

## J98619A SUBSCRIBER LOOP MESSAGE AND SIGNAL REPEATER

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### 1. GENERAL

**1.01** This section provides a general description of the J98619A message and signal repeater. The J98619A message and signal repeater is used to meet transmission and signaling requirements on long subscriber loops.

**1.02** This section is reissued to include information on the optional remote testing features which are available for use in the remote message and signal repeater cabinet.

### 2. DESCRIPTION

**2.01** The J98619A message and signal repeater is housed in a weatherproof aluminum cabinet that is 51 inches high, 26 inches wide, and 16 inches deep (Fig. 1). A fully equipped repeater cabinet weighs approximately 400 pounds and can be pole-, pedestal-, or wall-mounted, as required.

**2.02** A unitized steel framework built into the cabinet supports front and rear swingout gates on which the equipment is mounted. This framework bears the entire structural load by being directly bolted, through the cabinet, to external mounting frames at top and bottom.

**2.03** The repeater is designed to operate with external temperatures ranging from  $-40$  to  $+130^{\circ}$  F. To accomplish this, the cabinet is thermally insulated to minimize internal temperature

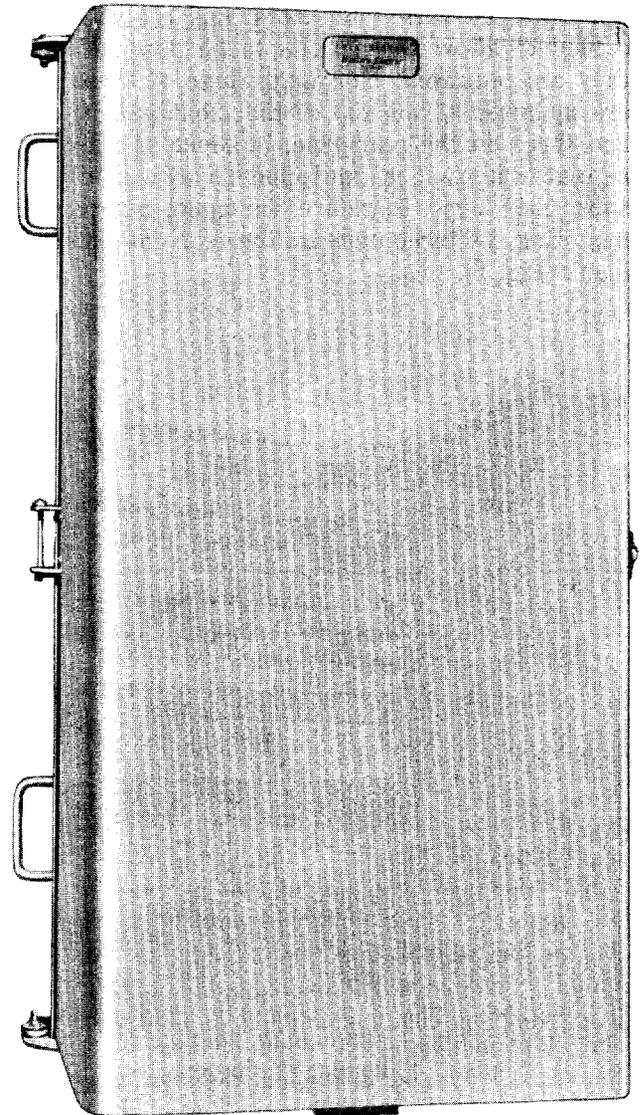
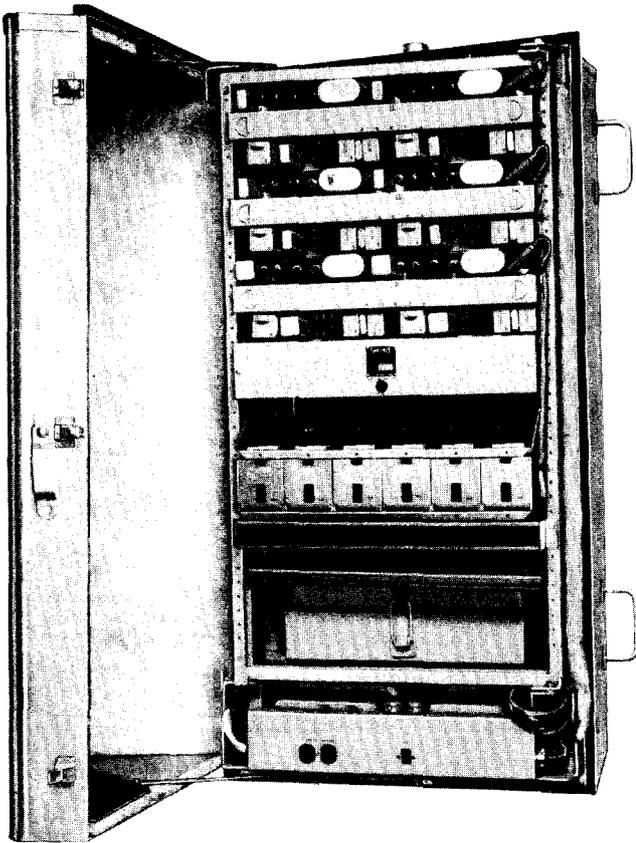


