

## DATA SET 202R

### TRANSMITTER-RECEIVER

### INSTALLATION AND CONNECTIONS

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#### 1. GENERAL

**1.01** This section contains information concerning the installation and connection of data set 202R. The data set should be installed in conformance with existing installation practices. Refer to the section entitled Data Sets, General Installation and Connection Information (590-010-200).

**1.02** This section is reissued for the following reasons:

- (a) To include Table A on interface leads
- (b) To include information on data set options
- (c) To update Table B
- (d) To update Fig. 2
- (e) To add note to Fig. 6, 7, 8, and 9.

**1.03** It is preferred that the data set be installed apart from but close to the business machine equipment on a nearby desk, table, stand, or in a Bell System-provided equipment cabinet. The data set is designed to operate in an ambient temperature range of 40 to 120°F and a relative humidity of 20 to 95 percent.

**1.04** Data set 202R should be located near the business machine because the interface cord

supplied by the customer should not exceed 50 feet in length [to reduce stray capacitance and to conform to Electronic Industries Association (EIA) standards]. In order to maintain high quality service and to minimize interference from other equipment, data sets should be used on individual lines that do not have extensions.

**1.05** Data set 202R requires an ac outlet to accept the plug on the power transformer. To prevent the data set from being accidentally turned off, this outlet should not be under control of a switch.

**1.06** To minimize inductive interference to data signals on the telephone (data) line, the line should not be carried in the same run as cable between the data set and business machine 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) station wire between the data set and the cable distribution terminal or building entrance. Ground the shield at one end only, preferably at the distribution terminal end.

**1.07** A 25-pin KS-19087 connector is provided at the rear of the data set for connection to the business machine. This connector is designed to mate with a customer-provided Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood or a right angle Cinch 239-13-99-140 hood and wired in accordance with Table A. Connections to the telephone and low-voltage ac power are made to the 44A connector block with a 10-conductor cord (D10P) which is 5 feet 6 inches long.

**1.08** Before connecting the data set to the line, verify that the loop and overall facilities have been tested and meet requirements specified in the section entitled Voice Bandwidth Private Line Data Circuits—Tests and Requirements (314-410-500). For switched network application, test requirements are contained in the section entitled Data Systems—Dataphone® Service and

◆ TABLE A ◆

DATA SET 202R INTERFACE

PIN NO.	EIA RS-232-C NOMENCLATURE	DATA SET 202R LEAD DESIGNATION
1	Protective Ground (AA)	Frame Ground (FG)
2	Transmitted Data (BA)	Send Data (SD)
3	Received Data (BB)	Receive Data (RD)
4	Request-to-Send (CA)	Request-to-Send (RTS)
5	Clear-to-Send (CB)	Clear-to-Send (CTS)
6	Data Set Ready (CC)	Data Set Ready (DSR)
7	Signal Ground (AB)	Signal Ground (SG)
8	Received Line Signal Detector (CF)	Data Carrier Detector (CD)
9	(Reserved for Data Set Testing)	+P
10	(Reserved for Data Set Testing)	-P
11-25		Not used

Data Access Arrangements on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501).

**1.09** To remove the cover of data set 202R-L1/2, loosen the four captive retaining screws located around the base of the data set (Fig. 1) and lift. To replace the cover, position the retaining wedges so that they will receive the cover lugs easily. Lower the cover in place by positioning the two rear retaining wedges first. Tighten the four retaining screws.

**1.10** After the cover has been removed, the circuit boards may be removed with the following procedure.

- (a) Remove the card retainer screw shown in Fig. 1.
- (b) Remove the card retainer by pulling it back and upward.

(c) Remove the circuit boards by carefully prying with a screwdriver on each end against the card nest.

(d) To replace the card, insert it in its proper slot with the equipment components facing down. Push the card into the slot until the face of the card is flush with the side of the card nest.

## 2. OPTIONS

**2.01** Data set 202R is provided with a number of options which must be installed prior to placing the data set in service. The options to be installed on the data set should be specified on the service order. Refer to Table B for a cross reference between options and the switches which control the options. The screw is rotated clockwise to close the switch. With the screw rotated counterclockwise, the switch is open. ◆The options are described in 2.03 through 2.10.◆

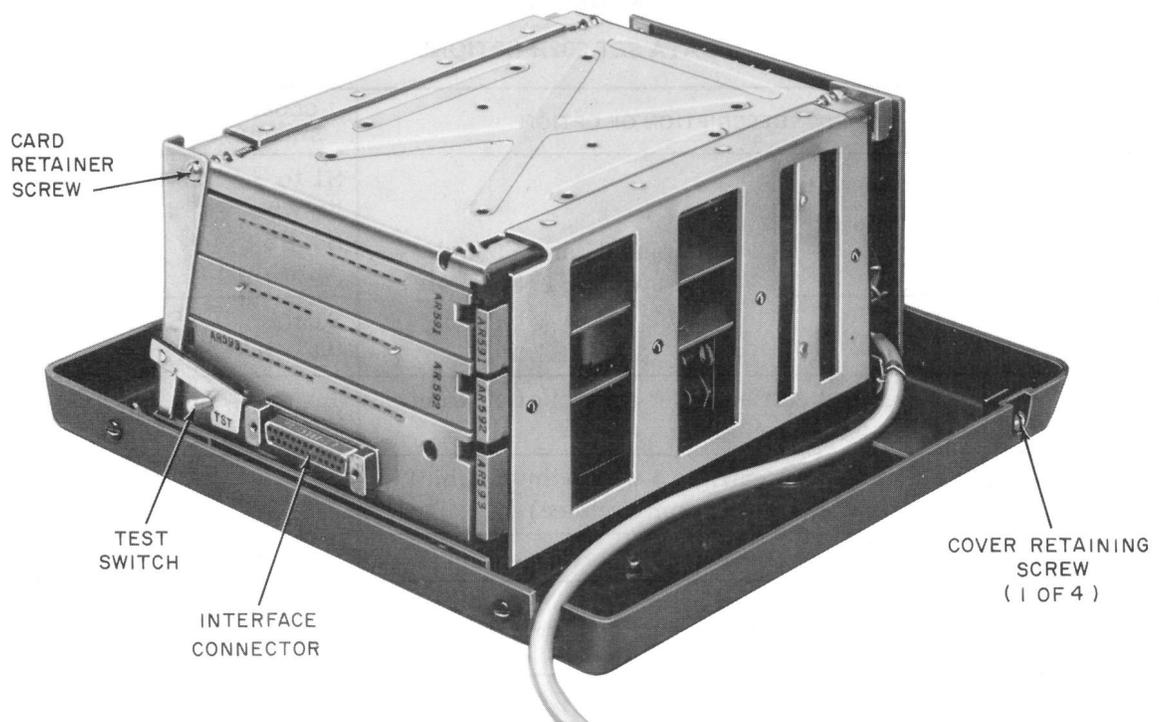


Fig. 1—Data Set 202R Rear View

**Note:** Refer to Fig. 2 and 3 for location of the option switches.

**2.02** A telephone set with an exclusion key may be ordered separately to provide switched network service. The recommended telephone sets are as follows:

- 511F desk telephone, rotary dial
- 558F wall telephone, rotary dial
- 2511F desk telephone, Touch-Tone® dial
- 2558D wall telephone, Touch-Tone dial.

Any of these telephones may also be used for 2-wire private line service with direct distance dialing (DDD) backup. Such an arrangement does not permit voice communication over private line facilities. However, the telephone can be used for voice communication on the DDD network even while the data set is in use on the private line facilities. With these arrangements, only manual origination and answering of Dataphone calls are possible.

**2.03 2-Wire—4-Wire:** The 2-wire option is used in private line facilities and switched network service where half-duplex operation is acceptable. The 4-wire option is used in point-to-point and multipoint private facilities where full-duplex service is required.

**2.04 Carrier Control:** With the carrier controlled by request-to-send option, the data set can transmit (carrier is *on*) when request-to-send is *on*, and the data set is conditioned to receive (no carrier) when request-to-send is *off*. With the continuous carrier option, the request-to-send lead is bypassed and is held *on* by circuitry within the data set. The continuous carrier option is used on 4-wire systems or on 2-wire systems arranged to transmit only. For receive-only service, a "no carrier" option inhibits the transmitter from sending carrier.

**2.05 Carrier Detector Acquisition Timer:** The carrier detector circuitry requires a signal in the data band for either 40 ( $\pm 5$ ) or 20 ( $\pm 5$ ) ms before the carrier detector lead turns *on*. The 40-ms acquisition timer should be used when the remote data set has either the 200- or 60-ms

◆ TABLE B ◆  
DATA SET 202R OPTIONS

REQUIRES	OPTION DESIG.	DESCRIPTION OF OPTION		CLOSE SWITCH	OPEN SWITCH	CIRCUIT PACK
One per station	Z	2-wire	Jumpers S4 and S5 and slide switch S1 (See Note)	S1 to "2-wire" S4, S5 <i>Note</i>	—	AR593
	Y	4-wire		S1 to "4-wire"	S4, S5 <i>Note</i>	
One per station	X	Data set carrier under control of customer request-to-send lead		S3B	S3A	AR593
	W	Continuous carrier (4-wire point-to-point or 2-wire transmit-only service)		S3A	S3B	
	V	No carrier (receive-only service)		—	S3A, S3B	
	T	Fast carrier turn-off		—	S2	AR591
	S	Soft carrier turn-off		S2	—	
One per station	R	Squelch of carrier detector		S3	—	
	Q	No squelch of carrier detector		—	S3	
One per station	N	20-ms carrier acquisition timer		S1	—	
	M	40-ms carrier acquisition timer		—	S1	
One per station	K	Carrier detector "OFF" clamps received data lead		S5	—	
	J	No clamp of received data lead		—	S5	
One per station	G	200-ms clear-to-send timer		—	S4A, S4B	
	F	60-ms clear-to-send timer		S4A	S4B	
	E	30-ms clear-to-send timer		S4B	S4A	

