

**SA-H147**  
**Processor Chassis for**  
**LSI-11 or MicroVAX**  
**Systems**  
**Manual**

**SA-H147**  
**Processor Chassis for**  
**LSI-11 or MicroVAX**  
**Systems**  
**Manual**

COPYRIGHT © SIGMA INFORMATION SYSTEM

ANAHEIM, CALIFORNIA - JANUARY 1987

MA900063 REV C



# Contents

SECTION 1 - GENERAL INFORMATION . . . . .	1
1.1 INTRODUCTION . . . . .	1
1.2 GENERAL DESCRIPTION . . . . .	2
1.3 CHASSIS . . . . .	2
1.4 FRONT CONSOLE . . . . .	3
1.5 SPECIFICATIONS . . . . .	4
SECTION 2 - INSTALLATION . . . . .	7
2.1 UNPACKING AND INSPECTION . . . . .	7
2.2 MODULE INSTALLATION . . . . .	7
2.2.1 22-Bit Addressing . . . . .	8
2.2.2 Q Bus Termination . . . . .	8
2.2.3 Module Insertion . . . . .	9
2.3 CHASSIS INSTALLATION . . . . .	11
SECTION 3 - POWER SUPPLY . . . . .	13
3.1 GENERAL INFORMATION . . . . .	13
3.2 POWER SUPPLY OUTPUT CONNECTIONS . . . . .	13
3.2.1 DC Output Power to Backplane . . . . .	14
3.2.2 Front Panel and Backplane 10-Pin Connectors . . . . .	14
3.3 DC VOLTAGE ADJUSTMENTS . . . . .	16
3.3.1 +5VDC Adjustment . . . . .	16
3.3.2 -12VDC Adjustment . . . . .	16
3.3.4 Power Fail Detect Adjustment . . . . .	17
3.4 AC CONVERSION . . . . .	18
SECTION 4 - ASSEMBLY/DISASSEMBLY . . . . .	19
4.1 INTRODUCTION . . . . .	19
4.2 REMOVAL OF CHASSIS FROM RACK . . . . .	19
4.3 POWER SUPPLY REMOVAL . . . . .	20
4.4 FRONT CONSOLE REMOVAL . . . . .	21
4.5 BACKPLANE REMOVAL . . . . .	22
APPENDICES . . . . .	24
Appendix A Q Bus Pin Assignments . . . . .	24
Appendix C System Wiring Diagram . . . . .	26
Appendix D AC Control/Power Fail Detect & Front Panel . . . . .	27
Appendix E Power Supply Module Schematic . . . . .	28

## Figures/Tables

Figure 1-1	SA-H147 Chassis Components . . . . .	3
Figure 1-2	Front Console . . . . .	3
Figure 2-1	22-Bit Addressing Jumpers . . . . .	8
Figure 2-2	Backplane Priority Structure . . . . .	9
Figure 2-3	Module Insertion into Backplane . . . . .	10
Figure 2-4	Rackmount Installation . . . . .	11
Figure 3-1	Backplane Power Connections . . . . .	14
Figure 3-2	J1 AND J2 Connector . . . . .	14
Figure 3-3	DC Power Adjustments . . . . .	16
Figure 3-4	Power Fail Detect Timing . . . . .	17
Figure 4-1	Power Supply Removal . . . . .	20
Figure 4-2	Front Console Removal . . . . .	21
Figure 4-3	Backplane Removal . . . . .	22
Table 2-1	DC Voltage Measurements . . . . .	12
Table 3-1	J1 Connections to Front Panel . . . . .	15
Table 3-2	J2 Connections to Backplane . . . . .	16

## **Section 1 - General Information**

### 1.1 INTRODUCTION

This manual provides general information, module installation, and power supply adjustments for the SA-H147 processor chassis manufactured by Sigma Information Systems, Anaheim, California. The material is arranged into the following sections.

Section 1 - GENERAL INFORMATION. This section provides a general description of the 7" chassis. Specifications are included.

Section 2 - INSTALLATION. This section describes the procedure for mounting the chassis in a standard rack. Module insertion into the backplane is included.

Section 3 - POWER SUPPLY. This section describes the power supply DC output distribution. AC conversion and DC power adjustments are included.

Section 4 - ASSEMBLY/DISASSEMBLY. This section provides procedures for removing the chassis from a 19" rack, and for disassembling the various components within the chassis.

APPENDICES. The appendices consist of system wiring diagrams and power supply schematics. Q bus pin assignments are also provided.

REF: H147.WPS/DM4

## 1.2 GENERAL DESCRIPTION

The SA-H147 processor chassis is designed to provide mounting and power for DEC\* compatible CPUs and associated modules. The SA-H147 consists of a 7" rackmount or tabletop chassis with a heavy duty power supply, operator console, and an LSI-11 or MicroVAX 12-row, quad-wide backplane.

The backplane supports LSI-11, LSI-11/2, and LSI-11/23 CPUs and associated Q bus devices. An optional backplane that supports MicroVAX applications is also available.

The power supply is designed for 50/60Hz operation and is strappable from 115VAC to 230VAC. The power outputs are +5VDC at 50A, and +12VDC at 5A, and -12VDC at 5A (400 watts maximum). The DC output voltages are adjustable and regulated.

Features include:

- Power fail detect circuit
- Line time clock for LTC generation and control
- DEC\* compatible Q bus or optional MicroVAX backplane
  - Termination resistors
  - 22-bit addressing
  - Interrupt priority structure
  - 24 dual LSI-11 slots (20 dual plus 4 C-D slots for MicroVAX backplane)
- Front access to installed modules
- Tabletop or rackmount versions
- Heavy duty 400W reliable power supply
- Convenient front operator console
- Compact 7" high enclosure

## 1.3 CHASSIS

The SA-H147 processor chassis contains the 12-row, quad-wide backplane, the power supply, three cooling fans and the front operator console as shown in Figure 1-1.

Chassis slides for rackmount installation are included with rackmount versions, and a dress cover is included with tabletop versions. Access to the installed modules is from the front of the chassis via a snap-off front bezel. Cooling air inlets at the left sides and exits at the right sides of the chassis.

\*Q Bus and DEC are registered trademarks of Digital Equipment Corporation.

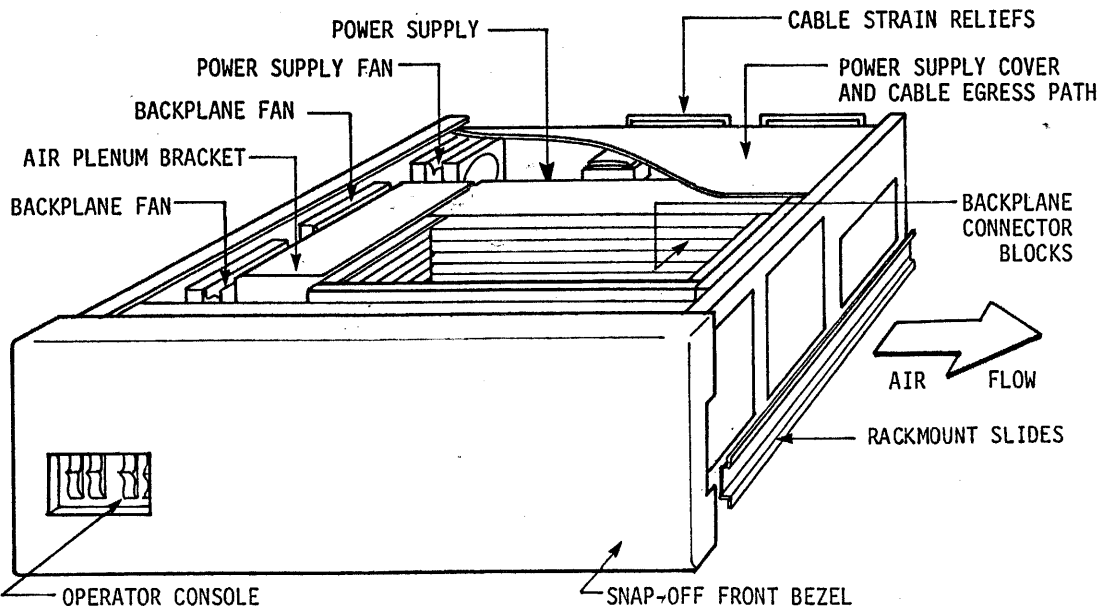


FIGURE 1-1: SA-H147 CHASSIS COMPONENTS

1.4 FRONT CONSOLE

The operator console assembly is mounted on the front of the chassis and consists of four switches and two LED indicators as shown in Figure 1-2.

