DATA SET 103J-L1/2
TRANSMITTER-RECEIVER
SINGLE SET
INSTALLATION AND CONNECTIONS

CONTENTS PAGE

1. GENERAL

1.01 This section contains the information needed to install and connect data set (DS) 103J-L1/2. The data set should be installed in conformance with the general instructions given in Section 590-010-200. The information in this section covers the installation of data sets in individual mountings. Refer to Section 590-010-202 for a description of multi-set arrangements in 40A-type data mounting(s) and cabinet.

1.02 Whenever this section is reissued, the reason for reissue will be given in this paragraph.

1.03 DS 103J-L1/2 provides Dataphone® service as described in Section 314-205-501, over an ambient temperature range of 40 to 120°F with a relative humidity range of 20 to 95 percent.

Note: These environmental operational limits are valid only if no condensation occurs.

1.04 DS 103J-L1/2 should be located near the Bell System terminal or customer-provided equipment (CPE), since the customer-provided interface cord should not exceed 50 feet in length to conform to EIA standards.

1.05 Low voltage alternating current is supplied to the data set by wall transformer KS-21239-L4 attached to the power cord of the mounting. The KS-21239-L4 transformer is plug-mounted. The lug should be used to secure the transformer to the power outlet where local regulations permit by using an attached 6-32 by 1/2-inch oval head machine screw. The customer must provide ac power of 105 to 129V at 57 to 63 Hz at a standard 3-wire grounded power receptacle that is easily accessible to the data set. The receptacle should not be under control of a switch. The power required per set is approximately 10 watts. Approximately 3 watts of this is dissipated in the wall transformer.

Caution: Remove and discard the protective covering from the data set mounting. If not removed before prolonged operation, excessive heating of the data set may result.

1.06 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 connect to a customer-provided Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood, or equivalent. The key telephone set connects to the M13F cord of DS 103J-L1/2.

2. CIRCUIT PACK REMOVAL AND REPLACEMENT

2.01 DS 103J-L1 must be removed from the mounting to be accessible (Fig. 1).

Caution: Handle the data set by the nonconductive surfaces only, to prevent damage.

DS 103J-L1 should be removed from the mounting as follows:

(1) Remove the front cover by gently squeezing it at the top to disengage the top hooks, then rotate it down and out of the mounting.

(2) Remove the data set from the mounting by pulling on the handle or by gently prying behind the faceplate with fingers.

2.02 To access the common ringer jack-pin option, open the data set by removing the two captive screws from underneath CP1. Using care, disengage the two teflon standoffs and rotate open the two circuit packs which remain attached by the three flexible tapes. Figure 2 shows DS 103J-L1 unfolded.

2.03 To reassemble DS 103J-L1, fold CM1 into place, engage the teflon standoffs, and secure CM1 by using the two captive screws underneath CP1.

2.04 To replace DS 103J-L1 in the mounting, proceed as follows:

(1) Slide the CP into the mounting, ensuring that it is firmly seated at the rear.

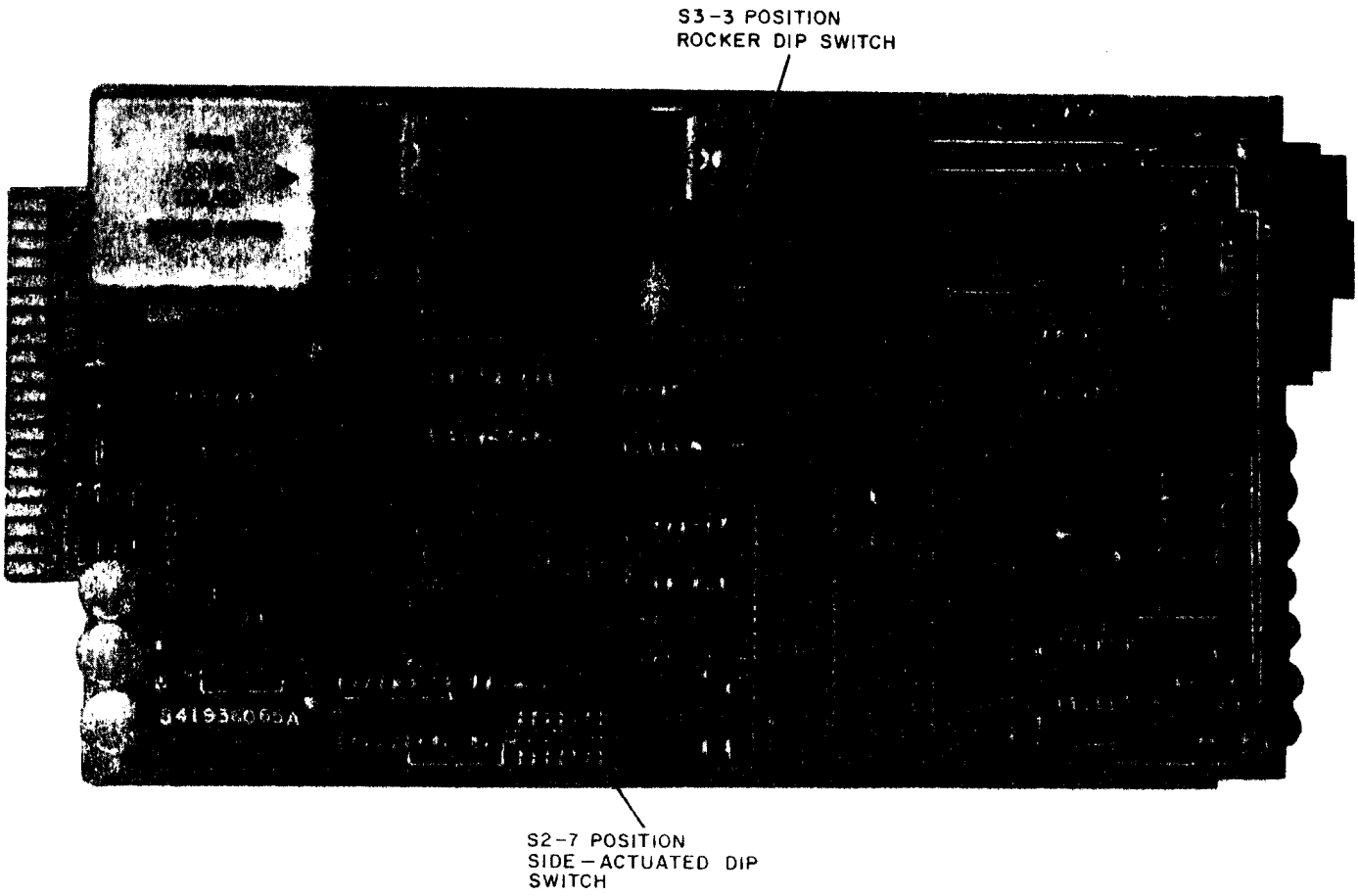


Fig. 1—Data Set 103J-L1

(2) Hook the tabs on the bottom of the front cover into the detents in the bottom of the mounting, and gently press the top of the front cover into the mounting until it snaps into place.

3. OPTIONS

3.01 The installer should remove DS 103J-L1 from the mounting and install the options called for on the service order prior to placing it in service.

3.02 An option label is shipped affixed to the bottom of the mounting. Extra labels are available by ordering Form E-6573.

3.03 The data set transmit level is fixed at a level lower than -9 dBm. It must not exceed -9 dBm under all operating conditions.

3.04 Data set options are determined by the switch settings S1 (on data mounting), S2 (Fig. 3), S3 (Fig. 4), and flexible cord pin jack (pin-jack option) on CP1 (Fig. 2). A description of the options shown in Table A follows.

