# TROUBLE LOCATION TESTS ON SUBSCRIBER CABLE PAIRS USING VOICE-FREQUENCY SWEEP TEST SETS AT SXS TEST DISTRIBUTORS

## 1. GENERAL

**1.01** This section describes the procedures for making voice-frequency sweep tests on subscriber cable pairs at Step-by-Step Test Distributors.

**1.02** The general theory of sweep testing is described in Section 330-450-100. Its application to subscriber loops is discussed in Section 330-450-102. The analysis and interpretation of sweep patterns as needed for precision location of troubles is described in Section 330-450-507.

## 2. APPARATUS

**2.01** The following items of equipment are required for all tests:

(1) Voice-Frequency Sweep Test Set meeting the general requirements in Section 330-450-100.

(2) Accessory Arrangement of 565GK Telephone Set per Section 330-450-102, Figs. 1-3 (furnish locally).

(3) Decade Capacitor — 3 decade, .001-1.110 MF range 1% accuracy, 7A, G.R. 1419A or equivalent.

(4) Cord, P3E, 3 ft., equipped with one 310 plug and one plug to match sweep set.

(5) Cord, P3N, 6 ft., equipped with one 310 plug and one 241A plug (3P17B).

(6) Test Distributor, SD-32007-01 or equivalent.

(7) Cord, 2W6A or equivalent equipped with one 310 plug and two alligator clips.

(8) Handset, 1011G, equipped with 2W37A cord or equivalent, terminated.

(9) Voltmeter — KS-14510 or equivalent arranged to terminate through 310 plug.

(10) 3A Noise Measuring Set. (See Section 103-611-100.)

(11) 96A Test Set. (See Section 106-230-105.)

(12) Cord, 3W1A.

**2.02** The following item is required for trouble location tests per Section 330-450-507:

*Artificial Cable Kit* — Western Electric 1A ACK or equivalent.

**2.03** The sweep set requires a 117V.AC power outlet and suitable ground, or the set may be equipped with a 3-wire power cord. The telephone set lamps may be activated with AC power by providing a 2012A transformer wired locally as described in Fig. 1 of Section 330-450-102.

**2.04** It will usually be most convenient to arrange the test apparatus on a cart that can be readily moved out of the way as necessary for other operations. The sweep set should be arranged for direct viewing to prevent reading errors.

## 3. PREPARATIONS FOR TESTING

**3.01** Connect the test apparatus as shown in Fig. 1. The numbers on the figure refer to the items in the apparatus list. The station arrangement is connected to the terminal strip on the test distributor, and the 1011G handset is connected to the test jack.

**3.02** Connect the sweep test set to a suitable ground and plug the power cord into a 117V.AC outlet. When the set has warmed up sufficiently, calibrate it in accordance with the manufacturer's manual.

*Note:* Do not allow the spot to stand in one location on the scope face for extended periods of time.

3.03 The voltmeter is adjusted to measure C.O. battery voltage.

3.04 The telephone handset remains on-hook and the exclusion key normal (down) for all tests. The 1011G handset is used to dial numbers and to provide the proper sleeve condition to the test distributor to hold a line for testing.

3.05 The sweep set is adjusted for impedance measurements or as required for each test.

## 4. TEST PROCEDURE

### (A) To Seize a Loop

4.01 Operate the DIAL button on the telephone set. Connect the 1011G handset as shown in Fig. 1 and dial the telephone number of the desired line.

4.02 Voltage on the line indicates a call in progress. If there is no call in progress, operate the TEST PAIR button on the telephone set. The characteristic curve of the pair will appear on the sweep set.

4.03 When testing is complete, release the line by disconnecting the 1011G handset.

### (B) To Make Sweep Tests

4.04 Operate the TEST PAIR button on the telephone set. The characteristic curve of the pair will appear on the sweep set.

4.05 To measure tip-ground characteristics, operate the TEST TIP button on the telephone set. To measure ring-ground characteristics, operate the TEST RING button on the telephone set.

### (C) To Make Other Tests

4.06 To make shunt capacitance measurements, operate the CAL button on the telephone set. This connects the decade capacitor to the sweep set in place of the pair under test. The procedure for measurement of shunt capacitance and conversion of measurements to pair length is described in Section 330-450-507.

4.07 If noise measurements are requested, operate the NMS key of the telephone set. The 3A NMS is connected to the pair in place of the sweep set. The function switch of the NMS should be set to 900. The receiver of the NMS may be used as a monitor.

4.08 The C MSG network is used in the 3A NMS for noise measurements. When a widening of the sweep trace due to noise is noted, noise measurements may be made first with the C MSG network and then with the 3KC FLAT network. Increases of 15 db or more with 3KC FLAT weighting would indicate the widening of the sweep trace may be caused by 60CPS voltage induced in the pair.

