TIE PRACTICE TP12447

EK-2260 B

Description and Installation Manual Issue 1-0 April 1981

This manual has been developed by TIE/communications, Inc. It is intended for the use of its customers and service personnel.

Any comments or suggestions for improving this manual would be appreciated. Forward your remarks to:

TIE/communications, Inc. 5 Research Drive Shelton, CT 06484

Attention: Manager, Technical Publications

The information in this manual is subject to change. While every effort has been made to eliminate errors, the company disclaims liability for difficulties arising from interpretation of the information contained herein.

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TIE's EK-2260B Key Telephone System is registered in accordance with provisions of Part 68 of the Federal Communications Commission's Rules and Regulations. Customers are advised that under FCC regulations the following provisions must be adhered to:

MEANS OF CONNECTION

Connection to telephone company lines must be made with FCC-approved plugs and jacks. Connections to TIE's EK-2260B system must be made with the RJ-21X standard connectors.

NOTIFICATION TO TELEPHONE COMPANY

Customers must give sufficient notice to the telephone company before connecting and disconnecting customer-provided equipment to telephone company lines. Customers must further advise the telephone company as to the particular lines affected and the FCC Registration Number and Ringer Equivalence Number of the equipment.

EK-2260B Registration Number:

BJ286G-67247-KF-E

EK-2260B ECOU-C/D Ringer Equivalence:

0.4B.

EK-2260 Power-Failure Telephone Ringer Equivalence:

1.5B

INCIDENCE OF HARM

The telephone company shall notify customers, where practical, in the event that customer-provided equipment causes harm to the telephone network of possible temporary discontinuance of service. In the event of such discontinuance of service, the telephone company must attempt to advise the customer prior to such discontinuance, afford customers an opportunity to correct the problem and advise customers of their right to bring complaint procedures before the FCC.

COMPATIBILITY TO TELEPHONE NETWORK

Customers shall be given prior notification of any alteration to telephone company equipment, operations or procedures which may be expected to affect customer-provided equipment operation.

RESPONSIBILITY TO GRANTEE

When power failure telephones are equipped in the system, installation and maintenance of the equipment are to be effected only by an authorized agent of TIE/communications.

Alterations or modifications of the equipment not expressly shown in TIE installation procedures are prohibited.

The customer is advised to disconnect the equipment from telephone company lines in the event of suspected equipment malfunction. Disconnections MUST be made at the RJ-21X connectors.

The TIE EK-2260B system is NOT authorized for use in coin or party line applications.

WARNING: This equipment generates, uses, and can radiate radio frequency energy. If not installed and used according to the manufacturer's instructions, this equipment may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device, in accordance with the specifications in FCC Rules, Part 15, Subpart J. These rules are designed to provide reasonable protection against such interference in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to radio or television reception. The user will be required to take the necessary steps, at his own expense, to correct any interference problems caused by this equipment.

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SECTION 1 - DESCRIPTIVE INFORMATION

1.00 INTRODUCTION

1.01 This section provides descriptive information on TIE's EK-2260B key telephone system.

1.02 The information provided in this section includes physical specifications, system capacities, DSS and intercom path data, power requirements, station loop data, environmental information, classes of service data, tone and lamp (LED) data, a list of system features, and a description of the system component circuits.

2.00 GENERAL

2.01 The TIE/communications EK-2260B is an electronic key telephone system which utilizes solid state space division switching, stored programs and multiple microcomputers for distributed control. Each telephone is equipped with a microcomputer for control and operation of the station, which also transmits the station status to the KSU on a real time basis.

2.02 The system operates on three pairs of wire which connect each telephone to the KSU.

2.03 All stations are arranged for "handsfree talkback" on internal calls and multiple path simultaneous handsfree intercom calling is provided.

2.04 The EK-2260B key system consists of the following major items:

- Key Service Unit (KSU).
- Power Supply.
- Multi-button key telephones.
- DSS console(s).

2.05 Installation of the system is simple and straight-forward. The KSU and power supply are mounted in the conventional manner, telephones and cables installed, C.O. lines and stations con-

nected to the system, and the circuicards plugged into the KSU. A minimum of option wiring and strapping is provided by the installer. Almost all options both system and individual station, ar performed by programming the microcomputers in the system from the DSS console. Information on this procedure if provided in the "Programming" section of this manual. Generally, there will be not need for the installer to 'open' the tell ephone set at the time of installation Stations which are to be equipped with speaker phones must have the speaker phone connected inside the telephone set. This information is provided in the "Speaker phone" section of this manual.

3.00 SPECIFICATIONS

3.01 Physical dimensions:

KSU

Height - 26.8 inches (68.1 cm)

Width - 23 inches (58.4 cm)

Depth - 11.5 inches (29.2 cm)

Weight - 87 pounds (39.5 kg)

Power Supplies

NTK- 2260B	H W D Wt	11.8 in. 16.1 in. 9.6 in. 66 lb.	(30 cm) (41 cm) (24.4 cm) (29.9 kg)
TUC 2260A	H W D Wt	12.6 in. 18.6 in. 9.5 in. 60 lb.	(32.0 cm) (47.2 cm) (24.1 cm) (27.2 kg)
TUC 2260B	H W D Wt	14.6 in. 20.8 in. 9.5 in. 65 lb.	(37.1 cm) (52.8 cm) (24.1 cm) (29.5 kg)
TUC BAT BOX	H W D Wt	12.1 in. 23.9 in. 9.3 in. 110 lb.	(30.7 cm) (60.7 cm) (23.6 cm) (49.9 kg)

Telephones

I-Type	H W D Wt	4.2 7.4 8.8 2.7	in. in.	(10.7 (18.8 (22.4 (1.22	cm)
W-Type	H W D Wt	4.2 9.9 9.0 2.7	in. in.	(10.7 (25.1 (22.9 (1.22	cm)

3.02 System Capacities:

- 3.03 The EK-2260B system has the following telephone, C.O. line, hotline and/or private line capacities:
 - Maximum 60 telephones or 59 telephones and 1 DSS console or 58 telephones and 2 DSS consoles.
 - 22 C.O. lines appearing at all telephones (square system) or 21 common C.O. lines and 5 private or hot lines or 20 common C.O. lines and 6 private or hot lines.
- 3.04 Each private line will appear at only ONE telephone. There will be no common audible and the line CANNOT be picked up by other stations or the DSS attendant.
- 3.05 Each 'hot line' will only appear at TWO telephones (each end of the hotline). Each hotline requires the use of an individual ECOU line circuit.

3.06 Intercom Paths:

3.07 The maximum number of intercom paths is 6. Each intercom path is arranged for handsfree talkback. All intercom paths may be in the talkback mode simultaneously.

3.08 DSS Positions:

- 3.09 The maximum number of DSS consoles which may be equipped is 2. Each equipped DSS console will reduce the number of telephones in the system by 1. Each DSS console will reduce the total number of intercom paths available by 1.
- 3.10 The DSS console functions with the standard system telephone. The console contains a busy lamp field which provides the attendant with the status of each station, DSS keys for direct access to the stations, paging access keys for access to both internal and external na-

ging zones plus all-call, night transfer of C.O. audible signals, message waiting control key, provision for signal calling when call-announcing is not desired, and provision for programming the system options.

3.11 When the system is equipped with 2 DSS consoles, one console will be designated as the primary console. All programming will be done from that console. The primary DSS is reached by dialling "0" and the other DSS is reached by dialling "9".

3.12 Power Requirements: (See also section 6.)

- 3.13 AC power requirements for the system are: 117VAC, +10%, 60 Hz, single-phase. 220VAC, +10%, 50 Hz, single-phase supplies are available also.
- 3.14 DC requirements of the system are provided by the power supply, as follows:

18V	at	14.5A	15 V	at	0.3A
5 V	at	6A	15 V	at	8.5A
24 V	at	1.5A			

3.15 Station Loop:

3.16 All telephones and DSS consoles in the system are connected to the KSU using three pairs of wire. The maximum length of the station loop is 1000 cable feet (24 ga.). Standard twisted pair (3-pair), inside wiring cable should be used. Standard, twisted pair, inside wiring cable may be used for distribution purposes. A 25-pair cable will serve 8 stations.

Note: Refer to ETL0026 (in front of manual) if job location may be subject to RFI problems.

3.17 Environmental Range:

3.18 The key service unit is designed to function over a temperature range of 32°F to 104°F (0°C to 40°C) and over a humidity range of 0% to 90% Relative. The unit may be stored between 150°F and -40°F (66°C to -40°C) at 0% to 90% relative humidity.

3.19 Dial Groups & Station Categories

3.20 The C.O. lines in the system may be divided into 2 groups (Dial Groups 1 & 2) so that stations may or may not have dial capability on certain lines in the system. Stations which are not

permitted to dial on a line will have access to the line through line key pickup, a transfer from another station, hold pickup, or the DSS attendant. This permits control of lines which are used for such services as In-WATS, 1-way-in trunks and tenant service. Stations which are permitted to dial in a group are programmed from the DSS console.

- 3.21 Dial Group 1 lines are the lower numbered lines in the system. Dial Group 2 lines are the higher lines in the system, except private lines. The division between Dial Group 1 and Dial Group is arbitrary and programmable. There is no toll restriction on lines in Dial Group 2.
- 3.22 The stations in the system may be divided into a maximum of 6 categories. This permits a wide variety of configurations which may exist between stations and dial groups. The categories are defined in the following paragraphs.
 - Category A stations: May dial on both dial groups with no toll restriction in either group.
 - Category B stations: May dial on Dial Group 1 lines with no toll restriction. May not dial on Dial Group 2 lines.
 - Category C stations: May dial on Dial Group 1 lines, subject to toll restriction. May not dial on Dial Group 2 lines.
 - Category D stations: May dial on both dial groups but is subject to toll restriction in Dial Group 1.
 - Category E stations: May dial on Dial Group 2 lines with no toll restriction. May not dial on Dial Group 1 lines.
 - Category F stations: May not dial on lines in either dial group. May make ICM calls only.
- 3.23 Station Class of Service:
- 3.24 Provision is made for programming for toll restriction. 8 classes of service are provided to separate toll, non-toll and no outside type stations. Classes 1 through 7 are permitted to dial programmed unrestricted codes. The clas-

- ses are (see also section 3, paragraph 2.06-39).
- Class 1 No dial restrictions.
- Class 2 Permitted codes only.
- Class 3 Permitted codes and local calls not exceeding 7 digits.
- Class 4 Permitted codes, local calls and 1+7-digit home NPA calls are permitted.
- Class 5 (ECPU-A & no EROU-A)
 No outside dialling permitted.

 Local calls and 1+7-digit toll calls.
- Class 6 Local calls not exceeding 7 digits.
- Class 7 No outside dialling except common unrestricted codes.
- Class 8 Only dialling on ICM lines is permitted.
- 3.25 Tone Signals:
- 3.26 The audible tone signals provided in the system are as follow:
 - C.O. Audible and Recall-530/660 Hz modulated at 16 Hz at a 1 second on/3 seconds off rate.

ICM Signal and Ring Back Tone-400 Hz at a 1 second on/3 seconds off rate.

Dial Tone- 400 Hz steady.

Slow Busy Tone-400 Hz at 60 IPM (ICM busy, Page busy, Station off-hook, MON in use).

Fast Busy Tone-400 Hz at 120 IPM (DND).

Preemption Tone-400/16 Hz at 60 IPM (to preempted party).

Splash Tone- 800 Hz. Microphone on - 1 splash. Microphone off - double-splash. Hotline- 5 short bursts of 800 Hz.

Alarm- 800 Hz at 240 IPM.

Paging- 400/16 Hz splash-tone.

3.27 Telephone Lamp (LED) Signals:

3.28 The visual lamp (LED) signals provided by the system to each telephone are:

C.O. LINE KEYIdle - LED not lit.
C.O. Incoming - LED flashes at 50 IPM.
Busy - LED lit steadily.
Hold - 100 IPM wink.
I-Hold or calls transferred from DSS - LED flutters at 300 IPM.
Exclusive Hold - Double wink.

ICM KEY-

Incoming (mic off) - LED flashes. Incoming (mic on) - LED flutters. Busy (I-have) - LED lit steadily.

HOLD KEY-Message waiting - LED flashes.

MON KEY

C.O. line in use - LED lit steadily.No C.O. line in use - LED flashes.

DND KEY -In use - LED lit steadily. Mic. mute - LED flashes.

3.29 At the DSS console, each DSS key provides the following indications:

Station off-hook - LED lit steadily. Message waiting - LED flashes. DND mode - LED flutters. ICM busy - LED winks. Station Monitor in use- LED winks.

4.00 FEATURES

4.01 The following features may be provided in the EK-2260B key telephone system:

a) Alarm Repeating:
Alarms from a customer-provided security system may be transmitted to all telephones within the system when the DSS console is NOT attended. If the console is attended, the alarm appears only at the console.

b) Alternate Point Answer:
This feature permits an intercom
call to be answered from a station
other than the called station.
This is accomplished by going offhook and dialling the called station's intercom number.

This is accomplished automatically if the DC loop is opened while the line is on hold.

d) Abbreviated (Repertory) Dialling:
This feature permits up to 16 frequently used numbers, up to 16 digits long (dial codes 10-25), to be stored in memory. Digits are programmed by the station user. A controlled pause may be stored when the system is used behind a PABX or on a private network. When a pause is programmed, the number of digits which may be stored is reduced by 1 digit for each pause. (Optional equipment feature.)

This feature provides the capability of adding other lines or stations to an existing call. When other parties are added to the call, an alert tone is heard. A maximum of three stations may be connected to a line. A maximum of two lines may be conferenced together.

Background Music:
Background music may be provided to stations and external paging zones. The music may be turned on or off at each station by depressing the number sign (#) key on the telephone dial (customer-provided music source required).

g) Dial Restriction:
See par. 3.19, Dial Groups and
Station Categories.

b) Distinctive Signaling:
 Different frequencies are used for
 C.O. audible and intercom signal ling (see par. 3.25).

Do Not Disturb: This feature is programmable on a station basis from the DSS console. The DND button at each station is a multifunction button. If the station is programmed for DND, depression of the DND button will activate the feature and the DND LED will light steadily. This turns off BGM, blocks all paging to the station, blocks all intercom calls and returns a fast busy signal to the calling party. Incoming C.O. signals will also be blocked if the DND button is depressed with the handset off-hook. The DSS attendant will be able to override the DND feature if the system is programmed for DSS over-If the DSS attendant overrides the DND condition, doublesplash tone will be heard and the station microphone is turned OFF automatically.

j) DTMF or Dial Pulsing: Either DTMF or dial pulse signalling may be used on the C.O. lines (equipment option).

k) Exclusive Hold:

This feature provides a distinctive visual indication and automatic recall. Depressing the HOLD button twice places a call on "Exclusive Hold". The call may NOT be picked up or removed from hold from any other telephone. insures that the call will not be accidentally dropped by another party. A distinctive double-wink LED visual signal is provided in the line button. Since calls placed on exclusive hold cannot be removed from hold by other stations, a recall signal is provided after a programmed period of time. This indicates to the station user that the call has been left on exclusive hold. The LED indication remains the same and the holding telephone receives C.O. audible signal. All other stations are still blocked from the call.

This is a programmable option. When this feature is used, the last C.O. line key on the telephone (CO22) is used for this pur-

pose. This reduces the number of C.O. line pickups by 1. The flash interval is timed by the microcomputer in the KSU (400 msec without an EROU, or 550 msec with ECPU-A/EROU-Aor ECPU-B). See Grounding Key also.

- m) Flexible C.O. Audible:
 3 different C.O. audible signalling modes may be programmed in
 the system:
- Common Audible: will ring for all C.O. lines (except private lines). A maximum of 10 stations may be assigned common audible signals.
- Group Signalling: Up to four ringing groups may be programmed. Lines must be assigned to a ringing group in sequence. A maximum of 10 stations may be assigned in a group. A station may be assigned to only one ringing group.
- Night Signalling:
 is controlled by the NT key at the
 DSS console. A maximum of 20 stations may be assigned to the night
 signalling group. These stations,
 and all other stations assigned to
 ringing groups during the day,
 will ring at night.

When 2 DSS consoles are equipped, the night transfer feature may be turned on or off from either console. An LED will light in the NITE transfer key when the system is in the NITE mode.

n) Grounding Key:
This feature is generally used when the system is installed behind a PABX which requires ground flash for transfer or operator recall. When this feature is used, the last C.O. line key is used for the grounding button (CO22). To provide this feature an EGDU-A card must be installed in the KSU (equipment option).

o) Handsfree Answer:
Intercom calls may be answered at
the called telephone without lifting the handset. All intercom
paths are arranged for handsfree
answer and all intercom paths may
be in the handsfree mode simultaneously.

p) Handsfree Dialling: See Monitoring.

q) Hotlines:

Two stations are permitted to be connected together on a 'hotline' basis. When one of these stations goes off-hook and the Hotline button is depressed, a distinctive signal is sent to the loudspeaker of the other station. To respond, the called station user must go off-hook and depress the Hotline button. The combination of Hotlines and Private lines may not exceed 6 in the system (equipment option, see par. 3.02).

r) I - Hold:

A single depression of the HOLD button will place a call on hold and provide a distinctive visual 'I-Hold' indication by the line key LED (flutter). The conventional 'wink' indication appears at all other telephones. The line may be removed from hold at any telephone.

s) Last Number Recall:

The last number dialled is stored in the telephone until another number is dialled. To redial the last number keyed, the user seizes a C.O. line and depresses the Dial Control key (DC) and then the asterisk key (*). When the system is installed behind a PABX, the system will generate a pause (3 seconds) after the access code.

t) Message Waiting:

This permits the attendant to cause the HOLD LED at a station to flash, indicating that the party has a message at the attendant's console. The station DSS key on the DSS console will also flash. The party may obtain the message by going offhook, depressing the ICM button, and dialling "1". The call will automatically be routed to the DSS console which activated the message waiting indicator (HOLD key).

u) Monitor:

This feature permits on-hook dialling or on-hook monitoring of a C.O. or ICM line. Operation of the MON button with no line seized will cause the MON LED to flash, indicating that the button had been depressed. In this mode, ICM calls are NOT blocked. The MON

LED will light steadily when the line key is depressed. In this state the line will be seized, ICM calls will be blocked and the calling party will receive busy tone. If the MON key is depressed while the station is off-hook, the transmission path is not transferred to the loudspeaker until the handset is returned to its cradle. The monitor feature is released when the MON key is depressed a 2nd time or the handset is lifted.

v) Music-On-Hold:

Synthesized music is generated by the microcomputer to provide music on C.O. lines placed on hold. A customer-provided music source (BGM source) may also be used for this purpose.

w) Paging:

Four internal and two external paging zones may be used in the system. Programming is accomplished from the DSS console. Stations in each internal paging zone must be consecutively numbered . Two external paging zones may be programmed also (equipment option). These zones will utilize customer-provided paging equipment. Each external zone may be programmed for Each external paging zone may be programmed to receive C.O. audible signals from a ringing group or NITE audible (see par. m, above). A maximum of 3 watts is provided for external paging, per Additional power requirements will require customer-provided amplifiers.

The system may be programmed for "Meet-Me-Answer" on paging. The paging party dials 8 + the zone number to page. If the paging party expects a response, the asterisk button (*) is depressed. This action removes the transmission path to the paging amplifier. To respond, the paged party goes to any telephone, in the zone, depresses the "8" key after lifting the handset, and is connected to the paging party.

Access codes for paging are 80 (AC), 81-84 (Int. Zones 1-4) and 85-86 (Ext. zones 1-2).

x) Power Failure Transfer: Power failure circuits may be provided with up to 5 power failure

telephones in the system. The telephones may be standard single line type or conventional multiline type sets for originating calls during a power failure. Incoming calls may be answered at certain 2260 telephones arranged for power failure operation. When conventional type telephones are used in the system, power failure bells must be used for each C.O. line serving the system (equipment option).

Tone or pulse type power failure telephones designed for use in the EK-2260 system may also be used. These telephones are designated I/W-2260-PFP (outpulse) and I/W-2260-PFT (tone).

- y) Privacy:
 Privacy is provided on both C.O.
 and ICM lines in the system.
- z) Private Lines:
 Up to 6 private lines may be provided. Each private line appears at one station only. The lines cannot be picked up at the DSS console and C.O. audible will only be transmitted to the private line station (equipment option).
- aa) Repertory Dialling: See Abbreviated Dialling.
- ab) Station Categories: Refer to par. 3.22.
- ac) Station Class of Service: Refer to par. 3.23.
- ad) Toll Restriction:
 See par. 3.23 and par. 5.00 in section -3.
- 4.02 DSS Features:
 (In addition to standard station features.)

Multiple DSS operation.
Automatic recall on unanswered calls (time programmable).
DSS Override (programming opt.).
Chain calling.
Signal calling.
Distinctive BLF indications (see par. 3.29).
Night Transfer (programmable).
Programming terminal.

5.00 SYSTEM COMPONENTS

- 5.01 TIE's EK-2260B key telephone system consists of the following components:
 - 1. EK-2260B KSU:
 Cabinet wired to accept all circuit cards required for system operation.
 - 2. EK-2260 Power Supply:
 Provides all power potentials required for system operation.
 - 3. Common Card Kit:
 Consists of 3 circuit cards;
 ECPU-A/B, EDTU-A and EICU-B.

The ECPU-A is the main central processing circuit card. The ECPU-B is the same as the ECPU-A, but also contains the program used in the EROU-A for toll restriction.

The EDTU-A contains its own microcomputer and controls all data transmissions between the telephones and the KSU.

The EICU-B is a 4-link intercom circuit card. It contains voice switching cicuits for handsfree talkback on all 4 links. This card also contains the tone matrix for the 4 links.

- 4. ECMU-A:
 EK-2260 basic memory circuit card containing repetory dialling memory for 60 stations. Used in place of the ECMU-C. Maximum 1 per system.
- 5. ECMU-C:
 Basic memory circuit card. One required per system. See also ECMU-A.
- 6. ECOU-C:
 Four circuit CO/PBX line card.
 Maximum 7 cards per system. See card selection guide.
- 7. ECOU-D:
 Two circuit CO/PBX line card.
 Used as expansion cards in the system. See card selection guide.
- B. EGDU-A:
 Provides for flashing ground on up
 to 26 C.O. lines when the system
 is installed behind a PABX.

9. EPFU-A: Power failure transfer circuit for C.O. lines.

10. EPGU-C The external paging circuit card includes two 3-watt amplifiers for 2 external paging zones. Also provides auxiliary control relays for external amplifiers.

This unit IS required for toll restriction in a system equipped with an ECPU-A card. This card IS NOT used in systems equipped with an ECPU-B. This card contains the toll restriction program. One is required per system with toll restriction

12. ESTU-C: Four station interface circuit card. Maximum 15 cards per system.

13. ESTU-D: Two station interface card.

14. ETSU-C: Dial pulsing sender card required in addition to ETSU-E for dial pulsing on C.O. lines when the system is equipped with more than 14 CO/PBX lines. See card selection guide.

DTMF tone sender used when DTMF signalling is required on the C.O. lines. This card contains the DTMF and system tone sources. DTMF tones are not generated by the dials of the telephones in the system. Maximum 1 per system.

16. ETSU-E: Dial pulse (DP) sender used when dial pulses are required on the C.O. lines. This card also contains the system tone sources. Maximum 1 card per system.

17. EXPU-A: 60 x 8 matrix expansion circuit card. Required when more than 12 C.O. lines are used in the system, when ad-

CIRCUIT CARD SELECTION GUIDE

			,			· · · · · · · · · · · · · · · · · · ·	·	
COMMON	HOTLINES	 ,~.	500		-v-		ETSU-	CARDS
C.O.	OR PRIVATE	LINES	ECOU -C	ECOU	EXPU -A	EXPU -E	ROTARY	TONE
	LINES	LINES					-E/C	TONE -D
		 	 	 			 	
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1-4	1 or 2	6		1	2	i	_	i
	3 or 4	6		0	1 2	0	*	
	5 or 6	4	1	1.	1	ò	-E&C	
	70.0	6 4	2	<u>'</u>	2	0		
	0	6		0		1	-E	
	1 or 2	4		1	1	0		
5-8		6			2	0	*	
	3 or 4	6		0	2		-E&C	
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		4	3		2	0		
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	1 or 2	6		-1	2	0		,
9-12	3 or 4	4		0	1	ò	*	
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Not recommended because some stations will not have access to all common C.O. lines.

^{*} ETSU-C is required in all systems with D.P. lines and 1 or more private lines.

ding private or hotlines or when adding 2 additional intercom links. Maximum 2 cards per system. See card selection guide.

18. EXPU-E:
Intercom expansion card circuit.
Adds 2 intercom links to the system. Contains a 60 x 2 matrix and 2 voice switch circuits. Maximum

1 per system. See card selection guide. EXPU-A required also.

19. Telephones and Consoles:

I-2260 key telephone set complete with keypad and faceplate.

I-2260-PFP pulse type power failure key telephone set complete with keypad and faceplate.

I-2260-PFT tone type power failure key telephone set complete with keypad and faceplate.

I-2260 DSS console.

W-2260 key telephone set complete with keypad and faceplate.

W-2260-PFP pulse type power failure key telephone set complete with keypad and faceplate.

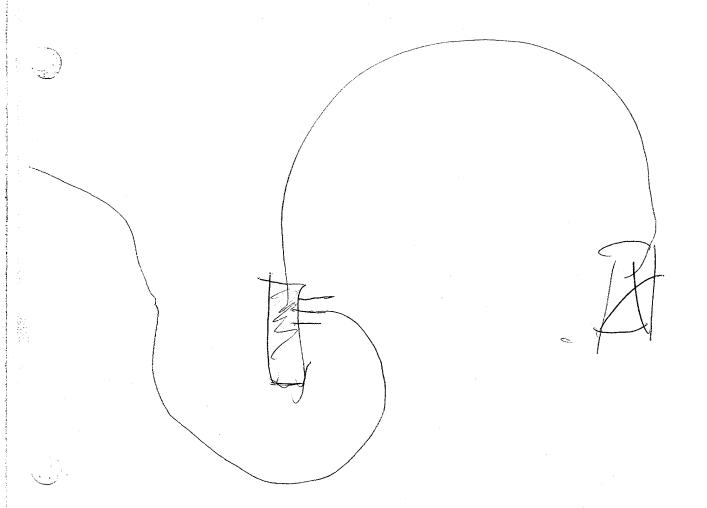
W-2260-PFT tone type power failure key telephone set complete with keypad and faceplate.

W-2260 DSS console.

402 SPU: External speakerphones.

20. Miscellaneous Equipment:

BE-5 External Ringer: Used for C.O. audible during power failure conditions. Each ringer serves 5 C.O. lines.





SECTION 2 - INSTALLATION PROCEDURES

1.00 INTRODUCTION

- 1.01 This section provides installation details for the EK-2260B system. KSU mounting, circuit card installation, station installation and power supply installation details are provided.
- 1.02 DO NOT use this manual for installation of TIE EK-2260-A systems. This manual should only be used for EK-2260B KSU's with 600 ohm cards.
- 1.03 Programming for the system is covered in section 3 of this manual.

 Operational Tests are detailed in section
 4; E-402/E-404 Speakerphone Installation, in section 5.

2.00 INSTALLATION - GENERAL

2.01 The following paragraphs detail installation of the EK-2260B key service unit.

A grounded wrist strap (for static protection) must be used when working on the KSU or installing, removing or handling circuit cards. (Wrist strap #2064 is available from the 3M Company.)

2.02 Selection of Equipment Location:

- 2.03 Considering the factors listed below, select a suitable site for installation of the KSU and power supply.
 - The KSU and power supply are designed for wall-mounting only.
 - b) Availability of a separately fused 117VAC, +10%, 60 Hz, single-phase, 3-wire (parallel blade and ground) power outlet. Refer also to par. 2.11, 2.16 and 2.36.
 - c) Location of the CO/PBX line terminations. The system utilizes two 25-pair cables for connection to telephone company lines. The cables plug into FCC-approved RJ-21X (USOC code) connectors placed by the telephone company at

- the location specified by the installer (at least to within 25 feet of the KSU).
- d) Location of the majority of stations. The practical objective of equipment location is to minimize cable runs.
- e) Location of telephone ducts or conduit, if provided.
- f) A well-ventilated area having a temperature range of 32°F to 104°F (0°C to 40°C) and a humidity range of 0% to 90% Relative, is recommended.
- g) A good earth ground must be provided, using 14-gauge or larger wire. A cold-water pipe, with insulated joints or meters bypassed with 14-gauge or larger straps, will generally provide a suitable ground.
- h) Availability of space to allow for accessing and servicing the equipment.
- i) Consideration should also be given to the following:

Lighting.
Flammables in the area.
Flooding possibility.
Moving machinery or equipment.

2.04 KSU Mounting:

- 2.05 The EK-2260B KSU is designed for wall-mounting only.
- 2.06 Figures 1A and 1B show the recommended layouts of the KSU site. Figure 2 shows the KSU cable connector arrangement. The power supply is mounted below the KSU. At least 12 inches of space should be provided between the KSU and the power supply. Cables from the telephones are terminated on station blocks to the right of the KSU. The station blocks are connected to the KSU via 25-pair cables. Bridging clips are used to connect the KSU side of the block to the station side. This permits the station leads to be opened for testing or troubleshooting purposes.

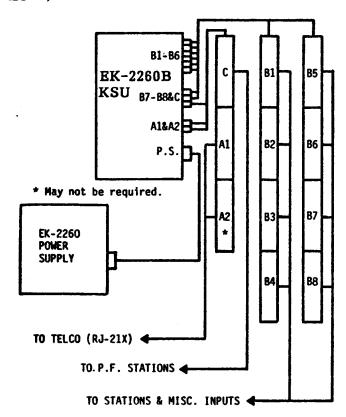


Figure 1A - KSU Site Layout (with P.F. Circuits)



When a concrete, masonry, or damp surface is selected for the KSU mounting site, the KSU MUST be mounted on a customer-provided backboard.

- 2.07 On the surface to which the KSU is to be mounted, locate four points which correspond to the mounting holes. In figure 3 are shown the dimensions between the centers of the mounting holes.
- The method of fastening the KSU to the mounting surface will depend upon the type of mounting surface. Attach the mounting brackets to the sides of the KSU as shown in the figure. Using suitable fasteners, secure the KSU to the mounting surface. A fully loaded KSU weighs approximately 87 pounds.

2.09 Power Supply Mounting:

2.10 The power supply is designed for wall-mounting only. For installation details on the battery backup supply, refer to section 6B. If TUC 2260A or 2260B supply is used and permanent AC connection is required, refer to section 6B or 6C for connection details.

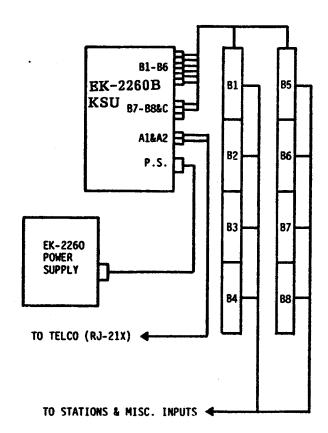


Figure 1B - KSU Site Layout without P.F. Circuits)

Note: When permanent AC wiring is desired, an electrician should perform the required wiring.

- 2.11 It is recommended that the power supply be mounted at least 12 inches below the KSU. The power supply cable connectors are located on the right side of both the KSU and the power sup-The power supply has a 6-foot AC power cord. Refer to figures 1 and 2.
- 2.12 On the surface to which the power supply is to be mounted, locate four points which correspond to the mounting holes in the flanges of the power supply. Figure 4 shows the dimensions between mounting hole centers for the power supply.
- 2.13 Using suitable fasteners, secure the power supply to the mounting surface. The power supply weighs approximately 66 pounds.

2.14 Grounding the System:

2.15 After the KSU and power supply have been mounted, the KSU MUST be properly grounded.

15 3/4"

MOUNTING BRACKETS -

21 9/16*

Do NOT use the 3rd wire (Green) of the AC line cord for earth ground.

- It is recommended that the AC ser-2.16 vice outlet used for the power supply be the 3-wire type (parallel blade and ground). A 3-wire to duplex adapter should NOT be used. See also par. 2.36.
- An additional earth ground must be provided for proper operation of the system. In most installations; a metallic cold-water pipe will provide a good earth ground. The installer should check that the cold-water piping is metallic throughout and has no joints or sections of non-metallic pipe. If the cold-water piping system is found to be inadequate for grounding purposes, an alternate grounding means must be used.
- The grounding wire used should be 2.18 as short as possible and 14-gauge or larger. This wire should be connected to the grounding lug located on the right side of the KSU and at the rear of the power cable connector.

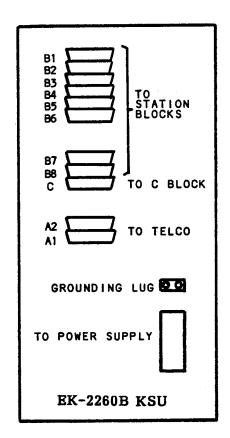


Figure 3 - KSU Mounting Arrangement

A = 21 21/32" B = 20" 9 7/8"

Figure 2 - KSU Connector Arrangement

Figure 4 - Power Supply Mounting Centers

A = NTK PSC Supply B = TUC 2260A Supply

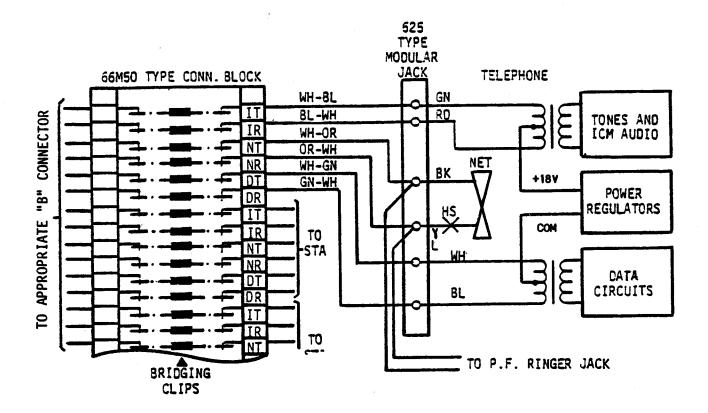


Figure 5 - KSU to Station Wiring

2.19 Station Block Mounting:

- 2.20 As shown in figure 1, station blocks (66M50 type) are recommended for station cable, DSS console cable, external paging, BGM and alarm terminations. These blocks will permit access to the leads, by using bridging clips, for testing and/or troubleshooting without the need to disconnect and reconnect leads. See figure 5 also.
- 2.21 Connections between the station blocks and the KSU block are accomplished using 25-pair cables. D-ring wire runs should be established for routing the cables between the blocks and the KSU.
- 2.22 Eight station blocks will be required as shown in figure 1. The assignment of stations to the blocks is as follows:
 - B1 block stations 20 through 27 B2 block stations 28 through 35

B3 block - stations 36 through 43
B4 block - stations 44 through 51
B5 block - stations 52 through 59
B6 block - stations 60 through 67
B7 block - stations 68 through 75
B8 block - stations 76 through 79
plus the external paging, BGM
source, and alarm connections.

2.23 Station Cabling:

- 2.24 Each station in the system requires three twisted pairs of wire between the station and the KSU. Cable limit between the station and the KSU is 1,000 cable feet for 24-gauge wire. See table 2 for cable terminations; terminate as shown in figure 5.
- 2.25 Industry standard twisted pair inside wiring cable should be used. Do not use random twisted station wire. Distribution cables may be used with distribution boxes. 3-pair or 4-pair twisted station wire is recommended for use between the station blocks or distribu-

tion boxes and the telephones. 24-gauge wire should be used for this purpose.

Note: Refer to ETL0026 (in front of manual) if job location may be subject to RFI problems.

2.26 The station wire should be terminated at the station location in a 625A2 or 625F2 (6-wire) type modular jack, or equivalent. All telephone sets are equipped with modular plugs. jacks will be required at the station location if the station requires a power failure ringer (refer to par. 2.29).

For proper operation of the system, and to avoid time-consuming troubleshooting during the testing of the system, it is important that pair-for-pair connections be maintained and polarity of pairs be observed at ALL locations where wire terminations or cross-connections are made. See par. 3.17 before terminating cables.

- 2.27 Station Installation: (I/W-2260 type sets)
- 2.28 There is no need for the installer to open the telephone set at time of installation unless an E-402 or E-404 Speakerphone is to be installed. to section 5 of this manual for speakerphone installation instructions. stall the telephone, simply plug in the set. Refer to figures 14 and 15 for telephone key arrangements.

I/W-2260-PFP/PFT power failure telephones are installed in the same manner as I/W-Simply plug the set into its 2206 sets. modular jack. See par. 3.22 for P.F. cross-connection details

- 2.29 Power Failure Station Ringer: (Used only with conventional type telephone sets)
- 2.30 If the station has a private line, or is to be an "answer only" station on one of the C.O. lines serving the system, a power failure ringer may be desired at the station location. A Proctor single line electronic ringer (Proctor #43732) or any other FCC approved single line high voltage (40-150VAC) ringer may be used. The ringer should be suitable for wall-mounting and equipped with a modular plug.

- 2.31 The ringer should be connected to the 2nd pair (white-orange) of the station cable. Two modular jacks should be installed at the telephone location; one jack for the telephone and the other for the ringer. Refer to figure 5.
- The power failure ringer will only ring during power failure condi-Incoming calls may be answered at the telephone. NO calls may be originated from the station. If the handset is lifted during the power failure condition, the user will receive a dial tone; but dialling will be ineffective. Refer to par. 2.33 for "Outgoing Power Failure Station" installation. Refer to par. 3.04 for power failure connections at the KSU.
- 2.33 Outgoing Power Failure Stations: (Conventional type telephones)
- I/W-2260 telephone sets cannot be 2.34 used to originate calls on C.O. or private lines during a power failure condition. It is recommended that multibutton key telephones of the conventional type be installed for this purpose. number of line pickups will depend upon the number of C.O. lines to be used for outgoing calls during a power failure condition. If the lines are also to be used for incoming calls, TIE's BE-5 ringer is recommended for the incoming C.O. audible function. The BE-5 contains 5 ringers and 5 neon lamps for visual indication of the ringing line. Five pairs are required between the BE-5 and C1 block at the KSU.
- Stations which are to be used for outgoing calls during a power failure should not be connected to the NT/NR leads of I/W-2260 "answer only" stations.
- 2.35 It is recommended that the multi-button "outgoing" sets and the BE-5 ringers be located at a central location to avoid confusion as to which lines are being used, which lines are ringing, and which lines are idle. pair for each C.O. line will be required between the telephones and the C1 block. Refer to par. 3.04 for power failure connections at the KSU.
- 2.36 TII[®]#428 Surge Protectors:
- 2.37 All EK-2260B installations should be equipped with power line surge protection devices. The TII #428 Plug-In

Iss 1, SECTION 3579-2

Powerline Surge Protector is a self-contained unit which plugs into a standard 3-prong grounded 117VAC wall-outlet. The system power supply should be plugged into the duplex receptacle on the surge protector. A cover plate screw holds the TII #428 unit in place.

- 2.38 The unit contains a long-life pilot lamp which glows when normal AC line voltage is present and extinguishes when power is off or during power line surges. The TII #428 unit contains a gas tube surge protector which operates at 300 V or higher potentials. MOV voltage clamping diodes are connected across the output to reduce low-level transients and ripple effects. The unit measures 4.9 x 3.3 x 3 inches and weighs 10 oz.
- 2.39 The TII #428 unit is available from TII Industries, Inc. or from the telephone-equipment supply houses.

2.40 Card Vintage Information:

2.41 The circuit cards and assemblies used in EK-2260 systems are identified by a circuit designation or number, a revision letter, an issue number and a manufacturing date. A brief description of the guidelines governing the changes of the above listed items follows: (See example #1)

a) Revision Letter:

The revision letter is updated whenever a change to the circuit adds a major feature or changes the circuit so that it is no longer compatible with other revisions.

b) <u>Issue Number:</u>

A change in the issue number occurs whenever a circuit change requires a change to the schematic.

c) Manufacturing Date:

The manufacturing date identifies the month and year of manufacture. This may also be used to identify minor component changes or mechanical changes which do not affect the function of the component.

d) Program Change (See example 2):

Because the operating program is contained in pluggable ROM ICs, special consideration must be given to these devices.

Mask ROMs have a unique identification number which is specified in the parts list of the associated circuit card.

