LINE CONCENTRATOR–IDENTIFIER SYSTEM
APPLIED TO TELEPHONE SECRETARIAL SERVICE
CIRCUIT TESTS

1. GENERAL

1.01 This section describes a method of testing the line concentrator-identifier circuits applied to telephone secretarial service.

1.02 This section is reissued to include systems employing a maximum of six trunks. The following tests are revised or added:

(a) To include pretripping test in Test A.

(b) To test trunk allotter sequence in Test B.

(c) To include alarm release option in Tests C, D, I, J, and K.

(d) To test systems using either four or two indicator circuits in Test E.

(e) To include tone spurt feature in Tests E and P.

(f) To include minor changes in Tests G and N.

(g) To test operation of new equipment timed lockout circuits in Test H.

(h) To include fuse designation changes in Test L.

(i) To add Test Q to check battery charging rate.

(j) To add Test R to check controller time-out limits.

(k) To add Test S to check continued display of calls when all trunks are busy.

(l) To add Test T to check lockout feature of units preference circuits.

(m) To add Test U to check operation of trunk capacity discharge circuit.

(n) To add Test V to check operation of locked-out controller release circuit.

(o) To add Test W to check operation of select and hold magnets and units and tens digits relays at the terminating equipment.

(p) To add Test X to check lockout feature of tens preference circuit.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

A. Call Through and Pretripping: The following features are checked. (1) Identification of called subscribers auxiliary line equipment. (2) Start circuit seizure. (3) Alternate use of controllers in originating and terminating equipment. (4) Pulse generator in originating equipment and pulse receiver in terminating equipment. (5) use of trunk allotter and trunk seizure. (6) Seizure of indicator and "walking down" of indicator allotter. (7) Lighting of subscriber lamps at switchboard. (8) Ringing tripping relay in central office does not pretrip.

B. Trunk Make-Busy and Trunk Allotter Sequence: This test checks the ability of the trunk allotter to assign the remaining trunks in sequence when one or more trunks are made busy.

C. Alternate Allotter: The following features are checked. (1) The alternate trunk allotter is used when a trouble occurs in the regular trunk allotter. (2) The alternate trunk allotter is used when the AA key is operated. (3) The regular trunk allotter is released when the AR key is operated or when alarm release telephone number is dialed.

D. Pulsing Path Transfer: The following features are checked. (1) The pulsing path is transferred to an alternate path when the circuit times out. (2) The pulses are transmitted over the alternate route. (3) The primary pulsing path is restored when the AR key is operated or alarm release telephone number is dialed.

E. Indicator Make Busy: This test checks the ability of the indicator allotter to assign the remaining indicator or indicators in sequence when one or more indicators are made busy.

F. Talking Path Seizure: The following features are checked. (1) The secretarial bureau attendant seizes a talking path during the period that the line is rung. (2) The trunk is held under the control of the secretarial bureau attendant. (3) A talking path can be verified over each equipped trunk.

G. Alternate Use of Controllers: The following features are checked. (1) Alternate use of controllers in originating and terminating equipment. (2) Make busy of controllers when either CA or CB key is operated. (3) Lamp indication of controller in use at originating equipment.

H. Timed Lockout Circuit: This test checks the operation of the two timed lockout circuits associated with unmodified equipments and the five circuits associated with modified equipments.

I. Units Timing: This test checks the units timing circuit.

J. Tens Timing: This test checks the tens timing circuit.

K. Alarm Cutoff: This test checks the alarm cutoff circuit.

L. Hold Magnet Check Relay: This test checks the hold magnet check relay for operations on either winding.

M. Indicator Allotter Make Busy: This test checks the make-busy feature for A and B indicator allotters.

N. Fuse Alarms: The following features are checked. (1) The ability of the fuse alarm circuits in the originating and terminating equipment to function when a fuse has operated. (2) Alarm functions in case of charging failure.

O. Measurement of Line Current: This test checks the circuits over which the pulses are transmitted.

P. All-Trunks-Busy and Traffic Registers: The following features are checked. (1) All-trunks-busy and traffic register circuit at the originating equipment. (2) ATB lamp and traffic register at the terminating equipment.

Q. Battery Charging Rate: This test checks charging current of battery charger at terminating equipment.

R. Controller Timeout: This test checks that a terminating equipment controller will time out in 4 to 6 seconds if PC1 or PC2 relays are held operated due to controller relay failure.

S. All-Trunks-Busy Call Display: The following features are checked. (1) Calls are pulsed through and displayed when all trunks are busy. (2) Tone spurt and talking path inoperative when all trunks are busy.

T. Units Digit Association and Lockout: The following features are checked. (1) Lockout circuit functions to lock out lower numbered U- relays, higher numbered LO- relays. (2) Proper select magnet operates with associated U- relay.

U. Trunk Capacity Discharge: This test checks the composite trunk capacity discharge circuit.

V. Release of Locked-out Terminating Controller: This test checks that dialing the telephone number assigned for the controller release, or operating the CR key, will release a locked-out controller.

