

➤ JReX-PM



➤ User's Guide

Document Revision 1.3

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1. User Information

1.1 About This Manual

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

Kontron Embedded Modules is certified to ISO 9000 standards.

1.5 Warranty

This Kontron Embedded Modules product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron Embedded Modules will at its discretion decide to repair or replace defective products.

Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed.

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 contact your local representative or consult our Web site for the latest product documentation, utilities, and drivers. If the information does not help to solve the problem, contact us by telephone or email.

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2. Introduction

2.1 JRex-PM

The JRex-PM hosts an Intel® Pentium® M processor in combination with an Intel® 855GM/GME chipset with an integrated graphic memory controller hub. Celeron M versions of this board are possible, too. A DDR-SDRAM-DIMM socket for up to 1 GB allows you to use standard DDR DIMM memory modules. Two USB 2.0 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-PM is 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.

JRex-PM online: <http://emea.kontron.com/index.php?id=226&cat=58&productid=241>

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 (JUMPtéc® 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 JUMPtéc 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-PM 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® Processor 800MHz, cacheless
 - Intel® Pentium®-M 745, 1.8GHz
 - Intel® Celeron®-M 373, 1.0GHz ULV
 - Intel® Celeron®-M 370 socket, 1.5GHz
- Chipset
 - Intel® 855GM/GME Chipset graphics memory controller hub
- Power Supply
 - Full ATX power supply support
 - +5V-only AT power supply support as an option
- Super I/O
 - Winbond W83627HF
- Cache
 - On-die second level cache between 0KB and 2MB depending on used CPU
- Memory
 - One 184-pin DIMM 2.5V unbuffered DDR SDRAM, up to 1 GB
- Two Serial Ports (COM A and COM B)
 - One RS232C serial port (COM A)
 - One TTL serial port (COM B)
 - 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 IDE port (up to two devices)
- Compact Flash Socket
- System Monitor Controller for Temperature and Fan

- Universal Serial Bus (USB)
 - 2 USB 2.0 ports
 - USB legacy keyboard support
 - USB-boot support
- Ethernet
 - Integrated Intel® 82562 10/100BASE-T LAN
 - Follows the common criteria of the embedded technology market segment
- Onboard Video Graphics Array (VGA)
 - Intel® 855GM/GME Chipset graphics memory controller hub with Intel® Extreme Graphics 2 technology
 - CRT (Cathode Ray Tube) and LCD flat panel LVDS interface (JILI)
- Audio
 - Integrated in Intel® SoundBlaster™ AC97
 - Windows Sound System™ compatible
 - Feature can only be used with additional JFLEX extension module
- Phoenix BIOS, 1024KB 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 280g (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-PM 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 512MB DDR SDRAM module. The attached hard disk was not supplied through the measurement path and there was no JFLEX™ extension module in the system.

- JRex-PM 800MHz cacheless

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	1.83A	0.19A	2.35A
DOS Standby	1.20A	0.19A	1.66A
Windows Idle	1.27A	0.19A	1.79A
Windows CPU Stress	1.87A	0.19A	2.43A
Windows 3D Performance	2.93A	0.19A	3.42A

- JRex-PM 1.0GHz (Celeron-M® 373)

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	2.03A	0.18A	2.44A
DOS Standby	1.25A	0.18A	1.69A
Windows Idle	1.22A	0.18A	1.78A
Windows CPU Stress	2.26A	0.18A	2.86A
Windows 3D Performance	3.11A	0.18A	3.61A

➤ JRex-PM 1.5GHz (Celeron-M® 370 Socket)

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	3.96A	0.22A	Not available
DOS Standby	2.67A	0.22A	Not available
Windows Idle	2.73A	0.22A	Not available
Windows CPU Stress	5.69A	0.22A	Not available
Windows 3D Performance	5.81A	0.22A	Not available

➤ JRex-PM 1.8GHz (Pentium-M® 745)

Operation State	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
DOS Prompt	3.93A	0.19A	4.49A
DOS Standby	2.43A	0.19A	2.74A
Windows Idle	2.39A	0.19A	2.59A
Windows CPU Stress	6.14A	0.19A	7.12A
Windows 3D Performance	5.91A	0.19A	6.89A


4.3.4 Supply Current (maximum)

Board	ATX Power Supply		AT Power Supply
	+5V	+3.3V	+5V only
JRex-PM 800, cacheless	3.86A	0.89A	4.98A
JRex-PM 1.0GHz, 373	4.08A	0.89A	5.23A
JRex-PM 1.5GHz, 370	7.36A	0.89A	Not available
JRex-PM 1.8GHz, 745	7.77A	0.89A	9.25A

➤ (calculated theoretical values from 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

	<p>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.</p> <p>Deutsch: VORSICHT ! Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.</p> <p>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.</p> <p>Danish: ADVARSEL ! Lithiumbatteri – Eksplosionsfare ved fejlagtig Håndtering. Udskiftning må kun skemed batteri af samme fabrikant og type. Lever det brugte batteri tilbage til leverandØren.</p> <p>Finnish: VAROITUS ! Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelman tyypin. Havita käytetty paristo valmistajan ohjeiden mukaisesti.</p> <p>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.</p> <p>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).</p>
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4.4 MTBF

The following Mean Time Between Failure (MTBF) values were calculated using a combination of manufacturer's test data and a Bellcore calculation for the remaining parts. The Bellcore calculation used is "Method 1 Case 1." In that particular method, 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. The manufacturer's data, when used, is specified at 50° C, which means that the following results are slightly conservative. The MTBF values shown below are for a 40° C office or telecommunications environment. Higher temperatures and other environmental stresses such as extreme altitude, vibration, or salt-water exposure can lower MTBF values.

➤ System MTBF (hours): 171.636

Notes:	Fans shipped with Kontron Embedded Modules GmbH products have a typical operating life of 50,000 hours. The system MTBF above assumes no fan, but a passive heat-sink arrangement. Estimated RTC battery life (as opposed to battery failures) is not accounted for in the above figures and needs to be considered separately. Battery life depends on temperature and operating conditions. When the Kontron unit has external power, the only battery drain is from leakage paths.
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4.5 Environmental Specifications

4.5.1 Temperature

The Intel® Mobile Pentium®-M is specified for proper operation when junction temperature is within the specified range of 0°C to 100°C.

The Intel® 855GM/GME Chipset temperature and the Intel® ICH4 I/O Controller Hub 4 (82801DB) case temperature are maximum 110°C.

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

Notes:	(*) 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.
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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

The JRex-PM is available with an Intel® Mobile Pentium®-M or Celeron®-M central processing unit (CPU) of up to 1.8GHz. Celeron®-M versions don't have full cache size and no SpeedStep® technology.

Intel® Mobile Pentium®-M CPU features include:

- Supports Intel® Architecture with Dynamic Execution
- High performance, low-power core
- On-die, primary 32-kbyte instruction cache and 32-kbyte write-back data cache
- Up to 2MB on-die second level cache with Advanced Transfer Cache Architecture
- Advanced Branch Prediction and Data Prefetch Logic
- Streaming SIMD Extensions 2 (SSE2)
- 400-MHz, Source-Synchronous processor system bus
- Advanced Power Management features, including Enhanced Intel SpeedStep® technology (only for Pentium® M processors)

5.2 Chipset

The chipset of the JRex-PM consists of the Intel® 855GM/GME chipset GMCH (Graphics and Memory Controller Hub) and the Intel® 82801DB ICH-4 (I/O Controller Hub 4).

5.2.1 GMCH (855GM/GME Chipset)

- Processor/Host Bus Support
 - Intel® Pentium® M and Celeron® M processors
 - Supports system bus at 400MHz
 - Supports Enhanced Intel® SpeedStep® technology
- Memory System
 - Directly supports one DDR SDRAM channel, 64-bits wide
 - Supports 200/266-MHz DDR SDRAM devices with double-sided SO-DIMMs (four rows populated) with unbuffered PC1600/PC2100 DDR SDRAM.
 - Supports 128-Mbit, 256-Mbit, and 512-Mbit technologies providing maximum capacity of 1 GB with x16 devices
 - All supported devices have four banks
- Internal Graphics Features
 - Up to 32MB of dynamic video memory allocation
 - Display image rotation
 - Graphics core frequency
 - Display core frequency at 133MHz or 200MHz
 - Render core frequency at 100MHz,133MHz, 200MHz
 - 2D graphics engine
 - 3D graphics engine
 - Single- or dual-channel LVDS panel support up to UXGA panel resolution with frequency range from 25MHz to 112MHz (single channel/dual channel)
- Video Stream Decoder
 - Improved hardware motion compensation for MPEG2
 - Software DVD at 60 Fields/second and 30 frames/second full screen
 - Support for standard definition DVD (i.e. NTSC pixel resolution of 720x480, etc.) quality encoding at low CPU utilization
- Power Management
 - APM 1.2 compliant power management
 - ACPI 1.0b, 2.0 support
 - Enhanced Intel® SpeedStep Technology support

