Intel Columbus II Chassis Technical Product Specification

Released
Revision 6.0

Order Number 282957-006

March, 1998

The Columbus II chassis may contain design defects or errors known as errata. Characterized errata that may cause the Columbus II chassis's behavior to deviate from published specifications are documented in the Specification Update.

Revision History

Revision	Revision History	Date
1.0	First release.	7/96
2.0	Reformatted and production edited version.	10/96
2.1	Added preliminary information for the R440LX DP & N440BX DP board sets.	8/97
3.0	Included more information on the R440LX DP Server board.	10/97
4.0	Added further information to accommodate R440LX DP Server board constraints. Added errata appendix. Updated all information to reflect all supported Intel products.	10/97
5.0	Updated for release of N440BX DP Server board.	3/98
6.0	Corrected power supply table and took out references to ALTServer and XXpress 12". Added spares and product code tables.	3/98

***NOTE**: If printing this document from an electronic file, use a PostScript printer with the appropriate PostScript print driver to insure the drawings print clearly.*

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1. Product Overview

1.1 Introduction

This Technical Product Specification (TPS) details the following attributes of the Columbus II chassis: dimension, power system, cooling system, peripheral bays, compatible Intel server board set products, front panel, I/O and interconnects, system configurations, safety certifications, environmental limits, and reliability, availability and serviceability features.

1.2 Product Description

The Columbus II chassis is designed to use power supplies rated up to 300 watts, utilizing PS/2 form factors with low voltage enable. Fans of various sizes (80, 92, and 120mm) may be used as required by specific configurations.

The chassis is approximately 19.3" high (49.02 cm), 17.7" deep (44.96 cm), and 8.3" wide (21.08 cm). The left side of the chassis is accessed through a removable side cover. There are eight I/O filler panels on the rear of the chassis to accommodate eight full-length expansion cards.

Table 1: Chassis Dimensions

Height	19.3 inches (49.02 cm)
Width	8.3 inches (21.08 cm) (chassis), 10 inches (with feet)
Depth	17.7 inches (44.96 cm)
Clearance Front	8.5 inches (21.59 cm)
Clearance Rear	5 inches (12.7 cm)
Clearance Side	3 inches (7.62 cm) (additional side clearance required for service)

The exterior system color will match Intel Color Standard 513505 (beige, or “Intel Pearl White”).

Front Bezel
The front bezel is a single piece of molded plastic with three removable 5.25" peripheral bay covers. The customer can easily customize bezels from the standard bezel design. Behind each peripheral bay cover, a removable EMI shield is installed.

Security
At the system-level, a variety of security options are provided. A padlock loop on the rear of the system side cover can be used to prevent access to add-in cards and peripherals. Additionally, a fastener behind the side cover secures the front bezel assembly, preventing extraction of the removable media peripherals. Security features of the software and BIOS are described in each board set TPS.

I/O panel

All input/output connectors are accessible on the rear of the chassis. A removable plate can be customized to provide a variety of connector placements. Three examples of the I/O interfaces are shown below.

