SWITCHED SPECIAL SERVICES

1000 HZ AND NOISE TESTS

PBX CENTRAL OFFICE TRUNKS, OFF-PREMISES STATION LINES AND TIE TRUNKS HAVING ACCESS TO THE DIRECT DISTANCE DIALING NETWORK

1. GENERAL

1.01 This section describes the methods used for making 1000 Hz measurements and message circuit noise and impulse noise tests on PBX central office trunks, off-premises station lines and tie trunks which have access to the Direct Distance Dialing (DDD) Network.

1.02 The term "Message Circuit Noise" in this section has been referred to in other practices as "Steady (White) Noise" and "Steady State Noise."

1.03 When testing PBX central office trunks from the PBX location, the customer should not be charged for test calls made from his premises. The test lines at the central office should be equipped with "No Charge" service. If "No Charge" service is not provided and the customer has measured rate service, normal procedures should be followed to credit the customer's account as outlined in Section 010-250-001.

1.04 When the number of PBX tie trunks to be tested is large, or the location of the PBX is such that it is not readily accessible, a combination loop-around, milliwatt and balance termination test line such as Fig. 54 of SD-98100-01, may be provided at the far-end PBX. An oscillator or milliwatt supply, and a transmission measuring set is required at the near-end PBX to make loop-around tests. When loop-around equipment is not provided, 2-way tests will have to be made. (A jack ended test trunk, such as Fig. 7 of SD-98100-01 typical, may be provided at the far-end PBX in this case).

1.05 PBX central office trunks, off-premises station lines and tie trunks should be measured under the same test conditions as that for which the expected measured loss (EML) was computed.

1.06 For typical transmission testing arrangements on PBX central office trunks, off-premises station lines and tie trunks, see Fig. 2 through 6.

1.07 At certain manual PBX switchboards the back cord, when connected to the measuring device, requires a resistance ground on the sleeve to put the cord in its normal talking condition.

1.08 If the measuring equipment used in making tests is not equipped with a holding device, a 274L inductor is required to hold the trunk or line under test when making tests from either the PBX location or the off-premises station location. The inductor should be connected to a General Radio 274 MB Plug (or equivalent) and the plug inserted into the "IN" Binding Posts of the measuring set. For typical connection of the above see Fig. 1. Also included in Fig. 1 are the settings of the 3A Noise Measuring Set (NMS) and the 6A Impulse Counter. The trunk or line under test must be held by the measuring set or an inductor because the subset at the originating test point must be placed in the "On-Hook" condition or the connection of the 1011-Type Handset removed during the measurements. This is necessary for the following reasons:

1. So the 1011B (MD) or 1013A Handset or the Subset does not bridge the measuring set. The 23A Transmission Measuring Set, for example, cannot make an accurate bridging measurement.

2. So the room noise at either the PBX location or the off-premises station location, picked up by the set, is not added to the noise of the trunk or line under test.

1.09 A holding circuit of some type (1.08) is required to hold the trunk under test: When making tests from the Central Office outgoing

trunk, or master test frame; or when making 2-way measurements, while changing cords to transmit or receive. A holding circuit, such as SD-96540-01 typical, or a 2AB Auxiliary Transmission Test Set will also provide the necessary holding condition for the trunk under test.

1.10 It should be noted that during the noise measurements the trunk or line should be monitored with the headphone provided. Note and record the nature of the noise in descriptive terms, such as: Single Frequency, Power Hum, Teletype or Data Impulses, Singing, Frying, Hissing, Crosstalk, etc.

1.11 Since noise levels can be influenced by circuits other than the one under test, noise measurements should be made during periods when a substantial volume of traffic is being switched.

1.12 When making tests from a customer's premises where key equipment, such as 1A or 1A1 Key Telephone Equipment, is involved, operate the HOLD key located on the telephone set to hold the connection when the handset is on-hook, or when the 1011B (MD) or 1013A Handset connection is removed. ***After completing the tests, the hold condition should be removed.***

2. TEST EQUIPMENT

2.01 The following test equipment is required at the originating test point to make measurements:

1—23A Transmission Measuring Set (TMS)

1—71B Milliwatt Reference Generator (or equivalent—required for making loop-around tests where a milliwatt supply is not provided)

1—3A Noise Measuring Set (NMS)

