

**AMA, CAMA, AND LOCAL DIAL SERVICE OBSERVING
CIRCUITS, FOR DDD TRUNKS AND JUNCTORS,
AND MISCELLANEOUS LOCAL DIAL TRUNKS
IN NO. 5 CROSSBAR OFFICE
TESTS
NO. 12 OR MODIFIED NO. 7 SERVICE OBSERVING DESK**

1. GENERAL

1.01 This section describes a method of testing the No. 5 crossbar AMA and CAMA service observing circuits which observe on DDD (direct distance dialing) traffic over intermarker (subscriber to trunk) incoming and outgoing message accounting. The method includes tests of the associated local dial observing circuit, trunk selection and control circuit, register connector circuit, and register and MF pulsing circuit using a No. 12 or modified No. 7 service observing desk position, No. 5 crossbar trunk test circuit, and master test frame.

1.02 This section is reissued to add tests for circuits used to observe on incoming CAMA trunk and junctor circuits and to revise the title. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

A. (Local Dial) Seizure, Transmission, Loop Identification, Supervision, Called Number Registration, and Observation Released:

The following features are checked. (1) Trunk seizure. (2) Transmission. (3) Loop identification. (4) Supervision. (5) Called number registration. (6) Release of observation from desk.

B. (AMA) Seizure, Transmission, Loop Identification, Sender Indication, Called Number Registration, Calling and Called Station Supervision, and Observation Released:

The following features are checked. (1) Trunk seizure. (2) Operation of register connector. (3) Transmission continuity. (4) Identification of trunk or junctor. (5) Sender attached or

released. (6) Outpulsing of called number from service observing register. (7) Supervision from calling and called stations. (8) Observation released from desk.

C. (AMA) Recycle of Service Observing Circuit: The following features are checked.

- (1) Prevention of seizure signal to desk.
- (2) Recycle operation of observing circuit.
- (3) Selection of another call.

D. (AMA) Overflow: This test checks that on an outgoing call an overflow signal is received when a reorder condition is encountered.

E. (AMA) Loop Reduction: The following features are checked: (1) Out-of-service trunk conditions. (2) Loop connector relays in Group A. (3) Loop connector relays in Group B. (4) Loop connector relays in Groups A and B.

F. (AMA) Class Selection: The following features are checked. (1) Out-of-service trunk conditions. (2) Selection of AMA class. (3) Selection of local dial class.

G. (AMA) Trouble Alarm: The following features are checked: (1) Trouble ground or battery connected to the trunk observing lead multiple wiring on the trunk connector relays. (2) Trouble ground connected to the windings of the called number register relays. (3) Failure of proper outpulsing from the register and MF pulsing circuit.

H. (AMA) Loop Identification Failure and Registration: This test checks the failure of the loop identification circuits to complete registration of the loop number and also checks the proper registration of all tens and units digits at the desk.

I. (AMA) Called Number Digit Pulsing and Registration: This test checks the outpulsing of all digits from the service observing register and the proper registration at the desk.

J. (CAMA) Seizure, Transmission, Loop Identification, Sender Indication, Called Number Registration, Calling and Called Station Supervision, and Observation Released: The following features are checked. (1) Trunk seizure. (2) Operation of register connector. (3) Transmission continuity. (4) Identification of trunk or junctor. (5) Sender attached or released. (6) Outpulsing of called number from service observing register. (7) Supervision from calling and called stations. (8) Observation released from desk.

K. (CAMA) Sender Calls CAMA Position, Position Attached, Calling Number Registration, Position Reorder, Register Reset, Position Disconnect, Extra Digit Pulsed, Operation of Two Digit Keys Simultaneously: The following features are checked. (1) Position called. (2) Position attached. (3) Lamp registration of calling number. (4) Reorder to CAMA operator. (5) Wipe-out of digit lamps in No. 2 indicator. (6) CAMA position released. (7) Extra digit pulsed. (8) More than two MF frequencies pulsed.

L. (CAMA) Recycle of CAMA Service Observing Circuit: The following features are checked. (1) Prevention of seizure signal to desk. (2) Recycle operation of observing circuit.

M. (CAMA) Loop Reduction: The following features are checked. (1) Out-of-service trunk conditions. (2) Loop connector relays in Group A. (3) Loop connector relays in Group B.

N. (CAMA) Class Selection: The following features are checked. (1) Out-of-service trunk conditions. (2) Operation check of CAMA class relays.

O. (CAMA) Trouble Alarm: This test checks that the trouble ground or battery is connected to the trunk observing lead multiple wiring on the trunk connector relays.

P. (CAMA) Loop Identification Failure and Registration: This test checks the failure of the loop identification circuits to complete

registration of the loop number and checks the registration of the zero, tens, and units digits at the desk.

Q. (CAMA) Overflow: This test checks the operation of the overflow signal circuits in the observing circuit and at the desk.

1.04 All tests except A require a talking circuit between the No. 12 or 7 desk position and the No. 5 crossbar office where the observing equipment is mounted.

1.05 Tests B, C, D, G, H, I, J, K, L, O, P, and Q require a talking circuit between the No. 12 or 7 desk position and the master test frame.

