

DATA AUXILIARY SET 828A

INSTALLATION AND CONNECTIONS

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APPENDIX 1	

1. GENERAL

1.01 This section contains information and instructions for the installation and connection of data auxiliary set (DAS) 828A. This section does not cover the installation of any other equipment that is used in conjunction with the data auxiliary set.

1.02 This section is reissued to add information on the following:

- Wiring for options X and Y
- Hazardous voltage protection
- Station bridging wiring (Fig. 7 and 8).

1.03 DAS 828A is used in standard station arrangements providing full data or full data/alternate voice service over 4-wire private line (4W PL) voiceband data circuits. It is available under four list codes, as follows:

- 828A-L1 (Rack Mount)
- 828A-L1A (Wall Mount)
- 828A-L1/2 (Rack Mount)
- 828A-L1A/2 (Wall Mount).

1.04 DAS 828A-L1 consists basically of a 24V4B repeater mounting unit, relays, and pad sockets that are assembled on hanger bars to form a single prewired and tested unit. It is also suitable for mounting on 19-inch or 23-inch relay racks, 31B or 16C apparatus mountings, and various equipment cabinets. List 1 provides a standard means to terminate 4W PL voiceband data channels. List 2 adds an alternate voice capability and 20-Hz manual signaling, and consists of a 37A1 data unit and 568HAA-3 telephone set.

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

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1.05 DAS 828A is not a complete functional unit.

All plug-in units such as the 227D or F-58122 amplifier, 89-type resistors, 359-type equalizer, 849-type network, and 1-type terminating set must be specified to meet the particular circuit requirements. This selection of components for the various station arrangements can be made by using information for the particular data set given in Appendix 1.

2. CONNECTIONS

A. Option Connections

2.01 Service options, shown in Fig. 1, should be specified on the service order. DAS 828A-L1 is supplied with option Z (4W modems) factory-connected. If 2W modems are involved, wiring option X or Y will apply. Service option connections are made between TB2 and TB3 for all DASs except those modified for station bridging. In addition, for 2W modems, service option connections between TB2 and TB2 must also be strapped on series 4 and higher DASs. All 4W DASs modified for station bridging must be wired as described in Part 4.4.

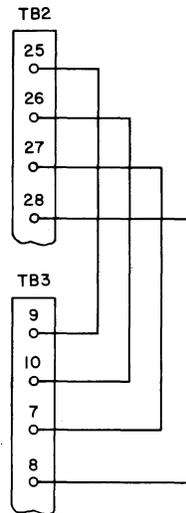
B. Loop-Back Connection

2.02 The loop-back method to be used should be specified on the service order. The wiring for various types of loop-back is shown in Fig. 2. If none is specified, assume local dc-operated loop-back. For this case, sketch 2A applies when the application is for data only. For alternate data/voice applications, no installer wiring is required, since the wiring is automatically done by the interconnection of DAS 828A-L1, the 37A1 data unit, and the 568HAA telephone set.

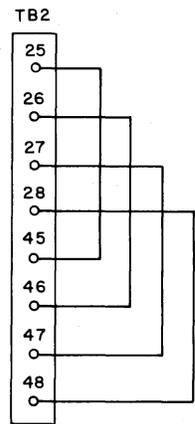
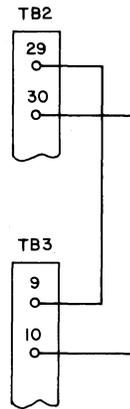
C. Power Connections

2.03 The power supply should be connected as shown in Fig. 3. Table A lists the supply characteristics. Table B gives the capacity of several supplies. The physical separation of the battery pair leads from the pair carrying the ringing signal is recommended to prevent pickup of 20-Hz ringing voltage.

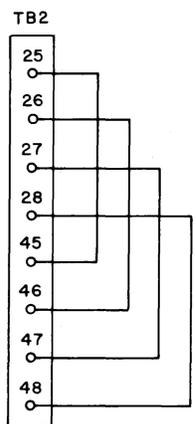
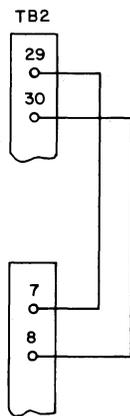
2.04 To reduce noise and 20-Hz crosstalk, ground one side of the ring generator at the power supply, then connect talk, signaling, and ringing grounds to a common local ground for all installations.



