DATA SET 202C-TYPE
TRANSMITTER-RECEIVER
INSTALLATION AND CONNECTIONS

CONTENTS PAGE

1. GENERAL

1.01 This section contains installation information concerning data set 202C-type. The data sets 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 update Table A and Fig. 5.

(b) To change 4.07 to add instruction for holding a quiet termination if reverse-channel attenuator is to be adjusted.

2. INSTALLATION

2.01 It is preferred that the data set be installed apart from the customer-provided equipment (CPE) on a nearby desk, table, stand, or in a Bell System equipment cabinet. The data set will operate in an ambient temperature range of 40 to 120°F and a relative humidity of 20 to 95 percent.

2.02 Data set 202C-type should be located near the CPE, 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, the data sets should be used on individual lines that do not have extensions.

2.03 Data set 202C-type requires a 3-wire 117-volt 60-Hz ac outlet. To prevent the data set from being turned off accidentally, this outlet should not be under control of a switch.

2.04 A 25-pin 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.

2.05 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 CPE or lines connected to teletypewriter services. If this condition cannot be met, it will be necessary to run the 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.

2.06 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 outlet for the business machine. If they are not served from the same panel, a test using the 6-type impulse counter should be made to detect excessive noise. This test procedure is contained in the section entitled Data Set 202C-Type—Transmitter-Receiver— Test Procedures (592-015-500).

2.07 Before connecting the data set to the line, verify that the loop and overall facilities have been tested and meet the requirements specified in the section entitled Data Systems—Dataphone® Service Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501).

3. OPTIONS

3.01 Data set 202C-type is provided with a number of options which must be installed prior to placing the data set in service. The options to be installed should be specified on the service order. Refer to Table A for a cross reference between the options and the straps on the terminal board by which the options are installed and removed. Refer to Table B for options to be installed in DAS 801-type when used with data set 202C-type.

3.02 Table A also shows the connections between the 1A-type data unit (reverse-channel transceiver) and the data set. Data sets 202C2, C6, C8, C10, and C12 are equipped and wired with the 1A-type data unit. When data sets 202C1, C5, C7, C9, or C11 are converted for reverse channel (by adding the 1A-type data unit), the stenciling on the data set must be changed accordingly.

TABLE A

OPTIONS AND CONNECTIONS

FEATURE OR OPTION			WIRING OPTION	STRAP TERMINALS ON TB2	PROVIDE
Automatic Answering Feature	Key Controlled (Voltage Interface)		ZE	48-49	1 Per Station (Note 1)
	Permanent (Voltage Interface)		Q*	59-60	
	Key Controlled (Contact Interface)		ZC	49-50	
	Permanent (Contact Interface)		ZD	50-51	
	Not Provided		—	Remove ZE, Q, ZC, and ZD wiring.	
Bit Rate	900 or less bps		ZA	14-15	1 Per Station (Note 2)
	Greater than 900 bps		ZB*	15-16	
Amplitude Equalizer		IN	F*	18-19	1 Per Station
		OUT	E	17-18	
Delay Equalizer		IN	B*	61-62, 64-65	1 Per Station
		OUT	A	62-63, 63-64	
Interface	Voltage (EIA)		N*	1-2, 4-5, 6-7, 8-9	1 Per Station
	Contact		M	2-3, 5-6, 9-10, 12-13	
Squelch		IN	R*	46-47	1 Per Station
		OUT	ZM†	47-55 (Remove R wiring.)	
Demodulator Clamp		ON	V*	20-21	1 Per Station
		OFF	U	21-22	
2-Wire Operation			Z*	27-28, 31-32, 33-34, 35-36, 38-39, 41-42, 53-54, 56-57	1 Per Station (Note 3)
4-Wire Operation			Y	30-31, 36-37, 37-38, 40-41, 54-55, 57-58	
Termination	600-ohm		X	44-45	1 Per Station
	900-ohm		W*	43-44	
Data Transmit Levels	0 dBm		K	11-12	1 Per Station (Note 4)
	−3 dBm		J	24-25	
	−6 dBm		H*	22-23	
	−9 dBm		G	23-24	

TABLE A (Cont)

FEATURE OR OPTION		WIRING OPTION	STRAP TERMINALS		PROVIDE
			TERMINAL NUMBERS	TERMINAL BOARD	
Reverse Channel	IN	T	1-2, 6-7	TB3	1 Per Station (Note 5)
	OUT	S	2-3, 7-8		
Reverse-Channel Transmit Level	—3 dBm	ZF	White lead to 1	TB4	1 Per Station (Note 4)
	—6 dBm	ZG*	White lead to 2	TB4	
	—9 dBm	ZH	White lead to 3	TB4	
801-Type ACU	Provided	ZJ	19-23 (Note 6)	TB1	1 Per Station
	Not Provided	—	17-20	TB1	
6017 AP Key	Provided	—	Remove ZV Wiring		1 Per Station
	Not Provided	ZV*	7-9	TB1	
Carrier Soft Turn-Off	IN	ZY*	1-2	AS87 CP	1 Per Station (Note 7)
	OUT	ZZ	3-4	AS87 CP	

* Factory-furnished option.

