

SERVICE
1A2 KEY TELEPHONE SYSTEM
501- AND 502-TYPE KEY SERVICE UNITS

1. GENERAL

1.01 This section provides identification, installation, connections and maintenance information for 501- and 502-type key service units (KSU). See Fig. 1.

1.02 Information in this section was formerly contained in Sections 518-250-101 and 518-250-401, which are hereby canceled.

1.03 This issue of the section is based on SD-69476-01, Issue 5D. If the section is to be used with equipment or apparatus reflecting later issues of the drawing, reference should be made to the SD to determine the extent of the change and the manner in which the section may be affected.

2. IDENTIFICATION

PURPOSE

Provides mounting facilities for 400 series KTUs with a capacity of six CO or PBX lines and optional manual or dial intercom.

ORDERING GUIDE

- Unit, Service, Key—See Table A

 **The 400 series KTUs are not furnished as part of the KSUs and must be ordered separately as required.**

(a) **Associated Apparatus (order separately)**

- Unit, Telephone, Key, 400A (MD), 400B (MD), 400C (MD), 400D (MD)
- Unit, Telephone, Key, 401A (for manual intercom)

DESIGN FEATURES

(a) The prewired package capacity, at the connecting blocks, is one to six central office (CO) or PBX lines, plus 9-station dial intercom (optional).

(b) When manual intercom service is to be furnished, the total line capacity is reduced by one for each 401A KTU installed.

(c) Spare mounting space on the lower half of the 31B apparatus mounting can be used for installing additional miscellaneous angle-bracket or panel-type KTUs.

(d) Preprinted aluminum foil pressure-sensitive tapes are provided on each 66-type connecting block to designate service feature leads and wiring connections.

(e) The two 502 series KSUs include a 6-foot length of A75A connector cable, partially factory terminated on the 66-type connecting blocks. Telephone sets may be plugged into these packages directly or extended by use of connector cables and/or adapters.

(f) A 24-volt dc operated KS-19385, List 1 (MD) or List 2 interrupter can be substituted for the one furnished with the KSU at locations where only 24-volt dc power is used.

3. INSTALLATION

PLANNING

3.01 Select a wall location in accordance with the following:

- Customer's approval and best interest
- Accessible with adequate illumination for maintenance

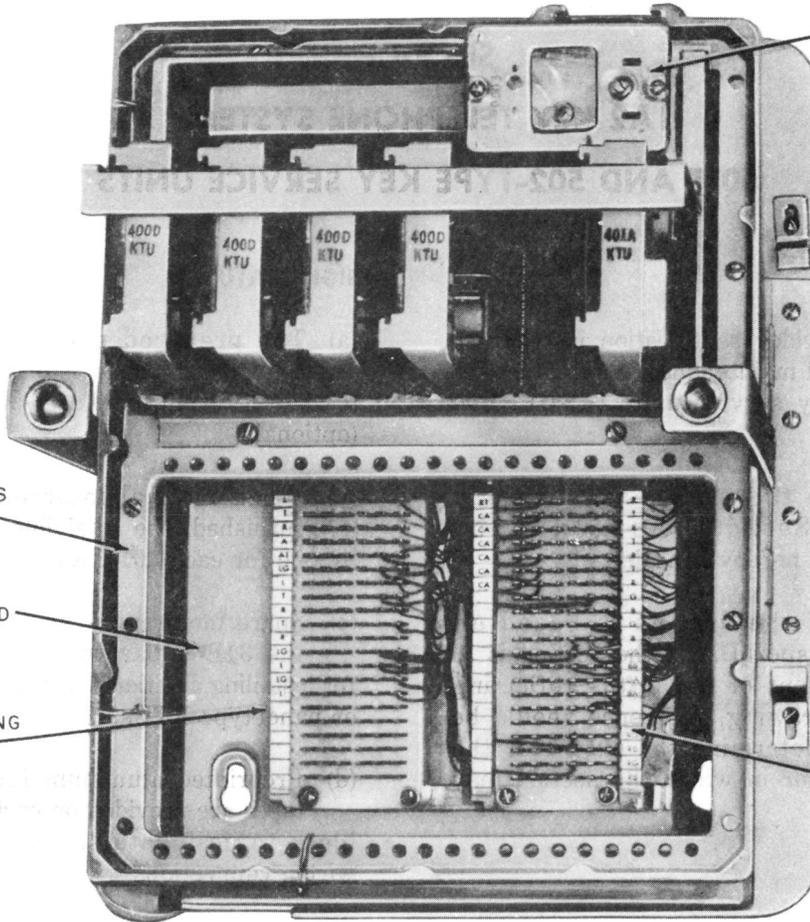
KS-19175, LI
INTERRUPTER31B
APPARATUS
MOUNTING177A
BACKBOARD66BI-25
CONNECTING
BLOCK66B3-50
CONNECTING
BLOCK

