

# Ak450NX MP Server Board Set

## *Specification Update*

Order Number 245146-009  
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Enterprise Server Group



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## Revision History

Date of Revision	Version	Description
February 1999	-001	This document is the first Specification Update for the <i>Intel® Ak450NX MP Server Board Set Technical Product Specification</i> .
March 1999	-002	Updated Table 1 information.
April 1999	-003	Updated Table 1
May 1999	-004	Added Errata 13
October 1999	-005	Added information on Board Configuration Jumper, Updated Table 1
March 2000	-006	Updated Table 1
April 2000	-007	Added Table1, Added Errata 14
June 2000	-008	Added Errata 15, and 16
July 2000	-009	Updated Table 1

## Preface

This document is an update to the specifications contained in the *Ak450NX MP Server Board Set Technical Product Specification*. It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools. It contains Specification Changes, Specification Clarifications, and Documentation Changes.

This document does not cover errata related to the AC450NX Server System. Refer to the *AC450NX Server System Specification Update* and the errata document for specification updates concerning the AC450NX Server System.

## Nomenclature

**Specification Changes** are modifications to the current published specifications. These changes will be incorporated into the next release of the specifications.

**Specification Clarifications** describe a specification in greater detail or further highlight a specification's impact on a complex design situation. These clarifications will be incorporated into the next release of the specifications.

**Documentation Changes** include typos, errors, or omissions from the current published specifications. These changes will be incorporated into the next release of the specifications.

**Errata** are design defects or errors. Characterized errata may cause the behavior of the Ak450NX MP Server Board Set to deviate from published specifications. Hardware and software designed to be used with any given printed board assembly (PBA) and firmware revision level must assume that all errata documented for that PBA and firmware revision level are present.

## General Information

For a complete revision history of system and board set level components, refer to the most recent Monthly Conversion Summary document for the Ak450NX and AC450NX product. Basic Ak450NX MP Server Board Set Identification information is shown in the Table 1.

**Table 1 - Basic Ak450NX MP Server Board Set Identification Information**

Component (Module) Description	Base PBA Number	PBA Revision Number	Fab Rev	Released BIOS/SSU/ firmware revision	Suggested BIOS/SSU/ firmware revision	Notes (See below)
CPU Baseboard	702545	301	2.1			
		302	2.1			
		501	2.3			
I/O Baseboard	704310	201	2.1	BIOS PR1, BMC02, SMIC83, SDR04	BIOS PR12, BMC10, SMIC86, SDR10	
		202	2.1	BIOS PR1, BMC02, SMIC83, SDR04	BIOS PR12, BMC10, SMIC86, SDR10	
		301	2.1	BIOS PR1, BMC02, SMIC83, SDR04	BIOS PR12, BMC10, SMIC86, SDR10	
		302	2.1	BIOS PR4, BMC08, SMIC86, SDR08	BIOS PR12, BMC10, SMIC86, SDR10	
		303	2.1	BIOS PR10, BMC10, SMIC86, SDR10	BIOS PR12, BMC10, SMIC86, SDR10	
		401	2.2	BIOS PR12, BMC10, SMIC86, SDR10	BIOS PR12, BMC10, SMIC86, SDR10	
		402	2.2	BIOS PR13, BMC10, SMIC86, SDR10	BIOS PR13, BMC10, SMIC86, SDR10	
Memory Board	702897	102	2.0			
PCI Hot Plug LED Board	732966	003	1.3			
I/O Riser Card	679267	102	2.1			
		201	2.0			
Midplane	701476	201	2.1			
		202	2.2			
		301	2.3			
		401	2.3			

The Enterprise Server Group (ESG) supports the Performance Microprocessor Division's (PMD) position on mixed steppings in MP systems, however please note that you can not mix processors with cache steppings requiring different voltages in the same system. The AD450NX system architecture implements one VRM to supply the same voltage to the cache core of two processors.