1—6A Impulse Counter (required for tests on facilities used for DATA-PHONE® services)

1—Monitoring Headphone (included with 3A NMS)

1—274L Inductor

1—General Radio 274MB Plug (or equivalent)

1—1011B (MD) or 1013A Handset

1—2W24A Cord (or equivalent—required when making tests with the 3A NMS at the off-premises station location)

1—2W6A Cord (or equivalent—required when making tests with the 23A TMS or 6A Impulse Counter at the off-premises station location)

1—4P4B Cord (or equivalent—required when making tests with the 3A NMS at the Test Jack of the Selector Switch (or equivalent) in the PBX equipment room)

1—3P2A Cord (or equivalent—required when making tests with the 23A TMS or 6A Impulse Counter at the Test Jack of the Selector Switch (or equivalent) in the PBX equipment room)

1—Form E-4948.

3. PBX CENTRAL OFFICE TRUNKS

3.01 For typical transmission testing arrangements of PBX central office trunks, see Fig. 2 for measurements made from the central office and Fig. 3 for measurements made from the PBX.

3.02 Requirements to be met on tests:

1000 Hz Measurement—Within $\pm$1.0 dB of the EML shown on the circuit or trunk layout record card; circuit, trunk or service order; line card; etc, as provided by local practices. If the EML is not provided and the PBX does not serve tie trunks or off-premises station lines, the loss should not exceed 6.5 dB. If the EML is not provided and the PBX serves tie trunks or off-premises station lines, the loss should not exceed 4.5 dB.

Message Circuit Noise Measurement—See Table A.

Impulse Noise Measurement—See Table I of Section 314-205-500 (DATA-PHONE Services).

4. PBX OFF-PREMISES STATION LINES

4.01 For a typical transmission testing arrangement of PBX off-premises station lines, see Fig. 4.

TABLE A

MESSAGE CIRCUIT NOISE TRANSMISSION TEST LIMITS

BUSY HOUR INTERIM NOISE CIRCUIT ORDER AND MAINTENANCE LIMITS IN dBrn "C" MESSAGE WEIGHTING (DECIBELS ABOVE REFERENCE NOISE, "C" MESSAGE WEIGHTING)			
	OK	OBJECTIONABLE NOISE	
TYPE CIRCUIT	RECORD ON FORM E-4948 WHEN NOISE IS BELOW:	RECORD ON FORM E-4948 AND FORWARD AS CALLED FOR BY LOCAL PRACTICES FOR ANALYSIS WHEN NOISE IS FROM:	RECORD ON FORM E-4948 AND PROCEED TO CLEAR TROUBLE OR REFER TO SUPERVISOR IMMEDIATELY FOR FURTHER TROUBLE CLEARING ACTION TO BE TAKEN WHEN NOISE IS ABOVE:
Central office trunks	20	20 to 30	30
Off-premises station lines and tie trunks (other than long haul)	28	28 to 41	41
Long haul tie trunks 0 to 50 miles	28	28 to 41	41
Long haul tie trunks 51 to 100 miles	31	31 to 41	41
Long haul tie trunks 101 to 400 miles	34	34 to 41	41
Long haul tie trunks 401 to 1000 miles	38	38 to 47	47
Long haul tie trunks 1001 to 1500 miles	40	40 to 47	47
Long haul tie trunks 1501 to 2500 miles	42	42 to 47	47
Long haul tie trunks 2501 to 4000 miles	44	44 to 47	47

4.02 Requirements to be met on tests:

1000 Hz Measurement—Within ± 1.0 dB of the designed EML shown on the circuit or trunk layout record card; circuit, trunk or service order; line card; etc, as provided by local practices.

Message Circuit Noise Measurement—See Table A.

Impulse Noise Measurement—See Table I of Section 314-205-500 (DATA-PHONE Services).

5. PBX TIE TRUNKS

5.01 For a typical transmission testing arrangement of PBX tie trunks, see Fig. 5 and 6.

5.02 Requirements to be met on tests:

1000 Hz Measurement—Within ± 1.5 dB of the designed EML shown on the circuit or trunk layout record card; circuit, trunk or service order; line card; etc, as provided by local practices.

Message Circuit Noise Measurement—See Table A.

Impulse Noise Measurement—See Part 3 of Section 314-205-501.

