

# DATA SET 202T-TYPE

## INSTALLATION AND CONNECTIONS

### TRANSMITTER-RECEIVER

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#### 1. GENERAL

1.01 This section contains information concerning the installation and connection of data set (DS) 202T-type. The data set should be installed in conformance with existing installation practices as presented in Section 590-010-200. The information in this section covers installation of data sets in individual housings. For information on multiple installation of DS 202T in a data station, refer to Section 592-861-200.

1.02 This section is reissued to add USOC information pertaining to DS 202T-L1A options, Table B and connecting dc power sources to certain DS 202T-types. Revision arrows are used to emphasize significant changes.

1.03 Prior to installing the data set, verify that the overall facilities meet requirements specified in Section 314-410-500. The private line facility must be arranged for -16 dBm receive level and 0 dBm transmit level.



*If DS 202T-type is used to replace a 202D or 202R, the existing facility may have been arranged for different levels.*

1.04 It is preferred that the data set be installed on a desk, table, stand, or in a Bell System pro-

vided equipment cabinet. The data set will operate over an ambient temperature range of 40 to 120°F with a relative humidity of 20 to 95 percent at 70°F and 20 to 40 percent at 120°F.

**Note:** These environmental conditions apply only if condensation does not accumulate on the circuits.

1.05 The DS 202T-type should be located near the customer-provided equipment (CPE) because the interface cord supplied by the customer should not exceed 50 feet in length (to reduce stray capacitance and as recommended by Electronic Industries Association [EIA] standards). To minimize inductive interference to data signals on the telephone (data) line, the line should not be carried in the same run as the cable between the data set and CPE or lines connected to teletypewriter services. If this condition cannot be met, it will be necessary to run the telephone (data) line in type SK (shielded), or equivalent, station wire between the data set and cable distribution terminal or building entrance. Ground the shield at one end only, preferably at the distribution terminal end.

**Caution 1:** *If the outlet has a metal cover, do not remove the center screw to mount the transformer. When this screw is removed, it is possible for the metal cover to fall across the prongs of the transformer.*

**Caution 2:** *Remove and discard the protective covering from the data set housing. If not removed before operation, excessive heating of the data set will result.*

1.06 Low voltage alternating current is supplied to the data set by wall transformer KS-21239-L5. The customer must provide a standard 3-wire,

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grounded 105 to 129V at 57 to 63 Hz, power receptacle that is easily accessible to the data set. The power required per set is approximately 7 watts. Approximately 1.7 watts of this is dissipated in the wall transformer.

**1.07** Data sets 202T-L1, 202T-L1/4, 202T-L1A/4 and 202T-L1A/3B/4 may be powered from two customer furnished dc sources, one  $+15 \pm 1.5$  volts and one  $-15 \pm 1.5$  volts. These supplies connect to the data mounting by the power transformer cord. The transformer is not furnished with these data sets.

**1.08** A 25-pin KS-19087-L6 connector is provided at the rear of the data set for connection to the CPE. This connector is designed to mate with a customer-provided Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood. Connection between the data set and 4-wire private line facilities is made with the furnished M8K cord. For service on 2-wire private line facilities, connection between the data set and line is made with a D25D cord (ordered separately) to permit connection to the 66E3 connecting block.

**1.09** To gain access to the circuit packs and option switches, it will be necessary to remove the data set from the housing. This can be done as follows:

- (a) Remove the front cover by gently squeezing it at the top and rotating it down and out of the housing.
- (b) If provided, loosen the retaining screw under the left front side of the housing until it is completely disengaged from the data set.
- (c) Gently pry the circuit pack(s) out of the housing using a screwdriver or similar tool behind the faceplate. On later sets, a wire handle is provided which should be rotated outward and pulled to remove the circuit packs.

**1.10** If the data set is equipped with the reverse channel circuit pack, it must be removed to gain access to the option switches. Remove the reverse channel circuit pack by removing the four screws and exerting steady upward pressure at the front and rear of the card. To replace the reverse channel circuit pack, align the female connectors on the bottom of the card with the contact posts on the data set. Press down on the circuit pack until it

makes good contact with the posts and the front edge is resting on top of the faceplate. Insert and tighten the retaining screws.

- (1) Slide the circuit pack(s) into the housing, ensuring that the contacts at the rear of the circuit pack are firmly seated in the connector at the rear of the housing.
- (2) If provided, align and tighten the retaining screw.
- (3) Hook the tabs on the bottom of the front cover into the detents in the bottom of the housing.
- (4) Gently rotate the top of the front cover into the housing until it snaps into place.

## 2. OPTIONS

**2.01** The installer should disassemble the data set to verify that the options called for on the service order are installed in the data set prior to placing it in service.

**2.02** Options are installed and removed by means of switches (Fig. 1) and straps (DS 202T-L1 only) on the data set printed wiring board (Fig. 2), by a strap on the reverse channel circuit pack (when provided), and by a screw switch on the backplane (frame ground to signal ground option). Refer to Table A or B for the switch settings and strap positions for the various options. Refer to Table C for the recommended options for a DS 202T-type used on 2-wire private line or 4-wire private line with talk-back. Refer to Table D for the recommended options for a DS 202T-type used on 4-wire point-to-point and multipoint systems without talk-back.