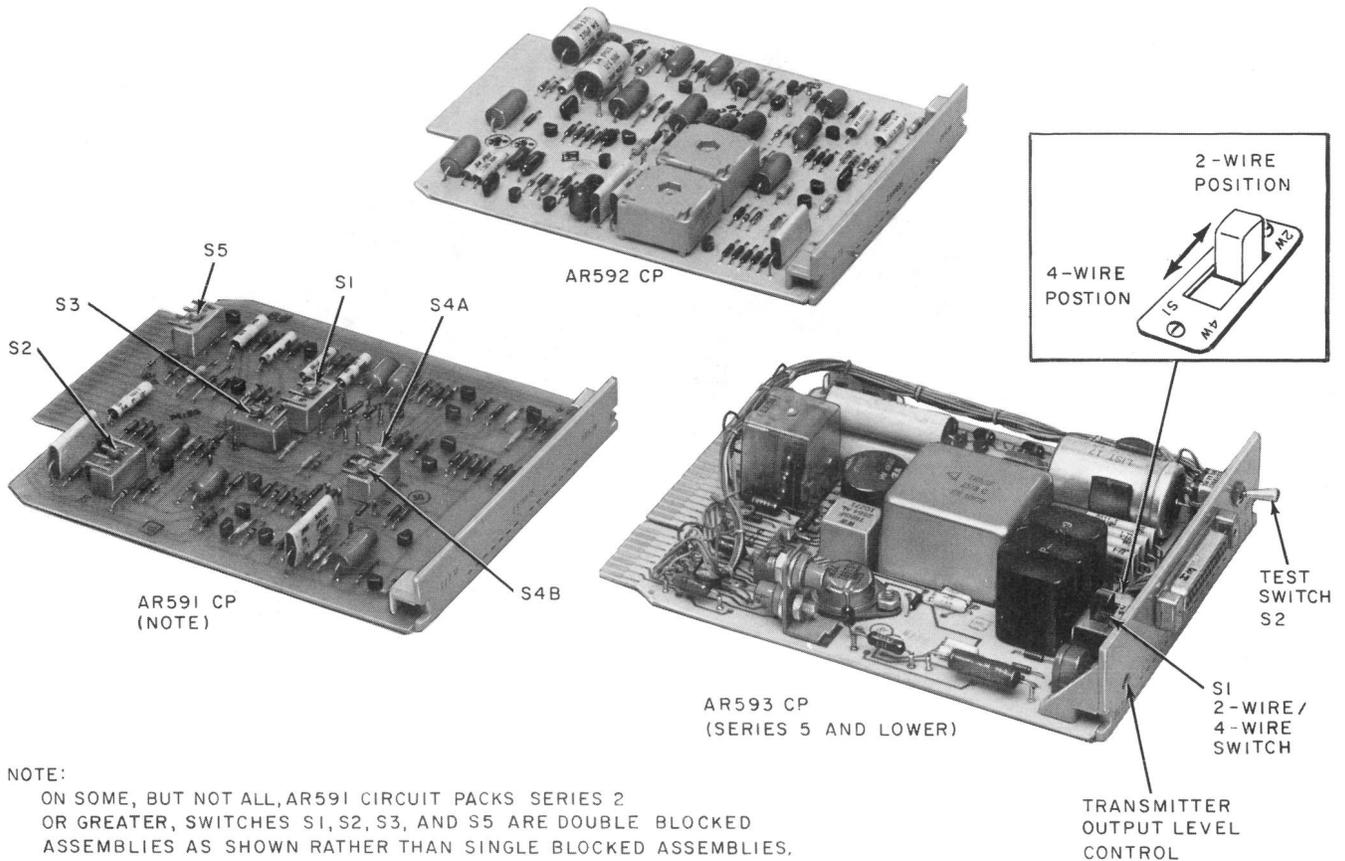
**Note:** AR593 CPs, series 6 and later, contain jumpers which are used as switches S4 and S5. The "open switch" condition is obtained by plugging one end of the jumper into the other end of the same jumper. The "closed switch" condition is obtained by plugging the jumper into two adjacent posts on the circuit board. The "open switch" condition allows digital loop-back test. To perform the "beeper" 4-wire loop-back test, close switches S4 and S5. All data sets with AR593, series 6 and later, are factory furnished in the "open switch" condition.

clear-to-send timing option. The 20-ms acquisition timer should be used when the remote data set has the 30-ms clear-to-send timing option.

#### 2.06 Carrier Detector Clamp of Receiver Data:

The carrier detector clamp circuit is a means of protecting the demodulator against excessive line noise. This circuit requires a signal in the data

band for a timed period before the demodulator is allowed to deliver a signal to the received data lead. If there is no such signal, noise will not operate the carrier detector and the receiver will be clamped off. An option is provided to set the carrier detector clamp timing to either 40 or 20 ms for applications requiring fast startup of the receiver. With the 20-ms option, the carrier



## NOTE:

ON SOME, BUT NOT ALL, AR591 CIRCUIT PACKS SERIES 2 OR GREATER, SWITCHES S1, S2, S3, AND S5 ARE DOUBLE BLOCKED ASSEMBLIES AS SHOWN RATHER THAN SINGLE BLOCKED ASSEMBLIES. WHEN THESE DOUBLE BLOCKED ASSEMBLIES EXIST, AT NO TIME SHOULD THE SCREW ASSOCIATED WITH ANY OF THESE SWITCHES BE REMOVED FROM THE MIDPOSITION AND INSTALLED IN EITHER END POSITION OR DAMAGE TO CIRCUIT COMPONENTS WILL RESULT.

Fig. 2—Data Set 202R Circuit Packs

detector is more susceptible to noise which may unclamp the carrier detector and receive data leads. If desired by the customer, the carrier detector clamp can be disabled completely; however, the demodulator will deliver spurious data whenever line noise is excessive.

**2.07 Receive Data Squelch:** When a transmitting 2-wire station has its request-to-send lead turned *off*, the line may reflect signals (echoes) back to that station for a period equal to the round-trip delay of the circuit. It is possible that these echoes might be recovered as valid data. To prevent this, the demodulator is squelched against all signals for a period of 120 ms. If the business machine is able to ignore the echoes, then the squelch option can be removed. In 4-wire

operation, echoes are not encountered; therefore, the "no-squelch" option should be used.

**2.08 Clear-to-Send Interval:** The *on* condition of the clear-to-send lead from the data set is a response to an *on* condition of request-to-send delayed by a time interval. This time interval allows the data communications equipment to establish a communication channel to a remote data processing terminal. Data set 202R provides three clear-to-send timing options: 200, 60, and 30 ms. The 200-ms option is used when the remote data set is equipped with the squelch option (switched network or 2-wire private line). The 60- and 30-ms options are used when the remote data set is strapped for the 40- or 20-ms carrier-detect options, respectively, without the receiver squelch. These shorter clear-to-send and carrier-detect intervals

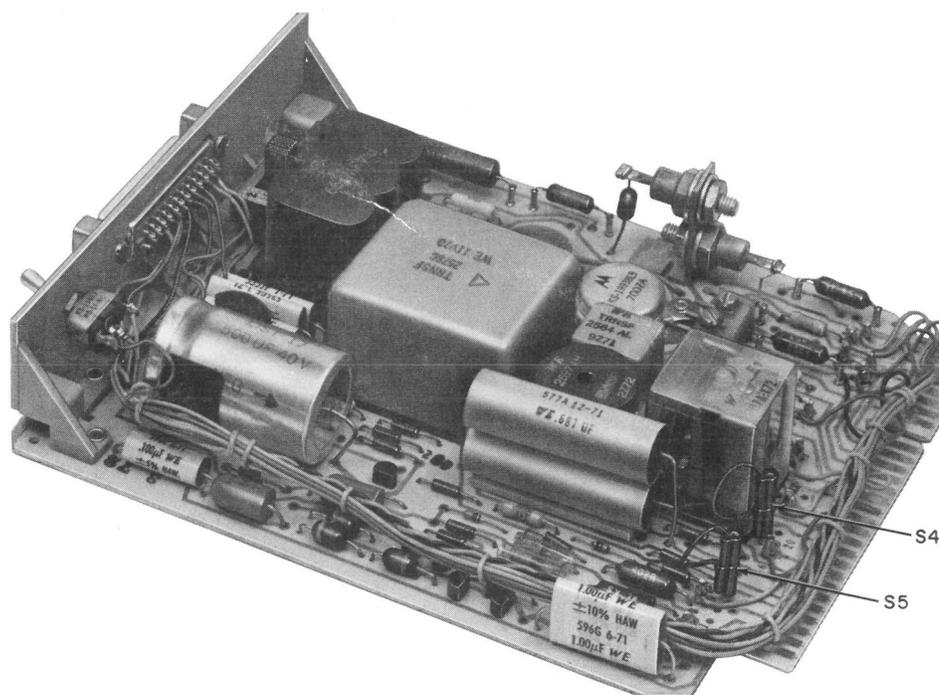


Fig. 3—AR593 Circuit Packs—Location of Switches S4 and S5

are for use on fast turnaround 2- and 4-wire private line applications.

**2.09 Soft Carrier Turn-Off:** When a business machine turns request-to-send *off* at the conclusion of a transmitted message, transients are likely to occur which may cause spurious spacing signals to be received at the distant station. With the soft carrier turn-off option, the data set transmits a 900-Hz carrier (which is outside the data band) for 27 to 45 ms after the request-to-send lead is turned *off*. This allows the remote data carrier-detect circuits to turn off and does not cause nonvalid data to appear on the remote received-data lead. This feature may be disabled for fast turnaround applications.

**2.10 Local Copy:** On 2-wire service, the receiver monitors the local or remote transmitted data at all times and provides the capability of obtaining a local copy. The local copy is not available on 4-wire service.◆

### 3. CONNECTIONS

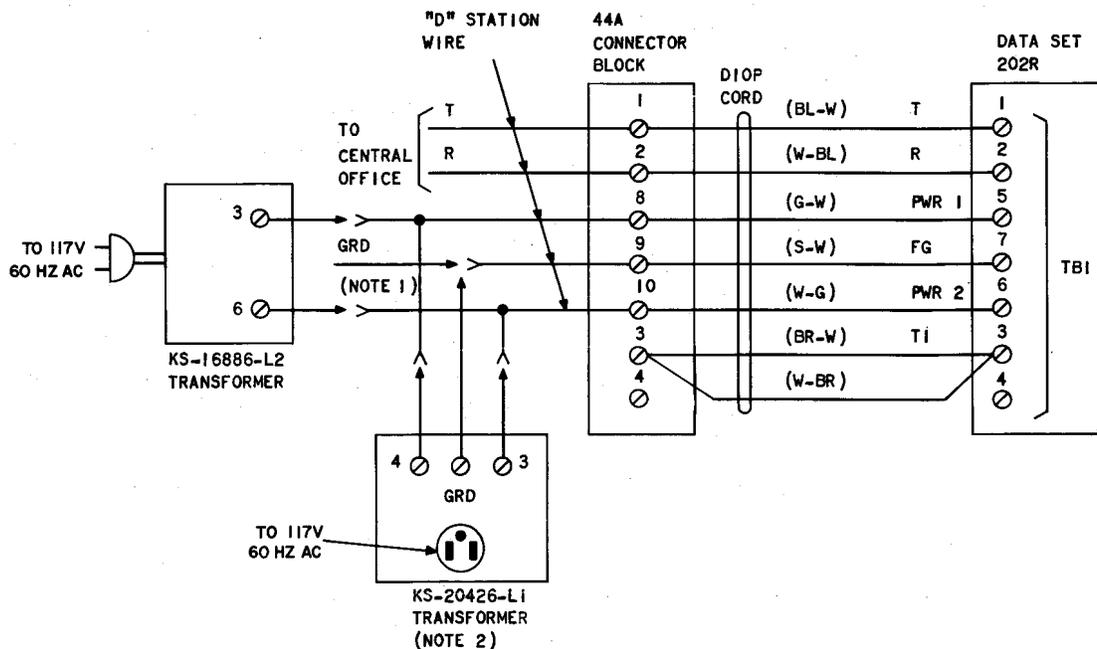
**3.01** Data set 202R is connected to the telephone line and ac power as shown in Fig. 4 through

17. Figure 4 shows the method for connecting data set 202R to a 2-wire private line without a telephone set. Figure 5 shows the connection to a 4-wire private line. Figures 6 through 9 show a 2-wire private line arrangement with alternate DDD backup. Figures 10 through 13 show DDD arrangements using various telephone sets. Figures 14 through 17 show 4-wire private line arrangements with alternate two DDD backup lines using various telephone sets.

