JRex-VE

JRex-VC

Product Manual

Document Revision 1.5

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1. USER INFORMATION

1.1 About This Manual

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For the circuits, descriptions and tables indicated, Kontron assumes no responsibility as far as patents or other rights of third parties are concerned.

1.2 Copyright Notice

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1.3 Trademarks

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- Microsoft is a registered trademark of Microsoft Corp.
- Intel is a registered trademark of Intel Corp.
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1.4 Standards

Kontron Embedded Modules is certified to ISO 9000 standards.

1.5 Warranty

This Kontron Embedded Modules product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron Embedded Modules will at its discretion decide to repair or replace defective products.
Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed.
You may receive a bill for test costs if Kontron Embedded Modules finds no fault with the product. You also may receive a bill for repairs if a product’s warranty has expired.
For warranty service or repair, return the product to a Kontron Embedded Modules service facility listed in the Technical Support section of this document.
The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product’s environmental specifications or improper installation or maintenance.
Kontron Embedded Modules will not be responsible for any defects or damages to other products not supplied by Kontron Embedded Modules that are caused by a faulty Kontron Embedded Modules product.

1.6 Technical Support

Technicians and engineers from Kontron Embedded Modules and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and

will help you use our products in your systems.
Before contacting Kontron Embedded Modules technical support, please consult our Web site for the latest product documentation, utilities, and drivers. If the information does not help solve the problem, contact your sales channel (your distributor or you Kontron Sales office where you order this board) by email or telephone.

2. INTRODUCTION

JRex-VE and JRex-VC are members of the Kontron Embedded Modules' 3.5" board family. JRex modules feature the same pinout and interface for the following components and peripherals:

- Reset- and powerbutton with Harddisk- and LAN LED
- ATX power
- 2xUSB
- 100BaseT Ethernet
- Keyboard/mouse combiconnector
- CompactFlash
- VGA
- RS232 serial port

These family features allow you to reuse chassis and maximize design re-use.

The JRex-VE hosts a VIA Eden CPU (Samuel 2 core) with 128 kByte L1 cache and 64 kByte L2 cache memory on. JRex-VC is based on the new Nehemiah core from VIA. A SDRAM-DIMM socket for up to 1.0GByte memory allows you to use standard DIMM memory modules.

The compatible features allow easy upgrades within the JRex product family.

Display connections (2 x 18 bit TFT) are simplified by using the JUMPtec Intelligent LVDS Interface (JILI), which automatically recognizes the display that is connected and independently sets all video parameters. All JRexes are plug-and-work enabled.

All information in this manual regarding JRex-VE are also valid for JRex-VC (with VIA C3 CPU) unless otherwise noted.

JREX-VE is tested with Windows 9x/Me, Windows NT4, Windows 2000, Windows XP and Linux. For other OS please contact your local OS distributor for supporting this chipset.
It is strictly recommended to use the latest chipset drivers for your OS !

3. SPECIFICATIONS

3.1 Functional Specifications

- **Processor** VIA Eden (C3, Antaur) Embedded System Platform Processor with 128 kByte L1 cache memory and 64 kByte L2 cache memory on die
- **Bus:** 66 MHz CPU bus with Eden 300 MHz
  133 MHz CPU bus with Eden 600MHz
  133 MHz CPU bus with all C3 and Antaur processors
  100 or 133 MHz memory bus (autodetect from SPD EEPROM)
- **Chipset:** ProSavage PN133T Chipset
- **Super I/O:** Integrated in VIA VT8231
- **Memory:** One 168-pin DIMM 3.3V PC-133 unbuffered SDRAM, up to 1.0 GB
- **Serial Port:** COM1 RS232
- **Parallel Port:** LPT1 Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP) with bi-directional capability
- **Floppy port** 1 floppy drive through flatfoil cable supported
- **EIDE port** (Enhanced Intelligent Drive Electronics): Two Peripheral Component Interconnect (PCI) Bus Master, IDE port support: Ultra 100 Direct Memory Access (UDMA100) mode
- **Universal Serial Bus (USB):**
  Four USB 1.1 ports (UHCI)
  USB legacy keyboard support
  USB floppy-boot and CDROM-boot support
- **Onboard Ethernet:**
  (MAC Integrated in VIA VT8231 with VIA VT6103 PHY), 10/100BASE-T LAN
- **Onboard VGA:** (Integrated in the VIA VT8606)

  S3 Savage 4 AGP controller
  Up to 32-megabyte (MB) Video RAM (UMA)
  CRT and low voltage differential signaling (LVDS) liquid-crystal display (LCD) interfaces
- **Audio:** Integrated in VIA VT8231 SoundBlaster™ AC97, Windows Sound System™ compatible
- **BIOS:** Phoenix, 512 KByte FLASH-BIOS
- **NV-EEPROM** for CMOS-setup retention w/o battery
- **PS/2 keyboard and mouse controller**
- **Watchdog timer (WDT)**
- **Real-time clock** (requires battery)

3.2 Mechanical Specifications

Mechanical: 101,6mm x 147,3mm (4.0" x 5.8")

3.3 Electrical Specifications

3.3.1 Supply Voltage

5V DC +/- 5%

3,3V DC +/- 5%

5V DC Standby +/- 5%

3.3.2 Supply Voltage Ripple

100 mV peak to peak 0-20 MHz

3.3.3 Supply Current

Typical (with 128MB SDRAM):

0.16 A @ 5V Standby

1.2 A @ 5V (with Eden 3000 CPU)

1.7 A @ 5V (with Eden 6000 CPU)

4.0 A @ 5V (with C3 1.0GHz CPU)

1.5 A @ 3.3V (with any available CPU)

3.3.4 RTC Battery

Real-time clock (RTC) battery voltage: 1.8 - 4.0 V (typ. 3.0 V)

RTC battery quiescent current: max. 3.5 uA @ 3.0 V

English:
CAUTION ! **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.**

Deutsch:
VORSICHT ! **Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.**

Danish:
ADVARSEL ! **Lithiumbatteri – Ekspiosionsfare ved fejlagtig håandtering. Udskifting må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leveradøren.**

Norwegian:
ADVARSEL ! **Eksplosjonsfare ved feilaktlg skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres I hendhold til fabrikantens instruksjoner.**

Swedish:
VARNING ! **Explosionsfara vid felaktigt batteribyte. Anvãnd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera anvãnt batteri enligt fabrikantens instruktion.**

Finnish:
VAROITUS ! **Paristo voi rãjãhtãã, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laltevalmistajan suosittelmaan tyyppiln. Havita kaytetty paristo valmistajan ohjeiden mukaisesti.**

3.4 Environmental Specifications

3.4.1 Temperature

operating 0 to +70 °C ((*)with appropriate airflow))

- VIA Eden CPU is specified for proper operation when junction temperature is within the specified range of 5°C to 85°C.
- Via TwisterT Host Bridge/Controller case temperature max. 85°C.
- MOSFETs “Siliconix SI4410” in SO-8 near USB connector: case temperature max. 110°C.

Nonoperating: -10 to + 85 ° C

(*) The maximum operating temperature is the maximum measurable temperature on any spot on the modules´s surface. It is the user´s responsibility to maintain this temperature within the above specification.

3.4.2 Humidity

Operating:	10% to 90% (noncondensing)
Nonoperating:	5% to 95% (noncondensing)

4. CPU AND CHIPSET

4.1 CPU

VIA Embedded System Processor features include:

- 66 MHz processor system bus (Eden 300 MHz)
- 133 MHz processor system bus (Eden 600 MHz, C3 & Antaur)
- Eden processors (Samuel-II) built in TSMC 0.15 micron process
- C3 and Antaur processors (Nehemiah) built in 0,13 micron process
- Two 64K Full speed "on-die" L1 caches with 4-way associativity
- One 4-way 64K unified L2 cache (half CPU speed on Eden, full speed on C3 and Antaur processors)
- MMX and 3Dnow! instructions supported

4.2 Chipset

ProSavage PN133T Chipset features include:

- **Defines Integrated Solutions for Value PC Mobile Designs**

- High performance SMA North Bridge: Integrated VIA Pro133A and S3 Graphics' ProSavage4 TM in a single chip
- 64-bit Advanced Memory controller supporting PC100 / PC133 SDRAM
- Combines with VIA VT8231 PCI-LPC South Bridge
    - **High Performance CPU Interface**
        - 133 MHz CPU Front Side Bus (FSB)
        - Five outstanding transactions (four In-Order Queue (IOQ) plus one output latch)
        - Dynamic deferred transaction support
    - **Advanced High-Performance DRAM Controller**
        - DRAM interface runs synchronous (133/133) mode and in pseudo-synchronous (133/100) mode with FSB133
        - Concurrent CPU, AGP, and PCI access
        - Supports standard PC133 and PC100 SDRAM memory types
        - 64-bit data width
        - SDRAM X-1-1-1-1-1-1-1 back-to-back accesses
    - **Integrated ProSavage4 2D/3D/Video Accelerator**
        - Optimized Shared Memory Architecture (SMA)

