LINE CROSS-CONNECTIONS, CLASS-OF-SERVICE, MESSAGE REGISTER, ANI LINE VERIFICATION, AND MESSAGE TIMING TESTS NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section describes methods of testing line cross-connections, class of service, associated line relay and registers, and message timing circuits in No. 1 crossbar offices. This section also describes the methods for making line verification tests in No. 1 crossbar offices arranged for automatic number identification.

1.02 This section is reissued:

(a) To add message timing to title.

(b) To revise Test H to cover ANI line verification of PBX trunks associated with PBX groups arranged for automatic identified outward dialing (AIOD) service.

(c) To add Test I to check operation of message timing circuits.

(d) To add Test J to check timing accuracy of message timer circuits.

(e) To make minor modifications throughout the text and to revise the section to conform with standard format.

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

1.03 The tests covered are:

A. Block Relay and Line Distributing Frame Cross-Connections Test: This test checks that the block relay and line distributing frame cross-connections are correct.

B. Class-of-Service Indication Test: This test checks that the class-of-service cross-connections are installed properly to give the correct charging and zoning treatment to the line under test.

C. Line Relay Test: This test checks the operate and nonoperate current of the customer line relay.

D. Message Register Operate Test — Call-Through Method: This test checks that the subscriber message register operates properly on a regular charge call.

E. Current Flow and 100-Operation Test of Register: This test checks the subscriber message register for operate and nonoperate requirements and applies the operate test automatically for 100 operations.

F. Message Register Lead Cross-Connections Test — Using Buzzer Where Message Registers Have No Fixed Relationship to Customer Number Terminals — Test Using Message Register Incoming Trunk: This test checks that the message register (M) terminal has been cross-connected to the correct customer number M terminal. It is used where registers are not permanently associated with customer numbers.

G. Message Register Lead Cross-Connections Test — Using Buzzer Where Message Registers Have No Fixed Relationship to Customer Number Terminals — Test at Line Distributing Frame: This test checks that the message register (M) terminal has been cross-connected to the correct customer number M terminal. It is used where registers are not permanently associated with customer numbers.

H. Line Verification Test in Offices Arranged for ANI: This test checks that the customer line sleeve has been cross-connected to the correct number network and that the number network has been connected to the proper primary bus.

I. Message Timer Operate Test: This test checks that the message timing relays and message timing (MT) meter are operating.

J. Message Timer Timing Test: This test checks the elapsed time accuracy of the MT meter.

1.04 Tests A through F, H, I, and J require action at the line link frame.

1.05 In performing Test B in offices having more than one class of service employing message registers, codes should be assigned for the registration test call which will give distinctive registration conditions for the different classes of service involved. This is, the test call should be directed to a zone in which the number of operations of the register will distinctively show that the class of service in which the customer line has been assigned is correct. This can be accomplished by directing the call to the test line circuit which is for use with the call-through test set located in the office whose zone gives the desired registration conditions. If the preceding test line circuit is not available in the various zones, it may be desirable to provide a special test code which will give a distinctive registration condition for the different classes of service. The line to be called may terminate in a subset in the central office and have its ring connected to the ring of the ANS jack at the miscellaneous register rack. Where only one class of service involving registers is employed and where a class-of-service check, therefore, is not required, the time bureau, if provided and on a charge basis, may be called. If a time bureau is not provided, the test call may be directed to some local test line on which an answer condition can be obtained.

1.06 Tests F and G are alternate methods of checking the message register lead cross-connections where registers have no fixed relationship to customer number terminals.

1.07 Tests F and G are required only when line message registers are associated with customer numbers in a flexible arrangement which permits the cross-connection of each message register to one of many customer number terminals. Where the line message registers are wired permanently to their associated customer number terminals, the buzzer tests are not necessary.