† Wiring furnished by installer.

Note 1: When automatic answer is specified and data set is wired for voltage interface (option N), provide option ZE or Q as required. If data set is wired for contact interface (option M) and automatic answer is specified, provide option ZC or ZD as required.

Note 2: →Option ZB must be used for all applications.←

Note 3: In addition to strapping arrangements on TB2, the following arrangements must be made on telephone circuit (11C apparatus unit):

(a) 2-wire (option Z) — white conductor of handset cord to GN of 4010B network, other white conductor of handset cord to R of 4010B network.

(b) 4-wire (option Y) — white conductor of handset cord to terminal 1 of TB6, other white conductor of handset cord to terminal 2 of TB6.

Note 4: Equipped only on early series data sets as specified in 4.02.

Note 5: 202C1, C3, C5, C7, C9, C11 — Factory furnished with option S. 202C2, C4, C6, C8, C10, C12 — Factory furnished with option T. →Install option T only if option Z is used.←

Note 6: Install options in DAS 801 as directed in Table B.

Note 7: →Available only on 202C5, C6, C7, C8, C9, C10, C11, C12.←

TABLE B

OPTIONS TO BE INSTALLED IN 801 ACU (WHEN USED WITH DATA SET 202C-TYPE)

FEATURE OR OPTION	OPTION DESIGNATION		REQUIRED
	801A1, A2, A6	801C2, C4	
Detect End of Answer Tone	W (Note 1)	W (Note 1)	Use All
Detect 2025-Hz Answer Tone	S (Note 1)	S (Note 1)	
Data Set to Data Mode by Contact to DT	Q (Note 1)	Q (Note 1)	
10-Conductor Mounting Cord (D10P-61)	M (Note 1)	M (Note 1)	
ACU Answer Detection or End of Number	B (Note 1)	B (Note 1)	
Isolated TK Contact	ZA (Note 1)	ZA (Note 1)	
Terminate Call via Data Set After DSS ON (Line Transfer in Test)	G (Note 2)	G (Note 2)	Use One of the Two
Terminate Call via CRQ After DSS ON (Line Transfer)	Z (Note 3)	Z (Note 3)	
ACR Timer Stop When DDS Goes ON	R (Note 2)	R (Note 2)	Use One of the Two
Do Not Stop ACR Timer When DDS Goes ON	H (Note 3)	H (Note 3)	
Voltage Interface	Z (801A6) (Note 2) (Factory-Wired 801A1) (Not Available 801A2)	Factory-Wired	Use One of the Two
Contact Interface	ZE (801A6) (Note 3) (Not Available 801A1) (Factory-Wired 801A2)	Not Available	
Short Loop (Under 400 ohms)	ZU out	Not Applicable	Use One of the Two
Long Loop (Over 400 ohms)	ZU		
Ground Start (2-Wire)	Factory-Wired	V	Use One of the Two
Without Ground Start (Loop Start)	Not Available	Y	
DLO Controlled by ACU	Factory-Wired	ZM (801C4) (Note 2) (Factory-Wired 801C2)	Use One of the Two
DLO Controlled by ACU and Data Set	Not Available	ZL (801C4) (Note 3) (Not Available 801C2)	

Note 1: Must be used in DAS 801 (ACU) when used with data set 202C.
Note 2: Normal option for DAS 801 when associated with data set 202C.
Note 3: Special option. Should be used only on customer request.

4. LOOP-LOSS MEASUREMENT AND PADDING

4.01 Present tariffs specify that the composite data signal power level reaching the central office shall be no greater than −12 dBm. To meet the required power levels, it may be necessary to install a pad external to the data set. The necessary pad may be either ordered assembled or made up in the field and installed in accordance with Fig. 1. For information on ordering pads and identifying resistor color codes, refer to Fig. 1.