OPTION Z-4 WIRE MODEM CONNECTIONS EXCEPT THOSE MODIFIED FOR STATION BRIDGING (FACTORY EQUIPPED)

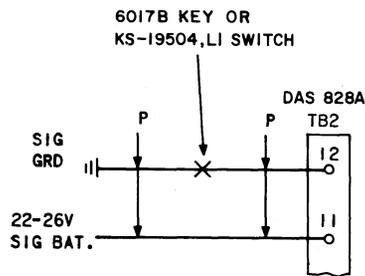


OPTION Y-2 WIRE MODEM ON RECEIVE PAIR (REMOVE FACTORY SHIPPED OPTION Z ABOVE)

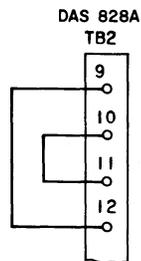


OPTION X-2 WIRE MODEM ON TRANSMIT PAIR (REMOVE FACTORY SHIPPED OPTION Z ABOVE)

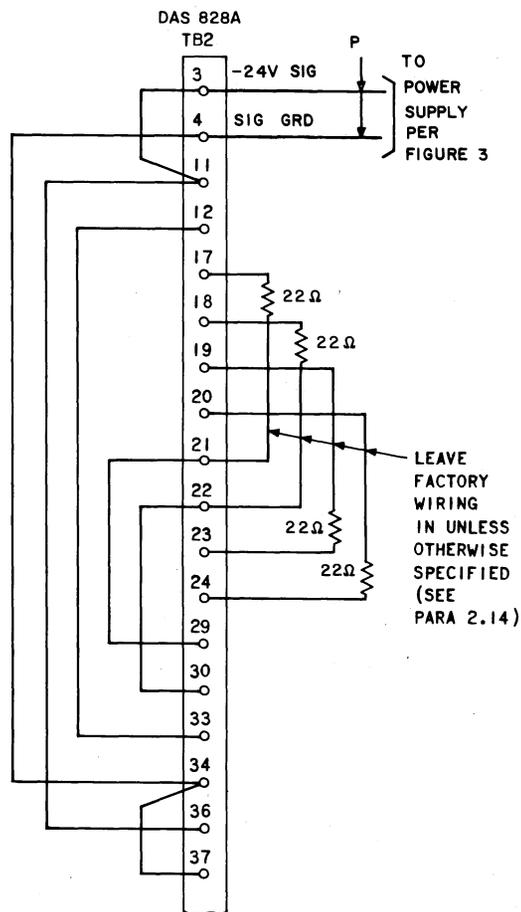
Fig. 1—Option Wiring for DAS 828A-L1



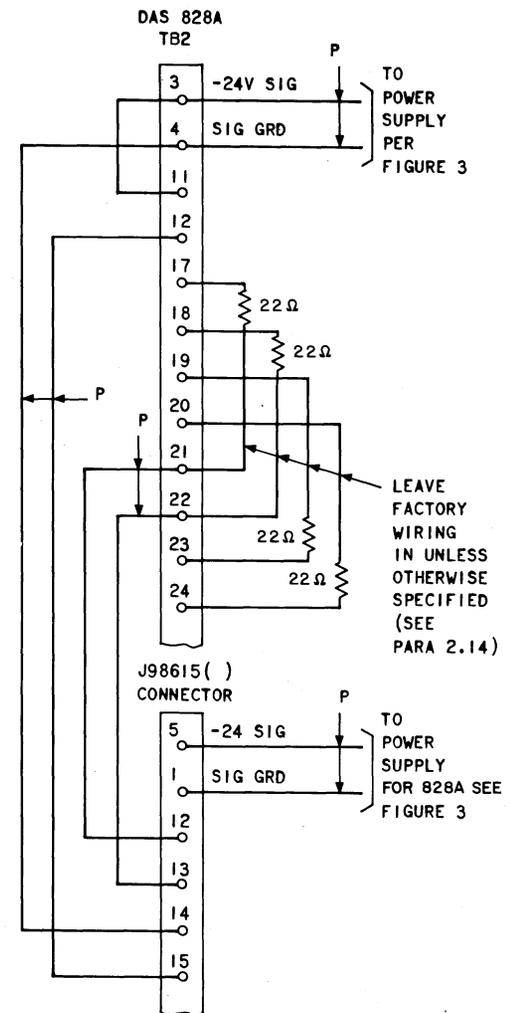
SKETCH 2A-
LOCAL DC OPERATION FOR DATA
ONLY WITH 2W OR 4W DATA SET



SKETCH 2B-
REMOTE DC OPERATION FOR DATA
ONLY WITH 2W OR 4W DATA SET

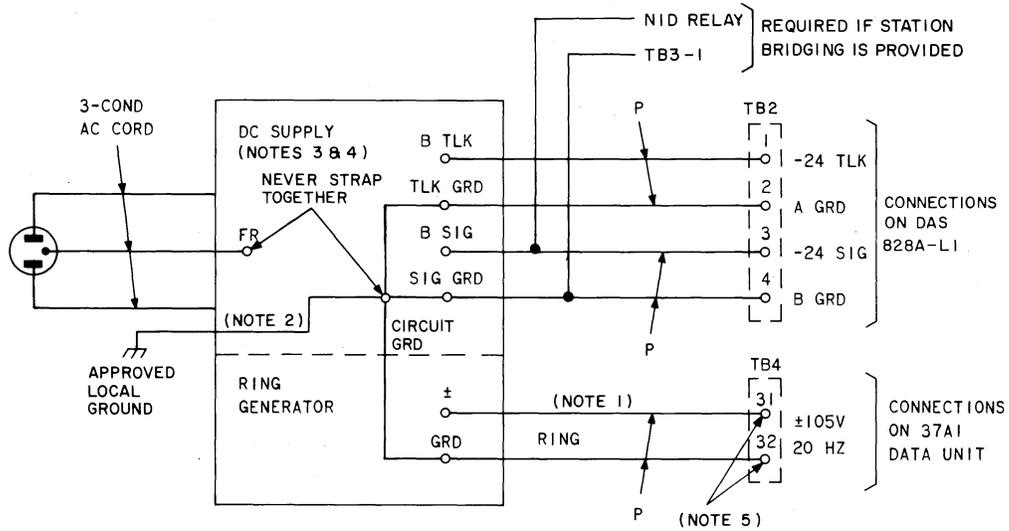


SKETCH 2C-
REMOTE AC (TONE) LOOPBACK FOR 4W DATA
SETS- DATA OR ALTERNATE DATA/VOICE.
44A1 DATA UNIT MOUNTS IN TERM SET
SOCKET OF 24V4B MOUNTING UNIT.



SKETCH 2D-
REMOTE AC (TONE) LOOPBACK FOR 2W DATA
SETS- DATA OR ALTERNATE DATA/VOICE.
44A1 DATA UNIT IN J98615 () MOUNTING
EXTERNAL TO DAS 828A.

Fig. 2—Loop-Back Wiring for DAS 828A-L1



- NOTES:
1. RUN RING GENERATOR LEADS SEPARATE FROM ALL OTHER LEADS.
 2. CONNECT ALL GROUNDS TO LOCAL GROUND AS SHOWN TO MINIMIZE 20-HZ PICKUP. THIS GROUND WIRE MUST BE RUN.
 3. STRAP POWER SUPPLY FOR 117 VOLTS AC INPUT (FACTORY SHIPPED).
 4. NOT ALL APPLICATIONS REQUIRE TALK, SIGNALING, AND RING VOLTAGES. CONNECT ONLY THOSE REQUIRED.
 5. USE "SSM" TYPE INSULATORS ON TB4-31 AND 32.

Fig. 3—Power Supply Connections

TABLE A

TYPICAL POWER SUPPLIES FOR USE WITH DAS 828A

UNIT	PROVIDES DC TALK AND DC SIG VOLTAGE	PROVIDES 20-HZ RINGING VOLTAGE	MOUNTING	NOTES
101G J86731C-2-L1		X	Rack, Cabinet	2
101G J86731C-2-L2		X	Wall	2
19B2	X		Wall	3
19C2	X		Rack	3
20B2	X		Wall	1, 3
20C2	X		Rack	1, 3
29B1	X		Wall	2
29C1	X		Rack	2
30B1	X		Wall	1, 2
30C1	X		Rack	1, 2

Note 1: These power units provide 30-Hz ringing voltage. However, 20-Hz ringing voltage is required for ringdown.

Note 2: These supplies do not fit into the 31B apparatus mounting.

Note 3: These supplies will fit into the 31B apparatus mounting.

