telephones must be type 44 telephones, or they must be standard single-line telephones modified for A-lead control. When used as intercom stations, a six-conductor line cord is required if a separate signaling device is used. (The six leads are T, R, A, A1, RC, and RG.)

B. Multibutton Telephones

2.38 The system can be arranged to make use of six-button, ten-button, or twenty-button telephones. The type of telephone for each station must be determined on the basis of the lines and features the user is to access. A six-button telephone will permit access to a maximum of five lines. A ten-button telephone will permit access to a total of nine lines. A twenty-button telephone will permit access to a total of nineteen lines. Features such as manual intercom, paging access, etc., which require button access, will reduce the number of buttons available for line assignment at each station.

3. INSTALLATION PLANNING

3.01 In planning an installation, both the immediate and future needs of the customer should be considered. The system should be able to take care of the customer's immediate needs, and be flexible enough to permit additions as the customer's future needs dictate. Consider the following when planning an installation.

EQUIPMENT LOCATION

3.02 The 501A KSU can be installed as a wall-mounted unit or as a free-standing floor unit. In either case adequate space must be provided in front of and on either side of the unit to permit access for installation and maintenance. Room should be provided on the right to allow opening the hinged equipment frame to expose the connecting blocks and the wiring on the back of the frame.

3.03 Space for an MDF must be provided on either the right side or the left side of the unit. The MDF is required to mount connecting blocks for distributing station cables throughout the building, cross-connecting stations and CO/PBX lines, and mounting equipment such as protectors for off-premises extensions and tie lines, paging equipment, and a music source. Ideally the MDF should be of sufficient size to accommodate any additional connecting blocks or equipment which may be added to the system at a later date.

3.04 The 501A KSU must be located within five feet of a 110 VAC, 60 Hz service outlet. The outlet must be the three-wire grounded type, and must not be on a circuit shared by any other equipment. The outlet must not be controlled by a switch.

ENVIRONMENT

3.05 The equipment should be located in an area that is not subject to extremes in temperatures and humidity. The area should be clean, well ventilated, and properly lighted. The equipment should not be located in a passageway or aisle used for moving machinery or vehicles, and it should not be located near equipment which produces strong magnetic or RF fields.

LOOP LIMITS

3.06 To minimize the length of cable runs, the equipment should be located in an area central to all telephones. This will lessen the possibility of problems which could arise from excessive loop lengths. The loop limit for key telephones should not exceed 50 Ohms. The loop limit for single-line telephones must not exceed 1200 Ohms.

4. INSTALLATION

UNPACKING AND INSPECTION

4.01 Remove the 501A KSU from the packing carton and place it with the back down on a flat surface. Loosen the two cover-holding screws, then raise the bottom edge of the cover and slide the cover toward the top edge of the frame. When the cover disengages from the top of the frame, lift it straight up.

4.02 Set the cover aside and inspect the KSU for any signs of damage. Make a note of any damage and report it promptly.

KSU MOUNTING

4.03 Use lag screws or the equivalent to mount the KSU on the wall or MDF backboard. Measure and mark the center of each hole. Drill the pilot holes, then insert and partially tighten each screw. Slip the KSU over the mounting screws, then tighten each screw. Typical mounting dimensions for a floor-mounting model are shown in Figure 4.

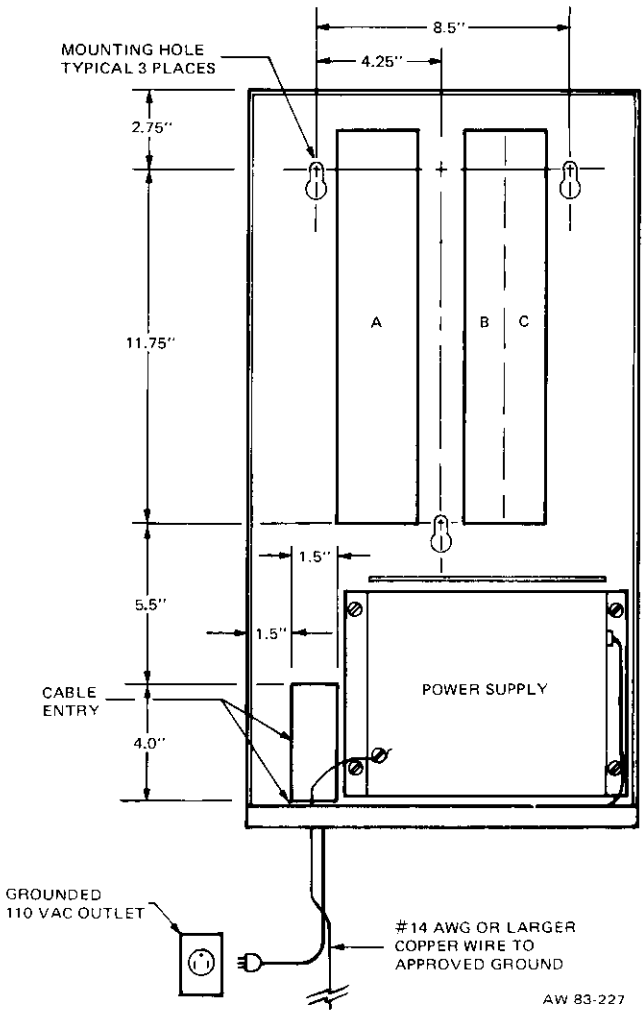

Figure 4: Mounting and Grounding the KSU

POWER SUPPLY

4.04 The 501A KSU can be ordered with or without a power supply. The power supply mounts in the lower right-hand corner of the KSU backboard. It attaches to the backboard with four machine screws. A length of six-pair cable is used to connect the power supply outputs to connecting block C on the backboard. Power supply cable connections are shown in Figure 5.

FRAME GROUND

4.05 Use a piece of #14 AWG or larger, insulated, stranded copper wire to construct an external ground. Strip about 3/8 of an inch of insulation from one end of the wire and connect a #10 ground lug. Feed the ground wire through the cable opening in the bottom of the frame shelf, and connect the ground lug to the external ground terminal on the power supply. Use a ground rod clamp or equivalent to connect the other end of the ground wire to an approved ground.

POWER SUPPLY ADJUSTMENT

4.06 Before operation of the system, test and adjust the power supply as follows:

(a) Plug the power cord into the service outlet.

(b) Use a VOM set to the proper DC voltage scale to measure A battery and B battery.

(c) If readings are lower than 21 Volts, unplug the power cord and move the primary tap from the 117V terminal to the 111V terminal at the top of the power supply.

(d) If readings are higher than 28 Volts, unplug the power cord and move the primary tap from the 117V terminal to the 123V terminal.

MDF ARRANGEMENT

4.07 Mount the backboard for the MDF. Then mount the connecting blocks, D rings, and any other applicable equipment. The functions and types of connecting blocks to be mounted are as follows:

(a) Mount one 50-pair block for the incoming CO/PBX lines. Designate this block the CO block.

(b) Mount one or two 25-pair connecting blocks for extending KSU block A. Designate the block(s) the KSU block(s).

(c) Mount one or more 50-pair blocks for single-line telephones and for miscellaneous equipment such as paging, music-on-hold, etc. Designate the block(s) the MISC block(s).

(d) Mount one 50-pair block for every two multibutton (6-line or 10-line) telephones. Designate these blocks the STA (station) blocks.

4.08 The layout of a typical MDF for a 501A KSU is shown in Figure 6.

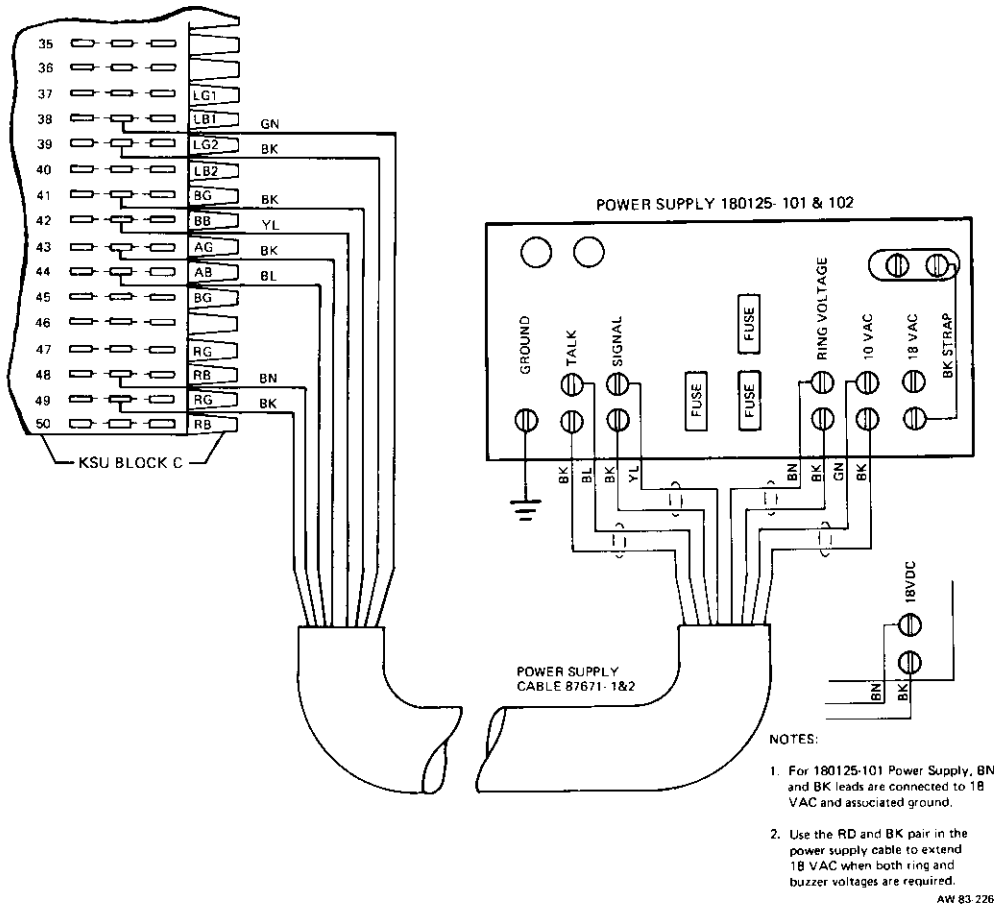

Figure 5: Power Supply Cabling

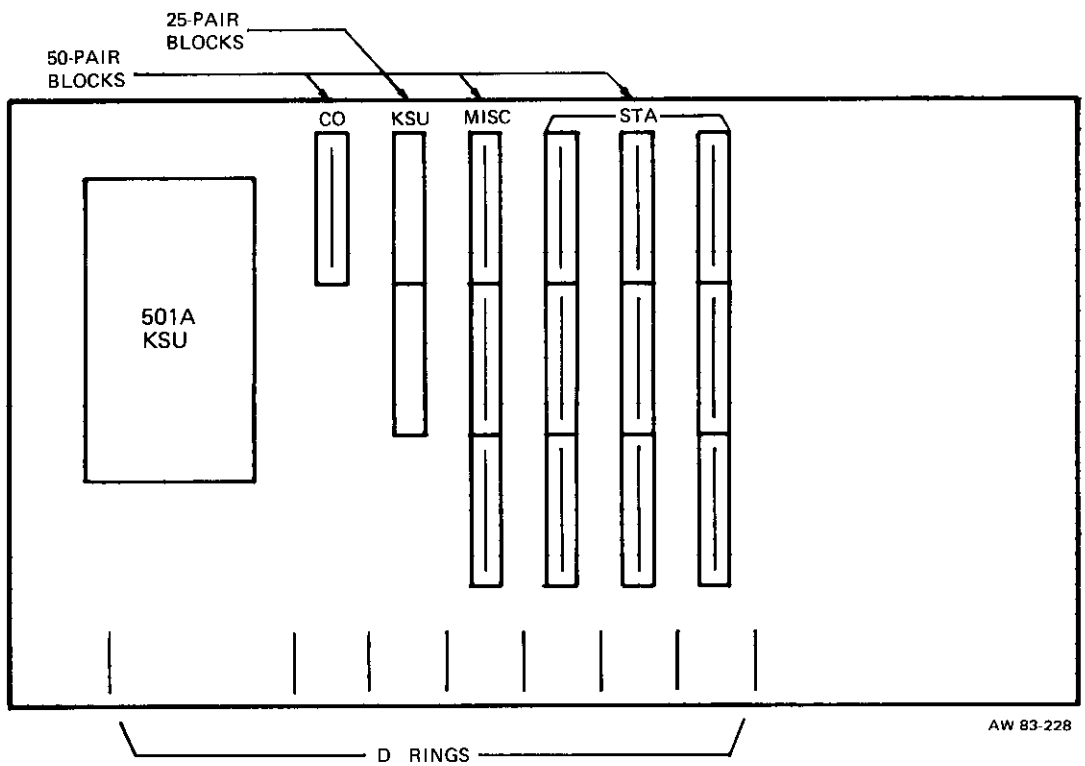

Figure 6: Typical MDF Layout For 501A KSU

EXTENSION BLOCK CABLING

4.09 To cable an extension of KSU block A:

(a) Strip about 2½ feet of sheath off one end of a length of 25-pair cable.

(b) Insert the stripped end of the cable through the cable entry in the backboard or the bottom plate of the KSU and through one of the holes in the KSU cable clamp. Tighten the clamp to secure the cable.

(c) Punch the cable leads down on the left side of blocks A and B in the order shown in Figure 7. Pass the B1 and R1 leads for each circuit across the top of block A and between blocks A and B.

(d) Cut the cable to the length required to reach the 25-pair extension block on the MDF.

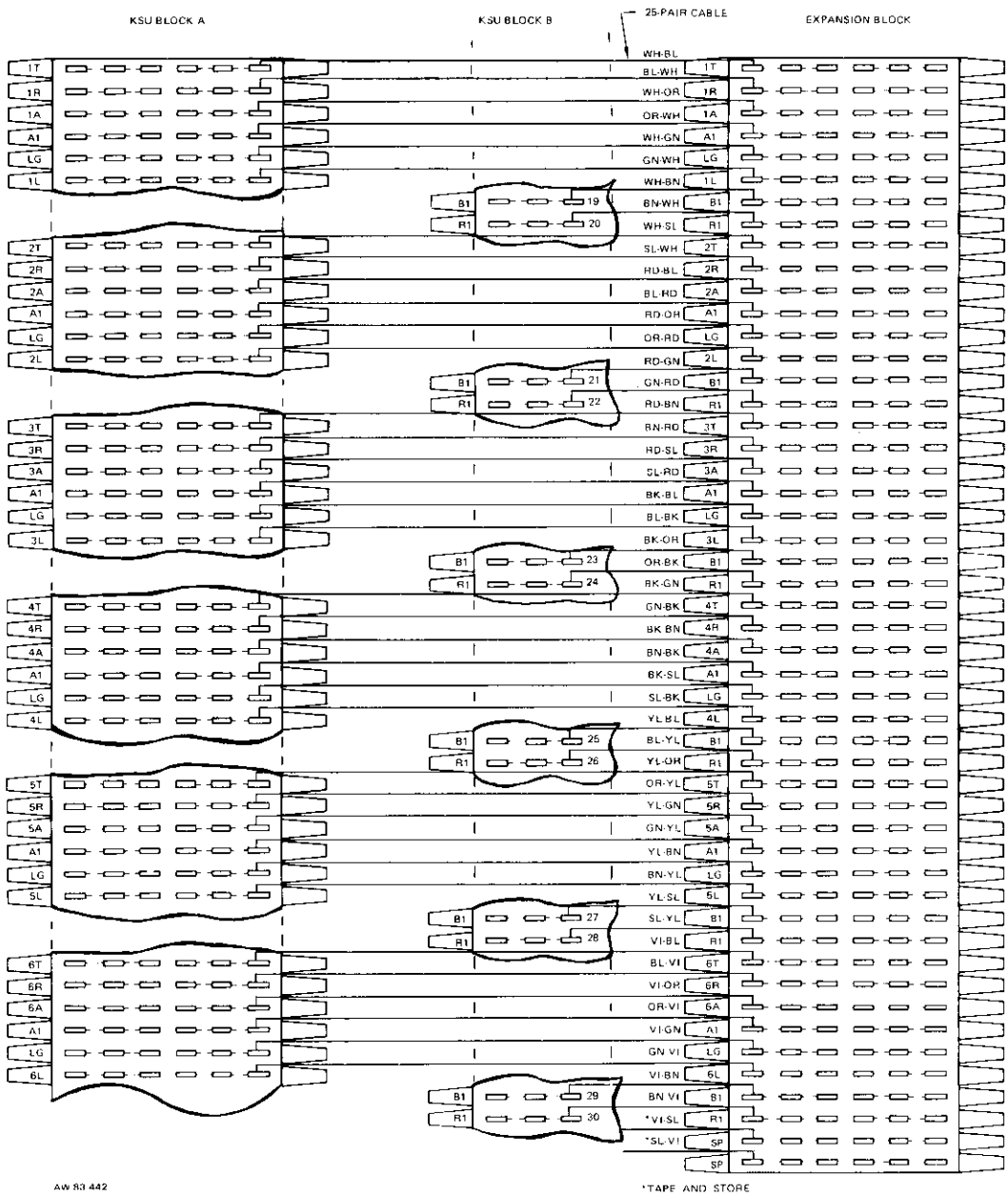

Figure 7: MDF Expansion Block Cabling

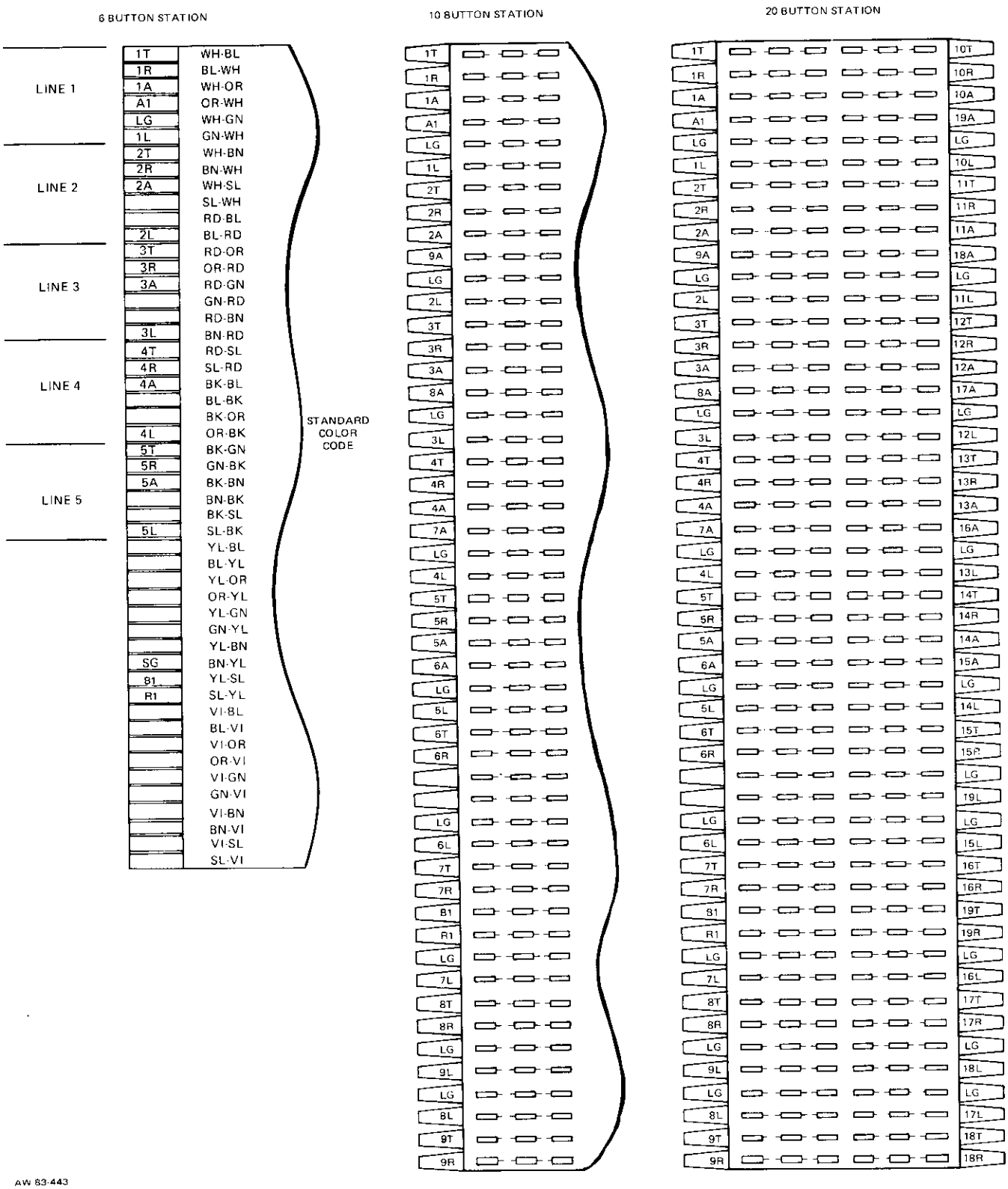

Figure 8: Typical Station Block Layouts

(e) Strip the end of the cable and punch the leads down in the standard color code order.

(f) If a second extension block is required, use a short length of 25-pair cable to multiple the terminals on the first extension block to the second.

STATION CABLING

4.10 Connect the 25-pair station cable from each multibutton telephone to one side of a station connecting block. Punch each cable down following the standard color code order. Label each block with the station identification and the proper lead designations. Refer to the applicable Telephone Apparatus Practice or circuit label for lead designations. For reference, typical station block layouts for 6, 10, and 20 button telephones are shown in Figure 8.

4.11 For each single-line station, punch down the station cable on the MISC connecting block. Use two-pair (quad) wire for telephones dedicated to a CO/PBX line; use three-pair wire for telephones serving as intercom stations. Label the block with the station line or intercom number and the proper lead designations.

LINE CARD KTU

4.12 One line card KTU (400E or equivalent) is required for each CO or PBX line serving the system. Strap each line card for the required options, then insert each card into the desired KSU card connector. Cross-connect each KTU as detailed in the following paragraphs. Use standard one-pair and three-pair cross-connect wire.

A. Line Cross-Connections

4.13 On KSU connecting block C, locate the Tn and Rn terminals associated with the card connector into which the line KTU was inserted. Cross-connect these terminals to the CO connecting block on the MDF for connection to the CO/PBX line. Use bridging clips to complete the connection to the CO/PBX line. (Refer to Figure 9 for connecting details.)

Note: In the preceding paragraph and in paragraphs that follow, the subscript "n" preceding or following a terminal or lead designation represents a numeral 1-6 that corresponds to a KSU card connector.

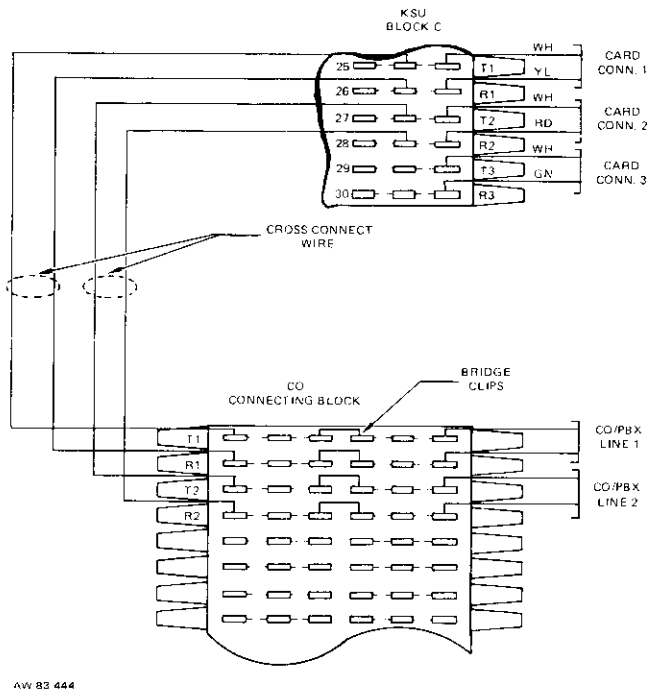

Figure 9: Connecting Details, Line KTU to CO/PBX Line

B. Station Cross-Connections

4.14 On KSU connecting block A, or on the KSU expansion block on the MDF, locate the T, R, A, A1, LG, and L terminals associated with the card connector for the line card KTU. Cross-connect the T, R, A, A1, LG, and L terminals to the corresponding terminals for the selected line key on the assigned station connecting block. An example of this cross-connection is shown in Figure 10.

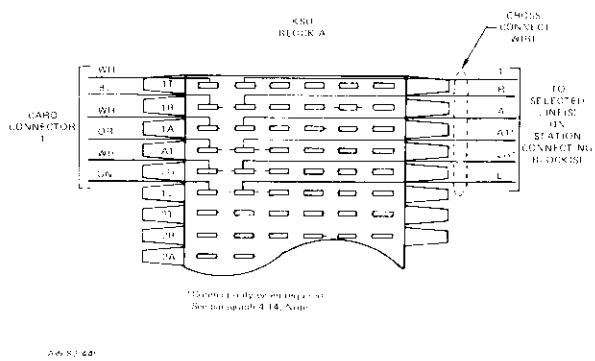

Figure 10: Connecting Details, Line KTU to Multibutton Station

Note: If the A1 terminal of any card connector is already connected to the A1 terminal of the first line on the station block, the A1 cross-connection can be omitted.

4.15 For a single-line telephone used as a line answering station, cross-connect the T, R, A, and A1 terminals on connecting block A or on the KSU expansion block on the MDF to the corresponding terminals on the MISC connecting block. Use bridging clips to complete the connections to the single-line telephone. (Refer to Figure 11.)

Note: In systems using 400-TPL or 400-PFL line card KTUs, single-line telephones used as CO/PBX line answering stations will not ring unless a 346A KTU is installed (see paragraph 4.21).

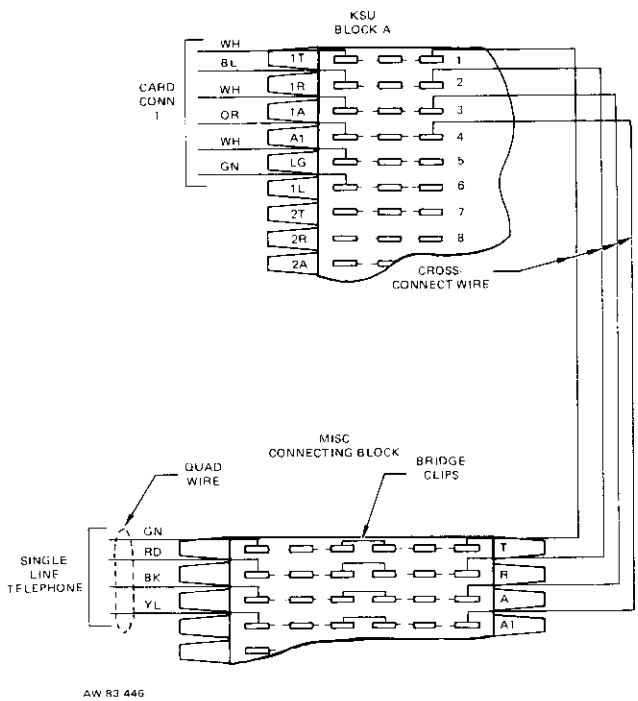

Figure 11: Connecting Details, Line KTU to Single-Line Station

C. Ringer Assignments

4.16 On KSU connecting block B, locate the B1 and R1 terminals associated with the card connector for the line card KTU. Connect the B1 terminal to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the R1 terminal to the SL-YL lead on the station block. Multiple the connections to the station block of each telephone that is to ring. See Figure 12 for connecting details.

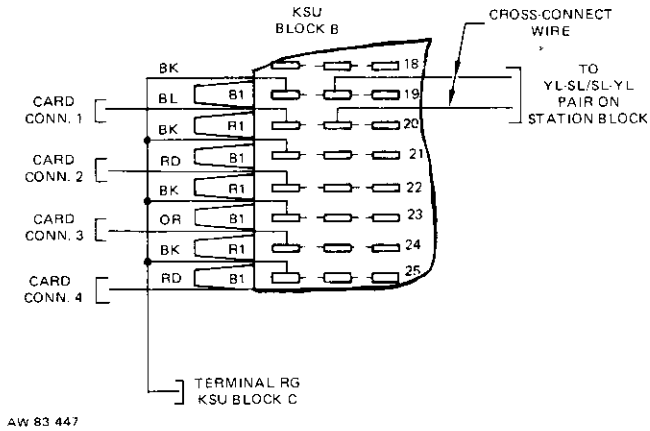

Figure 12: Connecting Details, Ringer Assignment

MANUAL INTERCOM SERVICE

4.17 The 401B manual intercom KTU can be used to connect a group of stations to a common talk path, or it can be used to provide a private talk path between two stations. For manual intercom service, insert the 401B manual intercom KTU into an unused KSU card connector, then cross-connect the equipment as follows:

(a) On KSU connecting block C, connect terminal AB (C44) to the AB terminal (C2, C4, C6, C8, C10, or C12) associated with the card connector into which the 401B KTU was inserted. Connect terminal AG (C43) to the corresponding AG terminal (C1, C3, C5, C7, C9, or C11). An example of these cross-connections is shown in Figure 13. The example shows A Battery and A Ground wired to card position 2.

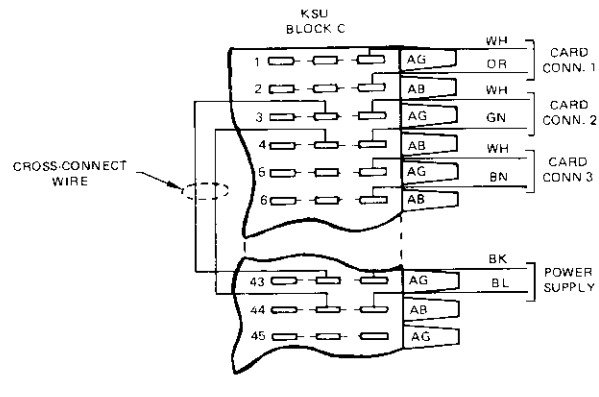

Figure 13: Connecting Details, A Battery and A Ground

(b) On KSU connecting block A, or on the KSU expansion block on the MDF, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals to the T, R, L, and LG terminals for the selected line key on the assigned station connecting block. If required, multiple the leads to the line pickup keys of any other assigned stations. Refer to Figure 14 for an example of connecting details.

(c) If necessary, arrange the associated telephones for button and buzzer signaling. (Refer to the applicable Telephone Apparatus Practice for details.)

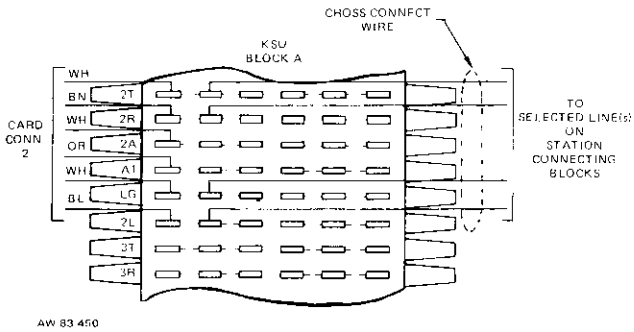

Figure 14: Connecting Details, Intercom KTU to Multibutton Station

(d) For low voltage buzzer signaling, arrange connecting block C on the 501A KSU as follows. (Refer to Figure 15.)

(1) Remove the brown jumper between terminals C50 and C48.

(2) Remove the brown jumper between terminals C49 and C47.

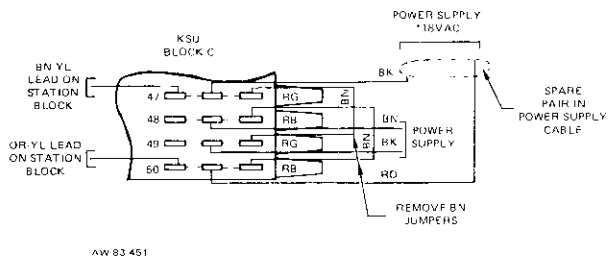

Figure 15: Connecting Details, Buzzer Signaling

(3) Connect the red lead in the power supply cable from ±18VAC on the power supply to terminal C50.

(4) Connect the black lead of the red/black pair in the power supply cable from ±18VAC GND on the power supply to terminal C47.

(5) Multiple terminal C50 (±18VAC) to the OR-YL lead on the station block of each telephone to be signaled.

(6) Multiple terminal C47 (Buzzer ground) to the BN-YL (SG) lead on the station block of each six-button telephone with a signal pushbutton.

Note: On a 10-or 20-button telephone it is not necessary to connect buzzer ground as the ground is common via the A1 lead.

BUTTON ACCESS PAGING

4.18 The 401B manual intercom KTU can also be used for button access to a PA system for voice paging. For such applications insert the 401B KTU into an unused KSU card connector; then arrange the equipment as follows:

(a) On KSU connecting block C, connect terminal AB (C44) to the AB terminal (C2, C4, C6, C8, C10, or C12) associated with the card connector into which the 401B KTU was inserted. Connect terminal AG (C43) to the corresponding AG terminal (C1, C3, C5, C7, C9, or C11). Refer to Figure 13 for an example of this cabling.

(b) On KSU connecting block A, or on the KSU expansion block on the MDF, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals as follows:

(1) Connect the T, R, L, and LG terminals to the T, R, L, and LG terminals of the selected line key on the assigned station connecting block. If required, multiple the leads to the line keys of any other assigned telephones. (Refer to Figure 16.)

(2) Connect the T and R terminals to the MISC connecting block on the MDF for cross-connection to the paging amplifier.

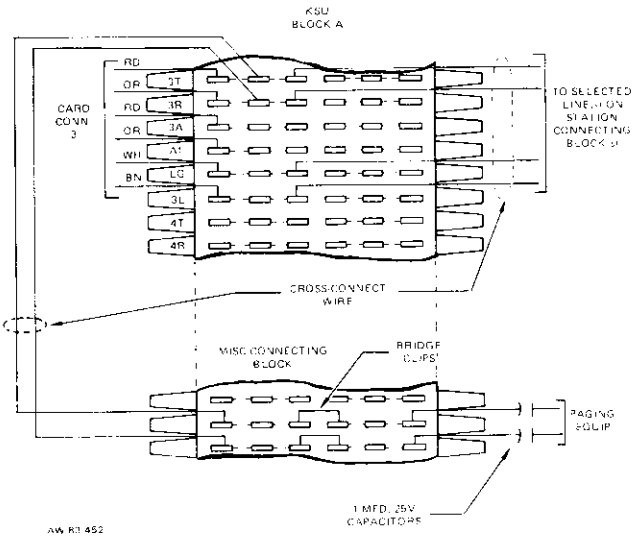

Figure 16: Connecting Details, Intercom KTU to Paging Equipment

(c) On each assigned telephone, convert the line pickup key used for paging access to non-locking operation.

(d) On the MISC connecting block directly across from the T and R appearances of the 401B KTU, connect the input leads to the PA system. Connect a 1 MFD, 25 Volt capacitor in series with each lead. Use bridge clips to complete the circuit to the PA equipment.

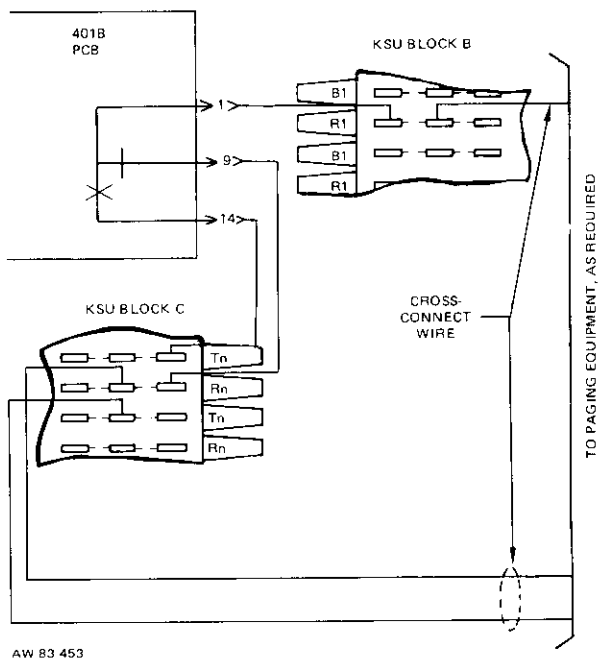

Figure 17: Connecting Details, Paging Equipment ON/OFF Control

(e) For on/off control of the paging amplifier, connect KSU card connector pins 1, 9, and 14 as required. Use pins 1 and 14 for a make contact set. Use pins 1 and 9 for a break contact set. Pin 1 corresponds to terminal R1 for the KSU card connector on KSU block B. Pins 14 and 9 correspond to terminals Tn and Rn, respectively, for the KSU card connector on KSU block C. See Figure 17 for connecting details.

MUSIC-ON-HOLD

4.19 For music-on-hold service, one 403A KTU is required. The 403A KTU mounts into a card panel adapter such as the 359A. The card panel adapter can be mounted on the 501A KSU or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions for mounting and wiring the card panel adapter.

4.20 Install the 403A KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 18.

CARD PANEL ADAPTER PIN NUMBER		MOH KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0		N/C
2	1	1	MUS 1
3	2	2	MUS 1
4	3	3	MUS 2
5	4	4	MUS 2
6	5	5	MUS 3
7	6	6	MUS 3
8	7	7	MUS IN
9	8	8	MUS IN
10	9	9	A BAT
11	10	10	NOT USED
12	11	11	AG
13	12	12	NOT USED
14	13	13	MUS 4
15	14	14	MUS 4
16	15	15	MUS 5
17	16	16	MUS 5
18	17	17	MUS 6
19	18	18	MUS 6
20	19		N/C

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Figure 18: Music-On-Hold KTU Connections

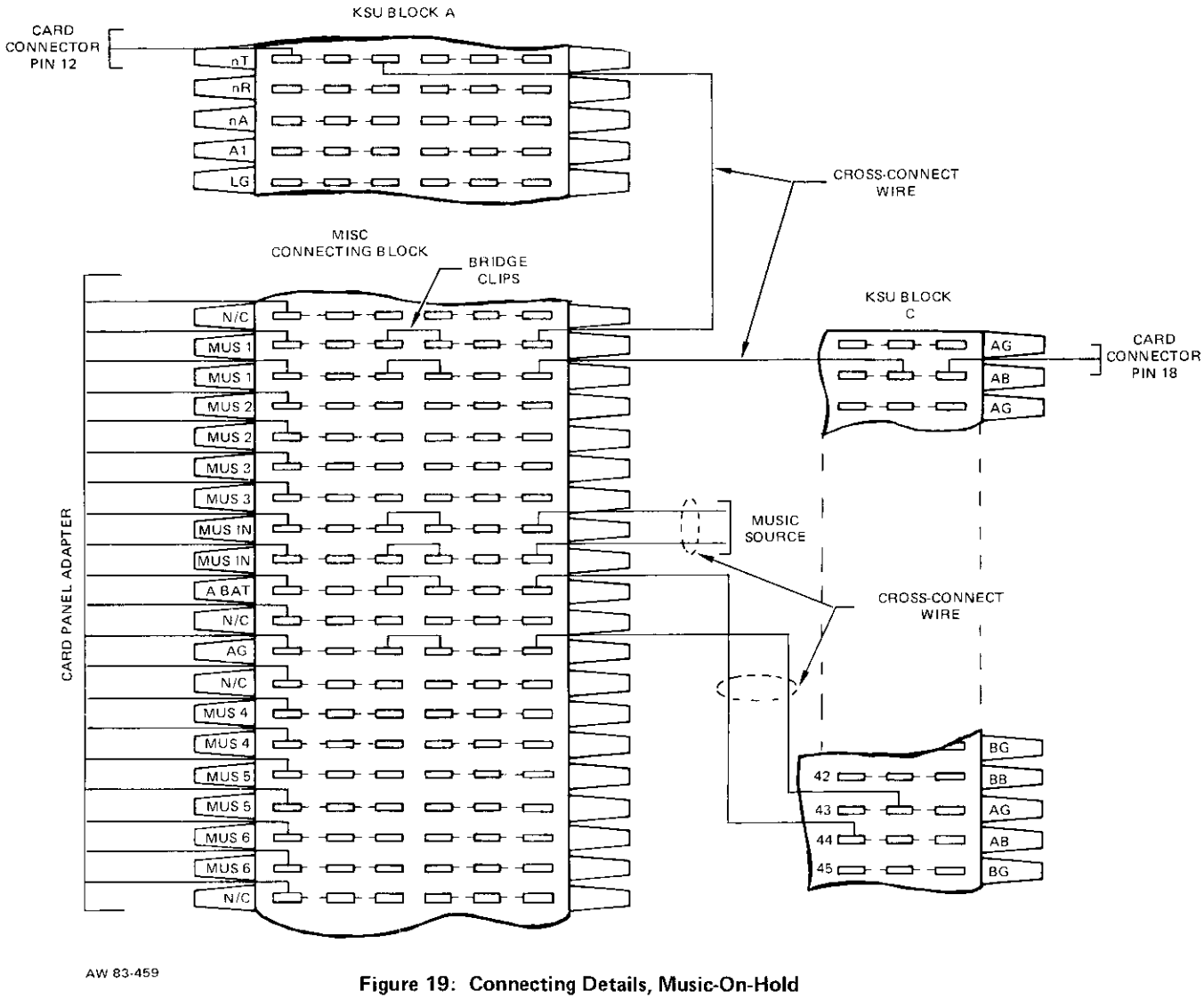

Figure 19: Connecting Details, Music-On-Hold

(b) On KSU connecting block C, connect terminal AB (C44) to the terminal across from the A BAT terminal on the MISC connecting block. See Figure 19 for details.

(c) On KSU connecting block C, connect terminal AG (C43) to the terminal across from the AG terminal on the MISC connecting block.

(d) Connect the output of the music source to the terminals across from the MUS IN terminals on the MISC connecting block.

(e) Connect the terminal across from one of the MUS 1 terminals to the AB terminal (C2, C4, C6, C8, C10, or C12) associated with the card connector for the selected line card KTU. The AB terminal corresponds to pin 18, the MOH input, on the line card KTU.

(f) Connect the terminal across from the other MUS 1 terminal to the nT terminal for the selected line card KTU on KSU connecting block A, or on the KSU expansion block on the MDF.

(g) Use bridging clips to complete the connections to the 403A music-on-hold KTU.

(h) If required, connect the MUS 2 through MUS 6 terminals to the assigned line card KTUs as described in steps (e), (f), and (g).

OFF-PREMISES LINE

4.21 The 346A off-premises line KTU is used to add standard two-wire telephones to a CO/PBX line. A maximum of six single-line telephones may be connected in parallel across the circuit. Maximum loop resistance is 1200 Ohms. If Tel-Touch telephones are used, loop resistance is limited to 500 Ohms.

4.22 In a 501A KSU not equipped with a dial intercom, install the 346A KTU as follows for a CO/PBX line station:

(a) Insert the 346A KTU into any unused card connector on the KSU.

(b) On KSU connecting block C, connect terminal AB (C44) to the AB terminal (C2, C4, C6, C8, C10, or C12) associated with the card connector into which the 346A KTU was inserted. Connect terminal AG (C43) to the corresponding AG terminal (C1, C3, C5, C7, C9, or C11). Refer to Figure 13 for an example of this cabling.

(c) On KSU connecting block A, or on the KSU expansion block on the MDF, locate the T, R, and A terminals associated with the card connector for the 346A KTU. Cross-connect these terminals to the T, R, and A terminals for the associated line card KTU as shown in Figure 20.

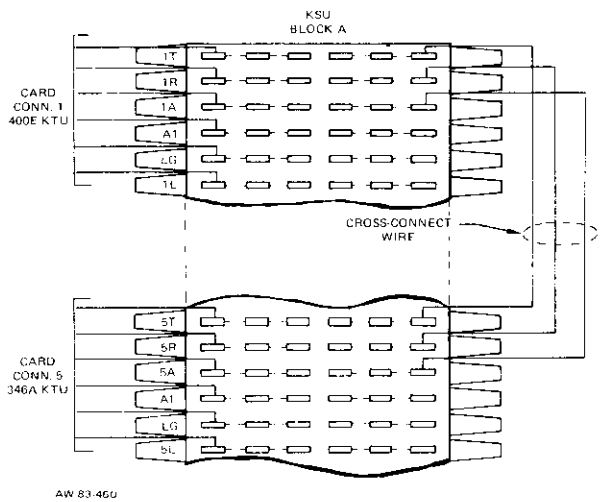

Figure 20: Connecting Details, 346A KTU to Line Card KTU

(d) On KSU connecting block C, connect the Tn and Rn terminals associated with the card connector for the 346A KTU to the MISC connecting block on the MDF for connection to the single-line telephone. (See Figure 21.) Multiple the leads to all assigned single-line telephones.

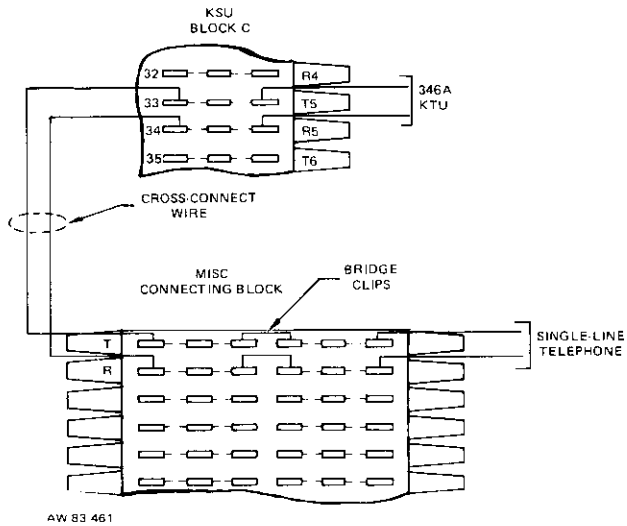

Figure 21: Connecting Details, 346A KTU to Single-Line Station

(e) On KSU connecting block B, connect the R1 terminal for the 346A KTU to the R1 terminal for the associated line card KTU as shown in Figure 22.

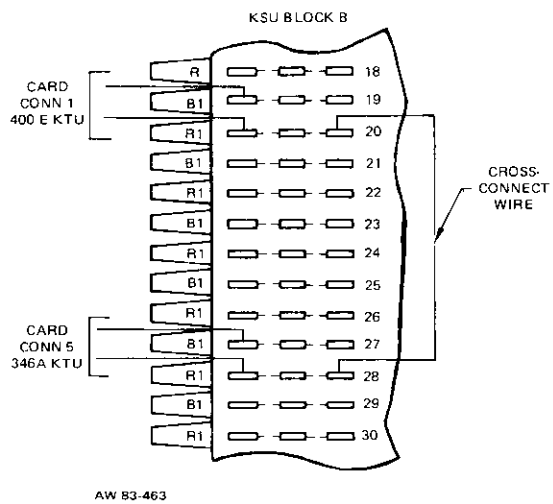

Figure 22: Connecting Details, R1 Lead

MULTILINE EXCLUSION

4.23 One 405A multiline exclusion KTU is used in conjunction with one or two 400E line card KTUs to provide exclusion (privacy) to one or two CO/PBX lines. The 405A KTU mounts into a 20-contact card connector such as the 359A one-card panel adapter, or into the 259B two-card panel adapter. The card panel adapter can be mounted on the 501A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.24 Instructions for installing both the 405A multiline exclusion KTU and the associated 400E line card KTU(s) are provided in the following paragraphs. These instructions will have to be modified accordingly if the line card KTU(s) are already installed.

A. Exclusion KTU Installation

4.25 Install the 405A KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 23.

CARD PANEL ADAPTER PIN NUMBER		EXCLUSION KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	N/C
2	1	1	1(1A)
3	2	2	2(1A)*
4	3	3	3(1R)*
5	4	4	4(1R)
6	5	5	5(2A)
7	6	6	6(2A)**
8	7	7	7(2R)**
9	8	8	8(2R)
10	9	9	9(LB)
11	10	10	10(EL)
12	11	11	BG
13	12	12	12(2T)**
14	13	13	13(2T)
15	14	14	14(2A)
16	15	15	15(1T)*
17	16	16	16(1T)
18	17	17	BB
19	18	18	18(S)
20	19	19	19(1A)

* To excluded phone, line 1
** To excluded phone, line 2

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Figure 23: Exclusion KTU Connections

(b) On KSU connecting block C, make the following connections:

(1) Connect terminal LB1 (C38) to the terminal across from terminal 9(LB) on the MISC connecting block.

(2) Connect terminal BB (C42) to the terminal across from terminal BB on the MISC connecting block.

(3) If the controlling station uses a non-locking signal key to activate exclusion, connect terminal BG (C41) to the terminal across from terminal BG on the MISC connecting block.

(c) On the station block of the controlling station, connect the signaling circuit as follows:

(1) Connect the A or S terminal of the assigned line pickup key (signal ground lead) to the terminal across from terminal 18(S) on the MISC connecting block. Multiple the signal ground lead to terminal 18(S) of any other exclusion circuit associated with the same telephone.

(2) Connect the associated L (lamp) terminal to the terminal across from terminal 10(EL) on the MISC connecting block.

(3) Connect the associated LG (lamp ground) terminal to terminal LG1 (C37) on KSU connecting block C.

(d) On the station block of the controlling station, locate the T, R, and A terminals for the first and, if necessary, the second excluded line circuit.

(1) Connect the T, R, and A terminals for the first circuit to the terminals across from terminals 16(1T), 4(1R), and 19(1A), respectively, on the MISC connecting block.

(2) If necessary connect the T, R, and A terminals for the second circuit to the terminals across from terminals 13(2T), 8(2R), and 14(2A) respectively on the MISC connecting block.

(e) On the station connecting block for the excluded telephone, locate the T, R, and A terminals for the first and, if necessary, the second excluded line.

(1) Connect the T, R, and A terminals for the first line to the terminals across from terminals 15(1T), 3(1R), and 2(1A), respectively, on the MISC connecting block. Multiple these terminals to the T, R, and A terminals of any other stations having this exclusive line.

(2) If necessary, connect the T, R, and A terminals for the second circuit to the terminals across from terminals 12(2T), 7(2R), and 6(2A), respectively, on the MISC connecting block. Multiple these terminals to the T, R, and A terminals of any other stations having this exclusive line.

(f) Use bridging clips on the MISC connecting block to complete all connections to the 405A exclusion KTU.

B. Line Card Installation

4.26 Strap each 400E line card for the required options. Then insert each card into the desired KSU card connector and cross-connect as follows:

(a) On KSU connecting block C, connect the Tn and Rn terminals of the first excluded line card to the CO connecting block for connection to the CO/PBX line. If a second line circuit is also to be excluded, connect the associated Tn and Rn terminals on block C to the CO connecting block.

