CORD SERVICE OBSERVING CIRCUIT AND ASSOCIATED DC-MF PULSE CONVERTER AND DC SIGNAL MONITORING CIRCUITS FOR POSITIONS ARRANGED FOR KEYPULSING TESTS NO. 12 OR MODIFIED NO. 7 SERVICE OBSERVING DESKS

1. GENERAL

1.01 This section describes a method of testing the cord service observing circuits, with or without a remote control connector circuit; the associated DC-MF pulse converter; DC signal monitoring circuit; and the transmission check circuit on cord service observing circuits (SOC's) associated with a No. 12 or modified No. 7 service observing desk position and a toll or DSA switchboard position.

1.02 This section is reissued to make a minor change in the title and to provide a method of checking the transmission check circuit.

1.03 The tests covered are:

A. Circuit Alarm Test (Where Provided): This test checks:

(1) Continuity of contact chain.

(2) Audible alarm release.

(3) Restoration of trunk to service.

(4) Potential on connector leads.

B. Loop Reduction (Where Provided): This test checks:

(1) Out-of-service trunk condition.

(2) Connector loops in group A.

(3) Connector loops in group B.

(4) Connector loops in both groups A and B.

(5) Connector loops in neither group A nor group B.

C. Plug-Up, Supervision, and Stale Call: This test checks:

(1) Front and rear cord plug-up.

(2) Front and rear cord supervision.

(3) Front and rear cord transmission.

(4) Operating group identification.

(5) Connector release under control of RLS key at No. 7 or No. 12 desk.

(6) Stale call rejection.

D. Ringing Test — No. 3, 3C, and 3CL Toll Switchboards: This test checks that ringing on the front or rear cord lights the FR or RR lamp at the No. 7 or No. 12 desk.

E. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 1 Toll Switchboard: This test checks that the R lamp is lighted at the No. 7 or No. 12 desk when more than two frequencies are received because of two keys being operated simultaneously. This

test also checks that the keyset attached signal is not received at the desk if the keyset is not attached within the predetermined time interval.

F. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 3, 3C, and 3CL Switchboards: This test checks the features outlined in Test E.

G. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 13C, 13D, 15C, and 15D DSA Switchboards: This test checks the features outlined in Test E.

H. Double KP Key Operation — (Positions With MF Keysets Only): This test checks that the D lamp is lighted at the No. 7 or No. 12 desk when a second KP signal is received on the same attempt.

I. Preliminary Keying — No. 1, 3, 3C, and 3CL Toll Switchboards: This test checks that the S lamp flashes at the No. 7 or No. 12 desk when a digit is keyed before a sender is attached.

J. Preliminary Keying — No. 13C, 13D, 15C, and 15D DSA Switchboards: This test checks the feature outlined in Test I.

K. Keyset Operation — No. 1 Toll Switchboard: This test checks:

(1) Keyset attached.

(2) Sender attached.

(3) Called number registration.

(4) Operation of indicator lamps at desk.

(5) Extra digit pulsed.

(6) Keyset disconnect.

(7) Trunk disconnect.

L. Keyset Operation — No. 3, 3C, and 3CL Toll Switchboards: This test checks the features outlined in Test K.

M. Keyset Operation — DSA No. 13C, 13D, 15C, and 15D Switchboards: This test checks the features outlined in Test K.

N. Remote Control Connector (Where Provided): This test checks the operation of the position and cord connector relays at the switchboard under control of the remote control connector position and cord selector switches.

O. Transmission Check Circuit (Where Provided): This test checks for the proper operation of circuits and relays associated with the transmission check circuit.

1.04 Tests A and B require action and verification at the No. 7 or No. 12 desk and at the relay frame on which the cord service observing equipment is located.

1.05 Tests C through M and O require action and verification at the No. 7 or No. 12 desk and at the switchboard position at which the cord under observation is located.

1.06 Test N requires action and verification at the remote control connector cabinet and at the associated switchboard positions.

1.07 A talking path will be required between the No. 7 or No. 12 desk and the relay frame on which the cord service observing equipment is located and also between the No. 7 or No. 12 desk and the switchboard position at which the cord under observation is located.