1.06 Tests B, C, D, G, H, I, J, K, L, O, P and Q require actions and verifications at the master test frame.

1.07 Tests B through Q require actions and verifications at the relay frame on which the observing equipment is mounted.

1.08 Perform Test B for AMA observing circuit on every trunk connected for observing in the AMA group. Perform Tests C, D, G, H, and I on only one trunk connector circuit and the associated trunk or junctor.

1.09 Perform Tests J and K for CAMA observing circuit on every trunk arranged for observing in the CAMA group. Perform Tests L, P, and Q on only one trunk connector circuit and the associated junctor.

1.10 If the trunk or junctor circuit being used for testing the observing circuit is arranged for intertoll completion, the route selected by the operated A through L keys should provide access to outgoing (not 2-way) intertoll trunk circuits.

1.11 The traffic department should be notified before starting and after completing these tests so that any signals caused by performing the tests can be disregarded.

1.12 Lettered Steps: A letter a, b, c, etc, added to a step number in Part 3 or 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 a 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

All Tests

2.01 No. 1020B headset.

Tests B, C, D, G, H, I, J, K, L, O, P, and Q

2.02 Master test control circuit, SD-25800-01.

2.03 Trunk test circuit, SD-25918-01.

2.04 No. 322A (make busy) plugs, as required.

Tests J, K, L, O, P, and Q

2.05 Register and CAMA sender test set, J25756B (SD-25676-01).

2.06 Incoming register test circuit, SD-25988-01.

2.07 Patching cord, W20C cord, 6 feet long, equipped with KS-13875 plug and one KS-13895 plug (for connecting register and CAMA sender test set to incoming register test circuit).

2.08 Patching cord, P3E cord, 6 feet long, equipped with two No. 310 plugs (No. 3P7A cord) (for connecting trunk test circuit to CAMA intermarker group or incoming trunk circuit).

Tests G, H, I, O, and P

2.09 Testing cord, No. 893 cord, 3 feet long, equipped with two No. 360A tools (No. 1W13A cord) and two KS-6278 connecting clips (two required) (for connecting to relay springs and ground terminals).

Tests C, G, H, I, L, O and P

2.10 Blocking and insulating tools, as required. Use tools and apply as covered in Section A502.031.

Tests D, H, and P

2.11 KS-3008 stop watch or equivalent.

3. PREPARATION

STEP	ACTION	VERIFICATION
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Test B Through I

- | | | |
|---|--|--|
| 1 | At desk —
Operate CO-AMA key for AMA tests at all positions except at position used for tests. | |
| 2 | At desk position used for tests —
Operate all CO- class exclusion keys except CO- AMA key. | |
| 3 | At cable turning section of desk —
Set SW key for observing circuit to be tested to center position to permit observation on any trunk desired. | |
| 4 | Set SWI key for observing circuit to be tested to HFA position for AMA tests. | |
| 5 | Operate momentarily OS key for AMA observing circuit to be tested. Operate all other OS keys for AMA observing circuits for same or other offices. | |

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STEP	ACTION	VERIFICATION
6a	If local dial observing circuit is provided using cable conductors in common with AMA observing — Operate local OS key to out-of-service position. <i>Note:</i> When the local dial observing circuit uses separate cable conductors to the desk, the local dial OS key referred to in this step is not provided.	
7	At desk — Operate STBY key.	STBY lamp lights.
8	Insert plug of No. 1020B headset into C, D jacks; allow 5 minutes for electron tubes to warm up.	
Tests B, C, D, G, H, and I		
9	At master test frame — Restore all keys; operate RL key momentarily.	At master test frame — All lamps extinguished.
10	Operate FS-, TS-, GPA/GPB, RA-, MT-, KY, HFA, E-M, FACD, TOBS, NTFS, NTS keys, as required.	
11	At relay frame — Block nonoperated all FA- relays in selection and control circuit except for frame on which trunks or junctors desired for these tests are located.	
Tests J Through Q		
12	At desk — Operate CO-MA key for CAMA tests at all positions except at position used for tests.	
13	At desk position used for tests — Operate all CO- class exclusion keys except CO-MA key.	
14	At cable turning section of desk — Set SW key for observing circuit to be tested to center position to permit observation on any trunk desired.	
15	Set SWI key (if provided) for the observing circuit to be tested, to CAMA position.	

STEP	ACTION	VERIFICATION
16	Operate momentarily OS key for CAMA observing circuit to be tested. Operate all other OS keys for CAMA observing circuits for same or other type of CAMA offices.	
17a	If local dial observing circuit is provided using cable conductors in common with CAMA and AMA observing — Operate local dial OS key to out-of-service position. <i>Note:</i> When the local dial observing circuit uses separate cable conductors to the desk, the local dial OS key referred to above is not provided.	
18	At desk — Operate STBY key.	
19	Insert plug of No. 1020B headset into C, D jacks; allow 5 minutes for electron tubes to warm up.	
Tests J, K, L, P, and Q		
20	At master test frame — Restore all keys.	
21	Operate RL key momentarily.	At master test frame — All lamps extinguished.
22	Patch IRT jack to IRT connector of register and CAMA sender test set.	
23	At test set — Operate L switch to OFF position.	
24	At master test frame— Operate POS switch to O position, MF switch to MPT position.	
25	At relay frame — Block nonoperated all FA- relays in selection and control circuit except for frame on which trunks or junctors desired for these tests are located.	
26b	When observing equipment is tested in conjunction with incoming trunk circuits for tandem or intertoll completion — At master test frame — Connect CAMA jack to T jack of trunk circuit used for test.	

