

# DATA SET 201C-L1D

## TRANSMITTER-RECEIVER

### INSTALLATION AND CONNECTIONS

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#### 1. GENERAL

1.01 This section contains the installation and connection information for data set (DS) 201C-L1D (Fig. 1). The data set should be installed in conformance with the general instructions in Section 590-010-200.

1.02 Whenever this section is reissued, the reason for reissue will be contained in this paragraph.

1.03 For maximum appearance and utility, install the data set apart from the customer-provided equipment (CPE) on a nearby desk, table, stand, or in a Bell System-provided equipment cabinet. The data set operates in an ambient temperature range of 40 to 120°F and a relative humidity range of 20 to 95 percent.

1.04 The data set must be located near the CPE since the interface cord supplied by the customer should not exceed 50 feet in length (as recommended by Electronic Industries Association [EIA] standards). In order to minimize inductive interference with data signals, the telephone line should not be carried in the same cable run as cable between the data set and CPE or lines connected to teletypewriter services. If this condition cannot be met, the telephone line must

be run in type SK (shielded) station wire between the data set and the cable distribution terminal or building entrance. The shield should be grounded at one end only, preferably at the distribution terminal end.

1.05 The data set requires a power source that provides 105 to 129 volts, 12 watts, at 57 to 63 Hz. The customer must supply an outlet that will accept the 3-prong plug on the P3BJ or KS-14532-L24 power cord provided with the data set. To avoid the possibility of data errors due to a potential difference between data set ground and CPE ground, the outlet for the data set power cord should be served from the same ac distribution panel as the CPE. If this condition cannot be met, a test using the 6H impulse counter should be made to detect the presence of noise potential. This test is described in Section 592-029-500. If test requirements are not met, data set ground and CPE ground must be bonded together in accordance with local instructions.

1.06 Connections to the CPE (Table A) are made through the 25-pin CUST INT connector at the rear of the data set (Fig. 2). This connector mates with a customer supplied Cinch or Cannon DB-19604-432 plug wired in accordance with Table A.

1.07 Connections to the telephone line (Table B) are made through a second 25-pin connector at the rear of the data set (Fig. 2). For private line service with a channel interface unit (CIU), an M8K cord is provided with the data set. For private line service without a CIU, a D25D cord (ordered separately) is required.

1.08 To gain access to the circuit packs and option straps in the data set, the data set

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Fig. 1—Data Set 201C-L1D/2/4/5

must be removed from the housing as follows (Fig. 3):

- (1) Disconnect the three cords from the rear of the data set.

**Warning: When removing front and rear covers use finger pressure only. No special tools are required. Excessive force may crack the data set cover.**

- (2) Remove the front cover by gently squeezing it on the top and bottom and pulling forward.
- (3) Loosen the two captive retaining screws at the rear bottom of the housing.
- (4) Slide the data set out the front of the housing.

**Warning: When the data set is removed from its housing, the data set should be placed on a clean, dry, nonconductive surface.**

- (5) Remove the three screws from the top of circuit pack TP2.
- (6) Slide circuit pack TP2 to the left until the rivets are disengaged from their keyhole slots.
- (7) Fold TP2 to the right and place on a flat surface (Fig. 4).

**1.09** To reassemble the data set, proceed as follows:

- (1) Fold circuit pack TP2 over onto the power unit and data set frame.

**TABLE A**  
**CUSTOMER INTERFACE**

PIN NO.	FUNCTION	DATA SET MNEMONIC	EIA DESIGNATION (RS-232-C)
2	Transmitted Data	SD	BA
3	Received Data	RD	BB
4	Request to Send	RS	CA
5	Clear to Send	CS	CB
6	Data Set Ready	DSR	CC
7	Signal Ground	SG	AB
8	Received Line Signal Detector	CO	CF
9	Test Voltage	+12V	—
10	Test Voltage	-12V	—
14	New Sync	NS (Non-EIA)	—
15	Transmitter Signal Element Timing	SCT	DB
16	Dibit Clock Transmitter	DCT (Non-EIA)	—
17	Receiver Signal Element Timing	SCR	DD
18	Dibit Clock Receiver* <u>or</u>	DCR (Non-EIA)	—
	Local Analog Loopback Test †	LL (Non-EIA)	—
19	Test Voltage	+5V (Non-EIA)	—
20	Data Terminal Ready	DTR	CD
24	Transmitter Signal Element Timing (External)	SCTE	DA