The following Table 2 indicates which stepping of the Pentium® II Xeon™ processor can be mixed within the same system. Table 3 indicates which stepping of the Pentium® III Xeon™ processor can be mixed within the same system. An "X" denotes which stepping can be mixed and a blank indicates the Ak450NX MP Server Board Set does not support the given BIOS/stepping combination. NS indicates that processors with that S-Spec number are not supported in the AC450NX System.

**Table 2 - Supported Pentium® II Xeon™ Processor / BIOS Combinations**

<b>PROCESSOR STEPPING</b>	<b>B0</b>	<b>B0</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>	<b>B1</b>
<b>FREQUENCY</b>	400MHz	400MHz	400MHz	400MHz	400MHz	400MHz	450MHz	450MHz	450MHz	450MHz	450MHz	450MHz	450MHz	450MHz
<b>CACHE SIZE</b>	512K	1M	512K	512K	1M	1M	512K	512K	512K	512K	1M	1M	2M	2M
<b>STEPPING ID</b>	0652h	0652h	0653h	0653h	0653h	0653h	0653 h	0653 h	0653 h	0653 h	0653 h	0653 h	0653 h	0653 h
<b>S-SPEC</b>	SL344	SL345	SL34H	SL35N	SL34J	SL35P	SL2XJ	SL33T	SL354	SL36W	SL2XK	SL33U	SL2XL	SL33V
<b>SL344</b>	x													
<b>SL345</b>		x												
<b>SL34H</b>			x	x										
<b>SL35N</b>			x	x										
<b>SL34J</b>					x	x								
<b>SL35P</b>					x	x								
<b>SL2XJ</b>							x			x				
<b>SL33T</b>														
<b>SL354</b>														
<b>SL36W</b>							x			x				
<b>SL2XK</b>											x	x		
<b>SL33U</b>											x	x		
<b>SL2XL</b>													x	x
<b>SL33V</b>													x	x
<b>BIOS</b>														
<b>PRODUCTION RELEASE 12</b>	x	x	x	x	x	x	x	NS	NS	x	x	x	x	x



**Table 3 - Supported Pentium® III Xeon™ Processor / BIOS Combinations**

<b>PROCESSOR STEPPING</b>	<i>B0</i>	<i>B0</i>	<i>B0</i>	<i>B0</i>	<i>B0</i>	<i>B0</i>	<i>C0</i>	<i>C0</i>	<i>C0</i>	<i>C0</i>	<i>C0</i>	<i>C0</i>
<b>FREQUENCY</b>	500MHz	500MHz	500MHz	500MHz	500MHz	500MHz	500MHz	500MHz	500MHz	550MHz	550MHz	550MHz
<b>CACHE SIZE</b>	512K	512K	1M	1M	2M	2M	512K	1M	2M	512K	1M	2M
<b>STEPPING ID</b>	0672 H	0672 H	0672 H	0672 H	0672 H	0672 H	0673 H	0673 H	0673 H	0673 H	0673 H	0673 H
<b>S-SPEC</b>	SL2XU	SL3C9	SL2XV	SL3CA	SL2XW	SL3CB	SL385	SL386	SL387	SL3LM	SL3LN	SL3LP
<b>SL2XU</b>	X	X					X					
<b>SL3C9</b>	X	X					X					
<b>SL2XV</b>			X	X				X				
<b>SL3CA</b>			X	X				X				
<b>SL2XW</b>					X	X			X			
<b>SL3CB</b>					X	X			X			
<b>SL385</b>	X	X					X					
<b>SL386</b>			X	X				X				
<b>SL387</b>					X	X			X			
<b>SL3LM</b>										X		
<b>SL3LN</b>											X	
<b>SL3LP</b>												X
<b>BIOS</b>												
<b>PRODUCTION RELEASE 12</b>	X	X	X	X	X	X	X	X	X	X	X	X

**Table 4 - Intel® 450NX PCIset components (all 100MHz)**

<b>TYPE</b>	<b>STEPPING</b>	<b>S-SPEC</b>
82451 (MIOC)	B1	SL2RV
82452 (RCG)	B0	SL2RW
82454 (PXB)	C0	SL36R
82453 (MUX)	B0	SL2RX
82454 (PXB)	B1	SL2ZA

