

DATA SET 402C-TYPE TRANSMITTER INSTALLATION AND CONNECTIONS

1. GENERAL

1.01 This section provides installation information and some of the common connection arrangements necessary for the successful operation of Data Set 402C-type.

1.02 This section is reissued for the following reasons:

- To provide information on the use of Data Sets 402C-type with key telephone systems
- To show changes to the answer-back tone and data transmitter level options to allow compliance with the tariff requirements of F.C. 263.
- To provide information on Data Sets 402C5, 402C6, 402C7, and 402C8.

Due to extensive revision, arrows ordinarily used to denote changes have been omitted.

1.03 Data Sets 402C1, 402C2, 402C3, and 402C4 are to be rated manufacture discontinued (MD), but information is retained in this section to cover those units already in the field.

1.04 Data Sets 402C5, 402C6, 402C7 and 402C8 are identical to Data Sets 402C1, 402C2, 402C3 and 402C4, respectively, with the exception that the later models contain a 3A2 data unit instead of a 3A1 data unit. This provides the capability for working with Electronic Switching System No. 1 offices and with Unigauge lines.

1.05 Information concerning the associated business machine is not covered in this section.

1.06 For a detailed description of the operation of Data Set 402C-type, refer to CD- and SD-1D039-01.

2. INSTALLATION

2.01 Data Set 402C-type shall be installed in conformance with existing practices covering installation of station sets.

2.02 The data set must be located within range of the interface connector cord, which is supplied by the customer. This cord should contribute 300 ± 100 picofarads to interface.

2.03 To avoid interference during data transmission, the following restrictions apply to data line where practicable.

- Use only on individual lines.
- Do not connect extension telephones.

2.04 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 the customer business machine, or lines connected to dc teletypewriter services. If this requirement cannot be met, it will be necessary to run telephone (data) line in SK (shielded) station wire between the data set and the cable distribution terminal, or building entrance.

2.05 The customer must furnish a 3-wire ac outlet that is not under control of a switch. The outlet must accept a plug having two parallel blades and a U-shaped grounding pin. To avoid the possibility of data errors due to a potential difference between data set ground and business machine ground, the outlet for the data set power cord should be served from the same ac distribution panel as the outlet for the business machine. If they are not served from the same panel, a test using the 6A impulse counter should be made to detect excessive noise (one bit in a 15-minute period). This test procedure is described in the section entitled Data Set 402C Transmitter—Test Procedures

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(594-019-500). If the test requirement is not met, data set ground and business machine ground must be bonded together.



The method of providing this bond should be in accordance with local instructions.

2.06 Verify with local test center that loop facilities have been tested and meet requirements specified in the section entitled Data System—DATA-PHONE® Service Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange and Remote Exchange Lines (314-205-501).

2.07 Wiring options should be specified on the service order and data set shall be wired accordingly.

2.08 All in-service data sets must meet signal level requirements which allow the data signal to be no greater than -12 dBm at the serving central office, as described in Part 3 of this section.

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3. CONNECTIONS

3.01 See the section entitled Data Set 402C-Type Transmitter—Maintenance (594-019-300) for cover removal and replacement.

3.02 The unused keys in Data Set 402C-type should be blocked.

3.03 Service options shown in Table A and Table B should be specified on the service order. The data set shall be wired accordingly. See Fig. 1 for location of terminal blocks.

3.04 The answer-tone and data transmit level in Data Sets 402C1 series 5 and below, 402C2 series 7 and below, 402C3 and 402C4 series 2 and below, and 402C5, 402C6, 402C7, and 402C8 series 1 may require padding to meet the signal level requirements. Table C shows the padding required for different values of local loop loss.

3.05 The pad will attenuate the output of data sets which cannot be adjusted by option selection to meet the -12 dBm requirement. The pad can be constructed locally or ordered from Western Electric Company.

3.06 Refer to Fig. 2 for pad construction and connections, and ordering information.

3.07 Data Sets 402C1 series 6 and above, 402C2 series 8 and above, 402C3 and 402C4 series 3 and above, and 402C5, 402C6, 402C7, and 402C8 series 2 and above have modified answer-tone and transmitter output power options (refer to Table B).

3.08 On older model sets, both answer-tone and data transmitter signal levels are strapped on TB2 as shown in Table A. On later model sets, the answer-tone signal level will be adjusted by straps on TB2 as shown in Table B.

3.09 The data transmitter levels will be adjusted by a strap on CP AS84, in accordance with Table B.

3.10 Connection information for the various standard service arrangements is shown in Fig. 3, 4, 5, 6, 7, and 8.

3.11 Table D shows connections between 1B1 data unit (reverse-channel receiver) and the data set. Data Sets 402C2, 402C4, 402C6, and 402C8 come wired and equipped with reverse-channel receiver.

