

KEY MONITORING CIRCUIT SD-96314-01
MF AND DC KEYPULSING
DSA, TOLL, AND CAMA SWITCHBOARDS
TESTS

1. GENERAL

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1.01 This section describes a method of testing the key monitoring circuit SD-96314-01 used in DSA, toll, and CAMA switchboards.

C. Number Checking—MF or DC Key Pulsing: This test checks that the number check is indicated by the number lamp.

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1.02 This section is reissued for the following reasons:

- (a) To revise apparatus Table A
- (b) To add additional steps to preparation (Part 3) for Tests A, C, D, and E
- (c) To add steps previously in preparation (Part 3) to method (Part 4) for Test B
- (d) To renumber steps in Tests A, C, D, and E.

D. CAMA MF or DC Key Pulsing Using CAMA Switchboard Key Monitoring Position: This test checks the registration of all digits, wipe out of digit display by the RS key, lamp indication of RS key operation, lamp indication of PD key operation, lockout of key monitoring circuit while a call is in progress, lamp indications of progress, disconnection indication when sender releases position, and reorder indication.

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This reissue does not affect Equipment Test List.

1.03 The tests covered are as follows.

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A. MF Key Pulsing on a Cord Basis:

This test checks the lockout of the key monitoring circuit while a call is in progress, registration of all digits, premature keying indications, lamp indications of progress, ST key disconnection indication, and recorder indication.

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B. DC Key Pulsing on a Cord Basis:

This test checks the lockout of the key monitoring circuit while a call is in progress, registration of all digits and disconnection when all digits are pulsed, premature keying indication, lamp indication of progress, ST key disconnection indication and indication of disconnection without ST key operation.

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E. CAMA MF or DC Key Pulsing Using Toll or DSA Key Monitoring Position: This test checks the registration of all digits, wipe out of digit display by the RS key, lamp indication of RS key operation, lamp indication of PD key operation, lockout of key monitoring circuit while a call is in progress, lamp indications of progress, disconnection indication when sender releases position, and reorder indication.

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1.04 Where a combined MF-DC keyset is provided, both MF and DC tests are made except that Test C is only made using either the MF or DC portion of the keyset.

1.05 Manpower requirements will be reduced if the key pulsing position selected for the tests is adjacent to the key monitoring position.

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1.06 In this section all verifications are observed at the key monitoring position unless otherwise specified.

1.07 In general, only those lamps, tones, signals, etc, necessary for verification, are mentioned in the verification column.

1.08 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Parts 3 and 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

2.01 The apparatus required for each test is shown in Table A. The details for each item are covered in the paragraphs indicated by the numbers enclosed in parentheses.

2.02 ♦21A transmission measuring set (TMS) (used to ascertain output of key monitoring amplifier has a 30-dB gain.)♦

2.03 Central office observing set No. 2 (SD-90448-01) (used as a traffic department item and equipped with the required patching cords and monitoring headset; not required when the key monitoring position is equipped with a KM key).

2.04 Tandem office sender test circuit SD-25963-01.

2.05 Position test circuit SD-55056-01, SD-61097-02, or SD-63971-01.

2.06 Monitoring headset consisting of one L2K cord equipped with one 723A receiver and one 289B plug (used when central office observing set No. 2 is not required.)

2.07 ♦Patching cord, 3P14A cord, 3 feet long equipped with two 241B plugs.

2.08 Patching cord, 3P17B cord, 6 feet long equipped with one 310 plug and one 241A plug.♦

3. PREPARATION

STEP	ACTION	VERIFICATION
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♦All Tests Except B

- | | | |
|---|---|--|
| 1 | At 21A TMS—
Remove cover. | |
| 2 | Connect set to ac power source. | |
| 3 | Connect 3P14A cord from OSC OUT 600Ω to
DET IN 600Ω. | |
| 4 | Set FREQ MULT selector switch to X100. | |
| 5 | Adjust FREQ control to 10. | |
| 6 | Operate power switch to ON. | |

Note: Allow about 10 minutes for 21A TMS to warm up.