## Summary Table of Changes

The following table indicates the Specification Changes, Specification Clarifications, or Documentation Changes that apply to the Ak450NX MP Server Board Set. Intel intends to fix some of the errata in the future, and to account for the other outstanding issues through documentation or specification changes as noted. This table uses the following notations:

### CODES USED IN SUMMARY TABLES

Doc:	Document change or update that will be implemented.
Fix:	Intel intends to fix this erratum in a future revision of the hardware or software associated with the Ak450NX MP Server Board Set. (Fix in future release)
Fixed:	This erratum has been fixed.
NoFix:	There are no plans to fix this erratum. (Will not fix)
Shaded:	This erratum is either new or modified from the previous version of the document.

**Table 5 - Errata**

NO.	PLANS	ERRATA
1	Fix	BIOS can not update the vendor ID registers in Cirrus 5446 video controller.
2	Fixed	Processor Offline occurred during soft reboot with bridge adapters in slot 1 or 2.
3	No Fix	System will hang during Post when configured with PC Concept Soft Keyboard.
4	Fixed	10V Reference on Ak450NX Midplane has 400 mV triangle wave.
5	Fixed	Windows NT* blue screen and hangs occurs cycling shutdown/restart.
6	Fix	PCI Hot Plug like for like adapter card replacement functionality is not supported under UnixWare 7.0.1.
7	Fixed	Use of AHA-3940AUW SCSI Controller Card with 450NX Chipset Requires BIOS 1.34.1s1.
8	Fixed	DAC960PG causes power fault in PCI Hot Plug (PHP) slots.
9	No Fix	Disabling BIOS flash write enable with I/O Board jumper causes hang.
10	Fix	Adding Intel® EtherExpress™ PRO/100+ LAN adapter can cause system to Power On.
11	Fix	Ak450NX possible problem with +12V over current on 64bit PCI slots.
12	Fix	CORFE* I2O adapter card does not initialize
13	No Fix	Cirrus Logic part not fully compliant to PCI 2.1 Specification
14	No Fix	Mylex 96PJ will not have PHP support in NT 4.0
15	No Fix	Recovery boot always required memory populated in bank 0
16	No Fix	Symbios 53896 SCSI controller may contains unprogrammed subsystem and subsystem vendor ID registers in function 0 space

Table 6 indicates the hardware or software revisions in which each erratum was fixed when applicable.

### CODES USED IN FOLLOWING TABLE

Doc:	Document change or update that will be implemented.
Fix:	Intel intends to fix this erratum in a future revision of the hardware or software associated with the Ak450NX MP Server Board Set. (Fix in future release)

Fixed: This erratum has been fixed.

NoFix: There are no plans to fix this erratum. Will not fix

Shaded: This erratum is either new or modified from the previous version of the document.

**Table 6 - Fixed in**

NO.	PLANS	CPU Baseboard	I/O Baseboard	Memory Module	Memory Termination Module	I/O Riser Card	Midplane	Others
1	Fix		704310-401					
2	Fixed							BMC05, SMIC85
3	No Fix							
4	Fixed						701476-401	
5	Fixed							Symbios driver 4.07.00
6	Fix							
7	Fixed							Adaptec SCSI BIOS 4.34.1s1
8	Fixed							DA960PG/PJ card
9	No Fix							
10	Fix							
11	Fix		704310-401					
12	Fix							BIOS PR9
13	No Fix							
14	No Fix							
15	No Fix							
16	No Fix							

## Errata

### **1. BIOS can not update the vendor ID registers in Cirrus\* 5446 video controller.**

**DESCRIPTION:** The A stepping of the Cirrus\* 5446 video controller does not allow BIOS to update the vendor ID registers as required by the *Windows NT\* Hardware Design Guide 1.0*.