1.08 Test H may be performed at the message register rack or, when facilities are provided, at the number network frame.

1.09 The directory number referred to in Test H consists of an office, thousand, hundred, ten, and unit digit. The office digit is the arbitrary digit used to represent a 3-digit office code. Cross-connections in the outpulser determine which digits are assigned to each central office.

1.10 In Test H, should there be physical and theoretical codes for a central office, the same office digit is used to represent both the physical and theoretical portion of the office. In this case, the 3-digit office code must be obtained from a combination of the office digit and either the numerical thousand or numerical thousand and hundred digit. Cross-connections in the outpulser determine which thousand and hundred digits are assigned to the physical and theoretical portions of the office.

1.11 In Test H, for lines in a PBX group, the directory number identified and displayed is the PBX group billing number.

1.12 In Test H, for lines in a PBX group arranged for AIOD service, the trunk number represented by four arbitrary digits is displayed.

1.13 In offices consisting of two or more number series, where due to the great number of message registers to be tested it is necessary to have two message register test trunks, care must be taken to patch the line vertical unit of the line to be tested to the proper customer number series test jacks.

1.14 Tests B, D, E, I, and J are performed only at request of the commercial or accounting department or in accordance with local instructions.

1.15 The tests covered in this section should be performed as rapidly as possible to minimize service interruption.

1.16 During Tests B, D, E, F, G, I, and J, the subscriber line message register will operate. A record of individual register readings should be taken and entered on the proper form ***before and after each test.*** This record should be forwarded in accordance with local instructions.

1.17 If a register fails on test and is replaced by a new register, record the readings of the old register before and after test and also the readings of the new register before and after test.

1.18 In Tests I and J, a record of individual message timer readings should be taken ***before and after*** the test. This record should be forwarded in accordance with local instructions.

1.19 If a message timing meter fails and is replaced by a new timing meter, record the readings of the defective timer to the nearest 0.1 hour ***before and after*** the test. Record the readings of the replacement timer ***before and after*** the test.

1.20 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

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

2.02 Patching cord, P3E cord, 10 feet long, equipped with two 310 plugs (3P6F cord) (for connecting MF keyset to trunk jack).

2.03 Patching cord, P3E cord, 6 feet long, equipped with two 310 plugs (3P7A or 3P6C cord) (for connecting message register test set to A and T jacks at message register rack).

2.04 Patching cord, P4Y cord, 7 feet long, equipped with 309, 310 and 351A (or 325A) plugs (4P14A cord) (for testing individual message rate and coin lines).

2.05 Patching cord, P5B cord, 7 feet long, equipped with 309, 310, and 351B (or 325B) plugs (5P2A cord) (for testing 2-party message rate lines).

2.06 Patching cord, P8B cord, 10 feet long, equipped with Jones plug (per KS-8585 L10) and Jones socket (per KS-8586 L7) (for connecting MF keyset to current supply).

2.07 Testing cord, W1C cord, 12 feet long, equipped with 1B plug and 360B tool (socket-type cord tip) (1W6A cord) (for testing message registers which are not cross-connected).

2.08 Testing cord, 815 cord, 12 feet long, equipped with 1C plug and 262 tool (1W12A cord) (for making buzzer tests of message register lead cross-connections).