Fig. 1—Message and Signal Repeater—Door Closed

changes caused by variations in external temperature. Four thermostatically controlled heating elements mounted at the rear wall of the cabinet are energized when the internal cabinet temperature is below

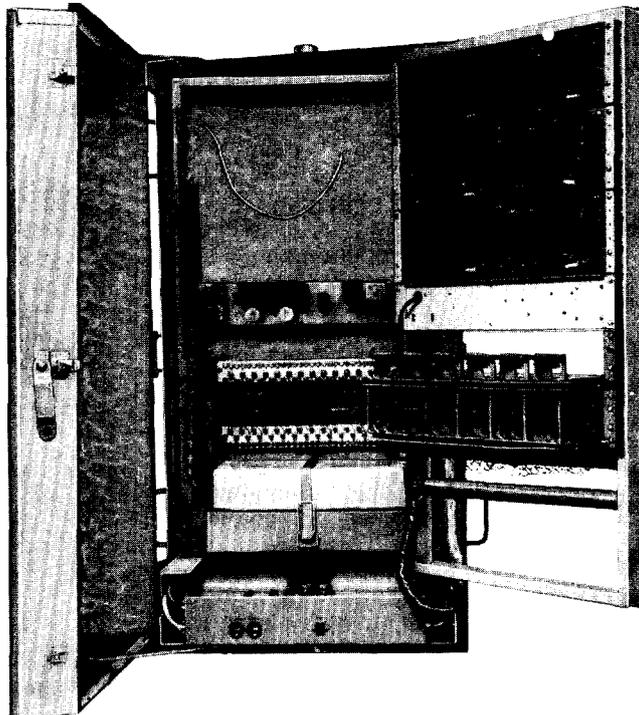
approximately 35° F. The heaters operate from commercial power. No standby power is provided for the heating elements.

**2.04** Space is provided for a maximum of six J98619B dial long line (DLL) plug-in type units to serve twelve subscriber loops. These units are equipped with connectors; and the cabinet is cabled to allow these units to be plugged in, as they are required. Normally, three of these units are mounted at the top of the front gate (Fig. 2) and three on the rear gate; however, the J98619A repeater shown is equipped to serve only six subscriber loops; therefore, the space reserved for mounting the three units on the rear gate is shown blank (Fig. 3).



**Fig. 2—Message and Signal Repeater—Door Open**

**2.05** The ringer panel is located on the front gate, just below the three dial long line units. Space is provided below the ringer for a



**Fig. 3—Message and Signal Repeater—Front Gate Open**

maximum of twelve plug-in-mounted E6 repeaters. However, since the J98619A repeater shown illustrates the equipment required to serve six subscriber loops, only six E6 units are installed.

**2.06** Each subscriber loop served by a repeater is provided with normal-through test jacks on both the central office side and the subscriber side. These jacks and the alarm sending loop test jack are all mounted on the front gate, just below the lower E6 repeater panel.

