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

1. GENERAL

1.001 This addendum supplements Section 216-112-501, Issue 5.

1.002 This section is issued to specify the particular tests of line message registers and message register cross-connections that are to be made under various conditions.

The following changes apply to Part 1 of the section:

(a) 1.21 through 1.25 - added

1.21 Test 1.03 D Message Register Operate — Call - Through Method should be used:

(a) When message registers are pretested prior to assignment or cross-connection (1) to verify cross-connections and register operation upon completion of service orders involving new service, or (2) to verify any change in central office facilities involving message registers or message register cross-connections.

(b) Upon completion of distributing frame transfers or changes in central office facilities where message registers or message register cross-connections are involved.

(c) When message register tests are requested by the Comptrollers.

(d) When message register cross-connections are replaced because of trouble or for other reasons.

1.22 Test 1.03 E Current Flow and 100-Operation Test of Register should be used:

(a) For pretesting message registers prior to assignment or cross-connection.

1.23 Both tests 1.03 C Line Relay Test, and E Current Flow and 100-Operation Test of Register should be used:

(a) When message registers are not pretested prior to assignment or cross-connection (1) to verify cross-connections and register operation upon completion of a service order involving new service, or (2) to verify any change in central office facilities involving message registers or message register cross-connections.

(b) When message register tests are requested by Commercial.

(c) When message registers in service are replaced because of trouble.

1.24 Tests C, D and E should be used individually or in any combination:

(a) As required in connection with tests requested by Traffic.

(b) As required in connection with Plant investigation of trouble indications.

Credit Charges on Message Registers

1.25 The PNB employee placing a test call or scoring message registers (not explained by standard message register verification forms [A-1960, K-204, etc]) must request an operator to prepare a credit ticket. The operator is given the following information:

(a) Employee's name and business location.

(b) Telephone number of the measured service involved.

(c) The message register number.

(d) The number of message registrations caused by test calls or other tests.
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.

**1. 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.
SECTION 216-112-501

TABLE A

<table>
<thead>
<tr>
<th>APPARATUS</th>
<th>TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable MF Keyset J27060A (SD-25352-01) (required only for offices equipped with MF terminating senders)</td>
<td>1 1 1 1</td>
</tr>
<tr>
<td>Message Register Test Set J24750A (SD-25190-01)</td>
<td>1</td>
</tr>
<tr>
<td>349A (or 298A) (make-busy) Plug or 32A Test Set</td>
<td>2</td>
</tr>
<tr>
<td>1011G (or replaced D81762) Dial Hand Test Set (Handset)</td>
<td>3</td>
</tr>
<tr>
<td>310 Plug</td>
<td></td>
</tr>
<tr>
<td>349A (Make-Busy) Plug</td>
<td></td>
</tr>
<tr>
<td>KS-6278 Connecting Clip</td>
<td></td>
</tr>
<tr>
<td>Cord (2.02)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.03)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.04)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.05)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.06)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.07)</td>
<td></td>
</tr>
<tr>
<td>Cord (2.08)</td>
<td></td>
</tr>
<tr>
<td>Tool (2.09)</td>
<td></td>
</tr>
<tr>
<td>KS-3008 Stopwatch or equivalent</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

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>
<thead>
<tr>
<th>NUMBER TO WHICH CALL IS TO BE MADE</th>
<th>TRUNK JACK TO BE USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular number A office</td>
<td>TRK</td>
</tr>
<tr>
<td>Extra number A office</td>
<td>X-TRK</td>
</tr>
<tr>
<td>Regular number B office</td>
<td>B-TRK</td>
</tr>
<tr>
<td>Extra number B office</td>
<td>BX-TRK</td>
</tr>
</tbody>
</table>
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**ACTION**

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| 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. |
| 9b   | Dial office code and number of line whose cross-connections are to be checked. |
| 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. |
| 11c  | Pass to operator number of line whose cross-connections are to be checked. |
| 12   | Remove plug from trunk jack. |
| 13d  | If no further test is to be made —  
|      | Remove all cords and plugs. |

