FCC PART 15 CLASS B

EMI MEASUREMENT AND TEST REPORT

FOR

PREMIO COMPUTER, INC.

938 Radecki Court,
City of Industry, CA 91748

FCC ID: PREMIOSRP6A

March 17, 1999

This Report Concerns:	**Equipment Type:**
☒ Original Report	Pentium® II Net Server ATX 300W Redundant Case, ITE

Test Engineer:	Thomas Huang
Test Date:	August 4, 1998
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *PREMIO COMPUTER, Inc.,* model PREMIODTP6E or the "EUT" as referred to in this report is a personal computer measuring 20.5"L x 14.75"W x 18.25"H, which features the Intel 440BX Motherboard. The system board utilizes the Intel FW82371EB chipset with Ultra I/O controller.

- The four-layered motherboard supports Intel Pentium® II processors 266, 300, 333, 350 or 400 MHz with integrated VRM, and is provided with a frequency synthesizer chip for CPU clock selection. The motherboard conforms to the Intel ATX form factor footprint. It has on-board support for four IDE hard drives, one floppy drives, one parallel port, two serial ports, two USB ports, PS/2 mouse and keyboard connectors.

- Other Motherboard features include Mode 0-4 PCI IDE; 3.3V unbuffered EDO (Extended Data Output) and SDRAM memory. Cache support for 512K in CPU support.

- Peripheral expansion capability includes four (4) 32-bit PCI slots, two (2) 16-bit ISA slots (one (1) shared PCI/ISA slot), and three (3) 168-pin DIMM memory socket.

- The EUT also includes a Full-Tower chassis with plastic front bezel. The Full-Tower chassis provides for eight (8) half-height bays (three (3) exposed 3.5 inch drive bays, and two (2) exposed 5.25 inch drive bays), and a 300 Watt ATX power supply.

- Additionally, the EUT was equipped with one (1) 3.5" floppy drive, one (1) IDE hard drive, and one (1) CD-ROM drive.

1.2 Objective

This Class B report is prepared on behalf of PREMIO COMPUTER, Inc. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules and to ICES-003 of the Canadian Interference-Causing Equipment Regulations.

The objective of the manufacturer is to demonstrate compliance with FCC Class B limits for conducted and radiated margin and to ICES-003 requirements for Information Technology Equipment.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Suite 2, Sunnyvale, California, USA.

Test sites at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-674 and R-657. The test sites has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1993, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167.

1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Data
HP	Spectrum Analyzer	8568B	2610A02165	12/6/99
HP	Spectrum Analyzer	8593B	2919A00242	12/20/99
HP	Amplifier	8349B	2644A02662	12/20/99
HP	Quasi-Peak Adapter	85650A	917059	12/6/99
HP	Amplifier	8447E	1937A01046	12/6/99
A.H. System	Horn Antenna	SAS0200/571	261	12/27/99
Com-Power	Log Periodic Antenna	AL-100	16005	11/2/99
Com-Power	Biconical Antenna	AB-100	14012	11/2/99
Solar Electronics	LISN	8012-50-R-24-BNC	968447	12/28/99
Com-Power	LISN	LI-200	12208	12/20/99
Com-Power	LISN	LI-200	12005	12/20/99
BACL	Data Entry Software	DES1	0001	12/20/99

1.7 Equipment Under Test (EUT)

Manufacturer	Description	Model	Serial Number	FCC ID
PREMIO COMPUTER, Inc.	Net Server ATX 300W Redundant Case	PREMIOSRP6A	None	IW2 PREMIOSRP6A

1.8 EUT Configuration List Details

Manufacturer	Description	Model	Serial Number	FCC ID
Intel	Motherboard	N440BX	IBNS82602678	DOC
SeaSonic	Power Supply	SSR-300	D05012498	DOC
MITSUMI	3.5” Floppy Drive	D359M3	7L19EG00075	None
MITSUMI	CD-ROM	CRMC-FX320M	EKF137195	DOC
Western Digital	Hard Drive	WDE4360-007B2	WS7011095628	None
Chembro Micom	Chassis	A9891-1	None	None

1.9 Support Equipment

Manufacturer	Description	Model	Serial Number	FCC ID
Key Tronic	Keyboard	101 WN	R0901	CIG101WIN-10
Microsoft	Mouse	2.0A	00826824	C3KSMP1
NEC	Monitor	JC-14W1VMA	5122300408	C5F7NFCMC1423B
Citizen Watch Ltd.	Printer	LSP-10	5047999-92	DLK66TLSP-10
EVEREX	Modem	EV-945	None	E3E5UVEV-945
EVEREX	Modem	EV-945	None	E3E5UVEV-945

1.10 External I/O Cabling

Cable Description	Length (M)	Port/From	To
Shielded Keyboard Cable	1.6	Keyboard Port/EUT	Keyboard
Unshielded mouse cable	2.0	Mouse Port/EUT	Mouse
Shielded Printer Cable	2.0	Parallel/EUT	Printer
Shielded Serial Cable x2	1.5	Serial 1/EUT	Modem
Shielded Video Cable	1.8	Video Out Port/EUT	Monitor
Unshielded Cable	1.5	LAN Port/EUT	Terminator

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

The following I/O ports were provided by the motherboard: two serial ports, one parallel port, two USB port, one PS/2 keyboard port, one PS/2 mouse port, one floppy interface connector, and two IDE interface connectors.

Since the fundamental frequency is the same with all processor speeds, 100MHz BUS in this case, the EUT was tested with the Intel Pentium® II 400MHz CPU to represent worst case results.

The BUS and processor speeds were achieved by installing the appropriate processor and changing the jumper settings on the motherboard. Following is the supported BUS and processor speeds:

Intel Pentium® II:

66MHz BUS for 266, 300, 333MHz processors.

100 MHz BUS for 350, 400MHz processors.

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, GWBASIC H, contained on the hard drive, is started in a DOS window under the Windows 95 operating system. Once loaded, the program sequentially exercises each system component.

The sequence used is as follows:

1) Lines of Hs scrolls across the VGA monitor
2) The printer outputs Hs
3) The two modems receive Hs

The complete cycle takes approximately 5 - 10 seconds and the process is continuously repeated.

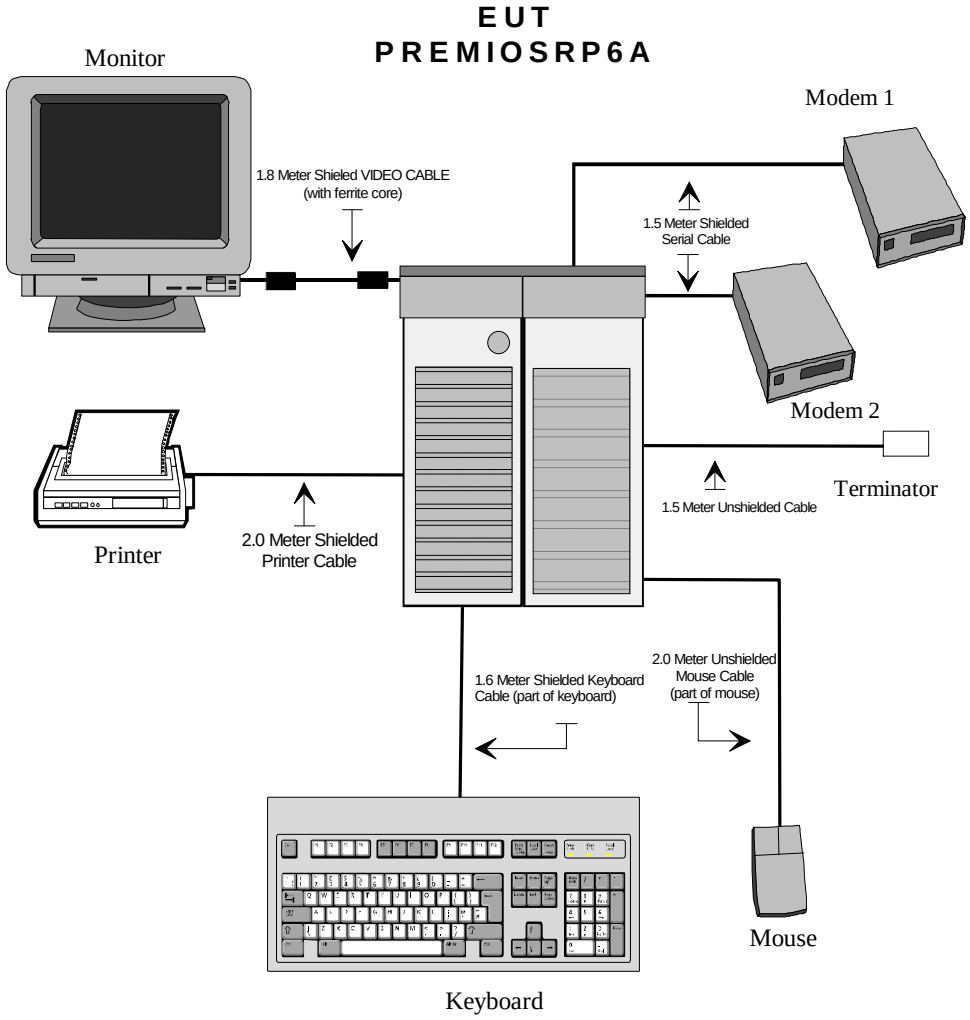
2.3 Special Accessories

As shown in section 2.5, all interface cables used for compliance testing are shielded as normally supplied by INMAC, Y.C. Cable, Monster Cable and from their respective support equipment manufacturers. The printer, the two modems and VGA monitor featured shielded metal connectors.

