

## DATA SETS 108D- AND 108E-TYPES

### SINGLE PRIVATE LINE STATION ARRANGEMENT

### USING DATA AUXILIARY SET 820D

### INSTALLATION

#### 1. GENERAL

**1.01** This section outlines the connections, options, and preoperative tests necessary for the installation of data set 108D- or 108E-type, AR17 circuit pack, and data auxiliary set (DAS) 820D-L1 or 820D-L1A in a single private line (PL) station. In this section, data sets 108D- and 108E-types will be referred to as data sets 108D and E.

**1.02** DAS 820D-L1 and -L1A are electrically identical. DAS 820D-L1 is supplied with a plastic cover and a KS-14532-L16 power cord and is used with a customer-provided terminal (CPT) or a Bell System provided model 37 TTY. DAS 820D-L1A is supplied without a plastic cover, uses an M3AY power cord, and is used with a model 33 or 35 TTY.



*A DAS 820D-L1 is used in a model 37 TTY because the DAS is very accessible. The DAS is therefore supplied with a plastic cover and KS-14532-L16 power cord to prevent possible customer contact with DAS operating voltages.*

**1.03** The station consists of a terminal device, a DAS 820D, a data set 108D or E, and an AR17 circuit pack. When the terminal device is a Bell System model 33, 35, or 37 TTY, it is a self-contained station which is intended to be completely assembled and tested at the distributing house *prior to* delivery. When the terminal device is a CPT, the DAS 820D with data set and AR17 circuit pack should be tested prior to delivery.

**1.04** This section covers the installation and connection of DAS 820D-L1 with a CPT. The connections required for DAS 820D-L1A are also covered in this section. For installation of DAS 820D-L1 in a model 37 TTY and DAS 820D-L1A in a model 33 or 35 TTY, refer to the sections listed in 6.01.

#### 2. TOOLS AND APPARATUS

**2.01** A TTS-28 portable station test set, or equivalent, is required for making data set level adjustments. A 748A extracting tool is used to remove the data set.

#### 3. OPTION CONNECTIONS

**3.01** Options are available with the data set, circuit pack, and the DAS 820D which govern the operating conditions of this arrangement. The desired options are selected by connections to the DAS 820D (see Table A), by adjusting screw switches located on AR17 circuit pack (see Table B), and by adjusting switches on data set 108D or 108E (see Tables C through G).

*Note:* Care should be taken to avoid stripping the threads in the plastic strip when tightening screws for applicable screw-switch options.

**3.02** Removal and replacement procedures for the DAS 820D-L1A and cover of the DAS 820D-L1 can be found in Section 591-028-301.

#### DAS 820D Options

**3.03** DAS 820D has a 26-screw terminal board (TB1) which furnishes connections for the line facility (2-wire or 4-wire) and for an optional remote TEST button and TEST lamp (see Fig. 1). The remote button and lamp must be locally engineered. Table A shows TB1 terminal assignments.



*The TEST lamp must be rated at 24 volts dc.*

**3.04** Remove the data set or circuit pack from the DAS by grasping the extracting handle (AR17 circuit pack) or tool (data set) and pulling

TABLE A  
TB1 TERMINAL ASSIGNMENTS ON DAS 820D

TERMINAL	CIRCUIT DESCRIPTION				
1	T	} 2-wire line connection	T	} Transmit	} 4-wire line connection
2	R		R		
3	T1		T1	} Receive	
4	R1		R1		
5 (GND) 6	TEST switch access for remote TEST switch				
7	Not Used				
8	Not Used				
9	Not Used				
10	CD lead from CPT or TTY terminal -- Not Used				
11 (21 VAC) 12	TEST lamp access for remote TEST lamp				
13 through 22	Not Used				
23	Frame Ground				
24	Signal Ground				
25	+24 Vdc				
26	-24 Vdc				

it straight out. Select the options specified in the service order by opening or closing the appropriate screw switches.

**Note:** It is not necessary to remove data set 108D (series 3) or 108E (series 2) from the DAS when implementing certain options. Refer to Section 591-028-100 for detailed information on the data sets.

#### AR17 Circuit Pack Options

**3.05** Table B shows the options and associated screw switch settings available with AR17 circuit pack. Replace AR17 circuit pack and data set 108D or 108E in the DAS when option selection is completed.