Fig. 1—501-Type KSU Front View with Cover Removed

- Wall offering adequate support and stability
- As close as practicable to stations being served
- Close to conduit or duct system for cabling purposes
- Near commercial ac power receptacle(s)
- Clean, dry, well ventilated, and free from flammable or corrosive fumes
- Where the surrounding room temperature normally does not exceed 110°F. Avoid locations near radiators, steam pipes, registers, and similar heating devices which would subject the equipment to excessive heat.

3.02 Refer to the following sections for additional information required to plan the installation of the KSU.

- 463-140-100, Equipment Cabinets and Apparatus Mountings, Identification
- 518-010-105, KTS, Grounding and Special Protection Requirements

INSTALLING

3.03 Use care when unpacking KSU to prevent damage.

3.04 Install KSU as follows:

- (1) Remove cover from KSU.

TABLE A
501- AND 502-TYPE KSUS

UNIT, SERVICE, KEY	9-STA DIAL INTERCOM 207C KTU*	POWER PLANT J86731D3 LIST 1*	116A COVER	ED-69462-50 FLOOR STAND (WITH COVER)	1-66B1-25 1-66B3-50 CONN BLOCKS	A75A CONN CABLE	31B APP MTG	177A BACK- BOARD	KS-19175, L1 INTERRUPTER* NOTE 1
501A1†					•		•	•	•
501A1D†	•				•		•	•	•
501A2†			•		•		•	•	•
501A2D†	•		•		•		•	•	•
501A3†				•	•		•	•	•
501A3D†	•			•	•		•	•	•
501A4		•		•	•		•	•	•
501A4D	•	•		•	•		•	•	•
502A3D	•			•	•	•	•	•	•
502A4D	•	•		•	•	•	•	•	•

* Replaceable components.

† MD

Note 1: KS-19385, List 1 (MD) or List 2 are optional for 24-volt dc operation.

- (2) Locate the fastener holes at the selected location.
 - (3) Install appropriate fasteners.
 - (4) Hang KSU on fasteners.
 - (5) Connect the circuit ground to an approved ground. For circuit ground, a No. 14 gauge wire should be attached from the LOC GRD terminal of the power unit to an approved local ground. If a 3-wire grounded receptacle is not available, a **frame ground** (No. 14 gauge wire) must be connected from the case or frame of the power unit to an approved local ground. **Do not strap the circuit ground to the frame or case of the power unit. The susceptibility of surge damage to semiconductor components used in 400-series KTUs require that grounding procedures be followed. Properly grounded installations will minimize service failures that can result from surge voltages or differences between dissimilar grounds.**
 - (6) Unlatch and open carrier.
 - (7) Terminate incoming CO/PBX lines. See Table B.
 - (8) Terminate station cables. See Table C.
 - (9) Place option straps (if required).
 - (10) Close and latch carrier assembly.
 - (11) Install KTUs necessary to provide required services.
- 3.05** Connect to an external power source if power plant is not supplied as part of the package. See Table B.
- Note:** The 101G-type power unit can furnish dc power to only one 501- or 502-type KSU.



