EXTROM

ELECTRONIC KEY TELEPHONE SYSTEM

HMS-612EE

INSTALLATION MANUAL

PANOR CORPORATION

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ELECTRONIC KEY TELEPHONE SYSTEM

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INSTALLATION MANUAL.

TO CORPORAÇÃO DE CONTROL DE CONTR

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INSTALLATION

PLANNING

- 1.01 Survey the area to be served by the HMS-612EE Electronic Key Telephone System and select a location that fulfills the following requirements:
 - · Provides a safe working location
 - Has adequate light and is always accessible
 - Has sufficient clearance above the floor to avoid damage from water and avoid being struck by cleaning equipment
 - Is clean, dry, well-ventilated, and free from corrosive fumes
 - · Is not subject to temperatures below 32 F(0°C) or above 104 F(40°C)
 - Is centrally located with respect to the stations to permit the shortest wiring runs
 - Is located within 900, 700, or 500 feet of the furthest station when using 22, 24, or 26 AWG wire, respectively
 - Is within 25 feet of the telephone company's terminal block
 - Is near a commercial ac pover receptacle
 - Meets with the customer's approval.
- 1.02 Arrange for the customer to provide a commercial 115V ac pover receptable in accordance with the following:
 - Is served by a separate fuse or circuit breaker
 - Is not under control of any switch
 - · Is of the grounded three wire type.

UNPACKING

- 1.03 To prevent damage to equipment and to avoid misplacing hardware items ,the key system shall be unpacked as follows:
- (1) Upon receipt of the shipment, check the equipment against the purchase order and packing list to ensure that the listed items have been supplied. Immediately file a shortage report with the supplier should any items be missing or incorrect.
- (2) Unpack the key service unit and remove it from the carton.
 Do not discard the KSU carton until all the equipment has been installed and the system fully tested.
 - (3) Check that the miscellaneous KSU hardware items listed in Table A have been provided.
 - (4) Inspect the KSU for:
 Damaged or loose connectors
 Broken or loose circuit cards
 Broken wires
 Damaged ac power cord

Broken or bent connector pins

Scratches or dents in the cabinet

Loose screws on the cover

- (5) Unpack the telephone instruments and handsets and remove them from their shipping cartons.
- (6) Locate all the miscellaneous items of telephone set hardware listed in Table Λ.
- (7) Inspect the telephone sets for damage to the keypad, handset cord line cord, modular connectors, jacks, and molded plastic parts.
 - (8) Do not remove circuit board SMDU from its box untill it is ready to be installed.

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TABLE A ORDERING GUIDE--REPLACEMENT HARDWARE

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QUANTITY REQUIRED	MOUNTING LOCATION	DESCRIPTION
1	KSU	Fuse, 3A
4		Screw, wood, phillips-head, M4.1 × 32S
1	5 - 5 - 5 - 5	Cable tie
2		User's Guide
1		Installation Manual
1	Station instrument	Card, directory
1		Card, operation guide
1		Tray, pull-out
1	30, 1	key top, designation tab
		Cover, designation
1 1	Pover-failure	Cable, power
1	transfer unit	Cable, modular, three-pair
		Screw, wood, phillips-head, M3.1 X 16S
1	Wall-mounting kit	Bracket, wall-mounting
1	0 5 0	Hook, handset
1		Cord, adapter
2	1.0	Screw, phillips-head, M3 × 8S
4		Screw, wood, phillips-head, M4.1 × 16S
1	Adjustable bracket	Bracket
1		Screw, self-tapping, phillips-head, M3 × 12S
2	SMDU	Spacer, PCB-4L
2		Spacer, PCB-4S
1	- 2	Flat cable, S/C-13×50BD
. 2		Screw, with small washer, M3×6S

Page 2

PRECAUTIONS

- 1.04 The following precautions must be observed to prevent damage to circuit boards and components:
 - Unplug the ac power cord before installing or removing printed circuit boards.
 - Do not remove circuit card from its antistatic bag untill they are ready to be plugged into the KSU.
 - Before handling any circuit cards, the installer must discharge any static buildup on his body by touching a good ground.
 - · Do not drop or rattle circuit card.
 - Do not grasp the cards by the components.
 - Do not touch the circuit runs on the board.
 - Only handle the circuit board by its edges.
 - Do not install and remove circuit cards unnecessarily.
 - · Do not attempt field repairs.
 - Do not expose cards to temperature extremes or high humidity or store them in such areas.
 - Printed circuit cards must be stored in their antistatic bags when not in use.

MOUNTING THE KSU

- 1.05 AT the selected location, mount the key service unit as follows:
 - (1) Fasten a piece of 3/4-inch plywood to the wall, using the appropriate screws or anchors. The plywood section should be large enough to accommodate the KSU and any other apparatus requiring wall mountlong, but in no case should it be less than 20inches wide and 20inches high.

- (2) Using the KSU as a guide, mark on the plywood the location of the four screw holes.
- (3) Fasten 1-1/4inch #8 screws at the upper two locations marked on the plywood. Leave a 1/5inch gap between the screwhead and the plywood.
- (4) Place the KSU against the plywood stubes so that the two screws extend 103 out through the top keyhole slots. 103 xis
- (5) Allow the KSU to slide down until mises it is resting on the two screws. 13-2MM Tighten the screws.
- (6) Place 1-1/4inch #8 screws in the polatic bottom two mounting holes on the SSU at the top of the keyhole slots. A dael and secure the KSU firmly to the plywood.

GROUNDING THE KSU

- 1.06 To protect the key system from service failures caused by voltage surges and dissimilar grounds, the following grounding procedure shall be followed:
 - (1) Run a 12 AWG or larger copper ground wire from the lower righthand corner of the KSU to the nearest cold water pipe, building ground, or ground rod.

Note: The cold water pipe system may not be utilized if it contains sections of plastic pipe or PVC elbows or unions.

- (2) Fasten the ground wire to the cold water pipe ground, building ground, or ground rod, using an approved ground clamp.
- (3) At the other end, fasten the ground wire to the KSU ground terminal located on the underside of the KSU to the left of the ac power cord entry.

Caution: Do not use the third wire (green) of the ac cord, or electrical outlet boxes or conduits for the KSU ground.

WIRING THE CENTRAL OFFICE LINES

A. General

1.07 The central office lines are brought in by the telephone company and terminated on either RJ-14C or RJ-21X network interfaces in accordance with FCC regulations. The RJ-14C is a 2-pair modular jack; one is required for up to two CO lines and three are required for six CO lines. The RJ-21X is a standard 25-pair female Amphenol-type cable connector , which in addition to terminating the six CO lines serving the HMS-612EE, may also be used to terminate lines for other services required by the customer such as facsimile or telex. At the KSU, the CO lines terminate in three 2-pair modular jacks. Jack MA terminates CO line 1 and 2, while jack MB terminates lines 3 and 4, jack MC terminates lines 5 and 6.