Programmable ROMs are presently identified by chip location and program revision letter. Changes are being implemented so that the marking on the ROM will identify the following:

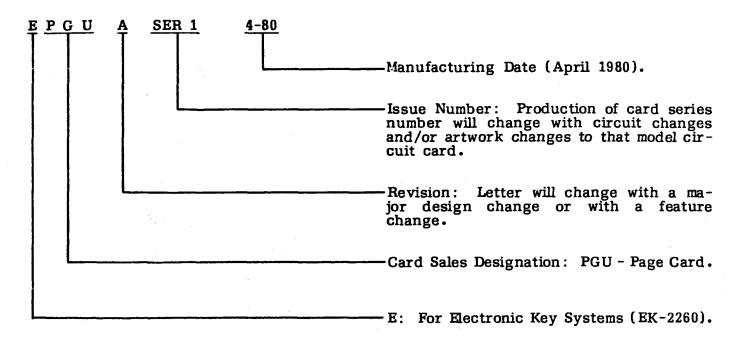
System or product identification code.

Designation of the card in which the ROM is used.

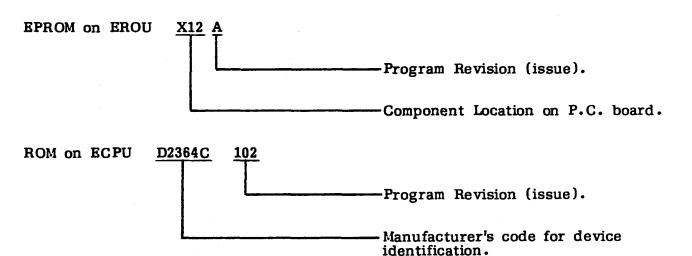
Location of the ROM socket.

Revision level of the program.

EXAMPLE #1



EXAMPLE #2



3.00 SYSTEM CONNECTIONS

3.01 The following paragraphs detail the connections which are required between the KSU and the telephones, the C.O. line connections, power failure connections, and the miscellaneous connections required by optional external equipment.

3.02 C.O. Line Connections (Systems WITHOUT Power Failure Circuits):

3.03 On the right side of the EK-2260B KSU are two 25-pair Amphenol type connectors for connection to telephone company lines. 25-pair cables must be connected to the telephone company connectors (USOC code, RJ-21X) in accordance with FCC rules, part 68, as the entrance point for the C.O. lines. Lines 1 through 25 enter the KSU in the first cable. Line 26, when required, enters in the second cable. Refer to table 1.

3.04 C.O. Line Connections (Systems WITH Power Failure Circuits):

3.05 A maximum of 5 power failure C.O. lines may be provided in the EK-2260B system.

According to FCC rules, part 68, when power failure circuits are installed in the EK-2260B system, the system must be installed and maintained by an agent of TIE/communications, Inc. Power failure circuit installation may be subject to inspection by the telephone company in accordance with the above stated rules.

3.06 Material required for power failure connections:

66M50 type connecting block equipped with 1 male (blue) and 1 female (red) connector. If line 26 is used as a power failure line, the second block ("A2") must be equipped.

89-type mounting bracket(s).

66MC connecting block cover(s).

One or two 25-pair cables, connector ended, male (blue)/female (red), length as required.

3.07 When power failure circuits are required in the EK-2260B system,

the 25-pair RJ-21X connector provided by the telephone company must be plugged into the male (blue) side of a 66M50-type connecting block equipped with "Amphenol 57 series" connectors. The female (red) side is connected to the "A" connector of the KSU with a connector ended (red/blue) 25-pair cable. This is in accordance with FCC rules, part 68. The "A" connecting block must be mounted on an 89-type bracket and equipped with a 66MC cover. The 25 pairs (50 clips) on the "A1" block are used for the first 25 C.O. lines. See table 1.

		• [BLOCK	A1	BLOCK	A2
CONN PIN	CABLE COLOR	CLIP	CIRCUIT NUMBER	LEAD DESIG	CIRCUIT NUMBER	LEAD DESIG
26 1	WH-BL BL-WH	1 2	C.O.#1	1T 1R	C.O.#26	26T 26R
27 2	WH-OR OR-WH	3 4	C.O.#2	2T 2R		
28 3	WH-GN GN-WH	5 6	C.O.#3	3T 3R		
29 4	WH-BR BR-WH	7 8	C.O.#4	4T 4R		
30 5	WH-SL SL-WH	9 10	C.O.#5	5T 5R		
31 6	RD-BL BL-RD	11 12	C.O.#6	6T 6R		
32 7	RD-OR OR-RD	13 14	C.O.#7	7T 7R		
33 8	RD-GN GN-RD	15 16	C.O.#8	8T 8R		L
34 9	RD-BR BR-RD	17 18	C.O.#9	9T 9R	NOTE LINES 2	3-26
35 10	RD-SL SL-RD	19 20	C.O.#10	10T 10R	MAY ONL USED PRIVA	AS
36 11	BK-BL BL-BK	21 22	C.O.#11	11T 11R	LINE	
37 12	BK-OR OR-BK	23 24	C.O.#12	12T 12R		
38 13	BK-GN GN-BK	25 26	C.O.#13	13T 13R		
39 14	BK-BR BR-BK	27 28	C.O.#14	14T 14R		
40 15	BK-SL SL-BK	29 30	C.O.#15	15T 15R		
41 16	YL-BL BL-YL	31 32	C.O.#16	16T 16R		
42 17	YL-OR OR-YL	33 34	C.O.#17	17T 17R		
43 18	YL-GN GN-YL	35 36	C.O.#18	18T 18R		
44 19	YL-BR BR-YL	37 38	C.O.#19	19T 19R		
45 20	YL-SL SL-YL	39 40	C.O.#20	20T 20R		
46 21	VI-BL BL-VI	41 42	C.O.#21	21T 21R		
47 22	VI-OR OR-VI	43 44	C.O.#22	22Ť 22R		
48 23	VI-GN GN-VI	45 46	C.O.#23	23T 23R		
49 24	VI-BR BR-VI	47 48	C.O.#24	24 T 24 R		
50 25	VI-SL SL-VI	49 50	C.O.#25	25T 25R		

Table 1 - A Block Layouts

- When required, the second block ("A2") must be added if the 26th line is to appear at a power failure station.
- If the 26th line is not required at a power failure station, the "A2" cable (RJ-21X) is plugged directly into the KSU.
- 3.08 Refer to par. 3.22 for C.O. line connections in systems equipped for power failure.

Private C.O. Line Connections: 3.09

- 3.10 When private C.O. lines are to be used, a maximum of 6 may be provided. The following rules apply: 21 common C.O. lines and 5 private or hotlines or 20 common C.O. lines and 6 private or hotlines. (Refer to par. 4.28.)
- 3.11 It is recommended, when private lines or hotlines are to be used, that the private or hotlines be put in service in reverse order (e.g., line 25, 24, 23, 22, 21, and line 26 last). This Lines 21 simplifies expansion later on. through 26 may be used as private lines. Refer to table 1.

3.12 C.O. Line Connections (Non-power-failure lines)

- 3.13 Table 1 shows the layout of the KSU "A" blocks. In systems equipped with EPFU cards, lines which are NOT connected to power failure circuits must be strapped with bridging clips on the "A" block. See figure 6.
 - If the 26th line is not required at a power failure station, the "A2" cable (RJ-21X) is plugged directly into the KSU.
- 3.14 When power failure circuits are not used, no installer wiring is required to connect the C.O. lines to the ECOU circuits. The ECOU circuit designations are as stated under par. 4.24 or 4.25.

3.15 Station Connections (Non-power-failure stations)

3.16 Six connections (3-pair) are required between the station block and the station. These are leads IT, IR, NT, NR, DT and DR. The station block terminations are shown in table 2.



Before terminating the stations, the DSS station number must be decided upon. The DSS station CANNOT be assigned numbers 51 and 79 in the system. The DSS console will be assigned the next station num-ber. For example, if the DSS sta-tion number is 20, the DSS console number will be 21. Connection details for the DSS console are described in par. 3.19.

- Connect the non-power-failure stations to the "B" blocks. Observe 3.17 polarity on all six connections.
- 3.18 Insert bridging clips as shown in figure 5 for all stations.
- DSS Console Connections: 3.19
- 3.20 DO NOT cross-connect the NT/NR leads from the DSS console to the NT/NR terminals on the "B" block. Con-(see table 2). Use a full pair. For convenience, LGD appears on clips 49 & 50 of blocks B1 through B7 plus clips 37-40 on block B8. nect the NT/NR leads to the LGD terminals
- Connect the IT/IR and DT/DR leads 3.21 to the IT/IR and DT/DR terminals on the "B" block, as for all other stations.
- 3.22 C.O. Line Connections (To power-failure stations)
- 3.23 Each C.O. line which is to appear at a power-failure station must be connected to an EPFU-A circuit. These connection points are located on the "C" block. See table 3 and figure 6.

Note: All C.O. lines do not require P.F. Non-powercross-connections. failure lines should be connected per par. 3.13.

- Using table 3, cross-connect the C.O. lines to the P.F. units. The 3.24 connections are shown in figure 6.
- "Answer Only" Power-Failure Sta-3.25 tion Cross-Connections:
- When I/W-2260 telephones are as-3.26 signed as "answer only" power-failure stations, they must be cross-connected to the STA#T & STA#R leads of the "C" block.

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88	LEAD De Sig	FRF8P8	FRFRPR	ニボドボアス	TRP&P&	11 27 2 2 2	ALT ALR 152 253 252	<u> </u>		
BLOCK	STATION NUMBER	STA 76	STA 77	STA 78	STA 79	EXT PAGE 1 EXT PAGE 2 BGM SOURCE	ALARM PAIR EXT PAGE 1	055 # 1 055 # 2		
8	LEAD DE SIG	=== % P&	-=	-= 25222		######################################			FRF8P8	091 091
BLOCK	STATION NUMBER	STA 68	STA 69	STA 70	STA	STA 72	STA 73	STA 74	STA 75	DSS CONSOLE
88	LEAD DES1G	######################################	-=F & P&	FRFRP8	にまざれてみ	FRFRPR	rap a pa Farapa	TRINKTR T	TRP R PR	ജ
BLOCK		STA 60	STA 61	STA 62	STA 63	STA 64	STA 65	STA 66	STA 67	DSS
88	LEAD DESIG	======================================	-= F #28	== F£ 28	==F#28	F=##P#	==₽ % ₽&	TRF#P8	TRP&PQ	097 097
BLOCK		STA	STA	STA STA	STA 55	STA 56	STA 57	STA 36	STA 59	CONSOLE
番	LEAD DES16	≓≅₽ ₹ ₽8	-== 5 28	FRFRPR	==F\$P\$	FRF8P8	FRFRPR	FRFRPR	듀듀주 孫 무였	99 99
BLOCK		STA 44	STA 45	STA 46	STA 47	STA 48	STA 49	STA 50	STA 51	DSS CONSOLE
83	LEAD DES1G	ニボドボアの	⋍⋍⋡⋭	_==F\$P8	######################################	≓≅₽æ₽æ	⊏≅₽ã₽程	FRPRPR F	_ _	99
BLOCK		श्रुष	STA	STA BE	STA 39	STA 40	STA 41	STA 42	STA 43	DSS CONSOLE
28	LEAD DES16	≓≅ĕ≅₽%	===5528	== F #5	== 5 228	FRFRPR	FRFRPR	드로 프로 무운	⊏≅₽ % ₽%	<u> </u>
BLOCK	STATION NUMBER	% ₩	Sa.	ST &	STA	STA X2	STA	ST A	STA	DSS CONSOLE
120	LEAD DESIG	≓≅₽₹₽₽	= <u>=</u> £\$58	== 5 25	== 5 228	⊏≅₽ % ₽8	⊨≅₽ % ₽&	≓≅₽₹₽器	-~F\$	~
BLOCK		R A	STA 21	ST Z	STA 23	STA 24	SIA	83.4¥	STA Z7	CONSOLE
	G.P	-4m4m6	-e-2=2	<u> </u>	28222 ¥	びまけまける	<u> </u>	288844	244444 24744	502
•	CABLE	 	주목 주 일 등 일 등 일 등 일 등 일 등 일 등 일 등 일 등 일 등 일	888 <u>8</u> 88 88888	፟ጜጜ ጞ ፞፞፞ቔቜ ጜ፞፞፞፞ቔ፞፞፞፞፞ቛ፞ቝ፞ዿ፞፞፞፞ቝ	ጞኇቑቔጞ ኇቑቘቑጜ፞ዿ	<u> </u>	72-98 87-72 81-72 81-72 81-41	8-8-8-8 -8-8-8-8 -8-8-8-8	VI-5L SL-VI
	NNS.		1	27~23.e.¥.o.		i		40 0 8842		1

From forther Table 2 - Station (B) Block Layouts

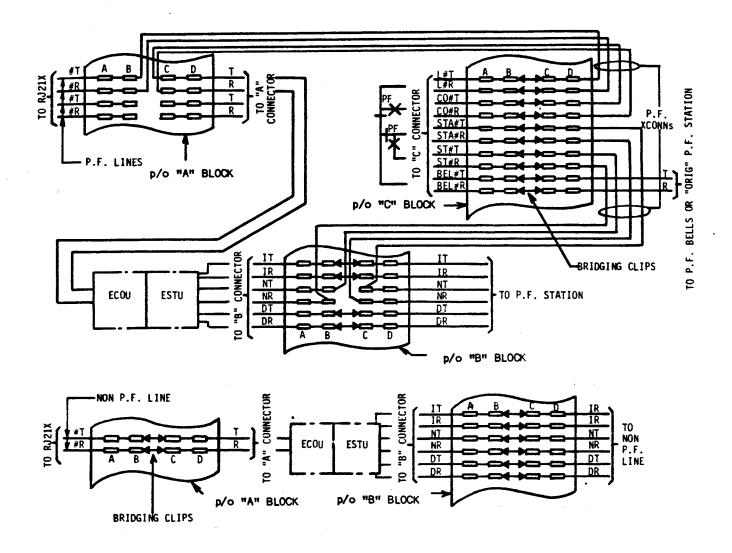


Figure 6 - Power Failure Connections



Only ONE I/W-2260 telephone may be assigned to a C.O. line. Stations with private lines should be cross-connected to that line.

- 3.27 Cross-connect the ST and STA leads in accordance with table 3. These cross-connections are shown in figure 6.
- 3.28 Connect the IT/IR and DT/DR leads from the P.F. stations to the "B" blocks as for all other stations.
- 3.29 P.F. Bells or P.F. "Originating Only" Stations Connections: (Conventional type telephones)
- 3.30 Power failure bells or power failure "originating stations" may be

provided. An EPFU-A circuit card must be equipped if this feature is required.

- 3.31 Power failure bells or "originating stations" require one pair of leads (BEL#T/BEL#R) from the "C" block to the bell and/or pickup. As stated under par. 2.35, these bells and/or telephones should be located in a centralized area.
- 3.32 TIE's BE-5 ringer is recommended for visual and audible indications of an incoming call during a power failure condition. One BE-5 is required for every 5 lines.
- 3.33 Connect the bells and/or pickups as indicated in table 3 and figure
 6. See par. 2.27 when I/W-2260-PFP/PFT telephones are used.

						BLOCK C1
	CONN PIN	CABLE COLOR	CLIP	CIRCUIT NUMBER	LEAD DESIG	COMMENTS (See figure 6)
	26 1 27 2 28 3 29 4 30 5	WH-BL BL-WH WH-OR OR-WH WH-GN GN-WH WH-BR BR-WH WH-SL SL-WH	1234567890	P.F. #1	LIT LIR COIR STAIT STAIR STIR STIR BELIT BELIR	Xconn to B clips on A1 block for 1st P.F. line. Xconn to C clips on A1 block for 1st P.F. line. Xconn to C clips on B block for 1st P.F. station. Xconn to B clips on B block for 1st P.F. station. To 1st P.F. originating station or ringer.
	31 6 32 7 33 8 34 9 35	RD-BL BL-RDR RD-RDR RD-RDR RD-RDR RD-RDR RD-RD-RDR RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD RD-RD-RD RD-RD-RD RD-RD-RD RD-RD-RD-RD RD-RD-RD-RD-RD-RD-RD-RD-RD-RD-RD-RD-RD-R	11 12 13 14 15 16 17 18 19 20	P.F. #2	L2T L2R C02T C02R STA2T STA2R ST2T ST2R BEL2T BEL2R	Xconn to B clips on A1 block for 2nd P.F. line. Xconn to C clips on A1 block for 2nd P.F. line. Xconn to C clips on B Block for 2nd P.F. station. Xconn to B clips on B block for 2nd P.F. station. To 2nd P.F. originating station or ringer.
	36 11 37 12 38 13 39 14 40 15	BK-BL BL-BK BK-BK BK-GN BK-BK BK-BK BR-BK BK-SL SL-BK	21 22 23 24 25 26 27 28 29 30	P.F. #3	L3T L3R C03T C03R STA3T STA3R ST3T ST3R BEL3T BEL3R	Xconn to B clips on A1 block for 3rd P.F. line. Xconn to C clips on A1 block for 3rd P.F. line. Xconn to C clips on B block for 3rd P.F. station. Xconn to B clips on B block for 3rd P.F. station. To 3rd P.F. originating station or ringer.
11 11	41 16 42 17 43 18 44 19 45	YL-BL BL-YL YL-OR OR-YL YL-GN GN-YL YL-BR BR-YL YL-SL SL-YL	31 32 33 34 35 36 37 38 39 40	P.F. ∦4	L4T L4R CO4T CO4R STA4T STA4R ST4T ST4R BEL4T BEL4R	Xconn to B clips on A1 block for 4th P.F. line. Xconn to C clips on A1 block for 4th P.F. line. Xconn to C clips on B block for 4th P.F. station. Xconn to B clips on B block for 4th P.F. station. To 4th P.F. originating station or ringer.
	46 21 47 22 48 23 49 24 50 25	VI-BL BL-VI VI-OR OR-VI VI-GN VI-BR BR-VI VI-SL SL-VI	41 42 43 44 45 46 47 48 49 50	P.F. #5	L5T L5R C05T C05R STA5T STA5R ST5T ST5F BEL5T BEL5T BEL5R	Xconn to B clips on A1 block for 5th P.F. line. Xconn to C clips on A1 block for 5th P.F. line. Xconn to C clips on B block for 5th P.F. station. Xconn to B clips on B block for 5th P.F. station. To 5th P.F. originating station or ringer.

Refer to Figure 6, Power Failure Connections.

Table 3 - Power Failure Block (C) Layout

- 3.34 Background Music (BGM) Connections:
- 3.35 When background music (BGM) or music-on-hold (MOH) is required, a customer-provided music source must be provided (the internal synthesized music source may be used for MOH). The source may be a radio, tuner, tape deck, pipedin music, etc.
- 3.36 BGM provides music through the loudspeakers in the telephones of the system. Music may also be provided through the paging system (programmable).

- 3.37 The music source should have an adjustable output level and an output impedance of 600 ohms or less.
- 3.38 The output from the music source should be connected to clips 29/30 of the B8 block. Shielded wire should be used between the music source and the station block and the shield should be grounded at the source end. Install bridging clips on the B8 block.
- 3.39 External Paging Zone Connections:
- 3.40 A maximum of two external paging zones may be provided. Each zone

has a maximum output power of 3 watts. If more than 3 watts are required in a zone, customer-provided amplifier(s) will be required.

- 3.41 If external amplifiers are not required, the external zone loudspeakers may be connected to clips 25/26
 and 27/28 on the B8 block. The maximum
 distance between the KSU and external
 speakers is 300 feet, using 22-AWG wire
 in an 8-ohm load.
- 3.42 If external amplifiers are required, shielded wire should be used between the amplifiers and the station block. Ground the shield at the amplifier end. Connect the amplifier inputs to clips 25/26 and 27/28 as detailed in par. 3.41, above. Install bridging clips on the B8 block.
- 3.43 Separate external zone paging level controls are provided on the EPGU-C card.
- 3.44 Dry contacts are provided for auxiliary purposes when the EPGU-C card is used. The contacts are rated at 1.25A for 24VDC resistive loads.
- 3.45 The contacts appear on the B8 block clips 33/34 (1S1/1S2) for zone one and clips 35/36 (2S1/2S2) for zone two. Install bridging clips on the B8 block.

3.46 Alarm Connections:

- 3.47 The system provides for alarm indications from a customer-owned security system to be transmitted to all telephones in the system if the DSS console is not attended or to the DSS attendant. Provision is made for either closed or open alarm circuit activation. Programming is done from the DSS console.
- 3.48 The alarm input pair should be connected to clips 31/32 on the B8 block. Install bridging clips on the B8 block.

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4.00 CIRCUIT CARD INSTALLATION

A grounded wrist strap (for static protection) must be used when working on the KSU or installing, removing or handling circuit

cards. (Wrist strap #2064 i available from the 3M Company.)

4.01 Insertion & Removal Procedures:

- 4.02 Identification: Three identification means are used to let personnel know which methods of treatment should be used for each card. These are as follows:
 - a) RED CARD EDGE: All cards containing static sensitive devices are marked with a RED forward edge and the word "MOS" labeled on the upper card pull. These cards may be damaged by static discharge and personnel should always use a grounded wrist strap when handling these cards. All cards used in the system except the EPFU-A contain MOS components.
 - b) RED CARD PULLS: Cards which are equipped with RED card pulls will disable all or a major part of the system when they are removed from the KSU. Power must always be turned OFF when installing or removing these cards.
 - c) WHITE or NATURAL CARD PULLS:
 Removal or insertion of these
 cards will not disable the major
 functions of call processing. Of
 course, features provided by
 removed cards and associated
 circuitry located on other cards
 will not function until the cards
 are reinstalled in their proper
 card slots.
- 4.03 Procedure: The following procedures should be followed when installing or removing circuit cards in a working EK-2260B system.

4.04 Cards having RED pulls:

- a) Snap on a grounded wrist strap.
- b) Turn power OFF.
- c) Install or remove card.
- d) Turn power back on.

	ECPU-A/B	EPFU-A	ESTU-C/D-1
	ECMU-A/C		ESTU-C/D-2
-	MISC-1	MISC-2	ESTU-C/D-3
	EDTU-A		ESTU-C/D-4
	ECOU-C/D-1	EXPU-A-1	RSTU-C/D-5
	ECOU-C/D-2	EXPU-A-2	ESTU-C/D-6
	ECOU-C/D-3	EXPU-E	ESTU-C/D-7
	ECOU-C/D-4	RPGU-C	ESTU-C/D-8
	ECOU-C/D-5	ETSC-D/E	ESTU-C/D-9
	ECOU-C/D-6	ETSU-C	ESTU-C/D-10
	ECOU-C/D-7	BICU-B	ESTU-C/D-11
	EGDU-A	ESTU-C/D-14	ESTU-C/D-12
		RSTU-C/D-15	ESTU-C/D-13

Figure 7 - EK-2260B KSU Card Layout

e) Checkout system.

4.05 Cards having WHITE pulls:

- a) All cards except ESTU-C/D:
 - 1. Snap on grounded wrist strap.
 - 2. Install or remove card.
 - 3. Depress XPT CLEAR button on ECMU card (located below the fuse) for approximately 3 seconds. This will set the cross-points on the newly installed card to their proper state.
 - 4. Checkout system.
- b) ESTU-C/D cards:
 - 1. Snap on grounded wrist strap.
 - 2. Plug in the ESTU-C/D card.
 - Depress XPT CLEAR button on

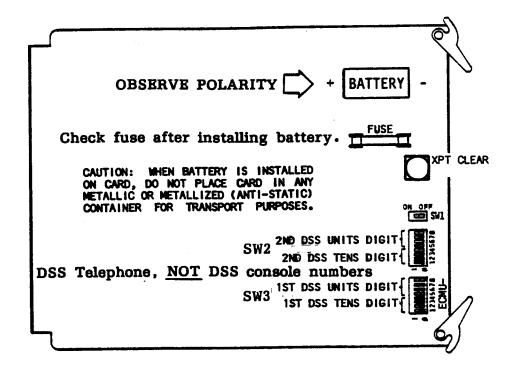


Figure 8 - Abbreviated ECMU Card Layout

ECMU card for approximately 3 seconds.

- 4. All stations connected to the ESTU card must be on-hook when the XPT CLEAR button is depressed. If a station is off-hook, the LED (on the ESTU) for that station will light. If an off-hook indication appears, hangup the handset at that station.
- 5. Depress the XPT CLEAR button again for about 3 seconds.
- 6. Checkout system.

4.06 Detailed Installation Procedure:

4.07 The following paragraphs provide circuit card installation details. Some circuit cards have option straps which must be installed. Details are also provided as to the number of each type of card, where applicable, which must be installed for a given size system.

Switch the power supply OFF before plugging in circuit cards.

4.08 Figure 7 shows the KSU card layout for the KSU.

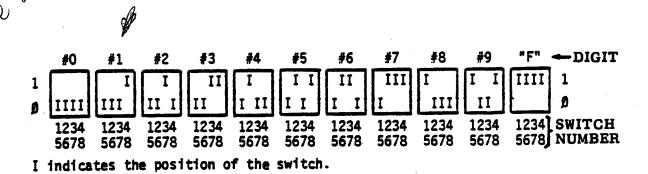


Figure 9 - ECMU Switch Setting Guide

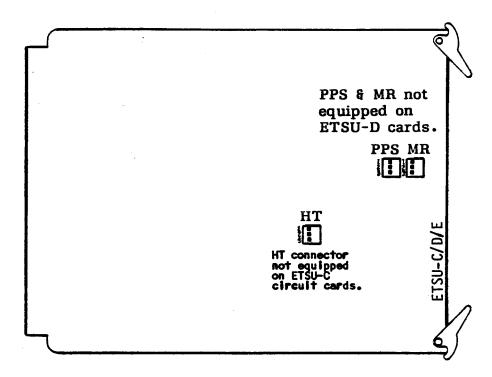


Figure 10 - Abbreviated ETSU-D/E Card Layout

4.09 ECPU-A: If toll restriction is NOT required, there are no strapping options on the card. See par. 5.00 in section 3 when toll restriction is required. One card is required per system. Refer to figure 7 for location.

ECPU-B: Supercedes the ECPU-A. If toll restriction is required, an EROU-A is not required with the ECPU-B. The ECPU-B contains the programs formerly contained in the ECPU-A and EROU-A.

- 4.10 ECMU-A: The ECMU-A is used in place of the ECMU-C when repetory dialling is required in the system. One card is required per system. Refer to figure 7 for card location. Refer to par. 4.12 and 4.13 and figures 8 and 9 for switch programming.
- 4.11 ECMU-C: DO NOT install this card if any station in the system requires repertory dialling. See ECMU-A for details. This card is the basic memory card for the system. Install this card only when the job does not require repertory dialling. One card is required per system. Refer to figure 7 for location.
- 4.12 Located on the front edge of the ECMU-C circuit card are 3 sets of switches; designated SW1, SW2 and SW3. Refer to figure 8. Also located on the ECMU-C is a small battery and a 0.25 Amp

fuse. The battery is used to protect the memory in event of power failure. The fuse protects the battery in event of a short circuit on the memory board. Switch SW1 is used in the power-on initializing program and its use is covered under par. 2.01 in section 3, "Programming Information". Switches SW2 and SW3 are DSS number assignment switches and their setting is detailed in the following paragraph.

4.13 Switch assembly SW3 assigns the PRIMARY DSS station number. Switch assembly SW2 assigns the 2nd DSS station number. The switches are designated on the circuit board and the switch positions are designated as 0 and 1. Each switch assembly contains 8 switches, as shown in figure 8. Switches 1 through 4 are the Operator's 'tens' digit and switches 5 through 8 are the Operator's 'units' digit. To assign the DSS station numbers, proceed as follows:

As stated under par. 3.16, the DSS station is the station directly preceeding the DSS console. The DSS station number CANNOT be assigned numbers 51 or 79. If, for instance, the DSS console has been connected to station number 25 on the "B" block, the DSS station number will be 24.

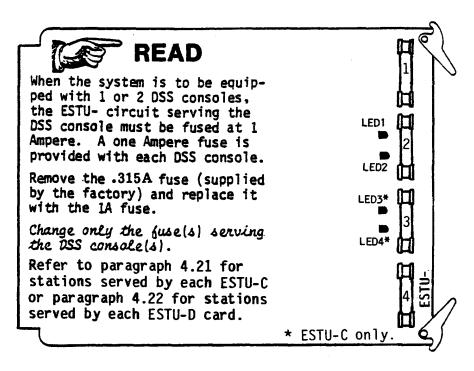


Figure 11 - Abbreviated ESTU-C/D Card Layout

- a) Figure 9 shows the positions of each 'tens' or 'units' switch for the digits 0 through 9 and "F" (F is the hexadecimal position for all "1's").
- b) If a DSS console is not to be installed in the system, set all switches in SW2 and SW3 to the F,F position. That is, all 8 switches in SW 2 and in SW3 would be set in the "1" position.

With this programming, all 6 ICM paths are available to all stations. (See Program 28 in section 3 for common audible signalling.)

- c) If the system has only 1 DSS console, set all 8 switches in SW2 in the '1' position (F,F).
- d) Referring to figures 8 and 9, set the 8 switches in SW3 for the 1st DSS station number (e.g., station 23 would be 0,0,1,0, 0,0,1,1).
- e) Set all 8 switches in SW2 for the 2nd DSS station number.
- f) Install the battery, supplied with the ECMU card, into the battery clips. <u>OBSERVE POLARITY</u>. Refer to figure 8. This battery protects the memory during card removal and power failures. After

- installing the battery, the fuse on the ECMU card should be checked to make sure that it has not been blown.
- g) Before installing the ECMU card in its card slot, place switch SW1 in the OFF position. Refer to par. 2.01 in section 3.
- 4.14 EDTU-A: The EDTU-A contains 2 microcomputers for controlling data transmission between the telephones and the KSU. One is required per system. There are no strapping options on this card. Refer to figure 7 for location.
- 4.15 EICU-B: The EICU-B is a 4-link intercom card and contains voice switching circuits for all 4 links. One is required per system. There are no strapping options on the card. Refer to figure 7 for location.
- if dial pulse signalling (DP) is required on the C.O. lines. See ETSU-E. The ETSU-D contains the BGM and MOH amplifiers, DTMF oscillators for C.O. line signalling, supervisory tone oscillators for internal system use, an alarm oscillator, and a switch matrix for transmitting BGM or ringback tone to paging circuits. This card may be installed in either system requiring DTMF signalling on C.O. lines. See figure 7 for location.

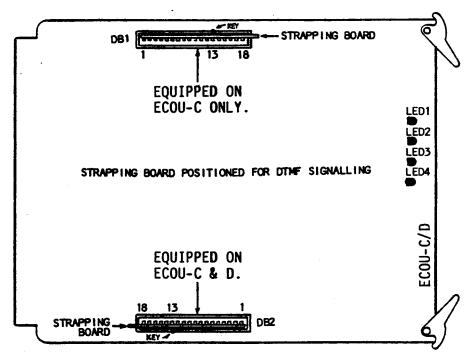


Figure 12 - Abbreviated ECOU-C/D Card Layout

- 4.17 The ETSU-D card may be strapped for one of three options when music-on-hold is or is not required. The HT connector is used for this function. Refer to figure 10 for location of the connector. Strap the HT connector for one of the following:
 - a) Strap 1-2 (factory strapping) for internal synthesized music.
 - b) Strap 2-3 to use the BGM music source for MOH.
 - c) Omit strap for NO music-on-hold.
- ETSU-E: DO NOT install this card if DTMF signalling is required on the C.O. lines. See ETSU-D. The ETSU-E contains BGM and MOH amplifiers, a microcomputer controlled dial pulsing circuit line signalling on up to 14 for C.O. lines, supervisory tone oscillators for internal use, an alarm oscillator, and a switch matrix for transmitting BGM or ringback tone to the paging circuits. This card may be installed in either system requiring dial pulse signalling on the C.O. lines. See figure 7 for location.
- 4.19 Three option connectors are equipped on the ETSU-E circuit card. Refer to figure 11 for location. These connectors are designated HT, PPS and MR. These connectors should be strapped as follows:

- a) Strap the HT connector for musicon-hold requirements as detailed in par. 4.17.
- b) The PPS connector should be strapped for the desired pulses per second output on the C.O. lines. Strap 1-2 (factory strapping) for 20 PPS or 2-3 for 10 PPS.
- c) The MR connector will determine the make/break ratio of the dial pulses. Strap 1-2 (factory strapping) will provide a 39%/61% make/ break ratio. Strap 2-3 will provide a 33%/67% make/break ratio.

POSITION KEY IN PIN LOCATION FOR TYPE OF PULSING REQUIRED.

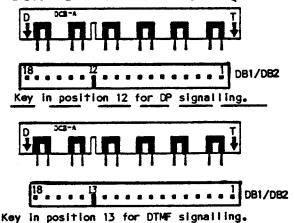


Figure 13 - DCB Strap Orientation

Factory strapping (1-2) will generally provide optimum pulsing performance. However, some older types of central offices, loop length, or various types of external signalling circuits may make strapping 2-3 more desirable.

- 4.20 ETSU-C: The ETSU-C provides capability for dial pulsing on C.O. lines when more than 14 C.O. lines are provided or if ECOU-C/D's are equipped in positions ECOU-C/D-6 or -7 for private line use. Maximum 1 card per system. Option connectors PPS and MR are provided for pulses per second strapping and percent make/break strapping. Refer to par. 4.19b) and c) for strapping instructions. Refer to figure 10 for strapping location. Refer to figure 7 for card location.
- 4.21 EPGU-C: The EPGU-C provides for up to two zones of external paging. The unit contains two power amplifiers, each having 3 watts of audio output. Separate volume controls are provided. There are no strapping options on the EPGU-C. The EPGU-C has an auxiliary relay for each external paging zone. Each relay provides a dry contact for control of an external amplifier. The relay for each zone is energized when the access code for the zone is dialled. Refer to figure 7 for card location.
- 4.22 ESTU-C: The ESTU-C is a four station interface card for the telephones in the system. A maximum of 15 ESTU cards may be installed in the system. There are no strapping options on the card. Refer to figure 7 for card locations. Refer to figure 11 for DSS console fusing requirements. Stations served by each ESTU in each card position are as follows:

ESTU-C-1 serves stations 20-23
ESTU-C-2 serves stations 24-27
ESTU-C-3 serves stations 28-31
ESTU-C-4 serves stations 32-35
ESTU-C-5 serves stations 36-39
ESTU-C-6 serves stations 40-43
ESTU-C-7 serves stations 44-47
ESTU-C-8 serves stations 48-51
ESTU-C-9 serves stations 52-55
ESTU-C-10 serves stations 56-59
ESTU-C-11 serves stations 60-63
ESTU-C-12 serves stations 64-67
ESTU-C-13 serves stations 72-75
ESTU-C-15 serves stations 76-79

4.23 ESTU-D: The ESTU-D is a two station interface card. It may be installed in any card position which can

serve an ESTU-C. Refer to figure 11 for DSS console fusing requirements. When an ESTU-D is plugged into a card position, the following stations are available:

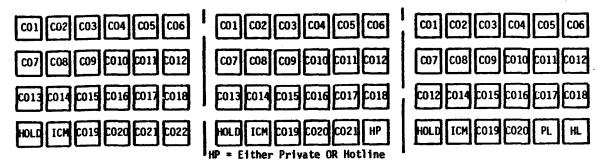
ESTU-D-1 serves stations 20 & 21
ESTU-D-2 serves stations 24 & 25
ESTU-D-3 serves stations 28 & 29
ESTU-D-4 serves stations 32 & 33
ESTU-D-5 serves stations 36 & 37
ESTU-D-6 serves stations 40 & 41
ESTU-D-7 serves stations 44 & 45
ESTU-D-8 serves stations 48 & 49
ESTU-D-9 serves stations 52 & 53
ESTU-D-10 serves stations 56 & 57
ESTU-D-11 serves stations 60 & 61
ESTU-D-12 serves stations 64 & 65
ESTU-D-13 serves stations 72 & 73
ESTU-D-15 serves stations 76 & 77

4.24 ECOU-C: The ECOU-C circuit card provides line circuits for four C.O. lines. A maximum of seven ECOU-C's may be installed in the system. Each is equipped with two option-connectors, designated DB1 and DB2. These connectors are factory-equipped with a strapping circuit for arranging the C.O. signalling mode of the ECOU card (DTMF or DP). Figure 12 shows the location of the connectors, and figure 13 shows the positioning of the strapping circuit for each signalling mode. There are no other strapping options on the ECOU-C card. C.O. lines served by each ECOU-C are as follow:

ECOU-C-1 serves lines 1-4 ECOU-C-2 serves lines 5-8 ECOU-C-3 serves lines 9-12 ECOU-C-4 serves lines 13-14* ECOU-C-5 serves lines 15-18 ECOU-C-6 serves lines 19-22 ECOU-C-7 serves lines 23-26

- * Use ECOU-D in card position ECOU-C-4 when practical.
- 4.25 ECOU-D: The ECOU-D is a two-line circuit card. It can be installed in any position which serves an ECOU-C card. There is only one signalling option connector on the ECOU-D. Refer to figures 12 and 13 for C.O. signalling mode arrangement. An ECOU-D plugged into a connector will serve the following C.O. lines.

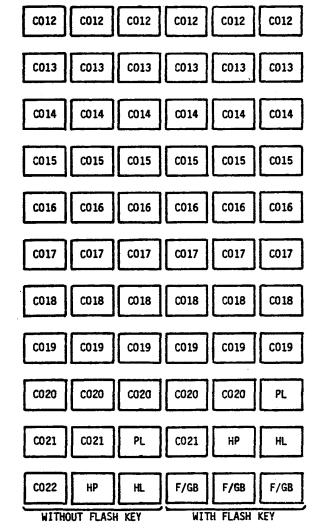
ECOU-D-1 serves lines 3 & 4 ECOU-D-2 serves lines 7 & 8 ECOU-D-3 serves lines 11 & 12 ECOU-D-4 serves lines 13 & 14 ECOU-D-5 serves lines 17 & 18 ECOU-D-6 serves lines 21 & 22 ECOU-D-7 serves lines 25 & 26



WITH NO PRIVATE OR HOTLINES WITH ONE PRIVATE OR HOTLINE WITH BOTH PRIVATE & HOTLINES When FLASH key is required, last C.O. line key (CO22) becomes the FLASH key. Private lines or hotlines move one key to the left

Figure 14 - I-2260 Telephone Key Layouts

- 4.26 EPFU-A: The EPFU-A circuit card provides 5 circuits for power failure transfer on C.O. lines. A maximum of 1 EPFU-A may be installed in the system. There are no strapping options on the EPFU-A card. C.O. lines served by the EPFU-A depend on cross-connections outlined in table 3. Refer to figure 7 for card locations.
- 4.27 EGDU-A: The EGDU-A circuit card provides a means of grounding the T/R conductors of the PABX line for transfer or attendant recall purposes. The EGDU-A will provide this function for up to 26 PABX lines. One EGDU-A card is required per system. There are no strapping options on this card.
- 4.28 EXPU-A: The EXPU-A circuit card is required when more than 12 C.O. lines are installed, private or hotlines are installed, or when the EXPU-E is installed. Maximum is 2 cards per system. There are no strapping options on the EXPU-A card. Refer to figure 7 for card location. Install the EXPU-A card(s) in the positions, as follows:
 - a) Install a card in EXPU-A-1 to serve the added intercom lines or to serve C.O. lines 13 through 18.
 - b) Install a card in EXPU-A-2 to serve C.O. lines 19 through 26, or to serve ANY private or hotlines (refer to par. 3.09).
- 4.29 EXPU-E: The EXPU-E is a 2 x 60 matrix expansion card for increasing the number of intercom paths in the system to 6. Voice switching circuits for the additional intercom circuits are also provided. An EXPU-A is also required when the EXPU-E is installed. Maximum one per system. There are no strapping options on the EXPU-E card. Refer to figure 7 for card location.



HP = Either Hotline or Private Line
HL = Hotline GB = Grounding Button
F = Flash Key PL = Private Line
Only right row of pickup keys shown.

