407AR AND 407BR MULTIPLE DATA STATIONS
INSTALLATION AND CONNECTIONS

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1. GENERAL

1.01 This section provides installation and connection procedures to be followed when installing the 407AR-L1B and 407BR-L1A multiple data stations. Installation information is also provided on the CALL DIRECTOR®,telephone set, and 2B automatic call distributor (ACD) associated with the data station. Information concerning the associated business machine, data terminal equipment, or related services is ***not*** included.

1.02 When this section is reissued, the reason for reissue will be presented in this paragraph.

1.03 The DS 407AR or 407BR multiple data station consists of data sets 407AR-L1B or 407BR-L1A, 41-type data mounting(s) (eight data sets per data mounting), and an appropriate cabinet. The 41A3 and 41B3 data mountings contain a 101A power unit, but only the 41A3 contains a test unit. One 101A power unit may supply power to one data mounting or a maximum of eight data sets. The test unit consists of the 46A1 and 47A1 data units. The DS 407AR and 407BR multiple data station sets are receivers of TOUCH-TONE® signals used primarily in Digital Inquiry Voice Answer-Back (DIVA) systems.

1.04 The 407AR and 407BR multiple data stations may be housed in a KS-20018-L11A or -L12A cabinet, or equivalent, or any mounting rack arrangement that will accept the 23-inch, 41-type data mounting. Each KS-20018-type cabinet listed above may house the following number of 41-type data mountings and data sets.

- KS-20018-L11A cabinet can house one 41A3 and up to two 41B3 data mountings with a maximum of twenty-four data sets 407AR-L1B or sixteen 407BR-L1A. (Heat dissipation reduces the number of DS 407BRs that can be mounted in a given cabinet.)

- KS-20018-L12A cabinet can house one 41A3 data mounting with a maximum of eight DS 407AR-L1B or 407BR-L1A.

Larger installations require additional KS-20018-L11A cabinets.

1.05 Plugs and cables for connecting the customer-provided terminals (CPTs) to the data sets are provided by the customer and should not exceed 50 feet in length. The cables for connecting the multiple data station to the transmission facilities must be terminated at the data mounting end in a 50-pin connector, such as the one on the A25D-type connector cable.

Some installations may require that a 5-foot M25A-61 cord, or equivalent, be supplied with the 407AR or 407BR multiple data station. These cords can serve as extension cords for connections to customer interface cords external to the cabinet. The M25A-61 cord, or equivalent,

is required when the customer interface cords have a bending radius greater than 4 inches.

1.06 The multiple data station may be installed in any location that is convenient for the customer within 50 feet of the CPT. It is desirable to mount the station adjacent to or within view of the customers audio response unit (ARU). This will allow visual monitoring of the status lamps on the DS 407ARs or 407BRs while operating or testing the ARU. Verify that the location selected by the customer for the installation is adequate for maintenance and that the customer-provided ac power outlet is ***not*** controlled by a switch. The ac power outlet must be within 6 feet of the equipment cabinet or mounting rack arrangement.

1.07 Reference directions (left, right, front, or rear) on the data mounting are in respect to facing the apparatus from the front.

1.08 When test or demonstration calls are made, refer to the section entitled Crediting Charges on Test Calls (010-250-001) for the proper procedure for crediting charges.

1.09 Ensure that the data loops have been tested and meet requirements outlined in the section entitled Data Systems—DATAPHONE® Service on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501) or Voice Bandwidth Private Line Data Circuits—Tests and Requirements (314-410-500).

1.10 Data sets and data units found to be defective should be returned to a Western Electric Company distributing house for repair. Sets should be tagged to indicate the nature of the trouble.

2. SPECIAL TOOLS

2.01 In addition to the standard installation tools, installation of the data mountings and data sets will require the following special tools:

- KS-19053-L1 screwdriver or equivalent
- Screw starter, Kedman Co. No. 1736, or equivalent.

3. OPTIONS

A. DS 407AR-L1B and 407BR-L1A

3.01 Options for DS 407AR and 407BR multiple data stations vary with application. Options are installed on the JU1C or JU3B circuit packs by means of small 2-pronged plugs which fit into numbered jacks on both DS 407AR and 407BR. Additional options on DS 407BR are made by means of a 4-section switch on the circuit module (daughter board). Installation of options should be made in accordance with the service order or the circuit layout record card. There are no options associated with the data units. ***Install options in DS 407AR-L1B or 407BR-L1A as applicable before installing the data sets in the data mounting.*** Options which apply to DS 407AR and 407BR are illustrated in Fig. 1 and 2, and are listed in Table A.

B. Station Options

3.02 Six options are made external to the data set (AA through JJ, Table A). Four of these options are made on the connector block or intermediate distribution frame; two are made on the power supply.

C. Option Descriptions

3.03 The following describes both the data set and the data station options.

(a) ***Option A***—This option (factory-furnished) provides switched telecommunications network operation with a line impedance of 900 ohms.

(b) ***Option B***—This option provides private line (PL) operation with a line impedance of 600 ohms. When this option is installed, the line control circuit of the data set is bypassed and the data set is placed on line via the data terminal ready (DTR) customer interface lead.

(c) ***Option C***—This option (factory-furnished) is provided when there is ***not*** an automatic call distributor (ACD) associated with the data system.

(d) ***Option D***—This option is provided when an ACD ***is*** associated with the data system.

