

**TROUBLE LOCATION TESTS
ON SUBSCRIBER CABLE PAIRS
USING VOICE-FREQUENCY SWEEP TEST SETS
AT THE MAIN DISTRIBUTING FRAME**

1. GENERAL

1.01 This section describes the procedures for making voice-frequency sweep tests on subscriber cable pairs at the main distributing frame.

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 transmission 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) Noise Measuring Set — J94003A (3A) equipped with 497A Network (see Section 103-611-100).
- (3) Accessory Arrangement of 565 GK Telephone Set per Section 330-450-102, Figs. 1-3 (furnish locally).
- (4) Decade Capacitor — 3 decade, .001-1.110 μ f range 1% accuracy, 7A, General Radio 1419A or equivalent.
- (5) Cord, P3N, 6 ft., equipped with one 310 plug and one 241A plug (3P17B).
- (6) Cord, P3E, 3 ft., equipped with one 310 plug and one plug to match sweep set.
- (7) Cord with one 310 plug and one shoe or two clips for connections to MDF.

(8) 96A Test Set (refer to Section 106-230-105).

(9) Cord, 3W1A.

2.02 The following item is required for some trouble location tests as described in 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 ground, or it should 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 indicated in Section 330-450-102, Fig. 1.

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. More accurate tests will result if the sweep set is positioned to permit direct viewing. Viewing from an angle may cause 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.

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 for extended periods of time as holes may be permanently burned in the coating on the face of the scope.

SECTION 330-450-504

3.03 The 3A NMS is used to detect calls in progress without causing interference. For this purpose, the NMS is arranged with:

- (1) FUNCTION switch to BRDG.
- (2) DAMP-NORM switch to NORM.
- (3) DBRN switch to 85.
- (4) C-497A network to C MSG.
- (5) Monitor receiver connect to MON-AC jack.

3.04 The receiver of the handset remains on-hook and the exclusion key normal (down) for all tests.

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

Note: Do not put out of service or make connections to pairs at the main frame if special safeguarding measures (SSM) or special service protection devices (SSP) are installed, unless a circuit release has been obtained.

4. TEST PROCEDURES

(A) To Seize a Loop

- 4.01** Operate the NMS button on the telephone set.
- 4.02** Connect the test cord from the LINE jack on the telephone set to the cable pair at the line side of the heat coils.
- 4.03** Monitor the pair with the monitor receiver of the 3A NMS. If a call is not in progress, remove the heat coils and begin testing.

(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 make tip-ground tests, operate the TEST TIP button on the telephone set. To make ring-ground tests, operate the TEST RING button on the telephone set.

4.06 To test for main frame bridges or unknown jumpers, operate the TEST PAIR key and reinsert the heat coils. The sweep set must be equipped with a DC blocking capacitor for this test.

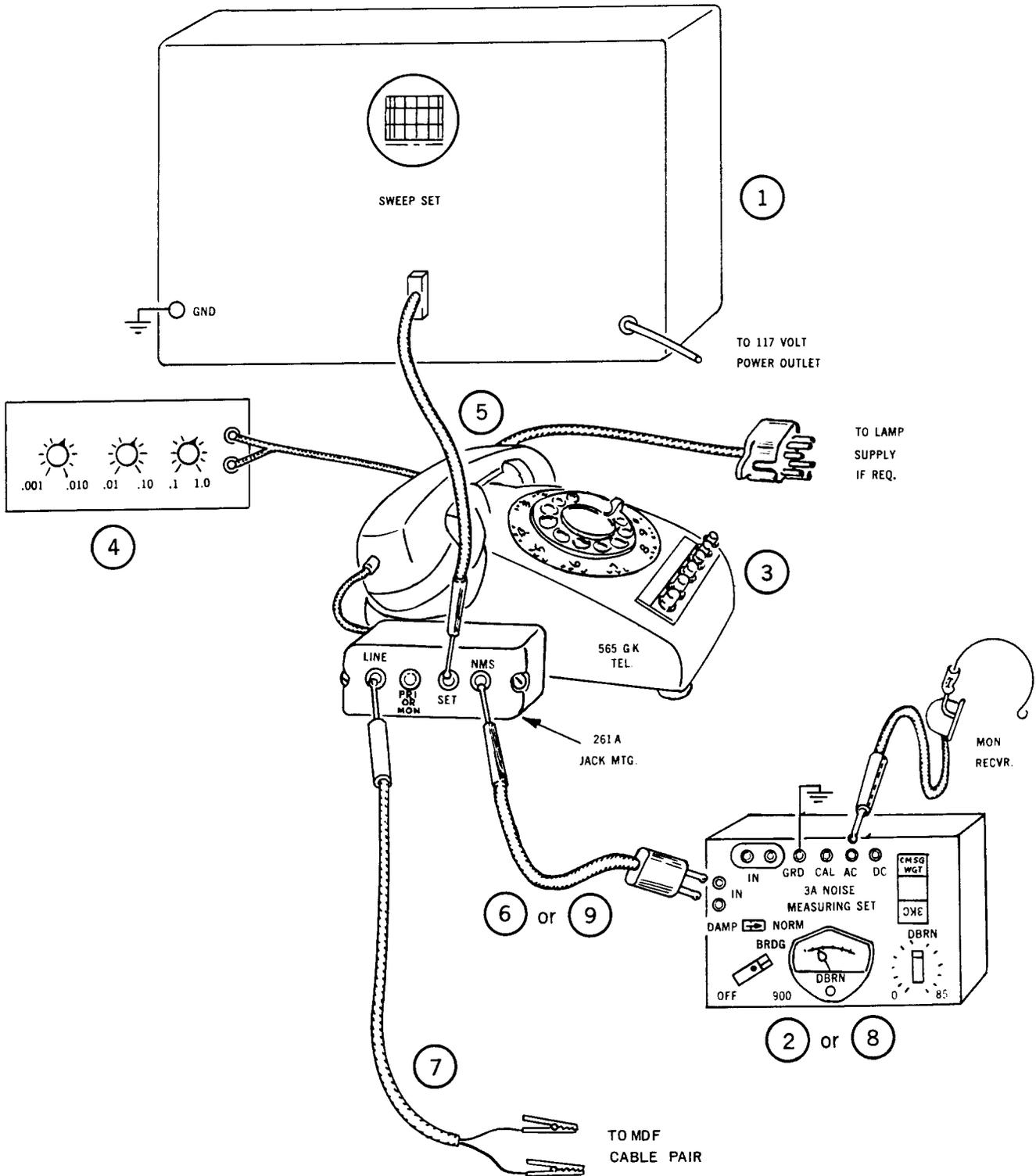
(C) To Make Other Tests

4.07 If noise measurements are required, operate the NMS key and set the function switch at 900. The C MSG weighting network is used.

4.08 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. Differences of 15 db or more would indicate that the widening of the trace may be caused by 60 cps EMF.

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

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



SEE APPARATUS PAGE 1

Fig. 1 - Test Connections