TABLE B
LINE CAPACITY

CONFIGURATION	MAX NUMBER OF LINES POWERED*	
	19- OR 20-TYPE POWER UNIT	29- OR 30-TYPE POWER UNIT
Data Only, Local DC Loop-Back (Fig. 2a)	4 (1)	22 (10)
Data Only, Remote DC Loop-Back (Fig. 2b)	6 (1)	25 (11)
Data Only, Remote AC Loop-Back (Fig. 2c or 2d)	2 (1)	18 (9)
Alternate Data/Voice Keyset Controls Loop-Back	1 (0)	7 (5) Plus One J86731C-L() for Ringdown
Alternate Data/Voice With Remote AC Loop-Back (Fig. 2c or 2d)	None	6 (5) Plus One J96731C-L() for Ringdown

* Numbers in parentheses indicate maximum number of lines when each line is equipped with dial back-up using DAS 828C (see Section 598-080-101).

2.05 For multiple installations of DASs that are powered by one supply, fuse each line separately. A 201C key telephone unit (KTU) can be used since it provides a means of fusing seven supply leads. The 201C KTU uses the 24-type (nonalarm) fuse with the 24E, 1/2-amp, recommended for 828A applications.

D. Line Connections

2.06 Connect the 4W PL as shown in Fig. 4. In a new installation, do not connect the pairs until the tests given in Section 598-080-500 have been completed.

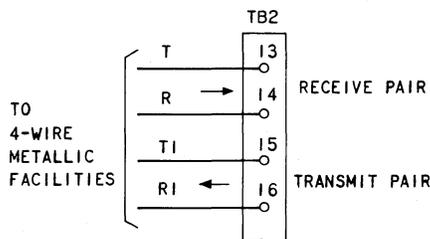


Fig. 4—4-Wire Private Line Connections

E. Connecting Cords

2.07 The connecting cords between DAS 828A and data set are listed in Appendix 1. The appendix provides ordering and installation information covering the particular data set.

2.08 DAS 828A can be located either close to or some distance away from the data set and key telephone set. The key telephone set cord is 5 feet in length, while the data set cord length varies depending upon the cord selected. When the length of the data set and telephone set cords is not sufficient, standard A- or B-type connecting cables or station wire should be used. Refer to Appendix 1.

2.09 There are restrictions on the maximum allowable cable length because of control circuits that are sensitive to the high resistance in long cables. The maximum cable length recommended for each data set configuration is given in Appendix 1.

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2.10 When it is desired to locate the key telephone set more than 100 feet from DAS 828A, determine the cable resistance as follows:

- (1) Turn off power to DAS 828A.
- (2) Connect the telephone set as desired. Disconnect the JUMPER cable on the 37A1 data unit from J2 on DAS 828A-L1.
- (3) Depress the PL TALK key and take the handset off-hook.
- (4) Measure the dc resistance between TB4-21 and TB4-4.

Requirement: 10 ohms or less.

- (5) If requirement is met, restore station to normal. Key set operation over the long cable will be verified during the tests in Section 598-080-500.
 - (6) If requirement is not met, the key telephone set must be located closer to DAS 828A, or the cable between the key set and the DAS must be paralleled with another cable.
- 2.11** The distance specified for the data set must not be exceeded.

F. Modem Connection

2.12 Detailed connection information for common types of modems is given in Appendix 1. Included in this information is a list of apparatus that must be ordered and the necessary connections that must be specified. Installer connections and any options required in the Bell System data sets to achieve compatible operation with the DAS are listed.

Note: Not all Bell System data set options required for a new installation are given. Only the options required by DAS 828A are given. The remaining data set options to be specified must be obtained by referring to the appropriate section on the data set.

2.13 Each particular data set application in Appendix 1 is covered by a table and an accompanying figure. For example, Table AB and Fig. A3 contain all the information needed for connecting data set 201A- and B-types for data-only

service at the station. The voice communications shown in Fig. A1 are common to all data sets.

G. Wiring For Locally Provided Equipment

2.14 When specified, locally provided transmission equipment may be connected at the drop side of the 24V4B repeater. The factory-furnished wiring, equipped with hazardous voltage protection for normal operation, is shown in Fig. 5. To add equipment, disconnect the jumpers and insert the equipment in the appropriate path as shown.

3. INSTALLATION

3.01 No special tools or test equipment are required to install the DAS.

3.02 The DAS should be installed in accordance with instructions given in sections covering installation of station sets. Refer to Section 590-010-200.

3.03 Figure 6 shows the rear view of a typical installation consisting of a DAS 828A-L1 and a 37A1 data unit mounted together on a 31B apparatus mounting and 177A backboard. This arrangement, together with the 568HAA-3 telephone set, makes up a complete 828A-L1A/2 for one 4W PL circuit.