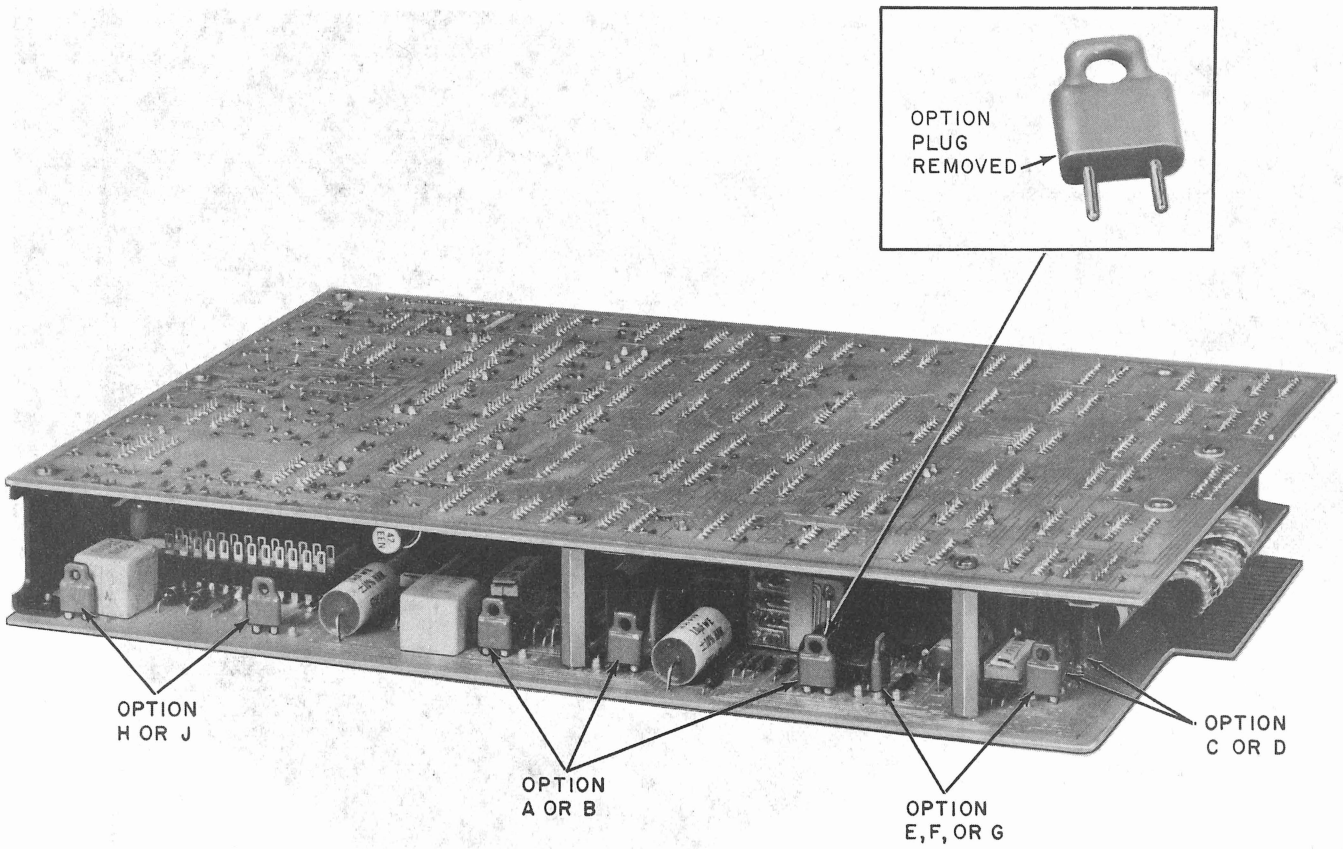

Fig. 1—Data Sets 407AR and 407BR—Option Plug Locations

(e) ***Option E***—This option provides 0-dB attenuation of the data set answer-back signal and allows a maximum signal level of -4 dBm out of the data set.

(f) ***Option F***—This option provides 4-dB attenuation of the data set answer-back signal and allows a maximum answer-back signal level of -8 dBm out of the data set.

(g) ***Option G***—This option (factory-furnished) provides 2-dB attenuation of the data set answer-back signal and allows a maximum signal level of -6 dBm out of the data set.

(h) ***Option H***—This option (factory-furnished) provides an Electronic Industries Association (EIA) voltage interface (RS-232-C).

(i) ***Option J***—This option provides a contact ***equivalent*** interface.

(j) ***Option K***—(DS 407BR-L1A only) With this option, the calling terminal is always able to initiate referral to an attendant by sending the TOUCH-TONE sequence **.

(k) ***Option L***—(DS 407BR-L1A only) With this option, the terminal can initiate referral to an attendant only during "computer down" mode.

(l) ***Option M***—(DS 407BR-L1A only) This option provides out of service controlled by the OS interface lead.

(m) ***Option N***—(DS 407BR-L1A only) This option provides out of service controlled by DTR lead.

(n) ***Option P***—This option provides 6-dB attenuation of the data set answer-back signal and allows a maximum signal level of -10 dBm out of the data set.

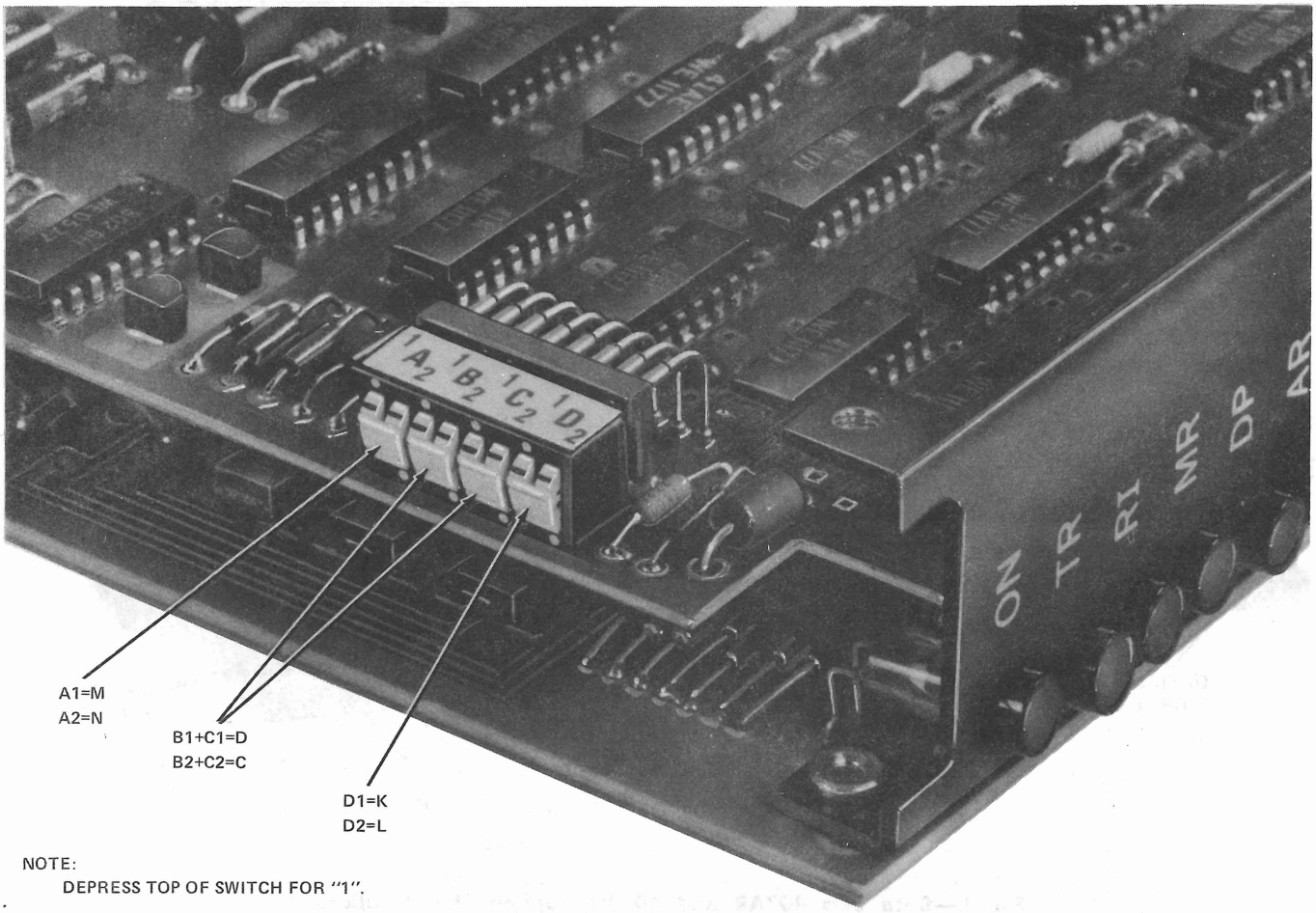

Fig. 2—Data Set 407BR—Option Switches on CM1 (Daughter Board)

(o) ***Option AA***—(DS 407BR-L1A only) This option provides for "computer-down" detection by means of a customer-actuated switch.