1.08 Approval of the Traffic Department shall be obtained before performing these tests.

1.09 Perform Tests C through M and O on one cord associated with any connector. Perform Tests C and I or C and J on one cord of each remaining connector. Where a remote control connector circuit is provided, different settings on the cord and position switches should be used in order to check paths through the remote control connector circuit.

1.10 Where connection to the cord under observation requires the use of a patching cord equipped with a No. 615A tool, the procedure to be followed shall be in accordance with Section 210-101-301.

1.11 ***Lettered Steps:*** A letter a, b, c, etc, is added to a step number to indicate that the step covers an action which may or may not be required, depending upon local conditions. The conditions under which a lettered step or series of steps should be made are given in the ACTION column, and all steps governed by the same condition are designated by the same letter. Where a condition does not apply, the associated steps 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 indicated paragraph.

2.02 Special cord for use with No. 1 toll switchboard, constructed as follows:

(a) Use No. 309 or No. 310 red plug and No. 309 or No. 310 black plug, depending upon jacks used.

(b) Use a standard-type cord, 6 feet long.

(c) Connect the tip of the red plug to the ring of the black plug with a KS-13492, L3 1000-ohm resistor, or equivalent, inserted in this connection.

(d) Connect sleeve of red plug to tip of black plug.

2.03 One of the following cords:

(a) 49-type jack switchboard; P3E cord, 6 feet long, equipped with two No. 310 plugs (3P7A cord).

(b) 92-type jack switchboard; P3F cord, 6 feet long, equipped with one No. 309 plug and one No. 310 plug (3P12E cord).

2.04 One of the following:

(a) 49-type jack switchboard; P3E cord, 6 feet long, equipped with two No. 310 plugs (3P6C cord).

(b) 92-type jack switchboard; P3F cord, 6 feet long, equipped with one No. 309 plug and one No. 310 plug (3P12F cord).

2.05 One of the following:

(a) 49-type jack switchboard; P3E cord, 6 feet long, equipped with two No. 310 plugs (3P6D cord).

TABLE A

APPARATUS	TESTS														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
No. 1020B Headset	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operator Telephone Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Test Cord (2.02)	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Portable Control Test Set, J64717B	–	–	–	1	1	1	–	1	1	–	1	–	–	–	–
Test Cord (2.03)	–	–	–	1	1	1	–	1	1	–	1	–	–	–	–
Test Cord (2.04)	–	–	–	1	1	1	–	1	1	–	1	–	–	–	–
Test Cord (2.05)	–	–	–	1	1	1	–	1	1	–	1	–	–	–	–
Test Cord (2.06)	–	–	–	–	–	–	–	–	–	–	1	1	1	–	–
KS-3008 Stop Watch (or equivalent)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Blocking Tools (2.07)	√	–	–	–	–	–	–	–	–	–	√	√	√	√	–

√ As required

(b) 92-type jack switchboard; P3F cord, 6 feet long, equipped with one No. 309 plug and one No. 310 plug (3P12G cord).

2.06 No. 893 cord, 6 feet long, equipped with two No. 360A tools (1W13B cord) and two No. 419A tools (used to establish test connections to relay springs).

2.07 Blocking and insulating tools, as required. Apply tools as covered in Section 069-020-801.

3. PREPARATION

STEP	ACTION	VERIFICATION
Tests A through M and O		
1	At desk — Operate CO CD key at all positions except at the position to be used for test.	
2	At desk position being used for test — Operate all CO- class exclusion keys except CO CD key.	
3	At cable turning section of desk — Operate OS keys for all cord SOC's.	
4	Set SW key of the SOC under test to normal position to permit observation on all connectors.	
5a	Where remote control connector circuit is not provided — At switchboard — Remove all patching cords associated with the SOC under test. *Note:* Disconnect patching cord from cord fasteners or cord socket before removing plug from loop connector socket.	
6b	Where remote control connector circuit is provided — At control cabinet — Open cabinet door.	All OS lamps are lighted.
7b	Restore all cord and position selector switches to an off or blank setting.	
Tests C through M and O		
8a	Where remote control connector circuit is not provided — At switchboard position being used for test — Connect the patching cord into the loop connector socket and then to the cord socket or cord fasteners of the cord under observation.	

