DATA SET 201C-L1C
TRANSMITTER-RECEIVER
INSTALLATION AND CONNECTIONS

CONTENTS PAGE

1. GENERAL

1.01 This section contains the installation and connection information for data set (DS) 201C-L1C. The data set should be installed in conformance with the general instructions contained in Section 590-010-200.

1.02 When this section is reissued, the reason for reissue will be contained in this paragraph.

1.03 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-provided equipment cabinet. The data set operates in an ambient temperature range of 40 to 120°F and a relative humidity range of 20 to 95 percent.

1.04 The data set must be located near the CPE since 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 minimize inductive interference with data signals, the telephone line should not be carried in the same cable run as cable between the data set and CPE or lines connected to teletypewriter services. If this condition cannot be met, the telephone line must be run in type SK (shielded) station wire between the data set and the cable distribution terminal or building entrance. The shield should be grounded at one end only, preferably at the distribution terminal end.

1.05 The data set requires a power source that provides 105 to 129 volts 12 watts at 57 to 63 Hz. The customer must supply an outlet that will accept the 3-prong plug on the P3BJ or KS-14532-L24 power cord provided with the data set. To prevent the data set from being turned off accidently, this outlet should not be under the control of a switch. 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 CPE. If this condition cannot be met, a test using the 6H impulse counter should be performed to detect the presence of noise potential. This test is described in Section 592-029-500. If test requirements are not met, data set ground and CPE ground must be bonded together in accordance with local instructions.

1.06 A 25-pin female connector is provided at the rear of the data set for connection to the CPE. The customer must provide a cord terminated with a Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood (or equivalent). Data set connections to the CPE are in accordance with Table A.

1.07 A 25-pin male connector is provided at the rear of the data set for connection to telephone company (telco) equipment via the M13F cord. Data set connections to telco equipment are in accordance with Table B.

TABLE A

CUSTOMER INTERFACE

PIN NO.	FUNCTION	DATA SET MNEMONIC	EIA DESIGNATION (RS-232-C)
2	Transmitted Data	SD	BA
3	Received Data	RD	BB
4	Request to Send	RS	CA
5	Clear to Send	CS	CB
6	Data Set Ready	DSR	CC
7	Signal Ground	SG	AB
8	Received Line Signal Detector	CO	CF
9	Test Voltage	+12V	---
10	Test Voltage	—12V	---
15	Transmitter Signal Element Timing	SCT	DB
16	Dibit Clock Transmitter	DCT (Non-EIA)	---
17	Receiver Signal Element Timing	SCR	DD
18	Dibit Clock Receiver* or Local Analog Loopback †	DCR (Non-EIA) LL (Non-EIA)	--- ---
19	Remote Release (+5V)	RR (Non-EIA)	---
20	Data Terminal Ready	DTR	CD
21	Ready	RDY (Non-EIA)	---
22	Ring Indicator	RI	CE
24	Transmitter Signal Element Timing (External)	SCTE	DA

* Option YT

† Option YS

1.08 To access the transmitter output level options and grounding option, it is necessary to remove the data set from the housing:

(1) Disconnect the three cords from the rear of the data set.

(2) Remove the front cover by gently squeezing it on top and bottom and pulling forward.

Caution: Use hands only. No special tools are required. Excessive force may crack the cover of the data set.

(3) Loosen the two retaining screws at the rear bottom of the housing.

(4) Slide the data set out the front of the housing.

Caution: When the data set is removed from the housing, the data set should be placed on a clean, dry, nonconductive surface.

(5) Remove the four screws from the line control board (TP1).

TABLE B

TELEPHONE LINE INTERFACE

PIN NO.	DESIGNATION	FUNCTION
1	L	Line status lamp control from data set to telephone set
2	−12V	Test voltage
3	+5V	Test voltage
4	LG	Line status lamp control ground
5	TD	Talk/data control from telephone set to data set
7	T	Telephone line tip
8	R	Telephone line ring
12	RNG	Common ringer control for multiple data sets
14	C	Data mode status from data set to ACU
16	D1	Data mode control from ACU to data set
20	+12V	Test voltage
21	T1	Telephone set tip
22	R1	Telephone set ring
23	A	Telephone line status from data set to ACU
25	TDG	Talk/data control ground

(6) Fold the line control board over to the right and place it on a flat surface. Figure 1 shows the data set unfolded for access to the option straps.

1.09 To reassemble the data set, proceed as follows:

(1) Fold the line control board over onto the transmitter-receiver.

(2) Replace the four screws which attach the line control board to the transmitter-receiver board.

(3) Slide the data set into the housing.

(4) Replace the two retaining screws at the rear bottom of the housing.

(5) Replace the front cover by gently squeezing it on top and bottom and pushing forward until it snaps into place.