4.09 Shorts, opens, crosses, and grounds may occasionally be encountered. These troubles may be located and cleared using the 96A Test Set connected in place of the NMS. The procedures are described in Section 634-310-501.

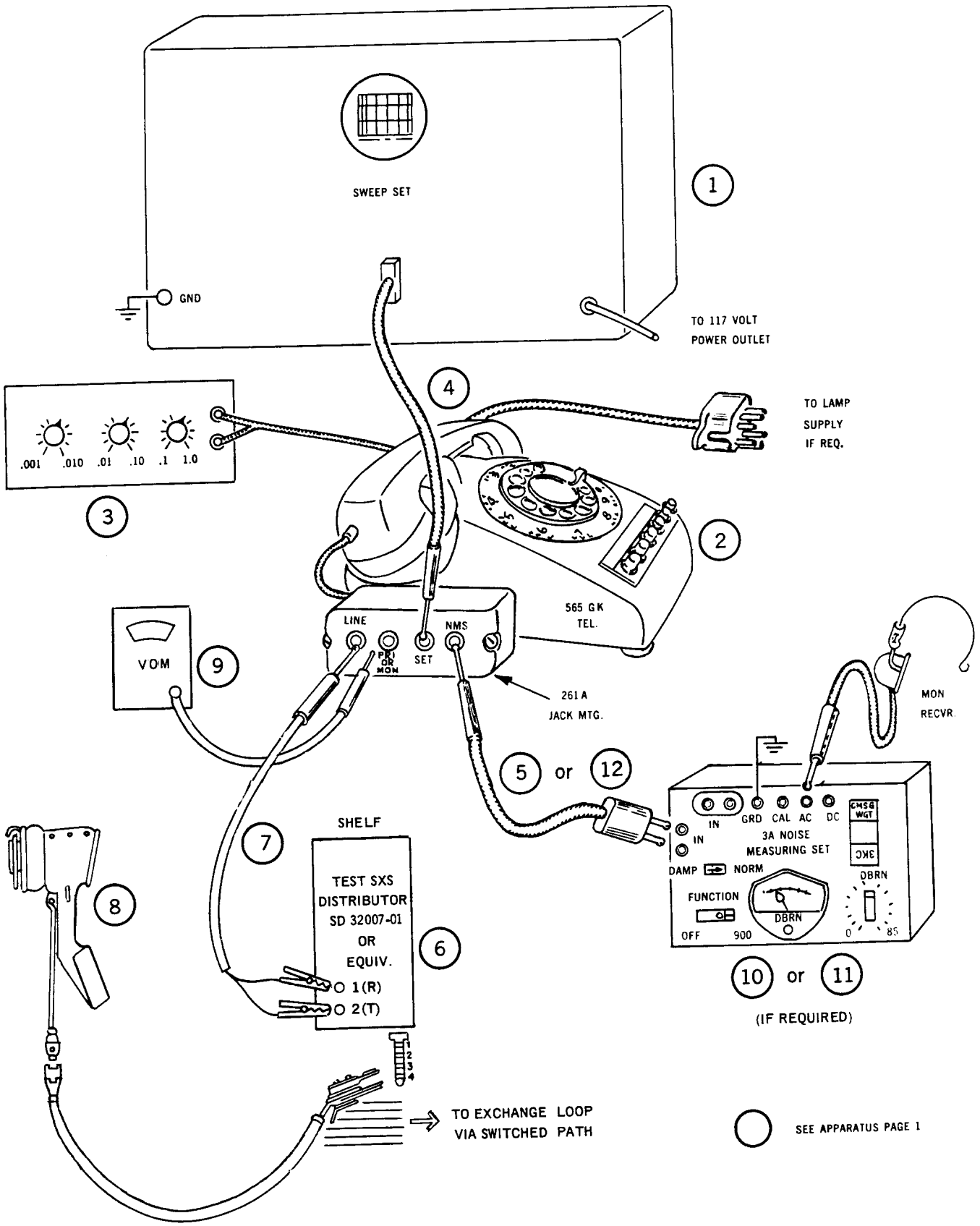
SWEEP SET
1
GND
TO 117 VOLT
POWER OUTLET
4
TO LAMP
SUPPLY
IF REQ.
.001 .010 .01 .10 .1 1.0
3
2
565 GK
TEL.
LINE
PRI OR MON
SET
NMS
VOM
9
261 A
JACK MTG.
MON
RECVR.
5 or 12
IN
IN
GRD CAL AC DC
CMSG WGT
3K
3A NOISE
MEASURING SET
DAMP NORM
DBRN
FUNCTION
DBRN
OFF 900
0 85
10 or 11
(IF REQUIRED)
SHELF
7
TEST SXS
DISTRIBUTOR
SD 32007-01
OR
EQUIV.
6
O 1(R)
O 2(T)
8
1
2
3
4
TO EXCHANGE LOOP
VIA SWITCHED PATH
SEE APPARATUS PAGE 1

Figure 1