5.2.2 ICH4 (82801DB)

- PCI 2.2 Bus interface at 33MHz
- Integrated LAN controller
 - WfM 2.0 and IEEE802.3 compliant with 10/100 Mbit/s Ethernet support
- USB
 - Two UHCI USB 1.1 or one EHCI high speed USB 2.0 host controller(s)
 - Supporting up to 4 ports (2 available on JRex CPU board, 2 by JFLEX™ extension)
- AC-Link for AC'97 support (only usable with JFLEX™ extension)
- Integrated IDE controller
 - Ultra ATA/100/66/33 and PIO mode support
 - Two channels for up to 3 devices with independent timing
 - Support of "Native Mode" register and interrupts
- Interrupt Controller
 - Two cascade 83C59 with 15 interrupts
 - Integrated I/O APIC capability with 24 interrupts
- Enhanced DMA
 - Two cascaded 8237 controllers
 - Supports PC/PCI DMA and LPC DMA
 - Supports DMA collection buffers
- Timers based on 82C54
- Power Management Logic
 - ACPI 2.0 compliant
 - Supports PCI PME#
- Low Pin Count (LPC) Interface
- SM Bus 2.0 interface (System Management Bus)

5.3 Super I/O

The super I/O device is a Winbond W83627HF that is connected to the LPC (Low Pin Count) Bus. This device provides the following additional features:

- Two serial ports (one RS232 available on JRex CPU board, one port available with JFLEX™ extension or as onboard TTL interface)
- One Multi-Mode Parallel Port
- Floppy Disk Controller
- PS/2-Keyboard Controller and PS/2-Mouse Interface
- IrDA Interface (only available through JFLEX™ extension)

5.4 CPU, Chipset and Super-I/O Configuration

See the "[Advanced Menu](#)" section and its submenus of the "[Appendix B: BIOS Operation](#)" chapter for information on possible settings.

6. System Memory

The JRex-PM uses standard 184 pin DDR-SDRAM memory modules. One socket X1 is available for 2.5V (power level), unbuffered double data rate synchronous dynamic random access memory (DDR-SDRAM) of up to 1024MB following Intel's DDR266/PC2100 Specification.

The supported devices on the DDR-SDRAM module must be 128-Mbit, 256-Mbit or 512-Mbit technologies chips. All modules validated by Intel with the 845 chipset and minimum DDR266 speed are electrical ready with the 855 chipset (A similar memory interface is used on the two chipsets.)

Notes:

Some older modules and modules out of specification are designed for 2.7V (power level). These modules may not work well at the JRex-PM.

The total amount of memory available on the DDR-SDRAM module is used for main memory and graphics memory on the JRex-PM. Unified Memory Architecture (UMA) 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.

6.1 Configuration

There are lots of settings available for timing and memory usage in the BIOS setup utility. See the "[Advanced Chipset Control Submenu](#)" and the "[Memory Cache Submenu](#)" section of the "[Appendix B: BIOS Operation](#)" chapter for details on the memory configuration settings.

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-PM provides:

- Second COM Port (with TTL level signals)
- 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
- Digital video out ports (DVOB and DVOC) for additional TV-Out Encoders, TMDS and LVDS transmitters

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 or click the following link:

["http://emea.kontron.com/index.php?id=82&cat=191"](http://emea.kontron.com/index.php?id=82&cat=191).

The JFLEX™ extension specification with design guidelines is available from the Kontron web site, too. If you have more ideas for more functionality, please inform Kontron via your sales channel. 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. The link to the JFLEX™ specification is:

<http://emea.kontron.com/index.php?id=780&cat=58&productid=241#d6-0>

WARNING

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 X12 (6 pins). To find the location of the keyboard and mouse connector, please see the "[Appendix E: Connector Layout](#)" chapter.

A PS/2-Keyboard can be directly connected to this interface. If you intend to use a PS/2-Mouse, too, connect a Y-cable to this interface. There are many different Y-cables that look similar to the following picture available on the market:



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 JRexes 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.

8.2 Configuration

Refer to the "[Keyboard Features Submenu](#)" and the "[Miscellaneous Submenu](#)" in the "[Appendix B: BIOS Operation](#)" chapter for information on configuration.


9. USB Interfaces

The JRex-PM offers 4 USB ports. These ports are driven by either two UHCI USB 1.1 or one EHCI USB 2.0 controller(s). Two of the 4 USB ports are available on the JRex-PM, 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 X7 (8 pins). To find the location of USB connectors, please see the "[Appendix E: Connector Layout](#)" chapter.

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:	<p>(*) To protect the external power lines of peripheral devices, make sure that:</p> <ul style="list-style-type: none"> -- 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. <p>The USB power lines are protected with a resettable fuse and are limited to 500mA.</p>
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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.

For high-speed USB 2.0 support of all 4 available ports on the USB, EHCI Host Controller can be enabled.

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 Intel®.

Notes:	<ol style="list-style-type: none">1. Some operating systems without USB 2.0 support do not work well with EHCI controller enabled. If you install such an OS on the JRex-PM, disable the EHCI controller in the Setup Utility before installation.2. For information on operating systems not listed on our Web site, contact your OS supplier for an USB 2.0 driver. Kontron is not allowed by law to ship USB 2.0 drivers.
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10. Ethernet Interface

10.1 Ethernet Controller

The JRex-PM uses the ICH4's integrated 32bit PCI LAN controller in combination with the Intel® 82562 platform LAN connect device. The network subsystem supports a 10/100Base-T interface. The device auto-negotiates the use of a 10Mbit/sec or 100Mbit/sec connection.

All major network-operating systems and several real-time and embedded operating systems support the interface.

The Intel® 82562 features are:

- IEEE 802.3 10Base-T/100Base-TX compliant physical layer interface
- IEEE 802.3u Auto-Negotiation support
- IEEE 802.3x Full Duplex Flow Control standard
- Digital Adaptive Equalization control
- Link status interrupt capability
- 10Base-T auto-polarity correction
- Platform LAN connect interface support
- Diagnostic loopback mode
- 1:1 transmit transformer ratio support
- Low power (less than 300mW in active transmit mode)
- Reduced power in "unplugged mode"

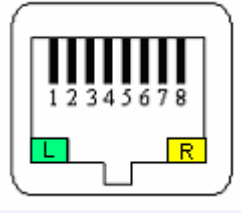
Notes:

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 (X8) with integrated LEDs for link and activity. To find the location of the Ethernet connector, please see the "[Appendix E: Connector Layout](#)" chapter.

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	Activity	Green	
R	Right LED	Link	Yellow	

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

10.3 Configuration

The onboard LAN controller can be enabled or disabled in the BIOS Setup Utility. Additionally it is possible to 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 "[I/O Device Configuration Submenu](#)" and the "[Boot Menu and Utilities](#)" 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 Intel® LAN 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 Intel®.

11. Graphic Interfaces

11.1 Video Controller

The JRex-PM uses the graphics accelerator integrated in the Intel® 855GM/GME chipset, which delivers high-performance 2D, 3D and video capabilities. With its interface to UMA (Unified Memory Architecture) up to 32MB of system memory are used as video memory.

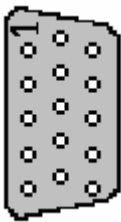
The controller can drive four interfaces with its two graphic engines on the JRex-PM:

- Cathode Ray Tube (CRT) interface
- Low Voltage Differential Signaling (LVDS) interface
- 2 Digital Video Output (DVO) ports

11.2 CRT Connector

The CRT (Cathode Ray Tube) interface is available through the standard DSUB15 connector X4. To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter.

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	VSYSN	Vertical Sync
	15	DCK	DDC Data Clock Line

11.3 Flat Panel LVDS Interface (JILI) Connector

The interface for the LCD Panel is available through the X3 connector (40 pins) on the bottom side of the board. This connector represents the JILI interface (JUMPtEC Intelligent LVDS Interface). 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 this interface, 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-PM 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-PM 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-PM.
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 Intel®.

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
101h	Graphics	640x480	256
103h	Graphics	800x600	256
105h	Graphics	1024x768	256
107h	Graphics	1280x1024	256
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
13Ah	Graphics	1600x1200	256
13Ch	Graphics	1920x1440	256
14Bh	Graphics	1600x1200	64K
14Dh	Graphics	1920x1440	64K
15Ah	Graphics	1600x1200	16M
15Ch	Graphics	1920x1440	16M

12. Serial-Communication Interfaces

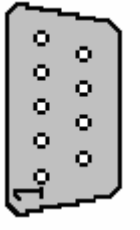
12.1 Serial Ports COMA and COMB

Two fully functional serial ports (COMA and COMB) provide asynchronous serial communications. One serial port is available as RS232 on the JRex-PM front panel, the second serial port offers TTL level signals on the CPU board or is available on the JFLEX™ extension module. The onboard serial port supports RS-232 operation modes and is compatible with the serial-port implementation used on the IBM Serial Adapter. The TTL signals of the second serial port are available on an internal connector on the CPU board or on the JFLEX™ connector and also can be used for IrDA connectivity. The ports are 16550 high-speed UART compatible and support 16-byte FIFO buffers for transfer rates up to 115.2Kbaud.