Figure 15 - W-2260 Telephone Key Layouts

SECTION 3 - PROGRAMMING

1.00 INTRODUCTION

- 1.01 This section provides the information required for programming the system features desired in any particular installation. Details for reading the "built-in" (initialization) program, reading the installer programming, program preparation, documenting the program for future reference, and executing the program are provided.
- 1.02 If the system has been installed, physically, as detailed in section 2 of this manual, the system is a functional system only if DTMF C.O. lines are used. No programming is required to test the stations and common C.O. lines. The system contains an initialization program, which cannot be changed, for a basic key telephone system.
- 1.03 If the system utilizes dial pulse (DP) C.O. lines, the system will not pulse out on the C.O. lines until the system is programmed for DP operation. Refer to table 9, program 33, for DP program information.
- 2.00 PROGRAMMMING GENERAL
- 2.01 Initialization:
- 2.02 Before applying power to the KSU, switch SW1 on the ECMU card should be set to the OFF position (refer to figure 8, section 2). In this position, when power is applied, the system will be initialized by the factory program. After TWO or more seconds have elapsed, the SW1 switch must be moved to the ON position.

If the SW1 switch is left in the OFF position, the system CANNOT be programmed by the installer for the desired features. If the system is powered up for the first time with SW1 in the ON position, the system will not be initialized and may or may not even be functional because of random data (garbage) in the operating program.

- 2.03 After initialization, the system will be configured in the following manner:
 - a) The attendant's telephone number(s) will be as set on the SW2/ SW3 switches on the ECMU card.
 - b) The attendant telephone(s) will receive COMMON C.O. audible on all common C.O. lines (up to 22). No other stations will receive C.O. audible.
 - c) Stations 20-29 will be in Page Zone 1, 30-39 in zone 2, 40-49 in zone 3, and 50-59 in zone 4.
 - d) C.O. lines will function with DTMF signalling (if ETSU-D card is installed). If ETSU-E card is installed, C.O. lines will not function at this time.



DO NOT return the SW1 switch to the OFF position after initialization. A power failure with the switch in the OFF position will result in reinitialization of the program when power is reapplied to the system.

2.04 Programming Preparation:

- 2.05 Before programming the system features can be started, the requirements of the programming must be defined. It then must be written or coded for system acceptance. The program is then put into the system, verified, debugged if necessary, and a record kept for future use.
- graph, the requirements of the program must be defined. Table 4 (Program Record Form) is provided for this purpose. It will also serve as the job record for the installation. The following paragraphs will define the parameters for each program. This table shows each program by name and number. The information which will ultimately be displayed during programming must be entered into the boxes on the form. When completed,

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the form will be used as the programming guide. Record the features desired in the system in table 4 according to the following guidelines:

groups may be provided, not including common or night ringing. If separate ringing groups ARE required, enter 0,1 in boxes C,D for program 20. If group ringing IS NOT required, enter 0,0.

NOTE: If 0,1 is entered, at least 1 C.O. line must be assigned in Ring Group 1.

- 21 Ring Group 1: Any number of lines may be assigned in Ring Group 1 up to the maximum number of common C.O. lines in the system. Stations which will receive C.O. audible from this group can not receive common or night audible. Stations in this group will receive C.O. audible at all times. The lines in this group must be the lowest numbered lines in the system (1-?). Enter the last C.O. line number in boxes C,D for program 21 (e.g., if lines 1-6 are in Ring Group 1, enter 0,6).
- 22 Ring Group 2: These lines are lines immediately following group 1. Any number may be assigned in this group that are NOT in group 1 (e.g., if group 1 is 1-6, the 1st line in this group is 7). Enter the last line number in boxes C,D in program 22 for this group (e.g., if lines 7-9 are in this group, enter 0,9). If no lines are to be assigned in this group, enter 0,0 in the boxes.
- 23 Ring Group 3: These lines are lines immediately following groups 1 and 2. Any number may be assigned in this group that are not in groups 1 and 2. Enter the last line number in boxes C,D in program 23. If no lines are assigned in this group, enter 0,0.
- 24 Ring Group 1 Stations: Up to a maximum of 10 stations may receive C.O. audible from the lines in Ring Group 1. These stations can not be in any other ringing group. Enter the station numbers in the C,D boxes in program 24. If less than 10 stations are in the group, enter 0,0 as the last station.

- Ring Group 2 Stations: Up to a maximum of 10 stations may receive C.O. audible from the lines in Ring Group 2. These stations can not be in any other ringing group. Enter the station numbers in the C,D boxes in program 25. If less than 10 stations are in the group, enter 0,0 as the last station.
- Ring Group 3 Stations: Up to a maximum of 10 stations may receive C.O. audible from the lines in Ring Group 3. These stations can not be in any other ringing group. Enter the station numbers in the C,D boxes in program 26. If less than 10 stations are in the group, enter 0,0 as the last station.
- 27 Ring Group 4 Stations: Up to a maximum of 10 stations may receive C.O. audible from the lines in Ring Group 4. The lines in Ring Group 4 are all common C.O. lines which were not assigned in Ring Groups 1, 2 or 3. These stations cannot be in any other ringing group. Enter the station numbers in the C,D boxes in program 27. If less than 10 stations are in the group, enter 0,0 as the last station.
- 28 Common Audible: Common audible is C.O. audible from all C.O. lines which are not private lines. Up to a maximum of 10 stations may be common audible stations. Common audible stations cannot be in any other ringing group. The initialization program assigns the attendant's telephone as the 1st (and 2nd, when 2 are equipped) station in the common audible group. However, these may be changed if required. Enter the station numbers in the C,D blocks of program 28 for all common audible stations. If less than 10 stations are in the group, enter 0.0 as the last station.
- 29 Off-hook Signalling: If the system is programmed for off-hook signalling, ALL stations will receive C.O. and ICM audible signals when the telephone is either on-hook or off-hook. If the system is programmed for NO off-hook signalling, telephones will only receive C.O. or ICM audible when on-hook. This is NOT an individual station feature. If Off-Hook Sig-

the C,D boxes of program 29. Enter 0,0 if it is not required.

- 30 DSS Override: If the system is programmed for DSS Override, the DSS attendant may override the Do-Not-Disturb (DND) feature or the Monitor to announce calls. All stations can be preempted when this feature is used. If DSS override is required, enter 0,1 in the C,D boxes of program 30. Enter 0,0 if it is not required.
- 31 Do-Not-Disturb: The DND feature is a station option. Each station must be programmed individually for DND. Enter 0,1 for stations which will have the DND feature. Enter 0,0 for stations without the feature. If the system is programmed for DSS Override, the attendant can reach the station, but the station user must lift the handset or depress the DND key to respond.
- Recall Timing: Any station placing a line on exclusive hold, or the DSS attendant extending a call, will activate the recall timing feature. The timing period is programmable in increments of 16 seconds. Enter in the C,D boxes of program 32 the digits corresponding to the desired amount of time for recall, as follows:

For NO recall, enter 0,0.
For 16 seconds, enter 0,1.
For 32 seconds, enter 0,2.
For 48 seconds, enter 0,3.
For 64 seconds, enter 0,4.
For 80 seconds, enter 0,5.
For 96 seconds, enter 0,6.
For 112 seconds, enter 0,7.
For 128 seconds, enter 0,8.

- 33 C.O. Line Pulsing: If the C.O. lines require DTMF pulsing, enter 0.0 in the C.D boxes of program 33. If dial pulsing is required, enter 0.1.
- 34 PBX Operation: If the system is installed behind a PBX, enter 0,1 in the C,D boxes of program 34. If it is not behind a PBX, enter 0,0. If an ECPU-B or an EROU-A is installed, see paragraph 5.24.
- 35 Flash Key: If 'flash' keys are required at each telephone, the type of flashing, open loop or grounding button must be program-

med. If NO flash key operation is required, enter 0,0 in the C,D boxes of program 35. If grounding button operation is required, enter 0,1. If open loop flash is required, enter 0,2.

- 36 Meet-Me-Answer: If the "Meet-Me-Answer" feature is required with paging, enter 0,1 in the C,D boxes of program 36. If the feature is not required, enter 0,0.
- lines (not private lines) may be divided into 2 groups (Dial Group 1 and Dial Group 2). Some stations will have dialling capability in Dial Group 1, some in Dial Group 2, and other stations will have dialling capability in both groups. Dial Group 1 lines are the lowered numbered lines. Dial Group 2 lines are the higher numbered lines, following Dial Group 1 lines, except for private lines. There is no toll restriction on Dial Group 2 lines. Enter the line number of the last line in Dial Group 1 in the C,D boxes of program 37. For example, if lines 1-10 are in Dial Group 1, enter 1,0.
- 38 Station Category: Programming for station access to dial groups is done on a station basis.

In systems equipped with an ECPU-A without an EROU-A card, the stations may be divided into 2 categories; category A and catagory B. If the system IS equipped with an ECPU-B or an EROU-A card, refer to paragraph 5.06 for station category arrangements.

Catagory A stations may dial on lines in Dial Groups 1 and 2.

Category B stations may dial only on lines in Dial Group 1.

For category A stations which may dial on all common C.O. lines (both dial groups) enter 0,0 in the C,D boxes next to the station number in program 38. For stations which may dial on the 1st group only, enter 0,1.

39 Station Class of Service: A station may be assigned one of two classes. Refer to paragraph 5.03 if an ECPU-B or an EROU-A is

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equipped. Enter into the C,D boxes of program 39 the class of service for each station in accordance with the following:

Enter 0,0 for Class A service - No dial restrictions.

Enter 0,5 for Class F service -Restricted from all C.O. line calls.

- 40-46 Not used in systems without an ECPU-B or an EROU-A. In systems equipped with an ECPU-B or an EROU-A, refer to paragraph 5.00 for programming details.
 - 47 Private Line #1: Enter the station number in the C,D boxes of program 47 for the 1st private line (21st C.O. line). Enter 0,0 0,0 in program 53.
 - 48 Private Line #2: Enter the station number in the C,D boxes of program 48 for the 2nd private line (22nd C.O. line). Enter 0,0 0,0 in program 54.
 - 49 Private Line #3: Enter the station number in the C,D boxes of program 49 for the 3rd private line (23rd C.O. line). Enter 0,0 0,0 in program 55.
 - 50 Private Line #4: Enter the station number in the C,D boxes of program 50 for the 4th private line (24th C.O. line). Enter 0,0 0,0 in program 56.
 - 51 Private Line #5: Enter the station number in the C,D boxes of program 51 for the 5th private line (25th C.O. line). Enter 0,0 0,0 in program 57.
 - 52 Private Line #6: Enter the station number in the C,D boxes of program 52 for the 6th private line (26th C.O. line). Enter 0,0 0,0 in program 58.
 - Hotline #1: Enter the 1st station number in the A,B boxes and the 2nd station number in the C,D boxes of program 53 for the 1st hotline (21st line circuit). Enter 0,0 in program 47.
 - Hotline #2: Enter the 1st station number in the A,B boxes and the 2nd station number in the C,D boxes of program 54 for the 2nd

- hotline (22nd line circuit). Enter 0,0 in program 48.
- Hotline #3: Enter the 1st station number in the A,B boxes and 55 the 2nd station number in the C,D boxes of program 55 for the 3rd hotline (23rd line circuit). Enter 0,0 in program 49.
- Hotline #4: Enter the 1st station number in the A,B boxes and the 2nd station number in the C,D boxes of program 56 for the 4th hotline (24th line circuit). ter 0,0 in program 50.
- Hotline #5: Enter the 1st station number in the A,B boxes and the 2nd station number in the C, D boxes of program 57 for the 5th hotline (25th line circuit). ter 0,0 in program 51.
- Hotline #6: Enter the 1st station number in the A,B boxes and the 2nd station number in the C,D boxes of program 58 for the 6th hotline (26th line circuit). Enter 0,0 in program 52.

All stations in a paging zone must be consecutively numbered. A station may be assigned to only ONE zone.



Lower numbered stations must be assigned to lower numbered zones (e.g., if stations 30-37 are as-lead) signed in zone 1, stations 20-29 CĂNNOT be assigned in a higher numbered zone).

> The lowest station number is entered in the A,B boxes and the highest station number in the C.D. boxes. Paging zones 1-4 are internal zones which use the loudspeakers in the telephones.

- Page Zone 1 (Dial code 81): ter the lowest and highest station numbers in program IZ1 for the 1st paging zone.
- IZ2 Page Zone 2 (Dial code 82): Enter the lowest and highest station numbers in program IZ2 for the 2nd paging zone.
- Page Zone 3 (Dial code 83): ter the lowest and highest station numbers in program IZ3 for the 3rd paging zone.

						Iss	1, SECTIO	ON 3579-3
ИT	3:	1	38		39		* 41 PERMITT	
NITE AUD	DO-NOT-DIS	TURB (DND)	LINE A		STATION		11	5 1
01	20	50	20	50	20	50	12	5 2
192	2 1	5 1	2 1	5 1	2 1	5 1	1 3	5 3
03	22	5 2	22	5 2	2 2	5 2	1 4	5 4
04	2 3	5 3	2 3	5 3	2 3	5 3	1 5	5 5
<u> </u>	24	5 4	2 4	5 4	2 4	5 4	16	5 6
0.6	2 5	5 5	2 5	5 5	2 5	5 5 5 6	17	5 7
07	26	5 6	26	5 6	2 6	5 6	1 8	5 8
08	27	5 7	27	5 7	2 7	5 7	21	6 1
09	28	5 8	28	5 8	2 8	5 8	2 2	6 2
10	29	5 9	29	5 9	2 9	5 9	2 3	6 3
11	30	60	30	60	30	60	2 4	6 4
12	31	61	3 1	6 1	31	6 1	2 5	6 5
13	3 2	6 2	3 2	6 2	3 2	6 2	2 6	6 6
1 4	3 3	6 3	3 3	6 3	3 3	6 3	2 7	6 7
15	3 4	6 4	3 4	6 4	3 4	6 4	2 8	68
16	3 5	6 5	35	6 5	3 5	6 5	3 1	71
17	3 6	6 6	3 6	6 6	3 6	6 6	3 2	7 2
1 8	37	6 7	37	6 7	37	6 7	3 3	7 3
19	3 8	68	3 8	68	3 8	68	3 4	7 4
20	39	6 9	39	6 9	3 9	69	3 5	7 5
PBX	40	70	40	7 0	40	70	3 6	7 6 7 7
34 OPERATION	41	71	41	71	4 1	71	3 8	
	4 2 1	7 2	4 2	7 2	4 2	7 2 7 3	41	7 8 8 1
		73	4 3	7 3	4 3 4 4	74	42	8 2
44 PBX ACCESS	4 4	7 4 7 5	4 4 4 4 5	7 4 7 5	45	75	43	8 3
רחותות ביים	4 5	7 6	4 6	76	46	7 6	4 4	8 4
12	4 6	777	47	777	47	17171	4 5	8 5
2 1	48	78	4 8	7 8	48	78	4 6	86
2 2	4 9	79	4 9	79	49	79	47	8 7
31							48	88
32		24	25	26	27 GROUP 4	28 COMM AUD	*	
41		GROUP 1 STATIONS	GROUP 2 STATIONS	GROUP 3 STATIONS	STATIONS	STATIONS	42 PERMITTER	
42		नि	01	0 1	01	01	C	AMMON.
* System	with	02	0 2	0 2	0 2	0 2	*45 UNRESTR	CTED CODES
1		03	0 3	0 3	0 3	0 3	11 2	3 1 -7
	r EROU-A.	0 4	04	0 4	04	0 4	12 1	3 2
20 GROUP RINGING		0.5	0.5	0 5	0.5	0 5	13)	3 3
LINE	ال الماري	06	06	0.6	0 6	06	1 4	3 4
21 GROUP 1	00	07	07	07	07	07	2 1	4 1
22 LINE GROUP 2	0 0	0 8	0 8	0 8	0.8	08	2 2 7	4 2 4 3
22 LINE		09	10	0 9	10	09	2 3	4 4
GROUP 3		10						*
29 SIGNAL	নিন্দা	47 P.L. # 48 P.L. #		53 H.L. # 54 H.L. #	<u> </u>	IZ1 PAGE IZ2 PAGE		46 DIGIT ABSORB
30 DSS OVERRIDE		49 P.L.	#3 00	55 H.L. #	┡┉┼╌╣┞╌╂╌┩	IZ3 PAGE	┃ ┻╇╇	11
32 RECALL TIMING	00	50 P.L. 1 51 P.L. 1		56 H.L. 1 57 H.L. 1	 - - - - 	IZ4 PAGE EZ1 EXT.		3 1
33 C.O. PULSING	00	52 P.L.		58 H.L.	المساورة المساورة	EZ2 EXT.	#2	41
35 PBX FLASH	00	36 MEET-ME PAGING	00	37 LINE CL	ASS O O	AL ALARM DETECTI	ON OO	

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IZ4 Page Zone 4 (Dial code 84): Enter the lowest and highest station numbers in program IZ4 for the 4th paging zone.

Note: Two external paging zones may be provided. Each zone may or may not provide BGM and C.O. audible signalling. Each zone must be programmed individually to provide these features. The BGM data will be entered in the A,B boxes and the C.O.audible data will be entered in the C,D boxes. The data when entered will be as follows:

In the A,B boxes -

0,0 = No BGM in the external zone.
0,1 = BGM in the external zone.

In the C,D boxes -

- 0.0 = No C.O. audible in zone.
- 0,1 = Ring Group 1 C.O. audible in the zone.
- 0,2 = Ring Group 2 C.O. audible in the zone.
- 0,3 = Ring Group 3 C.O. audible in the zone.
- 0,4 = Ring Group 4 C.O. audible in the zone.
- 0,5 = Common C.O. audible in zone. 0,6 = Night C.O. audible in zone.
- EZ1 External Zone 1 (Dial code 85):
 Enter the BGM and C.O. audible
 digits in A,B, C,D appropriate for
 the 1st external zone in program
 EZ1.
- EZ2 External Zone 2 (Dial code 86):
 Enter the BGM and C.O. audible digits in A,B, C,D appropriate for the 2nd external zone in program EZ2.
 - NT NITE C.O. Audible: Stations assigned to Ring Groups 1 through 4 or Common Audible (programs 24 through 28) will receive C.O. audible during BOTH day and night hours. NITE C.O. Audible stations are telephones which will require C.O. audible, exclusive of the above stations, at night only. These stations cannot be assigned in any other ring group. These stations will receive common audible at night.

Enter the station numbers, in the C,D boxes of program NT, for the stations which are to receive NITE

C.O. audible. If less than 20 stations (maximum) are assigned in the group, enter 0.0 as the last station.

- ALM Alarm Detection Mode: If alarms from a customer-provided security system are to be transmitted to telephones within the system, the system must be programmed for either an 'open' or 'closed' circuit indication which will activate the alarm. If no alarm detection is required or if the alarm detection is for a 'closed' circuit indication, enter 0,0 in the C,D boxes of program ALM. If the detection is provided by an 'open' circuit enter 0,1 in the boxes.
- 2.07 When all the information has been entered on the Program Record Form (table 4), the program requirements have been defined. A check of the information on the form for the following may save some time after programming is initiated:
 - a) If 0,1 appears in program 20, at least one line must be assigned in Ring Group 1, program 21.
 - b) If ring groups are entered, check that the line number in group 2 is higher than the number in group 1, and that the number in group 3 is higher than the number in group 2.
 - c) No station number appears twice (more than 1 time) in ALL of programs 24, 25, 26, 27, 28 and NT.
 - d) Check that the DTMF or DP data in program 33 agrees with the type of C.O. line signalling required.
 - e) When private lines AND hotlines are used in the same system, the line circuits must be programmed for one or the other. Check the following:

Use program 47 or 53 - NOT both. Use program 48 or 54 - NOT both. Use program 49 or 55 - NOT both. Use program 50 or 56 - NOT both. Use program 51 or 57 - NOT both. Use program 52 or 58 - NOT both.

Note: The private line assignment programs (47-52) and hotline assignment programs (53-58) are not checked by the system against each other. The LAST program "IN" will cancel the previous program: if a private line is assigned in pro-

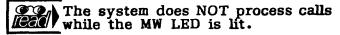
- gram 48, and a hotline is assigned in program 54 later, the private line assignment will be erased. The same applies in reverse order.
- f) If paging groups have been established, check that the lower numbered stations are assigned in lower numbered zones. Check that the lowest station number is entered in the A,B boxes and the highest in the C,D boxes. Check also that there is NO overlap between station numbers in different zones.
- g) All station numbers on the Program Record Form must be valid numbers (within the range of numbers for the system).

2.08 Program Reading:

- 2.09 The factory program (initialization program) is a permanent program stored in ROM (Read Only Memory) which cannot be changed. The installer program is a temporary program stored in RAM (Random Access Memory) which may be changed at the installer's discretion. Once the installer has programmed the system, the initialization program cannot be read without reinitialization of the system; only the current program may be read from the DSS console.
- 2.10 To read the program, without danger of rewriting, the DSS station handset is left ON-HOOK. The system will not write with the handset on-hook. The three classes of data in the program are:
 - System Base Data (see par. 2.11)
 - Station Base Data (see par. 2.12)
 - Toll Restriction Data (see 2.13)

2.11 To Read System Base Data:

- a) Leave the DSS station handset onhook.
- b) Depress the DATA ENTRY key (the MW button will light).



c) Depress the DSS key for the desired program. (The DSS key will light and data will appear in the display.)

Programs 20-23, 29, 30, 32-37, IZ1-IZ4, EZ1-EZ2 and ALM can be read in this manner.

- d) Dial "#." (The DSS LED will go out. Display will show 0,0 0,0.)
- e) Depress another DSS key to read another program.
- f) Programs 24 through 28 and NT are multiple entry programs. Enter the program by depressing the DSS key. The display will show the 1st entry ((0,1?,?).
- g) To advance through all entries, simply dial "*" after each entry. After the last entry, dial "#" to end the program.
- h) Depress the DATA ENTRY key to resume call processing. (MW LED will go out.)

2.12 To Read Station Base Data:

- a) Take the DSS station handset offhook.
- b) Depress the DATA ENTRY key. (MW LED will light. System stops processing calls.)
 - Programs 31, and 38-39 are station base programs.
- c) Depress the DSS key for the desired program; 0,0 0,0 will appear in the display.
- d) To read the program data for a station, dial the station number. (The station number will appear in the A,B boxes of the display.) Then Dial "*." (The data will appear in the C,D boxes of the display.)
- e) To read another station; dial "*".

 Then dial the station number, and
 "*" again. (The station number
 and the data will appear in the
 A,B C,D boxes of the display.)
- f) Repeat step e), to read other stations in any order.
- g) Dial "#" to end the program. (The DSS LED will go out for that program.)
- h) Depress the DATA ENTRY key to resume call processing; (MW LED will go out.)

2.13 To Read Toll Restriction Data:

a) Leave the DSS station handset onhook:

Table 5 - Program Index

PROGRAM NUMBER	PROGRAM	TABLE NUMBER	PROGRAM NUMBER	PROGRAM	TABLE NUMBER
20	Set Up Group Ringing	6	44	PBX Access Codes	20
21	Ring Group 1 Lines	6	45	Non-Restricted Codes	21
22	Ring Group 2 Lines	6	46	Digit Absorb Numbers	22
23	Ring Group 3 Lines	6	47	Assign Private Line 1	12
24	Ring Group 1 Stations	7	48	Assign Private Line 2	12
25	Ring Group 2 Stations	7	49	Assign Private Line 3	12
26	Ring Group 3 Stations	7	50	Assign Private Line 4	12
27	Ring Group 4 Stations	7	51	Assign Private Line 5	12
28	Common Ring Stations	8	52	Assign Private Line 6	12
29	Off-Hook Signalling	9	53	Assign Hotline 1	13
30	DSS Override	9	54	Assign Hotline 2	13
31	DND Assignments	9	55	Assign Hotline 3	13
32	Set Recall Timing	9	56	Assign Hotline 4	13
33	C.O. Pulsing Type	9	57	Assign Hotline 5	13
34	PBX Operation	10	58	Assign Hotline 6	13
35	PBX Flashing	10	. AL	Alarm Detection Mode	10
36	Meet-Me Paging	10	IZ1	Page Zone 1 Stations	14
37	Set Up Dial Groups	11	IZ2	Page Zone 2 Stations	14
38	Station Category	11	IZ3	Page Zone 3 Stations	14
39	Sta. Class of Svc.	16 or 17	IZ4	Page Zone 4 Stations	14
40	Not Used		EZ1	External Page Zone 1	15
41	Permitted Codes	19	EZ2	External Page Zone 2	15
42	Permitted Code Digits	18	NT	Assign Nite CO Audible	12
43	Not Used				

- b) Depress the DATA ENTRY key. (MW LED will light. System stops processing calls.)
- c) Depress the AC (All-Call) button.

To read toll restriction data, the AC (All-Call) key must be depressed FIRST. Then the DSS key for the data to be read is depressed. Programs 41, 42, 44, 45 and 46 are toll restriction programs.

If the AC DSS key is not depressed first, the system will erase the data in an initialization process (in preparation for programming) when the DSS key is depressed. The program must then be rewritten into the system for that function.

- d) Depress the DSS key for the data to be read. (DSS key will light and 1st entry will appear in the display.)
- e) Dial "*" to advance the program through the entries.
- f) Dial "#" to end the program. (DSS key LED will go out.)
- g) Depress the DATA ENTRY key to resume call processing. (MW LED will go out.)

3.00 PROGRAMMING THE SYSTEM

- 3.01 Programming the system features must be done from the PRIMARY DSS console. The primary DSS is determined by the DSS station number on switch assembly SW3 of the ECMU circuit card.
- 3.02 Remove the faceplate from the DSS console. Figure 16 shows the layout of the DSS console.
- 3.03 Table 5 is an index of the programs, by number and title. It provides a reference for locating the programming instructions in tables 6 through 22.
- 3.04 Using the Program Record Form (table 4) and tables 6 through 22, execute the appropriate programs using the instructions contained in the tables.

3.05 Programming Errors

- 3.06 The program is checked by the system for programming errors before the program is written into permanent memory. If an error is detected, an alarm is given and the system remains in the programming mode. In this mode the system is NOT operational.
- 3.07 When the alarm sounds, one or more of the DSS keys will light. Generally, when one or more of the DSS keys light, it indicates a conflict between programs. The microcomputer has no indication as to which one of the programs contains the error (e.g., when a station is assigned to more than one ringing group, the system does not know which group is the correct group).
- 3.08 Check the information on the Program Record Form in accordance with paragraph 2.07. The error may be in the program assignment or the error may have been made while the program was being executed. Use the following procedure:
 - a) Check the entries on the Program Record Form.
 - b) Check the program by reading each entry.
 - c) If the error is in the original assignment, correct the assignment and reprogram.
 - d) If the error was an execution error, correct the error by dialling

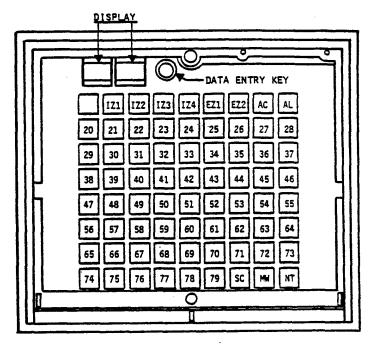


Figure 16 - EK-2260 DSS Console Layout

the correct information at the proper point in the program.

3.09 Failure to End the Program:

After each program has been keyed in, the "#" must be dialled to end the program. If the DATA ENTRY key is depressed before the "#" is dialled, the MW LED will go out but the system will remain in the programming mode and the DSS key will remain lit. Simply dial "#" to exit the program. When the DSS LED goes out, programming is final.

- 3.10 Even when the system accepts the program without an alarm, it does not mean that the program will necessarily perform the way it is expected to perform. The program should be validated by reading the entries when programming is complete (e.g., if an incorrect station number is assigned to a ring group, but not in more than one group, the system will perform as though the entry is correct).
- 3.11 Debugging the program (changes made to comply with system requirements) may be required as the result of the operational tests for each station.

4.00 TENANT SERVICE

- 4.01 Tenant service may be provided for two different groups of users (department or group within the company requiring separate trunks) in the system. This type of service may be provided in accordance with the following rules:
 - The C.O. trunks MUST be split into two dial groups.
 - b) Stations within the system may be programmed for dialling in the groups as follows:

Tenant Group 1: Dials out on 1st dial group and is denied dialling on the 2nd group.

Tenant Group 2: Dials out on 2nd dial group and is denied dialling on the 1st group.

Tenant Group 3: Dials out on either the 1st or the 2nd dial group (access to both groups).

Tenant Group 4: Denied dialling on the 1st and 2nd dial groups (no outgoing calls permitted in this group).

All telephones in the system can access all trunks (answer incoming calls, pick up a held call, etc.), but depending upon the programming, the user may or may not be able to dial out on the trunk.

- Stations in Tenant Groups 1 or 2 are not programmed for any form of toll restriction.
- d) Stations in Tenant Group 3 may be programmed for toll restriction, forcing toll calls into Dial Group 2.
- e) Special access lines (WATS, FX, etc.) must be included in one or the other of the two dial groups; they cannot be considered as part of a 3rd or special group.
- f) This feature should not be used when the EK-2260 system is installed behind a PABX.
- **4.02** Programming: To program the system for tenant service, use the following procedure:
 - a) Split the lines into two dial groups by using Program 37 (see

- table 11). Enter the number of the last C.O. line (1-xx) which is to be in the 1st group. The rest of the C.O. lines (up to C.O. line 12) will be in the 2nd dial group.
- b) Assign stations to Tenant Group 1 as follows:

Use Program 38 (see table 11) and assign stations to be in Station Category B. (See par. 5.06.)

Program each station (on a per station basis) in Program 39 with an "01".

- c) Assign stations to Tenant Group 2 as follows:
 - 1. In systems without an ECPU-B or an EROU-A, use program 38 (table 11) and assign stations to be in Station Category A. Assignments are made on a per station basis. Program each station in program 39 with a "5". Make sure that program 44 is programmed with "00".
 - 2. In systems with an ECPU-B or an EROU-A, use program 38 (table 11) and assign stations to be in Station Category A. Assignments are made on a per station basis. Program each station in program 39 with a "7".
- d) Assign stations to Tenant Group 3 as follows:
 - 1. Verify that "00" is entered in programs 38 and 39 for each station to be assigned in Group 3. If "00" is not entered, in either program, change the entry to be "00".
 - 2. When the system has an ECPU-B or an EROU-A, toll calls may be forced into Dial Group 2 by programming group 3 stations as category D stations. See table following par. 5.09.
- e) Assign stations to Tenant Group 4 as follows:
 - 1. In systems without an ECPU-B or an EROU-A, assign the Group 4 stations as 01 in program 38 and as 05 in program 39.
 - 2. In systems with an ECPU-B or an EROU-A, assign the Group 4 sta-

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tions as 01 in program 38 and 08 in program 39.

4.63 Testing: Each station should be tested on all C.O. lines. Access to all C.O. lines is permitted. However, dialling should only be possible on the proper lines for the station being tested. All other station features should function properly also.

5.00 TOLL RESTRICTION

5.01 General:

Toll restriction may be provided by the system which has either an ECPU-B or an ECPU-A plus an EROU-A. Both configurations will provide the same results. The ECPU-B contains the toll restriction program contained in the EROU-A card.

5.02 When the system is arranged for toll restriction (an ECPU-B or an EROU-A installed), the system may be programmed to provide the following features:

- Eight different station classes of service (par. 5.03).
- Six different station categories for access to Dial Groups (par. 5.06).
- Programming for up to eight 8-digit permitted codes (par. 5.10).
- Only home area codes may be dialled (par. 5.12).
- Only local calls may be dialled (par. 5.14).
- Only common unrestricted codes may be dialled (par. 5.16).
- "0" or "1" restriction in the 1st or 2nd dialled digit (par. 5.19 & 5.22).
- PBX operation with toll restriction (par. 5.24).
- Programming for digit absorbing when required (par. 5.41).
- Improved program operating conditions (par. 5.50).

5.03 Station Classes of Service:

5.04 Up to eight station classes of service may be programmed:

Class 1 service -No dial restrictions.

Class 2 service Can only dial permitted codes or
common unrestricted codes.

Class 3 service -Can only dial permitted codes, local 7-digit codes and common unrestricted codes.

Class 4 service Can dial permitted codes, local codes, 1+7 tolk codes and common unrestricted codes.

Class 5 service Can dial local codes, 1+7 toll
codes, and common unrestricted
codes.

Class 6 service -Can dial local codes and common unrestricted codes.

Class 7 service -Can dial only common unrestricted codes.

Class 8 service Dial restricted; can dial on ICM
lines only. Primarily intended
for use behind a PBX.

- 5.05 There is NO toll restriction on private lines.
- 5.06 Dial Groups & Station Categories:
- 5.07 The C.O. lines in the system may be divided into 2 "dial groups" as explained under par. 3.19 in section 1.
- 5.08 There is NO toll restriction on C.O. lines in Dial Group 2. WATS lines, FX lines, and other types of lines which are accessed by Category A, D and E stations should be in Dial Group 2. Stations permitted to dial on C.O. lines in Dial Group 2 (higher numbered lines) may dial ANY number without restriction. This arrangement is generally intended to force toll calls to be made on the special lines and at the same time deny access to station users which will not normally make toll calls.
- 5.09 When an ECPU-B or an EROU-A is installed, the number of station

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categories which may be used to configure the system is 6. The following table shows which categories of stations may dial in each dial group and the entry for each station in programs 38 and 39 on the program record form.

STATION CATEGORY	DIAL GROUP 1	DIAL GROUP 2	TOLL REST.	PROG 37	PROG 38	PROG 39
Α	YES	YES	NO	Line	00	01
В	YES	NO	МО		01	01
С	YES	NO	YES	p 1	01	02-07
D	YES	YES	YES	Group	00	02-06
E	NO	YES	NO		00	07
F	NO	NO	YES	Last	##	08

= May be either 00 or 01.

- 1. For "Tenant Service," use B and E for tenants.
- 2. For WATS lines as Dial Group 2, use category D.

5.10 Permitted Codes:

- 5.11 The system may be programmed for up to 8 codes of 8-digits each. These are permitted for use by class 2, 3 or 4 station users. When permitted codes are programmed, the maximum number of digits dialled must be programmed also. See tables 18 and 19 for details. Some practical uses of permitted codes are:
 - Calls to a branch office in an exchange with a different area code.
 - Calls to a nearby area, with a different area code(s), where business is normally conducted.
 - In-WATS (800) service.
 - Etc.

5.12 1+7 Toll (Home NPA) Codes:

5.13 Station users in class 4 or 5 are permitted to dial 1+7-digit toll calls. These are calls, not to exceed 8 digits in length, to any telephone number within the home area.

5.14 Local Calls:

5.15 Station users in classes 3, 4, 5 or 6 are permitted to dial local calls not to exceed 7 digits in length.

- 5.16 Common Unrestricted Codes:
- 5.17 Common unrestricted codes are permitted in classes 2-7. Codes which are generally permitted in this category are:
 - Emergency assistance (police or fire), 911.
 - Local or home area directory assistance, 411 or 1411.
 - Telephone repair service, 611.
 - Etc.
- 5.18 Up to 4 common unrestricted codes may be programmed. User is limited to the number of digits in each code.
- 5.19 Operator Assistance, "0" (Zero):
- 5.20 Only class 1 station users may dial "0" or "0+" on trunks in Dial Group 1.
- 5.21 The system will deny any C.O. line call with a "0" as the 1st or 2nd digit to station users in classes 2 through 7.
- 5.22 Calls With Area Codes:
- 5.23 Only class 1 station users may dial an area code call (0 or 1 in the 2nd digit) on lines in Dial Group 1. (Permitted codes excepted.)

5.24 PBX Operation:

- 5.25 When the system is equipped with an ECPU-B or an EROU-A circuit card (toll restriction), the system must be programmed to indicate when the system is behind a PBX and the access digits which are used to reach the C.O. lines. Provision is made for programming up to four 1-or-2-digit access codes. Toll restriction will only be effective on C.O. lines in Dial Group 1 after the programmed access digit(s) are dialled.
- 5.26 The EK-2260B system equipped with an ECPU-B or an EROU-A provides more capabilities than previously available in older key systems when used behind a PBX. Every effort has been made to make the toll restriction program compatible with the majority of PBX systems.

Before installing this feature in systems behind a PBX, the installer should make sure that the PBX

signalling arrangements, particularly the transfer function, and the toll restriction arrangements of this system are compatible with

5.27 PBX Considerations:

- In earlier systems, the PBX did not have the ability to recognize trunk access codes and could only count the number of digits dialled. Telephone sets equipped with toll-restriction dials would not permit the user to dial other stations within the system with a "0" or a "1" as the 2nd digit of the PBX station number. When these dials were used to restrict outside calls, inside calls were restricted also.
- In some systems, operation of the flash key would block further 5.29 dialling, thus, dial transfer calls within the PBX would be blocked.
- 5.30 The EK-2260B system is able to recognize trunk access codes. The toll restriction program is not started until such a code is recognized. Up to 4 different 1-or-2-digit codes may be programmed as trunk access codes. Refer to table 20 for details.
- Stations assigned to Classes of 5.31 Service 1 through 7 are permitted to dial any PBX number, even those containing 0's and 1's, without encountering restriction.
- 5.32 Class of Service 8 is intended for use in systems behind a PBX. this class, dialling is not permitted on PBX lines, but the user may dial all intercom calls.

5.33 Incoming vs Outgoing PBX Calls:

The system has the ability to recognize the difference between an incoming call and an outgoing call. Dialling is NOT permitted on incoming calls; the system has no way of determining whether the call is from another PBX station or from an outside line. If dialling is permitted under this condition, toll restriction could be defeated.

5.35 PBX Flashing:

In many PBX systems, the flash key 5.36 is used for transferring incoming calls. The EK-2260B system is designed to function with PBX systems requiring either "open loop" or "grounding button" for transfer operation.



If the PBX does NOT require flashing (either open loop or grounding button) for transfer, DO NOT program the EK-2260B system for flash key operation.

- The affect of flash key operation on the toll restriction program will vary, depending on whether the station is involved in an outgoing or an incoming call, as follows:
 - Outgoing Call: Operation of the flash key transmits an open pulse or tip ground pulse to the PBX (400 msec w/o ECPU-B or EROU-A; EROU or 550 msec w/ ECPU-B or EROU) trunk circuit for transfer, and at the same time, activates the toll restriction program.
 - Call: On an incoming Incoming call, dialling is blocked until the flash key is operated. 1st operation of the flash key (and subsequent odd numbered flashes) will permit dialling into the PBX. The 2nd operation of the flash key (and subsequent even numbered flashes) will again restrict dialling.

5.38 Dial and Class Arrangements for PBX Operation:

- Most PBX systems today, utilize 5.39 toll restriction programs which are more comprehensive than those used in key systems (primarily for economical The toll restriction programs reasons). utilize the fact that the system knows which stations are using which lines and can operate on the restriction parameters programmed into the system. When the stations are separated from the PBX by a key system (which is really a concentrator), the association between station and line is no longer available to the PBX. Thus, the key system must provide more flexible restriction arrangements.
- Following is one method which can be used to provide the flexibility required:
 - a) Connect the PBX non-restricted lines as Dial Group 2 lines in the system and program all nonrestricted stations for dialling on the dial group 2 lines.
 - b) Assign all stations which are to be subject to PBX toll restriction to Class of Service 01.

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- c) Assign stations permitted to make only PBX calls to Class of Service 07 and make sure that the trunk access codes are programmed in program #44.
- d) Assign stations permitted to make ONLY key system calls to Class of Service 08.

5.41 Digit Absorbing:

- 5.42 The system may be programmed to absorb (ignore) the 1st digit dialled. When an 'absorb' digit is dialled, the system will ignore that digit each time it is dialled as the 1st digit and will not advance the digit counter. If the digit is dialled again, or repeatedly dialled, the digit will continuously be absorbed. A maximum of 4 digits may be programmed as 'absorb' digits.
- 5.43 Certain central offices (mostly the step-by-step type), primarily located in areas where the number of "local call" exchanges is small, are arranged to absorb specific digits when dialled as the 1st digit. This arrangement is used to reduce the amount of switching equipment required for handling local traffic.
- 5.44 When toll restriction is provided, it is imperative that the restriction circuits be able to determine when the C.O. will recognize a digit as the 1st digit that will be switched for call routing purposes. This can determined (generally) by the installer using the following procedure:
 - 1. Check the local telephone directory for the "local call" exchange listings. These are generally listed in the first few pages of the book. Write down the 1st digit of each exchange listed. Example: 2, 3, 5, 8 & 9. Note that 4, 6 & 7 are not listed.
 - 2. In most cases, vacant levels (4, 6 % 7 in the example) will return a tone signal or an announcement. However, 411 and 611 are sometimes used for local information and telephone repair, respectively, and a tone signal or an announcement will not be received until after the 2nd or 3rd digit has been dialled.
 - Dial the 1st digit of a local exchange. Then dial 0 (zero). If the call is routed to an operator

- (for toll completion), the 1st digit was probably absorbed. Repeat the procedure 2 or 3 times for verification.
- 4. If the action in step 3 proves that the 1st digit is absorbed, the installer must determine if the digit will be absorbed more than one time. (The toll restriction circuits will not permit a zero to be dialled as a 2nd digit.)
- 5. Repeat step 3, dialling the absorb digit twice. If the operator can be reached when "0" is dialled as the 3rd digit, the absorbed digit should be programmed in program #46.