(b) On KSU connecting block A, or on the KSU expansion block on the MDF, locate the terminals associated with the card connector for the first line card. Connect the T, R, and A terminals to the terminals across from terminals 16(1T), 4(1R), and 1(1A), respectively, on the MISC connecting block. Connect the L and LG terminals for the first line card to the L and LG terminals for the selected line key on the station connecting block.

(c) If a second line card is provided, locate the terminals associated with the card connector on connecting block A or on the KSU expansion block. Connect the T, R, and A terminals to the terminals across from terminals 13(2T), 8(2R), and 5(2A), respectively, on the MISC connecting block. Connect the L and LG terminals for the second line card to the L and LG terminals for the selected line key on the station connecting block.

(d) On KSU connecting block B, connect the B1 terminal for the first excluded line circuit to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the corresponding R1 terminal on block B to the SL-YL lead of the station block. Multiple the connections to each telephone that is to ring. If required connect the B1 and R1 terminals for the second excluded line in a similar manner.

(e) Use bridging clips on the MISC connecting block to complete the connections to the exclusion KTU.

MANUAL TIE LINE

4.27 For manual tie line service, one 414A KTU is required at each key system for one tie line. The KTU requires a line pickup key and a nonlocking signaling key at the assigned station. The 414A

KTU mounts into a 20-contact card connector on the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the 501A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.28 Strap the 414A KTU for the required options. Then insert the KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 24.

(b) On KSU connecting block C, make the following connections to the MISC connecting block. As shown in Figure 25, use bridge clips to complete the connections to the 414A tie line KTU.

(1) Connect terminal C19 to terminal RN.

(2) Connect terminal C20 to terminal ST.

(3) Connect terminal C21 to terminal LF.

CARD PANEL ADAPTER PIN NO		MAN. TIE LINE KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	RG
2	1	1	RC
3	2	2	N/C
4	3	3	AG
5	4	4	±10V
6	5	5	ST
7	6	6	LG
8	7	7	LF
9	8	8	L
10	9	9	R(T)
11	10	10	±105V
12	11	11	RN
13	12	12	T
14	13	13	R
15	14	14	T(T)
16	15	15	BG
17	16	16	S
18	17	17	BB
19	18	18	AB
20	19	19	SP

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Figure 24: Manual Tie Line KTU Connections

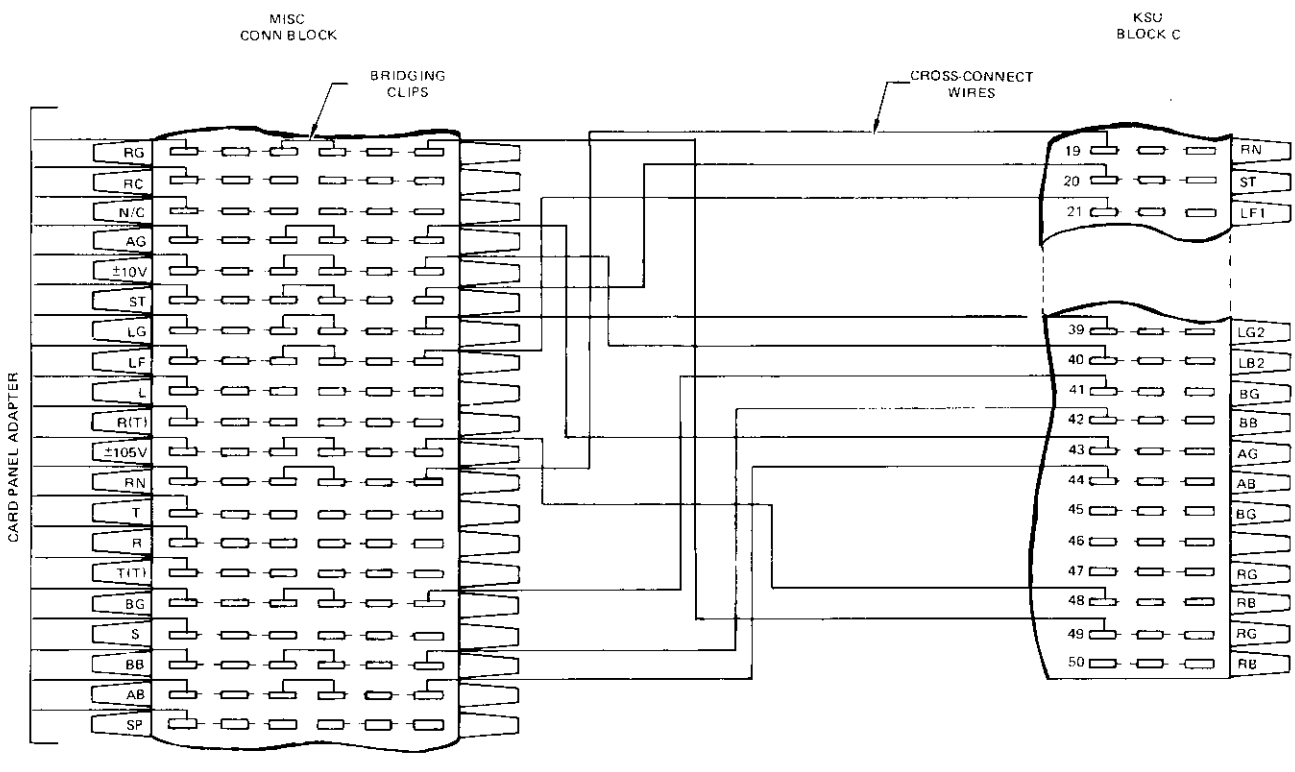

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Figure 25: Connecting Details, 414A/416A KTU Power and Interrupter Wiring

(4) Connect terminal C39 to terminal LG.

(5) Connect terminal C40 to terminal ±10V.

(6) Connect terminal C41 to terminal BG.

(7) Connect terminal C42 to terminal BB.

(8) Connect terminal C43 to terminal AG.

(9) Connect terminal C44 to terminal AB.

(10) Connect terminal C48 to terminal ±105V.

(11) Connect terminal C49 to terminal RG.

(c) On the MISC connecting block, connect the terminals across from terminals R(T) and T(T) to the CO connecting block for connection to the distant office. Connection details are shown in Figure 26.

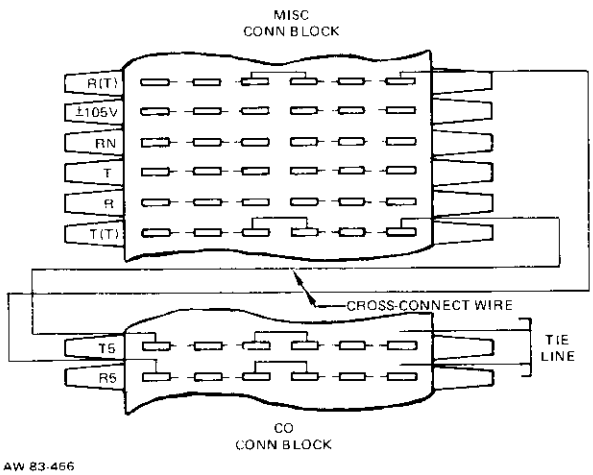

Figure 26: Connecting Details, 414A KTU to Tie Line

(d) On the station connecting block for the assigned telephone, locate the terminals for the selected line key. Connect the T, R, LG, and L terminals to the terminals across from the corresponding terminals on the MISC connecting block on the MDF. Refer to Figure 27.

(e) On the station connecting block, connect the terminal for the YL-SL lead to the terminal across from the RG terminal on the MISC connecting block. Connect the terminal for the SL-YL lead to the terminal across from the RC terminal on the MISC connecting block. Use bridge clips to complete the connections to the 414A tie line KTU.

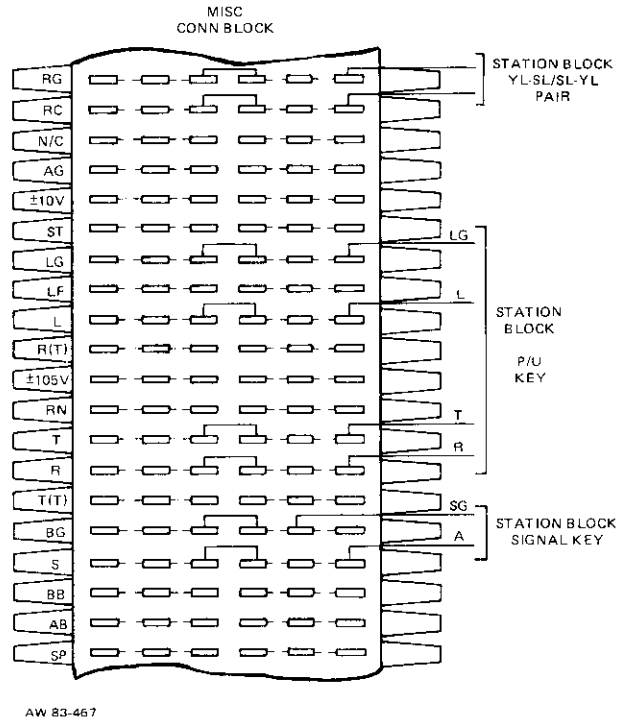

Figure 27: Connecting Details, 414A KTU to Station

(f) On the station connecting block, locate the terminals for the selected signaling key. Connect terminal SG to the terminal across from terminal BG on the MISC connecting block. Connect terminal A to the terminal across from terminal S on the MISC connecting block. Use bridge clips to complete the connections.

(g) Arrange the signaling key on the assigned station for nonlocking operation. Refer to the respective section in the Telephone Apparatus Practices Manual for details.

AUTOMATIC TIE LINE

4.29 For automatic tie line service, one 415A KTU is required at each key system for one tie line. The 415A KTU can be installed into any unused card connector on the 501A KSU.

4.30 Strap the 415A KTU for the required options. Then insert the KTU into the selected KSU card connector and make the following connections:

(a) On KSU connecting block C, connect terminal AB (C44) to the AB terminal (C2, C4, C6,C8, C10, or C12) associated with the card connector

into which the 415A KTU was inserted. Connect terminal AG (C43) to the corresponding AG terminal (C1, C3, C5, C7, C9, or C11). An example of these cross-connections is shown in Figure 13. The example shows A Battery and A Ground wired to card position 2.

(b) On KSU connecting block C, locate the Tn and Rn terminals associated with the card connector for the 415A KTU. Cross-connect these terminals to the CO connecting block on the MDF for connection to the distant office. Use bridge clips to complete the connections. Refer to Figure 28 for connecting details.

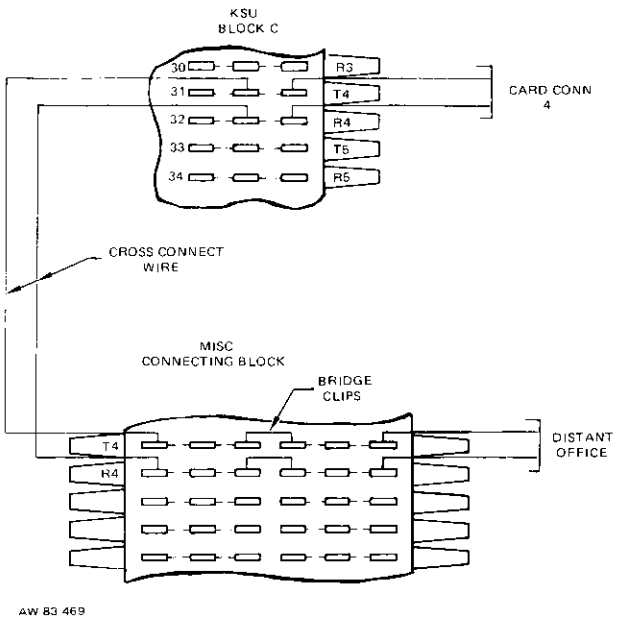

Figure 28: Connecting Details, 415A KTU to Tie Line

(c) On KSU connecting block A, or on the KSU expansion block on the MDF, locate the terminals associated with the card connector for the 415A tie line KTU. Connect the T, R, A, A1, LG, and L terminals to the corresponding terminals for the selected line key on the assigned station connecting block. An example of these connections is shown in Figure 29.

(d) On KSU connecting block B, locate the B1 and R1 terminals associated with the card connector for the 415A KTU. Connect the B1 terminal to the YL-SL lead on the selected station block. Connect the R1 terminal to the SL-YL lead. See Figure 30 for the cross-connection scheme.

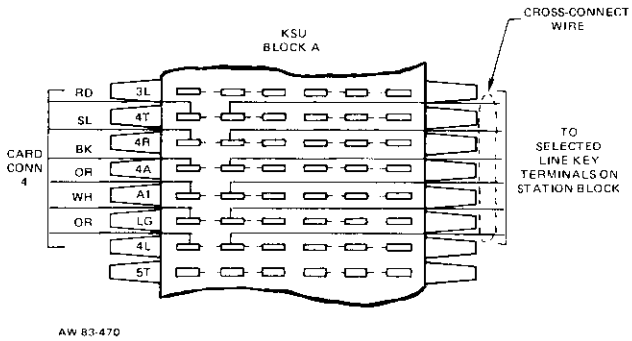

Figure 29: Connecting Details, 415A KTU to Multibutton Station

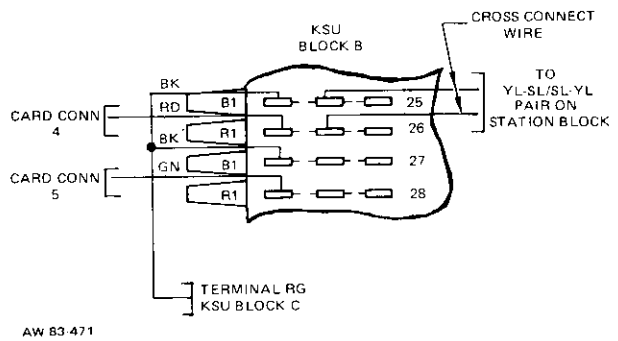

Figure 30: Connecting Details, 415A KSU to Ringer Assignment

4.31 An optional one-card, two-card, or four-card panel adapter may alternately be used to mount the 415A automatic tie line KTU. The card panel adapter can be mounted on the 501A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

PRIVATE LINE

4.32 The 416A station line KTU serves as the interface between a key telephone and a dedicated single-line telephone. A line pickup key and a nonlocking signaling key are required at the key telephone. The single-line telephone requires no dial as it can only be used to call the key telephone, or answer calls from the key telephone. The 416A KTU mounts into a 20-contact card connector such as the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the 501A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.33 Strap the 416A KTU for the required options. Then insert the KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 31.

(b) On KSU connecting block C, make the following connections to the MISC connecting block. As shown in Figure 25, use bridge clips to complete the connections to the 416A KTU.

CARD PANEL ADAPTER PIN NO		PVT LINE KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	RG
2	1	1	RC
3	2	2	N/C
4	3	3	AG
5	4	4	±10V
6	5	5	ST
7	6	6	LG,NG
8	7	7	LF
9	8	8	L
10	9	9	R(T)
11	10	10	±105V
12	11	11	RN
13	12	12	T
14	13	13	R
15	14	14	T(T)
16	15	15	BG
17	16	16	S
18	17	17	BB
19	18	18	AB
20	19	19	SP

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Figure 31: Private Line KTU Connections

(1) Connect terminal C19 to terminal RN.

(2) Connect terminal C20 to terminal ST.

(3) Connect terminal C21 to terminal LF.

(4) Connect terminal C39 to terminal LG.

(5) Connect terminal C40 to terminal ± 10V.

(6) Connect terminal C41 to terminal BG.

(7) Connect terminal C42 to terminal BB.

(8) Connect terminal C43 to terminal AG.

(9) Connect terminal C44 to terminal AB.

(10 Connect terminal C48 to terminal ± 105V.

(11) Connect terminal C47 to terminal RG.

(c) On the MISC connecting block, connect the terminals across from terminals T(T) and R(T) to the Tip and Ring leads of the dedicated single-line telephone. Use bridge clips on the MISC connecting block to complete the connections. Refer to Figure 32 for details.

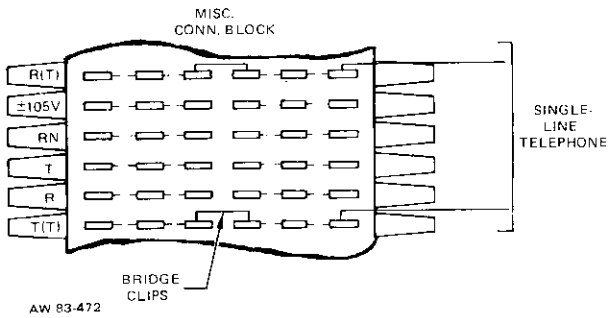


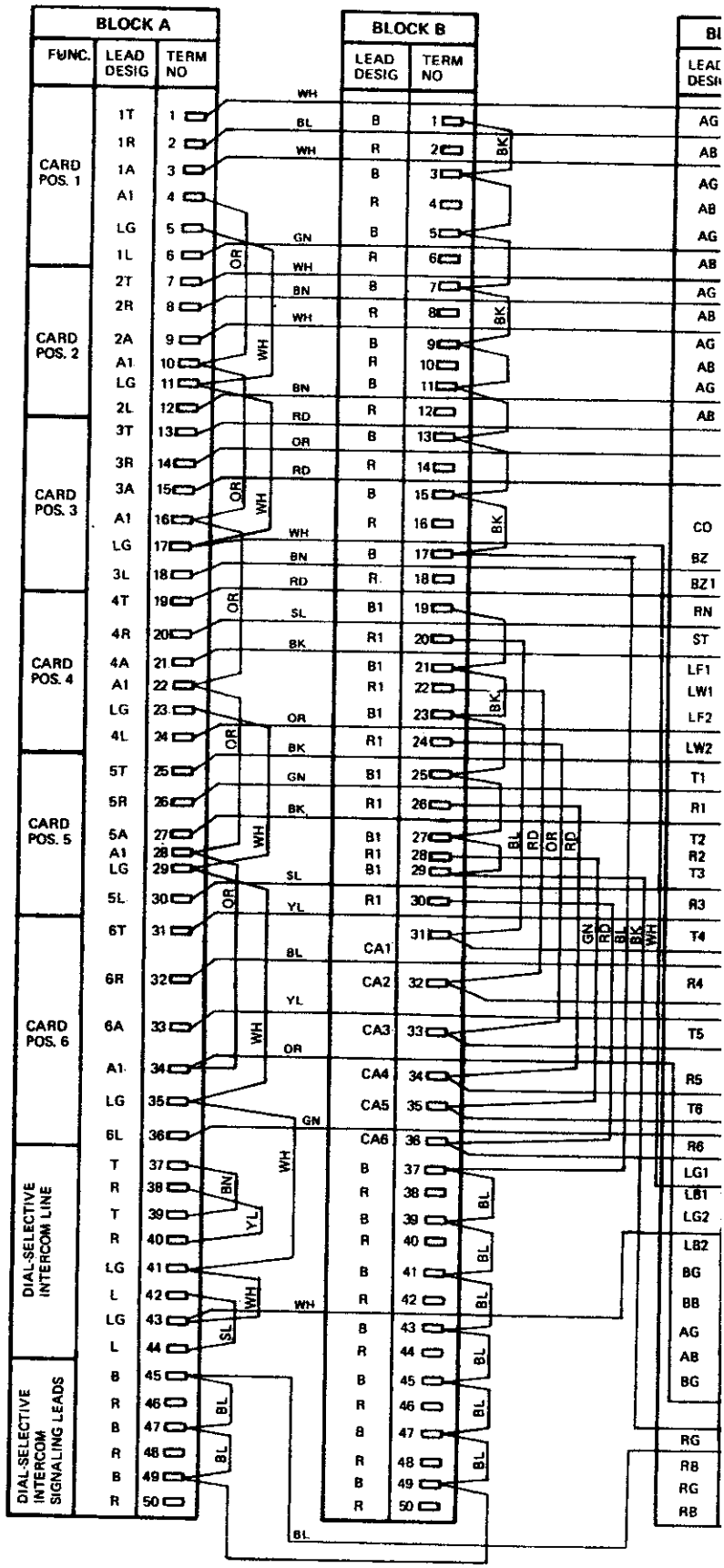
Figure 32: Connecting Details, 416A KTU to Single-Line Station

(d) On the station connecting block for the multibutton telephone, locate the terminals for the selected line pickup key. Connect the T, R, LG, and L terminals to the terminals across from the corresponding terminals on the MISC connecting block. Refer to Figure 27 for details.

(e) On the station connecting block, connect the terminal for the YL-SL lead to the terminal across from the RG terminal on the MISC connecting block. Connect the terminal for the SL-YL lead to the terminal across from the RC terminal on the MISC connecting block. As shown in Figure 27, use bridge clips to complete the connections to the 416A KTU.

(f) On the station connecting block, locate the terminals for the selected signaling key. Connect terminal SG to the terminal across from terminal BG on the MISC connecting block. Connect terminal A to the terminal across from terminal S on the MISC connecting block. Use bridge clips to complete the connections.

(g) Arrange the signaling key on the multibutton telephone for non-locking operation. Refer to the respective section in the Telephone Apparatus Practices Manual for details.


BLOCK A
FUNC.
LEAD DESIG
TERM NO
BLOCK B
LEAD DESIG
TERM NO
CARD POS. 1
CARD POS. 2
CARD POS. 3
CARD POS. 4
CARD POS. 5
CARD POS. 6
DIAL-SELECTIVE INTERCOM LINE
DIAL-SELECTIVE INTERCOM SIGNALING LEADS
1T 1
1R 2
1A 3
A1 4
LG 5
1L 6
2T 7
2R 8
2A 9
A1 10
LG 11
2L 12
3T 13
3R 14
3A 15
A1 16
LG 17
3L 18
4T 19
4R 20
4A 21
A1 22
LG 23
4L 24
5T 25
5R 26
5A 27
A1 28
LG 29
5L 30
6T 31
6R 32
6A 33
A1 34
LG 35
6L 36
T 37
R 38
T 39
R 40
LG 41
L 42
LG 43
L 44
B 45
R 46
B 47
R 48
B 49
R 50
B 1
R 2
B 3
R 4
B 5
R 6
B 7
R 8
B 9
R 10
B 11
R 12
B 13
R 14
B 15
R 16
B 17
R 18
B1 19
R1 20
B1 21
R1 22
B1 23
R1 24
B1 25
R1 26
B1 27
R1 28
B1 29
R1 30
CA1 31
CA2 32
CA3 33
CA4 34
CA5 35
CA6 36
B 37
R 38
B 39
R 40
B 41
R 42
B 43
R 44
B 45
R 46
B 47
R 48
B 49
R 50
AG
AB
AG
AB
AG
AB
AG
AB
AG
AB
AG
AB
CO
BZ
BZ1
RN
ST
LF1
LW1
LF2
LW2
T1
R1
T2
R2
T3
R3
T4
R4
T5
R5
T6
R6
LG1
LB1
LG2
LB2
BG
BB
AG
AB
BG
RG
RB
RG
RB
WH
BL
WH
BK
GN
OR
WH
BN
WH
BK
WH
OR
WH
RD
OR
BK
WH
SL
BK
OR
BK
OR
GN
BK
WH
BL
RD
OR
RD
SL
YL
OR
BL
YL
WH
OR
GN
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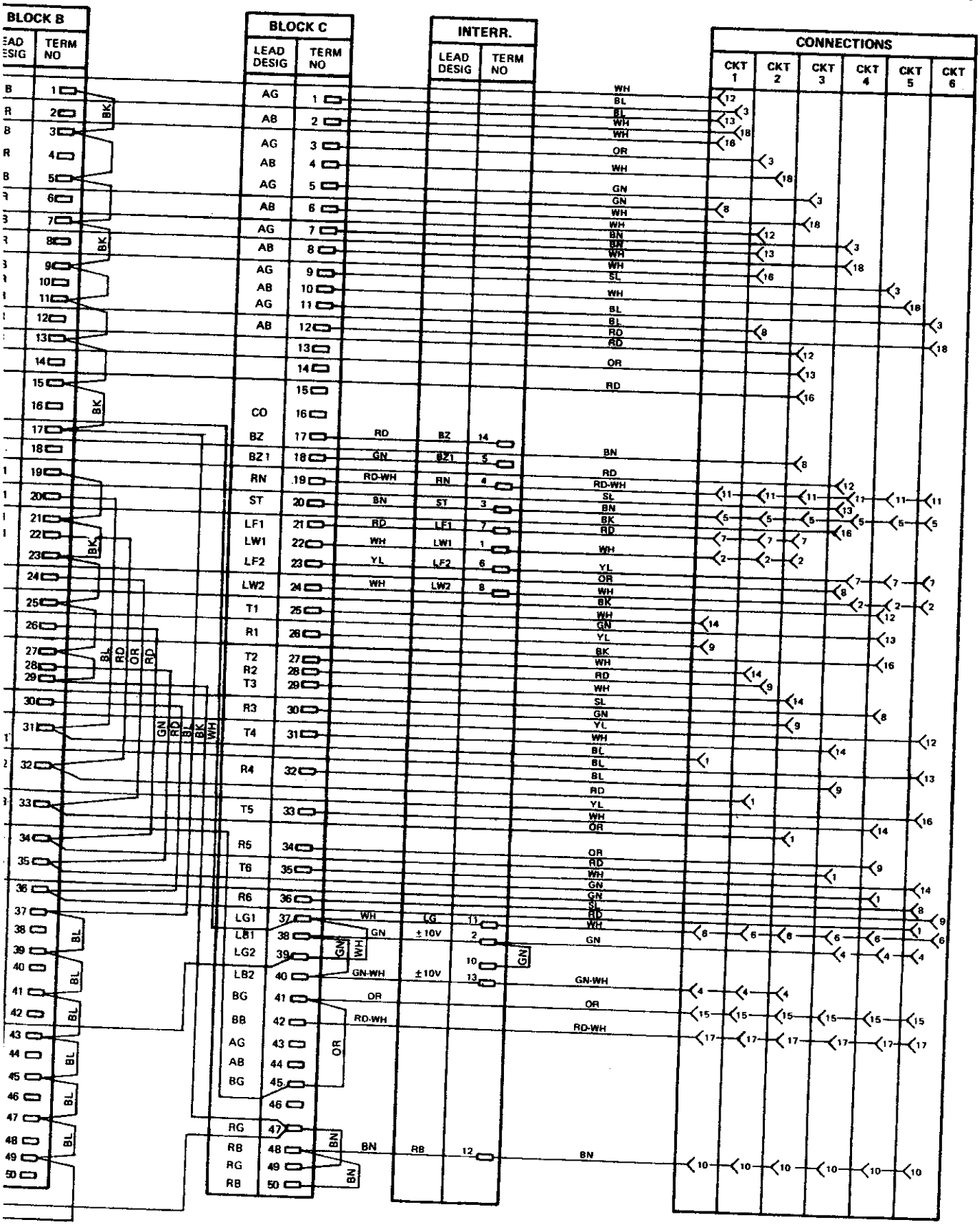

Figure 33: 501A KSU Cabinet Wiring Diagram

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512A
KEY SERVICE UNIT
GENERAL DESCRIPTION AND INSTALLATION

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1. INTRODUCTION

1.01 This section describes the ITT 512A Key Service Unit (KSU) and the associated equipment. The KSU features and capabilities are described, and detailed instructions for installation are provided.

1.02 This section supersedes all previously issued documents covering the 512A KSU. Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

RELATED DOCUMENTS

1.03 This section describes installation of the 512A KSU in a manual intercom application. For installation instructions for dial intercom applications, refer to the following practices:

(a) 36-307-101, 307A Dial-Selective Intercom.

(b) 36-357-101, 357A Dial-Selective Intercom.

(c) 36-110-101, 110-CX1 Announce-A-Call Intercom.

2. SYSTEM DESCRIPTION

2.01 The 512A KSU is designed to provide standard key system features for a maximum of 13 CO (Central Office) or PBX (Private Branch Exchange) lines, and for up to 36 stations. It can be configured for manual intercom service or for dial-selective intercom service. The number of stations served is dependent upon the type of intercom service provided, the lamp limitations of the power supply, and the contact rating of the interrupter and the line KTUs.

FEATURES AND CAPABILITIES

2.02 Features and capabilities of the system without a dial intercom unit are as follows:

(a) Thirteen CO/PBX lines.

(b) Music-on-hold (optional).

(c) Button access to paging (optional).

(d) Manual (button) intercom (optional).

(e) Buzzer or Ringer signaling.

(f) Semiautomatic exclusion (optional).

MECHANICAL PACKAGING

2.03 The 512A KSU is designed for wall mounting and can be ordered with or without a power supply or dial intercom. The KSU measures approximately 17 inches high, 27 inches wide, and 11 inches deep. It comes equipped with a fiberglass cover. The 512A KSU with the cover removed is shown in Figure 1.

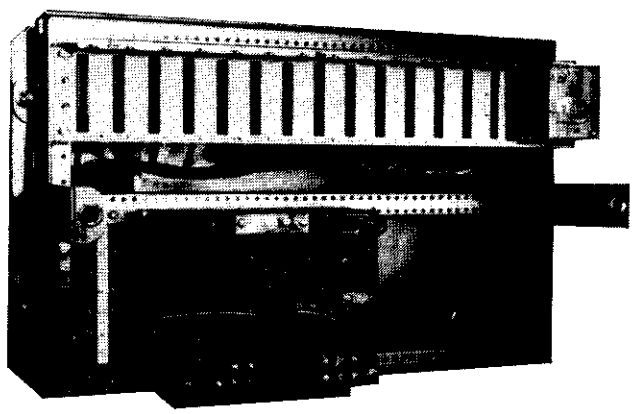

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Figure 1: 512A Key Service Unit

2.04 The 512A KSU consists of a backboard assembly, an equipment mounting frame, and a cover. The backboard assembly provides four slotted holes for the mounting screws and is equipped with two cable connector panels. Each panel accommodates three 50-pin, Amphenol-type male connectors through which the external equipment connects to the 512A KSU. A cutout in the lower left-hand corner of the backboard is used as an entry for external cables.

2.05 The equipment mounting frame is hinged to provide access to the cable connector panels and to the wiring on the back of the mounting frame. The frame is hinged to open from left to right. Two quarter-turn fasteners on the left side are used to secure the swing-out frame.

2.06 The card mounting panel at the top of the equipment mounting frame includes thirteen 18-contact card connectors. The card connectors are designated 1 through 13, from left to right. They are prewired to accept most 400-type plug-in KTUs (Key Telephone Units). An electromechanical interrupter in the right-hand corner generates timed signals for visual and audible signaling. The interrupter is factory cabled to the power supply and to the line card connectors.

2.07 The lower half of the swing-out equipment mounting frame accommodates a terminal board and the optional power supply. The terminal board (TB1) serves to interconnect the KSU, the interrupter, and the power supply. The power supply mounts to the right of TB1. The space to the right of the power supply is for additional equipment. It can be used to mount various adapter panels for additional KTUs, or to mount a dial-selective intercom.

CABLE CONNECTORS

2.08 The cable connector panels on the backboard assembly accommodate six 50-pin, Amphenol-type male connectors. The connectors are used to extend the internal system wiring to quick-connect terminal blocks on the MDF(Main Distributing Frame). From left to right, the connectors are designated P1 through P6. Connectors P1 through P4 are always provided. Connectors P5 and P6 are optional. They are part of the cable(s) for the optional 307A, 357A, or 110-CX1 dial intercom.

2.09 Standard 25-pair cables with female connectors are used to extend the KSU internal wiring to customer-provided terminal blocks on the MDF. The terminal blocks are designated A through F. Block A corresponds to connector P1, block B corresponds to connector P2, etc.

CABINET WIRING

2.10 For reference, cabinet wiring for the 512A KSU is shown in Figures 25 and 26 in the back of this section.

POWER SUPPLY

2.11 The 512A KSU is available with or without a power supply. The standard unit is equipped with a power supply capable of lighting up to 200 lamps. It features both a buzzer output and a ring generator output.

Warning: Installation of a power supply not fused according to ITT specifications for this product could result in serious damage to the equipment and a potential fire hazard. Refer to Table A for fuse specifications.

2.12 Power requirements for a 512A KSU not equipped with a power supply are shown in Table A.

TABLE A

512A KSU POWER REQUIREMENTS

TALK BATTERY (A BATT)	18-28 VDC, 1.0A Fused at 2A
SIGNAL BATTERY (B BATT)	20-28 VDC, 2.0A Fused at 5A
LAMP BATTERY	9-11 VAC, 8A Fused at 10A
BUZZER VOLTAGE	18-22 VAC, 1A Fused at 2A
RING VOLTAGE	100-118 VAC, 30 Hz., .050A

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SIGNALING LIMITS

2.13 Limits of the audible and visual signals provided by the system are given in the following paragraphs. These limits are imposed by the system power supply outputs and the current-handling capabilities of the interrupter contacts and the KTU relay contacts.

2.14 ***Station Lamps.*** The system power supply is capable of lighting a maximum of 200 lamps at one time. Interrupter contacts and KTU relay contacts limit the number of lamps per line to not more than 20.

2.15 *Ringers.* The system power supply is capable of operating a maximum of four electromechanical ringers at one time. Hence, no line should be arranged to ring at more than three telephones.

2.16 *Buzzers.* In systems employing low voltage buzzers for intercom signaling, the maximum number of buzzers per circuit should not exceed eight. This limit is imposed by output of the power supply.

ORDERING INFORMATION

2.17 Ordering information for the 512A KSU is provided in Table B.

ASSOCIATED EQUIPMENT

2.18 Standard and optional equipment available for use in the 512A KSU is described in the following paragraphs. For reference, this equipment and the applicable documents are listed in Table C.

TABLE B

512A KSU ORDERING INFORMATION

STOCK NUMBER	DESCRIPTION	DOCUMENT(S)	REMARKS
512A00-101	Basic unit - no power supply.	30-512-100	
512A00-OPG	Basic unit with power supply.	30-512-100	
512A09-101	Basic unit with 307A dial intercom for nine rotary dial stations. No power supply.	30-512-100 36-307-101	Can be arranged for Tel-Touch and expanded to serve 18 stations.
512A09-OPG	Basic unit with power supply and 307A dial intercom for nine rotary dial stations.	30-512-100 36-307-101	Can be arranged for Tel-Touch and expanded to serve 18 stations.
512A18-101	Basic unit with 357A dial intercom for 18 rotary dial stations. No power supply.	30-512-100 36-357-101	Can be arranged for Tel-Touch and expanded to serve 27 or 36 stations.
512A18-OPG	Basic unit with power supply and 357A dial intercom for 18 rotary dial stations.	30-512-100 36-357-101	Can be arranged for Tel-Touch and expanded to serve 27 or 36 stations.
512A10-101	Basic unit with 110-CX1 dial intercom for 10 rotary dial stations. No power supply. No call announce/tone PCB.	30-512-100 36-110-101	Can be arranged for Tel-Touch and expanded to serve 20 or 30 stations.
512A10-OPG	Basic unit with power supply and 110-CX1 dial intercom for 10 rotary dial stations. No call announce/tone PCB.	30-512-100 36-110-101	Can be arranged for Tel-Touch and expanded to serve 20 or 30 stations.

AW 83-349

TABLE C

512A KSU AUXILIARY EQUIPMENT

EQUIPMENT	DESCRIPTION	DOCUMENT
346A OFF-PREMISES LINE	KTU, 18-contact, optional. One per six single-line telephones.	36-346-201
400E LINE CARD	KTU, 18-contact. One required per CO/PBX line.	36-400-201
400TPL LINE CARD	KTU, 18-contact, optional. One required per CO/PBX line, provides DC isolation.	36-400-202
400PFL LINE CARD	KTU, 18-contact, optional. One required per CO/PBX line, provides DC isolation and Power Fail Transfer Switchthrough.	36-400-203
401B MANUAL INTERCOM	KTU, 18-contact, optional. A. For manual intercom network. One per intercom network. B. For button access to paging. One per paging system.	36-401-201
403A MUSIC-ON-HOLD	KTU, 18-contact, optional. One per six CO/PBX lines. Requires adapter panel for mounting.	36-403-201
405A EXCLUSION CARD	KTU, 20-contact, optional. One per two lines requiring exclusion. Requires adapter panel for mounting.	36-405-201
414A MANUAL TIE LINE	KTU, 20-contact, optional. Two per tie line, one at each key system. Requires adapter panel for mounting.	36-414-201
415A AUTOMATIC TIE LINE	KTU, 18-contact, optional. Two per tie line, one at each key system.	36-415-201
416A STATION LINE	KTU, 20-contact, optional. One per remote two-wire telephone. Requires adapter panel for mounting.	36-416-201
307A DIAL-SELECTIVE INTERCOM	For nine rotary dial stations. Can be arranged for Tel-Touch and up to 18 stations.	36-307-101
357A DIAL-SELECTIVE INTERCOM	For nine rotary dial stations. Can be arranged for Tel-Touch and 18, 27, or 36 stations.	36-357-101
110-CX1 ANNOUNCE-A-CALL INTERCOM	For 10 rotary dial stations. Can be arranged for Tel-Touch and 20 or 30 stations.	36-110-101
259B TWO-CARD PANEL	Adapter for two 18-pin or 20-pin KTUs. Factory wired.	36-259-101
359A ONE-CARD PANEL	Adapter for one 18-pin or 20-pin KTU. Factory wired.	36-359-101
182029-101 FOUR-CARD PANEL	Adapter for one to four 18-pin KTUs.	36-029-101

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A. Line Card KTU

2.19 For each CO or PBX line served by the 512A KSU, one 400E line card (or equivalent) must be provided. The line cards can be inserted into any of the 13 card connectors on the KSU card connector panel. These line cards serve as the interface between the CO or PBX lines and the key system stations.

B. Manual Intercom KTU

2.20 The 401B manual intercom KTU provides busy lamp feed and talk battery for a private line between two telephones in the same key system, or for a manual intercom network. The 401B KTU can be inserted into any card connector on the 512A KSU. It is capable of lighting the busy lamps for up to twenty stations. It can provide transmission battery for a maximum of four off-hook stations at one time. Since the KTU provides no means of signaling, stations in a 401B manual intercom network must be arranged for button and buzzer signaling.

2.21 The 401B KTU can also be used to provide button access to a customer-supplied paging system. One 401B KTU is required for each paging circuit to be accessed, and one button is required at each key system station allowed paging access.

C. Music-on-Hold KTU

2.22 The 403A KTU provides the interface to connect a low-level music source such as a tape deck or FM tuner to a CO/PBX line when placed on hold. The 403A KTU will serve a maximum of six CO/PBX lines. It mounts into a separate card panel adapter.

D. Dial Intercom KTUs

2.23 Three dial-selective intercom KTUs are available for use with the 512A KSU. The system can be ordered with or without dial intercom capabilities. The three dial intercom KTUs are described in the following paragraphs.

2.24 The 307A dial intercom KTU can be used to provide dial intercom service for 9 or 18 rotary dial stations. The basic unit serves 9 stations and includes a factory-wired, two-card mounting panel with a 160C dial intercom PCB. The unit can be expanded to serve 18 stations by adding a 160B dial intercom expansion PCB. The 307A unit can be arranged for Tel-Touch dialing by adding the pushbutton dial adapter kit 182666-101. The 307A KTU provides no station hold feature and is arranged for last party release. It provides a short burst of ringing to the called station. It does not return dial tone to the calling party.

2.25 The 357A dial intercom KTU can be used to provide dial intercom service for 9, 18, 27, or 36 rotary dial or Tel-Touch stations. The basic 357A unit serves nine stations and includes a factory-wired, six-card mounting panel with one 160C dial intercom PCB, one 166A Tel-Touch detector PCB, and one 166B Tel-Touch translator PCB. The unit can be expanded to serve up to 36 stations by adding one 160B dial intercom expansion PCB for each additional nine stations. The 357A KTU provides no station hold feature and is arranged for last party release. It provides a short burst of ringing to the called station. It does not return dial tone to the calling party.

> *Note:* When ordered as part of the 501A KSU, the 357A dial intercom KTU includes one dial intercom PCB and one dial intercom expansion PCB. The Tel-Touch detector and translator PCBs must be ordered separately.

2.26 The 110-CX1 announce-a-call intercom can be used to provide dial intercom service for 10, 20, or 30 rotary dial or Tel-Touch stations. The basic unit serves 10 rotary dial stations and includes a factory-wired, five-card mounting panel with a 183977-101, 10-station, rotary dial intercom PCB and a 185677-101 call announce/tone PCB. The unit can be expanded to serve up to 30 stations by adding one 185731-101 intercom expansion PCB for each additional 10 stations. It can be arranged for Tel-Touch dialing by adding a 183981-101 Tel-Touch adapter PCB. The 110-CX1 intercom unit provides dial tone and ringback tone to the calling station, and sends interrupted ringing to the called station. This intercom unit provides built-in call announce service.

> *Note:* When ordered as part of the 512A KSU, the 110-CX1 dial intercom KTU does not include a call announce/tone PCB.

E. Multiline Exclusion KTU

2.27 The 405A multiline exclusion KTU can be used to provide privacy on outside calls. This KTU requires a 20-contact card panel adapter for mounting. It permits a station to temporarily

disconnect other stations in the system from one or two selected CO/PBX lines. One 405A KTU is required for each two CO/PBX lines to be excluded.

Note: In a system where the stations to be excluded are equipped with multibutton exclusion telephones, the 405A KTU is not needed to provide the line exclusion feature.

F. Tie Line KTUs

2.28 Two types of tie line KTUs are available for use in the 512A KSU. These are the 414A manual ringdown tie line KTU and the 415A automatic tie line KTU.

2.29 The 414A tie line KTU provides for direct two-way communication between key telephones in two separate key systems. One KTU is required at each key system for one tie line. This KTU requires a line pickup key and a signaling button at the assigned station. It requires a 20-contact card panel adapter for mounting.

G. Station Line KTU

2.30 The 415A automatic tie line KTU provides automatic signaling and a transmission path between key telephones in two separate key systems. One 415A KTU is required at each key system. The 415A KTU mounts into any card connector on the 512A KSU and requires one line pickup button on the assigned telephone.

2.31 The 416A station line KTU permits signaling and talking on a line between a key system and a distant station. Signaling to the distant station is manual. Signaling from the distant station is automatic. This KTU mounts into a 20-contact card connector on a card panel adapter. One KTU is required per station line.

H. Off-Premises Line KTU

2.32 The 346A off-premises line KTU is used in the 512A KSU to permit the use of standard two-wire telephones. It can be used for connecting on-site or off-premises extensions. In a 512A system arranged for manual intercom service, the 346A KTU is used to connect single-line telephones to a designated CO line. In a system arranged for dial intercom service, the 346A KTU is used to connect single-line telephones as intercom stations. A maximum of six single-line telephones can be connected in parallel to one 346A off-premises KTU.

J. Card Panel Adapters

2.33 Some of the 400-type KTUs that can be used in the 512A KSU require card panel adapters for installation. Card panel adapters that can be used with the 512A KSU are:

(a) One-card panel 359A.

(b) Two-card panel 259B.

(c) Four-card panel 182029-101.

2.34 These adapter panels can be mounted on the swing-out equipment frame of the 512A KSU, or they can be mounted on the MDF near the KSU. For information concerning the adapter panels, refer to the documents listed in Table C.

STATION APPARATUS

2.35 Station equipment such as telephones and call announcers for the 512A KSU are described in the following paragraphs.

A. Single-Line Telephones

2.36 In the 512A KSU, a single-line telephone can be used as an intercom station, or as a station dedicated to a CO/PBX line. Such telephones must be type 44 telephones, or they must be standard single-line telephones modified for A-lead control. When used as intercom stations, a six-conductor line cord is required if a separate signaling device is used. (The six leads are T, R, A, A1, RC, and RG.)

B. Multibutton Telephones

2.37 The system can be arranged to make use of six-button, ten-button, or twenty-button telephones. The type of telephone for each station must be determined on the basis of the lines and features the user is to access. A six-button telephone will permit access to a maximum of five lines. A ten-button telephone will permit access to a total of nine lines. A twenty-button telephone will permit access to a total of nineteen lines. Features such as manual intercom, paging access, etc., which require button access, will reduce the number of buttons available for line assignment at each station.

3. INSTALLATION PLANNING

3.01 In planning an installation, both the immediate and future needs of the customer should be considered. The system should be able to take care of the customer's immediate needs, and be flexible enough to permit additions as the customer's future needs dictate. Consider the following when planning an installation.

EQUIPMENT LOCATION

3.02 Adequate space must be provided in front of and on either side of the wall-mounted 512A KSU to permit access for installation and maintenance. Room should be provided on the right to allow opening the hinged equipment frame to expose the cable connectors and the wiring on the back of the frame.

3.03 Space for an MDF must be provided on either the right side or the left side of the unit. The MDF is required to mount connecting blocks for distributing station cables throughout the building, cross-connecting stations and CO/PBX lines, and mounting equipment such as protectors for off-premises extensions and tie lines, paging equipment, and a music source. Ideally the MDF should be of sufficient size to accommodate any additional connecting blocks or equipment which may be added to the system at a later date.

3.04 The 512A KSU must be located within five feet of a 110 VAC, 60 Hz service outlet. The outlet must be the three-wire grounded type, and must not be on a circuit shared by any other equipment. The outlet must not be controlled by a switch.

ENVIRONMENT

3.05 The equipment should be located in an area that is not subject to extremes in temperatures and humidity. The area should be clean, well ventilated, and properly lighted. The equipment should not be located in a passageway or aisle used for moving machinery or vehicles, and it should not be located near equipment which produces strong magnetic or RF fields.

LOOP LIMITS

3.06 To minimize the length of cable runs, the equipment should be located in an area central to all telephones. This will lessen the possibility of problems which could arise from excessive loop lengths. The loop limit for key telephones should not exceed 50 ohms. The loop limit for single-line telephones must not exceed 1200 ohms.

4. INSTALLATION

UNPACKING AND INSPECTION

4.01 Remove the 512A KSU from the packing carton and place it with the back down on a flat surface. Loosen the two quarter-turn cover fasteners and remove the fiberglass cover.

4.02 Set the cover aside and inspect the KSU for any signs of damage. Make a note of any damage and report it promptly.

KSU MOUNTING

4.03 Mount the KSU on the wall or MDF backboard with four bolts or lag screws. Dimensions for locating the mounting holes are shown in Figure 2. Mark the mounting hole centers, drill the pilot holes, and then insert the screws. Partially tighten each screw. Slip the KSU over the screws. Then tighten each screw.

POWER SUPPLY

4.04 The 512A KSU can be ordered with or without a power supply. The power supply mounts to the right of TB1 on the hinged equipment mounting frame. It attaches to the mounting frame with four machine screws. A formed cable is used to connect the power supply outputs to the terminal board. Power supply cable-to-terminal board connections are shown in Figure 3.

FRAME GROUND

4.05 Use a piece of #14 AWG or larger insulated, stranded copper wire to construct an external ground. Strip about 3/8 of an inch of insulation from one end of the wire and connect a #10 ground lug. Attach the ground lug to the external ground terminal on the power supply. Route the ground wire along the inside lower edge of the equipment mounting frame toward the hinges. Bend the ground wire and route it along the lower edge of the backboard assembly to the cable entry cutout. Use a ground rod clamp or equivalent to connect the other end of the ground wire to an approved ground.

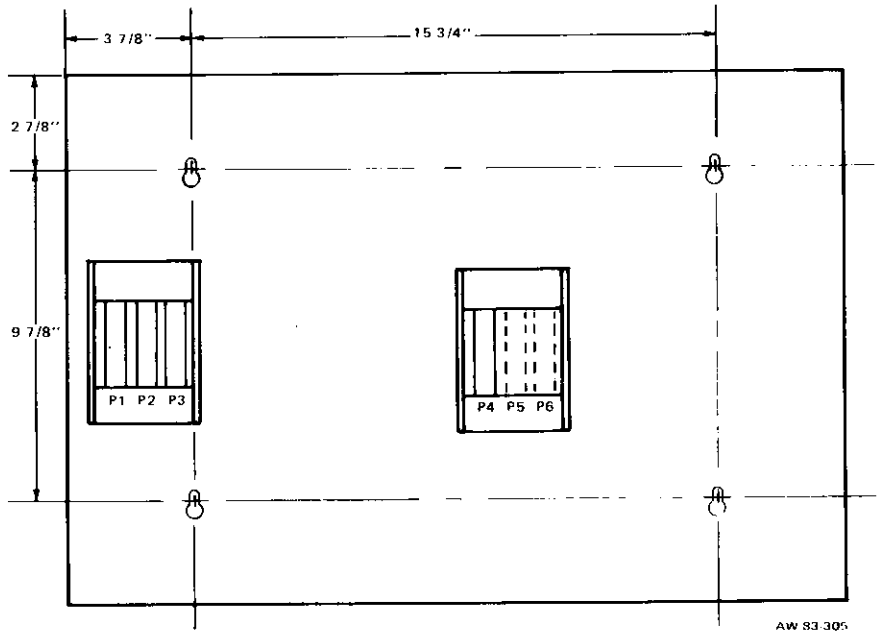

Figure 2: Mounting Hole Locations

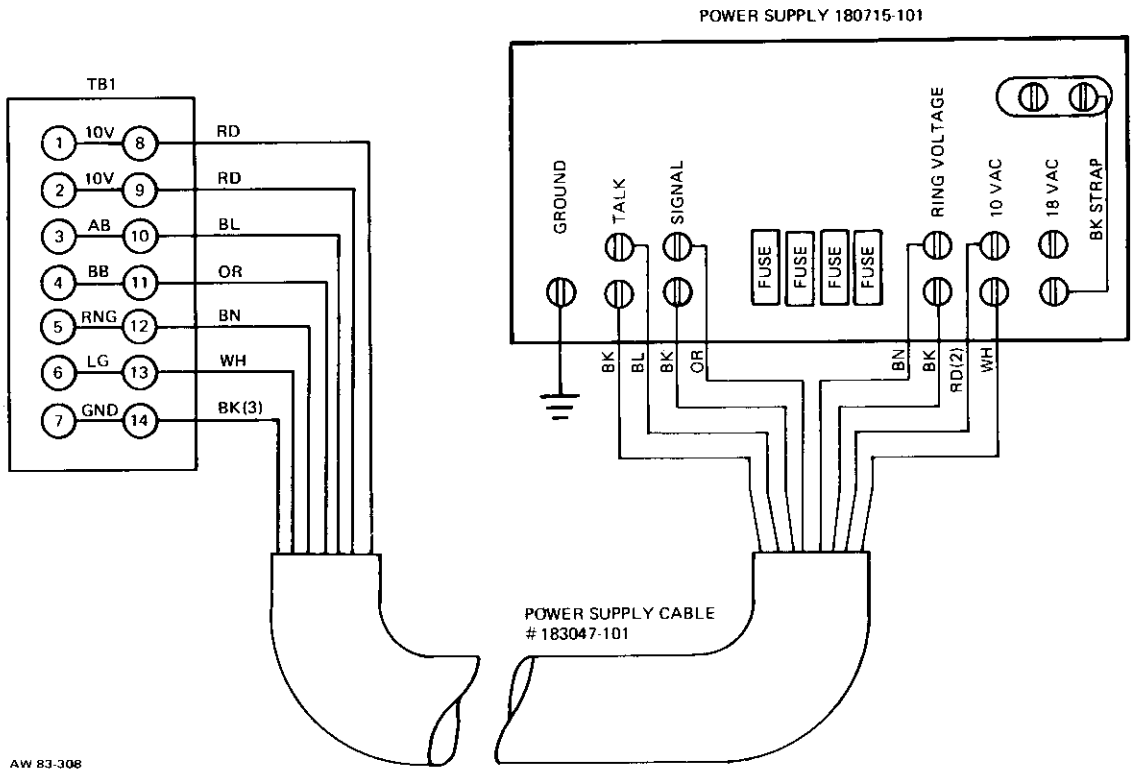

Figure 3: Power Supply Cabling

POWER SUPPLY ADJUSTMENT

4.06 Before operation of the system, test and adjust the power supply as follows:

(a) Plug the power cord into the service outlet.

