TEST LINE CIRCUITS
AND COMMUNICATION TRUNKS
NATIONWIDE DISTANCE DIALING PLAN

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1. GENERAL

1.01 This section describes the operation and use of test lines. They fit in with the general switching plan for nationwide distance dialing.

1.02 This section is being revised for the following reasons.

(a) Combine the following test line sections into one section:

- 660-440-100 Code 100—Loss, Noise and Balance Test Termination
- 660-440-101 Code 101—Secondary Toll Testboard Communication and Test Trunk
- 660-440-102 Code 102—One-Milliwatt 1000-Cycle Testing Power with Timed Disconnect
- 660-440-103 Code 103—Supervisory and Signaling Test Termination
- 660-440-104 Code 104—Far-End Transmission and Noise Checking Circuit
- 660-440-111 Code 161-X—Trouble Reporting Code for Use by Traffic in Multitestboard Cities
- 660-440-112 Code 958—Switching System Maintenance Center Communication Trunk
- 660-440-113 Code 970-XXX—Directing Code Used for Researching Outgoing Trunk Test Frames in Crossbar Tandem Toll Switching Offices

(b) To add test line sections for the following:

- 105-Type—Automatic Transmission Line
- 107-Type—Data Transmission Line
- 108-Type—Echo Suppressor.

(c) To remove all reference to SD drawings from the section.

1.03 This is a major revision of this section. The use of arrows to denote changes has been omitted for that reason.

1.04 Test lines have been standardized and will permit "fully automatic" or "one-person" tests to be made from testboards, switchboards, maintenance centers, or Centralized Automatic Reporting On Trunks (CAROT) centers.

1.05 This will enable the forces responsible for trunk maintenance use test lines to keep a closer watch on individual trunk performance, and to keep systems and circuits in the correct adjustment.

1.06 Regular checks should be made of test line performance. It is important that test lines and associated equipment be operational and accurate. Checks of their performance are covered in other sections. Refer to the Equipment Test List for the section on the appropriate test line in order to determine testing intervals and tests to be made.

TEST TONE LEVEL

1.07 The power of a signal load when applied to a trunk is one of the factors which affects the noise performance of other trunks in the system.

1.08 A value of -16 dBm0 for the average long-term input power per voiceband trunk has been established as a long range Bell System objective for a domestic multichannel trunk. This value is to be used as the value for signal power in the design of new systems.

1.09 Test tones used for short-term tests are treated as an exception and are allowed to be at 0 dBm0. Tones for long-term tests may be operated at -10 dBm0. New automatic maintenance systems are being designed for -16 dBm0 test tone

levels. Caution should be exercised when making tone level checks at intermediate test level points from test line tone sources. The input level of a test tone must be known.

TEST TONE FREQUENCY

1.10 The loss (design objective) of a trunk is measured at 400 Hz, 1000 Hz, and 2800 Hz. These are the nominal test frequencies. Currently, there is a long-term program to increase these test frequencies by 4 Hz to avoid slow gain variations caused by frequency beating with the 8 kHz sampling rate of digital carrier channel banks. The nominal frequencies will remain in general use for existing test line circuits. New system design will incorporate nominal frequencies offset by 4 or 5 Hz.

1.11 Test lines may be reached by dialing over the trunk to be tested. ***Test line*** and ***test termination*** are terms sometimes used interchangeably to designate testing equipment, circuit or communication trunk. The more sophisticated test lines can be used to make 2-way net loss measurements automatically or manually from the near-end office.

1.12 Test lines are connected automatically by the far-end switching equipment upon receipt of the proper address information. Test lines are disconnected, either by a timed interval or when released by the originating end.

1.13 The impedance of the test line circuit must match the impedance of the trunks at the switches. As shown on test line circuit drawings, impedance options of 600 and 900 ohms are available.

NATIONWIDE NUMBERING PLAN

1.14 In order to permit nationwide distance dialing, a numbering plan has been set up in which each telephone has a unique telephone number. With such a numbering system operators or customers, wherever located, may use this number to reach the desired telephone through the local or distance dialing network. Distance dialing codes consist of two basic parts:

(a) A 3-digit area or number plan area (NPA) code.

(b) A 7-digit telephone number made up of a 3-digit central office code plus a 4-digit station number.

NUMBERING PLAN AREA CODES

1.15 The United States and Canada, certain Caribbean Islands, and parts of Mexico have been divided geographically into numbering plan areas and assigned NPA codes. A few NPA codes have been assigned for special purposes. These special purpose codes include inward wide area telephone service (INWATS), TWX service, and mass calling arrangements (such as telethons and elections). Each area is assigned a distinctive 3-digit designation code called the area code. Calls between different numbering plan areas (foreign area calls) will in general require dialing the code of the area in which the called station is located, as well as the called station number. Calls which originate and terminate within the same area usually require dialing only the 7-digit called number.

TERMINATING TOLL CENTER CODE

1.16 In the switching plan distance dialing primary centers (class 3 offices), sectional centers (class 2 offices), and regional centers (class 1 offices) constitute central switching points (CSPs). Switching centers which provide the first stage of concentration for network traffic originating at end offices and the final stage of distribution for traffic terminating at end offices are called toll centers or toll points.

1.17 Toll centers offer inward operator assistance and are assigned service codes for this function (terminating toll center [TTC] code, terminating toll center).

1.18 A TTC is normally assigned to each CSP and toll center. One switching office per NPA, usually the principle city is identifiable without a TTC code.

1.19 In some large toll centers, usually the major cities, there is more than one toll switching system. All inward, information, and other generator functions may be routed to one location. In this case, the network administration department has no need to differentiate between systems, and no TTC code for the different switching systems is listed in the traffic routing bulletin. In other large toll centers, TTC codes have been assigned to multiple switching systems for traffic and plant

purposes. The tester may direct test calls to a particular office by the use of TTC codes. TTC codes are assigned on an interim basis and the traffic routing bulletin is updated from time to time.