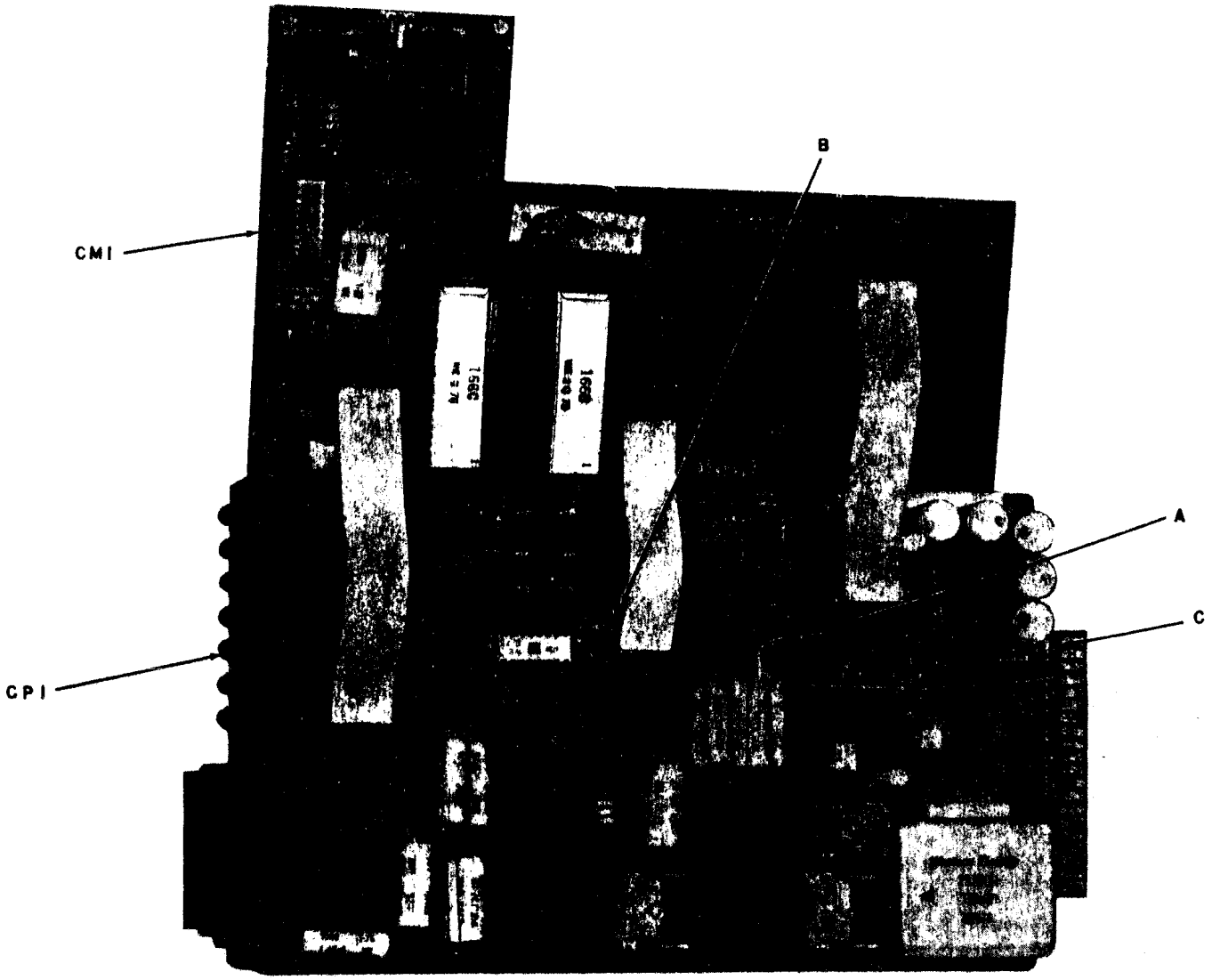


Fig. 2—Data Set 103J-L1 Unfolded

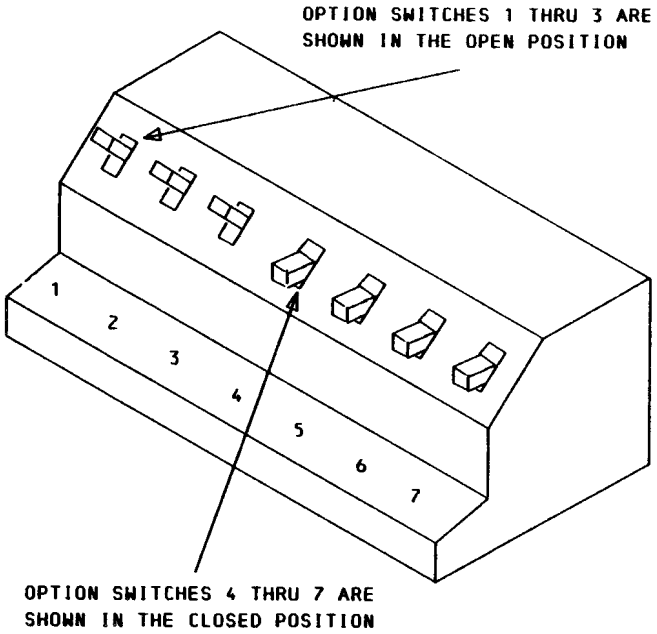


Fig. 3—Side Actuated DIP Option Switch S2

Receive Space Disconnect

- YES (option V): When this option is provided, the data set always disconnects upon receipt of a space disconnect signal of at least 2 seconds, but may disconnect in response to a spacing signal as short as 1 second.

- NO (option Y): When this option is provided, the data set does not disconnect upon receipt of a spacing signal of any duration.

Send Space Disconnect

- YES (option T): When the data terminal ready (CD) lead is turned ***off***, the data set transmits 3±1 seconds spacing signal prior to disconnecting.

- NO (option U): When the data terminal ready (CD) lead is turned ***off***, the data set disconnects immediately and no spacing signal is sent.

Loss of Carrier Disconnect

- YES (option S): When this option is provided, the data set disconnects when incoming carrier is lost for approximately 250 ms.

- NO (option R): When this option is provided, the data set does not disconnect when carrier is lost.

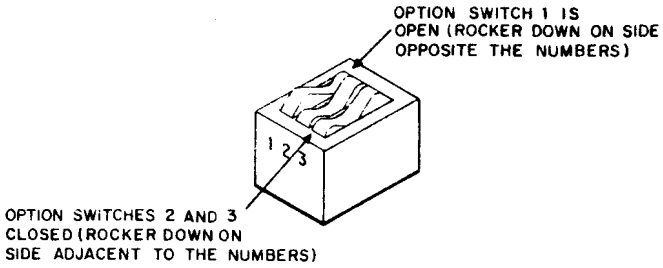


Fig. 4—Rocker DIP Option Switch S3

CC Indication

- EARLY (option ZD): When this option is provided, the CC lead turns ***on*** for call origination when data set goes off-hook. Some CPE require this early indication to obtain operating speed before data is received.

- DELAYED (option ZC): When this option is provided, the CC lead turns ***on*** at the originating data set when carrier is detected. This option has no effect on the CC lead when the data set is in the answer mode.

CB and CF Indications

- COMMON (option A): When this option is provided, the CB and CF leads turn ***on*** when handshaking is completed. Thereafter, both leads turn ***off*** with loss of carrier and turn ***on*** with reappearance of carrier.

- SEPARATE (option B): When this option is provided, the CB lead turns ***on*** when handshaking is completed and remains ***on*** for the duration of the data call. The CF lead turns ***on*** when carrier is detected and turns ***off*** when carrier is lost.

CC Indication for Analog Loop

- ON (option ZF): When this option is provided, the CC lead is ***on*** during analog loop test mode. Some CPE require this ***on*** condition during this test mode.

TABLE A

OPTION SWITCH SETTINGS

FEATURE		OPTION	FACTORY FURNISHED OPTION	SWITCH SETTING S2 SWITCH ON CM1 CONTACT SETTING 1	2	3	4	5	6	7	PROVIDE
Receive Space Disconnect	YES	V	√	—	—	O	—	—	—	—	One per set
	NO	Y		—	—	X	—	—	—	—	
Send Space Disconnect	YES	T	√	X	—	—	—	—	—	—	One per set
	NO	U		O	—	—	—	—	—	—	
Loss of Carrier Disconnect	YES	S	√	—	—	—	O	—	—	—	One per set
	NO	R		—	—	—	X	—	—	—	
CC Indication	EARLY	ZD	√	—	—	—	—	—	—	O	One per set
	DELAYED	ZC		—	—	—	—	—	—	X	
CB and CF Indications	COMMON	A	√	—	X	—	—	—	—	—	One per set
	SEPARATE	B		—	O	—	—	—	—	—	
CC Indication for Analog Loop	ON	ZF	√	—	—	—	—	O	—	—	One per set
	OFF	ZE		—	—	—	—	X	—	—	
Automatic Answer	YES	ZH	√	—	—	—	—	—	O	—	One per set
	NO	ZG		—	—	—	—	—	X	—	
	SEE NOTE										
				S3 SWITCH ON CP1 CONTACT SETTING 1	2	3	4	5	6	7	
Fail Safe State of CN Circuit	ON	K		—	X	—	—	—	—	—	One per set
	OFF	J	√	—	O	—	—	—	—	—	
Common Ringer	YES	ZB*		X	—	—	—	—	—	—	One per set
	NO	ZA†	√	O	—	—	—	—	—	—	
Tip-Ring Make Busy	YES	F		—	—	X	—	—	—	—	One per set
	NO	E	√	—	—	O	—	—	—	—	
	SEE NOTE										
Contact to Ground Make Busy Floating Contact Make Busy	For use with 40A-type data mounting			Not available when option ZB is used							— —
Common Grounds	YES	Q	√	Close S1 screw switch on 47C1 DM							One per set
	NO	P		Open S1 screw switch on 47C1 DM							

X = Contact closed O = Contact open — = Contact not applicable

* Strap C to B on CP1. † = Strap C to A on CP1.

Note: This space may be filled in by craftsperson when options have been determined.

- OFF (option ZE): When this option is provided, the CC lead is ***off*** during analog loop test mode.

Fail Safe State of CN Circuit

- ON (option K): When this option is provided, an open circuit is interpreted as an ***on*** condition on the CN lead and causes the line to be made busy if option F is installed.

- OFF (option J): When this option is provided, an open circuit is interpreted as an ***off*** condition on the CN lead. If the customer does not provide a signal on the CN lead, option J must be installed or the data set will not be functional.

Automatic Answer

- YES (option ZH): When this option is provided, the automatic answer feature of the data set is enabled.

- NO (option ZG): When this option is provided, incoming calls can only be answered manually.

Common Ringer

- YES (option ZB plus strap C to B on CP1): When DS 103J-L1/2 shares its telephone set with other new family data sets, this option enables the telephone buzzer to sound on incoming ringing.

- NO (option ZA plus strap C to A on CP1): This option disables the common ringer feature.

Tip-Ring Make Busy

- YES (option F). When this option is provided, any one of the following conditions will make the telephone line busy:

  (1) A power fail condition

  (2) The CN lead being ***on.***

  (3) Zero volts or an open circuit on the CN lead, provided the K option is installed

  (4) Operating the AL test button.