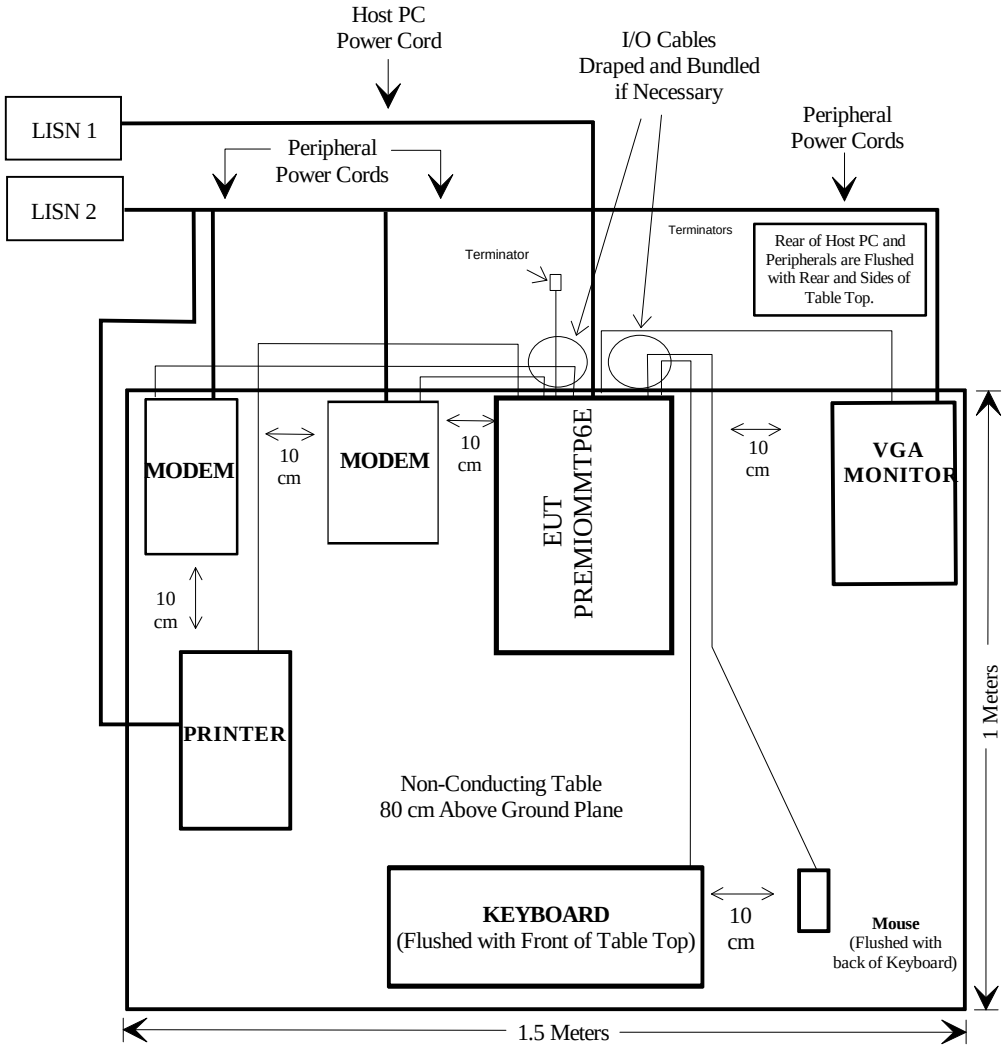
2.4 Block Diagram

The system has only one full speed. In the full-speed mode, the 14.318 MHz crystal on the motherboard drives the frequency synthesizer to produce the 66/100MHz BUS clock to the CPU and other components on the motherboard. Internally, the CPU is running at 266/300/333/350/400MHz.

2.5 Configuration of Test System



2.6 Test Setup Block Diagram



2.7 Equipment Modifications

No modification(s) to the EUT were necessary to comply with the applicable limits:

3 - CONDUCTED EMISSIONS TEST DATA

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

3.2 EUT Setup

The measurement was performed at the **O**pen **A**rea **T**est **S**ite, using the same setup per ANSI C63.4 - 1992 measurement procedure. Specification used was with the FCC Class B limits.

The EUT was connected to a 110 VAC / 60 Hz power source and it was placed center and the back edge of the test table. The VGA monitor was placed on one side of the EUT, the two Modems were placed on the other side, the printer was placed directly in front of the modems. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

The keyboard was placed directly in front of the EUT, flushed with the front of the tabletop. The PS/2 mouse was place next to the keyboard on one. The mouse was flushed with the back of the keyboard.

The spacing between the peripherals was 10 centimeters.

Input / Output cables were draped over edge of the test table and bundle when necessary.

3.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conducted emission test:

Start Frequency	450 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	100 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

3.4 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first LISN with the VGA monitor and all support equipment power cords connected to the second.

Since the fundamental frequency is the same with all processor speeds, 100MHz BUS in this case, the EUT was tested using the Intel Pentium® II 400 MHz CPU with the SEASONIC (SSR-300) 300 Watt power supply to represent worst case results for the final qualification test. Therefore, these results were used for final test data recorded in the table listed under section 3.6 of this report.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination. All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (less than -4 dBµV). Quasi-peak readings are distinguished with a "**Qp**".

3.5 Summary of Test Results

According to the data in section 3.6, the EUT complied with the FCC Conducted margin for a Class B device and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, with the *worst* margin reading of:

-3.2 dBm**V** at **0.830 MHz** in the ***Line*** mode for the **SEASONIC, *SSR-300*** power supply

3.6 Conducted Emissions Test Data

3.6.1 Test Data for SEASONIC Power Supply, model SSR-300 with Intel Pentium® II 400 MHz CPU, 0.45 - 30 MHz.

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBµV	Qp/Ave/Peak	Line/Neutral	dBµV	dB
0.830	44.8	Peak	Line	48	-3.2
1.160	44.4	Peak	Line	48	-3.6
1.570	44.1	Peak	Neutral	48	-3.9
3.320	40.8	Peak	Line	48	-7.2
3.760	38.0	Peak	Neutral	48	-10.0
4.290	37.6	Peak	Neutral	48	-10.4

3.7 Plot of Conducted Emissions Test Data

Plot of Conducted Emissions test data for the SEASONIC power supply, model SSR-300 with Intel Pentium® II 400 MHz processor is presented in Appendix B of this report as reference.

4 - RADIATED EMISSION DATA

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is $\pm$4.0 dB.

4.2 EUT Setup

The radiated emission tests were performed in the open area 3 meter test site, using the setup in accordance with the ANSI C63.4 - 1992. The specification used was the FCC Class B limits.

The EUT was connected to a 110 VAC / 60 Hz power source and it was placed center and the back edge of the test table. The VGA monitor was placed on one side of the EUT, the two Modems were placed on the other side, the printer was placed directly in front of the modems. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

The keyboard was placed directly in front of the EUT, flushed with the front of the tabletop. The PS/2 mouse was place next to the keyboard on one. The mouse was flushed with the back of the keyboard.

The spacing between the peripherals was 10 centimeters.

Input / Output cables were draped over edge of the test table and bundle when necessary.

4.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33, since the internal processor speed operates between 108-500 MHz, the system was tested to 2000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	2000 MHz
Sweep Speed	Auto
IF Bandwidth	100 KHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

4.4 Test Procedure

For the radiated emissions test, both the EUT and VGA monitor and all support equipment power cords was connected to the AC floor outlet since the power supply (SSR-300) used in the EUT did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (less than -4 dBµV), and are distinguished with a "**Qp**" in the data table.

Since the fundamental frequency is the same with all processor speeds, 100MHz BUS in this case, the EUT was tested using the Intel Pentium® II 400 MHz CPU at 100 MHz BUS speed to represent worst case results for the final qualification test. . Therefore, these results were used for final test data recorded in the table listed under section 4.7 of this report as reference.

The parallel port (LPT1), two serial ports (COM1 and COM2), two USB ports, TP port, BNC port, PS/2 mouse and keyboard ports were also tested.

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBµV means the emission is 7dBµV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Class B Limit

4.6 Summary of Test Results

According to the data in section 4.7, the EUT complied with the FCC Class B standards and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, and had the worst margin of:

-2.0 dBmV(QP) at **36.72 MHz** in the **Horizontal** polarization with the Intel Pentium® II 400 MHz CPU at 100 MHz BUS.

-1.7 dBmV(QP) at **36.72 MHz** in the **Horizontal** polarization with the Intel Pentium® II 400 MHz CPU at 100 MHz BUS – ***After Maximize procedure***.