#### Data Set Options

**3.06** Table C shows the switch settings for options associated with the data set faceplate. Table D shows the screw switch settings for selection of 2-wire or 4-wire application. Tables E and F show the hybrid network switching (2-wire application) for data sets 108D and E, respectively. Table G shows the screw switch settings for adjusting receiver sensitivity of the data set.

#### 4. INSTALLATION AND CONNECTION PROCEDURES

**4.01** The single PL station using DAS 820D-L1 with a CPT may be installed on any surface (shelf, desk, table, etc) that is convenient for customer use and within the limit of the customer-furnished interface cord and the DAS power cord.

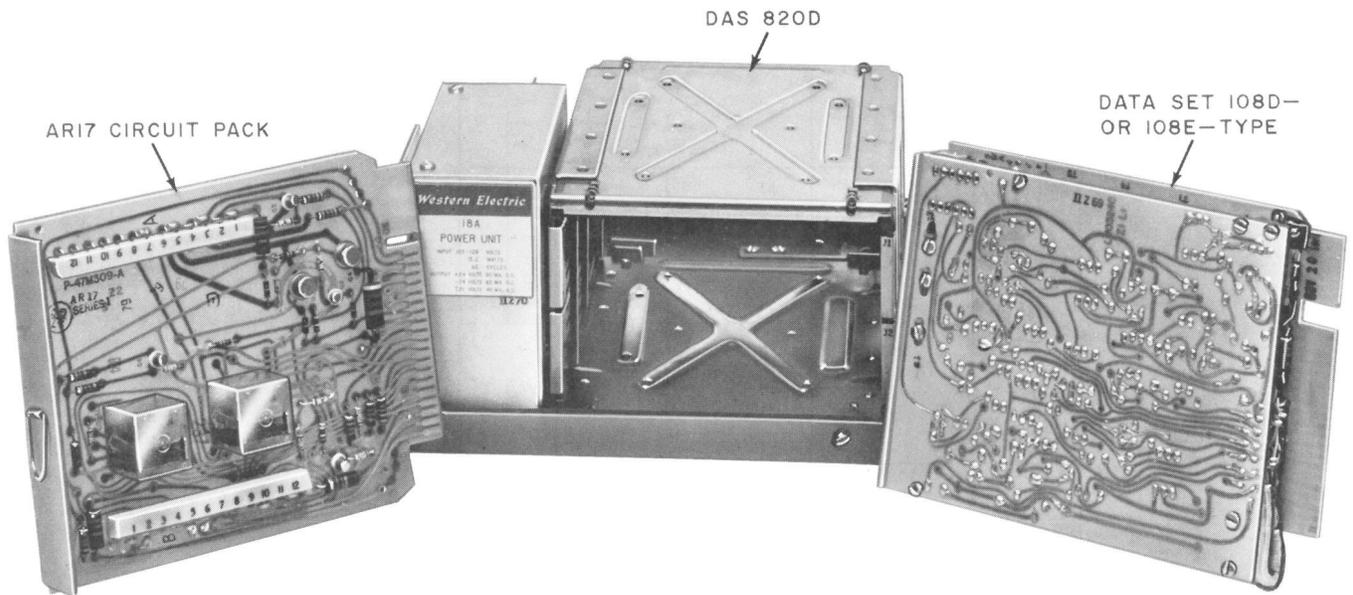


Fig. 1—Data Set 108D- or E-Type and AR17 Circuit Pack Used in Data Auxiliary Set 820D

TABLE B  
AR17 CIRCUIT PACK OPTIONS

FEATURE	O P T I O N	AR17 CIRCUIT PACK	
		SCREW(S) OPEN	SCREW(S) CLOSED
EIA Interface	W	B2, B4, B6, A2, A4	B1, B5, A1, A3
Current Interface	V	B1, B5, A1, A3	B2, B4, B6, A2, A4
Copy in Test Mode	T		B12
No Copy in Test Mode	S	B12	
Local Copy	R		B10
No Local Copy	Q	B10	
Mark Hold on Carrier Fail	N		A5
Space Hold on Carrier Fail	M	A5*	
Carrier Squelch on Carrier Fail	K †		A7
No Carrier Squelch on Carrier Fail	J	A7	

\* Use only with current interface.

