RC440BX Motherboard Specification Update

Release Date: November, 1999

Order Number: 716543-012

The RC440BX motherboard may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are documented in this Specification Update.

Copies of documents which have an ordering number and are referenced in this document, or other Intel literature, may be obtained from:

Intel Corporation
P.O. Box 5937
Denver, CO 80217-9808

or call in North America 1-800-548-4725, Europe 44-0-1793-431-155, France 44-0-1793-421-777,

Germany 44-0-1793-421-333, other Countries 708-296-9333

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REVISION HISTORY

Date of Revision	Version	Description
October, 1998	-001	This document is the first Specification Update for the Intel® RC440BX motherboard.
November, 1998	-002	Added Documentation Change 1.
December, 1998	-003	Added Documentation Change 2.
January, 1999	-004	Added Specification Change 2, Errata 2-4, and Documentation Changes 3-5.
February, 1999	-005	Added Specification Change 3.
March, 1999	-006	Added Specification Change 4.
April, 1999	-007	Updated Specification Change 4. Added Errata 5-6.
May, 1999	-008	Added Erratum 7.
June, 1999	-009	Updated Specification Change 4 and Erratum 5. Added Specification Change 5.
August, 1999	-010	Added Erratum 8.
September, 1999	-011	Added Specification Change 6 and Erratum 9.
November, 1999	-012	Updated Specification Change 2 and Errata 3-4.

PREFACE

This document is an update to the specifications contained in the RC440BX Motherboard Technical Product Specification (Order number 713832). It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools. It will contain Specification Changes, Errata, Specification Clarifications, and Documentation Changes.

Refer to the *Pentium® II Processor Specification Update* (Order number 243337) for specification updates concerning the Pentium II processor. Items contained in the *Pentium II Processor Specification Update* that either do not apply to the RC440BX motherboard or have been worked around are noted in this document. Otherwise, it should be assumed that any processor errata for a given stepping are applicable to the PBA revision(s) associated with that stepping.

Refer to the *82443BX Specification Update* (Order Number 290639) for specification updates concerning the 82443BX PCI A.G.P. Controller. Items contained in the *82443BX Specification Update* that either do not apply to the RC440BX motherboard or have been worked around are noted in this document. Otherwise, it should be assumed that any controller errata for a given stepping are applicable to the PBA revision(s) associated with that stepping.

Refer to the *Intel® 82371EB (PIIX4E) Specification Update* (Order Number 290635) for specification updates concerning the 82371EB PIIX4E. Items contained in the *Intel 82371EB (PIIX4E) Specification Update* that either do not apply to the RC440BX motherboard or have been worked around are noted in this document. Otherwise, it should be assumed that any PIIX4E errata for a given stepping are applicable to the Printed Board Assembly (PBA) revision(s) associated with that stepping.

Nomenclature

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

Errata are design defects or errors. Characterized errata may cause the RC440BX motherboard's behavior to deviate from published specifications. Hardware and software designed to be used with any given Printed Board Assembly (PBA) and BIOS revision level must assume that all errata documented for that PBA and BIOS revision level are present on all motherboards.

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

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

Specification Update for RC440BX Motherboards

GENERAL INFORMATION

Basic RC440BX Motherboard Identification Information

AA Revision	PBA Revision	440BX AGPSet Stepping	BIOS Revision	Notes
719448-204	719446-204	B1	4R4CB0XA.86A. 0004.P01	1-5
719448-205	719446-205	B1	4R4CB0XA.86A. 0007.P02	1-5
719448-206	719446-206	C1	4R4CB0XA.86A. 0007.P02	1-5
719448-207	719446-207	C1	4R4CB0XA.86A. 0009.P03	1-5
719448-208	719446-208	C1	4R4CB0XA.86A. 0012.P06	1-5
719448-209	719446-209	C1	4R4CB0XA.86A. 0012.P06	1-5
719448-210	719446-210	C1	4R4CB0XA.86A. 0012.P06	1-5
719448-211	719446-211	C1	4R4CB0XA.86A. 0016.P10	1-5
718163-206	718188-206	C1	4R4CB0XA.86A. 0009.P03	1-5
718163-207	718188-207	C1	4R4CB0XA.86A. 0010.P04	1-5
718163-208	718188-208	C1	4R4CB0XA.86A. 0012.P06	1-5
718163-209	718188-209	C1	4R4CB0XA.86A. 0012.P06	1-5
718163-210	718188-210	C1	4R4CB0XA.86A. 0012.P06	1-5
718163-211	718188-211	C1	4R4CB0XA.86A. 0016.P10	1-5
723888-205	723891-205	C1	4R4CB0XA.86A. 0009.P03	1-5
723888-206	723891-206	C1	4R4CB0XA.86A. 0010.P04	1-5
723888-207	723891-207	C1	4R4CB0XA.86A. 0012.P06	1-5
723888-208	723891-208	C1	4R4CB0XA.86A. 0012.P06	1-5
723888-209	723891-209	C1	4R4CB0XA.86A. 0012.P06	1-5