A. Wall-Mounted (DAS 828A-L1A or 828A-L1A/2)

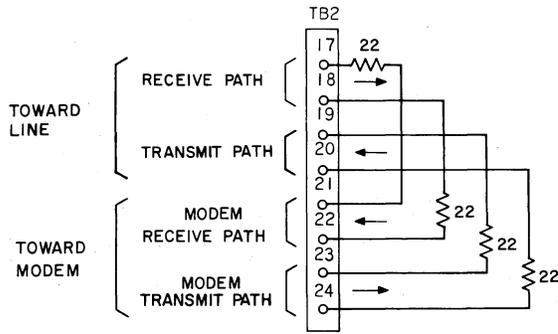
3.05 The installation procedure for a wall-mounted installation is as follows:

- (1) Mount the 177A backboard to the wall using instructions given in Section 463-130-100.

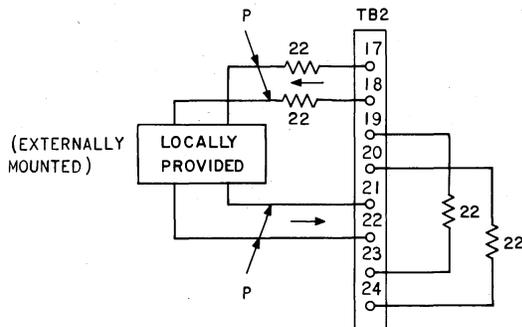
Note: The mounting can be arranged to open either left or right.

- (2) For DAS 828A-L1A/2, connect the 56HAA-3 telephone set to the 37A1 data unit by attaching the key telephone set plug to the TEL connector. Verify the RING key is converted to nonlocking (signaling) operation.

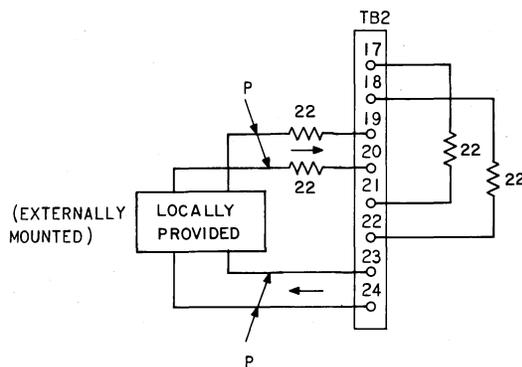
- (3) Install the plug-ins as specified on the service order or circuit layout drawing.



FACTORY SHIPPED
WIRING FOR
NO EQUIPMENT



RECEIVE PATH



TRANSMIT PATH

Fig. 5—Wiring Connections for Locally Provided Transmission Equipment

(4) Install 4W (Z) or 2W (X or Y) option to terminals of TB2 on the L1 package. Refer to Fig. 1 for terminal connections.

(5) Connect the power supply leads as required to terminals 1, 2, 3, and 4 of TB2 and terminals 31 and 32 of TB4. Refer to Fig. 3 for more detail on these connections.

(6) Wire the loop-back circuit as specified on service order or circuit layout. See Fig. 2.

(7) Install options as required in Bell System data set.

(8) Connect the data set to the DAS, using the plug-in cable to DATA plug P1, or connect to terminals on TB3. Refer to the part of Appendix 1 covering the data set.

(9) Apply power and perform tests referred to in 5.01.

Note: The incoming telephone line is not connected until after the installation tests are completed. The lines are connected as shown in Fig. 4.

B. Rack-Mounted (DAS 828A-L1 or 828A-L1/2)

3.06 The installation procedure for a rack-mounted installation is as follows:

(1) Assemble and set up the relay rack or mounting bars.

(2) Mount the DAS to the relay rack mounting bars.

(3) If alternate voice is to be provided, mount the 37A1 data unit adjacent to the DAS 828A-L1 or immediately above or below it. Refer to Fig. 4 of Section 598-080-100 for a typical example. If alternate voice is not to be provided, proceed to (5).

(4) Interconnect the L1 and 37A1 data unit by connecting the JUMPER cable on the 37A1 data unit to the JUMPER jack on DAS 828A-L1. Connect the 568HAA-3 telephone set plug to the TEL connector on the 37A1 data unit. Verify the RING key is converted to nonlocking (signaling) operation.