**WORKAROUND:** The B stepping of the Cirrus 5446 part is needed to allow BIOS to write to these registers.

**STATUS:** Fix in future release - The B step of the Cirrus 5446 part will be included on the PBA 704310-401 version of the Ak450NX I/O board.

### **2. Processor Offline occurred during soft reboot with bridge adapters in slot 1 or 2.**

**DESCRIPTION:** A problem has been observed where the processor will go offline after a Windows NT soft reboot (CTRL-ALT-DEL), but only with a configuration with any bridged adapter installed in the first two slots.

This symptom occurs without error messages being sent to the screen or the event log. This has been reproduced using the following adapters: Mylex\* PG(3.3V), SMC\* 9334TX, and NCR\* PDS/PQS. All of these adapters are bridged. During the soft reset it is observed that the BMC turns all four processors off, and then re-enables one processor.

**WORKAROUND:** None identified.

**STATUS:** Fixed in BMC 05 & SMIC 85.

### **3. System will hang during POST when configured with PC Concepts\* Soft Keyboard.**

**DESCRIPTION:** During validation testing this problem has been observed. The system configuration was as follows: 400 MHz 1 MB Cache, 128 MB RAM, 2 SCSI Drives, 1 IDE CDROM, BMC02, FPC08. With BIOS Beta 1 the system would hang with a POST code 52 when the keyboard was installed in the mouse port. The same POST code 52 would occur using BIOS Beta 2 when the keyboard was installed in the keyboard port.

**WORKAROUND:** None identified.

**STATUS:** No fix.

### **4. 10V Reference on Ak450NX Midplane has 400 mV triangle wave.**

**DESCRIPTION:** There is a 135 kHz 400 mV P-P triangle wave riding on the 10V reference. The reference is used for LOW margin of 3.3V and 5V. The problem is due to the RC constant of the regulated output. Ripple is filtered out in the power supplies, but will be confusing when trying to debug.

**WORKAROUND:** None identified.

**STATUS:** Fixed in 701476-401 Ak450NX Midplane Board.

### **5. Windows NT\* blue screen appears and system hangs shutdown/restart.**

**DESCRIPTION:** Blue screens have occurred on systems running a program which shuts down and restarts Windows NT\* 4.0 SP3. The two systems had several types of blue screens running Beta 1 BIOS and Alpha 11 BIOS. When upgrading to BIOS Beta 2, the frequency decreased dramatically. But the following three types of problems still occur:

- 1) Blue screen, stop 0xc000021a {fatal system error}.
- 2) Hang at or directly after Windows NT logo is displayed.
- 3) Blue screen, stop 0x0A ... IRQ\_NOT\_LESS\_OR\_EQUAL.

**WORKAROUND:** None identified.

**STATUS:** Fixed with Symbios Driver v4.07.00 .

## **6 . *PCI Hot-plug like-for-like adapter card replacement functionality is not supported under UnixWare\* 7.0.1.***

**DESCRIPTION:** BIOS is missing a Hardware Resource Table (HRT) which is required by UnixWare\* 7.0.1 in order for hot-plug operations to work. Hot plug operations consist of like-for-like adapter card replacement, hot add, hot remove or hot upgrade functionality.

**WORKAROUND:** None identified.

**STATUS:** Investigating.

## **7 . *Use of AHA-3940AUW SCSI Controller Card with 450NX Chipset requires BIOS 1.34.1s1.***

**DESCRIPTION:** When the security feature, "Password required for Boot Up" is enabled and the correct password is entered, whether it is the user or administrator password, the system locks up following detection of the Symbios devices and the loading of the Symbios boot ROM. No keyboard responses can be made and entering the password again does not effect any result.

**WORKAROUND:** It was determined that the problem was caused by having a AHA-3940AUW SCSI controller card installed. When the 3940 card was removed, the system would proceed through bootup as usual. When the 3940 was reinstalled, the system would again lock up as indicated above. This is a known issue. The BIOS on the 3940 card requires updating to version 1.34.1s1 to correct this problem.

