KEY SERVICE UNITS

501 AND 502 TYPES

CONNECTIONS

1.00 GENERAL

1.01 The figures and tables in this section provide connecting information at the key service unit (KSU) location. Descriptive information on these units of the 1A2 key telephone system is covered in the section entitled Key Service Units, 501 and 502 Types, Identification.

1.02 A block diagram outlining major components of the 501 and 502 KSUs is shown in Fig. 1. Key telephone sets designed for "A" lead control must be used with these KSUs. Refer to the appropriate sections for connecting information for station sets, separately mounted keys, cable distribution facilities, etc.

1.03 All 501- and 502-type KSUs are equipped with two 66-type connecting blocks. The 502 types are equipped with a section of A75A connector cable. Conductors of this cable, not connected by the factory, may be terminated as necessary on the job. Cabling to be connected on the 66-type blocks should terminate on available clips, from left to right on blocks "A" and "C" and from right to left on block "D" (see Fig. 2 and 3). Use a 714-type tool for terminating wires. The clip terminal layout of the 66-type blocks is shown in Fig. 3. Only one wire connection should be made per clip. This may be either looped through or terminated as required.

1.04 KSUs have aluminum tapes applied to the 66-type connecting blocks. The tape is applied initially as one continuous strip and covers all slots in the fanning strip. Before fanning the wires, prior to placement in the slots, slide the cutting edge of the 714 tool over the tape at each slot location. This weakens the tape so that the wires can be easily inserted into the slots without disturbing the separated tape sections on the fanning strip.

Once the tape is cut, only a small surface area remains adhering between the slots to hold the designation in place. Therefore, when removing wires, care should be taken to prevent the designation sections from being pulled loose.

1.05 The 400A key telephone units (KTUs) in these KSUs are equipped with nine spring clips to facilitate a number of circuit options. Strapping of the clips may be changed by using (see Fig. 8A, 8B, and 8C) long-nose pliers for removing or reterminating wire in the clips. Use 24 gauge wire (stripped of insulation at each end) for this purpose.

1.06 Index to figures and tables:

Table A - Arrangement of features and leads on block "A" showing A25B connector cable connections.

Table B - Arrangement of features and leads on block sections "C" and "D".

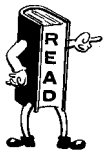
Table C - Connections of A75A connector cable to 66B1-25 connecting block.

Table D - Wiring options.

Table E - Procedure for disconnecting leads in the 565HDR telephone set.

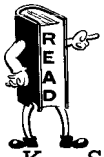
2.00 CONNECTIONS

2.01 KSUs can be obtained with or without a power plant. When power is not part of the package, wire to an external power supply from the 66B3-50 connecting block section "D" (see Table B and Fig. 5).



When using the 101G power plant (J86731 series), provide a separate supply for each KSU. Do not furnish power to other equipment from this source.

2.02 Interrupter common control leads may be extended from their multiple appearances on the "D" block to other 501 and/or 502 KSUs of the same key telephone system (see Table B). When this is done, remove interrupter(s) from all but one of the 501 and/or 502 KSUs.



Do not exceed 20 lamps per line circuit multiple, or 50 lamps per KS-19175, List 1 interrupter contact.

Key Service Units, 501 Type

2.03 Terminate key or running cables on connecting blocks "A" and "C". Terminate incoming lines on block "D". See Tables A and B for features, lead designations, and terminal numbers on connecting blocks. Also, Table A shows pair and pin assignment of circuit features for 25-pair connector cables. The conductors of connector cables should be terminated in sequence as shown in Fig. 2.

2.04 Field addition of a 207C KTU to a package not originally so equipped can be accomplished by using previously placed factory wiring and connecting as shown in Fig. 7.

Key Service Units, 502 Type

2.05 A factory supplied length of A75A connector cable is connected to block "A" as follows (see Table C):

- Blue-white binder (connector 1) to clip 1.
- Orange-white binder (connector 2) to clip 2.
- Green-white binder (connector 3) to clip 3.

Each 50-contact KS-16690, List 1 connector will provide for:

- Line pickup and hold features.
- Dial intercommunicating line.
- Visual signals for line and intercom circuits.
- Common audible signal circuits.
- Audible signaling for intercom lines.

See Tables A, B, and C for features, lead designations, and connections.

2.06 Some pairs in each binder group of the A75A connector cable are not factory terminated. These pairs may be used for dial intercommunicating codes, audible signal leads, and common audible control leads by connecting them to the proper vacant terminals on connecting block "C".

2.07 Plug-ended 6-button telephone sets may be connected directly to each connector of the A75A connector cable. Also they may be installed at a distance from the KSU by means of B25A connector cables and bridging adapters, etc, placed between the KSU and the plug-ended stations as needed.

2.08 Table C shows factory terminations of the A75A connector cable which connects lines 1 through 4 in each of its three 50-contact connectors. When more than 4 line circuits are equipped in the KSU and are to be served through the A75A connector cable, rearrange the wiring as required on the clip terminal blocks. (Refer to Tables A and C.) For example: each station in a system is to pick up lines 1, 2, and 3 plus the dial intercom line. In addition, line 4 is to appear at the first station, line 5 at the second, and line 6 at the third.

Arrangement of wiring at the 66-type blocks could be as follows:

- Connector 1 (blue-white binder) - No change.
- Connector 2 (orange-white binder) - Move wires from line 4 (clip 2) to line 5 (clip 1).
- Connector 3 (green-white binder) - Move wires from line 4 (clip 3) to line 6 (clip 1).

2.09 Connect additional key or running cables as needed to available clips not occupied by connector cable leads (see Fig. 2). See Tables A and B for features, lead designations, and connections to terminals on connecting blocks.

