

DATA SET 103A3

INSTALLATION AND CONNECTIONS

	CONTENTS	PAGE
1.	GENERAL	1
2.	TOOLS AND APPARATUS	2
3.	OPTION CONNECTIONS	2
	A. Data Set 103A3	2
	B. Telephone Sets	2
	C. Data Auxiliary Sets 801-Type	2
4.	CONNECTIONS	4

1. GENERAL

- 1.01** This section describes the procedures to be followed for installing a data set 103A3.
- 1.02** This section is reissued for the following reasons:
- (a) To include factory-furnished feature or option
 - (b) To add information for telephones equipped with a buzzer
 - (c) To ensure that the telephone set conforms to original factory wiring prior to making any wiring changes
 - (d) To introduce data set 103A3 series 2, which uses data set 103E6 instead of the 103E5 used in data set 103A3 series 1.
- 1.03** Data set 103A3 options are to be installed by telephone company (telco) personnel.
- 1.04** The data set should be installed in accordance with existing Bell System Practices (BSPs) covering the installation of station sets. The data set must be located within range of the terminal

interface connector cable. This cable should not exceed 50 feet in length.

1.05 The customer must furnish a standard 3-wire, grounding-type, 117-volt 60-Hz ac power receptacle capable of accepting a plug with two parallel blades and a round-shaped grounding pin. The receptacle must not be under the control of a switch.

1.06 To minimize the possibility of data errors due to potential differences between the data set and data terminal grounds, the data set power receptacle should be served from the same power distribution panel as the receptacle for the data terminal. If this is not possible, a test should be made using the 6H impulse counter to determine if excessive noise is present. This test procedure is described in Section 591-014-501. If the test requirements are not met, the data set and data terminal grounds must be bonded together in accordance with local regulations.

1.07 When a data auxiliary set (DAS) 801-type automatic calling unit (ACU) is used, a test between the ACU, data set, and data terminal must also be performed.

1.08 It must be verified that the overall transmission facility has been tested and meets transmission requirements specified in the section entitled Data Systems—Dataphone® Service and Data Access Arrangements on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501).

1.09 A 565HK, 2565HK, 662A1, or 2662A1 telephone set (not furnished as part of the data set) must be ordered to provide control of data set 103A3 and to establish the data set transmission path. If the 662A1 telephone set is used, a 2012B transformer must be ordered to supply power for the card dialer.

2. TOOLS AND APPARATUS

2.01 The following apparatus is required to install and set the transmit level of data set 103A3:

- 904-type data test center (DTC)
- 914B data test set (DTS)
- TTS-28 transmission measuring set (TMS).

3. OPTION CONNECTIONS

A. Data Set 103A3

3.01 Options for data set 103A3 are provided by data set 103E-type data modem. These options are installed by tightening or loosening screw switches on the circuit pack (CP) terminal blocks located on the rear of data set 103E-type. Install the options specified on the service order or work sheet as follows:

- For a data set 103A3 equipped with data set 103E2 or 103E4, refer to Table A and Fig. 1.
- For a data set 103A3 equipped with data set 103E5 or 103E6, refer to Table B and Fig. 2.

Caution: Exercise care when tightening option screw switches to prevent stripping the terminal blocks. When screws are to be loosened, loosen screw more than one complete turn.

B. Telephone Sets

3.02 Prepare the 565HK, 2565HK, 662A1, or 2662A1 telephone set for connection with data set 103A3 as follows:

- (1) Using a P12A858 blocking ring, block the HOLD key. If an 801-type ACU operated in the ground-start mode is used, do not block the HOLD key.
- (2) Prepare the key label (using Fig. 3 as an example) and insert it under the keys.
- (3) Convert the DATA, CLEAR-TALK, and TEST keys to nonlocking keys by removing the screws from the key plungers.

- (4) If the telephone set is equipped with a buzzer, disconnect and store its leads.
- (5) Change the telephone set wiring as indicated in the appropriate Table C, D, E, or F.



The telephone set wiring must conform to original factory wiring prior to making wiring changes per Step 5.

C. Data Auxiliary Sets 801-Type

3.03 Only three DASs 801-type are intended for use with data set 103A3:

- DAS 801A5 (dial pulse)
- DAS 801C3 (Touch-Tone® calling, ground-start operation)
- DAS 801C4 (Touch-Tone calling, dial tone detection, and loop-start operation).



Specific options which must be installed in the DASs are shown in Table G. Options which must not be used are shown in Table H. Refer to the appropriate sections covering the type of DAS being installed for option connections. When ground-start line is connected, the unused HOLD key on the telephone set must be wired to provide a backup method for obtaining dial tone should the ACU become inoperative. See appropriate Table C, D, E, or F for details.

