SA-H161Q

Q-bus System Chassis Manual

Σ Sigma Information Systems

SA-H161Q

Q-bus System Chassis Manual

Anaheim, California – January 1989

MA501227 REV A

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1. Introduction

This manual provides general installation and maintenance information, including drive and module installation for the SA-H161Q system 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 major components of the SA-H161Q chassis

Section 2 - INSTALLATION.

This section describes the procedure for mounting drives into the chassis and for installing modules into the backplane.

Section 3 - SPECIFICATIONS.

This section provides a list of specifications for the SA-H161Q chassis.

APPENDICES

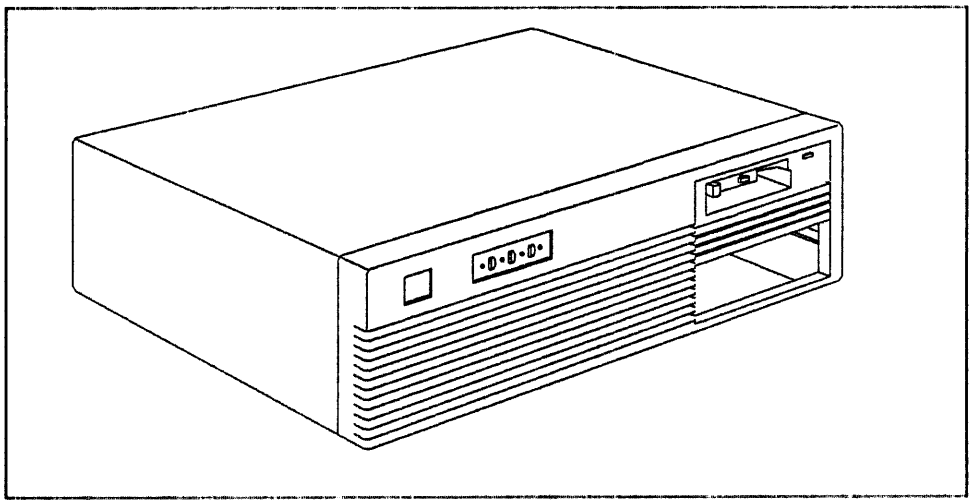
The appendices contain the system wiring diagram. They also include schematics for the front panel and the power fail detect boards.

1.1 General Description

The SA-H161Q is an AT look-alike tabletop enclosure for an LSI-11 Q- bus system. The chassis includes a modular AT-type power supply, rear I/O connector panel, and a drive frame that supports three slimline 5-1/4" drives.

Figure 1-1 shows is an exterior view of the SA-H161Q.

Figure 1-1: The SA-H161 Chassis



The SA-H161Q is available in two versions. One version contains an 8-slot dual-wide backplane; the second version contains a 4-slot, quad-wide backplane.

Figure 1-2 describes the 4-slot quad-wide backplane version of the SA-H161Q.

Figure 1-2: SA-H161 with 4-slot, Quad-wide Backplane

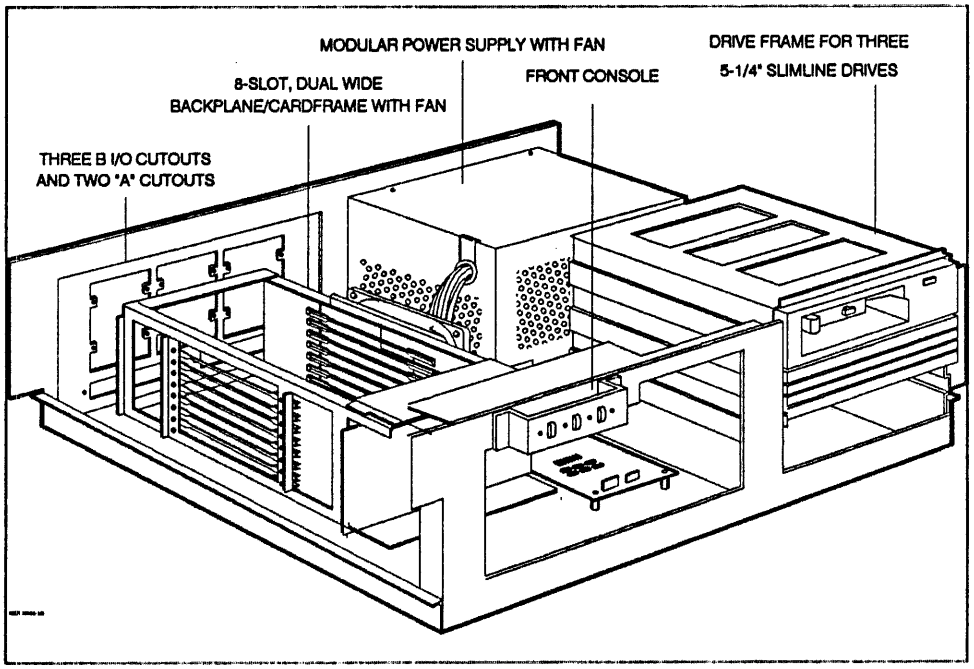
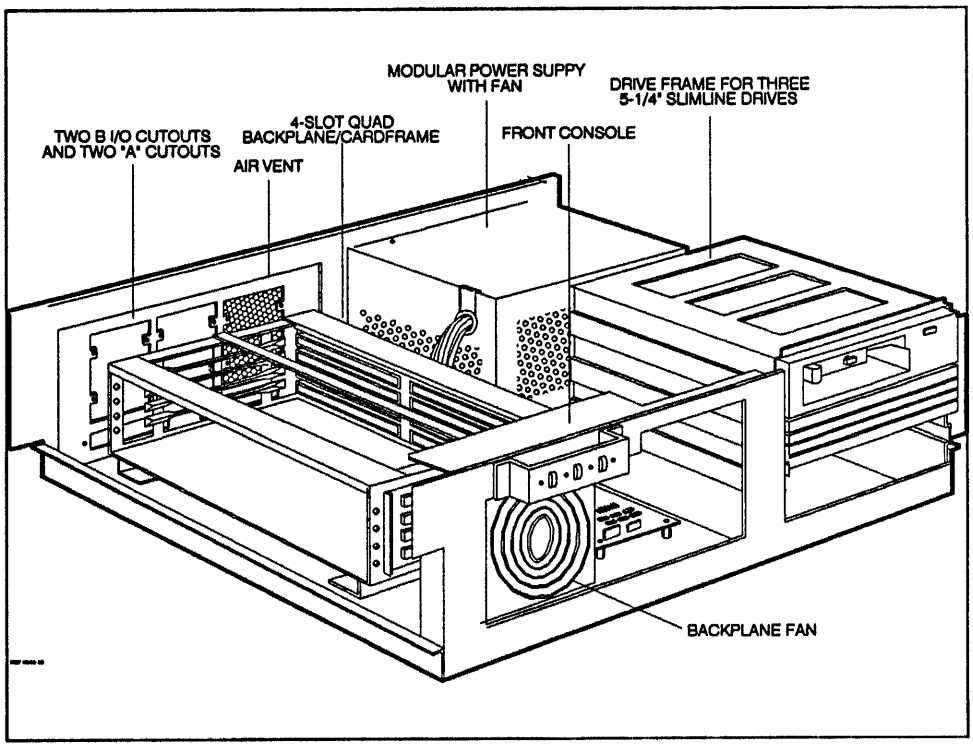