(p) ***Option BB***—(DS 407BR-L1A only) This option provides for "computer down" detection by means of all DTR leads being in the ***off*** condition simultaneously.

(q) ***Option CC***—(DS 407BR-L1A only) This option provides for "computer down" detection either by customer-actuated switch or by all DTR leads being ***off.***

(r) ***Option DD***—(DS 407BR-L1A only) "Computer down" option not used.

(s) ***Option HH***—This option provides frame ground to signal ground connection. This is the option usually specified.

(t) ***Option JJ***—This option eliminates frame ground to signal ground connection.

4. CUSTOMER INTERFACE INFORMATION

4.01 Customer interface lead functions, abbreviations, and lead designations are given in Table B.

5. INSTALLATION AND CONNECTION PROCEDURE

5.01 The front cover of the 41-type data mounting is removable (by opening to a horizontal position and pulling forward). A decal is attached to the inside cover of each of the 41-type data mountings, which provides the data set number

TABLE A

DATA SETS 407AR AND 407BR OPTIONS

OPTION	SELECTION	DESIG	STRAPPING				AVAILABLE IN
			ON LINE CONTROL AND INTERFACE BOARD	ON CM1[1]	ON 101A POWER UNIT	ON CONNECTOR BLOCK	
Type of Operation	Switched Network (DDD)	A[2]	E34—E32, E37—E38 E42—E41	—	—	—	Both 407AR and 407BR
	Private Line	B	E34—E33, E37—E36 E42—E43	—	—	—	
Used With ACD	No	C[2]	E28—E26, E30—E29[3]	B2+C2	—	—	Both 407AR and 407BR
	Yes	D	E28—E27, E30—E31[3]	B1+C1	—	—	
Answer Back Level	—4 dBm	E	E54—E56, E60—E58	—	—	—	Both 407AR and 407BR
	—8 dBm	F	E54—E53, E60—E59	—	—	—	
	—6 dBm	G[2]	E54—E55, E60—E61	—	—	—	
	—10 dBm	P	E54—E92, E25—E60	—	—	—	
Customer Interface	E1A	H[2]	E49—E48, E51—E52	—	—	—	Both 407AR and 407BR
	Contact Equivalent	J	E49—E47, E51—E50	—	—	—	
Terminal Initiated Referral	Always	K	—	D1	—	—	407BR Only
	During Computer Down Only	L[2]	—	D2	—	—	
OS Controlled by DTR	No	M[2]	—	A1	—	—	407BR Only
	Yes	N	—	A2	—	—	
Computer Down Detection	Switch Only	AA	—	—	—	Per Fig. 6	407BR Only
	All DTR ***off*** Only	BB	—	—	—	Per Fig. 7	
	Switch or All DTR ***off***	CC	—	—	—	Per Fig. 8	
	Not Used	DD	—	—	—	Per Fig. 9	
Out-of-Service Wiring	Tip-Ring Short	EE	—	—	—	—	Not Used
	Third Wire Ground	FF	—	—	—		
	Separate Pair Short	GG	—	—	—		
Grounding	Frame Ground Connected to Signal Ground	HH[2]	—	—	E16—E17	—	Both 407AR and 407BR
	Frame Ground and Signal Ground Not Connected	JJ	—	—	E16—E17 Open	Per Fig. 4	

1: Applies to DS 407BR only.
2: Factory furnished option.
3: Applies to DS 407AR and DS 407BR.

TABLE B

CUSTOMER INTERFACE LEAD FUNCTIONS

PIN NO.	LEAD DESIGNATION	ABBREVIATION	FUNCTION
1	Frame Ground	FG	Common to ac power service ground.
2	Voice Receive A	VRA	Provides one-half of a 600Ω balanced pair for line signals being passed to the customer.
3 4 5 6	A1 Data A2 Data A3 Data A4 Data	A1 A2 A3 A4	Low group outputs from data set when a valid TOUCH-TONE character is present.
7	Spare	—	Not used.
8	Voice Receive B	VRB	Provides one-half of a 600Ω balanced pair for line signals being passed to the customer.
9 10 11 12	B1 Data B2 Data B3 Data B4 Data	B1 B2 B3 B4	High group outputs from data set when a valid TOUCH-TONE character is present.
13	Spare	—	Not used.
14	Ring Indicator	RI	An ***on*** condition on this lead indicates that ringing signal is being received.
15	Attendant Request	AR	An ***on*** condition on this lead (data set in data mode) indicates that an attendant is requested on the line.
16	Data Present	DP	An ***on*** condition on this lead indicates that the data set is receiving a valid TOUCH-TONE signal. This lead is considered a data lead and therefore an ***on*** condition is a negative voltage.
17 18	Voice Answer-Back A Voice Answer-Back B	VAA VAB	Provides a 600Ω balanced pair for answer-back signal from customer to data set.
19	Data Mode	DM	An ***on*** condition on this lead and the DSR lead (Pin 23) indicates the data set is in the data mode. An ***off*** condition on the DM lead and an ***on*** condition on the DSR lead indicates the data set is in the talk mode.

TABLE B (Contd)

CUSTOMER INTERFACE LEAD FUNCTIONS

PIN NO.	LEAD DESIGNATION	ABBREVIATION	FUNCTION
20	Tone Answer-Back	TAB	An ***on*** condition on this lead causes the data set to disable the voice answer-back port and generate an answer-back tone (2025 Hz).
21	Data Receive	DR	An ***on*** condition ***must*** be placed on this lead (by the customer) to connect the TOUCH-TONE receiver to the telco line. This enables the data set to receive data.
22	Data Terminal Ready	DTR	An ***on*** condition on this lead prepares the data set to be connected to the telco line. In DS 407BR, the out-of-service function can be optionally controlled by the DTR lead. When that option (N) is selected, the OS lead has no effect and the set is out of service when DTR is ***off***.
23	Data Set Ready	DSR	An ***on*** condition on this lead indicates the data set is ***either*** in the data mode and ready to receive data, transmit answer-back signals, or both, depending on the condition of the DR lead (Pin 21), or is in the talk mode (DM lead Pin 19 is ***off***).
24	Signal Ground	SG	This conductor establishes the common ground for signals referenced to it and is optionally connected to frame ground via a strap located on the power unit.
25	Out of Service	OS	An ***on*** condition on this lead makes the data set appear busy to incoming calls. When an ACD is employed, this lead is placed in the ***off*** condition at all times. In DS 407BR, the out-of-service function can be optionally controlled by the DTR lead. When that option (N) is selected, the OS lead has no effect and the set is out of service when DTR is ***off***.

location and computer port assignment for each data set in the data mounting. Another decal is attached to the inside cover of the 41A3 data mounting, which provides local test information.