B. RJ-14C Network Interface

- 1.08 The following materials are required to connect the KSU to the RJ-14C jack.
- D4BU 4-conductor cord terminated in modular plugs at both ends (one required for two CO lines, three required for six CO lines)
- 1.09 The procedure for wiring the central office lines utilizing the RJ-14C network interface is as follows:
 - Label the RJ-14C containing the first two CO lines A, label the second RJ-14C(if provided) B and third RJ-14C(if provided) C.
 - (2) Refer to Fig.1-1 and take the first D4BU cord and connect jack MA in the KSU to network interface jack assembly A.
 - (3) If two or three RJ-14C jacks are provided, take the second (third) D4BU cord(s) and connect jack(s) NB(MC) in the KSU to network interface jack assembly B(C), as shown in Fig.1-1.

C. RJ-21X Network Interface

- 1.10 The following materials are required to connect the KSU to the RJ-21X jack:
- · A25C single-ended male connector cable
- D4BU 4-conductor cord terminated in a modular plugs at both ends (three required)
- 625A2N-4 four-wire surface-mounted of modular jack assembly (three required)
- 1.11 The procedure for wiring the six central office lines is described below. For purposes of standardization, it is recommended that all six CO lines be wired, even if only two CO lines are equipped initially.
 - (1) Mount the three modular jack
 assemblies to the plywood backboard between the KSU and RJ-21X
 jack. Use the wood screws provided
 - (2) Label one jack assembly A and the others B and C.
 - (3) Run the A25C connector cable from the RJ-21X jack to the three modular jacks of step (1).
 - (4) Terminate the first two pair of the connector cable on jack assembly A in accordance with Fig.1-2.
 - (5) Terminate the second two pair of the A25C connector cable on jack assembly B in accordance with Fig.1-2.
 - (6) Terminate the thired two pair of the A25C connector cable on jack assembly C in accordance with Fig.1-2.
 - (7) Plug the A25C connector cable into the RJ-21X jack.
 - (8) Take the first D4BU cord and connect jack MA in the KSU to modular jack assembly A.

- (9) Take the second D4BU cord and connect jack MB in the KSU to modular jack assembly B.
- (10) Take the third D4BU cord and GITDB2 connect jack MC in the KSU modular jack assembly C.

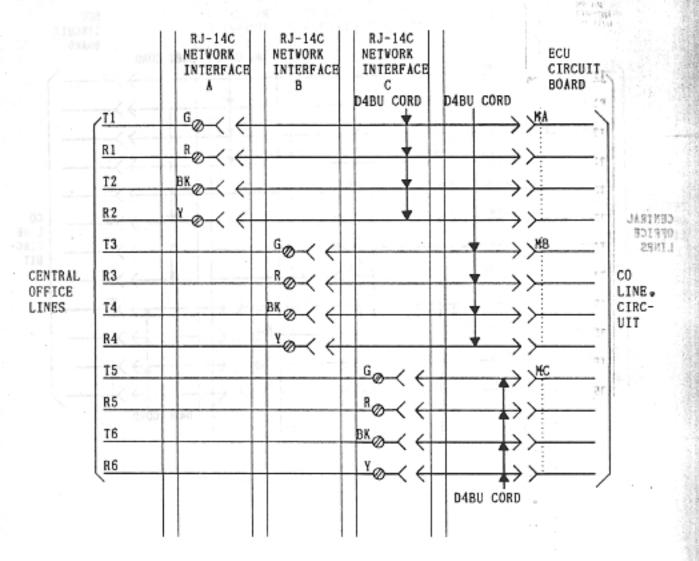


Fig.1-1 Connections for Central Office Lines Using Three RJ-14C Network Interface

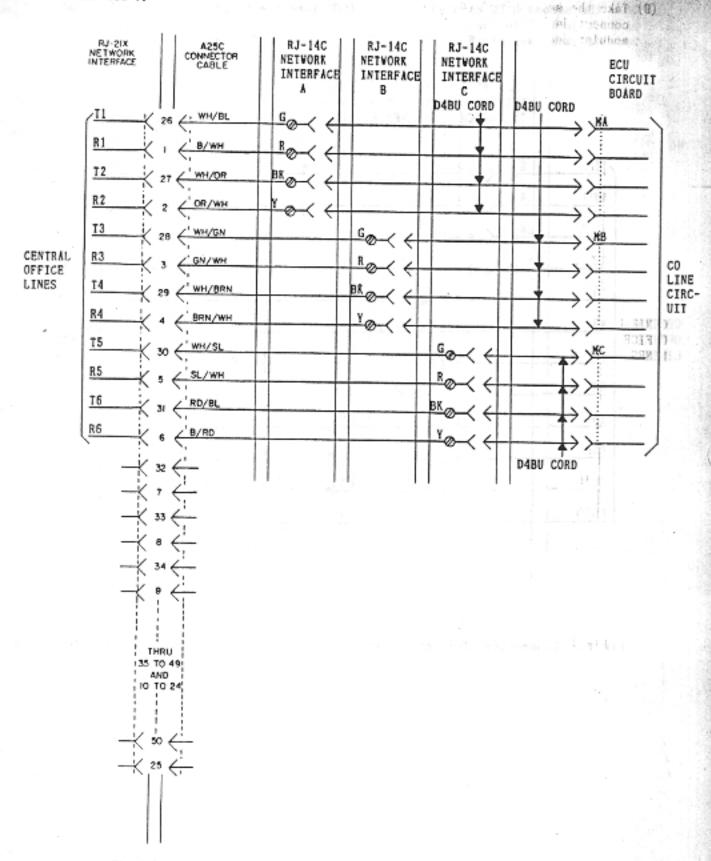


Fig.1-2 Connections for Central Office Lines Using RJ-21X Network Interface

INSTALLING THE POWER FAILURE TRANSFER

- ercial ac power, the power failure transfer unit transfers the central office lines from the KSU to customer-provided single line telephone sets. Each PFU cares for two CO lines, and three units are required to transfer all six lines. The following additional materials are required:
 - D4BU 4-wire double-ended modular cord (one required per PFU)
 - 2500-type single line tone-dial telephone sets for DTMF lines 500-type single line pulse-dial telephone for Pulse lines
 - Modular extension cords (as required to extend the telephone set line cord to the PFU)
- 1.13 The first power failure transfer unit is installed and wired as follows:
 - Unplug the KSU's power cord from the ac outlet.
 - (2) Remove the cover of the power failure unit .
 - (3) Mount the first PFU on the plywood backboard next to the KSU and label it No.1.
 - (4) Connect jack CNJ in the KSU with jack CNJ on the first PFU unit using the two-conductor modular power cord furnished with the PFU.
 - (5) Unplug the cord from modular jack MA in the KSU and relocate it to modular jack TC on the first PFU.
 - (6) Using a D4BU cord, connect jack MA in the KSU with Jack TK on the PFU.
 - (7) Replace the cover of the power failure unit.
 - (8) Plug the single line telephones into jacks TIT and T2T.