400-type KTUs require 20 volts minimum dc power for reliable relay operation. If power source is unmodified 101G-type power unit, do not feed other equipment from it, if this minimum voltage limit cannot be met. No more than 20 line lamps should be supplied

TABLE B

WIRING FEATURES AND LEAD DESIGNATIONS AT CONNECTING BLOCKS C AND D

6683-50 CONNECTING BLOCK												
BLOCK "C"						BLOCK "D"						
FEATURE	LEAD DESIG	TERM. ROW	A	B	C	D	E	F	TERM. ROW	LEAD DESIG	FEATURE	
Dial Selective Intercom Line Signaling Leads	B ₂	1							1	A-GRD.	Line 1	Manual Intercom Battery Feed
	R ₂	2						2	A-BAT.			
	R ₃	3						3	A-GRD.	Line 2		
	B ₃	4						4	A-BAT.			
	R ₄	5						5	A-GRD.	Line 3		
	B ₄	6						6	A-BAT.			
	B ₅	7						7	A-GRD.	Line 4		
	R ₅	8						8	A-BAT.			
	B ₆	9						9	A-GRD.	Line 5		
	R ₆	10						10	A-BAT.			
B ₇	11						11	A-GRD.	Line 6			
R ₇	12						12	A-BAT.				
B ₈	13						13	±18 VOLTS ±GRD	Ext. Power Supply Conn.			
R ₈	14						14					
B ₉	15						15	CO	Common Control Leads To Other Connecting Equipment			
R ₉	16						16					
B ₀	17						17	BZ BZ1				
R ₀	18						18					
Audible Signal	Line 1	B1, BZ1	19					19		RN ST		
		R1, BZ	20					20				
	Line 2	B1, BZ1	21					21	LF1 LW1			
		R1, BZ	22					22				
	Line 3	B1, BZ1	23					23	LF2 LW2			
		R1, BZ	24					24				
Line 4	B1, BZ1	25					25	T R	Line 1			
	R1, BZ	26					26					
Line 5	B1, BZ1	27					27	T R		Line 2		
	R1, BZ	28					28					
Line 6	B1, BZ1	29					29	T R		Line 3		
	R1, BZ	30					30					
*Common Audible Control	CA	CA	31					31	T R	Line 4		
		CA	32					32				
V,S	CA	CA	33					33	T R	Line 5		
		CA	34					34				
Spare		CA	35					35	T R	Line 6		
		CA	36					36				
			37						37	G (LG1) B (LB1)		
			38						38			
			39						39	G (LG2) B (LB2)		
			40						40			
			41						41	GB (GRD-B) BB (BAT-B)		
			42						42			
			43						43	GA (GRD-A) BA (BAT-A)		
			44						44			
	45						45	GB (GRD-B)				
	46						46					
	47						47	G or RG BAT ± or 105V ±				
	48						48					
	49						49	G or RG BAT ± or 105V ±				
	50						50					

*To common audible auxiliary equipment, Fig. 3 as required.

TABLE C
WIRING FEATURES AND LEAD DESIGNATIONS
AT CONNECTING BLOCK A

86B1-25 CONNECTING BLOCK "A"								
ARRANGEMENT OF FEATURES AND DESIGNATIONS SHOP-WIRED								
FEATURE	LEAD DESIG	TERM. ROW	A	B	C	D	E	F
Line 1	T	1						
	R	2						
	A	3						
	A1	4						
	LG	5						
	L	6						
Line 2	T	7						
	R	8						
	A	9						
	A1	10						
	LG	11						
	L	12						
Line 3	T	13						
	R	14						
	A	15						
	A1	16						
	LG	17						
	L	18						
Line 4	T	19						
	R	20						
	A	21	*	*	*	*	*	
	A1	22						
	LG	23						
Line 5	L	24						
	T	25						
	R	26						
	A	27						
	A1	28						
	LG	29						
Line 6	L	30						
	T	31						
	R	32						
	A	33						
	A1	34						
	LG	35						
Dial Selective Intercom Line †	L	36						
	T	37						
	R	38						
	T	39						
	R	40						
	LG	41						
Spare Clips	L	42						
	LG	43						
	L	44						
		45						
		46						
		47						
		48						
		49						
		50						

Connect key cables as required

Shop-Wired to Apparatus

through one 400-type KTU; no more than 50 lamps total should be supplied from one interrupter contact.