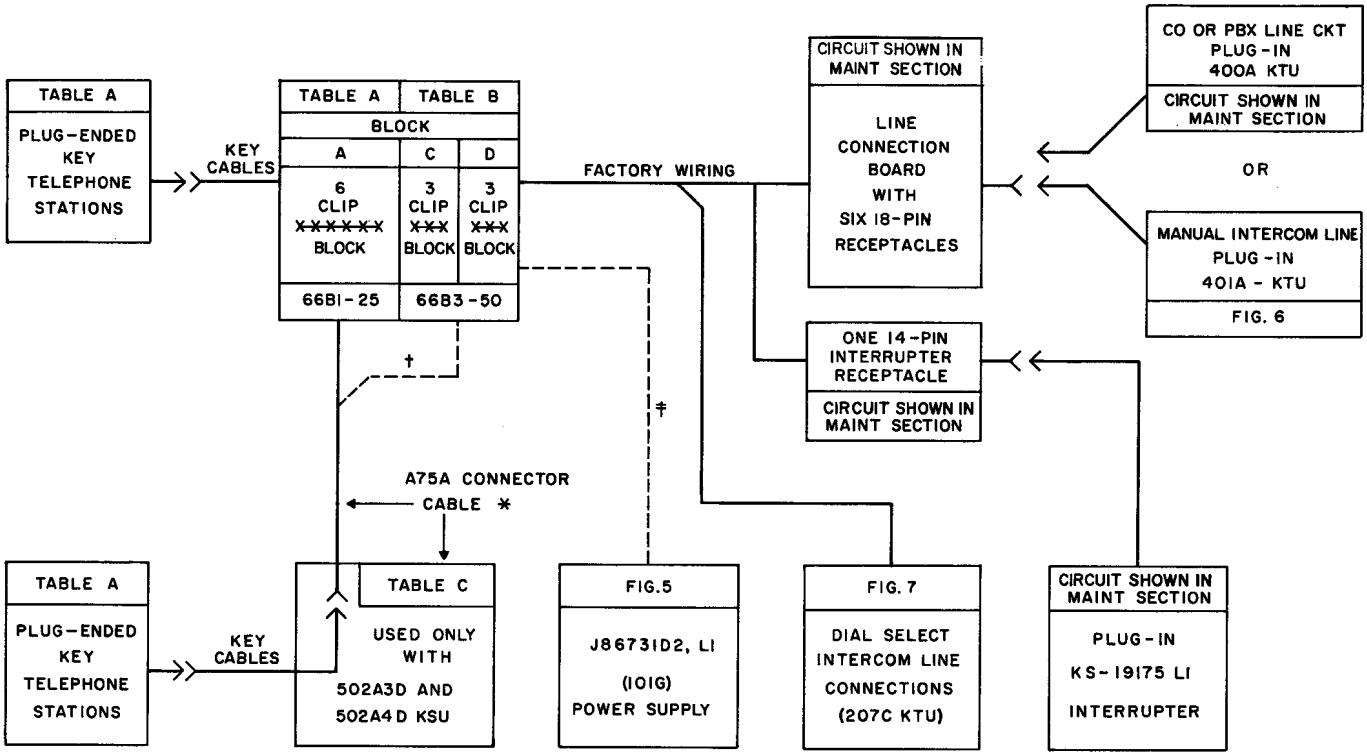
2.10 Fig. 4 shows an arrangement for connecting dial-intercommunicating signal leads and for extending stations by means of a 3-way bridging adapter, etc. The 66E3-25 connecting block also may be used for this purpose.

2.11 Exclusion and speakerphone leads in the 565HDR telephone sets must be disconnected, taped, and stored when two or more of these sets are connected in multiple through bridging adapters. This is necessary to avoid interference with working circuits. Proceed as in Table E.

Manual Intercommunicating Circuit

2.12 Manual intercom talking battery supply tip and ring leads (as needed) must be strapped on connecting block "D", as shown in Fig. 6.

2.13 Fig. 9 shows a pushbutton arrangement for signaling when manual intercom is provided. Normally vacant clip terminals are used for this purpose as necessary.



* FACTORY SUPPLIED A75A CONNECTOR CABLE IN 502A3D AND 502A4D KSU(S) ONLY.

† FEATURES TO BE USED AS NEEDED IN SPARE CABLE PAIRS.

‡ SHOP WIRED IN 501A4, 501A4D, AND 502A4D KSU(S) TO INTERNALLY MOUNTED FACTORY EQUIPPED POWER SUPPLY. FOR OTHER 501 AND 502 KSU(S), THIS WIRING MUST BE RUN TO A LOCALLY PROVIDED POWER SUPPLY AT THE TIME OF INSTALLATION.

Fig. 1 - 501 and 502 Key Service Units, Block Diagram

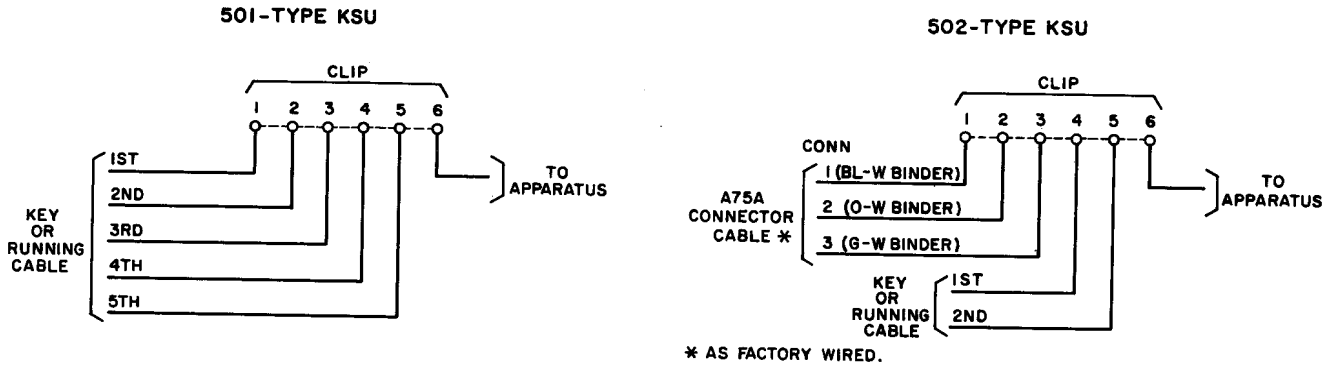


Fig. 2 - Key or Running Cable Termination on 66B1-25 Connecting Block (Block "A")

