



JRex-C3 / JRex-P3

User's Guide

Document Revision 1.3

kontron

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1. USER INFORMATION

1.1 About This Manual

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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.

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 and official distributors 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 us by telephone.

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2. INTRODUCTION

2.1 JRex-C3 and JRex-P3

The JRex-P3 hosts an Intel® Mobile Pentium® III CPU with 256kByte and the JRex-C3 an Intel® Mobile Celeron® low-voltage CPU with 128kByte L2 cache memory on die. The JRex-P3 CPU performs with 700MHz and the JRex-C3 with 300MHz processor clock. A SDRAM-DIMM socket for up to 512MByte memory allows you to use standard DIMM memory modules. Two USB ports and one 10/100 MBit Ethernet interface extend the standard connectivity of one serial, one parallel and a PS/2 mouse/keyboard interface.

The JRex-C3 and JRex-P3 are designed in a 3.5" JRex embedded line format, which can be extended with help of the JFLEX™ extension module concept and provides a space-saving, cost-optimized single board computer solution. JFLEX is an extension interface to support additional functions to JRex products.

2.2 JRex Embedded Line Family

Each JRex is a member of the 3.5" SBC family of Kontron Embedded Modules GmbH.

JRex embedded line modules are characterized by the same surface pin-outs and interfaces for Reset/ATX feature, 2xUSB, FAST LAN, PS/2 Keyboard/Mouse connector, Compact-Flash socket, VGA and one serial port. These embedded line family features allow the use of the same chassis over the whole product line and maximize design reuse.

JRex embedded line modules allow the use of standard desktop memories and full ATX power supplies. An optional 5V-only version is available, too.

These homogeneous features facilitate easy upgrades within the JRex embedded line product family. Connection of displays is simplified when using the onboard standard JILI-Interface (JUMPtec® Intelligent LVDS Interface). JILI automatically recognizes which display is connected and independently sets all video parameters. All JRexes in the embedded line are plug-and-work enabled to further reduce time-to-market.

As part of the standard features package, all JRex embedded line modules come with a JUMPtec Intelligent Device Architecture (JIDA) interface, which is integrated into the BIOS of the SBC modules. This interface enables hardware independent access to the JRex features that cannot be accessed via standard APIs. Functions such as watchdog timer, brightness and contrast of LCD backlight and user bytes in the EEPROM can be configured with ease by taking advantage of this standard JRex module feature.

The JRex embedded line products support the patented JFLEX™ extension module concept. A variety of JFLEX™ modules are available to extend the standard functionality of your JRex CPU board. The JFLEX extension bus is an open standard and the specification can be downloaded from the Kontron Web sites. This enables JRex users to develop own JFLEX™ extension boards to fulfill special requirements for their end-user-markets.

3. GETTING STARTED

Getting started with the JRex-C3 and JRex-P3 is very easy. For location of the connectors, see *Appendix E: Connector Layout*. Take the following steps:

1. Turn off the power supply.
2. Connect the power supply to the JRex's power supply connector. The board is available in an AT- (5V-only) or an ATX version.
3. Plug a memory module into the memory socket of the JRex.
4. Connect the CRT monitor to the CRT interface or a LCD panel to the JILI interface by using a corresponding adapter cable.
5. Plug the keyboard and the mouse to the combined PS/2 connector by using a Y-cable.
6. Connect the floppy drive cable to the JRex's floppy interface. Attach the floppy drive to the connector at the opposite end of the cable.
7. Connect the power supply to the floppy's power connector.
8. Plug a hard-drive data cable to the JRex's hard-disk interface.
9. Attach the hard disk to the connector at the opposite end of the cable.
10. If necessary, connect the power supply to the hard disk's power connector.
11. If required, plug a JFLEX™ extension card to the JFLEX™ bus on the JRex.
12. Make sure all your connections have been made correctly.
13. Turn on power.
14. Enter the BIOS by pressing the F2 key during boot-up. Make all changes in the BIOS setup. See the BIOS chapter of this manual for details.

4. SPECIFICATIONS

4.1 *Functional Specifications*

- **Processor**
  - Intel® Mobile Pentium® III (700MHz)
  - Intel® low-voltage Mobile Celeron® (300MHz)
- **Chipset**
  - VIA ProSavage PN133T Chipset (North Bridge + S3 ProSavage4 AGP)
  - VIA VT8231 (South Bridge)
- **Power Supply**
  - Full ATX power supply support
  - +5V-only AT power supply support as an option
- **Super I/O**
  - Integrated in VIA VT8231
- **Cache**
  - On die 256KByte (JRex-P3) or 128KByte (JRex-C3) L2 cache
- **Memory**
  - One 168-pin DIMM 3.3V PC-133 un-buffered SDRAM, up to 512MB
- **One Serial Port (COM A)**
  - RS232C serial port
  - 16550 compatible
- **One Parallel Port (LPT1)**
  - Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP) with bi-directional capability
- **Floppy Interface**
- **Intelligent Drive Electronics (IDE)**
  - One UDMA Peripheral Component Inter-connect (PCI) Bus Master EIDE port (up to two devices)
- **Compact Flash Socket**

Universal Serial Bus (USB)

- 2 USB 1.1 ports (UHCI)
- USB legacy keyboard support
- USB-Floppy and CD-ROM boot support

Ethernet

- DAVICOM DM9102A 10/100 Mbps PCI Fast Ethernet controller
- Follows the common criteria of the embedded technology market segment

Onboard Video Graphics Array (VGA)

- Integrated in the VIA PN133T Northbridge
- S3 ProSavage4 AGP controller
- Up to 32-megabyte (MB) Video RAM (UMA)
- CRT (Cathode Ray Tube) and LCD flat panel LVDS interface (JILI)

Audio

- Integrated in the VIA VT8231
- SoundBlaster™ AC97, Windows Sound System™ compatible
- Feature can only be used with additional JFLEX extension module

Phoenix BIOS, 512KB Flash BIOS

NV-EEPROM for CMOS Setup Retention without Battery

PS/2 Keyboard Controller

PS/2 Mouse Controller

Watchdog timer (WDT)

Real Time Clock (RTC) with Onboard Battery Supply

4.2 *Mechanical Specifications*

4.2.1. JFLEX™ Extension Bus Connectors

- 2 high-density connectors with 120 pins each that follow Kontron's JFLEX™ specification and offer PCI-Bus, LPC-Bus and special feature signals

4.2.2. Dimensions

- Length x Width: 101,6mm x 147,3mm (4.0" x 5.8")

4.2.3. Height on Top

- Max 45mm (1.77")
- Height is depending upon DDR SDRAM module and CPU cooler/fan.

4.2.4. Height on Bottom

- Maximum 6.8mm (0.27")

4.2.5. Weight

- About 200g (full featured version without DDR SDRAM and JFLEX™ extension modules)

4.3 *Electrical Specifications*

4.3.1. Supply Voltages

JRex embedded CPU boards can be equipped with two different power supply connectors. The ATX connector version requires +5V, +3.3V and +5V standby, while the AT connector version operates with +5V-only. The voltages +12V, -12V and –5V are not required to operate the JRex; nevertheless they may be required for peripheral devices such as backlight inverters or JFLEX™ extension modules.

- 5V DC +/- 5%
- 3,3V DC +/- 5%
- 5V DC Standby +/- 5%

4.3.2. Supply Voltage Ripple

- 100mV peak to peak 0 - 20MHz

4.3.3. Supply Current (typical)

The JRex-C3 and JRex-P3 is equipped with power-saving features. Different power-consumption tests were executed to give an overview of the electrical conditions for several operational states. The board used a 256MB DDR SDRAM module. The attached hard disk was not supplied through the measurement path and no JFLEX™ extension module was in the system.

- JRex-C3 (300MHz)

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	1.28A	1.05A	2.47A
DOS Standby	0.85A	0.81A	1.84A
Windows Idle	0.61A	1.09A	1.69A
Windows 100% CPU Load	1.05A	1.09A	2.21A
Windows 3D performance	1.28A	1.53A	2.89A

- JRex-P3 (700MHz)

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	2.54A	1.03A	3.80A
DOS Standby	0.95A	0.81A	1.89A
Windows Idle	0.78A	1.09A	2.03A
Windows 100% CPU Load	2.55A	1.09A	3.88A
Windows 3D performance	2.74A	1.53A	4.55A

4.3.4. Supply Current (maximum)

Board	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
JRex-C3 300MHz	1.99A	2.56A	4.75A
JRex-P3 700MHz	4.89A	2.56A	7.65A

(calculated theoretical values from all components maximum supply currents)

4.3.5. Real-time Clock (RTC) Battery

- Voltage range: 1.8V - 4.0V (typ 3.0V)
- Quiescent current: max. 3,5uA@ 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 durchden selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

French:
ATTENTION ! Risque d'explosion avec l'échange inadéquat de la batterie. Remplacement seulement par le même ou un type équivalent recommandé par le producteur. L'évacuation des batteries usagées conformément à des indications du fabricant.

Danish:
ADVARSEL ! Lithiumbatteri – Eksplosionsfare ved fejlagtig Håndtering. Udskifting må kun skemed batteri af samme fabrikant og type. Lever det brugte batteri tilbage til leverandØren.

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

Spanish:
Precaución ! Peligro de explosión si la batería se sustituye incorrectamente. Sustituya solamente por el mismo o tipo equivalente recomendado por el fabricante. Disponga las baterías usadas según las instrucciones del fabricante.

The battery of this product is not considered to be accessible by the end user. Safety instructions are given only in English, German, French, Danish, Finish and Spanish. If the battery is accessible by the end user, it is in the responsibility of the customer to give the corresponding safety instructions in the required language(s).

4.4 MTBF

The following MTBF (Mean Time Between Failure) values were calculated using a combination of manufacturer's test data, if the data was available, and a Bellcore calculation for the remaining parts. The Bellcore calculation used is "Method 1 Case 1". In that particular method the components are assumed to be operating at a 50 % stress level in a 40° C ambient environment and the system is assumed to have not been burned in. Manufacturer's data has been used wherever possible. The manufacturer's data, when used, is specified at 50° C, so in that sense the following results are slightly conservative. The MTBF values shown below are for a 40° C in an office or telecommunications environment. Higher temperatures and other environmental stresses (extreme altitude, vibration, salt water exposure, etc.) lower MTBF values.

- System MTBF (hours) : 174.522

Notes: Fans usually shipped with Kontron Embedded Modules GmbH products have 50,000-hour typical operating life. The above estimates assume no fan, but a passive heat sinking arrangement.
Estimated RTC battery life (as opposed to battery failures) is not accounted for in the above figures and need to be considered for separately. Battery life depends on both temperature and operating conditions. When the Kontron unit has external power; the only battery drain is from leakage paths.

4.5 *Environmental Specifications*

4.5.1. Temperature

The Intel® Mobile Pentium® III and Mobile Celeron® low voltage CPU are specified for proper operation when junction temperature is within the specified range of +0°C to +100°C.

The Via PN133T Host Bridge controller case temperature is specified for maximum +85°C.

- Operating: 0 to +70 C (*) (with appropriate airflow)
- Non-operating: -10 to +85 °C (non-condensing)

Note: (*) The maximum operating temperature is the maximum measurable temperature on any spot on the module's surface. You must maintain the temperature according to the above specification.

4.5.2. Humidity

- Operating: 10% to 90% (non-condensing)
- Non-operating: 5% to 95% (non-condensing)

5. CPU, CHIPSET AND SUPER I/O

5.1 CPU

This JRex is available with an Intel® Mobile Pentium® III (700MHz) or Intel® low-voltage Celeron® (300MHz) central processing unit (CPU). The 300MHz processor is equipped with a passive cooler and the 700MHz processor comes with an active cooling solution.

Their features include:

- 100 MHz processor system bus
- Built on Intel's 0.18 micron process
- 128K or 256K full speed "on-die" L2 cache operating at core frequency
- MMX technology
- Supports Internet Streaming SIMD extensions

5.2 *Chipset*

The chipset of the JRex-C3 and JRex-P3 consists of the VIA ProSavage PN133T (Twister™ T) North Bridge and the VIA VT8231 (South Bridge).

