DATA-PHONE® INTERCONNECTION ARRANGEMENT FOR LINE SIDE OF 10-TYPE DATA LINE CONCENTRATOR (DATREX*) INSTALLATION AND CONNECTION

CONTENTS PAGE

1. GENERAL

1.01 This section covers the options used in and installation and connection procedures to be followed when installing DATA-PHONE interconnection arrangements for the line side of the 10-type Data Line Concentrator (DATREX).

* Service mark of the Bell System.

1.02 These arrangements provide DATA-PHONE stations [full-duplex (FDX) or half-duplex (HDX)] with access to a DATREX concentrator via the Direct Distance Dialing (DDD) network. One such arrangement (Fig. 1) consists of a Data Set 103G-type, an AR270 circuit pack, a Data Set 109D- or 109E-type, a 208B adapter, and a 28A1 Data Mounting. If the installation consists of more than six interconnection arrangements, the 113-type Data Station equipped with Data Sets 113B-L1 may be used in place of the Data Sets 103G-type.

1.03 The 28A1 Data Mounting will mount in 23- or 25-inch racks and is capable of housing eight DATA-PHONE interconnection arrangements. Power is supplied to the 28A1 Data Mounting by a KS-20575-L1 rectifier which mounts in a space provided for it on the mounting or by some other suitable power source.

1.04 Data Set 103G-type (or 113-type Data Station) may be mounted any place that is convenient for the customer and within 50 feet of the AR270 circuit pack. A 6-foot cable is provided in the AR270 circuit pack. When Data Set 103G-type (or 113-type Data Station) is to be located outside the reach of the AR270 circuit pack cable, an extension cable (eg, M25A-61) must be used. Data

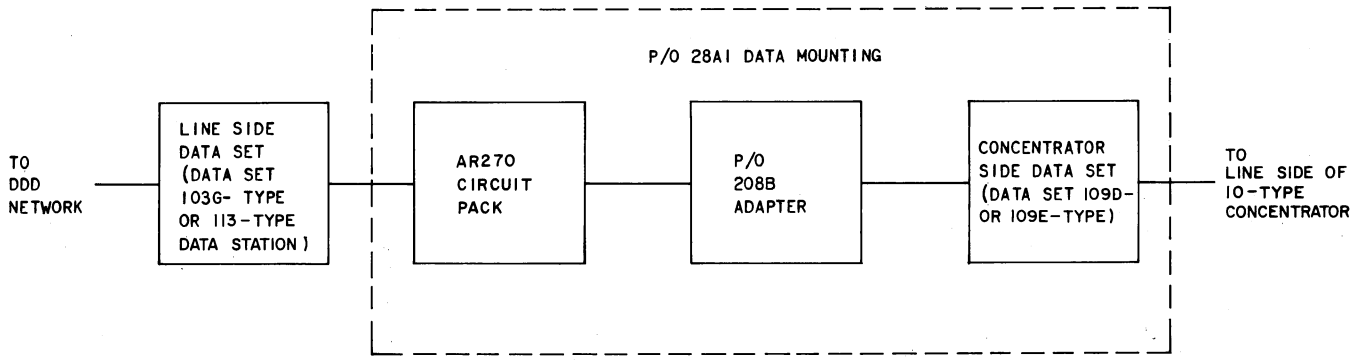

Fig. 1—DATA-PHONE Interconnection Arrangement

Set 109-type and AR270 circuit pack mount in the 28A1 Data Mounting as shown in Fig. 2.

1.05 Removal and replacement procedures for the circuit packs and Data Sets 109-type can be found in the section entitled DATA-PHONE® Interconnection Arrangement for Line Side of 10-Type Data Line Concentrator (DATREX*)—Maintenance Procedures (591-811-303).

1.06 A TTS-28 portable station test set (or equivalent), transmission measuring set (TMS), and a KS-14510-L1 (or equivalent) volt-ohm-milliammeter (VOM) are required for making the installation tests and adjustments outlined in Part 6 of this section.

1.07 General data set installation practices as outlined in the section entitled Data Sets—General Installation and Connection Information (590-010-200) should be followed in addition to the steps outlined in this section.

Do not connect power to the interconnection arrangements until instructed to do so in this practice.