4.7 Radiated Emissions Test Result Data

4.7.1 Primary Test Data for Intel Pentium® II 400 MHz CPU at 100 MHz BUS, 30 to 2000 MHz.

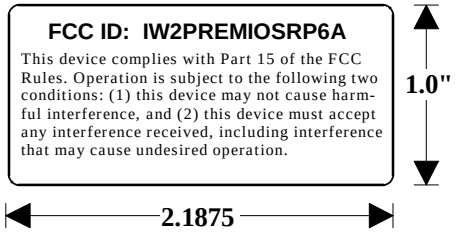
INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Freqency MHz	Ampl. dBmV/m	Angle Degree	Height Meter	Polar H/V	Antenna dBmV/m	Cable dB	Amp. dB	Corr. Ampl. dBmV/m	Limit dBmV/m	Margin dB
36.72	44.1	45	2.2	H	13.3	0.5	19.9	38.0	40.0	-2.0 QP
801.85	38.1	90	2.1	H	23.3	2.8	21.2	43.0	46.0	-3.0
66.35	45.5	210	1.1	V	9.6	1.2	21.2	35.1	40.0	-4.9
701.61	36.4	280	2.0	H	22.5	3.1	22.9	39.1	46.0	-6.9
801.86	35.0	60	1.1	V	23.3	2.8	21.2	39.9	46.0	-6.1
400.92	42.1	190	2.1	H	16.5	2.9	22.5	39.0	46.0	-7.0
129.56	43.1	225	2.1	H	12.3	1.8	20.3	36.9	43.5	-6.6
400.94	40.7	225	1.7	H	16.5	2.9	22.5	37.6	46.0	-8.4
300.71	41.3	190	1.8	H	15.1	4.6	22.9	38.1	46.0	-7.9
501.06	39.8	135	1.8	H	18.2	3.1	23.0	38.1	46.0	-7.9
701.65	33.4	135	1.1	V	22.5	3.1	22.9	36.1	46.0	-9.9
212.75	41.4	90	2.1	H	12.5	4.7	22.4	36.2	43.5	-7.3
1002.33	32.8	135	2.1	H	25.9	3.7	19.7	42.7	54.0	-11.3
249.20	41.4	45	2.2	H	12.6	2.3	22.5	33.8	46.0	-12.2
501.10	33.5	280	1.1	V	18.2	3.1	22.7	32.1	46.0	-13.9
501.18	32.3	225	2.1	H	18.2	3.1	22.7	30.9	46.0	-15.1

4.7.2 *Maximized* Final Test Data for Intel Pentium® II 400 MHz CPU at 100 MHz BUS, 30 to 2000 MHz.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC CLASS B	
Freqency MHz	Ampl. dBmV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBmV/m	Cable dB	Amp. dB	Corr. Ampl. dBmV/m	Limit dBmV/m	Margin dB
36.72	44.4	30	2.2	H	13.3	0.5	19.9	38.3	40	-1.7 QP
801.85	38.4	100	2.1	H	23.3	2.8	21.2	43.3	46	-2.7
66.35	45.9	190	1.1	V	9.6	1.2	21.2	35.5	40	-4.5
701.61	36.6	270	2	H	22.5	3.1	22.9	39.3	46	-6.7
801.86	35.2	45	1.1	V	23.3	2.8	21.2	40.1	46	-5.9
400.92	42.1	190	2.1	H	16.5	2.9	22.5	39.0	46.0	-7.0

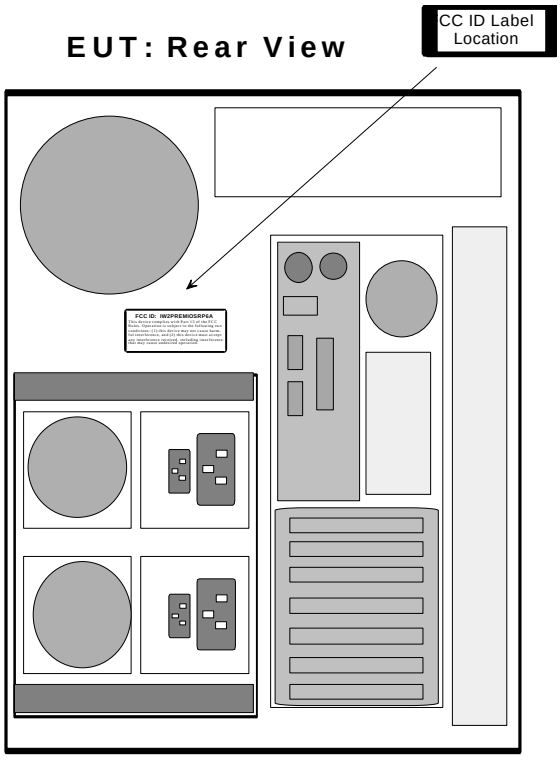
5– FCC PRODUCT LABELING AND WARNING STATEMENT

7.1 FCC ID Label



Specifications: Text is black in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT.

5.2 Proposed Label Location on EUT



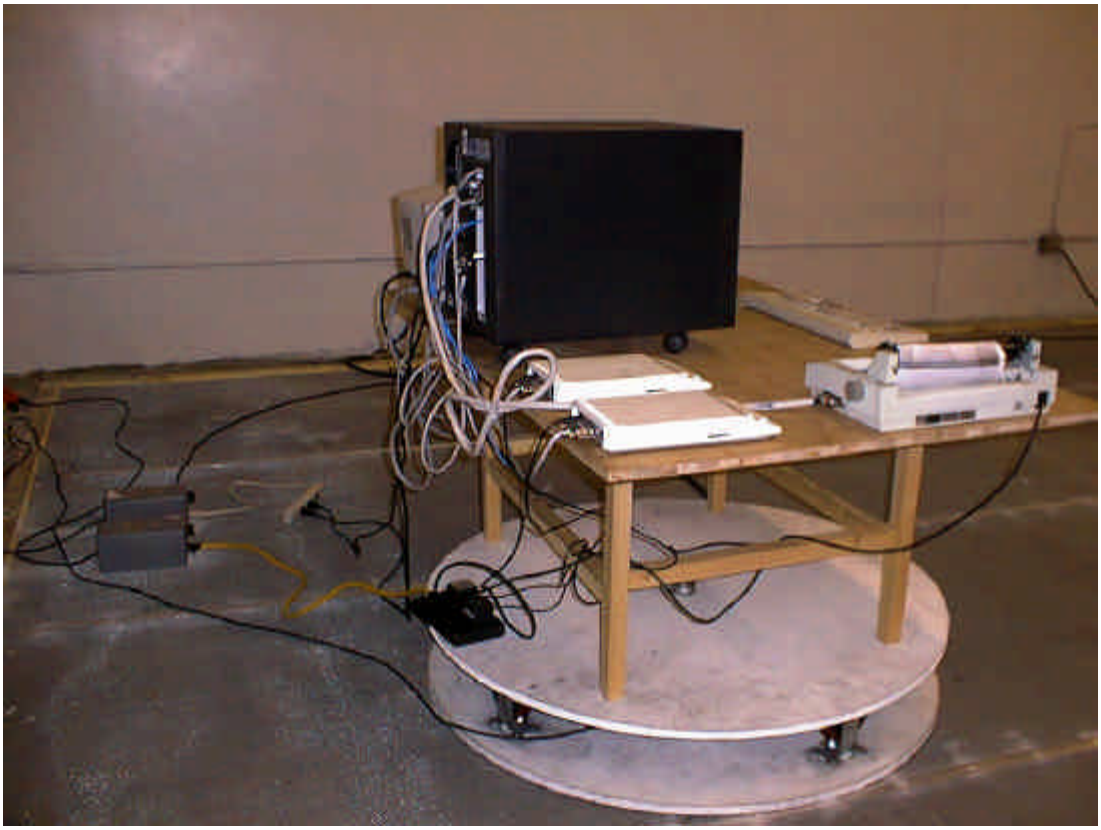
5.3 FCC Warning Statement

The FCC Warning Statement is provided with the product manual. A sample of the statement is presented in Appendix C of this report as reference.

6 - Conducted and Radiated Setup Photographs

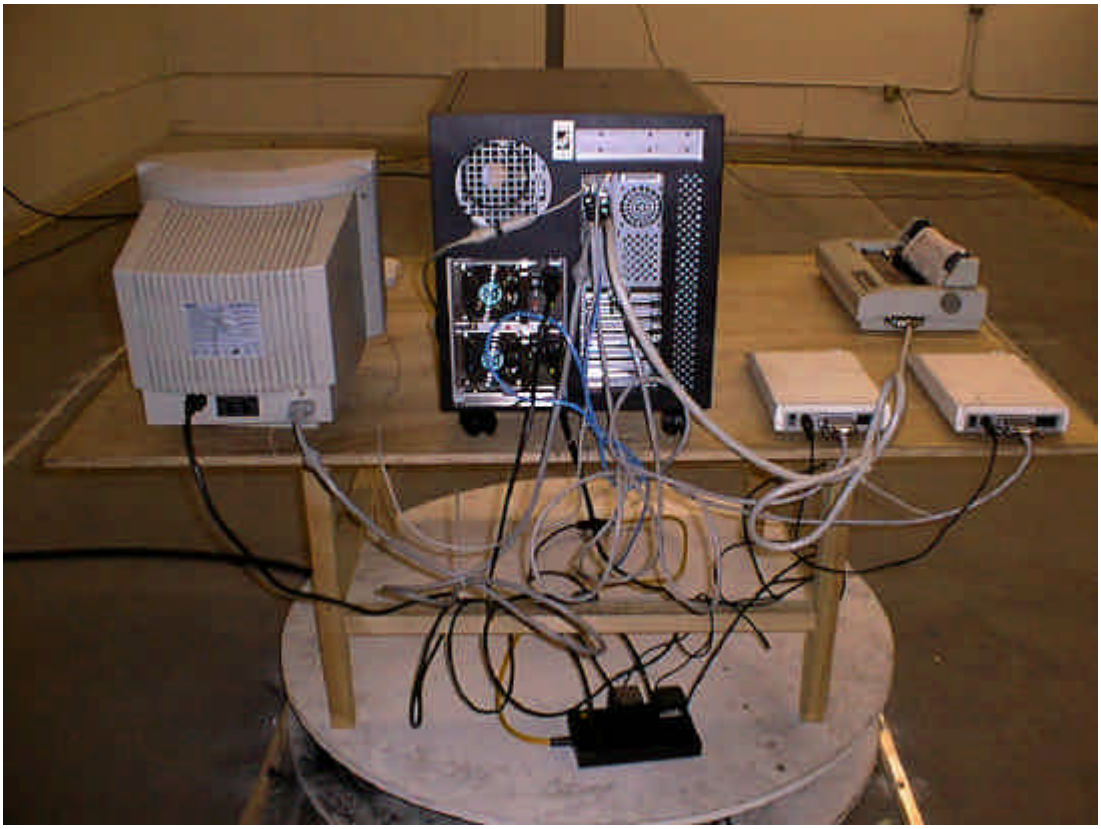
6.1 Conducted Emission Photograph – Front View