- Full internal AGP 4x performance
- Significant internal architectural upgrades from original S3 Savage4 standalone product
- 8 / 16 / 32 MB frame buffer using system memory
- Floating point triangle setup engine
- Single cycle 128-bit 3D architecture
- 8M triangles/second setup engine
- 140M pixels/second trilinear fill rate
- Microsoft Direct X texture compression
- Next generation, 128-bit 2D graphics engine
- Flat panel monitor support
- 2D/3D resolutions up to 1920x1440
- 3D Rendering Features
- 2D Hardware Acceleration Features
- Motion Video Architecture

- **Extensive LCD Support**
  - 36-bit DSTN/TFT flat panel interface with 256 gray shade support
  - Integrated 2-channel 110 MHz LVDS interface
  - Support for all resolutions up to 1600x1200
- **Concurrent PCI Bus Controller**
  - PCI 2.2 compliant, 32-bit 3.3V PCI interface with 5V tolerant inputs
  - Supports up to 5 PCI masters
- **Advanced System Power Management Support**
  - ACPI 1.0B and PCI Bus Power Management 1.1 compliant
- **Full Software Support**
  - Drivers for major operating systems and APIs: [Windows 9x / Me, Windows NT 4.0, Windows 2000, Windows XP, Direct3D, DirectDraw and DirectShow, OpenGL ICD for Windows 9x, NT, and 2000, and DXVA for Windows 2000 and Windows XP]

5. SYSTEM MEMORY

5.1 Memory Socket

The JRex-VE uses standard SDRAM memory modules. One socket is available for 3.3-volt (power level), unbuffered and buffered synchronous dynamic random access memory (SDRAM) of 8, 16, 32, 64, 128, 256 or 512MB following intel's PC100 or PC133 Specification.

6. USB INTERFACE

The JRex-VE comes with two USB ports, which you can expand by adding external hubs. You can connect up to 127 USB peripherals.

6.1 USB Connector

Pin	Pin Function
1	USB1_+5V
2	USB1-
3	USB1+
4	USB1_GND
5	USB2_+5V
6	USB2-
7	USB2+
8	USB2_GND
9	-
10	Shielded Ground
11	Shielded Ground
12	Shielded Ground
13	Shielded Ground

Note: The current of the power lines is internal limited to 500mA by a resettable fuse.

7. SERIAL-COMMUNICATION INTERFACE

The JRex-VE has one 16550-compatible serial port.

The line driver is conform to the IEEE RS232C standard.

7.1 Serial Connector

COM A (RS232C)	
Pin	**DSUB-9**
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

7.2 Configuration

Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

8. PARALLEL-COMMUNICATION INTERFACE

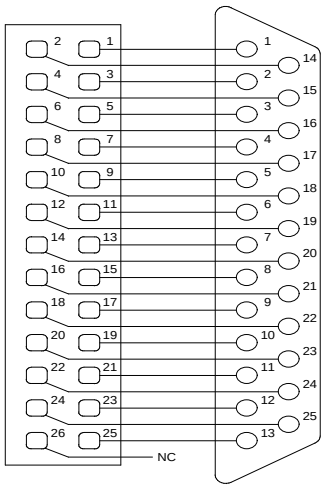
The JRex-VE supports one parallel port in either extended capabilities port (ECP) or enhanced parallel port (EPP) mode.

8.1 Parallel Connector

Parallel Port LPT 1				
Pin	**Signal Name**	**Function**	**In / Out**	**DSUB-25 (need adapter)**
1	Strobe#		Out	1
3	Data 0		I/O	2
5	Data 1		I/O	3
7	Data 2		I/O	4
9	Data 3		I/O	5
11	Data 4		I/O	6
13	Data 5		I/O	7
15	Data 6		I/O	8
17	Data 7		I/O	9
19	ACK#		In	10
21	BUSY		In	11
23	PAPER out		In	12
25	SEL out		In	13
2	AUTOFD#		Out	14
4	ERROR#		In	15
6	INIT#		Out	16
8	SEL in		Out	17
26	VCC (*)	+ 5 V	--	NC
10,12	GND	Signal Ground	--	18 - 25
14,16	GND	Signal Ground	--	18 - 25
18,20	GND	Signal Ground	--	18 - 25
22,24	GND	Signal Ground	--	18 - 25

Note: (*) To protect external power lines of peripheral devices, make sure that
-- the wires have the right diameter to withstand maximum available current
-- the enclosure of the peripheral device fulfils fire-protecting requirements of IEC/EN 60950.

You can use an adapter cable to change from the 26-pin header style of the JRex-VE to the more common 25-pin female D-sub.



26-pin Header to 25-pin D-Sub conversion

8.2 Configuration

The JRex-VE parallel port is bi-directional. The bi-directional functions are compatible with those of a PS/2 style parallel port. The functionality is always available and does not conflict with normal printer use. The parallel-port mode, I/O addresses, and IRQs are defined in the PhoenixBIOS Setup Utility.
Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuration.

9. KEYBOARD AND PS/2 MOUSE INTERFACE

This interface consists of Keyboard and PS/2 Mouse. A PS/2 keyboard works directly; by using a PS/2 mouse please use a Y-cable for mouse and KB.



Note: Some of the available Y-cable we see (Laptop-PS/2 Y) has to be connected the following way:

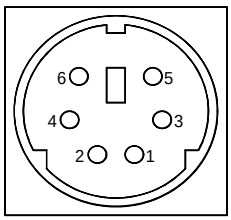
M - Keyboard
K - Mouse

To find the location of the keyboard/mouse connector on the JRex-VE board, please see the

Appendix E: Connector Layout chapter.

9.1 Keyboard/Mouse Connector

Pin	Signal Name	Function
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	VCC	+5V Vcc
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock



9.2 Configuration

Refer to the **Keyboard Features Submenu** and to the **Advanced Menu** (for PS/2 Mouse) in the **Appendix B: BIOS Operation**

10. FLOPPY-DRIVE INTERFACE

The floppy-drive interface can support one 3.5” drive, using the adapter cable ADA-Floppy 2, (part number 96001-0000-00-0).

The board can support the following drive capacities:

720K

1.44M

2.88M

10.1 Floppy Connector

Signal	Function	Pin	Signal	Function
VCC (*)	+ 5V	2	IDX	Index
VCC (*)	+ 5V	4	DS0	Drive select 0
VCC (*)	+ 5V	6	DCHNG#	Disk change
NC	-	8	NC	-
NC	-	10	Mo0	Motor on
NC	-	12	DIR	Direction select
NC	-	14	STEP	Step
GND	Ground	16	WD	Write data
GND	Ground	18	WG	Write gate
GND	Ground	20	TR00	Track 00
GND	Ground	22	WP	Write protect
GND	Ground	24	RD	Read data
GND	Ground	26	SIDE	Side one select

Note: (*)To protect the external power lines of peripheral devices, make sure that:
- wires have the right diameter to withstand the maximum available current
- the enclosure of the peripheral device fulfils the fire protecting requirements of IEC/EN 60950.

10.2 Configuration

Specify the drive type using the PhoenixBIOS Setup Utility.

Choices for the 3.5" drive type include:

360KB, 1.2MB, 720Kb, 1.44MB, 2.88MB, None

You can disable the floppy-disk interface from the PhoenixBIOS Setup Utility.

Refer to the **Advanced Menu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

11. IDE-CONTROLLER INTERFACE

PCI bus devices serve as primary and secondary IDE hosts on the JRex-VE. BIOS automatically configures them, but you can disable them by using the BIOS Setup Utility. Resources used by primary and secondary IDE host adapters are compatible with the PC/AT.

The IDE controller supports the following modes:

Ultra 100 DMA mode with a 80 pin UDMA100 cable

PIO modes up to Mode-4 timing

Multiword DMA Mode 0, 1, 2 with independent timing

11.1 IDE Connector

The IDE connector is a 40-pin, dual in-line, 2,54mm-pitch, male header.
To find the location of the Connector on the JRex-VE board, please see the

Appendix E: Connector Layout chapter.

11.2 Configuration

You can connect one or two IDE drives to the header by using an appropriate flat-ribbon cable.

1. Configure the first drive as master.
2. Configure the second drive (at the end of the cable) as slave.
3. Consult your disk-drive manual for instructions.

Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

11.3 CompactFlash Connector

A CompactFlash socket for commercial CompactFlash Memory Cards (only Type I) is integrated on the bottom side of the JRex-VE board.

11.3.1 Configuration

You can use the CompactFlash Memory card as a master device on the secondary IDE port. The BIOS will automatically detect the size of this medium.
Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

12. ETHERNET-CONTROLLER INTERFACE

The JRex-VE on-board Ethernet interface use the VT8231 integrated MAC and an external VT6103 PHY. This combination supports a 10/100Base-T interface. The device auto-negotiates the use of a 10Mbit/sec or 100Mbit/sec connection.

All Microsoft network-operating systems and Linux support the interface.