† Option K must *not* be used at both ends of a private line arrangement.

**TABLE C**  
**DATA SET FACEPLATE OPTIONS**

OPTION DESIGNATION	FUNCTION OF OPTION	SLIDE SWITCH*		ROTARY SWITCH S1†		FACEPLATE DESIGNATION	
		SWITCH	SWITCH POSITION	SWITCH	SWITCH POSITION‡		
X	DX Operation--Disables the directional control circuit of the data set to allow proper operation of a private line station.	S1	Closed	S1C	Down	DX	F
W	Not used in station application		Open		Up		H
V	SPACE HOLD ON TL (BB)--Enables the data set to provide a spacing condition on the BB lead when a loss of received carrier is detected by the data set.	S2	Closed	S1A	Down	TL	S
U	MARK HOLD ON TT (BB)--Enables the data set to provide a marking condition on the BB lead when a loss of received carrier is detected.		Open		Up		M
T	Not used in station application	S3	Closed	S1B	Down	RL	S
S	Not used in station application		Open		Up		M

*Note:* Options X, U, and S are factory-installed options.

\* Data sets 108D (series 2) and 108E (series 1)

† Data sets 108D (series 3) and 108E (series 2)

‡ *Down* refers to position closest to end of switch marked with dot.

*Up* refers to position farthest from end of switch marked with dot.

### Power Connections for DAS 820D

**4.02** The 117-volt ac power is connected to the power plug located on the rear of DAS 820D. DAS 820D-L1 is supplied with a KS-14532-16 (10-foot) flexible power cord. The cord is equipped at one end with a parallel blade grounding-type molded plug for connection to the outlet. The other end is equipped with a Hubbell connector for connection to the DAS. Ensure that the 117-volt 60-Hz ac power outlet is of polarized grounding-type and is available within 10 feet of the desired location of the DAS. Do not connect power to the DAS before procedures outlined in 5.04.

### EIA Interface Connections for DAS 820D

**4.03** The customer interface connections are made through connector J3 located on the rear of the DAS. Ensure that the customer-provided interface cord will reach the desired location of the DAS. Do not connect the interface cord to the DAS until option selection and data set adjustments have been completed.

### Tip and Ring Connections For DAS 820D

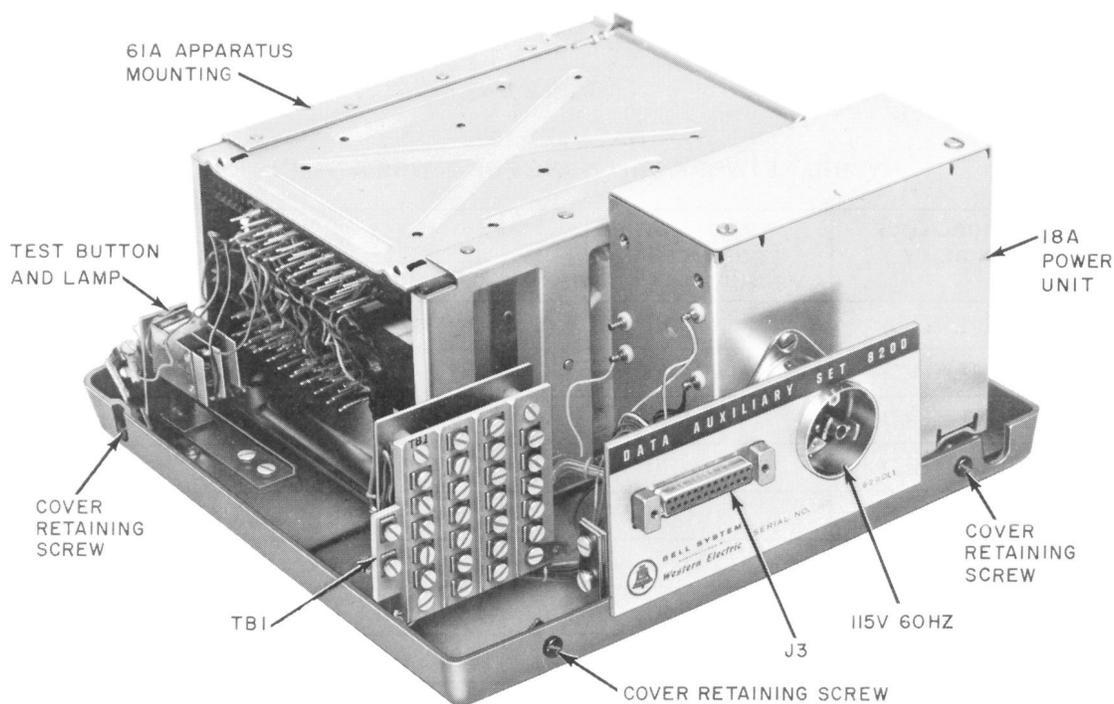
**4.04** The line facility tip and ring are connected to terminals 1 and 2 of TB1 at back of DAS for 2-wire application. For 4-wire application, the transmit loop pair is connected to terminals 1 and 2 of TB1 and the receive loop pair is connected to terminals 3 and 4 of TB1 (see Fig. 2).