3.04 When DAS 801A5 or 801C3 is installed, verify that the telephone line is arranged for ground-start operation. DAS 801C4 may be option-strapped for either loop-start or ground-start operation.

3.05 If DAS 801C-type is installed, verify that the telephone is arranged for Touch-Tone service.

3.06 If DAS 801-type is equipped with an M14C-61 (option N) mounting cord, this cord must be removed and a D10P-61 (option M) mounting cord installed. When changing cords, or if a DAS is equipped with a D10P-61 cord, ensure that the

TABLE A
DATA SETS 103E2 AND 103E4 – FEATURES OR OPTIONS

FEATURE OR OPTION		DESIG	CP NO.	SCREW SETTING	
				LOOSEN	TIGHTEN
Frequencies	Inverted	Z	CJ4	1 and 3	2
			CJ5	6, 9, and 11	7, 10, and 12
	Normal	Y*	CJ4	2	1 and 3
			CJ5	7, 10, and 12	6, 9, and 11
Answer Mode Indication	CE On	X	CJ8	1	2
	CE Off	W*	CJ8	2	1
Space Disconnect	Long	V*	CJ2		1
	Short	H			1 and 3
	None	W/O V, H		1	
Send Disconnect	Yes	T*	CJ2		7
	No	W/O T		7	
Loss of Carrier Disconnect	Yes	S	CJ8		12
	No	W/O S*		12	
Common Grounds	Yes	Q*	CJ8		10
	No	W/O Q		10	
Originate Only Test	Yes	G	CJ2		10
	No	W/O G	CJ2	10	
Without ANS/ORG Transfer	Yes	N*	CJ2		12
	No	W/O N		12	
Answer Control	Common	M*	CJ8		4
	Separate	W/O M		4	
CB/CF Indication	Combined	A*	CJ8	6	7
	Separate	B		7	6

