

Quick Start Guide

Before You Begin	4
Cautions and Warnings.....	4
Safety and Regulatory Requirements.....	5
Minimum Hardware Requirements.....	5
Installation Notes	6
I/O Shield.....	6
Microprocessor	7
Memory	8
Power Connectors.....	8
Server Board Components.....	9
Back Panel Connectors.....	10
Jumpers.....	11
ATX (Front Panel) Controls and Indicators.....	13
Fan Connectors	14
Chassis Intrusion Connector.....	14
SCSI Support.....	14
Troubleshooting Tips.....	15
Getting Help	16

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.

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[†] Third-party brands and trademarks are the property of their respective owners.

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

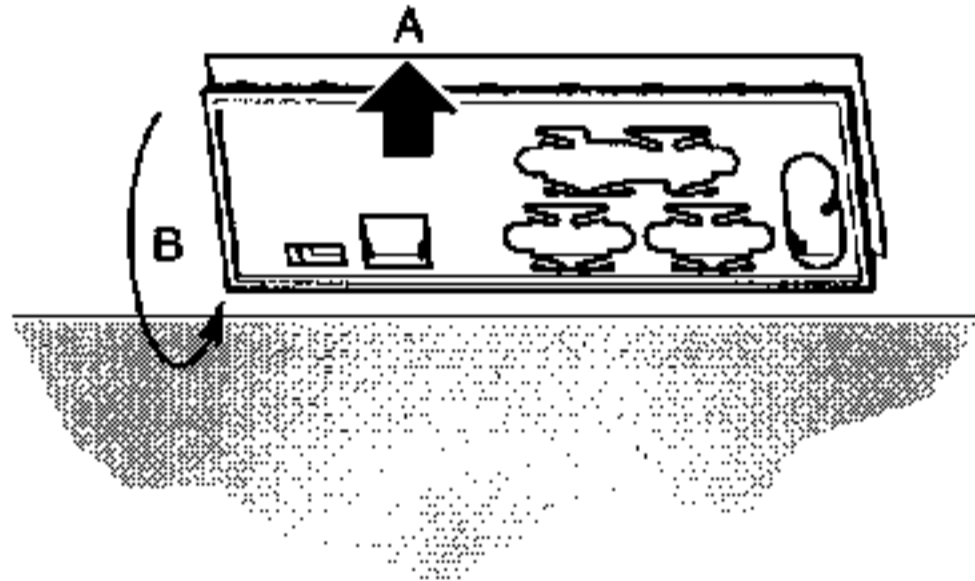
I/O Shield

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 seated (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

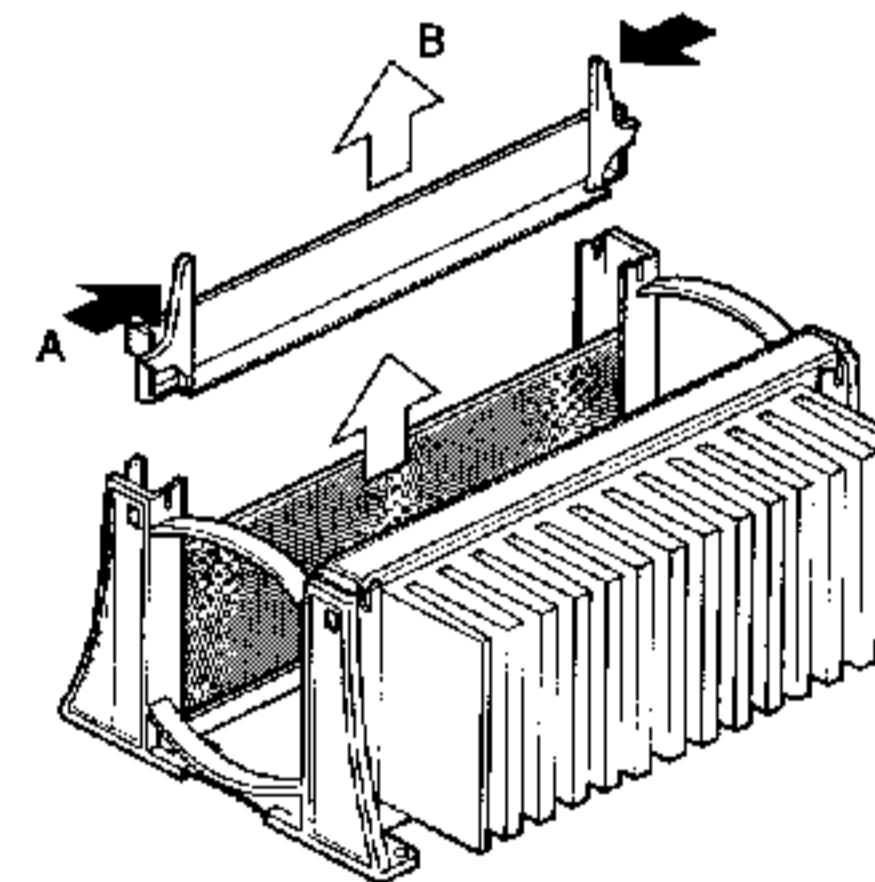
The N440BX server board supports up to two Intel Pentium II processors (with 100 MHz FSB). Each processor is packaged in a Single Edge Contact (S.E.C.) cartridge. The cartridge includes the processor core operating at 333 MHz, or faster, with an integrated 32 KB (16 KB data, 16 KB instruction) primary (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.

