

DATA SET 109C-TYPE
USED IN
10-TYPE DATA LINE CONCENTRATOR SYSTEM (DLCS*)
INSTALLATION

1. GENERAL

1.01 This section describes the procedure for installing Data Set 109C-type used with 10-type Data Line Concentrator service. Data Set 109C-type is mounted in a Bell System-provided model 33 or 35 teletypewriter (TTY).

*Formerly called DATREX

1.02 The data station is shipped from the distributing house with the data set already installed in the TTY. Installation of the station requires that the line be connected, the line current adjusted to the proper value, and power supplied to the teletypewriter.

1.03 A 3-conductor cord is used to connect the TTY to the customer-supplied 117-volt 60 Hz ac power. The data set is powered from the UCC 29 call control unit of the TTY. The customer must furnish a 3-wire outlet that is not under control of a switch.

1.04 Data Set 109C-type is limited to use on a 2-wire metallic loop. The transmission loop used by the data set must provide dc continuity. The loop cannot be carrier derived, and ground return cannot be used.

1.05 For 10-type Data Line Concentrator applications, a transmission loop is the 2-wire metallic line which connects Data Set 109C-type through the 10A concentrator to any other Data Set 109-type. The overall resistance of the loop, from Data Set 109C-type to Data Set 109-type, shall not exceed 2500 ohms, including the effective 400 ohms resistance of the concentrator.

1.06 Data Set 109C-type requires approximately 2 watts and Data Set 109C-L1/2 approximately 3 watts peak power of filtered 24 volts dc, which is supplied by the TTY.

2. TOOLS AND APPARATUS

2.01 The data station is assembled at the distributing house; therefore, the only special equipment required to complete the installation of the data station is a KS-16979-L1 volt-ohm-milliammeter, or equivalent. This meter is used to make the line pad adjustments when installing the data station.

3. OPTION CONNECTIONS

3.01 Before installation of the station is started, a check should be made to determine that the station is equipped with the proper features and options required to provide the service being installed. The service order should indicate the features and options required.

3.02 Data Set 109C-type is designed to be mounted in the model 33 or 35 TTY in front of the UCC 29 call control unit (see Fig. 1). In order to check the option connections, it is necessary to remove the cover of the TTY. For information on cover removal, refer to the section entitled Data Set 109C-Type, 10-Type Data Line Concentrator System (DLCS*), Maintenance (591-031-301).

DATA SET 109C-L1

3.03 Data Set 109C-L1 consists of an EU1 circuit pack interconnected to a 635T2 key by means of a cord CA1 (Fig. 2). The way in which the circuit board is interconnected to the key via the local cable (CA1) determines the operational function of Data Set 109C-L1.

3.04 For DLCS service, verify the following:

- (a) Option Z, space crossover shift, is installed (screw switch Z closed, screw switch Y open).

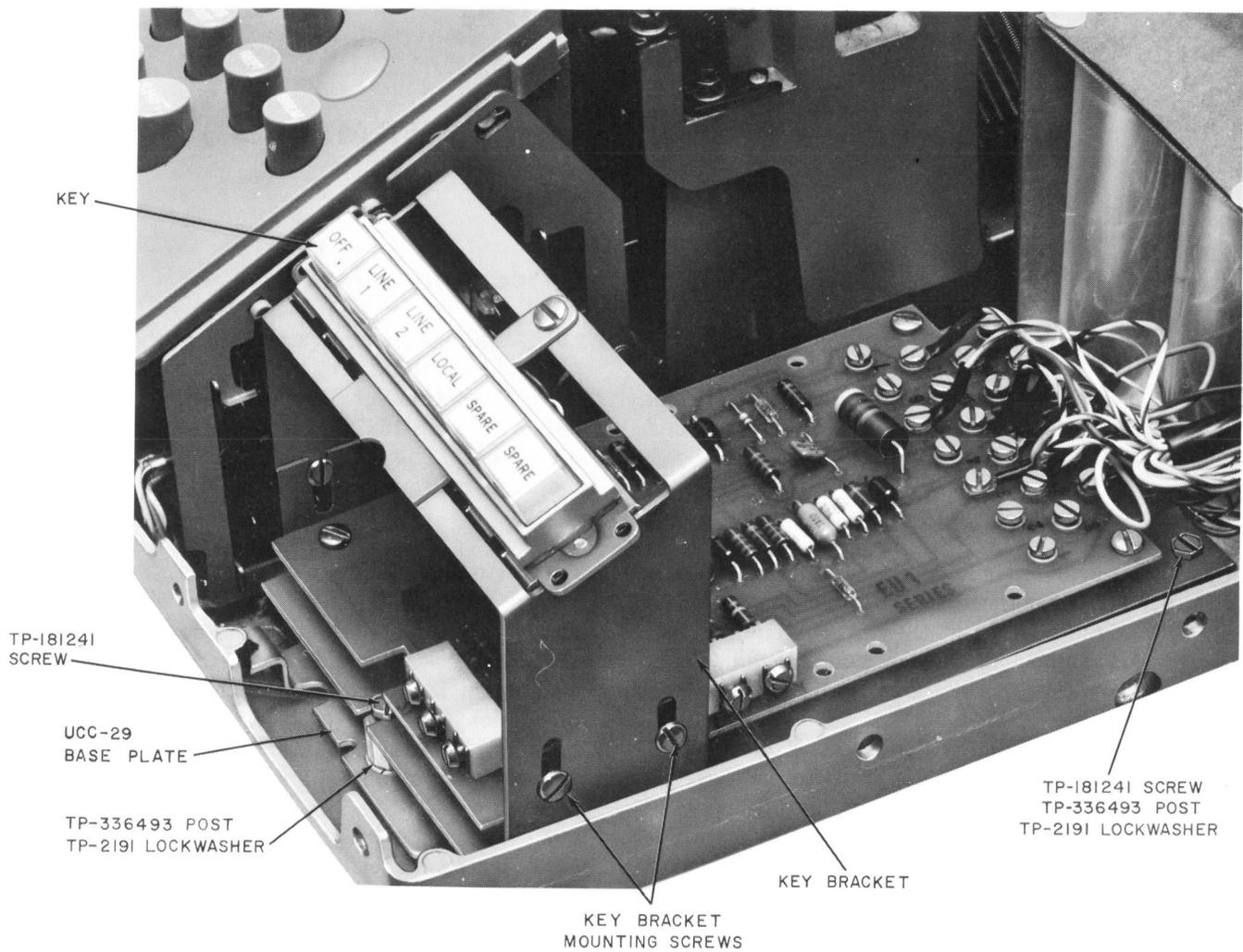


Fig. 1—Data Set 109C-L1 Installed in Model No. 33 Teletypewriter

(b) Key strip cord CA1 and UCC 29 cable are connected to the proper terminals. See Table A and Fig. 3.

DATA SET 109C-L1/2

3.05 Data Set 109C-L1/2 consists of Data Set 109C-L1 (see 3.03) and a snap-on ET1 circuit pack (Fig. 4 and 5). The ET1 circuit pack provides the additional features described in Table B when interconnected to Data Set 109C-L1.

3.06 The ET1 circuit pack can be ordered separately and added to Data Set 109C-L1. It is mounted by aligning the four spacer/bushings with the holes in the EU1 circuit board, and pressing into place.

3.07 For DLCS service, verify the following:

(a) Option Z, space crossover shift, is installed (screw switch Z closed, screw switch Y open).

(b) Key strip cord CA1, UCC 29 cable, and ET1 circuit pack are connected to proper terminals for wiring optional feature (R, S, or T) specified on work order. See Table C and Fig. 6.

