

**593-TYPE KEY SERVICE UNIT  
IDENTIFICATION AND INSTALLATION  
1A2 KEY TELEPHONE SYSTEM**

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**1. GENERAL**

1.01 This section provides information on the 593-type key service unit (KSU).

1.02 This section is reissued to:

- (a) Add information on the new 593B key service panel (KSP)
- (b) Rate the 593A KSU manufacture discontinued (MD)
- (c) Add option information for common audible signaling
- (d) Provide information on new KS-22453 power cord tag
- (e) Change information on grounding requirements
- (f) Add information on the 340A adapter
- (g) Correct minor errors
- (h) Change title.

Revision arrows are used to emphasize the more significant changes. The Equipment Test List (ETL) is not affected.

1.03 This section is based on drawing SD-69822-01, Issue 1. If this section is to be used with equipment or apparatus reflecting later issue(s) of the

drawing(s), reference should be made to the SDs and CDs to determine the extent of changes and the manner in which the section may be affected.

1.04 Incoming central office (CO) lines are to be installed in compliance with the Federal Communications Commission (FCC) Registration Program and must be routed through a standard network interface. Information on approved interfaces is contained in Sections 463-400-100 through 463-400-150.

**2. IDENTIFICATION**

**PURPOSE**

2.01 The 593-type KSU (Fig. 1) provides mounting and power facilities for 400-type line, intercom, and music-on-hold key telephone units (KTUs). The KSU contains four line jacks and three feature jacks.

2.02 The 593A (MD) and 593B KSUs are identical except the 593B is equipped with option plugs to provide options for audible signaling.

2.03 The 593-type KSU utilizes twelve 25-pair miniature ribbon connectors to provide connections to key telephone sets, CO/PBX lines, and miscellaneous services.

2.04 There is a Dual In-Line Package (DIP) switch adjacent to each station connector. There are five switches in each DIP package. Four switches are associated with the CO/PBX lines while the fifth switch is used for a manual buzzer signaling arrangement. Four switches in each DIP package in conjunction with an internally wired diode matrix provides 100 percent flexibility in common audible ringing assignments. Operation of a DIP switch associated with a CO/PBX line programs the associated key telephone set to ring on that line.

2.05 A dial intercom code is assigned to each station connector. The key telephone dial intercom code is determined by the connector with which it is mated.

2.06 The 593-type KSU provides station connectors (J9 through J18) for ten key telephone sets and ten dial intercom codes. The system can be expanded by wiring connector J10 to an externally mounted 66-type connecting block. This connector contains all

the CO/PBX station leads and intercom dial code leads R10 through R19 (R10 through R18 in the 593A KSU).

**2.07** An auxiliary connector J8 provides access to the leads required to add external common ringers and a 278A paging adapter. A 25-pair connector J7 serves as the interface between the KSU and the CO/PBX lines.

#### ORDERING GUIDE

**2.08** Order as follows:

- Unit, Key Service, 593B
- Cover, 164A
- Cord, Power (1-1/2 feet)—824013262
- Cord, Power (2 feet)—824013270
- Cord, Power (4 feet)—824013288
- Cord, Power (6 feet)—824013296
- Cord, Power (12 feet)—824010995
- Unit, Power, 288A1
- Interrupter, KS-19175, L1.4

#### COMMON FEATURES

**2.09** The 593-type KSU has the following features:

- Accommodates 400-series KTUs providing services described in Table A
- Connectorized for quick connection to key telephone sets, CO/PBX lines, and miscellaneous services
- Self-contained power unit with self-indicating circuit breakers (Table B)
- Includes KS-19175, L1 interrupter
- DIP switches for control of common audible signal
- DIP switch for common buzzer signaling system when required
- Dimensions: 15-3/4 inches wide, 15 inches high, and 7-1/2 inches deep

- Terminal block (Fig. 4) on 593-type KSU equipped with screw terminals for ease of initiating various features.

#### COVER

**2.10** The 593-type KSU is designed with a cover that encloses the jacks that accept the 400-type KTUs. The cover is held in place by a screw in the center top edge.

**2.11** If the 593-type KSU is to be installed in an office, the 164A decorative cover (Fig. 2) may be used. The 164A cover is styled to harmonize with a typical office decor. This cover is optional and is not a required component.

**2.12** The 164A cover is placed on the KSU by pushing on the cover until the two hanger feet drop into the detents in the 593-type housing. To remove, pull the cover out from the bottom and lift up to disengage the two hanger feet.

#### POWER

**2.13** The 593-type KSU is equipped with a 288A1 power supply which provides the following voltage:

- Talk Battery 18-27 volt dc 0.2 amperes
- Signal Battery 20-27 volt dc 1.15 amperes
- Lamp Battery 8-11 volt ac 4.0 amperes

The 288A1 power supply includes the 117B frequency generator which provides the ringing supply of 110-125 volt alternating current at 30 Hz.

**2.14** The voltages on the 288A1 power supply are internally wired to four circuit breakers mounted on the front of the power supply. Refer to Table B for circuit breaker assignments.

**2.15** When a circuit breaker is operated, the round disc in the center will pop out. To restore the circuit breaker after the trouble is cleared, the round disc must be pushed in.

**2.16** If abnormal commercial ac input voltage is suspected:

- (1) Remove the ac power cord from the ac receptacle.

**SECTION 518-215-425**

- (2) Using an ac voltmeter, determine the ac voltage at the commercial receptacle.
- (3) Pull out the ac voltage adjustment knob on the front of the power supply and turn the pointer to the voltage stenciled on the power supply that is closest to the commercial alternating current. Push the ac adjustment knob back in.

2.17 The power supply is equipped with a parallel blade ground receptacle. Three conductor power cords with male and female standard 3-prong plugs are available in the following lengths and should be ordered separately:

- Cord, Power (1-1/2 feet)—824013262
- Cord, Power (2 feet)—824013270
- Cord, Power (4 feet)—824013288
- Cord, Power (6 feet)—824013296
- Cord, Power (12 feet)—824010995.

2.18 The 288A1 power supply can be changed by removing two screws from the front of the unit, pulling slack in the power cord, and unplugging the input and output power cords.

**POWER FAILURE RELAY**

2.19 The 593-type KSU is equipped with a power failure relay that transfers the CO/PBX lines to the ringers of the following stations when power fails:

CO/PBX LINE	STATION CONNECTOR
1	J9
2	J10
3	J11
4	J12

**Note:** When the power failure relay releases, a capacitor is inserted in series with the station ringer and the CO/PBX line.

**Caution:** When connector J10 is extended to a 66-type connecting block to provide additional key telephone sets, the power failure circuit for the second CO/PBX line must be wired to a key telephone set ringer.

**3. INSTALLATION**

3.01 Select a wall location for a key telephone installation in accordance with the following:

- Customer approval and best interest.
- Accessible with adequate illumination for maintenance.
- Wall offering adequate support and stability.
- As close as practicable to stations being serviced.
- Close to conduit or duct system for cabling purposes.
- Near commercial ac power receptacle.
- Sufficient clearance above floor to avoid damage from water or blows incidental to cleaning.
- 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 other 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 a KTS:

- Section 518-010-101—Centralized Key Telephone Installations
- Section 518-010-105—KTS, Grounding, and Special Protection Requirements

- Section 518-215-100—1A2 KTS, Identification, and Arrangements
- Section 518-215-400—Service, 1A2 KTS, Line Services
- Section 518-215-401—Service, 1A2 KTS, Auxiliary Line Services
- Section 518-215-402—Service, 1A2 KTS, Intercom Services.

**3.03** Before mounting the 593-type KSU, select the proper length ac power cord (paragraph 2.17) and plug it into the power unit through the hole on the rear of the KSU. Route the ac power cord through the power cord retainers on the side or bottom of the KSU.

**3.04** Mount the 593-type KSU on the wall. Refer to Section 463-130-100 for the appropriate wall fasteners.

**3.05** Central office or PBX lines can be connected to the 593B KSU by using one of the following methods:

- (1) Plugging an A25B connector cable into jack 7 on the 593B KSU and connecting the other end to the network interface via a 66-type connecting block. Refer to Fig. 6, connector J7.
- (2) Plugging a 340A adapter into jack 7 on the 593B KSU and connecting D4BU cords between the 340A adapter and the network interface. Refer to the following table for jack assignments in the 340A adapter:

**340A ADAPTER**

TERMINAL	DESIGNATION	JACK
26	T(1)	A
1	R(1)	
27	T(2)	
2	R(2)	
28	T(3)	B
3	R(3)	
29	T(4)	
4	R(4)	

**3.06** To prevent damage to the telephone company equipment, it is imperative that the 593-type KSU be properly grounded and protected to limit voltage surges.



*The susceptibility of surge damage to semiconductor components used in 400-series KTUs requires the grounding and protection procedures be followed carefully. Properly protected and grounded installations will minimize service failures that can result from surge voltages or differences between dissimilar grounds. Refer to Section 518-010-105 for coverage of KTS grounding and protection requirements.*

**3.07** It is recommended all incoming CO/PBX lines be connected to protectors. The protector ground terminal will serve as the primary KSU ground point and must be connected to the coupled bonding conductor. In any case, the KSU ground source and the power service ground source should be bonded together.

**3.08** Using a No. 12 gauge wire, connect the circuit ground terminal on the 593-type KSU to the single-point ground terminal and the coupled bonding conductor or protector ground. If a 3-wire ac receptacle is not available, use a Hubbell B112433 adapter to convert the 2-prong outlet to a 3-prong

outlet, provided the outlet is grounded. If the outlet is not grounded, a frame ground must be connected to the single-point ground through a No. 12 gauge wire. Normally, the green wire in the power supply cord would ground the frame of the power supply. Refer to Section 518-010-105 for coverage of KTS grounding and protection requirements.

**Note:** To remove strain from the ground terminal, run the No. 12 gauge wire to the bottom of the 593-type KSU and clamp to the backboard or mounting surface.♦

**3.09** The KTUs that are going to be used should be carefully unpacked, options applied as applicable, and installed in their appropriate jacks.

**3.10** Install KTUs by inserting the plug end of the printed wiring boards into the 593-type KSU jacks.



**Exercise care when handling and inserting plug-in KTUs to avoid damage to the printed wiring boards and components.**

**3.11** Refer to Table A for KTU jack locations and the following figures for KTU connections.

**Note:** The figures for KTU connections are primarily provided for maintenance purposes. When a key telephone set is mated with a station connector, all connections are completed except CO/PBX lines and customer-provided music-on-hold.

Fig. 7—400G KTU (MD) Connections (CO/PBX Line) in 593-Type Key Telephone Unit

Fig. 8—400H KTU Connections (CO/PBX Line) in 593-Type Key Service Line

Fig. 9—33B Voice Coupler Connections (Music-On-Hold) in 593-Type Key Service Unit

Fig. 10—401-Type KTU Connections (Manual Intercom) in 593-Type Key Service Unit

Fig. 11—407C KTU Connections (Rotary Dial Intercom, 10-Code Selector) in 593-Type Key Service Unit

Fig. 12—424C KTU Connections (Rotary Dial Intercom, 19-Code Selector) in 593-Type Key Service Unit

Fig. 13—494-Type KTU Connections (TOUCH-TONE Service or Rotary and TOUCH-TONE Service, 19-Code Selector) in 593-Type Key Service Unit

Fig. 14—415-Type KTU Connections (Automatic, DC Signaling, Private Line) in 593-Type Key Service Unit

Fig. 15—Typical Wiring of 551A Key for Buzzer Signaling Arrangement

Fig. 16—278A Paging Adapter Connections for Dial or Manual Paging Access

♦Fig. 17—Audible Signaling Option Plug Arrangement Available for 593B Key Service Unit Only♦

**3.12** The station cables from the key telephone sets should now be mated to the station connectors. If conduit is not provided, B25A connector cables should be used to connect the key telephone sets to the station connectors.

