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CAL DATA
36-A POWER SUPPLY
(P/N 85500018-21)

TECHNICAL MANUAL
C21518010-X2

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Revision X2
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california data processors

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REVISIONS

Revision	Date	Approval	Description
X0	4-74		Preliminary
X1	5-74		Release Edition
X2	3-75		Nomenclature and photos updated. Maintenance expanded. Installation removed.

CONTENTS

TABLES

ILLUSTRATIONS

SECTION 1
INTRODUCTION

1.1 SCOPE

This manual provides the information needed to understand, operate and maintain the Cal Data 36-A Power Supply when used with the drawing package provided. The information in this manual is for the use of a skilled technician familiar with standard test equipment, solid-state logic theory, common maintenance practices and standard troubleshooting techniques. A basic knowledge of design principles and circuits used in power supplies is assumed, hence no tutorial material of this kind is included.

As a stand-alone publication, this manual has a good functional and physical description of the 36-A Power Supply, providing the information needed to understand the capabilities and features of the power supply and to plan a system using it. The maintenance coverage of this manual is commensurate with the prerequisite skills and knowledge of the defined user, characteristics of the product and maintainability requirements established by Cal Data.

1.2 DOCUMENTATION

Cal Data products covered in this manual include:

Assembly	Model	Description
85500018	85006-115	Power supply, 36 A output, 115 Vac input
85500019	85006-208	Power supply, 36 A output, 208 Vac input
85500020	85006-230	Power supply, 36 A output, 230 Vac input
85500021	85006-230E	Power supply, 36 A output, 230 Vac, 50 Hz input

The following paragraphs define publications and conventions that support this manual.

1.2.1 Publications

Figure 1-1 illustrates the relationship between Cal Data system elements and technical publications. Controlled copies of publications, provided in accordance with the terms of the purchase contract, are kept current for the life of the product.

1.2.2 Engineering Drawings

For maintenance purposes, this manual is supported by a drawing package that contains schematic diagrams, assembly drawings and other required engineering drawings. The drawing package is updated with the latest revision of each drawing.

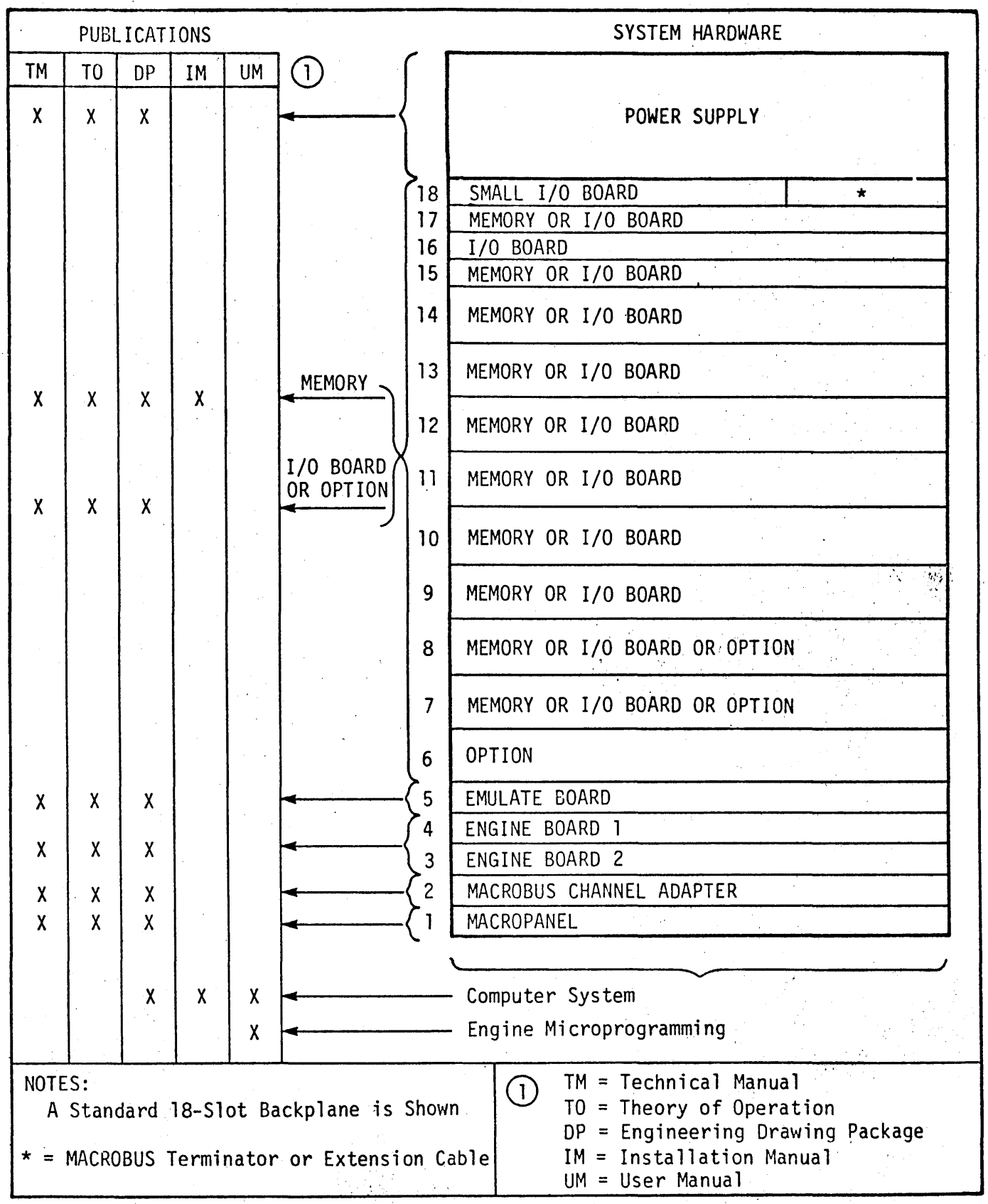


Figure 1-1. Relationship of Publications to Cal Data 1 System Elements

1.2.3 Abbreviations and Conventions

Table 1-1 lists the abbreviations found in this manual. Conventions used in the text of this manual include:

a. Equipment panel nomenclature is reproduced in all upper-case characters.

b. Signal names are capitalized for easy identification.

Table 1-1. Abbreviations

Abbreviation	Meaning
Cal Data	California Data Processors
A	ampere
mA	milliampere
V	volt
ac	alternating current
dc	direct current
rms	root-mean-square
Hz	hertz
m	meter
cm	centimeter
kg	kilogram
ft	foot
lb	pound
µs	microsecond
ns	nanosecond
psi	pounds per square inch
cfm	cubic feet per minute
lps	liters per second
^{o}C	degrees, Celsius
awg	American wire gauge

SECTION 2
DESCRIPTION

2.1 GENERAL

The 36-A Power Supply is a regulated, multiple-output dc supply providing all power requirements for the Cal Data and PDP-11 series of computers. Except for power ratings and connectors, the 36-A Power Supply is electrically and mechanically compatible with the DEC H720-E/F Power Supply.

Features of the 36-A Power Supply include:

AC Input Compatibility. The 36-A Power Supply is available in 115 Vac, 208 Vac and 230 Vac (50 and 60 Hz) input power configurations for use in all major countries of the world.

Regulated DC Outputs. Outputs of +5 Vdc at 36 A and -15 Vdc at 12 A are regulated to within three percent with low ripple and noise.

Circuit Protection. Both overvoltage and overcurrent protection circuits are included in the power supply. In addition, thermal circuit breaker is provided to prevent over-heating of power semiconductors.

Power-Failure/Restart. As a standard feature, both low ac and dc levels are detected and signalled by the power supply.

Line-Frequency Signal. A square wave line-frequency signal is provided at levels compatible with standard logic elements.

There are four versions of the 36-A Power Supply. One accommodates 115 Vac line input, and one 208 Vac line input. There are two 230 Vac line-input versions; one for European use; and the other for U.S. applications.