2.09 Blocking tools as required. Use tools and apply as covered in Section 069-020-801.

TABLE A

APPARATUS	TESTS									
	A	B	C	D	E	F	G	H	I	J
Portable MF Keyset J27060A (SD-25352-01) (required only for offices equipped with MF terminating senders)	1	—	—	—	1	1	—	1	—	—
Message Register Test Set J24750A (SD-25190-01)	—	—	—	—	1	—	—	—	—	—
349A (or 298A) (make-busy) Plug or 32A Test Set	—	1	1	1	—	—	—	—	—	—
1011G (or replaced D81762) Dial Hand Test Set (Handset)	1	1	1	1	1	1	—	1	1	—
310 Plug	—	—	2	—	—	—	—	—	—	—
349A (Make-Busy) Plug	—	—	1	—	—	—	—	3	1	—
KS-6278 Connecting Clip	—	—	—	—	1	—	1	—	—	—
Cord (2.02)	1	—	—	—	1	1	—	1	—	—
Cord (2.03)	—	—	—	—	2	2	—	—	—	—
Cord (2.04)	1	1	1	1	1	1	—	1	1	1
Cord (2.05)	1	1	1	1	1	1	—	1	1	1
Cord (2.06)	1	—	—	—	1	1	—	1	—	—
Cord (2.07)	—	—	—	—	1	—	1	—	—	—
Cord (2.08)	—	—	—	—	—	1	1	—	—	—
Tool (2.09)	—	—	—	—	—	—	—	—	—	1
KS-3008 Stopwatch or equivalent	—	—	—	—	—	—	—	—	1	1

3. PREPARATION

STEP	ACTION	VERIFICATION
Tests A Through F		
1	At line link frame — Using 4P14A cord, patch T, T1 jacks associated with office or number series involved to line vertical unit of line under test.	
Tests A, E, and F		
2a	If office is equipped with MF terminating senders — At message register rack frame — Using P8B cord, connect Jones plug of MF portable keyset to Jones socket of message register rack.	

STEP	ACTION	VERIFICATION
3a	Insert one end of P8B cord into MF keyset KS jack. *Note:* If it is necessary to use the handset, it should not be connected to the MF keyset TEL jack until a call has been set up.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Block Relay and Line Distributing Frame Cross-Connections Test	
4	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
5a	If office is equipped with MF terminating senders — When line is idle — Insert patching cord from portable MF keyset into trunk jack according to Table B.	T lamp lighted.
6a	At portable MF keyset — Operate KP key for interval long enough to ensure registration in sender, followed by operation of numerical keys corresponding to number of line whose cross-connections are to be checked. Operate ST key if necessary.	Lamps lighted according to Table C. *Note:* T lamp may or may not be momentarily extinguished before a tip party indication is displayed.
7a	To monitor on connection — With handset switch in MON position, insert plug into TEL jack of MF keyset.	

TABLE B

NUMBER TO WHICH CALL IS TO BE MADE	TRUNK JACK TO BE USED
Regular number A office	TRK
Extra number A office	X-TRK
Regular number B office	B-TRK
Extra number B office	BX-TRK

STEP	ACTION	VERIFICATION

TABLE C

LAMPS LIGHTED	CLASS OF SERVICE INDICATED
BY, T	Tip party
BY, R	Individual line, ring party of a party line, or last line of a terminal hunting group
BY, H	Line in a terminal hunting group other than last line

Notes:

1. If a "line busy" condition is encountered, busy tone will be heard and BY lamp will be lighted. In this case, disconnect the plug from the trunk jack and when BY lamp is extinguished, proceed as in Step 5a, 8b, or 10c.
2. In the event the call is misdirected, routed to intercept, or routed to a line not connected to the T and T1 jacks at the line link frame, none of the BY, T, R, or H lamps are lighted. In any event, the connection is held and may be traced forward to the line.

8b	If office is equipped with dial pulse terminating senders — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Dial tone heard.
9b	Dial office code and number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
10c	If offices are equipped with B switchboard operators — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).
11c	Pass to operator number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
12	Remove plug from trunk jack.	
13d	If no further test is to be made — Remove all cords and plugs.	