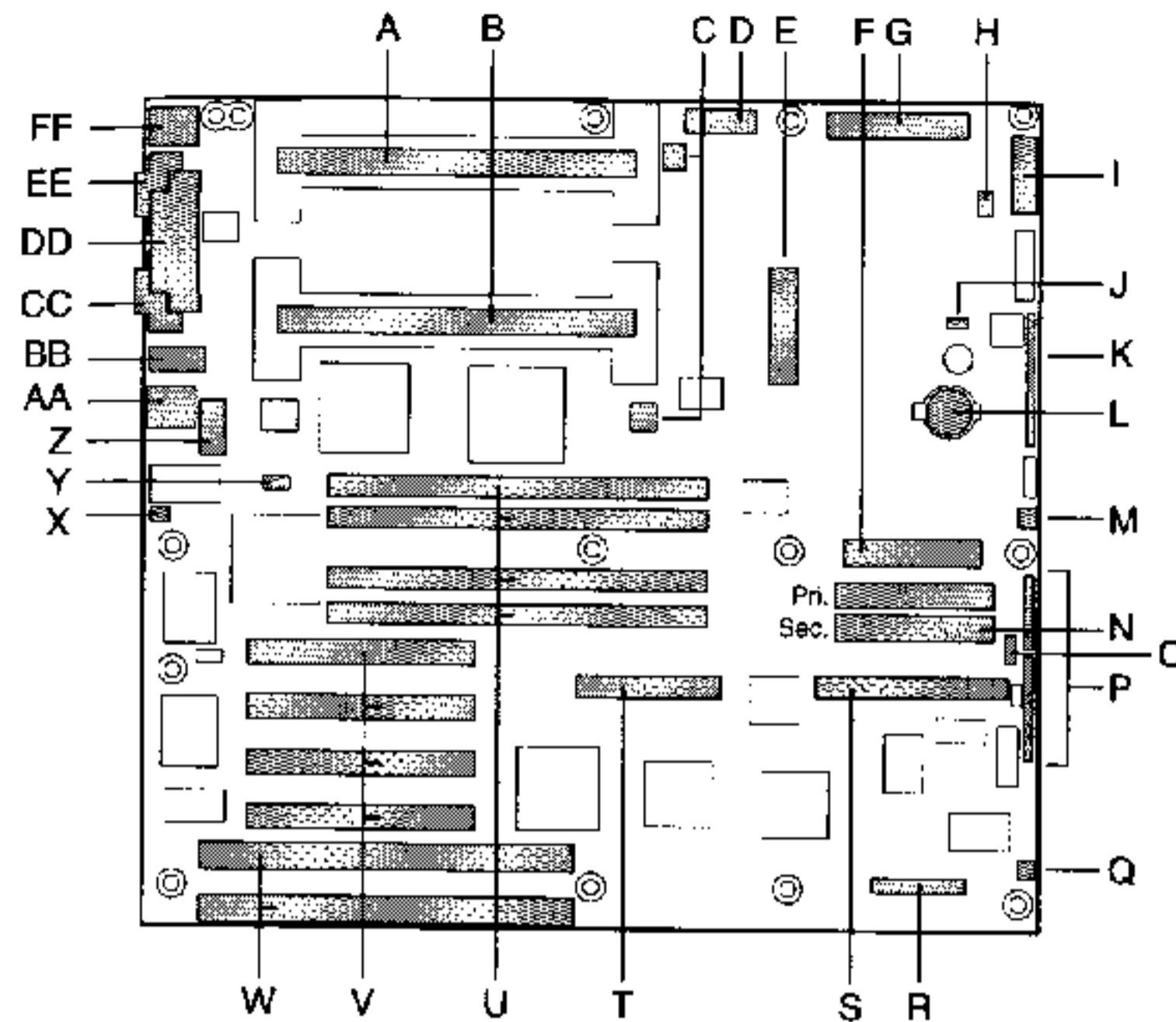


CAUTION, Use the correct power connector

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.