(b) Use a VOM set to the proper DC voltage scale to measure A battery and B battery.

(c) If readings are lower than 21 volts, unplug the power cord and move the primary tap from the 117V terminal to the 111V terminal at the top of the power supply.

(d) If readings are higher than 28 volts, unplug the power cord and move the primary tap from the 117V terminal to the 123V terminal.

MDF ARRANGEMENT

4.07 Mount the backboard for the MDF. Then mount the connecting blocks, D rings, and any other applicable equipment. The functions and types of connecting blocks to be mounted are as follows:

(a) Mount one 50-pair block for the incoming CO/PBX lines. Designate this block the CO block.

(b) Mount four 25-pair connecting blocks for KSU connections. Designate the blocks KSU blocks A, B, C, and D. Leave room for two additional blocks, E and F, which are required if a dial-selective intercom is added.

(c) Mount one or more 50-pair blocks for single-line telephones and for miscellaneous equipment such as paging, music-on-hold, etc. Designate the block(s) the MISC block(s).

(d) Mount the required number of 50-pair station connecting blocks. One block can serve two 6-line or 10-line telephones or one 20-line telephone. Designate these blocks the STA (station) blocks.

4.08 The layout of a typical MDF for a 512A KSU is shown in Figure 4.

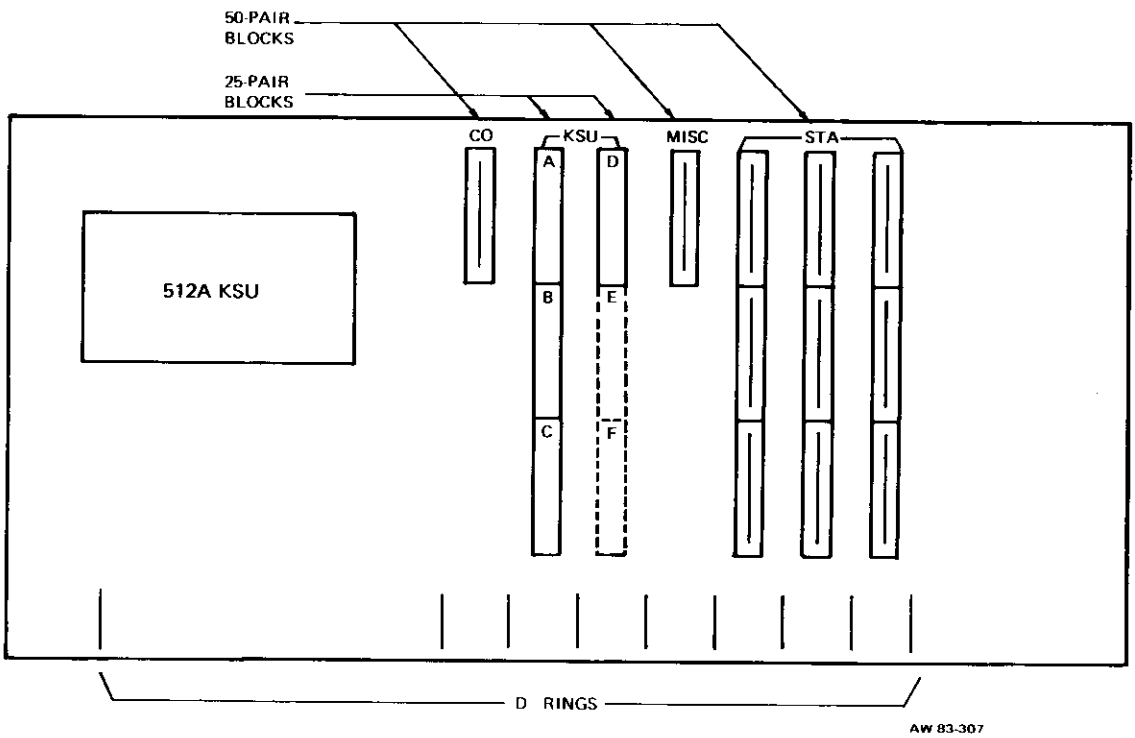

Figure 4: Typical MDF Layout of 512A KSU

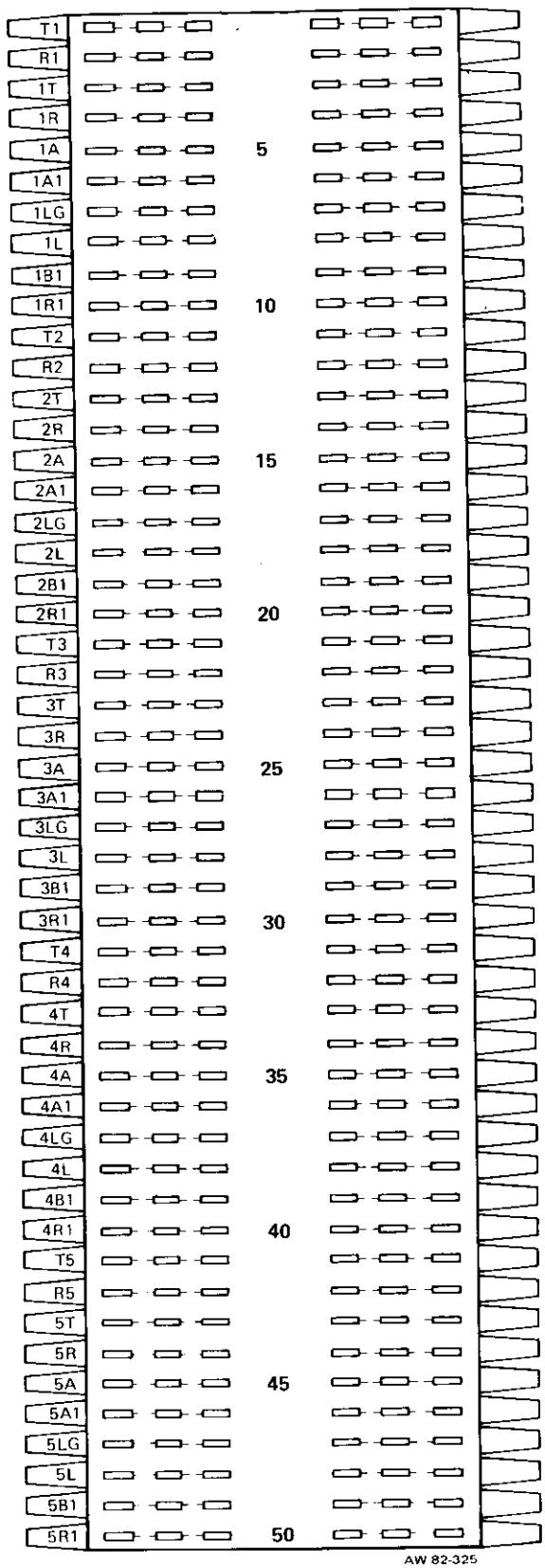

Figure 5A: Layout of KSU Connecting Block A

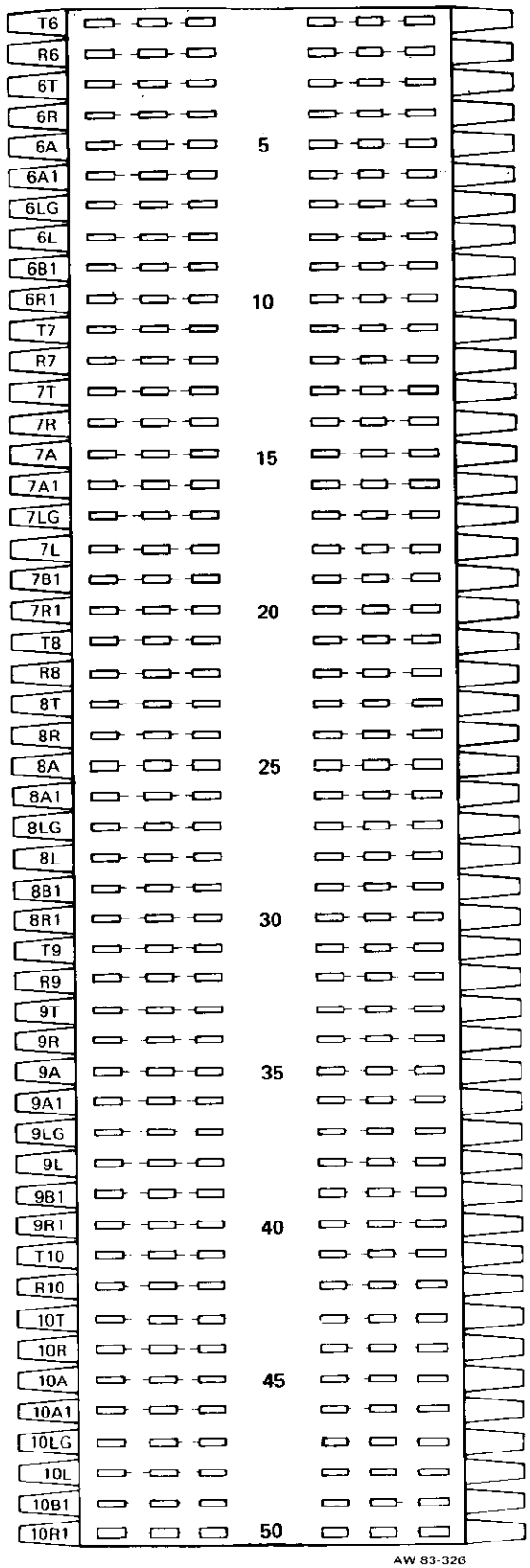

Figure 5B: Layout of KSU Connecting Block B

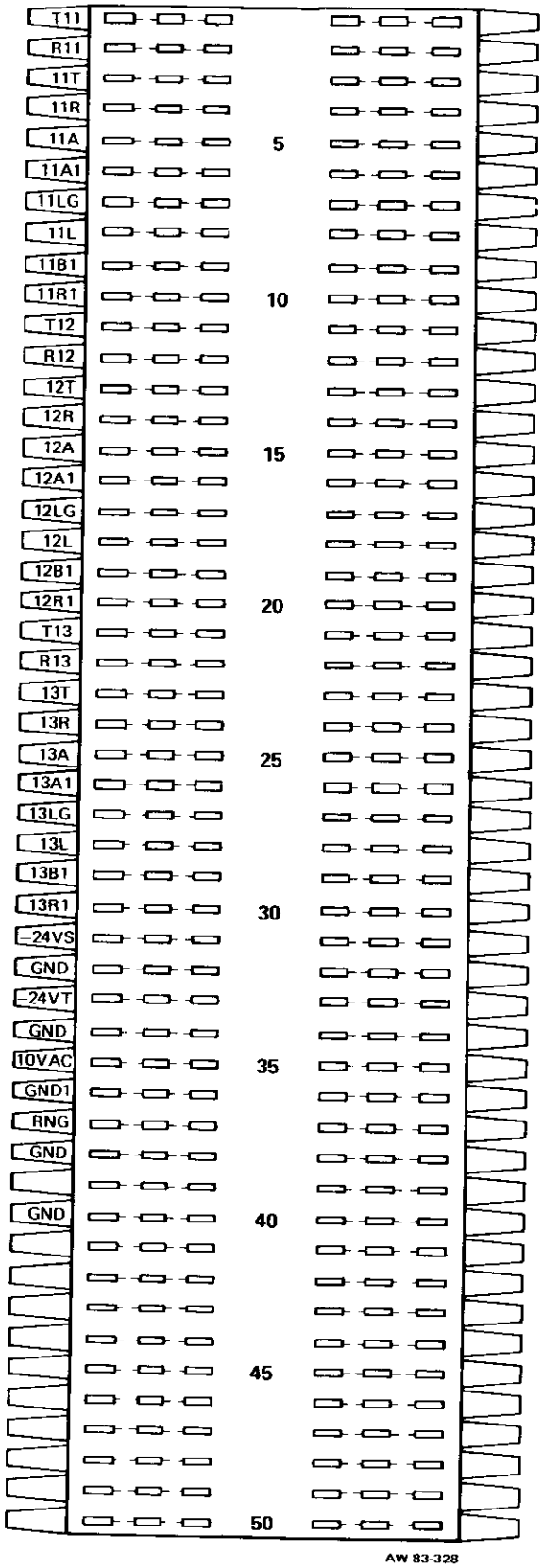

Figure 5C: Layout of KSU Connecting Block C

3

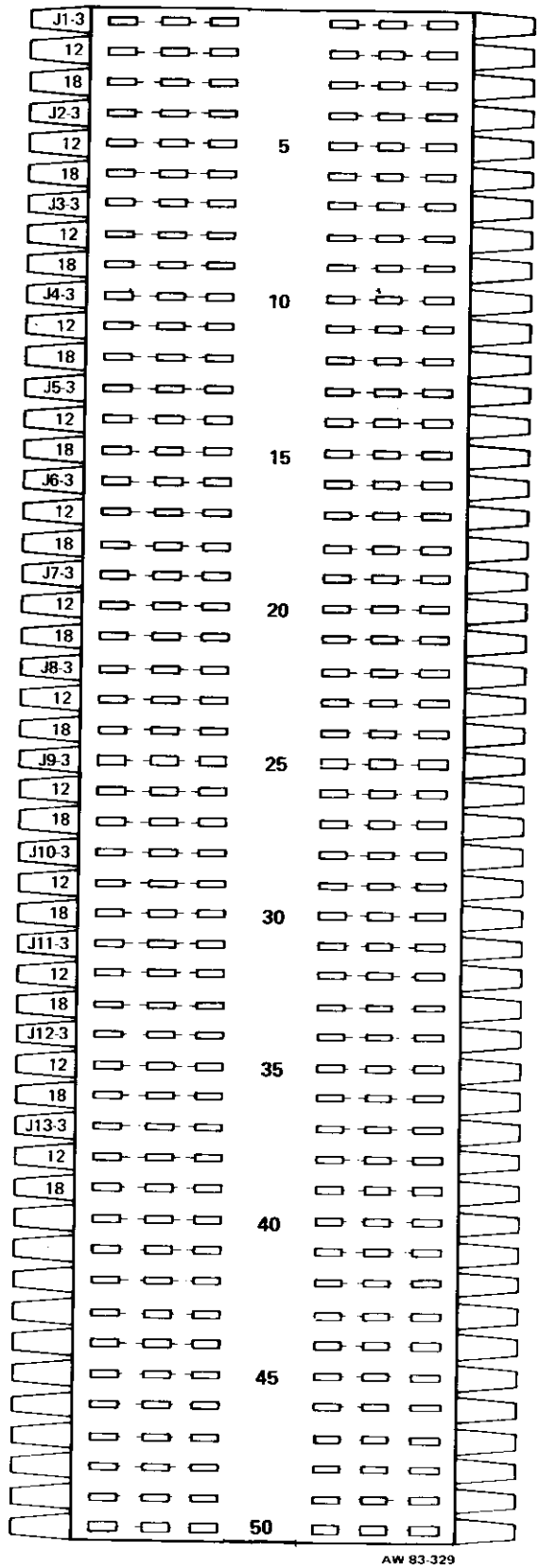

Figure 5D: Layout of KSU Connecting Block D

4

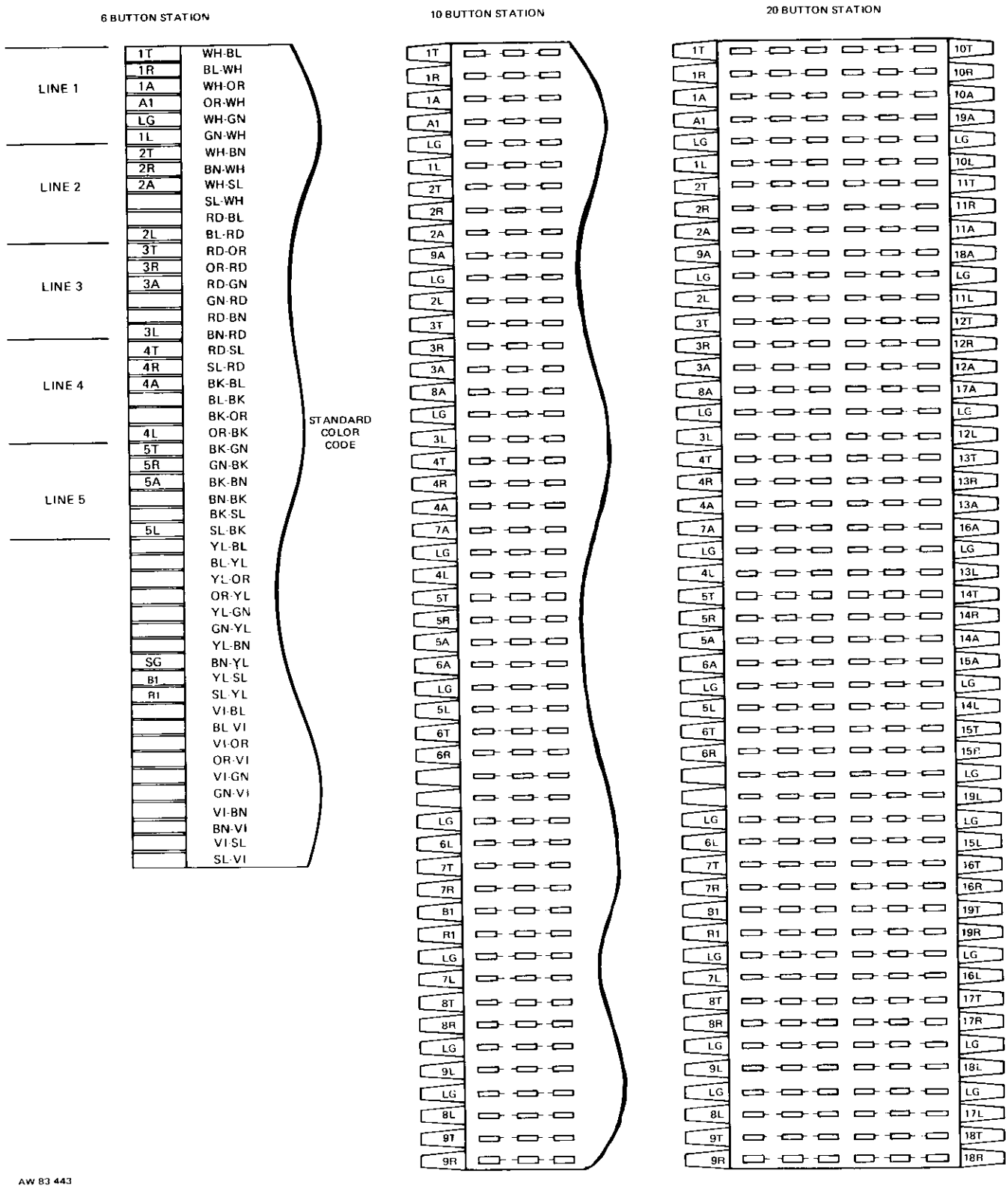

Figure 6: Typical Station Block Layouts

KSU BLOCK CABLING

4.09 For KSU connecting blocks A, B, C, and D, construct four 25-pair cables with standard 50-pin, Amphenol-type female connectors on one end. Cut each cable to the approximate length required, leaving enough excess to punch the other end down at the MDF. Attach the 50-pin connector on each cable to connectors P1, P2, P3, and P4 on the KSU. Route the cables through the cable opening in the lower left corner of the backboard.

4.10 Connect the cable from P1 to KSU connecting block A. Connect the cables from P2, P3, and P4 to KSU connecting blocks B, C, and D, respectively. Use the standard color code to punch down each cable. Label each block as shown in Figure 5.

STATION CABLING

4.11 Connect the 25-pair station cable from each multibutton telephone to one side of a station connecting block. Punch each cable down following the standard color code order. Label each block with the station identification and the proper lead designations. Refer to the applicable Telephone Apparatus Practice or circuit label for lead designations. For reference, typical station block layouts for 6, 10, and 20 button telephones are shown in Figure 6.

4.12 For each single-line station, punch down the station cable on the MISC connecting block. Use two-pair (quad) wire for telephones dedicated to a CO/PBX line; use three-pair wire for telephones serving as intercom stations. Label the block with the station line or intercom number and the proper lead designations.

LINE CARD KTU

4.13 One line card KTU (400E or equivalent) is required for each CO or PBX line serving the system. Strap each line card for the required options, then insert each card into the desired KSU card slot. Cross-connect each KTU as detailed in the following paragraphs. Use standard one-pair and three-pair cross-connect wire.

A. Line Cross-Connections

4.14 On KSU connecting block A, B, or C, locate the terminals associated with the card connector into which the line KTU was inserted. Cross-connect the Tn and Rn terminals to the Tip and Ring terminals for the CO or PBX line on the CO connecting block. Use bridge clips to complete the connection to the CO/PBX line. Refer to Figure 7 for connecting details.

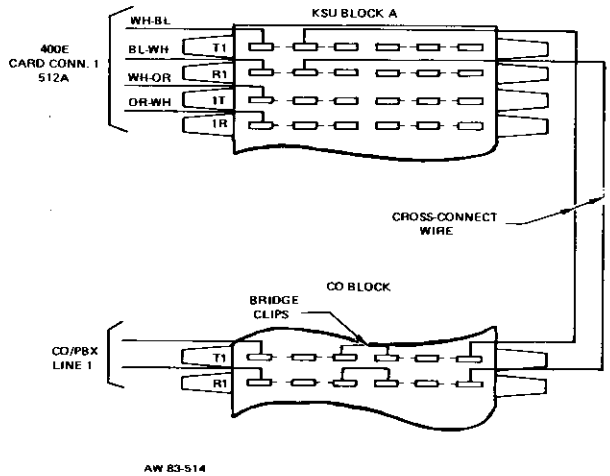

Figure 7: Connecting Details, Line KTU to CO/PBX Line

> *Note:* In the preceding paragraph and in paragraphs that follow, the subscript "n" preceding or following a terminal or lead designation represents a numeral 1-13 that corresponds to a KSU card connector.

B. Station Cross-Connections

4.15 Cross-connect the T, R, A, A1, LG, and L terminals to the corresponding terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, A, A1, LG, and L terminals of the line pickup key(s) for any other assigned station(s). An example of these connections is shown in Figure 8.

> *Note:* If the A1 terminal of any card connector is already connected to the A1 terminal of the first line on the station block, the A1 cross-connection can be omitted.

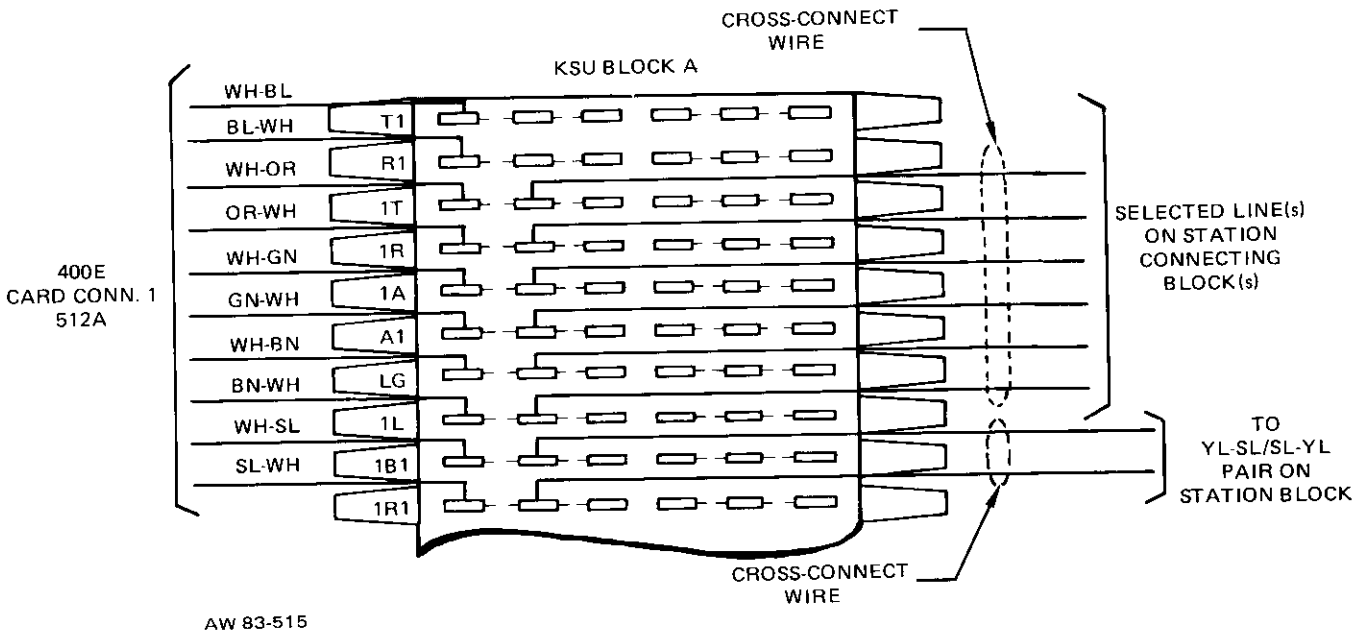

Figure 8: Connecting Details, Line KTU to Multibutton Station

4.16 For a single-line telephone used as a line answering station, cross-connect the T, R, A, and A1 terminals on the KSU connecting block to the corresponding terminals on the MISC connecting block. Use bridge clips to complete the connections to the single-line telephone. (Refer to Figure 9.)

Note: In systems using 400TPL or 400PFL line card KTUs, single-line telephones used as CO/PBX line answering stations will not ring unless a 346A KTU is installed. (See paragraph 4.22.)

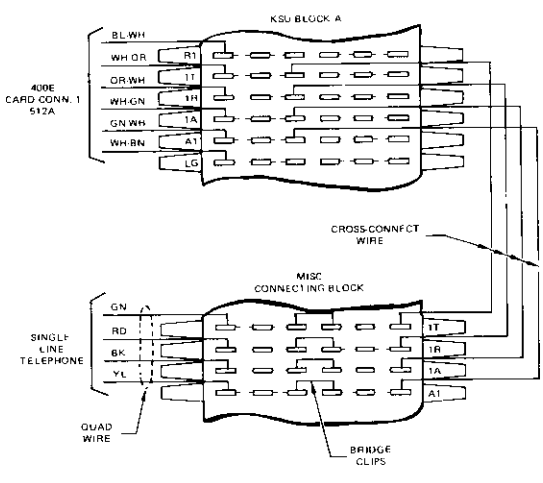

Figure 9: Connecting Details, Line KTU to Single-Line Station

C. Ringer Assignments

4.17 Cross-connect the B1 terminal on the KSU connecting block to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the R1 terminal to the SL-YL lead of the station block. Multiple the connections to the station block of each telephone that is to ring. Refer to Figure 8.

MANUAL INTERCOM SERVICE

4.18 The 401B manual intercom KTU can be used to connect a group of stations to a common talk path, or it can be used to provide a private talk path between two stations. For manual intercom service, insert the 401B manual intercom KTU into an unused KSU card connector, then cross-connect the equipment as follows:

(a) On KSU connecting block D, locate the Jn-3, -12, and -18 terminals associated with the card connector for the 401B KTU. Connect the Jn-3 terminal to terminal GND(C34) on KSU connecting block C. Connect the Jn-18 terminal to terminal – 24VT(C33) on connecting block C. An example of these cross-connections is shown in Figure 10. The example shows A Battery and A Ground wired to card connector 11.

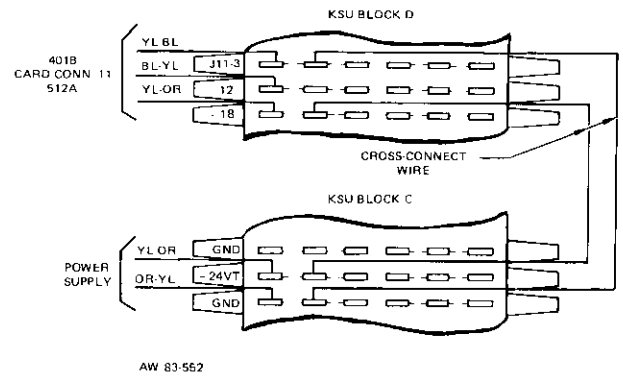

Figure 10: Connecting Details, A Battery and A Ground

(b) On KSU connecting block A, B, or C, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals to the T, R, L, and LG terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, L, and LG terminals of the line pickup key(s) for any other assigned station(s). See Figure 11 for example.

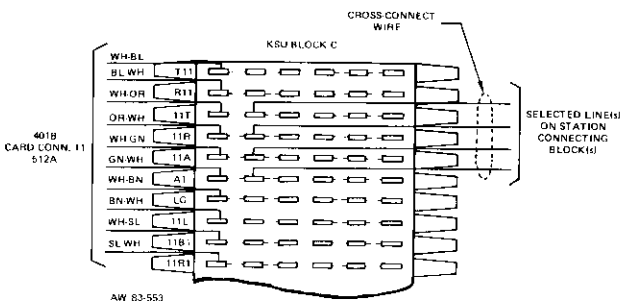

Figure 11: Connecting Details, Intercom KTU to Multibutton Station

(c) If necessary, arrange the associated telephones for button and buzzer signaling. (Refer to the applicable Telephone Apparatus Practice for details.)

(d) For low voltage signaling, arrange the equipment as follows refer to Figure 12:

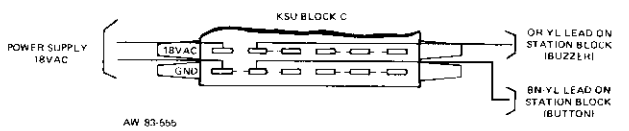

Figure 12: Connecting Details, Button and Buzzer Signaling

(1) Connect a length of #20 AWG insulated, solid copper wire from the 18VAC terminal on the power supply to terminal 49 on KSU connecting block C. Label the terminal 18VAC.

(2) Connect a length of #20 AWG insulated, solid copper wire from the 18VAC GND terminal on the power supply to terminal 50 on KSU connecting block C. Label the terminal GND.

(3) Multiple terminal 18VAC(C49) to the OR-YL lead on the station block of each telephone to be signaled.

(4) Multiple terminal GND(C50) to the BN-YL (SG) lead on the station block of each six-button telephone with a signal pushbutton.

Note: On a 10-button or 20-button telephone it is not necessary to connect buzzer ground since the ground is common via the A1 lead.

BUTTON ACCESS PAGING

4.19 The 401B manual intercom KTU can also be used for button access to a PA system for voice paging. For such applications, insert the 401B KTU into an unused KSU card connector, then arrange the equipment as follows:

(a) On KSU connecting block D, locate the Jn-3, -12, and -18 terminals associated with the card connector for the 401B KTU. Connect the Jn-3 terminal to terminal GND(C34) on KSU connecting block C. Connect the Jn-18 terminal to terminal –24VT(C33) on KSU connecting block C. Refer to Figure 10 for an example of these connections.

(b) On KSU connecting block A, B, or C, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals as follows:

(1) Connect the T, R, L, and LG terminals to the T, R, L, and LG terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, L, and LG terminals of the line pickup key(s) for any other assigned station(s). Refer to Figure 13.

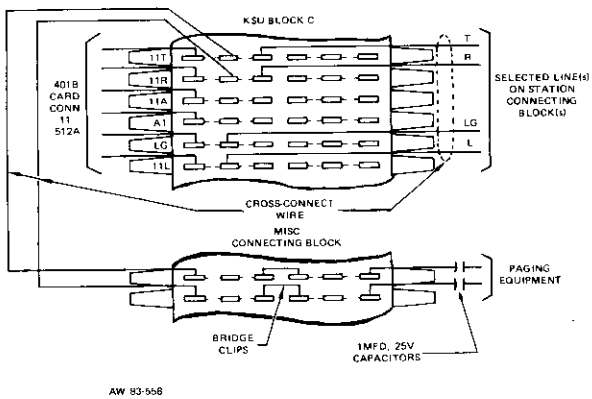

Figure 13: Connecting Details, Intercom KTU to Paging Equipment

(2) Connect the T and R terminals to the MISC connecting block for cross-connection to the paging amplifier.

(c) On each assigned telephone, convert the line pickup key used for paging access to nonlocking operation.

(d) On the MISC connecting block directly across from the T and R appearances of the 401B KTU, connect the input leads to the PA system. Connect a 1 MFD, 25 volt capacitor in series with each lead. Use bridge clips to complete the circuit to the PA equipment.

(e) For on/off control of the paging amplifier, connect KSU card connector pins 1, 9, and 14 as required. Use pins 1 and 14 for a make contact set. Use pins 1 and 9 for a break contact set. Pin 1 corresponds to terminal nR1 for the KSU card connector. Pins 14 and 9 correspond to terminals Tn and Rn, respectively. See Figure 14 for connecting details.

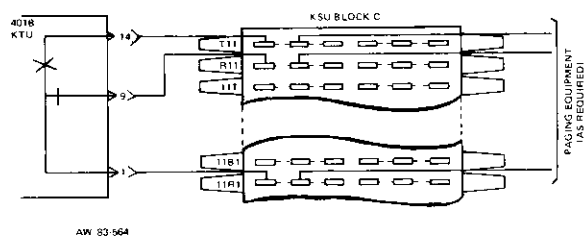

Figure 14: Connecting Details, Paging Equipment ON/OFF Control

MUSIC-ON-HOLD

4.20 For music-on-hold service, one 403A KTU is required to serve up to six CO/PBX lines. The 403A KTU mounts into a card panel adapter such as the 359A. The card panel adapter can be mounted on the 512A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions for mounting and wiring the card panel adapter.

4.21 Install the 403A KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 15.

CARD PANEL ADAPTER PIN NUMBER		MOH KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0		N/C
2	1	1	MUS 1
3	2	2	MUS 1
4	3	3	MUS 2
5	4	4	MUS 2
6	5	5	MUS 3
7	6	6	MUS 3
8	7	7	MUS IN
9	8	8	MUS IN
10	9	9	A BAT
11	10	10	NOT USED
12	11	11	AG
13	12	12	NOT USED
14	13	13	MUS 4
15	14	14	MUS 4
16	15	15	MUS 5
17	16	16	MUS 5
18	17	17	MUS 6
19	18	18	MUS 6
20	19		N/C

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Figure 15: Music-On-Hold KTU Connections

(b) On KSU connecting block C, connect terminal – 24VT(C33) to the terminal across from the A BAT terminal on the MISC connecting block. See Figure 16 for details.

(c) On KSU connecting block C, connect terminal GND(C34) to the terminal across from the AG terminal on the MISC connecting block.

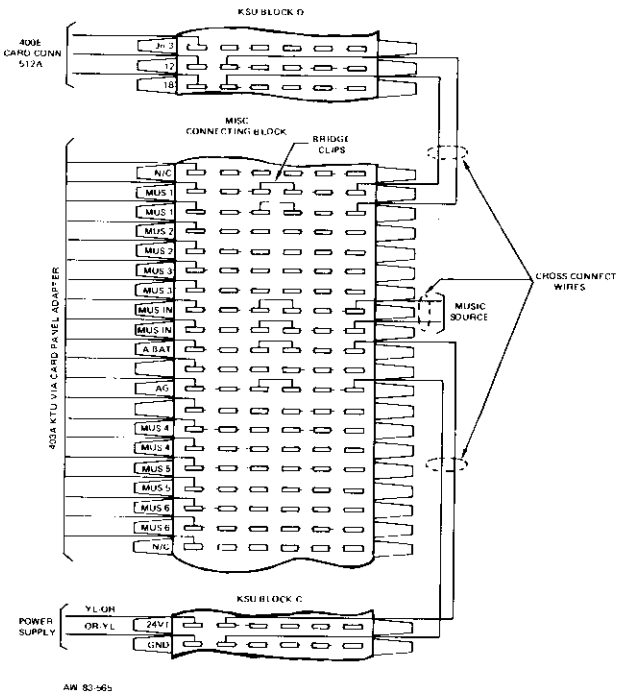

Figure 16: Connecting Details, Music-On-Hold

(d) Connect the output of the music source to the terminals across from the MUS IN terminals on the MISC connecting block.

(e) Connect the terminal across from one of the MUS 1 terminals to the Jn-18 terminal on block D associated with the card connector for the selected line card.

(f) Connect the terminal across from the other MUS 1 terminal to the Jn-12 terminal associated with the card connector for the selected line card.

(g) Use bridge clips to complete the connections to the 403A music-on-hold KTU.

(h) If required, connect the MUS 2 through MUS 6 terminals to the Jn-12 and Jn-18 terminals of any other assigned line cards as described in steps (e), (f), and (g).

OFF-PREMISES LINE

4.22 The 346A off-premises line KTU is used to add standard two-wire telephones to a CO/PBX line. A maximum of six single-line telephones may be connected in parallel across the circuit. Maximum loop resistance is 1200 ohms. If Tel-Touch telephones are used, loop resistance is limited to 500 ohms.

4.23 In a 512A KSU not equipped with a dial intercom, install the 346A KTU as follows for a CO/PBX line station:

(a) Insert the 346A KTU into any unused card connector on the KSU.

(b) On KSU connecting block D, locate the Jn-3, -12, and -18 terminals associated with the card connector into which the 346A KTU was inserted. Connect the Jn-3 terminal to terminal GND(C34) on KSU connecting block C. Connect the Jn-18 terminal to terminal −24VT(33) on KSU connecting block C. Refer to Figure 10 for an example of this cabling.

(c) On KSU connecting block A, B, or C, locate the terminals associated with the card connector for the 346A KTU. Cross-connect the terminals as follows:

(1) Connect the T, R, A, and R1 terminals to the T, R, A, and R1 terminals for the associated line card KTU.

(2) Connect the Tn and Rn terminals to the MISC connecting block on the MDF for connection to the single-line telephone. (See Figure 17.) Multiple the leads to all assigned single-line telephones.

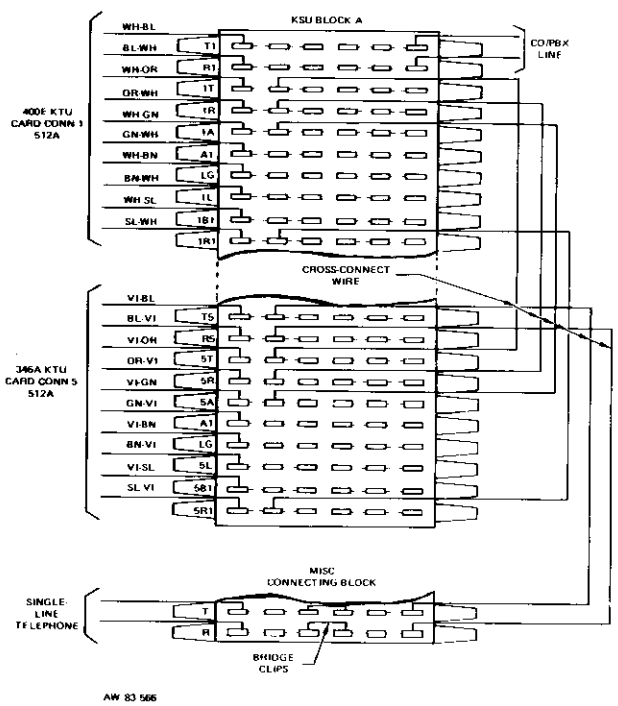

Figure 17: Connecting Details, 346A KTU

MULTILINE EXCLUSION

4.24 One 405A multiline exclusion KTU is used in conjunction with one or two 400E line card KTUs to provide exclusion (privacy) to one or two CO/PBX lines. The 405A KTU mounts into a 20-contact card connector such as the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the 512A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.25 Instructions for installing both the 405A multiline exclusion KTU and the associated 400E line card KTU(s) are provided in the following paragraphs. These instructions will have to be modified accordingly if the line card KTU(s) are already installed.

A. Exclusion KTU Installation

4.26 Install the 405A KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block on the MDF. Label the leads as shown in Figure 18.

CARD PANEL ADAPTER PIN NUMBER		EXCLUSION KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	N/C
2	1	1	1(1A)
3	2	2	2(1A)*
4	3	3	3(1R)*
5	4	4	4(1R)
6	5	5	5(2A)
7	6	6	6(2A)**
8	7	7	7(2R)**
9	8	8	8(2R)
10	9	9	9(LB)
11	10	10	10(EL)
12	11	11	BG
13	12	12	12(2T)**
14	13	13	13(2T)
15	14	14	14(2A)
16	15	15	15(1T)*
17	16	16	16(1T)
18	17	17	BB
19	18	18	18(S)
20	19	19	19(1A)

* To excluded phone, line 1
** To excluded phone, line 2

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Figure 18: Exclusion KTU Connections

(b) On KSU connecting block C, make the following connections:

(1) Connect terminal 10VAC(C35) to the terminal across from terminal 9(LB) on the MISC connecting block.

(2) Connect terminal −24VS(C31) to the terminal across from terminal BB on the MISC connecting block.

(3) If the controlling station uses a nonlocking signal key to activate exclusion, connect terminal GND(C32) to the terminal across from terminal BG on the MISC connecting block.

(c) On the station block of the controlling station, connect the signaling circuit as follows:

(1) Connect the A or S terminal of the assigned line pickup key (signal ground lead) to the terminal across from terminal 18(S) on the MISC connecting block. Multiple the signal ground lead to terminal 18(S) of any other exclusion circuit associated with the same telephone.

(2) Connect the associated L (lamp) terminal to the terminal across from terminal 10(EL) on the MISC connecting block.

(3) Connect the associated LG (lamp ground) terminal to terminal GND(C34) on KSU connecting block C.

(d) On the station block of the controlling station, locate the T, R, and A terminals for the first and, if necessary, the second excluded line circuit. Connect the terminals as follows:

(1) Connect the T, R, and A terminals for the first circuit to the terminals across from terminals 16(1T), 4(1R), and 19(1A), respectively, on the MISC connecting block.

(2) If necessary connect the T, R, and A terminals for the second circuit to the terminals across from terminals 13(2T), 8(2R), and 14(2A), respectively, on the MISC connecting block.

(e) On the station connecting block for the excluded telephone, locate the T, R, and A terminals for the first and, if necessary, second excluded line. Connect the terminals as follows:

(1) Connect the T, R, and A terminals for the first line to the terminals across from terminals 15(1T), 3(1R), and 2(1A), respectively, on the MISC connecting block. Multiple these terminals to the T, R, and A terminals of any other stations having this exclusive line.

(2) If necessary, connect the T, R, and A terminals for the second circuit to the terminals across from terminals 12(2T), 7(2R), and 6(2A), respectively, on the MISC connecting block. Multiple these terminals to the T, R, and A terminals of any other stations having this exclusive line.

(f) Use bridge clips on the MISC connecting block to complete all connections to the 405A exclusion KTU.

4.27 Strap each 400E line card for the required options. Then insert each card into the desired KSU card connector, and cross-connect as follows:

(a) On KSU connecting block A, B, or C, locate the terminals associated with the card connector for the first line card. Cross-connect the terminals as follows:

(1) Connect the Tn and Rn terminals to the CO connecting block for connection to the CO/PBX line.

(2) Connect the T, R, and A terminals to the terminals across from terminals 16(1T), 4(1R), and 1(1A), respectively, on the MISC connecting block.

(3) Connect the L and LG terminals to the L and LG terminals for the selected line on the station connecting block.

(4) Connect the B1 terminal to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the corresponding R1 terminal to the SL-YL lead on the station block.

(b) If a second line circuit is to be excluded, locate the terminals associated with the card connector for the second line circuit. Cross-connect the terminals as follows:

(1) Connect the Tn and Rn terminals to the CO connecting block for connection to the CO/PBX line.

(2) Connect the T, R, and A terminals to the terminals across from terminals 13(2T), 8(2R), and 5(2A), respectively, on the MISC connecting block.

(3) Connect the L and LG terminals to the L and LG terminals for the selected line on the station connecting block.

(4) Connect the B1 terminal to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the corresponding R1 terminal to the SL-YL lead on the station block.

(c) Use bridge clips on the MISC connecting block to complete the connections to the exclusion KTU.

MANUAL TIE LINE

4.28 For manual tie line service, one 414A KTU is required at each key system for one tie line. The KTU requires a line pickup key and a nonlocking signaling key at the assigned station. The 414A KTU mounts into a 20-contact card connector on the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the 512A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.29 Strap the 414A KTU for the desired options. Then insert the KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block. Label the leads as shown in Figure 12.

CARD PANEL ADAPTER PIN NO		MANUAL TIE LINE KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	RG
2	1	1	RC
3	2	2	N/C
4	3	3	AG
5	4	4	±10V
6	5	5	ST
7	6	6	LG
8	7	7	LF
9	8	8	L
10	9	9	R(T)
11	10	10	±105V
12	11	11	RN
13	12	12	T
14	13	13	R
15	14	14	T(T)
16	15	15	BG
17	16	16	S
18	17	17	BB
19	18	18	AB
20	19	19	SP

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Figure 19: Manual Tie Line KTU Connections

(b) Refer to Figure 20. On KSU connecting block C, make the following connections to the MISC connecting block:

(1) Connect terminal – 24VS(C31) to terminal BB.

(2) Connect terminal GND(C32) to terminal BG.

(3) Connect terminal – 24VT(C33) to terminal AB.

(4) Connect terminal GND(C34) to terminals AG and LG.

(5) Connect terminal 10VAC(C35) to terminal ± 10V.

(6) Connect terminal RNG(C37) to terminal ± 105V.

(7) Connect terminal GND(C38) to terminal RG.

(c) Use bridge clips to complete the connections in step (b) to the 414A tie line KTU.

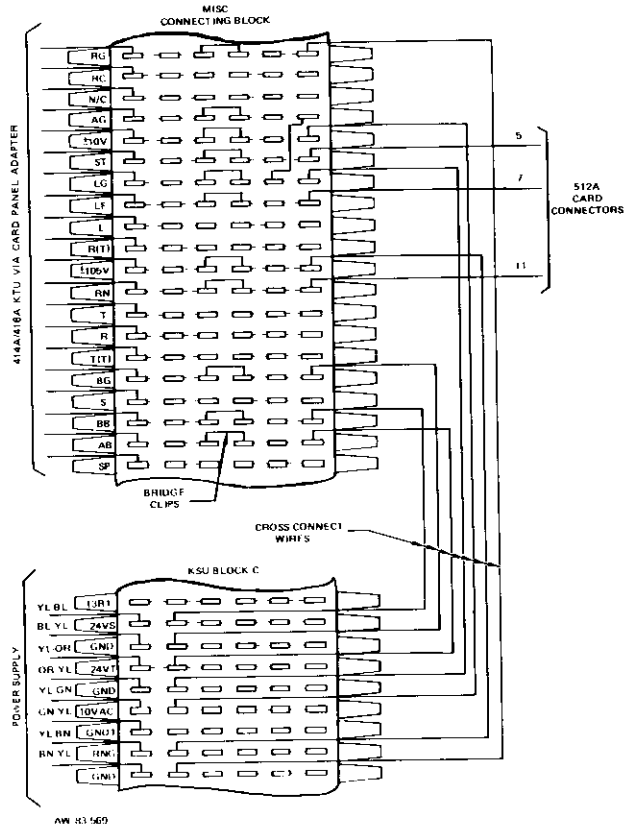

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Figure 20: Connecting Details, 414A/416A KTU Power and Interrupter Wiring

(d) On the back of one of the card panel connectors on the KSU, make the following connections to the MISC connecting block:

(1) Connect pin 11 to terminal RN.

(2) Connect pin 7 to terminal LF.

(3) Connect pin 5 to terminal ST.

(e) Use bridge clips to connect the RN, LF, and ST terminals to the 414A KTU.

(f) On the MISC connecting block, connect the terminals across from terminals R(T) and T(T) to the CO connecting block for connection to the distant office. Connection details are shown in Figure 21.

(g) On the station connecting block for the assigned telephone, locate the terminals for the selected line pickup key. Connect the T, R, LG, and L terminals to the terminals across from the corresponding terminals on the MISC connecting block. Refer to Figure 21.

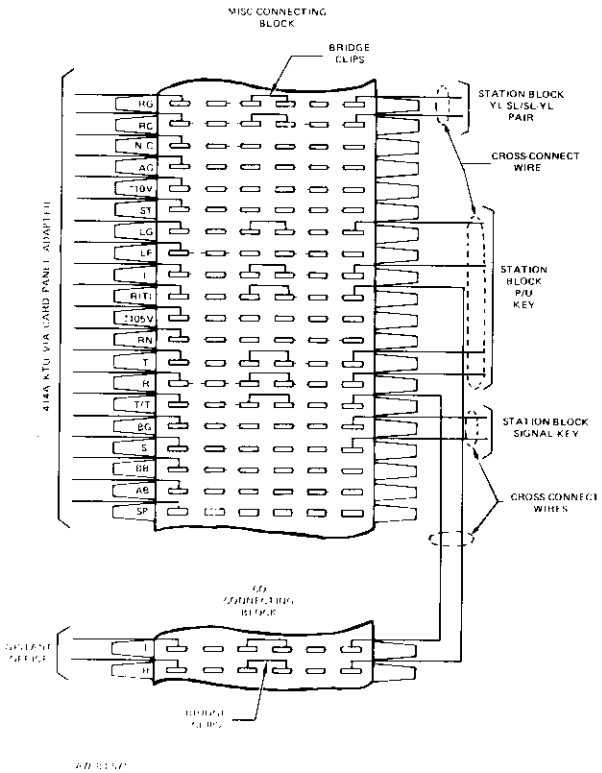

Figure 21: Connecting Details, 414A KTU to Station and Distant Office

(h) On the station connecting block, connect the terminal for the YL-SL lead to the terminal across from terminal RG on the MISC connecting block. Connect the terminal for the SL-YL lead to the terminal across from terminal RC on the MISC connecting block. Use bridge clips to complete the connections to the 414A tie line KTU.

(j) On the station connecting block, locate the terminals for the selected signaling key. Connect terminal SG to the terminal across from terminal BG on the MISC connecting block. Connect terminal A to the terminal across from terminal S on the MISC connecting block. Use bridge clips to complete the connections.