STEP	ACTION	VERIFICATION
	B. Class-of-Service Indication Test	
	Note: This test should not be made on a line connected in service except where tests are required by the commercial or accounting department.	
2	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
3	Read message register under test and enter reading on proper form.	
4a	If coin line or trunk from dial PBX having tip ground open at line circuit is being tested — Insert make-busy plug or 32A test set (with red button operated) into GRD jack.	
5	With handset switch in TALK position, insert plug into L jack.	Dial tone heard.
6b	If special test code used for differentiating between classes of service is provided — Dial special test code.	Ringing induction heard.
7b	Insert make-busy plug into ANS jack. *Note:* If line requires make-busy plug in GRD jack, make-busy plug may be transferred from GRD to ANS jack. If 32A test set is plugged into GRD jack, operate white button of test set for several seconds instead of inserting plug into ANS jack.	
8b	Read message register under test and enter reading on proper form.	See Table D.
9c	If customer lines arranged for message rate nonzoning or PBX customer nonzoning are being tested — Make calls to zero or PS operator as covered in Table D.	Operator verifies that correct trunk group is being used.
10d	If special test code not provided — Dial code number arranged to give distinctive indication of class of service used. *Note:* Only noncharge calls to the operator should be made for coin lines.	

STEP	ACTION	VERIFICATION

TABLE D — TYPICAL MARKER CROSS-CONNECTIONS*

CLASS OF CUSTOMER SERVICE	MARKER CROSS-CONNECTIONS	CHARGED EXPECTED	OTHER CHECKS REQUIRED
All classes of service with lines not equipped with message registers	Denied route	Operator	None
Remaining classes of service with all lines equipped with message registers:			
Coin all classes	Denied route	†	
Message rate nonzoning	Talking charge	1	Call both zero and PS operators
PBX customer nonzoning	Talking charge	1	Call PS operator
Flat rate zoning	Zone for two charge	2	None
Message rate zoning	Zone for three charge	3	None
PBX zoning	Zone for four charge	4	None

* This table is for differentiating between classes of service charge expected on test call, and other differentiating checks.

† The call should be routed to the restricted code operator. Obtain from the operator the group of trunks used.

11d	Read message register under test and enter reading on proper form.	See Table E.
12a	If coin line or trunk from dial PBX having tip ground open at line circuit is being tested — Remove make-busy plug or 32A test set from GRD jack.	
13b	If special test code used for differentiating between classes of service is provided — Remove plug from ANS jack.	
14	Remove plug from L jack.	***Note:*** If there is multiple charging equipment in the office, a call from a customer line (having privileges to multicharge area offices providing two or more registrations per call) to a multicharge zone may result in a single registration instead of a number of registrations if all the zone registration equipment is busy. Another call should be made when the zone registration equipment is idle.

TABLE E — TYPICAL TESTS FOR CHECKING CROSS-CONNECTIONS*

CLASS OF CUSTOMER SERVICE	CALLS ORIGINATED	CHARGE EXPECTED	NOTES
Coin public	Special service operator	None	1
Coin semipublic	Special service operator	None	1
Coin single slot	Special service operator	None	1
PBX nonzoning	Permanent signal operator	None	1, 5
PBX nonzoning	Note 2	None	1, 4, 5
Message rate nonzoning	Local charge test line	1	—
Message rate nonzoning	Note 2	None	1, 4
Message rate nonzoning	Permanent signal operator	None	1
Flat rate zoning	Local charge test line	None	—
Flat rate zoning	Note 2	Note 3	—
Message rate zoning	Local charge test line	1	—
Message rate zoning	Note 2	Note 3	—
Message rate zoning	Permanent signal operator	None	1, 5
PBX zoning	Permanent signal operator	None	1, 5
Party line — tip party originates calls	Local charge test line	1	—

* These are typical tests for checking that the cross-connections regarding class of service are properly installed for customer lines having message registers, charge expected on test call, and other differentiating checks.

Notes:

1. Obtain from operator the group of trunks used.

2. Call a charge test line in an office normally demanding a multiregistration.

3. Two or more charges depending upon office called. See Note in Step 14 if only one charge is recorded.

4. Call should be routed to restricted code operator.

5. Calls should be made only on PBX lines before the line connections are completed.

STEP	ACTION	VERIFICATION
15e	If no further tests is to be made — Remove all cords and plugs.	
	C. Line Relay Test	
2a	If testing prepayment coin lines — At message register rack frame — Insert 310 plug into ANS jack.	
3b	If testing prepayment coin lines equipped with E6498 or EA1 line relays — At message register rack frame — Insert 310 plug into CNE jack.	
4c	If testing tip party of 2-party line, prepayment coin line, or trunk from dial PBX having tip ground open at line circuit — At message register rack frame — Insert make-busy plug into GRD jack. *Note:* If desired, the 32A test set may be inserted into GRD jack and the red button may be used instead of the make-busy plug to simulate the condition.	
5	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
6	For operate test of line relay — Operate handset switch to TALK and insert plug into L jack.	Dial tone heard. BY lamp lighted.
7	Remove plug from L jack.	BY lamp extinguished.
8	For nonoperate test of line relay — Insert make-busy plug into NO jack.	
9	Insert plug of handset into L jack.	Dial tone not heard. BY lamp lighted. *Note:* If dial tone is not heard and minor alarm occurs, it indicates an unsatisfactory line relay adjustment.
10	Remove plug of handset from L jack.	BY lamp extinguished.
11d	If no further test is to be made — Remove all cords and plugs.	

STEP	ACTION	VERIFICATION
	D. Message Register Operate Test — Call-Through Method	
	Note: This test should not be made on a register connected in service except where tests are required by the commercial or accounting department.	
2a	If testing tip party of 2-party line or trunk from dial PBX having tip ground open at line circuit — At message register rack frame — Insert make-busy plug into GRD jack. *Note:* If desired, the 32A test set may be inserted into GRD jack and the red button may be used instead of the make-busy plug to simulate the condition.	
3	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates a busy line. Delay test until lamp is extinguished.
4	Read message register under test and enter reading on proper form.	
5	With handset switch in TALK position, insert plug into L jack.	Dial tone heard.
6	Dial code number of test line arranged to set up proper charge condition.	
7b	If called line terminates in subset in office and has its ring conductor connected to ring of ANS jack — Upon receipt of ringing induction, insert make-busy plug into ANS jack. *Note:* If line requires make-busy plug in GRD jack, make-busy plug may be transferred from GRD jack to ANS jack. If 32A test set is plugged into GRD jack, white button of test set may be operated for several seconds instead of placing plug in ANS jack.	
8	Read message register under test and enter reading on proper form.	Register records proper number of charges depending on code dialed and customer class of service.
9b	If called line terminates in subset in office and has its ring conductor connected to ring of ANS jack — Remove plug from ANS jack.	

STEP	ACTION	VERIFICATION
10	Remove plug from L jack.	
11c	If no further test is to be made — Remove all cords, plugs and 32A test set (if used).	

E. Current Flow and 100-Operation Test of Register

Note: These tests should not be made on a register connected in service except where tests are required by commercial or accounting department.

4	At message register rack frame — Using patching cord, connect T jack of message register test set to T jack of message register rack.	
5	Using patching cord, connect A jack of message register test set to A jack of message register rack. *Note:* To avoid possible grounding of the battery supply lead, connect the cord to the test set A jack first and when disconnecting, remove the cord from the test set last.	
6b	If registers are cross-connected for service — At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
7b	Read message register under test and enter reading on proper form. ***Caution: If the customer should attempt to make a call while the test is being made, the buzzer will sound. Immediately remove plug from the trunk jack. BY lamp will remain lighted until the line becomes idle.***	
8a	If office is equipped with MF terminating senders — When line is idle — Insert patching cord from portable MF keyset into trunk jack according to Table B.	T lamp lighted.
9a	Operate KP key for interval long enough to ensure registration in sender, followed by operation of numerical keys corresponding to number of line whose cross-connections are to be checked. Operate ST key if necessary.	Lamps lighted according to Table C. *Note:* T lamp may or may not be momentarily extinguished before a tip party indication is displayed.