5.45 ECPU-A Installation (with EROU-A):

- 5.46 When toll restriction is implemented in systems with an ECPU-A, an EROU-A circuit card must be installed. The ECPU-A must be strapped for operation with the EROU-A. Strap the ECPU-A as follows:
 - a) Located in the upper front corner of the ECPU-A card is a small strapping field. Refer to figure 17 for location.
 - b) Remove straps 9-10 and 11-12. A soldering iron is required.
 - c) Add straps 9-12 and 10-11.
- 5.47 Install the ECPU-A card in the ECPU-A/B card position. Refer to figure 7 in section 2 for location. No other straps or adjustments are required.

5.48 EROU-A Installation:

5.49 The EROU-A card is installed in the MISC card position. Refer to figure 7 for location. No strapping or adjustments are required.

5.50 Programming Operation Changes:

- 5.51 In systems without an ECPU-B or an EROU-A card, all calls in the system are released when the DATA ENTRY key is depressed again to return to the call- processing program. This is because the system has not kept up with real time during programming.
- 5.52 In systems with an ECPU-B or an EROU-A card installed, the system "freezes" when the DATA ENTRY key is

depressed and remains in that state until the DATA ENTRY key is depressed the 2nd time to return to call-processing (existing calls have not been released). Depending upon the state of the system at the time the DATA ENTRY key is depressed, some programs may or may not be permitted to be changed. These conditions are as



If efforts to program under the following conditions are attempted, the system will ignore operation of the DSS key.

- If a C.O. line is in the ringing mode, programs 20 through 28 and NT (ringing groups and station assignments to ringing groups) CAN NOT be changed.
- b) If any C.O. line is in use, program 33 or 35 CANNOT be changed.
- When a C.O. line is in use, that C.O. line CANNOT be programmed as a private line (programs 47-52).
- d) If paging is in progress, programs IZ1-IZ4 and EZ1-EZ2 (Paging pro-grams) CANNOT be changed.
- 5.53 When the ECPU-B or the EROU-A is installed, and the system is behind a PBX, program 44 must be programmed to provide the line access code(s) for the system. Refer to table 20 for programming details.

5.54 Toll Restriction Programming:

- 5.55 Before programming is initiated to implement toll restriction, the Program Record Form (see table 4) should be completed for programs 39, 41, 42, 44, 45 and 46.
- 5.56 Refer to the following tables for programming details:

Table 17 - Station Class of Ser-

Table 18 - Max. Per. Code Digits

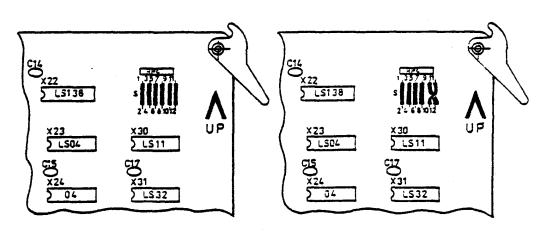
Table 19 - Permitted Codes

Table 20 - PBX Access Codes Table 21 - Non-restricted Codes

Table 22 - Digit Absorb Numbers

Care must be exercised when programming for toll restriction. The system is arranged to provide most of the desired toll restriction functions. However, misapplication of the programs capability or improper programming can override the objectives of toll restriction and provide the station user with means to defeat the desired purpose of the programmer.

"READ" indicators are placed in the tables to alert programmers so that objectives of their efforts cannot be defeated by the station In the final analysis, the programming of the system determines the overall effectiveness of Remember: the system. system can be defeated, the station user will find the way to do



No EROU-A Installed

B. EROU-A Installed

Figure 17 - ECPU-A Strapping For Use With EROU-A Card

Table 6

	GROUP RINGING ASSI	GNMENTS - PROGRAMS 20-23	
	TO PROGRAM	VERIFICATION	
1.	Check that the SW1 switch on the ECMU card is in the' ON position. Refer to figure 8 in section -2.	None.	SAMPLE PROGRAM (group 1 1-4)
2.	Lift the DSS station handset. System will not write when the handset is on-hook.	DSS key lights for the DSS station.	(group 2 5-10) (group 3 none)
3.	Depress the DATA ENTRY key on the DSS console. See figure 16.	MW button LED lights. DSS key LED for the DSS station goes out. Call-processing stops.	KEY DISPLAY DE 0,0 0,0 DSS20 0,0 0,0 01 0.0 0.1
	In systems without an EROU-A, calls in progress of pressed. Programming can be accomplished regard. In systems with an EROU-A, the system will maint ENTRY key is depressed. Programs 20-23 CANNOT be incoming ring mode.	less of the C.O. line status. ain the call status existing when the DATA	01 0,0 0,1 # 0,0 0,0 DSS21 0,0 0,0 04 0,0 0,4 # 0,0 0,0 # 0,0 0,0
	16 a "1" is programmed in Program 20, at least of Group 1 (Program 21).	ne C.O. line must be programmed into Line	OSS22 0,0 0,0 10 0,0 1,0
	Refer to paragraphs 2.06-21 through 2.06-23 for	assigning lines to groups.	* 0,0 0,0 * 0,0 0,0
4.	Depress DSS key #20 (to set up group ringing).	DSS key lights. Display = 0,0 0,0. If the display shows 0,0 0,1, group ringing has already been programmed.	DSS23 0,0 0,0 00 0,0 0,0 * 0,0 0,0 # 0,0 0,0
5.	Dial "1" to set up group ringing.	Oisplay = 0,0 0,1.	0E
	Dial "O" if group is not required (reprogramming).	Oisplay = 0,0 0,0.	
6.	Oial "*". 00 NOT dial "*" more than once. A 2nd "*" will write 0,0 in the program re- gardless of the digit dialled.	Oisplay = 0,0 0,0.	
7.	Dial "#".	Display = 0.0 0.0. DSS #20 LED goes out.	
8.	If group ringing <u>WAS</u> programmed, go to step 9. If group ringing <u>WAS NOT</u> programmed, depress the DATA ENTRY key.	MW LED will go out. DSS station LED will processing will resume. Note: If the system was programmed for group ringing and the DATA ENTRY key was depressed, the alarm will sound if no ringing groups are established.	light. Call-
9.	Depress DSS key #21 (Lines in group 1)	DSS key lights. Display = 0,0 0,0. If dinumber in the last two positions, the number the last line number assigned in the group	er indicates
10.	Dial the number of the last C.O. line to be in the ringing group (e.g., for the 5th line, dial "05".	Display = 0,0 + number dialled.	
11.	Dial "*".	Display = 0,0 0,0.	
12.	Dial "#".	OSS LED goes out. Display = 0,0 0,0.	
13.	Repeat steps 9 through 12 for groups 2 and 3 (programs 22 and 23), or go to next step.	As in steps 9 through 12.	
14.	Depress the DATA ENTRY key.	MW LED goes out. DSS station key LED will processing resumes.	light. Call-

If, when the DATA ENTRY key is depressed the 2nd time, the alarm sounds, one or more of the DSS 21-23 key LED's may light. The system has not resumed call-processing. If the system must be returned to service, this can be accomplished by switching off the power and then turning the power back on. This will return the system to service as it was before programming started. For programming to continue, an ERROR must be corrected. Check for the following, then reprogram:

- a) When a "1" is programmed in step 5, at least one C.O. line must be assigned in Line Group 1.
- b) There can be no overlapping of lines between the groups (e.g., group 1, lines 1-8 and group 2, lines 5-10 IS NOT permitted).
- c) Private lines may NOT be assigned in a ringing group.
- d) A line that does not exist in the system may NOT be assigned in a ringing group (e.g., Line 27 in the system).

Table 7

	STATION ASSIGNMENTS TO RINGI	NG GROUPS - PROGRAMS 24-27	
	TO PROGRAM	VERIFICATION	
	Check that the SWI switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.	
	Lift the DSS station handset. System will not write when handset is on-hook.	DSS key lights for the DSS	station.
	Depress the DATA ENTRY key on the DSS console. See figure 16.	MW button LED lights. DSS station goes out. Call-pro	key for the DSS cessing stops.
e e lesc	In systems without an EROU-A, calls the DATA ENTRY is depressed. Program regardless of C.O. line status. In systems with an EROU-A, the system status existing when the DATA ENTRY 24-27 CANNOT be accomplished if any ing ring mode. Refer to paragraphs 2.06-24 through	mming may be accomplished m will maintain the call key is depressed. Programs C.O. line is in the incom-	Group 1 stations 21,22,23 \$ 26 KEY DISPLAY DE 0,0 0,0 DSS24 0,1 0,0 21 0,1 2,1
4.	Depress DSS key for Ringing Group (Group 1 - DSS24, Group 2 - DSS25, Group 3 - DSS26 or Group 4 - DSS27).	OSS key lights. Display = 0,1 0,0. If display shows digits in last 2 positions, station has been programmed.	* 0,2 ?,? 22 0,2 2,2 * 0,3 ?,? 23 0,3 2,3 * 0,4 ?,?
5.	Dial number of 1st station in group.	Display = 0,1 + number.	26 0,4 2,6
6.	Oial "*".	Oisplay = 0,2 ?,?	0,5 ?,?
	Repeat steps 5 & 6 for each station in the group.	As in sample program.	* 0,6?,? * 0,00,0
8.	When there are no more stations in the group, dial "O", "O".	As in sample program.	?,? = DSS sta #
9.	Dial "*".	As in sample program.	(initialized)
10.	Dial "≢".	DSS key LED goes out. Oisp	lay = 0,0 0,0.
	Repeat steps 4 through 10, for all ringing groups (programs 25, 26 & 27]. If no lines are assigned in a group, dial "0", "0".	As in steps 4 through 10.	
12.	Depress DATA ENTRY key.	MW button LED goes out. DS: will light. Call-processing	S station LED g resumes.

If, when the DATA ENTRY key is depressed the 2nd time, the alarm sounds, one or more of the DSS 24-27 key LED's may light. The system has not resumed call-processing. If the system must be returned to service, this can be accomplished by turning off the power and turning the power back on. This will return the system to service as it was before programming started. For programming to continue, an ERROR must be corrected. Check for the following, then reprogram:

- a) A station may NOT be assigned to more than 1 ringing group; this includes NITE and COMMON audible groups.
- b) Station numbers programmed must be valid numbers.
- c) For less than 10 stations in the group, 00 must be dialled as the last station.

Table 8

NITE & COMMON C.O. AUDIBLE STATIO	N ASSIGNMENTS - PROGRAMS NT & 28	
TO PROGRAM	VERIFICATION	
 Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2. 	None.	
 Lift the DSS station handset. System will not write when handset is on-hook. 	DSS key lights for the DSS station.	
 Depress the DATA ENTRY key on the DSS console. Refer to figure 16. 	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.	
In systems without an EROU-A, calls the DATA ENTRY key is depressed. Proceedings of C.O. line status. In systems with an EROU-A, the system status existing when the DATA ENTRY NT and 28 CANNOT be accomplished if coming ring mode. Refer to paragraphs 2.06-28 and -NT	m will maintain the call key is depressed. Programs any C.O. line is in the in- DE 0.0 0.28 0.1 2.	42 49 ,0 ,0
4. Depress the NT (NITE) key. Programming for stations in NITE C.O. audible group - maximum 20 stations.	OSS key lights. Display = 0,3?, 0,10,0. If display shows 00 0,30, digits in last 2 positions. = 0,4?, a station is programmed. # 0,00,	?
5. Dial number of 1st station in group.	Display = 0,1 + number. DSS28 0,1 ?,	?
6. Dial "*".	Oisplay = $0,2?,?$ 42 0,24,	, 2
 Repeat steps 5 and 6 for each station to be assigned in the group. 	As in sample program. 0,3?, 0,3?, 0,4?,	,0
 When there are no more stations in the group, dial "O", "O". 		. 0
9. Dial "*".	As in sample program. ?,? = DSS &tc.	
10. Dial "#".	DSS key LED goes out. (initialized) Display = 0,0 0,0.	}
11. Repeat steps 4 through 10 for the Common Audible Group (Program 28). If no lines are in the group, dial "O", "O".	As in steps 4 through 10. Note that the USS station is already programmed.	
12. Depress the DATA ENTRY key.	MW button LED goes out. DSS station LED will light. Call-processing resumes.	

If, when the DATA ENTRY key is depressed the 2nd time, the alarm sounds, one or more of the DSS 24-28 & NT key LED's may light. The system has not resumed call-processing. If the system must be returned to service, this can be accomplished by turning off the power and turning the power back on. This will return the system to service as it was before programming started. For programming to continue, an ERROR must be corrected. Check for the following, then reprogram, as required.

- a) A station may NOT be assigned to more than 1 ringing group; this includes ringing groups 1-4 as well as common and night groups.
- b) Station numbers programmed must be valid numbers.
- c) If the ring group is not full, 00 must be dialled as the last station in the group.

Table 9

OFF-HOOK SIG., DSS OVERRIDE, DND, RECALL	TIMING & C.O. PULSING PROGRAMS (29-33)				
TO PROGRAM	VERIFICATION				
 Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2. 	None.				
Lift the DSS station handset. System will not write when handset is on-hook.	DSS key lights for the DSS station.				
 Depress the DATA ENTRY key on the DSS console. Refer to figure 16. 	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.				
[In systems without an EROU-A, calls in key is depressed.	n progress are dropped when the DATA ENTRY				
In systems with an EROU-A, the system when the DATA ENTRY zey is depressed.	will maintain the call status existing				
Refer to paragraphs 2.06-29 through -	33 for program information.				
4. Off-hook Signalling: 5. DSS Overrid	e: 6. C.O. Type Pulsing:				
NO YES NO	YES DP DTMF				
KEY DISPLAY KEY DISPLAY KEY DISPLAY	REY DISPLAY KEY DISPLAY KEY DISPLAY				
DE 0,0 0,0 DE 0,0 0,0 DE 0,0 0,0 DSS29 0,0 0,? DSS30 0,0 0,? DSS30 0,0 0,? DSS30 0,0 0,0 # 0,0 0,0	DE 0,0 0,0 DE 0,0 0,0 DE 0,0 0,0 DE 0,0 0,0 DSS30 0,0 0,? DSS33 0,0 0,? DSS33 0,0 0,? DSS33 0,0 0,2 DSS33 0,0 0,0 0,0 DSS33 0,0 0,0 0,0 DSS33 0,0 0,0 DE DE DE				
If system is programmed for If system is profiled to the system is profiled to the stations will have off-hook dant may overrise signalling on both ICM and tion in the Do-1.0. Endible calls. (CND) mode.	he DSS atten-programming cannot be accom- de any sti-plished is a C.O. Line is in				
7. Depress the DSS #31 key (DND program).	DSS key lights. Display = 0,0 0,0.				
8. Dial the 1st station number requiring the CND feature.	Display = number dialled + 0,0.				
9. Dial "*". Dial "1". Dial "*".	Display = 0,0 0,0.				
10. Repeat steps 8 and 9 for all stations to have the DND feature. Only stations requiring DND are programmed.	As in steps 8 and 9.				
11. After all stations are entered dial "#"	DSS #31 LED goes out. Display = 0,0 0,0.				
12. Depress DSS key #32 (Set Recall Timing) DSS key lights. Display = 0,0 0,0. I display shows a digit in the last 2 po sitions, time interval is programmed.					
13. Dial a digit $(0-8)$ to set time interval	13. Dial a digit $(0-3)$ to set time interval Display = 0.0 + number dialled				
0 = NO recall. 3 = 48 seconds. 6 = 96 seconds. 1 = 16 seconds. 4 = 64 seconds. 7 = 112 seconds. 2 = 32 seconds. 5 = 80 seconds. 8 = 128 seconds.					
14. Star "*". Stal "#".	Display = 0,0 0,0.				
15. Depress DATA ENTRY key.	MW button LED goes out. DSS station LED lights. System resumes call-processing.				
Later the second					

Table 10

	PBX OPERATION, FLASH KEY AND	MEET-ME-ANSWER PROGRAMS (34-36)
	TO PROGRAM	VERIFICATION
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.
2.	Lift the OSS station handset. System will not write when handset is on-hook.	OSS key lights for OSS station.
3.	Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.



(In systems without an EROU-A, calls in progress are dropped when the DATA ENTRY key is depressed.

In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.

Refer to paragraphs 2.06 -34 through -36 for program information.

L	(Kejet to putingraphs 2.08 - 34 through - 38 job program diffoundation.					
4.	Depress OSS key #34 (PBX Operation). If system is behind a PBX, see table 20 for programming PBX access codes.	OSS key lights. Display = 0.0 0.0. If 0.1 appears in the last 2 positions, PBX operation is programmed.	KEY DISPLAY			
	If system is NOT behind PBX, dial "O". If system IS behind PBX, Dial "1".	Display = 0,0 0,0. Display = 0,0 0,1.	DE 0,0 0,0 DSS34 0,0 0,2 1 0,0 0,1 * 0,0 0,0			
6.	Dial "*".	Oisplay = 0,0 0,0.	* 0,00,0			
7.	Oial "#".	OSS #34 LED gaes out.	0E			
3.	Depress OSS key #35 (Flash Key). If EROU-A is equipped, programming can only be accomplished when NO C.O. lines are in use.	DSS key lights. Display = 0,0 0,0. If 0,1 or 0,2 appears as the last 2 digits, flash key is programmed.	SAMPLE PRUGRAM ("open Loop") KEY DISPLAY DE 0,00,0			
10.	For NO flash key, dial "0". For "grounding button", dial "1". For "open loop" flash", dial "2". Oial "*". Dial "#".	Display = 0,0 0,0. Display = 0,0 0,1. Display = 0,0 0,2. Display = 0,0 0,0. Display = 0,0 0,0.	DSS35 0,0 0,? 2 0,0 0,2 * 0,0 0,0 * 0,0 0,0 DE			
12.	Depress OSS key #36 (Meet-Me-Answer).	DSS #35 LED goes out. OSS key lights. Display = 0,0 0,0. If 0,1 appears in the last 2 positions, Meet- Me-Answer is programmed.	KEY DISPLAY			
13.	For NO "Meet-Me-Answer", dial "O". To bave "Meet-Me-Answer", dial "I".	Oisplay = 0,0 0,0. Display = 0,0 0,1.	DE 0,0 0,0 DSS36 0,0 0,? 0 0,0 0,0			
14.	Dial "*".	Display = 0,0 0,0.	* 0,0 0,0 * 0,0 0,0			
15.	Oial "#".	DSS #36 LED goes out. Display = 0,0 0,0.	DE			
16.	Depress the DATA ENTRY key.	MW button LED goes out. OS will light. Call-processin	S station LED g resumes.			

Table 11

<u> </u>	SET UP DIAL GROUPS, DIAL GROUP STA	ATIONS & ALARM DETECTION (37-38 & ALM)
	TO PROGRAM	VERIFICATION
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.
2.	Lift the DSS station handset. System will not write when handset is on-hook.	DSS key lights for DSS station.
3.	Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.

In systems without an EROU—A, calls in progress are dropped when the DATA ENTRY key is depressed.

In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.

Refer to paragraphs 2.06 -37, -38 & -ALM for program information.

4.	Depress DSS key #37 (Dial Groups)	DSS key lights. Display = 0,0 ?,?.	SAMPLE PROGRAM 2 groups
5.	If 2 groups are NOT required in the system, dial "OO".	Display = 0,0 0,0.	5 in 1st group KEY DISPLAY
	If 2 groups ARE required, dial the number of the last C.O. line in the 1st group (if 5th line, dial "05").	Oisplay = 0,0 0,5.	DE 0,0 0,0 DSS37 0,0 ?.? 05 0,0 0,5
6.	Dial "*".	Display = $0.00.0$.	* 0,0 0,0 * 0,0 0,0
7.	Dial "#".	OSS LED goes out. Ofsplay = 0,0 0,0	DE
8.	Depress DSS key #38 (Dial Group Stations)	OSS key lights. Display = 0,0 0,0.	SAMPLE PROGRAM (sta. 39 only)
Э.	Dial the number of the 1st station for category B or C. Dial "*".	Display = number + 0,0.	KEY DISPLAY DE 0,0 0,0
10.	Dial "1" for 1st Dial Group ONLY.	Display = number + 0.1.	DSS38 0,0 0,0 39 3,9 0,0
11.	Oial "*".	Oisplay = 0,0 0,0.	* 3,9 0,0
12.	Repeat steps 9 through 11 for all Category B and C stations.	As in steps 9 through 11.	1 3,9 0,1 * 0,0 0,0 # 0,0 0,0
13.	After all stations, dial "#".	DSS LED goes out.	DE
14.	Depress DSS key ALM (Alarm Detection).	OSS key LED lights. Display = 0,0 0,?	SAMPLE PROGRAM (no detection)
15.	If alarm detection requires an "open contact", or NO detection, dial "O".	Display = 0,0 0,0.	KEY DISPLAY DE 0.0 0.0
	If alarm detection requires a "break contact", dial "1".	Display = 0,0 0,1.	OSSALM 0,0 0,? 0 0,0 0,0
16.	Dial "+".	Display = 0,0 0,0.	* 0,0 0,0 * 0,0 0,0
17.	Oial "#".	DSS key LED goes out. Display = 0,0 0,0	DE
18.	Depress the DATA ENTRY key.	MW button LED goes out. OSS will light. Call-processing	

Table 12

	PRIVATE LINE ASSIGNMENTS - PROGRAMS 47-52					
		TO PROGRAM	VERIFICATION			
1.	1. Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.		None.			
2.	tem	t the DSS station handset. Sys- will not write when handset is hook.	DSS key lights for DSS statio	on.		
3.		ress the DATA ENTRY key on the console. Refer to figure 16.	MW button LED lights. DSS ki station goes out. Call-proc	ey for DSS essing stops.		
		In systems without an EROU-A, car ENTRY key is depressed.	lls in progress are dropped who	en the DATA		
		In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.				
}		The MAXIMUM number of Private Lines AND Hotlines CANNOT EXCEED 6.				
res		Program 47 assigns ECOU line cir Program 48 assigns ECOU line cir Program 49 assigns ECOU line cir Program 50 assigns ECOU line cir Program 51 assigns ECOU line cir Program 52 assigns ECOU line cir	cuit 22 for Private Line #2. cuit 23 for Private Line #3. cuit 24 for Private Line #4. cuit 25 for Private Line #5.			
		In systems with an EROU-A, a privile in use.	vate line cannot be programmed	if that line		
4.		ress the OSS key for the program assign the private line.	OSS key lights. Display = 0.0 0.0. If display shows digits in last 2 positions, a station has been assigned to that private line.	SAMPLE PROGRAM (station 36 as- signed P.L. #2) KEY DISPLAY		
5.		I the station number to be as- ned the private line.	Display 0,0 ÷ number.	TE 0,0 0,0 DSS48 0,0 ?,? 36 0,0 3,6		
ó.	Dia] "#".	Display = 0,0 0,0.	* 0,0 a,a		
7.	Oia	l "∌".	Display = 0,0 0,0. DSS LED goes out.	# 0,0 0,0 DE		
8.	Dep	ress the DATA ENTRY key.	MW button LED goes out. DSS will light. Call-processing	station LED resumes.		

If, when the DATA ENTRY key is depressed the 2nd time, the alarm sounds, one or more of the DSS 47-52 key LED's may light. If the system must be returned to service, this can be accomplished by turning off the power and turning the power back on. This will return the system to service as it was before programming started. If programming is to continue, an ERROR must be corrected. Check the following, then reprogram, as required:

- a) The same stacion CANNOT be assigned to two or more private lines.
- b) Station numbers must be valid numbers.

Table 13

	HOTLINE ASSIGNMENTS - PROGRAMS 53-58		
TO PROGRAM VERIFICATION			
ECM	ck that the SWI switch on the U card is in the ON position. er to figure 8 in section -2.	None.	
2. Lift the DSS station handset. System will not write when handset is on-hook.		DSS key lights for DSS stat	ion.
3. Dep DSS	ress the DATA ENTRY key on the console. Refer to figure 16.	MW button LED lights. DSS I station goes out. Call-pro	
	In systems without an EROU-A, cal ENTRY key is depressed.	ls in progress are dropped w	ien the DATA
	In systems with an EROU-A, the sy when the DATA ENTRY key is depress	stem will maintain the call be sed.	status existing
373A	The MAXIMUM number of Private Lin	es AND Hotlines CANNUT EXCEE	7 6.
हिस्ती)	Program 53 assigns ECOU line circuit 21 for Hotline #1. Program 54 assigns ECOU line circuit 22 for Hotline #2. Program 55 assigns ECOU line circuit 23 for Hotline #3. Program 56 assigns ECOU line circuit 24 for Hotline #4. Program 57 assigns ECOU line circuit 25 for Hotline #5. Program 58 assigns ECOU line circuit 26 for Hotline #6.		
	If the ECOU circuits have been proprom will be cancelled when the	eviously assigned as privatz e ECOU is reassigned as a hox	lines, that Line.
	ress the DSS key for the program assign the hotline.	OSS key lights. Display = 0,0 0,0. If display shows digits in all 4 positions, the station numbers shown have been assigned to that hotline.	SAMPLE PROGRAM (stations 23 & 37 assigned HL *3) KEY DISPLAY DE 0,0 0,0
	l the station number of 1 of the tations to be assigned.	Oisplay = Number + 0.0.	OSS55 ?,? ?,? 23 2,3 0,0 * 2,3 0,0
6. Dia	10-gp.11	Display = Number + 0,0.	37 2,3 3,7
ass	I the other station number to be igned.	Display = 1st number + 2nd number.	# 0,0 0,0 # 0,0 0,0 DE
8. Dia	1 "7"	Display = 0,0 0,0.	
9. Dia] 11 gm .	OSS LED goes out. Display =	0,0 0,0.
		MW button LED goes out. DSS will light. Call-processing	
of the locan be return to cont	If, when the DATA ENTRY key is depressed the 2nd time, the alarm sounds, one or more of the DSS 53-58 key LED's may light. If the system must be returned to service, this can be accomplished by turning off the power and turning the power back on. This will return the system to service as it was before programming started. If programming is to continue, an ERROR must be corrected. Check the following, then reprogram.		
o) Star	b) Station numbers must be valid numbers.		

Table 14

INTERNAL PAGING ASSIGNMENTS - PROGRAMS IZ1-IZ4		
TO PROGRAM	VERIFICATION	
 Check that the SWI switch on the ECMU card is in the ON position. Refer to figure 8 in section -2. 	None.	
 Lift the OSS station handset. Sys- tem will not write when the handset is on-hook. 	OSS key lights for the OSS	station.
 Depress the DATA ENTRY key on the DSS console. See figure 16. 	MW button LED lights. DSS station goes out. Call-pro	key for the DSS cessing stops.
When the system is equipped with plished while paging is in progree The following rules apply for associal All stations assigned in a zoof Stations may only be assigned at the number of the stations of the system.	ss. igning stations to internal ; ne must be consecutively num! in one zone.	paging zones:
4. Depress DSS key for zone to be pro- grammed (Zone 1 - IZI, Zone 2 - IZ2, Zone 3 - IZ3 on Zone 4 - IZ4).	OSS key lights. Display = 0,0 0,0. If stations have been assigned in a zone, display will show 1st and last station numbers assigned in the zone.	INTERNAL PAGING SAMPLE PROGRAM (zone 1 - 20-23) (zone 2 - 24-32) (zone 3 - 33-36) (zone 4 - 37-42)
 Dial the number of the lowest sta- tion to be assigned in the zone. 	Display = number + ?,?.	KEY OTSPLAY DE 0,0 0,0
5. Dial "*".	Display = number + ?,?.	171 2,0 2,9
 Qial the number of the highest sta- tion to be assigned in the zone. 	Display = 1st number + 2nd number.	20 2.0 2,9 2.0 2,9 23 2,0 2,3
8. Dial "*".	Display = 0,0 0,0.	* 0,00,0 * 0,00,0
9. Ofal "#".	Display = 0,0 0,0. OSS key LED for the zone goes out.	1Z2 3,0 3,9 24 2,4 3,9
10. Repeat steps 4 through 9 for re- maining internal zones or skip to step 11.	As in steps 4 through 9.	2, 4 3, 9 32 2, 4 3, 2 0,0 0,0 4 0,0 0,0
II. Depress the DATA ENTRY key.	MW button LED goes out. OSS station LED will light. Call-processing resumes.	IZ3 4,04,9 33 3,34,9 * 3,34,9 36 3,33,6
If, after the DATA ENTRY key is depressed the 2nd time, the alarm sounds, any of the DSS keys IZI-IZ4 may light. The system has not resumed call-processing. If the system must be returned to service, this can be accomplished by switching off the power and turning the power back on. This will return the system to service as it was before programming started. If programming is to continue, an ERROR for programming started. If programming is to continue, an ERROR and the found. Check the following and reprogram, as required. a) Stations have not been assigned to more than one zone. b) Station numbers assigned in each zone are valid. c) The lowest numbered station is entered 1st, then the highest numbered station.		

Table 15

CALLED A CARLO SONE O	OTTONO DECCAME 571 572	
TO PROGRAM	PTIONS - PROGRAMS EZ1-EZ2 VERIFICATION	
1. Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.	
 Lift the OSS station handset. Sys- tem will not write when the handset is on-hook. 	DSS key lights for the DSS s	tation.
 Depress the DATA ENTRY key on the DSS console. See figure 16. 	MW button LED lights. DSS k station goes out. Call-proc	
When the system is equipped with plished while paging is in progre The following rules apply for ass at Each zone may be programmed f b) The data, when entered will b 0 = No BGM in the external zo 1 = BGM in the external zone.	ss. igning options to external pa or BGM/No BGM and One C.O. cu e: ne. 0 = No C.O. audible in e	ging zones: dible group. xternal zone. in zone. in zone. in zone. (all lines ex- in zone.
4. Depress DSS key for zone to be pro- grammed (Ext. zone 1 - EZ1 ox Ext. zone 2 - EZ21.	OSS key lights. Display = 0,0 0,0. If options have been previously programmed in a zone, display will show the options previously programmed.	SAMPLE PROGRAM zone 1 - 1 & 5 zone 2 - 0 & 6 KEY DISPLAY DE 0,0 0,0
5. Dial "O" or "I" for the BGM option.	Display = number + ?,?.	Z1 0,00,0 1 0,10,0
6. Dial "*".	Display = number + ?,?.	• 0,10,0
7. Dial a single digit (0-6) for the C.O. audible option.	Display = 1st number + 2nd number.	5 0,1 0,5 * 0,0 0,0 # 0,0 0,0
S. Dial "⇒".	Display = 0,0 0,0.	EZ2 0,0 0,0
9. Dial "#".	Display = 0,0 0,0. DSS key LED for the zone goes out.	0 0,0 0,0 * 0,0 0,0 6 0,0 0,6
10. Repeat steps 4 through 9 for the other zone if required or skip to step 11.	As in steps 4 through 9.	0,00,0 # 0,00,0 DE
11. Depress the DATA ENTRY key.	MW button LED goes out. OSS will light. Call processing	

Table 16

	STATION CLASS OF SERVICE (No	EROU-A) ASSIGNMENTS - PROGRAM 39
TO PROGRAM		VERIFICATION
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.
2.	Lift the DSS station handset. System will not write when handset is on-hook.	DSS key lights for DSS station.
3.	Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.

In systems without an EROU-A, calls in progress are dropped when the DATA ENTRY key is depressed.

In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.

The following rules apply for assigning stations to a Class of Service:

- al Only stations NOT in Class 1 must be programmed after initialization.
- b) To assign Class 5 stations, dial "5" to enter the data.
- c] If system is equipped with an EROU-A, use table 17 to assign stations to a Class of Service.

}	a case of secous.		
4.	Depress DSS key #39.	OSS ley lights. Display = 0,0 0,0.	SAMPLE PROGRAM (stations 35 &
5.	Dial the station number to be assigned a Class of Service.	Display = number + 0,0. If the display shows a number in the last digit, that number is the class previ- ously assigned.	40 assigned to class 5) KEY DISPLAY DE 0,0 0,0 DSS39 0,0 0,0
6.	Oial "*".	Display = Number + ?,?.	35 3,5 0,0
7.	Dial a single digit (1 or 5) to enter the class. Class 1 will only be entered to reprogram the class.	Display + Number + class assigned.	* 3,5 C,? 5 3,5 0,5 * 0,0 0,0 40 4,0 0,0
8.	Oial "+".	Display = 0,0 0,0.	* 4,0 0,?
9.	Repeat steps 5 through 8 for all stations to be assigned to class 5 or to be reassigned to class 1.	As in steps 5 through 8.	5 4,0 0,5 * 0,0 0,0 # 0,0 0,0 DE
10.	After all entries, dial "#".	DSS key #39 LED goes out. Display = 0,0 0,0	
11.	Depress the DATA ENTRY key.	MW button LED goes out. DSS will light. Call-processing	station LED resumes.

STATION CLASS OF SERVICE ASSIGNMENTS - PE	ROGRAM 39 (Systems with ERO	U-A Installed)	
TO PROGRAM	VERIFICATION		
1. Check that the SWI switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.		
 Lift the DSS station handset. Sys- tem will not write when handset is on-hook. 	DSS key lights for DSS sta	tion.	
Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS tion goes out. Call-proce		
In systems with an EROU-A, the sys when the DATA ENTRY key is depress		status existing	
(Ese) Only station classes 2 through 8 a	Use this table only when the system is equipped with an EROU-A circuit card. Only station classes 2 through 8 must be programmed after initialization of the system. Class 1 stations need only to be reprogrammed if assigned another class previously.		
4. Depress DSS key #39.	DSS key lights. Display = 0,0 0,0.	SAMPLE PROGRAM Sta. 27 - class 5	
 Dial the station number to be as- signed a class of service. 	Display = number + 0,0.	sta. 33 - class 6 sta. 42 - class 7	
6. Dial "+".	Display = number + ?,?	KEY DISPLAY	
7. Dial a single digit U-81 to enter the class of service. Refer to paragraph 5.03 for class description.	Display = number + the as- signed class.	DE 0,0 0,0 DSS39 0,0 0,0 27 2,7 0,0 * 2,7 ?,? 5 2,7 0,5	
8. Dial "*".	Display = 0,0 0,0.	• 0,00,0	
 Repeat steps 5 through 8 for all stations requiring class assign- ments. 	As in steps 5 through 8.	33 3,3 0,0 * 3,3 ?,? 6 3,3 0,6 * 0,0 0,0	
10. After all entries, dial "#".	Display = 0,0 0,0 DSS key #39 LED goes out.	42 4,2 0,0 * 4,2 ?,?	
11. Depress the DATA ENTRY key.	MW button LED goes out. DSS station LED will light and call-processing re- sumes	7 4,2 0,7 = 0,0 0,0 # 0,0 0,0 DE ?,? = previous ?,? = assignment	

Table 18

	PERMITTED CODE	DIGITS - PROGRAM 42
	PROGRAM	VERIFICATION
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.
2.	Lift the DSS station handset. System will not write when handset is on-hook.	OSS key lights for OSS station.
3.	Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.

Use this table ONLY if the system is equipped with an EROU-A circuit card. In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.

This program should be used to set the maximum number of digits permitted when the station user dials a "permitted code" (Program 41, table 19).

If a 0 is entered as the data in this program, there is $\frac{10}{10}$ maximum number of digits limit for the station user.

Do not enter the maximum number as a don't care (DC) digit.

4.	Depress DSS key #42.	DSS key lights. Display = 0,0 ?,?.	SAMPLE PROGRAM (11 digits MAX.)
5.	Dial the maximum number of digits which may be dialled when a "per-mitted code" is dialled.	Display = 0,0 + number.	KEY DISPLAY DE 0,0 0,0 DSS42 0,0 ?,?
6.	Dial "*".	Oisplay = 0,0 0,0.	11 0,0 1,1
7.	Oial "#".	Display = 0.0 0.0. DSS key #42 LED goes out.	* 0,0 0,0 * 0,0 0,0 VE
8.	Depress the DATA ENTRY key.	MW button LED goes out. DSS station LED will light and call-processing re- sumes.	

Table 19

Table 19		
PERMITTED CODES - PROGRAM 41 (Systems with EROU-A Installed)		
TO PROGRAM	VERIFICATION	
1. Check that the SWI switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.	
 Lift the OSS station handset. System will not write when the handset is on-hook. 	OSS key lights for the OSS	
 Depress the DATA ENTRY key on the DSS console. See figure 16. 	MW button LED lights. OSS station goes out. Call-pro	cessing stops.
Use this table only when the system is equipped with an EXCU-A card. The following rules apply for programming "permitted codes". a) A maximum of eight 8-digit codes may be programmed. b) The last digits not programmed will be considered as "don't care" digits. For example: if 1-800 is programmed the station user may dial additional digits without restriction. Refer also to program 42 for maximum digits. c) Operation of the "DC" key will program a digit as a "don't care" digit. Example: if 1-DC-DC-DC-5-5-5 is programmed, the station user can reach 555-1212 in any area. All other area code calls would be restricted. d) DO NOT program the 1st digit of a permitted code with a "O" or "DC".		
CAUTION: For reprogramming of use the # button to		ogram . DC
4. Depress OSS key ∉41.	OSS key lights. Oisplay = 1,0 8,0	PROGRAM SAMPLE
5. Dial 1st permitted code.	Display = 1,? 3,?	KEY DISPLAY DE 0.0 0.0
6. Dial "=".	Oisplay = 2,0 3,0	#41 1,0 B,0
7. Oial 2nd code or skip to step 21.	Display = 2,? 8,?	1 1,1 3,1 DC 1,2 3,3
8. Dial """.	Display = 3.0 8.0	OC 1,3 8,8
9. Oial 3rd code or skip to step 21.	Oisplay = 3,? 8,?	0C 1,4 3,3 5 1,5 3,5
10. Dial "*".	Display = 4,0 8,0	5 1,6 3,5
11. Oial 4th code or skip to step 21.	Display = 4,? 3,?	5 1,7 3,5 2,0 3,0
12. Oial "*".	0isplay = 5,3 8,0	1 2,1 5,1
13. Dial 5th code or skip to step 21.	Display = 5,? 3,?	8 2,2 5,8
14. Dial "-".	Display = 6.0 8.0	C 2,3 B,0 0 2,4 B,0
15. Dial 6th code or skip to step 21.	Display = 6,? 8,?	3,0 B,0
16. Dial "*".	Display = 7,0 8,0	# 4,0.8,0 # 5,0 5,0
17. Dial 7th code or skip to step 21.	Display = 7,? 8,?	# 6,0 B,0
18. Dial "+".	Display = 8,0 8,0	# 7,0 B,0 # 8,0 B,0
19. Dial 9th code or skip to step 21.	Display = 8,? 5,?	* 0,00,0
20. Dial "*".	Display = 0,0 0.0	(8 = blank)
21. Dial "#" repeatedly until display equals 0,0 0,0.	Display = 0,0 0,0. DSS #41	
22. Depress the DATA ENTRY key.	MW LED goes out. OSS stati light. System resumes call	

Table 20

	PBX ACCESS CODES - PROGRAM 4	4 (Systems with EROU-A Installed)	
PROGRAM		VERIFICATION	
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.	
2.	Lift the DSS station handset. System will not write when handset is on-hook.	DSS key lights for DSS station.	
3.	Depress the DATA ENTRY key on the DSS console. Refer to figure 16.	MW button LED lights. DSS key for DSS station goes out. Call-processing stops.	

Use this table only when the system is equipped with an EROU-A circuit card. In systems with an EROU-A, the system will maintain the call status existing when the DATA ENTRY key is depressed.

The following rules apply for programming PBX Access Codes for reaching C.V. lines when the system is installed behind a PBX.

- a) Up to 4 C.O. line access codes may be programmed.
- b) Access codes may be 1 or 2 digits. The 2nd digit may be programmed as a "don't care" digit by depressing the "DC" key when applicable. A "DC" digit appears as a blank digit in the display.
- cl 00 NOT enter the 1st digit of an access code as a "don't care" digit.
- d) 90 NOT enter a "don't care" digit as a Ind digit if the access code is a single digit. The toll restriction program will NOT examine the Ind digit when programmed as a "don't care" digit.