2. OPTIONS

2.01 This part outlines the options required in Data Sets 103G-type, 113-type Data Station, Data Sets 109D- or E-type, and AR270 circuit packs when used to provide the DATA-PHONE interconnection arrangement for the line side of a 10-type Data Line Concentrator. The 28A1 Data Mounting and 208B adapter are not equipped with optional arrangements.

Data Set 103G-Type (Installations of Six or Less Arrangements Only)

2.02 The Data Set(s) 103-type must be arranged to automatically answer incoming calls. In addition they must be equipped with the following options:

(a) Long space disconnect (option V)

(b) Carrier fail disconnect (option S)

(c) Send disconnect (option T)

(d) No common grounds (without option Q)

(e) Answer control combined (option M).

2.03 Equip Data Set 103G-type with the options described in 2.02 by opening and closing the option screw switches on CJ10 and CJ9 circuit packs of the data set (Fig. 3) in accordance with Table A. All other options in the data set may be left as factory equipped.

113-Type Data Station (Installations of More Than Six Arrangements Only)

2.04 When the 113-type Data Station is used, it must be equipped with the following options:

(a) No customer control of loss of carrier disconnect (without option Z in Data Set 113B-L1)

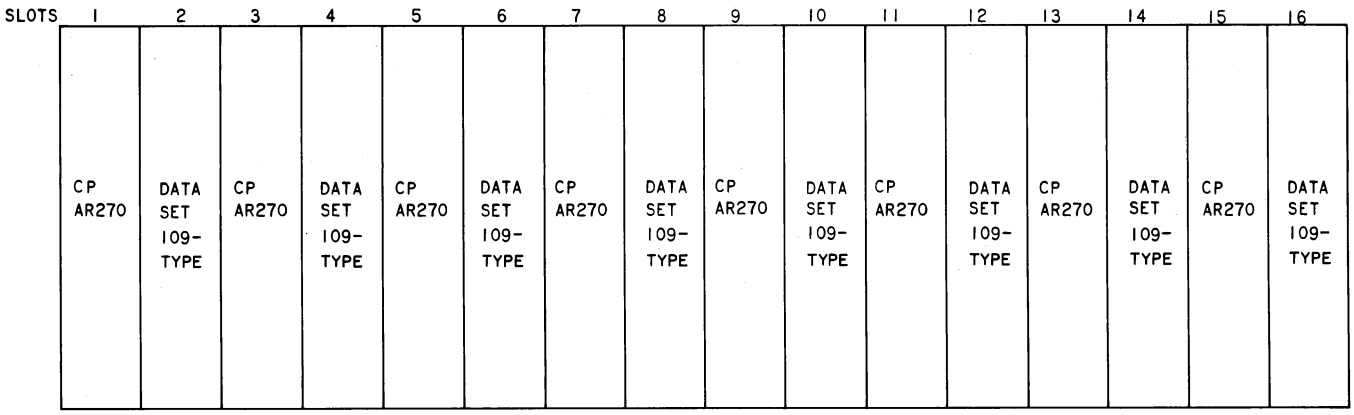

Fig. 2—Locations of Data Set 109E-Type and AR270 Circuit Pack in 28A1 Data Mounting

(b) No common grounds (without option V in 32A1 Data Mounting).

2.05 Equip the 113-type Data Station with the options outlined in 2.04 as follows.

(a) Remove option Z by opening screw switch Z on the Data Set 113B-L1.

(b) Remove option V by opening screw switch SS1 on the 32A1 Data Mounting.

Data Sets 109D-Type and 109E-Type

2.06 Data Set(s) 109D- or E-type must be equipped with the following options:

(a) Carrier squelch (option Z)

(b) Mark-hold on BB lead (option U)

(c) Space crossover shift (option R).

2.07 Equip the Data Set(s) 109E-type (if used) with the options outlined in 2.06 as follows:

(a) Option Z—Close screw switch S2.

(b) Option U—Open screw switch S1-A and close screw switch S1-B.

(c) Option R—Open screw switch S3-1 and close screw switch S3-2.