6. LONG HAUL PBX TIE TRUNKS

6.01 Overall 1000 Hz requirements to be met for long haul PBX tie trunks are contained in Part 5 of this section. Outlined below is the 1000 Hz requirement for that portion of the long

haul tie trunk from the PBX to the Serving Test Center.

6.02 For a typical example of a long haul tie trunk, see Fig. 7.

6.03 The 1000 Hz measurement on the PBX-Serving Test Center portion of the long haul tie trunk is a required trunk or circuit order test. This measurement is also to be made in the sectionalization of troubles encountered during overall 1000 Hz measurements of long haul tie trunks.

6.04 If the requirement from the PBX to the Serving Test Center cannot be met, and no facility or equipment problems can be found, refer to supervisor for further action.

6.05 Requirement to be met on tests:

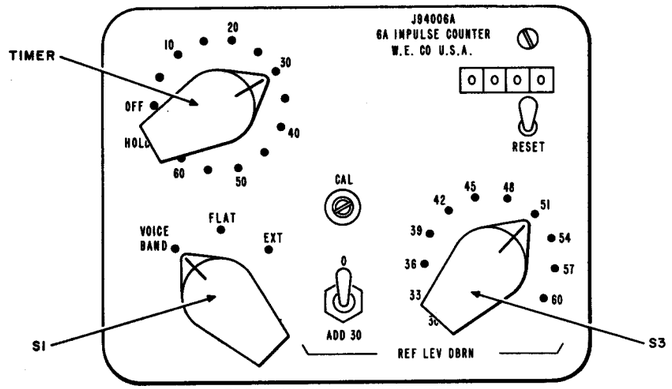
1000 Hz Measurement from PBX to Serving Test Center—Within ± 0.7 dB of loss shown on circuit or trunk layout record card for the portion of the trunk being measured.

7. TEST INTERVALS

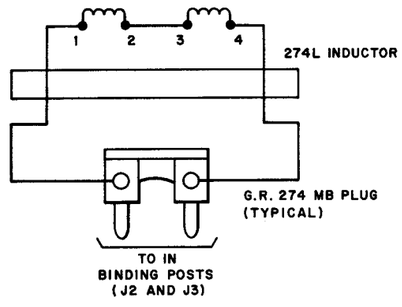
7.01 Table B contains the recommended transmission testing intervals for trunks and lines covered by this section.

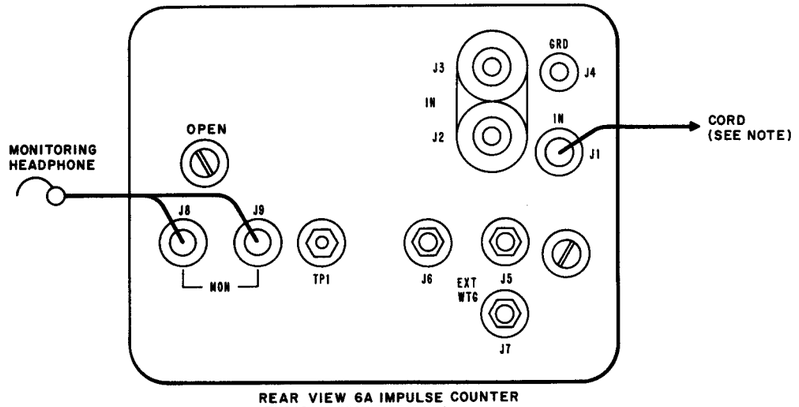
TABLE B

A. 1000 HZ TEST INTERVALS		
Central office trunks, off-premises station lines and tie trunks	Nonrepeatered	As required by local practices. Transmission trouble reports.
	Repeatered	Installation or change order. Transmission trouble reports. 6 months.
	Equipped with carrier facilities	Installation or change order. Transmission trouble reports. 3 months.
B. MESSAGE CIRCUIT NOISE TEST INTERVALS		
Central office trunks, off-premises station lines and tie trunks	All circuits	As required by local practices. Noise trouble reports. Special investigations.
C. IMPULSE NOISE TEST INTERVALS		
Central office trunks, off-premises station lines and tie trunks	All circuits used for DATA-PHONE services	Installation or change order. Noise trouble reports. Special investigations.