\* Option YT

† Option YS

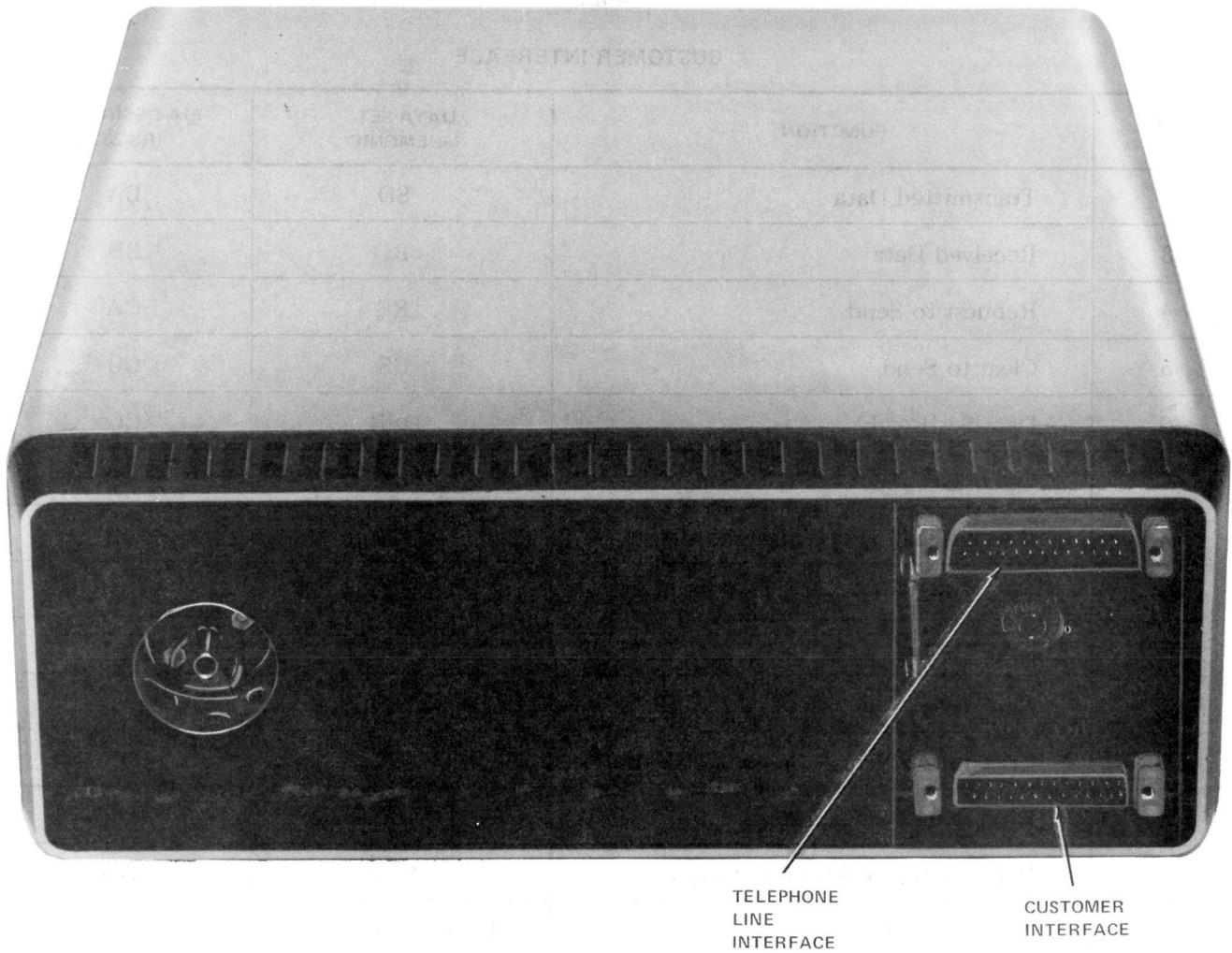


Fig. 2—DS 201C-L1D/2/4/5—Rear View

TABLE B

TELEPHONE LINE INTERFACE

PIN NO.	DESIGNATION	FUNCTION
2	- 12V	From power supply
3	+5V	From power supply
7	T	Telephone line tip
8	R	Telephone line ring
9	DT	Telephone line tip
10	DR	Telephone line ring
11	TEK6	Signal ground
13	TEK5	Data ready control from CIU* to data set
20	+12V	From power supply

\* Channel interface unit (DAS 828-type, DAS 829-type, or equivalent).

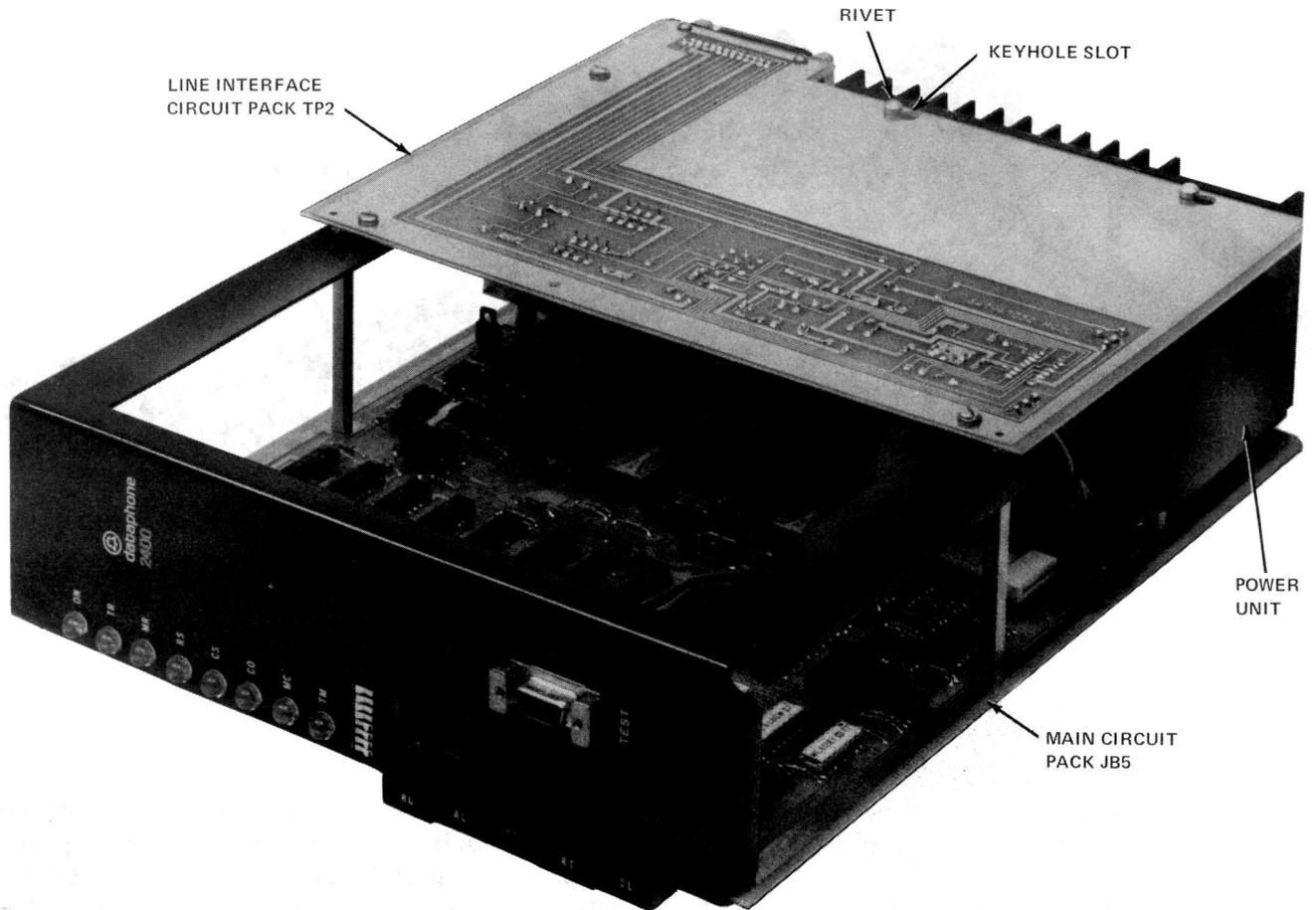


Fig. 3—DS 201C-L1D/2/5 (Without Housing)

- (2) Place the TP2 keyhole slots over the rivets and slide TP2 to the right to secure it in place.
- (3) Replace the three screws attaching TP2 to the power unit and data set frame.
- (4) Slide the data set into the housing.
- (5) Tighten the two captive retaining screws at the rear bottom of the housing.
- (6) Replace the front cover by gently squeezing it on top and bottom and pushing forward until it snaps into place.

## 2. OPTIONS

**2.01** The DS 201C-L1D is provided with a number of options which are installed prior to placing

the data set in service. All options are installed or removed with option switch S1 (Fig. 5) and/or with option straps (Fig. 4). The proper switch settings and strap placements for each option are shown in Table C. Similar information to that contained in Table C may be found on the pressure sensitive option label shipped with the data set. Extra labels are available by ordering Form E-10073.

