SA-H115

LSI-11 Stand-alone Small System Chassis

Manual

Sigma Information Systems

SA-H115
LSI-11 Stand-alone Small System Chassis
Manual

ANAHEIM, CALIFORNIA - AUGUST 1984

Contents

Figures/Tables

Section 1 - General Information

1.1 INTRODUCTION

This manual provides general installation and maintenance information, including storage device and module installation and power supply adjustments, for the SA-H115 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 chassis. Specifications are included.

Section 2 - INSTALLATION. This section describes the procedures for mounting storage devices into the chassis and for installing modules into the backplane.

Section 3 - POWER SUPPLY. This section describes power supply information for maintaining the SA-H115 chassis.

APPENDICES. The appendices include the system schematics and DC power supply schematics for the chassis. Q bus pin assignments are also provided.

1.2 GENERAL DESCRIPTION

The SA-H115 chassis is designed for systems integrators whose site requires a system enclosre to be located under a desk overhang or on an office floor, rather than the traditional tabletop or rackmount type of equipment. The compact cabinet occupies only 12" of horizontal floor space and is 20" deep. Features include:

Compact stand-alone cabinet for floor mounting installation.

Emphasis on serviceability. Modular power supply, backplane assembly, and storage device mounting assemblies are easily removed and installed to provide low cost maintenance.

Supports both 5 1/4" and 8" storage devices.

Includes 8-row, quad-wide Q bus backplane.

Front operator panel provides convenient operator control.

Qualified for FCC compliance using full system configuration of modules and installed drives.

Easy conversion between 115VAC and 230VAC.

The SA-H115 includes an 8-row, quad-wide LSI-11 backplane with 16 dual Q bus slots. Additionally, the chassis includes mounting space for 8" and 5 1/4" storage devices, a heavy duty power supply, and an operator's control panel.

The backplane, power supply, and storage devices are mounted as modular units that are easily removed and installed. The modular units are secured with thumbscrews, and all connections for the front panel, backplane, and installed storage devices are pluggable at the power supply unit. This modular design ensures convenient servicing and maintenance.

The backplane contains 16 dual Q bus slots and provides 18-bit or 22-bit addressing and Q bus termination. The backplane is built into a card frame assembly that supports installed modules and provides positive pin alignment. An optional backplane cover (P/N 500393) is available. The cover mounts over the cardframe assembly for module protection, and it includes a piano-hinged rear access door for module access.

A rear panel provides mounting space for user-configured connectors and for convenient cabling to I/O devices.

An example configuration is shown in Figure 1-1.

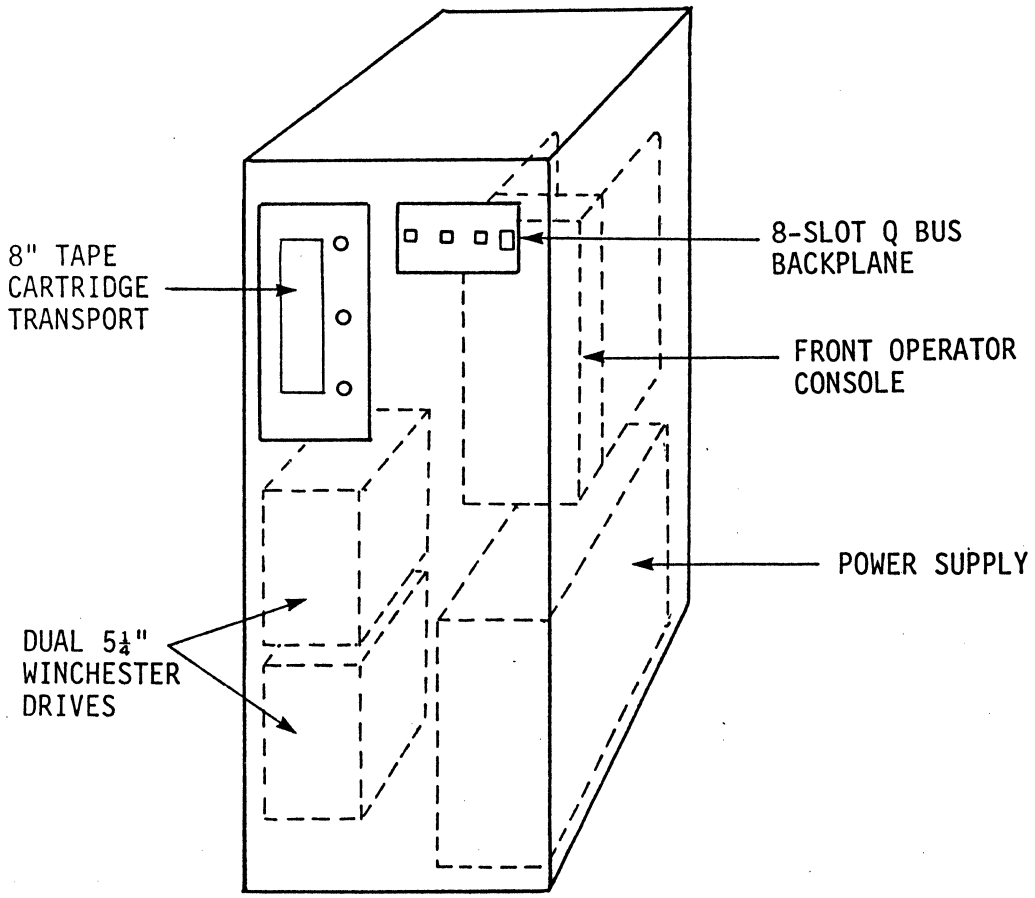


FIGURE 1-1: SA-H115 EXAMPLE CONFIGURATION

1.3 THE FRONT CONSOLE

The LSI-11 operator console consists of four switches and five LED indicators as shown in Figure 1-2.

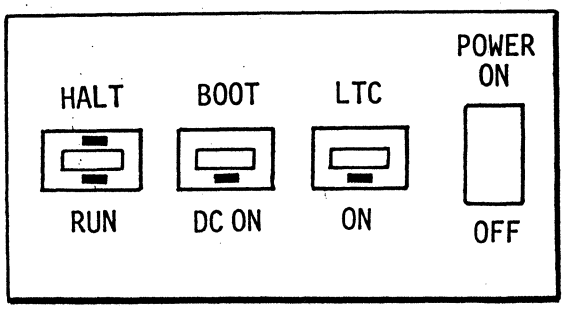


FIGURE 1-2: LSI-11 FRONT CONSOLE

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 fans, and DC to the backplane is enabled. The red DC ON LED indicates the presence of +5V.

LTC ENABLE SWITCH. 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/DC ON SWITCH. 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 the red DC ON LED is lit, +5V is applied to the front panel.

HALT/RUN SWITCH. 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. 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.

1.4 DRIVE TYPES

The SA-H115 front panel provides front access to a removable media 8" device such as a tape cartridge transport, floppy disk drive, or one or two slimline floppy disk drives. Mounting space and power are also provided for either two 5 1/4" winchester disk drives or a single 8" winchester disk drive. A list of recommended manufactures is shown in Table 1-2. Notify the factory if other storage devices are to be installed. Customized models are also available for user-defined combinations.

MANUFACTURER	STORAGE DEVICE TYPE	MODEL
Ampex	5 1/4" Winchester	P Series
Rodime	5 1/4" Winchester	R0220 Series
Fujitsu	8" Winchester	M2312
Kennedy	8" Tape Cartridge	6450
Control Data	8" Tape Cartridge	92190/92195
Shugart	8" Floppy	SA801/851
Mitsubishi	Dual 8" Slimline Floppies	M2896-63
Iomega	Removable Media Disk	Alpha 10.5

TABLE 1-2: RECOMMENDED STORAGE DEVICE MANUFACTURERS

1.5 FCC COMPLIANCE

The SA-H115 has been tested and qualified at an approved FCC Testing Laboratory for conducted and radiated emmissions as required to meet CLASS A. The tested chassis configuration included a full complement of disk drives and circuit boards representative of an end-user configuration. For more information regarding configuration, test methods, or test results, consult the factory.

1.6 SPECIFICATIONS

Dimensions:	12"W x 20"D x 26.5"H
Installation Chassis:	Stand-alone cabinet can be placed on the floor or under a desk area.
Storage Devices:	Mounted on individual brackets and installed using thumbscrews; no tools necessary
Backplane Assembly:	Mounted on separate bracket with thumbscrews for convenient removal.
Capacity:	8-row, quad-wide Q bus backplane with 16 dual Q bus slots
Storage Devices Supported:	8" removable media device such as tape cartridge transport, floppy disk drive, or dual slimline floppy drives. PLUS Two 5 1/4" winchester drives or single 8" winchester drive.
Power Supply Assembly:	Modular, heavy duty power supply assembly is easily removed; all wire and cable connections pluggable.
AC Input:	47/63 Hz. Convertible between 115VAC and 230VAC
DC Output:	+5VDC @ 40A, -5VDC @ 5A, +12VDC @ 5A, -12VDC @ 5A, +24VDC @ 5A. Not to exceed 400 watts.
Cooling:	Forced air rear intake with rear exhaust. Separate fans for power supply and installed modules.
Accessibility:	Access to backplane modules and installed storage devices is from the rear of the chassis. Access to removable media is from the front panel.
Temperature Operating Storage:	0°C to 50°C -45°C to 85°C
Humidity:	0% to 95% noncondensing
Altitude	Operating: 0 ft. to 10,000 ft. Storage: 0 ft. to 30,000 ft.

Section 2 - Installation

2.1 UNPACKING AND INSPECTION

Unpack the SA-H115 system chassis and visually inspect it for damage that might have occurred during shipment. Retain the shipping carton in case reshipment is necessary. Open the rear of the chassis 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-H115 chassis assembly with backplane, power supply, and front console.

An SA-H115 system chassis manual with logic diagrams for power supply modules.

An AC power cord.

An optional hardware kit containing mounting brackets with required hardware for mounting storage devices. Must be specified at time of order.