6.2 Conducted Emission Photograph – Side View



6.3 Radiated Emission Photograph – Front View

6.4 Radiated Emission Photograph – Rear View

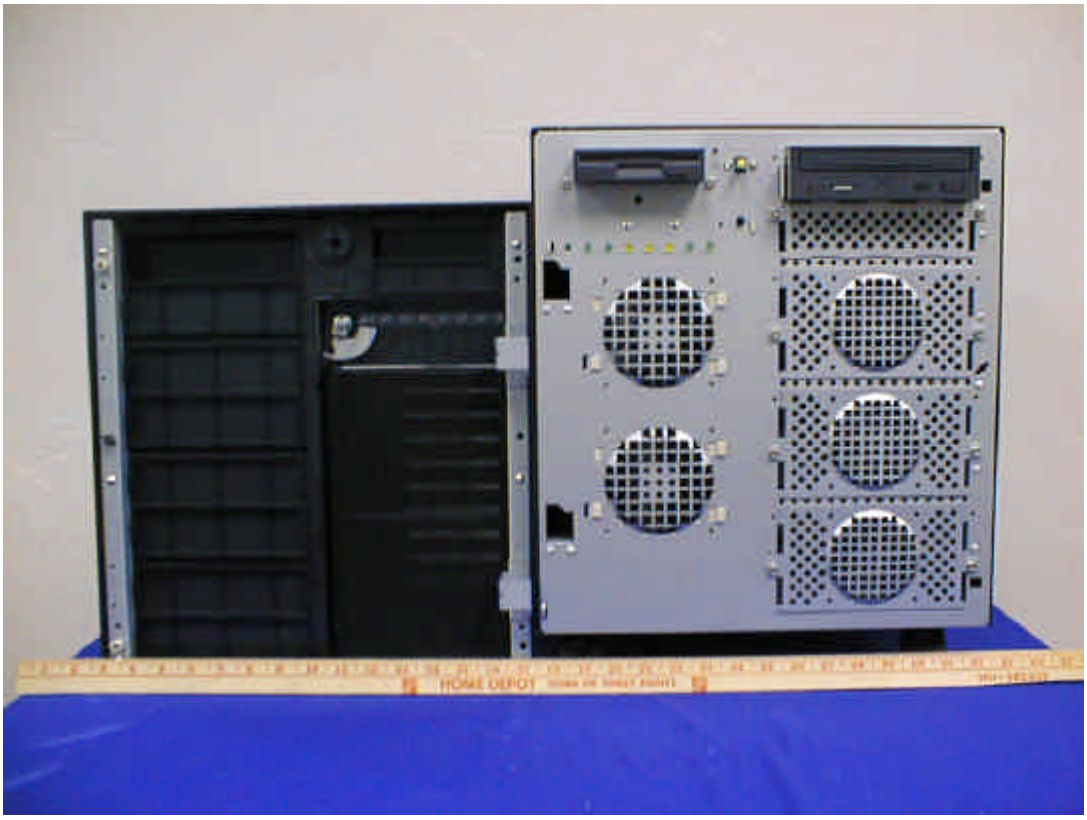


7 – EUT PHOTOGRAPHS

7.1 EUT - Front View

7.2 EUT - Rear View

7.3 EUT – Inside Front Bezel



7.4 EUT – Left Side View 1 with Cover Removed

7.5 EUT – Left Side View 2 with Cover Removed

7.6 Power Supply - Side View with Label

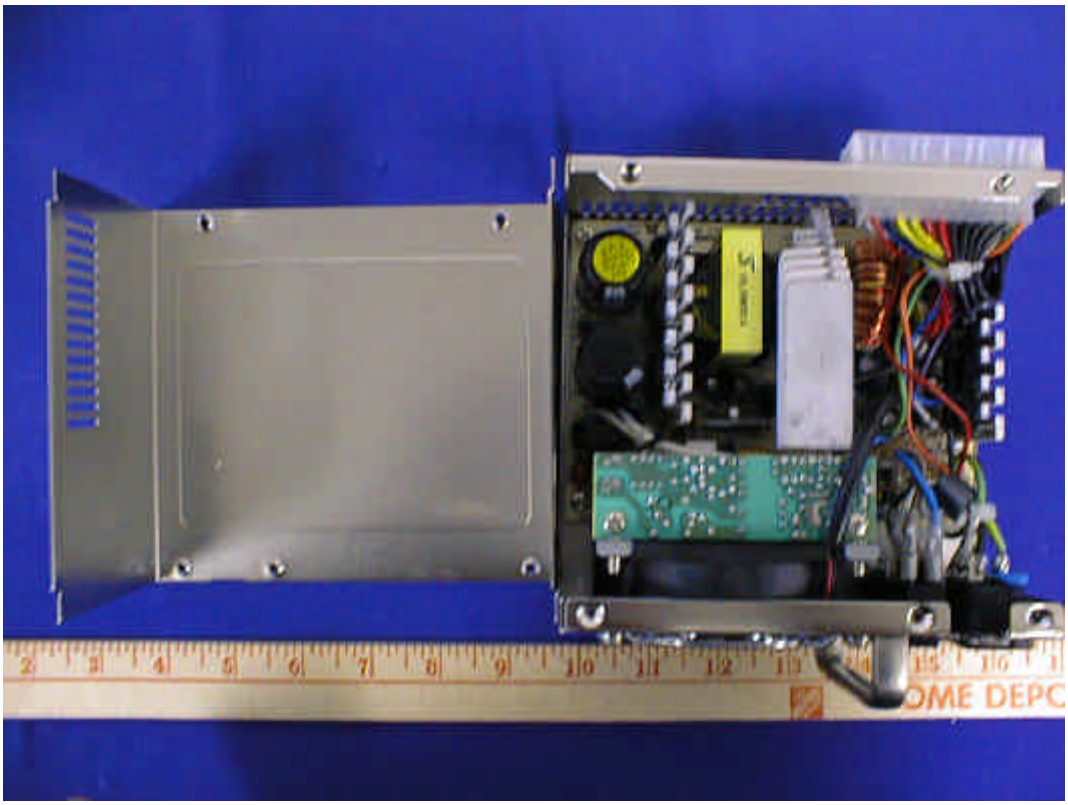
SEASONIC, M/N: SSR-300

7.7 Power Supply – Rear View

SEASONIC, M/N: SSR-300

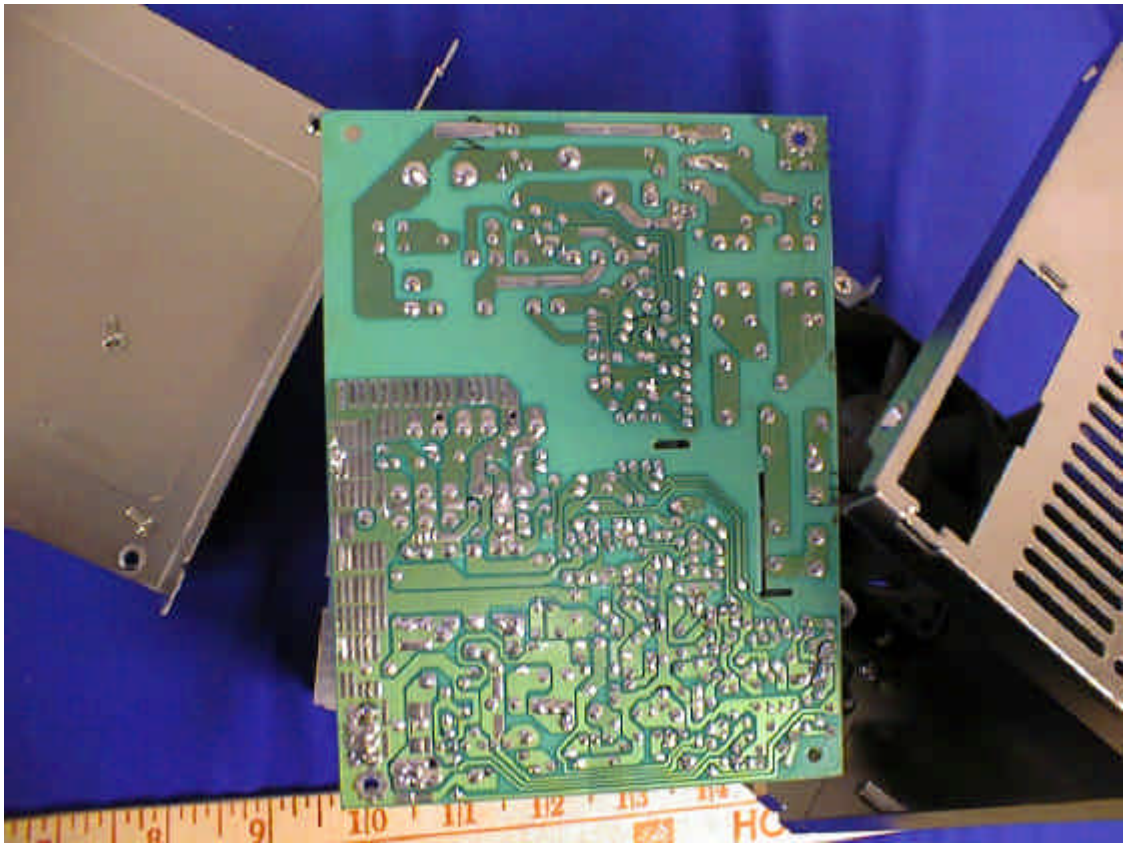
7.8 Power Supply - Cover Removed, Component View

