E-TYPE TELEPHONE REPEATERS

TAKING REPEATER OUT OF SERVICE AND ANALYZING TROUBLE

1. GENERAL

1.01 This and associated sections describe the methods for taking E1, E2, E13, and E23 telephone repeaters out of service and for analyzing trouble conditions.

1.02 The associated sections are as follows:

Section	Description
332-200-501	Taking an E1 or E13 Repeater Out of Service and Preparing for Trouble Analysis
332-200-502	Taking an E2 or E23 Repeater Out of Service and Preparing for Trouble Analysis
332-200-503	General Procedures for Trouble Analysis for a Line Equipped with an E1, E2, E13, or E23 Repeater — When Little Gain, No Gain, or Poor Transmission is Indicated
332-200-504	General Procedures for Trouble Analysis for a Line Equipped with an E1, E2, E13, or E23 Repeater — When Instability or Excessive Gain is Indicated

1.03 Each of the associated sections includes a flow diagram for the convenience of persons familiar with the test procedure.

2. METHODS OF TAKING REPEATER OUT OF SERVICE AND PREPARING FOR TROUBLE ANALYSIS

2.01 In some cases service may be suspended temporarily on the line until trouble is cleared, while in other cases it may be necessary to maintain service over the line without the repeater.

2.02 Where service may be suspended temporarily, the line should be removed from service until the trouble is cleared. The repeater, if it is singing, should be disabled until actual work of clearing the trouble is begun; otherwise noise may be induced into adjacent circuits.

2.03 Where it is necessary to continue service over the line, the repeater is disabled and the line is left in operation. The more common troubles in such cases can usually be cleared in the repeater while it is in this condition. However, if tests involving the associated line pairs are required, the line should be made busy for tests when permitted by service conditions. The repeater should not be returned to service until the trouble is cleared.

2.04 An E2 or E3 repeater may be disabled for a short period of time by means of a disabler plug inserted into pin jacks on the front of the repeater. Use of the plug does not interfere with continuity of the line. The disabler plug consists of a 354A plug with terminals bridged by a resistor of 1800 ohms ±5 per cent (KS-13490, List 1 or equivalent). The two pin jacks into which the plug is inserted are located at the right of pin jacks P- and C2 and are designated 2 and 3, respectively, on the inside of the repeater but are not designated on the outside of the repeater. E2 and E3 repeaters manufactured prior to late 1956 were provided with dummy plugs in pin jacks 2 and 3. In such repeaters, the dummy plugs must be removed to make the jacks accessible. The dummy plugs which are removed need not be restored to the jacks.

Caution: In order to avoid shortening tube life, use of the disabler plug in an E3 repeater should ordinarily be limited to a few days.

2.05 As an alternative to the method described in 2.04, the E2 or E3 repeater may be disabled by disengaging the repeater from the socket on the mounting shelf. A 680A tool should be used for the disengagement in order to prevent possible injury to personnel and damage to equipment. Where the E2 repeater position on the mounting shelf is provided with the automatic line-to-line connection switch, disengagement of the E2 repeater from the shelf socket does not interfere with continuity of the line. When the switch is not provided and the line must remain in service, the E2 repeater must be removed from the shelf and an E2 line connection plug per ED-92781-30, Group 4, inserted into the vacated E2 repeater shelf socket.

Caution: Whenever E2 or E3 repeaters are to be disengaged from the mounting shelf sockets, the heater voltage should be reduced before:

(a) One or more repeaters are disengaged on a shelf of four or fewer repeaters, or

(b) Two or more repeaters are disengaged on a shelf of more than four repeaters.

The heater voltage should be readjusted after the repeaters are disengaged and again after the repeaters are restored to the sockets.

2.06 Preparation for trouble analysis includes visual checks of the electron tubes, measurements, and adjustments of applied voltages in accordance with Section 332-200-501.

3. ANALYZING TROUBLES

3.01 The procedures for analyzing trouble conditions are arranged for use in connection with two general classifications of trouble reports:

(1) Where little gain, no gain, or poor transmission is indicated, and

(2) Where instability or high gain is indicated.

3.02 The procedures are applicable to lines equipped with E1 or E2 repeaters which are not combined with E3 repeaters or with combination E13 or E23 repeaters. The test operations are intended to make use of the E-repeater test set primarily. However, the 2G repeater test set may be used for tests involving uncombined E1 repeaters, also for tests involving E13 repeaters with the disadvantage of not having a test set network for substitution of the E3 repeater network, a feature of certain test operations.

3.03 The test operations consist of monitoring, various gain measurements, inspections and corrections for repeater network, and line irregularities, etc. The test operations are performed as appropriate and necessary, in accordance with flow diagrams, until the cause of trouble is determined.

3.04 In locating the causes of the more obscure troubles, reference to the simplified schematics of the repeaters and network components may be helpful. However, reference to the more complete information of the repeater circuit SD drawings may be necessary. Section 332-200-500 which describes procedures for tests and inspections of E-type repeaters contains the simplified schematics and lists the repeater circuit drawings.

4. TEST EQUIPMENT

4.01 The test equipment required for each test procedure is listed or otherwise referred to in the particular point section involved. The test equipment should be calibrated immediately before starting any series of tests.

Note: It is not necessary to use a blocking capacitor or a shunting resistor with the KS-14418 headset when monitoring E-type repeaters since the dc potentials at the monitoring points are less than 3 volts.