3.12 When Data Sets 402C1, 402C3, 402C5, and 402C7 are converted to Data Sets 402C2, 402C4, 402C6, and 402C8 by adding the 1B1 data unit, the stenciling on the data set must be changed accordingly.

3.13 Data Set 402C2 is converted to Data Set 402C1 by removing 1B1 data unit. If it is desired to store the 1B1 data unit within the confines of Data Set 402C, all leads from the 1B1 data unit must be disconnected and stored. The nameplate stenciling on the data set must be changed accordingly.

3.15 If operation with key telephone units is required, Data Sets 402C-type must be modified for "A" lead control. Typical connecting arrangements providing "A" lead control are shown in Fig. 4 and 8. This type of operation also requires internal modification to some earlier model data sets as explained in 3.16 through 3.19.

3.16 Data Sets 402C1 series 4 and below, 402C2 series 6 and below, and 402C3 and 402C4

TABLE A
DATA SET 402C OPTIONS

FEATURE OR OPTION		WIRING OPTION	STRAP TERMINALS ON TB2	STRAP TERMINALS ON TB3	PROVIDE
Without reverse channel*		R ✓		1-2, 7-8	1 per station
With reverse channel*		S		2-3, 6-7, 9-10	
Xmtr output and answer-tone level options	-3 dBm	Z†	9-10, 22-23		1 per station (see Note)
	-6 dBm	Y†	10-11, 23-24		
	-9 dBm	X† ✓	12-13, 25-26		
900-ohm line impedance		W‡ ✓	15-16		1 per station
600-ohm line impedance		V	14-15		
Automatic calling unit		T	27-28		1 per station
Without automatic calling unit		-‡ ✓	Remove T option		
Unattended answering		N	4-5		1 per station
Without unattended answering		ZC‡ ✓	3-4		
-18V on interface		M§	17-18		1 per station
Without -18V on interface		-‡ ✓	Remove M option		

* Data Sets 402C1, 402C3, 402C5, and 402C7 are *not* equipped with 1B1 data unit (reverse channel unit) and are factory wired for R option. Data Sets 402C2, 402C4, 402C6 and 402C8 are equipped with 1B1 data unit and are factory wired for S option.

† Option on earlier model data sets, see Table B for later model options.

‡ Factory-wired option.

§ To be connected for test purposes only.

Note: Use option which provides a level nearest -12 dBm at central office.

TABLE B

**ANSWER-TONE LEVEL AND DATA TRANSMITTER LEVEL OPTIONS
ON DATA SETS 402C1 SERIES 6 AND ABOVE, 402C2 SERIES 8 AND ABOVE,
402C3 AND 402C4 SERIES 3 AND ABOVE, AND 402C5, 402C6, 402C7,
AND 402C8 SERIES 2 AND ABOVE**

STATION TO CENTRAL OFFICE LOSS AT 1 KHZ (DB)	ANSWER TONE			DATA TRANSMITTER		
	WIRING OPTION	LEVEL (DBM)	STRAP TERMINALS ON TB2	WIRING OPTION	LEVEL (DBM)	STRAP TERMINALS ON CP AS84
0-1	X*	-12		ZW	-12	12 and 12
1-2	X*	-12	12-13	ZV	-11	12 and 11
2-3	X*	-12	25-26	ZU	-10	12 and 10
3-4	X*	-12		ZT	-9	12 and 9
4-5	Y	-8		ZS	-8	12 and 8
5-6	Y	-8	10-11	ZR	-7	12 and 7
6-7	Y	-8	23-24	ZQ	-6	12 and 6
7-8	Y	-8		ZP	-5	12 and 5
8-9	Z	-4		ZO	-4	12 and 4
9-10	Z	-4	9-10	ZN	-3	12 and 3
10-11	Z	-4	22-23	ZM	-2	12 and 2
11-12	Z	-4		ZL	-1	12 and 1

* Factory-wired option.

series 1 must be modified to provide "A" lead control. Later models have internal modifications incorporated.

3.17 Modifications for "A" lead control on Data Set 402C-type containing an apparatus unit (11A, 11C on 402C1, 402C2; 11G on 402C3, 402C4) with a terminal board (TB7) are accomplished by the following steps:

- Remove white and brown wires from terminal board (TB7) and interchange them. The wires should be connected as follows:

- (1) Connect white wire on terminal 5 of TB7.
- (2) Connect brown wire on terminal 3 of TB7.