- NO (option E): When this option is provided, the tip-ring make-busy feature is disabled.

Contact to Ground Make Busy or Floating Contact Make Busy

- These features can only be used with the 40A data mounting.

Common Grounds

- YES (option Q): When this option is provided, signal ground is connected to frame ground.

- NO (option P): When this option is provided, signal ground and frame ground are not connected together.

4. INTERFACE LEADS

4.01 DS 103J-L1/2 provides the customer with the interface leads listed in Table B. These leads conform to EIA Standard RS-232-C.

4.02 The telephone and ACU interface leads and their uses are listed in Table C and described as they are used in DS 103J-L1/2 installations.

4.03 Figure 5 shows a simplified diagram of the telephone set, interface, and the data set.

TABLE B

CUSTOMER INTERFACE

EIA DESIG-NATION	CIRCUIT	CIRCUIT PACK CONNECTOR PIN ASSIGNMENT	CUSTOMER INTERFACE CONNECTOR PIN ASSIGNMENT
AA	Protective Ground	—	Note 1
BA	Transmitted Data	2	2
BB	Received Data	3	3
CB	Clear to Send	5	5
CC	Data Set Ready	6	6
AB	Signal Ground	7	7
CF	Data Carrier Detector	8	8
+P	Data Set Test (+12V)	27	9
—P	Data Set Test (—12V)	26	10
—	Not Used	—	11
—	Not used	—	19
CD	Data Terminal Ready	22	20
CE	Ring Indicator	23	22
CN	Terminal Busy	25	25

Note 2

Note 3

Note 1: Not wired in connector but available in data mounting.

Note 2: All other interface connector pins on the mounting are unused. As specified in EIA Standard RS-232, connector pins 9 and 10 are not to be used by the CPE.

Note 3: Pin 19 is connected to pin 11 in the housing. This circuit is not used in low-speed data sets.

TABLE C

TELEPHONE AND ACU INTERFACE

DESIG-NATION	DESCRIPTION	CIRCUIT PACK CONNECTOR PIN ASSIGNMENT	P1 PLUG PIN ASSIGNMENT
L	Tel set line lamp voltage from data set	18	1
LG	Tel set line lamp control from data set	35	4
TD	Talk/data control from tel set	14	5
T	Tel line tip lead	20	7
R	Tel line ring lead	19	8
RD	Common ringer control contact to ground	39	12
C	Contact closure to ground from data set to ACU to indicate data mode	15	14
D1	Contact closure to ground from ACU to data set to place set off-hook	16	16
T1	Tel set tip lead	34	21
R1	Rel set ring lead	33	22
A	"A" lead control: used to provide an indication to ACU or KTU when the line is in use	37	23
A1		38	24
TDG	Ground lead	36	25
RT	Remote test (Note 1)	17	—
MB	Make busy (Note 1)	40	—

Note 1: Used in 40A-type data mounting only.

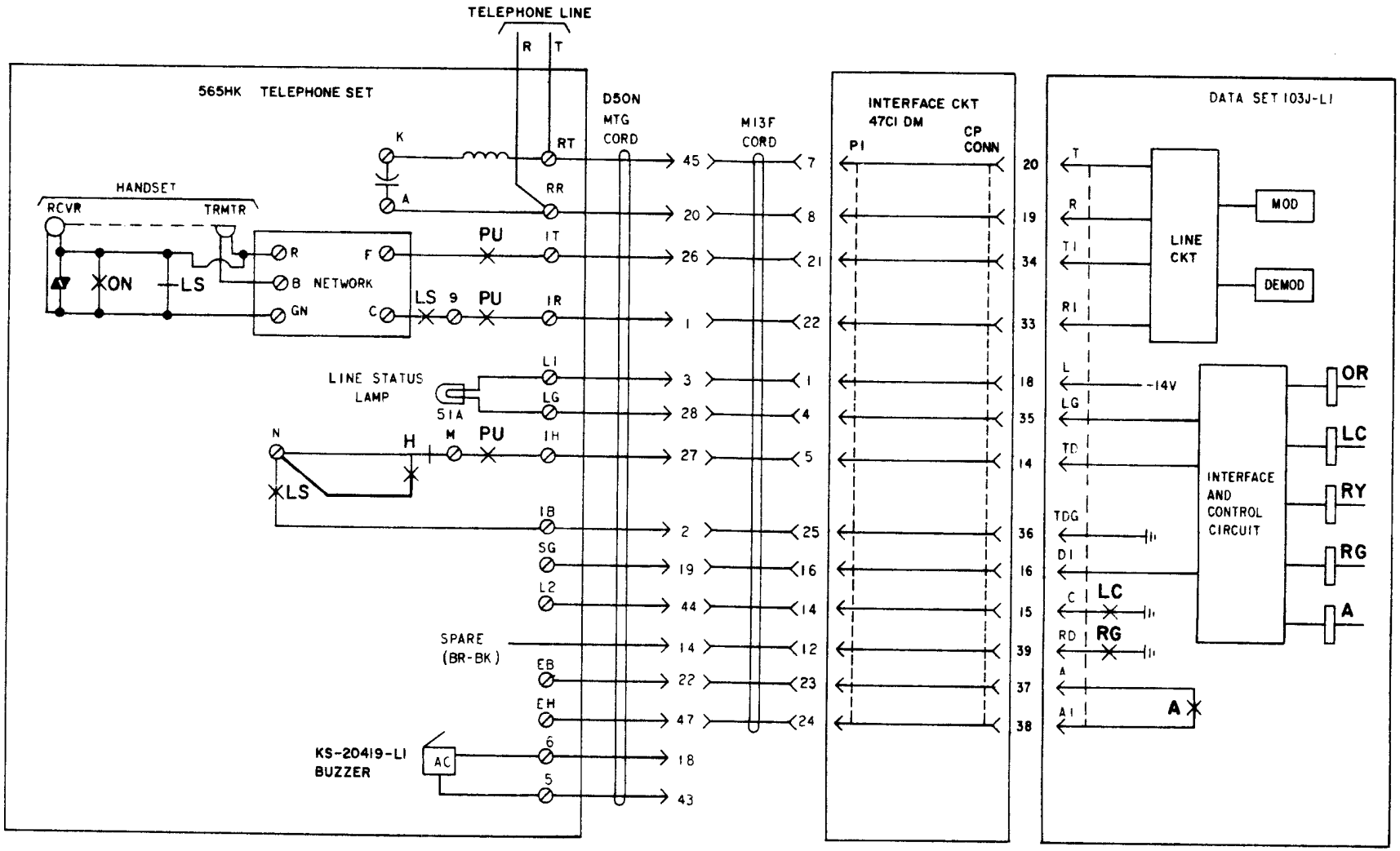


Fig. 5—Interface Between Telephone Set and Data Set Line Control

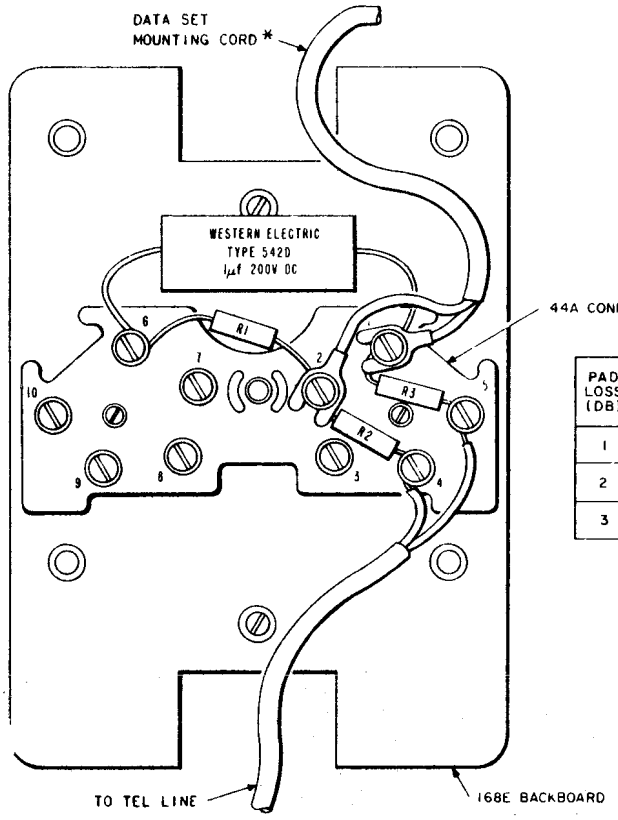
5. CONNECTIONS

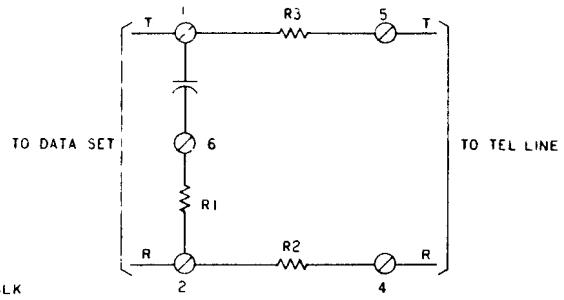
5.01 The data signal power level reaching the serving central office (SCO) should be no greater than -12 dBm. Usually the loop loss between the SCO and the data set is -3 dBm or greater. This -3 dBm loop loss combined with the fixed -9 dBm output level of the data set ensures that the signal reaching the SCO is not greater than -12 dBm. In some cases the loop loss is less than -3 dBm, and must be padded down. To meet the required power level, it will be necessary to install a pad external to the data set. The necessary pad may be ordered assembled or may be made up in the field and installed in accordance with Fig. 6.