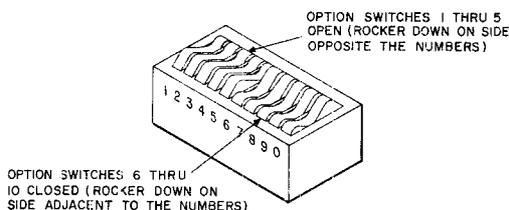


Fig. 1—Option Switch

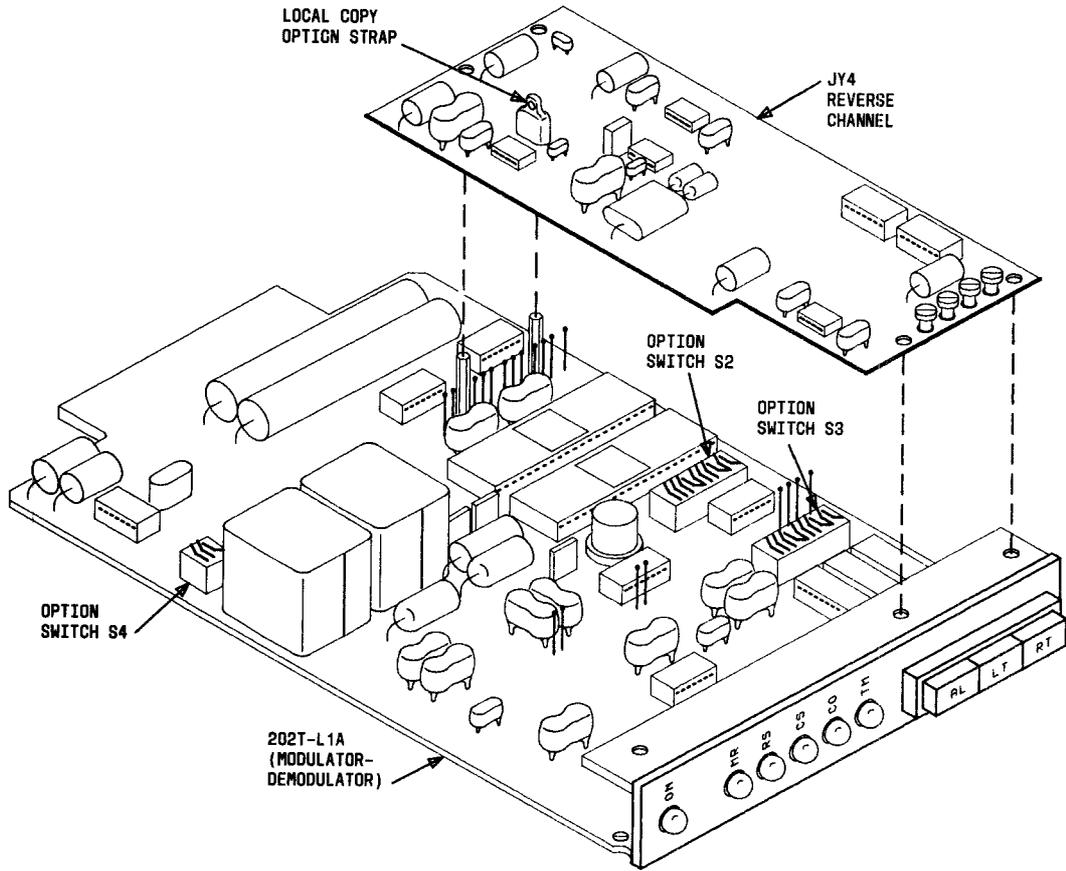


Fig. 2—Location of Option Switches



*A long screwdriver (6-inch) is needed to operate the screw switch that controls the grounding option. If the appropriate screwdriver is not available, the backplane may be taken out of the housing by remov-*

*ing the two screws on the bottom of the housing.*

**2.03 2-Wire Operation:** This option is used when 2-wire facilities are selected and half-duplex service is satisfactory. The 2-wire option can

TABLE A  
DATA SET 202T-L1 OPTIONS

FEATURE	OPTION	DESCRIPTION		SWITCH SETTING										PROVIDE
				S3 Switch Contact Setting On Transmitter-Receiver										
				1	2	3	4	5	6	7	8	9	0	
4-Wire Operation	ZK*			0	0	X	X	0	0	0	X	X	X	One Per Data Set
2-Wire Operation w/o Reverse Channel	ZD			X	0	X	0	0	X	X	0	0	0	
2-Wire Operation With Reverse Channel	ZC†			X	X	0	0	X	0	X	0	0	0	
				S2 Switch Contact Setting On Transmitter-Receiver										
				1	2	3	4	5	6	7	8	9	0	
4-Wire Operation	ZK*			X	-	-	-	-	-	-	-	-	-	One Per Data Set
Local Copy on Primary Channel in 2-Wire	ZA	IN		X	-	-	-	-	-	-	-	-	-	
	ZB†	OUT		0	-	-	-	-	-	-	-	-	-	
Soft Turnoff and Squelch Intervals		Soft Turnoff	Squelch											
	Z	0	0	-	-	0	X	-	-	-	-	0	X	
	Y*	8-ms	0	-	-	0	X	-	-	-	-	0	0	
	X	24-ms	0	-	-	0	X	-	-	-	-	X	0	
	W	0	9-ms	-	-	0	0	-	-	-	-	0	X	
	V	0	156-ms	-	-	X	0	-	-	-	-	0	X	
	T	8-ms	9-ms	-	-	0	0	-	-	-	-	0	0	
	S	8-ms	156-ms	-	-	X	0	-	-	-	-	0	0	
R	24-ms	156-ms	-	-	X	0	-	-	-	-	X	0		
Fast Carrier Detection	Q*	IN		-	-	-	-	0	-	-	-	-	-	One Per Data Set
	N	OUT		-	-	-	-	X	-	-	-	-	-	
Clear-to-Send Interval	M*	8-ms		-	-	-	-	-	0	0	-	-	-	
	K	30-ms		-	-	-	-	-	0	X	-	-	-	
	J	60-ms		-	-	-	-	-	X	0	-	-	-	
	G	180-ms		-	-	-	-	-	X	X	-	-	-	
External Control of CC (Data Set Ready)	B*	IN		-	-	-	-	-	-	-	0	-	-	One Per Data Set
	A	OUT		-	-	-	-	-	-	-	X	-	-	
Clamp	F*	IN		-	0	-	-	-	-	-	-	-	-	One Per Data Set
	E	OUT		-	X	-	-	-	-	-	-	-	-	

Table A (Contd)  
DATA SET 202T-L1 OPTIONS

FEATURE	OPTION	DESCRIPTION	SWITCH SETTING	PROVIDE
Carrier Detector Reset	ZL	IN	Strapping on Transmitter-Receiver CP Install E21-E23	One Per Data Set
	ZM*	OUT	Install E22-E23	
Continuous Carrier	ZN	IN	Install E24-E25	One Per Data Set
	ZO*	OUT	Install E25-E26	
Compromise Equalization	ZU*	Maximum	Install E27	One Per Data Set
	ZV	Minimum	Install E28	
Local Copy on Reverse Channel			Strapping on Reverse Channel CP	One Per Data Set
			ZE	
	ZF*	OUT	Install E21-E23	
Grounding Option			Screw Switch S1 Setting on Interface Circuit	One Per Data Set
			ZG*	
	ZH	Signal Ground Not Connected to Frame Ground	S1 Open	

- X Rocker down on side adjacent to numbers.
- O Rocker up on side adjacent to numbers.
- Rocker may be in either position.
- \* Factory furnished.
- † Factory furnished instead of 4-wire option when reverse channel CP is installed.

be selected with reverse channel (ZC) or without reverse channel (ZD). If option ZC is selected, the data set must be equipped with a reverse channel circuit pack (JY1 or JY2 for DS 202T-L1 and JY4 for DS 202T-L1A) and option ZE or ZF must be selected. If option ZD is selected, the reverse channel circuit pack must be physically removed from the data set.

**2.04 4-Wire Operation:** This option is used when 4-wire point-to-point or multipoint facilities are selected. The 4-wire option used with 4-wire facilities provides duplex capability.