STEP

ACTION

VERIFICATION

TABLE A

APPARATUS	TESTS				
	A	B	C	D	E
21A TMS (2.02)	1	—	1	1	1
Observing Set (2.03)	1	1	1	—	1
Test Circuit (2.04)	—	—	—	1	1
Test Circuit (2.05)	—	—	1	—	—
Head Telephone Set	1	1	1	2	2
Monitoring Headset (2.06)	1	1	1	1	1
3P14A Cord (2.07)	1	—	1	1	1
3P17B Cord (2.08)	2	—	2	2	2
C Screwdriver	1	—	1	1	1

- 7 Adjust OSC OUTPUT step control to -30 (white).
- 8 Adjust OSC OUTPUT smooth control to 0 (white).
- 9 Set DET INPUT selector switch to -30 (white). DB meter indicates 0 on black scale.
- 10 Remove cord connected in Step 3.
- 11 Set DET INPUT selector switch to 0 (white).
- 12 Connect a 3P17B cord between OSC OUT 600Ω of 21A TMS and amplifier IN jack of key monitoring circuit.
- 13 Connect a 3P17B cord between DET IN 600Ω of 21A TMS and amplifier OUT jack of key monitoring circuit. DB meter reads 0. (This indicates amplifier has a 30-dB gain.)
- 14a If verification of Step 13 is not met—
Adjust gain — control potentiometer mounted on faceplate of amplifier until requirement of Step 13 is met.

Note: Ascertain that the screw-type switches of amplifier designated 21-36 and 10-24 are

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STEP	ACTION	VERIFICATION
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closed (turned in) and screw-type switch designated 0-13 is opened (turned out).

15 Operate power switch to OFF.

16 Disconnect all cords.⚡

Tests A and C

17 At key pulsing position—
Check that position grouping key is normal.

18 Connect head telephone set to position telephone jacks.

19b If central office observing set No. 2 is required—
At key monitoring position—
Using P3D or P3F cords, as required, connect BT, BS1, BS2, and KDWO jacks of observing set to BT, BS1, BS2, and KDWO jacks, respectively, of monitoring and observing jack circuit.

20 Connect monitoring headset to monitoring circuit telephone jacks of key monitoring position or observing set No. 2, as required.

Tests D and E

17 Prepare sender test frame as outlined in section for testing CAMA operator position circuits, appropriate to system, such as Section 220-515-501 for crossbar tandem system.

18b If combined toll or DSA and CAMA—
At key pulsing position—
Operate TR (transfer) key and check that position grouping key and all TALK and MON (monitoring) keys are normal.

19c If TR key is in a regular CAMA position—
At key monitoring position—
Operate TR key to MON.

20c Connect monitoring headset to position telephone jacks.

21d If monitoring at toll or DSA key monitoring position—
Connect monitoring headset to monitoring jacks of key monitoring position or observing set No.2, as required.

STEP	ACTION	VERIFICATION
22e	If central office observing set No. 2 is required— Using P3D or P3F cords, as required, connect BT, BS1, BS2, and KDWO jacks of observing set to BT, BS1, BS2, and KDWO jacks of monitoring and observing jack circuit.	
4. METHOD		
A. MF Key Pulsing on a Cord Basis		
21	At key pulsing position— Insert plug of front or rear cord of an idle cord circuit into jack of an idle MF key pulsing trunk and operate TALK key.	
22	Operate and release KP key associated with cord.	
23	At key monitoring position— Connect monitoring cord to monitoring jack of key pulsing position.	
24c	If observing set No. 2 is not required— At key monitoring position— Operate KM key.	
25	At key pulsing position— Operate and release any digit key and then ST key.	All lamps extinguished.
26	Remove and reinsert plug in trunk jack.	
27	Operate and release KP key.	K (front) or K (rear) and S lamps light.
28	Operate digit keys 0-1-2-3-4-5-6-7-8-9-0. <i>Note:</i> The key monitoring circuit will release and the W lamp will light when the total number of digits keyed corresponds to the number of digits for which the key monitoring circuit is wired.	At key monitoring position— All keyed digits display lamps light.
29	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	All lamps extinguished.
30	At key pulsing position— Remove plug from trunk jack, operate and release RLS key, if provided, and reinsert plug.	

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STEP	ACTION	VERIFICATION
31	Repeat Steps 27 through 30 using, in turn, each combination of digits starting with 1 through 9.	
32	Remove plug from trunk jack far enough to break tip and ring contact but not far enough to break sleeve contact.	
33	Operate and release KP key.	K lamp lights.
34	Operate and release any digit key once.	K lamp extinguished. At key monitoring position— S lamp flashes. W lamp lights.
35	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	S lamp extinguished. W lamp extinguished.
36	At key pulsing position— Remove plug from trunk jack, operate and release RLS key, if provided, and reinsert plug.	
37	Operate and release KP key.	K (front) or K (rear) and S lamps light.
38	Key test line number.	At key monitoring position— Digit display lamps of test line number light.
39	At key pulsing position— Operate ST key.	K and S lamps extinguished. At key monitoring position— F and W lamps light.
40	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	All lamps extinguished.
41d	If both front and rear cords may be used for key pulsing— At key pulsing position— Repeat Steps 37 through 40 using other cord of pair.	Same as Steps 37 through 40.
42	At key pulsing position— Remove and reinsert plug in trunk jack.	
43	Operate and release KP key.	K (front) or K (rear) and S lamps light.
44	Operate and release digits 0 and 1 keys at same time.	At key monitoring position— F lamp flashes. W lamp lights.