**TABLE C**

<table>
<thead>
<tr>
<th>LAMPS LIGHTED</th>
<th>CLASS OF SERVICE INDICATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY, T</td>
<td>Tip party</td>
</tr>
<tr>
<td>BY, R</td>
<td>Individual line, ring party of a party line, or last line of a terminal hunting group</td>
</tr>
<tr>
<td>BY, H</td>
<td>Line in a terminal hunting group other than last line</td>
</tr>
</tbody>
</table>

**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.

Dial tone heard.

Lamps lighted according to Table C.

Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).

Lamps lighted according to Table C.
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.

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.

6b. If special test code used for differentiating between classes of service is provided —
   Dial special test code.

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.

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.

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.
### TABLE D — TYPICAL MARKER CROSS-CONNECTIONS*

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

* 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*

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

* 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.
<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>15e</td>
<td>If no further tests is to be made — Remove all cords and plugs.</td>
<td></td>
</tr>
<tr>
<td>2a</td>
<td>If testing prepayment coin lines — At message register rack frame — Insert 310 plug into ANS jack.</td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>If testing prepayment coin lines equipped with E6498 or EA1 line relays — At message register rack frame — Insert 310 plug into CNE jack.</td>
<td></td>
</tr>
<tr>
<td>4c</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> 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.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>At message register rack frame — Observe BY lamp.</td>
<td>At message register rack frame — BY lamp extinguished.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> BY lamp lighted indicates busy line. Delay test until lamp is extinguished.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>For operate test of line relay — Operate handset switch to TALK and insert plug into L jack.</td>
<td>Dial tone heard. BY lamp lighted.</td>
</tr>
<tr>
<td>7</td>
<td>Remove plug from L jack.</td>
<td>BY lamp extinguished.</td>
</tr>
<tr>
<td>8</td>
<td>For nonoperate test of line relay — Insert make-busy plug into NO jack.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Insert plug of handset into L jack.</td>
<td>Dial tone not heard. BY lamp lighted.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> If dial tone is not heard and minor alarm occurs, it indicates an unsatisfactory line relay adjustment.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Remove plug of handset from L jack.</td>
<td>BY lamp extinguished.</td>
</tr>
<tr>
<td>11d</td>
<td>If no further test is to be made — Remove all cords and plugs.</td>
<td></td>
</tr>
</tbody>
</table>
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.
   Read message register under test and enter reading on proper form.

4 With handset switch in TALK position, insert plug into L jack.

5 Dial code number of test line arranged to set up proper charge condition.

6 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.

7b Remove plug from ANS jack.

8 Read message register under test and enter reading on proper form.

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.

Note: BY lamp lighted indicates a busy line. Delay test until lamp is extinguished.

Register records proper number of charges depending on code dialed and customer class of service.
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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.

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 key-set into trunk jack according to Table B.

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.

At message register rack frame — BY lamp extinguished.

Note: BY lamp lighted indicates busy line. Delay test until lamp is extinguished.

T lamp lighted.

Lamps lighted according to Table C.

Note: T lamp may or may not be momentarily extinguished before a tip party indication is displayed.
STEP 10a  To monitor on connection —  
With handset switch in MON position, insert plug into TEL jack of MF keyset.

STEP 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.

STEP 12c  Dial office code, if required, and number of line whose cross-connections are to be checked.

STEP 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.

STEP 14d  Pass to operator number of line whose cross-connections are to be checked.

STEP 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).

STEP 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.

STEP 17  At message register rack —  
Operate OPR key of message register test set.

STEP 18  Set rheostat slider 1 for specified “operate” value of register.

STEP 19  Release OPR key.

STEP 20  Operate, release OPR key at least three times.

STEP 21  Operate NO key.

VERIFICATION  
Dial tone heard.