2.2 MAJOR FUNCTIONAL AREAS

Figure 2-1 is a block diagram of the 36-A Power Supply. The power supply provides the following outputs required for Cal Data applications as well as for compatibility with the DEC H720-E/F Power Supply:

+5 Vdc regulated
-15 Vdc regulated
+8 Vrms unregulated
-22 Vdc unregulated
Common ground for all dc voltages
115 Vac switched unregulated service outlet with overcurrent protection (115 Vac model only)
LTCL line-frequency clock signal
ACLO line-voltage failure signal
DCLO impending regulated-voltage failure signal

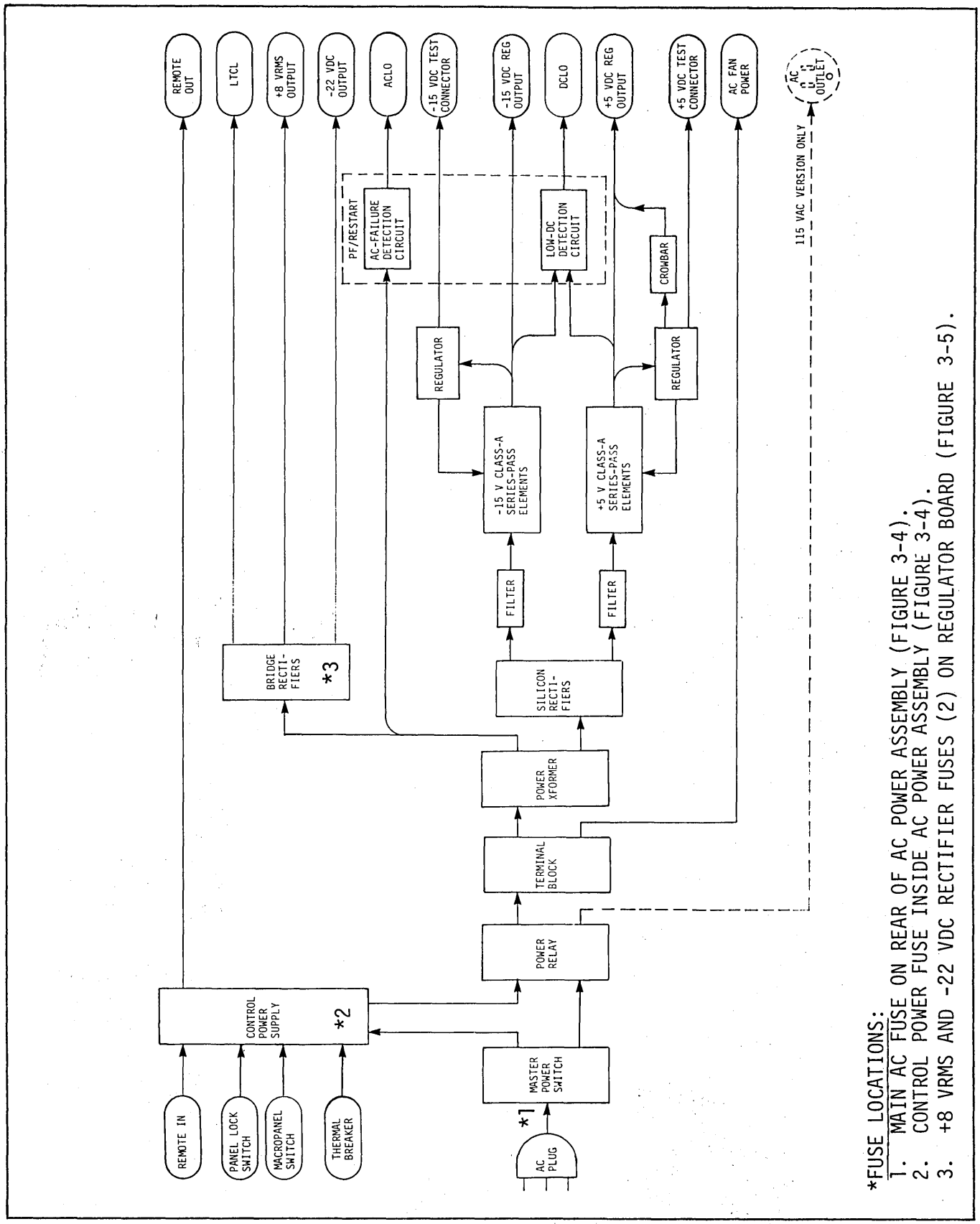


Figure 2-1. Cal Data 36-A Power Supply Block Diagram

The 36-A Power Supply consists of:

- Power supply metal chassis with cover
- AC power circuitry for 115 Vac, 208 Vac, 230 Vac U.S. (60 Hz) or 230 Vac European (50 Hz) operation
- Rectifier and regulator circuitry for +5 Vdc at 36 A
- Rectifier and regulator circuitry for -15 Vdc at 12 A
- Rectifier circuitry for DEC-compatible +8 Vrms and -22 Vdc unregulated outputs

2.2.1 Power Switching

A relay and separate 24 Vdc control power supply are used in conjunction with a remote power switch (e.g., on the Macropanel) to control ac power to the supply, fans and auxiliary equipment. The relay is activated by grounding an input control line.

The power switching circuit is wired so that one power supply can be used to control another.

2.2.2 Circuit Protection

The power supply has overvoltage and overcurrent protection, and a thermal circuit breaker.

The power supply is designed so that should a momentary short develop at any output, either to ground or to another output, no internal component will be damaged. If a component fails, causing input overcurrent, the ac fuse interrupts input power.

A "crowbar" circuit prevents the +5 Vdc output from exceeding +6.8 Vdc, including transients. If the crowbar should be triggered by either a component failure or a high-voltage transient on the +5 Vdc output, the +5 Vdc output is electrically grounded. The power supply must be switched off, the fuse replaced, and then the supply switched on again to reset the crowbar.

The ac fuse limits the total current drawn by the supply, fans and equipment plugged into the auxiliary power outlet (115 Vac model only). A master power switch on the rear of the power supply chassis removes power from the entire supply.

The power supply has a thermal circuit breaker on the primary semiconductor heat sink. This breaker opens the power relay in case of loss of cooling air, thus maintaining semiconductor junction temperature at 75 percent of the rated maximum value.

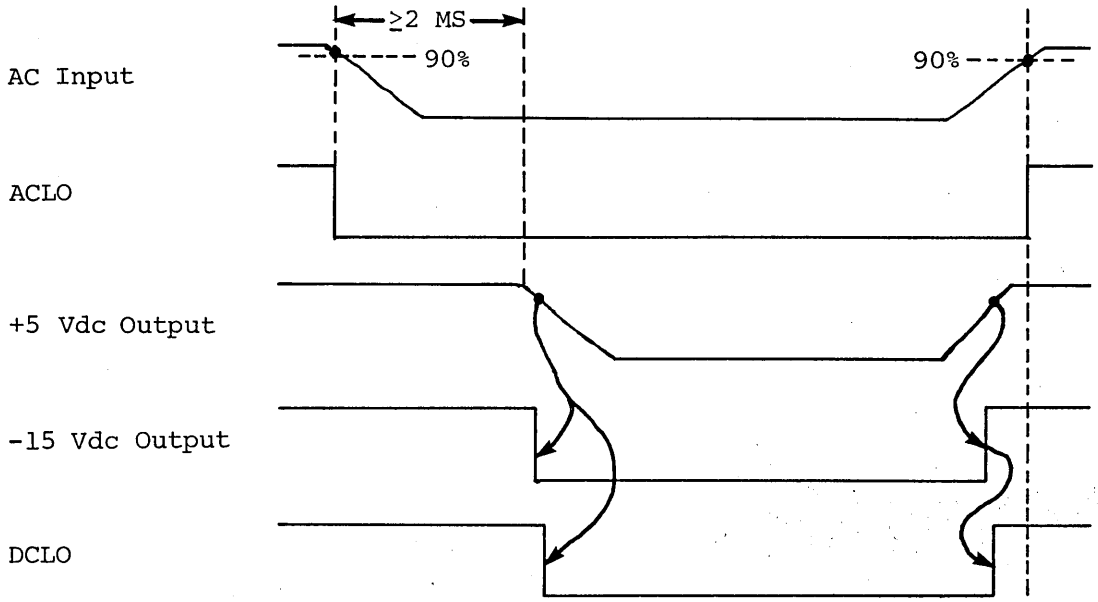
For safety, voltages above 30 V are totally insulated.