**STATUS:** Fixed in Adaptec SCSI controller BIOS 1.34.1s1.

## **8 . *DAC960PG causes power fault in PCI Hot-plug (PHP) slots.***

**DESCRIPTION:** The DAC960PG causes a power fault in PHP slots. When the card is placed in a PHP slot and the system is powered up it trips the power limits in the HIP1011. The HIP1011 then disconnects power. In this state the card cannot be recognized (and possibly the entire bus could crash).

It was found that the DAC960PG exceeds the PCI PHP current limit of 0.5A on 12V. The DAC960PG spikes up to 4A when powered on. Since this exceeds the 0.5A spec the slot powers down. In summary, since this card violates the PHP spec it cannot be used in AC450NX system PHP slots; even with no intention of hot plugging it, the card will fail.

**WORKAROUND:** It was also found this is NOT a problem with the DAC960PG/PJ. This card does not exceed the 0.5A limit. Therefore this problem is fixed in new DAC960 cards but customers should be aware that there will always be DAC960PGs out there that have this problem.

**STATUS:** Fixed in DAC960PG/PJ card.

## **9. *Disabling BIOS flash write enable with I/O board jumper causes hang***

**DESCRIPTION:** The system cannot boot if jumper 4 on the I/O board is set to disable BIOS write enable.

**WORKAROUND:** Set jumper 4 on the I/O Board to enable BIOS write.

**STATUS:** No Fix.

## **10. *Adding Intel® EtherExpress™ PRO/100+ LAN adapter can cause system to Power On***

**DESCRIPTION:** When an EtherExpress™ PRO/100+ LAN adapter is added to a powered down system, the system will power itself back on. The PRO/100+ card has a PCI signal, PME#, added in PCI rev 2.2. The PME#'s intended use is to signal for a power-on to the system, for Wake-On-LAN\*. The PRO/100+ card does not use any standby voltage and therefore pulls the PME# signal low (signaling a Wake-On-LAN event) when the card is installed in a system with power off.

BIOS Beta3 added Wake-On-LAN capability. It was found that when the power is turned off from the front panel the power control signal goes low (telling the system to power off) approximately 300 ms before power starts to drop. Then when the PME# is pulled low enough by the voltage dropping, the power control signal will go back high (telling the system to power back on). It was noted that Wake-On-LAN would not function if this version of the PRO100+ card or a similar card is installed in the system.

**WORKAROUND:** None identified.

**STATUS:** Investigating fix in the BIOS to add a setup option that allows the PME# line to be enabled or disabled for the Wake-On-LAN capability.

### **11. Ak450NX possible problem with +12V over current on 64bit PCI slots**

**DESCRIPTION:** It has been seen that some cards such as the Intel® Emergency Management Card 2 (EMC2) Server Management card may draw more current from the +12V than the PCI spec allows. An inrush current of 5A in less than 500ns has been observed. The HIP1011 power controller has built in over current shutdown and fault indicators, but in some cases the part can fail due to the slow +12V ramp on time.

**WORKAROUND:** None identified.

**STATUS:** Fix in I/O board 704310-401. The +12V ramp on time will be changed from approximately 50ms to approximately 25ms by choosing a different value for the capacitor that controls the +12V ramp on time.

### **12. CORFE\* I2O adapter card does not initialize**

**DESCRIPTION:** It has been documented that if a certain card (Intel® EtherExpress™ PRO100+ or Adaptec\* 3940AUW) is present in any PCI slot on PCI bus segment 2, (slots 3, 4, 5 or 6) the error “resource Conflict - PCI: Bus:03, Device:08, Function:00” will occur after POST. Even when attempting to use the System Setup Utility (SSU) to resolve the conflict, the error will persist. The error will go away only when the card (EtherExpress PRO100+ or Adaptec 3940AUW) is removed from a slot on the PCI bus segment 2 and placed in PCI slots 1 or 2.