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STEP	ACTION	VERIFICATION
27b	Insert plug into MB jack of incoming trunk used for test.	
28c	When observing equipment is tested in conjunction with incoming trunk circuits for local completion — At master test frame — Connect CAMA jack to T jack of trunk circuit used for test.	
29c	Insert plug into MB jack of incoming trunk used for test.	
30d	When observing equipment is tested in conjunction with intermarker trunk circuits — At master test frame — Connect CAMA jack to T jack of trunk circuit used for test.	
31d	Insert plug into MB jack of intermarker trunk used for test.	
32e	When observing equipment is tested in conjunction with junctor circuits — At relay frame — Operate MB switch of junctor circuit used for test.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. (Local Dial) Seizure, Transmission, Loop Identification, Supervision, Called Number Registration, and Observation Released	
1	At desk — Operate CO-D keys for local dial observing at all positions except at position used for tests.	
2	At desk position used in this test — Operate all CO- class exclusion keys except CO-D key.	
3	At desk — Operate OS keys for all local dial observing circuits except OS key for circuit used in this test.	
4	Operate STBY key.	STBY lamp lights.

STEP	ACTION	VERIFICATION
5	Insert plug of No. 1020B headset into C, D jacks; allow 5 minutes for electron tubes to warm up.	
6	Release STBY key; wait for observation to start.	STBY lamp extinguished. TRK, loop identification lamps lighted. Called number appears on tape of the pen register or tape printer. On TOUCH-TONE calls, observer hears digit tones.
7	Continue observation until conversation starts on completed call or return of supervisory signal on uncompleted call.	Observer hears conversation on completed call, supervisory mark appears on tape. On uncompleted call, supervisory marks appear on tape.
8	Operate STBY key.	STBY lamp lights. All other lamps extinguished.
9	Release STBY key; wait for another observation.	STBY lamp extinguished. TRK, loop identification lamps lighted. Call number appears on tape of the pen register or tape printer. On TOUCH-TONE calls, observer hears digit tones.
10	Repeat Step 7.	Same as Step 7.
11	Operate STBY key.	STBY lamp lights. All other lamps extinguished.
12	Remove plug from C, D jacks.	
13	Restore STBY key.	STBY lamp extinguished.
14	Restore all CO-D keys to desired positions.	
15	At position used for test — Restore all CO- keys to desired positions.	
16	Restore all local dial OS keys to in-service positions.	
	B. (AMA) Seizure, Transmission, Loop Identification, Sender Indication, Called Number Registration, Calling and Called Station Supervision, and Observation Released	
12	At master test frame — Insert make-busy plug into OGT-MB jack of trunk or junctor or operate MB switch of intermarker trunk used for test.	
13	Operate A- through L- keys, as required, to select trunk or junctor to be used in testing observing circuit and terminating number.	

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STEP	ACTION	VERIFICATION
14	Operate CST-, CSU-, CGB (if provided) keys, as required for AMA operation.	
15	Operate OGT, TLK keys.	
16	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
17	At master test frame — Operate ST key momentarily. <i>Note:</i> If an observation is received at the desk from an undesired trunk or junctor on the same frame, the observation should be released from the desk and Test B repeated.	At desk — TRK, FSV, S No. 1, loop identification lamps lighted. S- No. 1 lamp is extinguished when sender releases. Called number digit lamps, F lamp lighted in No. 1 indicator. <i>Note:</i> TRK lamp may flash for 15 to 30 seconds and then light steadily.
18	Operate ANS key after F lamp lights at desk.	High tone heard; FSV lamp extinguished.
19	Restore TLK ANS keys.	RSV lamp lights. High tone not heard.
20	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
21	At master test frame — Restore OGT key.	
22	Operate RL key momentarily.	At master test frame — All lamps extinguished.
23	Remove make-busy plug into OGT-MB jack or restore MB switch of intermarker trunk.	
24	Repeat Steps 11 through 23 for different trunk or junctor desired.	
25	At master test frame — Restore all other keys to normal.	
26b	If no further Tests B through I are to be performed — At desk — Remove No. 1020B headset from C, D jacks.	
27b	Restore all CO- class exclusion, SW1 class selection, SW loop reduction, OS keys operated or released in Steps 1 through 7 to desired positions.	

STEP	ACTION	VERIFICATION
28b	At relay frame — Remove blocking tools from FA- relays.	
29b	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
C. (AMA) Recycle of Service Observing Circuit		
12	At relay frame — Block nonoperated LB relay in selection and control circuit.	
13	At master test frame — Insert make-busy plug into OGT-MB jack of trunk or junctor, or operate MB switch of intermarker trunk used for test.	
14	Operate A- through L- keys, as required to select trunk or junctor desired and ter- minating number.	
15	Operate CST-, CSU-, CGB (if provided) keys, as required for AMA operation.	
16	Operate OGT, TLK keys.	
17	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
18	At master test frame — Operate ST key momentarily.	At relay frame — TM1 relay releases momentarily.
19	Restore TLK, OGT keys.	
20	At desk — Operate STBY key.	At desk — STBY lamp lights.
21	At master test frame — Operate RL key momentarily.	At master test frame — All lamps extinguished.
22	Repeat Steps 16 through 21 using same trunk or junctor.	Same as Steps 16 through 21.
23	Remove blocking tool from LB relay.	
24	Remove make-busy plug from OGT-MB jack or restore MB switch of intermarker trunk.	
25	Restore all other keys to normal.	
26	Proceed as in Test B, Steps 26b through 29b.	