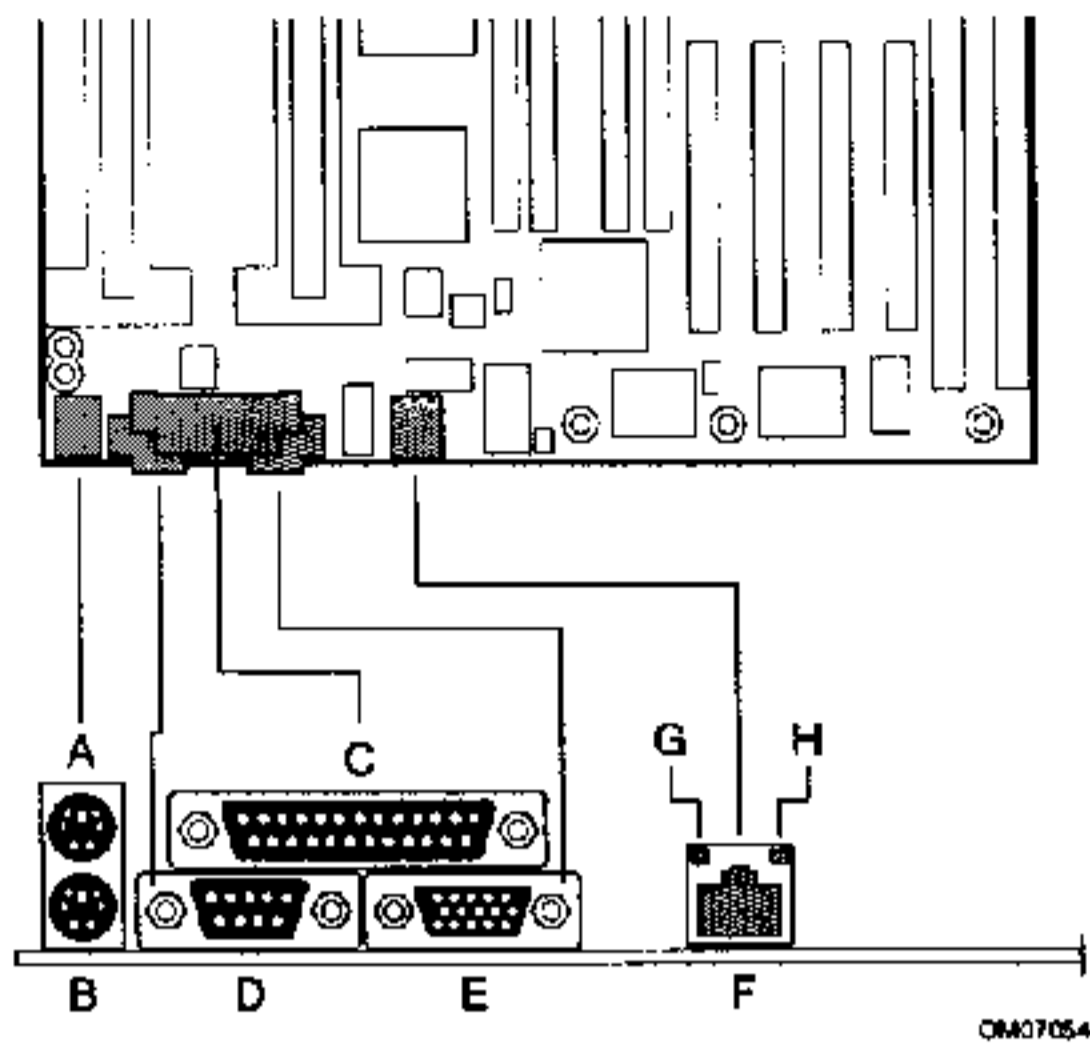
Server Board Components



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

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

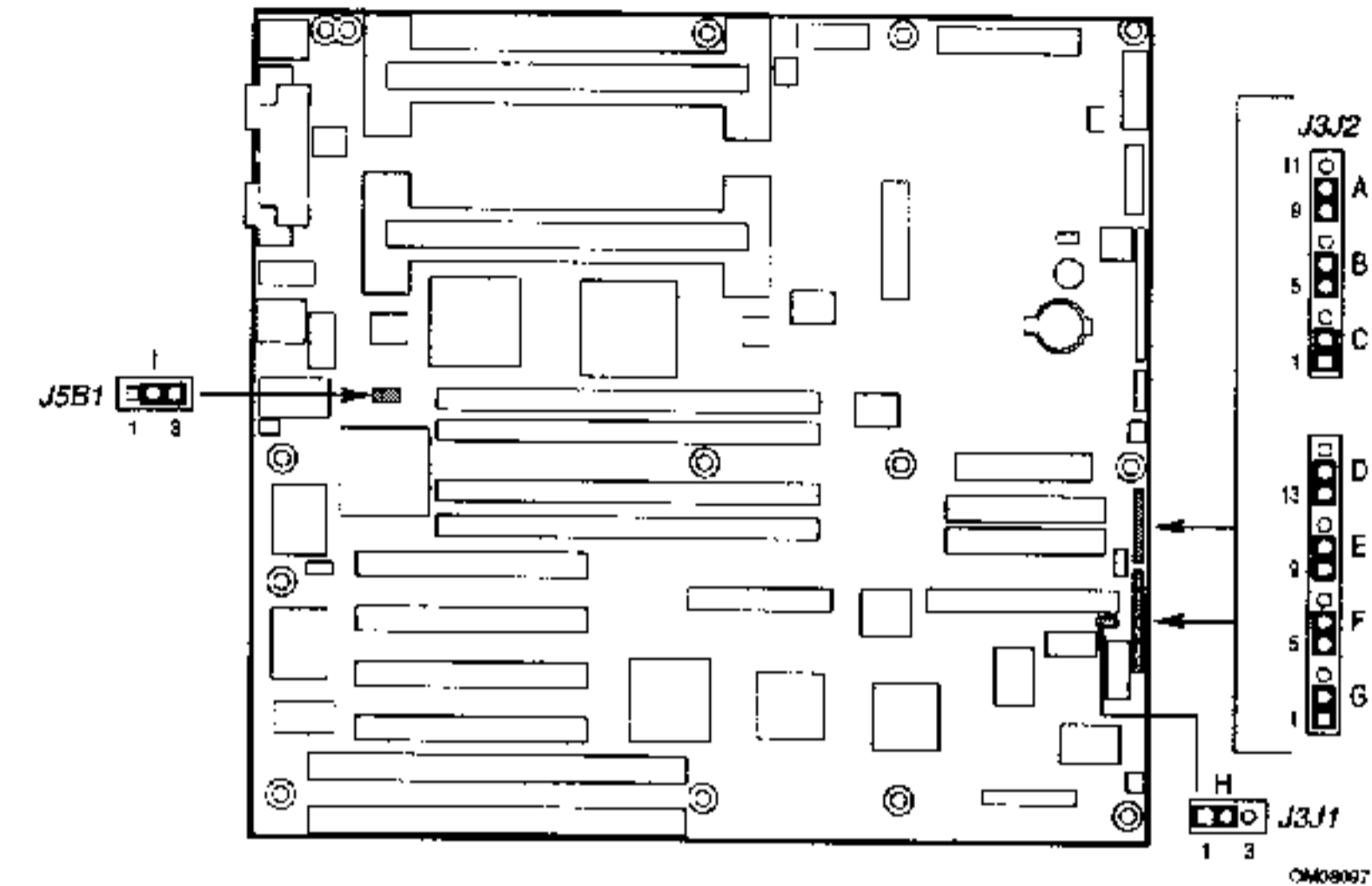
NOTE

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 10-11, Program	System boots normally. System tries to update BMC firmware.
B. Chassis Intrusion Detection	5-6, Enable 6-7, Disable	Switch installed on chassis indicates when cover has been removed. Chassis intrusion switch is bypassed.
C. FRB Timer Enable	1-2, Enable 2-3, Disable	FRB operation is enabled (system boots from processor 1 if processor 0 fails). FRB is disabled.
D. Boot Block Write Protect	13-14, Protect 14-15 Erase/Program	BIOS boot block is write-protected. 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.

