

SERVICE
1A2 KEY TELEPHONE SYSTEM
69B, D, AND G APPARATUS MOUNTINGS
IDENTIFICATION, INSTALLATION, AND CONNECTION

1. GENERAL

1.01 This section contains information for the 69B, D, and G apparatus mountings used in the 1A2 Key Telephone System (KTS).

1.02 This section is reissued to:

- Add information on the treatment of central office (CO) lines under the Federal Communication Commission (FCC) Registration Program
- Rerate 419A KTU from AT&TCo Standard to Manufacture Discontinued (MD)
- Add 419B KTU—Automatic Signaling, Ringdown Private Line Circuit
- Add 494A KTU—TOUCH-TONE® Selector (Fig. 6 revised and new Fig. 39 added)
- Add 440A (MD) and 478B KTU—TOUCH-TONE Adapters
- Remove information on the 470A KTU which was never manufactured
- Add 451A and 498A KTUs—Music-On-Hold Circuits
- Add 471B KTU—Battery Reversal Toll Restriction Circuit
- Add 479B Rotary Dial Toll Restriction Circuit
- Revise Table A to include these KTUs.

1.03 This issue of the section is based on the following drawings:

SD-69475, Issue 6—401A KTU

SD-69489, Issue 6 —428A KTU

SD-69513, Issue 15—400D (MD) KTU

SD-69530, Issue 9 —429C and 430A KTUs

SD-69559, Issue 10 —414A, 415A, 416A, 418A, 419-type, 461A, and 469A KTUs

SD-69561, Issue 2—417A KTU

SD-69567, Issue 15 —407B (MD), 407C, 420A, 422B, 423A, 424A (MD), 424B (MD), 424C, 425B, and 494A KTUs

SD-69590, Issue 3 —413A, 421A, 448A, and 449A KTUs

SD-69595, Issue 10 —426A and 427C KTUs

SD-69651-01, Issue 5 —400G (MD) KTU

SD-69906-01, Issue 4—440A KTU

SD-69917, Issue 1—467A KTU

SD-69921-01, Issue 3 —471-type and 479-type KTUs

SD-69922, Issue 3—451A and 498A KTU

SD-69942, Issue 2—400H KTU

SD-69599, Issue 3 —69-Type Apparatus Mounting

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

◆SD-69931, Issue 4—478B KTU◆

If this section is to be used with equipment or apparatus reflecting later issues of the drawings, reference should be made to the SDs to determine the extent of the changes and the manner in which the section may be affected.

1.04 ◆Incoming CO lines to be installed in compliance with the FCC Registration Program must be routed through a standard network interface. Information on approved interfaces is contained in Section 461-640-105, entitled Connecting Blocks, 66M3-50R, Identification, Installation, and Maintenance.◆

2. IDENTIFICATION

2.01 Purpose: The purpose of the 69B, D, and G apparatus mountings is to provide alternative mounting facilities for 400-series KTUs in centralized installations of the 1A2 KTS in conjunction with 584-type panels.

2.02 Ordering Guide**(a) Basic Units**

- Mounting, Apparatus, 69B
- Mounting, Apparatus, 69D
- Mounting, Apparatus, 69G

(b) Replaceable Optional Components

- Assembly, Guide, 834055907 (P-40V590)
- Assembly, Tab, 834481699 (P-44Y169)
- Strip, Designation, 834481673 (P-44Y167)

(c) Associated Apparatus or Equipment (order separately)

- Block, Connecting, 66B4-25 (as required)
- Bracket, Mounting, 99A (MD) or B
- Cable, Connector, A25B (as required)
- Unit, Telephone, Key (as required, see Table A).

2.03 Design Features

- (a) Equipped with two connectors aligned vertically to accommodate one 8-inch KTU or [by adding an 834055907 (P-40V590) guide assembly which must be ordered separately] two 4-inch KTUs (Table A).
- (b) The 69B apparatus mounting consists of two 913A (20-pin) connectors wired to a KS-16671,L1 plug mounted on the back of the apparatus mounting (Fig. 1).
- (c) The 69D or G apparatus mounting consists of two 914A (40-pin) connectors wired to two KS-16671,L1 plugs mounted on the back of the apparatus mounting (Fig. 2).
- (d) Tab assemblies hold the KTUs in place and provide mountings for designation strips.
- (e) The same numbered pins of each connector on which the 11 dedicated leads (BAT, GRD, LF, LW, etc) appear are strapped between the two connectors, and each dedicated lead is then brought out on one conductor.
- (f) The 69B, D, and G apparatus mountings are wired for those 400-series KTUs indicated by a bullet (●) in Table A.
- (g) The 69B, D, and G apparatus mountings are designed for frame mounting with a 99A (MD) or B bracket (Fig. 3). Mounting screws are furnished with each apparatus mounting.

Note: The 99A (MD) or B bracket consists of two 23-inch mounting bars on which a maximum of 12 apparatus mountings may be installed. The upper bar includes cable supports which retain the connector cables. The bracket requires a 9-inch vertical mounting space.
- (h) The A25B connector cables are required to extend the mountings to distributing terminals.

3. INSTALLATION**PLANNING**

- 3.01** Select the type apparatus mounting(s) required for specific KTUs to be used per Table A.

◆TABLE A◆

ARRANGEMENT OF 400 SERIES KTUs IN 69-TYPE APPARATUS MOUNTINGS

KTU	FUNCTION	SIZE (IN.)	PINS	APPARATUS MOUNTING			REMARKS
				69B	69D	69G	
400-Type	CO or PBX Line Circuit	4	18	●	●	*	When the 417A, 420A, or 421A KTU is used in the 69-type apparatus mountings, the cable run from the apparatus mounting to the connecting block should be as short as possible, preferably not longer than 10 feet to reduce the possibility of noise pickup on unpaired leads. When a 400H KTU is used as a line circuit and line will be equipped with music-on-hold, a 498A KTU must be used for music-on-hold as the 400H is not compatible with 451-type KTUs. <i>Note:</i> WORKING LIMITS: The maximum permissible length of cable run for the lamp feeder pairs (10V±, LW, LF) is determined by the lamp load. For a load of 20 lamps, the run from apparatus mounting to power supply shall be a maximum of 30 feet. For lesser loads, the length of run may be increased proportionately.
401A	Manual Intercom Line Ckt	4	18	●	●	*	
407B (MD) or 407C	Dial Intercom 10-Code Selector Circuit	8	80	*	*	●	
413A	Auxiliary Ringup Circuit	4	18	●	●	*	
414A	Manual Signaling, Ringdown Private Line Circuit	4	20	●	●	*	
415A	Automatic DC Signaling, Private Line Circuit	4	18	●	●	*	
416A	Station Line Circuit	4	20	●	●	*	
417A	Add-on Conference Ckt	4	40	*	●	*	
418A	Short Range, DC Signaling, Private Line Circuit	4	20	●	●	*	
419A (MD) or 419B	Automatic Signaling, Ringdown Private Line Circuit	8	20	●	●	*	
420A	Long Line Circuit	4	18	●	●	*	
421A	Power Failure Transfer Ckt, General Purpose Relay or Audible Signal Suppressor	4	40	†	●	*	
422B	Station Busy Selector Ckt	4	40	*	●	*	
423A	Dial Tone, Busy Tone, and Audible Ringback Tone Ckt	4	20	●	●	*	
424A (MD) 424B (MD), or 424C	Dial Intercom 19-Code Selector Circuit	8	80	*	*	●	
425A (MD) or 425B	Flashing Lamp Circuit	8	80	*	*	●	
426A	TOUCH-TONE Adapter Ckt	8	80	*	●	*	
427B (MD) (Series 4) or 427C		8	80	*	●	*	
428A	Multiline Exclusion Ckt	4	40	*	●	*	
429A (MD), 429B (MD), or 429C	Supplementary Hold Detector Circuit	4	40	*	●	*	
430A	Flutter Generator Circuit	4	20	●	●	*	
440A (MD)	TOUCH-TONE Adapter Circuit	8	80	*	●	*	

◆TABLE A (Contd)◆

ARRANGEMENT OF 400 SERIES KTUs IN 69-TYPE APPARATUS MOUNTINGS

KTU	FUNCTION	SIZE (IN.)	PINS	APPARATUS MOUNTING			REMARKS
				69B	69D	69G	
448A	Variable Delay-Timer Circuit	4	40	*	●	*	
449A	Immediate Transfer Cont Ckt	4	40	*	●	*	
451A (MD) or 451B	Music-On-Hold Circuit	4	40	*	●	*	
461A	Manual Signaling, Ringdown Private Line Circuit	4	20	●	●	*	
467A	Voltage Monitor Circuit	4	18	●	●	*	
469A	Lamp Extender Circuit	4	18	●	●	*	
471A (MD) or 471B	Bat. Reversal Toll Rstcn Ckt	4	18	●	●	*	
478B	TOUCH-TONE Adapter Circuit	8	80	●	●	*	
479B	Rot. Dial Toll Rstcn Ckt	8	20	*	●	*	
494A	TOUCH-TONE Selector	8	80	*	*	●	
498A	Music-On-Hold Circuit	4	40	*	●	*	

* Not usable.

● Usable.

† Restricted to transfer of one station ringer.

3.02 Apparatus mountings, connecting blocks, and power supply should be located with as short a distance between them as possible.

3.03 Verify that fusing requirements for the apparatus mountings can be met. See Table B for fusing requirements.

INSTALLING

3.04 If the 69-type apparatus mounting is to be installed in a cabinet, 16C apparatus mounting, or relay rack, install the 99A (MD) or B brackets (Fig. 3).

3.05 Install the 69-type apparatus mounting (using mounting hardware furnished).

3.06 Install the necessary 66B4-25 connecting blocks at the distribution point.



In installations where a number of 69-type apparatus mountings are installed, be sure to identify each connecting block with its associated apparatus mounting.

3.07 Connect the A25B connector cables to the apparatus mountings and route to the distributing point.

3.08 Cut down the A25B connector cables on the 66B4-25 connecting blocks as shown in Fig. 4, 5, and 6 for the 69B, D, and G apparatus mountings, respectively. Figures 4, 5, and 6 also contain schematics and block diagrams showing typical layouts of the apparatus mountings.

3.09 Dedicated lead connections for the 69B and D apparatus mountings are shown in Fig. 7. These connections should be made before installing KTUs in the apparatus mountings. Dedicated lead

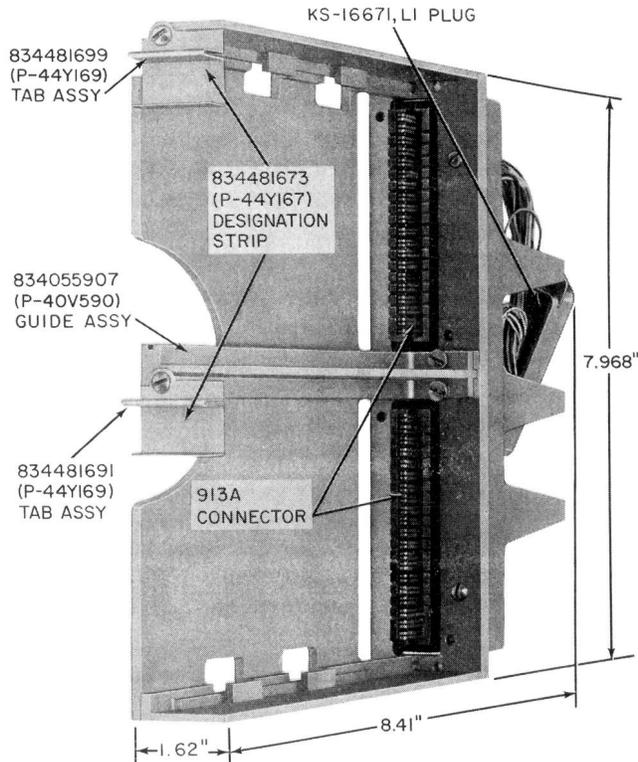


Fig. 1—69B Apparatus Mounting (With Guide Assembly)

connections for the 69G apparatus mountings are shown in various figures covering the connections for dial intercom. Dedicated leads are those leads, such as BAT, GRD, LF, LW, etc, that appear on the same numbered pin of each KTU.

4. CONNECTIONS

4.01 Figures 8 through 38 show the nondedicated lead connections of the 400-series KTUs that can be installed in the 69B and D apparatus mountings. Each figure is divided into three sections: field connections are shown on the left, row assignments in the center, and pin numbers of the connector on the right. Pin numbers are shown for reference only so that a complete picture of the KTU circuitry can be seen when the connection drawing of any KTU is compared to the functional schematic.

4.02 Field connections are made for any KTU by determining the connector used (connector A or B) and the connecting block on which the connector appears. For example (see Fig. 8), if a

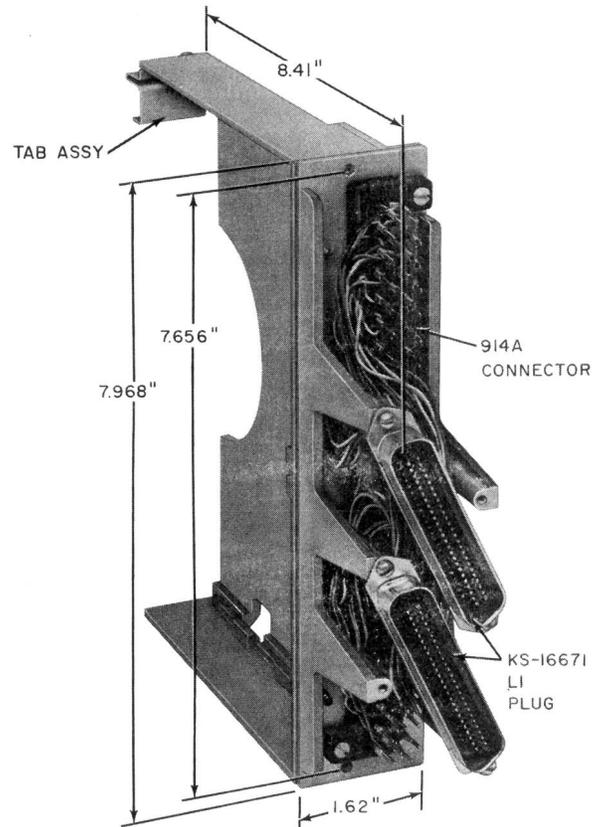


Fig. 2—69D or 69G Apparatus Mounting (Without Guide Assembly)

400-type KTU is installed in connector A of a 69B apparatus mounting, field connections are made to the rows shown in column 1. If a 400-type KTU is installed in connector B, field connections are made to the rows shown in column 2. If a 400-type KTU is installed in connector A or B of a 69D apparatus mounting, field connections are made to the rows shown in column 1, with the connections to connector A made to block 1 and the connections to connector B made to block 2.

4.03 Figures 39, 40, and 41 show power supply connections and strapping required to furnish a basic dial intercom, using a 407B (MD), 407C, 424A (MD), 424B (MD), 424C, and 494A KTU. Figure 42 covers the station connections and Table C covers the necessary connections to optional KTUs.

4.04 Figures 43 and 44 show the power supply and strapping required to furnish a deluxe dial intercom, using a 407B (MD), 407C, 424A (MD),

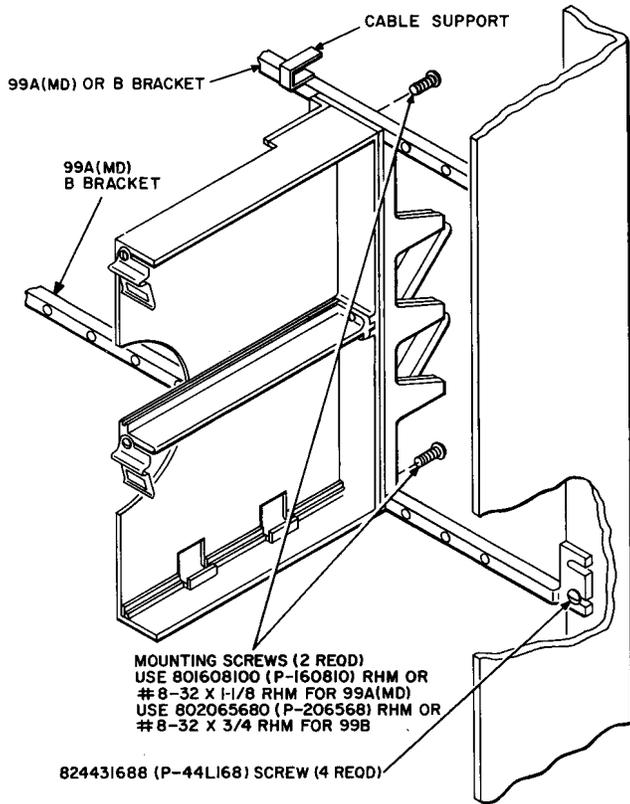


Fig. 3—69B, 69D, or 69G Apparatus Mounting on a 99A (MD) or 99B Bracket

424B (MD), or 424C KTU. Figure 45 shows the connections required when a 425B KTU is installed in a 69G apparatus mounting for a deluxe dial intercom system. Figure 46 shows the station connections, and Table D or E shows the necessary connections to associated and optional KTUs.

CONNECTION INDEX

- Fig. 4—Schematic of 69B Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block
- Fig. 5—Schematic of 69D Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block
- Fig. 6—Schematic of 69G Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block
- Fig. 7—Dedicated Lead Connections (Interrupter and Power) for 69B and 69D Apparatus Mountings.

Nondedicated Lead Connections for:

- Fig. 8—400D (MD) KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting

TABLE B

FUSING FOR 69-TYPE APPARATUS MOUNTINGS

FUNCTION	FUSE SIZE (AMP)	VOLTAGE	NUMBER OF FUSES NEEDED
Lamp steady (10V±)	2	10Vac	One per 50 lamps
Lamp flash (LF)	2	10Vac	
Lamp wink (LW)	2	10Vac	
Ringin (105V±)	.5	105Vac	As determined by total load connected to supply
Buzzer (18V±)	.5	18Vac	
Talk battery (BAT. A)	1-1/3	24Vdc	
Signal battery (BAT. B)	1-1/3	24Vdc	

- Fig. 9—400G (MD) KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 10—400H KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 11—401A KTU (Manual Intercom Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 12—413A KTU (Auxiliary Ringup Circuit) in 69B or 69D Apparatus Mounting
- Fig. 13—414A KTU (Manual Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 14—415A KTU (Automatic, DC Signaling Private Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 15—416A KTU (Station Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 16—417A KTU (Add-on Conference Circuit) in 69D Apparatus Mounting
- Fig. 17—418A KTU (Short Range, DC Signaling Private Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 18—419-Type KTU (Automatic Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 19—420A KTU (Long Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 20—421A KTU (Power Failure Transfer Circuit) in 69B or 69D Apparatus Mounting
- Fig. 21—421A KTU (Wired for DSS Feature) in 69D Apparatus Mounting
- Fig. 22—421A KTU (Used as Audible Signal Suppressor) in 69D Apparatus Mounting
- Fig. 23—422B KTU (Station Busy Selector Circuit) in 69D Apparatus Mounting
- Fig. 24—423A KTU (Dial, Busy and Audible Ringback Tone Circuit) in 69B or 69D Apparatus Mounting
- Fig. 25—426A, 427B (MD) (Series 4), or 427C KTUs (TOUCH-TONE Adapter Circuit) in 69D Apparatus Mounting
- Fig. 26—428A KTU (Multiline Exclusion Circuit) in 69D Apparatus Mounting
- Fig. 27—429-Type KTU (Supplementary Hold Detector Circuit) in 69D Apparatus Mounting and 430A KTU (Flutter Generator Circuit) in 69B or 69D Apparatus Mounting
- Fig. 28—448A KTU (Variable Delay Timer Circuit) in 69D Apparatus Mounting
- Fig. 29—449A KTU (Immediate Transfer Control Circuit) in 69D Apparatus Mounting
- Fig. 30—451B KTU (Music-On-Hold Circuit) in 69D Apparatus Mounting
- Fig. 31—Preset Conference Circuit of a Deluxe Dial Intercom Line (421A KTU in 69D Apparatus Mounting and a 413A KTU in a 69B or 69D Apparatus Mounting)
- Fig. 32—461A KTU (Manual Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting
- Fig. 33—467A KTU (Voltage Monitor Circuit) in 69B or 69D Apparatus Mounting
- Fig. 34—469A KTU (Lamp Extender Circuit) in 69B or 69D Apparatus Mounting
- Fig. 35—471A (MD) or 471B KTU (Battery Reversal Toll Restriction Circuit) in 69B or 69D Apparatus Mounting
- Fig. 36—440A (MD) or 478B KTU (TOUCH-TONE Adapter Circuit) in 69D Apparatus Mounting
- Fig. 37—479A (MD) and 479B KTU (Rotary Dial Toll Restriction Circuit) in 69D Apparatus Mounting

Fig. 38—498A KTU (Music-On-Hold Circuit)
Equipped With a 116A1 Circuit Module
in 69D Apparatus Mounting

Basic Dial Intercom

Fig. 39—Strapping and Power Supply Connections
for 407B (MD) or 407C KTU

Fig. 40—Strapping and Power Supply Connections
for 424A (MD), 424B (MD), or 424C
KTU

Fig. 41—Strapping and Power Supply Connections
for 494A KTU

Fig. 42—Station Connections

Table C—Connections From 407-Type or 424-Type
KTU to Optional KTUs

Deluxe Dial Intercom

Fig. 43—Strapping and Power Supply Connections
for 407B (MD) or 407C KTU

Fig. 44—Strapping and Power Supply Connections
for 424A (MD), 424B (MD), or 424C
KTU

Fig. 45—Strapping and Power Supply Connections
for 425A (MD) or 425B KTU

Fig. 46—Station Connections

Table D—Connections From 407-Type KTU to
Associated and Optional KTUs

Table E—Connections From 424-Type KTU to
Associated and Optional KTUs

TABLE C

**BASIC DIAL INTERCOM CONNECTIONS
FROM 407-TYPE OR 424-TYPE KTU TO OPTIONAL KTUs**

LEAD DESIG 407- OR 424- TYPE	66B4-25 CONN BLKS 407- OR 424-TYPE KTU ROW AND COLUMN ASSIGNMENT		OPTIONAL KTUS			
			420A KTU	421A KTU* (DSS)	"TOUCH-TONE"	
	BLK 1	BLK 2			426A	427B, SERIES 4 OR 427C
T	1A-E		•		•	
R	2A-E		•		•	
Y1	45A-E			•		•
Y2	46A-E			•		•
Y3	47A-E			•		•
LR, Y4	48A-E			•		•
Y5	49A-E			•		•
J	50A-E					
RS1		10F-B				•
LT2†		13F-B		•		
TTG		14F-B	•		•	•
RH		17F-B		•		•
CG		18F-B		•		•
B (1-XO)	As assigned for station connection (See Fig. 42)		•			
R (1-XO)			•			

* Connect required leads per Fig. 21

† Connect only when 424-type KTU provided.