4. CONNECTIONS

4.01 See Fig. 2 for layout of connecting block terminals.

External Power Supply

4.02 If an external power supply is required, connect the power supply to connecting block D according to Table B.

Interrupter Options

4.03 A 24-volt dc interrupter may be used in place of the factory-provided 10V ac interrupter. See Table D for connections.

Common Audible Signaling

4.04 See Fig. 3 for common audible signaling connections.

Manual Intercom Circuit (401A KTU)

4.05 Connections for the manual intercom circuit (401A KTU) are shown in Fig. 4.

Dial Intercom Circuit (207C KTU)

4.06 Addition of a 207C KTU can be accomplished by using previously placed factory wiring and connecting as shown in Fig. 5.

501-Type KSU

4.07 Terminate incoming CO/PBX lines on connecting block D as shown in Table B. Terminate key cables on connecting blocks A and C as shown in Tables B and C. Key cables should be terminated in sequence as shown in Fig. 6.

502-Type KSU

4.08 Terminate incoming CO/PBX lines on connecting block D as shown in Table B.

4.09 A factory supplied length of A75A connector cable is connected to block A. (See Fig. 6)

* Terminate key cables from left to right on available clips as required.
† Dial intercom line furnished in "D" suffixed KSU only.

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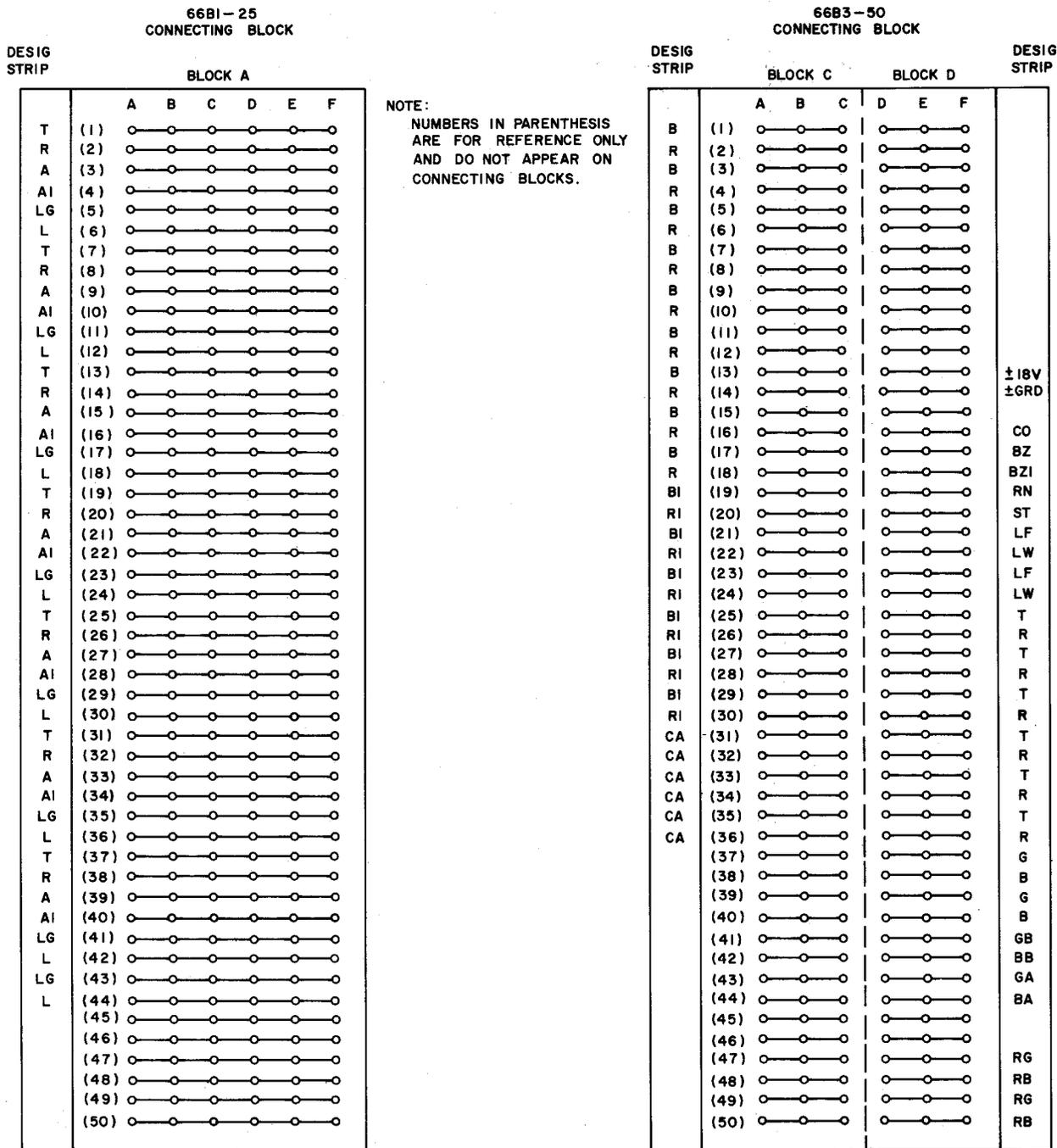