### 5. PREOPERATIVE ADJUSTMENTS AND TESTS

**5.01** Verify that the loop has been tested and meets requirements. Refer to the section entitled Private Line Data Circuits—Voice Bandwidth Circuits for Miscellaneous Data—Overall Tests and Requirements (314-410-500). Loop loss testing procedures and requirements for data sets 108D and E are given in Section 591-028-501.

### Hybrid Network Switching

**5.02** If the line facility is a 2-wire loop, the data set interface with the line is a hybrid network which must be adjusted to provide the correct loss. If the line facility is a 4-wire loop,



**Fig. 2—Data Auxiliary Set 820D—Accessible Connections**

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no loss adjustments are necessary to interface the data set with the line (see Table D). Switching of the hybrid is determined by the loop impedance of the facility. Tables E and F show typical loop impedance for data sets 108D and E, respectively, when the cable makeup is known. A good compromise switch setting of the hybrid network for 2-wire application is indicated in Tables E and F under the LOOP IMPEDANCE MEASURED column.

**Note:** The hybrid network switching arrangement should be provided on the service order or circuit layout record.

Upon completion of hybrid switching, plug data set 108D or E into the DAS.

**Data Set Receive Level Adjustment**

**5.03** Screw switch D on data set 108D or E was opened to provide minimum sensitivity (minimum gain of receive-amplifier stage) during manufacturing tests. If the receive level is less than -30 dBm (-31, -32, etc), the 6-dB reduction of gain should be removed by closing the 1-2 section of screw switch D. Table G shows the condition of the screw switches for each gain setting. The screw switch should be set according to the service order or circuit layout record.

**TABLE D  
2-WIRE/4-WIRE OPTIONS IN DATA SET**

OPTION	FUNCTION	"A" SCREW SWITCH SETTING		"C" SCREW SWITCH SETTING
		CLOSE (CW)	OPEN (CCW)	
Z	4-Wire	1-2, 3-4	2-3	1-2, 2-3, 3-4 All Open (CCW)
Y	2-Wire	2-3	1-2, 3-4	Refer to Table F or G

**TABLE E  
DATA SET 108D  
HYBRID NETWORK SWITCHING FOR 2-WIRE APPLICATION**

OPTION	TYPICAL LOOP FACILITY	TYPICAL 2-WIRE LOOP IMPEDANCE MEASURED AT 1170 Hz	SCREW SWITCH C		SCREW SWITCH D	
			OPEN	CLOSE	OPEN	CLOSE
H	26 NL (HC)	900*	1-2,3-4	2-3		3-4
G	24 NL (HC)	700	1-2,2-3	3-4	3-4	
F	22 NL (HC)	550	2-3	1-2,3-4	3-4	
E	19 NL (HC)	400	1-2,2-3	3-4		3-4
B	16 NL (HC)	280	2-3	1-2,3-4		3-4
A	26 H88 (HC)	1180	1-2,3-4	2-3	3-4	
A	24 H88 (HC)	1080	1-2,3-4	2-3	3-4	
A	22 H88 (HC)	1060	1-2,3-4	2-3	3-4	
A	19 H88 (HC)	1030	1-2,3-4	2-3	3-4	
A	16 H88 (HC)	1130	1-2,3-4	2-3	3-4	

