

CALL-THROUGH TESTS  
USING CALL-THROUGH TEST SET SD-90603-01 (J94715)  
OR SD-21069-01 (J24714)  
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of making call-through tests in step-by-step offices using the test set per Drawing SD-90603-01 or SD-21069-01.

1.02 Call-through tests provide means for obtaining data on the overall performance of central office equipment. These tests may be used as a partial measure of the quality of service being rendered by the central office equipment or they may be used as an aid to the analysis and location of suspected trouble conditions in the equipment. Call-through tests may also be employed to verify the condition of new trunk groups and new equipment preparatory to placing them in service.

1.03 When call-through tests are employed as a quality measuring device, it is usually preferable to omit the holding of connections on which irregularities are encountered. Under this procedure an indication is given of the extent to which service calls may be affected by repeated selection of equipment that may be in trouble. When this procedure is followed, the test data may be classified in accordance with the practices followed for service observing and the results may be expected to be similar to service observing results. The advantage of call-through tests in this connection is that they afford a larger sample of calls in a short space of time and thus afford a more adequate means of obtaining a relatively accurate picture of the performance of the equipment. The data will not be strictly comparable with service observing, however, because the call-through tests omit marginal conditions which are imposed in service by adverse conditions of subscriber lines and station equipment and because an arbitrary method of routing calls is employed rather than random distribution.

1.04 When call-through tests are employed for trouble detection purposes, the general method of routing calls outlined herein may be followed or the calls may be confined to the particular channels in which prevalence of trouble is suspected or regarding which specific performance data are desired.

1.05 Through calls should usually be made in relatively busy traffic periods in order to obtain distribution throughout the equipment. Testing at night should be avoided because of the possibility of calling subscribers in error.

2. APPARATUS

2.01 Call-Through Test Set per SD-90603-01 (J94715), SD-21069-01 (J24714), or equivalent. (The latter test set is not arranged to originate calls on coin lines.)

Note: Where a check of message registration is desired, message registers can be associated with the originating lines and located where they can be easily seen from the call-through test set.

2.02 Operator's Telephone Set.

2.03 Pen Register (optional), single or double, equipped with an S3B Cord and No. 110 Plug.

3. PREPARATION

Selection of Central Office Equipment

Subscriber Line Circuits for Outgoing Calls

3.01 When making call-through tests for the purpose of obtaining general data on the performance of the central office equipment, select from the records ten unassigned line circuits, each in a different line group. In line finder offices, if there are less than ten groups, the line circuits selected should be distributed as evenly as possible through the groups. If call-through tests are conducted on a routine basis, the originating lines should be varied periodically so that, over a long period, every line group in a line finder office will, at one time or another, have at least one associated line selected for use in conjunction with call-through tests.

Note: If a test set per SD-21069-01 is used, confine the selection to non-coin lines.

Receiving Lines or Terminations

3.02 To care for calls incoming to the call-through test set, select from the records a minimum of ten unassigned connector terminal numbers in the local office. If desired, more than ten connector terminals may be selected (in which case more than one such terminal would be cross-connected to each line circuit in the test set). Each terminal so chosen should, if possible, be in a different connector group of 100 terminals. These terminal numbers should be sufficiently different from each other so that equipment or operating irregularities will be unlikely to give an OK

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test. For routine call-through tests, every connector group should, at one time or another, have at least one terminal selected for use in conjunction with these tests. Where several offices are in the same building, it may be desirable to select some of the connector terminals from each unit if they can be cross-connected tip, ring and sleeve to the call-through test set. Where an office serves combined areas, as for example, 4 and 5 digit areas, the terminals selected for cross-connection to the call-through test set should be approximately proportional to the number of equipped 4 and 5 digit terminals.

### Selection of Test Call Numbers

3.03 Groups of called numbers should be selected so that test calls may be made to various terminations as follows:

(a) Connector terminals which are cross-connected to the call-through test set as covered in 3.02.