W. Units and Tens Digits and Select and Hold Magnet Operation: This test checks that the appropriate units and tens digits relays and the appropriate select and hold magnets will be operated at the terminating equipment in response to the operation of a particular RU-- relay at the originating equipment.

X. Originating Tens Digit Association and Lockout: This test checks the operation of tens group RU-- relays associated with corresponding T- relays. The preference feature of the T- relays is also checked.

1.04 Part of the tests in this section require testing at the originating equipment in the central office and part of the tests require testing at the terminating equipment in the answering bureau.

1.05 Tests in this section should be performed during periods of light traffic.

1.06 Where a reference is made to an SD number in a step, that particular phase of the test applies only to the equipment corresponding to the SD number. Where no reference is made to an SD number, that phase of the test applies to all equipments.

1.07 Local instructions should be followed for recording and reporting any register operations caused by performing these tests.

1.08 Ringup circuits will function with three different ringing arrangements. Determine proper ringing current polarity before performing Tests A through E, G through M, T, W, and X.

1.09 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 4 of this section, indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 The apparatus required for each test is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.

2.02 1011G dial hand test set equipped with W2DB cord, 4 feet long, one 471A jack, and two KS-6780 connecting clips (2W37A cord) (used to establish test talk path at originating equipment).

2.03 1011B handset (used to establish test talk path at terminating equipment).

2.04 Testing cord, 893 cord, 6 feet long, with two 360A tools, (1W13B cord), one KS-6278 connecting clip, and one 411A (test pick) tool (for applying battery, ringing current, or ground to test points) or 419A (test connector) tool (for connecting to relay springs).

2.05 553A (lamp extractor) tool.

2.06 319B (lamp cap extractor) tool.

2.07 Weston model 280 volt-ammeter or equivalent having voltage scales of 60, 30, and 3 volts and current scales of 15, 3, and 0.3 amperes equipped with test leads.

2.08 Testing cord, W2BS cord, 5 feet long, equipped with one 310 plug and two 35 cord tips (2W33A cord) or equivalent (for measuring line current and battery charging current).

2.09 KS-14510 L1 volt-ohm-milliammeter or equivalent equipped with KS-14510 L2 test leads or equivalent.

2.10 KS-3008 stop watch or equivalent for timing controller time out.

2.11 Blocking and insulating tools, as required. Use tools and apply as covered in Section 069-020-801.

TABLE A

APPARATUS	TEST																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1011G handset (dial hand test set) (2.02)	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1			1	1		1	1	1
1011B handset (dial hand test set) (2.03)	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1			1	1		1	1	1
893 Testing cord (2.04)	1	1	1	1	1		1	1	1	1	1	1	1	2						2		1	1	2
553A Tool (2.05)														2										
319B Tool (2.06)														2										
Weston volt-ammeter (2.07)															1		1							
Volt-ohm-milliammeter (2.09)																		1			1			
KS-3008 Stopwatch (2.10)																		1						

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	At originating equipment — Restore all keys.	At originating equipment — All lamps extinguished.
2	At terminating equipment — Restore all keys.	At terminating equipment — All lamps extinguished.
Tests A through M, P, S, T, V, W, and X		
3	At originating equipment — Determine which lines will be used in test and inform the switchboard attendant.	
Tests A through N, P, S, T, V, W, and X		
4	Establish a talking connection between originating equipment in the central office and terminating equipment in the answering bureau.	
Tests B, C, D, E, G, I, J, K, L, M, N, T, and X		
5	Select for test a vacant ringup circuit, if available, and inform terminating equipment end which line was selected for test.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Call Through and Pretripping	
5a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relays in sequence.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay. At originating equipment — UI-, TI- lamps lighted corresponding to operated RU-- relay.
6b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relays in sequence.	Same as Step 5a.

STEP	ACTION	VERIFICATION
7c	At originating equipment — If R resistor is 3000 ohms — Insulate in turn contacts of LO0 through LO9 relays listed in Table B associated with the RU-- relay under test.	

TABLE B

LO RELAY CONTACTS	LO RELAYS									
	LO-0	LO-1	LO-2	LO-3	LO-4	LO-5	LO-6	LO-7	LO-8	LO-9
	RU RELAYS									
Lower 1-2	00	01	02	03	04	05	06	07	08	09
Lower 3-4	10	11	12	13	14	15	16	17	18	19
Lower 5-6	20	21	22	23	24	25	26	27	28	29
Lower 7-8	30	31	32	33	34	35	36	37	38	39
Lower 9-10	40	41	42	43	44	45	46	47	48	49
Upper 1-2	50	51	52	53	54	55	56	57	58	59
Upper 3-4	60	61	62	63	64	65	66	67	68	69
Upper 5-6	70	71	72	73	74	75	76	77	78	79
Upper 7-8	80	81	82	83	84	85	86	87	88	89
Upper 9-10	90	91	92	93	94	95	96	97	98	99

8c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay in sequence.	Same as Step 5a.
9c	Remove insulating tool placed in Step 7c.	
10	Connect or patch temporarily an official line assigned to central office to a vacant ringup circuit at MDF.	
11d	If vacant ringup circuit is not available — Obtain permission to use ringup circuit in service.	
12	Originate a call.	At terminating equipment — Switchboard lamp lighted associated with selected ringup circuit. At originating equipment — Ringing tone is normal, and ring tripping relay in central office does not operate.
13	Disconnect official line.	

