DATA SET 207-TYPE
TRANSMITTER-RECEIVER
INSTALLATION AND CONNECTIONS

CONTENTS PAGE

1. GENERAL

1.01 This section contains instructions for connecting and installing the Data Set (DS) 207-type. This section also contains instructions for installing and connecting Data Auxiliary Set (DAS) 804M-type to DS 207.

1.02 This section is reissued to add information taken from a previous addendum and to add information concerning the installation and connection of DAS 804M.

1.03 Data Set 207-type is designed to be operated between ambient temperatures of +30 and +122°F with a relative humidity between 20 and 95 percent. The storage temperature for the data set shall be between −25 and +150°F.

1.04 The DS 207-type normally connects to the 309 switching system on the AUTOVON network. For information on the 309 switching system, refer to the section entitled Switching System No. 309, Identification, Installation, Connections, and Tests and Inspections During Installation (480-716-200).

1.05 The 32A1 power unit, required for Data Set 207C-type, requires an input voltage of either 120 (+10, −20 percent) or 230 (±10 percent) Vac with the line frequency limits between 47.5 and 63.0 Hz. The power rating for the 32A1 is 215 watts.

1.06 The 32B1 power unit has the same input voltage requirements as the 32A1 and is factory-supplied with a power cord to operate from an input voltage of 120 (+10, −20 percent) Vac single phase. If operation at 230 (±10 percent) Vac is required, the power cord must be replaced with one appropriate for 230-Vac service. Line frequency limits are between 47.5 and 63.0 Hz and the power rating is 215 watts.

1.07 Data Set 207-type is provided with a series listing of A, B, or C. Each listing has six generations. Data Set 207A-type is common equipment which is part of Data Set 207B-type or Data Set 207C-type installations. No mounting hardware or power unit is provided for Data Set 207A-type. The differences by generation breakdown are tabulated briefly in the following chart:

NOMENCLATURE	OPERATION	TIMING SOURCE	DELAYED ALARMS
207A1	Terminal Set	Customer-Supplied	Yes
207A2	Terminal Set	Self-Timed, 30-Minute Holdover	Yes
207A3	Half-Regenerator	Customer-Supplied	No
207A4	Half-Regenerator	Self-Timed, 30-Minute Holdover	No
207A5	Terminal Set	Self-Timed, 6-Second Holdover	Yes
207A6	Half-Regenerator	Self-Timed, 6-Second Holdover	No

1.08 Data Set 207B-type is an unshielded unit prepared for mounting in a 23-inch relay rack and contains a Data Set 207A-type and a 32B1 power unit mounted below the data set circuits. The generation breakdown for Data Set 207B-type (B2, B4, B5, B6) is identical to Data Set 207A-type (A2, A4, A5, A6, respectively). The 32B1 power unit is provided with a 10-foot 120-Vac power input cord.

1.09 Data Set 207C-type consists of a Radio Frequency Interference (RFI) shield which mounts on a 23-inch relay rack and contains a Data Set 207A-type and a 32A1 power unit mounted above the data set circuits. The generation breakdown for Data Set 207C-type (C2, C4, C5, C6) is identical to Data Set 207A-type (A2, A4, A5, A6, respectively). Interface and ac power connections are routed through customer-furnished 3/4-inch rigid ferrous conduit to entries provided on the RFI shield.

1.10 The data set may be supplied with an oscillator board in slot location D06 other than option X (69A oscillator) and option Y (AR160 oscillator). This different oscillator will be a 65A oscillator or a 72A oscillator (either unit to be considered as option V). The option V oscillator will provide a timing source (clock) having a long term accuracy of ± 0.0005 percent (± 5 parts in 10^6). This stability of the clock signal ensures a minimum outage holdover capability in excess of six seconds. Oscillator adjustment at 3-year intervals is necessary if the 6-second holdover requirement is to be maintained.

1.11 Either the 65A oscillator or the 72A oscillator will occupy slot location D06 only, similar to the AR160 oscillator board. Any Data Set 207A2, B2, C2, or Data Set 207A4, B4, C4 containing AR147 printed wiring boards in slot locations D01 and D03, together with a 65A oscillator in slot location D06, should be used as received. The 65A oscillator will be replaced with a 69A oscillator as soon as it becomes available. The following chart illustrates the new data set configuration:

DATA SET	SPECIFICATION	FACTORY SUBSTITUTE	FIELD REPLACEMENT (WHEN AVAILABLE)
207A1, A3 B1, B3 C1, C3	External timing	None	None
207A2, A4 B2, B4 C2, C4	30-Minute holdover using a 69A Oscillator with two AR147 Printed Wiring Boards	65A Oscillator or 72A Oscillator (Provided with two AR147 Printed Wiring Boards)	69A Oscillator will physically replace the 65A Oscillator or 72A Oscillator
207A5, A6 B5, B6 C5, C6	6-Second holdover using 65A Oscillator or 72A Oscillator	69A Oscillator will physically replace the 65A Oscillator or 72A Oscillator	65A Oscillator or 72A Oscillator

2. INSTALLATION

2.01 Both Data Set 207B-type and Data Set 207C-type are factory-shipped prepared for installation in a 23-inch wide rack. Data Set 207B-type requires 38 inches of vertical space by 10.5 inches deep. The data set will extend approximately 5.5 inches beyond the back of the relay rack mounting surface. Data Set 207C-type requires 40 inches of vertical space and is 13 inches deep. It will extend approximately 7.9 inches beyond the back of the relay rack mounting surface.

2.02 Installation of the data set requires a minimum of three men and a fork-lift type truck or equivalent. Two men are required to guide the data set as it is lifted into the rack position. The third man is required to install the mounting hardware. A screw-holding type screwdriver will be required. (***Note:*** A screwdriver, such as a Yankee Spiral Rachet No. 130, will also be helpful.) Data Set 207A-type weighs 90 pounds, Data Set 207B-type weighs 200 pounds, and Data Set 207C-type weighs 270 pounds.

2.03 After opening the shipping container of the Data Set 207C-type, remove the temporary screws and nuts which secure the data set in the container. Disengage the 48 screws which fasten the front cover of the mounting assembly and remove the cover from the mounting assembly. The temporary screws may be used to secure the data set to the relay rack.

2.04 Lift the data set into position on the relay rack and secure with the twelve 5/8-inch tapping screws

Caution: Never install Data Set 207B-type equipment without the rear cover in place. The cover protects circuit board connector wrapped wire terminals which can be deformed beyond repair.

2.05 After the data set is mounted in the relay rack, and if the equipment is a Data Set 207C-type, make sure that all options and required strappings are provided before installing the front panel of the RFI shield, and make sure that all options and required strappings are installed as instructed in Part 3 (CONNECTIONS) before applying ac power.

2.06 When installing Data Set 207C-type equipment, remove the covers from both the data set access box and power supply access box. Interface leads from 3/4-inch rigid ferrous conduit must be brought through the left side of the data set access box, as seen from the rear, located at the bottom (Fig. 1) before attaching the conduit to the appropriate access box holes. Use the mesh gaskets under the conduit lock nuts. Pull enough wire through the access box so that connections to adapter boards A1 and A2 may be made outside of the shield. The ac power leads will be provided through a conduit to the right side of the power supply access box, as seen from the rear, located at the top.

Warning: Be sure that ac power cannot be applied to the ac power cable when pulling the cable to the data set and while making connections.

Pull enough ac cord through the access box to permit connection to the power supply before

attaching the conduit to the appropriate access box hole.

2.07 After power and interface connections have been accomplished, complete the Installation Tests as directed in the section entitled Data Set 207-Type, Transmitter-Receiver, Test Procedures (592-020-500). After the installation tests have been completed successfully, install the covers to both access boxes with the screws provided. Make sure that the flange on each cover mates with the wire mesh around each opening. The wire mesh is part of the RFI shielding. Drive the screws until the covers are pulled down tightly.

2.08 Install the front cover of the RFI shield using the following sequence:

(a) Hold the panel in place. Apply KS-19094 Antiseize Compound to all mounting screw threads. Start the 16 screws around the 32A1 power unit.

(b) Start the six screws around the switch panel.

(c) Install and start the 16 pan head screws at the sides and 10 fillister head screws at the top and bottom of the RFI shield.

(d) Uniformly tighten the power unit screws first a revolution at a time per screw and in a clockwise sequence until essentially a metal-to-metal contact between the front cover and the power unit is achieved. Use the same procedure to pull the switch panel against the six screw guide clips. Complete the assembly of the front cover by uniformly and sequentially tightening the remaining 26 screws, by using the same procedure, until essentially a metal-to-metal contact between the outer flange of the front cover and the outer flange of the mounting assembly is achieved. These twenty-six screws consist of ten 12-24 fillister head screws, preferably 3/4 inch long, for the top and bottom of the data set, and sixteen self-tapping pan head screws, preferably 3/4 inch long, for the sides of the data set. The 3/4-inch length screws will not require the rubber "0" rings which may be provided in a separate bag or container for initial installation. These should be discarded.

Note: It must be emphasized that assembly of parts of the RFI shield, to assure tightness against electromagnetic interference, is critical and requires great care.

2.09 ▶The DAS 804M is not required for use with the DS 207 unless specified on the service order. It is normally used when tone disabling of echo suppressors is required. No special tools are required for installation of DAS 804M.◀

2.10 ▶Data Auxiliary Set 804M should be installed in conformance with existing practices covering installation of data sets. Refer to the section entitled Data Sets, General Installation Information (590-010-200).◀

2.11 ▶For information concerning the identification and operation of DAS 804M, refer to the section entitled Data Auxiliary Set 804M-Type, Identification and Connections (598-057-100).◀

3. CONNECTIONS

POWER SUPPLY CONNECTIONS

3.01 The 32B1 power unit supplied with Data Set 207B-type equipment is supplied with a 10-foot power cord for use with 120-Vac power. The 32A1 power unit supplied with Data Set 207C-type equipment is provided with ac power through the conduit to the connector block on the rear of the power unit. Connection of ac power is permitted through the access box with its cover removed. Removal of the RFI shield is not necessary.

3.02 Supply voltage to the 32A1 power unit may be either 120 Vac or 230 Vac single phase. The "hot" wire is secured to terminal L1 on terminal block TB1. The wire is inserted from below the block and clamped into place by driving the terminal screw in a clockwise rotation. The neutral, or ground, wire is similarly connected to terminal L2 on TB1. Frame ground (FG) is connected to terminal G. The remaining terminal is unused.

3.03 The 32B1 power unit is factory-supplied with a power cord which must only be plugged into a 120-Vac outlet. If operation from a 230-Vac outlet is required, the power cord must be replaced. For either 120-Vac or 230-Vac connections, the ac "hot" wire is connected to "L1" on AC INPUT terminal block TB1. The AC neutral, or ground, wire is connected to "L2" on TB1, and the frame ground lead is connected to "FG" on TB1. These connections are illustrated in Fig. 2.