**3.02** If the data set is provided with a KS-16886-L2 transformer, the transformer cord must be plugged in and the transformer mounted near the outlet. If the data set is provided with a KS-20426-L1 transformer, the transformer plugs into the outlet and is secured in place by means of the furnished clamp.

**3.03** Before the data set is electrically connected to the line, the output power should be adjusted to one of the following levels.

- (a) *For private line use, the level should be set by the procedure in 3.04 to the level specified on the service order.*



## NOTES:

1. IF A KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
2. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP SHOULD BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET WHERE LOCAL REGULATIONS PERMIT.

Fig. 4—Two-Wire Connection for Data Set 202R Without Telephone Set

- (b) *For Dataphone use, the output level should be set by the procedure in 3.05 to arrive at the serving central office (SCO) at -12 dBm.*
- 3.04** For installation on private lines, use either a high-impedance voltmeter across a 600-ohm termination [such as KS-16979 volt-ohm-milliammeter (VOM)] or a meter with a self-contained 600-ohm impedance (such as TTS-4 transmission measuring set).
- (a) Apply power to the data set. Connect the interface test adapter located in the cover of a 901B data test set (DTS) (or a 914-type DTS) to the interface connector on the data set. Turn request-to-send on by strapping terminal 9 (+P) to terminal 4 request-to-send (RTS).
  - (b) Remove transmitting tip and ring line to CO from data set.
  - (c) Connect the level measuring meter across the transmitting tip and ring. If the 600-ohm termination is required, place it across the transmitting tip and ring.
  - (d) Adjust the data set output level to that required by the service order. Refer to 3.06 for instructions on varying the power level.
  - (e) When the level has been set, disconnect the meter and 600-ohm termination.
  - (f) Reconnect transmitting tip and ring to data set.
- 3.05** For installation on the switched network (DDD), it is necessary to know the line loss from the SCO. If the line loss is not known, dial the milliwatt supply and measure its level at the data station. The TTS-4 transmission measuring set may be used to measure this level (use 900-ohm termination built into the TTS-4). The milliwatt

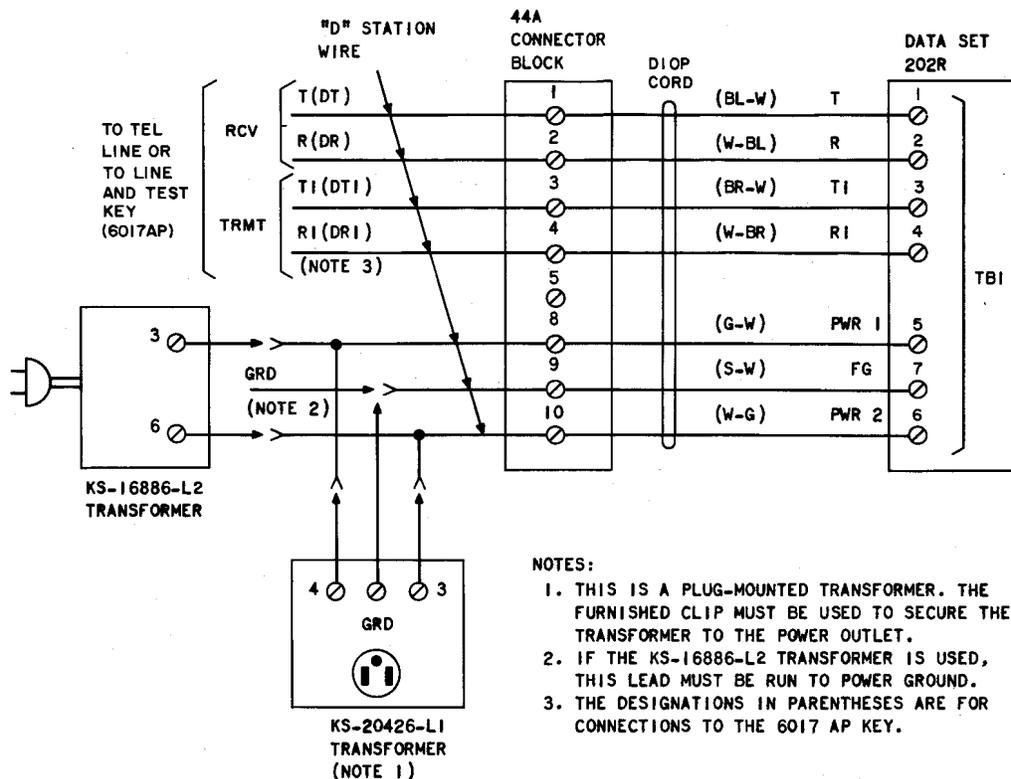


Fig. 5—Four-Wire Connection for Data Set 202R

supply transmits 1000 Hz at 0 dBm at the SCO; therefore, the level measured at the data station is equal to 0 dBm minus the line loss. For example, if -5 dBm is measured at the data station, the line loss is -5 dB.

**Note:** If the line loss is more than 10 dB, the line should not be used for data service.

(a) Do not connect the data set to the loop or to the associated telephone set.

(b) Apply power to the data set. Connect a 901 DTS cover or a 914-type DTS to the interface connector on the data set. Turn request-to-send on by strapping terminal 9 (+P) to terminal 4 (RTS).

(c) Connect the level measuring meter across tip and ring of the data set. If the meter in the 914-type DTS is used, an external 900-ohm load must be connected across tip and ring.

(d) Set the level at the data set so that the line loss subtracted from the data set output level is equal to -12.

For example:

If line loss is 5 dB:

$$-7 \text{ dBm} - (5 \text{ dB}) = -12 \text{ dBm}$$

The data set should be adjusted for -7 dBm output signal level. Refer to 3.06 for instructions on varying the output signal level.

**Note:** The line loss and maximum transmit level should be marked on the inside cover of the data set for future reference.

(e) When the level has been set, disconnect the meter and 900-ohm termination. Connect the data set to the line and to the associated telephone set.

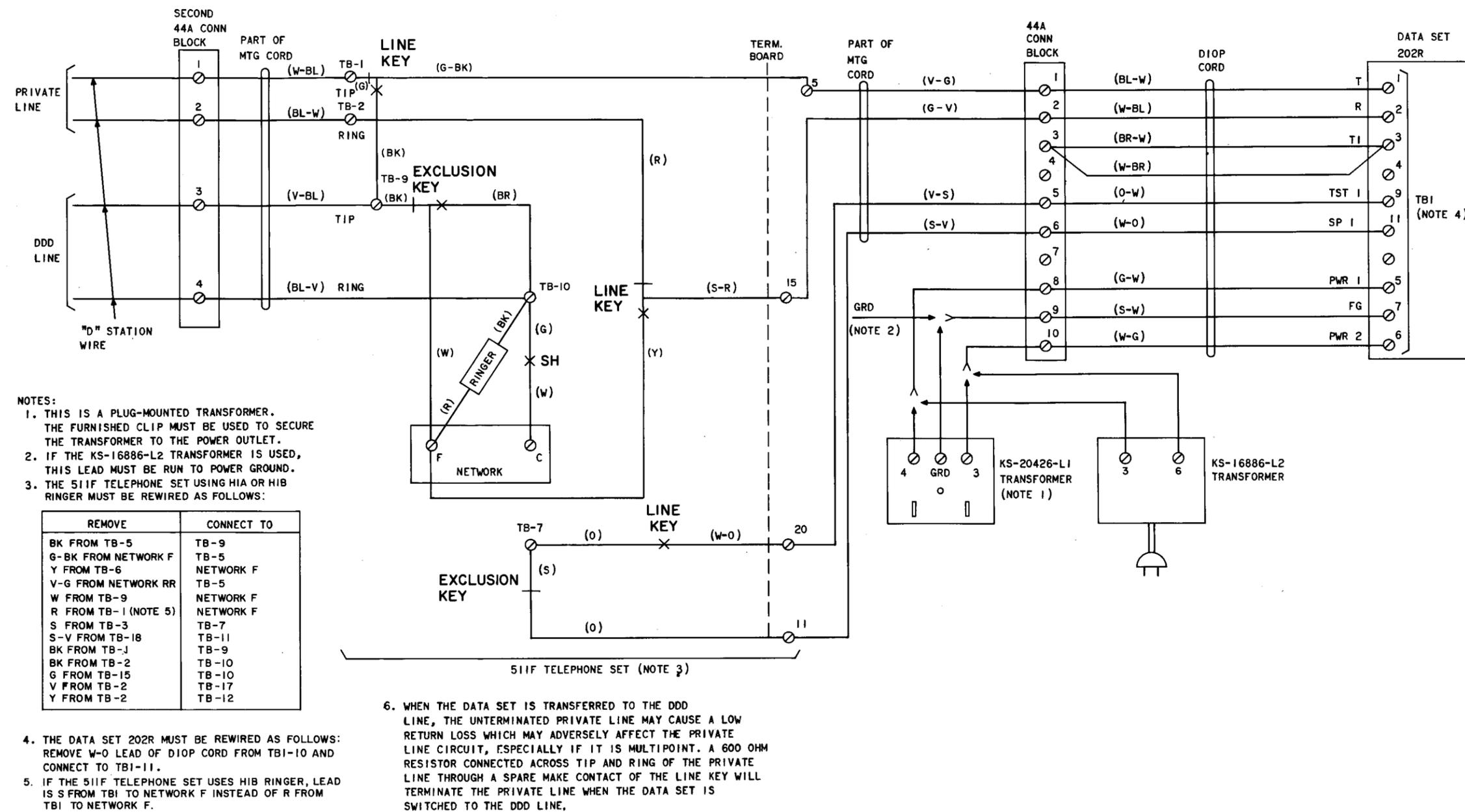
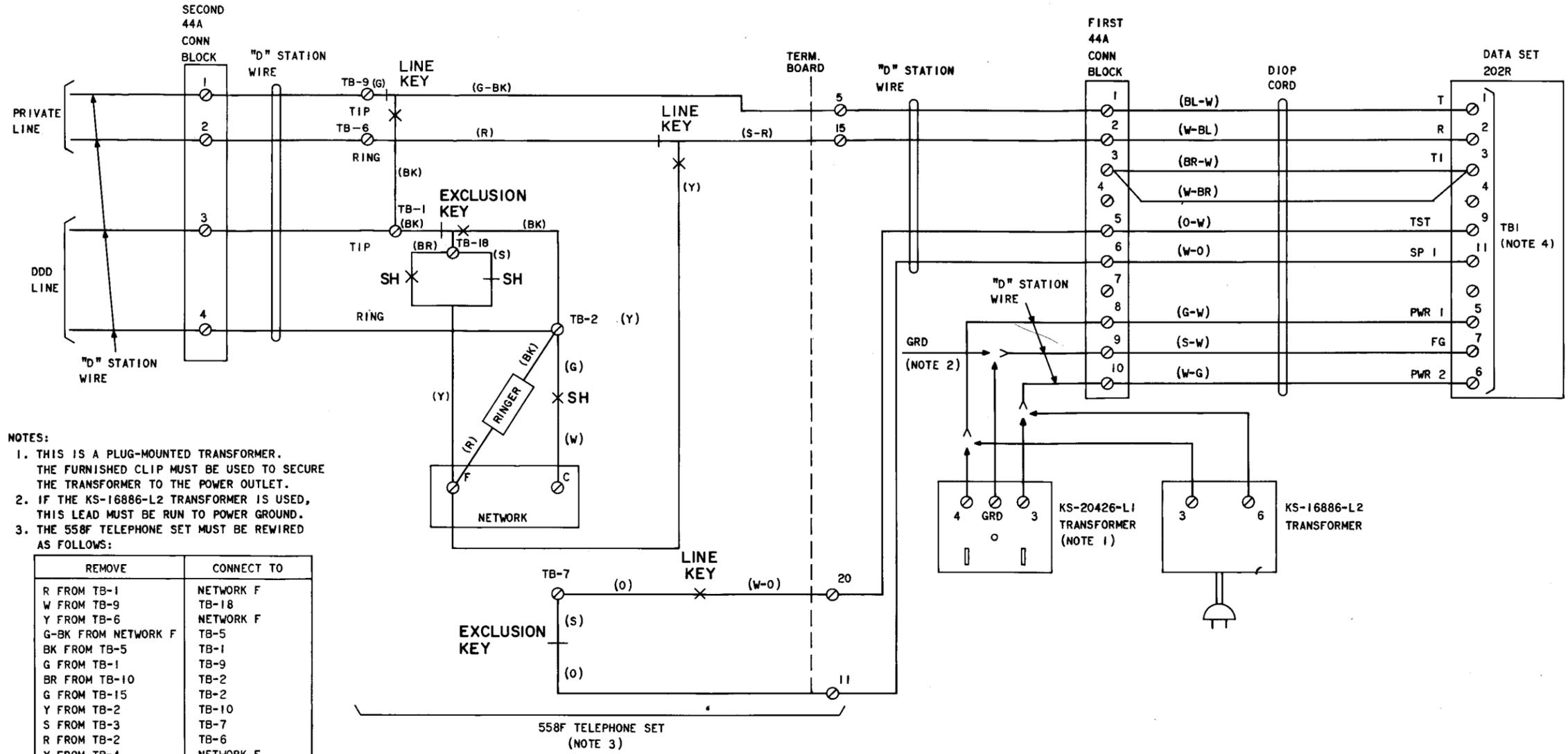