STEP	ACTION	VERIFICATION
	B. Trunk Make-Busy and Trunk Allotter Sequence	
6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
7b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 6a.
10c	Remove insulating tool placed in Step 8c.	
11	Operate TB1 key.	
12d	If three or more trunks are provided — Repeat Steps 6a, 7b, or 8c, 9c, 10c to momentarily make busy all trunks in turn.	At originating equipment — TK1 lamp does not light. Remaining TK- lamps lighted in sequence. At terminating equipment — T1 lamp does not light. Remaining T- lamps lighted in sequence.
13	At originating equipment — Restore TB1 key and operate TB2 key.	
14	Repeat Steps 6a, 7b, or 8c, 9c, 10c to momentarily make busy all trunks in turn.	At originating equipment — TK2 lamp does not light. Remaining TK- lamps lighted in sequence. At terminating equipment — T2 lamp does not light. Remaining T- lamps lighted in sequence.
15	At originating equipment — Restore TB2 key.	
16	Operate each next higher numbered TB- key and proceed as in Steps 13 through 15 until all TB- keys have been operated and restored.	At originating equipment — TK- lamp corresponding to operated TB- key does not light. Remaining TK- lamps lighted in sequence. At terminating equipment — T- lamp corresponding to operated TB- key does not light. Remaining T- lamps lighted in sequence.

STEP	ACTION	VERIFICATION
	C. Alternate Allotter	
6	At originating equipment — Operate AA key.	AA lamp lighted.
7a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
8b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 7a.
9c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of the LO- relay associated with the RU-- relay selected for test.	
10c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 7a.
11c	Remove insulating tool placed in Step 9c.	
12d	If three or more trunks are provided — Repeat Steps 7a, 8b, or 9c, 10c, 11c to test each equipped trunk.	At originating equipment — TK1 lamp lighted for each trunk tested. At terminating equipment — T1 lamp lighted for each trunk tested.
13	At originating equipment — Restore AA key.	AA lamp extinguished.
14	Manually release TA1 to TA6 relays if operated.	TA0 relay operated.
15	Block nonoperated TA0 relay.	
16e	If three or more trunks are provided — Repeat Steps 7a, 8b, or 9c, 10c, 11c to test each equipped trunk.	At originating equipment — AA, AL lamps lighted. Audible alarm sounds. TK1 lamp lighted for each trunk tested. At terminating equipment — T1 lamp lighted for each trunk tested.
17	At originating equipment — Operate momentarily AR key or dial telephone number assigned for alarm release.	AA, AL lamps extinguished. Audible alarm retired.
18	Remove blocking tool from TA0 relay.	If no TA- relays are operated — TA0 relay operated.

STEP	ACTION	VERIFICATION
19f	If three or more trunks are provided — Repeat Steps 7a, 8b, or 9c, 10c, 11c to test each equipped trunk.	At originating equipment — TK- lamps lighted in sequence. At terminating equipment — T- lamps lighted in sequence.
	D. Pulsing Path Transfer	
6	At originating equipment — Insulate 6T of SS relay.	
7a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay. TO lamp lighted. At originating equipment — AL lamp lighted. Audible alarm sounds.
8b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 7a.
9c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
10c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 7a.
11c	Remove insulating tool placed in Step 9c.	
12	Operate momentarily AR key or dial telephone number assigned for alarm release.	At terminating equipment — TO lamp extinguished. At originating equipment — AL lamp extinguished. Audible alarm retired.
13	Remove insulating tool placed in Step 6.	
14	Repeat Steps 7a, 8b, or 9c, 10c, 11c.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.

STEP	ACTION	VERIFICATION
	E. Indicator Make-Busy	
	Terminating Equipment SD-95748-01	
6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
7b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 6a.
10c	Remove insulating tool placed in Step 8c.	
11	At terminating equipment — Operate I1 key.	
12	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c three times.	At terminating equipment — I1 lamp does not light. I2 through I4 lamps lighted in sequence.
13	At terminating equipment — Operate I2 key.	
14	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c two times.	At terminating equipment — I1, I2 lamps do not light. I3, I4 lamps lighted in sequence.
15	At terminating equipment — Restore I1 key and operate I3 key.	
16	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c two times.	At terminating equipment — I2, I3 lamps do not light. I1, I4 lamps lighted in sequence.
17	At terminating equipment — Restore I2 key and operate I4 key.	