Figure 1-3 describes the 4-slot quad-wide backplane version of the SA-H161Q.

Figure 1-3: SA-H161 with 8-slot, Dual-wide Backplane



1.1.1 Backplane Assembly.

The backplane accommodates LSI-11 CPUs and associated modules. Backplane connectors are installed inside a cardframe with card guides for module protection and easy insertion.

There are two different backplane/fan assemblies available for the SA-H161Q.

The 8-slot, Dual-wide Backplane

System boards are inserted from the rear of the chassis by removing the I/O panel. The I/O panel contains three B I/O cutouts and two "A" sized cutouts for convenient cabling to peripheral devices. A fan located near the power supply unit draws cool air over the boards.

The 4-slot, Quad-wide Backplane

System boards are inserted from the left side of the chassis. The cover must be removed to insert boards. A fan located at the front of the chassis draws cool air over the installed boards. The I/O panel contains two B I/O cutouts and two "A" sized cutouts. An additional B I/O cutout contains a vent for air exhaust.

1.1.2 The Front Console

The front console provides system operating switches with LED indicators. The front console is shown in Figure 1-4.

LTC Switch/LED. When in the ON position (green LED is lit), 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).

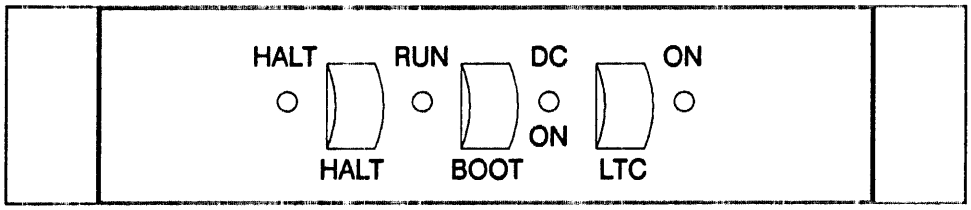
BOOT/RUN Switch/LED This is a momentary two-position switch. When depressed, the BDCOK line (BA1) is momentarily asserted, causing the CPU to execute one of three power-up options based on CPU type and installed jumpers: (Mode 0) processor executes a power fail routine at vector location 24, (Mode 1) processor drops into ODT, or (Mode 2) processor generates a bootstrap address (normally 773000) and executes instructions at that starting address. Depending on the bootstrap option selected, the system will either boot to a specified device or enter a bootstrap monitor.

When in the RUN position (switch out and green LED may be lit), a high on the BHALT line is generated, allowing programs to be run. When the green RUN LED is lit, 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. The activity of the RUN LED depends on the type of CPU being used.

HALT Switch/LED When in the HALT position (switch in and red LED is lit), the BHALT line (AP1) is asserted, causing the CPU to go into ODT mode.

DC ON LED When this red LED is lit, it indicates that AC is supplied to the power supply and DC to the backplane and drives is enabled.

Figure 1-4: The Front Console



1.1.3 The Power Supply.

The heavy duty 220 watt power supply is a modular unit with an ON/OFF switch accessible from the right-side of the chassis. Pluggable connectors provide easy power connection for drives and other internal components. The power supply includes a fan for forced air cooling and an unswitched convenience outlet.

Output voltage ratings are +5VDC @ 20A, +12VDC @ 8A, –12VDC @ 0.5A, and –5VDC @ 0.5A.

Notes

2. Installation

2.1 Unpacking and Inspection

Unpack the SA-H161Q 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 top cover and inspect the backplane, drive frame, power supply, etc., for apparent damage. If any damage has occurred, notify Sigma Information Systems immediately.

Contact Sigma for a Return Merchandise Authorization (RMA) number before returning any equipment.

Each shipping container should include the following:

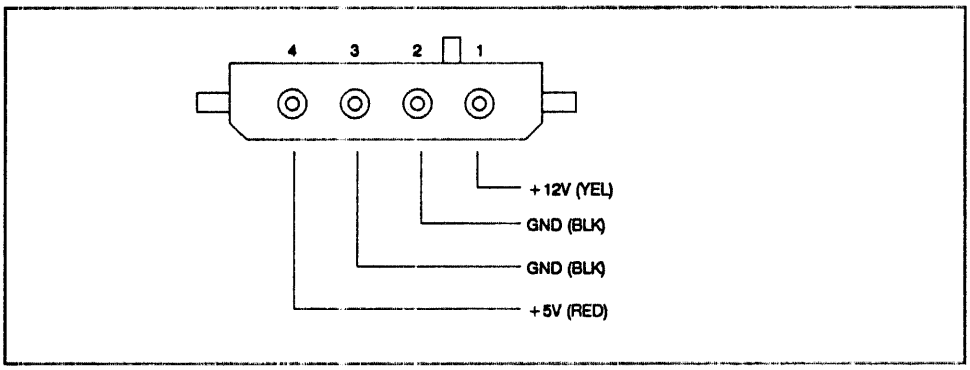
- An SA-H161Q chassis assembly with drive frame, backplane and power supply.
- An SA-H161Q system chassis manual with system wiring diagram.
- An AC power cord.

2.2 Drive Installation

The SA-H161Q chassis supports three 5-1/4" half-height drives. Use the following figures and procedure to install the drives into the drive frame.

1. Before installing any drives, verify proper drive power by checking the drive power connector. Each drive power connector contains voltages shown in Figure 2-1.