5.02 In the event the actual loop loss is not known, it may be determined as follows.

(1) Dial the central office milliwatt supply or request the local testboard to send 1000-Hz tone at 0 dBm on the loop.

(2) Use a transmission test set with 900-ohm termination to measure the level of the incoming signal. The numerical reading is equal to the loop loss in dB (for example, -6 dBm on the meter is equal to 6 dB loop loss).





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

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. 6—Loss Pad Connections

SINGLE DATA SET

5.03 ***DS 103J-L1/2 Without ACU:*** When a single DS 103J-L1/2 is installed without an ACU, connect tip and ring in the associated telephone set and connect the cables as shown in Fig. 7. Figure 8 provides detailed wiring information for the single data set installation without ACU. This information is useful in troubleshooting.

5.04 ***DS 103J-L1/2 With ACU:*** When a single DS 103J-L1/2 is installed with an ACU, connect tip and ring in the associated telephone set and connect the cables as shown in Fig. 9. Figure 10 provides detailed wiring information for the single data set installation with an ACU. This information is useful in strapping and troubleshooting. A strap must be added in the telephone set to enable ACU clearing of the data set.

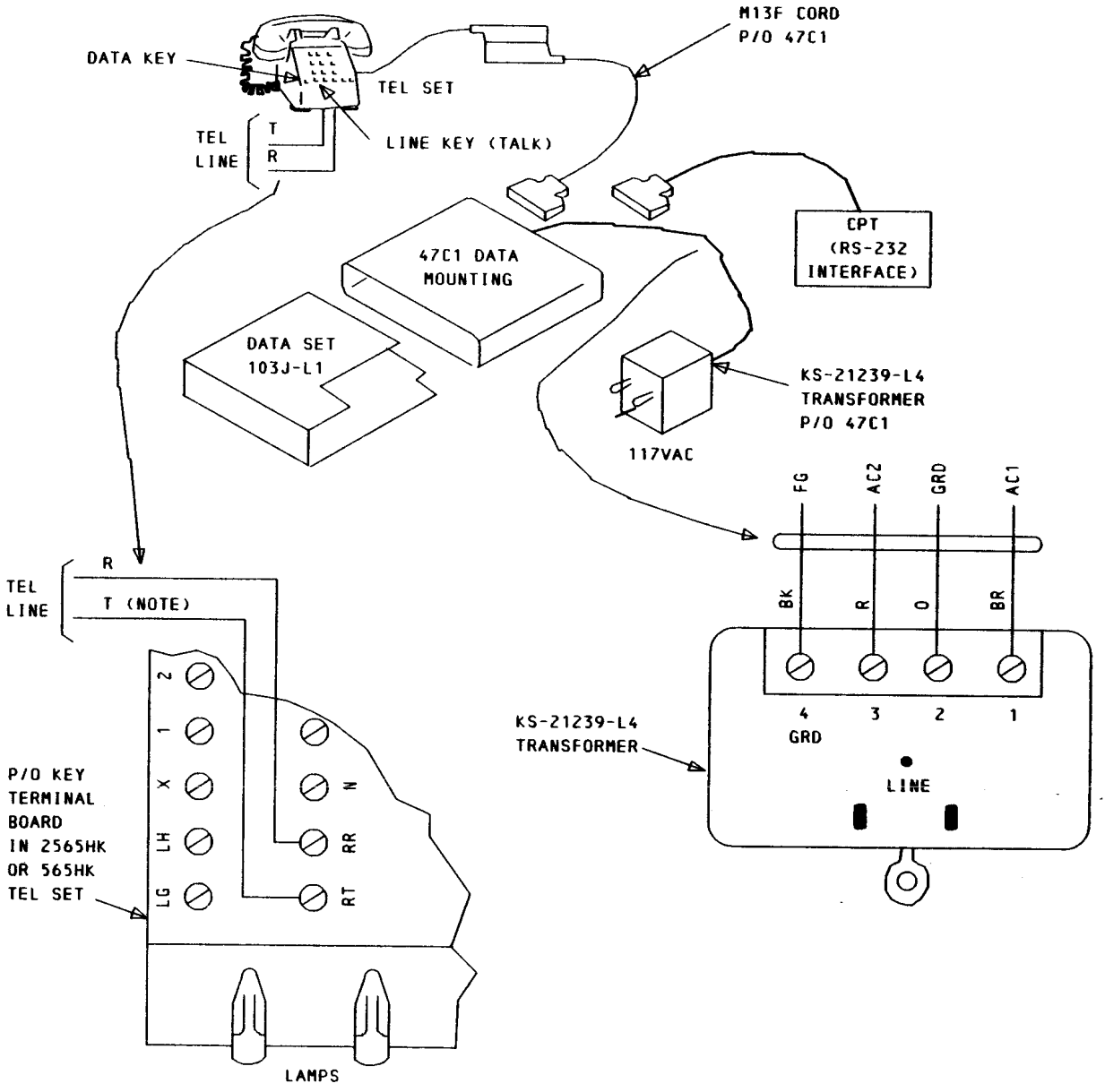


Fig. 7—Typical Data Set 103J-L1/2 Installation With 565HK Telephone Set

SINGLE DATA SET WITH SHARED TEL SET

5.05 If DS 103J-L1/2 shares its telephone set with other new family data sets, the data set should be connected in accordance with Fig. 11. The KS-21253-L3 adapter makes it possible for DS 03J to share a telephone set with other new family data sets with a minimum of effort on the part of the installer, since most of the connections are made via 50-pin connectors. Refer to Fig. 12 and 13 for details of the adapter.

5.06 To eliminate the need for several 110-Vac outlets, the individual KS-21239-L4 and 2012A transformers can be plugged into a multiple power outlet strip (Fig. 11). A 602-15 Waber Electric power outlet strip accommodates three transformers. A 1A2 power panel accommodates eight transformers. If there is interference, the spade lugs must be bent upward. A KS-14532-L20 or equivalent cord is required with the 1A2 power panel.

5.07 At installation of three or fewer data sets, tip and ring pairs may be connected directly to adapter screw terminals T1 and R1, T2 and R2, and T3 and R3, respectively, for the first three data sets. This arrangement eliminates the need for the B25A cable and the 66E-type connecting block.

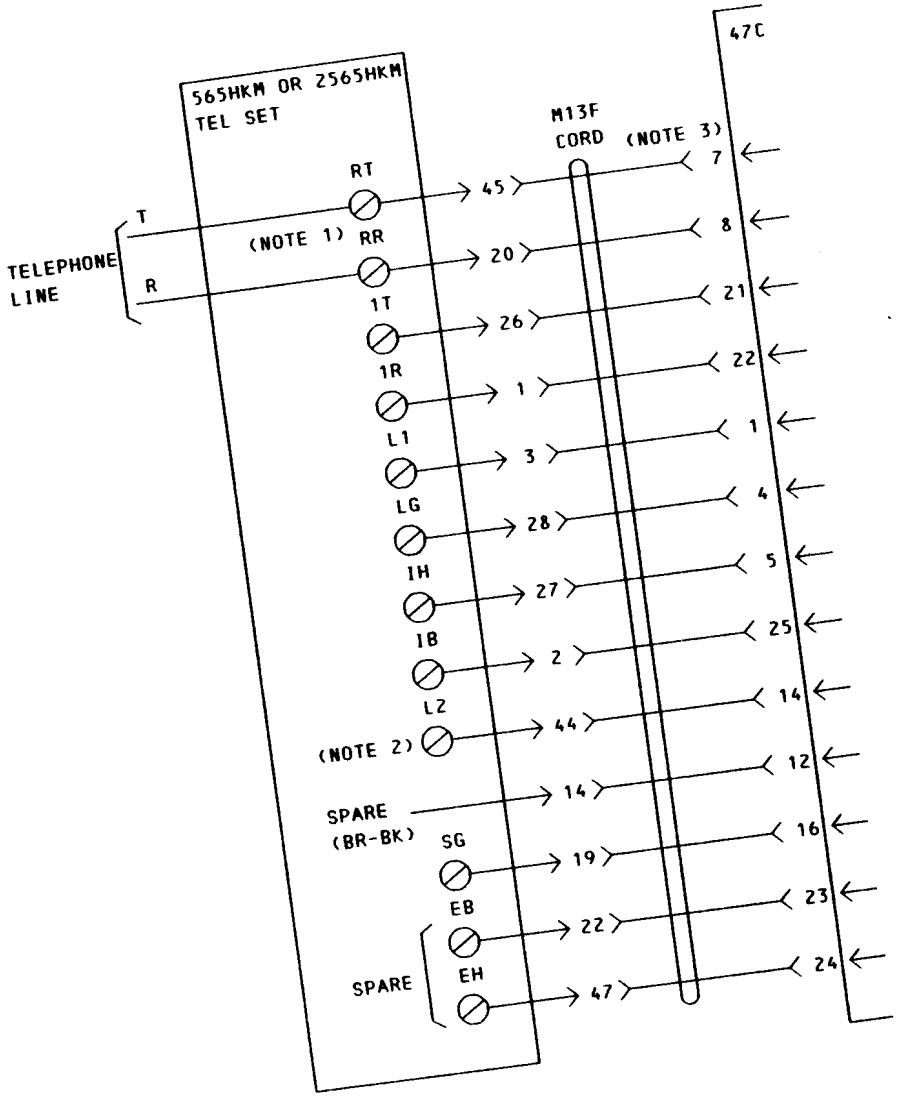
6. INSTALLATION TEST

6.01 After installation is completed, the data set should be tested to determine if it is operating properly. Refer to Section 591-039-500.