STEP	ACTION	VERIFICATION
9a	At cable turning section of desk — Restore OS key for SOC to be tested.	
10b	Where remote control connector circuit is provided — At control cabinet — Set the cord and position switches to agree with the cord and position to be used for test.	
11b	At cable turning section of desk — Restore OS key for SOC to be tested.	At control cabinet — OS lamps associated with SOC under test are extinguished.
12	At desk — Insert No. 1020B headset into C and D jacks.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Circuit Alarm Test (Where Provided)	
8	At relay frame — Insulate 2T and 3T contacts of an A relay in any connector circuit.	
9a	Where remote control connector circuit is not provided — At cable turning section of desk — Restore OS key for SOC to be tested.	
10b	Where remote control connector circuit is provided — At cable turning section of desk — Restore OS key for SOC to be tested.	At control cabinet — OS lamps associated with SOC under test are extinguished.
11	At desk — Insert No. 1020B headset into the C and D jacks.	At relay frame — AL lamp lights, minor audible alarm sounds, and aisle pilot lamp lights.
12	At relay frame — Operate AR key.	Minor audible alarm is silenced, aisle pilot lamp is extinguished, AL relay releases, and AL lamp remains lighted.
13	Remove insulator from A relay.	
14	Connect ground to FT lead at the make contact (_____) of the CH relay.	
15	Restore AR key.	AL lamp remains lighted, minor audible alarm sounds, and aisle pilot lamp lights.
16	Operate the AR key.	Minor audible alarm is silenced, aisle pilot lamp is extinguished, and AL relay releases.

STEP	ACTION	VERIFICATION
17	Remove ground from FT lead.	
18	Restore AR key.	AL lamp is extinguished.
19c	If no further tests are to be made on this circuit — Remove No. 1020B headset from C and D jacks at desk.	Relay frame equipment restores to normal.
20c	At cable turning section of desk — Restore SW key of SOC under test to position in which it was set prior to Step 4.	
21a	Where remote control connector is not provided — At switchboard — Reconnect all patching cords associated with the SOC under test. *Note:* Connect patching cord to loop connector socket before connecting to cord socket or cord fasteners.	
22b	Where remote control connector circuit is provided — At control cabinet — Reset the cord and position selector switches to their original setting and close cabinet door.	
23c	At desk — Restore all CO- keys and at cable turning section restore all OS keys operated in Steps 1 to 3.	

B. Loop Reduction (Where Provided)

8a	Where remote control connector circuit is not provided — At cable turning section of desk — Restore OS key for SOC to be tested.	
9b	Where remote control connector circuit is provided — At cable turning section of desk — Restore OS key for SOC to be tested.	At control circuit — OS lamps associated with SOC under test are extinguished.
10	At desk — Insert No. 1020B headset into C and D jacks.	
11	At cable turning section of desk — Operate OS key for circuit under test.	

STEP	ACTION	VERIFICATION
12	Set SW key in position to select group A for observation.	At relay frame — AG relay operates.
13c	When testing circuit other than SD-56225-01 — Restore OS key.	At relay frame — After 22 to 34 seconds time delay, A relays are operated in connectors in group A and also in connectors common to both groups A and B. Consult local office records for connector loop assignments.
14d	When testing circuit SD-56225-01 — Restore OS key.	B relays are operated in connectors in group A; B relays are operated in connectors common to both groups A and B. Consult local office records for connector loop assignments.
15	Operate OS key.	All A or B relays are released.
16	Set SW key in position to select group B for observation.	AG relay is released and BG relay is operated.
17c	When testing circuit other than SD-56225-01 — Restore OS key.	After 22 to 34 seconds time delay, A relays are operated in connectors in group B and also in connectors common to groups A and B. Consult local office records for connector loop assignments.
18d	When testing circuit SD-56225-01 — Restore the OS key.	B relays are operated in connectors in group B; B relays are operated in connectors common to both groups A and B. Consult local office records for connector loop assignments.
19	Operate OS key.	All A or B relays are released.
20	Restore SW key to center position.	BG relay is released.
21	Restore OS key.	All A relays operate after 22 to 34 seconds delay or all B relays operate.
22e	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	

C. Plug-up, Supervision, and Stale Call

13c	If testing from a No. 1 toll switchboard — Insert black plug of special cord assembly into REC jack of continuity test circuit and insert red plug into B/G jack of low-shunt testing circuit.	