4.02 The earlier series of data sets 202C-type are equipped with a fixed attenuator ▶for both primary and reverse-channel levels.◀ These data sets are as follows:

202C1 and C2 prior to series 10

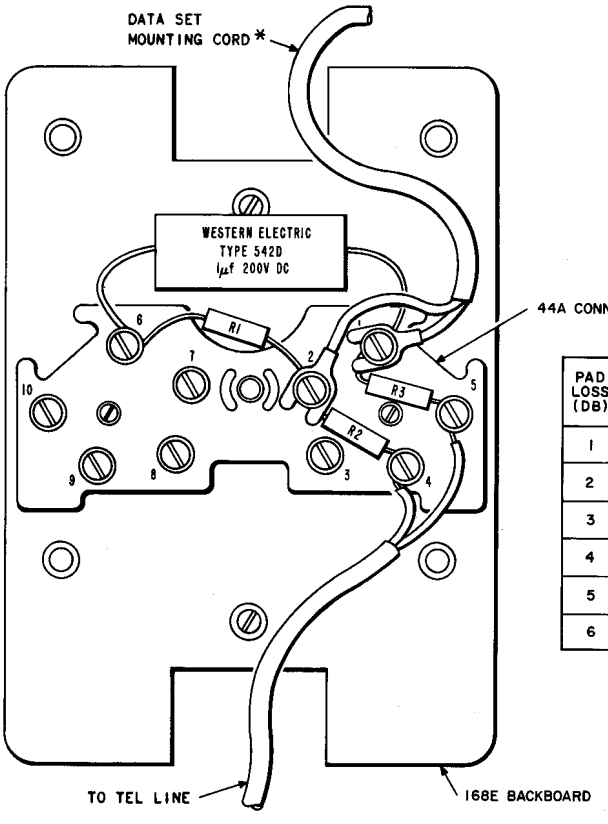
202C5, C6, C7, and C8 prior to series 4

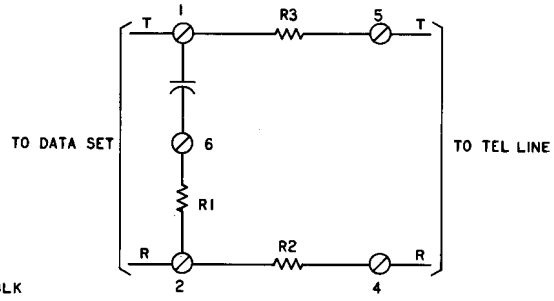
202C9, C10, C11, and C12 prior to series 3.

The fixed attenuator can be set at 0 dBm, −3 dBm, −6 dBm, or −9 dBm. An external pad must be used ▶to meet the −12 dBm signal level requirement◀ if the loop loss is less than 3 dB. The later series of data sets 202C-type are equipped with an attenuator which will vary the output signal level from 0 to −12 dBm; therefore, an external pad is not needed. Refer to Fig. 2 for the location of the variable attenuators on the later series data sets.

LOOP-LOSS MEASUREMENT

4.03 In order to determine what the output level of the data set should be, it is necessary to know the loop loss. To determine the loop loss, dial the central office milliwatt supply or request the local testboard to send a 1000-Hz tone at 0 dBm on the loop. Use a TTS-4 transmission measuring set (or equivalent) to measure the incoming signal across the line tip and ring.





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.