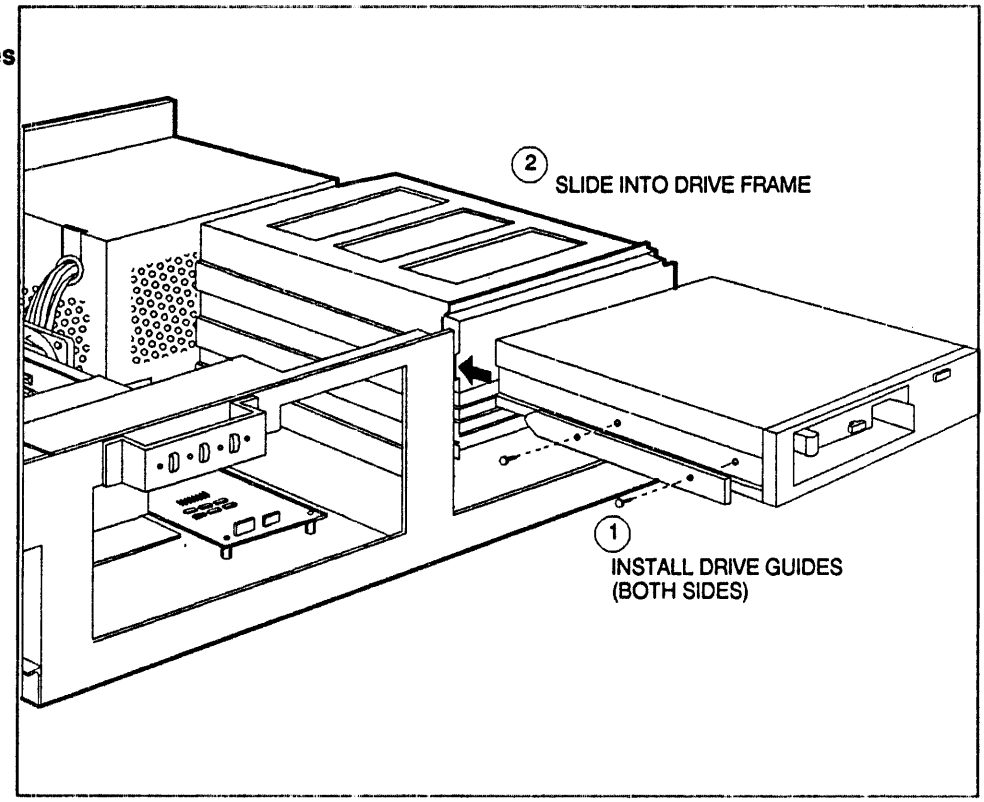
Figure 2-1: Drive Power Connector



2. Install slides on both sides of each drive.

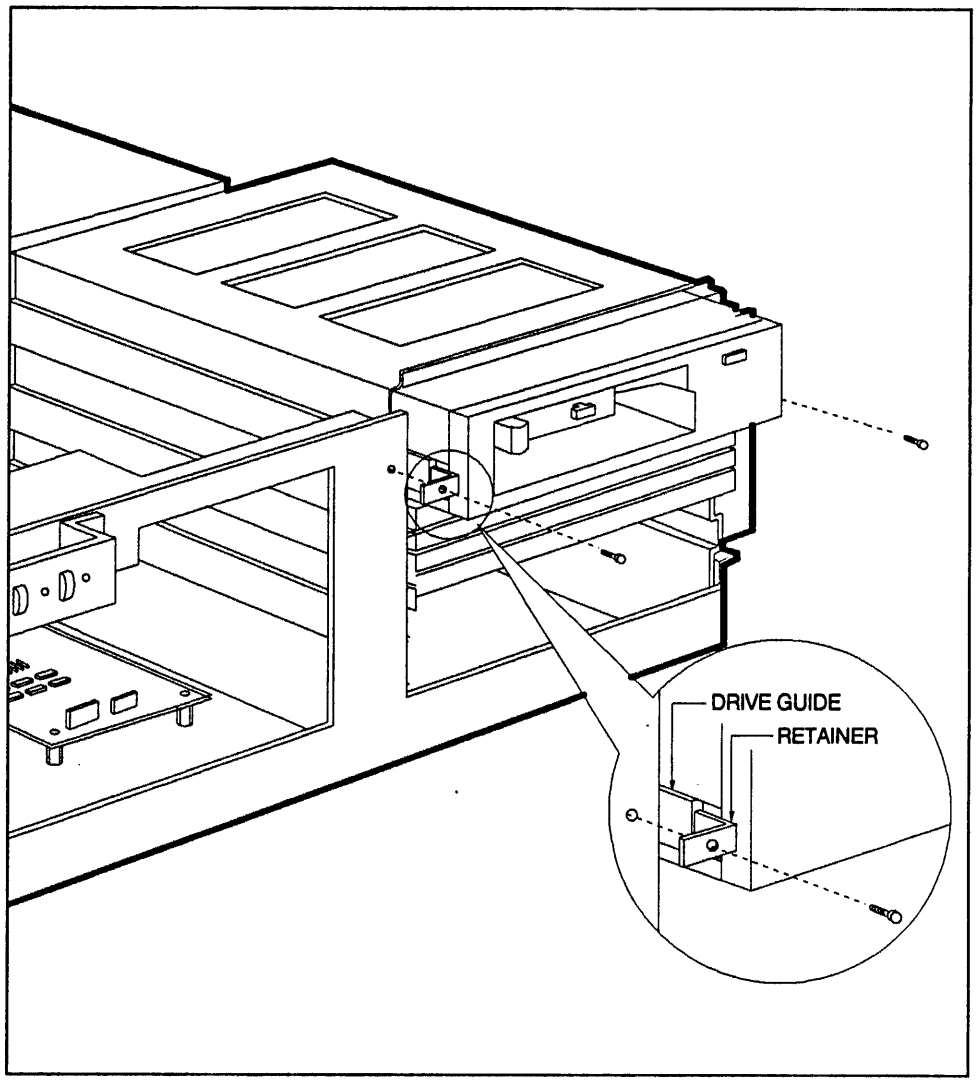
3. Slide the drive into the drive frame.

Figure 2-2: Installing Drive Guides



4. Install guide retainers to secure the drive in the drive frame.

Figure 2-3: Installing Drive Retainer Brackets



2.3 Installing Additional Full-Height Drive

A full-height (or slimline) 5-1/4" winchester drive can be installed in the SA-H161Q version that contains the 8-slot, dual-wide backplane. Use Figure 2-4 and the following procedure to install the drive.