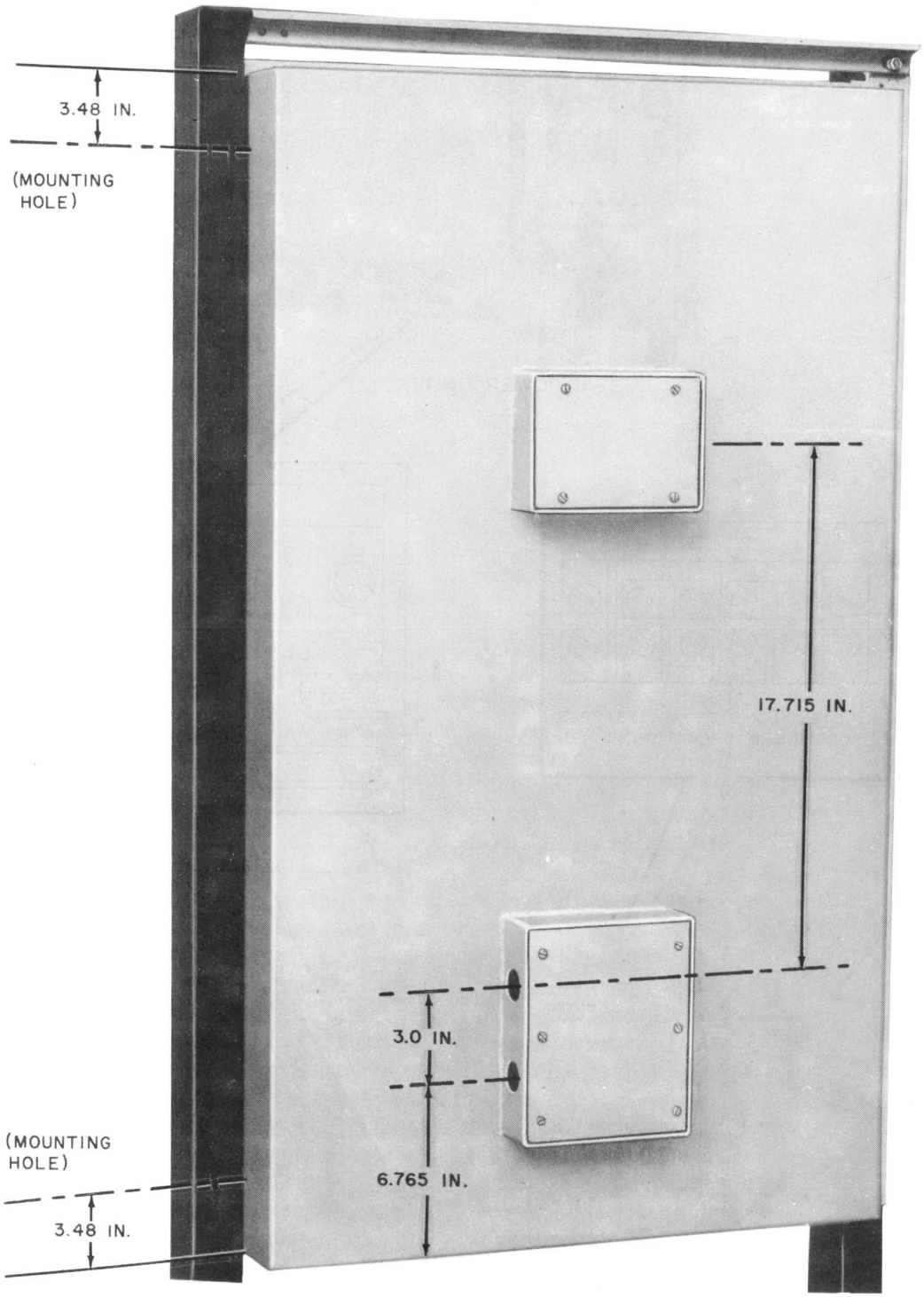


Fig. 1—Typical Data Set 207C-Type, Rear View With Dimensions

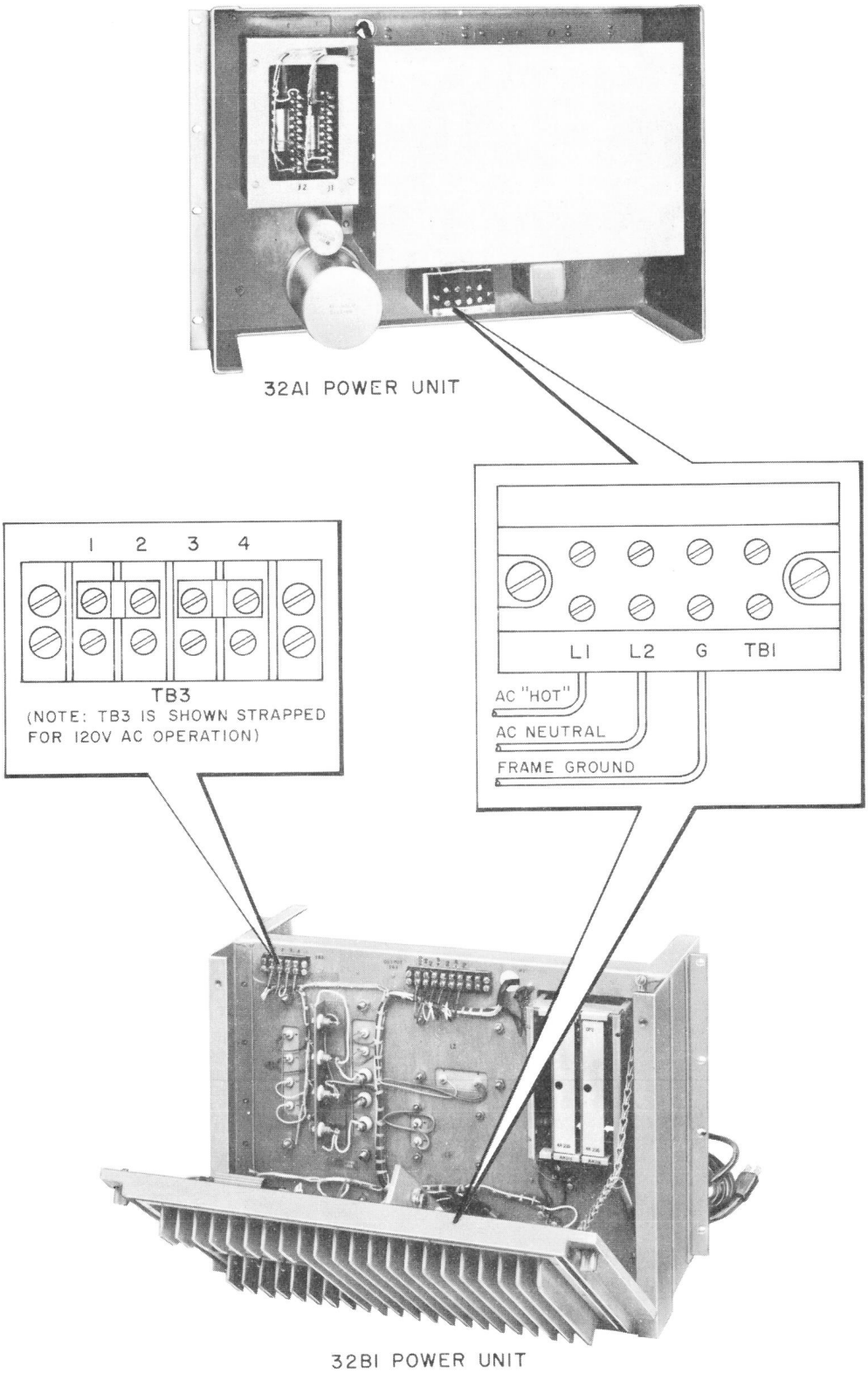


Fig. 2—Power Connections to Power Unit Associated With Data Set 207-Type

Caution: The power unit front panel is extremely heavy. It is hinged to provide access and chain-restricted to limit travel. The unexpected weight of the front panel may constitute a personnel hazard unless caution is used.

3.04 The following instructions are for arranging the power unit connections for 230-Vac operation. (If the equipment is a Data Set 207C-type, first remove the front cover of the RFI shield.) Unscrew the slotted thumbscrews on each side of the power unit panel. The thumbscrews are captive and will not completely separate from the panel. Carefully lower the hinged panel to the limit of the chain. With the ac power off, remove both shorting clips from terminals 1-2 and 3-4 on terminal block TB3. Use both shorting clips to make one strap between terminals 2-3 on TB3. The power unit is now conditioned to operate with an applied 230-Vac input voltage. Lift the panel to its original position and secure in place by using the two thumbscrews. Reassemble the front cover.

3.05 The power unit supplied with the data set is shipped with appropriate wire connections between the power unit output voltage terminal block (TB2) and the data set input voltage terminal strip (TS7). If the wires require removal or replacement, maintain the order specified in the following chart.

Caution: Be sure that the power unit AC INPUT switch is OFF.

TERMINAL		FUNCTION	WIRE COLOR	GAUGE (STRANDED)
FROM POWER UNIT	TO DATA SET			
TB2-1	TS7-1	18 Vac Ground	Black	16
TB2-2	TS7-2	18 Vac	Black-Red	16
TB2-3	TS7-3	+18 Vdc	Red	16
TB2-4	TS7-4	Signal Ground	Black	16
TB2-5	TS7-5	−18 Vdc	Orange	16
TB2-6	TS7-6	Frame Ground	Green	14

3.06 A circuit pack extracting tool (a 748A tool) is provided with each data set. It is designed to slip into the circuit pack keyway, lock onto the board faceplate, and serve as a handle for removing or inserting circuit packs. When not in use, the tool should be kept in the space provided for it. This space is located above the switch panel and below the filters. The top of the switch panel is used as a small shelf. A retaining clip is provided to secure the extracting tool to the shelf.

TERMINAL EQUIPMENT

3.07 ▶Certain options and circuit configurations will be noted on the service order. The following information applies to both Data Set 207B2 or B5 and Data Set 207C2 or C5 equipment as a general check that the data set is prepared to operate as terminal apparatus.◀

3.08 ▶A terminal data set does not contain circuit packs in locations G07 and G09. Data Sets 207B5 and 207C5 do not contain circuit packs in locations D01 and D03. In location D06, they utilize a 72A oscillator which provides a 230.4 kHz clock signal with an accuracy of ± 5 parts in 10^6. The stability of this clock signal provides a minimum holdover capability of six seconds. Data Sets 207B2 and 207C2 utilize a 69A oscillator with oven which is contained in location D06. Two AR147 circuit packs are also used in both locations D01 and D03. The 69A oscillator provides extremely accurate clock signals within ± 5.8 parts in 10^8 to provide a 30-minute holdover requirement. Remove the circuit pack retaining bar from the "G" nest. Connect the extracting tool to circuit pack CU 1 in location G01 and pull straight out. This special board should be marked "TERMINATOR" near the end of the board. If the board is marked "REGENERATOR," remove the small screw and pivot the terminal end 180 degrees relative to the assembly. Visually note that the board end is now designated "TERMINATOR." Replace the screw to secure the board in this position. Carefully insert the CU 1 board in the original location by pushing on the extracting tool until the circuit board mates with its connector. Slightly spread the top and bottom of the tool until it becomes free from the circuit pack. Do not replace the retaining bar.◀

3.09 ▶Some early data sets were supplied with a 65A oscillator to meet the requirements of the 6-second holdover. The 65A oscillator is electrically identical to the 72A oscillator which is presently available. The 65A or 72A oscillator frequency must be checked and adjusted at 3-year maximum intervals, or as necessary, if the 6-second holdover requirement is to be maintained.◀

3.10 Remove the circuit pack retaining bar from the "C" nest. Use the extracting tool and carefully remove the AR161 circuit pack from location C21. The AR161 (strap circuit) board is illustrated in Fig. 3, and the functions accomplished through the shorting straps are tabulated in Table A. Position the shorting straps as instructed by the service order. After the circuit pack is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.11 Remove the circuit pack retaining bar from the "B" nest. Use the extracting tool and carefully remove the AR3 circuit pack from location B19. Observe that the shorting clip is secured between terminals 1 and 6. If the clip is connected to any other terminal, remove the clip and correctly position between terminals 1 and 6. This provides a maximum output level from the transmitter output