SECTION 518-215-420

66B4-25
CONN BLOCK
ROW ASSIGNMENT
COL A OR F
(SEE NOTE)

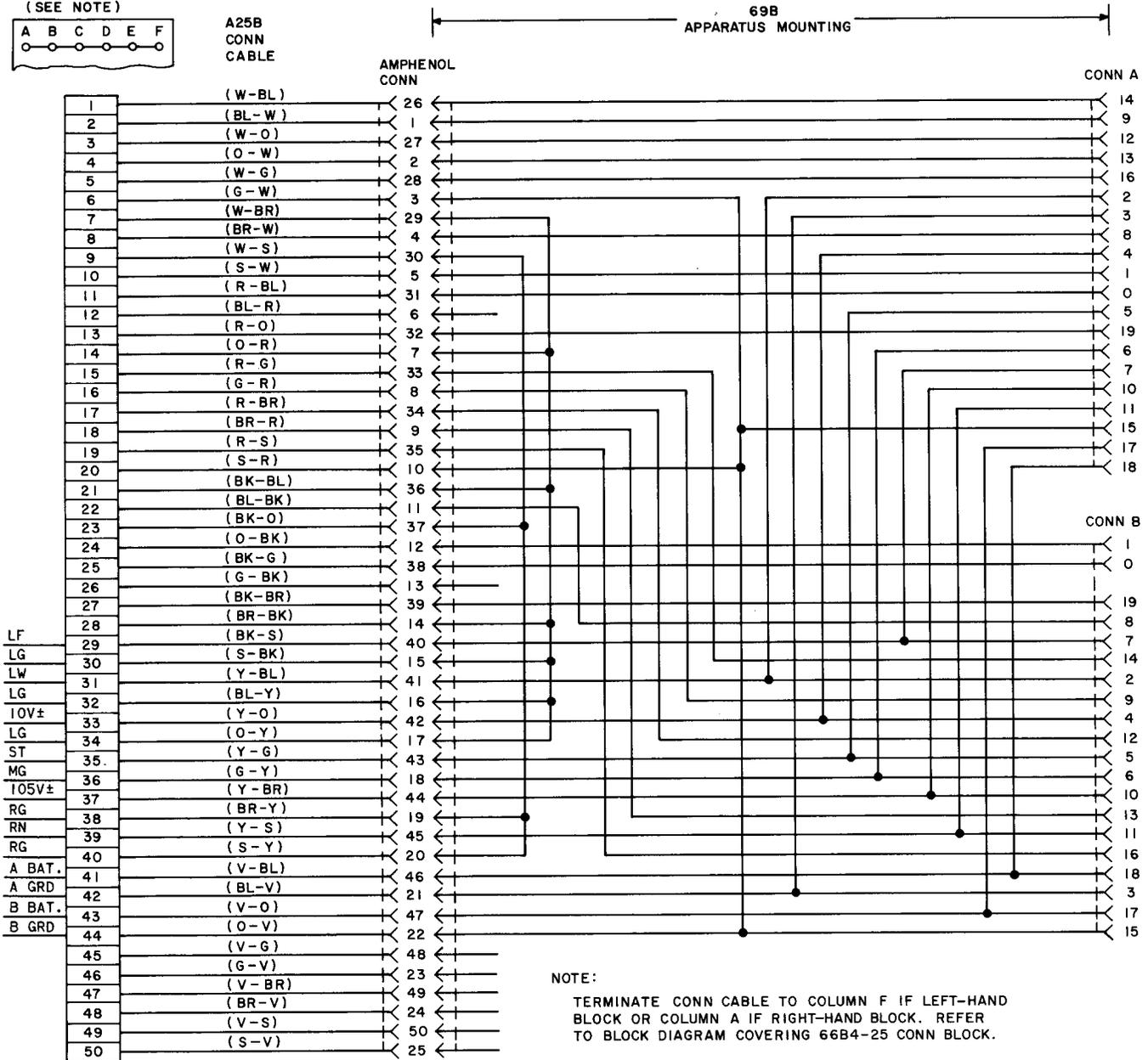
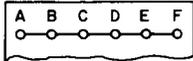
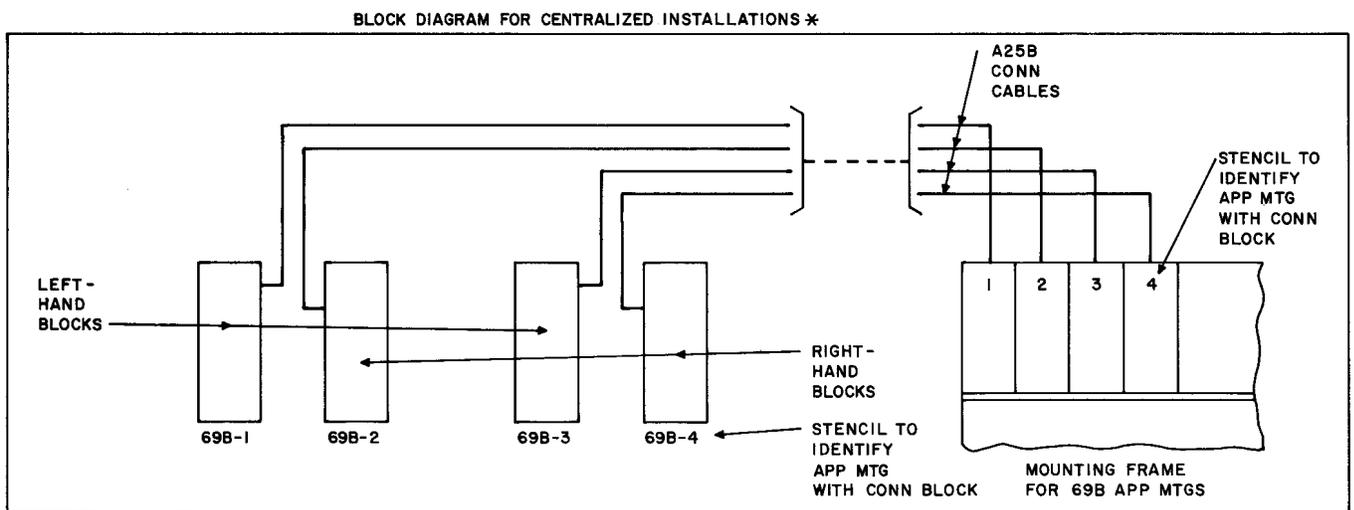
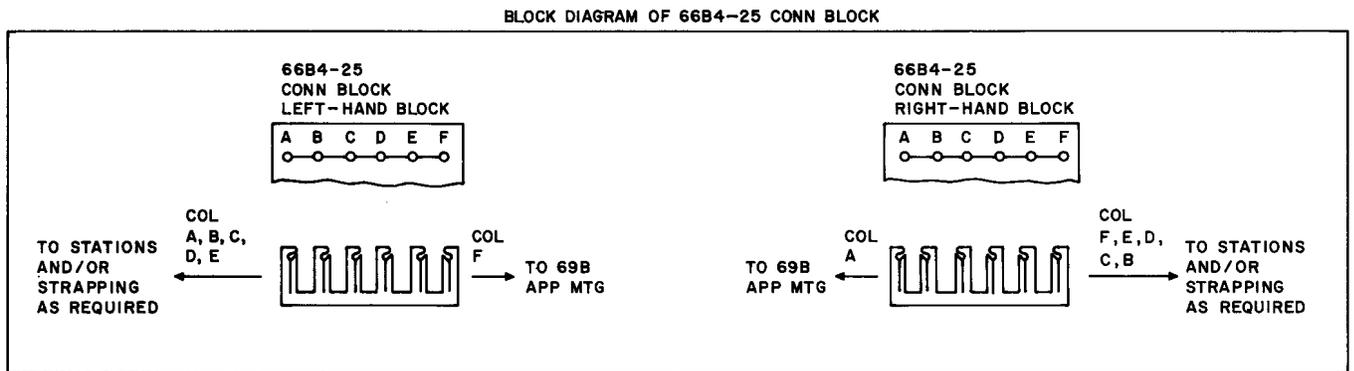
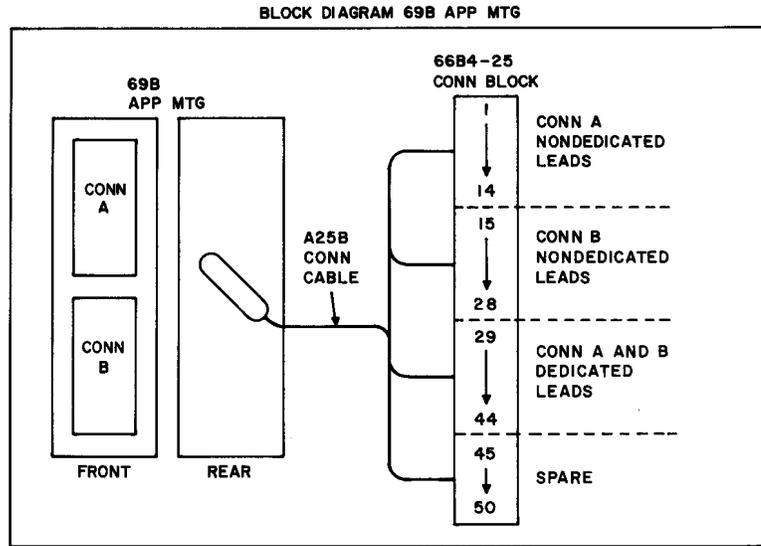


Fig. 4—Schematic of 69B Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block (Sheet 1 of 2)



* REFER TO SECTION 518-010-101 FOR BACKBOARDS TO BE USED IN CENTRALIZED LOCATIONS

Fig. 4—Schematic of 69B Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block (Sheet 2 of 2)

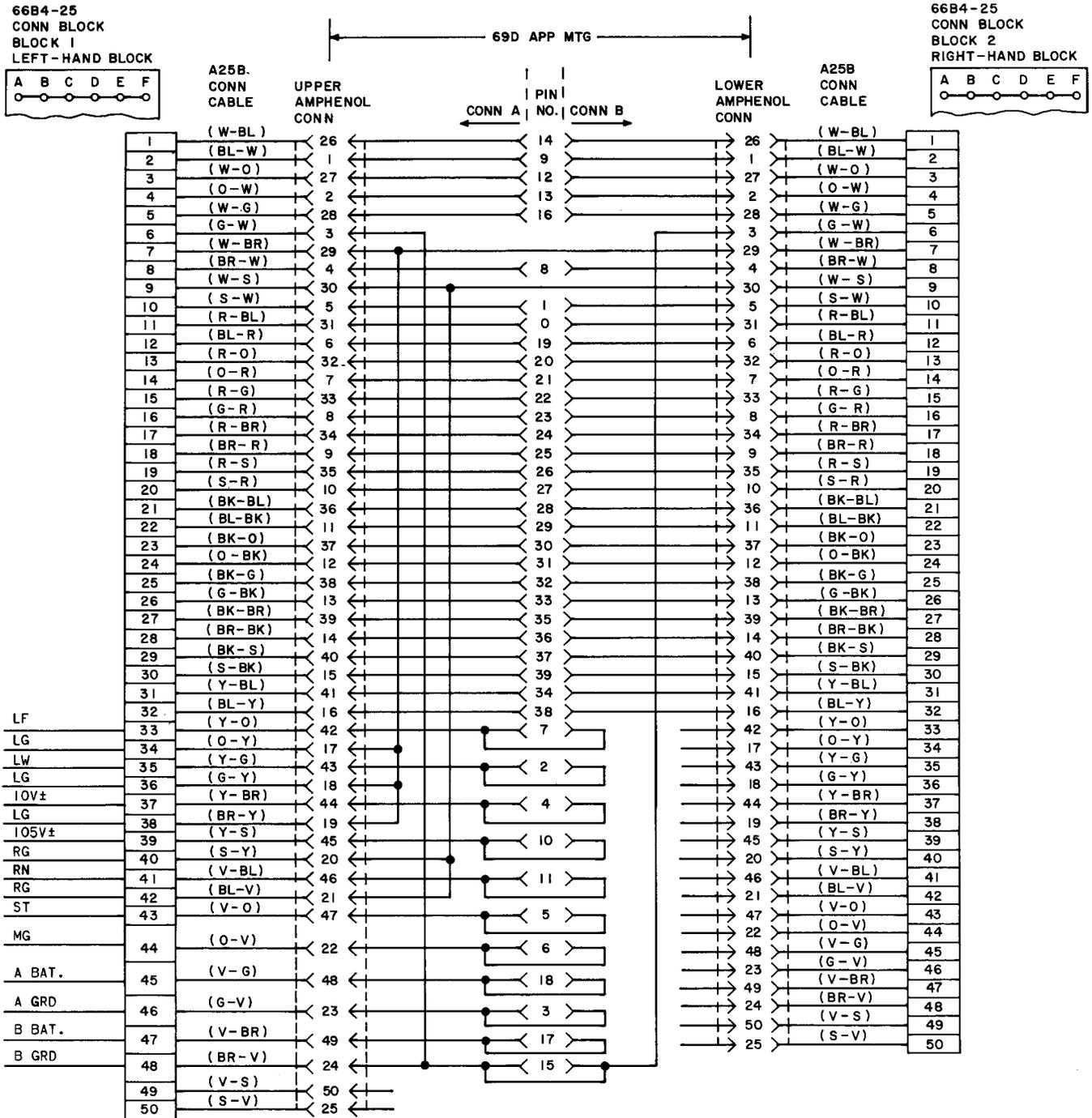
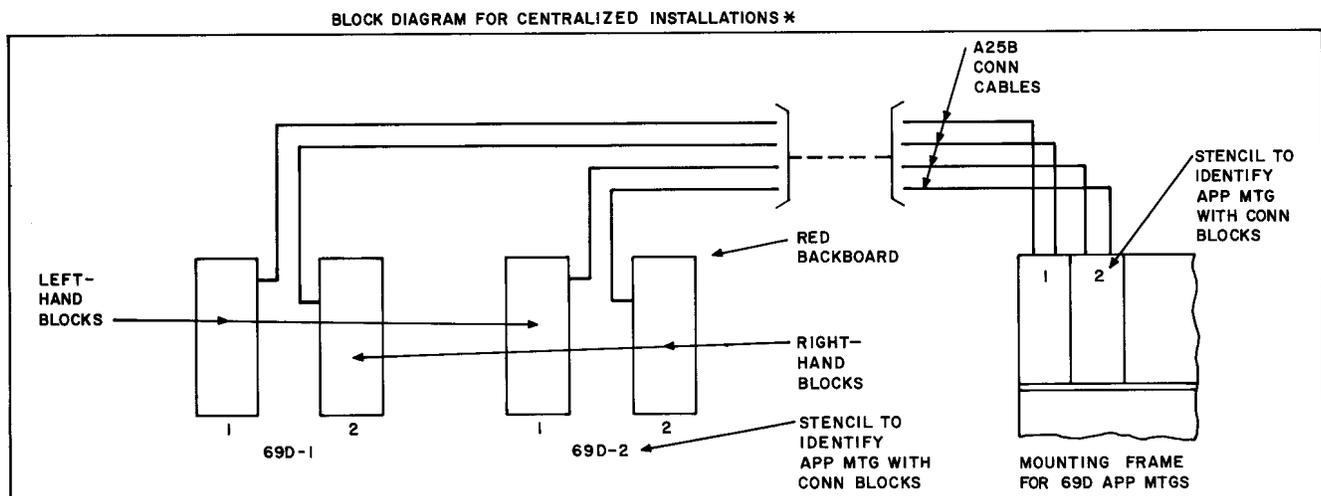
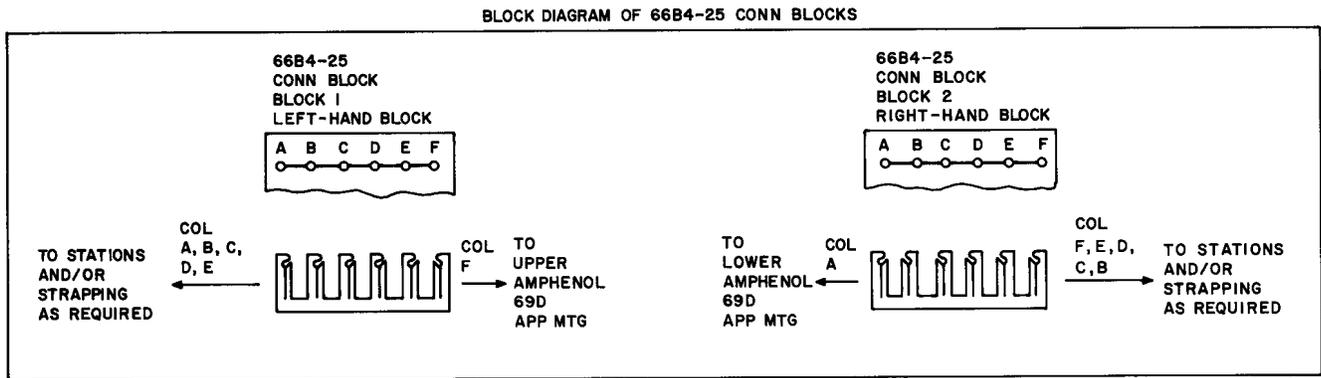
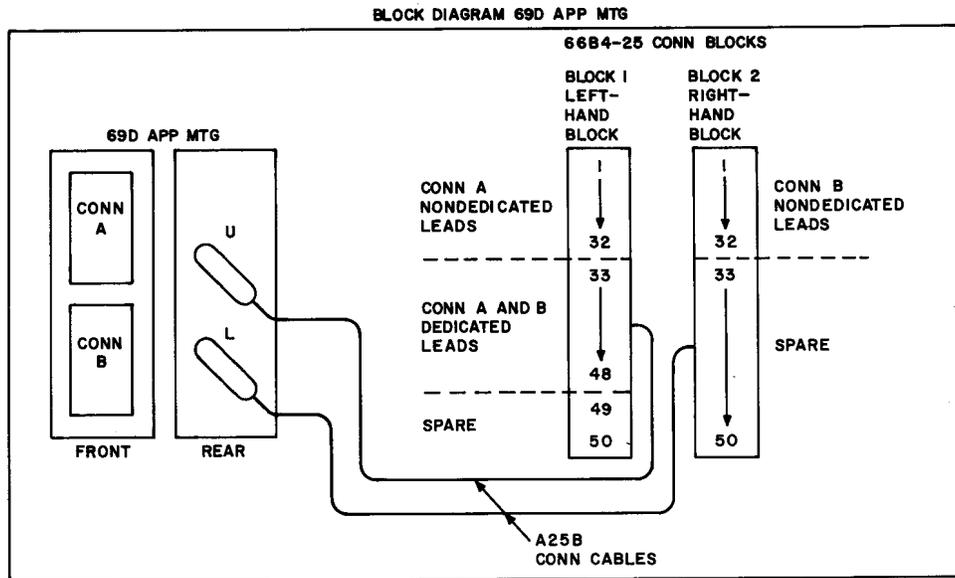


Fig. 5—Schematic of 69D Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block (Sheet 1 of 2)



* REFER TO SECTION 518-010-101 FOR BACKBOARDS TO BE USED IN CENTRALIZED LOCATIONS.

Fig. 5—Schematic of 69D Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block (Sheet 2 of 2)

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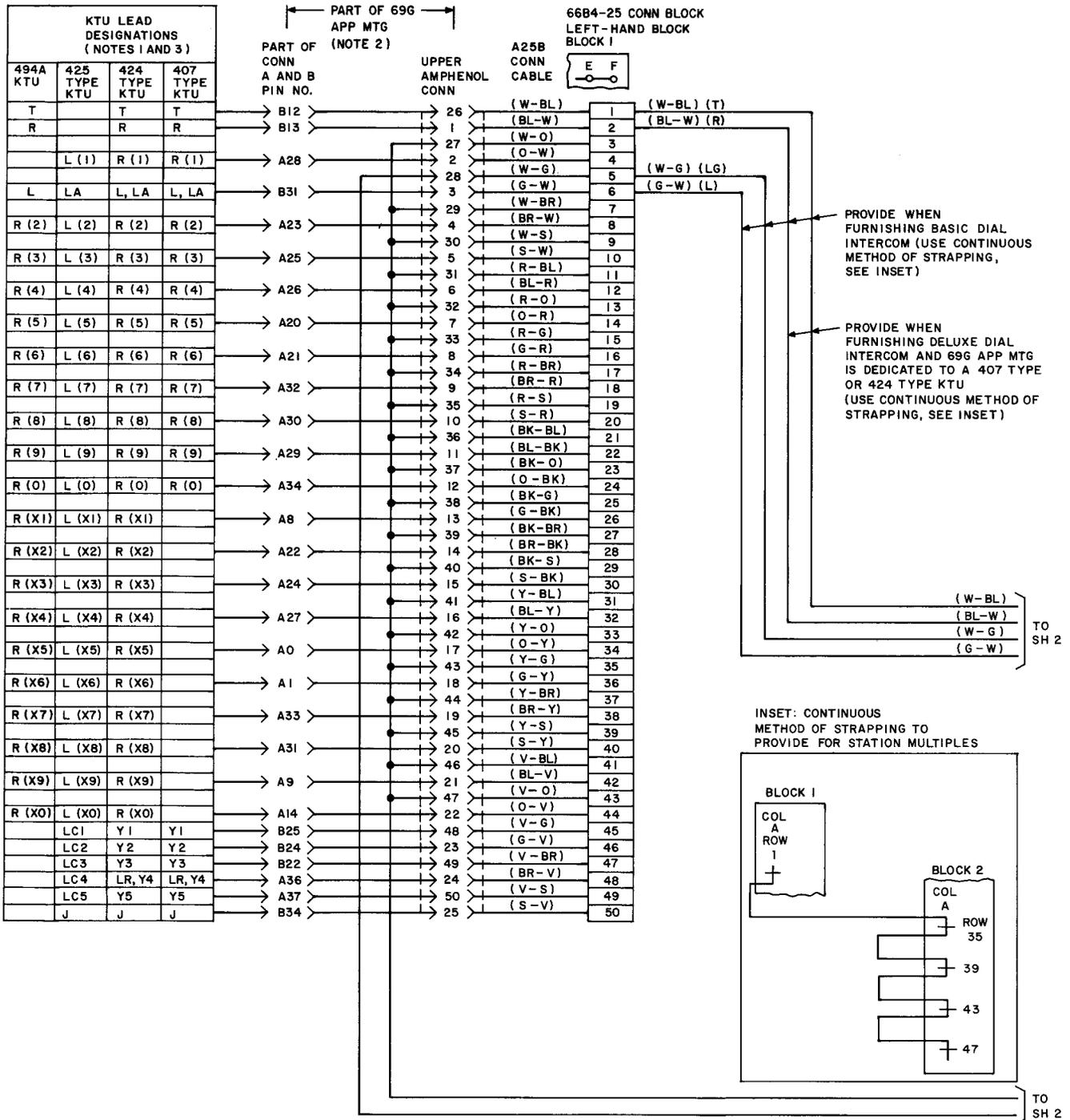
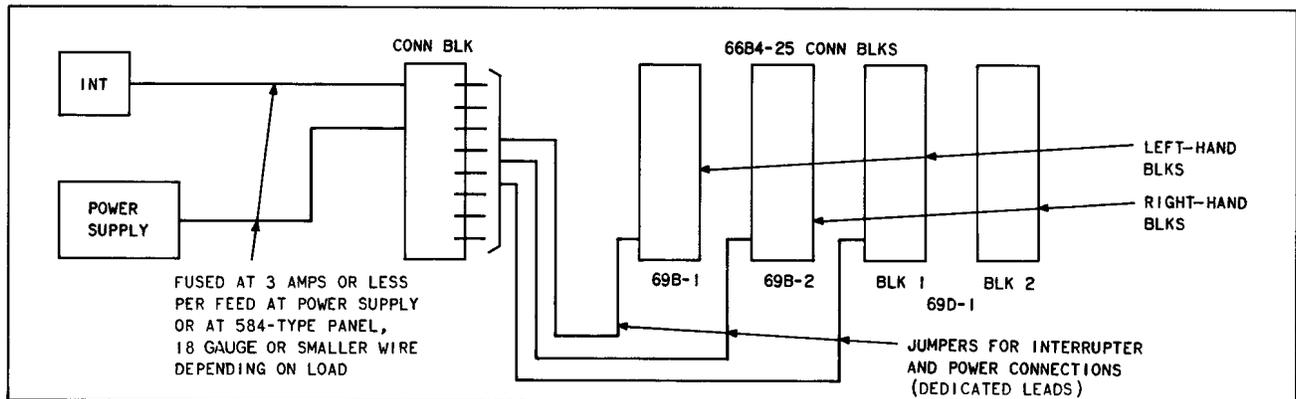
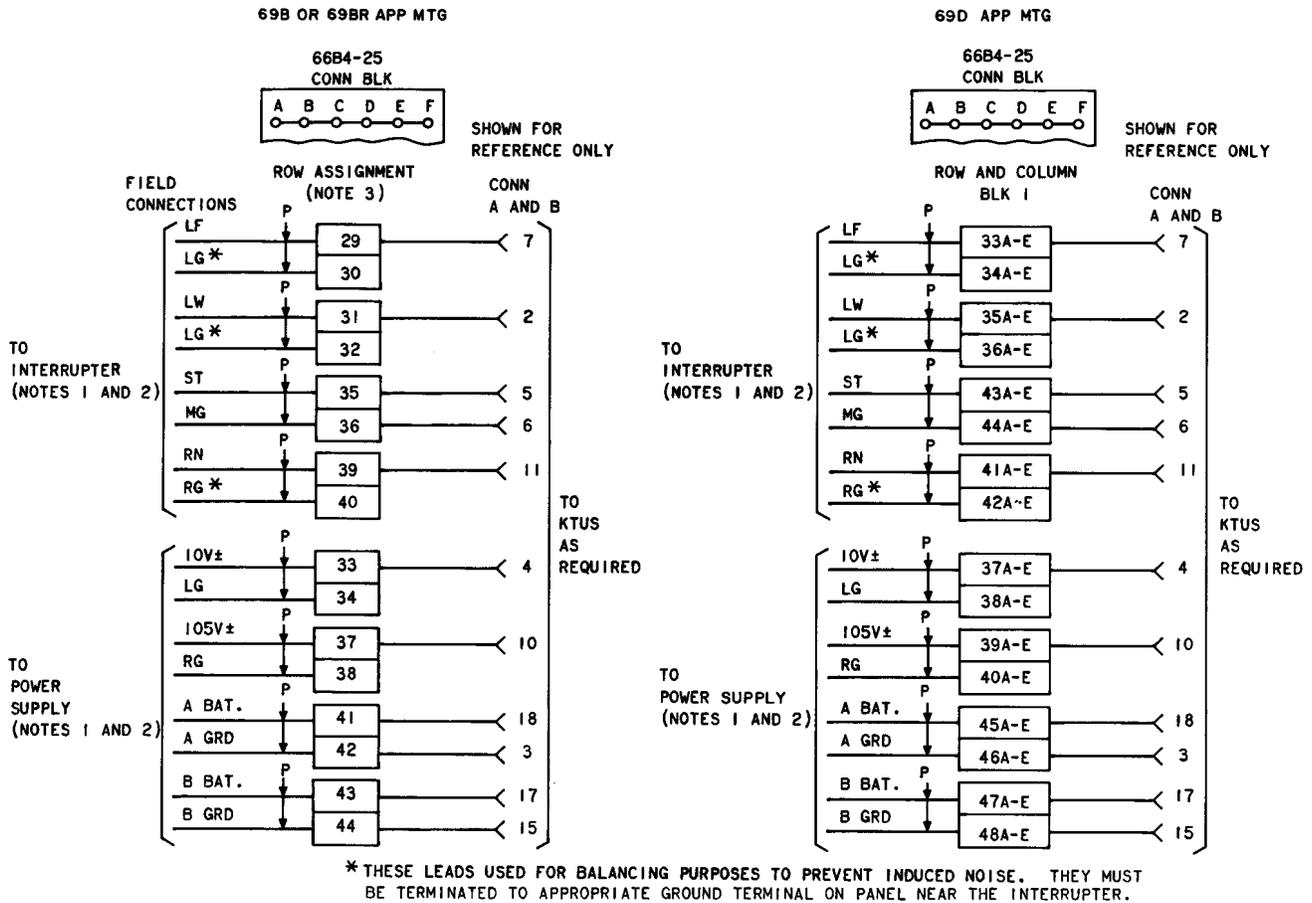


Fig. 6—Schematic of 69G Apparatus Mounting and Connections of the A25B Connector Cable to a 66B4-25 Connecting Block (Sheet 1 of 2)

SECTION 518-215-420



BLOCK DIAGRAM FOR CENTRALIZED INSTALLATION (NOTE 4)

NOTES:

1. CONNECT AS REQUIRED (FUSE WHERE NEEDED) SO AS NOT TO EXCEED THE MAXIMUM LOAD LIMITATIONS OF THE POWER SUPPLY.
2. THESE LEADS MAY BE MULTIPLIED FROM BLOCK TO BLOCK PROVIDING THE LIMITATION OF THE POWER SUPPLY IS NOT EXCEEDED.
3. COLUMN ASSIGNMENT FOR LEFT-HAND BLOCK IS COLUMN A-E AND FOR RIGHT-HAND BLOCK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 4 OR 5.
4. REFER TO SECTION 518-010-101 FOR BACKBOARDS TO BE USED IN CENTRALIZED INSTALLATIONS.