STEP	ACTION	VERIFICATION
14c	Insert rear cord under observation into B TRK jack of continuity test circuit.	At desk — TRK lamp lights steadily or flashes, and RPU lamp lights. If DC signal monitoring circuit is provided for rear cord — RSV lamp lights and FSV lamp may light.
15d	If testing from a No. 3, 3C, or 3CL toll switchboard — Insert rear cord not patched for observation into MT jack of position test circuit.	
16d	Insert rear cord under observation into position test circuit D jack.	At desk — TRK lamp lights steadily or flashes, and RPU and RSV lamps light.
17e	If testing from a No. 13- or 15-type DSA switchboard — Insert rear cord under observation into RING TEST jack of cord testing circuit.	Same as for Step 16d.
18	Operate TALK key.	
19	Check one-way transmission path by talking from switchboard to desk.	At desk — Adequate transmission should be received in one receiver.
20	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished; and, after 5 seconds, no signal is received from the cord plugged up.
21	At switchboard — Remove rear cord from testing jack.	
22c	If testing from a No. 1 toll switchboard — Insert front cord into B TRK jack of continuity test circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights. If DC signal monitoring circuit is provided for front cord — FSV lamp lights and RSV lamp may light.
23d	If testing from a No. 3, 3C, or 3CL toll switchboard — Insert front cord into position test circuit D jack.	At desk — TRK lamp lights steadily or flashes, and FPU and FSV lamps light.
24e	If testing from No. 13- or 15-type DSA switchboard — Insert front cord into RING TEST jack of cord testing circuit.	At desk — TRK lamp lights steadily or flashes, and FPU and FSV lamps light.

STEP	ACTION	VERIFICATION
25	Check one-way transmission path by talking from switchboard to desk.	At desk — Adequate transmission should be received in other receiver.
26	At switchboard — Remove front cord from jack of testing circuit.	At desk — FPU and FSV lamps are extinguished.
27	Restore TALK key.	
28	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
29c	If testing from a No. 1 switchboard — Remove special cord from REC jack and B/G jack.	
29d	If testing from a No. 3, 3C, or 3CL switchboard — Remove rear cord not used for observation from MT jack of position test circuit.	
30f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	D. Ringing — No. 3, 3C, and 3CL Toll Switchboards	
13	At switchboard — Insert rear plug of cord not used for observation into MT jack of position test circuit.	
14	Operate control key of portable control set to BAL position. Patch jacks 1, 2, and 3 of portable control set to jacks 1, 2, and 3 of position test circuit, respectively. Restore control key to TST position.	
15	Insert front and rear cords under observation into C and D jacks of position test circuit.	At desk — TRK lamp lights steadily or flashes, and FPU and RPU lamps light.
16	Operate RING key for front cord for approximately one second.	At desk — FR lamp lights for duration of ring.
17	Operate RING key for rear cord for approximately one second.	At desk — RR lamp lights for duration of ring.
18	At desk — Operate RLS key.	At desk — TRK, FPU, and RPU lamps are extinguished.
19	At switchboard — Remove cords from C and D jacks.	

STEP	ACTION	VERIFICATION
20	Remove cord from MT jack of position test circuit.	
21	Remove patch cords from jacks of portable control set and position test circuit.	
22c	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	E. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 1 Toll Switchboard	
13c	If testing from a switchboard position with a DC or DC-MF keyset — Patch portable control set jacks 1, 2, and 3 to the keyset test circuit jacks 1, 2, and 3, respectively.	
14c	Operate the control key in the portable control set to the LD position.	
15c	Insert front cord under observation into jack D of keyset test circuit in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
16d	If testing from a position with an MF keyset — Insert front cord under observation into the low-shunt testing circuit jack P in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
17	Operate TALK key.	
18	Depress front keyset attached key within time limit (__ seconds) specified on circuit drawing.	At desk — K and S lamps light.
19d	If testing from an MF or DC-MF keyset position — Key pulse digit 4; then depress digits 5 and 6 at same time; then key pulse digit 7.	At desk — Digit 4 appears in indicator space one. R lamp lights. Digit 7 appears in indicator space three.
20	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.
21	At switchboard — Remove front cord from test jack.	
22e	If RLS key is provided at switchboard — Operate RLS key.	