**2.02** The installer should verify that the options called for on the service order are installed.

**2.03 *New Sync:*** With new sync under customer control (option YB), the CPE can reset the receiver timing recovery circuit enabling the data set to rapidly synchronize to a new line signal. This option is generally used in the hub station of a multipoint polling arrangement where there are very short intervals between incoming messages

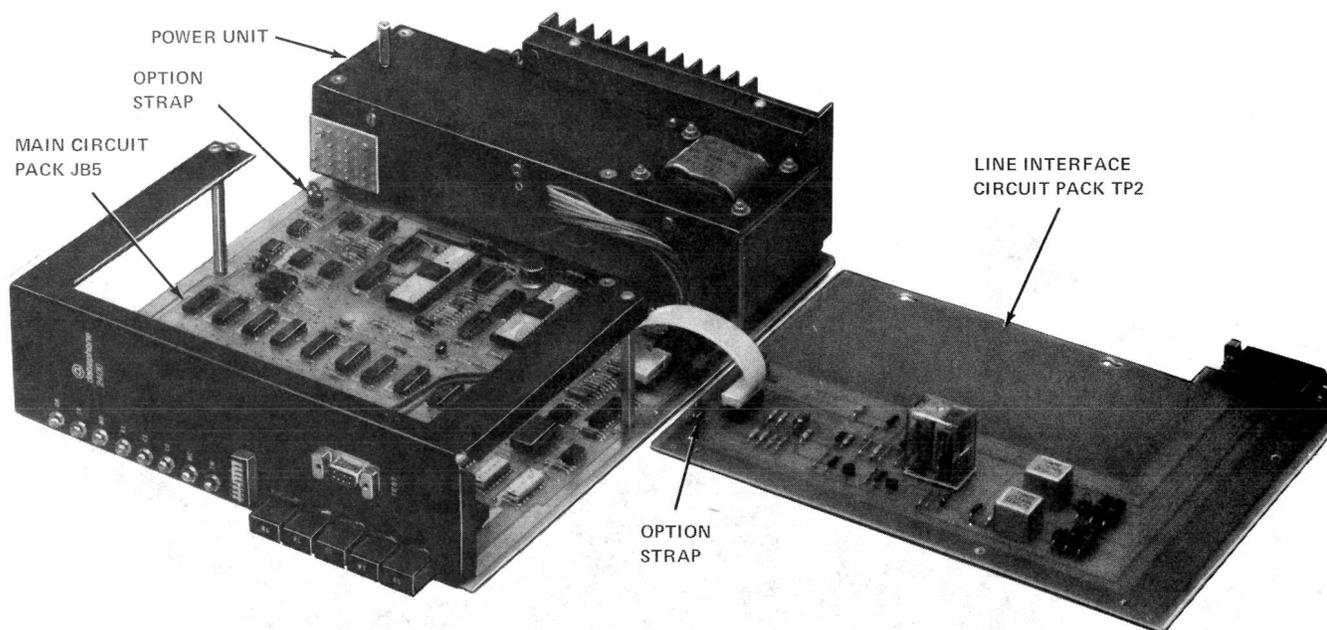


Fig. 4—DS 201C-L1D/2/5—Circuit Pack Access

from remote transmitters. If new sync is not required option YA (new sync not used) is installed.

**2.04 Transmitter Timing:** Internal timing, external timing, or timing controlled by the receiver bit clock (sometimes referred to as “slave” timing) can be provided.

(a) With internal timing (option YC), the data set provides serial clock (nominally 2400 Hz) to the CPE on the transmitter signal element timing lead (pin 15).

(b) With external timing (option YD), the CPE provides serial clock (2400 Hz) to the data set on the transmitter signal element timing (external) lead (pin 24). This causes transmitter serial clock to phase-lock to the external clock.

(c) With timing controlled by the receiver bit clock (option WI), the transmitter serial clock is phase-locked internally to the receiver serial clock.

**2.05 Use With Data Auxiliary Set (DAS) 828/829-Type:** These options enable or disable the DAS 828- or 829-type CIUs ability to externally control data set ready (CC—pin 6) through the telephone line interface. Option YI

(yes) allows the CIU to hold CC on or off by closing or opening the connection between telephone line interface pins 13 (TEK 5) and 11 (TEK 6). Option YJ (no) causes the data set to ignore the status of these telephone line interface pins.

**2.06 Grounding Option:** Option YK provides signal ground (pin 7) connected to protective (frame) ground (pin 1) to minimize the introduction of power line noise into the data circuits. If local conditions require that signal ground *not* be connected to protective ground, option YL may be installed.

**2.07 Status of Data Set Ready (DSR) During Local Analog Loopback:** These options allow the customer to determine if the DSR indication on the CPE is off or on during local analog loopback testing. Option YM provides for DSR to be on and YN provides for it to be off. These options make no distinction between manual testing via the AL test switch or automatic testing through pin 18 (option YS). Operation of any other test switch overrides these options.

**2.08 Continuous Receiver Bit Clock:** Option YO (*In*) allows the receiver signal element timing (DD) signal to be present even when there is no received carrier signal. This is accomplished

