

LOCAL TEST DESK—NO. 16 MAINTENANCE

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2.	MAINTENANCE	1	2.01 To perform any maintenance on the 647-type key modules, the key must be removed from the panel assembly. The left and right panel assembly have an indent along the lower outside edge to provide a hand hold for raising the panel. The panels are hinged at the top and raise from the bottom to gain access to the keys. <i>The ticket box in the left panel assembly must be removed before the panel is raised.</i> The ticket box would strike the writing shelf if an attempt is made to raise the panel with the ticket box in place. The center panel assembly must be in the lowered position before raising or lowering the left or right panel assemblies.
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	F. Buzzer Circuit	7	● E5837 designation strip
	G. Line Insulation Breakdown Circuit	7	● P-23F437 button
3.	REFERENCE DRAWINGS	8	● P-23F427 (clear) } button cap
	1. GENERAL		● P-23F428 (red) }
	1.01 This section provides maintenance information for the components of the test desk position and testing procedures for the equipment associated with the No. 16 local test desk (LTD).		● P-23F101 collar
	1.02 This issue of the section is based on the drawings listed in Part 3 (reference drawings). If this section is to be used with equipment or apparatus reflecting later issues of the drawings, reference should be made to the SD and CD to determine the extent of the changes and the manner in which the section may be affected.		● Lamp 51A.
			2.03 Refer to Table A and Fig. 1 and 2 for the most common maintenance information on the 647-type keys.
			2.04 To replace or remove designation tabs in the 647-type keys, the button cap may be removed without removing the key from the panel

TABLE A
KEY MAINTENANCE
(647 -TYPE)

COMPONENTS	TROUBLE	CLEARING PROCEDURE
Buttons and Plunger	Binding or Squeaking	<p>VERIFY COLLAR IS PROPERLY SEATED ON KEY. Clean bearing surfaces with water damp cloth. Do not lubricate. If excessive trouble replace key.</p>
	Fails to Remain in Locked Position	<p>Check that P-28E773 locking pin is properly seated in plunger. If more than one button is affected replace key.</p>
Contacts	Contact Failure Due to Improper Making or Breaking	<p>Gauge open contacts to a minimum separation of 0.010 inch. (Fig. 2) shows tools used for spring adjustment.) Avoid kinking spring.</p>
		<p>Separations between contact springs have minimum separation of 1/64 inch.</p>
	Contact Failure Due to Foreign Matter on Contacts	<p>Burnish contacts with 265C tool E/W and 266E burnishing blade.</p>
Lamps	Improper Illumination	<p>Remove dirt or film from lamps and illuminated area with water damp cloth. (Fig. 1 shows proper removal of lamps.)</p>
		<p>Position lamps properly.</p>
		<p>Clean and check tension on lamp mounting contacts.</p>