- 1.14 If the second and third power failure transfer units are provided, they are installed and wired as follows:
 - (1) Unplug the KSU's power cord from the ac outlet.
 - (2) Remove the covers of the PFUs.
 - (3) Mount the second (third) PFU on the plywood backboard next to the first and label it No.2 (No.3).
 - (4) Connect modular jack CNK on the first PFU with jack CNJ on the second PFU using the two-conductor modular power cord furnished with the unit.
 - (5) Other steps are same as steps 5 to 8 of first PFU except MB and MC₂₃

CABLING THE DISTRIBUTING FRAME

- 1.15 The installer shall provide
 one 66B4-25 connecting block for a
 12-station installation. The block shall
 be located near the KSU. The 66-type,
 block should not be connectorized.
 Designate the connecting block CB. The
 MDF is cabled as follows:
 - (1) Run an A25C 25-pair male connectors cable from the KSU to
 connecting block CB.
 - (2) Plug the cable into the mating connector in the KSU.
 - (3) At connecting block CB, terminate the cable on column A from top to bottom in standard color-code order. Refer to Figl-3 and Table B.

VIRING THE STATION SETS

1.16 Installation of the station instruments consists of providing surface- or flush-mounted four wire modular jacks, and running a four conductor station wire from the jacks to connecting block CB. The station wire used shall contain two twisted pair. The procedure is as follows:

- At the location of station 10, install a four-wire modular jack assembly.
- (2) Run the station wire from the modular jack of station 10 to connecting block CB at the MDF.
- (3) Terminate the station wire on the top four terminals of column F of CB in the following color-code order: (1) green, (2) red, (3) black, (4) yellow. Refer to Fig.1-3 and Table B.
- (4) Repeat steps (1) to (3) for station 11, terminating the station wire on the next four rows of connecting block CB in accordance with Table C.
- (5) Continue in this fashion for stations 12 to 21, in each case using the next four rows on connecting block CB.

INSTALLING THE ADJUSTABLE BRACKET

- 1.17 When mounted on a desk, the HMS-612EE instrument can be tilted toward the user, if desired, by installing an adjustable bracket to the bottom of the instrument. The bracket is installed as follows:
 - Unplug the line cord from the modular jack.
 - (2) Turn the telephone set over and lay it face down on the desk.
 - (3) Place the bare side of the bracket in the groove.
 - (4) Fasten the bracket to the base of the set with the self-tapping screw.

VALL MOUNTING TELEPHONE SET

1.18 An HMS-612EE key telephone instrument can be converted from desk to wall mounting with the WMK wall mounting kit. The set may be mounted directly to the wall or to a flushmounted modular jack, if provided. To convert a telephone set to wall mounting, proceed as follows:

- Plug the adapter cord provided with the kit into the modular wall jack only if the set is to mount directly to a jack assembly. Otherwise discard the adapter cord and proceed to step (7).
- (2) Holding the wall-mounting bracket close to the wall, run the free end of the adapter cord through the opening in the center of the bracket and out the opening in the top.
- (3) Secure the bracket to the modular assembly.
- (4) Fasten the wall-mounting bracket to the wall using the four wood screws provided.
- (5) Place the telephone set on the wall-mounting bracket so that the two upper tabs of the bracket enter the two upper slots in the base of the telephone.
- (6) Push the lower part of the telephone set against the bracket so that the lower two tabs snap into place in the lower two slots in the telephone.
- (7) If the set is mounted directly to a jack assembly, discard the existing line cord and plug the adapter cord into the telephone set in its place. Otherwise plug the existing line cord into the nearest modular jack assembly.

NOTE: A handset hook is already provided on the telephone set.

(3) (3) uN: vt.

CONNECTING A LOUD BELL

1.19 If a loud bell is provided, it can be connected to the HMS-612 key system. Terminals 49 and 50 of the connecting block CB (Fig.1-3 and table B) will provide a dry contact closure synchronizing with incoming signals of the C.O.lines. The dry contact closure can be programmed to provide closure for any or all incoming C.O.lines. It canalso be programmed for day ring, night ring, or both.

CAUTION: Maximum current allowed through the dry contact closure is 0.1 AMP.

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_	W/6H					_	- 6	-					1
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781	947/BK			24			Υ.		759		7.37		-
81	9×/5			**	_		_6	\vdash				reacting reacting	
BR	31.785			30	_		R	-			8.1		
1 .	Y/BL			31	_		BLX	17					
811	95./Y		-		_		Y						
691	Y/08	_	_	32	_		G						
91				22	-		-8		1.1		7.1		
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91)	7/44	_	_	35	_								
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Fig. 1-3 Layout of Connecting Block CB

TABLE B
CONNECTIONS FOR CONNECTING BLOCK CB

STATION		ONN CABL			ONN BLOCK		TION	FUNCTION
21,411,011	LEAD DESIG	PIN NO.	CABLE	ROW	COLUMN	LEAD DESIG	WIRE	PONCTION
	IT IR	26	W-BL BL-W	i 2		T R	G R	Voice
10	IT1 IR1	27 2	W-O O-W	3 4		T1 R1	BK Y	Data
	2T 2R	28 3	W-G G-W	5 6		T R	G R	Voice
11	2T1 2R1	29	W-BR BR-W	7 8	1 1	T1 R1	BK Y	Data
	3T 3R	30	W-S S-W	9		T R	G R	Voice
12	3T1 3R1	31 6	R·BL BL-R	11 12		T1 R1	BK Y	Data
	4T 4R	32	R-O O-R	13	1 1	T R	G R	Voice
13	4T1 4R1	33	R-G G-R	15 16		T1 R1	BK Y	Data
	5T 5R	34 9	R-BR BR-R	17		T R	G R	Voice
14	5T1 5R1	35 10	R·S S-R	19 20		T1 R1	BK Y	Data
	6T 6R	36 11	BK-BL BL-BK	21 22		T R	G R	Voice
15	6T1 6R1	37 12	BK-O O-BK	23 24		T1 R1	BK Y	Data
	7T 7R	38 13	BK-G G-BK	25 26	Α.	T R	G R	Voice
16	7T1 7R1	39 14	BK-HR BR-BK	27 28		T1 R1	BK Y	Data
	8T 8R	40 15	BK-S S-BK	29 30		T R	G R	Voice
17	8T1 8R1	41 16	Y-BL BLY	31 32	1 1	T1 R1	BK Y	Data
	9T 9R	42 17	Y-O O-Y	:33 :34		T R	G R	Voice
18	9T1 9R1	43 18	Y-G G-Y	35 36		TI RI	₽ķ	Data
	10T 10R	44 19	Y-BR BR-Y	37 38		T R	G R	Voice
19	10T1 10R1	45 20	Y-S S-Y	39 40		T1 Ri	BK Y	Data
	HT	46 21	V-BL BL-V	41 42		T R	G R	Voice
20	1171	47 22	V-0 O-V	43 44		T1 R1	BK Y	Data
	12T 12R	48 23	V·G G·V	45 46		T R	G R	Voice
21	12T1 12R1	49	V-BR BR-V	47 48		T1 Rt	BK Y	Data
oud Bell	-	50 25	V.S S.V	49 50				DRY RELAY CONTACT