3.18 The remaining Data Sets 402C-type that must be modified have an apparatus unit without a terminal board.

3.19 These sets are modified by interchanging the switchhook wires on terminals 48 and

49 of TB1. The color coding of the wires on terminals 48 and 49 may not agree with the color code of the wires attached to the switchhook, since the switchhook wires are spliced to the terminal wires to lengthen them. A continuity test should be made to verify that the wiring is correct. The correct connections are as follows:

11A Apparatus Unit

COLOR	CONNECTED TO
S-S	TB1-48
S-BR	TB1-49

11C Apparatus Unit

COLOR	CONNECTED TO
W	TB1-48
BR	TB1-49

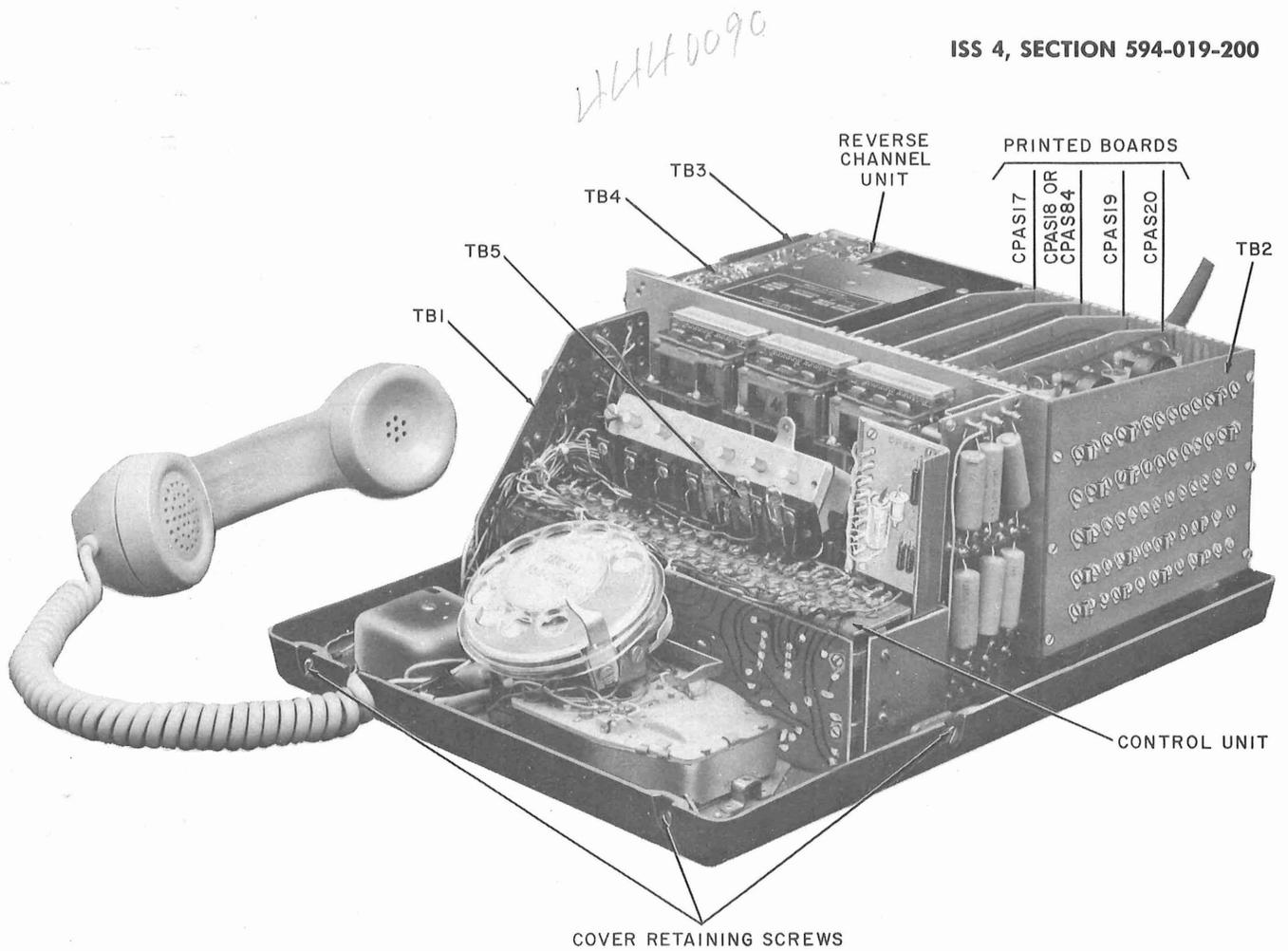
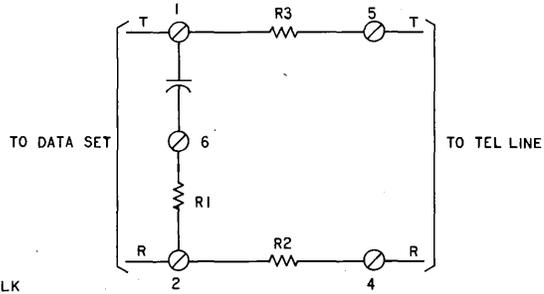
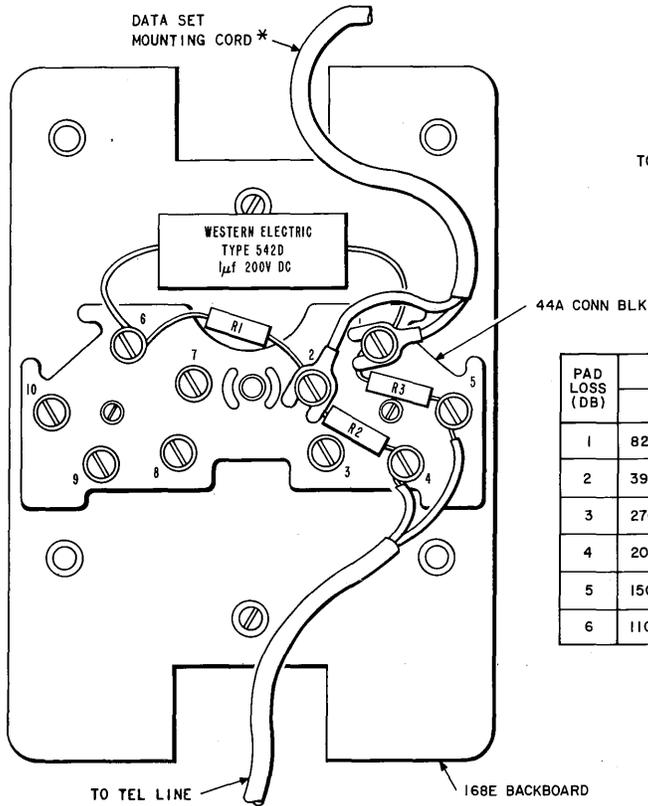