(b) Connector terminals in the same office or other dial offices which may be reached by dialing. These may be the terminals associated with the connector multiple test line, they may be terminals assigned to a line made permanently busy or terminals to which a distinctive tone has been connected for the purposes of this test, or they may be unassigned terminals, in which case an intercepting operator will be reached.

(c) Lines in manual offices which may be reached by dialing. These lines may be connected to the manual multiple test line (if provided), calls may be made to unassigned lines, in which case an intercepting operator will be reached, or a permanently made busy line may be used (if provided).

Note: Where desired, a distinctive tone may be connected to one or more unassigned lines for the purposes of this test. When a number of lines are so used their multiple numbers should be sufficiently different from each other so that equipment or operating irregularities will not be likely to give an OK test.

(d) The special service operator.

(e) Terminations reached by dialing special codes, such as long distance, information, repair service, etc.

(f) Call-through test sets in other dial offices.

3.04 Determine the proportion of test calls to be made over the various routes including channels within the office

and prepare a list of the call numbers associated with each route. The distribution of calls to the various destinations should usually be proportionate to the average normal traffic over the respective routes. The number of working trunks in each route may be taken as an approximation of the relative traffic density.

### Call Sheets

3.05 Enter the test call numbers on a call sheet such as that shown in Fig. 1, selecting the numbers in rotation from the various routes to be employed and at such frequency as will result in the desired distribution to the several routes. When the same test call number is to be used more than once, its appearances on the call sheets should be well separated. The call sheets should be numbered and used in numerical sequence.

Note: When a particular trunk group is to be tested, separate call sheets should be made out so that all of the calls will be routed through that group.

3.06 Designate each test call number by the letters "B," "O," "T," or "L" to show respectively whether a busy tone should be heard, an operator should answer, tone or interruptions from a test line should be received, or one of the line lamps in the call-through test set should light.

3.07 When a test call number is that of a connector terminal selected as covered in 3.02 to care for calls incoming to the call-through test set, place beside the test call number the number of the line circuit in the test set to which that connector terminal is cross-connected. This indicates that the TR key associated with the line circuit thus indicated should be operated when such a test call is dialed. It also shows that, upon the completion of such a test call, the corresponding line lamp in the test set should light, or if the call is dialed from the test set line circuit of the number given, a busy indication should be received.

### Preparation at the Test Set

3.08 When the call-through test set is first set up in an office, run in and connect the necessary temporary or permanent cable between the terminal strips in the test set and the H.I.D.F. terminal strips assigned for this use. See that all keys are normal. Connect ground and 24 volt battery supply through the necessary number of 1-1/3 ampere fuses as required by the circuit drawing.

3.09 At the I.D.F., cross-connect to the test set an intercepting trunk which should be assigned to care for such connector terminals as will from time to time be

Sheet No. 1

## CALL SHEET — CALL-THROUGH TEST

### STEP - BY - STEP OFFICES

OFFICE Main 2 DATE 10-26-34  
 CITY Typical TESTER John Doe

FOR EACH CALL MAKE STROKE MARK OR GIVE NUMBER OF TROUBLE TICKET

CALLED NUMBER AND INDICATION (See Note)		NUMBER OF LINE CIRCUIT IN TEST SET									
		1	2	3	4	5	6	7	8	9	10
		LINE SWITCH NO. OR LINE GROUP AND RELAY NO.									
		3-101	7-86	9-128	14-51	18-74	22-145	27-173	30-15	33-87	35-195
2-0235	L 1										
2-5321	L 1										
2-0683	L 2										
2-5879	L 2										
2-1376	L 3										
2-6128	L 3										
3-4570	B										
3-2593	T										
4-0081	T										
5-2593	T										
0	O										
110	O										
113	O										
114	O										
2-1728	L 4										
2-6725	L 4										
2-2397	L 5										
2-2783	L 5										
2-2054	L 6										
2-7629	L 6										
3-4570	B										
3-2593	T										
4-0081	T										
5-2593	T										
0	O										
2-3487	L 7										
2-8489	L 7										
2-3725	L 8										
2-8888	L 8										
2-4321	L 9										
2-9237	L 9										
2-4628	L 10										
2-6852	L 10										
3-4570	B										
3-2593	T										
4-0081	T										
5-2593	T										