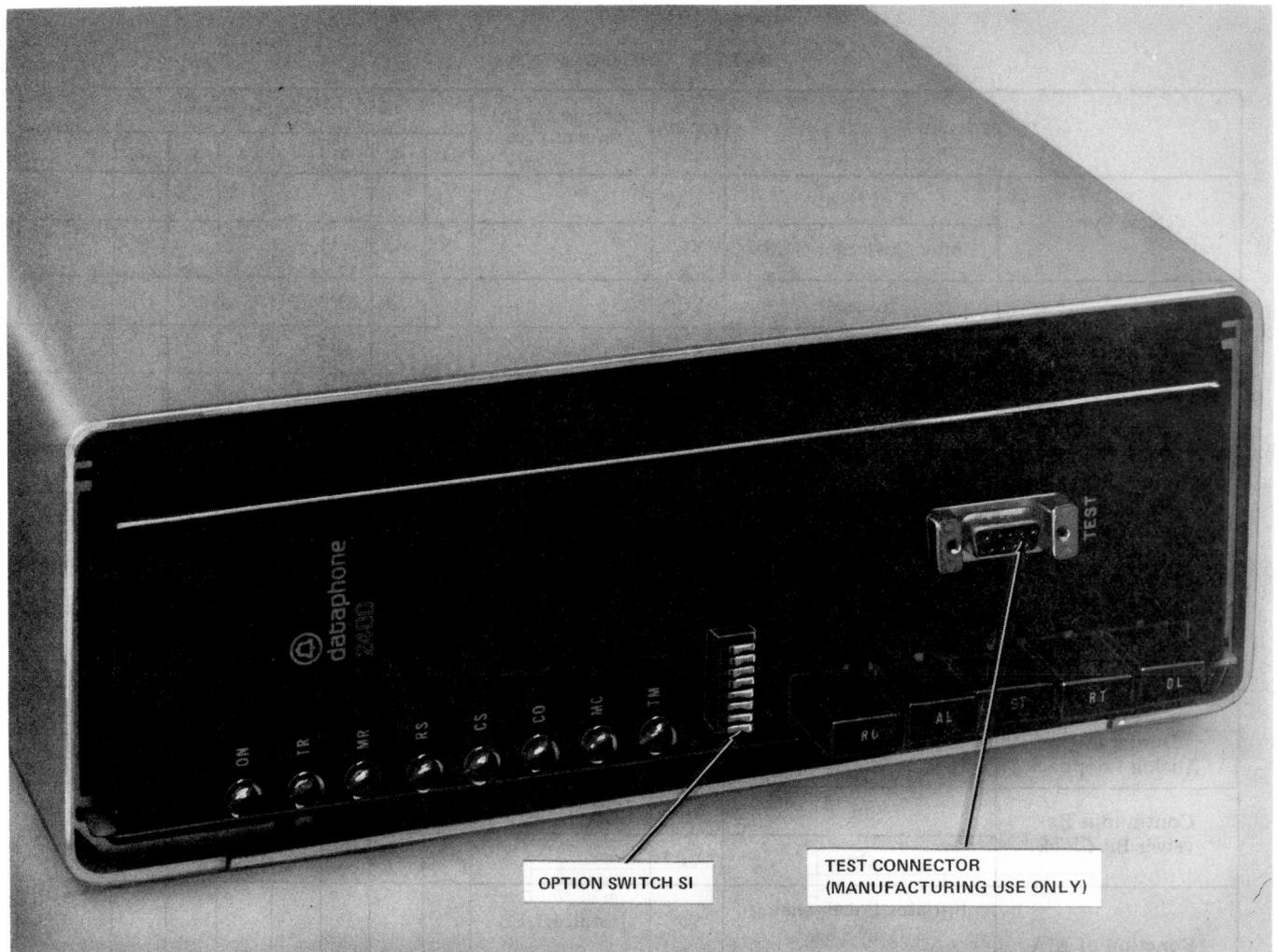


Fig. 5—DS 201C-L1D/2/4/5—Front Cover Removed

by having DD connected to the transmitter signal element timing (DB) signal, which is always present. Option YP (**Out**) allows the receiver signal element timing (DD) signal to be derived from the received data signal and to be changed to spacing (positive voltage) when the received line signal detector (CF) is off.

#### 2.09 Function of EIA Interface Pin 18:

Option YS allows analog loopback to be under the control of the CPE through interface pin 18. An EIA **on** voltage on pin 18 (LL) has the same effect on the data set as pressing the AL button, except that the data set ready (CC) signal is conditioned **on**. Option YT disables the electrically activated analog loopback test feature, and pin 18

becomes an output which provides receiver dibit clock (DCR).

#### 2.10 Type of Operation and Clear to Send

**Delay:** These options determine whether the data set will operate in the 2-wire or 4-wire mode, switched carrier or continuous carrier mode, and the length of the clear-to-send delay. The 4-wire operating mode is a full-duplex mode where separate lines are required for transmitting and receiving simultaneously, while in the 2-wire half-duplex mode the same line is used for both transmitting and receiving, but not simultaneously.

- (a) With 4-wire service, switched carrier or continuous carrier options are available.

TABLE C

DATA SET 201C-LID OPTIONS

FEATURE		OPTION	OPTION STRAP MAIN CKT JB5	SI SWITCH SETTING								
				1	2	3	4	5	6	7	8	
New Sync	Not Used	YA*		O								
	Under Customer Control	YB		X								
Transmitter Timing	Internal	YC*			O	O						
	External	YD			X	O						
	Controlled by Receiver Bit Clock (Slave)	WI			X	X						
Use with DAS 828/829-Type	Yes	YI*	Install E5-E6									
	No	YJ	Install E4-E5									
Grounding Option	Signal Ground Connected to Frame Ground	YK*	Install E7-E8									
	Signal Ground not Connected to Frame Ground	YL	Install E8-E9									
Status of DSR During Local Analog Loopback	DSR On	YM										O
	DSR Off	YN*										X
Continuous Receiver Bit Clock	In	YO									O	
	Out	YP*									X	
Function of EIA Interface Pin 18	Initiates Local Analog Loopback	YS	Install E1-E2									
	Provides Receiver Symbol Clock	YT*	Install E2-E3									
FEATURE		OPTION	OPTION STRAP LINE INT. TP2	SI SWITCH SETTING								
				1	2	3	4	5	6	7	8	
Type of Operation and Clear to Send Delay	4-Wire	Switched Carrier 7 MSEC Clear to Send Delay	XA*	Install E2-E3 Install E4-E6				O	X	X		
		Continuous Carrier 7 MSEC Clear to Send Delay	XB	Install E2-E3 Install E4-E6				O	O	X		
	2-Wire	Continuous Carrier 0 MSEC Clear to Send Delay	XC	Install E2-E3 Install E4-E6				X	O	X		
		Switched Carrier 150 MSEC Clear to Send Delay	XE	Install E1-E3 Install E5-E6				O	X	O		

\* Factory-furnished option

X = Closed

O = Open

- With the switched carrier, 7-ms clear-to-send delay option (XA), the data set can transmit (carrier is on) when request-to-send (CA) is *on*. The data set transmitter is off when CA is *off*.
  - With the continuous carrier, 7-ms clear-to-send delay option (XB), the data set transmitter remains on continuously to maintain synchronization; however, when CA is *off*, the data set transmitter sends an idle code of steady marks.
  - With the continuous carrier, 0-ms clear-to-send delay option (XC), data set operation is identical to option XB except that there is no delay between request-to-send and clear-to-send (CB).
- (b) With 2-wire service, the only option available is switched carrier with 150-ms of delay between request-to-send and clear-to-send (option XE). This delay allows sufficient time for echo suppressors in the telephone line to turn around and for the distant receiver to establish synchronization. In addition, the receiver is clamped for 100-ms after the transmitter is turned off to permit line echoes to decay.

### 3. INSTALLATION

3.01 The procedure for installing a DS 201C-L1D is as follows:

- (1) Unpack the data set and remove the protective covering from the housing.
- (2) Disassemble the data set as directed in paragraph 1.08.
- (3) Install the options called for on the service order. Refer to Table C.
- (4) Mark the installed options on the option label and attach it to the bottom of the housing.

- (5) Reassemble the data set as directed in paragraph 1.09.
- (6) Connect the data set to the telephone line or DAS as directed on the appropriate connection diagram.
- (7) Perform installation tests as directed in Section 592-029-520.