DATA SET 109C-L1/3

3.08 Data Set 109C-L1/3 consists of Data Set 109C-L1 equipped with a rotary dial (Fig. 7). The rotary dial permits access to the Direct

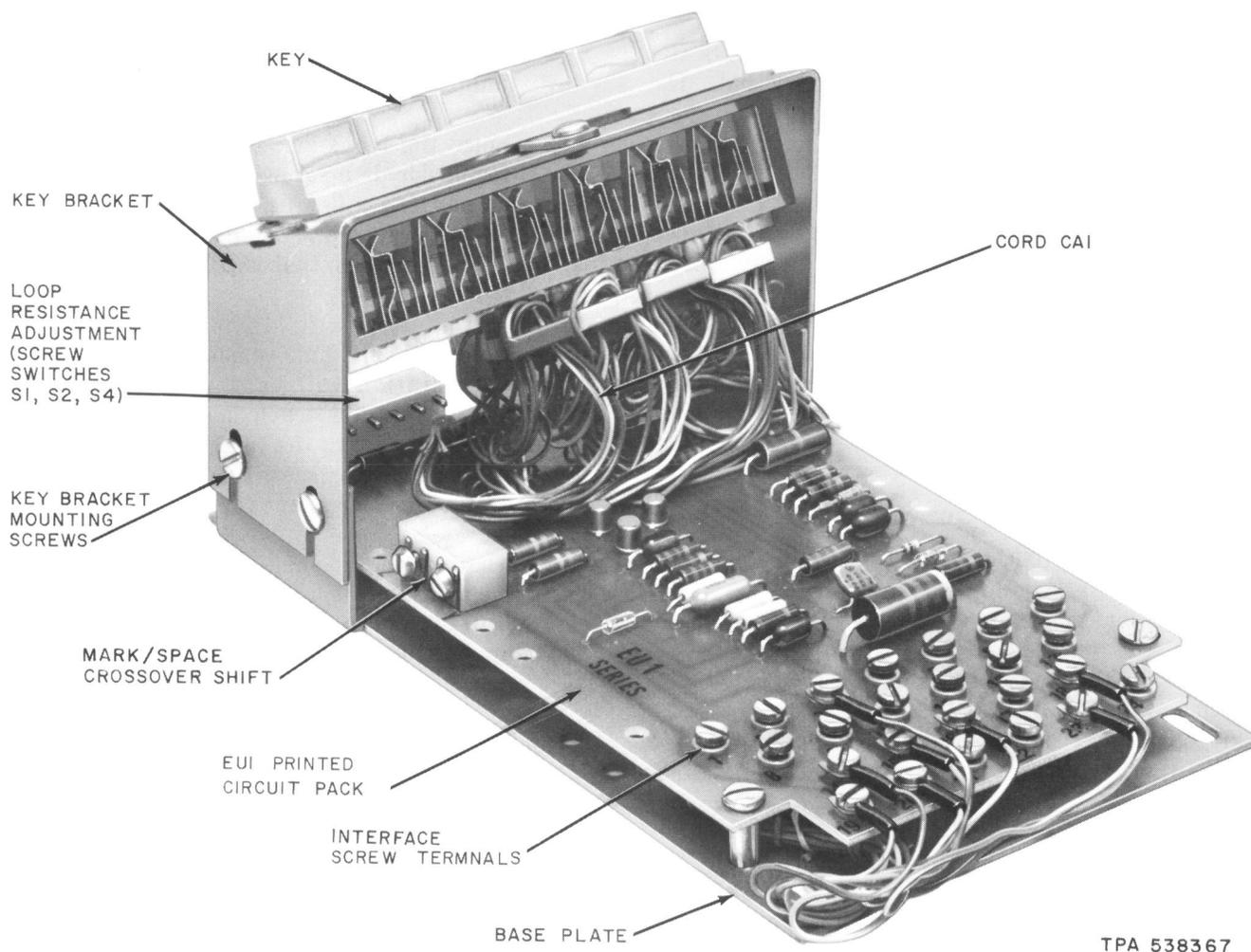


Fig. 2—Data Set 109C-L1

Distance Dialing (DDD) network through the DATA-PHONE® interconnection arrangement using a 10B concentrator.

3.09 For DLCS service, verify the following:

- (a) Option Z, space crossover shift, is installed (screw switch Z closed, screw switch Y open).
- (b) Key strip cord CA1, UCC 29 cable, dial, and listen-only handset are connected to the proper terminals. See Table D and Fig. 8.

DATA SET 109C-L1/4

3.10 Data Set 109C-L1/4 consists of Data Set 109C-L1 equipped with a TOUCH-TONE dial

and an ET2 circuit pack. See Fig. 9 and 10. The TOUCH-TONE dial permits access to the DDD network through the DATA-PHONE interconnecton arrangement.

3.11 For DLCS service, verify the following:

- (a) Option Z space crossover shift, is installed (screw switch Z closed, screw switch Y open).
- (b) Key strip cord CA1, UCC 29 cable, TOUCH-TONE dial, ET2 circuit pack, and listen-only handset are connected to the proper terminals. See Table E and Fig. 11.

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DATA SET 109C-L1/2/3

3.12 Data Set 109C-L1/2/3 consists of Data Set 109C-L1/2 equipped with a rotary dial. The dial permits access to the DDD network.

3.13 For DLCS service, verify the following:

- (a) Option Z, space crossover shift, is installed (screw switch Z closed, screw switch Y open).
- (b) Key strip cord CA1, UCC 29 cable, ET1 circuit pack, rotary dial, and listen-only handset are connected to the proper terminals. See Table F and Fig. 12.

DATA SET 109C-L1/2/4

3.14 Data Set 109C-L1/2/4 consists of Data Set 109C-L1/2 equipped with a TOUCH-TONE dial. The dial permits access to the DDD network.

3.15 For DLCS service, verify the following:

- (a) Option Z, space crossover shift, is installed (screw switch Z closed, screw switch Y open).
- (b) Key strip cord CA1, UCC 29 cable, ET1 circuit pack, ET2 circuit pack, TOUCH-TONE dial, and listen-only handset are connected to the proper terminals. See Table G and Fig. 13.

4. DETERMINATION OF LOOP RESISTANCE (DLCS) (Fig. 14)

4.01 For proper operation of the DLCS, the total resistance between a pair of Data Sets 109-type must be limited to 2500 ohms. If the total resistance is less than 2000 ohms, it must be adjusted to that nominal value. If total resistance is between 2000 and 2500 ohms, no pad resistance is required. The total resistance of a concentrator system is made up of the following:

- The pad supplied by the line-side data set (adjustable). (A)
- The resistance of the line link from the data set to the concentrator. (B)
- The concentrator effective resistance (400 ohms). (C)

- The resistance of the trunk link. (D)
- The pad supplied by the trunk-side data set (adjustable). (E)

4.02 Since the trunk-link resistance (D) for each trunk-side data set may vary, each trunk-side data set pad (E) must be set so that the total trunk-side resistance presented to the concentrator is equal for all trunks; that is, D plus E is constant for all trunks.

4.03 Since the line-link resistance (B) for each data station will vary with the physical location of the station, each line-side data set pad (A) must be set so that the total line-side resistance presented to the concentrator is equal for all stations; that is, A plus B is constant for all stations.

4.04 The metallic line-link resistance (B) plus the metallic trunk-link resistance (D) is a maximum of 1600 ohms for normal range stations and a maximum of 2100 ohms for extended range stations.

DATA SET 109C-TYPE LINE PAD

ADJUSTMENTS

4.05 When the line-side data station is installed, the effective resistance seen by this data set is the total of the resistances presented to the trunk side of the concentrator, plus the concentrator resistance (400 ohms), plus the line loop resistance. The line data set pad is adjusted to make the total circuit resistance a nominal 2000 ohms. This is accomplished as follows:

- (1) Obtain the total trunk-concentrator resistance (C + D) (this can be obtained from the service order or circuit layout record card).
- (2) Request the line loop be shorted at the concentrator and measure the short circuit resistance of this loop (B) using the KS-16979-L1 volt-ohm-milliammeter.
- (3) Add the resistance obtained in (1) and (2), which is B + C + D. Refer to Fig. 14 to determine the screw switch settings required to increase this total resistance value to a nominal 2000 ohms. The screw switches are designated S1, S2, and S4.