Fig. 1—Data Set 402C-Type—Inside View

TABLE C

OUTPUT LEVEL AND PAD LOSS REQUIRED FOR LOOP LOSS ON EARLIER MODEL DATA SETS

LOOP LOSS AT 1 KHZ (DB)	DATA SET OUTPUT LEVEL	PAD LOSS REQUIRED
0-1	-9 Option X	3
1-2	-9 Option X	2
2-3	-9 Option X	1
3-4	-9 Option X	None
4-5	-6 Option Y	2
5-6	-6 Option Y	1
6-7	-6 Option Y	None
7-8	-3 Option Z	2
8-9	-3 Option Z	1
9-12	-3 Option Z	None



PAD LOSS (DB)	RESISTOR VALUE (OHMS)				ORDERING INFORMATION
	R1		R2 AND R3		
1	8200	GRAY RED RED	47	YELLOW VIOLET BLACK	F-58101
2	3900	ORANGE WHITE RED	110	BROWN BROWN BROWN	F-58102
3	2700	RED VIOLET RED	160	BROWN BLUE BROWN	F-58103
4	2000	RED BLACK RED	220	RED RED BROWN	F-58104
5	1500	BROWN GREEN RED	240	RED YELLOW BROWN	F-58105
6	1100	BROWN BROWN RED	270	RED VIOLET BROWN	F-58106

NOTES:

1. RESISTORS ARE ALLEN BRADLEY, 1 WATT, 5% TOLERANCE (KS-19151 L1). CAPACITOR IS WESTERN ELECTRIC CO. 542D TYPE, 1UF, 200VDC.
2. A 101C TYPE COVER SHOULD BE USED TO PROTECT THE PAD.
3. THE PAD VALUE SHOULD BE STENCILED ON COVER FOR FUTURE REFERENCE.

* STORE UNUSED CONDUCTORS ON VACANT TERMINALS

Fig. 2—Pad Construction and Connections

TABLE D

LEAD COLOR FROM 1B1 DATA UNIT	TB ON DATA SET 402C	
	TB3	TB4
BR	3	
S	1	
W	8	
BL	6	
R		6
O		10
BK		8
G		5
W-BR	4	
W-BL	5	
Y		7