AA Revision	PBA Revision	440BX AGPSet Stepping	BIOS Revision	Notes
723888-210	723891-210	C1	4R4CB0XA.86A. 0016.P10	1-5
724299-205	723891-205	C1	4R4CB0XA.86A. 0009.P03	1-5
724299-206	723891-206	C1	4R4CB0XA.86A. 0010.P04	1-5
724299-207	723891-207	C1	4R4CB0XA.86A. 0012.P06	1-5
724299-208	723891-208	C1	4R4CB0XA.86A. 0012.P06	1-5
724299-209	723891-209	C1	4R4CB0XA.86A. 0012.P06	1-5
724299-210	723891-210	C1	4R4CB0XA.86A. 0016.P10	1-5

NOTES:

1. The PBA number or AA number is found on a small label on the component side of the board.
2. The 440BX AGPset kit used on this PBA revision consists of two components as follows:

Device	Stepping	S-Spec Numbers
82443BX	B1	SL2T5 SL2T6
82443BX	C1	SL2VH SL378
82371EB	A0	SL2MY

3. The following errata are contained in the *Pentium® II Processor Specification Update* (Order Number 243337) for the Pentium II processor and either do not apply to the RC440BX motherboard or have been worked-around in this PBA and/or BIOS revision: 3, 10-11, 17, 27-28, 32, 41, 50, 1AP-3AP. All other errata associated with the processor apply to this PBA revision.
4. The following items are contained in the *Intel® 82443BX Specification Update* (Order Number 290639) and either do not apply to the RC440BX motherboard or have been worked around in this PBA and/or BIOS revision: Erratum 3. All other errata associated with the AGPset apply to this PBA revision.
5. The following items are contained in the *Intel® 82371EB (PIIX4E) Specification Update* (Order Number 290635) and either do not apply to the RC440BX motherboard or have been worked around in this PBA and/or BIOS revision: None. All other errata associated with the PIIX4E apply to this PBA revision.

Summary Table of Changes

The following table indicates the Specification Changes, Errata, Specification Clarifications, or Documentation Changes which apply to the RC440BX motherboard. Intel intends to fix some of the errata in a future revision of the motherboard, 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 motherboard or BIOS.
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.

NO.	PLANS	SPECIFICATION CHANGES
1	Doc	Additional audio manufacturing option
2	Doc	Change to supported memory configurations
3	Doc	Support for the Intel® Celeron™ processor
4	Doc	Support for the Intel® Pentium® III processor
5	Doc	Support for 550 MHz Pentium III processors
6	Doc	Support for 600 MHz Pentium III Processors
NO.	**PLANS**	**ERRATA**
1	NoFix	Advanced Power Management may suspend system during CD-ROM playback
2	Fix	System BIOS Does Not Support All ACPI States and Events
3	Fixed	System will fail during POST if both Quick Boot and Quiet Boot are disabled
4	Fixed	Pressing Escape key during system boot may interrupt boot process
5	Fixed	System BIOS Does Not Load Latest Processor Microcode at Boot Time
6	NoFix	BIOS Setup Program Does Not Warn of IRQ Conflict
7	Fixed	System does not suspend correctly under OS/2* Warp* 4.0
8	NoFix	BIOS does not implement S4BIOS power state
9	Fixed	Floppy Disk Drive Error not Reported during POST
NO.	**PLANS**	**DOCUMENTION CHANGES**
1	Doc	Correction of typographical errors
2	Doc	Change to description of PCI IRQ routing
3	Doc	Change to table of supported video resolutions
4	Doc	Change to table of BIOS beep codes
5	Doc	Change to description of supported power states and events

The errata described in this specification update apply to combinations of PBA revision and BIOS revision as shown in the table below. Descriptions of the individual errata referred to by number in the table below are found in the ERRATA section of this document.