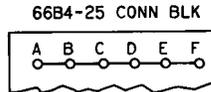
Fig. 7—Dedicated Lead Connections (Interrupter and Power) for 69B and 69D Apparatus Mountings

* - TO PROVIDE TIME-OUT CYCLES OF RING-UP CIRCUITS FROM 2.5 TO 7.5 SECONDS, INSTALL KS-13490, 1.1 WATT OR EQUIVALENT RESISTOR BETWEEN TERMINALS 1 AND 3 WITH A STRAP FROM 1 TO 2. TIME-OUT CYCLE AND RESISTOR VALUES ARE AS FOLLOWS:

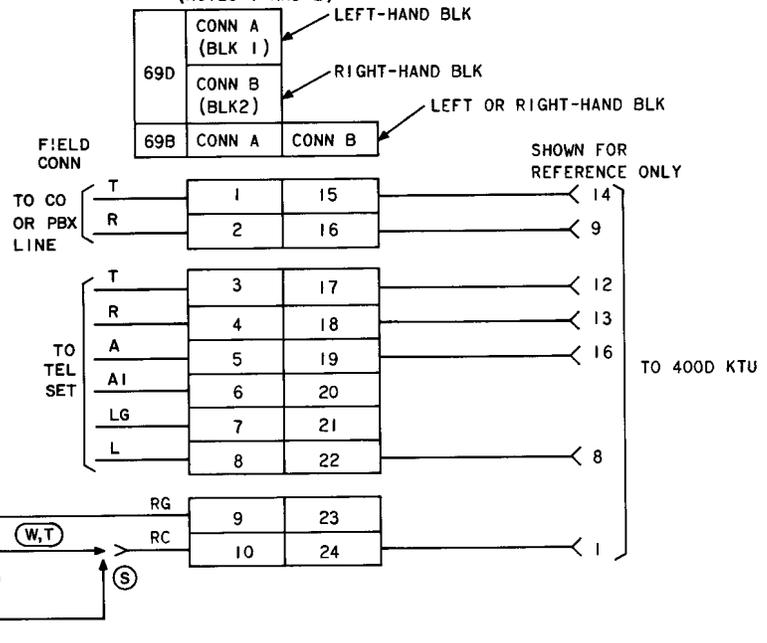
- 2.5 SECONDS - 0.13 MEGOHM RESISTOR
- 3.3 SECONDS - 0.20 MEGOHM RESISTOR
- 5.0 SECONDS - 0.39 MEGOHM RESISTOR
- 6.7 SECONDS - 0.75 MEGOHM RESISTOR
- 7.5 SECONDS - 1.2 MEGOHM RESISTOR

† - FOR 30-SECOND TIME-OUT CYCLE REMOVE ALL STRAPS FROM TERMINALS 1, 2, AND 3. WHEN THE DURATION OF MACHINE RINGING IS 1 SECOND OR LESS, TIME-OUT SHALL NOT BE REDUCED BELOW 5 SECONDS.

‡ OPTION STRAPS ON MD KTUS, 400A, B AND C.



ROW ASSIGNMENT
(NOTES 1 AND 2)



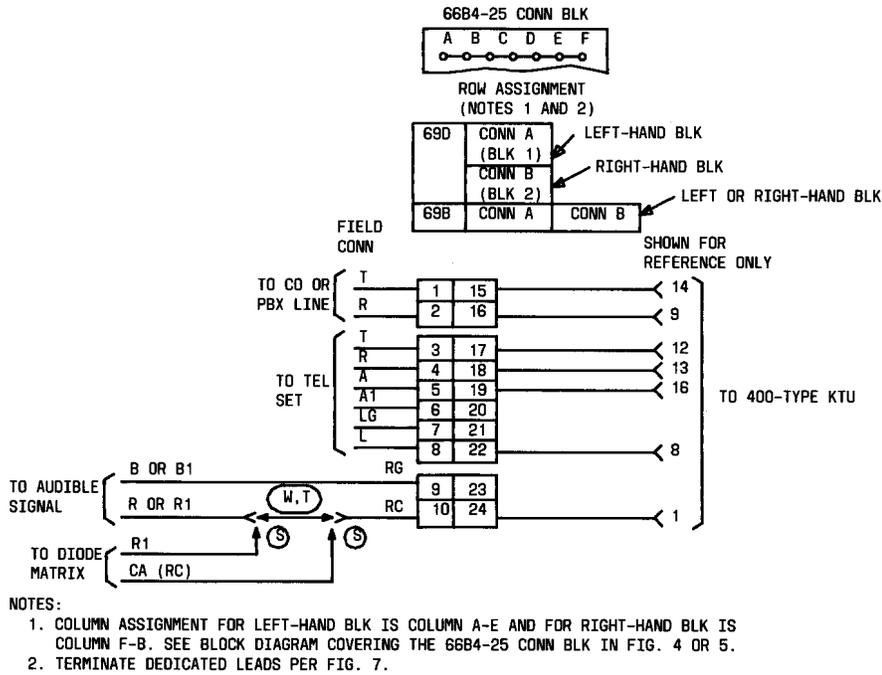
NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING THE 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. WHEN ZC OPTION IS USED, DUE TO THE DELAYED RELEASE OF THE HOLD BRIDGE, SOME TRANSMISSION LOSS IS ENCOUNTERED FOR APPROXIMATELY ONE SECOND WHEN STATION REENTERS A HELD CALL.
4. (W,T) OPTION (TERM. 4-8) MAY BE USED IN LOCALLY ENGINEERED ARRANGEMENTS ON RELAY COMMON AUDIBLE ARRANGEMENTS.

OPTION STRAPPING ON 400D (MD) KTU OPTION BLK

OPTION	FEATURES		STRAP TERMINALS
W	AUDIBLE SIGNALS	INTERRUPTED RING	5 TO 8, ‡5 TO 6
T		STEADY RING	6 TO 8, †4 TO 6
S		COMMON WITH DIODE MATRIX CONTROL	5 TO 8, †5 TO 6
Y	VISUAL HOLD CIRCUIT	LAMP WINK	7 TO 10, †8 TO 9
X		LAMP STEADY	7 TO 9, †7 TO 9
Z*	TIME-OUT CONTROL	SHORT TIME DELAY (10 SECONDS)	1 TO 2, †1 TO 9
†		LONG TIME DELAY	†
ZC (NOTE 3)	RELEASE OF HOLDING BRIDGE FROM CO OR PBX LINE CURRENT OPENS GREATER THAN	500 MILLISECONDS WHEN ASSOCIATED WITH NO. 1 ESS HAVING RESWITCH CAPABILITY	2 TO 3 USING 601A (5 UF) CAPACITOR OR EQUIVALENT
ZD		100 MILLISECONDS WHEN ASSOCIATED WITH 800A PBX AND/OR NO. 5 X-BAR CENTREX NOT HAVING AUTOMATIC PERMANENT SIGNAL RELEASE	2 TO 3 USING 575C (1 UF) CAPACITOR OR EQUIVALENT
ZJ		50 MILLISECONDS WHEN ASSOCIATED WITH NO. 5 X-BAR CENTREX HAVING AUTOMATIC PERMANENT SIGNAL RELEASE	2 TO 3 USING 575B (0.5 UF) CAPACITOR OR EQUIVALENT

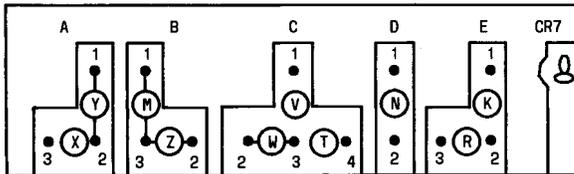
Fig. 8—Nondedicated Lead Connections for 400D (MD) KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting



OPTIONS

OPT	FEATURES	
M	TIMEOUT	LONG TIME DELAY (APPROXIMATELY 20 SECONDS)
Z		SHORT TIME DELAY (APPROXIMATELY 6±1.5 SECONDS)
Y	VISUAL HOLD CKT	LAMP WINK
X		LAMP STEADY
W	AUDIBLE SIGNAL	INTERRUPTED RING
T		STEADY RING
S	COMMON DIODE MATRIX CONTROL	COMMON WITH RELAY CONTROL
V		COMMON WITH RELAY CONTROL
R	DELAYED HOLD RELEASE	RELEASE OF HOLDING BRIDGE FROM CO OR PBX BY LINE CURRENT OPENS
K		MINIMUM OF 25 MS 600 MS
N	CONNECTS TO 50A CUSTOMER PREMISES SYSTEM	

TOP VIEW OF THE OPTION BLOCK HANDLE TOWARD USER. OPTION SYMBOLS SHOWN CONNECTED TO TERMINALS INDICATE FACTORY PROVIDED OPTIONS.



OPTION	CONNECT OPTION PLUG TO TERMINALS	FACTORY PROVIDED
Z	B2-B3	✓
Y	A1-A2	✓
X	A2-A3	
T	C3-C4	
W	C2-C3	✓
V	C1-C3	
R	E2-E3	
N	D1-D2	
K	E1-E2	
M	B1-B2	

Fig. 9—Nondedicated Lead Connections for 400G (MD) KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting

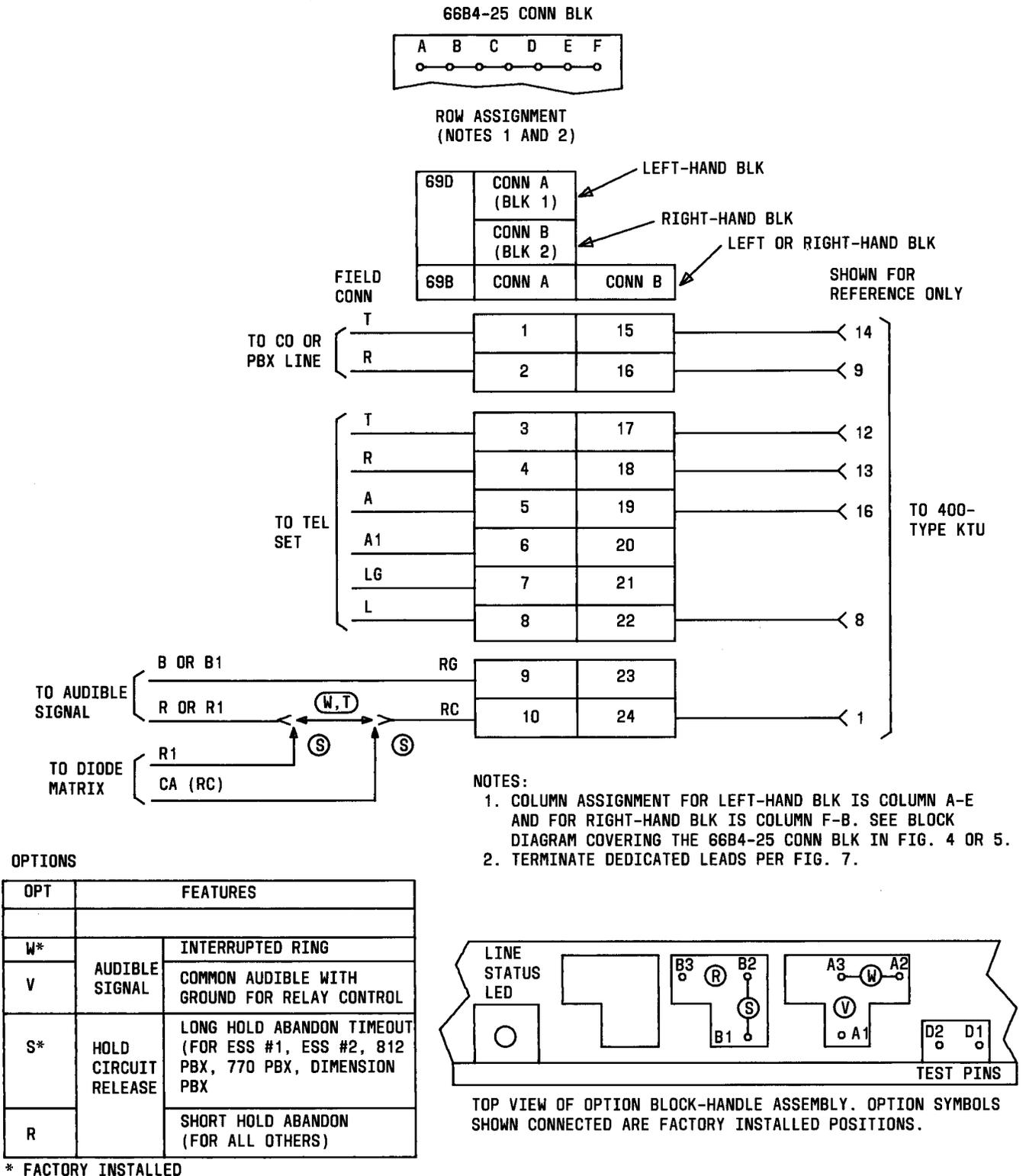


Fig. 10—Nondedicated Lead Connections for 400H KTU (CO or PBX Line Circuit) in 69B or 69D Apparatus Mounting

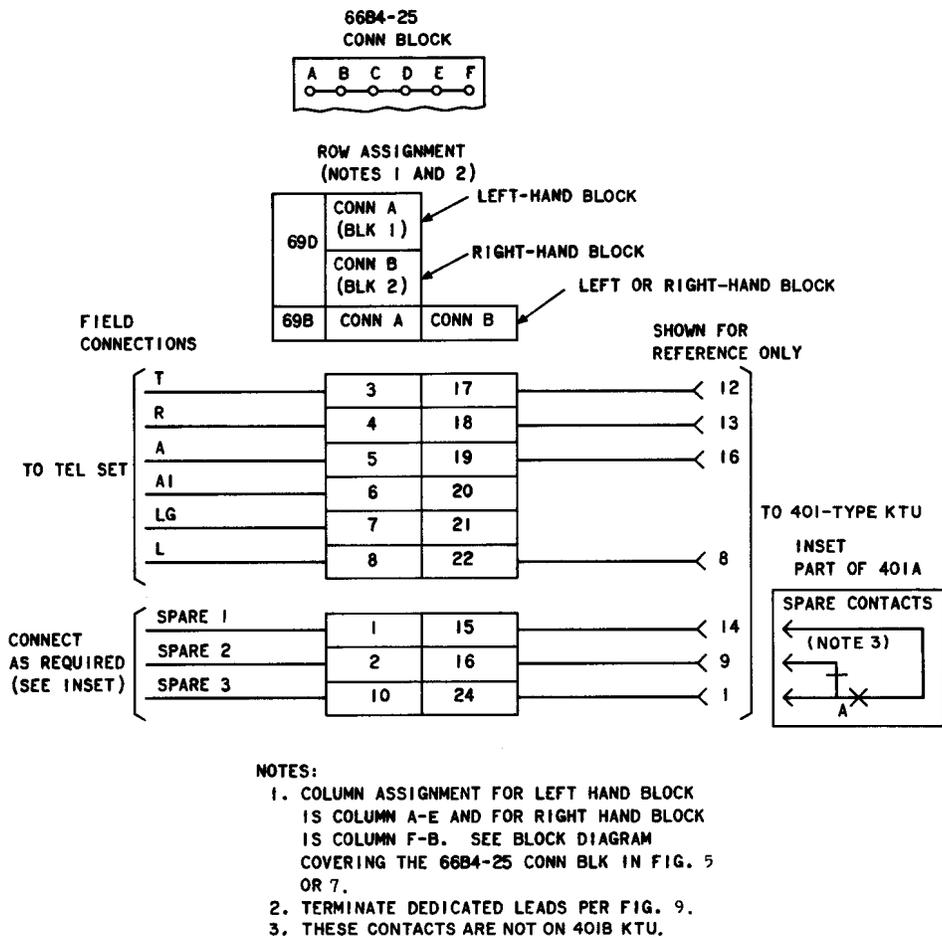
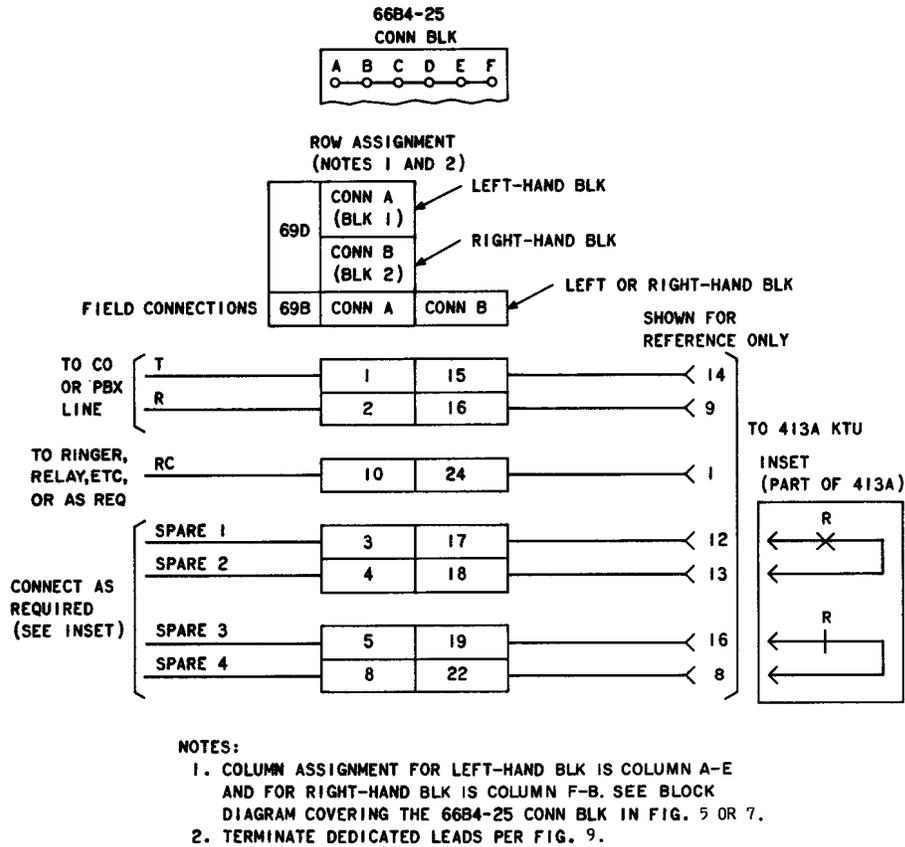


Fig. 11—Nondedicated Lead Connections for 401A KTU (Manual Intercom Line Circuit) in 69B or 69D Apparatus Mounting

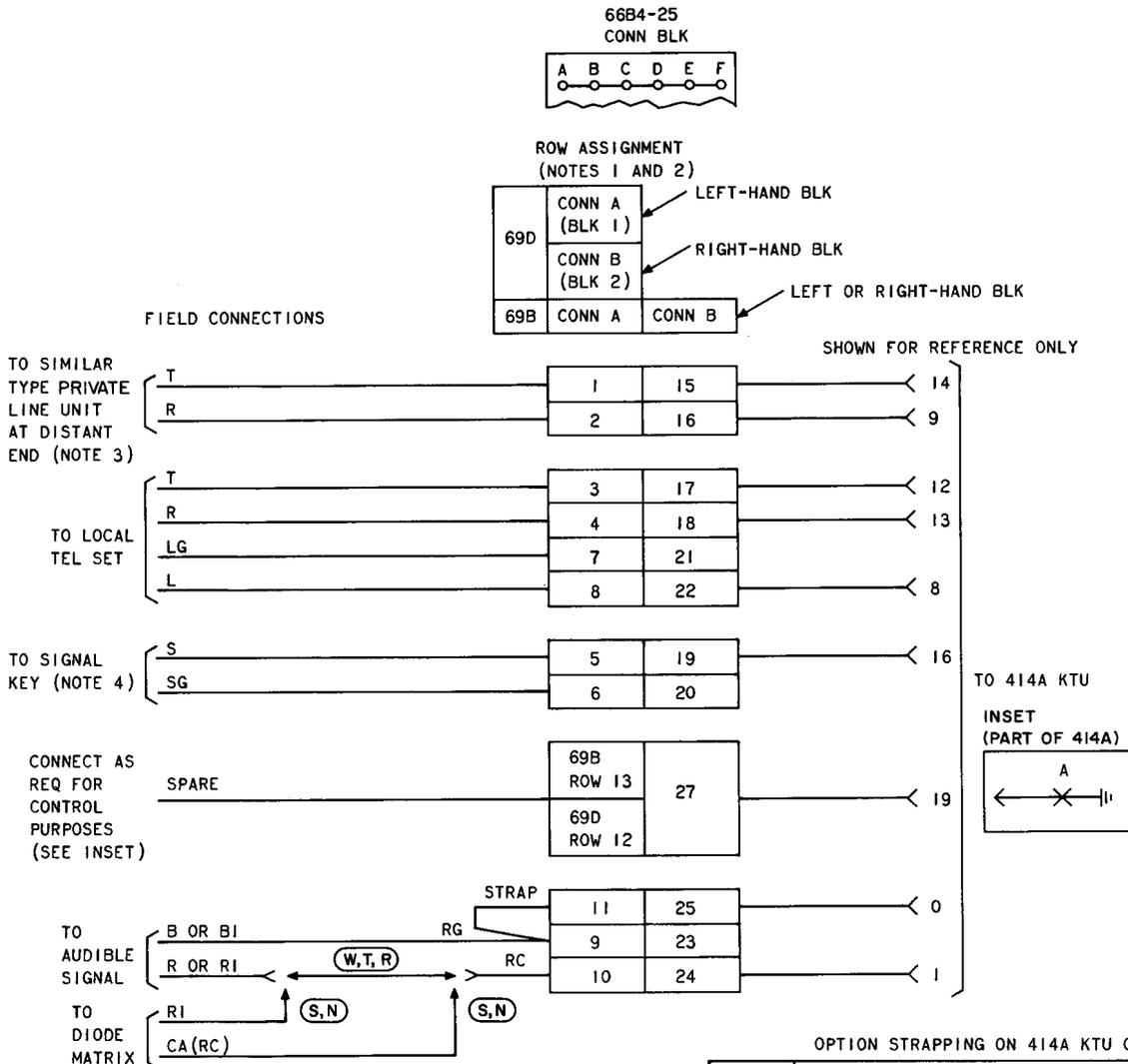


OPTION STRAPPING ON 413A KTU OPTION BLK

OPTION	FEATURES		STRAP TERMINALS
X	AUDIBLE SIGNALS	STEADY RING	9 TO 10
Z		INTERRUPTED RING	8 TO 10

Fig. 12—Nondedicated Lead Connections for 413A KTU (Auxiliary Ringup Circuit) in 69B or 69D Apparatus Mounting

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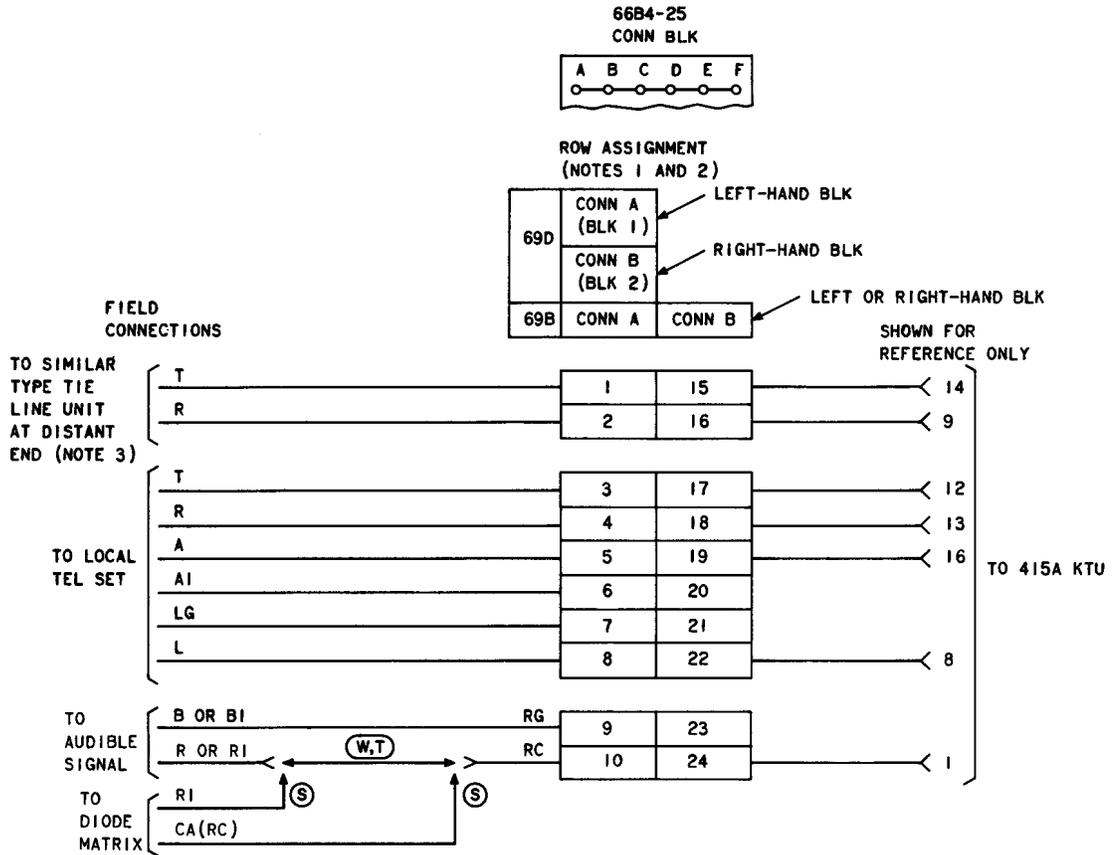


NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. PVT LINE CKT AT DISTANT END MAY BE A 414A KTU, 419A KTU, 204A KTU, OR ANY OTHER TYPE PVT LINE UNIT REQUIRING RINGING VOLTAGE FOR THE RINGUP CIRCUIT AND FURNISHING RINGING VOLTAGE FROM THE SIGNALING CKT.
4. SIGNAL KEY MAY BE A CONVERTED PICKUP KEY OR ANY EXTERNAL NONLOCKING KEY.
5. FOR SATISFACTORY AUDIBLE RINGBACK TONE, THE RINGING SUPPLY MUST CONTAIN AN AUDIBLE COMPONENT.