Fig. 6—Two-Wire Private Line With DDD Backup Using 511F Telephone Set



NOTES:

1. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
2. IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
3. THE 558F TELEPHONE SET MUST BE REWIRED AS FOLLOWS:

REMOVE	CONNECT TO
R FROM TB-1	NETWORK F
W FROM TB-9	TB-18
Y FROM TB-6	NETWORK F
G-BK FROM NETWORK F	TB-5
BK FROM TB-5	TB-1
G FROM TB-1	TB-9
BR FROM TB-10	TB-2
G FROM TB-15	TB-2
Y FROM TB-2	TB-10
S FROM TB-3	TB-7
R FROM TB-2	TB-6
Y FROM TB-4	NETWORK F
BR FROM TB-9	TB-18

4. THE DATA SET 202R MUST BE REWIRED AS FOLLOWS: REMOVE W-O OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.

5. WHEN THE DATA SET IS TRANSFERRED TO THE DDD LINE, THE UNTERMINATED PRIVATE LINE MAY CAUSE A LOW RETURN LOSS WHICH MAY ADVERSELY AFFECT THE PRIVATE LINE CIRCUIT, ESPECIALLY IF IT IS MULTIPPOINT. A 600 OHM RESISTOR CONNECTED ACROSS TIP AND RING OF THE PRIVATE LINE THROUGH A SPARE MAKE CONTACT OF THE LINE KEY WILL TERMINATE THE PRIVATE LINE WHEN THE DATA SET IS SWITCHED TO THE DDD LINE

Fig. 7—Two-Wire Private Line With DDD Backup Using 558F Telephone Set

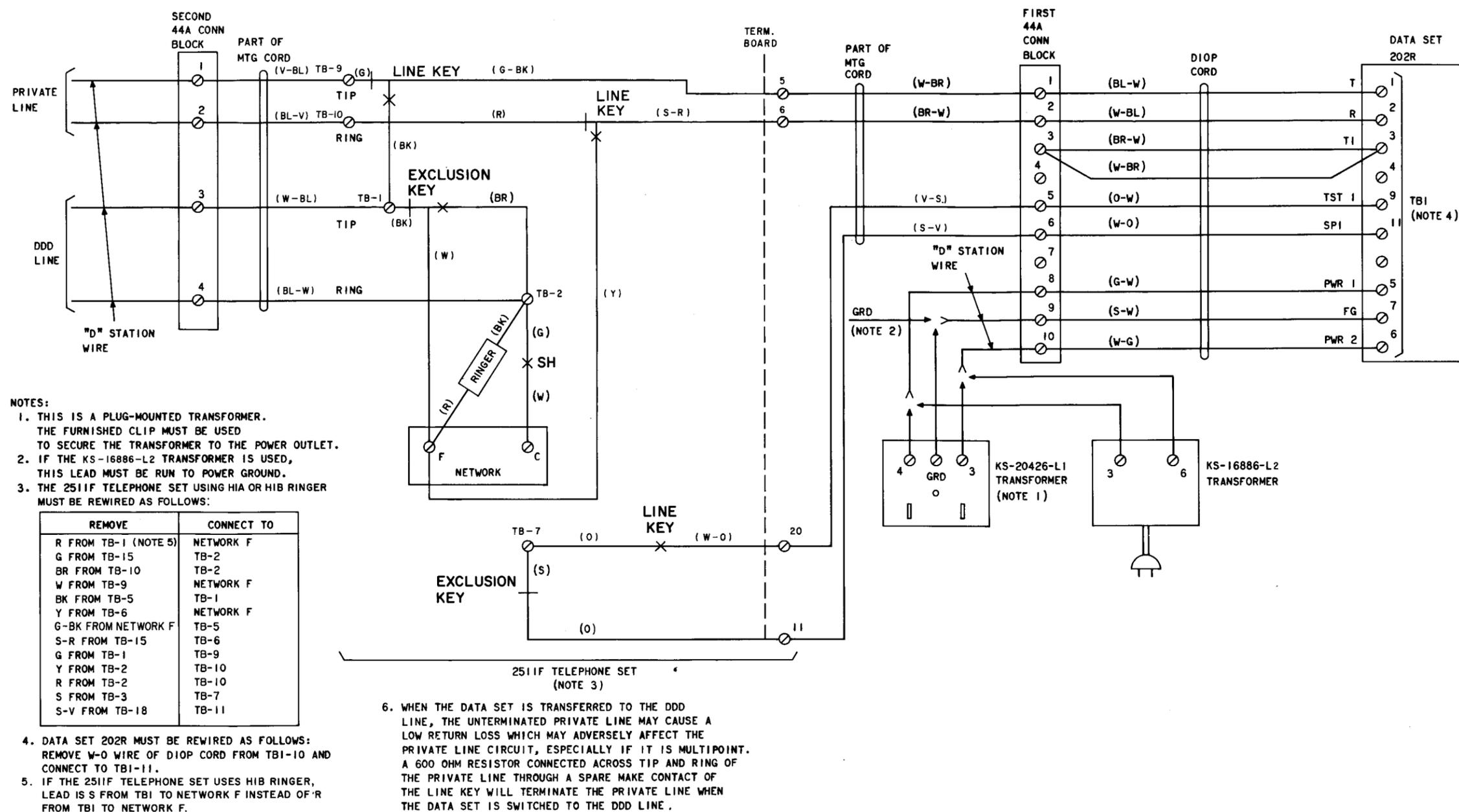
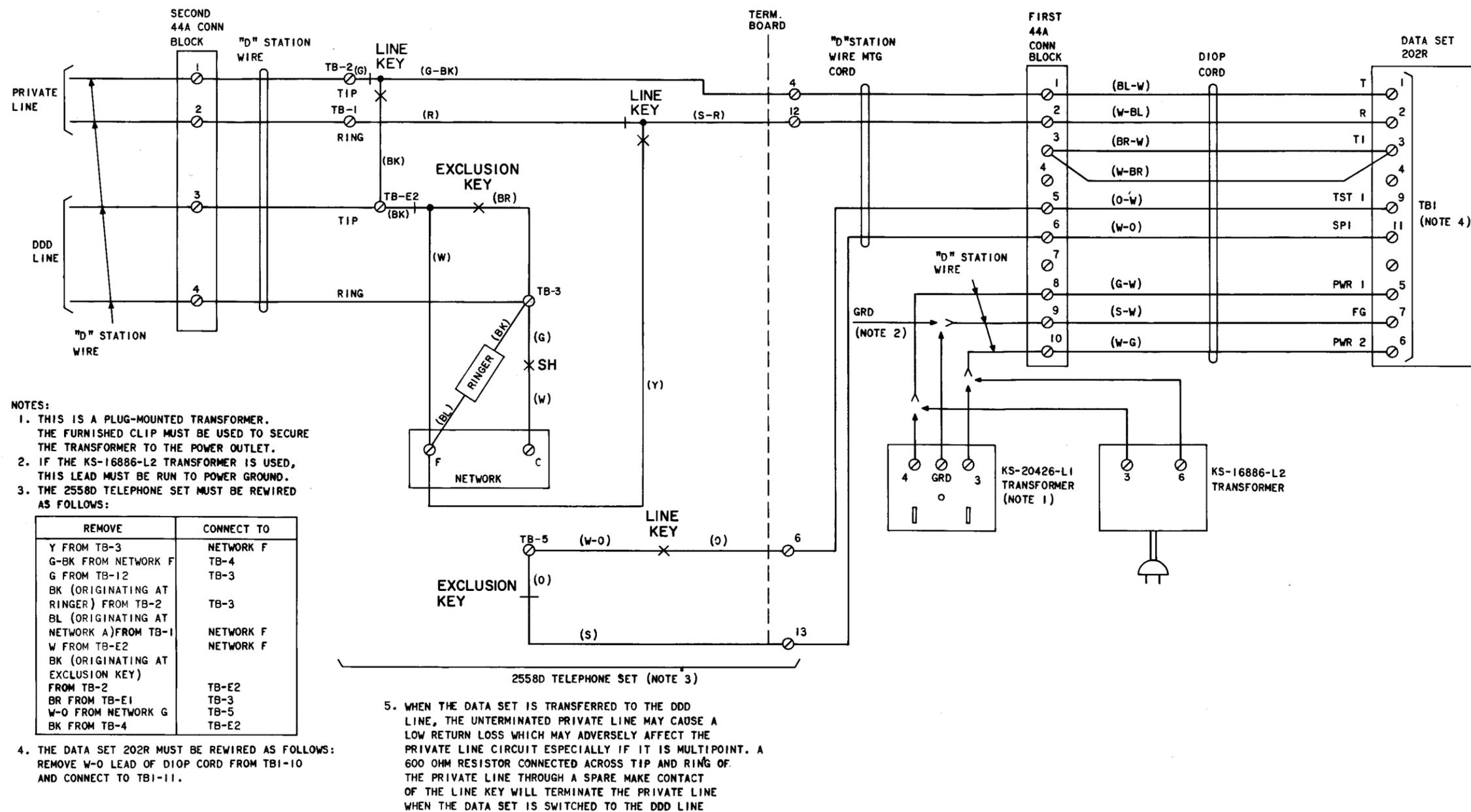