Fig. 1—Insertion Loss Pad Connections

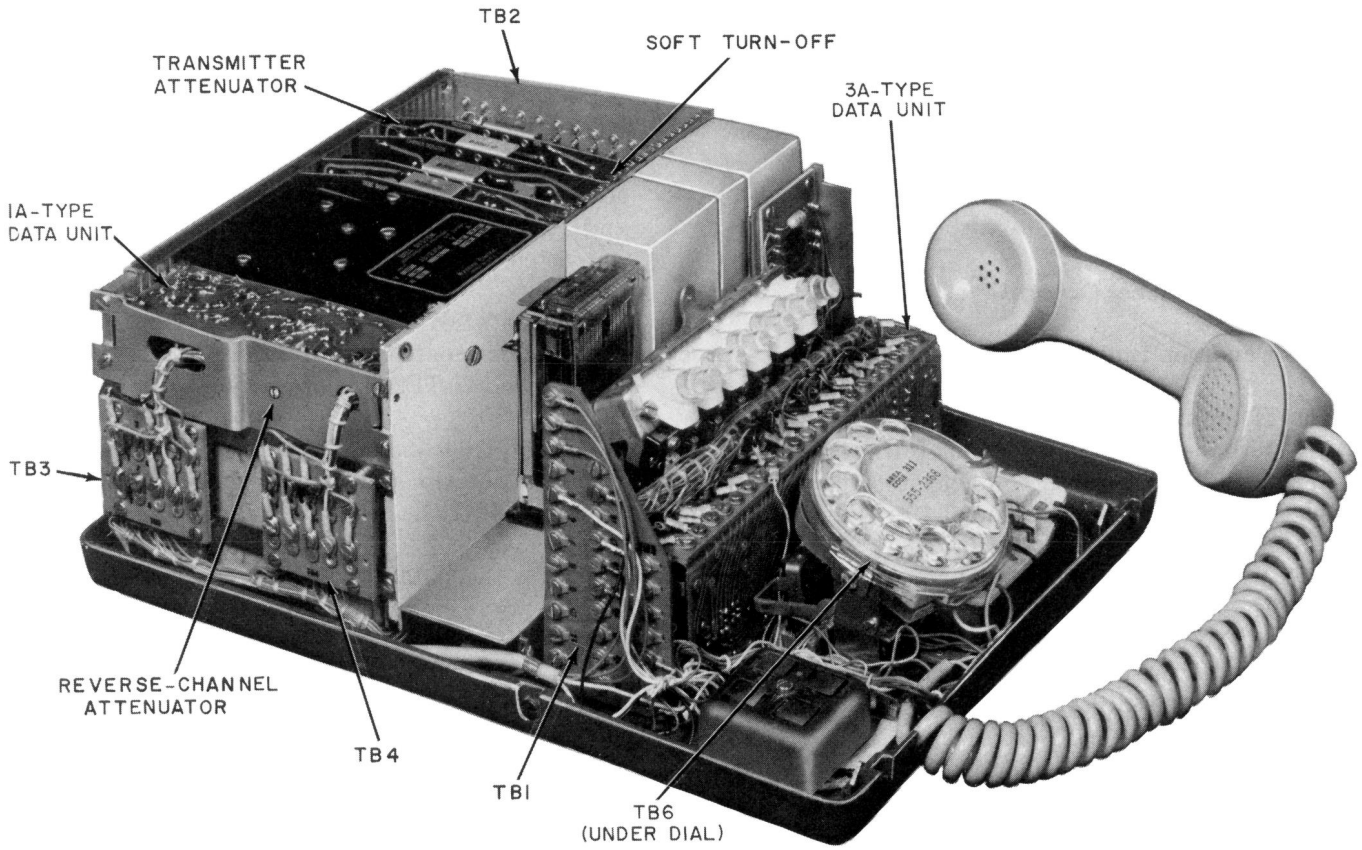


Fig. 2—Data Set 202C-Type—Location of Terminal Blocks

4.04 Disconnect the data set from the line tip and ring and connect the TTS-4 across the line. Set the REC IMP switch to 900 ohms and measure the incoming signal level. The numerical reading on the meter is the loop loss in dB (eg, −6 dBm = 6 dB loop loss).

FIXED PAD ATTENUATOR

4.05 After the loop loss has been determined, refer to Table C for the data set power setting and external pad required. The data set power settings are options which can be installed and removed as specified in Table A.

SIGNAL LEVEL ADJUSTMENT FOR DATA SETS WITH VARIABLE ATTENUATORS

4.06 Connect the data set to the line and connect the data set interface connector to an interface test adapter [cover of 901 data test set (DTS)] or to a 914B DTS. Dial the number for

TABLE C

MEASURED LOOP LOSS IN dB	POWER SETTING (DATA SET OPTION STRAP)	PAD (dB) LOSS
0-1	−9	3
1-2	−9	2
2-3	−9	1
3-4	−9	—
4-5	−6	2
5-6	−6	1
6-7	−6	—
7-8	−3	2
8-9	−3	1
9-10	−3	—
10-11	0	2
11-12	0	1

the serving central office quiet termination. It will be necessary to condition the data set to transmit to adjust the data set transmitter output level. To adjust the output level of the 387-Hz reverse-channel transmitter, it will be necessary to condition the data set to receive.

A. Primary Channel Output Level

4.07 Condition the data set as follows.

(1) If the interface test adapter is used, connect terminal 9 (+V) to terminal 4 (RTS) and to terminal 20 (DTR). ▶If contact interface is used, place a strap between terminal 19 (RR), terminal 20 (DTR), and terminal 21 (RY).◀

(2) If the 914B DTS is used, place a red pin in matrix positions 4-TP1, 9-TP1, and 20-TP1. ▶If contact interface is used, place a red pin in matrix positions 19-TP2, 20-TP2, and 21-TP2.◀

(3) Connect the TTS-4 across the data set tip and ring and set the REC IMP control to BRDG.