STEP	ACTION	VERIFICATION
45	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	All lamps extinguished.
46	At key pulsing position— Remove plug from trunk jack and operate and release RLS key, if provided.	
47e	If no further tests are to be performed— At all locations— Remove all cords and restore all keys.	
B. DC Key Pulsing on a Cord Basis		
1	At key pulsing position— Check that position grouping key is normal.	
2	Connect head telephone set to position telephone jacks.	
3a	If central office observing set No. 2 is required— At key monitoring position— Using P3D or P3F cords, as required, connect BT, BS1, BS2, and KDWO jacks of observing set to BT, BS1, BS2, and KDWO jacks, respectively, of monitoring and observing jack circuit.	
4	Connect monitoring headset to monitoring circuit telephone jacks of key monitoring position or observing set No. 2, as required.	
5	At key pulsing position— Insert plug of front or rear cord of an idle cord circuit into jack of an idle DC key pulsing trunk that requires ST key disconnection, and operate TALK key.	
6	Operate and release KP key associated with cord.	
7	At key monitoring position— Connect monitoring cord to monitoring jack of key pulsing position.	
8b	If central office observing set No. 2 is not required— Operate KM key.	
9	At key pulsing position— Operate and release any digit key and then ST key.	All lamps extinguished.

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STEP	ACTION	VERIFICATION
10	Remove and reinsert plug in trunk jack.	
11	Operate and release KP key.	K (front) or K (rear) and S lamps light.
12	Operate digit keys 0-1-2-3-4-5-6-7-8-9-0. <i>Note:</i> The key monitoring circuit will release and the W lamp will light when the total number of digits keyed corresponds to the number of digits for which the key monitoring circuit is wired.	K lamp extinguished. At key monitoring position— All keyed digit display lamps light. W lamp lights.
13	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	All lamps extinguished.
14	At key pulsing position— Remove plug from trunk jack, operate and release RLS key, if provided, and reinsert plug.	
15	Repeat Steps 11 through 14 using, in turn, each combination of digits starting with 1 through 9.	Same as Steps 11 through 13.
16	Remove plug from trunk jack far enough to break tip and ring contact but not far enough to break sleeve contact.	
17	Operate and release KP key.	K lamp lights.
18	Operate and release any digit key once.	K lamp extinguished. At key monitoring position— S lamp flashes. W lamp lights.
19	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	S lamp extinguished. W lamp extinguished.
20	At key pulsing position— Remove plug from trunk jack, operate and release RLS key, if provided, and reinsert plug.	
21	Operate and release KP key.	K (front) or K (rear) and S lamps light.
22	Key test line number.	At key monitoring position— Digit display lamps of test line number light.

STEP	ACTION	VERIFICATION
23	At key pulsing position— Operate ST key.	K and S lamps extinguished. At key monitoring position— F and W lamps light.
24	Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	All lamps extinguished.
25c	If both front and rear cords may be used for key pulsing— At key pulsing position— Repeat Steps 21 through 24 using other cord of pair.	Same as Steps 21 through 24.
26	At key monitoring position— Remove plug from trunk jack.	
27	At key pulsing position— Insert plug of front or rear cord of an idle cord circuit into jack of an idle dc key pulsing trunk that does not require ST key disconnection and operate TALK key.	
28	Operate KP key associated with cord.	K (front) or K (rear) and S lamps light.
29	Key test line number.	K and S lamps extinguished. At key monitoring position— Digit display lamps of test line number light. W lamp lights. S lamp flashes.
30	Operate and release KDWO key of observing set No. 2 or restore KM key of monitoring position, as required.	All lamps extinguished.
31	At key pulsing position— Remove plug from trunk jack and operate and release RLS key, if provided.	
32d	If no further test are to be performed— At all locations— Remove all cords and restore all keys.	

C. Number Checking—MF or DC Key Pulsing

21	At key monitoring position— Connect monitoring cord to monitoring jack of key pulsing position.
22c	If central office observing set No. 2 is not required— Operate KM key.

