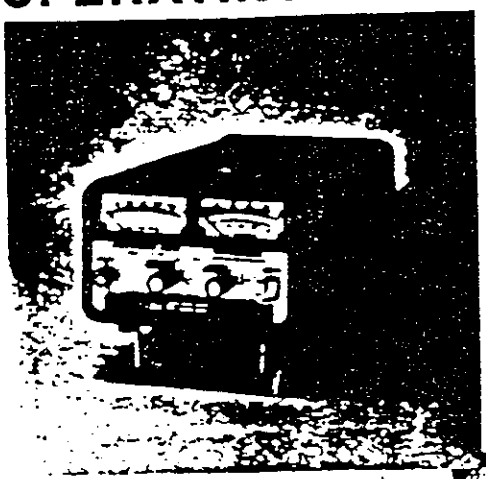
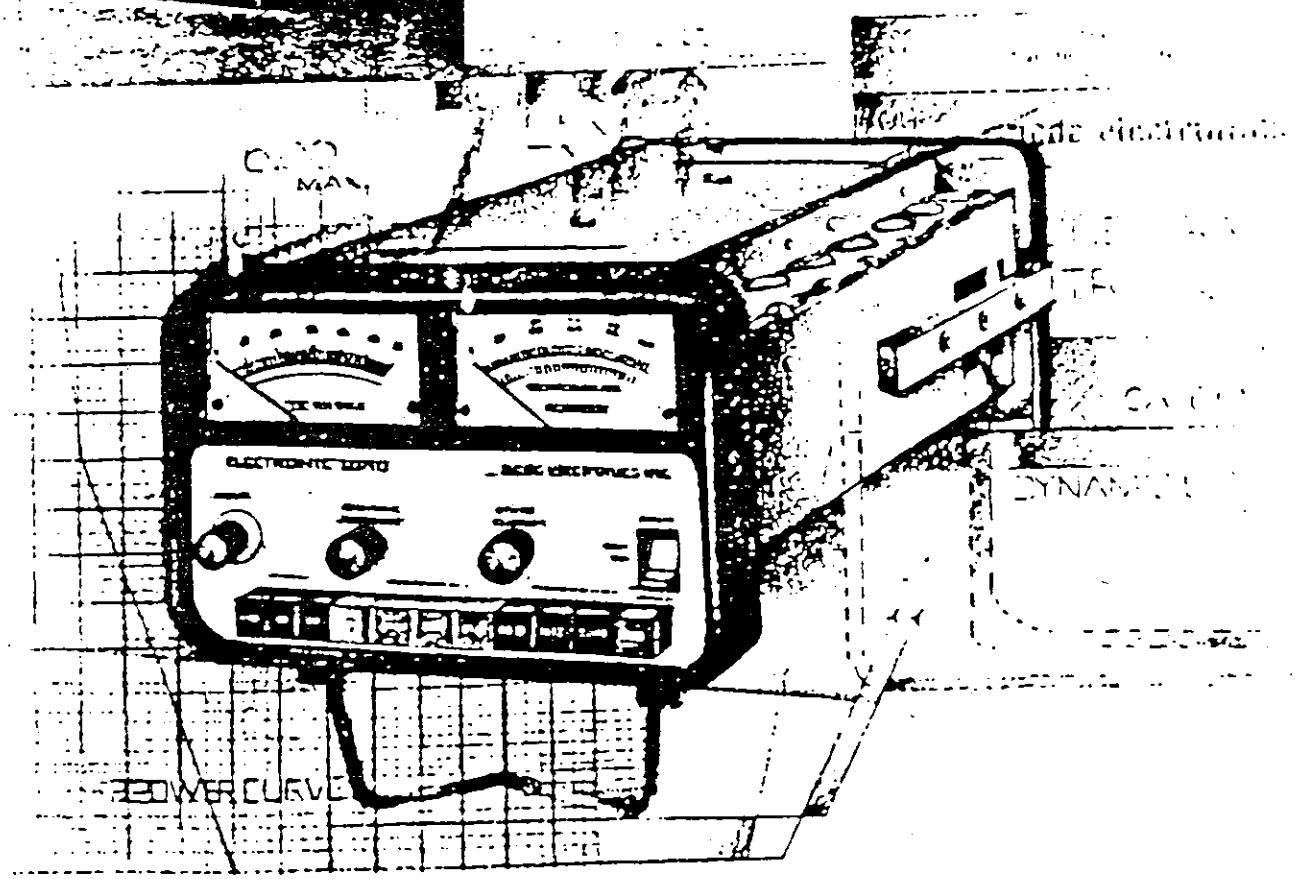
$10.00

OPERATING AND SERVICE MANUAL



EL 750
ELECTRONIC LOAD
TEST INSTRUMENT

PRELIMINARY



EMERSON

ACDC ELECTRONICS
DIVISION OF EMERSON ELECTRIC CO.
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TELEPHONE (201) 241-6077 TWX: 710-996-5968

WARRANTY

When used within specified operating conditions, this ACDC Electronic Load is guaranteed to meet all of its published specifications for a period of one year from the date of purchase. This guarantee covers all parts of the instrument including semiconductors, capacitors and mechanical parts.

If at any time this instrument is in need of warranty service the purchaser should promptly notify ACDC or its authorized representative describing the conditions. The method and place of warranty service will be specified by ACDC at its sole discretion. Authorized returns for warranty service should be forwarded to the specified service location, freight prepaid, where, without charge, the unit will be repaired.

The sole obligation of ACDC and purchaser's exclusive remedy under this or any other warranty, express or implied, is the repair or replacement of defective instruments as provided above. ACDC shall not be responsible for incidental or consequential damage whether or not forseeable caused by defects in the instrument. In warranty units requiring calibration or mechanical damage repair will be charged.

ELECTRICAL STANDARDS

All ACDC instrument standards are either certified directly or traceable to certification by the National Bureau of Standards.

CLAIMS FOR DAMAGE IN SHIPMENT

This instrument received comprehensive visual, mechanical and electrical inspection prior to shipment from the factory. Please examine it carefully for external damage or evidence of internal damage immediately upon receipt from the carrier and prior to operation. Claims for damage should be filed with the carrier with a copy of the report forwarded to ACDC. Advice of disposition and/or arrangement for repair or replacement of the instrument will be made by ACDC or its authorized representative. Please include model and serial numbers in all correspondence.

INTRODUCTION

This manual contains the information necessary to operate, test, calibrate and service the ACDC Model EL750B Electronic Load instrument. The Model EL750B is a sophisticated unit that requires competent technical personnel for servicing.

Models EL750B-E for 220VAC, EL750B-A for 230VAC and EL750B-K for 240VAC inputs are also available.

If any problem occurs that is not covered in this manual, please contact the nearest ACDC sales representative or write directly to ACDC Electronics Engineering Department.

Please include instrument serial number when writing for information.

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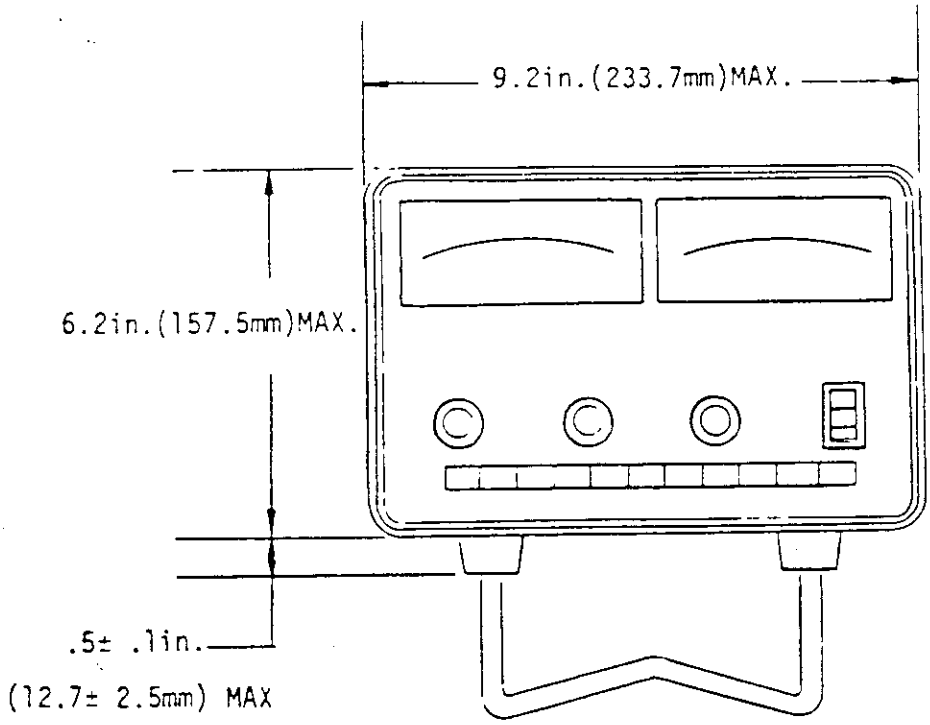
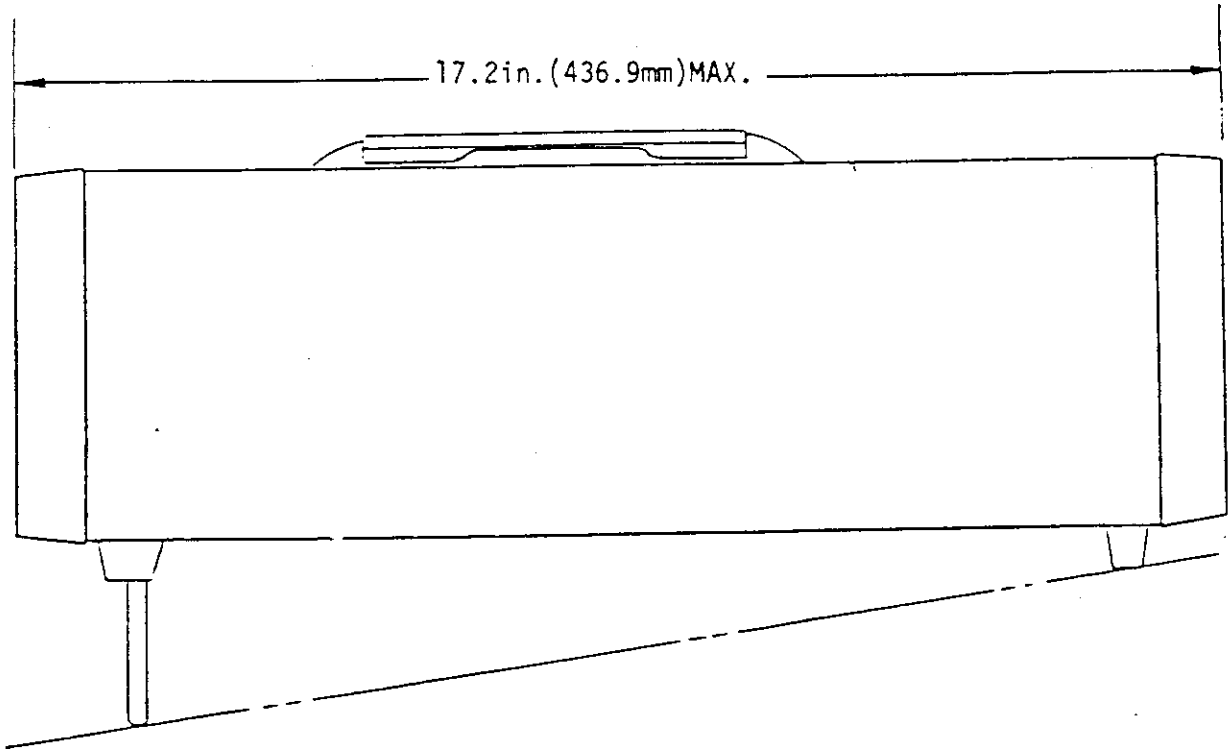
ACDC Electronics
Engineering Department
401 Jones Road
Oceanside, California 92054
Phone: (714) 757-1880





OUTLINE DIMENSIONS
FIGURE 1

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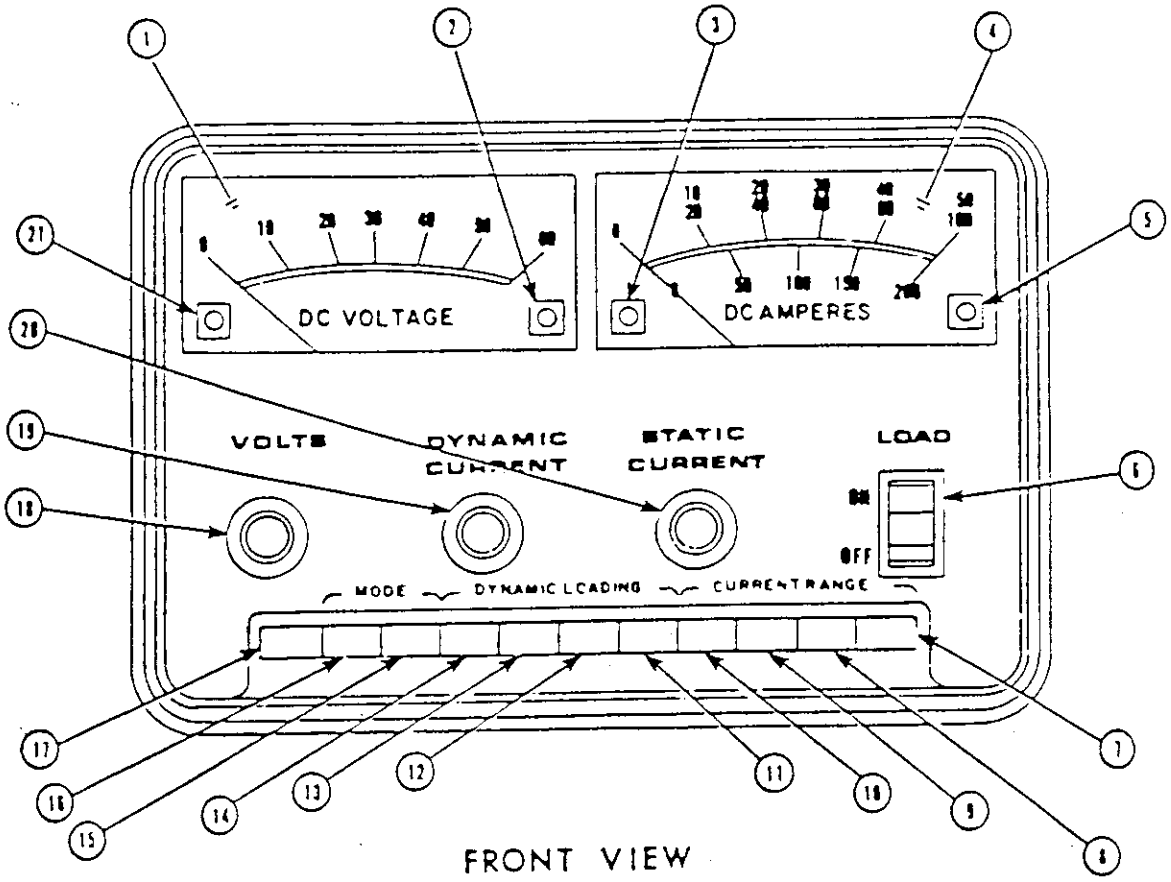
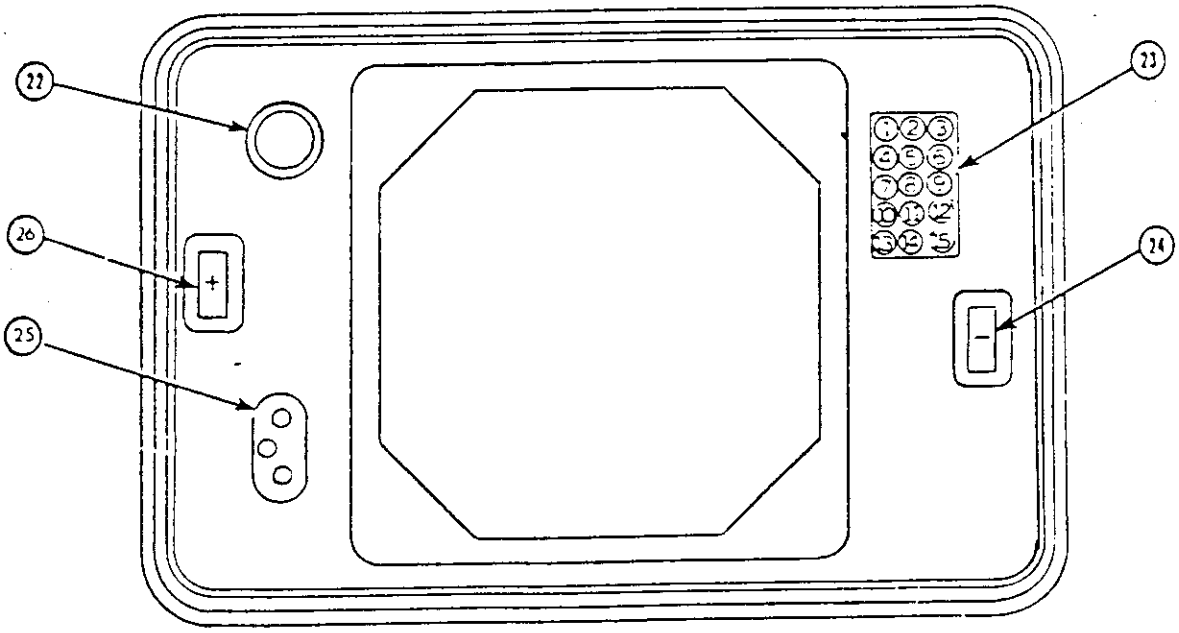
DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

