

SUBSCRIBER LOOP REMOTE MESSAGE REPEATER DESCRIPTION

1. GENERAL

1.01 This section provides a general description of the remote message repeater and its associated central office power and alarm circuit. The remote message repeater is used to provide voice-frequency gain on long multiparty or single-party subscriber loops.

2. DESCRIPTION

2.01 The remote message repeater system consists of a pole-mounted repeater cabinet (Fig. 1) equipped with a stub cable, lightning protector block, and connectors for plugging in two 596A panels. A power and alarm panel (J98623A), located in the central office, supplies power over a separate pair for each 596A panel and acts as an interface with the central office alarms. A view of the open cabinet illustrating the equipment mounting arrangement is shown in Fig. 2.

2.02 The 596A panel consists of a shelf for mounting six E6 repeaters; a circuit pack (CP1) (Fig. 3) containing power, alarm, and test circuits; and an 81A oscillator (CP2). The oscillator (900-Hz) is used to furnish the central office circuit with a signal indicating that the E6 repeaters in the remote cabinet are satisfactorily powered. A jack field is provided for checking repeater operation and testing subscriber lines.

2.03 The repeater cabinet (474A apparatus case) is weathertight, aluminum, 35 inches high, 26 inches wide, and 16 inches deep. A fully equipped repeater cabinet weighs approximately 220 pounds and can be pole-, pedestal-, or wall-mounted, as required.

2.04 An aluminum framework is built into the cabinet to bear the structural load when the unit is mounted to a wall or on a pole. Uprights

attached to the framework are used for mounting the 596A panels.

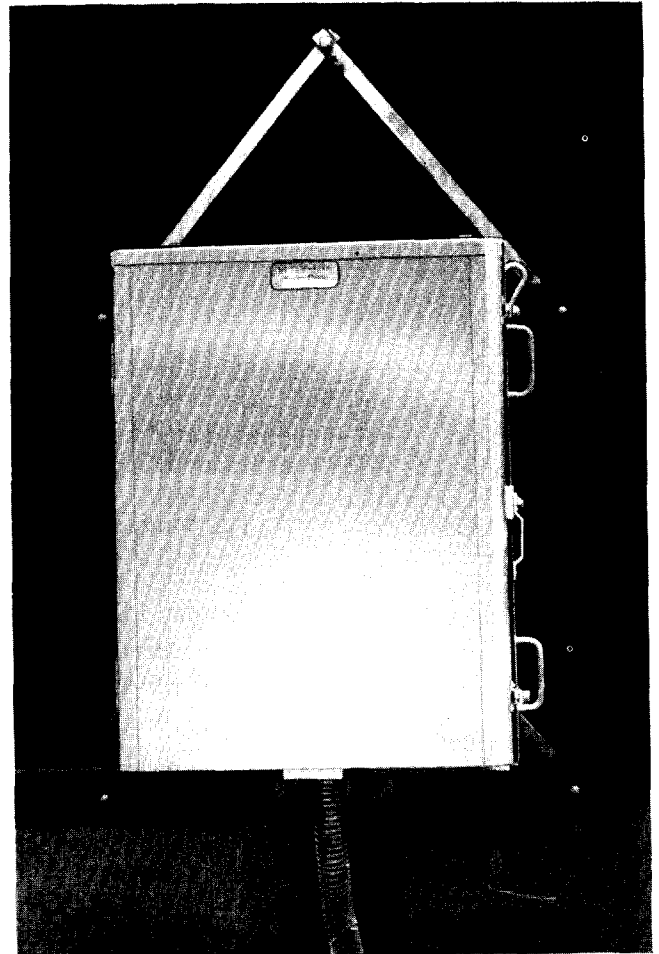


Fig. 1—Remote Message Repeater—Remote Cabinet

2.05 The central office power and alarm circuit (Fig. 4) consists of a mounting panel (J98623A, L1) equipped for plugging in two alarm circuit packs. Test jacks for measuring the power pair voltage and the level of the 900-Hz signal from the remote terminal are provided. Alarm (ALM)