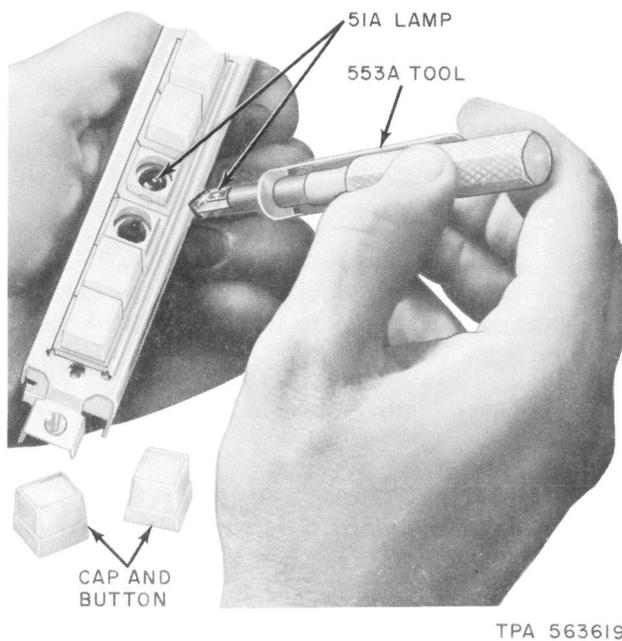


Fig. 1—Removing Lamp From 647-Type Key

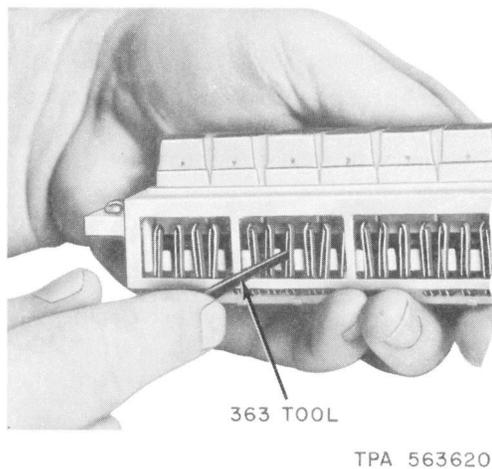


Fig. 2—Use of 363 Tool to Adjust Spring and Control Separation, 647-Type Key

assembly. The cap is removed by gripping the cap between the thumb and finger and pulling up with a slight rocking motion, to free the cap from the button. Insert the designation tab, replace the cap on the button, and push down until cap snaps into place.

Note: Tabs and opening on caps and buttons must align to properly lock cap to button just

as the tabs on the inside of the button must align with the recess on the plunger assembly.

2.05 To remove 647-type keys from the panel assembly, the key and its mounting bracket are removed as one unit. Keys are removed from the panel assembly by removing the screw holding the bracket on the end which does not have an open slot, and loosening the screw at the open-slotted end of the key bracket until the key may be slid free. To electrically disconnect the key, remove the plug retaining clip and disengage the plugs.

2.06 To replace a button lamp, the collar must be removed before the button may be removed to gain access to the lamp. Use a 553A tool to remove the lamp (Fig. 1).

Lever-Type Keys

2.07 Refer to Section 032-709-701 for requirements and adjusting information on the lever-type keys.

Voltmilliammeter

2.08 The meter in the test desk should be periodically checked for accuracy. The specification on the S9A meter requires $\pm 1\%$ accuracy. Test set KS-8039 is a voltmeter-ammeter which could be used to check the LTD meter.

Switchboard Clock

2.09 The switchboard clock operates on 18-24 volts ac. The clock cover is held in place by magnets and is removed from the front by pressing against any of the upper corners. The clock cover must be removed to set the clock. A slotted screw is provided on the right side of the clock for setting the seconds and minutes numerals. To set the seconds and minutes numerals, place a screwdriver in the slot and press in before turning the screw counter-clockwise. A push switch with normally closed contacts controls the power supply to the clock. Depress the switch to stop the clock. A knurled thumb wheel is provided for setting the hour numerals.

Speakerphone System



Remove power from 55-type control unit before attempting any maintenance of speakerphone components.

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2.10 *If speakerphone system transmits but does not receive:*

- (1) Visually inspect for loose or broken SP1 and SP2 leads between loudspeaker and 55B control unit. Refer to SD-1C379-01.
- (2) Replace 761A loudspeaker, if defective.

2.11 *If speakerphone system receives but does not transmit:*

- (1) Check for loose or broken M1 and M2 leads between the transmitter and 55B control unit. Refer to SD-1C379-01.
- (2) Replace 667B transmitter unit, if defective.

2.12 *If volume control does not vary loudspeaker volume:*

- (1) Check for loose or broken P1 lead between the transmitter and the 55B control unit.
- (2) Check for defective volume control.
- (3) Verify control unit is operating properly. Refer to Section 512-620-100 for information on the 55-type control unit.

2.13 *If amplification in receiver and/or transmitter unit(s) is poor:*

- Replace defective 55B control unit.

2.14 *If incoming speech is choppy:*

- (1) Room conditions may cause voice-switching or choppiness of incoming speech.
- (2) Move SP2 loudspeaker lead from terminal 29 to terminal 30 on 55B control unit to compensate for room conditions which cause choppiness in incoming speech.

Equipment Maintenance

A. Incoming and Outgoing Test Trunks

2.15 *If a test trunk cannot be seized by operating an incoming or outgoing key button, verify the start signal is received by the position control circuit as follows:*

- (1) Connect voltmeter to base of ST transistor (terminal 25 of CC terminal strip on the

trunk switching circuit of the J95005EA-1 position control unit.