SEASONIC, M/N: SSR-300

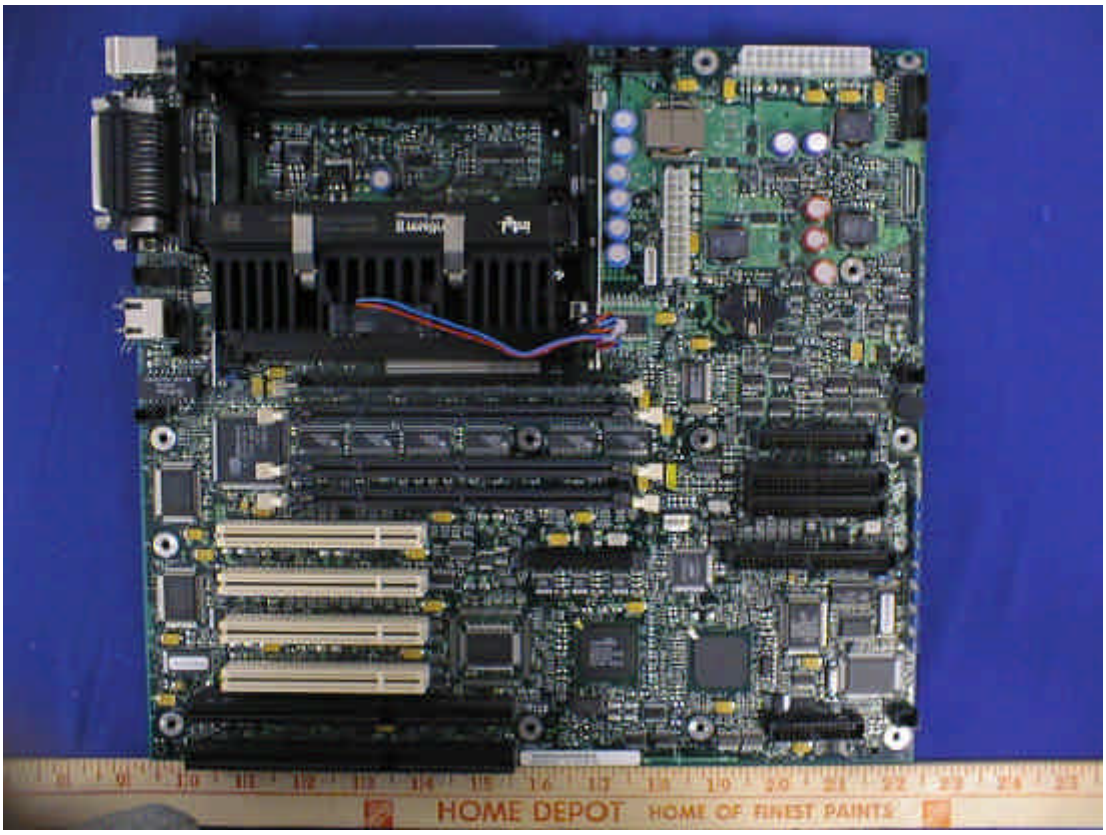


7.9 Power Supply – Circuit View

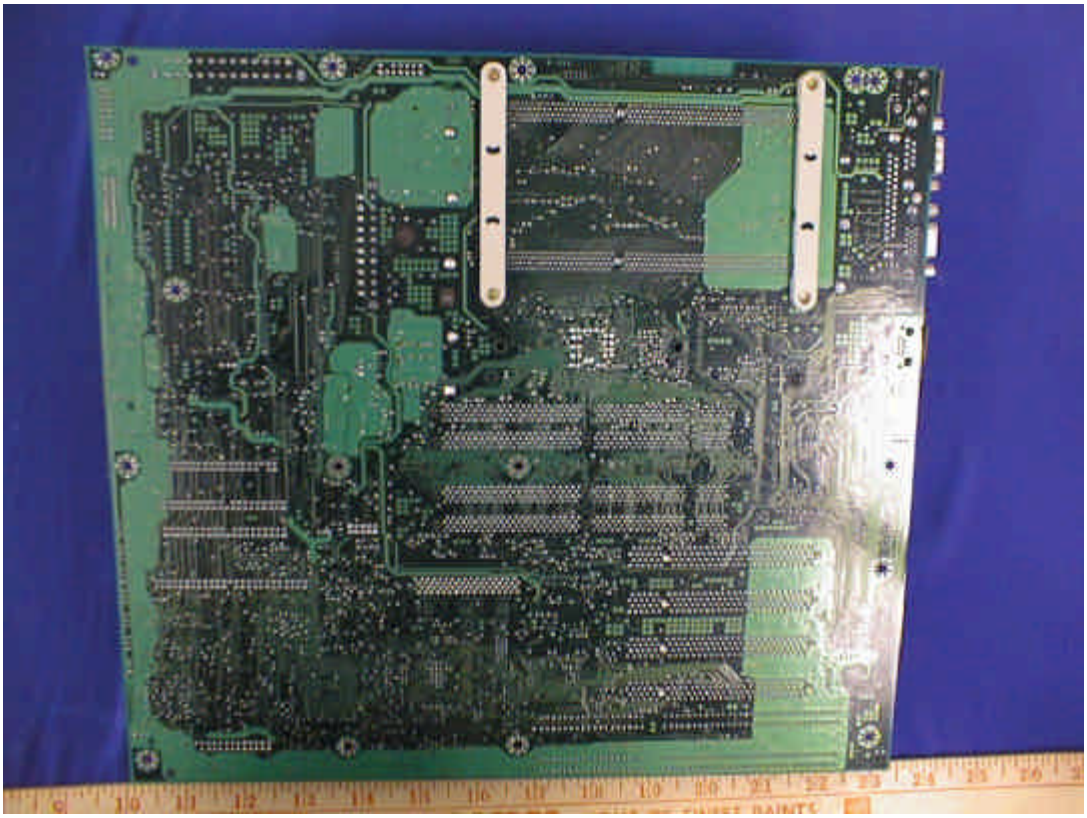
SEASONIC, M/N: SSR-300



7.10 Motherboard - Component View

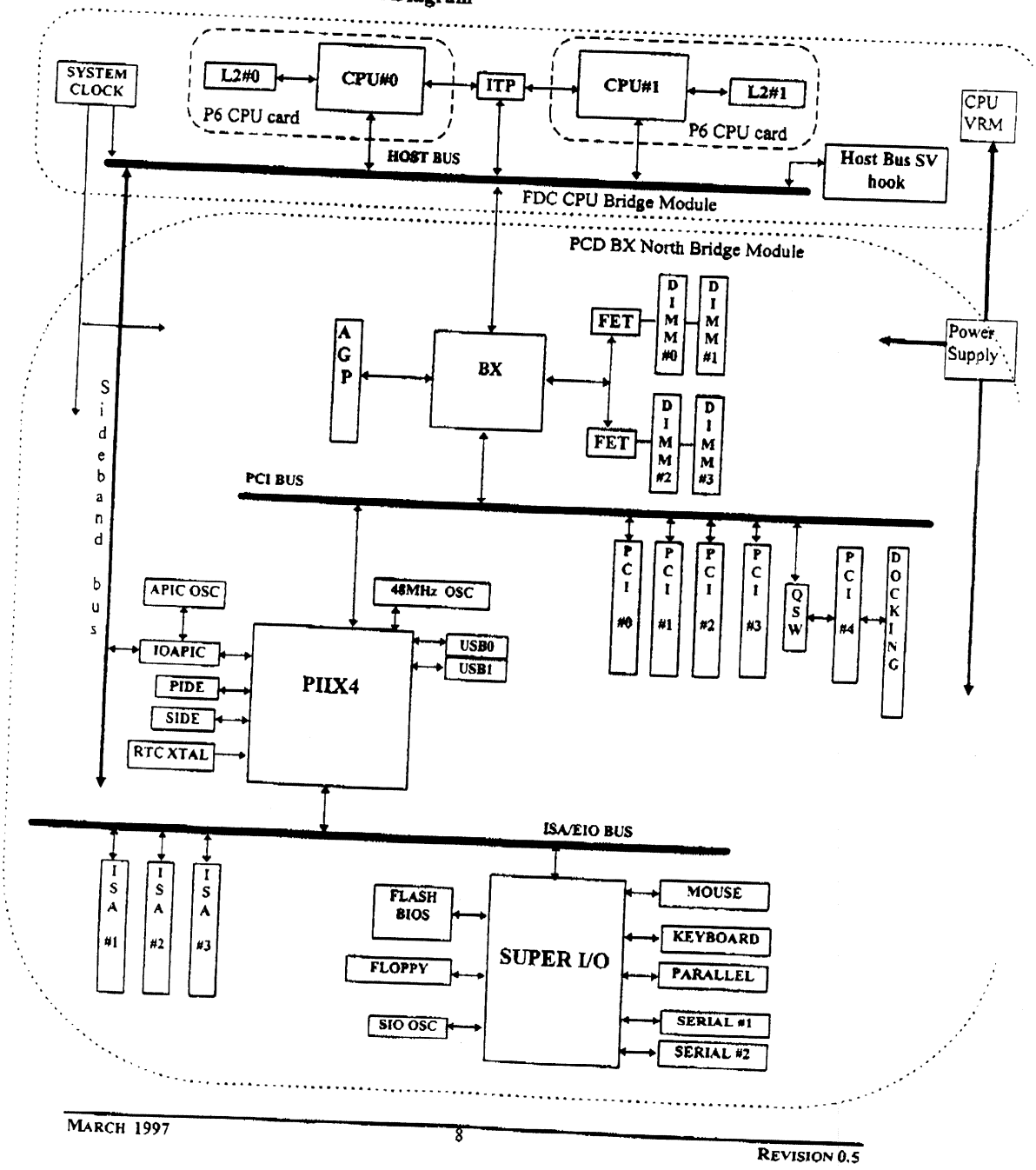


7.11 Motherboard - Circuit View

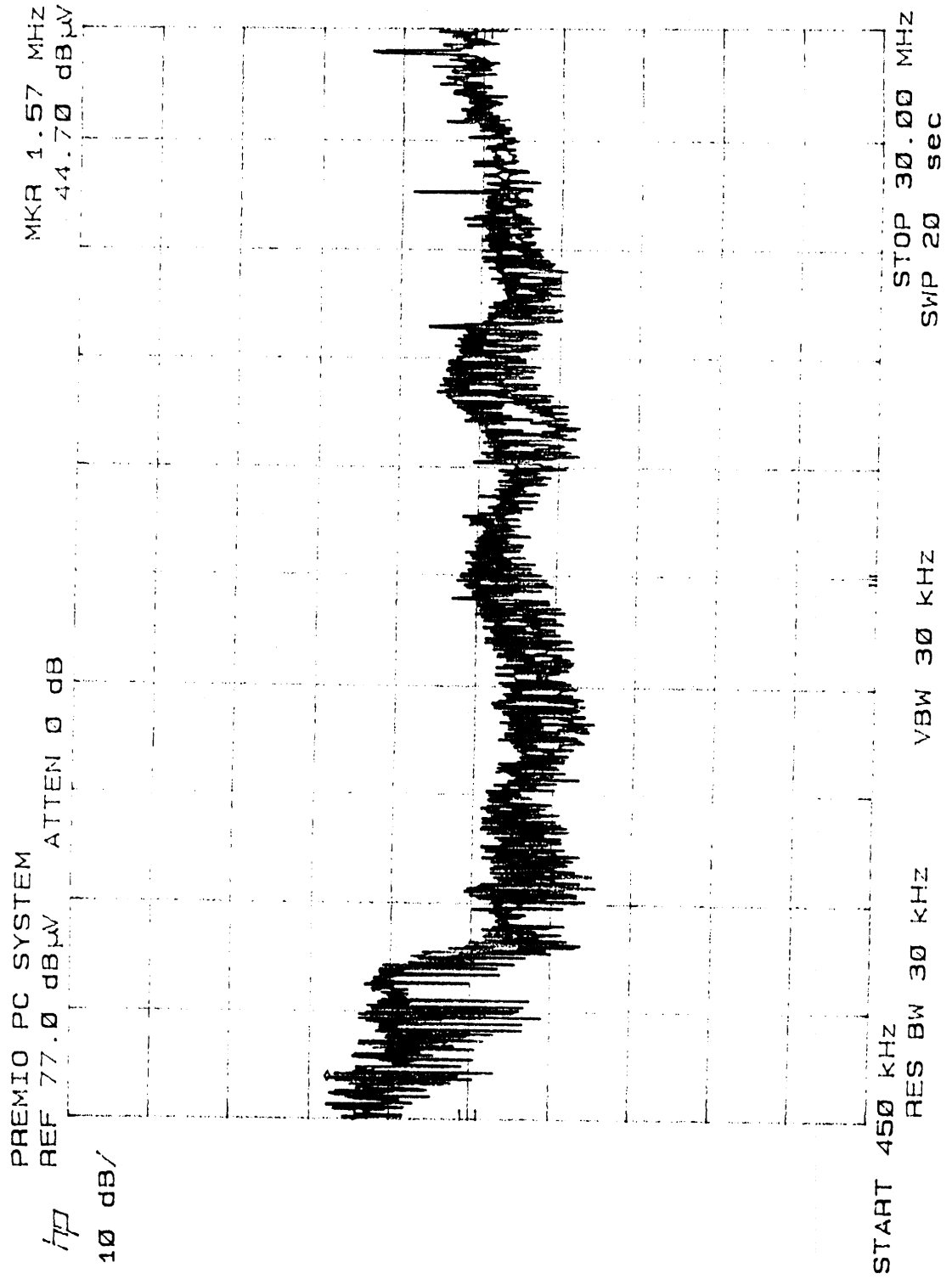


Appendix A – EUT BLOCK DIAGRAM

2.2.2. 4-DIMM Board Block Diagram



Appendix B – PLOT OF CONDUCTED EMISSION TEST DATA


MKR 1.57 MHz
44.70 dBµV
PREMIO PC SYSTEM
REF 77.0 dBµV
ATTEN 0 dB
10 dB/
START 450 kHz
RES BW 30 kHz
VBW 30 kHz
STOP 30.00 MHz
SWP 20 sec

Appendix C – USER MANUAL

N440BX Server Board

Quick Start Guide

Items Provided on the Bootable CD-ROM

N440BX Server Board Product Guide
LAN setup and diagnostics
Software drivers and utilities
Symbios SCSI Guide
Columbus II Chassis Subassembly Product Guide
Astor Chassis Subassembly Product Guide
To view the product guides, either boot to Windows† 95/NT† and use Adobe† Acrobat†, or boot the CD-ROM and use the DOS reader provided.

Order Number: 700949-001

Before You Begin

Declaration of FCC Conformity

This equipment has been tested and verified to Class B limits when in a compatible host computer, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

Cautions and Warnings

WARNINGS

This guide is for qualified technical personnel with experience installing and configuring server boards.

Disconnect the server board from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this guide. Failure to do this can result in personal injury or equipment damage. Some circuitry on the server board may continue to operate even though front panel power button is off.

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

CAUTION