5.2.1. Twister™ T

➤ **High performance SMA North Bridge in a single chip**

- Integrated VIA Pro133A
- Integrated S3 Graphics' ProSavage4™
- Supports Enhanced Intel® SpeedStep® technology

➤ **Processor/Host Bus Interface**

- 100 MHz CPU Front Side Bus (FSB)
- Five outstanding transactions (four In-Order Queue (IOQ) plus one output latch)
- Dynamic deferred transaction support

➤ **Memory System**

- Advanced High-Performance DRAM Controller
- DRAM interface runs synchronous (100/100) mode and in pseudo-synchronous (100/133) mode with FSB
- 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 tri-linear 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
- DSTN/TFT flat panel interface with 256 gray shade support
- 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
- **Power Management**
  - ACPI 1.0B and PCI Bus Power Management 1.1 compliant

5.2.2. VT8231

- **Integrated peripheral controllers**
  - USB controller with two root hubs and four function ports (USB 1.1, UHCI 1.1 compatible)
  - Dual channel UDMA EIDE controller (up to UDMA100 support)
  - AC-Link interface for AC97 audio codec
  - SoundBlasterPro / DirectSound compatible digital audio controller
  - LPC (Low Pin Count) interface
  - SM-Bus interface
  - Keyboard controller with PS/2 Mouse support
  - Super-I/O controller for one serial port, one parallel port and floppy interface
- **Integrated legacy functions**
  - DS-12885-style RTC (Real Time Clock)
  - Bus controller including DMA, timer and interrupt controller
  - Serial IRQ support
  - Fast reset and Gate A20 operation
- **Sophisticated PC-99-compatible Mobile Power Management**
  - ACPI V1.0 compliant
  - APM V1.2 compliant

5.3 *Super I/O*

The super I/O device is integrated in the South Bridge (VIA VT8231). This device provides the following features:

- One RS232 serial port available on the JRex CPU board (a second serial port on a JFLEX™ extension module is not supported)
- One Multi-Mode Parallel Port
- Floppy Disk Controller
- IrDA Interface (only available through JFLEX™ extension)

5.4 *CPU, Chipset and Super-I/O Configuration*

See the Advanced Menu and its submenus section of the Appendix B: BIOS chapter for information on possible settings.

6. SYSTEM MEMORY

The JRex-C3 and JRex-P3 use standard 168 pin SDRAM-DIMM memory modules. One socket (X5) is available for 3.3-volt (power level), un-buffered and buffered synchronous dynamic random access memory (SDRAM) of 8, 16, 32, 64, 128, 256 or 512MB following Intel®'s PC100 or PC133 Specification.

The total amount of memory available on the SDRAM-DIMM module is used for main memory and graphics memory on the JRex-C3 and JRex-P3. Shared Memory Architecture (SMA) manages the sharing of the system memory between the graphics controller and processor. Full system memory size is not available for software applications. Up to 32MB of system memory are used for graphics memory.

7. JFLEX™ EXTENSION CONCEPT

The patented JFLEX™ Extension concept is based on two connectors with 120 pins each. These connectors allow the JRex CPU board to have extra functions. The JRex-C3 and JRex-P3 provides:

- IrDA Interface
- Low Pin Count (LPC) Bus for more I/O devices
- PCI Bus for up to 3 additional PCI devices
- AC97 Bus for sound features
- LVDS panel output

There are already some JFLEX™ extension-modules available from Kontron Embedded Modules GmbH. Kontron also will offer additional functions in the future. Please visit the Kontron Web site for more information about available extension modules.

The JFLEX™ extension specification and design guide is now available from the Kontron Web site. If you have more ideas for more functionality, please inform Kontron via your sales channel or discuss your wishes at our forum on www.j-rex.com. You also can join our certified partner program, if you are interested and if you have experiences on digital panel adaptations or on PCI Bus designs. Please go to the Kontron Web site to get a membership in the certified partner program.

A detailed description of the signals on the JFLEX™ extension connectors and its timing characteristics is beyond the scope of this document. Refer to the specification and design guide available on the Kontron Web site and see the official LPC- and PCI-specifications for further details.

Notes:
When using a JRex CPU board designed as AT-version (5V-only) the +3.3V for JFLEX extension modules is generated with help of a DC/DC converter. This 3.3V power supply solution does not have the same capabilities as an ATX power supply.
In this case the maximum current for all JFLEX extension modules in the system is limited to 300mA. If your JFLEX extension modules need more power, it is strictly recommended to supply via additional power solutions on the JFLEX extension cards.

8. KEYBOARD AND MOUSE INTERFACE

The keyboard and mouse interface is available through the combined PS/2 connector X22 (6 pins). A PS/2-Keyboard can be directly connected to this interface. If you intend to use a PS/2-Mouse, connect a Y-cable to this interface. There are many different Y-cables available on the market that look similar to the following picture:



Notes:
Some Y-cables have reverse keyboard and mouse signals. If your keyboard and mouse do not work, connect the keyboard to the mouse side and the mouse to the keyboard side of the Y-cable. The issue lies not with the J-Rexs but with the Y-cable.

8.1 *Keyboard and Mouse PS/2 Connector*

The following table shows the pin-out of the PS/2 connector on the front.

Header	Pin	Signal Name	Function
	1	KBDAT	PS/2 Keyboard data (bi-directional I/O)
	2	MSDAT	PS/2 Mouse data
	3	KEYGND	Ground
	4	KEYVCC *	+5V
	5	KBCLK	PS/2 Keyboard clock (bi-directional I/O)
	6	MSCLK	PS/2 Mouse clock

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.

To find the location of the keyboard and mouse connector, please see the Appendix E: Connector Layout chapter.

8.2 *Configuration*

Refer to the Keyboard Features submenu and the I/O Device Configuration submenu in the Appendix B: BIOS chapter for information on configuration.

9. USB INTERFACES

The JRex-C3 and JRex-P3 offer 4 USB ports. These ports are driven by two UHCI USB 1.1 controllers. Two of the 4 USB ports are available on the JRex-C3 and JRex-P3, and two more ports are available on the JFLEX™ extension module. You can expand the ports for up to 127 USB peripherals by using external USB hubs.

9.1 *Connector*

The two onboard USB interfaces are available through the double port connector X13 (8 pins).

The following table shows the pin-out of the USB connector.

Header	Pin	Signal Name	Function
	1	USB0_5V *	USB0-supply (max. 500mA)
	2	USB0-	Universal serial bus port 0 (-)
	3	USB0+	Universal serial bus port 0 (+)
	4	USB_GND	USB Ground
	5	USB1_5V *	USB1-supply (max. 500mA)
	6	USB1-	Universal serial bus port 1 (-)
	7	USB1+	Universal serial bus port 1 (+)
	8	USB_GND	USB Ground

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.
The USB power lines are protected with a resetable fuse and are limited to 500mA

To find the location of the USB connectors, please see the Appendix E: Connector Layout chapter.

9.2 *Configuration*

You can enable or disable the two USB UHCI Host Controllers in the BIOS Setup Utility for support of USB 1.1 devices. USB host controller 1 serves the two onboard USB ports 0 and 1. USB host controller 2 only needs to be enabled for the use of two more ports that are available with a JFLEX™ extension module.

You also can enable or disable legacy USB support. The legacy support is required for USB-keyboard and USB-Mouse when used with non-USB aware operating systems like Unix or DOS. It is also required to boot from USB mass storage devices. For more information, see the I/O Device Configuration Submenu section in Appendix B: BIOS Operation.

You can download available drivers or get driver download support information from the Kontron Web site. Kontron provides you with the latest Kontron-tested drivers, which can differ from newer ones. For further technical questions, contact your local support or get support information and downloadable software updates from VIA.

10. ETHERNET INTERFACE

10.1 *Ethernet Controller*

The JRex-P3 and JRex-C3 use a Davicom DM9102A PCI Fast Ethernet Controller. The network controllers support 10/100Base-T interfaces. The devices auto-negotiate the use of a 10Mbit/sec or 100Mbit/sec connection. You can enable an onboard LAN RPL ROM to support the boot up of the system via Ethernet and a PXE-boot server.

The Davicom DM9102A provides the following features:

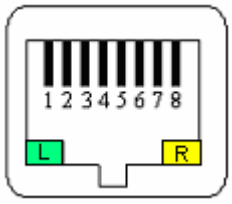
- **Integrated Fast Ethernet MAC, Physical Layer, and transceiver on one chip**
- **Compliance with PCI Specification 2.2**
- **PCI-bus-master architecture**
- **EEPROM 93C46 interface supports node ID, access-configuration information**
- **Compliance with IEEE 802.3u 100Base-TX and 802.3 10Base-T**
- **Compliance with IEEE 802.3u autonegotiation protocol for automatic link- type selection**
- **Full-duplex/half-duplex capability**
- **Support 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**
- **Loopback mode for easy system diagnostics**

Note: The Ethernet interface works according to the common criteria of the embedded technology market segment.

10.2 Connector

The 10/100Base-T connector is a standard 8-pin RJ45 jack (X27) with integrated LEDs for link and speed. The link LED is blinking on activity.

The following table shows the pin-out of the Ethernet connector.

Header	Pin	Signal Name	Function	In/Out
	1	TXD+	100/10BASE-T Transmit	Differential Output
	2	TXD-	100/10BASE-T Transmit	Differential Output
	3	RXD+	100/10BASE-T Receive	Differential Input
	4	NC **	For internal use only	
	5	NC **	For internal use only	
	6	RXD-	100/10BASE-T Receive	Differential Input
	7	NC **	For internal use only	
	8	NC **	For internal use only	
	L	Left LED	Speed	Green
	R	Right LED	Link	Yellow

NOTE: (**) Do not connect anything to these pins!

To find the location of the Ethernet interface, please see the Appendix E: Connector Layout chapter.

10.3 Configuration

You can enable the onboard LAN PXE boot ROM to allow the system to boot up via a network connection from a PXE boot server. Refer to the Boot menu section in the Appendix B: BIOS Operation chapter for additional information on configuration.

You can download available drivers from the Kontron Web site. For further information read the read-me file or contact technical support.

10.4 Ethernet Technical Support

If any problems occur, you can solve some of them by using the latest drivers for the Davicom Ethernet controller. Kontron provides you with the latest Kontron-tested drivers, which can differ from newer ones. For further technical support, contact either Kontron or get support information and downloadable software updates from Davicom.

11. GRAPHIC INTERFACES

11.1 *Video Controller*

The JRex-C3 and JRex-P3 use the graphics accelerator integrated in the VIA PN133T North Bridge, which delivers high-performance 2D and 3D capabilities. With its interface to SMA (Shared Memory Architecture) up to 32MB of system memory are used as video memory.

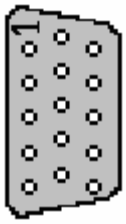
The controller can drive two interfaces with its graphic engine:

- Cathode Ray Tube (CRT) interface
- Low Voltage Differential Signaling (LVDS) interface

11.2 *CRT Connector*

The CRT (Cathode Ray Tube) interface is available through the standard DSUB15 connector X3.

The following table shows the pin-out of the CRT connector.

Header	Pin	Signal Name	Function
	1	RED	Red Video
	2	GRN	Green Video
	3	BLU	Blue Video
	4	NC	Not connected
	5	GND	Ground
	6	GND	Ground
	7	GND	Ground
	8	GND	Ground
	9	NC	Not connected
	10	GND	Ground
	11	NC	Not connected
	12	DDA	DDC Serial Data Line
	13	HSYNC	Horizontal Sync
	14	VSYNC	Vertical Sync
	15	DCK	DDC Data Clock Line

To find the location of the CRT interface, please see the Appendix E: Connector Layout chapter.

11.3 Flat Panel LVDS Interface (JILI) Connector

The interface for the LCD Panel is available through the X2 connector (40 pins) on the bottom side of the board. This connector represents the JILI interface (**J**UMPtec **I**ntelligent **L**VDS **I**nterface). The implementation of this subsystem complies with the JILI Specification of Kontron Embedded Modules GmbH. This JRex already supports the JILI3 implementation. A variety of cables for different display types are available from Kontron. Please refer to the cable list on the Kontron Web site for part numbers and cable names. A detailed description of the JILI interface standard also is available in a separate document JILIM???.PDF. The three question marks represent the document's revision number. You can download the document from the Kontron Web site, or contact your local Kontron technical support to receive it.

To find the location of the LCD Panel interface connector, please see the Appendix E: Connector Layout chapter.

11.4 Display Power Considerations

When using a LCD Panel, additional voltages may be required to drive the display's logic and to supply the backlight converter and the display's contrast voltage.

The display logic may require +5V for standard or +3.3V for low-power LCDs. Contrast voltages for passive displays are normally very different and can range from –30V to +30V. Backlight converters usually are +5V or +12V types. When using a Kontron JILI cable, you do not need to determine such configurations. Display logic voltage and contrast voltage come pre-configured on the JILI cable. On occasion, backlight voltage has to be adjusted on the cable.

Even though the JRex-C3 and JRex-P3 is also available as a +5V-only board, you need to supply the +12V for the backlight converter additionally when using such a converter type.

The onboard 3.3V-circuitry of the JRex-C3 and JRex-P3 and the +3.3V logic voltage of low-voltage panels are powered by separate voltage regulators. The one for the LCD is mounted on the JILI adapter cable.

11.5 Connecting a LCD Panel

To determine whether your panel display is supported, check the Kontron Web site for panel lists. We regularly update the list of panels that have been tested with our boards.

Many panel adapters for a wide spread variety of displays are available through Kontron. If you use one of those adapters supplied by Kontron, configuration is easy:

1. Check whether you have the correct adapter and cable for the panel you plan to use. Inspect the cable for damages.
2. Disconnect the power from your system.
3. Connect the panel adapter to the LCD Panel connector (JILI) on the JRex-C3 or JRex-P3.
4. Connect the other end of the cable to your display.
5. Connect the backlight converter.
6. Supply power to your system.
7. If no image appears on your display, connect a CRT monitor to the CRT connector.
8. If necessary program the EEPROM on the JILI cable with the matching configuration data.
9. If you still do not see improvement, consider contacting the dealer for technical support.