* Factory-furnished feature or option

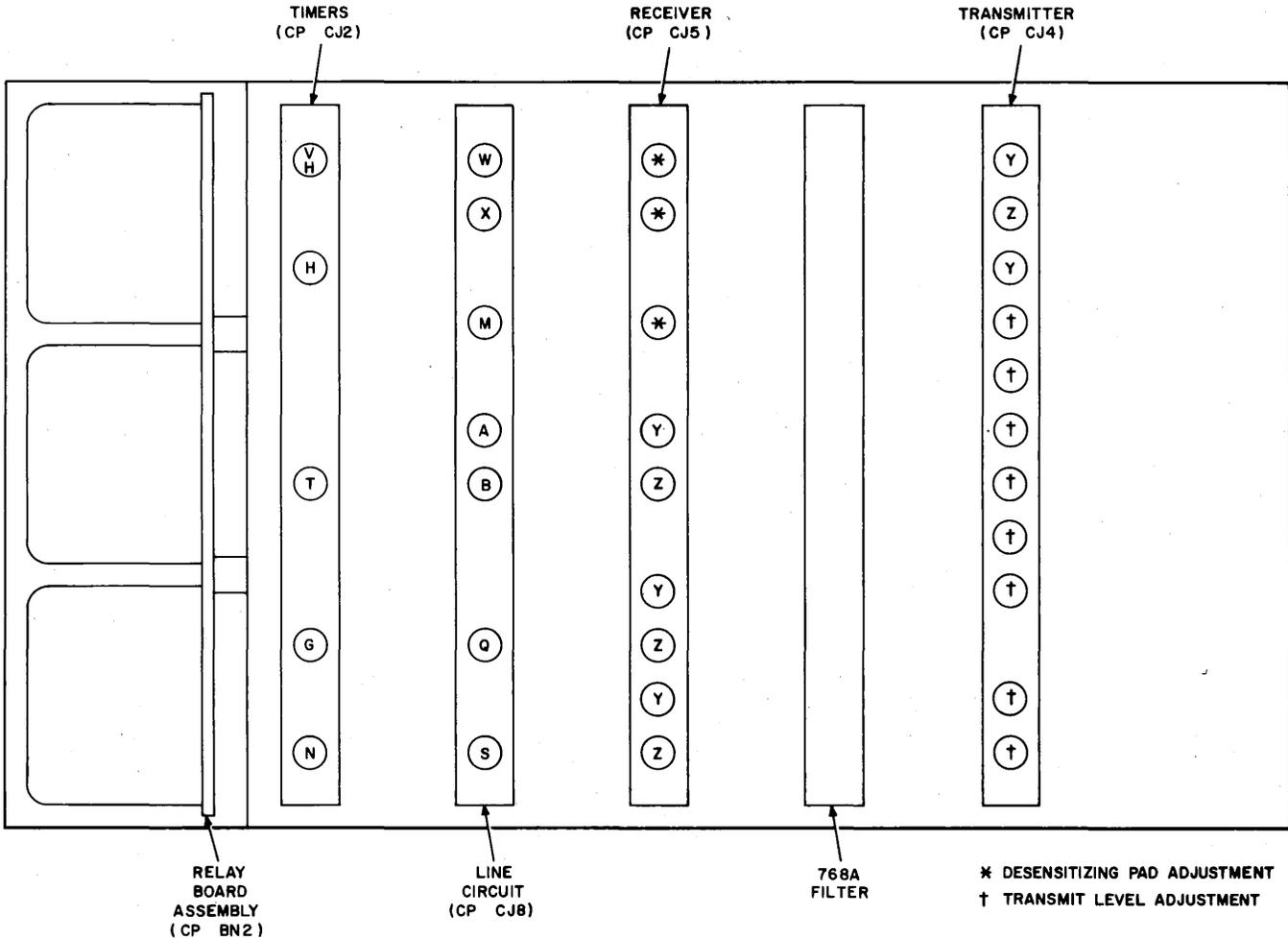


Fig. 1—Data Sets 103E2 and 103E4—Circuit Pack Locations and Option Screw Settings

S-W mounting cord conductor is connected to terminal TB2-3 as shown in Fig. 4.

3.07 In addition to specific options shown in Table G, DAS 801-type must be option-strapped for compatibility with the telephone line and the data terminal equipment. Table H shows the options that should *not* be used with data set 103A3.

4. CONNECTIONS

4.01 The connections for data set 103A3 *with* DAS 801-type are shown in Fig. 4.

4.02 The telephone line connections for data set 103A3 *without* DAS 801-type are shown in Fig. 5.

4.03 If the service order does not specify the transmitter power level to be used, adjust the level as follows:

- (1) Place a call to the 1000-Hz 1-mW terminal in the serving central office.
- (2) Using the TTS-28 TMS, measure and record the level of the received tone (measured loss).

TABLE B

DATA SETS 103E5 AND 103E6 – FEATURES OR OPTIONS

FEATURE OR OPTION		DESIG	CP NO.	SCREW SETTING	
				LOOSEN	TIGHTEN
Answer Mode Indication	CE On	X	CJ9 or § CJ14	1	2
	CE Off	W*		2	1
Space Disconnect	Long	V*	CJ10	3	8
	Short	H			3 and 8
	None	W/O V, H		3 and 8	
Send Disconnect	Yes	T*	CJ10		1
	No	W/O T		1	
Loss of Carrier Disconnect	Yes	S	CJ10		4
	No	W/O S*		4	
Common Grounds	Yes	Q*	CJ9 or § CJ14		10
	No	W/O Q		10	
Originate Only Test	Yes	G	CJ10		12
	No	W/O G*		12	
Without ANS/ORG Transfer	Yes	N*	CJ10		10
	No	W/O N		10	
Answer Control	Combined	M*	CJ9§		9
	Separate†	W/O M		9	
CB/CF Indication	Common	A*	CJ9 or § CJ14	5 and 7	4 and 6
	Separate	B		4 and 6	5 and 7
CC Indication Early	Yes	ZD*	CJ14§		12
	No†	W/O ZD		12	

→ * Factory-furnished feature or option when used in data set 103A3.←

→ † When 103E5 is equipped with CJ14 CP, the ZD option must be provided.

‡ The ANSWER CONTROL SEPARATE option cannot be used in the 103A3 series 1. Always provide the M option.←

§ CJ9 CP or CJ14 CP is used in data set 103E5.
CJ14 CP is used in data set 103E6.