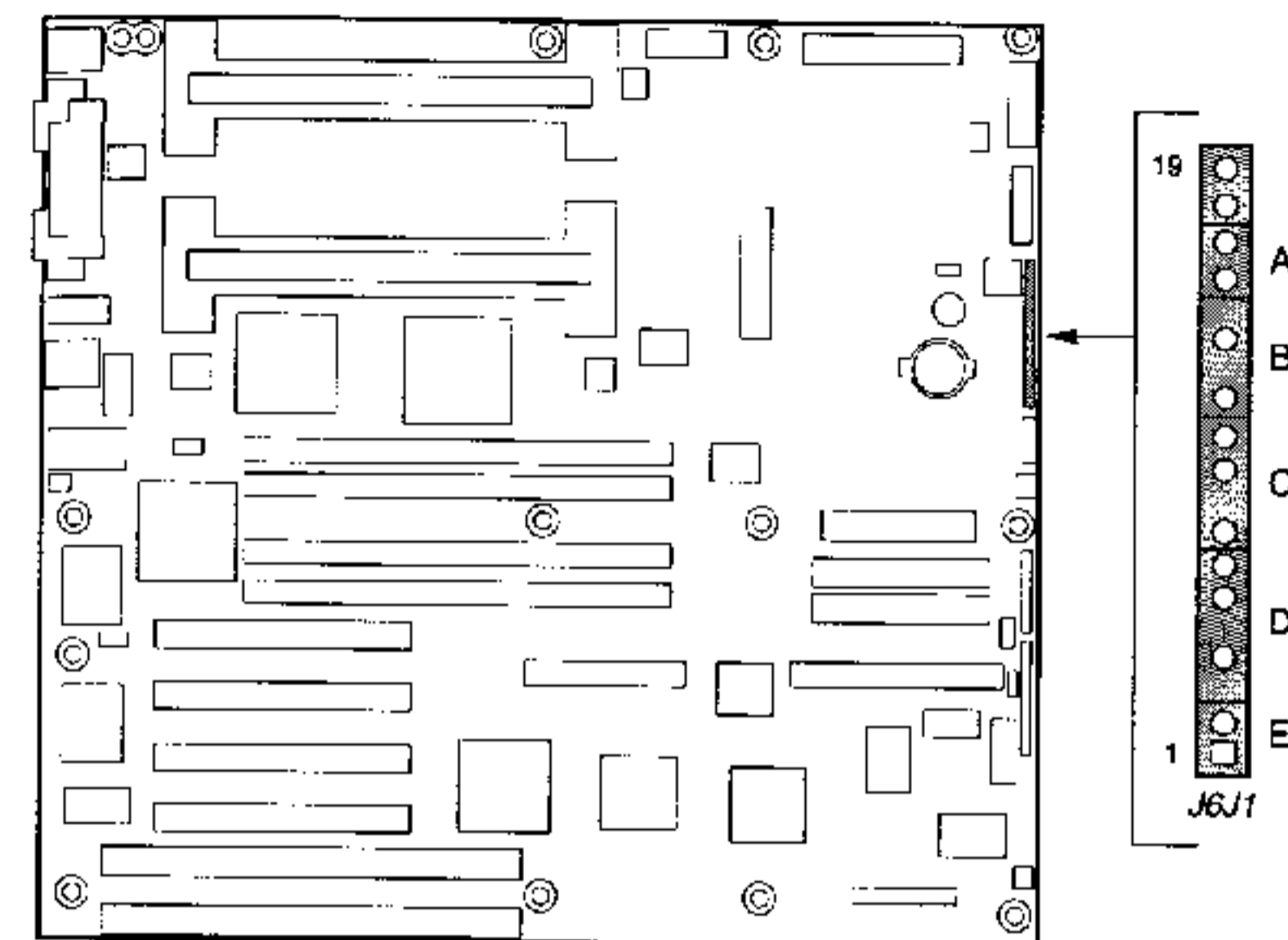


NOTE

+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.



OM08096

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 utility

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.: **1-900-555-5900** (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**