**3.13** If conduit is provided, A25B connector cables should be used to connect the key telephone sets to the station connectors. A KS-16690, L12 receptacle must be wired (Section 080-130-100) to the end of the A25B cable to mate with the station connector.

**3.14** Cable connectors are available in basically two heights. To ensure that the connector hold down bracket will fit snugly over the cable connectors, it is preferred that the installer obtain connectors of equal height. If all the cable connectors are of the high-profile type and have been plugged into the KSU connectors, the connector hold down bracket is assembled to the housing using the T slots provided in the housing. Pushing the bracket in and pulling down (at both ends of the bracket) will cause the bracket retaining rods to nest in the first cradle in the housing. If the bracket does not fit snugly over the connectors, push the bracket in and pull down. This will cause the bracket retaining rods to nest in a second cradle providing a better fit. If all the cable connectors are of the low-profile type, the foam tape supplied with the unit must be attached to the underside of the bracket and the bracket installed as previously described. If there is a mixture of cable connector heights, the foam tape should be cut and attached to the bracket to provide a snug fit over the low profile connectors. To release the hold down bracket, push the bracket in at the ends and pull up.

**3.15** ♦The 593-type KSU is factory equipped to provide 105-volt incoming ringing on the CO/PBX lines and 10-volt ac buzzers on the intercom for audible signaling. This signaling arrangement cannot be changed on the 593A KSU (MD). The 593B KSU is equipped with option plugs for changing the audible signaling. These option plugs are located behind the power supply which is removed as described in paragraph 2.18. Refer to Fig. 17 for information for changing the options.♦

**3.16** The common audible signal for the CO/PBX lines in the key telephone sets is controlled by four DIP switches located adjacent to each station connector. When a DIP switch is operated to the right, the associated CO/PBX line will ring at that station. The following table provides the DIP switch assignments for the CO/PBX lines.

CO/PBX LINE	DIP SWITCH NUMBER
1	1
2	2
3	3
4	4

**Note:** The capacitor in the station ringing bridge should be removed when the ringer is to be used for common audible ringing.

**3.17** Refer to Table C for CO/PBX lines interface assignments and miscellaneous feature assignments.

**3.18** Before applying power, check for loose or broken wiring and obvious equipment defects.

**3.19** Apply power and test the KTS for proper operation.

#### 4. ADDITIONAL FEATURES

##### MUSIC-ON-HOLD

**4.01** Music-on-hold can be provided by using the 498A KTU which plugs into jack 5A (Fig. 5). The customer music source must be wired through a 33B voice coupler (Fig. 9). The output of the 33B voice

coupler is wired to terminals 1 and 2 of the terminal block located above the ribbon connectors.

**Note:** When a 415-type KTU (automatic, dc signaling, private line) is used, music-on-hold cannot be provided.

##### BUZZER SIGNALING SYSTEM

**4.02** A station can be included in a common buzzer system by operating to the right, the fifth DIP switch associated with the station. If a station is to buzz other station(s), a 551A key must be installed (Fig. 15). With this common buzzer arrangement, when a 551A key is operated, all buzzers on stations having their DIP switch operated to the right will buzz.

**Note:** This arrangement cannot be provided with dial intercom. With dial intercom, the fifth DIP switch must be open.

##### PAGING

**4.03** Paging interface leads for a 278A paging adapter are provided in connector J8. Connections required for dial or manual paging access to the paging adapter are provided in Fig. 16. When dial access is provided, dial code 19 is the dedicated access code. When manual access is provided, a 551A key is required at each station that will access the paging arrangement. To access the paging adapter with manual access, the manual intercom button is depressed with the station off-hook and the 551A key is momentarily depressed. The paging arrangement will remain connected until the station goes on-hook.

##### MISCELLANEOUS

**4.04** Connector J8 also provides RC(1-4) leads for CO/PBX audible signals, such as gongs or loud ringing bells.

**4.05** Connector J10 can be wired to an externally mounted 66-type connecting block when additional key telephone sets are required. This connector contains all the CO/PBX station leads and intercom dial code leads R10 through R19.

**4.06** The 4A speakerphone is compatible with all stations connected to the 593-type KSU except the station associated with station connector J10. This station connector cable does not have the spare leads required for the 4A speakerphone.

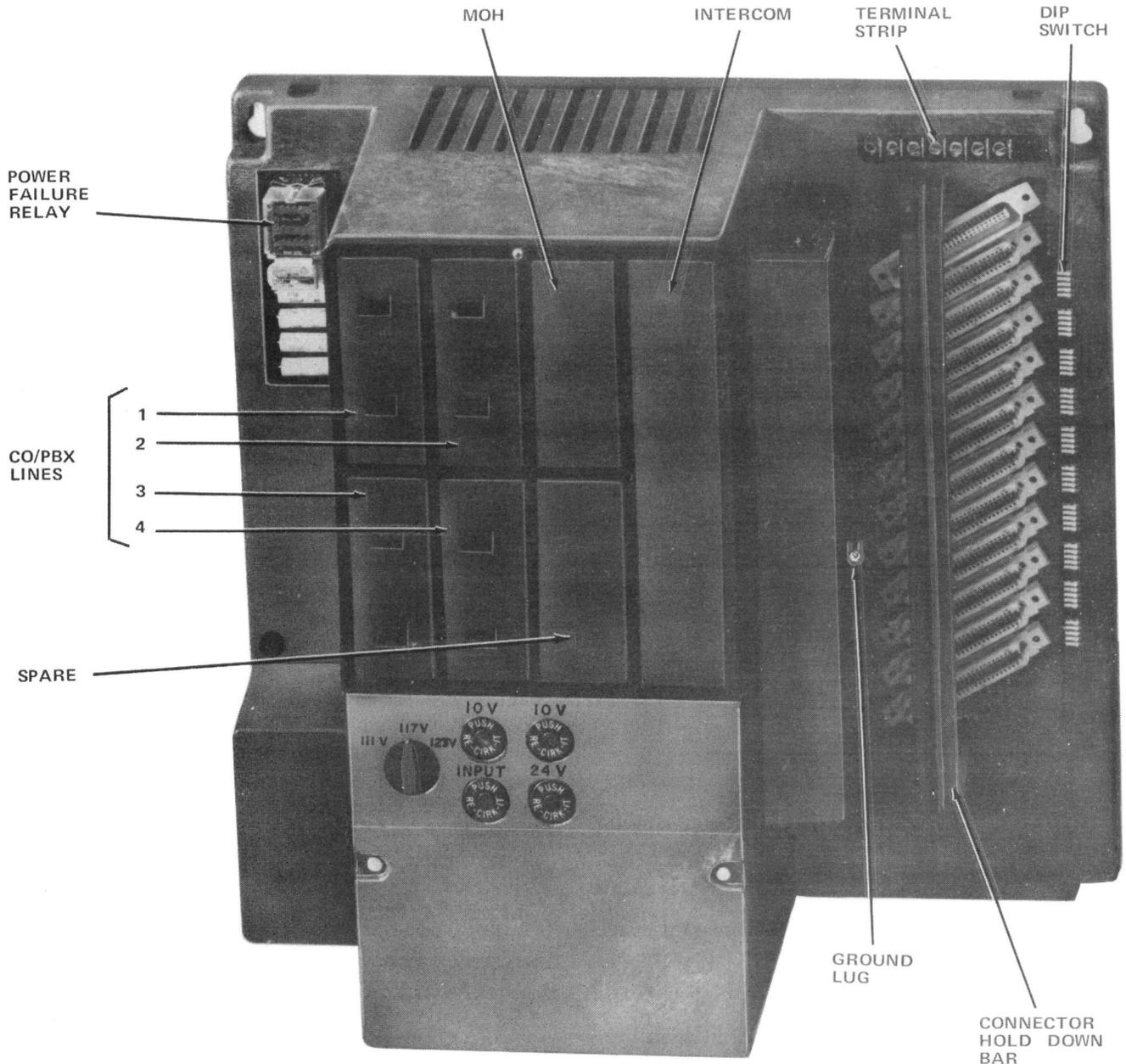


Fig. 1—593-Type Key Service Unit

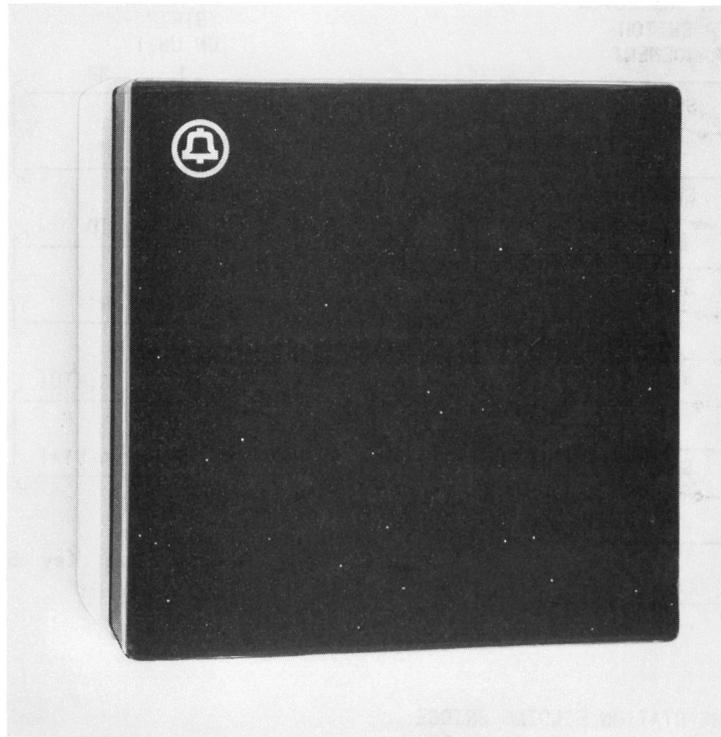
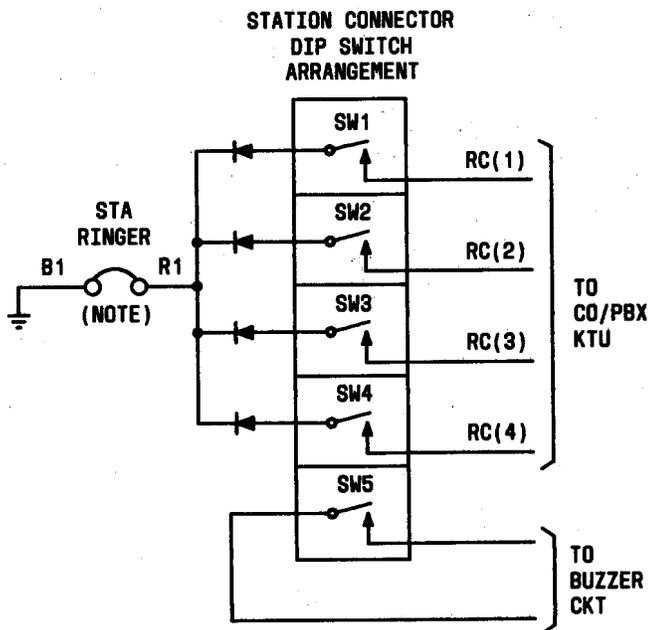