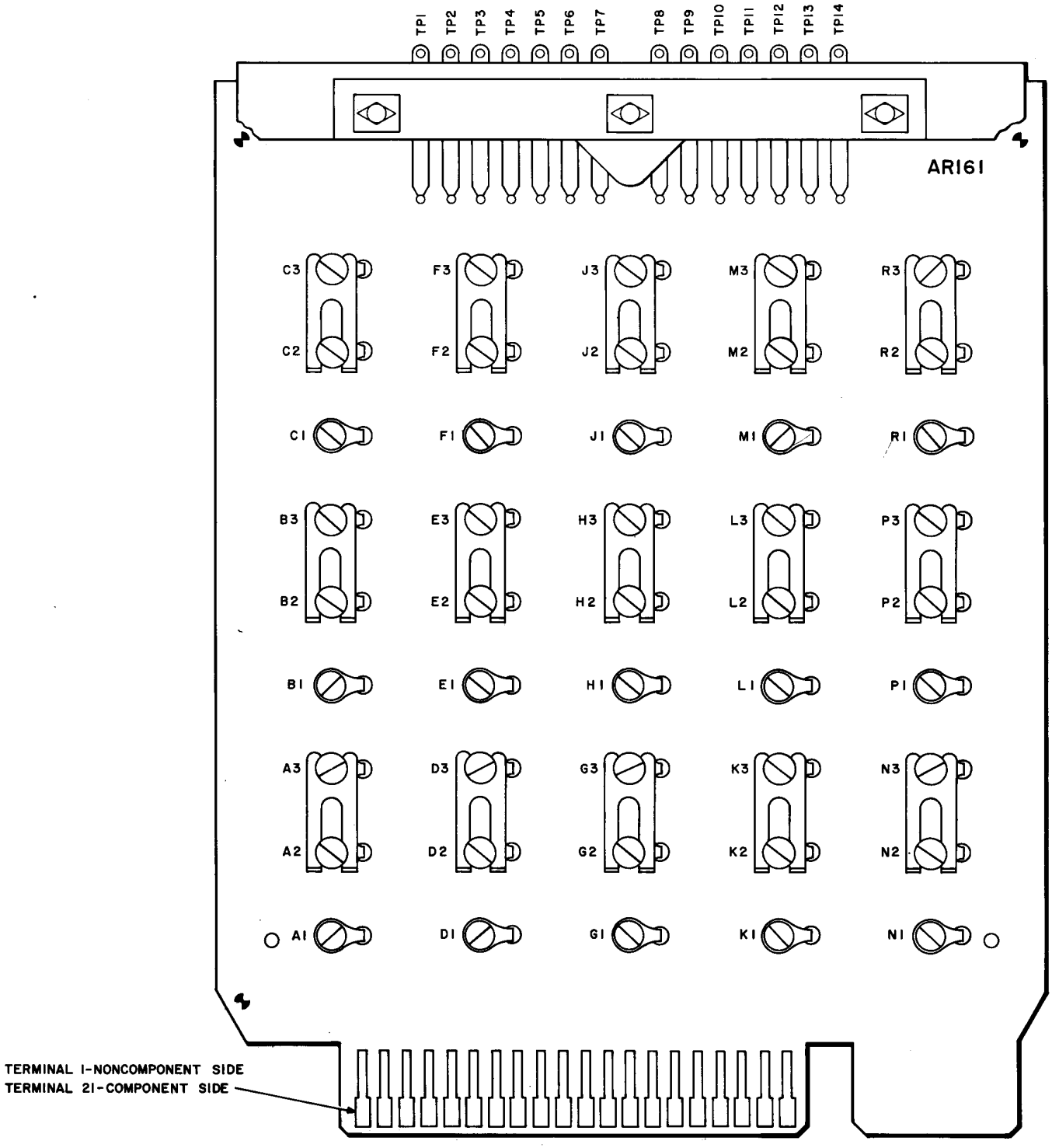


Fig. 3—Circuit Pack AR161 (Strap Circuit) Board

TABLE A

FUNCTIONS CONTROLLED THROUGH STRAP CIRCUIT (AR161) BOARD

CONNECT TERMINALS	OPTION PROVIDED
A1 to A2	Transmitter Clock at Dibit Rate
A2 to A3*	Transmitter Clock at Bit Rate
B1 to B2	Receiver Clock at Dibit Rate
B2 to B3*	Receiver Clock at Bit Rate
C1 to C2	SD Transitions on Negative Slope of Clock
C2 to C3*	SD Transitions on Positive Slope of Clock
D1 to D2	External Timing of Receive Clock
D2 to D3	Internal Timing of Receive Clock
E1 to E2	Transmitter Scrambler Disabled
E2 to E3*	Transmitter Scrambler Enabled
F1 to F2	Spare
F2 to F3	Spare
G1 to G2	Receiver Scrambler Disabled
G2 to G3*	Receiver Scrambler Enabled
H1 to H2	Spare
H2 to H3	Spare
J1 to J2	RSS Does Not Include Receiver In-Sync
J2 to J3*	RSS Does Include Receiver In-Sync
K1 to K2	External Control of Digital Loop Test
K2 to K3*	No External Control of Digital Loop Test
L1 to L2	External Control of Bypass Lockup
L2 to L3*	No External Control of Bypass Lockup
M1 to M2	External Control of Idle Code Generator
M2 to M3*	No External Control of Idle Code Generator
N1 to N2	RD Space Hold (Minus voltage)
N2 to N3*	RD Mark Hold (Plus voltage)
P1 to P2	Spare
P2 to P3*	Spare
R1 to R2	External Control of Line Loop Test
R2 to R3*	No External Control of Line Loop Test

* Factory-strapped; condition terminals as specified by the service order.

board. Carefully replace the circuit pack to the original location, remove the extracting tool, and replace the retaining bar.

3.12 Carefully remove the AR159 circuit pack from location G03. The AR159 (line circuit) board is illustrated in Fig. 4. This board contains four loss pads and other circuitry. By using combinations of the pads, the transmitter output level to the telephone line may be adjusted from 0 dBm to −18.0 dBm in 1.5 dB increments. To connect a pad into the circuit, the terminals must be strapped 1 to 3 and 2 to 4. To remove a pad from the circuit, the terminals must be strapped 1 to 2 and 3 to 4. The possible transmitter output levels using the four pads are tabulated in Table B. Condition the line circuit board as specified on the service order. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.13 Remove the circuit pack retaining bar from the "F" nest. Use the extracting tool and carefully remove the AR5 circuit pack from location F01. The AR5 (AGC-1) board is illustrated in Fig. 5 and the attenuation provided by loss pads is provided in Table C. Condition the AGC-1 board as specified on the service order. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.14 Use the extracting tool and carefully remove the AR152 circuit pack from location C15. The AR152 (military standard) board is illustrated in Fig. 6. This board provides option strapping to provide the customer business machine with either bipolar or unipolar data signals on the SD and RD interface leads. If the requirement is for ±6 volt polar data signals, strap terminals 1 to 2, 5 to 6, 7 to 8, and 11 to 12. If the requirement is for 4-volt unipolar data signals, strap terminals 2 to 3, 4 to 6, 8 to 9, and 10 to 12. Condition the board as specified on the service order. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.15 Be sure that the test connector plug (P1) is seated securely and screwed to the test jack (J1). These connectors are below the switch panel. (See Fig. 7.) Observe that a bare wire strap connects terminals FG1 to SG1. These terminals are to the right of the test connector. Remove the strap only if required by the service order.

3.16 Position the data set switches as follows:

(a) MODEM LOOP TEST—OFF

(b) BIT RATE—2400 (or as specified by the service order)

(c) LAMP TEST—OFF

(d) TERMINAL—NORMAL (or as specified by the service order)

(e) REC CARRIER—AUTO

(f) TRAN CARRIER—AUTO

(g) RD TRANSITIONS—AUTO

(h) SD TRANSITIONS—AUTO.

3.17 Position the power unit switches as follows:

(a) AC INPUT—OFF

(b) 18 VAC—ON

(c) ±18 VDC—ON.

3.18 Replace all circuit pack retaining bars and return the extracting tool to the shelf above the switch panel.

3.19 The 180A adapter board (A1 and A2) is accessible from the rear of the data set. After removing the data access box cover, remove two screws from each board and pull the board straight away from its associated connector. Identification of the terminals on each board is shown in Fig. 8 and Table D. Customer business machine input and output signal leads, together with the 4-wire telephone facility, are soldered to the terminals. The telephone line must be shielded if it is in the same cable which is carrying control, clock, or data signals. Connect the wires to the adapter boards A1 and A2 as specified on the service order. Connect the customer frame ground interface lead to the provided screw terminal on the adapter board support bracket nearest the "C" nest. Interface connections for a typical terminal station arranged for using Data Set 207-type ◗(B2, B5, C2, C5)◖ are illustrated in Fig. 9.

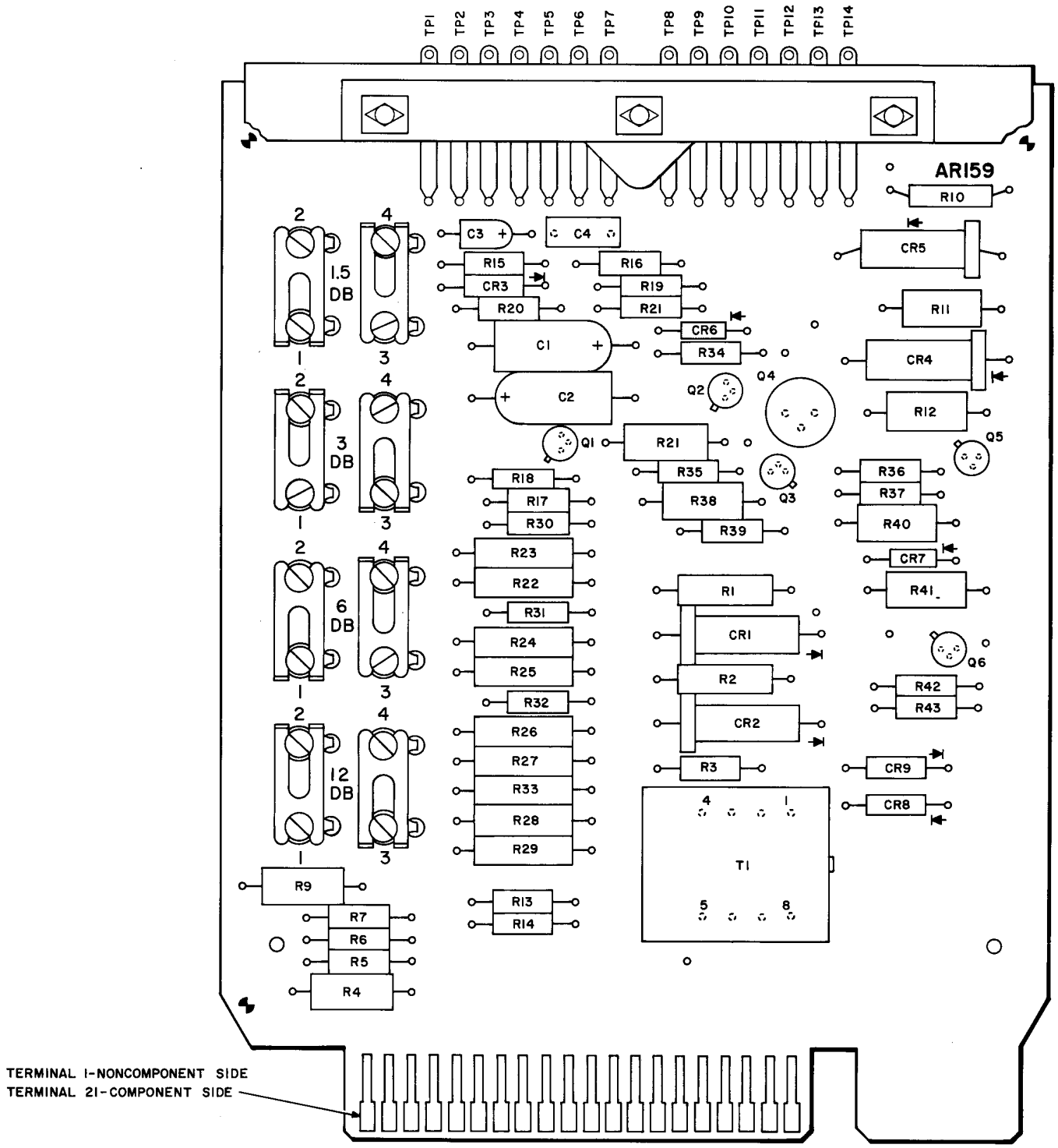


Fig. 4—Circuit Pack AR159 (Line Circuit) Board

TABLE B

TRANSMISSION LEVEL ADJUSTMENTS THROUGH LINE CIRCUIT (AR159) BOARD PADS

TRANSMITTER OUTPUT LEVEL (—DBM)	INSERT LOSS PAD OPTION AS REQUIRED			
	1.5 DB	3 DB	6 DB	12 DB
0*				
1.5	X			
3		X		
4.5	X	X		
6			X	
7.5	X		X	
9		X	X	
10.5	X	X	X	
12				X
13.5	X			X
15		X		X
16.5	X	X		X
18			X	X

* Factory-strapped; connect pads as specified by service order.