12.2 Onboard RS-232 Connector

COM A is available through the DSUB9 connector X10. To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter.

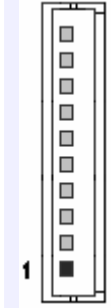
The following table shows the pin-out.

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

12.3 Onboard TTL Level Connector

COM B is available through the X15 connector (10 pins) and offers TTL level signals. This interface is not available on boards before layout BQBAL118 and revision CE?10. To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter. For adapter cable information see the "[Connector Functions and Interface Cables](#)" section in this manual.

The following table shows the pin-out.

Header	Pin	Signal Name	Function	In / Out
	1	RSLD	Data Carrier Detect	In
	2	DSR	Data Set Ready	In
	3	RX	Receive Data	Out
	4	RTS	Request to Send	Out
	5	TX	Transmit Data	--
	6	CTS	Clear to Send	In
	7	DTR	Data Terminal Ready	Out
	8	RI	Ring Indicator	In
	9	GND	Signal Ground	In
	10	VCC (*)	+5V	

Notes:	<p>(*) To protect the external power lines of peripheral devices, make sure that:</p> <ul style="list-style-type: none"> -- 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.
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WARNING	<p>When using a JFLEX extension board with serial port feature, this connector can not be used in parallel, because the TTL signals are routed to the JFLEX bus to drive the serial port on the extension module.</p>
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12.4 Configuration

You can set the serial input/output interfaces 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-PM incorporates 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 X11 connector (26 pins). To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter.

To have the signals available on a standard, parallel-interface connector DSUB-25, an adapter cable is required. For adapter cable information see the section "[Connector Functions and Interface Cables](#)".

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.

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-PM. The controller supports:

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

The controller also supports IDE legacy and IDE native mode configuration. The JRex-PM features 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 X5 (40 pins). To find the location of this interface, please see the “[Appendix E: Connector Layout](#)” chapter.

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

14.2 CompactFlash Socket

The CompactFlash socket X6 (50 pins) for commercial CompactFlashes (Type I) is integrated on the bottom side of the JRex-PM 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 “[Boot Menu and Utilities](#)” sections in the “[Appendix B: BIOS Operation](#)” chapter for additional information on configuration.

Notes:	<ol style="list-style-type: none"> 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.
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15. Floppy Interface

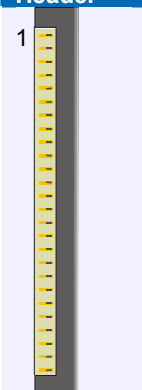
The floppy-drive interface of the JRex-PM uses a 2.88MB super I/O floppy-disk controller and can support one floppy disk drive with densities that range from 360kB to 2.88MB.

15.1 Connector

The floppy disk interface is available on the flat-foil connector X9 (26 pins). This type of connector is often internally used in notebooks to connect a slim-line floppy drive. To find the location of this interface, please see the “[Appendix E: Connector Layout](#)” chapter.

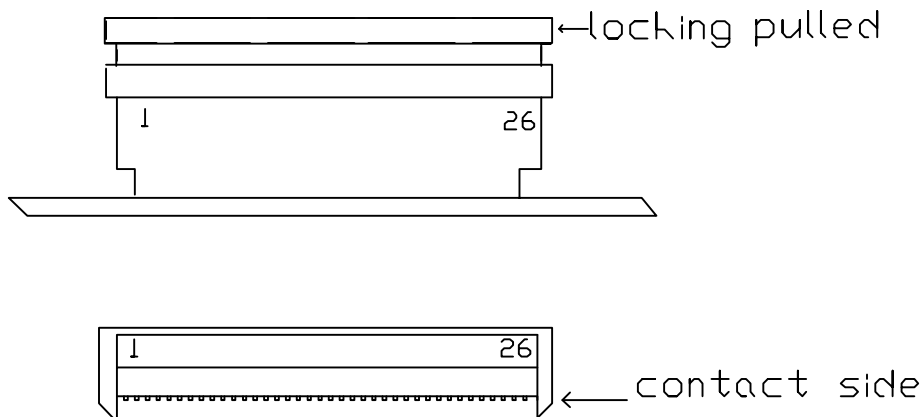
For adapter cable information see the “[Connector Functions and Interface Cables](#)” section in this manual.

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

Notes:	(*) To protect the external power lines of peripheral devices, make sure that: <ul style="list-style-type: none"> -- 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.
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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](#)", the "[Miscellaneous Submenu](#)" and the "[Boot Menu and Utilities](#)" section of the [Appendix B: BIOS Operation](#)" for more information on configuring the floppy drive.

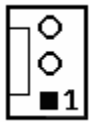
You also can disable the floppy-disk interface in the "[I/O Device Configuration Submenu](#)".

16. Fan Interface

The JRex-PM 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 J1 (3 pins). To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter.

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.

16.2 Configuration

For the purpose of fan control you can set the active trip point to a value from 40°C up to 100°C in the "[ACPI Control Submenu](#)" of the BIOS Setup Utility. The fan will automatically turn on whenever this trip point temperature value is reached. Setting this item to disabled means the fan will always run, except when the operating system takes control over it.

17. Power Interface

The JRex-PM is available with two different power interface connectors. It 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 X14 connector (20 pins). To find the location of this interface, please see the ["Appendix E: Connector Layout"](#) chapter. The JRex-PM requires +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-PM 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-PM, 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.

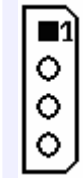
Header	Pin	Signal Name	Function	Pin	Signal Name	Function
	1	V3.3S *	+3.3V	11	V3.3S *	+3.3V
	2	V3.3S *	+3.3V	12	V-12	Not connected **
	3	GND	Ground	13	GND	Ground
	4	V5S *	+5V	14	PSON	Power On
	5	GND	Ground	15	GND	Ground
	6	V5S *	+5V	16	GND	Ground
	7	GND	Ground	17	GND	Ground
	8	ATXPWRGD	Powergood	18	V-5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

Notes:	<p>(*) To protect the external power lines of peripheral devices, make sure that:</p> <ul style="list-style-type: none"> -- 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. <p>The current on these pins is limited to 6A/pin.</p> <p>(**) These pins are -12V and -5V on the ATX power supply. On this board they are not required.</p>
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17.1.2 AT Connector Version

This power interface is an option to the ATX power interface and uses the connector X17 (4 pins). To find the location of this interface, please see the "[Appendix E: Connector Layout](#)" chapter. In this case the JRex-PM requires +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. 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:	<p>(*) To protect the external power lines of peripheral devices, make sure that:</p> <ul style="list-style-type: none"> -- 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. <p>The current of the pins on this connector is limited to 13A/pin.</p>
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17.1.3 Configuration

The JRex-PM is equipped with a power-management system that supports APM 1.2 and ACPI 2.0 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.

Additional information is available in the "[Important Technology Information](#)" chapter.

17.2 ATX/Reset/2LED Interface

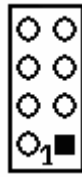
The ATX/Reset/2LED interface on the JRex-PM is an 8-pin female connector (X13) that offers four functions:

- Power Button
- Reset Button
- Hard Disk LED
- Power LED

To find the location of this interface, please see the “[Appendix E: Connector Layout](#)” chapter.

Kontron offers an accessory to have all four functions of the interface available. See the “[Connector Functions and Interface Cables](#)” section for ordering information.

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

Header	Pin	Signal Description	Function
	1	HDLED- *	Hard Disk LED
	2	PLED- **	Power LED
	3	HDLED+	Hard Disk LED (+5V)
	4	PLED+	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 PLED+ and the cathode to the PLED- line.

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 the onboard Winbond W83627HF controller of the JRex-PM 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 and the timeout (trigger period) from 1 second to 30 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 (Jumpteck 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 Winbond W83627HF controller 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. This controller is connected via the system management (SM) bus to the south bridge.

The following parameters are monitored:

- +3.3V from onboard DC/DC
- CPU core voltage
- +5V standby voltage
- Battery voltage
- CPU temperature with on-die diode
- 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 JUMPtec's Intelligent Device Architecture 32-bit 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. Important Technology Information

The following technological information is designed to give you a better understanding of some of the features offered by the JRex-PM. This information can be referenced when reading the Appendix A: System Resource Allocations and Appendix B: BIOS Operation sections that follow. There also are references to additional documentation that will help you develop a better understanding of the technical information. They are listed in the Appendix F: PC-Architecture Information.

20.1 Max CPU Frequency setting

Kontron Embedded Modules currently offers four variants of the JRex-PM. They are the 1800MHz Pentium® M 745 version, the 1000MHz Celeron®-M 373 version, the 1500MHz Celeron®-M 373 version and the 800MHz cacheless processor. These variants use a smart BIOS with the capability of identifying the CPU that the module is equipped with. Another feature of the BIOS is its ability to offer the user the option to set the maximum CPU frequency based on the Intel® SpeedStep® technology.

Notes:

Celeron® M processors do not support this feature.
The Max CPU Frequency setting option is only available since BIOS version BQBAR113.

