C-9945 VERIFIER TEST SET
DESCRIPTION AND OPERATION

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1. GENERAL

1.01 This section covers the description, operation, and applications of the C-9945 Verifier test set. See Figure 1.

1.02 The Verifier is a portable, self-powered test set which provides facilities for checking non-working cable pairs for opens, shorts, crosses and grounds. It is designed for use with front tap shoes, which allow direct connection to a 50-pair count on a main frame or terminal. However, single cable pairs may be tested by using the paired test cord.

1.03 Typical applications of the Verifier include pre-testing for cable transfers, pair reclamation programs, updating of cable records, cable completion tests, main frame and terminal checks.

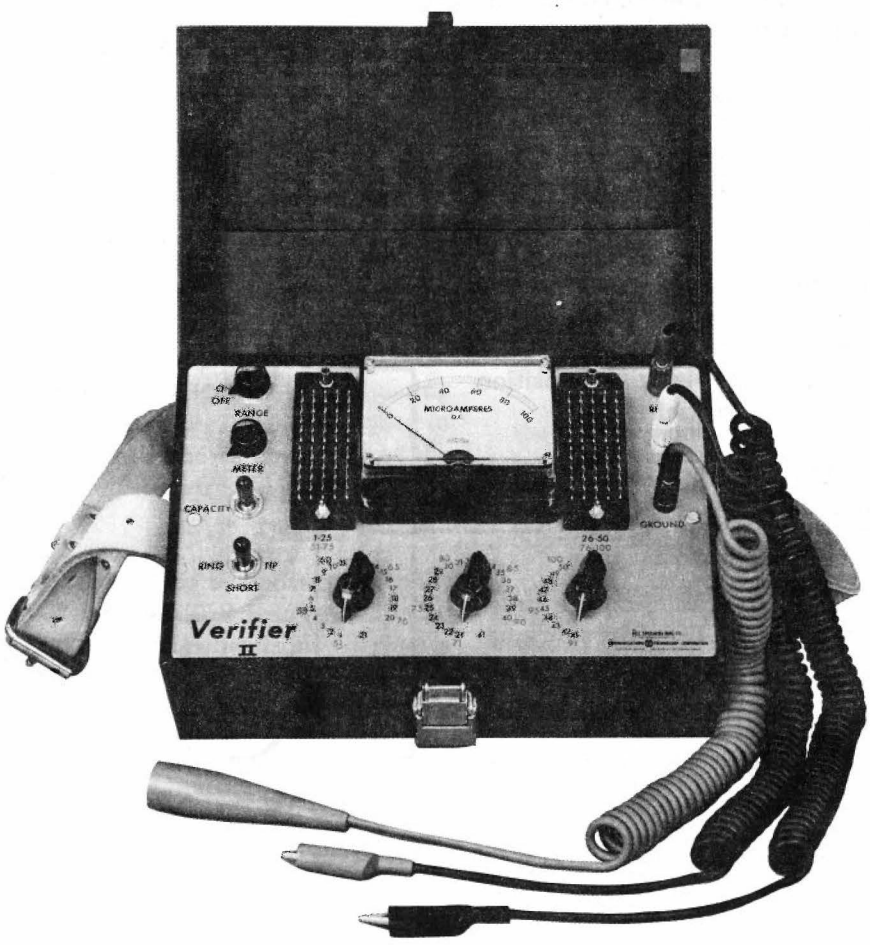

Figure 1
C-9945 VERIFIER TEST SET

2. DESCRIPTION

2.01 The C-9945 Verifier is a volt-ohmmeter type instrument with the following characteristics:

(a) A 0-100 microampere meter, protected with back-to-back diodes, is used as the indicating device.

(b) Two 25-pair Cinch Jones male connectors are provided for attachment, through connector cables, to a front tap shoe mounted on a 50-pair count of a Main Distribution Frame or building terminal.

(c) Three (3) rotary selector switches, with a total of 50 positions, provide rapid pair selection for testing.

(d) RING, TIP, and GROUND binding posts, with test leads, are provided for individual pair checks and for grounding the Verifier. These binding posts may also be used to connect the Verifier to other test equipment, in which case the Verifier acts as a rapid access switch, (See 4.12.)

(e) A 3-position SHORT toggle switch selects the ring-to-ground, tip-to-ground, and short circuit test functions and also selects ring or tip for capacity testing in conjunction with the CAPACITY switch.

(f) A CAPACITY toggle switch performs the capacitance test function for rapid fault detection (with the 3-position switch in the SHORT position) or detailed testing (with the 3-position switch in the RING or TIP position).