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STEP	ACTION	VERIFICATION
D. (AMA) Overflow		
12	At master test frame — Insert make-busy plug into OGT-MB jack of desired trunk or junctor or operate MB switch of intermarker trunk.	
13	Operate A- through L- keys, as required to select trunk or junctor desired and terminating number.	
14	Operate CST- CSU-, CGB (if provided) keys, as required for AMA operation.	
15	Operate OGT, TLK, ROT keys.	
16	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
17	At master test frame — Operate ST key momentarily.	TRK, S No. 1, loop identification lamps lighted. FSV lamp flashes at 120 ipm. S No. 1 lamp extinguished when sender releases. Called number digit lamps, F lamp lighted in No. 1 indicator. <i>Note:</i> TRK lamp may flash for 15 to 30 seconds before lighting steadily.
18	Restore TLK key.	RSV lamp lights. After 4 to 7 second delay for all type trunks except intermarker trunks, FSV lamp extinguished. FSV lamp extinguished immediately on intermarker trunk.
19	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
20	At master test frame — Restore ROT, OGT keys.	
21	Operate RL key momentarily.	At master test frame — All lamps extinguished.
22	Remove make-busy plug from OGT-MB jack or restore MB switch of intermarker trunk.	
23	Restore all other keys used in this test to normal.	

STEP	ACTION	VERIFICATION
24	Proceed as in Test B, Steps 26b through 29b.	
E. (AMA) Loop Reduction		
9	At cable turning section of desk — Operate OS key for AMA observing circuit under test.	
10	Set SW key to A position.	At relay frame — AG, all AT- relays for AMA operated.
11	Restore OS key.	AG, all AT- relays remain operated.
12	Set SW key in center position; operate OS key.	AG, all AT- relays released.
13	Set SW key to B position.	BG, all BT- relays for AMA operated.
14	Restore OS key.	BG, all BT- relays for AMA remain operated.
15	Set SW key in center position. Operate OS key momentarily.	BG, all BT- relays released.
16	Proceed as in Test B, Steps 26b through 29b.	
F. (AMA) Class Selection		
9	At cable turning section of desk — Operate OS key for AMA observing circuit under test.	At relay frame — MA, MA1, all HFA- relays operated.
10	Restore OS key.	MA1, all HFA- relays remain operated.
11	Set SW1 key to FA position. Operate OS key.	MA1, all HFA- relays released.
12a	If local dial observing circuit is provided using cable conductors in common with AMA observing — Release local dial OS key momentarily.	LD, LD1 relays operate momentarily.
13	Proceed as in Test B, Steps 26b through 29b.	
G. (AMA) Trouble Alarm		
12	At relay frame — Connect ground momentarily to 3M of any A- relay associated with AMA observing circuit under test.	At selection and control circuit — AL lamp lights. ST1, ST2 relays released. Office alarm operates.

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STEP	ACTION	VERIFICATION
13	At selection and control circuit — Operate AR key momentarily.	AL lamp extinguished. Office alarm silenced.
14	Connect 48-volt battery momentarily to 3M of any A- relay associated with observing circuit under test.	AL lamp lights. ST1, ST2 relays released. Office alarm operates.
15	Operate AR key momentarily.	AL lamp extinguished. Office alarm silenced.
16	At register circuit — Connect ground to terminal 55 of A relay.	At register circuit — AL lamp lights. Office alarm operates.
	<i>Caution: In order not to burn out contacts of this relay, do not connect ground to any other terminal.</i>	
17	Operate AR key.	Office alarm silenced.
18	Remove ground on terminal 55 of A relay.	
19	Restore AR key.	AL lamp extinguished.
20	Block RR7 relay nonoperated.	
21	At master test frame — Insert make-busy plug into OGT-MB jack of trunk or junctor or operate MB switch of intermarker trunk used for test.	
22	Operate A- through L- keys, as required to select AMA trunk or junctor to be used in this test and terminating number.	
23	Operate CST-, CSU-, CGB (if provided) keys, as required for AMA operation.	
24	Operate OGT, TLK keys.	
25	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
26	At master test frame — Operate ST key momentarily.	At register circuit — AL lamp lights. Office alarm operates.
27	At register circuit — Operate AR key momentarily.	AL lamp extinguished. Office alarm silenced.
28	Remove blocking tool from RR7 relay.	

STEP	ACTION	VERIFICATION
29	At desk — Operate STBY key.	At desk — STBY lamp lights.
30	At master test frame — Restore TLK, OGT keys.	
31	Operate RL key momentarily.	At master test frame — All lamps extinguished.
32	Remove make-busy plug from OGT-MB jack or restore MB switch of intermarker trunk.	
33	Restore all other keys to normal.	
34	Proceed as in Test B, Steps 26b through 29b.	
H. (AMA) Loop Identification Failure and Registration		
12	At relay frame — Block nonoperated DC1 relay in selection and control circuit.	
13	Connect 24M, U terminals of DC1 relay together.	
14	At master test frame — Insert make-busy plug into OGT-MB jack of trunk or junctor or operate MB switch of intermarker trunk used for test.	
15	Operate A- through L- keys, as required to select AMA trunk or junctor to be used in this test and terminating number.	
16	Operate CST-, CSU-, CGB (if provided) keys, as required for AMA operation.	
17	Operate OGT, TLK keys.	
18	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
19	At master test frame — Operate ST key momentarily.	At desk — Disregard all lamps except IF, which will light after a delay of 4 to 7 seconds.
20	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.