STEP	ACTION	VERIFICATION
10a	To monitor on connection — With handset switch in MON position, insert plug into TEL jack of MF keyset.	
11c	If office is equipped with dial pulse terminating senders — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Dial tone heard.
12c	Dial office code, if required, and number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
13d	If offices are equipped with B switchboard operators — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).
14d	Pass to operator number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
15b	If registers are cross-connected for service — Set sliders 1 and 2 of rheostat on message register test set in position where all resistance is cut in (on repeat tests, sliders may be left in position used on previous test).	
16e	If registers are not cross-connected for service — At line distributing frame — Insert plug of W1C cord into T jack; connect clip of W1C cord to cross-connection terminal of register to be tested.	
17	At message register rack — Operate OPR key of message register test set.	
18	Set rheostat slider 1 for specified "operate" value of register.	
19	Release OPR key.	Message register scored once.
20	Operate, release OPR key at least three times.	Message register scored each time OPR key released.
21	Operate NO key.	

STEP	ACTION	VERIFICATION
22	Set rheostat slider 2 for specified "non-operate" value of register.	
23	Release NO key.	
24	Operate, release NO key three times.	Message register not operated.
25f	If 100-operation test is to be made — Read message register under test and enter reading on proper form.	
26f	Operate interrupter lever; allow to return to normal without interference.	Register reading is 100 registrations more than reading before interrupter lever operated.
27	After completion of tests — Read message register under test and enter reading on proper form.	
28	Remove plug from T jack.	
29g	If no further test is to be made — Remove all cords and plugs.	

F. Message Register Lead Cross-Connections Test — Using Buzzer Where Message Registers Have No Fixed Relationship to Customer Number Terminals — Test Using Message Register Incoming Trunk

4	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
5	Read message register under test and enter reading on proper form.	
6	At message register rack frame — Using patching cord, connect T jack of message register test set to T jack of message register rack.	
7	Using patching cord, connect A jack of message register test set to A jack of message register rack. *Note:* To avoid possible grounding of the battery supply lead, connect the cord to the test set A jack first and when disconnecting, remove the cord from the test set last.	
8	Operate BUZ key.	

STEP	ACTION	VERIFICATION
9a	If office is equipped with MF terminating senders — When line is idle — Insert patching cord from portable MF keyset into trunk jack according to Table B.	T lamp lighted.
10a	Operate KP key for interval long enough to ensure registration in sender, followed by operation of numerical keys corresponding to number of line whose cross-connections are to be checked; operate ST key, if necessary.	Lamps lighted according to Table C. *Note:* T lamp may or may not be momentarily extinguished before a tip party indication is displayed.
11a	To monitor on connection — With handset switch in MON position, insert plug into TEL jack of MF keyset.	
12b	If office is equipped with dial pulse terminating senders — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Dial tone heard.
13b	Dial office code, if required, and number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
14c	If offices are equipped with B switchboard operators — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).
15c	Pass to operator number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
16	At line distributing frame — Insert plug of testing cord into BUZ jack.	
17	Momentarily touch 262 tool of testing cord to cross-connection terminal at horizontal line distributing frame of register associated with called number.	Buzzer momentarily sounded. Register not operated.
18	At message register rack frame — Remove plug from T jack.	
19d	If no further test is to be made — Remove all cords and plugs.	

STEP	ACTION	VERIFICATION
	G. Message Register Lead Cross-Connections Test — Using Buzzer Where Message Registers Have No Fixed Relationship to Customer Number Terminals — Test at Line Distributing Frame	
1	At line distributing frame — Insert plug of W1C cord into BUZ 2 jack; connect clip of cord to M cross-connection terminal on horizontal line distributing frame of message register under test.	
2	Insert plug of testing cord into BUZ 1 jack and momentarily touch 262 tool of cord to customer number M cross-connection terminal on vertical line distributing frame to which register under test is connected. *Note:* If the buzzer does not sound, verify that the line is not busy on an originating call by observing that the associated customer line hold magnet is not operated.	Buzzer momentarily sounded. *Note:* Register does not operate on this test.
3	Remove W1C and testing cords.	
	H. Line Verification Test in Offices Arranged for ANI	
	Note: When access is provided for making line verification tests at the number network frame, this test may be made at either the number network frame or the message register rack frame. ***Caution: If the customer should attempt to make a call while the test is being made, the buzzer will sound. Immediately remove plug of handset or keyset from jack and make-busy plug from ANI or ANI NLP jack. If line under test is patched to T and T1 jacks at the line link frame, BY lamp will light and remain lighted until line becomes idle, at which time the test may be repeated. If line under test is not patched at line link frame, no indication is given when line becomes idle. In this case, a repeat test should be attempted after a reasonable delay.***	
1b	If test of block relay and line distributing frame cross-connections (Test A) is made in conjunction with Test H — At line link frame — Patch T, T1 jacks associated with office or number series involved to line vertical unit of line under test.	