Note: B = Busy, O = Operator, L = Lamp in call-through test set, T = Tone or interruptions from a test line.  
 † Place beside each connector terminal number the number of the test set line circuit to which it is cross-connected.  
 \* When the called terminal is cross-connected to the originating line, a busy indication will be received.

Fig. 1 - Typical Call Sheet.

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associated with the test set. Also cross-connect the line circuits chosen for the call-through tests. Remove the intercepting cross-connections or straps of the connector terminals selected in accordance with 3.02 for connection to the call-through test set and cross-connect these terminals to the test set.

Note: In a temporary installation where the tests contemplated will not involve incoming calls, the intercepting trunk need not be provided and only the tip and ring conductors of the line circuits selected for the tests need be cross-connected to the test set.

3.10 Unless the designations made for previous call-through tests are still applicable, make up a new designation strip showing which subscriber line circuit, connector terminal, or both are associated with each line circuit of the test set.

### 4. METHOD - CALLS ORIGINATED AT THE CALL-THROUGH TEST SET

#### General

4.01 When a pen register is to be used, see that it is wound and supplied with tape and ink. Connect it to the SO jack of the test set. Connect an operator's telephone set to the TEL jacks of the test set. Operate the BZ key.

4.02 Dial the test calls successively as they appear on the call sheet following the procedures given in 4.06 to 4.16. Use the test set line circuits in rotation, changing the called number and test set line circuit each time. On the completion of each call, place a stroke mark or ticket number, as the case may be, in the column headed by the number of the test set line circuit used. When the end of the group on the highest numbered call sheet has been reached, return to the top of the group on call sheet No. 1 and start down again using for the first call, the line circuit next higher in number than the one used for the first call when beginning the previous series of calls through the group.

4.03 If a subscriber is reached in error, say to the subscriber, "This is the telephone company testing. What is your number please?" When the line number is obtained, say, "Thank you" and then disconnect immediately by restoring the TLK-HLD key. If it is found that the test call number is associated with a station in service, cross this number from the call sheet and advise the chief switchman of the circumstance.

4.04 Where trouble is encountered, enter upon a suitable numbered ticket, the line circuit on which the attempt was made, the number called, and a notation of the trouble encountered. Enter the number of the ticket on the call sheet, as mentioned

in 4.02. If calls are not to be traced, a trouble record, such as Form E-338, can be used instead of numbered tickets, and each entry given an item number for identification on the call sheet.

4.05 If troubles are to be traced, proceed as follows. Place a tag on the TLK-HLD key on which the attempt was made and operate the key to the HLD position where it should remain until the ticket is returned. After tracing, a notation of the trouble found should be entered on the ticket.

#### Calls from Coin Lines

4.06 In the following procedures when a call is to be originated on a coin subscriber line, momentarily operate the CN-RLS key to the CN position just before operating the associated TLK-HLD key. The coin lamp when lighted indicates that the test set has established the necessary circuit condition to simulate the deposit of a coin. The circuit is restored to normal and the lamp extinguished by a pulse of coin control current over the line conductors, or it may also be restored by a momentary operation of the CN-RLS key to the RLS position. Immediately after disconnection of calls made in accordance with 4.07 to 4.16, check to see that the coin lamp of the calling line circuit is extinguished by a pulse of coin control current.

#### Calls to Numbers Associated With the Call-Through Test Set

4.07 Whenever a call is to be dialed to a connector terminal number which is associated with the test set (indicated by the called terminal number on the call sheet having opposite it the number of the associated line circuit of the test set) operate the TR key associated with that line circuit.