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STEP	ACTION	VERIFICATION
23d	If position test circuit SD-55056-01 or SD-63971-01 is used— At key pulsing position— Insert plug of an idle cord circuit, with TALK key normal, into MT jack of position test circuit.	
24	At key pulsing position— Operate TALK key of number checking cord circuit and insert plug of cord into NC jack of position test circuit.	
25	Operate TALK key of an idle cord circuit and insert plug of rear cord into D jack of position test circuit.	At key monitoring position— D lamp flashes.
26	Operate and release KDWO key of observing set No. 2 or restore KM key of monitoring position, as provided.	D lamp extinguished.
27e	If no further tests are to be performed— At all locations— Remove all cords and restore all keys.	
D. CAMA MF or DC Key Pulsing Using CAMA Switchboard Key Monitoring Position		
23	At key monitoring position— Key code number of key pulsing position.	All keyed digit display lamps of number keyed light.
24	Operate RS key.	All keyed digit display lamps extinguished.
25	At sender test frame— Operate PO and REP keys.	
26	Operate ST key.	Test frame action starts.
27	At key pulsing position— When CS lamp lights— Connect head telephone set to position telephone jacks.	S lamp lights. Test frame and key pulsing position talk path established.
	<i>Note:</i> At this point test frame may block and verifications become impossible. If this happens, operate and release CA key; on recycle, verifications should be satisfactory.	
28	Operate digit keys 0-1-2-3-4-5-6.	At key monitoring position— All keyed digit display lamps light.

STEP	ACTION	VERIFICATION
29	At key pulsing position— Operate and release RS key.	At key monitoring position— All keyed digit display lamps extinguished. R lamp lights.
30	At key pulsing position— Operate digit keys 1-2-3-4-5-6-7.	At key monitoring position— R lamp extinguished upon first operation of digit key. All keyed digit display lamps light.
31	At key pulsing position— Operate and release RS key.	At key monitoring position— All keyed digit display lamps extinguished. R lamp lights.
32	Repeat Steps 30 and 31, in turn, using combinations starting with digits 2 through 9.	Same as Steps 30 and 31.
33	At key pulsing position— Operate digit 0 key seven times.	At key monitoring position— R lamp extinguished upon first operation of digit key. Seven digit 0 display lamps light.
34	At key pulsing position— Operate and release PD key.	At key monitoring position— D lamp lights.
35	At key pulsing position— Remove head telephone set plug.	
36	At key monitoring position— Operate and release RS key.	All lamps extinguished.
37	At key pulsing position— Operate and release PD key.	
38	At sender test frame— Restore PO, REP, and ST keys.	Test frame action stops when sender is released.
39	Operate PAR POS and REP keys.	
40	Operate ST key.	Test frame action starts.
41	At key pulsing position— When CS lamp lights— Connect head telephone set to position telephone jacks.	Test frame and key pulsing position talk path established.

Note: At this point test frame may block and verification becomes impossible. If this happens, operate and release CA key; on recycle, verification should be satisfactory.

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STEP	ACTION	VERIFICATION
42	At key monitoring position— Key code number of key pulsing position.	All keyed digit display lamps light.
43	Operate RS key.	All keyed digit display lamps extinguished.
44	At key pulsing position— Key calling number A-, B-, C-, TH-, H-, T-, U-.	At key monitoring position— All lamps extinguished. At key pulsing position— CS lamp extinguished. Test frame and key pulsing position talk path disconnected. Test circuit recycles and position talk path is again established. At key pulsing position— CS lamp lights. Order tone heard. S lamp lights.
45	Key calling number A-, B-, C-, TH-, H-, T-, U-. <i>Note:</i> Step 46 must be performed promptly when W lamp lights and S lamp is extinguished to prevent lockout of key monitoring circuit.	At key monitoring position— Calling number displayed. W lamp lights, if provided. S lamp extinguished. At key pulsing position— CS lamp extinguished. Test frame and key pulsing position talk path disconnected. Test circuit recycles and position talk path again seized.
46	At key monitoring position— Operate and release RS key.	All lamps extinguished. At key pulsing position— CS lamp lights. Order tone heard. S lamp lights.
47	Key calling number of any vacant code A-, B-, C-, TH-, H-, T-, U-.	S lamp flashes.
48	At key monitoring position— Operate and release RS key.	R lamp lights. At key pulsing position— S lamp lights steadily.
49	At sender test frame— Restore ST key.	
50	At key pulsing position— Key calling number A-, B-, C-, TH-, H-, T-, U-.	At key monitoring position— R lamp extinguished upon operation of first digit key. Calling number displayed. W lamp lights, if provided. At key pulsing position— S lamp extinguished.

