



**Telecommunications Division**

1972

## *ITT PRACTICE 30-601-100, Issue 1* **601A KEY SERVICE UNIT**

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# A Small Key System With Big System Features



## The ITT 601

No matter what business you're in, the telephone can be one of your most valuable tools. And for the small business, the ITT 601 key telephone system is unbeatable.

It gives you standard key system features, such as multiple lines with call holding and visual signals to indicate the status of each line.

It also can give you dial intercom with dial tone, ringback tone, repeated ringing at the called station, and call announcing with handsfree answer-back—plus paging access, off-premise stations, and even music-on-hold.

So even if you're starting out with only a couple of phones and one or two lines, you don't have to be without the features you want. The 601 gives you these big-system features--yet the equipment cabinet takes up less space than a typewriter.

*Multiline Access.* The 601 has a capacity of 5 lines and 10 telephones. Each telephone has access to any or all lines, giving you maximum flexibility in making and answering outside calls.

*Visual Signals.* Lamps at each phone indicate the status of all lines, whether idle, busy, on hold, or with an incoming call. Each condition has a different lamp indication. Lamp signals assure prompt and correct answering of incoming calls, avoid interruptions of calls in progress, and allow full use of all lines.

*Dial Intercom.* With dial intercom, you can talk with someone at any other station in the system by dialing their intercom number. Intercom can have dial tone, ringback tone, and repeated signaling at the called station. It can be adapted for pushbutton dialing if pushbutton-dial phones are used.

*Call Announcing with Handsfree Answer-Back.* With call announcing, intercom stations are signaled by tone-and-voice instead of by buzzer or ringer. When a station is called, a pleasant tone is emitted from the call announcer and is followed by a message from the caller. The called party can then converse through his call announcer--handsfree--from several feet away--or he may use the handset for a more private conversation. When the handset is used, the call announcer turns off. And you can choose telephones with a built-in call announcer or standard key telephones and separate call announcers.

*Mixed Signaling.* A system can be mixed with up to 5 call announcer stations and up to 5 buzzer or ringer stations.

*Manual Intercom.* Private intercom can be provided between two stations. For example, between an executive and a secretary.

*Access to a Public Address System for Voice Paging.* The 601 can be equipped to allow someone at any telephone to page through their public address system by pushing a button or by dialing an intercom number.

*Music-on-Hold.* When a call is put on hold, music is automatically transmitted to the distant party assuring them they have not been disconnected.

*Off-Premise Stations.* Single line phones at distant locations can have access to dial intercom or to a predetermined outside line.

*Busy-Station Lamp Display.* The central answering location can be equipped with a lamp display that shows at a glance which stations are busy.

*And It Uses Standard Key Telephones.* The 601 uses standard key telephones, which are available in a selection of styles and colors.

*Small Size.* The 601 cabinet is compact and attractive so it may be conveniently mounted on an office wall or in a concealed location. Approximate dimensions are 15 inches high, 8 inches wide, and 7 inches deep.

Product specifications subject to change.

**Telecommunications Corporation**



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**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).

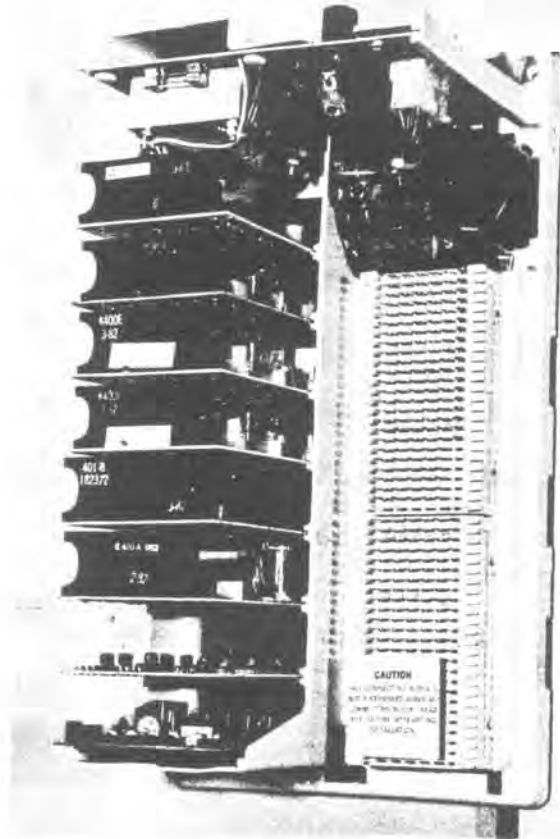


Figure 1: 601A Key Service Unit

## 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.
- (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).

## 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: 8¾ 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).

## 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.  <b>NOTE: A system may be mixed; five stations signaled by call announcing and five by buzzers (or ringers if a ringing generator is used).</b>
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.  <b>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).</b>
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.

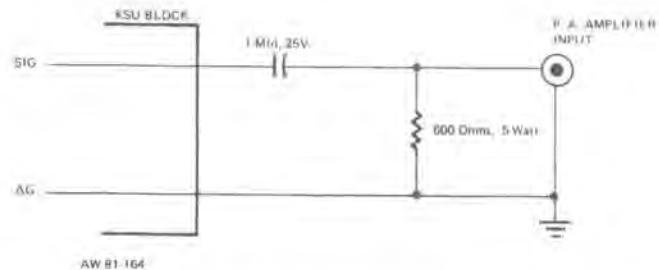


Figure 2: Wiring Connections for Voice Paging With A System Using All Call Announcers

## 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

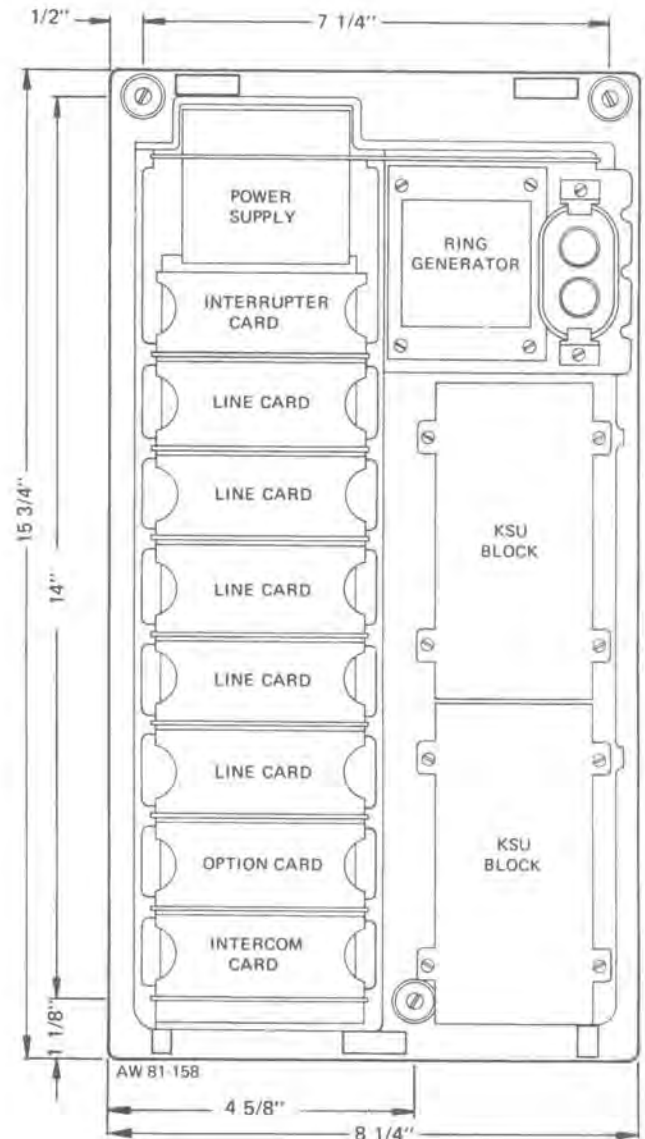


Figure 3: Dimensions, 601A KSU

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.

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

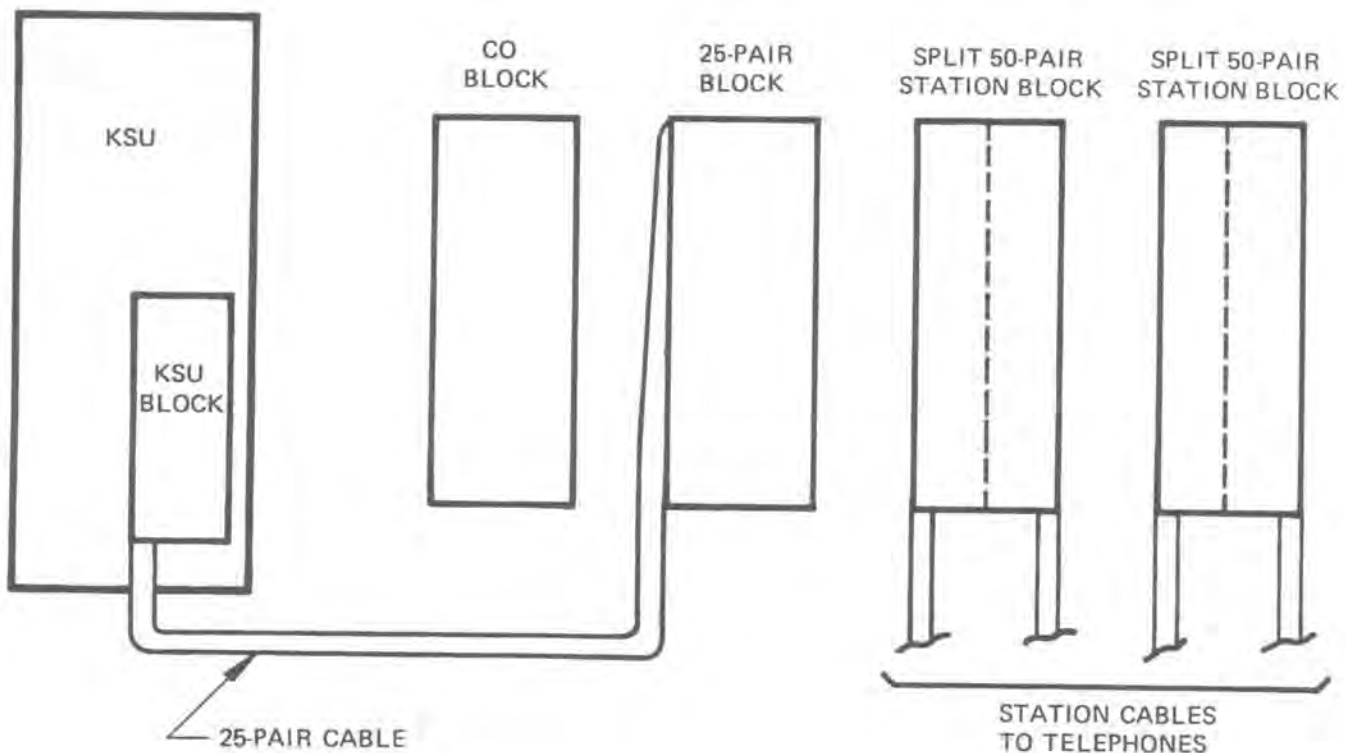
**4.06** Mount the KSU on a wall with three bolts or screws. (Be sure the power cord is in place.) Install key system ground using a 14-gauge copper