### 4. CONNECTIONS

4.01 Connections for the various types of service using DS 201C-L1D are shown in Fig. 6 through 14. The figure numbers and titles of these connection drawings are listed below:

Fig. 6—2-Wire Service Using 66E3 Connecting Block Only

Fig. 7—4-Wire Service Using 66E3 Connecting Block Only

Fig. 8—4-Wire Service (Data Only) Using DAS 828A

Fig. 9—4-Wire Service (Data/Voice) Using DAS 828A

Fig. 10—4-Wire Service (Data Only) With Switched Network Backup Using DAS 828A and DAS 828C

Fig. 11—4-Wire Service (Data/Voice) With Switched Network Backup Using DAS 828A and DAS 828C

Fig. 12—4-Wire Service (Data Only) Using DAS 829-Type

Fig. 13—4-Wire Service (Data/Voice) Using DAS 829-Type

Fig. 14—4-Wire Service (Data Only or Data/Voice) With Switched Network Backup Using DAS 829-Type

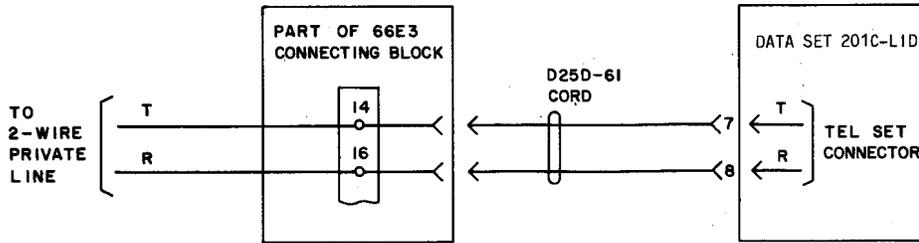
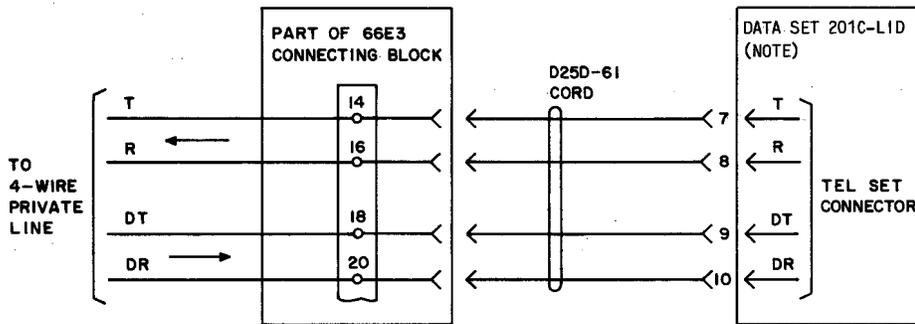
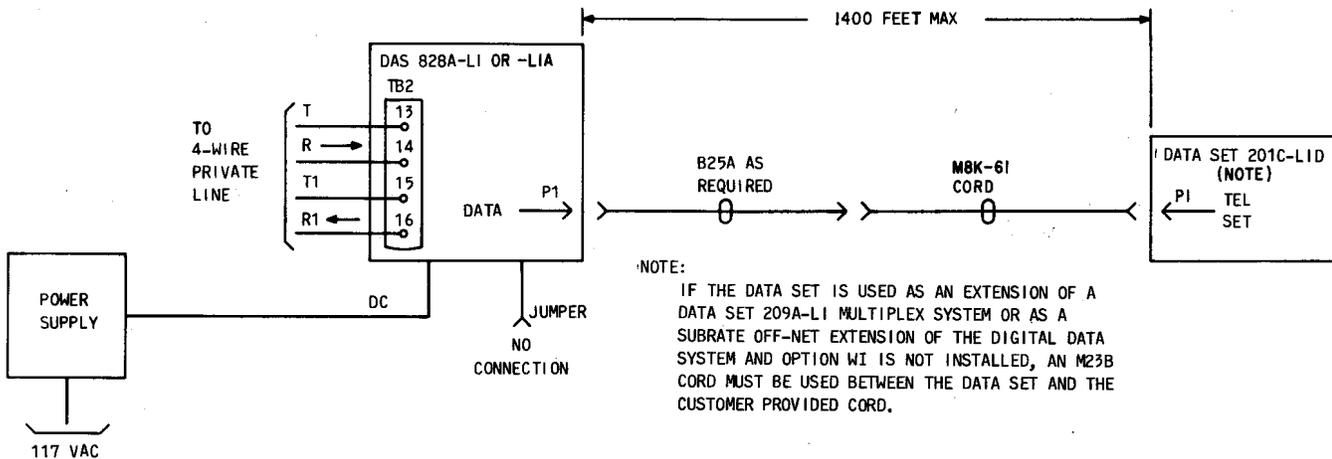


Fig. 6—2-Wire Service Using 66E3 Connecting Block Only



NOTE:  
IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM AND OPTION WI IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.

Fig. 7—4-Wire Service Using 66E3 Connecting Block Only



NOTE:  
IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM AND OPTION WI IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.