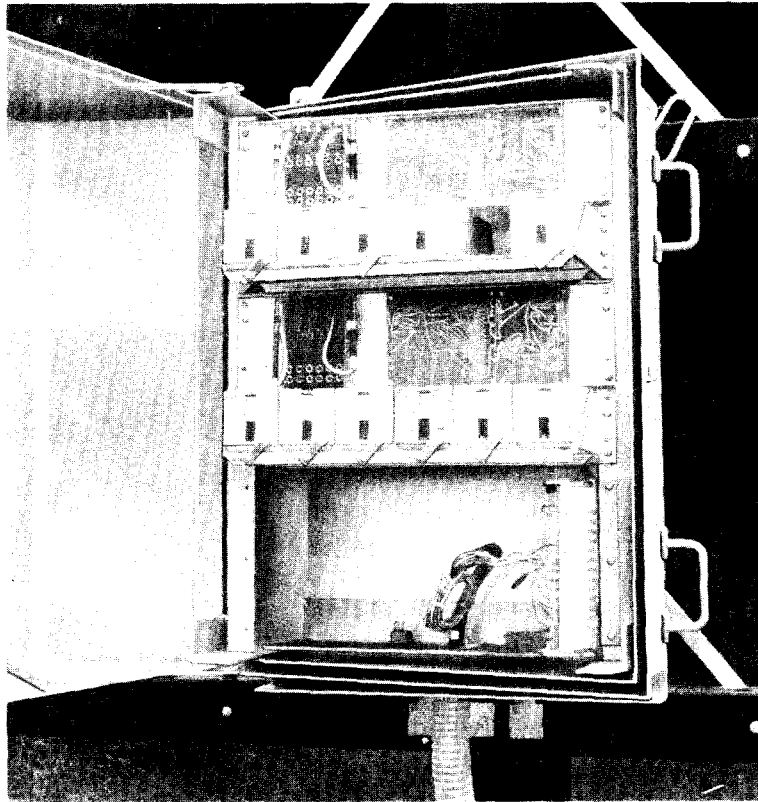


Fig. 2—Remote Message Repeater—Door Open

lamps and an alarm cut-off (ACO) key are used to indicate and retire alarms. Circuits which interface the central office alarm system are provided.

3. OPERATION

A. Remote Message Repeater (SD-99526-01)

3.01 The remote repeaters provide a means of amplifying voice frequencies in long subscriber loops. When the repeater is used in conjunction with a 96V dial long line circuit (J99334), located in the central office, the effective range of the loop is extended beyond the normal central office limits.

3.02 This circuit, using E6 repeaters, provides about 9 dB of gain for up to 12 multiparty or private lines with loops between 2800 and 3600 ohms from the central office. A block diagram of the system is shown in Fig. 5.

3.03 Power is supplied to the remote cabinet from the central office over separate power pairs

(one pair for each group of six repeaters). The voltage across the power pair and the E6 power terminals is continuously monitored. If the voltage is adequate for satisfactory operation (16V to 44V), a 900-Hz signal at -8 dBm is transmitted back to the central office via the power pair. If the voltage drops below 16V, the signal is removed resulting in an alarm at the central office. The 81A oscillator is used to supply the 900-Hz signal.

3.04 An E6 repeater, when unpowered, introduces a 10- to 15-dB loss. In order to reduce the overall circuit loss during a power pair failure, the series converters in the E6 repeater are shunted by the break contacts of the de-energized TBL relay. Carbon block protection is provided on both sides of the repeater to protect the circuitry from lightning surges.

B. Power and Alarm Circuit (SD-99527-01)

3.05 The power and alarm circuit (Fig. 6), located at the central office, supplies power for operating the E6 repeaters in the remote cabinet.

