2A COMMUNICATION SYSTEM (BUSINESS INTERPHONE)

CONNECTIONS AND MAINTENANCE

1. GENERAL

1.01 This section is issued to cover information previously contained in Sections 518-430-300 and 518-430-400 which are hereby canceled, and to include the following:

- 311A16D key service unit (replaces 311A15 KSU being rated MD).
- 247-type KTU TOUCH-TONE® adapter and associated 228A KTU.
- 227B KTU
- 237B KTU add-on circuit.
- Field modification of 311A15 (MD) KSU to provide PBX add-on circuit.
- Field modification of 311A15 (MD) KSU to use 253B KTUs when adding system stations.
- Change lead designation from ***TO*** to ***ST.***

2. CONNECTIONS

2.01 All connections to the 2A Communication System are made on the four dual connecting blocks, designated A-B, C-D, G-F, and H-J, provided by the 311A16D or 311A15 (MD) KSU. See Section 461-604-101 on connecting blocks.

2.02 Refer to appropriate sections for connecting information for station sets, separately mounted keys, cable distribution facilities, etc.

(a) ***Connection Index***

TABLE A

POWER CONNECTIONS (NOTE)

LEAD DESIGNATION	CONNECTING BLOCK B D E F — TERMINAL
*A1	33E
Ground A	38D
Battery A	39D
Ground B	41D
Battery B	42D
Ground C	47D
10v ac or Battery C	50D

* Connect from associated 1A1 or 1A2 KTS

Note: Power is supplied from associated key equipment, 19- or 20-type power unit, or a 101G or equivalent power supply.

TABLE B

STATION CONNECTIONS FOR SYSTEMS WITH 2-6 STATIONS

CODED STATION		LEAD DESIG	CONNECTING BLOCK A B — A B C D E F — BLOCK	TERMINAL
Sta 4	Tel Set	T	A	1C
		R		2C
		A		3C
		A1		4C
		LG		5C
		L		6C
	694-Type Subset	M2		7C
		M1		8C
		S2		9C
		S1		10C
Sta 5	Tel Set	*	A	11C-16C
	Subset			17C-20C
Sta 6	Tel Set	*	A	21C-26C
	Subset			27C-30C
Sta 7	Tel Set	*	A	31C-36C
	Subset			37C-40C
Sta 8	Tel Set	*	A	41C-46C
	Subset			47C-50C
Sta 9	Tel Set	*	B	1D-6D
	Subset			7D-10D

* 10 leads, same as Station 4

TABLE C

CONNECTIONS FOR SYSTEMS WITH 7-12 STATIONS

STATION CONNECTIONS IN ADDITION TO TABLE B					REMOVE STRAPS			
CODED STATION		LEAD DESIG	CONNECTING BLOCK C D A B C D E F		CONNECTING BLOCK H J A B C D E F			
			BLOCK	TERMINAL	BETWEEN		AND	
					BLOCK	TERMINAL	BLOCK	TERMINAL
Sta 21	Tel Set	*	C	1C-6C	H	1C	J	1D
	Subset			7C-10C		2C		2D
Sta 22	Tel Set	*	C	11C-16C		3C		3D
	Subset			17C-20C		4C		4D
Sta 23	Tel Set	*	C	21C-26C		5C		5D
	Subset			27C-30C		6C		6D
Sta 24	Tel Set	*	C	31C-36C		7C		7D
	Subset			37C-40C		8C		8D
Sta 25	Tel Set	*	C	41C-46C		9C		9D
	Subset			47C-50C		10C		10D
Sta 26	Tel Set	*	D	1D-6D		25B	H	26B
	Subset			7D-10D		41C		42C
					J	33D	J	34D
						37D		38D

* 10 leads, same as Station 4 on Table B

TABLE D

CONNECTIONS FOR SYSTEMS WITH 13-18 STATIONS

STATION CONNECTIONS IN ADDITION TO TABLES B AND C					STRAPS TO BE REMOVED IN ADDITION TO TABLE C			
CODED STATION		LEAD DESIG	CONNECTING BLOCK F G A B C D E F		CONNECTING BLOCK H J A B C D E F			
			BLOCK	TERMINAL	BETWEEN		AND	
					BLOCK	TERMINAL	BLOCK	TERMINAL
Sta 27	Tel Set	*	F	1C-6C	H	42C	H	43C
	Subset			7C-10C	J	4F	J	11F
Sta 28	Tel Set	*	F	11C-16C		5F		12F
	Subset			17C-20C		6F		13F
Sta 29	Tel Set	*	F	21C-26C		7F		14F
	Subset			27C-30C		8F		15F
Sta 31	Tel Set	*	F	31C-36C		9F		16F
	Subset			37C-40C		10F		17F
Sta 32	Tel Set	*	F	41C-46C		23E		24E
	Subset			47C-50C		25E		26E
Sta 33	Tel Set	*	G	1D-6D		34D		35D
	Subset			7D-10D		38D		39D

* 10 leads, same as Station 4 on Table B

TABLE E

CONNECTIONS FOR DIRECT STATION SELECTION (DSS)
(See Note)

KEY FOR SELECTING CODED STATION OR CONFERENCE GROUP	LEAD DESIG	CONNECTING BLOCK B, D, OR G (D E F)	
		BLOCK	TERMINAL
4	C	B	11D
5			13D
6			15D
7			17D
8			19D
9			21D
Conference Group For Stations 4-9	CO		23D
*	SG		30D
21	C	D	11D
22			13D
23			15D
24			17D
25			19D
26			21D
Conference Group For Stations 21-26	20		23D
†	SG		30D
27	C	G	11D
28			13D
29			15D
31			17D
32			19D
33			21D
Conference Group For Stations 27-29 and 31-33	30		23D
‡	SG		30D

* Connect to keys selecting stations 4-9 and conference key for this group.

† Connect to keys selecting stations 21-26 and conference key for this group.

‡ Connect to keys selecting stations 27-29 and 31-33, and conference key for this group.

Note: Also modify each 253-type KTU per Table F when DSS is provided.

TABLE F

MODIFICATION OF 253-TYPE KTU WHEN AUDIBLE SIGNALING OR DSS IS PROVIDED

FOR CODED STATION			REMOVE STRAP (SEE NOTE)	
ON 1ST 253-	ON 2ND 253-	ON 3RD 253-	BETWEEN TERMINALS	AND
4	21	27	1	2
5	22	28	3	4
6	23	29	5	6
7	24	31	7	8
8	25	32	9	10
9	26	33	11	12

Note: Remove existing strap and install a 400J diode between terminals associated with each station receiving audible signaling or DSS. Position arrow on diode toward odd-numbered terminal.

