SUBSCRIBER, AUXILIARY, AND KEYPULSING "A" SENDERS
TESTS USING SENDER TEST CIRCUITS SD-21186-01, SD-21026-01, AND SD-21026-02
PANEL OFFICES

1. GENERAL

1.01 This section describes methods of testing link type subscriber, auxiliary, and keypulsing "A" sender circuits with sender test circuit SD-21186-01, link type subscriber and auxiliary senders with sender test circuit SD-21026-01, and sender selector or rotary link type decoder subscriber and auxiliary senders with sender test circuit SD-21026-02. Also included in this section are miscellaneous tests which are made without the sender test circuit.

1.02 This section is reissued for the following reasons:

(a) To add Test BE for the recording of PCI pulses.

(b) To revise the method of testing subscriber senders equipped with the TOUCH-TONE dialing feature. This test is designated BP.

(c) To revise Table A to include instructions on added and revised tests.

(d) To revise Part 5 to include added keys and lamps.

(e) To revise existing information in the test chart and to expand the test chart to care for the tests of additional features.

1.03 The tests covered are:

A. Full Selector Call: This test checks that the sender functions properly on a normal service call to a panel or crossbar office.

B. Incoming Overflow: This test checks that the sender will function properly when an overflow condition is encountered after incoming group selection.

C. Office Overflow: This test checks that the sender will function properly when an overflow condition is encountered after office group selection.

D. Permanent Signal: This test checks that the sender will function to route a call to a permanent signal trunk if the first digit is not dialed within the allotted time following sender seizure.

E. Special Service Operator: This test checks that the sender will complete a call to a special service operator.

F. 3-Digit Operator: This test checks the sender functions on a 3-digit operator call using a direct route.

G. Restricted Service: This test checks that the sender waits until all digits have been dialed before closing the trunk when a restricted code is dialed.

H. Unassigned Code: This test checks the functions of the sender when an unassigned code is dialed.

I. Late Release — Full Selector Call: This test checks that the sender will send the incoming selector to telltale and then release if a call is abandoned after the thousands digit has been dialed.

J. Register Control (SUB SDR): This test checks that the sender will count and register dial pulses correctly under extreme operating conditions with a minimum interval between numerical digits.

K. Full Selector — High Five Incoming Group: This test checks that the sender will add five pulses in incoming group selection

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when a call is made to the "B" crossbar office of a common multioffice trunk group.

L. PCI Direct Call: This test checks that the sender will transmit PCI pulses on calls routed direct to PCI offices.

M. PCI Tandem Call: This test checks that the sender will transmit PCI pulses on calls to PCI tandem offices.

N. Late Release — PCI Call: This test checks that on PCI calls abandoned after trunk test, the sender will await assignment, complete PCI outpulsing, and release when the code is one which operates the sender TW relay, or will release without awaiting assignment when the code is one which does not operate the sender TW relay.

O. PCI Tandem — 3-Digit Operator: This test checks the sender functions on a call to a 3-digit operator through a PCI tandem office.

P. Capacity Test for Ground Closures between PCI Pulses: This test checks that the sender provides ground closures between PCI pulses to discharge cable capacity.

Q. Operation Test of TG Train: This test checks the ability of the sender TG train to assign, following the equivalent of a short closure in the trunk.

R. Full Selector Call (KP SDR): This test checks the ability of the sender to function with all of the various trunking conditions encountered on KP calls.

S. Register Control (KP SDR): This test checks the sender steering relays for proper operation when slow pulses are received and makes a release test of the sender TS and RS relays.

T. Early Release — Operator Straightforward Through Crossbar Tandem: This test checks the ability of the sender to release on an abandoned operator straightforward call through crossbar tandem in offices where the office selectors are not arranged to send reverse battery from overflow or telltale positions.

U. 3-Digit Operator Through Crossbar Tandem: This test checks the sender functions on a call to an operator through crossbar tandem.

V. Time-out — Keypulsing "A" Sender: This test checks the ability of the sender to time out and release when only two digits are keyed on a 3-digit code, or after one digit when testing with a 2-digit code.

W. Operator's Error — Office Selector Trunk: This test checks the ability of the sender to time out and release when a code requiring district selections is keyed on a direct trunk to a distant office selector.

X. Operator's Error — Tandem District Trunk: This test checks the ability of the sender to time out and release when only four digits, followed by a start signal, are keyed on a panel sender tandem trunk.

Y. Operator's Error — Incoming Selector: This test checks the ability of the sender to time out and release when more than four digits are keyed on a direct trunk to an incoming selector.

Z. Prefix 1-1 Feature: This test checks that if two ones (1-1) are pulsed into the sender before the office code, the sender will complete the call on an extended area basis.

AA. Counting Relays: This test checks that only one pair of counting relays will operate for each revertive pulse received by the sender.

AB. Release Test of STP Relay: This test provides a release test of the sender STP relay using the readjust release value and is intended to be used only after the relay has been readjusted to the current flow values.

AC. Nonoperate Test of OF Relay: This test provides a nonoperate test of the sender OF relay.

AD. Cancel TG Test: This test checks for the presence of a false pulse in the sender during or afer trunk test and preceding incoming group selection.

AE. SC Ground Check — Call Abandoned After AV Relays Operated: This test checks the ability of the sender to connect 5-ohm ground to the SC lead on a call abandoned after the AV relays have operated and before the district has advanced out of "Selections Beyond" position.

AF. Toll Diversion Feature: This test checks that the sender will reverse the dialing tip and ring at dialing completion for the diversion of restricted PBX traffic on extra charge calls.

AG. Dial Tone: This test checks that the sender furnishes dial tone to the customer as soon as it is ready to register the first digit.

AH. Second Trial Test — Decoder Senders: This test checks the ability of the sender to make a second trial on a trouble release from the decoder. The decoder trouble indicator is used in conjunction with this test.

AI. Partial Dial Timing: This test checks the ability of the sender to time out and release when the customer fails to complete dialing within the allotted time.

AJ. Stuck Sender Timing: This test checks the ability of the sender to time out and release when the sender fails to complete selections and release in the allotted time following registration.

AK. Intersender Timing: This test checks that intersender timing functions properly on full selector or PCI calls. It also provides a method of checking the sustaining period of the intersender timing control circuit.

AL. Stuck Sender Lamp and Priming Features (SUB SDR): This test checks that the priming feature of the subscriber sender will not operate falsely and that the sender will function to light its associated SS lamp at the sender make-busy frame when a stuck sender condition is encountered. Primed release of the stuck subscriber sender is manually checked.

Note: Because of certain combinations of wiring arrangements in the subscriber senders and test circuits, the test as outlined in Part 4 may not check these features effectively or may cause the test frame to block falsely. Where these conditions exits, this test should be omitted. Under these circumstances, the features may be tested on an in-service basis using a simulated service call.

AM. Stuck Sender Lamp and Priming Features (KP SDR): This test checks that the priming feature of the KP sender will not operate falsely and that the sender will function to light its associated SS lamp at the sender make-busy frame when a stuck sender condition is encountered.

AN. Coin Features: This test makes operate and nonoperate tests of the GT and SGT relays of coin senders.

AO. MF Call— Ten Digits: This test checks that the subscriber sender, auxiliary sender link, and auxiliary sender function properly on a call requiring MF outpulsing of ten digits, or of seven digits on a 10-digit skip 3 call.

AP. MF Call — Seven Digits: This test checks that the subscriber and auxiliary sender function properly on a 7-digit type MF outpulsed call.

AQ. MF Call — Ten Digits — Abandoned: This test checks the release features of the subscriber and auxiliary senders on MF 10-digit calls abandoned at various times.

AR. MF Call — Ten Digits — Trouble Timeout Before Receipt of Wink: This test checks the time-out features of the auxiliary sender and the ability of the subscriber sender to disconnect on trouble conditions encountered prior to receiving the remote sender attached wink.

AS. MF Call — Ten Digits — Trouble Timeout After Receipt of Wink: This test checks the time-out features of the auxiliary sender and the ability of the subscriber sender to disconnect on trouble conditions encountered after receiving the remote sender attached wink.

AT. MF Call — Stuck Auxiliary Sender — Primed Release: This test checks that, with the auxiliary sender CTR key pulled out and no other auxiliary sender in the group stuck, an auxiliary sender will time out and stick on trouble conditions encountered prior to receiving the remote sender attached wink. Primed release of the stuck auxiliary sender is manually checked.

AU. MF Call — Ten Digits — No Auxiliary Sender Available: This test checks that, with no auxiliary sender available, a 10-digit call will be routed to overflow.

AV. MF Call — Ten Digits — Incoming Trunk Reversed: This test checks that a 10-digit call, on completion of dialing, will be routed to overflow if the incoming trunk is reversed at time of seizure.

AW. No More Than One Stuck Auxiliary Sender in a Group: This test checks that the operating ground to all CTR relays in an auxiliary sender group is removed when any CTR relay in the group is operated (indicating a call being held on a time-out condition).

AX. 10-Digit Recycle Call: This test checks that subscriber senders function properly on 10-digit calls using area codes that are to be compressed.

AY. 10-Digit Recycle Call — No Code compressors Available: This test checks that, with no code compressors available, calls will be routed to overflow, 10-digit MF trunks or intercept, depending upon decoder cross-connections.

AZ. 3-Digit Operator Call — No Code Compressors Available. This test checks that, with no code compressors available, 3-digit calls will terminate.

BA. Major Alarm — Two Auxiliary Senders Stuck: This test checks that if a second auxiliary sender in a group becomes stuck, a major alarm sounds. The test circuit is not used for this test.

BB. Prefix 0 Feature: This test checks that the sender will complete the call to the traffic service position when the area or office code is preceded by the digit zero.

BC. Prefix 1 Feature: This test checks that the sender functions as required when the area or office code is preceded by the digit one.

BD. TOUCH-TONE Dialing: This test checks that subscriber senders and their associated TOUCH-TONE receivers and converters will function properly with TOUCH-TONE signaling.

BE. PCI Pulsing: This test provides for recording on paper tape the PCI pulse patterns generated by subscriber senders.

1.04 The circuit used for testing has access to the senders through 206-type selectors which are mounted on the test frame and are known as master switches and sender selector switches.

1.05 The test circuit is arranged to make a test cycle of all senders when testing is started with the master switches and sender selector switches in their normal positions. By advancing these switches, through the operation of keys, testing may be started from any point in the test cycle. A feature is provided in test circuits serving senders equipped with dial pulse register switches for repeating any test either two or four times, before automatically advancing to test the next sender. Also, it is possible to make successive repeat tests on a particular sender.

1.06 Registers are provided on the sender test frames as follows: CT (circuits tested), to record the number of sender circuits tested; RST (repeated single tests), to record the number of repeated single tests; PB (pass busy), to record the number of busy senders which are passed without being tested; and TBL (trouble), to record the number of failures which bring in the test circuit time alarm.

1.07 A 10-digit class of call is used to test the auxiliary senders for the following special conditions:

(a) Abandoned calls.

(b) Stuck auxiliary sender.

(c) Overflow due to no auxiliary senders available.

(d) Overflow due to incoming trunk reversal at time of seizure.

No separate tests are required for other MF outpulsed classes since the circuit features are the same.

1.08 A test chart is provided in this section for performing the tests. The data on the chart should be completed by consulting office records and following the instructions provided in Part 6.