1.20 TTC codes can also be obtained from the testboard by signaling the desired area code and 101. When the testboard answers, it requests the TTC code of the required toll center.

1.21 The distinctive 3-digit code assigned to each TTC enables outward operators in different cities to reach inward directory assistance, to "leave word," and to request a specific operator in distant toll centers.

1.22 The TTC codes assigned together with NPA codes are part of the routing information prepared by the network administration department.

1.23 A secondary use of the TTC code is by maintenance personnel to reach test lines in distant offices.

1.24 When tandem trunks to switching systems are used by maintenance forces to establish communications with distant offices, they can use the switchboard directory to obtain the proper numbering plan area code and/or the TTC code. The area code, TTC code, followed by the appropriate test line code (such as 101) will establish communications with the desired toll center.

2. TEST LINES

GENERAL

2.01 Test line and test termination are terms used interchangeably to name testing equipment, facilities, circuits, or testing communication channels. These include simple passive terminations and relatively complex testing circuits. Some test lines are capable of applying marginal signaling tests and transmission tests and of recognizing and replying to specific signals received.

2.02 Test lines which provide tone have a 300-millisecond quiet period to permit the single-frequency (SF) signaling unit to change supervisory state.

2.03 Some class 5 offices must furnish continuously repeated supervisory cycles of off-hook and on-hook in order to release the test line.

2.04 New test line designs provide for 4 Hz above the desired frequency to avoid the modulation by-products which may be provided by T-carrier (PCM type carrier).

100-TYPE TEST LINE—LOSS, NOISE AND BALANCE TEST TERMINATION

2.05 The 100-type test line (new combined type) provides a test termination to make one-way loss measurements in addition to noise and balance tests. The old type only provides for noise and balance tests. The 100-type test line also provides the following functions:

(a) Off-hook supervision to the calling end as long as trunks are held by the calling end.

(b) PAD CONTROL feature at offices having pad control arrangements. Tests are normally made in the PAD OUT condition.

(c) A termination (600 or 900 ohms plus capacitance) which simulate the nominal office impedance.

2.06 A 5- to 6-second 0 dBm0, 1 kHz tone is provided before the balance mode on new versions of the 100-type test line. This allows one-way loss and noise measurements to be made with one dial-up. A diagram of a 100-type test line is provided in Fig. 1.

2.07 Detailed testing procedures which require the use of 100-type test line terminations are contained in Bell System Practices for the following tests:

- 1 kHz loss measurements
- Terminal and office cabling balance tests
- Return loss measurements
- Singing point tests
- Noise and crosstalk tests
- Repeater gain adjustments.

101-TYPE TEST LINE—COMMUNICATIONS

2.08 The 101-type test line provides a communication and test line into a testboard or test position which can be reached over any incoming trunk. The 101-type test line is used for the following:

(a) Overall tests on trunks

(b) Trouble reports

(c) Assistance in trouble location and trouble clearance.

2.09 The 101-type test line returns off-hook supervision to the originating point when the trunk is answered at the testboard position, and on-hook supervision when the testboard disconnects.

2.10 A recall signal from the originating point is indicated on the testboard position cord lamp when the proper key is operated at the terminating testboard.

2.11 Offices having pad control arrangements provide a pad-in condition during the connection. A pad control key is provided at testboards to check operation of switching pads. A diagram of a 101-type test line setup is provided in Fig. 2.

102-TYPE TEST LINE—MILLIWATT

2.12 The 102-type test line provides connections to a 1 kHz source for one-way transmission measurements with off-hook supervision. The 102-type test line has been assigned to the intertoll train in 2-train No. 4 crossbar offices. The 102-type test line provides access to 1 kHz test signal on a timed disconnect basis and furnishes the necessary pad switching signals and test power levels for intertoll trunks terminated in No. 4 type systems.

2.13 Test signal is sent for approximately 10 seconds. The signal is then removed to ensure that the test line will be disconnected from intermediate (intertoll) trunks using single-frequency signaling. When the test signal is connected, an off-hook supervisory signal is returned. When the timing circuit disconnects, an on-hook signal is returned.

2.14 In offices using fixed 2 dB pads (TP2) or 3 dB (TP3), the test pads are included in the test line to reduce the testing power to the proper level at the switches. A diagram of a 102-type test line setup is provided in Fig. 3.

103-TYPE TEST LINE—SIGNAL-SUPERVISORY

2.15 The 103-type test line provides a supervisory and signaling test circuit for intertoll trunks, equipped with ring forward (rering) features, which can be reached by automatic trunk test arrangements or by dialing manually. The 103-type test line performs the following functions:

(a) On seizure, the test line returns an off-hook.

(b) On receipt of a ring forward (rering) signal, the test line returns an on-hook.

(c) On receipt of a second ring forward (rering), the test trunk returns a 120 IPM flash.

2.16 Crossbar tandem offices use an automatic incoming trunk test frame or CAROT/remote office test line (ROTL). No. 4 Toll Switching System offices use the automatic outgoing intertoll trunk test frame (AOIT), automatically directed outgoing intertoll trunk test frame (ADOIT), trunk and facility maintenance system (TMFS), outgoing trunk test system (OTTS), or CAROT/OTTS ROTL. These frames can automatically test the supervisory and signaling path features of intertoll trunks terminated at distant offices that are equipped with 103-type test lines. A diagram of a 103-type test line layout is provided in Fig. 4.

104-TYPE TEST LINE—MEASURING TRANSMISSION AND NOISE

2.17 The 104-type test line provides a test for 2-way transmission testing and one-way noise checking, with off-hook supervision.

2.18 Incoming calls routed to 104-type test lines connect to the measuring circuit, one at a time, through a sequence chain circuit as the measuring equipment becomes idle. When test calls arrive from different originating offices at about the same time, they wait on the test lines and are served in turn by the measuring circuit. This termination can be used to test trunks from offices equipped with either the automatic transmission test and control circuit (ATTC) or the automatic

transmission measuring system (ATMS) associated with automatic trunk test frames. A diagram of 104-type test line layout is provided in Fig. 5.