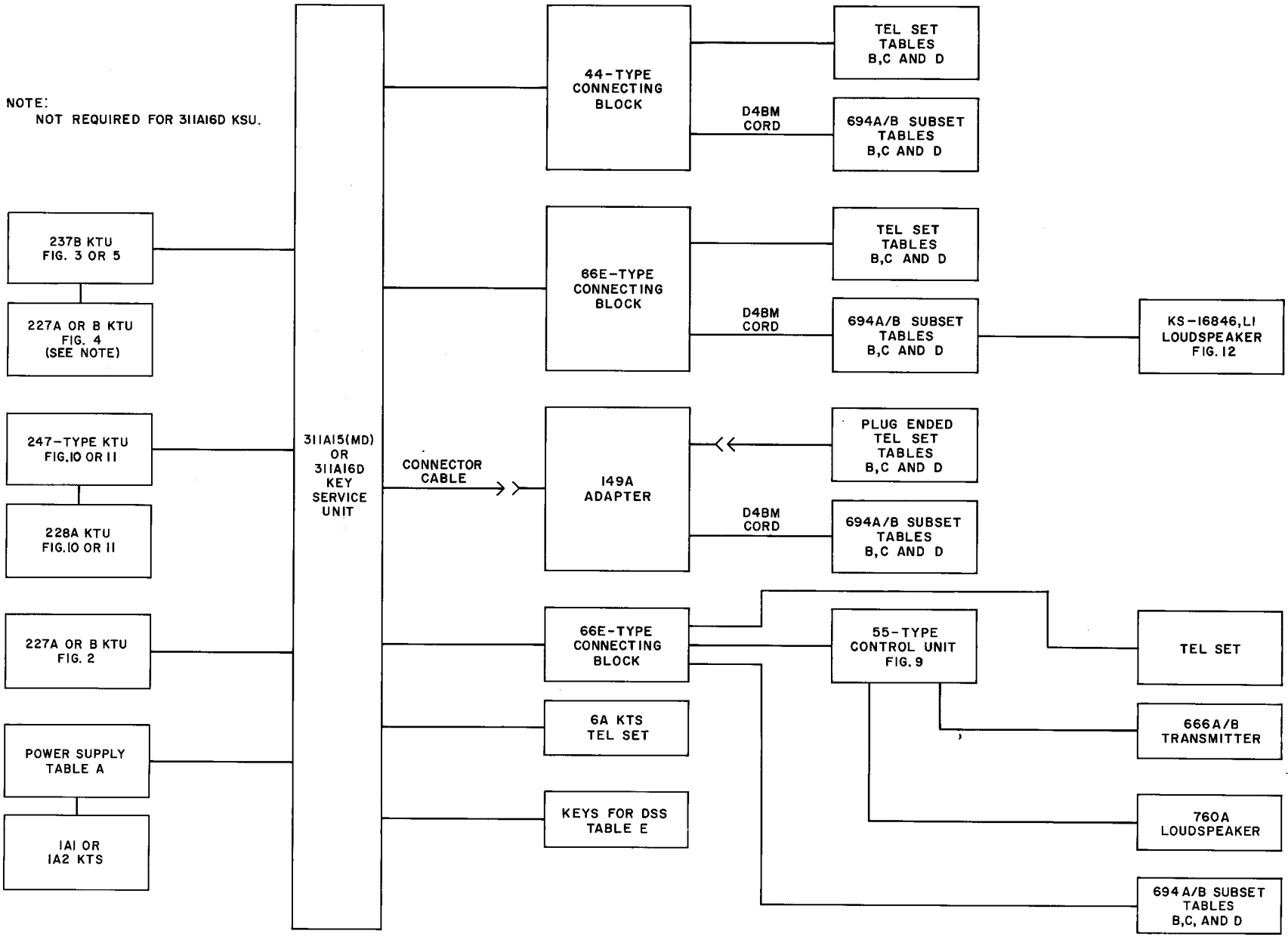
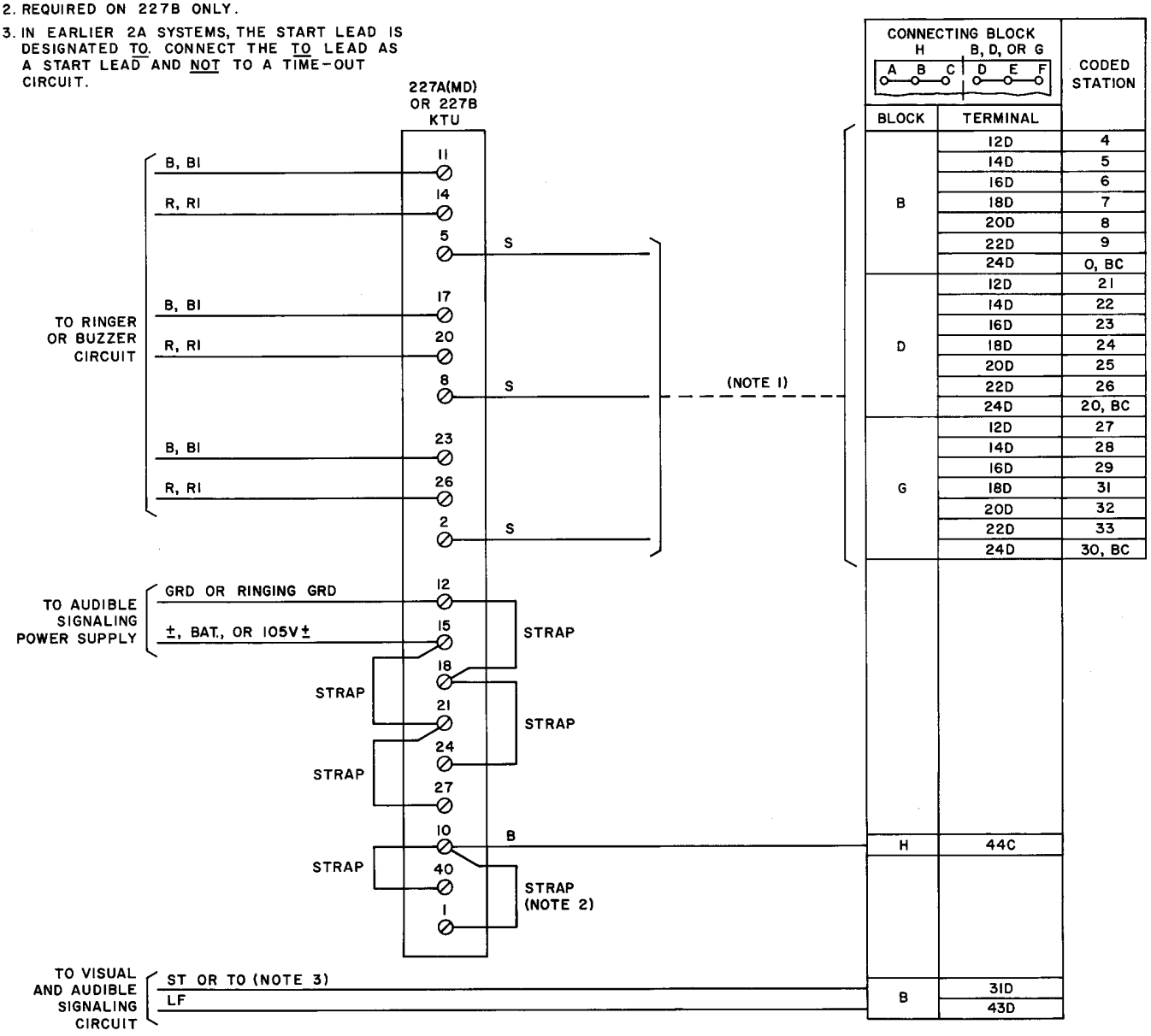


Fig. 1— Block Diagram of 2A System

NOTES:
1. CONNECT TO TERMINAL ASSOCIATED WITH STATION DESIRING AUDIBLE SIGNALING.
2. REQUIRED ON 227B ONLY.
3. IN EARLIER 2A SYSTEMS, THE START LEAD IS DESIGNATED TO. CONNECT THE TO LEAD AS A START LEAD AND NOT TO A TIME-OUT CIRCUIT.