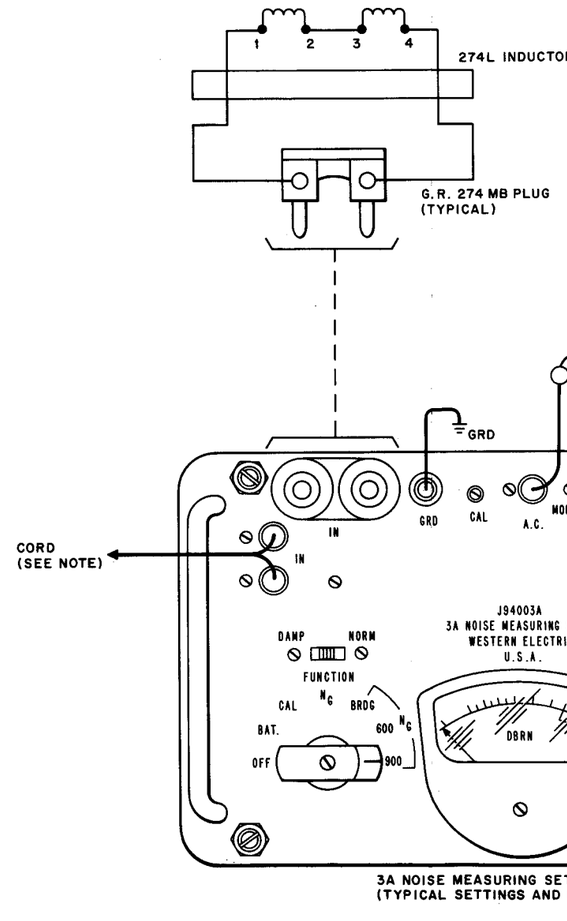
FRONT VIEW 6A IMPULSE COUNTER
(TYPICAL SETTINGS)





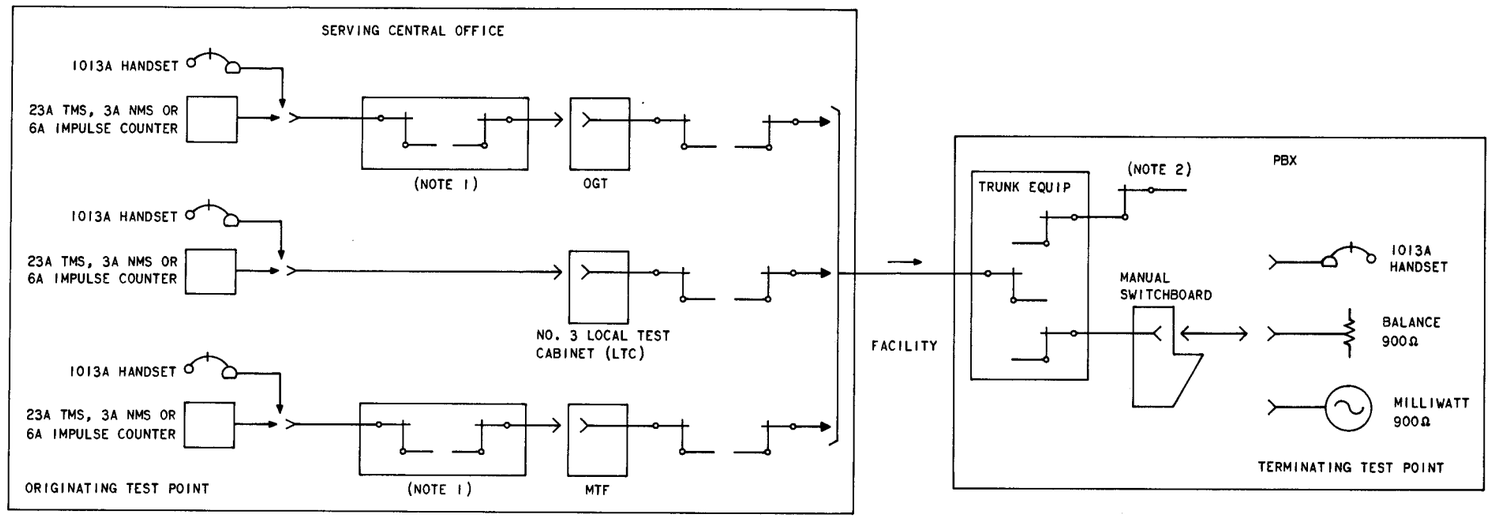
REAR VIEW 6A IMPULSE COUNTER
(TYPICAL CONNECTIONS)

NOTE:
WHEN MAKING TESTS FROM PBX OFF PREMISES STATION USE 2W6A CORD (OR EQUIV) WITH 6A SET AND 2W24A CORD (OR EQUIV) WITH 3A SET.
WHEN MAKING TESTS FROM TEST JACK OF SELECTOR SWITCH AT SXS PBX USE 3P2A CORD (OR EQUIV) WITH 6A SET AND 4P4B CORD (OR EQUIV) WITH 3A SET.



