DATA SET 109E-TYPE
MULTIPLE DATA SET ARRANGEMENT
USING 28A1 DATA MOUNTING AND 27-TYPE DATA UNIT
DESCRIPTION

1. GENERAL

1.01 This section describes the physical and functional characteristics of data set 109E-type in the multiple data set arrangement. Information is limited to the multiple data set arrangement using the 28A1 data mounting and the 27-type data unit.

1.02 This section is reissued to include information on the 27B1 data unit, and the title has been changed accordingly. Since this reissue constitutes a general revision, arrows ordinarily used to denote changes have been omitted.

1.03 A multiple arrangement allows the installation of a large number of data sets in a relatively small area. There are two basic arrangements; one consists of up to sixteen data sets 109E-type, a 28A1 data mounting, ***two 27A1 data units,*** and an appropriate power supply. The second arrangement consists of up to eight data sets, a 28A1 data mounting, ***one 27B1 data unit,*** and an appropriate power supply. This arrangement provides loop-back testing capabilities. Either arrangement is capable of full-duplex (FDX) or half-duplex (HDX) operation at speeds up to 150 bauds. Connectors and cables for connecting customer-provided terminals (CPTs) to the data unit(s) are provided by the customer and should not exceed 50 feet in length. The 28A1 data mounting, 27-type data unit, power supply, and A25B connector cable (for connecting data mounting to transmission facilities) are not supplied with the data sets and are ordered individually.

1.04 Data set 109E-type uses a tricurrent level baseband transmission scheme. It is a serial transmission dc data set designed to operate over a 2-wire metallic loop in the FDX mode. Data set 109E-type can also operate in the HDX mode with any data set 109-type. In the FDX mode data set 109E-type will work with data sets 109E-type, 109F-type, 109H-type, or 109G-type (in a hub).

1.05 The data set and associated mounting apparatus may be located any place that is convenient for the customer and should be within 50 feet of the CPTs.

1.06 The 28A1 data mounting, 27-type data unit, and data set 109E-type require no periodic maintenance after installation tests and adjustments have been completed. Data set options and line pad resistance are inserted by opening or closing the proper screw switches on the data set at the time of installation. Options which consist of strapping connections must also be made on the 27-type data unit at the time of installation. The options deal with the interface to the CPT.

2. PHYSICAL DESCRIPTION

2.01 The complete data set 109E-type multiple data set arrangement, consisting of the 28A1 data mounting, the 27-type data unit(s), and the data sets 109E-type, is approximately 6 inches high and 10 inches deep. The complete arrangement will mount on a 23- or 25-inch rack and weighs approximately 27 pounds.

DATA SET 109E-TYPE

2.02 Data set 109E-type (Fig. 1) is a single printed circuit pack (AR-type) that is approximately 5-1/2 inches high, 7 inches deep, and 1/2-inch wide. It weighs approximately 8 ounces.