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4.	Oepress (OSS key #44.	OSS key lights. Display = 1,0 8.0.	SAMPLE PROGRAM (Assume cocies
5.		1st access code (1 or 2 r 1 digit and "DC").	Display = 1,1 + access code. "Don't care" appears as a blank digit.	91,92,93,94,95 and 8 are used) KEY DISPLAY
6.	Oial "*"	•	Display - 2.0 3.8.	DE 0,0 0.0
7.		teps 5 and 6 for additional odes up to a maximum of 4 step 8.	As in sample program.	DSS44 1,0 8,0 9 1,1 8,9 DC 1,2 9,8 2,0 3,0
8.	After al edly unt	l entries, dial "#" repeat- il display = 0,0 0,0.	Display = 0,0 0,0.	\$ 2,13,8 * 3,08,0
9.	Oepress	the DATA ENTRY key.	MW button LED goes out. DSS station LED will light. Call-processing resumes.	# 4,0 8,0 # 0,0 0,0 DE
	CAUTION: For reprogramming or adding entries to this program use the # button to bypass the existing program. DO NOT use the * button to bypass the existing entries.		B - BLANK	
	NOTE:	TE: If the PBX provides universal night answering or call pickup using dial access codes, it is suggested that those codes be programmed as trunk access codes. This will prevent loop-around to defeat the tall restriction program by using those codes.		

Table 21

	COMMON UNRESTRICTED CODES - PROGRAM	45 (Systems with EROU-A Installed)
	TO PROGRAM	VERIFICATION
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	None.
2.	Lift the DSS station handset. System will not write when the handset is on-hook.	DSS key lights for the DSS station.
3.	Depress the DATA ENTRY key on the DSS console. See figure 16.	MW button LED lights. DSS key for the DSS station goes out. Call-processing stops.

Use this table only when the system is equipped with an EROU-A circuit card. The following rules apply for programming "common unrestricted codes".

- 2) A maximum of four 4-digit codes may be programmed.
- b) The system recognizes only the digits programmed as the unrestricted code. No additional digits may be dialled by the station user.
- c! Operation of the "OC" key will program a digit as a "don't care" digit. Example: on dial tie-lines, 3-OC-OC would permit access to all 300 numbered stations on the other end. (Example assumes that an access code is used to reach the tie-line(s).)
- d) 00 NOT program the 1st digit of an unrestricted code as a "O" or "DC".

CAUTION: For reprogramming or adding entries to this program use the # button to bypass the existing program. DO NOT use the * button to bypass the existing entries.

•	Depress DSS key #45.	OSS key lights. Display = 1,0 B,0	PROGRAM SAMPLE (911,411 & 611)
5.	Dial 1st unrestricted code.	Display = 1,? 8,?	KEY DISPLAY
6.	Dial "*".	Display = 2,0 8,0	DE 0,00,0
7.	Dial 2nd code or skip to step 13.	Oisplay = 2,? B,?	#45 1,0 8,0
8.	Oial "*".	Display = 3,0 8,0	9 1,1 8,9
9.	Dial 3rd code or skip to step 13.	Display = 3,? B,?	1 1,3 8,1
10.	Dial "*".	Display = 4,0 8,0	2,0 8,0 4 2,1 8,4
11.	Dial 4th code or skip to step 13.	Display = 4,? 8,?	1 2,2 8,1
12.	Dial "*".	Display = 0,0 0,0	1 2,3 8,1 = 3,0 8,0
13.	Dial "#" repeatedly until display equals 0.0 0.0.	Display = 0.0 0.0. OSS #45 LED goes out.	6 3,1 3,6 1 3,2 8,1
14.	Depress the DATA ENTRY key.	MW button LED goes out. OSS station key LED will light. System resumes call processing.	1 3,3 8,1 * 4,0 8,0 * 0,0 0,0 (B = blank)

Table 22

	DIGIT ABSORB NUMBERS - PROGRAM	4 46 (Systems with EROU-A Installed)		
	TO PROGRAM	VERIFICATION		
1.	Check that the SW1 switch on the ECMU card is in the ON position. Refer to figure 8 in section -2.	No ne.		
2.	Lift the DSS station handset. System will not write when the handset is on-hook.	DSS key lights for the DSS station.		
3.	Depress the DATA ENTRY key on the DSS console. See figure 16.	MW button LED lights. DSS key for the DSS station goes out. Call-processing stops.		

Use this table only when the system is equipped with an ERUU-A circuit card. The following rules apply for programming "digit absorb numbers".



- a) A maximum of four single digit numbers may be programmed. When these numbers are dialled as the 1st digit (either once or repeatedly), they will be ignored by the tall restriction program. Refer to paragraph 5.41.
- 6) 00 NOT program an absorb digit as a "0" or "1".

CAUTION: For reprogramming or adding entries to this program use the # button to bypass the existing program. CO NOT use the * button to bypass the existing entries.

4. Oepress OSS key 46.	OSS key lights. Display = 1,0 8.0	PROGRAM SAMPLE (2 & 3)
5. Dial 1st absorb digit.	Display = 1,1 8,?	KEY DISPLAY
6. Oial "+".	Oisplay = 2,0 8,0	DE 0,0 0.0
7. Dial 2nd digit or skip to step 13.	Display = 2.I 8.?	#46 1,0 8,0 2 1,1 8,2
8. Dial "*".	Ofsplay = 3,0 8,0	* 2,0 3,0
9. Dial 3rd digit or skip to step 13.	Oisplay = 3,1 8,?	3 2,1 8,3 * 3,0 8,0
10. Dial "*".	Display = 4,0 B,0	# 4,0 8,0
11. Dial 4th digit or skip to step 13.	Display = 4,1 8,?	* 0,00,0
12. Oial "*".	Display = 0,0 0,0	(8 = blank)
<pre>13. Ofal "#" repeatedly until display equals 0,0 0,0.</pre>	Display = 0,0 0,0. DSS #46 LED goes out.	
14. Depress DATA ENTRY key.	MW button LED goes out. Di LED will light. System re- processing.	

SECTION 4 - OPERATIONAL TESTS & FAULT LOCATION

1.00 INTRODUCTION

1.01 This section provides the information and procedures necessary to test the operational features of the TIE EK-2260B key telephone system. Information is also provided to assist the installer when the expected result of an operational test does not occur.

2.00 GENERAL

- 2.01 The operational tests, which should be made to ensure proper operation of all features at all stations, have been divided into four categories, as follow:
 - 1. C.O. line and ICM tests.
 - 2. System features.
 - 3. Station tests.
 - 4. DSS console tests.
- 2.02 The tests in each category are indexed in table 23. Test procedure location is also provided.
- The test procedures have been arranged to minimize the amount of time required to completely test a system. Tests in categories 1 and 2 can be performed using 2 telephone sets. tion tests must be performed at each station and the DSS tests performed at each DSS position.
- If a problem situation developes during operational testing, refer to paragraph 4.00 for information on use of the troubleshooting flowcharts. Verification information in the operational test tables assumes that the system has been tested using the following sequence:

- CO/ICM tests are made 1st and all C.O. and ICM lines are tested.
- System tests are made before station and DSS tests.
- Station tests. These tests will verify that the telephone set and station card function together to perform all station set functions.
- DSS console tests. These tests will verify the special functions of each DSS position.

TEST PROCEDURE 3.00

- 3.01 To expedite testing of the system and to minimize the time required to complete the tests, the following sequence is recommended.
 - Establish two telephones, close to each other, for testing categories 1 and 2. Two persons should perform the tests; each with a copy of the procedure. C.O. line, intercom, and system tests will be performed at these two stations.
 - b) Upon successful completion of the tests in categories 1 and 2, one person should test each station with the other person assisting from the DSS position.
 - c) Finally, the DSS console(s) should be tested. When 2 DSS positions are equipped, both should be completely tested. This can be accomplished with one person at each DSS position.

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Table 23 - Operational Test Index

		Table 23 - Operational Test Index		
CATEGORY	TEST	OPERATIONAL TEST	PAGE	
		Outgoing Call.		
	2 `	Dialling.	1	
	3	I-Hold.	4-3	
	4	MOH Verification.		
C.O.	5 6	Exclusive Hold.		
LINE	6	Flash Key.		
TEST	8	Incoming Call.	4-4	
, 20.	9	Incoming Answer.		
	11	Automatic Recall Timing.		
	12	Automatic Hold Release.	4.5	
	13	Power Failure.	4-5	
	14	Seizure.		
	15	Busy Tone.	4-6	
	16	Talkback.	. •	
INTERCOM	17	Handset to Handset.		
TEST	18	Signal Calling.	ì	
ILJI	19	Off-Hook Signalling	4-7	
	20	Do-Not-Disturb.	7 ,	
	21		ł	
	22	Alternate Point Answer.	4-8	
	25	Microphone Mute. Add-On Conference - C.O. Line.		
	25	Add On Conference - U.U. Line.	4-9	
	26	Add-On Conference - Intercom.		
		Add-On Conference - C.O. & ICM.		
CVCTEM	28	Alarm Repeating.	4-10	
SYSTEM	29	Background Music (BGM).		
FEATURES		C.O. Audible Signalling.	4-11	
	31	Paging.	4-11	
	33	Meet-Me-Answer Timing.	4-12	
	34	External Paging Zones.	4-12	
	36	All-Call.		
	37	Key Tests.	4-13	
	38	Dial Tests.		
	39	Hotline Test.	1	
	40	Private C.O. Line.		
	41	Flash Key Operation (Open Loop Flashing).	4-14	
STATION	42	Flash Key Operation (Grounding Button Flash).		
TESTS	43	Do-Not-Disturb.		
	44	Dial Restriction.		
		Dial (Toll) Restriction	4-15	
	46	Line Restriction.		
	47	Repertory Dialling.		
	49	Last Number Recall.	4-16	
	50	Key, LED & Message Waiting Test.	4-17	
DSS	51	Signal Calling Tests.		
CONSOLE	52	DSS Override.	4-18	
TESTS	53	Night Transfer.		
	54	Distinctive Indications.	4-19	
	56	DSS Selection.		

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C.O. LI	NE TESTS
TEST	VERIFICATION
 Outgoing Call: Lift the station handset at the 1st station (sug- gest that the 1st station be a Common 	Station LED lights at the DSS console.
Audible station). Depress a C.O. line key.	C.O. line LED lights at all stations. Dial tone received.
Dialling: When dial tone is re- ceived, dial a known telephone number.	Dial pulses or DTMF tones heard in hand- set. After pulsing, C.O. audible ring- back tone is received from distant end.
When called party answers -	Conversation is possible between both telephones.
3. I-Hold: Depress the HOLD button one time.	Line LED at calling telephone flutters at 5 times per second (300 IPM).
·	Line LED at all other telephones winks at approximately 2 times per second (100 IPM).
	C.O. line number and station number appear in display on the DSS console (AB= line number,CD=station number).
I-Hold Release: At the 2nd tele phone, lift the handset and depress the C.O. line key of the held line.	Station LED lit at DSS console. Second telephone connected to calling party. C.O. line LED at all telephones lit steadily. Held line number no longer displayed at DSS console.
4. MOH Verification: Verify that the called party received music while the line was on hold.	Verification received from held party (if MOH is provided in the system).
5. Exclusive Hold: At the 2nd tele phone, depress the HOLD button 2 times.	C.O. line LED at 2nd telephone "double- winks" each second.
Clines.	C.O. line LED at all other telephones lit steadily. Held line and holding station numbers displayed at the DSS console.
Exclusive Hold Release: At the 1st telephone, depress the winking C.O. line button.	Conversation NOT possible with called party.
At the 2nd telephone, depress the winking C.O. line key.	Conversation reestablished with calling party. C.O. line LED lit steadily at all telephones. Held line no longer displayed at the DSS console.

TEST	TESTS continued VERIFICATION
6. Flash Key: If system is pro- grammed for "open loop" flash key operation.	
Seize a C.O. line.	As in Test #1.
Dial any digit.	Dial tone removed.
Depress the Flash key.	Dial tone returns.
Repeat tests 1 through 6 for all common C.O. lines in the system.	As in tests #1 through #6.
8. Incoming Call Tests:	
Select the last C.O. line at the 1st telephone. Call the directory number of the 1st common C.O. line in the system.	As in tests #1 and #2. C.O. audible heard at Common Audible stations. Ringing C.O. line LED flashes at approximately 1 time per second (50 IPM) at all telephones.
Incoming Answer: At the 2nd tel- ephone, lift the handset.	Station LED lights at the DSS console.
Depress the flashing C.O. line key.	C.O. line LED lit steadily at all stations. C.O. audible stops. Conversation possible with 1st telephone.
10. Repeat tests 8 and 9 by calling all the remaining C.O. lines in the system.	As in tests #8 and #9.
11. Automatic Recall Timing: At the 1st station, lift the handset, depress a C.O. line key and dial an- other C.O. line in the system.	As in test #8.
At the 2nd station, answer the incoming call.	As in test #9.
At the answering station, depress the HOLD button twice (Exclusive Hold).	As in test #5. Calling telephone re- ceives MOH, when provided.
Time the duration of the HOLD period before C.O. audible is heard at the station which placed the call on hold.	Time to recall is the same as the time interval programmed in Program #32.
Reanswer the call at the 2nd station.	Conversation restored with the 1st tele- phone.
DO NOT HANGUP - GO TO TEST #12.	

C.O. LINE	TESTS continued	
TEST	VERIFICATION	
12. Automatic Hold Release: At the		
2nd telephone, place the call on HOLD again.		
At the KSU "A" block, short the C.O. line clips for the line placed on HOLD (winking line button). Refer to table 1 for clip location.		
13. Power Failure: If the system is equipped with power failure ringers or telephones, turn off the power switch on the system power supply.	All LED's go out and system does not function.	
Go off-hook at each "originating pow- er failure" station.	Dial tone received and outside calls are possible.	
Dial the number of each C.O. line.	Power failure bells ring for each line and calls may be answered at each "answer" station.	
RETURN POWER TO THE SYSTEM		
END OF C.O. LINE TESTS		

ICM CARDS REQUIRED	EICU-B EQUIPPED			EICU- EXPU-		
SYSTEM			ICM	LINES		
CONFIG.	1	2	3	4	5	6
SYSTEMS WITH NO DSS CONSOLE	1st ICM CALL	2nd ICM CALL	3rd ICM CALL	4th ICM CALL	5th ICM CALL	6th ICM CALL
SYSTEMS WITH ONE DSS CONSOLE	FROM 1st	1st ICM CALL	2nd ICM CALL	3rd ICM CALL	4th ICM CALL	5th ICM CALL
SYSTEMS WITH TWO DSS CONSOLES	DSS ONLY	FROM 2nd DSS ONLY	1st ICM CALL	2nd ICM CALL	3rd ICM CALL	4th ICM CALL

INSTALLER NOTES ON C.O. LINE TESTS:

INTERCOM TESTS

NOTES ON INTERCOM TESTING:

- 1. To make intercom tests on all ICM lines, requires that all ICM lines except the one under test be "made busy". This is accomplished by going off-hook at a station, depressing the ICM button and leaving the telephone off-hook. There is NO time-out period on the ICM lines.
- 2. If the system is equipped with a DSS console, the 1st ICM line is dedicated to the DSS console.
- 3. If the 2nd DSS console is equipped, the 2nd ICM line is dedicated to the 2nd DSS console.
- 4. All ICM lines not dedicated to the DSS consoles are selected by the system in consecutive order starting with the lowest ICM line available. The table on the preceding page shows which ICM lines are seized depending upon system configuration when the request for an ICM line is made.

ICM TEST PREPARATION PROCEDURE

To test the ICM lines, make sure that all stations in the system are on-hook. No station LED's should be lit at the DSS console. Lift the handset at the 1st test telephone location and depress the ICM button. This will seize the 1st ICM line which is available to all stations. Depending on the number of ICM lines available to all stations, go to other telephones and seize the remaining ICM lines. Note the ICM line seized at each telephone. At this point all ICM lines are seized by specific telephones. When all ICM lines are busy the ICM LED will be lit at all stations.

TEST	VERIFICATION
14. Seizure: At the 1st telephone	Dial tone heard in the handset. LED in the ICM button lit steadily. Station key lit steadily at the DSS for all off-hook telephones.
15. Busy Tone: Dial the ICM number of one of the telephones holding the other ICM lines.	Busy tone (50 IPM) heard in the handset.
16. Talkback: Hangup the handset.	ICM LED's goes out.
Lift the handset and reseize the ICM line.	As in test 14.
Dial the ICM number of an idle station. DO NOT HANGUP.	Called station LED winks at the DSS console. ICM LED at the called station flutters. Splash tone heard from the calling station handset and from the called station loudspeaker. Conversation possible between the handset and and the on-hook telephone.

INTERCOM T	ESTS CONTINUED
TEST 17. Handset to Handset: At the talk back station, lift the handset.	VERIFICATION No change, same as test 16 except that the voice from the calling station is muted.
Depress the ICM button at the talk- back station.	ICM LED's at both stations lit steadily. Both station LED's steady at the DSS. Talkback no longer possible. Handset to handset conversation possible.
18. Signal Calling: Hangup both stations. Reseize the ICM line.	Same as test 14.
Call an idle station by dialling the ICM number + 1 (e.g., station 23, dial 231).	ICM audible heard at called station. ICM LED flashes at 50 IPM.
19. Off-Hook Signalling: Hangup. Reseize the ICM line.	Same as test 14.
Repeat test 18 to an off-hook station which is connected to a C.O. line.	If the system IS programmed for off-hook signalling, muted ICM audible is heard at called station. ICM LED flashes at 50 IPM.
	If the system IS NOT programmed for off- hook signalling, busy tone (50 IPM) is received at calling station.
20. Do-Not-Disturb: Hangup both stations. Do this test if any station in the system is programmed for DND. Reseize the ICM line.	Same as test 14.
At a station programmed for DND, depress the DND button 1 time.	DND LED lit steadily.
On the ICM line, call the DND station.	Fast busy (100 IPM) tone heard at call- ing station.
21. Alternate Point Answer: Hangup. Reseize the ICM line.	Same as test 14.
Call an idle station.	Same as test 16.
At a 3rd station, go off-hook and dial the ICM number of the talkback station. DO NOT depress the ICM button before dialling.	3rd station connected handset to handset with the calling station.
Hangup both telephones.	

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INTERCOM T	ESTS CONTINUED
TEST	VERIFICATION
22. MIC Mute: The DND button is a dual-purpose button. It enables the DND feature when a station has been been programmed for that feature. It also serves as the "mic mute" button. For microphone muting, the DND button is depressed twice at DND stations or one time at a non-DND station. When mic muting is activated, the DND LED flashes at 50 IPM.	
Reseize the ICM line.	Same as test 14.
At a 2nd station, activate the "mic mute" feature.	DND LED flashes at 50 IPM.
Call the station with the "mic mute" active.	Double splash-tone heared at both stations. Calling party CAN be heard by the called party. Called party CANNOT be heard by the calling party. ICM LED flashes at 50 IPM at called station.
At the called station, depress the DND button again.	ICM LED flutters. DND LED goes out. Talkback heard at the calling station.
23. Repeat tests 14 through 22 for the remaining ICM lines. Keep the ICM line just tested 'busy' by depressing the ICM key at a station and leaving the station off-hook until the remaining lines are tested.	Same as tests 14 through 22.
24. After all ICM lines have been tested, hangup up all telephones holding ICM lines. The dedicated ICM lines are tested as part of the DSS	

END OF INTERCOM TESTS

INSTALLER NOTES ON INTERCOM TESTS:

console tests.

SYSTEM FEATURE TESTS

System features are features controlled by the microcomputers in the system which are not directly related to any one line or station. These features are:

> Add-On Conference Alarm Repeating Background Music (BGM) C.O. Audible Signalling Paging

It is assumed that the C.O. lines and ICM lines have been tested and are functioning in accordance with tests 1 through 24 at this time.

TEST	VERIFICATION
<pre>25. Add-On Conference - C.O. Line: (2 lines and 1 station) Make a C.O. line call to another line in the system.</pre>	Same as test 1 and 2
Answer the incoming call at another station (2nd station).	Same as tests 8 and 9.
At the 1st station, depress ADD-ON button.	Call placed on "exclusive hold", same as test 5. Held party receives MOH.
Make a 2nd C.O. line call to another line in the system.	Same as tests 1 and 2.
Answer the incoming call at a 3rd station.	Same as tests 8 and 9.
Depress the ADD-ON button again.	All three telephones receive beep tone are connected together
26. Add-On Conference - Intercom:(3 internal stations)Make an ICM call to another station.	Same as tests 14 and 16.
Answer the ICM call with the handset.	Same as test 17.
At either station, depress the ADD-ON button.	Dial tone received at calling station.
Dial another ICM station.	Same as tests 14 and 16.
Answer the 2nd call with the handset.	Same as test 17.
Depress the ADD-ON button again.	All three stations receive beep tone and are connected together.

CVCTFM	FFATURE	TFCTC	continued	

VERIFICATION TEST 27. Add-On Conference - C.O. & ICM: (1 C.O. line and 2 stations) Make a C.O. line call to another line Same as tests 1 and 2. in the system. Answer the incoming call at another Same as tests 8 and 9. station. Call placed on "exclusive hold", same as At the 1st station, depress ADD-ON button. test 5. Held party receives MOH. Same as tests 14 and 16. Depress the ICM button and call another station. Answer the ICM call with the handset. Same as test 17. All three parties receive beep tone and Depress the ADD-ON key again. are connected together on C.O. line. ICM LED's go out. Alarm sounds at DSS console. If the NT Alarm Repeating: If the system button at the DSS is lit, alarm will is programmed for alarm activasound at all telephones. tion by a "closed" circuit, shortcircuit clips 31/32 on the B8 block. If the system is programmed for alarm Same as above. activation by an "open" circuit, remove one of the bridging clips from 31/32 on the B8 block. BGM, when provided, at all telephones 29. Background Music (BGM): Verify and the proper external paging zone(s). that BGM is present at all stations and, if programmed, in the external paging zone(s). With the handset on-hook, depress the BGM goes on or off. "#" button to turn the BGM on or off. 30. C.O. Audible Signalling: From a station, seize a C.O. line and call each line in the system. If the tests are made from the DSS, night audible stations can be verified at the same time by depressing the NT key. Verify that.... C.O. audible received at all stations All lines except private lines ring at common audible stations. in group. All Ring Group 1 lines ring at Same as above. all Group 1 stations.

Cont'inued

CVCTEM	FFATIIDE	TFCTC	continued

TEST TEST	E TESTS continued VERIFICATION
30. Continued.	
All Ring Group 2 lines ring at all Group 2 stations.	C.O. audible received at all stations in the group.
All Ring Group 3 lines ring at all Group 3 stations.	Same as above.
All Ring Group 4 lines (lines not in groups 1, 2 or 3) ring at Group 4 stations.	Same as above.
All lines except private lines ring at the night stations when the NT key is lit at the DSS.	Same as above.
Each private line rings at the correct station (one sta. only).	C.O. audible received at the correct station.
C.O. audible in an external page zone is from lines in the cor- rect ringing group.	Only lines in the programmed ringing group ring in the external zone.
31. Paging: From a station, lift the handset, and seize an ICM line.	As in test 14.
Dial the access code for the 1st internal page zone (dial code 81).	BGM, if provided, removed. Paging possible to all stations in the zone. IZ1 LED lit at the DSS console. Splash tone heard from loudspeakers in the zone and in the callers handset.
If the system is programmed for "Meet Me Answer" on paging, dial "*" after the page. Wait for answer.	Paging station can no longer be heard at telephones in the page zone.
At a station in the page zone, lift the handset and dial "8". Do not depress ICM button before dialling.	Answer station connected to the calling station. ICM LED lit at both stations. IZ1 LED at DSS goes out.
Hangup.	ICM LED goes out. BGM restored to appropriate stations in zone.
32. Repeat test 31 for each internal paging zone. Meet Me Answer test is not required for each zone. Access codes are:	Same as test 31.
Zone 2 access code, 82. Zone 3 access code, 83. Zone 4 access code, 84.	IZ2 lights at DSS. IZ3 lights at DSS. IZ4 lights at DSS.

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SYSTEM FEATURE TESTS continued		
TEST	VERIFICATION	
33. Meet Me Answer Timing: Repeat test 31 from any station but DO NOT answer the page. The page cirtimes the response period. Approximately 30 seconds after the "*" button is depressed, the paging circuit times out.	At the end of the timing period, Zone LED goes out at the DSS and caller receives busy tone (50 IPM).	
34. External Zones: Lift the hand- set at any station, depress the ICM button, and dial the access code for the 1st external zone (85).	BGM, if programmed in the zone, is removed. Splash-tone heard in the caller's handset and from all loudspeakers in the zone. Paging is possible to all loudspeakers in the zone. EZ1 LED lit at the DSS console.	
Background music in zone.	See test 29.	
C.O. audible in zone.	See test 30.	
35. Repeat test 34 for the 2nd external zone (dial code 86).	Same as test 34. EZ2 lights at DSS.	
36. All-Call: Lift the handset at any station, depress the ICM button, and dial code 80.	Same as test 31. IZ1-IZ4 and EZ1-EZ2 LED's light at the DSS console.	
END OF SYSTEM FEATURE TESTS		

INSTALLER NOTES ON SYSTEM FEATURE TESTS:

NOTES ON STATION TESTING:

- 1. The following tests assume that tests 1 through 36 have been completed and all common C.O. lines, the ICM lines and system features are functioning properly.
- 2. These tests will verify that the station set and the station card (ESTU) can function together, transmit and receive data from each other, and perform all functions peculiar to each station. The tests are simple and require a minimum of time at each station.
- 3. If "verification" results are not obtained on a test, simply swap the set with another to determine whether is set is at fault or the station card should be replaced.
- 4. Station tests to be performed are:

Key Tests
Dial Tests
Hotline Tests
Private C.O. Line Tests
Flash Key Tests
Do-Not-Disturb
Dial Restriction
Line Restriction
Repertory Dialling
Last Number Recall

TEST	VERIFICATION
37. Key Tests: Lift the handset at the station.	Station LED lights at the DSS console.
Depress the 1st C.O. line key.	Dial tone received and C.O. LED lights.
Repeat for all common C.O. line keys.	Same as above.
Depress the HOLD key.	LED flutters in last line key depressed.
Depress the fluttering line key.	Dial tone returns and LED lit steadily.
Depress the DND key.	LED in DND key lights. Steady
Depress the MON key.	LED in MON key lights. flashing.
Depress the DC key.	LED in ICM key lights. Dial tone heard.
38. Dial Tests: Select ICM numbers of existing stations which have all of the digits 0-9 (e.g., 20, 26, 31, 37, 45, 48 & 49).	
At the station under test, lift the handset, depress the ICM button and dial the 1st station number selected.	Called station goes into talkback mode, and called station key flashes at the DSS console.
Comb	i inuad

Continued

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TEST	VERIFICATION
38. Continued.	
Depress ICM again.	Dial tone returns.
Repeat the process for each ICM num- per selected.	Same as above.
39. Hotline Test: If the station has been programmed for a hot-line, lift the handset. Depress the notline (HL) button.	Five tone bursts heard in handset and from loudspeaker of called station. HL LED at called station flutters. HL LED at calling station lit steadily.
Answer the hotline call. Lift the nandset and depress the "HL" button.	Conversation possible between both hotline stations. HL LED at called statio changes to steady.
40. Private C.O. Line: If the sta- tion has a private C.O. line, test the line as in tests 1 thru 6.	Same as tests 1 through 6.
At another station, originate a call on any C.O. line to the private line number.	C.O. audible heard at private line station. C.O. line LED flashes at 50 IPM.
Answer the call at the private line station.	C.O. audible stops. Conversation possible with calling station. C.O. line LE lit steadily.
41. Flash Key Operation: (Open Loop Flashing) If system is programmed for "open loop" flashing, lift the handset and depress a CO/PBX line key.	Dial tone received.
Dial "1".	Dial tone removed.
Momentarily depress the FLASH key.	Dial tone returns.
42. Flash Key Operation: (Grounding Button Flash) If the system is equipped and programmed for "grounding button" operation behind a PABX, have the PBX attendant extend an incoming trunk to the station. After the attendant has disconnected from the trunk, momentarily depress the FLASH key.	
43. Do-Not-Disturb: If the station has been programmed for DND, momentarily depress the DND button ONE time.	DND LED lights <u>steadily</u> .

		STS continued
AA KIST	TEST	VERIFICATION If the station is permitted to dial on
(Sys	Restriction: tems Without ECPU-B or U-A card.)	C.O. lines (class 00), dial tone will be removed. If the station is not permitted C.O. line dialling (class 5), caller
5.	the in plat Group I and dial	will receive fast busy tone. If system is equipped with an EROU card the line will disconnect.
With Seize a l	(Toll) Restriction: (System ECPU-B or EROU-A Card) ine in Dial Group 1 and test on for class restrictions.	
Class 1	No dial restrictions.	All calls should reach destination.
Class 2	Permitted codes and common unrestricted codes only.	Unauthorized calls return fast busy tone and C.O. line is dropped.
Class 3	Local calls, permitted codes and unrestricted codes only.	Same as above.
Class 4	1+7 toll calls, local calls, permitted codes and unrestricted codes only.	Same as above.
Class 5	1+7 toll calls, local calls and unrestricted codes only.	Same as above.
Class 6	Local calls and unrestricted codes only.	Same as above.
Class 7	Unrestricted codes only.	Same as above.
Class 8	Intercom calls only.	If a call is attempted on a C.O. line, fast busy tone is returned and C.O. lind dropped after 1st digit dialled.
46. Line Restriction: Seize a Group 2 line (if dial groups have been programmed in the system) and dial 5.		If station IS permitted dial access to Group 2 lines, dial tone is removed. I station IS NOT permitted dial access to Group 2 lines, fast busy tone is returned. If the system is equipped with an ECPU-B or an EROU-A, the line will disconnect.
tem dialling, 16 digits ory. Sto 10 throug depress ' position,	ertory Dialling: If the sysis equipped for repertory, 16 telephone numbers up to solve long may be stored in memorage positions are numbered ph 25. To program a number, "DC", and dial the storage, then the number (e.g., DC, 1212). 555-1212 will be	

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STATION TESTS continued		
TEST	VERIFICATION	
47. continued.		
stored in position 10. To recall the number, depress DC + the storage position.		
Lift the handset and WITHOUT seizing a line, depress the "DC" button.	ICM LED lights and dial tone received.	
Dial 10 + the code for local information.		
Hangup.		
Lift the handset and seize a C.O. line.	C.O. dial tone received. LED lit in line key.	
Depress "DC", then dial 10.	Local information operator reached.	
48. Test 47 may be repeated for any of the storage positions (10-25) when required.	Same as test 47.	
49. Last Number Recall: The tele- phone will redial the last num- ber keyed in when "DC" and "*" are depressed.		
Seize a line. Dial the number of another line and hangup.		
Lift the handset and depress a C.O. line button.	C.O. dial tone received.	
Depress "DC', then depress "*".	Line previously dialled will ring in.	
Hangup.		
END OF S	TATION TESTS	

INSTALLER NOTES ON STATION TESTS:

NOTES ON DSS CONSOLE TESTS:

- 1. The following tests will check all the functions of the DSS console(s). The dedicated intercom path will be tested as well as all special functions of the console. It is assumed that the keys, LED's, and data transmission to and from the KSU function properly at the primary DSS, if that DSS was used for programming the system.
- 2. The following tests are performed in this test phase:

Key and LED tests Message Waiting Test Signal Calling Test DSS Override Night Transfer Test

VERIFICATION

TEST 50. Key, LED & Message Waiting Test: This test will check the key, LED and message waiting function for all equipped stations in the system. At the DSS under test, lift the handset.

Depress the DSS key for the lowest numbered equipped station in the system (except the DSS station).

Depress the MW button.

Depress the DSS key for the next equipped station.

Depress the MW button.

quipped stations in the system.

At one of the stations with a flashing HOLD key, lift the handset, depress the ICM button and dial "1".

To cancel the MW signals, hangup the DSS station handset. Depress MW, then the station key. Repeat the process for all stations (MW, station key, MW, station key, etc.).

Station LED lit steadily on the DSS console.

Splash tone heard in the DSS station handset and from the loudspeaker of the called station. Station key LED winks (50 IPM) in the DSS console. ICM LED at called station flutters. Talkback possible from the called station.

HOLD key at called station flashes at 50 IPM.

Previous station LED continues to wink. Same results as previous station.

HOLD key at called station flashes.

Repeat the above two steps for all e-| Same as previous steps. All station keys at the DSS for equipped stations continue to wink. HOLD keys at all stations continue to flash.

> Calling station is routed to the DSS which turned on the message waiting indicator.

> Station key LED at DSS and HOLD LED at the station goes out as each DSS key is depressed.

	TESTS continued VERIFICATION
TEST	
51. Signal Calling Tests: Lift the the the handset at the DSS station.	DSS station LED lights on the DSS console.
Depress the station key for an idle station.	Splash tone heard in DSS station hand- set and the called station loudspeaker. ICM LED at called station flutters. Talkback possible.
Depress the "SC" button.	ICM audible heard in DSS handset and at called station. ICM LED flashes (50 IPM). Station key at DSS winks.
Answer the called station with the handset.	No change.
Depress the ICM button at the called station.	ICM LED at called station and station LED at DSS lit steadily. Handset to handset conversation possible.
Hangup both stations.	All LED's go out.
52. DSS Override: At a station programmed for DND, depress the DND button one time. This puts the station in the DND mode.	DND LED at the station lit steadily. Station key at the DSS flutters.
At the DSS console, signal the DND station.	If the system IS programmed for DSS Override, double splash tone is heard both stations. Talkback IS NOT possi- ble from the called station. If the system IS NOT programmed for DSS Override, attendant receives busy tone
At the station; to talkback to the attendant, depress the DND button 2 times.	DND LED at station goes out. Station key at DSS winks. Talkback now possible.
Hangup.	All LED's go out.
53. Night Transfer: At the DSS console, seize a C.O. line and call another line in the system (not a private line).	Same as test 1 and 2.
When C.O. audible is received, depress the NT key.	C.O. audible heard from all stations in the NITE C.O. audible group.
Answer the ringing line.	Same as test 9.
Hangup.	All LEDs go out.

DSS CONSOLE	TESTS continued
TEST	VERIFICATION
54. Distinctive Indications: At a station, depress the MON button.	
Depress the ICM button.	Dial tone received. ICM LED lit stead- ily. Station LED winks at DSS. MON LED changes to steady.
Dial another station number.	ICM LED at called station flutters. Station LED winks at DSS. Talkback pos- sible.
Lift calling station handset.	MON LED goes out. Station LED at DSS changes to steady.
Lift called station handset. Depress the ICM button.	ICM LED changes to steady. Station LED at DSS changes to steady.
55. If the 2nd DSS console is equipped in the system, repeat test 50 at the 2nd DSS console. Tests 51 through 54 are common system functions and need not be retested for the 2nd console.	Same as test 50.
56. DSS Selection: At a station, lift the handset, depress the ICM key and dial "O" (zero).	Talkback possible from the primary (1st) DSS position.
Hangup, reseize an ICM line and dial "9".	Talkback possible from the second DSS position.
END OF DSS	CONSOLE TESTS

INSTALLER NOTES ON DSS CONSOLE TESTING:

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4.00 FAULT LOCATION

- 4.01 The following pages provide fault locating flowcharts for use in event of unexpected results of operational tests or when customer trouble reports TIE's EK-2260B system is are received. equipped with plug-in type circuit cards for easy replacement when required. Some of the fault location procedures require replacement of circuit cards to provide an indication as to fault location.
- 4.02 Spare Circuit Cards: Following is a list of circuit cards which should be kept in inventory for system maintenance purposes.

ECPU-A/B EDTU-A ECMU-A/C EICU-B ECOU-C/D ESTU-C/D ETSU-D/E

If systems are in service which are not equipped with a DSS console, it is recommended that a console be available from the service shop or from stock for reprogramming purposes. An inventory of telephones and DSS console(s) should be maintained also.

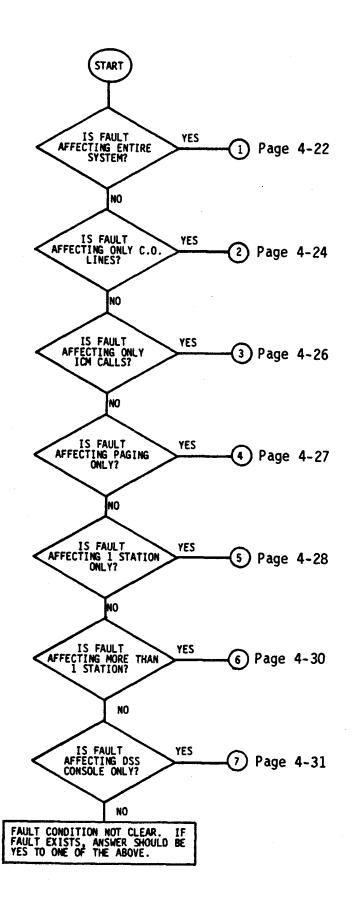
4.03 Test Equipment: No special test equipment is required for maintaining or troubleshooting the EK-2260B system. However, a lineman's hand test set ("butt set"), a buzzer type continuity test set or test lamps MUST NOT be used for testing in the system (except when specified). When continuity tests of the KSU wiring are required, power must be removed from the KSU and an ohmmeter used for the tests. When voltage measurements are required, a voltmeter having a sensitivity of at least 20,000 ohms per volt should be used.



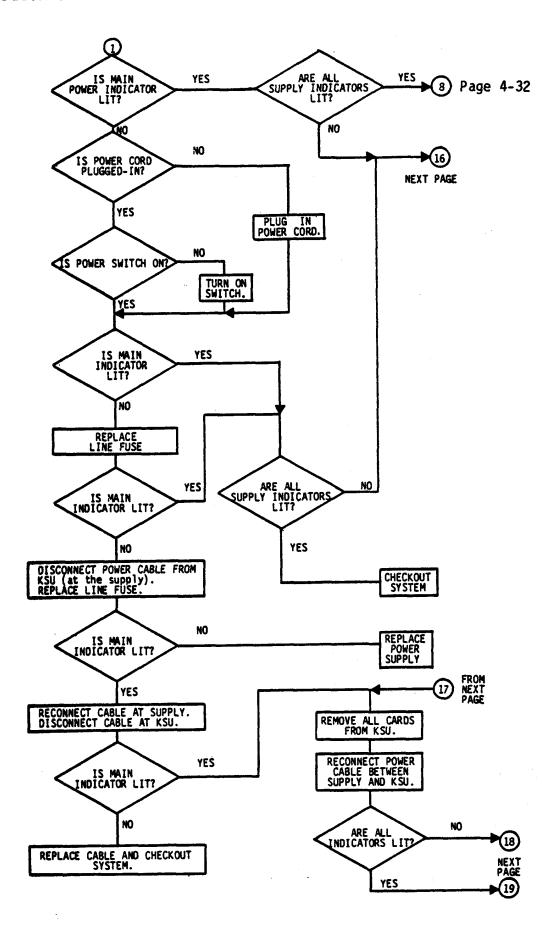
When circuit cards are to be re-placed or plugged into the KSU, refer to par. 4.01 through 4.05 in section -2 for card insertion and removal procedures.

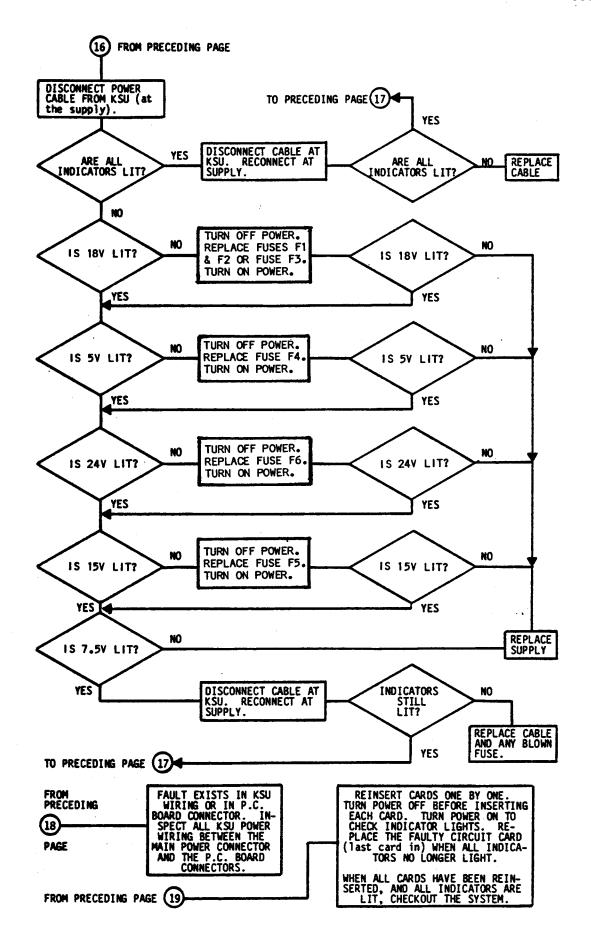
4.05 Using the Flowcharts: The flowcharts should be used as a diagnostic tool whenever the results of an operational test are unexpected or when trouble reports are received. The flowcharts may be used for locating a fault in the KSU, a station set or the DSS console.