PBA Revision	BIOS Revision	Errata That Apply
719446-204	4R4CB0XA.86A.0004.P01	1-9
	4R4CB0XA.86A.0007.P02	1-9
	4R4CB0XA.86A.0009.P03	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-205	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02	1-9
	4R4CB0XA.86A.0009.P03	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-206	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02	1-9
	4R4CB0XA.86A.0009.P03	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-207	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8

PBA Revision	BIOS Revision	Errata That Apply
719446-208	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-209	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-210	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
719446-211	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
718188-206	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8

PBA Revision	BIOS Revision	Errata That Apply
718188-207	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
718188-208	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
718188-209	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
718188-210	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8

PBA Revision	BIOS Revision	Errata That Apply
718188-211	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
723891-205	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
723891-206	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
723891-207	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
723891-208	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8

PBA Revision	BIOS Revision	Errata That Apply
723891-209	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8
723891-210	4R4CB0XA.86A.0004.P01‡	1-9
	4R4CB0XA.86A.0007.P02‡	1-9
	4R4CB0XA.86A.0009.P03‡	1-9
	4R4CB0XA.86A.0010.P04‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0012.P06‡	1-2, 4-6, 8-9
	4R4CB0XA.86A.0016.P10	1-2, 6, 8-9
	4R4CB0XA.86A.0017.P11	1-2, 6, 8

‡ Note: This combination of BIOS revision and PBA revision has not undergone regression testing. Use of a PBA with down-revision BIOS is an untested combination and is undertaken at the user's risk.

SPECIFICATION CHANGES

The Specification Changes listed in this section apply to the *RC440BX Motherboard Technical Product Specification* (Order Number 713832). All Specification Changes will be incorporated into a future version of that specification.

1. Additional Audio Manufacturing Option

In addition to the audio subsystem described in Section 1.8.1, a manufacturing option is available that uses the ES1371 audio controller rather than the Sound Blaster* AudioPCI 64V Audio Controller. All audio features are supported except that the controller is not PC98 compliant and does not support the optional digital audio connector described in Section 1.8.3.6.

2. Change to Supported Memory Configurations

256 MB DIMMs have been qualified on the RC440BX motherboard. The following changes will be made to the Technical Product Specification:

In Section 1.1, Overview, in the second point under Main Memory 256 MB will be replaced with 512 MB.

In Section 1.4, System Memory, maximum memory size will be changed from 256 MB to 512 MB.

The following line will be added to the table of DIMMs:

DIMM Size	Non-ECC Configuration	ECC Configuration
256 MB	32 Mbit x 64	32 Mbit x 72

Note: 256 MB DIMMs used with this board must be built with 128 Mbit device technology.

In Section 2.1, Memory Map, the first line of Table 45 will be changed to:

Address Range (decimal)	Address Range (hex)	Size	Description
1024 K - 524288 K	100000 - 20000000	511 MB	Extended memory

3. Support for the Intel® Celeron™ Processor

The following will be added to the list of supported processors in Section 1.3, Processor:

Processor Type	Processor Speed	Host Bus Frequency	Cache Size	Package Type
Celeron processor	366 400	66 MHz 66 MHz	128 KB 128 KB	Single Edge Processor Package

4. Support for the Intel® Pentium® III Processor

The following will be added to the microprocessor row in section 1.1:

Intel Pentium III processor with 100 MHz host bus speed

The first sentence in section 1.3 will be replaced in its entirety as follows:

The motherboard supports a single Pentium III processor, Pentium II processor or Celeron™ processor.

The first sentence of the caution in section 1.3 will be replaced in its entirety as follows:

The motherboard supports Pentium III processors with a 100-MHz host bus, Pentium II processors with a 100- or 66-MHz host bus and Celeron processors with a 66-MHz host bus.

The following will be added to the list of supported processors in Section 1.3, Microprocessor:

Processor Type	Processor Speed (in MHz)	Host Bus Frequency (in MHz)	Level 2 Cache (in KB)
Pentium III processor	450* 500**	100 100	512 512

* BIOS version 4R4CB0XA.86A.0012.P06 or later is required to support the Pentium III processor at 450 MHz on all RC440BX motherboard revisions. Earlier BIOS versions will identify the processor as a Pentium II processor and will not work reliably with a Pentium III processor.

