

DATA SETS 108D- AND E-TYPE
MULTIPLE PRIVATE LINE STATION ARRANGEMENT
USING 28A1 DATA MOUNTING AND 27B1 DATA UNIT
INSTALLATION AND CONNECTIONS

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1. GENERAL

1.01 This section provides installation and connection procedures to be followed when installing data sets 108D- and E-type in the multiple data set private line station arrangement. This information is limited to the multiple arrangement using the 28A1 data mounting and the 27B1 data unit. In this section, data sets 108D- and E-type will be referred to as data sets 108D and E.

1.02 The multiple arrangement using data set 108D or E (Fig. 1 and 2, respectively) consists of eight data sets per data mounting, a 28A1 data mounting, one 27B1 data unit per data mounting (one for eight data sets), and KS-20575 rectifier or an appropriate power source.

1.03 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 set arrangement to the transmission facilities must be terminated at

the data mounting end in a 50-pin connector, such as the one on the A25B-type connector cable. The 27B1 data unit, 28A1 data mounting, and A25B-type connector cable are not furnished with the data sets and must be ordered separately.

1.04 Power supplies for the multiple data set arrangement may be external sources or a KS-20575 rectifier, which can be mounted on the 28A1 data mounting. The KS-20575 rectifier or other external power sources is not furnished with the 28A1 data mounting and must be ordered separately. One KS-20575 rectifier may supply power to two 28A1 data mountings.

1.05 The multiple data set arrangement may be installed in any location that is convenient for the customer within 50 feet of the CPT. 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 and cable must be arranged to adequately reach the equipment cabinet or mounting rack arrangement.

1.06 The data set 108D and E multiple arrangement using the 28A1 data mounting and 27B1 data unit may be housed in a KS-20018 type or KS-20093 type cabinet, or equivalent, or any mounting rack arrangement that will accept the 23- or 25-inch 28A1 data mounting.

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

1.08 A 748A tool may also be needed if the locking bar is *not* functional for extracting the data set from the 28A1 data mounting. A portable station test set TTS-28, or equivalent, is required when making level adjustments.