- (4) Make the screw switch settings determined in (3). The location of the screw switches is shown by Fig. 2.

4.06 After the loop resistance has been determined and the loop pad adjusted, connect the ring side of the incoming transmission loop to terminal 20 on the EU1 circuit pack. Do *not* connect the tip side until instructed in Part 5 of this section.

4.07 After completing installation of the data station as outlined in this section, check that the OFF button is depressed, apply ac power to the station by inserting the ac power cord of the TTY to the customer-provided receptacle. Verify that the TTY motor is *not* running.

5. INSTALLATION TESTS

5.01 Installation tests described are performed to determine if Data Set 109C-type is operable and if proper connections have been made. The tests to be made are controlled by the status of the DLCS 10-type Data Line Concentrator installation. The tests are performed under the following conditions:

- (1) Test A—concentrator is not installed, or the line to the concentrator is not installed
- (2) Tests A, B, C—concentrator and trunk-side data sets terminated.

Test A—Local Test

5.02 Depress the OFF button of Data Set 109C-type and operate the ac power switch on the TTY to the ON position. Verify that the TTY motor is *not* running.

5.03 Depress the LOCAL button of the data set and verify the following:

- (a) The LOCAL lamp is lighted.
- (b) The motor starts and the TTY is running closed.
- (c) Local copy is printed correctly when TTY keyboard is operated.



If the condition described in 5.01 (1) exists, depress the OFF button and connect tip lead to the terminal specified in the wiring interconnections table or wiring diagram for the list number of the data set being tested (109C-L1, 109C-L1/2, 109C-L1/4, 109C-L1/2/4—terminal 8; 109C-L1/3, 109C-L1/2/3—terminal 19).

Test B—Verification of Tip and Ring Connection

5.04 If the condition described in 5.01(2) exists, proceed as follows: With the KS-16979-L1 volt-ohm-milliammeter or equivalent set to the 75-mA scale, connect the positive probe of the meter to terminal 8 of the EU1 circuit pack for Data Sets 109C-L1, 109C-L1/2, 109C-L1/4 and 109C-L1/2/4; and to terminal 19 for Data Sets 109C-L1/3 and 109C-L1/2/3. Connect the negative probe of the meter to the tip side of the incoming transmission loop.

5.05 Depress the LINE 1 button. Check to see if current is indicated by the meter. Switch to the 15-mA scale if measured current should be between +1.0 and +10 mA. If no current is indicated (or less than +0.3 mA), reverse the tip and ring connections to the circuit pack. Current should now be indicated on the meter. The following conditions also exist:

- (a) The LINE 2 lamp is lighted.
- (b) The TTY motor is running and the TTY runs closed.

Note: If line to concentrator is not terminated, the TTY will run open.

Test C—Verification of Loop Pad Resistance Settings (Fig. 15)

5.06 Any one of four conditions may be present at this time:

- (1) Camp-on
- (2) Holding trunk
- (3) Connection to computer through concentrator.

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5.07 A *camp-on condition* can be recognized by the fact that a nonprinting character (DEL) is selected by the TTY receiving mechanism every 3 to 4 seconds. When DEL is received, the meter needle kicks downward slightly. The apparent momentary change is likely to be less than 0.1 mA. The current reading on the meter during the camp-on condition should be as indicated in Fig. 15. If out of limits, the resistance pad screw switches must be adjusted. If the current is too low, set the screw switches to the next lower resistance value. If the current is too high, set the screw switches to the next higher resistance value. Continue changing the screw switch positions until the reading is within limits.

5.08 The station may go out of camp-on condition at any time and enter either of two conditions:

- (a) A holding trunk condition
- (b) A connection condition.

5.09 A *holding trunk condition* can be recognized by the following sequence of events:

- (1) After camp-on is received, the downward kick of the meter disappears.
- (2) The TTY stops receiving DEL characters.
- (3) The loop current remains the same.
- (4) No answer-back is received from a computer.

Loop resistance pads may be adjusted during a holding trunk condition, if desired. The current values and adjustment procedures are the same as for a camp-on condition shown in Fig. 15.

Note: If a station is placed on a holding trunk and a connection is desired, it will be necessary to depress the OFF button of the data set and place another call.

5.10 The *connection condition* may be recognized by the following sequence of events:

- (1) The TTY stops receiving DEL characters every 3 or 4 seconds.
- (2) Answer-back is received from a computer.
- (3) In some cases, the loop current increases.

Following the answer-back characters the loop current for a normal range station should be 3.2 ± 0.4 mA. If out of limits, follow the instructions given in 5.07 about changing the screw switch settings, until a reading of 3.2 ± 0.4 mA is obtained.

Note 1: Extended range stations are those stations served over a total loop resistance of from 2100 to 2500 ohms. They may have a minimum current level of 2.4 mA. All padding resistance is removed for extended range stations.

Note 2: If for any reason the connection is dropped, it will be necessary to depress the OFF button, and then depress the LINE 1 button again in order to reestablish a connection.

5.11 *Lines to Concentrator Not Terminated:*

When the station is being installed and the line has not been connected to the concentrator, the line pad settings can be verified per Fig. 15. Request the line be shorted at the concentrator and measure the short circuit loop current. The loop current should be within the tolerances contained in the LINE PAD CURRENT ADJUSTMENT WITH SHORT CIRCUIT AT CONCENTRATOR column.

Note: Extended range stations (A set to zero) short circuit current must be greater than 1.5 mA.

5.12 Connect the tip side of the line to the correct terminal on the EU1 circuit pack. See the particular data set schematic in this practice.

TABLE A

WIRING INTERCONNECTIONS FOR DATA SET 109C-L1 (DLCS)

INTERCONNECTING WIRES	EUT CIRCUIT BOARD SCREW TERMINALS
Cord (CA1)	
G-W	2
BR-W	3
O-W	12
G-R	14
BL-W	15
O-R	16
BR-R	17
BL-BK	17
S-W	18
BL-R	20
S-R	22
BR-BK	22
R-BL*	
R-O*	
R-G*	
R-BR*	
UCC-29 Cable	
W-O-G	1
R	1
W-BK-P	5
W-P	9
W-O-BL	10
W-BK-O	10
BL	11
W-O-BR	13
S	14
O	15
R-Y	19
W-R-G	19
R-BL	21
R-G	21
W-G	23

* CA1 may include these wires; if present, tape and store.