2.2 DRIVE INSTALLATION

The SA-H115 chassis has several combinations of storage device configurations. This section describes installation of the devices listed in Table 1-2. Other combinations can be accommodated, and this section is intended to be a guide for general drive installation. If drives other than those listed in Table 1-2 are used, consult the factory. The storage devices are mounted on drive mounting brackets and installed over the ledges in locations A, B, and C as shown in Figure 2-1. The 8" winchester is mounted directly on the chassis and the B and C ledges shown below are not included for this version.

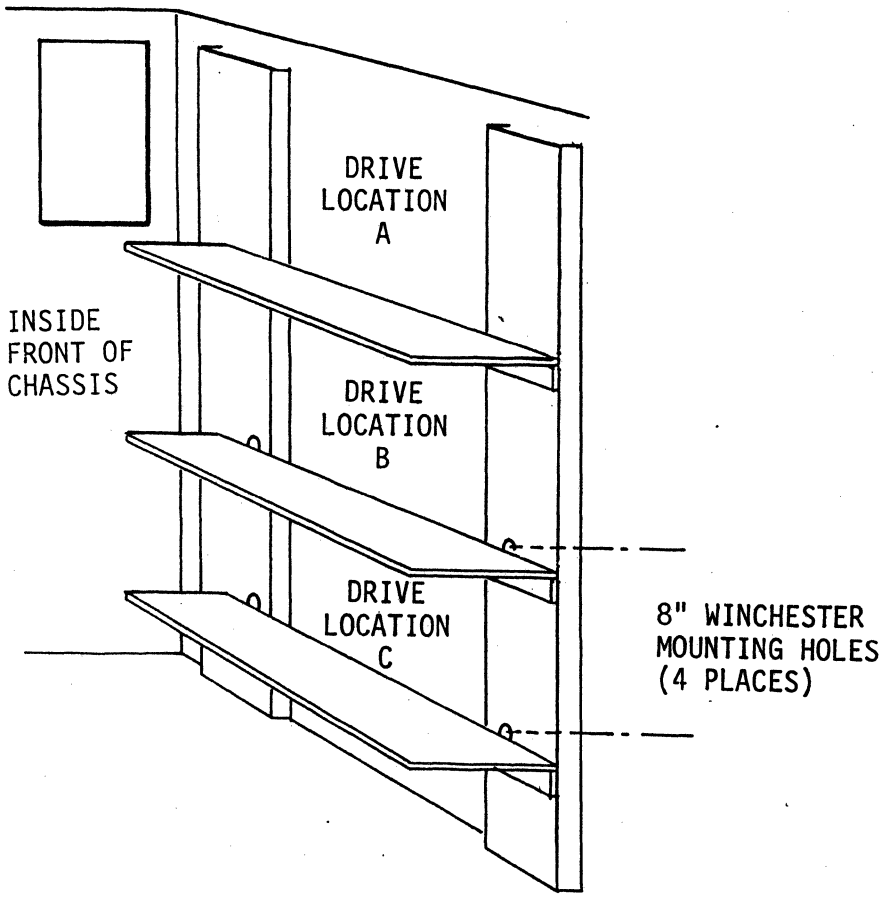


FIGURE 2-1: STORAGE DEVICE MOUNTING LOCATIONS

Drive location A contains an 8" device that requires front panel access, such as a standard floppy disk drive, dual slimline floppy disk drives, or tape cartridge transport. Drive locations B and C can each contain a 5 1/4" winchester drive, or they can share a single 8" winchester drive.

2.3 8" FLOPPY OR REMOVABLE MEDIA DISK DRIVE(S) MOUNTING

Use the following procedure to install floppy or removable media disk drives in location A.

1. If dual slimline floppy drives are used, secure them together with the supplied mounting brackets using eight (four on each side) 8-32 x 3/8 panhead phillips screws with associated lock and flat washers as shown in Figure 2-2. Two bar brackets are installed on the right side (as viewed from the front of the drive), and a rectangular bracket is installed on the left side of the drive.

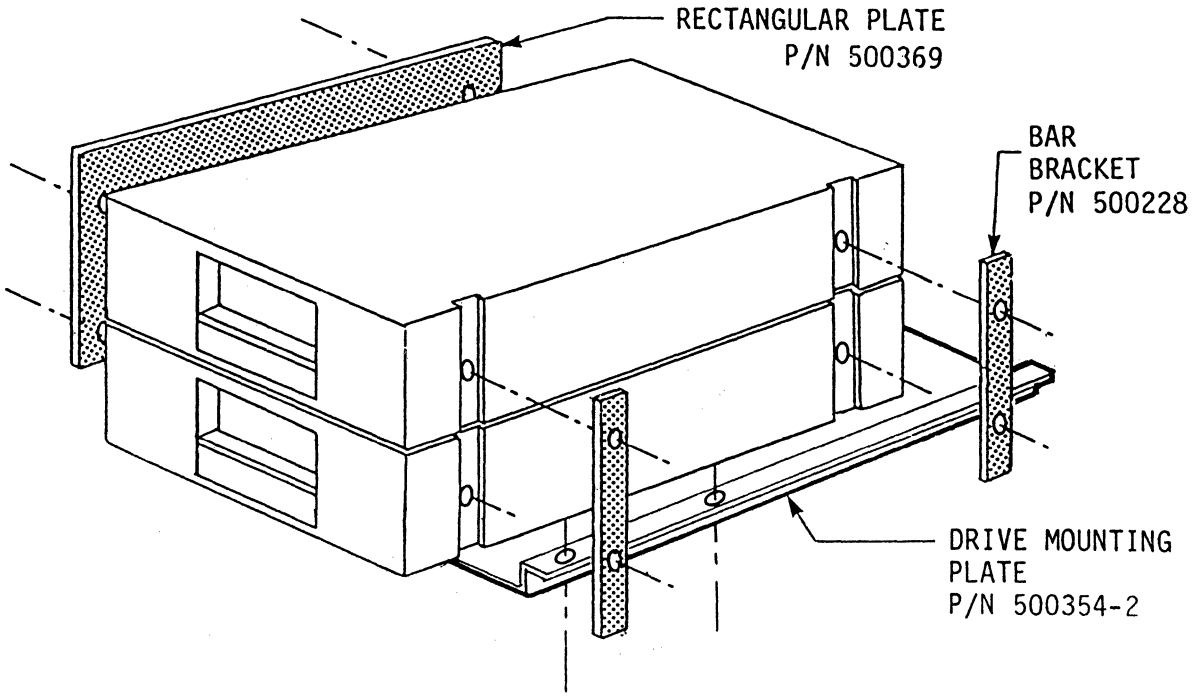


FIGURE 2-2: SLIMLINE FLOPPY DRIVES BRACKETS

2. Secure the removable media disk drive, the single 8" floppy drive, or the dual slimline floppy drive assembly to the drive mounting bracket using four 8-32 x 3/8 flathead screws.

3. Slide the drive mounting bracket under the front flange, and secure the rear of the bracket with the thumbscrews as shown in Figure 2-3.

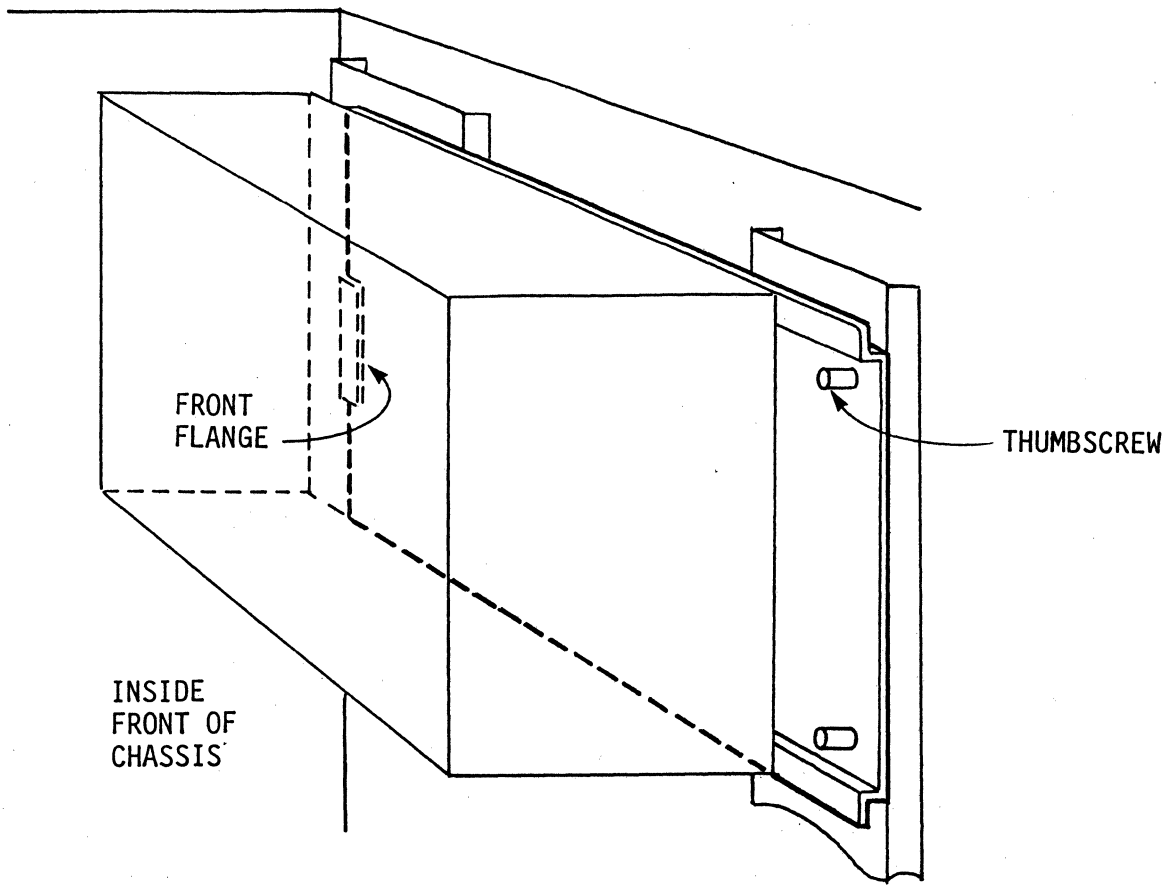


FIGURE 2-3: MOUNTING FLOPPY DRIVES INTO CHASSIS

4. Check that power supply voltages meet manufacturer's specifications before applying power to the drive(s). Section 3.2.1 illustrates and defines drive power connections.