3A NOISE MEASURING SET
(TYPICAL SETTINGS AND CONNECTIONS)

Fig. 1—Typical Connections and Settings of 3A Noise Measuring Set and 6A Impulse Counter



NOTES:
1. A HOLDING CIRCUIT SUCH AS SD-96540-01 (OR EQUIVALENT) OR A 2AB TTS IS REQUIRED TO PROVIDE TRUNK HOLDING. SEE PAR 1.10.
2. SOME LARGE DIAL PBXS MAY BE EQUIPPED WITH TRANSMISSION TEST LINES. PER SD-98100-01. IN THIS CASE TESTS CAN BE MADE FROM THE CENTRAL OFFICE.

Fig. 2—Typical Transmission Arrangement—1000 Hz and Noise Measurements—PBX Central Office Trunks—Serving Central Office to PBX

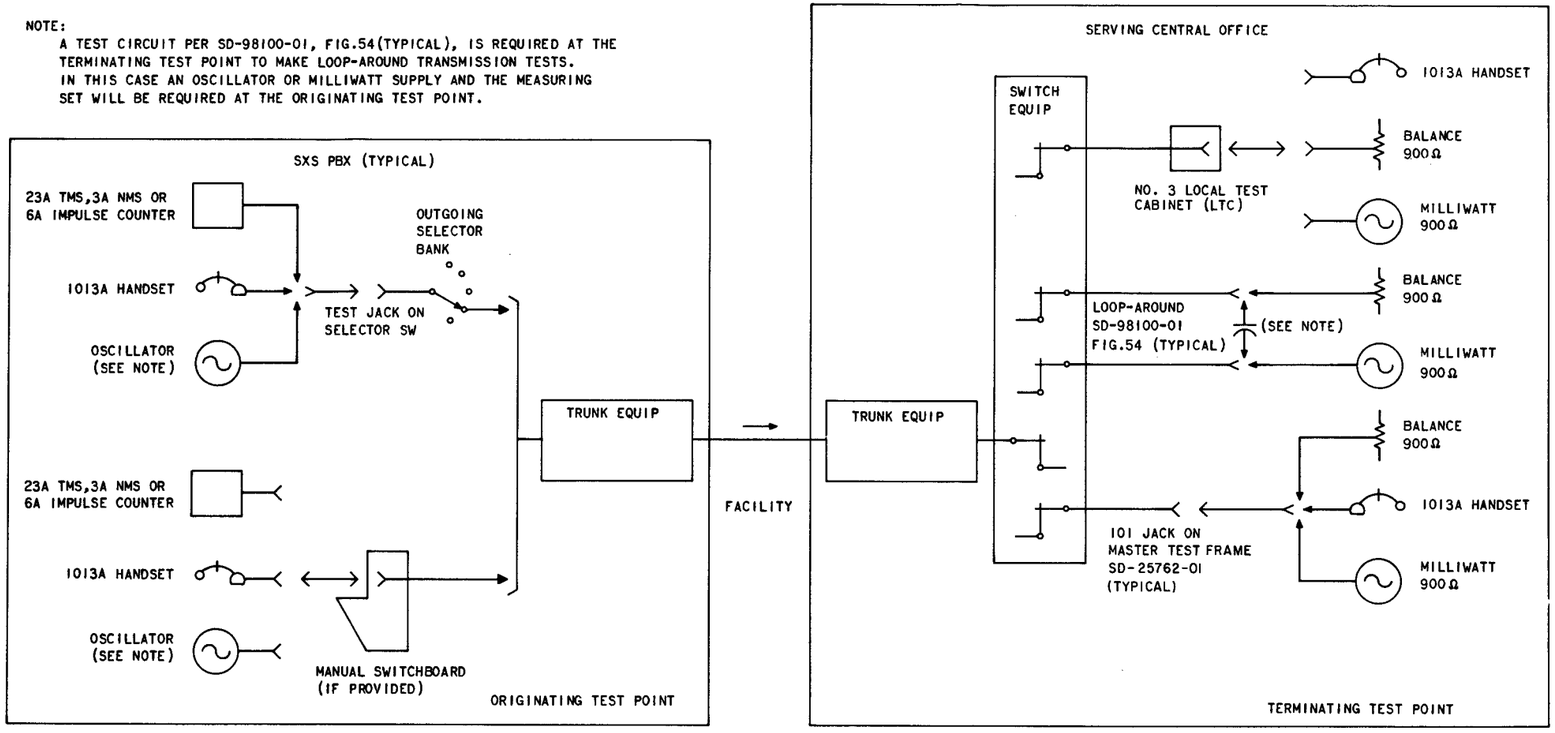
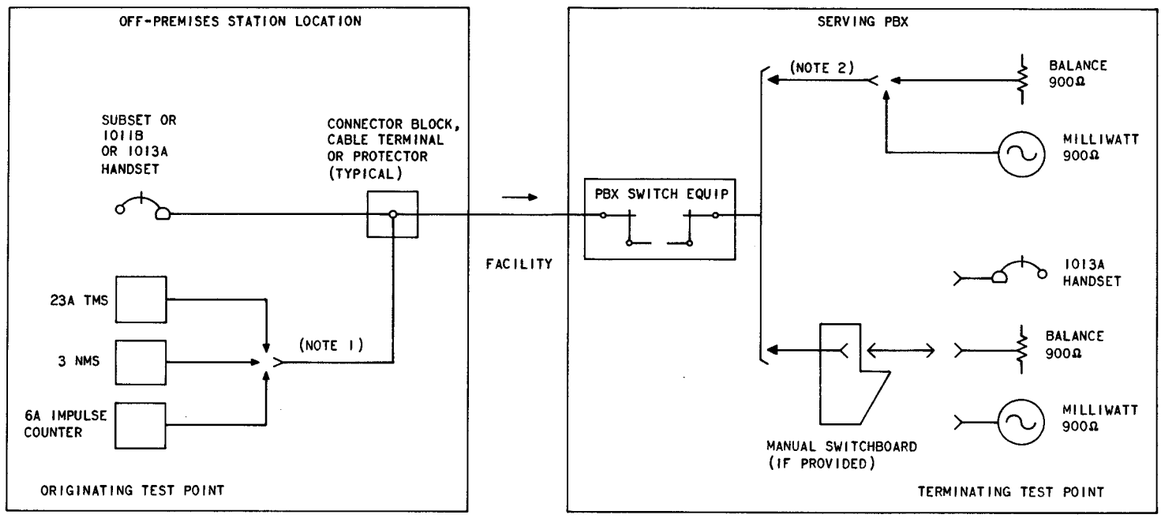
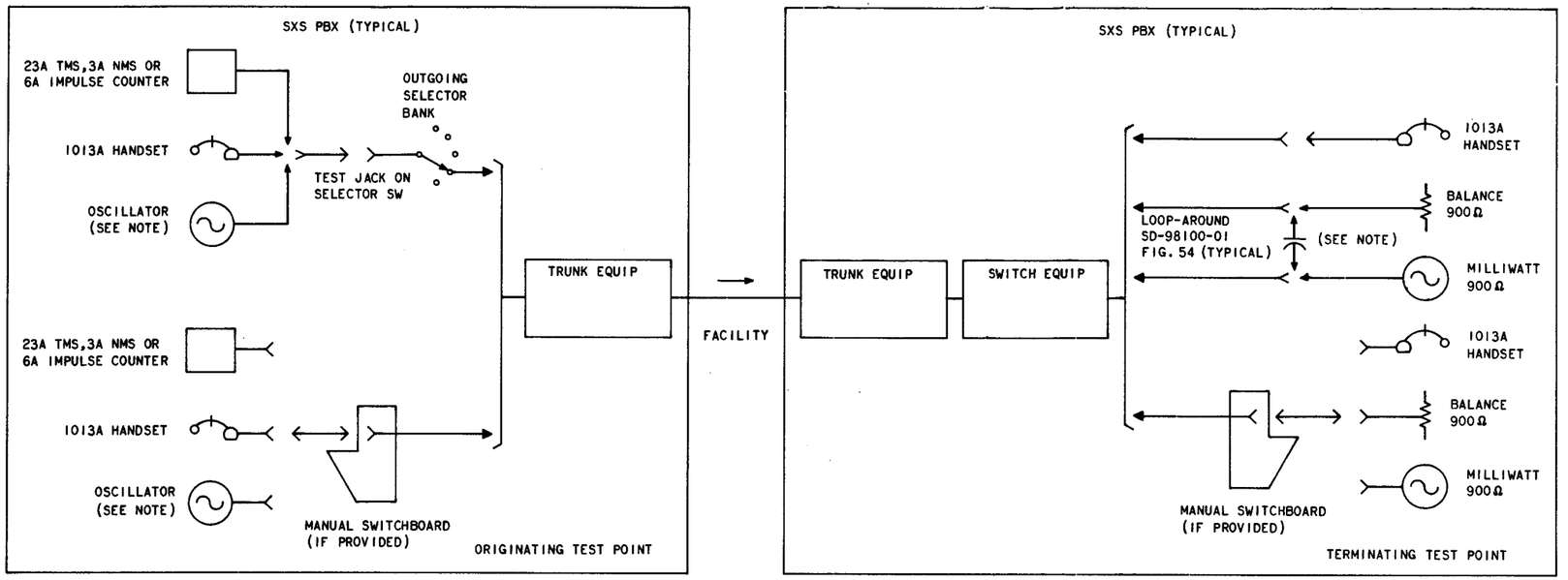