1. Remove the drive bracket (P/N 501321) located at the front of the chassis by unscrewing the four screws shown in Figure 2-4. Save the screws.

2. Place the drive inside the drive bracket a secure it to the bracket on both sides of the drive.

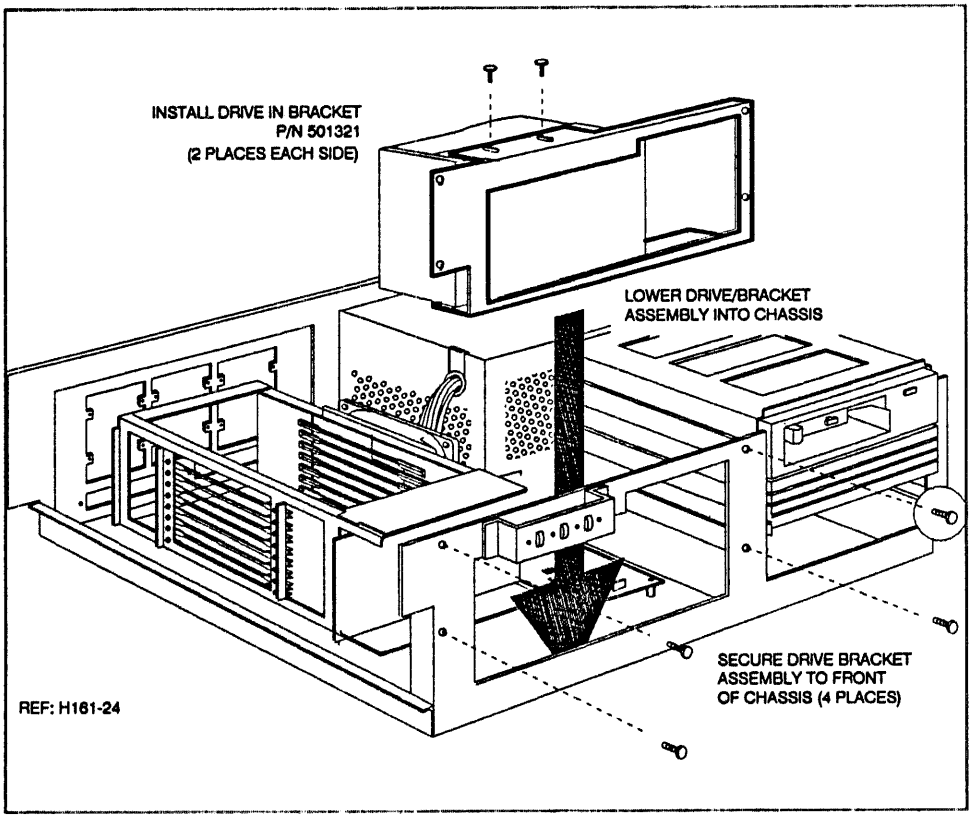
3. Lower the drive/bracket assembly back into the front of the chassis.

4. Secure the drive/bracket assembly from the front of the chassis using the reserved screws.

Note

Do not attempt to remove the fan from the 4-slot, quad-wide backplane version in order to install an additional drive. You may incur air flow problems that will overheat the system boards and/or drives.

Figure 2-4: Install an Additional Drive



2.4 Installing Boards

The SA-H161Q 8-slot, dual-wide and 4-slot, quad-wide backplanes each contain 16 Q22 slots. They provide direct plug-in installation for Q-bus compatible modules. The backplanes are built into a cardframe assembly that supports installed modules. Card guides provide positive pin alignment.

The backplanes use standard DEC-type connector blocks and have a multi-layered printed circuit board assembly (PCBA) with +5VDC and GND inner layers. The PCBA is wired for 22-bit addressing.

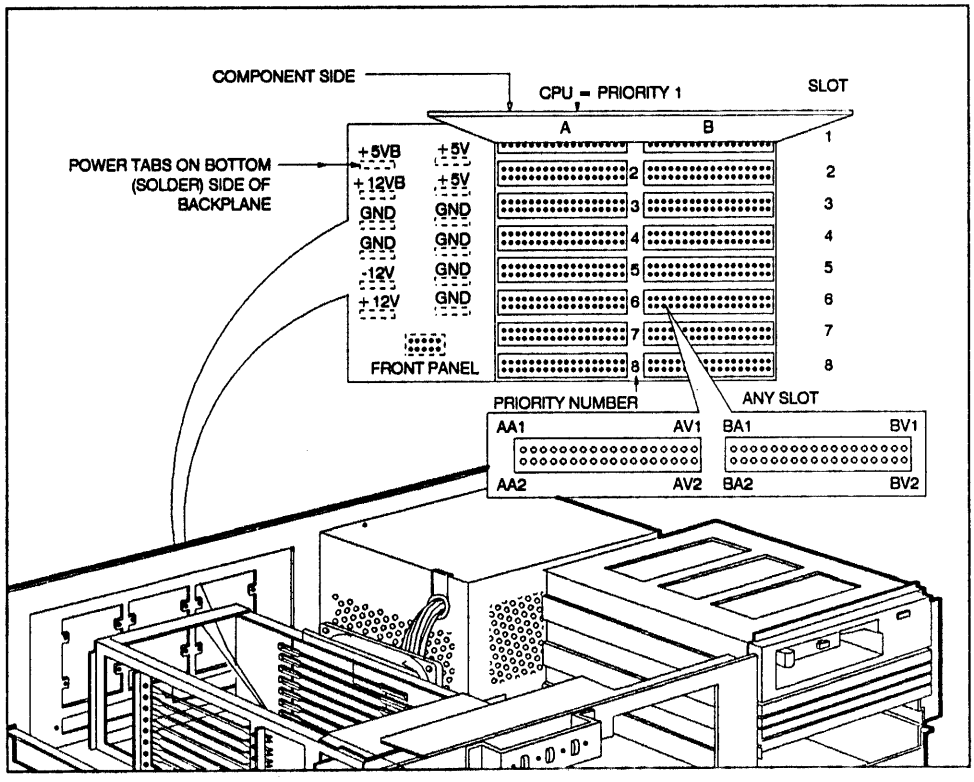
Modules plug directly into the backplane connectors with priorities determined by the interrupt level of the module and by its distance from the CPU (backplane priority). When more than one device with the same interrupt level requests interrupt service, the device closest to the CPU (highest backplane priority) receives the interrupt grant first. Appendix A lists the pin assignments for the Q-bus.