**2.07** Space is provided at the bottom of the front gate for the mounting of the J98619D remote testing, dc bypass unit and for the J98619E remote testing, signal and timer unit. The remote testing features, available on an optional basis, permit the dc bypassing of a DLL circuit at a remote location. The dc bypassing is under control of a positive coin potential applied to the line under test from the central office or the local test desk for a period of approximately 10 seconds. The remote testing signal and timer unit, provided on an optional basis, enables the application of a 1000-Hz milliwatt tone and simulated dial pulses

at the remote location. This arrangement provides means for direct signaling and transmission tests between the remote cabinet and the serving central office. Actuation of this test mode is also under the control of a positive coin potential except that an application period of 25 seconds or longer is required. When the remote cabinet is equipped for remote testing, any DLL circuits used in the central office on lines connecting to the remote cabinet must be similarly equipped or these lines must be accessed for test (and the positive coin potential applied) at the MDF. The dc bypassing of two DLL circuits in tandem is performed sequentially by reapplication of the positive coin potential. A similar sequence is required for actuation of the milliwatt supply and dial pulse simulation.⚡

**2.08** The fuse and control panel is mounted on the rear gate, just below the space provided for the dial long line units; the battery compartment is at the bottom of this gate.

**2.09** The standby battery, made up of two 11-cell, high specific gravity, lead acid units connected in series, is completely enclosed in a leakproof plastic container. All battery gasses and fumes are confined to this compartment and vented to the outside by means of a plastic tube through the back of the cabinet. The top half of the battery container is removable to permit servicing the battery.

**2.10** The ac power panel is located at the bottom of the cabinet. Two ac receptacles J6 and J7 and one fused -48 Vdc TST jack J9 are provided on this panel. The two dc power supplies that are located behind this panel are connected to J7 (RECT 1 and RECT 2). Jack J6 can be used to provide power for ac-operated test equipment. Dc-operated test equipment can be connected to TST jack J9. Also provided on this panel are the cabinet heater on-off switch and lamp.

**2.11** The outside plant cable connecting to the message and signal repeater circuits may consist of single or multiple cables. These cables enter the cabinet at the bottom and terminate on two connecting blocks mounted on the rear wall. The blocks have insulation-crushing screw terminals and are equipped with 2A1A protector units. Field substitution of 6A1A protector units is suggested in areas of high lightning incidence. The connecting blocks are connected by local cable to the various

equipment units. The cable entrance fittings at the top and bottom of the cabinet are each provided with a cap to seal the fitting when it is not used. At the time the repeater is installed, the cap on the bottom cable entrance is removed and replaced with a gland nut furnished with the cabinet.

**Note:** The top cable entrance fitting will not be used.

**2.12** A hole is provided near the lower right corner at the back of the repeater cabinet for commercial ac power entrance. A waterproof fitting is provided with the cabinet to accept rigid conduit.

**2.13** A KS-19822, L1 panel board is available for bringing commercial 117-V, 60-Hz ac power to the message and signal repeater cabinet. The panel board is housed in a weatherproof box measuring 16 inches high, 9 inches wide, and 3-1/2 inches deep, and has an external weatherproof receptacle for connecting the remote cabinet to an external emergency source of ac power such as a portable generator. The panel board box is suitable for pole or surface mounting. When the box cover is opened, power may be taken from a connected emergency source of ac power by changing the location of a dead-front pull-out fuse. This serves as a 30-ampere transfer device with two 15-ampere branch circuits for the repeater (including heater). (See Section 332-906-510 for details.) Neutral and ground connections are provided internally, and an internally located lightning arrester is permanently bridged to the normal power source connection.

**2.14** A J98619C alarm panel is located in the central office. It contains the apparatus required to furnish alarm indications and allow connections to the local office audible and visible alarms. An arrangement is provided to send alarms to a remote office when necessary.

**2.15** ⚡The 752A tool should be used to extract the ED-99795 relay driver circuit packs used on the J98619D remote testing, dc bypassing unit.⚡

### 3. OPERATION

**3.01** The J98619A message and signal repeater provides a means of amplifying voice frequencies and repeating signal information in subscriber loops, and thereby extends the effective

range of such loops beyond the normal central office limits. A single unit will provide for 4-party selective or 8-party semiselective ringing for each of a maximum of 12 loops. Therefore, a fully equipped repeater can furnish telephone service to a maximum of 96 remotely located subscribers on an 8-party semiselective basis. Ten-party divided code ringing is an alternate use. Single- and 2-party customers may also be served. Automatic number identification cannot be used for customers served through this equipment. Also, the use of more than five simultaneously operated ringers per line is not recommended because of ringing supply limitations.