The ethernet controller provides:

Integrated Fast Ethernet MAC in VT8231 South Bridge

Physical Layer, and transceiver in separate chip

EEPROM 93C46 interface supports node-ID, access-configuration information

Compliance with IEEE 802.3u 100Base-TX and 802.3 10Base-T

Compliance with IEEE 802.3u auto-negotiation protocol for automatic link-type selection

Full-duplex/half-duplex capability

Supports IEEE 802.3x full duplex flow control

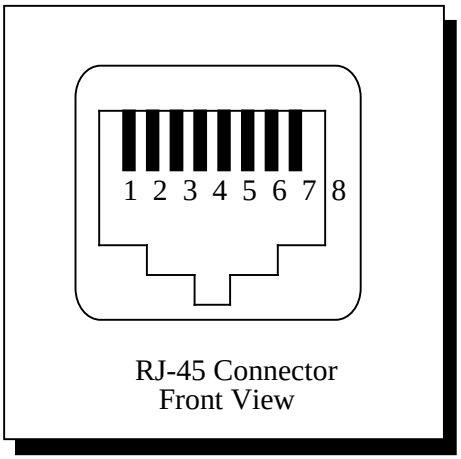
Digital-clock recovery circuit using advanced digital algorithm to reduce jitter

High-performance 100Mbps-clock generator and data-recovery circuit

Provides loopback mode for easy system diagnostics

12.1 LAN Connector

The 10/100Base-T connector is a standard 8-pin RJ45 jack.



RJ-45 Connector
Front View

12.1.1 RJ45 Pinout

Pin#	Signal Name	Function	In/Out
1	TXD+[1]	100/10BASE-T Transmit	Differential Output
2	TXD-[1]	100/10BASE-T Transmit	Differential Output
3	RXD+[2]	100/10BASE-T Receive	Differential Input
4	NC	Unused Pin	
5	NC	Unused Pin	
6	RXD-[2]	100/10BASE-T Receive	Differential Input
7	NC	Unused Pin	
8	NC	Unused Pin	

Notes:

[1]TXD+, TXD- Differential output pair drives 10 and 100Mb/s Manchester-encoded data to the 100/10BASE-T transmit lines.

[2]RXD+, RXD- Differential input pair receives 10 and 100Mb/s Manchester-encoded data from the 100/10BASE-T receive lines.

12.2 Configuration

The configuration of the on-board PCI Ethernet interface via the PhoenixBIOS Setup is automatically.

12.3 Ethernet Technical Support

You can solve some Ethernet problems by using the latest VIA 4in1 and Ethernet drivers. We provide you with the latest tested drivers, which can differ from newer ones.

For further technical support, contact either **Kontron** or get support information and download software updates from VIA.

13. GRAPHICS-CONTROLLER INTERFACE

13.1 Flat Panel LVDS (JILI) Connector

The user interface for flat panels is the JUMP*tec* Intelligent LVDS Interface (JILI). The implementation of this subsystem complies with the JILI Specification.

To find the location of this Connector on the JRex-VE board, please see the **Appendix E: Connector Layout** chapter.

13.2 VGA Connector

DSUB15	Signal Name	Function
1	RED	Analog Video Red
2	GREEN	Analog Video Green
3	BLUE	Analog Video Blue
5	GND	Signal Ground
6	GND	Signal Ground
7	GND	Signal Ground
8	GND	Signal Ground
10	GND	Signal Ground
13	HSYNC	Horizontal Sync
14	VSYNC	Vertical Sync

13.3 Configuration

Refer to the **Advanced Chipset Control Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

In case of problems:

- check out the latest drivers on our homepage
- set the values in the Advanced Chipset Control Submenu to the highest values
- use a clean installation of your OS
- switch manual to your configuration at the Display Control Submenu.

14. POWER (CONNECTOR AND BUTTON)

The JRex-VE uses +5V, +3.3V. +5V Standby and a power good signal. For some panels or some JFLEX modules +12V is required. Also by some harddisks and floppy drives. Please make sure that all voltages will connect to the board at the same time.

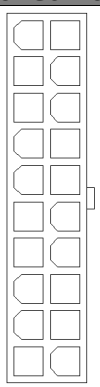
It is recommend to use a standard ATX power supply.

In difference to the ATX specification the JRex-VE is starting by switching on the primary supply voltage of the ATX power supply (auto start after power)

When using a non-ATX power supply please connect 3.3V to all pins named “+3.3V” and 5V to all pins named “+5V” and “+5V Standby”. The pins “Power Good” and “Power Supply On” must be left open.

The JRex-VE is also available for 5V-only Systems. This version uses a 4-pin power connector mechanically and electrically compatible to those on 3,5” hard disks.

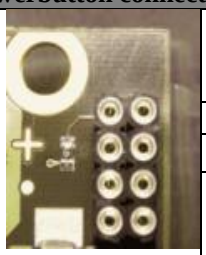
14.1 Power Connector

Power Connector		
+12V		+5V
+5V Standby		+5V
Power Good		-5V
Ground		Ground
+5V		Ground
Ground		Ground
+5V		Power Supply On
Ground		Ground
+3.3V		-12V
+3.3V		+3.3V

Cable connector for power is available from

- Molex as 20 pin 5557d use with 5556 or 44476 terminals

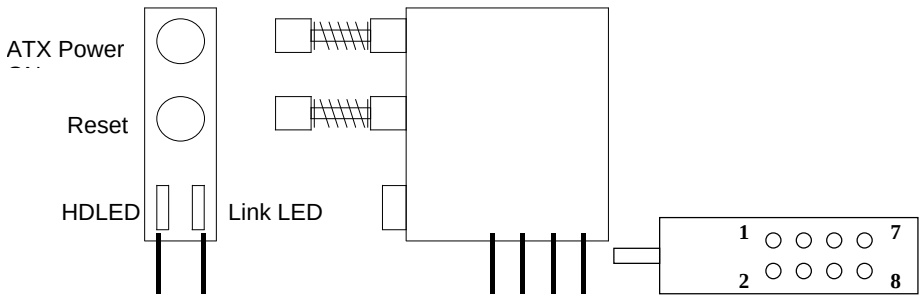
14.2 Socket Powerbutton

Powerbutton connector		
HDLED (Cathode)		LAN LinkLED (Cathode)
+5V (Anode)		+3.3V (Anode)
Reset		Ground
Powerbutton		Ground

14.3 Powerbutton

At the front oft the Board a button for switching the ATX power supply on or off can be connected. The board layout directly supports a combined button which can also reset the board.
Also there are LEDs for Harddisk activity (HDLED) and for displaying a link to a network (Link LED).

This combined button is available from Kontron.



15. JFLEX EXTENSION CONNECTOR

Our JFLEX Extension Concepts includes 2 Connectors with 120 pins.
These Connectors allows to extend our JRex Boards with some extra functions.
On the JRex-VE we provide:

- LPC Bus for more I/O devices
- PCI Bus for up to 3 PCI devices
- AC97 Bus for sound
- MC97 Bus for modem
- 3.3 V extra power module for 5V only systems
- interface for a TV out module
- interface for a DVI output module
- digital panel output
- LVDS panel output

Some extension modules will be available soon from Kontron Embedded Modules GmbH to allow you to add interesting functions.
Our JRex extension specification and design guide is only available from Kontron Embedded Modules GmbH by signing an NDA. We need this step because a high speed design on fast panel signals and PCI Bus is very critical.
If you have more ideas for more functionability please feel free to inform us via your sales channel or discuss your wishes in our forum on www.j-rex.com.
We will also make an overview of certified partners available to make designs for your own extended functions.
If you are interested and if you have experiences on digital panel adaptations or on PCI bus please contact us on our webpage to get a membership in the certified partner program.

16. WATCHDOG TIMER

Programming:

The system BIOS makes it very easy to use the watchdog via software interrupt 15h. Two ways are possible to access the watchdog: The simplest way is to use AH=0E0h to init or trigger the watchdog. The second way is to use the functions ”Write I^2C” and ”Read I^2C” with AH=0E1h and handling the I^2C bus protocol.

For detailed describtion see Application Notes and our Specification X00391.
Both documents can be downloaded from our webpage or ask our technical support.

17. APPENDIX A: SYSTEM-RESOURCE ALLOCATIONS

17.1 I/O Port Assignments

Devices on the JRex-VE use I/O addresses common to the PC/AT.

17.2 Interrupt Request Lines

The following table describes the allocation of the 16 hardware-interrupt lines for the JRex-VE.

IRQ #	Primary Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Cascade	No	
3	Free	Yes	
4	COM1	No	Note (1)
5	Soundblaster Compatibility mode	No	Note (1)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	Free	Yes	
10	Free	Yes	
11	Free	Yes	
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1)
15	IDE1 (Compact Flash)	No	Note (1)

Notes: [1] If the "Used For" device is disabled in setup, the corresponding interrupt is available for other devices.