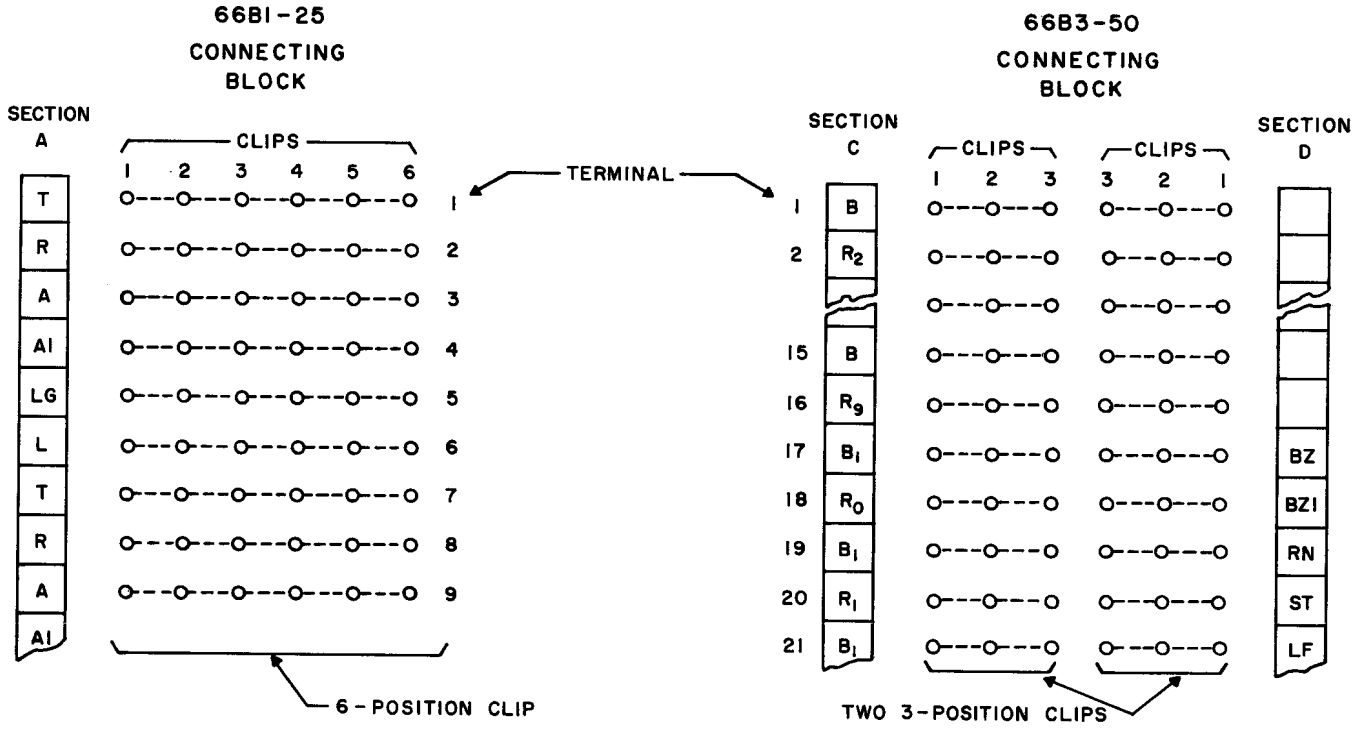
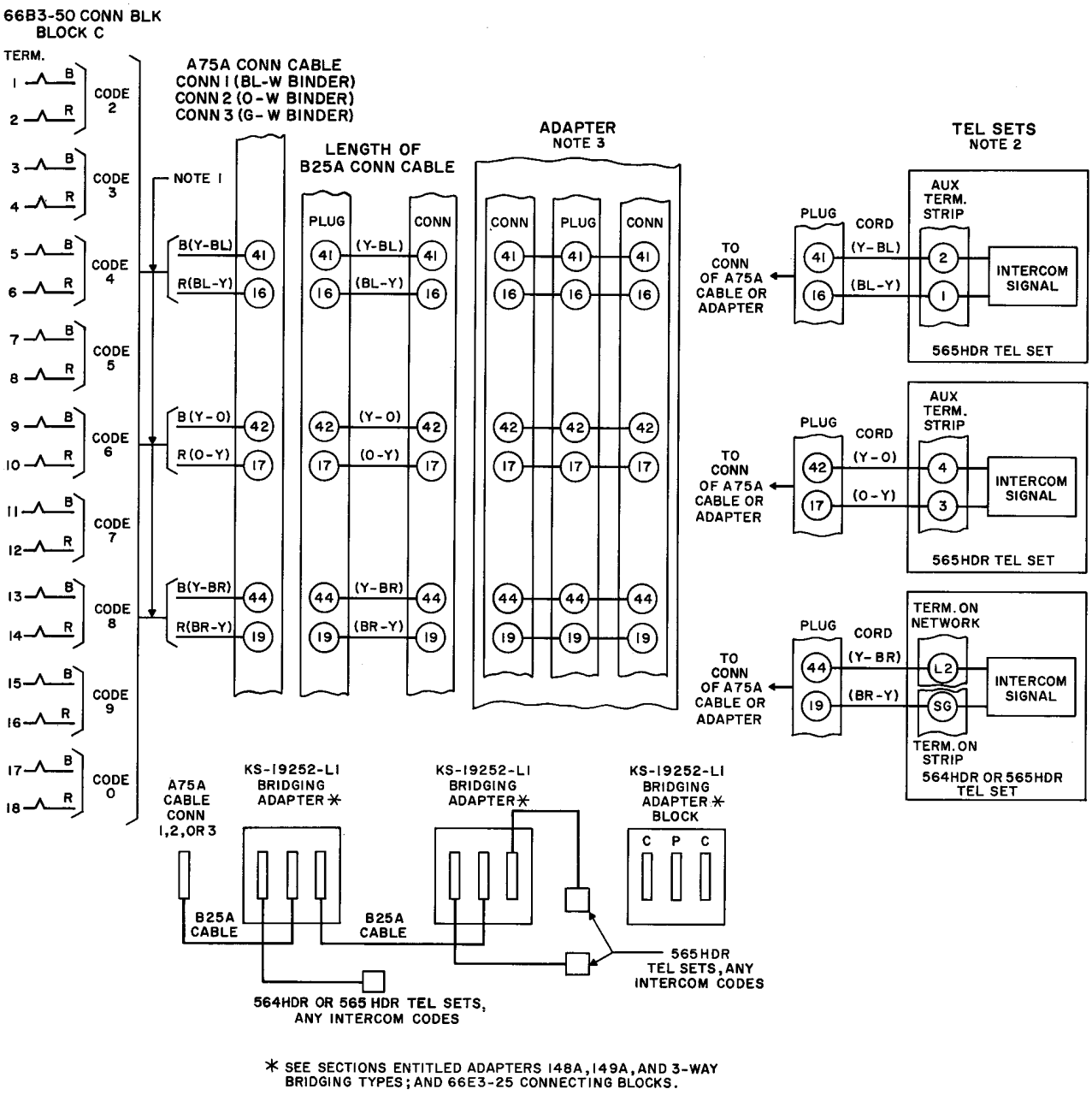


Fig. 3 - 501 and 502 KSU Clip Terminal Layout of 66B1-25 and 66B3-50 Connecting Blocks



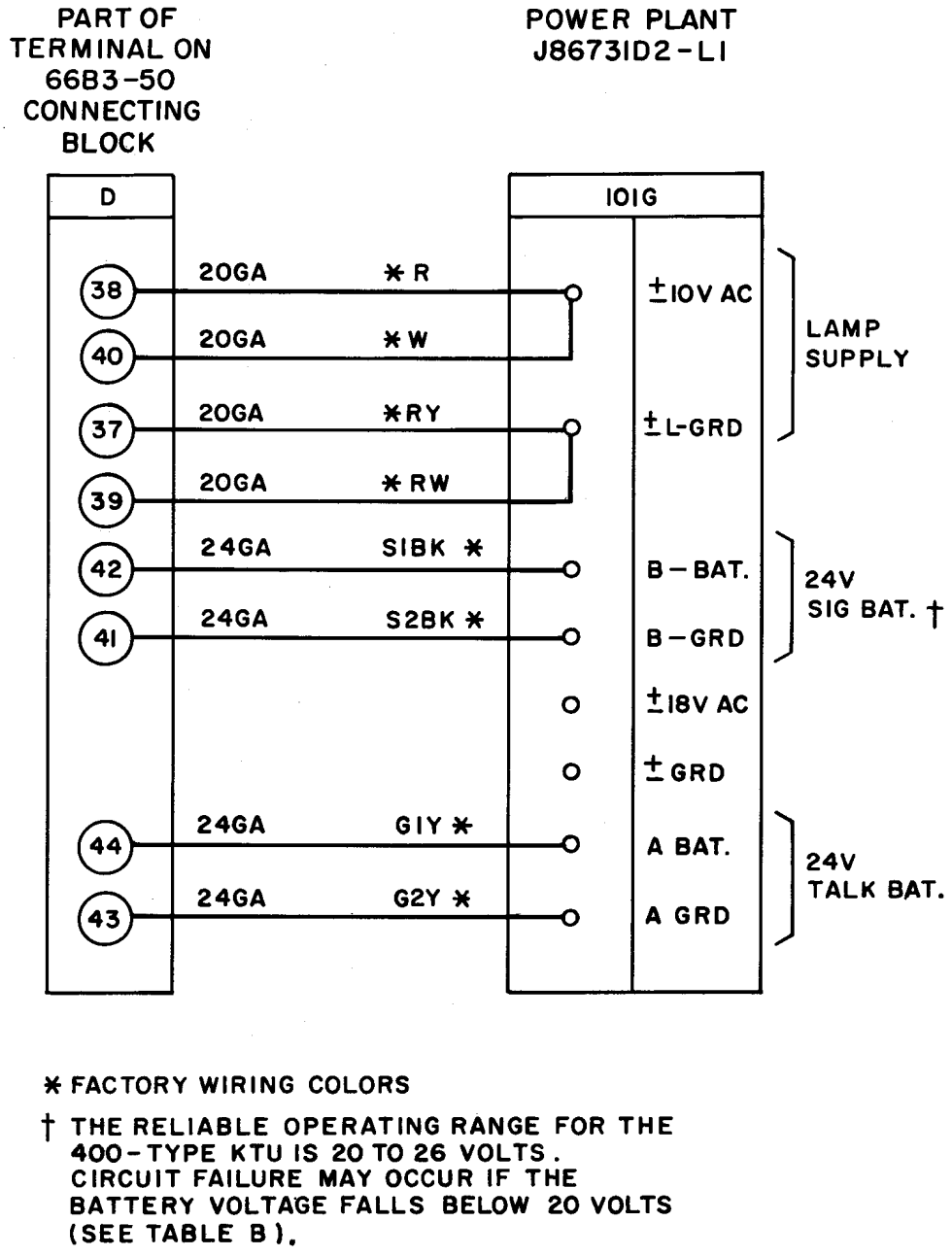
* SEE SECTIONS ENTITLED ADAPTERS 148A, 149A, AND 3-WAY BRIDGING TYPES; AND 66E3-25 CONNECTING BLOCKS.