5. Cable the floppy and removable media drive(s) per manufacturer's specifications.

2.4 TAPE CARTRIDGE TRANSPORT INSTALLATION

With Figure 2-4 as a guide, install the tape transport using the following procedure.

1. Remove the existing front bezel on the tape transport by removing the two screws at the top and two hex nuts at the bottom of the standoffs.

2. The CDC bracket includes an assembly with LEDs and a 4-pin connector to the tape transport module. Ensure that pin 1 is correctly aligned when plugging the 4-pin connector on the tape transport module.

3. Install the front bracket with 6-32 hex nuts with flat/lock washers.

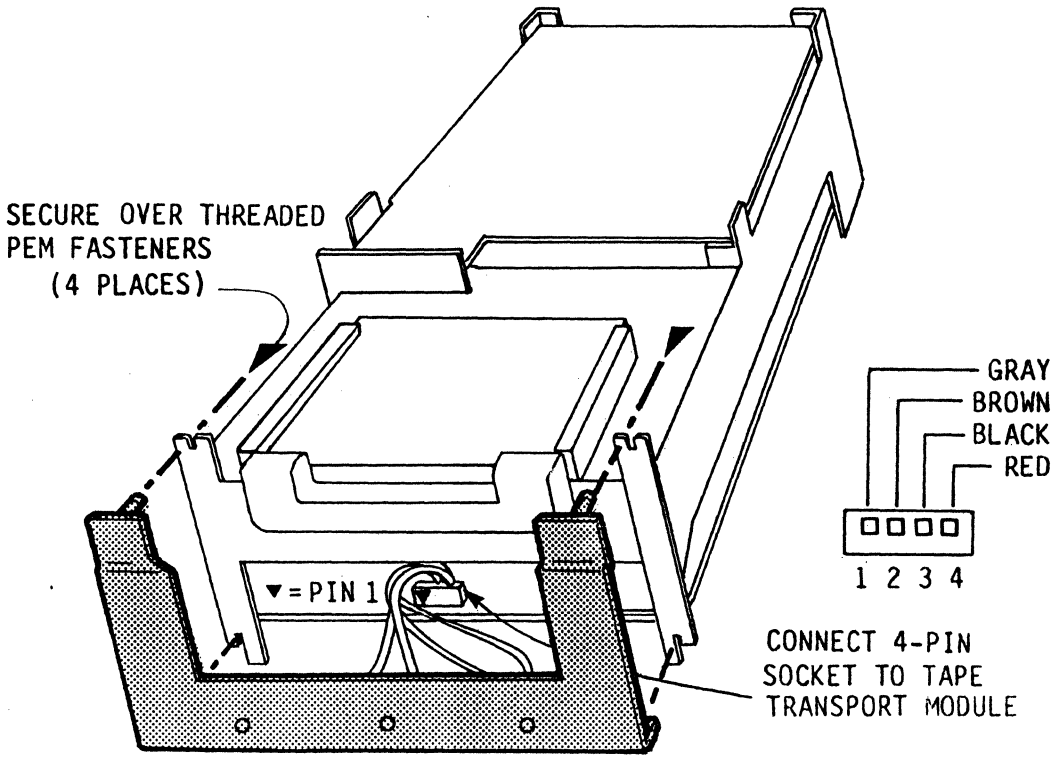


FIGURE 2-4: TAPE TRANSPORT MOUNTING BRACKET

4. Place the tape transport assembly over the mounting plate shown in Figure 2-2 and secure from the bottom using 8-32 x 3/8 hardware.

5. Slide the mounting bracket under the front flange in drive location A (Figure 2-3) and secure the bracket at the rear with thumbscrews.

6. Check that voltages meet manufacturer's specifications before applying power to the transport. Section 3.2.1 defines DC power connections.

7. Cable the tape transport per manufacturer's specifications.

2.5 8" WINCHESTER DRIVE MOUNTING

The 8" Fujitsu winchester occupies locations B and C. With Figure 2-5 as a guide install the drive using the following procedure.

1. Mount the two fan mounting brackets onto the slimline fan using 6-32 x 1/4 hardware and install the fan assembly onto the holding brackets using 6-32 x 3/8 hardware.

2. Secure the holding brackets with fan assembly onto the drive shock-mounts using 10mm screws.

3. Secure the drive directly to the side of the chassis in drive locations B and C (Figure 2-1) using 10-32 x 3/8 hardware. Insert the red/white twisted pair cable to the fan. Cable the drive per manufacturer's specifications.

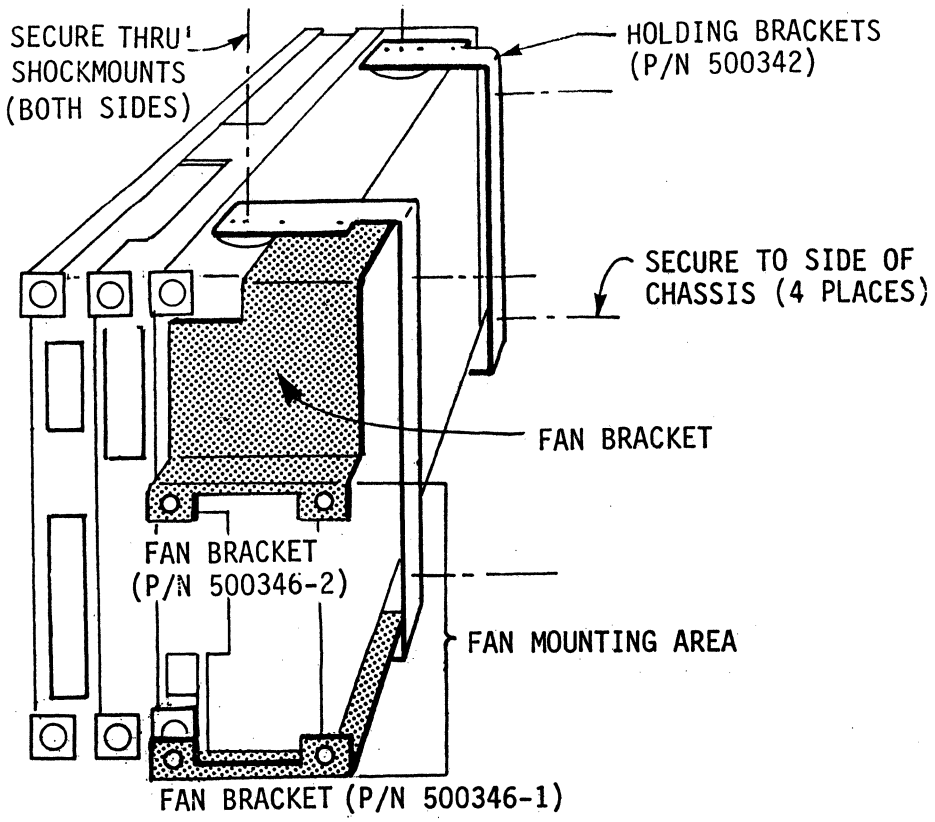


FIGURE 2-5: 8" WINCHESTER MOUNTING BRACKETS

4. Check that power supply voltages meet manufacturer's specifications before applying power to the drive. Section 3.2.1 illustrates and defines DC power connections.

2.6 5 1/4" WINCHESTER DRIVE INSTALLATION

Install the first 5 1/4" winchester drive in location B and the second 5 1/4" winchester drive (if used) in location C using the following procedure. (If an 8" winchester drive is used, refer to Section 2.5.)

1. The 5 1/4" RODIME or AMPEX drive, when used with Sigma's SDC-RLV12 controller, requires a formatter module that is secured to the drive mounting bracket. Using Figure 2-6 as a guide, install the formatter module.

   A. Insert the mylar sheet between the formatter module and the mounting bracket. The insulating spacers are inserted between the module and the mylar sheet.

   B. Attach the formatter module to the inside of the mounting bracket using four nylon spacers and screws.

   C. Mount the bracket to the sides of the winchester drive using four (two on each side) 6 x 3/8 screws with lock washers.

   D. Cable the formatter to the drive as shown.

2. Install the drive on the drive mounting bracket and secure from the bottom using 6-32 x 3/8 panhead phillips screws with associated lock and flathead washers.

3. Slide the mounting bracket under the front flange in drive location B (Figure 2-1) and secure the bracket at the rear with thumbscrews.

4. If a second 5 1/4" winchester drive is used, slide the 2nd mounting bracket under the flange in drive location C (Figure 2-1) and secure the bracket at the rear with thumbscrews.

5. Check that power supply voltaes meet manufacturer's specifications before applying power to the drive. Section 3.2.1 illustrates and defines DC power connections.