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 of-

fice 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 COR T R A A1 LG L RC RG	WH-BL BL-WH WH-OR OR-WH WH-GN GN-WH WH-BN BN-WH WH-SL SL-WH	COT COR T R A A1 LG L RC RG	WH-BL BL-WH WH-OR OR-WH WH-GN GN-WH WH-BN BN-WH WH-SL SL-WH
2	COT COR T R A A1 LG L RC RG	RD-BL BL-RD RD-OR OR-RD RD-GN GN-RD RD-BN BN-RD RD-SL SL-RD	COT COR T R A A1 LG L RC RG	RD-BL BL-RD RD-OR OR-RD RD-GN GN-RD RD-BN BN-RD RD-SL SL-RD
3	COT COR T R A A1 LG L RC RG	BK-BL BL-BK BK-OR OR-BK BK-GN GN-BK BK-BN BN-BK BK-SL SL-BK	COT COR T R A A1 LG L RC RG	BK-BL BL-BK BK-OR OR-BK BK-GN GN-BK BK-BN BN-BK BK-SL SL-BK
4	COT COR T R A A1 LG L RC RG	YL-BL BL-YL YL-OR OR-YL YL-GN GN-YL YL-BN BN-YL YL-SL SL-YL	COT COR T R A A1 LG L RC RG	YL-BL BL-YL YL-OR OR-YL YL-GN GN-YL YL-BN BN-YL YL-SL SL-YL
5	COT COR T R A A1 LG L RC RG	VI-BL BL-VI VI-OR OR-VI VI-GN GN-VI VI-BN BN-VI VI-SL SL-VI	COT COR T R A A1 LG L RC RG	VI-BL BL-VI VI-OR OR-VI VI-GN GN-VI VI-BN BN-VI VI-SL 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	801A CONNECTION BLOCK		COMMENTS	
		ROW	TERMINAL		
Line 1	CO/PBX Line	T1	1	1	Direct Ring Lead
		R1	2	1	
		DR1	1	2	
	Station Connections	1T	3	1-5	One Conn. Per Station
		1R	4	1-5	
		1A	5	1-5	
		A1	6	1-5	
		LG	6	1-5	
		1L	7	1-5	
		RC	2	5	
RG		2	4		
Line 2	CO/PBX Line	T2	8	1	
		R2	9	1	
		DR2	8	2	
	Station Connections	2T	10	1-5	One Conn. Per Station
		2R	11	1-5	
		2A	12	1-5	
		A1	13	1-5	
		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	One Conn. Per Station
		3R	18	1-5	
		3A	19	1-5	
		A1	20	1-5	
		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	One Conn. Per Station
		4R	29	1-5	
		4A	30	1-5	
		A1	31	1-5	
		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	One Conn. Per Station
		5R	36	1-5	
		5A	37	1-5	
		A1	38	1-5	
		LG	38	1-5	
		5L	39	1-5	
		5RC	34	5	
5RG		34	4		
Dial Intercom	Station Connections	T	42, 44	1-5	Use with call announcing card only
		R	43, 45	1-5	
		A	1-10	6	
		LG	A1/LG	1-5	
		L	47, 49	1-5	
		RT	40, 41	1-5	
Call Announce	Station Connections	AB	46, 48	1-5	Connect AB to 27-6 Connect 26-6 to 29-6
		RESET	22, 23	1-5	
		GROUND	24	1-5	Any ground will suffice Signal path, stations 10-19*
RT	40, 41	1-5			

\*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.

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	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 Lamp	LG	YL-GN	43	YL-GN	35	—	—
—	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 DESIG- NATION	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

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**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.

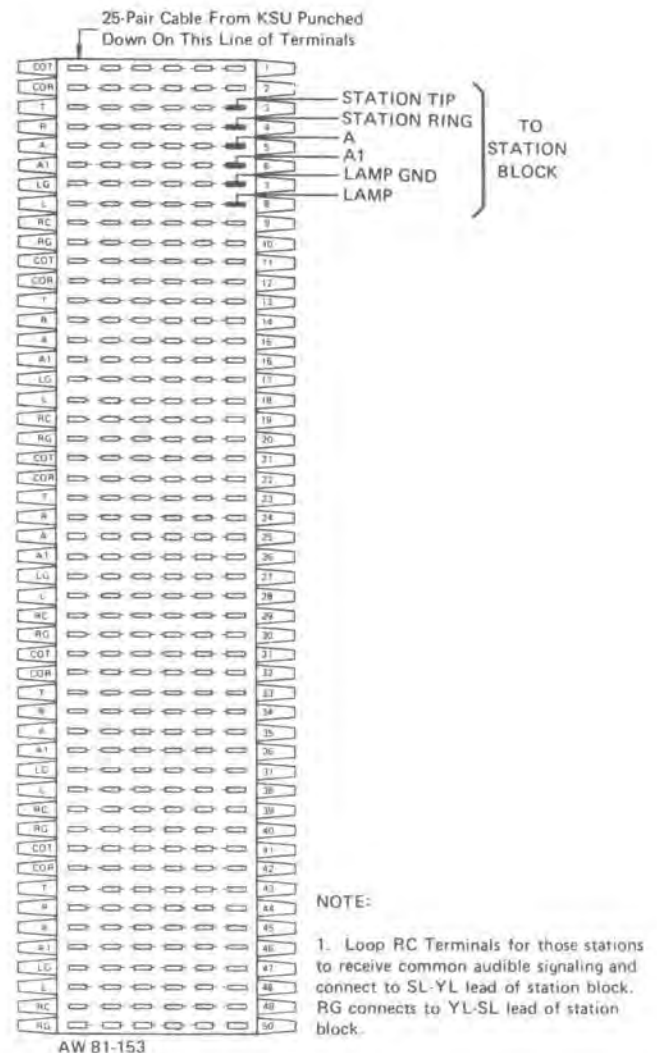


Figure 5: Station Cross-Connections

**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.

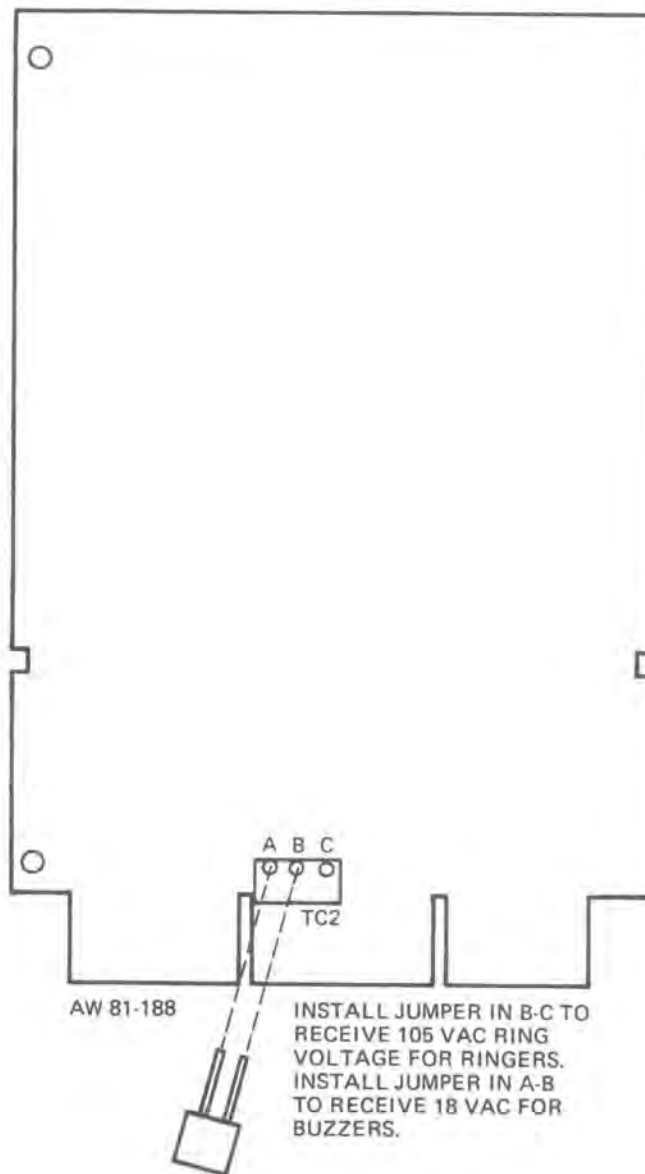


Figure 6: Interrupter Card

## 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)

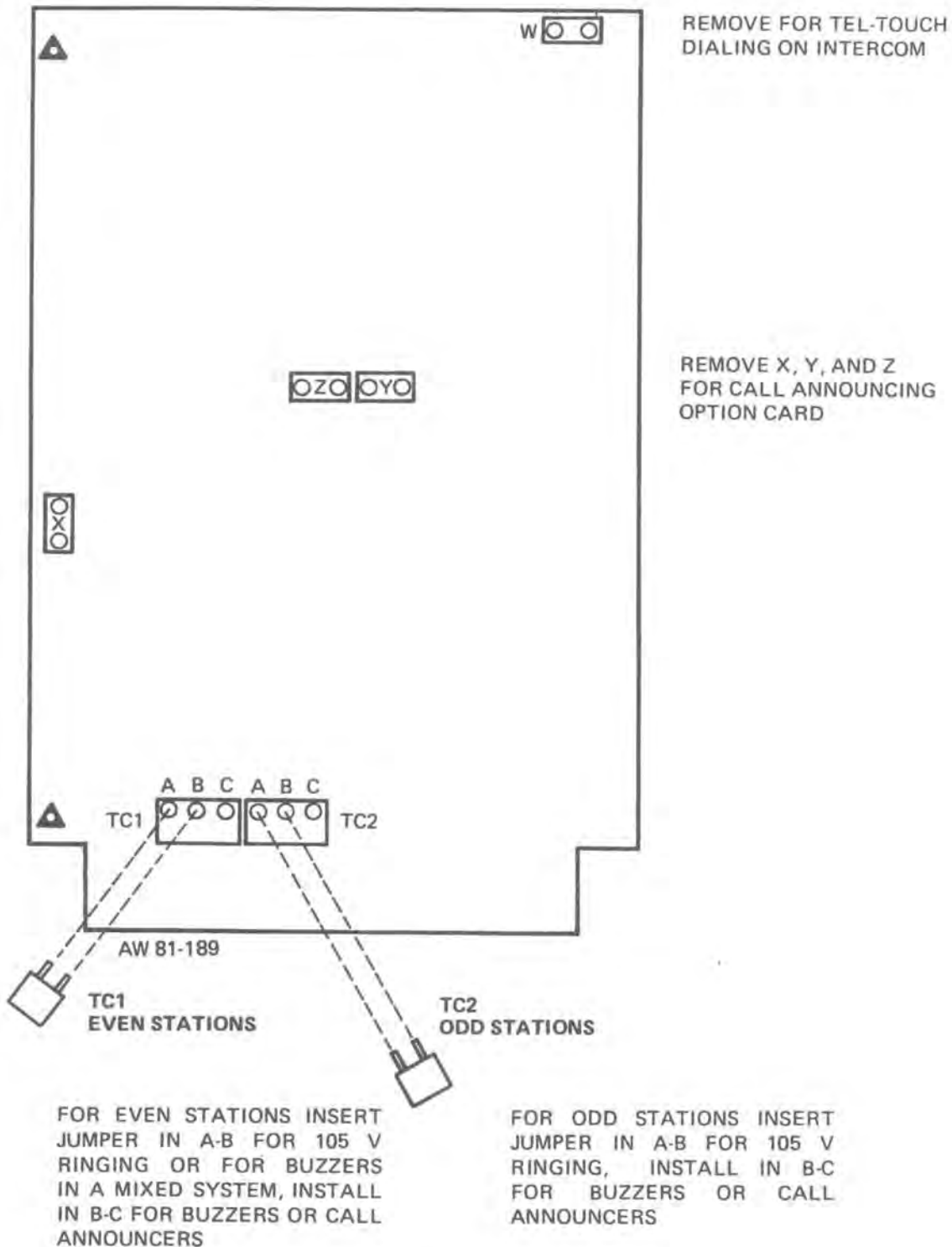
**6.02** To install dial intercom with buzzer signaling only, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 8 and Table H.