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STEP	ACTION	VERIFICATION
21	At master test frame — Restore TLK, OGT keys.	
22	Operate RL key momentarily.	At master test frame — All lamps extinguished.
23	At relay frame — Connect 1U, 2L winding terminals of TU relay together.	
24	At master test frame — Operate OGT, TLK keys.	
25	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
26	At master test frame — Operate ST key momentarily.	Disregard all lamps except identification lamps 00 which are lighted.
27	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
28	At master test frame — Restore TLK, OGT keys.	
29	Operate RL key momentarily.	At master test frame — All lamps extinguished.
30	Repeat Steps 23 through 29. For Step 23, use Table A for test connec- tion to be used.	Same as Steps 23 through 29.

TABLE A

RELAY TERMINALS CONNECTED	IDENTIFICATION NUMBER	
	TENS	UNITS
2U (T1) and 2L (U1)	1	1
2U (T2) and 2L (U2)	2	2
2U (T3) and 2L (U3)	3	3
2U (T4) and 2L (U4)	4	4
U (T5) and L (U5)	5	5
1U (T1) and 1L (U1)	6	6
1U (T2) and 1L (U2)	7	7
1U (T3) and 1L (U3)	8	8
1U (T4) and 1L (U4)	9	9

STEP	ACTION	VERIFICATION
31	At relay frame — Remove blocking tool from DC1 relay.	
32	Remove test connections on T-, U-, DC1 relays.	
33	At master test frame — Remove make-busy plug from OGT-MB jack.	
34	At relay frame — Restore MB switch of intermarker trunk to normal.	
35	Proceed as in Test B, Steps 26b through 29b.	

I. (AMA) Called Number Digit Pulsing and Registration

12	At master test frame — Insert make-busy plug into OGT-MB jack of trunk or junctor or operate MB switch of intermarker trunk used for test.	
13	At relay frame — Block nonoperated C1, C2 relays in register connector circuit.	
14	Connect ground to 00 (make) spring of C2 relay.	
15	Operate momentarily CK, ON relays in register circuit simultaneously.	At relay frame — Relays CK, ON lock operated.
16	Operate manually ST7 relay in register circuit.	Relay ST7 locks operated.
17	Set up digit 0 in each A through L register relay by connecting ground momentarily to terminals 45 and 55.	

Caution: In order not to burn out contacts of these relays, do not connect ground to any other terminals.

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STEP	ACTION	VERIFICATION
18	At master test frame — Operate A- through L- keys, as required to select AMA trunk or junctor to be used in this test and terminating number.	
19	Operate CST-, CSU, CGB (if provided) keys, as required for AMA operation.	
20	Operate TLK, OGT keys.	
21	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
22	At master test frame — Operate ST key momentarily.	At desk — S No. 1 lamp lighted. 11-digit 0 lamps, F lamp in No. 1 indicator lighted.
23	At desk — Operate STBY key.	At desk — STBY lamp lights. All other lamps extinguished.
24	At master test frame — Restore TLK, OGT keys.	
25	Operate RL key momentarily.	At master test frame — All lamps extinguished.
26	Repeat Steps 15 through 25 except set up digits 1 through 9 in Step 17 successively by connecting ground momentarily to terminals as shown in Table B, making separate test for each digit group.	At desk — 11-digit lamps, F lamp in No. 1 indicator lighted corresponding to digit number set up in register circuit.

TABLE B

DIGIT NUMBER REQUIRED	TERMINALS GROUNDED ON NO. 293A RELAYS
1	15 and 25
2	15 and 35
3	25 and 35
4	15 and 45
5	25 and 45
6	35 and 45
7	15 and 55
8	25 and 55
9	35 and 55

STEP	ACTION	VERIFICATION
27	At relay frame — Remove ground connection from C2 relay.	
28	Remove blocking tool from C1, C2 relays.	
29	At master test frame — Operate OGT, TLK keys.	
30	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
31	At master test frame — Operate ST key momentarily.	Digit lamps, F lamp in No. 1 indicator, corresponding to called number, lighted.
32	At desk — Operate STBY key.	At desk — STBY lamp lights. All other lamps extinguished.
33	At master test frame — Restore TLK, OGT keys.	
34	Operate RL key momentarily.	At master test frame — All lamps extinguished.
35	Remove make-busy plug from OGT-MB jack.	
36	Restore all other keys to normal.	
37	Proceed as in Test B, Steps 26b through 29b.	
J. (CAMA) Seizure, Transmission, Loop Identification, Sender Indication, Called Number Registration, Calling and Called Station Supervision, and Observation Released		
33b	When observing equipment is tested in conjunction with incoming trunk circuits for tandem or intertoll completion — At master test frame — Operate A- through L- keys, as required for terminating route (see 1.10).	
34b	Operate keys in accordance with Table C for route selected in Step 33b.	
35b	Operate ITNP, TCB, LS or HS, CAM, TOBS, OP, TLK, COMP keys as required.	