Fig. 2—164A Cover



NOTE: THE CAPACITOR IN THE STATION RINGING BRIDGE SHOULD BE REMOVED WHEN THE RINGER IS TO BE USED FOR COMMON AUDIBLE RINGING

Fig. 3—DIP Switch Arrangement for Common Audible Ringing

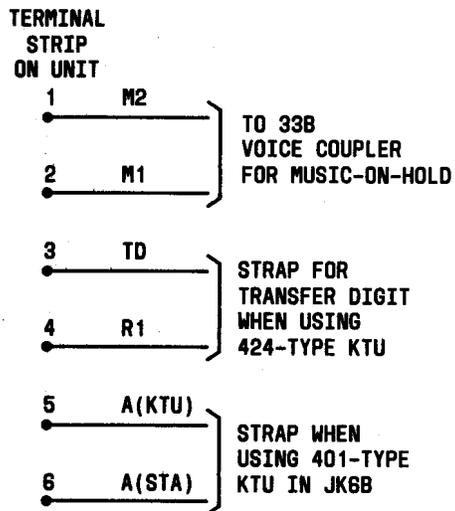


Fig. 4—593-Type Key Service Unit Terminal Strip Assignments

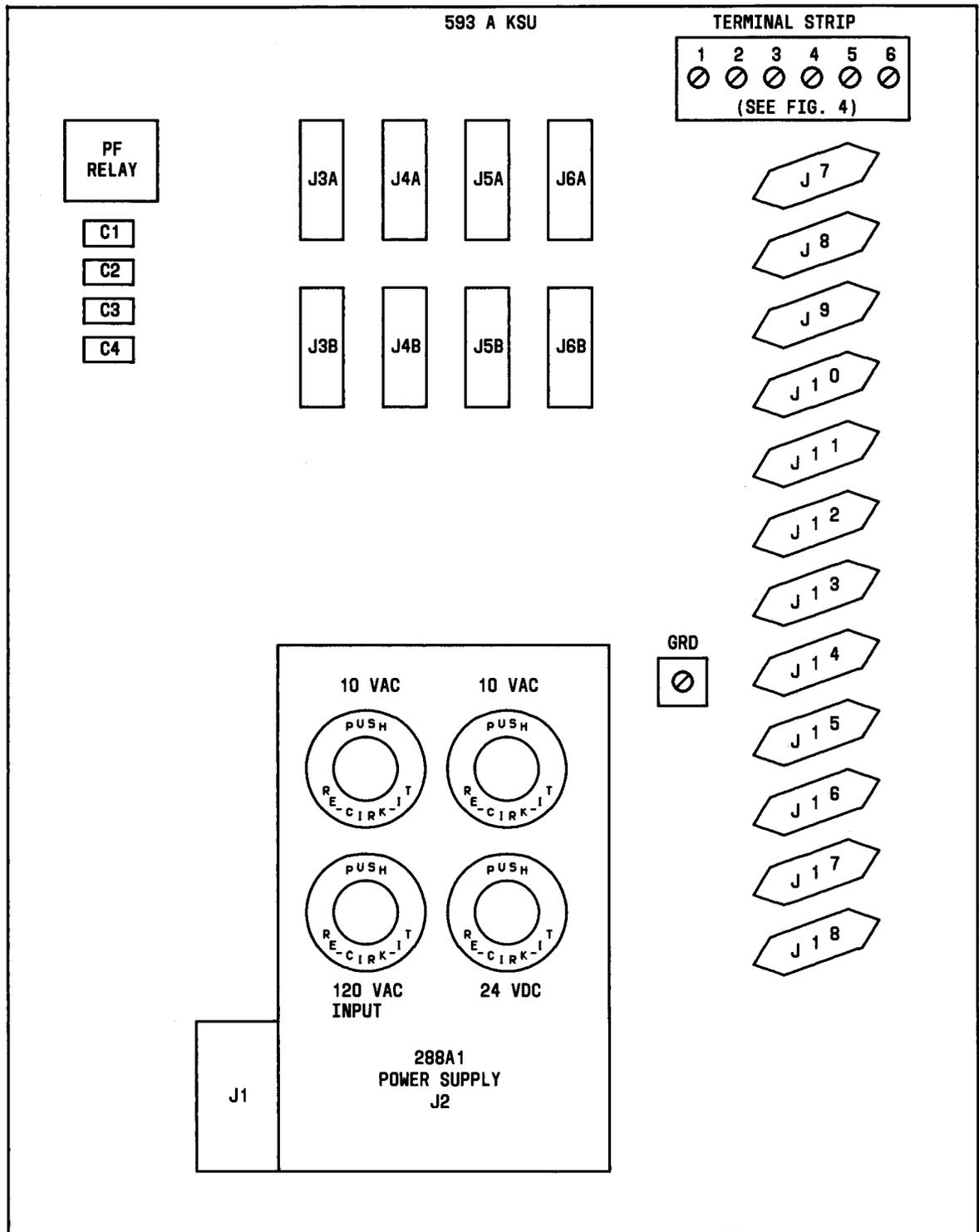


Fig. 5—593-Type Key Service Unit, Jacks, Cable Connectors, Circuit Breakers, and Miscellaneous Component Locations

593-TYPE KSU  
CONNECTOR J7

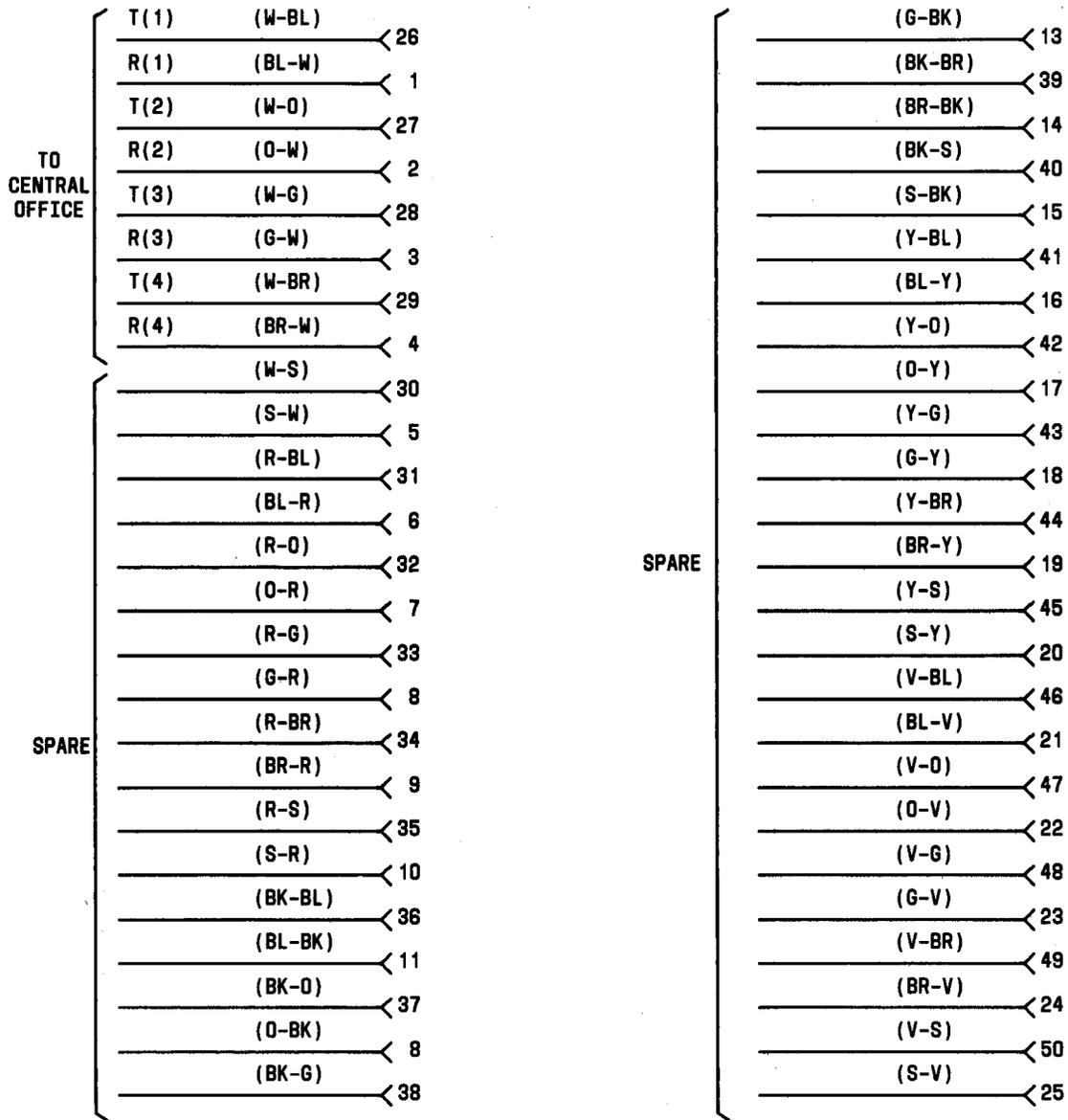
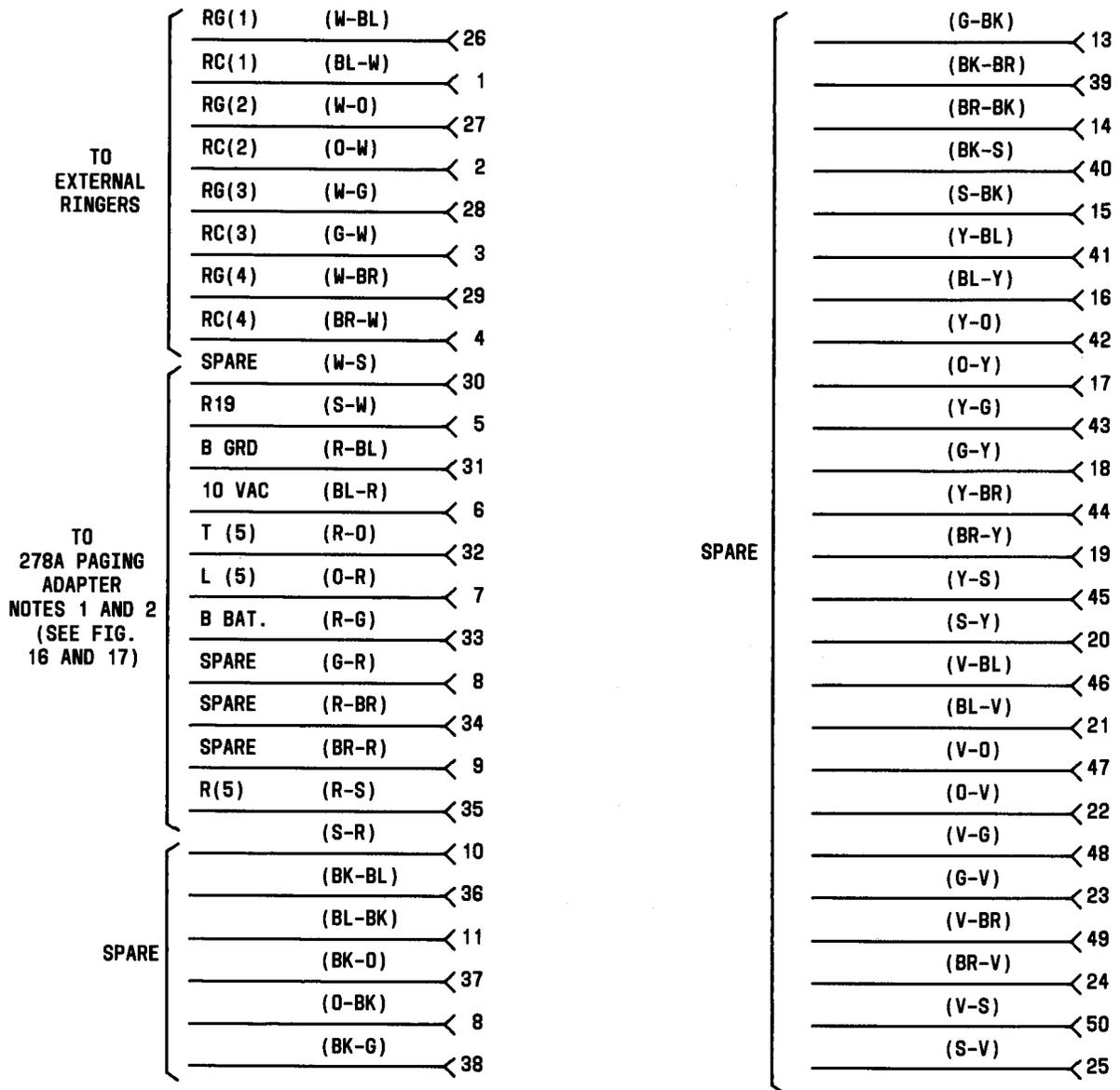