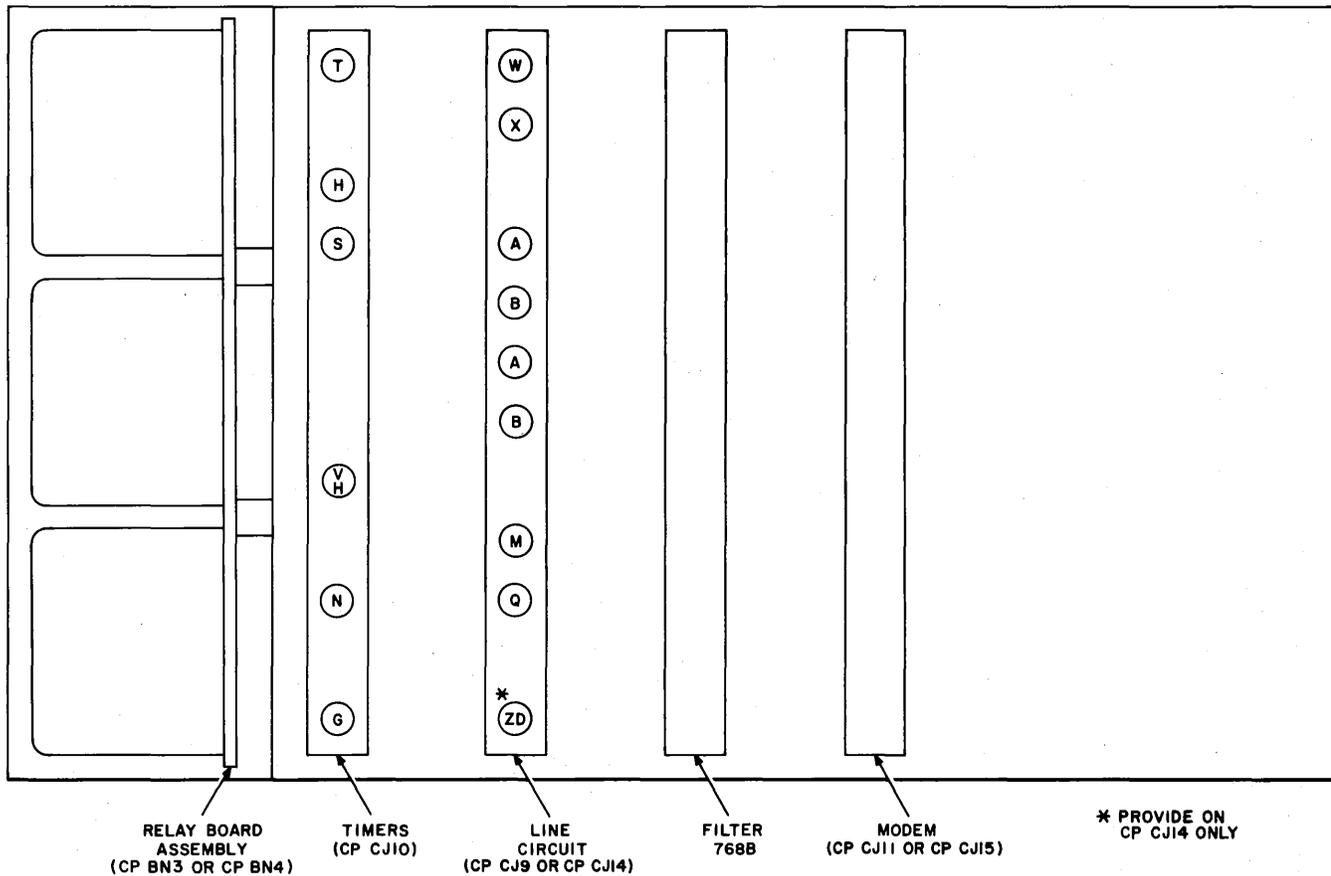


Fig. 2—Data Sets 103E5 and 103E6—Circuit Pack Locations and Option Screw Settings



For this measurement the telephone line shall be terminated with a 900-ohm impedance and the received signal filtered to provide at least 25-dB attenuation at 60 Hz. The TTS-28 test set provides the termination and filter required when the FUNCTION switch is set to the DBM 900Ω TERM position. The data set should not be connected to the telephone line during this test.

connector A on the 914B DTS and to the data terminal interface connector on the data set.

- (3) Disconnect the TMS.
- (4) Using the 914B DTS, connect the cord furnished with the 914B DTS to interface

- (5) Insert matrix pins in TP1-20 and TP1-9.

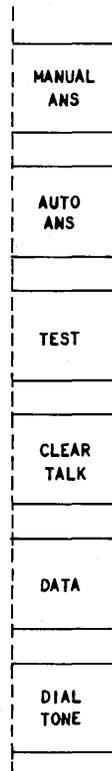
Note: This applies a voltage of between +5 and +25 Vdc to the CD lead of data set 103A3, which is required during level adjustment of the transmitter.

- (6) If a DAS 801-type ACU is used, connect the telephone line to the ACU as shown in Fig. 4 and remove ac power from DAS 801. Without a DAS 801-type ACU, connect the telephone line to the data set as shown in Fig. 5.