4.08 When both a subscriber line circuit and a connector terminal are cross-connected to a line circuit in the test set, the operation of the associated TR key makes the same connections as if the line circuit and associated connector terminal had been cross-connected in the usual way for a line in service except that the test set is bridged across the tip and ring. When the TR key is normal, the connector terminal is disconnected from the test set line circuit and is connected to the intercepting trunk associated with the test set so that incoming calls reach the intercepting operator.

4.09 Operate to the TLK position the TLK-HLD key of one of the line circuits of the test set which is not associated with the connector terminal called (see note). When dial tone is heard, dial the local office prefix and the number of the called terminal. When selections have been made, note that audible ringing is heard and that the line lamp of the test set line

circuit having the TR key which was operated in accordance with 4.07 is lighted.

Note: In progressing in orderly sequence through the call sheets, calls will occasionally be made from a line circuit to which the called connector terminal is cross-connected. In such cases, proceed as under "Calls to Busy Lines," 4.11 to 4.13.

4.10 Simulate an answer condition by momentarily operating the TLK-HLD key of the called line to the HLD position. Note that the associated line lamp is extinguished and that the audible ringing ceases. Restore the TR key of the called line and the TLK-HLD key of the calling line.

Note: If during periods of relatively light traffic it is desired to hold a connection so that other trunks in the same group can be tested, operate the TLK-HLD key of the calling line to the HLD position.

#### Calls to Busy Lines, Test Lines or Lines With Tone

4.11 Whenever a call is to be dialed to a busy line, a connector multiple test line in another step-by-step office, a manual multiple test line in a manual office or any line which will send back a distinctive tone, proceed as follows:

4.12 Operate to the TLK position the TLK-HLD key of one of the line circuits of the test set. When dial tone is heard, dial the office prefix and the number of the called terminal.

4.13 When selections are completed, note that the proper indication is received as covered on the call sheet. Then restore the TLK-HLD key.

Note: If it is desired to hold the connection see note under 4.10.

#### Calls to Operators or Other Call-Through Test Sets

4.14 Whenever a call is to be dialed to a special service operator, an intercepting operator, or other telephone company employee, or to another call-through test set, proceed as follows:

4.15 Operate to the TLK position the TLK-HLD key of one of the line circuits of the test set. When dial tone is heard, dial the code or, where necessary, dial the

office prefix and number of the called terminal.

4.16 When the call is answered by an operator, say, "I am making a test call," and, unless the initial response has given sufficient identification, ascertain that the termination reached corresponds with the number which was dialed. Upon completion of the conversation, restore the TLK-HLD key.

Note: If it is desired to hold the connection, see note under 4.10.

#### Restoring the Test Set to Normal

4.17 When testing has been completed, restore the BZ key to normal and disconnect the operator's telephone set. Check to see that all the TR and TLK-HLD keys are normal.

#### 5. METHOD - CALLS INCOMING FROM SOURCES OTHER THAN THE SAME CALL-THROUGH TEST SET

5.01 When the call-through test set is to be used for receiving calls not dialed from the same test set, proceed as follows:

5.02 Connect an operator's telephone set to the TEL jacks of the test set. Operate the BZ key if the test set is to be constantly attended.

5.03 Operate the TR keys of the lines over which test calls are to be received.

5.04 Upon observing the lighting of a line lamp, operate the associated TLK-HLD key to the TLK position and answer by giving the office name and the connector terminal number (for example, "Liberty 5867").

5.05 Restore the TLK-HLD key to normal.

5.06 When leaving the test set, restore the BZ key to normal and check to see that all the TLK-HLD keys are normal. If no more incoming calls are expected, restore the TR keys to normal and disconnect the operator's telephone set.

#### 6. REPORTS

6.01 Upon the completion of the test, the information obtained from the tickets and call sheets should be entered on a summary sheet. Form E-338 or a special form provided locally may be used for this purpose. This sheet, together with the call sheets, trouble tickets and pen register tapes should then be turned over to the proper supervisor, in accordance with local instructions.