

DATA SET 401L-TYPE INSTALLATION AND CONNECTIONS

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1. GENERAL

1.01 This section provides installation and connection information on Data Set (DS) 401L-type. Also included in this section is information on installation of options, number encoding, and adjustments.

1.02 This section is reissued to add information on later models of DS 401L-type containing circuit pack (CP) BE61, which require modified installation procedures. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The data set should be installed in accordance with existing practices covering installation of data sets; ie, Data Sets—General Installation and Connection Information (590-010-200).

1.04 Installation test and demonstration calls should be made in accordance with the section entitled Crediting Charges on Test Calls (010-250-001).

2. INSTALLATION

2.01 DS 401L-type must be located within range of the interface connector cord supplied by the customer. This cord should not exceed 6 feet in length.

Note: Verify that the data loop has been tested and meets requirements in the section entitled Data Systems—DATA-PHONE® Service,

Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501).

2.02 To avoid interference during data transmission, the instructions listed below should be followed.

- Use only on individual ground-start type lines with 48-volt central office battery.
- Do not connect extension telephones.



The data set is not equipped for "A" lead control on the data line.

2.03 Operation on the No. 1 Electronic Switching System (No. 1 ESS) requires a long trunk circuit. Long Trunk Circuit SD-96371-01 is suggested when DS 401L-type is used in conjunction with No. 1 ESS.

2.04 Both Data Sets 401L1 and 401L2 are powered from the central office, but the customer must furnish a 60-Hz ac power outlet to supply power to the electrical answer-back circuitry of DS 401L2. This outlet should not be under the control of a switch.

2.05 Removing the Data Set Cover: Grasp the lower portion of the data set cover and pull forward. After removing the cover from the base, lift it from hinges at the top of the data set.

2.06 Install data set options and the number to be encoded as specified on the service order. Refer to Table A for option installation information and Fig. 1 for option screw location and number encoding information.

2.07 Use four No. 8 round head wood screws, or equivalent, and a backboard if the data set is to be secured in a masonry wall, and secure the data set to the wall.

TABLE A
OPTION INSTALLATION

FUNCTION OF OPTION	LOOSEN SCREW(S)	TIGHTEN SCREW(S)
After answer tone is received, data set remains in data mode for 10 seconds before terminating call.	A	B,C
After answer tone is received, data set remains in data mode for 70 seconds before terminating call.	A,C	B
Customer controls call termination by TCL closure after a minimum of 10 seconds in the data mode.	A,B	C
Customer controls call termination at any time with TCL closure.	B,C	A
Allows Data Set 401L2 to be remotely tested.	E	D
Does not allow Data Set 401L2 to be remotely tested.	D,E	—
Allows Data Set 401L1 to be remotely tested.	D	E
Does not allow Data Set 401L1 to be remotely tested.	D,E	—
Answer-tone detector detects end of answer tone.	—	F
Answer-tone detector detects beginning of answer tone.	F	—
EON circuit operates 1 second after dialing ceases. For use in No. 1 and No. 5 crossbar exchanges.	—	12
EON circuit operates immediately after dialing ceases. For exchanges other than No. 1 and No. 5 crossbar.	12	—

2.08 Install the data set cover by positioning it over the hinges, and press fitting at the bottom.



The data set must be mounted vertically with the interface jack at the bottom, because the data set contains mercury relays, which do not function properly in other positions.