Fig. 8—Two-Wire Private Line With DDD Backup Using 2511F Telephone Set



- NOTES:
- THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
  - IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
  - THE 2558D TELEPHONE SET MUST BE REWIRED AS FOLLOWS:

REMOVE	CONNECT TO
Y FROM TB-3	NETWORK F
G-BK FROM NETWORK F	TB-4
G FROM TB-12	TB-3
BK (ORIGINATING AT RINGER) FROM TB-2	TB-3
BL (ORIGINATING AT NETWORK A) FROM TB-1	NETWORK F
W FROM TB-E2	NETWORK F
BK (ORIGINATING AT EXCLUSION KEY) FROM TB-2	TB-E2
BR FROM TB-E1	TB-3
W-O FROM NETWORK G	TB-5
BK FROM TB-4	TB-E2

- THE DATA SET 202R MUST BE REWIRED AS FOLLOWS: REMOVE W-O LEAD OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.

- WHEN THE DATA SET IS TRANSFERRED TO THE DDD LINE, THE UNTERMINATED PRIVATE LINE MAY CAUSE A LOW RETURN LOSS WHICH MAY ADVERSELY AFFECT THE PRIVATE LINE CIRCUIT ESPECIALLY IF IT IS MULTIPOINT. A 600 OHM RESISTOR CONNECTED ACROSS TIP AND RING OF THE PRIVATE LINE THROUGH A SPARE MAKE CONTACT OF THE LINE KEY WILL TERMINATE THE PRIVATE LINE WHEN THE DATA SET IS SWITCHED TO THE DDD LINE

Fig. 9—Two-Wire Private Line With DDD Backup Using 2558D Telephone Set



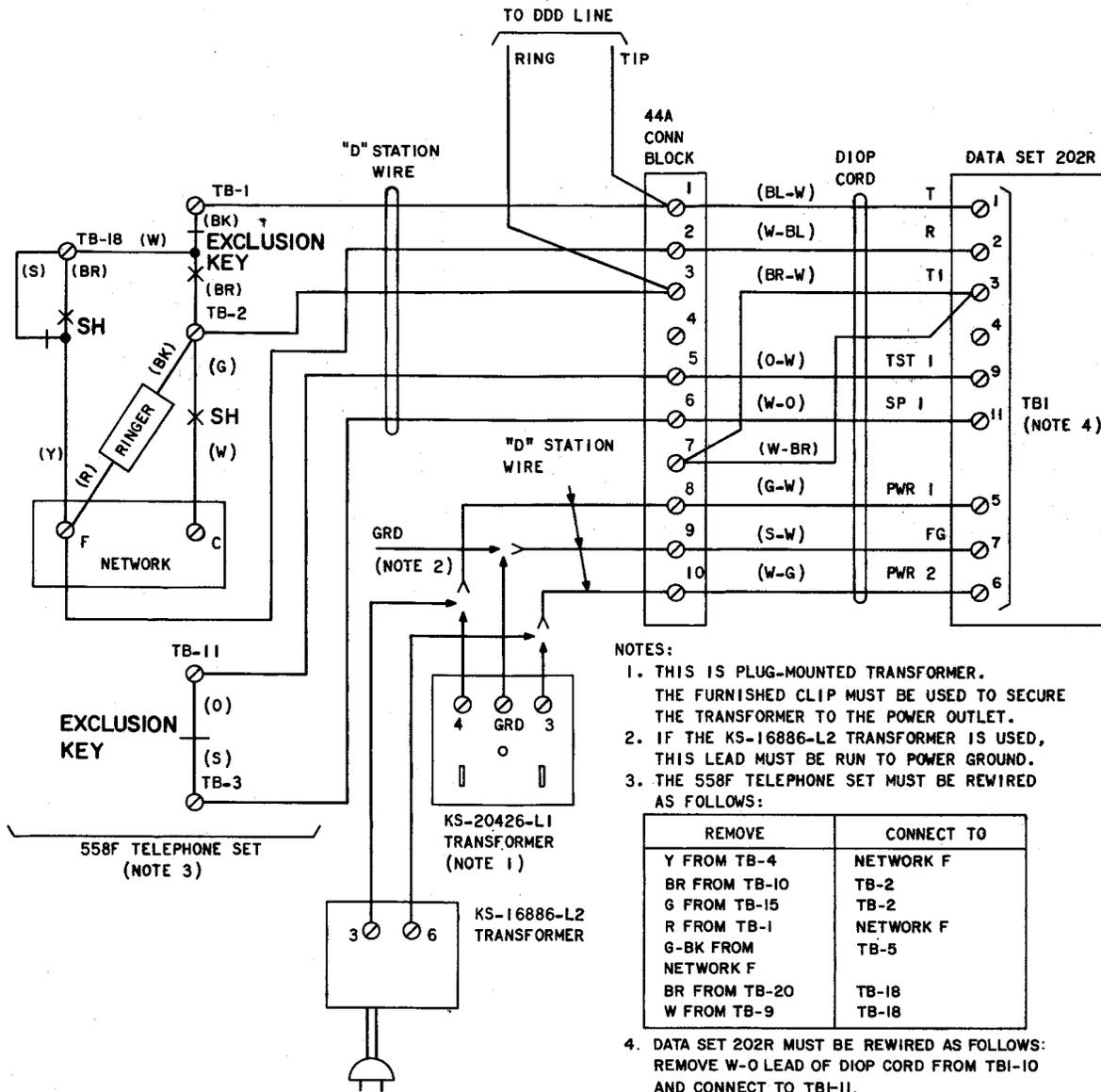


Fig. 11—Two-Wire DDD Using 558F Telephone Set

598-080-100. For a connection arrangement between data set 202R and the 828A, refer to Section 598-080-200.

**4. MULTIPLE ARRANGEMENTS**

**4.01** Data set 202R-L1, when used with 107A brackets, is suitable for mounting in multiple arrangements. Two 107A brackets must be attached to the sides of the 61B apparatus mounting of each data set 202R. This permits the sets to be mounted on 67A, 67B, or similar brackets used in 200-type

key telephone mounting arrangements. Refer to Fig. 18 for a typical mounting arrangement in a KS-20018 cabinet.

**4.02** Five data sets may be mounted in a 7-inch mounting plate space on a 23-inch mounting frame. Four data sets will fit on a 19-inch mounting frame. A 6017AP or 6017AR key may be mounted to the side of the 107A bracket. This will reduce by one the number of sets that will fit in the available mounting space.