Fig. 2—Terminal Layout of Connecting Blocks A, C, and D

and Table E.) Each 50-contact KS-16690, List 1 connector will provide for:

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

TABLE D
CONNECTIONS FOR 24V DC INTERRUPTER

	MOVE FACTORY STRAP*		ADD STRAP*		REMOVE
	FROM	TO	FROM	TO	
KS-19385,L1 (MD) Interrupter	42D	46D	42D	46E	Strap Between Terminals 10 and 13 on Interrupter Connector
	37E	46F	45D	†	
KS-19385,L2 Interrupter	42D	46D	42D	46E	
	37E	45D	46F	†	

*Terminals on connecting block D.

†Connect to terminal 10 on interrupter connector.

4.10 When more than four line circuits are to be served through the A75A connector cable, rearrange the wiring as required on the connecting blocks. (Refer to Table C and E.)

4.11 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 terminals on connecting block C.

4.12 Connect additional key cables as needed to available terminals not occupied by connector cable leads (Fig. 6).

5. MAINTENANCE

5.01 Maintenance of the KSU is limited to normal station repairs and wiring checks of the mounting facility and terminal field. No field maintenance is to be performed on the plug-in KTUs.

5.02 Care must be used when removing and inserting plug-in KTUs into the connectors to avoid damage to the printed wiring and other components.

5.03 When trouble is encountered, proceed as follows:

(a) Determine if trouble is at individual station or common to the system.

(b) If common to the system:

(1) Check power supply and fuses.

(2) From nature of trouble report, determine which KTU is causing trouble.

(3) Replace KTU with one known to be working properly to determine whether trouble is in KTU or external to it (be sure to strap in the correct options on replacement KTU, as applicable).

(c) If replacement of the KTU does not clear trouble, the trouble is external to the KTU and the complete wiring serving the KTU should be checked. Place original KTU back in service.

5.04 When a KTU or a connector is taken out of service or replaced by another, all nondedicated wiring for the connector or KTU should be removed to avoid damage to a different type KTU should it be inadvertently plugged into the connector.