7. REFERENCES

7.01 The following BSPs provide additional information:

SECTION	TITLE
314-205-501	Data Systems—DATA-PHONE® Service—Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines
590-010-200	Data Sets and Data Access Arrangements—General Installation and Connection Information
590-010-202	Data Sets—Station Arrangements for Mixed Data Set Types in 40A Data Mounting



NOTES:

1. RT AND RR ARE LOCATED ON THE KEY TERMINAL BOARD NEAR THE LAMP STRIP.
2. L2 IS LOCATED ON THE TEL SET NETWORK.
3. THIS CORD AND TRANSFORMER ARE SHIPPED WITH THE DATA SET 103J-L1/2.

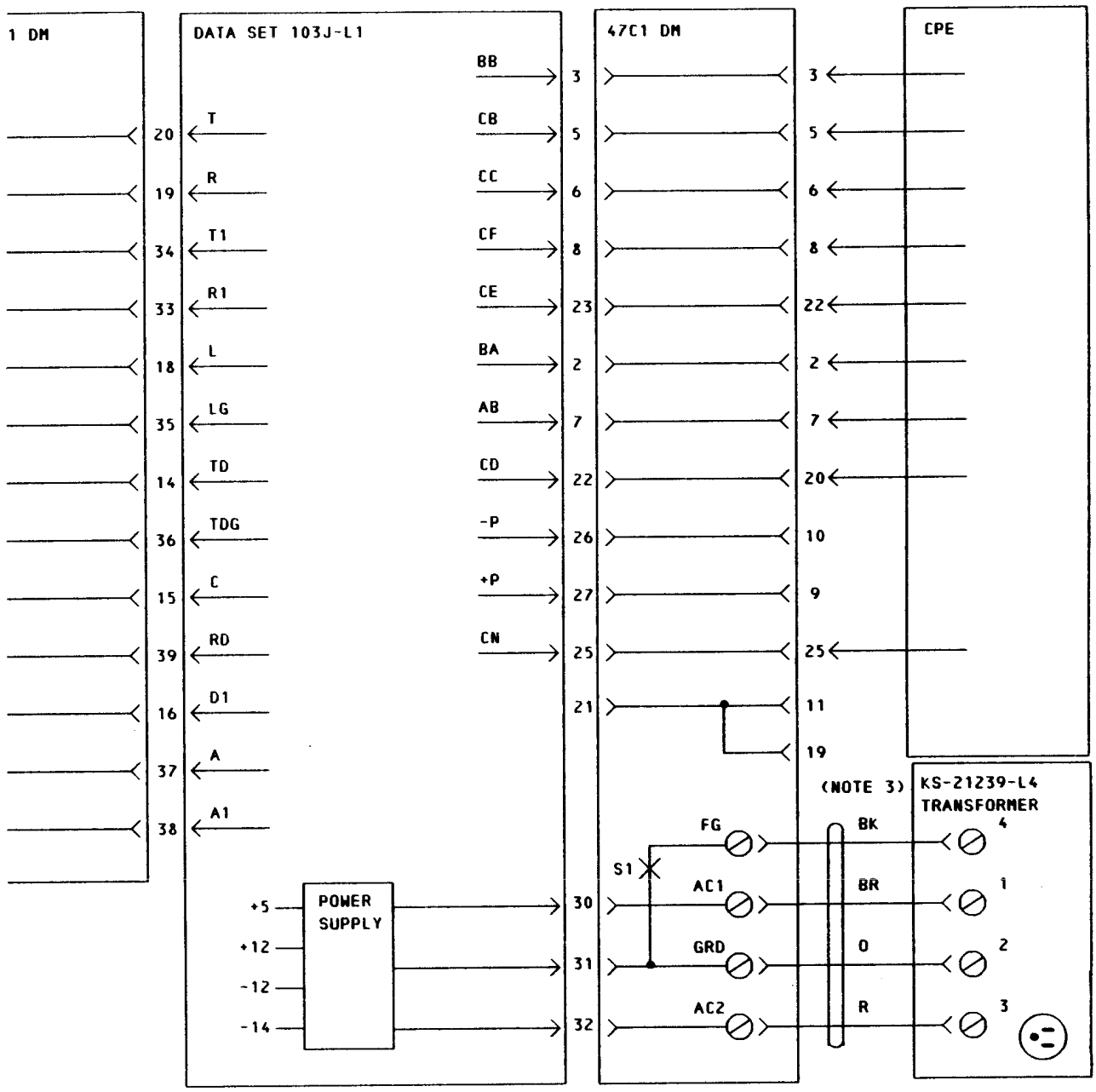
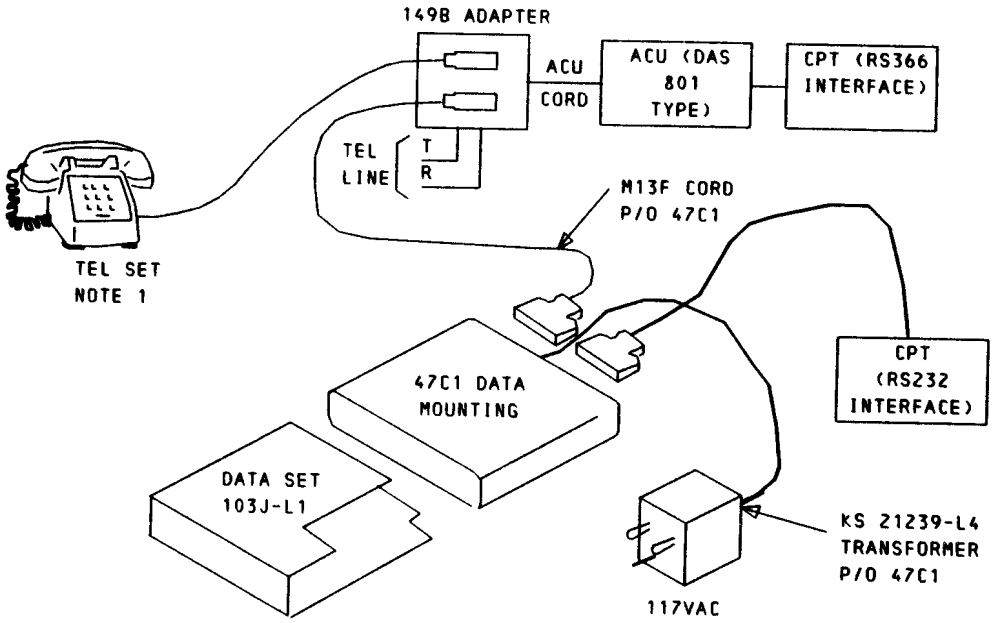


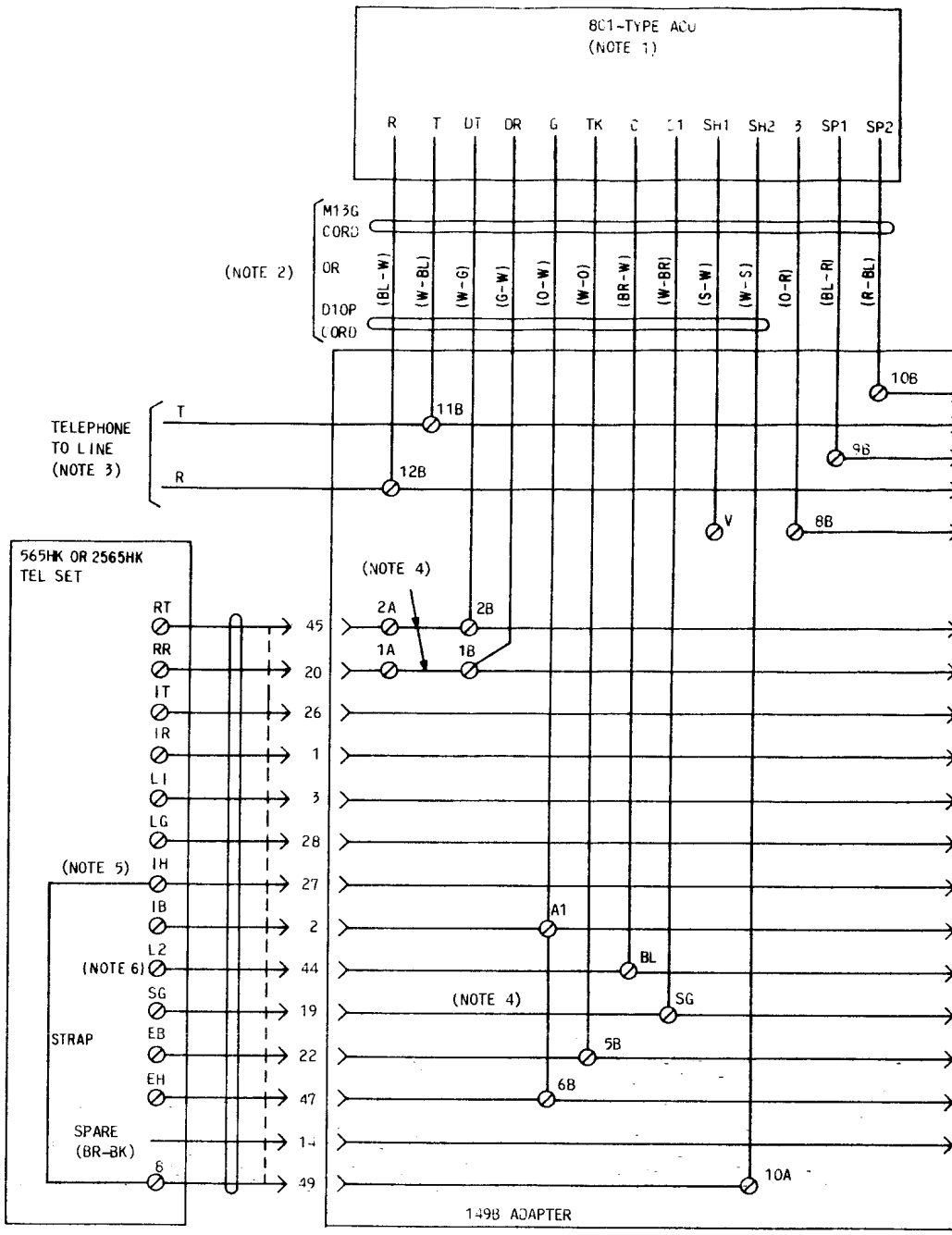
Fig. 8—Data Set 103J-L1/2 Installation With 565HK Telephone Set—Connection Diagram



