

**N3 CARRIER TERMINAL
LINE TERMINATING UNITS
J99300AL AND J99300AT
DESCRIPTION**

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- (b) To provide a means for applying appropriate dc line voltages or currents
- (c) To provide a means for insertion of appropriate transmitting and receiving line attenuators
- (d) To provide lightning protection supplemental to the standard carbon-block arresters.

1.04 A 4-wire line is used for the carrier-frequency signals; one pair is for transmission and the other for reception. These are connected to the line terminating unit when it is inserted in its socket and are separately terminated at balanced transformer windings, thus obviating the need for external noise control units. Taps on these windings provide simplex connections to the line for the application of dc potentials needed to operate remote repeaters or amplifiers, or to furnish sealing current where required.

1.05 Plug-in span pads are provided in both transmitting and receiving signal paths to permit adjustment of line signal levels as appropriate to the particular cable route used.

1. GENERAL

1.01 The J99300AT line terminating unit (see Fig. 1) replaces the J99300AL unit (see Fig. 2) for N3 carrier terminals. Both units are described in this section.

1.02 This section is reissued to include the J99300AT line terminating unit. Because of the general revision of this section, marginal arrows normally used to indicate changes have been omitted.

1.03 The functions of the line terminating unit are:

- (a) To connect the carrier-frequency lines to the group units

2. J99300AT LINE TERMINATING UNIT

2.01 The J99300AT line terminating unit contains transmitting and receiving signal circuits, and power feed circuits. The J99300AT, List 1 unit (see Fig. 1 and 3) includes a constant current regulator and is used whenever power is supplied to remote N repeaters. List 2 units (see Fig. 4) do not include constant current regulators and must be used (rather than List 1), when transmitting sealing current only, or when terminating simplex leads. List 2 must also be used when transmitting power to 240-type amplifiers only, with or without sealing current. In addition, the List 2 unit is used when power is neither transmitted nor received.

SECTION 362-904-100

A. Transmitting Signal Circuits

2.02 Varistors RV1 through RV15 (see Fig. 5) are connected across the input to pad AT1 to guard against line surges caused by lightning. This is in addition to the 500-volt protection afforded by the standard carbon-block lightning arresters outside the terminal equipment.

2.03 Attenuator AT1 is a 49-type span pad which uses plug-in units to permit adjustment of signal attenuation between 0 dB and 44 dB in 2-dB steps.

2.04 The signal out of AT1 is coupled to the line by balanced transformer T1. The tapped output winding provides a dc connection to the line for regulated or unregulated line current.

B. Receiving Signal Circuits

2.05 The incoming carrier-frequency signal is coupled to pad AT2 by means of balanced transformer T2 (see Fig. 5). The tapped input winding of T2 provides a dc connection to the line.

2.06 Transformer T2 is designed to maintain adequate longitudinal balance of the line toward suppression of longitudinal noise. Capacitors C1 and C2 across the primary and secondary, respectively, serve to improve the transmission characteristics of the circuit.

2.07 Attenuator AT2 is a 49-type span pad which uses plug-in units to permit adjustment of signal attenuation between 0 dB and 44 dB in 2-dB steps.

2.08 Varistors RV16, RV17, and RV18 connected across the output of AT2 protect the group receiver circuits against lightning-induced line surges in addition to the protection afforded by the standard carbon-block arresters.

C. Power Feed Circuits

2.09 Direct-current power for remote use is connected to the centertapped windings of T1 and T2 via choke coils L1 and L2, respectively. This current is regulated in List 1 equipment and unregulated in List 2 (see Fig. 6).

2.10 Capacitors C3 and C4 can discharge a pulse of current to burn open any temporary

residual short circuits in carbon-block lightning protectors after they have arced because of a line surge.

2.11 The voltages and currents needed by all permissible combinations of equipment and sealing currents are obtained by closure of various combinations of screw switches, S1 through S10 for List 1 equipment, and S11 through S16 for List 2. Specific instructions for these adjustments are given in Section 362-904-504. Repeater powering requirements are covered in SD-97272-01. Jacks J5, J6, and J7 provide connections for a voltmeter used during the prescribed procedures.