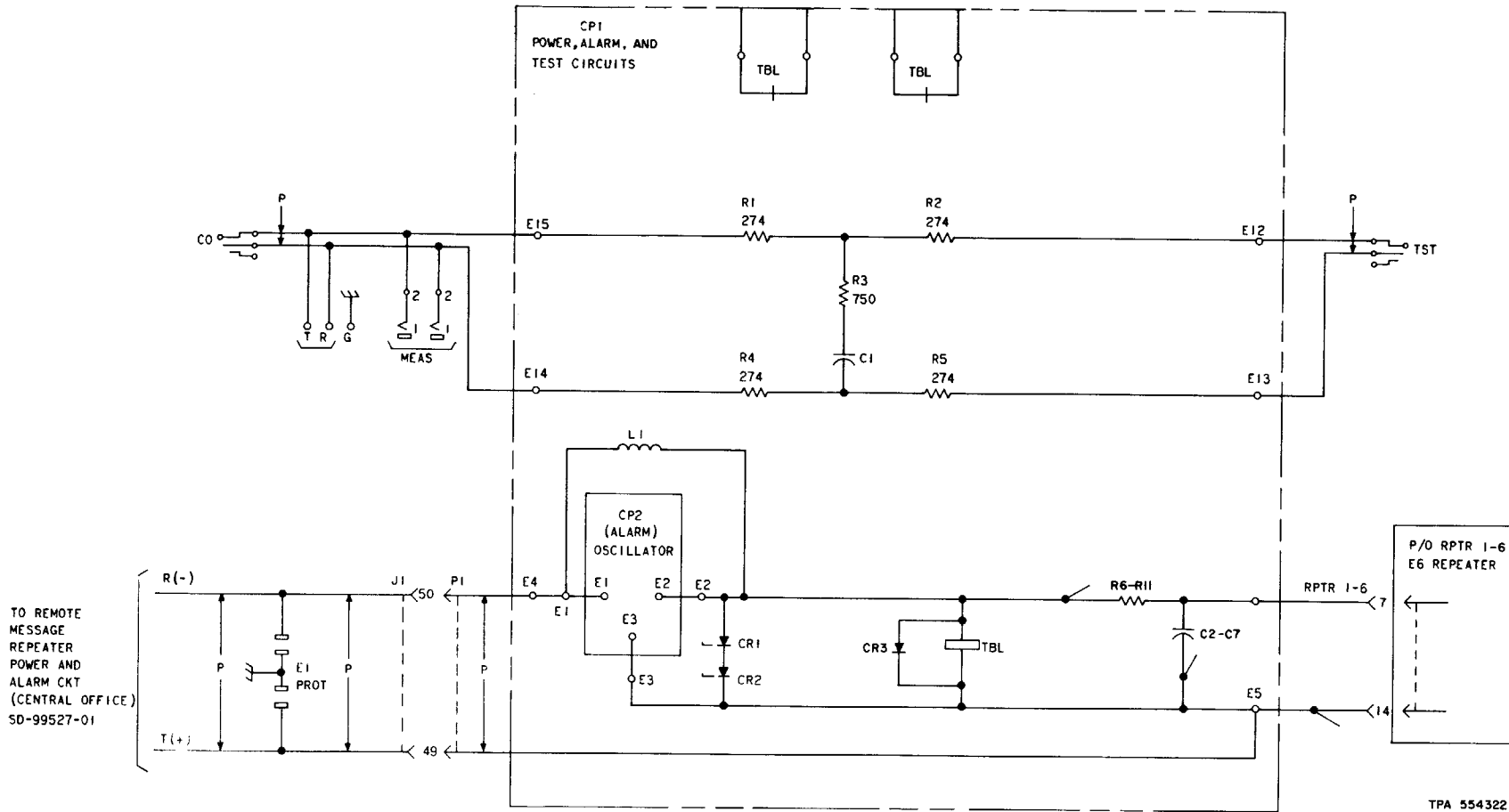


Fig. 3—CP1 Power, Alarm, and Test Circuits