Fig. 8—4-Wire Service (Data Only) Using DAS 828A

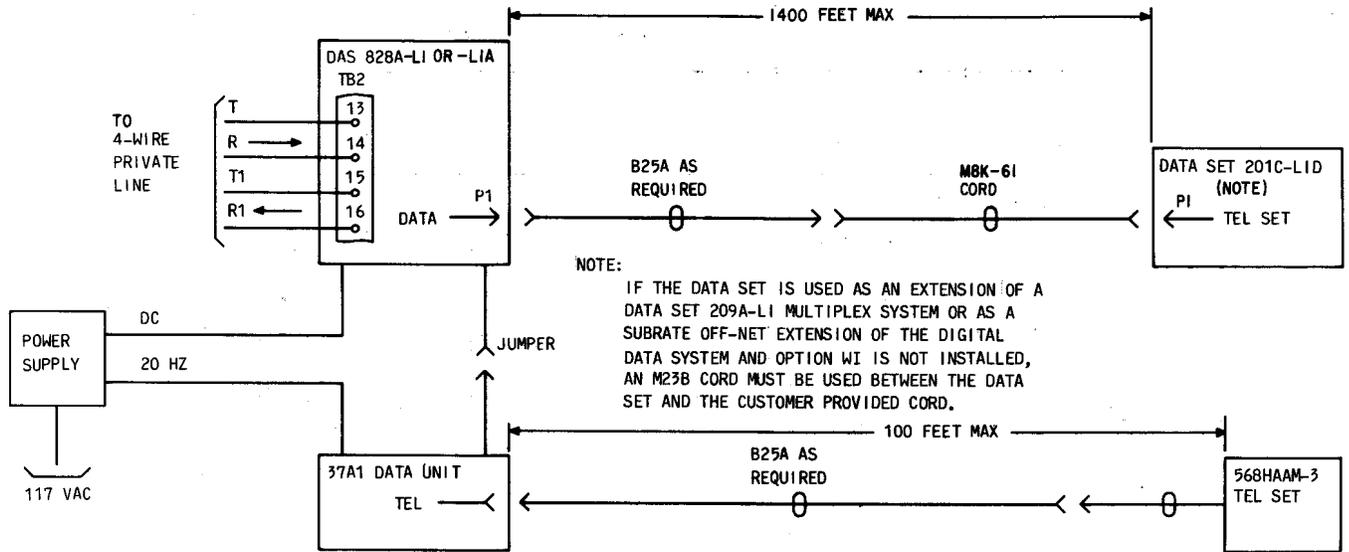
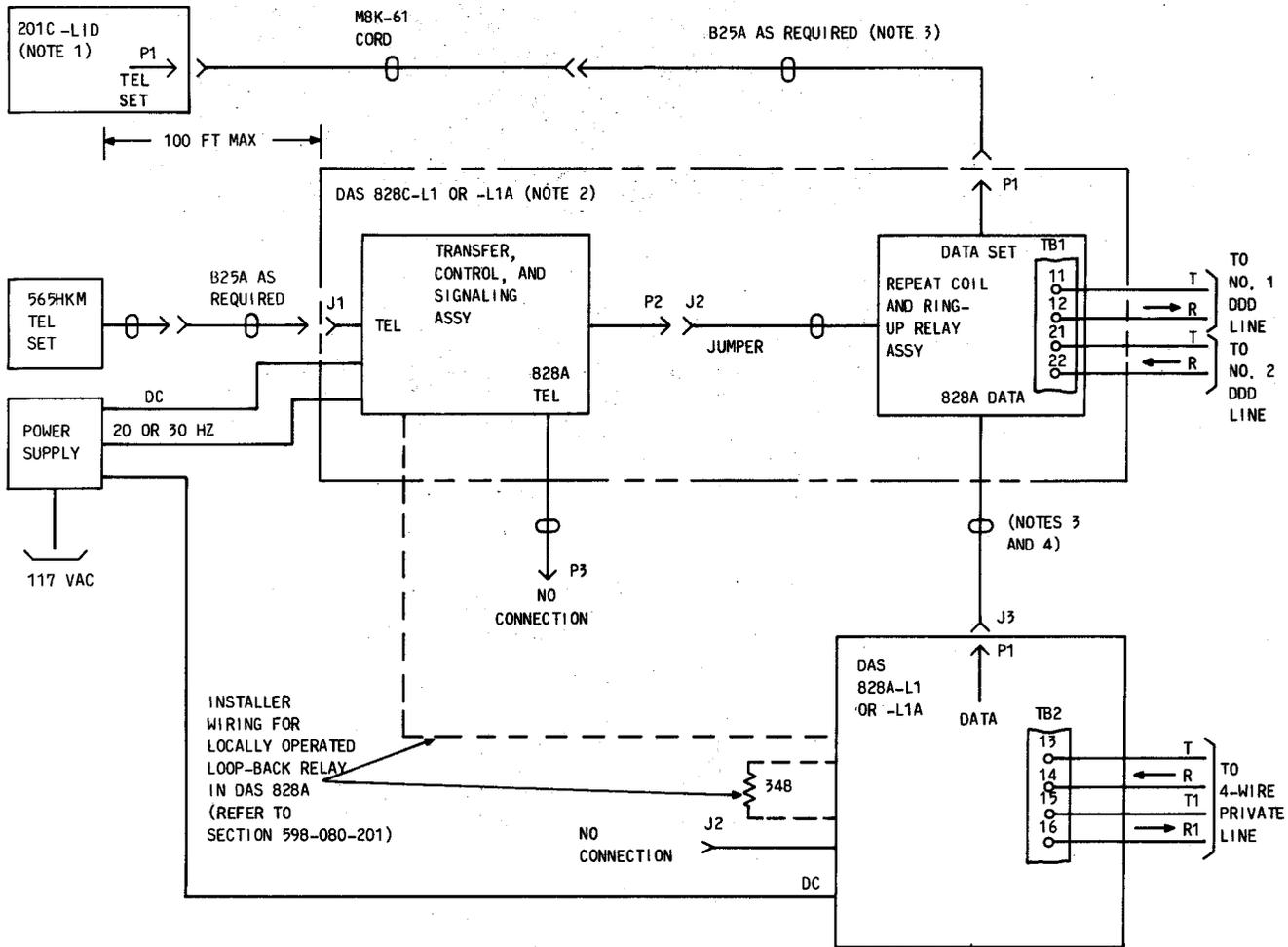