3. CONNECTIONS

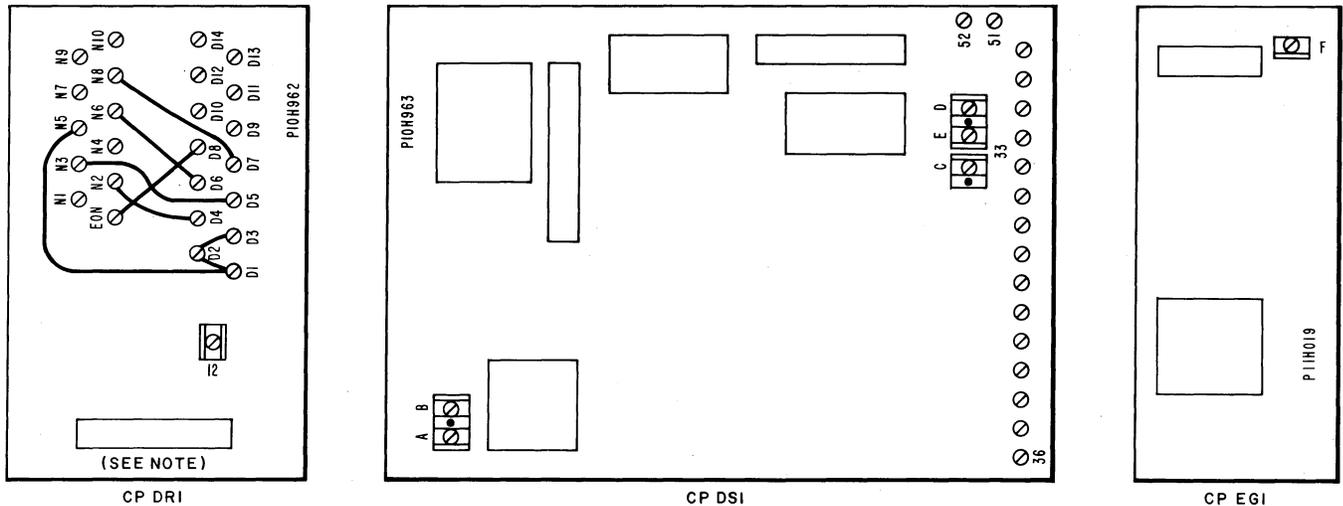
3.01 Plug business machine cord into the interface jack. Detailed designation information for the interface cord is provided in the section

entitled Data Set 401L-Type, Description and Operation (594-027-100).

3.02 Connect the 558F telephone set in the following manner.

Note: If the station employs DS 401L1, connect the telephone as shown in Fig. 2. If the station employs DS 401L2, connect the telephone as shown in Fig. 3.

(a) Remove the **yellow** lead from terminal 2 on the terminal strip of 558F telephone set; tape and store it.



NOTE:

TO ENCODE A NUMBER PLACE A STRAP FROM THE DIGIT TERMINAL (D) TO THE RESPECTIVE NUMERAL (N). IF A NUMERAL IS REPEATED, STRAP THE DIGIT LEAD TO THE DIGIT TERMINAL WHICH HAS ALREADY BEEN ENCODED. THIS PREVENTS HAVING MORE THAN ONE STRAP UNDER ANY SCREW. NO. 555-2368 IS ILLUSTRATED TO SHOW HOW TO STRAP REPEATED NUMBERS. ANY STRAPS NOT BEING USED SHOULD BE SECURED TO ITS OWN SCREW. AFTER THE NUMBER IS ENCODED, THE NEXT DIGIT TERMINAL SHOULD BE CONNECTED TO THE EON TERMINAL.