** The following RC440BX motherboard revisions, or later support the Pentium III processor at 500 MHz or faster with BIOS version 4R4CB0XA.86A.0012.P06, or later. Earlier BIOS versions will identify the processor as a Pentium II processor and will not work reliably with a 500 MHz Pentium III processor. Earlier motherboard revisions do not support a 500 MHz or faster Pentium III processor.

Product Code	MM#	AA#	PBA#
BERCMSTDK	819436	718163-208	718188-208
BERCASTDK	820538	723888-205	723891-205
BLKRC440BX	820492	724299-205	723891-205

The first sentence of the note in section 1.4 will be replaced in its entirety as follows:

Pentium III processors with a 100 MHz host bus or Pentium II processors with a 100 MHz host bus should be paired only with 100 MHz SDRAM.

In Section 4.2, Maintenance Menu, Table 57 will add an entry for 500Mhz with a host bus operating at 100 MHz.

In Section 4.3, Main Menu, the following option will be added to Table 58:

Feature	Options	Description
Processor Serial Number	• **Disabled (default)** • Enabled	Disabled blocks the processor from reporting the processor serial number to the operating system or software.

5. Support for 550 MHz Pentium® III Processors

The motherboard supports 550 MHz Pentium® III processors. Section 1.2, Microprocessor, will have the following table entry added:

Processor Type	Processor Speed (in MHz)	Host Bus Frequency (in MHz)	Level 2 Cache (in KB)
Pentium III processor*	550	100	512

In Section 4.2, Maintenance Menu, Table 57 will add an entry for 550Mhz with a host bus operating at 100 MHz.

BIOS revision 4R4CB0XA.86A.0016.P10 or later is required for the motherboard to properly support a 550 MHz processor.

6. Support for 600 MHz Pentium III Processors

The motherboard supports 600 MHz Pentium III processors. Section 1.2, Microprocessor, will have the following table entry added:

Processor Type	Processor Speed (in MHz)	Host Bus Frequency (in MHz)	Level 2 Cache (in KB)
Pentium III processor*	600	100	512

BIOS revision 4R4CB0XA.86A.0017.P11 or later is required for the motherboard to properly support a 600 MHz processor.

ERRATA

1. Advanced Power Management May Suspend System During CD-ROM Playback

PROBLEM: ATAPI devices (such as CD-ROM and DVD drives) do not reset the inactivity timer that is used by Advanced Power Management to determine when to place the system into suspend mode.

IMPLICATION: When playback of an audio CD or a DVD file is the only system activity, the system will go into suspend mode when the inactivity timer expires.

WORKAROUND: Temporarily disable the Low-power standby and Shut off monitor options on the Display Properties, Screen Saver menu. This menu is available from the Windows* 95 Control Panel.

STATUS: This erratum will not be fixed.

2. System BIOS Does Not Support All ACPI States and Events

PROBLEM: Under the Advanced Configuration and Power Interface (ACPI), the system BIOS does not wake the system from the S1 state after the following events: LAN activity, USB, PS/2 keyboard, PS/2 mouse. The S4BIOS power state is not supported.

IMPLICATION: The user will not be able to use ACPI if the system must wake from one of these events. See Documentation Change 5 for wake up devices and events currently supported by ACPI and Advanced Power Management (APM).

WORKAROUND: Use APM if power management from any of these devices is required.

STATUS: This erratum will be fixed in a future BIOS revision.

3. System Will Fail During POST if Both Quick Boot and Quiet Boot are Disabled

PROBLEM: If both Quick Boot and Quiet boot are disabled in the BIOS Setup program, the system will lock up during the memory portion of the POST.

IMPLICATION: The user will not be able to view POST diagnostic information for all the devices that are normally tested by the BIOS during POST.

WORKAROUND: None.

STATUS: This erratum was fixed in BIOS revision 4R4CB0XA.86A.0010.P04.

4. Pressing Escape Key During System Boot May Interrupt Boot Process

PROBLEM: If the user presses the Escape key to clear the graphics logo and display diagnostic information during the boot process, the system may fail to detect devices connected to the onboard IDE interface and/or the system may hang.

IMPLICATION: The system may require a reboot to be usable.

WORKAROUND: Disable the Quiet Boot option to view diagnostic information during the boot process.

STATUS: This erratum was fixed in BIOS revision 4R4CB0XA.86A.0016.P10.

5. System BIOS Does Not Load Latest Processor Microcode at Boot Time

PROBLEM: Even if a later processor microcode update has been loaded into non-volatile RAM by an update utility, the BIOS loads the superseded original microcode from within the BIOS flash module.