**2.05 Compromise Delay Equalization (DS 202T-L1A Only):** This option is the same

as the "compromise equalization" option provided on DS 202T-L1 series 6 and higher. Option ZV (minimum compromise delay equalization) provides reduced envelope delay distortion compensation to eliminate an over-equalization condition on channels with low envelope delay distortion. Option ZU (maximum compromise delay equalization) provides the same delay equalizer characteristics provided on data sets without the delay equalizer options (DS 202T-L1 series 5 and lower). For data bit rates above 1200 bps, it is necessary to perform a data distortion test to determine the proper delay equalizer option setting. The procedure for this data distortion test is contained in Section 592-031-500.

◆ TABLE B ◆  
DATA SET 202T-L1A OPTIONS

FEATURE	OPTION	DESCRIPTION	SWITCH SETTING										PROVIDE	USOC DECSN
			S3 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER											
			1	2	3	4	5	6	7	8	9	0		
4-Wire Operation	ZK*		0	-	-	0	-	X	X	X	X	X	One Per Data Set	E10
2-Wire Operation	ZD	w/o Reverse Channel	X	-	-	X	-	X	0	0	0	0	One Per Data Set	E10
	ZC†	With Reverse Channel	X	-	-	X	-	0	0	0	0	E9		
Compromise Delay Equalization	ZV	Minimum	-	X	-	-	-	-	-	-	-	-	One Per Data Set	
	ZU*	Maximum	-	0	-	-	-	-	-	-	-	-		
Compromise Amplitude Equalization	ZX	Minimum	-	-	-	-	X	-	-	-	-	-	One Per Data Set	
	ZW*	Maximum	-	-	-	-	0	-	-	-	-	-		
Channel Condition	ZZ	C2	-	-	X	-	-	-	-	-	-	-	One Per Data Set	
	ZY*	Basic	-	-	0	-	-	-	-	-	-	-		
			S2 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER											
			1	2	3	4	5	6	7	8	9	0		
4-Wire Operation	ZK*		X	-	-	-	-	-	-	-	-	-	One Per Data Set	E10
Local Copy on Primary Channel in 2-Wire	ZA	In	X	-	-	-	-	-	-	-	-	-	One Per Data Set	A1
	ZB†	Out	0	-	-	-	-	-	-	-	-	-		A2
Soft Turnoff and Squelch Intervals		SOFT TURNOFF	SQUELCH										One Per Data Set	
	Z	0	0	-	X	-	-	-	0	X	0	-		C6
	Y*	8 ms	0	-	X	-	-	-	0	0	0	-		C5, C6
	X	24 ms	0	-	X	-	-	-	0	0	X	-		C6
	W	0	9 ms	-	0	-	-	-	0	X	0	-		C6
	V	0	156 ms	-	0	-	-	-	X	X	0	-		C6
	T	8 ms	9 ms	-	0	-	-	-	0	0	0	-		C6
	S	8 ms	156 ms	-	0	-	-	-	X	0	0	-		C6
R	24 ms	156 ms	-	0	-	-	-	X	0	X	-	C6		
Fast Carrier Detection	Q*	In		-	-	0	-	-	-	-	-	-	One Per Data Set	C5, C6
	N	Out		-	-	X	-	-	-	-	-	-		C6
Clear-to-Send Interval	M*	8 ms		-	-	-	0	-	-	-	-	0	One Per Data Set	C5, C6
	K	30 ms		-	-	-	0	-	-	-	-	X		C6
	J	60 ms		-	-	-	X	-	-	-	-	0		C6
	G	180 ms		-	-	-	X	-	-	-	-	X		C6

◆ TABLE B ◆ (Contd)  
DATA SET 202T-LIA OPTIONS

FEATURE	OPTION	DESCRIPTION	SWITCH SETTING										PROVIDE	USOC DECSN	
External Control of CC (Data Set Ready)	B*	In	-	-	-	-	-	-	-	-	-	0	-	One Per Data Set	
	A	Out	-	-	-	-	-	-	-	-	-	X	-		
Clamp	F*	In	-	-	-	-	0	-	-	-	-	-	-	One Per Data Set	D7 D8
	E	Out	-	-	-	-	X	-	-	-	-	-	-		
			S4 SWITCH CONTACT SETTING ON TRANSMITTER-RECEIVER												
			1	2	3										
Carrier Detector Reset	ZL	In	-	X	-								One Per Data Set	D8	
	ZM*	Out	-	0	-										
Continuous Carrier	ZN	In	X	-	-								One Per Data Set	D8 D7,D8	
	ZO*	Out	0	-	-										
State of CC (Data Set Ready) During Analog Loopback	YB	On	-	-	X								One Per Data Set	D8 D7,D8	
	YA*	Off	-	-	0										
Local Copy on Reverse Channel	ZE	In	STRAPPING ON REVERSE CHANNEL CP										One Per Data Set	B3 B4	
	ZF†	Out	Install E21-E22 Install E21-E23												
Grounding Option (Data Set)	ZG*	Signal Ground Connected to Frame Ground	SCREW SWITCH S1 SETTING ON INTERFACE CIRCUIT										One Per Data Set	F11 F12	
	ZH	Signal Ground Not Connected to Frame Ground	S1 Closed  S1 Open												
Grounding Option (Data Mounting)	ZI*	Signal Ground Connected to Frame Ground	STRAPPING ON 39A1 or 40B1 DATA MOUNTING											F11 F12	
	ZJ	Signal Ground Not Connected to Frame Ground	Wire Strap if Power Supply In  Wire Strap if Power Supply Out												

X Rocker down on side adjacent to numbers.  
 0 Rocker up on side adjacent to numbers.  
 - Rocker may be in either position.  
 \* Factory furnished.  
 † Factory furnished instead of 4-wire option when reverse channel CP is installed.

TABLE C

RECOMMENDED CUSTOMER OPTIONS FOR 2-WIRE PRIVATE LINE AND  
4-WIRE PRIVATE LINE WITH TALK-BACK USING DATA SET 202T-TYPE

OPTION	NEAR END	FAR END 202C, 202D, OR 202R (NOTE)
Received Data Squelch	156-ms	IN
Clear-to-Send Delay	180-ms	200-ms
Fast Carrier Detection	OUT (Normal) (23-ms)	40-ms
Soft Carrier Turnoff	24-ms	IN
Received Data Clamp	IN	IN
Alternate Voice	Optional	Optional
Switched Network Backup	Optional	Optional
Reverse Channel	Optional in 2-Wire Private Line	Optional in 2-Wire Private Line *
Carrier Detector Reset	Not Used	Not Offered
Local Copy	Optional in 2-Wire Private Line	Always Provided for 2-Wire Data Set
Continuous Carrier	OUT--Carrier Under Control of Request-to-Send	Carrier Controlled by Request-to-Send †

**Note:** If far-end data set is a 202T-type the recommended options are the same as those for the near end.

\* Not offered with DS 202R.

† Not offered with DS 202C or D.