Electrostatic discharge (ESD) can damage server board components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety and Regulatory Requirements

See the *N440BX Server Board Product Guide* for all applicable safety standards, electromagnetic compatibility (EMC) regulations, and product certification markings.

EMC testing: Before computer integration, make sure that the chassis, power supply, and other modules have passed EMC testing using a server board with a microprocessor from the same family (or higher) and operating at the same (or higher) speed as the microprocessor on this system board.

Battery warning sticker provided: Place the sticker inside the chassis in an easy-to-see location near the battery but not on the server board itself.

Intended uses: This product was evaluated for use in computers that will be installed in offices, computer rooms, and similar locations. Other uses require further evaluation.

Server board diagram sticker provided: Place the sticker inside the chassis in an easy-to-see location, preferably oriented similarly to the server board.

I/O panel sticker provided: Place the sticker on the back of the chassis near the I/O shield, preferably oriented similarly to the I/O shield.

Minimum Hardware Requirements

To avoid integration difficulties and possible board damage, your system must contain the following minimum requirements.

Processor

Minimum of one 333 MHz or faster Pentium® II processor and a processor termination card.

Memory

Minimum of 32 MB of 100 MHz, 3.3 V, PC/100 compliant SDRAM on 168 pin gold DIMMs. Either 72 bit (ECC) or 64 bit (non-ECC).

Power Supply

Minimum of 300 W with 0.8 A +5 V standby current (in order to support Wake On LAN† (WOL)). If you choose not to use WOL, make sure the WOL Enable jumper (J5B1) is in the Disable position (pins 1-2).