- (2) Meter should read zero voltage.
- (3) Depress outgoing or incoming trunk button.
- (4) Meter should read 4.5 VDC. Relays LOA and BSA lock operated.
 - (a) If meter stays at 0 voltage, or 4.5 VDC, check wiring of chaining switches for the incoming and outgoing trunk selection keys.
 - (b) If meter reads approximately 48 VDC, check the ST transistor.

2.16 *If the test trunk cannot be seized by the control circuit, perform the following tests:*

- (1) Verify at least one headset is properly plugged into one of the headset jacks.
- (2) Verify AP relay in position control circuit, and CO and CO1 relays of the control group test trunk lock operated when PR1 button is operated.
- (3) Depress SEC button associated with the same control group. Verify AS relay locks operated. AP relay releases if test trunk was transferred from primary to secondary test circuit.
- (4) Depress SO button associated with the same control group. Verify relay ASO locks operated. AS relay releases if test trunk was transferred from secondary test circuit.
- (5) Use Table B for a step-by-step check of control circuit relays.
- (6) If test circuits cannot be seized after proper operation of all relays is verified, check to ensure that all control keys are properly connected. Check for loose or broken connections.

2.17 Adjustable relays in the secondary ringing circuit, test trunk circuits, and test and no-test central office trunks should be checked periodically for proper operation. Malfunctions may develop and not be detected in normal use, especially in circuits which are infrequently used.

TABLE B
RELAY OPERATION

STEP	CONTROL GROUP	RELAYS TO MANUALLY OPERATE	RELAYS WHICH LOCK OPERATED (NOTE)	RELAYS WHICH RELEASE (NOTE)
1	A	LOA	LOA, BSA	
2		TA	TA	
3		TB, TC, BSB		
4		AP	AP, CO, COI	
5		AS	AS	AP
6		ASO	ASO	AS
7		BP, CP		
8		LOB	LOB, BSB	
9		TB	TB	
10	B	TC		
11		BP	BP, CO, COI	
12		BS	BS	BP
13		BSO	BSO	BS
14		CP		
15	C	LOC	LOC	
16		TC	TC	
17		CP	CP, CO, COI	
18		CS	CS	CP
19		CSO	CSO	CS
20	A	DTA		LOA, BSA, TA ASO, CO, COI
21	B	DTB		LOB, BSB, TB BSO, CO, COI
22	C	DTC		LOC, TC, CSO CO, COI

Note: Relays listed in column 4 (relays which lock operated) and column 5 (relays which release) refer to the status of those relays when the associated relays in column 3 are manually operated.

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2.18 *If busy (BY) indicator does not illuminate when PRI, SEC, or SO test circuit is seized, perform the following tests:*



The BY indicator will not illuminate when the test circuits are connected to MDF test trunks, since MDF trunks bypass the test trunk of the position control circuit.

- (1) Depress incoming or outgoing test trunk button.
- (2) Verify TA, TB, or TC relay operates, when seizing a test or no-test trunk. (Relays will not operate when MDF trunks are seized.)
- (3) Block (nonoperated) the TM0 relay to bypass the control circuit.
- (4) Manually operate the ST relay.
- (5) Verify BA and BID relays operate when ST relay is operated.
- (6) IF BA and BID relays do not operate, check wiring of lockout control circuit. Verify ground is connected to punching 6F of BA relay and 10F of BID relay. Check for loose or broken connections to the incoming or outgoing test trunk keys.

B. Visual Indicator Circuit

2.19 *If no numeral is displayed in the visual indicator tube, when the VI button is depressed, make the following tests:*

- (1) Block L relay operated.
- (2) Measure 130 VAC on terminal 1 of L relay.
- (3) Connect one cord of a test receiver to -48 VDC and observe the numerals which appear in the visual indicator while connecting the opposite cord of the test receiver to the following punchings:

**POSITION TERMINAL
STRIP (C) PUNCHING**

**NUMERAL IN
VISUAL INDICATOR**

1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
10	0

- (4) If correct numerals are made to appear on the visual indicator while proceeding through step 3, check wiring of visual indicator lockout circuit.
- (5) If numerals do not appear on the visual indicator when completing step 3, the visual indicator tube may be defective.