2.19 Section 212-503-101 describes the automatic transmission test and control circuit (ATTC). This frame is used in conjunction with the AOIT in No. 4 toll switching offices.

2.20 The 104-type test line can be used for manual 2-way transmission measurements without the aid of a person at the terminating end. The 104-type test line can also be used for the following:

(a) Provides test pads as required.

(b) Provides off-hook supervision.

(c) Measures the 1 kHz loss of the trunk from originating end to far end.

(d) Adjusts a transmitting pad to equal the trunk loss measured from the originating end to far end. If this loss exceeds 10 dB, the transmitting pad value is reduced by 10 dB and a subsequent "wink" signal indicates this fact to the originating end.

(e) Makes a recheck of the trunk loss. By means of a local loop, checks to see if the pads have been properly adjusted. In case of failure in either of these checks, a repetition of the measurement is requested.

(f) Applies 1 kHz test tone directly to the trunk to permit a receiving measurement at the originating end.

(g) After a timed interval, sends 1 kHz test tone through the transmitting pad adjustment preceded by a "wink" signal if it has been reduced by 10 dB. This provides information on the loss in this pad to the originating end.

2.21 Explanation of the general methods for making measurements on an automatic or manual basis are included in Section 103-235-100 which describes the far-end (104-type test line) and near-end (ATTC) transmission measuring and noise checking circuit.

(a) When tone is transmitted to the far end, the pads in the 104-type test line adjust to the loss of the trunk in the transmitting direction as shown in Fig. 6.

(b) The 1 kHz tone is returned to the originating end for two separate conditions as shown in Fig. 7.

2.22 The near-to-far trunk loss is obtained by subtracting the lesser value from the larger value.

2.23 For manually dialed tests, a testboard attendant at the outgoing or originating end of the trunk, signals the 104-type test line over the trunk to be measured to reach the far-end 104-type test line. The attendant can then measure the transmission loss of the trunk in each direction and obtain a noise indication from the far end without assistance at the far end. The noise indication is not a noise measurement. ***Tests which indicate noise should have noise measurements made at each end.*** The noise checking circuit indicates noise which exceeds 41 dBrnc.

Note: Manually dialed tests require more time to complete than fully automatic tests.

105-TYPE TEST LINE—AUTOMATIC TRANSMISSION MEASURING

2.24 The 105-type automatic transmission test line arrangement, shown in Fig. 8, provides a central office termination for test calls directed to a responder. Fully automatic loss and noise measurements on trunks can be made and recorded for both directions of transmission. These test lines are available for ESS and electromechanical switching offices, and for various types of trunks which terminate in the following types of office.

- No. 1 Crossbar
- No. 5 Crossbar
- Crossbar Tandem
- Panel
- Step-by-Step
- No. 1 ESS
- No. 2 ESS

- No. 3 ESS
- No. 4 Crossbar
- No. 4 ESS

2.25 The 105-type test lines and ROTL access circuits as, shown in Fig. 9, act as parking circuits for calls awaiting connection to the responder.

2.26 The 105-type test lines which are intended for connection to intertoll trunks are assigned code 105 or equivalent on CCIS. Also, in No. 4 ESS 959-105 or 959-155 can be used. The 105-type test line for connection to other types of trunks are assigned 7-digit subscriber-type numbers.

2.27 When the 105-type test line is seized, timing functions are initiated and an off-hook supervisory and test progress tone are returned to the originating office. If the responder is idle, the test line is connected to the responder and the test progress tone is removed. After testing has been completed, the responder signals the test line to release.

2.28 The responder is readily adaptable to manual tests if the near-end office is equipped with a compatible test unit such as the ATMS director or an ROTL and responder unit equipped with an interrogator.

107-TYPE TEST LINE—DATA TRANSMISSION TEST LINE

2.29 The 107-type test line provides a connection to a signal source which provides test signals for one-way testing of data and voice transmission parameters. The test line provides a peak-to-average (P/AR) signal, gain-slope frequencies, and quiet termination and allows measurement of return loss, frequency shift, phase jitter, C-notch noise, impulse noise, gain hits, phase hits, and dropouts. Figure 10 provides a diagram of the 107-type test line.

2.30 The sequence of tones is as follows:

(1) 200 milliseconds off-hook for quiet transmission

(2) 15 seconds P/AR.

(3) 1 second off-hook transmission

(4) 10 seconds 1004-Hz tone

(5) 1 second off-hook quiet transmission

(6) 10 seconds 404-Hz tone

(7) 1 second off-hook transmission

(8) 10 seconds 2804-Hz tone

(9) 20 seconds off-hook

(10) 40-seconds of 4 tone intermodulation distortion test signal (equal amplitude tones of 857, 863, 1372, and 1388 Hz.)

(11) 1 second off-hook transmission

(12) 20 seconds at 2 tone intermodulation distortion test signal (1372 and 1388 Hz at 3 dB higher level than the 4 tone signals)

(13) 3 seconds on-hook followed by 300 millisecond off-hook

(14) 17 minutes 1004-Hz tone

(15) 3 seconds on-hook followed by 300 millisecond off-hook.

(16) 17 minutes 1004-Hz tone

(17) 3 seconds on-hook followed by 300 milliseconds off-hook.

(18) On-hook.

2.31 The P/AR signal, which has a spectrum similar to many high-speed data sets, permits a rapid check of the quality of a facility for data transmission. The P/AR signal is particularly sensitive to envelope delay distortion. The three gain-slope frequencies, 1004 Hz, 404 Hz, 2804 Hz, at -16 dBm0 permit measurement of facility frequency characteristic. The 20-second quiet termination permits measurement of background noise or provides a proper termination for return loss measurements. The 40 seconds of 4 tones permit a measurement of intermodulation distortio· The 20 seconds of 2 tones (check signal) provide for a measurement of signal to noise ratio for possible correction of the intermodulation test. The 17-minute, 1004 Hz, -16 dBm0 tone permits measurement of frequency shift, phase jitter, C-notch noise, impulse noise, gain hits, phase hits, and dropouts.