INSTALLING THE SMDU CARD

- 1.20 The optional SMDR Interface card SMDU provides the interface for connecting a customer provided printer to the KSU. It will provide data station message detail recording.
 - (1) Unplug the power cord from the ac receptacle.
 - (2) Discharge any static electricity on your person by touching the KSU backplate, if properly grounded.
 - (3) Refer to Fig.1-4 insert two kinds of spacers on its position to the KSU.
 - (4) Peel off the sheel on the base at SMDU location.
 - (5) Locate the assigned position of SMDU cards.
 - (6) Fasten the SMDU cards by screwing two screws as shown in Fig. 1-4.
 - (7) Insert the flat ribbon cable into connector CNR on the SMDU cards with conductor side of the cable facing the connector contacts.
 - (8) Insert the other end of the ribbon flat cable into connector CNR on the ECU card.

CONNECTING THE PRINTER MITORWHOD

1.21 The SMDU card is equipped with an RS232C connector to permit the attachment of a printer. The printers listed below are required other models can not be connected to this system.

a. OKIDATA Model : LM-182

b. EPSON Model : FX-85 no 3 (2)

The following characteristic about the data output from the SMDU should be observed.

- 7-bit format !-
- ASCII code
- One start bit CONNECTT
- 4) Non-parity
- 5) Two stop bits

Fig.1-5 shows the detailed connections for the printers listed above. Other pins must not be connected.

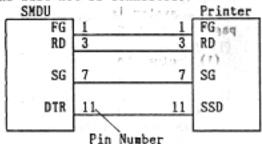


Fig. 1-5 Connecting SMDU and Printer

1.22 The dip-switch DS must be set to select the speed of print (bit/sec.) and to back up memory of clock during power failure (battery

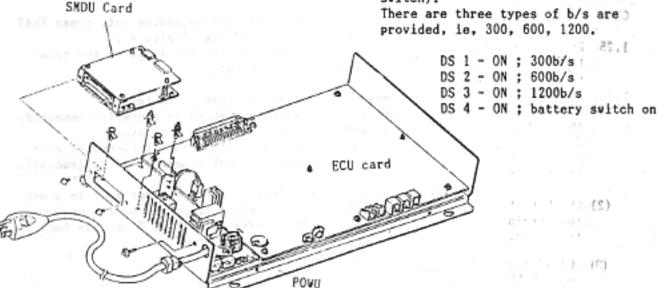


Fig. 1-4 Istalling the SMDU Card

CONNECTING AN EXTERNAL MUSIC SOURCE

- 1.23 If an external music source is available, it can be connected to the KSU as follows:
 - Unplug the power cord from the ac outlet.
 - (2) Connect customer provided music source and the KSU, using minijack ended 1-pair cord.
 - Note: The input level of the external music source shall be adjusted for 100mV.

CONNECTING AN EXTERNAL PAGING SYSTEM

- 1.24 If an external paging system is provided, station users can gain access by dialing INT plus 59 on their telephone instruments. (See User's Guide for complete instructions.)
 The key system is connected to the paging system as follows:
 - Unplug the power cord from the ac outlet.
 - (2) Connect customer provided paging system and the KSU, using minijack ended i-pair cord.
 - Note: The output impedance of the KSU across the PAGING OUT terminals is 500 ohms and the level of the output signal is 200mV.

COMPLETING THE INSTALLATION

- 1.25 Prior to perming the programming or turning the system up for service, review the installation as follows:
 - Carefully check the connections at the connecting blocks and modular jack assemblies to ensure that all connections were performed and to the proper locations.
 - (2) Check that no wires are broken at the terminals or touching adjacent terminals.
 - (3) Check that each circuit board is securely installed in its proper location.

- (4) Check the flat ribbon cables to ensure they are firmly in the connectors, conductor-side facing the contacts, and that the boards are correctly interconnected.
- (5) Check that the KSU has been properly grounded.
- (6) Plug the KSU power cord into an ac outlet.
- (7) Check that power is supplied to the KSU by observing that ECU LED flashes.
- (8) Power the printer for SMDR. You should supply KSU with the power before the printer.

SYSTEM RESET

1.26 Improper operation of the system
by one or several station users
may cause several stations or the entire
system to lock up. Operation of the
RESET button on the ECU card will reset
the system and clear the problem.
Caution should be exercised to ensure
that no conversations are in progress
when pressing the RESET button. Any
such conversations will be disconnected.

WIRING CHECK

- 1.27 When installing an HMS-612EE system you can use a 612EE BLF telephone to check the status of the connection between the KSU and each station.
- Plug power cord into a dedicated ac. outlet.
- (2) At any BLF telephone set, press FEAT key and dial 0 plus * . Observe the BLF lamps on the telephone set.
- -- A steady lamp indicates
 - A station which is properly connected.
- -- A flashing lamp indicates
 A station that is not connected properly or not connected at all(vacant).
- (3) Press (or any other key) in order to return to normal operation. NOTE: Please allow 5 or 6 seconds for this to occur.

FEATURE PROGRAMMING

CUSTOMER-PROGRAMMED FEATURES

2.01 The EXTROM™HMS-612EE Electronic Kev Telephone System contains a variety of advanced features to enhance the calling process and make telephone communications more efficient. Some of these features are programmed by each station user, some by only one user, and others are programmed by the installer during installation.

2.02 The only features programmed by station users are station and system speed dialing. For station speed dialing, each station user must program his or her own repertories of ten abbreviated dialing codes. In addition, the user at station 10 must program the 70 abbreviated dialing codes of the system speed dialing feature. These codes are then available to all extensions. Instructions for programming these two features are described in the HMS-612EE User's Guide.