BLOCK	TERMINAL	CODED STATION
B	12D	4
	14D	5
	16D	6
	18D	7
	20D	8
	22D	9
	24D	0, BC
D	12D	21
	14D	22
	16D	23
	18D	24
	20D	25
	22D	26
	24D	20, BC
G	12D	27
	14D	28
	16D	29
	18D	31
	20D	32
	22D	33
	24D	30, BC
H	44C	
B	31D	
	43D	

Fig. 2 — Connections for Audible and Visual Signaling

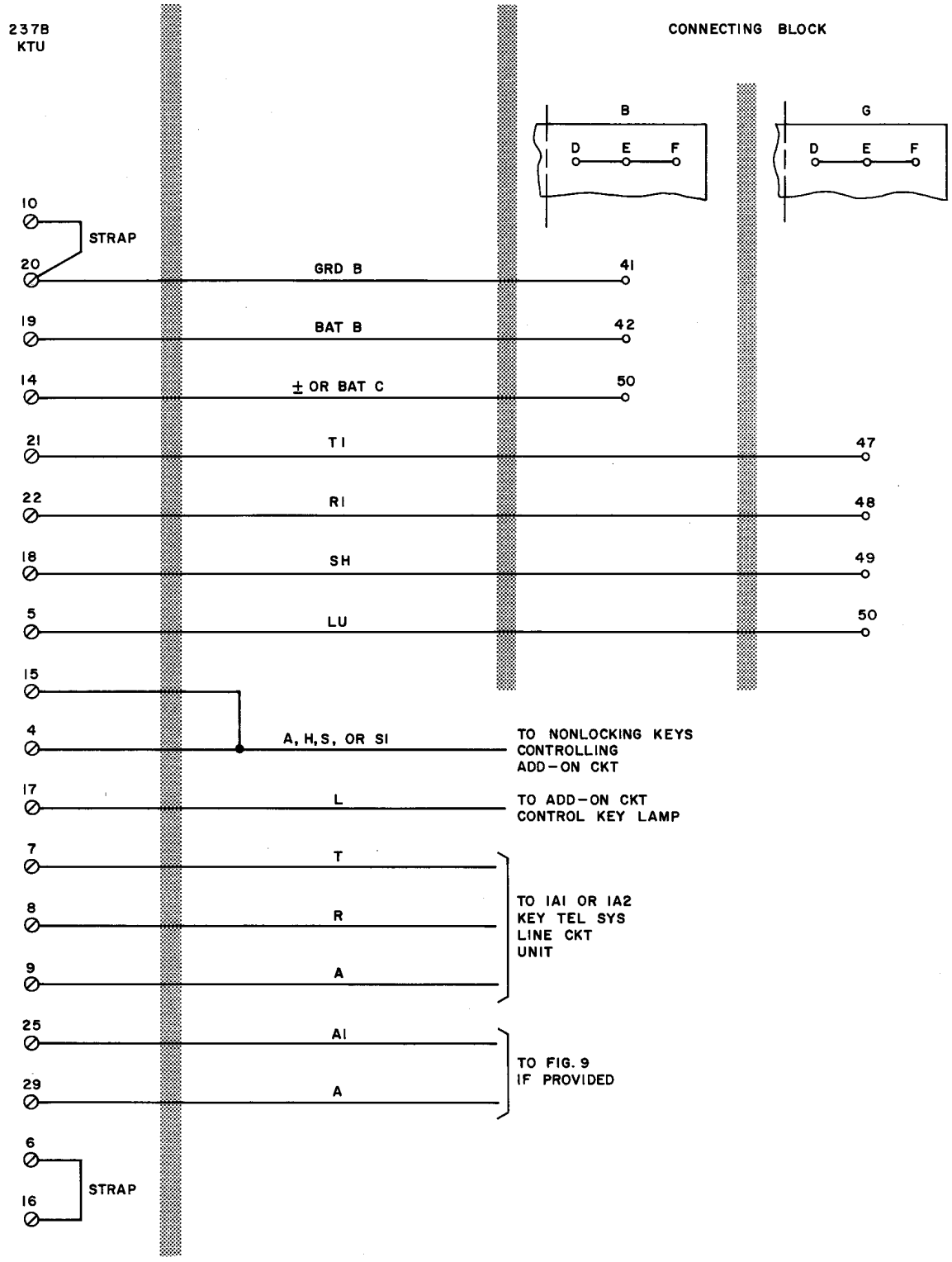
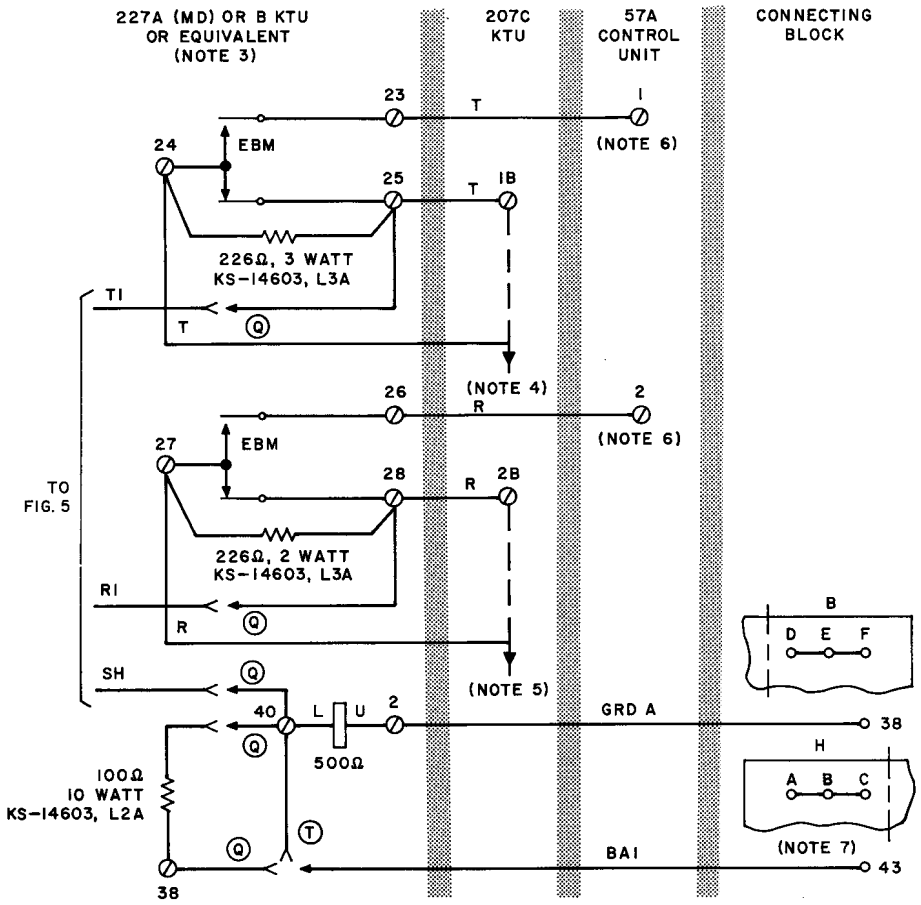