2.4.1 The 8-slot, Dual-wide Backplane

The priority structure for the 8-slot, dual-wide backplane is shown in Figure 2-5.

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 consisting of an A or B alpha and slot number. The CPU plugs into the slot 1 A-B connector. Take special care to ensure that modules are not installed backward.

Figure 2-5: The 8-Slot, Dualwide Backplane



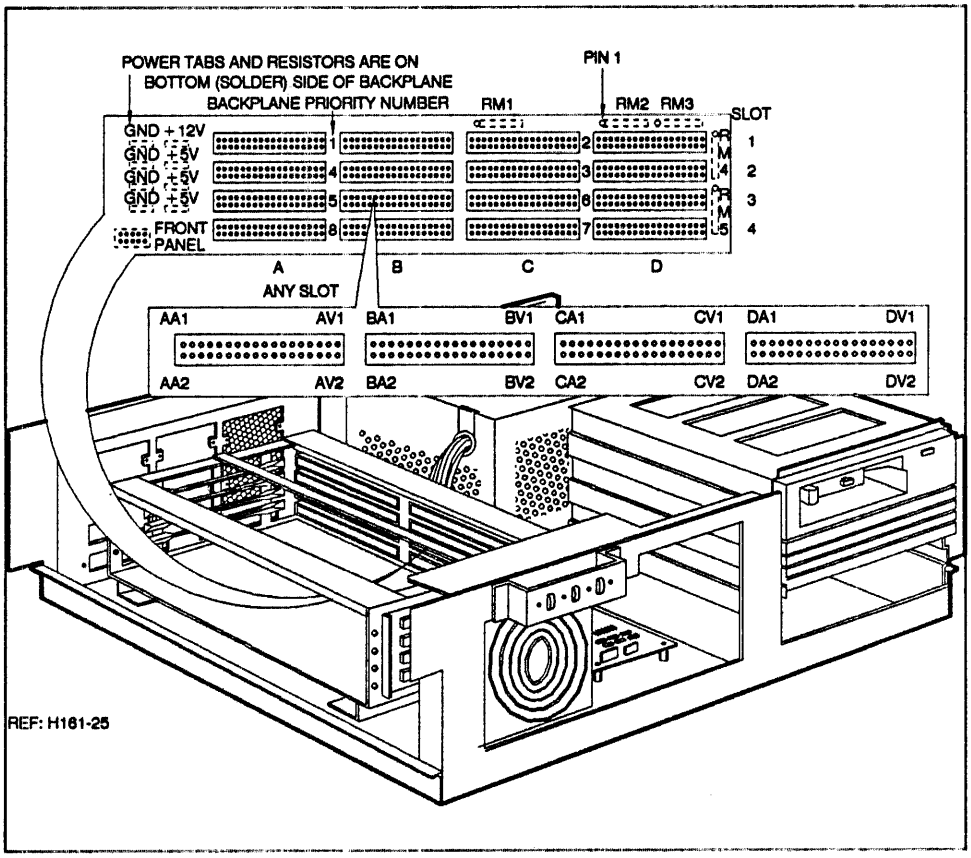
2.4.2 The 4-slot, Quad-wide Backplane

The 4-slot, quad-wide backplane PCBA includes resistor modules (RM1 through RM5) for Q-bus termination. If the system is already using a bootstrap/terminator, and no further termination is required, remove resistor modules RM1 through RM5. These resistor modules are shown in Figure 2-6.

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 consisting of an A, B, C or D alpha and a slot number. The CPU plugs into the slot 1 A-B connector. Take special care to ensure that modules are not installed backward.

Appendix B lists the signal pinouts for the resistor modules.

Figure 2-6: The 4-Slot, Quad-wide Backplane



3. Specifications

Dimensions:	7.25" high x 21.25" wide x 16.25" deep.
Installation:	Tabletop enclosure can be placed on any desktop area. Allow sufficient room at the rear for cooling and cabling.
Drives:	Three horizontally-mounted half-height 5-1/4" drives are accessible from the front panel. One additional full-height 5-1/4" winchester can be mounted vertically in the chassis. that contains the 8-slot, dual-wide backplane.
Power Supply	
AC Input:	Switch selectable 115VAC or 230VAC.
DC Outputs:	Total outputs not to exceed 220 watts +5VDC +12VDC -5VDC -12VDC 20A 8A 0.5A 0.5A
Backplane:	8-slot, dual-wide Q bus backplane with access to installed modules via the rear I/O connector panel or 4-slot, quad-wide Q-bus backplane with access to installed modules from the left-side of the chassis after top covered is removed.
Front Panel:	Switches and LEDs for HALT, BOOT/RUN, and LTC – plus DC ON LED.
I/O Connectors:	Rear I/O connector panel includes three B I/O cutouts and two "A" sized cutouts.
Cooling.	Front intake with rear exhaust. One fan is located in the power supply unit. The other fan is mounted near the backplane/cardframe assembly.
Shipping Wt.:	50 pounds

Notes

A. Q-bus Pin Assignments

PIN	SIGNAL	MicroVAX	LSI-11/73	LSI-11/23
AA2	+5V			
AB2	-12V	N/U	N/U	
AC2	GND			
AD2	+12V			
AE2	BDOUTL			
AF2	BRPLYL			
AH2	BDINL			
AJ2	BSYNCL			
AK2	BWTBTL			
AL2	BIRQ4L			
AM2	*BIAK1L		N/U	MMUSTRH
AN2	*BIAK0L		BIAKL	
AP2	BBS7L			
AR2	*BDMG1L		N/U	UBMAAPL
AS2	*BDMG0L			
AT2	BINITL			
AU2	BDAL0L			
AV2	BDAL1L			
BA2	+5V			
BB2	-12V	N/U	N/U	
BC2	GND			
BD2	+12V		N/U	
BE2	BDAL2L			
BF2	BDAL3L			
BH2	BDAL4L			
BJ2	BDAL5L			
BK2	BDAL6L			
BL2	BDAL7L			
BM2	BDAL8L			
BN2	BDAL9L			
BP2	BDAL10L			
BR2	BDAL11L			
BS2	BDAL12L			
BT2	BDAL13L			
BU2	BDAL14L			
BV2	BDAL15L			