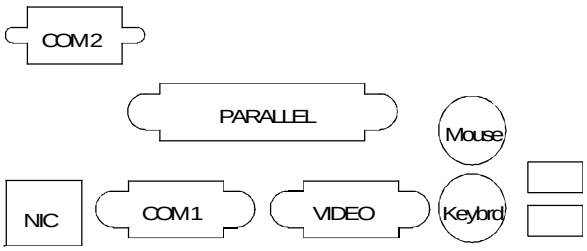

Figure 1: B440FX Style I/O Connector Map

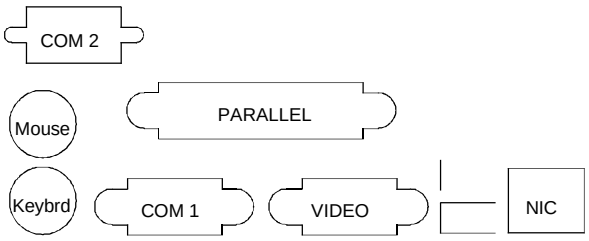

Figure 2: R440FX, R440LX, & N440BX Style I/O Connector Map

Chassis Views

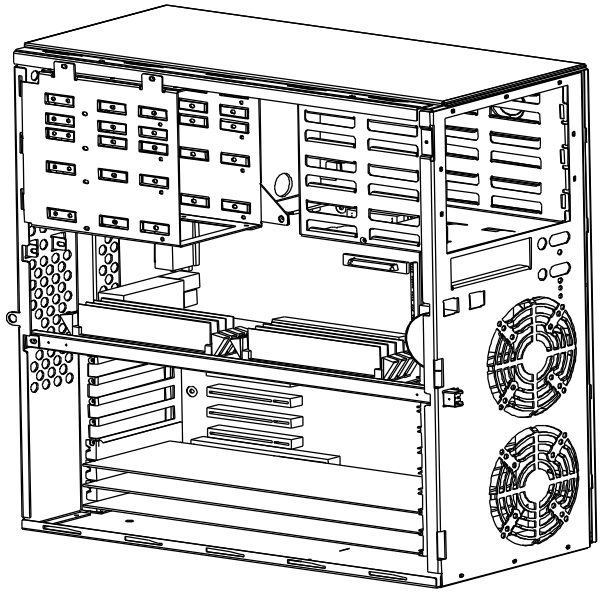

Figure 4: Columbus II Front/Side View (w/o side panel & bezel), B440FX DP Server board set is shown.

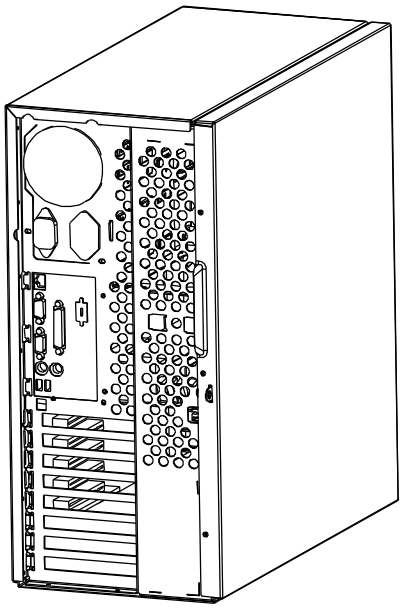

Figure 5: Columbus II Rear/Side View

2. System Configuration

2.1 Power Supply

The Columbus II chassis uses a standard PS/2 power supply. A PS/2 form factor supply was chosen for the following features: System power requirements, power distribution, form factor, thermal performance, acoustic noise, and cost. The following section is an overview of the available power supplies used with the Columbus II chassis. More detailed specifications are available for each complete server system.

The PS/2 form factor optimizes the overall system dimensions. The mechanical outline and dimensions follow the standard PS/2 form factor. These approximate dimensions are 5.5" (14 cm) by 3.4" (8.6 cm) by 5.9" (15 cm). A typical PS/2 form factor power supply with remote enable can be used. A low cost, two conductors, low voltage remote enable permits the system power to be activated from the front of the system. The 275-watt and 300-watt power supplies feature a custom baseboard connector to accommodate the addition of +3.3 VDC and remote sense lines. With the exception of the 275-watt and 300-watt models, these power supplies do not incorporate Power Factor Correction (PFC).

Table 2: Power Supply output summary

	275 Watt Supply 661386-XXX	**275 Watt Supply w/PFC* 661387-XXX**	**300 Watt Supply w/PFC*682139-XXX**
+5 VDC Output	26 Amp Max	26 Amp Max	26 Amp Max
+12 VDC Output	10 Amp Sustained 13Amp/12sec peak current	10 Amp Sustained 13Amp/12sec peak current	10 Amp Sustained 13Amp/12sec peak current
-12 VDC Output	0.5 Amp Max	0.5 Amp Max	0.5 Amp Max
-5 VDC Output	0.25 Amp Max	0.25 Amp Max	0.25 Amp Max
+3.3 VDC Output	11 Amp Max	11 Amp Max	16 Amp Max
+5 VDC Standby	750 mA Max**	750 mA Max**	800 mA Max
Output balancing	Total combined output power of +3.3v and +5v shall not exceed 147 W.	Total combined output power of +3.3v and +5v shall not exceed 147 W.	Total combined output power of +5v and +12v shall not exceed 167 W
AC Line Voltage	Switchable 100-120 VAC, 200-240 VAC settings	Auto-ranging for either 100-120 VAC or 200-240 VAC	Auto-ranging for either 100-120 VAC or 200-240 VAC
AC Line Freq.	50/60 Hz	50/60 Hz	50/60 Hz
AC Input Current	6.3 Amp at 115 VAC 3.5 Amp at 220 VAC	4.6 Amp at 115 VAC 2.3 Amp at 220 VAC	4.6 Amp at 115 VAC 2.3 Amp at 220 VAC
Board sets	B440FX DP, R440FX UP	R440LX DP	N440BX DP

*This power supply incorporates Power Factor Correction (PFC).