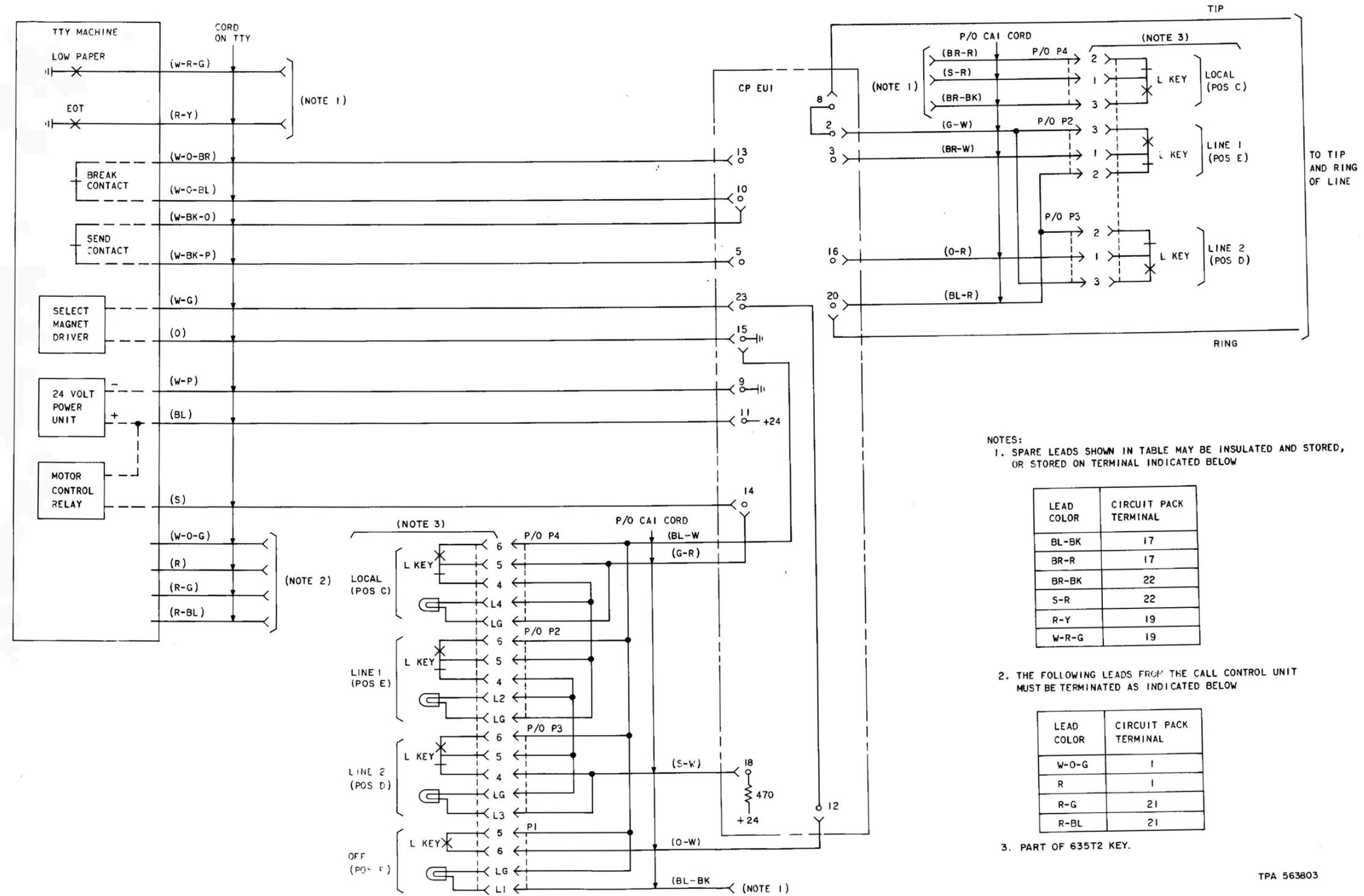


Fig. 3—Wiring Diagram, Data Set 109C-L1

TABLE B
OPTIONS PROVIDED BY ET1 CIRCUIT PACK

WIRING OPTION	FEATURE	DESCRIPTION
R*	EOT	EOT Disconnect — Receipt of an EOT character will stop teletypewriter motor, disconnect data set from line and light OFF lamp.
T	SST	Send-Space Timer — Prevents sending spaces longer than required for normal data or break signal. This protects quasi-ternary channels from false operation.
S	EOT and SST	Provides both EOT disconnect and send-space timer.

* Factory-wired on Data Set 109C-L1/2.

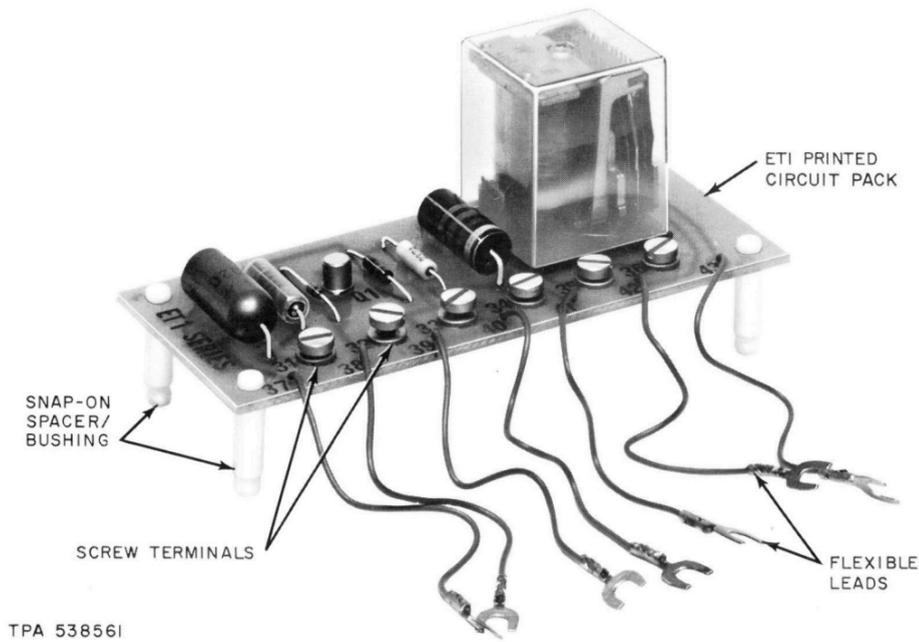


Fig. 4—Circuit Pack ET1

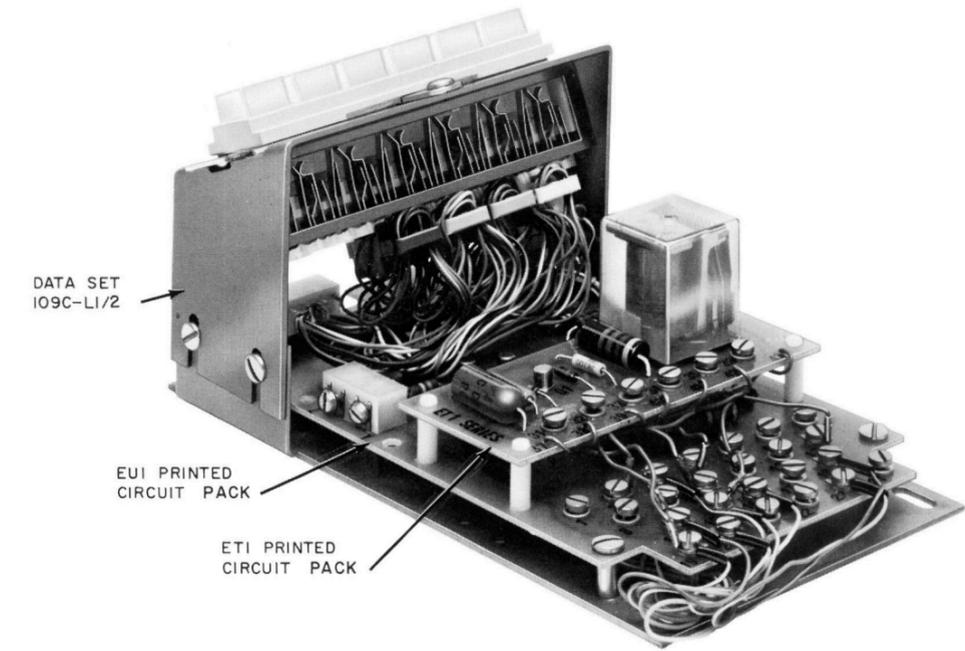


Fig. 5—Data Set 109C-L1/2

TABLE C

WIRING INTERCONNECTIONS FOR DATA SET 109C-L1/2 (DLCS)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS WIRING OPTION			ET1 CIRCUIT PACK SCREW TERMINALS WIRING OPTION		
	R	T	S	R	T	S
ET1 Circuit Pack Spade Lugs						
37	9	9	9			
38		10	10	31		
39		13	13	31		
40	4	4	4			
41	14		14		35	
42	2		2		32	
43	19		19		32	
Cord (CA1)						
BR-W	3	3	3			
O-W	12	12	12			
BL-W	15	15	15			
O-R	16	16	16			
BR-R	17	17	17			
BL-BK		17		34		34
S-W	18	18	18			
G-W	19	2	19			
BL-R	20	20	20			
BR-BK	22	22	22			
G-R		14		35		35
S-R	22	22	22			
R-BL*						
R-O*						
R-G*						
R-BR*						
UCC-29 Cable						
W-O-G	1	1	1			
R	1	1	1			
W-BK-P	5	5	5			
W-P	9	9	9			
W-O-BL	10				33	33
W-BK-O	10	10	10			
BL	11	11	11			
W-O-BR	13				31	31
S	14	14	14			
O	15	15	15			
W-R-G	17	19	17			
R-BL	21	21	21			
R-G	21	21	21			
W-G	23	23	23			
R-Y				36	36	36

* CA1 may include these wires; if present, tape and store.