PIN	SIGNAL	MicroVAX	LSI-11/73	LSI-11/23
AA1	BIRQ5L			
AB1	BIRQ6L			
AC1	BDAL16L			
AD1	BDAL17L			
AE1	*SSPARE1	N/U	N/U	SINGLE STEP
AF1	*SSPARE2	SRUNL	SRUNL	SRUNL
AH1	*SSPARE3	N/U	N/U	SRUNL
AJ1	GND			
AK1	*MSPAREA	N/U	N/U	N/U
AL1	*MSPAREB	N/U	N/U	N/U
AM1	GND			
AN1	BDMRL			
AP1	BHALTL			
AR1	BREFL		N/U	N/U
AS1	+12VB	N/U	N/U	
AT1	GND			
AU1	PSPARE1	N/U	N/U	
AV1	+5VB	N/U		
BA1	BDCOKH			
BB1	BPOKH			
BC1	*SSPARE4	BDAL18L	BDAL18L	MMUDAL18H
BD1	*SSPARE5	BDAL19L	BDAL19L	MMUDAL19H
BE1	*SSPARE6	BDAL20L	BDAL20L	MMUDAL290H
BF1	*SSPARE7	BDAL21L	BDAL21L	MMUDAL21H
BH1	*SSPARE8	N/U	N/U	CLKDISL
BJ1	GND			
BK1	*MSPAREB	N/U	N/U	N/U
BL1	*MSPAREB	N/U	N/U	N/U
BM1	GND			
BN1	BSACKL			
BP1	BIRQ7L			
BR1	BEVNTL			
BS1	PSPARE4	N/U	N/U	+12VB
BT1	GND			
BU1	PSPARE2	N/U	N/U	
BV1	+5V			

*NOT BUSSED, N/U = NOT USED

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.

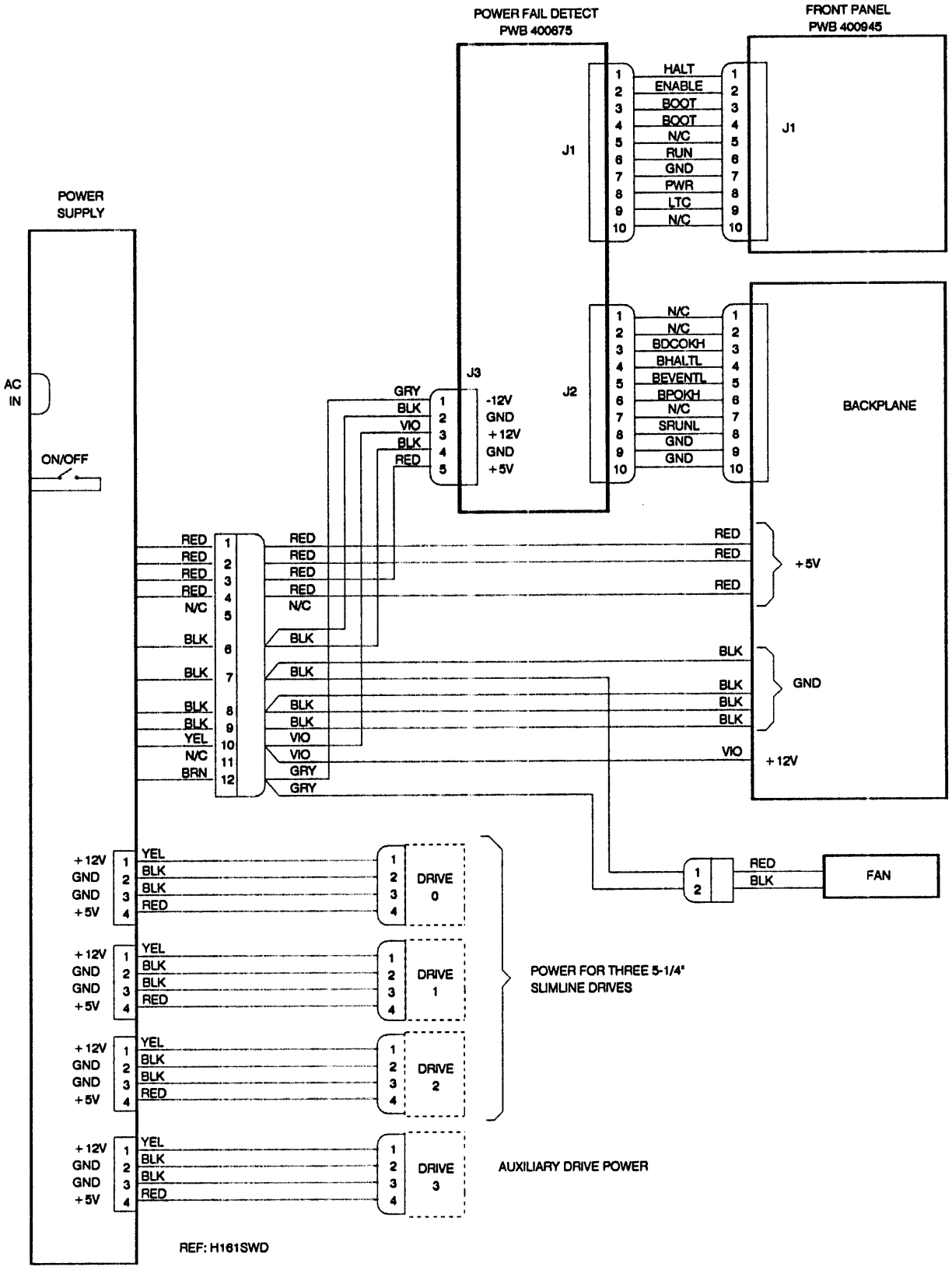
PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
CA1	NOT USED	CA2	+5V	DA1	NOT USED	DA2	+5V
CB1	*MAA<0>L	CB2	MAA<9>L	DB1	*MAA<7>L	DB2	MAA<7>L
CC1	NOT USED	CC2	GND	DC1	NOT USED	DC2	GND
CD1	*RAS<5>H	CD2	RAS<1>H	DD1	*MAA<5>L	DD2	MAA<5>L
CE1	*BMCAS<0>H	CE2	BMCAS<0>L	DE1	*MAA<4>L	DE2	MAA<4>L
CF1	*RAS<1>H	CF2	NOT 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<2>L	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	*RASL<2>H	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.