IMPLICATION: The system will be subject to processor errata that have been worked around in the new update.

WORKAROUND: None.

STATUS: This erratum was fixed in BIOS revision 4R4CB0XA.86A.0016.P10.

6. BIOS Setup Program Does Not Warn of IRQ Conflict

PROBLEM: The BIOS Setup program does not display an asterisk in the Peripheral Configuration submenu to warn that the IRQ chosen for the serial port is in use by another device.

IMPLICATION: The user may assign two devices to use the same IRQ resource.

WORKAROUND: None.

STATUS: This erratum will not be fixed.

7. System Does Not Suspend Correctly Under OS/2* Warp* 4.0

Problem: Under the OS/2* Warp* 4.0 operating system, the system will not suspend from the start menu. When the user attempts to put the system into the suspend state, it suspends for about one second, then wakes up.

IMPLICATION: The user will not be able to force the system to suspend.

WORKAROUND: None.

STATUS: This erratum was fixed in BIOS revision 4R4CB0XA.86A.0010.P04.

8. BIOS Does Not Implement S4BIOS Power State

PROBLEM: The S4BIOS (Suspend to Disk) power state has not been implemented in the motherboard BIOS.

IMPLICATION: The user will not be able to suspend the system to a state that includes saved context information.

WORKAROUND: None.

STATUS: This erratum will not be fixed.

9. Floppy Disk Drive Error not Reported during POST

PROBLEM: If the floppy disk drive power or data cable is disconnected, the error is not reported during POST and the screen will go black with a timeout of up to 55 seconds. After this timeout, the system will then boot the operating system.

IMPLICATION: The user will not know that the floppy drive is not available until trying to access the device.

WORKAROUND: None.

STATUS: This erratum was fixed in BIOS revision 4R4CB0XA.86A.0017.P11.

DOCUMENTATION CHANGES

The Documentation Changes listed in this section apply to the *RC440BX Motherboard Technical Product Specification* (Order Number 713832). All Specification Clarifications will be incorporated into a future version of that specification.

1. Correction of Typographical Errors

In Figure 1, microATX Motherboard Components, the description for callout C should be “Video Line In (optional)”.

In Figure 5, Midboard Audio/Video Connectors, the descriptions for callouts B & C should be:

B Video Line in (blue) (optional)

C Auxiliary line in (natural)

In Table 13, “Line In Connector (Optional) (Blue) J2D3” should read “Video Line In (Optional) (Blue) J2D3”.

In Section 3.6.2, OEM Logo or Scan Area, the first sentence should read “A 4 KB flash-memory user area is available for displaying a custom OEM logo during POST.”

In Section 3.7, Recovering BIOS Data, the cross reference in the first paragraph should read “(see Section 1.66.2)” and the cross reference in the first note should read “(see Section 4.7)”.

Section 3.4, SMBUS, actually describes the operation of the SM BIOS. The section should read as follows:

3.4 SM BIOS

SM BIOS is a method for managing computers in a managed network. See Section 6.2 for information about the latest SM BIOS specification.

The main component of SM BIOS is the management information format (MIF) database, which contains information about the computing system and its components. Using SM BIOS, a system administrator can obtain the system types, capabilities, operational status, and installation dates for system components. The MIF database defines the data and provides the method for accessing this information. The BIOS enables applications such as Intel® LANDesk® Client Manager to use SM BIOS. The BIOS stores and reports the following SM BIOS information:

- BIOS data, such as the BIOS revision level
- Fixed-system data, such as peripherals, serial numbers, and asset tags
- Resource data, such as memory size, cache size, and processor speed
- Dynamic data, such as event detection and error logging

Intel can provide system manufacturers with a utility that programs system and chassis-related information into the SM BIOS space in flash memory. The utility is used to program the BIOS during system manufacturing, so that the BIOS can later report this information. Once written, this information cannot be overwritten.

SM BIOS does not work directly under non-Plug and Play operating systems (such as Windows NT*). However, the BIOS supports a SM BIOS table interface for such operating systems. Using this support, a SM BIOS service-level application running on a non-Plug and Play OS can access the SM BIOS information.