**2.06 Compromise Amplitude Equalization (DS 202T-L1A Only):** Option ZX (minimum compromise amplitude equalization) effectively removes compromise amplitude equalization and is required on lines with high end delay distortion near the upper limit and amplitude distortion near the lower limit of the 3002 specification. Without this option this combination of distortions may cause parity errors at 1200 bps. Option ZW (maximum compromise amplitude equalization) provides the same amplitude equalization as DS 202T-L1. The test used to determine the proper option for an installation is described in Section 592-031-500.

**2.07 Channel Condition (DS 202T-L1A Only):** These options modify the demodulator for operation over C2 conditioned lines (ZZ) or basic lines (ZY). Option ZY is similar to the demodulator setting provided by DS 202T-L1.

**2.08 Local Copy on Primary Channel in 2-Wire:** With this option installed, the receiver continuously monitors the transmitted line signal while in the data mode and provides a local copy on the received data circuit.

**2.09 Soft Turnoff and Squelch Intervals:**

(a) When a data terminal turns request-to-send **off** at the end of a message, transients occur which may cause spurious signals to be received at a distant station. With the soft carrier turnoff option, the data set transmits out-of-band carrier (900 Hz) for a period of either 24- or 8-ms after request-to-send is turned **off**. This option should be used in conjunction with the received data clamp option and results in a steady mark on the

TABLE D  
RECOMMENDED OPTIONS FOR 4-WIRE POINT-TO-POINT AND  
MULTIPOINT WITHOUT TALK-BACK USING DATA SET 202T-TYPE

OPTION	RECOMMENDATION
Clear-to-Send Delay	<p>8-ms if remote data set is a 202T-type with fast mode carrier detection.</p> <p>30-ms if remote data set is a 202T-type with normal mode carrier detection or a 202R, 202D5, or D6 with 40-ms carrier detector timing.</p> <p>60-ms if remote data set is a 202C, 202D3, 202D4, or a 202R, 202D5, or 202D6 with the 40-ms carrier detector timing.</p>
Fast Carrier Detection	<p>IN (fast mode) if remote data set is a 202T-type with 8-ms clear-to-send delay.</p> <p>OUT (normal mode) if remote data set is optioned for 30- 60- 180- or 200-ms clear-to-send delay.</p>
Soft Carrier Turnoff	<p>24-ms if remote data set is a 202C, 202D3, D4, D5, D6, 202R, or 202T with normal mode fast carrier detection. *</p> <p>8-ms if remote data set is a 202T-type with fast carrier detection option.</p> <p>Quick turnoff if remote data set uses carrier detector reset option.</p>
Received Data Clamp	IN
Carrier Detector Reset	<p>IN—at master station of broadcast polling or bridge multipoint system when remote data sets use the quick carrier turnoff and master station is able to implement this circuit.</p> <p>OUT—all other times.</p>
Continuous Carrier	<p>IN—for point-to-point applications and for data set as master station of split bridge multipoint systems.</p> <p>OUT—may be used for above applications and should be used for data set at the remote station of split bridge multipoint system.</p>
Alternate Voice	Optional (with DAS 828A or 829-type).
Switched Network Backup	Optional (with DAS 828A or 829-type).

\* Data set 202T-type must be optioned for the 8-ms or quick turnoff interval when the interval between consecutive turnoffs of the request to send circuit is less than 165-ms.

received data circuit of the remote data set. The 8-ms option should be used when the remote data set has the fast received line signal detector option. The 24-ms option should be used when the remote data set is a 202D, 202R, or 202T-type with the normal received line signal detector option. However, the 24-ms option must not be used when the interval between consecutive turnoffs of request-to-send circuits is less than 165-ms. Neither the 8- nor 24-ms option should be used at the remote stations of a multipoint system when intermessage intervals are less than 10-ms. For this case, the 0-ms (quick turnoff) option should be used (at the remote stations) in conjunction with the received data clamp and the carrier detector reset options (at the master station). With the 0-ms (quick turnoff) option, carrier will be turned off in less than 1-ms after the request-to-send circuit is turned **off**.

**Note:** In 2-wire applications for terminals which immediately turn **on** request-to-send as soon as the received line signal detector goes **off**, the 8-ms soft turnoff option is incompatible with the 8-ms clear-to-send interval option, and the 24-ms soft turnoff option is incompatible with the 8-ms and 30-ms clear-to-send interval options.

(b) In half-duplex operation on 2-wire facilities, when a station that has been transmitting has its request-to-send circuit turned **off**, the telephone line may reflect signals (echoes) back to that station for a period up to the round trip delay of the circuits (about 1-ms per 100 miles each way). The squelch option when used with the received data clamp option prevents the demodulator of the station that has been transmitting from delivering these reflections as data to the received data circuit. The DS 202T-type provides for either 156-, 9-, or 0-ms (no squelch) options. The 156-ms option is recommended for use on 2-wire private line facilities and on 4-wire private lines with talk-back. The 9-ms option may be used on 2-wire private line facilities less than 50 miles. On facilities longer than 50 miles, the 9-ms option may be used only if the customer terminal is able to ignore echoes. The 0-ms option (no squelch) should be used on 4-wire data sets and may be used on 2-wire data sets if the data terminal is able to ignore echoes.

**2.10 Fast Carrier Detection:** The DS 202T-type is provided with an option for either normal

or fast response of the carrier detector to an incoming data signal. With the fast carrier detection-out option (N), the received line signal detector turns **on** in less than 20-ms if data signals are received and turns **off** in approximately 10-ms if data signals are not received. This option is compatible with the clear-to-send interval options in DS 202C, 202D, 202E, and 202R and is recommended when the distant data set has either the 180-, 60-, or 30-ms clear-to-send interval. With the fast carrier detection-in option (Q), the received line signal detector circuit turns **on** in approximately 6-ms if marking carrier is received. The circuit will turn **off** in approximately 5-ms for carrier frequencies between 860 Hz and 940 Hz (soft carrier turnoff). If the carrier frequencies are outside of these limits, but are within the limits for the normal mode, the normal mode response times will occur. This option must be used when the remote data set uses the 8-ms clear-to-send interval option.

**2.11 Clear-to-Send Interval:** The **on** condition of the clear-to-send circuit from the data set is a response to an **on** condition on the request-to-send circuit delayed by a time interval which permits the data set to establish operations with the remote receiver. The DS 202T-type provides four clear-to-send interval options: 180-, 60-, 30-, and 8-ms.

(a) **180-ms:** This option is recommended for use on 2-wire private line facilities greater than 400 miles round trip and is required when the remote data set has the 156-ms squelch option.

(b) **60- and 30-ms:** The 60- and 30-ms options should be used on 4-wire point-to-point and multipoint facilities to be compatible with the turn-on time of the received line signal detector of DS 202C, 202D, and 202R.

(c) **8-ms:** This option is recommended for use on duplex multipoint systems requiring fast start-up of the data set and is compatible only with a DS 202T-type at the distant end. With this option, the data terminal must keep the transmitted data circuits in the mark state when request-to-send is **on** until the clear-to-send indication is given. The distant data set must be optioned for fast carrier detection.