D. Constant Current Regulator

2.12 In the List 1 unit, a constant current output is maintained which is relatively independent of variations of input voltages or output loads, including those caused by temperature effects of lines and equipment. The level of current to be maintained is established by the prescribed settings of the screw switches (see Fig. 6). Power feed options for the List 1 unit include ± 130 volts, +130 and -48 volts, or +130 volts and ground. The List 2 unit, without the constant current regulator, has power feed options of +130 volts, or -48 volts and ground.

2.13 Transistors Q1 and Q2 perform as dynamic resistances which change proportionally to variations in line voltage and inversely as line resistance. A fixed reference Q1 emitter bias of approximately 8 volts is established by CR1 and the three varistors. This causes Q1 collector current to be essentially independent of collector voltage.

2.14 The conductance of Q2 is a function of the base voltage, which is that at the junction of R2 and R3. This causes the conductance of Q2 to increase in response to an increase in line resistance, or to decrease if line resistance decreases, thus keeping the current constant.

3. J99300AL LINE TERMINATING UNIT

3.01 The J99300AL line terminating unit contains transmitting and receiving signal circuits and power feed circuits. The J99300AL unit (Fig. 2) has been replaced by the J99300AT unit and is listed Manufacture Discontinued.

A. Transmitting Signal Circuits

3.02 Varistors RV1 through RV15 are connected across the input to pad AT1 to guard against line surges caused by lightning. This is in addition to the 500-volt protection afforded by the standard carbon-block lightning arresters outside the terminal equipment.

3.03 Attenuator AT1 is a 49-type span pad which uses plug-in units to permit adjustment of signal attenuation between 0 dB and 44 dB in 2-dB steps.

3.04 The signal out of AT1 is coupled to the line by balanced transformer T1. The tapped output winding provides a dc connection to the line for the operation of remote repeaters and 240-type amplifiers, or for use as sealing current.

B. Receiving Signal Circuits

3.05 The incoming carrier-frequency signal is coupled to pad AT2 by means of balanced transformer T2 (see Fig. 5). The tapped input winding of T2 provides a dc connection to the line for the current needed by remote equipment.

3.06 Transformer T2 is designed to maintain adequate longitudinal balance of the line toward suppression of longitudinal noise. Capacitors C1 and C2 across the primary and secondary, respectively, serve to improve the transmission characteristics of the circuit.

3.07 Attenuator AT2 is a 49-type span pad which uses plug-in units to permit adjustment of signal attenuation between 0 dB and 44 dB in 2-dB steps.

3.08 Varistors RV16, RV17, and RV18 connected across the output of AT2 protect the group

receiver circuits against lightning-induced line surges in addition to the protection afforded by the standard carbon-block arresters.

C. Power Feed Circuits

3.09 Direct-current power for remote use must be supplied with minimum effect on the signal currents on the lines. Choke coils L1 and L2 serve to connect unregulated direct current to the centertapped windings of T1 and T2, respectively (see Fig. 5).

3.10 Capacitors C3 and C4 can discharge a pulse of current to burn open any temporary residual short circuits in carbon-block lightning protectors after they have arced because of a line surge.

3.11 The voltages and currents needed by all permissible combinations of equipment and sealing currents are obtained by closure of appropriate screw switches A through J (see Fig. 7 and 8). Specific instructions for these adjustments are given in Section 362-904-502. The jacks provide connections for a voltmeter used during the prescribed procedures.

4. DRAWINGS

4.01 The following drawings are not included but are listed for reference purposes:

SD-97183-01	Line Terminating Circuit J99300AL
SD-97183-02	Line Terminating Circuit J99300AT
SD-97185-01	Terminal Circuit
SD-97272-01	Application Schematic for Powering N1, N1A, N2, ON1, and ON2 Repeaters.