3.20 Connecting customer equipment to the data set frame ground, using the screw terminal by adapter boards A1 and A2, requires the ground lead to be terminated as a bare single-conductor wire or to be provided with an open-end spade-tip lug. The ground screw is staked to prevent complete removal. This prevents the screw from being accidentally dropped behind the protective rear cover and creating a short-circuit condition.

3.21 Interface adapter boards A1 and A2 are secured to the data set with nylon screws. During installation and/or testing, extreme care must be used when removing or replacing the adapter board to prevent the nylon screws from dropping into the data set.

> ***Note:*** If the nylon screws are dropped inside the data set, ***DO NOT replace them with conductive (metallic) screws.***

3.22 When the data set is first installed, visually inspect the contacts on each relay to observe for crossed-wire spring contacts. If crossed contacts are observed, remove the plastic contact cover. Pull straight out with a finger grip on the narrow ends. Use a KS-6320 orange stick to carefully reposition all misaligned contacts to provide proper operation. Replace the plastic contact cover by using the reverse-removal procedure.

3.23 Perform the installation tests required for terminal equipment. Data set testing information is contained in the section entitled Data Set 207-Type, Transmitter-Receiver, Test Procedures (592-020-500).

REGENERATOR EQUIPMENT

3.24 ▶Certain options and circuit configurations will be noted on the service order. The following information applies to both Data Set 207B4 or B6 and Data Set 207C4 or C6 equipment as a general check that the data set is prepared to operate as regenerator apparatus. A regenerative Data Set 207-type will not contain circuit packs in locations A09, A11, and A13. Data Sets 207B6 and 207C6 do not contain circuit packs in locations D01 and D03. In location D06, they utilize a 72A oscillator which provides a 230.4 kHz clock signal with an accuracy of ± 5 parts in 10^6. Circuit packs from these locations provide delayed alarm functions for terminal equipment only. A Data Set 207-type regenerator will be provided with the regenerator line amplifier and bypass relays contained on circuit packs in locations G07 and G09. The stability of the clock signal provides a minimum holdover capability of six seconds. Data Sets 207B4 and 207C4 utilize a 69A oscillator with oven which is contained in location D06. Two AR147 circuit packs are also used in locations D01 and D03. The 69A oscillator provides extremely accurate clock signals within ± 5.8 parts in 10^8 to provide a 30-minute holdover requirement. Some early data sets were supplied with a 65A oscillator to meet the requirements of the 6-second holdover. The 65A oscillator is electrically identical to the 72A oscillator which is presently available. The 65A or 72A oscillator frequency must be checked and adjusted at 3-year maximum intervals, or as necessary, if the 6-second holdover requirement is to be maintained.◀

3.25 Remove the circuit pack retaining bar from the "G" nest. Use the extracting tool and carefully remove the CU 1 circuit pack in location G01. Observe that the board end is marked "REGENERATOR." (See Fig. 10.) If the board is marked "TERMINATOR," remove the small

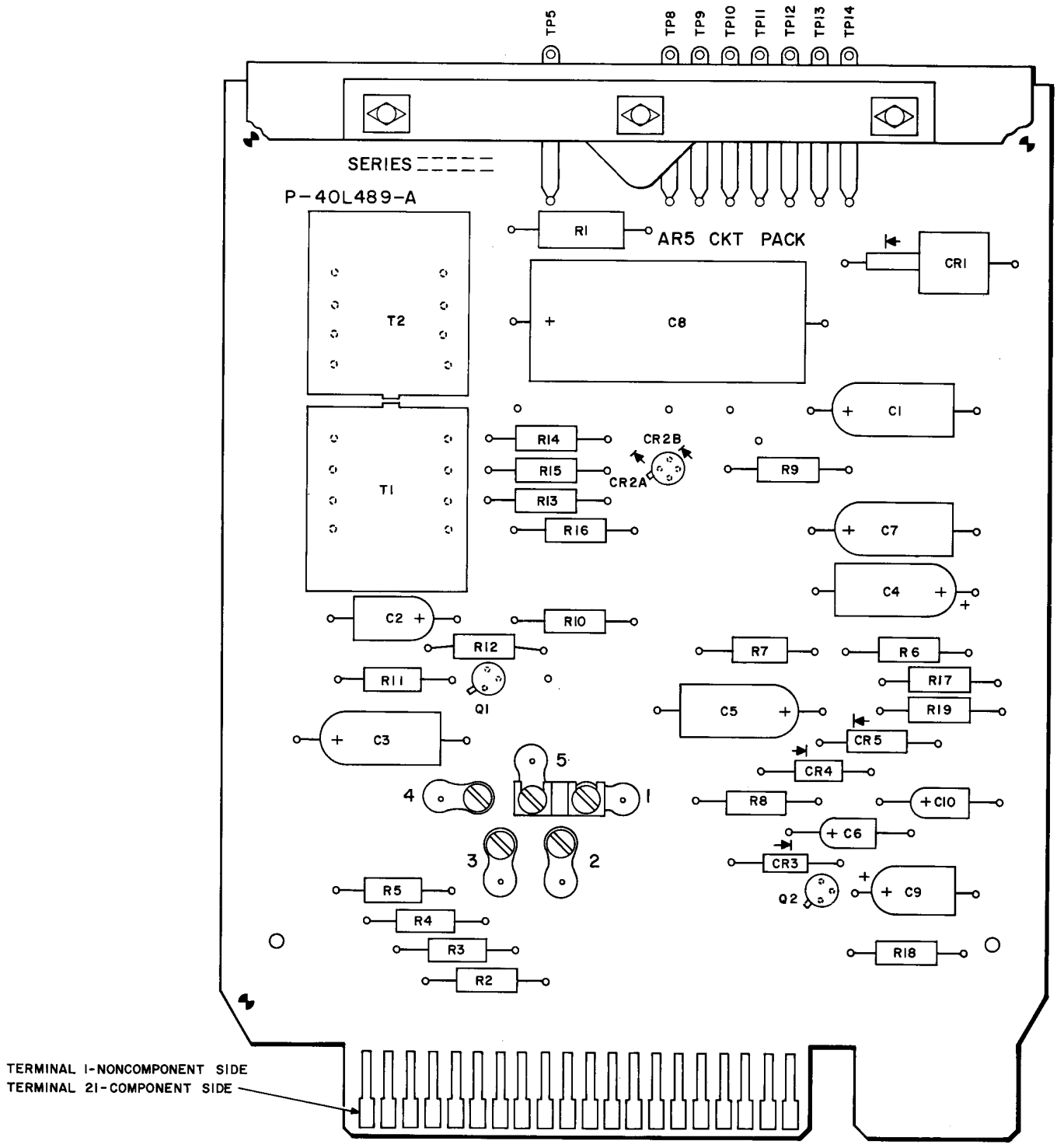


Fig. 5—Circuit Pack AR5 (AGC-1) Board

TABLE C

RECEIVER CIRCUITS INPUT LEVEL ADJUSTMENT ON AGC-1 (AR5) BOARD

PAD LOSS OPTION (DB)	CONNECT TERMINALS	RECEIVER SENSITIVITY (DBM)
0	1 to 5	−35 to −6
5	2 to 5	−30 to −1
10	3 to 5	−25 to +4
15	4 to 5	−20 to +9

screw and pivot the board 180 degrees. Visually note that the board is now marked "REGENERATOR." Replace the small retaining screw and carefully replace the CU 1 circuit pack to its original location.

3.26 Remove the circuit pack retaining bar from the "C" nest. Use the extracting tool and carefully remove the AR161 circuit pack from location C21. The AR161 (strap circuit) board is illustrated in Fig. 3. The functions performed through the straps on the AR161 (strap circuit) board are tabulated in Table A. Two regeneration configurations are available to meet all requirements. One configuration is provided for a regenerator consisting of two Data Sets 207-type. The remaining configuration provides for a Data Set 207-type to operate with a non-207 companion modem. Definite strapping requirements are tabulated in Table E for each configuration. The remaining straps shall be connected as specified on the service order. After the board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.27 Remove the circuit pack retaining bar from the "B" nest. Use the extracting tool and carefully remove the AR3 circuit pack from location B19. Observe that the shorting clip is secured between terminals 1 and 6. If the clip is connected to any other terminal, remove the clip and correctly position between terminals 1 and 6. This provides a maximum output level from the transmitter output board. Carefully replace the circuit pack to the original location, remove the extracting tool, and replace the retaining bar.

3.28 Carefully remove the AR159 circuit pack from location G03. The AR159 (line circuit) board is illustrated in Fig. 4. This board contains four loss pads and other circuitry. By using combinations of the pads, the transmitter output level to the telephone line may be adjusted from 0 dBm to −18.0 dBm in 1.5 dB increments. To connect a pad into the circuit, the terminals must be strapped 1 to 3 and 2 to 4. To remove a pad from the circuit, the terminals must be strapped 1 to 2 and 3 to 4. The possible transmitter output levels using the four pads are tabulated in Table B. Condition the line circuit board as specified on the service order. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.29 Remove the circuit pack retaining bar from the "F" nest. Use the extracting tool and carefully remove the AR5 circuit pack from location F01. The AR5 (AGC-1) board is illustrated in Fig. 5 and the attenuation provided by loss pads is provided in Table C. Condition the AGC-1 board as specified on the service order. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.30 Use the extracting tool and carefully remove the AR152 circuit pack from location C15. The AR152 (military standard) board is illustrated in Fig. 6. This board provides option strapping to provide either bipolar or unipolar data signals on the SD and RD interface leads. Regenerator operation requires ±6 volt polar data signals. Strap terminals 1 to 2, 5 to 6, 7 to 8, and 11 to 12. After the circuit board is properly conditioned, carefully return it to the original location and remove the extracting tool.

3.31 Be sure that the test connector plug (P1) is seated securely and screwed to the test jack (J1). These connectors are below the switch panel. (See Fig. 7.) Observe that a bare wire strap connects terminals FG1 to SG1. These terminals are to the right of the test connector. Remove the strap only if required by the service order.