Fig. 9—4-Wire Service (Data/Voice) Using DAS 828A

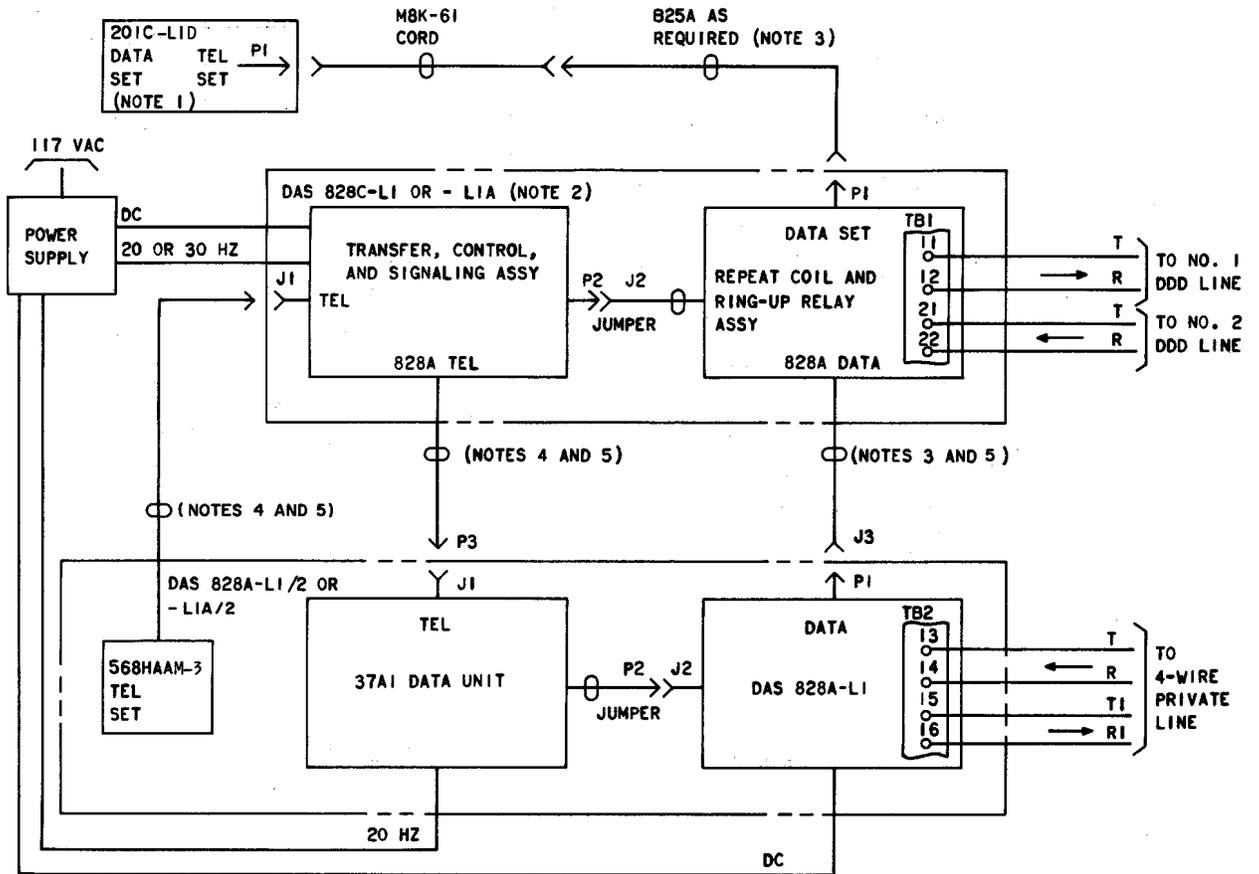
**SECTION 592-029-220**



**NOTES:**

1. IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM, AND OPTION WI IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.
2. ADD 227A AMPLIFIER IN RECEIVE PATH AS DIRECTED IN SECTION 598-080-201.
3. MAXIMUM DISTANCE BETWEEN DATA SET AND DAS 828A IS 1400 FEET.
4. MAY BE EXTENDED WITH B25A CABLE.

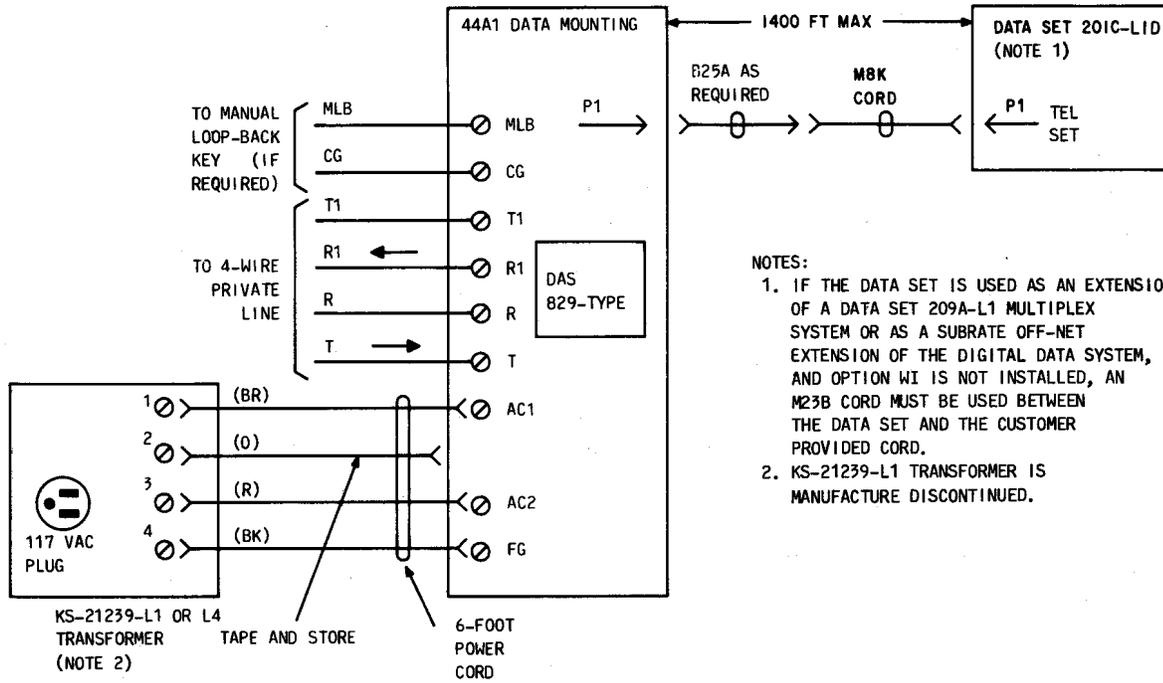
**Fig. 10—4-Wire Service (Data Only) With Switched Network Backup Using DAS 828A and DAS 828C**



NOTES:

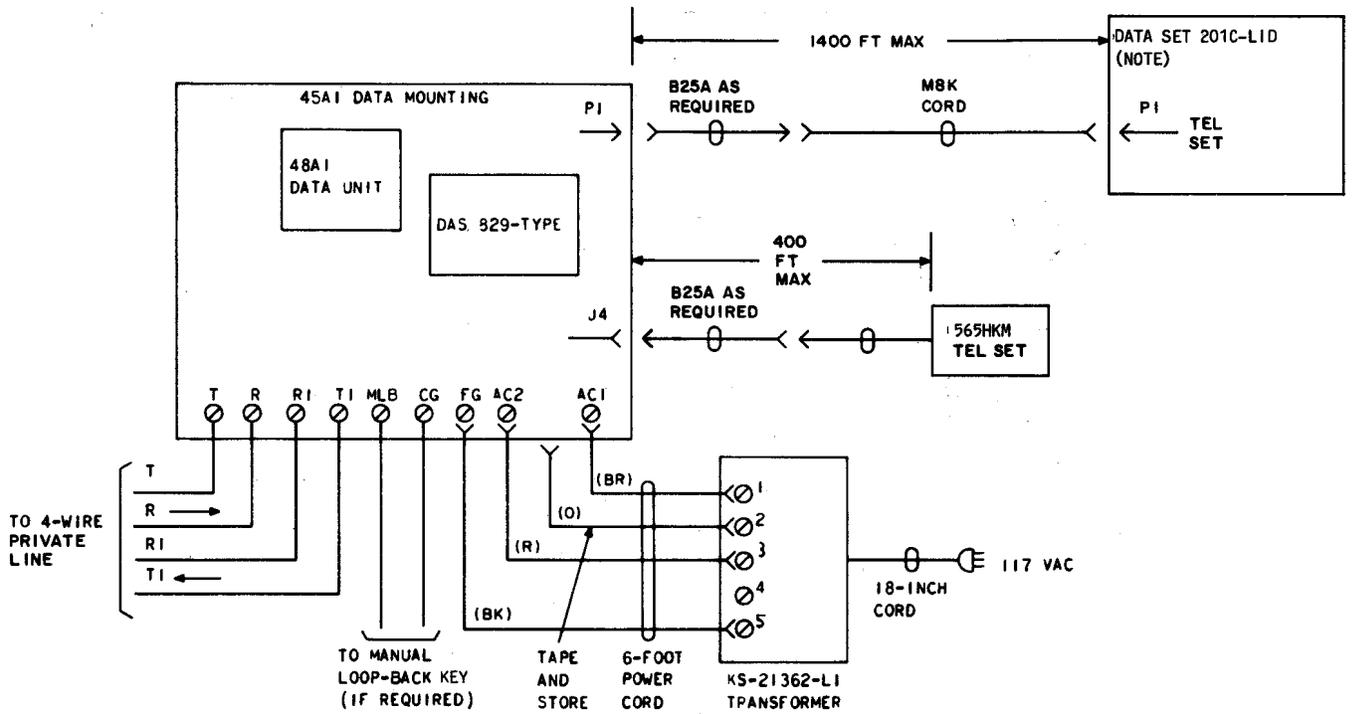
1. IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM, AND OPTION W1 IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.
2. ADD 227D AMPLIFIER IN RECEIVE PATH AS DIRECTED IN SECTION 598-080-201.
3. MAXIMUM DISTANCE BETWEEN DATA SET AND DAS 828A IS 1400 FEET.
4. MAXIMUM DISTANCE BETWEEN TEL SET AND 37A1 DATA UNIT IS 100 FEET.
5. MAY BE EXTENDED WITH B25A CABLE.