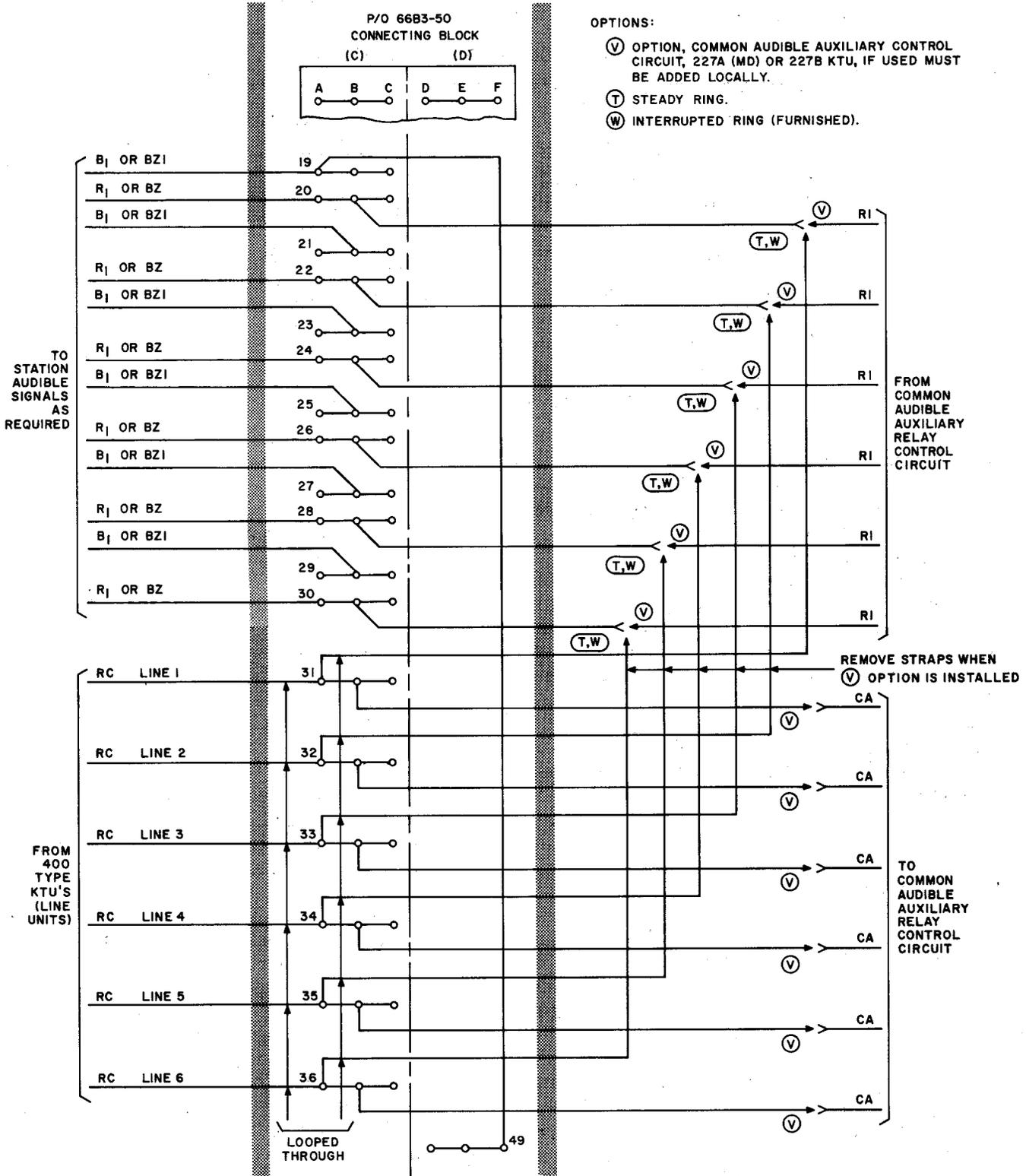
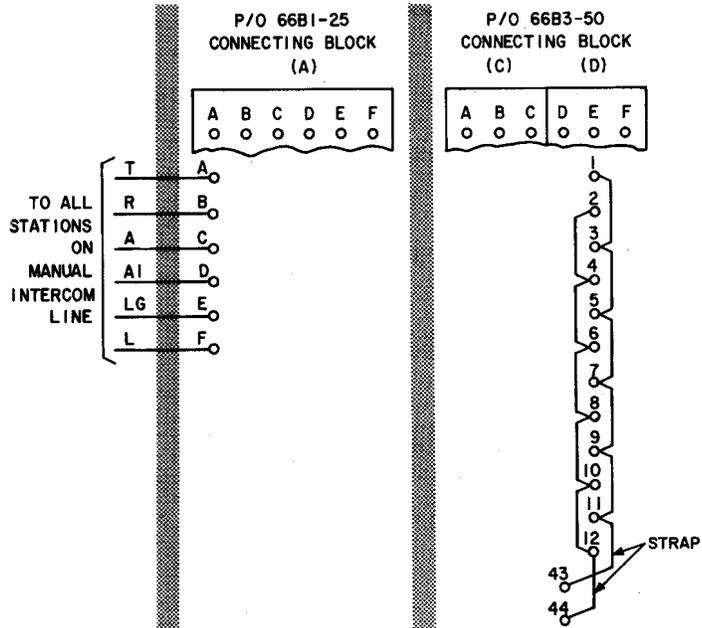