The 36-A Power Supply is designed to meet all Underwriters' Laboratories requirements.

2.2.3 Power-Failure/Restart

The 36-A Power Supply contains integral power-failure detection circuits for both ac and dc. These circuits are designed so that during a power-down sequence, the dc levels do not fall until at least two milliseconds after ac power fails. During a power-up sequence, dc levels go high before the rising ac reaches its normal high level.

These sequences are illustrated below:



AC Power-Failure Detection

The ac power-failure detection circuit provides an AC-Low indicator signal (ACLO) that is at +5 Vdc during normal power supply operation and line input.

When there is a power failure that reduces the ac line input by more than about 10 percent below the nominal value, ACLO switches to 1.0 Vdc, maximum. ACLO can sink 60 mA for at least ten milliseconds after ac failure. There is a minimum of one volt hysteresis in the detection of low ac. ACLO can be ORed with ACLO from up to three other similar power supplies.

When ac power is re-established, ACLO returns to +5.0 Vdc.

DC Low-Power Detection

The dc low-power detection circuit provides a DC-Low indicator signal (DCLO) that is +4.0 Vdc minimum when both regulated dc supplies are within their normal operating ranges.

Whenever either regulated dc supply drops below its normal operating range, DCLO switches to 1.0 Vdc maximum. DCLO can sink 60 mA with or without ac line input to the power supply. DCLO can be ORed with DCLO from up to three other similar power supplies.

When the regulated dc supplies are again both within their normal operating ranges, DCLO returns to the high level. DCLO reaches the high level before ACLO reaches the high level.

2.2.4 Line-Frequency Signal

The power supply provides a line-frequency signal (LTCL) at input line frequency. The high level is +5.0 ±0.8 Vdc. The low level is 0.0 ±0.8 Vdc and is capable of sinking 20 mA. The noise component of LTCL above 120 Hz is less than one volt peak-to-peak under any load or input.

2.2.5 Input Power Variations

The 115, 208 and two 230 Vac versions of the power supply differ only in types of power cable, power plugs, fan connections and the configurations of the jumpers on the input power terminal strip (and the ac service outlet that appears only on the 115 Vac supply).

2.2.6 Fan Power

The fans operate on 115 Vac in all versions of the power supply. In the 115 Vac supply, the two pairs of fans are connected in parallel. In the 208 and 230 Vac supplies, the two pairs of fans are connected in series.

2.3 SPECIFICATIONS

General specifications for the 36-A Power Supply are given in Table 2-1.

Table 2-1. Cal Data 36-A Power Supply Specifications

Characteristic	Specification
ELECTRICAL	
AC input	115, 208 or 230 Vac ±10%, 50 or 60 Hz
AC output	One standard outlet; 3 A, maximum (115 Vac model only)
DC outputs	
Unregulated	-22 Vdc ± 25% at 1.5 A; +8 Vrms ±25% at 1.5 A
Regulated	+5 Vdc ±3% with ±5% adjustment at 36 A, maximum -15 Vdc ±3% with ±5% adjustment at 12 A, maximum

(Continued)

Table 2-1. (Continued)

Characteristic	Specification
Peak transient voltage	±5% on +5 and -15 Vdc supplies
Response time	+5 Vdc supply: 50 µs maximum, 50 to 100% load -15 Vdc supply: 50 µs maximum, 75 to 100% load
Overload protection	Foldback on +5 and -15 Vdc supplies
Overvoltage protection	+5 Vdc supply limited to +6.8 Vdc peak, including transients
Voltage level sequencing	-15 Vdc output grounded unless +5 Vdc output is within one volt of regulation
AC power-failure and low-dc detection	Integral part of power supply
Line-frequency signal	Square-wave at line frequency: high: +5.0 ± 0.8 Vdc low: 0.0 ± 0.8 Vdc
Test connector switch voltages	Switch 1: +4.75 ± 0.1 Vdc to +5.25 ± 0.1 Vdc Switch 2: -14.25 ± 0.1 Vdc to -15.75 ± 0.1 Vdc
MECHANICAL	
Size	16.5 by 5.5 by 9.3 inches (41.9 by 14.0 by 25.7 cm)
Weight	Approximately 37 lb (17 kg), net
Cooling	External fans in the computer chassis providing air at a minimum of 60 cfm (28 lps) installed
Mounting	In rear quarter of computer chassis
Connectors	
AC input	Three-wire, 6 feet (1.8 m), fixed and strain-relieved line, with standard three-prong 115, 208 or 230 Vac plug.
AC output	Standard three-receptacle (115 Vac model only)
DC and logic	Two connectors
Fans and macropanel	One connector
Remote power control	Two connectors enabling one power supply to control another via a cable
ENVIRONMENTAL	
Storage temperature	-20° to +75° C
Operating temperature	0° to +50° C
Humidity	10 to 90% relative humidity, without condensation

SECTION 3
PHYSICAL DESCRIPTION

3.1 GENERAL

The 36-A Power Supply housing (Figure 3-1) measures 16.5 by 5.5 by 9.3 inches (41.9 by 14.0 by 23.7 cm) and fits in the rear of a Cal Data or compatible chassis. The power supply weighs approximately 37 pounds (17 kg).

Figure 3-2 is an exploded view of the assemblies that make up the power supply. Connector pin assignments are given in Appendix A.

3.2 CHASSIS ASSEMBLY

The chassis of the 36-A Power Supply consists of a metal housing with the power transformer and five large capacitors mounted on it (Figure 3-3). The assemblies described below are mounted on the chassis.

3.3 AC POWER ASSEMBLY

The ac power assembly (Figure 3-4) contains the ac plug, cable, input connector and fuse. It also has two connectors for remote control of the power supply, the master power toggle switch, and the panel-lock slide switch. All of these are accessible from the rear of the power supply.

The ac power assembly also contains the 24 V control power supply and the power relay used by this supply. The control power supply comprises a control transformer and a control board that holds the control rectifier diodes, control supply fuse and connectors.

The panel-lock slide switch overrides the Macropanel (or remote) control switch. The MAIN PWR toggle switch, in turn, overrides the slide switch. The MAIN PWR switch removes input power from the entire power supply, including the control circuitry. Thus, there are three levels of control on the power supply.

Fans and the Macropanel are connected to the ac power supply via cables to connector J4 near the main power transformer (Figure 3-1).

3.4 RECTIFIER HEAT SINK ASSEMBLY

The rectifier heat sink assembly is a small assembly that holds rectifiers CR1 to CR4. It is mounted on the chassis next to the -15 Vdc heat sink assembly.

3.5 SUBASSEMBLY

The +5 Vdc and -15 Vdc heat sink assemblies, output connectors J2 and J3, the regulator board connector and the wiring harness are mounted on the chassis as a unit. This unit is called the power supply subassembly.