STEP	ACTION	VERIFICATION
18	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c two times.	At terminating equipment — I3, I4 lamps do not light. I1, I2 lamps lighted in sequence.
19	At terminating equipment — Restore I3, I4 keys.	
Terminating Equipment SD-95962-01		
20	At originating equipment SD-95964-01 — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
21c	At originating equipment — Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
22c	At originating equipment — Remove insulating tool placed in Step 20c.	
23	At terminating equipment — Operate I1 key.	
24	At originating equipment — Repeat Steps 20c, 21c, 22c two times.	At terminating equipment — I1 lamp does not light. I2 lamp lighted.
25	At terminating equipment — Restore I1 key and operate I2 key.	
26	At originating equipment — Repeat Steps 20c, 21c, 22c two times.	At terminating equipment — I2 lamp does not light. I1 lamp lighted.
27	At terminating equipment — Restore I2 key.	
	F. Talking Path Seizure	
5	At originating equipment — Connect or patch temporarily official line assigned to central office to vacant ringup circuit at MDF.	
6a	If vacant ringup circuit is not available — Obtain permission to use ringup circuit in service.	

STEP	ACTION	VERIFICATION
7	Leave TB1 key normal and operate remaining TB- keys.	
8	Originate a call.	At terminating equipment — Switchboard lamp lighted associated with operated ringup circuit. T1 lamp lighted. At originating equipment — TK1 lamp lighted.
9	At terminating equipment — Operate TALK key of idle cord, and during next ringing interval, insert cord into jack associated with lamp lighted in Step 8.	Switchboard lamp extinguished. Tone spurt heard. Talking circuit satisfactory.
10	Remove cord from switchboard jack and restore TALK key.	At originating and terminating equipment — Hold magnets released.
11	At originating and terminating equipment — Repeat Steps 5 through 10 in turn with next higher numbered TB- key restored and all other TB- keys operated until tests have been applied to all equipped TB- keys.	At originating and terminating equipment — Same as Steps 8 through 10 except that TK-, T- lamps lighted corresponding to TB- key in normal position.
12	Disconnect official line.	

G. Alternate Use of Controllers

6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
7b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 6a.
10c	Remove insulating tool placed in Step 8c.	

STEP	ACTION	VERIFICATION
11	Repeat Steps 6a, 7b, or 8c, 9c, 10c to test each equipped trunk.	At originating equipment — CA, CB lamps lighted alternately. At terminating equipment — Controller A, controller B operated alternately.
12	At originating equipment — Operate EA or CB key.	
13	Repeat Steps 6a, 7b, or 8c, 9c, 10c to test each equipped trunk.	At originating equipment — CA lamp lighted for each trunk tested. At terminating equipment — Controller A, controller B operated alternately.
14	At originating equipment — Restore EA or CB key and operate EB or CA key.	
15	Repeat Steps 6a, 7b, or 8c, 9c, 10c to test each equipped trunk.	At originating equipment — CB lamp lighted for each trunk tested. At terminating equipment — Controller A, controller B operated alternately.
16	At originating equipment — Restore EB or CA key.	
17	At terminating equipment — Operate EA or CB key.	
18	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c to test each equipped trunk.	At originating equipment — CA, CB lamps lighted alternately. At terminating equipment — Controller A operated for each trunk tested.
19	At terminating equipment — Restore EA or CB key and operate EB or CA key.	
20	At originating equipment — Repeat Steps 6a, 7b, or 8c, 9c, 10c to test each equipped trunk.	At originating equipment — CA, CB lamps lighted alternately. At terminating equipment — Controller B operated for each trunk tested.
21	At terminating equipment — Restore EB or CA key.	

STEP	ACTION	VERIFICATION
	H. Timed Lockout Circuit	
	Originating Equipment SD-95739-01	
5	At originating equipment — Select RU-- relay for test within 0 through 4 units group for Steps 6a, 7b, or 8c, 9c, 10c.	
6a	At originating equipment — If R resistor is 1470 ohms — Apply ground momentarily to 2B of selected RU-- relay.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
7b	At originating equipment — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of selected RU- relay.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 6a.
10c	Remove insulating tool placed in Step 8c.	
11	Operate LOA key.	
12	Repeat Steps 6a, 7b, or 8c, 9c, 10c two times.	At originating equipment — First time lockout MA, MB, MC relays operated and released.
13	Select RU-- relay for test within 5 through 9 units group for Step 14.	
14	Operate selected RU-- relay two times as outlined in Steps 6a through 10c.	Same as Step 12.
15	Restore LOA key and operate LOB key.	
16	Operate a selected RU-- relay in 0 through 4 units group by repeating Steps 6a, 7b, or 8c, 9c, 10c two times.	Second timed lockout MA, MB, MC relays operated and released.
17	Operate a selected RU-- relay in 5 through 9 units group by repeating Steps 6a, 7b, or 8c, 9c, 10c two times.	Same as Step 16.