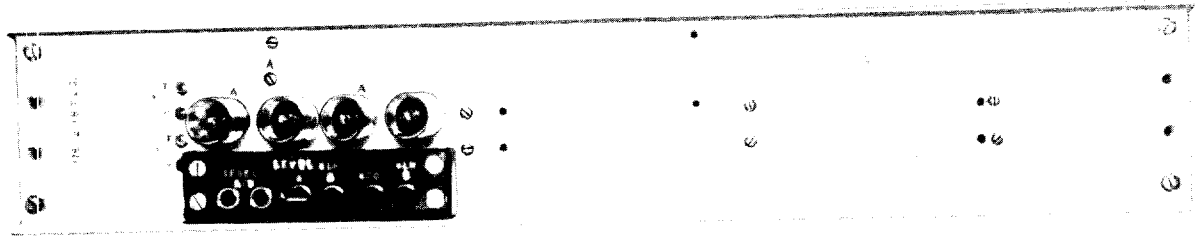
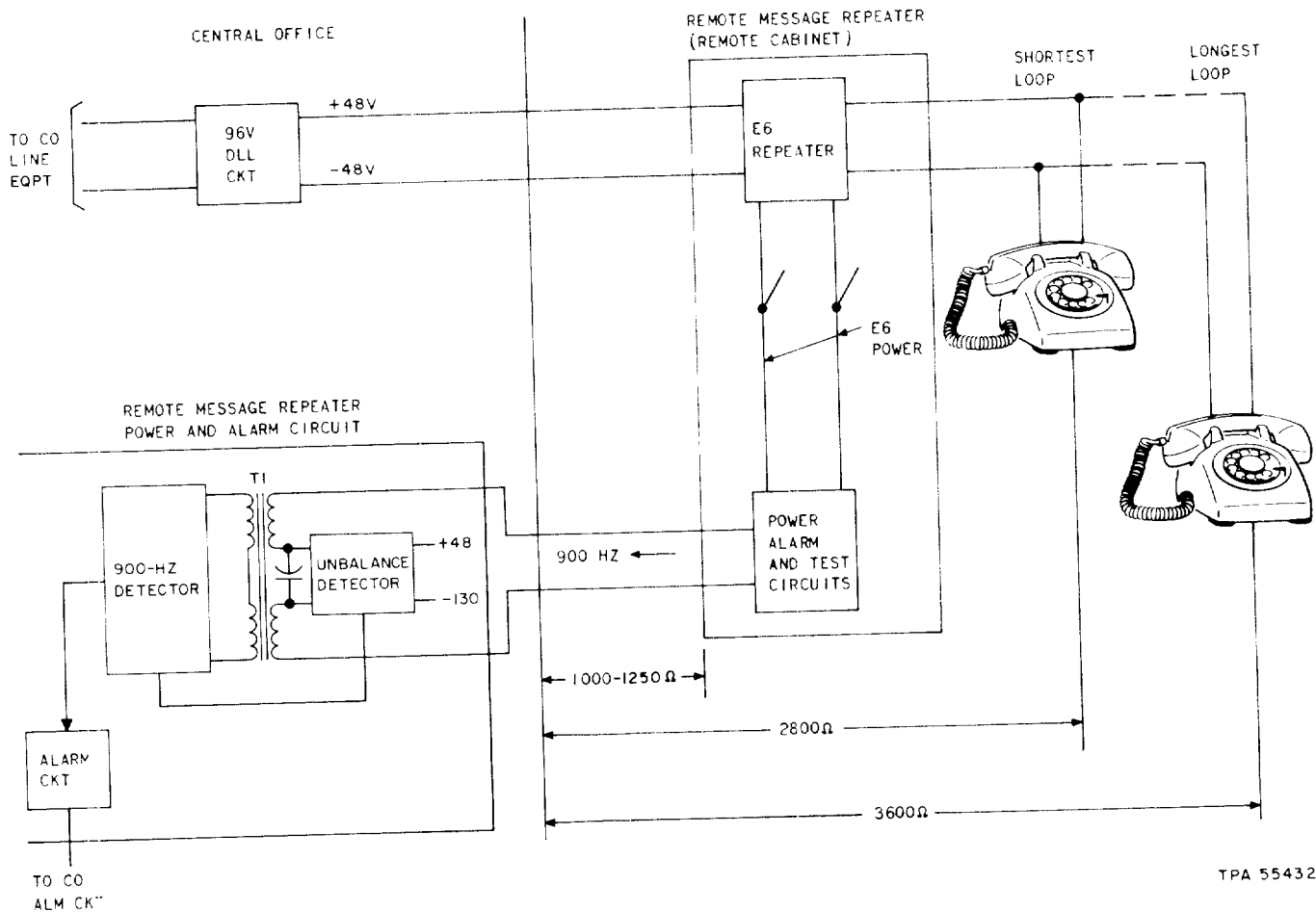