NOTE 1: THESE PAIRS ARE DEAD-ENDED AT CONNECTING BLOCK. CONNECT AS REQUIRED.

NOTE 2: WHEN TWO OR MORE 565HDR TELEPHONE SETS ARE MULTIPLED THROUGH ADAPTERS, THE EXCLUSION AND SPEAKERPHONE LEADS INSIDE THE TELEPHONE SETS MUST BE DISCONNECTED, TAPED, AND STORED. SEE TABLE E.

NOTE 3: ADAPTERS MAY BE MULTIPLED, AS SHOWN, TO PROVIDE MORE THAN TWO INTERCOMMUNICATING CODES PER CONNECTOR OF THE A75A CONNECTOR CABLE.

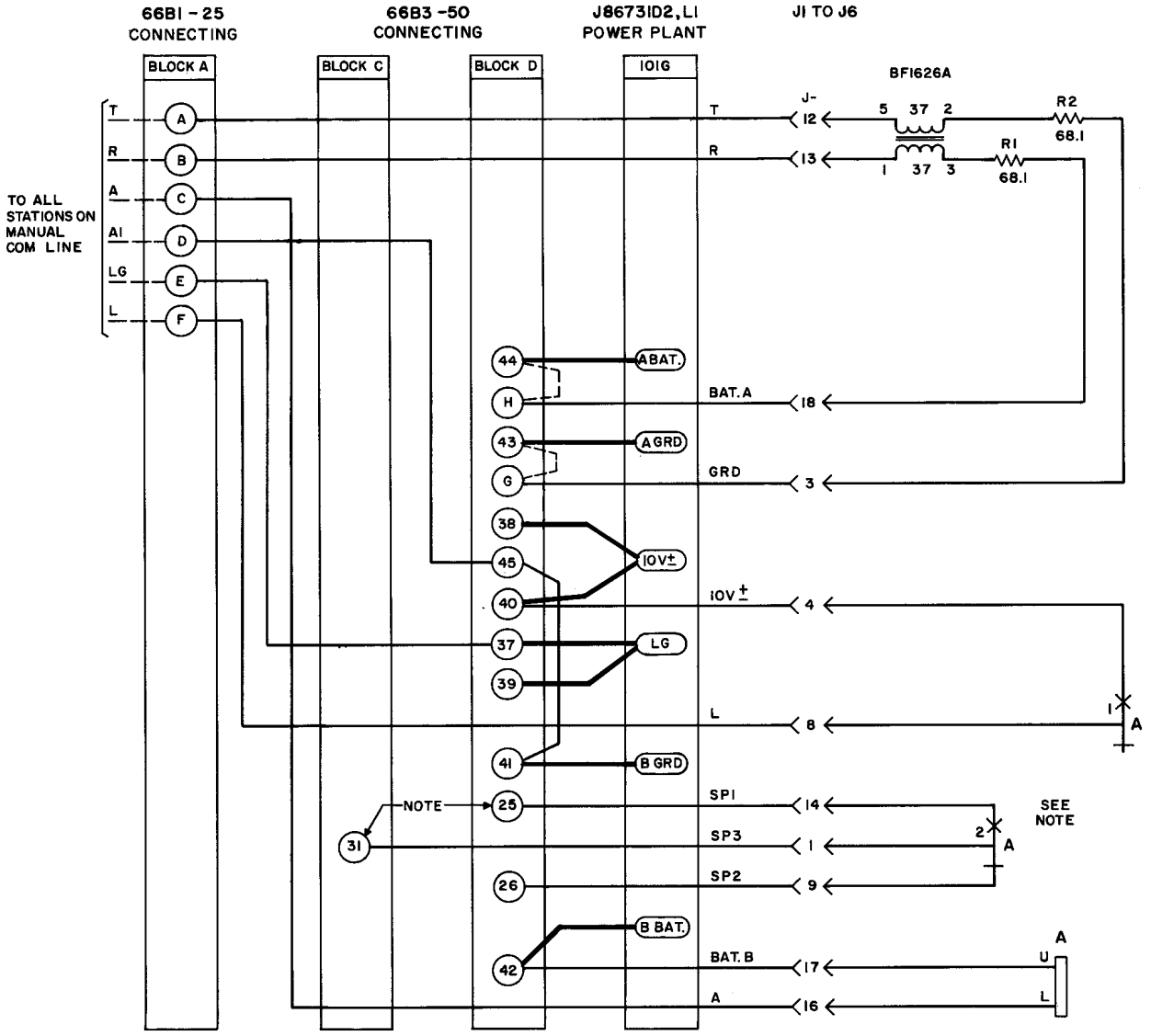
Fig. 4 - Suggested Intercommunicating Signal Connections Using Plug-Ended Telephone Sets



* FACTORY WIRING COLORS

† THE RELIABLE OPERATING RANGE FOR THE 400-TYPE KTU IS 20 TO 26 VOLTS. CIRCUIT FAILURE MAY OCCUR IF THE BATTERY VOLTAGE FALLS BELOW 20 VOLTS (SEE TABLE B).