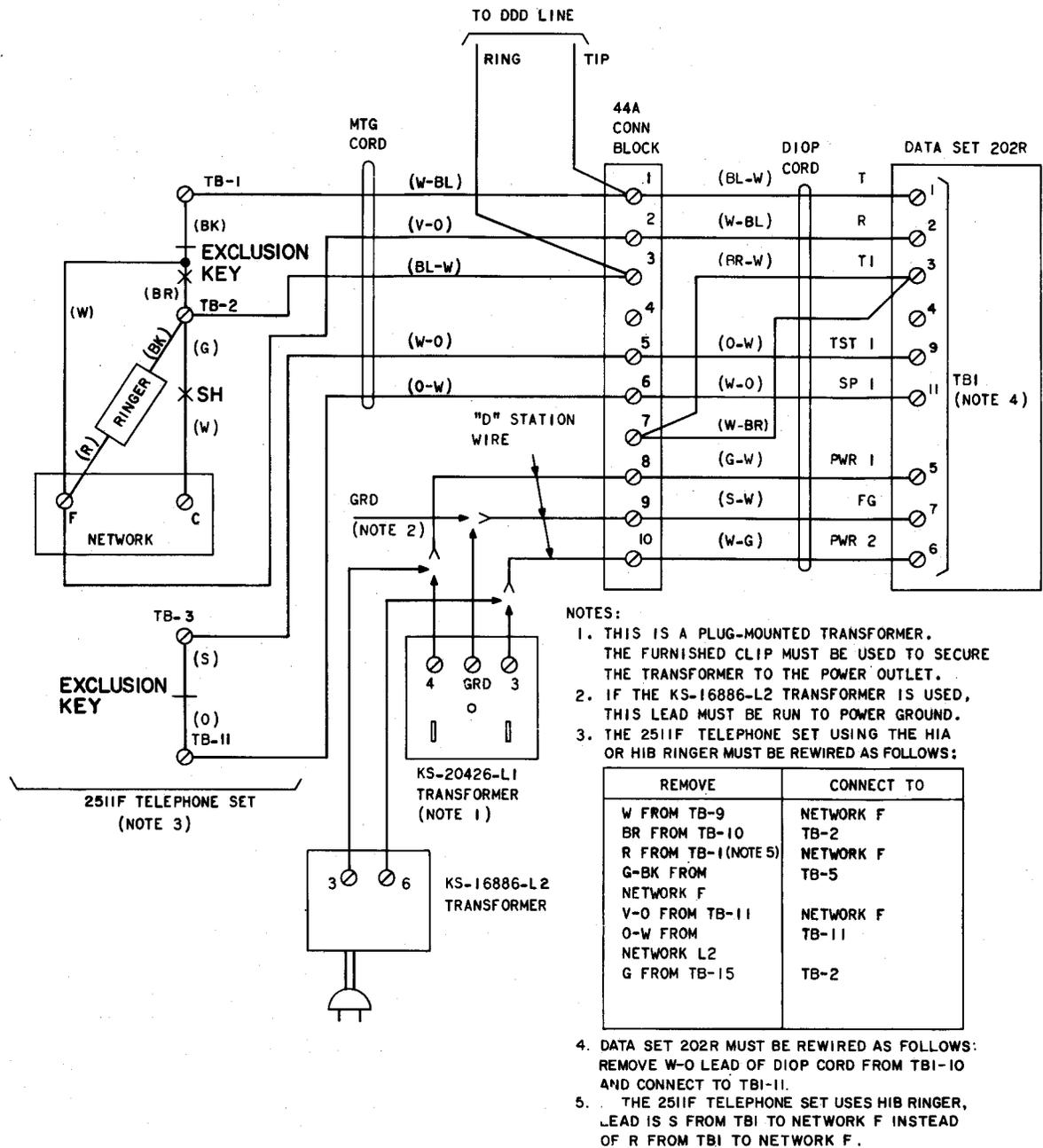


Fig. 12—Two-Wire DDD Using 2511F Telephone Set

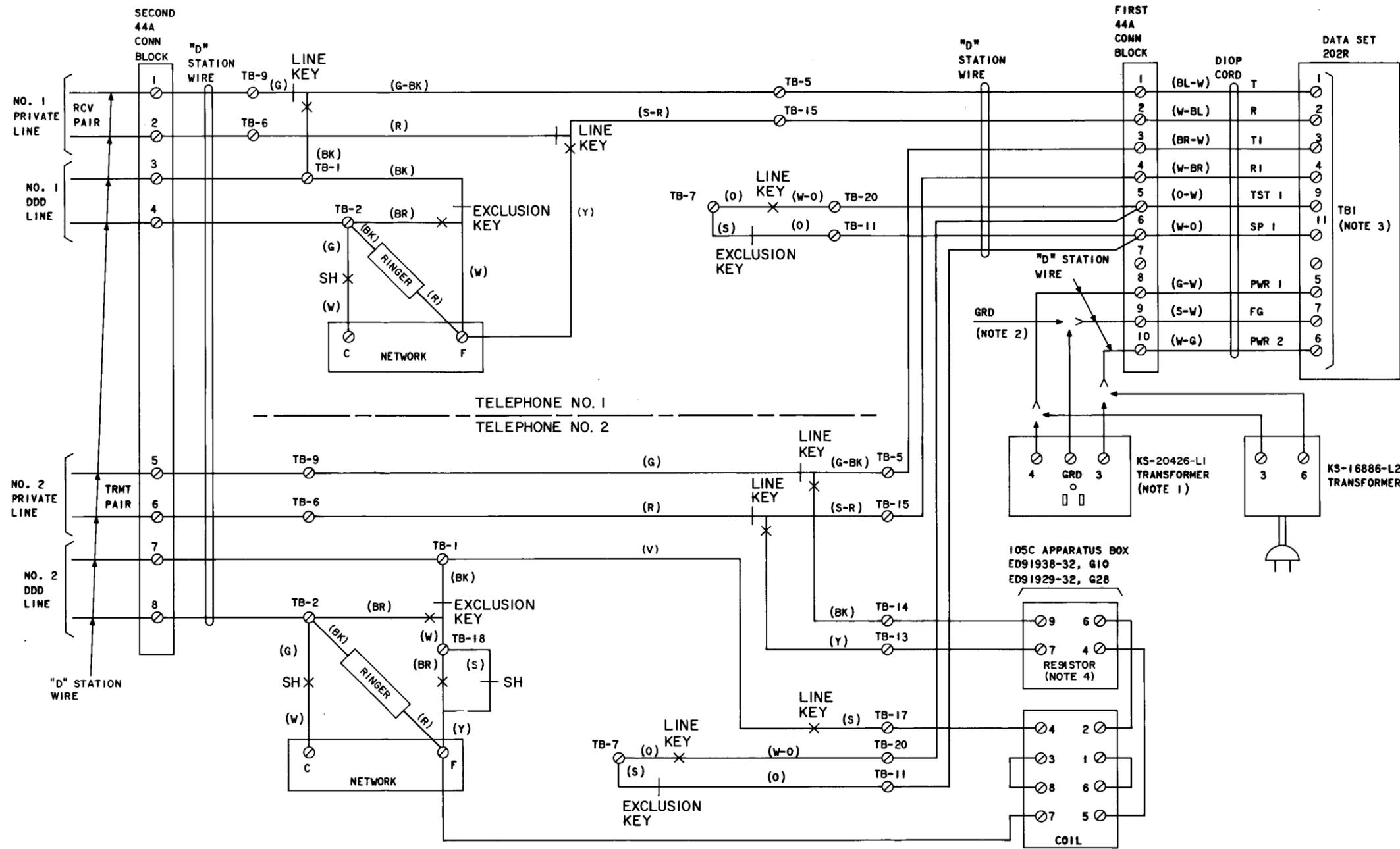
**4.03** To provide line connections to the data set, it may be desirable to install a 66E3 connector block on the 67-type brackets. A 78A apparatus mounting is available for this purpose. Each 66E3 connecting block may be used to distribute up to 25 telephone lines to the data sets.

**4.04** To provide power to the data sets, it will be necessary to use a 590B panel to distribute

the 110-Vac power. This panel consists of four duplex outlets into which the KS-20426 transformer can be plugged. Only one transformer will fit on each duplex outlet. The clip furnished with each transformer must be used to secure the transformer to the panel.

**4.05** If the KS-16886-L2 transformer is used, refer to Fig. 19. Only one 590B panel is needed





- NOTES:
1. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
  2. IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
  3. DATA SET 202R MUST BE REWIRED AS FOLLOWS: REMOVE W-0 WIRE OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.
  4. VALUE OF RESISTOR SELECTED TO MEET SERVING CENTRAL OFFICE LEVEL REQUIREMENT. REFER TO PARAGRAPH 3.05 FOR PROCEDURE DESCRIBING HOW DATA SET TRANSMIT LEVEL IS OBTAINED. SPECIFY 89-TYPE RESISTOR TO ACHIEVE DESIRED TRANSMIT LEVEL.
  5. THE TWO 558F TELEPHONE SETS MUST BE REWIRED AS FOLLOWS:

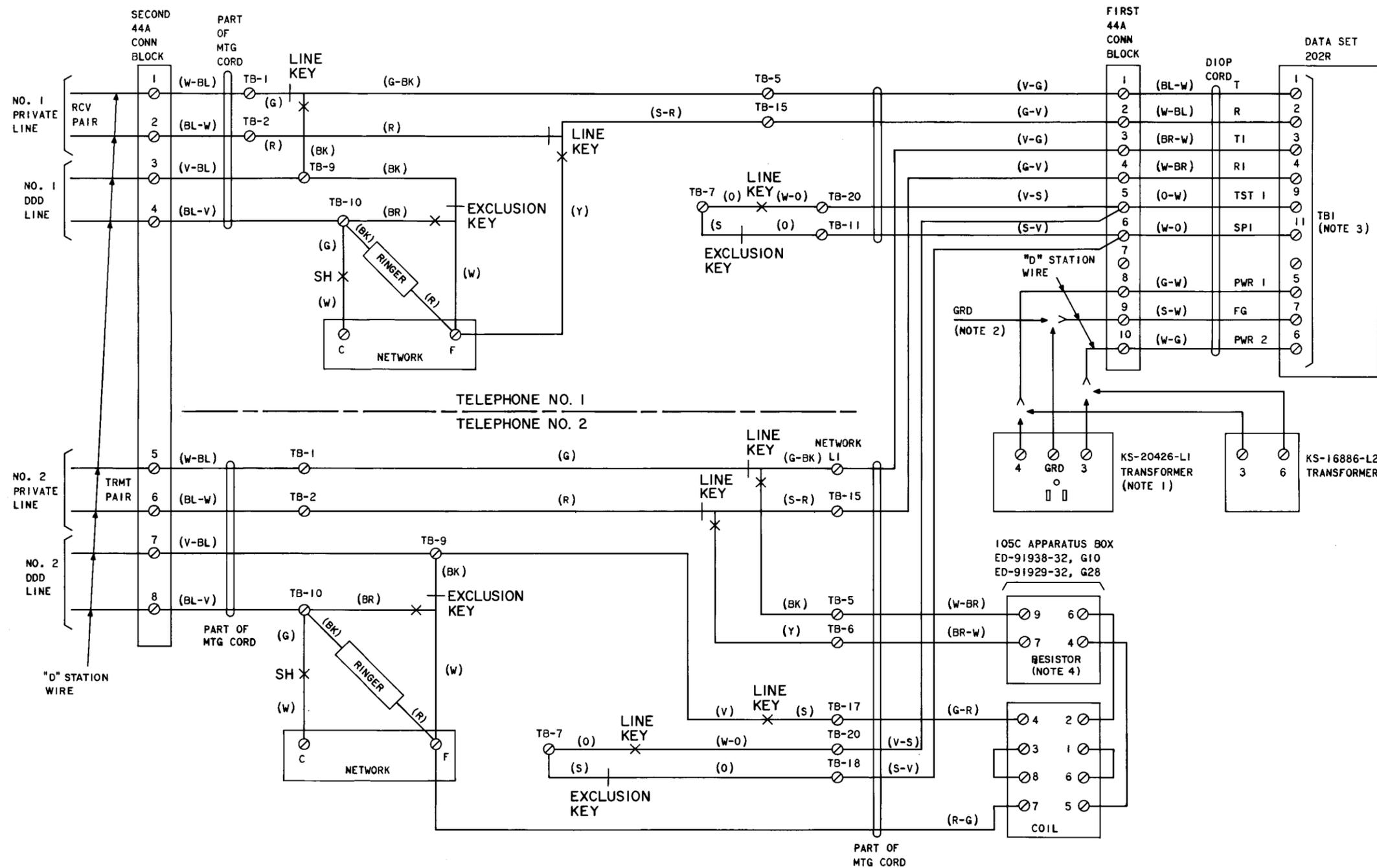
NO. 1 558F TELEPHONE SET

REMOVE	CONNECT TO
R FROM TB-1	NETWORK F
W FROM TB-9	TB-18
Y FROM TB-6	NETWORK F
G-BK FROM NETWORK F	TB-5
BK FROM TB-5	TB-1
G FROM TB-1	TB-9
BR FROM TB-10	TB-2
G FROM TB-15	TB-2
Y FROM TB-2	TB-10
S FROM TB-3	TB-7
R FROM TB-2	TB-6
Y FROM TB-4	NETWORK F
BR FROM TB-9	TB-18

NO. 2 558F TELEPHONE SET

REMOVE	CONNECT TO
R FROM TB-1	NETWORK F
V FROM TB-2	TB-1
W FROM TB-9	TB-18
G-BK FROM NETWORK F	TB-5
BK FROM TB-5	TB-14
Y FROM TB-6	TB-13
BL FROM TB-14	TB-13
G FROM TB-1	TB-9
BR FROM TB-10	TB-2
S FROM TB-3	TB-7
R FROM TB-2	TB-6
G FROM TB-15	TB-2
Y FROM TB-4	NETWORK F
B FROM TB-9	TB-18

Fig. 14—Four-Wire Private Line With Two DDD Backup Using 558F Telephone Set



- NOTES:
1. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
  2. IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
  3. DATA SET 202R MUST BE REWIRED AS FOLLOWS: REMOVE W-O WIRE OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.
  4. VALUE OF RESISTOR SELECTED TO MEET SERVING CENTRAL OFFICE LEVEL REQUIREMENT. REFER TO PARAGRAPH 3.05 FOR PROCEDURE DESCRIBING HOW DATA SET TRANSMIT LEVEL IS OBTAINED. SPECIFY 89-TYPE RESISTOR TO ACHIEVE DESIRED TRANSMIT LEVEL.
  5. THE TWO 511F TELEPHONE SETS MUST BE REWIRED AS FOLLOWS:

NO. 1 511F TELEPHONE SET (WITH HIA OR HIB RINGER)

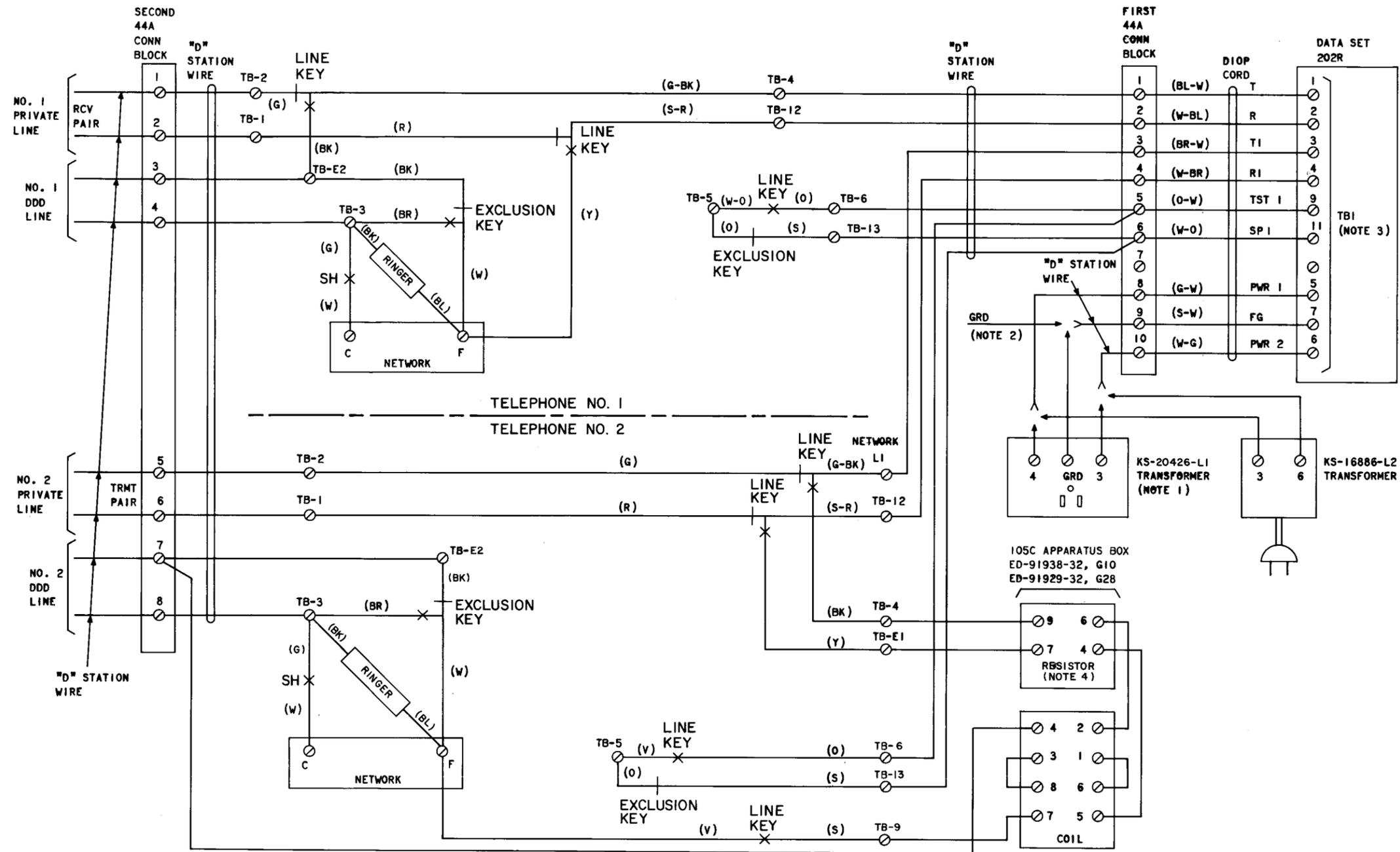
REMOVE	CONNECT TO
BK FROM TB-5	TB-9
G-BK FROM NETWORK F	TB-5
Y FROM TB-6	NETWORK F
V-G FROM NETWORK RR	TB-5
W FROM TB-9	NETWORK F
R FROM TB-1 (NOTE 6)	NETWORK F
S FROM TB-3	TB-7
S-V FROM TB-18	TB-11
BK FROM TB-1	TB-9
BK FROM TB-2	TB-10
G FROM TB-15	TB-10
V FROM TB-2	TB-17
Y FROM TB-2	TB-12

NO. 2 511F TELEPHONE SET (WITH HIA OR HIB RINGER)

REMOVE	CONNECT TO
G-BK FROM NETWORK F	NETWORK LI
V-G FROM NETWORK RR	NETWORK LI
W FROM TB-9	NETWORK F
R FROM TB-1 (NOTE 6)	NETWORK F
BK FROM TB-1	TB-9
Y FROM TB-2	TB-10
BK FROM TB-2	TB-10
G FROM TB-15	TB-10
S FROM TB-3	TB-7
O FROM TB-11	TB-18
V FROM TB-2	TB-9
R-G FROM TB-19	NETWORK F

6. IF HIB RINGER IS IN 511F TELEPHONE SET, THIS LEAD WILL BE S FROM TBI INSTEAD OF R FROM TBI.

Fig. 15—Four-Wire Private Line With Two DDD Backup Using 511F Telephone Set



- NOTES:
1. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
  2. IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
  3. DATA SET 202R MUST BE REWIRED AS FOLLOWS: REMOVE W-0 WIRE OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.
  4. VALUE OF RESISTOR SELECTED TO MEET SERVING CENTRAL OFFICE LEVEL REQUIREMENT. REFER TO PARAGRAPH 3.05 FOR PROCEDURE DESCRIBING HOW DATA SET TRANSMIT LEVEL IS OBTAINED. SPECIFY 89-TYPE RESISTOR TO ACHIEVE DESIRED TRANSMIT LEVEL.
  5. THE TWO 2558D TELEPHONE SETS MUST BE REWIRED AS FOLLOWS:

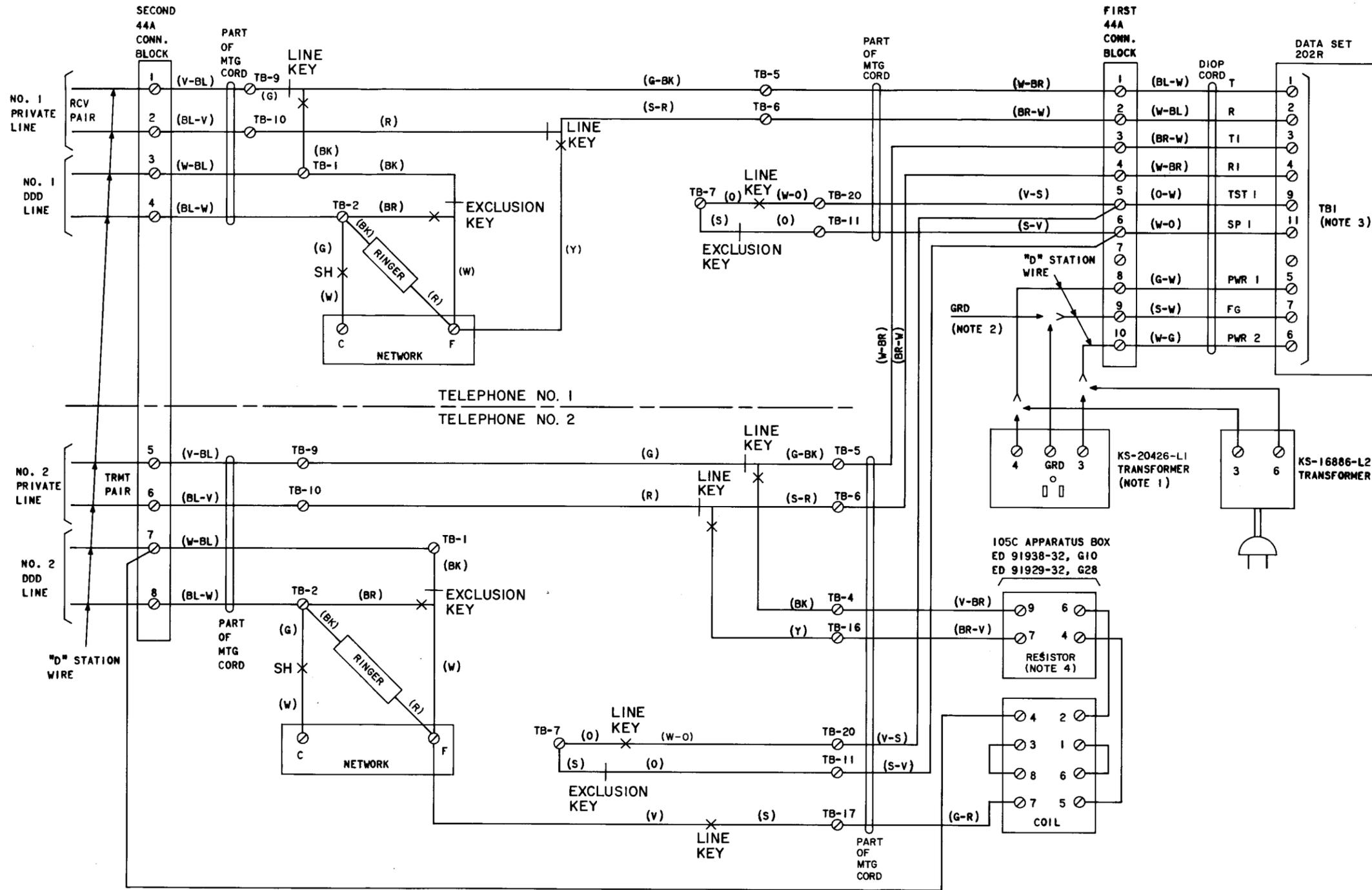
NO. 1 2558D TELEPHONE SET

REMOVE	CONNECT TO
Y FROM TB-3	NETWORK F
G-BK FROM NETWORK F	TB-4
G FROM TB-12	TB-3
BK (ORIGINATING AT RINGER) FROM TB-2	TB-3
BL (ORIGINATING AT NETWORK A) FROM TB-1	NETWORK F
W FROM TB-E2	NETWORK F
BK (ORIGINATING FROM EXCLUSION KEY) FROM TB-2	TB-E2
BR FROM TB-E1	TB-3
W-0 FROM NETWORK G	TB-5
BK FROM TB-4	TB-E2

NO. 2 2558D TELEPHONE SET

REMOVE	CONNECT TO
W-0 FROM NETWORK G	TB-5
W FROM TB-E2	NETWORK F
BK (ORIGINATING AT EXCLUSION KEY) FROM TB-2	TB-E2
BR FROM TB-E1	TB-3
BK (ORIGINATING AT RINGER) FROM TB-2	TB-3
G FROM TB-12	TB-3
G-BK FROM NETWORK F	NETWORK LI
Y FROM TB-E1	TB-1
Y FROM TB-3	TB-E1
V INSULATED LEAD FROM LINE KEY	NETWORK F
S INSULATED LEAD FROM LINE KEY	TB-9
BL (ORIGINATING AT NETWORK A) FROM TB-1	NETWORK F