FUNCTIONAL CONTROLS

ITEM NO	DESCRIPTION	FUNCTION
1	VOLTMETER	INDICATES VOLTAGE ACROSS INPUT TERMINALS
2	Saturation INDICATOR LAMP	Red Led Lamp Lights When Load Saturates Due To Insufficient Voltage or Current
3	E. I. INDICATOR LAMP	RED LED LAMP LIGHTS WHEN VOLTAGE OR POWER EXCEEDS THE MAXIMUM RATING OF THE INSTRUMENT
4	AMMETER	INDICATES OLAD CURRENT ON FOUR RANGES, DETERMINED BY RANGE SWITCHES
5	OVERTEMPERATURE INDICATOR	RED LED LAMP LIGHTS WHEN INTERNAL HEAT EXCEEDS SAFE OPERATING TEMPERATURE
6	LOAD SWITCH	TURNS LOAD CURRENT ON WHEN IN THE UP POSITION
7	200 AMP RANGE SWITCH	SETS THE INSTRUMENT ON THE 0 TO 200 SCALE ON THE AMMETER
8	100 AMP RANGE SWITCH	SETS THE INSTRUMENT ON THE 0 TO 100 SCALE ON THE AMMETER
9	50 AMP RANGE SWITCH	SETS THE INSTRUMENT ON THE 0 TO 50 SCALE ON THE AMMETER
10	10 AMP RANGE SWITCH	SETS THE INSTRUMENT ON THE 0 TO 10 SCALE ON THE AMMETER
11	DYNAMIC LOADING 1KHz SWITCH	SWITCHES LOAD CURRENT BETWEEN TWO CURRENT LEVELS AT A RATE 1000 Hz PER SECOND
12	DYNAMIC LOADING 100/120 SWITCH	SWITCHES LOAD CURRENT BETWEEN TWO CURRENT LEVELS AT A RATE OF 100/120 Hz PER SECOND
13	DYNAMIC LOADING DC SWITCH	ALLOWS LOWER CURRENT LEVEL TO BE SET WHILE MONITORING CURRENT ON AMMETER
14	DYNAMIC LOADING OFF SWITCH	RESTORES INSTRUMENT TO NORMAL OPERATION
15	R MODE SWITCH	PLACES THE INSTRUMENT IN CONSTANT RESISTANCE MODE
16	I MODE SWITCH	PLACES THE INSTRUMENT IN CONSTANT CURRENT MODE
17	POWER SWITCH	PRESS-ON PRESS-OFF SWITCH CONTROLS INPUT POWER TO THE INSTRUMENT
18	INPUT VOLTAGE CONTROL KNOB	ADJUSTMENT FOR THE RATED VOLTAGE OF THE POWER SUPPLY UNDER TEST WHEN OPERATING MODE IS CONSTANT RESISTANCE
19	DYNAMIC CURRENT CONTROL KNOB	SETS THE LOWER OF THE TWO CURRENT LEVELS WHEN DYNAMIC LOADING FUNCTION IS OPERATING. AS CONTROL IS ROTATED CLOCKWISE LOAD CURRENT INCREASES. CONTROL IS INACTIVATED WHEN DYNAMIC LOADING OFF SWITCH IS DEPRESSED
20	STATIC CURRENT CONTROL KNOB	SETS THE LOAD CURRENT ROTATE CLOCKWISE TO INCREASE
21	AC POWER INDICATOR LAMP	GREEN LED LAMP LIGHTS WHEN AC POWER IS ON
22	LINE FUSE	FUSE HOLDER FOR 1/2 AMP FUSE FOR 115 VOLT OR 1/4 AMP FUSE FOR 230 VOLT CURRENT
23	INPUT-OUTPUT CONNECTOR	USED FOR SPECIAL APPLICATIONS SUCH AS EXTERNAL PROGRAMMING AND REMOTE CONTROL OPERATIONS
24	NEGATIVE INPUT TERMINAL	BUSBAR CONNECTOR FOR NEGATIVE DC SOURCE
25	AC CORD CONNECTOR	FOR AC INPUT POWER CORD
26	POSITIVE INPUT TERMINAL	BUSBAR CONNECTOR FOR POSITIVE DC SOURCE



FRONT VIEW



REAR VIEW

FUNCTIONAL CONTROLS

FIGURE 2

SPECIFICATIONS

POWER REQUIREMENTS

EL750B	105 TO 125V
EL750B-A	210 TO 250V
EL750B-E	198 TO 242V
EL750B-K	216 TO 264V

47 TO 63Hz, 1Ø, 20W

MAXIMUM LOADING POWER

750W (See Safe Operating Curve)

MAXIMUM LOAD VOLTAGE

55VDC.

MAXIMUM LOAD CURRENT

150A

MAXIMUM LOAD VOLTAGE

1.8VDC

OPERATING MODE

Constant Current or Constant Resistance.

CURRENT RIPPLE

Less Than 0.1A P-P

DYNAMIC LOADING

ALLOWS SWITCHING BETWEEN TWO CURRENT LEVELS AT A SWITCH SELECTED RATE OF ≈1 KHZ OR TWO TIMES INPUT LINE FREQUENCY. THE TWO CURRENT LEVELS ARE SET BY FRONT PANEL CONTROLS.

DYNAMIC LOAD RESPONSE TIME

1 MICROSECOND PER AMP OR 50 MICROSECONDS, WHICHEVER IS GREATER.

REMOTE PROGRAMMING (CONSTANT CURRENT)

0 - 10V IS EQUAL TO 0 - 150A. ACCURACY IS ± 1%. PROGRAM VOLTAGE INPUT IMPEDANCE APPROXIMATELY 100K.

METER RANGES

VOLMETER 0 - 60 VOC.
AMMETER 0 - 10 - 50 - 100 - 200A

METER ACCURACY

2% FULL SCALE

PROTECTION CIRCUITS

ELECTRONIC CIRCUIT LIMITS POWER DISSIPATION TO 750W. LOAD SHUTS DOWN IN THE EVENT OF AN EVERVOLTAGE. THERMAL SENSORS SHUT OFF LOAD IN THE EVENT OF AN OVERTEMPERATURE CONDITION. UNIT IS PROTECTED AGAINST APPLICATION OF REVERSED POLARITY VOLTAGES.

CURRENT SIGNAL OUTPUT

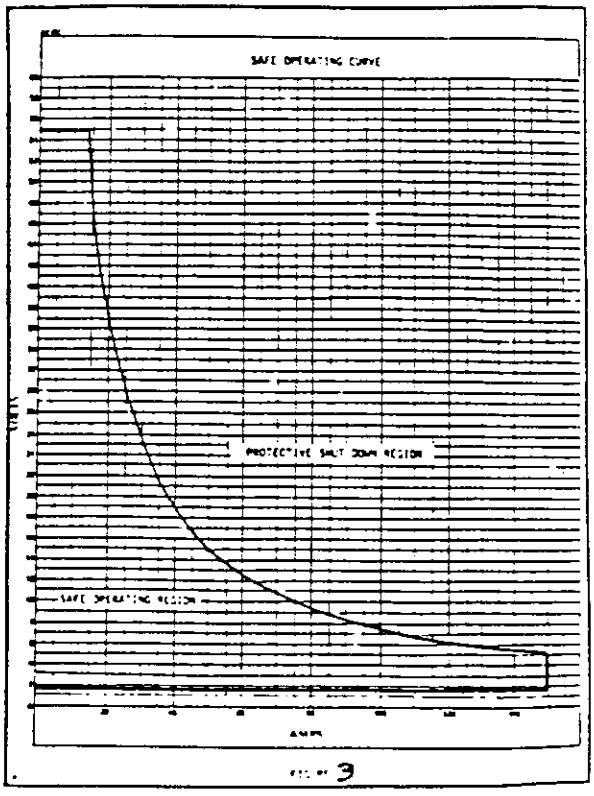
VOLTAGE PROPORTIONAL TO CURRENT IS PROVIDED. 1 MILLIVOLT PER AMP, ±1%

OPERATING TEMPERATURE RANGE

0 - 40°C.

COOLING

FORCED AIR COOLING INTEGRAL IN DESIGN.



SECTION II

OPERATING INSTRUCTIONS

OPERATING INSTRUCTIONS

SEE FIG. (2) FUNCTIONAL CONTROLS

LOAD CONNECTION

The output of the DC power supply should be connected directly to the bus bars of the EL750B. Use short cables of adequate size to handle the rated load current of the power supply.

CAUTION

OBSERVE POLARITY OF BUS BARS WHEN CONNECTING CABLES.

CONSTANT CURRENT

1. Turn the AC power switch on.
2. Set the mode switch to constant current, load switch off, current controls fully counter-clockwise, dynamic load switch off, and range switch to the desired current range.
3. Turn on power supply under test. At this point the EL750B is at no load.
4. Turn load switch on and adjust static current control clockwise until desired current level is obtained.
5. When the load current exceeds the maximum current capability of the power supply the instrument will saturate. The indicator lamp marked SAT will indicate this condition. To reset circuit to normal operation turn current control counter-clockwise.

CONSTANT RESISTANCE

1. Turn the AC power switch on.
2. Set the mode switch to constant resistance, load switch off. Current controls fully counter-clockwise, dynamic load switch off, and range switch to the desired current range.
3. Set the volt selector knob to the voltage rating of the power supply under test.
4. Turn on power supply. At this point the EL750B is at no load.
5. Turn load switch on and adjust static current control clockwise until desired current is obtained.

DYNAMIC LOADING

The dynamic load section switches the load current from one level to another at a repetition rate of 2 times AC line frequency or ≈ 1 KHz and a duty cycle of 50%.

1. Set the upper current level as noted in constant current or constant resistance operating procedures.
2. Set dynamic load current control fully counter-clockwise and dynamic loading switch to DC.
3. Adjust dynamic load current control clockwise until desired lower current level is obtained.
4. After upper and lower current levels have been set, switch dynamic loading switches to either of the two frequencies provided.
5. At this point the current meter should indicate the average of the two current levels.
6. The current waveform may be monitored by connecting a scope to pins 1 and 2 of connector J2.

DYNAMIC LOADING NOTES

Dynamic loading in resistance mode

In the resistance mode the load current change is modified by the voltage transient of the power supply and voltage drop across load cable.

Dynamic loading in current mode

In the current mode the load current change is not affected by the power supply voltage transient unless the voltage drops below the minimum operating voltage of the EL750B. In this condition the load transistors will saturate causing distortion of the dynamic current waveform.

LOAD CABLE INFLUENCE WITH DYNAMIC LOADING

When dynamic loading a power supply with the EL750B, the type and length of interconnect system becomes important. The inductance of the cables or bus bars causes a negative voltage transient at the input terminals of the EL750B. If the input voltage, during the transient, drops below 1.8 volts, the load will saturate causing severe distortion of the current waveform. Load instability or oscillation may also be evident. The maximum interconnect system inductance may be approximated by using the following equation:

$$L=(Vin - 1.8) \times 10^{-6}$$

Where: L is in microhenries

Vin is the power supply voltage.

The following factors should be considered when selecting an interconnect system:

1. Keep interconnect system short. A five foot length of #2 GA cable has an inductance of 2μH. A two foot length has 0.7μH.
2. Run interconnect cables parallel in close proximity for lower inductance. For example: Two #2 GA cables spaced 1/8 inch apart have a total inductance of 0.68μH. Separated by more than 12 inches results in 4μH.
3. Use cables or bus bars with large surface areas to reduce "skin effect".

When operating the EL750B at or near the minimum operating voltage (1.8V), the interconnect system inductance effect becomes severe. Special effort must be made to lower the inductance.

Flat copper strips, separated by 10 mil insulation will provide the lowest inductance. If the inductance cannot be reduced enough, a capacitor may be connected across the input terminals of the EL750B. The capacitance value is not as important as the ESR. ESR should be less than 0.1 ohm at the switching frequency.

EXTERNAL PROGRAMMING

The EL750B can be programmed for current externally by applying a 0 to 10 volt signal to J2 pin 8 (+) and pin 7 (-). Set the controls as follows:

1. AC power switch on.
2. Set the load switch off, dynamic load switch off, and meter range switch to desired current range.
3. The setting of the mode switch and voltage and current controls is irrelevant because they are disconnected during external programming.

NOTE: The load switch must be off during external programming. Turning the load switch on restores control of the load to the front panel controls.

External program methods

Figure 4A shows how to program using the internal 15V supply.

A programmable DC supply and a function generator may be used as shown in Fig. 4B. Any waveform may be used within the frequency range of 20Hz to 50KHz. The DC supply should be set to give the average current of the high and low current levels. For example, if the load is to vary between 50 and 100 amps, the DC program voltage should be set to produce a current of 75 amps (5VDC). The AC voltage is then set to produce a current which varies from 50 to 100 amps (3.33V P-P).