The Max CPU frequency settings available for the modules are as follows:

- 1800MHz: 600, 800, 1000, 1200, 1400, 1600, 1800MHz (default since BQBAR114)

WARNING

Selecting frequencies higher than the default may cause the system to reach "Critical Trip Point" and shutdown if a proper cooling solution is not used. Always ensure that you use a proper cooling when selecting higher frequency settings.

Refer to the "[Power Menu](#)" section in the "[Appendix B: BIOS Operation](#)" chapter of this manual for more information.

20.2 Thermal Monitor and Catastrophic Thermal Protection

20.2.1 Thermal Monitor

The Thermal Monitor within the Pentium M processor helps to control the processor temperature by activating the TCC (Thermal Control Circuit) when the processor silicon reaches its maximum operating temperature. The temperature at which the Intel Thermal Monitor activates the TCC is not user-configurable and is not software visible.

The Thermal Monitor controls the processor temperature by modulating (starting and stopping) the CPU core clocks at a 50% duty cycle (TM1) or by initiating an Enhanced Intel SpeedStep® technology transition (TM2*) when the processor silicon reaches its maximum operating temperature. The mode is selectable in the BIOS Setup Utility.

- Maximum operating temperature activating TCC: 100°C

Notes:	(*) TM2 is the recommended mode for the Intel Pentium M processor. TM2 is not supported on boards with Celeron® M processor.
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Thermal Monitor supports two modes to activate the TCC: Automatic and On-Demand mode. The Intel Thermal Monitor Automatic Mode must be enabled via BIOS for the processor to be operating within specification. Automatic mode does not require any additional hardware, software drivers, or interrupt handling routines.

20.2.2 Catastrophic Thermal Protection

The Intel Pentium M processor supports the THERMTRIP# signal for catastrophic thermal protection.

In the event of a catastrophic cooling failure, the processor will automatically shut down when the silicon has reached the absolute maximum temperature. At this point the system BUS signal THERMTRIP# will go active. THERMTRIP# activation is independent of processor activity and does not generate any bus cycles. The system will immediately shut down.

- Absolute maximum temperature activating THERMTRIP#: 125°C

For more details, see Chapter 5.1.2 of the Intel Pentium M Processor Datasheet.

20.3 Processor Performance Control

The Pentium M processor can run in different performance states (multiple frequency/voltage operating points). The CPU performance can be altered while the computer is functioning. This allows the processor to run at different core frequencies and voltages depending on CPU thermal state and OS policy.

Microsoft Windows XP includes built-in processor performance control to operate the processor more efficiently when it is not fully utilized. Win2k, WinME and Win9x do not support processor performance control. Special software is required for OSes that are not capable of processor performance control.

In Windows, the processor performance control policy is linked to the Power Scheme setting in the control panel power option applet.

Notes:	Windows always runs at the highest performance state when the "Home/Office" or the "Always On" power scheme is selected. For more detailed information about processor performance control, see: <ul style="list-style-type: none">- Chapter 8 of the ACPI Specification Revision 2.0c- Windows platform design notes
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20.4 Thermal Management

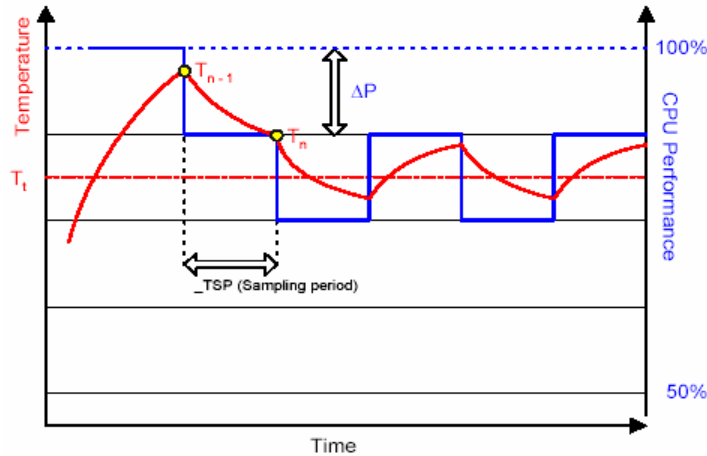
ACPI allows the OS to play a role in the thermal management of the system. With the OS in control of the operating environment, cooling decisions can be made based on the application load on the CPU and the thermal heuristics of the system.

The ACPI thermal solution on JRex-PM supports three cooling policies and their trip points:

- Active Trip Point
 - Active cooling devices typically consume power and produce noise but are able to cool a thermal zone without limiting system performance. The active cooling trip point declares the temperature threshold OS uses to start/stop active cooling devices (fan).
- Passive Cooling Trip Point
 - Passive cooling devices produce no noise, but may not be effective enough to cool the thermal zone. The passive cooling trip point declares the temperature threshold in which the OS will start or stop passive cooling. In this case it throttles the processor.
- Critical Trip Point
 - The OS performs an orderly, but critical, shutdown of the system when the temperature reaches the critical trip point.

20.4.1 Processor Clock Throttling

The ACPI OS assesses the optimum CPU performance change necessary to lower the temperature using the following equation:



$$\Delta P[\%] = TC1(T_n - T_{n-1}) + TC2(T_n - T_t)$$

ΔP is the performance delta, T_t is the target temperature = critical trip point. The two coefficients $TC1$ and $TC2$ and the sampling period TSP are hardware dependent constants that you must supply. (See the setup options in the ACPI Control Submenu section in the BIOS Operation chapter).

It is up to you to set the cooling preference of the system by setting the appropriate trip points in the BIOS setup.

Notes:	For more detailed information see Chapter 12 of the ACPI Specification.
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20.5 I/O APIC vs 8259 PIC Interrupt mode

The I/O APIC (Advanced Programmable Interrupt Controller) handles interrupts differently than the 8259 PIC. Enable the I/O APIC mode in the BIOS Setup Utility, if your operating system supports it.

The following information explains these differences to the standard 8259 PIC mode:

- Method of interrupts transmission
 - The I/O APIC transmits interrupts through the system bus and interrupts are handled without the needs for the processor to run an interrupt acknowledge cycle.
- Interrupt priority
 - The priority of interrupts in the I/O APIC is independent of the interrupt number.
- More interrupts
 - The I/O APIC in the chipset of the JRex-PM supports a total of 24 interrupts.

Notes:

The APIC is not supported by all operating systems. Only Windows XP supports APIC. The APIC mode must be enabled in the BIOS setup before the OS installation. APIC only works in ACPI mode. For more detailed information about APIC, see Chapter 8 of the IA-32 Intel Architecture Software Developer's Manual, Volume 3.

20.6 Native vs. compatible IDE mode

20.6.1 Compatible IDE Mode

The ATA controller emulates a legacy IDE controller, which is a non-standard extension of the ISA-based IDE controller. In compatible mode, the controller requires two ISA IRQs (14 and 15) that cannot be shared with other devices.

20.6.2 Native Mode

The ATA controller acts as a true PCI device that does not require dedicated legacy resources and can be configured anywhere in the system. ATA controllers running in native mode use their PCI interrupt for both channels and can share this interrupt pin with other devices in the system, like any other PCI device.

By requiring only one shareable interrupt instead of two non-shareable ones, native-mode controllers significantly decrease the likelihood that a user will install a device that cannot work because no interrupts are available.

Enable Native IDE Support in the BIOS Setup Utility if your OS supports this mode.

Notes:

The Native Mode is not supported by all operating systems.
The Native mode must be enabled in the BIOS setup before the OS installation.
Native Mode only works in ACPI mode.
For more information see the Microsoft Windows platform design notes about Native-mode ATA.

20.6.3 Native Mode Configuration

Windows XP SP1 and Windows Server 2003 will switch a native-mode-capable ATA controller from compatible to native mode if the BIOS indicates that the controller can be switched, the controller supports native mode and the appropriate registry entry is set.

You must add a DWORD VALUE called EnableNativeModeATA under

```
HKEY_LOCAL_MACHINE/System/CurrentControlSet/Control/PnP/PCI/
```

and set 1 as the value.