1.09 Service may be adversely affected in performing the following tests for the reasons indicated.

TEST	REASON
AH	Excessive decoder usage.
AK	May send service calls to overflow if senders delay in assignment or incoming brush selection for a period in excess of the test frame timing.
AR, AS, or AT	Excessive auxiliary sender holding time.
AU	May send service calls to overflow during period when all auxiliary senders within a group are made to appear busy. Interaction between two test frames may also result when this condition exists.
AY, AZ	When making these tests, one or two code compressor connectors are disabled for a short interval of time. This causes the code compressors to appear busy to a maximum of 20 subscriber senders during the following intervals of time:

TEST	REASON
AY	From the time of dialing the third digit to the completion of the fourth.
AZ	From the time of dialing the third digit until the sender closes the fundamental loop for district brush selection, approximately 1 second.

1.10 Test AH should be performed at a time when the subscriber sender under test has immediate access to its first choice decoder.

1.11 Actions and verifications at locations other than the sender test circuit are required as follows:

TEST	ACTIONS AND VERIFICATIONS AT
AH	Decoder Trouble Indicator
AJ	Subscriber Sender Make-Busy Frame
AK	Decoder Trouble Indicator
AL	Subscriber Sender Make-Busy Frame
AS	Auxiliary Sender
AT	Subscriber Sender Make-Busy Frame
AW	Auxiliary Sender
BA	Subscriber Sender Make-Busy Frame and Auxiliary Sender

1.12 ***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.

1.13 Local instructions should be followed with reference to recording any register operations caused by performing these tests.

2. APPARATUS

All Tests Except AW and BA

2.01 Subscriber sender test circuit per SD-21186-01, SD-21026-01, or SD-21026-02.

Tests E through U, W through AF, AI, AJ, and AX through AZ

2.02 184B (make-busy) plugs, as required.

Tests V, AI, AJ, AK, AM, AS, AT, and AX through BA

2.03 KS-3008 stop watch, or equivalent.

Tests AH, AJ, AS, and BA

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

Tests AI and AJ

2.05 893 cord equipped with two 360A tools (1W13A cord) and two KS-6278 connecting clips.

Tests AK, AO through AV, AX through AZ, BB through BD

2.06 349A (make-busy) plugs, as required.

Tests AK, AS, AT and BA

2.07 322A (make-busy) plugs, as required.

Test AW

2.08 38B lamp socket equipped with a 2Y switchboard lamp.

2.09 624B (connecting) tool.

Test BE

2.10 Brush Recorder Mark II, or equivalent.

2.11 W2J cord, 9 feet 6 inches long, equipped with one 310 plug (2W9A) and two 29 cord tips.

3. PREPARATION

STEP	ACTION	VERIFICATION
	All Tests Except Tests AW and BA	
1	Restore all lever type keys to normal, operate test class release keys (R1, R2, and R3) and remove plugs from test jacks.	All lamps extinguished.
2a	If test circuit does not restore to normal — Momentarily operate CA key.	All lamps extinguished.
3b	If master switches and sender selector switches are off normal — Operate PC key.	
4b	Operate and restore SS key intermittently until sender selector restores.	
5b	Operate and restore M1 and M2 keys intermittently until master selectors restore.	
6b	Restore PC key.	

STEP	ACTION	VERIFICATION
7c	If it is desired to test a particular sender — Operate PC key.	
8c	Operate and restore M1 and M2 keys until master selectors reach terminal associated with desired sender selector.	
9c	Operate and restore SS key until sender selector reaches terminal associated with sender to be tested.	
10c	Restore PC key.	
11d	If testing rotary link type senders with sender test circuit equipped to test both rotary link and panel link type senders — Operate RL key.	
12e	If testing senders which delay trunk test until thousands and hundreds digits are dialed and senders which delay only until thousands digit is dialed — Operate TG AH key.	
13f	If "sender group" feature is provided, and is required (see note below) — Operate proper GR- key.	
	Note: The operation of a GR- key will cause the test circuit to block with the GR lamp lighted when all senders having certain operating conditions have been tested. Upon receiving the GR lamp during test, consult the office records and reset the test circuit keys as required. Restore the GR- key to allow the test circuit to advance.	

4. METHOD

STEP	ACTION	VERIFICATION
	Tests A through C	
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

STEP	ACTION	VERIFICATION
	D. Permanent Signal	
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. DB lamp remains lighted 20 to 40 or 30 to 60 seconds during each test, depending on type of sender being tested. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.
	Tests E through U	
14	Operate keys and insert 184B plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.
	V. Time-out KP "A"	
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test first sender to which it has access.
16	When KN lamp lights — Start timing.	Sender times out and releases in 27 to 57 seconds. Test circuit advances and continues to test senders to which it has access. EC lamp lights. Minor alarm sounds.
17	Restore ST key.	All lamps extinguished. Minor alarm silenced.
	Tests W through AF	
14	Operate keys and insert 184B plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.

STEP	ACTION	VERIFICATION
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AG. Dial Tone

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15	Operate ST key.	DT lamp lights. Dial tone heard in test receiver.
16	Momentarily operate CA key.	Test circuit advances to next sender. DT lamp lights. Dial tone heard in test receiver.
17	Repeat Step 16 for each sender until all senders have been tested.	EC lamp lights. Minor alarm sounds.
18	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AH. Second Trial Test—Decoder Senders

STEP	ACTION	VERIFICATION
14	At sender test frame — Operate keys shown on test chart.	
15	At first choice decoder to sender under test — Insulate one of contacts of R relay associated with code selected.	
16	At sender test frame — Operate ST key.	Test circuit proceeds to test first sender to which it has access.
17	At decoder trouble indicator — Operate LP key.	Trouble indication displayed for sender under test.
18	Momentarily operate RL key. *Note:* RL key should be operated and display released before test circuit advances to next sender.	Display released. Test circuit advances to next sender.
19	Repeat Steps 17 and 18 until all senders having same first choice decoder have been tested.	
20	At decoder frame — Remove insulator from contacts of R relay.	
21	Repeat Steps 15 through 20 until all senders have been tested.	EC lamp lights. Minor alarm sounds.

STEP	ACTION	VERIFICATION
22	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AI. Partial Dial Timing

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15g	If testing senders arranged for timed release and disconnect tone is to be checked -- Operate MAX LINE key where 170A precision interrupter is furnished or insert 184B plug into MIN BR dial control jack where relay interrupter is furnished.	
16h	If sender test circuit SD-21186-01 equipped with timed release test feature is used to test senders arranged for automatic priming after time-out — Place jumper from N terminal of arc 2 (terminal 22) to 21 terminal of arc 1 of sender test frame TC selector bank, using 893 cord. *Note:* This connection shortens test circuit timing interval to within 30-second minimum timing period of sender.	
17i	If testing senders arranged for timed release or senders arranged for automatic priming with test circuit equipped for timed release test (Tests 83 through 88) — Operate ST key.	Test circuit proceeds to test senders to which it has access. Test circuit checks duration of prescribed timing intervals.
18g	If testing senders arranged for timed release and disconnect tone is to be checked (Tests 84 and 85) — Measure timing interval and listen for disconnect tone in test receiver.	Disconnect tone heard 20 to 40 seconds after A lamp is extinguished. EC lamp lights. Minor alarm sounds.
19j	If testing senders arranged for automatic priming with test circuit equipped with SL key (Tests 89, 90, and 91) — Operate ST key.	Test circuit proceeds to test senders to which it has access.
20j	Measure timing interval.	Test 89 — 30 to 60 seconds from sender seizure to DB lamp extinguished. Tests 90 and 91 — 30 to 60 seconds from A lamp extinguished to DB lamp extinguished. EC lamp lights. Minor alarm sounds.
21	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AJ. Stuck Sender Timing

STEP	ACTION	VERIFICATION
14	At sender make-busy frame — Restore (push in) sender CTR keys.	
15	At sender test frame — Operate keys shown on test chart.	
16g	If testing senders arranged for timed release and disconnect tone is to be checked — Operate MAX LINE key where 170A precision interrupter is furnished or insert 184B plug into MIN BR dial control jack where relay interrupter is furnished.	
17h	If sender test circuit SD-21186-01 equipped with timed release test feature is used to test senders arranged for automatic priming after time-out — Place jumper from N terminal of arc 2 (terminal 22) to 21 terminal of arc 1 of sender test frame TC selector bank, using 893 cord. *Note:* This connection shortens test circuit timing interval to within 30-second minimum timing period of sender.	
18h	Insulate 1T and 2T of SC2 relay in test frame timing circuit. *Note:* This action eliminates test for 10-second interval between line release and sender release and prevents test circuit from blocking falsely.	
19i	If testing senders arranged for timed release or senders arranged for automatic priming with test circuit equipped for timed release tests (Tests 92 through 97) — Operate ST key.	Test circuit proceeds to test senders to which it has access. Test circuit checks duration of prescribed timing intervals.
20g	If testing senders arranged for timed release and disconnect tone is to be checked (Tests 92, 93, and 94) — Measure timing interval and listen for disconnect tone in test receiver.	Test 92 — Disconnect tone heard 20 to 40 seconds after U lamp is extinguished. Tests 93 and 94 — Disconnect tone heard 60 to 80 seconds after U lamp is extinguished. EC lamp lights. Minor alarm sounds.
21j	If testing senders arranged for automatic priming with test circuit equipped with SL key (Test 98) — Operate ST key.	Test circuit proceeds to test senders to which it has access.

STEP	ACTION	VERIFICATION
22j	Measure timing interval.	Test 98 — Without distant office selections — 30 to 60 seconds from U lamp extinguished to DB lamp extinguished. Test 98 — With distant office selections — 60 to 90 seconds from U lamp extinguished to DB lamp extinguished. EC lamp lights. Minor alarm sounds.
23	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AK. Intersender Timing

STEP	ACTION	VERIFICATION
14	Operate keys and insert 349A plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test first sender to which it has access.
16	When TOI lamp lights — Start timing.	TOI lamp remains lighted 3 to 6 seconds. Test circuit advances to next sender.
17	Repeat Step 16 until all senders have been tested.	EC lamp lights. Minor alarm sounds.
18	Restore ST key.	All lamps extinguished. Minor alarm silenced.
19g	If it is desired to test sustaining period of intersender timing control circuit — At decoder trouble indicator — Momentarily insert 322A plug into IT jack and start timing.	IT lamp lights and remains lighted 5 to 12 seconds.

AL. Stuck Sender Lamp and Priming Features (SUB SDR)

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test first sender to which it has access. SS lamp at sender make-busy frame lights after timing interval.
16	At sender make-busy frame — Restore (push in) CTR key of sender under test.	SS lamp extinguished at sender make-busy frame. Test circuit advances to next sender.
17	At lighting of each successive SS lamp — Repeat Step 16 until all senders have been tested.	EC lamp lights. Minor alarm sounds.

STEP	ACTION	VERIFICATION
18	At sender test frame — Restore ST key.	All lamps extinguished. Minor alarm silenced.