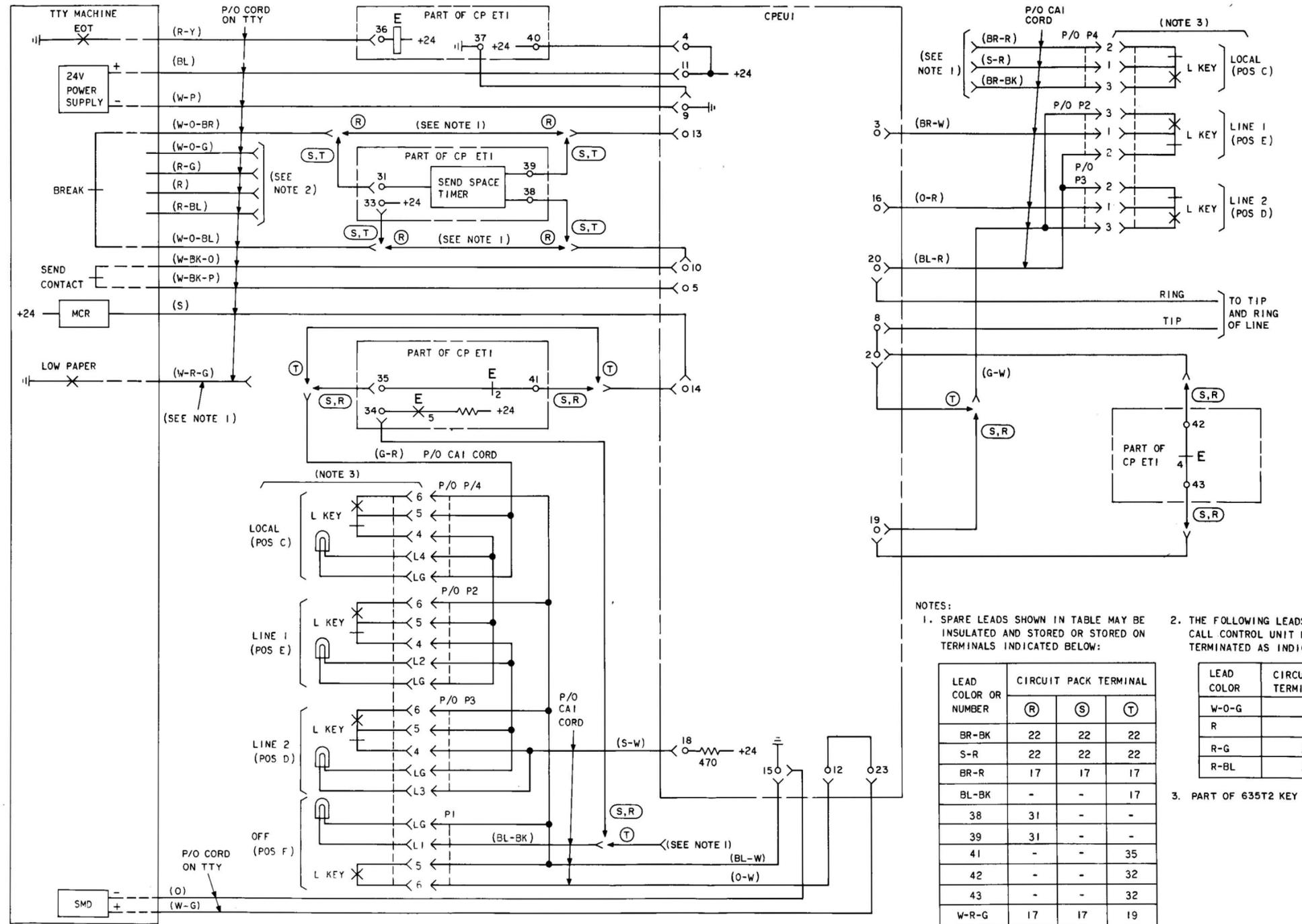


Fig. 6—Wiring Diagram, Data Set 109C-L1/2

Table C and Fig. 6

TABLE D
WIRING INTERCONNECTIONS FOR
DATA SET 109C-L1/3 (DLCS)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS	INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS
Cord (CA1)		Dial (Rotary)	
BR-W	8	G	1
O-W	12	Y	2
G-R	14	Y	3
BL-W	15	BL	5
BL-BK	15	RCVR (Handset)	
O-R	16	W	2
S-W	18	W	3
G-W	19	UCC-29 Cable	
BL-R	20	W-BK-P	1
S-R	22	W-P	9
BR-BK	22	O	9
R-BL*		R-Y	9
R-O*		W-O-BL	10
R-G*		W-BK-O	10
R-BR*		BL	11
		W-O-BR	13
		S	14
		W-O-G	17
		R	17
		W-R-G	21
		R-BL	21
		R-G	21
		W-G	23

*CA1 may include these wires; if present, tape and store.