STEP	ACTION	VERIFICATION
51	Remove head telephone set plug.	
52	At key monitoring position— Operate and release RS key.	All lamps extinguished.
53	Operate and release PD key and remove head telephone set plug.	
54	At sender test frame— Restore PAR POS and REP keys and remove head telephone set plug.	
55f	If no further tests are to be performed— At all locations— Remove all cords and restore all keys.	
E. CAMA MF or DC Key Pulsing Using Toll or DSA Key Monitoring Position		
23	At key monitoring position— Connect monitoring cord to monitoring jack of key pulsing position.	
24f	If observing set No. 2 is not required— Operate KM key.	
25	At sender test frame— Operate PO and REP keys.	
26	Operate ST key.	Test frame action starts.
27	At key pulsing position— When CS lamp lights— Connect head telephone set to position telephone jacks.	S lamp lights. Test frame and key pulsing position talk path established.
<i>Note:</i> At this point test frame may block and verifications become impossible. If this happens, operate and release CS key; on recycle, verifications should be satisfactory.		
28	Operate digit keys 0-1-2-3-4-5-6.	At key monitoring position— All keyed digit display lamps light.
29	At key pulsing position— Operate and release RS key.	At key monitoring position— All display lamps extinguished. R lamp lighted while RS key is operated.
30	At key pulsing position— Operate digit keys 1-2-3-4-5-6-7.	At key monitoring position— All keyed digit display lamps light.

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STEP	ACTION	VERIFICATION
31	At key pulsing position— Operate and release RS key.	At key monitoring position— All display lamps extinguished. R lamp lighted while RS key is operated.
32	Repeat Steps 30 and 31 using, in turn, combinations starting with digits 2 through 9.	Same as Steps 30 and 31.
33	At key pulsing position— Operate digit 0 key seven times.	At key monitoring position— Seven digit 0 display lamps light.
34	At key pulsing position— Operate and release PD key.	At key monitoring position— D lamp lights.
35	At key pulsing position— Remove head telephone set plug.	
36	At key monitoring position— Operate and release KDWO key of observing set No. 2 or restore and operate RM key of monitoring position, as provided.	All lamps extinguished.
37	Remove monitoring cord from monitoring jack of key pulsing position.	
38	At sender test frame— Restore PO, REP, and ST keys.	Test frame action stops when sender is released.
39	Operate PAR POS and REP keys.	
40	Operate ST key.	Test frame action starts.
41	At key pulsing position— When CS lamp lights— Connect head telephone set to position telephone jacks.	Test frame and key pulsing position talk path established.
	<i>Note:</i> At this point test frame may block and verification becomes impossible. If this happens, operate and release CA key; on recycle, verification should be satisfactory.	
42	At key monitoring position— Connect monitoring cord to monitoring jack of key pulsing position.	
43	At key pulsing position— Key calling number A-, B-, C-, TH-, H-, T-, U-.	At key monitoring position— All lamps extinguished. At key pulsing position— CS lamp extinguished. Test frame and key pulsing position talk path disconnected.

STEP	ACTION	VERIFICATION
		Test circuit recycles and position talk path again established. CS lamp lights. S lamp lights.
44	Key calling number A-, B-, C-, TH-, H-, T-, U-. <i>Note:</i> Step 45 must be performed promptly when W lamp lights and S lamp is extinguished to prevent lockout of key monitoring circuit.	At key monitoring position— Calling number displayed. W lamp lights. S lamp extinguished. At key pulsing position— CS lamp extinguished. Test frame and key pulsing position talk path disconnected. Test circuit recycles and position talk path again established.
45	At key monitoring position— Operate and release KDWO key of observing set No. 2 or restore and operate KM key of monitoring position, as provided.	At key pulsing position— CS lamp lights. Order tone heard. S lamp lights.
46	Key calling number of any vacant code A-, B-, C-, TH-, H-, T-, U-.	S lamp flashes.
47	Operate RS key.	S lamp lights steadily. At key monitoring position— R lamp lighted while RS key is operated.
48	At sender test frame— Restore ST key.	
49	At key pulsing position— Key calling number A-, B-, C-, TH-, H-, T-, U-.	At key monitoring position— Calling number displayed. W lamp lights. At key pulsing position— S lamp extinguished.
50	Remove head telephone set plug.	
51	At key monitoring position— Operate and release KDWO key of observing set No. 2 or restore KM key of monitoring position, as provided.	All lamps extinguished.
52	At sender test frame— Restore PAR POS and REP keys and remove head telephone set plug.	
53g	If no further tests are to be performed— At all locations— Remove all cords and restore all keys.	