(k) Convert the signaling key on the associated telephone for nonlocking operation. Refer to the respective section in the Telephone Apparatus Practices Manual for details.

AUTOMATIC TIE LINE

4.30 For automatic tie line service, one 415A KTU is required at each key system for one tie line. The 415A KTU can be installed into any unused card connector on the 512A KSU.

4.31 Strap the 415A KTU for the required options. Then insert the KTU into the selected KSU card connector and make the following connections:

(a) On KSU connecting block D, locate the Jn-3, -12, and -18 terminals associated with the card connector into which the 415A KTU was inserted. Connect the Jn-3 terminal to terminal GND(C34) on KSU connecting block C. Connect the Jn-18 terminal to terminal −24VT(C33) on KSU connecting block C. Refer to Figure 10 for an example of these connections.

(b) On KSU connecting block A, B, or C, locate the terminals associated with the card connector for the 415A KTU. Referring to Figure 22, connect these terminals as follows:

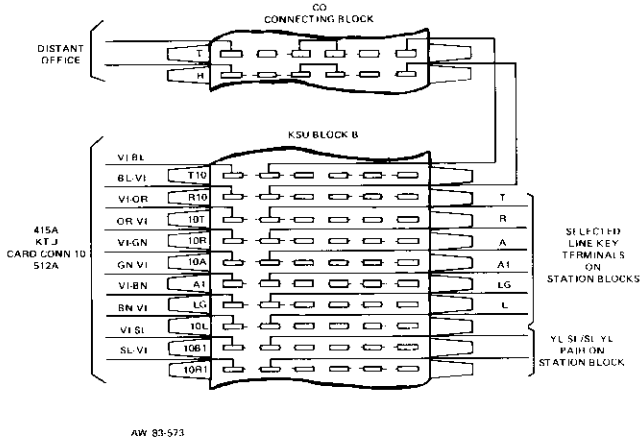

Figure 22: Connecting Details, 415A KTU

(1) Connect the Tn and Rn terminals to the Tip and Ring terminals on the CO connecting block for cross-connection to the distant office. Use bridge clips to complete the connections.

(2) Connect the T, R, A, A1, LG, and L terminals to the corresponding terminals of the selected line pickup key on the station connecting block.

(3) Connect the B1 terminal to the YL-SL lead of the selected station block.

(4) Connect the R1 terminal to the SL-YL lead.

4.32 An optional one-card, two-card, or four-card panel adapter may alternately be used to mount the 415A automatic tie line KTU. The card panel adapter can be mounted on the 512A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

PRIVATE LINE

4.33 The 416A station line KTU serves as the interface between a key telephone and a dedicated single-line telephone. A line pickup key and a nonlocking signaling key are required at the key telephone. The single-line telephone requires no dial since it can only be used to call the key telephone, or answer calls from the key telephone. The 416A KTU mounts into a 20-contact card connector such as the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the 512A KSU, or near the KSU on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

4.34 Strap the 416A KTU for the desired options. Then insert the KTU into the card panel adapter and make the following connections:

(a) Connect all the leads from the card panel adapter to the MISC connecting block. Label the leads as shown in Figure 23.

(b) Refer to Figure 20. On KSU connecting block C, make the following connections to the MISC connecting block:

(1) Connect terminal – 24VS(C31) to terminal BB.

(2) Connect terminal GND(C32) to terminal BG.

(3) Connect terminal – 24VT(C33) to terminal AB.

(4) Connect terminal GND(C34) to terminals AG and LG.

CARD PANEL ADAPTER PIN NO		PVT LINE KTU PIN NO	MISC CONNECTING BLOCK LEAD DESIG
259B	359A		
1	0	0	RG
2	1	1	RC
3	2	2	N/C
4	3	3	AG
5	4	4	±10V
6	5	5	ST
7	6	6	LG,NG
8	7	7	LF
9	8	8	L
10	9	9	R(T)
11	10	10	±105V
12	11	11	RN
13	12	12	T
14	13	13	R
15	14	14	T(T)
16	15	15	BG
17	16	16	S
18	17	17	BB
19	18	18	AB
20	19	19	SP

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Figure 23: Private Line KTU Connections

(5) Connect terminal 10VAC(C35) to terminal ± 10V.

(6) Connect terminal RNG(C37) to terminal ± 105V.

(7) Connect terminal GND(C38) to terminal RG.

(c) On the back of one of the card panel connectors on the KSU, make the following connections to the MISC connecting block:

(1) Connect pin 11 to terminal RN.

(2) Connect pin 7 to terminal LF.

(3) Connect pin 5 to terminal ST.

(d) Use bridge clips to connect the RN, LF, and ST terminals to the 416A KTU.

(e) On the MISC connecting block, connect the terminals across from terminals R(T) and T(T) to the tip and ring leads of the dedicated single-line telephone. Use bridge clips on the MISC connecting block to complete the connections. Refer to Figure 24 for details.

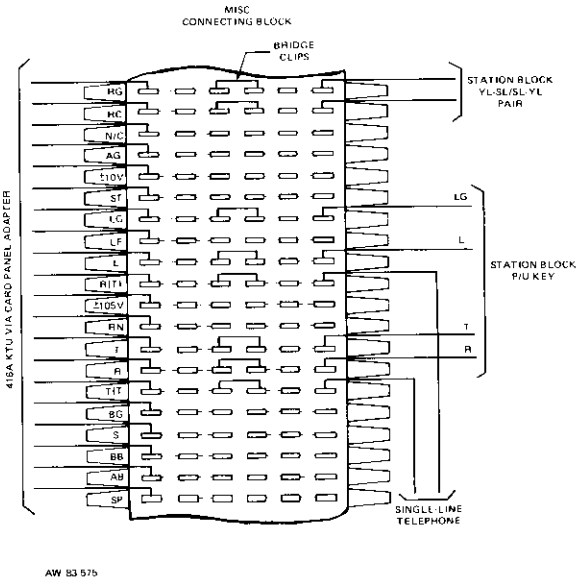


Figure 24: Connecting Details, 416A KTU

(f) On the station connecting block for the multibutton telephone, locate the terminals for the selected line pickup key. Connect the T, R, LG, and L terminals to the terminals across from the corresponding terminals on the MISC connecting block. Use bridge clips to complete the connections to the 416A KTU.

(g) On the station connecting block, connect the terminal for the YL-SL lead to the terminal across from the RG terminal on the MISC connecting block. Connect the terminal for the SL-YL lead to the terminal across from the RC terminal on the MISC connecting block. Use bridge clips to complete the connections to the 416A KTU.

(h) On the station connecting block, locate the terminals for the selected signaling key. Connect terminal SG to the terminal across from terminal BG on the MISC connecting block. Connect terminal A to the terminal across from terminal S on the MISC connecting block.

(j) Convert the signaling key on the multibutton telephone for nonlocking operation. Refer to the respective section in the Telephone Apparatus Practices Manual for details.

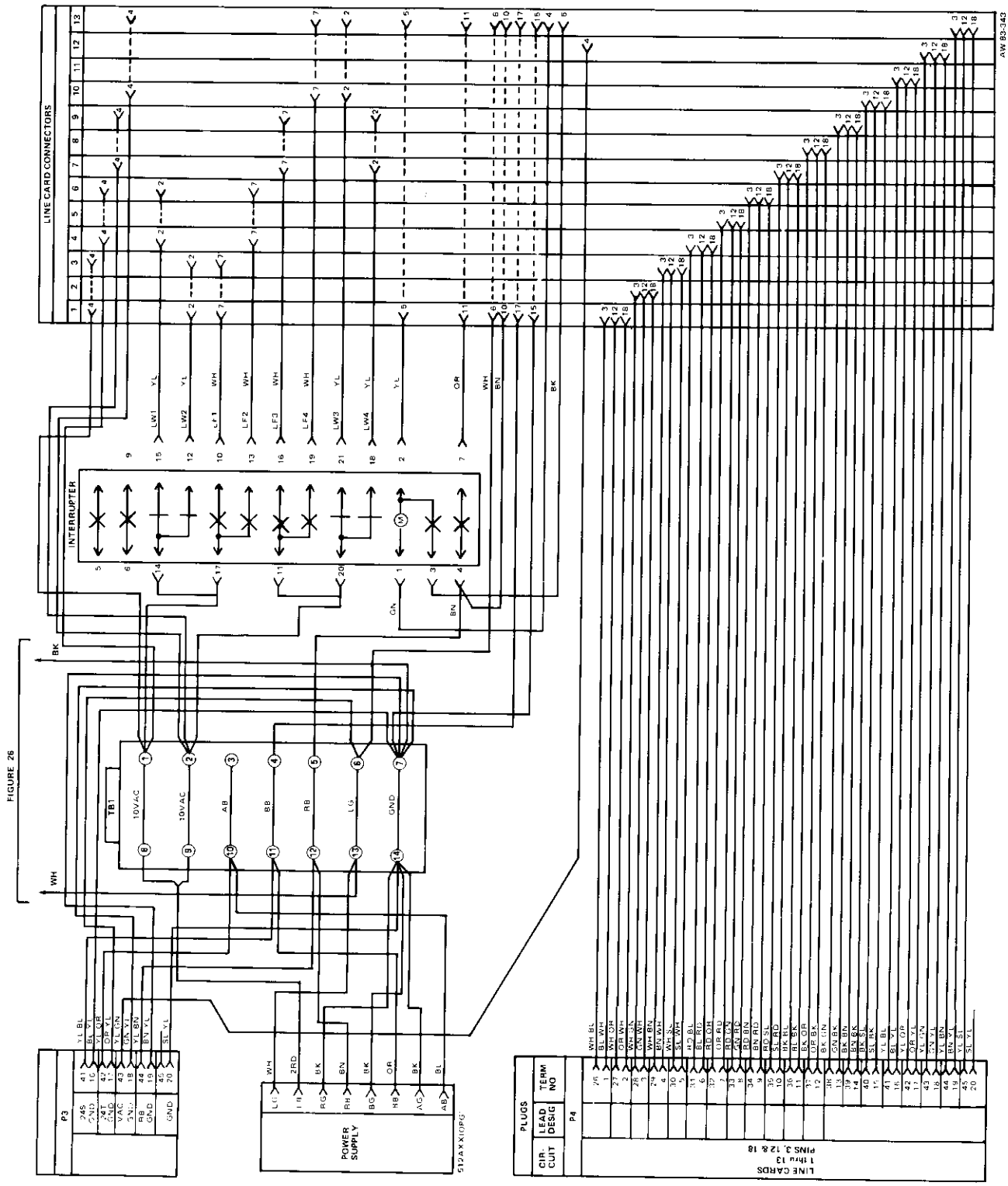
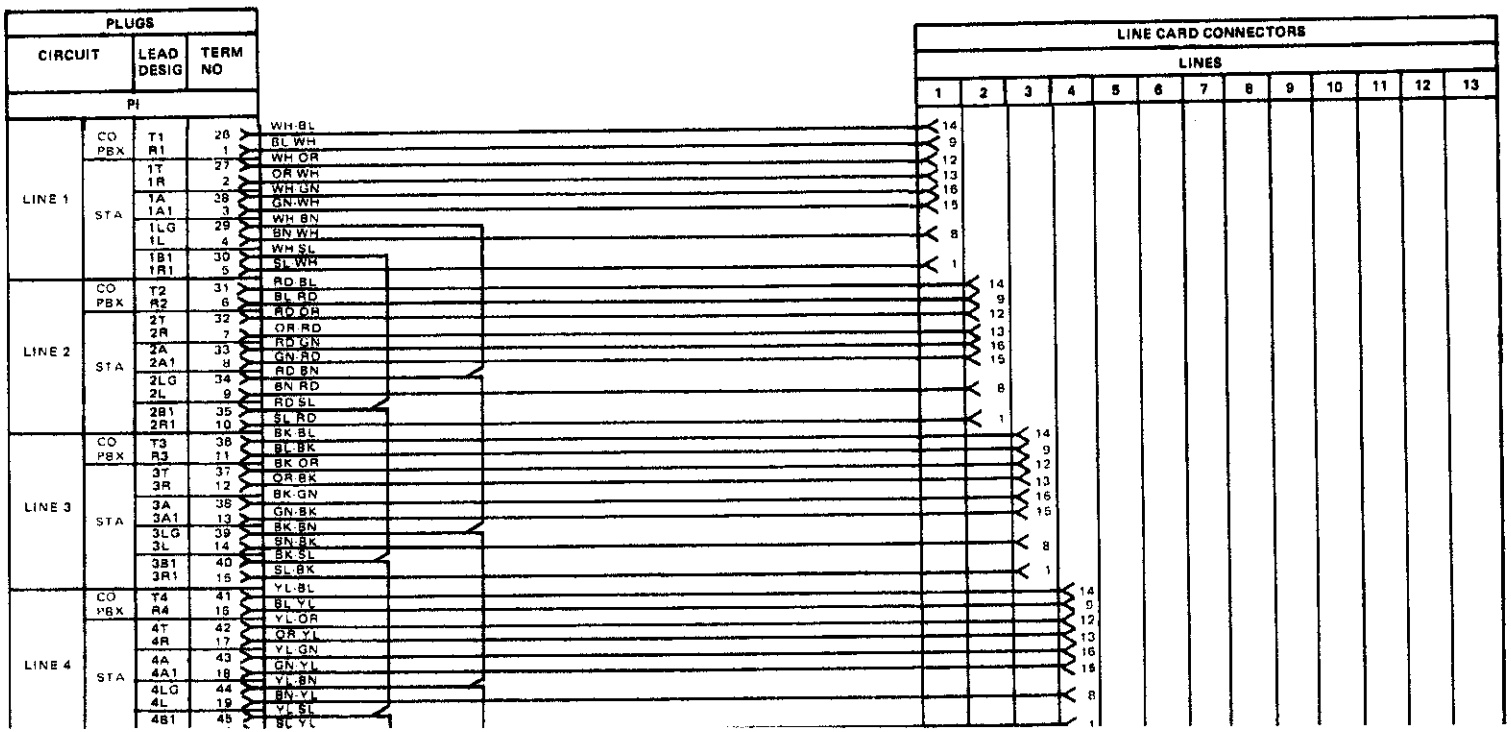


Figure 25: Cabinet Wiring, Power Supply, Interrupter, and Connector P4


PLUGS
CIRCUIT
LEAD DESIG
TERM NO
PI
LINE 1
LINE 2
LINE 3
LINE 4
CO PBX
STA
T1 R1
1T 1R
1A 1A1
1LG 1L
1B1 1R1
T2 R2
2T 2R
2A 2A1
2LG 2L
2B1 2R1
T3 R3
3T 3R
3A 3A1
3LG 3L
3B1 3R1
T4 R4
4T 4R
4A 4A1
4LG 4L
4B1
26 1
27 2
28 3
29 4
30 5
31 6
32 7
33 8
34 9
35 10
36 11
37 12
38 13
39 14
40 15
41 16
42 17
43 18
44 19
45
WH-BL
BL-WH
WH-OR
OR-WH
WH-GN
GN-WH
WH-BN
BN-WH
WH-SL
SL-WH
RD-BL
BL-RD
RD-OR
OR-RD
RD-GN
GN-RD
RD-BN
BN-RD
RD-SL
SL-RD
BK-BL
BL-BK
BK-OR
OR-BK
BK-GN
GN-BK
BK-BN
BN-BK
BK-SL
SL-BK
YL-BL
BL-YL
YL-OR
OR-YL
YL-GN
GN-YL
YL-BN
BN-YL
YL-SL
BL-YL
LINE CARD CONNECTORS
LINES
1 2 3 4 5 6 7 8 9 10 11 12 13
14 9 12 13 16 15 8 1

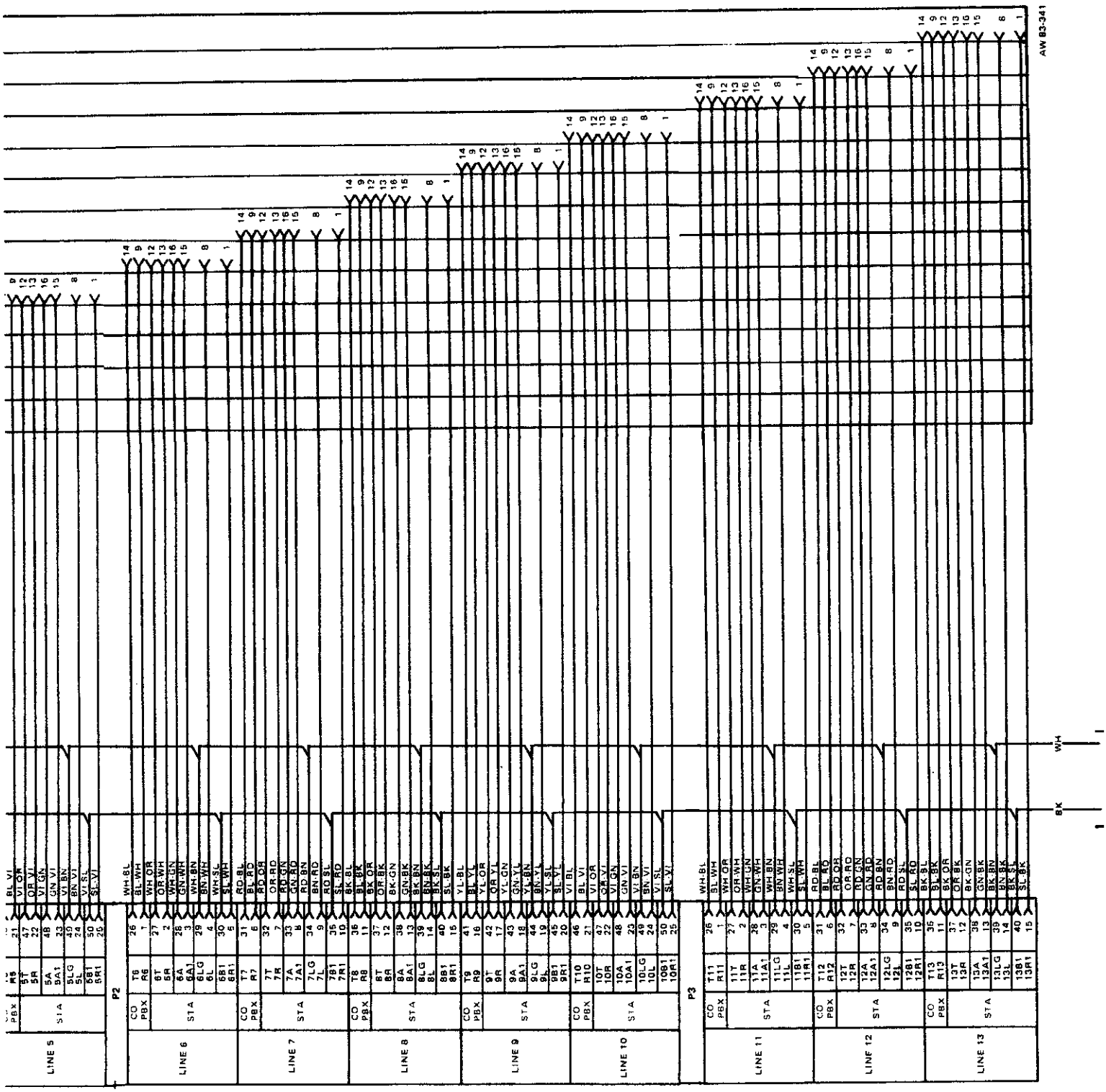


Figure 26: Cabinet Wiring, Connectors P1, P2, and

K100-3

KSU POWER SUPPLY

1. INTRODUCTION

1.01 This section describes the K100-3 Power Supply, 677108-000-003, and provides instructions for installing the power supply in the 501A KSU (Key Service Unit) or in the 512A KSU.

RELATED DOCUMENTS

1.02 For additional information concerning the 501A KSU and the 512A KSU, refer to sections 30-501-100 and 30-512-100, respectively.

2. DESCRIPTION

2.01 The K100-3 Power Supply is shown in Figure 1. It is designed for use in 1A2 key service units such as the 501A KSU and the 512A KSU. It replaces the 180125-101 and 180125-102 power supplies used in the 501A KSU, and the 180715-101 power supply used in the 512A KSU.

2.02 The K100-3 Power Supply is designed to mount on the backboard of a floor-mounting 501A KSU or on the swing-out gate of the 512A KSU. Brackets for mounting are provided on the rear of the unit. The unit measures approximately 7 inches high, by 9-1/2 inches wide, by 5 inches deep. Mounting hole centers are shown in Figure 1.

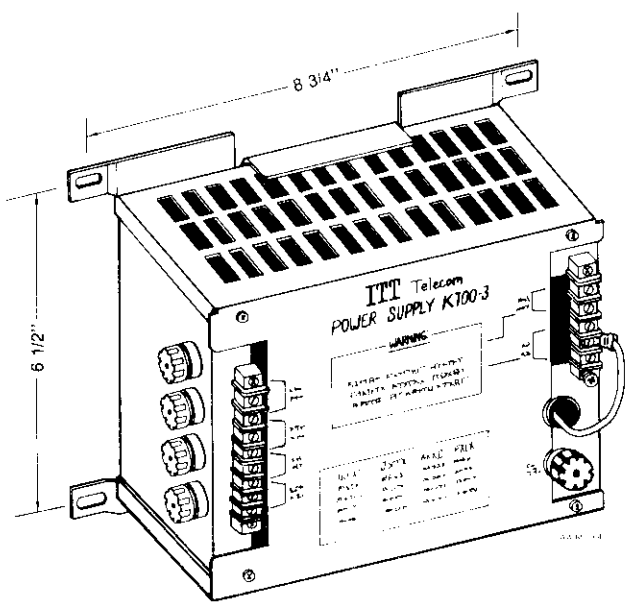


Figure 1: K100-3 Power Supply

2.03 Input and output specifications for the K100-3 Power Supply are shown in Table A.

TABLE A

K100-3 POWER SUPPLY SPECIFICATIONS

INPUT	108, 115, or 120 VAC, 60 Hz., 1.7 Amps Nominal
OUTPUTS	
Lamp Voltage	9 - 11 VAC, 60 Hz., 8.0 Amps
Buzzer Voltage	16 - 21 VAC, 60 Hz., 0.5 Amps
Talk (A) Battery	18 - 28 VDC, 1.0 Amps*
Signal (B) Battery	18 - 28 VDC, 2.0 Amps*
Ringing Voltage	115 VAC, 30 Hz., 0.05 Amps

* Maximum Combined DC Current is 2.0 Amps.

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3. INSTALLATION

3.01 Procedures for installing the K100-3 Power Supply in a 501A KSU and in a 512A KSU are provided in the following paragraphs. Use the applicable procedure.

501A

3.02 Install the K100-3 Power Supply in the 501A KSU as follows:

(a) Mount the power supply on the wall below the backboard. On a floor-mounting unit, mount the power supply on the backboard between the power supply shield and the shelf.

(b) Refer to Figure 2 and connect the leads in the power supply cable as follows:

(1) Connect the BL/BK pair to the −24 VDC TALK terminals. Connect the black lead to the (+) terminal: connect the blue lead to the (−) terminal.

(2) Connect the YL/BK pair to the −24 VDC SIG terminals. Connect the black lead to the (+) terminal: connect the yellow lead to the (−) terminal.

(3) Connect the GN/BK pair to the 10 VAC LAMP terminals. Connect the black lead to the (C) terminal: connect the green lead to the (±) terminal.

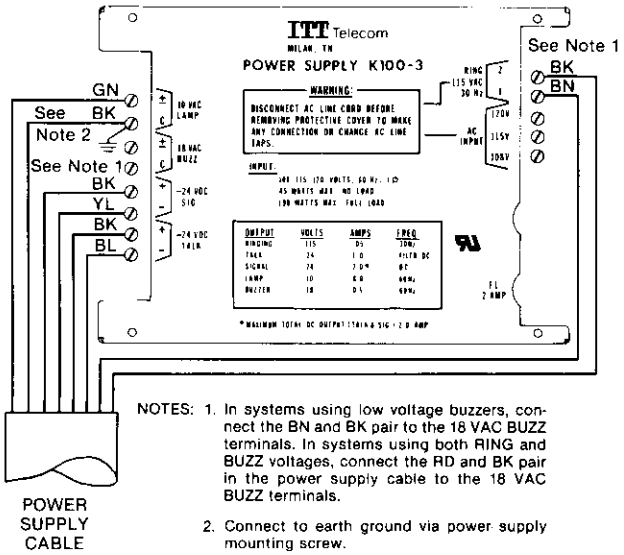

Figure 2: Connecting Scheme for 501A KSU

(4) Connect the BN/BK pair to the RING 115 VAC 30 Hz terminals or to the 18 VAC BUZZ terminals. If the system is arranged for low voltage buzzer operation, connect the black lead to the 18 VAC BUZZ (C) terminal: connect the brown lead to the (±) terminal. If the system is arranged for ringer operation, connect the black lead to the RING 115 VAC 30 Hz (2) terminal: connect the brown lead to the (1) terminal.

(5) In a system using both ringers and low voltage buzzers, connect the BN/BK pair to the RING 115 VAC 30 Hz terminals as in step 4. Connect the RD/BK pair in the power supply cable to the 18 VAC BUZZ terminals. Connect the black lead to the (C) terminal: connect the red lead to the (±) terminal.

(6) Connect a length of #18 AWG wire from the 10 VAC LAMP terminal (C) to one of the four power supply mounting screws. Connect earth ground to the mounting screw.

(c) Test and adjust the power supply as follows:

(1) Plug in the power cord.

(2) Use a VOM set to the proper DC voltage scale to measure TALK and SIGNAL battery.

(3) If readings are lower than 21 volts, unplug the power cord, remove the insulator from the AC INPUT terminals, and move the primary tap from the 115V terminal to the 108V terminal.

(4) If readings are higher than 28 volts, unplug the power cord, remove the insulator from the AC INPUT terminals, and move the primary tap from the 115V terminal to the 120V terminal.

(5) Cover the AC INPUT terminals with the insulator, plug the power supply in, and verify that the power supply outputs agree with those shown in Table A.

512A

3.03 Install the K100-3 Power Supply in the 512A KSU as follows:

(a) Mount the power supply on the swing-out gate of the 512A KSU.

(b) Refer to Figure 3 and connect the leads in the power supply cable as follows:

(1) Connect the BL/BK pair to the −24 VDC TALK terminals. Connect the black lead to the (+) terminal: connect the blue lead to the (−) terminal.

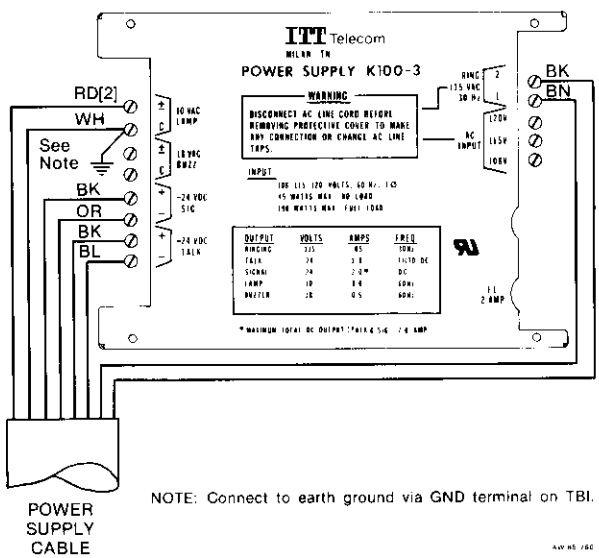

Figure 3: Connecting Scheme for 512A KSU

(2) Connect the OR/BK pair to the −24 VDC SIG terminals. Connect the black lead to the (+) terminal: connect the orange lead to the (−) terminal.

(3) Connect the RD/WH pair to the 10 VAC LAMP terminals. Connect the white lead to the (C) terminal: connect the two red leads to the (±) terminal.

(4) Connect the BN/BK pair to the RING 115 VAC 30 Hz terminals. Connect the black lead to the (2) terminal: connect the brown lead to the (1) terminal.

(5) Connect a length of #18 AWG wire from the 10 VAC LAMP terminal (C) to the GND terminal on terminal board 1 (TB1) to the left of the power supply. Connect the earth ground to the GND terminal.

(c) Test and adjust the power supply as follows:

(1) Plug in the power cord.

(2) Use a VOM set to the proper DC voltage scale to measure TALK and SIGNAL battery.

(3) If readings are lower than 21 volts, unplug the power cord, remove the insulator from the AC INPUT terminals, and move the primary tap from the 115V terminal to the 108V terminal.

(4) If readings are higher than 28 volts, unplug the power cord, remove the insulator from the AC INPUT terminals, and move the primary tap from the 115V terminal to the 120V terminal.

(5) Cover the AC INPUT terminals with the insulator, plug the power supply in, and verify that the power supply outputs agree with those shown in Table A.

584C
CARD PANEL

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1. INTRODUCTION

1.01 This section describes the ITT 584C card panel and provides instructions for its application and installation in a key telephone installation.

1.02 This section supersedes KSP584-102 and all previous documents covering the 584C 13-card panel. Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 This equipment can be configured for use with dial pulse or DTMF (dual tone multifrequency) telephones. The equipment has been granted an FCC registration number under Part 68 of Title 47 of the code of federal regulations. For direct connection to the telephone lines, the equipment must be installed as described, and the FCC registration number must be reported to the serving telephone company.

2. DESCRIPTION

2.01 The 584C card panel is shown in Figure 1. It is designed for use in large centralized 1A2-type key system installations. The 584C card panel provides printed circuit board connectors for 13 type-400 KTUs (Key Telephone Units). Fully equipped with line card KTUs, the panel will provide key telephone service for 13 lines.

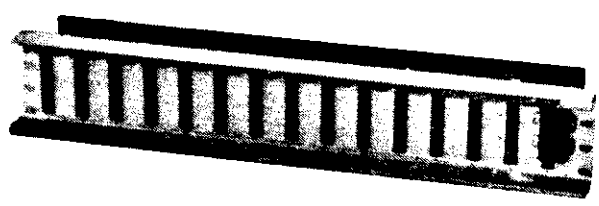

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Figure 1: 584C Card Panel

2.02 The 584C card panel measures approximately 23 inches wide, 4 inches high, and 4-3/4 inches deep. It is designed to mount on a standard 23-inch relay rack or on the swing-out equipment mounting frame of a key system apparatus cabinet.

2.03 The 584C card panel is made up of a card mounting assembly, a terminal panel assembly, and the associated hardware. It can optionally be equipped with an interrupter.

CARD MOUNTING ASSEMBLY

2.04 The card mounting assembly forms the front of the 584C card panel. It is equipped with thirteen 18-contact printed circuit card connectors and a 21-pin receptacle for the interrupter. The printed circuit card connectors are numbered 1 through 13 from left to right. They are factory-wired to accommodate most type-400 KTUs. The 21-pin interrupter receptacle is factory-wired to accept the ITT 190478-101 interrupter.

2.05 On the top edge of the card mounting assembly, a KTU retainer bracket is mounted. The bracket is attached to the card mounting assembly with machine screws inserted through elongated holes. When the screws are loose, the bracket can be slid from side to side. To lock the KTUs in place, the bracket is slid to the left and the screws are tightened.

TERMINAL PANEL ASSEMBLY

2.06 The terminal panel assembly makes up the back of the 584C card panel. It is equipped with three 25-pair male connectors, an 18-contact printed circuit board connector, screw terminals for power supply connections, and 22 non-indicating flat fuses. Arrangement of the terminal panel assembly is shown in Figure 2.

2.07 The 25-pair connectors are used to extend the card panel wiring to externally-mounted terminal blocks for cross-connection with station apparatus. The connectors are designated, from top to bottom, 1, 2, and 3. Connector 1 is associated with the first five KTU connectors on the front of the card panel. Connector 2 is associated with KTU connectors 6 through 10. Connector 3 is associated with KTU connectors 11, 12, and 13. In addition, connector 3 includes connections to pin 18 of each connector on the card panel.

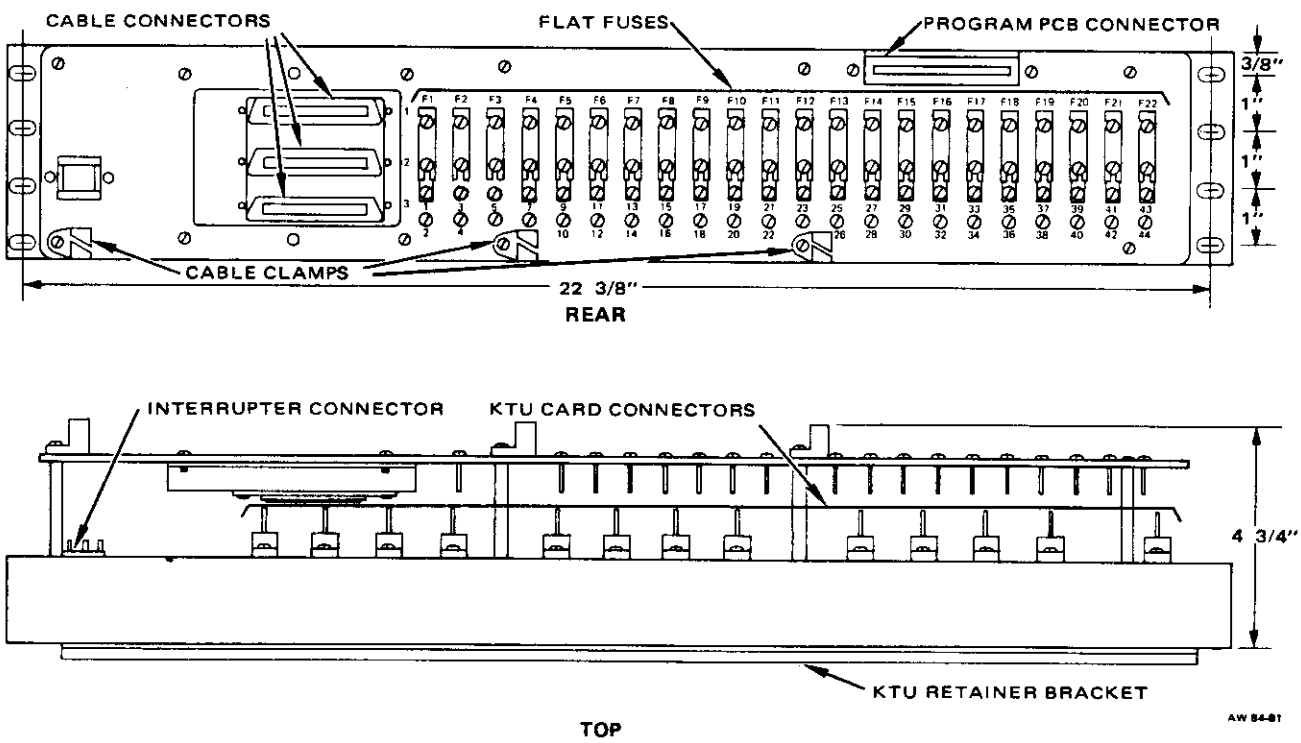


Figure 2: Terminal Panel Assembly

2.08 The screw terminals on the terminal panel assembly are arranged to permit flexibility in connecting the panel to a source of power. The terminals can be used to connect a single key system power supply or the outputs of several different supplies to one 584C panel. Similarly, the terminals can be used to interconnect two 584C panels for connection to a single key system power supply.

2.09 Flat, non-indicating fuses on the terminal panel assembly are provided to protect the key system power supply from equipment overloads. Individual fuse values are stamped on the terminal panel assembly. The fuses are easily replaceable.

2.10 The 18-contact connector on the terminal panel assembly is for the PROGRAM A/C PCB. The connector and the program PCB are used to provide two methods of distributing lamp signals. When the program PCB is inserted so that the message PROGRAM A can be read from the top of the 584C panel, the panel is arranged for one-panel operation wherein all interrupter signals are distributed to lines served by the panel. Under this arrangement, fusing is adequate for 17 lamps per line or a maximum of 50 lamps per interrupter contact.

2.11 When the program PCB is inserted so the message PROGRAM C can be read from the top of the panel, the assembly is arranged for two-panel operation wherein the interrupter on the first panel serves both panels. Under this arrangement, half the lamp flash and lamp wink signals from the interrupter are distributed to the second 584C panel. Fusing under this second arrangement is adequate for an average of 8 lamps per line on the main panel and a total of 100 lamps on the second panel.

INTERRUPTER

2.12 The optional interrupter for the 584C card panel (ITT part number 194078-101) plugs into the 21-pin receptacle on the card mounting assembly. The interrupter operates from 10 volts, 60 Hz AC from the key system power supply. It produces a 15 IPM signal for interrupted ringing, a 60 IPM lamp flash signal, and a 120 IPM lamp wink signal. One interrupter can be used to provide the interrupted ringing, lamp flash, and lamp wink signals for one or two 584C card panels.

CHASSIS WIRING

2.13 For reference, the wiring diagrams for the 584C card panel are provided in Figure 15 and Figure 16 at the back of this section.

ORDERING INFORMATION

2.14 Two variations of the 584C card panel are available. Part number 000584-00C is the panel without an interrupter. Part number 000584-0C1 is the panel with an interrupter.

3. INSTALLATION

UNPACKING AND INSPECTION

3.01 Remove the 584C card panel, mounting hardware, and the optional interrupter from the packing carton. Inspect the card panel and interrupter for signs of damage. Make a note of any equipment damage or part shortages and report it promptly.

MOUNTING THE PANEL

3.02 Mount the 584C card panel on the key system mounting frame or relay rack. Position the card panel so the connector for the interrupter is on the right, as viewed from the front. Hold the card panel in place and secure it using the hex head screws provided.

3.03 If necessary, plug in the interrupter.

TERMINAL BLOCK CONNECTIONS

3.04 On the MDF (main distributing frame) or equivalent, mount three 25-pair connecting blocks. Label the blocks A, B, and C. Label the terminals on each block as shown in Figure 3.

3.05 Construct three 25-pair cables to complete the connections from the 584C card panel to the connecting blocks. Attach a 50-pin Amphenol-type female connector to one end of each cable. Follow the standard color code order.

3.06 Connect the first cable from connector 1 on the rear of the 584C card panel to connecting block A on the MDF. Using a punch-down tool, terminate the cable in the standard color code order on connecting block A. In a similar man-

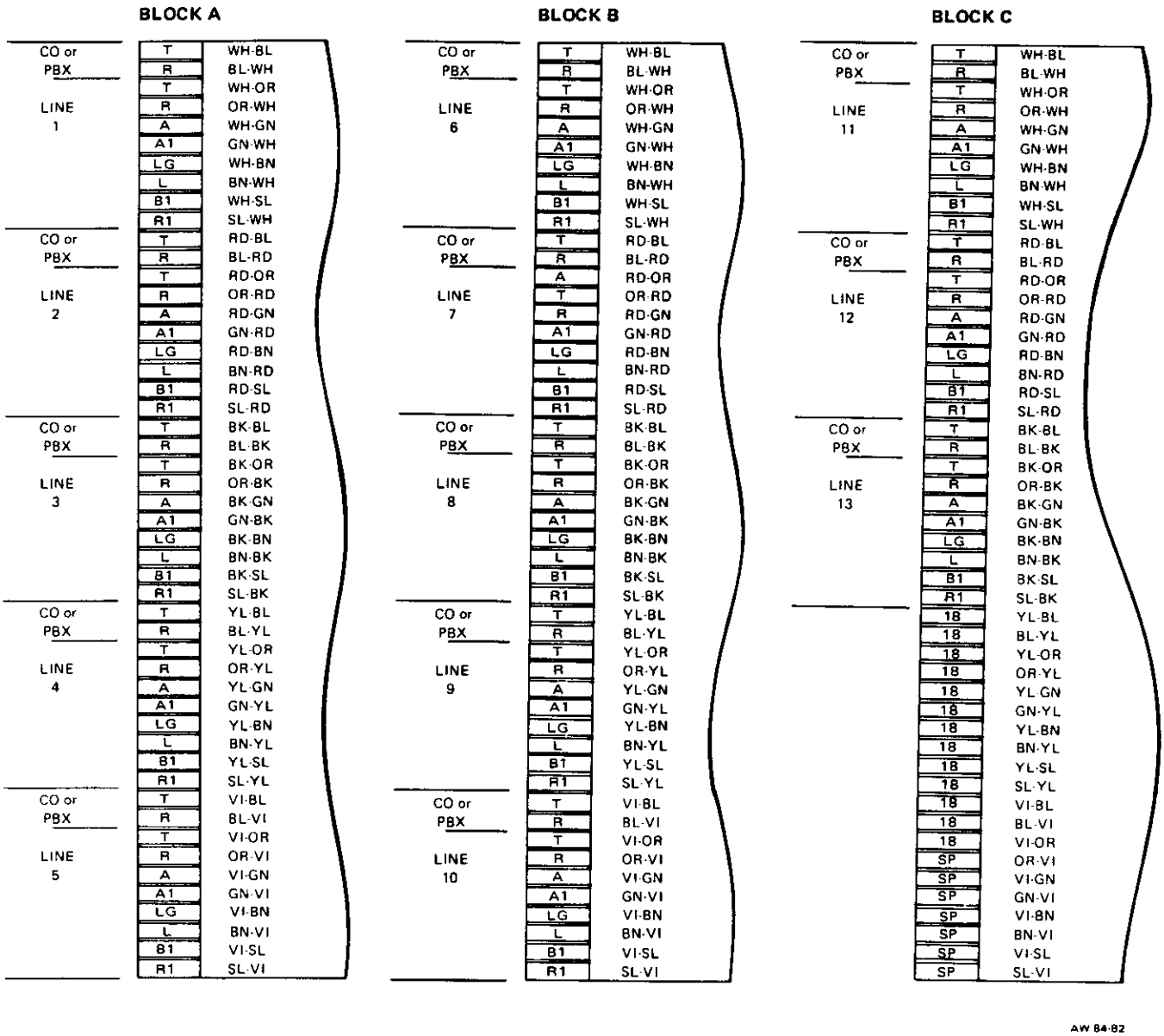


Figure 3: Arrangement of Key System Connecting Blocks

ner, connect the second cable from connector 2 to connecting block B, and the third cable from connector 3 to connecting block C.

POWER CONNECTIONS

Warning: Before making any power connections, make certain there is no output from the key system power supply.

A. Single-Panel Application

3.07 For a single-panel application, where the interrupter serves only the one panel, complete the power supply connections as shown in Figure 4. Use insulated 18 gauge solid copper wire for all connections. Verify that the factory straps are on the proper terminals. Be sure to insert the program PCB so the message PROGRAM A can be read from the top of the panel.

B. Two-Panel Application

3.08 For a two-panel application, where the interrupter on the first panel serves both panels, complete the power supply cabling as shown in Figure 5. Use insulated 18 gauge solid copper wire for all connections. Verify that the factory

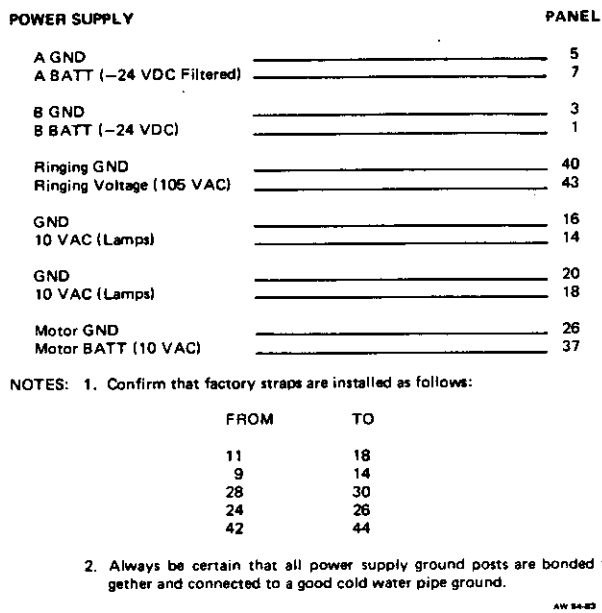


Figure 4: 584C Panel Connections; Program A, Single Panel

straps are on the proper terminals. On each card panel, be sure to insert the program PCB so the message PROGRAM C can be read from the top of the panel.

C. Frame Ground

3.09 Be certain that all power supply ground posts are bonded together and connected to an approved earth ground such as a ground rod or cold water pipe. Use a piece of #14 AWG or larger insulated, stranded copper wire to construct the external frame ground.

KTU INSTALLATION

3.10 Determine the KTU to be inserted in each KTU connector on the 584C card panel. Loosen the screws holding the KTU retainer bracket, then slide the bracket to the left and insert each KTU. Insert each KTU with the component side to the right. Leave the retainer bracket loose until all KTUs have been installed, strapped, and cross-connected.

STATION CONNECTIONS

3.11 On the MDF, mount the required number of station connecting blocks. One 25-pair block can serve one 6-button telephone or one 10-button telephone. One 50-pair block can serve two 6-button or 10-button telephones, or one 20-button telephone.

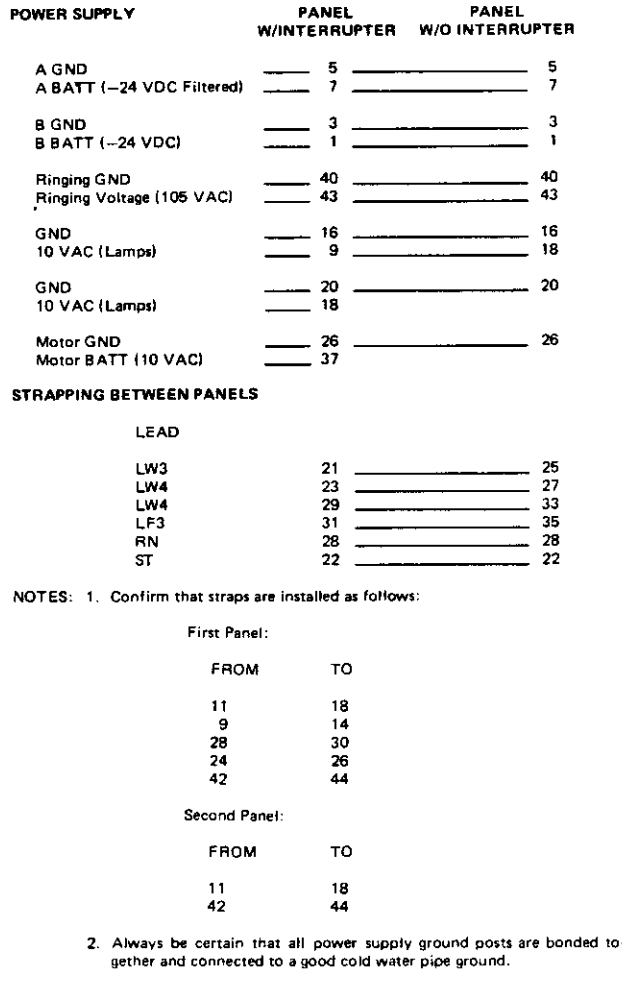


Figure 5: 584C Panel Connections; Program C, Two Panels With One Interrupter

3.12 Connect the 25-pair station cable from each multibutton telephone to a station connecting block. Punch each cable down following the standard color code order. Label each block with the station identification and the proper lead designations. Refer to the applicable Telephone Apparatus Practice or circuit label for lead designations. For reference, typical station block layouts for 6-button, 10-button, and 20-button telephones are shown in Figure 6.

3.13 For each single-line station, punch down the station cable on a 50-pair miscellaneous (MISC) connecting block. Use two-pair (quad) wire for telephones dedicated to a CO/PBX line; use three-pair wire for telephones serving as intercom stations. Label the block with the station line or intercom number and the proper lead designations.

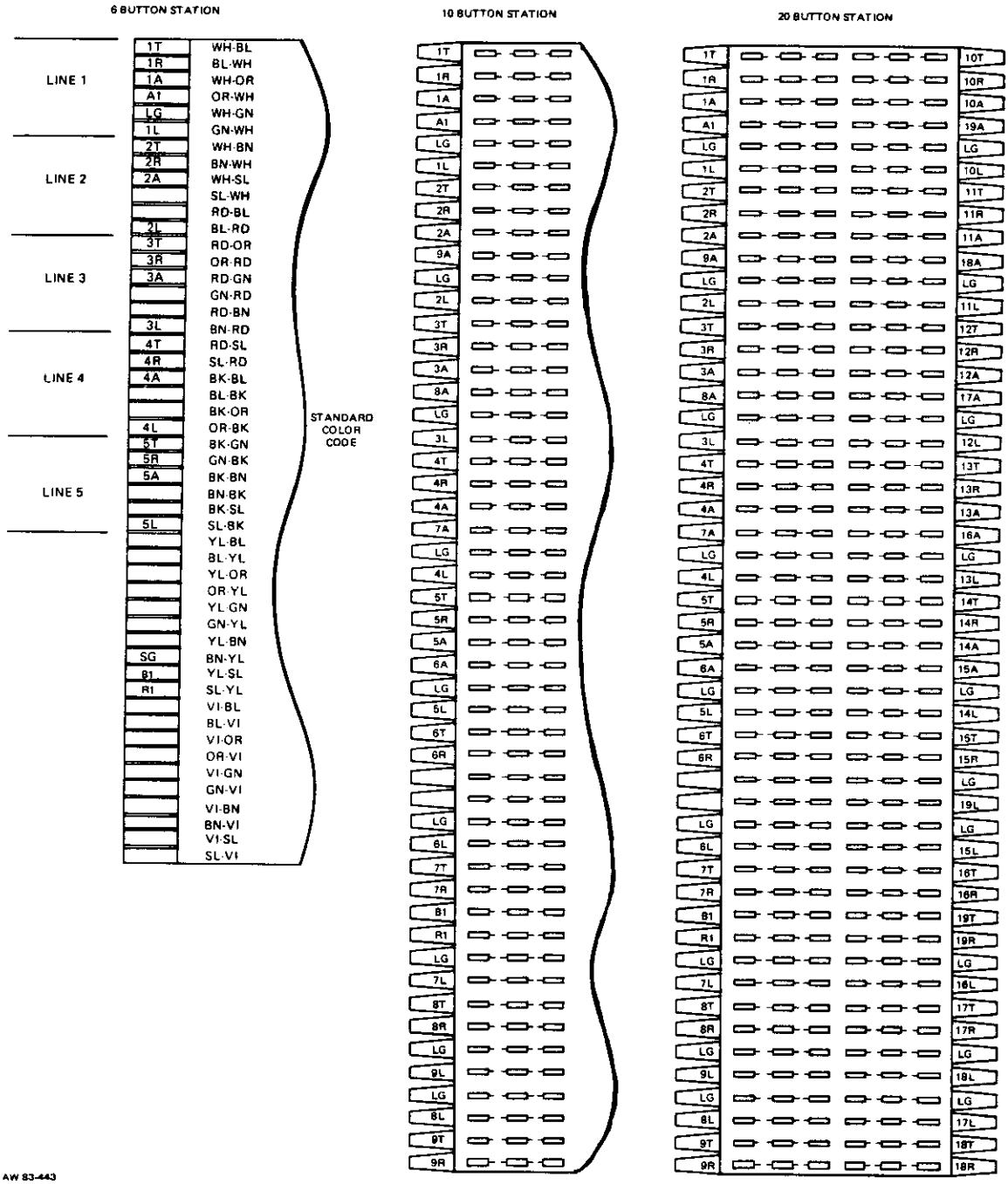


Figure 6: Typical Station Block Layouts

LINE CARD KTU

3.14 One line card KTU (400E or equivalent) is required for each CO or PBX line serving the system. Strap each line card for the required options, then insert each card into the desired KTU connector on the 584C card panel. Cross-connect each KTU as detailed in the following paragraphs. Use standard one-pair and three-pair cross-connect wire.