3.32 Position the data set switches as follows:

(a) MODEM LOOP TEST—OFF

(b) BIT RATE—2400

(c) LAMP TEST—OFF

(d) TERMINAL—NORMAL

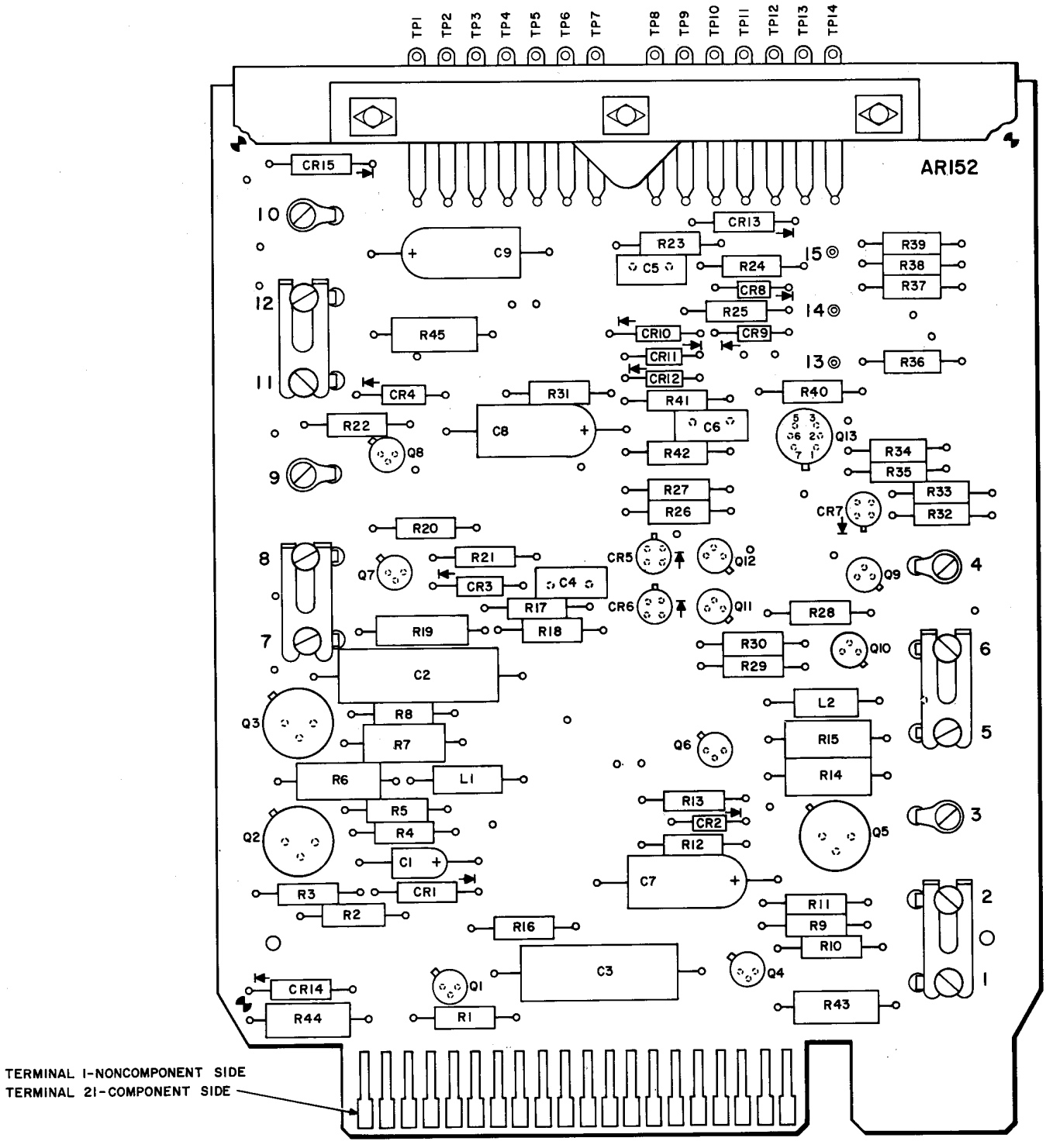
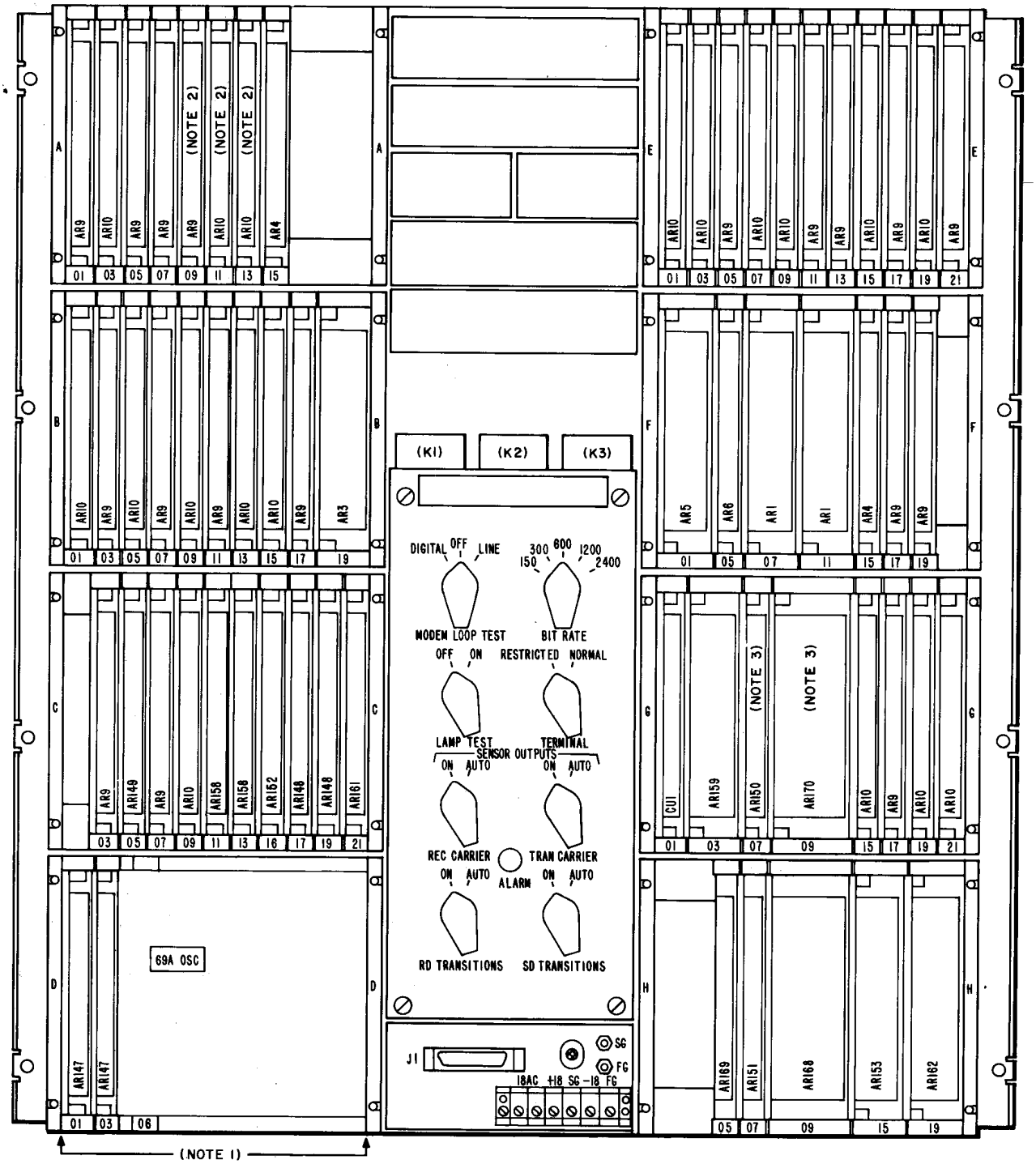


Fig. 6—Circuit Pack AR152 (Military Standard) Board



NOTES:

1. DATA SETS 207A5 AND 207A6 USE ONLY A 72A OSCILLATOR (230.4 KHZ) IN SLOT LOCATION D06 DATA SETS 207A2 AND 207A4 REQUIRE THE TWO AR147 BOARDS AND THE 69A OSCILLATOR AS SHOWN IN D01 AND D03.
2. ONLY DATA SETS 207A2 AND 207A5 ARE PROVIDED WITH DELAYED ALARM CIRCUITS (LOCATIONS A09, A11, AND A13).
3. ONLY DATA SETS 207A4 AND 207A6 ARE PROVIDED WITH BYPASS AND TRANSFER CIRCUITS (LOCATIONS G07 AND G09).

Fig. 7—Typical Data Set 207-Type

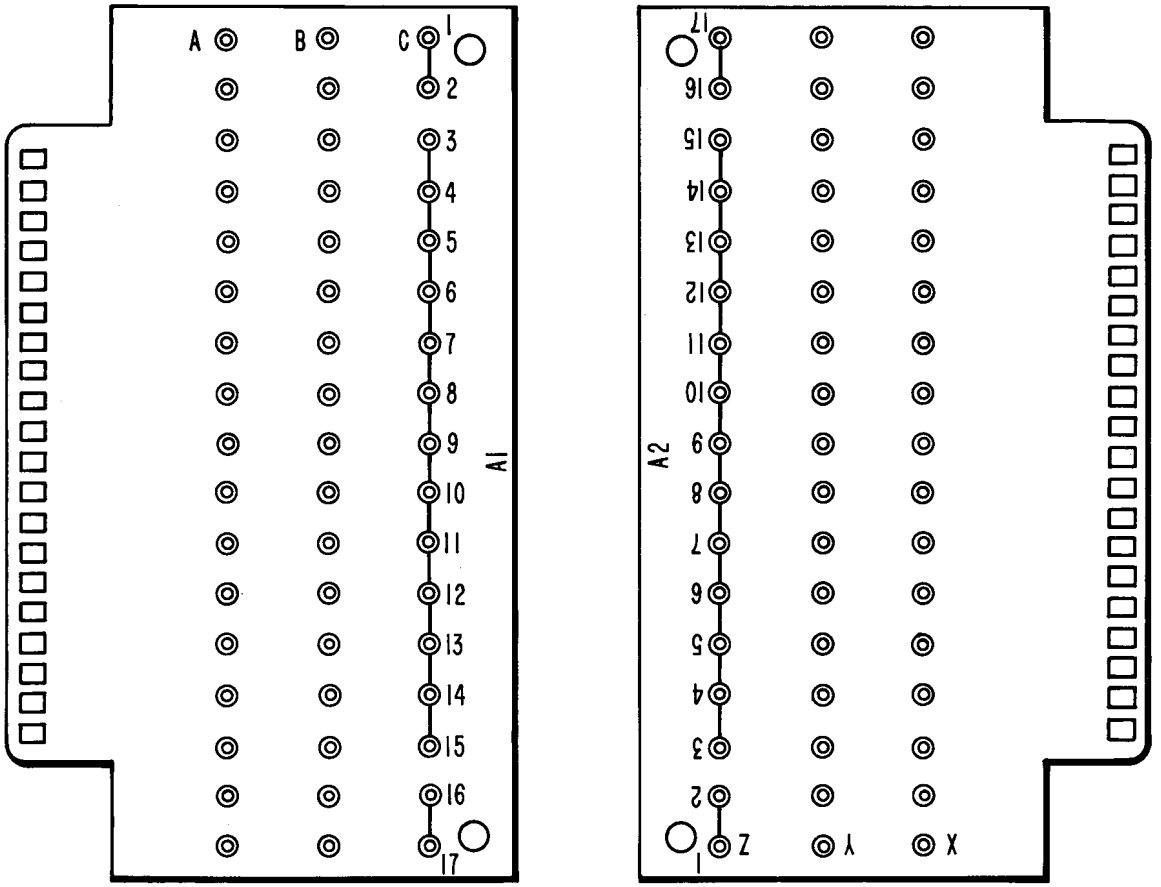


Fig. 8—Data Set 207-Type Interface Adapter Boards

(e) REC CARRIER—AUTO

(f) TRAN CARRIER—AUTO

(g) RD TRANSITIONS—AUTO

(h) SD TRANSITIONS—AUTO.