**2.12 External Control of CC (Data Set Ready):**

(a) When this option is installed, the data set ready (CC) lead is externally controlled by the

DAS 828A, 829-type, or equivalent line terminating unit. This indicates to the CPE when the private line channel is in a maintenance mode or other test condition.

(b) When this option is not installed, the data set ready lead is always **on** except when the data set is in one of the three test modes.

**2.13 Clamp:** With the received data clamp installed, the clamp circuit will squelch the received data circuit when the received line signal detector is **off**. If desired by the customer, the clamp circuitry associated with the received line signal detector may be disabled. With option E (clamp out) installed on DS 202T-L1, noise may cause spurious signals on the received data circuit even if the received line signal detector is **off**. It is recommended that option F (clamp in) always be installed on DS 202T-L1. Data set 202T-L1A with option E (clamp out) installed is less affected by noise than DS 202T-L1.

**2.14 Carrier Detector Reset:** The DS 202T-type provides a carrier detector reset interface circuit on pin 25 of the customer interface. This interface circuit is provided for turning **off** the received line signal detector circuit in less than 0.2-ms for those cases where the 0-ms soft turn-off interval of the distant data set is used to minimize the time between received messages at the master station of a split bridge multipoint system. If this circuit is not used by the CPE, this option should not be installed in the data set, because noise may trigger the circuit if it is not held **off** by the CPE.

**2.15 Continuous Carrier:** With the continuous carrier option installed, carrier is transmitted as long as the data set is in the data mode. The clear-to-send circuit remains **on**; therefore, options M, K, J, and G (clear-to-send intervals) are inoperative. This option may be used on duplex facilities and in transmit-only service over 2-wire facilities. With the carrier under control of request-to-send, carrier is transmitted in less than 1 ms after the request-to-send circuit is turned **on**. This option is required to control the direction of data transmission in half-duplex operation over 2-wire facilities. It may also be used in duplex services to provide a means of signaling the remote terminal (for example, carrier-off could be used as an out-of-service indication).

**2.16 State of CC (Data Set Ready) During Analog Loopback (DS 202T-L1A Only):**

With option YB (ON) the data set ready circuit turns **on** during the analog loopback test mode when the CPE ready circuit is turned **on**. This permits testing with the CPE. With option YA (OFF) the data set ready circuit is clamped **off** during the analog loopback test mode as it is with DS 202T-L1.

**2.17 Local Copy on Reverse Channel:** With the option installed, the receiver monitors the reverse channel transmitter and provides a local copy on the secondary received line signal detector (SCF) circuit. The local copy signal is delayed less than 50-ms.

**2.18 Compromise Equalization (DS 202T-L1 Only):** Compromise equalizer options are available on DS 202T-L1 series 6 and higher. Option ZV (minimum compromise equalization) provides reduced envelope delay distortion compensation to eliminate an over-equalization condition on channels with low envelope delay distortion. Option ZU (maximum compromise equalization) provides the same equalizer characteristics provided on data sets without the equalizer options (series 5 and lower). For data bit rates above 1200 bps, it is necessary to perform a data distortion test to determine the proper equalizer option setting. The procedure for this data distortion test is contained in Section 592-031-500.

**2.19 Grounding Options:** Protective and signal grounds are normally cross-connected together by means of a screw switch on the interface circuit, located at the inside rear of the housing or by strapping on data mounting power supplies. This arrangement is intended to provide additional margin to longitudinal power line noise. The screw switch or strapping may be opened at the request of the customer with due consideration given to possible noise conditions, ground potential differences, safety conditions, local electrical codes, and the data terminal manufacturer's recommendations.

### 3. CONNECTIONS

**3.01** This part contains information for connecting DS 202T-type in a single data set installation on 2-wire or 4-wire private line facilities. For information on multiple installation of DS 202T, refer to Section 592-861-200.

**3.02** ♦Data sets 202T-L1, 202T-L1/4, 202T-L1A/4 and 202T-L1A/3B/4 are powered by two customer-provided dc power sources. To supply power to

these data sets, make the following backplane connections using power transformer cord:

- +15v  $\pm$ 1.5v dc           source to AC1
- 15v  $\pm$ 1.5v dc           source to AC2

Common to GRD.

**Note:** Common can be either grounded or floating depending on whether or not it is desired to have circuit ground of the data set connected to frame ground.¶

**3.03** The connection diagrams are as follows:

- Fig. 3—4-Wire Data Set on 4-Wire Private Line With DAS 829-Type, Data/Voice
- Fig. 4—4-Wire Data Set on 4-Wire Private Line With DAS 829-Type, Data Only
- Fig. 5—4-Wire Data Set on 4-Wire Private Line With Alternate Switched Network Backup With DAS 829-Type, Data Only
- Fig. 6—4-Wire Data Set on 4-Wire Private Line With Alternate Switched Network Backup With DAS 829-Type, Data/Voice
- Fig. 7—2-Wire or 4-Wire Data Set on 4-Wire Private Line With DAS 828A, Data Only
- Fig. 8—2-Wire or 4-Wire Data Set on 4-Wire Private Line With DAS 828A, Data/Voice
- Fig. 9—4-Wire Data Set on 4-Wire Private Line With Switched Network Backup With DAS 828A and 828C, Data Only
- Fig. 10—4-Wire Data Set on 4-Wire Private Line With Switched Network Backup With DAS 828A and 828C, Data/Voice
- Fig. 11—4-Wire Data Set Connected to Locally Engineered Private Line Termination Without DAS 828-Type or 829-Type
- Fig. 12—2-Wire Data Set Connected to Locally Engineered Private Line Termination ,

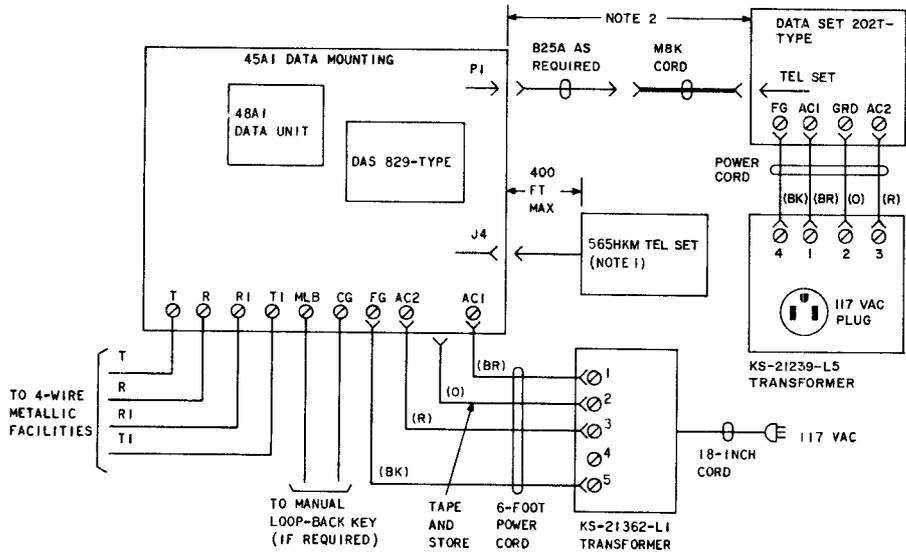
**4. INSTALLATION TESTS**

**4.01** After the data set has been installed, it should be tested to determine if it is operating properly. Perform installation tests as directed in Section 592-031-500.