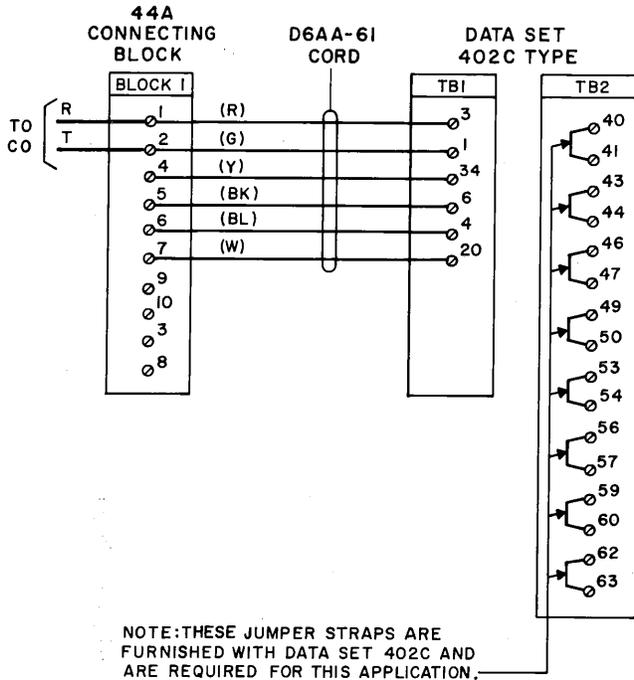


Fig. 3—Connections, Data Set 402C-Type Transmit Only Terminal

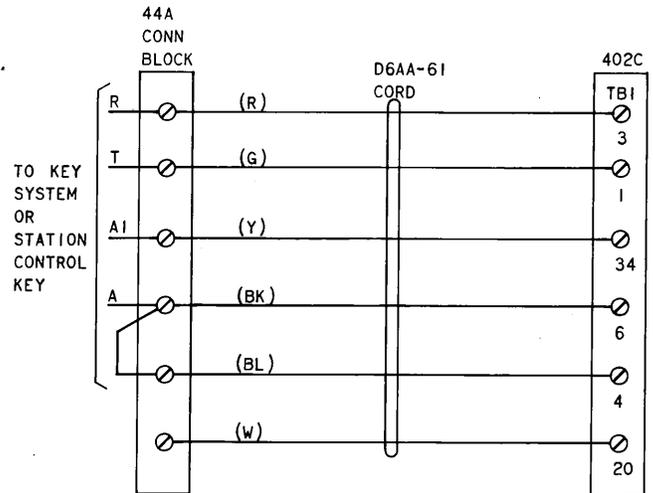


Fig. 4—Connections, Data Set 402C-Type Transmit Only Terminal With "A" Lead Control