*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

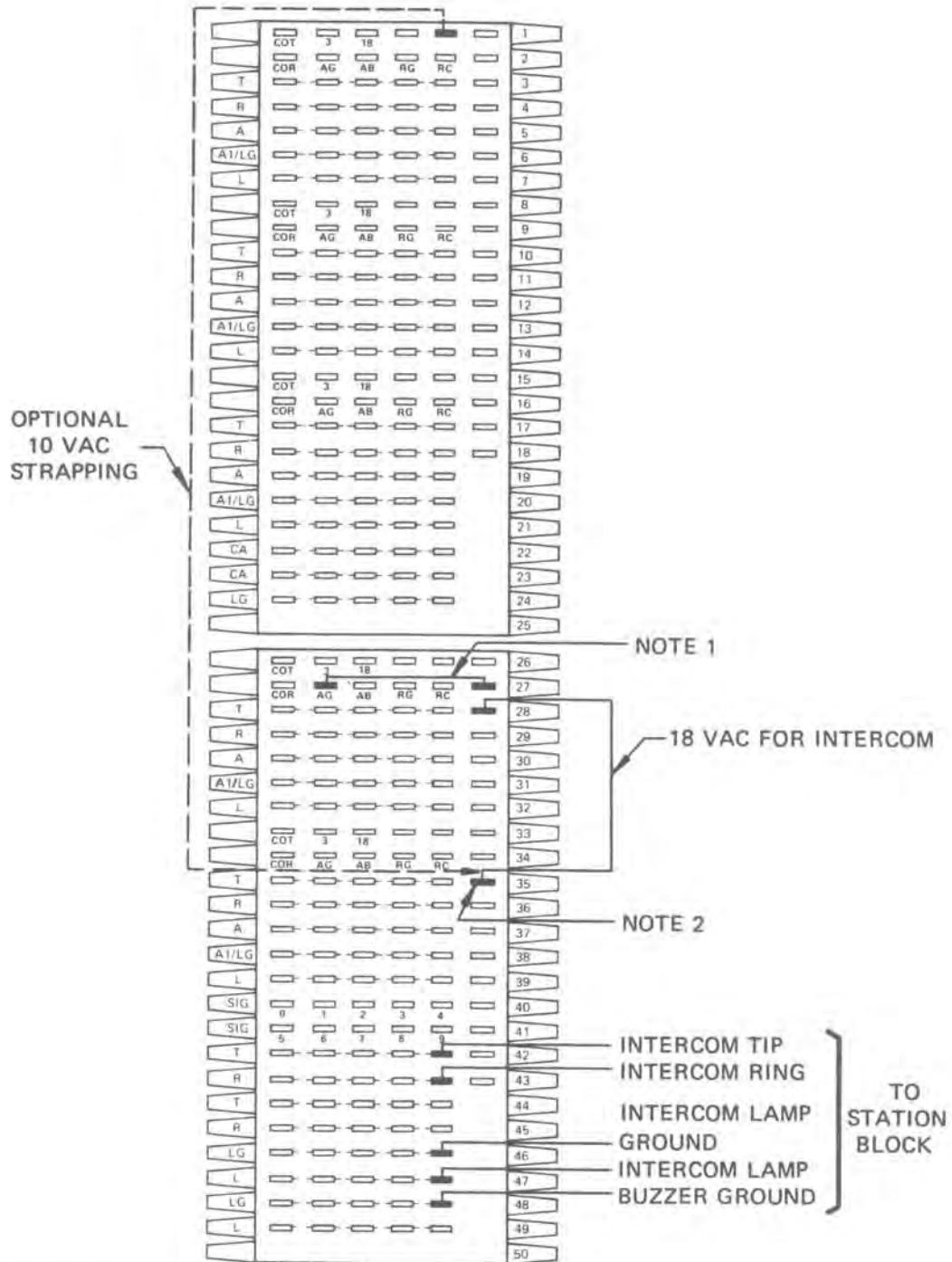
FROM		TO	
ROW	TERMINAL	ROW	TERMINAL
28	6	35	6
27	6	Any AG Terminal	

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:

AW 81-190

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

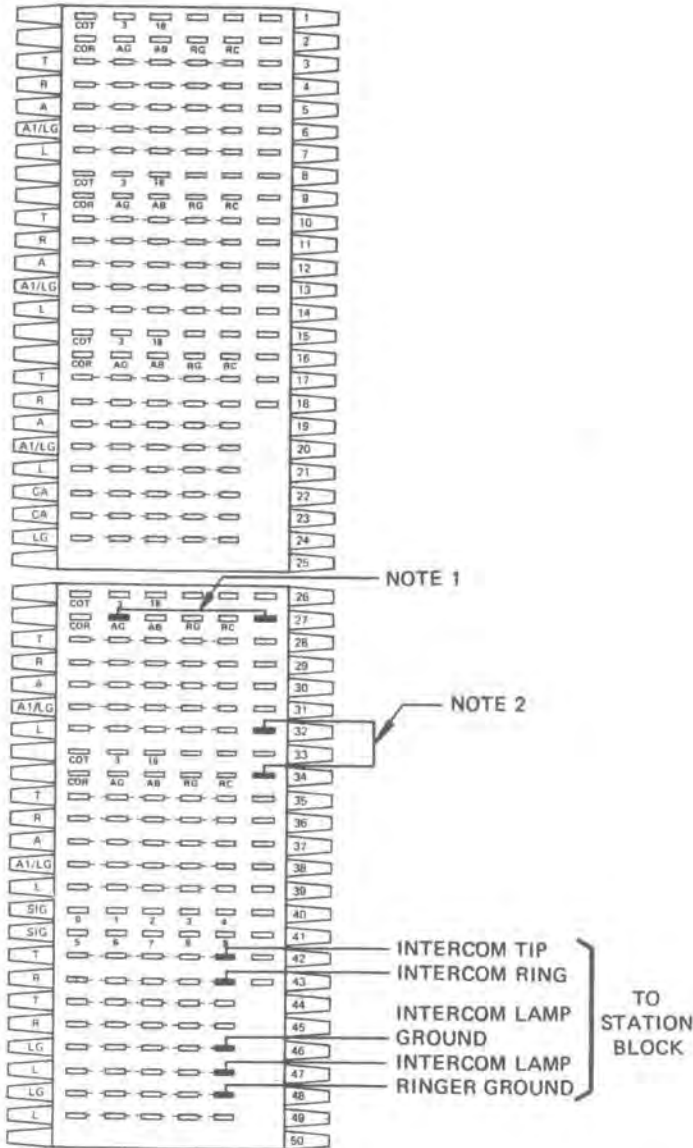
6.03 To install dial intercom with ringer signaling only, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 9 and Table J.

*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 34, Terminal 6 for 105 VAC on intercom.
3. Connect ringer signal lead to the proper SIG terminal.

Figure 9: Dial Intercom, Ringer Signaling

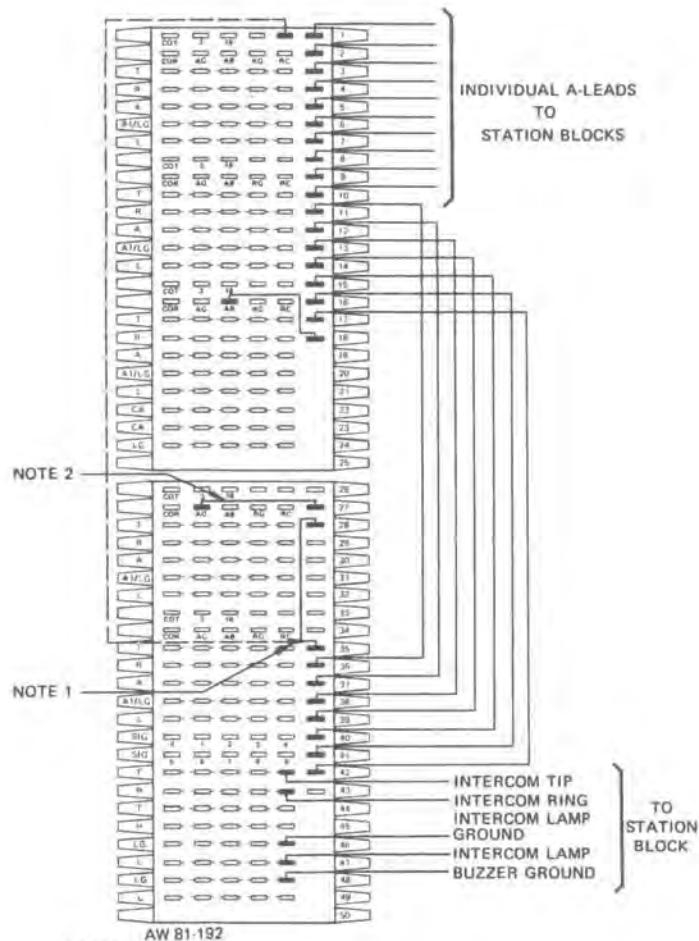
**6.04** To install dial intercom with buzzer signaling and ringback tone and dial tone, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 10 and Table K.