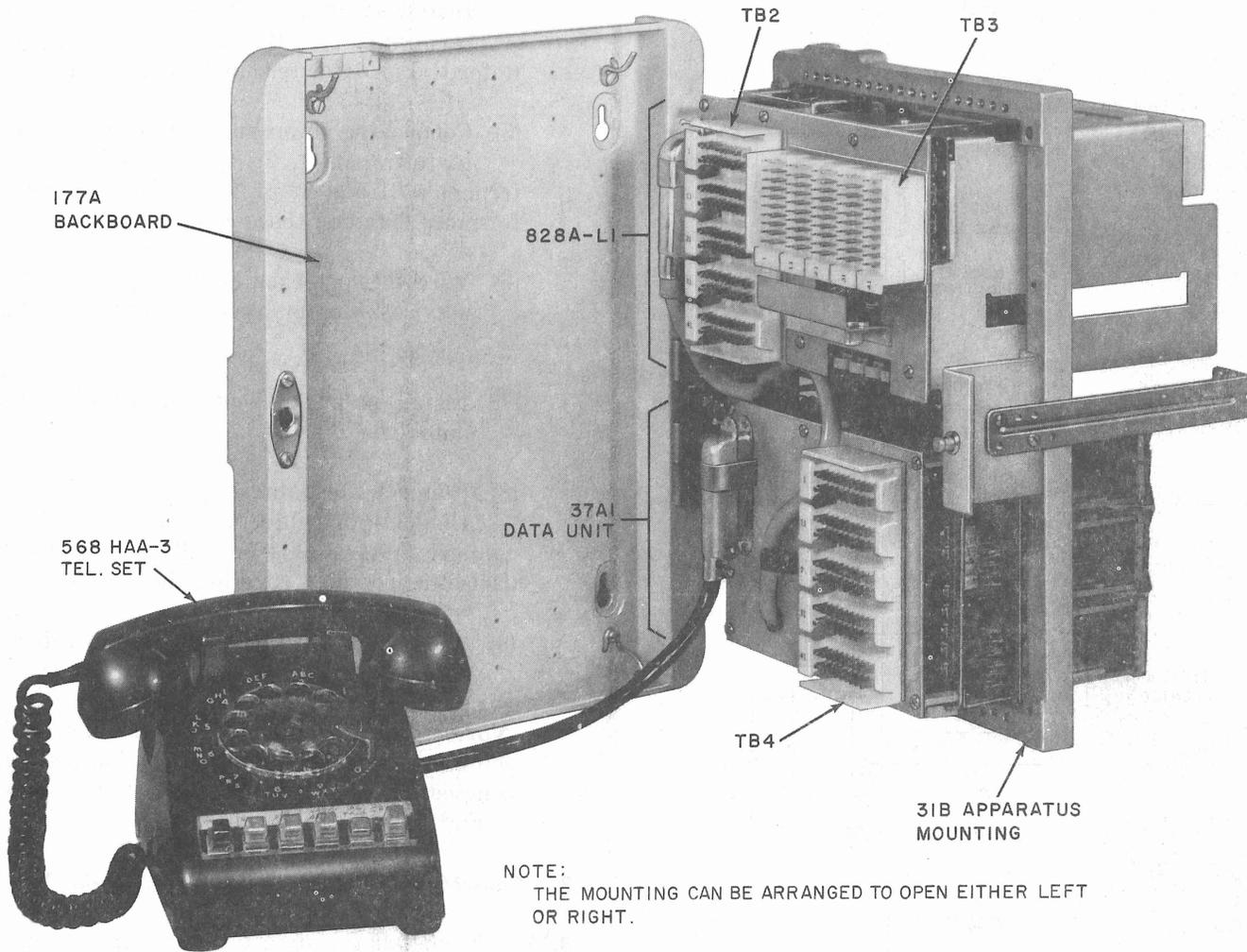


Fig. 6—Rear View of DAS 828A-L1A/2

(5) Repeat (3) through (9) of 3.05 to complete the installation.

4. DAS 828A MODIFIED FOR STATION BRIDGING

4.01 DAS 828A may be modified to provide a 5-way split bridge. The modified DAS will allow up to four modems to be connected to a single 4W private line.

A. Ordering Information

4.02 The following equipment is required to modify DAS 828A to provide the station bridging capability:

- 2—mounting bars, P-12C824 (may not be required for DAS 828A-L1A—refer to Section 598-080-100)
- 1—49A1 data unit
- 10—screws, P-44L168

- 8—screws, 6-32 x 1/2
- 6—nuts, 6-32
- 1—227D amplifier
- 1—228A KTU
- 22—resistors, 180 ohms, 1/4 watt, 1% KS-20616-L1A or equivalent (includes 2 spares)
- Resistors, 600 ohms, 1/4 watt, 1% KS-20616-L1A or equivalent (1 required to terminate each unused bridge port; 4 required for installation test)
- 1—89E (1 dB) pad
- 1—89N (3 dB) pad
- Cords, adapters, cable, or wire as required.