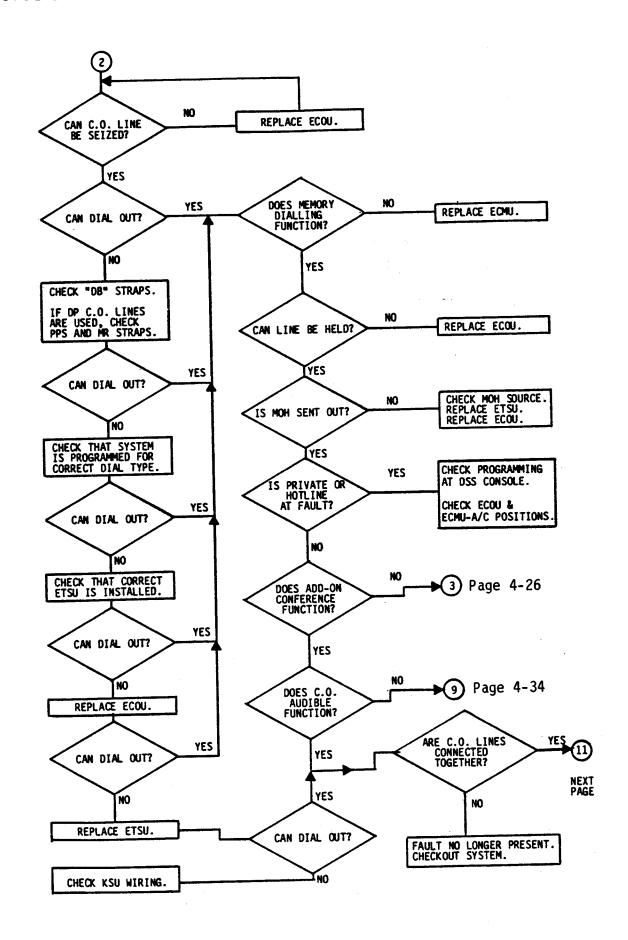
- 4.05 If fault location is required as a result of an operational test failure at time of installation, the following should be checked prior to initiating fault location procedures:
 - If the problem involves specific telephones and/or the DSS console, fuses on the ESTU-C/D station card should be checked as well as the station cable wiring and termina-Refer to paragraphs 4.22 and 4.23 in section 2 for stations served by each ESTU-C/D circuit card. Figure 11 shows the fuse layout of the station card.
 - If the problem involves a feature that is programmable from the DSS console, the programming should be checked as outlined in section -3.
 - If the problem involves a specific C.O. line, that C.O. line should be checked at the KSU or the KSU "A" block before fault location is The problem should be isolated to either inside or out-Table 1 shows side the system. the layout of the KSU "A" block. When an "A" block is provided, each line may be opened (bridging clip removed) for isolation of the When an "A" block is not fault. provided, the T & R leads of the C.O. line must be checked on pins of the RJ-21X connector.
- 4.06 If the problem still exists after the above conditions have satisfied, proceed with the fault been location process. Start with the 1st flowchart on the following page.
- 4.07 Figures 18, 19 and 20 are provided as an aid in understanding the building blocks of the system and to give installation and maintenance personnel a more comprehensive knowledge of the sys-The block diagrams are general in their make-up and all of the components shown may or may not be equipped in any given system.

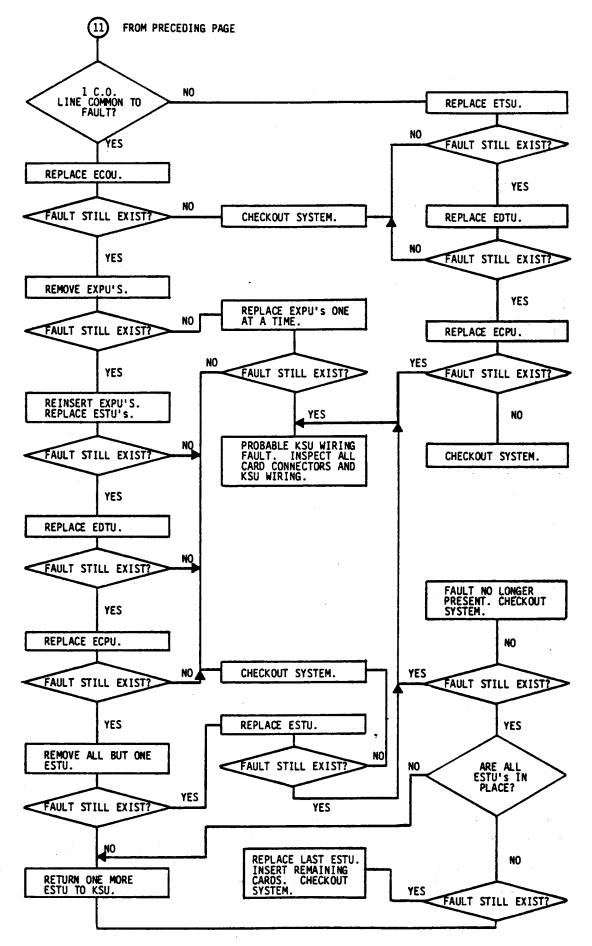


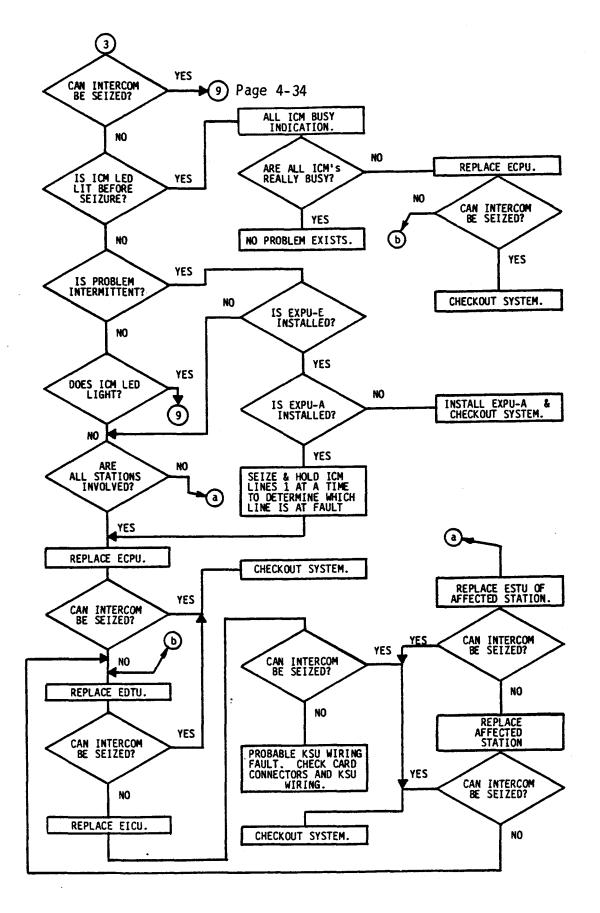
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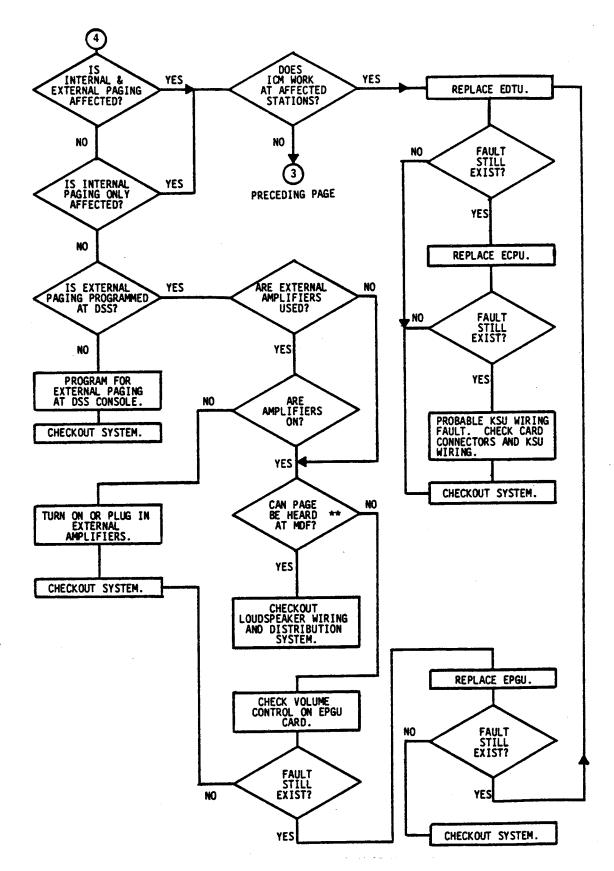




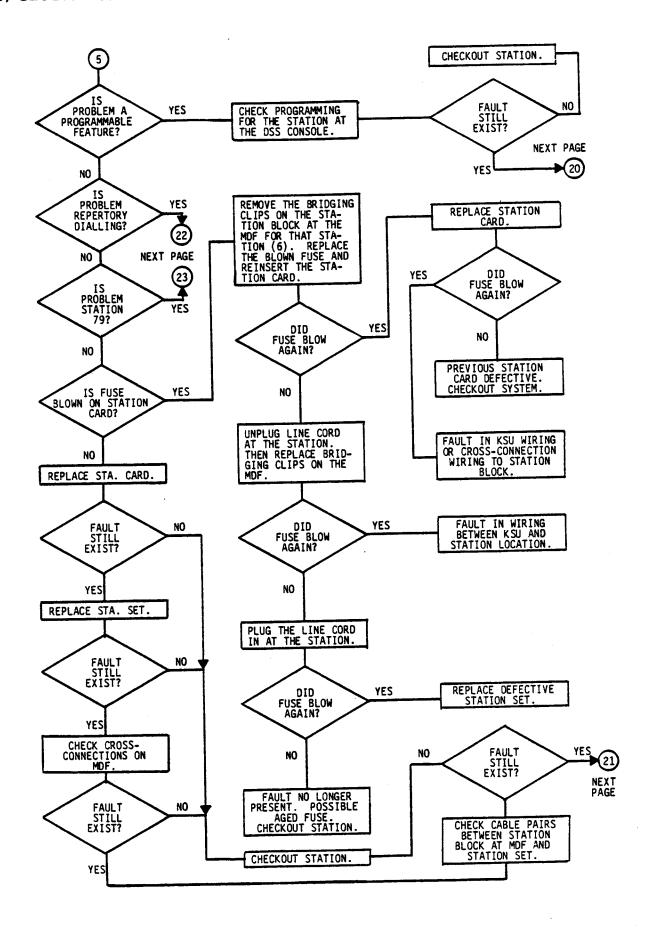


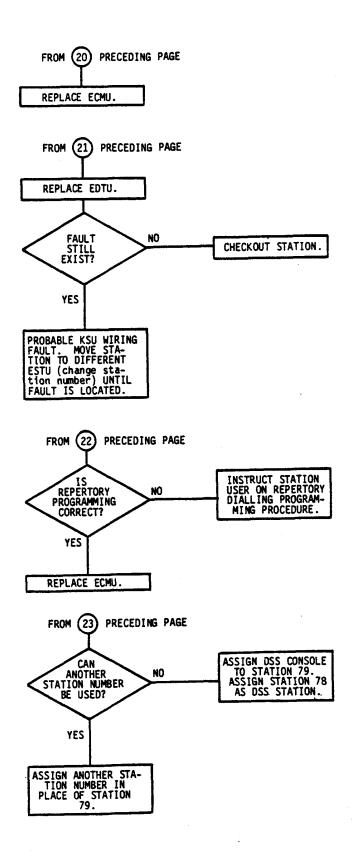


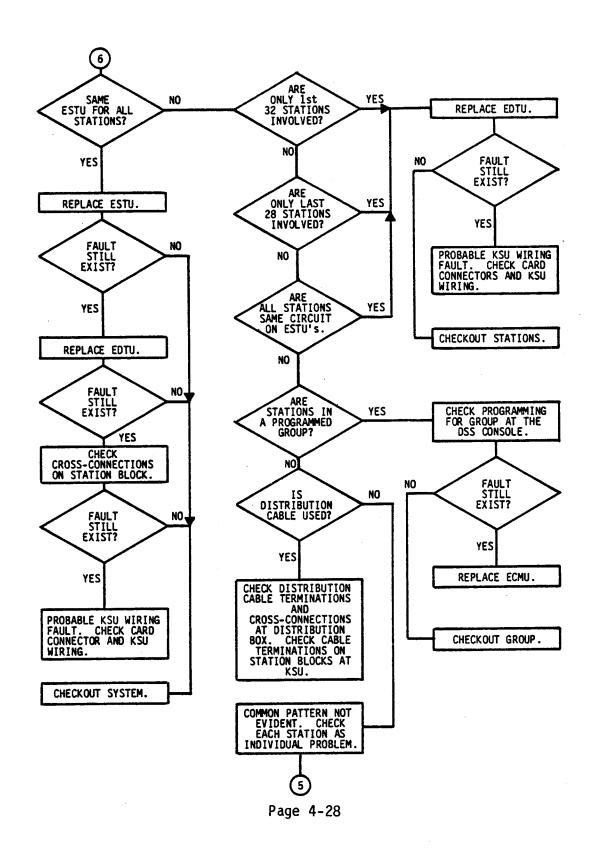


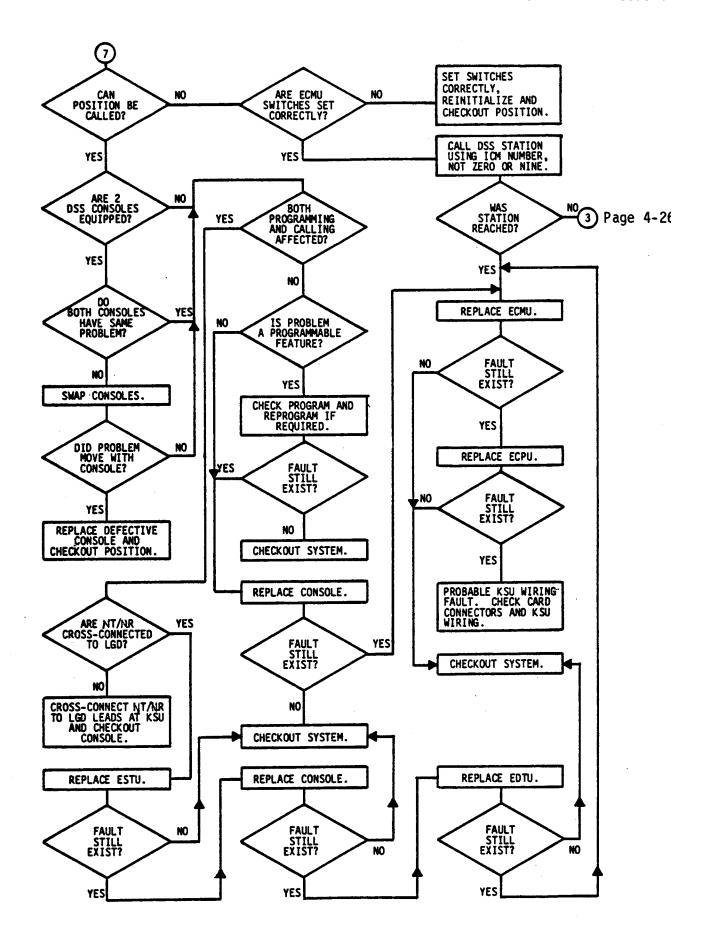


** Use "butt set" and monitor EXT PAGE T/R terminals on MDF station block.

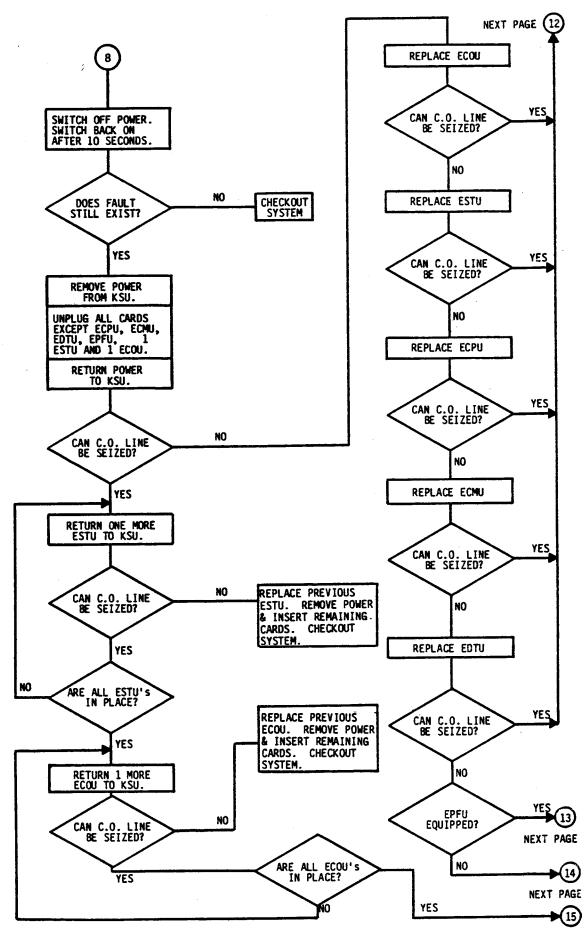


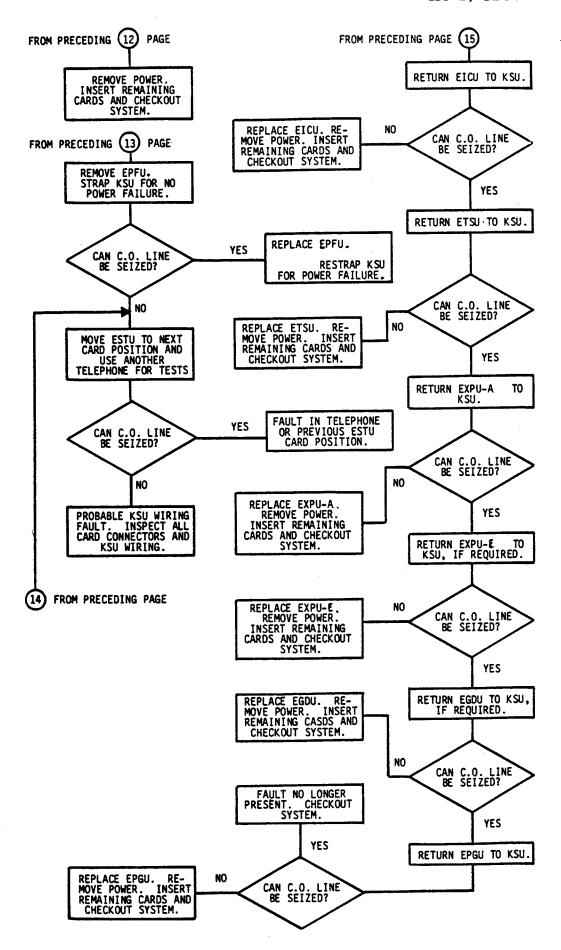


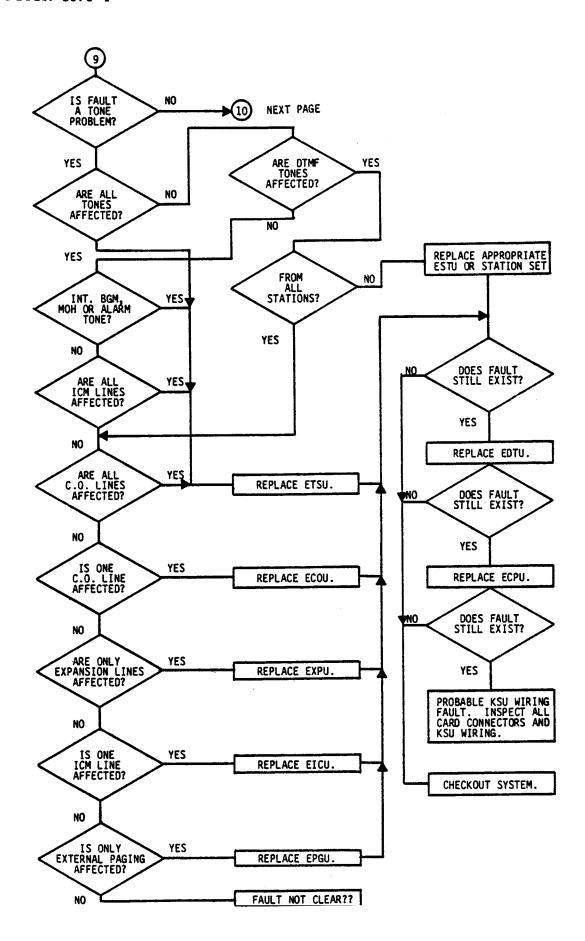


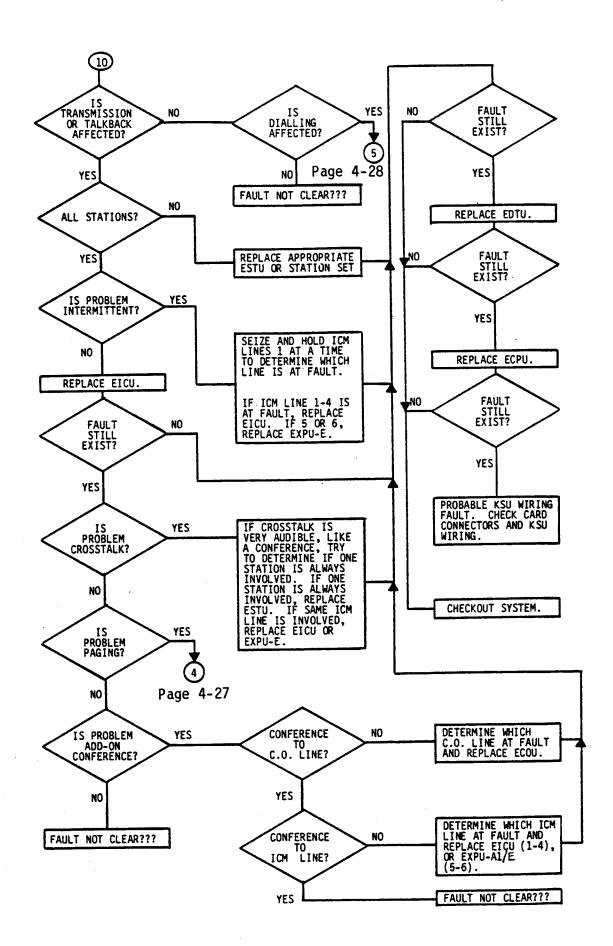


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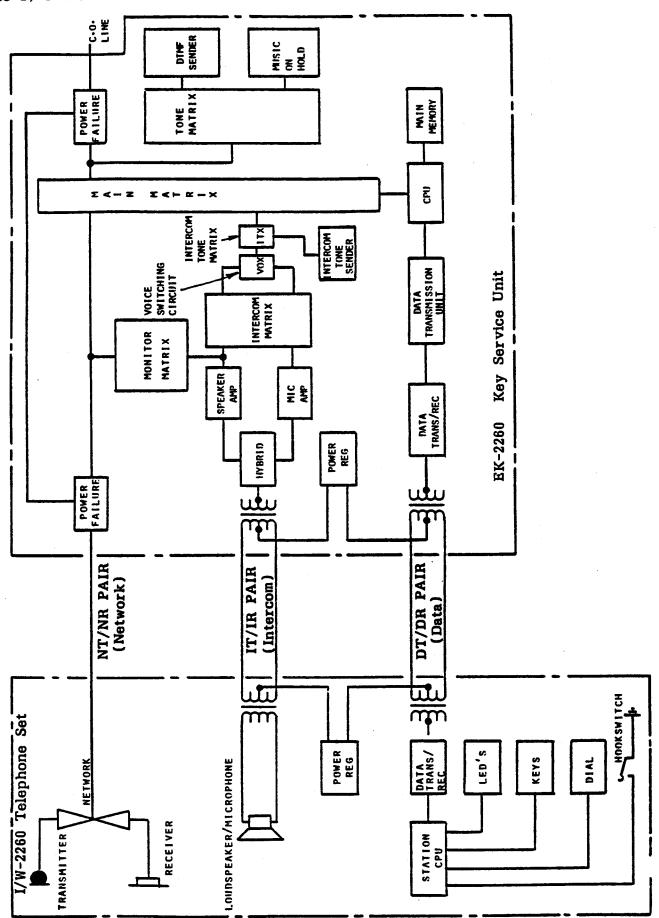


Figure 18 - System Block Diagram

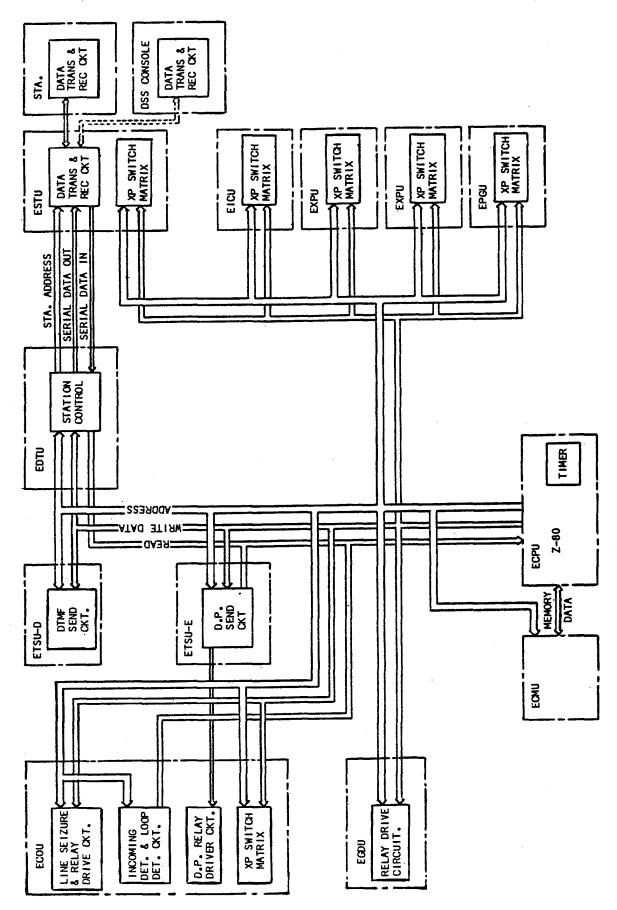


Figure 19 - System Digital Block Diagram

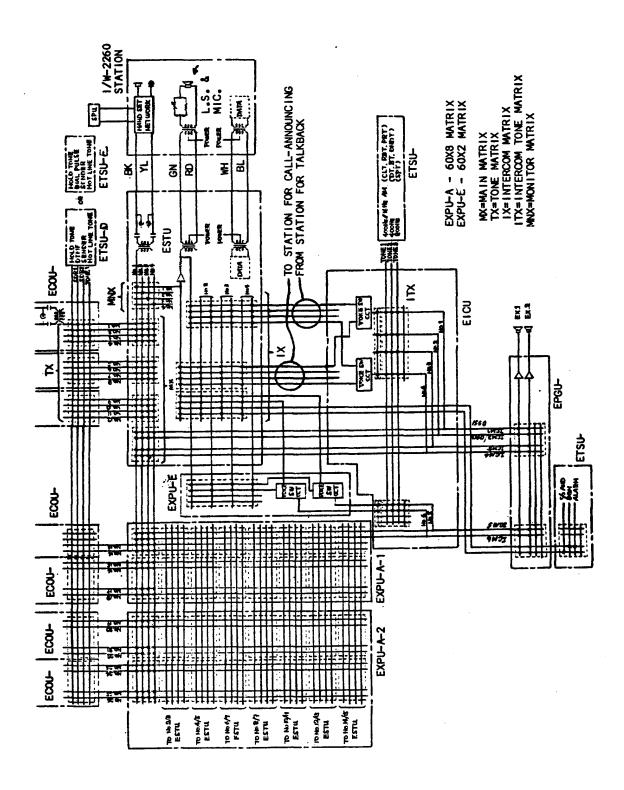
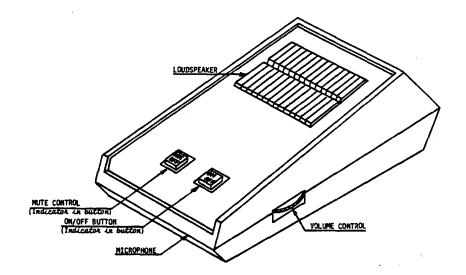


Figure 20 - System Analog Block Diagram

SECTION 5 - SPEAKERPHONE INSTALLATION



1.00 INTRODUCTION

1.01 This section provides the electrical and mechanical information required for installation of the TIE E-402 Speakerphone when used with the TIE I-2260 key telephone set and for installation of the TIE E-404 Speakerphone when used with the TIE W-2260 key telephone set.

2.00 GENERAL

- 2.01 The I/W-2260 key telephone sets will provide handsfree loudspeaker telephone operation when used with TIE E-402 or E-404 Speakerphones.
- 2.02 Speakerphone operation may be enabled without the loss of any of the normal operating features associated with the I/W-2260 key telephone sets. To assure optimum performance of either speakerphone, the system should be programmed for "on-hook" signalling (refer to program 29 in table 9 in section 3 for details).
- 2.03 No additional equipment is required when these speakerphones are connected to the I/W-2260 telephone sets. E-402 and E-404 speakerphones derive their power by direct connection to the telephone sets.

3.00 INSTALLATION

- a) Procedure for installing the E-402 Speakerphone with the I-2260 key telephone set:
 - 1. Unplug the set from its modular jack.
 - 2. Remove the faceplate from the telephone by placing a small screwdriver or paper clip in the slot between the faceplate and the housing (bottom of the faceplate) and pry gently upward to disengage the faceplate. Pull the faceplate forward to remove it.
 - 3. Loosen the captive screws (bottom center of set and upper left faceplate corner) and remove the housing from the set. Disconnect the loudspeaker leads for convenience in working on the set.
 - 4. Located in the center rear of the set is the modular line cord connector. Adjacent to the right side of the connector is a rubber filler plug. Remove the filler plug and insert the E-402 cord through the opening. Be careful not to pull the spade-tips off the leads while inserting the cord.



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When removing straps, use a pair of pliers and pull on the spade tips only. Do not pull on the lead itself.

- 5. Connect the E-402 leads according to table 24. Remove straps TLAT-L1 and SP1-MT. The key and dial assembly may be lifted out of the set for convenient access to the terminals.
- 6. Located on the P.C. board inside the speakerphone is a power voltage switch. Move the switch to the "10V" position.
- 7. Located directly in front of the E-402 cord entrance hole, in the base of the set, are two square holes, separated by a narrow strip. Hook the strain-relief hook over the narrow strip to secure the E-402 cord.
- 8. Replace the key and dial assembly.
- 9. Reconnect the loudspeaker leads to the SP1/SP2 terminals on the ANU board.
- Replace the upper housing and faceplate.
- b) Procedure for installing the E-404 Speakerphone with the W-2260 key telephone set:
 - Unplug the set from its modular jack.
 - 2. Remove the faceplate from the telephone set by inserting a small-blade screwdriver in the slot between the faceplate and the housing cover (at the bottom of the faceplate). Gently pry the faceplate up and, using fingers, lift the faceplate upwards.
 - 3. Loosen the three captive screws that fasten the housing cover to the base. Lift off the cover.
 - 4. Remove the filler plug located adjacent to the entrance point of the modular line cord connector. Insert the E-404 cord through the hole, being careful that the spade tips are not pulled off the leads.

- 5. Attach the strain-relief clip of the E-404 cord to the housing base. The hook on the clip fits over the narrow strip between two square holes located under the cord entrance.
- 6. Connect the leads of the E-404 cord to the P.C. board terminals according to table 24.



When removing straps, use a pair of pliers and pull on the spade tips only. Do not pull on the lead itself.

- 7. Remove two straps as indicated by table 24.
- 8. Restore the housing cover to the base. Before tightening the captive screws, align and press on the cover to engage the latches.
- 9. Restore the faceplate. Insert the two latches of one side before inserting the others. Press the center of the faceplate and check the action of the keys to assure that they are free to move.
- 10. Remove the faceplate of the E-404 Speakerphone by inserting a small-blade screwdriver into the slot between the bottom of the faceplate and the housing cover. Gently pry the faceplate up and then slide it away from the housing cover to disengage the tabs at the upper end.
- 11. Loosen the two captive screws to separate the cover from the base. Lift off the cover and set the switch on the P.C. board to the "10V" position. (This switch is located near the heat sink, and the 10V position is labelled on the P.C. board.)
- 12. Restore the housing cover to the base. Check the alignment of the cover before tightening the captive screws.
- 13. Restore the faceplate by engaging tabs and latches. Check that the keys are free to move.

E-402 LEADS	ANU TERMINALS
WH	TLAR
BR	TLAT .
SL	L1
BL	SG
OR & YL	RB
LGN	HSD
RD	HRD
PK	SP1 •
VI	MT •
GN	
BK	Tape and store
LBL	5 3 3 7 6

* Remove straps.

Table 24 - Connections, E-402/E-404 to I/W-2260 Telephones

4.00 OPERATION

4.01 E-402 and E-404 Speakerphones are operated by use of three controls as illustrated on page F1. The control functions are as follows.

On/Off Button: Momentarily depressing the ON/OFF button is the same as lifting the handset of the telephone set, except that the user can transmit and receive handsfree. (A line button must be depressed to select the desired C.O. line or an ICM button for an intercom call.) The on/ off button

contains an LED which, when lit, indicates that the speakerphone is "on."

Momentarily depressing the on/off button a second time causes the speakerphone to turn off.

Volume Control: This control adjusts the level of sound from the loudspeaker. (Best performance is

usually obtained with low levels of volume control.)

Mic/Off Button: This button turns the microphone off to provide privacy when desired by the station user. When this button is lit, the distant party will not hear any conversation from the speakerphone end.

4.02 To change from handset to speakerphone operation, simply depress the on/off button and then hang up the handset.

5.00 SPEAKERPHONE LOCATION

- 5.01 The speakerphone and I/W-2260 telephone set combination should sit directly on a hard surface (e.g., desk, table, credenza, etc.) and as far away as possible from noise sources such as typewriters, radios, etc.
- 5.02 DO NOT place the speakerphone unit in hard-surfaced corners or under low shelves: these locations may cause echo or transmission problems.
- 5.03 The speakerphone-telephone set combination should be placed at least 2 inches back from the edge of the surface upon which it sits. Obstacles should NOT be placed in front of the microphone.

SECTION 6A - NTK-2260B POWER SUPPLY

1.00 INTRODUCTION

- 1.01 This section provides operating, installation, and other information on the NTK-2260B power supply (TIE Part Number 12030) as follows:
 - input/output voltages
 - current ratings
 - ripple factors
 - control
 - fusing
 - voltage measurements
- 1.02 To install other power supplies designed for the EK-2260C system, see the section indicated as follows:

Power Supply TUC-2260B with Battery Back-Up	Section 6B	TIE Part No. 12031 & 12033
TUC-2260A without Battery Back-Up	6C	12032

- 2.00 GENERAL
- 2.01 Input Voltages: 117VAC +10%, Hz, single phase; or 220VAC +10 50 Hz, single phase.
- 2.02 Input Current Ratings: The NT 2260B power supply is equipp with a 8-ampere line fuse.
- 2.03 Output Specifications: Volta limits, ripple, current capa ties, and related data are presented table 25.
- 3.00 CONTROL (see figure 29):
- 3.01 Power Switch: An on/off rock switch is provided on the frepanel of the supply.
- 3.02 Power Indicator: An indica lamp is located above the power switch. This indicator should be when the power switch is in the "c

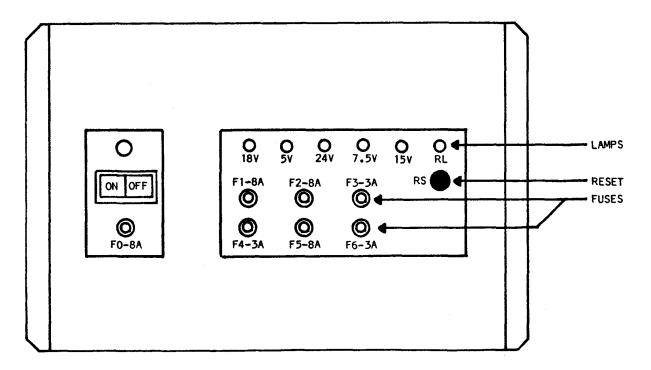


Figure 29 - EK-2260B Power Supply Front Panel Arrangement

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VOLTAGE SOURCE	INDICATOR	VOLTAGE LIMITS	RIPPLE (P-P)	MAXIMUM CURRENT	REGULATOR INPUT FUSE	+ PROBE	- PROBE
L5V	5 V	4.8-5.3	50mV	6A	F4-3A	B12	B13
S15V A15V T15V	15 V	14.3-15.8	20mV 70mV 50mV	.3A 8.5A 5.5A	F5-8A	B1	B2
R24V	24V	20-28	.5 V	1.5A	F6-3A	B7	B8
AB7.5V SB7.5V	7.5V**	7.4-7.9	50mV	5mA	AUTOMATIC PROTECTION	B5 B6	B2 B2
T18V	18 V	18-28	2 V	11.5A* 1.5A*	F1-8A F2-8A F3-3A	A9	A7

^{*} Individually fused for each station on ESTU cards.

Table 25 - Output Voltage and Current Specifications

position. If the indicator is not lit, the power is off (no input), the supply is not plugged in, or the line fuse is blown.

- 3.03 Power Failure Reset: The power supply is equipped with a circuit which provides a reset pulse to the microcomputers in the system when a power failure longer than 40 milliseconds has occured.
- 3.04 Power Failure LED (RL): This lamp will light when a power failure longer than 40 milliseconds but shorter than 1 second has occured. The LED will remain lit until turned off by depressing the Reset Switch (RS) adjacent to the RL indicator.
- 3.05 Output Fuses: Six output fuses are located on the front of the power supply (refer to figure 29).

4.00 INSTALLATION

- 4.01 Refer to paragraph 2.09 in section 2 for power supply mounting details.
- 4.02 Figure 21 shows the pin connections on the power cable connector. Layout is illustrated from the wiring side of the connector.

5.00 VOLTAGE MEASUREMENTS

5.01 If voltage measurements should be required during the fault location process, voltage readings should be made

- at the designated measuring points and should be within the limits shown in table 25.
- 5.02 Voltage measurements should be made with a voltmeter with a sensitivity rating of at least 20,000 ohms per volt.
- 5.03 Measurements should be made with the power supply connected to the KSU so that the supply is loaded during the measuring procedure.
- 5.04 Measurements are made inside the power supply on either the "A" or "B" terminal strip located on the printed circuit board. Each terminal is designated on the P.C. board.

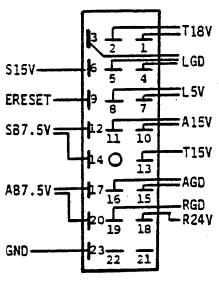


Figure 21 - Power Cable Connector Wiring

^{**} Derived from T15V supply.

SECTION 6B - TUC-2260B POWER SUPPLY

1.00 INTRODUCTION

This section provides operating, installation, and other informa-1.01 tion on the TUC-2260B Power Supply with Battery Back-Up (TIE Part Numbers 12031 and 12033) as follows:

- input/output voltages
- input current ratings
- output specifications
- component description
- installation
- control
- reset procedures
- voltage measurements

To install other power supplies 1.02 designed for the EK-2260B system, see the section indicated as follows:

Power Supply NTK-2260B	Section 6A	TIE Part No. 12030
TUC-2260A (without battery back-up)	6C	12032

2.00 **GENERAL**

Input Voltages: 117VAC +10%, 60 2.01 Hz, single phase; or 220VAC +10%, 50 Hz, single phase.