NL--Nonloaded (HC)--High Capacity  
\* Compromise hybrid network switching

**TABLE F**  
**DATA SET 108E**  
**HYBRID NETWORK SWITCHING FOR 2-WIRE APPLICATION**

OPTION	TYPICAL LOOP FACILITY	TYPICAL 2-WIRE LOOP IMPEDANCE MEASURED AT 2125 Hz	SCREW SWITCH C		SCREW SWITCH D	
			OPEN	CLOSE	OPEN	CLOSE
H	—	900*	1-2,3-4	2-3		3-4
G	26 NL (HC)	650	2-3	1-2,3-4	3-4	
F	24 NL (HC)	500	2-3,3-4	1-2		3-4
E	22 NL (HC)	400	1-2,2-3	3-4		3-4
B	19 NL (HC)	280	2-3	1-2,3-4		3-4
A	16 NL (HC)	200	2-3	1-2,3-4		3-4
ZA	26 H88 (HC)	1300	1-2,3-4	2-3	3-4	
ZA	24 H88 (HC)	1260	1-2,3-4	2-3	3-4	
ZA	22 H88 (HC)	1250	1-2,3-4	2-3	3-4	
ZA	19 H88 (HC)	1240	1-2,3-4	2-3	3-4	
ZA	16 H88 (HC)	1340	1-2,3-4	2-3	3-4	

NL--Nonloaded (HC)--High Capacity

\* Compromise hybrid network switching

**TABLE G**  
**SCREW SWITCH D SETTINGS ON THE DATA SET**  
**FOR REDUCTION IN GAIN**

DB REDUCTION IN GAIN	"D" SCREW SWITCH		DATA SET OPTION
	CLOSED	OPEN	
6	—	1-2	K
0	1-2	—	J

#### Data Set Transmit Level Adjustment



*Tip and ring connections must be disconnected for data set transmit level adjustment.*

**5.04** Connect power to DAS. Connect terminals + and - of TTS-28 portable station test set to TP1 and TP2 of the data set. Test points are identified by raised numbers on faceplate of data set. Set FUNCTION switch of TTS-28 to DBM 900

$\Omega$  TERM 0 position. Connect power to DAS. Adjust potentiometer R18 on the data set for output level specified on service order or circuit layout record. If the line is a 4-wire 600-ohm termination, adjust R18 to indicate 1-1/2 dBm more than the output level specified to allow for use of the TTS-28 with a 900-ohm termination.

**Note:** If TTS-28 indicates no output level and K option (carrier squelch on carrier failure) is installed on AR17 circuit pack, pull AR17 circuit pack approximately 2 inches from mounting to obtain measurement. Adjust output level and then replace AR17 circuit pack.

**5.05** Verify connection of tip and ring to terminals 1 and 2 (2-wire) or the transmit loop pair to terminals 1 and 2 and the receive loop pair to terminals 3 and 4 (4-wire) of TB1 on DAS. Replace the cover on DAS 820D-L1 and connect interface cord. The station is now ready for private line service.

**SECTION 591-028-201**

**6. REFERENCES**

**6.01** Detailed information for data set 108D and E private line station using DAS 820D is found in the following Bell System Practices (BSPs):

<b>SECTION</b>	<b>TITLE</b>
591-028-100	Data Sets 108D- and 108E-Types—Used in Station Applications—Description
591-028-301	Data Sets 108D- and 108E-Types—Single Private Line Station Arrangement—Using Data Auxiliary Set 810D—Maintenance
591-028-501	Data Sets 108D- and 108E-Types—Single Private Line Station Arrangement—Using Data Auxiliary Set 820D—Testing Procedures
591-801-202	37 Teletypewriter Keyboard Send-Receive (KSR) Station

**SECTION**

**TITLE**

	Arrangement—Nonswitched Point-to-Point Private Line Service—Installation
591-802-201	37 Teletypewriter Automatic Send-Receive (ASR) Station Arrangement—Nonswitched Point-to-Point Private Line Service—Installation
591-803-201	37 Teletypewriter Receive Only (RO) Station Arrangement—Nonswitched Point-to-Point Private Line Service—Installation
591-815-201	33 and 35 Teletypewriter Station for General Purpose—Point-to-Point Private Line Service—Installation and Checkout