DIAL TONE	MANUAL ANS	AUTO ANS	TEST	CLEAR TALK	DATA
--------------	---------------	-------------	------	---------------	------

NOTES:

1. DIAL TONE IS TO BE TYPED ON LABEL (FORM E-4227-G) IF THE DATA SET IS CONNECTED TO A TELEPHONE LINE ARRANGED FOR GROUND-START OPERATION. OTHERWISE IT WILL BE LEFT BLANK.
 2. DOTTED LINES INDICATE PERFORATIONS IN FORM E-4227-G.
- A - KEY LABEL--565HK OR 2565HK TELEPHONE SET



NOTE:

- SAME NOTES AS FIG. 2A, EXCEPT LABEL IS FROM FORM E-4646.
- B - KEY LABEL--662A1 OR 2662A1 TELEPHONE SET

Fig. 3—Key Labels

→TABLE C←

565HK TELEPHONE SET – CHANGES FOR USE WITH DATA SET 103A3
(NOTE 1)

ORIGIN OF LEAD (NOTE 2)	COLOR (NOTE 3)	MOVE SPADE – ENDED LEAD	
		FROM	TO
PU Keys for 1T thru 5T	G	Tel Net F	SG
D50N Mtg Cord (5)	S-W	Stored	Tel Net F
PU Key for 2H	Y-BR	M	6
D50N Mtg Cord (44)	Y-BR	Tel Net L2	6
PU Key for 3H	BR	M	4
PU Key for 5H	BR-BK	X	3
LS Switch	(BR) [S-G]	N (Note 4)	5
D50N Mtg Cord (50)	V-S	N (Note 4)	5
H Key	O-BK	N (Note 4)	RR
Added Strap	—	N (Note 4)	SG

Notes:

1. The telephone set wiring must conform to original factory wiring prior to making any wiring changes.
2. See Section 502-617-402 for telephone set terminal information. If the telephone set is equipped with a buzzer, disconnect and store the buzzer leads.
3. () Designates current color code; [] designates MD color code.
4. Leads need not be moved or added unless DAS 801-type ACU operated in the ground start mode is used with data set 103A3.

(7) Operate the MANUAL ANS key on the telephone set. Using another telephone, call the data set. When ringing is heard, depress the DATA key and hold until the DATA lamp lights. The data set should transmit f_2 mark to the calling station.

(8) When the tone is heard at the calling station, replace the handset. At the data set, disconnect tip and ring from the data set or ACU, if used, and connect the TTS-28 test set to measure the level of the transmitted tone.

Set the FUNCTION switch on the TTS-28 to the DBM 900Ω TERM position.

(9) Using Table I, locate under the 1000-Hz MEASURED LOSS column the measured loss value recorded in (2) above and adjust potentiometer R34 on CJ11 CP or CJ15 CP until the TTS-28 indicates the corresponding dBm reading listed in the OUTPUT LEVEL DBM column.

4.04 If the transmitted power to be used is specified on the service order, adjust the

→TABLE D←

**2565HK TELEPHONE SET – CHANGES FOR USE WITH DATA SET 103A3
(NOTE 1)**

ORIGIN OF LEAD (NOTE 2)	COLOR (NOTE 3)	MOVE SPADE – ENDED LEAD	
		FROM	TO
PU Keys for 1T thru 5T	G	Tel Net L2	SG
D50N Mtg Cord (5)	S-W	Stored	Tel Net L2
PU Key for 2H	Y-BR	M	1
PU Key for 3H	BR	M	4
PU Key for 5H	BR-BK	X	3
LS Switch	BR	N (Note 4)	5
D50N Mtg Cord (50)	V-S	N (Note 4)	5
H Key	O-BK	N (Note 4)	RR
Added Strap	—	N (Note 4)	SG

Notes:

1. The telephone set wiring must conform to original factory wiring prior to making any wiring changes.
2. See Section 502-541-415 for key and terminal designations in the 565HK telephone set. If the telephone set is equipped with a buzzer, disconnect and store the buzzer leads.
3. () Designates current color code; [] designates MD color code.
4. Leads need not be moved or added unless DAS 801-type ACU operated in the ground start mode is used with data set 103A3.

level as outlined in 4.03 (4) through (9), ignoring the MEASURED LOSS column in Table I.

4.05 If data set 103A3 is equipped with a data set 103E2 or 103E4, set the transmit level and provide the receiver desensitizing pad (see

Table J and Fig. 6) as specified on the service order. If the service order does not specify the settings to be used, measure the loop loss as in 4.03 (1) and (2). Provide the desensitizing pad and transmit level in accordance with Table J.