Input Current Ratings: The TUC-2260B Power Supply (TIE Part Num-2.02 ber 12031) is equipped with a 12.5-ampere circuit breaker, located behind access door 1. See figure 24.

Output Specifications: 2.03 Voltage limits, ripple, current capacities, and related data are presented in table 27.

3.00 COMPONENT DESCRIPTION

The TUC-2260B Power Supply con-3.01 sists essentially of two units: the power supply (TIE Part Number 12031) and the battery back-up cabinet (TIE Part Number 12033).

3.02 Power Supply:

Transformer/Regulators: Converts input of 120VAC @ 60 Hz to a secondary output of 20 VDC that is rectified to provide all of the DC outputs as shown in table 27.

B. Battery Charger: The 2-amp battery charger, having an output of 24VDC, is powered by a 30VAC secondary output from the At a single rate, transformer.

VOLTAGE SOURCE	INDICATOR	VOLTAGE LIMITS	RIPPLE (P-P)	MAXIMUM CURRENT	EXTERNAL CIRCUIT PROTECTION	INTERNAL REGULATOR PROTECTION
L5V	L5V	4.8-5.2	50mV	6A		BREAKER #3
S15V	S15V	14.3-15.8	20mV	.5A		BREAKER #1
A15V T15V	A/T15V	14.7-15.8	50mV	8.5A	AUTOMATIC	BREAKER #2
AB7.5V SB7.5V	AB/SB7.5V	7.4-7.9	35mV	15mA		RESISTOR
T18V	T18V	18-28	2 V	15A*	BREAKER #4	NONE
R24V	R24V	19-32	.5 V	2A	BREAKER #5	NONE

^{*} Individually fused for each station on ESTU cards.



the charger can recharge the batteries to a maximum of 27.5 volts. It is voltage regulated, current limited, and has redundant circuit breaker protection.

- 3.03 Battery Back-Up Cabinet: This is equipped with a battery tray, a 30-amp circuit breaker, and terminal blocks with factory-installed wiring ready for connecting to batteries.
 - A. Cabinet construction and associated wiring have been designed to help prevent polarity reversal when Globe-Union U-128 gell/cell (or equivalent) batteries are installed. Regardless of the source of their manufacture, batteries must be installed according to the connections and layout shown in figure 23.
 - B. Four batteries can be installed inside the battery tray when the maximum dimensions of each battery are:

- C. Factory-installed wiring results in a series-parallel arrangement 15 5/8" MIN of the batteries to provide 24VDC, as shown in figure 23. The estimated running time when batteries are on full load is three hours.
- 3.04 Battery Specifications: Batteries are available separately from several sources. Current information on names of local suppliers can be obtained from:

Customer Service Department TIE/communications (203-929-7373)

- A. Required are four, gelled-electrolyte, maintenance-free batteries, rated at 12 volts, 28 amp-hrs. [The nominal capacity should be 28 amp-hrs, as determined at 68°F (50°C) for a 20-hour rate (1.4A to 10.5V).]
- B. The battery back-up unit has been designed for use with gelled electrolyte batteries only.
- C. Batteries having dimensions equal to or less than those shown in par. 3.03B (above) will fit inside the battery tray. To install larger batteries, modification of

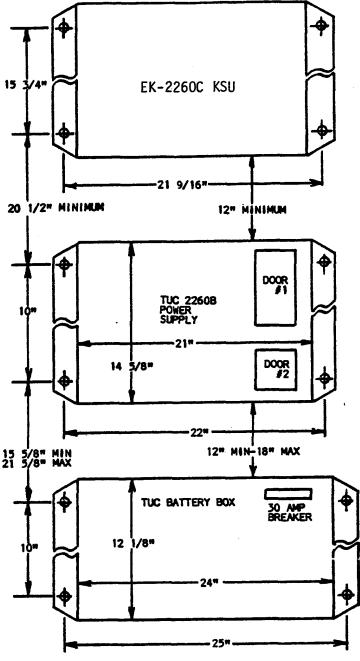


Figure 22 KSU/P.S. Mounting Arrangement

the battery tray will be necessary.

- D. Connection of batteries to factory-installed wiring inside battery cabinet will be direct if battery terminals are the L-type and have holes to accept the 1/4" fasteners provided.
- E. Selection, installation, and maintenance of batteries must comply with the National Electrical Code

and other applicable codes. See par. 4.02.

4.00 INSTALLATION

4.01 Installation of Power Supply:

The AC line source should be dedicated exclusively to the system. If the source is provided with a breaker at the service entrance panel, the breaker switch should be equipped with a lock-clip to prevent accidental shut-down, or should be labelled "Do Not Turn Off."

A. Standard Line-Cord Method:

- The power supply should be wall-mounted at least inches below the KSU. Power supply mounting centers are shown in figure 22.
- Make certain that the AC line (an on/off rocker breaker switch recessed behind access door 1 is in the "off" position.
- Plug the AC line power cord into a suitable receptacle.

B. Permanent AC Connection Method:



This method should be performed by an electrician.

- Mount the power supply as described in steps 1 and 2 (see above).
- Remove the power supply cover. 2.
- Unsolder the black and white wires of the AC line cord from the line filter.
- Remove the ground connection (green wire) from the chassis.
- Remove the line cord bracket and replace it with the knockout bracket (supplied separately in the power supply shipping carton).
- Use #14 3-conductor wire in conduit half-inch light-wall

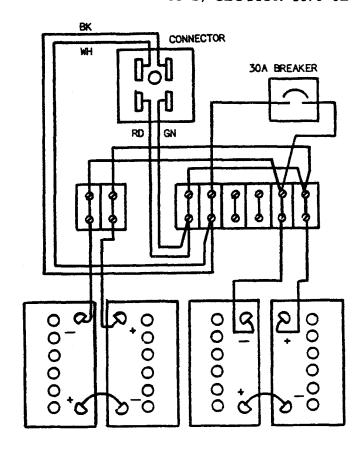


Figure 23 - Battery Box Connections

to permanently connect the power supply to the AC line. Fasten the conduit to the knock-out bracket Solder the black with locknuts. and white wires to the corresponding terminals of the AC line fil-Fasten the ground wire ter. (green) to the chassis ground using the lock washer.

Restore the power supply cover.

4.02 Installation of Battery Cabinet:

CAUTION

Carry the battery cabinet only by the chassis - not by the chassis The cover is fastened to the chassis by screws through slots in the cover and has been designed to slide off by loosening (rather than removing) these screws.

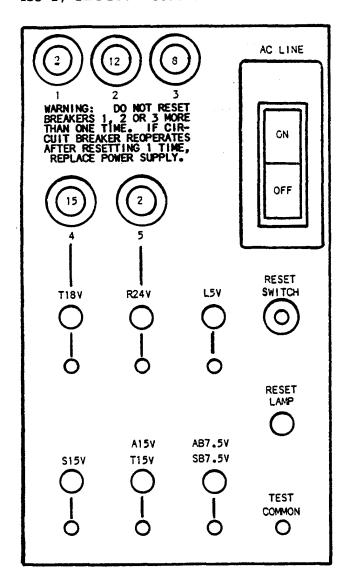
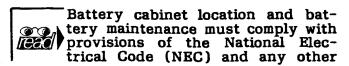


Figure 24 - Power Supply Control Panel (Door #1)

- 4.03 The loaded battery cabinet weighs over 110 lbs and is, therefore, easier to mount unloaded than loaded.
 - A. Turn off the 30-amp circuit breaker switch located on the front of the battery cabinet.
 - B. Mount the battery cabinet on the wall 12-18 inches below the power supply. Mounting centers are shown in figure 22.



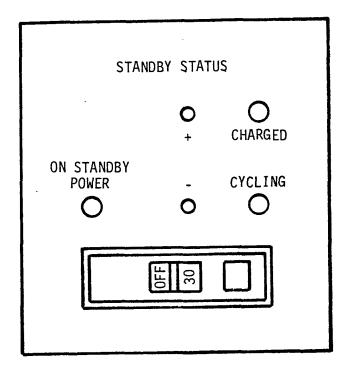


Figure 25 - Battery Charger Status Panel (Door #2)

applicable codes. Among other things, article 480 of the NEC requires that ventilation provisions must be made to prevent accumulation of battery gases or explosive gas mixtures, or both of these. Installation of the battery back-up unit in any unventilated location (such as a storage closet) is not recommended. For further details, consult the NEC, available from the National Fire Protection Association, Boston, MA 02210.

- C. Plug the 4-wire connecting cable from the battery back-up to the power supply cabinet.
- D. Check the position of the Standby Breaker that is recessed behind access door 2. This switch must be in the "on" position so that the power supply may derive power from the batteries during a power failure.

4.04 Installation/Replacement of Batteries:

4.05 Selection of batteries must be based upon the battery specifications presented in par. 3.04.

4.06 It is not necessary to turn off the AC Line Breaker behind access door 1 when installing or replacing batteries.

4.07 Procedure:

- A. Turn off the Standby Breaker, using the switch recessed behind access door 2.
- B. Turn off the 30-amp circuit breaker switch located on the front of the battery cabinet.
- C. Unplug the connection cable between the power supply and battery back-up unit.
- D. Slide off the chassis cover of the battery back-up unit after loosening all screws on top, bottom, and sides.
- E. If batteries are being replaced, disconnect battery interconnections and connections to terminal block. Remove hold-downs and lift out batteries.
- F. Place new batteries in position on the battery tray so that the polarity of battery terminals lines up according to figure 23.
- G. Interconnect batteries with 8-gauge, insulated, stranded, lug-terminated wires, 1/4" screws, nuts, and washers provided.
- H. Connect batteries to terminal block, using factory-installed wiring. See figure 23.
- Install the battery hold-downs and restore chassis cover.
- J. Plug the connection cable from the battery back-up unit to the power supply.
- K. Turn on the 30-amp circuit breaker switch located on the front of the battery cabinet.
- L. Turn on the Standby Breaker, using the rocker switch recessed behind access door 2.

4.08 Power Supply to KSU Connection:

A. Make certain that the AC Line Breaker (behind access door 1) is in the "off" position.

- B. Connect the power supply to the KSU, using the connection cable provided.
- C. For proper operation of the system, the following breakers should then be set in the "on" position:
 - 1. AC Line Breaker (behind access door 1)
 - 2. Standby Breaker (behind access door 2)
 - 3. Circuit Breaker (30-amp) on front of battery cabinet

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5.00 CONTROL

5.01 Controls are recessed behind two access doors located on the front of the power supply.

5.02 Access Door 1: (See figure 24.)

- A. AC Line Breaker:
 This illuminated rocker switch is an on/off switch as well as a circuit breaker.
- B. DC Output Indicators:
 When lit, these indicate that voltages are being provided in the ranges specified in table 27. An output indicator that is not lit is a signal that the output either is absent or is below the specified range on the applicable bus.
- C. DC Output Test Jacks:
 These jacks permit measurements without removing the chassis cover. For procedures and normal values, see par. 7.00 and table 28.
- D. DC Circuit Interrupters: (Buttons pop out when circuit malfunctions.)
 - 1. Circuit Breakers 1, 2, & 3:
 These buttons will trip to signal an internal problem.
 - 2. Circuit Breakers 4 & 5:
 These buttons will trip to signal an external problem.

5.03 Access Door 2: (See figure 25.)

A. Standby Breaker:
In the "on" position, the battery back-up unit can supply power during a power failure or interruption affecting the AC line. A malfunction will trip this breaker switch to "off."

B. Standby Indicators:

- 1. On Standby Power: When the battery back-up unit is working as the power source, this indicator lamp is lit.
- 2. Charged: When batteries are fully charged, lamp is lit.
- 3. Cycling: When batteries are being charged, lamp is lit.

6.00 RESET PROCEDURES:

- 6.01 DC Circuit Interrupters: (See figure 24.)
 - A. Circuit Breakers 1, 2, & 3:

 (These buttons trip to signal an internal malfunction.) Reset a button once. A second trip probably indicates the need for replacement of the power supply.
 - B. Circuit Breakers 4 & 5:

 Because these breakers are associated with external malfunctions, the cause of the problem in the external circuit should be sought before resetting.
- 6.02 Reset Indicator Lamp: When lit, this lamp indicates that there has been a momentary loss of AC power. Depress reset switch to turn lamp off. (See figure 24.)
- NOTE: Reset lamp lights when output voltages at filter capacitors drop to levels that will not maintain proper bus voltages. Reset lamp will go out when capacitors have discharged to levels that cannot energize lamp and will not come back on when power is restored.
- 6.03 AC Line Breaker: trips if malfunction occurs in the AC line circuitry or if more than 12.5A is drawn from the AC line. (See figure 24.)
- 6.04 Standby Breaker: In the "on" position, batteries will supply power during a power failure. (See figure 25.)
- 6.05 30-amp Circuit Breaker: (Located on front of battery backup chassis cover.) This breaker is turned off during battery replacement and when connecting the battery back-up unit to the power supply.

7.00 VOLTAGE MEASUREMENTS

Note: Voltage measurements should be made with a voltmeter that has a sensitivity rating of at least 20,000 ohms per volt.

Measurements should be made with the power supply connected to the KSU so that the supply is loaded during the measuring procedure.

7.01 Voltage readings can be made by inserting test probes into the test jacks recessed behind access door 1 (see figure 24). Readings may be compared to those values shown in table 28.

7.02 Figure 26 shows the pin connections on the power cable connector. Layout is illustrated from the wiring side of the connector.

7.03 Battery test jacks are located on the battery status panel (door 2, see figure 25) for measuring battery voltage. Fully charged batteries should measure approximately 27.5 volts.

POWER BUS DESIG	VOLTAGE	PROBE TO:	PROBE TO:	LIMITS:
L5V	5٧	L5V		4.8-5.2
AB7.5V SB7.5V	7.50	AB/SB 7.5V	TECT	7.4-7.9
S15V	15 V	S15V	TEST COMMON	14.3-15.8
A15V T15V	15V	A/T 15V		14.7-15.8
T18V	18V	T18V		18-28
R24V	24V	R24V		19-32

Table 28 - Power Voltage Measurements

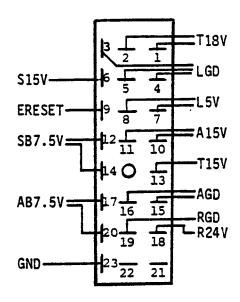


Figure 26 - Power Cable Connector Wiring

SECTION 6C - TUC-2260A POWER SUPPLY

1.00 INTRODUCTION

1.01 This section provides operating, installation, and other information on the TUC-2260A Power Supply (TIE Part Number 12032) as follows:

- input/output voltages
- current ratingsripple factors
- component description
- control
- installation
- reset procedures
- voltage measurements

1.02 To install other power supplies designed for the EK-2260B system, see the section indicated as follows:

Power Supply NTK-2260B	Section 6A	TIE Part No.
TUC-2260B with Battery Back-Up	6B	12031 & 12033

2.00 GENERAL

- 2.01 Input Voltages: 117VAC +10%, 60 Hz, single phase; or 220VAC +10%, 50 Hz, single phase.
- 2.02 Input Current Ratings: The TUC-2260A Power Supply is equipped with a 12.5-ampere circuit breaker, located behind the access door. See figure 27.
- 2.03 Output Specifications: Voltage limits, ripple, current capacities, and related data are presented in table 29.

3.00 COMPONENT DESCRIPTION

3.01 The TUC-2260A Power Supply includes a transformer and regulators that convert an input of 120VAC @ 60 Hz to a secondary output of 20 VDC. This secondary output is then rectified to provide all of the DC outputs shown in table 29.

VOLTAGE Source	INDICATOR	VOLTAGE LIMITS	RIPPLE (P-P)	MAXIMUM CURRENT	EXTERNAL CIRCUIT PROTECTION	INTERNAL REGULATOR PROTECTION	+ PROBE TO	- PROBE TO
L5V	L5V	4.8-5.2	50mV	6A		BREAKER #3	L5V	
S15V	S15V	14.3-15.8	20mV	.5A		BREAKER #1	S15V	
A15V T15V	A/T15V	14.7-15.8	50mV	8.5A	AUTOMATIC	BREAKER #2	A/T 15V	TEST
AB7.5V SB7.5V	AB/SB7.5V	7.4-7.9	35mV	15mA		RESISTOR	AB/SB 7.5V	COMMON
T18V	T18V	18-28	2 V	15A*	BREAKER #4	NONE	T18V	
R24V	R24V	19-32	.5 V	2A	BREAKER #5	NONE	R24V	

^{*} Individually fused for each station on ESTU cards.

Table 29 - Output Voltage and Current Specifications



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INSTALLATION 4.00

Installation of Power Supply: 4.01



The AC line source should be dedicated exclusively to the system. If the source is provided with a breaker at the service entrance panel, the breaker switch should be equipped with a lock-clip to prevent accidental shut-down, or should be labelled "Do Not Turn Off."

A. Standard Line-Cord Method:

- 1. The power supply should be wall-mounted at least 12 in. below the KSU. The power supply mounting centers are shown in figure 4 in section 2.
- Make certain that the AC line breaker (an on/off rocker switch recessed behind the access door) is in the "off" position.
- Plug the AC line power cord into a suitable receptacle.

B. Permanent AC Connection Method:



This method should be performed by This method sure electrician.

- Mount the power supply as described in steps 1 and 2 (see above).
- Remove the power supply cover.
- Unsolder the black and white wires of the AC line cord from the line filter.
- Remove the ground connection (green wire) from the chassis.
- Remove the line cord bracket and replace it with the knockout bracket (supplied separately in the power supply shipping carton).
- Use #14 3-conductor wire in half-inch light-wall conduit to permanently connect the power supply to the AC line. Fasten the conduit to the knock-out bracket with locknuts. Solder the black and white wires to the correspond-

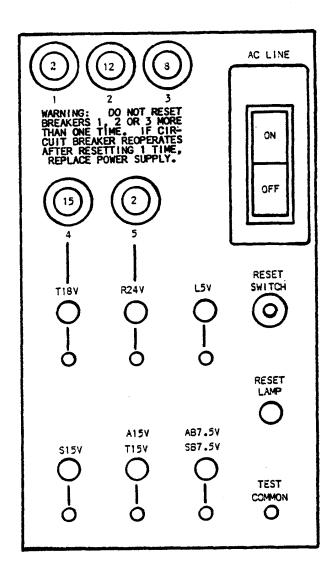


Figure 27 - Power Supply Control Panel

ing terminals of the AC line fil-Fasten the ground wire (green) to the chassis ground using the lock washer.

Reinstall the power supply cover.

Power Supply to KSU Connection: 4.02

- Make certain that the AC Line Breaker (behind access door) is in the "off" position.
- Connect the power supply to the KSU, using the connection cable provided.
- Turn on the AC Line Breaker (behind the access door).

CONTROL 5.00

- 5.01 Controls are recessed behind the access door located on the front of the power supply. (See figure 27.)
 - A. AC Line Breaker: This illuminated rocker switch is an on/off switch as well as a circuit breaker.
 - B. DC Output Indicators: When lit, these indicate that voltages are being provided in the ranges specified in table 29. An output indicator that is not lit is a signal that the output either is absent or is below the specified range on the applicable bus.
 - C. DC Output Test Jacks: These jacks permit measurements without removing the chassis cov-For procedures and normal values, see par. 7.00 and table 29.
 - D. DC Circuit Interrupters: (Buttons pop out when circuit malfunctions.)
 - 1. Circuit Breakers 1, 2, & 3: These buttons will trip to signal an internal problem.
 - 2. Circuit Breakers 4 & 5: These buttons will trip to signal an external problem.

6.00 RESET PROCEDURES:

- 6.01 DC Circuit Interrupters: (See figure 27.)
 - Circuit Breakers 1, 2, & 3: (These buttons trip to signal an internal malfunction.) Reset a button once. A second trip probably indicates the need for replacement of the power supply.
 - B. Circuit Breakers 4 & 5: Because these breakers are associated with external malfunctions, the cause of the problem in the external circuit should be sought before resetting.
- 6.02 Reset Indicator Lamp: When lit, this lamp indicates that there has been a momentary loss of AC power. Depress reset switch to turn lamp off. (See figure 27.)

Reset lamp lights when output voltages at filter capacitors drop Note: to levels that will not maintain proper bus voltages. Reset lamp will go out when capacitors have discharged to levels that cannot energize lamp and will not come back on when power is restored.

6.03 AC Line Breaker: Trips if malfunction occurs in the AC line circuitry or if more than 12.5A is drawn from the AC line. (See figure 27.)

7.00 VOLTAGE MEASUREMENTS

Note: Voltage measurements should be made with a voltmeter that has a sensitivity rating of at least 20,000 ohms per volt.



Measurements should be made with the power supply connected to the KSU so that the supply is loaded KSU so that the supply is loaded during the measuring procedure.

- 7.01 Voltage readings can be made by inserting test probes into the test jacks recessed behind the access door (see figure 27). Readings may be compared to those values shown in table 29.
- Figure 28 shows the pin connec-7.02 tions on the power cable connec-Layout is illustrated from the wirtor. ing side of the connector.

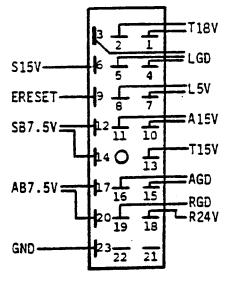


Figure 28 - Power Cable Connector Wiring

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GLOSSARY OF TERMS AND ABBREVIATIONS TIE EK-820/1236/2260 KEY TELEPHONE SYSTEMS

1.00 INTRODUCTION

This section is issued to provide a glossary of terms and abbreviations used in 1.01 the installation manuals and drawing sections for TIE's EK-820, EK-1236 and EK-2260 key telephone systems.

2.00 REASON FOR REISSUE

2.01 This section is reissued because lead designations contained in TIE Practices, Section 3573 have been added to the glossary.

402 SPU Ivory speakerphone unit. 404 SPU White speakerphone unit.

820 TIE key telephone system with 8 lines and 20 stations.

system may have 2 additional lines used as private lines.

820KU-A Key assembly used in I-820 telephones.

1236 TIE key telephone system with 12 lines and 36 stations. EK-1236

system may have 2 additional lines used as private lines.

1236DKU-A DSS keyboard assembly in I-1236 DSS console.

1236KU-A Key Assembly used in I-1236 telephones.

2260 TIE key telephone system with 22 lines and 60 stations. EK-2260

system may have 4 additional lines used as private lines.

2260DKU-A DSS key board assembly in I-2260 DSS consoles.

2260KU-A Key assembly used in I-2260 non-power-failure telephones.

2260PFKU-A Key assembly used in I-2260 power-failure telephones.

Ampere.

A15V Audio 15 volt supply.

AB7.5V Audio Bias 7.5 volt supply.

Absorbed digit A dialled digit ignored by the system or the local exchange.

AC Alternating Current.

(0-7)ADMemory ADdress enable (8K byte) [Lead designation used on sche-

matics].

Add-On Conference Adding another station or line to an existing C.O. or ICM call.

ADR(0-15) ADdress Bus [Lead designation used on schematics].

AGD "A" & "S" supply GrounD. [Lead designation used on schematics].

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Repeating alarms from a security system via the loudspeakers of Alarm Repeating the telephones. ALarm input Tip [Lead designation used on schematics]. ALT ALarm input Ring [Lead designation used on schematics]. ALR ALM Answering an intercom call from a station other than the called Alternate Point stations. Answering Add-On. AO Alternate Point Answering. APA Same as NR. (Obsolete) AR "A" Relay control [Lead designation used on schematics]. AR(1-10) 1st 3 digits of a 10-digit telephone number. Same as the NPA Area Code code. Same as NT. (Obsolete) AT Person operating DSS position. Attendant В Music played through the loudspeakers of the telephones or the Background music paging system. BELL Tip [Lead designation used on schematics]. BEL(1-5)T BELI Ring [Lead designation used on schematics]. BEL(1-5)R Background Music. **BGM** BackGround Music [Lead designation used on schematics]. **BGM** Busy Lamp Field. BLF Same as IR. (Obsolete) BR A small metal clip used to connect 2 adjacent terminals (clips) on Bridging Clip a 66 type connecting block. Same as IT. (Obsolete) BT BUSAK BUS request Acknowledge [Lead designation used on schematics]. BUS ReQuest [Lead designation used on schematics]. BUSRO The LED indicators in the station buttons on the DSS console that Busy Lamp Field indicate the status of each station. Tone heard by calling party when called station is busy or cannot' Busy Tone be reached. C Designation for capacitors on schematics. C# Announcing an intercom call through the loudspeaker at the called Call-Announcing Call may be answered "handsfree." CARD enable for ESTU's [Lead designation used on schematics]. CARD(1-15) Designation for chokes or inductors on schematics. CH# CIRcuit control signal [Lead designation used on schematics]. CIR(1-4) Check point for tone testing [Lead designation used on sche-CK(1-2) matics]. CKT or ckt Circuit. Channel external CLock [Lead designation used on schematics]. CLK(1-3)

I/O address enable for ECOU [Lead designation used on sche-CO matics]. Telephone company central office (exchange). C.O. Central Office Tip [Lead designation used on schematics]. CO(1-26)T Central Office Ring [Lead designation used on schematics]. CO(1-26)R Ring signal heard at designated stations for a C.O. line call. C.O. Audible May be either the NPA code or the digits of a local exchange. Code Common return for power leads. COM heard at designated stations for all C.O. lines in Ring signal Common Audible the system, except private lines. I/O address enable for sub CPU and cross-point switches [Lead CONT designation used on schematics]. Clock Pulse (3.58 MHz, for EDTU & ETSU cards) [Lead designation CP used on schematics]. Same as DR. (Obsolete) CR Same as DT. (Obsclete) CT Designation for diodes on schematics. D# Switch on/off DATA [Lead designation used on schematics]. DATA Key used to change the system from the call-processing mode to th Data Entry Key programming mode, located inside the DSS console. Connector for selection of type of pulsing to be used on C.O DB1/DB2 lines. See also DCB. Dial Control button on telephone. DC DC Direct current. Dial Connection Board. Inserted into DB1/DB2 connector on ECO DCB cards to select type of C.O. line pulsing. Data Entry key inside DSS console. UE °C Degrees Centigrade or Celsius. ٥F Degrees Fahrenheit. A specific group of lines segregated for dialling purposes. Dial Group Tone heard by calling party when system is ready to accept th Dial Tone dial information. The system or C.O. ignores a digit that is dialled. Digit Absorbing De-Not-Disturb. DND Blocking calls to a telephone by using the DND button. Do-Not-Disturb Use of the DC key in programming to indicate that any digit may t "Don't care" dialled in a particular digit position. Dial Pulse. DP Dial Pulse relay control [Lead designation used on schematics]. DP(1-16)Data Ring lead to telephone from KSU. DR Separate console at an attendant position which permits signalling DSS Console a station by depressing a single button. Also provides visual indication of the status of all stations within th system. Ability of the attendant to override a busy condition at a calle DSS Override

station.

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DSS Position	The attendant station; equipped with a regular telephone and a DSS console.
DT	Data Tip lead to telephone from KSU.
DTMF	Dual Tone Multi-Frequency.
	E
E-402	See 402 SPU.
E-404	See 404 SPU.
ECMU	Electronic Central Memory Unit.
ECOU	Electronic Central Office Unit.
ECPU	Electronic Central Processing Unit.
EDTU	Electronic Data Transmission Unit.
EICU	Electronic Intercom Unit.
EGDU	Electronic Grounding Unit.
EK-820	See 820.
EK-1236	See 1236.
EK-2260	See 2260.
EPFU	Electronic Power Failure Unit.
EPGU	Electronic Paging Unit.
EPROM	Erasable/Programmable Read Only Memory.
ERESET	External RESET from power supply [Lead designation used on schematics].
EROU	Electronic Read Only Unit.
ESTU	Electronic Station Unit.
ETC	ETCetera (Grounding relay control) [Lead designation used on schematics].
ETSU	Electronic Tone Sending Unit.
Exclusive Hold	A C.O. line call placed on hold that cannot be removed from hold at any station other than the holding station.
EXPU	Electronic Expansion Unit.
External Paging	Paging through external loudspeakers of a P.A. system.
	•
F#	Designation for fuses on schematics.
FCC	Federal Communications Commission.
F/GB	Flash or Grounding Button.
FL	Flash.
FX	Foreign Exchange line.
ga.	Gauge.
GB	Grounding Button.
GND	KSU ground.

H Hotline. HL HLD Hold button. All exchanges located within the NPA area of the calling tele-Home Area telephone. Holding a C.O. line call by using the HOLD button. Hold Hotline A dedicated line between two stations. Hotline or Private Line. HP Hookswitch in telephone set. HS Hold Tone (MOH) source selection connector on ETSU card. HT Hold Tone Tip [Lead designation used on schematics]. HT(1-2)T Hold Tone Ring [Lead designation used on schematics]. HT(1-2)R Hz Hertz (Cycles per second). Ι I-320 Ivory 820 telephone used in EK-820 system. Ivory 1236 telephone used in EK-1236 system. I-1236 1 - 2260Ivory 2260 telephone used in EK-2260 system. Amplifier network unit used in ivory non-power-failure telephones. I-ANU-A Amplifier network unit used in ivory power-failure telephones. I-ANU-B IC Integrated circuit. ICM judge [Lead designation used on schematics]. IC5.6 ICM Intercom. Voice switch link for ICM 5 or 8 [Lead designation used on sche-ICM(1-16) matics]. DSS printed circuit board in ivory DSS consoles. I-DSU-A1 I-DSU-A2 DSS printed circuit board in I-1236 DSS console. I-DSU-A3 DSS printed circuit board in I-2260 DSS console. Interrupt [Lead designation used on schematics]. IEO An indication at the telephone of the lines placed on hold at that I-Hold telephone. INTerrupt request [Lead designation used on schematics]. INT Ring signal heard at called station on an intercom call. Intercom audible The line accessed when the ICM button is depressed to call another Intercom path station in the system. Paging through the internal loudspeakers of the telephone sets. Internal Paging Input/Output ReQuest [Lead designation used on schematics]. IORQ Input/Output Write Strobe [Lead designation used on schematics]. IOWS Pulsing unit used in I-2260 Dial Pulse Power Failure Telephones. IPFPU-A Tone generator unit used in I-2260 Tone Power Failure Telephones. IPFTU-A IR Intercom Ring lead to telephone from KSU. Intercom Tip lead to talaphone from KSU. IT

KSU

Key Service Unit.

Designation for inductors or chokes on schematics.

L(1-5)T Line Tip (C.O.) [Lead designation used on schematics].

L(1-5)R Line Ring (C.O.) [Lead designation used on schematics].

Logic 5 volt supply.

Last Number Recall Redialling the last number dialled by using an abbreviated code.

LED Light Emitting Diode.

LED# Designation for LEDs on schematics.

LGD Logic Ground.
Line Group See Dial Group.

Local Call All calls that are made to exchanges without a toll charge.

L.S. Loudspeaker.

LSP(1-2)T LoudSPeaker Tip [Lead designation used on schematics].

LSP(1-2)R LoudSPeaker Ring [Lead designation used on schematics].

----- M

mA Milliampere.

MD(0-7) Memory Data bus [Lead designation used on schematics].

MREQ Memory REQuest [Lead designation used on schematics].

Message Waiting An indication that a message is being held by the DSS attendant.

Indicated by an LED in the HOLD button of each telephone in

the system.

MIC mute Turning off the station microphone by using the DND button.

MOH Music-On-Hold.

MON Monitor.

MOS Metal Oxide Semiconductor.

MOV# Designation for metal oxide varistors on schematics.

MR Make/break Ratio.

mV Millivolts.

MW Message Waiting button.

NEC National Electrical Code.

NET Network (500 type) in telephone set.

Night Transfer State of the Night Transfer (NT) key at the DSS position which activates night audible ringing to stations assigned in that

N

group.

NPA Numbering Plan Area.

N-PSU-B Printed circuit board in EK-1236 power supply.

N-PSU-C Printed circuit board in EK-2260 power supply.

NR Network Ring lead to telephone from KSU.

NT Network Tip lead to telephone from KSU.

NT Night Transfer button on DSS console.

Clock Pulse (1.79 MHz) [Lead designation used on schematics]. Station handset not in cradle or speakerphone on. Also indicates Off-hook a C.O. or ICM line seizure. Off-hook signalling Signalling a station that is off-hook. Station handset in cradle or speakerphone off. Also indicates ICM On-hook or C.O. line in idle state. OPtion Control [Lead designation used on schematics]. OPC See Attendant. Operator Public Address. P.A. Private Automatic Branch Exchange. PABX See Internal Paging or External Paging. Paging Private Branch Exchange (may be automatic or manual). PBX Operation of the key system behind a PABX or PBX. PBX operation Printed circuit board. PCB -PF · Power Failure. Picofarads. pf Designation for opto-isolators on schematics. PHC# PL Private Line. Loss of commercial AC power. Power failure Pulses per second. PPS A C.O. line which may only appear at one particular station. Private line Power Supply. PS Designation for positive coefficient thermistors on schematics. PTH# Designation for transistors on schematics. Q# Ring side of a pair. Generally the negative side. R Designation for resistors on schematics. R# **R24V** Relay 24 volt supply. Random Access Memory. RAM Memory ReaD [Lead designation used on schematics]. RD Input/output Read Data bus [Lead designation used on schematics]. RD(0-7)Rectifier designation on schematics. REC# Resignalling the holding telephone after a line has been placed on Recall hold for a period of time. Period of time in seconds before recall. Recall Timing Number assigned by the FCC after a system has been approved for Registration use on telephone company lines. Number

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Repertory Dialling	Stored frequently called numbers for automatic dialling. Numbers are recalled by using abbreviated codes.
RESET	RESET signal [Lead designation used on schematics].
RFSH	ReFreSH dynamic memories [Lead designation used on schematics].
RGD	Relay supply ground.
RGT	RinGing Tone (530 Hz/660 Hz/16 Hz FM [Lead designation used on schematics].
Ringback Tone	Ringing tone heard by calling party.
Ring Group	A group of lines segregrated for ringing purposes.
Ringer Equivalence Number	Number denoting the result of calculations involving voltage, current and impedance on a line circuit and compared with a standard telephone ringer. Maximum ringer equivalence number which may be used on one line is 5.
RJ-21X	Universal Service Order Code (USOC) for 25-pair connector ended entrance cable provided by the telephone company.
RKEYB	Reset KEY Break contact [Lead designation used on schematics].
ROM	Read Only Memory.
RP#	Designation for resistor arrays on schematics.
1S1/1S2	External paging control (zone 1) [Lead designation used on schematics].
2S1/2S2	External paging control (zone 2) [Lead designation used on sche-matics].
S15V	Switching 15 volt supply.
SB7.5V	Switching Bias 7.5 volt supply.
SCR#	Designation for silicon controlled rectifiers on schematics.
SDR(1-2)T	Tone SenDeR path Tip [Lead designation used on schematics].
SDR(1-2)R	Tone SenDeR path Ring [Lead designation used on schematics].
Signal Calling	Calling a station using audible tones to signal (instead of call-announcing). Accomplished by dialling a "1" after the station number.
SORCE	External BGM and MOH audio source [Lead designation used on schematics].
Sp	Spare.
Speakerphone	Provides handsfree telephone operation. External unit which ∞n - nects to the regular telephone to provide the feature.
Splash Tone	A short single burst of tone.
ST(1-5)T	STation Tip (P.F. on) [Lead designation used on schematics].
ST(1-5)R	STation Ring (P.F. on) [Lead designation used on schematics].
SPU	Speakerphone Unit.
STA or Sta	Station.
STA(1-5)T	STAtion Tip (P.F. off) [Lead designation used on schematics].
STA(1-5)R	STAtion Ring (P.F. off) [Lead designation used on schematics].
Station	Same as telephone.
Station Category	A combination of station class and dial group assignment.
Station Class	A class which stipulates the dialling parameters of a station assigned to the class.

Station Loop	Distance of the station from the KSU, expressed either in feet or ohms.
STR(0-1)	Strobe [Lead designation used on schematics].
SW	Switch.
SW(A-D)	Cross-point SWitch address [Lead designation used on schematics].
SX(1-19)	Switch control, X axis [Lead designation used on schematics].
SY(1-13)	Switch control, Y axis [Lead designation used on schematics].
SYSTEM	SYSTEM judge [Lead designation used on schematics].
	T
Т	Tip side of a pair. Generally the positive side.
Τ#	Designation for transformers on schematics.
T15V	Telephone 15 volt supply.
T18V	Telephone 18 volt supply.
TLA(1-4)T/R	TeLephone A pair (NT/NR) [Lead designation used on schematics].
TLB(1-4)T/R	TeLephone B pair (IT/IR) [Lead designation used on schematics].
TLC(1-4)T/R	TeLephone C pair (DT/DR) [Lead designation used on schematics].
Tenant Service	Two groups of users using the same key service unit.
Tens Digit	Leftmost digit of a two-digit number.
Toll Restriction	Permission or denial of certain calls depending upon class of service of the station.
TONE1	400 Hz/16 Hz tone [Lead designation used on schematics].
TONE2	400 Hz tone [Lead designation used on schematics].
TONE3	800 Hz tone [Lead designation used on schematics].
TRD(1-2)	Telephone Receive Data [Lead designation used on schematics].
TSC(1-8)	Telephone Selection Control [Lead designation used on schematics].
TSD(1-2)	Telephone Send Data [Lead designation used on schematics].
	·
uf	Microfarads.
UNIT(1-8)	UNIT enable signal [Lead designation used on schematics].
Units Digit	Rightmost digit of a two-digit number.
omis bigit	raginamose digit of a two digit indimosity
V	\Volts.
VA#	Designation for varistors on schematics.
VAC	Volts Alternating Current.
VDC	Volts Direct Current.
VR#	Designation for variable resistors (potentiometers) on schematics.
	W
W-820	White 820 telephone used in EK-820 system.
W-1236	White 1236 telephone used in EK-1236 system.
W-2260	White 2260 non-power-failure telephone used in EK-2260 system.
W-2260-PFP	White 2260 dial pulse power-failure telephone used in EK-820/1236/
	2260 systems.

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W-2260-PFT	White 2260 tone power-failure telephone used in EK-820/1236/2260
	systems.
WAIT	WAIT for CPU [Lead designation used on schematics].
WANU-A	Amplifier network unit in white non-power-failure telephones.
WANU-B	Amplifier network unit in W-2260 power-failure telephones.
WATS	Wide Area Toll Service.
WD(0-9)	Input/output Write Data bus [Lead designation used on schematics].
WDKU-36A	DSS keyboard assembly in W-1236 DSS consoles.
WDKU-60A	DSS keyboard assembly in W-2260 DSS consoles.
WDSU-36A	DSS printed circuit board in W-1236 DSS consoles.
WDSU-60A	DSS printed circuit board in W-2260 DSS consoles.
WKU-08A	Keyboard assembly in W-820 telephones.
WKU-12A	Keyboard assembly in W-1236 telephones.
WKU-22A	Keyboard assembly in W-2260 non-power-failure telephones.
WPFKU-22A	Keyboard assembly in W-2260 power-failure telephones.
WPFPU-A	Pulse generator board in W-2260 Dial Pulse Power-Failure tele- phones.
WPFTU-A	Tone generator board in W-2260 Tone Power-Failure telephones.
WR	Memory WRite [Lead designation used on schematics].
	X
X#	Designation for digital ICs on schematics.
Xconn	Cross-connect.
XML(1-60)	Main Link, X axis [Lead designation used on schematics].
XPT CLEAR	Cross-point clear button on ECMU cards.
XSL(1-60)	Sub Link, X axis [Lead designation used on schematics].
XT#	Designation for crystals on schematics.
XTAL	Designation for crystals on schematics.
XTAL	Designation for crystals on schematics.
Y#	
	Y
~ Y#	Designation for analog ICs on schematics.
Y# YML(1-24)	Designation for analog ICs on schematics. Main Link, Y axis [Lead designation used on schematics].
Y# YML(1-24)	Designation for analog ICs on schematics. Main Link, Y axis [Lead designation used on schematics]. Sub Link, Y axis [Lead designation used on schematics].