17.3 Direct Memory Access (DMA) Channels

DMA #	Used For	Available
0		Yes
1	Sound	No
2	FDC	No
3	LPT	No
4	Cascade	No
5		Yes
6		Yes
7		Yes

17.4 Upper Memory Area Map

Upper Memory	Use	Available
C0000h – CBFFFh	VGA BIOS	No
CC000h – DFFFFh		Yes
E0000h – E6000h		Yes
E6000h – E6FFFh	System BIOS	No
F0000h – EC000h	System BIOS	No

17.5 PCI Devices

PCI Device #	IDSEL #	IRQ	Busmaster
AGP Grafic	-	INTA	-
AC97 Sound Controller	-	INTC	
Ethernet Controller	-	INTA	
1st and 2nd USB Controller	-	INTD	

18. APPENDIX B: BIOS OPERATION

The JRex-VE comes equipped with Phoenix BIOS 4.0, which is located in an onboard Flash. The device has an 8-bit access. The shadow RAM feature offers faster access (16 bit). You can update the BIOS using a Flash utility. For complete Phoenix BIOS 4.0 information, visit the **Phoenix Technologies Web site**.

18.1 BIOS Version

The BIOS version displays onscreen during the POST at boot.

18.2 Setup Guide

The PhoenixBIOS setup utility allows you to change system behavior by modifying the BIOS configuration. Setup-utility menus allow you to make changes and turn features on or off.

BIOS-setup menus represent those found in most models of the JRex-VE. The BIOS setup utility for specific models can differ slightly.

Note: Selecting incorrect values can cause system boot failure. Load setup-default values to recover by pressing <**F9**>.

18.2.1 Start Phoenix BIOS Setup Utility

To start the PhoenixBIOS setup utility, press <**F2**> when the following string appears during bootup.

```
Press <F2> to enter Setup
```

The Main Menu then appears.

Several sections comprise the **Setup Screen.**

Setup Screen	Location	Function
Menu Bar	Top	Lists and selects all top level menus
Legend Bar	Bottom	Lists setup navigation keys
Item Specific Help Window	Right	Help for selected item
Menu Window	Left Center	Selection fields for current menu
General Help Window	Overlay (center)	Help for selected menu

Menu Bar

The menu bar at the top of the window lists menus. Use the left/right arrow keys to make a selection.

Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The table below describes the legend keys and their alternates.

Key	Function
<F1> or <Alt-H>	General Help window
<Esc>	Exit menu
← or → Arrow key	Select a menu
↑ or ↓ Arrow key	Select fields in current menu
<Tab> or <Shift-Tab>	Cycle cursor up and down
<Home> or <End>	Move cursor to top or bottom of current window
<PgUp> or <PgDn>	Move cursor to next or previous page
<F5> or <->	Select previous value for the current field
<F6> or <+> or <Space>	Select next value for the current field
<F9>	Load the default configuration values for this menu
<F10>	Save and exit
<Enter>	Execute command or select submenu
<Alt-R>	Refresh screen

Selecting an Item

Use the ↑ or ↓ key to move the cursor to the field you want. Then use the + and - keys to select a value for that field. The **Save Value** commands in the **Exit** menu save the values displayed in all the menus.

Displaying Submenus

Use the ← or → key to move the cursor to the submenu you want. Then press <Enter>. A pointer (4) indicates submenus.

Item Specific Help Window

The Help window on the right side of each menu displays the Help text for the selected item. It updates as you move the cursor to each field.

General Help Window

Pressing <**F1**> or <**ALT-F1**> on a menu brings up the General Help window that describes legend keys and alternates. Press <**Esc**> to exit the General Help window.

18.3 Main Menu

Feature	Option	Description
System Time	HH:MM:SS	Sets the system time. Use <**Enter**> to move to MM or SS.
System Date	MM/DD/YYYY	Set the system date. Use <**Enter**> to move to DD or YYYY.
Legacy Diskette A	360 kB, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 kB, 3 ½ “ **1.44/1.25 MB, 3 ½ “** 2.88 MB, 3 ½ “ Disabled	Select the type of floppy disk drive.
Legacy Diskette B	360 kB, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 kB, 3 ½ “ 1.44/1.25 MB, 3 ½ “ 2.88 MB, 3 ½ “ **Disabled**	Select the type of floppy disk drive.
8 Primary Master	Autodetected drive	Displays result of PM autotyping.
8 Primary Slave	Autodetected drive	Displays result of PS autotyping.
8 Secondary Master	Autodetected drive	Displays result of SM autotyping.
8 Memory Shadow	sub menu	Opens Memory Shadow Menu
8 Memory Cache	sub menu	Opens Memory Cache Menu

System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory	N/A	Displays amount of extended memory detected during bootup.

Note: In the **Option** column, **bold** shows default settings.

18.3.1 Primary Master, Primary Slave, and Secondary Master Submenus

Feature	Option	Description
Type	None User **Auto** CD-ROM ATAPI Removable Other ATAPI	None = Autotyping is unable to supply the drive type or end user has selected None, disabling any drive that may be installed. User = End user supplies hdd information. Auto = Autotyping, drive supplies information.
Cylinders	1 to 65,536	Number of cylinders.
Heads	1 to 256	Number of read/write heads.
Sectors	1 to 63	Number of sectors per track.
Maximum Capacity	N/A	Displays calculated size of the drive in CHS
Total Sectors	N/A	Displays total number of sectors in LBA
Maximum Capacity	N/A	Displays calculated size of drive in LBA
Multisector Transfer	Disabled Standard 2 sectors 4 sectors 8 sectors **16 sectors**	Any selection except Disabled determines the number of sectors transferred per block. Standard is one sector per block.
LBA Mode Control	Disabled **Enabled**	Enabling LBA causes Logical Block Addressing to be used in place of CHS.
32-Bit I/O	**Disabled** Enabled	Enables 32-bit communication between CPU and IDE card. Requires PCI or Local Bus.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 **Fast PIO 4** FPIO3 / DMA1 FPIO4 / DMA2	Selects the method for transferring the data between the hard disk and system memory. Autotype the drive to select the optimum transfer mode.
Ultra DMA Mode	Disabled Mode 0 Mode 1 Mode 2 Mode 3 Mode 4 Mode 5	Selects the Ultra DMA mode used for moving data to/from the drive. Autotype the drive to select the optimum Ultra DMA mode.
SMART Device Monitoring	**Disabled** Enabled	Enables SMART warnings of imminent failure of drive. (Device must support tis feature)

18.3.2 Memory Shadow sub menu:

Feature	Option	Description
CC00 - CFFF	**Disabled** Enabled	Accesses to this upper memory region go to the ISA bus if Disabled or to local memory if Enabled.
D000 – D3FF	**Disabled** Enabled	see above.
D400 – D7FF	**Disabled** Enabled	see above.
D800 - DBFF	**Disabled** Enabled	see above.
DC00 - DFFF	**Disabled** Enabled	see above.

18.3.3 Memory Cache sub menu:

Feature	Option	Description
Memory Cache	Disabled **Enabled**	**Enables or Disables the L2 cache.**
Cache System BIOS area	uncached **Write Protect**	**Caches the system BIOS to improve performance.**
Cache Video BIOS area	uncached **Write Protect**	**Caches the video BIOS to improve performance.**
Cache Extended Memory area	uncached Write Through Write Protect **Write Back**	**Controls caching of extended and conventional system memory.**
CC00 – CFFF	**Disabled** Write Through Write Protect Write Back	Controls caching of accesses to this upper memory region. Disabled: Block is not cached. Write Through: Writes are cached and sent to main memory at once. Write Protect: Writes are ignored. Write Back: Writes are cached, but not sent to main memory until necessary.
D000 – D3FF	see above.	see above.
D400 – D7FF	see above.	see above.
D800 – DBFF	see above.	see above.
DC00 – DFFF	see above.	see above.

Note: In the **Option** column, **bold** shows default settings.

18.3.4 Advanced Menu

Feature	Option	Description
8 Advanced Chipset Control	Submenu	Opens Advanced Chipset Control submenu.
Plug & Play (PNP) OS	Yes **No**	If your system has a PNP OS, such as Win9X, select Yes to let the OS configure PNP devices not required for boot. No makes BIOS configure them.
Reset Configuration Data	**No** Yes	Yes erases all configuration data in ESCD, which stores the configuration settings for plug-in devices. Select Yes when required to restore the manufacturer's defaults.
Secured Setup Configuration	**Yes** No	Yes prevents a Plug and Play OS from changing system settings.
8 PCI Configuration	Submenu	Opens PCI Configuration submenu.
PS/2 Mouse	**Enabled** Autodetect Disabled	Selecting Disabled prevents installed PS/2 mouse from functioning but frees up IRQ12. Selecting Autodetect frees IRQ12 if no mouse detected.
8 Keyboard Features	Submenu	Opens keyboard features submenu.
8 I/O Device Configuration	Submenu	Opens I/O Device Configuration submenu.
8 Hardware Monitor	Submenu	Opens the Hardware Monitor submenu.
Large Disk Access Mode	**DOS** Other	Select DOS if you have DOS. Select Other if you have another OS, such as UNIX. A large disk has more than 1024 cylinders, more than 16 heads, or more than 63 sectors per track.
Halt On Errors	No **Yes**	Determines if post errors cause the system to halt.

Note: In the **Option** column, **bold** shows default settings.