11.6 Configuration

You can set the general configuration for the graphic controller in the BIOS setup utility. Refer to the Advanced Chipset Control submenu and the Display Control submenu in the Appendix B: BIOS Operation chapter for more configuration information.

You can download drivers for the graphics controller from the Kontron Web site. For further information, read the read-me or help files or contact technical support.

11.7 Graphics Technical Support

If problems occur, you can solve some of them by using the latest drivers for the graphics controller. Kontron provides you with the latest tested drivers, which can differ from newer ones. For further technical support, contact either Kontron, or obtain support information and downloadable software updates from VIA and/or S3.

11.8 Available Video Modes

The following list shows the video modes supported by the graphics controller with maximum frame buffer size. When configured for smaller frame buffers and/or using a LCD panel on the JILI interface, not all of the video modes listed below may be available. Capability depends on system configuration and on display capabilities. Different operating systems also may not support all listed modes by the available drivers.

11.8.1. Standard IBM-Compatible VGA Modes

Video Mode	Type	Characters/Pixels	Colors/Gray val.
00h/01h	Text	40x25	16
02h/03h	Text	80x25	16
04h/05h	Graphics	320x200	4
06h	Graphics	640x200	2
0Dh	Graphics	320x200	16
0Eh	Graphics	640x200	16
0Fh	Graphics	640x350	Mono
10h	Graphics	640x350	16
11h	Graphics	640x480	2
12h	Graphics	640x480	16
13h	Graphics	320x200	256

11.8.2. Extended VESA VGA Modes

VESA	Display	Pixels	Colors
100h	Graphics	640x400	256
101h	Graphics	640x480	256
102h	Graphics	800x600	16
103h	Graphics	800x600	256
105h	Graphics	1024x768	256
107h	Graphics	1280x1024	256
10Eh	Graphics	320x200	64K
10Fh	Graphics	320x200	16M
111h	Graphics	640x480	64K
112h	Graphics	640x480	16M
114h	Graphics	800x600	64K
115h	Graphics	800x600	16M
117h	Graphics	1024x768	64K
118h	Graphics	1024x768	16M
11Ah	Graphics	1280x1024	64K
11Bh	Graphics	1280x1024	16M
11Dh	Graphics	640x400	64K
11Eh	Graphics	640x400	16M
120h	Graphics	1600x1200	256
122h	Graphics	1600x1200	64K
124h	Graphics	1600x1200	16M
12Eh	Graphics	320x200	256
131h	Graphics	320x240	256
133h	Graphics	320x240	64K
134h	Graphics	320x240	16M
13Bh	Graphics	1400x1050	256
13Ch	Graphics	1400x1050	64K
13Eh	Graphics	1400x1050	16M
141h	Graphics	400x300	256
143h	Graphics	400x300	64K
144h	Graphics	400x300	16M
151h	Graphics	512x384	256
153h	Graphics	512x384	64K
154h	Graphics	512x384	16M

12. SERIAL-COMMUNICATION INTERFACE

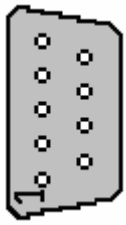
12.1 *Serial Port COMA*

One fully functional serial port (COMA) provides asynchronous serial communications. The serial port is available on the JRex-C3 and JRex-P3. A second serial port available on some JFLEX™ extension modules is not supported with the JRex-C3 and JRex-P3. The onboard serial port supports RS-232 operation modes and is compatible with the serial-port implementation used on the IBM Serial Adapter. The port is 16550 high-speed UART compatible and supports 16-byte FIFO buffers for transfer rates up to 115.2Kbaud.

12.2 *RS-232 Connector*

COM A is available through the DSUB9 connector X16.

The following table shows the pin-out.

Header	Pin	Signal Name	Function	In / Out
	1	DCD1	Data Carrier Detect	In
	2	SIN1	Receive Data	In
	3	SOUT1	Transmit Data	Out
	4	DTR1	Data Terminal Ready	Out
	5	GND	Signal Ground	--
	6	DSR1	Data Set Ready	In
	7	RTS1	Request to Send	Out
	8	CTS1	Clear to Send	In
	9	RI1	Ring Indicator	In

To find the location of the serial ports on the board, please see the Appendix E: Connector Layout chapter.

12.3 *Configuration*

You can set the serial input/output interface to enabled, disabled or auto. The base I/O-addresses 3F8h, 2F8h, 3E8h, or 2E8h can be configured when enabled, as well as the interrupts IRQ3 or IRQ4. Refer to the I/O Device Configuration submenu in the Appendix B: BIOS Operation chapter for information on configuration.

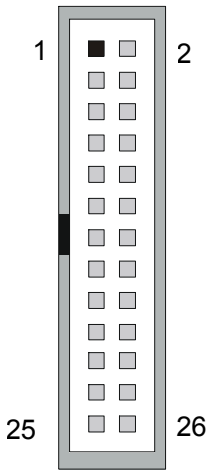
13. PARALLEL-PORT INTERFACE

The JRex-C3 and JRex-P3 incorporate an IBM XT/AT compatible parallel port. It supports uni-directional, bi-directional, EPP and ECP operating modes.

13.1 *Connector*

The parallel port is available through the X17 connector (26 pins). To have the signals available on a standard, parallel-interface connector DSUB-25, an adapter cable is required, which is available from KONTRON (KAB-DSUB25-1, Part Number 96015-0000-00-0).

The following table shows the pin-out as well as necessary connections for a DSUB-25 adapter.

Header	Pin	Signal Name	Function	In / Out	DSUB-25
	1	/STB	Strobe	Out	1
	3	PD0	Data 0	I/O	2
	5	PD1	Data 1	I/O	3
	7	PD2	Data 2	I/O	4
	9	PD3	Data 3	I/O	5
	11	PD4	Data 4	I/O	6
	13	PD5	Data 5	I/O	7
	15	PD6	Data 6	I/O	8
	17	PD7	Data 7	I/O	9
	19	/ACK	Acknowledge	In	10
	21	/BUSY	Busy	In	11
	23	PE	Paper out	In	12
	25	/SLCT	Select out	In	13
	2	/AFD	Autofeed	Out	14
	4	/ERR	Error	In	15
	6	/INIT	Init	Out	16
	8	/SLIN	Select 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

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.

To find the location of the parallel port, please see the Appendix E: Connector Layout chapter.

13.2 *Configuration*

The parallel-port mode, I/O addresses, and IRQs are changeable from the BIOS Setup Utility. You can program the base I/O-address 378h (default), 3BCh or 278h. You can set the parallel port mode to disable, enable or AUTO (default). You can choose IRQ5 or IRQ7 as the parallel-port interrupt.

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

14. IDE INTERFACES

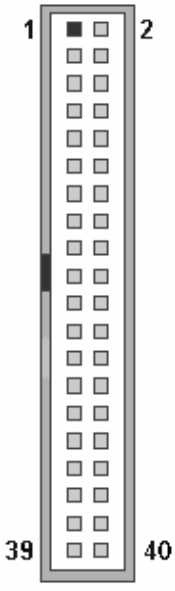
PCI-bus devices serve as primary and secondary IDE hosts on the JRex-C3 and JRex-P3. The primary host controller supports:

- Up to Ultra DMA 100 mode
- Up to PIO mode 4 timing
- Multiword DMA mode 1and 2 with independent timing

The JRex-C3 and JRex-P3 feature one IDE interface that can drive two hard disks and one CompactFlash socket. When two IDE devices share a single adapter, they are connected in a master/slave, daisy-chain configuration. If only one drive is in the system, you must set it as the master. The CompactFlash socket is implemented through the secondary host as master.

14.1 *Connector*

The IDE interface is available through Connector X4 (40 pins). This interface is designed in 0.1" grid for optimal connectivity to a 3.5" hard drive. The following table shows the pin-out of the IDE connector.

Header	Pin	Signal Name	Function
	1	/HDRST	Reset
	2	GND	Ground
	3-18	PIDE_D1..D15	Primary IDE ATA data bus
	19	GND	Ground
	20	NC	Not connected
	21	PIDE_DRQ	Primary IDE DMA Request for IDE master
	22	GND	Ground
	23	/PIDE_IOW	Primary IDE IOWJ Command
	24	GND	Ground
	25	/PIDE_IOR	Primary IDE IORJ Command
	26	GND	Ground
	27	PIDE_RDY	Primary IDE ready
	28	PIDE_PD1	IDE1 Cable Select (470Ω to Ground)
	29	/PIDE_AK	Primary IDE DACK for IDE master
	30	GND	Ground
	31	PIDE_IRQ	IDE IRQ Primary
	32	NC	Not connected
	33	PIDE_A1	Primary IDE ATA address bus
	34	PIDE_ATAD	UDMA detection
	35	PIDE_A0	Primary IDE ATA address bus
	36	PIDE_A2	Primary IDE ATA address bus
	37	/PIDE_CS1	IDE chipselect 1 for primary channel 0
	38	/PIDE_CS3	IDE chipselect 2 for primary channel 1
	39	PIDE_ACT	Drive Activity
	40	GND	Ground

To find the location of IDE interface, please see the Appendix E: Connector Layout chapter.

14.2 CompactFlash Socket

The CompactFlash socket X11 (50 pins) for commercial CompactFlashes (Type I) is integrated on the bottom side of the JRex-C3 and JRex-P3 board. Because the signals of the socket are connected to the secondary IDE, the socket is not a hot-plug capable interface. Turn off power to the system before adding or removing a CompactFlash card.

The following table shows the pin-out of the CompactFlash socket.

Pin	Signal Name	Function	Pin	Signal Name	Function
1	GND	Ground	2	D3	Data 3
3	D4	Data 4	4	D5	Data 5
5	D6	Data 6	6	D7	Data 7
7	/CS1	Chip select 1	8	GND	Ground
9	GND	Ground	10	GND	Ground
11	GND	Ground	12	GND	Ground
13	VCC	+5V	14	GND	Ground
15	GND	Ground	16	GND	Ground
17	GND	Ground	18	SA2	Addr. 2
19	SA1	Addr. 1	20	SA0	Addr. 0
21	D0	Data 0	22	D1	Data 1
23	D2	Data 2	24	NC	Not connected
25	GND	Ground	26	GND	Ground
27	D11	Data 11	28	D12	Data 12
29	D13	Data 13	30	D14	Data 14
31	D15	Data 15	32	/CS3	Chip select 3
33	GND	Ground	34	/IOR	I/O read
35	/IOW	I/O write	36	VCC	+5V
37	IRQ	Interrupt	38	VCC	+5V
39	GND	Ground	40	NC	Not connected
41	/RESET	Reset	42	IOCHRDY	Ready
43	NC	Not connected	44	VCC	+5V
45	SIDE_ACT	Drive Activity	46	NC	Not connected
47	D8	Data 8	48	D9	Data 9
49	D10	Data 10	50	GND	Ground

14.3 Configuration

The IDE interfaces offer several configuration settings. Refer to the Main Menu, the ACPI Control submenu, the I/O Device Configuration Submenu and the Master or Slave Submenu in the Appendix B: BIOS Operation chapter for additional information on configuration.

Notes:
1. Use an UDMA flat-ribbon cable (80 lines) to drive UDMA66 or UDMA100 devices
2. When using a standard ribbon cable (40 lines) with UDMA66 or UDMA100 devices, you have to disable the Ultra DMA Mode in the BIOS Setup Utility.
3. The CompactFlash interface does not support DMA operations. If you use a CompactFlash which is capable of DMA modes, switch to USER configuration and use non-DMA operation modes.

15. FLOPPY INTERFACE

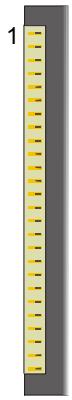
The floppy-drive interface of the JRex-C3 and JRex-P3 uses a 2.88MB super I/O floppy-disk controller and can support one floppy disk drive with densities that range from 360kB to 2.88MB.

15.1 *Connector*

The floppy disk interface is available on the flat-foil connector X15 (26 pins). This type of connector is often internally used in notebooks to connect a slim-line floppy drive.

Accessories are available for this interface from Kontron. To connect a standard 3.5" floppy drive, use an adapter cable (ADA-FLOPPY-2, Part Number 96001-0000-00-0). If you have a slim-line 3.5" floppy drive, you may need a flat foil cable (KAB-FLOPPY/MOPS-1, Part Number 96019-0000-00-0). It also is possible to get a slim line 3.5" floppy drive with cable from Kontron (FLOPPY-MOPS-1, Part Number 96010-0000-00-0).