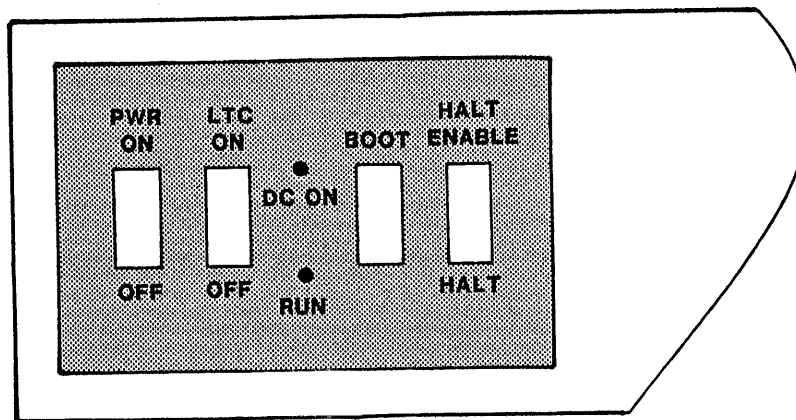


FIGURE 1-2: FRONT CONSOLE



ON-OFF SWITCH. The power supply includes a remote ON/OFF solid state relay. When the ON/OFF switch is in the ON position, the relay is enabled. AC is supplied to the power supply and DC to the backplane and fans is enabled.

LTC ENABLE SWITCH. When in the ON (up) position, a line frequency square wave is asserted upon the B EVENT line (BR1), causing the LSI-11 CPU to be interrupted at line frequency (50 or 60Hz).

BOOT SWITCH. This is a momentary two-position switch. When depressed, the BDCOK line (BA1) is momentarily asserted, causing the CPU to address the location of the bootstrap PROM (173000). Depending on the bootstrap option selected, the system will either boot to a specified device or enter a bootstrap monitor.

HALT/ENABLE SWITCH. When in the HALT position, the B HALT line (AP1) is asserted, causing the CPU to go into ODT mode. When in the ENABLE position, a high on the B HALT line is generated, allowing programs to be run.

DC ON LED. When on, this LED indicates +5V is applied to the front panel.

RUN LED. When on, this LED indicates that the SRUN line is asserted and a program is being executed from main memory. When off, either the CPU is in ODT or it is in a Programmed Wait state.

## 1.5 SPECIFICATIONS

Capacity: 12-row, quad-wide backplane with 24 dual Q bus slots. Optional MicroVAX backplane with 20 dual Q bus slots plus 4 C-D slots wired for MicroVAX applications.

Installation: Rackmount version mounts in standard 19" RETMA rack and occupies 7" of vertical rack space. Allow 0.5" for rear cable egress.

Tabletop version occupies a desktop area. Allow sufficient area around the chassis for cooling.

Dimensions: 7"H x 19 3/4"D x 19"W

Power:

Input: 115VAC or 230VAC +/- 10%, 50/60Hz

Output: +5VDC @ 50A, +12VDC @ 5A, and -12VDC @ 5A. Note to exceed 400 watts.

Cooling: Forced air, left-side intake with right-side exhaust. One fan for power supply. Two fans for installed modules.

Accessibility: Access to backplane modules is via the snap-off front panel.

Cable Egress: At the rear of the chassis with two strain reliefs.

Environment:	Temperature	Humidity	Altitude
Operating:	0°C to 50°C	0 to 95%	0 to 10,000ft
Storage	-45°C to 85°C	0 to 95%	0 to 30,000ft

noncondensing

## **Notes**

## Section 2 - Installation

### 2.1 UNPACKING AND INSPECTION

Unpack the 7" system chassis and visually inspect it for damage that might have occurred during shipment. Retain the shipping carton in case reshipment is necessary. Remove the chassis covers and inspect the backplane, power supply, etc., for component damage. If any damage has occurred, notify Sigma Information Systems immediately. Each shipping container should include the following:

An SA-H147 chassis assembly with backplane, power supply, and front console.

An "SA-H147 Processor Chassis Manual" with logic diagrams for power supply modules.

An AC power cord.

A hardware kit containing required hardware for rackmounting the chassis (for rackmount versions only).

### 2.2 MODULE INSTALLATION

The processor chassis is shipped with 22-bit addressing and Q bus termination unless otherwise specified per customer order. Before installing modules into the backplane, verify that these options are configured properly. This section describes the procedures to verify and/or reconfigure addressing and Q bus termination.

### 2.2.1 22-Bit Addressing

The backplane (LSI-11 or MicroVAX) is shipped configured for 22-bit addressing. However, the LSI-11 backplane can be reconfigured for 18-bit addressing if required.

The backplane provides 22-bit addressing for use with LSI-11/23 modules, memories and DMA devices designed to accommodate 22-bit addressing. These extended address bits are assigned as follows:

BADL18L	BC1, DC1	BDAL20L	BE1, DE1
BDAL19L	BD1, DD1	BDAL21L	BF1, DF1

Since the old style quad LSI-11 and the dual LSI-11/2 both use these signal lines internally, the extra address bits should not be connected when the system is not being used as a 22-bit system. The backplane has four jumpers on row B that provide 22-bit addressing. See Figure 2-1. Section 4.5 describes the procedure to remove the backplane if it is necessary to reconfigure the 22-bit address jumpers.

When the system is to be used with 22-bit addressing, jumpers W1, W2, W3, and W4 are installed (shipping configuration). If the backplane is to be used with the LSI-11/2, remove W1 through W4. When used with the old style, quad-wide LSI-11 remove all jumpers W1 through W8.

### 2.2.2 Q Bus Termination

The PCBA also includes five terminating resistor modules. Resistor modules (RM1-RM5) are normally installed in the backplane to provide full termination of all Q bus lines. If a system is already using a bootstrap/terminator, and no termination is required, remove resistor modules RM1-RM5. Connection to resistor modules is shown in Appendix B.