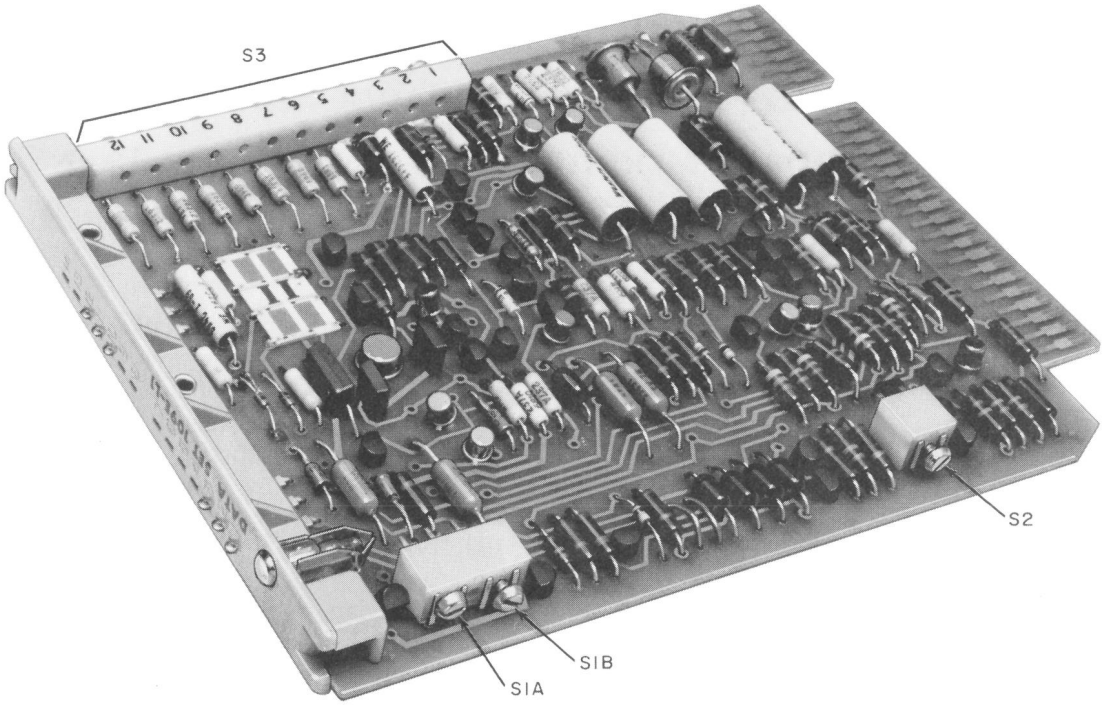


Fig. 1—Data Set 109E-L1

2.03 Power requirements for data set 109E-type are a maximum of 110 mA of +24 ±2 Vdc and 95 mA of −24 ±2 Vdc power.

28A1 DATA MOUNTING

2.04 The 28A1 data mounting (Fig. 2) is approximately 6 inches high and 10 inches deep. It mounts on either a 23- or 25-inch rack and weighs approximately 15 pounds. Mounting space is provided for mounting sixteen data sets 109E-type and two 27-type data units. Only eight data sets 109E-type can be installed when a 27B1 data unit is used, because it is connected to both J1 and J2 on the data mounting.

2.05 The dc voltages to be delivered to the data set via the data mounting must be supplied to the data mounting from an external source or by a KS-20575 rectifier which must be ordered separately. Space is provided on the 28A1 data mounting for mounting the KS-20575 rectifier.

27-TYPE DATA UNIT

2.06 The 27-type data unit (Fig. 3) is approximately 4-3/4 inches high, 7 inches wide, 1-1/2 inches deep, and weighs approximately 2 pounds. It provides interface connections on an individual basis for any data set 109E-type to any of eight CPTs. The 27A1 data unit consists of eight EIA connectors, eight toggle switches (designated NORMAL-OFF), and spade-tipped straps for implementing options (Table A). The physical characteristics of a 27B1 data unit are identical to those of a 27A1 with the exception of the toggle switches and the 50-conductor cable and connector. The toggle switches on the 27B1 are designated TEST-NORMAL. The 50-conductor cable used with the 27B1 data unit is terminated with two connectors while the 27A1 is terminated with one. Neither data unit requires external power.

2.07 Either DU may be used with private line service but only the 27A1 can be used with Data Line Concentrator Systems. If a 27B1 is used with data sets 109E-type, only half of the slots in the 28A1 data mounting can be utilized.

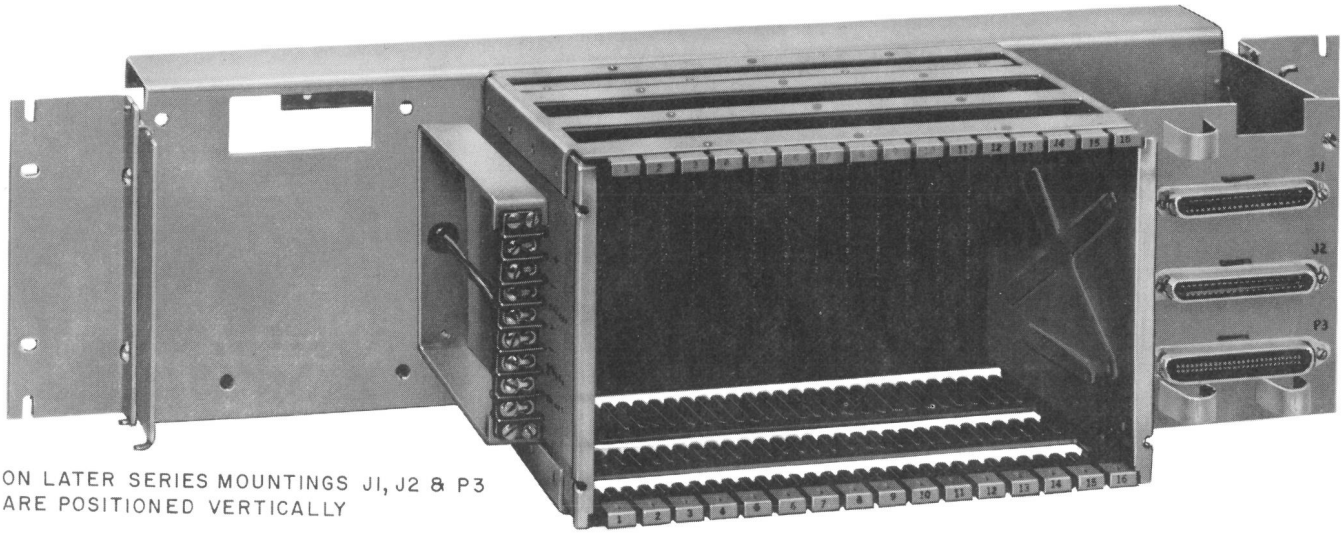


Fig. 2—28A1 Data Mounting

An advantage of the 27B1 DU over the 27A1 DU is the loop-back capability of the 27B1 (see 3.12).