TABLE C

CAMA INCOMING TRUNK TYPE	INC SUP	TYPE OF COMPLETION	OUTGOING TRUNK OUT SUPERVISION	OPERATE KEYS
Non-BL	Rev Bat.	Tandem	—	CAMO, COGT, SLP, KY
Non-BL	Rev Bat.	Local	—	CAMO, SLP
Non-BL	Rev Bat.	Intertoll	SX	CAM1, COGT, SLP, KY
BL	E and M Leads	Tandem	—	CAMO, COGT, CEMI, KY
BL	E and M Leads	Local	—	CAMO, CEMI
BL	E and M Leads	Intertoll	SX	CAM1, COGT, CEMI, KY
BL	Rev Bat.	Tandem	—	CAMO, COGT, SXS, KY
BL	Rev Bat.	Local	—	CAMO, SXS
BL	Rev Bat.	Intertoll	SX	CAM1, COGT SXS, KY

STEP	ACTION	VERIFICATION
36c	When observing equipment is tested in conjunction with incoming trunk circuits for local completion — At master test frame — Operate A-, B-, C- keys, as required for local office code.	
37c	Operate keys in accordance with Table C for route selected in Step 36c.	
38c	Operate ITNP, TCB, LS or HS, CAM, TOBS, TLK, COMP, TTL keys as required.	
39d	When observing equipment is tested in conjunction with intermarker trunk circuits — At master test frame — Operate A- through L- keys, as required for terminating route (see 1.10).	
40d	Operate keys in accordance with Table D for route selected in Step 39d.	

TABLE D

	TYPE OF COMPLETION	OUTGOING TRUNK OUT SUPERVISION	OPERATE KEYS
	Tandem	—	CAMO, COGT
	Intertoll	Rev Bat.	CAM1, COGT,
	Intertoll	E and M Leads	CAM1, E-M
	Local	—	CAMO

STEP	ACTION	VERIFICATION
41d	Operate IMT, TCB, MT-, CAM, TOBS, KY, TLK, SXS, IRV, COMP keys as required.	
42d	Operate FG-, FS- keys for associated trunk link frame in CAMA office.	
43d	Operate HT-, TT-, UT- keys for trunk number.	
44e	When observing equipment is tested in conjunction with junctor circuits — At master test frame — Operate A- through L- keys, as required for junctor used in test.	
45e	Operate CST-, CSU-, CGB (if provided) keys as required for class of service having access to selected junctor.	
46e	Operate FG-, FS-, TS-, NTFS, NTTS, CAMO/1, GPA/B, KY, MT-, RA-, CAM, TOBS, E-M, TLK, OGT, COGT keys as required.	
47	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
48	At master test frame — Operate ST key momentarily.	High tone heard. TRK, FSV, loop identification tens, units, S No. 1 lamps lighted. K, S lamps light in No. 2 indicator.
49	At test set — Key calling number.	High tone not heard. S No. 1, S No. 2 lamps extinguished. Called number digit lamps, F lamp lighted in No. 1 indicator.
50	At master test frame — Operate ANS key.	High tone heard. FSV lamp extinguished.
51	At master test frame — Restore TLK, ANS keys.	RSV lamp lights. High tone not heard.

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STEP	ACTION	VERIFICATION
52	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
53	At master test frame — Restore ITNP, IMT, or OGT key as required.	
54	Operate RL key momentarily.	At master test frame — All lamps extinguished.
55b	Where observing equipment is tested in conjunction with incoming trunk circuits for tandem or intertoll completion — Remove plug from MB jack of trunk used for test.	
56c	When observing equipment is tested in conjunction with incoming trunk circuits for local completion — Remove plug from MB jack of trunk used for test.	
57d	When observing equipment is tested in conjunction with intermarker trunk circuits — Remove plug from MB jack of trunk used for test.	
58e	When observing equipment is tested in conjunction with junctor circuits — At relay frame — Restore MB switch of junctor.	
59	Repeat Steps 25, 33b through 58e, using different setting of A- through L- keys as required for trunk or junctor desired.	Same as Steps 25, 33b through 58e.
60	At master test frame — Restore all other keys to normal, remove patch cords used in test.	
61f	If no further Tests J through Q are to be performed — At desk — Remove No. 1020B headset from C, D jacks.	
62f	Restore all CO- class exclusion, SWI class selection, SW loop reduction, OS keys operated or released in Steps 12 through 18 to desired position.	
63f	At relay frame — Remove blocking tools from FA- relays.	
64f	At desk — Restore STBY key.	At desk — STBY lamp extinguished.