2.08 Equip the Data Set(s) 109D-type (if used) with the options outlined in 2.06 as follows.

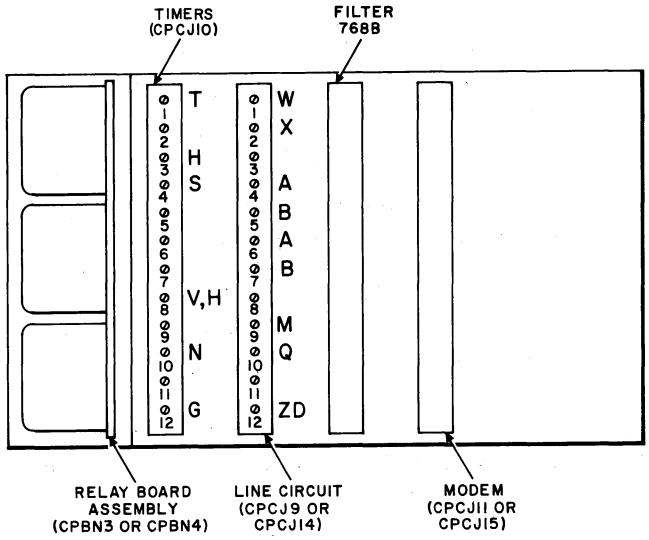

Fig. 3—Data Set 103-Type Option Screw Switches

(a) Option Z—Close screw switch S4.

(b) Option U—Open screw switch S2.

(c) Option R—Connect strap link between terminals 4 and 5 of S5 and remove strap link from between terminals 3 and 4 of S5.

AR270 Circuit Pack

2.09 Optimum operation of Data Set 109E-type is obtained with a capacitive line (ie, cable pair) when it is used in the FDX mode. Since in many installations the loop between the Data Set 109E-type and trunk-side data set will be purely resistive (less than 6 miles of cable), the AR270

TABLE A

DATA SET 103-TYPE OPTION SCREW SWITCH SETTINGS

OPTION	DESIGNATION	CIRCUIT PACK	SCREW SETTINGS	
			OPEN	CLOSE
Long space disconnect	V	CJ10		8
Carrier fail disconnect	S	CJ10		4
Send disconnect	T	CJ10		1
Answer control combined	M	CJ9		9
No common ground	w/o Q	CJ9	10	

circuit pack is arranged so that a capacitor may be inserted across the line to simulate line capacitance. This is accomplished by closing screw switch C and opening screw switches A and B on the AR270 circuit pack. At installations where the loop between the Data Set 109E-type and trunk-side data set is 6 miles or more of cable, remove the capacitor by opening screw switch C and closing screw switches A and B. At all other installations, install the capacitor by closing screw switch C and opening screw switches A and B.

3. DATA SET 109-TYPE INSTALLATION ADJUSTMENTS

Line Pad Adjustments

3.01 In order to properly adjust the line pads of Data Set 109-type, it is necessary to know the resistance of the trunk between the concentrator and the trunk-side data set in addition to the resistance of the loop between the concentrator and Data Set 109-type. This information should be found on the service order or circuit layout record card. To determine the amount of padding to be inserted in the data set, add the resistance of the trunk loop to the resistance of the Data Set 109-type loop. The difference between this sum and 1600 ohms is the amount of padding that should be inserted in the data set.

3.02 Data Set 109D-type is provided with a set of shorting links for a series of resistors which may be inserted in each side of the loop. Data Set 109E-type is provided with screw switches for the same purpose. After determining the amount of padding to be inserted as described in 3.01, locate the resistance value nearest to but not greater than the padding needed in the PAD RESISTANCE (OHMS) column of Table B for Data Set 109D-type or Table C for Data Set 109E-type. Install the shorting link or open and close the screw switches given for this value in the INSTALL LINKS BETWEEN SCREWS column of Table B (Data Set 109D-type) or SCREW SWITCH SETTINGS column of Table C (Data Set 109E-type).

4. INSTALLATION

4.01 This part describes the procedures for installing the DATA-PHONE interconnection arrangements. This requires one 28A1 Data Mounting per eight interconnection arrangements; one AR270 circuit pack and one Data Set 109D- or E-type per arrangement; one 208B adapter per four arrangements; and a 113-type Data Station, consisting of a 32A Data Mounting and one Data Set 113B-L1 per arrangement, and an appropriate power source such as a KS-20575-L1 rectifier. At installations of six or less arrangements, the 113-type Data Station is replaced by one Data Set 103G-type for each arrangement. For 113-type Data Station installation procedures, refer to the section entitled 113-Type Data Station—Installation and Connections (591-814-200).