3. FUNCTIONAL DESCRIPTION

3.01 The data set 109E-type multiple data set arrangement provides a maximum of 16 EIA interface connections between line facilities and CPTs.

3.02 Sixteen transmission facilities, each consisting of 2-wire metallic loops, are interfaced to the 28A1 data mounting through an intermediate distribution frame or connector block and an A25B-type connector cable. Two 27A1 data units must be used in this configuration to provide the 16 interface circuits (Fig. 4). If a 27B1 data unit is used only eight interface circuits are available for each 28A1 data mounting (Fig. 5).

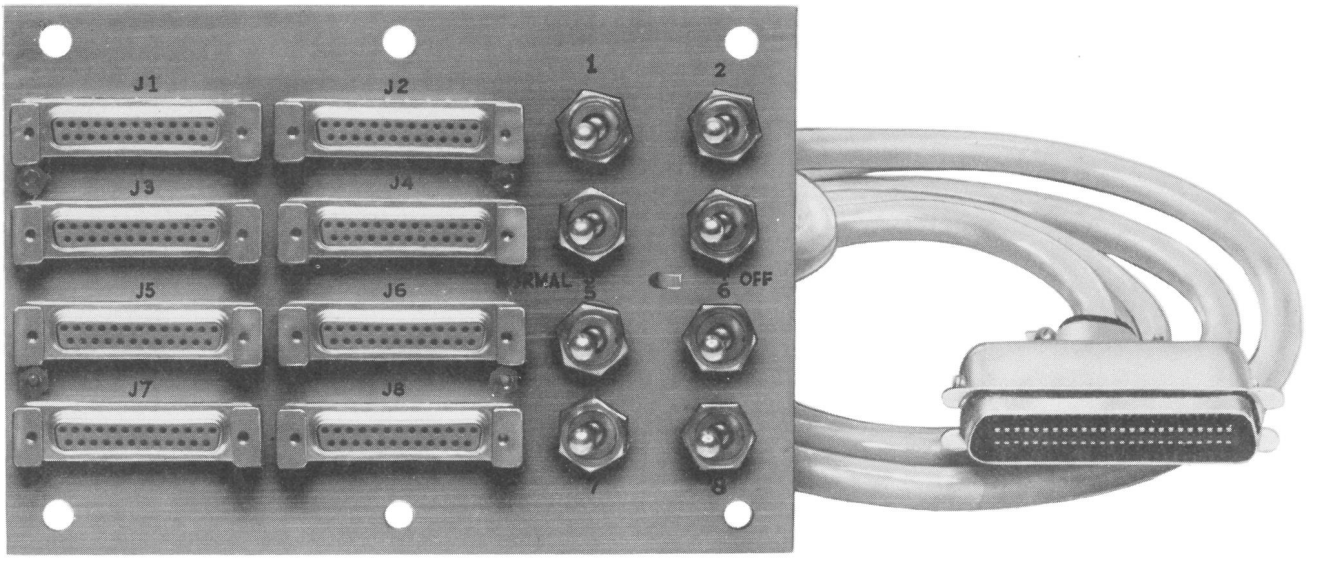
28A1 DATA MOUNTING

3.03 The 28A1 data mounting is a multiple apparatus housing which will accommodate any size AR-type circuit pack or data set. In multiple data set arrangements, the 28A1 data mounting provides mounting space for, and delivers power to, up to 16 data sets 109E-type. Connector P3 on the 28A1 data mounting provides interconnection from the data sets 109E-type to the transmission facilities. Connectors J1 and J2 on the 28A1 data mounting provide interconnection from the data sets 109E-type to the 27-type data unit(s).