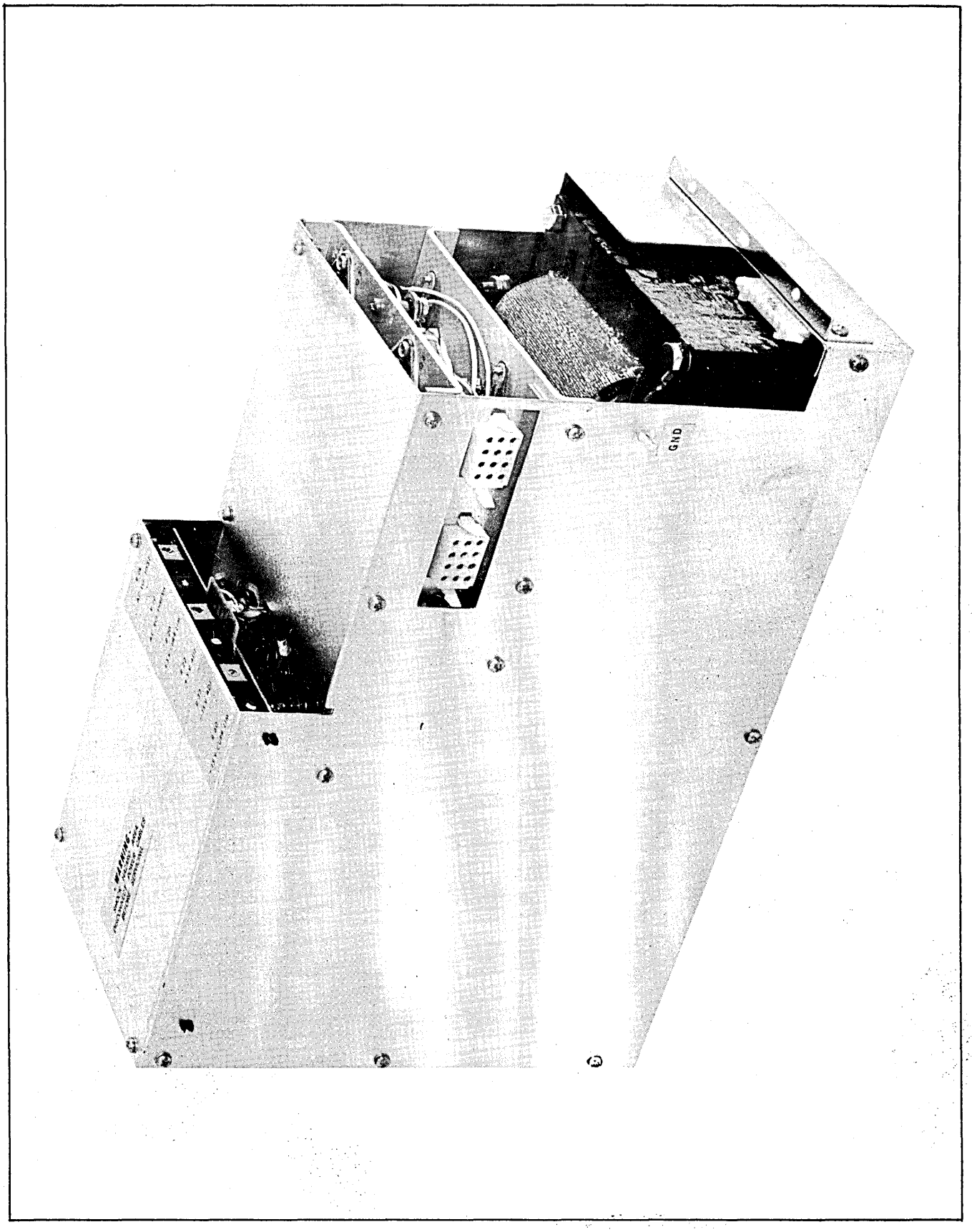
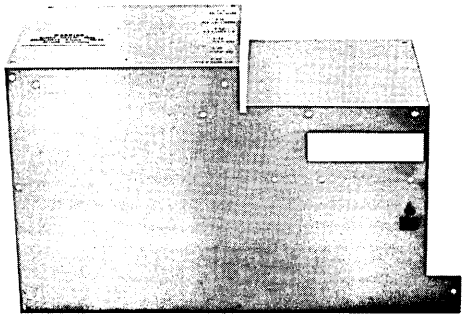
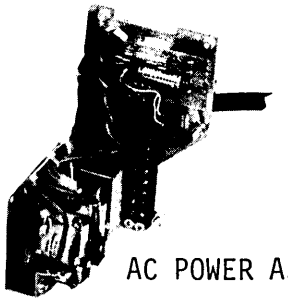