AM. Stuck Sender Lamp and Priming Features (KP SDR)

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test first sender to which it has access. Circuit blocks.
16	When DB lamp lights — Start timing.	With sender TW relay normal, SS lamp at sender make-busy frame lights 60 to 120 seconds after DB lamp lights at sender test frame. With sender TW relay operated, SS lamp at sender make-busy frame lights 90 to 150 seconds after DB lamp lights at sender test frame.
17	Momentarily operate CA key.	Test circuit advances to next sender.
18	Repeat Steps 15, 16, and 17 until all senders have been tested.	EC lamp lights. Minor alarm sounds.
19	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AN. Coin Features

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

Tests AO through AR

STEP	ACTION	VERIFICATION
14	Operate keys and insert 349A plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

BE. MF Call — Ten Digits — Trouble Time-out After Receipt of Wink

STEP	ACTION	VERIFICATION
14	At sender make-busy frame — Insert 322A plug into make-busy jack of auxiliary sender to be tested.	At sender make-busy frame — Associated SS lamp lights.
15	At sender test frame — Operate PAS- key associated with auxiliary sender to be tested.	
16g	If more than one group of auxiliary senders is provided — Insert 184B plug into ASG- jack associated with group of auxiliary senders to be tested.	
17	Operate keys and insert 349A plugs into jacks shown on test chart.	
18	Select subscriber sender which has access to auxiliary sender to be tested.	
19	At auxiliary sender — Block nonoperated ACA relay.	
20	At sender test frame — Operate ST key.	
21	At sender make-busy frame — Remove make-busy plug from auxiliary sender under test.	At auxiliary sender — 6 to 14 seconds after test circuit blocks — Test circuit starts and blocks. STC and STE relays operate. 6 seconds later — STC relay releases.
22	Insert 322A plug into make-busy jack of auxiliary sender under test.	
23	At sender test frame — Restore ST key.	
24	Momentarily operate CA key.	Test circuit, subscriber sender and auxiliary sender restore.
25	At auxiliary sender — Remove blocking tool from ACA relay.	
26	At sender make-busy frame — Remove 322A plug from make-busy jack of auxiliary sender tested.	At sender make-busy frame — Associated SS lamp extinguished.
27	At sender test frame — Restore PAS- key.	

STEP	ACTION	VERIFICATION
28	Repeat Steps 14, 15, 19 through 27, as required, to test other auxiliary senders in group.	
29g	If more than one group of auxiliary senders is provided — Change plug in ASG- jack, as required, and repeat Steps 14, 15, 18 through 27.	

AT. MF Call — Stuck Auxiliary Sender — Primed Release

STEP	ACTION	VERIFICATION
14	Operate PAS- key associated with auxiliary sender to be tested.	If only one group of auxiliary senders is provided — At sender make-busy frame — Associated SS lamp lights.
15g	If more than one group of auxiliary senders is provided — Insert 184B plug into ASG- jack associated with group of auxiliary senders to be tested.	
16	Operate keys and insert 349A plugs into jacks shown on test chart.	
17	Select subscriber sender which has access to to particular group of auxiliary senders to be tested.	
18h	If sender monitor operation is provided — Notify trouble supervisory operator not to prime subscriber sender selected for test.	
19i	If automatic priming is provided — Operate (pull out) CTR key for subscriber sender selected for test.	
20	Operate ST key.	Test circuit proceeds to test auxiliary sender. At sender make-busy frame — SS lamp associated with auxiliary sender under test lights, if not already lighted. At sender test frame — DB lamp lights. At sender make-busy frame — 6 to 12 seconds after DB lamp lights — SS lamp changes to flashing signal.
21	At the sender make-busy frame — Insert 332A plug into auxiliary sender make-busy jack.	Auxiliary sender SS lamp stops flashing but remains lighted.

STEP	ACTION	VERIFICATION
22	Remove 322A plug from auxiliary sender make-busy jack.	Auxiliary sender releases. If more than one group of auxiliary senders is provided — Associated SS lamp extinguished.
23	At sender test frame — Restore ST key.	
24	Momentarily operate CA key.	Test circuit and subscriber sender restore.
25	Restore PAS- key.	If one group of auxiliary senders is provided — Associated SS lamp extinguished.
26	To test other auxiliary senders in group — Operate PAS- key, as required, and repeat Steps 20 through 25.	
27g	If more than one group of auxiliary senders is provided — Change plug in ASG- jack, as required, and repeat Steps 14, 17 through 26.	
28h	If sender monitor operation is provided — Notify trouble supervisory operator that testing is completed.	
29i	If automatic priming is provided — Restore (push in) CTR key.	
30g	If more than one group of auxiliary senders is provided — Remove plug from ASG- jack.	

AU. MF Call — Ten Digits — No Auxiliary Sender Available

STEP	ACTION	VERIFICATION
14	Operate keys and insert 349A plugs into jacks shown on test chart for semiautomatic test, if provided, or for automatic test, if provided.	
15g	If more than one group of auxiliary senders is provided — Insert 184B plug into ASG- jack for group of auxiliary senders to which subscriber sender under test has access.	
16h	If semiautomatic test is provided — Operate ST key.	Test circuit proceeds to test sender. Test circuit blocks. ***Note:*** Blocking of the test circuit at this time is an indication that the subscriber sender has recognized an all auxiliary senders busy condition. Under this condition an overflow is registered in the subscriber sender.

STEP	ACTION	VERIFICATION
17i	If automatic test is provided — Operate ST key.	Test circuit proceeds to test senders to which it is directed. EC lamp lights. Minor alarm sounds.
18h	Operate CA key.	Test circuit advances to next sender. Test circuit blocks.
	Note: If more than one group of auxiliary senders is provided, it may be necessary to manually select the next subscriber sender which has access to the particular group of auxiliary senders.	
19h	Repeat Step 18h for each subscriber sender until all senders have been tested.	EC lamp lights. Minor alarm sounds.
20	Restore ST key.	All lamps extinguished. Minor alarm silenced.
21g	If more than one group of auxiliary senders is provided — Change 184B plug in ASG- jack, as required, and repeat Steps 16h through 20.	

AV. MF Call — Ten Digits — Incoming Trunk Reversed

STEP	ACTION	VERIFICATION
14	Operate keys and insert 349A plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

AW. No More Than One Stuck Auxiliary Sender in a Group

STEP	ACTION	VERIFICATION
1	Check that there are no stuck auxiliary senders in group to be tested.	CTR relay of each auxiliary sender normal.
2	With one side of 38B lamp socket connected to 48-volt test battery — Connect other side (extended by 624B tool) momentarily to terminal A23 of each auxiliary sender in group.	Lamp lights on each test.

STEP	ACTION	VERIFICATION
3	With 38B lamp socket connected to last terminal tested in Step 2 — Momentarily operate CTR relay of each auxiliary sender of group.	Lamp extinguished with operation of each CTR relay.
4	Disconnect 38B lamp socket and remove 624B tool from terminal A23.	

AX. 10-Digit Recycle Call

STEP	ACTION	VERIFICATION
14	Operate keys and insert plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	Test circuit restores. All lamps extinguished. Minor alarm silenced.

AY. 10-Digit Recycle Call — No Code Compressors Available

STEP	ACTION	VERIFICATION
14	Operate keys and insert plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	Test circuit restores. All lamps extinguished. Minor alarm silenced.

AZ. 3-Digit Operator Call — No Code Compressors Available

STEP	ACTION	VERIFICATION
14	Operate keys and insert plugs into jacks shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	Test circuit restores. EC lamp extinguished. Minor alarm silenced.

STEP	ACTION	VERIFICATION

BA. Major Alarm — Two Auxiliary Senders Stuck

STEP	ACTION	VERIFICATION
1	Check that there are no stuck auxiliary senders in group to be tested.	
2	At sender make-busy frame — Insert 322A plugs into make-busy jacks of first two auxiliary senders in group to be tested.	SS lamp lights.
3	At first auxiliary sender made busy — Block operated ON, BK, and CTR relays.	
4	At second auxiliary sender made busy — Block operated UD relay. Then block operated ON relay.	14-20 seconds after blocking ON relay — BK1 relay operates. Major alarm sounds.
5	Remove blocking tools from ON and UD relays.	Major alarm silenced.
6	At sender make-busy frame — Remove make-busy plug from second auxiliary sender. *Note 1:* To test other auxiliary senders in same group, proceed as described for second auxiliary sender (Steps 4, 5, and 6). *Note 2:* To test first auxiliary sender, remove blocking tools from ON, BK and CTR relays. Make busy and then block operated ON, BK and CTR relays in any other auxiliary sender in same group. Test first auxiliary sender as described in Steps 4, 5, and 6.	SS lamp extinguished.

BB and BC. Prefix O and 1 Features

STEP	ACTION	VERIFICATION
14	Operate keys shown on test chart.	
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

BD. TOUCH-TONE Dialing

STEP	ACTION	VERIFICATION
14	Operate keys, switches, and insert 349A plugs into jacks shown on test chart.	

STEP	ACTION	VERIFICATION
15	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lights. Minor alarm sounds.
16	Restore ST key.	All lamps extinguished. Minor alarm silenced.

BE. PCI Pulsing

STEP	ACTION	VERIFICATION
1	Adjust Brush Recorder Mark II in accordance with Section 100-131-100.	
2	Using 2W9A cord, connect PCI jack to the T and R jacks on brush recorder arranged for balanced input.	
3	At Brush Recorder — Set VOLT/CHART LINE switch to 2.	
4	At sender test frame — Originate PCI tandem call.	
5	Operate ST key. *Note:* When auxiliary equipment for automatic start and stop of chart control drive, omit Steps 6 and 8.	Test circuit proceeds to test sender.
6	At Brush Recorder — Operate CHART/SPEED 125 pushbutton. *Note:* Use dial progress lamps as guide to the start of PCI pulsing.	
7	Make sample test and reset VOLT/CHART LINE switch to obtain adequate pulse amplitude.	
8	At end of PCI pulsing, operate CHART SPEED OFF pushbutton.	See Figure 1 for interpretation of pulses. *Note:* Figure 1 shows typical PCI signals recorded by a Brush Recorder. Dotted lines between digit groups are added as an aid for decoding signals. Note the effective pulse duration is across the plateau. Any deviation will cause shorter or longer duration of battery application to trunk conductors. The number used is 9637888R.

STEP	ACTION	VERIFICATION
↱ 9	At sender test frame — Restore ST key.	Test frame will complete test and stop.
↳ 10	Repeat Steps 1 through 6 and Step 8 on each sender to be tested.	

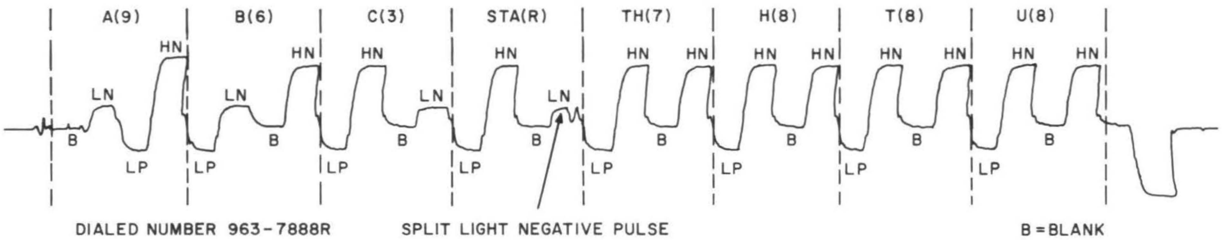

Fig. 1 — PCI Pulse Interpretation

5. INTERPRETATION OF JACK, KEY, LAMP, AND SWITCH DESIGNATIONS

5.01 *Jacks*

JACK	PURPOSE
ACA (2-9) ACB (0-1) ACC (0-9)	***Area Code A, B, C:*** 349A plugs inserted in these jacks cause the test circuit to dial an area code (X0X, X1X) used in direct distance dialing.
ASG	***Auxiliary Sender Group:*** Used to direct the test circuit PAS- keys to a particular group of auxiliary senders.
CCB	***Code Compressor Busy:*** Used to make the code compressors appear busy to the subscriber sender under test.
IGT	***"High Five" Incoming Group:*** To test the sender for five more than the normal number of pulses for incoming group selection (SD-21026-01 and SD-21026-02).
IT1, IT2	***Intersender Timing:*** To test desired group of subscriber senders for intersender timing control.