Fig. 1—Data Set 401L-Type Option Screw Locations and Number Encoding Information

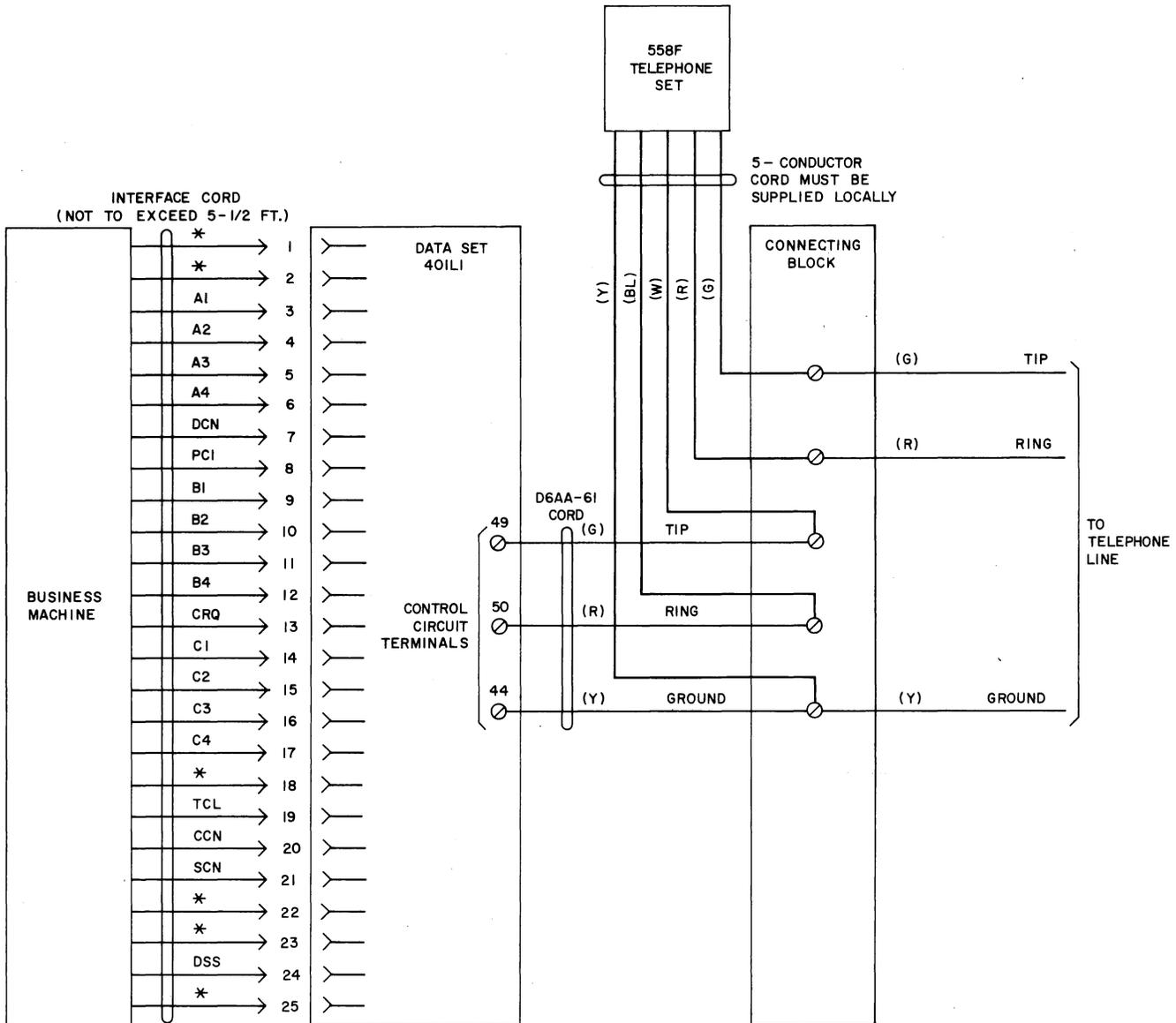
- (b) Remove the *green* lead from terminal 15 on the terminal strip of 558F, and connect it to terminal 2 of the same terminal strip.
- (c) Connect a strap (M1W cord, or equivalent) between terminal 1 on terminal strip of 558F and terminal F on the network of 558F telephone set.
- (d) Connect a strap between terminals 2 and 4 on the terminal strip of 558F telephone set.
- (e) Connect a strap between terminal 14 and terminal B on the network within the 558F telephone set.
- (f) Using a 5-conductor cord which must be supplied locally (D5AK), make the following connections within telephone set 558F: red (ring) lead to terminal 2, green (tip) to terminal 1, yellow (ground) to terminal 13, white to terminal 9, and blue to terminal 18. Connect to the station as shown in Fig. 2 or 3.

Note: The 558F telephone set may be used in the normal telephone manner. However,

since telephone operation interferes with data operations, it should only be used when the data set is not in operation. Dial tone is obtained by pressing the ground start button on the telephone set. If necessary, the exclusion key may be used to improve telephone communications.

3.03 Although it is not a generally available option, in certain cases the customer may request that the DIAL and/or TALK functions be disabled on the associated telephone set. To disable the dialing function only, remove the dial from the 558F telephone set and replace with an apparatus blank as shown in Section 502-501-102. The TALK functions only may be disabled by shorting out the handset transmitter. If both the DIAL and TALK functions are to be disabled, remove the 558F telephone set from the telephone line and reconnect DS 401L-type to the tip and ring of the telephone line.