OPTION	FEATURES		STRAP TERMINALS
W	AUDIBLE SIGNALS	UNDER CONTROL OF TIME-OUT CIRCUIT (B RELAY)	INTERRUPTED RING 7 TO 8
T			STEADY RING 6 TO 7
S			COMMON WITH DIODE MATRIX CONTROL 7 TO 8
R			STEADY RING
N		UNDER CONTROL OF R RELAY	COMMON WITH DIODE MATRIX CONTROL 4 TO 6
X	TIME-OUT	10 SECONDS	
Z		16 SECONDS	
WITHOUT X OR Z		23 SECONDS	
M	AUDIBLE RINGBACK TONE (NOTE 5)		REMOVE X OR Z STRAPS 9 TO 10

Fig. 13—Nondedicated Lead Connections for 414A KTU (Manual Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting



NOTES:

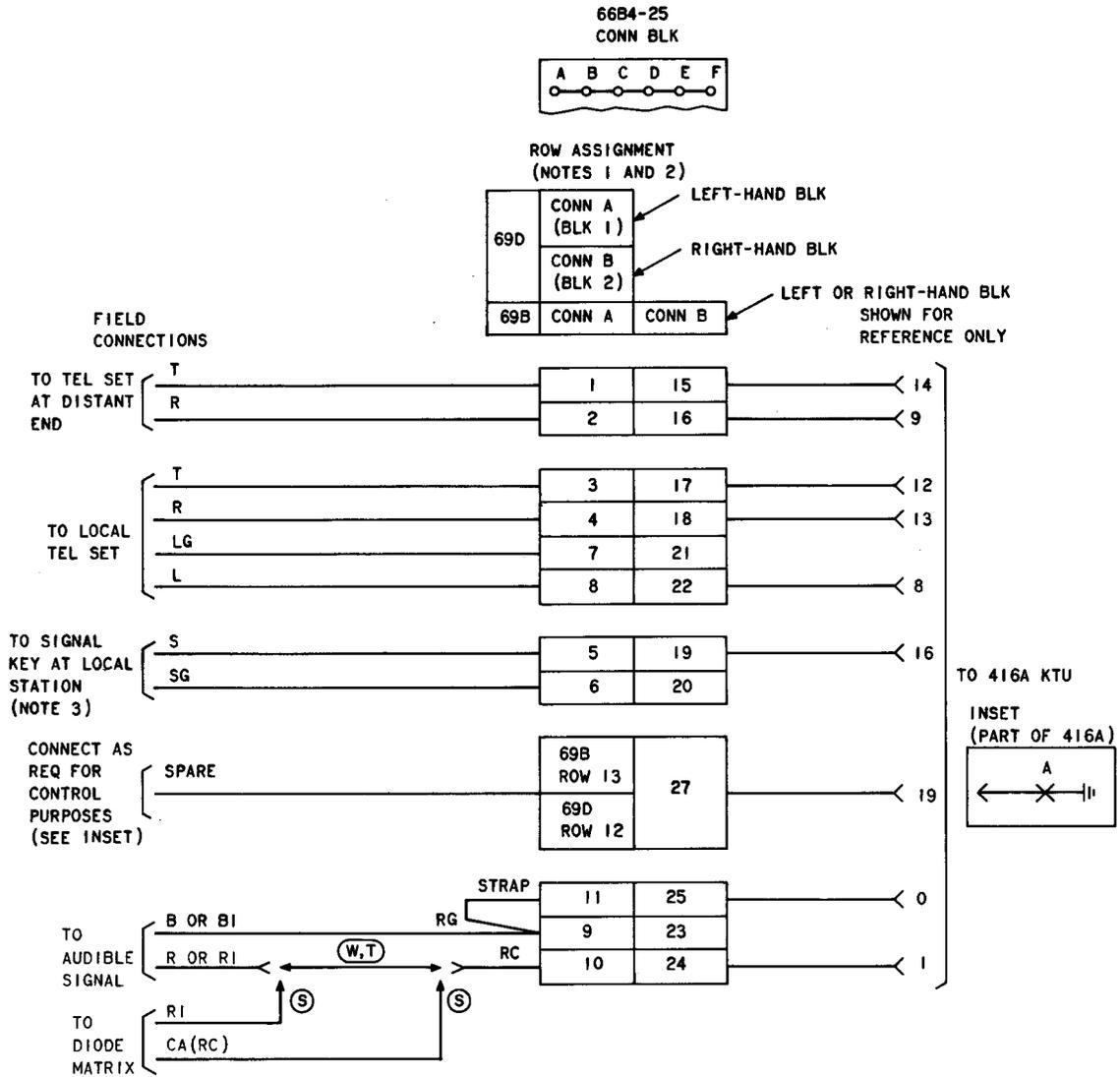
1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 6684-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. PVT LINE CKT AT DISTANT END MAY BE A 415A KTU, 203A KTU, OR ANY OTHER TYPE PVT LINE UNIT REQUIRING DC VOLTAGE FOR THE RINGUP CIRCUIT AND FURNISHING DC VOLTAGE FROM THE SIGNALING CIRCUIT.

OPTION STRAPPING ON 415A KTU OPTION BLK *

OPTION	FEATURES	STRAP TERMINALS
W	AUDIBLE SIGNALS	INTERRUPTED RING 4 TO 6
T		STEADY RING 5 TO 6
S		COMMON WITH DIODE MATRIX CONTROL 4 TO 6
M	AUDIBLE RINGBACK TONE	1 TO 2
Y	VISUAL HOLD SIGNAL	7 TO 8

* - FOR IDLE LINE TERMINATION CONNECT A KS-13490, LI 910 OHM RESISTOR IN SERIES WITH A 542F, 2 UF CAPACITOR ACROSS TERMINALS 9 AND 10. ORDER COMPONENTS LOCALLY AND INSTALL.

Fig. 14—Nondedicated Lead Connections for 415A KTU (Automatic, DC Signaling Private Line Circuit) in 69B or 69D Apparatus Mounting



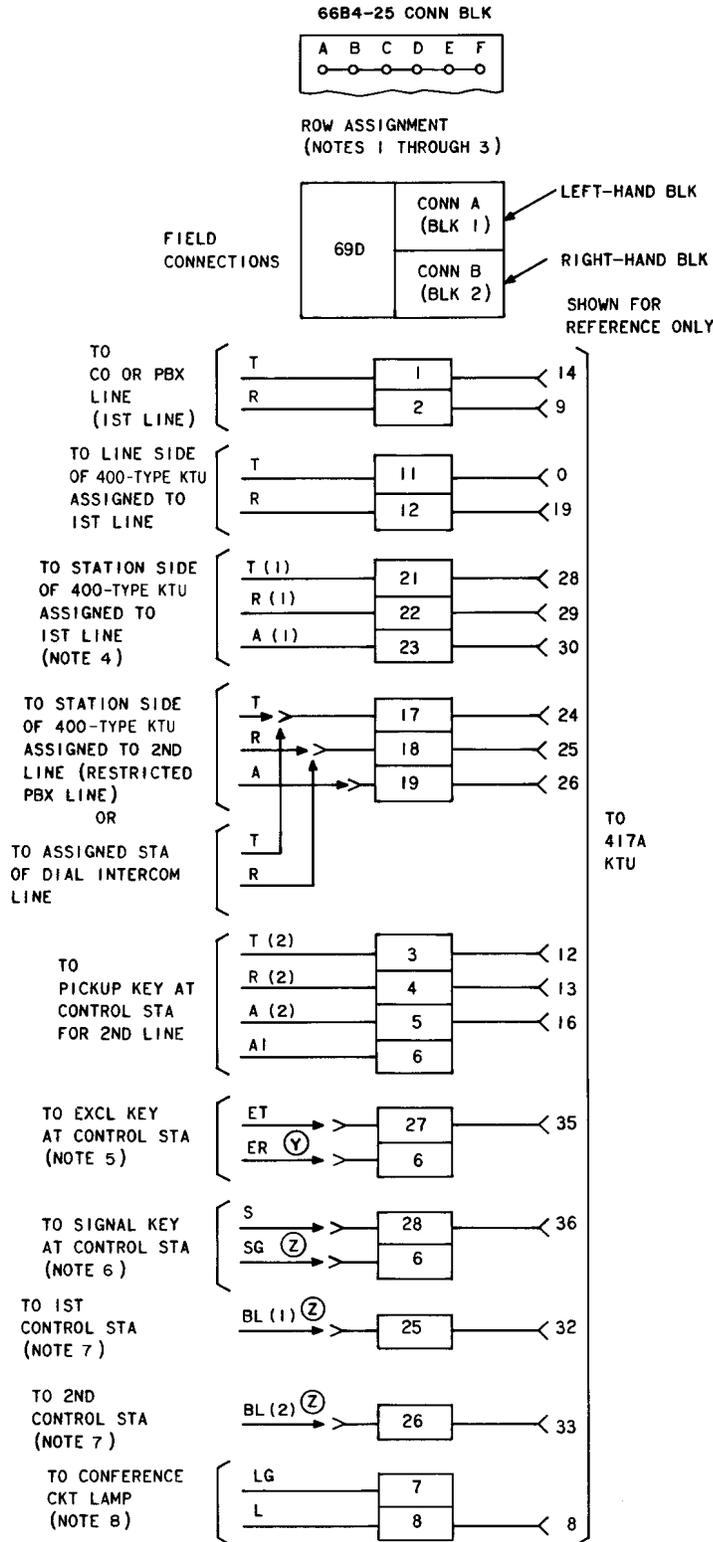
NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. SIGNAL KEY MAY BE A CONVERTED PICKUP KEY OR AN EXTERNAL NONLOCKING KEY.

OPTION STRAPPING ON 416A KTU OPTION BLK

OPTION	FEATURES	STRAP TERMINALS
W	INTERRUPTED RING	5 TO 8
T	STEADY RING	7 TO 8
S	COMMON WITH DIODE MATRIX CONTROL	5 TO 8
M	AUDIBLE RINGBACK TONE	9 TO 10

Fig. 15—Nondedicated Lead Connections for 416A KTU (Station Line Circuit) in 69B or 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. ASSOCIATED LAMP AND RINGING CKTS FROM 400-TYPE KTU AND DIAL INTERCOM LINE CONNECT DIRECTLY TO TELEPHONE SETS.
4. STATION LEADS FROM THE TEL SET FOR THE 1ST LINE MUST ALSO BE TERMINATED TO THE STA SIDE OF THE ASSIGNED 400-TYPE KTU.
5. REMOVE AND INSULATE EXCLUSION KEY LEADS FROM IT AND IR IN THE TEL SET IF SO CONNECTED.
6. SIGNAL KEY MAY BE A CONVERTED PICKUP KEY OR AN EXTERNAL NONLOCKING KEY.
7. A DIODE MUST BE INSTALLED IN THE "A" LEAD OF THE TEL SET WHEN Z OPTION IS PROVIDED. FOR METHOD OF CONNECTION USE STATION BUSY LAMP OPTION AS SHOWN IN CONNECTION SECTION OF TYPE SET USED.
8. LAMP INDICATING CONFERENCE CKT IS ACTIVATED.

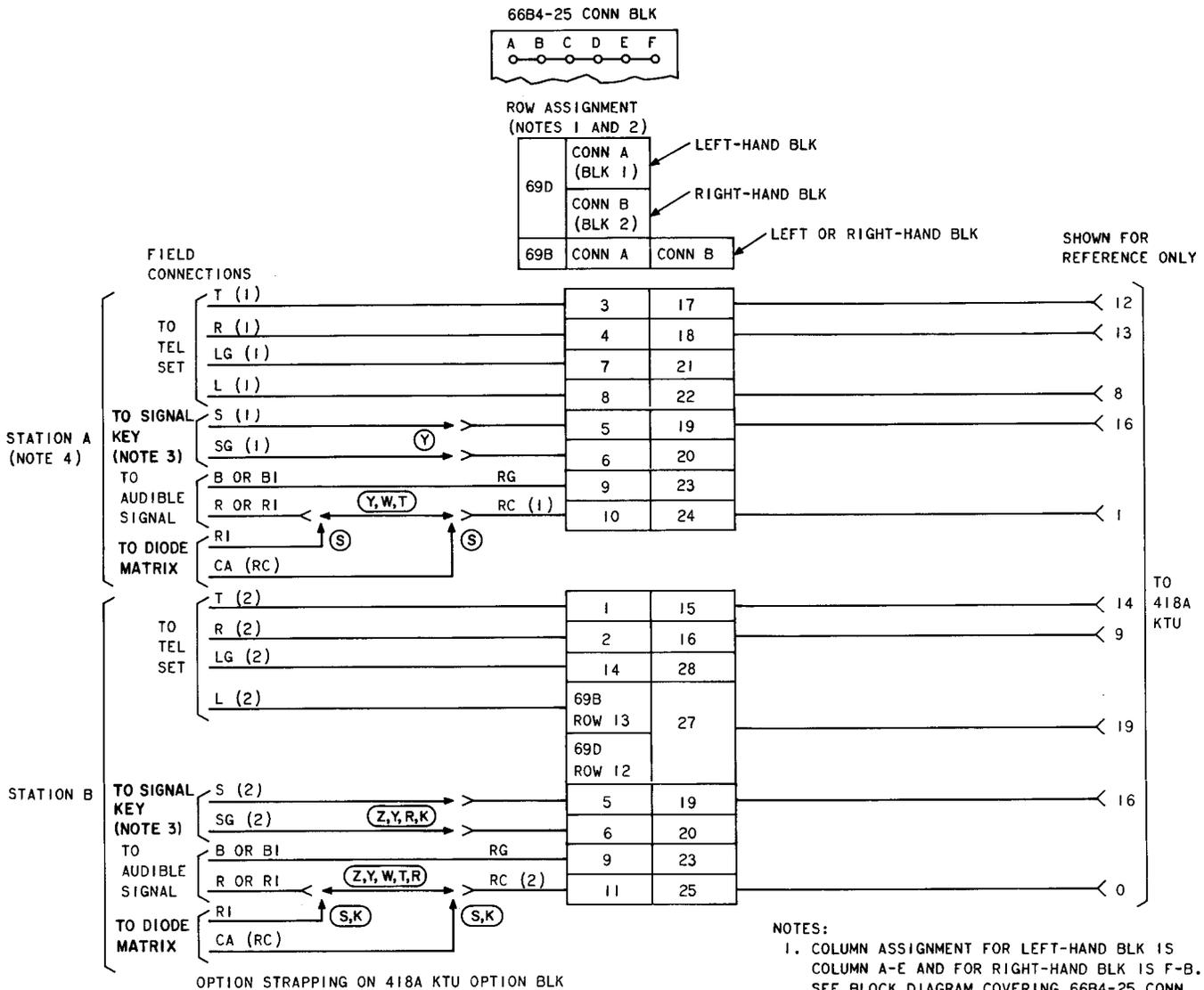
OPTION STRAPPING ON 417A KTU OPTION BLK

OPTION	FEATURES		STRAP TERMINALS
X	ONE STATION	CONTROLLED BY NONLOCKING KEY	6 TO 10
W *	TWO STATIONS		4 TO 6, 8 TO 10
Y	CONTROLLED BY EXCLUSION KEY		3 TO 5
Z	CONTROLLED BY NONLOCKING KEY		1 TO 2

* - INSTALL KS-15724, L1 DIODES OR EQUIVALENT (PROCURE LOCALLY) BETWEEN TERMINALS AS SHOWN.

Fig. 16—Nondedicated Lead Connections for 417A KTU (Add-on Conference Circuit) in 69D Apparatus Mounting

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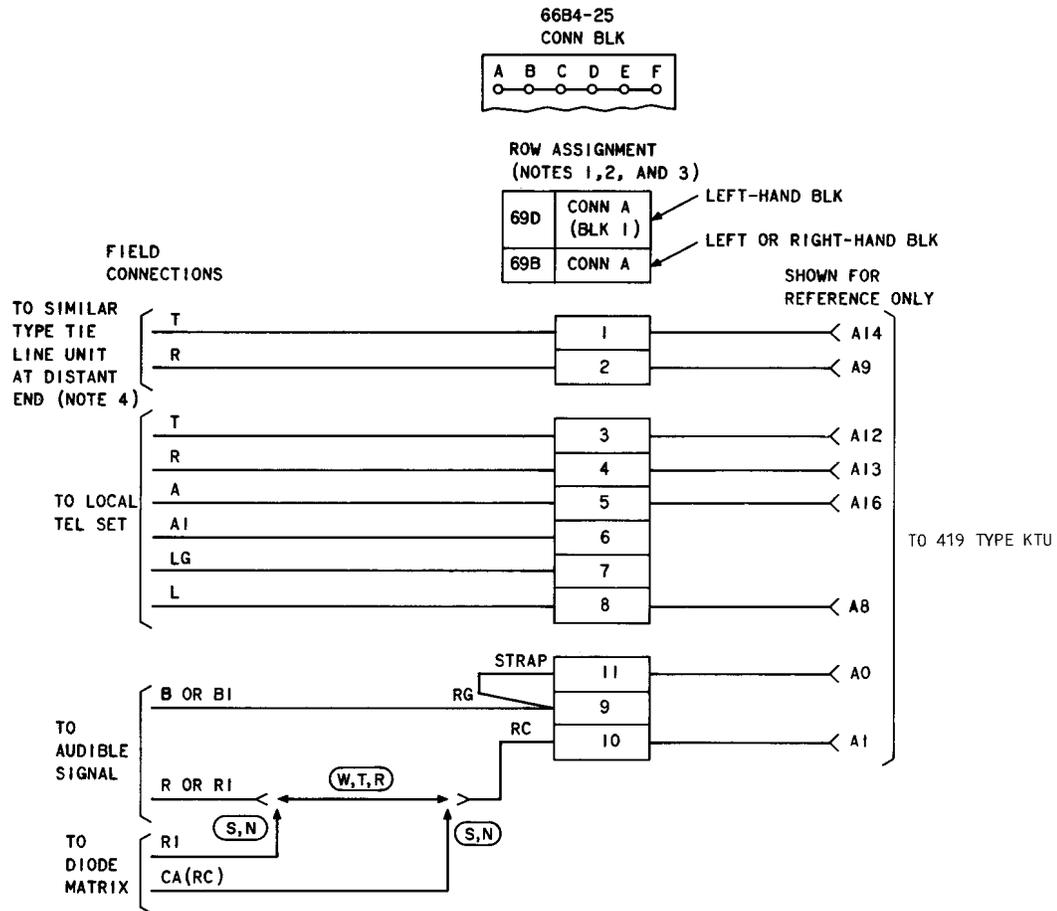
OPTION	FEATURES		STRAP TERMINALS
W	TWO-WAY AUTOMATIC	INTERRUPTED RING	2 TO 3 TO 4 *
T		STEADY RING	1 TO 2 TO 4 *
S		COMMON WITH DIODE MATRIX CONTROL	2 TO 3 TO 4 *
R	ONE-WAY AUTOMATIC, ONE-WAY MANUAL (NOTE 5)	INTERRUPTED RING	3 TO 4
Z		STEADY RING	1 TO 4
K		COMMON WITH DIODE MATRIX CONTROL	3 TO 4
Y	TWO-WAY MANUAL (NOTE 6)		
Q	AUDIBLE RING-BACK	TWO-WAY AUTOMATIC	9 TO 10, 5 TO 7 TO 8 *
H		ONE-WAY AUTOMATIC, ONE-WAY MANUAL	5 TO 7, 9 TO 10
M		TWO-WAY MANUAL	9 TO 10

*--USE CONTINUOUS METHOD OF STRAPPING

NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. SIGNAL KEY MAY BE A CONVERTED PICKUP KEY OR AN EXTERNAL NONLOCKING KEY.
4. STATION "A" IS ALWAYS ASSIGNED AS THE AUTOMATIC SIGNALING STATION WHENEVER THE ONE-WAY AUTOMATIC, ONE-WAY MANUAL SIGNALING OPTION IS USED.
5. THESE OPTIONS APPLY TO THE SIGNAL KEY AND AUDIBLE SIGNAL AT STA "B" ONLY. THE AUDIBLE SIGNAL AT STA "A" IS UNDER CONTROL OF THE SIGNAL KEY OF STA "B". THE AUDIBLE SIGNAL AT STA "A" MAY BE PART OF A COMM AUDIBLE ARRANGEMENT PROVIDED THE DIODE MATRIX IS USED FOR CONTROL.
6. THE AUDIBLE SIGNALS AT STAS "A" AND "B" MAY BE PART OF A COMM AUDIBLE ARRANGEMENT PROVIDED THE DIODE MATRIX IS USED FOR CONTROL.

Fig. 17—Nondedicated Lead Connections for 418A KTU (Short Range, DC Signaling Private Line Circuit) in 69B or 69D Apparatus Mounting



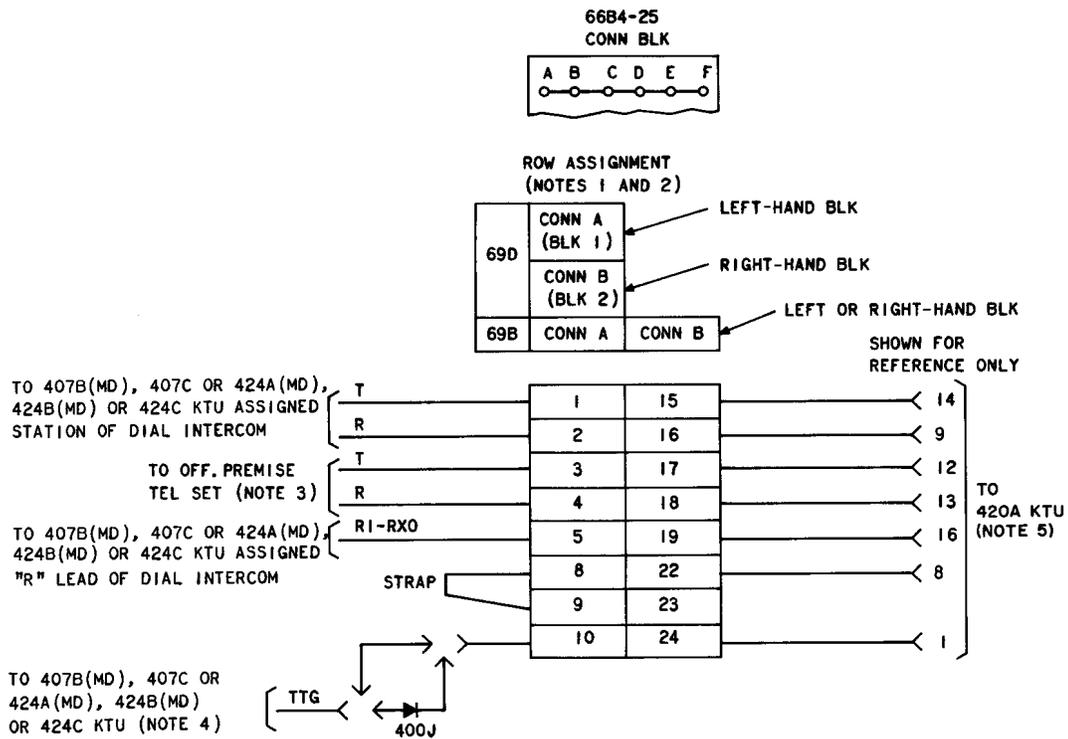
NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. THE 419 TYPE KTU REQUIRES THE USE OF BOTH CONNECTORS IN THE APP MTG BUT CONNECTIONS ARE ONLY MADE THROUGH THE "A" CONNECTOR.
4. PVT LINE CKT AT DISTANT END MAY BE A 419A, 414A, OR 204A KTU OR ANY OTHER TYPE PVT LINE UNIT REQUIRING RINGING VOLTAGE FOR THE RINGUP CIRCUIT AND FURNISHING RINGING VOLTAGE FROM THE SIGNALING CIRCUIT.

OPTION STRAPPINT ON 419 TYPE KTU OPTION BLK

OPTION	FEATURES		STRAP TERMINALS
W	UNDER CONTROL OF TIME-OUT CIRCUIT (B RELAY)	INTERRUPTED RING	6 TO 8
T		STEADY RING	5 TO 6
S		COMMON WITH DIODE MATRIX CONTROL	6 TO 8
R	UNDER CONTROL OF R RELAY	STEADY RING	3 TO 5
N		COMMON WITH DIODE MATRIX CONTROL	
X	TIME-OUT	6 SECONDS	9 TO 10
Z		17 SECONDS	7 TO 10
WITHOUT X OR Z		25 SECONDS	REMOVE X OR Z STRAPS
M	AUDIBLE RINGBACK TONE		1 TO 2

Fig. 18—Nondedicated Lead Connections for 419-Type KTU (Automatic Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting



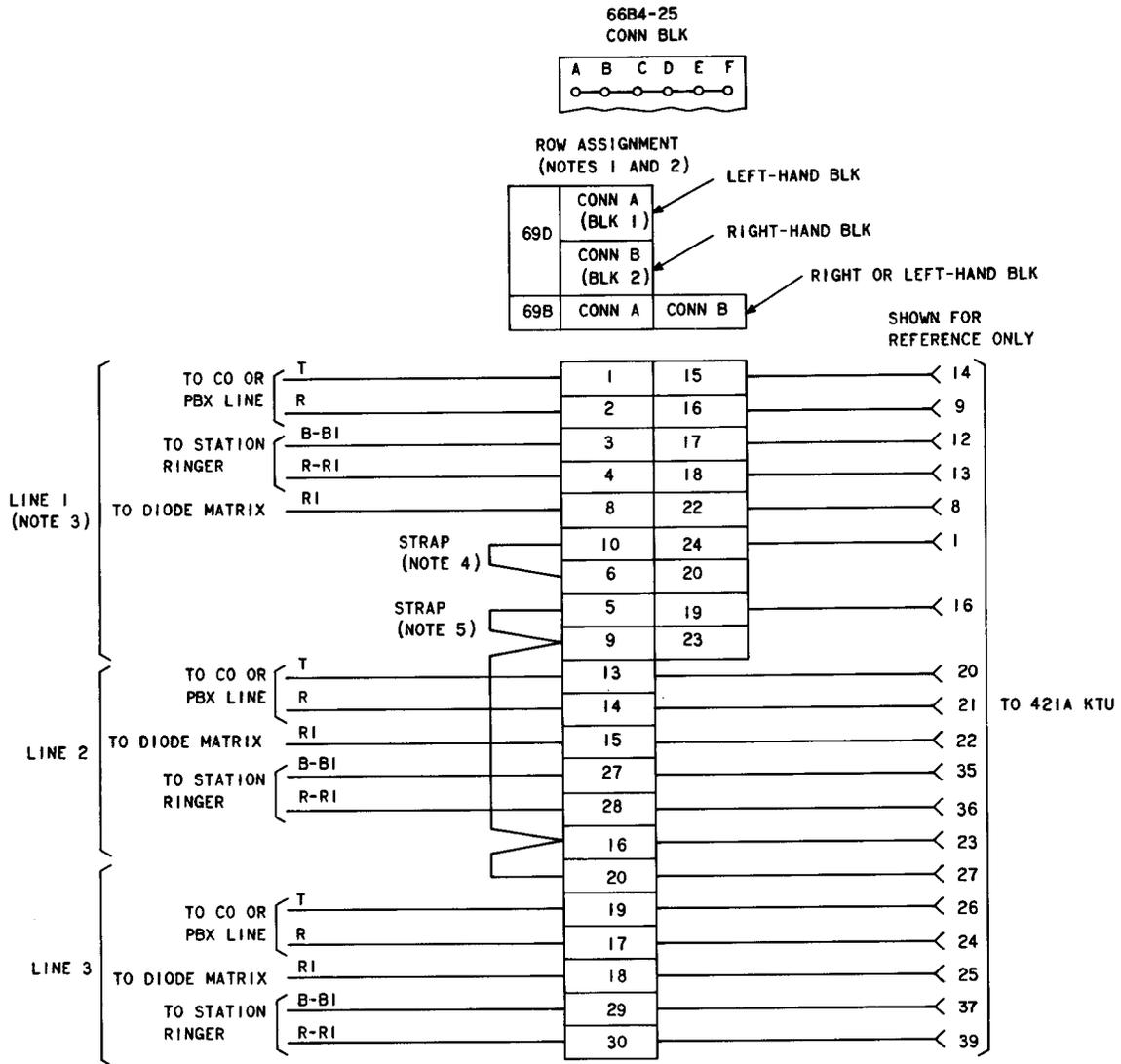
NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLOCK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. MAXIMUM STATION CONDUCTOR LOOP IS 500 OHMS. OFF-PREMISE TELEPHONE SET MAY BE EQUIPPED WITH A "TOUCH-TONE" DIAL PROVIDED THE INTERCOM CIRCUIT IS SO EQUIPPED.
4. PROVIDE A 400J DIODE FOR EACH 420A KTU INSTALLED WHEN THE INTERCOM IS EQUIPPED WITH THE "TOUCH-TONE" ADAPTER (426A AND 427B, SERIES 4 OR C KTUS).
5. THE CABLE RUN FROM THE APPARATUS MOUNTING TO THE CONNECTING BLOCK SHOULD BE AS SHORT AS POSSIBLE, PREFERABLY LESS THAN 10 FT.