**IMPLICATIONS:** The CORFE\* I2O card cannot be initialized and used in the system.

**STATUS:** Fixed in Production Release BIOS 9 – In certain configurations of adapter cards, an arithmetic error in the BIOS can result in very large adapter memory requests.

### **13. Cirrus Logic part not fully compliant to PCI 2.1 Specification**

**DESCRIPTION:** The Cirrus logic video controller (CL-GD5446) is not fully compliant with the PCI 2.1 specification. It will sometimes insert more than 16 wait states during a transaction before retrying.

**IMPLICATIONS:** Increased wait states could cause video accesses to take more time, thus affecting video performance.

**STATUS:** Will not fix. Cirrus has not communicated any plans to fix this erratum.

### **14. Mylex 960PJ will not have PHP support in NT 4.0**

**DESCRIPTION:** Mylex 960PJ PCI card has been identified that will not have PHP support in NT 4.0. Mylex reported that 960PJ do not support hot plug functionality.

**IMPLICATIONS:** Mylex 960PJ will not have PHP support in NT 4.0.

**STATUS:** Will not fix.

### **15. Recovery boot required memory to be populated in bank 0**

**DESCRIPTION:** During a BIOS recovery on this platform, if bank 1 of memory board is populated with memory and bank 0 is left empty, the system will alarm a beep code and will not perform the recovery boot.

**IMPLICATIONS:** Recovery boot will fail if memory is not populated in bank 0.

**WORKAROUND:** Will not fix, Recovery boot always required memory populated in bank 0.

### **16. Symbios 53C896 SCSI controller may contain unprogrammed subsystem and subsystem vendor ID registers in function 0 space**

**DESCRIPTION:** After greater than 2000 power cycles of random sequenced resets (NT reboots, AC and DC power cycles) DOS utilities caught unprogrammed subsystem and subsystem vendor ID registers in function 0 of the Symbios 53C896 part. The failure does not go away with a ctl-alt-del reset but does go away with a DC power cycle. The problem was root caused to an issue in the 53C896 part.

**IMPLICATIONS:** No workarounds are available at this time.

**WORKAROUND:** No

## Specification Changes

The specification changes listed in this section apply to *the Ak450NX MP Server Board Set Technical Product Specification*. All specification changes will be incorporated into a future release of the *Ak450NX MP Server Board Set Technical Product Specification*.

**Table 7 - Specification Changes**

NO.	PLANS	SPECIFICATION CHANGES
1	Doc	CPU Jumper Settings
2	Doc	I/O Jumper Settings

### 1. CPU Jumper Settings

























**Table 8 - BoardConfiguration Jumper Block (Bus Ratio)**

Pins 5-6	Pins 7-8	Pins 9-10	Pins 11-12	Bus Ratio	Core Freq. (MHz)
1	1	1	0	11:2	550
1	1	0	0	9:2	450
1	0	1	0	7:2	350
1	0	0	0	Reserved	
0	1	1	0	5:1	500
0	1	0	0	4:1	400
0	0	1	0	3:1	300
0	0	0	0	Reserved	

**Key:** 0-open; 1-closed

### 2. I/O Jumper Settings

Please note that in jumper block J2CA jumper 4B should be labeled Reserved. This was originally labeled as BIOS Update. However, because portions of NVRAM are read during POST, it is not possible to read/write protect the flash component. If this jumper is moved to the A-B position the system will not boot.

J2C1	A	B	C	
1				Update Server Mgmt
2				Recovery Boot
3				Reserved
4				Reserved
5				CMOS Clear
6				Password Clear
7				PHP switch override
8				Enable ISP chain

## Figure 1 Configuration Jumpers



## Specification Clarifications

The specification clarifications listed in this section apply to *the Ak450NX MP Server Board Set Technical Product Specification*. All specification clarifications will be incorporated into a future release of the *Ak450NX MP Server Board Set Technical Product Specification*.

**Table 9 - Specification Clarifications**

NO.	PLANS	SPECIFICATION CLARIFICATIONS
0	Doc	none