(g) An ON-OFF/RANGE control knob turns the Verifier on and off and adjusts the swing of the meter needle in the capacitance test function.

(h) A METER control knob calibrates the meter for full scale deflection in the short test function.

(i) Power for the Verifier is supplied by one Eveready #455 (Western Electric KS14369) 45-volt battery.

(j) The Verifier is housed in a rugged 10-1/4" x 6-1/4" x 6-3/4" steel case with a heavy leather carrying strap.

Note: Front tap shoes and test connectors for use on main frames and terminal equipment must be ordered separately.

3. PRECAUTIONS

3.01 Always ground the Verifier to the main frame, terminal or cable sheath before operating.

3.02 **Do not contact working pairs.** This will result in noisy circuits.

3.03 The Verifier meter movement may be damaged by excessive shock or other abuse; use care when transporting or working with the instrument.

3.04 The battery in the Verifier is affected by temperature. The instrument should be protected from temperature extremes when in use and in storage. Operating range of the batteries is +40° to +110° F.

3.05 Do not leave a discharged battery in the Verifier. For relatively long periods of storage (months), remove the battery.

4. SETUP AND OPERATION

Setup

4.01 See Figure 2 for setup when testing non-working pairs at a main frame or terminals where front tap shoes may be used.

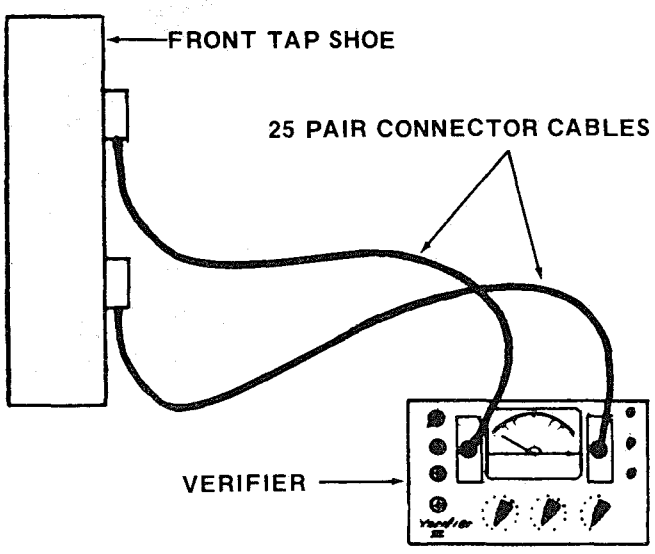

Figure 2
SETUP FOR FRONT TAP SHOE OPERATION

4.02 When making a main frame check or when testing vacant pairs in a working cable, use the single pair test cord for making the tests.

4.03 The Verifier may also function as a 50-position switch for rapid access to individual pairs that require testing with other test equipment. The selected pair is available on the front panel RING and TIP terminals.

4.04 Begin setup by grounding the Verifier to the Main Distribution Frame, terminal or cable ground. Use the GROUND lead provided.

4.05 Test the Verifier battery by turning the ON-OFF/RANGE control knob to ON. Connect the RING and TIP test leads together and adjust the METER control to obtain a reading of 100. Replace the battery if a reading of 100 can not be obtained.

Note: The SHORT and CAPACITY toggle switches must both be in the vertical position for this test. Disconnect the RING and TIP test leads after testing the battery and setting the meter.

Operation

4.06 The Verifier operates as a comparative device in testing cable pairs, both in the SHORT and CAPACITY test modes. It does not provide a measurement of the actual value of resistance or capacitance of a cable pair, but rather indicates the characteristics of this pair as related to others in the same complement. A reference SHORT reading might be established when the battery is tested (by connecting the RING and TIP leads together and adjusting the METER control for a reading of 100, described in 4.05); however, the use of a known good pair of the complement being tested is required to set a reference CAPACITY reading.

4.07 Connect the Verifier to a known good pair, using the RING and TIP test leads, or by operating the selector switches (when front tap shoe is being used).

Note: The selector switches operate in a progressive manner; the first switch permits selection of pairs 1-20, then must be rotated to 21 to permit selection of pairs 21-40 on the second switch. Likewise, the second switch must be rotated to 41 to permit selection of pairs 41-50 on the third switch.