Lamps lighted according to Table C.

Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).

Lamps lighted according to Table C.

Message register scored once.

Message register scored each time OPR key released.
SECTION 216-112-501

**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. |  

Page 14
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.
18 | At message register rack frame —
   Remove plug from T jack. | Register not operated.
19d | If no further test is to be made —
   Remove all cords and plugs. | 

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VERIFICATION

T lamp lighted.

Lamps lighted according to Table C.

Dial tone heard.

Lamps lighted according to Table C.

Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).

Lamps lighted according to Table C.

Buzzer momentarily sounded.

Register not operated.
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**

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.

6b  If test of block relay and line distributing frame cross-connections (Test A) is made in conjunction with Test H —
Observe BY lamp.

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.

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.

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.

**VERIFICATION**

At message register rack frame —
ST lamp lighted.

*Note:* ST lamp extinguished indicates test is in progress at remote location.

BY lamp extinguished.

*Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.

T lamp lighted.

Lamps lighted according to Table C.

*Note:* T lamp may or may not be momentarily extinguished before a tip party indication is displayed.

Dial tone heard.
### ACTION

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>11e</td>
<td>Dial office code, if required, and number of line whose cross-connections are to be checked.</td>
</tr>
</tbody>
</table>
| 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. |
| 13f  | Pass to operator number of line whose cross-connections are to be checked. |
| 14   | Insert make-busy plug into ANI jack. |

### VERIFICATION

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamps lighted according to Table C.</td>
<td></td>
</tr>
<tr>
<td>Order tone heard (two spurts of tone except when office designation required, in which case one long spurt of tone).</td>
<td></td>
</tr>
<tr>
<td>Lamps lighted according to Table C.</td>
<td></td>
</tr>
<tr>
<td>T, R, or H lamp extinguished.</td>
<td></td>
</tr>
</tbody>
</table>

*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.
15g If repeat verification of line under test is to be made —
Remove plug from ANI jack.

16g Repeat Step 14.

17d If access is provided at number network frame for making ANI line verification tests —
Remove plug from ST jack.

18 Remove plug from ANI jack.

19h If no further test is to be made —
Remove all cords and plugs.

1. 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.

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

J. Message Timer Timing Test

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

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>At message register rack frame — Observe BY lamp.</td>
<td>At message register rack frame — BY lamp extinguished.</td>
</tr>
</tbody>
</table>

*Note:* BY lamp lighted indicates busy line. Delay test until lamp is extinguished.

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>At line distributing frame — Transfer jumper from terminal of timer to be tested to terminal of a spare timer.</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Perform Test I to verify operation of spare timer.

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STEP 4  ACTION

Record line identity, reading of timer under test, and reading of spare timer on form to be sent to accounting department.

STEP 5  ACTION

At line link frame —
Remove patching cord.

STEP 6  ACTION

On timer under test —
Simultaneously block operated MT relay and start stopwatch.

STEP 7  ACTION

When right numbered wheel of timer advances to next digit —
Simultaneous with the wheel advancement, remove blocking tool from MT relay and stop stopwatch.

STEP 8  ACTION

Record elapsed time on form to be sent to accounting department.

STEP 9  ACTION

At timer under test —
Block operated MT relay and record exact time of day on a synchronous-type electric clock.

STEP 10 ACTION

Exactly 24 hours from time recorded in Step 9 —
Remove blocking tool from MT relay and record timer reading.

STEP 11a ACTION

If timer meets requirements of Step 10 and line is not busy —
Transfer jumper from spare timer to timer under test.

STEP 12a ACTION

Record timer readings of timer under test and spare timer on form to be sent to accounting department.

STEP 13b ACTION

If timer does not meet requirements of Step 10 —
Replace timer.

STEP 14b ACTION

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.

STEP 15b ACTION

Record timer readings of new timer and spare timer on forms to be sent to accounting department.

VERIFICATION

Meter reading is 240 more than recorded in Step 9.