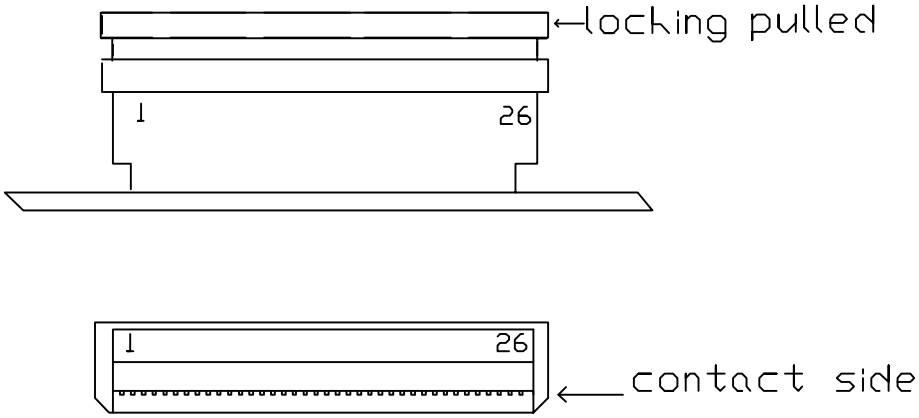
The following table shows the connector pin-out.

Header	Pin	Signal Name	Function	Pin	Signal Name	Function
	1	VCC *	+5V	2	/IDX	Index
	3	VCC *	+5V	4	/DR0	Drive Select 0
	5	VCC *	+5V	6	/DSKCHG	Disk Change
	7	NC	Not connected	8	NC	Not connected
	9	NC	Not connected	10	/MTR0	Motor on 0
	11	NC	Not connected	12	/FDIR	Direction Select
	13	NC	Not connected	14	/STEP	Step
	15	GND	Ground	16	/WDATA	Write Data
	17	GND	Ground	18	/WGATE	Write Gate
	19	GND	Ground	20	/TRK0	Track 00
	21	GND	Ground	22	/WRTPRT	Write Protect
	23	GND	Ground	24	/RDATA	Read Data
	25	GND	Ground	26	/HDSEL	Side One Select

To find the location of floppy-drive interface on the JRex-C3 and JRex-P3 board, please see the Appendix E: Connector Layout chapter.

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.

15.1.1. Connector Diagram



15.2 *Configuration*

You can configure the floppy disk interface in the BIOS Setup Utility. You can choose the 3.5" (common) or 5.25" drive types with densities of 360kB, 720kB, 1.2MB, 1.25MB, 1.44MB or 2.88MB. Refer to the Main Menu section of the Appendix B: BIOS Operation chapter for more information on configuring the floppy drive.

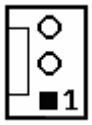
You also can disable the floppy-disk interface in the I/O Device Configuration Submenu.

16. FAN INTERFACE

The JRex-C3 and JRex-P3 is normally shipped with a fan. If for any reason no fan is mounted or a different fan has to be used, use this interface to connect a fan to cool the CPU. The connector and onboard system controller support the speed monitoring of the fan. This connector supports 5V fans, only.

16.1 *Connector*

The fan interface is available on connector X14 (3 pins).

Header	Pin	Signal Description	Function
	1	Sense	Speed Monitoring
	2	VCC *	+5V
	3	GND	Ground

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.

For the location of the fan connector see Appendix E: Connector Layout.

16.2 *Configuration*

You do not need to configure this feature.

17. POWER INTERFACE

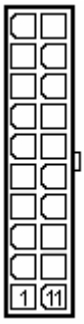
The JRex-C3 and JRex-P3 are available with two different power interface connectors. They can be either equipped with an ATX power connector or with an AT power connector (+5V-only) version. The ATX-version has a standard 20-pin ATX-connector, while the AT-version uses a 4-pin power connector.

17.1 *Power Interface Connectors*

17.1.1. ATX Connector Version

This power connector is available through the X24 connector (20 pins). The JRex-C3 and JRex-P3 require +5V, +5V Standby and +3.3V to be supplied to the board. Additionally some LCD panel backlight inverters may need +12V, as well as some JFLEX™ extension modules or some hard disk and floppy disk drives. The +12V is not generated onboard of the JRex-C3 and JRex-P3 and needs to be supplied, too, as soon as peripheral devices require this voltage. Kontron recommends that you use an ATX power supply with this type of JRex-C3 and JRex-P3, even though not all voltages are required. If you intend to use an AT power supply with this connector, please connect +3.3 V on all pins "V3.3S" and +5V on all pins "V5S" and "V5SB". Leave "ATXPWRGD" and "PSON" unconnected.

The following table shows the pin-out of the connector.

Header	Pin	Signal Name	Function	Pin	Signal Name	Function
	1	V3.3S *	+3.3V	11	V3.3S *	+3.3V
	2	V3.3S *	+3.3V	12	V-12	Not connected **
	3	GND	Ground	13	GND	Ground
	4	V5S *	+5V	14	PSON	Power On
	5	GND	Ground	15	GND	Ground
	6	V5S *	+5V	16	GND	Ground
	7	GND	Ground	17	GND	Ground
	8	ATXPWRGD	Powergood	18	V-5	Not Connected **
	9	V5SB	+5V Standby	19	V5S *	+5V
	10	VCC12 *	+12V	20	V5S *	+5V

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.
The current on these pins is limited to 6A/pin.

. (**) These pins are –12V and –5V on the ATX power supply. On this board they are not required.

To find the location of this connector see Appendix E: Connector Layout.

17.1.2. AT Connector Version

This power interface is an option to the ATX power interface and uses the connector X6 (4 pins). In this case the JRex-C3 and JRex-P3 require +5V-only to be supplied to the board. The +3.3V for onboard and external low-power devices is generated onboard by a DC/DC converter. This 3.3V power supply solution does not have the same capabilities as an ATX power supply. In this case the maximum current for all JFLEX extension modules in the system is limited to 300mA. If your JFLEX extension modules need more power, it is strictly recommended to supply via additional power solutions on the JFLEX extension cards.

However, the +12V that may be required for the LCD panel backlight inverter, the JFLEX™ extension modules, and some hard disk or floppy disk drives, is not generated onboard and needs to be additionally supplied.

The following table shows the pin-out of the connector.

Header	Pin	Signal Description	Function
	1	V5S *	+5V
	2	GND	Ground
	3	GND	Ground
	4	VCC12 *	+12V

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.
The current of the pins on this connector is limited to 13A/pin.

For the location of this connector see Appendix E: Connector Layout.

17.1.3. Configuration

The JRex-C3 and JRex-P3 are equipped with a power-management system that supports APM 1.2 and ACPI 1.0B features. You can configure lots of options for power-saving states such as standby state with partial power reduction and suspend state with full-power reduction. Please refer to the Power menu section in the Appendix B: BIOS Operation chapter for more information about power savings.

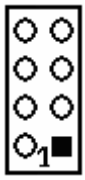
17.2 *ATX/Reset/2LED Interface*

The ATX/Reset/2LED interface on the JRex-C3 and JRex-P3 is an 8-pin female connector (X26) that offers four functions:

- Power Button
- Reset Button
- Hard Disk LED
- Ethernet Link LED

Kontron offers an accessory to have all four functions of the interface available on one device (ATX/Reset/2LED connector, Part Number 96070-0000-00-0).

The following table shows the pin-out of the connector.

Header	Pin	Signal Description	Function
	1	HDLED- *	Hard Disk LED
	2	LILED- **	Power LED
	3	HDLED+	Hard Disk LED (+5V)
	4	LILED+	Power LED (+3.3V)
	5	/RESIN	Reset Input
	6	GND	Ground
	7	+5V_ALWAYS	Power Button Source
	8	PWRBTN	Power Button Input

Notes: (*) This signal has an onboard 470 Ohm resistor. Directly connect the anode of the LED to HDLED+ and the cathode to HDLED- line.

(**) This signal has an onboard 1000 Ohm resistor. Directly connect the anode of the LED to the LILED+ and the cathode to the LILED- line.

For the location of this connector see Appendix E: Connector Layout.

17.2.1. Configuration

The function of the power button can be set to either "power off" or "sleep" mode from the BIOS setup utility. When set to "power off" the power button offers an On/Off function and when set to "Sleep," it offers a Sleep/Wake function. Please refer to the Power menu section in the Appendix B: BIOS Operation chapter for more information about power savings.

18. WATCHDOG TIMER

The watchdog timer is integrated in an onboard PIC controller of the JRex-C3 and JRex-P3 and can issue a reset to the system or generate a non-maskable interrupt (NMI). The watchdog timer circuit has to be triggered within a specified time by the application software. If the watchdog is not triggered because proper software execution fails or a hardware malfunction occurs, it will reset the system or generate the NMI.

18.1 *Configuration*

You can set the watchdog timer to disabled, reset or NMI mode. You can specify the delay time from 1 second to 30 minutes and timeout (trigger period) from 0.4 second up to 10 minutes. The delay time is the time after first initialization before the trigger period starts. The timeout is the time the watchdog has to be triggered within. You can make the initialization settings in the BIOS setup. Refer to the Watchdog Settings Submenu in the Appendix B: BIOS Operation chapter for information on configuration.

18.2 *Programming*

18.2.1. Initialization

You can initialize the watchdog timer from the BIOS setup. You also can set up the initialization from the application software with help of the JIDA (Jumptec Intelligent Device Architecture) programmer's interface.

18.2.2. Trigger

The watchdog needs to be triggered out of the application software within a specified timeout period. You can only do this in the application software with help of the JIDA programmer's interface.

For information about the JIDA programmer's interface refer to the JIDA BIOS extension section in the Appendix B: BIOS chapter and separate documents available in the JIDA software packages on the Kontron Web site.

19. HARDWARE MONITOR

The South Bridge VIA VT8231 monitors several critical hardware parameters of the system, including power-supply voltages, fan speed and CPU temperature, which are very important for a high-end computer system to remain stable and properly.

The following parameters are monitored:

- CPU core voltage
- +12V power plane
- +5V power plane
- +2.5V power plane
- +3.3V power plane
- CPU temperature
- CPU fan speed

19.1 *Configuration*

You can use the Hardware Monitor submenu in the BIOS Setup Utility to obtain information on voltages, fan speed and to check the temperature of the CPU die. For more information on this submenu, see the Appendix B: BIOS Operation chapter in this manual.

To monitor the parameters of this feature from your operating system, Kontron recommends that you use the 32-bit protected mode JUMP*tec*'s Intelligent Device Architecture driver (JIDA 32) with the test and demo application for Windows 95/98/ME/NT/2000/XP, which is available on the Kontron Web site.

20. APPENDIX A: SYSTEM-RESOURCE ALLOCATION

20.1 *Interrupt Request (IRQ) Lines*

IRQ #	Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Slave 8259	No	
3		Yes	
4	COM1	No	Note (1)
5	Sound	Yes	Note (2), Note (4)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9		Yes	
10	SCI	Yes	Note (3)
11		Yes	
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1)
15	CompactFlash IDE1	No	Note (1)

Notes: (1) If the „used for"-device is disabled in setup, the corresponding interrupt is available for other devices.
(2) Possible setting for LPT1. IRQ7 is the default setting.
(3) Available in default configuration. IRQ 10 is used as SCI, if ACPI enabled.
(4) Available in default configuration. IRQ 5 is used for legacy audio enabled

20.2 *Direct Memory Access (DMA) Channels*

DMA #	Use	Available	Comment
0		Yes	
1	Sound	Yes	Note (2), (3)
2	FDC	No	Note (1)
3	LPT	Yes	Note (2)
4	Cascade	No	
5		Yes	
6		Yes	
7		Yes	

Notes: (1) If the „used for"-device is disabled in setup, the corresponding DMA channel is available for other devices.
(2) Possible setting for LPT1 if configured for ECP mode.
(3) Available in default configuration, DMA 1 is used for legacy audio enabled

20.3 *Memory Map*

The JRex-C3 and JRex-P3 processor modules can support up to 512MB of memory. The first 640KB of SDRAM are used as main memory.

Using DOS, you can address 1MB of memory directly. Memory area above 1MB (high memory, extended memory) is accessed under DOS via special drivers such as HIMEM.SYS and EMM386.EXE, which are part of the operating system. Please refer to the operating system documentation or special textbooks for information about HIMEM.SYS and EMM386.EXE.

Other operating systems (Linux or Windows versions) allow you to address the full memory area directly.

Upper Memory	Use	Available	Comment
A0000h – BFFFFh	VGA Memory	No	Mainly used by graphic adapter cards. If a PCI graphic card is in the system this memory area is mapped to the PCI bus.
C0000h – CBFFFh	VGA BIOS, RPL/PXE ROM	No	
CC000h – DFFFFh		Yes	Free for LPC bus or shadow RAM in standard configurations. If JRC software is used, a 16K block is shadowed for BIOS extension, starting with first free area at D0000h, D4000h, D8000hor DC000h. (BIOS extensions do not use the whole shadow block.).
E0000h – F0000h	System BIOS, USB legacy support	No	

20.3.1. Using Expanded Memory Managers

JRex-C3 and JRex-P3 extension BIOSes may be mapped to an upper memory area. (See the previous table.). Some add-on boards also have optional ROMs or use drivers that communicate with their corresponding devices via memory mapped I/O such as dual-ported RAM. These boards have to share the upper memory area with the Expanded Memory Manager's EMS frame. This often causes several problems in the system.

Most EMMs scan the upper memory area for extension BIOSes (optional ROMs) and choose a free memory area for their frame if it is not explicitly set. Normally, they are not always capable of detecting special memory-mapped I/O areas. You need to tell the EMM which memory areas are not available for the EMS frames, which is most of the time done by using special exclusion parameters.