JACK	PURPOSE
LR to E827	***Pulsing Jacks:*** To apply the proper test condition to the sender pulsing circuit, where the test circuit is arranged to test senders equipped with different types of L relays, as follows:
LR	***Long Range:*** For testing senders using the 239HE L relay arranged for long-range dialing, with the 178- or Y-type RA relay, and the 149- or Y-type SR relay.
L24	***L24 Relay:*** For testing senders using the L24- or L1-type relay and relay type dial registers, with the 178- or Y-type RA relay, and the 149- or Y-type SR relay.
L1	***L1 Relay:*** For testing senders using the L1 type L relay and 200-type selector dial registers, with 320-ohm or 1050-ohm SR relay winding.
E827	***E827 Relay:*** For testing senders using the E827 L relay.

JACK	PURPOSE
MF	*Multifrequency:* A 349A plug inserted in this jack prepares the MF adapter circuit for dial pulsing the area code into the sender and for checking MF outpulsing of the auxiliary sender.
OFN	*OF Nonoperate* To provide a nonoperate current flow test of the sender OF relay.
PBX SURGE to HS MAX BR	*Dial Control Jacks:* These jacks are furnished only when the test circuit is equipped with the capacitor timed relay interrupter circuit and are used to apply various tests to the subscriber sender dialing circuit, as follows:
PBX SURGE	*PBX Surge:* To permit a hold test of the L relay on a PBX surge.
LS MIN BR	*Low Speed Minimum Break:* To permit a hold test of the RA relay over a train of pulses.
LS MAX BR	*Low Speed Maximum Break:* To permit a hold test of the SR relay over a train of pulses.
MS MIN BR	*Medium Speed Minimum Break:* To permit a release test of the L relay and operation of the pulse counting relays, or 200-type selector dial pulse registers.
MS MAX BR	*Medium Speed Maximum Break:* To test for double pulsing on a line surge.
HS MIN BR	*High Speed Minimum Break:* To permit an operate test of the RA relay on the first pulse.
HS MAX BR	*High Speed Maximum Break:* To permit an operate test of the L relay and of the prime pulse counting relays or a release of the 200-type selector dial pulse registers.

JACK	PURPOSE
	Note: The MS MIN BR and HS MAX BR jacks perform the best general test of the dial register and should be used for most routine testing. The remaining jacks impose more severe tests on various parts of the dial register, and should be used occasionally during the test cycles or applied to any sender which is suspected of dialing failures.
PCI	*Panel Call Indicator:* To provide for connecting the sender test circuit to an amplifier and associated pen register for checking PCI outpulsing.
RC	*Remote Control:* These jacks are located in suitable locations on the sender frames. Momentarily insertion of a make-busy plug simulates operation of CA (control advance) key at sender test circuit. Used in conjunction with a 32A test set, depression of the red button operates the CA feature; depression of the white button controls the DSS or SS advance, depending on which key of the 32A test set is operated.
RCY	*Recycle:* A plug in this jack prepares the test frame for recycle calls.
RV	*Revertive:* This jack facilitates the adjustment of RV relay of the test circuit (SD-21026-02 only).
RVT	*Reversed Trunk:* To check function of auxiliary sender when an overflow or reversed trunk is encountered upon trunk test.
SK2	*Skip Two:* To check function of auxiliary sender on a 7- or 8-digit call requiring that the first and second digits of the office code be omitted during MF outpulsing.
SK3	*Skip Three:* To check function of auxiliary sender on a call requiring that the first three digits be omitted during MF outpulsing.

JACK	PURPOSE
SKP	***Slow Keypulse:*** To check that the sender will register slow keypulses correctly, by slowing the keypulse cycle of the test circuit. Also causes a current flow test to be made on the sender TM and RM relays, by changing the resistance of the circuit.
SP	***Slow Pulse:*** To test the stepper and counting relays for operation on slow revertive pulsing.
STP	***Stepper:*** To apply the readjust release requirement to the STP relay.
TDV	***Toll Diversion:*** To provide a test of the toll diversion feature.
TO, TO1	***Time-out:*** To provide time-out tests of auxiliary senders.
TR	***Test RS Relay:*** To make a current flow release test of the sender RS relay.
TT	***Test TS Relay:*** To make a current flow release test of the sender TS relay.
WO, WO1, WO2	***Wipe-out:*** To provide abandoned call conditions for tests of auxiliary senders.
ZLL	***Zero Loop No Leak:*** To provide special line conditions as an aid to detecting an open capacitor connected to the secondary winding of a polar L relay. Where provided, the HS MIN BR dial control jack should be used with the ZLL jack.
7DG	***7-Digit:*** To indicate that the test call is to be a 7- or 8-digit call requiring multifrequency outpulsing.

5.02 *Keys*

KEY	PURPOSE
A (0-9) B (0-9) C (0-9)	***Office Code:*** To set up the first, second, and third digits of the selected office code.
AD	***Advance:*** To manually advance the test circuit on a step-by-step basis, when the DSS key is operated.
APB	***Automatic Pass Busy:*** To cause the test circuit to automatically pass a busy sender after waiting a minimum period of 30 seconds.
ASB	***Auxiliary Senders Busy:*** Prevents the premature release of the busy condition placed on auxiliary senders during the all senders busy test.
B	***B Digit:*** To permit registering a 3-digit code when testing 3/2-digit senders.
CA	***Control Advance:*** To manually advance the test circuit to the next sender when the REP key is normal, or to cause another test to be started on the same sender if the REP key is operated. (See RC jack.)
CAN SY	***Cancel Synchronizing:*** To provide a test for falsely crossed contacts of the transfer relays of the decoder senders. All digits are registered before selections are checked.
CAP CI or CAP RCI	***Capacity Call Indicator:*** To add capacity to the fundamental circuit and to check that the sender grounds the FT and FR leads between pulses to discharge the cable loop.
CLASS (R1 to 27) CLASS (0 to 19)	***Class Control:*** To control the class of call as shown in the following table:

SD-21186-01 CLASS KEY	SD-21026-01 AND SD-21026-02 CLASS KEY	CLASS OF CALL
1	0	Full Selector
2	1	Incoming Overflow
3	2	Office Overflow — FS or PCI (preferably FS)
4	3	Permanent Signal
5	4	Special Service Operator
6	5	3-Digit Operator
7	6	Unassigned Code and Restricted Service
8	7	Late Release — FS
9	8	Register Control Test — FS
10	—	Full Selector — High 5 Incoming Group Crossbar "B" Unit
13	9	PCI Direct — Below 10,000 Without Stations
13	10	PCI Direct — Below 10,000 With Stations
13	11	PCI Direct — Above 9999 Without Stations
13	12	PCI Direct — Above 9999 With Stations
20	13	PCI Tandem — Below 10,000 Without Stations
20	14	PCI Tandem — Below 10,000 With Stations
20	15	PCI Tandem — Above 9999 Without Stations
20	16	PCI Tandem — Above 9999 With Stations
14	17	PCI Direct — Release — Nondistant Office Selector
15	18	PCI Direct — Release — Distant Office Selector

SD-21186-01 CLASS KEY	SD-21026-01 AND SD-21026-01 CLASS KEY	CLASS OF CALL
16	19	PCI Tandem to 3-Digit Operator
19	—	Early Release — Operator Straightforward Through Crossbar Tandem
21	—	3-Digit Operator Through Distant Office
22	—	Time-out — Keypulsing "A"
23	—	Operator's Error — Office Selector Trunk
24	—	Operator's Error — Tandem District Trunk
25	—	Operator's Error — Incoming Selector

Note: Operate the R key, where provided, in each row of class keys in which no other key is operated.

KEY	PURPOSE
CR OFF (0-1600)	***Compensating Resistance—Office:*** To provide, with the sender compensating resistance for the code used, the desired resistance in the fundamental circuit for office selections. (See 6.07.)
CR BEY OFF (0-1600)	***Compensating Resistance — Beyond Office:*** To provide, with the sender compensating resistance for the code used, the desired resistance in the fundamental circuit for selections beyond office. (See 6.07.)
CTG	***Cancel TG Test:*** To provide a test for the presence of a false pulse in the sender during or after trunk test and preceding incoming group selection.

KEY	PURPOSE
DB (0-4)	***District Brush:*** To set up the district brush selection as required for the office code used.
DG(0-9)	***District Group:*** To set up the district group selection as required for the office code used.
DPL B	***Dial Pulse — B:*** To provide dial pulses having the longest allowable open period.
DSS	***Dial Step-by-Step:*** To pulse each digit into the sender on a step-by-step basis under control of the AD key.
DT	***Dial Tone:*** To connect the dialing loop to a test receiver for checking dial tone.
DTA	***Dial Tone Advance:*** To provide for advancing the test circuit for completion of a normal test call, after dial tone has been checked.
FC	***Free Call:*** To test a coin sender for a free call or a noncoin call.
GR-	***Group:*** To stop the test circuit after it has tested the last sender in a group for which the test circuit was prepared. (See Part 3, Step 13f.)
H(0-9)	***Hundreds:*** To set up the hundreds digit of a called number.
HLV	***High Level:*** To provide a simulated strong signal condition on TOUCH-TONE calls.
IND DIG	***Index Digit:*** To permit the check of digit 8 as the A code digit when testing 3/2-digit senders arranged for this feature (SD-21026-01 only).
KPA	***Keypulsing "A":*** To permit the testing of KP "A" switchboard senders. Causes the dial control switch to remain normal while the KPA switch is advanced.
LC (O, FT, FR, FT/FR, CC1-O, CC1-NO, Z-O, FTA-NO, FTA-O)	***Link Class:*** To set up a class-of-service or class-of-trunk indication in the sender. (See 6.08.)
LLV	***Low Level:*** To provide simulated high loss line signals on TOUCH-TONE tests.
LP	***Lamp:*** To connect battery for lighting the progress lamps.
M1/M2	***Master Selector:*** To manually advance the master selectors for connecting to a sender selector.
MAX LINE	***Maximum Line:*** To add 1000 ohms to the dialing loop for a severe test of the subscriber sender dial pulsing circuit.
MHF	***Maximum High Frequency:*** This feature provides TOUCH-TONE frequencies to be generated at 1.5 percent above nominal frequency.
MIN B or MIN LINE B	***Minimum Line — B Dial Pulse:*** To connect the B dialing interrupter on a minimum loop for a severe test of the subscriber sender dial pulsing circuit of senders equipped with L24 type L relays.
MIN CI	***Minimum Call Indicator:*** To provide a sensitive marginal MG relay for use with a maximum nonuniversal service loop or a maximum service loop with universal pulsing (SD-21026-01 only).
MLF	***Maximum Low Frequency:*** This feature provides TOUCH-TONE frequencies to be generated at 1.5 percent below nominal frequency.
MTG	***Marginal Trunk Guard:*** To check the marginal trunk guard relay in the sender.
ND	***No District:*** To cause the checking switch to omit the check of district brush and group selections.