18.3.5 Advanced Chipset Control Submenu

Feature	Option	Description
PCI Delay Transaction	**Enabled** Disabled	Latches PCI-to-ISA cycles into buffer to free the PCI bus.
Aperture Size	2M, 4M, 8M, 16M, 32M, **64M,** 128M, 256M	Select the size of the AGP graphics aperture.
Frame Buffer Size	None, **8 Mb**, 16 Mb, 32 Mb	Select the size of the VGA UMA frame buffer.
Spread Spectrum Modulation	**Disabled**, 0.25%, 0.5%	Enables the Spread Spectrum Support of the Clock Synhesizer to reduce EMI.

Note: In the **Option** column, **bold** shows default settings.

18.3.6 PCI Configuration Submenu

Feature	Option	Description
PCI IRQ line 1	Disabled **Auto** IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PCI interrupt INTA. Select Auto to let the BIOS assign the IRQ.
PCI IRQ line 2	Disabled **Auto** IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PCI interrupt INTB. Select Auto to let BIOS assign IRQ.
PCI IRQ line 3	Disabled **Auto** IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PCI interrupt INTC. Select Auto to let BIOS assign IRQ.
PCI IRQ line 4	Disabled **Auto** IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PCI interrupt INTD. Select Auto to let BIOS assign IRQ.
►PCI/PNP ISA UMB Region Exclusion	Submenu	Opens UMB Region Exclusion submenu.
►PCI/PNP ISA IRQ Resource Exclusion	Submenu	Opens IRQ Exclusion submenu.
Default Primary Video Adapter	**AGP** PCI	In a system with an AGP and a PCI video adapter end user can select the adapter which will be initialized by the BIOS.
Assign IRQ to PCI VGA	 No **Yes**	Determines if a PCI VGA device get's an IRQ assigned. Win98SE has shutdown problems if a PCI VGA controller hasn't an IRQ assigned!

Notes: In the **Option** column, **bold** indicates the default setting.

PCI/PNP ISA UMB Region Exclusion Submenu

Feature	Option	Description
CC00 - CFFF	**Available** Reserved	Reserves specified block of upper memory for legacy ISA devices.
D000 – D3FF	**Available** Reserved	Reserves specified block of upper memory for legacy ISA devices.
D400 – D7FF	**Available** Reserved	Reserves specified block of upper memory for legacy ISA devices.
D800 - DBFF	**Available** Reserved	Reserves specified block of upper memory for legacy ISA devices.
DC00 - DFFF	**Available** Reserved	Reserves specified block of upper memory for legacy ISA devices. (Reserved if legacy USB enabled.)

Note: In the **Option** column, **bold** shows default settings.

18.3.7 PCI/PNP ISA IRQ Exclusion Submenu

Feature	Option	Description
IRQ3	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ4	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ5	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ7	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ9	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ10	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ11	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ12	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.

Note: In the **Option** column, **bold** shows default settings.

18.3.8 Keyboard Features Submenu

Feature	Option	Description
Numlock	**Auto** On Off	On or Off turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric keypad.
Key Click	**Disabled** Enabled	Turns audible key click on.
Keyboard auto-repeat rate	**30/sec**, 26.7/sec, 21.8/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Sets the number of times to repeat a keystroke per second if you hold the key down.
Keyboard auto-repeat delay	¼ sec, **½ sec**, ¾ sec, 1 sec	Sets the delay time after the key is held down before it begins to repeat the keystroke.

Note: In the **Option** column, **bold** shows default settings.

18.3.9 I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	Disabled Primary Compact Flash **Both**	Enables onboard PCI IDE device.
Floppy disk controller	Disabled **Enabled** Auto	Enables onboard FDC controller.
Base I/O address	**Primary** Secondary	Selects base address of the FDC controller. (Primary = 3F0h, Secondary = 370)
Serial Port A	Disabled Enabled **Auto**	Disabled turns off the port. Enabled requires end user to enter the base I/O address and IRQ. Auto makes the BIOS or OS configure the port, depending on PNP OS setting.
Base I/O address	**3F8h**, 2F8h, 3E8h, 2E8h	Select I/O base of port.
IRQ	IRQ 3, **IRQ 4**	Select IRQ of Port A and B

Feature	Option	Description
Parallel Port	Disabled Enabled **Auto**	Disabled turns off the port. Enabled requires end user to enter base I/O address and the IRQ. Auto makes the BIOS or OS configure the port, depending on PNP OS setting.
Mode	Output only Bi-directional ECP **EPP**	Set the mode for the parallel port.
Base I/O address	**378h**, 278h, 3BCh	Select I/O base of port.
IRQ	IRQ 5, **IRQ 7**	Select IRQ of parallel port.
DMA	DMA1, **DMA3**	Select DMA channel of port if in ECP mode.
LAN Device	Disabled **Enabled**	Enable or disable onboard Ethernet controller.
Onchip USB Device	Disabled **Enabled**	Enable or disable 1st onboard USB controller.
Onchip USB 2 Device	Disabled **Enabled**	Enable or disable 2nd onboard USB controller.
Legacy USB Support	**Disabled** Enabled	Enable or disable support for USB keyboard and mice. Enable for use with non-USB aware OS such as UNIX and DOS.
OnChip Audio Device	**Disabled** Enabled	Enable or disable OnChip AC97 sound controller
SoundBlaster™	**Disabled** Enabled	Enable or disable SoundBlaster™ compatibility mode
MPU-401	**Disabled** Enabled	Enable or disable MPU 401 compatibility mode
►Watchdog Settings	Submenu	Opens WDT settings submenu.

Notes: The options noted in ***bold italics*** are default settings.

If legacy USB is enable, IRQ1 and IRQ2 do not wake the system from standby or suspend state on some OS. Better use ACPI mode or disable legacy support if your OS has a USB driver. Also Standby and Suspend doesn't work on DOS mode if legacy USB is enabled.

In SoundBlaster™ compatibility mode reserve IRQ5 in PCI/PNP ISA IRQ Exclusion submenu if you are using Windows 9x or disable this mode (Windows 9x driver supports SoundBlaster™ in DOS Box).

18.3.10 Watchdog Settings Submenu

Feature	Option	Description
Mode	**Disabled** Reset NMI	Select watchdog operation mode.
Timeout	0.4s, 1s, 10s, **30s**, 1m, 5m, 10m	Max. trigger period.
Delay	1s, 5s, 10s, **30s**, 1m, 5m, 10m, 30m	Delay after boot to start watchdog

Note: In the **Option** column, **bold** shows default settings.

18.3.11 Hardware Monitor sub menu:

Feature	Option	Description
VCore	x.xx V	Reports current CPU core voltage in Volt.
VCC (12V)	x.xx V	Reports current 12V external supplie voltage in Volt.
VCC (5V)	x.xx V	Reports current 5V external supplie voltage in Volt.
VCC (2.5V)	x.xx V	Reports current 2.5V onboard voltage in Volt.
VCC (3.3V)	x.xx V	Reports current 3.3V external supplie voltage in Volt.
CPU Temp	xx °C/ xxx °F	Reports current CPU die temperature.
CPU Fan 1 Speed	xxxx rpm	Reports current speed of connected fan.

18.4 Security Menu

Feature	Option	Description
Set Supervisor Password	Up to seven alphanumeric characters	Pressing <**Enter**> displays the dialog box for entering the user password. In related systems, this password gives full access to setup.
Set User Password	Up to seven alphanumeric characters	Pressing <**Enter**> displays the dialog box for entering the user password. In related systems, this password gives restricted access to setup.
Diskette access	User Supervisor	Enabled requires supervisor password to access floppy disk.
Fixed disk boot sector	**Normal** Write protected	Write-protect the boot sector on the hard disk for virus protection. Requires a password to format or Fdisk the hard disk.
Virus check reminder	**Disabled** Daily Weekly Monthly	Displays a message during boot-up asking (**Y/N**) if you backed up the system or scanned for viruses. Message returns on each boot until you respond with **Y**. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and monthly on the first boot of the month.
System backup reminder	**Disabled** Daily Weekly Monthly	Displays a message during boot-up asking (**Y/N**) if you backed up the system or scanned for viruses. Message returns on each boot until you respond with **Y**. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and monthly on the first boot of the month.
Password on boot	**Disabled** Enabled	Enabled requires a password on boot. Requires prior setting of the supervisor password. If supervisor password is set and this option is disabled, BIOS assumes user is booting.

Notes: In the **Option** column, **bold** shows default settings.
Enabling Supervisor Password requires a password for entering Setup.
Passwords are not case sensitive.
User and Supervisor passwords are related.
You can only create a User password if a Supervisor password is first created.