*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

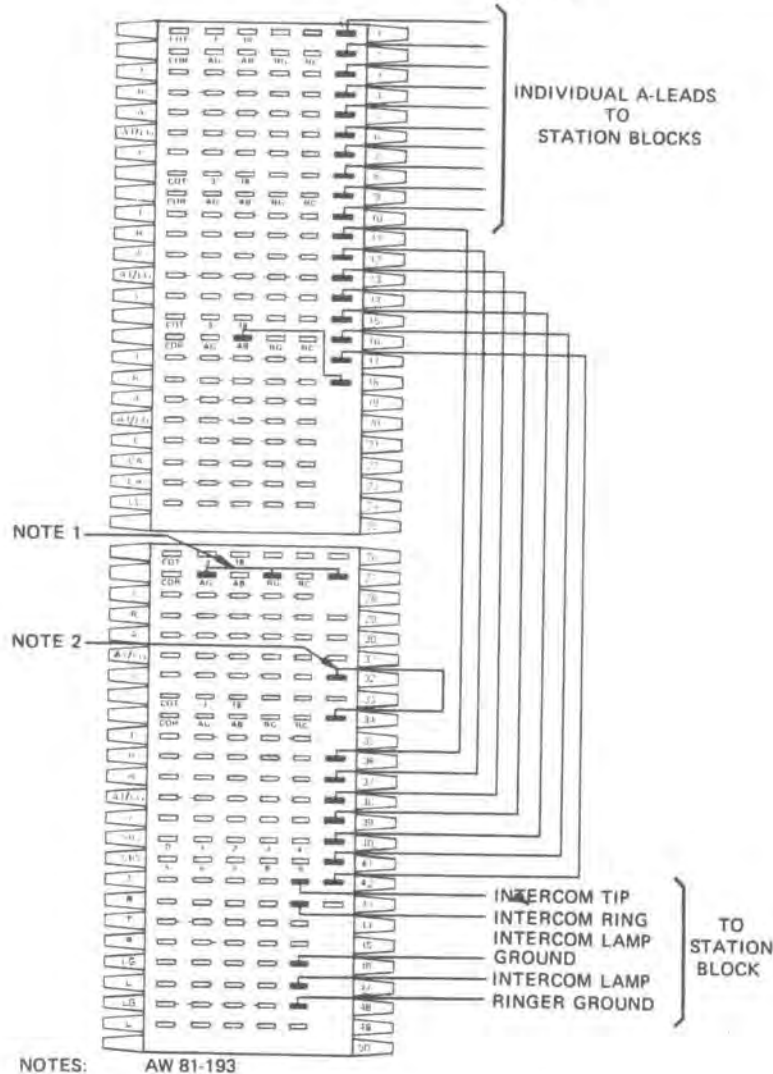
6.05 To install dial intercom with ringer signaling and ringback tone and dial tone, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 11 and Table L.

*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

AW 81-179



NOTES: AW 81-193

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

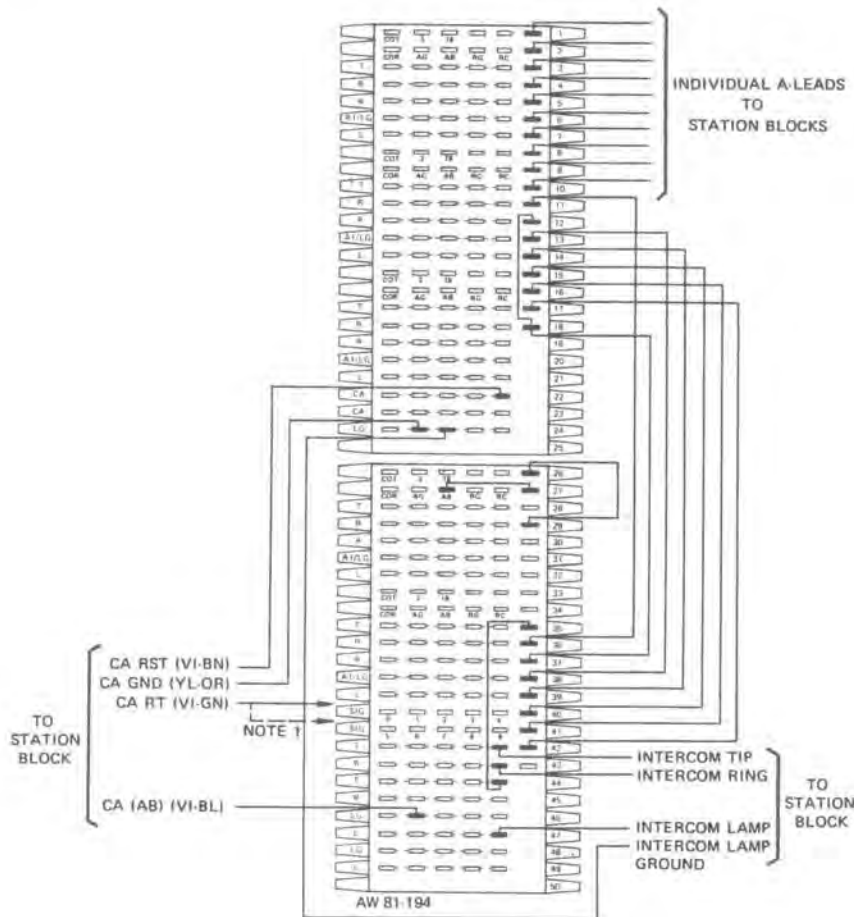
**6.06** To install dial intercom using all call announcers for signaling with dial tone and tone burst, make the appropriate station connections (paragraph 6.01). Install jumpers on the KSU block as shown in Figure 12, paragraph 6.07 and Table M.

**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

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

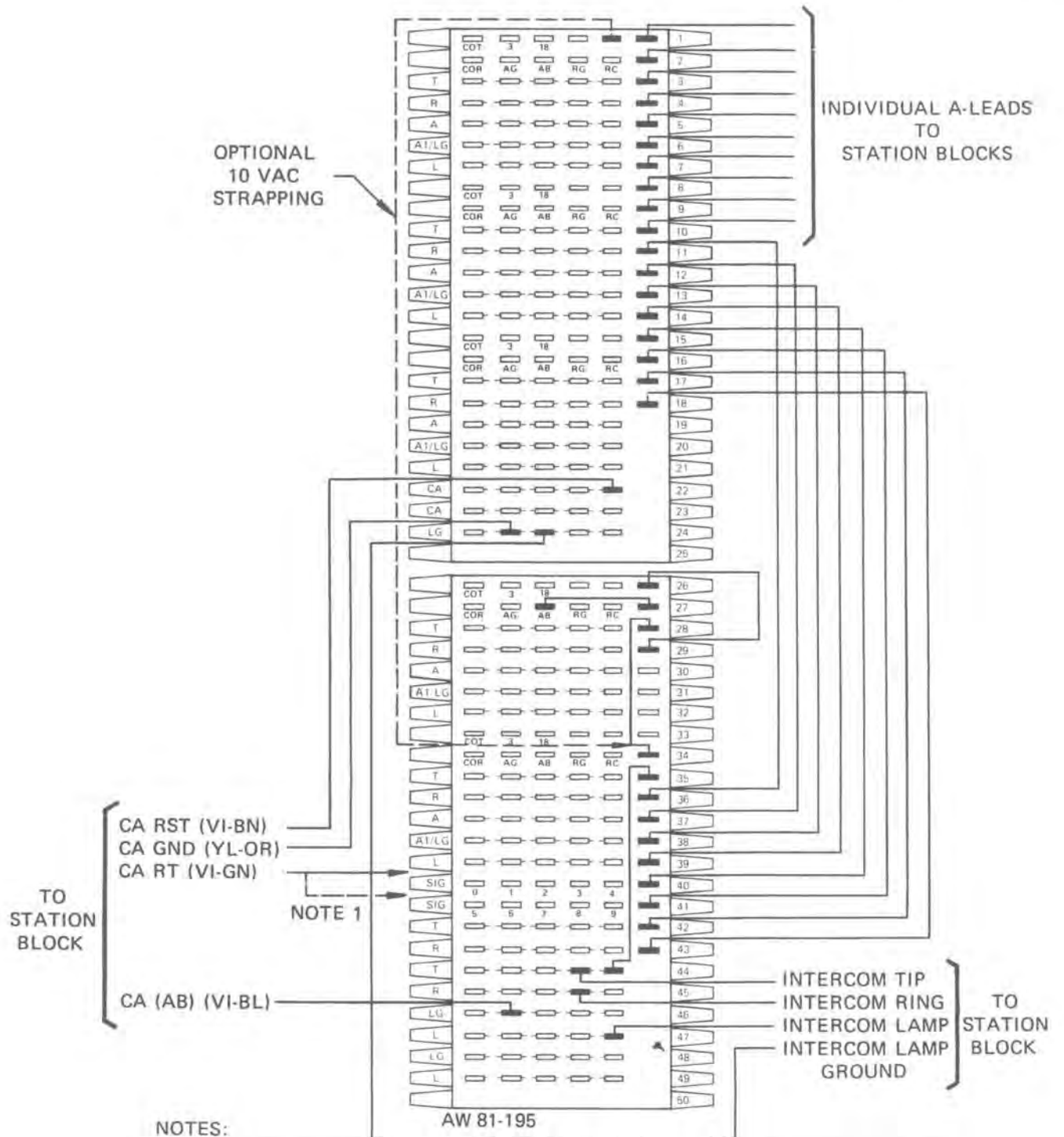
lead of the station block, from Row 46 or 48, Terminal 1-5 to the VI-BL lead of the station block, and from the appropriate SIG terminal to the VI-GN lead of the station block. (Refer to call announce instructions in paragraph 7.01.) Call announcers are connected to odd SIG terminals and ringers are 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.