Fig. 3—Typical Transmission Arrangement—1000 Hz and Noise Measurements—PBX Central Office Trunks—PBX to Serving Central Office



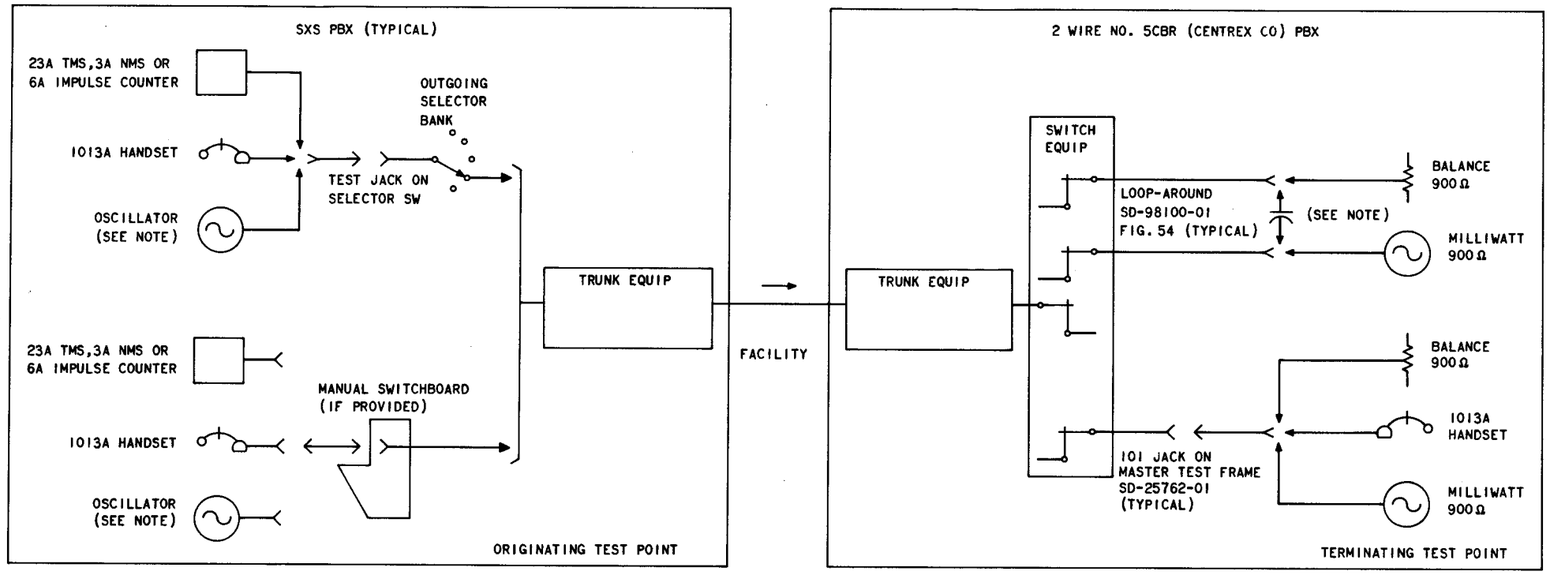
NOTES:
1. WHEN MAKING NOISE TESTS FROM THE OFF-PREMISES STATION LOCATION, A 274L INDUCTOR CONNECTED THROUGH A G.R. 274MB PLUG (TYPICAL) WILL BE REQUIRED TO HOLD THE LINE UNDER TEST. SEE FIG. 1 FOR A TYPICAL CONNECTION.
2. SOME LARGE DIAL PBXS MAY BE EQUIPPED WITH TRANSMISSION TEST LINES PER SD-98100-01.