1.10 A label (E-6550) and holder (841 788 292) are available for use with DS 201C-L1C to permit identification of the circuit number and trouble call number. The label holder is backed with pressure-sensitive adhesive so the label can be affixed to the bottom of the housing. Mount the holder below the center of the mounting and flush with the front edge.

2. OPTIONS

2.01 Before the data set is placed in service, check to make sure that the proper options are installed. Table C provides a summary of data set options.

2.02 Options are installed and removed by means of multiple section rocker assemblies on the

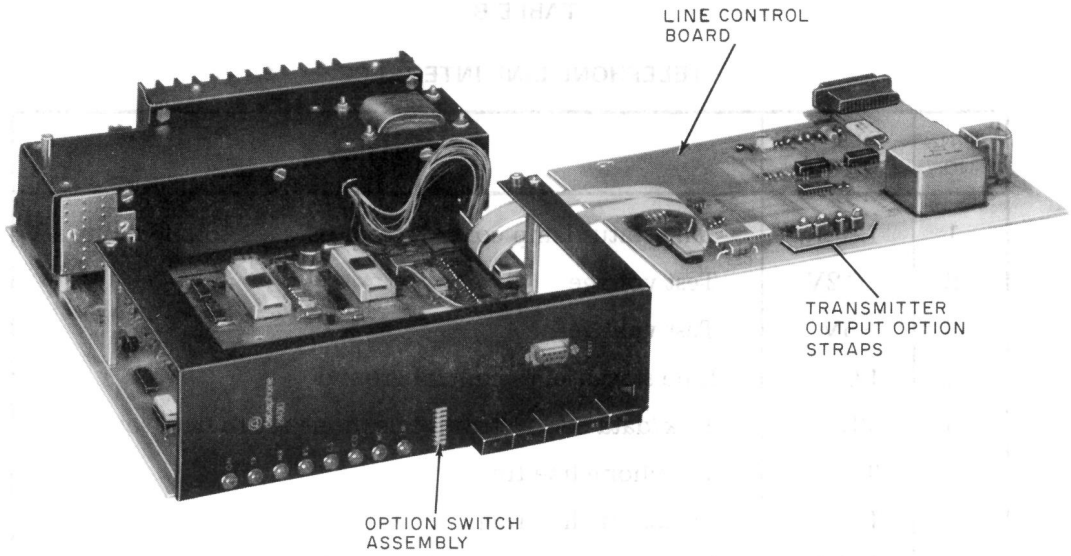


Fig. 1—Data Set Unfolded for Access to Option Straps

faceplate and by strapping plugs located on the line control board and on the transmitter-receiver board. Refer to Fig. 2 for a detailed sketch of the option switch assembly.

2.03 ***Transmit Signal Level Options:*** These options allow adjustment of the data set transmitted power output level and receiver sensitivity in order to compensate for line losses introduced by the local loop to the serving central office. Options ZA through ZP provide an output power level of 0 through -15 dBm in 1-dB steps.

> ***Note:*** The option is "strap out" when the strapping plug is parallel (horizontal) to the edge of the board.

2.04 ***Transmitter Timing Option:*** This option allows synchronization of the transmitter internal clock to the external bit clock from the CPE. When this option is in the internal position (YC), customer interface lead DA (transmitter signal element timing external) has no effect on operation of the data set, and the transmitter serial clock (DB) runs freely at its nominal rate of 2400 Hz (±0.005) percent. When the option is in the external timing position (YD), application of a 2400 Hz (±0.01) percent square-wave to pin 24 (DA) will cause transmitter serial clock (DB) to phase-lock to the external clock.

2.05 ***Automatic Answer:*** These options enable or disable the automatic answer and answer tone generation of the data set internal line control. This option provides the following two modes of operation.

- Option YE provides automatic answer controlled by the CPE through contact interface leads data terminal ready (CD) and ready (RDY). Both leads must be ***on*** (contact closure to +5 volt supply or EIA ***on*** voltage) for automatic answer to occur.

- Option YF provides automatic answer controlled by the CPE through the data terminal ready (CD) EIA interface lead. Data terminal ready must be ***on*** for automatic answer to occur.

2.06 ***Grounding Option:*** Option YK straps signal ground (AB) to frame ground (AA) inside the data set. Option YL separates these grounds.

2.07 ***Function of EIA Pin 18:*** Option YS allows analog loopback to be under the control of the CPE through interface pin 18. An EIA ***on*** voltage on pin 18 (LL) has the same effect on the data set as pressing the AL button, except that the data set ready (CC) signal is conditioned ***on***. Option YT disables the electrically activated