21. Appendix A: System-Resource Allocation

21.1 Interrupt Request (IRQ) Lines

21.1.1 In 8259 PIC mode (I/O APIC mode is disabled)

IRQ #	Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	Yes	Note (4)
4	COM1	No	Note (1)
5		Yes	Note (2)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	SCI	Yes	Note (3)
10		Yes	
11		Yes	
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1)
15	CompactFlash IDE1	No	Note (1)

Notes:	<p>(1) If the „used for“-device is disabled in setup, the corresponding interrupt is available for other devices.</p> <p>(2) Possible setting for LPT1. IRQ7 is the default setting.</p> <p>(3) Available in default configuration. IRQ 9 is used as SCI, if ACPI is enabled.</p> <p>(4) Available in default configuration. Used when COM2 for JFLEX is enabled.</p>
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21.1.2 In I/O APIC mode

IRQ #	Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	Yes	Note (4)
4	COM1	No	Note (1)
5	-	Yes	Note (2)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	SCI	Yes	Note (3)
10		Yes	
11		Yes	
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1), Note (5)
15	CompactFlash IDE1	No	Note (1), Note (5)
16	PIRQ[A]	For PCI	
17	PIRQ[B]	For PCI	
18	PIRQ[C]	For PCI	
19	PIRQ[D]	For PCI	
20	PIRQ[E]	No	
21	PIRQ[F]	No	
22	PIRQ[G]	No	
23	PIRQ[H]	No	

Notes:	<p>(1) If the „used for“-device is disabled in setup, the corresponding interrupt is available for other devices.</p> <p>(2) Possible setting for LPT1. IRQ7 is the default setting.</p> <p>(3) Available in default configuration. IRQ 9 is used as SCI, if ACPI is enabled.</p> <p>(4) Available in default configuration. Used when COM2 for JFLEX is enabled.</p> <p>(5) Available if IDE controller is in Native Mode.</p>
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21.2 Direct Memory Access (DMA) Channels

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

Notes:	<p>(1) If the „used for“-device is disabled in setup, the corresponding DMA channel is available for other devices.</p> <p>(2) Possible setting for LPT1 if configured for ECP mode.</p> <p>(3) Possible setting for legacy audio device</p>
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21.3 Memory Map

The JRex-PM processor modules can support up to 1024MB of memory. The first 640KB of DDR-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 – CFFFFh	VGA BIOS, RPL/PXE ROM	No	
D0000h – 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, D8000h or DC000h. (BIOS extensions do not use the whole shadow block.).
E0000h – F0000h	System BIOS, USB legacy support	No	

21.3.1 Using Expanded Memory Managers

JRex-PM 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
```

Notes:

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 board.

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

21.4 I/O Address Map

The I/O-port addresses of the JRex-PM 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
0020 - 003D	Interrupt Controller 1	No	Fixed
0040 - 0053	Timer, Counter	No	Fixed
0060 - 0067	Keyboard controller	No	Fixed
0070 - 0077	Real Time Clock and CMOS Registers	No	Fixed
0080 - 008F	DMA Page Register	No	Fixed
0090 - 009F	DMA Control	No	Fixed
0092	Reset Generator	No	Fixed
00A0 - 00BF	Interrupt Controller 2	No	Fixed
00C0 - 00DF	DMA Controller 2	No	Fixed
00F0	Math. Coprocessor	No	Fixed
0100 - 010F	General Purpose I/O	No	Kontron Control Port, Fixed
0170 - 0177	Hard Disk Drive (Secondary)	No	Available if IDE port 2 is disabled or in native IDE mode
01F0 - 01F7	Hard Disk Drive (Primary)	No	Available if IDE port 1 is disabled or in native IDE mode
0274 - 0277	ISA PNP Data	No	Fixed
0278 - 027F	LPT	Yes	Possible address for LPT
02E8 - 02EF	COM4	Yes	Possible address for COM
02F8 - 02FF	COM2	Yes	Possible address for COM
0330 - 0331			
0376	IDE Controller	No	Available if IDE port 2 is disabled or in native IDE mode
0378 - 037F	LPT	No	Available if LPT is disabled
03BC - 03C3	LPT	Yes	Possible address for LPT
03B0 - 03DF	Graphic Subsystem	No	Fixed
03E8 - 03EF	COM3	Yes	Possible address for COM
03F6	IDE Controller	No	Available if IDE port 2 is disabled or in native IDE mode
03F0 - 03F7	Floppy Controller	No	Available if floppy controller is disabled
03F8 - 03FF	COM1	No	Available if COM is disabled
04D0 - 04D1	Interrupt Select	No	Fixed
0CF8 - 0CFF	PCI Configuration	No	Fixed
1000 - 107F	System Resources	No	Fixed
1180 - 11BF	System Resources	No	Fixed
1454	System Resources	No	Fixed
14D4	System Resources	No	Fixed
1500 - 157F	System Resources	No	Fixed
1800 - 1807	Graphic Subsystem	No	Fixed
1C00 - 1C1F	USB Host Controller 1	No	Fixed
2000 - 201F	USB Host Controller 2	No	Fixed
2400 - 240F	Ultra ATA Storage Controller	No	Fixed
2800 - 281F	SM-Bus Controller	No	Fixed
3000 - 303F	Ethernet Controller	No	Fixed

21.5 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	-	-	Separate Bus, integrated in Intel chipset
Ethernet (AD24)	INTE#	Discrete channel	
AC97 Sound	INTB#		Separate Bus, integrated in Intel chipset
1 st UHCI USB Controller	INTA#	-	Separate Bus, integrated in Intel chipset
2 nd UHCI USB Controller	INTD#	-	Separate Bus, integrated in Intel chipset
EHCI USB Controller	INTH#		Separate Bus, integrated in Intel chipset

21.6 SM Bus Devices

The JRex-PM 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-PM.

SM Bus Address	SM Device	Comment
10h/11h	SM-Bus Host	Integrated in Intel ICH4
A0h/A1h	SPD EEPROM	Part of the DDR SDRAM module
D2h/D3h	Clock Generator	

WARNING

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

22. Appendix B: BIOS Operation

The JRex-PM comes with Phoenix BIOS 4.0, Release 6.1, which is located in the onboard Flash EEPROM in compressed form. 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.

22.1 Determining the BIOS Version

To determine the BIOS version of the JRex-PM, 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 <BQBAR115>
Copyright 2002-2005 Kontron Embedded Modules GmbH
```

Whenever you contact technical support about BIOS issues, providing a BIOS version <BQBAR??> 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: GKA010002

CPU = Mobile Genuine Intel(R) processor 1600MHz
503M System RAM Passed
1024K 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-PM serial numbers always start with GK and are followed by up to seven characters and digits. The first three positions represent the lot number and the last three or four digits are the number of the board in that lot.

In the example above, the JRex-PM with the serial number GKA010002 is board number 2 from the lot A01.

22.2 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-PM. The BIOS setup utility for specific models can differ slightly.

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

22.2.1 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.

22.2.2 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. Changes you made for the single items keep the new configuration for all the internal BIOS session, but they are only saved to the CMOS and EEPROM, when the <F10> key is pressed, and the setup is finished.

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.

22.3 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.
▸ Compact Flash	Autodetected drive	Displays result of CF autotyping.
Smart Device Monitoring	Disabled Enabled	Turns on Self-Monitoring Analysis-Reporting Technology, which monitors the condition of the hard drive and reports when a catastrophic IDE failure is about to happen.
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:	<p>In the Option column, bold shows default settings.</p> <p>(*) Extended Memory = capacity of memory module – selected frame buffer memory size</p>
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22.3.1 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.

Notes:	<p>In the Option column, bold shows default settings.</p> <p>(*) 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.</p>
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22.4 Advanced Menu

Feature	Option	Description
▸ Advanced Chipset Control	Sub menu	Opens Advanced Chipset Control sub menu.
▸ PCI/PNP Configuration	Sub menu	Opens PCI/PNP Config sub menu.
▸ Memory Cache	Sub menu	Opens Cache Control sub menu.
▸ I/O Device Configuration	Sub menu	Opens Peripheral Config sub menu.
▸ Keyboard Features	Sub menu	Opens Keyboard Features sub menu.
▸ Hardware Monitor	Sub menu	Shows hardware monitor current state.
▸ Watchdog Settings	Sub menu	Opens Watchdog Config sub menu.
▸ Display Control	Sub menu	Opens Display Control sub menu
▸ Miscellaneous	Sub menu	Opens sub menu with miscellaneous options.

22.4.1 Advanced Chipset Control Submenu

Feature	Option	Description
Enable Memory gap	Disabled Enabled	Allows enabling a 1MB memory gap for add-on cards at 15MB
Graphics Engine 1	Disabled Enabled	Enable/Disable Internal Graphics Device.
Graphics Engine 2	Disabled Enabled	Enabled/Disabled Function 1 of the Internal Graphics Device
Graphics Memory	UMA = 1MB, 8MB , 16MB, 32MB	Select the amount of main memory that the Internal Graphics Device will use.

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

22.4.2 PCI/PNP Configuration Submenu

Feature	Option	Description
PNP OS installed	No Yes	If your system has a PnP OS (e.g. Win9x) select Yes to let the OS configure PnP devices not required for booting. No allows the BIOS to configure them.
Reset Configuration Data *	No Yes	Yes erases all configuration data in ESCD, which stores the configuration settings for plug-in devices. Select Yes when required to restore the manufacturer's defaults.
Secured Setup Configuration	Yes No	Yes prevents a Plug and Play OS from changing system settings.
▸ PCI Device, Slot #x	Sub menu	Opens sub menu to configure slot x PCI device
PCI IRQ line 1 PCI IRQ line 2 PCI IRQ line 3 PCI IRQ line 4 Onboard LAN IRQ line Onboard USB EHCI IRQ line	Disabled Auto Select IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQs for external PIC interrupts A/B/C/D and the onboard LAN and USB2.0 host controller. Select Auto to let the BIOS assign the IRQ.
▸ PCI/PNP ISA IRQ Resource Exclusion	Sub menu	Opens IRQ Exclusion sub menu.
Default Primary Video Adapter	AGP PCI	In a system with an AGP and a PCI video adapter end user can select the adapter which will be initialized by the BIOS.