#### 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.*

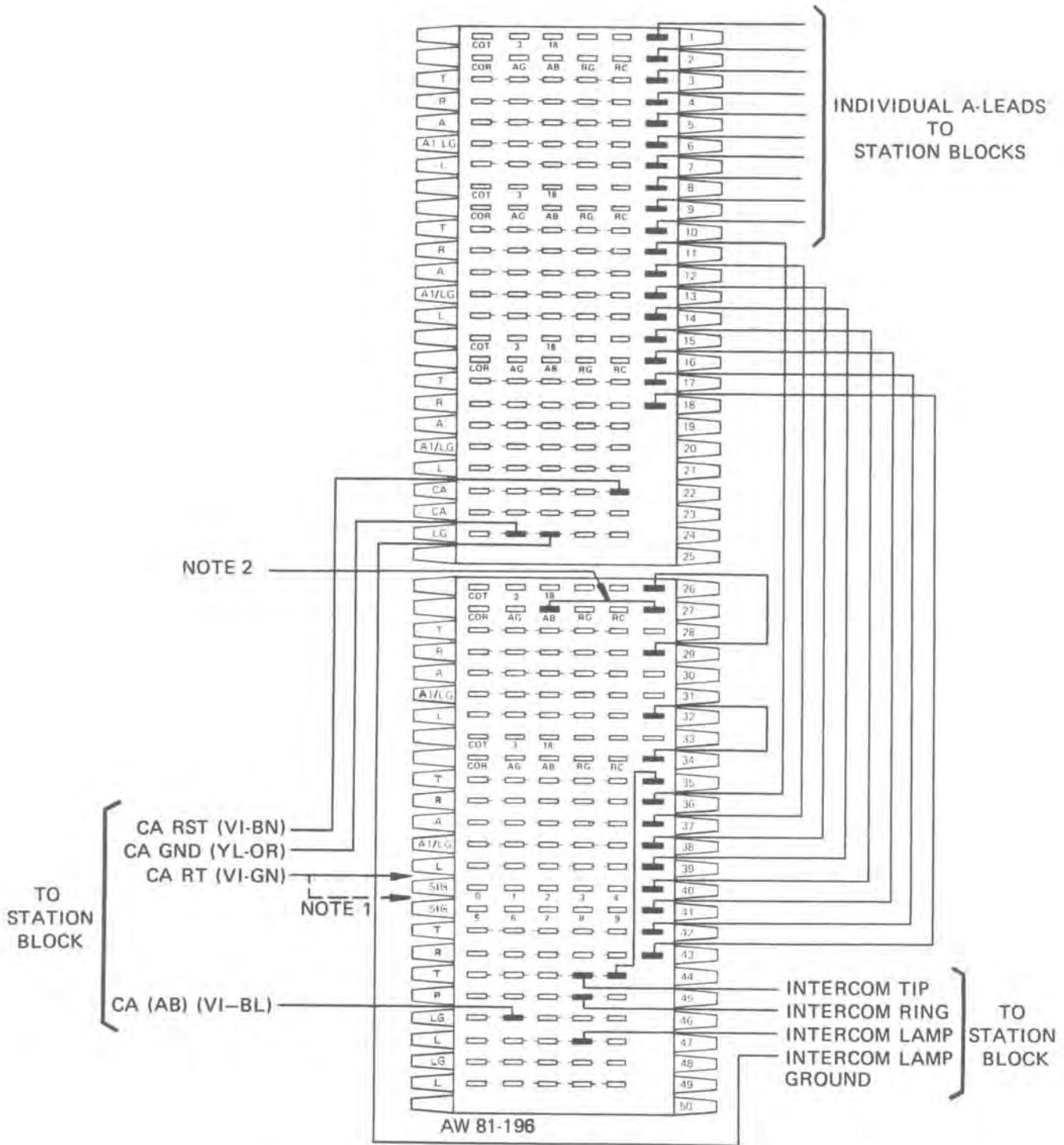
- Unplug power cord.
- Insert intercom card with straps X, Y, and Z in place. (See Figure 7.)
- Plug in power cord.
- With a meter, measure -19 VAC from Row 37, Terminal 6 to any AG terminal. If -19 V is measured, unplug power cord and remove the intercom card.
- Remove X, Y, and Z straps.
- Insert intercom card.
- Refer to Figure 15 and strap the call announcer card as required. Insert the card in the option slot.
- 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) AB (-24 VDC)	33 (YL-OR) 41 (VI-BL)	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)	Row 40 and 41, Terminal 1-5 assigned to that station.

AW 81-185

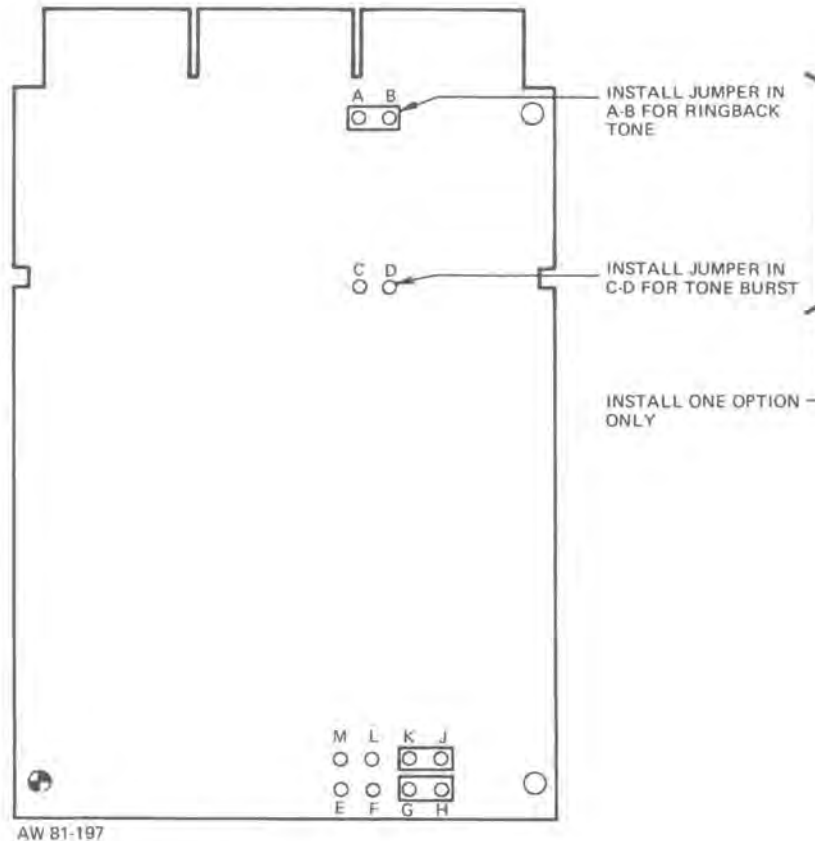


Figure 15: Call Announcer Card

**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:

- 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.
- 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.
- 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.
- 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.

- Remove the Red ringer lead from RR on terminal board. Tape and store lead.
- Remove the Black ringer lead from RT on terminal board. Tape and store lead.
- Connect the Green CA lead to RR on terminal board.
- 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 Pair	1	6	1	3
2		2	6	3	1-5
3	Second Output Pair	3	6	8	3
4		4	6	10	1-5
5	Third Output Pair	5	6	15	3
6		6	6	17	1-5
7	Input Pair	7	6	Music Source	
8		8	6		
9	-24 Vdc	9	6	2*	3
10	-	10	6	NC	-
11	Ground	11	6	2*	2
12		12	6	NC	-
13	Fourth Output Pair	13	6	26	3
14		14	6	28	1-5
15	Fifth Output Pair	15	6	33	3
16		16	6	35	1-5
17	Sixth Output Pair	17	6	NC	-
18		18	6	NC	-

\*These may be any available AB and AG pins.

**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.)

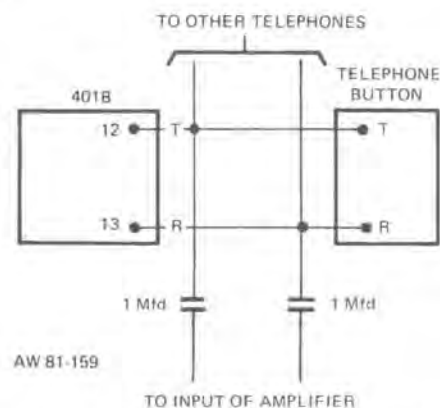


Figure 16: Schematic, Button-Accessed Paging

**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 transferred 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.)

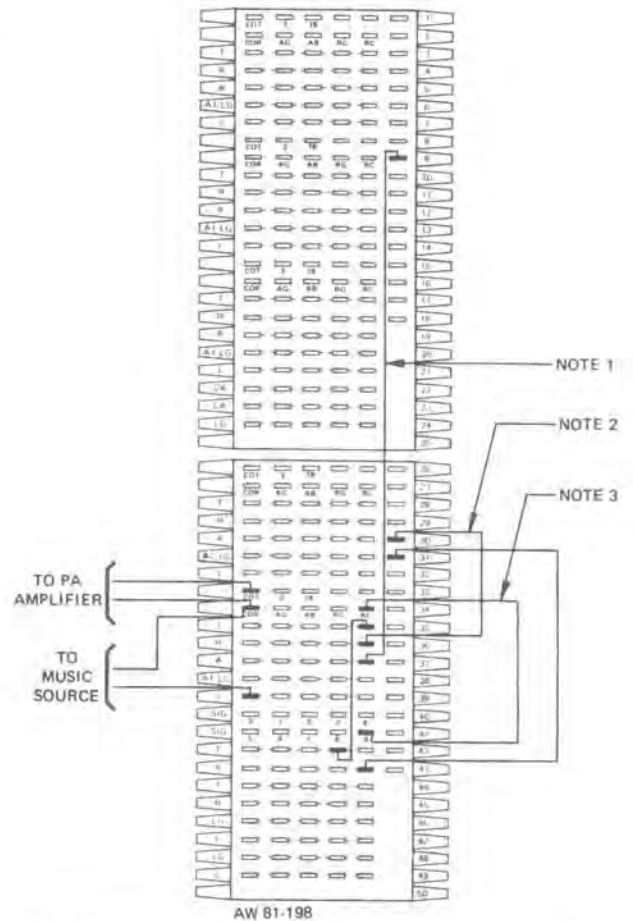
**11.02** Installation procedures for paging equipment and connections are given in the following paragraphs.

**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 6). 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.

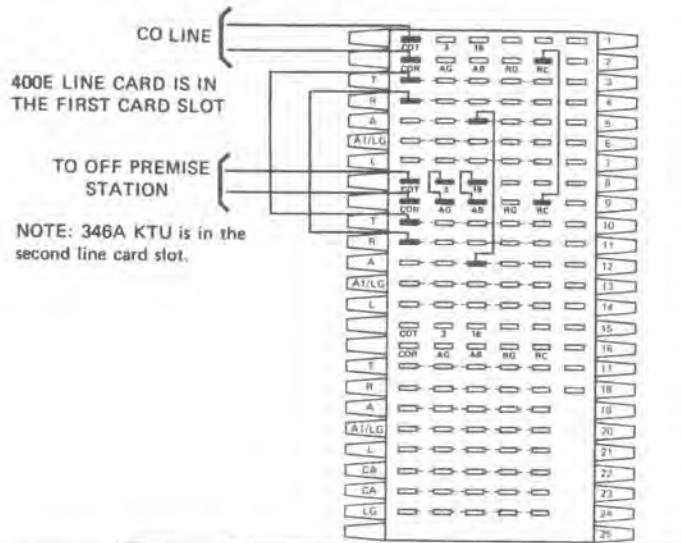
12.02 Install the 346A KTU in a line card position. Make connections as shown in Table V. (See Figure 18.) If connected to a CO line, the 346A KTU should be installed in a line card position adjoining the line card it is being connected to.

**SIGNALING OPTIONS**

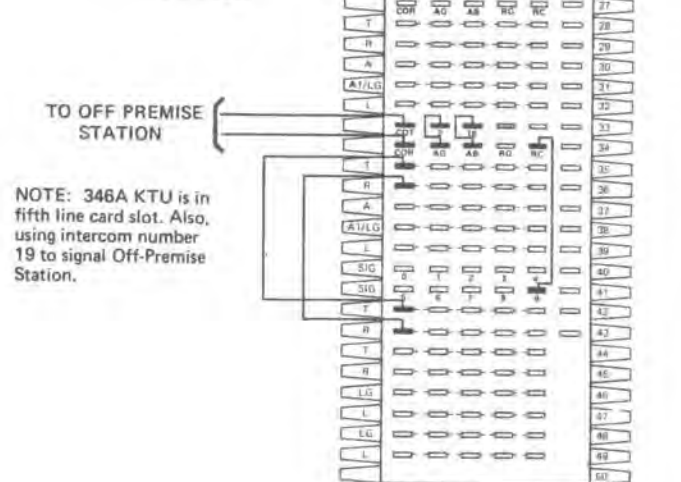
12.03 Signaling options are as follows:

- (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.