6. Cable the winchester drive controller module. Ensure pin 1 connections are correctly aligned.

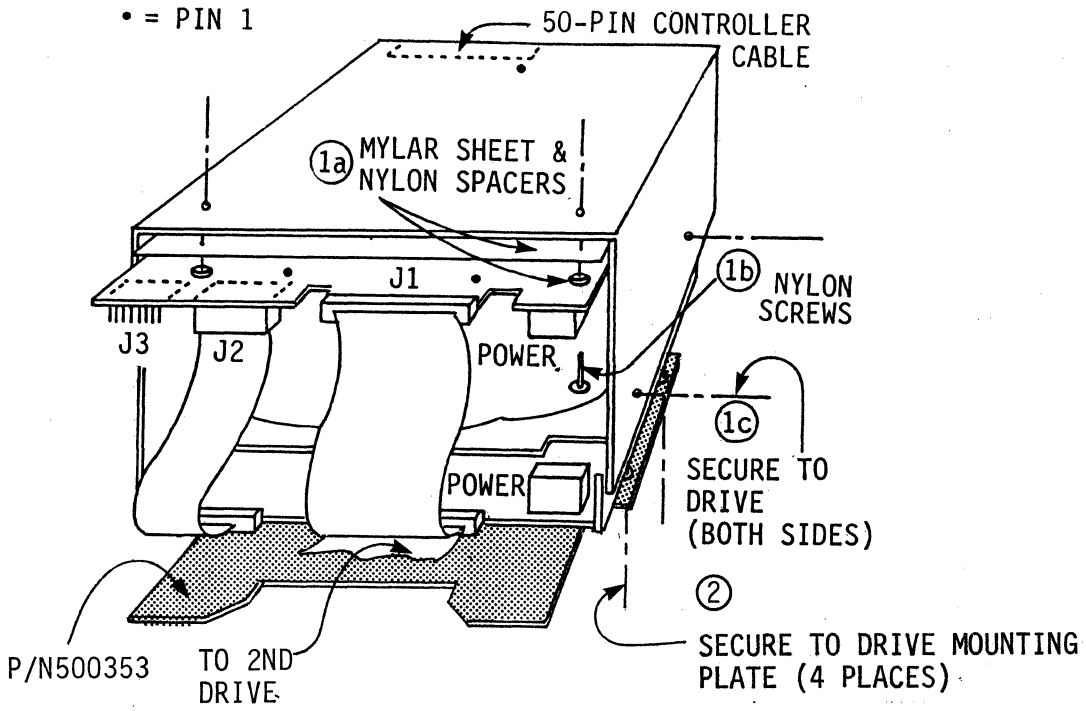


FIGURE 2-6: 5 1/4" WINCHESTER CABLING

2.7 MODULE INSTALLATION

The SA-H115 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.

2.7.1 Q Bus Termination

The PCBA includes five terminating resistor modules. Resistor modules RM1 through RM5 are normally installed in the backplane to provide full termination of all Q bus lines. If the system is already using a bootstrap/terminator, and no termination is required, remove resistor moldules RM1 through RM5. Resistor module locations are shown in Figure 2-7, and pin assignments are defined in Table 2-1.

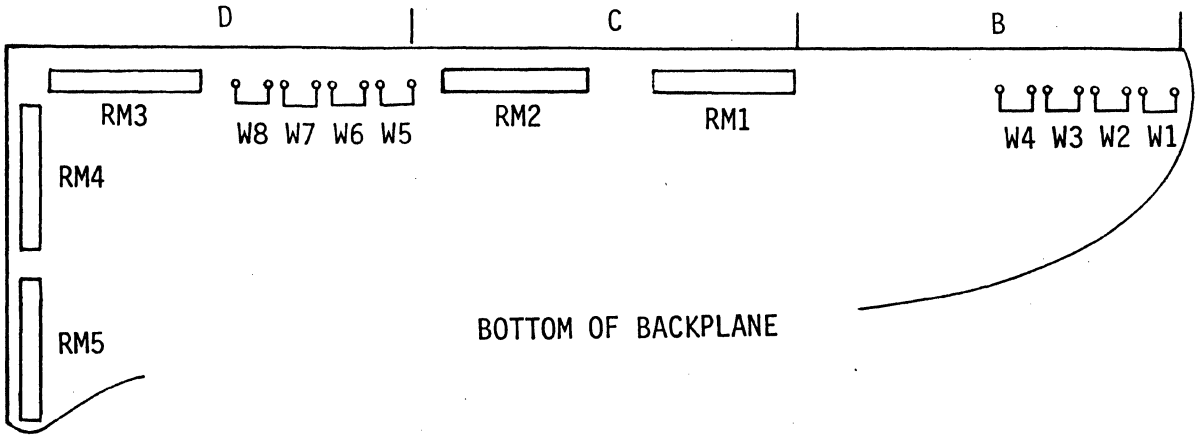


FIGURE 2-7: ADDRESSING JUMPERS AND RESISTOR MODULES

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
BDALOL	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

TABLE 2-1: TERMINATION CONNECTIONS

2.7.2 22-Bit Addressing

The backplane also 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
BDAL19L	BD1, DD1
BDAL20L	BE1, DE1
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 2-7.

When the system is to be used with 22-bit addressing, install W1, W2, W3 and W4. When 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.

2.7.3 Module Insertion

The SA-H115 backplane uses standard DEC-type connector blocks and provides direct plug-in installation for Q bus* compatible modules. The backplane assembly includes card guides that provide positive pin alignment and extractor mounting holes that secure the modules.

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 2-8 defines the device priorities for the backplane.

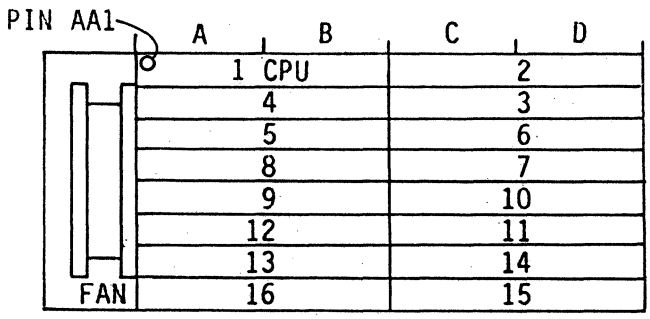
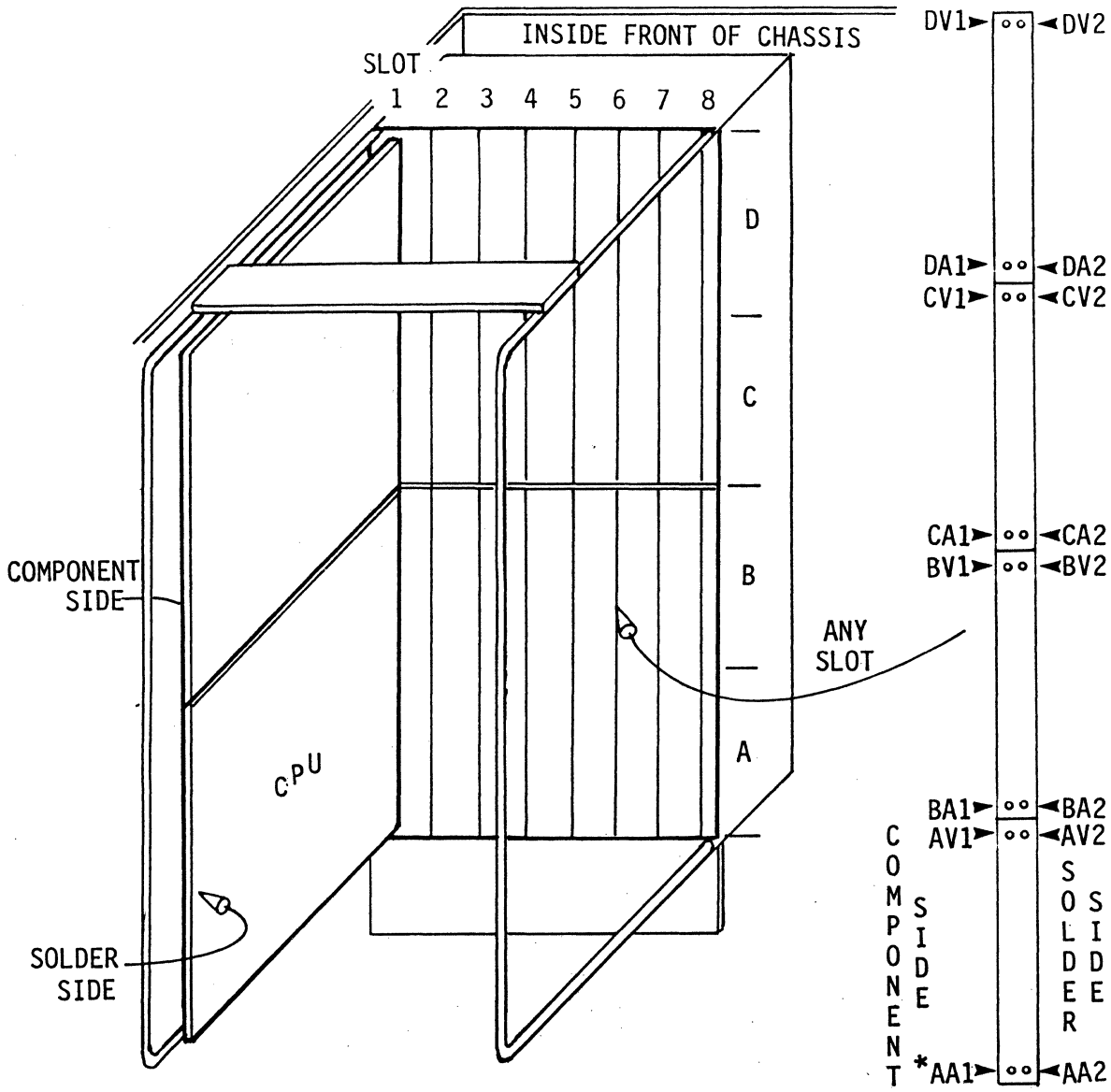


FIGURE 2-8: BACKPLANE DEVICE PRIORITY ASSIGNMENTS

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 2-9 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.



*THIS NOMENCLATURE OMITS AG1(2), AI1(2), AO1(2), AND AQ1(2), AND THE RESPECTIVE POSITIONS FOR BA1(2)-BV1(2), CA1(2)-CV1(2), AND DA1(2)-DV1(2).

FIGURE 2-9: MODULE INSERTION INTO BACKPLANE

2.8 REAR PANEL CONNECTORS

A recessed rear panel plate contains sixteen cutouts for mounting 25-pin DB25P plugs that can be wired for convenient connection to peripheral devices. The recessed connector panel is accessed by loosening the four screws and raising and lifting off the cover plate from the large end of the screw slots.

The rear panel is shown in Figure 2-10. Other versions are available; consult the factory for specific user-configurations.