Fig. 6—593-Type Key Service Unit, Cable Connector Terminal Assignment (Sheet 1 of 4)

593-TYPE KSU  
CONNECTOR J8

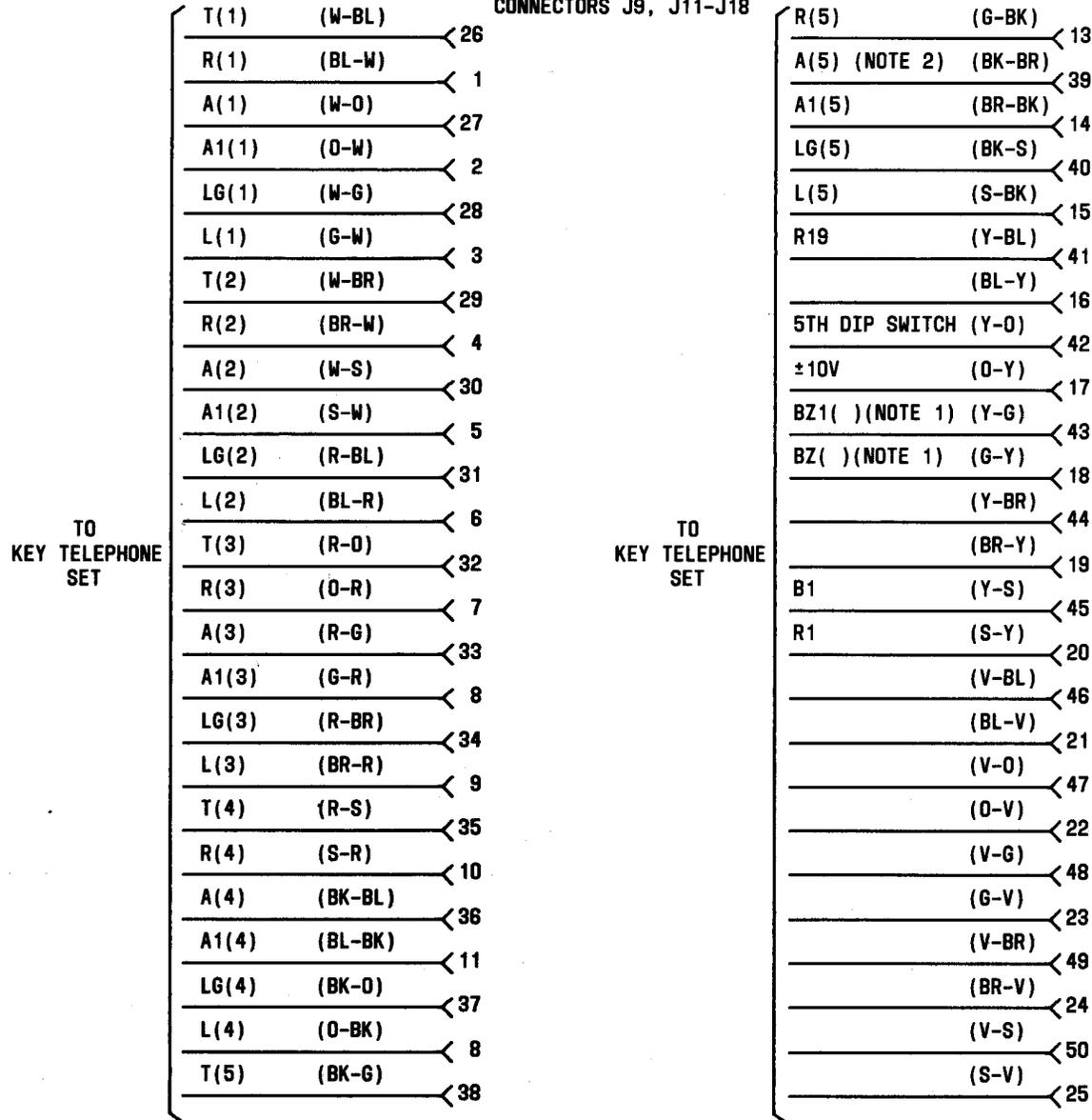


NOTES:

1. WITH DIAL INTERCOM, A SINGLE-SPURT ±10 VOLT SIGNAL WILL APPEAR WHENEVER CODE 19 IS DIALED
2. WITH MANUAL SIGNALING, A ±10 VOLT SIGNAL WILL APPEAR ON TERMINAL R19 WHENEVER A 551A KEY, CONNECTED AT A STATION BETWEEN THE O-Y AND Y-BL LEADS, IS OPERATED

Fig. 6—593-Type Key Service Unit, Cable Connector Terminal Assignment (Sheet 2 of 4)

593-TYPE KSU  
CONNECTORS J9, J11-J18



NOTES:

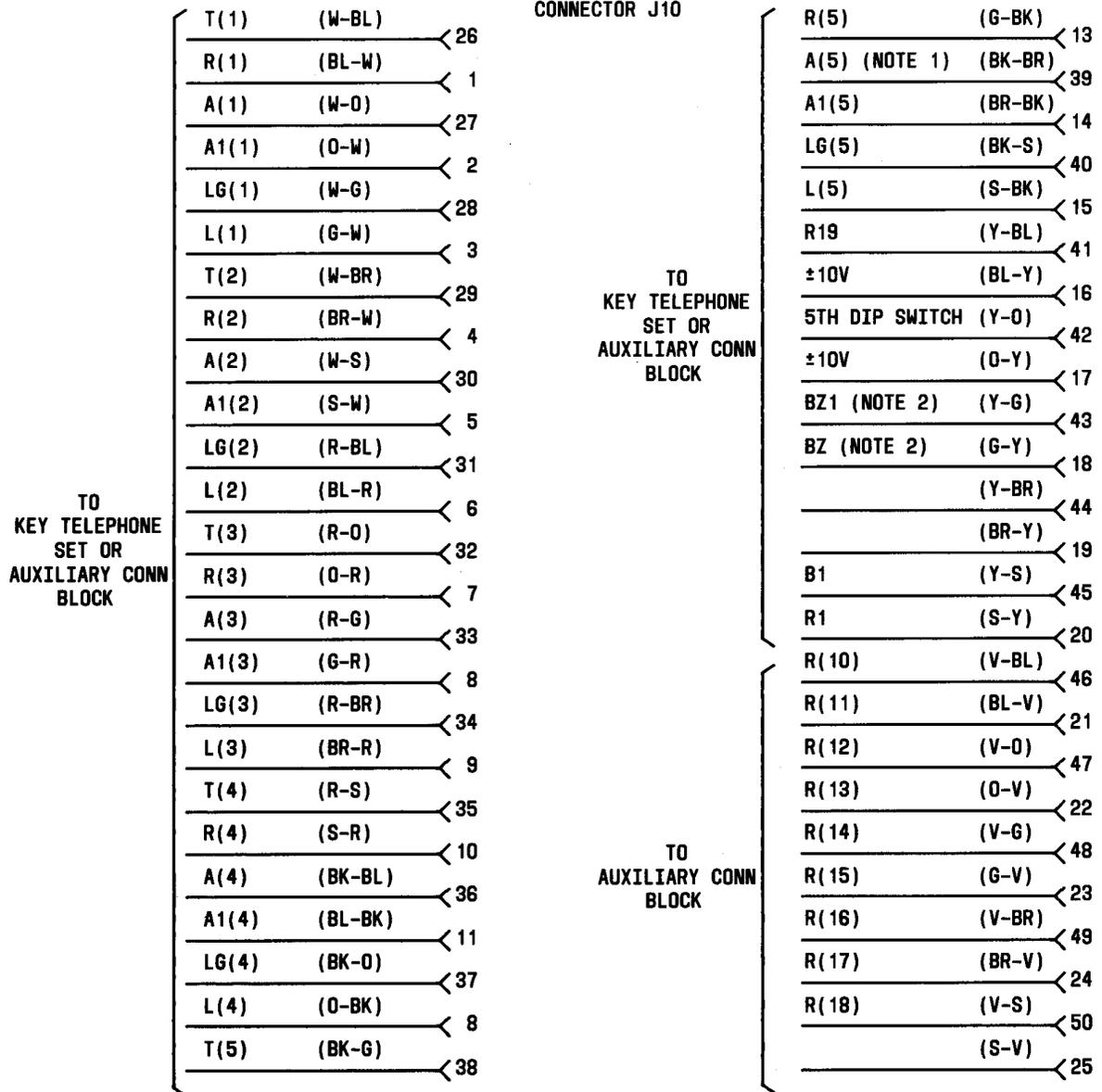
1.