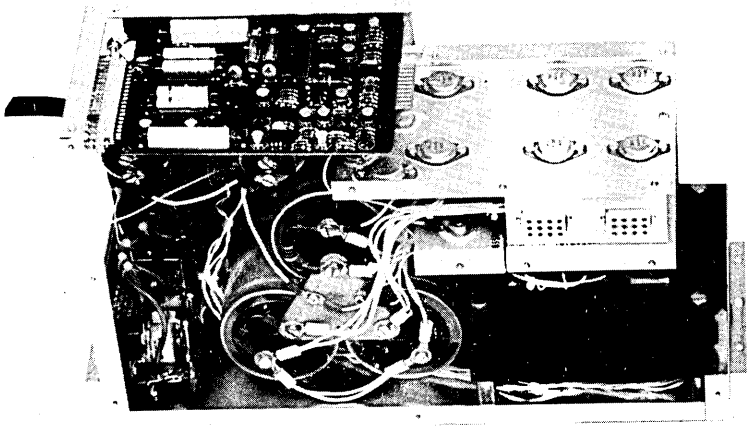
Figure 3-1. Cal Data 36-A Power Supply



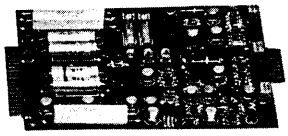
COVER PLATE



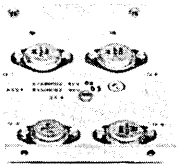
AC POWER ASSEMBLY



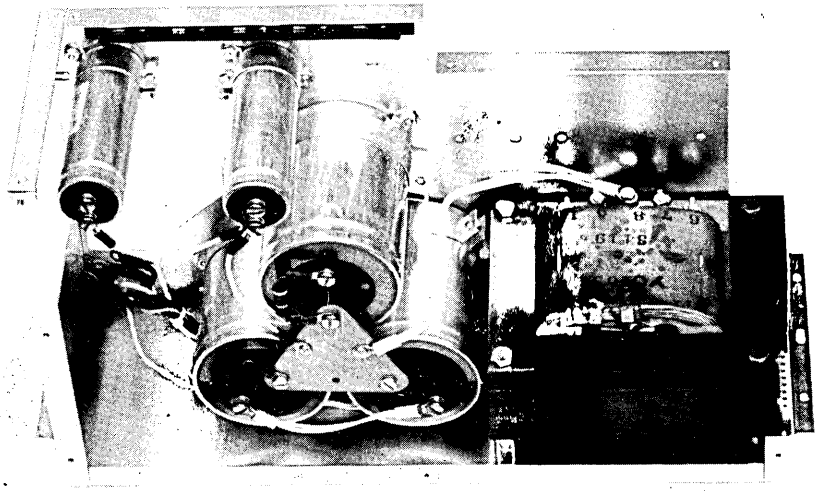
ASSEMBLED POWER SUPPLY



REGULATOR BOARD

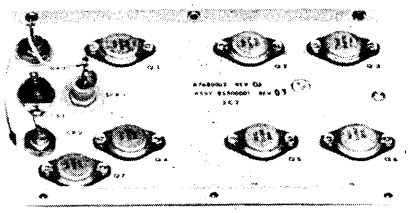


-15 VDC HEAT-SINK ASSEMBLY



CHASSIS ASSEMBLY

RECTIFIER HEAT-SINK ASSEMBLY



+5 VDC HEAT-SINK ASSEMBLY

Figure 3-2. 36-A Power Supply Assemblies

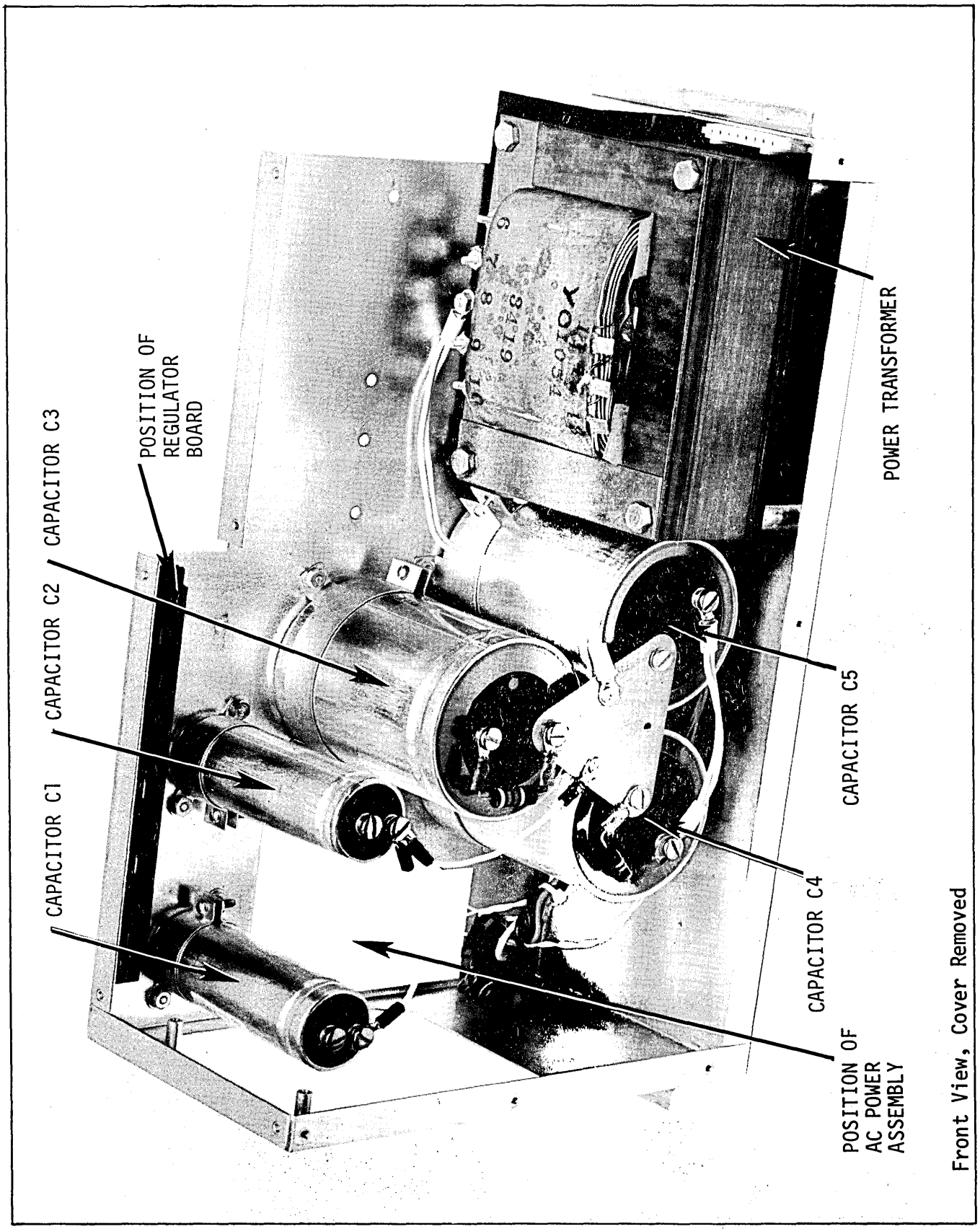
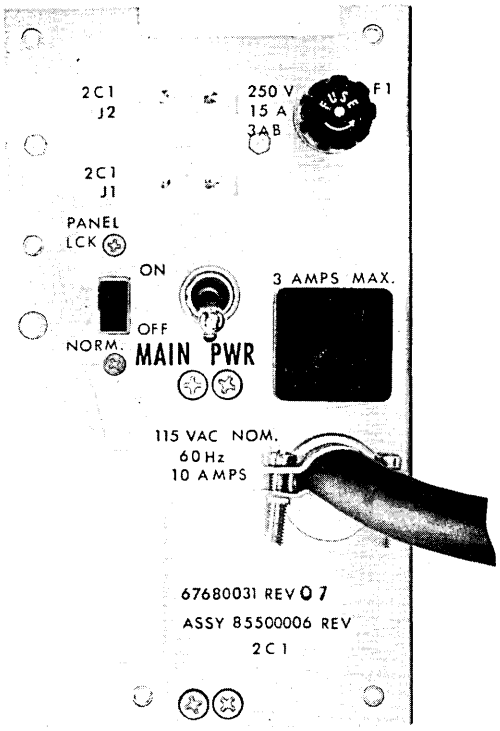
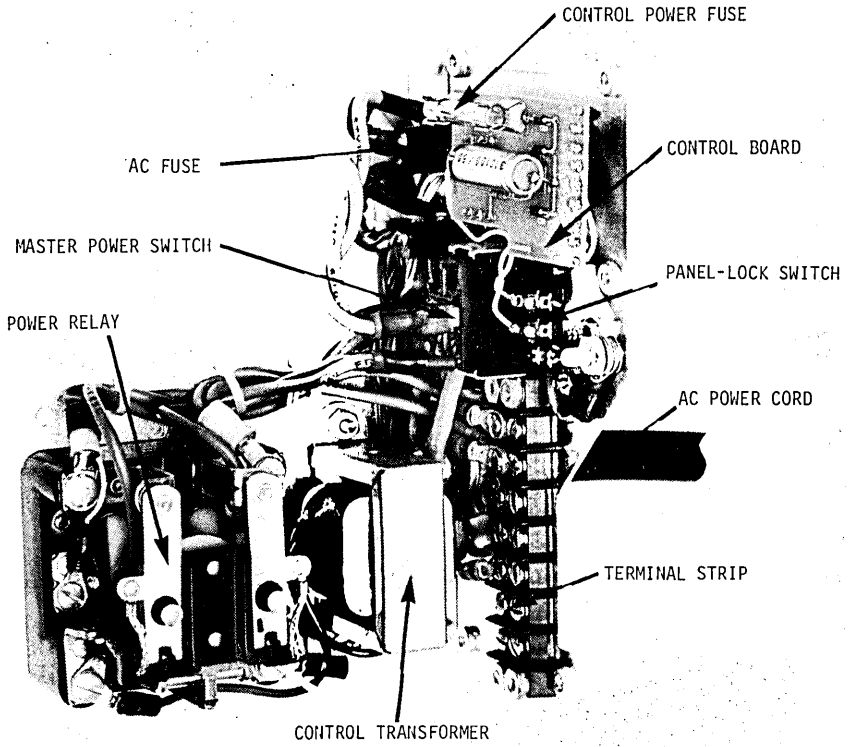


Figure 3-3. 36-A Power Supply Chassis Assembly



Exterior View



Interior View

Figure 3-4. 36-A Power Supply AC Power Assembly

3.5.1 -15 Vdc Heat Sink Assembly

The -15 Vdc heat sink assembly holds four transistors that are associated with the -15 Vdc regulated-output circuitry. The assembly is mounted on the chassis next to the rectifier heat sink assembly.

3.5.2 +5 Vdc Heat Sink Assembly

The +5 Vdc heat sink assembly holds seven transistors that are associated with the +5 Vdc regulated output circuitry. The components of the "crowbar" circuit (paragraph 2.2.2) are also located on this assembly, which is attached to the power supply chassis above the rectifier and -15 Vdc heat sink assemblies.

3.6 REGULATOR BOARD

The regulator board (Figure 3-5) is a printed circuit-board that is located in the top of the power supply. It contains circuitry associated with both the regulated and unregulated outputs.

The fuses for the -22 Vdc and +8 Vrms circuits are located on the regulator board.