Notes:	In the Option column, bold shows default settings. (*) Setting this option to “yes”, under certain circumstances, may help to recover from system boot failure or a resource conflict.
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22.4.3 PCI Device, Slot #x Submenu

Feature	Option	Description
Option ROM Scan	Disabled Enabled	Initialize device expansion ROM.
Enable Master	Disabled Enabled	Enables device in slot as a PCI bus master, not every device can function as a master. Check device documentation.
Latency Timer	Default. 20h. 40h. 60h. 80h. A0h. C0h. E0h	Minimum guaranteed time slice allocated for bus master in units of PCI bus clocks. A high-priority, high-throughput device may benefit from a greater value.

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

22.4.4 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:	<p>In the Option column, bold shows default settings.</p> <p>(*) IRQ9 is used for SCI in ACPI mode. Do not use IRQ9 for legacy ISA devices when ACPI enabled.</p> <p>(**) Entry is only visible when primary IDE or secondary IDE is disabled.</p>
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22.4.5 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 Base 0-512K	Uncached Write Through Write Protected Write Back	Controls caching of base memory up to 512KB.
Cache Base 512-640K	Uncached Write Through Write Protected Write Back	Controls caching of base memory above between 512 and 640KB.
Cache Extended Memory area	Uncached Write Through Write Protected Write Back	Controls caching of system memory above 1MB.
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.

Notes:	In the Option column, bold shows default settings.
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22.4.6 I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	Disabled Primary Secondary Both	Enables onboard PCI IDE device.
USB UHCI Host Controller 1	Enabled Disabled	Enable / Disable UHCI 1 Host Controller for USB ports 0 and 1 (JRex front).
USB UHCI Host Controller 2	Enabled Disabled	Enable / Disable UHCI 2 Host Controller for USB ports 2 and 3 (JFLEX Bus).
USB EHCI Host Controller *	Disabled Enabled	Controls USB 2.0 functionality.
Legacy USB Support **	Disabled Enabled	Enable support for USB keyboard and mice and boot from USB mass storage devices.
AC97 Audio Controller	Disabled Enabled	Enables the AC97 Audio device. This feature can only be used with a sound module on the JFLEX Bus.
Onboard LAN Controller	Disabled Enabled	Enables the ICH4 internal LAN controller.
Onboard LAN PXE ROM	Disabled Enabled	Enables the remote boot BIOS extension for the onboard LAN controller.
Floppy disk controller	Disabled Enabled	Enable / Disable the onboard FDC 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.
Serial port B	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 B is available on the JFLEX Bus.
Mode	Normal, IR	Set the mode for Serial Port B.
Base I/O address	3F8h, 2F8h, 3E8h, 2E8h	Select I/O base of port.
IRQ (port A and B)	IRQ 3, IRQ 4	Select IRQ of Port A and B
Onboard LPT	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	Output only Bi-directional EPP ECP	Set the mode for the parallel port.
Base I/O address	378h , 278h, 3BCh	Select I/O base of port.
IRQ	IRQ 5, IRQ 7	Select IRQ of parallel port.
DMA	DMA1, DMA3	Select DMA channel of port if in ECP mode.

Notes:

In the Option column, bold shows default settings.

- (*) The USB ports are multiplexed between UHCI and EHCI. Ports are routed to EHCI if an USB 2.0 high-speed device is connected and an EHCI driver is loaded.
- (**) 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.

22.4.7 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.

Notes:	In the Option column, bold shows default settings.
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22.4.8 Hardware Monitor Submenu

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

Voltage/Temperature/Fan	Explanation
VCC 3.3V Voltage	3.3V power plane
CPU Core Voltage	CPU core voltage
5Vsb Voltage	5V-Standby voltage
Battery Voltage	Battery voltage
CPU Temperature	CPU Temperature in °C and °F
CPU Fan Speed	CPU fan speed in rpm

22.4.9 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.

Notes:	In the Option column, bold shows default settings.
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22.4.10 Display Control Submenu

Feature	Option	Description
Display Mode	CRT only LFP only CRT+LFP	Select the display mode.
JDA Revision	x.x	Displays the revision of the JILI data area image.
Flat Panel Type	VGA * SVGA * XGA * XGA2 * SXGA * UXGA * Enter PAID Enter FPID Auto	Select Auto to let the BIOS automatically detect the panel type or use one of the predefined fixed panel types. Choose Enter PAID or Enter FPID to manually set JILI3 ID values.
PAID/FPID **	0 – FFFF, default 0	Enter the JILI3 ID.
Flat Panel Scaling	Centered Stretched	Stretched expands a low resolution video mode to full screen on a higher flat panel resolution.
Flat Panel Backlight ***	0 – 255, default 128	Enter a value to adjust backlight of the LCD.
Flat Panel Contrast ****	0 – 63, default 32	Enter a value to adjust contrast of the LCD.

Notes:	<p>In the Option column, bold shows default settings.</p> <p>(*) Standard timings for VGA to UXGA panels cannot drive all available displays of that type on the market. Use a JILI cable whenever possible.</p> <p>(**) Only visible if Enter PAID or Enter FPID is selected.</p> <p>(***) Only visible if the panel adapter is equipped with a MAX5362 DAC for backlight control.</p> <p>(****) Only visible if the panel adapter is equipped with a Xicore X9429 digital potentiometer for contrast control.</p>
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22.4.11 Miscellaneous Submenu

Feature	Option	Description
Floppy Check	Disabled Enabled	Enabled verifies floppy type on boot; disabled speeds boot.
Summary Screen	Disabled Enabled	If enabled, a summary screen is displayed just before booting the OS to let the end user see the system configuration.
QuickBoot Mode	Disabled Enabled	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Extended Memory Testing	Normal * Just zero it None	Determines which type of tests will be performed on memory above 1MB.
Dark Boot	Disabled Enabled	If enabled, system comes up with a blank screen instead of the diagnostic screen during bootup.
Halt On Errors	Yes No	Determines if post errors cause the system to halt.
PS/2 Mouse	Auto Detect Enabled Disabled	Selecting Disabled prevents any installed PS/2 mouse from functioning but frees up IRQ12. Selecting Autodetect frees IRQ12 if a mouse is not detected.
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 is one that has more than 1024 cylinders, more than 16 heads or more than 63 sectors per track.

Notes:	In the Option column, bold shows default settings. (*) The option "Normal" is not visible when QuickBoot Mode is enabled.
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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

22.5 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:	<p>In the Option column, bold shows default settings.</p> <p>(*) 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.</p>
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22.6 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.

22.6.1 ACPI Resume Events

The following events resume the system from S1:

- Power button
- PME#
- PS/2 keyboard and mouse
- USB keyboard and mouse activity
- USB resume event

Feature	Option	Description
Enable ACPI *	No Yes	Enables/Disables ACPI BIOS (Advanced Configuration and Power Interface). IRQ9 is used for SCI (System Control Interrupt).
▸ ACPI Control	sub menu	Opens the ACPI sub menu
Max.CPU Frequency **	1800MHz 1600MHz 1400MHz 1200MHz 1000MHz 800MHz 600MHz	Warning! Selecting frequencies higher than the default may cause the system to reach "critical trip point" and shut down if a proper cooling solution is not used. Always ensure that you use proper cooling when selecting higher frequency settings.
Automatic Thermal Monitor Control Circuit **	Disabled TM1 TM2 ***	Enables the thermal control circuit (TCC) of the thermal monitor feature of the Pentium-M CPU. TM1 = 50% duty cycle TM2 = Geyserville III Automatic TTC must be enabled to ensure that the processor operates within specification.
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 Modem Ring	Off On	Enabled wakes the system on incoming calls detected by mode (RI).
Resume on Time	Off On	Enabled wakes the system at a specific time.
Resume Time	00:00:00	Specifies the time when the system is to wake.
Power supply	ATX AT	Specifies whether an ATX or an AT power supply is used.
Power Button Function	Power Off Sleep	Determines if the system enters suspend or soft off when the power button is pressed.
Power Loss Control ****	Stay Off Power On Last State	Determines how the system behaves after a power failure. This only works in conjunction with a CMOS backup battery.