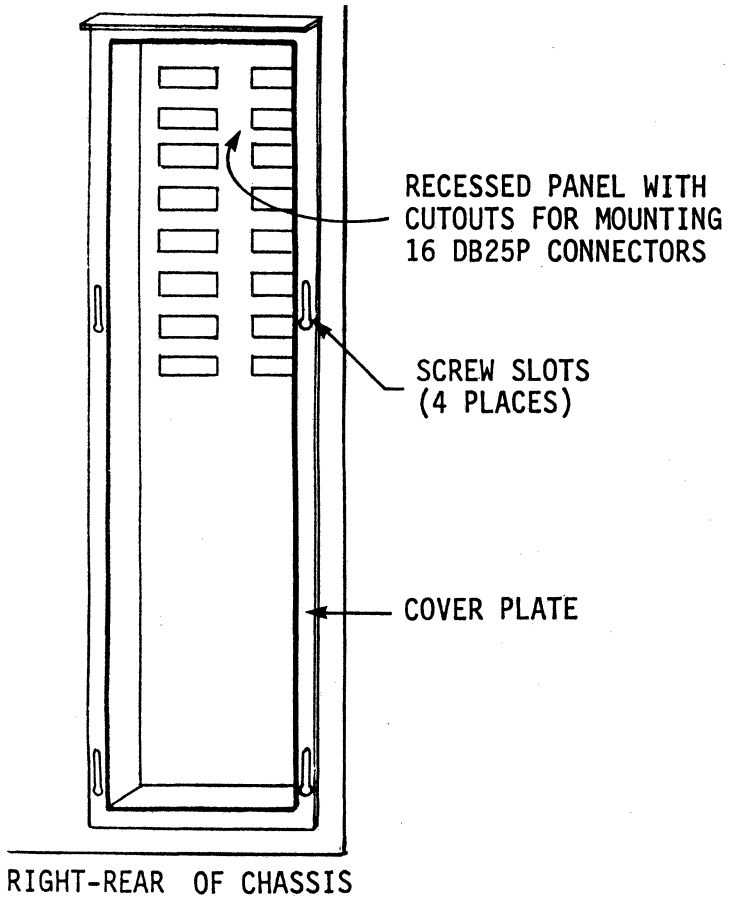


FIGURE 2-10: REAR PANEL CONNECTOR MOUNTING

Section 3 - Power Supply

3.1 GENERAL INFORMATION

This section contains a detailed description of the SA-H115 power supply. Output power connections are defined, and DC voltage adjustments and AC conversion are described.

The power supply consists of two major assemblies:

A 400 watt open frame switching power supply module with AC input control, power fail detect circuitry, and regulated and adjustable DC outputs.

A power distribution module with connectors for front panel logic and remote ON/OFF, backplane logic and power, and drive power.

Input power is applied via the power cord, through an IEC-compatible connector and fuse to an AC input line filter. Power for three fans is derived from the input windings on the power transformer, allowing the use of 115VAC fans for both 115VAC and 230VAC operation.

The open frame switching power supply provides +5V at 40A output as the primary output. In order for the secondary outputs to function properly, the +5V output must have approximately a 4A load. Each secondary output is regulated via separate linear regulators; thus, none of the secondary outputs are affected by loads on other outputs.

3.2 POWER SUPPLY OUTPUT CONNECTIONS

Power supply output connectors are located on the power distribution panel, which is on top of the power supply unit. Output power can be measured from these connections shown in Figure 3-1.

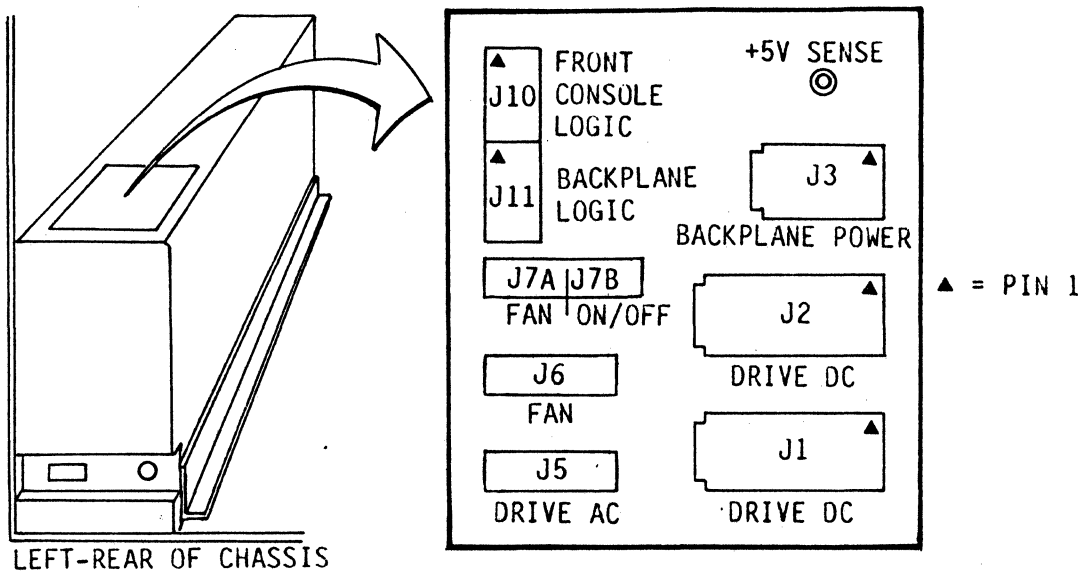
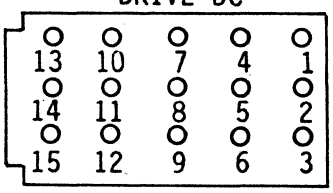


FIGURE 3-1: POWER DISTRIBUTION PANEL

3.2.1 Drive Power Connectors

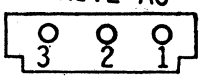
Power is distributed to devices via power cables that are configured for specific drives. Connectors J1 and J2 distribute DC drive power, and J5 distributes AC drive power, if needed. Before connecting power to any devices, ensure that proper voltage is present on these connectors. The connectors are defined in Figure 3-2.

J1 & J2
DRIVE DC



PIN	SIGNAL	PIN	SIGNAL
1	+5V	9	+5V
2	+5V	10	GND
3	+12V	11	GND
4	GND	12	GND
5	GND	13	+24V
6	GND	14	-12V
7	+12V	15	-5V
8	GND		

J5
DRIVE AC

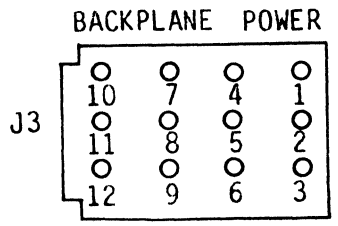


PIN	SIGNAL
1	AC
2	GND
3	AC

FIGURE 3-2: DRIVE POWER CONNECTORS

3.2.2 DC Output Power to Backplane

Attachment of DC power to the backplane is via power cables from J3 for +5VDC, +12VDC, -12VDC, +12V Battery, +5V Battery, and Ground. Figure 3-3 defines the J3 connector.



PIN	SIGNAL	PIN	SIGNAL
1	+5V	7	GND
2	+5V	8	GND
3	+5V	9	GND
4	+5V	10	+12V
5	N/C	11	-5V
6	GND	12	-12V

FIGURE 3-3: J3 BACKPLANE POWER CONNECTOR

The J3 connector applies DC power via power cables to the inner layers of the multilayer PCBA on the backplane. The power tabs for +5VDC can accept up to 45A. Figures 3-4 illustrates the backplane power connections that are derived from J3.

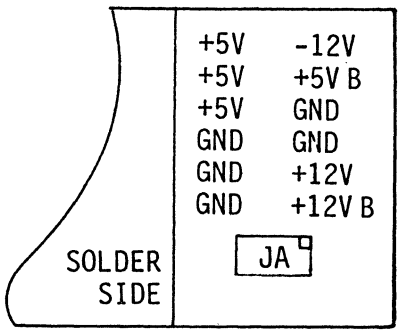


FIGURE 3-4: BACKPLANE POWER TABS

3.2.3 Front Console and Backplane Logic Connectors

Two 10-pin connectors are provided for interfacing to the front console (J10) and backplane (J11). The J10 cable plugs into the front console PCBA (Figure 4-2), and the J11 backplane cable plugs into JA on the backplane PCBA (Figure 3-4). The 10-pin connector is illustrated in Figure 3-5. Pin assignments for J10 and J11 are defined in Tables 3-1 and 3-2, respectively.

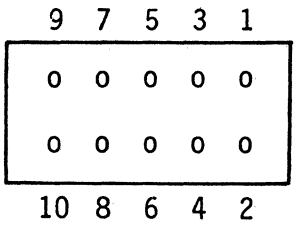


FIGURE 3-5: J10 AND J11 CONNECTOR

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	BHALT L	From front panel switch.
5	BEVENT L	Line frequency signal from power supply to BEVENT line.
6	BPOKH	Supplied by 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 3-1: J10 CONNECTIONS TO FRONT PANEL

PIN	SIGNAL*	DESCRIPTION
1	HALT	From front panel to assert BHALT line for ODT mode.
2	ENABLE	From front panel for high on BHALT line to run programs
3	BOOT	Normal position of BOOT switch on front panel
4	BOOT	From front panel to assert BDCOK line for bootstrapping.
5	N/C	
6	RUN	From processor to assert SRUN during program execution.
7	GND	Ground
8	PWR	From power supply to indicate +5V on front panel.
9	LTC	Line frequency signal from power supply to BEVENT line.
10	N/C	

*These signals are described in detail in Section 1.3.

TABLE 3-2: J11 CONNECTIONS TO BACKPLANE

3.2.4 Remote ON/OFF and Fan Connectors

Two AC power connectors are provided for power to the fans and for the remote ON/OFF switch located on the front console. The fan located on the backplane and the remote ON/OFF switch share connector J7, and power from J6 is distributed to the rear door fan. A third fan is located inside the power supply unit and does not require external power cabling. Figure 3-6 shows the J6 and J7 connectors.