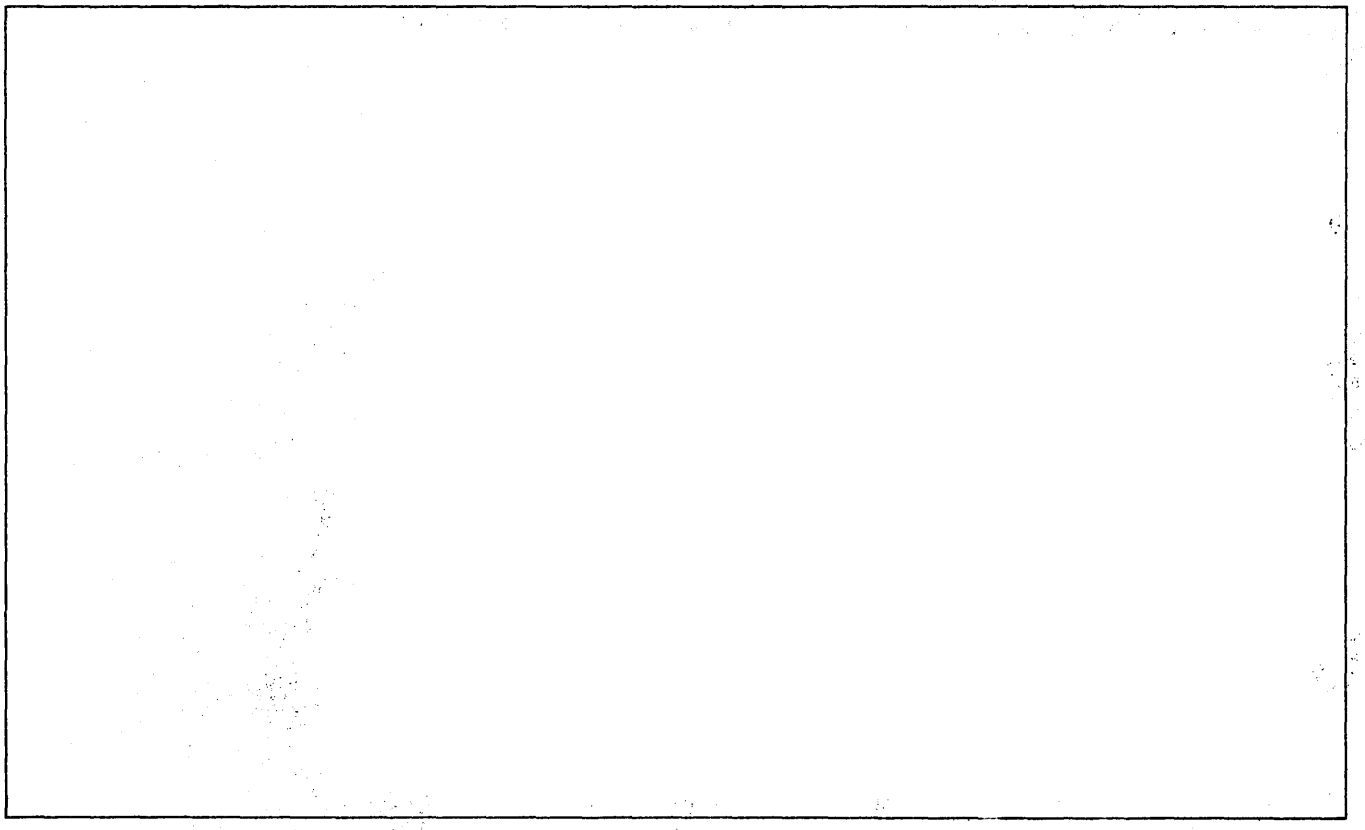


Figure 3-5. 36-A Power Supply Regulator Board

SECTION 4
INTERFACE

4.1 OVERVIEW

The 36-A Power Supply interfaces with a standard ac line as a source and provides all outputs necessary for Cal Data or PDP-11 systems. Appropriate output interface connectors are provided. Pin assignments for all connectors are given in Appendix A.

4.2 INPUT INTERFACE

The input to the supply is a standard grounded type plug for 115, 208 or 230 Vac, according to the version ordered.

Associated with the Macropanel power switch is a control extension cable that connects to power supply connector J4 (Figure 4-1).

4.3 OUTPUT INTERFACE

Connectors J2 and J3 are for dc and logic output, J4 is for ac to the fans and Macropanel (remote) control, and 2C1J1 and 2C1J2 are for remote power control. In addition, on the 115 Vac power supply, there is a 115 Vac accessory outlet.

One power supply can control or be remotely controlled by another through a cable plugged into the remote power control connectors on each unit.

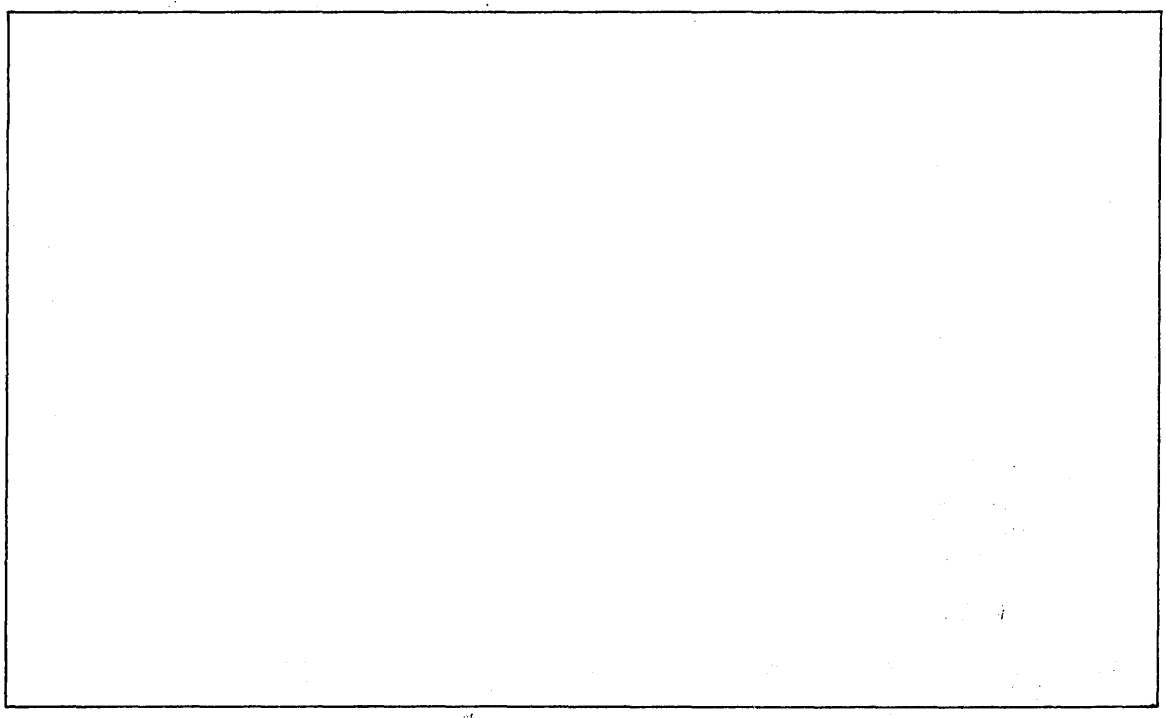


Figure 4-1. Fan/Macropanel Cable to 36-A Power Supply Connector J4

SECTION 5
MAINTENANCE

5.1 GENERAL

This section describes preventive and corrective maintenance procedures for the 36-A Power Supply.

In general, corrective maintenance is limited to isolation of a fault to a specific assembly or major component, followed by replacement of the faulty item. Troubleshooting procedures can then be used to verify that the suspected assembly is malfunctioning and to help diagnose the specific problem. Repair should be conducted only at the factory or by an authorized Cal Data representative.

5.2 PREVENTIVE MAINTENANCE

The power supply is a reliable solid-state device designed to perform continuously for many years without degradation. Preventive maintenance consists of performing the following tasks every six months:

a. Inspect the power supply for damaged wires or components, or other obvious defects
b. Using a low-pressure source of air (75 psi one foot from the board or 5 kg/cm^2 30 cm from the board), blow off accumulated dust and foreign matter
c. Check that the power supply outputs are within tolerance

5.3 CORRECTIVE MAINTENANCE

The most frequent maintenance steps necessary for the power supply are fuse replacement and adjustment for major load changes. Repair of the power supply in the field is not recommended.

Power supply operating problems can be isolated with the aid of Table 5-1. Fuse types and sizes are listed in Table 5-2. Provided that the load on the power supply does not exceed the design limit, certain faults can be corrected by making adjustments provided for on the regulator board. These adjustments may be made by the user in the field (paragraph 5.3.1) if the power supply warranty period is over or if permission is granted by an authorized Cal Data representative.

If field checks and adjustments fail to correct power supply operation, a circuit malfunction may be suspected. Replace the power supply with a spare known to be operating properly.

If the proper test equipment is available, a more thorough power supply adjustment procedure may be performed by the user, with the unit removed from the system (paragraph 5.3.2). Adjustment during the warranty period may be made only by prior permission of an authorized Cal Data representative. If the power supply cannot be made to operate properly under these controlled conditions, return the malfunctioning unit for repair to California Data Processors.