108-TYPE TEST LINE—ECHO SUPPRESSOR TEST LINE

2.32 The echo suppressor measuring set (Fig. 11) is connected to the near end. Loop around terminations are provided at the far-end. The loop-around unit steers the first near-end test call to the test port termination. The second near-end test call is connected to the auxiliary port termination. The echo suppressor measuring set is used to make echo suppression test on the test port trunk. The echo suppressor associated with the test call to the auxiliary port is disabled.

2.33 The 108-type test line provides far-end loop around termination for in-service testing of echo suppressors and is to be used with the 58-type echo suppressor measuring system (ESMS). A 108-type test line with the 58-type ESMS is shown in Fig. 12.

2.34 An intertoll trunk containing an echo suppressor is seized at the testboard and the digits 108 are dialed. The trunk under test is connected to the test port of the far-end 108-type test line. The trunk is then transferred to the panel containing the 58-type ESMS at the near end. The far-end 108-type test line termination returns a 1 kHz tone from the test port. The meter on the ESMS is then adjusted to a marked reference level.

2.35 A second auxiliary trunk is seized and the digits 108 are dialed. The second test call is connected to the far-end auxiliary port of the 108-type test line termination. After the auxiliary test line is connected, the 1 kHz tone being transmitted on the test trunk is removed and the auxiliary test trunk is transferred to the test panel containing the ESMS.

2.36 The 58-type ESMS is calibrated by transmitting the 1 kHz tone through the auxiliary trunk to the 108-type test line and then back over the test trunk to the ESMS. This tone is adjusted to the marked reference level on the ESMS control unit. The measuring equipment is calibrated so that performed tests are independent of the auxiliary trunk. After the 58-type ESMS is calibrated, it is not necessary to recalibrate unless a different auxiliary trunk is used.

2.37 Maintenance procedures consist of selecting the ***type, location*** and ***mode*** corresponding to the echo suppressor on the test trunk.

2.38 Seven echo suppressor tests are completed in succession. Each test gives a ***pass*** or ***fail*** indication. After all echo suppressor tests have been completed on the test trunk, the trunk can be released. A second test trunk can be tested by dialing the digits 108 on the second test trunk selected. The second connecting test trunk is looped around by the 108-type test line and the seven echo suppressor tests can be performed.

CODE 161-X—TROUBLE REPORTING CODE FOR OPERATORS

2.39 Code 161 has been assigned in most Bell System toll switching offices to reach a communication line terminated at a trouble reporting location. This code is used by the operators to report troubles encountered on trunks. Figure 13 provides a diagram of a code 161-X operator trouble reporting setup.

OPERATOR TROUBLE REPORTING

2.40 Switchboards in many large metropolitan areas have access, either directly or over tandem trunks, to toll switching systems with different testboard locations. In order to direct calls to the testboard responsible for the maintenance of trunks in the switchboard, a directing digit (X) for each testboard location is placed on all designation strips by the network administration department. A number of trunks in the regular tandem group are used for trouble reporting purposes. These trunks are connected to a separate multiple extending throughout the switchboard and suitably designated. These trunks are used in common for trouble reporting as well as outgoing call attempts.

2.41 Operators report each toll call irregularity to the designated report receiving position or testboard by dialing on key pulsing code 161, plus the ***directing digit***, followed by the number of tandem or intermediate (intertoll) trunk involved. The directing digit directs a trouble reporting call to the proper testboard.

CODE 958—COMMUNICATION TRUNK

2.42 Code 958 has been assigned throughout the Bell System for the present as a communication trunk for receiving incoming calls to the switching maintenance center for obtaining assistance in clearing intersystem trouble. Figure 14 is a diagram of code 958 setup.

2.43 Equipment trouble in a remote office may impair calls between offices. When there are indications of intersystem trouble, tracing and clearing may be expedited by the use of this line for communications between the two maintenance centers involved.

2.44 Code 958 provides a means for terminating incoming calls at crossbar-type and No. 4 ESS Toll Switching System maintenance centers.

2.45 The switching of intertoll traffic between various No. 4 Crossbar Tandem and No. 5 Crossbar Systems has developed the need for facilities to communicate directly between the equipment maintenance centers of widely separated toll switching offices.

2.46 Originating trunk circuits are provided in switching maintenance centers to gain access to the intermediate trunks terminated in the switching equipment.

2.47 When an outgoing call is to be made, the area code (if necessary), the TTC, or terminating toll point code (obtained from the traffic routing guide) for the distant office and the code 958 are dialed. The call is switched through the office where the call originated. Then it is switched through the distant switching office to an incoming trunk which has key and lamp appearances in the maintenance center.

CODE 970-XXXX—DIRECTING CODE—CROSSBAR TANDEM

2.48 Code 970-XXXX provides a connection through the crossbar switches to a spare office link terminal and the associated jack appearance at the manual outgoing trunk test frame. All outgoing trunks have an outgoing trunk jack appearance at crossbar tandem offices. This test appearance can be patched to any desired outgoing trunk by means of a patch cord having tip, ring, and sleeve conductors. Figure 15 provides a code 970-XXXX setup for any outgoing trunk.

2.49 Only the first three digits (970) need to be dialed or key pulsed from the testboard to direct an incoming intertoll trunk to the desired outgoing trunk for terminal and office cabling balance tests.

2.50 The entire 970-XXXX (XXXX=any digits) may, in some cases, need to be dialed from the local telephone in order to direct a centralized automatic message accounting (CAMA) or automatic message accounting (AMA) trunk to the 970 terminal. The additional digits are necessary to satisfy the senders in the crossbar tandem so that they will drop off the connection.