STEP	ACTION	VERIFICATION
2a	If office is equipped with MF terminating senders — At message register rack frame — Using patching cord, connect Jones plug of MF portable keyset to Jones socket at frame.	
3a	Insert one end of patching cord into MF keyset KS jack. *Note:* If it is necessary to use the handset, it should not be connected to the MF keyset TEL jack until a call has been set up.	
4c	If test of block relay and line distributing frame cross-connections (Test A) is not made in conjunction with Test H — At message register rack frame — Insert make-busy plug into ANI NLP jack.	
5d	If access is provided at number network frame for making ANI line verification tests — Insert make-busy plug into ST jack.	At message register rack frame — ST lamp lighted. *Note:* ST lamp extinguished indicates test is in progress at remote location.
6b	If test of block relay and line distributing frame cross-connections (Test A) is made in conjunction with Test H — Observe BY lamp.	BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
7a	If office is equipped with MF terminating senders — When line is idle — Insert patching cord from portable MF keyset into trunk jack according to Table B.	T lamp lighted.
8a	Operate KP key for interval long enough to ensure registration in sender, followed by operation of numerical keys corresponding to number of line whose cross-connections are to be checked. Operate ST key if necessary.	Lamps lighted according to Table C. *Note:* T lamp may or may not be momentarily extinguished before a tip party indication is displayed.
9a	To monitor on connection — With handset switch in MON position, insert plug into TEL jack of MF keyset.	
10e	If office is equipped with dial tone terminating senders — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Dial tone heard.

STEP	ACTION	VERIFICATION
11e	Dial office code, if required, and number of line whose cross-connections are to be checked.	Lamps lighted according to Table C.
12f	If offices are equipped with B switchboard operators — When line is idle — With handset switch in TALK position, insert plug into trunk jack according to Table B.	Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).
13f	Pass to operator number of line whose cross-connections are to be checked. *Note:* With a plug inserted into ANI NLP jack, a lighted BY lamp does not indicate a busy line. If the line to which the call is directed is busy, busy tone will be heard, in which case, the plug of handset or MF keyset should be removed from the trunk jack. Repeat Steps 7a through 13f until line is found idle.	Lamps lighted according to Table C.
14	Insert make-busy plug into ANI jack.	T, R, or H lamp extinguished. ***For individual, 2-party, or PBX lines,*** OF-, TH-, H-, T-, U- indicator tubes lighted corresponding to directory number of line being verified. ***For multiparty lines*** MP lamp lighted. ***Note 1:*** If line is associated with a PBX group arranged for AIOD service, the lighted indicator tubes will correspond to an arbitrary trunk number. If the PBX directory number of a PBX group arranged for AIOD service is indicated, refer to SD-95813-01 Note 110 for corrective measures. ***Note 2:*** The indicator tubes (or MP lamp) are extinguished after an interval of approximately 30 seconds unless plug is removed from ANI jack prior to this time. ***Note 3:*** A mismatch will occur between the lighted indicator tubes and the customer directory number if the sleeve lead is improperly cross-connected, if the number network is improperly connected to the primary buses, or if the patch cord is improperly placed at the line link frame.