NOTE: Both the AC and DC signal sources must be isolated from the positive or negative inputs to the load.

When the DC and/or AC signal source must be connected to the negative input to the load, the circuit in Figure 4C should be used. An external +15 volt supply must be used to provide operating voltages for the OP amps. The upper frequency response of this circuit is limited due to the slew rate of the OP amps used.

PARALLEL CONNECTED LOADS

Two or more EL750B's may be paralleled to obtain higher current or power ratings. The control of the loads is the same as for individual loads. If simultaneous control of all loads is required, the circuit described in Fig. 4C in the external programming section may be used. The circuit shown within the dashed lines is to be repeated for each EL750B.

PROTECTION CIRCUIT

The EL750B is protected against overvoltage, overcurrent, and overpower by a circuit that automatically limits the current to a safe value. In the event of an overvoltage condition the protection circuit will reduce the load current to zero. When any of the three conditions occur, the "EI" indicator lamp will turn on to indicate a fault condition.

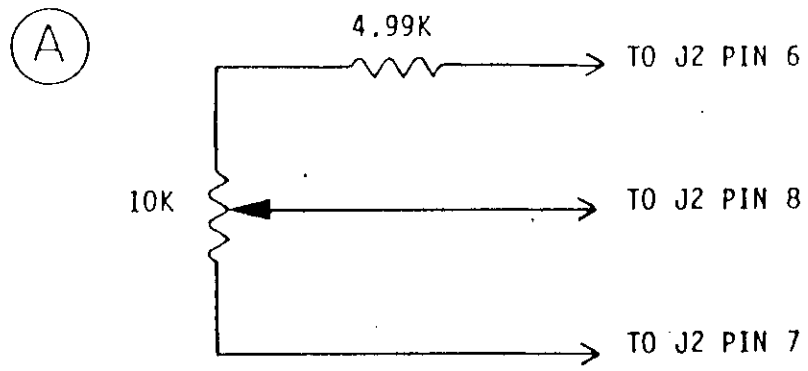
CURRENT MONITOR

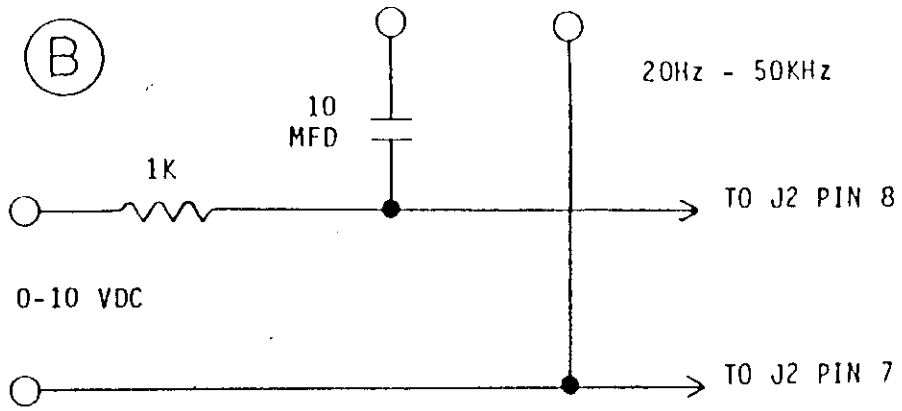
The load current may be monitored at J2 pin 1 (+) and pin 2 (-) with a digital voltmeter or an oscilloscope. The output is one millivolt per amp. The minus output (J2 pin 2) is connected to the minus bus bar.

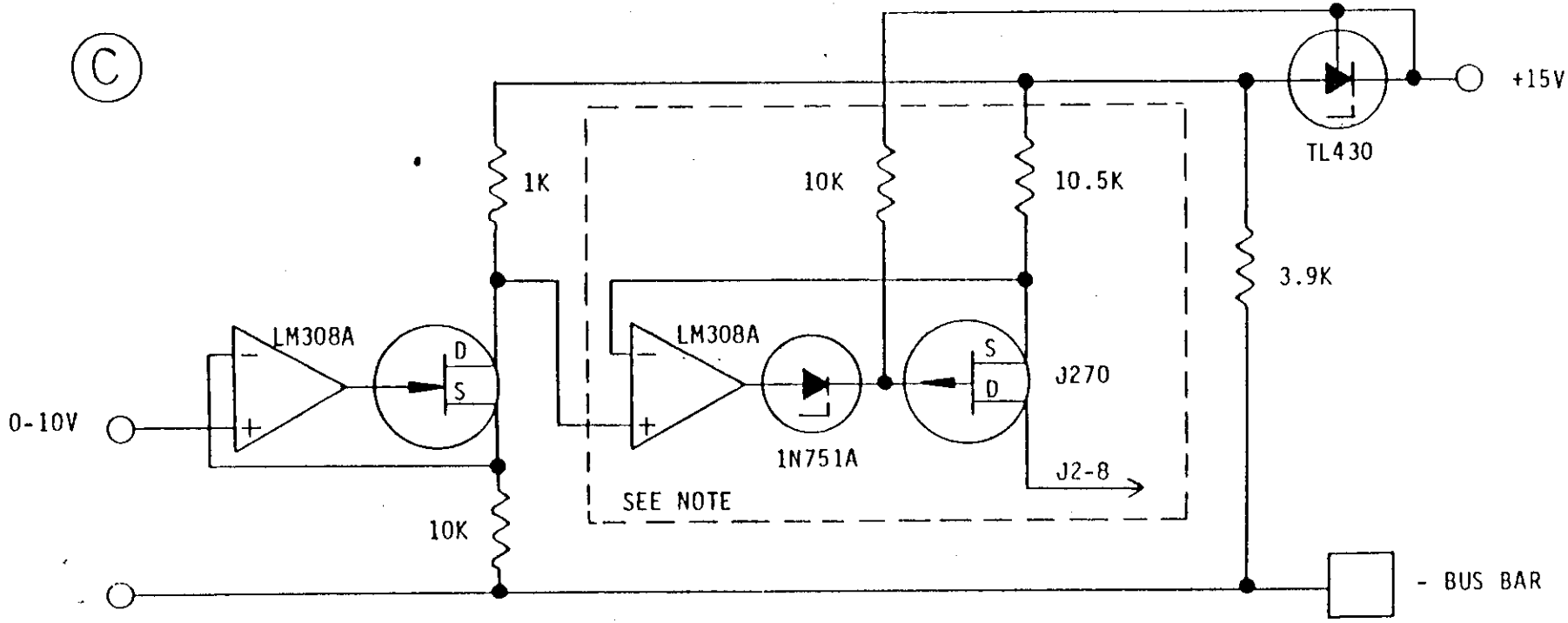
J2 INPUT/OUTPUT CONNECTOR PIN FUNCTIONS

PIN NO.	FUNCTION
1	Common
2	Current shunt output
3	Not used
4	Not used
5	Not used
6	+15 VDC, 10mA Max. load
7	+15 VDC return
8	Remote Program Input

J2-9 through J2-15--not used.







NOTE: THE CIRCUIT WITHIN THE DASHED LINES IS REPEATED FOR EACH EL750B USED.

FIGURE 4

SECTION III

CIRCUIT DESCRIPTION

CIRCUIT DESCRIPTION

INTRODUCTION

This section of the manual contains a description of the circuitry used in the EL750B electronic load. Individual descriptions are separated into the following parts: Shunt element and drivers, error amplifier, switch logic, reference supply, meter amplifier, protection circuit, and power supply. Refer to the block diagram (Figure 5) and appropriate schematics (Figures 18 and 19) while reading the circuit description.

SHUNT ELEMENT AND DRIVERS

The shunt element, consisting of 16 transistors connected in parallel, dissipates the power from the DC source connected to the EL750B. These transistors are located on the four flanges of the heat radiator and soldered directly to the power PC boards. Each transistor is driven by a circuit designed to force the current to share among the 16 transistors regardless of load current. The 16 circuits are identical; therefore, a description of one will be sufficient. The circuit consists of an OP amp, one FET transistor, and two bipolar transistors connected as a constant current sink. The output voltage of the error amplifier is used to program the current to the required level.

This voltage is applied to the non-inverting input of the OP amp. The load current flowing through R7 produces a voltage which is applied to the inverting input of the OP amp. The OP amp compares the two voltage levels and adjusts the drive current to maintain their equality. R2 and C2 provide frequency compensation for the circuit. The low value of R6 (3 ohms) reduces the current gain of the Darlington-connected transistors (Q2 and Q3) and forces Q2 to carry a larger portion of the load current.

ERROR AMPLIFIER

The error amplifier consists of IC-7 and associated components. These components are located on the PC board.

The load current is controlled by a program voltage which is developed one of three ways:

1. A stable reference source (constant current operation)
2. A portion of the voltage applied to the load (constant resistance operation)
3. A remote program voltage supplied by the user.

The appropriate voltage is selected by the mode switch (S2) and the switch logic circuit. It is then applied to the positive side of a half bridge consisting of R47 and R50.

A 0.001 ohm meter shunt is used to monitor the total load current. The voltage developed across this shunt is negative with respect to circuit common and is applied to the negative side of the half bridge.

The voltage at the center point of the half bridge will be the difference of the two voltages as referenced to circuit common. This error voltage is amplified and used to program the current in the shunt element.

IC-7 is a precision OP amp connected as a differential amplifier. It provides the gain required to maintain current regulation. R14 and C17 provide frequency compensation. Offset voltages are balanced out by R45 and R46.

SWITCH LOGIC

The switch logic circuit consists of IC-1 through IC-6 and associated components. These components are located on the control PC board. Inputs to this circuit are controlled by front panel switches S5 through S7 and S12.

An analog switch IC (IC-6) switches the input of the error amplifier to one of three sources:

1. Static current control

2. Dynamic current control

3. Remote program input

NOTE: When remote program is not used, this position becomes "Load Off".

This switch is controlled by the front panel push button switches, IC4, and IC5. The front panel switches program IC4 and IC5 to select the input to the error amplifier and the dynamic loading frequency.

When the dynamic loading feature is being used the switches in IC-6 connected to the static and dynamic current controls are turned on alternately at a repetition rate of 2 times or 16 times the AC line frequencies (120Hz or 960Hz). These frequencies are obtained from a master oscillator operating at 32 times line frequency, phase-locked to the AC power line frequency. The output of the phase-lock-loop IC (IC-1) is divided by 2 and 16 by IC-2 and IC-3.

REFERENCE SUPPLY

The reference supply consists of IC-11 and associated components. It is located on the control board.

IC-11 is an adjustable shunt regulator which is adjusted to 10 volts with R38. The reference voltage is used by the protection circuit to establish threshold levels. The reference voltage is divided down to 1.5 volts by R41 and R42 to be used during constant current operation.

METER AMPLIFIER

The meter amplifier consists of IC-10 and associated components. It is a precision OP amp operating at a fixed gain of 60 and is located on the control board.

The input to the amplifier is the voltage from the meter shunt. Offset voltages are balanced out by R32 and R33. The output of the amplifier is used to drive the current meter and the protection circuit. FET transistor Q4 stops the current meter from pegging upscale during power on or off. R36 calibrates the current meter.

PROTECTION CIRCUIT

The protection circuit consists of IC-8c, IC-8d and IC-9 and associated components located on the control board and IC-2a, IC-2b and associated components located on the power supply board.

The protection circuit monitors four operating parameters: Voltage, current, power dissipation and heatsink temperature. If any or all of these parameters exceed a safe level, the circuit either takes over control of the shunt element or turns it off completely.

OVERPOWER CIRCUIT

The DC input voltage is divided by R28 and R29 and applied to one input of the analog multiplier IC (IC-9). The output of the meter amplifier is applied to the second input. The output is the product of the two inputs - a voltage level representing the power being dissipated by the load This voltage is applied to the inverting input of IC-8c, an OP amp operating as a comparator. When the voltage equals the reference voltage applied to the non-inverting input, the output swings negative to take over control of the shunt elements. The result is that the load current is clamped to a safe level. When the output of IC-8c or IC-8d drops, Q3 is biased on to light the "EI" indicator.

OVERCURRENT CIRCUIT

The output of the meter amplifier is applied to the inverting input of IC-8d, an OP amp operating as a comparator. When the voltage equals the reference voltage applied to the non-inverting input, the output swings negative to take over control as described in the overpower circuit.

OVERVOLTAGE CIRCUIT

The overvoltage sensor is a zener diode (CR13). When the input voltage exceeds the breakdown voltage of the diode, the voltage at the inverting input of IC-8c is increased. When this voltage exceeds the reference voltage applied to the non-inverting input, the output goes negative, thus turning off the shunt element and turning on Q3 to light the "EI" indicator.

OVERTEMPERATURE CIRCUIT

The overtemperature sensors are thermistors RT1 and RT2. They are located on the heat radiator at the opposite end from the fan. The thermistors, along with R3 through R6, are connected in a bridge configuration with IC-2a and IC-2b serving as detectors. The outputs of IC-2a and IC-2b are normally positive and go negative when an overtemperature condition exists. This turns off the shunt element and turns on Q1 to light the "OT" indicator. Resistor R7 provides trippoint hysteresis to allow the heat radiator to cool before normal operation can be resumed.

POWER SUPPLY

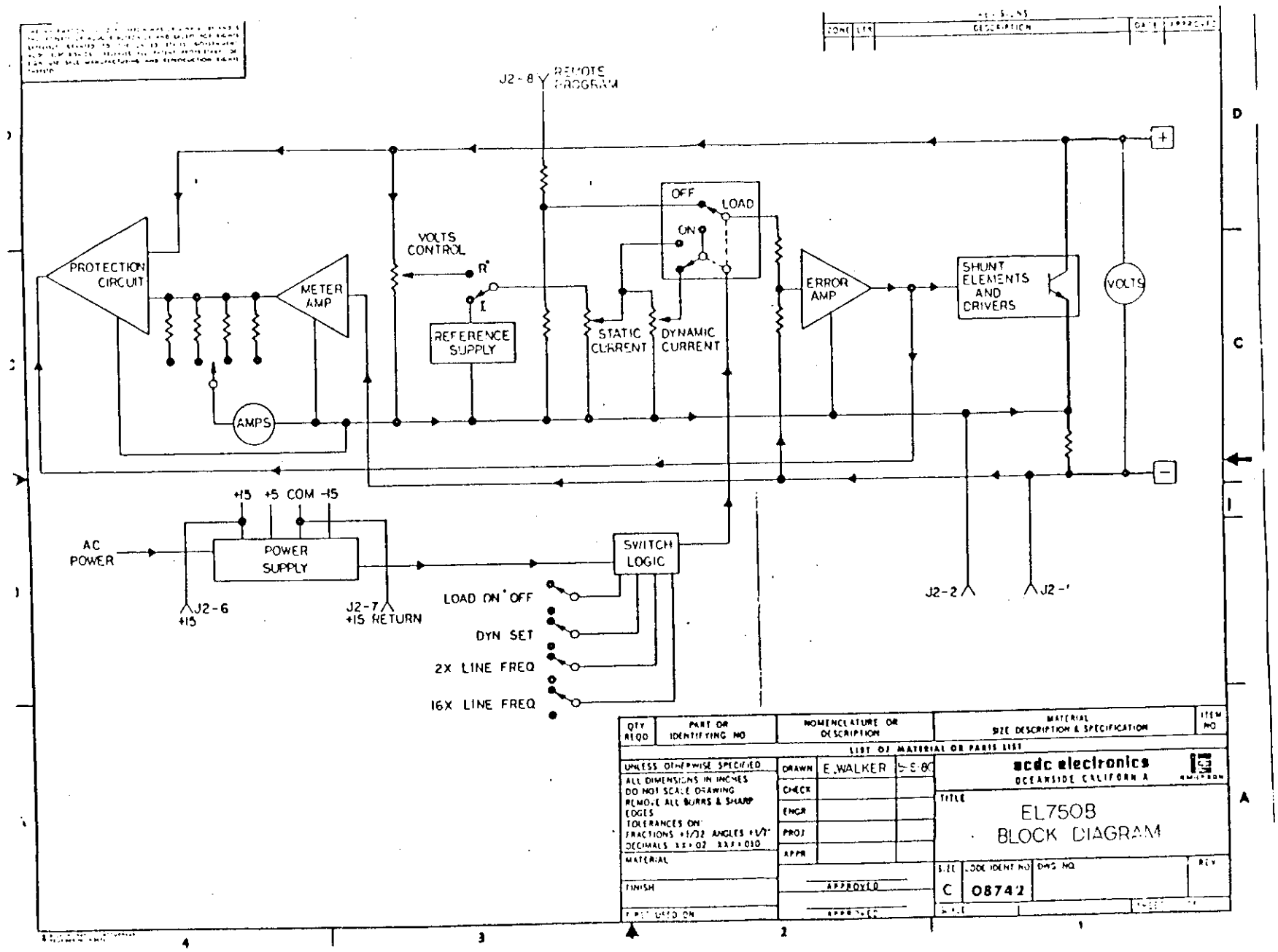
The power supply circuit provides the operating power for the EL750B system. Electronic regulation is used, when necessary, to provide stable, low ripple output voltages. The power supply circuit is located on the power supply board.