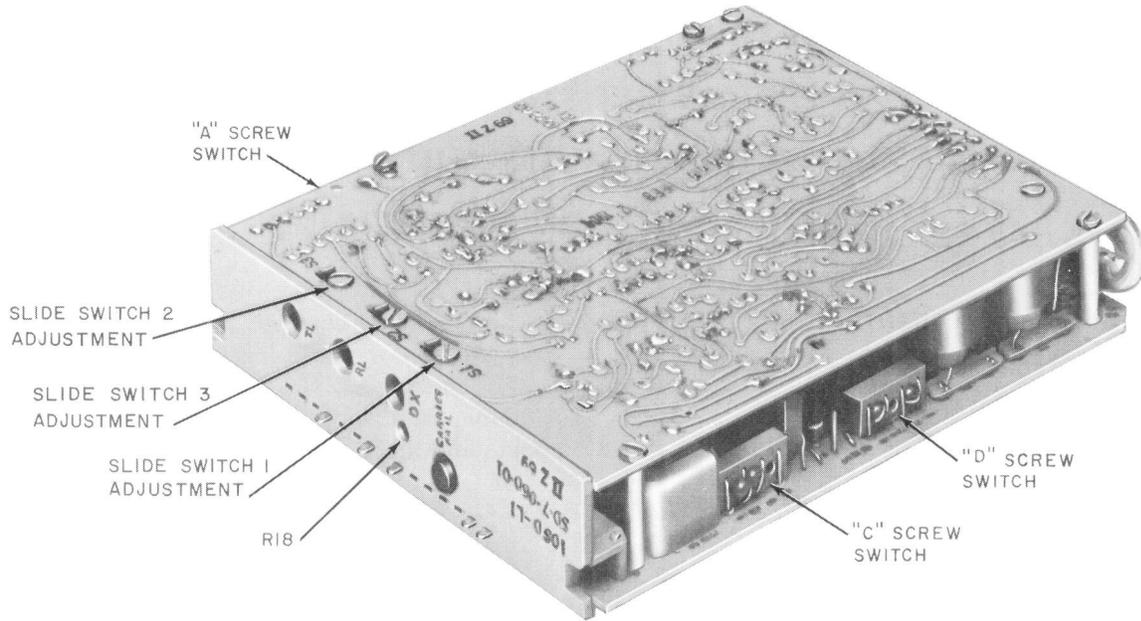


Fig. 1—Data Set 108D-Type

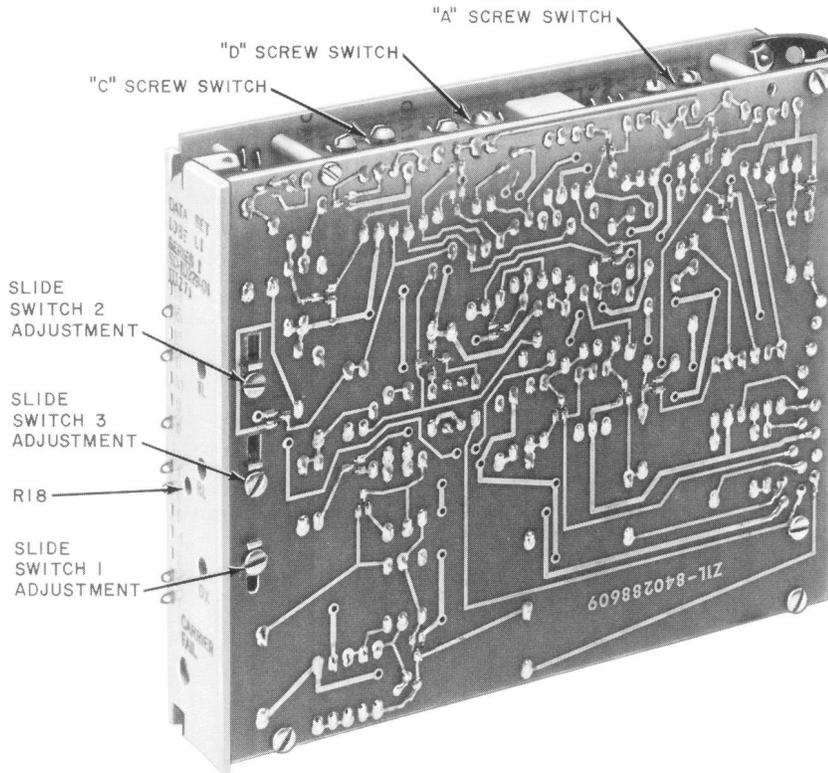


Fig. 2—Data Set 108E-Type

2. OPTIONS

2.01 Options for data sets 108D and E multiple arrangement vary depending on the application of the arrangement. These optional adjustments are made on the data set 108D or E and the 27B1 data unit. The optional strapping connections made on the 27B1 data unit are options that deal with the interface control leads to the CPT. There are no options associated with the 28A1 data mounting.



Options should be installed prior to installation.

A. Data Sets 108D and E

Faceplate-Indicated Options

2.02 Faceplate-indicated option selection on the 108D and E is made by means of slide or rotary switches as shown in Table A. Table A also provides option designation, function of option, and faceplate designation. Installation of options on the data set is made in accordance with specifications on the service order or circuit layout record. See Fig. 1 and 2 for location of switches on data set 108D and E, respectively.

2-Wire or 4-Wire Options

2.03 The option of 2-wire or 4-wire service is also provided with data sets 108D and E. These options are implemented by three screw switches (A, C, and D). Table B provides the applicable information for implementing 2-wire or 4-wire service.

2.04 For 4-wire service, option Z must be installed in the data set. The transmit loop facility is connected to the connector terminals mating with card terminals 15 and 16 (R and T). The receive loop facility is connected to the connector terminals mating with card terminals 17 and 18 (T1 and R1). The screw options are set as shown in Table B.

2.05 For 2-wire service, option Y is installed in the data set. The loop facility is connected to the connector terminals mating with card terminals 15 and 16 (R and T). The screw options are set as shown in Table B.

2.06 When 2-wire service is required (option Y), screw switches C and D are adjusted to provide maximum transhybrid loss. The data set

interface with the line is a hybrid network which must be adjusted to provide the correct loss when the facility is 2-wire. Switching of the hybrid is determined by the loop impedance of the facility. Tables C and D show typical loop impedance and provide screw switch settings for maximum transhybrid loss when installing data sets 108D and E, respectively.

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

If the loop facility is *not* known, 900 ohms is a good compromise switch setting of the hybrid network (2-wire) as shown in Tables C and D under the Loop Impedance Measured column.