** Early versions of these two supplies provided 100mA of 5V standby current. Later versions are compatible with the R440LX DP Server board set and provide up to 750mA of 5V standby current.

For detailed information on these power supplies, please refer to their individual specifications: 275W Power Supply Spec # 651373, 275W PFC Power Supply Spec # 651374, 300W PFC Power Supply Spec # 682139-003 Rev3.

Fan Requirements
The power supply incorporates an 80mm, low acoustic noise fan in order to exhaust air. The sound pressure level is measured from one meter away on either side of the power supply in a free field. The worst case peak value of the measurements shall not exceed 38 dBA at 23°C ±2°C.

AC Power Line
The system is specified to operate from 100-120VAC, 200-240VAC, at 50 or 60Hz. The non-PFC power supplies are switch selectable; the PFC power supplies are auto-ranging. The system is tested to meet these line voltages and has been tested (but not specified) at ±10% of the voltage ranges and similarly, at ±3 Hz on the line input frequency.

The system is specified to operate without error at a full-power supply output load with line source interruptions not to exceed one period of the AC input power frequency (IE, 20 milliseconds at 50 Hz).

The system is specified to meet IEC 801-5. No damage will occur when a unidirectional surge wave of 2Kv is applied in the common modes (lines to protective earth) and 1Kv is applied in the normal mode (line to line).

In addition, a system with the 275-watt standard, the 275-watt PFC or the 300-watt PFC power supply is not damaged by AC surge ring wave to 3.0kV/500A. This ring wave is a 100kHz, damped oscillatory wave with a specified rise time for the linear portion of the initial half-cycle of 0.5µsec. Additionally, the system will not be damaged by a unidirectional surge wave of 1.5kV /3000A, with a 1.2µsec rise time and 50µsec duration. Further details on these waves can be obtained in ANSI/IEEE STD C62.45-1992.

Power Supply/System Configuration
A system that is built using the Columbus II chassis can only be configured with a single supply.

Server board sets using the Intel Pentium® Pro microprocessor, (B440FX DP, R440FX UP) or Intel Pentium® II microprocessor (R440LX DP, N440BX DP) use onboard DC-DC voltage converters for the processor core power requirements. These DC-DC voltage converters use +12V or +5V and may be onboard and/or plug-in Voltage Regulation Modules (VRM).

2.2 System Cooling

One or two system fans and the power supply fan will provide cooling for the processor, hard drives, and add-in cards. All system fans provide a signal for fan failure or RPM detection that the baseboard can make available for server management functions. The actual fan implemented is based on baseboard requirements. Removal of the side cover gives access to the fans. Failed fans can be easily changed with the system shut down.

2.3 System Peripheral Bays

3.5" Floppy Drive Bay

In some configurations, the chassis ships from the factory with a 3.5" floppy drive installed beneath the 5.25" peripheral bay. Access for replacement of the drive is through the removal of the side cover.

5.25" Peripheral Bays

The system design includes three 5.25" half-height peripheral bays. These bays are designed for peripherals with removable media (e.g. floppy disk, CD-ROM or tape drive). These bays will have removable filler panels installed when peripherals are not present.

Any two consecutive 5.25" bays are convertible to a single, full-height bay. A wide to narrow converter must be used to connect the 8-bit cable to some board sets (ie: B440FX DP & R440FX UP). Only one SCSI device can be installed in the 5.25" bays if six SCSI hard drives are present [(A total maximum of seven SCSI devices are supported). An optional 16-bit wide SCSI cable will use a wide to narrow converter for peripherals with narrow 8-bit SCSI connectors, in the 5.25" bays. (Not true for N440BX DP Server)] An IDE CD-ROM, IDE tape drive or a second floppy drive can also be installed. The 5.25" peripherals are removable directly from the front of the chassis after removal of the side cover and front bezel. Cosmetic cover panels are installed for all of the unused 5.25" bays by the factory.

The 5.25" bays are not recommended for a hard disk drive, due to several factors. These include hard disk drive generated EMI and increased ESD susceptibility, the manufacturer of the hard drive, or the hard drive model number that a customer may select. A hard drive will not be integrated into these bays at any Intel factory. Intel does not support hard disk drives installed into the 5.25" bays.