3.33 Position the power unit switches as follows:

(a) AC INPUT—OFF

(b) 18 VAC—ON

(c) ±18 VDC—ON.

3.34 Replace all circuit pack retaining bars and return the extracting tool to the shelf above the switch panel.

3.35 Adapter boards A1 and A2 are accessible from the rear of the data set. Remove two screws from each board and lift the board straight away from its associated connector. Identification of the terminals on each board is shown in Fig. 8 and Table D. The companion modem input and output signal leads, together with the 4-wire telephone facility, are soldered to the terminals. The telephone line must be shielded if it is in the same cable which is carrying control, clock, or data signals. Connect the wires to the adapter boards A1 and A2 as specified on the service order. Connect the frame ground interface lead to the provided screw terminal on the adapter board support bracket nearest the "C" nest.

3.36 When the data set is first installed, visually inspect the contacts on each relay to observe for crossed-wire spring contacts. If crossed contacts are observed, remove the plastic contact cover. Pull straight out with a finger grip on the narrow

TABLE D

INTERFACE CONNECTIONS

TERMINAL	ADAPTER BOARD A1			ADAPTER BOARD A2		
	A	B	C	X	Y	Z
1	R1	T1	GG05	LP1	LP1	HG03
2	R1B	T1B	GG05	LP2	LP2	HG03
3	*	*	*	LPA	LPA	HG01
4	*	*	*	LPB	LPB	HG01
5	SCRE	GG03	GG01	TM1	TM1	HG01
6	RD	GG03	GG01	TM2	TM2	HG01
7	SCRB	GG03	GG01	48CO	48CO	HG01
8	SCRA	GG03	GG01	COGD	COGD	HG01
9	SCB	GG03	GG01	LLT	BPL	HG01
10	SCA	GG03	GG01	RSSE	TSSE	HG01
11	*	*	*	RSS2	TSS	HG01
12	SD	GG03	GG01	RSS1	+18B	HG01
13	DTI	GG03	GG01	RSSD	+18I	HG01
14	SCTE	GG03	GG01	RDTX	−18I	HG01
15	*	*	*	SDTX	*	HG01
16	RB	TB	HG05	IC	*	*
17	R	T	HG05	DLT	*	*

* Unused terminals

ends. Use a KS-6320 orange stick to carefully reposition all misaligned contacts to provide proper operation. Replace the plastic contact cover.

3.37 Delayed alarms are not provided with the Data Set 207-type (B4, B6, C4, C6) half-regenerators. The ALARM lamp on the switch panel for these data sets will be illuminated to signal a power supply failure. The lamp is provided with central office battery voltage through relay contacts within the data set.

3.38 Interface connections for a typical regenerator station arranged for using two Data Sets 207-type (B4, B6, C4, C6) are illustrated in Fig. 11. Interface connections for a typical regenerator station arranged for using one Data Set 207-type (B4, B6, C4, C6) and a compatible non-207-type companion data set are illustrated in Fig. 12.

DATA AUXILIARY SET 804M-TYPE CONNECTIONS

3.39 ▶Data Auxiliary Set 804M-type can be used with DS 207-type when the data set is operated as terminal equipment. The following options should be provided in the DAS 804M-type: M, N, F, W, Y, R, and T. To disable the automatic answer feature (option M), the AUTO key should be blocked and the strap between terminals 51 and 52 on TB1 should be removed. Figure 13 is a block diagram of DS 207-type and DAS 804M-type.◀

3.40 ▶For information concerning the options contained in DAS 804M-type and their functions, refer to the section entitled Data Auxiliary Set 804M-Type, Identification and Connections (598-057-100).◀

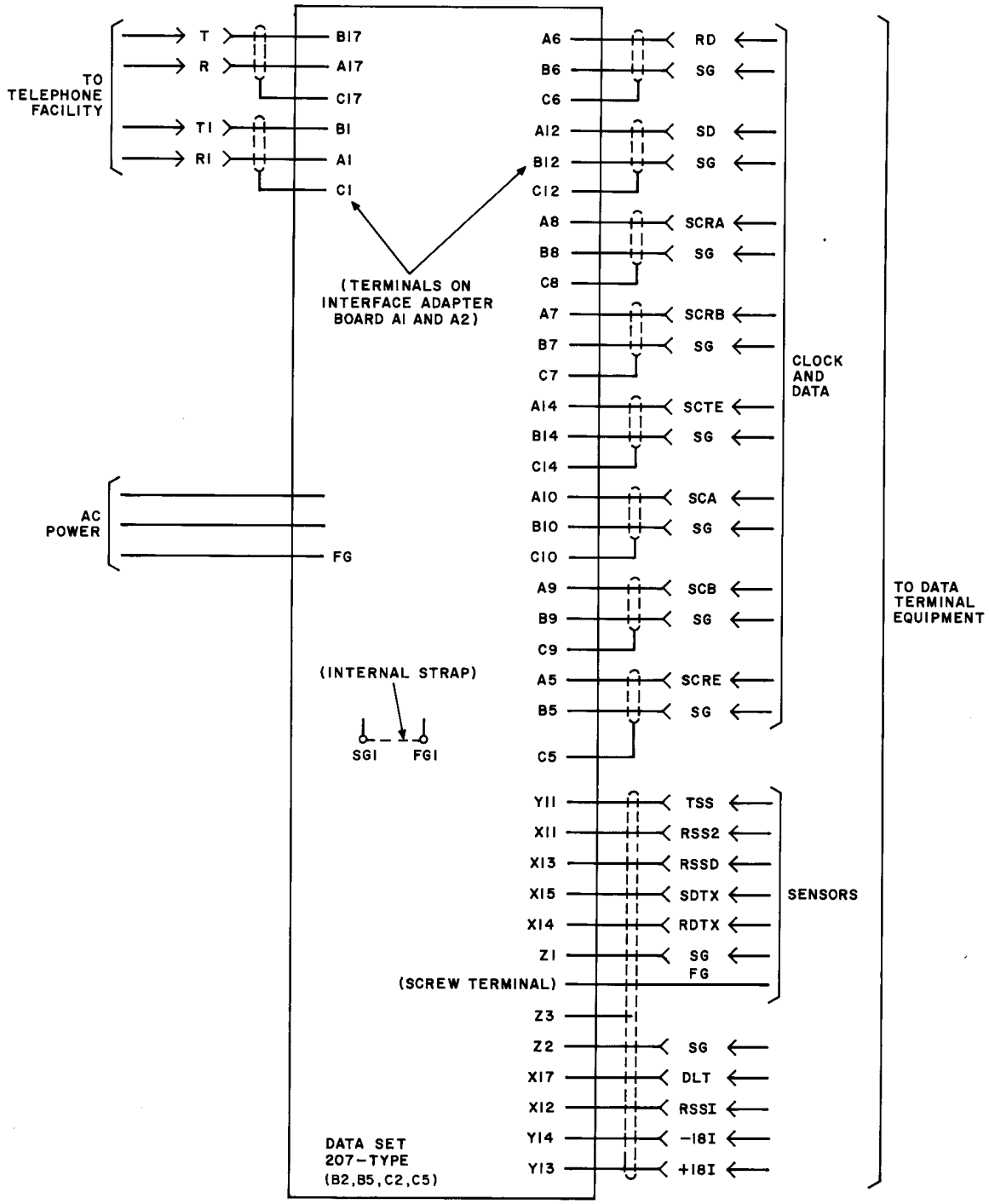


Fig. 9—Interface Connections for a Typical Terminal Station

3.41 The following changes must be made in DAS 804M-type so that it will be compatible with DS 207-type:

(a) Remove the red wire from terminal 6 of TB3 and connect it to terminal 3 of TB3.

(b) Connect a wire from terminal 3 of TB3 to terminal 49 of TB1.

(c) Remove the red-slate wire from terminal 63 of TB1 and connect it to terminal 48 of TB1.

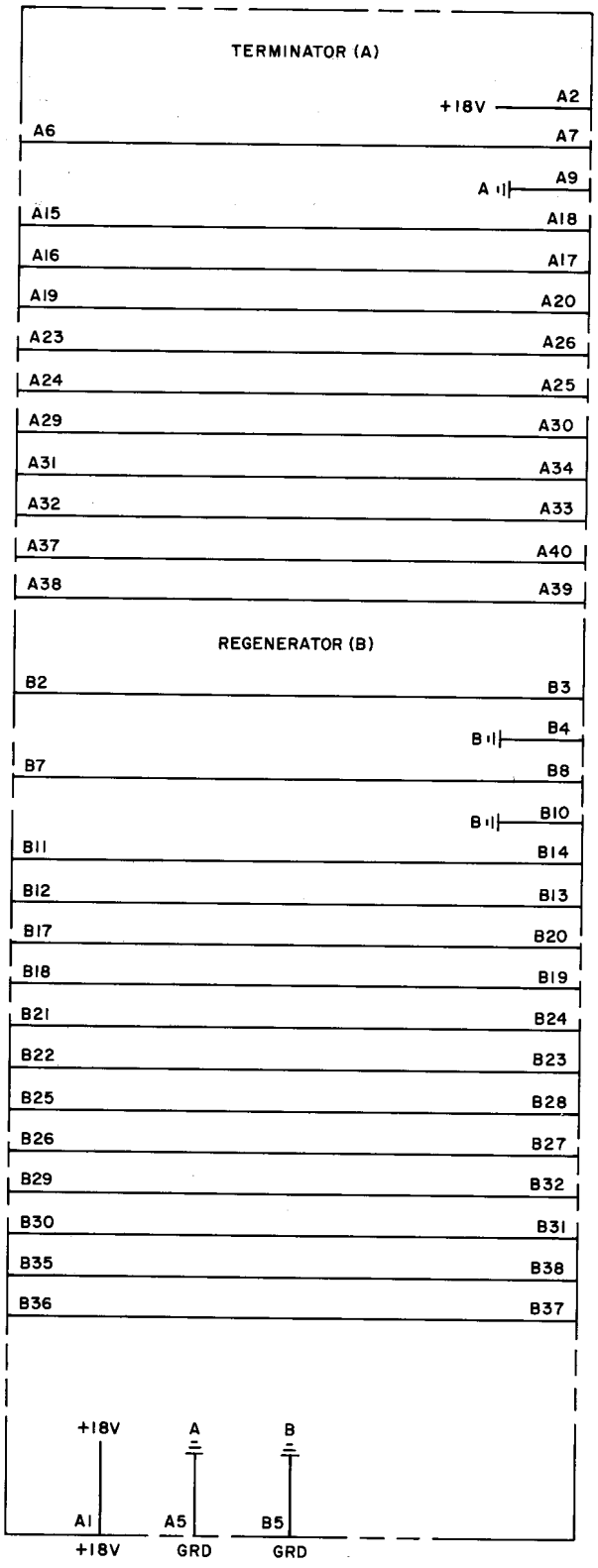


Fig. 10—Circuit Pack CU 1 (Terminator-Regenerator) Board

TABLE E

STRAP CIRCUIT (AR161) OPTIONS FOR REGENERATORS

DATA SET 207 TO DATA SET 207	DATA SET 207 TO NON-207 COMPANION MODEM
A1 to A2	A2 to A3
B1 to B2	B2 to B3
C2 to C3	
E1 to E2	E2 to E3
G1 to G2	G2 to G3
J2 to J3	J2 to J3

(d) Remove the red-green wire from terminal 50 of TB1 and connect it to terminal 23 of TB1.◀

3.42 ▶When using DAS 804M1 (rotary dial), remove the off-normal dial contact connections by removing the wires from TB1-49 and TB1-50 and connecting them to TB3-4 and TB3-5, respectively.◀

3.43 ▶Power and line connections for DAS 804M-type are taken from adapter boards A1 and A2 and TS7 on DS 207-type as shown in Fig. 14.◀

3.44 ▶Connections from the adapter boards and TS7 are made to connecting blocks before going to DAS 804M-type (Fig. 15).◀

3.45 ▶Figure 16 shows the 25-pin connector on the rear of DAS 804M-type and the designation of the pin leads.◀

3.46 ▶Connection of DAS 804M-type to the KTU 1 should be made according to Fig. 17. Voltage terminations for the KTU 1 are shown in Fig. 18 on the KTU 2.◀

3.47 ▶The DAS 804M-type will automatically go into the test mode condition if the dc power supply is interrupted. This condition will occur when DAS 804M is installed and power first applied, and possibly later on if a power failure occurs. The TEST lamp will light when power is applied, and the following steps should be taken for its release:

(a) Operate TALK key and take handset off-hook.