Receiver Gain Option

2.07 Data set option K may be installed to reduce the gain of the receiver by 6 dB while option J provides full gain. These options are installed when the data set receive level is determined. Option J or K is installed by closing or opening the 1—2 section of screw switch D, respectively. Refer to 5.02 for installation of option J or K.

B. 27B1 Data Unit

2.08 Optional connections on the 27B1 data unit are in the form of strapping arrangements. The CSQ lead appears as a spade-tipped lead in the 27B1 data unit. This lead can be optionally strapped to one of two screw terminals (RS or SPARE) on the 27B1 data unit, as required on the service order or circuit layout record. Options on the 27B1 data unit can be defined and installed as follows:

- **Option R (Carrier Squelch on Carrier Fail):** This option turns the data set off if carrier is lost for 110 to 250 ms. To install option R, connect the CSQ lead to the RS screw terminal.
- **Option Q (No Carrier Squelch on Carrier Fail):** This option keeps the data set in the data mode even if the carrier fails. To install option Q, connect the CSQ lead to the SPARE screw terminal. (In the test mode, carrier squelch on carrier fail is applied.)

3. INSTALLATION

3.01 The multiple private line arrangement using data set 108D or E, 28A1 data mounting, KS-20575 rectifier, and 27B1 data unit may be installed in any cabinet or any mounting rack arrangement that will accept the 23- or 25-inch 28A1 data mounting. The 28A1 data mounting may be arranged to mount as follows:

- 23-inch mounted in a KS-20018 type cabinet
- 25-inch mounted in a KS-20093 type cabinet.

3.02 The following information contains instructions which can be applied to installations having a multiple arrangement.

28A1 Data Mounting

3.03 If the 28A1 data mounting is to be installed in a 23-inch rack, arrange the brackets so the long sides are against the data mounting. When the data mounting is to be installed in the 25-inch rack, arrange the brackets so the short sides are against the data mounting.

3.04 When the KS-20575 rectifier is to be used as a power source for the data sets, mount it in the space provided on the left-hand side of the data mounting, using the four screws provided with the rectifier.



Do not connect power to the equipment until instructed to do so.

27B1 Data Unit

3.05 Install and interconnect the 27B1 data unit as follows, using the screws supplied with the 28A1 data mounting.



Ensure that the options are properly connected on the 27B1 data unit before installing.

KS-20018 Type Cabinet

- (1) Install one 27B1 data unit on the rear of the 28A1 data mounting (either left- or right-hand side as required).

- (2) Install the 28A1 data mounting in the cabinet with the eight screws provided.
- (3) Route the two 27B1 data unit connector cables as required.
- (4) Connect P1 of the 27B1 data unit to connector J1 of the 28A1 data mounting.
- (5) Connect P2 of the 27B1 data unit to connector J2 of the 28A1 data mounting.

KS-20093 Type Cabinet

- (1) Install the 27B1 data unit behind the customer access door on the front left-hand side of the cabinet.
- (2) Install the 28A1 data mounting in the cabinet with the eight screws provided.
- (3) Route the two 27B1 data unit connector cables as required.
- (4) Connect P1 of the 27B1 data unit to J1 of the 28A1 data mounting.
- (5) Connect P2 of the 27B1 data unit to J2 of the 28A1 data mounting.

Data Sets 108D and E

3.06 The installation procedure for data sets 108D and E can be found in 4.03.

4. CONNECTIONS

4.01 The interconnection arrangement for the typical data set 108D or E multiple arrangement is shown in Fig. 3.

4.02 Connect the 28A1 data mounting to the transmission facilities as follows:

- (1) Plug the 50-pin J3 (A25B-type) connector cable into P3 of the 28A1 data mounting.
- (2) Route the A25B-type connector cable to the intermediate distribution frame (IDF) or connector block and make connections as required.
- (3) Connect the appropriate private line facilities to the IDF or connector block as required.