Fig. 7—Data Set 109C-L1/3

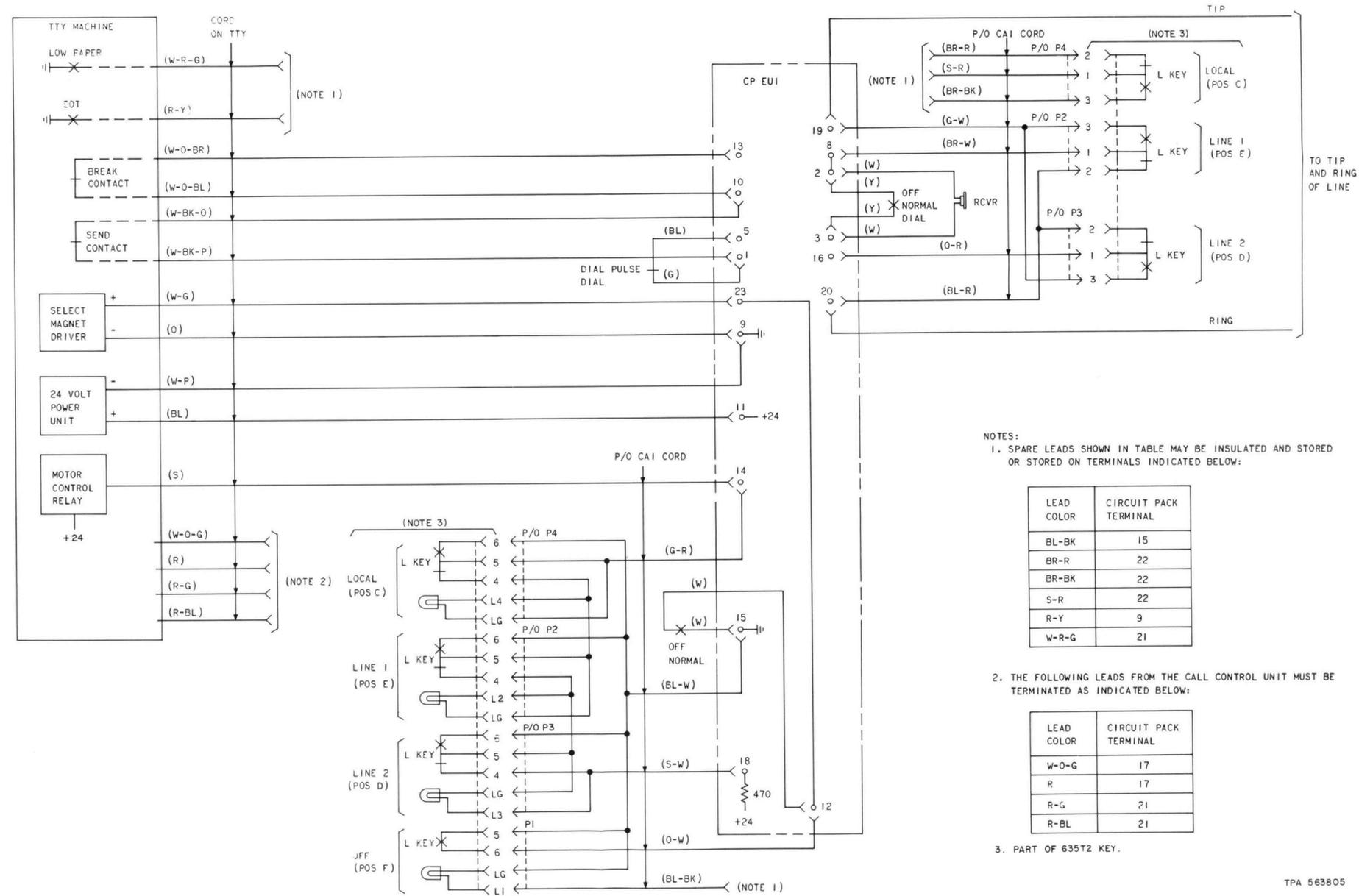


Fig. 8—Wiring Diagram, Data Set 109C-L1/3

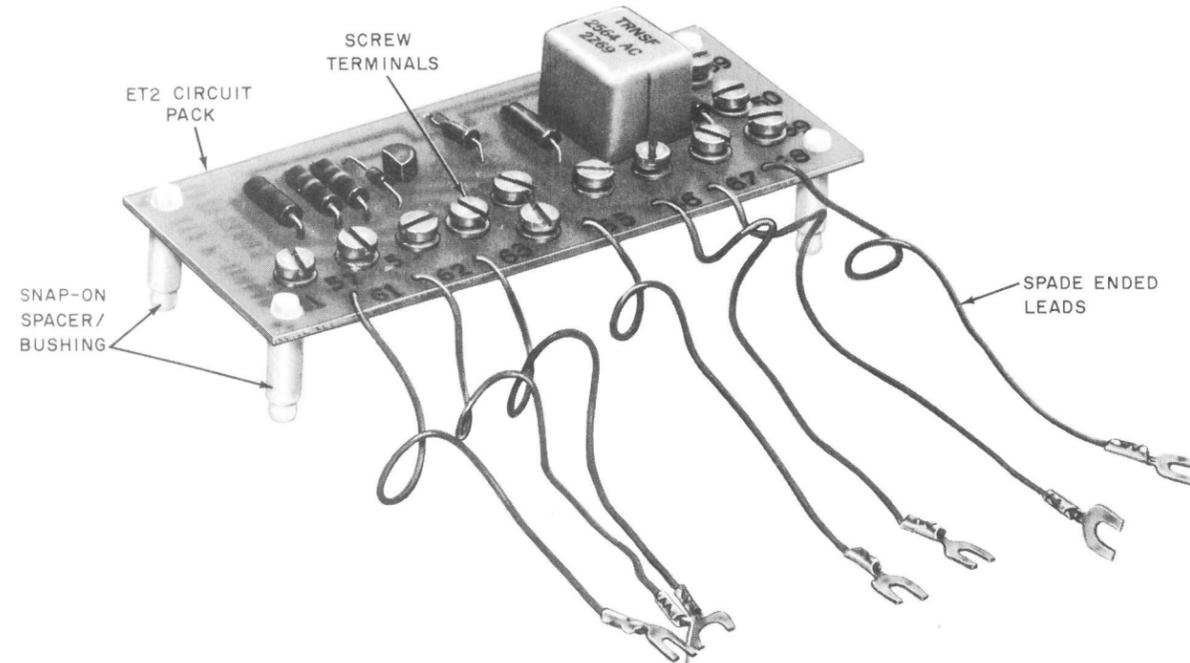


Fig. 9—Circuit Pack ET2

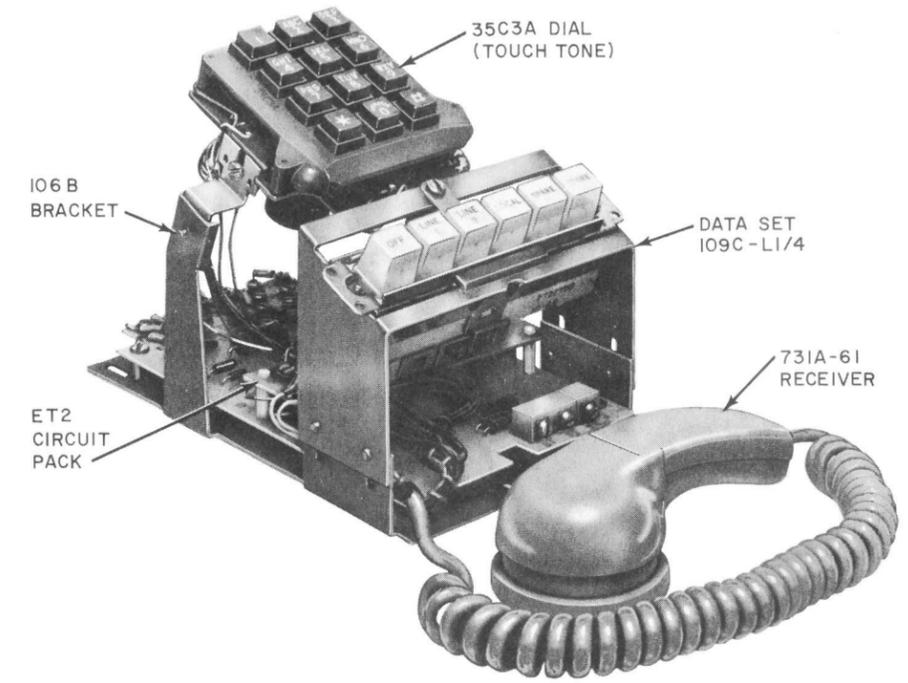


Fig. 10—Data Set 109C-L1/4

TABLE F
WIRING INTERCONNECTIONS FOR DATA SET 109C-L1/2/3 (DLCS)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS WIRING OPTION			ETI CIRCUIT PACK SCREW TERMINALS WIRING OPTION		
	R	T	S	R	T	S
ETI Circuit Pack Spade Lugs						
37	9	9	9			
38		10	10	31		
39		13	13	31		
40	4	4	4			
41	14		14		35	
42				32	32	32
43	19		19		32	
Cord (CA1)						
BR-W	8	8	8			
O-W	12	12	12			
BL-W	15	15	15			
O-R	16	16	16			
S-W	18	18	18			
BL-R	20	20	20			
BR-BK	22	22	22			
S-R	22	22	22			
BR-R	22	22	22			
G-R		14		35		35
BL-BK		15		34		34
R-BL*						
R-O*						
R-G*						
R-BR*						
UCC-29 Cable						
W-BK-P	1	1	1			
W-P	9	9	9			
O	9	9	9			
W-O-BL	10		10		33	33
W-BK-O	10	10	10			
BL	11	11	11			
W-O-BR	13		13		31	31
S	14	14	14			
W-O-G	17	17	17			
R	17	17	17			
W-R-G	21	21	21			

TABLE F (Cont)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS WIRING OPTION			ETI CIRCUIT PACK SCREW TERMINALS WIRING OPTION		
	R	T	S	R	T	S
UCC-29 Cable (Cont)						
R-G	21	21	21			
R-BL	21	21	21			
W-G	23	23	23			
R-Y				36	36	36
Dial (Rotary)						
G	1	1	1			
Y	2	2	2			
Y	3	3	3			
BL	5	5	5			
RCVR (Handset)						
W	2	2	2			
W	3	3	3			

*CA1 may include these wires ; if present, tape and store.