NOTES:

1. STRAP PER FIGURE 10.
2. IF THE ACU USES TERMINATE CALL VIA DATA SET AFTER DSS ON OPTION G AND NEITHER MANUAL ORIGINATE NOR VOICE COMMUNICATIONS IS REQUIRED, THE TEL SET MAY BE OMITTED. IF THE ACU USES TERMINATE CALL VIA ACU AFTER DSS ON OPTION Z AND THE TEL SET IS OMITTED, AN ADDITIONAL STRAP MUST BE PROVIDED. CONNECT A 66E BLOCK TO THE 149B VIA AN A25D DOUBLE-ENDED CORD, AND STRAP TERMINAL 4 TO 48 ON THE 66E BLOCK.

Fig. 9—Typical Data Set 103J-L1/2 With ACU and Telephone Set


801-TYPE ACU
(NOTE 1)
R
T
DT
DR
G
TK
C
C1
SH1
SH2
3
SP1
SP2
M13G
CORD
(NOTE 2)
OR
D10P
CORD
(BL-W)
(W-BL)
(W-G)
(G-W)
(O-W)
(W-O)
(BR-W)
(W-BR)
(S-W)
(W-S)
(O-R)
(BL-R)
(R-BL)
10B
9B
8B
11B
12B
T
R
V
TELEPHONE
TO LINE
(NOTE 3)
565HK OR 2565HK
TEL SET
(NOTE 4)
2A
2B
1A
1B
RT
RR
IT
IR
LI
LG
IH
IB
L2
SG
EB
EH
SPARE
(BR-BK)
6
45
20
26
1
3
28
27
2
44
19
22
47
14
49
(NOTE 5)
(NOTE 6)
STRAP
A1
BL
SG
5B
6B
10A
149B ADAPTER

DAS 801-TYPE ACU OPTIONS

	DAS 801C-L1/2 (BSP 598-012-202)	DAS 801C4 (BSP 598-012-201)	DAS 801A6 (BSP 598-010-201)
REQUIRED	X, T, B, ZG, ZP	X, T, B, ZG, ZB, ZH, ZM, M	X, T, B, ZB, ZF, ZG, M
NOT USED	W, S, E, Q, ZA, ZN	W, S, E, Q, F, ZA, ZC, ZJ, ZK, ZL, N, G, Z	W, S, E, Q, F, ZA, ZC, ZE, N, G, Z
CHOOSE	V OR Y, R OR H, G OR Z, ZU OR ZV, ZQ OR ZR OR ZS OR ZT	V OR Y, R OR H, ZD OR A	R OR H, ZD OR A

NOTES:
1. OPTIONS DAS 801 PER ADJACENT TABLE. REFER TO 598-010-201, 598-012-201 OR 598-012-202 FOR INSTALLATION AND REMOVAL OF OPTIONS.
2. DAS 801C-L1/2 IS EQUIPPED WITH AN M13G CORD. DAS 801C4 AND DAS 801A6 ARE EQUIPPED WITH A D10P CORD.
3. IF EITHER DAS 801C-L1/2 OR 801C4 IS USED, THE TELEPHONE LINE MUST BE ARRANGED FOR TOUCH-TONE SERVICE. IF DAS 801A6 IS USED OR IF DAS 801C-L1/2 OR 801C4 HAS OPTION V INSTALLED, THE TELEPHONE LINE MUST BE ARRANGED FOR GROUND-START OPERATION.
4. INSTALLER STRAPS.
5. TERMINAL DESIGNATIONS SHOWN ARE FOR 565HKM AND 2565HKM TELEPHONE SETS. ADD STRAP IN TELEPHONE SET AS SHOWN. FOR THE 662A1M OR 2662A1M TELEPHONE SET, CONNECT THE INSULATED AND STORED (V-BR) LEAD OF THE D50K MOUNTING CORD TO TERMINAL 1. NO STRAPPING IS REQUIRED.
6. L2 IS LOCATED ON THE TEL SET NETWORK.
7. THIS CORD AND TRANSFORMER SHIPPED WITH DATA SET 103J-L1/2.