Notes:	<p>In the Option column, bold shows default settings.</p> <p>(*) Disable ACPI support whenever you are using an operating system without ACPI capability.</p> <p>(**) See the chapter "Important Technology Information" of this user's guide for more details about these features. Default was 1200MHz before BIOS version BQBAR114.</p> <p>(***) A JRex-PM with Celeron M processor does not support TM2.</p> <p>(****) Only available up to BIOS version BQBAR113.</p>
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22.6.2 ACPI Control Submenu

Feature	Option	Description
Active Trip Point *	Disabled 40 C – 100 C	Determines the temperature of the ACPI Active Trip Point, the point at which the OS will turn on/off the CPU fan.
Passive Trip Point *	Disabled 40 C – 100 C	Determines the temperature of the ACPI Passive Trip Point, the point at which the OS will turn on/off CPU clock throttling.
Critical Trip Point *	40 C – 110 C	This value controls the temperature of the ACPI Critical Trip Point- the point at which the OS will shut the system off.
APIC – IO APIC Mode *	Disabled Enabled	This item is valid only for Windows XP. Also, a fresh install of the OS must occur when APIC Mode is desired. Test the IO APIC by setting an item to Enabled. The APIC Table will then be pointed to by the RSDT, the Local APIC will be initialized, and the proper enable bits will be set in IHC4M. See section 14.1
Native IDE Support *	Disabled Enabled	Enable Native IDE support for WINXP by setting this item. The NATA Package will be created if this item is set to Enabled. Changing this item will have no effect in WIN98, WINME, or WIN2K. See section 13.2 for more details.

Notes:	<p>In the Option column, bold shows default settings. (*) See the chapter “Important Technology Information” of this user’s guide for more details about these features. The default for this item was disabled before BIOS BQBAR114.</p>
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22.7 Boot Menu and Utilities

MultiBoot is a boot utility integrated in the PhoenixBIOS 4.0. The JRex-PM provides the MultiBoot XP version with integrated Boot First function.

22.7.1 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
IDE CD	IDE compatible CD-ROM 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 BEV	Ethernet Controller on the PCI Bus with LAN Boot ROM
PCI SCSI	SCSI Controller on the PCI Bus with SCSI BIOS ROM

22.7.2 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.

22.8 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.

22.9 Kontron BIOS Extensions

Besides the Phoenix System BIOS, the JRex-PM 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.

22.9.1 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.

22.9.2 Remote Control Client Extension

You can remotely control the JRex-PM 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.

22.9.3 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-PM 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.

22.10 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-PM.

Use PhoenixPhlash to:

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

22.10.1 Flashing a BIOS

Use the following procedure to update or restore a BIOS.

1. Download the Phoenix Phlash compressed file, CRDxBQBA.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.
PHLASH16.EXE	Programs the flash ROM.
WINCRIS.EXE	Creates the Crisis Recovery Diskette from Windows.
WINCRIS.HLP	Serves as the help file of WINCRISSES.EXE.
CRISDISK.BAT	Batch file for crisis disk.
BIOS.WPH	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 CRDxBQBA.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.
PHLASH16.EXE	Programs the flash ROM.
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:

```
PHLASH16 <bios name>      (Example: PHLASH16 BQBAR113.WPH)
```

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 Phlash16.exe.

```
PHLASH16 /X <bios name>
```

22.10.2 Preventing Problems When Updating or Restoring BIOS

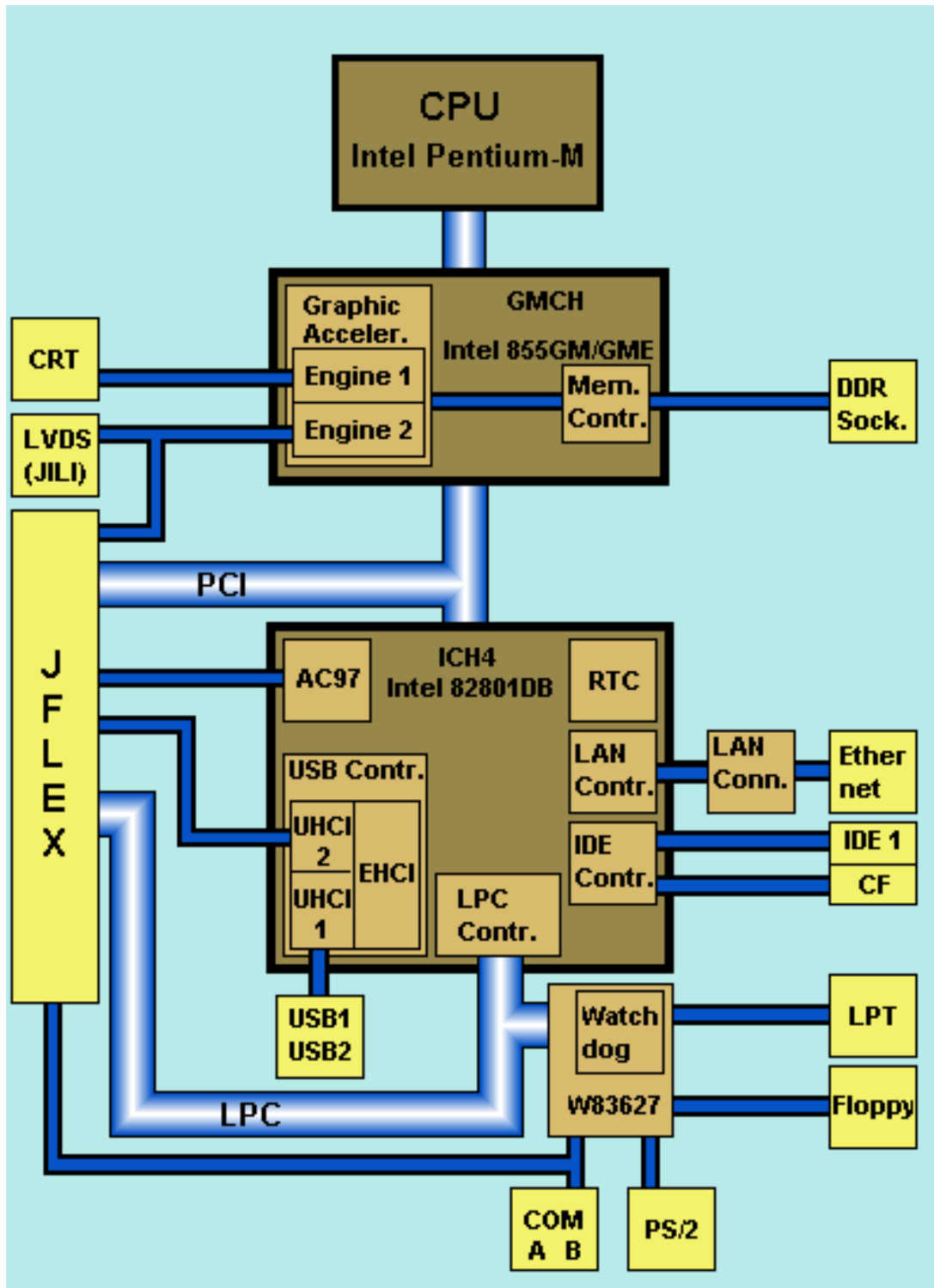
Updating the BIOS represents a potential hazard. Power failures or fluctuations can occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

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.

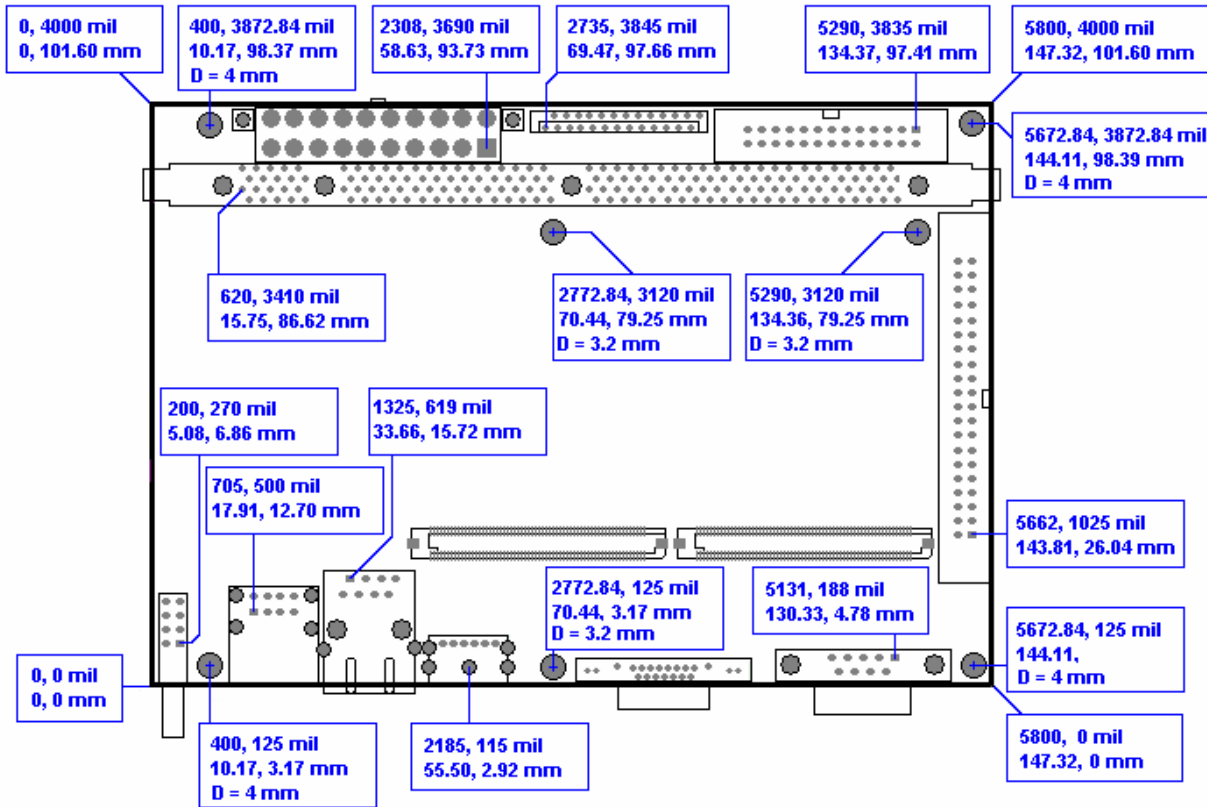
For further information on the update key and the crisis diskette, see the Application Note PHLASH_SCE???, which is available from the KONTRON Embedded Modules Web site. The three question marks stand for the revision number of the file.