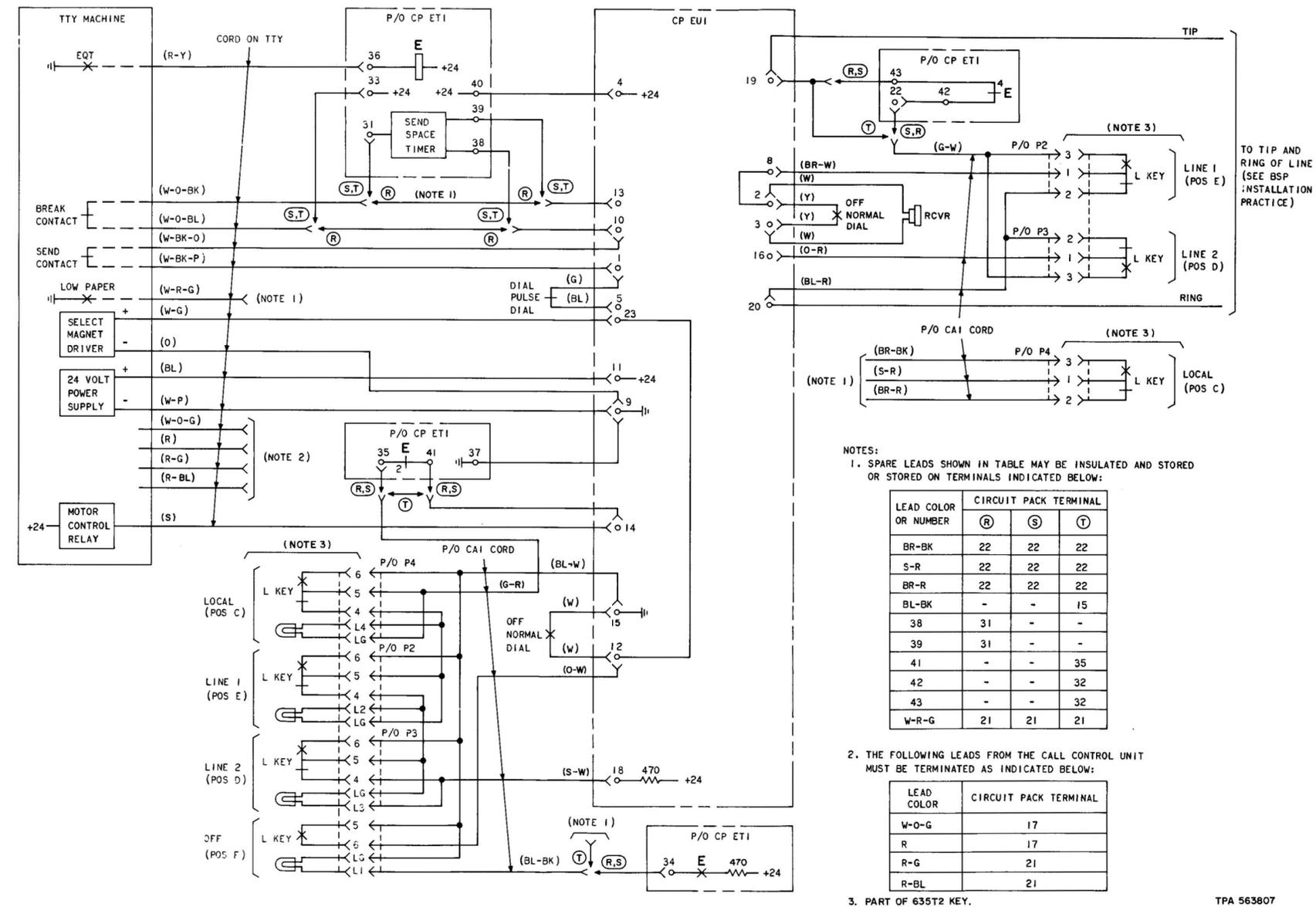


Fig. 12—Wiring Diagram, Data Set 109C-L1/2/3

Table F and Fig. 12

TABLE G

WIRING INTERCONNECTIONS FOR DATA SET 109C-L1/2/4 (DLCS)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS	ET1 CIRCUIT PACK SCREW TERMINALS	ET2 CIRCUIT PACK SCREW TERMINALS
ET1 Circuit Pack Spade Lugs			
37	9		
38			
39			
40	4		
41	14		
42	1		
43	2		
Cord CA1			
BR-W	3		
O-W	12		
BL-W	15		
O-R	16		
S-W	18		
G-W	19		
BL-R	20		
BR-BK	22		
S-R	22		
BR-R	22		
BL-BK		34	
G-R		35	
R-BL*			
R-O*			
R-G*			
R-BR*			
UCC-29 Cable			
W-BK-P	5		
W-P	9		
O	9		
W-O-BL	10		
W-BK-O	10		
BL	11		
S	14		
W-O-G	17		
R	17		
W-R-G	21		
R-BL	21		
R-G	21		
W-G	23		
W-O-BR			64
R-Y		36	

TABLE G (Cont)

INTERCONNECTING WIRES	EUI CIRCUIT BOARD SCREW TERMINALS	ET1 CIRCUIT PACK SCREW TERMINALS	ET2 CIRCUIT PACK SCREW TERMINALS
TOUCH-TONE Dial			
V			51
R-G			52
G			53
B-K			54
O			54
R			55
O-BK			56
BL			57
W			58
G-W			59
ET2 Circuit Pack Spade Lugs			
61	12		
62	4		
63	15		
65	13		
66	19		
67	1		
68	15		
RCVR (Handset)			
W			60
W			69

*CA1 may include these wires; if present, tape and store.

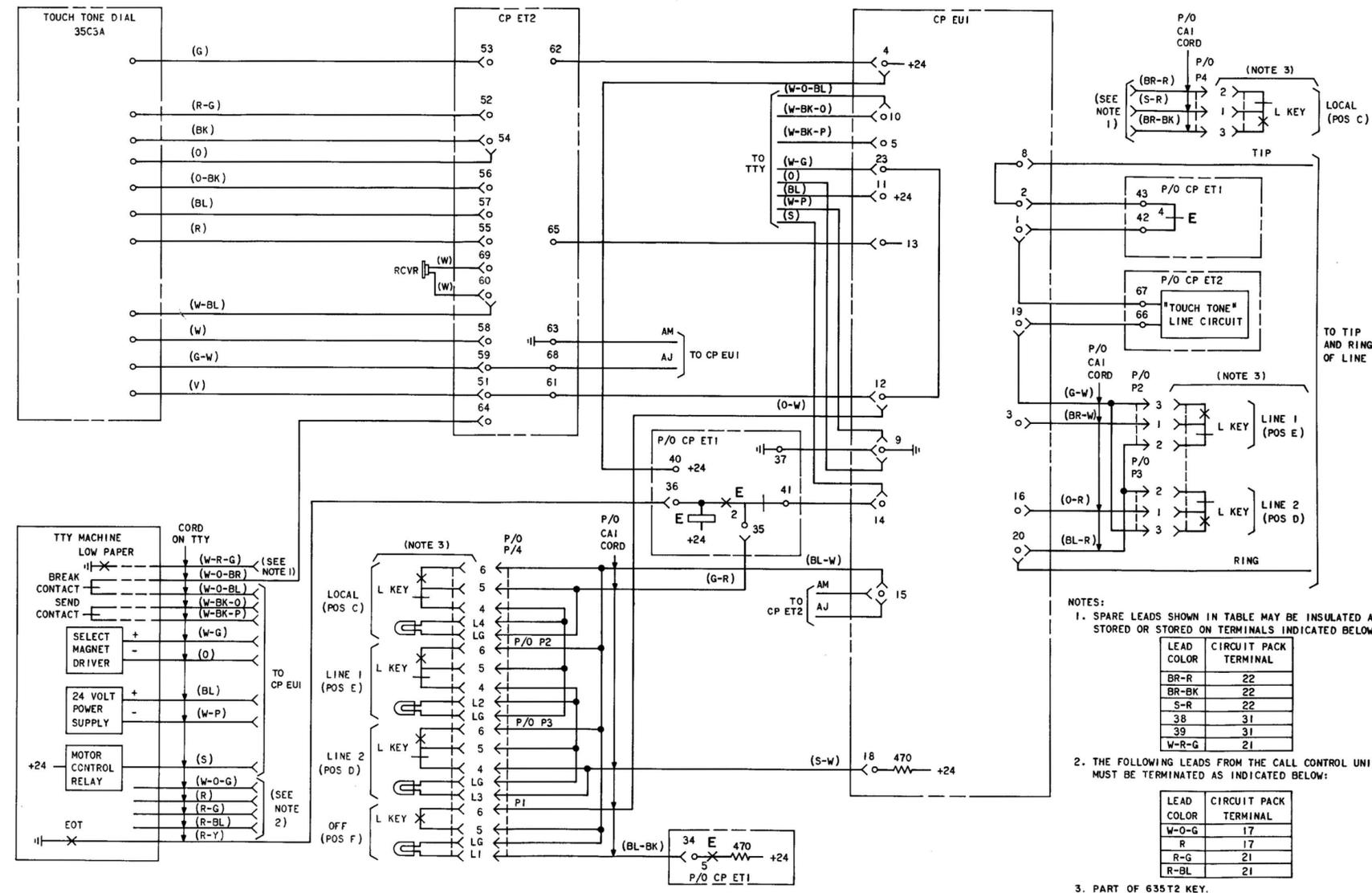
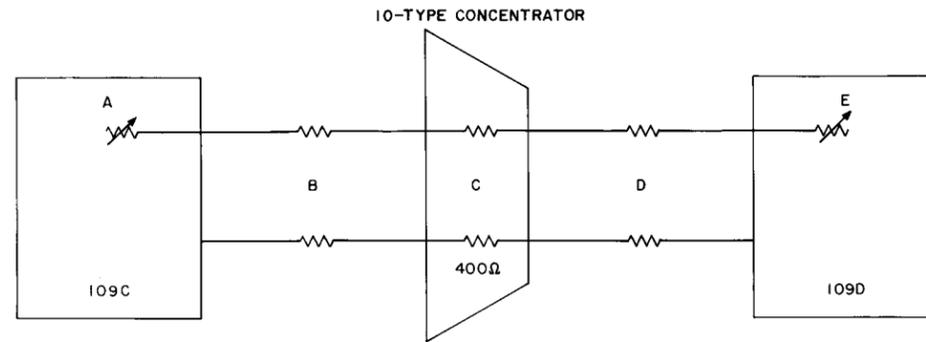