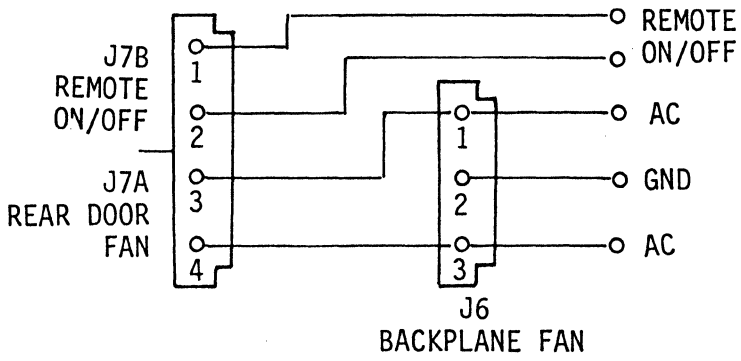


FIGURE 3-6: FAN AND REMOTE ON/OFF CONNECTORS

3.2.5 +/- Sense Switch

Switch SW1 is a 3-position switch used for margining the +5VDC to +/- 5% of nominal. The marginal voltages should be between 4.75 (low margin) and 5.25 (high margin). Switch SW1 is defined in Figure 3-7.

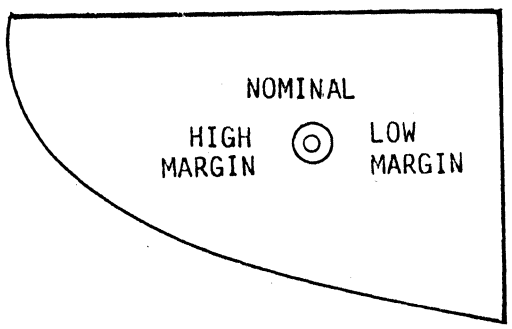


FIGURE 3-7: SWITCH SW1

3.3 POWER SUPPLY ADJUSTMENTS

The voltage settings of each of the power supply outputs is adjustable; however, because of the shock hazzard associated with off line open frame switching power supplies, Sigma recommends that such adjustments be performed only by qualified and experienced personnel. Each output is set at the factory and no external adjustments should be necessary.

If adjustment of the power supply output voltages is required, it is necessary to remove the power supply and adjust the outputs with the power supply recabled outside the chassis.

3.3.1 Power Supply Disassembly

If power supply adjustments are necessary, use the following procedure to gain access to the power supply.

1. Switch chassis power off and disconnect the power cord.

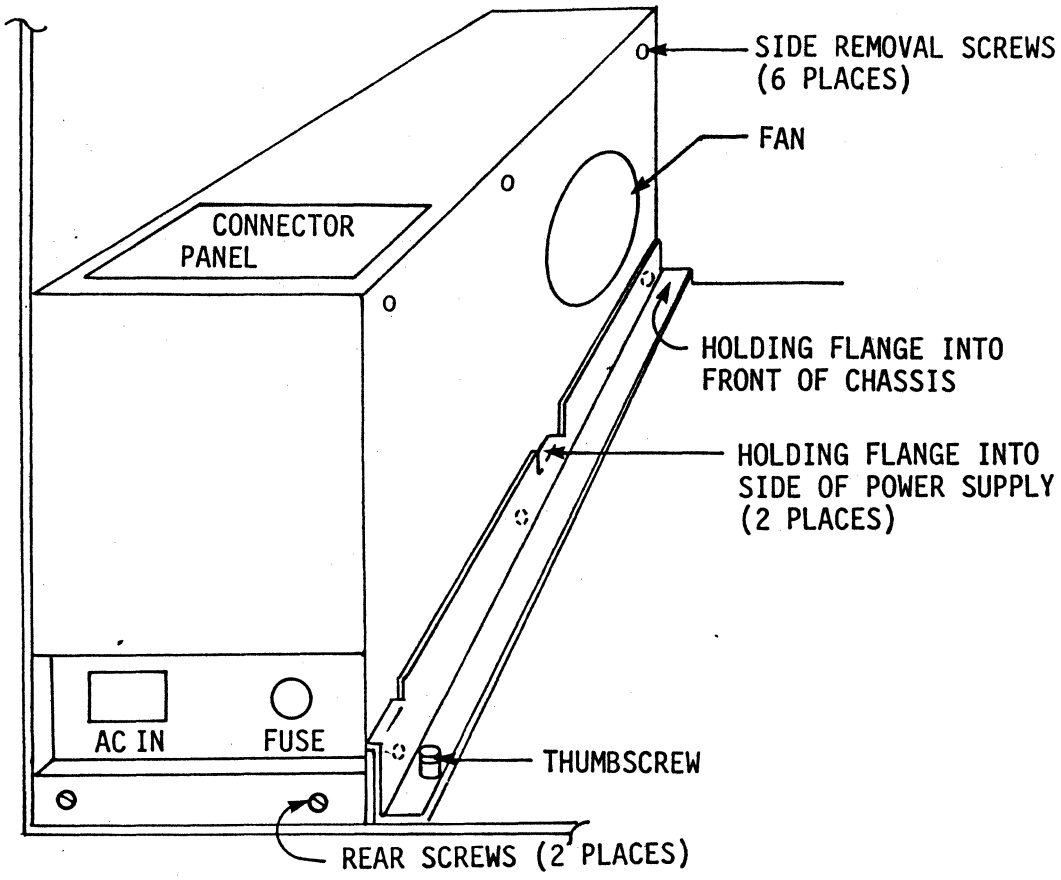


FIGURE 3-8 POWER SUPPLY DISASSEMBLY

2. Remove the holding bar on the right side (as viewed from the rear of the chassis) of the power supply by loosening the thumbscrew.

3. Remove the two screws at the rear of the power supply

4. Free the power supply by moving gently to the right in the chassis. Remove cabling at the connector panel and carefully note which cables plug into associated positions.

5. Slide the power supply out of the chassis and recable.

6. Remove side cover by removing six flathead screws on the unit.

7. Refer to Section 3.3.2 for AC conversion and Section 3.3.3 for DC voltage adjustments.

3.3.2 DC Voltage Adjustments

Voltages can be adjusted to within +/-10% of nominal by turning potentiometers clockwise for a decrease and counterclockwide for an increase in voltage. The power supply module bracket is connected to DC GND and AC safety GND, and can be used for ground reference in voltage measurements. If any output cannot be brought within the limits, or if the voltage adjustement pot is near its extreme limit when obtaining proper output voltage, the module must be replaced. Refer to Figure 3-9 for location of voltage adjustment pots.

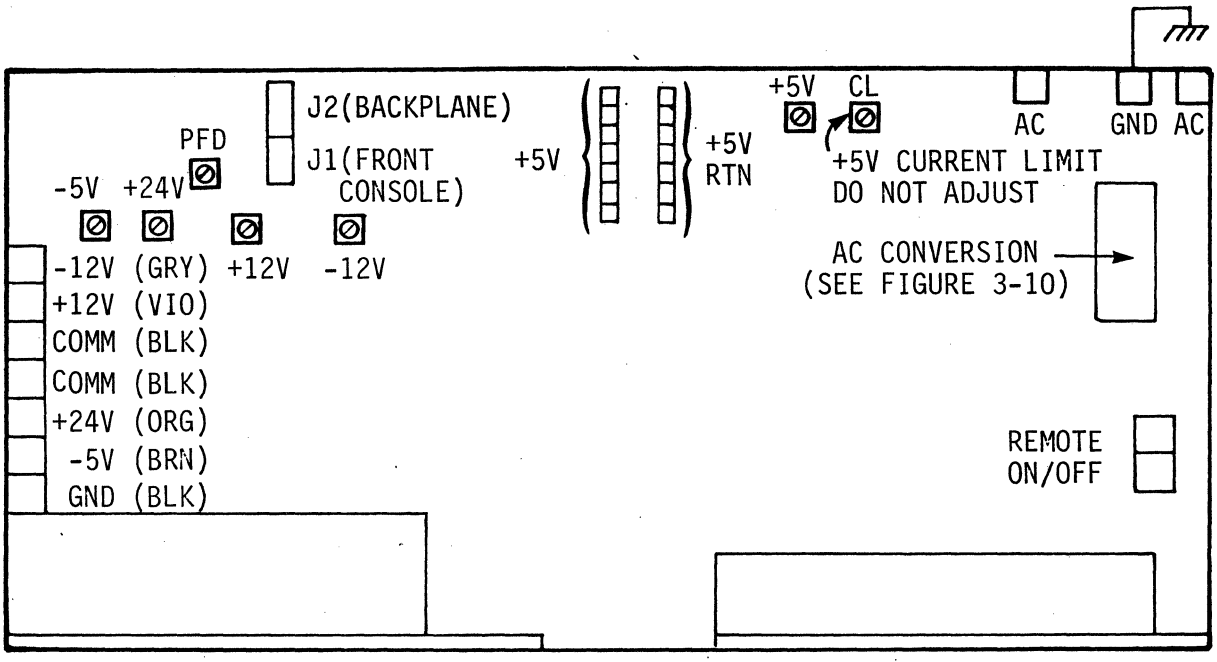


FIGURE 3-9: DC POWER ADJUSTMENTS

+5VDC Adjustment

Adjust +5VDC by turning the pot indicated in Figure 3-9. Measure +5VDC +/- 0.25VDC on pin AA2, BA2, or BV1 of any backplane connector slot (Figure 2-9).

+12VDC Adjustment

Adjust +12VDC by turning the pot indicated in Figure 3-9. Measure +12VDC +/- 0.6VDC on pin AD2 or BD2 of any backplane connector slot (Figure 2-9).

+24VDC Adjustment

Adjust +24VDC by turning the pot indicated in Figure 3-9. Measure +12VDC +/- 0.6VDC on the power tab shown in Figure 3-9.

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 3-9 shows the location of the power fail detect pot. Adjustment should be made by monitoring BB1 (Figure 2-9). 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 3-10 shows the timing relationship of BPOKH and BDCOKH as provided by the power supply unit.