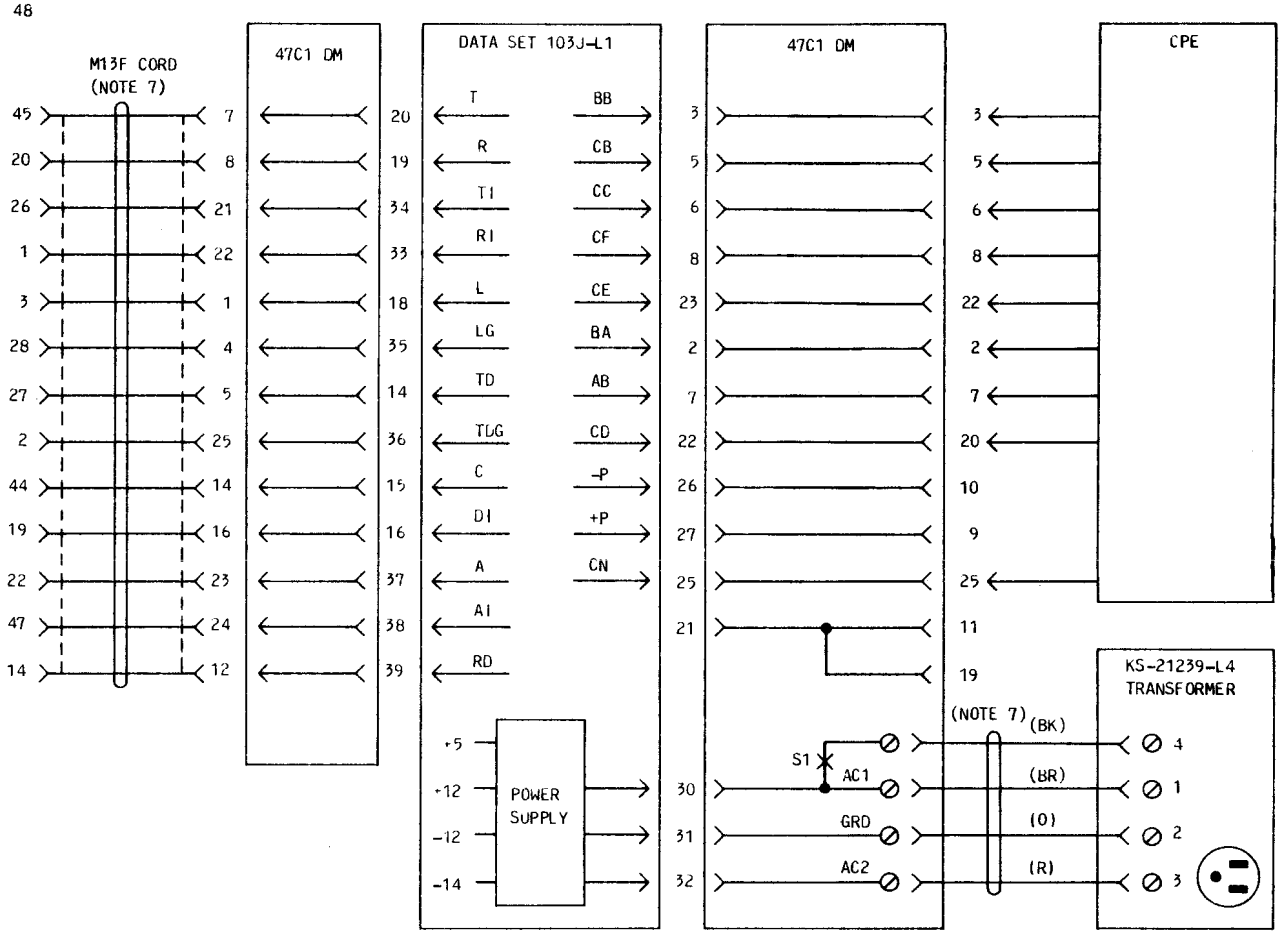
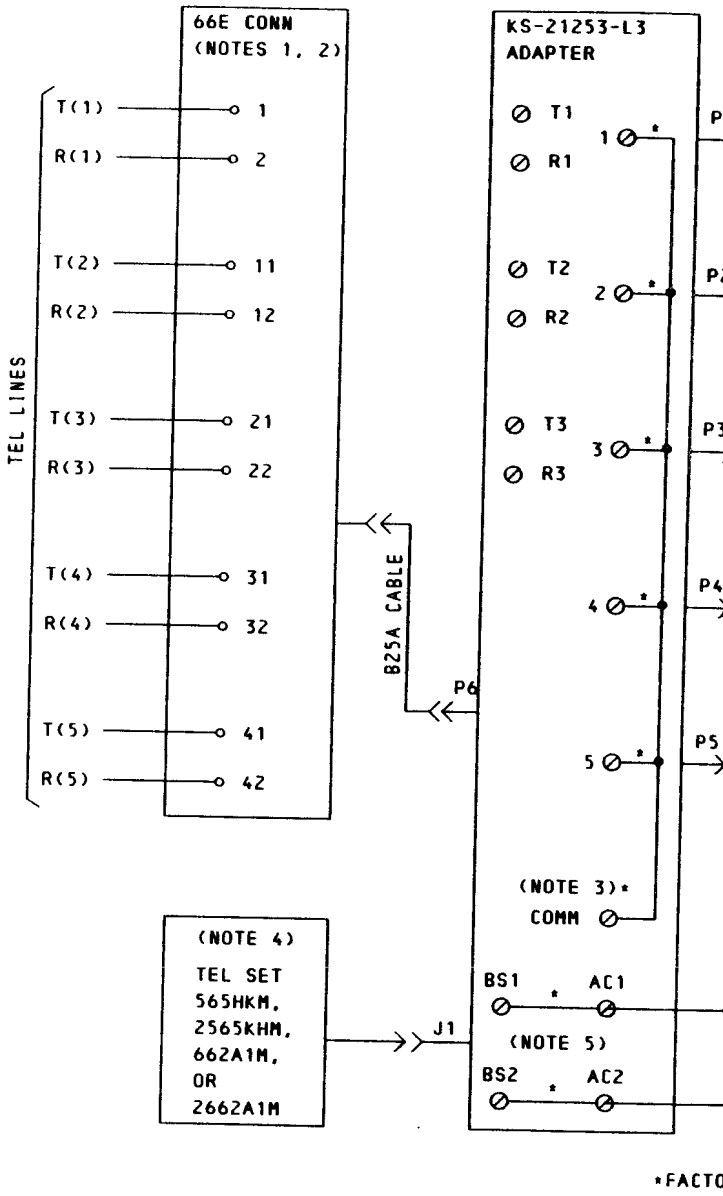
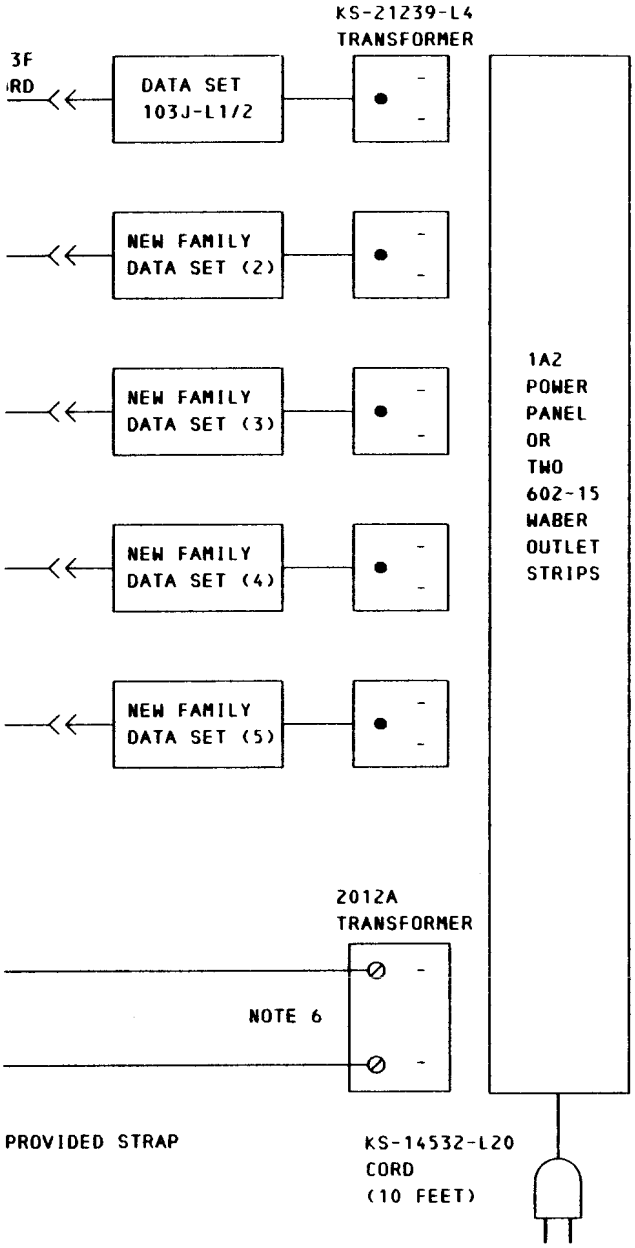


Fig. 10—Data Set 103J-L1/2 Installation With Automatic Calling and 565HK Telephone Set—Connection


66E CONN
(NOTES 1, 2)
TEL LINES
T(1)
R(1)
T(2)
R(2)
T(3)
R(3)
T(4)
R(4)
T(5)
R(5)
1
2
11
12
21
22
31
32
41
42
B25A CABLE
P6
KS-21253-L3
ADAPTER
T1
R1
T2
R2
T3
R3
1
2
3
4
5
(NOTE 3)*
COMM
BS1
AC1
(NOTE 5)
BS2
AC2
(NOTE 4)
TEL SET
565HKM,
2565KHM,
662A1M,
OR
2662A1M
J1
P5
*FACTO



NOTES:

1. THE ARRANGEMENT SHOWN IS FOR FIVE NEW FAMILY DATA SETS WITH RINGING-ACTIVATED COMMON BUZZER IN THE TELEPHONE SET.
2. IF THE INSTALLATION IS FOR TWO OR THREE DATA SETS, THE 66E CONNECTING BLOCK AND THE B25A CABLE CAN BE OMITTED AND THE TELEPHONE LINES CONNECTED DIRECTLY TO THE T AND R TERMINALS OF THE ADAPTER.
3. IF AUDIBLE RINGING AS COVERED BY NOTE 1 OR NOTE 5 IS NOT DESIRED FOR A PARTICULAR LINE, REMOVE THE FACTORY-PROVIDED STRAP BETWEEN ADAPTER TERMINAL COMM AND THE TERMINAL (1, 2, 3, 4, 5) CORRESPONDING TO THE PARTICULAR TELEPHONE LINE.
4. IF AUDIBLE RINGING IS REQUIRED FOR ONE LINE, THE TELEPHONE RINGER MAY BE STRAPPED (IN THE TEL SET) ACROSS LINE 1 AS FOLLOWS:
   565HKM, 2565HKM TEL SET - RR TO 1R, RT TO 1T
5. IF A RINGING GENERATOR IS AVAILABLE AND COMMON RINGING OF THE TELEPHONE SET RINGER IS REQUIRED, REMOVE STRAPS BS1 TO AC1 AND BS2 TO AC2 AND CONNECT RINGING GENERATOR ACROSS BS1 AND BS2 ON THE ADAPTER. CHANGE THE TELEPHONE SET AS FOLLOWS:
   565HKM, 2565HKM TEL SET - DISCONNECT THE BUZZER
   - STRAP RR TO 5 AND STRAP RT TO 6.
6. PROVIDE THE 2012A TRANSFORMER ONLY IF COMMON RINGING PER NOTE 1 OR NOTE 5 IS REQUIRED.

Fig. 11—Multiple Individually Housed Data Set 103J-L1/2 Installation With Other New Family Data Sets