Installation Notes

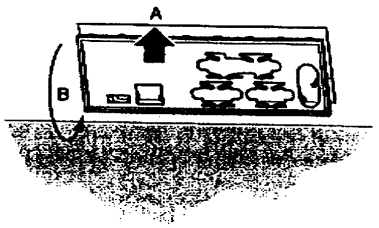
I/O Shield

NOTE

An ATX 2.0-compliant I/O shield is provided with the server board. The shield is required by Electromagnetic Interference (EMI) regulations. It minimizes EMI and ensures proper cooling of the server. If the shield does not fit the chassis, obtain a properly sized shield from the chassis supplier.

The shield fits the rectangular opening near the power supply in the back of the chassis. The shield has cutouts that match the external I/O connectors (e.g., keyboard and mouse).

1. Install the shield from inside the chassis. Orient the shield so that the cutouts align with the corresponding I/O connectors on the server board.
2. Position one edge so that the dotted groove (A) is outside the chassis wall, and the lip of the shield rests on the inner chassis wall.
3. Hold the shield in place, and push it into the opening until it is sealed (B). Pressure holds the shield in place.
4. If you want to use the Emergency Management Port (EMP) functionality, you must connect a serial cable (provided) to the serial port 2 header on the server board.



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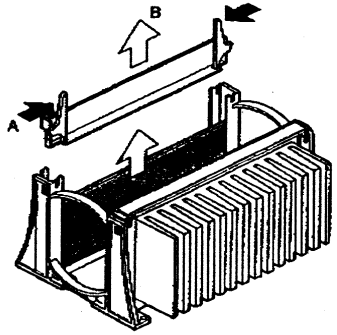
Microprocessor

The N440BX server board supports up to two Intel Pentium II processors (with 100 MHz FSB). Each processor is packaged in a Single Edge Contact (S.E.C.) cartridge. The cartridge includes the processor core operating at 333 MHz, or faster, with an integrated 32 KB (16 KB data, 16 KB instruction) primary (L1) cache; the 512 KB with Error Correcting Code (ECC) secondary (L2) cache; a thermal plate; and a back cover. If you are installing two processors, make sure they are the same speed, voltage, and stepping.

The S.E.C. cartridges are mounted in a dual-processor retention mechanism, which is provided with the N440BX server board. The retention mechanism is keyed to ensure correct orientation and is mounted with four screws that are provided with the N440BX server board.

CAUTION, single-processor configurations

If you install only one processor in a system, it must go in the primary connector (closest to the DIMM sockets and the center of the server board). With a single-processor configuration, you must install a termination board and termination latch assembly in the empty secondary connector (closest to the edge of the server board) to ensure proper operation of your system. A termination board is provided with the N440BX server board.



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CAUTION, do not overtighten screws

The four screws used to attach the retention mechanism to the server board should not be tightened to more than six inch-pounds of torque.

After mounting the retention mechanism, install the processor(s) in the Slot 1 connector(s) and connect the processor fan power cable(s) to both the S.E.C. cartridges and the connector(s) on the server board. See the server board layout diagram for fan connector locations.

Memory

Only 100MHz PC/100-compliant SDRAM is supported by the server board. Memory is partitioned as four banks of SDRAM DIMMs, each providing 64 bits (non-ECC) or 72 bits (64-bit main memory plus ECC) of noninterleaved memory:

- Install from 32 MB to 512 MB of unbuffered memory, using up to four single- or double-banked DIMMs, or
- Install from 32 MB to 1 GB of registered memory, using up to four single- or double-banked DIMMs

Installed DIMMs must be the same speed and either all registered or all unbuffered. For a list of supported memory, call your service representative or visit the Intel Support website.

Power Connectors

There are three power connectors on the N440BX server board. The Main power connector and the Aux power connector are for use with the Intel Astor and Columbus II chassis subassemblies only. The ATX power connector is for use with ATX compliant power supplies.

⚠ **CAUTION, Use the correct power connector**

Failure to use the correct power supply connector during system integration may result in damage to the server board. See the server board component diagram for the power connector locations (D, E, G).

In order to use the Wake On LAN (WOL) capabilities of the N440BX, your power supply must provide 0.8 A of +5 V Standby current. This powers the Baseboard Management Controller (BMC). If your power supply does not provide this current, you should disable Wake On LAN with the WOL jumper.

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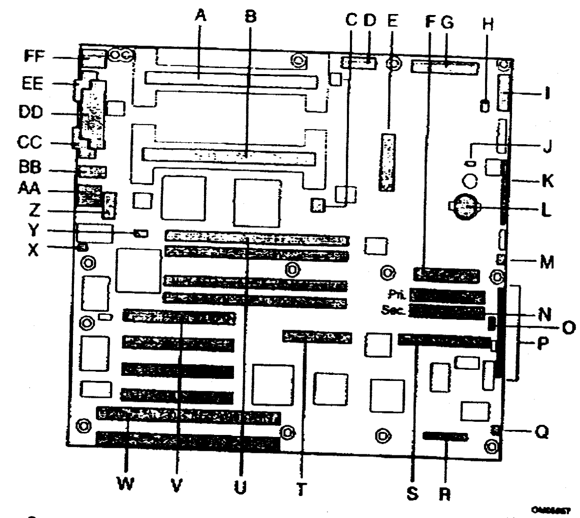
Server Board Components



A. Secondary processor connector
B. Primary processor connector
C. Processor Heatsink fan connectors
D. Aux power connector
E. ATX power connector
F. Diskette drive connector
G. Main power connector
H. Hard drive LED connector
I. Front panel connector, 16 pin
J. Speaker connector
K. AT† front panel connector
L. Lithium backup battery
M. System fan connector (fan1)
N. IDE connectors, primary and secondary
O. External IMB connector
P. Configuration jumper blocks
Q. System fan connector (fan2)
R. Server monitor module (SMM) connector
S. Narrow SCSI connector
T. Wide SCSI connector
U. Memory sockets for four DIMM components
V. PCI slots for add-in boards
W. ISA slots for add-in boards
X. Chassis intrusion connector
Y. WOL enable jumper
Z. USB header
AA. RJ-45 network connector
BB. Serial port 2 header
CC. VGA† monitor port
DD. Parallel port connector
EE. Serial port 1 connector
FF. Keyboard and Mouse PS/2† compatible connectors

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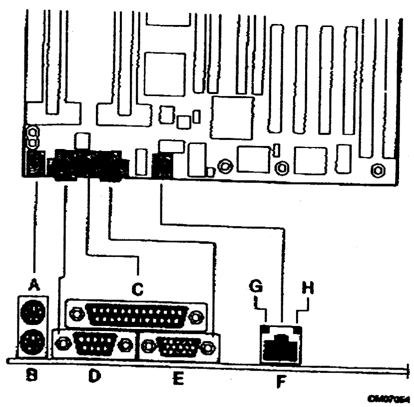
Back Panel Connectors



A. Mouse Connector
B. Keyboard Connector
C. Parallel Port Connector
D. Serial Port Connector
E. VGA Connector
F. Network Connector
G. Green NIC LED
H. Orange NIC LED

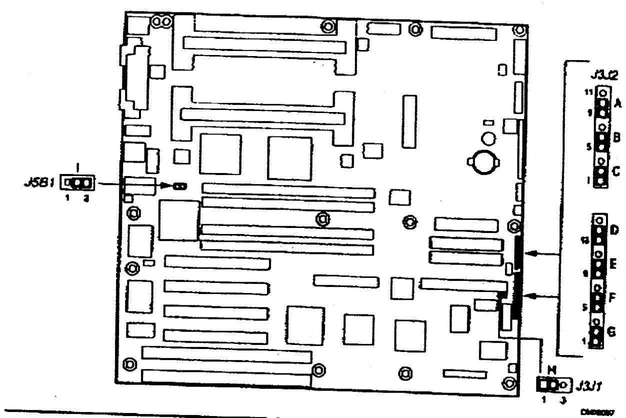
NOTE

Serial Port 2 connector required for EMP: If you wish to use the Emergency Management Port (EMP) features and software, you must install a serial port connector and connect it to the header on the server board. If there is no opening on the chassis I/O shield, use the included expansion slot cover.

NIC LED Color	If it's on	If it's blinking	If it's off
Orange	100 Mbps network connection.	NA	10 Mbps network connection.
Green	Linked to network, no network traffic.	Linked to network, sending or receiving data.	Not linked to network.

Jumpers

One 12-pin single inline header and one 9-pin single inline header provide seven 3-pin jumper blocks that control various configuration options, as shown in the figure below. The shaded areas show default jumper placement for each configurable option. Refer to the *N440BX Product Guide* for more information.



Jumper Block	Pins (default in bold)	What it does at system reset
A. BMC Forced Update Mode	**9-10, Normal**	System boots normally.
	10-11, Program	System tries to update BMC firmware.
B. Chassis Intrusion Detection	**5-6, Enable**	Switch installed on chassis indicates when cover has been removed.
	6-7, Disable	Chassis intrusion switch is bypassed.
C. FRB Timer Enable	**1-2, Enable**	FRB operation is enabled (system boots from processor 1 if processor 0 fails).
	2-3, Disable	FRB is disabled.
D. Boot Block Write Protect	**13-14, Protect**	BIOS boot block is write-protected.
	14-15 Erase/Program	BIOS boot block is erasable and programmable.

continued

Jumper Block	Pins (default in bold)	What it does at system reset
E. Recovery Boot	**9-10, Normal**	System attempts to boot using the BIOS stored in flash memory.
	10-11, Recovery	BIOS attempts a recovery boot, loading BIOS code from a floppy diskette into the flash device. This is typically used when the BIOS code has been corrupted.
F. Password clear	**5-6, Protect**	Maintains the current system password.
	6-7, Erase	Clears the password.
G. CMOS clear	**1-2, Protect**	Preserves the contents of NVRAM.
	2-3, Erase	Replaces the contents of NVRAM with the manufacturing default settings.
H. BMC boot block write protect	**1-2, Protect**	BMC boot block is write protected.
	2-3, Erase/Program	BMC boot block is erasable and programmable.
I. WOL Enable	**1-2, Disabled**	Disables Wake On LAN. If your power supply does not provide 0.8 A of +5 V Standby current, you must move the WOL Enable jumper to this position.
	2-3, Enabled	Enables Wake On LAN.