Power is applied to the primary of transformer T1 through fuse F1, power switch S1 and AC input connector J1. The full wave bridge rectifiers and associated filter components in the secondaries of T1 provide filtered DC voltages.

The unregulated output is approximately 5 VDC. This voltage is used to drive the shunt elements and the LED indicators. Transistors Q3 through Q5 and associated components apply the 5 volts to the shunt element after the -15 volt supply exceeds approximately -13 volts. This prevents the shunt element from sinking current when switching the AC power on or off. Transistor Q2 and associated components are connected as a constant current source for AC power indicator DS1.

The ±15 volt outputs are electronically regulated by IC-1, a dual-tracking regulator IC.

A line frequency signal is obtained from the secondary of T1 and rectified by CR5 and CR6.


J2-8 REMOTE PROGRAM
PROTECTION CIRCUIT
METER AMP
VOLTS CONTROL
R
I
REFERENCE SUPPLY
OFF
LOAD
ON
STATIC CURRENT
DYNAMIC CURRENT
ERROR AMP
SHUNT ELEMENTS AND DRIVERS
VOLTS
AMPS
+
-
+15 +5 COM -15
AC POWER
POWER SUPPLY
SWITCH LOGIC
J2-6 +15
J2-7 +15 RETURN
LOAD ON/OFF
DYN SET
2X LINE FREQ
16X LINE FREQ
J2-2
J2-1
D
C
B
A
4
3
2
1
QTY REQD
PART OR IDENTIFYING NO
NOMENCLATURE OR DESCRIPTION
MATERIAL SIZE DESCRIPTION & SPECIFICATION
ITEM NO
LIST OF MATERIAL OR PARTS LIST
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS IN INCHES
DO NOT SCALE DRAWING
REMOVE ALL BURRS & SHARP EDGES
TOLERANCES ON:
FRACTIONS ±1/32 ANGLES ±1/2°
DECIMALS .X ±.02 .XX ±.010
MATERIAL
FINISH
DRAWN E.WALKER 5-8-80
CHECK
ENGR
PROJ
APPR
APPROVED
acdc electronics
OCEANSIDE CALIFORNIA
TITLE
EL750B
BLOCK DIAGRAM
SIZE C
CODE IDENT NO 08742
DWG NO
REV

MAINTENANCE

This section of the manual contains information for performing preventive maintenance, calibration and corrective maintenance for the EL750B.

PREVENTIVE MAINTENANCE

Preventive maintenance consists of cleaning, visual inspection, etc. Preventive maintenance performed on a regular basis may prevent instrument breakdown and will improve the reliability of the instrument. The severity of the environment to which this instrument is subjected determines the frequency of maintenance. A convenient time to perform preventive maintenance is preceding adjustment of the instrument.

COVER REMOVAL

WARNING

Dangerous voltages exist at several points throughout this instrument. When the instrument is operated with the cover removed, do not touch exposed connections or components. Some transistors have voltages present on their cases. Disconnect power before cleaning the instrument or replacing parts.

The cover is held in place by two screws located on the back panel. To remove the cover, remove the two oval head screws and finish washers and pull away the panel. The cover will now slide off the instrument.

CLEANING

This instrument should be cleaned as often as operating conditions require. Accumulation of dirt on components acts as an insulating blanket and prevents efficient head dissipation which can cause overheating and component breakdown.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. In particular, avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

EXTERIOR

Loose dust accumulated on the front panel can be removed with a soft cloth or small brush. Dirt that remains can be removed with a solf cloth dampened with a mild detergent and water solution. Abrasive cleaners should not be used.

INTERIOR

Dust in the interior of the instrument should be removed occasionally due to its electrical conductivity under high-humidity conditions. The best way to clean the interior is to blow off the accumulated dust with dry, low-pressure air. Remove any dirt which remains with a soft brush or a cloth dampened with a mild detergent and water solution. A cotton-tipped applicator is useful for cleaning in narrow spaces.

SECTION IV

MAINTENANCE AND CALIBRATION

SWITCH CONTACTS

Switch contacts and pads are designed to operate dry for the life of the switch. However, as the switches are not sealed, dust attracted to the contact area may cause switch contacts to become electrically noisy. Cleaning may be accomplished by flushing the contact area with isopropyl alcohol or kelite (1 part kelite to 20 parts water). Do not use chemical cleaning agents that leave a film or that might damage plastic parts. Do not use cotton swabs or similar applicators to apply cleaning agents as they tend to snag and leave strands of cotton on switch contacts.

VISUAL INSPECTION

This instrument should be inspected occasionally for such defects as broken connections, improperly seated connectors, damaged circuit boards and heat-damaged parts.

The corrective procedure for most visible defects is obvious; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, it is important that the cause of overheating be corrected to prevent recurrence of the damage.

CALIBRATION

INTRODUCTION

The following procedure returns the EL750B to correct calibration.

TEST EQUIPMENT

The following test equipment or equivalent substitutes are required for performing the tests described herein.

POWER SOURCES

1.8 VDC 150A, ACDC JF2N200P
5.0 VDC 180A, ACDC JF5N200P
0 to 70 VDC 1A, HP 6296A

Voltmeter, 4-1/2 digit digital, Hickok 3400

Oscilloscope, Tektronix 5440

Plug-in, vertical Tektronix 5A48

Plug-in, horizontal Tektronix 5B42

Test cables, #2 GA, 5 ft. long

Card extender, ACDC 70-347-001

Meter shunt 50mV, 150A, ± 0.1%

Resistor, 1Ω ± 1%, 5W

Hipot, 1000 VAC & 500 VDC, Slaughter 103/105 -1.0

CALIBRATION CYCLE

Recommended calibration cycle is six months or as required.

The following calibration steps should be performed in sequence as listed.

PANEL METER MECHANICAL ZERO ADJUST

The mechanical zero adjustment is located below each meter and behind the front panel. Remove any power source connected to the EL750B and turn power switch off. Allow at least one minute for meter pointer to stabilize.

Rotate adjustment screw clockwise until pointer is exactly at zero. Rotate adjustment screw slightly counter-clockwise to relieve tension on pointer suspension.

REFERENCE VOLTAGE

Set control per Table 1-A

Connect DVM to TP3 (+) and TP1 (-)

Adjust R38 for a voltage reading of 10 ± 0.01 volts.

REMOTE PROGRAM CALIBRATION

Connect equipment as shown in Figure 2

Set controls per Table 1-C

Set meter range to 200A

Adjust program voltage to 10 ± 0.01 volts.

Adjust R10 for 50 millivolts across calibration shunt.

Adjust program voltage to 100 ± 1 millivolt.

Adjust R45 for 0.50 millivolt across calibration shunt.

CURRENT METER ZERO

Hook up test equipment as shown in Figure 6.

Set controls per Table 1-A.

The voltage across the calibration shunt must be 0 ± 30μV. Calibrate per paragraph "Remote Program Calibration" if voltage is not within specification.

Adjust R32 for a zero reading on current meter.

CURRENT METER CALIBRATION

Hook up test equipment as shown in Figure 6.

Set controls per Table 1-B.

Adjust static current control for 3.33 millivolts across calibration shunt.

Adjust R36 for a current meter reading of 10 amps.

Change meter range to 50A.

Adjust static current control for 16.67 millivolts across calibration shunt.

The current meter shall read 50 ± 0.5 amps.

Change meter range to 100A.

Adjust static current control for 33.33 millivolts across calibration shunt.

The current meter shall read 100 ± 1 amps.

Change meter range to 200A.

Adjust static current control for 50 millivolts across calibration shunt.

The current meter shall read 150 ± 1.5 amps.

VOLTAGE CONTROL KNOB ADJUST

Connect equipment as shown in Figure 6.

Set controls per Table 1-G.

Adjust voltage control for 150 amps on current meter.

The voltage control knob should be adjusted on the pot shaft so that it will indicate 5 volts.

PERFORMANCE VERIFICATION TESTS

Failure to meet the requirements of the following tests indicates a circuit failure which requires repair. Return the unit to factory for repair or contact factory for assistance in trouble shooting.

MINIMUM LOAD VOLTAGE

Connect equipment as shown in Figure 6.

Set controls per Table 1-D.

Set voltage source to 1.8 ± 0.05 volts as measured at the load terminals.

The load current must be adjustable from 0 to 150 amps with the static current control.

CURRENT RIPPLE

Connect equipment as shown in Figure 8.

Set controls per Table 1-B.

Adjust load current to 1 amp.

The ripple measured across the 1 ohm resistor shall not exceed 0.1 volt P-P.

DYNAMIC LOAD RESPONSE TIME

Connect equipment as shown in Figure 9.

Set controls per Table 1-E.

Set dynamic load to switch between 75 and 150 amps. Verify that both 120Hz and 1KHz frequencies are functional.

Measure rise and fall time on the current across the calibration shunt.

The rise and fall time shall be less than 75 microseconds.

PROTECTION CIRCUITS

Overvoltage -

Connect equipment as shown in Figure 10.

Set controls per Table 1-D.

Adjust load current to 1.0 amps.

Adjust programmable supply voltage up until the "EI" indicator lights and the load current drops to zero.

The overvoltage point shall occur between 57 and 70 volts.

Overcurrent -

Connect equipment as shown in Figure 6.

Set controls per Table 1-F.

Set voltage source to 2 volts.

Adjust load current up until the "EI" indicator lights and the load current stops increasing.

The overcurrent point shall occur between 152 and 159 amps.

Overpower -

Connect equipment as shown in Figure 10.

Set controls per Table 1-D.

Set programmable supply to 6 ± 0.01 volts.

Adjust the load current up until the "EI" indicator lights and the load current stops increasing.

The load current at this point shall be between 125 and 137.5 amps.

Turn static current control fully counter-clockwise.

Set programmable supply to 50 ± 0.1 volts.

Adjust the load current up until the "EI" indicator lights and the load current stops increasing.

The load current at this point shall be between 15 and 17 amps.

Overtemperature -

Connect equipment as shown in Figure 6.

Set controls per Table 1-D.

Set the load current to 50A.

Remove P6 from power supply board.

Temporarily short terminals 1 to 4 on J6 (located on board).

The load current shall drop to zero and the "OT" indicator shall light.

Remove jumper and replace P6. The unit shall resume normal operation.

HIPOT (DIELECTRIC WITHSTAND TEST)

Hipot test must be performed with AC power switch in the "ON" position.

1000 VAC: AC input to input bus bars and AC input to chassis.

500 VDC: Input bus bars to chassis.

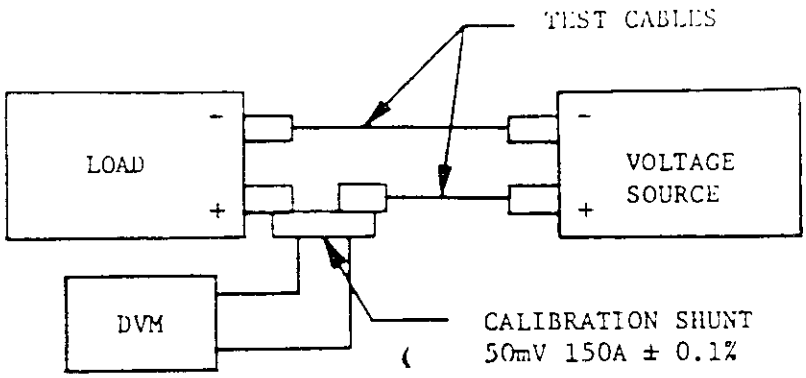
TABLE I

	VOLTS CONTROL	DYN. CURRENT CONTROL	STATIC CURRENT CONTROL	LOAD ON/OFF	POWER ON/OFF	I (CURRENT)	R (RESISTANCE)	OFF	DC	120Hz	1KHz	10A	50A	100A	200A
A	5	CCW	CCW	OFF	ON	IN	OUT	IN	OUT	OUT	OUT	IN	OUT	OUT	OUT
B	5	CCW	*	ON	ON	IN	OUT	IN	OUT	OUT	OUT	IN	OUT	OUT	OUT
C	5	CCW	CCW	OFF	ON	IN	OUT	IN	OUT	OUT	OUT	OUT	OUT	OUT	IN
D	5	CCW	*	ON	ON	IN	OUT	IN	OUT	OUT	OUT	OUT	OUT	OUT	IN
E	5	*	*	ON	ON	IN	OUT	*	*	*	*	OUT	OUT	OUT	IN
F	0	CCW	*	ON	ON	OUT	IN	IN	OUT	OUT	OUT	OUT	OUT	OUT	IN
G	*	CCW	CW	ON	ON	OUT	IN	IN	OUT	OUT	OUT	OUT	OUT	OUT	IN

* REFERENCE PROCEDURE FOR SETTING THIS CONTROL.