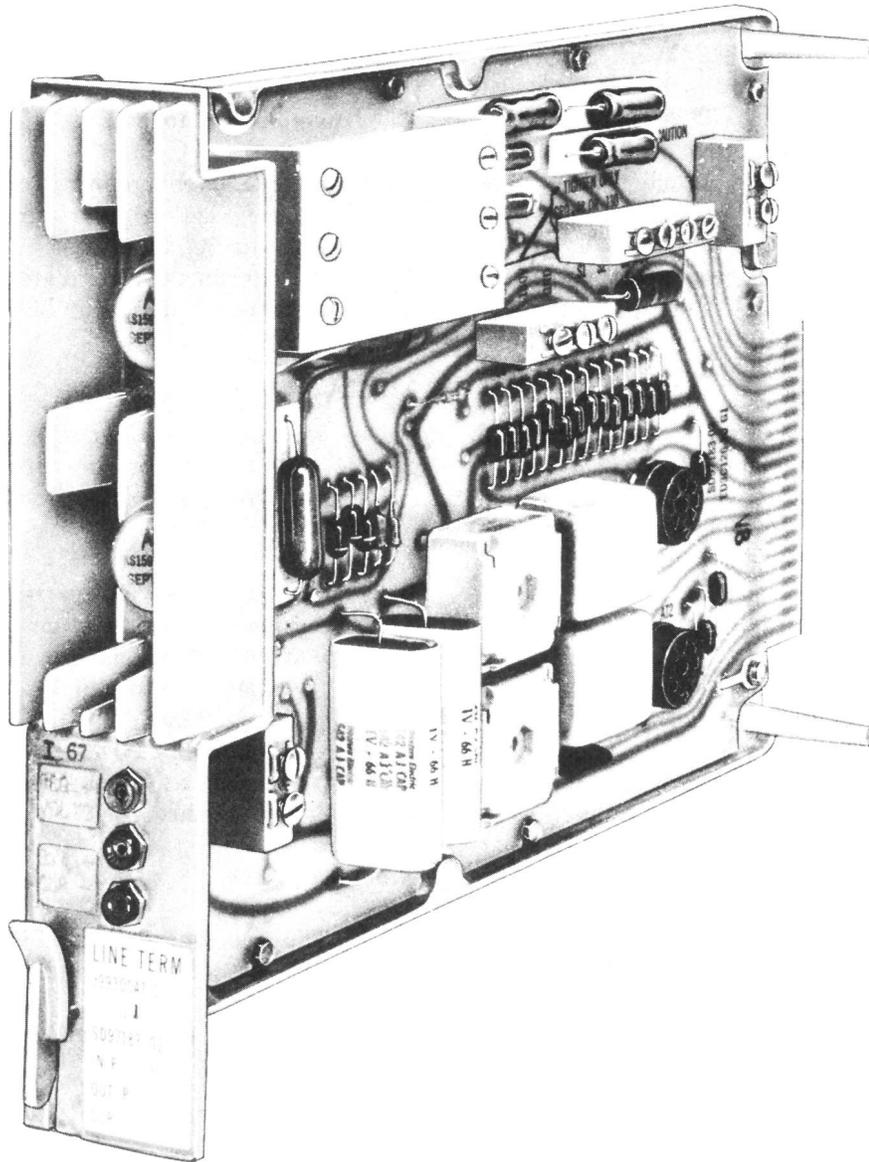


Fig. 1—Line Terminating Unit J99300AT, List 1

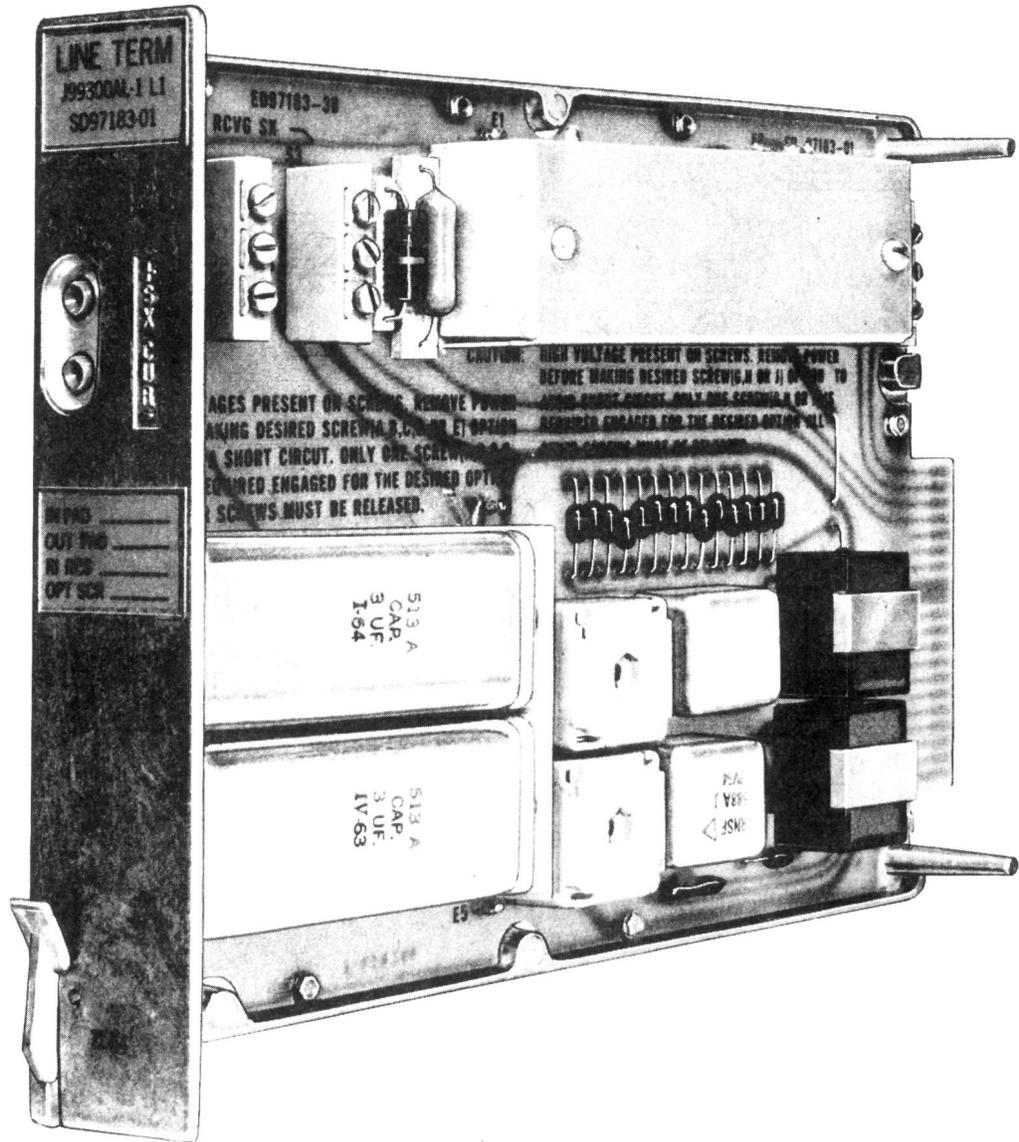