C. Group Busy Indicator

2.20 *If the group busy (GB) indicator does not illuminate when all outgoing test trunks in a trunk group are seized or made busy, make the following tests:*

- (1) Measure -48 VDC at L of GB relay.
- (2) Measure -48 VDC on 10M of last BY relay in the trunk group.
- (3) Block last BY relay operated.
- (4) Measure -48 VDC on 10M of next lower BY relay.
- (5) Continue steps 3 and 4 until -48 VDC is measured at all BY relays in the trunk group.
- (6) If the group busy indicator does not function properly after completing step 5, verify that the outgoing trunk keys are properly wired and that there are no loose or broken connections.

D. Dial Testing Circuit

2.21 *If the dial test (DT) indicator does not illuminate when SET 10 or 18 key is operated, verify the position relays DT and DT1 operated.*

2.22 *If the position meter cannot be adjusted to the 10V or 18V setting for making a dial test, perform the following checks:*

- (1) Verify C, P, and P1 relays in the dial testing circuit operate.
- (2) Verify G resistor in dial testing circuit has one side connected to ground.
- (3) Verify G resistor is a 400-ohm resistor.

2.23 *If the subscriber does not receive dial tone when the dial test key is operated, verify the DT relay in the dial testing circuit operates.*

2.24 *If there is no meter reading when dialing zero, perform the following checks:*

- (1) Verify the P and P1 relays follow the dial pulses when dialing with the SET 10 or 18 key and dial test key operated.
- (2) Check the C relay releases when the dial test key is operated.
- (3) Check C capacitor.

E. Conductor Identification Tone Circuit

2.25 *If no conductor identification tone is heard when the sounder (S) key is operated:*

- (1) Verify TN1 relay operates.
- (2) Verify ST relay associated with the conductor identification tone circuit operates.

2.26 A steady conductor identification tone indicates the tuned circuits are not oscillating. Check for a short or open in the T1 transformer and L1 inductor.

F. Buzzer Circuit

2.27 *If buzzer does not operate:*

- (1) Verify TN relay operates.
- (2) Measure for 105 VAC between the buzzer and 6B of TN relay.

G. Line Insulation Breakdown Circuit

2.28 *If no breakdown voltage is applied to circuit when BT1 or BT2 key is operated:*

- (1) Verify position relays BD, BD1, and BD2 operate when BT1 key is operated or BD and BD2 relays operate when BT2 key is operated.
- (2) Verify BY and G relays in the breakdown test circuit operate.

2.29 *If selector for line insulation breakdown steps to terminal 2 and stops:*

- Measure for 105 VAC between terminal 1B and 17 of SC relay.

2.30 *If selector steps slowly (20 seconds) to complete the line insulation breakdown cycle:*

- SC relay is not operating properly. SC relay should operate more rapidly after completing step 2.

2.31 *If maximum breakdown is not applied for a 3 second interval:*

- (1) Verify S and S1 relays in breakdown test circuit operate.
- (2) Verify ground is present on wiper terminal of ARC 6.

2.32 *If selector switch does not stop after two cycles:*

- Check EC relay in breakdown test circuit operates.

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3. REFERENCE DRAWINGS

3.01 The following circuit drawings are used with the 16-type local test desk. Titles are condensed and rearranged for use as a ready reference.

SECTION		TITLE
SD-&CD-1C379-01	SD-Issue 1	Primary and secondary test circuits
SD-&CD-1C380-01	SD-Issue 1	Common system telephone circuits—Talk trunks, loudspeaker trunks, and test circuits
SD-&CD-1C381-01	SD-Issue 1	Trunk switching circuit
SD-&CD-1C401-01	SD-Issue 1	60 and 120 IPM flashing circuit
SD-&CD-95570-02	SD-Issue 1	TOUCH-TONE and MF circuit
SD-&CD-95737-01	SD-Issue 15B	Incoming or outgoing test trunk circuits
SD-&CD-95741-01	SD-Issue 6B	Secondary ringing circuit
SD-&CD-95764-01	SD-Issue 2B	Test trunk circuit for detecting intermittent trouble
SD-&CD-96472-01	SD-Issue 5B	MDF loudspeaker trunk circuit
SD-&CD-99549-01	SD-Issue 1	Fuse alarm circuit