5.02 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number of this section indicates an action which may or may not be required, depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the PROCEDURE column, and all steps governed by the same condition are designated by the same letter within the procedure. Where a condition does not apply, all steps designated by that letter should be omitted.

5.03 The installation and connection procedures for the 407AR and 407BR multiple data stations are as follows.

STEP	PROCEDURE
	Do not apply power to the cabinet or any of the related components of the data station until the complete station has been installed.
1	Position the KS-20018-L11A or -L12A cabinet, or equivalent, near the customer-provided 60-Hz power outlet and the business machine interface cords as described in paragraph 1.06.
	Note: For ease of installation of the 41-type data mounting(s), the KS-20018-L11A and -L12A cabinets may be placed ***face up*** during installation.
2	Gain access to front of cabinet.
	Note: A bag of number 12 mounting screws and star washers are supplied with each 41-type data mounting. Frame ground is connected to the cabinet from the 41-type data mounting by the use of the star washers.
3	Verify that terminals E16 and E17 on 101A power unit are connected together (option HH) per Fig. 3. If the service order or circuit layout record card requires that signal ground ***not*** be connected to frame ground (optional JJ), remove the strap between E16 and E17 on 101A power unit per Fig. 3. Strap terminal 31 of 41-type data mounting(s) as shown in Fig. 4.
4	Remove the 101A power unit from the 41-type data mounting(s). (Power unit may be shipped loose.)
5	Remove front cover of each 41-type data mounting to be installed as required.
	Note: Removal of the power unit and front cover from the data mounting ensures easy installation of the data mounting within the cabinet.
6a	When installing a DS 407AR data station in a KS-20018-L11A cabinet, install the mounting brackets (furnished with the 41-type data mounting) in the cabinet. The top of the bracket has the hole closest to the end. Mount the 41A3 data mounting in the top or center position as required.
6b	When installing a DS 407BR data station in a KS-20018-L11A cabinet, do not use the mounting brackets. Mount the 41A3 data mounting in either the third, sixth, and ninth holes from the top or the third, sixth, and ninth holes from the bottom of the cabinet.

STEP	PROCEDURE

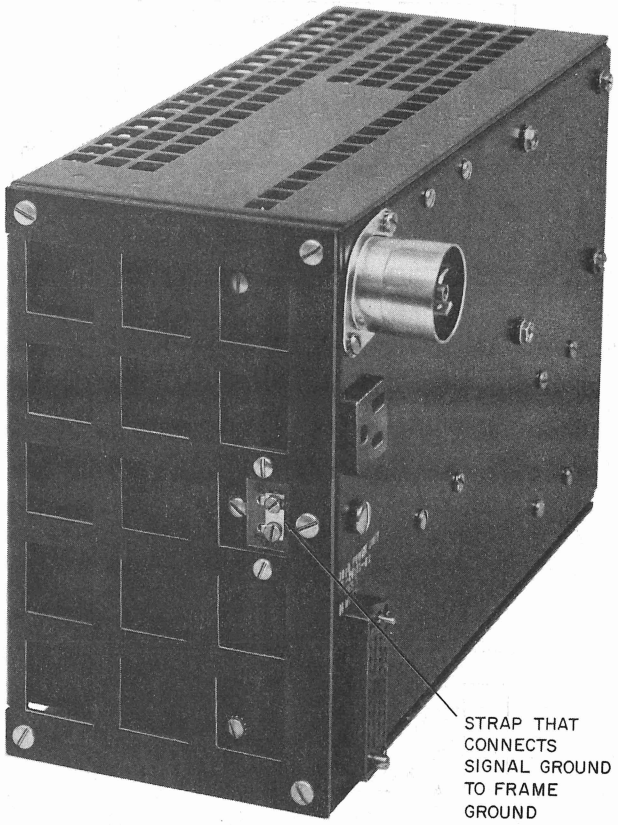

Fig. 3—Rear View of 101A Power Unit

7a Mount the 41B3 data mountings above and below the 41A3 data mounting as required for a DS 407AR data station.

7b Mount the 41B3 data mounting above or below the 41A3 data mounting as required for a DS 407BR data station.

8a Connect the five wires from the 41B3 data mounting(s) to the 46A1 data unit (after removing 47A1 data unit) per Table C by removing two screws under the 46A1 data unit and sliding it forward. (The top of the 46A1 data unit hinges upward to provide access to the terminals.)

Note: In private line systems (option B), remove BL-W wire from screw terminal 35 on the 46A1 data unit and reconnect to screw terminal 25.

9b If a KS-20018-L12A cabinet is required—
Mount the 41A3 data mounting in the cabinet.