**3.02** A block diagram of the basic subscriber loop message and signal repeater is shown in Fig. 4. The message and signal circuit provides for repeating dial pulses and supervisory signals, and amplifying voice frequencies from the subscriber, and repeating ringing and amplifying voice frequencies from the central office. This is accomplished by the use of E6 repeaters for voice amplification and dial long line units for repeating dial pulsing, supervisory signals, and ringing. A self-contained ringing generator is provided.

**3.03** A standby battery power supply helps to provide trouble-free, uninterrupted service.

**3.04** For each loop served, the J98619A repeater unit will use one E6 plug-in repeater equipped with two 830A networks to compensate for part of the line losses and to match each E6 repeater to an H88 loaded line. Also, one J98619B DLL unit (containing two DLL circuits) will be used to repeat dial pulses, ringing, and supervisory signals for each two loops served and to act as E6 repeater disablers. Therefore, to serve the maximum of 12 loops, twelve E6 repeaters, twenty-four 830A networks, and six DLL units will be used. The use of the remote testing units is optional.

**3.05** When the components of a message and signal repeater are installed at the central office, the E6 repeater and associated networks are optional. The E6 repeater and associated networks will always be required when the message and signal repeater is installed at a remote location, as described in 3.04.

**3.06** Ringing is supplied by a modified Lorain TB20M23 transistorized 20-hertz ringer. A diode and capacitor biasing circuit is used to eliminate

the auxiliary batteries normally used with this unit to provide superimposed ringing. The ringing generator operates continuously, except when the system is operating without ac power, at which time it operates on a demand basis to conserve battery charge.

**3.07** The repeater unit is powered from any nearby commercial source of 105 to 130 Vac. A standby battery on float charge is provided to power the unit in case of commercial power failure. The approximate number of hours of reserve at 77°F versus total CCS/hour (100 call seconds/hour) for the cabinet is shown in Fig. 5.

**3.08** An alarm system in the repeater unit detects trouble and transmits alarm signals to the central office via a dedicated pair for fuse failure, commercial power failure, or low standby battery voltage.

**3.09** If commercial power fails, an ac failure alarm is generated and the repeater system derives power from the standby battery. Indication of the ac failure alarm signal in the central office is delayed for approximately six minutes to prevent momentary power interruptions from activating an alarm. During an ac power failure, the heater units in the message and repeater cabinet are inoperative.

**3.10** A voltage sensing circuit in the message and signal repeater monitors the battery voltage. If the battery voltage drops below approximately 44 volts, the batteries are automatically disconnected from the load to prevent permanent battery damage, and a low-battery alarm signal is sent to the central office. Restored ac power (emergency or normal) removes the ac failure alarm, returns the repeater unit to service, and recharges the standby battery. The low-battery alarm is removed when the battery terminal voltage exceeds approximately 47 volts.

**3.11** A J98619C alarm receiving panel must be provided in the central office to receive and decode the alarm signals transmitted from the repeater unit. In addition, the alarm receiving panel can be arranged to send the alarm signals to a remote office when the alarm receiving panel is in an unattended or a partially attended office.