If the Expanded Memory Manager you use cannot detect extension BIOSes (optional ROMs), make sure you excluded all areas in the upper memory, which are used by extension BIOSes, too. Your instruction in the CONFIG.SYS concerning the Expanded Memory Manager should look like this: (question marks symbolize the location of extension BIOS).

MS-DOS Example

```
DEVICE=EMM386.EXE X=????-???? X=E000-FFFF
```

Note: When booting up your system using this configuration under MS-DOS, the exclusion of area F000 to FFFF causes a warning. Microsoft reports that this message will always appear when the F000 segment lies in the shadow RAM. This is a bug of EMM386, not of the JRex.

Please read the technical manuals of add-on cards used with the JRex-C3 and JRex-P3 for the memory areas they use. If necessary, exclude their memory locations to avoid a conflict with EMM386.

20.4 I/O Address Map

The I/O-port addresses of the JRex-C3 and JRex-P3 are functionally identical with a standard PC/AT. All addresses not mentioned in this table should be available. We recommend that you do not use I/O addresses below 0110hex with additional hardware for compatibility reasons, even if available.

Address (h)	Use	Available	Comment
0000 - 001F	DMA Controller 1	No	Fixed
0010	System Control	No	Fixed
0020 - 003F	Interrupt Controller 1	No	Fixed
0040 - 005F	Timer, Counter	No	Fixed
0060 - 006F	Keyboard controller	No	Fixed
0070 - 0077	NMI, RTC and CMOS	No	Fixed
0080	BIOS POST	No	Fixed
0081 - 008F	DMA Page Register	No	Fixed
0092	System Control	No	Fixed
00A0 00BF	Interrupt Controller 2	No	Fixed
00C0 - 00DF	DMA Controller 2	No	Fixed
00E0 - 00EF	System Control	No	Fixed
00F0 - 00FF	Math Coprocessor	No	Fixed
0100 - 010F	General Purpose I/O	No	Kontron Control Port, Fixed
0170 - 0177	2nd HDD (CompactFlash)	No	Available if IDE port 2 is disabled
01F0 - 01F7	1st HDD	No	Available if IDE port 1 is disabled
0220 - 022F	Sound Blaster	Yes	Possible address for legacy audio
0240 - 24F0	Sound Blaster	Yes	Possible address for legacy audio
0260 - 026F	Sound Blaster	Yes	Possible address for legacy audio
0274 - 0279	ISA PNP	No	Fixed
0278 - 027F	LPT	Yes	Possible address for LPT
0280 - 028F	Sound Blaster	Yes	Possible address for legacy audio
02E8 - 02EF	COM4	Yes	Possible address for COM A
02F8 - 02FF	COM2	Yes	Possible address for COM A
0300 - 0303	MPU-401	Yes	Possible address for legacy audio
0310 - 0313	MPU-401	Yes	Possible address for legacy audio
0320 - 0323	MPU-401	Yes	Possible address for legacy audio
0330 - 0333	MPU-401	Yes	Possible address for legacy audio
0378 - 037F	LPT	No	Available if LPT is disabled
03BC - 03C3	LPT	Yes	Possible address for LPT
03B0 - 03DF	Video	No	These addresses are 10bit decoded (mirrored every 400hex)
03E8 - 03EF	COM3	Yes	Possible address for COM A
03F0 - 03F5	Floppy	No	Available if floppy controller disabled
03F8 - 03FF	COM1	No	Available if COM1 is disabled
04D0 - 04D1	Interrupt Select	No	Fixed
0678 - 067A	LPT ECP Extension	Yes	Free in standard configuration, possible addresses for ECP
0778 - 077A	LPT ECP Extension	No	Free, if LPT not used in ECP mode
07BC - 07C3	LPT ECP Extension	Yes	Free in standard configuration, possible addresses for ECP
0A79	ISA PNP	No	Fixed
0CF8 - 0CFF	PCI Configuration	No	Fixed
1000 - 107F	Ethernet Controller	No	Fixed
1400 - 141F	IDE Controller	No	Available if both IDE interfaces are disabled
1800 - 181F	USB Controller Port 0/1	No	Dynamic (address if all PCI onboard devices are on)
1C00 - 1C1F	USB Controller Port 2/3		Dynamic (address if all PCI onboard devices are on)
4000 - 407F	System Resources	No	Fixed
6800 - 687F	Hardware Monitoring	No	Fixed
8100 - 810F	SM Bus Controller	No	Fixed
FE00	System Resources	No	Fixed
FFF8 - FFFF	AC97 Audio Controller	Yes	Free in standard configuration, used when Sound enabled

20.5 Peripheral Component Interconnect (PCI) Devices

All devices follow the PCI 2.1 specification. The BIOS and OS control memory and I/O resources. Please refer to the PCI 2.1 specification for details.

PCI Device (IDSEL)	PCI IRQ	REQ/ GNT	Comment
AGP Graphic	INTA#-	-	Separate Bus, integrated in VIA chipset
Ethernet (AD13)	INTD#	REQ#3 /GNT#3-	
AC97 Sound	INTC#		integrated in VIA chipset
1st UHCI USB Controller	INTD#	-	integrated in VIA chipset
2nd UHCI USB Controller	INTD#	-	integrated in VIA chipset

20.6 SM Bus Devices

The JRex-C3 and JRex-P3 uses an onboard System Management (SM) Bus. This bus is available on the JFLEX-extension connector. Look at the JFLEX specification (available on the Kontron Web site) for signal locations.

The following addresses for the SM bus are already used on the JRex-C3 and JRex-P3.

SM Bus Address	SM Device	Comment
10h/11h	SM-Bus Host	Integrated in VIA chipset
A0h/A1h	SPD EEPROM	Part of the DDR SDRAM module
D2h/D3h	Clock Generator	

Note: Accesses that are not allowed to the onboard SM bus devices may cause system failures. Problems resulting out of this are not under warranty!

21. APPENDIX B: BIOS OPERATION

The JRex-C3 and JRex-P3 come with Phoenix BIOS 4.0, Release 6.1, which is located in the onboard Flash EEPROM in compressed from. 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.

21.1 *Determining the BIOS Version*

To determine the BIOS version of the JRex-C3 and JRex-P3, immediately press the <**Pause/Break**> key on your keyboard as soon as you see the following text display in the upper left corner of your screen:

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technology Ltd.
All Rights Reserved
Kontron(R) BIOS Version <BQP3R116>
Copyright 2004 Kontron Embedded Modules GmbH
```

Whenever you contact technical support about BIOS issues, providing a BIOS version <BQP3R???> is especially helpful.

The system BIOS provides additional information about the board's serial number, CPU, and memory information by displaying information similar to the following:

```
S/N: GC4330122

VIA VT8606 + VT8231
CPU = Intel (R) Mobile Pentium(R) III processor 700MHz
639K System RAM Passed
119M Extended RAM Passed
256K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed

UMB upper limit segment address: E4EC
```

The board's serial number has value to technical support. JRex-C3 and JRex-P3 serial numbers always start with GC and are followed by six or seven digits. The first digit represents the year of manufacturing, the next two digits stand for the lot number, and the last three or four digits are the number of the board in that lot.

In the example above, the board with the serial number GC4330154 was manufactured in year 2004, lot 33 of that year, and is board number 154 of that lot.

21.2 *Configuring the System BIOS*

The Phoenix BIOS 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-C3 and JRex-P3. 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**>.

21.2.1. Start Phoenix BIOS Setup Utility

To start the Phoenix BIOS Setup Utility, press the <**F2**> key when the following string appears during boot up.

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

The Main Menu then appears.

21.2.2. General Information

The **Setup Screen** is composed of several sections:

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 different 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. **Save Value** commands in the **Exit** menu save the values displayed in all menus.

Displaying Submenus

Use the ← or → key to move the cursor to the submenu you want. Then press <**Enter**>. A pointer (▸) marks all 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 the legend keys and their alternates. Press <**Esc**> to exit the General Help window.

21.3 *Main Menu*

Feature	Option	Description
System Time	HH:MM:SS	Sets system time. Press <Enter> to move to MM or SS.
System Date	MM/DD/YYYY	Sets the system date. Press <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.
▸ Primary Master	Autodetected drive	Displays result of PM autotyping.
▸ Primary Slave	Autodetected drive	Displays result of PS autotyping.
▸ Secondary Master	Autodetected drive	Displays result of SM autotyping.
▸ Memory Shadow	Submenu	Opens Memory Shadow submenu.
▸ Memory Cache	Submenu	Opens Memory Cache submenu.
System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory *	N/A	Displays amount of extended memory detected during bootup.

Notes: In the Option column, bold shows default settings.
(*) Extended Memory = capacity of memory module – selected frame buffer memory size

21.3.1. Master or Slave Submenus

Feature	Option	Description
Type	None User **Auto** CD-ROM IDE Removable ATAPI Removable Other ATAPI	None = Autotyping is not able 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. The drive itself supplies the information. CD-ROM = CD-ROM drive. ATAPI Removable = Read- and writeable media e.g. LS120 and USB-ZIP Other ATAPI = for ATAPI devices not supported by other HDD features.
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 the calculated size of the drive in CHS.
Total Sectors	N/A	Number of total sectors in LBA mode.
Maximum Capacity	N/A	Displays the calculated size of the drive in LBA.
Multi-Sector Transfer	**Disabled** 2 sectors 4 sectors 8 sectors 16 sectors	Any selection except Disabled determines the number of sectors transferred per block. The 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 FPIO 3 / DMA 1 FPIO 4 / DMA 2	Selects the method for transferring the data between the hard disk and system memory.
Ultra DMA Mode *	Disabled MOD0 MOD1 MOD2 MOD3 MOD4 MOD5	Selects the UDMA mode to move data to/from the drive. Autotype the drive to select the optimum transfer mode. This feature is autodetected.
SMART Monitoring	Disabled Enabled	Shows whether a disk supports SMART.

Note: In the Option column, bold shows default settings.
(*) The CompactFlash IDE interface is not capable of running UDMA modes. On the 40 pin IDE interface an 80line UDMA 100 cable is required for proper operation in modes UDMA 3 and higher.

21.3.2. Memory Shadow Submenu

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

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

21.3.3. Memory Cache Submenu

Feature	Option	Description
Memory Cache	Disabled **Enabled**	Enables or Disables L2 cache.
Cache System BIOS area	Uncached **Write Protected**	Controls caching of System BIOS area.
Cache Video BIOS area	Uncached **Write Protected**	Controls caching of Video BIOS area.
Cache Extended Memory area	Uncached Write Through Write Protected **Write Back**	Controls caching of system memory above 1MB.
CC00 - CFFF D000 - D3FF D400 - D7FF D800 - DBFF DC00 - DFFF	**Disabled** Write Through Write Protected Write Back	Disabled: block is not cached. Write Through: Write 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.

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

21.4 *Advanced Menu*

Feature	Option	Description
‣ Advanced Chipset Control	Submenu	Opens Advanced Chipset Control submenu.
Plug & Play (PNP) OS Installed	Yes **No**	If your system has a PNP OS, such as Win98, select Yes to let the OS configure PNP devices not required for boot. Selecting No makes the BIOS configure them.
Reset Configuration Data	**No** Yes	Yes erases all configuration data in Extended System Configuration Data (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.
‣ PCI Configuration	Submenu	Opens PCI Advanced submenu.
PS/2 Mouse	**Auto Detect** Enabled Disabled	Disabled prevents installed PS/2 mouse from functioning but frees up IRQ12. Enabled forces the PS/2 mouse port to be enabled regardless if a mouse is present. Autodetect enables the PS/2 mouse only if present.
‣ Keyboard Features	Submenu	Opens keyboard features submenu.
‣ I/O Device Configuration	Submenu	Opens I/O Device Configuration submenu.
‣ Hardware Monitor	Submenu	Opens 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	**Yes** No	Determines if errors detected during boot up cause system to halt.

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

21.4.1. 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 size of AGP graphics aperture. Half of installed system memory is normally the best choice.
Frame Buffer Size	None, **8 MB**, 16 MB, 32 MB	Select size of VGA SMA frame buffer. None uses the minimum size for the onboard graphic to function correctly.
Spread Spectrum Modulation	**Disabled** 0.25% 0.5%	Enables spread spectrum modulation of clock synthesizer.

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

21.4.2. 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 INT A/B/C/D. Select Auto to let BIOS assign IRQ.
PCI IRQ Line 2	Disabled **Auto** IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for PCI interrupt INT A/B/C/D. 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 INT A/B/C/D. 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 INT A/B/C/D. 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, user can select adapter that BIOS initializes.
Assign IRQ to PCI VGA	No **Yes**	Determines if a PCI VGA device is assigned an IRQ. Win98SE has shutdown problems if a PCI VGA does not have an IRQ assigned.

Notes: In the Option column, bold shows default settings.

21.4.3. PCI/PNP ISA UMB Region Exclusion Submenu

Feature	Option	Description
CC00 – CFFF	**Available** Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.
D000 – D3FF	**Available** Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.
D400 – D7FF	**Available** Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.
D800 - DBFF	**Available** Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.
DC00 - DFFF	**Available** Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.

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

21.4.4. PCI/PNP ISA IRQ Resource Exclusion Submenu

Feature	Option	Description
IRQ3	**Available** Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ4	**Available** Reserved	See above.
IRQ5	**Available** Reserved	See above.
IRQ7	**Available** Reserved	See above.
IRQ9	**Available** Reserved	See above.
IRQ10 *	**Available** Reserved	See above.
IRQ11	**Available** Reserved	See above.
IRQ12	**Available** Reserved	See above.
IRQ14 **	**Available** Reserved	See above.
IRQ15 **	**Available** Reserved	See above.

Notes: In the Option column, bold shows default settings.
(*) IRQ10 is used for SCI in ACPI mode. Do not use IRQ10 for legacy ISA devices when ACPI enabled.
(**) Entry is only visible when primary IDE or secondary IDE is disabled.

21.4.5. I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	Disabled Primary Secondary **Both**	Enables onboard PCI IDE device.
Floppy disk controller	Disabled **Enabled**	Enable / Disable the onboard FDC controller.
Base I/O address	**Primary,** Secondary	Set the base I/O address for floppy disk controller.
Serial port A	Disabled Enabled **Auto**	Disabled turns off the port. Enabled requires end user to enter the base I/O address and the IRQ. Auto makes the BIOS configure the port. Serial port A is available on the JRex front.
Base I/O address	3F8h, 2F8h, 3E8h, 2E8h	Select I/O base of port.
Interrupt	IRQ 3, IRQ 4	Select IRQ of Port A
Parallel port	Disabled Enabled **Auto**	Disabled turns off the port. Enabled requires end user to enter the base I/O address and the IRQ. Auto makes the BIOS configure the port.
Mode	Uni-directional **EPP** ECP	Set the mode for the parallel port.
Base I/O address	**378h**, 278h, 3BCh	Select I/O base of port.
Interrupt	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**	Enables the onboard VIA LAN controller.
OnChip USB Device	**Enabled** Disabled	Enable / Disable UHCI 1 Host Controller for USB ports 0 and 1 (JRex front).
OnChip USB 2 Device	Enabled **Disabled**	Enable / Disable UHCI 2 Host Controller for USB ports 2 and 3 (JFLEX Bus).
Legacy USB Support *	**Disabled** Enabled	Enable support for USB keyboard and mice and boot from USB mass storage devices.
OnChip Audio Device	**Disabled** Enabled	Enables the AC97 Audio device. This feature can only be used with a sound module on the JFLEX Bus.
‣ Watchdog Settings	Submenu	Opens Watchdog Settings submenu.

Notes: In the Option column, bold shows default settings.
(*) If you want to use the USB boot feature, enable USB BIOS Legacy Support. A 16kb UMB area (most likely DC000h-DFFFFh) is used for USB BIOS Legacy Support.

21.4.6. Watchdog Settings Submenu

Feature	Option	Description
Mode	**Disabled** Reset NMI	Select watchdog operation mode.
Delay	1s, 5s, 10s, **30s**, 1min, 5.5min, 10.5min, 30.5min	The time until the watchdog counter starts counting. Useful to handle longer boot times.
Timeout	1s, 5s, 10s, **30s**, 1min, 5.5min, 10.5min, 30.5min	Max. trigger period.

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

21.4.7. Keyboard Features Submenu

Feature	Option	Description
Numlock	Auto **On** Off	On or Off turns NumLock on or off at boot up. Auto turns NumLock on if it finds a numeric key pad.
Key Click	**Disabled** Enabled	Turns audible key click on.
Keyboard auto-repeat rate	**30/sec**, 26.7/sec, 21.8/sec, 18,5/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.

21.4.8. Hardware Monitor Submenu

This submenu shows the current voltages, temperatures and the fan speed of the system.

Voltage/Temperature/Fan	Explanation
Vcore	Core Voltage
V(12)	12V Power Plane
V(5)	5V Power Plane
V(2.5)	2.5V Power Plane
V(3.3)	3.3V Power Plane
CPU Temp	CPU Temperature in °C and °F
CPU Fan 1 Speed	CPU fan speed in rpm

21.5 *Security Menu*

Feature	Option	Description
Supervisor Password is	**Clear** Set	Displays whether password is set.
User Password is	**Clear** Set	Displays whether password is set.
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.
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.
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 bootup 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 bootup 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. A User password is possible only if a Supervisor password exists.

21.6 *Power Menu*

In the BIOS Setup Utility, you can set up an Advance Power Management system (APM 1.2) to reduce 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

In addition you can enable an ACPI 1.0 support in the BIOS setup utility, if you intend to use an operating system supporting the Advanced Configuration and Power Management Interface. For logical reasons it is required to use an ATX power supply with the ACPI feature.

The following states are supported from the system:

- S0 (Working)
- S1 (Sleeping with processor context maintained)
- S5 (Soft off)

The state S2 (sleeping with processor context not maintained) and S3 (Save to RAM) is not supported. The state S4 (Save to Disk) is a matter of the used operating system.

Use the Wake Up Events submenu to specify whether an activity can terminate a power saving state and restore Full On.

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 your own selections from the following fields. Disabled turns off all power management.
Enable ACPI	**No** Yes	Enables or disables the ACPI function.
‣ IRQs Activity Monitoring	Submenu	Opens IRQ Activity Monitoring submenu.
Idle Mode	**Off** On	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 input device before the screen is turned off.
Resume on Time	**Off** On	On wakes the system at a specific time.
Resume Time	00:00:00	Specifies when system wakes.

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

21.6.1. IRQs Activity Monitoring Submenu

This menu allows the user to enable or disable IRQs as activities and resume event.

Feature	Option	Description
IRQ1	**Yes** No	Wakes up system on IRQ1 (Keyboard).
IRQ12	**Yes** No	Wakes up system on IRQ12 (PS/2 Mouse).
IRQ3, 4, 5, 6, 7, 9, 10, 11, 15	Yes **No**	Wakes up system on IRQ if set to Yes.

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

21.7 *Boot Menu and Utilities*

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 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 PXE ROM of the onboard LAN controller. Supports Intel PXE. Check the Intel Web site for more information.
‣ Boot Device Priority	Submenu	Opens boot device priority submenu.
‣ Display Control	Submenu	Opens display control submenu.

Notes: In the Option column, bold represents default settings.
(*) A CMOS battery backup must be present for this selection to work properly.

21.7.1. Dark Boot

After you turn on or reset the computer, Dark Boot displays a graphical logo (default is a blank screen) instead of the text based POST screen, which displays a number of PC diagnostic messages.

The graphical logo stays up until just before the OS loads unless:

- You press <Esc> to display the POST screen
- You press <F2> to enter Setup
- POST issues an error message
- The BIOS or an option ROM requests keyboard input

21.7.2. MultiBoot XP

MultiBoot XP comes with a complete new look of the Boot Device Priority submenu. This submenu is now separated into two sections:

- Boot Priority Order
- Excluded from Boot Order

MultiBoot XP can display the setup menus by each kind of device type and arrange the boot priority order with any sequence of devices. MultiBoot XP meets the requirements of PC 98 and accommodates more devices that are bootable. It employs a boot scheme that is generic and flexible enough to boot from any current device. You can select your boot device in Setup, or you can choose a different device each time you boot by selecting your boot device in the Boot First function.

An available bootable device can be easily switched between the two sections by just highlighting the device and then pressing <X>. To change the order, select the device to change and press <-> to decrease or <+> to increase priority. You can also choose between four default configurations for the boot order <1>-<4>.

Boot Priority Order

This section shows eight configuration entries for up to eight devices that can be arranged in boot priority order (1: highest priority, 8: lowest priority).

Excluded from Boot Order

This section shows all devices that are excluded from the boot order. Any device listed here will never be used as boot device and not appear in the Boot First function.

The following table shows a list of supported devices:

Device	Description
IDE 0	Primary master IDE hard drive
IDE 1	Primary slave IDE hard drive
IDE 2	Secondary master IDE hard drive
IDE 3	Secondary slave IDE hard drive
Legacy Floppy Drives	Standard Legacy Diskette Drive
USB KEY	USB Stick
USB FDC	USB Diskette Drive
USB HDD	USB Hard Drive and memory sticks that follow MMS specification
USB CDROM	USB CD-ROM Drive
USB ZIP	USB ZIP Drive
USB LS120	USB LS120 Drive
PCI LAN	Ethernet Controller on the PCI Bus with LAN Boot ROM
PCI SCSI	SCSI Controller on the PCI Bus with SCSI BIOS ROM

21.7.3. Boot First Function

Display the Boot First function 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. With the MultiBoot XP feature only devices detected during boot up are displayed.

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 the previous boot sequence.
- Enter Setup.
- Press <Esc> to continue with the existing boot sequence.

21.7.4. Display Control Submenu

Feature	Option	Description
JDA Revision		Shows the actual revision of used JDA (JILI Data Area).
Display Mode	CRT only LCD only **CRT+LCD**	Selects display boot devices. CRT+LCD is the simultaneous mode.
Flat Panel Type	**Auto Detect** VGA, SVGA, XGA,SXGA UXGA * Enter PAID Enter FPID	Select Auto Detect whenever using a JILI cable on the LCD interface. VGA, SVGA, XGA, SXGA, UXGA provide standard timings for LCD panel resolutions. You can enter the Panel Adapter ID (PAID) or the Flat Panel ID (FPID) manually.
LCD Backlight **	0 – 255	Enter a value to adjust backlight of the LCD.
LCD Contrast ***	0 – 63	Enter a value to adjust contrast of the LCD.

Note: In the Option column, bold shows default settings.
(*) Standard timings for VGA to UXGA panels cannot drive all available displays of that type that are on the market. Use a JILI cable whenever possible.
(**) Only visible if the panel adapter is equipped with a MAX5362 DAC for backlight control.
(***) Only visible if the panel adapter is equipped with a Xicore X9429 digital potentiometer for contrast control.

21.8 *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.

21.9 *Kontron BIOS Extensions*

Besides the Phoenix System BIOS, the JRex-C3 and JRex-P3 comes with a few BIOS extensions that support special features. All extensions are located in the onboard flash EEPROM. Some extensions are permanently available; some are loaded if required during boot up. Supported features include:

- JIDA standard
- Remote Control (JRC)
- Onboard LAN RPL ROM

All enabled BIOS extensions require shadow RAM. They will be loaded into the same 32K shadowed memory block, if possible. However, if the system memory cannot find free memory space because all the memory is already used for add-on peripherals, the BIOS extensions do not load.

21.9.1. JIDA BIOS extension

The JUMPtec Intelligent Device Architecture (JIDA) BIOS extension is not a true extension BIOS. It is part of the system BIOS and is located in the system BIOS segments after boot up. It is permanently available and supports the JIDA 16-bit and JIDA 32-bit standard.

The JIDA 16-bit standard is a software interrupt 15hex driven programmers interface and offers lots of board information functions. For detailed information about programming, refer to the JIDA specification and a source code example (JIDAI???.ZIP), which you can find at the Kontron Web site. The three question marks represent the revision number of the file. You also can contact technical support for this file.

For other operating systems, special 32-bit drivers (JIDAIA??.ZIP) are available. You can download the zip file from the Kontron Web site.

21.9.2. Remote Control Client Extension

You can remotely control the JRex-C3 and JRex-P3 using software available from Kontron (JRC-1, Part Number 96047-0000-00-0). This software tool can communicate with the board via one of the serial ports. During boot-up, the system BIOS scans the serial ports for an available JRC connection. If detected, it loads the JRC client BIOS extension into the memory. With the JRC client loaded into the first detected free memory location between C0000hex and DFFFFhex, a 16K block is shadowed.

For more information on the Remote Control usage, refer to the JRC-1 technical manual or Application Note JRCUsage_E???.PDF, which you can find on the Kontron Web site.

21.9.3. LAN PXE ROM

If the onboard LAN PXE ROM is enabled in the system BIOS setup, a special optional ROM for the Ethernet controller loads into memory during boot up. This optional ROM allows you to boot the JRex-C3 and JRex-P3 over an Ethernet connection. A server with Intel PXE boot support is required on the other side of the Ethernet connection. The setup and configuration of the server, including PXE support, is not the responsibility of Kontron.

The PXE ROM extension is loaded into the first free memory area between C0000hex and DFFFFhex and a 16K block of memory is shadowed.

21.10 *Updating or Restoring BIOS Using PhoenixPhlash*

PhoenixPhlash allows you to update the BIOS by using a floppy disk without having to install a new ROM chip. PhoenixPhlash is a utility used to flash a BIOS to the Flash ROM installed on the JRex-C3 and JRex-P3.

Use PhoenixPhlash to:

- Update the current BIOS with a newer version
- Restore a corrupt BIOS

21.10.1. Flashing a BIOS

Use the following procedure to update or restore a BIOS.

1. Download the Phoenix Phlash compressed file, CRDxBQP3.ZIP, from the KONTRON Embedded Modules Web site or contact your local technical support for it. 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.

2. Install Phoenix Phlash on a hard disk by unzipping the content of CRDxBQP3.ZIP into a local directory such as C:\PHLASH.

3. Create a Crisis Recovery Diskette by inserting a blank diskette into Drive A: or B: and execute WINCRISIS.EXE. This at least copies three files onto the 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.

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

   Phoenix Phlash runs in either command line mode or crisis recovery mode.

5. 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 <bios name>      (Example: PHLASH BQP3R116.ROM)
   ```

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

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

   If you see this message after you execute Phlash, disable the memory manager or use parameter /x for Phlash.exe.