(b) Momentarily press DATA key.

(c) Depress TALK key.

Both DATA and TEST lamps should now be out indicating that the test mode is released.

3.48 When all connection requirements have been completed, perform the Installation Test procedures in the section entitled Data Set 207-Type, Transmitter-Receiver, Test Procedures (592-020-500). After testing is completed, refer to Part 2 (INSTALLATION) and complete 2.07 and 2.08 for Data Set 207C-type.

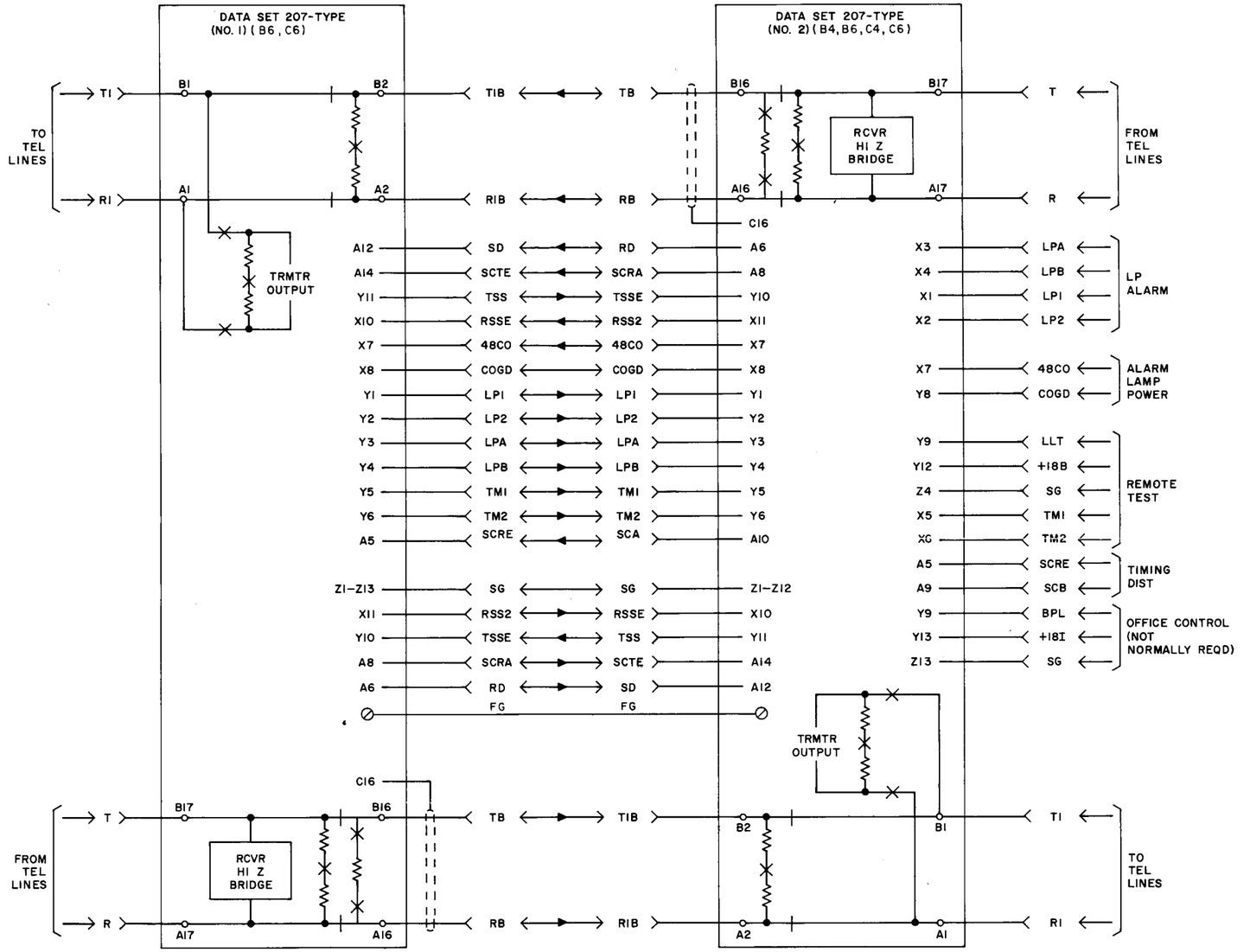


Fig. 11—Interface Connections for a Typical Regenerator Station Using Two Data Sets 207-Type

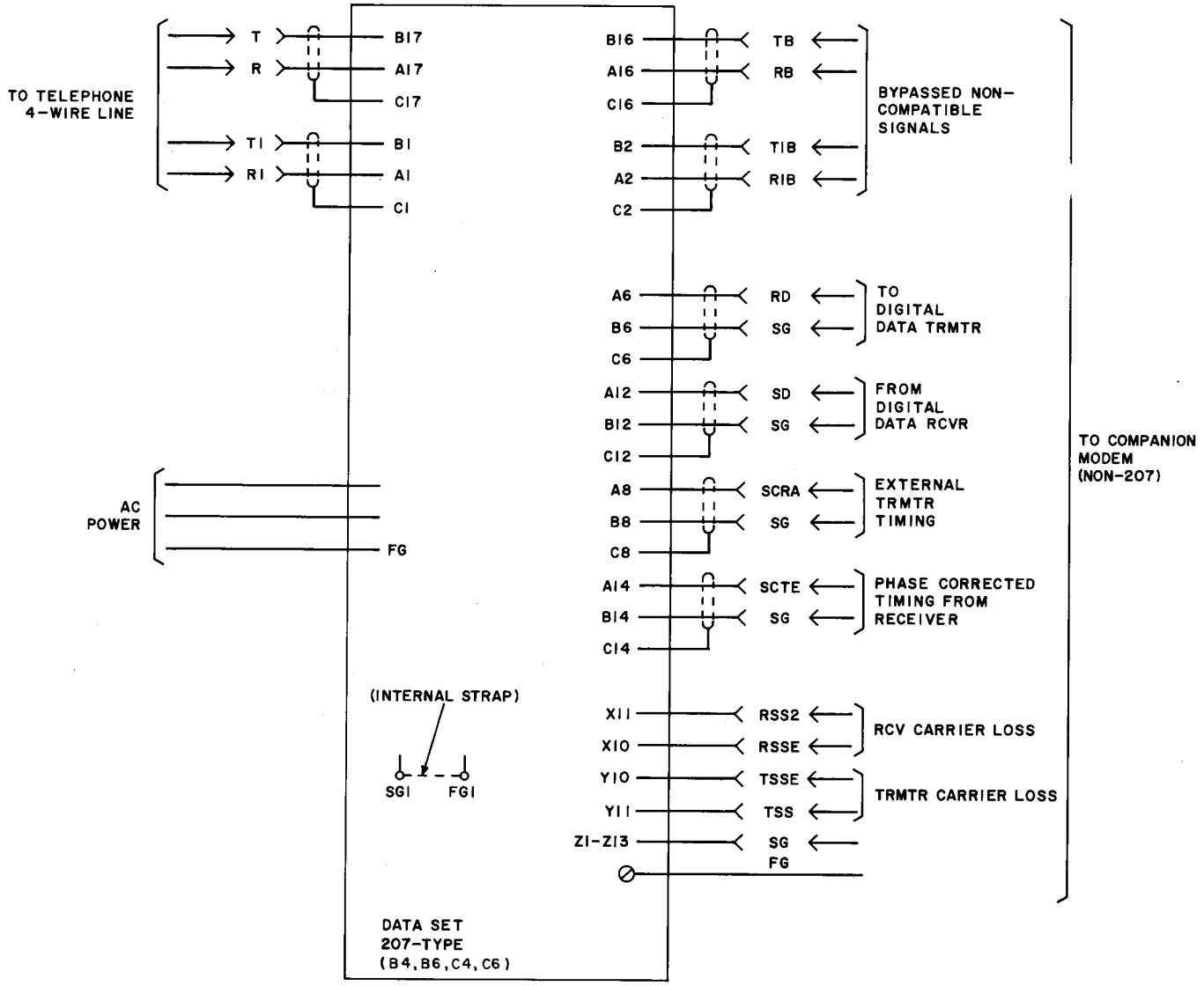


Fig. 12—Interface Connections for a Typical Regenerator Station Using One Data Set 207-Type and a Non-207 Companion Modem