STEP	ACTION	VERIFICATION
	K. (CAMA) Sender Calls CAMA Position, Position Attached, Calling Number Registration, Position Reorder, Register Reset, Position Disconnect, Extra Digit Pulsed, Operation of Two Digit Keys Simultaneously	
33b	When observing equipment is tested in conjunction with incoming trunk circuits for tandem or intertoll completion — At master test frame — Operate A- through L- keys, as required for terminating route (see 1.10).	
34b	Operate keys in accordance with Table C for route selected in Step 33b.	
35b	Operate ITNP, TCB, LS or HS, CAM, TOBS, OP, TLK, COMP keys as required.	
36c	When observing equipment is tested in conjunction with incoming trunk circuits for local completion — At master test frame — Operate A-, B-, C- keys, as required for local office code.	
37c	Operate keys in accordance with Table C for route selected in Step 36c.	
38c	Operate ITNP, TCB, LS or HS, CAM, TOBS, TLK, COMP, TTL keys as required.	
39d	When observing equipment is tested in conjunction with intermarker trunk circuits — At master test frame — Operate A- through L- keys, as required for terminating route (see 1.10).	
40d	Operate keys in accordance with Table D for route selected in Step 39d.	
41d	Operate IMT, TCB, MT-, CAM, TOBS, KY, TLK, SXS, IRV, COMP keys as required.	
42d	Operate FG-, FS- keys for associated trunk link frame in CAMA office.	
43d	Operate HT-, TT-, UT- keys for trunk number.	
44e	When observing equipment is tested in conjunction with junctor circuits — At master test frame — Operate A- through L- keys, as required for junctor used in test.	

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STEP	ACTION	VERIFICATION
45e	Operate CST-, CSU-, CGB (if provided) keys as required for class of service having access to selected junctor.	
46e	Operate FG-, FS-, TS-, NTFS, NTTS, CAMO/1, GPA/B, KY, MT-, RA-, CAM, TOBS, E-M, TLK, OGT, COGT keys, as required.	
47	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
48	At master test frame — Operate ST key momentarily.	High tone heard. TRK, FSV, loop identification tens, units and S No. 1 lamps lighted, K, S lamps light in No. 2 indicator.
49	At test set — Key digit 0 six times.	High tone not heard. Digit 0 lamps light in first six spaces in No. 2 indicator.
50	At test set — Operate RS key momentarily.	Digit 0 lamps extinguished. W lamp lights. S No. 2 lamp lights steadily.
51	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
52	At master test frame — Operate RL key momentarily.	At master test frame — All lamps extinguished.
53	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
54	At master test frame — Operate ST key momentarily.	High tone heard. TRK, FSV, loop identification tens, units, S No. 1 lamps lighted. K, S lamps light in No. 2 indicator.
55	At test set — Key digit 0 seven times.	High tone not heard. Digit 0 lamps light in first seven spaces in No. 2 indicator. S No. 2 lamp flashes at 120 ipm.
56	At test set — Operate RS, STT keys momentarily in sequence.	Digit 0 lamps extinguished. W, D lamps light. S lamps extinguished in No. 1, 2 indicators. FSV lamp flashes or lights steadily.
57	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.

STEP	ACTION	VERIFICATION
58	Repeat Steps 52 through 57, keying each digit from 1 through 9 successively seven times in Step 55.	Lamps corresponding to digit keyed light in first seven spaces instead of digit 0 lamps in Step 55.
59	Repeat Steps 52 through 57, keying digit 1 eight times in Step 52.	Digit 1 lamps light in first seven spaces; X pattern of lamps light in eighth space instead of digit 0 lamps in Step 55.
60	Repeat Steps 52 through 57, keying digits 0, 1 simultaneously in Step 55.	R lamp lights instead of digit 0 lamps in Step 55.
61	At master test frame — Restore ITNP, IMT, or OGT key as required.	
62	Operate RL key momentarily.	At master test frame — All lamps extinguished.
63b	When observing equipment is tested in conjunction with incoming trunk circuits for tandem or intertoll completion — At master test frame — Remove plug from MB jack of trunk used for test.	
64c	When observing equipment is tested in conjunction with incoming trunk circuits for local completion — At master test frame — Remove plug from MB jack of trunk used for test.	
65d	When observing equipment is tested in conjunction with intermarker trunk circuits — At master test frame — Remove plug from MB jack of trunk used for test.	
66e	When observing equipment is tested in conjunction with junctor circuits — At relay frame — Restore MB switch of junctor.	
67	Repeat Steps 25, 33b through 66e, except Steps 58, 59, 60. Use different setting of A- through L- keys as required for trunk or junctor desired.	Same as Steps 25, 33b through 66e.

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STEP	ACTION	VERIFICATION
68	At master test frame — Restore all other keys to normal; remove patch cords used in test.	
69	Proceed as in Test J, Steps 61f through 64f.	
L. (CAMA) Recycle of CAMA Service Observing Circuit		
33	At relay frame — Block nonoperated LB relay in selection and control circuit.	
34e	When observing equipment is tested in conjunction with junctor circuits — At master test frame — Operate A- through L- keys, as required for junctor used in test.	
35e	Operate CST-, CSU-, CGB (if provided) keys as required for class of service having access to selected junctor.	
36e	Operate FG-, FS-, TS-, NTFS, NTTS, CAMO/1, GPA/B, KY, MT-, RA-, CAM, TOBS, E-M, TLK, OGT, COGT keys as required.	
37	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
38	Operate ST key momentarily.	At relay frame — TM1 relay releases momentarily.
39	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
40	At master test frame — Restore TLK, OGT keys.	
41	Operate RL key momentarily.	At master test frame — All lamps extinguished.
42	At relay frame — Remove blocking tool from LB relay.	
43	At relay frame — Restore MB switch of junctor.	
44	At master test frame — Restore all other keys to normal; remove patch cords used in test.	
45	Proceed as in Test J, Steps 61f through 64f.	