Fig. 4—Power and Alarm Circuit Panel



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Fig. 5—Block Diagram

A voltage of +48 volts is applied to the tip of the power pair and -130 volts to the ring through resistance lamps, a relay (UB), and transformers T1 and T2.

3.06 The loss of the power pair at 900 Hz must not exceed 10 dB to ensure proper operation of the alarm circuit.

3.07 The 900-Hz signal from the remote cabinet is coupled to a bandpass filter via transformer

T1. The filter prevents unwanted signals, which may appear on the power pair, from falsely satisfying the detector. The filter has a 900-Hz center frequency with a 3-dB bandwidth of 200 Hz. A curve showing insertion loss versus frequency is shown in Fig. 7. Transformer T2 is used as a longitudinal choke.

3.08 The unbalance detector is provided for the detection of leakage currents, tip or ring to ground, which may affect circuit operation. Unbalance

is detected by a double-wound relay wired series opposing and placed in series with the +48 volts and -130 volts being applied to the power pair. Unbalance conditions lasting only several seconds will not trigger an alarm.

3.09 The 900-Hz output from the filter is amplified and ac-coupled to a peak voltage detector which charges a capacitor (of a value large enough to prevent an interruption of the 900-Hz signal of only a few seconds duration from triggering an alarm). The voltage across the capacitor provides the base drive to saturate a transistor, which in turn biases another transistor to cutoff, resulting in a nonoperated TBL relay and no alarm. When the signal is absent, the capacitor discharges causing the second transistor to turn on and the TBL relay to operate.

3.10 The operation of the TBL relay, in turn, operates the ALM relay, lights the ALM lamp located on the mounting panel, and activates the central office audible and visual alarms. An ACO key is provided at the central office for silencing audible alarms. The visual alarms remain lighted until the TBL relay is released.

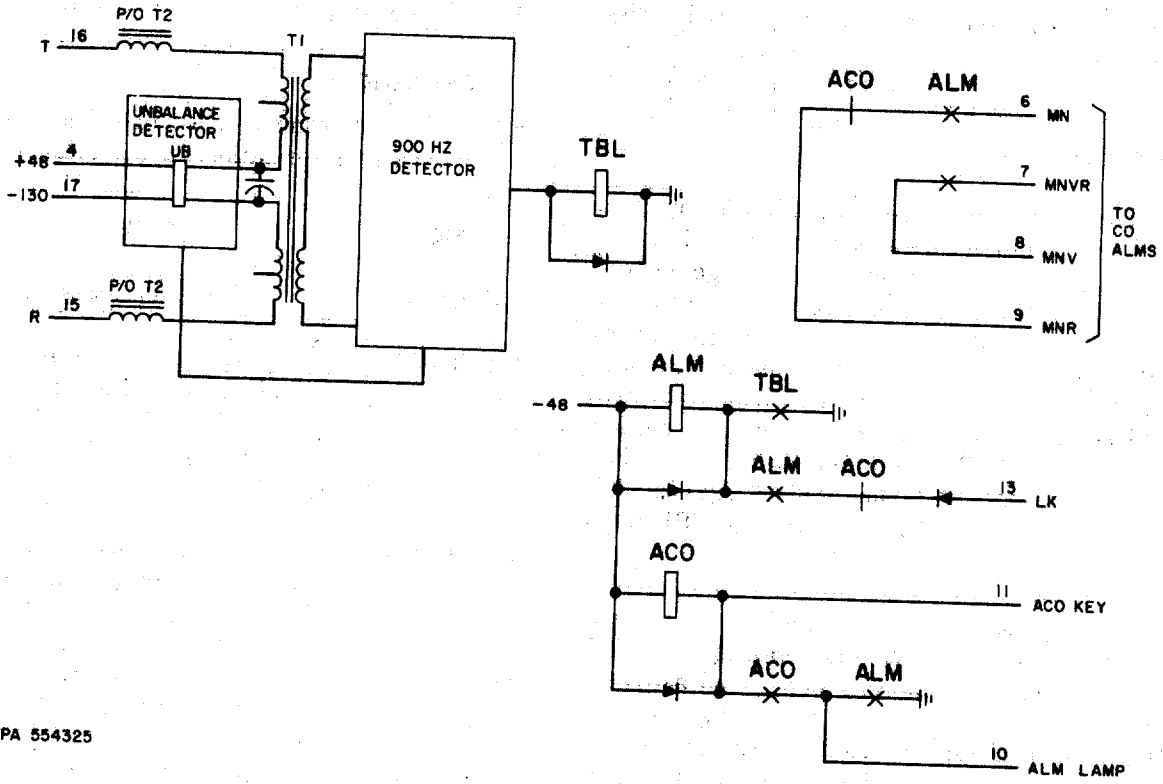
3.11 The remote message repeater is provided with a jack field and built-in testing circuitry for checking the repeaters and for troubleshooting. Jacks are provided on the central office power and alarm panel for checking the level of the received 900-Hz signal and for measuring the line voltage (dc). The LEVEL jacks for checking the 900-Hz signal are common to two circuits (A and