   ```
   PHLASH /X <bios name>
   ```

21.10.2. Preventing Problems When Updating or Restoring BIOS

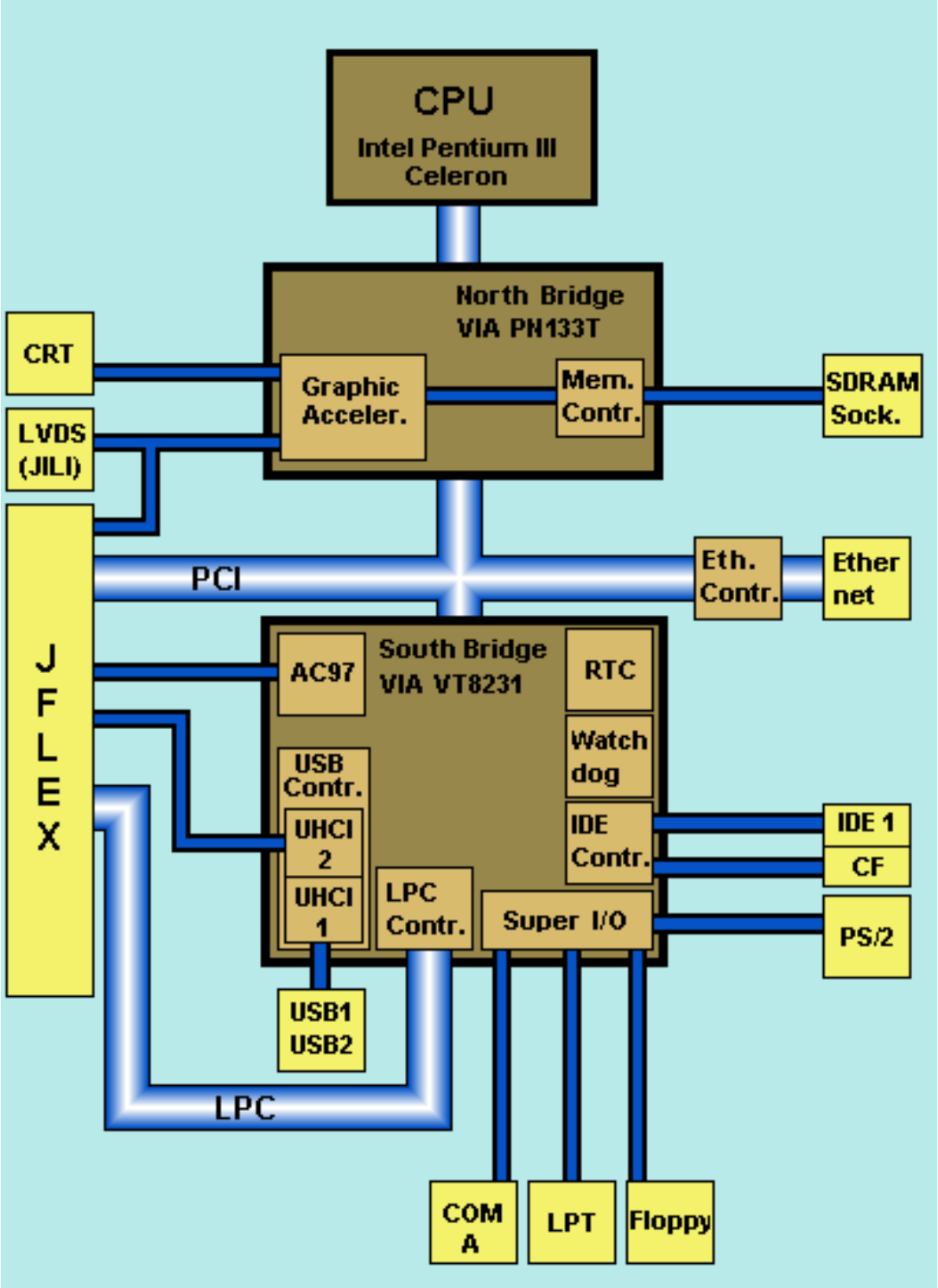
Updating the BIOS represents a potential hazard. Power failures or fluctuations can occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

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 parallel port (LPT) to force initiating the boot block recovery routine.

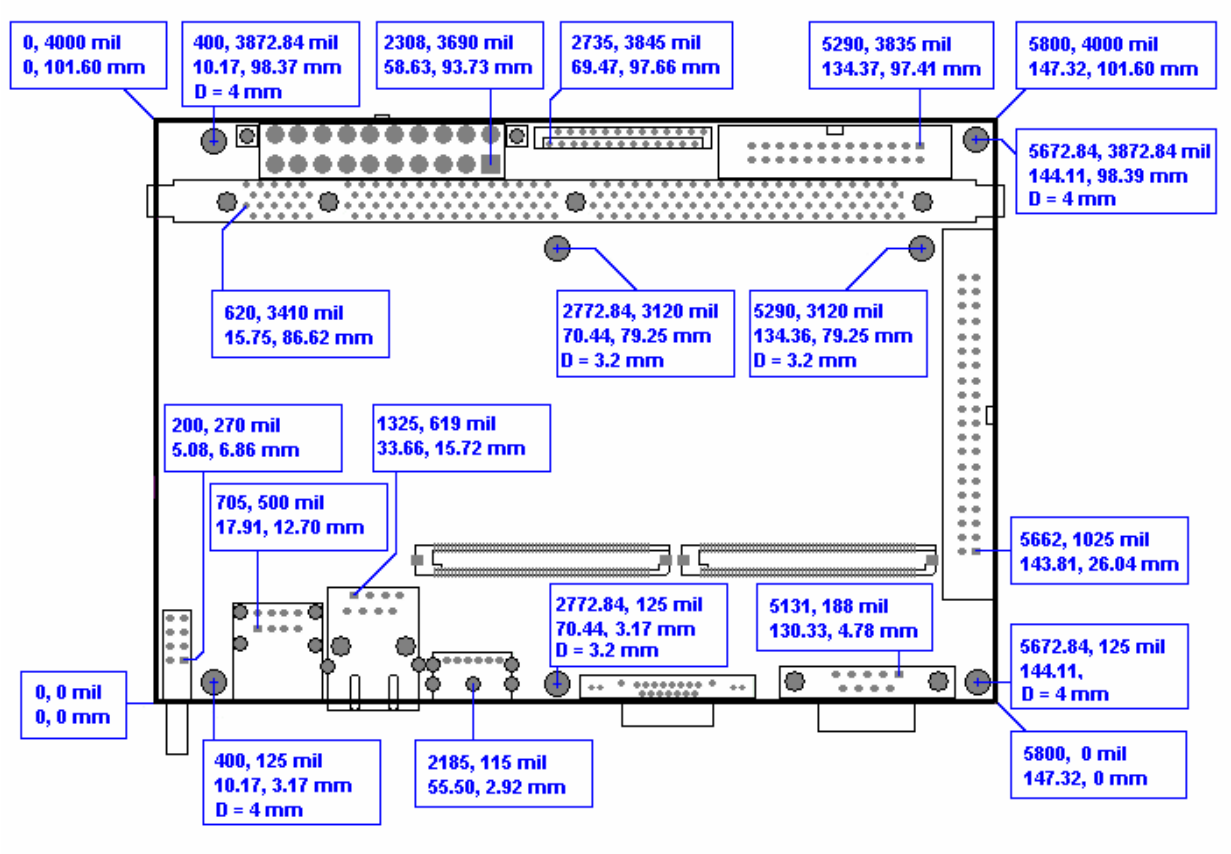
For further information on the update key and the crisis diskette, see the Application Note PHLASH_SCE???, which is available from the KONTRON Embedded Modules Web site. The three question marks stand for the revision number of the file.