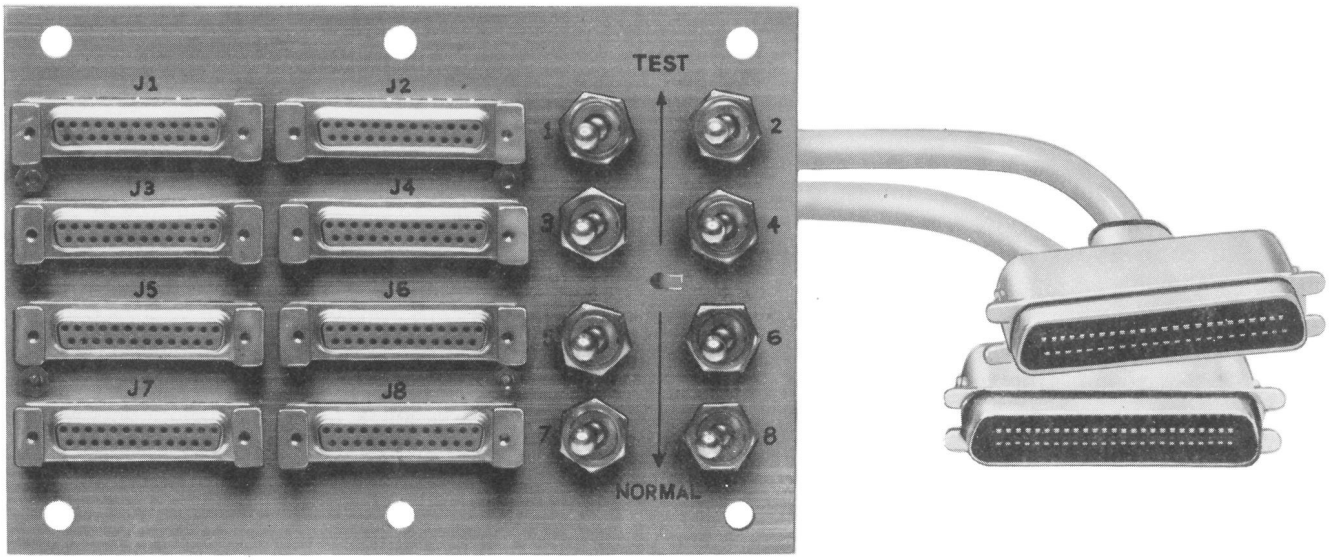
3.04 The 28A1 data mounting is electrically divided into two halves, each half providing power requirements for eight data sets. Connector jack J1 and terminals 1, 2, and 3 of terminal block 1 (TB 1) are associated with interface and power connections, respectively, for the data sets in slots 1 through 8. Connector jack J2 and terminals 4, 5, and 6 of TB 1 are associated with interface and power connections for the data sets in slots 9 through 16. When a separate power source is to be supplied for each half of the 28A1 data mounting, one source is connected to TB 1 terminals 1, 2, and 3; the second source is connected to TB 1 terminals 4, 5, and 6.

3.05 Terminals 1 and 4 of TB 1 are for connection to +24 volts dc, terminals 2 and 5 are for connections to −24 volts dc, and terminals 3 and 6 are for connection to signal ground. Terminal 7 is not used and terminal 8 is for connection to frame ground.

3.06 When one power source, such as the KS-20575 rectifier, is used to supply both halves of the data mounting, the (+) 24 volts of the rectifier is connected to terminals 1 and 4 of TB 1, the (−) 24 volts is connected to terminals 2 and 5 of TB 1, and signal ground is connected to terminals 3



FRONT VIEW OF 27AI



FRONT VIEW OF 27BI

Fig. 3—27-Type Data Unit

and 6 of TB 1 (Fig. 6). Terminal 7 is not used and terminal 8 is connected to frame ground on the rectifier.

3.07 This KS-20575 rectifier is capable of supplying power to both halves of a data mounting equipped with 16 data sets. When part of the data mounting is used for arrangements other than the multiple data set arrangement, the capacity of the KS-20575 rectifier may exceed the load requirements of the data mounting. In this case, other 28A1 data mounting halves may be added

TABLE A

OPTION CONNECTIONS ON THE 27-TYPE DATA UNIT

DATA UNIT	OPTION	WIRING		FACTORY EQUIPPED	CONNECT SPADE-ENDED LEADS TO SCREWS AS INDICATED				
					CC	CF	CB	CD	CSQ
27A1	Z	CC and CF terminations	DLCS	√	RS	ON			
	Y		Private Line		ON	RS			
	X	CB termination	Open				*		
	W		Looped to CA	√			CA		
	V		Common to CC				†		
	T	CD termination	DLCS, no signal from CPT	√				ON	
	S		DLCS, signal from CPT; Private line, all applications					*	
27B1	R		Carrier squelch on carrier fail						RS
	Q		No carrier squelch on carrier fail	√					Spare

* Insulate and store.

† Connect to same screw as spade CC.