CAUTION

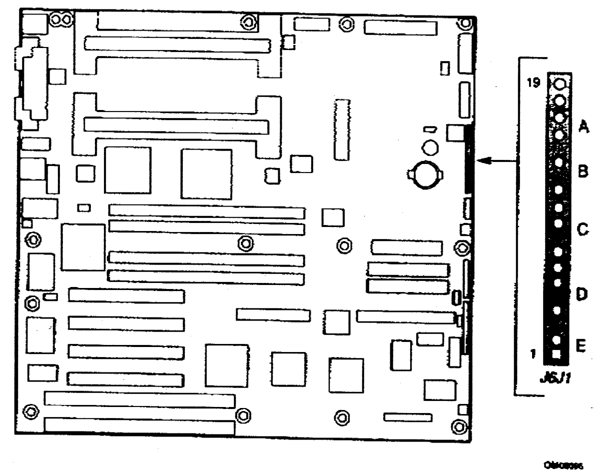
Moving either of the boot block write protect jumpers (J3J2-D or J3J1) may cause significant damage to the server board. Only move these jumpers when directed to by your customer service representative.

NOTE

+5 V Standby required for WOL: If you wish to use the WOL feature, your power supply must provide 0.8 A of +5 V Standby current. If it does not, your server board may not boot. Move the WOL Enable jumper to the Disabled position if your power supply does not provide the required current.

ATX (Front Panel) Controls and Indicators

The N440BX server board has connectors that meet the standard AT interface for LED indicators and other functions. The connector block is at J6J1.



Connector	Pin	Signal
A. Reset switch	17	Reset switch
	16	GND
B. Power LED	14	GND
	13	N/C
	12	+5V
C. Speaker	11	SPKR_HDR
	10	PIEZO_IN
	9	N/C
	8	GND
D. Hard drive activity LED	7	+5V
	6	HD activity LED
	5	N/C
	4	+5V
E. Power switch	2	GND
	1	Power button

Fan Connectors

The server board has four 3-pin, shrouded, and keyed fan connectors. Two are located next to the processor sockets (one for each processor) for a tachometer fan heat sink. The remaining two fan connectors attach to system fans equipped with sensors that indicate whether the fan is operating. The sensor pins for these fans are routed to the Baseboard Management Controller (BMC). You can use LANDesk® Server Manager or the EMP to monitor fan failure.

System Fan Connectors

Pin	Signal Name
1	Ground
2	Fan Sensor
3	+12 V

Fan Heat Sink Connectors

Pin	Signal Name
1	Ground
2	+12 V
3	Fan Sensor

Chassis Intrusion Connector

The server board supports chassis intrusion monitoring. The server board recognizes an open switch as a chassis open condition. If the Chassis intrusion detection jumper is disabled, the switch is bypassed, and the BMC does not monitor if the chassis has been opened.

SCSI Support

The server board includes a Symbios† SYM53C876 dual channel Ultra SCSI controller chip that is integrated as a PCI bus master. The adapter supports 8- or 16-bit Fast SCSI that provides 10 or 20 MB/sec throughput, or Fast-20 Wide SCSI that can burst data at 20 or 40 MB/sec.

No logic, termination, or resistor loads are required to connect devices to the SCSI controller other than termination in the device at the end of the cable. The SCSI bus is terminated on the server board with active terminators that cannot be disabled. The onboard device must always be at one end of the bus.

Use the integrated Symbios SCSI Utility to:

- Change default values
- Check or change any SCSI device settings that conflict with those of other devices in the system
- Perform a low-level format on SCSI devices installed in the system

To enter the SCSI Utility after you have integrated the server board into a working system, boot the computer and press <Ctrl><C> when the following message appears:

```
Press <Ctrl><C> to start configuration uitlity
```

For information on SCSI termination and cabling, see the *N440BX Server Board Product Guide*.

Low Cost PCI RAID Support

The AMI MegaRAID† Express 762 RAID controller card supports the Symbios SYM53C876 and is a high-performance, low-cost hardware RAID solution.

Troubleshooting Tips

The system does not boot or show video at power on? Follow the three steps below.

1) Does the power supply fan turn on?

   No: If configuring with only one processor verify that the processor is in the Primary CPU slot and the termination card is in the Secondary CPU slot. (See the Server Board Components drawing)

   Note: There are three power connectors on the N440BX. One is a standard ATX power connector and the other two are proprietary connectors. Verify that the correct on-board power connector is being used.

2) What kind of memory are you using?

   Only 3.3 V, 168-pin, unbuffered or registered, 100 MHz, PC/100 compliant SDRAM DIMMs with gold plated contacts is supported. It may be either 72-bit (ECC) or 64-bit (non-ECC). Contact your service representative, or see the support website for a list of supported memory.

3) Are you using a power supply that supports WOL?

   Your power supply must provide 0.8 A of +5 V Standby current to support WOL. If it does not provide this current, move the WOL Enable jumper (J5B1) to the disable position (pins 1-2).

The system sometimes works, but is exhibiting erratic behavior:

This is typically the result of using a under-powered power supply. Make sure it's at least a 300 W power supply.

The on-board Intel EtherExpress adapter is not recognized by the operating system.

Make sure Plug'N'Play OS is set to NO in the BIOS Setup for non Plug'N'Play operating systems.

The SCSI hard drive(s) are recognized during POST but not by the OS?

Make sure no pins are bent and that all connectors are firmly plugged in. Also verify the SCSI bus is properly terminated

Getting Help

World Wide Web

http://support.intel.com/support/motherboards/server/

Telephone

Talk to a Customer Support Technician* (Intel reserves the right to change pricing for telephone support at any time without notice).

In U.S.: **1-900-555-5800** (M–F, 7:00 *am*–5:00 *pm*, Th 7:00 *am*–3:00 *pm*, PST). Calls billed at U.S. $2.50 per minute.

In U.S. and Canada: **1-800-404-2284** (M–F, 7:00 *am*–5:00 *pm*, Th 7:00 *am*–3:00 *pm*, PST). Credit card calls billed at U.S. $25 per incident.

In Europe:

English language:	+44-131-458-6847
French language:	+44-131-458-6848
German language:	+44-131-458-6954
Italian language:	+44-131-458-6951

(M, Th, F, 8:00 *am*–5:00 *pm*, T–W, 8:00 *am*–4:00 *pm*, UK time)
Credit card calls billed at U.S. $25 per incident (levied in local currency at the applicable credit card exchange rate plus applicable VAT).

In Asia-Pacific region (Singapore local time, Oct–April: M–F, 6:00 *am*–4:00 *pm*, April–Oct: M–F, 5:00 *am*–4:00 *pm*).
Credit card calls billed at U.S. $25 per incident.

Australia (Sydney):	+1-800-649-931
Hong Kong:	+852-2-844-4456
Korea:	+822-767-2595
PRC:	+852-2-844-4456
Singapore:	+65-831-1311
Taiwan:	+886-2-718-9915

Rest of the world: Call the North American Service Center at **+1-916-377-7000** (M–F, 7:00 *am*–5:00 *pm*, U.S. pacific standard time).
Credit card calls billed at U.S. $25 per incident.

* Or contact your local dealer or distributor.

Technical Training & Support

If you are registered in the Intel Processor Dealer Program (North America), the Genuine Intel Dealer Program (Asia-Pacific Region), or the Intel Processor Integrator Program (Europe), you are eligible for technical training and support.

In U.S. and Canada: **1-800-538-3373**, ext. 442 (M–F, 5:00 *am*–5:00 *pm*, PST)

In Europe: contact your distributor or fax your details to European Literature on **+44 (0) 1793 513142**.

In Asia: **+65-831-1379** (M–F, 8:30 *am*–5:30 *pm*, Singapore local time) or via e-mail: **APAC_gid@ccm.isin.intel.com**

Appendix D – AGENT AUTHORIZATION LETTER

Premio Computer, Inc.
938 Radecki Court
City of Industry, CA 91744
Tel. (626) 839-3100
Fax: (626) 839-3199
www.premiopc.com

Inc. 500

FEDERAL COMMUNICATION COMMISSION
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Subject: *Agent Authorization*

TO WHOM IT MAY CONCERN:

We, the undersigned, hereby authorize Bay Area Compliance Laboratory Corporation to act on our behalf in all matters relating to application for Assignment of Applicant Code, including the signing of all documents relating to these matters. All acts carried out by Bay Area Compliance Laboratory Corporation on our behalf shall have the same as our own.

Sincerely,

Name: (Signature) _____ 8/19/98

(Print) Crystal Wu

Title: President

Company: PREMIO Computer, Inc.