JACK	INTERCOM CODE R( )	JACK	INTERCOM CODE R( )
J9	0	J14	5
J10	1	J15	6
J11	2	J16	7
J12	3	J17	8
J13	4	J18	9

2. FOR MANUAL INTERCOM, STRAP TERMINALS 5 AND 6 ON THE 593-TYPE KSU

Fig. 6—593-Type Key Service Unit, Cable Connector Terminal Assignment (Sheet 3 of 4)

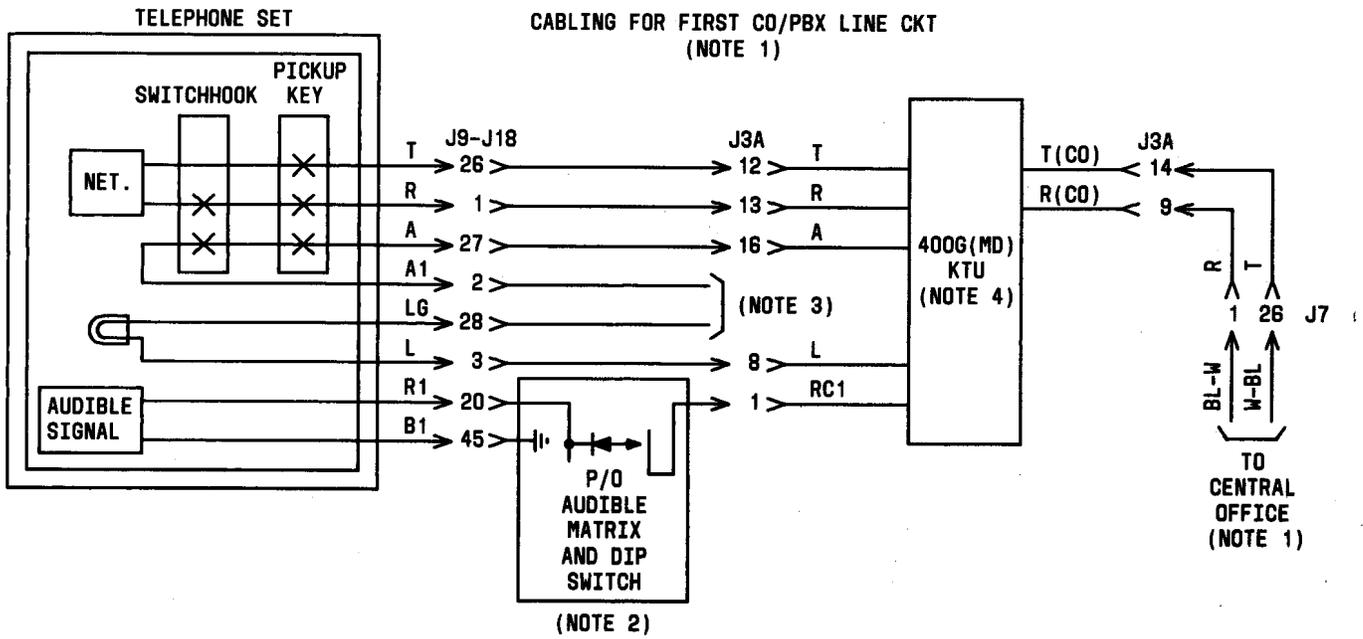
593-TYPE KSU  
CONNECTOR J10



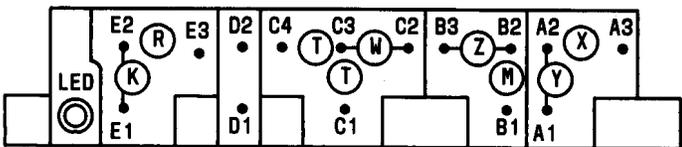
NOTES:

1. FOR MANUAL INTERCOM, STRAP TERMINALS 5 AND 6 ON THE 593-TYPE KSU
2. DIAL INTERCOM CODE 1 IS ASSIGNED TO CONNECTOR J10 WHEN USING A 407- OR 424-TYPE KTU

Fig. 6—593-Type Key Service Unit, Cable Connector Terminal Assignment (Sheet 4 of 4)



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



OPTION	FEATURE	CONNECT TERMINALS
M	RING TIMEOUT	LONG TIME DELAY (APPROXIMATELY 20 SECONDS) B1-B2
Z	VISUAL HOLD CKT	SHORT TIME DELAY (APPROXIMATELY 5.75 SECONDS) B2-B3†
Y	LAMP WINK	A1-A2†
X		A2-A3
W	INTERRUPTED RING	C2-C3†
T	AUDIBLE SIGNAL	STEADY RING C3-C4
S		COMMON WITH DIODE MATRIX CONTROL C1-C3
V		COMMON WITH RELAY CONTROL C1-C3
R	DELAYED HOLD RELEASE	RELEASE OF HOLDING BRIDGE FROM CO/PBX BY LINE CURRENT OPENS MINIMUM OF 25 MS E2-E3
K		600 MS E1-E2†

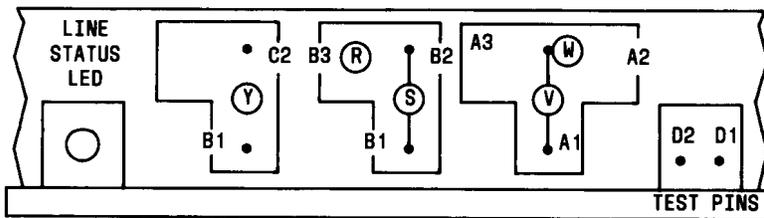
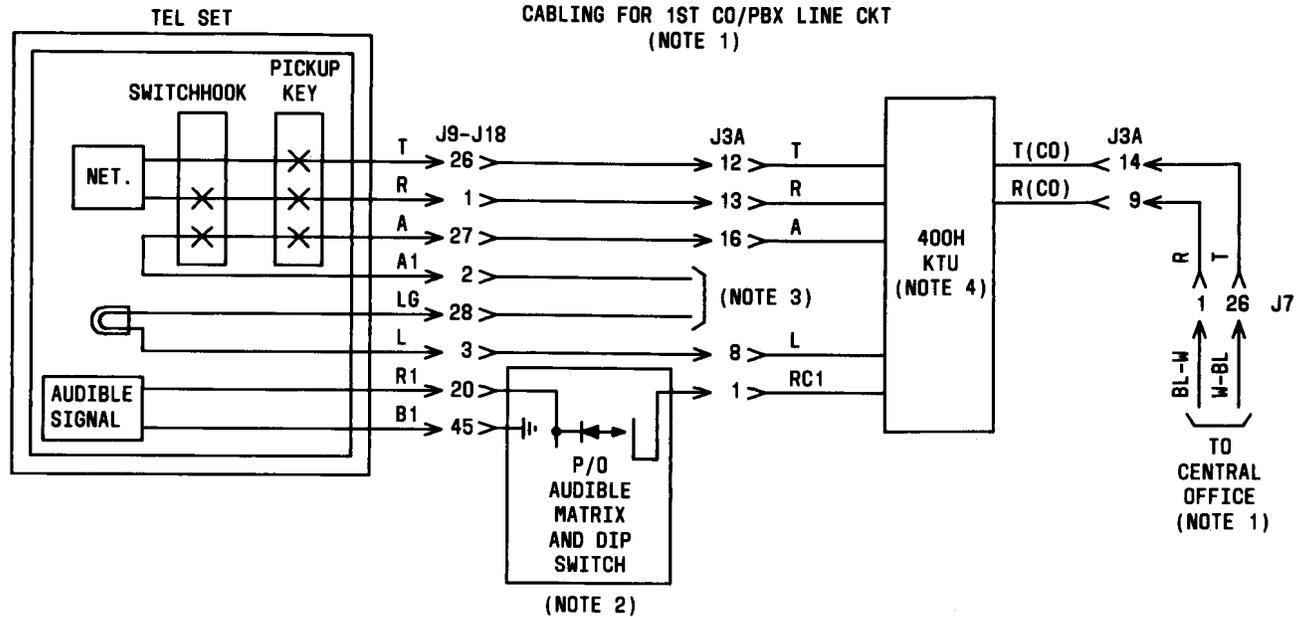
† DENOTES FACTORY-PROVIDED OPTIONS

- NOTES:**
- REFER TO FIG. 4 FOR KEY CABLE TERMINAL ASSIGNMENTS FOR THE REMAINING CO/PBX LINES. THE FOLLOWING TABLE SHOWS JACK ASSIGNMENTS FOR 400-TYPE KTUs:

CKT	JK
1	J3A
2	J4A
3	J3B
4	J4B

- COMMON AUDIBLE SIGNALS FOR CO/PBX LINE ARE ASSIGNED BY OPERATING DIP SWITCHES ASSOCIATED WITH EACH KEY TELEPHONE SET CONNECTOR (J9-J18). REFER TO PARAGRAPH 3.16
- A1, LG, AND B1 LEADS ARE INTERNALLY STRAPPED TO GROUND
- REFER TO SECTION 518-215-400 FOR DETAILED INFORMATION ON 400G KTU

Fig. 7—400G KTU (MD) Connections (CO/PBX Line) in 593-Type Key Service Unit



TOP VIEW OF OPTION BLOCK-HANDLE ASSEMBLY. OPTION SYMBOLS SHOWN CONNECTED ARE IN FACTORY-INSTALLED POSITIONS

OPTIONS

OPT	FEATURE	
T*†	CO OR PBX LINE CIRCUIT	
W*	INTERRUPTED RING	
V	AUDIBLE SIGNAL	COMMON AUDIBLE WITH GROUND FOR RELAY CONTROL
S*	HOLD CIRCUIT RELEASE	LONG HOLD ABANDON TIME-OUT (FOR ESS #1, ESS #2, 812 PBX, 770 PBX, "DIMENSION" PBX)
R		SHORT HOLD ABANDON (FOR ALL OTHERS)
Y†	TIME-OUT	WITH 14 SECONDS
		WITHOUT 6 SECONDS

+ FACTORY INSTALLED  
 † AN OPTION PLUG IS NOT PROVIDED. USE KS-21290, L7 OPTION PLUG COMCODE 841732613  
 ‡ T OPTION ISSUE 1 ONLY

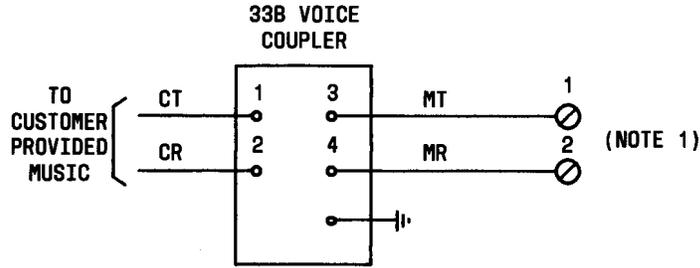
NOTES:

1. REFER TO FIG. 4 FOR KEY CABLE TERMINAL ASSIGNMENTS FOR THE REMAINING CO/PBX LINES. THE FOLLOWING TABLE SHOWS JACK ASSIGNMENTS FOR 400-TYPE KTUs:

CKT	JK
1	J3A
2	J4A
3	J3B
4	J4B

2. COMMON AUDIBLE SIGNALS FOR CO/PBX LINE ARE ASSIGNED BY OPERATING DIP SWITCHES ASSOCIATED WITH EACH KEY TELEPHONE SET CONNECTOR (J9-J18). REFER TO PARAGRAPH 3.16  
 3. A1, LG, AND B1 LEADS ARE INTERNALLY STRAPPED TO GROUND  
 4. REFER TO SECTION 518-215-400 FOR DETAILED INFORMATION ON 400H KTU

Fig. 8—400H KTU Connections (CO/PBX Line) in 593-Type Key Service Unit

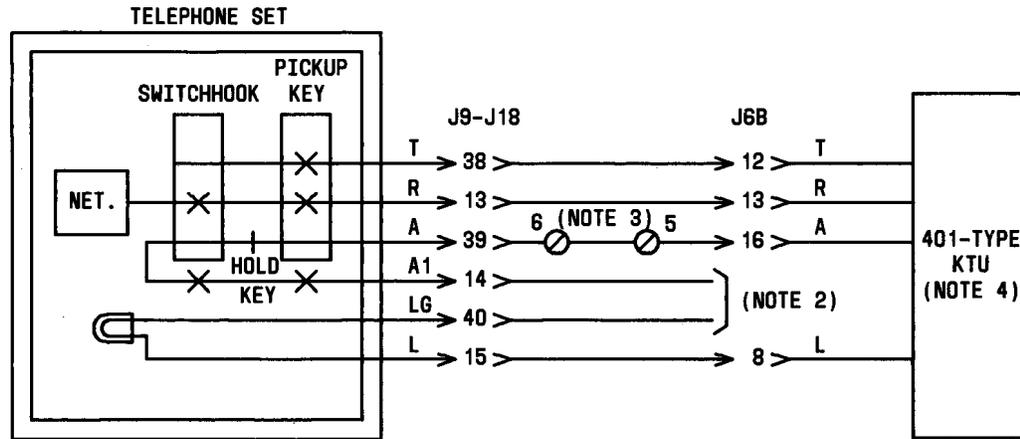


NOTES:

1. SCREW TERMINALS 1 AND 2 ARE LOCATED ON A TERMINAL STRIP ON THE RIGHT TOP OF THE 593A KEY SERVICE UNIT.
2. TO PROVIDE MUSIC-ON-HOLD A 498A KTU MUST BE PLUGGED INTO JACK 5A AND THE ABOVE CONNECTIONS PROVIDED FROM THE CUSTOMER MUSIC SOURCE.