Fig. 3 — Connecting 237B KTU Add-On Circuit to 311A16D KTU

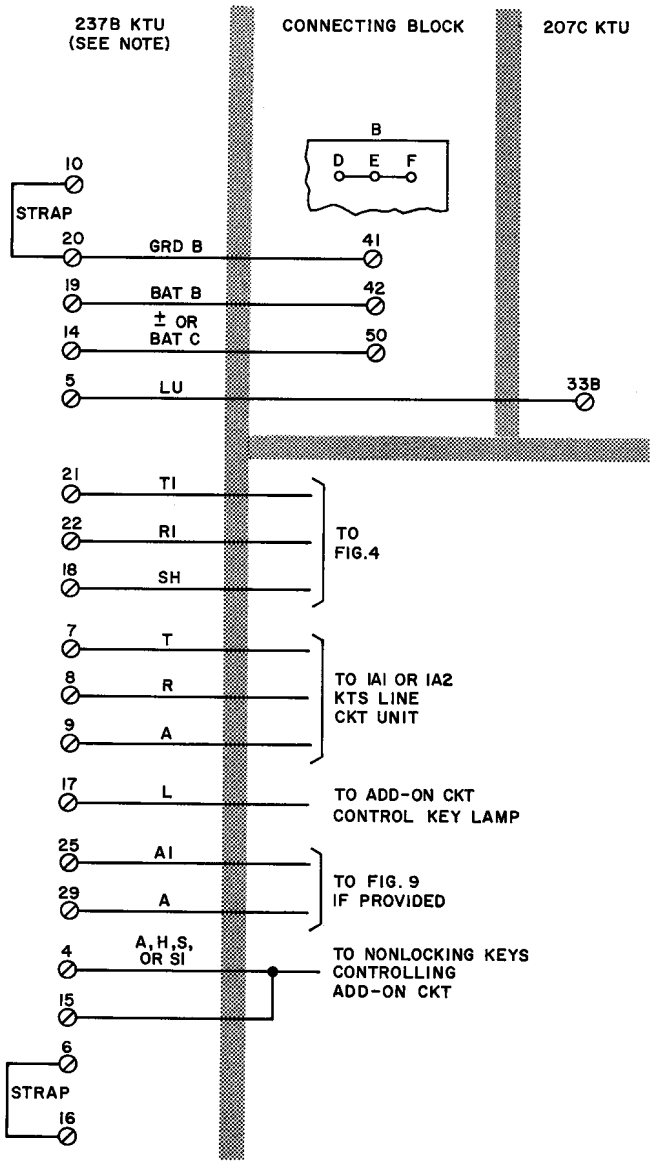


NOTES:

1. THIS MODIFICATION WILL CONVERT A 311A15 (MD) KSU TO BE ELECTRICALLY THE SAME AS A 311A16D KSU. THIS WILL PERMIT THE USE OF 253B KTUS FOR STATION EXPANSION WITHIN THE SYSTEM, AND ALSO THE USE OF 237B KTU (FIG. 5) FOR PROVIDING PBX ADD-ON CIRCUIT.
2. EXISTING 253A KTUS MUST ALSO BE MODIFIED (SEE FIG. 6) WHEN A 253B OR A 237B KTU IS ADDED TO THE SYSTEM.
3. UTILIZE A 227A (MD) OR B KTU, OR EQUIVALENT, TO PROVIDE CL RELAY. THE OTHER RELAYS ON THE 227-TYPE KTU MAY BE USED TO PROVIDE ADDITIONAL CIRCUITS.
4. REMOVE THREE T LEADS FROM TERM. IB OF 207C KTU, ADD WIRE TO LENGTHEN, AND CONNECT TO CL RELAY AS SHOWN. THE THREE WIRES CONNECT AT THE OTHER END, ONE TO EACH J2 CONN FOR 253-TYPE KTU, PIN 22.
5. REMOVE THREE R LEADS FROM TERM. 2B OF 207C KTU, ADD WIRE TO LENGTHEN, AND CONNECT TO CL RELAY AS SHOWN. THE THREE WIRES CONNECT AT THE OTHER END, ONE TO EACH J2 CONN FOR 253-TYPE KTU, PIN 47.
6. REMOVE AND TAPE LEADS CONNECTED TO TERMS. 1 AND 2 OF 57A CONTROL UNIT. CONNECT NEW LEADS FROM TERMS 1 AND 2 OF 57A TO THE CL RELAY AS SHOWN.
7. CONNECT BAI LEAD TO SPARE DI TERM. ON CONNECTING BLOCK H. THIS IS AN EQUIVALENT BAI TERM.

(Q) WITH PBX ADD-ON CIRCUIT FIG. 5
(T) WITHOUT PBX ADD-ON CIRCUIT.
– – – – DENOTES TO BE REMOVED.

Fig. 4 — Modification of 311A15 (MD) KSU to Provide 253B KTUs for Adding Stations or When 237B KTU Add-On Circuit is Provided



NOTE:
WHEN 237B KTU IS PROVIDED FOR 311A15(MD)KSU, MODIFY THE KSU PER FIG. 4 AND EXISTING 253A KTUS PER FIG. 6.

Fig. 5 — Connecting 237B KTU Add-On Circuit to 311A15 (MD) KSU

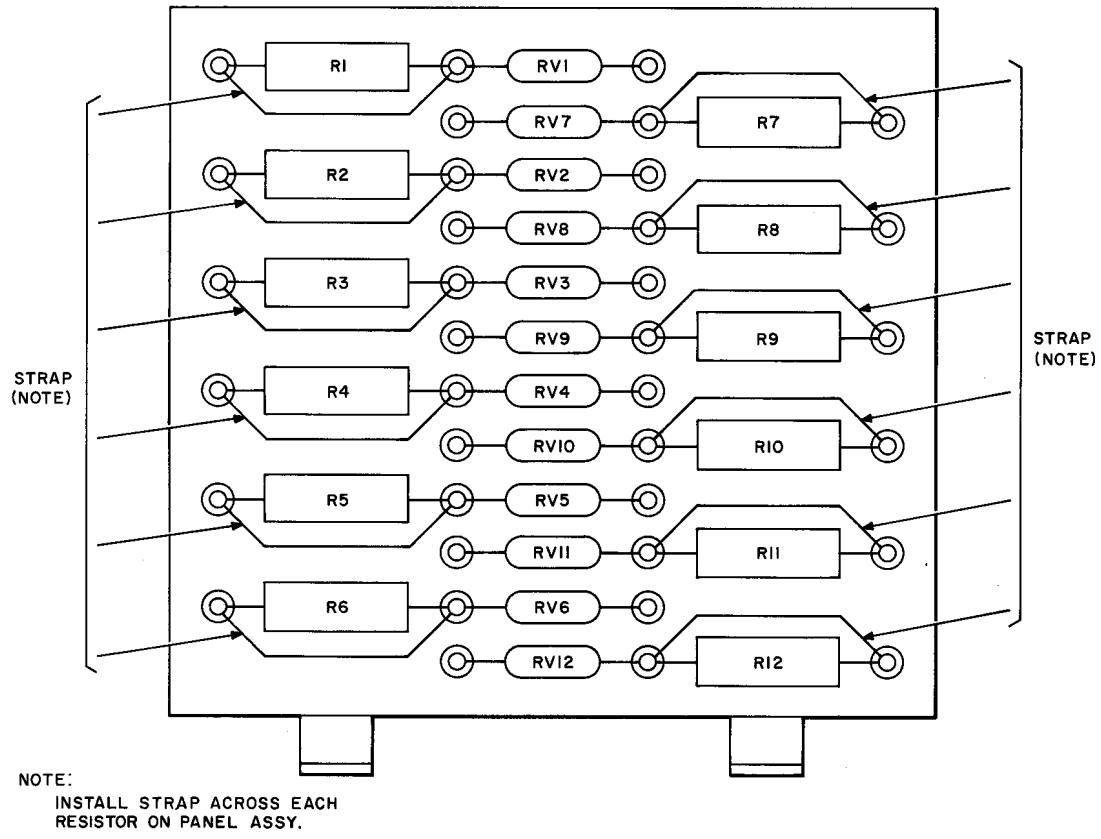


Fig. 6 — Modification of Existing 253A KTUs When Adding a 253B or 237B KTU to the System