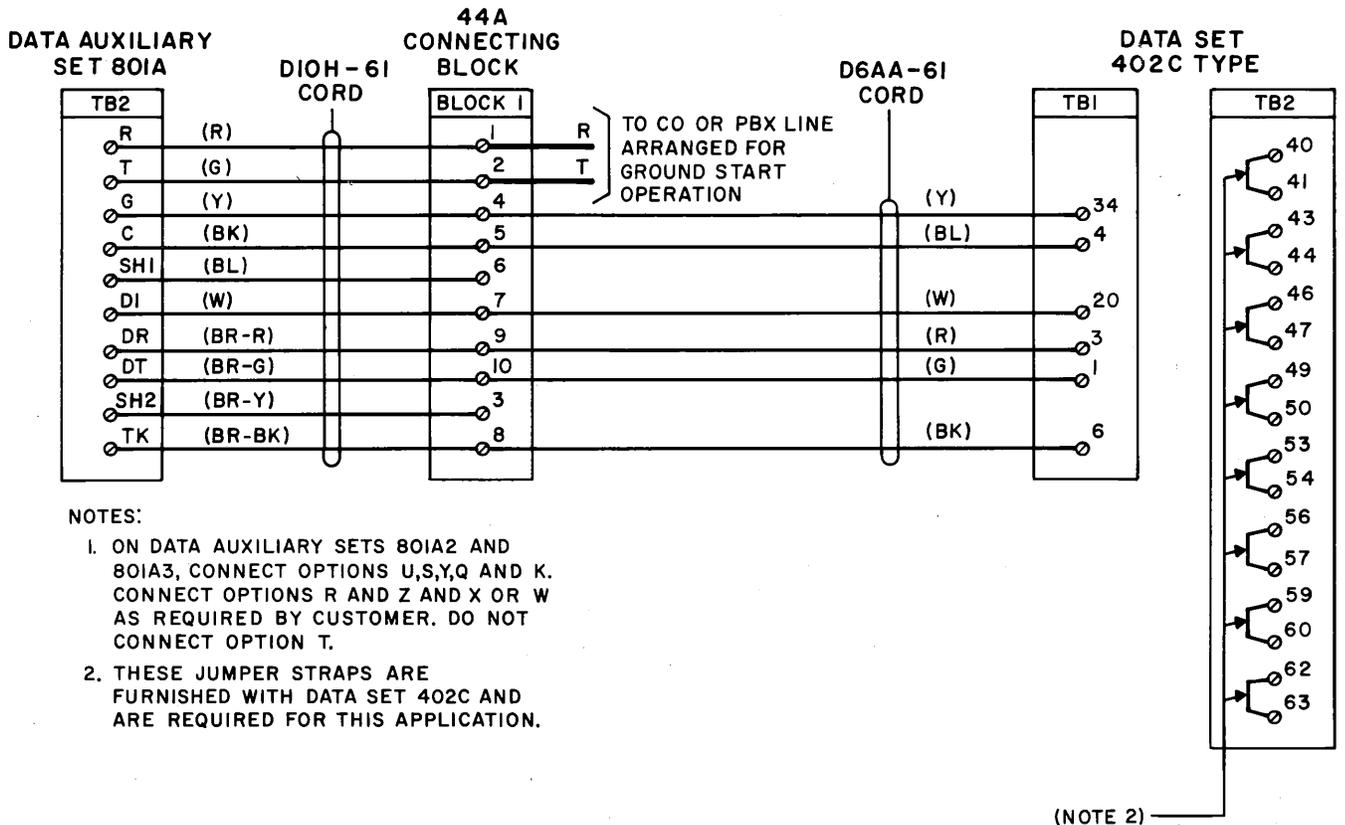


Fig. 5—Connections, Data Set 402C-Type Transmit Only Terminal With Data Auxiliary Set 801A-Type