→TABLE E←

662A1 TELEPHONE SET – CHANGES FOR USE WITH DATA SET 103A3
(NOTE 1)

ORIGIN OF LEAD (NOTE 2)	COLOR (NOTE 3)	MOVE SPADE – ENDED LEAD	
		FROM	TO
599A Key Conn. (44)	G	Tel Net F	SG
D50K Mtg Cord (5)	S-W	Stored	Tel Net F
D50K Mtg Cord (23)	G-V	Stored	R
599A Key Conn. (4)	S-W	A2	BL
599A Key Conn. (6)	G-R	A2	6
599A Key Conn. (10)	BR-BK	A2	S1
D50K Mtg Cord (17)	O-Y	Stored	S1
LS Switch	(BR) [S-G]	A (Note 3)	10
D50K Mtg Cord (50)	V-S	Stored (Note 3)	10
599A Key Conn. (48)	W-G	Stored (Note 4)	Tel Net A
599A Key Conn. (50)	S-Y	Stored (Note 4)	SG

Notes:

1. The telephone set wiring must conform to original factory wiring prior to making any wiring changes.
2. See Section 502-543-405 for key and terminal designations in the 2565HK telephone set. If the telephone set is equipped with a buzzer, disconnect and store the buzzer leads.
3. () Designates current color code; [] designates MD color code.
4. Leads need not be moved or added unless DAS 801-type ACU operated in the ground start mode is used with data set 103A3.

→TABLE F←

**2662A1 TELEPHONE SET – CHANGES FOR USE WITH DATA SET 103A3
(NOTE 1)**

ORIGIN OF LEAD* (NOTE 2)	COLOR	MOVE SPADE – ENDED LEAD	
		FROM	TO
599A Key Conn. (44)	G	T	SG
D50K Mtg Cord (5)	S-W	Stored	T
D50K Mtg Cord (23)	G-V	Stored	R
599A Key Conn. (4)	S-W	A2	BL
599A Key Conn. (6)	G-R	A2	6
599A Key Conn. (10)	BR-BK	A2	S1
D50K Mtg Cord (17)	O-Y	Stored	S1
LS Switch	BR	A (Note 3)	10
D50K Mtg Cord (50)	V-S	Stored (Note 3)	10
599A Key Conn. (48)	W-G	Stored (Note 3)	Tel Net A
599A Key Conn. (50)	S-Y	Stored (Note 3)	SG

Notes:

1. The telephone set wiring must conform to original factory wiring prior to making any wiring changes.
2. See Section 502-619-402 for telephone set terminal information. If the telephone set is equipped with a buzzer, disconnect and store the buzzer leads.
3. Leads need not be moved or added unless DAS 801-type ACU operated in the ground start mode is used with data set 103A3.

TABLE G
DATA AUXILIARY SET 801-TYPE
REQUIRED OPTIONS
(NOTE 1)

FEATURE OR OPTION	OPTION DESIGNATION
Data set to data mode by grounded contact	ZG
Grounded TK and CL contacts	ZB
Data set answer detection without end of number	E
2-Wire	ZH (Note 2)
DLO controlled by ACU	ZM (Note 2)
Mounting cord D10P-61	M

Notes:

1. Options W, X, S, and T are not applicable when the E option is used. All other options not shown in this table and Table H must be strapped for compatibility with the telephone line and the data terminal equipment.
2. DAS 801C only.

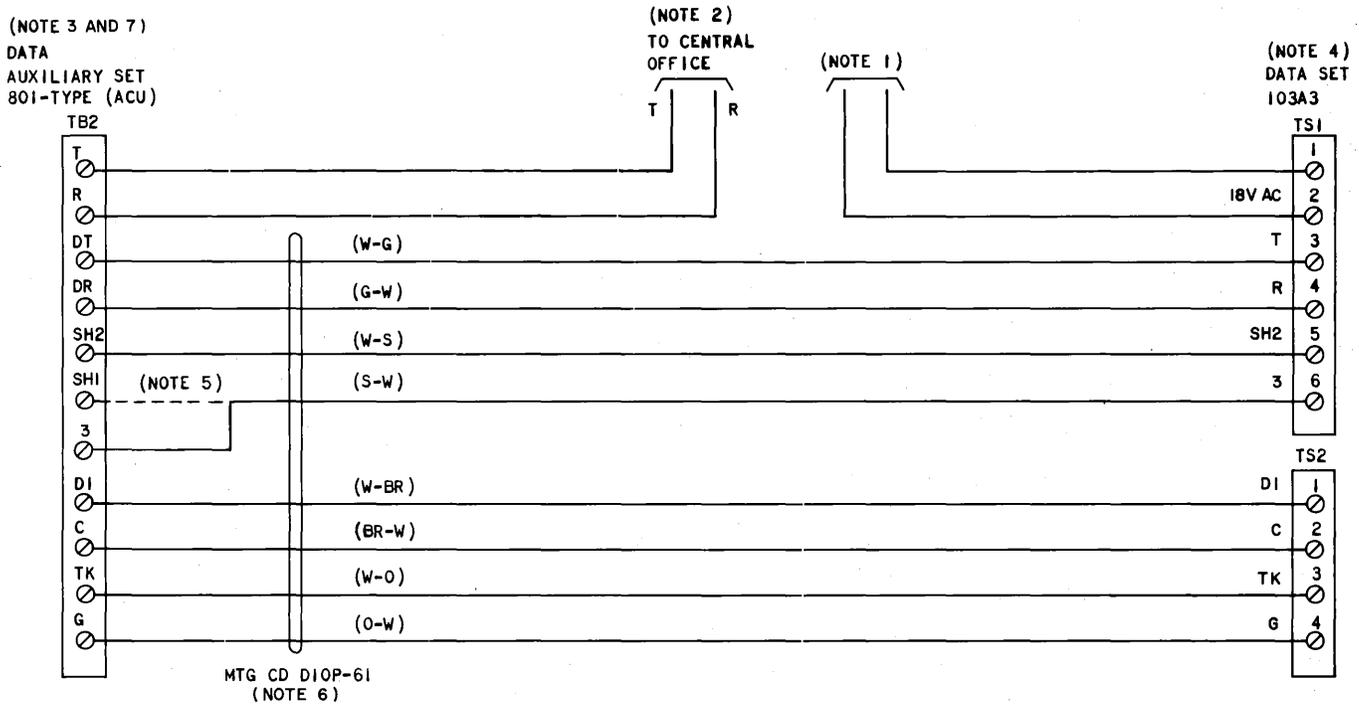
TABLE H
DATA AUXILIARY SET 801-TYPE
OPTIONS NOT USED WITH DATA SET 103A3
(NOTE 1)