Fig. 3—Common Audible Connections for Auxiliary Relay Control Circuit



REF DESIG	J1		J2		J3		J4		J5		J6							
	CONNECTING BLOCK																	
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	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		

Fig. 4—Connections for Manual Intercom Circuit, 401A KTU

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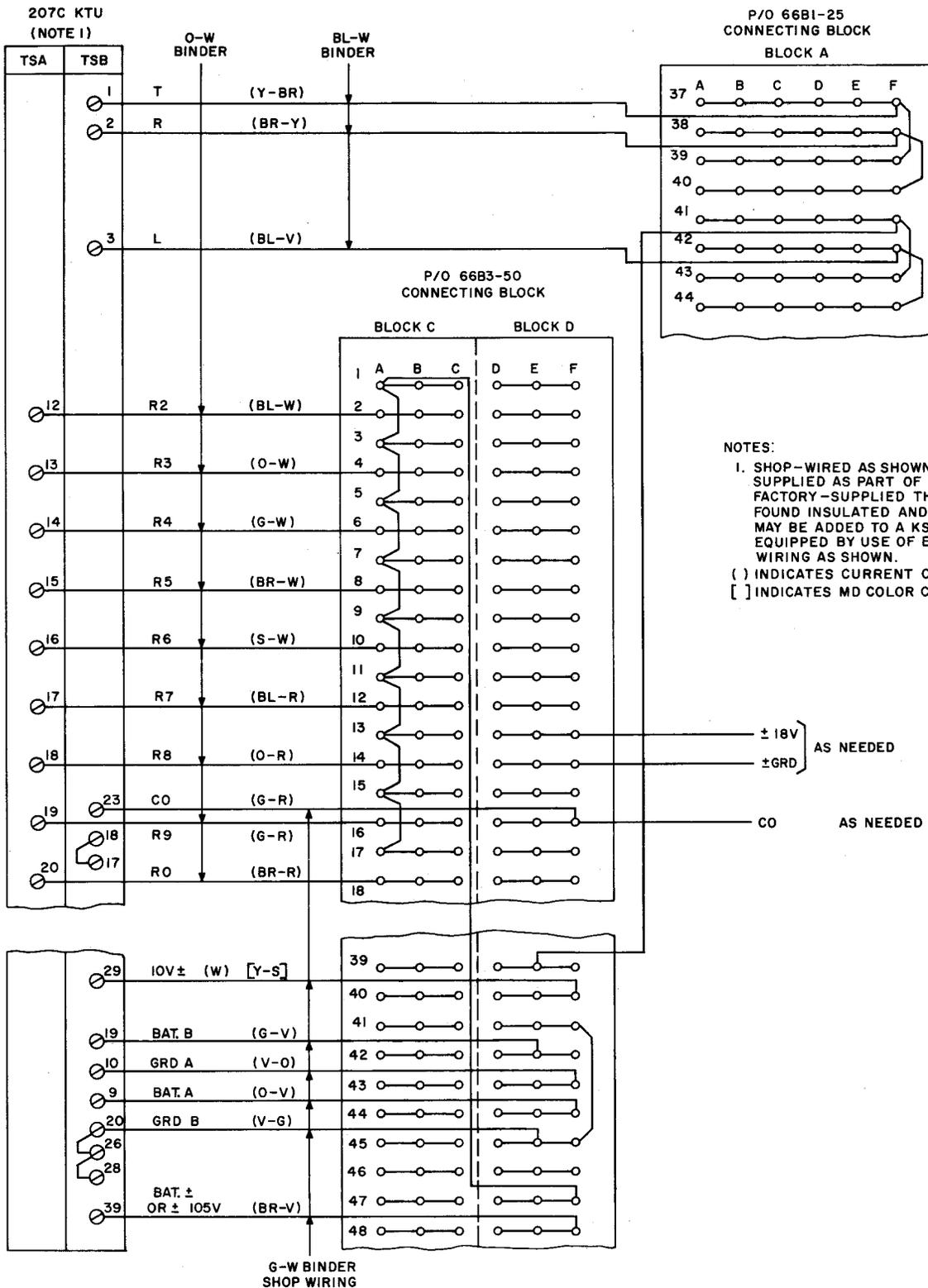