**5. REFERENCES**

**5.01** The following Bell System Practices provide additional information concerning DS 202T-type and data stations using DS 202T-type.

SECTION	TITLE
590-102-130	39A1 Data Mounting—Identification
590-102-131	40-Type Data Mounting—Identification
590-102-137	47-Type Data Mounting—Identification
592-031-100	Data Set 202T-Type—Transmitter- Receiver—Description and Operation
592-031-180	Data Set 202T Transmitter-Receiver—Summarizing Specification—Data Systems
592-031-500	Data Set 202T-Type Transmitter-Receiver—Test Procedures and Maintenance
592-861-100	Data Station Using Data Set 202T—Description and Operation
592-861-200	Data Station Using Data Set 202T—Installation and Connections
592-861-500	Data Station Using Data Set 202T—Test Procedures
598-080-100	Data Auxiliary Set 828A— Description and Operation
598-080-200	Data Auxiliary Set 828A—Installation and Connections
598-080-101	Data Auxiliary Set 828C—Description and Operation



- NOTES:
- DESIGNATE KEY STRIP AS SHOWN.  
 CONVERT RING BUTTON TO NONLOCKING.
- |      |   |   |            |      |   |
|------|---|---|------------|------|---|
| HOLD | — | — | PL<br>TALK | RING | — |
|------|---|---|------------|------|---|
- THIS DISTANCE IS LIMITED TO A MAXIMUM OF 200- FEET FOR DS 202T-L1 OR 1000- FEET FOR DS 202T-L1A.

Fig. 3—4-Wire Data Set on 4-Wire Private Line With DAS 829-Type, Data/Voice

SECTION	TITLE	SECTION	TITLE
598-080-201	Data Auxiliary Set 828C—Installation and Connections	666-511-502	Test of Data Services Provided by Data Set 202T From a Private Line Test Room
598-082-100	Data Auxiliary Set 829-Type Channel Interface Units—Voiceband Private Line Channels—Description	6.02	Detailed information concerning DS 202T-type is also contained in CD- and SD-1D243-01.

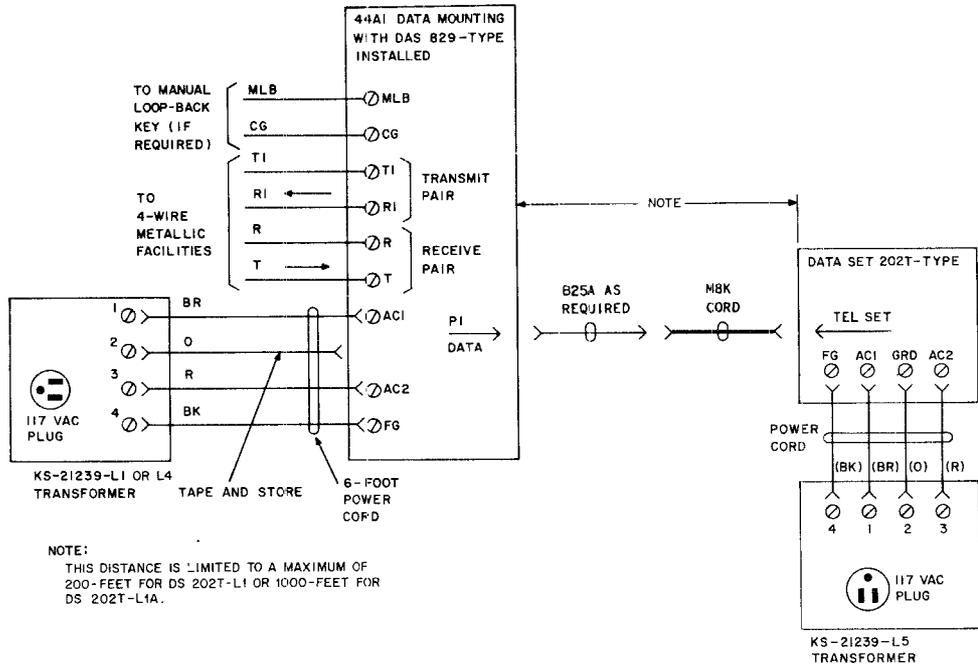
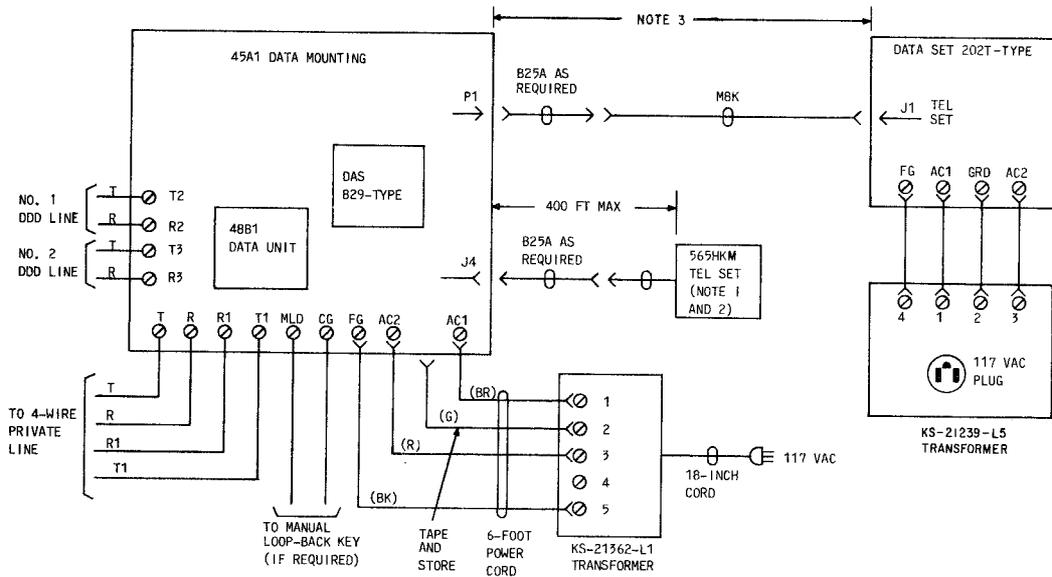


Fig. 4—4-Wire Data Set on 4-Wire Private Line With DAS 829-Type, Data Only



NOTES:

1. DESIGNATE KEY STRIP AS SHOWN.  
 CONVERT REL BUTTON TO NONLOCKING.
2. CONVERT TEL SET AS SHOWN IN TABLE.
3. THIS DISTANCE IS LIMITED TO A MAXIMUM OF 200- FEET FOR DS 202T-L1 OR 1000- FEET FOR DS 202T L1A.