TABLE A
DATA SET FACEPLATE-INDICATED OPTIONS

OPTION DESIGNATION	FUNCTION OF OPTION	SLIDE SWITCH *		ROTARY SWITCH S1 †		FACEPLATE DESIGNATION	
		SWITCH	SWITCH POSITION	SWITCH	SWITCH POSITION ‡		
X	FDX Operation—Disables the hub directional control circuit of the data set to allow proper operation of a private line station.	S1	Closed	S1(DX)	Down	DX	F
W	HDX Operation—Not functional in station application.		Open		Up		H
V	Space Hold on TL (BB)—Enables the data set to provide a spacing condition on the TL lead when a loss of received carrier is detected by the data set.	S2	Closed	S1(TL)	Down	TL	S
U	Mark Hold on TL (BB)—Enables the data set to provide a marking condition on the TL lead when a loss of received carrier is detected by the data set.		Open		Up		M
T	Not functional in station application.	S3	Closed	S1(RL)	Down	RL	S
S	Not functional 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.

TABLE B
2-WIRE/4-WIRE OPTIONS

OPTION	"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 C or D.

TABLE C
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.

See Table E for connection of line facilities to station.

4.03 Insert data set 108D or E in the proper position on the 28A1 data mounting. One data set mounts in each odd slot of the 28A1 data mounting (1, 3, 5, 7, etc) up to a maximum of eight.

4.04 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.

4.05 Connect the EIA outputs of the CPT to the 27B1 data unit via the eight customer-provided cables which plug into J1 through J8 on the data

TABLE D
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.

unit. (See 3.05 for connection of the 27B1 data unit to the 28A1 data mounting.)

4.06 Make KS-20575 rectifier wiring connections to the 28A1 data mounting as follows:

Note: The wiring connections between the KS-20575 rectifier and the 28A1 data mounting are made with 22-gauge, or larger, solid wire for power, signal ground, and frame ground connections.

- (1) Connect +24 volts on the rectifier to terminals 1 and 4 of TB1.
- (2) Connect -24 volts on the rectifier to terminals 2 and 5 of TB1.
- (3) Connect signal ground on the rectifier to terminals 3 and 6 of TB1.
- (4) Connect the frame ground on the rectifier to terminal 8 of TB1.

Note: Verify if customer desires signal ground and frame (protective) ground made common. Connect terminal 8 to terminal 3 of TB1 on 28A1 data mounting if customer desires common grounds.

- (5) Connect the ac power cord to a 117-volt 60-Hz ac outlet.

5. PREOPERATIVE ADJUSTMENTS

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 591-028-502.

Data Set Receive Level Adjustment

5.02 At the time of manufacture, option K is provided (screw switch D on data set 108D or E is open) for minimum sensitivity (minimum