STEP	ACTION	VERIFICATION
M. (CAMA) Loop Reduction		
20	At cable turning section of desk — Operate class selection CAMA key (if provided), OS key for CAMA observing circuit under test.	
21	Set SW key to A position.	At relay frame — AG, all AT- relays for CAMA operated.
22	Restore OS key.	AG, all AT- relays remain operated.
23	Set SW key in center position; operate OS key.	AG, all AT- relays released.
24	Set SW key to B position.	BG, all BT- relays for CAMA operated.
25	Restore OS key.	BG, all BT- relays remain operated.
26	Set SW key in center position; operate OS key momentarily.	BG, all BT- relays released.
27	Proceed as in Test J, Steps 61f through 64f.	
N. (CAMA) Class Selection		
20	At cable turning section of desk — Set SW1 key (if provided) for CAMA observing circuit under test to FA position; operate OS key momentarily.	At relay frame — CAM, CA1, CA2, all CMA- relays released.
21	Set SW1 key (if provided) to CAMA position; operate OS key.	CAM, CA1, CA2, all CMA- relays operated.
22	Restore OS key.	CAM, CA1, CA2, all CMA- relays remain operated.
23	Proceed as in Test J, Steps 61f through 64f.	
O. (CAMA) Trouble Alarm		
20	At selection and control circuit — Connect ground momentarily to 3M of any A- relay associated with CAMA observing circuit under test.	At selection and control circuit — AL lamp lights. ST1, ST2 relays released. Office alarm operates.
21	Operate AR key momentarily.	AL lamp extinguished. Office alarm silenced.
22	Connect —48-volt battery momentarily to 3M of any A- relay associated with observing circuit under test.	AL lamp lights. ST1, ST2 relays released. Office alarm operates.

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STEP	ACTION	VERIFICATION
23	Operate AR key momentarily.	AL lamp extinguished. Office alarm silenced.
24	Proceed as in Test J, Steps 61f through 64f.	
P. (CAMA) Loop Identification Failure and Registration		
33	At relay frame — Block nonoperated DC2 relay in selection and control circuit.	
34	Connect together terminals 24M, U of DC2 relay.	
35e	When observing equipment is tested in conjunction with junctor circuits — At master test frame — Operate A- through L- keys, as required for junctor used in test.	
36e	Operate CST-, CSU-, CGB (if provided) keys as required for class of service having access to selected junctor.	
37e	Operate FG-, FS-, TS-, NTFS, NTTS, CAMO/1, GPA/B, KY, MT-, RA-, CAM, TOBS, E-M, TLK, OGT, COGT keys as required.	
38	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
39	At master test frame — Operator ST key momentarily.	After delay of 4 to 7 seconds, IF lamp lights. High tone heard.
40	At desk — Operator STBY key.	STBY lamp lights. All other lamps extinguished.
41	At master test frame — Restore TLK, OGT keys.	
42	Operate RL key momentarily.	At master test frame — All lamps extinguished.
43	At relay frame — Connect together winding terminals 1U, 2L of TU relay.	
44	At master test frame — Operate OGT, TLK keys.	
45	At desk — Restore STBY key.	At desk — STBY lamp extinguished.

STEP	ACTION	VERIFICATION
46	At master test frame — Operate ST key momentarily.	Identification lamps 00 lighted. High tone heard.
47	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
48	At master test frame — Restore TLK, OGT keys.	
49	Operate RL key momentarily.	At master test frame — All lamps extinguished.
50	At relay frame — Remove blocking tool from DC2 relay.	
51	Remove test connections from TU, DC2 re- lays.	
52	At relay frame — Restore MB switch of junctor.	
53	At master test frame — Restore all other keys to normal; remove patch cords used in test.	
54	Proceed as in Test J, Steps 61f through 64f.	
Q. (CAMA) Overflow		
33e	When observing equipment is tested in con- junction with junctor circuits — At master test frame — Operate A- through L- keys, as required for junctor used in test.	
34e	Operate CST-, CSU-, CGB (if provided) keys as required for class of service having access to selected junctor.	
35e	Operate FG-, FS-, TS-, NTFS, NTTTS, CAMO/1, GPA/B, KY, MT-, RA-, CAM, E-M, TOBS, TLK, OGT, COGT keys as re- quired.	
36e	At desk — Restore STBY key.	At desk — STBY lamp extinguished.
37	At master test frame — Operate ST key momentarily.	At desk — TRK, FSV, loop identification tens, units, S No. 1 lamps lighted. K, S lamps light in No. 2 indicator. High tone heard.

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STEP	ACTION	VERIFICATION
38	At test set — Operate STT key momentarily.	High tone not heard. Overflow tone heard. D lamp lights. S No. 1, S No. 2 lamps extinguished. Called number digit lamps, F lamp lighted in No. 1 indicator.
39	At desk — Operate STBY key.	STBY lamp lights. All other lamps extinguished.
40	At master test frame — Operate RL key momentarily.	At master test frame — All lamps extinguished.
41	At relay frame — Restore MB switch of junctor.	
42	At master test frame — Restore all keys to normal; remove patch cords used in test.	
43	Proceed as in Test J, Steps 61f through 64f.	