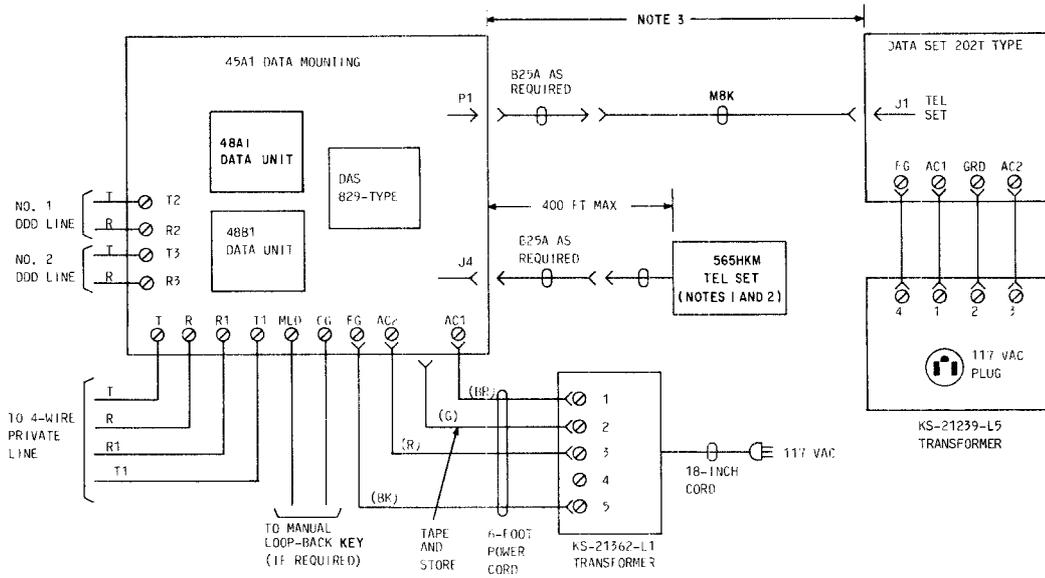
HOLD	DDD1	DDD2	-	REL
------	------	------	---	-----

2. CONVERT TEL SET AS SHOWN IN TABLE.

636A KEY LEADS

COLOR	REMOVE	CONNECT
BRN	M	X
S-R	M	N
Y	M	TAPE AND STORE
O-BK	N	M

**Fig. 5—4-Wire Data Set on 4-Wire Private Line With Alternate Switched Network Backup With DAS 829-Type, Data Only**



- NOTES:  
1. DESIGNATE KEY STRIP AS SHOWN CONVERT RING AND REL BUTTONS TO NONLOCKING

HOLD	DDD1	DDD2	PL TALK	RING	REL
------	------	------	---------	------	-----

2. CONVERT TEL SET AS SHOWN IN TABLE:

636A KEY LEADS		
COLOR	REMOVE	CONNECT
BRN	M	X
S-R	M	N
Y	M	TAPE AND STORE
O-BK	N	M

3. THIS DISTANCE IS LIMITED TO A MAXIMUM OF 200- FEET FOR DS 202T-L1 OR 1000- FEET FOR DS 202T-L1A.

**Fig. 6—4-Wire Data Set on 4-Wire Private Line With Alternate Switched Network Backup With DAS 829-Type, Data/Voice**

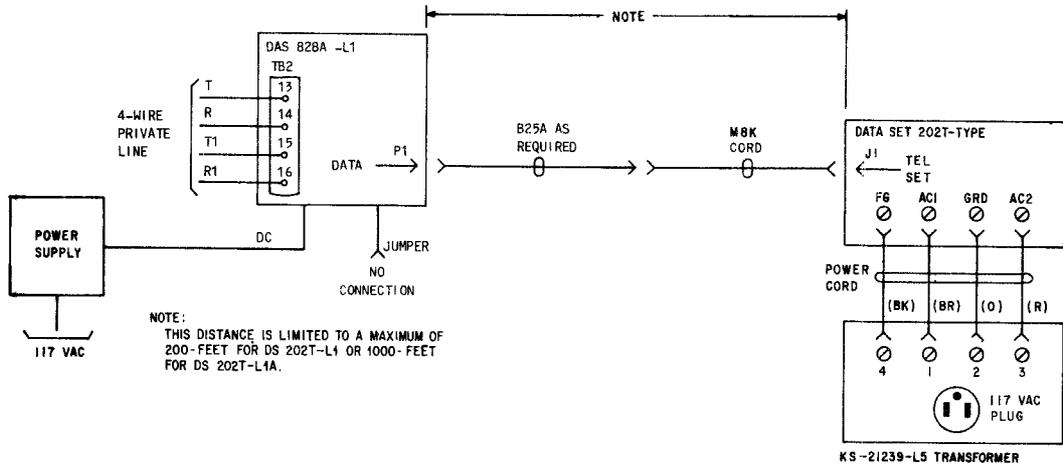


Fig. 7—2-Wire or 4-Wire Data Set on 4-Wire Private Line With DAS 828A, Data Only

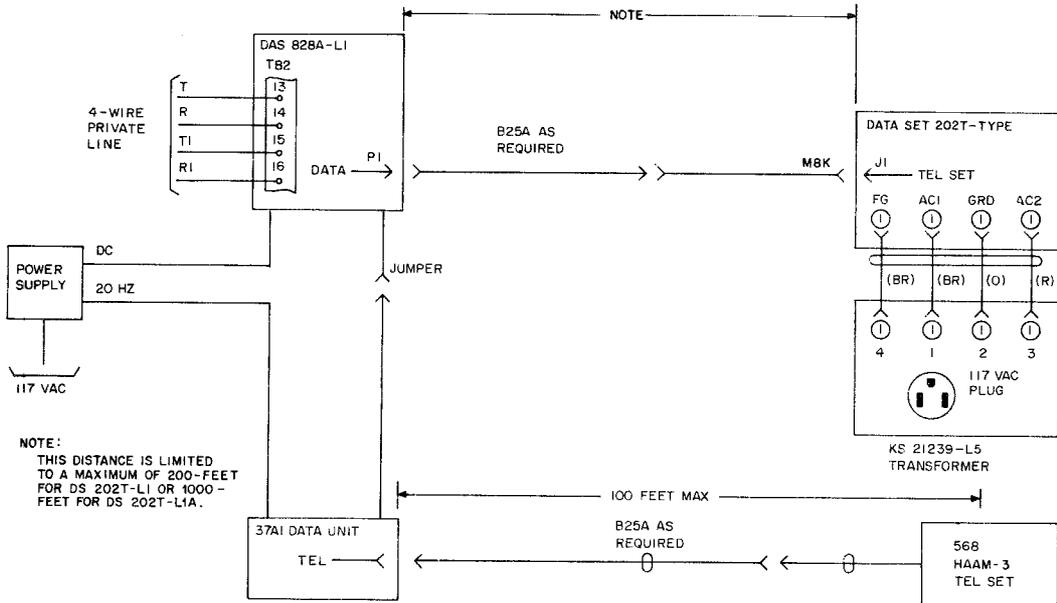


Fig. 8—2-Wire or 4-Wire Data Set on 4-Wire Private Line With DAS 828A, Data/Voice