Internal 3.5" Hard Drive Bays

The product contains a bay for 3.5" hard drives that are accessible when the side cover is removed. The four-drive 3.5" peripheral bay accommodates four peripherals at 1.0" high or three peripherals 1.6" high. The six-drive 3.5" peripheral bay accommodates six peripherals 1.0" inch high or three peripherals at 1.6" high. The six-drive bay is used in systems configured with B440FX DP, R440LX DP, R440FX UP, and N440BX DP Server board sets. The drives are mounted in the carrier via four fasteners. The carrier is mounted in the chassis via three fasteners.

The system is designed to provide up to 11 watts of power for six 1.0" hard drives. The system is designed to provide up to 17 watts of power for three 1.6" hard drives. Peripherals must be specified to operate at a maximum ambient temperature of $50^{O}C$.

2.4 Compatible Board Sets

N440BX DP Server board features

- Single or dual Slot 1 Pentium II processor
- Intel 82440BX chipset
- 100 MHz system bus
- 1 GB with 100MHz PC/100 registered or unbuffered SDRAM DIMMs (4 sites)
- 3 PCI full length slots, 1 shared full length PCI/ISA, 1 full length ISA slot
- 1x32 bit PCI bus
- Onboard PCI Dual Ultra SCSI, (Symbios 53C876)
- Onboard PCI 10/100Mb Ethernet (Intel 82558)
- Onboard PCI SVGA graphics 2MB SGRAM (Cirrus 5480)
- Keyboard, mouse ports
- 1 parallel and 2 serial ports
- USB header

Detailed information on this product is available in the N440BX DP Server Technical Product Specification, order 243701-001.

R440LX DP Server board features

- Single or dual Slot 1 Pentium II processor, 266MHz/512KB ECC
- Intel 82440LX PCIset
- 512MB single bank 66MHz unbuffered SDRAM DIMMs (4 sites)
- 1x32 bit PCI bus
- 4 PCI slots, 1 ISA
- Onboard Ultra SCSI, 1 wide 68-pin D connector (Adaptec AIC7880)
- SVGA graphics onboard (CIRRUS)
- 1MB video memory onboard
- Intel 10/100Mb Ethernet onboard (Intel 82557)
- Keyboard, mouse ports
- 1 parallel and 2 serial ports

Detailed information on this product is available in the R440LX DP Server Technical Product Specification, order number 282998-004.

B440FX DP Server board set features

The B440FX DP Server supports one or two identical (clock speed and revision) Pentium Pro processors. The system is fully MPS 1.1 and 1.4 compliant with appropriate Pentium Pro extensions. The memory subsystem supports up to 1GB of system memory using commodity DRAM DIMMs on the processor/memory module. The baseboard provides a connector slot for the processor/memory module.

- Pentium Pro processor support 166 MHz/256KB & 512KB, 180 MHz/256KB, 200 MHz/256KB & 512KB
- Dual PCI high-performance I/O segments - PCI-0 (via host bridge) and PCI-1 (via PCI-to-PCI bridge)
- 6 PCI and 3 ISA add-in card slots - one shared slot. A total of eight can be used.
- PC-compatible I/O control (serial, parallel, keyboard, mouse)
- Intel 82440FX PCIset
- Onboard PCI bus master network, SCSI, and IDE subsystems
- Onboard Cirrus 54M40 VGA adapter (512KB memory expandable to 1MB)
- Onboard Server Management features

Table 4: Option kits for B440FX DP Server

Option Kit	Features
Processor/Memory Board	See B440FX DP TPS
ABUC2NDCPUA	Heat Sink kit for field upgrade of added processor and VRM Module (B440FX DP Only)
ACOLBUCWSCSIA	Wide SCSI Cable and two Narrow/Wide Adapters for replacement of Narrow SCSI cabling, for use with Wide SCSI Drives. (B440FX DP Only)

Detailed information on this product is available in the B440FX DP Server Technical Product Specification, order number 282968-001.

R440FX UP Server baseboard features

R440FX supports a single Pentium Pro processor. The system is fully MPS 1.1 and 1.4 compliant with appropriate Pentium Pro extensions. The R440FX UP Server baseboard uses an ATX I/O in an AT size 12"x13". Four parity DIMM sockets. Support for 512MB and up to 1GB with dual RAS DIMMs.