3.15 On connecting block A, B, or C, locate the terminals associated with the card connector into which the line KTU was inserted. Referring to Figure 7, cross-connect the terminals as follows:

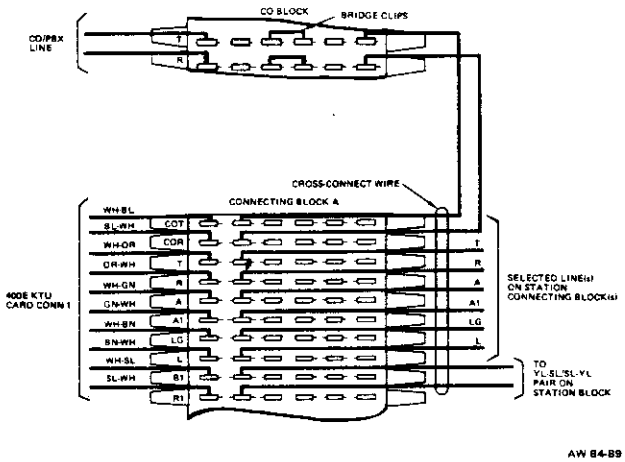


Figure 7: Connecting Details, Line KTU to Multibutton Station

(a) Connect the COT and COR terminals to the Tip and Ring terminals for the CO/PBX line on the CO (trunk) connecting block. Use bridge clips on the CO connecting block to complete the connections to the CO/PBX line.

(b) Connect the T, R, A, A1, LG, and L terminals to the corresponding terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, A, A1, LG, and L terminals of the line pickup key(s) for any other assigned station(s).

(c) Connect the B1 terminal to the YL-SL lead on the station block of a telephone that is to ring when the line is called. Connect the R1 terminal to the SL-YL lead of the station block. Multiple the connections to the station block of each telephone that is to ring.

3.16 For a single-line telephone used as a line answering station, cross-connect the T, R, A, and A1 terminals on connecting block A, B, or C to the corresponding terminals on the MISC connecting block. Use bridge clips to complete the connections to the single-line telephone. Refer to Figure 8.

Note: In systems using 400TPL or 400PFL line card KTUs, single-line telephones used as CO/PBX line answering stations will not ring unless connected via a 346A KTU.

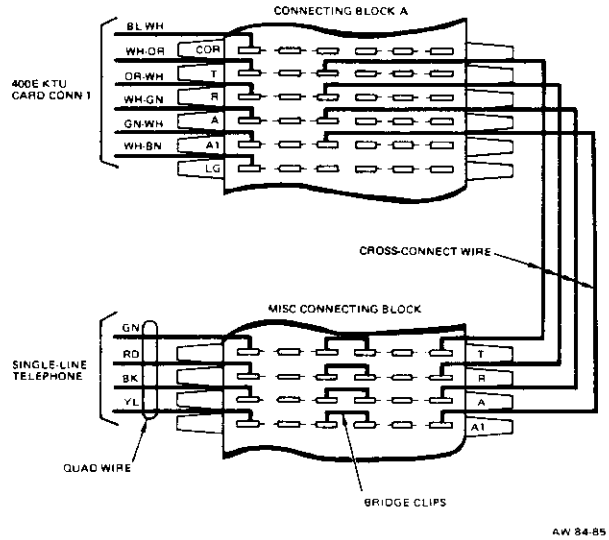


Figure 8: Connecting Details, Line KTU to Single-Line Station

MANUAL INTERCOM SERVICE

3.17 The 401B manual intercom KTU can be used to connect a group of stations to a common talk path, or it can be used to provide a private talk path between two stations. For manual intercom service, insert the 401B manual intercom KTU into an unused card connector on the 584C card panel, then cross-connect the equipment as follows:

(a) On connecting block C, locate the terminal corresponding to pin 18 of the card connector for the 401B KTU. Connect the terminal to A battery (– 24VDC) from terminal 7 on the rear of the 584C card panel, or from the key system power supply.

(b) On connecting block A, B, or C, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals to the T, R, L, and LG terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, L, and LG terminals of the line pickup key(s) for any other assigned station(s). See Figure 9 for example.

(c) If necessary, arrange the associated telephones for button and buzzer signaling. (Refer to the applicable Telephone Apparatus Practice for details.)

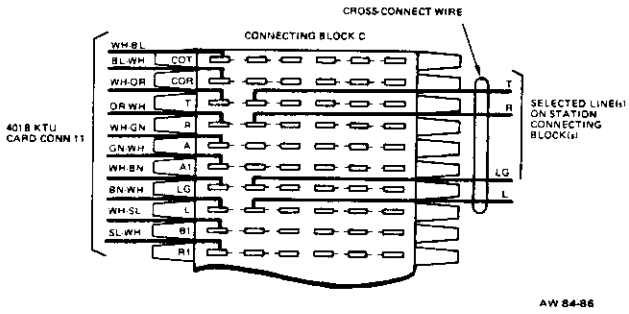


Figure 9: Connecting Details, Intercom KTU to Multibutton Station

(d) For low voltage signaling arrange the equipment as follows, referring to Figure 10.

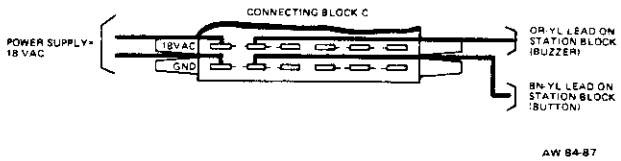


Figure 10: Connecting Details, Button and Buzzer Signaling

(1) Connect a length of #20 AWG insulated, solid copper wire from the 18VAC terminal on the power supply to a spare terminal on connecting block C. Label the terminal 18VAC.

(2) Connect a length of #20 AWG insulated, solid copper wire from the 18VAC GND terminal on the power supply to a spare terminal on connecting block C. Label the terminal GND.

(3) Multiple the 18VAC terminal to the OR-YL lead on the station block of each telephone to be signaled.

(4) Multiple the GND terminal to the BN-YL (SG) lead on the station block of each six-button telephone with a signal pushbutton.

Note: On a 10-button or 20-button telephone it is not necessary to connect buzzer ground since the ground is common via the A1 lead.

BUTTON ACCESS PAGING

3.18 The 401B manual intercom KTU can also be used for button access to a PA system for voice paging. For such applications, insert the 401B KTU into an unused KTU card connector on the 584C card panel, then arrange the equipment as follows:

(a) On connecting block C, locate the terminal corresponding to pin 18 of the card connector for the 401B KTU. Connect the terminal to A battery (– 24VDC) from terminal 7 on the rear of the 584C card panel, or from the key system power supply.

(b) On connecting block A, B, or C, locate the T, R, L, and LG terminals associated with the card connector for the 401B KTU. Cross-connect these terminals as follows:

(1) Connect the T, R, L, and LG terminals to the T, R, L, and LG terminals for the selected line key on the assigned station connecting block. If required, multiple the connections to the T, R, L, and LG terminals of the line pickup key(s) for any other assigned station(s). Refer to Figure 11.

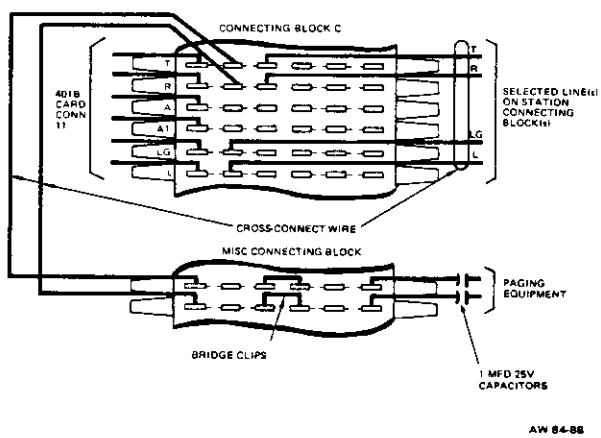


Figure 11: Connecting Details, Intercom KTU to Paging Equipment

(2) Connect the T and R terminals to the MISC connecting block for cross-connection to the paging amplifier.

(c) On each assigned telephone, convert the line pickup key used for paging access to nonlocking operation.

(d) On the MISC connecting block directly across from the T and R appearances of the 401B KTU, connect the input leads to the PA system. Connect a 1 MFD, 25 volt capacitor in series with each lead. Use bridge clips to complete the circuit to the PA equipment.

(e) For on/off control of the paging amplifier, connect KTU card connector pins 1, 9, and 14 as required. Use pins 1 and 14 for a make contact set. Use pins 1 and 9 for a break contact set. Pin 1 corresponds to terminal R1 for the card connector. Pins 14 and 9 correspond to terminals COT and COR, respectively. See Figure 12 for connecting details.

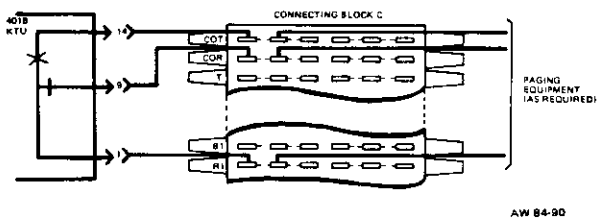


Figure 12: Connecting Details, Paging Equipment On/Off Control

MUSIC-ON-HOLD

3.19 For music-on-hold service, one 403A KTU is required to serve up to six CO/PBX lines. The 403A KTU mounts into a card panel adapter such as the 359A. Refer to the applicable card panel adapter practice for instructions for mounting and wiring the card panel adapter.

OFF-PREMISES LINE

3.20 The 346A off-premises line KTU is used to add standard two-wire telephones to a CO/PBX line. A maximum of six single-line telephones may be connected in parallel across the circuit. Maximum loop resistance is 1200 ohms. If Tel-Touch telephones are used, loop resistance is limited to 500 ohms.

3.21 In a key system not equipped with a dial intercom, install the 346A KTU as follows for a CO/PBX line station:

(a) Insert the 346A KTU into any unused card connector on the 584C card panel.

(b) On connecting block C, locate the terminal corresponding to pin 18 of the card connector for the 346A KTU. Connect the terminal to A Battery (– 24VDC) from terminal 7 on the rear of the 584C card panel or from the key system power supply.

(c) On connecting block A, B, or C, locate the terminals associated with the card connector for the 346A KTU. Cross-connect the terminals as follows:

(1) Connect the T, R, A, and R1 terminals to the T, R, A, and R1 terminals for the associated line card KTU.

(2) Connect the COT and COR terminals to the MISC connecting block on the MDF for connection to the single-line telephone. (See Figure 13.) Multiple the leads to all assigned single-line telephones.

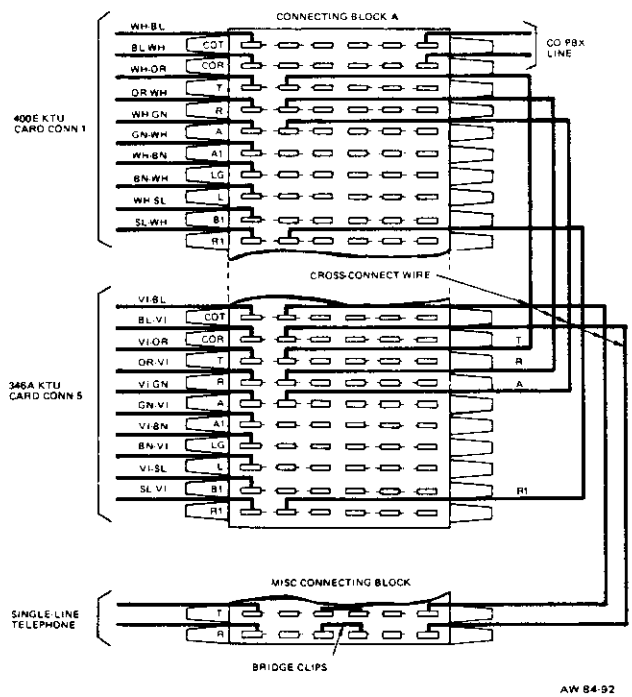


Figure 13: Connecting Details, 346A KTU

MULTILINE EXCLUSION

3.22 One 405A multiline exclusion KTU is used in conjunction with one or two 400E line card KTUs to provide exclusion (privacy) to one or two CO/PBX lines. The 405A KTU mounts into a

20-contact card connector such as the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the swing-out equipment mounting frame of the key system apparatus cabinet, or on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

MANUAL TIE LINE

3.23 For manual tie line service, one 414A KTU is required at each key system for one tie line. The KTU requires a line pickup key and a nonlocking signaling key at the assigned station. The 414A KTU mounts into a 20-contact card connector on the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the swing-out equipment frame of the key system apparatus cabinet, or on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

AUTOMATIC TIE LINE

3.24 For automatic tie line service, one 415A KTU is required at each key system for one tie line. The 415A KTU can be installed into any unused card connector on the 584C card panel.

3.25 Strap the 415A KTU for the required options. Then insert the KTU into the selected card connector and make the following connections:

(a) On connecting block C, locate the terminal corresponding to pin 18 of the card connector for the 415A tie line KTU. Connect the terminal to A battery (−24VDC) from terminal 7 on the rear of the 584C card panel, or from the key system power supply.

(b) On connecting block A, B, or C, locate the terminals associated with the card connector for the 415A KTU. Referring to Figure 14, connect these terminals as follows:

(1) Connect the COT and COR terminals to the Tip and Ring terminals on the CO connecting block for cross-connection to the distant office. Use bridge clips to complete the connections.

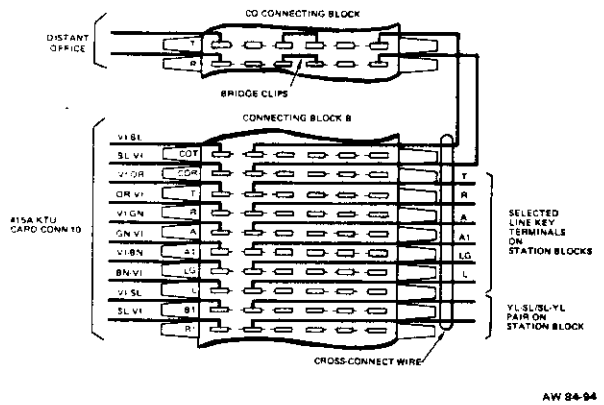


Figure 14: Connecting Details, 415A KTU

(2) Connect the T, R, A, A1, LG, and L terminals to the corresponding terminals of the selected line pickup key on the station connecting block.

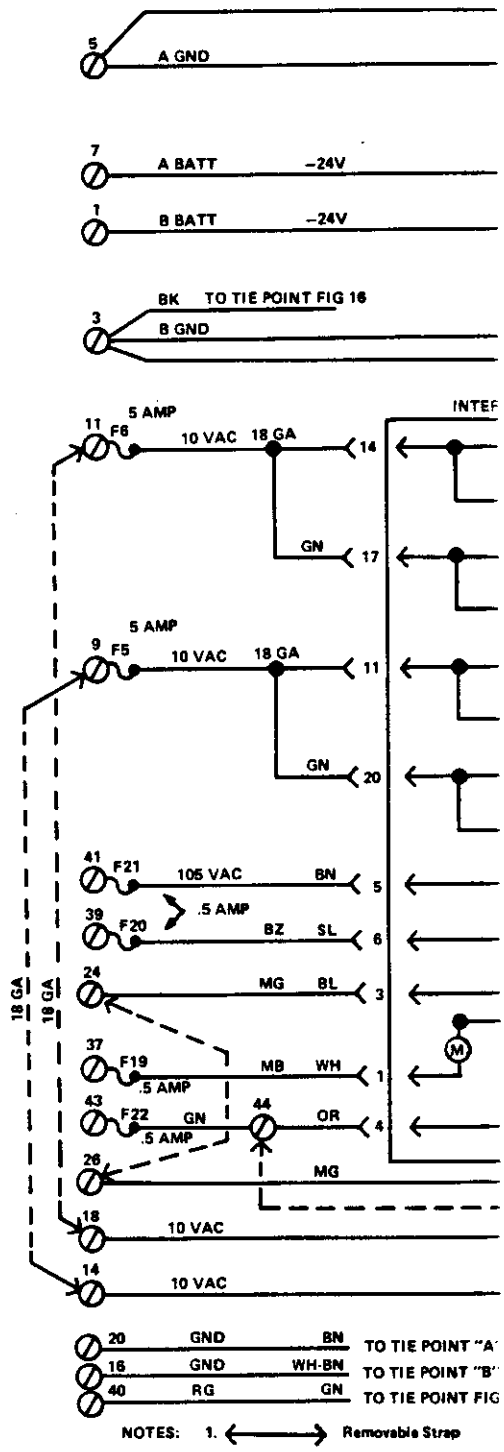
(3) Connect the B1 terminal to the YL-SL lead of the selected station block.

(4) Connect the R1 terminal to the SL-YL lead.

3.26 An optional one-card, two-card, or four-card panel adapter may alternately be used to mount the 415A automatic tie line KTU. The card panel adapter can be mounted on the swing-out equipment mounting frame of the key system apparatus cabinet, or on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.

PRIVATE LINE

3.27 The 416A station line KTU serves as the interface between a key telephone and a dedicated single-line telephone. A line pickup key and a nonlocking signaling key are required at the key telephone. The single-line telephone requires no dial since it can only be used to call the key telephone or answer calls from the key telephone. The 416A KTU mounts into a 20-contact card connector such as the 359A one-card panel adapter, or the 259B two-card panel adapter. The card panel adapter can be mounted on the swing-out equipment frame of the key system apparatus cabinet or on the MDF. Refer to the applicable card panel adapter practice for instructions on mounting and wiring the card panel adapter.


5
A GND
7
A BATT
-24V
1
B BATT
-24V
BK
TO TIE POINT FIG 16
3
B GND
INTEF
11
F6
5 AMP
10 VAC
18 GA
14
GN
17
9
F5
5 AMP
10 VAC
18 GA
11
GN
20
41
F21
105 VAC
BN
5
39
F20
.5 AMP
BZ
SL
6
24
MG
BL
3
18 GA
18 GA
37
F19
.5 AMP
MB
WH
1
43
F22
.5 AMP
GN
44
OR
4
26
MG
18
10 VAC
14
10 VAC
20
GND
BN
TO TIE POINT "A
16
GND
WH-BN
TO TIE POINT "B
40
RG
GN
TO TIE POINT FIG
NOTES:
1.
Removable Strap
2. When interrupter is used for one panel c
PROGRAM PLUG in position A. When
is used for two panels place PROGRAM
position C on both panels.

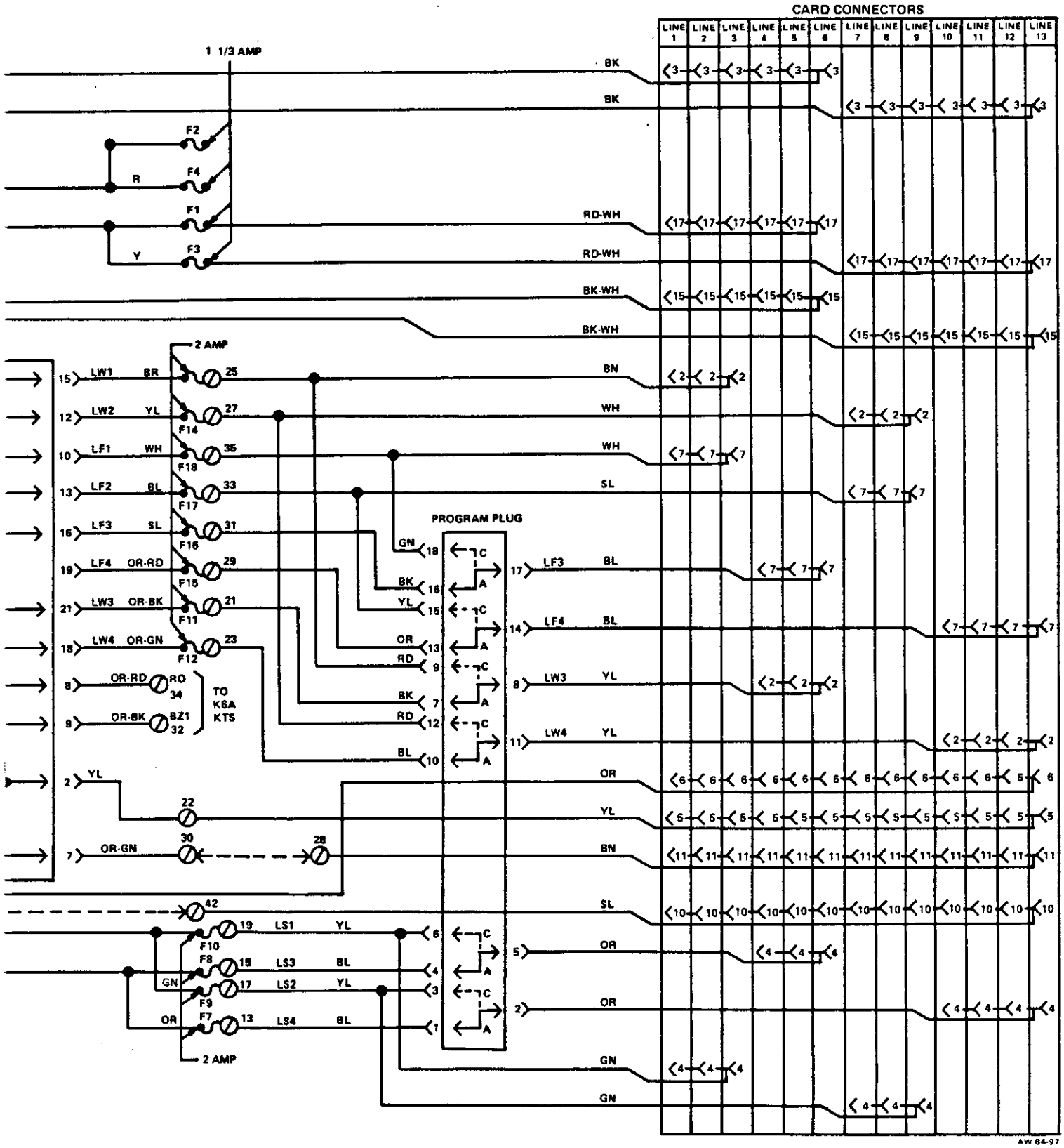
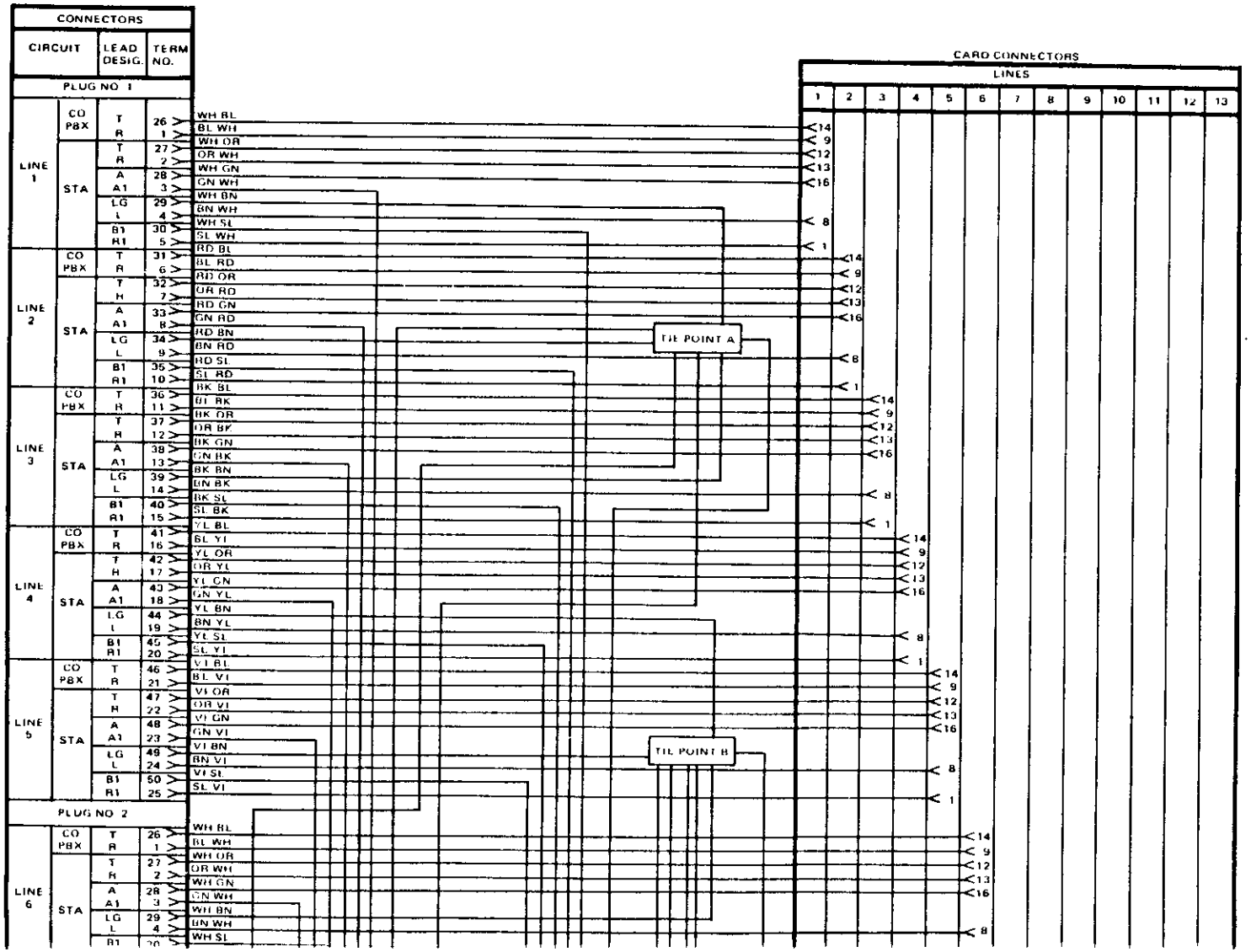


Figure 15: Power Connections and Fuse Designations


CONNECTORS
CIRCUIT
LEAD DESIG.
TERM NO.
PLUG NO 1
LINE 1
CO PBX
T
R
26
1
WH BL
BL WH
STA
T
R
27
2
WH OR
OR WH
A
A1
28
3
WH GN
GN WH
LG
L
29
4
WH BN
BN WH
B1
R1
30
5
WH SL
SL WH
LINE 2
CO PBX
T
R
31
6
RD BL
BL RD
STA
T
R
32
7
RD OR
OR RD
A
A1
33
8
RD GN
GN RD
LG
L
34
9
RD BN
BN RD
B1
R1
35
10
RD SL
SL RD
LINE 3
CO PBX
T
R
36
11
BK BL
BL BK
STA
T
R
37
12
BK OR
OR BK
A
A1
38
13
BK GN
GN BK
LG
L
39
14
BK BN
BN BK
B1
R1
40
15
BK SL
SL BK
LINE 4
CO PBX
T
R
41
16
YL BL
BL YL
STA
T
R
42
17
YL OR
OR YL
A
A1
43
18
YL GN
GN YL
LG
L
44
19
YL BN
BN YL
B1
R1
45
20
YL SL
SL YL
LINE 5
CO PBX
T
R
46
21
VI BL
BL VI
STA
T
R
47
22
VI OR
OR VI
A
A1
48
23
VI GN
GN VI
LG
L
49
24
VI BN
BN VI
B1
R1
50
25
VI SL
SL VI
PLUG NO 2
LINE 6
CO PBX
T
R
26
1
WH BL
BL WH
STA
T
R
27
2
WH OR
OR WH
A
A1
28
3
WH GN
GN WH
LG
L
29
4
WH BN
BN WH
WH SL
CARD CONNECTORS
LINES
1
2
3
4
5
6
7
8
9
10
11
12
13
14
9
12
13
16
8
1
TIE POINT A
TIE POINT B

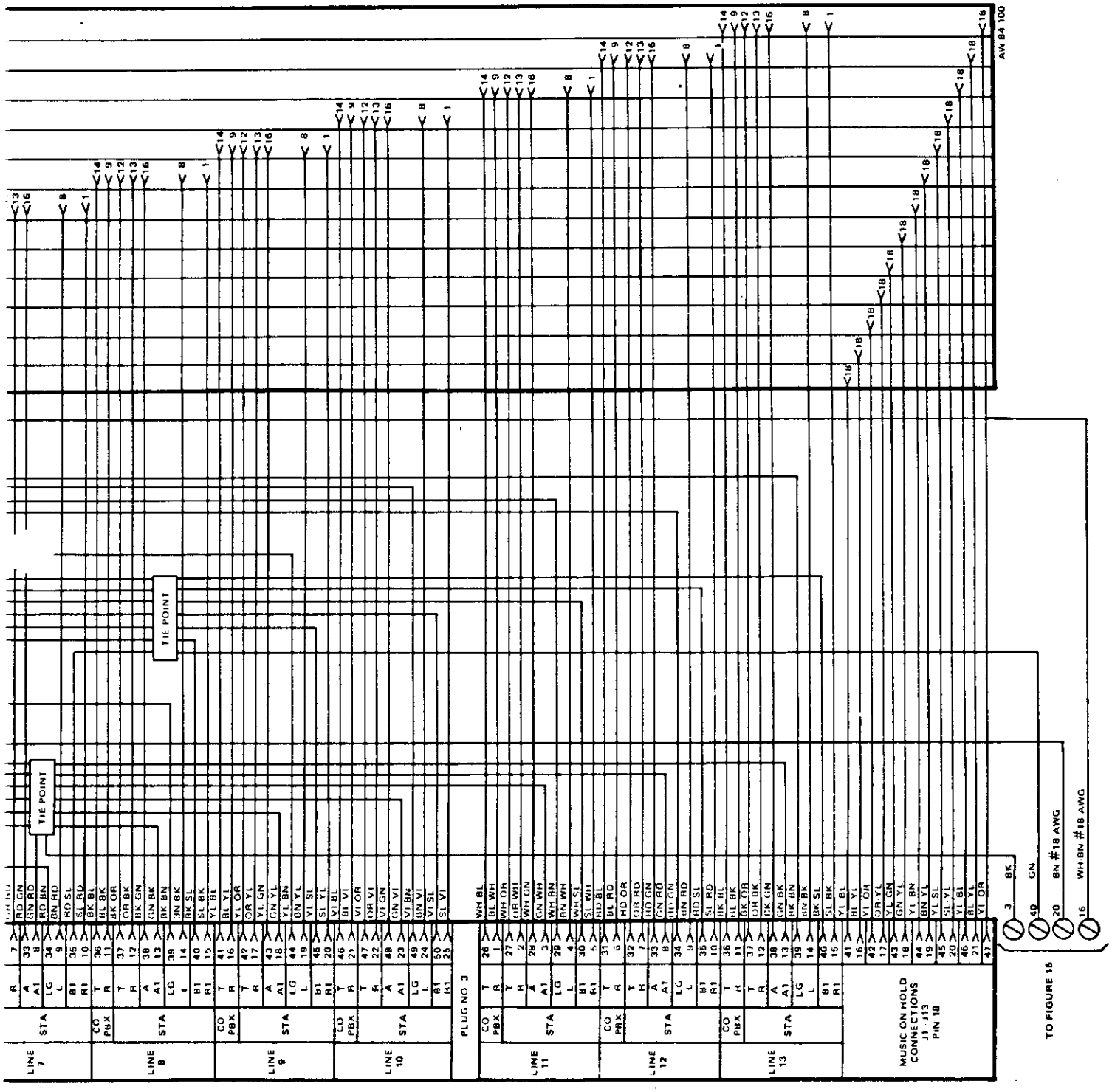


Figure 16: Internal Wiring, 584C Card Panel

601A KEY SERVICE UNIT

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1. GENERAL

1.01 This section covers identification, installation, and operation of a 601A Key Service Unit (KSU) and associated apparatus. (See Figure 1.) The 601A KSU provides standard key system functions and features for five CO lines and ten stations. Various optional features may be added to the basic 601A KSU to meet the individual requirements of each installation. Standard key telephones are used in a 601A KSU.

1.02 This section supersedes all documents covering the 601A KSU. When the need for reissue of this document arises, reasons for reissue will be given in this paragraph.

LINE FEATURES

1.03 Line features include:

(a) 5-line capacity.

(b) Music-on-hold (optional).

(c) Use of standard 400-type line cards to provide line pickup, hold, visual and audible signaling.

(d) Buzzer or ringer signaling. (Ringer signaling requires an easily installed ring generator.)

(e) Common audible signaling (strapping option).

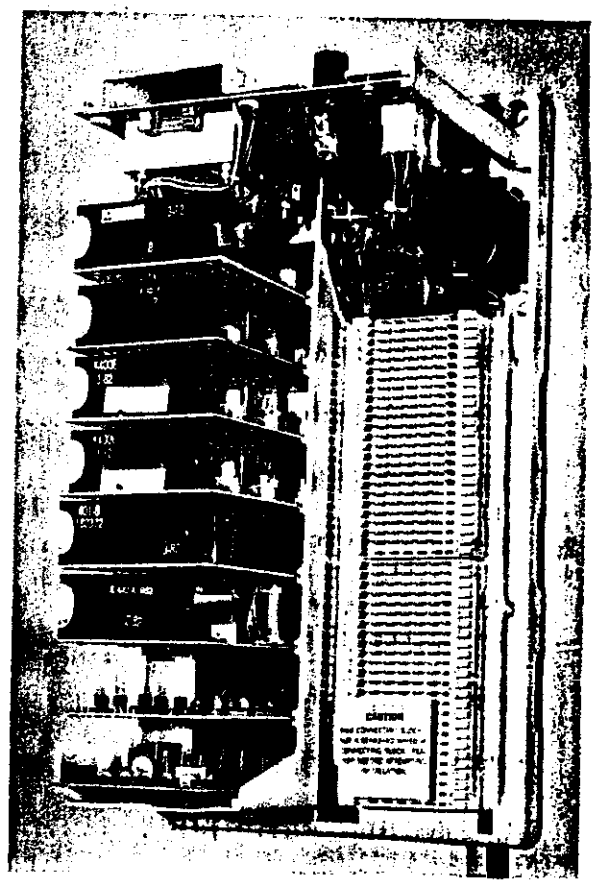

Figure 1: 601A Key Service Unit

INTERCOM FEATURES

1.04 Standard dial intercom features include:

(a) 10-station capacity.

(b) Two digit dial codes.

(c) Common talk path.

(d) Busy lamp indication.

(e) Last party hold.

1.05 Optional intercom features are:

(a) Tel-Touch dialing.

(b) Dial tone, ringback tone (call announcer card).

(c) Call announcing, providing dial tone and tone burst.

(d) A system can be split with five station codes designated for call announcing and five for buzzers or ringers.

(e) Manual intercom.

(f) Dial access to a paging system.

(g) Pushbutton access to a paging system.

TECHNICAL SUMMARY

1.06 A summary of technical information follows.

(a) Power input: 115 VAC, 50/60 Hz, 1.5A fused.

(b) Power supply outputs: -24 VDC at 1A, 18 VAC at 1A, and 10 VAC at 2A. (Both the 18 VAC at 1A and the 10 VAC at 2A are fused with the same fuse rated at 2A.)

(c) Line capacity: 5.

(d) Station capacity: 10 (dial codes).

(e) Busy lamp capacity (10 VAC): 50.

(f) Approximate dimensions;
1. Height: 15¾ inches.
2. Width: 8¼ inches.
3. Depth: 7 inches.
4. Weight (Standard KSU): Approx. 12 lbs.

RELATED DOCUMENTS

1.07 For additional information regarding the 601A Key System, refer to the following sections:

(a) 184163-101 (184162-101 Ringing Generator Kit).

(b) 184243-101 (183977-101 Intercom Card).

(c) 184244-101 (183965-101 Interrupter Card).

(d) 184245-101 (184589-101 Power Supply Card).

(e) 184246-101 (183973-101 Call Announcer Card).

(f) 184247-101 (183981-101 T-T Adapter For Intercom).

(g) 36-400-001 (000400-00E 400E Line Card).

(h) KSP 410-00A-101 (000410-00A 410A Paging Adapter Card).

(j) KSP 401-00B-101 (000401-00B Manual Intercom Card).

(k) KSP 403-00A-101 (000403-00A 403A Music-On-Hold Card).

2. IDENTIFICATION

STANDARD 601A KEY SERVICE UNIT

2.01 The basic 601A Key Service Unit (KSU) is designed for wall mounting and includes a card frame assembly, power supply, interrupter, connecting block, card cover, and rear panel cover. See Table A for ordering information.

2.02 The card frame assembly has seven 18-contact card connectors, one 20-contact card connector, and one 44-contact card connector. Two of the 18-contact connectors are dedicated to the power supply and interrupter and five are wired for CO/PBX line cards. The 44-contact card connector is dedicated to intercom. The 20-pin connector is used for option cards. Pins 1 through 18 of the 20-contact card connector are wired to individual terminals on the KSU block so that the proper wiring for various option cards may be performed.

Note: The 20-pin connector is not wired to use 20-pin cards such as the 405A Semiautomatic Exclusion, 414A Ringdown Tie Line, or the 416A Station Line circuits.

POWER SUPPLY

2.03 The power supply (184589-101) consists of a transformer and other electrical components mounted on a printed circuit board and provides all voltages required for a system using buzzer signaling or call announcing. Power input is 115 VAC, 50/60 Hz. Outputs are as follows:

(a) Regulated -24 VDC at 1 Amp for intercom and line card talk battery and power for logic circuits and relays.

TABLE A

ORDERING INFORMATION

FEATURE OR FUNCTION	ORDERING NO.	DESCRIPTION
Key Service Unit	601A00-0P0	KSU, equipped with power supply for buzzer signaling, interrupter, cover. Includes the following: 184589-101 Power Supply; 183965-101 Interrupter Card.
CO/PBX Line	000400-00E	KTU, CO/PBX Line Card. 18-contact P.C. board. One required per CO/PBX line.
Music-On-Hold	000403-00A	KTU, Music-on-hold. One required per system. (Requires low-level music source.) 18-contact P.C. board.
Ringer Signaling	184162-101	KIT, Ringing Generator. One required per system to provide ringing voltage.
Dial Intercom	183977-101	KTU, Dial Intercom. One required per system. 44-contact P.C. board.
Tel-Touch (Tone) Dialing for Intercom	183981-101	KTU, T-T adapter. One required per system. (Mounts on 183977-101 KTU.)
Dial Tone and Ringback for Intercom Calls	183973-101	KTU, Call-Announcing. One required per system. (Call Announcer not used. KTU strapped for ringback.) 18-contact P.C. board.
Call Announcing with Dial Tone and Tone Burst	183973-101	KTU, Call-Announcing. One required per system. (A call announcer is required at each station.) 18-contact P.C. board.
Call Announcer Card	185677-101	KTU, Call Announcing. Replaces the 183973-101 call announcer card with the additional feature of allowing the use of the 76M exclusion telephones. ***NOTE: A system may be mixed; five stations signaled by call announcing and five by buzzers (or ringers if a ringing generator is used).***
Manual Intercom	000401-00B	KTU, Manual Intercom. One required per manual intercom circuit.
Button Access to a P.A. System for Voice Paging	000401-00B	KTU, Manual Intercom. One required. 18-contact P.C. Board. Installs in line card slot.
Dial Access to a P.A. System for Voice Paging	000410-00A	KTU, Paging Adapter. One required. 18-contact P.C. board. Installs in line card slot and uses one intercom number. ***NOTE: The 410A KTU is not required in an all call announcing system (or in a mixed system if a call-announcing number is available).***
Line Extender for CO/PBX or Intercom lines.	000346-00A	KTU, Off-Premise Line. 18-contact P.C. Board. Installs in line card slot (Ringing generator required).

AW 81-169

(b) 18 VAC at 1 Amp unregulated for intercom or CO buzzer signaling. This supply is also tapped at 10 VAC at 2 Amps for station lamps and will supply 50 lamps continuous load. The current rating for the 18 VAC plus the 10 VAC is 2 Amps.

Caution: The 18 VAC at 1 Amp and the 10 VAC at 2 Amps are fused with one fuse rated at 2 Amps. Therefore, both cannot operate at peak loads at the same time. It is unlikely that this situation would occur; but if it did, the result would be a blown fuse.

2.04 The power supply board plugs into the power supply connector provided in the 601A KSU. Two plastic push fasteners are provided to anchor the power supply to the KSU frame. The power cord plugs into the 3-pin jack, J1, on the PC board. The ringing generator plugs into the 6-pin jack, J2, on the PC board.

Caution: Be sure to unplug the power cord before inserting any static sensitive cards.

INTERRUPTER CARD

2.05 The interrupter (183965-101) is intended for use with the 601A KSU to provide lamp flash, lamp wink, and interrupted signaling. This signaling may be 105 VAC for ringers or 18 VAC for buzzers, depending on the strapping of option block TC1 located near the center of the card at the connector end. The unit is installed by plugging it into the second (from the top) card connector of the 601A KSU.

RINGING GENERATOR KIT

2.06 A ringing generator kit (184162-101) must be ordered and installed if ringers are used in the system. It has a nominal output of 105 VAC, 30 Hz, and will drive up to three ringers simultaneously.

CO/PBX LINE CARD

2.07 One 400E CO/PBX line card KTU must be ordered and installed for each CO or PBX line coming to the system. These are installed by inserting them into the prewired line card connectors. The 400E KTU includes circuitry for music-on-hold and signaling through a separate lead.

DIAL INTERCOM

2.08 The various dial intercom configurations are as follows:

(a) Using buzzers for signaling, with or without dial tone and ringback tone. (Dial tone and ringback tone are provided by the call announcer card.)

(b) Using ringers for signaling, with or without dial tone and ringback tone. (A ringing generator must be installed for ringer signaling, and a call announcer card must be installed to provide dial tone and ringback tone.)

(c) Using call announcers for signaling. In this application, the call announcer card is strapped to provide a tone burst for alerting and a tone burst for confirmation instead of ringback tone. Dial tone is also provided.

(d) Mixed signaling, using buzzers (or ringers) and call announcers for signaling. Five station codes must be allocated for each method; odd-numbered stations will be signaled by call announcer and even-numbered stations by buzzer (or ringer).

(e) The dial intercom is normally accessed by rotary dialing but can be adapted to accept Tel-Touch (tone) dialing by adding a T-T adapter card to the intercom card. The intercom is accessed in either case by dialing a 2-digit intercom number.

2.09 The intercom card plugs into a dedicated connector in the 601A KSU. Station connections are made on the KSU terminal block.

TEL-TOUCH (TONE DIAL) ADAPTER CARD

2.10 The Tel-Touch adapter card (183981-101) is designed for use with the dial intercom card. The Tel-Touch card is mounted on top of the intercom card and the assembly is inserted into the intercom card position to decode standard dual-tone, multifrequency (DTMF) codes. This allows both rotary dialing and Tel-Touch dialing to be used for intercom.

CALL ANNOUNCER CARD

2.11 The call announcer card (183973-101) is designed for use in the option card position of the 601A KSU to permit tone and voice signaling with handsfree answerback for up to ten stations on intercom calls. Each station to be signaled by tone and voice signaling will require a call announcer. This may be a 174B call announcer connected to each telephone or an 870 (rotary dial) or 2870 (T-T dial) telephone with integral call announcer. If stations are situated within 15 feet of each other, one call announcer may be used to serve several stations. The call announcer card provides dial tone and ringback tone for intercom calls even though call announcers are not used. The call announcer card must be strapped for tone burst when call announcers are used, since call announcers must not be used with ringback tone.

MANUAL INTERCOM

2.12 The 401B manual intercom KTU provides busy lamp feed and a talk path for manual intercom or for a private line between two stations only. This card may be installed in any vacant line card position or in the option card position. Stations must be signaled by a separate buzzer arrangement or by using a converted pickup button of the telephone. (Manual intercom may require two buttons of the connected telephones, one button to access the line and one for signaling, unless an external signal button is used.) This KTU requires A-Battery (AB) and A-Ground (AG) to be strapped to terminals 18 and 3 respectively for the line position used on the 601A KSU block.

Note: The terminal designations 18 and 3 are written below the terminals on the KSU block.

VOICE PAGING

2.13 Voice paging through a customer owned PA system from any station can be provided by either of two means. These two means are button access to a PA amplifier, or dial access to PA amplifier.

(a) Button-accessed paging for a 401B manual intercom card may be used to access the PA amplifier. A person at any station can page by holding down a line pickup button that has been converted to nonlocking operation and talking into the handset. In planning this type of installation, remember that a button will be used at each telephone and a line card position will be used in the KSU.

(b) For dial-accessed paging in a system using all ringers and buzzers for intercom signaling (with or without dial tone and ringback tone), a 410A paging adapter KTU is installed in a vacant line card position. Background music through the PA amplifier is also available in this type of paging installation. In a system using all call announcers for intercom signaling, the 410A KTU cannot be used. An intercom number is assigned to paging, and an interface circuit consisting of a .1 Mfd, 25 V capacitor and a 600 Ohm, .5 Watt resistor must be connected to the PA amplifier input. (See Figure 2.) In a mixed system (using buzzers or ringers at some stations and call announcers at other stations) either of the two methods may be used. If a buzzer or ringer is used (even number), a 410A KTU must be provided. This will reduce line capacity by one.

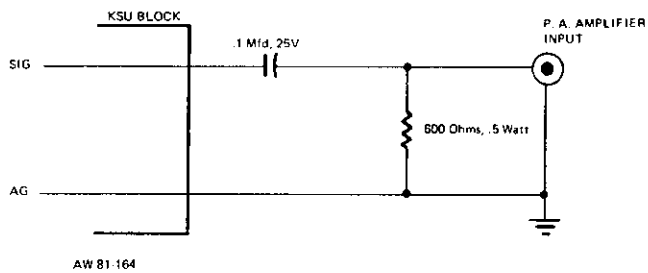

Figure 2: Wiring Connections for Voice Paging With A System Using All Call Announcers

MUSIC-ON-HOLD

2.14 A 403A KTU may be ordered and installed in the option card position or in a separately provided card panel, such as a 359A one-card panel, to provide music-on-hold for a maximum of six CO or PBX lines. A low-level music source, such as a tape deck or FM tuner, must be separately provided.

SUBSETS AND CALL ANNOUNCERS

A. Single-Line Telephones

2.15 Single-line telephones may be used in connection with a key system such as the 601A. This is possible if the telephone is modified for A-lead control, or if a subset is ordered with the A-lead control factory wired (44 type feature telephone or equivalent). It is also required that six-conductor line cord be used for these subsets when a separate signaling device is used. (The six leads are; Tip, Ring, A, A1, RC and RG.)

B. 6-Button Telephones

2.16 A 6-button subset will access a total of five lines including intercom. If call announcing is used for signaling, a 174B Call Announcer must be provided and connected to each station to be signaled by call announcing.

C. 10-Button Telephones

2.17 A 10-button subset will access a total of nine lines including intercom. Therefore, a 10-button set may handle five CO/PBX lines, dial intercom and manual intercom, and will have a remaining line button that may be used to access a public address system for voice paging.

2.18 Subsets with feature code 76 (automatic privacy for CO/PBX calls) are not compatible with the 601A KSU equipped with a 183973-101 call announcer card. However, the 185677 call announcer card allows the use of 76M exclusion telephones with the 601A intercom. This card can also be used with nonexclusion telephones and a mixture of exclusion and nonexclusion telephones. The 601A intercom utilizes the A-lead for the intercom line. A 76M telephone has dedicated lines for intercom in which the A-leads are not used but are taped and stored in the telephone. If one of these dedicated lines is to be used for intercom, the A-lead must be connected in the telephone. Therefore, it is recommended that some other line be used for intercom. Also, when using 76M telephones the OR-YL wire must be connected to -24VDC and an A-lead ground must be connected to system ground.

D. 174B Call Announcer

2.19 The 174B Call Announcer can serve as a loudspeaker for tone and voice signaling and as a microphone for handsfree answerback. One call announcer can serve one telephone or several telephones if they are located in the same area. It is equipped with a privacy switch that can be operated to disable the transmit mode. The purpose of this switch is to prevent a caller from hearing a conversation at the called station.

3. PLANNING THE INSTALLATION

3.01 Compare the size of the area in which the 601A is to be installed with the dimensions of the 601A. (See Figure 3.) Be sure to allow room for additional connecting blocks. The KSU should be centrally located to minimize the length of cable runs and must be within five feet (length of power cord) of a 110 VAC service outlet which is not controlled by a switch that could be accidentally turned off. The service outlet must be of the grounding type and should provide an individual circuit which is not being shared by other equipment. Complete the station planning form shown in Table B.

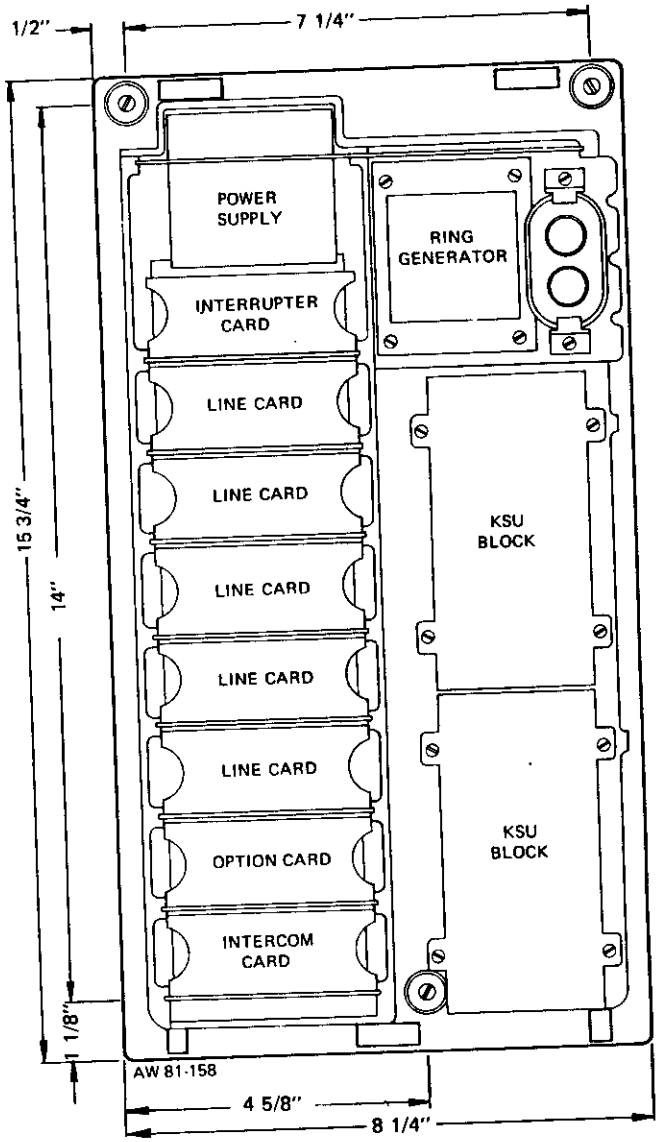

Figure 3: Dimensions, 601A KSU

Caution: Do not splice or add extensions to the power cord.