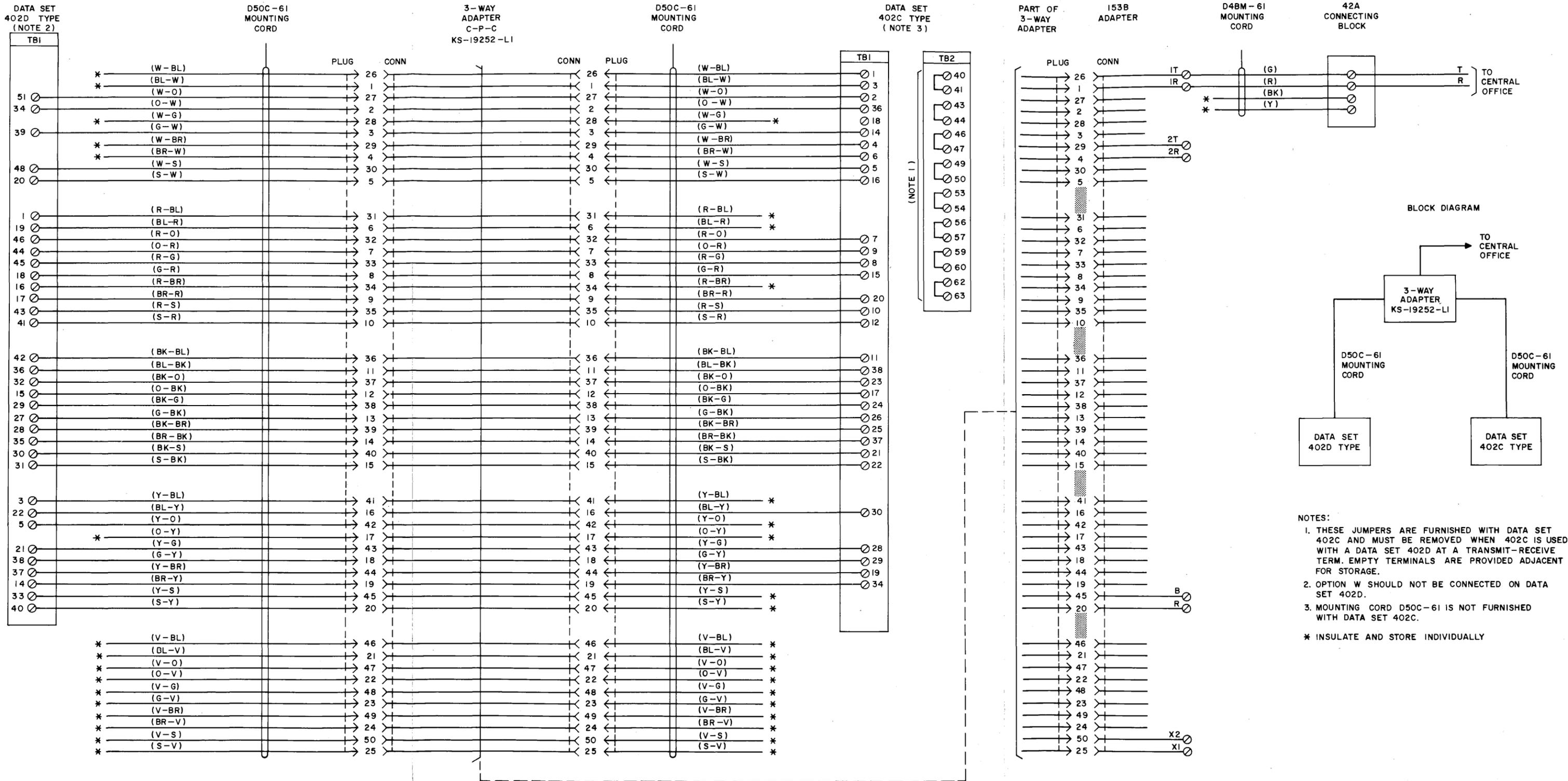
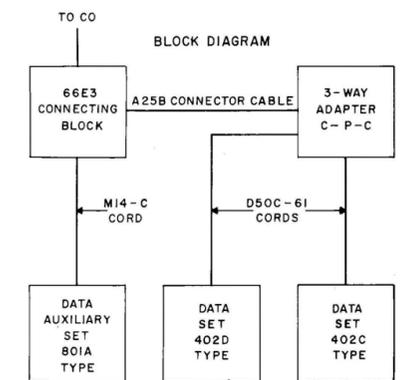
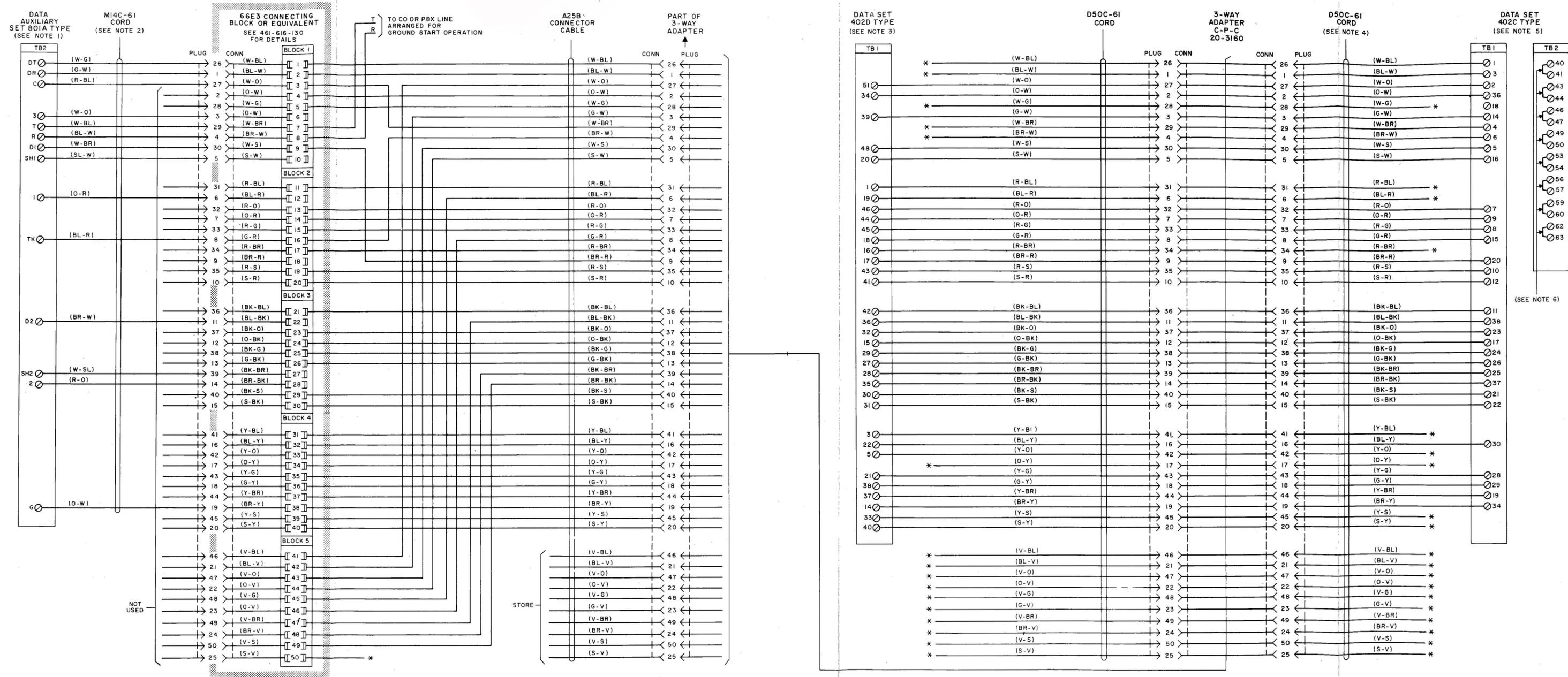


Fig. 6—Connections, Data Set 402C-Type When Used With Data Set 402D-Type at a Transmit Receive Terminal