- Pentium Pro processor support 166 MHz/256KB & 512KB L2 cache, 180 MHz/256KB, 200 MHz/256KB & 512KB
- Intel 82440FX PCIset
- 3 PCI and 2 ISA add-in card
- PC-compatible I/O control (serial, parallel, keyboard, mouse, and USB)
- Onboard PCI bus master network adapter, SCSI, and dual IDE subsystems
- Onboard Cirrus 54M40 VGA adapter (512KB memory expandable to 1MB)
- Onboard Server Management features

Detailed information on this product is available in the R440FX UP Server Technical Product Specification, order number 282958-001.

2.5 Standard Configurations

Table 5: Standard System-level Configurations

Baseboard	B440FX DP	R440FX UP	R440LX DP	N440BX DP	KRDCOL
Modular Baseboard	Yes	No	No	No	No
Processor/Memory Board	0	N/A	N/A	N/A	No
Std Bezel	Yes	Yes	Yes	Yes	Yes
Front Panel/LED Display	non-µcontroller	non-µcontroller	non-µcontroller	non-µcontroller	non-µcontroller
3.5" Floppy	1	1	1	1	0
CDROM	1	1	1	1	0
3.5" Peripheral bay	6 drive bay	6 drive bay	6 drive bay	6 drive bay	6 drive bay
Standard Cable Set	1	1	1	1	1
Power Supply	275 Watt	275 Watt	275 Watt	300 Watt	300 Watt
Power Brick	N/A	N/A	N/A	N/A	N/A
System Fans	2 120mm or 2 92mm	2 120mm	2 120mm	2 120mm	2 120mm

2.6 System Interconnection

Signal Definitions
The standard cable construction is briefly described below. The pin-out on the connectors referred to in this section, are defined in the appropriate baseboard Technical Product Specification.

System Internal Cables
Baseboard to Front Panel

- R440LX/N440BX - 2X8 IDC connector.
- B440FX/R440FX - 2X8 IDC connector with 10 wire cable.

Baseboard to I/O Panel - B440FX/R440FX/R440LX/N440BX COM 2 only

- 2 X 5 connector with 9-wire cable to 9-pin Sub-D serial connector.

Baseboard to SCSI devices

- N440BX - Wide and narrow SCSI connectors are provided on the baseboard to support a variety of configurations without the need for expensive adapter solutions.
- B440FX/R440FX/R440LX - 50-pin narrow SCSI cable to two narrow connectors for 5.25" SCSI devices and six narrow connectors for 3.5" devices mounted in the internal bay. Narrow cable is attached to baseboard via a 50- to 68-pin (M/M) adapter. An optional 68-pin wide SCSI version of this cable can be used.

Baseboard to IDE devices

- R440FX/R440LX/N440BX - Two IDE channels are provided on the baseboard to support IDE peripherals in the external and internal peripheral bays.
- B440FX - A 40-pin, 18" IDE cable can be used for 2 IDE peripherals. The IDE cable is not included with the standard B440FX DP Server system.

Baseboard to floppy devices

- B440FX/R440FX/R440LX/N440BX - A 34-pin floppy cable supports a 3.5" floppy drive only.

Fan Connectors

- N440BX/R440LX has two 3-pin connectors mounted on the baseboard for system fans. The fan connectors pins are pin 1 - ground, pin 2 - tachometer signal, pin 3 - +12V. Two 3-pin connectors are mounted on the baseboard near the processor slots to provide power for fan/heatsink. Fans can be monitored via server management software.
- B440FX/ R440FX has four 3-pin connectors on the baseboard. These fans can be monitored via server management software. The fan connectors are pin 1 - ground, pin 2 - fault signal, and pin 3 - +12V. This pin-out is different than used on previous chassis and baseboard designs.

2.7 Front Panel

B440FX/R440FX/R440LX

The front panel contains two momentary switches; one for Power ON/OFF and one for system reset. The front panel also contains 2 LEDs. There is a green Power ON LED and a yellow hard drive access LED. These LEDs are behind plastic light pipes.

Table 6: Columbus II LED current

SIGNAL NAME	RECOMMENDED SERIES R VALUE	MAX CURRENT	LED COLOR
PWR_GOOD	150 ohms	20 mA	GREEN
HD_ACTIVITY#	150 ohms	20 mA	GREEN