KEY	PURPOSE
OB (0-9)	*Office Brush:* To set up the office brush selection as required for the office code used.
OG (0-9)	*Office Group:* To set up the office group selection as required for the office code used.
PAS (0-9)	*Particular Auxiliary Sender:* To select a particular auxiliary sender. ***Caution: When a test requires the operation of one of these keys, all available auxiliary senders are made to appear busy for a short interval during each test.***
PC	*Particular Circuit:* To permit the manual operation of the master and sender selectors for connecting to a particular sender.
PF 0	*Prefix 0:* Provides for dialing a zero digit before dialing the A digit of area or office code.
PF 1	*Prefix 1:* Provides for dialing a one digit before dialing the A digit of area or office code.
PL LP	*Pulse Lamp:* To light lamps indicating the number of revertive pulses which actually were sent to the sender to satisfy a particular selection.
PP	*Preliminary Pulse:* To cancel the sending of a preliminary pulse.
PSS	*Pulsing Step-by-Step:* When making TOUCH-TONE tests, this key operated provides for pulsing one digit at a time, using a 32A test set.
REP	*Repeat:* To enable the test circuit to make an indefinite number of repeat tests on a sender.
REP 2	*Repeat 2:* To enable the test circuit to make two tests on a sender before advancing. With test circuit SD-21026-01, the REP key must also be operated.
REP 4	*Repeat 4:* To enable the test circuit to make four tests on a sender before advancing. The REP key must also be operated.
RL	*Rotary Link:* To permit the testing of rotary link type senders where the test circuit has access to rotary link type and panel link type senders.
RTG	*Release Trunk Guard:* To change the TG operate test to a soak before release test. (SD-21026-01, Fig. S only.)
S or SS	*Sender Selector:* To manually advance the sender selectors to a particular sender.
SA	*Step Advance:* To manually advance the test circuit selections on a step-by-step basis, when the SS key is operated.
SCG	*SC Ground:* To check the ability of the sender to connect 5-ohm ground to the SC lead on an abandoned call.
SD	*Stations Delay:* To test the sender for the stations delay feature.
SFT	*Special Frequency Test:* When making TOUCH-TONE test, this feature causes two single-frequency tones and four triple-frequency tones to be outpulsed before outpulsing a 7- or 10-digit test call.
SGT NO	*SGT Nonoperate:* To make a nonoperate test of the sender SGT relay.
SGT OPR	*SGT Operate:* To make an operate test of the sender SGT relay.
SKO	*Skip Office:* To cause the checking switch to omit the check of office brush and group selections.
SL	*Sender Lamp:* To check for the proper functioning of the sender lamps and to check the release of the sender when primed.
SLP	*Slow Pulse:* To provide simulated extremely slow digit keying by customer on TOUCH-TONE tests.

KEY	PURPOSE
SM	*Sender Monitor:* To permit the handset at the test frame to be connected to the call circuit to the trouble supervisory position.
SP	*Slow Pulse:* To test the sender counting relays for operation on slow revertive pulsing.
SS	*Step by Step:* To advance the test circuit for selections on a step-by-step basis under control of the SA key.
SSA	*Stuck Sender Assignment:* To check the ability of the sender to connect 5-ohm or high-resistance ground on a stuck sender on CI class of call in awaiting assignment position.
ST	*Start:* To start the test circuit.
STAT-OT or STAT-TTD (O-M)	*Stations and Ten Thousands:* To set up the fifth digit or station letter of a called number.
STP	*STP Relay Test:* To apply the readjust release requirement to the STP relay.
T (0-9)	*Tens:* To set up the tens digit of a called number.
TA	*Time Alarm:* To prevent the test circuit from timing or to retire the test circuit time alarm.
TG AH	*Trunk Guard Await Hundreds:* To permit testing senders which delay trunk test until thousands and hundreds digits are dialed, where the same test circuit tests senders which delay trunk test only until thousands digit is dialed. (SD-21026-01 only.)
TGO	*TG Operate:* To provide a fast operation test of the sender TG relay on a CI class of call.
TH or TD (0-9)	*Thousands:* To set up the thousands digit of a called number.

KEY	PURPOSE
TR-AD	*Timed Release — After Dialing:* To check for the premature or delayed application of 5-ohm ground and high-resistance ground to the sender SC lead on a stuck sender without distant office selections after all digits have been dialed.
TR-DO	*Timed Release — Distant Office:* To check for the premature or delayed application of 5-ohm ground and high-resistance ground to the sender SC lead on a stuck sender with distant office selections after all digits have been dialed.
TR-PD	*Timed Release — Partial Dial:* To check for the premature or delayed application of 5-ohm ground to the SC lead after only three digits have been dialed.
TR-PD1	*Timed Release — Partial Dial One Digit:* To check for premature or delayed routing to permanent signal after one digit has been dialed.
TR-PS	*Timed Release — Permanent Signal:* To check for premature or delayed routing to permanent signal before dialing any digits.
TS (0-3, 0G,1G,0H, 1H,0L,1L)	*Talking Selection:* To set up the talking selection as required by the office code and class of call used. (See 6.06.)
TT	*TOUCH-TONE:* To provide for outpulsing each TOUCH-TONE signal at rate of 11 ±1 pps.
TTN	*TOUCH-TONE Nominal:* To provide for outpulsing TOUCH-TONE signals at rate of 7-pps.
U (0-9)	*Units:* To set up the units digit of a called number.
1-1	*One-One:* To cause a one-one prefix to be dialed into the sender.

5.03 ***Lamps***

LAMP	INDICATION
A,B,C	***Office Code (Dial Progress):*** The first, second, or third digit of the office code is being pulsed into the sender.
A or TH B or TT C or TU	A or Tandem Hundreds B or Tandem Tens C or Tandem Units — (MF and PCI Progress) : The first, second, or third digit of the office code pulsed out by the sender is being checked.
ADA,ADB, ADC	***Area Code A,B,C (Dial Progress):*** The first, second, or third area code digit is being dial pulsed into the sender.
AMA,AMB, AMC	***Area Code A,B,C (MF Progress):*** The first, second, or third area code digit is being MF outpulsed.
AST	***Auxiliary Sender Test:*** A special test is being made of an auxiliary sender.
COIN	***Coin:*** A test is being made of a coin sender.
DB	***District Brush:*** The district brush selection is being checked.
DG	***District Group:*** The district group selection is being checked.
DT	***Dial Tone:*** The dial tone circuit is in position for the listening test.
EC	***End of Cycle:*** The last sender to which the test circuit has access has been tested satisfactorily.
FB	***Final Brush:*** The final brush selection is being checked.
FG	***False Ground:*** Fundamental circuit falsely crossed or grounded previous to talking selection.
FP	***False Pulse:*** Multifrequency outpulsing has not been canceled immediately in an auxiliary sender when a call has been abandoned during multifrequency outpulsing.

KEY	PURPOSE
FR	***Fundamental Ring:*** Lights with the TS lamp and is extinguished when the test circuit checks ground on the FR lead from the sender operated FO relay, following talking selection. The following table indicates the significance of the various combinations of the TS, SC-REL, FR, and LD lamps, with the check sequence switches in the talking selection position.

R2 SEQ. SW. POS.	LAMPS LIGHTED TS	SC-REL	FR	LD	FAILURE INDICATED
15	X		X		Open Tip
16	X	X	X		SC not released
16	X		X	X	SC slow release
17	X	X	X		False ground on Tip
17	X		X	X	Talking selection or open FR lead
17	X			X	Talking selection
17				X	Link dismissal

LAMP	INDICATION
FT	***Final Tens*** The final tens selection is being checked.
FU	***Final Units:*** The final units selection is being checked.
G	***Ground:*** Lights momentarily after district brush selection if ground is checked on sender FR lead when testing for zone registration with the TS-0G or TS-1G key operated.
GR	***Group:*** The test is stopped awaiting the resetting of the control keys and restoring of the group key which blocked the test circuit.

KEY	PURPOSE
H	***High-Resistance Battery:*** Lights momentarily after district brush selection if 580- ohm battery is checked on the sender FR lead when testing for zone registration with the TS-0H or TS-1H key operated.
H	***Hundreds (Dial Progress):*** The hundreds digit is being pulsed into the sender.
H	***Hundreds (MF and PCI Progress):*** The hundreds digit pulsed out by the sender is being checked.
IA	***Incoming Advance:*** The incoming advance feature of the sender is being checked.
IB	***Incoming Brush:*** The incoming brush selection is being checked.
IG	***Incoming Group:*** The incoming group selection is being checked.
IMP	***Impulser:*** The complete set of PCI pulses from the sender have not been received during the time allowed by the test circuit.
IND DIG	***Index Digit:*** The index digit (8) is being dialed when testing 3/2-digit senders with the IND DIG key operated.
IT	***Intersender Timing:*** The intersender timing feature in one or more groups of subscriber senders is activated.
KC	***Key Code:*** The office code is being registered on KP "A" senders.
KN	***Key Number:*** The numerical digits are being registered on KP "A" senders.
KP	***Keypulse:*** Awaiting keypulse or gate opener signal.
L	***Low-Resistance Battery:*** Lights momentarily after district brush selection if 580-ohm battery is checked on the sender FR lead when testing for zone registration with the TS-0H or TS-1H key operated.

LAMP	INDICATION
LD	***Link Dismissal:*** Lights after release test of sender SC relay and is extinguished when test circuit receives low-resistance battery on SC lead for dismissing the link. (See FR lamp.)
MATCH (0-9)	***Match:*** The selection number required or, on a CI call, the digit dialed or keyed.
MR	***Message Registration:*** Failure to check ground, high-resistance battery, or low-resistance battery, on the sender FR lead for zone registration, when testing senders wired for this feature. Lights momentarily after district brush selection if proper indication is received.
MTG NO	***MTG Nonoperate:*** The sender MTG relay is operated during its nonoperate test.
MTG O	***MTG Operate:*** An operate test of the sender MTG relay is being made.
OB	***Office Brush:*** The office brush selection is being checked.
OF	***Overflow:*** Failure of the sender AV1 relay to operate within its allowable period during fundamental test, or failure of the sender OF or AV1 relay to operate during overflow tests.
OFN	***OF Nonoperate:*** The OF relay has operated on the nonoperate test.
OG	***Office Group:*** The office group selection is being checked.
P(0-9)	***MF Pulse:*** The multifrequency digit actually registered by the MF adapter circuit.
PCI(0-9)	***PCI Check:*** The digit pulsed by the sender on a PCI call.
PTF	***Pulse Time Failure:*** Failure of the test circuit MF adapter pulse timing circuit.

KEY	PURPOSE
PULSE (0-9)	***Pulse Check:*** The actual number of revertive pulses sent to the sender for the selection being made when the failure occurred.
RBT	***Reverse Battery Test:*** Failure on reverse battery test when testing KP "A" senders on operator straightforward class through distant office selector.
S	***Synchronizing:*** The sender has closed the fundamental circuit prematurely.
SB	***Sender Busy:*** The test circuit is connected to a busy sender.
SC	***SC Relay:*** Failure of the sender SC relay to respond to the operate test.
SCG	***SC Ground:*** Failure of the subscriber sender to place a 5-ohm ground on the SC lead when the sender has timed out on a stuck sender after the AV1 relay has operated, with the SCG key operated.
SCM	***SC Marginal:*** Failure of the KP "A" sender to place a 5-ohm ground on the SC lead for advancing the district or trunk into reorder position.
SC REL	***SC Relay Release:*** A check is being made for release of the sender SC relay. (See FR lamp.)
SD	***Stations Delay:*** A check is being made of the sender stations delay timing.
SDR NOR	***Sender Normal:*** Awaiting the return of the sender to normal.
SFT	***Special Frequency Test:*** The test frame is making a special frequency test in regard to TOUCH-TONE calling prior to outpulsing a 7- or 10-digit test call.
ST	***Start Signal:*** Awaiting the MF start pulse after outpulsing of last numerical digit by auxiliary sender.