OFF-PREMISES TELEPHONE INSTALLATION

EOPU-A/B Circuit Card

SYSTEMS APPLICATION:

EK-820/EK-1236/EK-2260

r	AM.	TE	Wi	re
u	л	TE	П	3

PAGE PAR. SUBJECT 1.00 FUNCTION..... 2.00 SPECIFICATIONS.... 2.01 Number of Circuits per Card.. 2.02 Number of Cards per System... Compatibility..... 2.03 2.04 Loop Limitations..... Dial Signalling Specification 2.05 2.06 Ringing Output..... 2.07 External RG Supply..... INSTALLATION..... Equipment Required..... 3.00 3.05 Installation Procedure..... 3.06 4.00 OPERATION..... 5.00 INSERTING OR REMOVING CIRCUIT CARDS..... Avoiding Static Damage..... Handling Procedures..... 6.00 OPERATIONAL TESTING.....

1.00 FUNCTION

1.01 The EOPU-A/B Circuit Card allows an interface to be established between the 820/1236/2260 KSU and singleline telephones. It converts off-hook and dialling information to digital data for use by the CPU (central processing unit). Digital data received from the main CPU is converted to signals that can be processed by a single-line telephone.

1.02 With the EOPU-A/B circuit card, telephone service can be supplied to single-line telephones at an off-premises location. Therefore, as its primary purpose, the EOPU-A/B card permits telephones to be located away from the KSU beyond the standard loop length.

The EOPU-B circuit card is compatible with systems using ESTU-C/D cards, which have an impedance transmission path lower than ESTU-A/B cards.

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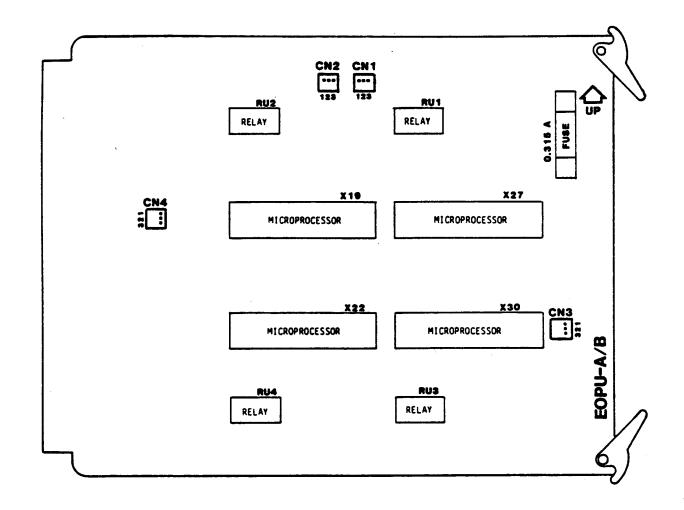


Figure 1. Abridged EOPU-A/B Circuit Card Layout

2.00 SPECIFICATIONS

2.01 Number of Circuits per Card:
One EOPU-A/B circuit card will support interfacing with four single-line telephones.

2.02 Number of Cards per System:

Because the EOPU card occupies the position of any ESTU card, the maximum number of EOPU cards is equal to the maximum number of ESTU card positions in a particular system.

2.03 Compatibility:

The EOPU-A card can occupy any
ESTU-A/B position. The EOPU-B card can
occupy any ESTU-C/D position.

2.04 Loop Limitations:

The maximum loop resistance is
500 ohms. (This is the standard loop resistance permitted between the EOPU-A/B
card and a single-line telephone.)

2.05 Dial Signalling Specification:

The EOPU-A/B circuit card is designed to accept rotary dial pulses at 10 or 20 PPS + 20% (pulses per second). The make/break ratio provided ranges from 80%/20% to 50%/50%. Contact bounce is 1.0 msec. or less. [When connection is to be made to an electronic key system that uses DTMF signalling, the OP line must be equipped with a tone-to-pulse converter.]

2.06 Ringing Output:

The EOPU-A/B circuit card controls
a ringing voltage sent to the single-line
telephone. This ringing voltage is provided from an external ringing generator.

2.07 External RG Supply:
An external RG (ringing generator)
supply is required to provide ringing for
two EOPU-A/B cards. The RG supply converts DC voltage from the KSU to 60 VAC,
30 Hz.

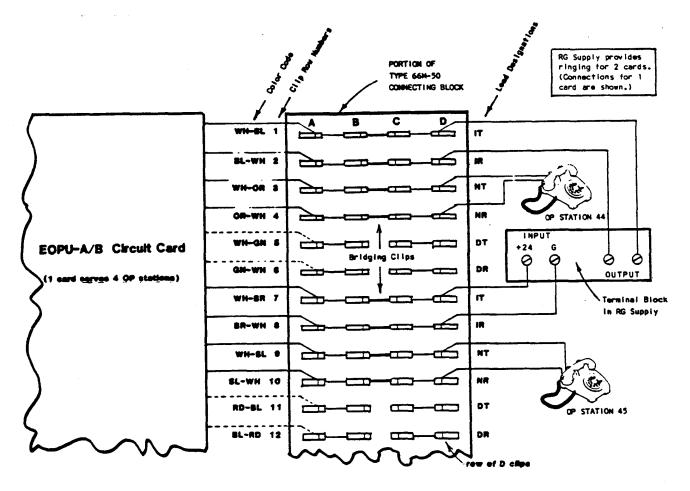


Figure 2. Connecting Stations and RG Supply to Connecting Block

3.00 INSTALLATION

3.01 One pair of wires is used to connect each OP (off premises) station to the KSU.

Standard telephone quad cable may be used. Of course, outside wiring cable must be used for outside runs.

3.02 All stations that are served by an EOPU-A/B circuit card must be single-line (two-wire) sets. For example, if an OP station is required at station 46, then an EOPU-A/B card should be inserted in the position occupied by the ESTU-A/C-7 card, and the other stations (44,45,47) served by this position must be the single-line type. See table 1 for stations served at each ESTU card position.

- 3.03 Conventional multi-button sets (576- and 577-types) may be used in certain applications.
- 3.04 The limit between the OP station and the KSU is determined by a maximum loop resistance of 500 ohms. (For two-conductor cable, the limit between the OP station and the KSU is 9,300 cable feet for #22 AWG wire and 5,800 cable feet for #24 AWG wire.)

			α	NNECTIONS (ON THE	B BLOCK			
STATION CARD	STATIONS SERVED	OUTPUT® From RG Supply			INPUTT to RG Supply				
POSITION		# LEAD	S CLIPS	COLORS	,	LEADS	CLIPS	COLORS	BLOCK
	SYSTEM								
50511 440 4	ABC				١				
ESTU-A/C-1 ESTU-A/C-2	20-23 24-27	20 IT/I		WH-BL BK-GN	21 25	IT/IR IT/IR	7/8 31/32	WH-BR YL-BL	81
ESTU-A/C-3	28-31	28 IT/I	R 1/2	WH-BL	29	IT/IR	7/8	WH-BR	
ESTU-A/C-4	32-35	32 IT/I		BK-Gt	33	IT/IR	31/32	YL-BL	82
ESTU-A/C-5	36-39	36 IT/I	R 1/2	WH-BL	37	IT/IR	7/8	WH-BR	
ESTU-A/C-6	40-43	40 IT/I	R 25/26	BK-GN	41	IT/IR	31/32	YL-BL	83
ESTU-A/C-7	44-47	44 IT/I	R 1/2	WH-BL	45	IT/IR	7/8	WH-BR	84
ESTU-A/C-8	48-51	48 IT/I	R 25/26	BK-GN	49	IT/IR	31/32	YL-BL	54
ESTU-A/C-9	52-55	52 IT/I	R 1/2	WH-BL	53	IT/IR	7/8	WH-BR	85
ESTU-A/C-10	56-59	56 IT/I	R 25/26	BK-GN	57	IT/IR	31/32	YL-BL	
ESTU-A/C-11	60-63	60 IT/I	• -	WH-BL	61	IT/IR	7/8	WH-BR	86
ESTU-A/C-12	64-67	64 IT/I	R 25/26	BK-GN	65	IT/IR	31/32	YL-BL	
ESTU-A/C-13	68-71	68 IT/I		WH-BL	69	IT/IR	7/8	WH-BR	87
ESTU-A/C-14	72-75	72 IT/I	R 25/26	BK-GN	73	IT/IR	31/32	YL - BL	
ESTU-A/C-15	76-79	76 IT/I	R 1/2	WH-BL	77	IT/IR	7/8	WH-BR	88
A = EK-820 sys B = EK-1236B s C = EK-2260B s	system	designat output I These ou connecte	ion served	OUT to	tin nec The	ted to I put term ted to I se Input	Tinput minal de: Routput termina	signated G clip.	is con-

Table 1. Connections between RG Supply and B Blocks.

3.05 Equipment Required:

- RG (ringing generator) supply* quantity as needed. (one provides
 ringing for two EOPU-A/B cards,
 i.e., eight OP stations).
- Tone-to pulse converter† one required when the EOPU-A/B is used to interface with another key system that uses tone (DTMF) sending.
- EOPU-A/B circuit cards* quantity as needed. (one card is required for every four OP stations).
 Use EOPU-A cards for positions occupied by ESTU-A/B cards. Use EOPU-B cards for positions occupied by ESTU-C/D cards.

*TIE/communications products tavailable from other manufacturers

								COLOR	CLIPS	LEAD
						-STAT	IONS	- 		
20	28	36	44	52	60	68	76	WH-OR	3/4	
21	29	37	45	53	61	69	77	WH-SL	9/10	
22	30	38	46	54	62	70	78	RD-GN	15/16	
23	31	39	47	55	63	71	79	BK-BL	21/22	N-7
24	32	40	48	56	64	72	1	BK-BR	27/28	NT/N
25	33	41	49	57	65	73		YL-OR	33/34	
26	34	42	50	58	66	74		YL-SL	39/40	
27	35	43	51	59	67	75		VI-GN	45/46	
<u>B</u> 1	B2	B3 .	B4	B 5	В6	B7	88			

Table 2. Connections between OP Stations and B Blocks.

3.06 Installation procedure:

Before inserting or removing any circuit card, read and follow the special directions given in pars. 5.00-5.03.

- (1) Notice that the EOPU-A/B circuit card has 4 option connectors designated CN1, CN2, CN3, and CN4. See figure 1. Check that the strapping bars have been installed in the 2,3 positions of each option connector.
- (2) Insert the EOPU-A/B card into an appropriate ESTU slot in the KSU. (An EOPU-A card may occupy the position of an ESTU-A/B card, an EOPU-B card may occupy the position of an ESTU-C/D card.) Refer to table 1 to determine the position the EOPU-A/B card should occupy to serve each OP station.
- (3) Connect each single-line station to the MDF (main distribution frame). One ringing station may be installed for each OP line. The pair of wires from the station should be connected to the NT/NR D clips on the B block that correspond to the station number being installed. Shown in table 2 are the wire colors, clip numbers, and lead designations for each OP sta-

<<Install bridging clips.>>

Connect one or more external ring ing generator supplies to the MDI using table 1 as a guide.
Shown in figure 2 is an examp

of connections that must be mad if the RG supply is to provic ringing for stations 44-47.

- (a) Connect the output terminal in the RC supply to the IT/l D clips on the B block. The clips should correspond to the first OP station served by the EOPU-A/B card. bridging <<Install clips.> Example. if four single lin telephones are being installe in station positions 44-4' connect the RG supply outputerminals to the IT/IR clips station 44 on the B block; illustrated in figure 2.
- (b) Connect the input terminals in the RG supply to the IT/1 D clips on the B block. The clips should correspond to tl second OP station served by the EOPU-A/B card.

Input terminal designated +: is connected to the IT D clip

input terminal designated G connected to the IR D clip <<Install bridging clips. Example if four single lip telephones are being installed in station positions 44-47, connect the RG supply input terminals to the IT/IR clips of station 45 on the B block.

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- (5) If needed, install a tone-to-pulse converter according to the manufacturer's instructions.
- (6) At the DSS console, each OP station key should be identified in a special way to help remind the attendant that no call announcing is possible at the OP station and that it is not possible to override an OP station.
- (7) At the DSS console, program each OP station for the Do-Not-Disturb feature. [With this programming, operation of OP stations with EK stations and with the DSS station and console will be consistent for all combinations of program options. With this programming, the results of actions presented in Operational Testing will be as described.]
- (8) Follow through by testing the operation of the OP stations and associated components installed. See par. 6.00, "Operational Testing."

4.00 OPERATION

A. Placing a Call to an OP Station

- 4.01 To call a party at an EOPUequipped station, the user of an EK station goes off-hook, depresses the ICM key, and dials the extension number of the OP station.
- 4.02 A splash tone followed by ICM ringback tone is provided to alert the caller that call-announcing and talk-back (hands-free answer) are not possible at the OP station.
- 4.03 When the OP station has been called, it will ring periodically (at a regular on/off rate) until the call is answered or abandoned. The caller will receive a busy tone if the OP station is busy.

B. Transferring a Call to an OP Station

4.04 The Add-On key is used in the usual way to transfer intercom andC.O. calls to the OP station.

C. Originating an ICM Call at an OP Station

4.05 To originate an ICM call, the OP station user should first go off-hook and determine if the ICM is available for use. (The ICM dial tone indicates that an ICM link is idle and available for use.) If the ICM is available for use, the user should dial the number of the desired station.

The OP station user can call an EK station either by dialling the two-digit number only or by dialling first the two-digit number and then digit 1.

When two digits are dialled, the called party can answer either hands-free or handset-to-handset.

When three digits are dialled, the called party will near a splash tone and ICM signal tone, indicating that the ICM call can be answered handset-to-handset only.

D. Gaining Access to a C.O. Line at an OP Station

4.06 Because the OP station has no direct access to a C.O. line, the OP station user must obtain the transfer of an outside line to the OP station. This is accomplished by requesting either any user of an EK station or the DSS attendant to transfer a C.O. line to the OP station.

4.07 Procedure for gaining C.O. Line Access:

- (1) The OP station user should request transfer of a C.O. line from either any EK station user or from the DSS attendant. Then the OP station user must hang up the handset.
- (2) The EK station user should seize an idle C.O. line by momentarily depressing an appropriate C.O. line key, depress the Add On key, depress the ICM key, dial the OP station number, and wait for the OP station user to pick up the handset. When the called party picks up the handset, the EK station user should press the Add On key again and then hang up.

... or ...

If requested, the DSS attendant should press an idle C.O. line key, press the Add On key, press

- the OP station key, wait for the OP user to answer, and then press the Add On key again and then hang up.
- (3) After picking up the handset and hearing a dial tone, the OP station user should immediately dial the desired number.

E. Transferring a Call at an OP Station

4.08 The OP station user can transfer a C.O. line call or ICM call by first flashing the hook switch to obtain a dial tone, dialling the number of the station to which the call is being transferred, and waiting for the called station user to answer. After the called station user answers, the OP station user should flash the hook switch (this action establishes a three-way call). When the three-way call has been established, the OP station user can hang up and the other parties will remain connected.

5.00 INSERTING OR REMOVING CIRCUIT CARDS

- 5.01 Follow the special procedures given below when handling circu cards to avoid damage caused by electrostatic discharge. Procedures are specific to the type of card.
- 5.02 Static electricity is now considered a major threat to sensitive solid-state circuits. A static discharge of less than 100 volts can destroy a weaken the oxide layer in complementar metal oxide silicon (CMOS) and in be polar devices.
- 5.03 In the telecommunications field technical service personnel routinely handle many circuit cards during system installation and especially during troubleshooting. Therefore, because the risk of static damage exists each time circuit card is handled, technical service personnel should use effective procedures and devices to control state whenever a circuit card is handled.

AVOID STATIC DAMAGE

The grounded wrist strap, considered the key tool to control static, must be worn when handling all circuit cards and when working on the KSU. The grounded wrist strap (Part Number 2064) is available from the 3M Company.)

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HANDLING PROCEDURES (Insertion, Removal, Modification)

Procedure If System Is Equipped with an ECMU Series 3 (or Later) Card

Applications

- Cards that have both red edges and white extractors
- EPFU-A card
- (1) Wear grounded wrist strap.
- (2) Leave power on.
- (3) Insert or remove card.
- (4) Before inserting an ESTU card, all make sure stations on-hook. (To confirm that all stations are on-hook, check that all LEDs on previously installed cards are out.)
- (5) Press the XPT CLEAR button on the ECMU card for 3 seconds. (This button is just beneath the fuse.) This action will cause the crosspoints to be set properly on the card being inserted.
- Check out the system, especially (6) those features associated with the card just inserted.

Applications

- Cards that have red extractors Cards that do not have red edges
- (Except EPFU-A/B)
- (1) Wear a grounded wrist strap.
- (2) Turn power off to insert the card.
- (3) Restore power and check out the system, especially those features associated with the card just inserted.

Procedure If System Is Equipped with an ECMU Series 1 or Series 2 Card

Applications

- All cards
- (1) Wear a grounded wrist strap.
- Turn power off to insert or remove (2) card.
- (3) Restore power and check out the system, especially those features associated with the card just inserted.

6.00 OPERATIONAL TESTING

- 6.01 After the off-premises components have been installed, their operation should be evaluated to be sure performance is as expected.
- 6.02 Before testing the operation of off-premises components, the system in which these components have been installed should be completely operation-

Verify that all OP stations have been programmed to have the DND feature.

6.03 The operational tests that follow are used to evaluate the functions of OP stations with EK stations and the DSS attendant. All six operational tests should be performed. If an expected result of an operational test does not occur, refer to the installation "Operational Tests and manual chapter, Fault Location."

Call f	rom an OP station to an EK station	test 1
STEP	ACTION	RESULT*
Two-Di	git Dialling Method:	
1.	Take OP handset off-hook.	Hear dial tone in OP handset. At DSS console, OP station key flutters.
2.	Dial EK station number (two-digit dialling).	In OP handset, hear splash tone. At EK station: hear splash tone while ICM key flutters. At DSS console: EK station key winks while OP station key continues to flutter.
3.	At the EK station, verify that of free answer is operational. At received.	call-announcing is received and that hands- t the OP station, verify that talkback is
4.	At EK station, press ICM key and take handset off-hook.	At EK station, ICM key lights steadily. At DSS console: EK station key lights steadily while OP station key continues to flutter.
5.	Verify that handset-to-handset two stations.	communication is operational between these
6.	Restore all handsets to on-hook position.	System is ready for test procedure de- scribed below.
Three	-Digit Dialling Method:	
7.	Take OP handset off-hook.	Hear dial tone in OP handset. At DSS console, OP station key flutters.
8.	At OP station, dial the two-digit EK station number and immediately dial digit 1 (three-digit dialling).	In OP handset, hear ringback tone. At EK station, hear splash tone and ICM signal tone while ICM key flashes. At DSS console, OP station key flutters while EK station key winks.
9.	At EK station, press ICM key and take handset off-hook.	At EK station, ICM key lights steadily. At DSS console, EK station key lights steadily while OP station key flutters.
10.	Verify that handset-to-handset two stations.	communication is operational between these
11.	Restore all handsets to on-hook position.	System is ready for further testing.
	DIAL TONE. 400	cs of tone signals are as follows:) Hz steady IE & RINGBACK TONE: 400 Hz & 1 sec/3 sec (on/off) rate 800 Hz

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Call	Call to an idle OP station from an EK station test 2							
STEP .	ACTION	RESULT*						
Two-D	Two-Digit Dialling Method:							
1.	Take EK station off-hook.	At DSS console, EK station key lights steadily.						
2.	At EK station, depress ICM key.	At EK station: hear dial tone in handset; ICM key lights steadily.						
3.	Dial OP station number (Two-digit dialling).	At EK station: hear splash tone followed by ringback tone. OP station rings. At DSS console. OP station key winks.						
4.	Take OP station off-hook.	At DSS console, OP station key flutters.						
5.	 Verify that handset-to-handset communication is operational between these two stations. 							
6.	Restore all handsets to on-hook position.	System is ready for test procedure de- scribed below						
Three	-Digit Dialling Method:							
7.	Repeat steps 1-5, except that in step 3, dial the OP station number and then immediately dial digit 1.	(Results are the same as in steps 1-5).						
8.	Restore all handsets to on-hook position.	System is ready for further testing.						
	*Characteristics of tone signals are as follows: DIAL TONE: 400 Hz steady ICM SIGNAL TONE & RINGBACK TONE: 400 Hz & 1 sec/3 sec (on/off) rate SPLASH TONE: 800 Hz							

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Call	to a busy OP station from an EK Sta	tion test 3		
STEP	ACTION	RESULT*		
1.	Take OP station handset off-hook.	In OP handset, hear dial tone. At DSS console, OP station key flutters.		
2.	Take EK station handset off-hook.	At DSS console, EK station key lights steadily.		
3.	At EK station, press ICM key.	At EK station, hear dial tone in handset while ICM key lights steadily.		
4.	Dial the OP station number.	Hear fast busy signal in EK handset.		
5.	Restore all handsets to on-hook position.	System is ready for further testing.		
Call	to an idle OP station from another	OP station test 4		
STEP	ACTION	RESULT*		
1.	At first OP station, take handset off-hook.	At first OP station, hear dial tone in handset. At DSS console, station key of first OP station flutters.		
2.	At first OP station, dial the number of the second OP station.	At first OP station, hear splash tone ir handset. At second OP station, hear ringing. At DSS console, station key of second station winks.		
3.	At second OP station, take handset off-hook.	At DSS console, station key of second Of station flutters.		
4.	Verify that handset-to-handset	communication is operational between these		

*Characteristics of tone signals are as follows:

DIAL TONE: 400 Hz steady

ICM SIGNAL TONE & RINGBACK TONE: 400 Hz @ 1 sec/3 sec (on/off) rate

System is ready for further testing.

SPLASH TONE: 800 Hz

two stations.

on-hook position.

Restore all handsets to

5.

FAST BUSY TONE: 400 Hz @ 120 IPM.

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Call t	o an idle OP station from the DSS	attendant test 5
STEP	ACTION	RESULT*
Direct	Select Method:	
1.	Take DSS handset off-hook.	At the console, DSS station key lights steadily.
2.	At DSS console, depress the station key assigned to the OP station.	While the OP station rings, DSS attendant first hears a splash tone and then ringback tone. At the console, the OP station key winks.
3.	Take OP handset off-hook.	At the console. OP station key flutters.
4.	Verify that handset-to-handset two stations.	communication is operational between these
5.	Restore all handsets to on-hook position.	System is ready for test procedure described below.
Two-Di	git Dialling Method:	
6.	Take DSS handset off-hook.	At the console, DSS station key lights steadily.
7.	At DSS station, depress ICM key	At the DSS station, dial tone is heard in handset, and ICM key lights steadily.
8.	At DSS station, dial the two digits of the OP station.	While the OP station rings, DSS attendant first hears a splash tone and then ringback tone. At the console, the OP station key winks.
9.	Take OP handset off-hook.	At the console, OP station key flutters.
10.	Verify that handset-to-handset two stations.	communication is operational between these
11.	Restore all handsets to on-hook position	System is ready for test procedure de- scribed below
Three-	Digit Dialling Method:	
12.	Repeat steps 6-10, except that in step 8 dial the two digits of the OP station and then immediately dial digit 1.	Results are the same as in steps 6-10.
13.	Restore all handsets to on-hook position.	System is ready for further testing.
	DIAL TONE: 400	& RINGBACK TONE: 400 Hz @ 1 sec/3 sec (on/off) rate

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Call to a busy OP station from the DSS attendant test 6							
STEP	ACTION	RESULT*					
Direct	Direct Select Dialling:						
1.	Take OP handset off-hook.	In OP handset, hear dial tone. At the DSS console, OP station key flutters.					
2.	Take DSS handset off-hook.	At the console, DSS station key lights steadily.					
3.	At DSS console, depress the station key assigned to the OP station.	Double splash tone is heard in DSS hand- set.					
4.	Restore all handsets to on-hook position.	System is ready for test procedure de- scribed below.					
Two-Di	Two-Digit Dialling:						
5.	Take OP handset off-hook.	At the console, OP station key flutters. Dial tone is heard in OP handset.					
6.	Take DSS handset off-hook.	At the console, DSS station key lights steadily.					
7.	At DSS station, depress ICM key.	At the DSS station, hear dial tone in handset while ICM key lights steadily.					
8.	At DSS station, dial the two digits of the OP station.	Fast busy tone is heard in DSS handset.					
9.	Restore all handsets to on-hook position.	System is ready for test procedure described below.					
Three-	Digit Dialling:						
10.	Repeat steps 5-8, except that in step 8 dial the two digits of the OP station and then immediately dial digit 1.	(Results are the same as in steps 5-8).					
11.	Restore all handsets to on-hook position.	System is ready for further testing.					
	**Characteristics of tone signals are as follows: DIAL TONE: 400 Hz steady ICM SIGNAL TONE & RINGBACK TONE: 400 Hz @ 1 sec/3 sec (on/off) rate SPLASH TONE: 800 Hz FAST BUSY TONE: 400 Hz @ 120 IPM.						

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TIE 1236SBU SPEAKER BOX

1.00 INTRODUCTION:

1.01 This section provides information on TIE's 1236SBU Speaker Box when used with TIE's EK-820/1236/2260 key telephone systems, as follows:

2.00 - Description & Operation

3.00 - Installation

4.00 - Troubleshooting

1.02 The 1236SBU can be used as a supplementary loudspeaker unit in place of a station set when a complete telephone is not required. Loudspeaker volume is adjusted using the volume control on the box. One 1236SBU may be installed per station number.

2.00 DESCRIPTION & OPERATION:

- 2.01 TIE's 1236SBU Speaker Box is a self-contained unit having a volume control, loudspeaker and the electronic circuitry required by the system enclosed in a housing which may be desk or wall-mounted.
- 2.02 Six leads (3-pair) are required between the box and the KSU. The leads are designated IT/IR (Intercom T/R), NT/NR (Network T/R) and DT/DR (Data T/R). Power is simplexed between the IT/IR and DT/DR pairs.
- 2.03 A station number must be assigned to the box. The box may be called on the ICM by dialling its station number. Call-announcing and talkback are standard features of the box.
- 2.04 Station users must NOT call the box station using the signal calling feature. A call in this mode CANNOT be answered at the box.
- 2.05 The attendant must NOT extend a C.O. line call to a box station. The DSS console circuitry automatically places an extended call on hold and that call CANNOT be answered at the box station.

2.06 The Speaker Box may or may not be assigned as part of a paging zone.

2.07 Dimensions:

2.2" high. 4.5" wide.

6.4" deep.

Weight:

11 ounces.

3.00 INSTALLATION:

3.01 Installation of the 1236SBU is simple and straight-forward. The materials required for each box installation consists of the following:

1236SBU.

[1]

3-pair twisted station wire. [Length as required]

6-wire modular station jack (625A2 or 625F2 type or equivalent). [1] DO NOT USE A 4-WIRE JACK.

- 3.02 Mounting: The Speaker Box may be either desk or wall-mounted.
 - a) If desk mounting is required, two self-adhesive strips are provided for use as non-skid feet. Remove the backing from the strips and insert the strips into the groves along the sides in the base of the box.
 - b) If wall-mounting is required, do the following:
 - Remove the base of the box by loosening the captive screw located in the front lower center of the box.
 - 2. Mount the base of the box on the wall. Two screws are provided for this purpose. If the box is to be mounted on a masonry surface, #10 plastic anchors may be used to secure the screws. The base should be mounted with the 2 square openings at the bottom.

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- 3. Remount the front of the box on the base and secure with the front screw.
- 3.03 Connect the station wire to the station modular jack in the following manner.

WH-BL lead to GN terminal. BL-WH lead to RD terminal. WH-OR lead to BK terminal. OR-WH lead to YL terminal. WH-GN lead to WH terminal. GN-WH lead to BL terminal.

3.04 Connect the station wire at the MDF "B" block. Refer to the installation manual for "B" block layout.

WH-BL lead to IT clip.
BL-WH lead to IR clip.
WH-OR lead to LGD clip.
OR-WH lead to LGD clip.
WH-GN lead to DT clip.
GN-WH lead to DR clip.
(No connections to NT/NR clips.)

3.05 Plug in the Speaker Box and test as detailed under par. 4.00.

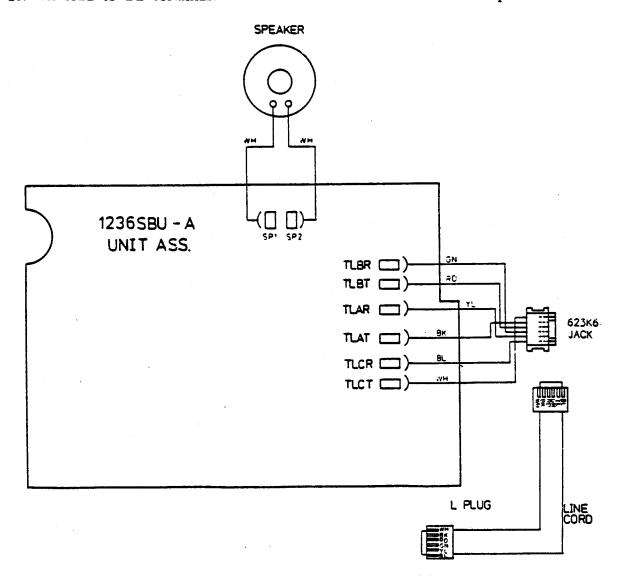


Figure 1 - 1236SBU Wiring

4.00 TROUBLESHOOTING:

- 4.01 Testing: To test the box, perform the following:
 - Call the box from another station in the system.
 - 1. Call-announcing should be heard from the speaker box.
 - 2. Call-announcing loudness should be adjustable from the volume control at the box.
 - 3. Talkback should be heard at the calling station.
- 4.02 Troubleshooting: If test results are not satisfactory, proceed as follows. (The following procedure assumes that the system has been installed and tested in accordance with the instructions in the system installation manual.

- a) Check the wiring connections at the MDF "B" block and at the box modular jack.
- b) Move the box to a different station number. If the box functions at this time, replace the card which served the previous station number.
- c) If the station card is known to function properly, check the wiring inside the box. Figure 1 illustrates the box wiring.
- d) If no fault can be found with the box wiring, replace the box.
- 4.03 Figure 2 is a schematic of the box circuitry. Figure 3 shows the component layout of the printed circuit board. Table 1 is a parts list for the speaker box.

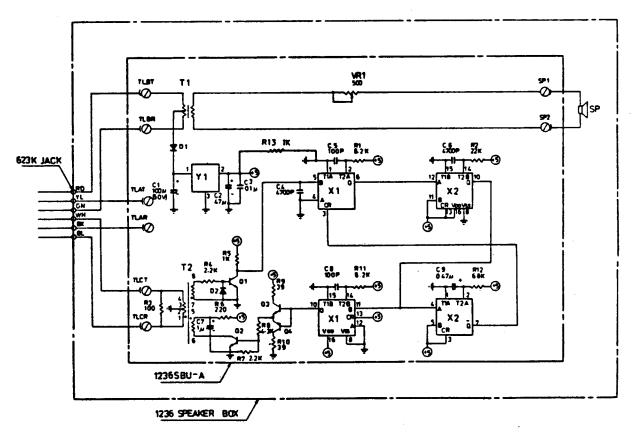


Figure 2 - 1236SBU Schematic

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Table 1 - 1236SBU-A Parts List

ITEM	SPECIFICATION	QTY	COMPONENT DESIGNATIONS
P.C.8.	1236\$BU-A	1	
Terminals		8	SP, SP2, TLAT, TLAR, TLBT, TLBR, TLCT, TLCR
Volume Control	161P-N2A 500 ohms	1	VR1
IC	uPC7805H/HA17805P uPD4528C	1 2	Y1 X1,X2
Transistor	2SA733 2SC945/2SC1815 2SD571	1 2 1	Q4 Q1,Q3 Q2
Diode	15553 SM-1A-02/51V20	1	02 01 - 5
Transformer	134H1 (C)	1	T2 T1
Electrolytic Capacitor	SL50T100CE SL16VB47CE SL50VBR47CE SL50VB1CE	1 1 1 - 1	C1 C2 C9 C7
Ceramic Capacitor	CKD57Y5V1H104Z RPE112F104Z50V CK45B1H472KY	1 2	C3 C4,C6
Film Capacitor	SOA-1H-101J	2	C5,C8
Resistor	39 ohms .25W 5% 100 " " " 220 " " " 1K " " " 2.2K " " " 4.3K " " " 8.2K " " " 68K " " "	2 1 1 2 2 1 2 1 1	R9,R10 R3 R6 R5,R13 R4,R7 R8 R1,R11 R2 R12

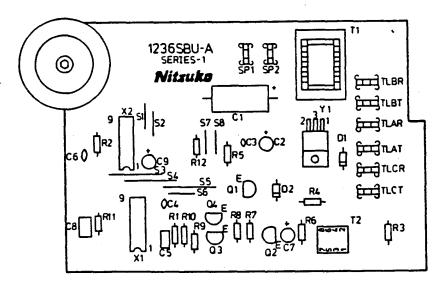


Figure 3 - 1236SBU-A Component Layout

EXTERNAL SPEAKERS FOR 820, 1236 & 2260 STATIONS

INTRODUCTION: 1.00

This section provides information on the Valcom, Inc. V-1022B Wall-1.01 Speaker/Amplifier Assembly when used with all models of TIE's I/W-820, I/W-1236 and I/W-2260 key telephone sets, as follows:

2.00 - Description

3.00 - Specifications

4.00 - Ordering Information

5.00 - Installation 6.00 - Connections

7.00 - Fusing

8.00 - Operation

9.00 - Troubleshooting

The V-1022B can be used as a sup-1.02 plementary loudspeaker unit associated with a station set when additional volume is required. Loudspeaker volume is adjusted using the volume control on telephone. One loudspeaker may be installed per station.

2.00 DESCRIPTION:

2.01 The Valcom V-1022B unit is a selfcontained 2-watt paging unit containing a 5-watt amplifier, volume control and wide range loudspeaker enclosed in a wall-mounted baffle.

Four leads (2-pair) are required between the loudspeaker and its associated telephone set. The leads are designated T/R (audio) and RB/SG (power). A four-conductor line cord with spadetips should be used for this purpose (see par. 5.00).

3.00 SPECIFICATIONS:

3.01 Input impedance: 600 ohms. Input level: -15 dBM to +10 dBM. Current at 24VDC: 200MA. Dimensions: 10.5" high. 9.4" wide.

5.5" deep.

Weight: 5.3 pounds.

4.00 ORDERING INFORMATION:

4.01 The Valcom V-1022B may be ordered from telephone-equipment supply

houses or from Valcom, Inc. directly, as follows:

> (Qnty) V-1022B Valcom, Inc. 1864 9th Street SE Roanoke, VA 24014

A V-1020A Ceiling unit may be or-4.02 dered as an equivalent unit which may be recess-mounted in the ceiling if A V-9914 ceiling bridge for desired. suspended ceiling installation and a V-9915 back box (for dust protection) may be ordered also.

5.00 **INSTALLATION:**

- 5.01 Materials required:
 - One Valcom unit (per station).
 - Two #10 mounting screws (screw type and anchors as required for mounting surface).
 - One 4-conductor telephone line cord equipped with spade-tips on both ends (maximum cord length, 25 feet).
- The V-1022B should be mounted as 5.02 close to the ceiling as practical. The baffle is secured to the mounting bracket from the top.
- 5.03 | Mounting (V-1022B):
 - Unscrew the mounting bracket from the baffle.
 - b) Using suitable hardware, mount the bracket on the wall. Keep in mind that the retaining screw is on top of the baffle.
 - c) Connect one end of the line cord to the baffle terminal strip as follows:

GN - Terminal T RD - Terminal R

BK - Terminal -24

YL - Terminal GND

d) Secure the baffle to the bracket.

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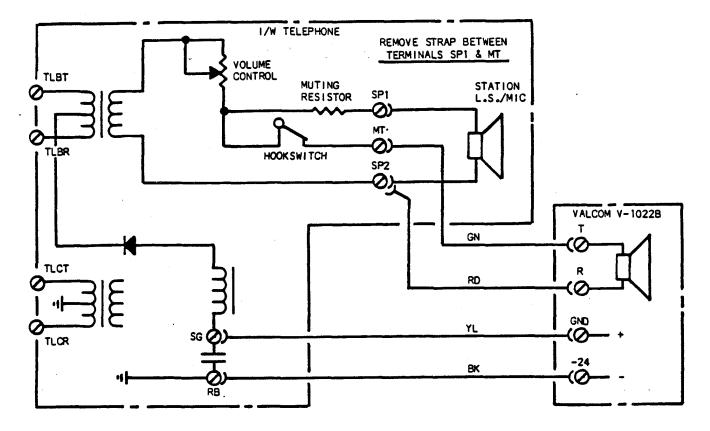


Figure 1 - Connections for Quiet Locations

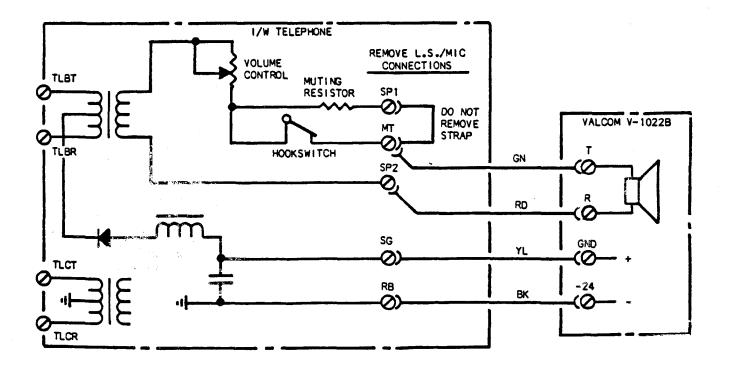


Figure 2 - Connections for Noisy Locations

6.00 CONNECTIONS:

6.01 There are two methods of connecting the loudspeaker to the telephone set.

Unplug the telephone set before making connectings.

- a) If the station is located in a relatively quiet area use the connections shown in figure 1. See also par. 8.02a.
- b) If the station is located in a noisy area use the connections shown in figure 2. See also par. 8.02b.

7.00 FUSING:

7.01 When a loudspeaker is connected to a station, the fuse on the ESTU station card in the KSU must be changed to a 0.5A fuse. Refer to section 2 in the installation manual for fuse location. DO NOT use a slow-blow type fuse. Use only an AGC type or equivalent (3AG). DO NOT substitute a larger fuse.

8.00 OPERATION:

- 8.01 Located on the bottom of the V-1022B baffle is a screwdriver type volume control. Set the volume control on the telephone to maximum volume position (rotate wheel toward back of set): Adjust the volume, using the control in the baffle, to the maximum level suitable for the location. This can be accomplished by calling the station from another telephone and call-announcing until the proper level has been set. Loudspeaker volume can now be controlled from the telephone.
- 8.02 Operation of the station in the talkback mode depends upon the method of connection used in par. 6.01, as follows:
 - a) If the station was connected for a quiet location (figure 1), signalling or call-announcing will be heard from both loudspeakers when the telephone is on-hook. No sound will be heard from the baffle when the telephone is offhook. Talkback is possible from station during call-announcing.
 - b) If the station was connected for a

noisy location (figure 2), the loudspeaker inside the telephone is not used. No talkback is possible from the station at any time. Off-hook signalling to the station is muted (lower in volume) when the station is off-hook.

8.03 It is generally not desirable to use the Monitor feature (MON key) at stations connected to a loudspeaker.

9.00 TROUBLESHOOTING:

9.01 Use the following chart for troubleshooting purposes:

NO SOUND

- Check that the volume control at both baffle and telephone are turned up.
- 2. Check for presence of RB & SG at loudspeaker baffle.
- 3. Make sure that power leads (BK/YL) are connected correctly.
- 4. If quiet location connections were used, make sure that station is on-hook.
- 5. Using a "butt" set, check for audio on T/R leads in the baffle. If not present, check MT/SP2 terminals inside telephone.

LOW VOLUME

- 1. Check that the volume control at both baffle and telephone are turned up.
- 2. Check that telephone is on-hook.
- 3. Check the voltage (RB & SG) at the baffle. Voltage at terminal -24 should be -18 to -28 VDC.
- 4. Check continuity of T/R leads between telephone and baffle. It is possible that low level sound may be heard from baffle with one side (T or R) open.

SQUEAL

- 1. Lower volume setting.
- 2. Baffle to close to telephone.
- 3. Change location or position of baffle.

TECHNICAL ASSISTANCE

When problems or questions arise during installation or servicing that cannot be resolved using this or related documents, then contact TIE Technical Service Department as follows:

For assistance between 8:30 AM and 5:00 PM, Eastern time, call:

(203) 929-7373

For assistance in the event of an **ABSOLUTE** emergency at other times than those listed, call:

(203) 929-7920

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