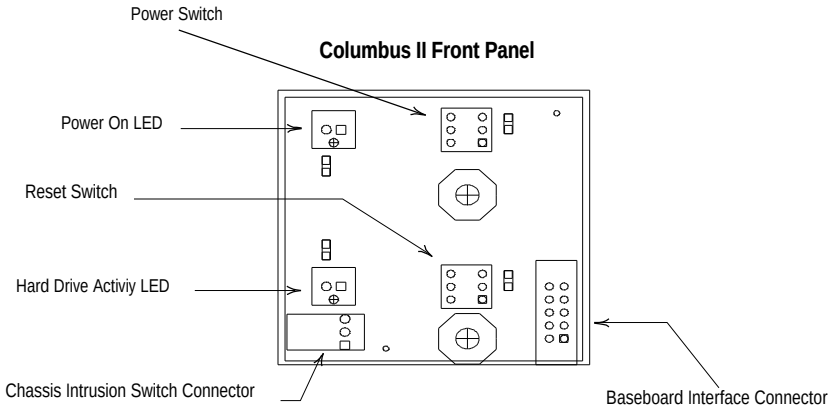

Figure 3: Front Panel for B440FX DP, R440LX DP, N440BX and R440FX UP

Table 7: Baseboard/Front Panel Interface

Pin #	I/O	Description
1	--	GND
2	I	TTL Low true = hard disk activity, requires series R for LED
3	O	TTL Low True = reset system
4	O	TTL Low True = toggle system power
5	--	VCC
6	--	Spare

2.8 Chassis Intrusion Switch Connector Interface

Table 8: Chassis intrusion switch connector interface

Pin #	I/O	Description
1	O	TTL High True = Chassis switch
2		Chassis switch return (GND or output of next chassis switch connector)
3	O	TTL High True = Chassis switch

3. Certification

3.1 Safety

USA
The system is UL listed to UL 1950, 3rd Edition.

Canada
The system is certified by UL (cUL) to meet the requirements of CSA C22.2 No. 950-M93. The product will bear the cUL mark.

Europe
The system is certified to meet the requirements of EN 60 950 with by TUV (GS License).

International
The system is certified to meet the requirements of amendments and IEC 950 with amendments, EN 60 950 with amendments and Nordic deviations by NEMKO.

3.2 Electro-Magnetic Compatibility

USA
The system is certified to FCC CFR 47 Part 15, Class B.

Canada
The system complies with the Limits for Radio Noise Emissions for Class B Digital Apparatus as required by Industry Canada (IC).

Europe
The system complies with the EU EMC directive (89/336/EEC) via EN 55022, Class B and EN 50082-1. The product will carry the CE mark. The system is tested to the following immunity standards and maintains normal performance within these specification limits:

IEC 801-2 ESD Susceptibility (level 2 contact discharge, level 3 air discharge)
IEC 801-3 Radiated Immunity (level 2)
IEC 801-4 Electrical fast transient (level 2)

International
The system is compliant with CISPR 22, Class B.

Japan
The system is registered with VCCI and complies with VCCI Class 2 limits (CISPR 22 B Limit).

3.3 Environmental Limits

System Office Environment

Table 9: System Office Environment Summary

Operating Temperature	+10^{O}C to +35^{O}C with the maximum rate of change not to exceed 10^{O}C per hour.
Non-Operating Temperature	-40^{O}C to +70^{O}C
Non-Operating Humidity	95%, non-condensing @ 30^{O}C
Acoustic noise	< 45 dBA at typical office ambient temperature (65-75F)
Operating Shock	No errors with a half sine wave shock of 2G (with 11 millisecond duration).
Package Shock	System operational after a 30" free fall, cosmetic damage may be present
ESD	20KV per Intel Environmental test specification*

*NOTE: CD-ROM only to 15KV

System Environmental Testing

The system environmental tests include:

- Temperature Operating and Non-Operating
- Humidity Non-Operating
- Shock Packaged and Unpackaged
- Vibration Packaged and Unpackaged
- AC Voltage, Freq. & Source Interrupt
- AC Surge
- Acoustics
- ESD
- EMC Radiated Investigation

For further information, please refer to the Environmental & Reliability Board and System Validation Test Handbook, #58178 Rev-01

4. Reliability, Serviceability and Availability

4.1 Mean-Time-Between-Failure (MTBF)

N440BX DP Baseboard

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted Failure in Time (FIT) data.

Sub Assembly Description	Calculated FIT (in hours)
Sample Baseboard	Not available yet.
Front Panel Board	Not available yet.
Power Supply	Not available yet.
1.44MB 3.5" FDU	Not available yet.
Calculated Complete System MTBF	Not available yet.

R440LX DP Baseboard

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted Failure in Time (FIT) data.