**LINE CARD EXTENDER APPLICATION**



**INTERCOM APPLICATION**



AW 81-199

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
<b>LINE CARD EXT.</b>		
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
<b>INTERCOM APPLICATION</b>		
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.

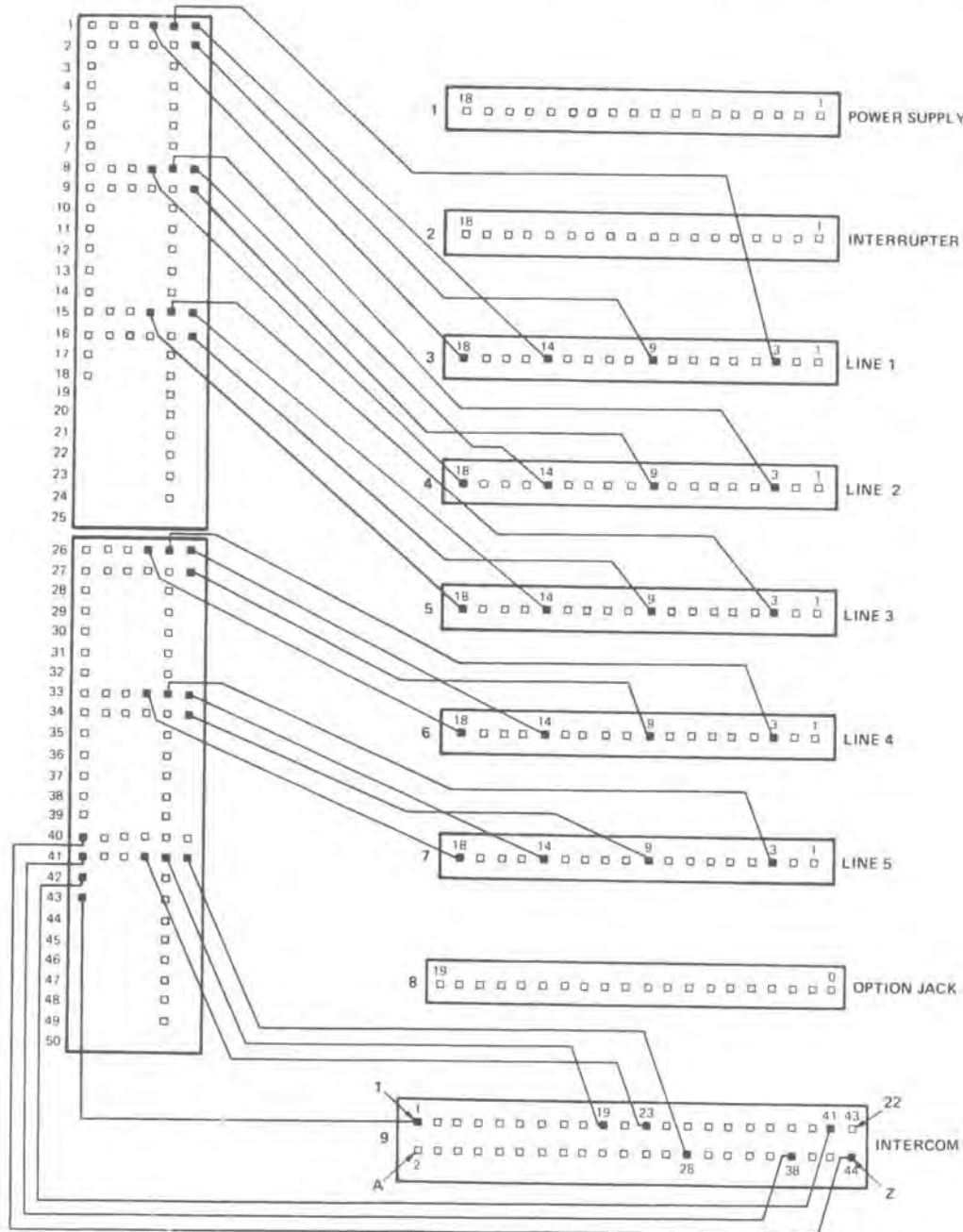
**13.04** Refer to the related documents of the cards shown if additional information such as the card schematic or circuit logic is required.



14. INTERNAL WIRING

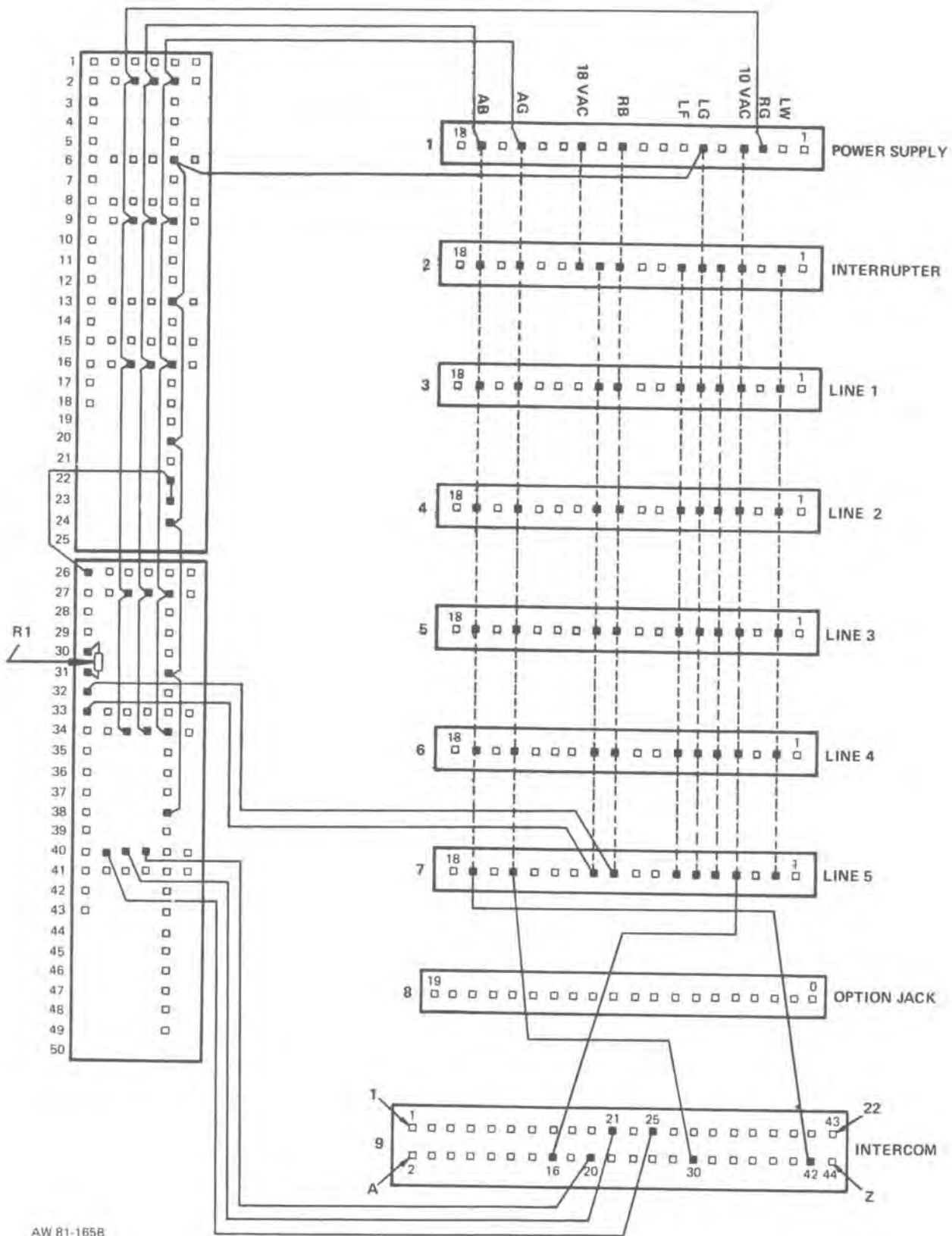
14.01 The Internal Wiring diagrams shown in Figures 20, 21, 22, 23, and 24 are intended to be used as reference material when questions arise concerning factory wiring of the 601A KSU. It is important to note that these figures represent the KSU as

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.