INSTALLER-PROGRAMMED FEATURES

- 2.03 At the time of installation, the installer (11) Outgoing Call Restriction by Line: consults with the customer to determine which features are desired and to which stations. He/She then performs the necessary programming at the KSU and station 10. Should the customer's requirements change at a later date, the installer must return to the premises and reprogram the affected features.
- 2.04 The following is a list of the installer programmed features and the various choices available with each:
- (1) Hold Recall Interval: User is reminded of calls kept on hold for more than a preset time interval. (one, two, three minutes, or no hold recall)
- (2) Loud Bell Night Transfer: To designate whether the customer provided loud bell rings during night transfer or not.
 - (3) Pulse Make Ratio: Make ratio is 33% or 40% for Rotary C.O. lines only.
 - (4) Pulse Rate: 20pps or 10pps for Rotary C.O. lines only.

- (5) Inter Digit Pause: Break interval between rotary digits dialed (500ms, 700ms, 800ms, or 1100ms). For rotary C.O.lines only.
- (6) DTMF Tone Interval: Duration of DTMF tones sent on tone C.O. lines.
- (7) Flash/Recall: Program FLASH for accessing PBX features requiring a "HOOKFLASH". Program RECALL for use behind a Central Office for reseizing dial tone.
- (8) PBX Pause Number: If one or more of the one digit PBX access numbers (0. 7,8,9) are programmed, a pause will automatically follow the number(s) when registered as the first digit of a speed-dial number.
- (9) Rotary/Tone By Line: Select either ROTARY or TONE for each line used.
- (10) C.O. Line/PABX Line: Select by line, if used behind a PBX or a Central Office.
- Restrict all outgoing calls one or more lines. Incoming and internal calls will be allowed only. NOTE: Line(s) will be restricted on all phones. (20)
- (12) Loud Bell Ring Assignment: To designate whether the customer provided loud bell rings or not on incoming calls. Programmable on a per line basis.
- (13) Master Station Number: To designate which one station is able to access special features such as Night Transfer, Programming system speeddial numbers, and setting the date/ time for the optional SMDR feature. NOTE: System programming can only be accessed by station set 10 regardless of master station assignment.
- (14) Pause Interval: The duration of the "Programmable Pause" used in speeddialing can be set from one to fifteen seconds. NOTE: Pause can be linked together in speed dial memory.

- (15) Flash/Recall Interval: Duration of the "loop open" condition during a Flash/Recall.
- (16) Timing of Call for SMDR: Program the time interval allowed to pass before the SMDR will begin timing a call. This will allow time for dialing and for a connection to be made.
- (17) <u>Digit Timer for SMDR</u>: Program the length of time the KSU will wait between digits before recording a "Number Dialed" for the SMDR.
- (18) Flexible Ringing Assignment: Designates which stations will and will not ring during normal operation. Programmable on a perstation / per line basis.
- (19) Outgoing Call Restriction by Station: the ECU card, UNDER NORMAL OPERATING Programmable on a per station basis. CONDITIONS, THE LIFE OF THE BATTERY TEN YEARS.
 - A Non Restricted.
 - B Toll Restricted. .
 - C Outgoing call restricted.
 - · See Table D.
- (20) Night Transfer: Designates which stations provide an audible signal on incoming calls after night transfer is activated.
- (21) Tenant Group Assignment: Assigns station to one of 12 tenant groups if required. (Tenant groups are defined in feature nos. 25 and 26 below.)
- (22) Zone Page Group: In addition to allcall page. Up to eight paging zones can be assigned.
- (23) Number of Digits Allowed: Class "B" restriction can be programmed to allow 1-15 digits. (See feature no.19.)
- (24) Restricted 3 digit sequences: Class "B" restriction can also be programmed to deny ten 3-digit prefixes (Exchanges or area codes depending on digits allowed in feature 19.).

- (25) Tenant Group Line Designation: Designating which CO lines can or cannot be accessed by each tenant group.
- (26) Tenant Group Restriction: Defining type of restriction (If any) on a phone assigned to a tenant group. NOTE: Same restriction will apply to all groups.

 Restrictions available are: 20 moissis
 - 1) Cannot access lines.
 - Can access incoming calls and calls on hold only.
 - 3) Can access calls on hold only.
 4) No restriction

dialing cod to laid its must process to the 20.

4) No restriction.

PRECAUTIONS

2.05 Should the commercial ac supply suffer a power failure, the programming memory is protected against ensure by a lithium battery mounted on the ECU card, UNDER NORMAL OPERATING CONDITIONS, THE LIFE OF THE BATTERY IS TEN YEARS.

NOTE: Should the KSU be removed from service and the battery left connected, battery life could be reduced to as little as 90 days.

- 2.06 The battery is connected to the circuitry via a miniature slide switch (BS) on the ECU card. If the miniature slide switch is in the OFF position, the battery is disconnected. If it is in the ON position, the battery is connected. To prevent reducing the life of the battery prematurely, the following precautions should be observed:
 - Upon removing the KSU from service, preparing it for shipment, or during a period of non-use, make sure the miniature slide switch is in the OFF position.
 - (2) Prior to programming any features, make sure the BS switch is in the ON position.
 - (3) After programming is completed, the BS switch must be left in the ON position, for as long as the KSU is in the service.

PLACING THE SYSTEM IN PROGRAMMING MODE

- 2.07 The following steps are performed to place the system in the programming mode.

 NOTE: WHILE IN THIS MODE, CALLS CAN NOT BE PLACED OR RECEIVED. If the system is being programmed for the first time after installation, perform all the steps listed below.
 - (1) Make sure the ac power cord is plugged into the outlet.
 - (2) Make sure station set 10 is connected.
 - (3) On station set 10, press FEAT key, dial 0.9, * press HOLD key, (FEAT Ø 9 ₱ HOLD) and wait for the MUTE LED to flash, (Approx. 4 seconds)
 - (4) Program each feature, one after the other, in accordance with the following paragraphs.

PROGRAMMING THE FEATURE

- 2.08 Once the system is in programming mode, the actual programming is performed at station 10. Programming consists of keying the access code for the desired feature, and then pressing the proper combination of line, intercom keys or two digit code on the dial pad to light the required LEDs.

 The same access code may be assigned to several features. All features using the same code may be programmed at the same time without rekeying the code.

 After programming each particular ACCESS CODE, the HOLD key must be pressed briefly
- 2.09 To program each feature, refer to Table C and make a list of the features to be programmed and the options desired for each.
 Then proceed as follows:

in order to register the desired features.

(1) Key the four digit ACCESS CODE of the first feature on the keypad of station 10. When pressing the first digit of the ACCESS CODE, the MUTE LED changes to slow flashing, and when pressing the fourth digit the MUTE LED is extinguished.

- (2) Observe the keystrip. The lighted DHZ LEDs indicate how that feature is presently programmed.
- (3) To program the feature for the desired option, refer to Table C and determine which LEDs should desired and which should be extinguished.
- (4) To light an LED, press the associated line or intercom button or 2-digit ACCESS DIAL briefly.
- (5) To extinguish an LED, press the associated line or intercom button or 2-digit ACCESS DIAL briefly.
- (6) Repeat steps 4 or 5 until the desired combination of LEDs is lit and all others are dark.
- (7) Repeat steps (3) through (6) for other features using the same ACCESS CODE.
- (8) After programming for a particular ACCESS CODE is completed, press the HOLD key briefly. The LEDs extinguish. The MUTE LED flashes.