Make sure the SHORT switch is upright, then move the CAPACITY switch to the left. The meter needle should swing upwards. Adjust the RANGE control to move the indicator to an even scale division (i.e. 30, 40, 60) between 20 and 80 on the meter. (The actual value of this reading is unimportant, as it serves only as a reference; a high scale reading should be chosen for ease of measurement, if possible.) Note this reading as the reference RING TO TIP CAPACITY, then move the SHORT switch first to RING, then TIP. These meter readings should be equal and higher than the ring to tip capacity reading. Note this value as the reference one-side to ground capacity reading, then return the SHORT switch to the upright position.

4.08 The RING and TIP test leads and the selector switches may be used interchangeably to make pair tests. However, to avoid false indications, do not attempt to use the RING and TIP test leads for making short and capacity tests when a front tap shoe is in use.

4.09 The SHORT and CAPACITY toggle switches actuate the Verifier testing functions as shown in Chart A.

CHART A

TEST	CAPACITY SWITCH	SHORT SWITCH
Ring To Tip Capacity	Left	Upright
Ring To Ground Capacity	Left	Ring (left)
Tip To Ground Capacity	Left	Tip (right)
Short Circuit	Upright	Upright
Ring Ground	Upright	Ring (left)
Tip Ground	Upright	Tip (right)

4.10 Short, ground and capacity tests may be made individually on each pair if desired. However, the most rapid means of fault detection is to perform a rapid ring to tip capacity test on all pairs first. Suspect pairs can then be given additional tests to determine the exact nature of the trouble. To make the rapid ring to tip capacity test, set the SHORT and CAPACITY switches as described in 4.09, then proceed as follows:

Rotate the selector switches in sequence through all 50 positions, pausing at each position until the meter needle stabilizes.

Note the pair number and reading of any position which exhibits an abnormal indication. (Any reading other than the ring to tip capacity reference should be considered abnormal.)

Note: Some good pairs may read slightly above or below reference due to normal capacity differences; however, these pairs should be noted for further tests.

4.11 Once suspect pairs are identified, detailed short and capacity tests should be made to determine the exact nature of the trouble. Use Charts B and C to select the appropriate tests for each suspect pair, based on the reading obtained in the ring to tip capacity test.

CHART B

RING TO TIP CAPACITY TEST EVALUATION		
METER READING	**POSSIBLE FAULT**	**VERIFY WITH TEST NO.**
Ring To Tip Capacity Reference	None	—
Below Ring To Tip Capacity Reference	Distant Open	1, 2
Much Below Ring To Tip Capacity Reference	Nearby Open	1, 2
Above Ring To Tip Capacity Reference	One Side Grounded or Crossed	1, 2, 4, 5
Zero	Short, Both Sides Grounded, or Very Close Full Open	1, 2, 3, 4, 5

4.12 Cable records should be brought up to date as trouble is identified. When all pairs of a complement have been tested, move the front tap shoe to the next count to be verified and repeat the steps in 4.06 through 4.11.

4.13 The Verifier may be used as a rapid access switch for additional test equipment such as a VOM, tone generator, scope, etc. To do this, first turn the ON-OFF/RANGE control knob to OFF, then connect the instrument to be used to the RING, TIP and GROUND binding posts. Pair access for the intended test may then be accomplished with the use of the selector switches.

4.14 When all testing is completed, turn off the ON-OFF/RANGE control knob.

CHART C

DETAILED SHORT AND CAPACITY TESTS		
TEST	**METER READING**	**PAIR CONDITION**
1. Ring To Ground Capacity	One-Side-To-Ground Capacity Reference	Ring Side Good
	Below One-Side-To-Ground Capacity Reference	Ring Side Open
	Above One-Side-To-Ground Capacity Reference	Ring Crossed
	Zero	Ring Ground or Very Close Ring Open (See Ring Ground Test Below)
2. Tip To Ground Capacity	One-Side-To-Ground Capacity Reference	Tip Side Good
	Below One-Side-To-Ground Capacity Reference	Tip Side Open
	Above One-Side-To-Ground Capacity Reference	Tip Crossed
	Zero	Tip Ground or Very Close Tip Open (See Tip Ground Test Below)
3. Short Circuit	Zero 100	Good Shorted Pair
4. Ring Ground	Zero 100	Ring Good Ring Ground
5. Tip Ground	Zero 100	Tip Good Tip Ground
NOTE: The general location of an open can usually be determined by the deflection of the meter needle in relationship to the one-side-to-ground reference point.		

5. MAINTENANCE

5.01 Maintenance of the set should not be attempted other than replacing weak batteries and keeping the set clean.

5.02 Return the set to the manufacturer for repairs.