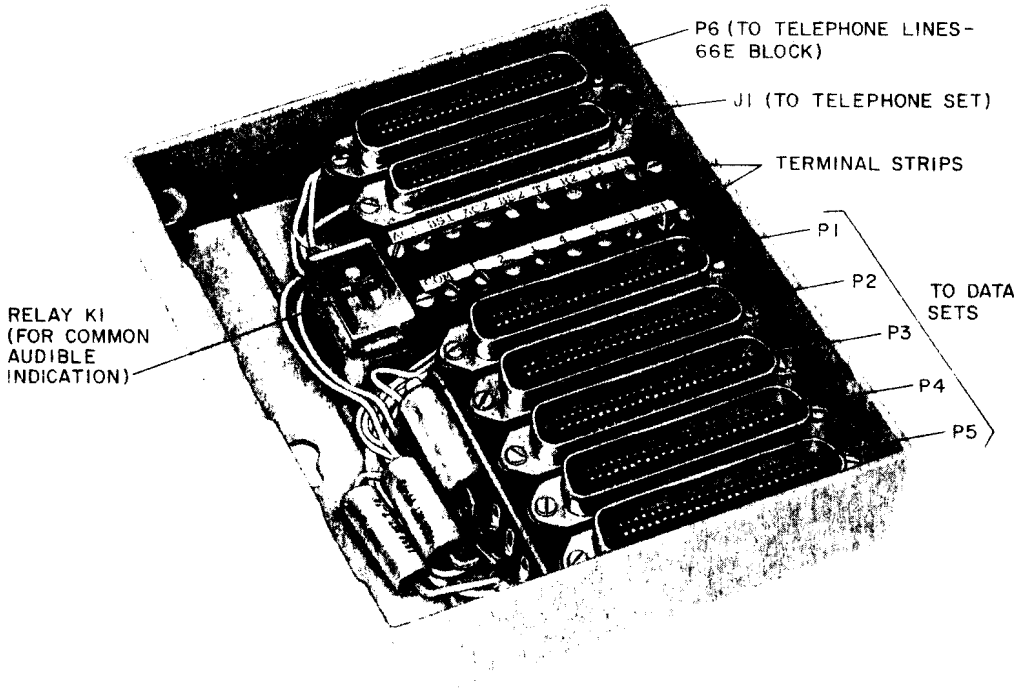
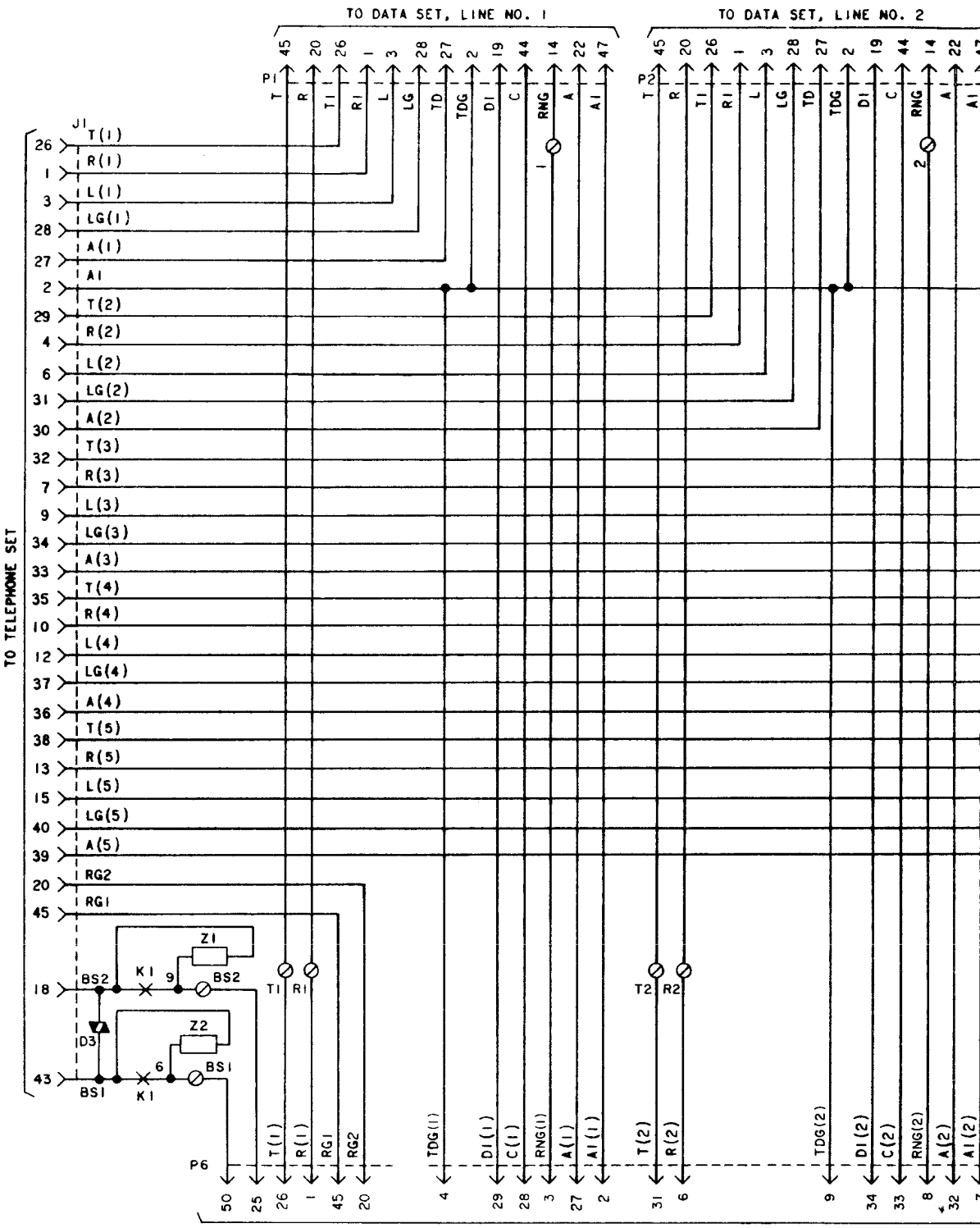


Fig. 12—KS-21253-L3 Adapter With Cover Removed


TO DATA SET, LINE NO. 1
TO DATA SET, LINE NO. 2
TO TELEPHONE SET
J1
P1
P2
P6
T(1)
R(1)
L(1)
LG(1)
A(1)
AI
T(2)
R(2)
L(2)
LG(2)
A(2)
T(3)
R(3)
L(3)
LG(3)
A(3)
T(4)
R(4)
L(4)
LG(4)
A(4)
T(5)
R(5)
L(5)
LG(5)
A(5)
RG2
RG1
Z1
Z2
K1
BS2
BS1
D3
T1
R1
T2
R2
RNG
TDG
DI
C
TI
RI
LG
TD
RNG(1)
RNG(2)
TDG(1)
TDG(2)
DI(1)
DI(2)
C(1)
C(2)
A(1)
A(2)
AI(1)
AI(2)

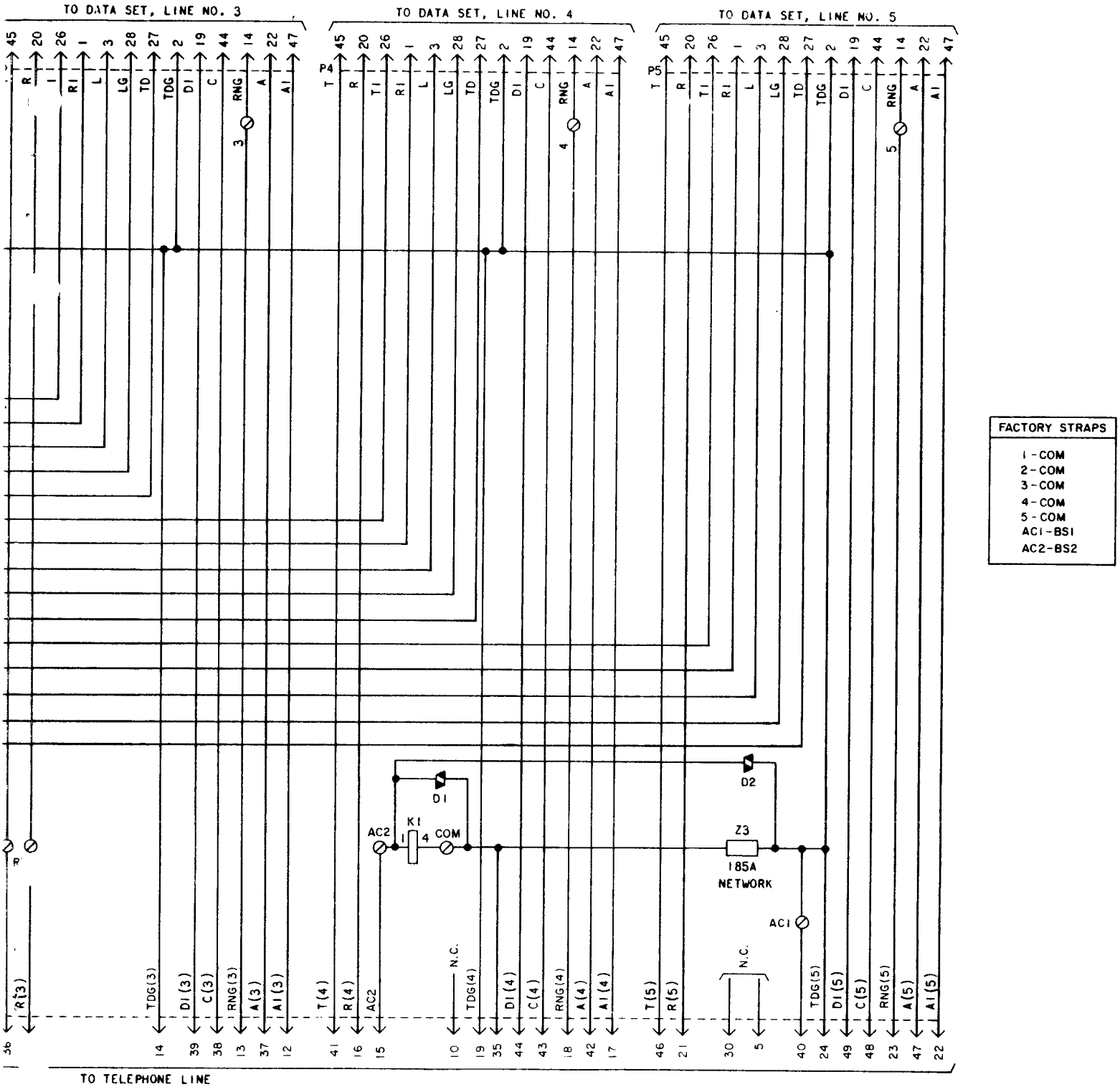


Fig. 13—Adapter for up to Five Data Sets Connected to One Key Telephone Set