NOTE: The HOLD key must be pressed in order to register each ACCESS CODE in memory.

(9) To program the next feature refer to Table C to determine the correct ACCESS CODE and repeat steps (1) to (8).

NOTE: Make sure that the MUTE LED is flashing before entering a new ACCESS CODE. If it is not flashing make sure that the HOLD key has been pressed in order to insure that the last ACCESS CODE programmed has been registered in memory.

TAKING THE SYSTEM OUT OF PROGRAMMING MODE

- 2.10 To restore the system to operating mode after all programming is gomplete, proceed as follows:
 - At station set 10 press the HOLD key briefly to make sure that your last entry has been registered. The MUTE LED flashes.
 - (2) Dial 9, 0, 9, 0. The MUTE LED extinguishes. The system is now operational.
 - (3) Check the operation of the system to ensure that each feature, each C.O.line, and each station has been properly programmed.

CLEARING THE PROGRAMMED FEATURES AND DIAL NUMBERS

- 2.11 To clear the all programmed features and speed dial numbers, proceed as follows:
 - (1) Refer to section 2.07 and place the system in programming mode.
 - (2) At station set 10, dial 9,0,0,0. Programmed features and speed dial numbers are now cleared. (2)
 - (3) Refer to section 2.10 and take the system out of programming mode.

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Table C FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	JU-1110	ACCESS	₩LIG	HTED	LEDs		SET AT
No.	SOS COST THE CREAT SOR	CODE	JALG		KEY	C01	C02	C03	INT	FACTORY
1	Hold Recall Interval	0000	None	STAFE.	-	-	-	-		127
		2	1 min.	64.77	C01	•	-			11 113
		7.	2 min.	T MATE	C02	-	•			
Н	0	g ·	3 min.	C. MIZ	CO1,2	•	•			
2	Loud Bell Ring		Day	Ring	C03		4.0	•		
Н	DAY/NIGHT			No 1	_			-		
Н			Night	Ring	INT		26.7		•	
	- 0 0			No	_				-	
3	[Make Ratio]	0010	33%	87 187.8	C01	•	bu 1.1			1 1
	ROTARY CO ONLY	T o	40%	F 22 S	-	-	411.5			
4	[Pulse Rate]		20pps	70 1.1	C02		•			1 1
	ROTARY CO ONLY	0	10pps		_		-			•
5	[Inter Digit Pause]		800ms		_			-	-	
	ROTARY CO ONLY	y 10 1-45	1100ms	Legge d	C03		1.7	•	_	100
	(ac 0)	meter is positi	700ms		INT			-	•	NAT.
			500ms		CO3, INT		38 1	•	•	
6	DIMF Outpulsing	0011	55ms	ed ²	C01		U.			7.7
	Ratio		75 m s		_	-				
7	Flash/Recall		Flash	(PABX)	C02		•	100		0.0
	1, . 2	2.161	Recal	(C.O.)			-			. •
8	PBX Access Code	0020	None		_	-	-	-	-	•
	for CO Lines		7		C01	•	-	-	-	
	7		8		C02	-	•	-	-	
	2 m		9		C03	-	-	•	-	
			0		INT	-	-	-	•	
9	(Pulse or Tone by	♦ 5XX0	Tone		-	-				•
	line] ROTARY CO ONLY	1	Pulse		C01	•				
10	CO Line or PABX	1	CO Lin	ne	-		-			
	by line		PABX		C02		•			
11	Outgoing Call		Nonre	stricted	-			-		
	Restriction by Line		Restr	icted	C03			•		
12	Loud Bell Ringing		Rings		INT				•	•
	Assignment		Does 1	Not Ring	-				-	

Table C FEATURE PROGRAMMING

à Tr	FEATURE	ACCESS	OPTION	ACCESS	▼ LIG	HTED	LEDs		SET AT
No.		CODE		DIAL	C01	C02	C03	INT	FACTORY
13	Master Station	0040	STA# 10	00	200	-10		165	49 00 1
	Number	. 57	STA# 11	01	•	-	_	_	
	(Master station is	- 1	STA# 12	02	-	•	-	_	
-	able to access		STA# 13	03	•	•	_	_	1
0	features such as		STA# 14	04	-	-	•	100	08 to 44 X1
	Night transfer,		STA# 15	05	•	-	•	_ 1	SERVER 1
0	Speed dial numbers,		STA# 16	06	-	•	•	_	
	External BGM,		STA# 17	07	•	•	•	-	
	and setting the date		STA# 18	08	2200	+	-	•	8 6011 4
0	/time for the SMDR		STA# 19	09	•	-	- 1	•	7163.788
	feature.)		STA# 20	10	-	•	-	•	merchill &
			STA# 21	• 11	•	•	_ 7	•	F 950304

Legend:

- Indicator lamp will turn on when pressing desired key.
- ♠ Replace XX with Line Number of CO Line being programmed (01~06).
- * Do not use the ACCESS DIAL over 12.
- ▼ Do not press Feature keys. Lighted LEDs will indicate when pressing ACCESS DIÁL.

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- Corresponding LED should be "ON" for this feature.
- Corresponding LED should be "OFF" for this feature.

Table C FEATURE PROGRAMMING,

Ţ.	FEATURE	ACCESS	OPTION	ACCESS	▼LIG	HTED	LEDs		SET AT
No.		CODE	213	DIAL	C01	C02	C03	INT	FACTORY
14	Pause Interval	0050	(1 sec.)	00	_	-	-	-	2712140
	(for speed dial)	6	1 sec.	01	•	-	-	-	100 Y. V.
			2 sec.	02	-	•	-	-	
			3 sec.	03		•	-	-	•
			4 sec.	04	-	-	•	-	
		6	5 sec.	05	•	-	•	-	
	0 0		6 sec.	06	-	•	•	-	
			7 sec.	07	•	•	•	_	
			8 sec.	08	-	-	-	•	
		0	9 sec.	09	•	-		•	
			10 sec.	10	-	•	-	•	
		0	11 sec.	11	•	•	-	•	
	0 0		12 sec.	12	-	-	•	•	
	0 0		13 sec.	13	•	-	•	•	
	0 0		14 sec.	14	-	•		•	-
	0 0 0	2.1	15 sec.	15		•	•	•	
15	Flash/Recall	0060	20 ms	00	-	-	-	-	
	Interval	1	40 ms	01	•		-	-	
74	o gailaib aparted "	1	60 ms	02	-	•	-	T :-	
	Jer rook midt wi	re abi	80 ms	03	•	•	-		
UGP	ticks start of the S	WING A	100 ms	04	-	-	•	-	
	(20pd 2h		200 ms	05	•	-	•	_	
	- 61		300 ms	06	-	•	•	-	
	. 11		400 ms	07	•	•	•	-	
٠	1,0		500 ms	08	_	-	-	•	
			600 ms	09	•	-	_	•	
	4		700 ms	10	-	•	-	•	
			800 ms	11	•	•	-	•	
	7		900 ms	12	-	-	•	•	
			1000 ms	13	•	-	•	•	•
			2000 ms	14	-		•	•	
			3000 ms	15					