Fig. 4—Typical Transmission Arrangement—1000 Hz and Noise Measurements—PBX Off-Premises Station Lines



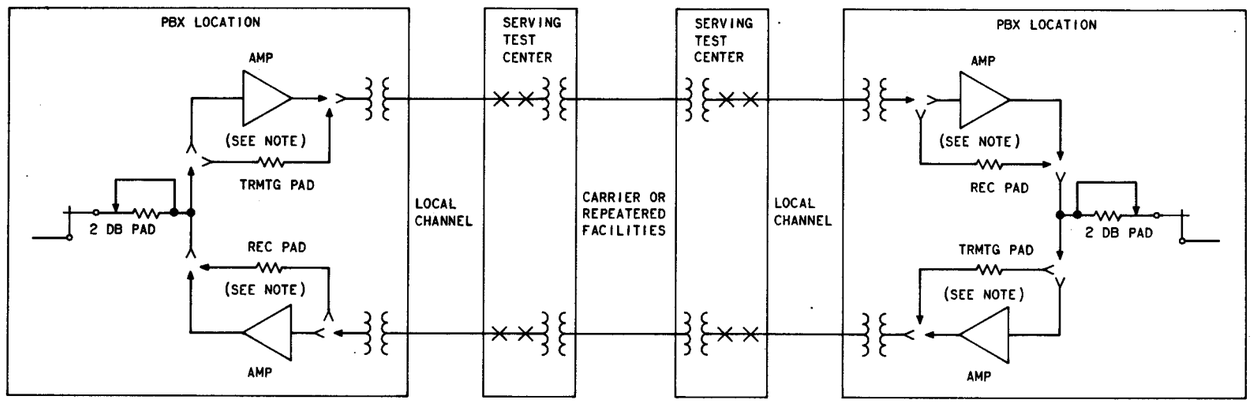
NOTE:
A TEST CIRCUIT PER SD-98100-01, FIG. 54 (TYPICAL), IS REQUIRED AT THE TERMINATING TEST POINT TO MAKE LOOP-AROUND TRANSMISSION TESTS. IN THIS CASE AN OSCILLATOR OR MILLIWATT SUPPLY AND THE MEASURING SET WILL BE REQUIRED AT THE ORIGINATING TEST POINT.

Fig. 5—Typical Transmission Arrangement—1000 Hz and Noise Measurements—PBX Tie Trunks—SXS PBX to SXS PBX



NOTE:
A TEST CIRCUIT PER SD-98100-01,FIG.54 (TYPICAL), IS REQUIRED AT THE TERMINATING TEST POINT TO MAKE LOOP-AROUND TRANSMISSION TESTS. IN THIS CASE AN OSCILLATOR OR MILLIWATT SUPPLY AND THE MEASURING SET WILL BE REQUIRED AT THE ORIGINATING TEST POINT.SEE PAR 1.04

Fig. 6—Typical Transmission Arrangement—1000 Hz and Noise Measurements—PBX Tie Trunks—SXS to 2-Wire No. 5 CSBR (CENTREX CO) PBX



NOTE:
WHERE 227 TYPE AMPLIFIERS ARE USED AS PART OF THE V-4 TERMINAL REPEATER, THE TRMTG AND REC PADS AT THE PBX WILL NOT BE PROVIDED.

Fig. 7—Typical Layout, Long Haul Tie Trunk