B. Modification Procedure

4.03 This procedure assumes the DAS 828A has already been installed and is to be modified for station bridging.

- (1) Install the 49A1 data unit to the mounting bars, using four P-446168 screws.
- (2) Mount the 228A KTU using four P-446168 screws.
- (3) Mount twenty 180-ohm, 1/4-watt, 1% resistors and install straps to the 228A KTU as shown in Fig. 7.
- (4) Modify the DAS 828A wiring as shown in Fig. 7 and 8.
- (5) Plug the 227D amplifier into its mounting shelf.
- (6) Connect modem to the 228A KTU per Fig. 7 and the appropriate figure in Appendix 1.4

5. INSTALLATION TESTING

5.01 After completing the installation procedure for the DAS, it must be tested as outlined in Section 598-080-500. These tests are required

to ensure proper operation following installation work.

5.02 A loop-back test should be made by the serving test center to obtain benchmark transmission records. In addition, lineup of the 24V4B repeater and the required transmission test measurements should be made. These values should be recorded for future maintenance test purposes.

5.03 Assuming the 44A1 tone detector is used, the loop-back test by the STC also verifies that the 44A1 operates properly.

5.04 For wall-mounted installations, the 116A dust cover should be installed over the DAS after installation work and tests are completed.

6. DIAL BACKUP USING DAS 828C

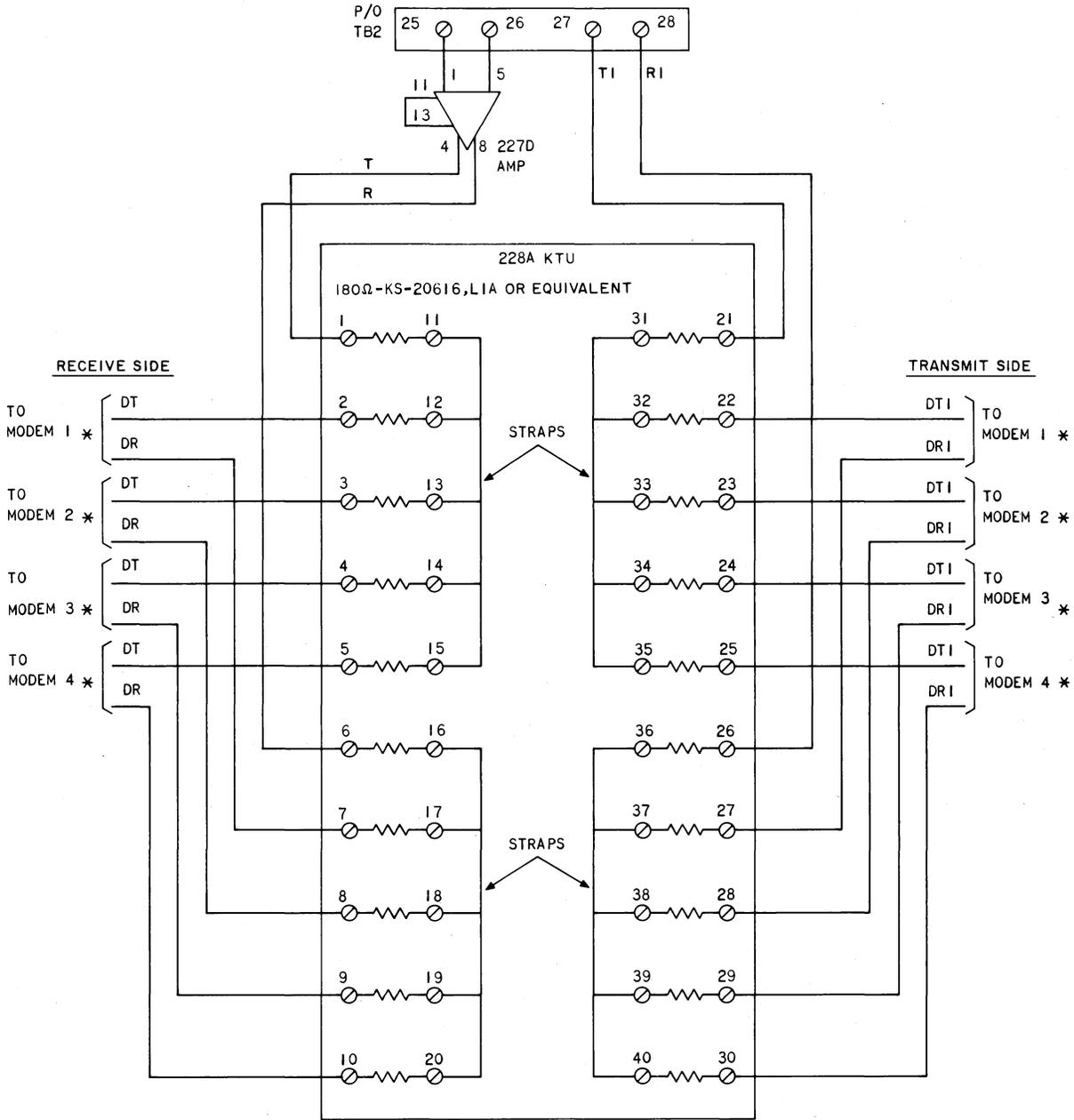
6.01 If the station arrangement is to include dial backup service using DAS 828C, the data set and telephone set will connect to DAS 828C instead of DAS 828A. DAS 828C is described in Section 598-080-101, which specifies the data set options required. This practice should be followed when it conflicts with information given in Section 598-080-100 on DAS 828A. Dial backup is not available with DAS 828A and station bridging.