- NOTES:**
1. OPTIONS U OR V, S, M, Y, AND Q SHOULD BE CONNECTED ON DATA AUXILIARY SETS 801A2 OR 801A3 WHEN USED WITH DATA SET 402C AND 402D. CONNECT OPTIONS R, Z AND X OR W AS REQUIRED BY CUSTOMER. DO NOT CONNECT OPTION T.
 2. MOUNTING CORD MI4C-61 IS NOT FURNISHED WITH DATA AUXILIARY SET 801A AND MUST BE SUPPLIED LOCALLY.
 3. DO NOT CONNECT OPTION W ON DATA SET 402D.
 4. MOUNTING CORD D50C-61 IS NOT FURNISHED WITH DATA SET 402C AND MUST BE SUPPLIED LOCALLY.
 5. CONNECT OPTION T ON DATA SET 402C.
 6. THESE JUMPER STRAPS ARE FURNISHED WITH DATA SET 402C AND MUST BE REMOVED WHEN 402C IS USED WITH A DATA SET 402D AT A TRANSMIT-RECEIVE TERMINAL. EMPTY TERMINALS ARE PROVIDED ADJACENT FOR STORAGE.
- * INSULATE AND STORE INDIVIDUALLY.

Fig. 7—Connections, Data Set 402C-Type When Used With Data Set 402D-Type and Data Auxiliary Set 801A-Type at a Transmit-Receive Terminal

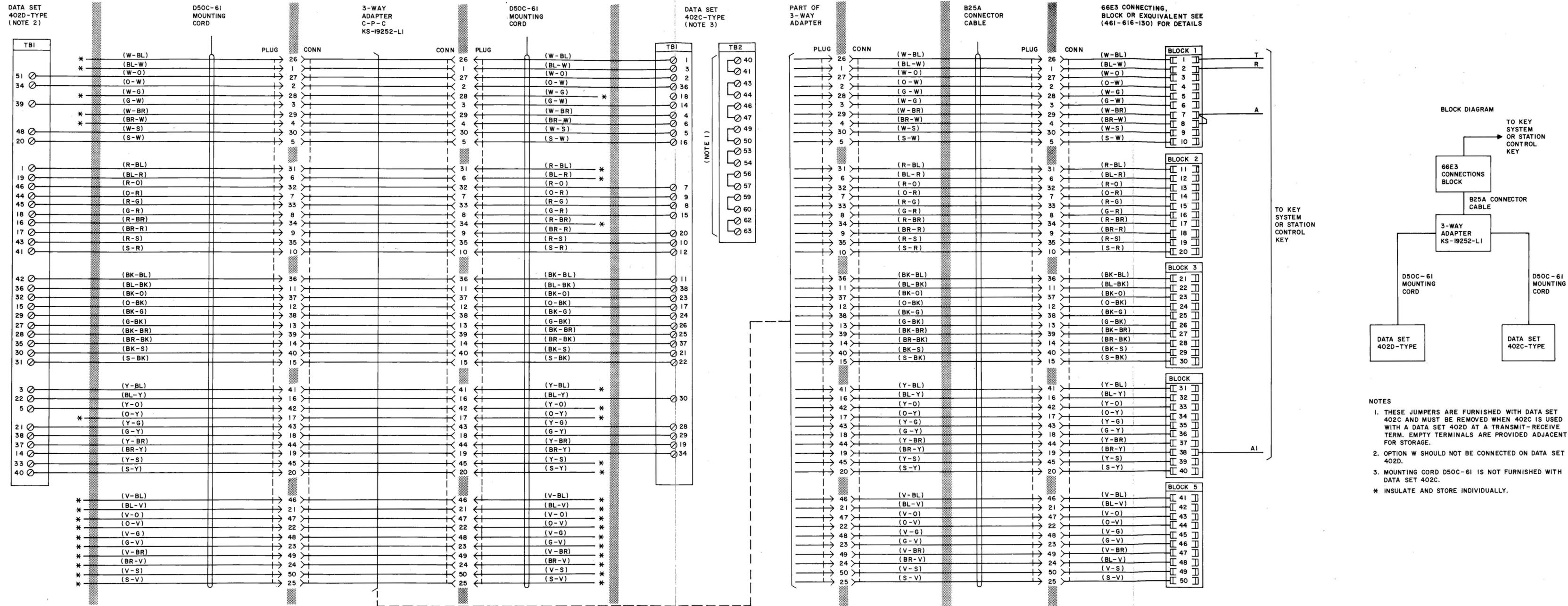


Fig. 8—Connections, Data Set 402C-Type When Used With Data Set 402D-Type at a Transmit-Receive Terminal With "A" Lead Control