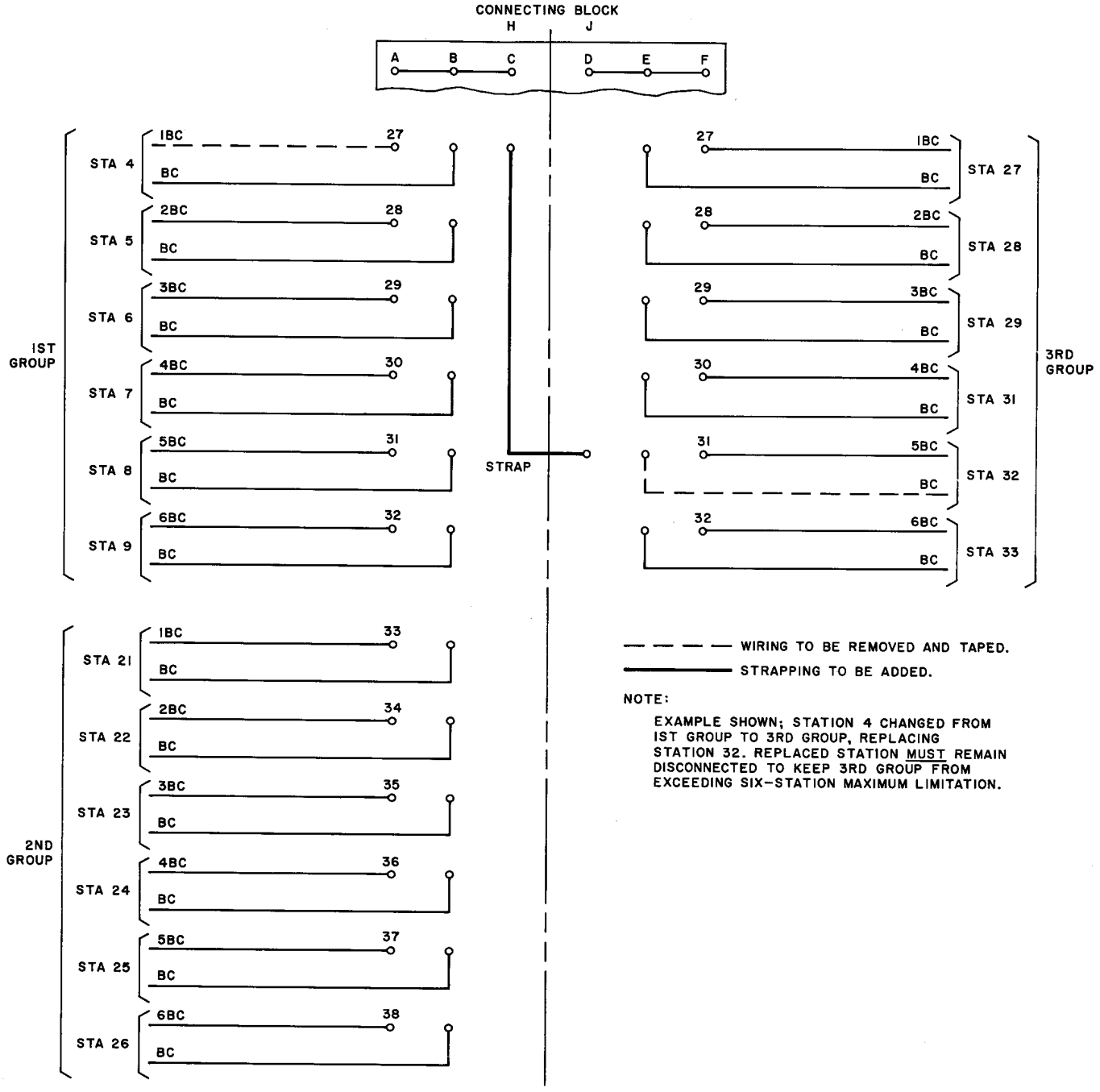


Fig. 7 — Changing an Assigned Station from One Conference Group to Another Group

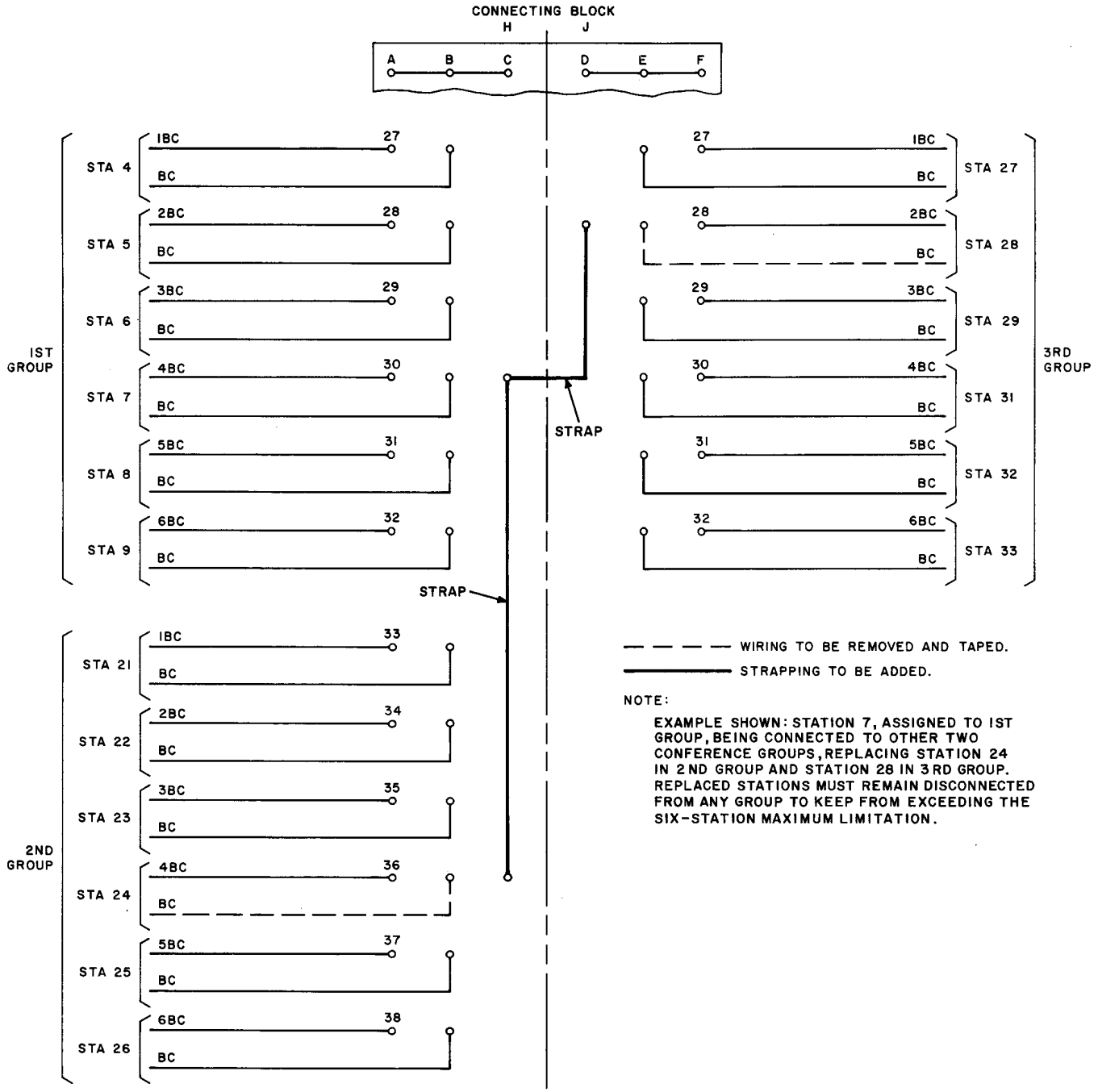
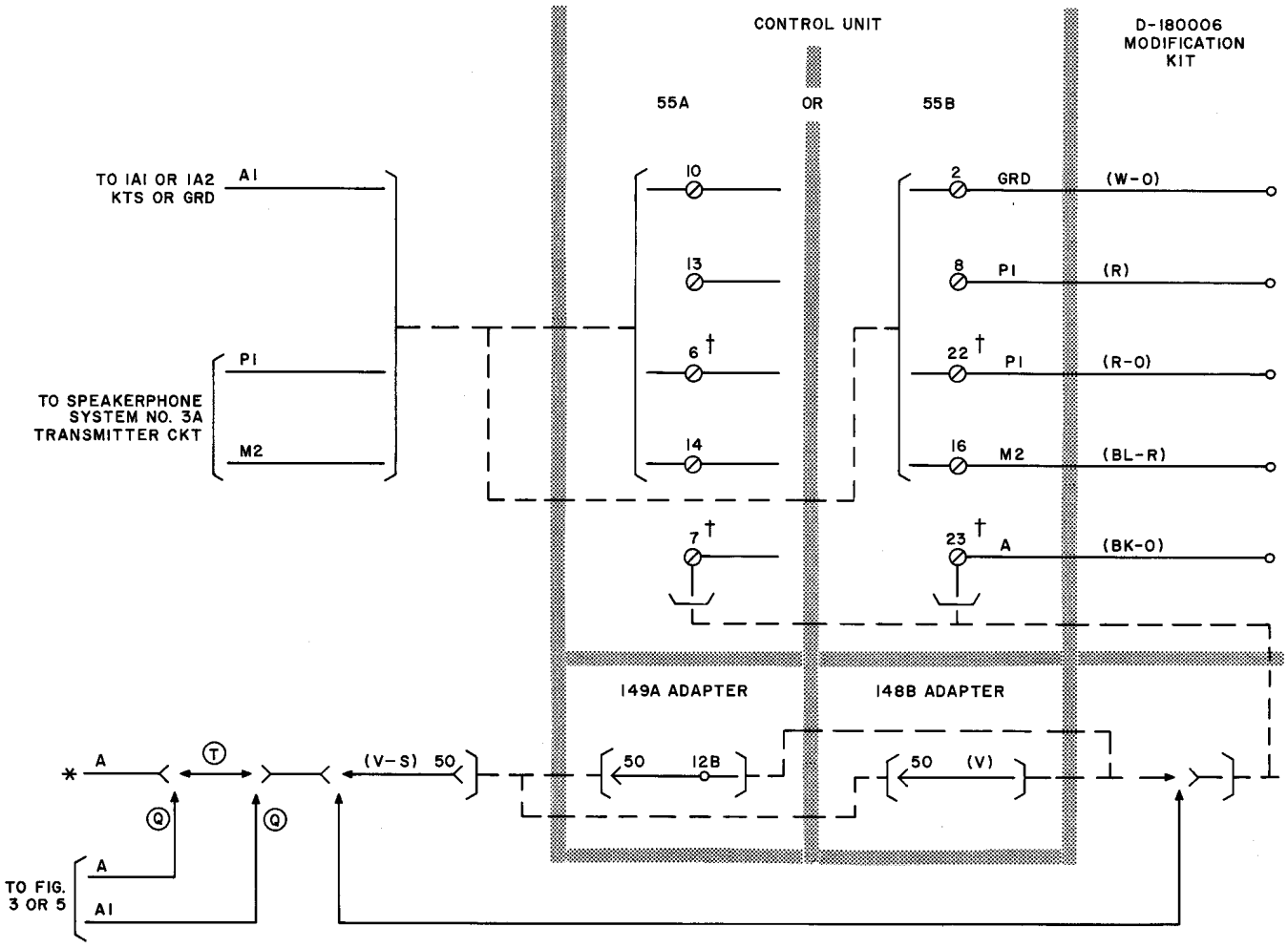