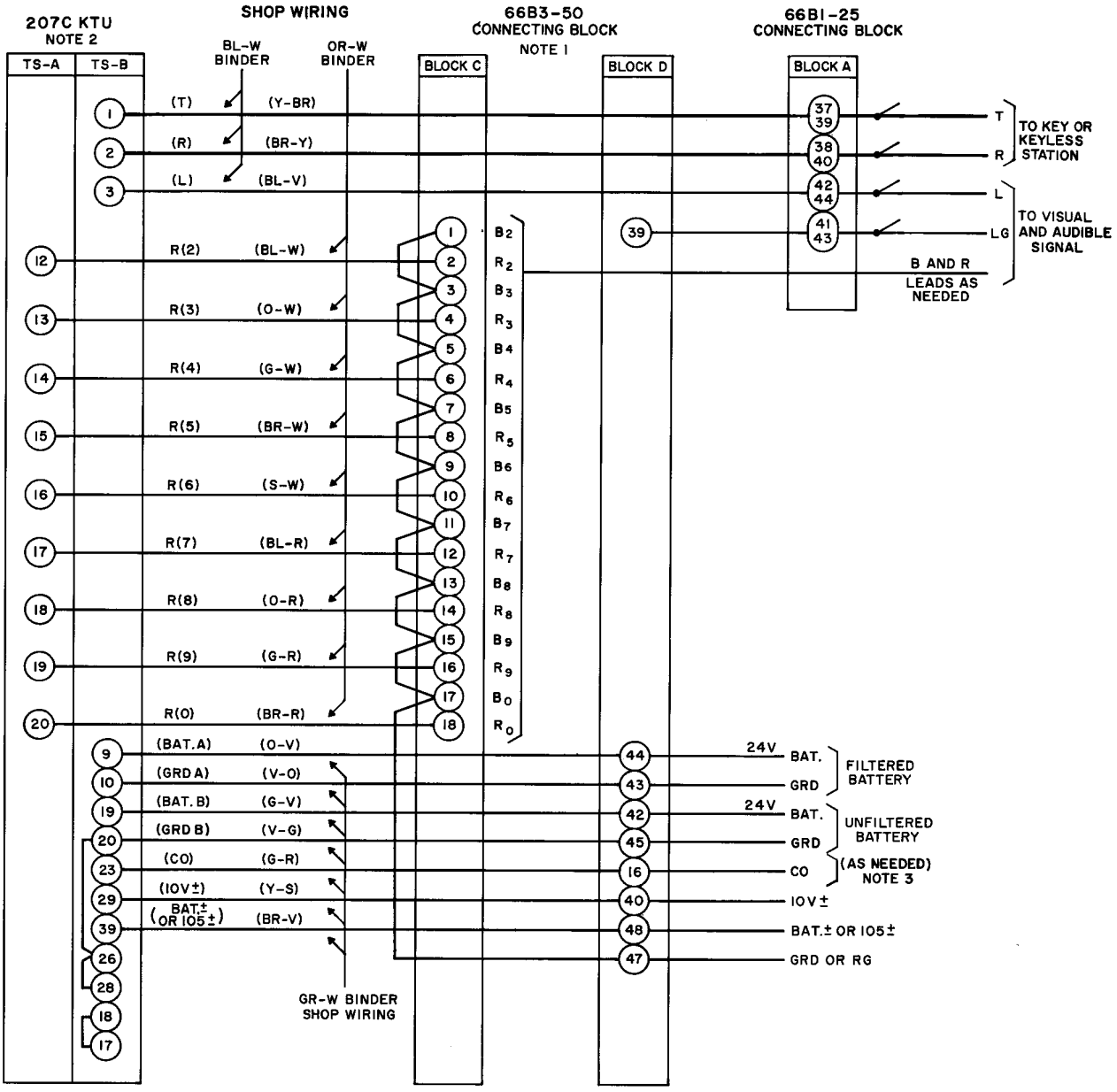
Fig. 5 - 501 and 502 Key Service Units Power Supply Connections



NOTE: MAKE CONTACT NUMBER 2 OF THE "A" RELAY MAY BE USED TO CONTROL TIME-OUT OF A 1A1 SYSTEM. CONNECT GROUND TO CLIP TERMINAL 25 ON BLOCK D AND EXTEND CLIP TERMINAL 31 ON BLOCK C TO THE 1A1 SYSTEM CO LEAD. BOND THE SEPARATE POWER SUPPLY GROUNDS WITH A NUMBER 14 OR EQUIVALENT GROUND WIRE.

REF DESIG	J1		J2		J3		J4		J5		J6	
	CONNECTING BLOCK											
	A	D	A	D	A	D	A	D	A	D	A	D
(A)	1		7		13		19		25		31	
(B)	2		8		14		20		26		32	
(C)	3		9		15		21		27		33	
(D)	4		10		16		22		28		34	
(E)	5		11		17		23		29		35	
(F)	6		12		18		24		30		36	
(G)		1		3		5		7		9		11
(H)		2		4		6		8		10		12

Fig. 6 - 501 and 502 Connections of Manual Intercommunicating Line Unit - 401A KTU in Any Jack Position



NOTE 1: THESE LEADS ARE SHOP WIRED IN ALL 501 AND 502 KEY SERVICE UNITS.

NOTE 2: SHOP-WIRED AS SHOWN WHEN 207C KTU IS INCLUDED AS PART OF PACKAGE. WHEN NOT FACTORY-SUPPLIED THESE LEADS WILL BE FOUND TAPED AND STORED. A 207C KTU MAY BE ADDED IN THE FIELD TO A KSU THAT IS NOT FACTORY EQUIPPED. USE EXISTING COLOR CODED WIRING; ADD STRAPPING AS SHOWN.

NOTE 3: THE CO LEAD MAY BE USED TO CONTROL TIME-OUT OF A 1A1 SYSTEM. CONNECT CLIP TERMINAL 16 (CO LEAD) OF CONNECTING BLOCK D TO PUNCHING 37 OF THE 232 A/B KTU IN THE 1A1 KTS. BOND THE SEPARATE POWER SUPPLY GROUNDS WITH A NUMBER 14 OR EQUIVALENT GROUND WIRE.