STEP	ACTION	VERIFICATION
18	Restore LOB key.	
Originating Equipment SD-95964-01		
19	At originating equipment — Select RU-0 or RU-5 relay for test.	
20	Insulate contacts of LO- relay associated with selected RU-0 or RU-5 relay.	
21	Apply ringing current momentarily to M lead on associated ringup circuit to operate selected RU-0 or RU-5 relay.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
22	Repeat Step 21 two times.	A timed lockout MA, MB, MC relays operated and released.
23	Operate LA key.	
24	Repeat Step 21 two times.	B timed lockout MA, MB, MC relays operated and released.
25	Restore LA key.	
26	Remove insulating tools placed in Step 20.	
27	Repeat Steps 19 through 26 to test remaining timed lockout circuits as shown in Table C.	Same as Steps 19 through 26.

Note: Operation of L- key transfers to next higher numbered timed lockout circuit except LE key which transfers to timed lockout circuit 1.

TABLE C

TIMED LOCKOUT CIRCUIT	TRANSFER KEY	RINGUP RELAYS
1	LA	RU-0 RU-5
2	LB	RU-1 RU-6
3	LC	RU-2 RU-7
4	LD	RU-3 RU-8
5	LE	RU-4 RU-9

STEP	ACTION	VERIFICATION
	I. Units Timing	
6	At terminating equipment — Insulate 3T of SM relay in controller A.	
7	Operate EA or CB key.	
8a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU- relay selected for test.	At terminating equipment — TO lamp lighted. At originating equipment — AL, UI- lamp lighted. Audible alarm sounds.
9b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 8a.
10c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU- relay selected for test.	
11c	Apply ringing current momentarily to M lead on associated ringup current to operate RU- relay selected for test.	Same as Step 8a.
12c	Remove insulating tool placed in Step 10c.	
13	At terminating equipment — Remove insulating tool placed in Step 6.	
14	Restore EA or CB key.	
15	At originating equipment — Operate momentarily AR key or dial telephone number assigned for alarm release.	At terminating equipment — TO lamp extinguished. At originating equipment — AL, UI- lamps extinguished. Audible alarm retired.
	J. Tens Timing	
6	At originating equipment — Connect ground to 11B of DC1 relay in controller A.	
7	Operate EA or CB key.	
8a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At originating equipment — AL, TI- lamps lighted. Audible alarm sounds. At terminating equipment — TO lamp lighted.

STEP	ACTION	VERIFICATION
9b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 8a.
10c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
11c	Apply ringing current momentarily to M lead on associated ringup current to operate RU-- relay selected for test.	Same as Step 8a.
12c	Removing insulating tool placed in Step 10c.	
13	Operate momentarily AR key or dial telephone number assigned for alarm release.	At originating equipment — AL, TI- lamps extinguished. Audible alarm retired. At terminating equipment — TO lamp extinguished.
14	At originating equipment — Remove ground from 11B of DC1 relay.	
15	Restore EA or CB key.	

K. Alarm Cutoff

6	At originating equipment — Block nonoperated DC3 relay of controller A.	
7	Operate EA or CB key.	
8a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At originating equipment — AL lamp lighted. Audible alarm sounds.
9b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 8a.
10c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	

STEP	ACTION	VERIFICATION
11c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 8a.
12c	Remove insulating tool placed in Step 10c.	
13d	If ACO key is locking type — Operate ACO key.	ACO lamp lighted. AL lamp remains lighted. Audible alarm retired.
14d	Repeat Steps 8a, 9b, or 10c, 11c, 12c.	ACO, AL lamps remain lighted. Audible alarm not sounded.
15e	If ACO key is nonlocking type — Operate momentarily ACO key.	ACO lamp lighted. AL lamp remains lighted. Audible alarm retired.
16e	Repeat Steps 8a, 9b, or 10c, 11c, 12c.	ACO lamp extinguished. AL lamp remains lighted. Audible alarm sounds.
17d	If ACO key is locking type — Operate momentarily AR key or dial telephone number assigned for alarm release. Restore ACO key.	AL, ACO lamps extinguished.
18e	If ACO key is nonlocking type — Operate momentarily AR key or dial telephone number assigned for alarm release.	AL lamp extinguished. Audible alarm retired.
19	Remove blocking tool from DC3 relay.	
20	Restore EA or CB key.	

L. Hold Magnet Check Relay

6	At originating equipment — Remove CA or DA fuse.	
7a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At originating equipment — H, HA relays operated.
8b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 7a.

STEP	ACTION	VERIFICATION
9c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU- relay selected for test.	
10c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 7a.
11c	Remove insulating tool placed in Step 9c.	
12	Replace CA or DA fuse and remove CB or DB fuse.	
13	Repeat Steps 7a, 8b, or 9c, 10c, 11c.	Same as Step 7a.
14d	At originating equipment SD-95739-01 — If not equipped with HS, HP resistors — Connect ground momentarily to equipment side of DB fuse holder.	DA fuse should not operate.
15	At originating equipment — Replace CB or DB fuse.	

M. Indicator Allotter Make Busy

6a	At terminating equipment — If IA, IB keys provided — Operate IA key.	
7b	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay selected for test.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
8c	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay selected for test.	Same as Step 7b.
9d	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
10d	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay selected for test.	Same as Step 7b.