Fig. 2—Line Terminating Unit J99300AL

SECTION 362-904-100

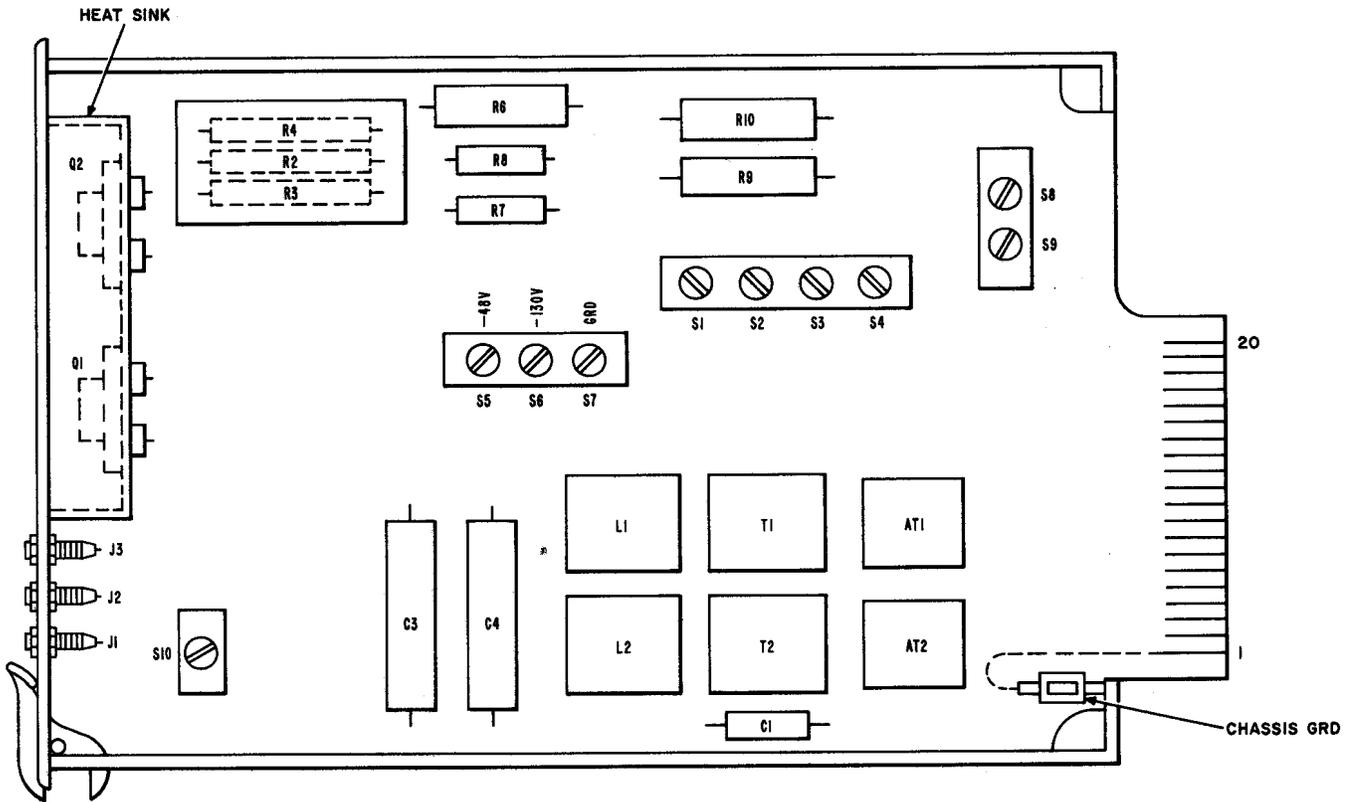