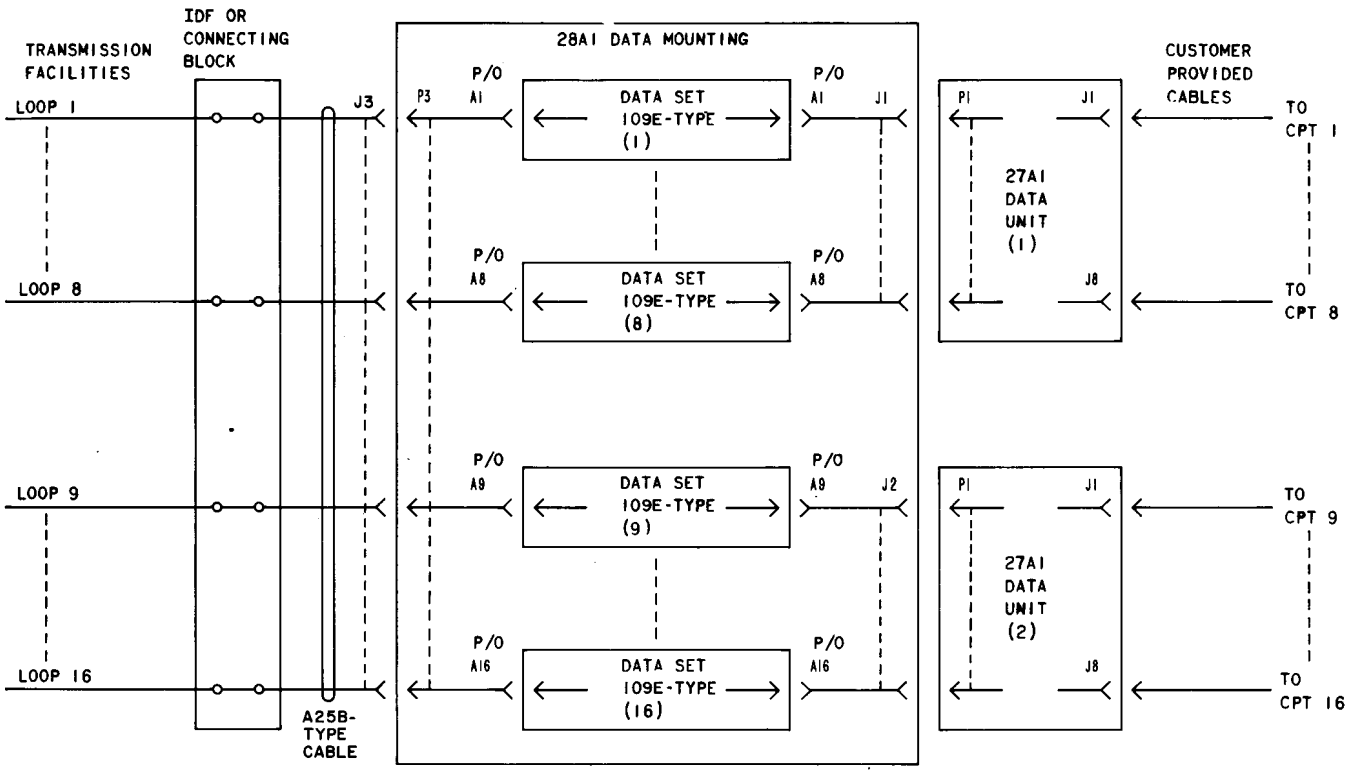


Fig. 4—Block Diagram of a Data Set 109E-L1 Multiple Arrangement Using a 27A1 Data Unit