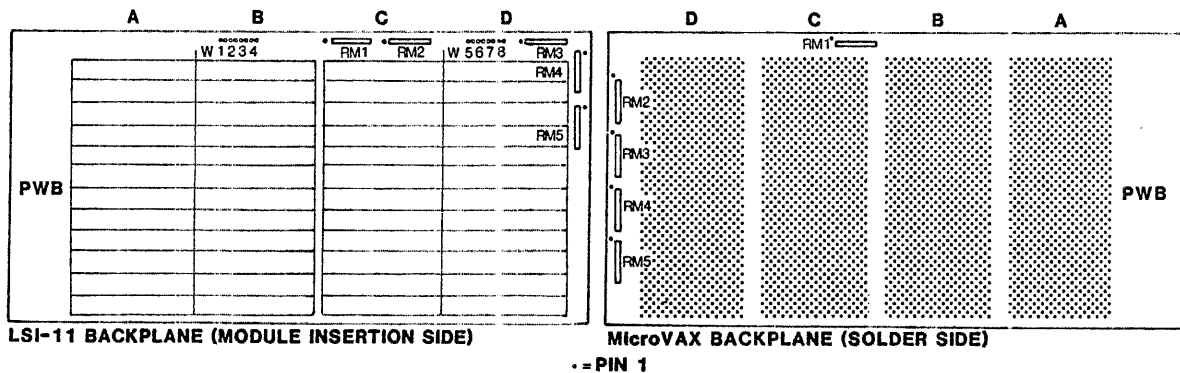


FIGURE 2-1: 22-BIT ADDRESSING JUMPERS

2.2.3 Module Insertion

The SA-H147 backplane provides direct plug-in installation for Q bus\* compatible modules. The backplane is built into a cardframe assembly that supports installed modules; the assembly includes card guides that provide positive pin alignment and extractor mounting holes that secure the modules. The backplane uses standard DEC-type connector blocks

Modules plug directly into the backplane with priorities determined by the interrupt level of the module and by its distance from the CPU (backplane priority). When more than one device with the same interrupt level requests interrupt service, the device that is closest to the CPU (lowest backplane priority) will receive the interrupt grant first. Figure 2-2 defines the device priorities for the backplane.

MODULE INSERTION SIDE OF BACKPLANE

		A	B	C	D
F A N  AIR PLENUM BRACKET  F A N		1 (CPU)			2
		4			3
		5			6
		8			7
		9			10
		12			11
		13			14
		16			15
		17			18
		20			19
		21			22
		24			23

LSI-11 BACKPLANE PRIORITY STRUCTURE

		A	B	C	D
F A N  AIR PLENUM BRACKET  F A N		1 (CPU)			MicroVAX
		2			MicroVAX
		3			MicroVAX
		4			MicroVAX
		5			6
		8			7
		9			10
		12			11
		13			14
		16			15
		17			18
		20			19

MicroVAX BACKPLANE PRIORITY STRUCTURE

FIGURE 2-2: BACKPLANE PRIORITY STRUCTURE

Each connector block accommodates 36 lines per dual slot (18 each on component and solder sides of the board). Each line includes an alphanumeric identifier. Refer to Figure 2-3 for row A through D identifiers. Take special care to ensure that the logic modules are not installed backward. Notice that the LSI-11 processor commands the highest priority and plugs into slot 1, rows A and B.

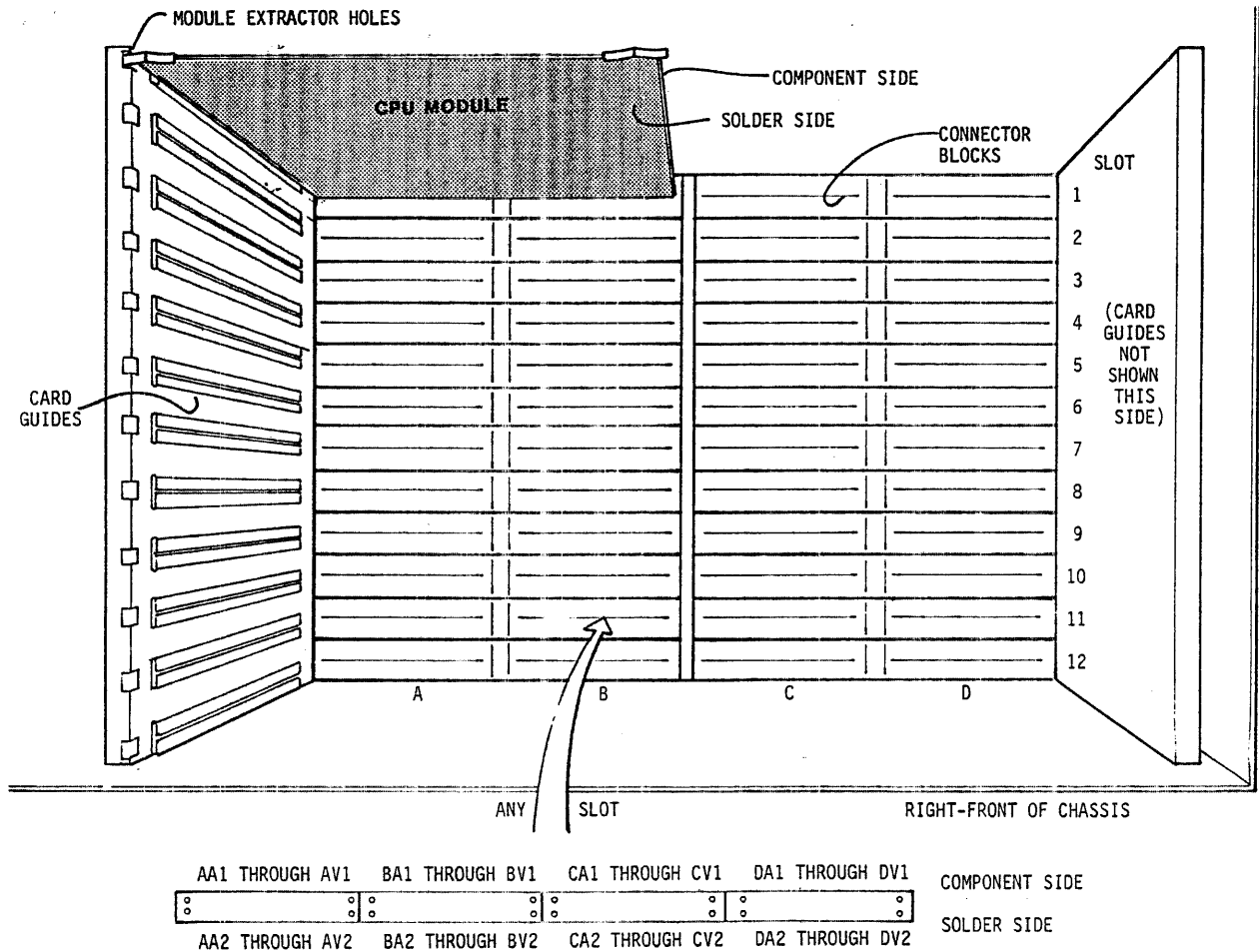


FIGURE 2-3: MODULE INSERTION INTO BACKPLANE

### 2 3 CHASSIS INSTALLATION

Use the following procedure to install the SA-H147 into a standard 19" RETMA rack and to apply AC input power.

1. Remove the slides from the chassis by sliding the chassis out until the rear retaining spring buttons engage. Depress the springs and slip the slides completely free from the chassis. Set the chassis aside.
2. Notice that the left and right outer rails are marked X XX X LH and X XX X LR on the label shown in Figure 2-5.
3. Place the slides in the rack, marking the intended position of the mounting holes both on the front and at the rear of the rack. Bolt the slides into place using 10-32 x 1/2" screws. Bolt the rear of the slides to the rack side rails using four 10-32 x 3/8" screws. All screws use flat washers with locking washers next to the hex nut.