18.5 Power Menu

A power management system reduces the amount of energy used after specified periods of inactivity. The setup menu supports:

Full On state

Standby state with partial power reduction

Suspend state with full power reduction

Feature	Option	Description
Power Button Function	**Power Off,** Sleep	Power Off sets the power button to switch off the system immediately. Sleep sets the power button to go into sleep state or to switch off the system, when the power button is pressed for at least 5 sec.
Power Savings	**Disabled** Customized Maximum Power Saving Maximum Performance	Maximum options select predefined values. Select Customized to make selections from the following fields. Disabled turns off all power management.
Enable ACPI	**No**, Yes	En/Disable ACPI BIOS
►IRQs Activity Monitoring	Submenu	Opens IRQs Activity Monitoring submenu.
Idle Mode	**Off** On	Turns on or off the idle mode power savings. Idle mode slows down the CPU during brief periods of inactivity.
Standby Timeout	**Off**, 1min, 2min, 4min, 6min, 8min, 12min, 16min	Inactivity period required to put system in Standby mode (partial power shutdown).
Auto Suspend Timeout	**Off**, 5min, 10min, 15min, 20min, 30min, 40min, 60min	Inactivity period required after Standby to Suspend mode (maximum power shutdown).
Hard Disk Timeout	**Disabled**, 10 sec – 15 min	Inactivity period of hard disk required before standby (motor off).
Video Timeout	**Disabled**, 10 sec – 15 min	Inactivity period of user output device required before the screen is turned off.
Resume On Time	**Off** On	Allows the system to wake at specific time.
Resume Time	[hh:mm:ss]	Specifies time when system wakes.

Note: In the **Option** column, **bold** shows default settings.

18.5.1 IRQs Activity Monitoring Submenu

Feature	Option	Description
IRQ1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 15	Enable Disable	Wakes up system on IRQ.

Note: If legacy USB is enabled, IRQ1 and IRQ12 do not wake system from standby or suspend state on some OS. Please use ACPI. For more restrictions please look at chapter **"I/O Device Configuration Submenu"**.

18.6 Boot Menu

18.6.1 QuietBoot

Upon turn on or reset, QuietBoot displays a black screen as the default or a grapical logo instead of a text-based POST screen, which displays diagnostic messages.

The graphical logo is visible until just before the OS-load unless:

<**Esc**> is pressed to display the POST screen

<**F2**> is pressed to enter Setup

POST issues an error message

BIOS or option ROM requests keyboard input

18.6.2 MultiBoot

Multiboot allows you to select the following boot device:

Hard disk

Floppy disk

CD-ROM

Network card

You can make the selections from the BIOS utility setup, or by selecting the boot device in the **BootFirst Menu**.

MultiBoot consists of the following menus:

Setup Boot

Boot Device Priority

Removable Devices

Hard Drive

Network Boot Priority

Boot First

18.7 Setup Boot Menu

Feature	Option	Description
Floppy Check	**Disabled** Enabled	Enabled verifies floppy type on boot; disabled speeds boot.
Summary Screen	**Disabled** Enabled	If enabled, a summary screen is displayed just before booting the OS to let the end user see the system configuration.
QuickBoot Mode	Disabled **Enabled**	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Dark Boot	**Disabled** Enabled	If enabled, system comes up with a blank screen instead of the diagnostic screen during bootup.
Onboard LAN PXE ROM	**Disabled** Enabled	Enables remote boot BIOS extension for the onboard LAN controller.
8 Boot Device Priority	sub menu	Opens boot device priority sub menu
8 Display Control	sub menu	Opens Display Control sub menu
Display Mode	**Simultan** LCD only CRT only	Select the display boot devices.
Flat Panel Type	VGA SVGA XGA **Auto Detect**	Set either a fixed panel type or let BIOS autodetect the panel via JILI adapter information.

Notes: In the Option colum, bold reprsents the default settings.
If the onboard LAN PXE ROM is enabled, the lanboot rom asks during bootup which lanboot option to use.

18.7.1 Boot Device Priority Submenu

This menu allows you to select the order of the devices from which the BIOS attempts to boot the OS. During POST, if BIOS is unsuccessful at booting from one device, it will try the next one on the list.

The items on this menu each may represent the first of a class of items. For example, if you have more than one hard disk drive, Hard Drive represents the first of such drives as specified in the Hard Drive menu described below.

To change the order select the device you want to change and press <-> to decrease or <+> to increase priority.

Feature	Option	Description
8 Hard Drive	Boot priority & submenu	Sets boot priority of Hard Disks as described in the respective submenu.
8 Removable Devices	Boot priority & submenu	Sets boot priority of Removable Devices as described in the respective submenu.
ATAPI CD-ROM Drive	Boot priority	Sets boot priority of ATAPI CD:ROM Drives.
8 Network Boot	Boot priority & submenu	Sets boot priority of Network adapters as described in respective submenu.

18.7.2 Hard Drive Priority Menu

If there is more than one bootable hard drive, select **Hard Drive** and press <**Enter**> to display Fixed Disk Menu and choose a boot priority.

18.7.3 Removable Devices Menu

If there is more than one Removable Media drive, select **Removable Devices** and press <**Enter**> to display the Removable Media menu and choose which drive is represented in the boot-order menu.

Note: The standard 1.44MB floppy drive is referenced as Legacy Floppy Drives.

18.7.4 Network Boot Priority Menu

If there is more than one bootable network adapter in the system, select **Network Boot** and press <**Enter**> to display available network adapters and choose the boot priority.

18.7.5 Display Control Submenu

18.7.6 Boot First Menu

Display the **Boot First Menu** by pressing <**Esc**> during POST. In response, the BIOS displays the message `Entering Boot Menu` and then displays the Boot Menu at the end of POST.

Use the menu to select a following option:

- Override the existing boot sequence (for this boot only) by selecting another boot device. If the specified device does not load the OS, the BIOS reverts to previous boot sequence.
- Enter Setup.
- Press <**Esc**> to continue with the existing boot sequence.

18.8 Exit Menu

The following sections describe the five options in **Exit Menu**. Pressing <**Esc**> does not exit this menu. You must select an item from the menu to exit.

Feature	Option	Description
Exit Saving Changes	Saves selections and exits setup. The next time the system boots, the BIOS configures the system according to the Setup selection stored in CMOS.	Exit Saving Changes
Exit Discarding Changes	Exits Setup without storing in CMOS any new selections you may have made. The selections previously in effect remain in effect.	Exit Discarding Changes
Load Setup Defaults	Displays default values for all the Setup menus.	Load Setup Defaults
Discard Changes	If, during a Setup session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you saved to CMOS.	Discard Changes
Save Changes	Saves all the selection without exiting Setup. You can return to the other menus to review and change your selection.	Save Changes

18.9 Updating BIOS with Phoenix Phlash

Phoenix Phlash allows you to update BIOS using a floppy disk without having to install a new ROM chip. Phoenix Phlash is a utility for flashing a BIOS to the Flash ROM installed on the JRex-VE

Use Phoenix Phlash to:

Update the current BIOS with a newer version

Restore a corrupt BIOS (see below)

You can download Phoenix Plash as a compressed file, CRISBQC3.ZIP, from the Web site. It contains the following files:

File	Purpose
MAKEBOOT.EXE	Creates the custom boot sector on the Crisis Recovery Diskette.
CRISBOOT.BIN	Serves as the Crisis Recovery boot sector code.
MINIDOS.SYS	Allows the system to boot in Crisis Recovery Mode.
PHLASH.EXE	Programs the flash ROM.
WINCRISIS.EXE	Creates the Crisis Recovery Diskette from Windows.
WINCRISIS.HLP	Serves as the help file of WINCRISES.EXE.
PLATFORM.BIN	Performs platform-dependent functions.
BIOS.ROM	Serves as the actual BIOS image to be programmed into Flash ROM.

To install Phoenix Phlash on a hard disk, unzip the content of CRISBQC3.ZIP into a local directory such as C:\PHLASH.

Creating a Crisis Recovery Diskette

Insert a blank diskette into Drive A: or B: and execute WINCRISIS.EXE. This copies four files onto the Crisis Recovery Diskette.

File	Purpose
MINIDOS.SYS	Allows the system to boot in Crisis Recovery Mode.
PHLASH.EXE	Programs the flash ROM.
PLATFORM.BIN	Performs platform-dependent functions.
BIOS.ROM	Serves as the actual BIOS image to be programmed into Flash ROM.

If the BIOS image (BIOS.ROM) changes due to an update or bug fix, copy the new BIOS.ROM image onto the diskette.