Fig. 7 - 501 and 502 KSU Connections of Dial-Select Intercommunicating Line

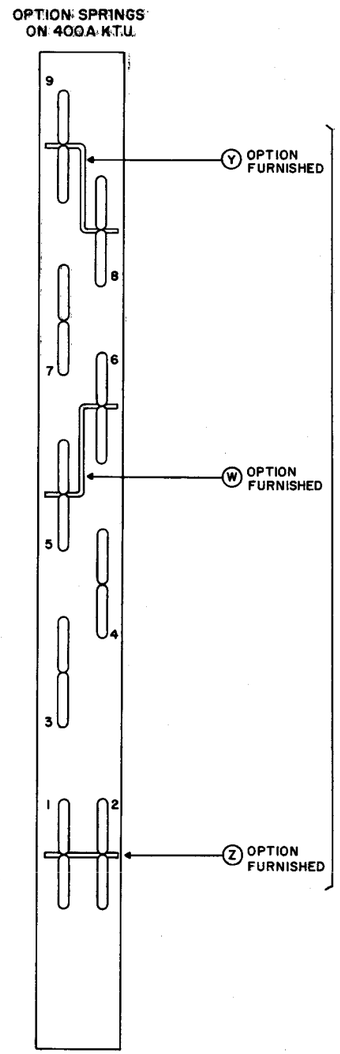


FIG. 8A

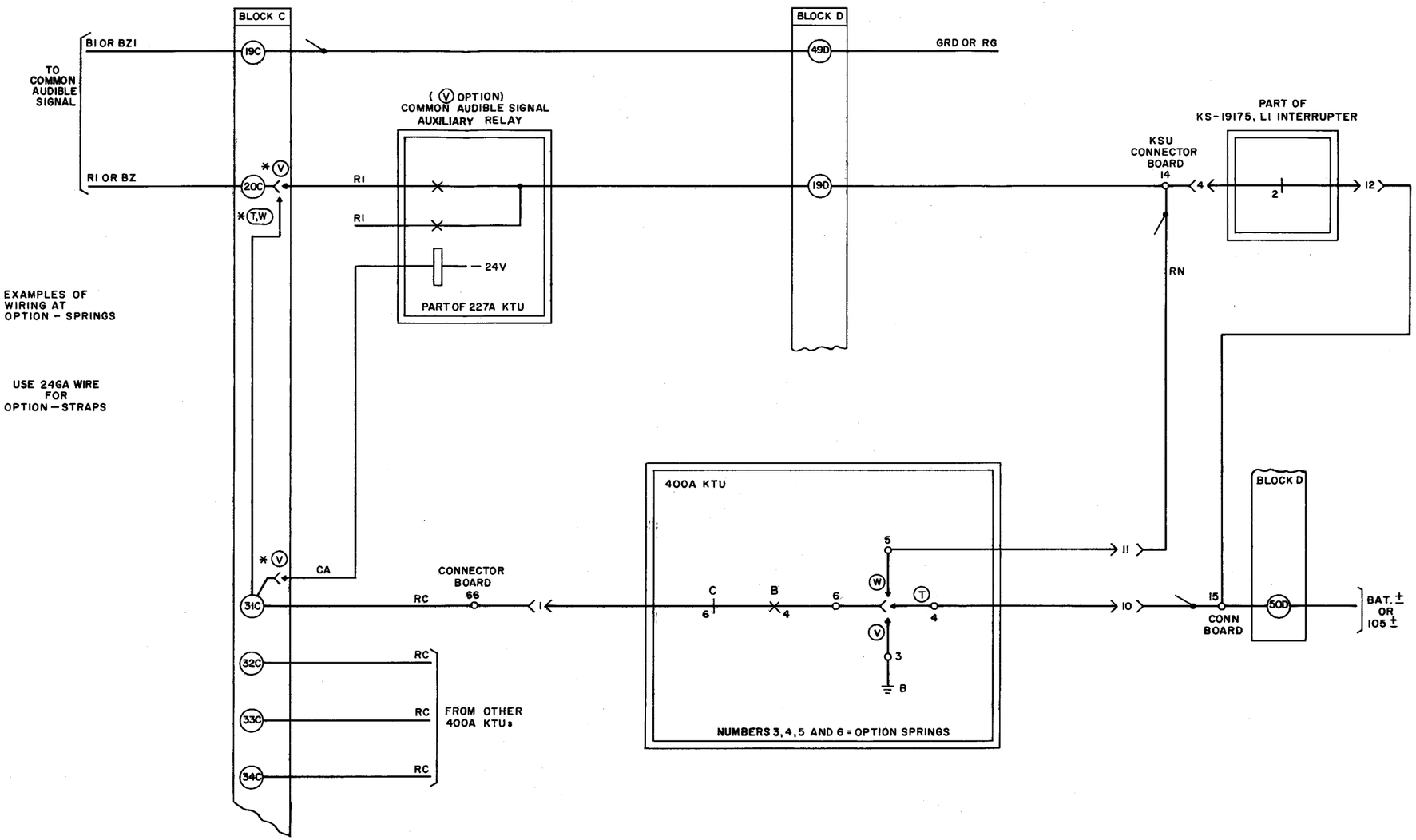


FIG. 8B

* SEE FIG. 8C AND TABLE B.