2.51 Detailed procedures for use of this code in connection with terminal, and office cabling balance tests, in crossbar tandem toll switching offices are covered in other Bell System Practices. In some cases, the capacitance of this test line is appreciable and should be taken into consideration in office balance procedure.

3. GLOSSARY

3.01 A glossary of terms is provided to aid in the understanding of definitive words used in this section.

Attenuation Distortion Loss deviation over the range of 404 Hz and 2804 Hz frequencies compared to 1004 Hz reference frequency.

C-Notch Noise (signal correlated noise) A measure of background or impulse noise measured through a weighting network when a holding tone, usually 1004 Hz at -16 dBm0, is being transmitted over the system under test. The tone is blocked at the measuring set by a notch filter.

Envelope Delay Distortion Envelope delay is defined as the derivative of the circuit phase shift (in radians) with respect to frequency (radians per second). The deviation of this derivative at any frequency from its value at a prescribed frequency (usually 1800 Hz) is called envelope delay distortion.

Intermodulation Distortion Intermodulation distortion is a measure of the linearity of a system. Excessive intermodulation distortion causes fundamental frequencies in a test tone or other signal (data or speech) to develop harmonics which mix with the original signal and cause distortion.

Frequency Shift A fixed offset in each received frequency of a signal relative to the transmitted signal, due to differences in inserted carrier frequencies in receivers of single sideband transmission systems.

Gain Hits, Phase Hits, and Dropouts Rapid random changes in the loss and phase characteristics of the channel.

Impulse Noise Indicated by the number of noise bursts exceeding a selected voltage threshold.

Loss End-to-end circuit attenuation measured at 1004 Hz.

Peak-To-Average (P/AR) Rating A measure of the transmission quality (mainly the phase response) of a channel for many data signals derived from a P/AR ratio measurement of a test pulse.

Phase Jitter Undesired phase modulation on a received signal.

Return Loss A measure of the mismatch between the actual telephone circuit impedance as compared to the nominal impedance defined telephone circuits.

4. TEST CODES REFERENCE INFORMATION

4.01 This part provides a list of Bell System Practices for reference information on test codes that are discussed in this section.

Bell System Practices

Number	Title
103-235-300	Accuracy and Operational Tests—Far-End (Code 104) Transmission Measuring and Noise Checking Circuits
103-235-500	Far-End Transmission Measuring and Noise Checking Equipment and Test Lines Without Test Progress Tone—Tests
103-235-501	Far-End Transmission Measuring and Noise Checking Circuit and Test Line—Employing Test Progress Tone—Equipment Tests