OPTION STRAPPING ON 420A KTU OPTION BLK

OPTION		FEATURE	STRAP TERMINALS
J, X	AUDIBLE SIGNALS	AC BUZZER, 18V ± OR 10V ±	1 TO 4, 7 TO 8
K, X		DC BUZZER, 24V DC	
M, X, R		RINGER, 105V ± STEADY	2 TO 4, 7 TO 8
X		INTERRUPTED	
R		INTERRUPTED WITH STATION BUSY	

Fig. 19—Nondedicated Lead Connections for 420A KTU (Long Line Circuit) in 69B or 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. ONLY ONE STATION RINGER CAN BE TRANSFERRED WHEN THE 421A KTU IS USED WITH A 69B APP MTG.
4. STRAP MUST BE ADDED REGARDLESS OF APP MTG. USED.
5. ADD STRAPS ACCORDING TO NUMBER OF LINES SERVED.

OPTION STRAPPING ON 421A KTU OPTION BLK

OPTION	FEATURE	STRAP TERMINALS
W	FOR GENERAL PURPOSE USE	1 TO 2, 5 TO 6, 7 TO 8

Fig. 20—Nondedicated Lead Connections for 421A KTU (Power Failure Transfer Circuit) in 69B or 69D Apparatus Mounting

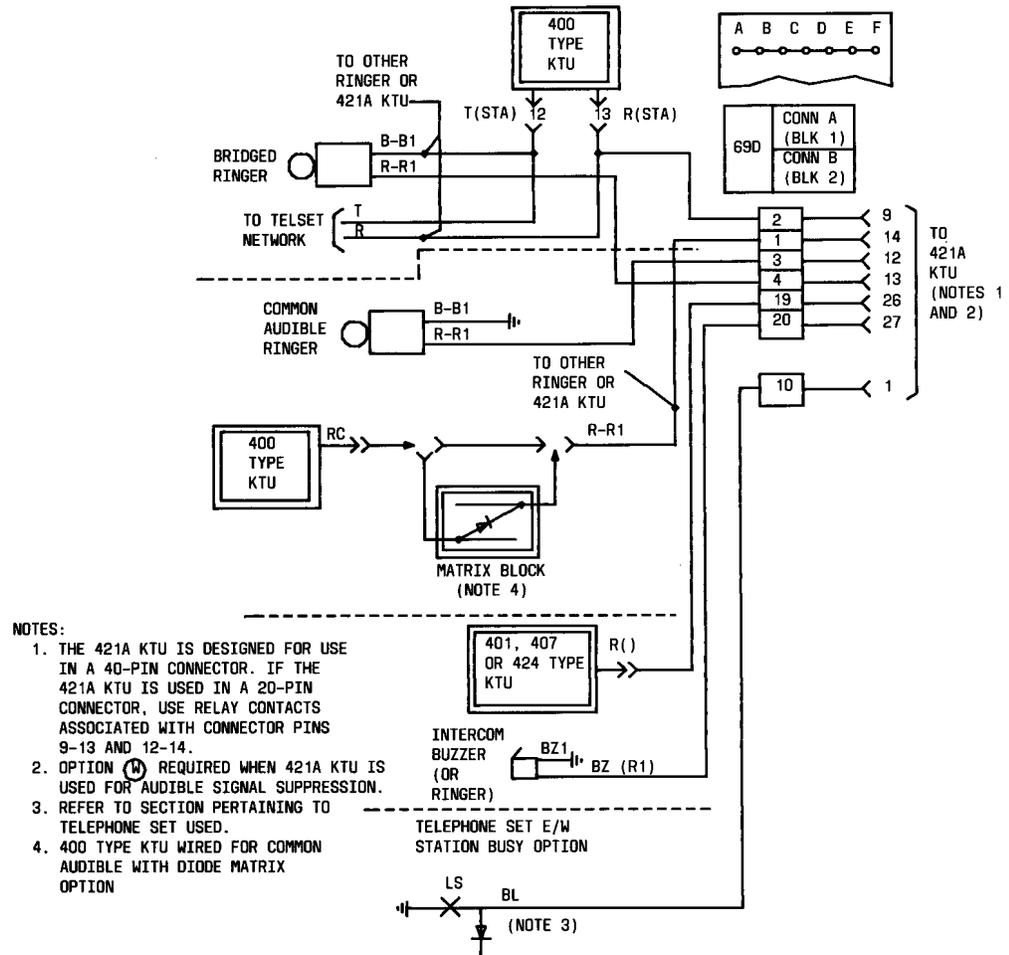
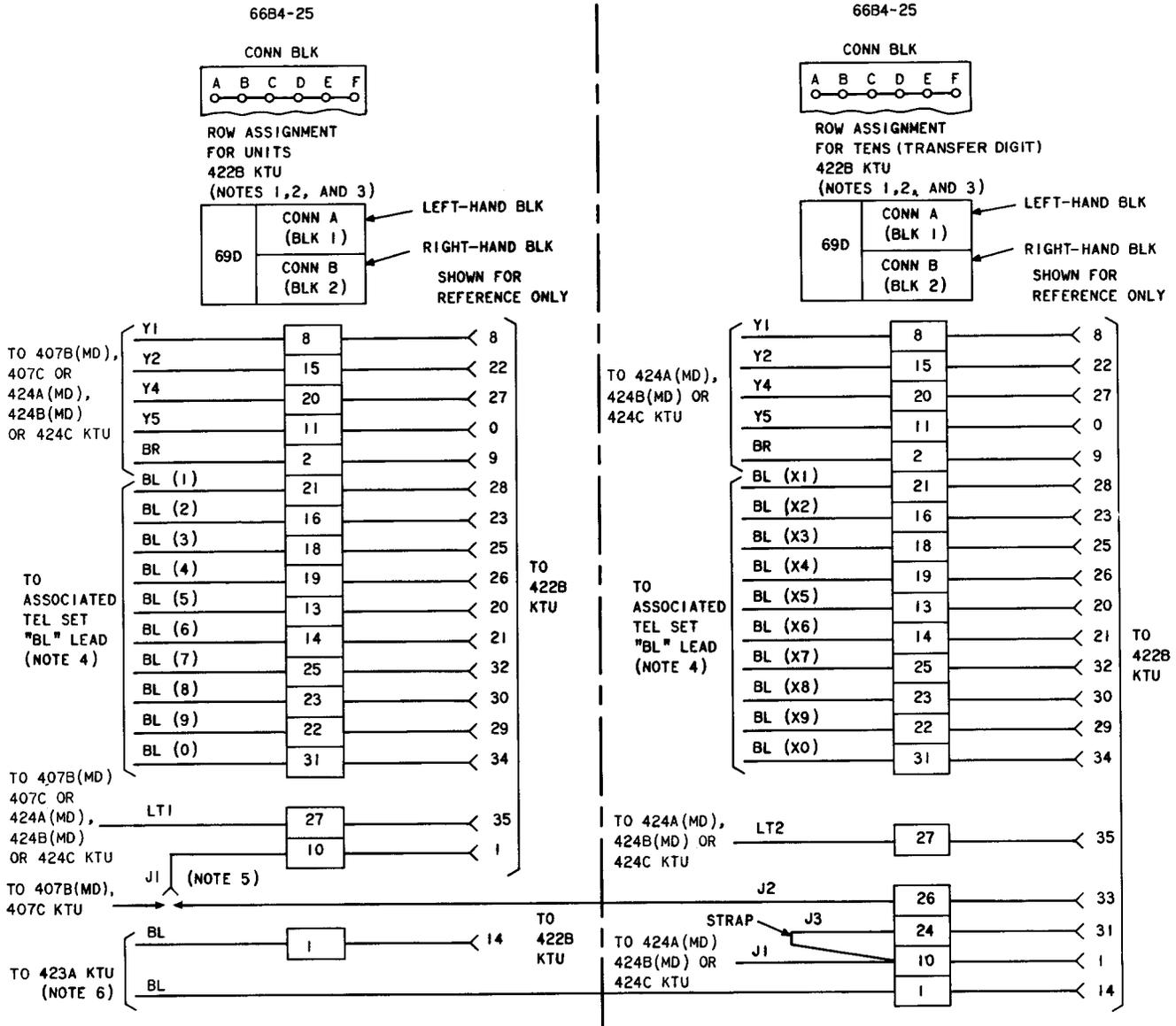


Fig. 22—Nondedicated Lead Connections for 421A KTU (Used as Audible Signal Suppressor) in 69D Apparatus Mounting



NOTES:

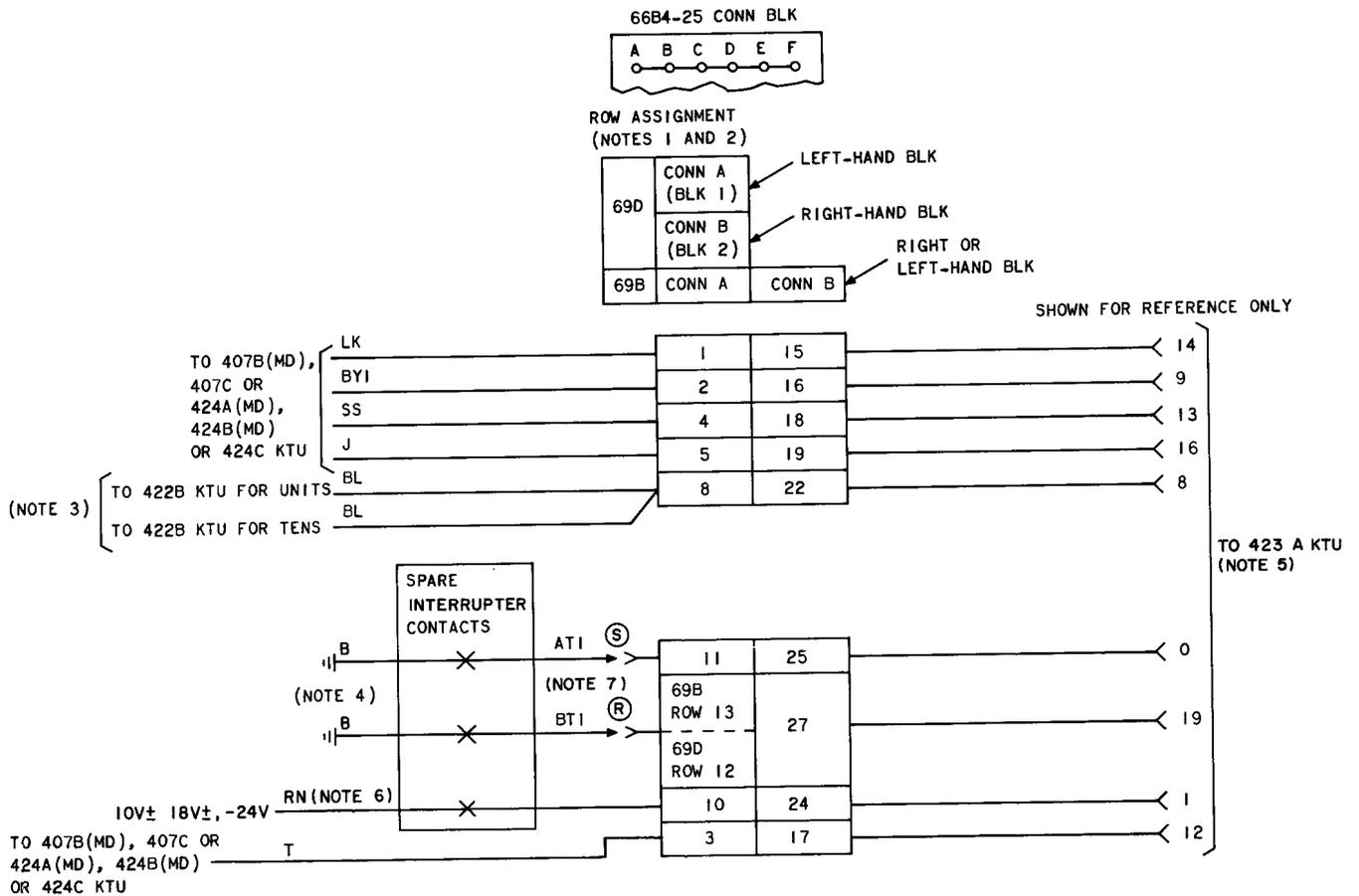
1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK COLUMN IS F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. PROVIDE A SEPARATE 422B KTU FOR THE UNITS GROUP (1-0, SINGLE DIGIT NOS.) AND FOR THE TENS GROUP (X1-X0, TWO DIGIT NOS.)
4. PROVIDE AND INSTALL A DIODE IN THE "A" LEAD OF THE ASSOCIATED TEL SETS AS SHOWN IN TEL SET CONNECTION SECTION. FOR CONNECTION, USE THE STATION BUSY OPTION AS SHOWN IN THE CONNECTION SECTION OF THE TYPE SET USED.
5. CONNECT "J1" LEAD OF UNITS 422B KTU WHEN A 407B KTU IS PROVIDED FOR THE DIAL INTERCOM CIRCUIT. WHEN A 424(MD), 424B(MD), OR 424C KTU IS PROVIDED, STRAP THE "J1" LEAD OF 422B KTU TO "J2" LEAD OF TENS 422B KTU.
6. 423A KTU ASSOCIATED WITH SAME DIAL INTERCOM AS THE 422B KTUS.

OPTION STRAPPING ON 422B KTU OPTION BLK

OPTION	FEATURE	STRAP TERMINALS
R*	STATION BUSY TONE	6 TO 8 ○—▶—○

* - INSTALL 441J OR EQUIVALENT DIODE (PROCURE LOCALLY) AS SHOWN.

Fig. 23—Nondedicated Lead Connections for 422B KTU (Station Busy Selector Circuit) in 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. 422B KTUS ASSOCIATED WITH THE SAME DIAL INTERCOM AS THE 423A KTU.
4. CONNECT TO B GRD AS SHOWN.
5. TO ADJUST DIAL TONE VOLUME ON 423A KTU. TURN KNURLED WHEEL (RII ON 423A) TO FULL CLOCKWISE POSITION FOR MINIMUM DIAL TONE VOLUME AND TO FULL COUNTERCLOCKWISE POSITION FOR MAXIMUM DIAL TONE VOLUME.

6. IF INTERRUPTED 105V± IS USED FOR DIAL INTERCOM, DO NOT CONNECT THIS LEAD. IF BUZZERS ARE USED FOR DIAL INTERCOM, AUDIBLE SIGNAL IS SUPPLIED ON THIS LEAD VIA SPARE INTERRUPTER CONTACTS TO PIN 1 OF 423A KTU ON 423A KTU OPTION BLK, STRAP TERMINALS 6 TO 7 AND REMOVE (R) OPTION STRAP BETWEEN TERMINALS 4 AND 6.

OPTION STRAPPING ON KTU OPTION BLOCK

OPTION	FEATURES	STRAP TERMINALS
		ON 423A
T	DIAL TONE	1 TO 2
R	STATION BUSY TONE	4 TO 6
S	AUDIBLE RINGBACK	NO STRAP

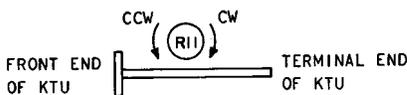
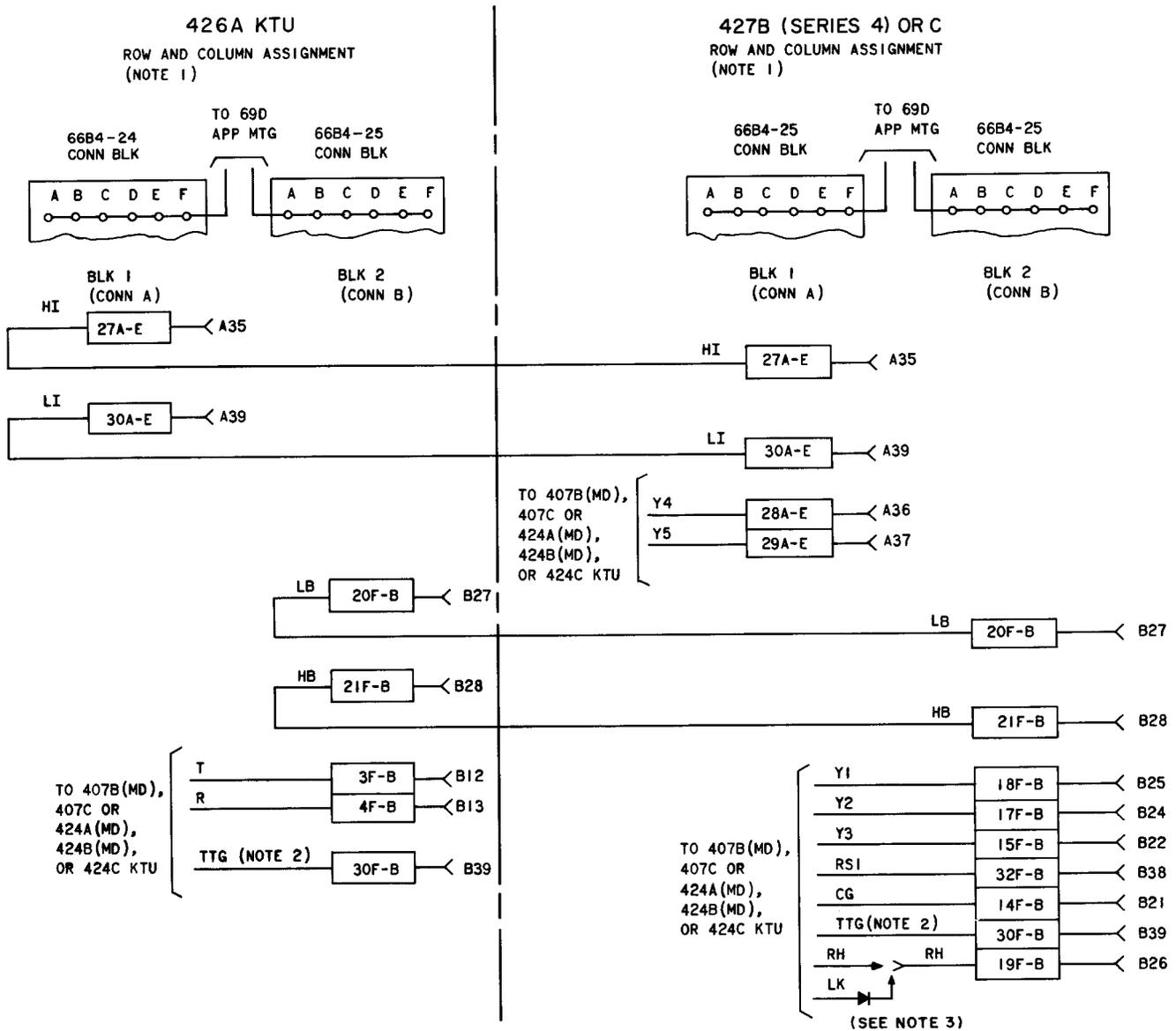
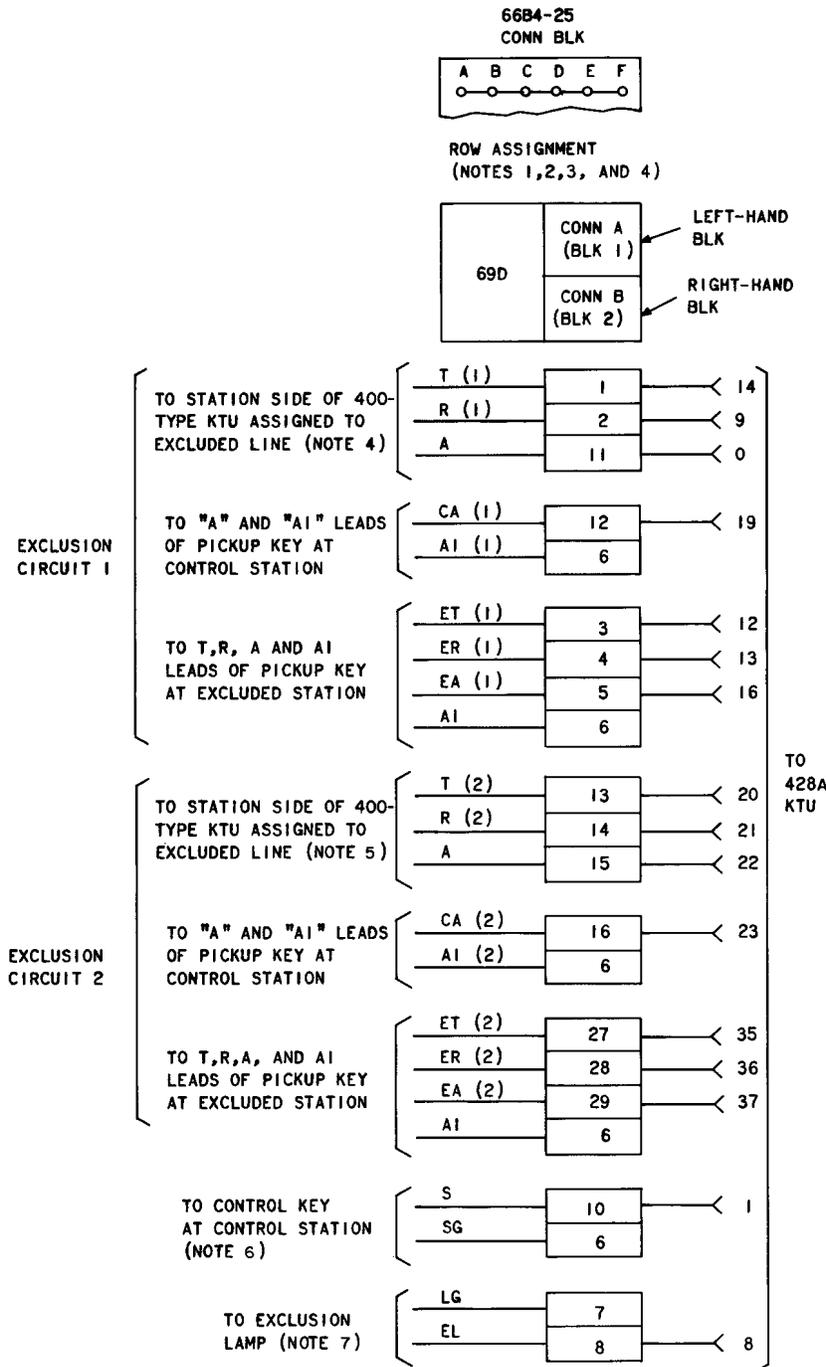


Fig. 24—Nondedicated Lead Connections for 423A KTU (Dial, Busy and Audible Ringback Tone Circuit) in 69B or 69D Apparatus Mounting



- NOTES:
1. TERMINATE DEDICATED LEADS FOR THE 69D APP MTG PER FIG. 9.
 2. WHEN ADDING THE 426A AND 427B (SERIES 4) OR C KTUS TO AN EXISTING SYSTEM EQUIPPED WITH A 420A KTU, A DIODE MUST BE INSTALLED IN THE TTG LEAD CONNECTING TO THE 420A KTU, SEE CONNECTING FIGURE COVERING 420A KTU.
 3. A 400J DIODE (PROCURE LOCALLY) MUST BE CONNECTED AS SHOWN WHEN PROVIDING DIAL TONE IN A "TOUCH-TONE" EQUIPPED SELECTOR-ONLY ARRANGEMENT.

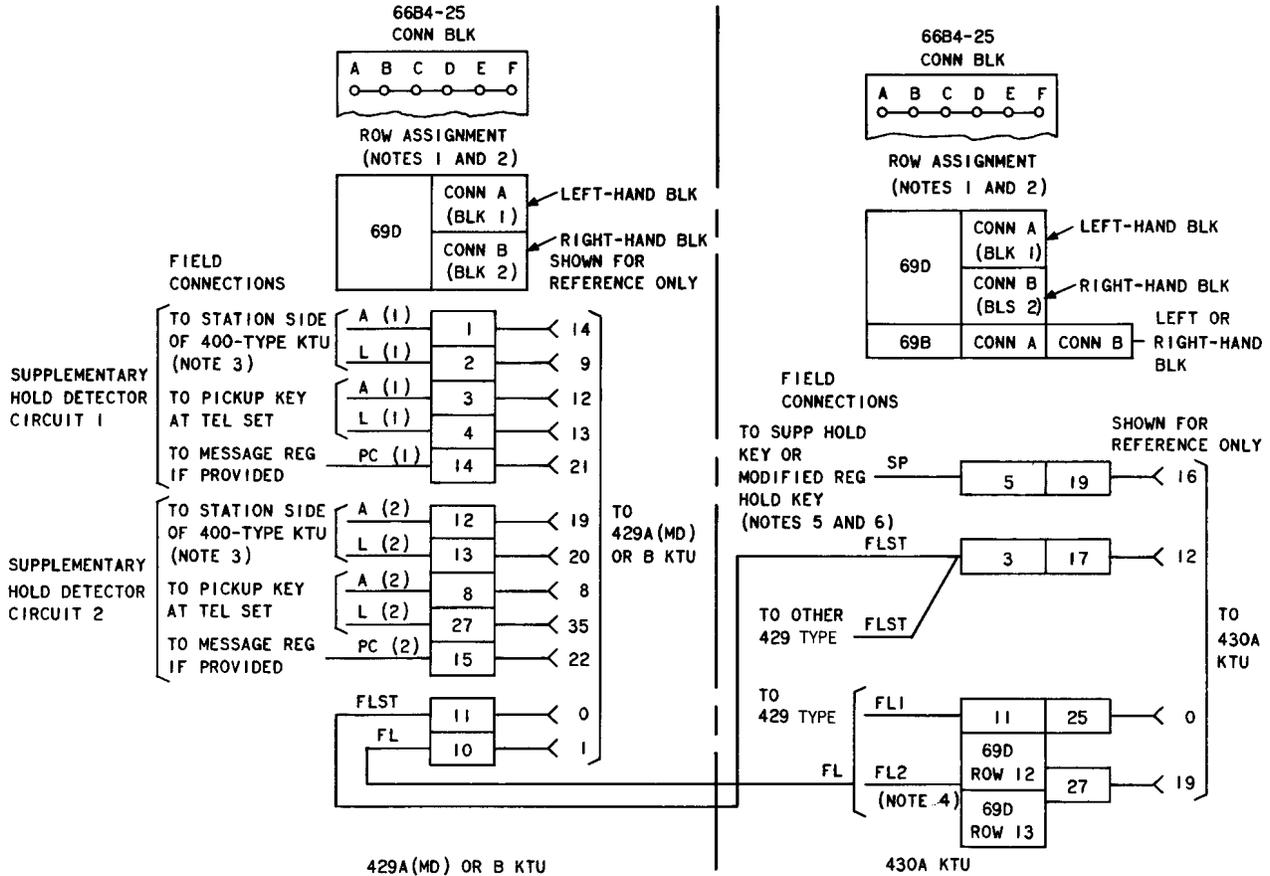
Fig. 25—Nondedicated Lead Connections for 426A, 427B (MD) (Series 4), or 427C KTUs (TOUCH-TONE Adapter Circuit) in 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING THE 66B4-25 CONN BLK IN FIG. 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. ASSOCIATED LAMP LEADS FROM THE 400-TYPE KTU TERMINATE DIRECTLY TO TEL SETS.
4. FOR AUTOMATIC EXCLUSION, REMOVE B GRD FROM TERM 48A-E ON CONNECTING BLOCK 1.
5. T AND R LEAD FROM STATION SIDE OF 400-TYPE KTU ALSO TERMINATES TO TEL SET OF CONTROL STATION. "A" LEAD FROM STATION SIDE OF 400-TYPE KTU MUST CONNECT THROUGH 428A KTU BEFORE CONNECTING TO TEL SET (CA(1) OR CA(2) LEAD).
6. CONTROL KEY MAY BE A LOCKING OR NONLOCKING TYPE.
7. LAMP INDICATING AN EXCLUSION CIRCUIT IS ACTIVATED.