Fig. 3—Line Terminating Unit J99300AT, List 1, Side View

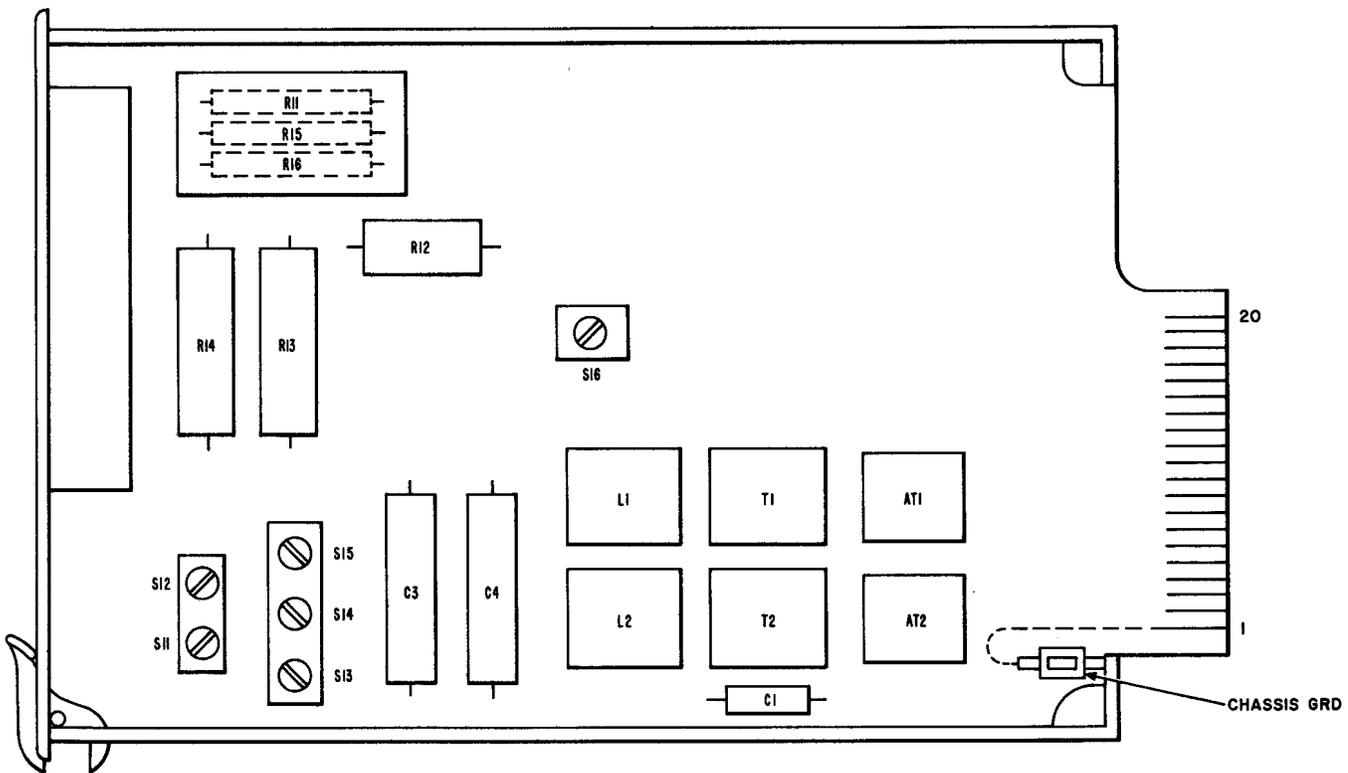


Fig. 4—Line Terminating Unit J99300AT, List 2, Side View