STEP	PROCEDURE

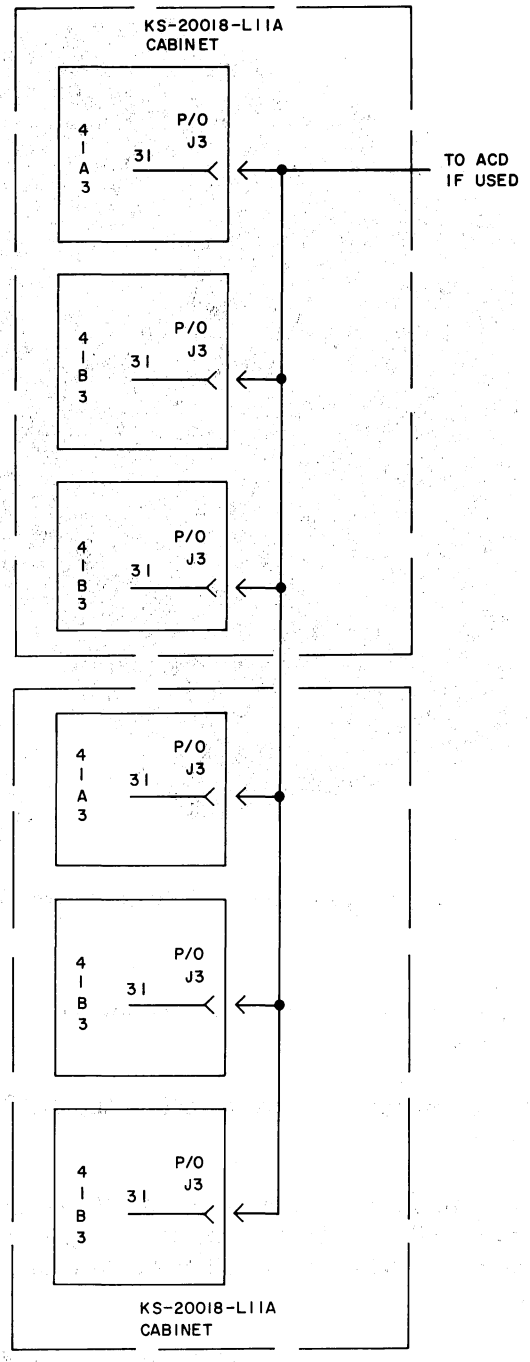

Fig. 4—Station Wiring When Frame Ground and Signal Ground Are Disconnected (Multiple Cabinets) (Option JJ)

STEP	PROCEDURE

TABLE C

41B3 DATA MOUNTING CONNECTIONS TO 46A1 DATA UNIT

41B3 DATA MOUNTING			46A1 DATA UNIT
DESIG	PIN NO.	COLOR CODE	SCREW TERMINAL
SLT	16	S	7, 8, or 9
SLR	19	G	10, 11, or 12
LTS	15	G-R	4, 5, or 6
LT	23	BR	1, 2, or 3
RTR	20	W	19, 20, or 21

Note: The 46A1 data unit may have to be removed from the 41A3 data mounting when the above connections are made from the 41B3 data mounting.

10 Reinstall the 101A power unit(s) removed in Step 4 in their original location in the 41-type data mounting(s).

11a If a KS-20018-L11A cabinet is used—
Connect the KS-14532-L16 power cable (furnished with 41A-type data mounting) to the ac inlet located on the side of the 101A power unit mounted in the ***botton*** 41B3 data mounting.

12a Interconnect all other 101A power units together using P3BJ power cables (furnished with the 41B-type data mountings).

13b If a KS-20018-L12A cabinet is used—
Connect the KS-14532-L16 power cable (furnished with 41A3 data mounting) to the ac inlet located on the side of the 101A power unit.

14 Verify that all pertinent data set options are properly installed per Table A and Fig. 1 and 2.

15 Insert each data set into the 41-type data mounting(s).

Note: Ensure that a good connection is made between the data set and the data mounting by using sufficient force when pushing the data set into position.

STEP	PROCEDURE

16 Insert the two telephone connector plugs (A25D connector cable equipped with KS-16689-L3 plug) into J3 and J4 located on the rear of each 41-type data mounting.

17 Route the A25D connector cables, as required, through the cabinet to the connecting block or intermediate distribution frame (IDF) and terminate per Table D.

18 Connect service line to connecting block or IDF.

19 Connect service line to pins 23 and 48 of the A25D connector cable going to J4 of the 41A3 data mounting as shown in Fig. 5.

Note: For private line systems (option B), connect tip and ring pairs ***only*** per Table D. The remainder of the arrangement is connected per customer requirement.

TABLE D

TELEPHONE INTERFACE CONNECTIONS FOR DATA SETS 407AR AND 407BR

DATA SET		J3 CABLE PAIRS		J4 CABLE PAIRS				J13 CABLE PAIRS				J14 CABLE PAIRS			
						SVC LINE									
NO.	LINE	TIP	RING	OS1	OS2	T	R	TT	TR	LAMP	A	DTRA	ARA	+12	ST1
1	1	26	1	26	1	48	23	26	1	27	2	26	1	27	2
2	2	29	4	27	2	48	23	28	3	29	4	28	3	29	4
3	3	32	7	28	3	48	23	30	5	31	6	30	5	31	6
4	4	35	10	29	4	48	23	32	7	33	8	32	7	33	8
5	5	38	13	30	5	48	23	34	9	35	10	34	9	35	10
6	6	41	16	31	6	48	23	36	11	37	12	36	11	37	12
7	7	44	19	32	7	48	23	38	13	39	14	38	13	39	14
8	8	47	22	33	8	48	23	40	15	41	16	40	15	41	16

Note 1: Data set 1 is mounted in the left most slot of the 41-type mounting facing the front panel of the mounting.
Note 2: The out-of-service leads are not required for operation with an ACD. In this case, the out-of-service function is accomplished by turning DTRA ***off***.