STEP	ACTION	VERIFICATION
23c	If testing from a DC or combined DC-MF keyset position — Insert front cord into jack D of keyset test circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
24d	If testing from an MF keyset position — Insert front cord into jack P of low-shunt testing circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
25	After a time delay of approximately 25 seconds, operate front keyset attached key.	At desk — Keyset attached signal is not received.
26	Remove front cord from jack D or P.	At desk — FPU lamp is extinguished.
27e	If RLS key is provided at switchboard — Operate RLS key.	
28	Restore TALK key.	
29	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
30c	If testing from a DC or DC-MF keyset position — Remove three patch cords from portable control set and keyset test circuit.	
31f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	

F. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 3, 3C, and 3CL Toll Switchboards

13	At switchboard — Insert a cord, other than cord patched up for observation, into the position test circuit MT jack.	
14	Patch portable control set jacks 1, 2, and 3 to the position test circuit jacks 1, 2, and 3, respectively.	
15c	If testing from a switchboard position with a DC keyset — Operate control key in portable control set to the LD position.	
16d	If testing from a position with an MF or combined DC-MF keyset — Operate control key in portable control set to TST position.	

STEP	ACTION	VERIFICATION
17	Insert front cord under observation into jack D of position test circuit in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
18	Operate TALK key.	
19	Depress front keyset attached key within time limit (__ seconds) specified on circuit drawing.	At desk — K and S lamps light.
20d	If testing from an MF or DC-MF position — Key pulse digit 4; then depress digits 5 and 6 at same time; then key pulse digit 7.	At desk — Digit 4 appears in indicator space one. R lamp lights. Digit 7 appears in indicator space three.
21	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.
22	At switchboard — Remove front cord from jack D of position test circuit.	
23e	If RLS key is provided at switchboard — Operate RLS key.	
24	Insert front cord into D jack of position test circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
25	After time delay of approximately 25 seconds, operate front keyset attached key.	At desk — Keyset attached signal is not received.
26	Remove front cord from jack D.	At desk — FPU lamp is extinguished.
27e	If RLS key is provided at switchboard — Operate RLS key.	
28	Restore TALK key.	
29	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
30	At switchboard — Remove cord from MT jack of position test circuit.	
31	Remove patch cords from portable control set and position test circuit.	
32f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	

STEP	ACTION	VERIFICATION
	G. More Than Two Frequencies Pulsed and Keyset Attached Timing Test — No. 13C, 13D, 15C, and 15D DSA Switchboards	
13c	If testing from a position arranged for MF or DC-MF pulsing — Insert the front plug of the cord under observation into the P jack of the cord testing circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
14d	If testing from a position arranged for DC key pulsing — Insert the front plug of the cord under observation into a trunk jack which requires key pulsing.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
15	Operate TALK key.	
16	Depress front keyset attached key within time limit (__ seconds) specified on circuit drawing.	At desk — K and S lamps light.
17c	If testing from an MF or DC-MF keyset position — Key pulse digit 4; then key pulse digits 5 and 6 at same time; then key pulse digit 7.	At desk — Digit 4 appears in indicator space one. R lamp lights. Digit 7 appears in indicator space three.
18	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.
19	Remove front cord from P or trunk jack.	
20e	If RLS key is provided at switchboard — Operate RLS key.	
21c	If testing from an MF or DC-MF position — Insert front cord into P jack of cord testing circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
22d	If testing from DC keyset position — Insert front cord into a trunk jack which requires key pulsing.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
23	After time delay of approximately 25 seconds operate front keyset attached key.	At desk — Keyset attached signal is not received.
24	Remove front cord from P or trunk jack.	At desk — FPU lamp is extinguished.
25e	If RLS key is provided at switchboard — Operate RLS key.	
26	Restore TALK key.	