TABLE C

DATA SET 201C-L1C OPTIONS

FEATURE		OPTION	LINE CONTROL BOARD (TP1) STRAP IN (VERTICAL)	LINE CONTROL BOARD (TP1) STRAP OUT (HORIZONTAL)	PROVIDE
Transmit Line Signal Level	0 dBm	ZA		1, 2, 4, 8	One Per Station
	−1 dBm	ZB	1	2, 4, 8	
	−2 dBm	ZC	2	1, 4, 8	
	−3 dBm	ZD	1, 2	4, 8	
	−4 dBm	ZE	4	1, 2, 8	
	−5 dBm	ZF	1, 4	2, 8	
	−6 dBm	ZG	2, 4	1, 8	
	−7 dBm	ZH	1, 2, 4	8	
	−8 dBm	ZI	8	1, 2, 4	
	−9 dBm	ZJ*	1, 8	2, 4	
	−10 dBm	ZK	2, 8	1, 4	
	−11 dBm	ZL	1, 2, 8	4	
	−12 dBm	ZM	4, 8	1, 2	
	−13 dBm	ZN	1, 4, 8	2	
	−14 dBm	ZO	2, 4, 8	1	
	−15 dBm	ZP	1, 2, 4, 8		

FEATURE		OPTION	SWITCH SETTING 1	2	3	4	5	6	7	8	DIGITAL BOARD (JB4)	PROVIDE
Transmitter Timing	INTERNAL	YC*					X					One Per Station
	EXTERNAL	YD					O					
Automatic Answer	RDY & DTR CONTROLLED OR NOT PROVIDED	YE								O		One Per Station
	DTR CONTROLLED ONLY	YF*								X		
Grounding Option	SIGNAL GRD CONNECTED TO FRAME GRD	YK*									Install E1-E1	
	SIGNAL GRD NOT CONNECTED TO FRAME GRD	YL									Remove E1-E2	
Function of EIA Interface Pin 18	INITIATES LOCAL ANALOG LOOPBACK	YS				X					Install E3-E4	One Per Station
	PROVIDES RECEIVE SYMBOL CLOCK	YT*				O					Install E4-E5	
Cont Receiver Bit Clock	IN	YO							O			One Per Station
	OUT	YP*							X			
Satellite Option	IN	YQ*			X							One Per Station
	OUT	YR			O							

* Factory-furnished option

X - Closed

O = Open

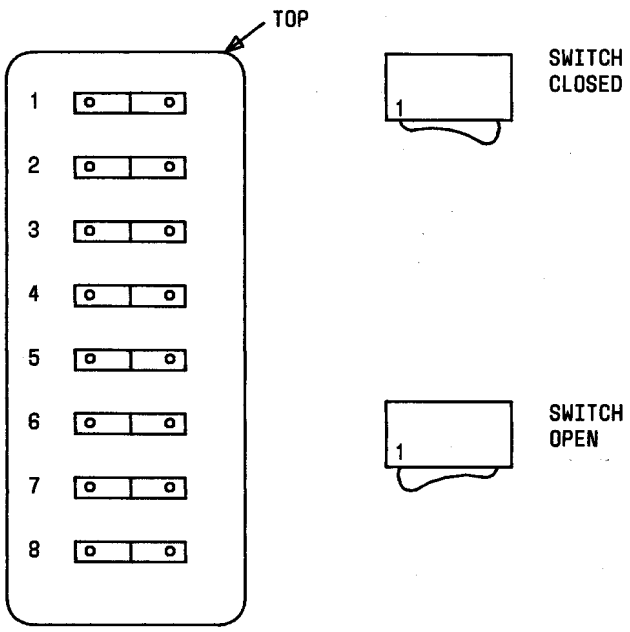


Fig. 2—Details of Option Switch

analog loopback test feature, and pin 18 becomes an output which provides receiver dibit clock (DCR).

2.08 ***Continuous Receiver Bit Clock:*** Option YO allows the receiver signal element timing (DD) signal to be present even when there is no received carrier signal. This is done by having DD connected to the transmitter signal element timing (DB) signal, which is always present. Option YP allows the receiver signal element timing (DD) signal to be derived from the received data signal and to be changed to spacing (positive voltage) when the received line signal detector (CF) is ***off.***

2.09 ***Satellite Option:*** Option YQ allows the data set to be used over DDD satellite links. This option inhibits request-to-send at the called set for 275 ms after the end of answer tone. This silent interval allows echo suppressors which have been disabled by the answer tone frequency to enable. Subsequent turnarounds are not affected by this option.

3. INSTALLATION

3.01 The procedure for installing a DS 201C-L1C is as follows:

(1) Unpack the data set and remove the protective covering from the housing.

(2) Disassemble the data set as directed in 1.08.

(3) Install the required options called for on the service order. Refer to Table C.

(4) Adjust the transmitter output level as directed in 4.01.

(5) Mark the installed options on the option label (E-6898) and attach it to the bottom of the housing.

(6) Reassemble the data set as directed in 1.09.

(7) Connect the data set to the telephone line as directed on the appropriate connection diagram.

(8) Perform installation tests as directed in Section 592-029-510.

4. CONNECTIONS

4.01 The data set output level is controlled by straps on the line control board. Set the output level so that the level of the signal reaching the serving central office does not exceed -12 dBm. For example, if the loop loss is 5 dB:

Output level = -12 dBm + 5 dB = -7 dBm.