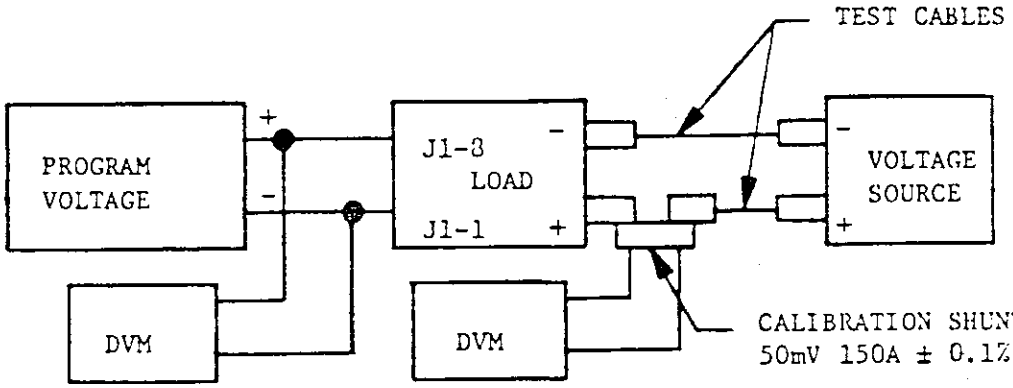
CW CLOCKWISE

CCW COUNTER-CLOCKWISE



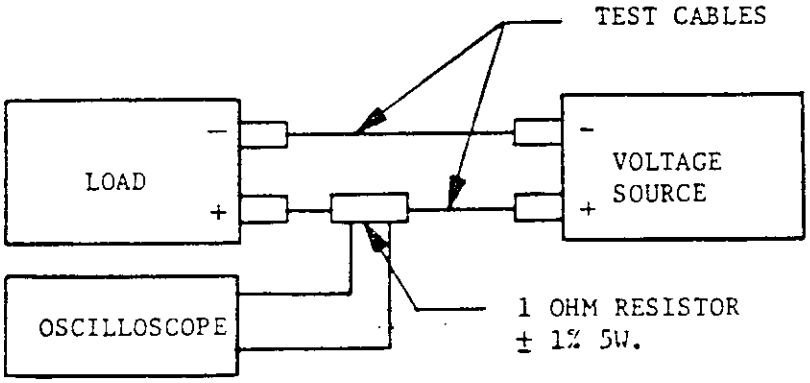
SET TO 5V. UNLESS SPECIFIED OTHERWISE.

Figure 6



SET TO 5V.

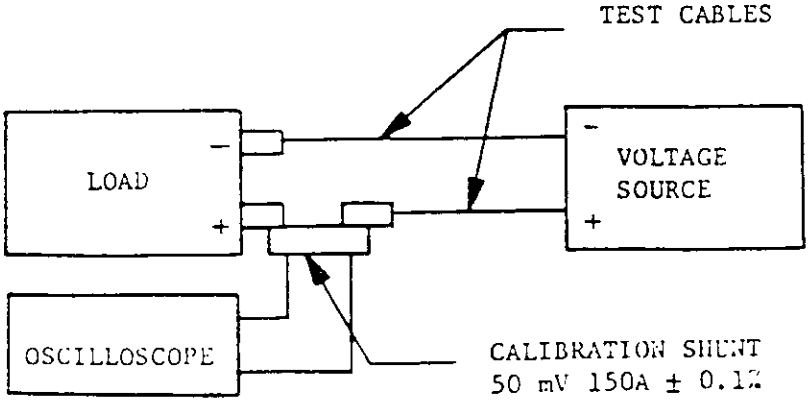
Figure 7



SET TO 5V.

NOTE: LOAD AND VOLTAGE SOURCE GROUND TERMINALS MUST BE CONNECTED TO EARTH.

Figure 8



SET TO 5V.

NOTE: USE TWISTED PAIR TO CONNECT SCOPE TO SHUNT, DO NOT USE PROBE.

Figure 9

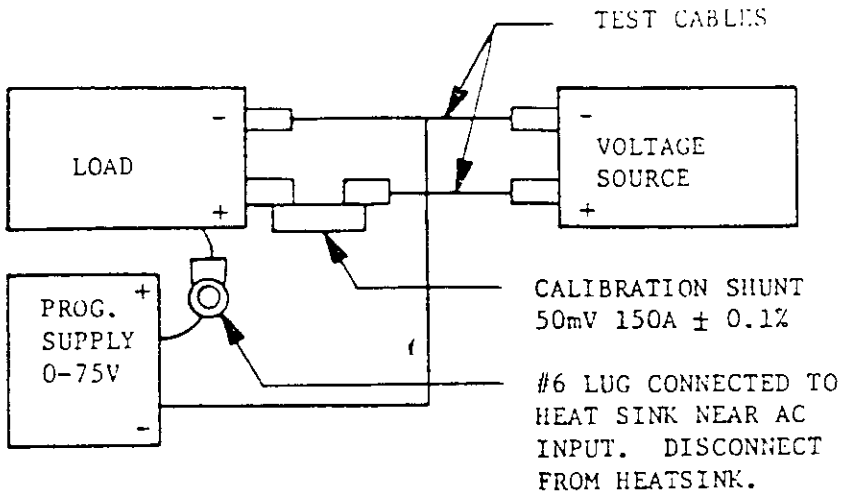

TEST CABLES
LOAD
-
+
VOLTAGE
SOURCE
-
+
PROG.
SUPPLY
0-75V
+
-
CALIBRATION SHUNT
50mV 150A ± 0.1%
#6 LUG CONNECTED TO
HEAT SINK NEAR AC
INPUT. DISCONNECT
FROM HEATSINK.

Figure 10

SECTION V

REPLACEABLE ELECTRICAL PARTS
ELECTRICAL COMPONENTS
DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

REPLACEABLE ELECTRICAL PARTS

The information in this section is for reference only. Schematics may or may not include all revisions. Contact the factory for information pertaining to the current list of materials.

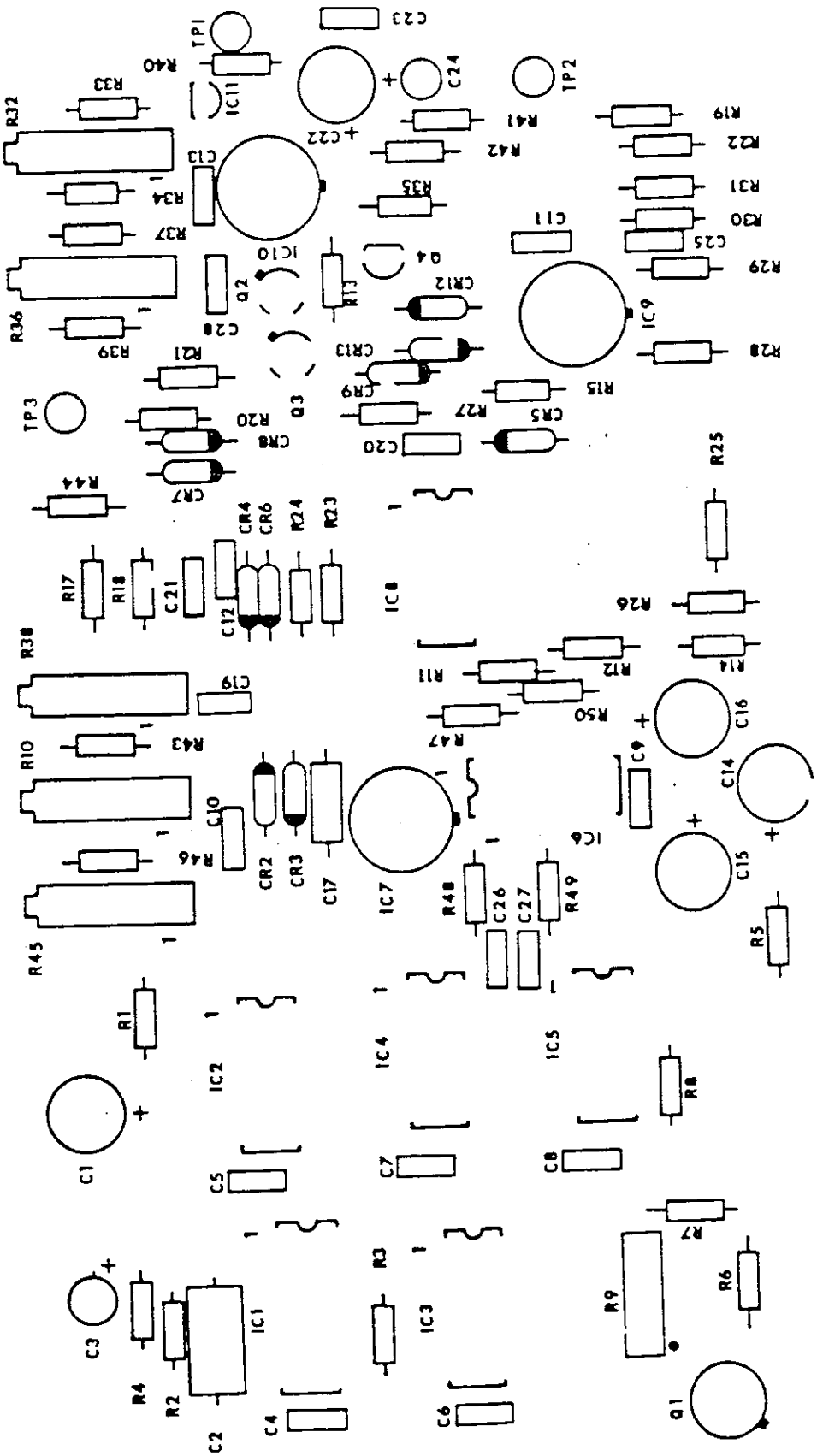
Manufacturer call-outs are for reference only. The equipment may or may not use listed manufacturers.

Replacement parts are available from ACDC Electronics, 401 Jones Rd. Oceanside, Calif. 92054. Direct all enquiries to the CSO department when ordering parts; include model number, ACDC part number, reference designator, and component value or description.

LIST OF MANUFACTURERS

ACDC	ACDC Electronics, Div. of Emerson Oceanside, Calif. 92054
AD	Analog Devices, Inc. Norwood, Mass. 02062
AVX	AVX Ceramics Myrtle Beach, So. Carolina 29577
BOU	Bourns, Inc. Riverside, Calif. 92507
BUSS	Bussman Manufacturing St. Louis, Mo. 63178
CK	C & K Components, Inc. Newton, Mass. 02158
CRL	Centralab Electronics Div. Milwaukee, Wisc. 53201
CTS	CTS Corp. Elkart, Ind. 46514
DALE	Dale Electronics, Inc. Norfolk, Nebraska 68701
FAIR	Fairchild Camera & Instruments Mountain View, Calif. 94042
GI	General Instrument. Optoelectronics Palo Alto, Calif. 94304
ILL	Illinois Capacitor Inc. Morton Grove, Ill. 60053
IMC	IMC Magnetics Rochester, N.H. 03867
MAL	Mallory Capacitor Co. Huntsville, Ala. 35801
MEP	Mepco/Electra, Inc. Morristown, N.J. 07960
MOD	Modutec, Inc. Norwalk, Conn. 06854
MOL	Molex Inc. Lisle, Ill. 60532
MOT	Motorola Semiconductor Products Phoenix, Ariz. 85036
NSC	National Semiconductor Corp. Santa Clara, Calif. 95051

PAC	Pacific Electrocord C.. Gardena, Calif. 90247
RCA	RCA Solid State Div. Sumerville, N.J. 08876
ROM	R-Ohm Corp. Irvine, Calif. 92716
SPR	Sprague Products Co. North Adams, Mass. 01247
TI	Texas Instruments Inc. Dallas, Texas 75265
TRW	TRW IRC Resistors Philadelphia, Penn. 19108
WTH	Western Thermistor Oceanside, Calif. 92054



CONTROL BOARD

FIGURE 11

COMPONENT PARTS LIST, CONTROL BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION	MFR. CODE	MFR. P/N
C1	62-708-005	CAPACITOR, EL, 33 MFD, 25V	ILL	336RAR025B
C2	54-435-682	CAPACITOR, FILM, 0.0068 MFD, 80V	SPR	192P682R8
C3	58-577-002	CAPACITOR, TANT, 4.7 MFD, 35V	MAL	TDC475M035NSF
C4	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C5	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C6	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C7	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C8	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C9	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C10	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C11	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C12	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C13	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C14	62-708-018	CAPACITOR, EL, 33 MFD, 35V	ILL	336RAR035B
C15	62-708-005	CAPACITOR, EL, 33 MFD, 25V	ILL	336RAR025B
C16	62-708-005	CAPACITOR, EL, 33 MFD, 25V	ILL	336RAR025B
C17	54-435-472	CAPACITOR, FILM, 0.0047 MFD, 80V	SPR	192P472R8
C18		NOT USED		
C19	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C20	67-159-104	CAPACITOR, CER, 0.1 MFD, 100V	AVX	SR301C104K
C21	67-159-104	CAPACITOR, CER, 0.1 MFD, 100V	AVX	SR301C104K
C22	62-708-005	CAPACITOR, EL, 33 MFD, 25V	ILL	336RAR025B
C23	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C24	70-333-004	CAPACITOR, EL, 22 MFD, 10V	ILL	226RLR010M
C25	67-159-103	CAPACITOR, CER, 0.01 MFD, 100V	AVX	SR211C103K
C26	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
C27	56-137-005	CAPACITOR, CER, 0.1 MFD, 50V	AVX	MR045E104MAA
CR2	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR3	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR4	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR5	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR6	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR7	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR8	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR9	50-464-045	DIODE, SIGNAL	ROM	1N4454
CR12	51-739-049	DIOBE, ZENER, 10V 5%, 0.4W	MOT	1N758A
CR13	51-739-118	DIODE, ZENER, 62V 5%, 0.4W	MOT	1N980B
IC1	69-298-003	INT. CIR., DGT, PHASE LOCK LOOP	MOT	MC14046BCP
IC2	69-298-001	INT. CIR., DGT, DUAL D FLIP FLOP	MOT	MC14013BCP
IC3	69-298-001	INT. CIR., DGT, DUAL D FLIP FLOP	MOT	MC14013BCP
IC4	69-298-005	INT. CIR., DGT, QUAD 2 INPUT OR GATE	MOT	MC14071BCP
IC5	69-298-002	INT. CIR., DGT, TRIPLE 3 INPUT NAND GATE	MOT	MC14023BCP
IC6	69-298-004	INT. CIR., DGT, QUAD ANALOG SWITCH	MOT	MC14066BCP