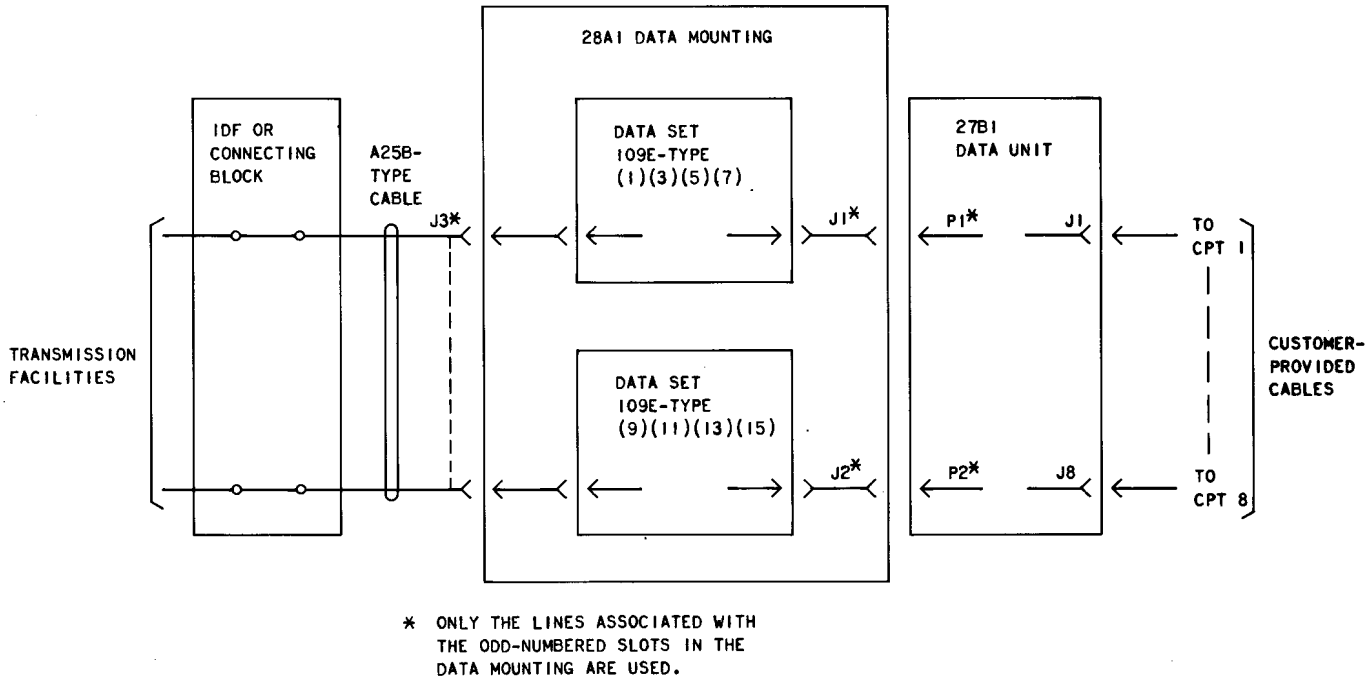


Fig. 5—Block Diagram of a Data Set 109E-L1 Multiple Arrangement Using a 27B1 Data Unit

by strappings between the TB 1 terminals, as long as the total source drain (+24V and −24V) does not exceed the rectifier limits (4 amps).

DATA SET 109E-TYPE

3.08 For a functional description of the data set 109E-type, refer to the section entitled Data Set 109E-Type—Description (591-036-100).

27-TYPE DATA UNIT

3.09 The data set 109E-L1 multiple data set arrangement uses two 27A1 or one 27B1 data units. Each unit provides connecting and supervisory options for up to eight data sets. Interconnection to each data unit from the 28A1 data mounting is made through J1 and J2 on the 28A1 data mounting (Fig. 5 and 6). The EIA outputs of the CPTs are connected to each data unit via eight customer-provided cables which plug into J1 through J8 on the data unit.

Multiple Arrangements With 27-Type Data Unit

3.10 Eight toggle switches (one for each data set) located on the 27A1 data unit are designated NORMAL-OFF. These toggle switches are connected between the CD lead of EIA terminal connectors (J1-J8) and the current squelch (CSQ) lead of data set 109E-type (Fig. 6). When the current squelch option is provided on data set 109E-type (Z option), the toggle switches function as follows. In the NORMAL position, a positive voltage from the CPT is applied to the current squelch lead, allowing the data set to operate in the normal manner. In the OFF position, the CD lead is opened and no voltage is applied to the CSQ lead. The data set 109E-type appears out of service. When current squelch option for data set 109E-type has not been provided (Y option), the switches have no effect regardless of the switch position.

Data sets to be used for private line loops must be equipped with the option that disables the data set current squelch feature (option Y—screw switch S2 open). In this case, the 27A1 NORMAL-OFF switch or 27B1 TEST-NORMAL switch associated with a data set so equipped will be ineffective.

3.11 The 27A1 data unit provides options in the form of strapping arrangements (Table A). The CB, CC, CD, and CF leads appear as spade-tipped leads in the 27A1 data unit. These leads can be optionally strapped to screw terminals on the 27A1 data unit labeled RS, ON, and CA. The options should be made in accordance with the interface requirements of the particular arrangement during initial installation.

3.12 Each of the eight toggle switches on the 27B1 data unit, designated TEST-NORMAL, is associated with a particular customer interface circuit (Fig. 7). When the switch is positioned to TEST, the transmitted data lead (BA) is disconnected from the customer interface and looped back to the received data lead (BB) and the data set ready lead (CC) is opened. This configuration facilitates loop-back testing of the circuit up to the customer interface.

3.13 The 27B1 data unit serves ***only the eight odd-numbered slots*** in the 28A1 data mounting, but uses both connectors J1 and J2. Screw terminals and spade-tipped leads are provided to strap the optional arrangements (Table A) of data set and terminal equipment leads.

3.14 The basic arrangement of the options listed in Table A for the 27A1 is limited to the 10-type Data Line Concentrator System and private line (PL) use while that for the 27B1 is for PL use only. If any other arrangement is desired, it must be locally engineered.