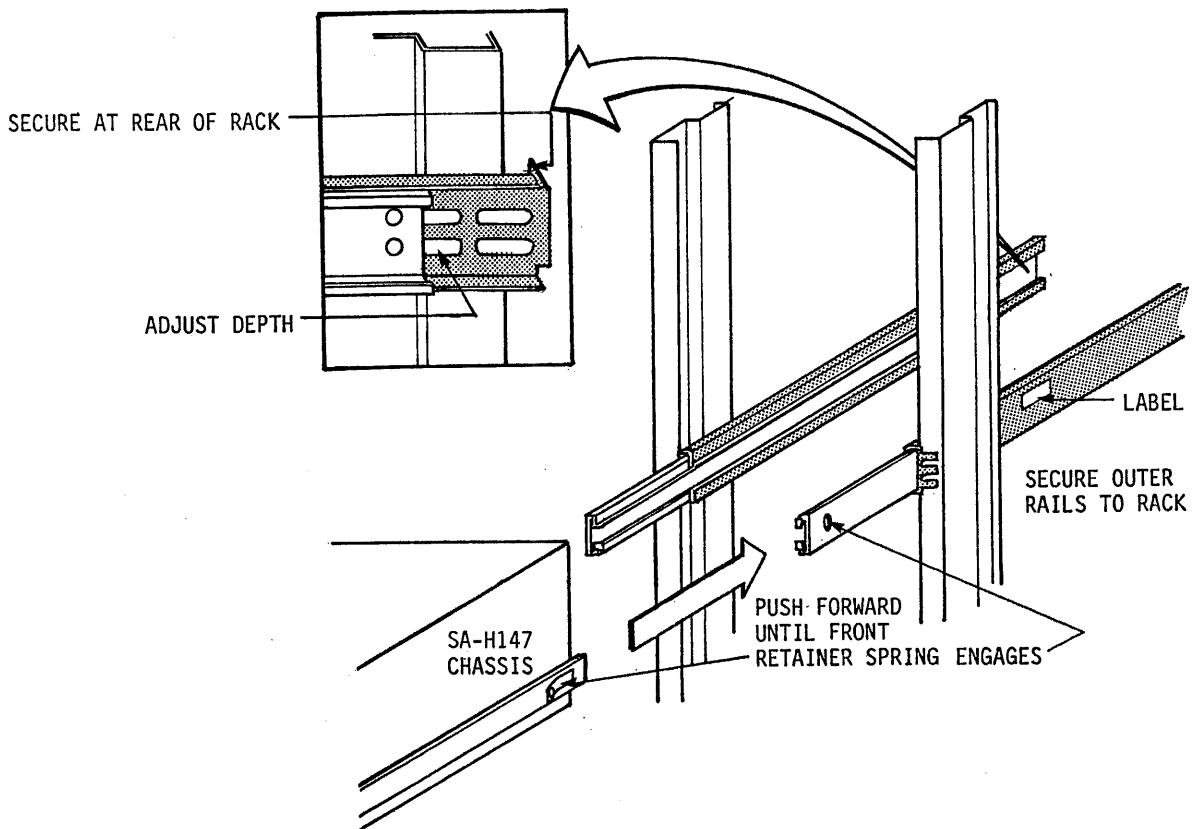


FIGURE 2-4: RACKMOUNT INSTALLATION



4. Install the chassis slides into the outer rails. Push chassis into the rack until the retaining spring engages.
5. Check the chassis itself for proper AC power selection (Section 3).
6. Plug the AC cord into a proper main receptacle and switch the power ON/OFF switch to the ON position. Check DC voltages as defined in Table 2-1. The voltages can be measured on the backplane. See Appendix A for Q bus pin assignments.

VOLTAGE	MEASUREMENT SOURCE
+5VDC +/- 0.25VDC	AA2,BA2,BV1
+12VDC +/- 0.60VDC	AD2,BD2
-12VDC +/- 0.60VDC	AB2,BB2

TABLE 2-1: DC VOLTAGE MEASUREMENTS

## Section 3 - The Power Supply

### 3.1 GENERAL INFORMATION

This section contains a detailed description of the SA-H147 power supply. Output power connections are defined, and DC voltage adjustments and AC conversion are described. Service to the power supply requires disassembly (Section 4). It is recommended that the chassis be returned to the Sigma factory for service to the power supply except for voltage adjustments described in this section.

### 3.2 POWER SUPPLY OUTPUT CONNECTIONS

The power supply consists of two major assemblies which are shown in Figure 4-1.

#### AC DISTRIBUTION/POWER FAIL DETECT MODULE

This module provides remote on/off power to the front panel, and distributes front panel logic signals and backplane power fail detect circuitry via two 10-wire ribbon cables.

#### DC DISTRIBUTION MODULE

DC outputs are routed to the multilayered PCBA on the backplane via power cables. The +12VDC output also provides power to the three fans.

3.2.1 DC Output Power to Backplane

Attachment of DC power to the backplane is via power cables from TB1 on the DC distribution module. The power cables provide +5VDC, +12VDC, -12VDC and Ground. The power tabs for +5VDC can accept up to 45A. Figures 3-1 illustrates the backplane power connections.

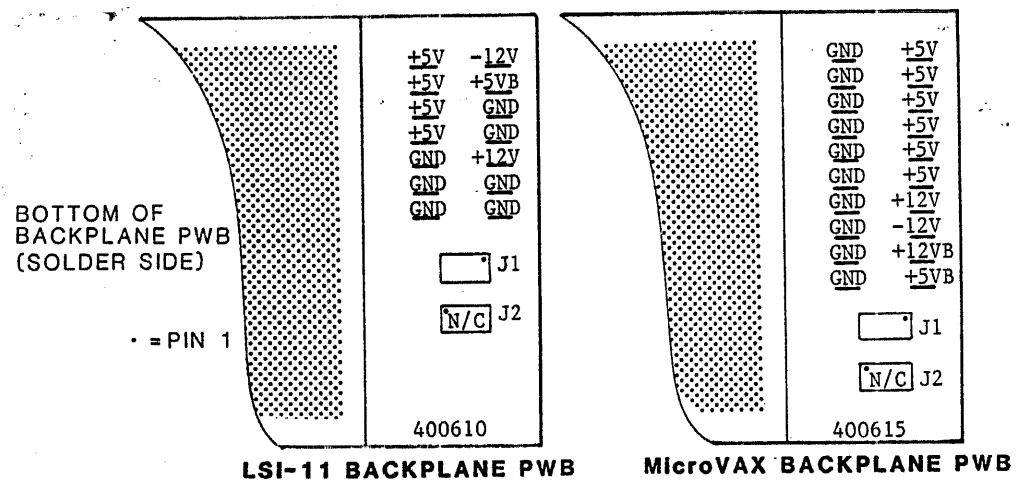


FIGURE 3-1: BACKPLANE POWER CONNECTIONS

3.2.2 Front Panel and Backplane 10-Pin Connectors

The AC distribution/power fail detect module contains two 10-pin connectors for interfacing to the front console (J1) and backplane (J2). The J1 cable plugs into the front console PCBA (Figure 4-2), and the J2 backplane cable plugs into J1 on the backplane PCBA (Figure 3-1). The 10-pin connector is illustrated in Figure 3-2. Pin assignments for J1 and J2 are defined in Tables 3-1 and 3-2, respectively.