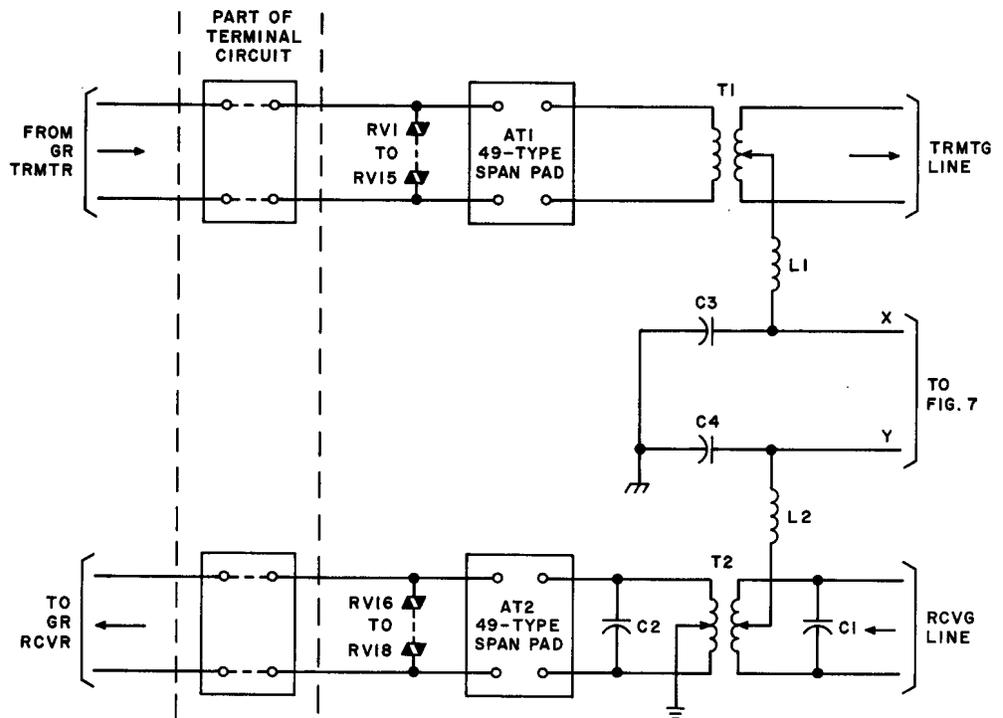


Fig. 5—Transmitting and Receiving Circuits—Simplified Diagram