LAMP	INDICATION
STA	***Station (Dial Progress):*** The station digit is being pulsed into the sender.
STA	***Station (MF and PCI Progress):*** The station digit pulsed out by the sender is being checked.
T	***Tens (Dial Progress):*** The tens digit is being pulsed into the sender.
T	***Tens (MF and PCI Progress):*** The tens digit pulsed out by the sender is being checked.
TA	***Time Alarm:*** The test of a particular sender was not completed in the allowable time.
TC	***Trunk Closure:*** Failure to check trunk closure. Also checks minimum release time of sender TC1 relay on a full selector call.
TDR	***Toll Diversion Reversal:*** Satisfactory detection of the subscriber sender's ability to reverse the dialing tip and ring at dialing completion.
TG	***Trunk Guard:*** Failure of the sender to complete trunk test within the allotted time, probably due to failure of the TG relay to respond to the operate test.
TGT	***Trunk Guard Test:*** An open during trunk test or premature trunk closure when testing KP "A" senders on operator straightforward class through district office selector or crossbar tandem.
TH or TD	***Thousands (Dial Progress):*** The thousands digit is being pulsed into the sender.
TH or TD	***Thousands (MF or PCI Progress):*** The thousands digit pulsed out by the sender is being checked.
TOI	***Time-out Intersender:*** Lights from trunk closure to intersender timing time-out on intersender timing tests.

LAMP	INDICATION
TS	***Talking Selection*** Talking selection is being checked. (See FR lamp.)
TT	***TOUCH-TONE:*** Indicates test circuit prepared to originate a TOUCH-TONE call.
TTH or TTD	***Ten Thousands (Dial Progress):*** The ten thousands digit is being pulsed into the sender.
U	***Units (Dial Progress):*** The units digit is being pulsed into the sender.
U	***Units (MF and PCI Progress):*** The units digit pulsed out by the sender is being checked.

5.04 ***Switches***

SWITCH	INDICATION
ACA ACB ACC	Provides for dialing and checking MF outpulsing of the area code digits.

6. PREPARATION OF TEST CHART

6.01 Complete the test chart to show the test circuit keys to be operated for each test as directed in Table A and the following paragraphs.

6.02 Select ACA, ACB, and ACC jacks, if equipped, or select positions of ACA, ACB, and ACC switches, if equipped, to provide the area code required for each 10-digit call.

6.03 Select A, B, and C keys for office code digits to provide the type of routing required for each test. When testing 3/2-digit senders with a 2-digit code, one key should be operated in the A and C rows, and on test circuit SD-21186-01, if the call is routed through panel sender tandem, also operate the O key in the B row.

6.04 Select the following jacks or keys as required by the office code used: B, IND DIG, MTG, 1-1, TDV jack, PF0, PF1.

6.05 Select DB- and DG- or ND keys, OB- and OG- or SKO keys, to conform with the routing of the office code selected unless otherwise stated in Table A or the test chart.

6.06 Select a TS- key corresponding to the talking selection of the selected code unless otherwise stated in Table A or the test chart. For KP "A" senders operate the TS-O key on all calls. When testing subscriber senders arranged for zone registration and which apply ground, high-resistance battery, or low-resistance battery to the FR lead during district group selections, operate a key in accordance with the following table to check for the proper talking selection and zoning feature.

TS KEY	TALK. SEL.	TEST FRAME LAMP	FR LEAD
0G	0	G	Ground
1G	1	G	Ground
0H	0	H	580-ohm BAT
1H	1	H	580-ohm BAT
0L	0	L	52.5-ohm BAT
1L	1	L	52.5-ohm BAT

6.07 Select CR OFF- and CR BEY OFF- keys to provide, with the compensating resistance in the sender, the desired total resistance in the fundamental circuits. These totals will be 900 ohms and 1600 ohms on alternate calls unless otherwise stated in Table A or the test chart. When a more stringent STP relay operate test is required, operate CR BEY OFF key 1600 and select an office code for a full selector call which requires that the subscriber sender provide 900 ohms beyond office compensating resistance.

6.08 Select LC- keys to test all classes of service when testing subscriber senders. The O, CC1-O, CC1-NO, and Z-O keys should be used for subscriber senders equipped with a Z and a CC1 relay in the FT lead, and the O, FT, FR, and FT/FR for subscriber senders equipped with an FT and an FR relay in the FT and FR leads, respectively. For KP "A" senders, the type of trunk condition is registered as shown in the following table.

KEY	KP SENDER ROUTING
O	Trunks to District Selectors
FT	Trunks to Incoming Selectors
FR	Trunks to Distant Office Selectors and Crossbar Tandem
FT/FR	Trunks to Panel Sender Tandem
FTA-NO	Trunks to Crossbar "B" Office (High Five IG Sel.)
FTA-O	Trunks to Crossbar "A" Office

Note: When the KP "A" senders are arranged for direct operator routing to two crossbar units within a common trunk group, the FT key provides an operate test of the FTB relay, the FTA-NO key provides a nonoperate test of the FTA relay, and the FTA-O key provides an operate test of the FTA relay.

6.09 When testing subscriber senders and a specific jack is not shown on the test chart, select a dial pulse control jack, where provided, to apply all of the various tests to the sender pulsing circuit. If the test circuit is arranged to test senders equipped with different types of L relays, select the proper pulsing jack for the type of L relay under test. The DPL B, MAX LINE, and MIN B or MIN LINE B keys, where provided, should be operated to perform special tests of the sender pulsing circuit. The MAX LINE key is used on senders equipped with L1 or L24 type L relays and the MIN B or MIN LINE B key is used on senders equipped with the L24 type L relay.

6.10 When provided, CTR key of the subscriber and the auxiliary sender should be operated (pulled out) unless otherwise stated in Table A or the test chart. This will prevent the sender from releasing when a failure occurs while testing.

TABLE A

TEST	SELECTION OF TEST CIRCUIT KEYS
A	Select office codes to check each used numerical on A, B, and C keys and each OB, OG, DB, and DG selection. Select numerical digits to insure coverage of all possible combinations of registration. Vary the dial speed and select the proper pulsing jacks or keys, for the type of sender under test, to apply all of the various test conditions to the sender pulsing circuit. The ZLL jack has been provided and should be included in some cycles of these tests, when testing senders equipped with L relays of the 239- or 280-type. Where provided, the HS MIN BR dial control jack should be used with the ZLL jack. A proportionate amount of codes using the MTG relay should be selected, and the sender test circuit MTG key operated, to check the operating characteristics of the sender MTG relay.
B	Select an office code for a full selector call to a panel or crossbar office. For Test 2 select a code requiring a CR BEY OFF- key other than 1600. Use Test 3 to check the OF relay for adjustment and sticky back contact.
C	Select office codes as follows: *Test 4:* Select an office code for a full selector call to a panel crossbar office. *Test 5:* Select an office code for a call to a PCI office. When sender test circuit SD-21186-01, Fig. AE, or SD-21026-01, Fig. AM, is provided, this test should be used to detect false rotation of the sender impulser switch on an overflow call. *Test 6:* Use this test to detect falsely crossed contacts of the transfer relays of the decoder senders. Select office codes to obtain DB0 and DB3, DG0, OB0, and OG0 selections, using several FS or PCI codes, if necessary. Use numerical keys 3333 and 9999 with each code selected. (Operate the STAT (0) key on test frames equipped with the relay interrupter circuit.) ***Note:*** The (SKO) key should be operated when making office overflow tests, if required, by the code used.
D	Operate the proper selection control keys for a permanent signal call. If the TR-PS key is provided, make the permanent signal test as outlined in Test 83.
E	When sender test circuit SD-21186-01, Fig. AE, or SD-21026-01, Fig. AK, is provided, Test 9 should be used to detect premature link dismissal.
F	Select a code for a call direct to a 3-digit operator.
G	Select a restricted office code and a class of service to which it is restricted.
H	Select an unassigned (vacant) office code. Use Test 12 when senders require numerical digits to be dialed. Use Test 13 when senders do not require numerical digits to be dialed.
I	Select an office code for a full selector call to a panel or crossbar office.
J	Select an office code for a full selector call to a panel or crossbar office. Use Test 15 when the sender test circuit is equipped with the 170A precision interrupter. Use Test 16 when the sender test circuit is equipped with the capacitor timed relay interrupter circuit.

TEST

TABLE A (Cont)

SELECTION OF TEST CIRCUIT KEYS

K Select an office code for a full selector call to the "B" crossbar office of a common multioffice trunk group.

L Select office codes for PCI direct calls which will provide the following tests of the sender:

(a) Test of no stations delay. Tests 18 through 27. SD key must be normal.

(b) Test of stations delay, no fifth digit dialed. Tests 18 through 27. Operate SD key when testing subscriber senders.

(c) Test of stations delay, fifth digit dialed. Tests 28 through 31 are for calls arranged for party letters; Tests 32 through 41 are for calls to offices with numbers above 9999; Tests 42 through 46 are for calls to offices with numbers above 10,499. Operate the SD key when testing subscriber senders.

Note: Numerical digits have been preselected to insure coverage of all possible combinations of registration and CI pulsing. When making PCI tests, the PCI jack, where provided, may be used to connect the sender test circuit to an amplifier and associated pen register for checking PCI outpulsing. The RTG key, where provided (SD-21026-01, Fig. S only), should be operated on a proportionate amount of PCI tests to check the release feature of the sender TG relay.

M Select office codes for PCI tandem calls which will provide the following tests of the sender:

(a) Test of no stations delay. Test 47. SD key must be normal.

(b) Test of stations delay, fifth digit dialed. Test 47. Operate the SD key when testing subscriber senders.

(c) Test of stations delay, fifth digit dialed. Test 48 is for calls arranged for party letters; Test 49 is for calls to offices with numbers above 9999; Test 50 is for calls to offices with numbers above 10,499. Operate the SD key when testing subscriber senders.

Note: When making successive cycles of Tests 47 through 50, the combination of numerical digits which can be used are as shown for PCI direct calls. When making PCI tests, the PCI jack, where provided, may be used to connect the sender test circuit to an amplifier and associated pen register for checking PCI outpulsing. The RTG key, where provided (SD-21026-01, Fig. S only), should be operated on a proportionate amount of PCI tests to check the release feature of the sender TG relay.

N Test 51 requires a PCI direct code not requiring distant office selections. Test 52 requires a PCI direct code through a 2-wire office or crossbar tandem or a PCI tandem code. Operate the SD key when testing subscriber senders.

O Select a code for a call through PCI tandem to a 3-digit operator. Select a CR BEY OFF- key to provide, with the compensating resistance in the sender, a total of 900 ohms in the fundamental.

P Select an office code for a call to a PCI direct or PCI tandem office requiring 0 ohms beyond office compensating resistance in the sender and operate the CR BEY OFF 1300 key. If no such code is available, select a code requiring the least compensating resistance in the sender and select a CR BEY OFF- key to provide a total of 1300 ohms in the fundamental. Operate the proper class key for the type of PCI call selected.