Phoenix Phlash runs in one of two modes:

Command Line Mode

Crisis Recovery Mode

Use the Command Line mode to update or replace a BIOS. To execute Phlash in this mode, move to the Crisis Recovery Disk and type:

```
PHLASH BQC3R110.ROM (replace BQC3R110.ROM by new BIOS-filename)
```

Phoenix Phlash will update the BIOS. Phlash can fail if the system uses memory managers. If this occurs, the utility displays the following message:

```
Cannot flash when memory manager are present.
```

Update the BIOS image by typing:

```
PHLASH /X BQC3R110.ROM (replace BQC3R110.ROM by new BIOS-filename)
```

18.10 Boot Block Support

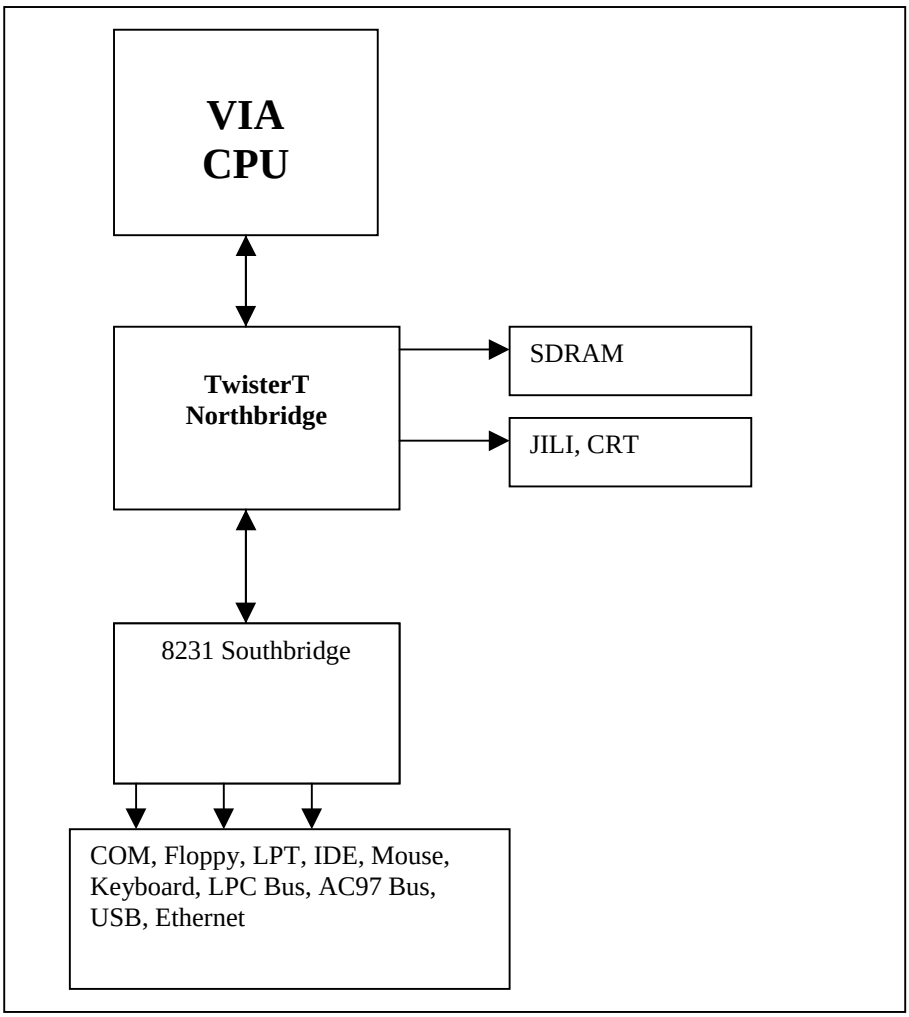
Updating the BIOS represents a potential hazard. Power failures or fluctuations that occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

To prevent this hazard, many systems come with a boot-block Flash ROM. The boot-block region contains a fail-safe recovery routine. If the boot-block code finds a corrupted BIOS (checksum fails), it boots into the crisis recovery mode and loads a BIOS image from a crisis diskette (see above).

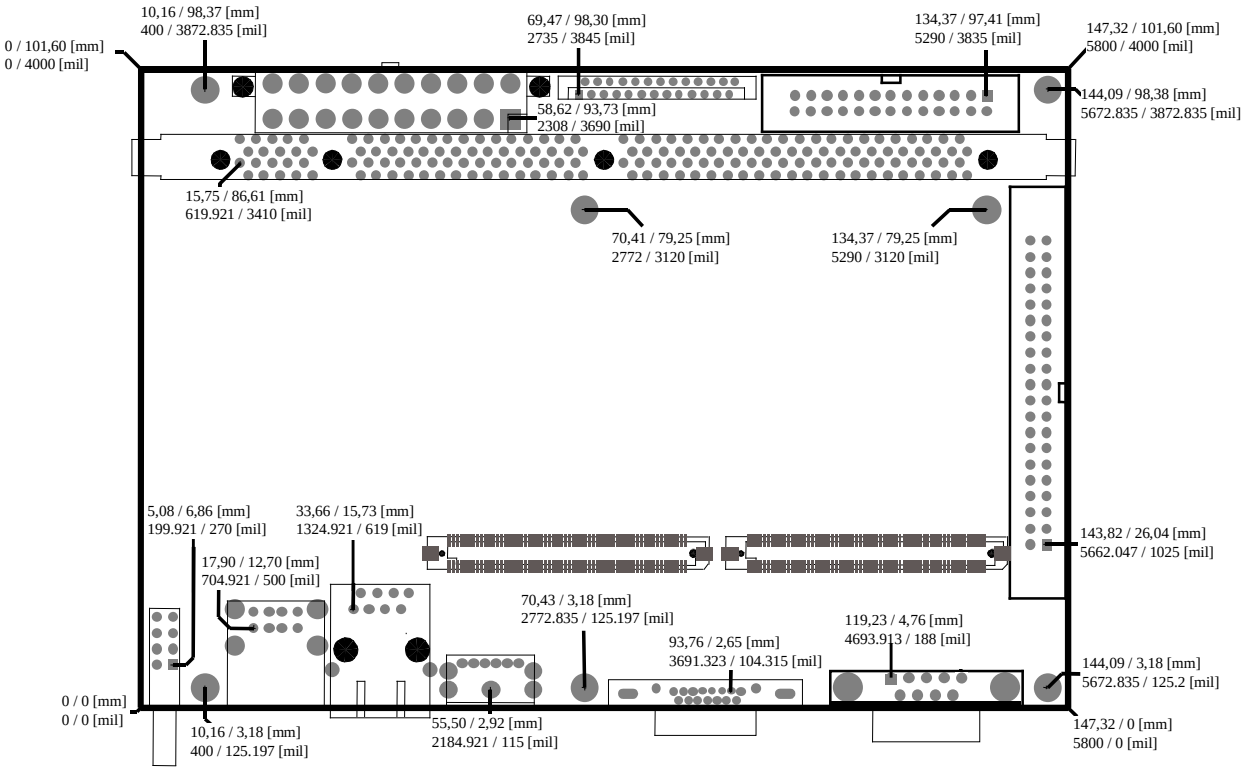
Additionally, the end user can insert an update key into the serial port (COM1 only) to force initiating the boot block recovery routine.

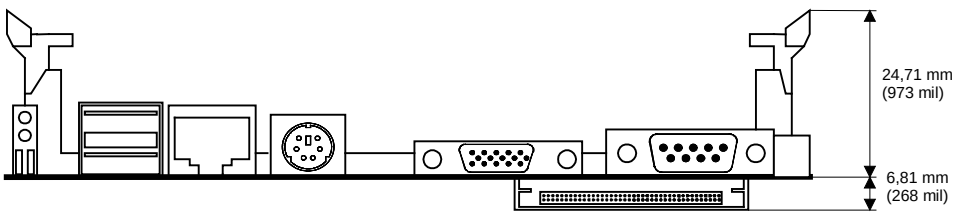
For further information on the update key and the crisis diskette, see application note **JAP0034**.