Fig. 8 — Connecting One Station to All Conference Groups



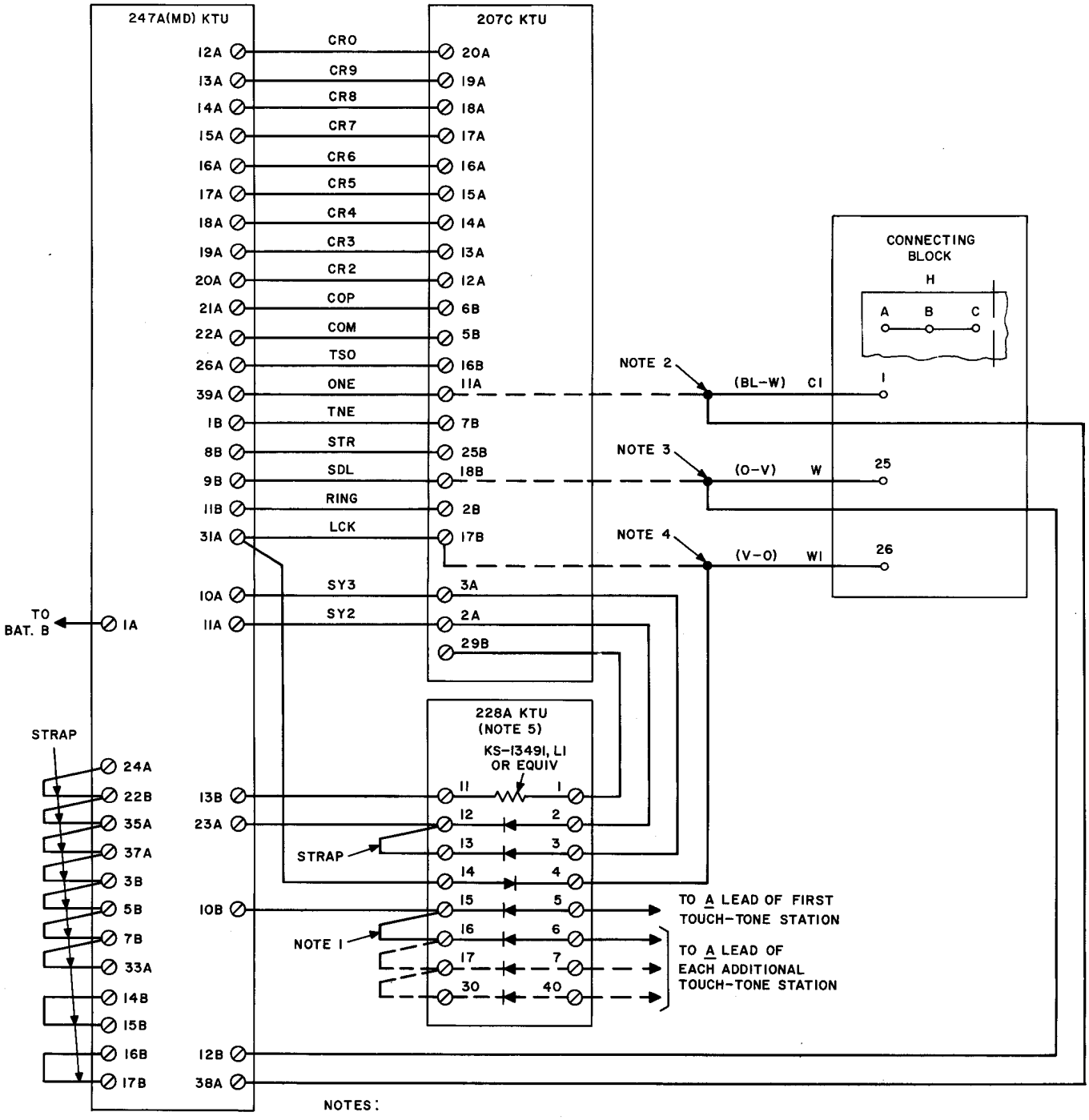
* CONNECT TO A LEAD TERMINAL OF THE STATION EQUIPPED WITH SPEAKERPHONE SYSTEM NO. 3A. SEE TABLES B,C, OR D FOR TERMINAL LOCATION.