(4) WIth the data set in the data mode, adjust the transmitter attenuator shown in Fig. 2 so that the data set output is equal to the difference (in dB) between the desired central office power level of −12 dBm and the loop loss obtained in 4.04. For example, if loop loss is 5 dB:

Data set output = −12 dBm +5 dB

Data set output = −7 dBm.

The data set should be set to −7 dBm output signal level.

(5) ▶If the data set is equipped with a reverse channel, do not disconnect terminal 9 (+V) from terminal 20 (DTR); or if applicable, red pins from matrix positions 9-TP2 and 20-TP2. This prevents having to redial a quiet termination when adjusting the reverse-channel attenuator.◀

B. Reverse-Channel Output Level

4.08 Condition the data set as follows.

(1) If the interface test adapter is used, connect terminal 10 (−V) to terminal 4 (RTS) and connect terminal 9 (+V) to terminal 11 (SA) and to terminal 20 (DTR) ▶if not previously connected.◀

(2) If the 914B DTS is used, insert red pins in matrix positions 10-TP1, 4-TP1, 9-TP2, 11-TP2, and 20-TP2 ▶if not previously inserted.◀

(3) The TTS-4 should be connected across the data set tip and ring with the REC IMP control to BRDG.

(4) With the data set in the data mode, adjust the reverse-channel attenuator shown in Fig. 2 so that the data set output is equal to the difference (in dB) between the desired central office power level of −12 dBm and the loop loss obtained in 4.04. [Refer to 4.07 (4) for an example.]

5. DISABLING TALK AND DIAL FUNCTIONS

5.01 The following is a method for disabling the talk and/or dial functions associated with data set 202C-type. This modification is only done at the request of the customer (as specified on the service order).

5.02 To disable the dial function on a set equipped with a rotary dial, the pulsing contacts should be shorted out. This is accomplished by removing the line lead from the F terminal of the network and connecting it to the RR terminal.

5.03 To disable the dial function on a data set equipped with the Touch-Tone® dial, the blue lead to the dial should be disconnected, taped, and stored.

5.04 To disable the talk function, the transmitter in the handset must be shorted out. The recommended procedure is to connect both of the transmitter leads in the handset to the same screw on the rear of the transmitter holder.

When the talk feature of a Dataphone® data set is disabled, a warning label must be attached to the data set case.

6. CONNECTIONS

6.01 Data set 202C-type is connected to the telephone line as shown in Fig. 3 through Fig. 7. The location of the terminal blocks is shown in Fig. 2. The connection drawings are as follows:

Fig. 3—2-Wire Switched Network

Fig. 4—2-Wire Switched Network Using Data Auxiliary Set 801-Type

Fig. 5—4-Wire Private Line

Fig. 6—4-Wire Switched Network (Common Battery)

Fig. 7—4-Wire Switched Network (E and M Signaling).