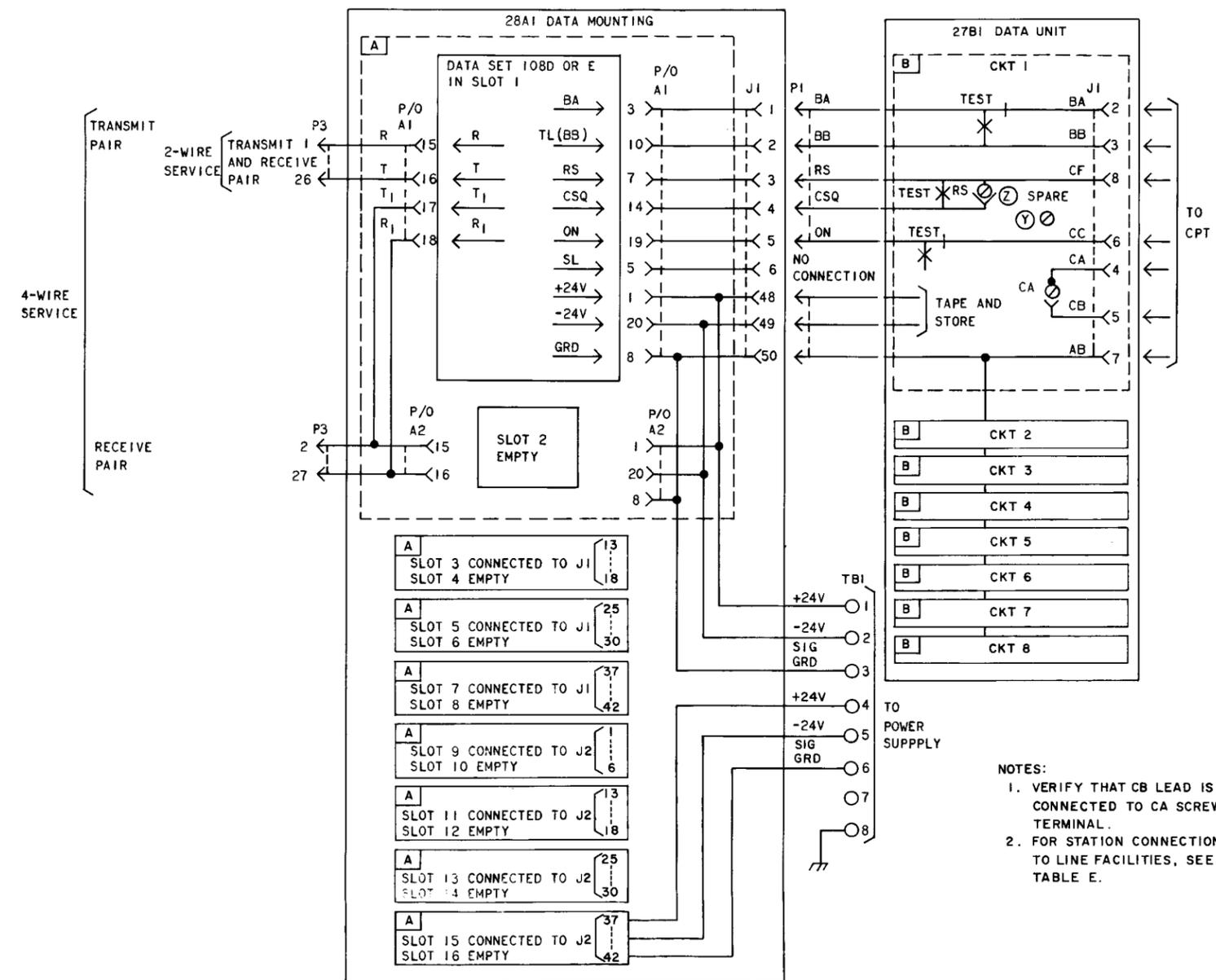


Fig. 3—Data Set 108D- or E-Type Multiple Arrangement Interconnection Block Diagram

TABLE E
STATION CONNECTIONS TO LINE FACILITIES

DATA SET SLOT	2-WIRE		4-WIRE			
	SEND AND RECEIVE		SEND		RECEIVE	
	R	T	R	T	T1	R1
1	1	26	1	26	2	27
3	3	28	3	28	4	29
5	5	30	5	30	6	31
7	7	32	7	32	8	33
9	9	34	9	34	10	35
11	11	36	11	36	12	37
13	13	38	13	38	14	39
15	15	40	15	40	16	41

gain of receive-amplifier stage). If the receive level is less than -30 dBm (-31, -32), the 6-dB reduction of gain should be removed by installing option J (closing the 1-2 section of screw switch D). Table F shows the condition of the screw switch for each gain setting. The screw switch should be set according to the service order or circuit layout record.

on faceplate of data set. Set FUNCTION switch of TTS-28 to DBM 900 Ω 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.

TABLE F
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.

5.03 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



If carrier squelch on carrier fail (option R) is installed in the 27B1 data unit, it MUST be removed to measure the output level of the data set. At time of initial installation, unplug the 27B1 data unit from the 28A1 data mounting (P1 and P2 from J1 and J2) to make data set transmit level adjustment via R18.



If installing a data set in an arrangement that is already installed on customer premises, carefully remove 27B1 data unit (from cabinet) and remove option R to make transmit level adjustment for data set being installed. To remove option R, remove CSQ spade tip lead from RS screw. Once the measurements and adjustments (via R18) have been made, reconnect the CSQ lead to RS screw and reinstall 27B1 data unit in cabinet as required.

SECTION 591-028-202

5.04 Connect the private line facility lines as required.

5.05 Perform installation tests in accordance with Section 591-028-502.

6. REFERENCES

6.01 The following documents pertain to data sets 108D and E multiple private line station:

- SD- & CD-73060-01 Data Set 108D
- SD- & CD-1D229-01 Data Set 108E
- SD- & CD-1D176-01 Data Systems Station 28-Type Data Mounting
- SD- & CD-1D183-01 Data Systems 27-Type Data Unit

SECTION	TITLE
590-100-114	27A1 and 27B1 Data Units—Identification
590-102-124	28A1 Data Mounting—Identification

SECTION	TITLE
591-028-100	Data Sets 108D- and 108E-Type, Used in Station Applications—Description
591-028-102	Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit—Description
591-028-302	Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit—Maintenance
591-028-502	Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit—Test Procedures.