22. APPENDIX C: BLOCK DIAGRAM

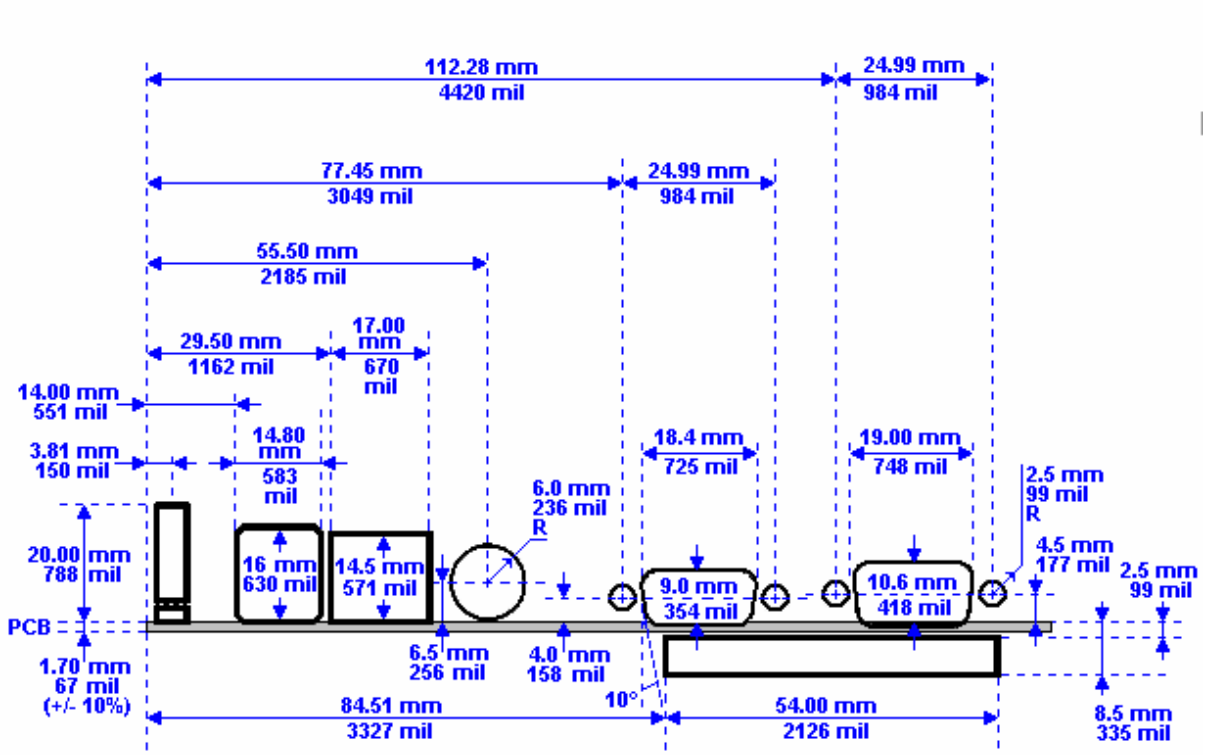


23. APPENDIX D: MECHANICAL DIMENSIONS

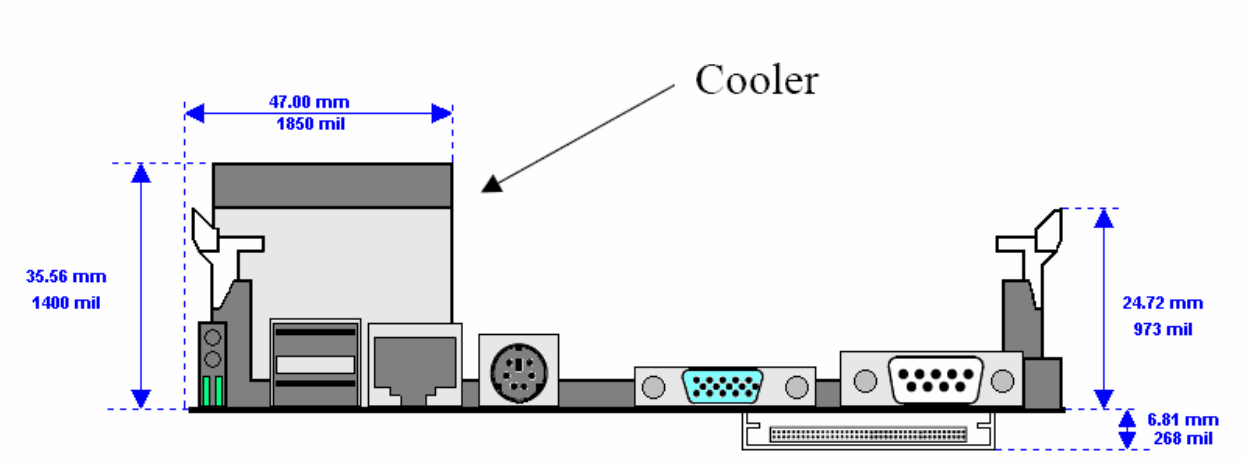
23.1 *Top View*



23.2 *Front View Connectors*

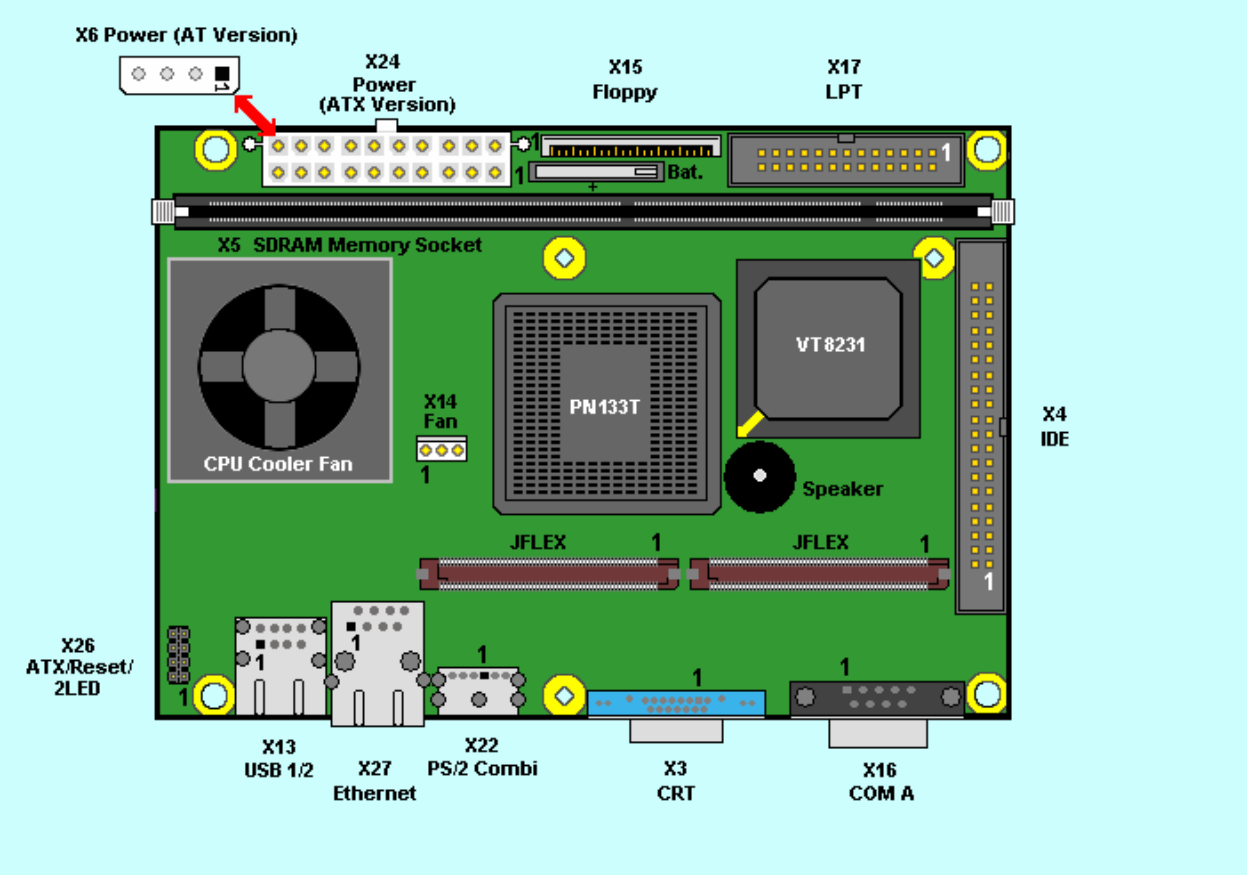


23.2.1. Front View Cooler



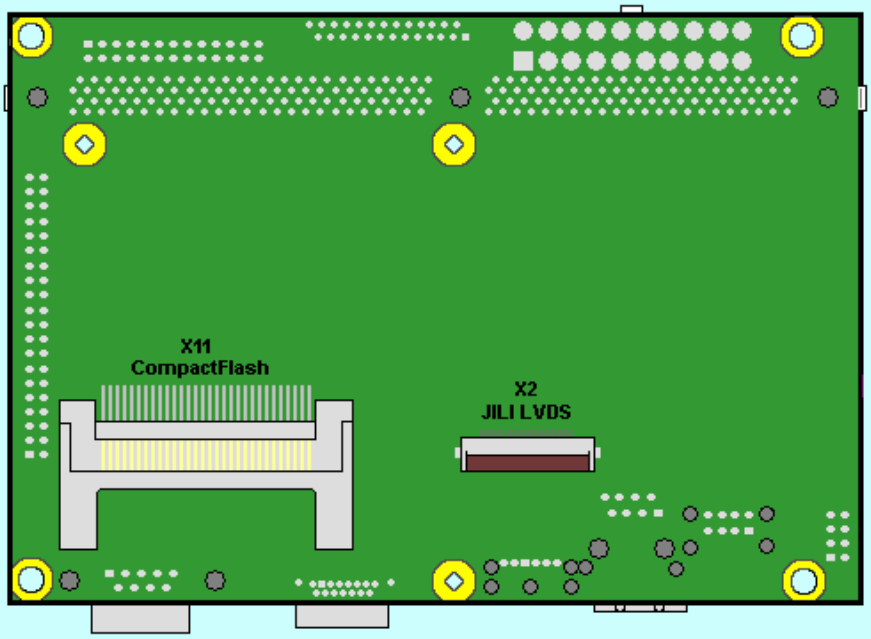
24. APPENDIX E: CONNECTOR LAYOUT

24.1 *Top Side*



Notes: The position of Pin 1 is marked with a quadratic pad on the PCB.

24.2 *Bottom Side*



24.3 Connector Functions and Interface Cables

The table notes connector functions, as well as mating connectors and available cables.

Connector	Function	Mating Connector	Available Cable or Accessory	Description
X2	JILI LVDS Interface		KAB-JILI-?????? (see separate cable list)	For JILI interface cables
X3	CRT Connector	Standard DSUB15 male plug		For CRT monitor connection
X4	Primary IDE Hard Disk Interface Connector	2.54mm 40 pos. (AMP 4-215882-0 or compatible)	KAB-IDE-1 (PN 96022-0000-00-0)	For 3.5" HDD
X5	SDRAM-DIMM Socket			For memory modules
X6	AT Power Connector	Mate-N-Lok Connector (AMP 1-480424-0 or compatible)		For power connection
X11	CompactFlash Connector			For CompactFlash IDE storage devices (no DMA).
X13	USB Connectors	Standard USB plug		For USB device connection
X14	Fan Interface			For fan connection
X15	Floppy Drive Interface Connector		ADA-FLOPPY-2 (PN 96001-0000-00-0) or KAB-FLOPPY/MOPS-1 (PN 96019-0000-00-0)	For 3.5" floppy or slim line floppy.
X16	Serial Interface Connectors (COM A)	Standard DSUB9 female plug.		For DSUB9 RS232 connection
X17	Parallel Interface LPT Connector	2.54mm 26 pos. (AMP 2-215882-6 or compatible)	KAB-DSUB25-1 (PN 96015-0000-00-0)	For DSUB 25 LPT adaptation.
X22	PS/2 Mouse and Keyboard Combination Connector	Standard PS/2 plug		For keyboard and mouse connection via Y-cable
X24	ATX Power Connector	AMP DUAC Connector or compatible		For power connection
X26	ATX/Reset/2LED Interface	2.54mm 8 pos. male header	ATX/Reset/2LED connector (PN 96070-0000-00-0)	For power and reset button
X27	Ethernet Connector	Standard RJ45 plug		For Ethernet connection

24.4 Pin-out Table

Pin	COM A X16	LPT X17	Floppy X15	Primary IDE X4	Compact Flash X11	ATX/Reset/ 2LED X26	CRT X3
1	DCD1	/STB	VCC *	/HDRST	GND	HDLED- *	RED
2	SIN1	/AFD	/IDX	GND	D3	LILED- **	GRN
3	SOUT1	PD0	VCC *	PIDE_D7	D4	HDLED+	BLU
4	DTR1	/ERR	/DR0	PIDE_D8	D5	LILED+	NC
5	GND	PD1	VCC *	PIDE_D6	D6	/RESIN	GND
6	DSR1	/INIT	/DSKCHG	PIDE_D9	D7	GND	GND
7	RTS1	PD2	NC	PIDE_D5	/CS1	+5V_ALWS	GND
8	CTS1	/SLIN	NC	PIDE_D10	GND	PWRBTN	GND
9	RI1	PD3	NC	PIDE_D4	GND		NC
10		GND	/MTR0	PIDE_D11	GND		GND
11		PD4	NC	PIDE_D3	GND		NC
12		GND	/FDIR	PIDE_D12	GND		DDA
13		PD5	NC	PIDE_D2	VCC		HSYNC
14		GND	/STEP	PIDE_D13	GND		VSYNC
15		PD6	GND	PIDE_D1	GND		DCK
16		GND	/WDATA	PIDE_D14	GND		
17		PD7	GND	PIDE_D0	GND		
18		GND	/WGATE	PIDE_D15	SA2		
19		/ACK	GND	GND	SA1		
20		GND	/TRK0	NC	SA0		
21		/BUSY	GND	PIDE_DRQ	D0		
22		GND	/WRTPRT	GND	D1		
23		PE	GND	/PIDE_IOW	D2		
24		GND	/RDATA	GND	NC		
25		/SLCT	GND	/PIDE_IOR	GND		
26		VCC *	/HDSEL	GND	GND		
27				PIDE_RDY	D11		
28				PIDE_PD1	D12		
29				/PIDE_AK	D13		
30				GND	D14		
31				PIDE_IRQ	D15		
32				NC	/CS3		
33				PIDE_A1	GND		
34				PIDE_ATAD	/IOR		
35				PIDE_A0	/IOW		
36				PIDE_A2	VCC		
37				/PIDE_CS1	IRQ		
38				/PIDE_CS3	VCC		
39				PIDE_ACT	GND		
40				GND	NC		
41					/RESET		
42					IOCHRDY		
43					NC		
44					VCC		
45					SIDE_ACT		
46					NC		
47					D8		
48					D9		
49					D10		
50					GND		

Pin	Ethernet X27	PS/2 Mouse Keyb X22	USB X13	Power ATX X24	Power AT X14	Fan X9
1	TXD+	KBDAT	USB0_5V *	V3.3S *	V5S *	Sense
2	TXD-	MSDAT	USB0-	V3.3S *	GND	VCC *
3	RXD+	KEYGND	USB0+	GND	GND	GND
4	NC **	KEYVCC *	USB_GND	V5S *	VCC12 *	
5	NC **	KBCLK	USB1_5V *	GND		
6	RXD-	MSCLK	USB1-	V5S *		
7	NC **		USB1+	GND		
8	NC **		USB_GND	ATXPWG		
9				V5SB		
10				VCC12 *		
11				V3.3S *		
12				V-12		
13				GND		
14				PSON		
15				GND		
16				GND		
17				GND		
18				V-5		
19				V5S *		
20				V5S *		

Notes: (*) To protect the external power lines of peripheral devices, make sure that:
-- the 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.
(**) Do not connect anything to these signals.

25. APPENDIX F: PC ARCHITECTURE INFORMATION

The following sources of information can help you better understand PC architecture.

25.1 *Buses*

25.1.1. JFLEX

- JFLEX Specification Version 1.3 May 2004

25.1.2. 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

25.1.3. 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. You can search for information about the SIG on the Web.
- 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.

25.2 General PC Architecture

- Embedded PCs, Markt&Technik GmbH, ISBN 3-8272-5314-4 (German)
- 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, John P. Choisser and John O. Foster, Annabooks, 1997, ISBN 0-929392-36-1

25.3 Ports

25.3.1. RS-232 Serial

- EIA-232-E standard
  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. You can search for information about the standard on the Web.
- RS-232 Made Easy: Connecting Computers, Printers, Terminals, and Modems, Martin D. Seyer, Prentice Hall, 1991, ISBN 0-13-749854-3
- National Semiconductor
  The Interface Data Book includes application notes. Type “232” as a search criteria to obtain a list of application notes. You can search for information about the data book on National Semiconductor’s Web site.

25.3.2. ATA

AT Attachment (ATA) Working Group
This 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. You can search for information about the working group on the Web.
We recommend you also search the Web for information on *4.2 I/O cable*, if you use hard disks in a DMA3 or PIO4 mode.

25.3.3. 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. You can search for information about the standard on the Web.

25.4 *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

26. APPENDIX G: DOCUMENT REVISION HISTORY

Version	Date	Edited by	Changes
BQP3M101	10.09.2002	WKA	Created preliminary manual. Changes without notice.
BQP3M110	18.10.2002	WKA	first public release
BQP3M111	21.10.2002	WKA	Added some APM restrictions
BQCPM112	29.12.2005	BHO	Brought to Kontron style, reworked whole document, added lots of missing information
BQP3M113	24.12.2006	BHO	Added 3.3V current limitation for the AT-versions