19. APPENDIX C: BLOCK DIAGRAM

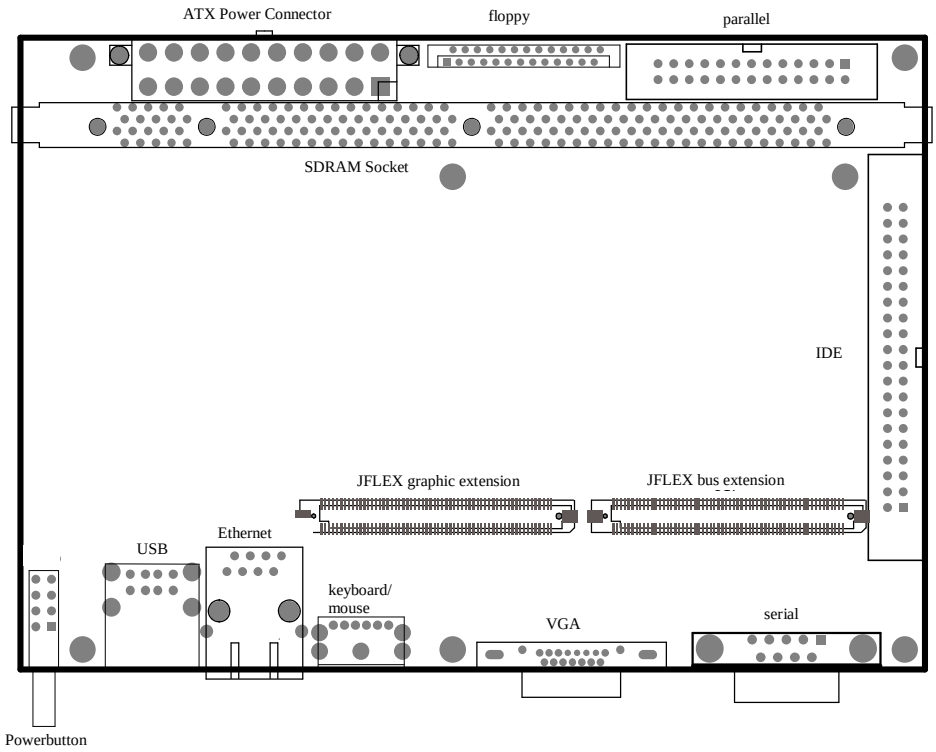


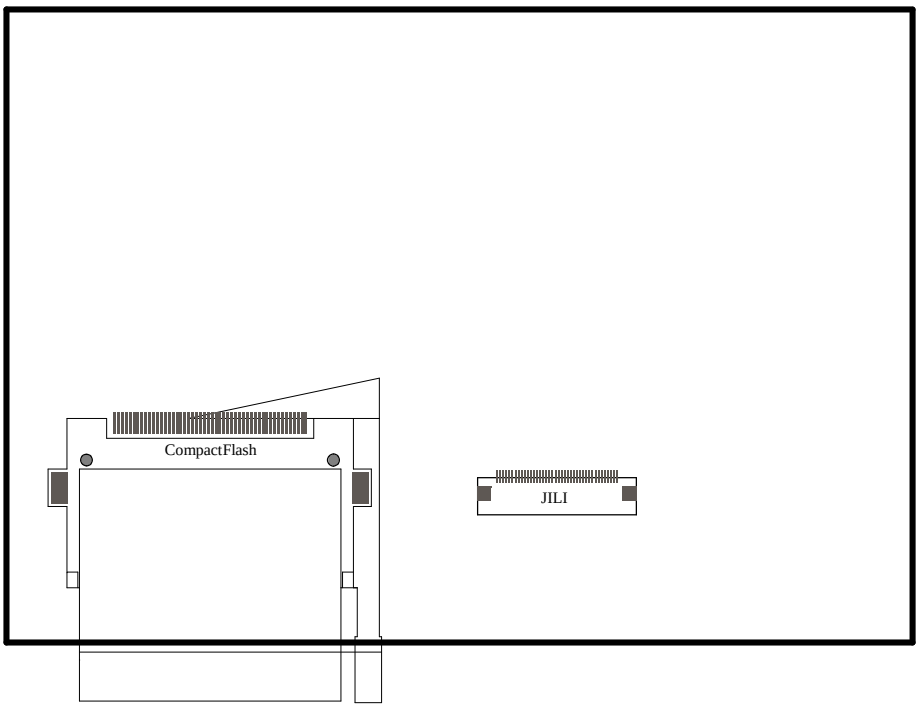
20. APPENDIX D: MECHANICAL DIMENSIONS





21. APPENDIX E: CONNECTOR LAYOUT





22. APPENDIX F: JIDA STANDARD

Every board with an on-board BIOS extension supports the following function calls, which supply information about the board. JUMP*tec* Intelligent Device Architecture (JIDA) functions are called via Interrupt 15h. Functions include:

AH=EAh

AL=function number

DX=4648h (security word)

CL=board number (starting with 1)

The interrupt returns a CL≠0 if a board with the number specified in CL does not exist. CL will equal 0 if the board number exists. In this case, the content of DX determines if the operation was successful. DX=6B6Fh indicates success; other values indicate an error.

22.1 Obtaining Information about Boards that Use the JIDA Standard

To obtain information about the installed boards that follow the JIDA standard, use the following procedure.

1. Call Get BIOS ID with CL=1.
   The name of the first device installed will be returned.
   If you see the result **Board exists** (CL=0), increment CL, and call **Get BIOS ID** again.
2. Repeat until you see **Board not present** (CL≠0).
   You now know the names of all boards within your system that follow the JIDA standard.
3. You can find out more information about a specific board by calling the appropriate inquiry function with the board's number in CL.

Note: Association between board and board number may change because of configuration changes. Do not rely on any association between board and board number. Always use the procedure described above to determine the association between board and board number.

Refer to the JIDA manual in the jidai110.zip folder for further information on implementing and using JIDA calls with C sample code.

23. APPENDIX G: LITERATURE AND STANDARDS

Below is a list of information sources to help you to further understand PC architecture.

23.1 Buses

23.1.1 ISA, Standard PS/2 - Connectors

- *AT Bus Design: Eight and Sixteen-Bit ISA, E-ISA and EISA Design,* Edward Solari, **Annabooks**, 1990, ISBN 0-929392-08-6
- *AT IBM Technical Reference Vol 1&2,* 1985
- *ISA & EISA Theory and Operation,* Edward Solari, **Annabooks**, **1992,** ISBN 0929392159
- *ISA Bus Specifications and Application Notes,* Jan. 30, 1990, Intel
- *ISA System Architecture, Third Edition,* Tom Shanley and Don Anderson, Addison-Wesley Publishing Company, 1995, ISBN 0-201-40996-8
- *Personal Computer Bus Standard P996,* Draft D2.00, Jan. 18, 1990, IEEE Inc
- *Technical Reference Guide, Extended Industry Standard Architecture Expansion Bus,* Compaq 1989

23.1.2 PCI

- **PCI SIG**
  The PCI-SIG provides a forum for its ~900 member companies, who develop PCI products based on the specifications that are created by the PCI-SIG.
- *PCI & PCI-X Hardware and Software Architecture & Design,* Fifth Edition, Edward Solari and George Willse, Annabooks, 2001, ISBN 0-929392-63-9.
- *PCI System Architecture,* Tom Shanley and Don Anderson, Addison-Wesley, 2000, ISBN 0-201-30974-2.

23.2 General PC Architecture

- *Embedded PCs*, Markt&Technik GmbH, ISBN 3-8272-5314-4 (German)
- **ePanorama PC Hardware**
  ePanorama.net is dedicated to offer information on electronics found on the Web.
- *Hardware Bible*, Winn L. Rosch, SAMS, 1997, 0-672-30954-8
- *Interfacing to the IBM Personal Computer*, Second Edition, Lewis C. Eggebrecht, SAMS, 1990, ISBN 0-672-22722-3
- *The Indispensable PC Hardware Book*, Hans-Peter Messmer, Addison-Wesley, 1994, ISBN 0-201-62424-9
- *The PC Handbook: For Engineers, Programmers, and Other Serious PC Users, Sixth Edition*, John P. Choisser and John O. Foster, **Annabooks**, 1997, ISBN 0-929392-36-1

23.3 Ports

23.3.1 RS-232 Serial

- **EIA-232-E Interface**
  The EIA-232-E standard specifies the interface between (for example) a modem and a computer so that they can exchange data. The computer can then send data to the modem, which then sends the data over a telephone line. The data that the modem receives from the telephone line can then be sent to the computer.
- *RS-232 Made Easy: Connecting Computers, Printers, Terminals, and Modems*, Martin D. Seyer, Prentice Hall, 1991, ISBN 0-13-749854-3
- **National Semiconductor**
  Interface Data Book includes application notes. Type “232” as a search criteria to obtain a list of application notes.

23.3.2 IDE

Technical Committee T13
is responsible for all interface standards relating to the popular AT Attachment (ATA) storage interface utilized as the disk drive interface on most personal and mobile computers today.

The X3T10 standard defines an integrated bus interface between disk drives and host processors. It provides a common point of attachment for systems manufacturers and the system.
We recommend you also search for information on “4.2 I/O cable” if you use hard disks in a DMA3, DMA4 , DMA5 or PIO4 mode.

23.3.3 USB

USB specification
USB Implementers Forum, Inc. is a non-profit corporation founded by the group of companies that developed the Universal Serial Bus specification. The USB-IF was formed to provide a support organization and forum for the advancement and adoption of Universal Serial Bus technology.

23.4 Programming

- *C Programmer’s Guide to Serial Communications*, Second Edition, Joe Campbell, SAMS, 1987, ISBN 0-672-22584-0
- *Programmer's Guide to the EGA, VGA, and Super VGA Cards*, Third Edition, Richard Ferraro, Addison-Wesley, 1990, ISBN 0-201-57025-4
- *The Programmer’s PC Sourcebook*, Second Edition, Thom Hogan, Microsoft Press, 1991, ISBN 1-55615-321-X
- *Undocumented PC, A Programmer’s Guide to I/O, CPUs, and Fixed Memory Areas*, Frank van Gilluwe, Second Edition, Addison-Wesley, 1997, ISBN 0-201-47950-8

24. APPENDIX H: DOCUMENT REVISION HISTORY

Version	Date	Edited by	Changes
0.1	18.09.02	BAJ	Created preliminary manual.
0.2	04.12.02	DMA	Reworked bios part.
1.0	05.12.02	BAJ	first public release
1.1	25.07.03	BAJ	removed PS-note
1.2	06.08.03	BAJ	additions in temperature and supply current parts
1.3	20.08.03	BAJ	Added battery notes, C3 and Antaur specifications
1.4	22.10.03	BAJ	Added mech. dimensions in [mm]
1.5	23.07.04	BAJ	Added description of 5V-only Version