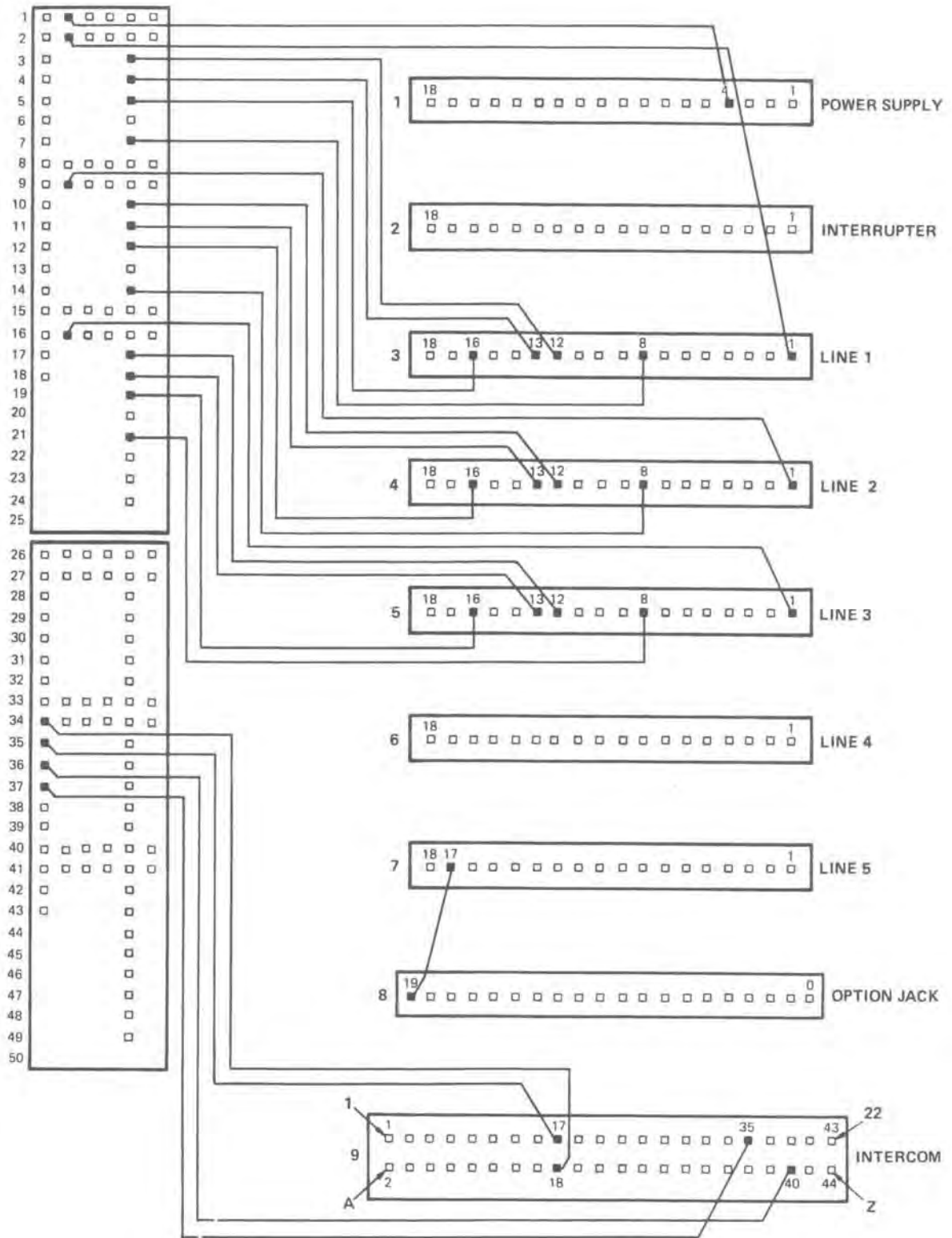
AW 81 155A

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



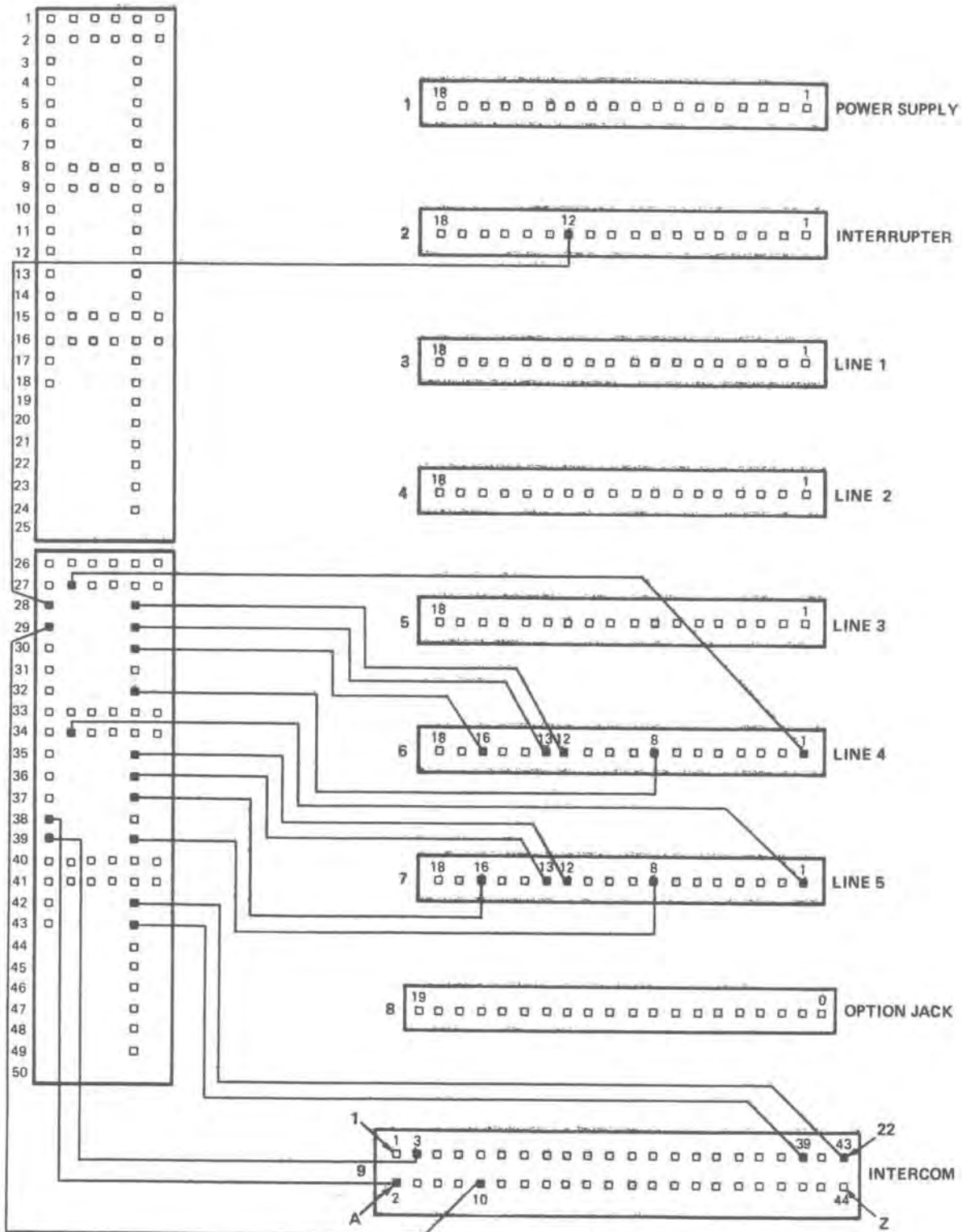
AW 81-165B

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



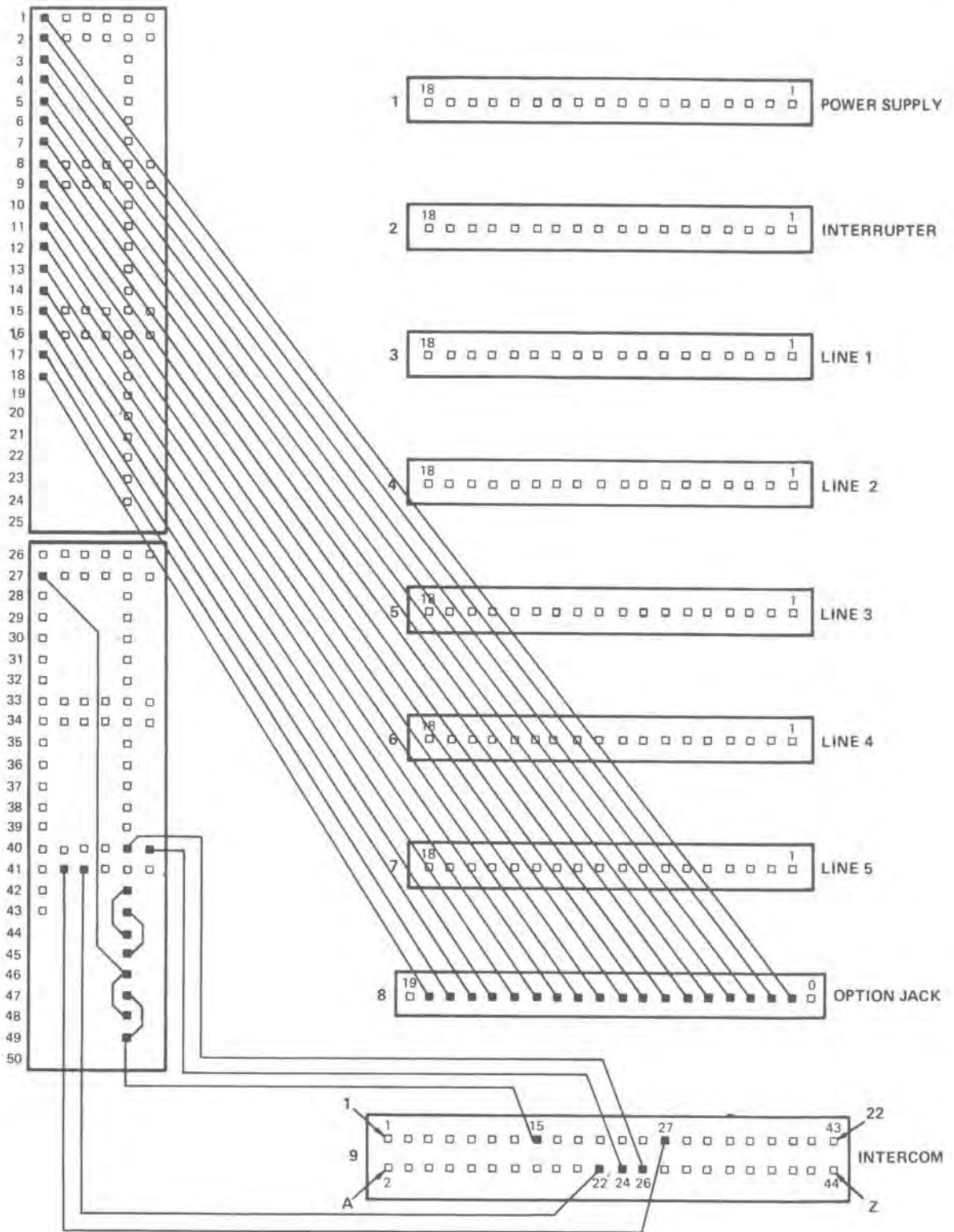
AW 81-165C

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



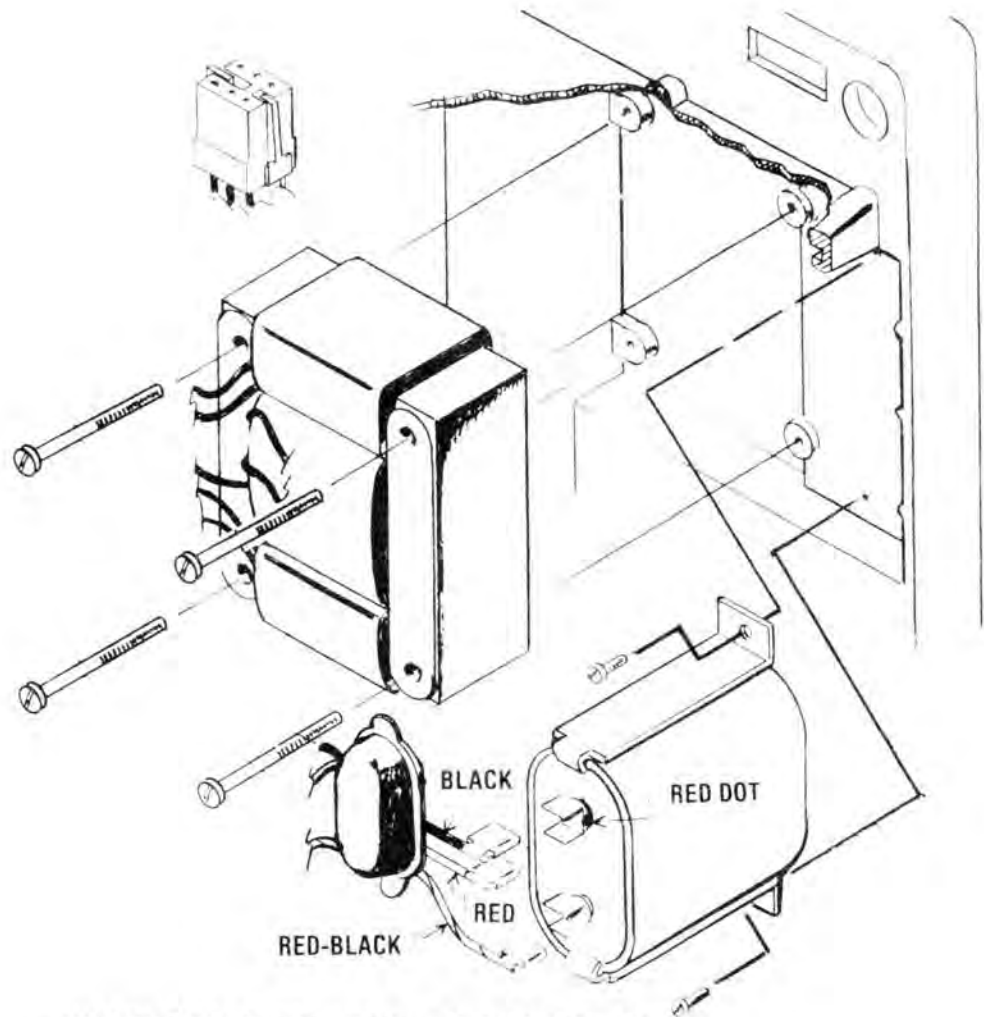
AW B1-165D

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



AW 81-165E

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



### INSTRUCTIONS FOR INSTALLING 184162-101 RING GENERATOR KIT IN A 601A KEY SERVICE UNIT

1. Unplug KSU power cord from wall outlet.
2. **Remove KSU cover.** Press upward on center section of bottom of cover to unlatch it, then swing bottom of cover slightly forward and lift cover off.
3. **Remove power supply.** Unplug power cord from power supply board; loosen ground terminal screw and disconnect ground wire; push the two plastic push-fasteners (on each side of the transformer) out; pull power supply board out.
4. **Install Ring Generator Transformer.** Place the ring generator transformer in position on the four bosses on KSU backboard and secure with four 1<sup>3</sup>/<sub>4</sub>-inch thread-forming screws. (Transformer wire leads should be toward your left as you face KSU.)
5. **Install Capacitor.** Position two metal brackets on capacitor as shown in figure and secure capacitor to KSU backboard with two short thread-forming screws.
6. **Install power supply.** Slide board into its slot; push two push-fasteners through two holes near front corners of power transformer and matching holes in KSU top panel.
7. Plug ring generator into 6-pin connector on power supply board.
8. Plug power cord into 3-pin connector on power supply board.
9. Connect power supply ground wire.
10. Plug power cord in 110 Vac wall outlet.
11. Install KSU cover. Slide cover on with bottom of cover tilted outward. When top of cover is in place, swing bottom in toward KSU until it snaps in place.

**184163-101**

**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 integrated 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.

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# 183965-101