STEP	ACTION	VERIFICATION
11	At originating equipment — Repeat Steps 7b, 8c, or 9d, 10d two times.	At terminating equipment — B indicator allotter should handle call.
12a	At terminating equipment — If IA, IB keys are provided — Operate IB key.	
13a	At originating equipment — Repeat Steps 7b, 8c, or 9d, 10d two times.	At terminating equipment — A indicator allotter should handle call.
14a	At terminating equipment — Restore IA key.	
15a	At originating equipment — Repeat Steps 7b, 8c, or 9d, 10d two times.	At terminating equipment — A indicator allotter should handle call.
16d	At originating equipment — Remove insulating tool placed in Step 9d.	
17a	At terminating equipment — Restore IB key.	

N. Fuse Alarm

Originating Equipment Fuse Alarm

5	At originating equipment — Connect battery to alarm bar for individual fuses.	At originating equipment — FA lamp lighted. Audible alarm sounds.
6	Disconnect battery from alarm bar for individual fuses.	FA lamp extinguished. Audible alarm retired.
7	Remove FA lamp.	
8	Repeat Step 5.	Audible alarm sounds.
9	Repeat Step 6.	Audible alarm retired.
10	Replace FA lamp.	
11	Connect battery to frame fuse alarm by inserting 411A test pick into hole in fuse mounting.	20A lamp lighted. Audible alarm sounds.
12	Remove 411A test pick from fuse mounting.	20A lamp extinguished. Audible alarm retired.
13	Remove 20A lamp.	

STEP	ACTION	VERIFICATION
14	Repeat Step 11.	Audible alarm sounds.
15	Repeat Step 12.	Audible alarm retired.
16	Replace 20A lamp.	
Terminating Equipment Fuse Alarm		
17	At terminating equipment — Connect battery to fuse alarm bar on any fuse.	At terminating equipment — FA lamp at equipment cabinet, FA lamp at switchboard lighted. Audible alarm sounds.
18	Disconnect battery from fuse alarm bar.	FA lamp at equipment cabinet, FA lamp at switchboard extinguished. Audible alarm retired.
19	Remove FA lamp on fuse panel.	
20	Repeat Step 17.	FA lamp at switchboard lighted. Audible alarm sounds.
21	Operate AS key at switchboard.	Audible alarm retired.
22	Repeat Step 18.	FA lamp at switchboard extinguished.
23	Replace FA lamp on fuse panel.	
24	Restore AS key at switchboard.	
25a	If charge failure alarm is provided — Disconnect rectifier by removing power plug from receptacle or remove fuse in central office feeders.	FA lamp at equipment cabinet, FA lamp at switchboard lighted. Audible alarm sounds.
26a	Reconnect rectifier by plugging power cord into power receptacle or replace fuse in central office feeders.	FA lamp at equipment cabinet, FA lamp at switchboard extinguished. Audible alarm retired.

O. Measurement of Line Current

Caution: The following test will result in all service being interrupted. Perform the test during period of light traffic.

3	At originating equipment — Connect sleeve conductor of W2BS cord to (+) terminal of Weston model 280 volt-ammeter. Connect tip conductor of W2BS cord to (—) terminal of Weston model 280 volt-ammeter. Use 0.3 ampere scale.	
4	Operate EA or CB key.	

STEP	ACTION	VERIFICATION
5	Insert plug of W2BS cord into LC jack associated with controller A.	
6	Block operated STA1 relay.	Ammeter should read between 0.025 and 0.035 ampere.
7	Remove plug from LC jack.	
8	Remove blocking tool from STA1 relay.	
9	Restore EA or CB key.	
10	Operate EB or CA key.	
11	Insert plug of W2BS cord into LC jack associated with controller B.	
12	Block operated STB1 relay.	Ammeter should read between 0.025 and 0.035 ampere.
13	Remove plug from LC jack.	
14	Remove blocking tool from STB1 relay.	
15	Restore EB or CA key.	

P. All-Trunks-Busy and Traffic Registers

Caution: The following test will result in all service being interrupted. Perform the test during periods of light traffic.

5	At originating equipment — Connect or patch temporarily official line assigned to central office to vacant ringup circuit at MDF.	
6a	If vacant ringup circuit is not available — Obtain permission to use ringup circuit in service.	
7	Leave TB1 key normal and operate remaining TB- keys.	
8	Originate call.	At terminating equipment — Switchboard lamp lighted associated with operated ringup circuit.
9	At terminating equipment switchboard — Operate TALK key of idle cord. Insert cord, during next ringing interval, into jack associated with lamp lighted in Step 8.	Switchboard lamp extinguished. Talking path completed. ATB lamp lighted. Tone spurt not heard.