Option ZH provides -7 dBm output power.

4.02 If the loop loss is not known, it can be determined as follows:

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

(2) Use a transmission test set such as the TTS-4 with a 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.

4.03 ***DS 201C-L1C Without Automatic Calling Unit (ACU):*** When a single DS 201C-L1C is installed without an ACU, connect cables and connect tip and ring as shown in Fig. 3. Figure 4 provides detailed wiring which may be useful in troubleshooting this arrangement.

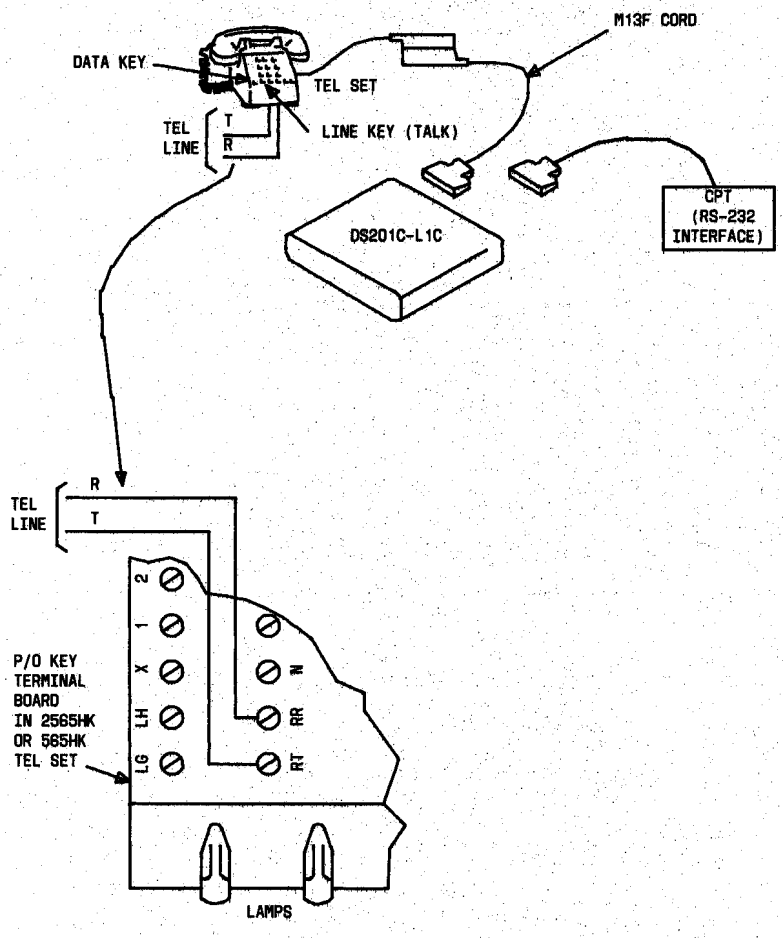
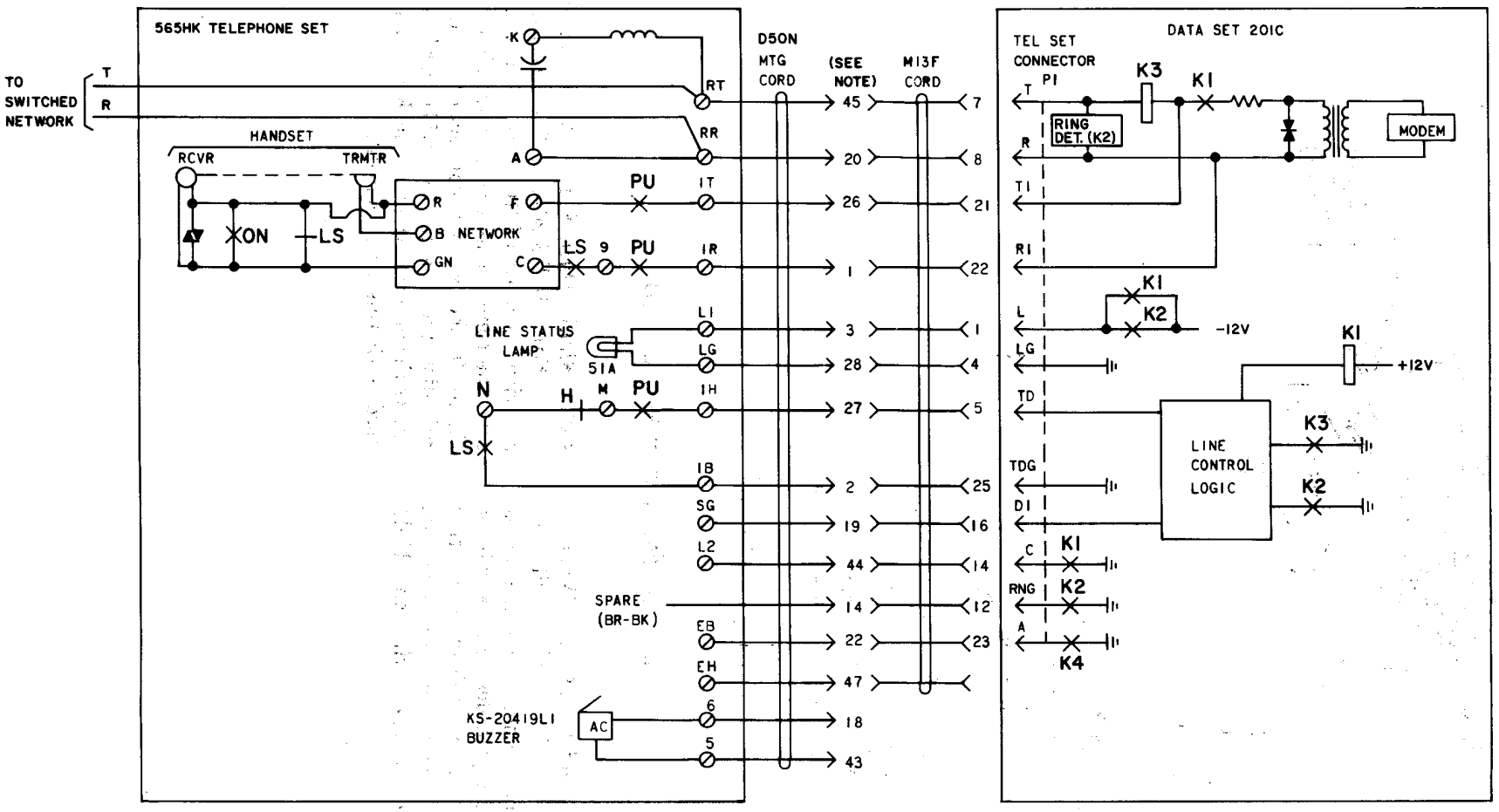