B). A key is provided for selecting the desired circuit.

4. REFERENCES

4.01 The following is a list of sections and other related information on the remote message repeater:

SECTION	TITLE
332-206-100	E-Type Repeaters, E6 Repeater
332-206-520	Subscriber Loop Message Repeater, Maintenance Tests
332-310-510	E6 Repeater Lineup, Subscriber Loops, Long Route Design
680-800-010	Resistance Zoning of Exchange Services Including Long Subscriber Route Design
801-406-152	Message and Signal Repeater For Long Subscriber Loops
852-200-104/ AG15.121	Subscriber Long Route Design
CD, SD-97020-01	E6 Telephone Repeater
CD, SD-99526-01	Common Systems Remote Message Repeater
CD, SD-99527-01	Common Systems Remote Message Repeater Power and Alarm Circuit



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Fig. 6—Central Office Power and Alarm Circuit

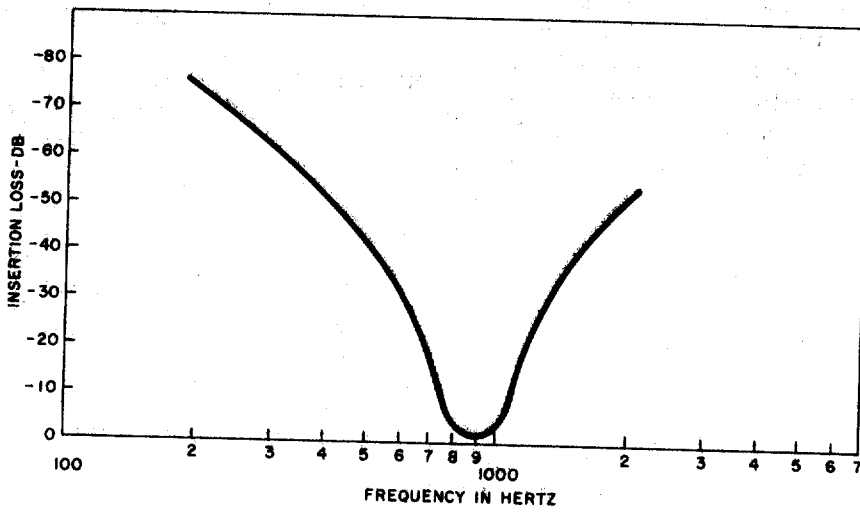


Fig. 7—900-Hz Bandpass Filter