28A1 Data Mounting

4.02 The 28A1 Data Mounting may be arranged to mount in either a 23-inch (ie, KS-20018 cabinet) or 25-inch (ie, KS-20093 cabinet) rack by adjustment of the mounting brackets on each end of the data mounting. If the 28A1 Data Mounting is to be installed in a 23-inch rack, arrange the

TABLE B

LINE PAD LINKS FOR DATA SET 109D

PAD RESISTANCE (OHMS)	INSTALL LINKS BETWEEN SCREWS
0	L and P, N and J, D and G, F and B
294	L and P, K and J, D and G, C and B
632	L and P, M and J, D and G, E and B
926	L and M, J and K, D and E, B and C
1238	L and P, J and H, D and G, B and A
1532	L and H, J and K, D and A, B and C
1870	L and M, J and H, D and E, B and A

TABLE C

LINE PAD SCREW SWITCH SETTINGS FOR DATA SET 109E

PAD RESISTANCE (OHMS)	SCREW SWITCH SETTINGS	
	OPEN S3 —	CLOSE S3 —
0	—	4, 5, 6, 7, 9, 10, 11, 12
136.2	7, 9	4, 5, 6, 10, 11, 12
266	6, 10	4, 5, 7, 9, 11, 12
402.2	6, 7, 9, 10	4, 5, 11, 12
522	5, 11	4, 6, 7, 9, 10, 12
650.2	5, 7, 9, 11	4, 6, 10, 12
788	5, 6, 10, 11	4, 7, 9, 12
924.2	5, 6, 7, 9, 10, 11	4, 12
1022	4, 12	5, 6, 7, 9, 10, 11
1158.2	4, 7, 9, 12	5, 6, 10, 11
1288	4, 5, 11, 12	6, 7, 9, 10
1424.2	5, 6, 7, 9, 10, 11	4, 12
1544	4, 5, 11, 12	6, 7, 9, 10
1680.2	4, 5, 7, 9, 11, 12	6, 10
1810	4, 5, 6, 10, 11, 12	7, 9
1946.2	4, 5, 6, 7, 9, 10, 11, 12	—

Note: Screw switch S3-3 and S3-8 should contain no screws.

mounting brackets with the long sides against the data mounting. For 25-inch racks, arrange the brackets with the short sides against the data mounting.

4.03 If the KS-20575-L1 rectifier is to be used to power the 28A1 Data Mounting, perform the following.

(1) Mount the rectifier in the space provided on the front left-hand side of the data mounting.

(2) Route the ac power cord from the rectifier to the rear of the data mounting via the slot in the top of the mounting.

(3) Using eight 12-24 BHM screws, mount the 28A1 Data Mounting in the rack.

Data Set 109D- or E-Type, AR270 Circuit Pack, and 208B Adapter

4.04 Verify that the proper options are installed in the Data Sets 109D- or E-type and AR270 circuit packs as required in Part 2 of this section. Install the Data Sets 109D- or E-type and AR270 circuit packs in the 28A1 Data Mounting slot locations shown in Fig. 2.

Note: For installations requiring four or less arrangements, slot 1 through 8 or 9 through 16 are all that are used.

4.05 Install the 208B adapters in connectors J1 and J2 of the 28A1 Data Mounting.

Note: Installations requiring four or less arrangements use only one 208B adapter in connector J1 (when using slots 1 through 8) or J2 (when using slots 9 through 16).

5. CONNECTIONS

28A1 Data Mounting

5.01 Connect the 28A1 Data Mounting as follows.

(1) Plug the 50-pin connector end of the line cable into P3 of the data mounting.

(2) Route the line cable through the hole (behind J1, J2, and P3) in the data mounting to an intermediate distribution frame (IDF) or connector block.

(3) Connect leads 1, 3, 5, 7, 9, 11, 13, and 15 of the line cable to the IDF or connector block (L2 of Data Sets 109-type).