Fig. 5—Connections for Dial Intercom Circuit, 207C KTU

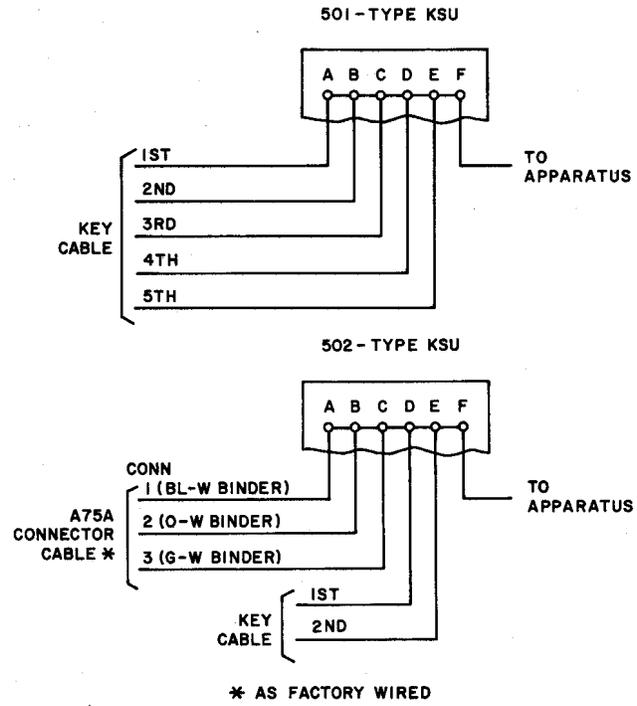


Fig. 6—Key Cable Termination on Connecting Block
A

TABLE E

FACTORY CONNECTIONS OF A75A CONNECTOR CABLE
ON 66B1-25 CONNECTING BLOCK A IN THE 502A3D AND 502A4D KSUS

A75A CONNECTOR CABLE					66B1-25 CONNECTING BLOCK BLOCK "A"					
FEATURE	LEAD DESIG	PIN NO.	CABLE COLOR	TERM. ROW	A	B	C	D	E	F
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						
These cable pairs in each binder of the A75A cable are not terminated by the factory. Connect pairs as needed per Table D.		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							