3.04 For DS 401L2, connect the KS-16886-L2 power transformer as shown in Fig. 3.



* NOT USED

TPA 526520

Fig. 2—Data Set 401L1 Connection Information

4. ADJUSTMENTS

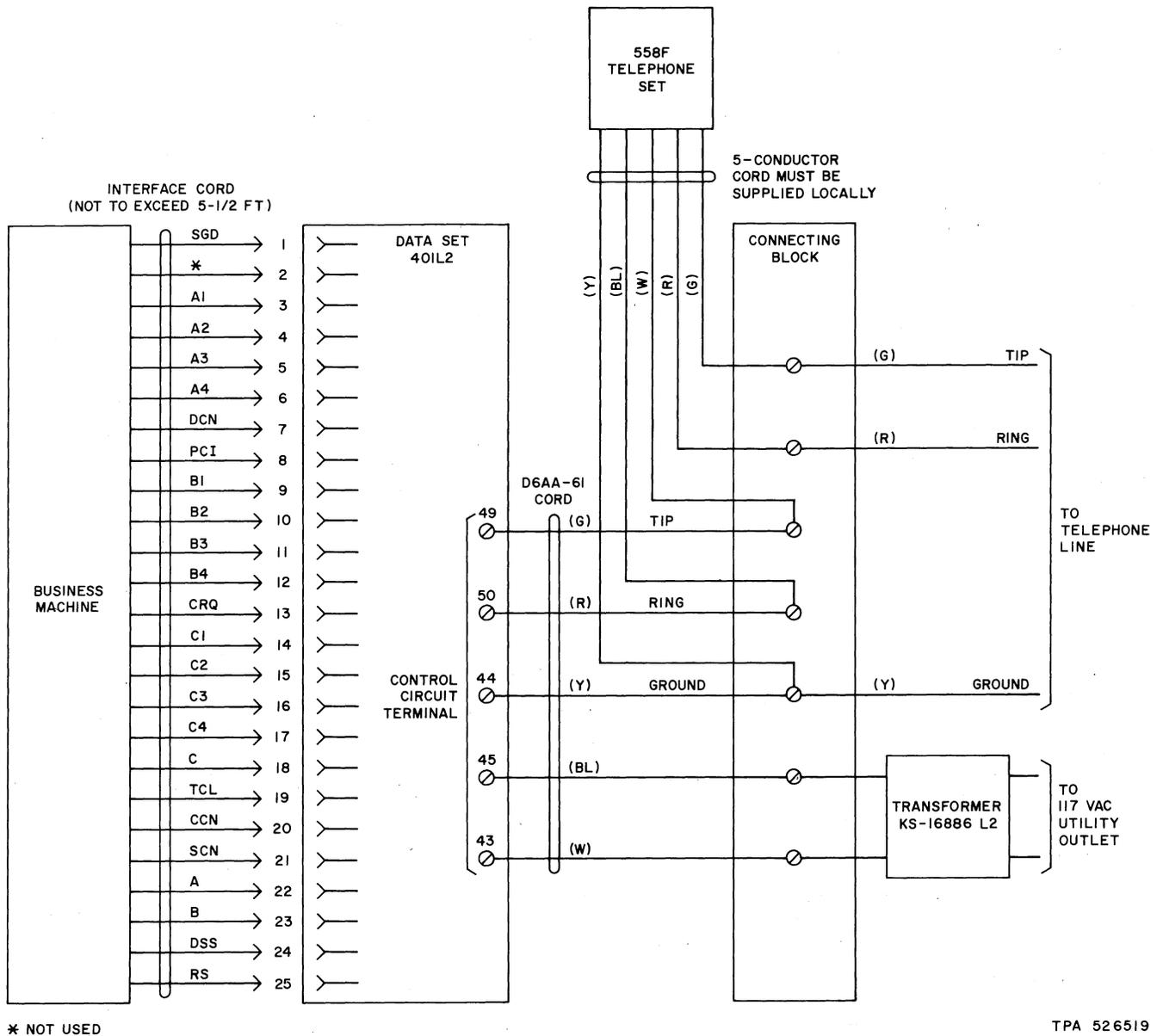
4.01 DS 401L-type requires the following (or equivalent) equipment for installation:

- KS-14510 VOM
- Transmission Test Set (TTS-4ANH equipped with a dial adapter cover and a 52A headset).
- 1013-type Handset

4.02 *Strapping to Compensate for Loop Length:*

The line build-out network and the power level network on the line coupler must be adjusted after the data set has been installed. This adjustment compensates for the length of the loop to the central office. Measure the central office battery current before the data set is connected in the following manner:

- (a) Use a 1013-type handset to call a quiet termination or an idle telephone. (Apply ground to ring for dial tone.)



* NOT USED

TPA 526519

Fig. 3—Data Set 401L2 Connection Information



Determine the polarity of the central office battery before performing the next step to avoid damage to the meter.

(b) Connect a KS-14510-L1 VOM, or equivalent (adjusted to indicate a maximum of 120 milliamperes), between tip and ring.

Note: The VOM will maintain the loop and hold the call.

(c) Remove the 1013-type handset, and measure the central office battery current.

(d) Remove the VOM and adjust the line coupler terminal block screws to provide the proper

compensation for the central office battery current in accordance with Table B.

Note: These adjustment are made on the line coupler by tightening or loosening screws on the terminal block. Tightening a screw provides contact between two terminals on the block. Loosening the screw opens the circuit between the terminals.

**4.03 Data Set 401L-Type Level:
Adjustment Procedure**

TABLE B

LOOP COMPENSATION OPTIONS

CENTRAL OFFICE BATTERY CURRENT	TIGHTEN SCREWS ON CP BE58 OR CP BE61
More than 68 mA	None
48 – 68 mA	B, D
38.5 – 48 mA	A, C
Less than 38.5 mA	A, B, C, D

STEP	PROCEDURE
	Note: Calibrate the transmission test set before making measurements.
1	Disconnect the DS 401L-type from the data line.
2	Connect a transmission test set (TTS-4 or equivalent) across tip and ring of the data line.
3	Arrange the TTS-4 to receive with an impedance of 900 ohms.
4	Using the telephone portion of the transmission test set, call the 1000-Hz 1-mw termination at the serving central office.
5	Measure and record the level of the incoming 1000-Hz signal.
	Note: The reading on the meter is the loss in dB of the local loop.
6	Record the value measured for later use.
7	Terminate the call to the 1000-Hz termination by releasing the data line (TTS-4 LINE/MON switch to OPEN position).
8	Arrange the TTS-4 to send 1000 Hz at a send level of 0 dBm (0 CAL position) and an impedance of 900 ohms.
9	Call a quiet termination.
10	Condition the TTS-4 for a bridging mode of operation (REC IMP switch set to BRDG/ADD 20 dB).

STEP	PROCEDURE
11	Measure and record the indication on the transmission test set. <i>Note:</i> 20 dB must be added to the meter indication if TTS-4 is used.
12	Using Table C, locate the reading recorded in Step 6 on the horizontal (XdB) axis and the number recorded in Step 11 on the vertical axis (YdB). <i>Note:</i> The final level is found by reading the XdB scale down and the YdB scale across to the junction of XdB and YdB. For example, if XdB = -1 and YdB = 5 then the final level is equal to -6 dBm. Record this value for later use.
13	Terminate call by placing LINE/MON key to OPEN.
14	Connect DS 401L-type to the data line tip and ring.
15	Encode the number of the data test center (DTC) in DS 401L-type as described in Fig. 1.