TABLE B

STATION PLANNING FORM

ICM NO.	"SIG" TERM	PARTY OR LOCATION	WHICH BUTTON WILL THESE LINES APPEAR ON						SIGNALING MODE (NOTE 1)			SUBSET/CALL ANNOUNCER MODEL NO. (NOTE 2)
			1	2	3	4	5	ICM	CA	RN	BZ	
10	0											
11	1											
12	2											
13	3											
14	4											
15	5											
16	6											
17	7											
18	8											
19	9											
Additional KSU Equipment Required												
400E Line Card KTU			1	1	1	1	1					
183977-101 Intercom Card								1				
183973-101 Call Announcing Card									1			
184162-101 Ringing Generator Kit										1		

NOTE 1: CA = Call Announcing
RN = Ringer
BZ = Buzzer

A system may be mixed 5 call announcers and 5 buzzers (or ringers). Odd number stations must be call-announcer stations and even numbered stations must be buzzer or ringer stations.

NOTE 2: Stations to be signaled by call announcing must have a 174B call announcer connected to the telephone set or a telephone set with integral call announcer (model 870 rotary dial or 2870 T-T dial).
AW 81-170

3.02 There are several items that should be considered when installing station cabling. A direct cable run to any station (the most desirable type of installation) may not exceed 1200 Ohms of loop resistance when used for single-line telephones. When key telephones are used, this loop resistance limit drops to 50 Ohms. A satellite installation cannot be used unless additional leads for the Lamp (L), Lamp Ground (LG), (A1), and (A) lead grounds are to be provided. Installation of cables that exceed loop resistance limits can cause problems such as being unable to answer a call and release the call announcer or stop the ringer from ringing. Standard 24-gauge cable has approximately 25.7 Ohms for each 1000 feet in length. A 1000 foot cable run would have approximately 51.4 Ohms of loop resistance.

3.03 The connecting block in the 601A provides terminating points for five station cables. If more than five stations are to be connected, additional 66-type connecting blocks must be mounted near the KSU. The connecting block in the KSU is not a standard wired 1A2 connecting block. (Refer to Table C for a layout of this block.) In certain small installations it may be an advantage to terminate the telephones on the KSU block. However, it is recommended that separate split 50-pair, 66-type blocks are used for each two stations to be connected and the terminals from the 601A KSU block be transferred to an external 25-pair, 66-type block (all common terminals for each row). This wili simplify installation and troubleshooting. Some of the leads that are involved in various feature installations (such as intercom leads, A-leads, and some signal leads) must terminate on the KSU block.

Note: Terminals on the KSU block are individually wired. Not all terminals are common for each row. If terminals one through five are common, for a particular row, any one of these terminals may be used. This will be referred to as terminals 1-5. Also, any terminal of the KSU block may be transferred to a separate 25-pair block (if extra terminals are required) by using cross-connect wire. An ohmmeter should be used to check for common terminals.

TABLE C

KSU BLOCK LAYOUT
(ROWS 1 - 25)

CIRCUIT	DESIG-NATION	TERMINAL NUMBER 1	2	3	4	5	6 (Note 1)	ROW NO.
CO/PBX LINE 1		T1	Pin 3	Pin 18		10 Vac	Pin 1	1
		R1	AG	AB	RG	RC	Pin 2	2
STATION CONNECTIONS LINE 1 (INCLUDE RG, RC ON ROW 2)	T R A A1/LG L	1T (TERMINAL 1 - 5) 1R (TERMINAL 1 - 5) 1A (TERMINAL 1 - 5) A1/LG (TERMINAL 1 - 5) 1L (TERMINAL 1 - 5)					Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 (Note 2)	3 4 5 6 7
CO/PBX LINE 2		T2	Pin 3	Pin 18			Pin 8	8
		R2	AG	AB	RG	RC	Pin 9	9
STATION CONNECTIONS LINE 2 (INCLUDE RG, RC ON ROW 9)	T R A A1/AG L	2T (TERMINAL 1 - 5) 2R (TERMINAL 1 - 5) 2A (TERMINAL 1 - 5) LG (TERMINAL 1 - 5) 2L (TERMINAL 1 - 5)					Pin 10 Pin 11 Pin 12 Pin 13 Pin 14	10 11 12 13 14
CO/PBX LINE 3		T3	Pin 3	Pin 18			Pin 15	15
		R3	AG	AB	RG	RC	Pin 16	16
STATION CONNECTIONS LINE 3 (INCLUDE RG, RC ON ROW 16)	T R A A1/LG L	3T (TERMINAL 1 - 5) 3R (TERMINAL 1 - 5) 3A (TERMINAL 1 - 5) LG (TERMINAL 1 - 5) 3L (TERMINAL 1 - 5)					Pin 17 Pin 18	17 18 19 20 21
CA RST	CA CA	BUS (1 - 5) CONNECTED TO ROW 26, TERMINAL 6 BUS (1 - 5) CONNECTED TO ROW 26, TERMINAL 6						22 23
GROUND	LG	BUS, GROUND						24
								25

NOTES:

(1) These terminals are internally wired to pins of the option slot as listed.

(2) When a call announcer card is used in the system, the intercom A-lead must be brought from each station to one of these ten terminals.

TABLE C (Cont.)

KSU BLOCK LAYOUT
(ROWS 26 - 50)

CIRCUIT	DESIG-NATION	TERMINAL NUMBER 1	2	3	4	5	6 (TIE POINTS)	ROW NO.
CO/PBX LINE 4		T4	Pin 3	Pin 18			Connected to Rows 22, 23	26
		R4	AG	AB	RG	RC	Connected to Rows 46, 48	27
STATION CONNECTIONS LINE 4 (INCLUDE RG, RC ON ROW 27	T	4T (TERMINAL 1 - 5)					18VAC Buzzer sig.	28
	R	4R (TERMINAL 1 - 5)					CA RST (Call Ann. Reset)	29
	A	4A (TERMINAL 1 - 5)					56 OHMS	30
	A1/LG	LG (TERMINAL 1 - 5)						31
	L	4L (TERMINAL 1 - 5)					105 V from Ring Gen.	32
CO/PBX LINE 5		T5	Pin 3	Pin 18			105 V RN Interrup. Ring	33
		R5	AG	AB	RG	RC	105 V Input to ICM Relay Tree	34
STATION CONNECTIONS LINE 5 (INCLUDE RG, RC ON ROW 34)	T	5T (TERMINAL 1 - 5)					Aux. Input (18 V Input to Relay Tree)	35
	R	5R (TERMINAL 1 - 5)					Call Ann. Ringback Tone	36
	A	5A (TERMINAL 1 - 5)					-19V For Call Ann.	37
	A1/LG	LG (TERMINAL 1 - 5)					L1 Lamp Control (CA)	38
	L	5L (TERMINAL 1 - 5)					L2 Lamp Control (CA)	39
INTERCOM RT (SIGNAL) CONN.	SIG	RT 10	RT 11	RT 12	RT 13	RT 14	RB Tone Burst (CA)	40
	SIG	RT 15	RT 16	RT 17	RT 18	RT 19	RL ICM Relay Control (CA)	41
INTERCOM T, R STATION CONNECTONS	T	INTERCOM T (TERMINAL 1 - 5)					FP Breaks ICM Dial Tone	42
	R	INTERCOM R (TERMINAL 1 - 5)					AO For Mixed System	43
	T	INTERCOM T (TERMINAL 1 - 5)						44
	R	INTERCOM R (TERMINAL 1 - 5)						45
INTERCOM LAMP & LAMP GROUND (NOTE 1)	LG	BUS (1 - 5) CONNECTED TO ROW 27, TERMINAL 6						46
	L	INTERCOM LAMP (TERMINAL 1 - 5)						47
	LG	BUS (1 - 5) CONNECTED TO ROW 27, TERMINAL 6						48
	L	INTERCOM LAMP (TERMINAL 1 - 5)						49
								50

NOTES:

(1) Terminals labeled LG on Rows 46 and 48 are connected only to Row 27, Terminal 6. When they are to be used for ground, Row 27, Terminal 6 must be strapped to Row 27, Terminal 2 (AG). When Call Announcers are used, Row 27, Terminal 6 must be strapped to Row 27, Terminal 3 (AB) and these terminals then provide -24 V TALK BATTERY.

(2) Terminals AG, RG and Power Supply Ground must be strapped together when 400D line cards are used.

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4. INSTALLATION FOR CO SERVICE ONLY

PREASSEMBLE THE KSU

4.01 Remove the KSU from the carton and place it on a level work surface with the cover up. Press inward on the center section of each end of the cover to unlatch it. Lift the cover straight up and set it aside.

> ***Caution: The 601A contains static sensitive components. Personnel who may be required to handle PCB's or wiring must have knowledge of proper handling techniques and the necessary safeguard equipment for protecting static-sensitive devices.***

4.02 Check that the following items are included, and set them aside until they are called for. Be sure to handle the cards by the edges and not to touch the components or contacts.

(a) 3-conductor power cord.

(b) One small envelope containing two plastic push fasteners. (These may be included in power supply carton.)

(c) One carton containing the KSU power supply (183969-101).

(d) One carton containing the interrupter card (183965-101).

INSTALL RINGING GENERATOR (IF REQUIRED)

4.03 Installation is as follows:

(a) Turn the KSU so the front is up and the KSU block is to the right.

(b) Place the transformer on the plastic bosses at the upper right corner of the KSU. Transformer leads should be to the left and brought over the top of the transformer when the capacitor is in place. Secure the transformer with the four long screws included.

(c) Using the two short screws, attach the two metal clips loosely to the KSU immediately to the right of the transformer.

(d) Raise the clips and place the capacitor (with wiring toward the left) under them. Tighten the two screws so the two clips fasten over the shoulders of the capacitor and hold it securely.

INSTALL POWER SUPPLY

4.04 Installation is as follows:

(a) Insert power supply in the top card position of the KSU.

(b) If a ringing generator has been installed, push the ringing generator jack onto the 6-pin plug, J2, of the power supply. (Check for proper alignment of pin numbers on jacks.)

(c) Push the two plastic push fasteners through the two holes near the front corners of the power transformer and through the matching holes of the KSU frame.

INSTALL POWER CORD

4.05 Installation is as follows:

(a) Turn the KSU so the rear panel is exposed.

(b) Remove the two screws in the rear panel; lift the panel from the KSU frame and set it aside.

(c) Remove one of the two screws that secures the power cord retainer bar at the bottom of the KSU. Loosen the second screw.

(d) Insert the plastic jack of the power cord through the rectanglular slot in the back of the KSU below the ringing generator. Be sure to leave enough cord to plug into the power supply card and clear the ringing generator, if one is used.

(e) Plug the power cord into the 3-pin jack of the power supply. (Check for proper alignment of pin numbers on jacks.)

(f) Place the power cord in the retainer slot and gently pull the slack out of the cord. Reinstall the screw removed in a previous step. Tighten both screws of the retainer bar.

(g) Reinstall the rear panel cover and the two screws that were removed.

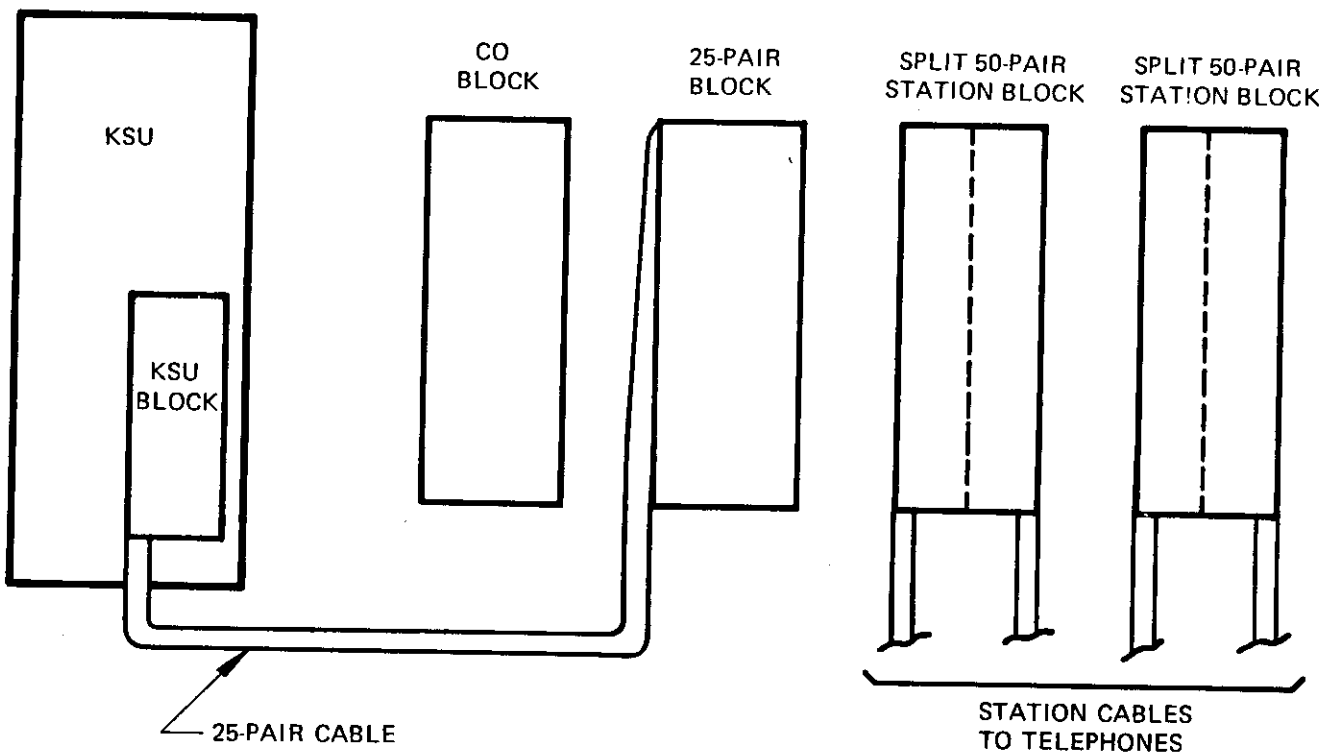
MOUNT THE KSU

4.06 Mount the KSU on a wall with three bolts or screws. (Be sure the power cord is in place.) Install key system ground using a 14-gauge copper

wire from the ground screw of the power supply card to a good earth ground such as a cold water pipe or ground rod. Also, it is necessary to install a 22-gauge wire from any unused AG terminal on the KSU connecting block to the ground screw of the power supply card. Most electrical codes do not recognize AC neutral as a good earth ground. Therefore, both the 14-gauge and 22-gauge wires are necessary. Also, ringer ground (RG) in the 601A KSU is not common with (AG). In order for the ringers to operate, it may become necessary to common the RG with AG ground by running a jumper wire between the two. It is recommended that this jumper be used in all installations.

INSTALL CONNECTING BLOCKS

4.07 Install two 25-pair, 66-type connecting blocks near the KSU. (See Figure 4.) The first 25-pair block is used for the connection of central office lines and will be referred to as a CO block. On the second 25-pair block, extend connection points from the KSU block by punching down a 25-pair cable on the left side of the 601A KSU block in the order shown in Table D. This 25-pair cable is then punched down on the second 25-pair block in standard wiring color code order. The 25-pair block should be labeled to indicate the order of the terminals. (See Table D.) This type of arrangement simplifies installation and troubleshooting while providing enough terminals to ensure a proper and orderly installation. When installing a 25-pair block, check to see that the terminals are pointed in the proper direction. One column of terminals is pointing opposite from the other five and is used for the 25-pair cable termination. Before any wires are punched, turn the block so that cross-connect wire from the station blocks comes to the proper side. In this position, the cross-connect wire can more easily be hooked onto the terminals.



NOTE: Station cross-connections are made between the Station Block and the 25-Pair Block. CO Tip and CO Ring cross-connections are made between the CO Block and the KSU Block, or 25-Pair Block. Intercom cross-connections are made between the Station Block and the KSU Block.

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Figure 4: Typical Installation Using External Blocks

TABLE D

TRANSFER OF KSU BLOCK TO 25-PAIR BLOCK

CO/PBX LINE	KSU BLOCK	WIRE COLOR	25-PAIR BLOCK	WIRE COLOR
1	COT	WH-BL	COT	WH-BL
	COR	BL-WH	COR	BL-WH
	T	WH-OR	T	WH-OR
	R	OR-WH	R	OR-WH
	A	WH-GN	A	WH-GN
	A1	GN-WH	A1	GN-WH
	LG	WH-BN	LG	WH-BN
	L	BN-WH	L	BN-WH
	RC	WH-SL	RC	WH-SL
	RG	SL-WH	RG	SL-WH
2	COT	RD-BL	COT	RD-BL
	COR	BL-RD	COR	BL-RD
	T	RD-OR	T	RD-OR
	R	OR-RD	R	OR-RD
	A	RD-GN	A	RD-GN
	A1	GN-RD	A1	GN-RD
	LG	RD-BN	LG	RD-BN
	L	BN-RD	L	BN-RD
	RC	RD-SL	RC	RD-SL
	RG	SL-RD	RG	SL-RD
3	COT	BK-BL	COT	BK-BL
	COR	BL-BK	COR	BL-BK
	T	BK-OR	T	BK-OR
	R	OR-BK	R	OR-BK
	A	BK-GN	A	BK-GN
	A1	GN-BK	A1	GN-BK
	LG	BK-BN	LG	BK-BN
	L	BN-BK	L	BN-BK
	RC	BK-SL	RC	BK-SL
	RG	SL-BK	RG	SL-BK
4	COT	YL-BL	COT	YL-BL
	COR	BL-YL	COR	BL-YL
	T	YL-OR	T	YL-OR
	R	OR-YL	R	OR-YL
	A	YL-GN	A	YL-GN
	A1	GN-YL	A1	GN-YL
	LG	YL-BN	LG	YL-BN
	L	BN-YL	L	BN-YL
	RC	YL-SL	RC	YL-SL
	RG	SL-YL	RG	SL-YL
5	COT	VI-BL	COT	VI-BL
	COR	BL-VI	COR	BL-VI
	T	VI-OR	T	VI-OR
	R	OR-VI	R	OR-VI
	A	VI-GN	A	VI-GN
	A1	GN-VI	A1	GN-VI
	LG	VI-BN	LG	VI-BN
	L	BN-VI	L	BN-VI
	RC	VI-SL	RC	VI-SL
	RG	SL-VI	RG	SL-VI

NOTE: Punch down a 25-pair cable on the KSU block in the order shown. Punch the other end of the 25-pair cable down on the second 25-pair block in the same order as shown. This provides extra terminals for a proper installation.
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4.08 If five or fewer stations are to be connected, they can be connected directly to the KSU block. Refer to Table E for the CO lines and station terminations. If these telephones are to be set up for intercom or call announcers, refer to Tables F and G for the order in which the 25-pair station cable is to be punched down. If the number of telephones to be installed at this time or in the future is to exceed three, it is recommended that the procedure described in paragraph 4.07 be used.

TABLE E

KSU BLOCK
CO LINES AND STATION TERMINATION

CIRCUIT		DESIGNATION	601A CONNECTION BLOCK		COMMENTS
			ROW	TERMINAL	
Line 1	CO/PBX Line	T1	1	1	
		R1	2	1	
		DR1	1	2	Direct Ring Lead
	Station Connections	1T	3	1-5	
		1R	4	1-5	
		1A	5	1-5	
		A1	6	1-5	One Conn. Per Station
		LG	6	1-5	
		1L	7	1-5	
		RC	2	5	Ring From CO Line Card
		RG	2	4	
Line 2	CO/PBX Line	T2	8	1	
		R2	9	1	
		DR2	8	2	
	Station Connections	2T	10	1-5	
		2R	11	1-5	
		2A	12	1-5	
		A1	13	1-5	One Conn. Per Station
		LG	13	1-5	
		2L	14	1-5	
		2RC	9	5	
		2RG	9	4	
Line 3	CO/PBX Line	T3	15	1	
		R3	16	1	
		DR3	15	2	
	Station Connections	3T	17	1-5	
		3R	18	1-5	
		3A	19	1-5	
		A1	20	1-5	One Conn. Per Station
		LG	20	1-5	
		3L	21	1-5	
		3RC	16	5	
		3RG	16	4	
Line 4	CO/PBX Line	T4	26	1	
		R4	27	1	
		DR4	26	2	
	Station Connections	4T	28	1-5	
		4R	29	1-5	
		4A	30	1-5	
		A1	31	1-5	One Conn. Per Station
		LG	31	1-5	
		4L	32	1-5	
		4RC	27	5	
		4RG	27	4	
Line 5	CO/PBX Line	T5	33	1	
		R5	34	1	
		DR5	33	2	
	Station Connections	5T	35	1-5	
		5R	36	1-5	
		5A	37	1-5	
		A1	38	1-5	One Conn. Per Station
		LG	38	1-5	
		5L	39	1-5	
		5RC	34	5	
		5RG	34	4	
Dial Intercom	Station Connections	T	42, 44	1-5	
		R	43, 45	1-5	
		A	1-10	6	Use with call announcing card only
		LG	A1/LG	1-5	
		L	47, 49	1-5	
		RT	40, 41	1-5	Signal path, stations 10-19*
Call Announce	Station Connections	AB	46, 48	1-5	Connect AB to 27-6
		RESET	22, 23	1-5	Connect 26-6 to 29-6
		GROUND	24	1-5	Any ground will suffice
		RT	40, 41	1-5	Signal path, stations 10-19*

*In a mixed system (5 call announcer stations and 5 ringer or buzzer stations) odd-number dial codes must be used for call announcing stations and even number dial codes for ringer or buzzer stations.

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TABLE F

STATION CONNECTIONS FOR 6-BUTTON TELEPHONES AND 174B CALL ANNOUNCER

DESIG-NATION	TERMINAL IN SET	MOUNTING CORD	PLUG PIN	CONNECTING CABLE	CONN. BLOCK ROW NUMBER	601A CONN. BLOCK ROW	601A CONN. BLOCK TERMINAL
1T	1T	WH-BL	26	WH-BL	1	3	1-5
1R	1R	BL-WH	1	BL-WH	2	4	1-5
1A	1H	WH-OR	27	WH-OR	3	5	1-5
A1	1B	OR-WH	2	OR-WH	4	6	1-5
1LG	LG	WH-GN	28	WH-GN	5	6	1-5
1L	L1	GN-WH	3	GN-WH	6	7	1-5
2T	2T	WH-BN	29	WH-BN	7	10	1-5
2R	2R	BN-WH	4	BN-WH	8	11	1-5
2A	2H	WH-SL	30	WH-SL	9	12	1-5
—	—	SL-WH (b)	5	SL-WH (b)	10	—	—
2LG	LG	RD-BL	31	RD-BL	11	13	1-5
2L	L2	BL-RD	6	BL-RD	12	14	1-5
3T	3T	RD-OR	32	RD-OR	13	17	1-5
3R	3R	OR-RD	7	OR-RD	14	18	1-5
3A	3H	RD-GN	33	RD-GN	15	19	1-5
—	—	GN-RD (b)	8	GN-RD (b)	16	—	—
3LG	LG	RD-BN	34	RD-BN	17	20	1-5
3L	L3	BN-RD	9	BN-RD	18	21	1-5
4T	4T	RD-SL	35	RD-SL	19	28	1-5
4R	4R	SL-RD	10	SL-RD	20	29	1-5
4A	4H	BK-BL	36	BK-BL	21	30	1-5
—	—	BL-BK (b)	11	BL-BK (b)	22	—	—
4LG	LG	BK-OR	37	BK-OR	23	31	1-5
4L	L4	OR-BK	12	OR-BK	24	32	1-5
5T	5T	BK-GN	38	BK-G	25	42, 44	1-5
5R	5R	GN-BK	13	GN-BK	26	43, 45	1-5
5A (1)	5H	BK-BN	39	BK-BN	27	1-10	6
—	—	BN-BK	39	BN-BK	28	—	—
5LG	LG	BK-SL	40	BK-SL	39	A1/LG	1-5
5L	L5	SL-BK	15	SL-BK	30	39	1-5
—	6	YL-BL	41	YL-BL	31	—	—
—	5	BL-YL	16	BL-YL	32	—	—
CA GND	4	YL-OR	42	YL-OR	33	34	2 (AG)
—	3	OR-YL (b)	17	OR-YL (b)	34	—	—
Hold	LG	YL-GN	43	YL-GN	35	—	—
Lamp	LH	GN-YL	18	GN-YL	36	—	—
—	L2 (c)	YL-BN	44	YL-BN	37	—	—
—	SG	BN-YL	19	BN-YL	38	—	—
B1	RT	YL-SL	45	YL-SL	39	RG	—
R1	RR	SL-YL	20	SL-YL	40	RC	—
CA (AB)	ET	VI-BL	46	VI-BL	41	46, 48	1-5
—	—	BL-VI (b)	21	BL-VI	42 (b)	—	—
—	—	VI-OR (b)	47	VI-OR (b)	43	—	—
—	—	OR-VI (b)	22	OR-VI (b)	44	—	—
CA RT	1	VI-GN	48	VI-GN	45	40, 41	1-5 (d)
—	—	GN-VI	23	GN-VI (b)	46 (b)	—	—
CA RST	8	VI-BN	49	VI-BN	47	22, 23	1-5
—	—	BN-VI (b)	24	BN-VI (b)	48	—	—
—	—	VI-SL (b)	50	VI-SL (b)	49	—	—
—	—	SL-VI (b)	25	SL-VI (b)	50	—	—

(b) Spare Conductors. (c) On network. (d) RT Terminal assigned to this station.

NOTES:

(1) Line position 5 is used for intercom. If this station is to be signaled by call announcer, the 5A lead must be connected to terminal 6 of any row 1 through 10.

(2) CA RT lead is moved from RR on the network to Terminal 1 of the Terminal Board.

(3) On telephones equipped with 76M Features, the OR-YL lead is used for (AB).

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TABLE G

STATION CONNECTIONS FOR 10-BUTTON TELEPHONES
WITH BUILT-IN CALL ANNOUNCER

CIRCUIT DESIGNATION	MOUNTING CORD	PLUG PIN	RUNNING CABLE	STATION BLOCK ROW NUMBERS	JUMPERS TO KSU BLOCKS	
					ROW	TERMINAL
1T	WH-BL	26	WH-BL	1	3	1-5
1R	BL-WH	1	BL-WH	2	4	1-5
1A	WH-OR	27	WH-OR	3	5	1-5
A1	OR-WH	2	OR-WH	4	6	1-5
1LG	WH-GN	28	WH-GN	5	6	1-5
1L	GN-WH	3	GN-WH	6	7	1-5
2T	WH-BN	29	WH-BN	7	10	1-5
2R	BN-WH	4	BN-WH	8	11	1-5
2A	WH-SL	30	WH-SL	9	12	1-5
9A	SL-WH (b)	5	SL-WH	10	—	—
2LG	RD-BL	31	RD-BL	11	13	1-5
2L	BL-RD	6	BL-RD	12	14	1-5
3T	RD-OR	32	RD-OR	13	17	1-5
3R	OR-RD	7	OR-RD	14	18	1-5
3A	RD-GN	33	RD-GN	15	19	1-5
8A	GN-RD (b)	8	GN-RD	16	—	—
3LG	RD-BN	34	RD-BN	17	20	1-5
3L	BN-RD	9	BN-RD	18	21	1-5
4T	RD-SL	35	RD-SL	19	28	1-5
4R	SL-RD	10	SL-RD	20	29	1-5
4A	BK-BL	36	BK-BL	21	30	1-5
7A	BL-BK (b)	11	BL-BK	22	—	—
4LG	BK-OR	37	BK-OR	23	31	1-5
4L	OR-BK	12	OR-BK	24	32	1-5
5T	BK-GN	38	BK-GN	25	35	1-5
5R	GN-BK	13	GN-BK	26	36	1-5
5A	BK-BN	39	BK-BN	27	37	1-5
6A	BN-BK	14	BN-BK	28	1-10	6
5LG	BK-SL	40	BK-SL	29	38	1-5
5L	SL-BK	15	SL-BK	30	39	1-5
6T	YL-BL	41	YL-BL	31	42, 44	1-5
6R	BL-YL	16	BL-YL	32	43, 45	1-5
CA GND	YL-OR	42	YL-OR	33	24	1-5
AB	OR-YL	17	OR-YL	34	—	AB
6LG	YL-GN	43	YL-GN	35	—	A1/LG
6L	GN-YL	18	GN-YL	36	47, 49	1-5
7T	YL-BN (b)	44	YL-BN	37	—	—
7R	BN-YL (b)	19	BN-YL	38	—	—
B1	YL-SL	45	YL-SL	39	—	RG
R1	SL-YL	20	SL-YL	40	—	RC
CA-24VT	VI-BL	46	VI-BL	41	46, 48	1-5
7L	BL-VI (b)	21	BL-VI	42	—	—
8T	VI-OR (b)	47	VI-OR	43	—	—
8R	OR-VI (b)	22	OR-VI	44	—	—
CA RT	VI-GN	48	VI-GN	45	40, 41	SIG
9L	GN-VI (b)	23	GN-VI	46	—	—
CA RST	VI-BN	49	VI-BN	47	22, 23	1-5
8L	BN-VI (b)	24	BN-VI	48	—	—
9T	VI-SL (b)	50	VI-SL	49	—	—
9R	SL-VI (b)	25	SL-VI	50	—	—

b) Spare connectors

4.09 Install a split 50-pair, 66-type connecting block for each two telephones to be installed. (See Figure 4.) This split 50-pair block allows one telephone to be connected to each side and provides two extra terminals for cross-connections at each station. All common cross-connections between these two telephones can be made by making connections to one side of the split 50-pair block from the 25-pair block and placing a bridging clip on the two center terminals of the proper row of the split 50-pair block. Bridging clips may be used for all connections except call announcer A-lead connections. Each A-lead must be connected separately to the KSU block of the 601A.

CONNECT STATION CABLE TO STATION BLOCKS

4.10 Using the standard wiring color code order, connect each station to one side of each split 50-pair block by punching down a 25-pair cable on the outside column of terminals. Label the blocks with station number and lead designations.

Note: If the 601A KSU block is used, all cabling is brought through the center opening in the bottom of the KSU cover.

CO/PBX CROSS-CONNECTIONS

4.11 Once the CO lines have been connected to the CO block, cross-connect from each Tip and Ring of the CO lines to the COT and COR terminals of the KSU block or the 25-pair block.

STATION CROSS-CONNECTIONS

4.12 Cross-connect from each station block to the second 25-pair block as shown in Figure 5. Connections are made on the KSU block if the second 25-pair block is not used. Cross-connections to be made are for Tip, Ring, A, A1, Lamp and Lamp Ground.

Caution: Be sure to cross-connect by designation. Blocks should be labeled properly so that designations of leads may be matched correctly. Terminals RG, AG and Power Supply Ground must be strapped together when 400D line cards are used. 400D cards are no longer available but if an old card is being used this problem will be taken care of by following the proper grounding procedure described in paragraph 4.06.

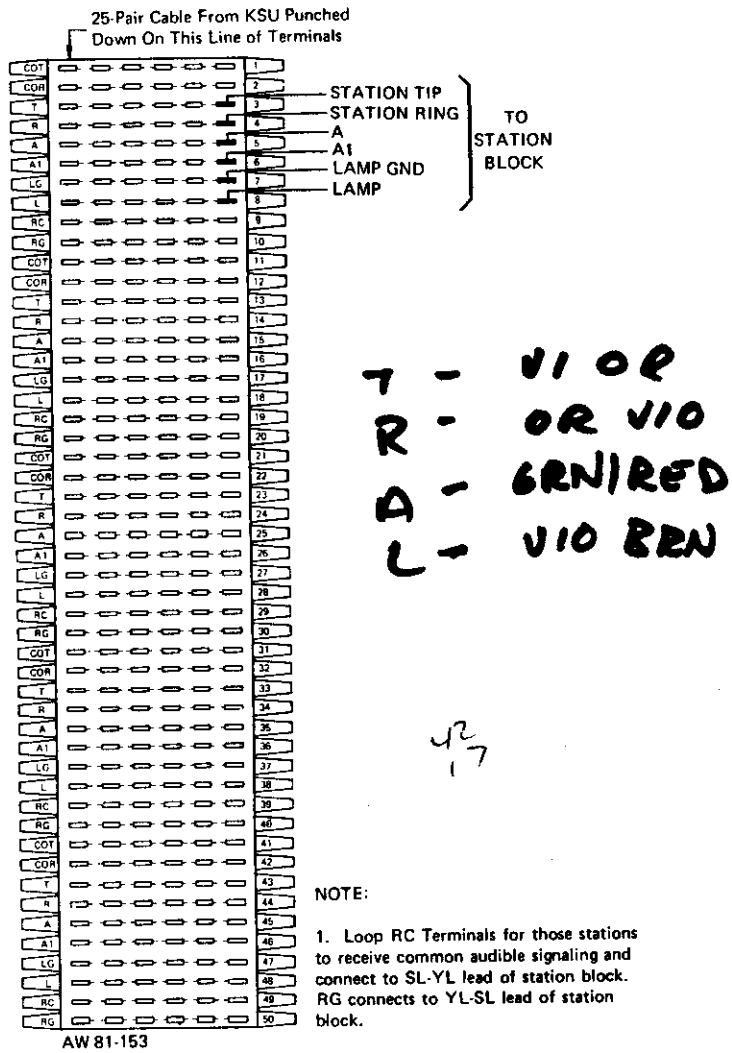


Figure 5: Station Cross-Connections

COMMON AUDIBLE SIGNALING

4.13 Two or more lines may be connected to ring at one or more stations. For example: if one station is assigned to answer all calls, the ringer at that station can be caused to ring on all lines by looping the RR lead from the station to the RC terminals desired for common audible. (This is normally the SL-YL lead of the station cable which will appear at Row 40 on the station block. Also, the YL-SL lead must be connected to an RG terminal.)

INSTALL PLUG-IN KTU'S

4.14 Refer to Figure 6 and strap the interrupter card for 18 VAC or 105 VAC signaling. Insert the interrupter card (component side up) into the card position immediately beneath the power supply. Remember that the power cord must be unplugged whenever static sensitive cards, such as the interrupter card, are installed or removed. Also, cards should be handled only by the edges.

Caution: The 601A contains static sensitive components. Personnel who may be required to handle PCBs or wiring must have knowledge of proper handling techniques and the necessary safeguard equipment for protecting static sensitive devices.

4.15 Insert one 400E line card into each active line card position. These are the five card positions immediately beneath the interrupter. The 400E line card has several strapping options. Refer to the instructions packed with the 400E line card and strap the card for the desired options.

OPERATIONAL CHECKS

4.16 Complete the following checklist.

(a) Recheck all connections for correctness and security.

(b) Plug power cord into 110 VAC service outlet.

(c) Go off-hook at a station and depress each connected line button in sequence. The busy lamp for the associated line should be on at all connected stations when its button is depressed at any station.

(d) While off-hook, depress line 1 button and check for sidetone and dial tone.

(e) Check for proper CO ringing by dialing another line on your telephone. The lamp associated with the line of the incoming call should flash at all connected stations. Answer at another set and check the talk path.

(f) Push the HOLD button. The lamps associated with the line being tested should wink at all connected stations.

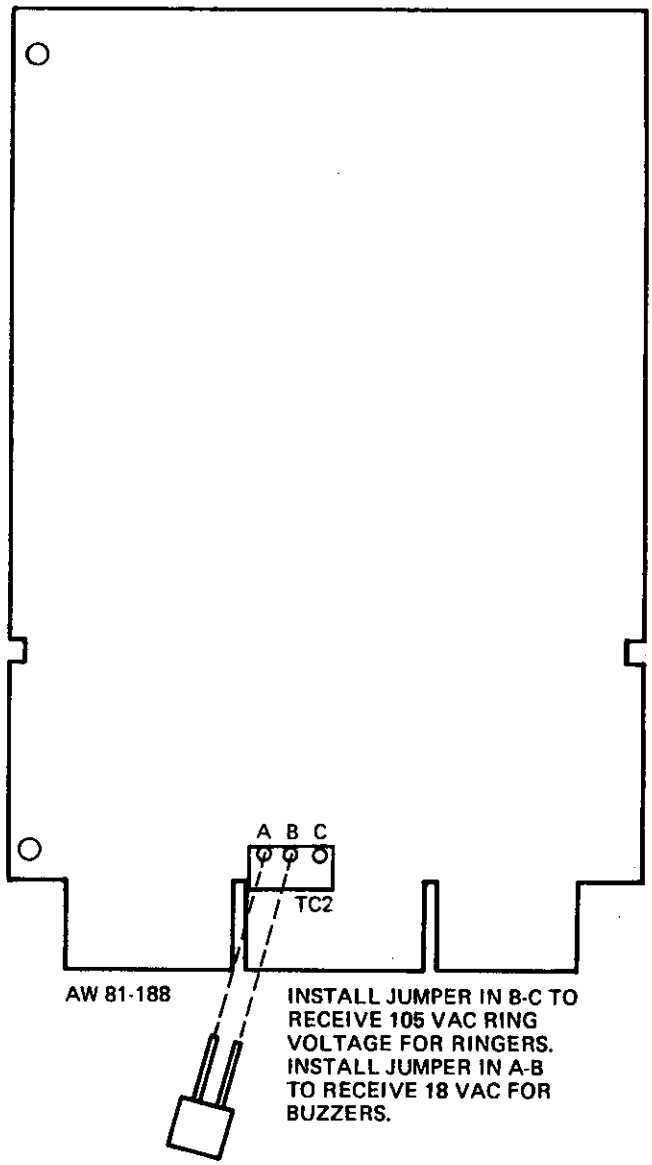


Figure 6: Interrupter Card

5. INSTALLATION OF FEATURES

5.01 Choose the desired types of installations from the following list and refer to the appropriate paragraphs.

(a) Dial intercom with buzzer signaling only. Refer to paragraph 6.02.

(b) Dial intercom with ringer signaling only. Refer to paragraph 6.03.

(c) Dial intercom with buzzer signaling and ringback tone and dial tone. Refer to paragraph 6.04.

(d) Dial intercom with ringer signaling and ringback tone and dial tone. Refer to paragraph 6.05.

(e) Dial intercom with all call announcers and dial tone and tone burst. Refer to paragraph 6.06.

(f) Dial intercom with mixed signaling, buzzers and call announcers. Refer to paragraph 6.07.

(g) Dial intercom with mixed signaling, ringers and call announcers. Refer to paragraph 6.08.

(h) Music-on-hold. Refer to paragraph 8.01.

(j) Manual intercom. Refer to paragraph 9.01.

(k) Button-accessed paging. Refer to paragraph 10.01.

(l) Dial-accessed paging. Refer to paragraph 11.01.

5.02 Some of the connections for features such as intercom are made completely on the KSU block in the 601A. Cross-connections between the station blocks and the KSU are made with 24-gauge cross-connect wire. On the KSU block the Tip (T), Ring (R), Lamp (L) and Lamp Ground (LG) terminals are common across the five terminals of the corresponding row. Individual signal leads must be connected to the appropriate SIG terminal on the KSU block. The SIG terminal on the KSU block is normally the SL-YL lead and appears on Row 40 of the station block. Station 10 must connect to SIG 0, 11 to SIG 1, 12 to SIG 2 and so forth. This corresponds to a 2-digit access number for dial access features. The SIG terminals are numbered 0 through 9. When the number one is placed in front of the terminal number, the results are dial codes 10 through 19. Individual A-leads from the stations to the KSU block should also be connected (in order) to the appropriate terminal. Assign the first A-lead terminal to the first station, the second A-lead terminal to the second station and so forth.

SIGNALING

5.03 To use ringers for signaling, a ringing generator must be installed in the KSU to provide 105 VAC, 30 Hz. For buzzer signaling, a separate buzzer must be provided and installed in the telephone.

TEL-TOUCH (TONE) DIALING

5.04 To equip the intercom for tone dialing, install the Tel-Touch adapter card on the intercom card as follows:

(a) Remove the W plug from the intercom card. (See Figure 7).

(b) Place the two cards with components facing each other and with the small end of the Tel-Touch card toward the edge connector of the intercom card.

(c) Insert the two rows of pins on the Tel-Touch card into the two connectors on the intercom card making sure that all pins mate properly with connectors.

6. INSTALLATION OF DIAL INTERCOM

6.01 Connections for intercom Tip, Ring, Lamp, and Lamp Ground are made from those terminals of the appropriate station block line position which are being used for intercom. For example: if the fourth line position is being used for intercom, the fourth station Tip, Ring, Lamp, and Lamp Ground are connected to intercom Tip, Ring, Lamp and Lamp Ground on the KSU block. The SL-YL lead of the station block is connected to the proper SIG terminal and the YL-SL lead is connected to the proper signal ground. (Buzzer or Ringer Ground)

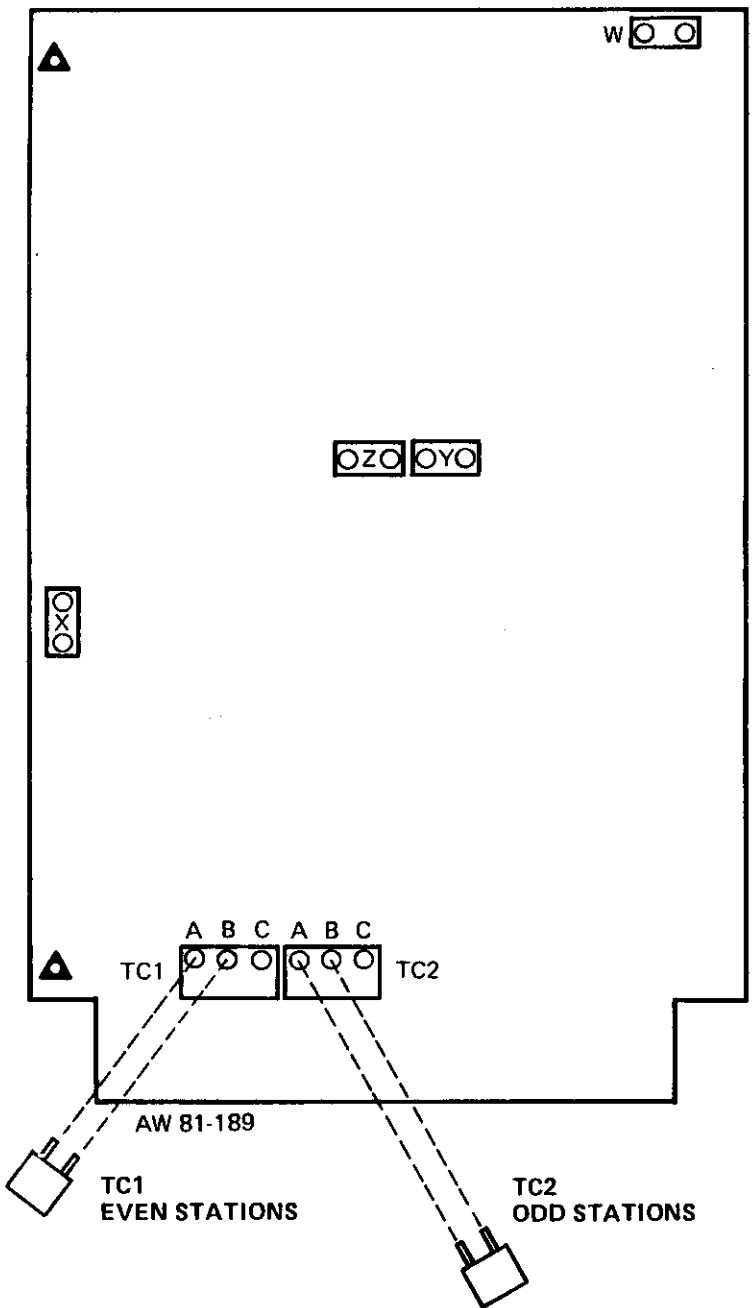
6.02 To install dial intercom with buzzer signaling only, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 8 and Table H.

Note: Install a jumper from Row 28, Terminal 6 to Row 35, Terminal 6 for 18 VAC into the intercom card. For 10 VAC into the intercom card, install a jumper from Row 1, Terminal 5 to Row 35, Terminal 6. Do not install both jumpers.

TABLE H

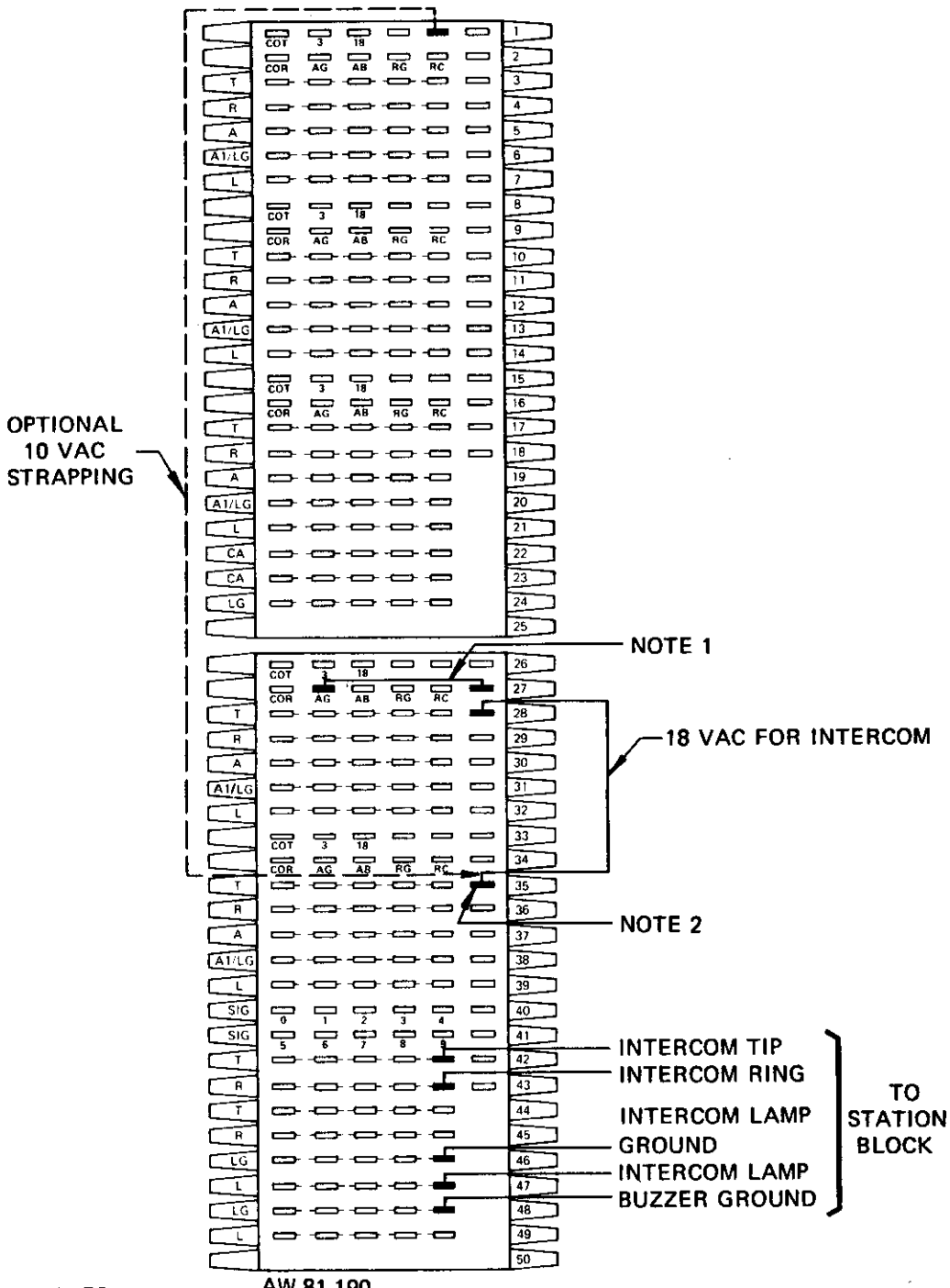
FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
28	6	35	6
27	6	Any AG Terminal	

AW 81-176



CAUTION: Call announcers must be on odd stations in a mixed system, (call announcers at some stations, ringers or buzzers at others).

Figure 7: Intercom Card



NOTES:

1. Strapping AG to Row 27, Terminal 6 causes Ground to appear on Rows 46 and 48 which are normally spare terminals.
2. Strap Row 28, Terminal 6 to Row 35, Terminal 6 for 18 VAC on intercom. Strap Row 1, Terminal 5 to Row 35, Terminal 6 for 10 VAC on intercom. Do not use both straps.
3. Connect buzzer signal lead to the proper SIG terminal.

Figure 8: Dial Intercom, Buzzer Signaling

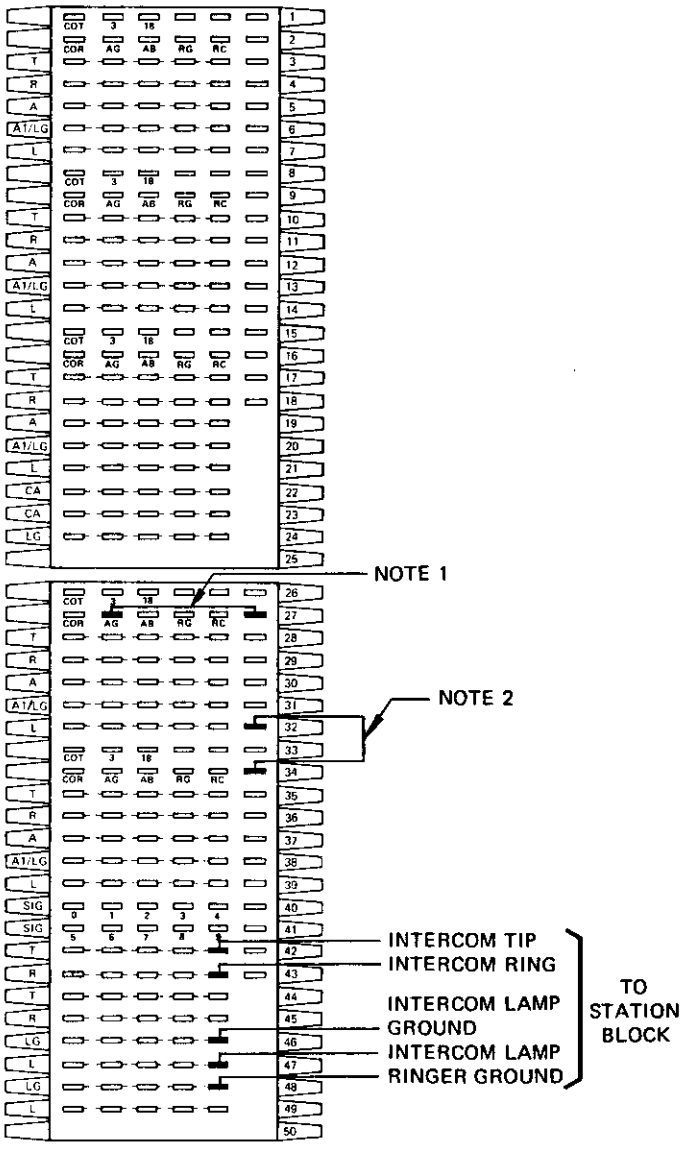
6.03 To install dial intercom with ringer signaling only, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 9 and Table J.