**3.12** The J98619D remote testing dc bypass unit is under control of the local test desk or

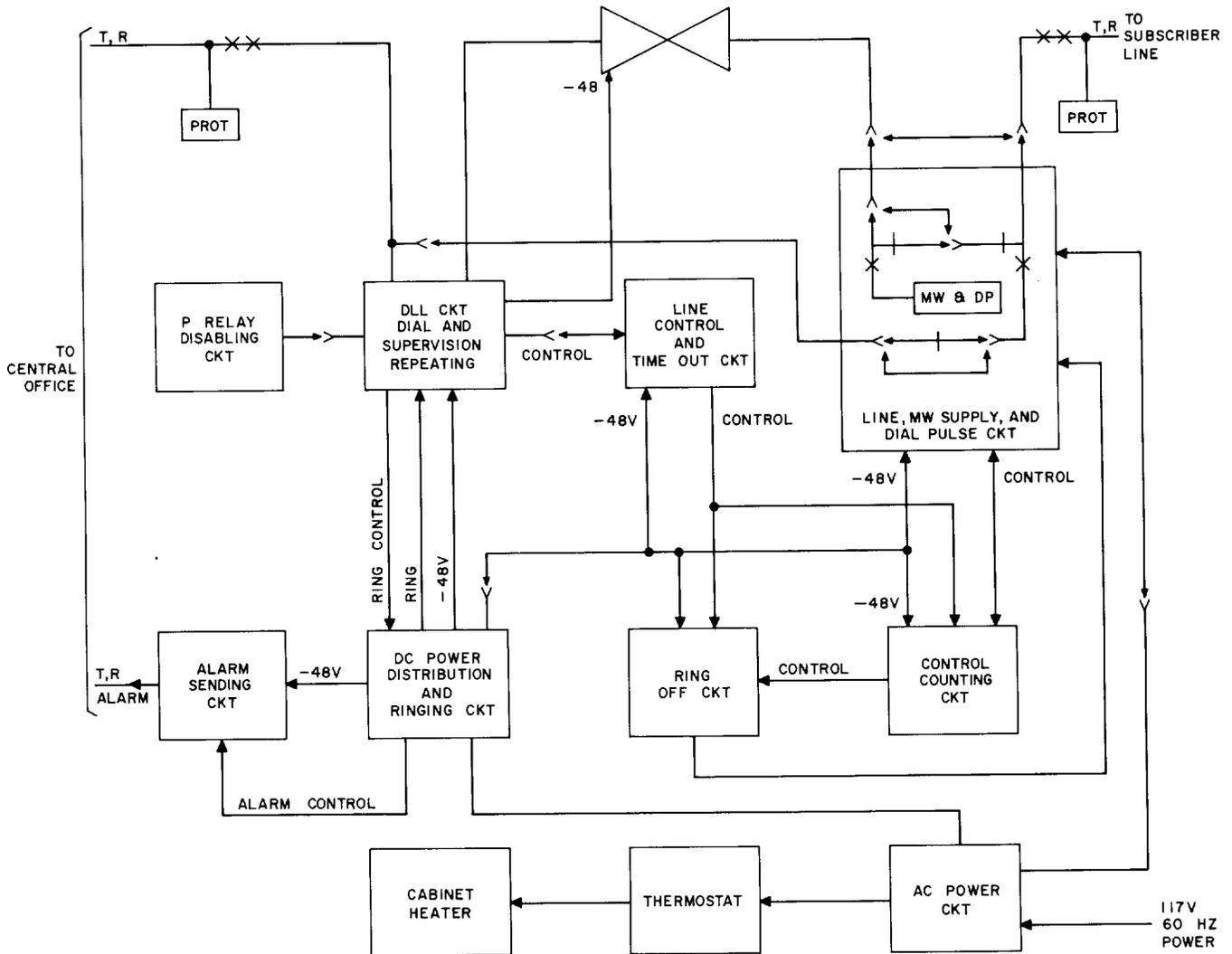


Fig. 4—Message and Signal Repeater—Block Diagram

local test cabinet and permits the dc bypass of the DLL circuit and any associated E6 repeater in a remote cabinet or the central office where the remote testing equipment is located. The dc bypass is controlled by applying a positive coin potential to the line under test for less than 10 seconds. Two dc bypassing units used in tandem require sequential applications of the positive coin potential. The first application will cause the bypassing of the first unit and the second application will cause the bypassing of the second unit. When the dc bypass condition is established, the subscriber line may be tested for shorts, crosses, grounds, and continuity from the local test desk or test cabinet. When the dc bypass testing is completed, the line should normally be restored by applying a ringing

signal to the line. A 3-minute timer will also restore the line to normal in the event a ringing signal is not applied to the line.

**3.13** The J98619D dc bypass unit will handle a maximum of 12 subscriber lines equipped with J98619B DLL units. Testing is restricted to one line at a time. Where two DLL units are used in tandem, a J98619D dc bypass unit will be required at each DLL location.

**3.14** The J98619E remote testing, signal, and timer unit is intended for use as an addition to the J98619D dc bypass unit in the remote cabinet. The J98619E unit provides a 20-second application of 1000-Hz milliwatt tone through a 10-dB pad to