Fig. 26—Nondedicated Lead Connections for 428A KTU (Multiline Exclusion Circuit) in 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING THE 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. T AND R LEADS FROM STATION SIDE OF 400-TYPE KTU TERMINATE DIRECTLY TO THE ASSIGNED PICKUP KEY AT TELEPHONE SET.
4. LIMITATIONS OF 430A KTU ARE AS FOLLOWS:
 (A) FL1 OR FL2 CAN SERVE A MAXIMUM OF 50 LAMPS (51A) EACH. DIVIDE LAMPS AS EVENLY AS POSSIBLE BETWEEN THE TWO LEADS.
 (B) SP LEAD CAN CONNECT TO A MAXIMUM OF 20 STATIONS.
5. ANY TELEPHONE SET EQUIPPED WITH A HOLD KEY HAVING A SET OF TRANSFER CONTACTS AND SUFFICIENT CORD LEADS CAN INITIATE I HOLD. REWIRE HOLD KEY ACCORDING TO CONNECTION SECTION OF TYPE SET USED.
6. WHEN USED WITH CONCENTRATOR SETS AND THE 657 KEY MODULE, CONNECT AS FOLLOWS:

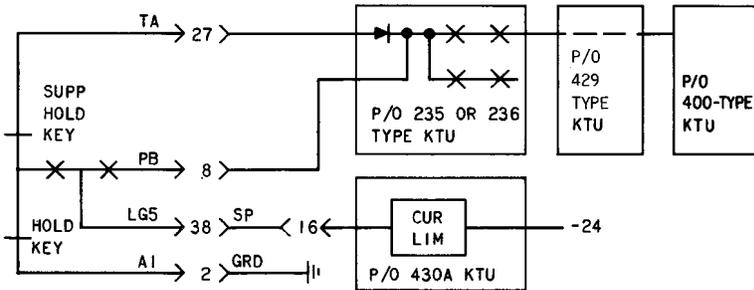
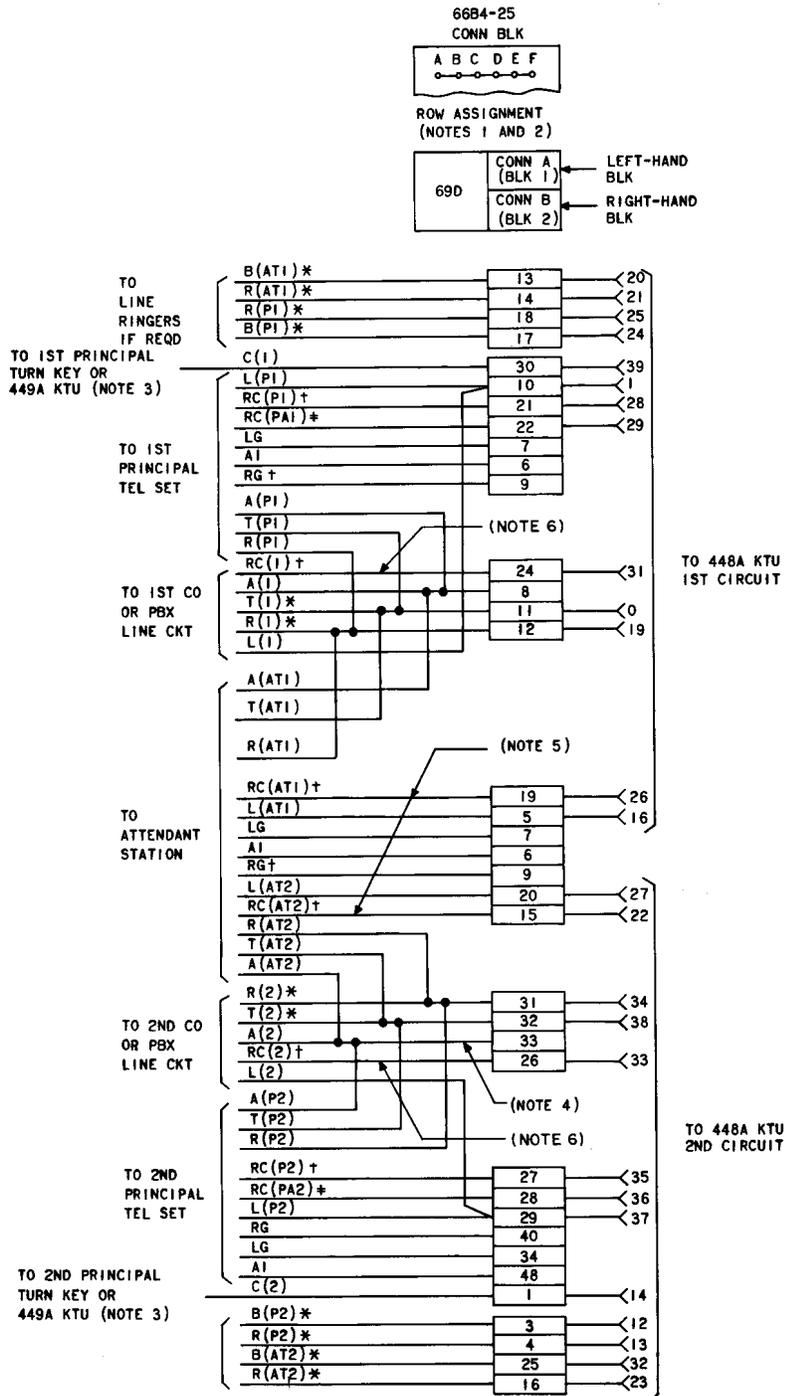


Fig. 27—Nondedicated Lead Connections for 429-Type KTU (Supplementary Hold Detector Circuit) in 69D Apparatus Mounting and 430A KTU (Flutter Generator Circuit) in 69B or 69D Apparatus Mounting



OPTION STRAPPING ON 448A KTU OPTION BLOCK

AUDIBLE SIGNALS	OPTION	FEATURE	STRAP TERMINALS	
			1ST CKT	2ND CKT
	W	INTERRUPTED RING	8 TO 7 §	3 TO 5 §
	T	STEADY RING	8 TO 6	3 TO 4
	X	STEADY BUZZER	8 TO 10	3 TO 1

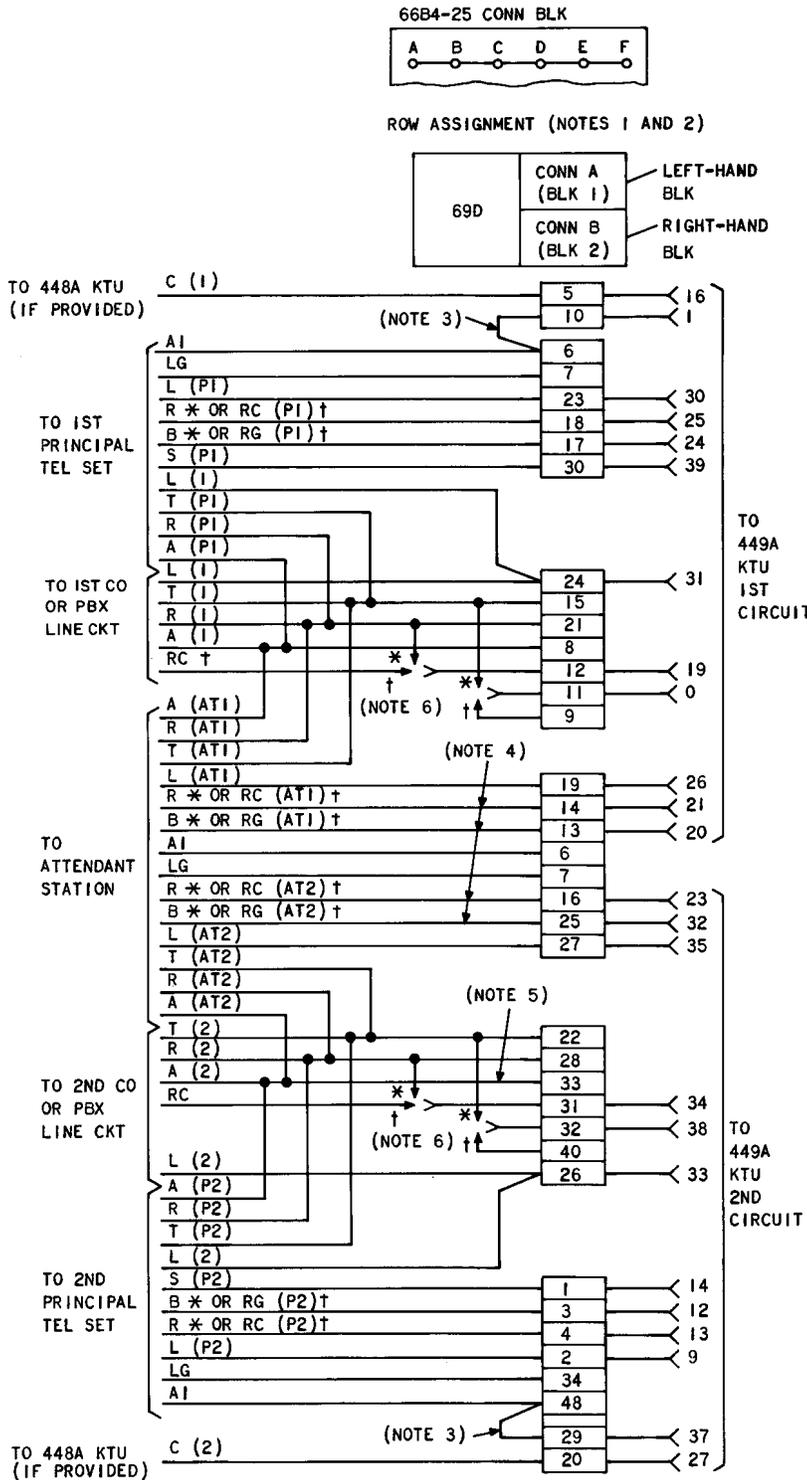
§ FACTORY PROVIDED

NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING THE 66B4-25 CONN BLK IN FIG. 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. IF IMMEDIATE RINGER TRANSFER IS REQUIRED, CONNECT TO A TURN KEY OR A 449A KTU.
4. MAKE SURE THAT ROW 33 IS NOT CONNECTED TO THE INTERRUPTED OR USED FOR ANY OTHER CONNECTION.
5. MULTIPLE RC LEADS FROM BOTH CIRCUITS TO SAME AUDIBLE SIGNAL AT ATTENDANT STATION.
6. (V) OPTION MUST BE APPLIED ON 400 TYPE KTU LINE CIRCUIT.

* FOR LINE RINGING
 † FOR COMMON AUDIBLE RINGING
 ‡ CONNECT WHEN COMMON AUDIBLE IS USED AND RINGER IS NOT TO BE CUT OFF

Fig. 28—Nondedicated Lead Connections for 448A KTU (Variable Delay Timer Circuit) in 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING THE 66B4-25 CONN BLK IN FIG. 7.
 2. TERMINATE DEDICATED LEADS PER FIG. 9.
 3. PROVIDE STRAP ONLY IF CIRCUIT IS USED WITH A 448A KTU. IF CIRCUIT IS USED WITH A 448A KTU, NONE OF THE RINGER CONNECTIONS SHOWN FOR THAT CIRCUIT ARE REQUIRED.
 4. MULTIPLE THE RINGING LEADS FROM BOTH CIRCUITS TO THE SAME AUDIBLE SIGNAL AT THE ATTENDANT STATION.
 5. MAKE SURE THAT ROW 33 IS NOT CONNECTED TO THE INTERRUPTER OR USED FOR ANY OTHER CONNECTION.
 6. FOR RINGING OPTIONS, CONNECT AS FOLLOWS:
 FOR LINE RINGING - 1ST CIRCUIT - PROVIDE A STRAP FROM ROW 15 TO ROW 11 AND A STRAP FROM ROW 21 TO ROW 12 AND **DO NOT** CONNECT THE RC LEAD.
 FOR COMMON AUDIBLE RINGING - 1ST CIRCUIT - PROVIDE A STRAP FROM ROW 9 TO ROW 11 AND CONNECT THE RC LEAD FROM THE LINE CKT TO ROW 12.
 FOR LINE RINGING - 2ND CIRCUIT - PROVIDE A STRAP FROM ROW 22 TO ROW 32 AND A STRAP FROM ROW 28 TO ROW 31 AND **DO NOT** CONNECT THE RC LEAD.
 FOR COMMON AUDIBLE RINGING - 2ND CIRCUIT - PROVIDE A STRAP FROM ROW 40 TO ROW 32 AND CONNECT THE RC LEAD FROM THE LINE CKT TO ROW 31.
- ① OPTION MUST BE APPLIED ON 400G KTU (OR EARLIER) LINE CIRCUIT.
 ② OPTION MUST BE APPLIED ON 400H KTU
 SEE BSP 518-215-400

* FOR LINE RINGING
 † FOR COMMON AUDIBLE RINGING

Fig. 29—Nondedicated Lead Connections for 449A KTU (Immediate Transfer Control Circuit) in 69D Apparatus Mounting

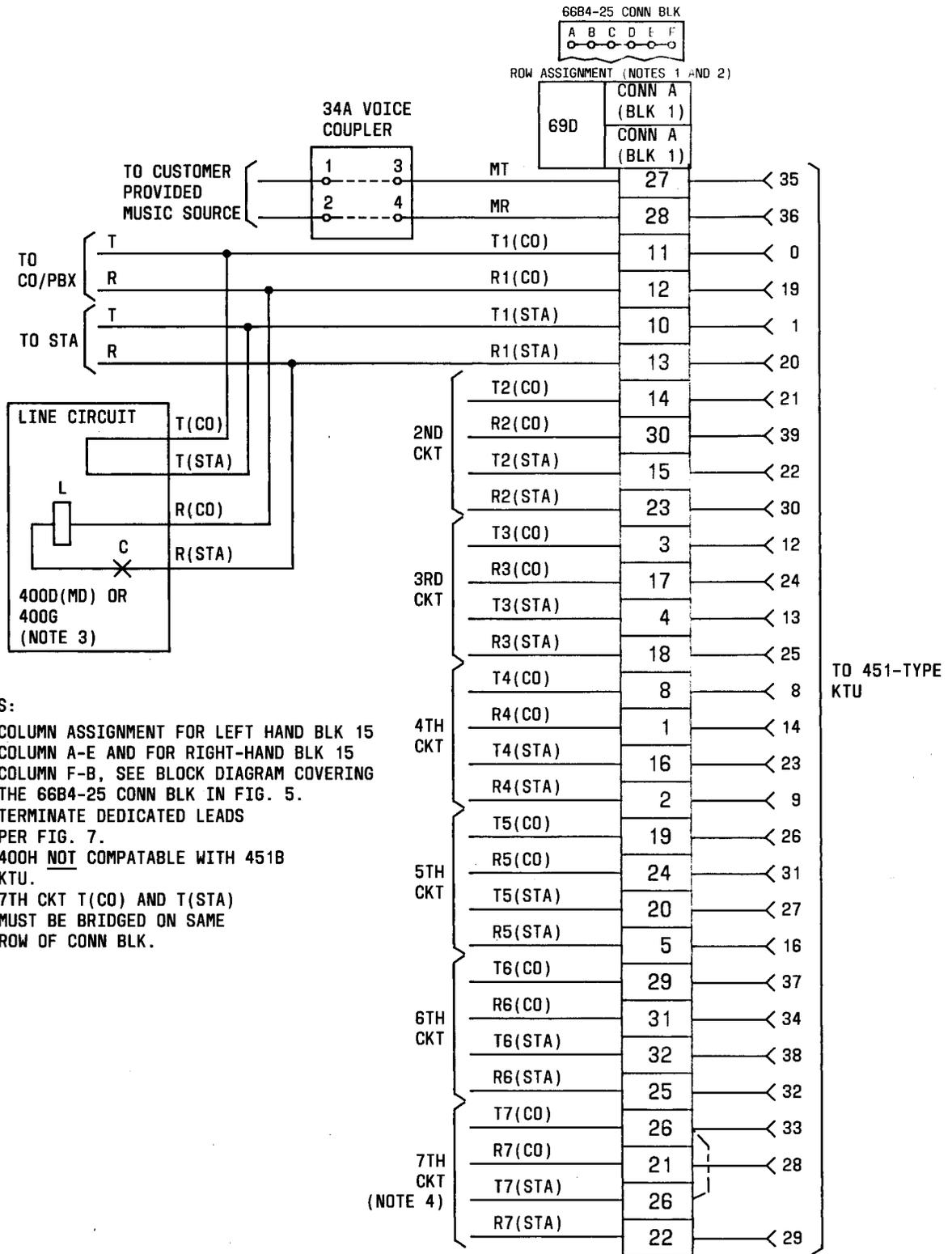
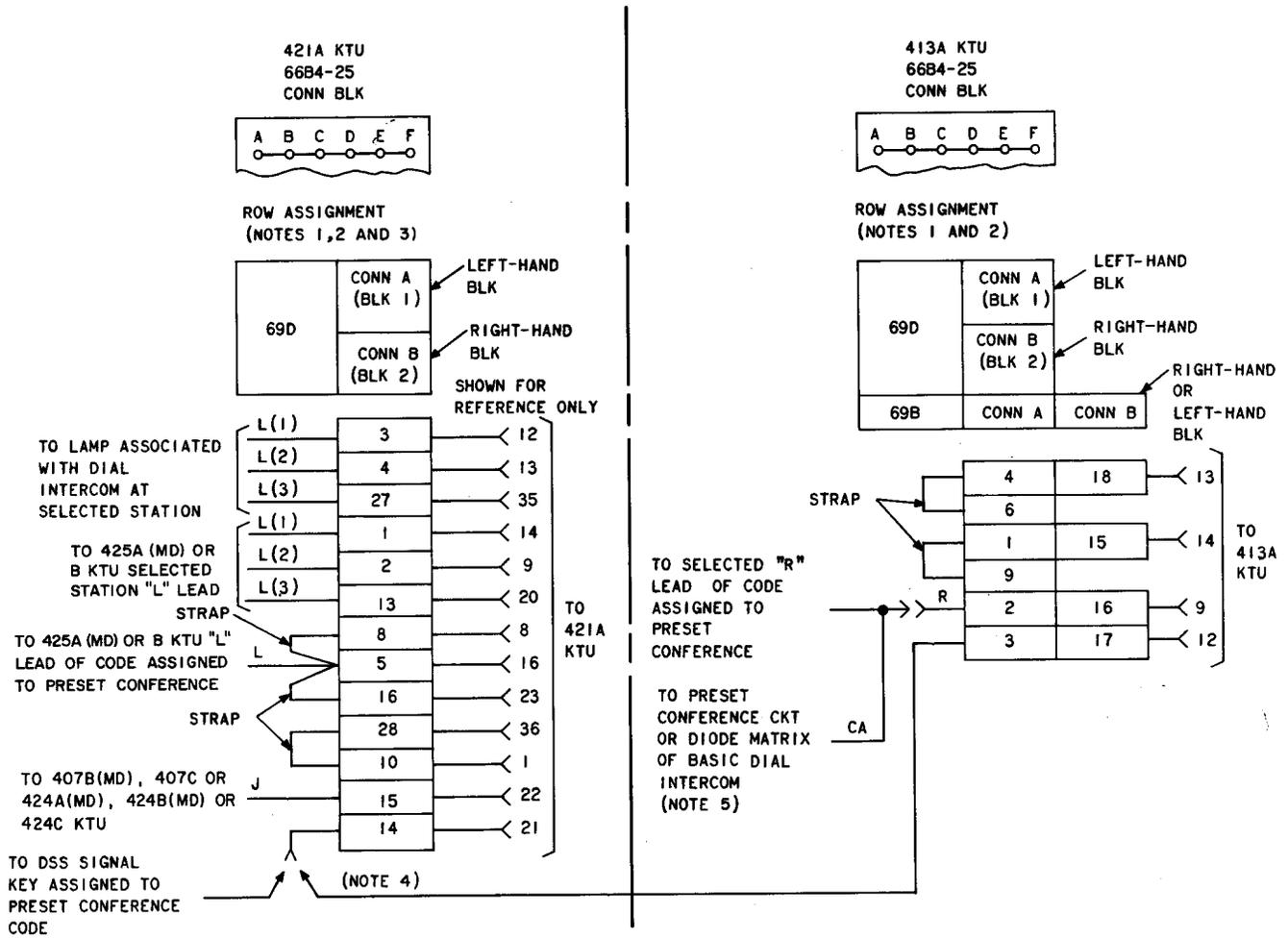


Fig. 30—Nondedicated Lead Connections for 451B KTU (Music-On-Hold Circuit) in 69D Apparatus Mounting

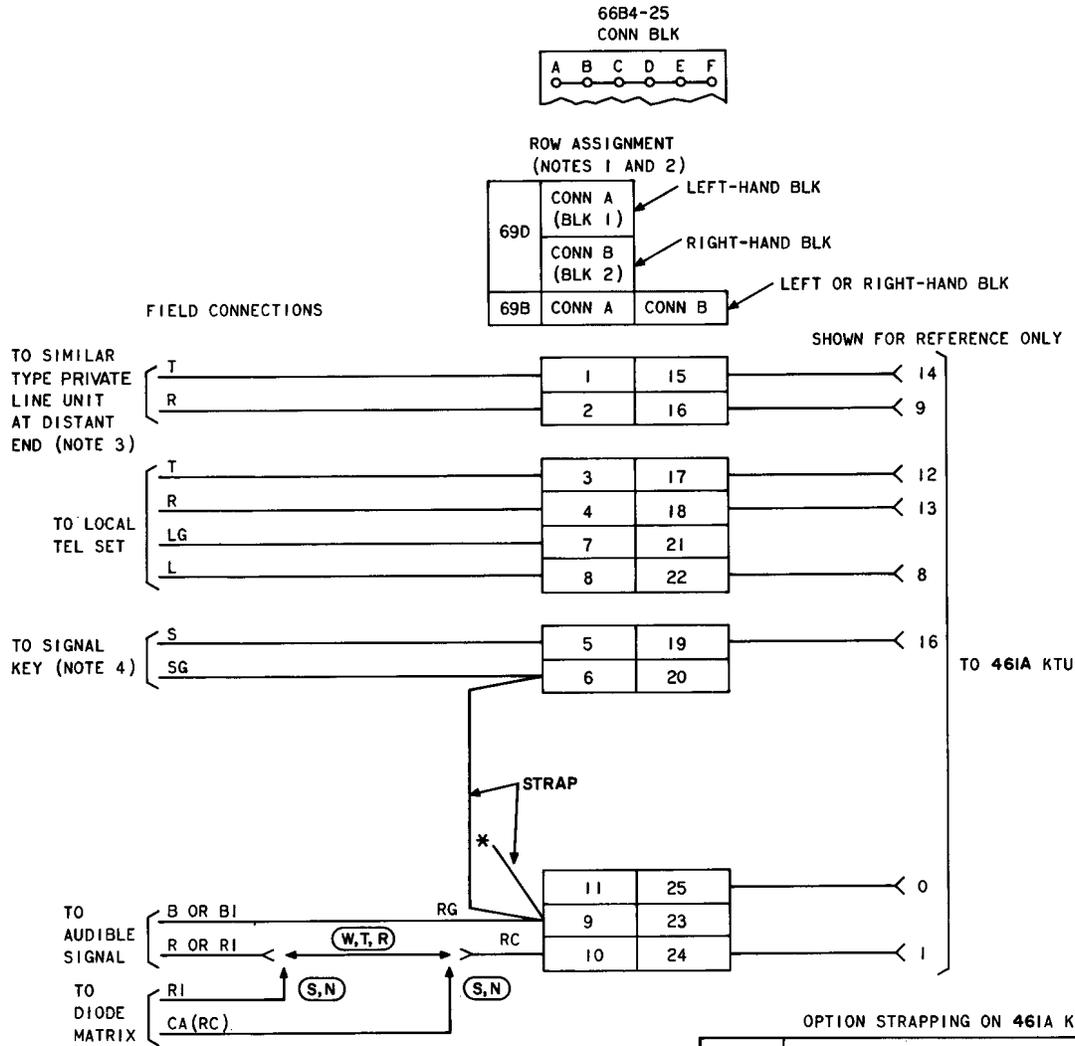


- NOTES:
1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
 2. TERMINATE DEDICATED LEADS PER FIG. 9.
 3. WHEN THIS CIRCUIT IS PROVIDED, RING VOLTAGE (105V±) MUST BE USED TO OPERATE THE AUDIBLE SIGNALS CONNECTED TO THE DIAL INTERCOM LINE.
 4. PROVIDE THE 413A KTU ONLY WHEN ACCESS TO THE PRESET CONFERENCE IS BY DIAL CODE OR BY DIAL CODE AND DSS. DO NOT PROVIDE THE 413A KTU WHEN ACCESS TO THE PRESET CONFERENCE IS LIMITED TO DSS.
 5. THE "CA" LEAD MUST CONNECT TO THE DIODE MATRIX WHETHER OR NOT THE 413A KTU IS PROVIDED.