Note: Terminal AG should be connected to RG. Either AG or RG may be used if connected as described in the grounding procedure (paragraph 4.06). Connecting Row 32, Terminal 6 to Row 34, Terminal 6 is for 105 VAC into the intercom card.

TABLE J

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
32	6	34	6
AG		27	6

AW 81-177



AW 81-191

NOTES:

1. AG must be strapped to RG somewhere on the Block, strapping from RG to Row 27, Terminal 6 causes Ground to appear on Rows 46 and 48 which are normally spare terminals.
2. Strap Row 32, Terminal 6 to Row 24, Terminal 6 for 105 VAC on intercom.
3. Connect ringer signal lead to the proper SIG terminal.

Figure 9: Dial Intercom, Ringer Signaling

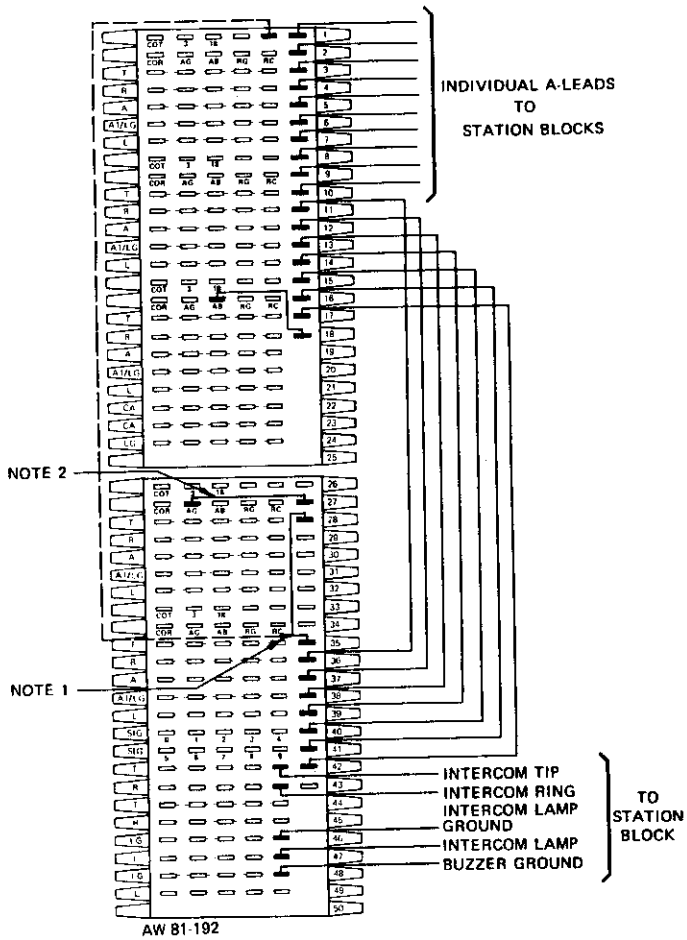
6.04 To install dial intercom with buzzer signaling and ringback tone and dial tone, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 10 and Table K.

Note: Install a jumper from Row 28, Terminal 6 to Row 35, Terminal 6, for 18 VAC into the intercom card. For 10 VAC, install a jumper from Row 1, Terminal 5 to Row 35, Terminal 6. Do not install both jumpers. Connect the individual A-lead from each station block to the proper terminal of the KSU block, Rows 1 through 10, Terminal 6.

TABLE K

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
11	6	36	6
12	6	37	6
13	6	38	6
14	6	39	6
15	6	40	6
16	6	41	6
17	6	42	6
28	6	35	6
AG		27	6
AB		18	6

AW 81-178



AW 81-192

NOTES:

1. Strap Row 28, Terminal 6 to Row 35, Terminal 6 for 18 VAC on intercom. Strap Row 1, Terminal 5 to Row 35, Terminal 6 for 10 VAC on intercom. Do not use both straps.
2. Strap AG to Row 27, Terminal 6 to cause Ground to appear on Rows 46 and 48 which are normally spare terminals.
3. Connect buzzer signal lead to the proper SIG terminal.

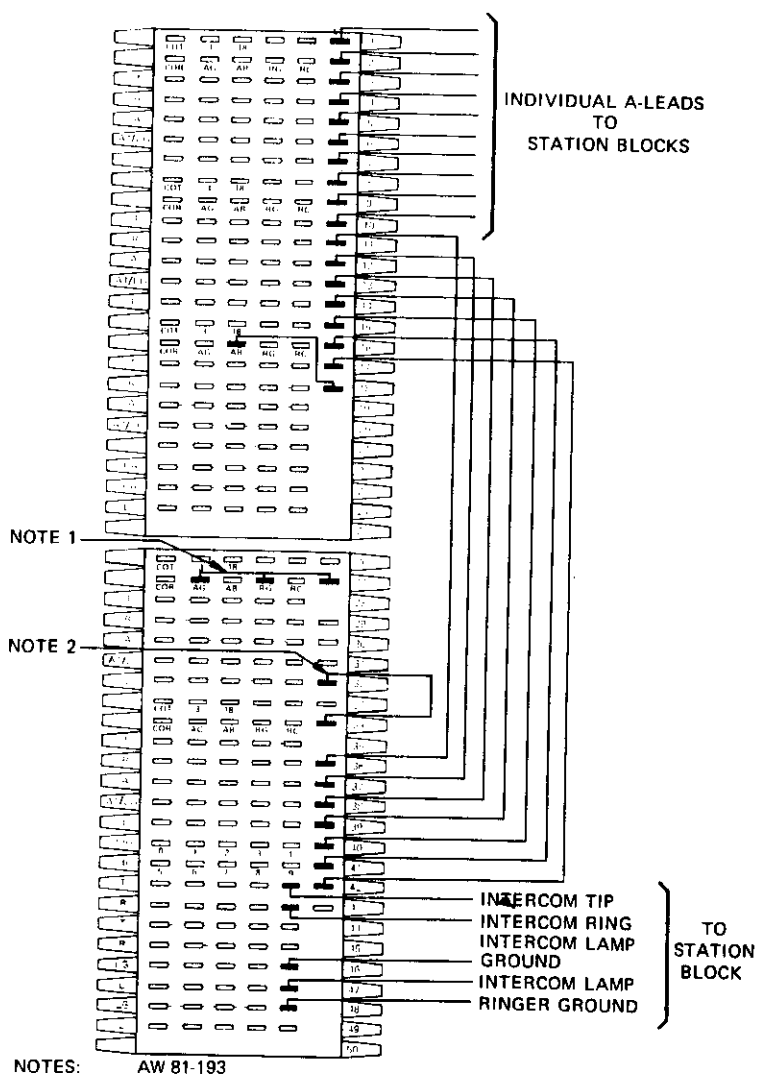
Figure 10: Dial Intercom, Buzzer Signaling with Ringback and Dial Tone

6.05 To install dial intercom with ringer signaling and ringback tone and dial tone, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 11 and Table L.

Note: Terminal AG must be common to RG. Connect each individual A-lead.

TABLE L

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
11	6	36	6
12	6	37	6
13	6	38	6
14	6	39	6
15	6	40	6
16	6	41	6
17	6	42	6
AB		18	6
RG		27	6
32	6	34	6



1. AG must be strapped to RG somewhere on the Block, strapping RG to Row 27, Terminal 6 causes Ground to appear on Rows 46 and 48 which are normally spare terminals.
2. Strap Row 32, Terminal 6 to Row 34, Terminal 6 for 105 VAC for intercom.
3. Connect the ringer signal lead to the proper SIG terminal.
4. Call Announce Card must be installed with A-B strap in place.

Figure 11: Dial Intercom, Ringer Signaling with Ringback and Dial Tone

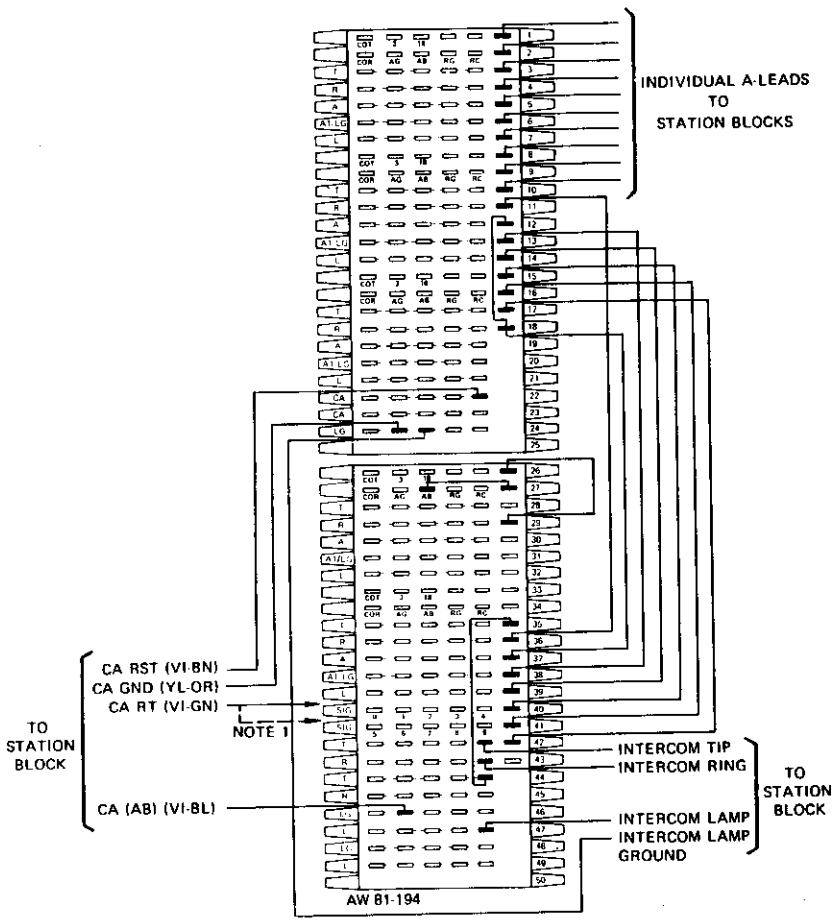
6.06 To install dial intercom using all call announcers for signaling with dial tone and tone burst, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 12, paragraph 6.07 and Table M.

6.07 Connect the station intercom lamp ground to Row 24, Terminal 1-5. The station A-lead must also be connected. For the call announcers, a jumper must be connected from Row 22 or 23, Terminal 1-5 to the VI-BN lead of the station block, from Row 24, Terminal 1-5 to the YL-OR lead of the station block, from the appropriate SIG terminal to the VI-GN lead of the station block, and from Row 46 or 48, Terminal 1-5 to the VI-BL lead of the station block.(Refer to call announce instructions in paragraph 7.01.)

TABLE M

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
11	6	36	6
12	6	Loop Through 18-6	
18	6	37	6
13	6	38	6
14	6	39	6
15	6	40	6
16	6	41	6
17	6	42	6
35	6	44	5
26	6	29	6
AB		27	6

AW 81-180



NOTES:

1. Connect to appropriate SIG Terminal 0 through 9.
2. Connecting AB to Row 27, Terminal 6 causes A-Battery (-24 VDC) to appear on Rows 46 and 48 which are normally spare terminals.

Figure 12: Dial Intercom, All Call Announcers

6.08 To install dial intercom with mixed signaling consisting of buzzers and call announcers, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 13, paragraph 6.09 and Table N.

TABLE N

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
11	6	36	6
12	6	37	6
13	6	38	6
14	6	39	6
15	6	40	6
16	6	41	6
17	6	42	6
18	6	43	6
26	6	29	6
28	6	34	6
AB		27	6
35	6	44	5

AW 81-181

6.09 Connect Row 28, Terminal 6 to Row 34, Terminal 6 to provide 18 VAC into the intercom card. For 10 VAC, install a jumper from Row 1, Terminal 5 to Row 34, Terminal 6. Do not install both jumpers. Connect station intercom lamp ground to Row 24, Terminal 1-5. Connect proper A-lead. For the call announcer, connect a jumper from Row 22 or 23, Terminal 1-5 to the VI-BN lead of the station block, from Row 24, Terminal 1-5 to the YL-OR lead of the station block, from Row 46 or 48, Terminal 1-5 to the VI-BL lead of the station block, and from the appropriate SIG terminal to the VI-GN lead of the station block. (Refer to call announce instructions in paragraph 7.01.) Call announcers are connected to odd SIG terminals and buzzers are connected to even SIG terminals. Buzzer connections are from the appropriate SIG terminal to the SL-YL lead of the station block. Buzzer ground is connected from any A1/LG terminal to the YL-SL lead of the station block.

6.10 To install dial intercom with mixed signaling using ringers and call announcers, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 14, paragraph 6.11 and Table P.

6.11 Connect station intercom lamp ground to Row 24, Terminal 1-5. Connect proper A-lead. For the call announcer, connect a jumper from Row 22 or 23, Terminal 1-5 to the VI-BN lead of the station block, from Row 24, Terminal 1-5 to the YL-OR lead of the station block, from Row 46 or 48, Terminal 1-5 to the VI-BL lead of the station block, and from the appropriate SIG terminal to the VI-GN lead of the station block. (Refer to call announce instructions in paragraph 7.01.) Call announcers are connected to odd SIG terminals and ringers are connected to even SIG terminals. Ringer connections are from the appropriate SIG terminal to the SL-YL lead of the station block. Ringer ground is connected from any A1/LG terminal to the YL-SL lead of the station block.

TABLE P

FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
11	6	36	6
12	6	37	6
13	6	38	6
14	6	39	6
15	6	40	6
16	6	41	6
17	6	42	6
18	6	43	6
26	6	29	6
32	6	34	6
35	6	44	5
AB		27	6

AW 81-182

INSTALL DIAL INTERCOM CARD

6.12 The following steps should be taken to properly install the intercom card without damage to the call announcer card from improper strapping.

Caution: Make sure power cord is unplugged before inserting or removing any static sensitive cards. Handle cards by the edges.

(a) Unplug power cord.

(b) Insert intercom card with straps X, Y, and Z in place. (See Figure 7.)

(c) Plug in power cord.

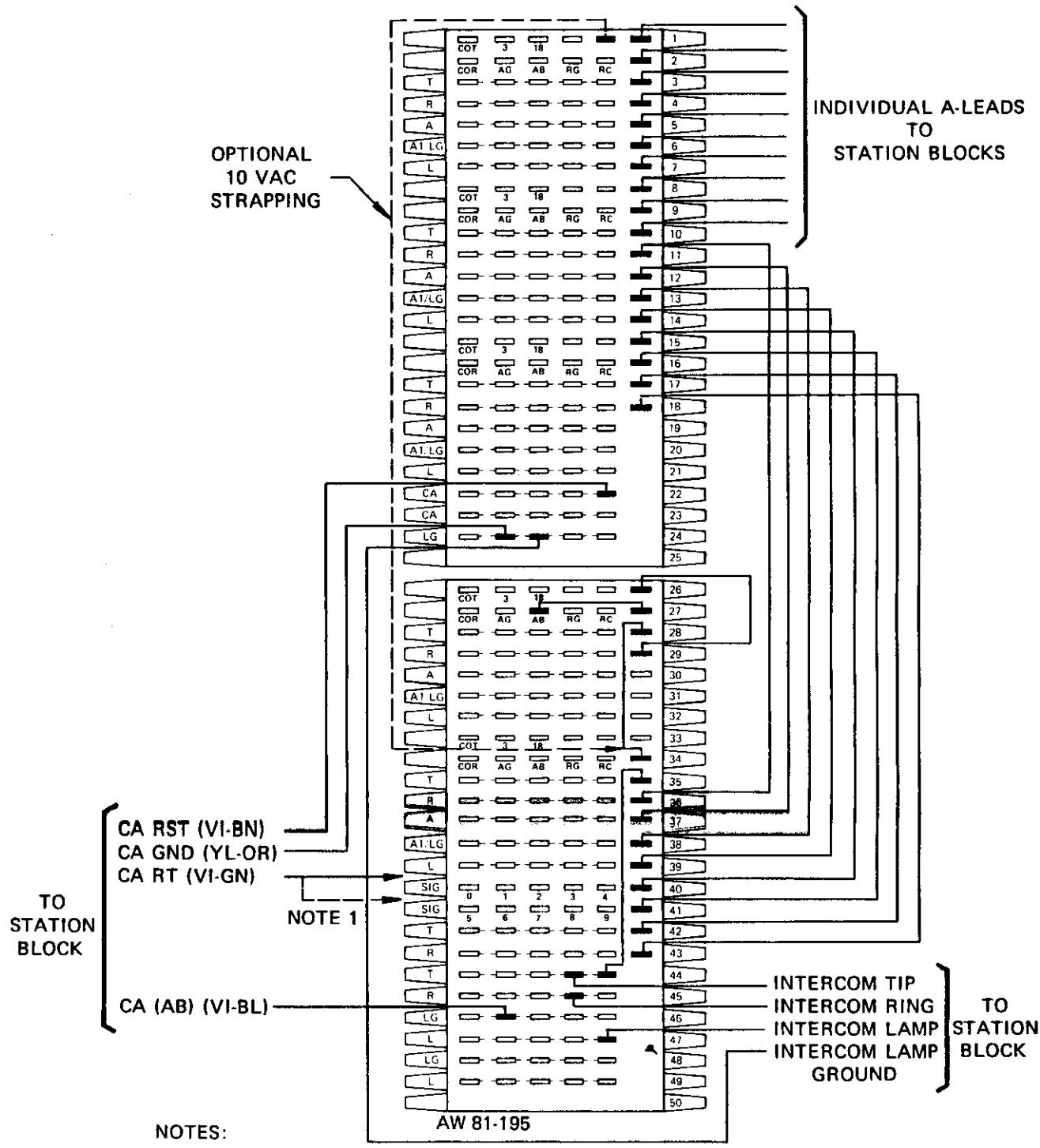
(d) With a meter, measure -19 VAC from Row 37, Terminal 6 to any AG terimnal. If -19 V is measured, unplug power cord and remove the intercom card.

(e) Remove X, Y, and Z straps.

(f) Insert intercom card.

(g) Refer to Figure 15 and strap the call announcer card as required. Insert the card in the option slot.

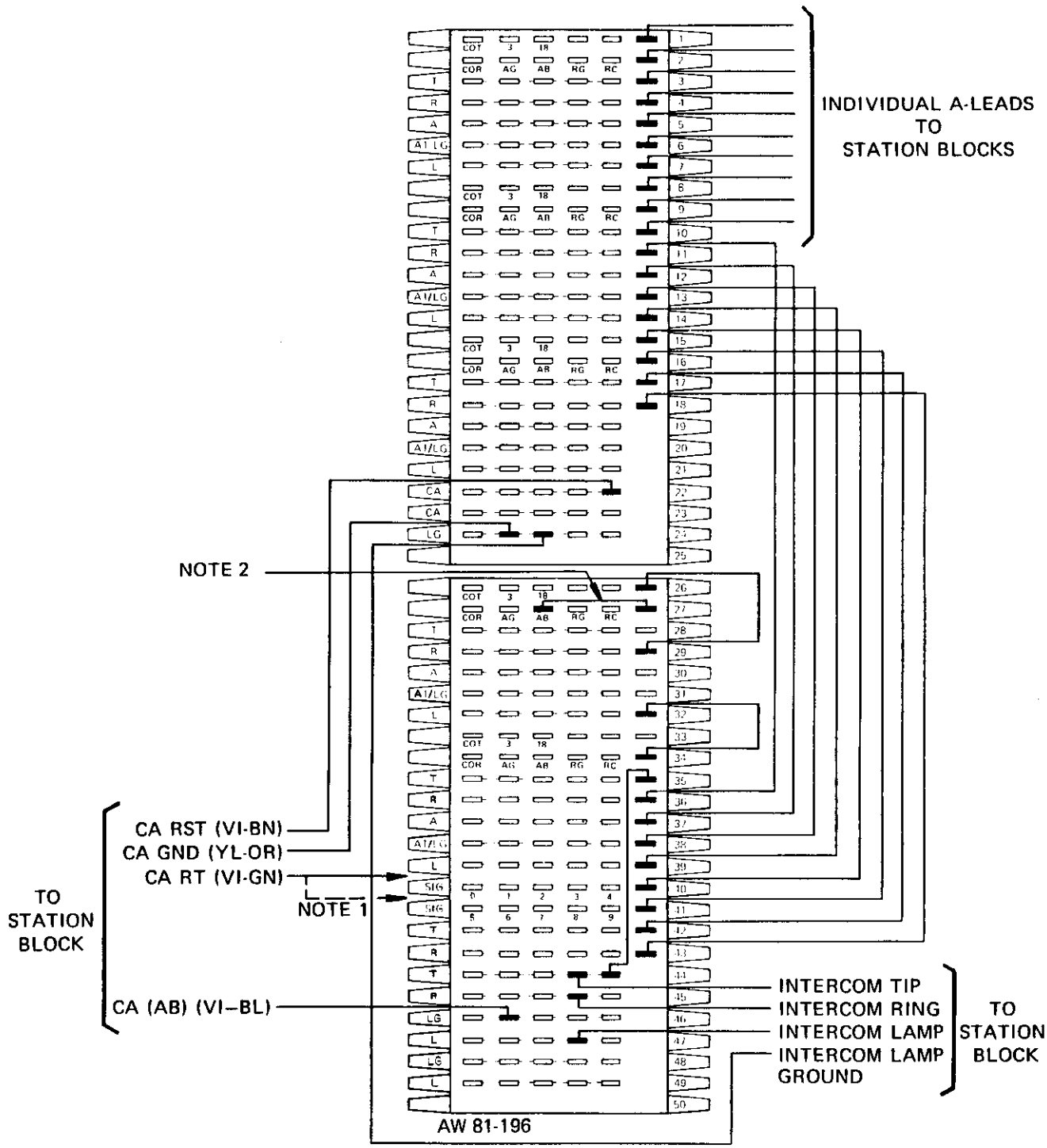
(h) Plug in power cord.



NOTES:

1. Connect to appropriate SIG Terminal 0 through 9. In a mixed system, call announcers are connected to odd SIG terminals and buzzers to even SIG terminals.
2. Connecting AB to Row 27, Terminal 6 causes A-Battery (-24 VDC) to appear on Rows 46 and 48 which are normally spare terminals.
3. Strap Row 28, Terminal 6 to Row 34, Terminal 6 for 18 VAC on intercom.
   Strap Row 1, Terminal 5 to Row 34, Terminal 6 for 10 VAC on intercom.
   Do not use both straps.

Figure 13: Dial Intercom with Mixed Signaling, Buzzers and Call Announcers



NOTES:

1. Connect to appropriate SIG Terminal 0 through 9. In a mixed system, call announcers are connected to odd SIG terminals and ringers to even SIG terminals.
2. Connecting AB to Row 27, Terminal 6 causes A-Battery (-24 VDC) to appear on Rows 46 and 48 which are normally spare terminals.

Figure 14: Dial Intercom With Mixed Signaling, Ringers And Call Announcers

7. CALL ANNOUNCING

7.01 The call announcing card may be used in any one of three applications:

(a) To provide dial tone and ringback tone for dial intercom (using no call announcers).

(b) To provide call announcing (dial tone, tone burst, confirmation tone, and handsfree answerback to the intercom stations). Each station must be equipped with a 174B call announcer or a telephone with integral call announcer.

(c) Split System: Call announcing and buzzers or ringers. To provide dial tone, tone burst and confirmation tone to all intercom stations, and to provide call announcing with handsfree answerback to a maximum of five stations. The remaining five stations will be signaled by buzzer or ringer.

7.02 Application (a) of paragraph 7.01 does not require any additional connections except the strapping options required on the call announcer card. (See Figure 15.)

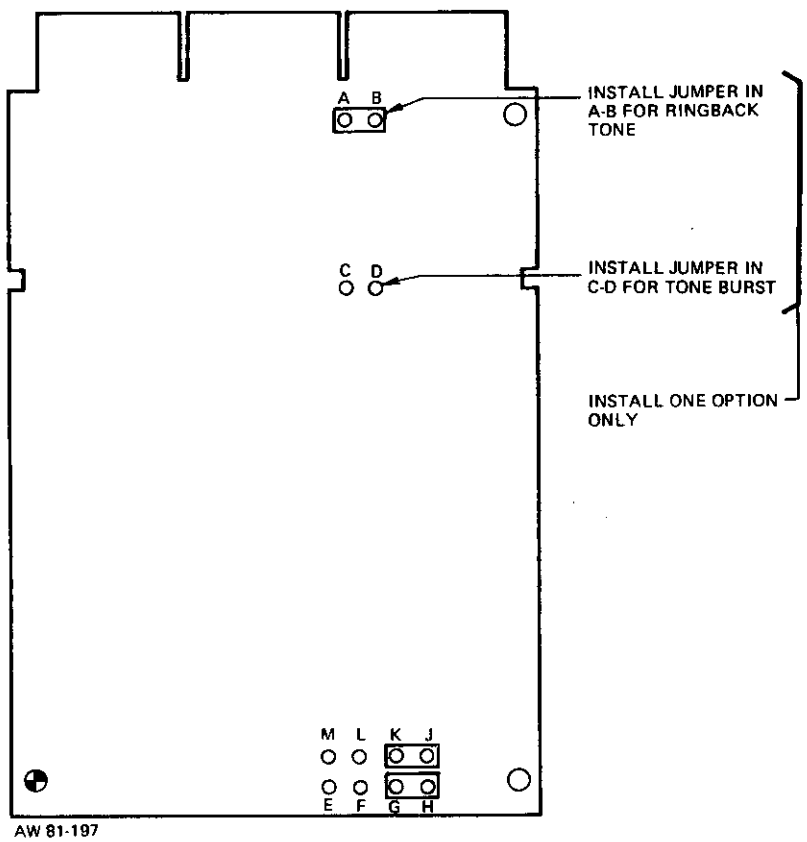
7.03 To provide call announcing for all stations install jumpers and A-leads as shown in Figure 12.

7.04 In an effort to standardize on the leads to be used for a call announcer installation involving both 6-button and 10-button telephones, cross-connections should be connected from the station block of the telephone to the KSU block as shown in Table R.

TABLE R

DESIGNATION	STATION BLOCKS	KSU BLOCK
AG (LG)	33 (YL-OR)	Row 24, Terminal 1-5
AB (-24 VDC)	41 (VI-BL)	Row 46 or 48, Terminal 1-5
CA RST	47 (VI-BN)	Row 22 or 23, Terminal 1-5
CA RT	45 (VI-GN)	Row 40 and 41, Terminal 1-5 assigned to that station.

AW 81-185



AW 81-197

Figure 15: Call Announcer Card

7.05 It is recommended that the procedure in paragraph 7.04 be used to ensure the availability of terminals required for cross-connections. However, some call announcers may be installed in a different manner. (Refer to paragraphs 7.06 and 7.07.)

7.06 If 5-line telephones and 174B call announcers are used, cross-connections between the station blocks and KSU block may be as shown in Table S.

TABLE S

DESIGNATION	STATION BLOCKS	KSU BLOCK
AG (LG) AB (-24 VDC)	33 (YL-OR) 34 (OR-YL)	Row 24, Terminal 1-5 Row 46 or 48 Terminal 1-5
CA RST	39 (YL-SL)	Row 22 or 23, Terminal 1-5
CA RT	40 (SL-YL)	Rows 40 and 41, Terminal 1-5 assigned to that station.

AW 81-183

7.07 If 10-button telephones with integral call announcers are used, cross-connections between the station block and KSU blocks may be as shown in Table T.

TABLE T

DESIGNATION	STATION BLOCKS	KSU BLOCK
AG (LG) AB (-24 VDC)	33 (YL-OR) 41 (OR-YL)	Row 24, Terminal 1-5 Row 46 or 48, Terminal 1-5
CA RST	47 (VI-BN)	Row 22 or 23, Terminal 1-5
CA RT	45 (VI-GN)	Rows 40 and 41, Terminal 1-5 assigned to that station.

AW 81-184

7.08 Individual jumpers are required from each station block for intercom A-leads and for CA RT (SIG) leads.

(a) ***A-leads:*** Install a jumper from the intercom A-lead terminal on each station block (Row 27 for 5-line sets, Row 28 for 9-line sets) to the appropriate terminal in column 6, rows 1 through 10.

(b) ***CA RT leads:*** Install a jumper from the CA RT terminal on each station block to the SIG terminal (on the KSU block) assigned to that station. This is Row 40 on the station block for 5-line sets and Row 45 on the station block for 10-button sets with integral call announcer.

CONNECT 174B CALL ANNOUNCER TO 6-BUTTON TELEPHONES

7.09 The 174B call announcer for voice signaling on intercom connects to 565 or 2565 telephones as follows:

(a) Connect the Black (-24 VDC) lead of the call announcer together with the VI-BL lead of the telephone to ET of the terminal board.

(b) Connect the Yellow (GND) lead of the call announcer together with the YL-OR lead of the telephone to terminal 4 of the terminal board.

(c) Connect the Red (CA RST) lead of the call announcer together with the VI-BN lead of the telephone to terminal 8 of the terminal board.

(d) Connect the Green (CA RT) lead of the call announcer together with the VI-GN lead of the telephone to terminal 1 of the terminal board. (The VI-GN lead will have to be moved from RR on the network.)

Note: This procedure corresponds with the installation in paragraph 7.04 and allows the ringer leads to remain in place on the telephone. Therefore, ringers may be used on a telephone while a call announcer is installed. Terminals ET, 8, 3 and 4 are spare terminals.

7.10 If the procedure in paragraph 7.06 has been used to install cross-connections for call announcers, the following procedure is used to connect a 174B call announcer to 565 or 2565 telephones.

(a) Remove the Red ringer lead from RR on terminal board. Tape and store lead.

(b) Remove the Black ringer lead from RT on terminal board. Tape and store lead.

(c) Connect the Green CA lead to RR on terminal board.

(d) Connect the Red CA lead to RT on terminal board.

(e) Connect the Black CA (-24 VDC) lead to 3 on terminal board.

(f) Connect the Yellow CA (GND) lead to 1B on terminal board.

Note: The procedure in paragraphs 7.04 and 7.09 is the recommended practice for call announcers. Paragraphs 7.06, 7.07 and 7.10 are intended as a reference to procedures which may have been used in an existing installations. These procedures should not be used in new installations.

8. MUSIC-ON-HOLD

8.01 Music-on-hold can be provided by installing a 403A music-on-hold card in the option card position of the KSU or in a separate card mounting facility such as a 359A one-card panel.

8.02 If the KSU option card position is used, pin 6 of rows 1 through 18 must be connected as shown in Table U.

8.03 If a separate mounting facility is used for the 403A KTU, the same connections must eventually be made to pins 1 through 18 of the 403A card connector.

Note: The 400E line card must be strapped F-H. Refer to the related document of the 400E card for strapping instructions.

8.04 To install a 403A music-on-hold card in a 359A one-card panel, the following connections are made.

8.05 There are six output leads consisting of 2 individual leads each from the 359A panel which must be isolated and connected to the KSU block or corresponding terminals of the 25-pair block if it is used. The first output lead corresponds to pins 1 and 2 of the 403A card. The second output lead corresponds to pins 3 and 4 of the 403A card and so forth. These output pins are connected (by way of the 359A panel and KSU block connectors) to pins 12 and 18 (input pins) of the 400E line cards.

Note: The card connector is numbered 0 through 19 but the terminal board on the back of the 359A panel is numbered 1 through 20. The 403 card is numbered 1 through 18. Therefore, the first output pair of the 359A panel would be numbered 2 and 3 and correspond to pins 1 and 2 on the 403 card when the card is centered in the connector.

TABLE U

CONNECTIONS TO ADD A 403A MUSIC-ON-HOLD KTU TO OPTION SLOT

PIN NO.	LEAD DESIGNATION	OPTION SLOT TERMINALS		JUMPER TO	
		ROW	TERMINAL	ROW	TERMINAL
1	First Output	1	6	1	3
2	Pair	2	6	3	1-5
3	Second Output	3	6	8	3
4	Pair	4	6	10	1-5
5	Third Output	5	6	15	3
6	Pair	6	6	17	1-5
7	Input	7	6	Music	
8	Pair	8	6	Source	
9	-24 Vdc	9	6	2*	3
10	-	10	6	NC	-
11	Ground	11	6	2*	2
12	-	12	6	NC	-
13	Fourth Output	13	6	26	3
14	Pair	14	6	28	1-5
15	Fifth Output	15	6	33	3
16	Pair	16	6	35	1-5
17	Sixth Output	17	6	NC	-
18	Pair	18	6	NC	-

*These may be any available AB and AG pins.

AW 81-186

8.06 Connect the leads as follows:

(a) Connect one lead of the first pair from the 359A panel to Row 1, Terminal 3 of the KSU block. Connect the second lead of this pair to Row 3, Terminal 1-5 of the KSU block.

(b) Connect one lead of the second pair from the 359A panel to Row 8, Terminal 3 of the KSU block. Connect the second lead of this pair to Row 10, Terminal 1-5 of the KSU block.

(c) Connect one lead of the third pair from the 359A panel to Row 15, Terminal 3 of the KSU block. Connect the second lead of this pair to Row 17, Terminal 1-5 of the KSU block.

(d) Connect one lead of the fourth pair from the 359A panel to Row 26, Terminal 3 of the KSU block. Connect the second lead of this pair to Row 28, Terminal 1-5 of the KSU block.

(e) Connect one lead of the fifth pair from the 359A panel to Row 33, Terminal 3 of the KSU block. Connect the second lead of this pair to Row 35, Terminal 1-5 of the KSU block.

(f) The sixth output lead is spare and is not connected when used in connection with a 601A KSU.

(g) Connect the output of the music source to Terminals 8 and 9 on the back of the 359A panel.

(h) Connect terminal AB and AG of the KSU block to Terminals 10 and 12 respectively on the 359A panel.

9. MANUAL INTERCOM

9.01 Manual intercom (401B KTU) can be installed to connect all stations to one common talk path, or it can be installed to provide a private talk path between two stations.

9.02 After determining the CO/PBX line card position to be used, install a jumper from AB to 18 and a jumper from AG to 3 for that line position on the KSU connecting block.

9.03 Four station connections must be made for each telephone to be connected to the manual intercom; Tip, Ring, Lamp, and Lamp Ground. These connections should be made from the station block of the telephone (at the designated line) to the second 25-pair block or to the KSU if the 25-pair block is not used.

9.04 Manual intercom requires one line pickup button and one signal button at each connected station. Usually, the button at the extreme right is used for signaling and the adjacent button is connected to the manual intercom talk circuit. Buzzer signal and ground leads must be connected between stations, and power must be supplied to one side of the buzzer. This button and buzzer arrangement may be used for signaling or if dial intercom is also in use, the called party may be signaled on dial intercom (by buzzer, ringer, or call announcer) and both parties can then switch to manual intercom.

9.05 The 401B card is inserted in any unused line card position. Cross-connections between the station block and the KSU or 25-pair block should correspond to that line in which the card is inserted.

10. BUTTON-ACCESSED PAGING ADAPTER

10.01 Pushbutton access to a PA system for voice paging from intercom stations can be provided by installing a 401B KTU in any vacant CO/PBX line card position of the KSU.

10.02 After determining the CO/PBX line card position to be used, strap AB to 18 and AG to 3 at that line position of the KSU block.

10.03 Convert a spare button of each telephone set to nonlocking operation.(See instructions packed with subset.) Connect the Tip and Ring leads from this button to station Tip and station Ring of the designated line that corresponds to the line card position in which the 401B card is inserted. These cross-connections are made on the KSU block or 25-pair block if it is used. Connect a 1 Mfd capacitor in series with both input leads to the amplifier. (See Figure 16.)

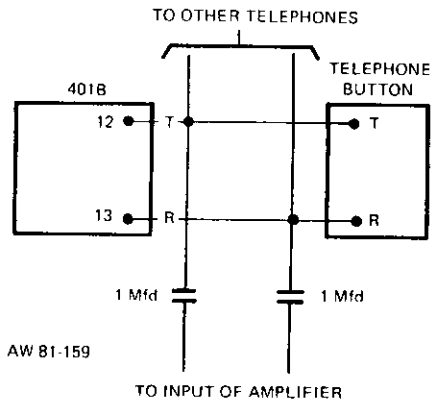


Figure 16: Schematic, Button-Accessed Paging

10.04 Button-accessed paging is accomplished by going off-hook, depressing the designated nonlocking button, and talking into the telephone handset. The user's voice will go out over the PA system.

11. DIAL-ACCESSED PAGING

11.01 Dial access to a customer furnished PA system for voice paging from intercom stations can be provided by one of the following methods:

(a) In a system using ringers or buzzers for intercom signaling (with or without dial tone and ringback tone), a 410A paging adapter KTU may be installed in any vacant line card position. Any unused intercom number may be assigned to this feature.

(b) In a system using all call announcers for intercom signaling, an intercom number may be assigned to voice paging. (The 410A card is not used.)

(c) In a mixed system using call announcers at some stations and ringers or buzzers at other stations, either of the above arrangements may be used. Arrangement (a) must be used with an even number assigned to voice paging, and arrangement (b) requires an odd number be assigned to voice paging.

Note: It is possible to provide background music through the PA amplifier but only if the KSU block terminals have been transfered to a 25-pair block. Connect the music source output leads to pins 8 and 9 of the 410A card. Connect the amplifier leads to pins 14 and 9 of the 410A card. Pins 14 and 9 are CO Tip and CO Ring respectively of the 25-pair block. Pin 8 of the 410A card corresponds to that row of the 25-pair block which is designated for Lamp (L) of the line in which the 410A card is inserted. (See Figure 17.)

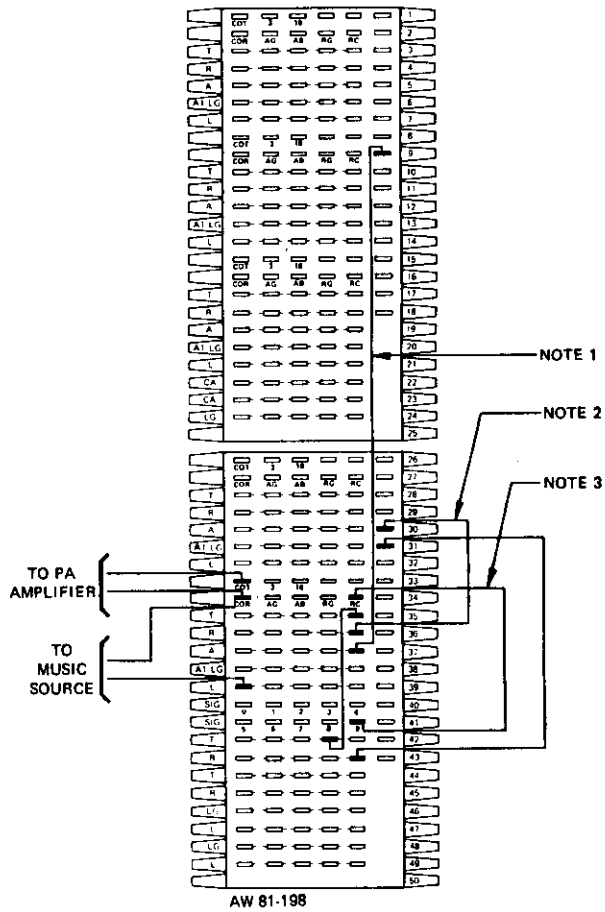
11.02 Installation procedures for paging equipment and connections are given in the following paragraphs.

11.03 Determine the line card position to be used and connect COT and COR of that line position to the amplifier inputs.

11.04 Determine the intercom number to be used for voice paging and connect the corresponding SIG terminal, on Row 40 or 41, to the RC terminal of the line position used.

Note: In a mixed system, an even number must be assigned for voice paging.

11.05 Connect any T terminal of the line position used to any intercom T terminal on Row 42 or 44.



NOTES:
1. When a call announcer card is used, strap Line 5 A-lead (Row 37, Terminals 1-5) to Terminal 6 of Rows 1 through 9. (SIG 9 is used for an example.)
2. A 56 Ohm resistor is factory wired on Terminal 6 between Rows 30 and 31. The wiring shown is necessary to place this resistor on the Intercom ring leads.
3. Connect appropriate SIG Terminal to RC (Row 34, Terminal 5) for Ring up voltage. (SIG 9 is used for an example.)
4. Music source is optional. Unless the KSU Block Terminals have been transferred to a separate 25-pair block (providing spare terminals) and corresponding terminals are used as shown, two wires would be connected to COR (Row 34, Terminal 8). This is not a recommended installation practice.

Figure 17: Connections to Add Dial Access Paging

11.06 Connect any R terminal of the line position used to Row 30, Terminal 6, and connect Row 31, Terminal 6 to any intercom R Terminal on Row 43 or 45. (A 56 ohm resistor is factory wired between Row 30, Terminal 6 and Row 31, Terminal 6.)

11.07 Connect any A terminal of the line position used to any terminal 6 of Rows 1 through 10. (To simplify troubleshooting, use the Row 1 through 10 that corresponds to the SIG terminal used. For example, if SIG 8 is used, connect A-lead to Row 8.)

11.08 Connect the AG terminal to the RG terminal at the line position used.

11.09 Refer to the instruction sheet packed with the 410A KTU and strap the KTU for Option W. If 18 VAC is used for intercom signaling, strap the KTU for Option V. If 105 VAC is used for intercom signaling, strap the KTU for Option U.

INSTALL 410A KTU

11.10 Insert the 410A KTU into the CO/PBX line position assigned.

12. OFF-PREMISE LINE KTU

12.01 The 346A key telephone unit (KTU) is used to permit adding off-premise stations (standard two-wire telephone sets) to the dial intercom system or to a predetermined CO line. A maximum of six telephone sets may be connected in parallel across the circuit. Maximum loop resistance for the circuit is 1200 Ohms. If Tel-Touch telephones are used or a minimum of 23 milliamps DC is required, the loop resistance is limited to 500 Ohms.

INSTALLATION OF 346A KTU (ALL BUZZER OR RINGER SIGNALING OR MIXED SYSTEM)

Caution: Be sure power to the system is off before making connections and before plugging in the 346A KTU. Double check all connections before power is restored to the system.

12.02 Install the 346A KTU in a line card position. Make connections as shown in Table V. (See Figure 18.) If connected to a CO line, the 346A KTU should be installed in a line card position adjoining the line card it is being connected to.

SIGNALING OPTIONS

12.03 Signaling options are as follows:

(a) Ringing only can be supplied to the off premise station.

(b) For grounded ringing on the intercom system, strap A-B and E-F. This is factory strapping on the 346A KTU.

(c) For buzzer signaling on the intercom system and grounded ringing to off-premise station, strap A-B and G-H on the 346A KTU.

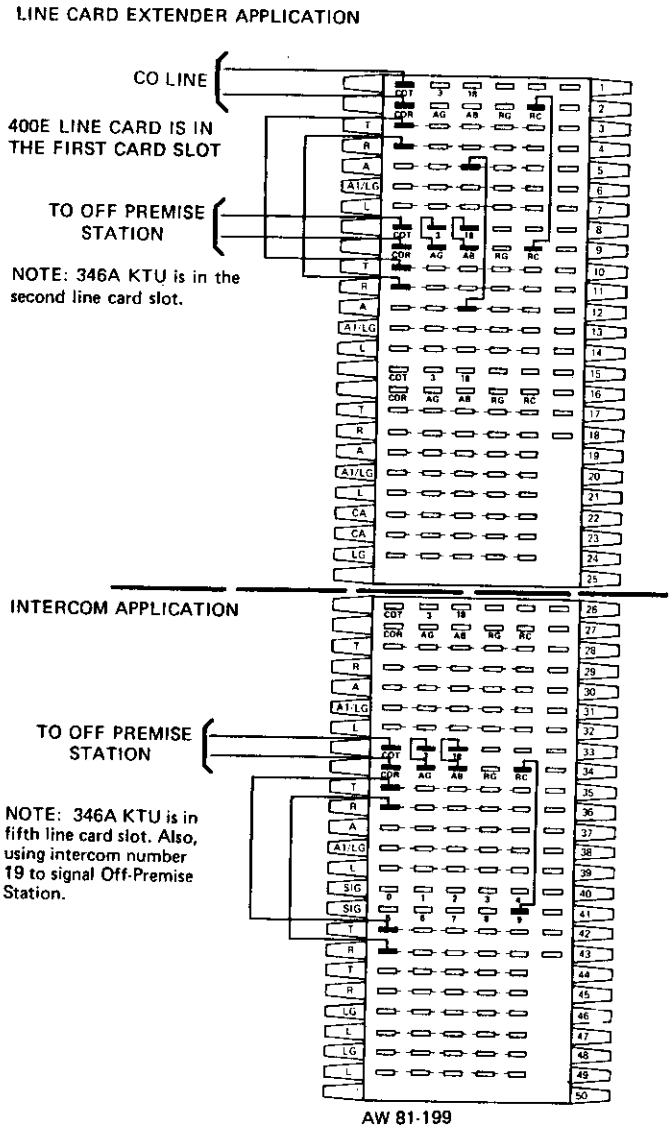


Figure 18: Connections to Add 346A Off-Premise Line

TABLE V

CONNECTIONS TO ADD 346 OFF-PREMISE LINE KTU
TO 601 KEY TELEPHONE SYSTEM

346 PIN NO.	DESIGNATION	CONNECTIONS
		LINE CARD EXT.
14	Tip (Out)	CO "T" OF LINE POSITION USED TO PHONE
9	Ring (Out)	CO "R" OF LINE POSITION USED TO PHONE
12	Tip (In)	TO LINE CARD TIP (T ON TERMINAL BLOCK)
13	Ring (In)	TO LINE CARD RING (R ON TERMINAL BLOCK)
1	RC	"RC" OF LINE POSITION USED TO LINE CARD "RC"
3	AG	"3" OF LINE POSITION USED TO "AG" OF SAME POSITION
6	LG	PROVIDED BY CONNECTOR
10	AC	PROVIDED BY CONNECTOR (RINGING GENERATOR MUST BE INSTALLED)
18	AB	"18" OF LINE POSITION USED TO "AB" OF SAME POSITION
15	AG or BG	PROVIDED BY CONNECTOR
16	A-LEAD	TO LINE CARD A-LEAD
		INTERCOM APPLICATION
14	Tip (Out)	CO "T" OF LINE POSITION USED TO PHONE
9	Ring (Out)	CO "R" OF LINE POSITION USED TO PHONE
12	Tip (In)	TO ICM TIP (ANY TERMINAL 1-5 ON ROW 42 OR 44)
13	Ring (In)	TO ICM RING (TO ANY TERMINAL 1-5 ON ROW 43 OR 45)
1	RC	TO ICM "SIG" FOR ICM NO. USED (TERM. 1-5, ROW 40 OR 41)
3	Ground	"3" OF LINE POSITION USED TO "AG" OF SAME POSITION
6	LG	PROVIDED BY CONNECTOR
10	AC	PROVIDED BY CONNECTOR (RINGING GENERATOR MUST BE INSTALLED)
18	AB	"18" OF LINE POSITION USED TO "AB" OF SAME POSITION
15	AG or BG	PROVIDED BY CONNECTOR
16	A-LEAD	(NOT USED)

AW 81-187

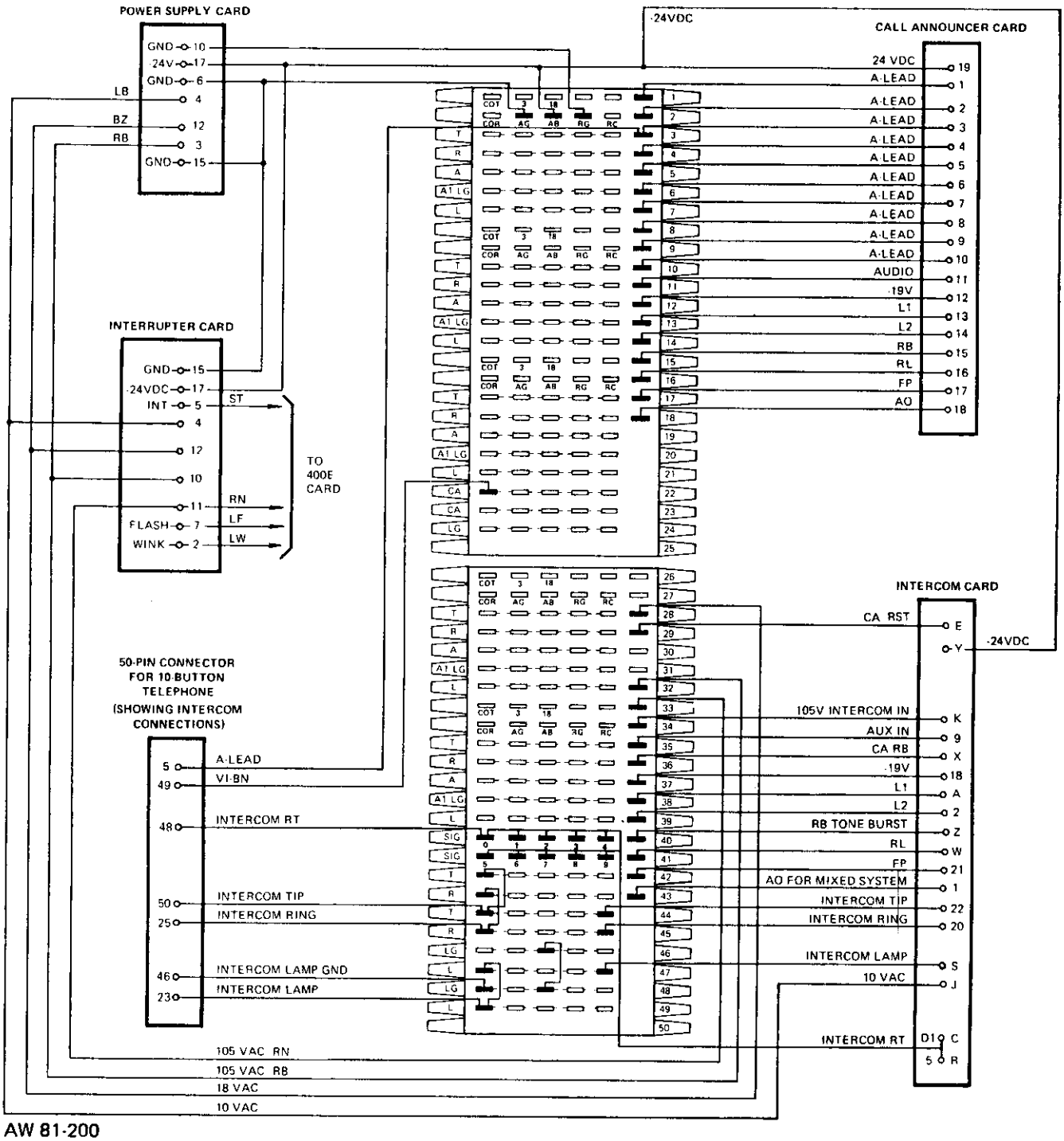
13. BLOCK DIAGRAM FOR 601A KSU

13.01 Since the 601A KSU block is not a standard wired 1A2 connecting block, the block diagram shown in Figure 19 is provided to show how the pins from various cards used in the 601A correspond to the terminals on the KSU block. This may be of assistance should the need for troubleshooting arise or in locating a terminal on the KSU block that refers to a particular card pin.