Table 5-1. 36-A Power Supply Fault Isolation

Fault	Possible Causes
No outputs	a. Power failure b. AC line fuse open c. Control power-supply fuse open d. Regulator board disconnected e. Remote control jumper plugs not installed
Low +5 Vdc output (<+2 Vdc)	a. Overcurrent foldback b. Overvoltage crowbar triggered
Low -15 Vdc output (>-2 Vdc)	a. Overcurrent foldback b. +5 Vdc output out of tolerance (power supply interlock)
No +8 Vrms output	a. Regulator board fuse open
No -22 Vdc output	a. Regulator board fuse open

Table 5-2. 36-A Power Supply Fuse Types and Sizes

Function	Type	Rating
AC power, 115 Vac	250 V, 3AB	15 A
AC power, 208 and 230 Vac	250 V, 3AB	7 A
Control power	230 V, 3AG	0.25 A
+8 Vrms	230 V, 3AG	2 A
-22 Vdc	230 V, 3AG	2 A

5.3.1 Field Adjustment

Any change in system configuration that significantly changes the +5 Vdc or -15 Vdc load on the power supply calls for readjustment of the supply. This common procedure is described below for the 115 Vac version of the power supply (P/N C85500018).

Equipment Required

A digital voltmeter or volt/ohm meter is needed. The former is preferred.

Initial Conditions

The following conditions are assumed:

a. The power supply is in operational condition.

b. The power supply is mounted in the computer chassis and connected to the backplane with a Cal Data power harness.

c. The line cord is connected to a 110 to 125 Vac, 60 Hz source.

Procedures

The procedures below may be followed only if the potentiometer seals on the regulator board are broken or if permission has been granted by an authorized Cal Data representative.

When approximate potentiometer settings are given based on the physical position of the adjustment slot, the results are generally close to the correct values for a great majority of cases.

1. Set the MAIN PWR switch on the power supply to ON.

2. If the system is equipped with a Macropanel, set the PWR switch on the Macropanel to ON.

3. Set the panel-lock slide switch on the power supply to NORM if the system is equipped with a Macropanel; otherwise, set the switch to PANEL LCK. The power supply should energize.

4. Remove the Macropanel bezel and overlay. Connect the voltmeter across any of the 4.7 microfarad electrolytic capacitors or across pins 7 and 14 of any integrated circuit on the Macropanel. Adjust potentiometer R22 for a meter reading of +5.00 Vdc ±3%. (All potentiometers called out are on the power supply regulator board, as illustrated in Figure 3-5. The approximate setting of each potentiometer is illustrated in Figure 5-1).

5. Connect the voltmeter across pins 3 and 4 of power supply connector J2 or J3 (refer to Figure 5-2). Adjust R37 for a meter reading of -15.00 Vdc ±3%.

6. Turn R20 completely counterclockwise. Advance R20 clockwise one-half turn so that the adjustment slot is at the 1:00 o'clock position. This provides a +5 Vdc current limit of approximately 40 A.

7. Turn R60 completely counterclockwise. Advance R60 clockwise two-thirds of a turn so that the adjustment slot is at the 4:00 o'clock position. This provides a -15 Vdc current limit of approximately 14 A.

8. Turn R19 completely counterclockwise. Advance R19 clockwise one-half turn so that the adjustment slot is at the 12:00 o'clock position. This provides an ACLO threshold of approximately 103 Vac input. If the power supply line input is suspected of being less than 110 Vac, it is advisable to adjust R19 to a lower setting. A 10:00 o'clock position provides a threshold of approximately 100 Vac. An extreme counterclockwise position provides a threshold of approximately 95 Vac.

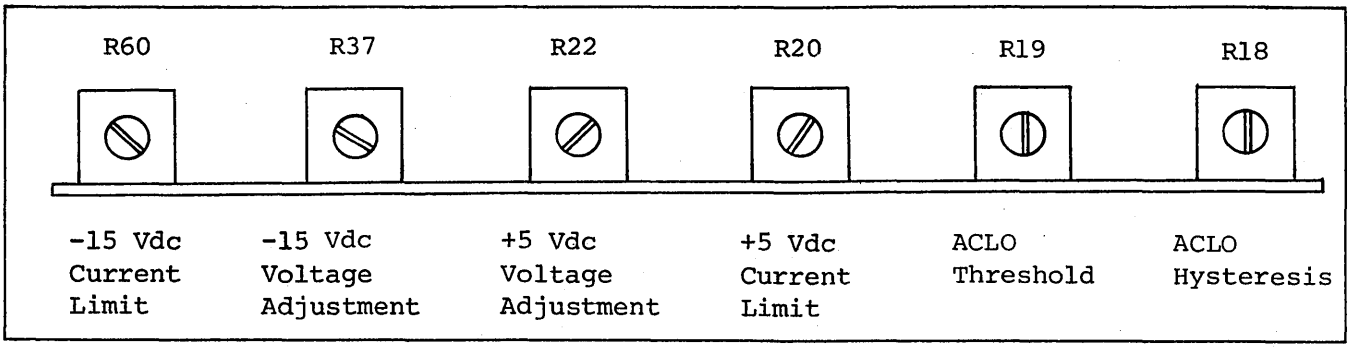


Figure 5-1. Regulator Board Adjustment Potentiometers

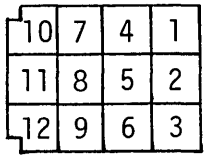
Connector	Pin	Signal	Name
	1	+5 VDC	+5 Vdc
	2	+5 VDC	+5 Vdc
	2	-15 VDC	-15 Vdc
	4	PWR GND	Power Ground
	5	PWR GND	Power Ground
	6	PWR GND	Power Ground
	7	+8 VRMS	+8 Vrms
	8	SIGNAL GND	Signal Ground
	9	DCLO-L	DC Low
	10	-22 VDC	-22 Vdc
	11	LTCL	Line-Transition Clock
	12	ACLO-L	AC Low

Figure 5-2. DC Output Connectors J2 and J3

9. Turn R18 completely counterclockwise. Advance R18 clockwise one-half turn so that the adjustment slot is at the 12:00 o'clock position. This provides an ACLO hysteresis of approximately 3 Vac, meaning that ACLO is asserted at 103 Vac (see step 8) and turned off at 106 Vac. An extreme counterclockwise position provides an ACLO hysteresis of approximately 1 Vac. An extreme clockwise position provides an ACLO hysteresis of approximately 5 Vac.

10. Set the panel-lock slide switch on the power supply to NORM. Set the PWR switch on the Macropanel to OFF.

11. Replace the Macropanel bezel and overlay.

5.3.2 Depot-Level Adjustment

Precise adjustment of the power supply requires controlled electrical conditions and accurate test equipment. This procedure is described below for the 115 Vac version of the power supply (P/N C85500018).

Equipment Required

The following equipment is needed:

a. Digital voltmeter (DVM)

b. Volt/ohm meter (VOM)

c. Ammeter, 0 to 40 A, 3% accuracy or better

d. Resistive or electronic loads, adjustable from 0 to 40 A at +5 Vdc and adjustable from 0 to 14 A at -15 Vdc

e. Variac with 10 A capacity at 115 Vac

f. Portable cooling fan with 100 cfm capacity

Initial Conditions

The following conditions are assumed:

a. The power supply is in operational condition.

b. The power supply is removed from the chassis.

c. Remote jumper connectors are installed on 2C1J1 and 2C1J2 (refer to Figure 3-4).

d. A cooling fan is positioned in the approximate location of the rearmost fan in the computer chassis when the power supply is installed (refer to Figure 5-3). The fan is plugged into the 115 Vac service outlet on the power supply.

e. The MAIN PWR switch is set to OFF and the panel-lock slide switch is set to NORM.

f. The power supply line cord is connected to the Variac. The Variac is set for 115 Vac output.

Procedures

The procedures below may be followed only if the potentiometer seals on the regulator board are broken or if permission has been granted by an authorized Cal Data representative.