Fig. 13—Wiring Diagram, Data Set 109C-L1/2/4



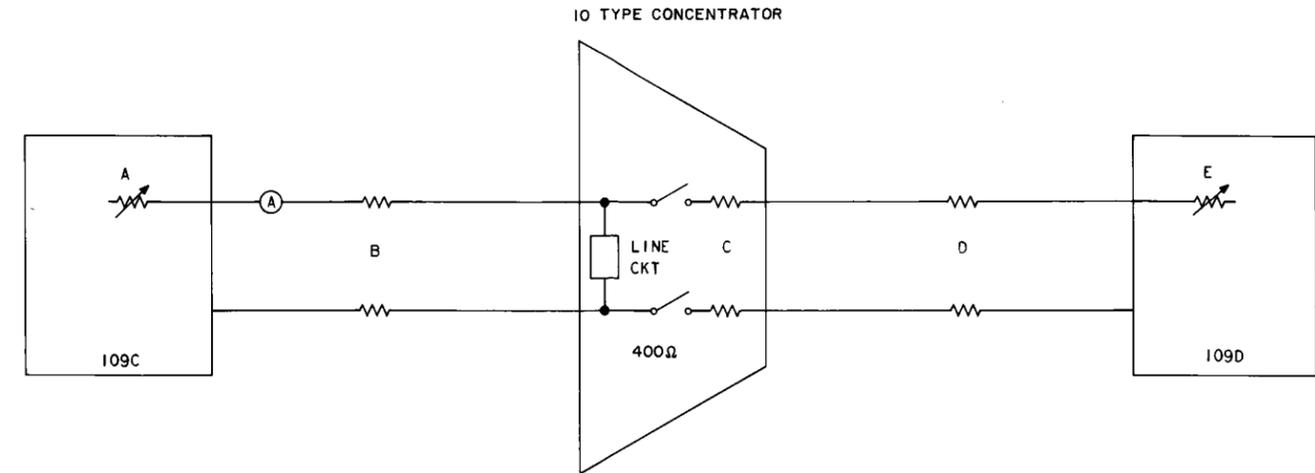
LINE PAD RESISTANCE SETTINGS

TOTAL KNOWN RESISTANCE		REQUIRED PAD RESISTANCE	SCREW SWITCH POSITION		
B+C+D+E	B+D+E	A	S4	S2	S1
2500 TO 1800	2100 TO 1400	0 *	CLOSED	CLOSED	CLOSED
1800 TO 1500	1400 TO 1100	270	CLOSED	CLOSED	OPEN
1500 TO 1300	1100 TO 900	510	CLOSED	OPEN	CLOSED
1300 TO 1000	900 TO 600	780	CLOSED	OPEN	OPEN
1000 TO 700	600 TO 300	1100	OPEN	CLOSED	CLOSED
700 TO 500	300 TO 100	1370	OPEN	CLOSED	OPEN
500 TO 400	100 TO 0	1610	OPEN	OPEN	CLOSED

* WITH MAXIMUM METALLIC LINE AND TRUNK, THE PAD RESISTANCE IS ZERO (A=0)

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Fig. 14—Data Set 109C-Type Line Pad Adjustment



NORMAL RANGE STATIONS KNOWN VALUES (OHMS)		APPROXIMATE VALUE (OHMS)	LINE PAD ADJUSTMENT WITH CAMP-ON SIGNAL: OR HOLDING TRUNK LOOP CURRENT (MA)	LINE PAD ADJUSTMENT-WITH SHORT CIRCUIT AT CONCENTRATOR: LOOP CURRENT (MA)	CONNECTION CONDITION CURRENT VALUES (MA)
C+D+E	D+E	A+B			
400 TO 500	0 TO 100	1600 TO 1400	1.4 TO 1.8	2.0 TO 2.4	2.8 TO 3.6 FOR ALL READINGS
500 TO 600	100 TO 200	1500 TO 1300	1.5 TO 1.9	2.1 TO 2.6	
600 TO 700	200 TO 300	1400 TO 1200	1.6 TO 2.0	2.2 TO 2.7	
700 TO 800	300 TO 400	1300 TO 1100	1.7 TO 2.1	2.4 TO 2.9	
800 TO 900	400 TO 500	1200 TO 1000	1.8 TO 2.3	2.5 TO 3.1	
900 TO 1000	500 TO 600	1100 TO 900	1.9 TO 2.4	2.7 TO 3.4	
1000 TO 1100	600 TO 700	1000 TO 800	2.0 TO 2.6	2.8 TO 3.7	
1100 TO 1200	700 TO 800	900 TO 700	2.2 TO 2.8	3.0 TO 4.0	
1200 TO 1300	800 TO 900	800 TO 600	2.3 TO 3.1	3.3 TO 4.4	
1300 TO 1400	900 TO 1000	700 TO 500	2.5 TO 3.4	3.5 TO 4.9	
1400 TO 1500	1000 TO 1100	600 TO 400	2.7 TO 3.8	3.9 TO 5.5	
1500 TO 1600	1100 TO 1200	500 TO 300	3.0 TO 4.3	4.3 TO 6.4	

NOTE:

- EXTENDED RANGE STATION (B=1600 TO 2100 OHM) SET A TO ZERO AND CHECK LINE CIRCUIT
- (a) CAMP ON CURRENT MUST BE GREATER THAN 1.1 MA
- (b) CURRENT WITH SHORT CIRCUIT MUST BE GREATER THAN 1.5 MA

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Fig. 15—Verification of Line Pad Resistance Settings Using Camp-On, Holding Trunk or Short Circuit Current Measurements