† THE RINGER CUT OFF ASSOCIATED WITH THESE TERMINALS CANNOT BE USED

(Q) WHEN ADD-ON CIRCUIT (FIG. 3 OR 5) IS PROVIDED.

(T) WHEN ADD-ON CIRCUIT (FIG. 3 OR 5) IS NOT PROVIDED.

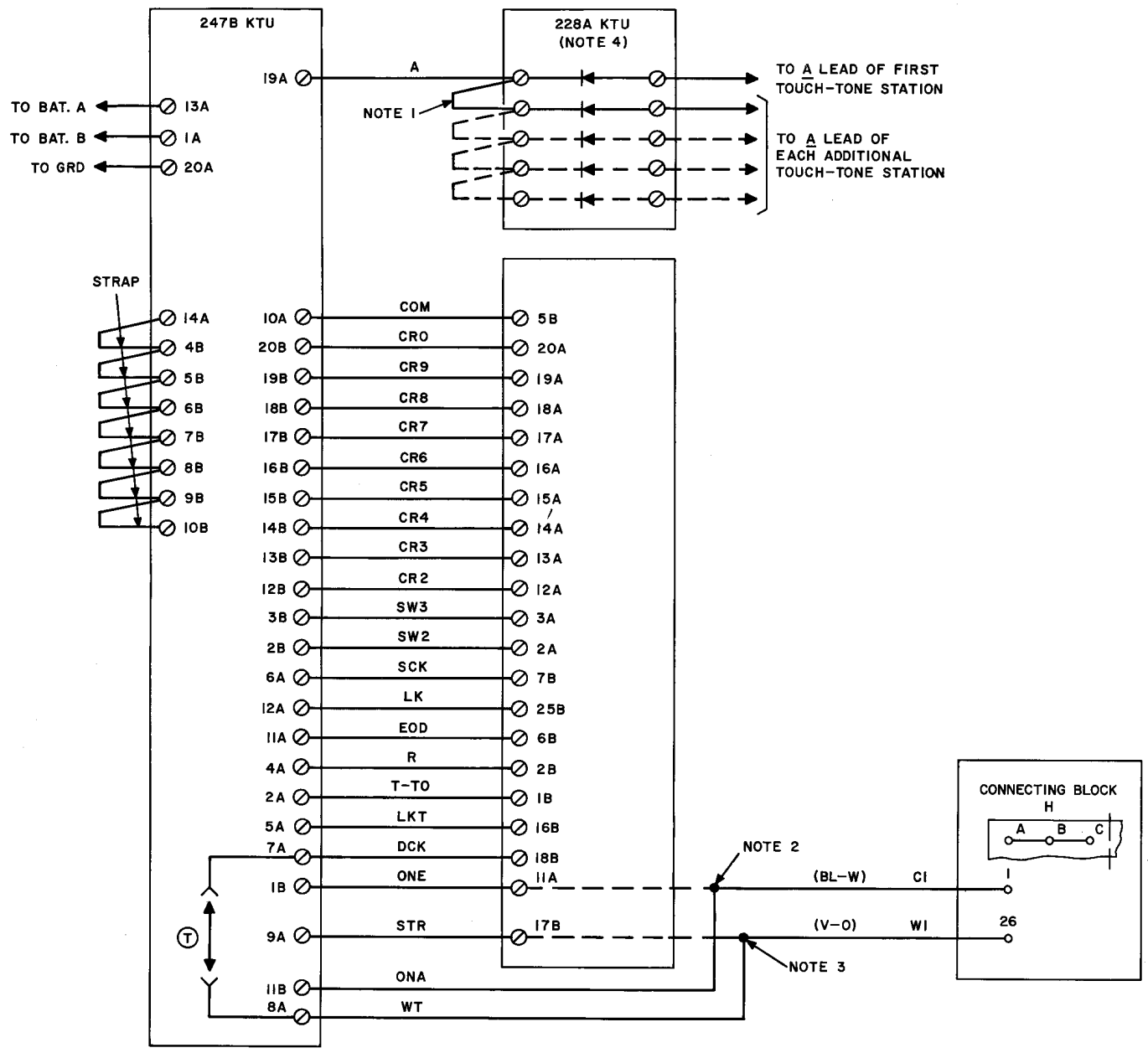
Fig. 9 — Modification of Associated 55-Type Control Unit When a Station is Equipped with 3-Type Speakerphone



NOTES:

1. ADD STRAP AND ONE DIODE FOR EACH ADDITIONAL TOUCH-TONE STATION.
2. DISCONNECT AND REMOVE BLUE-WHITE LEAD FROM TERMINAL 11A OF 207C KTU. SPLICE AS REQUIRED, AND CONNECT THE LEAD TO TERMINAL 38A OF 247A KTU.
3. DISCONNECT AND REMOVE ORANGE-VIOLET LEAD FROM TERMINAL 18B OF 207C KTU. SPLICE AS REQUIRED, AND CONNECT THE LEAD TO TERMINAL 12B OF 247A KTU.
4. DISCONNECT AND REMOVE VIOLET-ORANGE LEAD FROM TERMINAL 17B OF 207C KTU. SPLICE AS REQUIRED, AND CONNECT THE LEAD TO TERMINAL 4 OF 228A KTU.
5. ALL DIODES ARE 400J OR EQUIVALENT.