TABLE A (Cont)

TEST	SELECTION OF TEST CIRCUIT KEYS
Q	Select office codes for PCI direct or PCI tandem calls to provide the following conditions: *Test 55:* A stations or fifth numerical digit is dialed. Operate SD key when testing subscriber senders: *Test 56:* Sender awaits a stations or fifth numerical digit which is not dialed. Operate SD key when testing subscriber senders. *Test 57:* A stations digit is not dialed and the sender does not await the digit. SD key must be normal. *Note:* Operate the proper class key for the type of PCI call selected.
R	Select routes which are available to the KP operator for each of the following conditions: *Test 58:* Using a district selector and requiring the registration of an office code and numerical digits. *Test 59:* Using an incoming selector and requiring registration of numerical digits only. *Note* Where KP senders are arranged for direct operator trunks to two crossbar units within a common multioffice trunk group, the FTA-NO and FTA-O keys should be used on this test to check this feature (See 6.08). *Test 60:* Using a distant office selector or crossbar tandem trunk and requiring the registration of an office code and numerical digits. *Test 61:* Using a panel sender tandem trunk and requiring the registration of an office code and numerical digits.
S	Select an office code for a full selector call to a panel or crossbar office which is available to the KP operator. *Note:* Numerical digits have been preselected to insure coverage of all variations of battery and ground pulsing.
T	Select a code for an operator straightforward call routed through crossbar tandem. This test is provided for testing KP senders in offices where the office selectors are not arranged to send reverse battery from overflow or telltale positions.
U	Select a code for a call to a 3-digit operator on which the KP operator routes through crossbar tandem.
V	Select an office code which is available to the KP operator.
W	Select an office code for a full selector or PCI call which requires district selections and is available to the KP operator.
X	Operate any key in the TH, H, T, and U rows.

TABLE A (Cont)

TEST	SELECTION OF TEST CIRCUIT KEYS
Y	Operate any key in the TH, H, T, U, and STAT rows.
Z	Select an office code to the extended area. Operate a TPCI test class key which is appropriate for the stations delay used on the extended area routing.
AA	Select an office code for a full selector call to a panel or crossbar office.
AB	Select an office code for a full selector call to a panel or crossbar office. Select a CR BEY OFF- key to provide, with the compensating resistance in the sender, a total of 900 ohms in the fundamental.
AC	Select a code for a full selector call to a panel or crossbar office which requires the operation of the sender MTG relay.
AD	Select an office code which requires operation of the sender TG relay and does not require distant office selections.
AE	Select an office code for a full selector code which does not require distant office selections.
AF	Select an office code which requires diversion of restricted PBX traffic.
AG	This test may be made separately, as shown on the test chart, or in conjunction with any test call. If made in conjunction with any test call, the DTA key must be operated momentarily to advance the test circuit after dial tone is received. *Note:* Use MAX LINE key where the sender test circuit is equipped with the 170A precision interrupter circuit.
AH	Select a test code if one is available, otherwise, select an unassigned (vacant) code.
AI	Tests 83, 84, and 85 — Make these tests when using sender test circuit SD-21186-01 to test senders arranged for timed release and arrange tests as follows: (a) Tests 83 and 84 — Operate the proper selection control and compensating resistance keys for a permanent signal call. (b) Test 85 — Select an office code for a full selector call to a panel or crossbar office. Tests 86, 87, and 88 — Make these tests when using sender test circuit SD-21186-01 equipped with timed release test feature to test senders arranged for automatic priming after time-out and arrange tests as follows: (a) Tests 86 and 87 — Operate the proper selection control and compensating resistance keys for a permanent signal call. (b) Test 88 — Select an office code for a full selector call to a panel or crossbar office. Tests 89, 90, and 91 — Make these tests when using sender test circuit SD-21026-01, SD-21026-02, or SD-21186-01 equipped with SL key, to test senders arranged for automatic priming after time-out and arrange tests as follows:

TABLE A (Cont)

TEST	SELECTION OF TEST CIRCUIT KEYS
	(a) Tests 89 and 90 — Operate the proper selection control and compensating resistance keys for a permanent signal call.
	(b) Test 91 — Select an office code for a full selector call to a panel or crossbar office.
AJ	Tests 92, 93, and 94 — Make these tests when using sender test circuit SD-21186-01 to test senders arranged for timed release and arrange tests as follows:
	(a) Test 92 — Select an office code for a full selector call to a panel or crossbar office which does not require distant office selections.
	(b) Test 93 — Select an office code for a full selector call to a panel or crossbar office which requires distant office selections.
	(c) Test 94 — Select an office code for a PCI call which does not require distant office selections. Operate the proper class key for the type of PCI call selected.
	Tests 95, 96, and 97 — Make these tests when using sender test circuit SD-21186-01 equipped with timed release test feature to test senders arranged for automatic priming after time-out and arrange tests as follows:
	(a) Test 95 — Select an office code for a full selector call to a panel or crossbar office which does not require distant office selections.
	(b) Test 96 — Select an office code for a full selector call to a panel or crossbar office which requires distant office selections.
	(c) Test 97 — Select an office code for a PCI call which does not require distant office selections. Operate the proper class key for the type of PCI call selected.
	Test 98 — Select an office code for a full selector call with or without office selections.
AK	Select an office code for a full selector or PCI call with or without office selections.
AL	Select an office code for a full selector call to a panel or crossbar office.
AM	Select an office code, which is available to the KP operator, for a full selector call to a panel or crossbar office.
AN	Select an office code for a full selector call to a panel or crossbar office or a PCI direct call with stations delay C. Operate the MAX LINE key when the sender test circuit is not equipped for extended coin range. When the MAX LINE key is used on sender test circuits equipped with the capacitor timed relay interrupter circuit, the HS MIN BR dial control jack must be used.
AO	Select area and office codes as follows:
	(a) Tests 200 through 209, select area codes such that each ACA, ACB, and ACC numeral is checked.
	(b) Test 210, select area and office codes to route the call on a 10-digit skip 3 basis.
	Note: A, B, C, TH, H, T, and U digits have been preselected to insure coverage of all possible combinations of registration and MF pulsing in the auxiliary sender. Included are those combinations which would be encountered on a 7-digit option.

TABLE A (Cont)

TEST **SELECTION OF TEST CIRCUIT KEYS**

AP Select office codes which will cause the marker to route the call for the desired pulsing condition as follows:

	TEST NO.	DIGITS PULSED MF	REMARKS
(a)	211	7	No Skip — Tandem Route
(b)	212	8	Manual Office With Party — Tandem Route
(c)	213	5	7-Digit Skip 2 — "C" Directing Digit
(d)	214	4	7-Digit Skip 3 — Direct Route

AQ to AV Select area and office codes typical of 10-digit calls which use auxiliary senders.

AX Select area codes which are wired as compressed codes in the 3-digit code compressor circuit.

AY Select area codes which are wired as compressed codes in the 3-digit code compressor circuit. Furnish office and district selections for routing established for code when all compressors are made to appear busy.

AZ Select a typical 3-digit operator code.

BB Select any office or area code.

BC Select an office or area code requiring the use of a prefix one.

BD Select any 7 or 10 digit test call. Arrange successive test calls so that digits 0-9 will be used at least once and in an order that will use all 5 units of each 2-out-of-5 digit register in the TOUCH-TONE converter circuit. For example, three 7-digit calls, using numericals 3570, 4219, and 8061 will check the fourth, fifth, and sixth digit registers in the TOUCH-TONE converter circuit.

BE Set sender test frame for a PCI tandem call. If possible, use digit 3, 6, or 8 for first digit of office code to provide a light positive pulse in the first quadrant.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER SS	KP	AS	A	B	C	TD TH	H	T	U	TTD STAT	DB	DG	OB	OG	TS	COMP RES. OFF	BEY OFF	CLASS KEY ~~SD-21186-01~~	SD-21026 -01, -02	LC	DIAL CONT.	*MISC.
						6	2	4	1	1	1	1	0	4	2	—	—	0	SKO	900	—	0			—
A	1	Full Selector Call	X			7	2	3	0	0	0	0	0	0	0	—	—	0	SKO	0	~~1~~	0			MTG
B	2	Incoming Overflow	X	X					0	0	0	0						3			2	1			
	3		X	X					0	0	0	0						3		1600	2	1			
C	4	Office Overflow	X	X					0	0	0	0						3			3	2			
	5		X	X					3	3	6	9						3			3	2			
	6		X	X														3			3	2			CAN SY
D	7	Permanent Signal	X			1	0	0	0	0	0	0						3	SKO	0	4	3			
E	8	Special Serv Operator	X			0	0	0	0	0	0	0									5	4			
	9		X			0	0	0	0	0	0	0									5	4			SP
F	10	3-Digit Operator	X	X			1	1	0	0	0	0									6	5			
G	11	Restricted Service	X						0	0	0	0									7	6			
H	12	Unassigned Code	X						0	0	0	0									7	6			
	13		X						N	N	N	N									6	5			
I	14	Late Rel — Full Selector Call	X	X					9	9	9	9									8	7			
J	15	Register Cont — Full	X						0	0	0	0									9	8			DPL B, MAX LINE
	16	Selector Call	X						0	0	0	0									9	8		HS MAX	
K	17	Full Selector — High Five	X						9	9	9	9									10	0			IGT jack on SD-21026-01, -02
		Inc Grp																							
L	18	PCI Direct Call	X	X					0	1	2	3	0								13	9		Note 1	
	19		X	X					9	0	1	2	0								13	9		"	
	20		X	X					6	6	8	9	0								13	9		"	
	21		X	X					7	8	9	0	0								13	9		"	
	22		X	X					8	9	0	1	0								13	9		"	
	23		X	X					5	4	7	6	0								13	9		"	
	24		X	X					4	3	6	7	0								13	9		"	
	25		X	X					3	2	5	4	0								13	9		"	

* Operate KPA key when testing KP "A" senders.
Note: N denotes key normal.

Note 1: Insert 184B plug into HS MAX dial control jack when test circuit is equipped with capacitor timed relay interrupter circuit.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER SS	KP	AS	A	B	C	TD TH	H	T	U	STAT	DB	DG	OB	OG	TS	COMP RES. OFF	BEY OFF	CLASS KEY SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	*MISC.
L	26		X	X					2	7	4	5	0								13	9		Note 1	
(Cont)	27		X	X					1	5	3	8	0								13	9		"	
	28		X	X					1	2	3	4	J								13	10		"	
	29		X	X					2	3	4	5	M								13	10		"	
	30		X	X					3	4	5	6	R								13	10		"	
	31		X	X					4	5	6	8	W								13	10		"	
	32		X	X					0	4	9	5	1								13	11		"	
	33		X	X					0	3	0	1	1								13	11		"	
	34		X	X					0	0	1	2	1								13	11		"	
	35		X	X					0	1	2	3	1								13	11		"	
	36		X	X					0	2	3	4	1								13	11		"	
	37		X	X					0	4	5	0	1								13	11		"	
	38		X	X					0	3	6	9	1								13	11		"	
	39		X	X					0	0	8	7	1								13	11		"	
	40		X	X					0	1	7	8	1								13	11		"	
	41		X	X					0	2	4	6	1								13	11		"	
	42		X	X					0	9	8	9	1								13	12		"	
	43		X	X					0	8	5	6	1								13	12		"	
	44		X	X					0	5	6	7	1								13	12		"	
	45		X	X					0	6	7	8	1								13	12		"	
	46		X	X					0	7	4	0	1								13	12		"	
M	47	PCI Tandem Call	X	X																	20	13		Note 1	
	48		X	X																	20	14		"	
	49		X	X																	20	15		"	
	50		X	X																	20	16		"	
N	51	Late Rel — PCI Call	X	X					7	8	9	0	0								14	17			
	52		X	X					8	9	0	1	0								15	18			
O	53	PCI Tandem 3-Digit Operator	X	X			1	1	0	0	0	0	0								16	19			
P	54	Cap Tst for Grd Closures between PCI Pulses	X	X					5	7	7	7	0												SD, CAP CI or CAP RCI
Q	55	Operation Test of TG Train	X	X																					TGO
	56		X	X																					TGO
	57		X	X																					TGO

* Operate KPA key when testing KP "A" senders.