Sub Assembly Description	Calculated FIT (in hours)
Sample Baseboard	9,653.00
Front Panel Board	670.00
Power Supply	9,937.00
1.44MB 3.5" FDU	2,469.00
Calculated Complete System MTBF	43,996.00

B440FX DP Board Set

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted Failure in Time (FIT) data.

Sub Assembly Description	Calculated FIT (in hours)
Sample Baseboard	16,112.00
Sample Processor/Memory Module	6,575.00
Front Panel Board	670.00
VRM linf 12V/5V	5,367.00
Power Supply	9,937.00
1.44MB 3.5" FDU	2,469.00
Calculated Complete System MTBF	24,313.00

R440FX UP Baseboard

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted Failure in Time (FIT) data.

Sub Assembly Description	Calculated FIT (in hours)
Sample Baseboard	21,977.00
Front Panel Board	670.00
Power Supply	9,937.00
1.44MB 3.5" FDU	2,469.00
Calculated Complete System MTBF	28,528.00

4.2 Serviceability

The Intel Server system should only be serviced through a qualified technician. The desired Mean-Time-To-Repair (MTTR) of the system is 30 minutes including diagnosis of the system problem. To meet this goal, the system enclosure and hardware have been designed to minimize the MTTR. Following are the maximum times a trained field service technician should take to perform the listed system maintenance procedures, after diagnosis of the system.

Table 10: Serviceability Times

Remove cover	1 minute
Remove and replace disk drive	5 minutes
Remove and replace power supply	5 minutes
Remove and replace fan	5 minutes
Remove and replace expansion board	5 minutes
Remove and replace front panel board	5 minutes
Remove and replace baseboard (with no expansion boards)	10 minutes
Overall MTTR	20 minutes

APPENDIX A: PRODUCT INFORMATION

The following table details the spares list for the Columbus II chassis.

Table 9: Spares list for the Columbus II chassis - R440FX, B440FX, R440LX & N440BX

Product Code	MM#	Description
FRU615917	811152	Bezel Assembly
FRU650566	811210	Fan Bracket
FRU651331	811226	Chassis
FRU654277	811235	Cable, Floppy
FRU659250	811256	Peripheral Drive Rail, 10-Pack(N440BX)
FRU660391	815364	SLT1TERM Terminator Card, 20-Pack (R440LX, N440BX)
FRU661386	811265	Non-PFC Power Supply, 275W
FRU661387	816571	PFC Power Supply, 275W
FRU682139	817877	PFC Power Supply, 300W (N440BX)
FRU669496	815361	CPU Retention Mechanism (R440LX)
FRU669496A	815361	CPU Retention Mechanism, 10-Pack(N440BX)
FRU670060/662116	816569	Fan Assembly, 100CFM, 120mm
FRU684601	817879	Front Panel Cable, 10-Pack (N440BX)
FRU695948	817888	Front Panel (N440BX)
FRU651036	811223	Front Panel (R440FX)
FRU627164	811158	Peripheral Bay (B440FX)
FRU651009	811211	Floppy Cable (B440FX)
FRU651010	811212	SCSI Wide Cable (B440FX)
FRU651011	811213	Peripheral Bay Cable (B440FX)
FRU651012	811214	Front Intrusion Cable (B440FX)
FRU651013	811575	Front Panel Cable (B440FX)
FRU651339	811227	Card Guide (B440FX)
FRU657372	811579	Module Rail Assembly (B440FX)
FRU659250	811256	Peripheral Rail Assembly (B440FX)
FRU650532	818134	L Cover, 10-Pack (N440BX)
FRU687819	818133	Access Cover, 10-Pack (N440BX)
FRU656157	811242	B440FX Country Kit
FRU664835	811273	R440FX Country Kit
FRU684548	816570	R440LX Country Kit
FRU687059	817925	N440BX Country Kit, 10-Pack

APPENDIX B: PRODUCT CODES

These tables contain product code information for the B440FX and R440FX products.