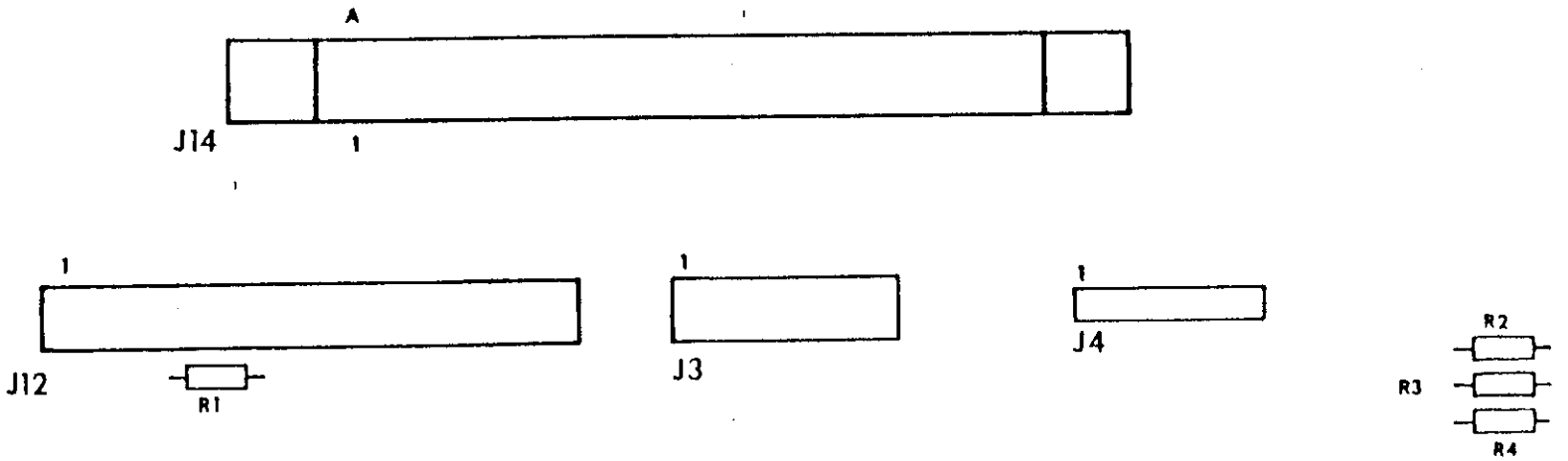
COMPONENT PARTS LIST/CONTROL BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION	MFR. CODE (1)	MFR. P/N
IC7	62-331-020	INT. CIR., LIN, PRECISION OP-AMP	FAIR	µA714HC
IC8	62-331-019	INT. CIR., LIN, QUAD OP-AMP	NSC	LM324AN
IC9	69-300-001	INT. CIR., LIN, ANALOG MULTIPLIER	AD	AD40317
IC10	62-331-020	INT. CIR., LIN, PERCISION OP-AMP	FAIR	µA714HC
IC11	69-299-001	INT. CIR., LIN, SHUNT REGULATOR	TI	TL430CLP
Q1	52-057-013	TRANSISTOR, NPN	MOT	2N2222A
Q2	52-057-013	TRANSISTOR, NPN	MOT	2N2222A
Q3	52-725-004	TRANSISTOR, PNP	MOT	2N2907A
Q4	65-969-004	TRANSISTOR, FET, N CHANNEL	NSC	J108
R1	55-675-271	RESISTOR, FXD, FILM, 270 OHM, 5%, 1/4W	MEP	CR25
R2	55-675-124	RESISTOR, FXD, FILM, 120K 5%, 1/4W	MEP	CR25
R3	55-675-104	RESISTOR, FXD, FILM, 100K 5%, 1/4W	MEP	CR25
R4	55-675-104	RESISTOR, FXD, FILM, 100K 5%, 1/4W	MEP	CR25
R5	55-675-273	RESISTOR, FXD, FILM, 27K 5%, 1/4W	MEP	CR25
R6	55-675-103	RESISTOR, FXD, FILM, 10K 5%, 1/4W	MEP	CR25
R7	55-675-105	RESISTOR, FXD, FILM, 1M 5%, 1/4W	MEP	CR25
R8	55-675-104	RESISTOR, FXD, FILM, 100K 5%, 1/4W	MEP	CR25
R9	68-474-004	RESISTOR, FXD, NTWK, 5X100K 2%, 1/4W	CTS	750-61-R100KΩ
R10	60-301-103	RESISTOR, VAR, FILM, 10K 10%,	BOU	3006P-1-103
R11	57-757-502	RESISTOR, FXD, FILM, 102K 1%, 1/10W	DALE	CMF-55C
R12	57-757-225	RESISTOR, FXD, FILM, 1.78K 1%, 1/10W	DALE	CMF-55C
R13		NOT USED		
R14	55-675-272	RESISTOR, FXD, FILM, 2.7K 5%, 1/4W	MEP	CR25
R15		NOT USED		
R16		NOT USED		
R17	55-675-512	RESISTOR, FXD, FILM, 5.1K 5%, 1/4W	MEP	CR25
R18	55-675-103	RESISTOR, FXD, FILM, 10K 5%, 1/4W	MEP	CR25
R19	55-675-271	RESISTOR, FXD, FILM, 270 OHM 5%, 1/4W	MEP	CR25
R20	55-675-223	RESISTOR, FXD, FILM, 22K 5%, 1/4W	MEP	CR25
R21	55-675-682	RESISTOR, FXD, FILM, 6.8K 5%, 1/4W	MEP	CR25
R22	55-675-271	RESISTOR, FXD, FILM, 270 OHM 5%, 1/4W	MEP	CR25
R23	57-757-381	RESISTOR, FXD, FILM, 6.81K 1%, 1/10W	DALE	CMF-55C
R24	57-757-501	RESISTOR, FXD, FILM, 100K 1%, 1/10W	DALE	CMF-55C
R25	57-757-494	RESISTOR, FXD, FILM, 93.1K 1%, 1/10W	DALE	CMF-55C
R26	57-757-401	RESISTOR, FXD, FILM, 10K 1%, 1/10W	DALE	CMF-55C
R27	55-675-103	RESISTOR, FXD, FILM, 10K 5%, 1/4W	MEP	CR25
R28	57-757-489	RESISTOR, FXD, FILM, 82.5K 1%, 1/10W	DALE	CMF-55C
R29	57-757-426	RESISTOR, FXD, FILM, 18.2K 1%, 1/10W	DALE	CMF-55C
R30	55-675-123	RESISTOR, FXD, FILM, 12K 5%, 1/4W	MEP	CR25
R31	57-757-383	RESISTOR, FXD, FILM, 7.15K 1%, 1/10W	DALE	CMF-55C
R32	60-301-503	RESISTOR, VAR, FILM, 50K 10%,	BOU	3006P-1-503
R33	55-675-106	RESISTOR, FXD, FILM, 10M 5%, 1/4W	MEP	CR25
R34	57-757-475	RESISTOR, FXD, FILM, 59K 1%, 1/10W	DALE	CMF-55C

COMPONENT PARTS LIST/CONTROL BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION		⚠1 MFR. CODE	MFR. P/N
R35	57-757-301	RESISTOR, FXD, FILM, 1K	1%, 1/10W	DALE	CMF-55C
R36	60-301-201	RESISTOR, VAR, FILM, 200 OHM	10%,	BOU	3006P-1-201
R37	57-757-268	RESISTOR, FXD, FILM, 499 OHM	1%, 1/10W	DALE	CMF-55C
R38	60-301-503	RESISTOR, VAR, FILM, 50K	10%,	BOU	3006P-1-503
R39	57-757-477	RESISTOR, FXD, FILM, 61.9K	1%, 1/10W	DALE	CMF-55C
R40	57-757-443	RESISTOR, FXD, FILM, 27.4K	1%, 1/10W	DALE	CMF-55C
R41	57-757-489	RESISTOR, FXD, FILM, 82.5K	1%, 1/10W	DALE	CMF-55C
R42	57-757-417	RESISTOR, FXD, FILM, 14.7K	1%, 1/10W	DALE	CMF-55C
R43	55-675-202	RESISTOR, FXD, FILM, 2K	5%, 1/4W	MEP	CR25
R44	55-675-103	RESISTOR, FXD, FILM, 10K	5%, 1/4W	MEP	CR25
R45	60-301-503	RESISTOR, VAR, FILM, 50K	10%, 1/4W	BOU	3006P-1-503
R46	55-675-335	RESISTOR, FXD, FILM, 3.3M	5%, 1/4W	MEP	CR25
R47	57-757-430	RESISTOR, FXD, FILM, 20K	1%, 1/10W	DALE	CMF-55C
R48	55-675-104	RESISTOR, FXD, FILM, 100K	5%, 1/4W	MEP	CR25
R49	55-675-104	RESISTOR, FXD, FILM, 100K	5%, 1/4W	MEP	CR25
R50	57-757-430	RESISTOR, FXD, FILM, 20K	1%, 1/10W	DALE	CMF-55C

⚠1 MFR. CODE IS FOR REFERENCE ONLY - EQUIPMENT MAY OR MAY NOT USE LISTED MANUFACTURER.



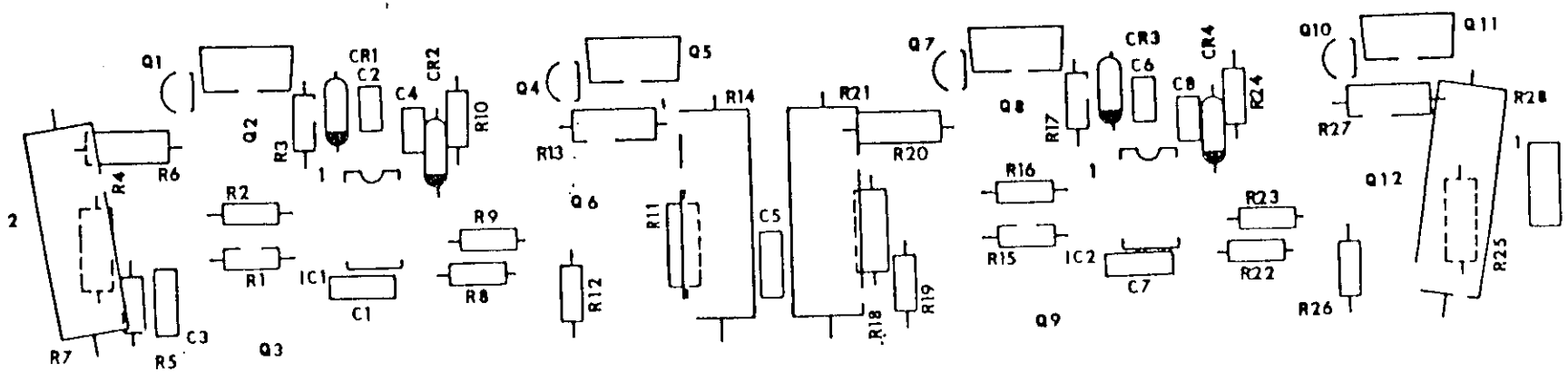
SWITCH BOARD

FIGURE 12

COMPONENT PARTS LIST/SWITCH BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION		⚠1 MFR. CODE	MFR. P/N
R1	64-346-001	RESISTOR, FXD, FILM, 60K	0.1%, 1/10W	DALE	MF 1/8
R2	64-346-002	RESISTOR, FXD, FILM, 2.4K	0.1%, 1/10W	DALE	MF 1/8
R3	64-346-003	RESISTOR, FXD, FILM, 5.4K	0.1%, 1/10W	DALE	MF 1/8
R4	64-346-004	RESISTOR, FXD, FILM, 11.4K	0.1%, 1/10W	DALE	MF 1/8
S1-11	64-062-000	SWITCH, MULTIPLE PUSHBUTTON		CRL	2KCM0A0001-1369

⚠1 MFR. CODE IS FOR REFERENCE ONLY - EQUIPMENT MAY OR MAY NOT USE LISTED MANUFACTURER.



EL 750B POWER BOARD

FIGURE 13

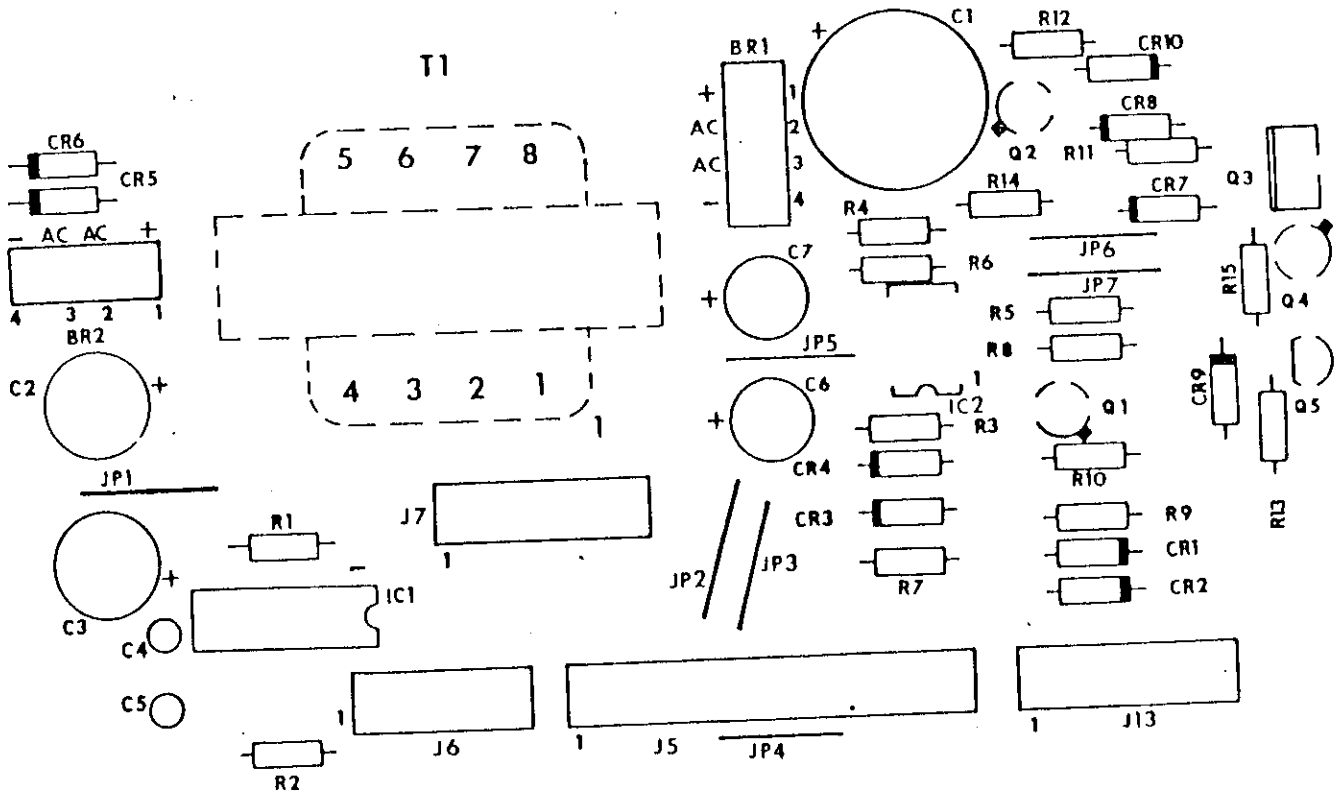
COMPONENT PARTS LIST/POWER BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION		MFR. CODE	MFR. P/N
C1	56-137-005	CAPACITOR, CER, 0.1 MFD 50V		AVX	MR045E104MAA
C2	67-159-821	CAPACITOR, CER, 820 PFD 100V		AVX	SR151C821K
C3	56-137-005	CAPACITOR, CER, 0.1 MFD 50V		AVX	MR045E104MAA
C4	67-159-821	CAPACITOR, CER, 820 PFD 100V		AVX	SR151C821K
C5	56-137-005	CAPACITOR, CER, 0.1 MFD 50V		AVX	MR045E104MAA
C6	67-159-821	CAPACITOR, CER, 820 PFD 100V		AVX	SR151C821K
C7	56-137-005	CAPACITOR, CER, 0.1 MFD 50V		AVX	MR045E104MAA
C8	67-159-821	CAPACITOR, CER, 820 PFD 100V		AVX	SR151C821K
CR1	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR2	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR3	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR4	50-464-045	DIODE, SIGNAL		ROM	1N4454
IC1	62-331-017	INT. CIR., DUAL OP-AMP		NSC	LM358AN
IC2	62-331-017	INT. CIR., DUAL OP-AMP		NSC	LM358AN
Q1	65-969-005	TRANSISTOR, FET, N CHANNEL		MOT	2N5638
Q2	54-031-088	TRANSISTOR, NPN		RCA	2N5298
Q4	65-969-005	TRANSISTOR, FET, N CHANNEL		MOT	2N5638
Q5	54-031-088	TRANSISTOR, NPN		RCA	2N5298
7	65-969-005	TRANSISTOR, FET, N CHANNEL		MOT	2N5638
Q8	54-031-088	TRANSISTOR, NPN		RCA	2N5298
Q10	65-969-005	TRANSISTOR, FET, N CHANNEL		MOT	2N5638
Q11	54-031-088	TRANSISTOR, NPN		RCA	2N5298
R1	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R2	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R3	55-675-683	RESISTOR, FXD, FILM, 68K	5%, 1/4W	MEP	CR25
R4	50-461-390	RESISTOR, FXD, FILM, 39 OHM	5%, 1/2W	MEP	CR37
R5	55-675-222	RESISTOR, FXD, FILM, 2.2K	5%, 1/4W	MEP	CR25
R6	69-332-309	RESISTOR, FXD, WW 3 OHM	5%, 1W	TRW	BW20
R7	63-403-002	RESISTOR, FXD, WW 0.02 OHM	3%, 5W	DALE	LVR-5
R8	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R9	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R10	55-675-683	RESISTOR, FXD, FILM, 68K	5%, 1/4W	MEP	CR25
R11	50-461-390	RESISTOR, FXD, FILM, 39 OHM	5%, 1/2W	MEP	CR37
R12	55-675-222	RESISTOR, FXD, FILM, 2.2K	5%, 1/4W	MEP	CR25
R13	69-332-309	RESISTOR, FXD, WW, 3 OHM	5%, 1W	TRW	BW20
R14	63-403-002	RESISTOR, FXD, WW, 0.02 OHM	3%, 5W	DALE	LVR-5
R15	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R16	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R17	55-675-683	RESISTOR, FXD, FILM, 68K	5%, 1/4W	MEP	CR25
R18	50-461-390	RESISTOR, FXD, FILM, 39 OHM	5%, 1/2W	MEP	CR37
R19	55-675-222	RESISTOR, FXD, FILM, 2.2K	5%, 1/4W	MEP	CR25
R20	69-332-309	RESISTOR, FXD, WW, 3 OHM	5%, 1W	TRW	BW20
R21	63-403-002	RESISTOR, FXD, WW, 0.02 OHM	3%, 5W	DALE	LVR-5
.22	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25