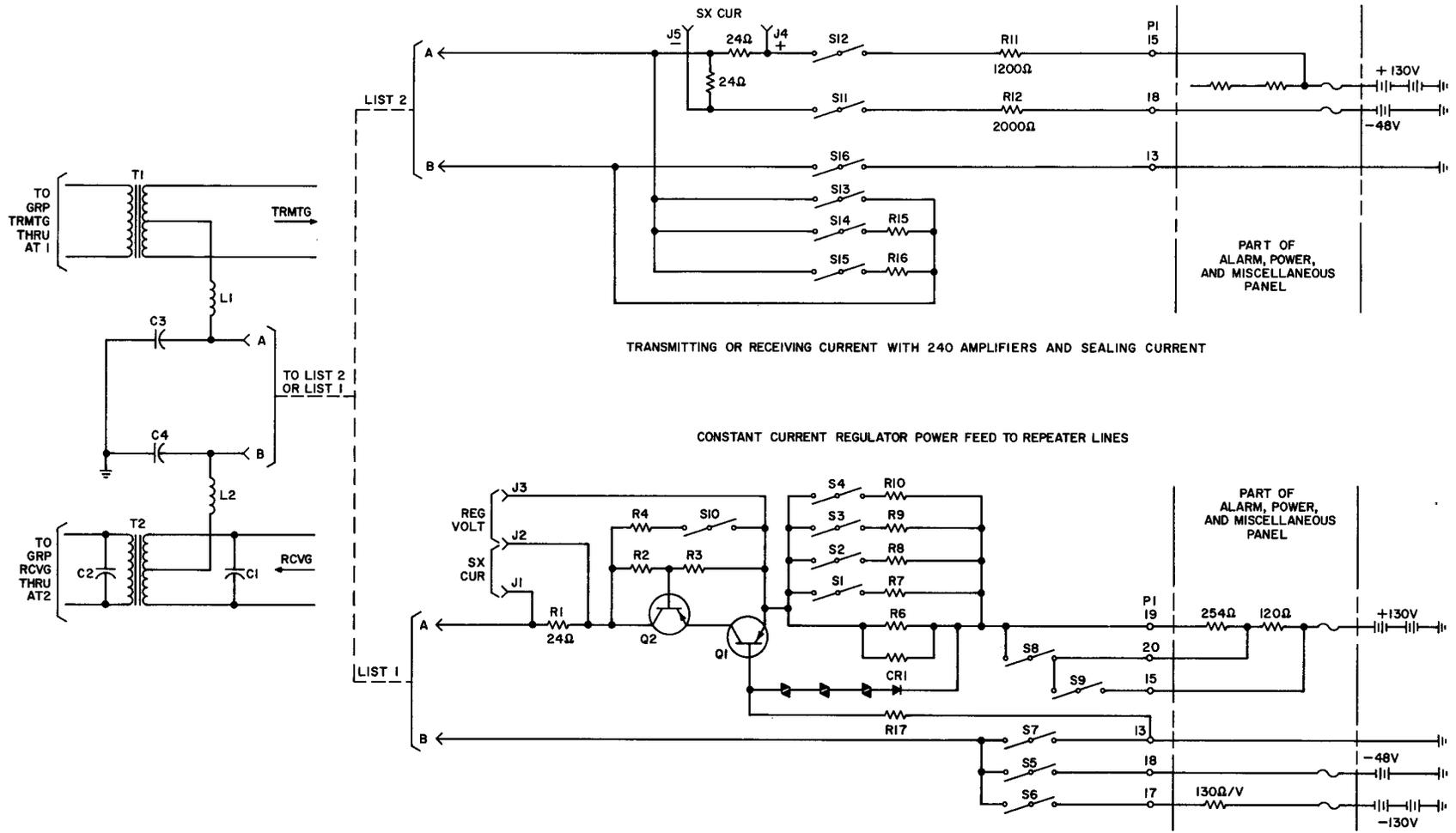


Fig. 6—Power Feed for J99300AT, List 1 and List 2

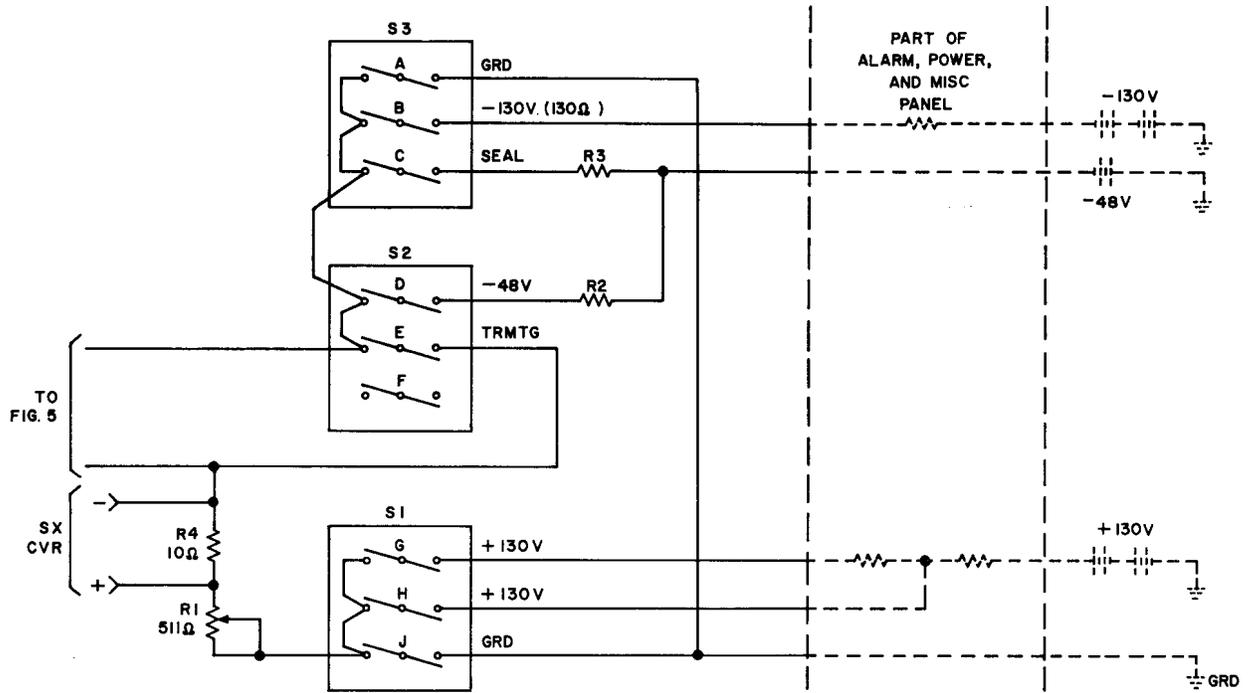