Fig. 16—Four-Wire Private Line With Two DDD Backup Using 2558D Telephone Set



- NOTES:
1. THIS IS A PLUG-MOUNTED TRANSFORMER. THE FURNISHED CLIP MUST BE USED TO SECURE THE TRANSFORMER TO THE POWER OUTLET.
  2. IF THE KS-16886-L2 TRANSFORMER IS USED, THIS LEAD MUST BE RUN TO POWER GROUND.
  3. DATA SET 202R MUST BE REWIRED AS FOLLOWS:  
REMOVE W-O WIRE OF DIOP CORD FROM TBI-10 AND CONNECT TO TBI-11.
  4. VALUE OF RESISTOR SELECTED TO MEET SERVING CENTRAL OFFICE LEVEL REQUIREMENT. REFER TO PARAGRAPH 3.05 FOR PROCEDURE DESCRIBING HOW DATA SET TRANSMIT LEVEL IS OBTAINED. SPECIFY 89-TYPE RESISTOR TO ACHIEVE DESIRED TRANSMIT LEVEL.
  5. THE TWO 2511F TELEPHONE SETS MUST BE REWIRED AS FOLLOWS:

NO. 1 2511F TELEPHONE SET (WITH HIA OR HIB RINGER)

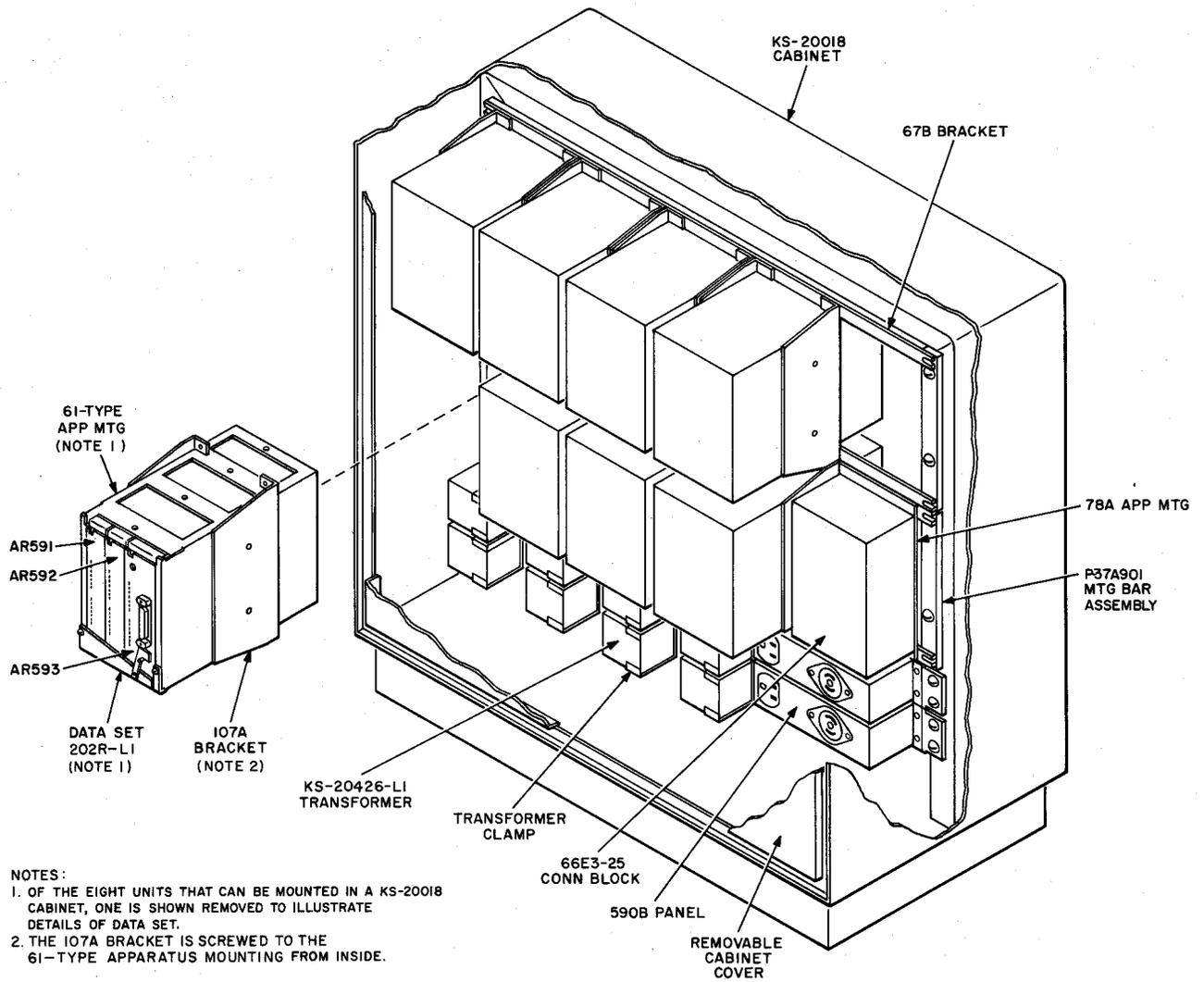
REMOVE	CONNECT TO
R FROM TB-1 (NOTE 6)	NETWORK F
G FROM TB-15	TB-2
BR FROM TB-10	TB-2
W FROM TB-9	NETWORK F
BK FROM TB-5	TB-1
Y FROM TB-6	NETWORK F
G-BK FROM NETWORK F	TB-5
S-R FROM TB-15	TB-6
G FROM TB-1	TB-9
Y FROM TB-2	TB-10
R FROM TB-2	TB-10
S FROM TB-3	TB-7
S-V FROM TB-18	TB-11

NO. 2 2511F TELEPHONE SET (WITH HIA OR HIB RINGER)

REMOVE	CONNECT TO
G FROM TB-1	TB-9
R FROM TB-2	TB-10
G-BK FROM NETWORK F	TB-5
S-R FROM TB-15	TB-6
BL-V FROM TB-8	TB-16
BK FROM TB-5	TB-4
G FROM TB-15	TB-2
R FROM TB-1 (NOTE 6)	NETWORK F
W FROM TB-9	NETWORK F
S FROM TB-3	TB-7
S-V FROM TB-18	TB-11
V FROM TB-2	NETWORK F
Y FROM TB-6	TB-16
Y FROM TB-2	TB-10
BR FROM TB-10	TB-2

6. IF HIB RINGER IS IN 2511F TELEPHONE SET, THIS LEAD WILL BE S FROM TBI INSTEAD OF R FROM TBI.

Fig. 17—Four-Wire Private Line With Two DDD Backup Using 2511F Telephone Set



**Fig. 18—Multiple Arrangement of Eight Data Sets 202R in a KS-20018 Cabinet**

**SECTION 592-025-200**

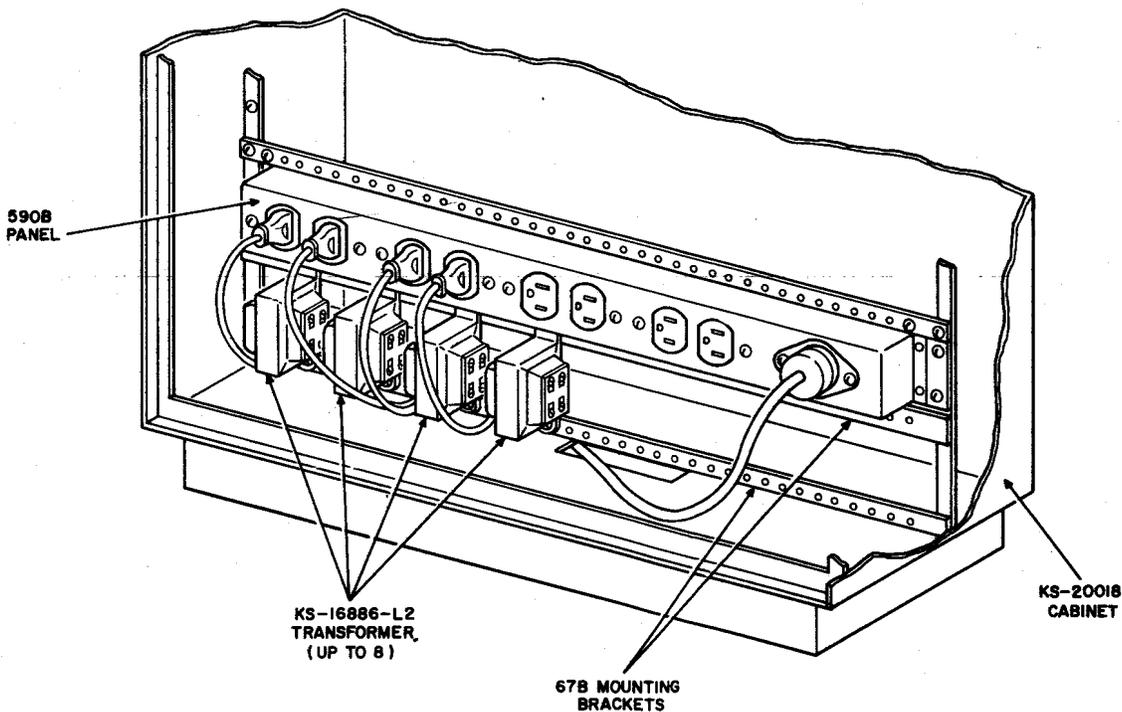
to distribute power, and the remaining space can be used to mount the transformers. The KS-16886-L2 transformers can be mounted on 67-type brackets below the power distribution panel.

**4.06** The arrangement shown in Fig. 18 uses a KS-20018 cabinet. Other cabinets which can be used are the KS-20093 and KS-20757 types.

**5. REFERENCES**

**5.01** The following BPSs contain information pertaining to data set 202R and associated equipment:

SECTION	TITLE
592-025-150	Data Set 202R Transmitter-Receiver—Theory of Operation and Supplementary Information
592-025-180	Data Set 202R Transmitter-Receiver—Summarizing Specification—Data Systems Station
592-025-300	Data Set 202R Transmitter-Receiver—Maintenance
592-025-500	Data Set 202R Transmitter-Receiver—Test Procedures
598-080-100	Data Auxiliary Set 828A—Data Service Unit—Description and Operation
598-080-200	Data Auxiliary Set 828A—Data Service Unit—Installation and Connection
668-102-517	Data Test Center 904A- and 904C-Types, Test Procedure—Data Set 202R—Loop-Back Test.
502-501-102	502-, 510-, 511-, 515-, 555-, and 558-Type Telephone Sets
502-503-102	2502-, 2510-, 2511-, 2515-, 2555-, and 2558-Type Telephone Sets
590-002-108	Data Set 202R—Reference Guide
592-025-100	Data Set 202R Transmitter-Receiver—Description and Operation



**Fig. 19—KS-16886-L2 Transformer Mounted on 67-Type Brackets**