B. Backplane Resistor Module Pins

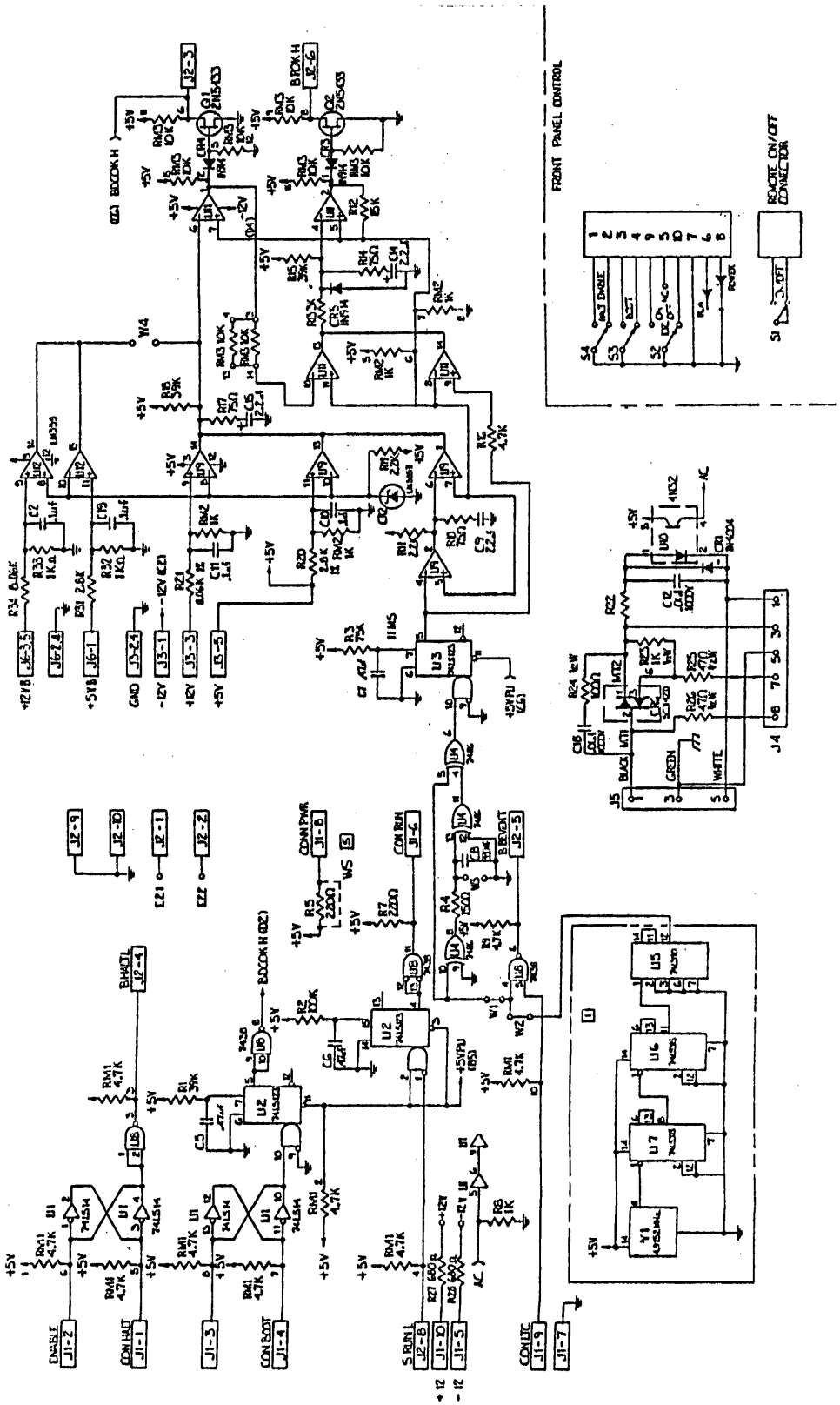
BUS SIGNAL	PIN	RESISTOR MODULE PIN	BUS SIGNAL	PIN	RESISTOR MODULE PIN
BIRQ5L	AA1,CA1	RM1-2	BDAL19L	BD1,DD1	RM3-6
BIRQ6L	AB1,CA1	RM1-3	BDAL20L	BE1,DE1	RM3-5
BDAL16L	AC1,CC1	RM1-4	BDAL21L	BF1,DF1	RM3-7
BDAL17L	AD1,CD1	RM1-5	BSACKL	BN1,DN1	RM4-8
BDMRL	AN1,CN1	RM2-4	BIRQ7L	BP1,DP1	RM4-6
BHALTL	AP1,CP1	RM2-6	BEVENTL	BR1,DR1	RM5-3
BREFL	AR1,CR1	RM2-7	BDAL2L	BE2,DE2	RM3-9
BDOUTL	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	RM2-2	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