(4) Connect leads 26, 28, 30, 32, 34, 36, 38, and 40 of the line cable to the IDF or connector block (L1 of Data Sets 109-type).

(5) Insulate and store the remainder of the cable leads.

(6) Cross-connect L1 and L2 of the concentrator lines in accordance with Table D.

TABLE D

CROSS-CONNECTIONS FOR DATREX CONCENTRATOR LINES

CONCENTRATOR LINE NO.	CROSS-CONNECT L1 TO	CROSS-CONNECT L2 TO
1	P3-26	P3-1
2	P3-28	P3-3
3	P3-30	P3-5
4	P3-32	P3-7
5	P3-34	P3-9
6	P3-36	P3-11
7	P3-38	P3-13
8	P3-40	P3-15

Data Set 103G-Type, 113-Type Data Station, and AR270 Circuit Pack

5.02 Connect the plug of the cable provided by the AR270 circuit pack to the 25-pin interface cable connector of the data set.

Note: The 25-pin interface cable connector is located on the faceplate of Data Set 113B-type and on the rear of Data Set 103G-type.

Power Connections

5.03 Connect power to the arrangements as follows.

(1) If one power source is to be used for both halves of the 28A1 Data Mounting, strap terminals 1, 2, and 3 of TB1 on the data mounting to terminals 4, 5, and 6, respectively.

(2) Connect terminal 8 of TB1 to FR GRD lead of the power source.

(3) Connect terminal 3 or 6 of TB1 to the COM lead of the power source.

(4) Connect terminal 1 or 4 of TB1 to the +24 lead of the power source.

(5) Connect terminal 2 or 5 of TB1 of the −24 lead of the power source.

(6) If the KS-20575-L1 rectifier is used as the power source, connect the rectifier power cord to a 117-volt 60-Hz ac outlet.

6. DATA SET 103G-TYPE AND 113-TYPE DATA STATION OUTPUT LEVEL ADJUSTMENT

113-Type Data Station

6.01 For Data Set 113B-type level adjustment procedure, consult the section entitled 113-Type Data Station—Installation and Connections (591-814-200).

Data Set 103G-Type

6.02 Adjust the transmitted power level of Data Set 103G-type as follows.

(1) Place a call to the 1000-Hz 1-mW terminal in the serving central office.

(2) Using the TMS, measure and record the level of the received tone. This is the actual measured loss (AML).

(3) Disconnect the TMS and terminate the call.

(4) Compare the AML to the expected measured loss (EML). The EML should be found on

the service order or circuit layout record card. The AML should not deviate from the limits given in Table E.

(5) Terminate the data set by calling a local test desk or data test center.

(6) Release AUTO key.

(7) Operate DATA key and hold operated until DATA lamp lights, and then release.

(8) Simultaneously operate DATA and TEST keys, then release.

(9) Condition VOM to read 5 volts ac.

(10) Connect VOM between terminals 10 and 13 of the CJ9 circuit pack option block.

(11) Using Table F, locate the measured loss value recorded in (2) under the 1000 Hz MEASURED LOSS column and adjust potentiometer R34 on CJ11 or CJ15 circuit pack until VOM indicates the corresponding RMS voltage listed in the F2 RMS VOLTAGE column. This ensures that the received level at the central office does not exceed −12 dBm.

(12) Disconnect VOM and terminate call.

6.03 Perform the installation test as outlined in the section entitled DATA-PHONE® Interconnection Arrangement—For Line Side of 10-Type Data Line Concentrator (DATREX*)—Test Procedures (591-811-503).

TABLE E

LOOP LIMITS

TYPE OF LOOP	AML LIMITS
Without repeaters or carriers	EML ±1 dB
With E7 repeaters	EML ±1 dB
With all other repeaters and/or carriers	EML ±2 dB

TABLE F

F_2 TRANSMIT LEVEL (CIRCUIT PACK CJ11 OR CJ15)

1000-Hz MEASURED LOSS	F_2 OUTPUT LEVEL dBm	F_2 RMS VOLTAGE
Above 12 dB	0	2.05
10 to 12 dB	−2	1.63
8 to 10 dB	−4	1.29
6 to 8 dB	−6	1.03
4 to 6 dB	−8	0.82
2 to 4 dB	−10	0.65
0 to 2 dB	−12	0.51