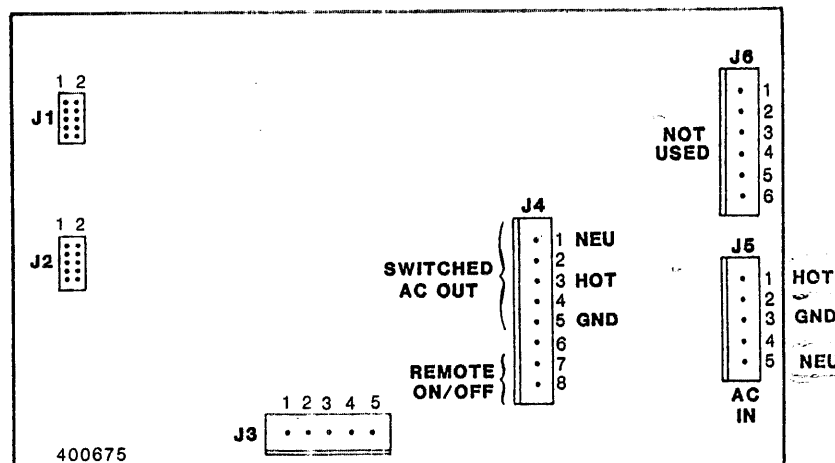


FIGURE 3-2: J1 AND J2 CONNECTOR

PIN	SIGNAL	DESCRIPTION
1	HALT	From front panel to assert BHALT line for ODT mode
2	ENABLE	From front panel to generate high on BHALT for running programs
3	$\overline{\text{BOOT}}$	Normal position of BOOT switch on front panel
4	BOOT	From front panel to assert BDCOK line for bootstrapping
5	N/C	No Connection
6	RUN	From processor to assert SRUN during program execution
7	GND	Ground
8	PWR	From power supply to indicate +5V presence on front panel
9	LTC	Line frequency signal from power supply to BEVENT line
10	N/C	No Connection

TABLE 3-1: J1 CONNECTIONS TO FRONT PANEL

PIN	SIGNAL	DESCRIPTION
1	N/C	Option Pad
2	N/C	Option Pad
3	BDCOKH	From power supply to indicate DC voltage out of tolerance
4	BHALTL	From front panel switch
5	BEVENTL	Line frequency signal from power supply to BEVENT line
6	BPOKH	From power supply to indicate AC power condition
7	N/C	Option Pad
8	SRUN	From processor to indicate RUN status on front panel
9	GND	Ground
10	GND	Ground

TABLE 3-2: J2 CONNECTIONS TO BACKPLANE

### 3.3 DC VOLTAGE ADJUSTMENTS

Voltages can be adjusted to within +/-10% of nominal by turning potentiometers clockwise for a decrease and counterclockwise for an increase in voltage. Refer to Figure 3-3 for location of voltage adjustment pots on the power supply module. The power fail detect adjustment is located on the AC distribution/power fail detect module (Figure 3-2).

#### NOTES

The power supply bracket is connected to DC GND and AC safety GND, and can be used for ground reference in voltage measurements.

The +12VDC output is not adjustable; however, it is cross regulated by the +5V load and should measure +12VDC +/- 8%.

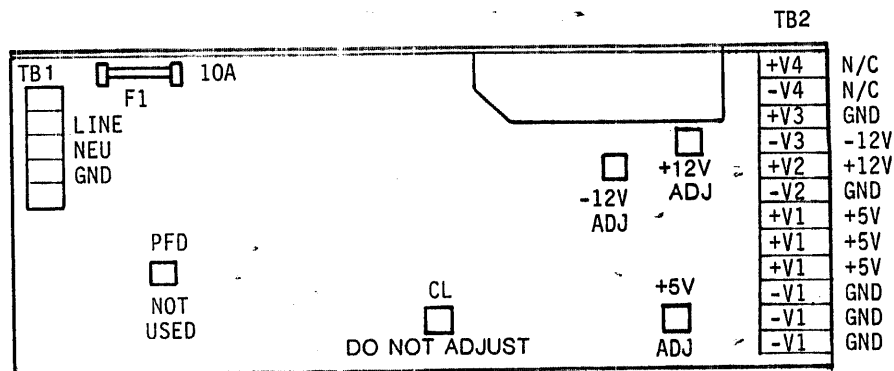


FIGURE 3-3: DC POWER ADJUSTMENTS

#### 3.3.1 +5VDC Adjustment

Measure +5VDC +/- 0.25VDC on pin AA2, BA2, or BV1 of any backplane connector slot (Figure 2-4). If the output cannot be brought within the limits, or if the voltage adjustment pot is near its extreme limit when obtaining proper output voltage, the module must be replaced.

#### 3.3.2 -12VDC Adjustment

Adjustment of the -12VDC power is made by turning the pot indicated in Figure 3-1. Measure +12VDC +/- 0.6VDC on pin AB2 or BB2 of any backplane connector slot (Figure 2-4).

### 3.3.4 Power Fail Detect Adjustment

The power supply includes a power fail detect circuit which provides BPOKH and BDCOKH signals in the proper timing sequence to the Q bus. The power supply also provides the LTC signal which is connected to the BEVENT line (BR1) and controlled by the LTC front panel switch. This signal is used by the Q bus as timing for a line time clock.

The power fail circuitry is designed to detect a 1/2 cycle drop-out on the AC line. The detection is done via a retriggerable one-shot that is retriggered on zero crossing and whose dwell slightly exceeds the duration of 1/2 cycle line frequency. Since line frequency can be either 50Hz or 60Hz, adjustment of the power fail detect signal should be checked at time of installation.

Figure 3-2 shows the location of the power fail detect pot. Adjustment should be made by monitoring BB1 (Figure 2-3). Note that pin BB1 should be high. If +5VDC and +12VDC are present and within tolerance, BPOKH should be high. If not, adjustment is necessary. Using a VOM, adjust the pot until pin BB1 can be observed going low. Then back off until pin BB1 remains high. Continue slightly beyond this point to provide extra margin.

Figure 3-4 shows the timing relationship of BPOKH and BDCOKH as provided by the power supply unit.

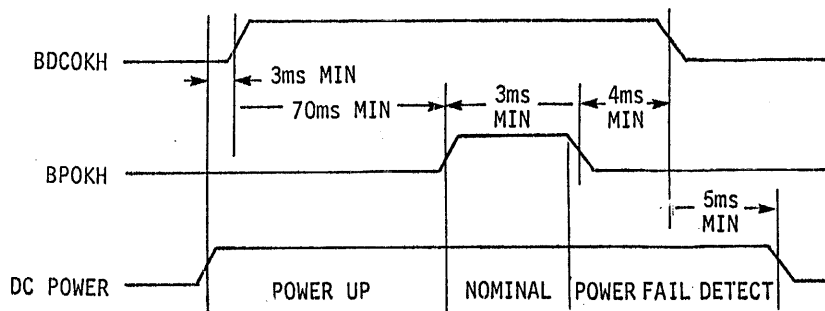


FIGURE 3-4: POWER FAIL DETECT TIMING

- BPOKH** A signal signifying the status of AC power. If power fails in a 1/2 cycle drop-out or longer power outage, BPOKH is asserted on BB1. Both BPOKH and BDCOKH remain asserted (low) after power is off.
- BDCOKH** A signal signifying the status of DC power on the Q bus, pin BA1. The signal must be asserted before DC power is lost and becomes valid after DC power is restored.

### 3.4 AC CONVERSION

Input power is applied via the power cord, through an IEC compatible connector, line filter and fuse to the AC control/power fail detect module, which contains the remote on/off logic and provides AC power to the DC distribution module. Transient voltage suppressors protect the power supply from transient voltage spikes.

AC input power can be converted easily between 115VAC and 230VAC via the jumper shown in Figure 3-3. The jumper should be installed for 115VAC operation and removed for 230VAC operation.