Table 10: B440FX Baseboard Codes

Description	Product code
Baseboard	BBUC04A

Table 11: R440FX Baseboard Codes

Description	Product code
CPU 200 MHz/256K, 32MB	BROS06A
CPU No processor, no memory	BROS14A
R440FX Boxed Board, no CPU, no memory	ROSBRDKIT

Table 14: R440LX Baseboard Codes

Description	Product code
Baseboard without retention mechanism, without term card	B0RD0STD
R440LX Boxed Board	BOXR440LX

Table 15: N440BX Baseboard Codes

Description	Product code
N440BX Baseboard, no Processor, no Memory, no retention module, no terminator card, 10-Pack	B0NS0SD
N440BX Boxed Board	BOXN440BX

Table 12: B440FX System Codes

Description	Product code
BC440FX DP Server, Columbus II chassis, Non-PFC power supply	SCOLBUCSTD03A
BC440FX DP Server, Columbus II chassis, PFC power supply	SCOLBUCSTD011A
1 CPU 200MHz/512K, 32MB	MBUCCPU10A
1 CPU 166MHz/512K, 32MB	MBUCCPU12A
No CPU, no memory	MBUCCPU13A
1 CPU 200MHz/256K, 32MB	MBUCCPU16A
2 CPU 200MHz/256K, 0MB	MBUCCPUSTD20A
1 CPU 200MHz/256K, 0MB	MBUCCPUSTD21A
2 CPU 200MHz/512K, 32MB	MBUCCPUD25A
2 CPU 200MHz/256K, 32MB	MBUCCPUD26A
2nd processor UG kit – heat sink, VRM, clips, grease, NO Processor	ABUC2NDCPUA
2nd processor UG kit for 200MHz/512K – heat sink, 14.5A VRM, clips, grease, NO Processor	ABUC2ND200512B

Table 13: R440FX System Codes

Description	Product code
R440FX UP Server Accessory Kit	ACOLROSWSCSIA
CPU 200MHz/256K, 32MB	SROSCOLSTD05A
CPU 200MHz/256K, 32MB, EU System	ESROSCOLSTD05A

Table 14: R440LX System Codes

Description	Product code
Base System - No CPU, No Memory, No CD-ROM, No Term Card, w/Retention Mech.	S0RDCL0X0XSD
CPU 266MHz, No Memory, 24x CD-ROM, w/Term Card, w/Retention Mech.	S1RDCL265X0CSD
CPU 266MHz, No Memory, No CD-ROM, w/Term Card, w/Retention Mech.	S1RDCL265X0XSD
Base System - Non-PFC Power Supply and No Country Kit	S0RDCL0X0X0CNT
Columbus II Chassis Assembly	KRDCOL
233MHz CPU, Fan HT Sink, Term Card, Fan Cable	BRCKIT233
266MHz CPU, Fan HT Sink, Term Card, Fan Cable	BRCKIT266
300MHz CPU, Fan HT Sink, Term Card, Fan Cable	BRCKIT300

Table 15: N440BX System Codes

Description	Product code
NC440BX, (1) 350MHz Processor, 64MB Memory, CD-ROM, no HDD, Country Kit	S1NSCL355X6CSD
NA440BX, no Processor, no Memory, no CD-ROM, no HDD, no Country Kit	S0NSAS0X0XSD
NA440BX, no Processor, no Memory, no CD-ROM, no HDD, Country Kit	S0NSAS0X0KSD
NC440BX, no Processor, no Memory, no CD-ROM, no HDD, Country Kit	S0NSCL0X0KSD
NA440BX, (1) 400MHz Processor, 64MB Memory, CD-ROM, no HDD, Country Kit	S1NSAS405X6CSD

APPENDIX C: ERRATA

These errata items have been listed in the Specification Update for the Columbus II Chassis product during previous revisions of the Columbus II Chassis Technical Product Specification.

The following table indicates the Errata, Specification Changes, Specification Clarifications, and documentation changes which apply to the Intel Columbus II chassis. 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 TABLE

Doc:	Document change or update that will be implemented.
Fix:	This erratum is intended to be fixed in a future revision of the hardware or software associated with the Columbus II chassis.
Fixed:	This erratum has been previously fixed.
NoFix:	There are no plans to fix this erratum.
Shaded:	This erratum is either new or modified from the previous version of the document.

#	Status	Summary
1	NoFix	The SCSI cables for the Columbus II chassis are out of the FAST-20 SCSI 3 specification.

1. The SCSI cables for the Columbus II chassis are out of specification for FAST-20 SCSI 3 specifications.

Problem: The SCSI cables for Columbus II chassis (both wide and narrow) do not meet the Fast-20 SCSI 3 specifications with respect to cable impedance.

Implication: The wide SCSI impedance is 80 Ohms and the narrow cable's impedance is estimated at 105 to 130 Ohms. The SCSI 3 Specification states the specification at 90 Ohms +/- 6 Ohms.

Workaround: None identified. The cable and the system was designed within SCSI 2 specifications.

Status: This erratum is listed for informational purposes.