C. System Wiring Diagram



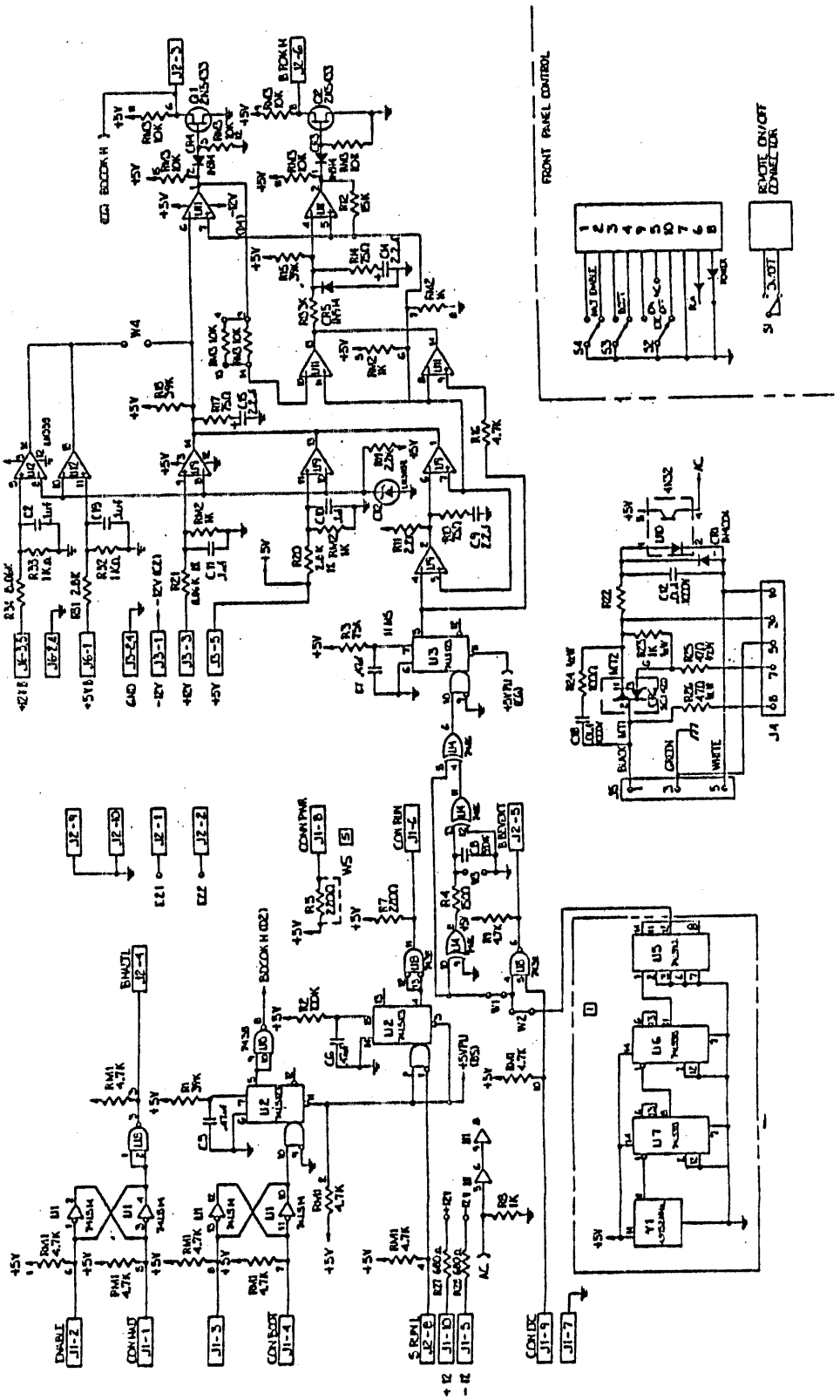
D. Power Fail Detect Schematic (PWB 400675)

(for 8 slot backplane)

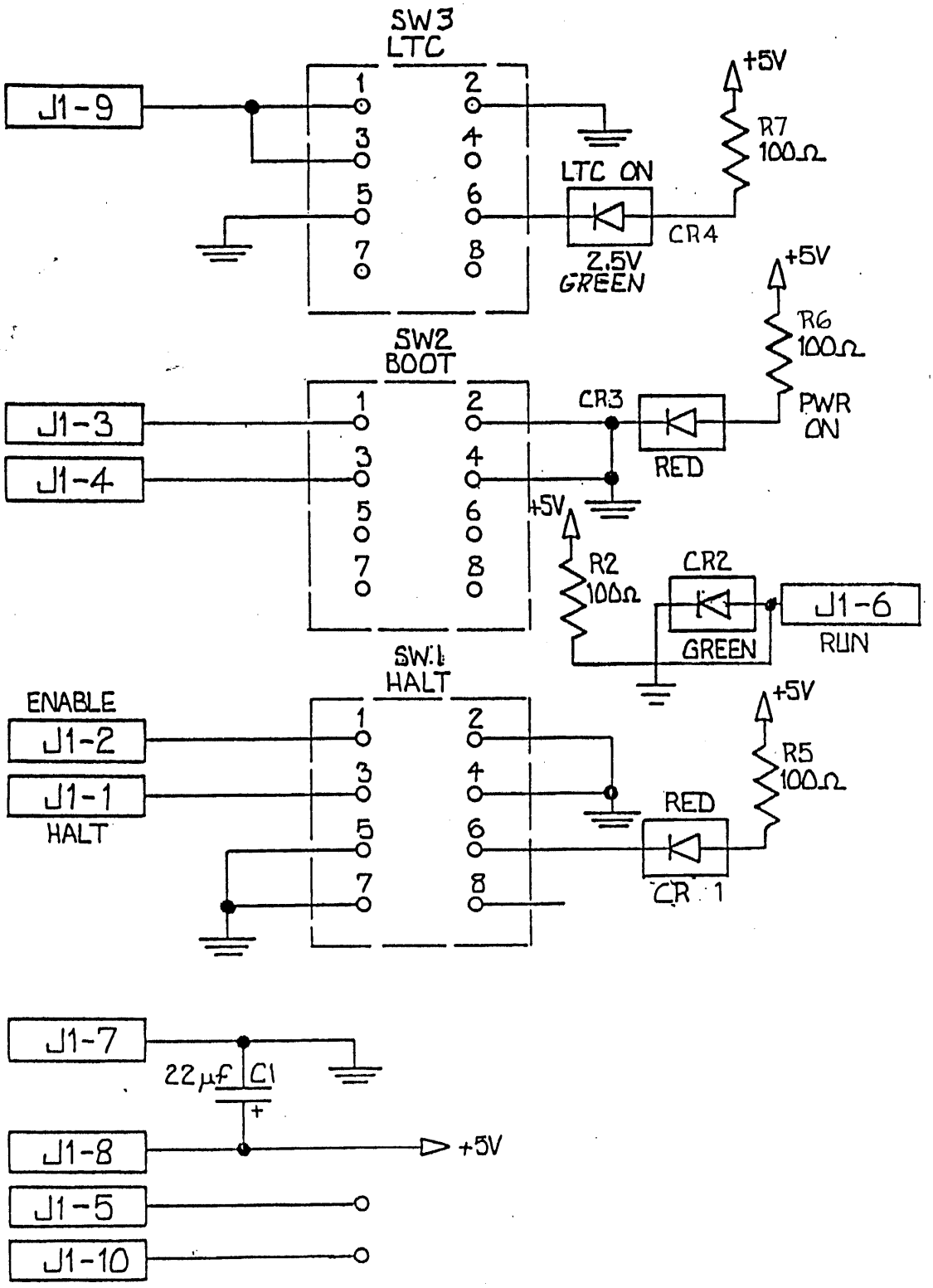


E. Power Fail Detect Schematic (PWB 400675)

(for 4 slot backplane)



F. Front Panel Schematic (PWB 400545)



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