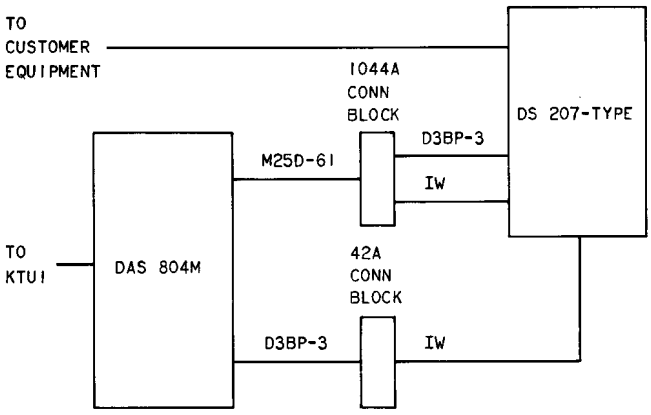


Fig. 13—Block Diagram of Data Set 207 With Data Auxiliary Set 804M

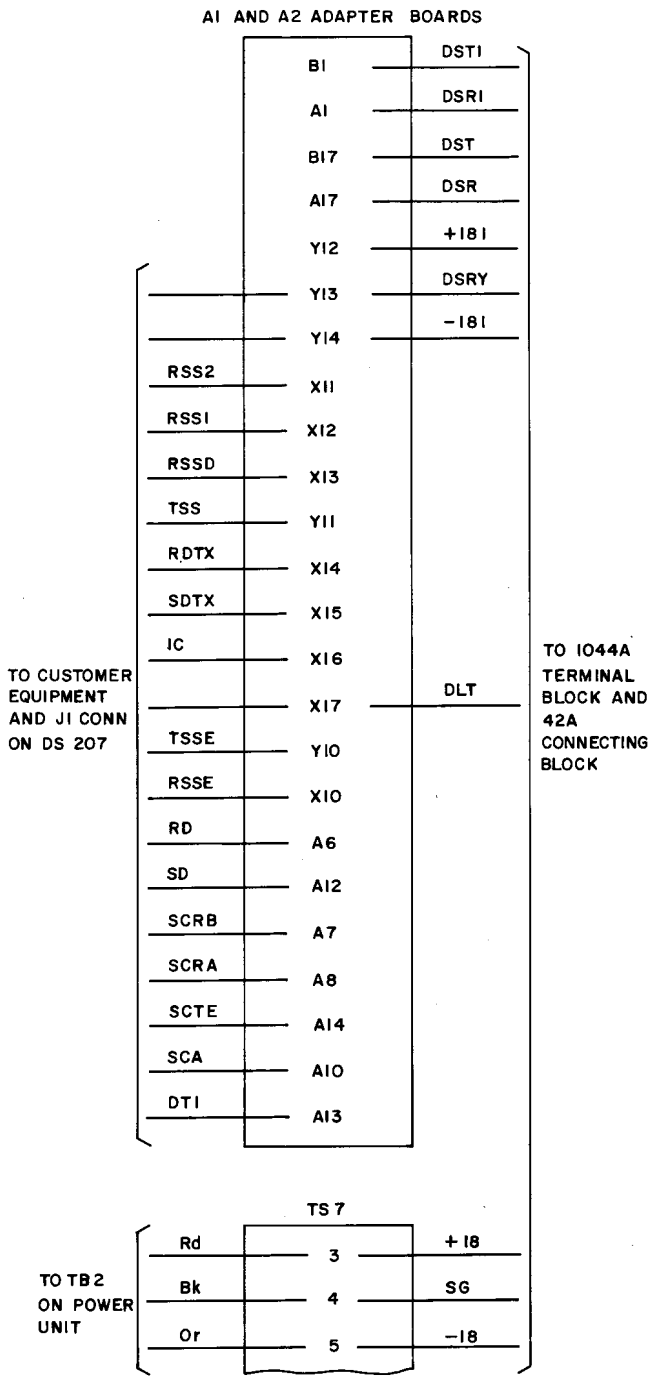


Fig. 14—Line, Power, and Interface Connections on Data Set 207

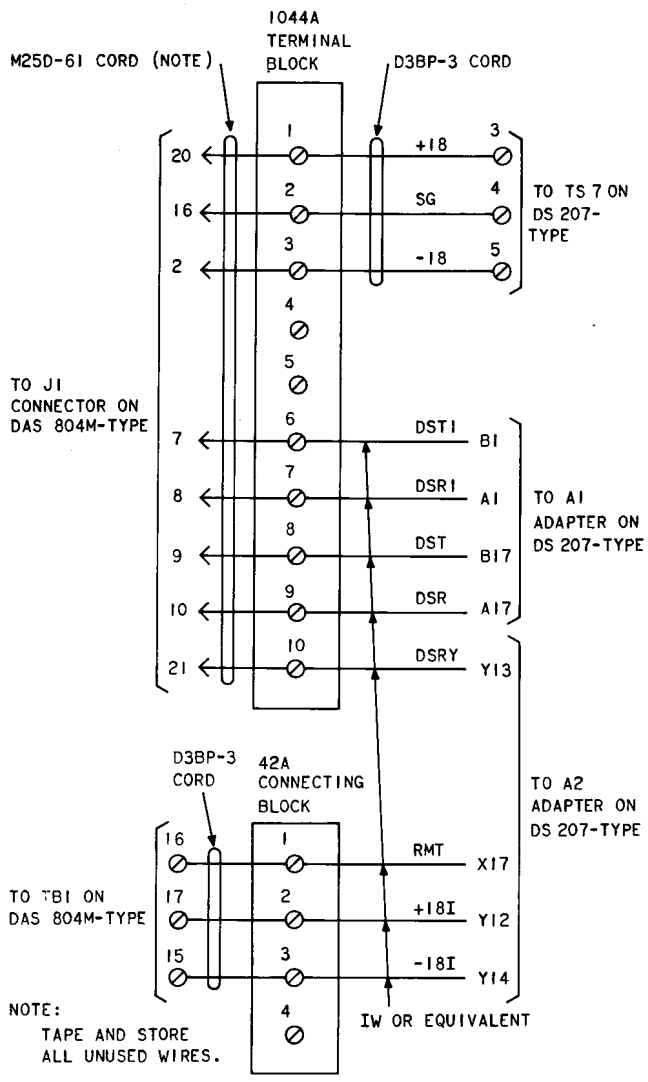


Fig. 15—Intraconnections for Data Set 207-Type With Data Auxiliary Set 804M

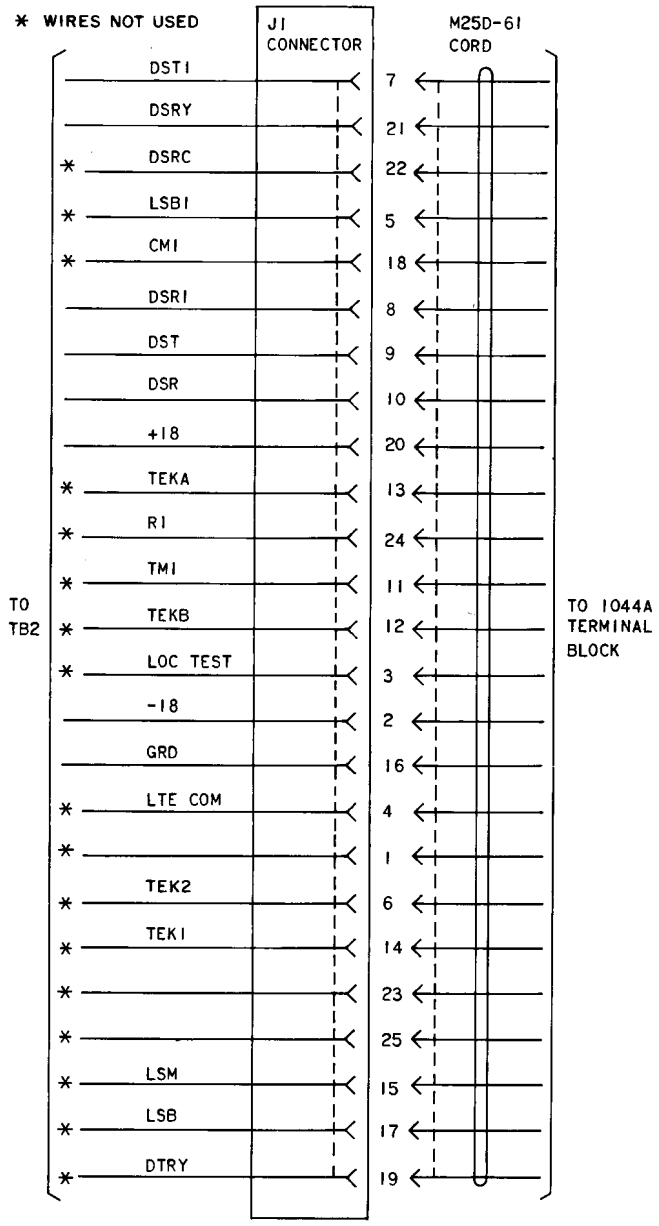


Fig. 16—Connector Jack on Data Auxiliary Set 804M

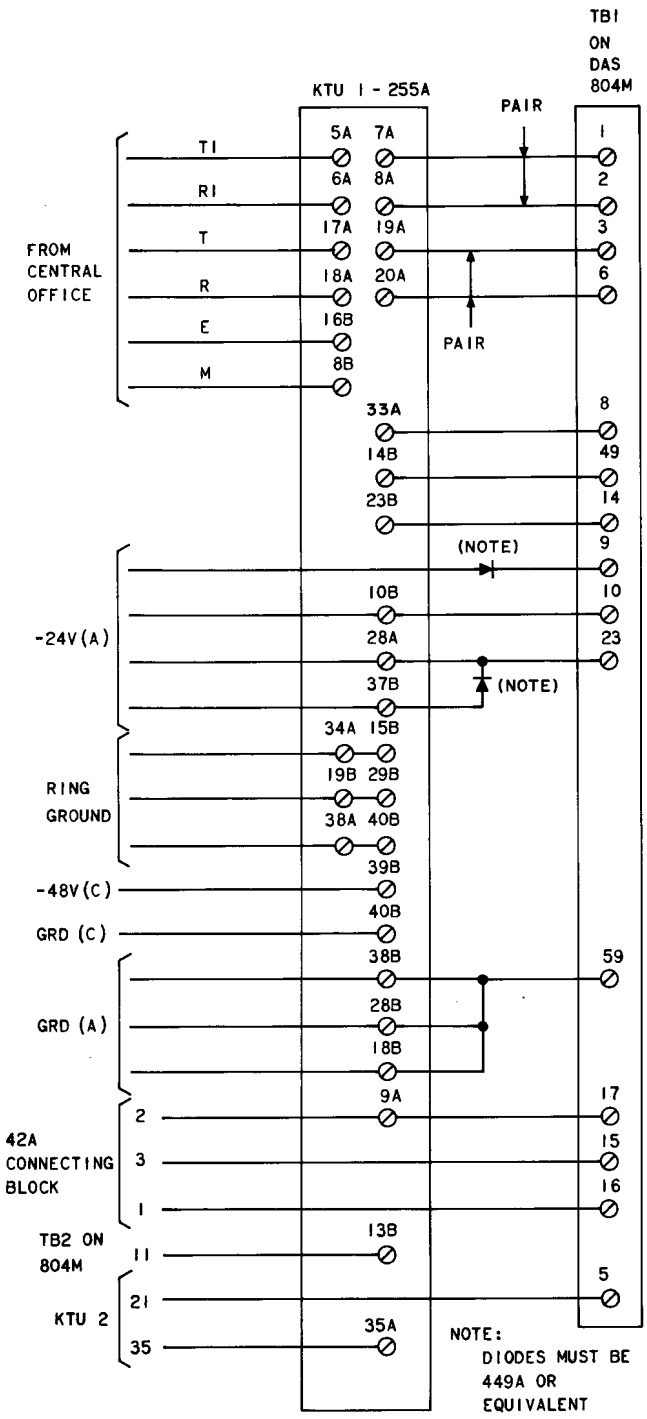


Fig. 17—Telephone Line and Voltage Source Terminations

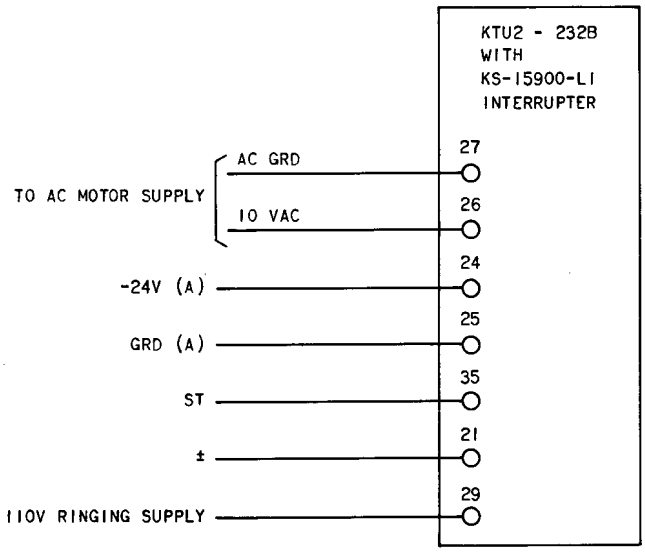


Fig. 18—Voltage Source Terminations