13.02 The intercom card is inserted in the intercom card connector of the KSU. This connector is numbered 1 through 44. Numbers 1 through 22 refer to Pins 1-22 of the intercom card. Numbers 23-44 refer to letters A through Z (excluding letters G, I, O, and Q) of the intercom card.

13.03 When the Tel-Touch card is mounted on the intercom card, refer to the related documents for the card schematic. Pin numbers of the Tel-Touch card match the corresponding pin numbers of the intercom card where the two cards mate.

13.04 Refer to the related documents of the cards shown if additional information such as the card schematic or circuit logic is required.



AW 81-200

NOTE:

Pin numbers shown for each card do not appear in the same order as shown on the card schematic in the related document of each card. Refer to paragraph 13.01 for additional information concerning this block diagram.

Figure 19: Block Diagram, 601A Key Service Unit

14. INTERNAL WIRING

14.01 The Internal Wiring diagrams shown in Figures 20, 21, 22, 23, and 24 are intended to be used as reference material when questions arise concerning factory wiring of the 601A KSU. It is important to note that these figures represent the KSU as viewed from the rear. Therefore, terminals on the KSU block and pins on the card connectors will appear inverted from the positions in which they are shown when viewing the KSU from the front. These figures show how the card connectors are wired to the KSU block as well as some of the strapping of the KSU block to provide common terminals.

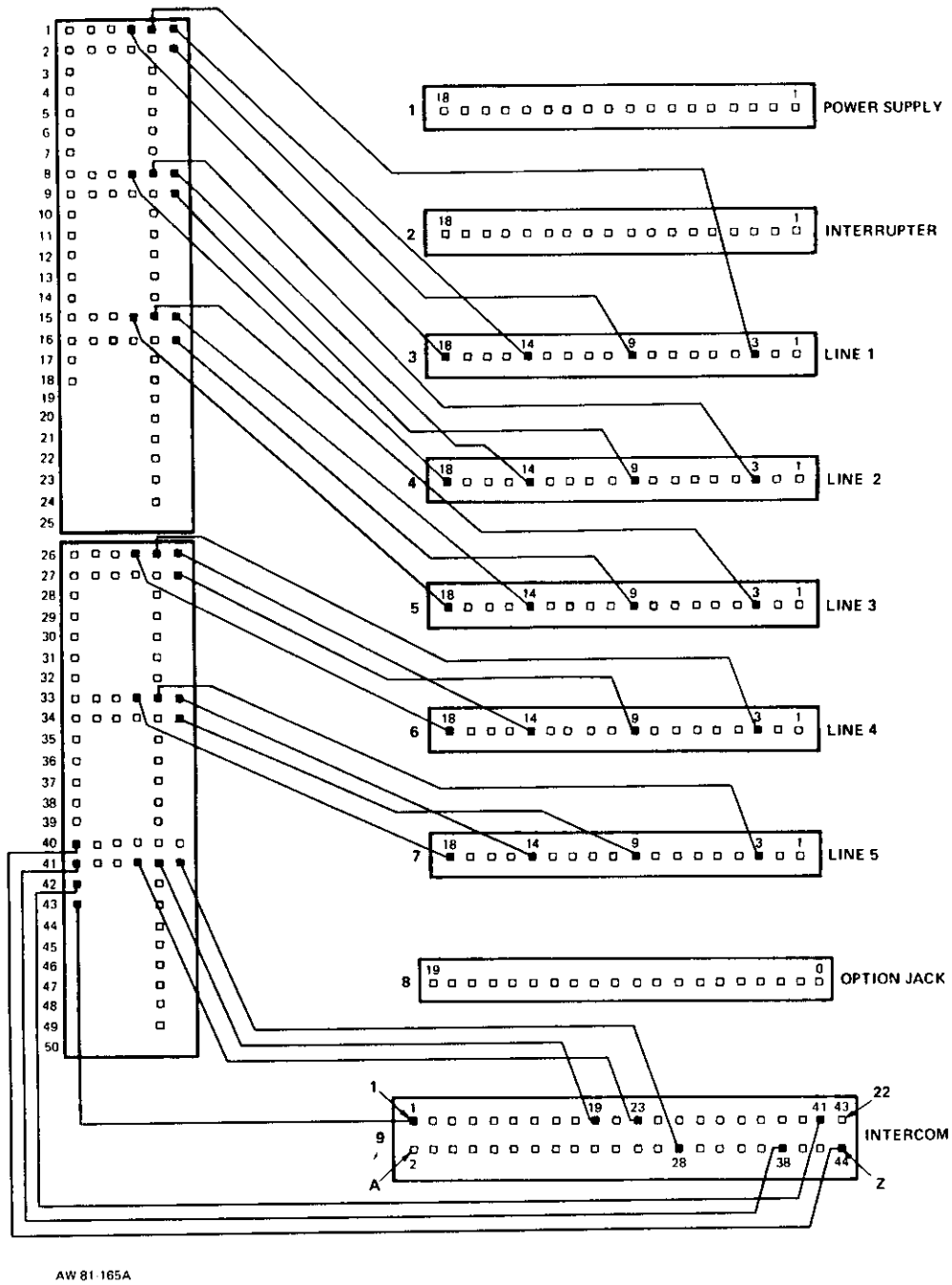


Figure 20: KSU Internal Wiring; CO Lines, Intercom RT 15, 16, 17 (Viewed from rear of KSU)

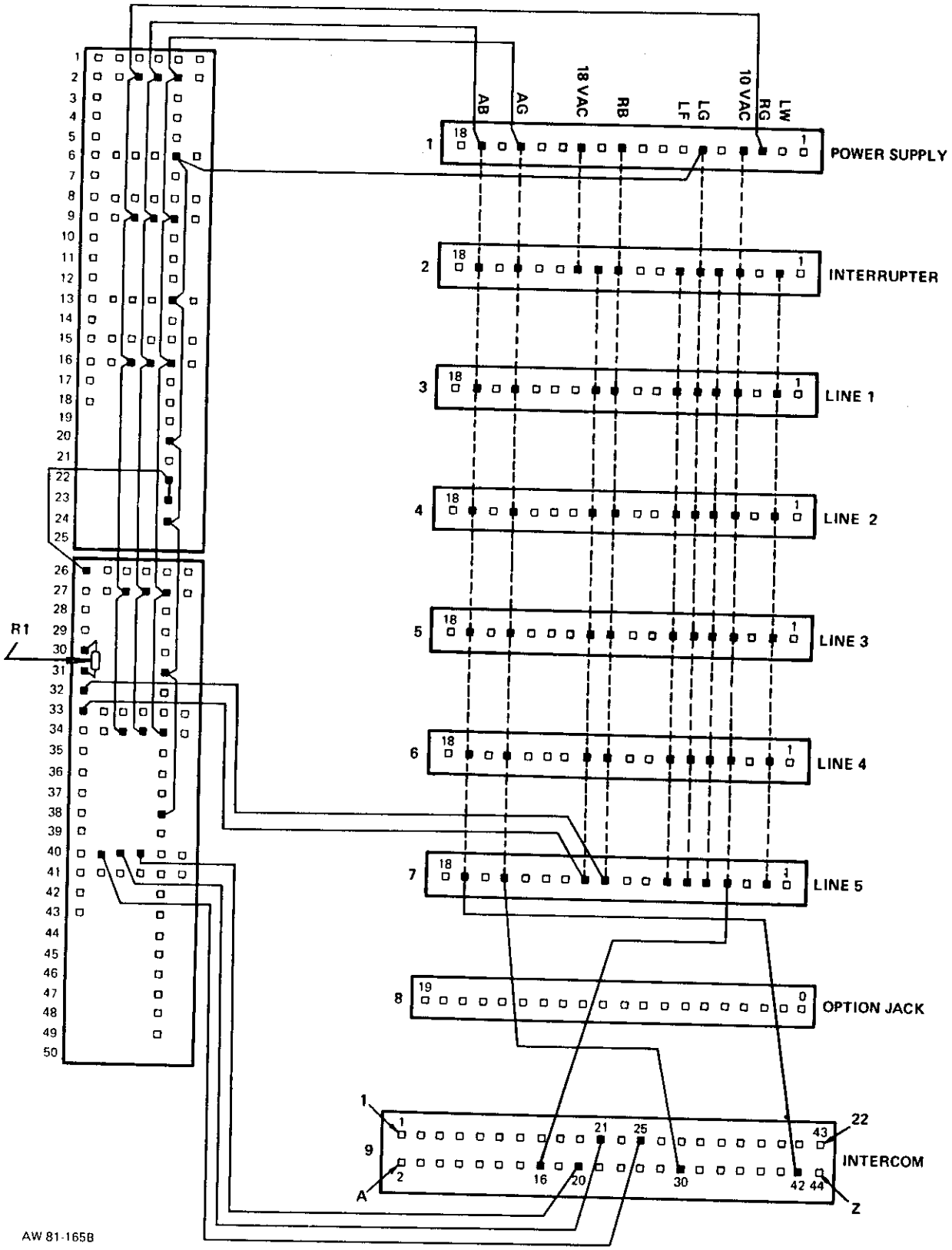
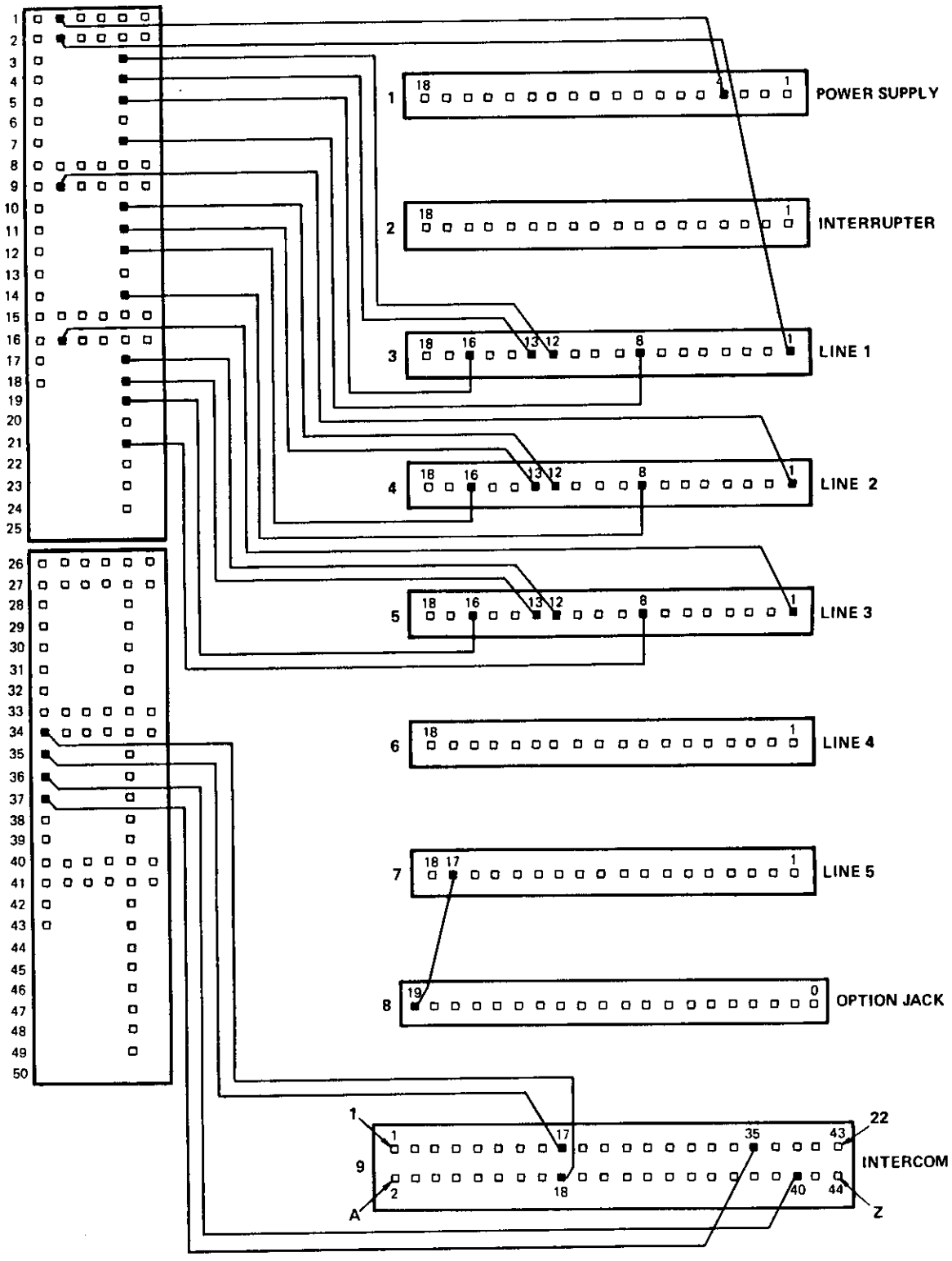


Figure 21: KSU Internal Wiring; Power Supply, Interrupter, Line Card, Intercom RT 12, 13, 14 (Viewed from rear of KSU)



AW 81-165C

Figure 22: KSU Internal Wiring; Station Connections and Intercom (Partial) (Viewed from rear of KSU)

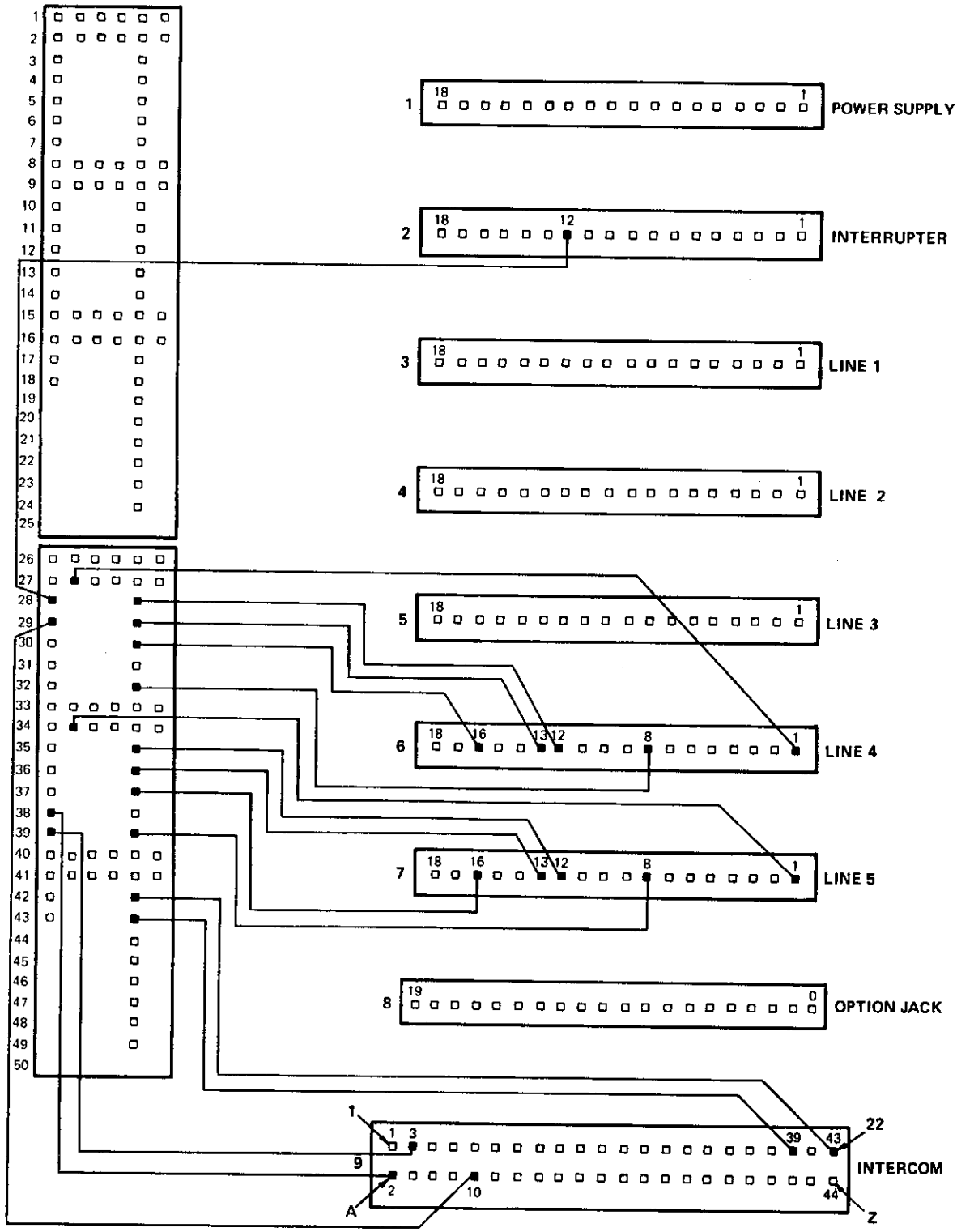


Figure 23: KSU Internal Wiring; 10 VAC Lamping, Intercom T and R (Viewed from rear of KSU)

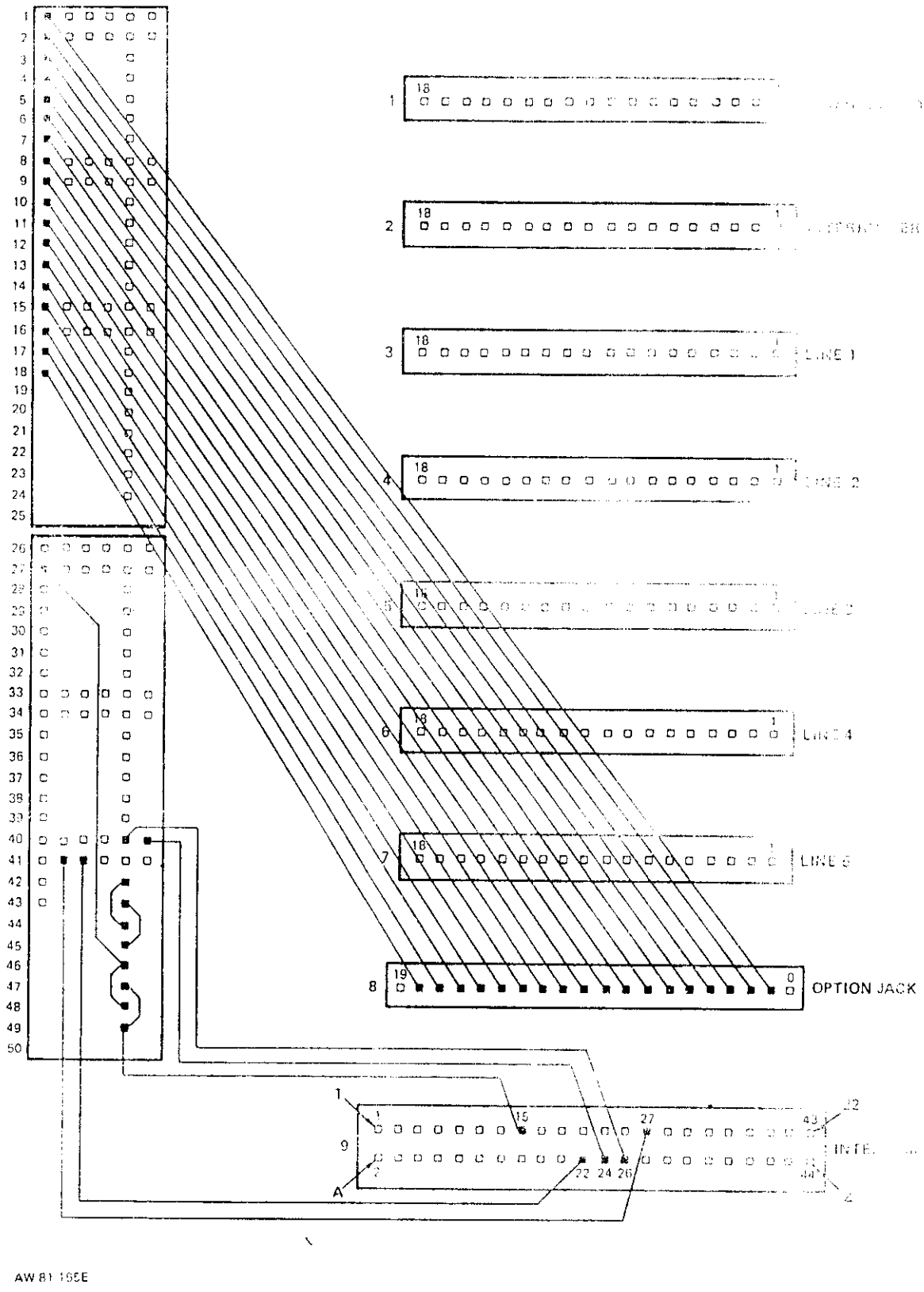


Figure 24: KSU Internal Wiring; CO Lines, Intercom RT 15, 16, 17
(Viewed from rear of KSU)

POWER SUPPLY CARD FOR USE WITH K601A KEY TELEPHONE SYSTEMS (P/N 184589-101)

1. GENERAL

1.01 This power supply (184589-101) is intended for use with the ITT 601A key system. The power supply board provides the following voltages:

(1) Regulated -24 Vdc at 1 amp for intercom and line card talk battery and power for logic circuits and relays.

(2) 18 Vac at 1 amp unregulated for power to buzzers for intercom or CO signaling.

(3) 10 Vac at 2 amps for station lamps.

1.02 This document has been re-issued to change part number in title and in paragraph 1.01. The old number was 183969-101.

1.03 The unit consists of a transformer and other electrical components mounted on a printed circuit board. It includes a fuse, power cord and a jack for connection to a ring generator kit P/N184162-101.

2. INSTALLATION

2.01 The power supply board plugs into the power supply connector provided in the K601A key system. Two plastic push fasteners are provided to anchor the power supply to the KSU frame. The power cord plugs into connector J1 on the PC board.

2.02 A jack (J3) has been provided under J1 so the customer may optionally insert a metal oxide varistor (MOV) in the two outside holes to protect the circuit against voltage transients on the power line.

3. CIRCUIT DESCRIPTION

3.01 The power cord supplies 115 Vac to transformer T1 through connector J1 and fuse F1. Transformer T1 steps down this voltage to 18 Vac and 10 Vac which are connected to card edge connectors 12 and 4. T1 also provides 36.6 Vac to the bridge rectifier consisting of CR1 through CR4. C1 is a filter capacitor used to remove ripple from the output of the bridge rectifier. Voltage across C1 is nominally -31.0 Vdc. CR5 and R1 provide a reference voltage comprised of R2, R3, Q1, Q2, and C2. Voltage across C2 is nominally -30.6 Vdc. Q3 is an intergrated voltage regulator and provides -24 Vdc to card edge connector 17.

3.02 When ring generator kit is installed, 105 Vac 30 Hz is supplied to card edge connector 10.

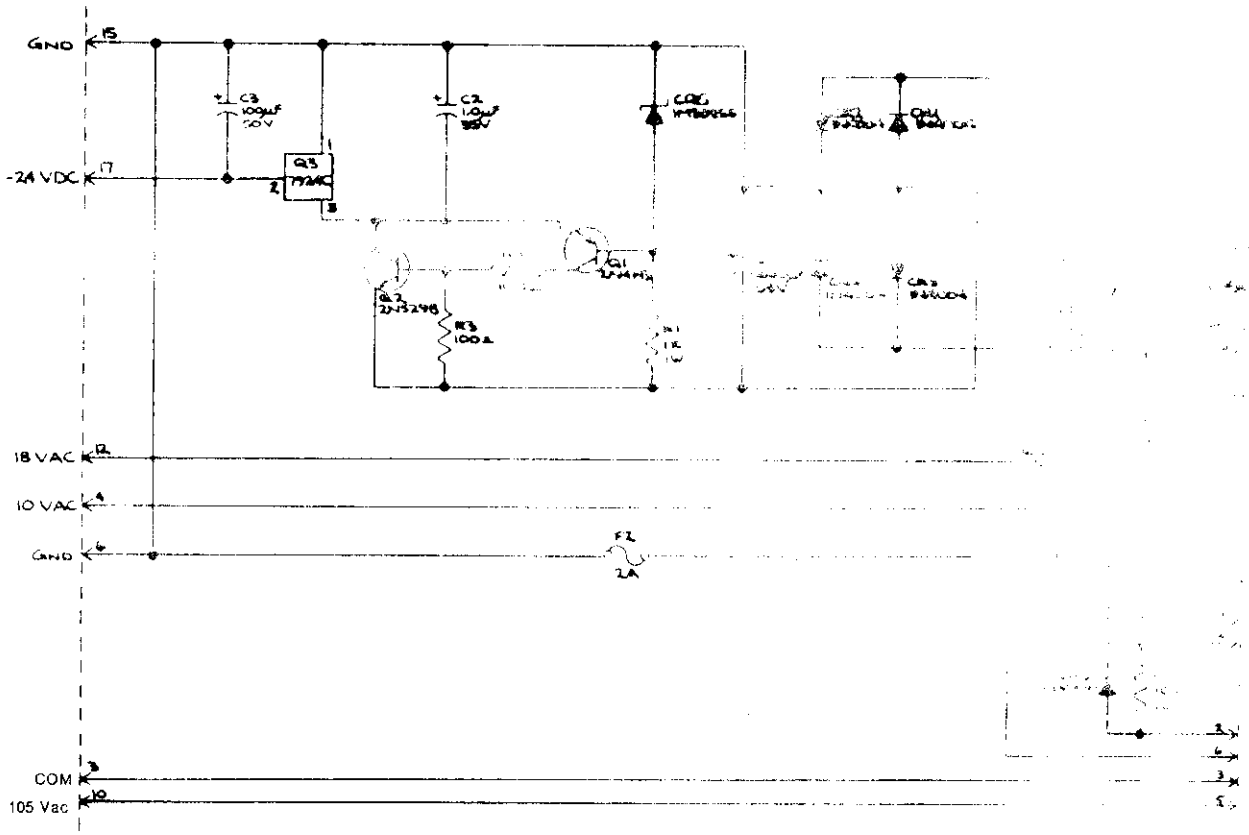


Fig. 1-Power Supply Schematic

501A
KEY SERVICE UNIT
GENERAL DESCRIPTION AND INSTALLATION

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1. INTRODUCTION

1.01 This section describes the ITT 501A Key Service Unit (KSU) and the associated equipment. The KSU features and capabilities are described, and detailed installation instructions are provided.

1.02 This section is reissued to add illustrations for cross-connecting the equipment and to correct errors in the previous issue. This section supersedes all previously issued documents covering the 501A KSU. Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

RELATED DOCUMENTS

1.03 This section describes installation of the 501A KSU in a manual intercom application. For installation instructions for dial intercom applications, refer to the following practices:

(a) 36-307-101, 307A Dial-Selective Intercom.

(b) 36-357-101, 357A Dial-Selective Intercom.

(c) 36-110-101, 110-CX1 Announce-A-Call Intercom.

2. SYSTEM DESCRIPTION

2.01 The 501A KSU is designed to provide standard key system features for a maximum of six CO or PBX lines and for up to 36 stations. It can be configured for manual intercom service or for dial-selective intercom service. The number of stations served is dependent upon the type of intercom service provided, the lamp limitations of the power supply, and the contact rating of the interrupter and the line KTUs.

FEATURES AND CAPABILITIES

2.02 Features and capabilities of the system without a dial intercom unit are as follows:

(a) Six CO/PBX lines.

(b) Music-on-hold (optional).

(c) Button access to paging (optional).

(d) Manual (button) intercom (optional).

(e) Buzzer or ringer signaling.

(f) Semiautomatic exclusion (optional).

MECHANICAL PACKAGING

2.03 The 501A KSU is designed for wall or floor mounting and can be ordered with or without a power supply or dial intercom. The KSU measures approximately 14 inches wide, and 11 inches deep. It comes equipped with a fiberglass cover. The floor-mounting model with the cover removed is shown in Figure 1.

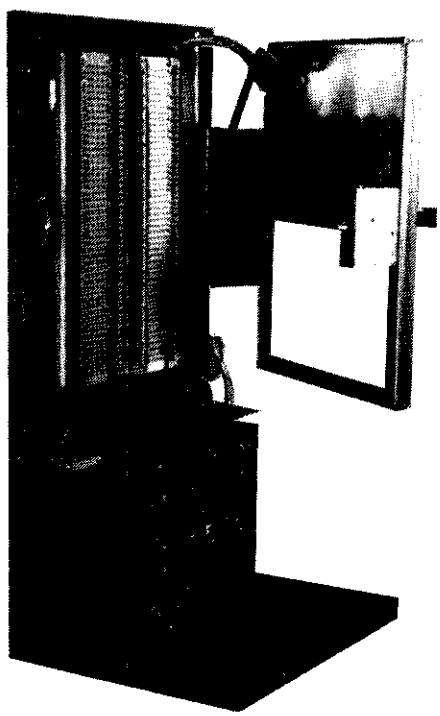

Figure 1: 501A Key Service Unit

2.04 The 501A KSU consists of a backboard assembly, an equipment mounting frame, and a cover. The backboard assembly includes two type 66B quick-connect terminal blocks and is equipped with a cable clamp and clips for securing cables. Slotted holes are provided in the backboard for the mounting screws. The backboard assembly for the floor-mounting unit also provides a power supply shield and a shelf for the power supply. A cutout in the backboard is used as an entry for external cables. The power supply shelf forms the bottom of the cabinet. A hole in the shelf is used as an alternate entry for the external cables.

2.05 The equipment mounting frame is hinged to provide access to the quick-connect terminal blocks and to the wiring side of the card connectors on the card mounting panel. The frame is hinged to open from left to right. A quarter-turn fastener on the left side is used to secure the swing-out frame.

2.06 The card mounting panel at the top of the equipment mounting frame includes six 18-contact card connectors. The card connectors are designated 1 through 6, from left to right. They are prewired to accept most 400-type plug-in KTUs (Key Telephone Units). An electromechanical interrupter in the upper right corner generates timed signals for visual and audible signaling. The interrupter is factory cabled to the card connectors by way of the quick-connect terminal blocks.

2.07 The lower half of the swing-out equipment mounting frame is designed for mounting additional, optional equipment. It can be used to accommodate various adapter panels for additional KTUs or a dial-selective intercom.

CONNECTING BLOCKS

2.08 There are two quick-connect terminal blocks on the backboard assembly. These are 66B-type terminal blocks and are designated A, B, and C. Organization and layout of the terminal blocks are such that the 501A can easily be arranged for dial-selective intercom.

2.09 The left-hand terminal block, block A, is shown in Figure 2. It is a 25-pair block arranged to terminate cross-connect leads from the station connecting blocks. In systems arranged for dial-selective intercom, the lower portion of the terminal block is used to multiple the intercom station Tip, Ring, lamp, and lamp ground leads. As the number of stations served by the 501A KSU increases, it will be necessary to cable terminal block A to one or more duplicate connecting blocks on the MDF (Main Distributing Frame).

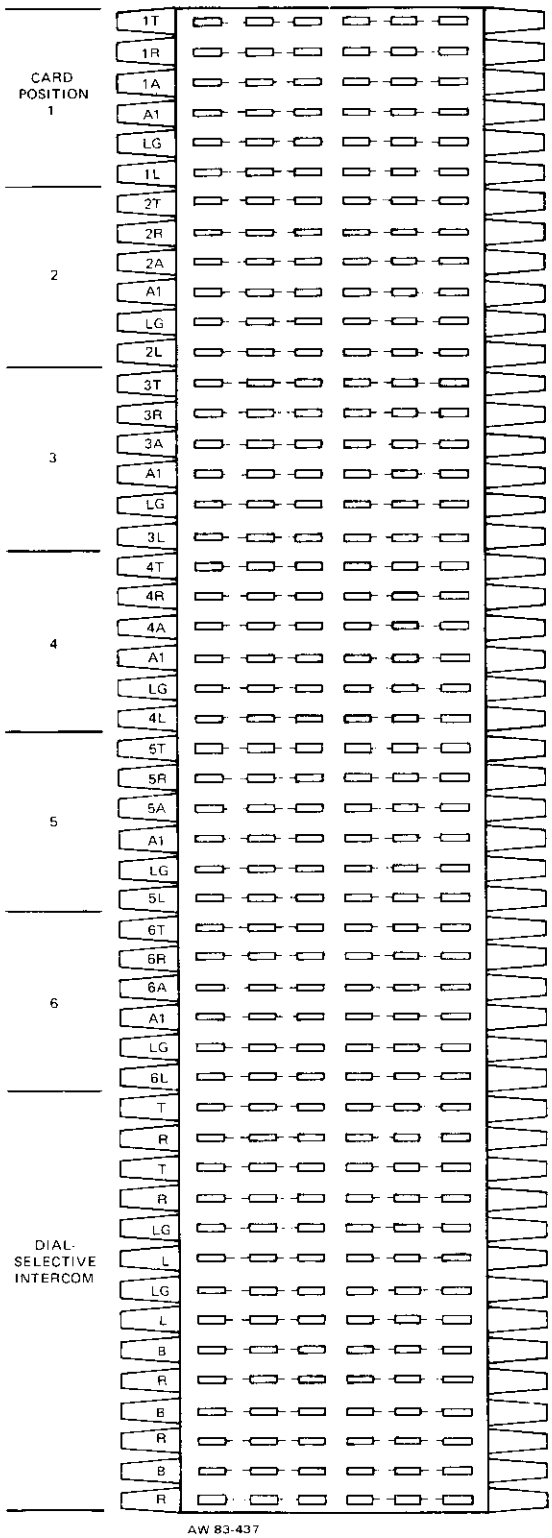

Figure 2: KSU Connecting Block A

2.10 The right-hand terminal block on the backboard assembly is a 50-pair block. The left side is designated block B, and the right side is designated block C. Block B is used to terminate the station ringer leads. Block C is used to terminate the CO/PBX line Tip and Ring leads. In systems arranged for dial-selective intercom, terminal blocks A and B are used for assigning dial codes. Block C is used for connecting the power supply and interrupter outputs to the dial intercom KTU. Layout of this block is shown in Figure 3.

CABINET WIRING

2.11 For reference the cabinet wiring diagram for the 501A KSU is shown in Figure 33 in the back of this section.

POWER SUPPLY

2.12 The 501A KSU is available with or without a power supply. It can be ordered with either of the following power supplies:

(a) The 180125-101 power supply is for use in systems using buzzer signaling. It provides no ringer output and is capable of lighting a maximum of 70 lamps.

(b) The 180125-102 power supply is for use in systems using buzzer and ringer signaling. It provides both ringer and buzzer output and is capable of lighting a maximum of 70 lamps.

Warning: Installation of a power supply not fused according to ITT specifications for this product could result in serious damage to the equipment and the surrounding area. Refer to Table A for fuse specifications.

2.13 Power requirements for a 501A KSU not equipped with a power supply are shown in Table A.

SIGNALING LIMITS

2.14 Limits of the audible and visual signals provided by the system are given in the following paragraphs. These limits are imposed by the system power supply outputs and the current-handling capabilities of the interrupter contacts and the KTU relay contacts.

2.15 ***Station Lamps.*** The system power supply is capable of lighting a maximum of 70 lamps at one time. Interrupter contacts and KTU relay contacts limit the number of lamps per line to no more than 20.

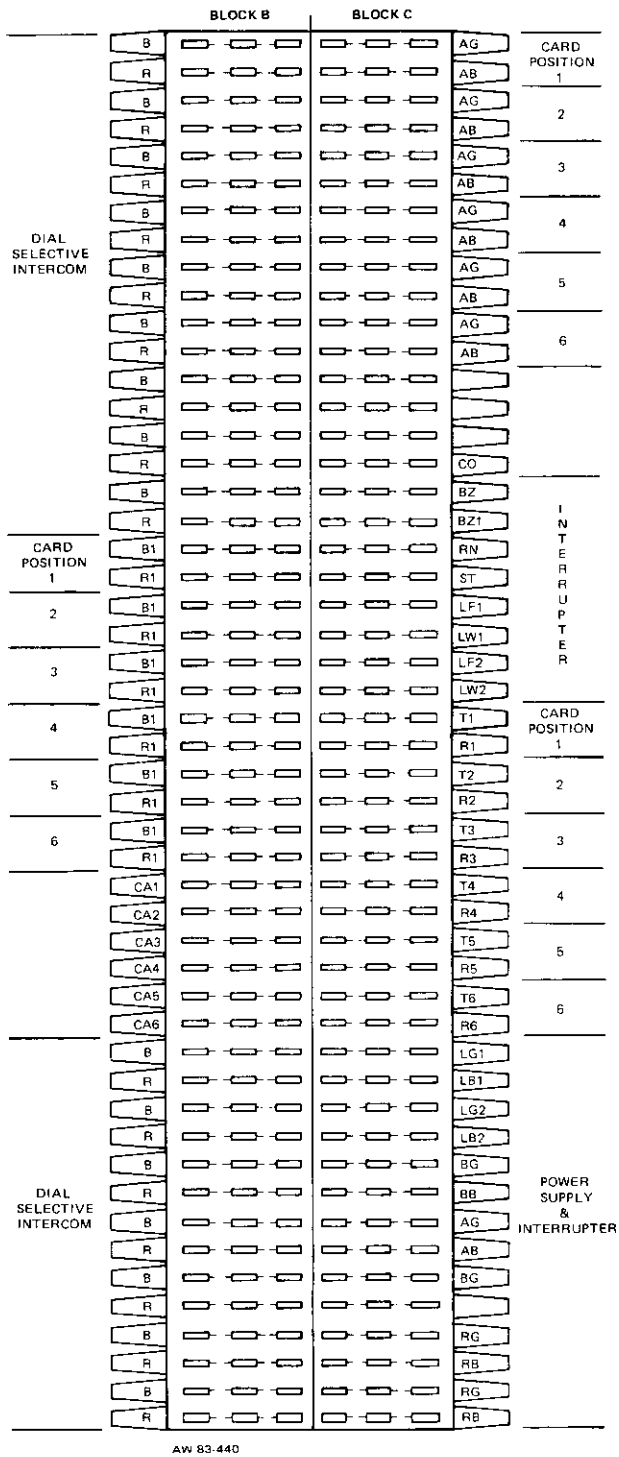

Figure 3: KSU Connecting Blocks B and C

TABLE A

501A KSU POWER REQUIREMENTS

TALK BATTERY (A BATT)	18-28 VDC, 0.9A Ripple 20 mv (max.) Fused at 2A
SIGNAL BATTERY (B BATT)	20-28 VDC, 0.6A Fused at 2A
LAMP BATTERY	9-11 VAC, 2.8A Fused at 5A
BUZZER VOLTAGE	16-20 VAC, 1.4A Fused at 2A
RING VOLTAGE	100-118 VAC, 30 Hz., .050A

AW 83-229

2.16 ***Ringers.*** The system power supply is capable of operating a maximum of four electro-mechanical ringers at one time. Hence, no line should be arranged to ring at more than three telephones.

2.17 ***Buzzers.*** In systems employing button and buzzer signaling, the maximum number of buzzers per circuit should not exceed eleven. This limitation is imposed by output of the power supply.

ORDERING INFORMATION

2.18 Ordering information for the 501A KSU is provided in Table B.

ASSOCIATED EQUIPMENT

2.19 Standard and optional equipment available for use in the 501A KSU is described in the following paragraphs. For reference this equipment and the applicable documents are listed in Table C.

A. Line Card KTU

2.20 For each CO or PBX line served by the 501A KSU, one 400E type line card (or equivalent) must be provided. The line cards can be inserted into any of the six card connectors on the KSU card connector panel. These line cards serve as the interface between the CO or PBX lines and the key system stations.

B. Manual Intercom KTU

2.21 The 401B manual intercom KTU provides busy lamp feed and talk battery for a private line between two telephones in the same key system, or for a manual intercom network. The 401B KTU can be inserted into any card connector on the 501A KSU. It is capable of lighting the busy lamps for up to twenty stations. It can provide transmission battery for a maximum of four off-hook stations at one time. As the KTU provides no means of signaling, stations in a 401B manual intercom network must be arranged for button and buzzer signaling.

2.22 The 401B KTU can also be used to provide button access to a customer-supplied paging system. One 401B KTU is required for each paging circuit to be accessed, and one button is required at each key system station allowed paging access.

C. Music-on-Hold KTU

2.23 One 403A music-on-hold KTU will serve the 501A KSU. The 403A KTU provides the interface to connect a low-level music source such as a tape deck or FM tuner to a CO/PBX line when placed on hold. The 403A KTU will serve a maximum of six CO/PBX lines. It mounts into a separate card panel adapter.

D. Dial Intercom KTUs

2.24 Three dial-selective intercom KTUs are available for use with the 501A KSU. The system can be ordered with or without dial intercom capabilities. The three dial intercom KTUs are described in the following paragraphs.

2.25 The 307A dial intercom KTU can be used to provide dial intercom service for 9 or 18 rotary dial stations. The basic unit serves 9 stations and includes a factory-wired, two-card mounting panel with a 160C dial intercom PCB. The unit can be expanded to serve 18 stations by adding a 160B dial intercom expansion PCB. The 307A unit can be arranged for Tel-Touch dialing by adding the pushbutton dial adapter kit 182666-101. The 307A KTU provides no station hold feature and is arranged for last party release. It provides a short burst of ringing to the called station. It does not return dial tone to the calling party.

TABLE B

501A KSU ORDERING INFORMATION

STOCK NUMBER	DESCRIPTION	DOCUMENT(S)	REMARKS
501A00-101	Basic unit. No power supply.	30-501-100	
501A00-OFP	Basic unit. Includes power supply with no ring generator.	30-501-100	
501A00-FPG	Basic unit. Includes power supply with ring generator.	30-501-100	
501A09-FPG	Basic unit with power supply, ring generator, and 307A dial intercom for nine rotary dial stations.	30-501-100 36-307-101	Can be arranged for Tel-Touch and expanded to serve 18 stations.
501A18-FPG	Basic unit with power supply, ring generator, and 357A dial intercom for 18 rotary dial stations.	30-501-100 36-357-101	Can be arranged for Tel-Touch and expanded to serve 27 or 36 stations.
501A10-101	Basic unit with 110-CX1 dial intercom for 10 rotary dial stations – no call announce/ tone PCB or power supply.	30-501-100 36-110-101	Can be arranged for Tel-Touch and expanded to serve 20 or 30 stations.
501A10-OFP	Basic unit with 110-CX1 dial intercom for 10 rotary dial stations. No call announce/ tone PCB. Includes power supply with no ring generator.	30-501-100 36-110-101	Can be arranged for Tel-Touch and expanded to serve 20 or 30 stations.
501A10-FPG	Basic unit with 110-CX1 dial intercom for 10 rotary dial stations. No call announce/ tone PCB. Includes power supply with ring generator.	30-501-100 36-110-101	Can be arranged for Tel-Touch and expanded to serve 20 or 30 stations.

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2.26 The 357A dial intercom KTU can be used to provide dial intercom service for 9, 18, 27, or 36 rotary dial or Tel-Touch stations. The basic 357A unit serves nine stations and includes a factory-wired, six-card mounting panel with one 160C dial intercom PCB, one 166A Tel-Touch detector PCB, and one 166B Tel-Touch translator PCB. The unit can be expanded to serve up to 36 stations by adding one 160B dial intercom expansion PCB for each additional nine stations. The 357A KTU provides no station hold feature and is arranged for last party release. It provides a short burst of ringing to the called station. It does not return dial tone to the calling party.

Note: When ordered as part of the 501A KSU, the 357A dial intercom KTU includes one dial intercom PCB and one dial intercom expansion PCB. The Tel-Touch detector and translator PCBs must be ordered separately.

2.27 The 110-CX1 announce-a-call intercom can be used to provide dial intercom service for 10, 20, or 30 rotary dial or Tel-Touch stations. The basic unit serves 10 rotary dial stations and includes a factory-wired, five-card mounting panel with a 183977-101, 10-station, rotary dial intercom PCB and a 185677-101 call announce/tone PCB. The unit can be expanded to serve up to 30 stations by

TABLE C

501A KSU AUXILIARY EQUIPMENT

EQUIPMENT	DESCRIPTION	DOCUMENT
346A OFF-PREMISES LINE	KTU, 18-contact, optional. One per six single-line telephones.	36-346-201
400E LINE CARD	KTU, 18-contact. One required per CO/PBX line.	36-400-201
400TPL LINE CARD	KTU, 18-contact, optional. One per CO/PBX line, provides DC isolation.	36-400-202
400PFL LINE CARD	KTU, 18 contact, optional. One per CO/PBX line, provides DC isolation and Power Fail Transfer Switchthrough.	36-400-203
401B MANUAL INTERCOM	KTU, 18-contact, optional. A. For manual intercom network. One per intercom network B. For button access to paging. One per paging system.	36-401-201
403A MUSIC-ON-HOLD	KTU, 18-contact, optional. One per system. Requires adapter panel for mounting.	36-403-201
405A EXCLUSION CARD	KTU, 20-contact, optional. One per two lines requiring exclusion. Requires adapter panel for mounting.	36-405-201
414A MANUAL TIE LINE	KTU, 20-contact, optional. Two per tie line, one at each key system. Requires adapter panel for mounting.	36-414-201
415A AUTOMATIC TIE LINE	KTU, 18-contact, optional. Two per tie line, one at each key system.	36-415-201
416A STATION LINE	KTU, 20-contact, optional. One per remote two wire telephone. Requires adapter panel for mounting.	36-416-201
307A DIAL-SELECTIVE INTERCOM	For nine rotary dial stations. Can be arranged for Tel-Touch and up to 18 stations.	36-307-101
357A DIAL-SELECTIVE INTERCOM	For nine rotary dial stations. Can be arranged for Tel-Touch and 18, 27, or 36 stations.	36-357-101
110-CX1 ANNOUNCE-A-CALL INTERCOM	For 10 rotary dial stations. Can be arranged for Tel-Touch and 20 or 30 stations. Equipped with a Call Announce/Tone PCB.	36-110-101
259B TWO-CARD PANEL	Adapter for two 18 or 20 pin KTUs. Factory wired.	36-259-101
359A ONE-CARD PANEL	Adapter for one 18 or 20 pin KTU. Factory wired.	36-359-101
182029-101 FOUR-CARD PANEL	Adapter for one to four 18 pin KTUs.	36-029-101

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adding one 185731-101 intercom expansion PCB for each additional 10 stations. It can be arranged for Tel-Touch dialing by adding a 183981-101 Tel-Touch adapter PCB. The 110-CX1 intercom unit provides dial tone and ringback tone to the calling station, and sends interrupted ringing to the called station. This intercom unit provides built-in call announce service.

Note: When ordered as part of the 501A KSU, the 110-CX1 dial intercom KTU does not include a call announce/tone PCB.

E. Multiline Exclusion KTU

2.28 The 405A multiline exclusion KTU can be used to provide privacy on outside calls. This KTU requires a 20-contact card panel adapter for mounting. It permits a station to temporarily disconnect other stations in the system from one or two selected CO/PBX lines. One 405A KTU is required for each two CO/PBX lines to be excluded.

Note: In a system where the stations to be excluded are equipped with multibutton exclusion telephones, the 405A KTU is not needed to provide the line exclusion feature.

F. Tie Line KTUs

2.29 Two types of tie line KTUs are available for use in the 501A KSU. These are the 414A manual ringdown tie line KTU and the 415A automatic tie line KTU.

2.30 The 414A tie line KTU provides for direct two-way communications between key telephones in two separate key systems. One KTU is required at each key system for one tie line. This KTU requires a line pickup key and a signaling button at the assigned station. It requires a 20-contact card panel adapter for mounting.

2.31 The 415A automatic tie line KTU provides automatic signaling and a transmission path between key telephones in two separate key systems. One 415A KTU is required at each key system. The 415A KTU mounts into any card connector on the 501A KSU and requires one line pickup button on the assigned telephone.

G. Station Line KTU

2.32 The 416A station line KTU permits signaling and talking on a line between a key system and a distant station. Signaling to the distant station is manual. Signaling from the distant station is automatic. This KTU mounts into a 20-contact card connector on a card panel adapter. One KTU is required per station line.

H. Off-Premises Line KTU

2.33 The 346A off-premises line KTU is used in the 501A KSU to permit the use of standard two-wire telephones. It can be used for connecting on-site or off-premises extensions. In a 501A system arranged for manual intercom service, the 346A KTU is used to connect single-line telephones to a designated CO line. In a system arranged for dial intercom service, the 346A KTU is used to connect single-line telephones as intercom stations. A maximum of six single-line telephones can be connected in parallel to one 346A off-premises KTU.

J. Card Panel Adapters

2.34 Some of the 400 type KTUs that can be used in the 501A KSU require card panel adapters for installation. Card panel adapters that can be used with the 501A KSU are:

(a) One-card panel 359A.

(b) Two-card panel 259B.

(c) Four-card panel 182029-101.

2.35 These adapter panels can be mounted on the swing-out equipment frame of the 501A KSU, or they can be mounted on the MDF near the KSU. For information concerning the adapter panels, refer to the documents listed in Table C.

STATION APPARATUS

2.36 Station equipment such as telephones and call announcers for the 501A KSU are described in the following paragraphs.

A. Single-Line Telephones

2.37 In the 501A KSU, a single-line telephone can be used as an intercom station, or as a station dedicated to a CO/PBX line. Such