## **Section 4 - Disassembly**

### 4.1 INTRODUCTION

The SA-H147 consists of four major assemblies: the operator console assembly, the power supply assemblies, the backplane, and the chassis assembly. The chassis is designed such that each of these assemblies can be replaced independently using the procedures in this section. Replacement of components is in reverse order of the removal of the components.

### 4.2 REMOVAL OF CHASSIS FROM RACK

The rackmount chassis is easily removed from a 19" RETMA rack using the following procedure.

1. Disconnect the power cord.
2. Disconnect or unplug any cables to installed modules.
3. Slide chassis out until rear spring button release latches engage.
4. Disengage the rear spring button and pull chassis forward and lift out from rack.



### 4.3 POWER SUPPLY REMOVAL

It is recommended that the chassis be returned to Sigma for service to the power supply except for the voltage adjustments and AC conversion described in Section 3. DC power adjustments are accessible by removing the hood over the power supply assembly. Remove the cable strain reliefs and the phillips head screw at the rear of the chassis. If AC conversion is required, or if the power supply is to be returned to the factory, the entire assembly must be removed. With Figure 4-1 as a guide, use the following procedure to remove the power supply.

1. Remove the four 6-32 x 3/8 screws at the rear of the chassis. Slide the rear panel partially out. The DC distribution module and the AC distribution/power fail detect module are mounted to this rear panel.
2. Disconnect the power and ground cables at the backplane (Figure 3-1).
3. Disconnect the 10-pin cable to the backplane.
4. On the AC distribution/power fail detect module, disconnect the 10-pin front panel ribbon cable from J1.
5. Refer to Figure 4-2 to disconnect the power ON/OFF cable from the front panel.
6. Disconnect the fan cables at the fan assemblies.
7. The power supply assembly containing the power supply components should now be free to be removed completely from the chassis.

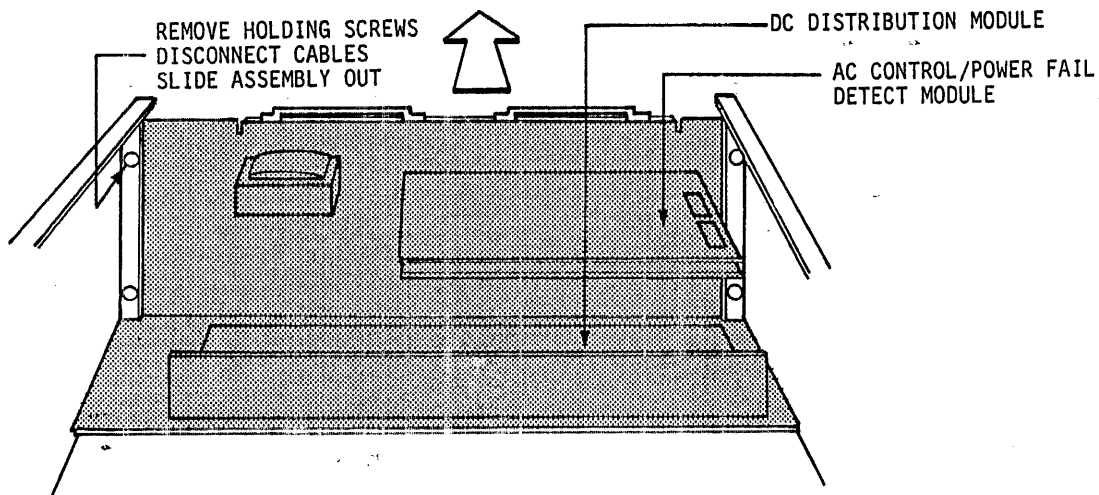


FIGURE 4-1: POWER SUPPLY REMOVAL

#### 4.4 FRONT CONSOLE REMOVAL

The front console assembly consists of a printed circuit board assembly (PCBA) mounted on the front console bracket. With Figure 4-2 as a guide, use the following procedure to remove the assembly.

1. Pull the front bezel outwards at the bottom and snap off.
2. Remove the top cover of the chassis by unscrewing the four screws on the top of the chassis.
3. Disconnect the 10-pin connector and remove the ON/OFF cable that is plugged into the front console PCBA. The 10-pin connector is located on the switch side of the PCBA and is accessible from the bottom of the PCBA.
4. Unscrew the two 6-32 hex nuts, lock washers, and flat washers that secure the front bracket to the chassis.

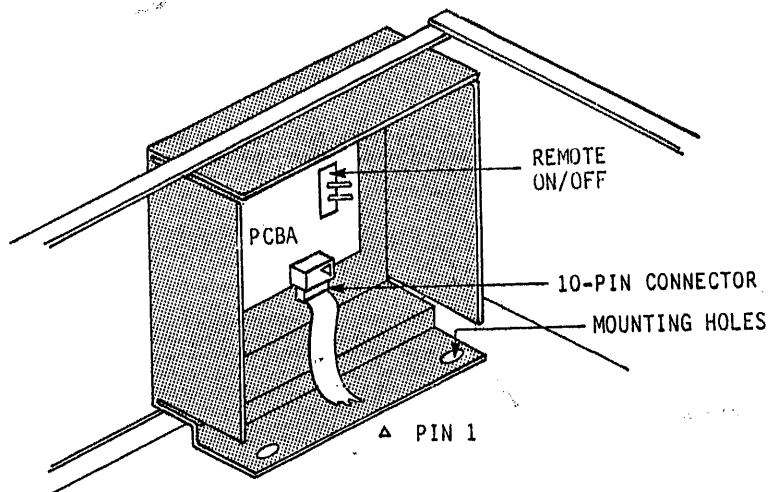


FIGURE 4-2: FRONT CONSOLE REMOVAL

#### 4.5 BACKPLANE REMOVAL

The mounting bracket for the backplane fans also serves as an air plenum for efficient cooling of the backplane modules. Before removing the backplane/cardframe assembly, the air plenum assembly with two fans must first be removed. Refer to Figure 4-3 and use the following procedure to remove the backplane assembly.

1. Remove the fan cables from the two fans located near the backplane.
2. Remove the four attaching screws that secure the air plenum bracket with fans. These screws are accessible from the bottom of the chassis.
3. Lift the air plenum bracket and fans up and out of the chassis.
4. Unscrew the four 6-32 x 5/16 backplane attaching screws from the bottom of the chassis.
5. Disconnect all attaching cables on the bottom of the backplane PCBA. All cables are illustrated in Figure 3-1.
6. Lift the backplane from the chassis.