Fig. 8A and 8B - 501 and 502 KSU Example of Wiring Options T, V, and W

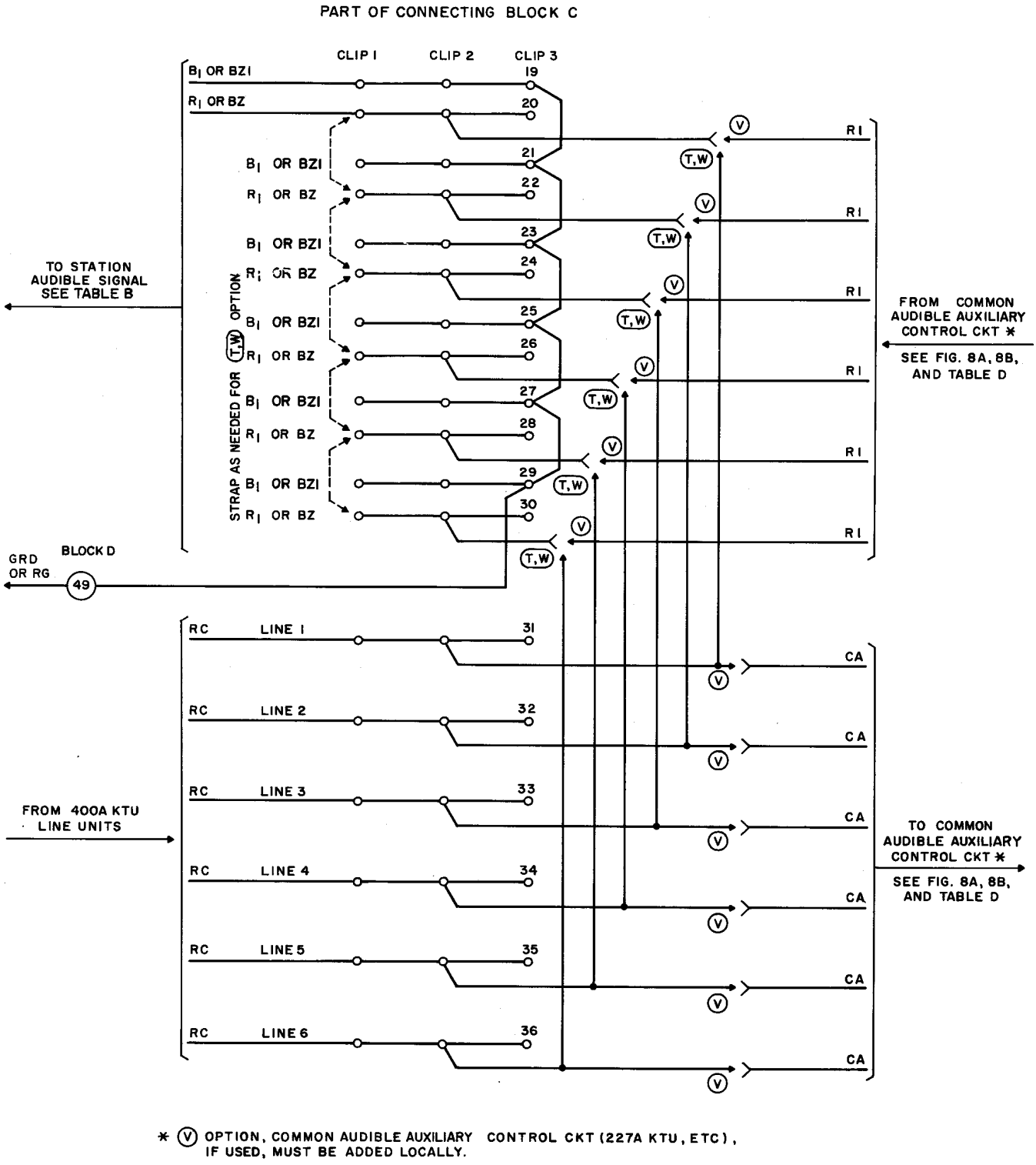


Fig. 8C - 501 and 502 KSU Example of Common Audible Connections

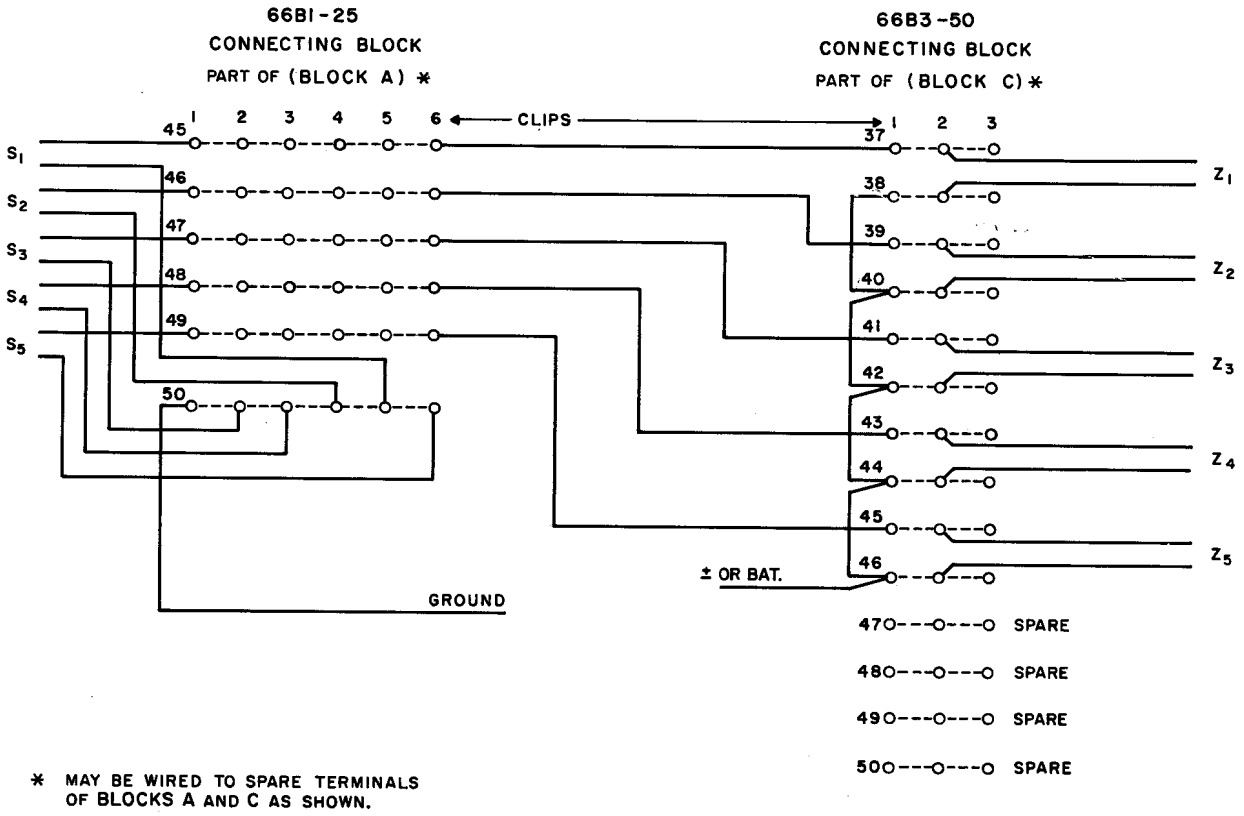


Fig. 9 - 501 and 502 KSU Connections for 5-Station Button and Buzzer System

TABLE A

501 AND 502 KSU LEAD DESIGNATIONS OF
A25B CONNECTOR CABLE AND 66-TYPE CONNECTING BLOCKS

A25B Connector Cable					66B1-25 Connecting Block "A" Arrangement of Features and Designations Shop-Wired								
Feature	Lead Desig	Pin No.	Cable Color		Feature	Lead Desig	Term. Row	Clip 1	2	3	4	5	6
Line 1	T	26	W-BL		Line 1	T	1						
	R	1	BL-W			R	2						
	A	27	W-O			A	3						
	A1	2	O-W			A1	4						
	LG	28	W-G			LG	5						
	L	3	G-W			L	6						
Line 2	T	29	W-BR		Line 2	T	7						
	R	4	BR-W			R	8						
	A	30	W-S			A	9						
	A1	5	S-W			A1	10						
	LG	31	R-BL			LG	11						
	L	6	BL-R			L	12						
Line 3	T	32	R-O		Line 3	T	13						
	R	7	O-R			R	14						
	A	33	R-G			A	15						
	A1	8	G-R			A1	16						
	LG	34	R-BR			LG	17						
	L	9	BR-R			L	18						
Line 4	T	35	R-S	Connect key or running cables as required.	Line 4	T	19	‡	‡	‡	‡	‡	Shop-wired to apparatus †
	R	10	S-R			R	20						
	A	36	BK-BL			A	21						
	A1	11	BL-BK			A1	22						
	LG	37	BK-O			LG	23						
	L	12	O-BK			L	24						
Dial Intercom	T	38	BK-G										
	R	13	G-BK										
Spare*		39	BK-BR		Line 5	T	25						
		14	BR-BK			R	26						
Dial Intercom	LG	40	BK-S			A	27						
	L	15	S-BK			A1	28						
Spare*		41	Y-BL			LG	29						
		16	BL-Y			L	30						
		42	Y-O		Line 6	T	31						
		17	O-Y			R	32						
		43	Y-G			A	33						
		18	G-Y			A1	34						
		44	Y-BR			LG	35						
		19	BR-Y			L	36						
Com Aud	B1 or BZ1	45	Y-S	Connect as required to Table B (see Fig. 8A, 8B, and 8C).	Dial Selective Intercom Line§	T	37						
	R1 or BZ	20	S-Y			R	38						
Spare*		46	V-BL			T	39						
		21	BL-V			R	40						
		47	V-O			LG	41						
		22	O-V			L	42						
		48	V-G			LG	43						
		23	G-V			L	44						
		49	V-BR	Use spare pairs. Connect as required for button and buzzer circuits. See Fig. 9 and Table B.	Spare see Fig. 9		45						
		24	BR-V				46						
		50	V-S				47						
		25	S-V				48						
							49						
							50						

* Dead-end and store at connecting blocks. Leave sufficient length to reach any clip terminal in package.

† Shop wiring from apparatus is terminated on clip 6, block "A".