COMPONENT PARTS LIST/POWER BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION		MFR. CODE (1)	MFR. P/N
R23	55-675-102	RESISTOR, FXD, FILM, 1K	5%, 1/4W	MEP	CR25
R24	55-675-683	RESISTOR, FXD, FILM, 68K	5%, 1/4W	MEP	CR25
R25	50-461-390	RESISTOR, FXD, FILM, 39 OHM	5%, 1/2W	MEP	CR37
R26	55-675-222	RESISTOR, FXD, FILM, 2.2K	5%, 1/4W	MEP	CR25
R27	69-332-309	RESISTOR, FXD, WW, 3 OHM	5%, 1W	TRW	BW20
R28	63-403-002	RESISTOR, FXD, WW, 0.02 OHM	3%, 5W	DALE	LVR-5

(1) MFR. CODE IS FOR REFERENCE ONLY - EQUIPMENT MAY OR MAY NOT USE LISTED MANUFACTURER.



POWER SUPPLY BOARD

FIGURE 14

COMPONENT PARTS LIST/POWER SUPPLY BOARD ASSEMBLY

REF. DES.	ACDC P/N	NAME & DESCRIPTION		MFR. CODE [1]	MFR. P/N
C1	63-284-018	CAPACITOR, EL, 2100 MFD 10V		MAL	VPR212N010JIL6A
C2	62-708-009	CAPACITOR, EL, 220 MFD 35V		ILL	227RAR035B
C3	62-708-009	CAPACITOR, EL, 220 MFD 35V		ILL	227RAR035B
C4	67-159-152	CAPACITOR, CER, 0.0015 MFD 100V		AVX	SR151C152K
C5	67-159-152	CAPACITOR, CER, 0.0015 MFD 100V		AVX	SR151C152K
C6	62-708-005	CAPACITOR, EL, 33 MFD 25V		ILL	336RAR025B
C7	62-708-005	CAPACITOR, EL, 33 MFD 25V		ILL	336RAR025B
BR1	67-684-002	RECTIFIER, BRIDGE 2A 100V		MOT	MDA201
BR2	67-684-002	RECTIFIER, BRIDGE 2A 100V		MOT	MDA201
CR1	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR2	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR3	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR4	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR5	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR6	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR7	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR8	50-464-045	DIODE, SIGNAL		ROM	1N4454
CR9	51-739-101	DIODE, ZENER 9.1V 0.4W		MOT	1N757A
CR10	50-464-003	RECTIFIER, POWER 1A 400V		MOT	1N4004
IC1	67-755-001	INT. CIR., ±15V DUAL TRACKING REGULATOR		MOT	MC1468L
IC2	62-331-017	INT. CIR., DUAL OP-AMP		NSC	LM358AN
Q1	52-725-004	TRANSISTOR, PNP		MOT	2N2907A
Q2	52-725-004	TRANSISTOR, PNP		MOT	2N2907A
Q3	54-031-084	TRANSISTOR, NPN		TI	T1P41B
Q4	52-057-013	TRANSISTOR, NPN		MOT	2N2222A
Q5	65-969-003	TRANSISTOR, FET, N CHANNEL		MOT	2N5639
R1	55-675-100	RESISTOR, FXD, FILM, 10 OHM	5%, 1/4W	MEP	CR25
R2	55-675-100	RESISTOR, FXD, FILM, 10 OHM	5%, 1/4W	MEP	CR25
R3	57-757-368	RESISTOR, FXD, FILM, 4.99K	1%, 1/10W	DALE	CMF-55C
R4	57-757-368	RESISTOR, FXD, FILM, 4.99K	1%, 1/10W	DALE	CMF-55C
R5	57-757-468	RESISTOR, FXD, FILM, 49.9K	1%, 1/10W	DALE	CMF-55C
R6	57-757-468	RESISTOR, FXD, FILM, 49.9K	1%, 1/10W	DALE	CMF-55C
R7	55-675-753	RESISTOR, FXD, FILM, 75K	5%, 1/4W	MEP	CR25
R8	55-675-682	RESISTOR, FXD, FILM, 6.8K	5%, 1/4W	MEP	CR25
R9	55-675-272	RESISTOR, FXD, FILM, 2.7K	5%, 1/4W	MEP	CR25
R10	55-675-221	RESISTOR, FXD, FILM, 220 OHM	5%, 1/4W	MEP	CR25
R11	55-675-300	RESISTOR, FXD, FILM, 30 OHM	5%, 1/4W	MEP	CR25
R12	55-675-332	RESISTOR, FXD, FILM, 3.3K	5%, 1/4W	MEP	CR25
R13	55-675-104	RESISTOR, FXD, FILM, 100K	5%, 1/4W	MEP	CR25
R14	55-675-472	RESISTOR, FXD, FILM, 4.7K	5%, 1/4W	MEP	CR25
R15	55-675-681	RESISTOR, FXD, FILM, 680 OHM	5%, 1/4W	MEP	CR25
T1	52222	TRANSFORMER (115V VERSION ONLY)		ACDC	52222
T2	52533	TRANSFORMER (220, 230, 240V VERSION)		ACDC	52533

[1] MFR. CODE IS FOR REFERENCE ONLY - EQUIPMENT MAY OR MAY NOT USE LISTED MANUFACTURER.

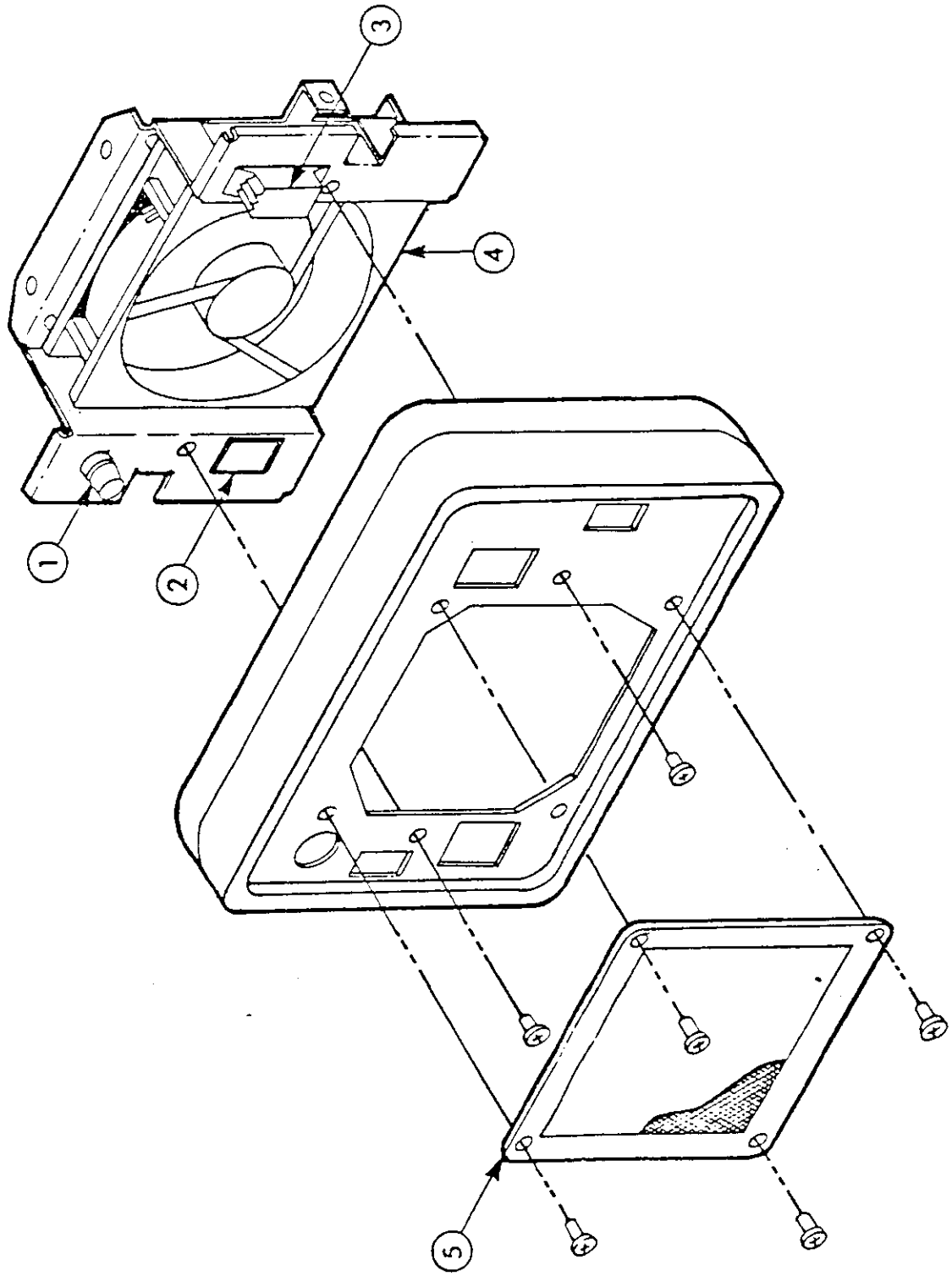


Figure 15

COMPONENT PARTS LIST/CHASSIS ASSEMBLY

REF. DES.	ITEM NO.	ACDC P/N	NAME & DESCRIPTION	⚠1 MFR. CODE	MFR. P/N
F1	1	51-533-012	FUSE, 1/2A (115V MODEL ONLY)	BUSS	AGC 1/2
F1	1	51-533-025	FUSE, 1/4A (220-240V MODEL ONLY)	BUSS	AGC 1/4
	2	65-736-000	AC LINE CORD (115/230V MODEL)	PAC	C-3120-008-BL
	2	65-736-001	AC LINE CORD (220/240V MODEL)	PAC	C-2123-02M-GY
P2	3	60-477-022	CONNECTOR	MOL	03-09-2154
	3	60-477-026	CONNECTOR PINS	MOL	02-09-2143
B1	4	55-554-003	FAN (115V MODEL ONLY)	IMC	WS2107FL
B1	4	55-554-006	FAN (220-240V MODEL ONLY)	IMC	WS2107FL-6
	5	61-469-001	FAN FILTER	IMC	6993
	6	64-022-002	CASE	ACDC	
	7	69-331-000	TRANSISTOR, POWER	RCA	2N5886
	8	69-363-001	POWER BOARD ASSY	ACDC	
RT1,2	9	69-599-001	THERMISTOR	WTH	A1094
R203	10	64-026-000	METER SHUNT, 100A, 100mV	ACDC	
	11	69-362-001	POWER SUPPLY BOARD ASSY	ACDC	
	12	69-364-001	CONTROL BOARD ASSY	ACDC	
	13	69-365-001	SWITCH BOARD ASSY	ACDC	
M2	14	64-061-003	METER, VOLTS	ACDC	
M1	15	64-061-002	METER, AMP	ACDC	
DS2-4	16	64-063-001	LED, RED	GI	MV5053
DS1	17	64-063-002	LED, GREEN	GI	MV5253
R202	18	63-710-105	POTENTIOMETER, 1 MEG	BOU	82A1A-B28-A25
R201	19	63-710-103	POTENTIOMETER, 10K	BOU	82A1A-B28-A15
R200	20	63-520-102	POTENTIOMETER, 1K 3 TURN	BOU	3543S-1-102
S12	21	63-446-007	SWITCH, TOGGLE, SPDT	CK	7101J2ZQE
	22	64-516-001	KNOB, VOLTS	ACDC	
	23	64-140-002	KNOB, CURRENT	ACDC	
	24	64-062-014	PUSH BUTTON SET	ACDC	

⚠1 MFR. CODE IS FOR REFERENCE ONLY - EQUIPMENT MAY OR MAY NOT USE LISTED MANUFACTURER.