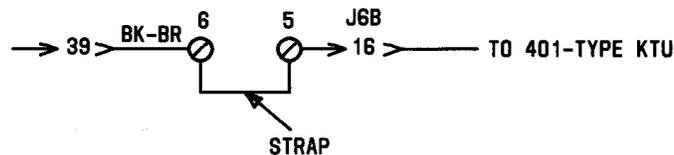
Fig. 9— 33B Voice Coupler Connections (Music-on-Hold) in 593-Type Key Service Unit

CABLING FOR MANUAL INTERCOM  
ASSIGNED TO THE FIFTH LINE  
(NOTE 1)



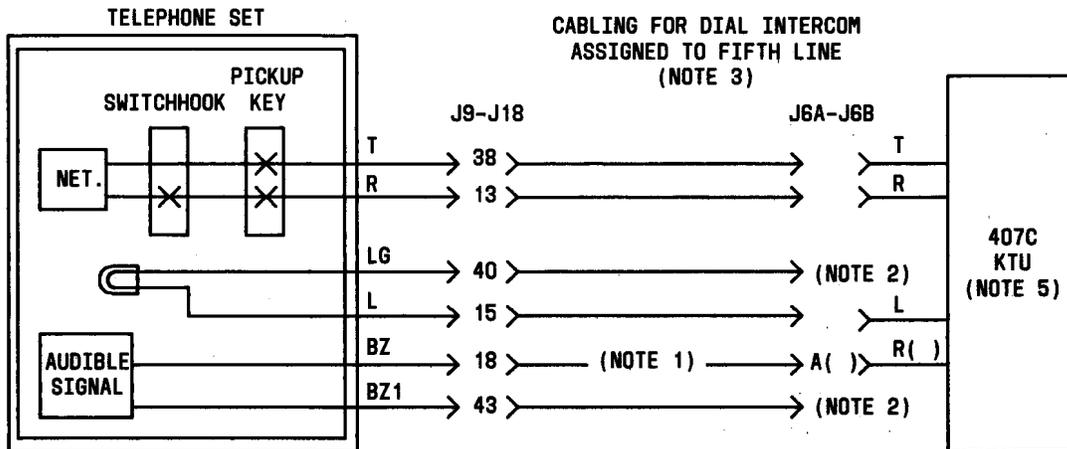
NOTES:

1. MANUAL INTERCOM IS ASSIGNED TO JACK 6B WHICH IS INTERNALLY WIRED TO THE FIFTH LINE IN THE KEY TELEPHONE SET CONNECTOR. HOWEVER, MANUAL INTERCOM (401-TYPE KTU) CAN BE ASSIGNED TO LINE JACK 3A, 3B, 4A, OR 4B WHICH WILL APPEAR IN THE KEY TELEPHONE SET CONNECTORS AS LINE 1, 2, 3, OR 4
2. A1 AND LG LEADS ARE INTERNALLY STRAPPED TO GROUND
3. WHEN A 401-TYPE KTU IS USED IN JK6B, COMPLETION OF THE A LEAD CONNECTION REQUIRES STRAPPING TERMINALS 5 AND 6 OF THE TERMINAL STRIP ON THE 593-TYPE KSU. THIS STRAP MUST BE REMOVED WHEN DIAL INTERCOM IS USED



4. REFER TO SECTION 518-215-402 FOR DETAILED INFORMATION ON 401-TYPE KTU

Fig. 10— 401-Type KTU Connections (Manual Intercom) in 593-Type Key Service Unit



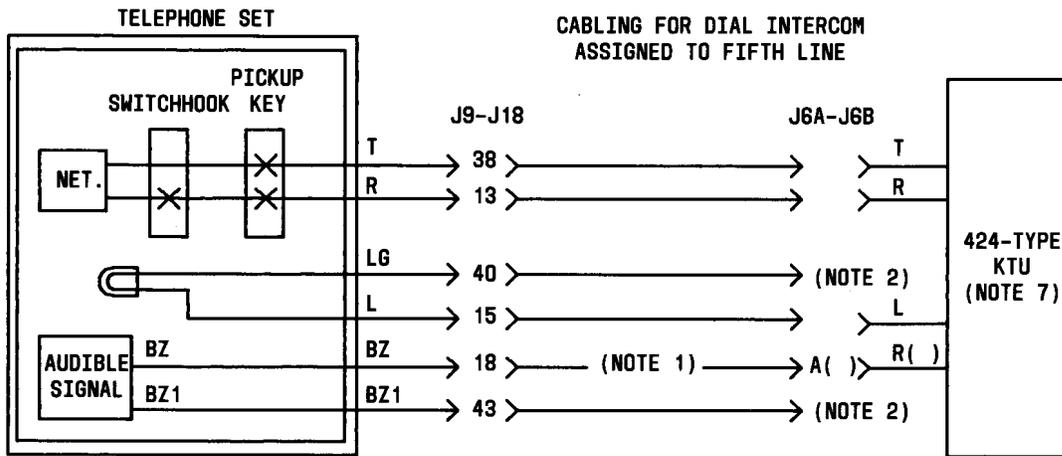
**NOTES:**

1. THE AUDIBLE SIGNALING LEADS ARE INTERNALLY WIRED TO THE KEY TELEPHONE SET CONNECTORS IN THE FOLLOWING MANNER:

KEY TEL SET CONNECTOR	R ( )	J6A TERM.	KEY TEL SET CONNECTOR	R ( )	J6A TERM.
J9	0	A34	J14	5	A20
J10	1	A28	J15	6	A21
J11	2	A23	J16	7	A32
J12	3	A25	J17	8	A30
J13	4	A26	J18	9	A29

2. THE LG AND BZ1 LEADS ARE INTERNALLY STRAPPED TO GROUND
3. THE FIFTH DIP SWITCH AT EACH STATION CONNECTOR MUST BE OPEN WHEN DIAL INTERCOM IS USED
4. TERMINALS 5 AND 6 OF TERMINAL STRIP ON THE 593-TYPE KTU MUST NOT BE STRAPPED WHEN DIAL INTERCOM IS USED
5. REFER TO SECTION 518-215-402 FOR MORE DETAILED INFORMATION ON 407-TYPE KTU

**Fig. 11— 407C KTU Connections (Rotary Dial Intercom, 10-Code Selector) in 593-Type Key Service Unit**



**NOTES:**

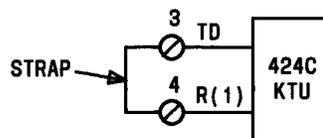
1. THE AUDIBLE SIGNALING LEADS ARE INTERNALLY WIRED TO THE KEY TELEPHONE SET CONNECTORS IN THE FOLLOWING MANNER:

KEY TEL SET CONNECTOR	R ( )	J6A TERM.	KEY TEL SET CONNECTOR	R ( )	J6A TERM.
J9	0	A34	J14	5	A20
J10	*	A28	J15	6	A21
J11	2	A23	J16	7	A32
J12	3	A25	J17	8	A30
J13	4	A26	J18	9	A29

KEY TEL SET CONNECTOR	R ( )	J6A TERM.	KEY TEL SET CONNECTOR	R ( )	J6A TERM.
J10	10	A14	J10	15	A0
	11	A8		16	A1
	12	A22		17	A33
	13	A24		18	A31
	14	A27		19	A9

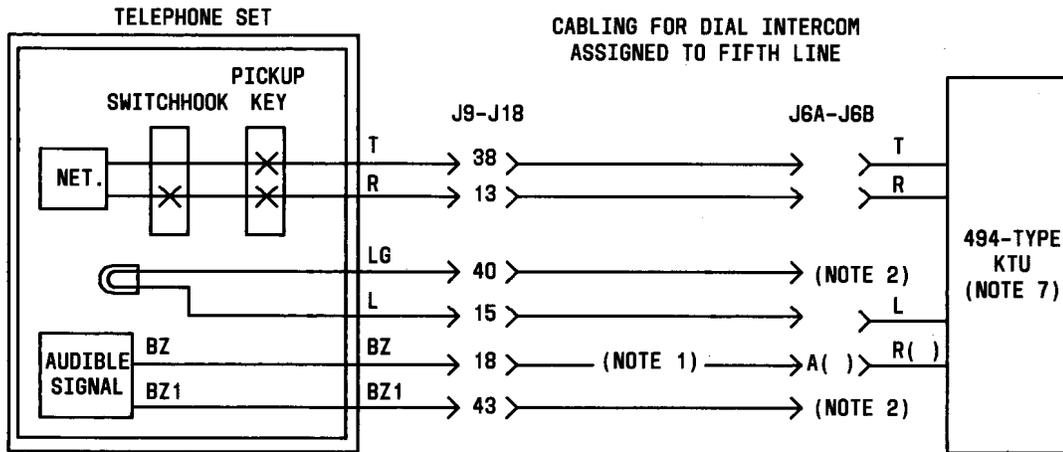
T, R, L, AND R10 THROUGH R19 CAN BE ACCESSED TO PROVIDE DIAL CODES FOR ADDITIONAL STATIONS BY WIRING KEY TELEPHONE SET CONNECTOR J10 TO A 66-TYPE CONNECTING BLOCK \*R(1) IS ASSIGNED AS THE INITIAL DIGIT OF A 2-DIGIT CODE AND CANNOT BE USED AS A STATION CODE. THEREFORE, CONNECTOR J10 DOES NOT HAVE A STATION CODE. R19 CANNOT BE USED FOR A STATION CODE IF DIAL PAGING IS PROVIDED

2. THE LG AND BZ1 LEADS ARE INTERNALLY STRAPPED TO GROUND
3. THE FIFTH DIP SWITCH AT EACH STATION CONNECTOR MUST BE OPEN WHEN DIAL INTERCOM IS USED
4. TO OBTAIN DIAL CODES BEYOND 9, TERMINALS 3 AND 4 OF TERMINAL STRIP ON THE 593-TYPE KSU MUST BE STRAPPED