‡ Terminate key or running cables from left to right on available clips as required.

§ Dial intercom line furnished in "D" suffixed KSU only.

TABLE B

501- AND 502-TYPE KSU
ARRANGEMENT OF FEATURES AND LEAD DESIGNATIONS
FOR THE 66B3-50 CONNECTING BLOCK

66B3-50 Connecting Block													
Left Half Block "C"						Right Half Block "D"							
	Lead Desig	Term. Row	Clip 1	Clip 2	Clip 3	Clip 3	Clip 2	Clip 1	Term. Row	Lead Desig	Feature		
Dial Selective Intercom Line Signaling Leads	B R 2	1 2							1 2	A-GRD A-BAT	Line 1	Manual Intercom Battery Feed	See Fig. 6
	B R 3	3 4							3 4	A-GRD A-BAT	Line 2		
	B R 4	5 6							5 6	A-GRD A-BAT	Line 3		
	B R 5	7 8							7 8	A-GRD A-BAT	Line 4		
	B R 6	9 10							9 10	A-GRD A-BAT	Line 5		
	B R 7	11 12							11 12	A-GRD A-BAT	Line 6		
	B R 8	13 14							13 14	Spare			
	B R 9	15 16							15 16	CO	Common Control Leads to Other Connecting Equipment		
	B R 0	17 18							17 18	BZ BZ1			
Audible Signal — Line 1	B1,BZ1 *R1,BZ	19 20							19 20	RN ST			
Audible Signal — Line 2	B1,BZ1 *R1,BZ	21 22							21 22	LF1 LW1			
Audible Signal — Line 3	B1,BZ1 *R1,BZ	23 24							23 24	LF2 LW2			
Audible Signal — Line 4	B1,BZ1 *R1,BZ	25 26							25 26	T R	Line 1	CO or PBX Lines	
Audible Signal — Line 5	B1,BZ1 *R1,BZ	27 28							27 28	T R	Line 2		
Audible Signal — Line 6	B1,BZ1 *R1,BZ	29 30							29 30	T R	Line 3		
Common Audible Control †	CA CA	31 32							31 32	T R	Line 4		
	CA CA	33 34							33 34	T R	Line 5		
	CA CA	35 36							35 36	T R	Line 6		
Spare See Fig. 9		37 38							37 38	LG1 LB1	Power Supply Connecting		See Fig. 5
		39 40							39 40	LG2 LB2			
		41 42							41 42	B-GR B-BAT			
		43 44							43 44	A-GR A-BAT			
		45 46							45 46	B-GR			
		47 48							47 48	G or RG BAT± or 105V±			
		49 50							49 50	G or RG BAT± or 105V±			

When manual intercom line(s) are used, these punchings are to be strapped as needed to A-BAT and A-GRD. Connect to corresponding row 44 and 43 respectively on Block "D".

Remove straps when manual intercom line is disconnected.

Connect common control leads to corresponding terminals on each "D" block. When more than one 501 and/or 502 key service unit is used in the same key telephone system, remove interrupter(s) from all but one KSU.

Caution: Do not exceed 20 lamps per line circuit multiple or 50 lamps per KS-19175, List 1 interrupter contact.

When external power supply is used, connect to these punchings.

Caution: When using 101G power plant(s) (J86731 series), provide one for each key service unit. Do not furnish power to other equipment from this source.

* Strap as needed for audible signaling arrangements (options T, W or V) as in Fig. 8B and 8C.

† V option, to common audible auxiliary equipment (Fig. 8C).

TABLE C

502A3D AND 502A4D KSU
FACTORY CONNECTIONS OF A75A CONNECTOR CABLE TO 66B1-25 CONNECTING BLOCK

A75A Connector Cable					66B1-25 Connecting Block Block "A"					
Feature	Lead Desig	Pin No.	Cable Color	Term. Row	Clip 1	Clip 2	Clip 3	Clip 4	Clip 5	Clip 6
Line 1	T	26	W-BL	1	Connector 1 Blue-White Binder Shop-Wired	Connector 2 Orange-White Binder Shop-Wired	Connector 3 Green-White Binder Shop-Wired			
	R	1	BL-W	2						
	A	27	W-O	3						
	A1	2	O-W	4						
	LG	28	W-G	5						
	L	3	G-W	6						
Line 2	T	29	W-BR	7						
	R	4	BR-W	8						
	A	30	W-S	9						
	A1	5	S-W	10						
	LG	31	R-BL	11						
	L	6	BL-R	12						
Line 3	T	32	R-O	13						
	R	7	O-R	14						
	A	33	R-G	15						
	A1	8	G-R	16						
	LG	34	R-BR	17						
	L	9	BR-R	18						
Line 4	T	35	R-S	19						
	R	10	S-R	20						
	A	36	BK-BL	21						
	A1	11	BL-BK	22						
	LG	37	BK-O	23						
	L	12	O-BK	24						
		38	BK-G	25						
		13	G-BK	26						
		39	BK-BR	27						
		14	BR-BK	28						
		40	BK-S	29						
		15	S-BK	30						
		41	Y-BL	31						
		16	BL-Y	32						
		42	Y-O	33						
		17	O-Y	34						
		43	Y-G	35						
		18	G-Y	36						
		44	Y-BR	37						
		19	BR-Y	38						
		45	Y-S	39						
		20	S-Y	40						
		46	V-BL	41						
		21	BL-V	42						
		47	V-O	43						
		22	O-V	44						
		48	V-G	45						
		23	G-V	46						
		49	V-BR	47						
		24	BR-V	48						
		50	V-S	49						
		25	S-V	50						

These cable pairs in each binder of the A75A cable are not terminated.

Connect pairs as needed, according to Tables A and B.

See 2.05, 2.06, and 2.08.

TABLE D

501 AND 502 KSU FEATURES AND OPTIONS

Feature or Option		Provide			Option Straps on 400A KTU
		Option Furnished	App or Wrg	Location of Wiring Option	
CO or PBX Line Ckt					
Time-Out Control*	Long-Time Delay			At Each 400 KTU Line Ckt Only Fig. 8A	None
	Short-Time Delay		Z		1 to 2
Visual Hold Sig	Lamp Wink		Y		8 to 9
	Lamp Steady		X		7 to 9
Audible Signaling	Interrupted Ring		W	See Note and Fig. 8A, 8B, 8C	5 to 6
	COM AUD Control		V		3 to 6
	Steady Ring		T		4 to 6

Note: Options T, V, or W must be wired at each 400A KTU (line card, Fig. 8A) and at the associated 66B1-25 connecting block (Fig. 8C and Table B).

* Long time delay is a function of the printed wiring and is effective only when the "Z" option strap is removed.

TABLE E

PROCEDURE FOR DISCONNECTING LEADS IN 565HDR TELEPHONE SETS WHEN USING KS-19252, LIST 1 BRIDGING ADAPTER(S)

Lead Desig	Cord Color	Remove from Term.*
R1	G-V	R
T1	V-G	RR
P4	BR-V	ON
P3	V-BR	ON1
LK	S-V	L1†
AG	V-S	N
ER	BL-V	ER
ET	V-BL	ET
EB	O-V	EB
EH	V-O	EH

* Insulate and store leads.
† Terminal on network.