Fig. 7—J99300AL Power Feed Circuit

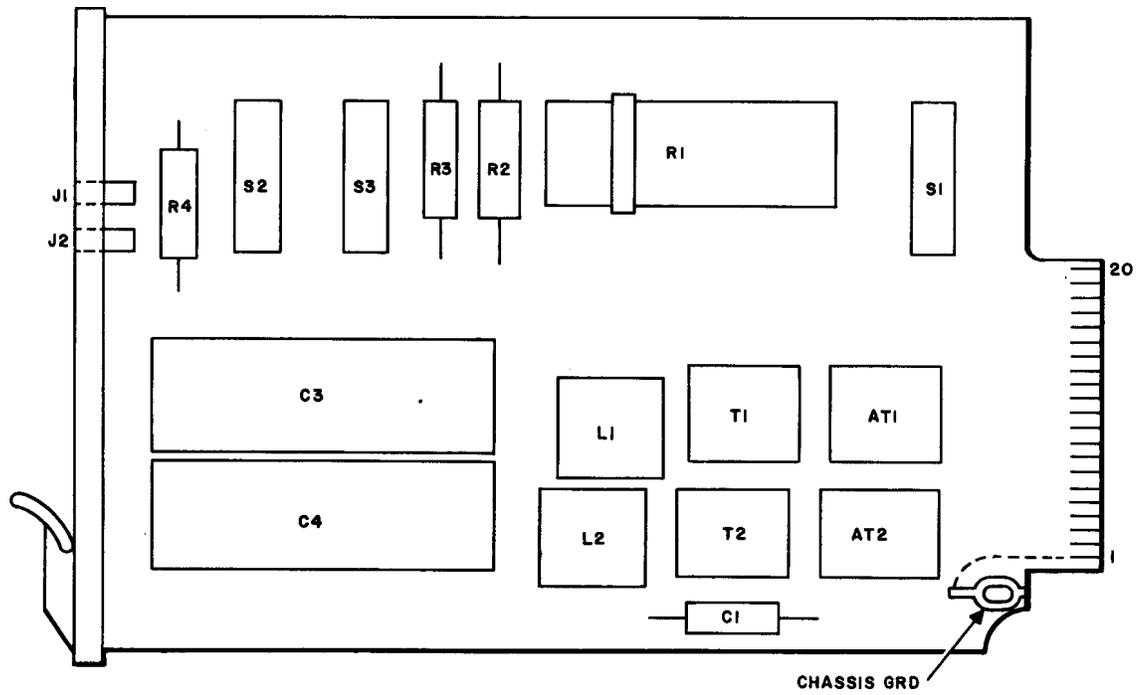


Fig. 8—Line Terminating Unit J99300AL—Side View