2. Change to Description of PCI IRQ Routing

Table 50, PCI Interrupt Routing Map, will be replaced in its entirety as follows:

Table 50. PCI Interrupt Routing Map

PIIX4 PIRQ Signal	1st PCI Expansion Slot (J4D1)	2nd PCI Expansion Slot (J4C1)	3rd PCI Expansion Slot (J4B1)	4th PCI Expansion Slot (J4A1)	Onboard Video	PCI Audio	USB
PIRQA	INTA	INTD	INTC	INTB	INTA		
PIRQB	INTB	INTA	INTD	INTC		INTA	
PIRQC	INTC	INTB	INTA	INTD			
PIRQD	INTD	INTC	INTB	INTA			INTA

3. Change to Table of Supported Video Resolutions

In Section 1.7.1, NVIDIA* RIVA*128ZX Graphics Controller, Table 2 will be replaced in its entirety as follows:

Table 2. NVIDIA RIVA 128ZX Refresh Rates

Resolution	Refresh Rates at 8 and 16 bpp Bit Depth	Maximum Refresh Rates at 32 bpp
320 x 200	70, 72, 75, 85, 100, 120* (DDraw only)	120
320 x 240	60, 70, 72, 75, 85, 100, 120* (DDraw only)	120
400 x 300	60, 70, 72, 75, 85, 100, 120* (DDraw only)	120
480 x 360	60, 70, 72, 75, 85, 100, 120* (DDraw only)	120
512 x 384	60, 70, 72, 75, 85, 100, 120* (DDraw only)	120
640 x 400	70, 72, 75, 85, 100, 120* (DDraw only)	120
640 x 480	60, 70, 72, 75, 85, 100, 120	120
800 x 600	60, 70, 72, 75, 85, 100, 120	120
960 x 720	60, 70, 72, 75, 85, 100, 120* (DDraw only)	120
1024x 768	60, 70, 72, 75, 85, 100, 120	100**
1152 x 864	60, 70, 72, 75, 85, 100, 120	120
1280 x 1024	60, 70, 72, 75, 85, 100, 120	60**
1600 x 1200	60, 70, 72, 75, 85	60**

* A refresh rate of 120 Hz is required for direct draw drivers.

** All lower refresh rates are also supported.

4. Change to Table of BIOS Beep Codes

In Section 5.4, BIOS Beep Codes, Table 77, Beep Codes, will be replaced in its entirety as follows:

Table 77. Beep Codes

Beep	Description
1	Refresh failure
2	Parity can not be reset
3	First 64k memory failure
4	Timer not operational
5	Reserved
6	Memory not Installed
7	Exception interrupt error
8	Display memory R/W error
9	Reserved
10	CMOS Shutdown register test error
11	Invalid BIOS (e.g. POST module not found, etc.)

5. Change to Description of Supported Power States and Events

In Section 3.5.2.1, Table 52, Power States and Targeted System Power, will be replaced in its entirety as follows:

Table 52. Power States and Targeted System Power

Global States	Sleeping States	CPU States	Device States	Targeted System Power *
G0 - working state	S0 – working	C0 - working	D0 – working state	Full power > 60 W
G1 - sleeping state	S1 - CPU stopped	C1 - stop grant	D1, D2, D3- device specification specific.	5 W < power < 30 W
G2/S5	S5 - Soft off. Context not saved. Cold boot is required.	No power	D3 – no power except for wake up logic.	Power < 5 W **
G3 - mechanical off. AC power is disconnected from the computer.	No power to the system.	No power	D3 – no power for wake up logic, except when provided by battery or external source.	No power to the system so that service can be performed.

* Total system power is dependent on the system configuration, including add-in boards and peripherals powered by the system chassis' power supply.

** Dependent on the standby power consumption of wake-up devices used in the system.

In Section 3.5.2.2, Table 53, Wake Up Devices and Events, will be replaced in its entirety as follows:

Table 53. ACPI Wake Up Devices and Events

These devices/events can wake up the computer…	…from this ACPI state
Power switch	S1, S5
RTC alarm	S1, S5
LAN	S1
Modem	S1
IR command	S1
USB	S1
PS/2 keyboard	Not Available
PS/2 mouse	Not Available
Sleep button	S1

In Section 3.5.1, Advanced Power Management, the following table will be added and all following tables will be renumbered as necessary:

Table 51. APM Wake Up Devices and Events

These devices/events can wake up the computer…	…from this APM state
Power switch	Standby, Soft Off
RTC alarm	Standby, Soft Off
LAN	Standby, Soft Off
Modem	Standby, Soft Off
IR command	Not Available
USB	Not Available
PS/2 keyboard	Standby
PS/2 mouse	Standby
Sleep button	Soft Off (from front panel header)