Fig. 10 — Modification of KSU to Provide TOUCH-TONE Dialing Using 247A (MD) KTU

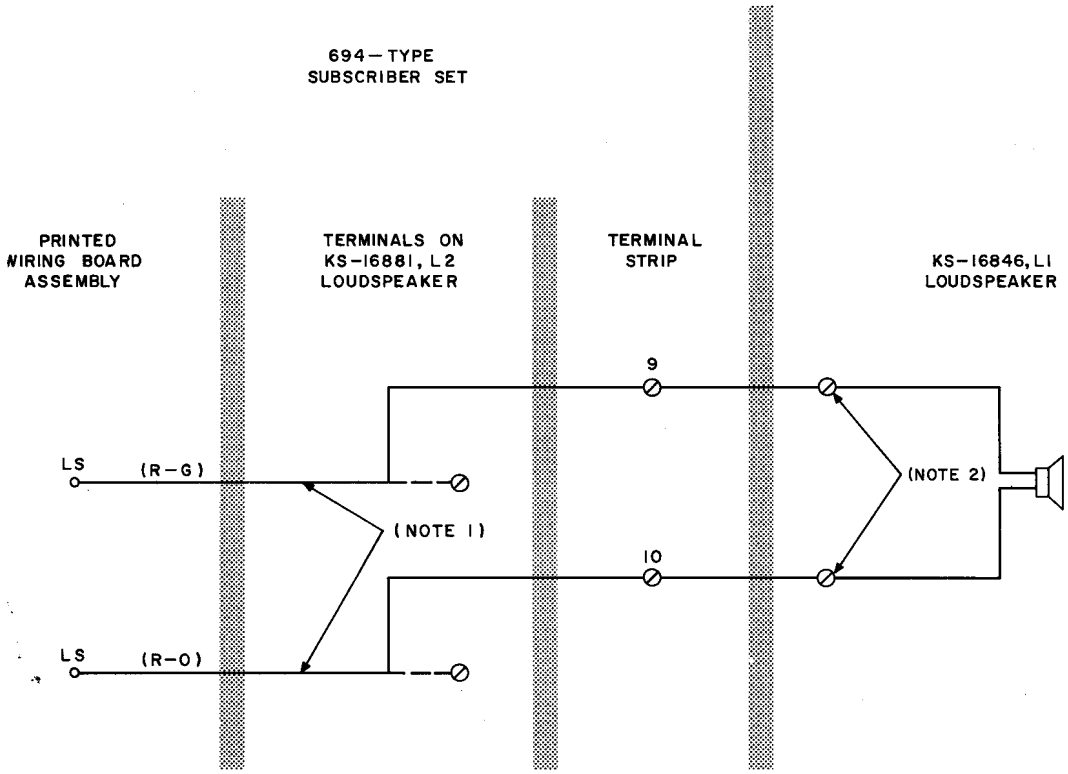


(T) LEAD IS REQUIRED WHEN A 216A KTU IS NOT PROVIDED.

NOTES:

1. ADD STRAP AND ONE DIODE FOR EACH ADDITIONAL TOUCH-TONE STATION.
2. DISCONNECT AND REMOVE BLUE-WHITE LEAD FROM TERMINAL 11A OF 207C KTU. SPLICE AS REQUIRED, AND CONNECT THE LEAD TO TERMINAL 11B OF 247B KTU.
3. DISCONNECT AND REMOVE VIOLET-ORANGE LEAD FROM TERMINAL 17B OF 207C KTU. SPLICE AS REQUIRED, AND CONNECT THE LEAD TO TERMINAL 8A OF 247B KTU.
4. ALL DIODES ARE 400J OR EQUIVALENT.

Fig. 11 — Modification of KSU to Provide TOUCH-TONE Dialing Using 247B KTU



NOTES:

1. REMOVE LEADS FROM TERMINALS ON KS-16881, L2 LOUDSPEAKER AND CONNECT LEADS TO TERMINALS 9 AND 10.
2. ADD APPROVED WIRING, BY SPLICING OR USING D-TYPE CONNECTORS, TO LEADS PROVIDED BY KS-16846, L1 LOUDSPEAKER, TAPE, AND CONNECT TO TERMINALS 9 AND 10.

Fig. 12 — Connections for KS-16848, List 1 External Loudspeaker

694180

3. MAINTENANCE

(a) Refer to the following as an aid in locating and clearing trouble:

- CD- and SD-69480-01 (311A15 (MD) and 311A16D KSU)
- CD- and SD-69447-01, Section 518-310-113 } 247A (MD) KTU
- CD- and SD-69529-01, Section 518-310-114 } 247B KTU
- CD- and SD-69532-01 (57B Control Unit)

(b) ***Replaceable Apparatus*** (refer to ordering guide in Section 512-534-100 for ordering nomenclature and color).

- 694-type subscriber set
- 66B3-50 connecting blocks
- 117A cover
- 57B control unit
  P-28E322 printed wiring board
  P-28E323 printed wiring board
  P-28E324 printed wiring board
- 207C KTU
- 252-type KTU
- 253-type KTU
- 216B KTU
- KS-16846, L1 loudspeaker
- 227-type KTU
- 237B KTU
- 247A (MD) KTU
  P-48F439 printed wiring board
  P-48F442 printed wiring board
  P-48F445 printed wiring board
- 228A KTU
- 247B KTU
  No. Y1 through Y5 circuit packs

(c) ***311A15 (MD) or 311A16D KSU***

(1) Limit activity involving KSU to:

- Tracing wiring trouble
- Replacement of defective component KTUs

(2) Connecting block H-J provides:

- Option strapping points
- Test points for checking circuit continuity

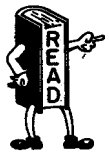
(3) 57-Type control unit:

- Operating battery is under control of the 253-type KTU over the ***BA1*** lead.
- Verify trouble within one of the three plug-in circuit boards by interchanging suspected board with good one.
- Replace defective board and/or return it for repairs.

(d) ***Station Components***

(1) Replace defective station sets.

(2) Check to ensure that wiring of 694-type subscriber set is properly terminated.



Reversal of M1 and M2 leads will cause low microphone output. Any deviation from proper installation rules outlined in Section 512-534-100 Part 3(a)(1) should be reported to the immediate supervisor.

(e) ***Optional KTUs Associated With KSU***

(1) Ensure that the various optional KTUs (227-type, 228A, 237B, and 247-type) are properly positioned and terminated.

(2) Refer to separate sections for detailed maintenance information on these units.

(f) ***Radio Interference***

(1) Interference from commercial AM (.55 to 1.6 MHz) or FM (88 to 109 MHz) broadcast stations may be experienced when the system is installed in vicinity of a transmitting station.

- Interference most frequently encountered is audible program material from station loudspeaker or handset receiver.
- Extreme interference may cause analysis of system voice switching characteristics and will result in loss of transmission or reception.

(2) When interference is encountered from AM stations, perform following steps in sequence until interference is eliminated or reduced to an acceptable degree.

- Install a 0.01 μf disc capacitor KS-16048, L4 directly across the microphone terminals or terminals 6 and 7 of the 694-type subscriber set.
- Install an additional 0.01 μf disc capacitor KS-16048, L4 across terminals 1 and 2 of the subscriber set.
- Install a 0.02 μf capacitor KS-13814, L7 across terminals C and F of the telephone set network.
- Any additional steps, to reduce interference picked up in telephone sets, as outlined in Section 500-150-100.

(3) When interference is encountered from FM stations, perform either or both of the following steps in addition to, or in place of, steps outlined in (2):

- Remove 694A or B subscriber set from each station at which interfering signal is audible and replace it with a 694C or D type.

  Note: The 694C or D is the result of a distributing house modification which includes capacitors properly positioned on the printed wiring board of the subscriber set circuitry.

- Replace telephone sets equipped with 425B, E, or G networks with sets equipped with 425J networks. This is a distributing house modification, refer to Section 500-150-100.