TABLE C. FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	ACCESS	▼ LIG	HTED	LEDs	138	SET AT
No.		CODE		DIAL	C01	C02	C03	INT	FACTOR
16	Timing of Call	0061	l sec.	00	J.	-	-00	3 - 3 - 1	9/3/
	for SMDR		5 sec.	01	•	-	i.mb	e s ct	10
			9 sec.	02	-	0	-	-	
			13 sec.	03	•	0	-	-	1 1
			17 sec.	04	-	-	•	_	
		1	21 sec.	05	•		•	-	777
			25 sec.	06	-	•	•	-	111
			29 sec.	07	•	•	•	-	
			33 sec.	08	-	-	-	•	111
			37 sec.	09	•	-	-	•	
			41 sec.	10	-	•	_	•	
			45 sec.	11	•	•	-	•	111
			49 sec.	12	-	-	•	•	
		-	53 sec.	13	•	-	•	•	111
			57 sec.	14	-	•	•	•	111
		1	61 sec.	15	•	•		0	11

NOTE: Timing of call for SMDR

Timing of call refers to a pre-programmed time delay between dialing out and the answer of the C.O. call by the outside party. This does not detect the outside party picking up. It only delays the start of the SMDU times. This feature is preset at the factory for 5 seconds.

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TABLE C FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	ACCESS	▼ LIG	HTED	LEDs		SET AT
No.	naroh of on 30	CODE	gian aco	DIAL	C01	C02	C03	INT	FACTORY
17	Digit Timer	0070	1 sec.	00		-	-	-	
	for SMDR		2 sec.	01	•	-	-11	-	2.30
	2010 30003		3 sec.	02	-	•	-		
	pbr toward of its	Stat	4 sec.	03	•	•	-20	-	10.00
			5 sec.	04	-	-	•	-	
	31		6 sec.	05	•	-	•	-	
	1		7 sec.	06	-	•	•	-	
1			8 sec.	07	•	•	•	-	
			9 sec.	08	-	-	-	•	
73	132 10 01 01	100 20	10 sec.	09	•		-	•	•
79	man (inc. top Tip	m)	11 sec.	10	-	•	-	•	
		9	12 sec.	11	•	•	-	•	E9 30 10
+			13 sec.	12	-	-	•	•	10.0
		12	14 sec.	13	•	-	•	•	
			15 eec	14	1_				

NOTE: Digit timer means; Interval time of dialing for SMDR. It must be required to dial within programmed digit time.

16 sec.

If dialed exceeds the programmed digit time, lap time is started before dialing is completed. This feature preset at factory for 10 seconds.

Printed out "Lap time" is added to digit time and timing of call as shown in chart below.

15

last	digit	sta	hung u	
	10 seconds	5 seconds		1 1 1 1 1 1 1
a s a a a a a				
dial	digit time	timing of call	lap t	ine

NOTE: SMDR recording format

a) Outgoing format

05-19, 02:13P, 00:01:15, S012, 000 11223344556677889900112233 001 A0001

[Date Time Laptime Station No. Incoming use only Dial No. [CO line No. Acount code The Code

b) Incoming format

Date [Time] [Laptime] CO line No. | Incoming time | Station No. | Acount code | till answer

erasting to

TABLE C FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	201	ACCESS	₩LIG	HTED	LEDs		SET AT
No.	8 -	CODE		1 4	KEY	C01	C02	C03	INT	FACTORY
18	Flexible Ringing	m 2YYO	Line 1	Rings	C01	•				
	Assignment **		1. 1.	No	51 –	-				
			Line 2	Rings	C02		0			
		-		No	_		-			
		. 0	Line 3	Rings	C03			•		
				No	_			-		•
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Line 4	Rings	INT	tel 1	0.676	150	•	5 8 1 09 1 0
				No		o parties	er is	10	0.10	•
	the state of the state of	■ 2YY1	Line 5	Rings	C01	•		h -libit	16.13	
			1 2 10	No	20° - 18	_560	1. 99	18 0	galli	
			Line 6	Rings	C02		0			
	0 6 4 5 4		-	No	bes	H _{ON}		tiso	0938	
19	Out Going Call	■1YYI	Class A		_	-	-	. (0.14	1.75	
	Restriction		Class B		C01	•	-		-	
	by Stations		Class C		C02	-	•	2.161		7
20	Night Transfer	■4YY0	Yes		C01	•				
			No		-		_	0 8 0	3 7	

- Replace YY with extension number of station being programmed.
- Station 10 is programmed at factory to all line ringing of flexible ringing assignment.

TABLE C FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	ACCESS	▼ LIG	▼LIGHTED LEDs				
No.	THE MALES	CODE	SON I	DIAL	C01	C02	C03	INT	FACTORY	
21	Tenant Group	■3 YY0	No assign	00	-	-	-	_	•	
	Belongs by Station	-	Group 1	01	•	-	-13	-	- Traff	
		0	Group 2	02	-	•	-	- 1	a Mod	
			Group 3	03	•		-1	-,,	1	
-		3	Group 4	04	-	-	•	-		
	- 6		Group 5	05	•	-	•	-		
	- 0		Group 6	. 06	-	•	•	-		
	+ - 0		Group 7	07	•		•	-		
	- 0	0.0	Group 8	08		-	-	•		
	0 9 -		Group 9	09	•	-	-	•		
		1	Group 10	10	-	•	-	•		
		4	Group 11	- 11	•	•	-	•		
	0	0	Group 12	•12	-	-	•	•		
22	Zone Page Group	■3YY1	No assign	00	-	-	-	-	•	
	Belongs by Station	0	Group 1	01	•	-	_	-		
			Group 2	02	-	•	-	-		
			Group 3	03	•	•	-	-		
	1		Group 4	04	-	-	•	-		
	-09L7 '28 HOT.	nds W	Group 5	05		-	•	-	4.114	
			Group 6	06	-	•	•	-		
		1	Group 7	07	•	•	•	-		
		10	Group 8	**08	-	-	. —in.	•	1 12	

[.] Do not use the ACCESS DIAL over 12.

^{**} Does this mean not to ACCESS DIAL over 08.