4. REFERENCES

4.01 The following Bell System Practices (BSPs) contain information pertaining to the data set 109E-type multiple data set arrangement:

SECTION	TITLE
590-100-114	27A1 and 27B1 Data Units—Identification
590-102-124	28A1 Data Mounting—Identification
591-036-100	Data Set 109E-L1—Description
591-036-201	Data Set 109E-Type—Multiple Data Set Arrangement Using 28A1 Data Mounting and 27-Type Data Unit—Installation and Connections

591-036-301	Data Set 109E-Type—Multiple Data Set Arrangement Using 28A1 Data Mounting and 27-Type Data Unit—Maintenance
591-036-501	Data Set 109E-Type—Multiple Data Set Arrangement Using 28A1 Data Mounting and 27-Type Data Unit—Test Procedure.

4.02 The following schematic diagrams and circuit descriptions contain information pertaining to data set 109E-type multiple data set arrangement:

SD-&CD-1D198-01	Data Set 109E-L1
SD-&CD-73055-01	No. 10A Data Line Concentrator
SD-&CD-1D212-01	No. 10B Data Line Concentrator
SD-&CD-1D183-01	27-Type Data Unit
SD-&CD-1D176-01	28-Type Data Mounting

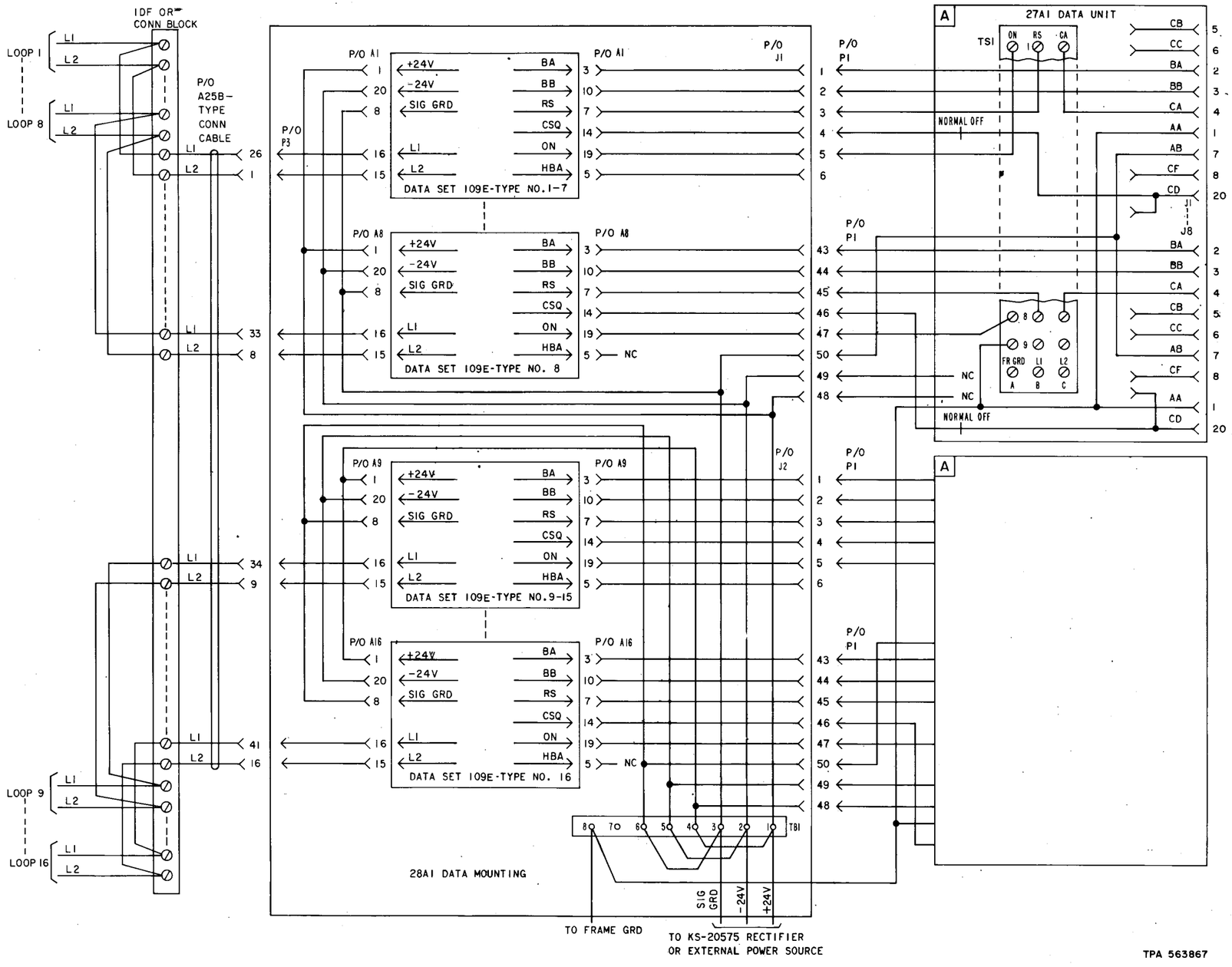


Fig. 6—Data Set 109E-Type Multiple Data Set Arrangement Using a 27A1 Data Unit—Interconnection Diagram