STEP	ACTION	VERIFICATION
27	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
28f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	H. Double KP Key Operation (Positions With MF Keysets Only)	
13c	If testing from a No. 3, 3C, or 3CL toll switchboard position — Insert a cord, other than cord patched up for observation, into the position test circuit MT jack.	
14c	Patch portable control set jacks 1, 2, and 3 to position test circuit jacks 1, 2, and 3, respectively.	
15c	Operate control key in portable control set to TST position.	
16c	Insert front cord under observation into jack D of position test circuit.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
17d	If testing from a No. 1 or No. 13- or 15-type DSA switchboard — Insert front cord under observation into low-shunt testing circuit P jack.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
18	Operate TALK key.	
19	Depress front keyset attached key.	At desk — K and S lamps light.
20	Key pulse digit 3, then digit 4, and then depress keyset attached key followed by digit 5 and digit 6.	At desk — Lamps for digits 3 and 4 light in display panel in first two indicator spaces. FSV lamp flashes. D lamp lights.
21	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.
22	At switchboard — Remove front cord from test jack D or P.	
23	Restore TALK key.	
24e	If RLS key is provided at switchboard — Operate RLS key.	

STEP	ACTION	VERIFICATION
25c	If testing from a No. 3, 3C, or 3CL toll switchboard — Remove cord from MT jack in position test circuit.	
26c	Remove patch cords from portable control set and position test circuit.	
27f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	I. Preliminary Keying — No. 1, 3, 3C, and 3CL Toll Switchboards	
13	Patch keyset test circuit or position test circuit jacks 1, 2, and 3 to portable control set jacks 1, 2, and 3, respectively.	
14	Operate control key in portable control set to TST position.	
15	Insert the plug of the rear cord under observation into an idle trunk jack.	At desk — TRK lamp lights steadily or flashes, and RPU lamp lights.
16c	If testing from a No. 1 toll switchboard position — Insert the plug of the front cord under observation into jack D of the key set test circuit.	At desk — FPU lamp lights.
17d	If testing from a No. 3, 3C, or 3CL toll switchboard position — Insert the plug of the front cord under observation into the MT jack of the position test circuit.	At desk — FPU lamp lights.
18	Operate TALK key.	
19e	If testing from an MF keyset position — Depress front keyset attached key.	At desk — K lamp lights.
20e	Key pulse digit 4.	At desk — S lamp flashes and digit 4 appears on display panel.
21f	If testing from a DC or DC-MF keyset position — Depress front keyset attached key.	At desk — K lamp lights.
22f	Key pulse digit 4.	At desk — S lamp flashes and digit 3 appears on display panel.
23	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.

STEP	ACTION	VERIFICATION
24	Remove cords from test jacks.	
25	Restore TALK key.	
26g	If RLS key is provided at switchboard — Operate RLS key.	
27	Remove patch cords from portable control set and position test circuit.	
28h	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	J. Preliminary Keying — No. 13C, 13D, 15C, and 15D DSA Switchboards	
13	Insert the plug of a rear cord under observation into an idle trunk jack.	At desk — TRK lamp lights steadily or flashes, and RPU lamp lights.
14	Insert the plug of the front cord in an idle trunk jack requiring key pulsing.	FPU lamp lights.
15	Operate TALK key.	
16c	If testing from MF keyset position — Depress front keyset attached key; then immediately key pulse digit 4 before sender is attached; then key pulse digits 5 and 6 after sender is attached.	At desk — K lamp lights and S lamp flashes. Digit 4 appears on display panel.
17d	If testing from a DC or DC-MF keyset position — Depress keyset attached key; then immediately key pulse digit 4 before sender is attached; then key pulse digits 5 and 6 after sender is attached.	At desk — K lamp lights. S lamp flashes. Digit 3 appears on display panel.
18	At desk — Operate RLS key momentarily.	At desk — All lamps are extinguished.
19	At switchboard — Remove cord from trunk jacks.	
20e	If RLS key is provided at switchboard — Operate RLS key.	
21	Restore TALK key.	
22f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	