STEP	ACTION	VERIFICATION
10	Remove cord from switchboard jack. Restore TALK key.	At originating equipment — Hold magnets released. Peg count, ATB registers score. At terminating equipment — Hold magnets released. ATB lamp extinguished.
11	At originating equipment — Repeat Steps 7 through 10 with next higher numbered TB- key normal and all other TB- keys operated, until tests have been applied to all equipped TB- keys.	Same as Steps 7 through 10 except TK- lamp lighted corresponding to TB- key in normal position.
12	Disconnect official line.	
	Q. Battery Charging Rate	
3	At terminating equipment — Connect Weston model 280 volt-ammeter, using 3-ampere scale, (—) to load (middle) terminal and (+) to bus (bottom) terminal of charge fuse holder.	
4	Remove CHG fuse.	At terminating equipment — If call is being served — CT relay operated. CC relay released. Meter indicates 0.600 ampere. If equipment is idle — CT relay released. CC relay operated. Meter indicates 0.350 ampere.
5	Operate released (CC, CT) relays as required.	Same as Step 4.
6a	If requirements of Step 4 are not met, refer to Section 067-103-501, Test 10A for adjustment procedure.	
7	Replace CHG fuse.	
8	Disconnect meter.	
	R. Controller Timeout	
3	At terminating equipment SD-95962-01 — Operate CA key.	
4	Connect leads of KS-14510 L1 ohmmeter to 1T, 2T of DL2 relay on controller A.	Ohmmeter should indicate zero resistance.
5	Operate manually XN, XP, YN, YP, ZN, or ZP relay, start timing.	After 4 to 6 seconds — Ohmmeter should indicate infinite resistance.

STEP	ACTION	VERIFICATION
6	Disconnect leads connected in Step 4.	
7	Restore CA key, operate CB key.	
8	Repeat Steps 4 through 6 for controller B.	Same as Steps 4 through 6.
9	Restore CB key.	

S. All Trunks Busy Call Display

Caution: The following test will result in all service being interrupted. Perform the test during periods of light traffic.

5	At originating equipment — Connect or patch temporarily official line assigned to central office to vacant ringup circuit at MDF.	
6a	If vacant ringup circuit not available — Obtain permission to use ringup circuit in service.	
7	Operate all TB- keys.	At terminating equipment — ATB lamp lighted.
8	At originating equipment. — Originate call.	At terminating equipment — Switchboard lamp lighted associated with operated ringup circuit.
9	At terminating equipment switchboard — Operate TALK key of idle cord. Insert cord, during next ringing interval, into jack associated with lamp lighted in Step 8.	Switchboard lamp continues to light. Tone spurt not heard. Talking path not completed.
10	Remove cord from switchboard jack. Restore TALK key.	
11	At originating equipment — Restore all TB- keys.	At terminating equipment — ATB lamp extinguished.
12	Disconnect official line.	

T. Units Digits Association and Lockout

6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU00, RU09 relays simultaneously.	At originating equipment — UI0 lamp lighted. LO0 relay operated. SM0 select magnet operated.

STEP	ACTION	VERIFICATION
7b	At originating equipment SD-95739-01 — If R resistor is 20,700 ohms — Apply battery momentarily to 2B of RU00, RU09 relays simultaneously.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO0, LO9 relays associated with RU00, RU09 relays.	
9c	Simultaneously apply ringing current momentarily to M leads on associated ringup circuit for RU00, RU09 relays.	Same as Step 6a.
10c	Remove insulating tools placed in Step 8c.	
	U. Trunk Capacity Discharge	
3	At originating equipment — Make busy controller A by operating CA key when CA lamp is dark.	At originating equipment — CA lamp lighted.
4	At controller A — Set KS-14510 L1 volt-ohm-milliammeter to X1 scale.	
5	Connect KS-14510 L1 volt-ohm-milliammeter test leads to 2 of P relay and 2T of W relay.	Meter indicated open circuit.
6	Operate manually ST2 relay.	Meter indicated 300 ohms. W relay operated.
7	Release ST2 relay.	Meter indicates open circuit. W relay released.
8	Restore CA key.	CA lamp extinguished.
9	Make busy controller B by operating CB key when CB lamp is dark.	CB lamp lighted.
10	Repeat Steps 4 through 7 for controller B.	Same as Steps 4 through 7.
11	Disconnect meter leads.	
12	Restore CB key.	CB lamp extinguished.
	V. Release of Locked-out Terminating Controller	
5	At terminating equipment — Block operated 4T, 5T, 8T, 9T of CL relay. Insulate 2B, 4B, 5B, 6T of CL relay.	

STEP	ACTION	VERIFICATION
6	Apply ground momentarily to 4B of TO relay.	At terminating equipment — CL lamp lighted.
7	At originating equipment — Operate CR key or dial telephone number assigned for controller release.	At terminating equipment — CL lamp extinguished.
8	At terminating equipment — Remove blocking and insulating tools placed in Step 5.	

W. Units and Tens Digits Relays and Select and Hold Magnets Operation — Terminating Equipment

Caution: The following test will result in all service being interrupted. Perform the test during periods of light traffic.