5. TERMINALS 5 AND 6 OF THE TERMINAL BLOCK ON THE 593-TYPE KSU MUST NOT BE STRAPPED WHEN DIAL INTERCOM IS USED
6. DIAL CODE 19 IS AVAILABLE FOR A STATION AUDIBLE SIGNAL IF IT IS NOT USED FOR DIAL PAGING ACCESS
7. REFER TO SECTION 518-215-402 FOR MORE DETAILED INFORMATION ON THE 424-TYPE KTU

**Fig. 12— 424C KTU Connections (Rotary Dial Intercom, 19-Code Selector) in 593-Type Key Service Unit**



NOTES:

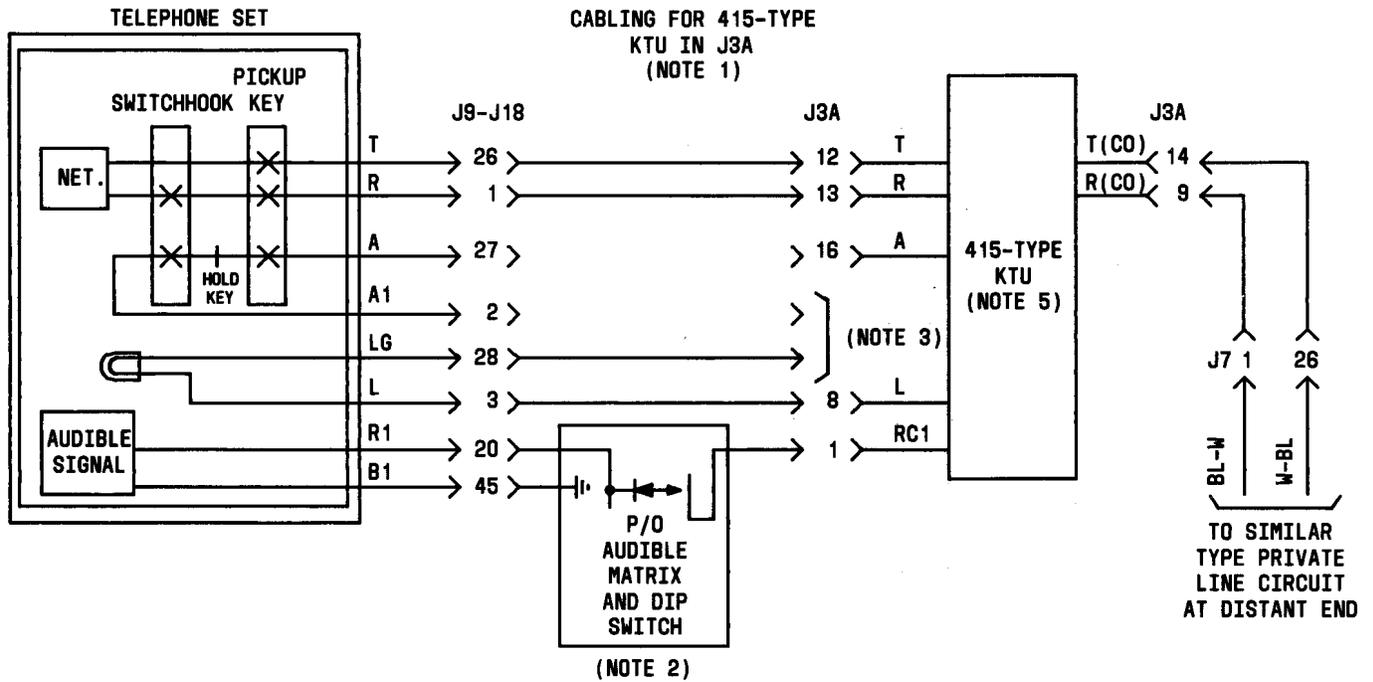
1. THE AUDIBLE SIGNALING LEADS ARE INTERNALLY WIRED TO THE KEY TELEPHONE SET CONNECTORS IN THE FOLLOWING MANNER:

KEY TEL SET CONNECTOR	R( )	J6A TERM.	KEY TEL SET CONNECTOR	R( )	J6A TERM.
J9	0	A34	J14	5	A20
J10	*	A28	J15	6	A21
J11	2	A23	J16	7	A32
J12	3	A25	J17	8	A30
J13	4	A26	J18	9	A29

KEY TEL SET CONNECTOR	R( )	J6A TERM.	KEY TEL SET CONNECTOR	R( )	J6A TERM.
J10	10	A14	J10	15	A0
	11	A8		16	A1
	12	A22		17	A33
	13	A24		18	A31
	14	A27		19	A9

- T, R, L, AND R10 THROUGH R19 CAN BE ACCESSED TO PROVIDE DIAL CODES FOR ADDITIONAL STATIONS BY WIRING KEY TELEPHONE SET CONNECTOR J10 TO A 66-TYPE CONNECTING BLOCK
- \*R(1) IS ASSIGNED AS THE INITIAL DIGIT OF A 2-DIGIT CODE AND CANNOT BE USED AS A STATION CODE. THEREFORE, CONNECTOR J10 DOES NOT HAVE A STATION CODE. R19 CANNOT BE USED FOR A STATION CODE IF DIAL PAGING IS PROVIDED
2. THE LG AND BZ1 LEADS ARE INTERNALLY STRAPPED TO GROUND
  3. THE TRANSFER DIGIT IS INTERNALLY STRAPPED FOR DIGIT 1 AND CANNOT BE CHANGED
  4. THE FIFTH DIP SWITCH AT EACH STATION CONNECTOR MUST BE OPEN WHEN DIAL INTERCOM IS USED
  5. TERMINALS 5 AND 6 OF THE TERMINAL BLOCK ON THE 593-TYPE KSU MUST NOT BE STRAPPED WHEN DIAL INTERCOM IS USED
  6. DIAL CODE 19 IS AVAILABLE FOR A STATION AUDIBLE SIGNAL IF IT IS NOT USED FOR DIAL PAGING ACCESS
  7. REFER TO SECTION 518-215-402 FOR MORE DETAILED INFORMATION ON THE 494-TYPE KTU

Fig. 13—494-Type KTU Connections (TOUCH-TONE Service or Rotary and TOUCH-TONE Service, 19-Code Selector) in 593-Type Key Service Unit



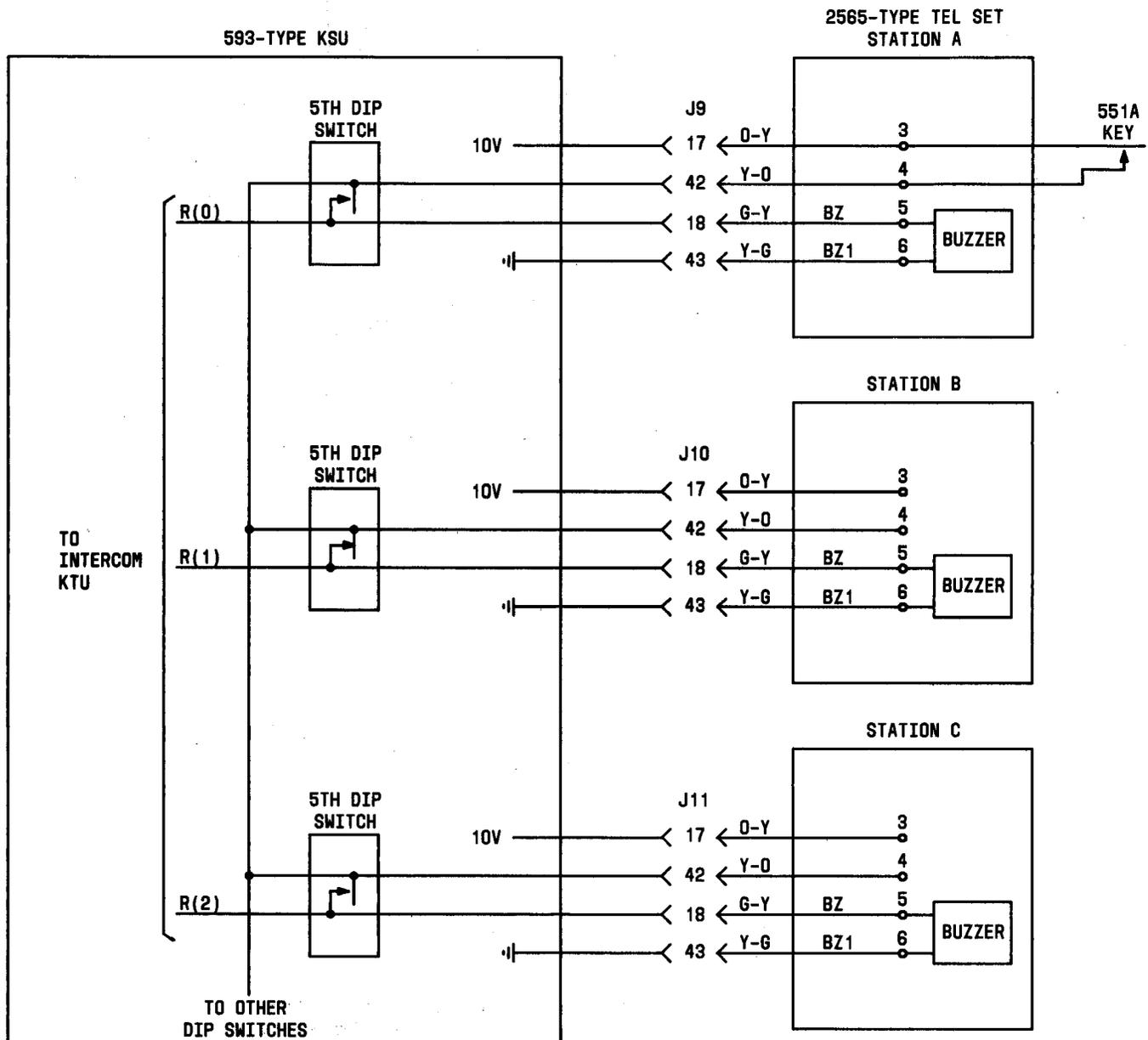
**NOTES:**

1. REFER TO FIG. 4 FOR KEY CABLE TERMINAL ASSIGNMENTS FOR THE REMAINING CO/PBX LINES. THE FOLLOWING TABLE SHOWS JACK ASSIGNMENTS FOR 400-TYPE KTUs:

CKT	JK
1	J3A
2	J4A
3	J3B
4	J4B

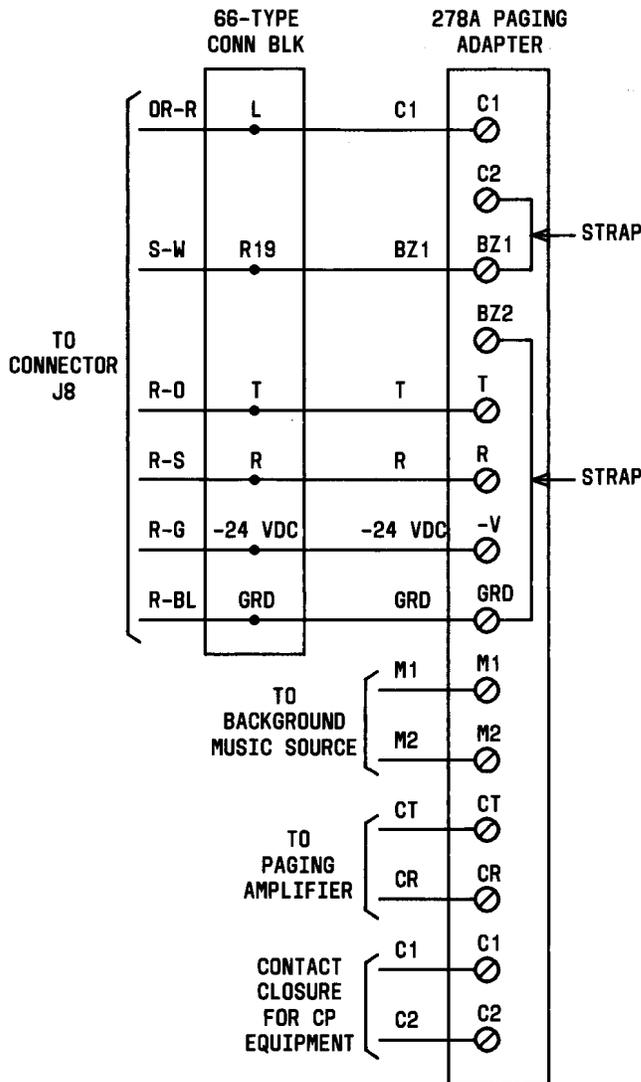
2. COMMON AUDIBLE SIGNALS FOR CO/PBX LINES ARE ASSIGNED BY OPERATING DIP SWITCHES ASSOCIATED WITH EACH KEY TELEPHONE SET CONNECTOR (J9-J18). REFER TO PARAGRAPH 3.16
3. A1, LG, AND B1 LEADS ARE INTERNALLY STRAPPED TO GROUND
4. MUSIC-ON-HOLD CANNOT BE PROVIDED ON CO/PBX LINES WHEN THE 415-TYPE KTU IS USED
5. REFER TO SECTION 518-215-400 FOR MORE DETAILED INFORMATION ON 415-TYPE KTU

**Fig. 14—415-Type KTU Connections (Automatic, DC Signaling, Private Line) in  
593-Type Key Service Unit**



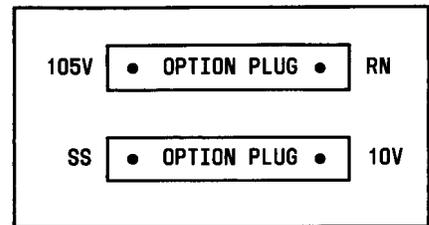
NOTE: STATION A IS EQUIPPED WITH A 551A KEY AND WILL SIGNAL STATION B BECAUSE STATION B HAS THE 5TH DIP SWITCH OPERATED. ALL STATIONS THAT HAVE THE 5TH DIP SWITCH OPERATED WILL BUZZ WHEN A 551A KEY IS OPERATED. THIS SIGNALING ARRANGEMENT CANNOT BE PROVIDED WHEN DIAL INTERCOM IS USED BECAUSE THE 5TH DIP SWITCH AT EACH STATION MUST BE OPEN.

Fig. 15—Typical Wiring of 551A Key for Buzzer Signaling Arrangement



- NOTES:**
1. FOR MANUAL INTERCOM, CONNECT A 551A KEY BETWEEN THE O-Y AND Y-BL PAIR IN THE KEY TELEPHONE SET(S) THAT ACCESS THE PAGING SYSTEM
  2. DIAL PAGING CANNOT BE PROVIDED WITH THE 407-TYPE KTU
  3. WHEN BACKGROUND MUSIC IS REQUIRED, REFER TO OPTION STRAPPING INFORMATION IN SECTION 518-010-116

**Fig. 16—278A Paging Adapter Connections for Dial or Manual Paging Access**



**OPTIONS**

FEATURE	PLUG POSITION
*CO/PBX LIN 105V RINGING	105V - RN
*INTERCOM 10 VAC BUZZER	SS - 10V
CO/PBX LINE 10 VAC BUZZER	RN - 10V
INTERCOM 105V RINGING	SS - 105V

\* FACTORY PROVIDED

**NOTES:**

1. REMOVE THE POWER SUPPLY TO ACCESS THE AUDIBLE SIGNALING OPTION PLUGS
2. IF THE SAME VOLTAGE IS REQUIRED FOR THE SIGNALING ARRANGEMENT, THE OPTION PLUGS SHOULD BE REMOVED AND THE TERMINALS CONNECTED WITH WIRE-WRAPPED STRAPS
3. IF THE FACTORY-PROVIDED SIGNALING OPTIONS ARE CHANGED, THE TELEPHONE SET SIGNALING LEADS MUST BE CHANGED

**Fig. 17—Audible Signal Option Plug Arrangement Available for 593B Key Service Unit Only**

TABLE A

593-TYPE KEY SERVICE UNIT, JACK, AND CONNECTOR ASSIGNMENTS

JACK	ASSIGNMENT	
J1	Receptacle for KS-19175, L1 Interrupter	
J2	Receptacle for 288A1 Power Supply	
J3A	400-Type KTU (CO/PBX Line) or 401-Type KTU (Manual Intercom) or 415-Type KTU (Automatic, DC Signaling, Ringdown Private Line)*	Line 1
J4A		Line 2
J3B		Line 3
J4B		Line 4
J5A	498A KTU (Music-on-Hold)	
J5B	Future Application	
J6A J6B	407-Type KTU (Dial Intercom, Rotary Service—10 Codes) or 424-Type KTU (Dial Intercom, Rotary Selector—19 Codes) or 494A KTU (Dial Intercom, TOUCH-TONE Service—19 Codes) or 494B (Dial Intercom, Rotary and/or TOUCH-TONE Service—19 Codes) or 401-Type KTU (Manual Intercom)†	
J7	Input Connector for CO/PBX Lines	
J8	Connector to Provide Cabling for External Ringers and 278A Paging Adapter	
		<b>DIAL CODE</b>
J9	Connectors Provide Cabling Connections for Key Telephone Sets (J10 Provides Intercom Codes R10 Through R19 Audible Signal Leads)‡	0
J10		1
J11		2
J12		3
J13		4
J14		5
J15		6
J16		7
J17		8
J18		9

\* Music-on-hold cannot be provided for CO/PBX lines when the 415-type KTU is used.

† The 401-type KTU (manual intercom) plugs into J6B only.

‡ When a single digit is assigned as an initial digit of a two digit code, the connector assigned to that digit will not have a station code.

TABLE B

## 593-TYPE KEY SERVICE UNIT CIRCUIT BREAKER ASSIGNMENTS

CIRCUIT BREAKER LOCATION	AMPERES	ASSIGNMENT
Upper Left (10V)	2A	10-Volt AC Feeder for the 400-Type Line Circuits and Auxiliary Cable Connector J8
Upper Right (10V)	2A	10-Volt AC Feeder for the Intercom and Buzzer Circuits
Lower Left (INPUT)	2A	120-Volt AC Input Voltage to the 288A1 Power Supply
Lower Right (24V)	2A	24-Volt DC Feeder for Talk and Signal Battery

TABLE C

**593-TYPE KEY SERVICE UNIT CABLE CONNECTOR  
TERMINAL ASSIGNMENTS**

CONNECTOR J7		
LEAD DESIGNATION	TERMINAL	CO/PBX LINE CABLE COLOR
T(1)	26	W-BL
R(1)	1	BL-W
T(2)	27	W-O
R(2)	2	O-W
T(3)	28	W-G
R(3)	3	G-W
T(4)	29	W-BR
R(4)	4	BR-W
SPARE	30	W-S
	5	S-W
	31	R-BL
	6	BL-R
	32	R-O
	7	O-R
	33	R-G
	8	G-R
	34	R-BR
	9	BR-R
	35	R-S
	10	S-R
	36	BK-BL
	11	BL-BK
	37	BK-O
	12	O-BK
	38	BK-G
	13	G-BK
	39	BK-BR
	14	BR-BK
	40	BK-S
	15	S-BK
	41	Y-BL
	16	BL-Y
42	Y-O	
17	O-Y	
43	Y-G	
18	G-Y	
44	Y-BR	
19	BR-Y	
45	Y-S	
20	S-Y	
46	V-BL	
21	BL-V	
47	V-O	
22	O-V	
48	V-G	
23	G-V	
49	V-BR	
24	BR-V	
50	V-S	
25	S-V	

CONNECTOR J8		
LEAD DESIGNATION	TERMINAL	AUXILIARY CABLE COLOR
RG(1)	26	W-BL
RC(1)	1	BL-W
RG(2)	27	W-O
RC(2)	2	O-W
RG(3)	28	W-G
RC(3)	3	G-W
RG(4)	29	W-BR
RC(4)	4	BR-W
SPARE	30	W-S
R19	5	S-W
B GRD	31	R-BL
±10V	6	BL-R
T(5)	32	R-O
L(5)	7	O-R
B BAT.	33	R-G
SPARE	8	G-R
SPARE	34	R-BR
SPARE	9	BR-R
R(5)	35	R-S
SPARE	10	S-R
	36	BK-BL
	11	BL-BK
	37	BK-O
	12	O-BK
	38	BK-G
	13	G-BK
	39	BK-BR
	14	BR-BK
	40	BK-S
	15	S-BK
	41	Y-BL
	16	BL-Y
	42	Y-O
	17	O-Y
	43	Y-G
	18	G-Y
	44	Y-BR
	19	BR-Y
	45	Y-S
	20	S-Y
	46	V-BL
	21	BL-V
	47	V-O
22	O-V	
48	V-G	
23	G-V	
49	V-BR	
24	BR-V	
50	V-S	
25	S-V	

TABLE C (Contd)

**593-TYPE KEY SERVICE UNIT CABLE CONNECTOR  
TERMINAL ASSIGNMENTS**

CONNECTOR J9 THROUGH J18		
LEAD DESIGNATION	TERMINAL	STATION CABLE COLOR
T(1)	26	W-BL
R(1)	1	BL-W
A(1)	27	W-O
A1(1)	2	O-W
LG(1)	28	W-G
L(1)	3	G-W
T(2)	29	W-BR
R(2)	4	BR-W
A(2)	30	W-S
A1(2)	5	S-W
LG(2)	31	R-BL
L(2)	6	BL-R
T(3)	32	R-O
R(3)	7	O-R
A(3)	33	R-G
A1(3)	8	G-R
LG(3)	34	R-BR
L(3)	9	BR-R
T(4)	35	R-S
R(4)	10	S-R
A(4)	36	BK-BL
A1(4)	11	BL-BK
LG(4)	37	BK-O
L(4)	12	O-BK
T(5)	38	BK-G
R(5)	13	G-BK
A(5)‡	39	BK-BR
A1(5)	14	BR-BK
LG(5)	40	BK-S
L(5)	15	S-BK
R19	41	Y-BL
±10V*	16	BL-Y
5TH DIP SWITCH	42	Y-O
±10V	17	O-Y
BZ1†	43	Y-G
BZ†	18	G-Y
SPARE	44	Y-BR
SPARE	19	BR-Y
B1	45	Y-S
R1	20	S-Y
R10*	46	V-BL
R11*	21	BL-V
R12*	47	V-O
R13*	22	O-V
R14*	48	V-G
R15*	23	G-V
R16*	49	V-BR
R17*	24	BR-V
R18*	50	V-S
SPARE	25	S-V

\* Appears only in connector J10.

† Refer to Fig. 11, 12, or 13 for connector dial code assignments.

‡ Appears on terminal 6 of the terminal strip on 593-type KSU.