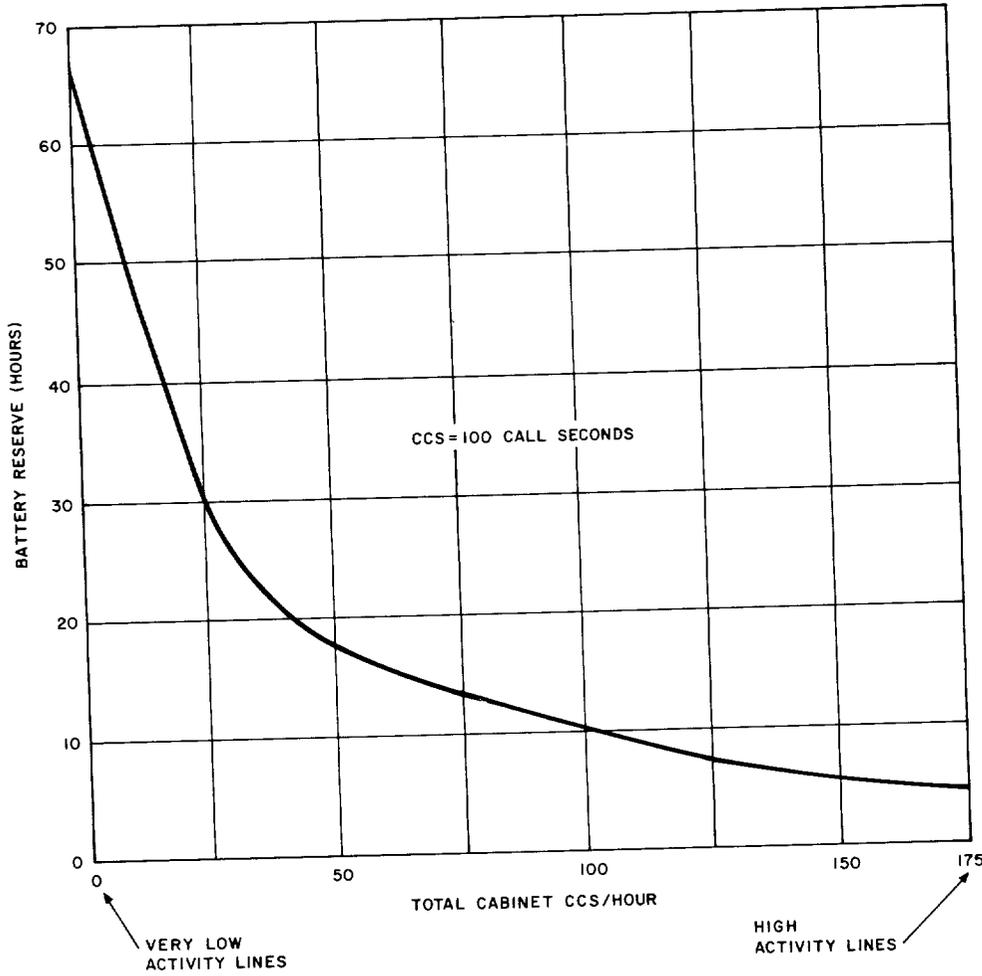


Fig. 5—Standby Power Supply—Reserve Characteristics

the subscriber side of the E6 repeater on the line under test, followed by a 20-second period of simulated dial pulses to enable testing of relative transmission loss and dial pulse distortion. During the transmission and pulsing tests, the cable pair on the subscriber side of the message and signal repeater is disconnected. The unit is controlled by the application of a positive coin potential to the line under test for a period of at least 25 seconds after having previously established the dc bypass condition around any preceding DLL circuits or by application of the positive coin potential at the MDF. The interrupter is used as a dial pulse simulator and generates continuous dial pulses at 11 pulses per second (pps) with a percent break of 61 percent. The J98619D and the J98619E units at the remote location are restored to normal operation upon the completion of the dial pulse simulation. ♣

4. REFERENCES

4.01 The following is a list containing related information on the J98619A message and signal repeater, components, and on the use of the remote testing features.

SECTION	TITLE
AA388.193	Message and Signal Repeaters for Long Subscriber Loops
332-206-100	E-Type Repeaters, E6 Repeater
332-906-510	J98619A Subscriber Loop Message and Signal Repeater, Tests and Adjustments
639-400-200	Signal Repeater, Installation

SECTION	TITLE	SECTION	TITLE
662-202-500	Local Test Cabinet No. 3	SD-97020-01	E6 Telephone Repeater
662-300-500	Local Test Desk—12 Type	SD-99763-01	Message and Signal Repeater Instruction Manual for Lorain Model TB20M Sub-Cycle Ringing Converter. (Specification No. 5148-005)
662-400-500	Local Test Desk—14 Type		
SD-81619-01	Rectifier Circuit J87247		