FEATURE OR OPTION	OPTION DESIGNATION
Data set to data mode by contact to D1	Q
Data set to data mode by isolated contact	F
ACU answer detection or end of number	B
Isolated TK contact	ZA
Isolated CL contact	ZC
Ground start (4-wire)	ZK (Note 2)
4-Wire	ZJ (Note 2)
Terminate call via data set after DSS goes on (line transfer) in test	G
Terminate call via CRQ after DSS goes on (line transfer)	Z
DLO controlled by ACU and data set	ZL (Note 2)
Mounting cord M14C-61	N

Notes:

1. Options W, X, S, and T are not applicable when the E option is used. All other options not shown in this table and Table G must be strapped for compatibility with the telephone line and the data terminal equipment.
2. DAS 801C only.

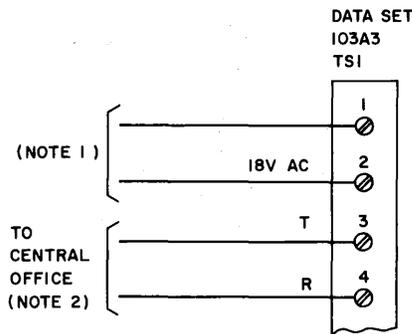
SECTION 591-014-201



NOTES:

1. CONNECT TO 2012B OR EQUIVALENT TRANSFORMER WHEN ATTENDANT UNIT IS A 662A1 TEL SET.
2. IF DS 103A3 IS TO BE CONNECTED TO A PBX LINE, READ PARAGRAPH 1.05, SECTION 591-014-101.
3. SEE TABLES G AND H.
4. SEE TABLE A AND B.
5. THIS WIRE MUST BE MOVED FROM TERMINAL SH1 TO TERMINAL 3.
6. TAPE AND STORE THE UNUSED LEADS.
7. IF THE ACU IS AN 801C-L1/2 MODIFY THE ABOVE CONNECTIONS TO THE DATA SET 103A3 AS FOLLOWS:
(A) DISREGARD NOTE 1, CONNECT THE W-BL LEAD TO TSI-1 AND THE BL-W LEAD TO TSI-2.
(B) DISREGARD NOTE 5. CONNECT THE O-R LEAD INSTEAD OF THE S-W LEAD TO TSI-6.
(C) CONNECT T AND R OF THE TELEPHONE LINE TO TSI-1 AND TSI-2, RESPECTIVELY.

Fig. 4—Data Set 103A3—Connections With DAS 801-Type (ACU)◄



NOTES:

1. CONNECT TO 2012B OR EQUIVALENT TRANSFORMER WHEN ATTENDANT UNIT IS A 662A1 TEL SET.
2. IF DS 103A3 IS TO BE CONNECTED TO A PBX LINE, READ PARAGRAPH 1.05 OF SECTION 591-014-101.