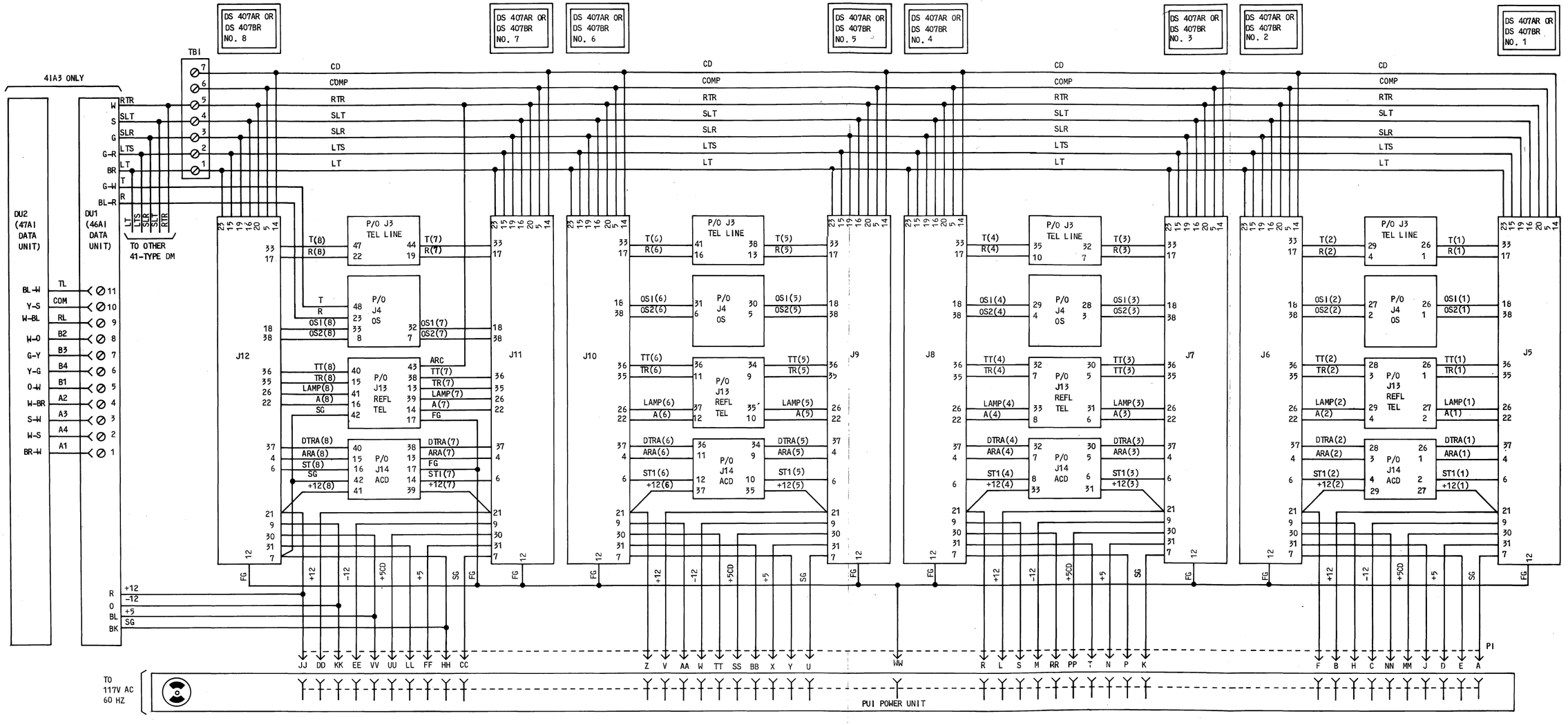

Fig. 5—41A3 or 41B3 Data Mounting for Data Set 407AR or 407BR—Interconnection Diagram

STEP	PROCEDURE

20e If a 2B ACD is specified on the service order or circuit layout record card—
Proceed to Section 594-800-501.

21 Connect the central office telephone lines to the tip and ring pairs of the data sets at the connecting block or IDF per Table D.

22 Wire option AA, BB, CC, or DD as specified on the service order or circuit layout record card, in accordance with Fig. 6, 7, 8, or 9, as applicable.

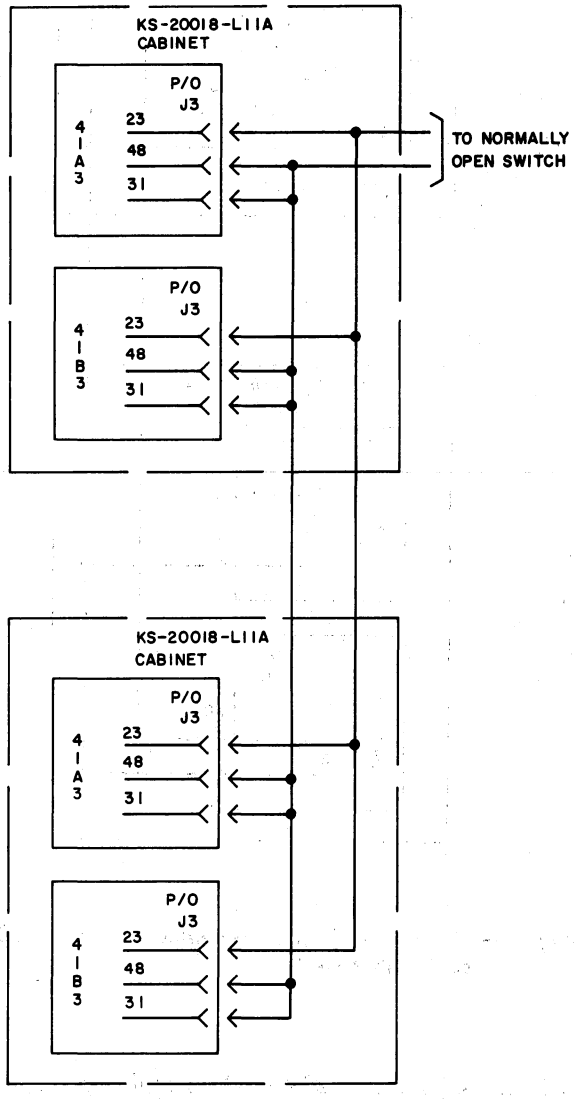

Fig. 6—Computer Down Detection by Switch Only (Option AA)

STEP	PROCEDURE

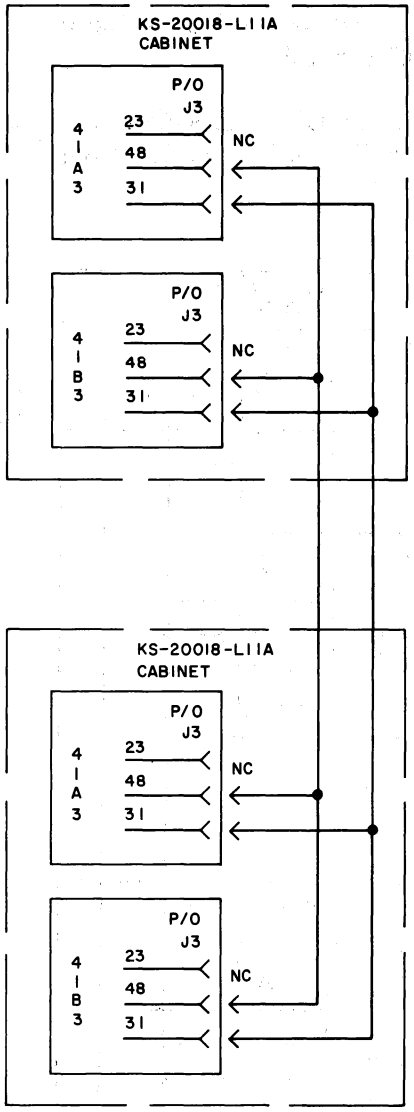

Fig. 7—Computer Down Detection by All DTR OFF Only (Option BB)

23f If a 831CM, 2831CM, 630DAM, or 2630DAM telephone set, or equivalent, or a Call Director is specified on the service order or circuit layout record card—
Make connections per Table E from connecting block or IDF to Call Director or key telephone set. Refer to Fig. 10 for a functional wiring arrangement from data set number 1 to the Call Director or key telephone set.