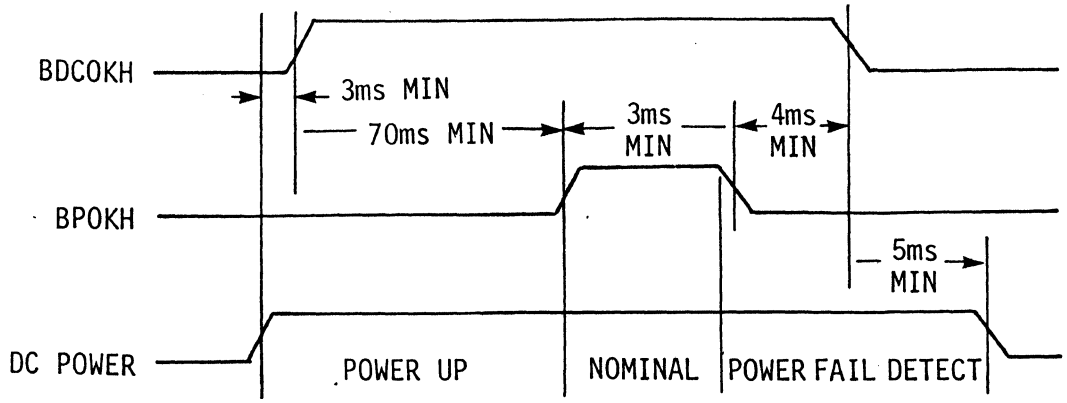


FIGURE 3-10: POWER FAIL DETECT TIMING

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.

3.3.3 115VAC/230VAC Conversion

Conversion between 115VAC and 230VAC requires removing the power supply and disassembling the unit. Refer to Figure 3-8 to gain internal access to the power supply and to Figure 3-9 for AC jumper locations. Figure 3-11 defines AC conversion.

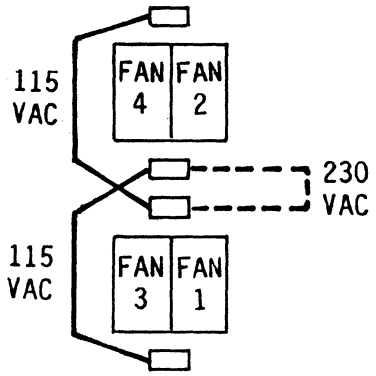
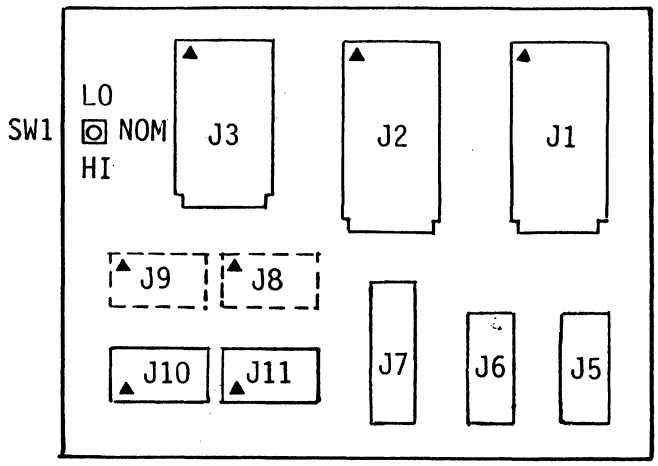


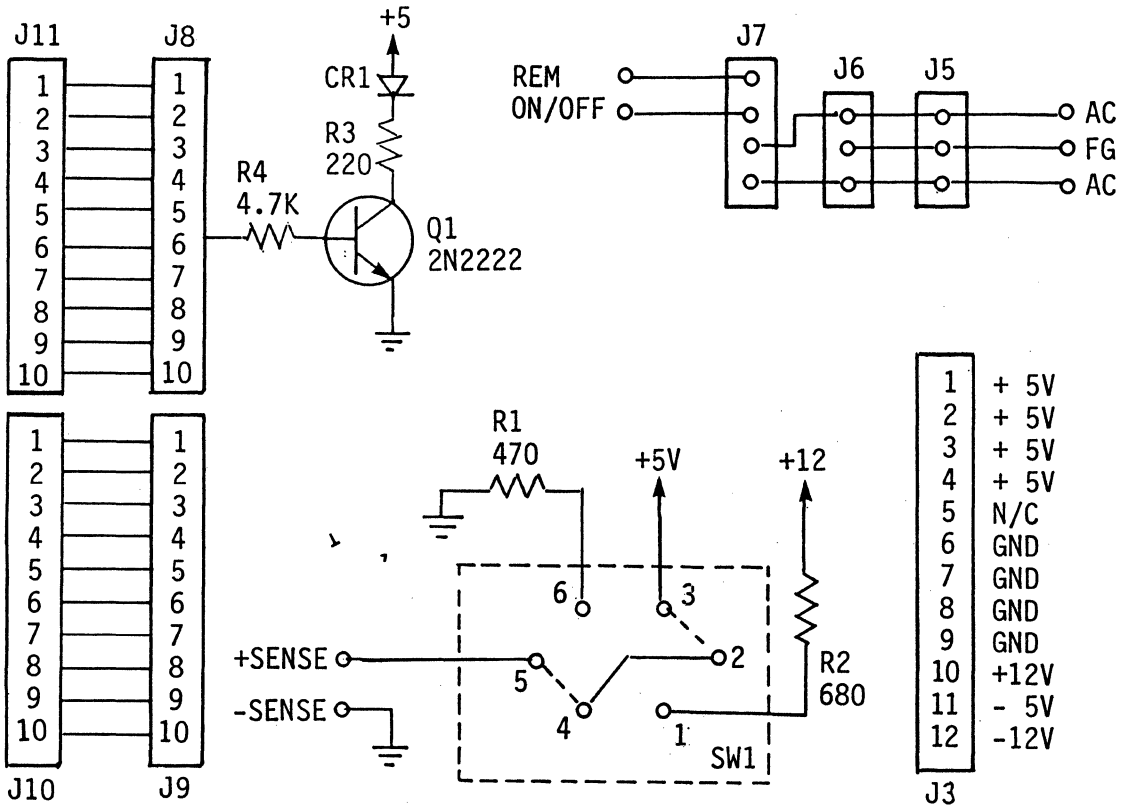
FIGURE 3-11: 115/230VAC CONVERSION

PIN	Q BUS	LSI-11/2	LSI-11/23	PIN	Q BUS	LSI-11/2	LSI-11/23
AA1	BIRQ5L			AA2	+5V		
AB1	BIRQ6L			AB2	-12V		
AC1	BDAL16L			AC2	GND		
AD1	BDAL17L			AD2	+12V		
AE1	*SS1	STOP L	SINGLE STEP	AE2	BDOUTL		
AF1	*SRUNL	SRUNL	SRUNL	AF2	BRPLYL		
AH1	*SRUNL	SRUNL	SRUNL	AH2	BDINL		
AJ1	GND			AJ2	BSYNCL		
AK1	*MSPAREA	MTOEL	NOT USED	AK2	BWTBTL		
AL1	*MSPAREB	GND	NOT USED	AL2	BIRQ4L		
AM1	GND			AM2	*BIAK1L	NOT USED	MMUSTRH
AN1	BDMRL			AN2	*BIAKOL		
AP1	BHALTL			AP2	BBS7L		
AR1	BREFL	NOT USED	NOT USED	AR2	*BDMG1L	NOT USED	UBMAAPL
AS1	+12VB			AS2	*BDMGOL		
AT1	GND			AT2	BINITL		
AU1	PSPARE1			AU2	BDALØL		
AV1	+5VB			AV2	BDAL1L		
BA1	BDCOKH			BA2	+5V		
BB1	BPOKH			BB2	-12V		
BC1	*SSPARE4	SCLK3H	MMUDAL18H	BC2	GND		
BD1	*SSPARE5	SWMIB18H	MMUDAL19H	BD2	+12V		
BE1	*SSPARE6	SWMIB19H	MMUDAL20H	BE2	BDAL2L		
BF1	*SSPARE6	SWMIB20H	MMUDAL21H	BF2	BDAL3L		
BH1	*SSPARE8	SWMIB21H	CLKDISL	BH2	BDAL4L		
BJ1	GND			BJ2	BDAL5L		
BK1	*MSPAREB	NOT USED	NOT USED	BK2	BDAL6L		
BL1	*MSPAREB	NOT USED	NOT USED	BL2	BDAL7L		
BM1	GND			BM2	BDAL8L		
BN1	BSACKL			BN2	BDAL9L		
BP1	BIRQ7L			BP2	BDAL1ØL		
BR1	BEVNTL			BR2	BDAL11L		
BS1	PSPARE4	PSPARE4	+12VB	BS2	BDAL12L		
BT1	GND			BT2	BDAL13L		
BU1	PSPARE2			BU2	BDAL14L		
BV1	+5V			BV2	BDAL15L		