Fig. 5—Data Set 103A3—Connections Without DAS 801-Type (ACU)◄

TABLE I

F₂ TRANSMIT LEVEL

1000-HZ MEASURED LOSS	F ₂ OUTPUT LEVEL DBM
Above 12 dB	0
10 to 12 dB	-2
8 to 10 dB	-4
6 to 8 dB	-6
4 to 6 dB	-8
2 to 4 dB	-10
0 to 2 dB	-12

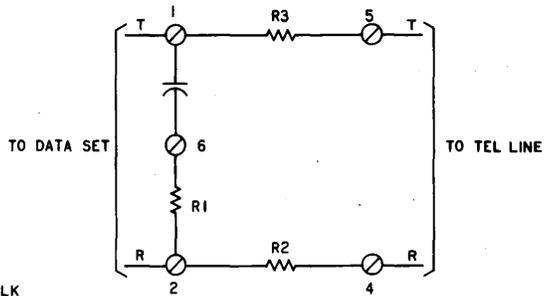
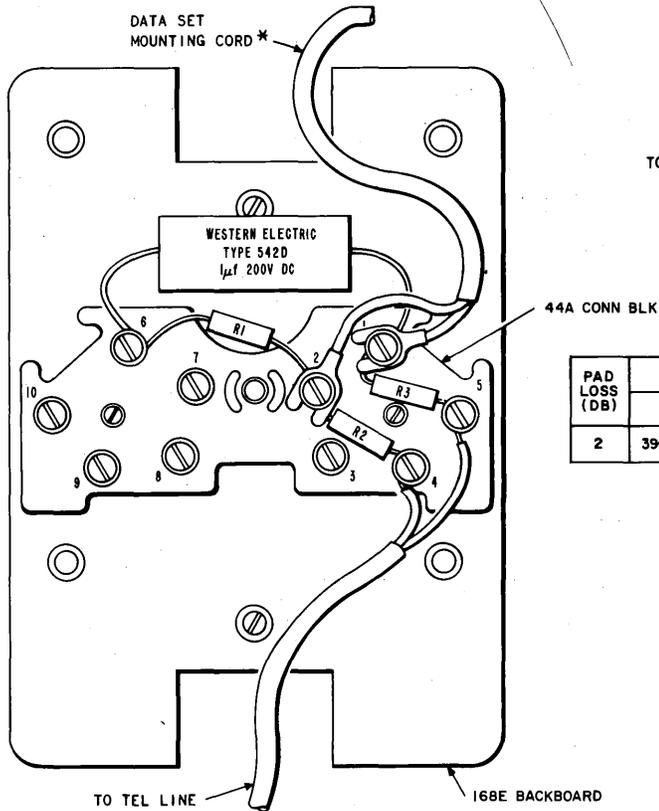
TABLE J

DATA SET 103E2 OR 103E4
 TRANSMIT LEVEL (CJ4 CP) AND DESENSITIZING PAD (CJ5 CP)

1000-HZ MEAS. LOSS	TRANSMIT LEVEL				DESENSITIZING PAD		
	DB		LOOSEN	TIGHTEN	DB	LOOSEN	TIGHTEN
	F ₂	F ₁					
Above 12	0	0	4, 12	5, 6, 7, 8, 9, 11	0	1, 2, 4	—
*—	0	-4	4, 11	5, 6, 7, 8, 9, 12	0	1, 2, 4	—
10-12	-2	-2	5, 12	4, 6, 7, 8, 9, 11	0	1, 2, 4	—
—	-2	-6	5, 11	4, 6, 7, 8, 9, 12	0	1, 2, 4	—
8-10	-4	-4	6, 12	4, 5, 7, 8, 9, 11	2	1, 2	4
—	-4	-8	6, 11	4, 5, 7, 8, 9, 12	2	1, 2	4
6-8	-6	-6	7, 12	4, 5, 6, 8, 9, 11	4	1, 4	2
—	-6	-10	7, 11	4, 5, 6, 8, 9, 12	4	1, 4	2
4-6	-8	-8	8, 12	4, 5, 6, 7, 9, 11	6	2, 4	1
—	-8	-12	8, 11	4, 5, 6, 7, 9, 12	6	2, 4	1
2-4	-10	-10	9, 12	4, 5, 6, 7, 8, 11	6	2, 4	1
—	-10	-14	9, 11	4, 5, 6, 7, 8, 12	6	2, 4	1
0-2†	-12	-12	9, 12	4, 5, 6, 7, 8, 11	6	2, 4	1

* Factory-furnished strapping is “— (F2 -0, F1 - -4)”

† Requires external 2-dB insertion loss pad (see Fig. 6).



PAD LOSS (DB)	RESISTOR VALUE (OHMS)					ORDERING INFORMATION	
	R1			R2 AND R3			
2	3900	ORANGE	WHITE	RED	110	BROWN BROWN BROWN	F-58102

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. 6—Pad Constructions and Connections (for Note After Table J)