Fig. 3—DS 201C-L1C Without an ACU

4.04 ***DS 201C-L1C With ACU:*** When a single DS 201C-L1C is installed with an ACU, connect cables and connect tip and ring as shown in Fig. 5. Figure 6 provides detailed wiring which may be useful in troubleshooting this arrangement. Figure 7 shows an alternate connection for DAS 801C-list type equipped with an M15H cord.

4.05 ***Single Data Set With Shared Telephone Set:*** If DS 201C-L1C shares the telephone set with other DSs 201C or other new family data sets, the connections are made as shown in Fig. 8. Figure 9 shows this connection made with an 801C-list type using an M15H cord. Figure 10 shows the internal wiring of the KS-21253-L3 adapter used with this arrangement.



NOTE:
MAY BE EXTENDED WITH B25A CABLE. MAXIMUM DISTANCE BETWEEN TELEPHONE SET AND DATA SET IS 100 FEET.

Fig. 4—Connection Wiring for DS 201C-L1C Without an ACU

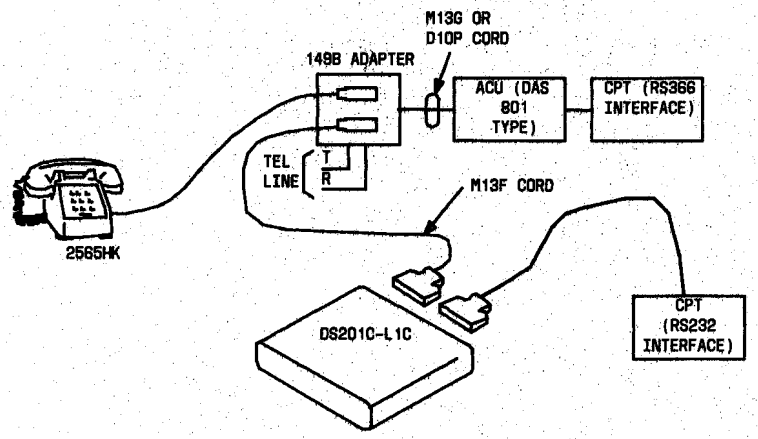


Fig. 5—DS 201C-L1C With an 801C ACU

5. REFERENCES

5.01 Additional information concerning DS 201C-L1C and auxiliary apparatus is contained in the following publications:

SECTION	TITLE
502-500-120	Telephone Sets—540, 560, 1560, and 2560 Series—Common Installation and Maintenance Information
592-029-110	Data Set 201C-L1C Transmitter-Receiver—Installation and Connection
592-029-510	Data Set 201C-L1C Transmitter-Receiver—Test Procedures
598-012-202	Data Auxiliary Set 801C-List Type—Installation and Connection

NOTES:

1. DAS 801-TYPE OPTIONS REQUIRED ARE SHOWN IN THE FOLLOWING TABLE:

801C-L1/2	801C4	801A6
V OR Y	V OR Y	
W	W	W
S	S	S
ZG	ZG	ZG
B	B	B
ZN		
G OR Z	G OR Z	G OR Z
R OR H	R OR H	R OR H
ZQ, ZR, ZS, OR ZT		
ZU OR ZV		
	ZH	
	ZM	
		ZE OR ZF
	M	M

2. MI3G CORD PROVIDED WITH 801C-L1/2. DIOP CORD PROVIDED WITH 801C4 AND 801A6
3. DIOP CORD DOES NOT CONTAIN THESE LEADS.
4. INSTALLER STRAP.
5. MAY BE EXTENDED WITH B25A CABLE. MAXIMUM DISTANCE BETWEEN TEL SET AND DATA SET IS 100 FEET.

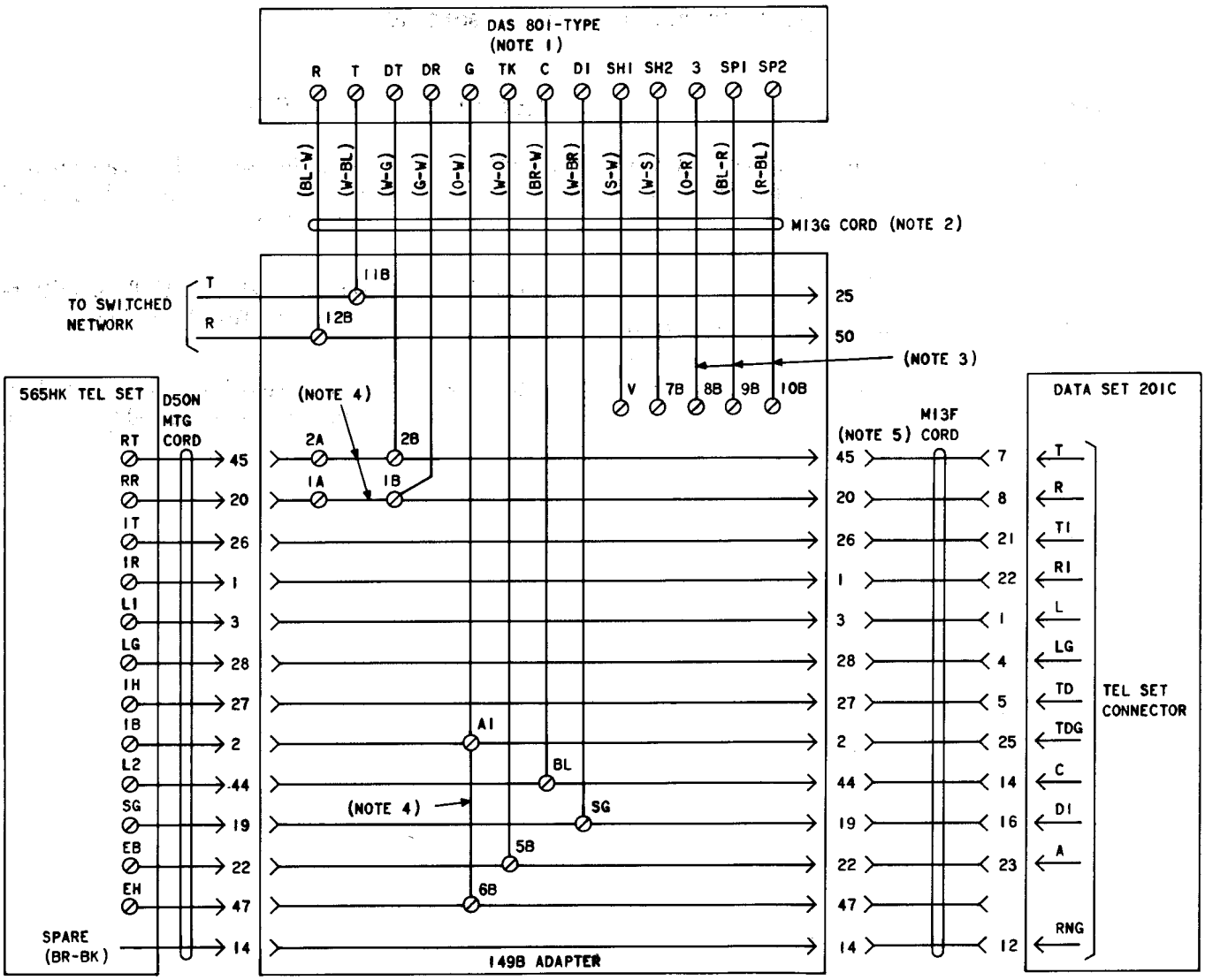


Fig. 6—Connection Wiring for DS 201C-L1C With an 801C ACU

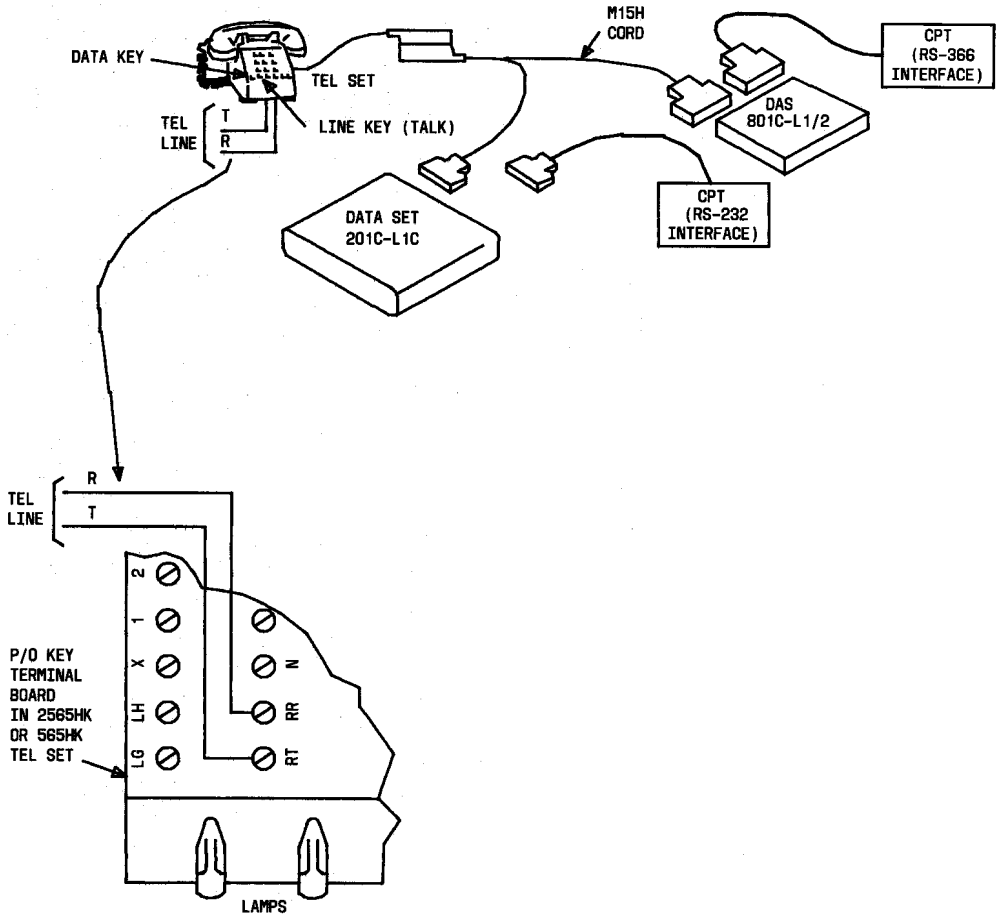


Fig. 7—DS 201C-L1C With an 801C ACU Using M15H Cord