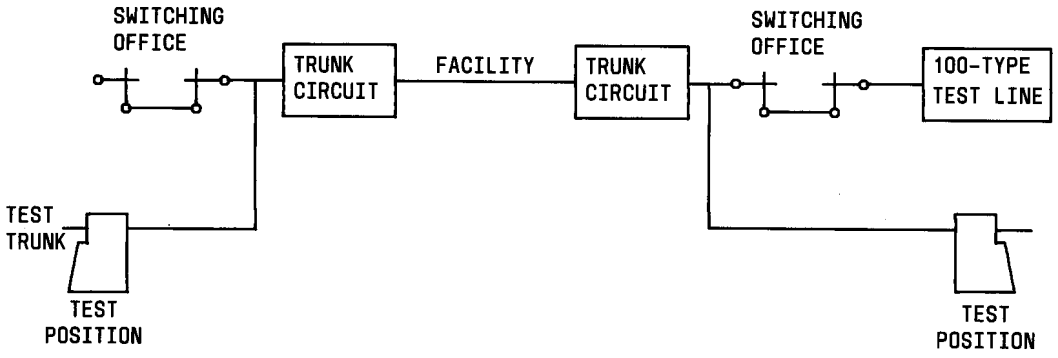


Fig. 1—100-Type Test Line Diagram

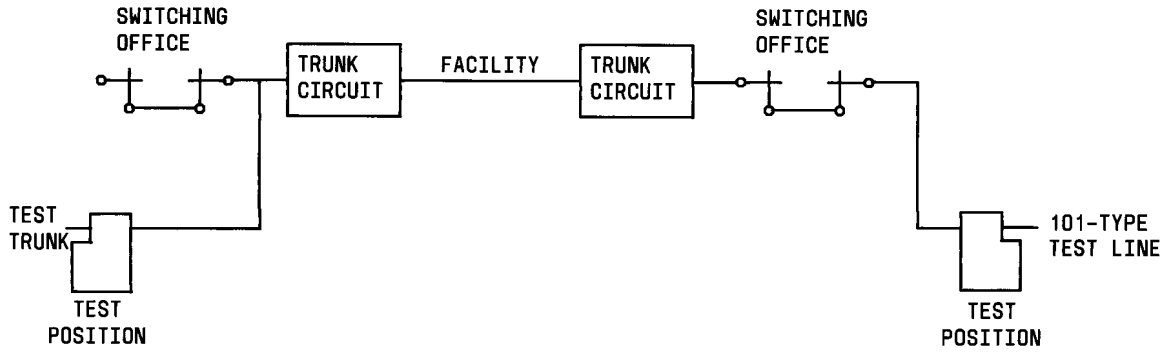


Fig. 2—101-Type Test Line Diagram

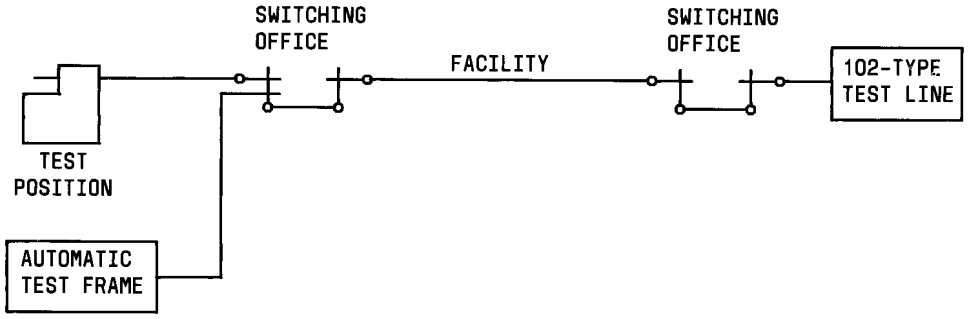


Fig. 3—102-Type Test Line Setup Diagram

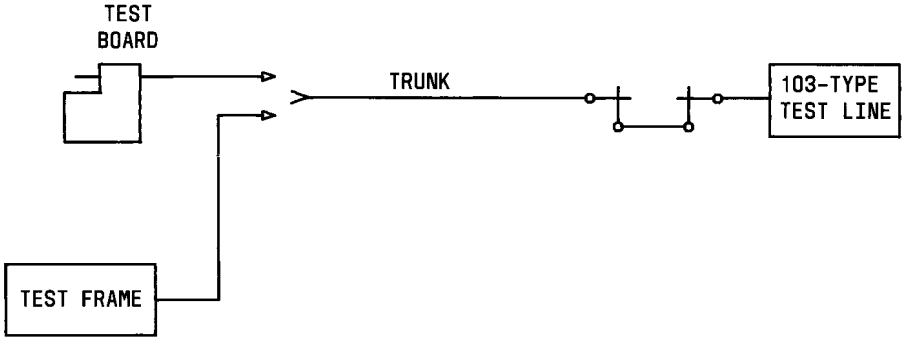


Fig. 4—103-Type Test Line Layout Diagram

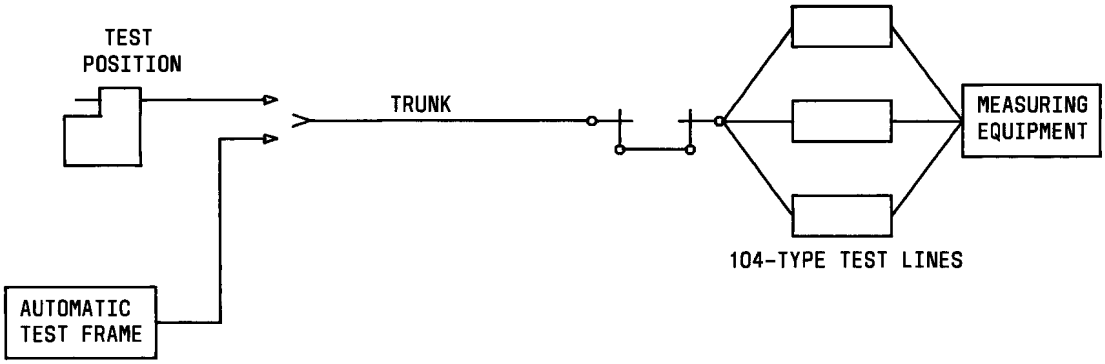


Fig. 5—Diagram of 104-Type Test Line

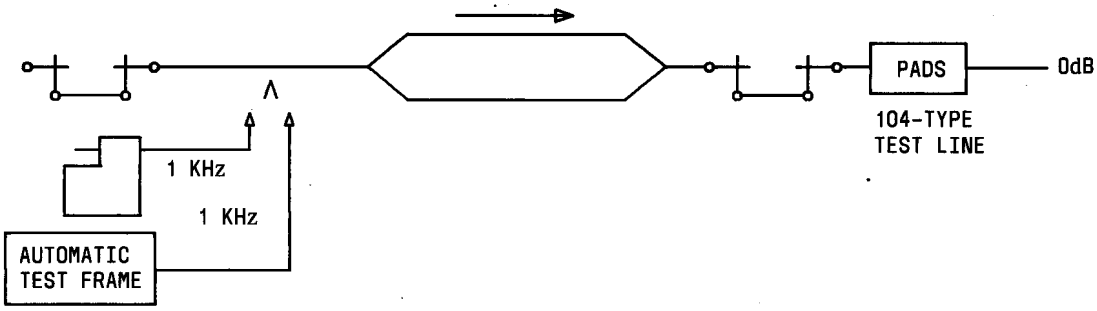
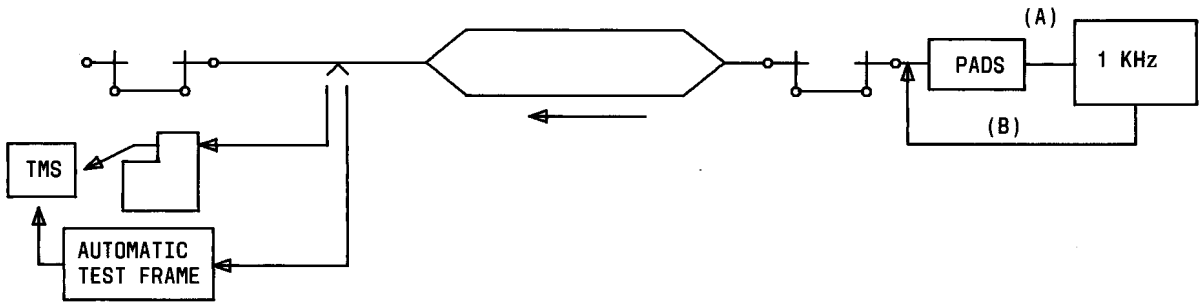


Fig. 6—Diagram of 104-Type Test Line Trunk Loss in Transmitting Direction



(A) THROUGH THE PADS WHICH HAVE STORED THE NEAR-TO-FAR TRUNK LOSS.
(B) BYPASSING THE PADS INDICATING THE FAR-TO-NEAR TRUNK LOSS.