TABLE C FEATURE PROGRAMMING

If one or more stations were programmed to Class B of Toll Restriction, the

following feature No.23 and 24 should be programmed.

	FEATURE	ACCESS	OPTION	ACCESS	▼ LIG		SET AT		
No.		CODE	0.00	DIAL	C01	C02	C03	INT	FACTORY
23	Restricted Digit	0051	Non	00	-	-	0 <u>1</u> 7 0.	Z_wd	Estoniel
	number of Toll -		1 digit	01	•	-	_	_	
	Restriction Class B		2 digits	02	-	•	_	_	
			3 digits	03	•	•	-	-	
			4 digits	04	-	-	•	_	
			5 digits	05	•	-	•	-	
		100	6 digits	06	-	•	•	-	
			7 digits	07	•	•	•	-	
			8 digits	08	-	+	-	•	•
			9 digits	09	•	-	-	•	
			10 digits	10	-	•	-	•	
			11 digits	-11		•	-	•	
			12 digits	12	±3.6	10	•	•	Zoner Pa
			13 digits	13	•	+ 1	•	•	Post NE
			14 digits	14	-	•	•	•	
			15 digits	15	•	•	•	•	

	FEATURE	ACCESS	3-digit Number
No.		CODE	to Restrict
24	Restricted Special	7000	2 2 2
	Ten 3-digit Numbers	7100	
	of Toll Restriction	7200	
	at Class B	7300	1 10
		7400	
		7500	A gard of the
		7600	
		7700	
		7800	
		7900	

		-		
Number	LIG	HTED	LEDs	
Z	C01	C02	C03	INT
1	0	-	-	- 1
2	-	•	-	-1
3	0	•	-	-
4	CDA.		•	1.001
5	0	-	•	-
6	750	•	•	1000e4
7	0	•	•	-
8	-	-	-	•
9	0	-	-	•
0	_	•	-	•
non		-	-	-
•	•	•		•
			•	•

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Note: To program 3-digit number for restriction key in 4 digit access code.

Then enter 3-digit number from dial pad.

Note: Program item No.24, indicator LED's are not lit but can be confirmed by taking following STEPS as listed right of No.24.

STEP 1 Press ACCESS CODE. First digit will be displayed.

STEP 2 Press FEAT key. Second digit will be displayed.

STEP 3 Press FEAT key again. Third digit will be displayed.

Note : To cancel 3-digit number for restriction press INT key, then each digit.

TABLE C FEATURE PROGRAMMING

If tenant feature was programmed, the following feature No.25 and 26 should be programmed.

	FEATURE	ACCESS	01	PTION	ACCESS	*LI	GHTED	LEDs		SET AT
Νo.	200	CODE			KEY	C01	C02	C03	INT	FACTORY
25	Tenant Group Restriction	◆ 6XX0	Group 1	Restricted	-	-				15775
				Non	C01				1 1	•
		tehred i	Group 2	Restricted	-	-	-			
		401	Post Albrech	Non	C02		•			•
	Taufa shap		Group 3	Restricted	-	1	-	_		
П		536 - 76 - 3		Non	C03			•		•
	(Lisais	800-740	Group 4	Restricted	_				_	
		.11185	0 751	Non	INT				•	•
		◆6XX1	Group 5	Restricted	-	-				1
			100000	Non	- C01					•
П			Group 6	Restricted	-		-			
				Non	C02		•			•
			Group 7	Restricted	-			-		
				Non	C03			•		•
			Group 8	Restricted	-				-	
				Non	INT				•	•
		◆6XX2	Group 9	Restricted	-	-				
				Non	C01	•			-	•
			Group10	Restricted	_		-		-	
				Non	C02		•	-		•
			Group11	Restricted	-			-		Joseph
				Non	C03			•		•
	7		Group12	Restricted	_				-	
	1			Non	INT				•	•

TABLE C FEATURE PROGRAMMING

	FEATURE	ACCESS	OPTION	ACCESS	₩LI	SET AT			
No.		CODE	and the second of the second o	KEY	C01	C02	C03	INT	FACTORY
26	Tenant Type	0011	Can Not access		8112 -		20	-	•
		50.00	Can access Holded Line	C03			•	-	
			Restrict Outside Calls	INT	1 1000		-	•	
		beysi re	No Restriction	CO3, INT			•	•	

· : Unable to do outgoing call in all cases.

Table D

CLASS	CONTENTS							
	C.O.LINE	Behind PBX						
Class A	No restriction	No restriction						
Class B	 Dialing 0 or 1 will automatically restrict a call. Dialing more than programmed digits will automatically restrict a call. Dialing programmed 3-digits number will automatically restrict a call. 	1. Dialing PBX access code plus 0 or 1 will automatically restrict a call. 2. Dialing PBX access code plus more than programmed digits will automatically restrict a call. 3. Dialing PBX access code plus programmed 3-digits will automatically restrict a call.						
Class C	Dialing outside line code will automatically restrict a call.	Dialing outside line code following with PBX access code will automatically restrict a call.						

Note: Of Class B ,private speed dialing is toll-restricted.

Common speed dialing is not toll-restricted.

FCC COMPLIANCE

RADIO FREQUENCY INTERFERENCE

- 3.01 The ECU card generate and use radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. Both have been type tested and found to comply with the limits for a Class A device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by unplugging and plugging in the key service unit, the user is encouraged to try to correct the interference by one or more of the following measures:
 - (a) Reorient the radio or TV receiving antenna.
 - (b) Relocate the key service unit with respect to the radio or TV receiver.
 - (c) Plug the key service unit into a different outlet so that it and the radio or TV receiver are on different branch circuits.
- 3.02 If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

HEARING AID COMPATIBILITY

- 3.03 FCC rules prohibit the use of non-hearingaid compatible telephones in the following locations:
 - Any public or semipublic location where coinoperated or credit card telephones may be found.
 - Elevators, highways and tunnels (automobile, subway, railroad or pedestrian) where a person with impaired hearing might be isolated in an emergency.
 - Places where telephones are specifically installed to alert emergency authorities such as fire, police or medical assistance personnel.
 - 4. Hospital rooms, residential health care facilities, convalescent homes, and prisons, specifically where telephones are used for signaling life-threatening or emergency situations if alternative signaling methods are not available.
 - 5. Workstations for hearing impaired personnel.
 - Hotel, motel, apartment lobbies; in stores where telephones are used by patrons to order merchandise; in public transportation terminals where telephones are used to call taxis, or to reserve lodging or rental automobiles.
 - Hotel and motel rooms. (At least ten percent of the room must contain hearing-aid compatible telephones; or contain jacks for plug-in hearing-aid compatible telephones which will be provided to hearing impaired customers upon request.)

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- (b) Relative Towns of the Control of
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