STEP	ACTION	VERIFICATION
14 (Cont)		*Note 4:* If BYI lamp lights, wait until BYI lamp is extinguished. *Note 5:* If TBL lamp lights, make a repeat verification. TBL lamp lights on any trouble which causes the outpulser to time out. This condition could be caused by a trouble in the outpulser or identifier during or after identification. Therefore, lighting of TBL lamp may be accomplished by a partial or complete display on the indicator tubes. In any case, when TBL lamp lights, the lamp display should be disregarded and a repeat test should be made. *Note 6:* If TO lamp lights, make a repeat verification. TO lamp may light due to a heavy traffic condition or trouble in the outpulser connector. If TO lamp lights on successive repeat verifications, this is an indication of trouble in the outpulser connector. To permit tracing the connection, the line verification connector and display circuit is locked to the incoming trunk until released by removing the plug from ANI jack.
15g	If repeat verification of line under test is to be made — Remove plug from ANI jack.	All lighted indicator tubes, lamps (except ST lamp) extinguished.
16g	Repeat Step 14.	
17d	If access is provided at number network frame for making ANI line verification tests — Remove plug from ST jack.	ST lamp extinguished.
18	Remove plug from ANI jack.	All lighted indicator tubes, lamps extinguished.
19h	If no further test is to be made — Remove all cords and plugs.	

I. Message Timer Operate Test

Note: This test should not be performed except where test is requested by the commercial or accounting department.

2	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.

STEP	ACTION	VERIFICATION
3	Record line identity and associated message timer meter reading on form to be sent to accounting department in accordance with local instructions.	
4	Operate handset switch to TALK and insert plug into L jack.	Dial tone heard. BY lamp lighted.
5	Dial code number of test line arranged to set up proper charge condition.	
6	When ringing induction is heard — Insert make-busy plug into ANS jack and start stopwatch.	
7	Observe right numbered wheel of message timing meter; when wheel advances one digit, record elapsed time.	
8	Permit timer to run until right numbered wheel has advanced two more digits. When wheel has advanced to third digit, remove handset plug from L jack and stop stopwatch.	The elapsed time from first operation of numbered wheel to third operation should be 12 minutes.
9	Remove make-busy plug from ANS jack.	
10	At line link frame — Remove patching cord.	
11	Record final reading on form to be sent to accounting department.	

J. Message Timer Timing Test

Note: This test should not be performed except where test is requested by the commercial or accounting department.

2	At message register rack frame — Observe BY lamp.	At message register rack frame — BY lamp extinguished. *Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.
3	At line distributing frame — Transfer jumper from terminal of timer to be tested to terminal of a spare timer. *Note:* Perform Test I to verify operation of spare timer.	

STEP	ACTION	VERIFICATION
4	Record line identity, reading of timer under test, and reading of spare timer on form to be sent to accounting department.	
5	At line link frame — Remove patching cord.	
6	On timer under test — Simultaneously block operated MT relay and start stopwatch.	
7	When right numbered wheel of timer advances to next digit — Simultaneous with the wheel advancement, remove blocking tool from MT relay and stop stopwatch.	
8	Record elapsed time on form to be sent to accounting department.	
9	At timer under test — Block operated MT relay and record exact time of day on a synchronous-type electric clock.	
10	Exactly 24 hours from time recorded in Step 9 — Remove blocking tool from MT relay and record timer reading.	Meter reading is 240 more than recorded in Step 9.
11a	If timer meets requirements of Step 10 and line is not busy — Transfer jumper from spare timer to timer under test.	
12a	Record timer readings of timer under test and spare timer on form to be sent to accounting department.	
13b	If timer does not meet requirements of Step 10 — Replace timer.	
14b	When line is not busy — Transfer jumper from terminal of spare timer to new timer. *Note:* Perform Test I to verify operation of new timer.	
15b	Record timer readings of new timer and spare timer on forms to be sent to accounting department.	