STEP	PROCEDURE

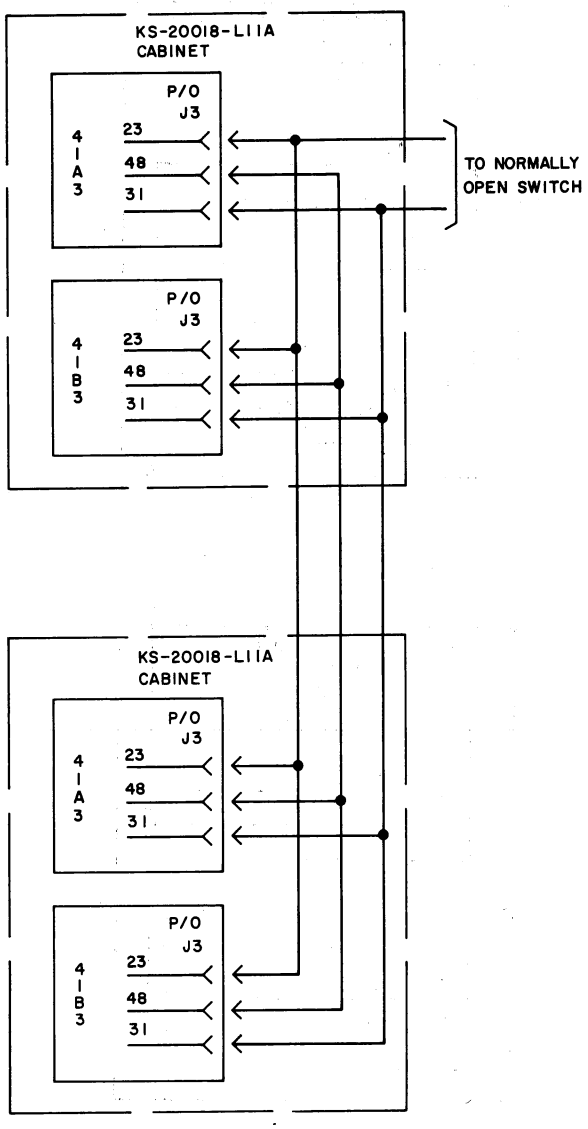

Fig. 8—Computer Down Detection by Switch or All DTR OFF (Option CC)

Note: Table E shows the connecting arrangement for the first four data sets to the Call Director or telephone set via the connecting block or IDF. Refer to the KEY SYSTEMS SERVICE MANUAL, volume one, or pertinent BSPs, for complete Call Director or telephone set, or equivalent, pin assignment.

STEP	PROCEDURE

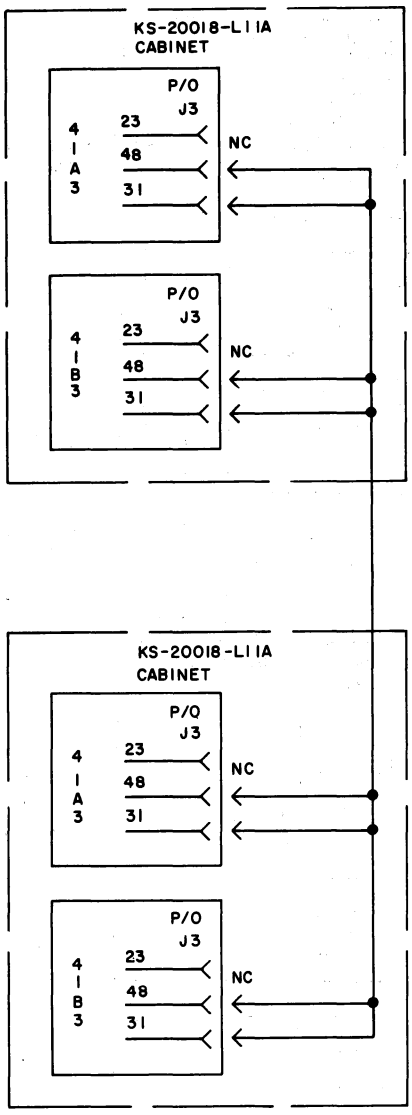

Fig. 9—Computer Down Detection Not Used (Option DD)

24 If an 831CM, 2831CM, 630DAM, or 2630DAM telephone set is specified for use in a referral telephone arrangement, make connections as shown in Fig. 11 using an 828D-L1 DAS and KS-19252-L1 bridging adapters as required.

25 Connect the power cord to a 117-volt 60-Hz ac grounded outlet.

STEP	PROCEDURE

TABLE E

CONNECTION ARRANGEMENT FOR DATA SET 407AR OR 407BR TO A TELEPHONE SET OR CALL DIRECTOR

KEY TEL SET OR CALL DIRECTOR		CONNECTING BLOCK OR IDF		KS-16672-L3 50-PIN CONNECTOR
DESIG	PIN NO.	DESIG	PIN NO.	J3
R1	1	TR	27	
T1	26	TT	2	DATA
A1	2 (to GRD)	—	—	SET
AH	27	A	4	1
L1	3 (to 10V RMS — Note 1)	—	—	(Note 2)
LG1	28	LAMP	3	
R2	4	TR	33	
T2	29	TT	8	
A	Common to DATA SET 1	—	—	DATA
A-H-S2	30	A	10	SET
L2	6 (to 10V RMS — Note 1)	—	—	2
LG2	31	LAMP	9	(Note 2)
R3	7	TR	39	
T3	32	TT	14	DATA
A	Common to DATA SET 1	—	—	SET
A-H-S3	33	A	16	3
L3	9 (to 10V RMS — Note 1)	—	—	(Note 2)
LG3	34	LAMP	15	
R4	10	TR	45	
T4	35	TT	20	DATA
A	Common to DATA SET 1	—	—	SET
A-H-S4	36	A	22	4
L4	12 (to 10V RMS — Note 1)	—	—	(Note 2)
LG4	37	LAMP	21	

Note 1: The 10V RMS must be locally supplied. If more than one lamp is required per data set, a 412A, or equivalent, KTU should be used.

Note 2: Data set 1 is mounted in the far left slot of the 41-type data mounting. The J4 connector provides the same pin assignment as the J3 connector for data sets 5 through 8.