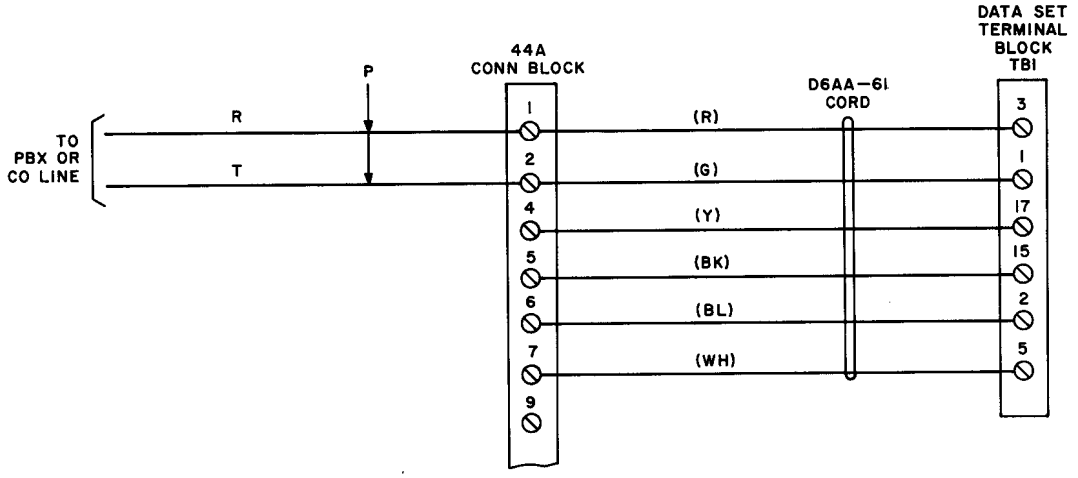
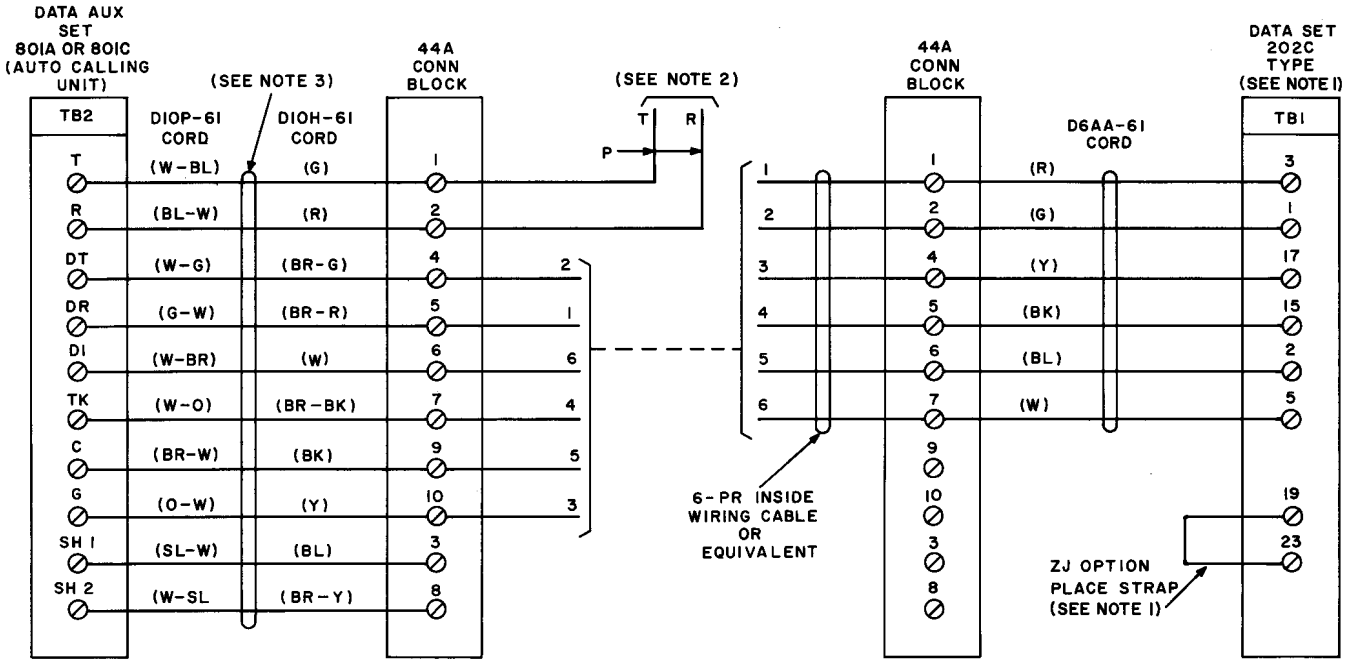


Fig. 3—2-Wire Switched Network



NOTES:

1. FOR GROUND START ACU, ADD DESIGNATION- DIAL TONE- IN SPARE 1 POSITION ON KEY DESIGNATION STRIP. STRAP IS STORED AT TB1 17 AND 20. THE BUTTON MUST BE NONLOCKING. THIS BUTTON AND THE ZJ STRAP ARE NOT REQUIRED WITH A LOOP START ACU.
2. WITH 801A-TYPE ACU, CONNECT T AND R TO CO OR PBX LINE ARRANGED FOR GROUND START OPERATION. WITH 801C-TYPE ACU, CONNECT T AND R TO CO OR PBX LINE ARRANGED FOR "TOUCH-TONE" DIALING. THE 801C-TYPE CAN BE USED ON EITHER LOOP OR GROUND START OPERATION.
3. THE DIOP-61 CORD REPLACES THE DIOH-61 CORD WHICH HAS BEEN MD'D.

Fig. 4—2-Wire Switched Network Using Data Auxiliary Set 801-Type

Note: pp. 11-? were missing
from the original copy.

These pages contain figs. 5-7

If you have these pages please contact:

Sam Etler (etler@cs.wisc.edu)