STEP	ACTION	VERIFICATION
	K. Keyset Operations — No. 1 Toll Switchboard	
13c	If P4, P5, and P6 resistors are provided in service observing position circuit — At relay frame — Insulate 1B and 2B contacts of PC relay.	
14c	Connect 1T and 2T contacts of MSA relay together by use of one No. 893 cord.	
15d	If testing from a No. 1 toll switchboard position with a DC or combined DC-MF keyset — Insert front cord under observation into trunk jack D of keyset test circuit in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
16d	At switchboard — Patch portable control set jacks 1, 2, and 3 to keyset test circuit jacks 1, 2, and 3, respectively.	
17d	Operate control key in portable control set to LD position.	
18e	If testing from a No. 1 toll switchboard position with an MF keyset — Insert front cord into low-shunt testing circuit jack P in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
19	Operate TALK key.	
20	Depress front keyset attached key.	At desk — K and S lamps light.
21	Key pulse digit 1 fifteen times.	At desk — Digit 1 lamp lights in first 11 or 14 display spaces and an X pattern of lamps 1, 3, 5, 7, and 9 lights in the 12th or 15th display space.
22	Depress ST key.	At desk — K and S lamps are extinguished. W lamp lights.
23	Restore TALK key.	
24	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
25	Repeat Steps 15d through 24 except Step 21 where digit 2 should be key pulsed instead of digit 1. Repeat this procedure until all digits (3, 4, 5, etc, through 0) have been key pulsed.	Same as for Steps 15d through 24 except for Step 21 where digit 2 or 3 or 4 etc, through 0 lamp lights in first 11 or 14 display spaces.

STEP	ACTION	VERIFICATION
26c	Remove insulator from PC relay.	
27c	Remove No. 893 cord from MSA relay.	
28d	Remove patch cords from portable control set and keyset test circuit.	
29e	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	L. Keyset Operation — No. 3, 3C, and 3CL Toll Switchboards	
13c	If P4, P5, and P6 resistors are provided in service observing circuit — At relay frame — Insulate 1B and 2B contacts of PC relay.	
14c	Connect 1T and 2T of MSA relay together by use of one No. 893 cord.	
15	At switchboard — Insert a cord other than cord patched up for observation into position test circuit MT jack.	
16	Patch portable control set jacks 1, 2, and 3 to position test circuit jacks 1, 2, and 3, respectively.	
17d	If testing from a DC keyset position — Operate control key in portable control set to LD position.	
18d	If testing from an MF or DC-MF keyset position — Operate control key in portable control set to TST position.	
19	Insert front cord under observation into D jack of position test circuit in switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
20	Operate TALK key.	
21	Depress front keyset attached key.	At desk — K and S lamps light.
22	Key pulse digit 1 fifteen times.	At desk — Digit 1 lamp lights in first 11 or 14 display spaces and an X pattern of lamps 1, 3, 5, 7, and 9 lights in 12th or 15th display spaces.

STEP	ACTION	VERIFICATION
23	Depress ST key.	At desk — K and S lamps are extinguished. W lamp lights.
24	Restore TALK key.	
25	Remove cords from MT and D jacks of position test circuit.	
26	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
27	Repeat Steps 15 through 26, except for Step 22 where digit 2 should be key pulsed instead of digit 1. Repeat this procedure until all digits (3, 4, 5, etc, through 0) have been key pulsed.	Same as for Steps 15 through 26, except for Step 22 where digit 2 or 3 or 4 etc, through 0 lamp lights in first 11 or 14 display spaces.
28	Remove patching cords from portable control set and position test circuit.	
29c	Remove insulator from PC relay.	
30c	Remove No. 893 cord from MSA relay.	
31e	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	

M. Keyset Operation — DSA No. 13C, 13D, 15C, and 15D Switchboards

13c	If P4, P5, and P6 resistors are provided in service observing position circuit — At relay frame — Insulate 1B and 2B contacts of PC relay.	
14c	Connect 1T and 2T of MSA relay together by use of one No. 893 cord.	
15d	If testing from a position using a DC keyset only — Insert front cord into jack of a trunk requiring ST key operation and having an associated sender arranged to accept either 11 or 14 digits.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
16d	Operate TALK key.	
17d	Depress front keyset attached key.	At desk — K and S lamps light.