6.02 Rewire the telephone set per Part 3 of Section 598-080-201.

7. REFERENCES

7.01 The following sections can be referred to for additional information on installing the DAS.

SECTION	TITLE
332-104-500	V4 Type Repeater—Initial Lineup
332-104-501	V4 Type Repeaters—227 Type
332-104-501	V4 Type Repeaters—227 Type Amplifiers—Tests and Adjustments
461-604-100	Connecting Blocks 66-Type—Tools, Terminating, Adapters, and Maintenance



* - TERMINATE ALL UNUSED PORTS WITH 600Ω RESISTORS.

Fig. 7—Wiring Connections for DAS 828A-L1 Modified for Station Bridging

SECTION	TITLE	SECTION	TITLE
461-200-102	Adapters—148, 149, 153 and 3-Way Bridging Types—Identification	590-100-131	44A1 Data Unit Tone Detector—Description
463-140-100	Equipment Cabinets and Apparatus Mountings-Installation	598-080-100	Data Auxiliary Set 828A—Description and Operation
590-010-200	Data Sets—General Installation and Connection Information	598-080-101	Data Auxiliary Set 828C—Description and Operation

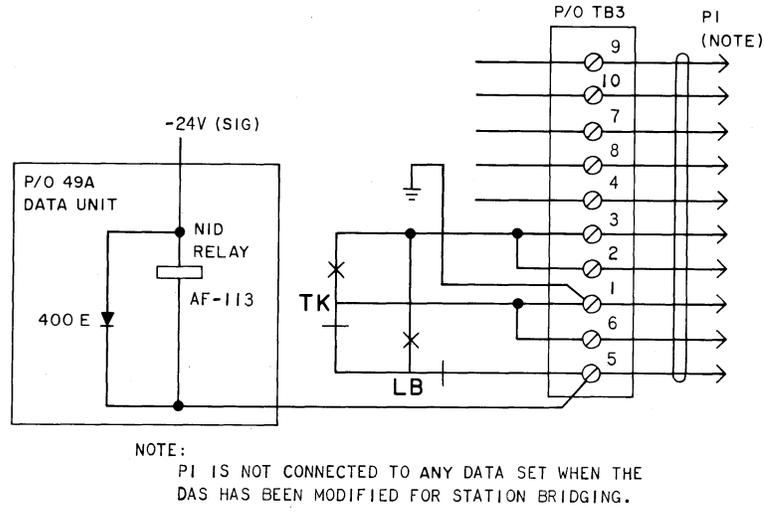


Fig. 8—Not-in-Data Indication as Modified for Station Bridging

SECTION	TITLE	SECTION	TITLE
598-080-201	Data Auxiliary Set 828C—Installation and Connections	598-080-501	Data Auxiliary Set 828C—Maintenance and Test Procedures
598-080-500	Data Auxiliary Set 828A—Maintenance and Test Procedures	800-610-158	Packaged Electronic Products—Wiring, Cabling, Numbering, and Lettering