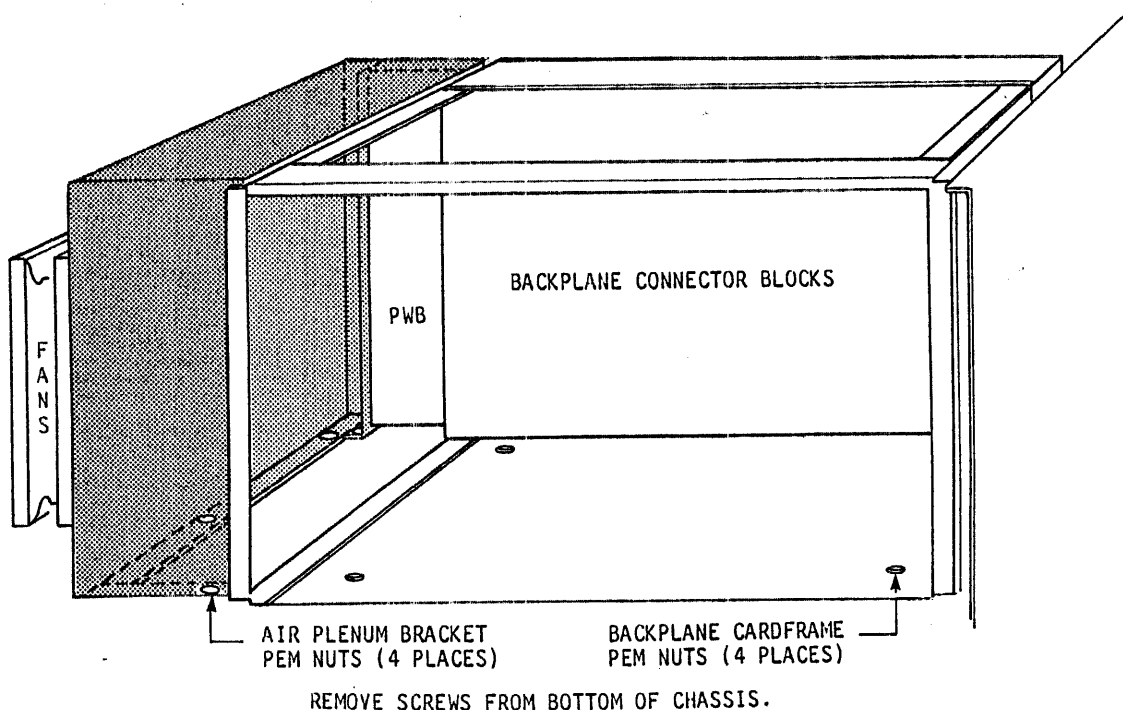


FIGURE 4-3: BACKPLANE REMOVAL

PIN	SIGNAL	Micro VAX	LSI- 11/73	LSI- 11/23	PIN	SIGNAL	Micro VAX	LSI- 11/73	LSI- 11/23
AA1	BIRQ5L				AA2	+5V			
AB1	BIRQ6L				AB2	-12V	N/U	N/U	
AC1	BDAL16L				AC2	GND			
AD1	BDAL17L				AD2	+12V		N/U	
AE1	*SSPARE1	N/U	N/U	SINGLE STEP	AE2	BDOUTL			
AF1	*SSPARE2	SRUNL	SRUNL	SRUNL	AF2	BRPLYL			
AH1	*SSPARE3	N/U	N/U	SRUNL	AH2	BDINL			
AJ1	GND				AJ2	BSYNCL			
AK1	*MSPAREA	N/U	N/U	N/U	AK2	BWTBTL			
AL1	*MSPAREB	N/U	N/U	N/U	AL2	BIRQ4L			
AM1	GND				AM2	*BIAK1L		N/U	MMUSTRH
AN1	BDMRL				AN2	*BIAK0L		BIAKL	
AP1	BHALTL				AP2	BBS7L			
AR1	BREFL		N/U	N/U	AR2	*BDMG1L		N/U	UBMAAPL
AS1	+12VB	N/U	N/U		AS2	*BDMG0L			
AT1	GND				AT2	BINITL			
AU1	PSPARE1	N/U	N/U		AU2	BDAL0L			
AV1	+5VB	N/U			AV2	BDAL1L			
BA1	BDCOKH				BA2	+5V			
BB1	BPOKH				BB2	-12V	N/U	N/U	
BC1	*SSPARE4	BDAL18L	BDAL18L	MMUDAL18H	BC2	GND			
BD1	*SSPARE5	BDAL19L	BDAL19L	MMUDAL19H	BD2	+12V		N/U	
BE1	*SSPARE6	BDAL20L	BDAL20L	MMUDAL20H	BE2	BDAL2L			
BF1	*SSPARE6	BDAL21L	BDAL21L	MMUDAL21H	BF2	BDAL3L			
BH1	*SSPARE8	N/U	N/U	CLKDISL	BH2	BDAL4L			
BJ1	GND				BJ2	BDAL5L			
BK1	*MSPAREB	N/U	N/U	N/U	BK2	BDAL6L			
BL1	*MSPAREB	N/U	N/U	N/U	BL2	BDAL7L			
BM1	GND				BM2	BDAL8L			
BN1	BSACKL				BN2	BDAL9L			
BP1	BIRQ7L				BP2	BDAL10L			
BR1	BEVNTL				BR2	BDAL11L			
BS1	PSPARE4	N/U	N/U	+12VB	BS2	BDAL12L			
BT1	GND				BT2	BDAL13L			
BU1	PSPARE2	N/U	N/U		BU2	BDAL14L			
BV1	+5V				BV2	BDAL15L			

\*NOT BUSSED, N/U = NOT USED

NOTE

C-D slots for LSI-11/73 and LSI-11/23 are the same as A-B slots. Pin assignments for MicroVAX C-D slots are defined on the next page.