Note 1: Insert 184B plug into HS MAX dial control jack when test circuit is equipped with capacitor timed relay interrupter circuit.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER SS	KP	AS	A	B	C	TD TH	H	T	U	STAT	DB	DG	OB	OG	TS	COMP RES. OFF	BEY OFF	CLASS KEY SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	*MISC.
R	58	Full Selector Call		X														0			1	—	O		
	59			X										ND				0	SKO		1	—	FT		
	60			X														0			1	—	FR		
	61			X										ND				0	SKO		1	—	FT/FR		
S	62	Register Control		X					6	0	6	0						0							SKP jack
	63			X					6	8	6	2						0							
	64			X					5	9	8	4						0							
	65			X					3	0	3	0						0							TT jack
	66			X					9	1	9	1						0							TR jack
T	67	Early Rel — Opr Straightfor-		X					0	0	0	0		ND				0			19	—	FR		
		ward Through Crossbar																							
		Tandem																							
U	68	3-Digit Operator Through		X			1	1	0	0	0	0		ND				0			21	—	FR		
		Crossbar Tandem																							
V	69	Time-out — Keypulsing "A"		X					0	0	0	0						0			22	—	O		
		Sender																							
W	70	Operator's Error — Office		X					0	0	0	0		ND				0			23	—	FR		
		Selector Trunk																							
X	71	Operator's Error — Tandem		X										ND				0	SKO	0	24	—	FT/FR		
		District Trunk																							
Y	72	Operator's Error —		X										ND				0	SKO	900	25	—	FT		
		Incoming Selector																							
Z	73	Prefix 1-1 Feature	X	X					9	0	4	5													1-1
	74		X	X					9	0	4	5	0												1-1, SD
AA	75	Counting Relays	X	X					3	7	9	0									1	0			SP key or jack
AB	76	Release Test of STP Relay	X	X					9	9	9	9									1	0			STP jack
AC	77	Nonoperate Test of OF Relay	X	X																	1	0			MTG, OFN jack
AD	78	Cancel TG Test	X	X					0	0	0	0									1	0			CTG

* Operate KPA key when testing KP "A" senders.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER SS	KP	AS	A	B	C	TD TH	H	T	U	STAT	DB	DG	OB	OG	TS	COMP RES. OFF	BEY OFF	CLASS KEY SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	*MISC.
AE	79	SC Ground Check — Call	X	X					0	0	0	0									1	0			SCG
		Aband After AV Relays																							
		Operated																							
AF	80	Toll Diversion Feature	X						0	0	0	0									1	0			TDV jack
AG	81	Dial Tone	X			N	N	N	0	0	0	0									1	0			DT
AH	82	Second Trial Test — Decoder	X						0	0	0	0									1	0			
		Senders																							
AI		Partial Dial Timing:																							
	83	No. Digits Dialed	X			1	0	0	0	0	0	0						3	SKO		4	—			TR-PS
	84	One Digit Dialed	X			2			0	0	0	0						2	SKO		5	—			TR-PD1
	85	Three Digits Dialed	X						0	0	0	0									6	—			TR-PD
	86	No. Digits Dialed	X			1	0	0	0	0	0	0						3	SKO		4	—			TR-PD1
	87	One Digit Dialed	X			2			0	0	0	0						2	SKO		5	—			TR-PD1
	88	Three Digits Dialed	X						0	0	0	0									6	—			TR-PD
	89	No. Digits Dialed	X			1	0	0	0	0	0	0						3	SKO		4	3			
	90	One Digit Dialed	X			2			0	0	0	0						2	SKO		5	4			
	91	Three Digits Dialed	X						0	0	0	0									1	0			SL
AJ		Stuck Sender Timing:																							
	92	Without Dist Off. Selections	X						0	0	0	0									1				TR-AD
	93	With Dist Off. Selections	X						0	0	0	0									1				TR-DO
	94	Awaiting Assignment	X						0	0	0	0													SSA
	95	Without Dist Off. Selections	X						0	0	0	0									1				TR-AD
	96	With Dist Off. Selections	X						0	0	0	0									1				TR-DO
	97	Awaiting Assignment	X						0	0	0	0													SSA
	98	All Digits Dialed	X						0	0	0	0									1	0			SL, CAN SY

* Operate KPA key when testing KP "A" senders.
Note: N denotes key normal.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER SS	KP	AS	A	B	C	TD TH	H	T	U	STAT	DB	DG	OB	OG	TS	COMP RES. OFF	BEY OFF	CLASS KEY SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	*MISC.
AK	99	Intersender Timing	X						0	0	0	0						3			3	2			IT-jack
AL	100	Stuck Sender Lamp and	X						0	0	0	0									1	0			TR-AD (SD-21186-01, Fig. S)
		Priming Features (SUB SDR)																							or SL, CAN SY, CTR Keys
																									Out
AM	101	Stuck Sender Lamp and		X					0	0	0	0													
		Priming Features (KP SDR)																			1	—			KPA, SS, CAN SY, CP Keys
																									Out
AN	102	Coin Features	X						0	0	0	0									1 or 13	0 or 9			SGT-OPR
	103		X						0	0	0	0									1 or 13	0 or 9			SGT-NO

* Operate KPA key when testing KP "A" senders.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER			AREA CODE						TD										COMP RES.		CLASS KEY				MISC.
			SS	KP	AS	A	B	C	A	B	C	TH	H	T	U	STAT	DB	DG	OB	OG	TS	OFF	BEY OFF	SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	
AO	200	MF Call — 10 Digit — No Skip	X		X				1	1	1	1	1	1	1	0								20	13			MF jack
	201		X		X				2	0	3	4	0	5	6	0								20	13			
	202		X		X				3	2	4	5	9	6	7	0								20	13			
	203		X		X				4	3	5	6	8	7	8	0								20	13			
	204		X		X				5	4	6	7	7	8	9	0								20	13			
	205		X		X				6	5	7	8	6	9	0	0								20	13			
	206		X		X				7	6	8	9	5	0	2	0								20	13			
	207		X		X				8	7	9	0	4	2	3	0								20	13			
	208		X		X				9	8	0	2	3	3	4	0								20	13			
	209		X		X				0	9	2	3	2	4	5	0								20	13			
	210	MF Call — 10 Digit — Skip 3	X		X				2	1	2	1	2	1	2	0								20	13			SK3, MF jacks
AP	211	MF Call — 7 Digit — No Sta	X		X	N	N	N				2	1	2	1	0								20	13			7DG, MF jacks
	212	MF Call — 7 Digit — Sta	X		X	N	N	N				3	2	3	2	J								20	13			SD, 7DG, MF jacks
	213	MF Call — 7 Digit — Skip 2	X		X	N	N	N				4	3	2	1	0								20	13			7DG, SK2, MF jacks
	214	MF Call — 7 Digit — Skip 3	X		X	N	N	N				2	3	2	3	0								20	13			7DG, SK3, MF jacks
AQ	215	MF Call — 10 Digit — Aband	X		X							1	2	3	4	0								20	13			WO, MF jacks
		After 8 Digits Dialed																										
	216	MF Call — 10 Digit — Aband	X		X							2	1	4	3	0								20	13			WO1, MF jacks
		After Dialing Completed																										
	217	MF Call — 10 Digit — Aband	X		X							2	1	3	4	0								20	13			WO2, MF jacks
		During MF Pulsing																										
AR	218	MF Call — 10 Digit — Tbl	X		X							3	4	1	2	0					3			20	13			TO, MF jacks
		Time-out — Dialing Not																										CTR (AS) In
		Completed																										
	219	MF Call — 10 Digit — Tbl	X		X							3	4	2	1	0					3			20	13			TO1, MF jacks
		Time-out — Dialing																										CTR (AS) In
		Completed																										
AS	220	MF Call — 10 Digit — Tbl	X		X							4	3	1	2	0								20	13			CTR (AS) In, MF jacks
		Time-out After Receipt of																										
		Wink																										
AT	221	MF Call — Stuck Auxiliary	X		X							4	3	1	2	0								20	13			TO1, MF jack, CAN SY
		Sender — Primed Release																										CTR (AS) Out
AU	222	MF Call — 10 Digit — No	X									1	1	1	1	0					3			20	13			MB- (AS), MF jacks, PAS-
		Auxiliary Sender Available																										ASB, CAN SY
		Semiautomatic Test																										
	223	MF Call — 10 Digit — No	X									0	1	1	1	0					3			20	13			MS- MAX- BR, MF jacks,
		Auxiliary Sender Available																										ASB
		Automatic Test																										
AV	223.1	MF Call — 10 Digit —	X		X							1	1	1	1	0					3			20	13			RVT, MF jacks
		Incoming Trunk Reversed																										

Note: N denotes jack not plugged or key normal.

BSP TEST	TEST NO.	TITLE	TYPE OF SENDER			AREA CODE																COMP RES.		CLASS KEY				MISC.
			SS	KP	AS	A	B	C	A	B	C	TH	H	T	U	STAT	DB	DG	OB	OG	TS	OFF	BEY OFF	SD-21186-01	SD-21026 -01, -02	LC	DIAL CONT.	
AX		10-Digit Recycle Call																										
	224	Full Selector	X													0								1	0			RCY jack
	225	PCI Direct	X													0								13	9			RCY jack
	226	PCI Tandem	X													0								20	13			RCY jack
	227	7-Digit MF	X		X											0								20	13			RCY, 7DG, MF jacks
AY		10-Digit Recycle Call																										
		No Code Compressors Available																										
	228	Overflow Routing	X																		3			3	2			RCY, CCB jacks
	229	MF-Routing — Request	X		X																			20	13			MF, CCB jacks
		Auxiliary Sender																										
	230	Intercept Routing	X																					5	4			RCY, CCB jacks
AZ	231	3-Digit Operator Call —	X																					6	5			CCB jack
		No Code Compressors Available																										
BB		Prefix 0 Feature																										
	233	Prefix 0 — 7 Digit	X																					20	13			PF0, MF jack
	234	Prefix 0 — 10 Digit MF	X																					20	13			PF0, MF jack
BC	235	Prefix 1	X																					20	13			PF1
BD		TOUCH-TONE Dialing																										
	236	7-Digit Call	X																					20	13			TT,
	237	10-Digit Call	X		X																			20	13			TT, MF jack
	238	Maximum High Frequency	X																					20	13			TT MHF
	239	Maximum Low Frequency	X																					20	13			TT MLF
	240	Special Frequency	X																					20	13			TTN SFT
	241	Low Level Frequency	X																					20	13			TT LLV
	242	High Level Frequency	X																					20	13			TT HLV
BE	243	PCI Pulse Check	X													0								20	13			