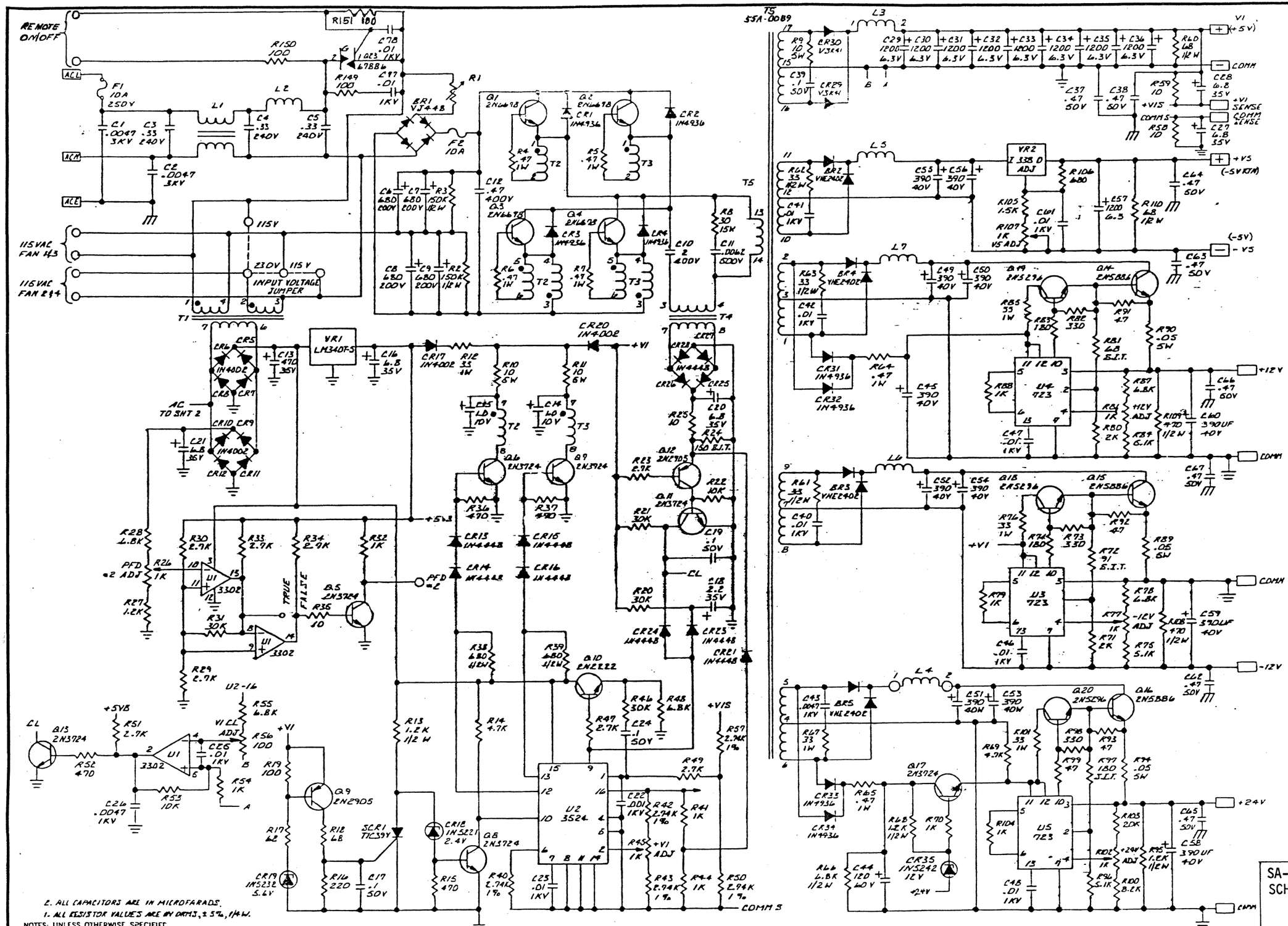
*NOT BUSSED

Q BUS PIN ASSIGNMENTS



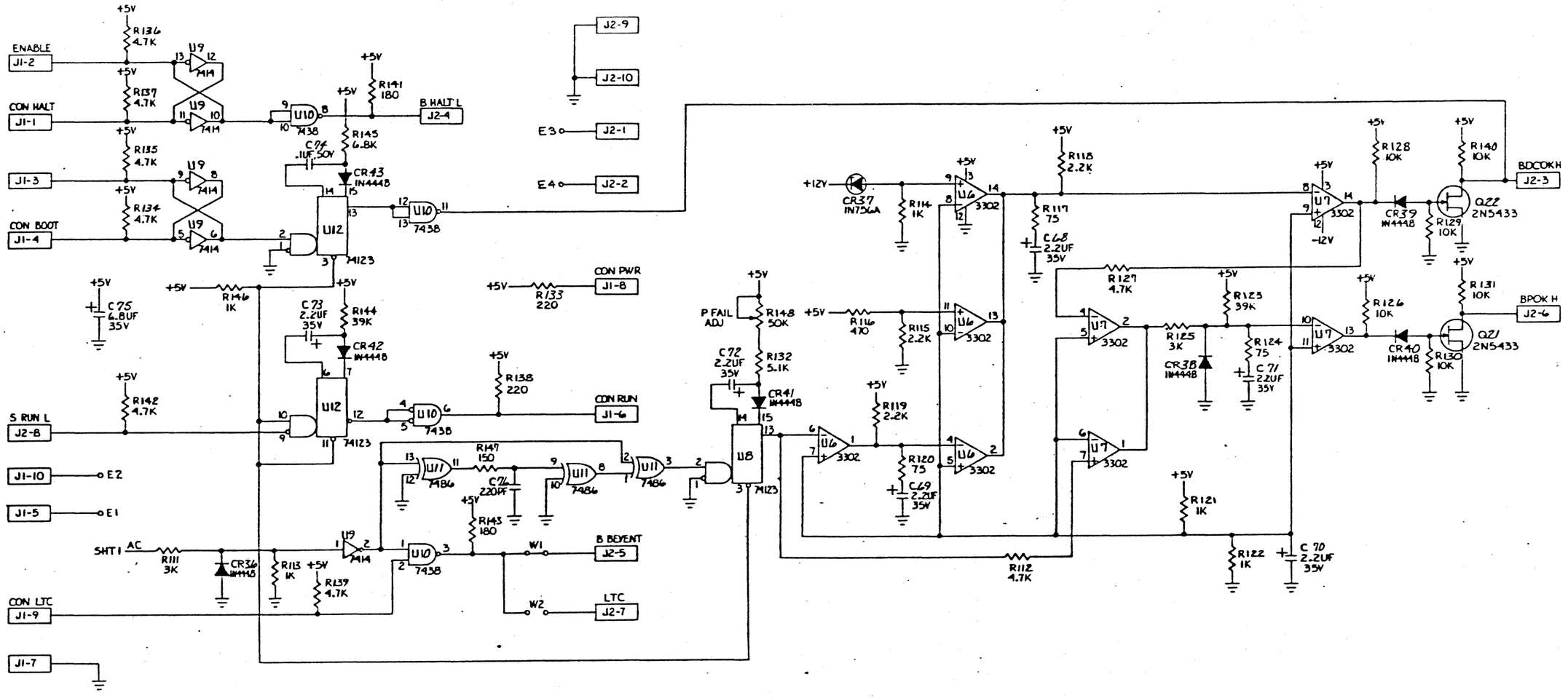


SW1 POSITION	STATE
CENTER (NOMINAL)	2 TO 3, 4 TO 5
MARGIN LOW	1 TO 2, 4 TO 5
MARGIN HIGH	2 TO 3, 5 TO 6

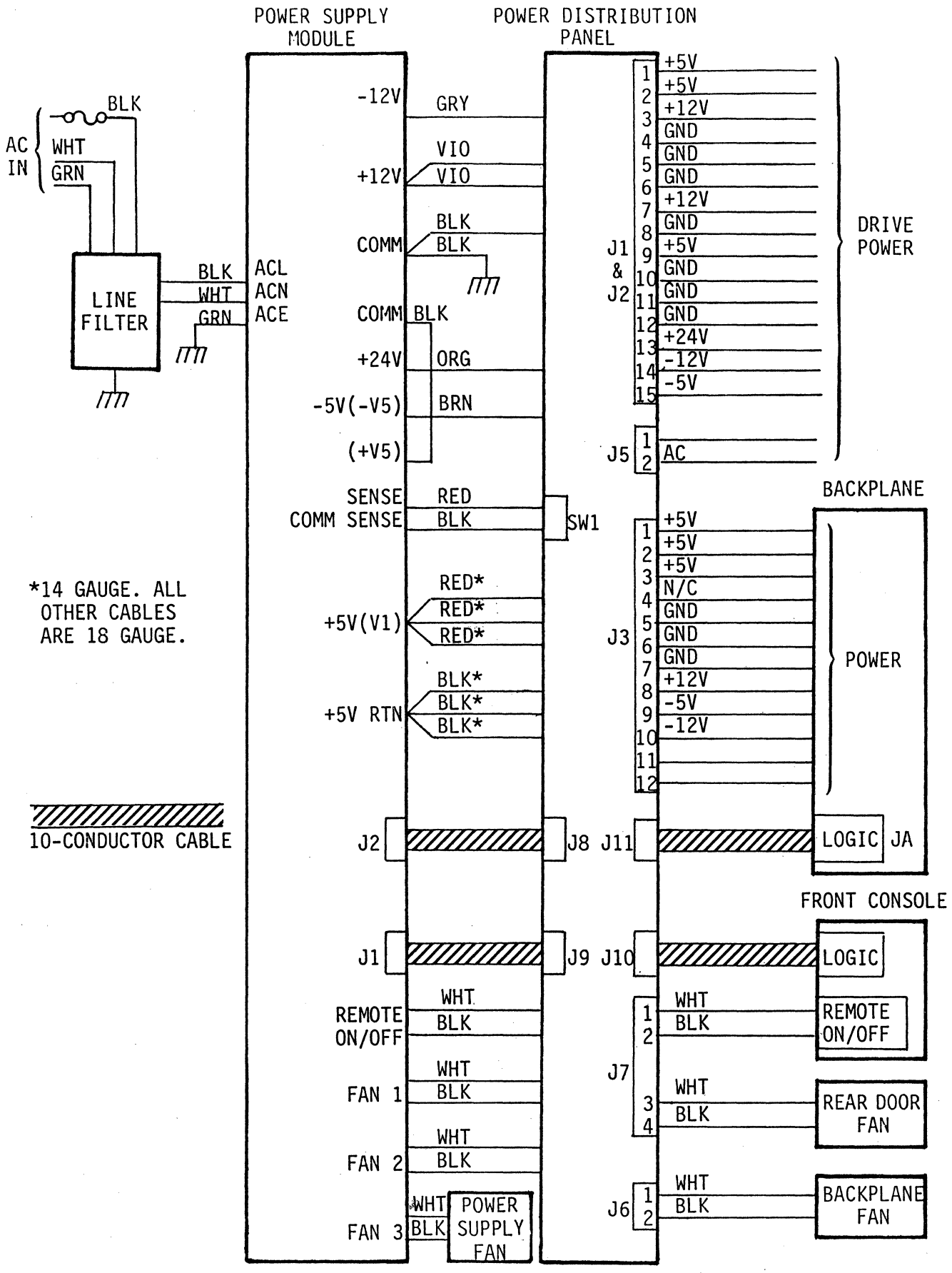


SA-H115 POWER SUPPLY
SCHEMATIC 05D-0062-01

SHEET 1 OF 2 C-1



SA-H115 POWER SUPPLY SCHEMATIC
05D-0062-01
SHEET 2 OF 2



SA-H115 SYSTEM WIRING DIAGRAM