OPTION STRAPPING ON 421A KTU OPTION BLK

OPTION	FEATURE	STRAP TERMINALS
W	PRESET CONFERENCE	1 TO 2, 7 TO 8

Fig. 31—Nondedicated Lead Connections for Preset Conference Circuit of a Deluxe Dial Intercom Line (421A KTU in 69D Apparatus Mounting and a 413A KTU in a 69B or 69D Apparatus Mounting)



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 OR 7.
2. TERMINATE DEDICATED LEADS PER FIG. 9.
3. PVT LINE CKT AT DISTANT END MAY BE A 414A KTU, 419A KTU, 204A KTU, OR ANY OTHER TYPE PVT LINE UNIT REQUIRING RINGING VOLTAGE FOR THE RINGUP CIRCUIT AND FURNISHING RINGING VOLTAGE FROM THE SIGNALING CKT.
4. SIGNAL KEY MAY BE A CONVERTED PICKUP KEY OR ANY EXTERNAL NONLOCKING KEY.
5. FOR SATISFACTORY AUDIBLE RINGBACK TONE, THE RINGING SUPPLY MUST CONTAIN AN AUDIBLE COMPONENT.

* STRAP TO B GRD (DEDICATED WIRING) OF APPARATUS MOUNTING

OPTION STRAPPING ON 461A KTU OPTION BLK

OPTION	FEATURES		STRAP TERMINALS
W	AUDIBLE SIGNALS	UNDER CONTROL OF TIME-OUT CIRCUIT (B RELAY)	INTERRUPTED RING 7 TO 8
T		STEADY RING	6 TO 7
S		COMMON WITH DIODE MATRIX CONTROL	7 TO 8
R		UNDER CONTROL OF R RELAY	STEADY RING
N	COMMON WITH DIODE MATRIX CONTROL		
X	TIME-OUT	10 SECONDS	1 TO 2
Z		15 SECONDS	2 TO 3
WITHOUT X OR Z		23 SECONDS	REMOVE X OR Z STRAPS
M	AUDIBLE RINGBACK TONE (NOTE 5)		9 TO 10

Fig. 32—Nondedicated Lead Connections for 461A KTU (Manual Signaling, Ringdown Private Line Circuit) in 69B or 69D Apparatus Mounting

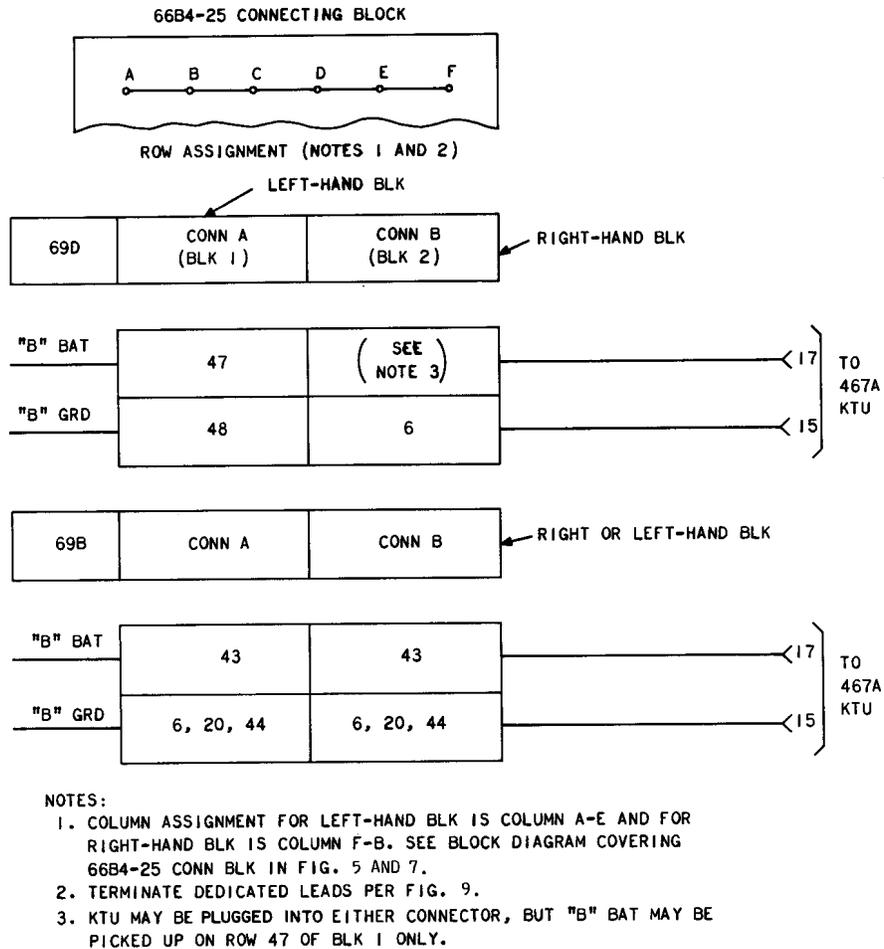
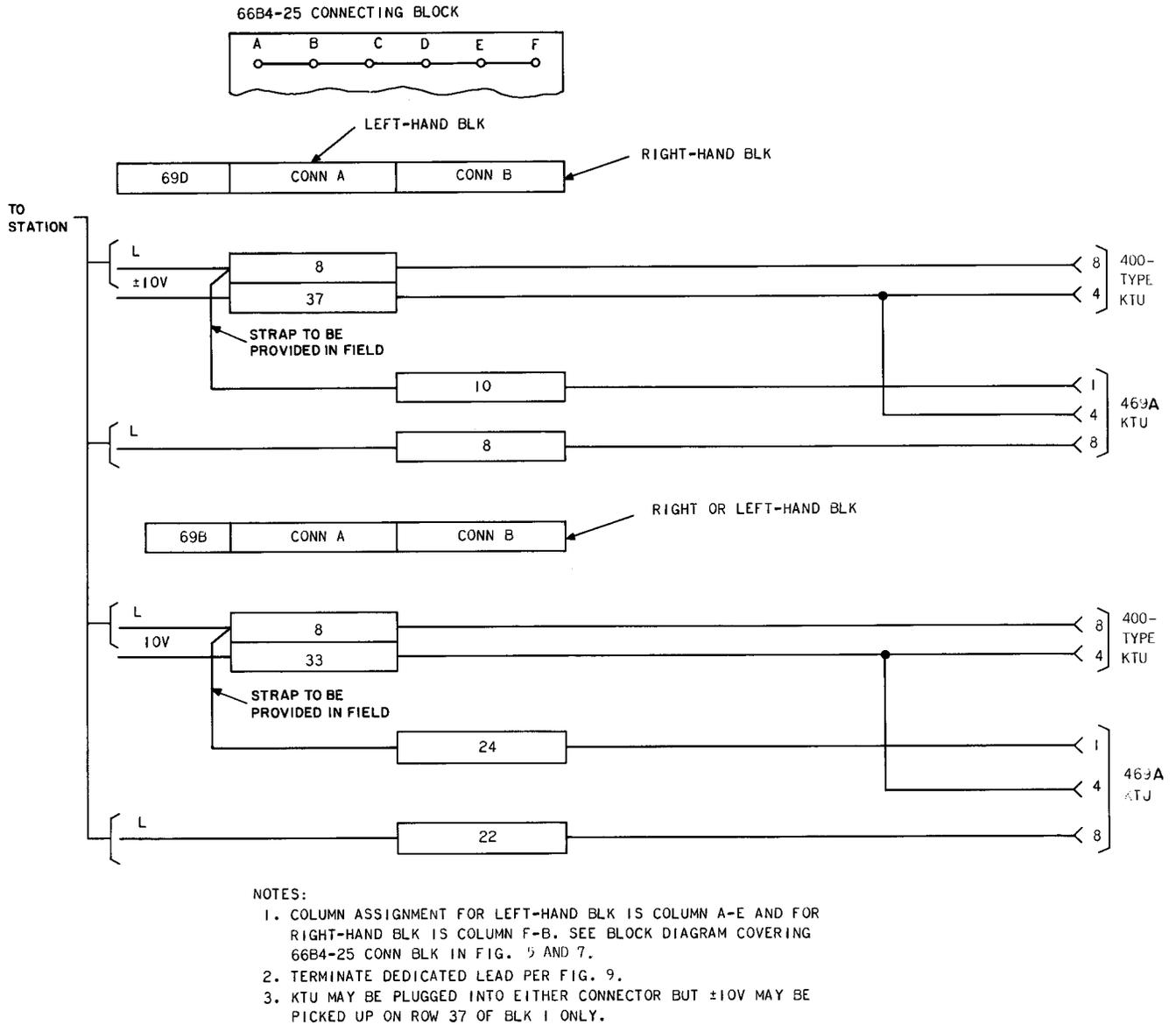


Fig. 33—Nondedicated Lead Connections for 467A KTU (Voltage Monitor Circuit) in 69B or 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT-HAND BLK IS COLUMN A-E AND FOR RIGHT-HAND BLK IS COLUMN F-B. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5 AND 7.
2. TERMINATE DEDICATED LEAD PER FIG. 9.
3. KTU MAY BE PLUGGED INTO EITHER CONNECTOR BUT ±10V MAY BE PICKED UP ON ROW 37 OF BLK 1 ONLY.

Fig. 34—Nondedicated Lead Connections for 469A KTU (Lamp Extender Circuit) in 69B or 69D Apparatus Mounting

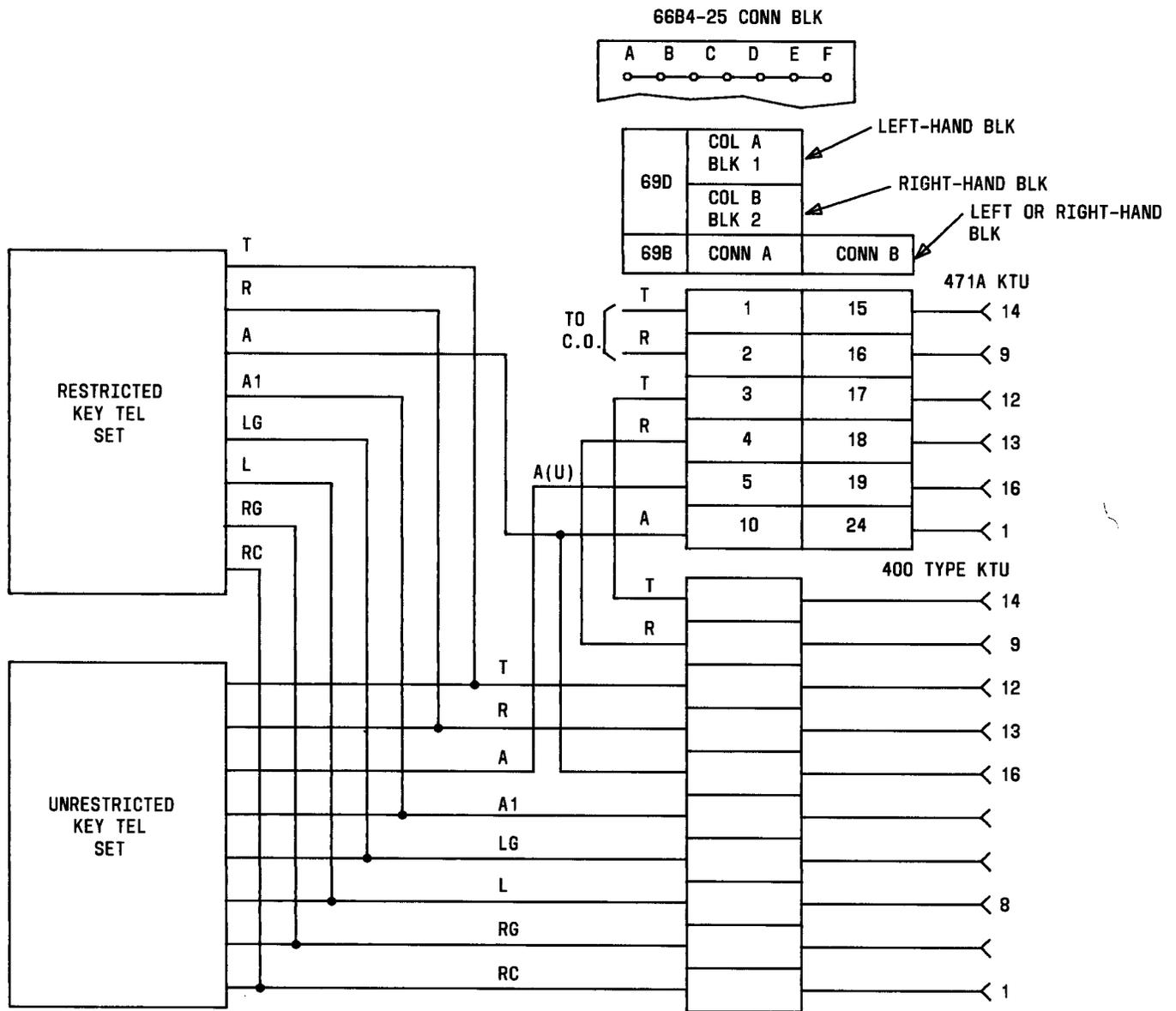
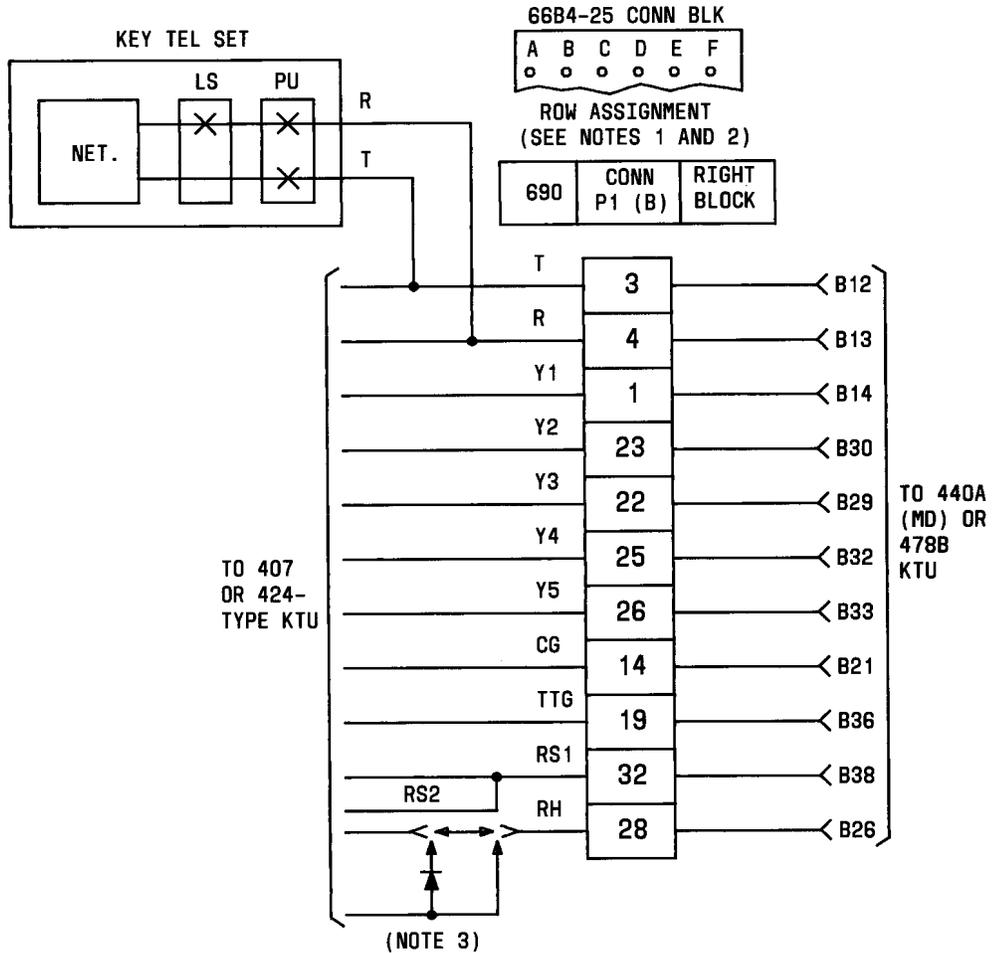
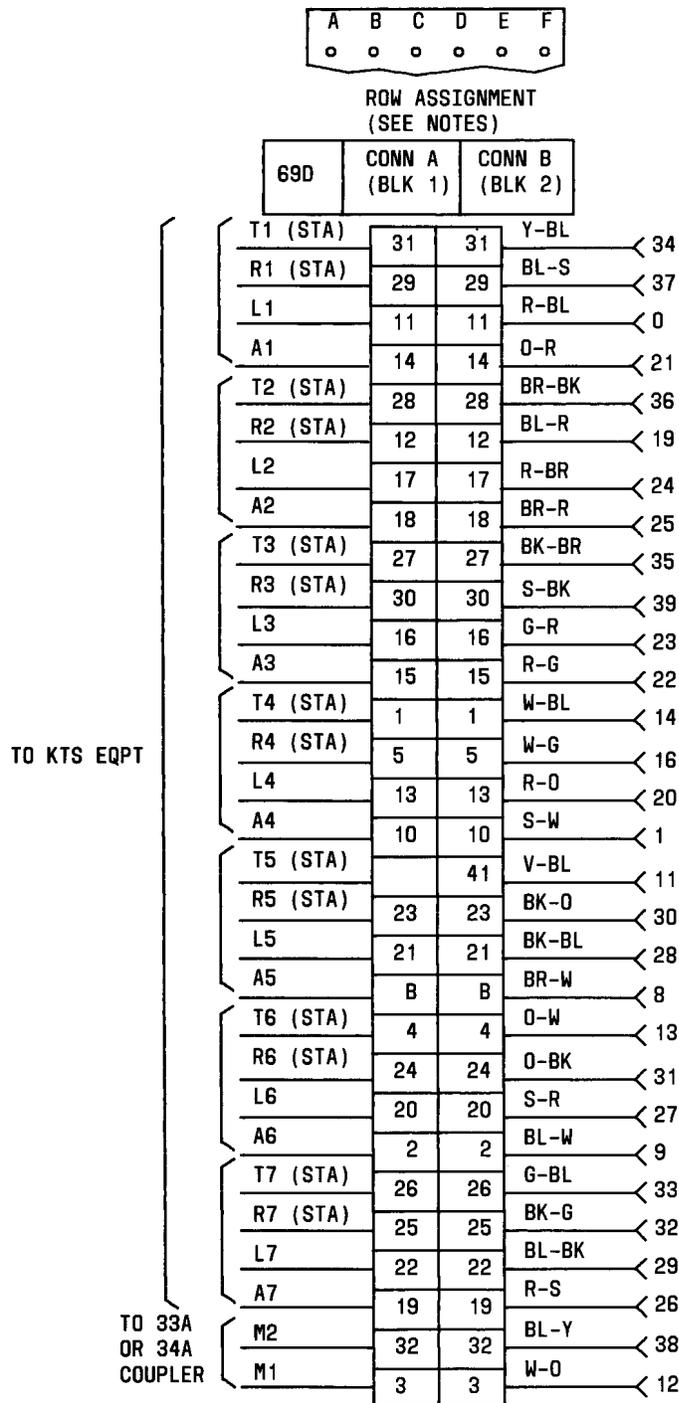


Fig. 35—Nondedicated Lead Connections for 471A (MD) or 471B KTU (Battery Reversal Toll Restriction Circuit) in 69B or 69D Apparatus Mounting



- NOTES:
1. SEE BLOCK DIAGRAM COVERING 66B4-25 CONN BLK IN FIG. 5.
 2. TERMINATE DEDICATED LEADS PER FIG. 7.
 3. DIODE (400J, LOCALLY PROVIDED) MUST BE FURNISHED IN SYSTEM EQUIPPED WITH DIAL TONE.
 4. WHEN ADDING THE 440A KTU (MD) TO AN EXISTING SYSTEM EQUIPPED WITH A 420A KTU, A DIODE MUST BE INSTALLED IN THE TTG LEAD CONNECTING TO THE 420A KTU. SEE FIG. 14 COVERING CONNECTIONS OF THE 420A KTU.

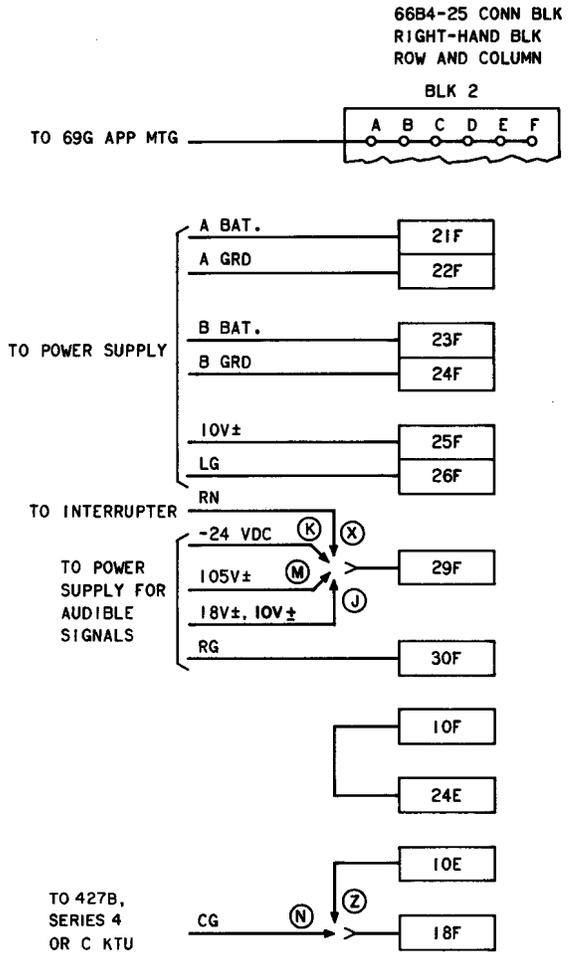
Fig. 36—Nondedicated Lead Connections for 440A (MD) or 478B KTU (TOUCH-TONE Adapter Circuit) in 69D Apparatus Mounting



NOTES:

1. COLUMN ASSIGNMENT FOR LEFT HAND BLK IS COLUMN A-E AND FOR RIGHT HAND BLK IS B-F. SEE BLK DIAGRAM COVERING 6684-25 CONN BLK IN FIG. 5
2. TERMINATE DEDICATED LEADS PER FIG. 7
3. IF A 498A EQUIPPED WITH A 116A1 CM IS INSTALLED IN CONNECTOR A, A SECOND KTU REQUIRING THE RN LEAD CANNOT BE USED IN CONNECTOR B, IF A SECOND 498A IS USED IN CONNECTOR B, DO NOT EQUIP IT WITH A 116A1 CM

Fig. 38—Nondedicated Lead Connections for 498A KTU (Music-On-Hold Circuit) Equipped With a 116A1 Circuit Module in 69D Apparatus Mounting



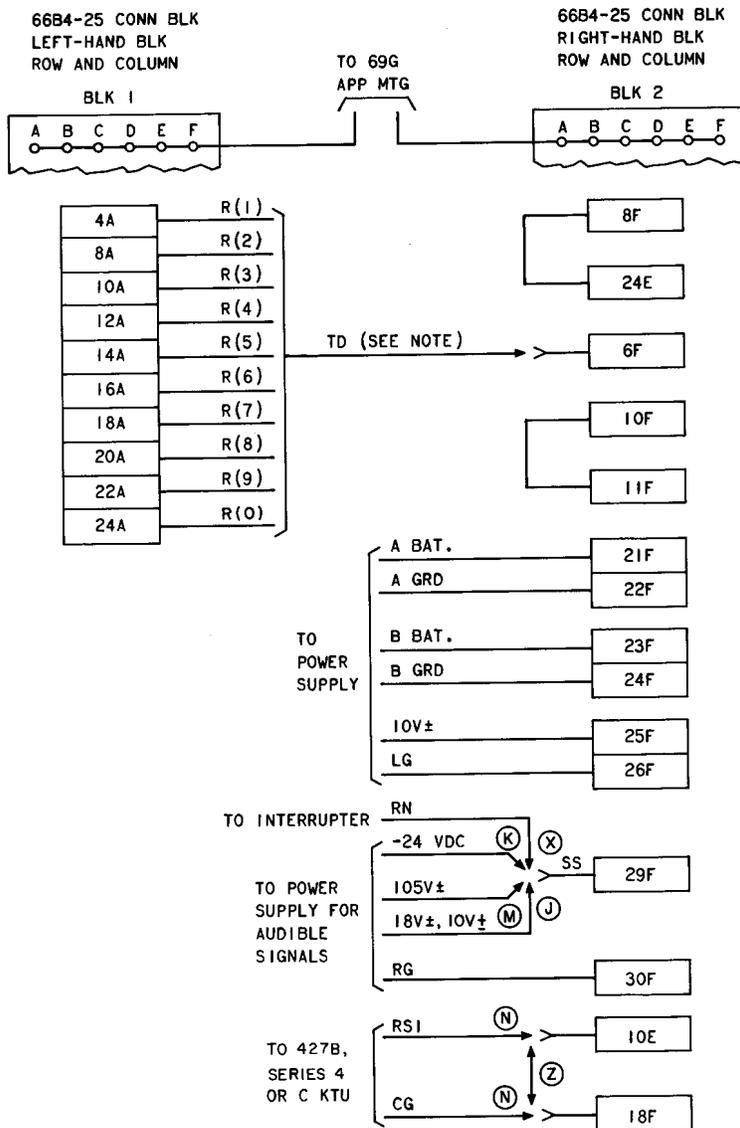
OPTIONS

Z	WITHOUT	"TOUCH-TONE" DIAL STATION
N	WITH	
M	RINGER	TYPE AUDIBLE SIGNALS
K	DC BUZZER OR BELL	
J	AC BUZZER OR BELL	
X	INTERRUPTED	

NOTE:

A COMMON RINGER MAY NOT BE USED WITH THE R2 LEAD IN THE 407B (MD) KTU. A COMMON RINGER MAY BE USED ON R2 OF 407C KTU.

Fig. 39—Basic Dial Intercom, Strapping and Power Supply Connections for 407B (MD) or 407C KTU



OPTIONS

Z	WITHOUT	"TOUCH-TONE" DIAL STATION
N	WITH	
M	RINGER	TYPE AUDIBLE SIGNALS
K	DC BUZZER OR BELL	
J	AC BUZZER OR BELL	
X	INTERRUPTED	

NOTE:

1. ANY SELECTED R LEAD [R(1)-R(0)] MAY BE ASSIGNED AS THE INITIAL DIGIT OF A 2-DIGIT CODE. THE R LEAD SO ASSIGNED MAY NOT BE USED FOR A STATION CODE.
2. R2 LEAD OF 424A (MD) AND 424B (MD) AND 424B (MD) MAY NOT BE USED WITH COMMON RINGER. THE 424C KTU MAY BE USED WITH A COMMON RINGER.