Fig. 11—4-Wire Service (Data/Voice) With Switched Network Backup Using DAS 828A and DAS 828C



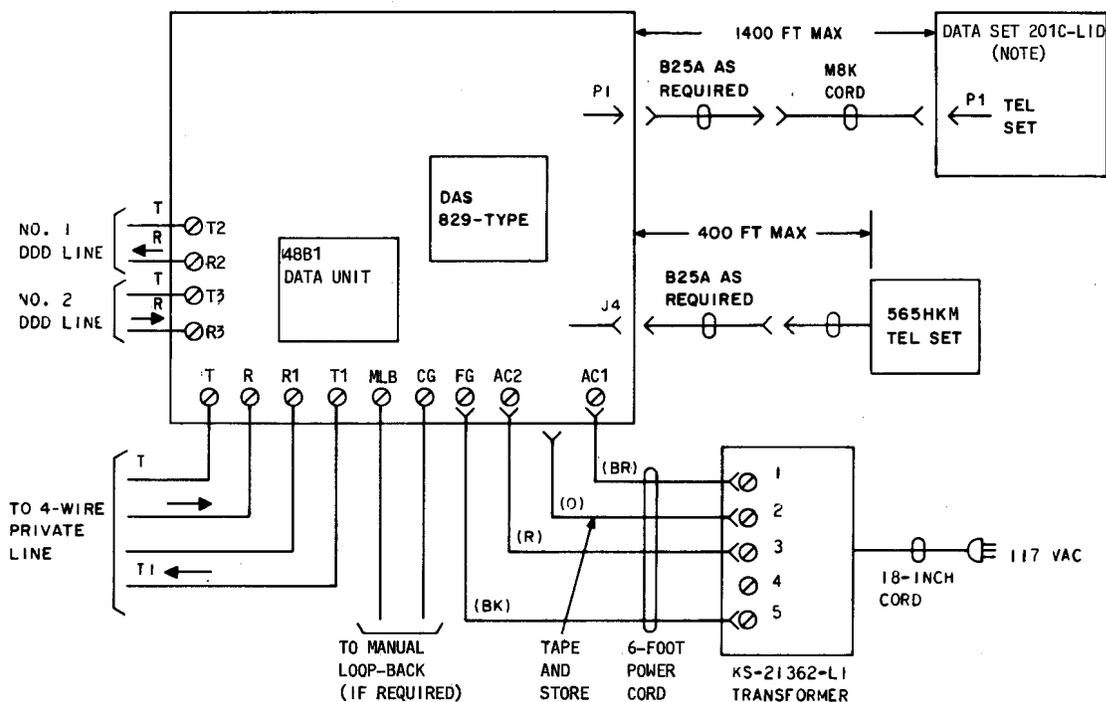
- NOTES:
1. IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM, AND OPTION WI IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.
  2. KS-21239-L1 TRANSFORMER IS MANUFACTURE DISCONTINUED.

Fig. 12—4-Wire Service (Data Only) Using DAS 829-Type



NOTE:  
 IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM AND OPTION W1 IS NOT INSTALLED, AN M29B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.

Fig. 13—4-Wire Service (Data/Voice) Using DAS 829-Type



NOTE:  
 IF THE DATA SET IS USED AS AN EXTENSION OF A DATA SET 209A-L1 MULTIPLEX SYSTEM OR AS A SUBRATE OFF-NET EXTENSION OF THE DIGITAL DATA SYSTEM AND OPTION WI IS NOT INSTALLED, AN M23B CORD MUST BE USED BETWEEN THE DATA SET AND THE CUSTOMER PROVIDED CORD.

Fig. 14—4-Wire Service (Data Only or Data/Voice) With Switched Network Backup Using DAS 829-Type

5. REFERENCES

5.01 Additional information concerning DS 201C-L1D and auxiliary apparatus is contained in the following publications:

SECTION	TITLE	SECTION	TITLE
		502-500-120	Telephone Sets—540, 560, 1560, and 2560 Series—Common Installation and Maintenance Information
314-205-501	Data Systems—DATA-PHONE® Service and Data Access Arrangements on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines	590-002-100	Data Services—2000 and 2400 BPS Provided by Data Set 201-Type—Reference Guide
		590-010-200	Data Sets and Data Access Arrangements—General Installation and Connection Information
		590-102-141	50A1 Data Mounting—Identification
314-410-500	Voice Bandwidth Private Line Data Circuits—Tests and Requirements	592-029-120	Data Set 201C-L1D—Transmitter-Receiver—Description and Operation
314-919-100	Digital Data System—Subrate Off-Net Extension Arrangement—Installation and Connections	592-029-520	Data Set 201C-L1D—Transmitter-Receiver—Test Procedures and Maintenance

SECTION	TITLE	SECTION	TITLE
598-080-100	Data Auxiliary Set 828A— Description and Operation	598-082-201	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels— (Alternate Voice and Dial Backup)— Installation and Connections
598-080-101	Data Auxiliary Set 828C— Description and Operation		
598-080-200	Data Auxiliary Set 828A— Installation and Connections	598-082-500	Data Auxiliary Set 829-Type— Channel Interface Units—Voice- band Private Line Channels— Maintenance and Test Procedures
598-080-201	Data Auxiliary Set 828C— Installation and Connections		
598-080-500	Data Auxiliary Set 828A— Maintenance and Test Procedures	598-082-501	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels— (Alternate Voice and Dial Backup)— Test Procedures
598-080-501	Data Auxiliary Set 828C— Maintenance and Test Procedures		
598-082-100	Data Auxiliary Set 829-Type— Channel Interface Units—Voice- band Private Line Channels— Description	666-511-501	Test of Data Services Provided by Data Set 201C From a Private Line Testroom
598-082-101	Data Auxiliary Set 829-Type— Supplementary Functions for Voiceband Private Line Channels— (Alternate Voice and Dial Backup)— Description	999-100-138	Data Set 201C—How to Operate Manual.
598-082-200	Data Auxiliary Set 829-Type— Channel Interface Units—Voice- band Private Line Channels— Installation and Connections	5.02	Detailed information concerning DS 201C-L1D is contained in Circuit Description (CD) and Schematic Drawing (SD) 1D290-01 entitled Data Systems Station—Data Set 201C-L1D.