Fig. 7—Diagram of 104-Type Test Line Trunk Loss 1 kHz

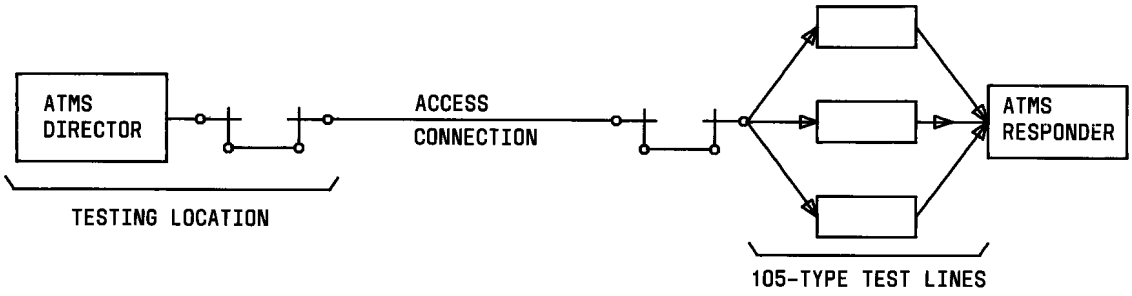


Fig. 8—Arrangement for 105-Type Test Lines

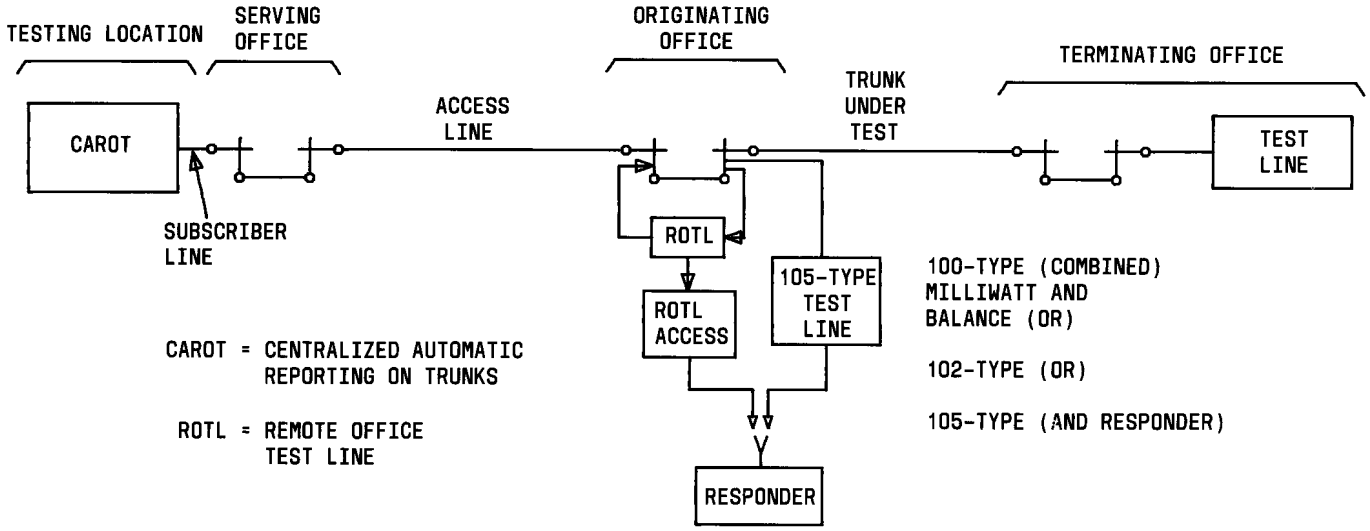


Fig. 9—Typical Arrangement for 105-Type Trunk Testing (ROTL Operation)