Fig. 40—Basic Dial Intercom, Strapping and Power Supply Connections for 424A (MD), 424B (MD), or 424C KTU

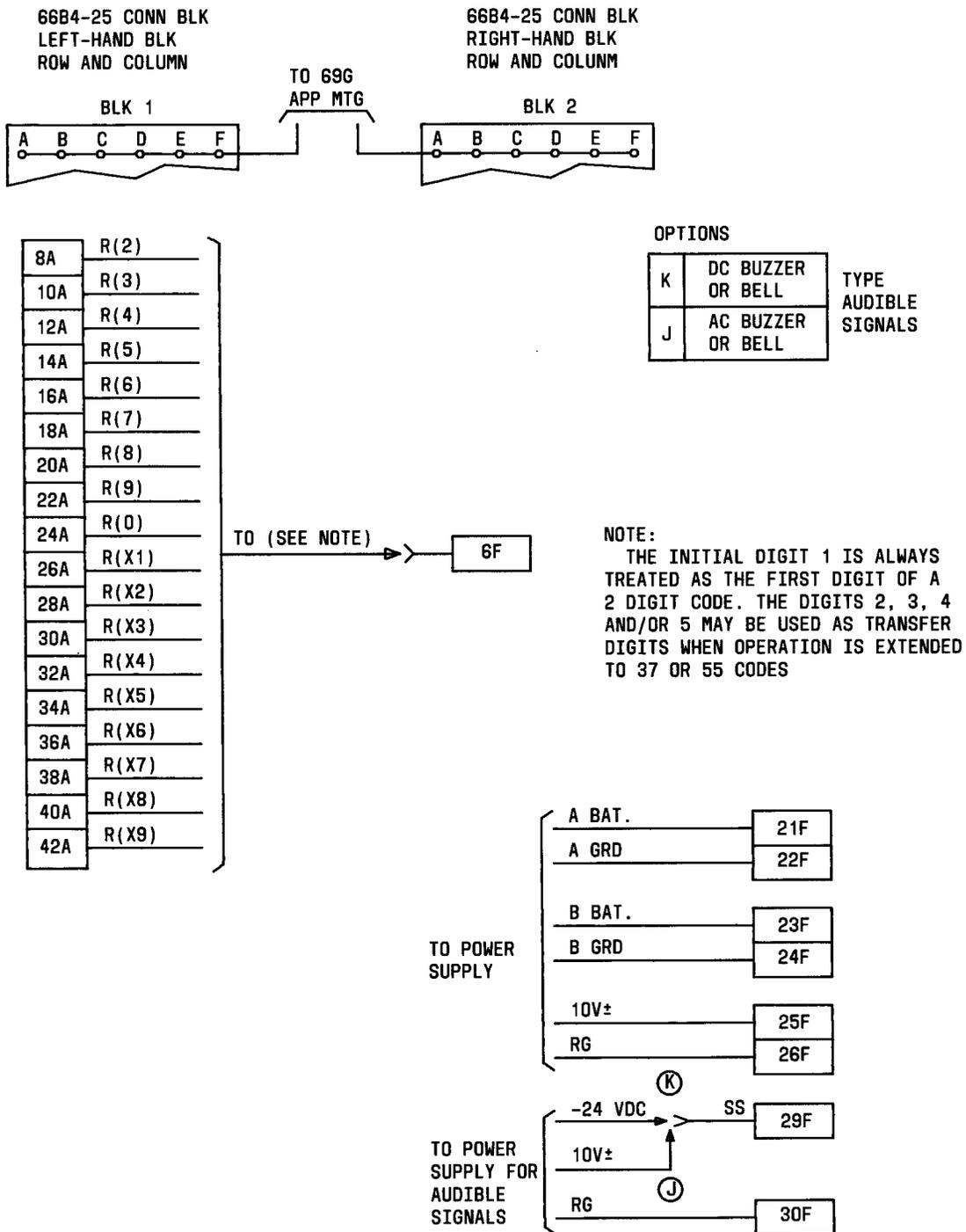
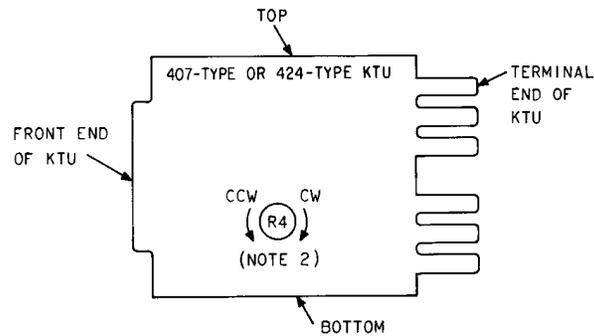
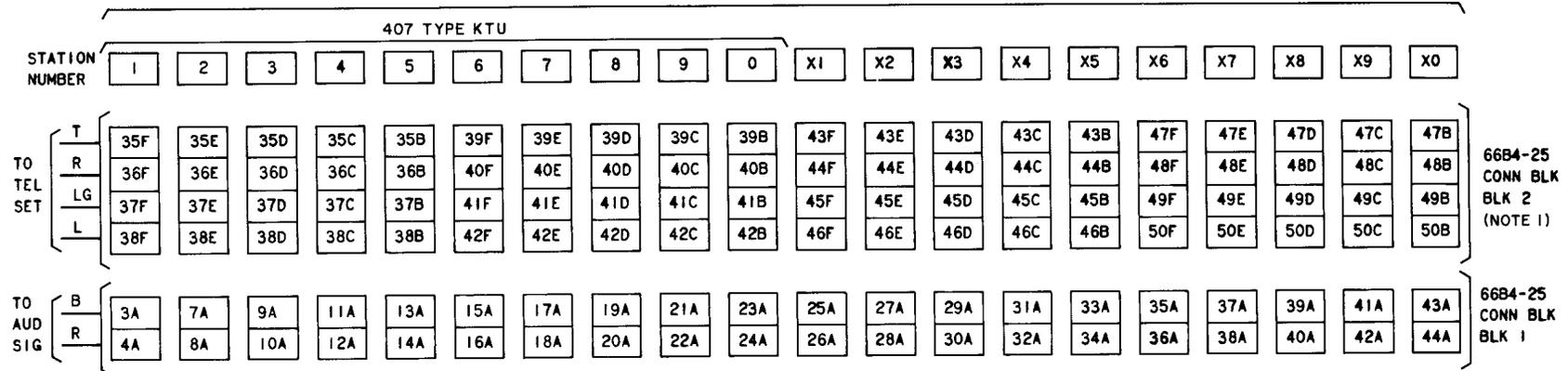


Fig. 41—Basic Dial Intercom, Strapping and Power Supply Connections for 494A KTU

ROW AND COLUMN ASSIGNMENTS FOR STATIONS

424 TYPE KTU



NOTES:

1. WHEN MAKING STATION CONNECTIONS, RUN STRAPS (T,R,LG,L) BETWEEN CONN BLKS 1 AND 2 AS SHOWN IN INSET.
2. RESISTOR R4 CAN BE ADJUSTED TO PROVIDE A TIMING CYCLE FOR THE RELEASE OF RELAY B FROM 0.5 SEC TO 2.5 SEC. A TIMING CYCLE OF 1.5 SEC IS PROVIDED BY THE FACTORY. TURN KNURLED WHEEL TO FULL CCW POSITION FOR 0.5 SEC TIMEOUT AND TO FULL CW POSITION FOR 2.5 SEC TIMEOUT.

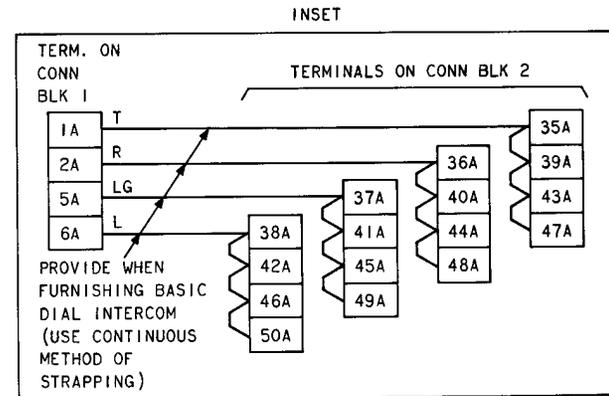


Fig. 42—Basic Dial Intercom, Station Connections

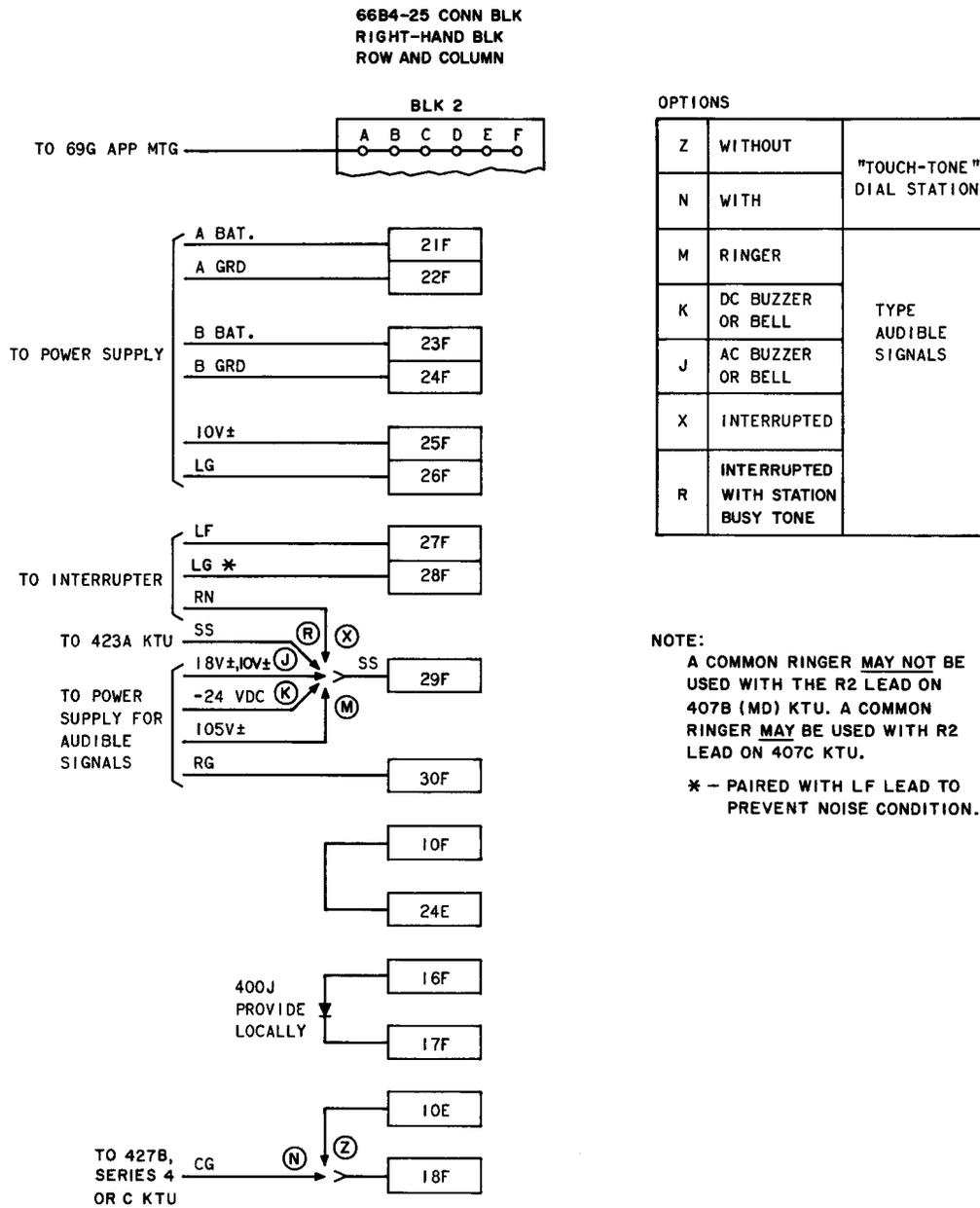
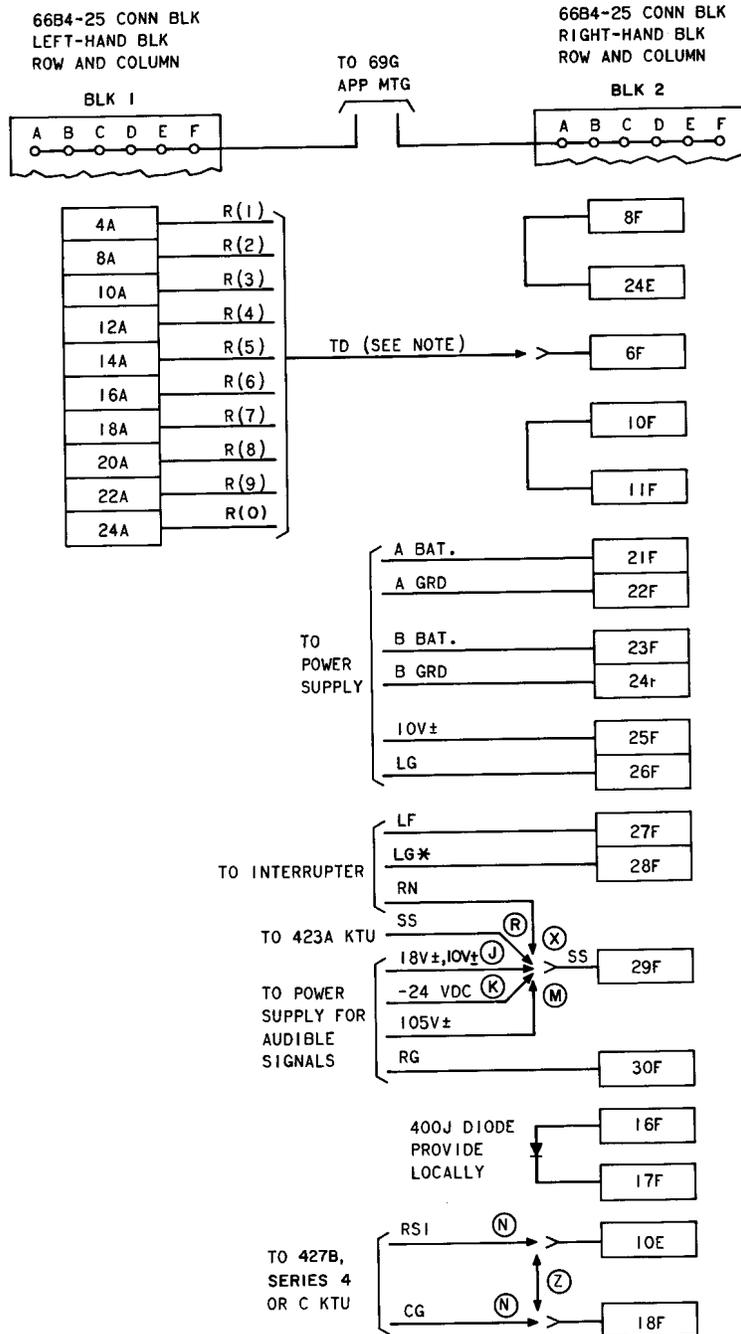


Fig. 43—Deluxe Dial Intercom, Strapping and Power Supply Connections for 407B (MD) or 407C KTU



OPTIONS

Z	WITHOUT	"TOUCH-TONE" DIAL STATION
N	WITH	
M	RINGER	TYPE AUDIBLE SIGNALS
K	DC BUZZER OR BELL	
J	AC BUZZER OR BELL	
X	INTERRUPTED	
R	INTERRUPTED WITH STATION BUSY TONE	

NOTES:

1. ANY SELECTED R LEAD [R(1)-R(0)] MAY BE ASSIGNED AS THE INITIAL DIGIT OF A 2-DIGIT CODE. THE R LEAD SO ASSIGNED MAY NOT BE USED FOR A STATION CODE.
2. A COMMON RINGER MAY NOT BE USED WITH R2 LEAD OF 424A (MD) AND 424B (MD) KTU'S. A COMMON RINGER MAY BE USED WITH 424C KTU.

* - PAIRED WITH LF LEAD TO PREVENT NOISE CONDITION.

Fig. 44—Deluxe Dial Intercom, Strapping and Power Supply Connections for 424A (MD), 424B (MD), or 424C KTU

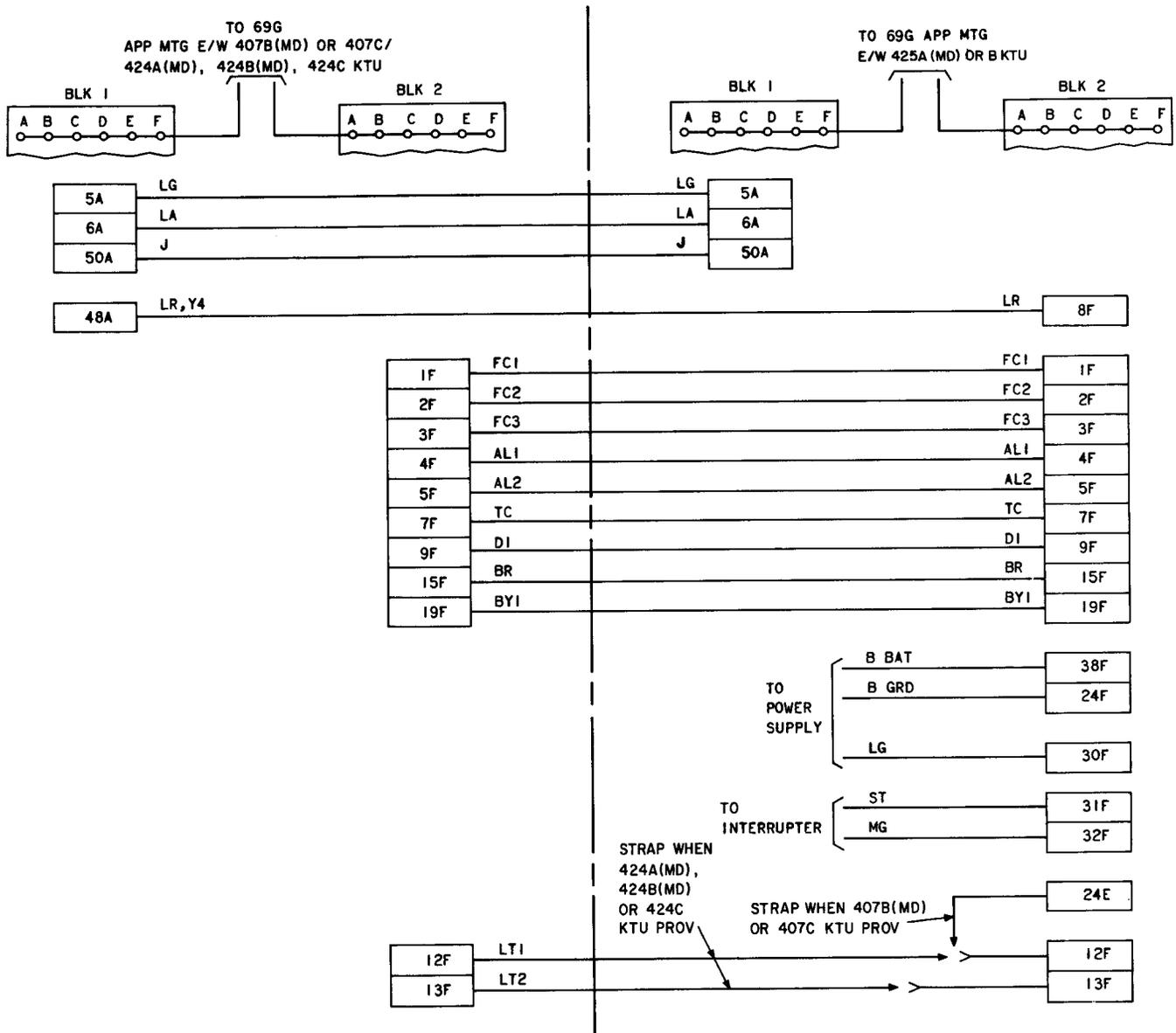
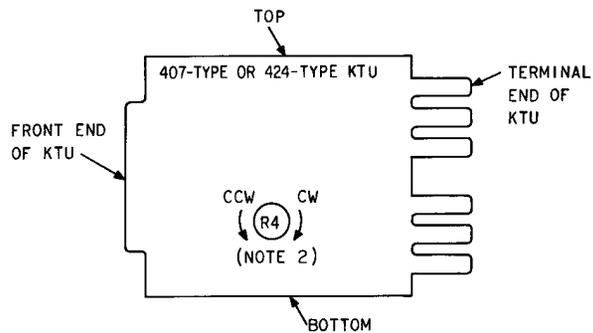


Fig. 45—Deluxe Dial Intercom, Strapping and Power Supply Connections for 425A (MD) or 425B KTU

424 TYPE KTU ROW AND COLUMN ASSIGNMENTS FOR STATIONS

		407 TYPE KTU																					
STATION NUMBER		1	2	3	4	5	6	7	8	9	0	X1	X2	X3	X4	X5	X6	X7	X8	X9	X0		
TO TEL SET	T	35F	35E	35D	35C	35B	39F	39E	39D	39C	39B	43F	43E	43D	43C	43B	47F	47E	47D	47C	47B	6684-25 CONN BLK 2 (NOTE 1) 407B/424A KTU	
	R	36F	36E	36D	36C	36B	40F	40E	40D	40C	40B	44F	44E	44D	44C	44B	48F	48E	48D	48C	48B		
TO TEL SET	LG	3A	7A	9A	11A	13A	15A	17A	19A	21A	23A	25A	27A	29A	31A	33A	35A	37A	39A	41A	43A	6684-25 CONN BLK BLK 1 425A (MD) OR B KTU	
	L	4A	8A	10A	12A	14A	16A	18A	20A	22A	24A	26A	28A	30A	32A	34A	36A	38A	40A	42A	44A		
TO AUD SIG	B	3A	7A	9A	11A	13A	15A	17A	19A	21A	23A	25A	27A	29A	31A	33A	35A	37A	39A	41A	43A	6684-25 CONN BLK 1 407B/424A KTU	
	R	4A	8A	10A	12A	14A	16A	18A	20A	22A	24A	26A	28A	30A	32A	34A	36A	38A	40A	42A	44A		



NOTES:

1. WHEN MAKING STATION CONNECTIONS, RUN STRAPS (T,R) BETWEEN CONN BLKS 1 AND 2 AS SHOWN IN INSET.
2. RESISTOR R4 CAN BE ADJUSTED TO PROVIDE A TIMING CYCLE FOR THE RELEASE OF RELAY B FROM 0.5 SEC TO 2.5 SEC. A TIMING CYCLE OF 1.5 SEC IS PROVIDED BY THE FACTORY. TURN KNURLED WHEEL TO FULL CCW POSITION FOR 0.5 SEC TIMEOUT AND TO FULL CW POSITION FOR 2.5 SEC TIMEOUT.

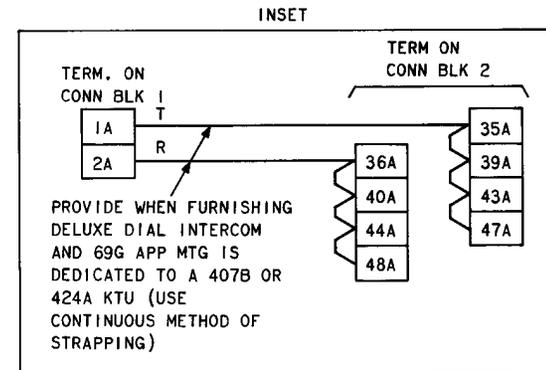


Fig. 46—Deluxe Dial Intercom, Station Connections

TABLE D

DELUXE DIAL INTERCOM CONNECTIONS FROM 407-TYPE KTU TO ASSOCIATED AND OPTIONAL KTUS

LEAD DESIG 407- TYPE	66B4-25 CONN BLKS 407- OR 424-TYPE KTU ROW AND COLUMN ASSIGNMENT		ASSOCIATED KTUS TO PROVIDE DELUXE DIAL INTERCOM			OPTIONAL KTUS						
	BLK 1	BLK 2	425A(MD) OR 425B KTU	422B KTU	423A KTU	420A KTU	421A KTU* (DSS)	"TOUCH-TONE"		PRESET CONFERENCE		
								426A	427B SERIES 4 OR 427C	421A	413A	1A1 MAT. BLK
T	1A-E				•	•		•				
R	2A-E					•		•				
LA	6A-E		•									
Y1	45A-E			•			•		•			
Y2	46A-E			•			•		•			
Y3	47A-E						•		•			
LR			•									
Y4	48A-E			•			•		•			
Y5	49A-E			•			•		•			
J	50A-E		•	•	•					•		
FC1		1F-B	•									
FC2		2F-B	•									
FC3		3F-B	•									
AL1		4F-B	•									
AL2		5F-B	•									
TC		7F-B	•									
D1		9F-B	•									
RS1		10F-B							•			
TTG		14F-B				•		•	•			
BR		15F-B	•	•								
LK		16F-B			•							
RH		17F-B					•		•			
CG		18F-B					•		•			
BY1		19F-B	•		•							
SS		20F-B			•							
B (1-0)	As assigned for station connection (See Fig. 42)					•						
R (1-0)						•					•	•

* Connect required leads per Fig. 21.

TABLE E

DELUXE DIAL INTERCOM CONNECTIONS FROM 424-TYPE KTU TO ASSOCIATED AND OPTIONAL KTUS

LEAD DESIG 424- TYPE	6684-25 CONN BLKS 407- OR 424-TYPE KTU ROW AND COLUMN ASSIGNMENT		ASSOCIATED KTUS DELUXE DIAL INTERCOM						OPTIONAL KTUS				
			424A(MD) OR 425B KTU	422B KTU (UNITS)	422B KTU (TENS)	423A KTU	420A KTU	421A KTU* (DSS)	"TOUCH-TONE"		PRESET CONFERENCE		
	426A	427B SERIES 4 OR 427C							421A	413A	1A1 MAT. BLK		
	BLK 1	BLK 2											
T	1A-E						•	•		•			
R	2A-E							•		•			
LA	6A-E		•										
Y1	45A-E			•	•				•				
Y2	46A-E			•	•				•				
Y3	47A-E								•				
LR			•										
Y4	48A-E			•	•				•				
Y5	49A-E			•	•				•				
J	50A-E		•		•	•					•		
FC1		1F-B	•										
FC2		2F-B	•										
FC3		3F-B	•										
AL1		4F-B	•										
AL2		5F-B	•										
TC		7F-B	•										
D1		9F-B	•										
RS1		10F-B								•			
LT1		12F-B	•	•									
LT2		13F-B	•		•				•				
TTG		14F-B						•		•			
BR		15F-B	•	•	•								
LK		16F-B				•							
RH		17F-B							•		•		
CG		18F-B							•		•		
BY1		19F-B	•			•							
SS		20F-B				•							
B(1-X0)	As assigned for station connection (See Fig. 42)							•					
R(1-X0)								•				•	•

* Connect required leads per Fig. 21.