5	At originating equipment — Operate TB- keys for all equipped trunks except trunk selected for test.	At originating equipment — TB- lamps lighted corresponding to operated TB- keys.
6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of RU-- relay for operation as shown in Table D.	At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay as shown in Table D. At originating equipment — UI-, TI- lamps lighted corresponding to operated RU-- relay.
7b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of RU-- relay for operation as shown in Table D.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU-- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate RU-- relay as shown in Table D.	Same as Step 6a.
10	At terminating equipment switchboard — Operate TALK key of idle cord. Insert cord, during next ringing interval, into jack associated with lamp lighted in Step 6a, 7b, or 9c.	At terminating equipment — Switchboard lamp extinguished. Observe that appropriate select and hold magnets operated corresponding to operated RU-- relay as shown in Table D. At originating equipment — UI-, TI- lamps extinguished.

STEP	ACTION	VERIFICATION
11	At terminating equipment switchboard — Remove cord from jack.	
12c	At originating equipment — Remove insulating tools placed in Step 8c.	
13	Restore TB- keys operated in Step 5.	TB- lamps extinguished.
14	Repeat Steps 5, 10, 13, 6a, 7b, or 8c, 9c, 12c for remaining RU-- relays and trunks listed in Table D.	Same as Step 6a, 10, 13. See Table D.
	X. Originating Tens Digit Association and Lockout	
6a	At originating equipment SD-95739-01 — If R resistor is 1470 ohms — Apply ground momentarily to 2B of an idle RU0- relay.	At originating equipment — TI0 lamp lighted. At terminating equipment — Switchboard lamp lighted corresponding to operated RU0- relay.
7b	At originating equipment SD-95739-01 — If R resistor is 20,500 ohms — Apply battery momentarily to 2B of an idle RU0- relay.	Same as Step 6a.
8c	At originating equipment — If R resistor is 3000 ohms — Insulate contacts of LO- relay associated with RU0- relay selected for test.	
9c	Apply ringing current momentarily to M lead on associated ringup circuit to operate an idle RU0- relay.	Same as Step 6a.
10c	Remove insulating tool placed in Step 8c.	
11	Operate an idle RU-- relay for remaining tens group of RU1- through RU9- relays as described in Steps 6a, 7b, or 8c, 9c, 10c.	At originating equipment — TI- lamp lighted corresponding to operated tens group RU-- relay. At terminating equipment — Switchboard lamp lighted corresponding to operated RU-- relay.
12	At originating equipment — Operate idle RU0-, RU1- relays simultaneously as described in Steps 6a, 7b, or 8c, 9c, 10c.	TI0 lamp lighted before TI1 lamp lighted. At terminating equipment — Switchboard lamp lighted corresponding to RU0- relay before lamp corresponding to RU1- relay.
13	At originating equipment — Select other pairs of higher and lower tens group RU- relays and operate as described in Step 12.	Lower numbered TI- lamp lighted before higher numbered TI- lamp. At terminating equipment — Switchboard lamp lighted corresponding to lower numbered RU-- relay before lamp corresponding to higher numbered RU-- relay.

TABLE D

ACTION			VERIFICATION					
			TRUNK USED FOR TEST					
			1	2	3	4	5	6
OPERATE RU - - RELAY	SELECT MAGNET OPERATES SW1 THROUGH SW3	SWITCH BOARD LAMP LIGHTS	TRUNK CONNECT HOLD MAGNET	TRUNK CONNECT HOLD MAGNET	TRUNK CONNECT HOLD MAGNET	TRUNK CONNECT HOLD MAGNET	TRUNK CONNECT HOLD MAGNET	TRUNK CONNECT HOLD MAGNET
00	0	00	(SW1) A1	(SW1) A2	(SW1) A3	(SW1) A4	(SW3) A5	(SW3) A6
11	1	11	(SW1) A1	(SW1) A2	(SW1) A3	(SW1) A4	(SW3) A5	(SW3) A6
22	2	22	(SW1) A1	(SW1) A2	(SW1) A3	(SW1) A4	(SW3) A5	(SW3) A6
33	3	33	(SW1) B1	(SW1) B2	(SW1) B3	(SW1) B4	(SW3) B5	(SW3) B6
44	4	44	(SW1) B1	(SW1) B2	(SW1) B3	(SW1) B4	(SW3) B5	(SW3) B6
55	5	55	(SW2) C1	(SW2) C2	(SW2) C3	(SW2) C4	(SW3) C5	(SW3) C6
66	6	66	(SW2) C1	(SW2) C2	(SW2) C3	(SW2) C4	(SW3) C5	(SW3) C6
77	7	77	(SW2) C1	(SW2) C2	(SW2) C3	(SW2) C4	(SW3) C5	(SW3) C6
88	8	88	(SW2) D1	(SW2) D2	(SW2) D3	(SW2) D4	(SW3) D5	(SW3) D6
99	9	99	(SW2) D1	(SW2) D2	(SW2) D3	(SW2) D4	(SW3) D5	(SW3) D6