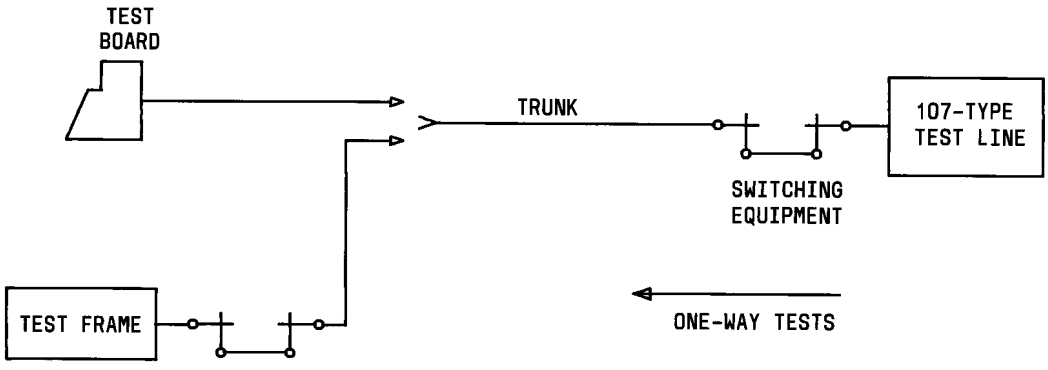


Fig. 10—107-Type Test Line

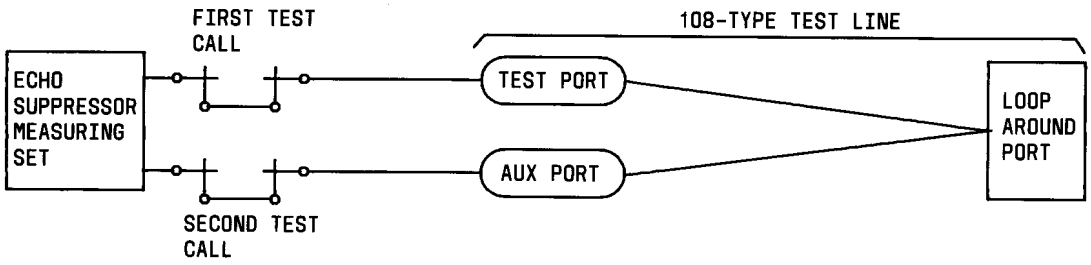


Fig. 11—Echo Suppressor Measuring Set

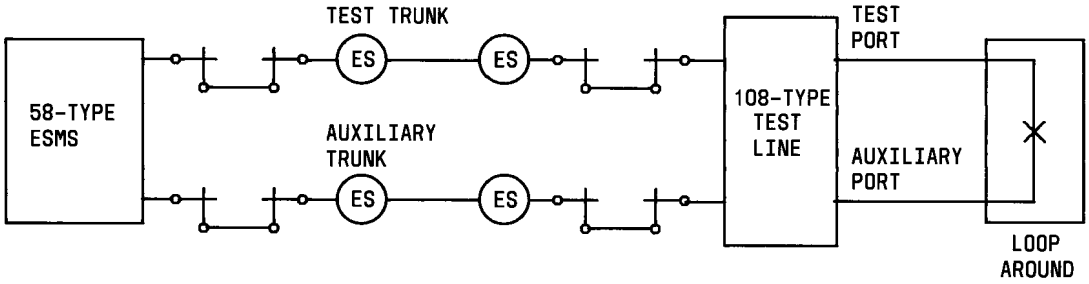


Fig. 12—108-Type Test Line

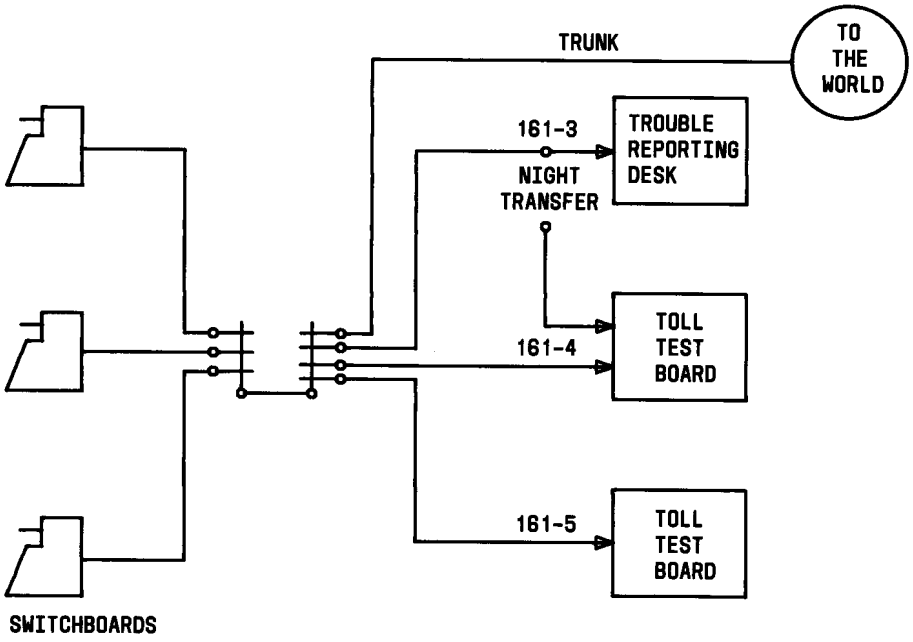


Fig. 13—Code 161-X Operator Trouble Reporting Setup

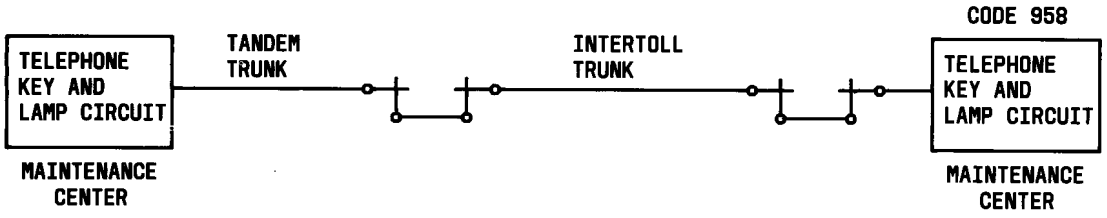


Fig. 14—Code 958 Setup

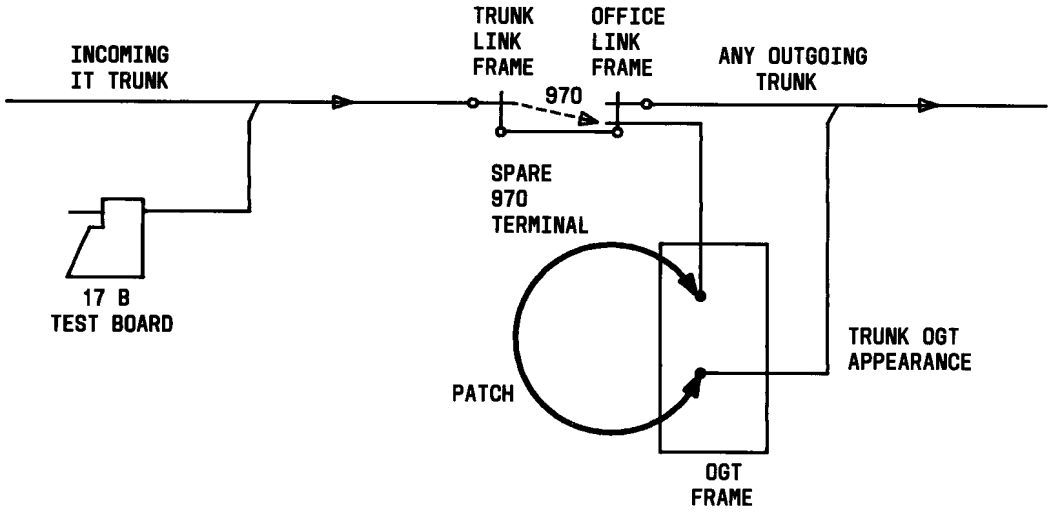


Fig. 15—Code 970-XXXX Setup