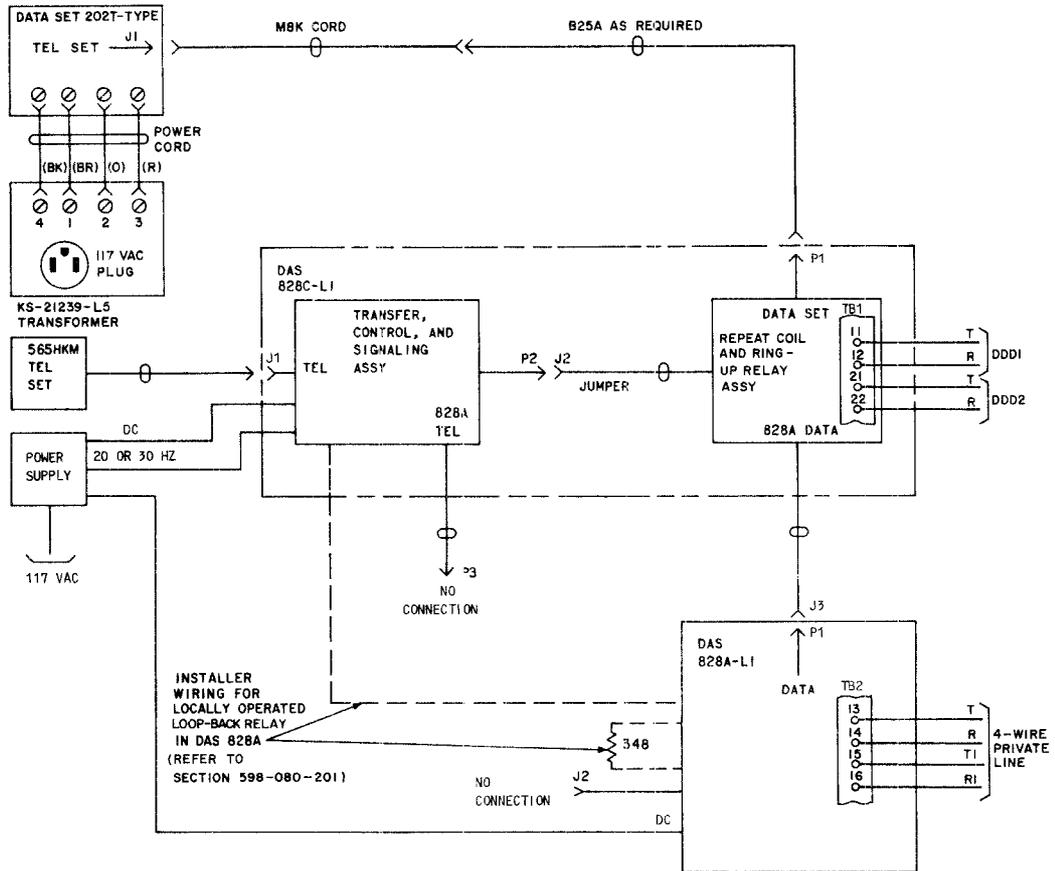


Fig. 9—4-Wire Data Set on 4-Wire Private Line With Switched Network Backup With DAS 828A and 828C, Data Only



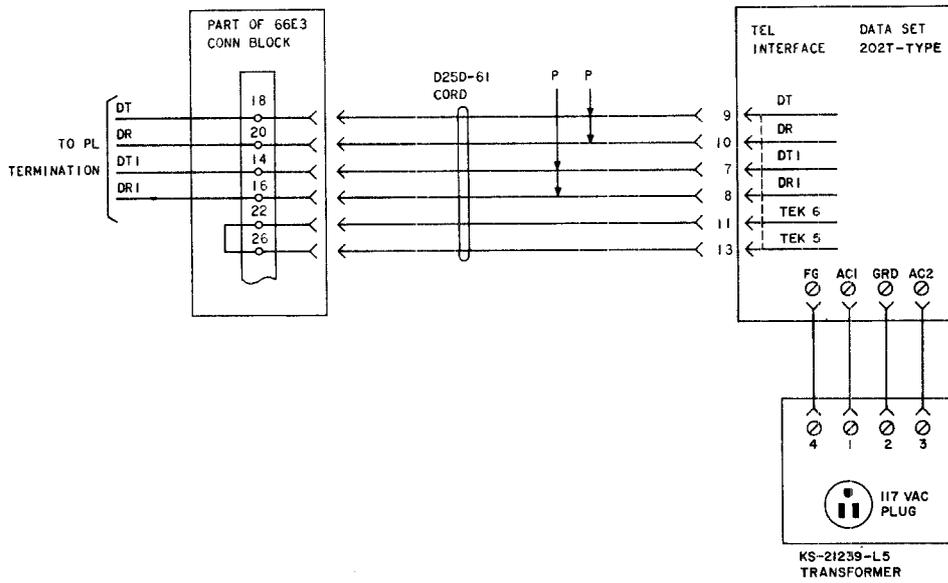


Fig. 11—4-Wire Data Set Connected to Locally Engineered Private Line Termination Without DAS 828- or 829-Type

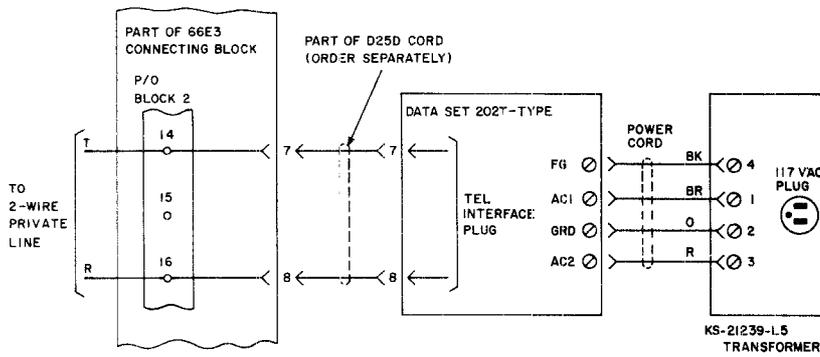


Fig. 12—2-Wire Data Set Connected to Locally Engineered Private Line Termination