STEP	ACTION	VERIFICATION
18d	Key pulse digit 1 fifteen times.	At desk — Digit 1 lamp lights in first 11 or 14 display spaces and an X pattern of lamps 1, 3, 5, 7, and 9 lights in 12th or 15th display spaces; K and S lamps are extinguished and W lamp lights.
19d	Remove front cord from trunk jack.	At desk — All lamps except TRK lamp are extinguished.
20d	Restore TALK key.	
21d	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
22d	Repeat Steps 15d through 21d except for Step 18d where digit 2 should be key pulsed instead of digit 1. Repeat this procedure until all digits (3, 4, 5, etc, through 0) have been key pulsed.	Same as for Steps 15d through 21d except for Step 18d where digit 2 or 3 or 4 etc, through 0 lamp lights in first 11 or 14 display spaces.
23e	If testing from a position using an MF or combined DC-MF keyset — Insert the front cord into the P jack of the cord testing circuit which appears in the switchboard multiple.	At desk — TRK lamp lights steadily or flashes, and FPU lamp lights.
24e	Operate TALK key.	
25e	Operate keyset attached key.	At desk — K and S lamps light.
26e	Key pulse digit 1 fifteen times.	At desk — Digit 1 lamp lights in first 11 or 14 display spaces and an X pattern of lamps 1, 3, 5, 7, and 9 lights in display space 12 or 15.
27e	Depress ST key.	At desk — K and S lamps are extinguished and the F and W lamps light.
28e	Remove front cord from jack P.	At desk — All lamps except TRK lamp are extinguished.
29e	Restore TALK key.	
30e	At desk — Operate RLS key momentarily.	At desk — TRK lamp is extinguished.
31e	Repeat Steps 23e through 30e, except for Step 26e where digit 2 should be key pulsed instead of digit 1. Repeat this procedure until all digits (3, 4, 5, etc, through 0) have been key pulsed.	Same as for Steps 23e through 30e, except for Step 26e where digit 2 or 3 or 4 etc, through 0 lamps light in first 11 or 14 display spaces.

STEP	ACTION	VERIFICATION
32c	Remove insulator from PC relay.	
33c	Remove No. 893 cord from MSA relay.	
34f	If no further tests are to be made on this circuit — Proceed as in Test A, Steps 19c through 23c.	
	N. Remote Control Connector (Where Provided)	
1	At cable turning section of desk — Operate OS key for cord SOC under test.	
2	At remote control connector cabinet — Open cabinet door.	OS lamps associated with the SOC under test are lighted.
3	Set position selector switches to position 1.	
4	Set cord selector switch associated with SOC under test to position 1.	
5	Block ST relay operated.	At switchboard — CD1 relay in the selected position operates. Consult local office records for position selector switch assignments.
6	Remove blocking tool from ST relay.	CD1 relay releases.
7	Repeat Steps 4, 5, and 6 for positions 2, 3, and 4 of the cord selector switch.	Same as in Steps 5, 6, and 7 except that CD2, CD3, and CD4 relays operate instead of CD1 relay.
8	Repeat Steps 3 through 7 for positions 2 through 7 of position selector switches.	Same as in Steps 5, 6, and 7.
9	Reset cord and position selector switches to their original settings and close cabinet door.	
10	At cable turning section of desk — Restore OS key for cord SOC used in test.	
	O. Transmission Check Circuit (Where Provided)	
13	At switchboard position used for test — Connect front and rear cords under observation to balance test termination jacks in switchboard multiple.	At desk — TRK, FPU, and RPU lamps light. (TRK lamp may flash.)
14	At desk position used for test — Operate NOISE-ORIG-TERM key to TERM.	

STEP	ACTION	VERIFICATION
15	Operate CAL-OFF-ON key to CAL.	At desk — Volume indicating meter indicates —0.5 to +0.5 vu for approximately 4 seconds and 1000-cps tone is heard in one receiver; then meter indicator drops and tone is no longer heard.
16	Operate NOISE-ORIG-TERM key to NOISE. *Note:* If volume indicating meter readings do not meet the requirements of Steps 15 and 16, see Section 210-114-503 for adjusting procedure.	Volume indicating needle should not read more power than —20 vu.
17	Operate CAL-OFF-ON key to OFF.	Volume indicating needle returns to resting position.
18	Operate NOISE-ORIG-TERM key to TERM.	
19c	If no further tests are to be performed — At switchboard position used for test — Remove front and rear cords from balance test termination jacks on switchboard multiple.	At SO desk position used for test — FPU and RPU lamps extinguished.
20c	At SO desk position used for test — Operate RLS key momentarily.	TRK lamp extinguished.
21c	Proceed as in Test A, Steps 19c through 23c.	