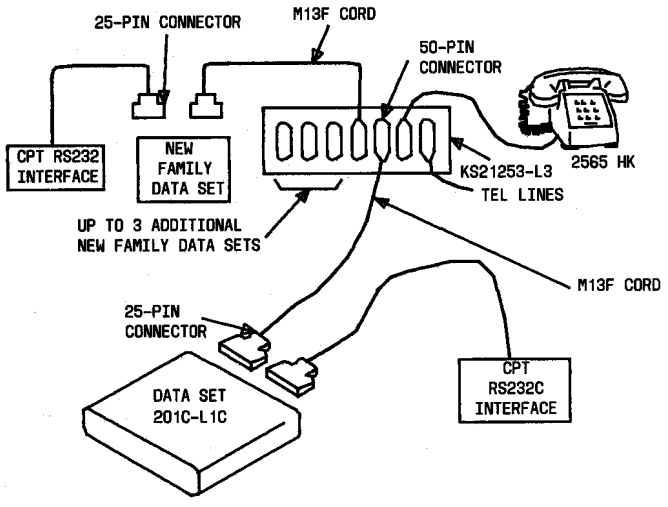


Fig. 8—Single Data Set With Shared Tel Set

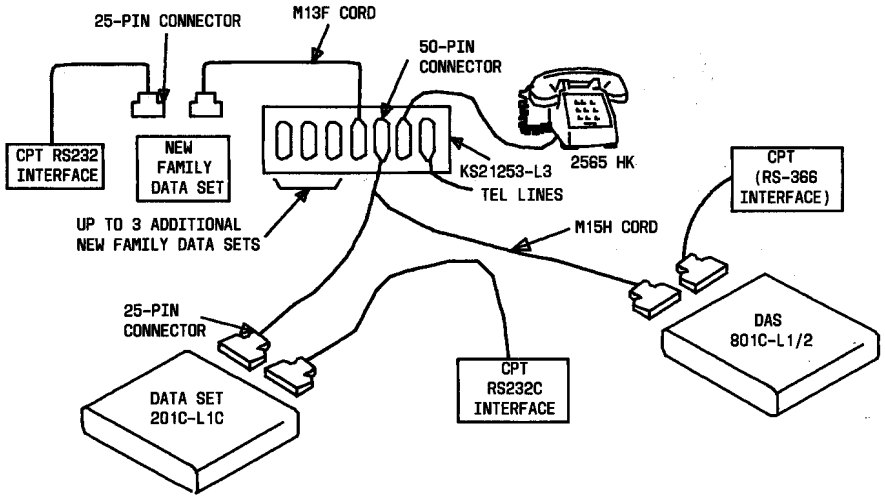
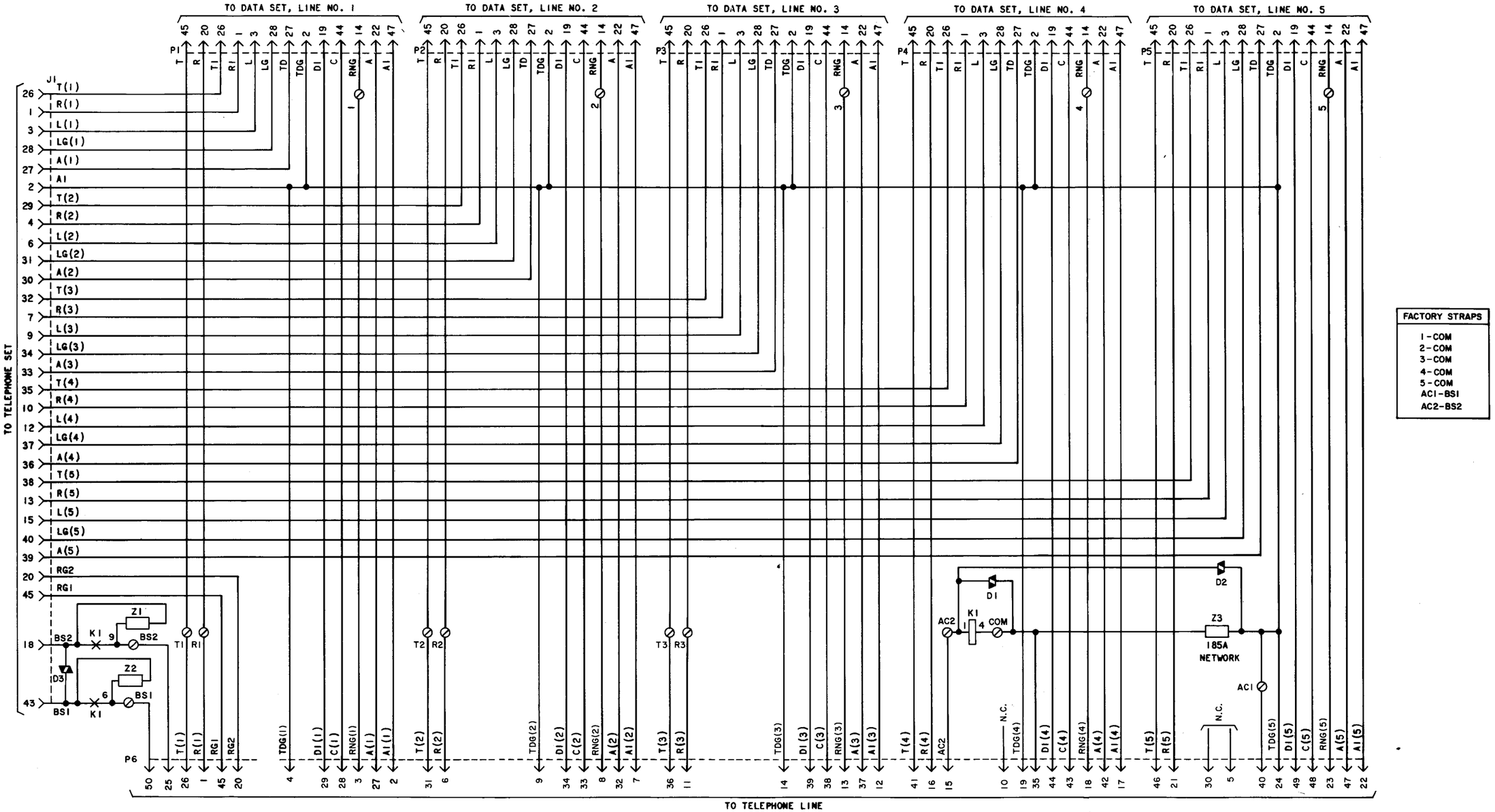


Fig. 9—Single Data Set With Shared Tel Set Using M15H Cord



FACTORY STRAPS
1-COM
2-COM
3-COM
4-COM
5-COM
AC1-BS1
AC2-BS2

Fig. 10—Wiring of KS-21253-L3 Adapter