TABLE C
LEVEL SETTING CHART FOR DATA SET 401L-TYPE
READ FINAL dB AT THE JUNCTION OF XdB AND YdB

		← XdB →												
		0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
YdB	6	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
	5	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
	4	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
	3	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
	2	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2
	1	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1
	0	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
	-1	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
	-2	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2
	-3	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3
	-4	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
-5	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	
-6	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	
-7	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	
-8	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	
-9	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	
-10	-22	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	

STEP	PROCEDURE																																						
16	<p>Using the TTS-4 or a nearby telephone, place a call to the DTC. Request the DTC to do the following:</p> <p>(a) Call DS 401L-type number and allow it to ring twice and hang up.</p> <p>(b) Answer the call from DS 401L-type and transmit a 2025-Hz answer tone.</p> <p>Note: After receiving the call from DTC, the DS 401L-type will call the DTC. Upon receiving 2025-Hz answer tone from the DTC, DS 401L-type will go into the transmit mode.</p>																																						
17	<p>Once the data set is in the transmit mode, set the output level recorded in Step 12 by adjusting the option screws on the appropriate line coupler according to Table D, while observing the output level on the transmission test set.</p> <p style="text-align: center;">TABLE D SCREW ADJUSTMENT FOR CP BE61 AND CP BE58</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" data-bbox="472 863 857 905">TIGHTENED OPTION SCREWS</th> <th data-bbox="857 863 1179 905" rowspan="2">OUTPUT LEVEL</th> </tr> <tr> <th data-bbox="472 905 664 947">CP BE61</th> <th data-bbox="664 905 857 947">CP BE58</th> </tr> </thead> <tbody> <tr> <td data-bbox="472 947 664 989">None</td> <td data-bbox="664 947 857 989">None</td> <td data-bbox="857 947 1179 989" rowspan="16" style="text-align: center; vertical-align: middle;">  </td> </tr> <tr> <td data-bbox="472 989 664 1031">E</td> <td data-bbox="664 989 857 1031"></td> </tr> <tr> <td data-bbox="472 1031 664 1073">F</td> <td data-bbox="664 1031 857 1073"></td> </tr> <tr> <td data-bbox="472 1073 664 1115">EF</td> <td data-bbox="664 1073 857 1115">H</td> </tr> <tr> <td data-bbox="472 1115 664 1157">G</td> <td data-bbox="664 1115 857 1157"></td> </tr> <tr> <td data-bbox="472 1157 664 1199">EG</td> <td data-bbox="664 1157 857 1199"></td> </tr> <tr> <td data-bbox="472 1199 664 1241">FG</td> <td data-bbox="664 1199 857 1241">G</td> </tr> <tr> <td data-bbox="472 1241 664 1283">EFG</td> <td data-bbox="664 1241 857 1283"></td> </tr> <tr> <td data-bbox="472 1283 664 1325">H</td> <td data-bbox="664 1283 857 1325"></td> </tr> <tr> <td data-bbox="472 1325 664 1367">EH</td> <td data-bbox="664 1325 857 1367">EG</td> </tr> <tr> <td data-bbox="472 1367 664 1409">FH</td> <td data-bbox="664 1367 857 1409"></td> </tr> <tr> <td data-bbox="472 1409 664 1451">EFH</td> <td data-bbox="664 1409 857 1451"></td> </tr> <tr> <td data-bbox="472 1451 664 1493">GH</td> <td data-bbox="664 1451 857 1493">EGH</td> </tr> <tr> <td data-bbox="472 1493 664 1535">EGH</td> <td data-bbox="664 1493 857 1535"></td> </tr> <tr> <td data-bbox="472 1535 664 1577">FGH</td> <td data-bbox="664 1535 857 1577">FG</td> </tr> <tr> <td data-bbox="472 1577 664 1619">EFGH</td> <td data-bbox="664 1577 857 1619">FGH</td> </tr> </tbody> </table>	TIGHTENED OPTION SCREWS		OUTPUT LEVEL	CP BE61	CP BE58	None	None		E		F		EF	H	G		EG		FG	G	EFG		H		EH	EG	FH		EFH		GH	EGH	EGH		FGH	FG	EFGH	FGH
TIGHTENED OPTION SCREWS		OUTPUT LEVEL																																					
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FGH	FG																																						
EFGH	FGH																																						
18	<p>Remove all temporarily installed straps, replace the data set cover, and verify proper operation of the data set.</p> <p>Note: Reencode number per service order.</p>																																						
19	<p>End of test.</p>																																						

5. REFERENCES

5.01 For additional information to this section, refer to the following:

- SD and CD-1D089-01

- 25A Data Mounting (SD and CD-1D090-01)

- Section 103-204-100 (Model TTS-4 Series of Transmission Test Sets)