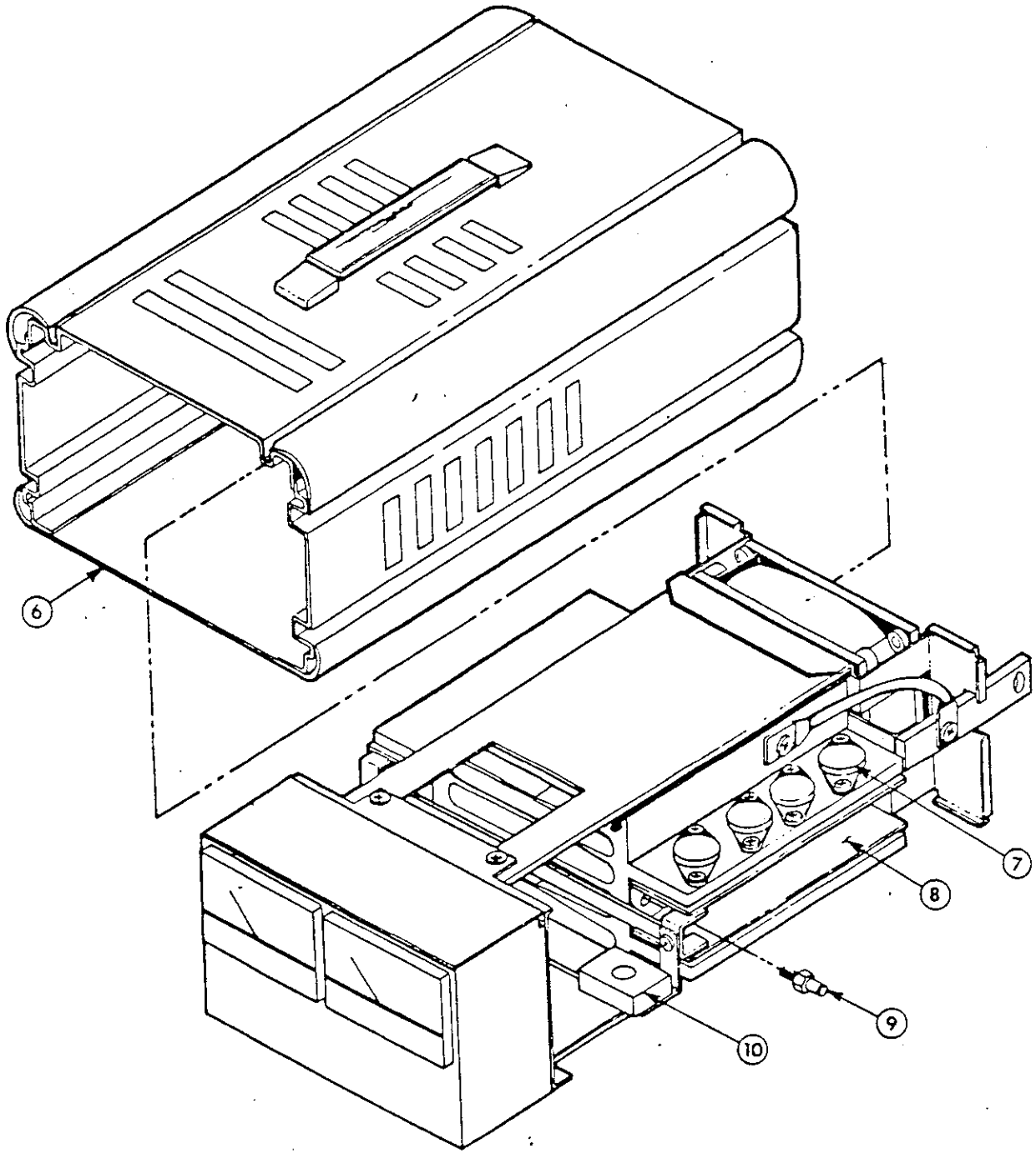


Figure 16

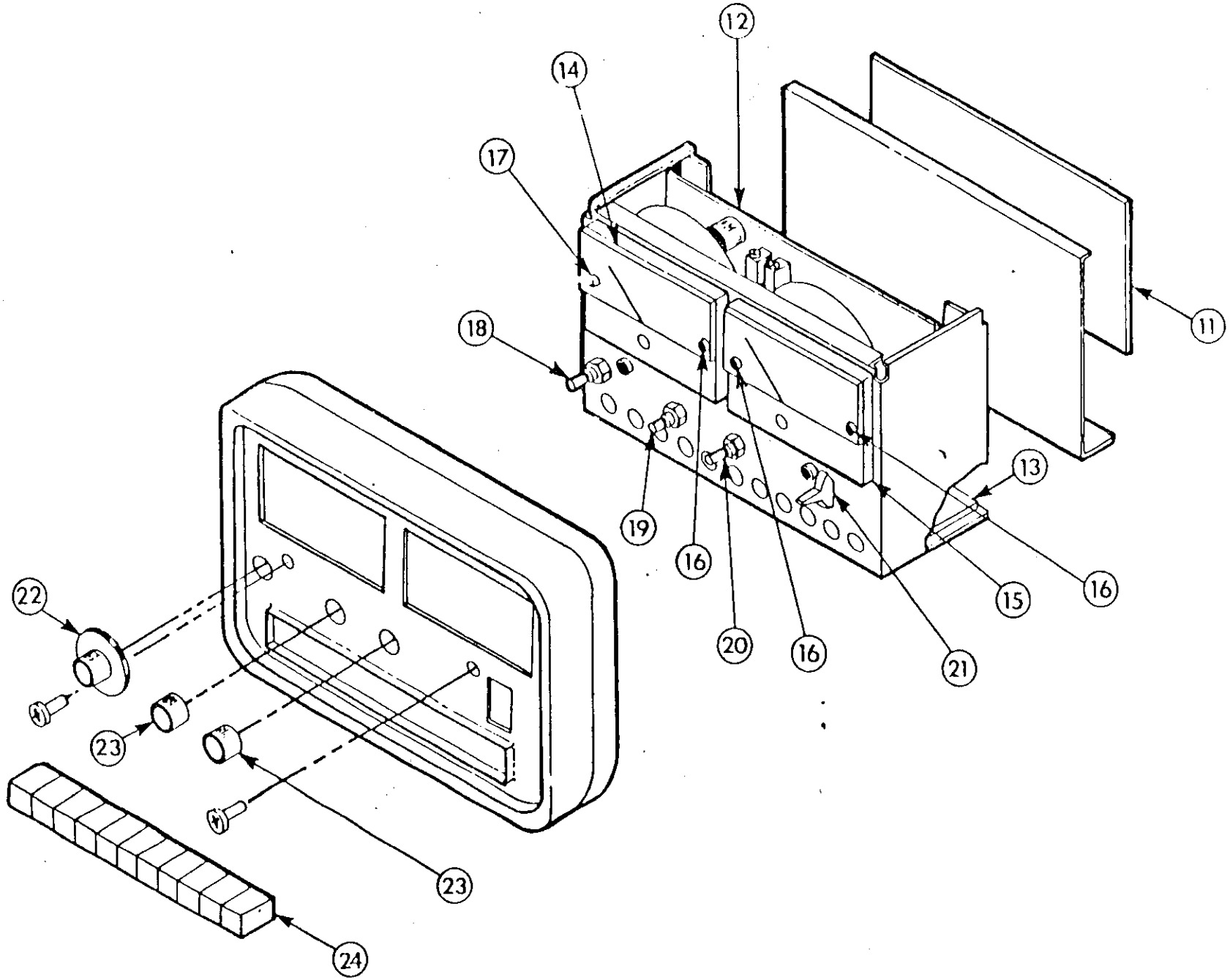


Figure 17

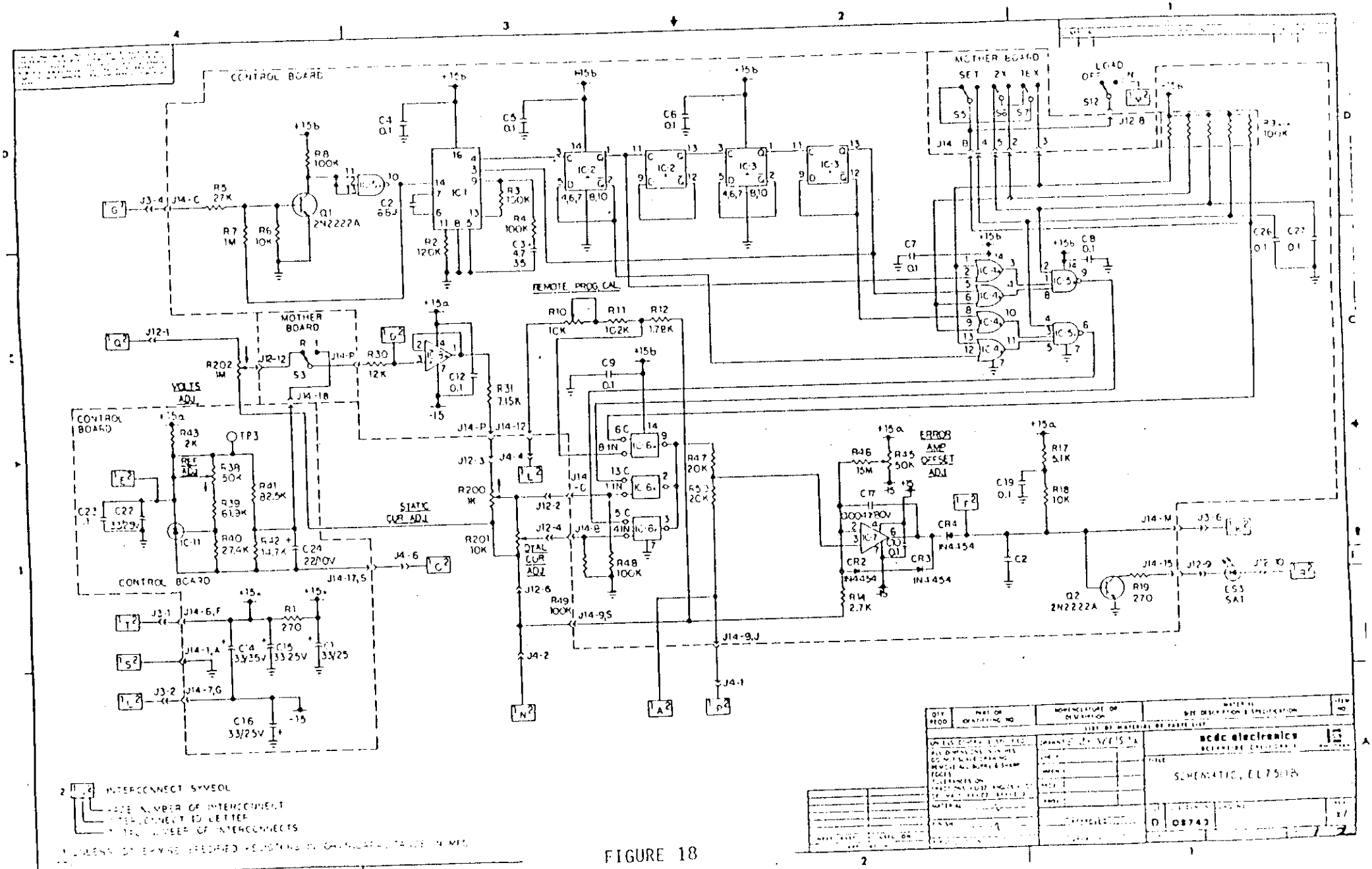

CONTROL BOARD
MOTHER BOARD
REMOTE PROG CAL
VOLTS ADJ
STATIC CUR ADJ
DYNAMIC CUR ADJ
ERROR AMP OFFSET ADJ
SET
2X
1/2X
LOAD
OFF
ON
SCHEMATIC, EL7518
acdc electronics
08743

FIGURE 18

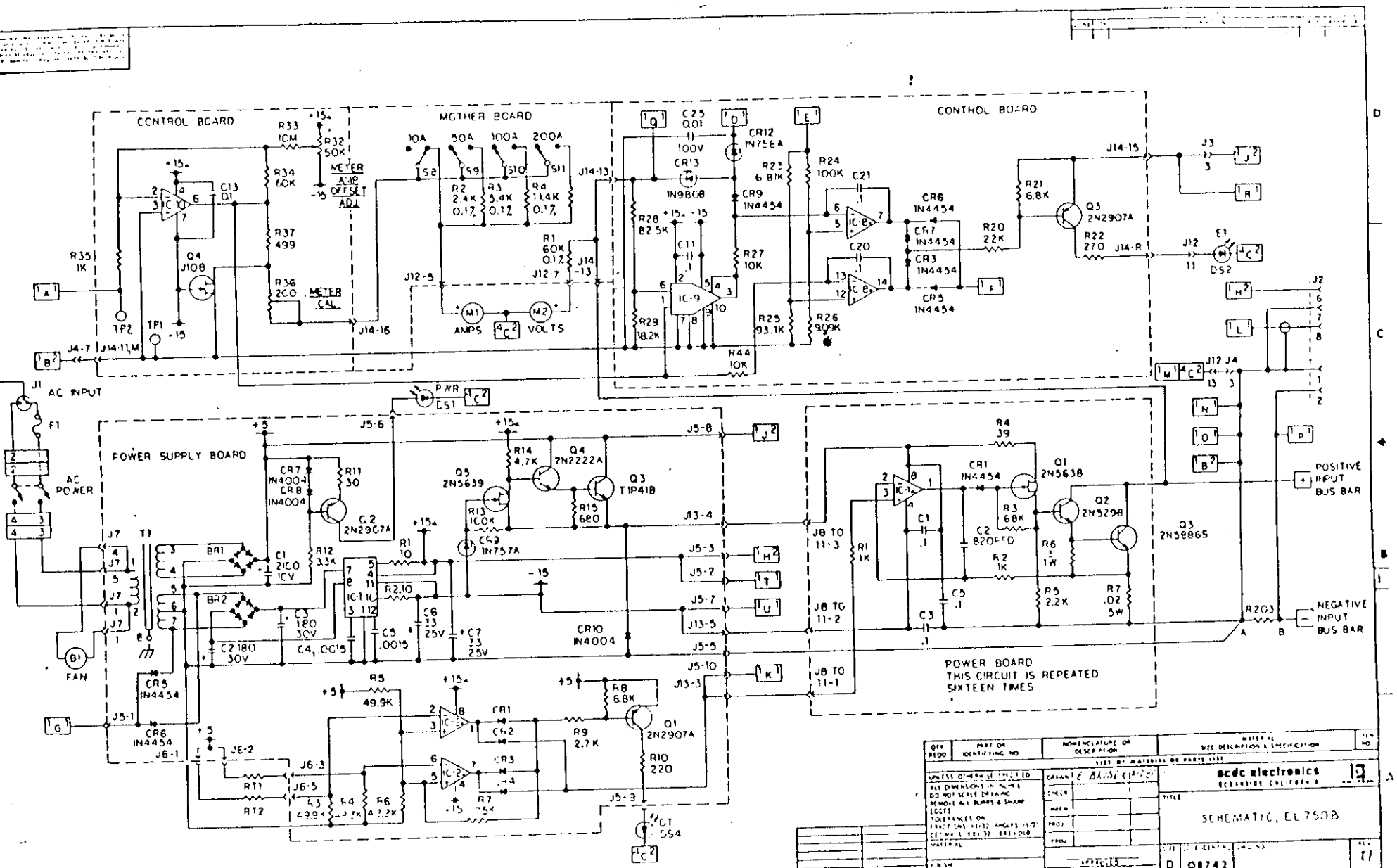

CONTROL BOARD
MOTHER BOARD
CONTROL BOARD
POWER SUPPLY BOARD
AC INPUT
AC POWER
FAN
AMPS
VOLTS
POSITIVE INPUT BUS BAR
NEGATIVE INPUT BUS BAR
POWER BOARD
THIS CIRCUIT IS REPEATED
SIXTEEN TIMES
SCHEMATIC, EL7508
acdc electronics

FIGURE 19