STEP	PROCEDURE

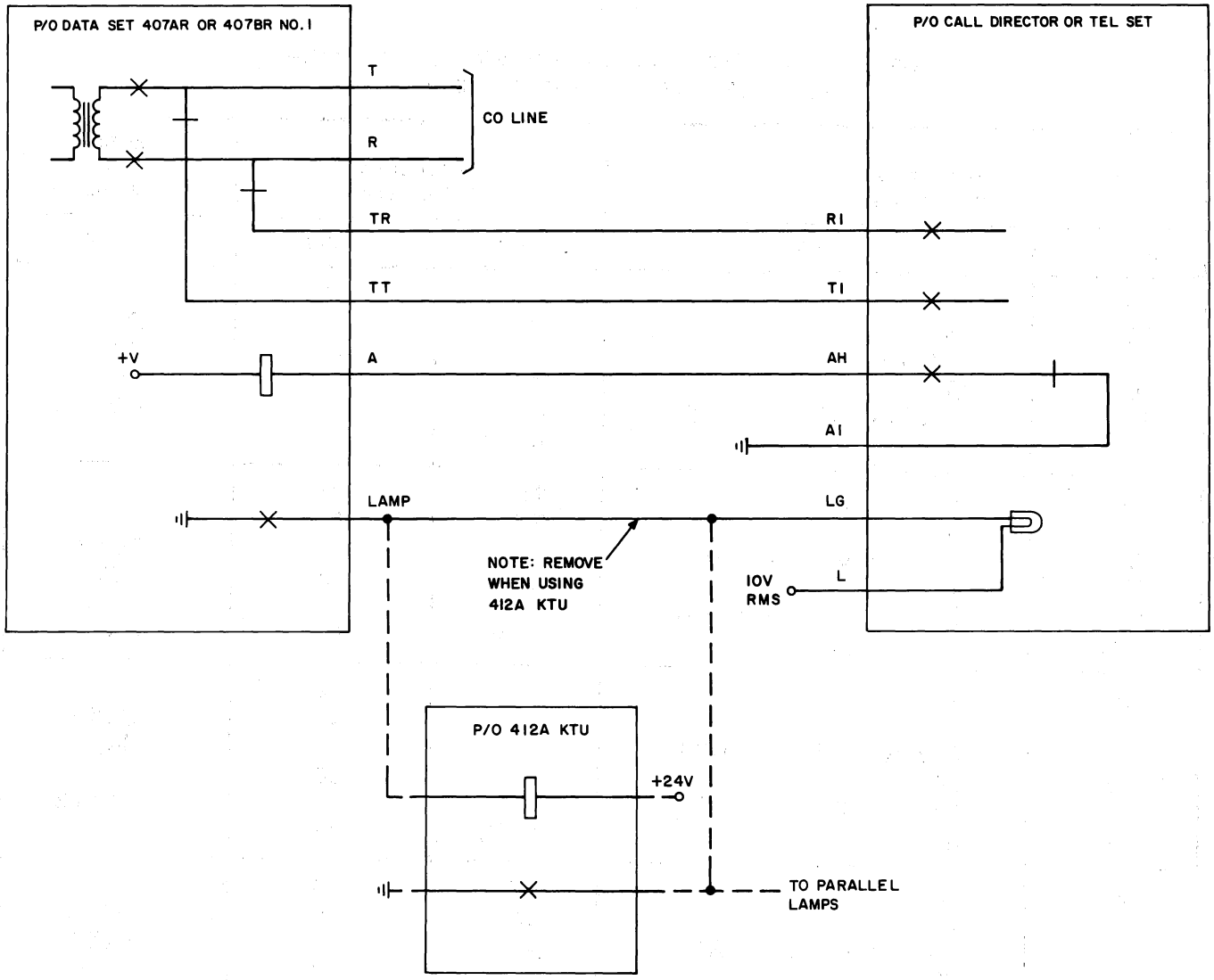

Fig. 10—Functional Wiring Arrangement From Data Set 407AR or 407BR to Call Director or Telephone Set

Requirement: ON lamp of every data set should light, indicating proper power wiring.

26 Install front covers on 41-type data mounting(s) and perform the installation test per Section 594-801-500.

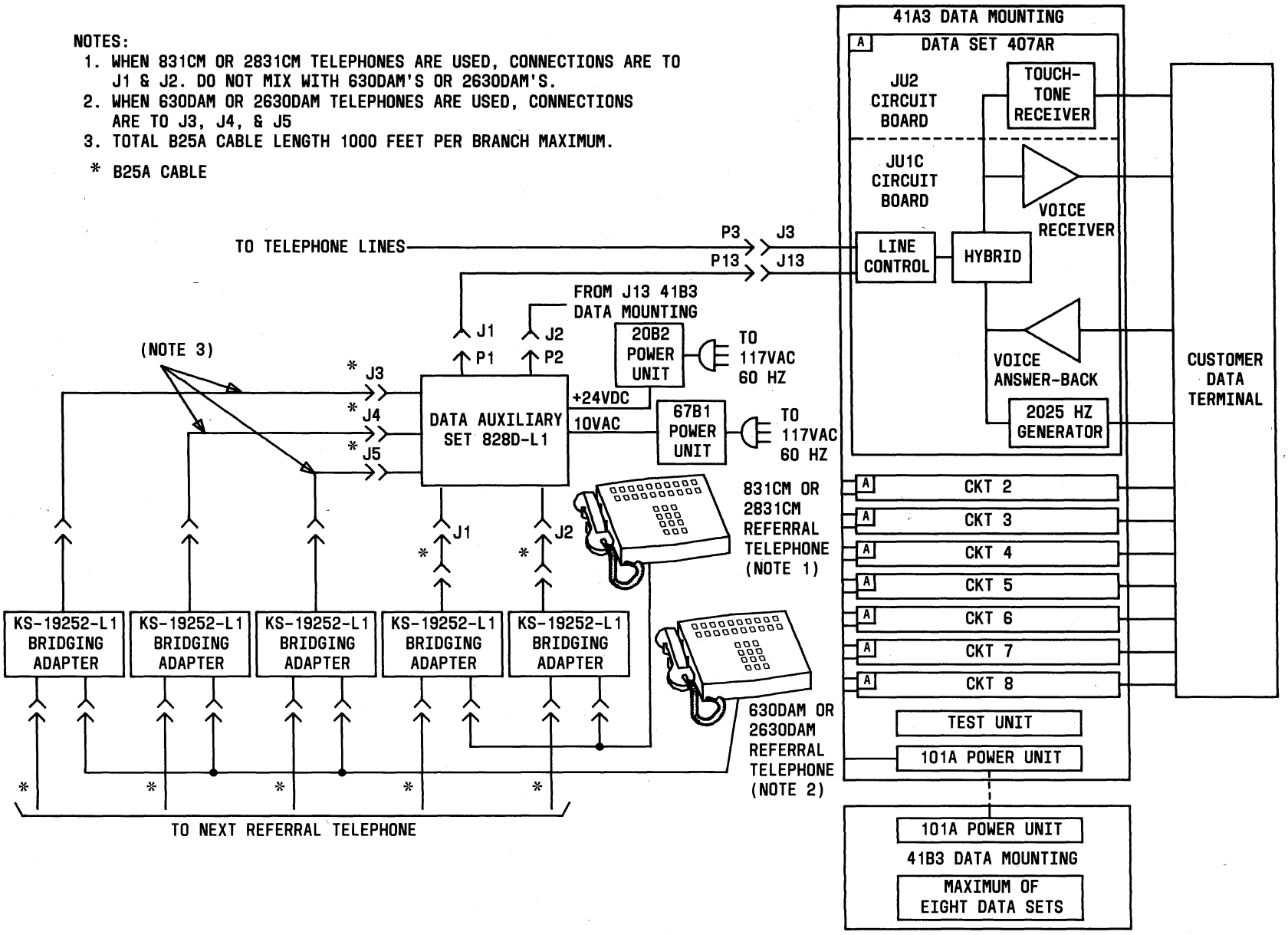

Fig. 11—407AR Multiple Data Station Arrangement Functional Block Diagram—Typical