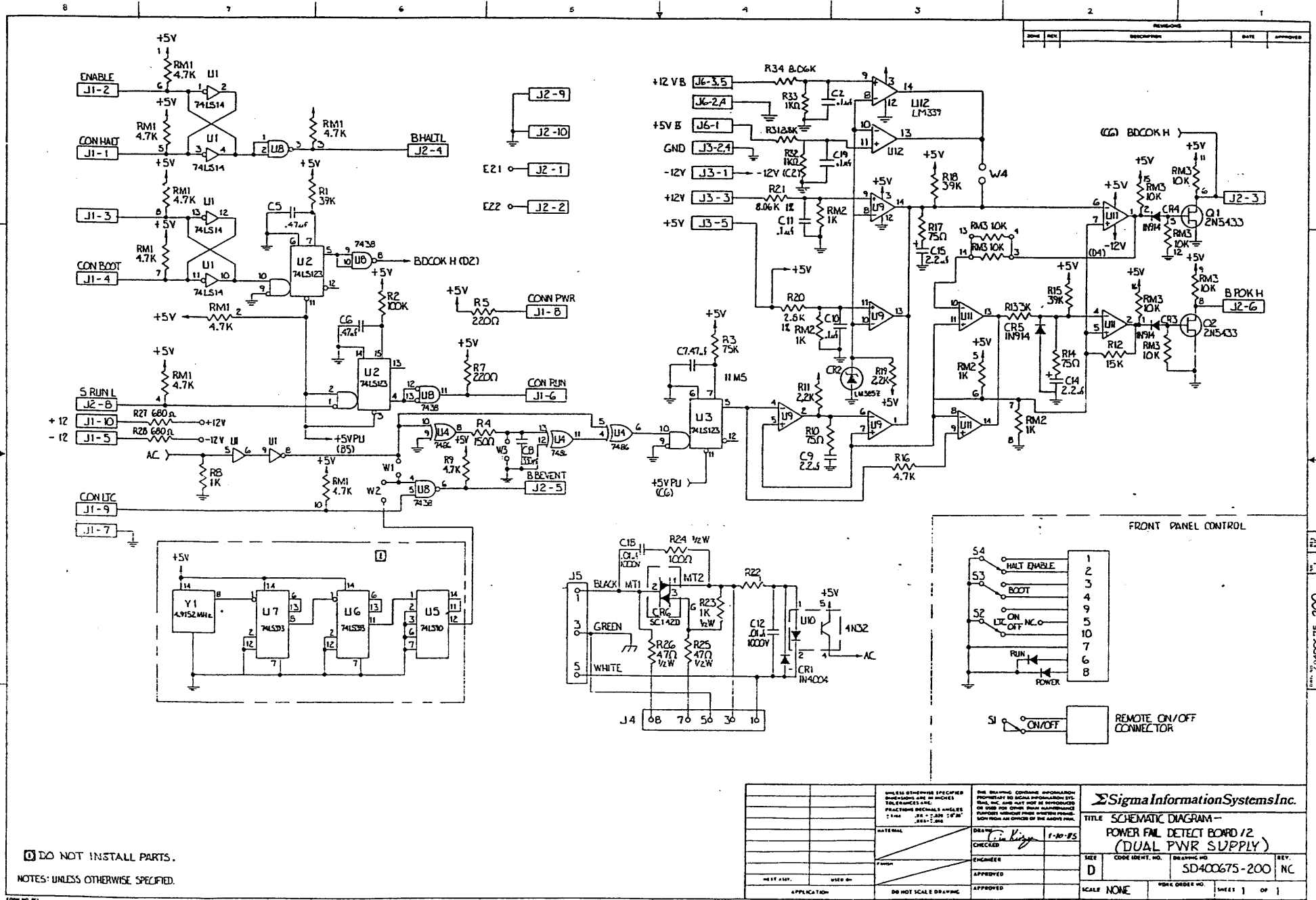
! CA1	NOT USED	CA2	+5V	DA1	NOT USED	DA2	+5V	!
! CB1	*MAA<0>L	CB2	MAA<9>L	DB1	*MAA<7>L	DB2	MAA<7>L	!
! CC1	NOT USED	CC2	GND	DC1	NOT USED	DC2	GND	!
! CD1	*RAS<5>H	CD2	RAS<1>H	DD1	*MAA<5>L	DD2	MAA<5>L	!
! CE1	*BMCAS<0>H	CE2	BMCAS<0>L	DE1	*MAA<4>L	DE2	MAA<4>L	!
! CF1	*RAS<1>H	CF2	NOT USED	DF1	*MAA<3>L	DF2	MAA<3>L	!
! CH1	*BMCAS<1>H	CH2	BMCAS<1>H	DH1	*MAA<6>L	DH2	MAA<6>L	!
! CJ1	*MSID<0>L	CJ2	MSID<2>L	DJ1	*MSID<2LL	DJ2	NOT USED	!
! CK1	*MSWT<1>H	CK2	MSWT<1>H	DK1	*RAS<3>H	DK2	NOT USED	!
! CL1	*RAS<4>H	CL2	RAS<0>H	DL1	*RAS<7>H	DL2	RAS<3>H	!
! CM1	*MSID<1>L	CM2	MSID<3>L	DM1	*MSID<3>L	DM2	NOT USED	!
! CN1	*MAA<1>L	CN2	MAA<1>L	DN1	*RAS<2LH	DN2	NOT USED	!
! CP1	*MAA<2>L	CP2	MAA<2>L	DP1	*BMCAS<2>H	DP2	BMCAS<2>H	!
! CR1	*MAA<0>L	CR2	MAA<0>L	DR1	*BMCAS<3>H	DR2	BMCAS<3>H	!
! CS1	*MAA<8>L	CS2	MAA<8>L	DS1	*MSWT<2>H	DS2	MSWT<2>H	!
! CT1	GND	CT2	MSID<4>L	DT1	GND	DT2	*MSID<4>L	!
! CU1	*RAS<0>H	CU2	NOT USED	DU1	*RAS<6>H	DU2	RAS<2>H	!
! CV1	NOT USED	CV2	NOT USED	DV1	NOT USED	DV2	NOT USED	!

\*Used by MSA32 memory module. Not used by CPU.

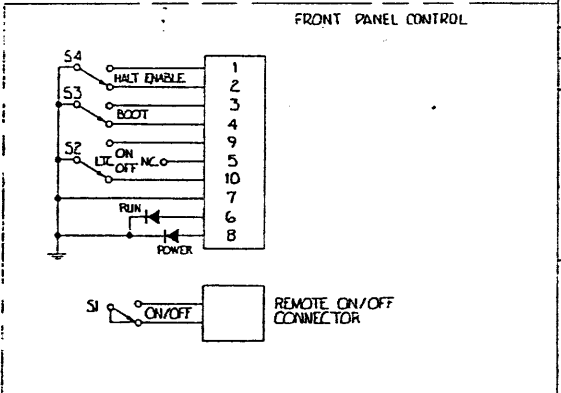
#### MicroVAX C-D Slot Definitions

BUS SIGNAL	PIN	RESISTOR MODULE PIN	BUS SIGNAL	PIN	RESISTOR MODULE PIN
BIRQ5L	AA1, CA1	RM1-2	BDAL19L	BD1, DD1	RM3-6
BIRQ6L	AB1, CA1	RM1-3	BDAL20L	BE1, DE1	RM3-5
BDAL16L	AC1, CC1	RM1-4	BDAL21L	BF1, DF1	RM3-7
BDAL17L	AD1, CD1	RM1-5	BSACKL	BN1, DN1	RM4-8
BDMRL	AN1, CN1	RM2-4	BIRQ7L	BP1, DP1	RM4-6
BHALTL	AP1, CP1	RM2-6	BEVENTL	BR1, DR1	RM5-3
BREFL	AR1, CR1	RM2-7	BDAL2L	BE2, DE2	RM3-9
BDOURL	AE2, CE2	RM1-6	BDAL3L	BF2, DF2	RM4-2
BRPLYL	AF2, CF2	RM1-7	BDAL4L	BH2, DH2	RM4-3
BDINL	AH2, CH2	RM1-8	BDAL5L	BJ2, DJ2	RM4-4
BSYNCL	AJ2, CJ2	RM1-9	BDAL6L	BK2, DK2	RM4-5
BWTBTL	AK2, CK2	RM2-1	BDAL7L	BL2, DL2	RM4-7
BIRQ4L	AL2, CL2	RM2-3	BDAL8L	BM2, DM2	RM5-5
BBS7L	AP2, CP2	RM2-5	BDAL9L	BN2, DN2	RM5-9
BINITL	AT2, CT2	RM2-8	BDAL10L	BP2, DP2	RM5-8
BDAL0L	AU2, CU2	RM2-9	BDAL11L	BR2, DR2	RM5-7
BDAL1L	AV2, CV2	RM3-2	BDAL12L	BS2, DS2	RM5-6
BDCOKH	BA1, DA1	RM3-3	BDAL13L	BT2, DT2	RM5-4
BPOKH	BB1, DB1	RM3-8	BDAL14L	BU2, DU2	RM5-2
BDAL18L	BC1, DC1	RM3-4	BDAL15L	BV2, DV2	RM4-9





REVISIONS			
NO.	REV.	DESCRIPTION	DATE



UNLESS OTHERWISE SPECIFIED, COMPONENTS ARE TO BE USED AS SHOWN IN THIS DRAWING. PRACTICE RECOMMENDATIONS ARE GIVEN IN THE MARGINS OF THIS DRAWING. FOR OTHER RECOMMENDATIONS, REFER TO THE DATA SHEET OF THE COMPONENTS.		THE DRAWING CONTAINS INFORMATION PROPRIETARY TO SIGMA INFORMATION SYSTEMS, INC. AND MAY NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF SIGMA INFORMATION SYSTEMS, INC.	
DATE	1-NOV-85	DRAWN BY	Lin King
CHECKED		ENGINEER	
		APPROVED	

TITLE	SCHEMATIC DIAGRAM - POWER FAIL DETECT BOARD 12 (DUAL PWR SUPPLY)		
SIZE	CODE IDENT. NO.	DRAWING NO.	REV.
D		SD400675-200	NC
SCALE	NONE	WORK ORDER NO.	SHEET 1 OF 1

DO NOT INSTALL PARTS.  
NOTES: UNLESS OTHERWISE SPECIFIED.