## INTERRUPTER PCB

### (ABBREVIATED DESCRIPTION)

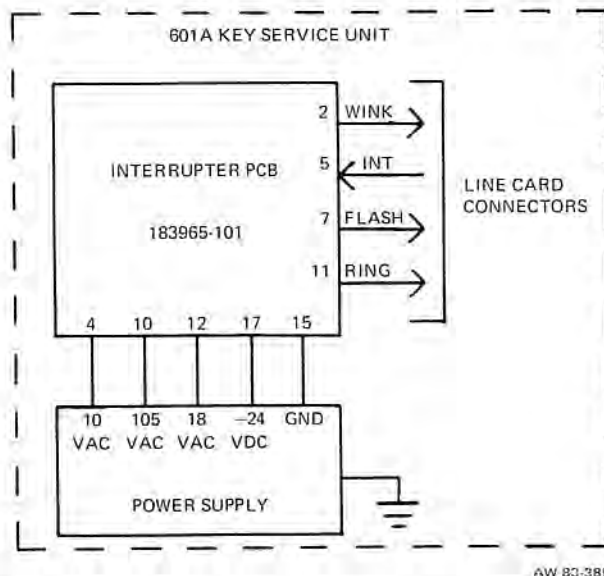


Figure 1: Block Diagram of Interrupter PCB and Associated Equipment

## 1. INTRODUCTION

1.01 This section briefly describes the ITT Interrupter PCB, P/N 183965-101. The document includes a general description, strapping instructions to enable operation, installation instructions, and a block diagram. For more detailed information and a circuit schematic, see Section 36-965-101.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

## 2. GENERAL DESCRIPTION

2.01 The 183965-101 PCB (Printed Circuit Board) is a plug-in, electronic interrupter circuit for use in 601A key telephone systems. The circuit interrupts lamp battery, 10VAC, from the key system power supply to provide the lamp flash and lamp wink signals for the system. It also interrupts ring battery (105VAC, 30Hz) or buzzer voltage (18VAC, 60Hz) to generate the audible signals for the system. One interrupter PCB is used in each 601A system to control the visual and audible signals for the key telephones.

2.02 Figure 1 is a block diagram of the interrupter PCB.

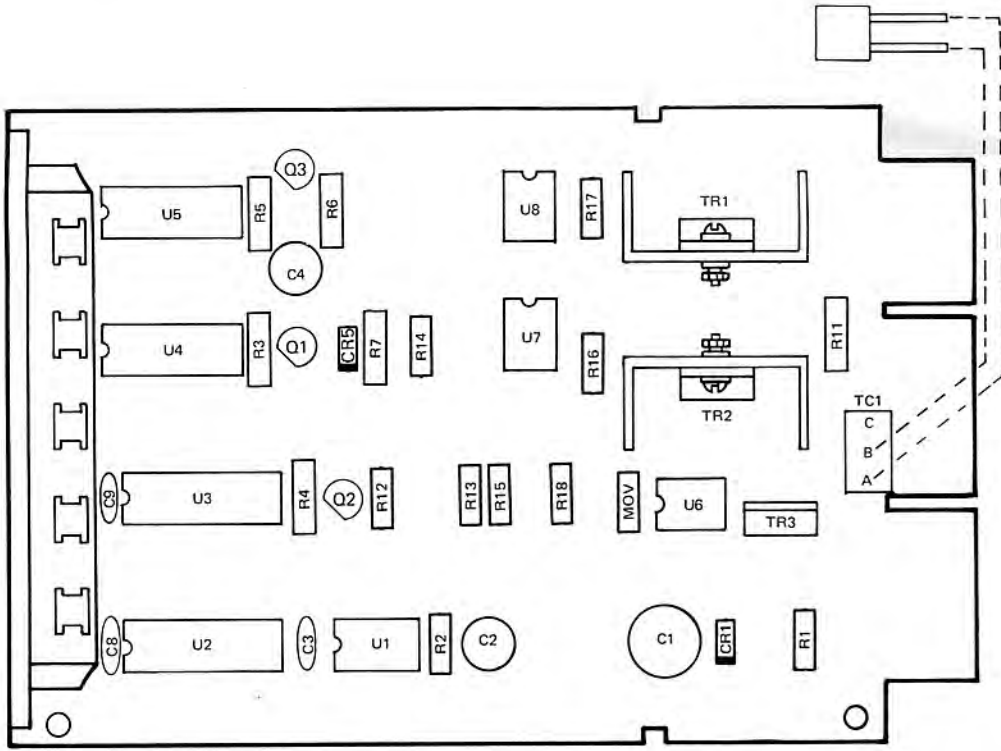
## 3. INSTALLATION

**Warning:** The interrupter PCB contains static-sensitive components. Personnel who may be required to handle the PCB or wiring must have knowledge of proper handling techniques and the necessary safeguard equipment for protecting static-sensitive components.

3.01 Strap the PCB as follows to determine the ring voltage output: (Refer to Figure 2.)

- (a) For 18 VAC output, strap A to B.
- (b) For 105 VAC output, strap B to C.

3.02 Install the 183965-101 interrupter PCB, component side up, into the second (from the top) connector of the 601A. Seat the card edge connector firmly, but gently into the mating connector. Note that the power-supply PCB plugs into the top connector and the interrupter is installed immediately below the power supply.



NOTE: Install jumper in B-C for 105 VAC ring voltage.  
Install jumper in A-B for 18 VAC for buzzer.

AW 83-302

Figure 2: Strapping For Interrupter PCB

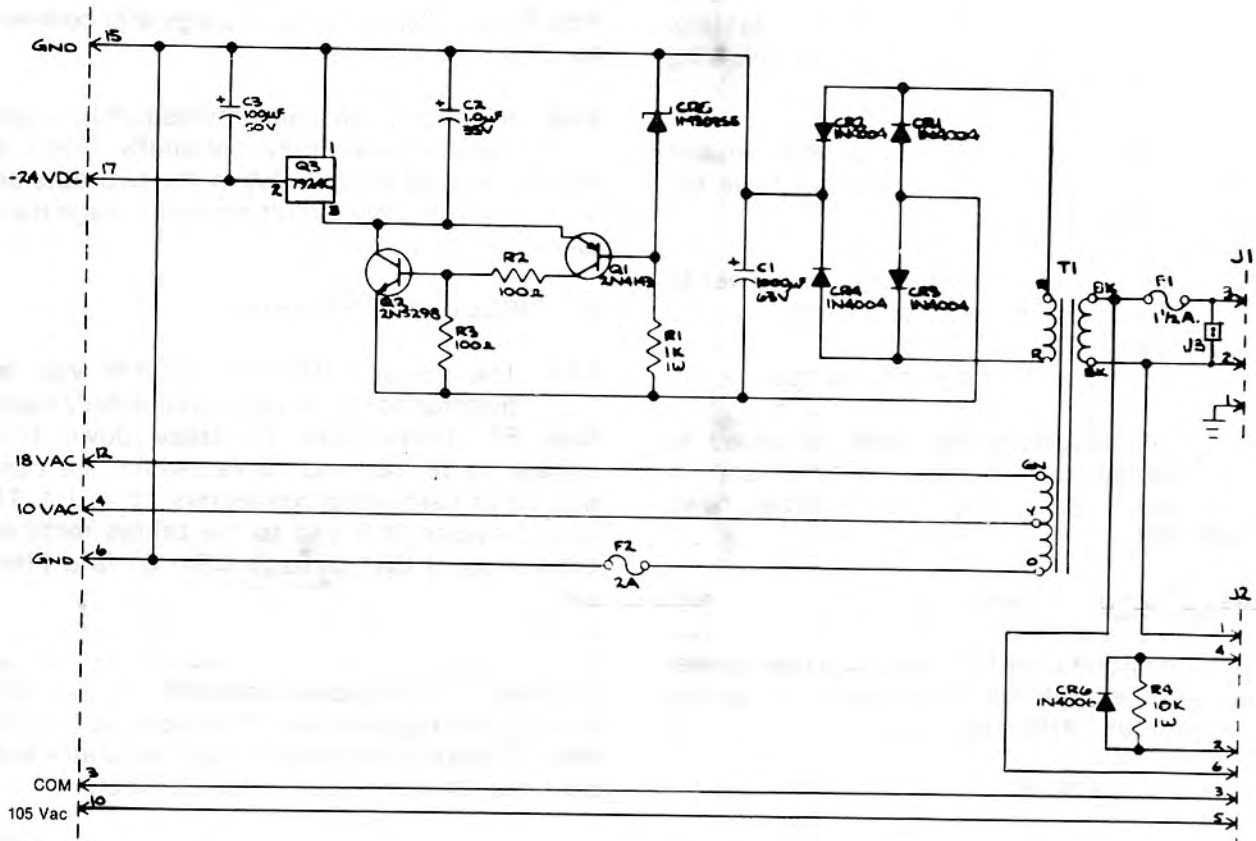


Fig. 1-Power Supply Schematic