1. Turn on the Variac and set the MAIN PWR switch to ON.

2. Set the panel-lock slide switch to PANEL LCK. The power supply should energize.

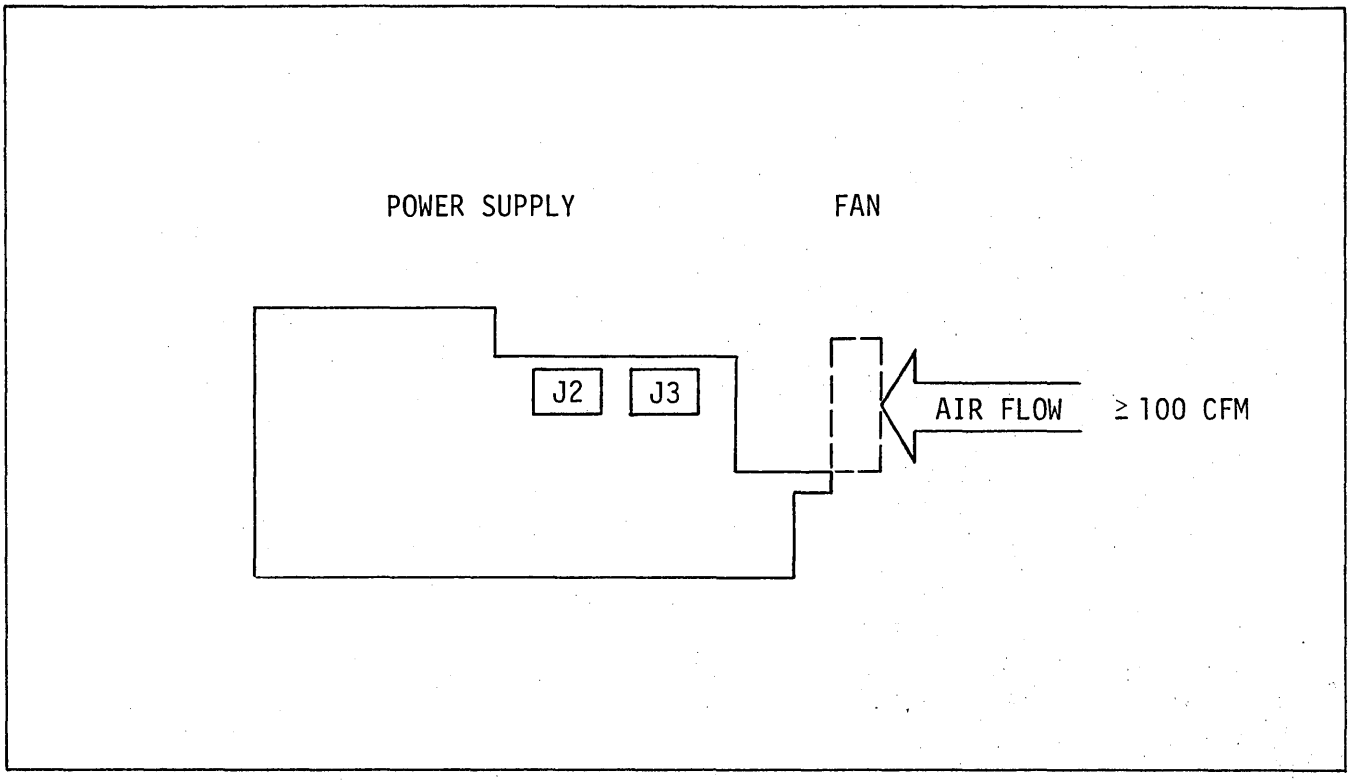


Figure 5-3. External Fan Placement for Adjustment

3. Connect the DVM across pins 1 and 4 of connector J2 or J3 (refer to Figure 5-2). Adjust potentiometer R22 for a meter reading of +5.15 Vdc ±1%. (All potentiometers called out are on the regulator board, as illustrated in Figure 3-5).

4. Connect the DVM across pins 3 and 4 of connector J2 or J3. Adjust R37 for a meter reading of -15.00 Vdc ±3%.

5. Connect the 5-volt load to either J2 or J3; positive lead to pins 1 and 2, negative lead to pins 4 and 5. Insert the ammeter in series with the load.

   CAUTION: Because of the high currents associated with the +5 Vdc output, two conductors of at least 14 awg should be used for both the +5 Vdc and ground connections.

   Adjust the load to obtain a 30 A reading on the ammeter. Slowly increase the load to 40 A. The power supply should start limiting the current somewhere between 35 and 40 A. Current limiting is reached when the +5 Vdc output begins to drop. Adjust R20 so that current limiting starts at 40 A.

   Turn off the load, but leave it connected. Leave the DVM connected.

6. On the J2 or J3 connector not used by the 5-volt load, connect the 15-volt load with the positive lead to pin 4 and the negative lead to pin 3. Insert the ammeter in series with the load.

   Adjust the load to obtain a 12 A reading on the ammeter. Slowly increase the load to 14 A. Adjust R60 so that current limiting starts at 14 A.

   Turn off the load, but leave it connected.

7. Set the DVM for a range of 150 Vac and connect it to the power supply line input (fan connector J4, pins 3 and 6, may conveniently be used for this). Set the VOM for a range of +5 Vdc and connect it to pins 4 and 12 of connector J2 or J3.

   Using the ammeter, adjust the loads for a reading of approximately 25 A at +5 Vdc and 5 A at -15 Vdc.

   While watching the VOM, slowly decrease the Variac voltage until the VOM reading drops to zero. Note the ac input voltage on the DVM. The reading should be 103 Vac ±1%.

   Slowly increase the Variac voltage until the VOM again reads +5 Vdc, then decrease the Variac voltage until the VOM reading drops to zero. Note the ac input voltage. Repeat this procedure several times in order to get an accurate indication of the ac level at which the dc voltage is lost. Adjust R19 so that loss of dc occurs at 103 Vac ±1%.

   Leave the test setup as is.

8. With the same test setup and in the same manner as in step 7, slowly increase the Variac voltage and note the ac level at which the output voltage returns to +5 Vdc. Adjust R18 so that full return of dc voltage occurs at 106 Vac ±1%.

9. Turn off the loads, the power supply and the Variac. Disconnect all test equipment and leads.

APPENDIX A
CONNECTOR PIN ASSIGNMENTS

The tables in this appendix give the pin assignments for the 36-A Power Supply connectors.

Table A-1. DC Output Connectors J2 and J3

Pin	Signal	Name
1	+5 VDC	+5 Vdc
2	+5 VDC	+5 Vdc
3	-15 VDC	-15 Vdc
4	PWR GND	Power Ground
5	PWR GND	Power Ground
6	PWR GND	Power Ground
7	+8 VRMS	+8 Vrms
8	SIGNAL GND	Signal Ground
9	DCLO-L	DC Low
10	-22 VDC	-22 Vdc
11	LTCL	Line-Transition Clock
12	ACLO-L	AC Low

Table A-2. Fan/Macropanel Power Connector J4

Pin	Signal	Name
1	PANEL SW	Macropanel Power Switch Return
2	PANEL LCK	Macropanel Lockout
3	FAN PWR A	Fan Power A
4	FAN PWR A	Fan Power Return A
5	FAN PWR B	Fan Power B
6	FAN PWR B	Fan Power Return B
7	PANEL SW	Macropanel Power Switch
8	LOCK RET	Macropanel Lockout Return

Table A-3. Remote Connector 2C1J1

Pin	Signal Name
1	Control Relay Coil
2	+24 Vdc Control Supply
3	Macropanel Switch

Table A-4. Remote Connector 2C1J2

Pin	Signal Name
1	+24 Vdc Return
2	Temperature Switch
3	Temperature Switch Return

Table A-5. Regulator Board Test Connector P2

Pin	Signal	Name
1	-15 MAR H	-15.75 Vdc
2	-15 MAR I	-15.00 Vdc
3	-15 MAR L	-14.25 Vdc
5	+5 MAR H	+5.25 Vdc
6	+5 MAR I	+5.00 Vdc
7	+5 MAR L	+4.75 Vdc