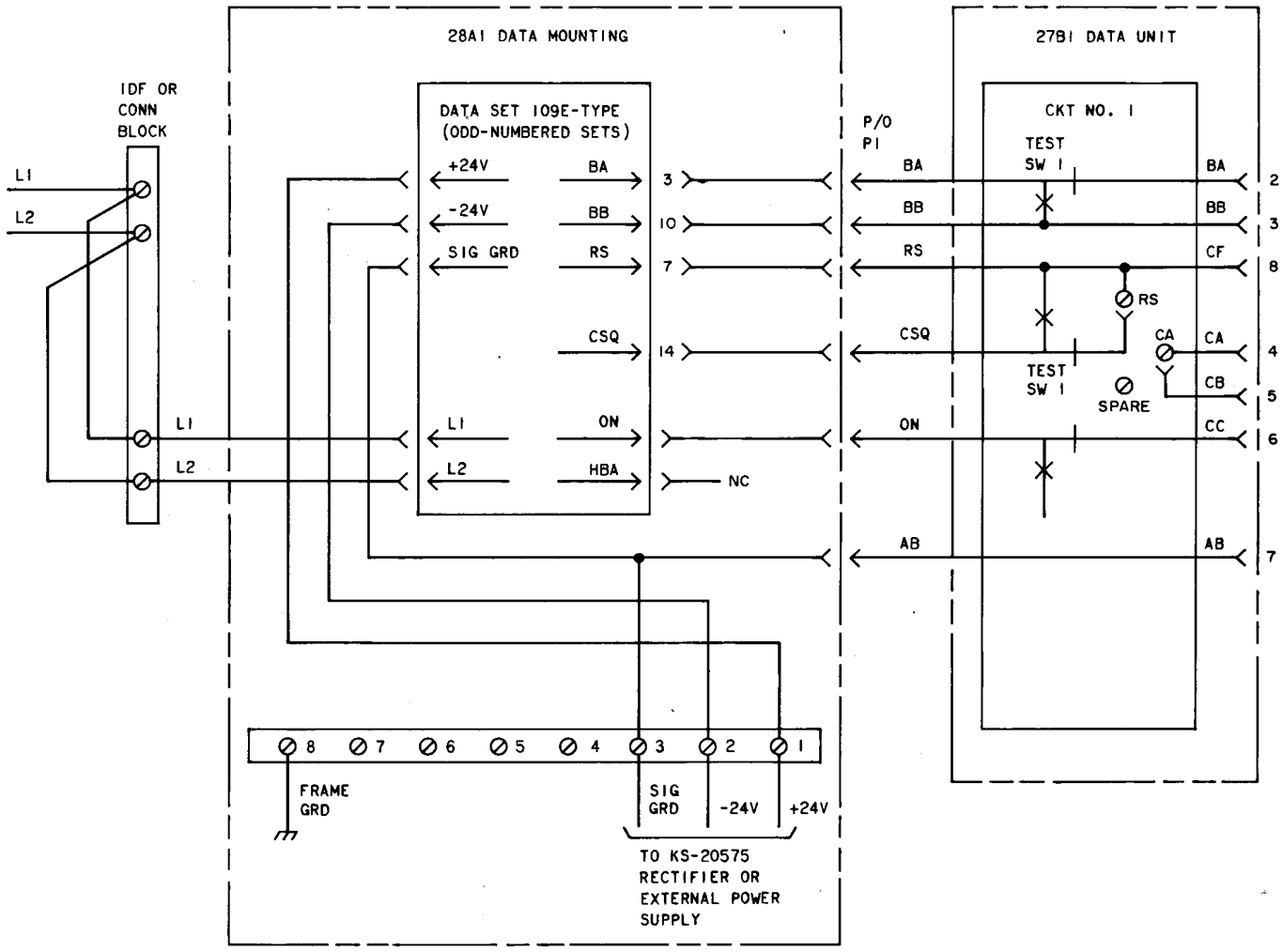


Fig. 7—Data Set 109E-Type Multiple Data Set Arrangement Using a 27B1 Data Unit—Interconnection Diagram