23. Appendix C: Block Diagram

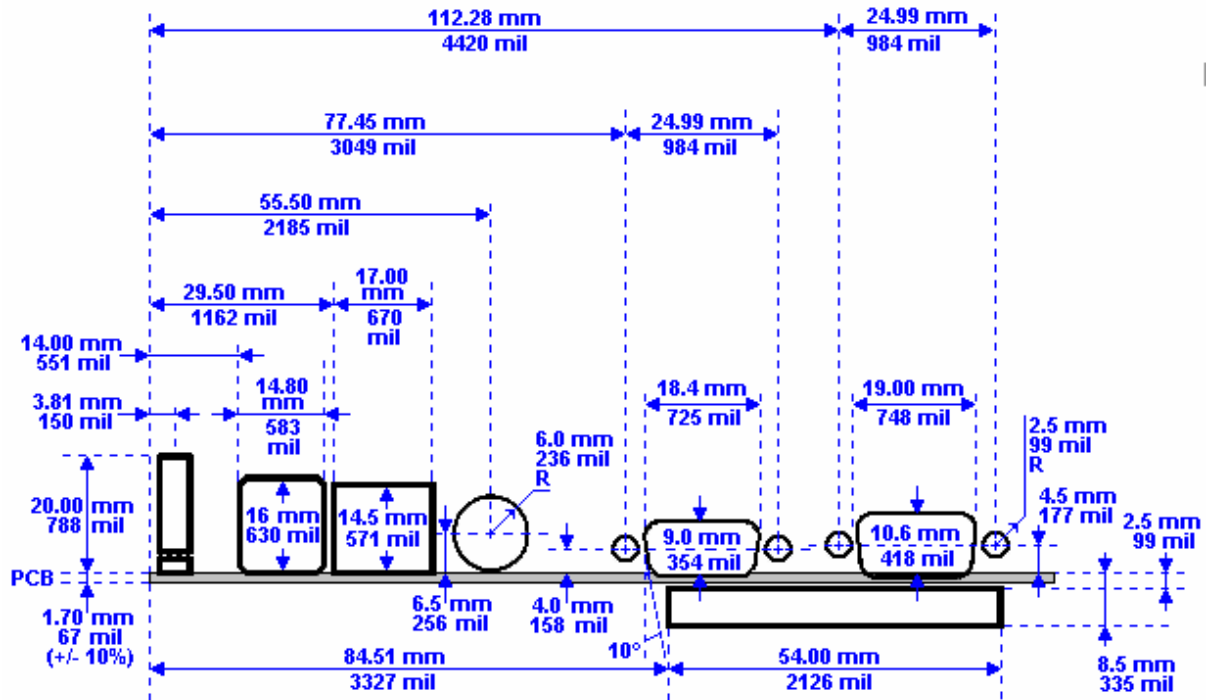


24. Appendix D: Mechanical Dimensions

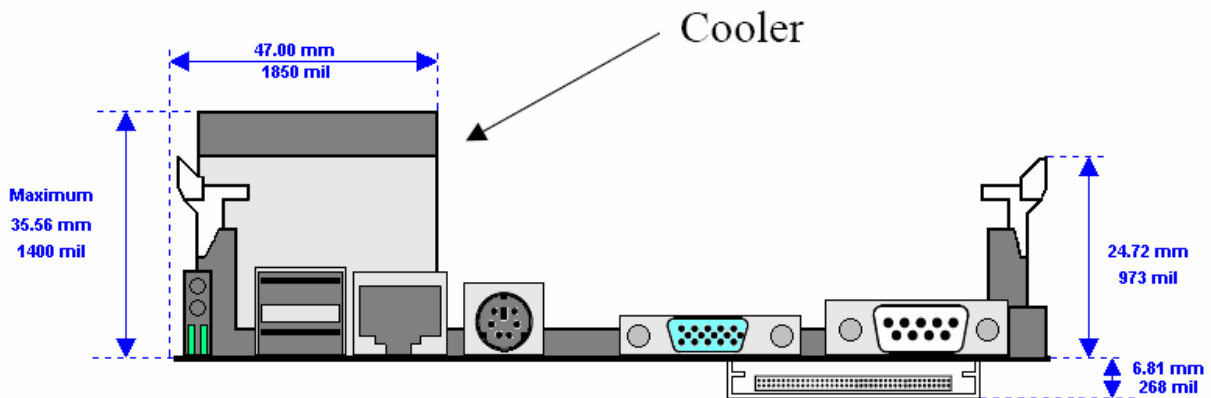
24.1 Top View



24.2 Front View Connectors

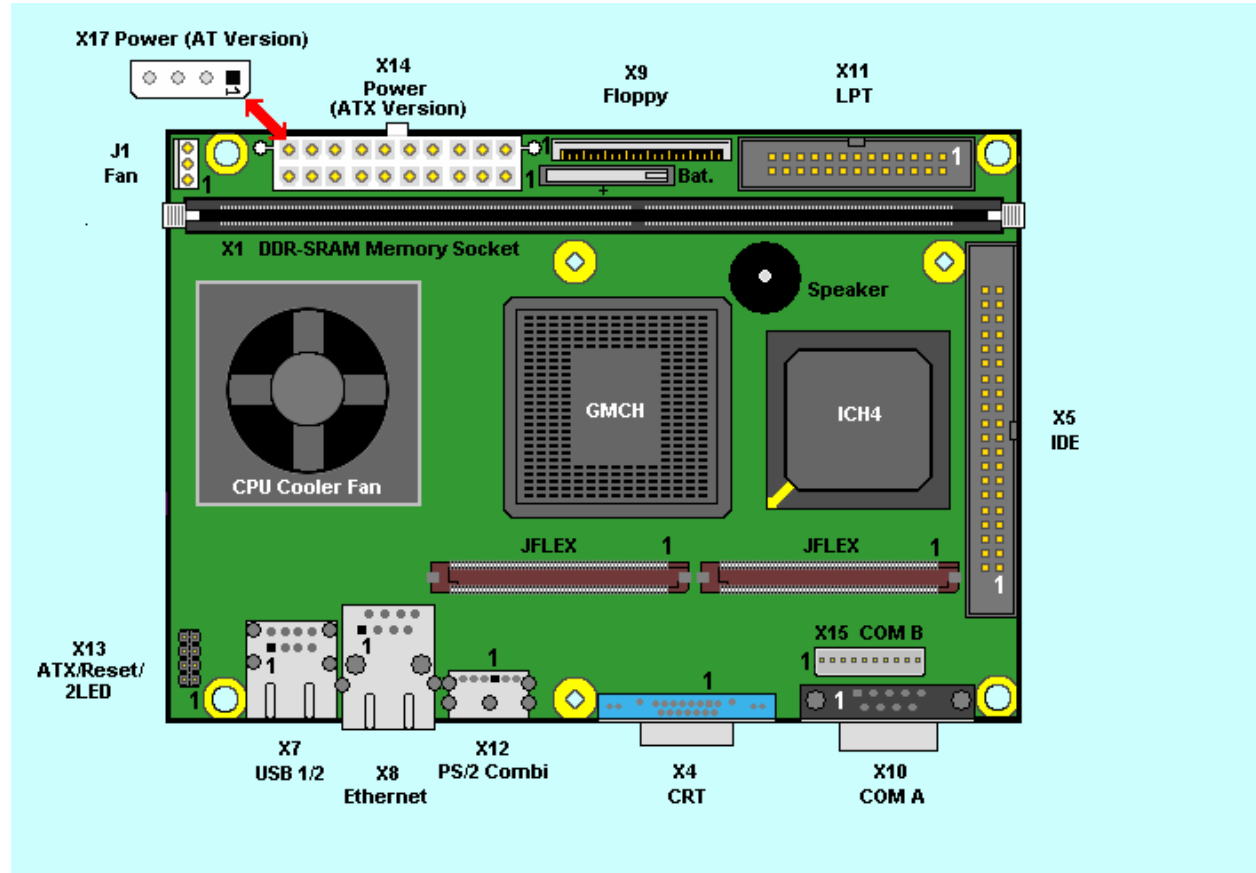


24.2.1 Front View Cooler



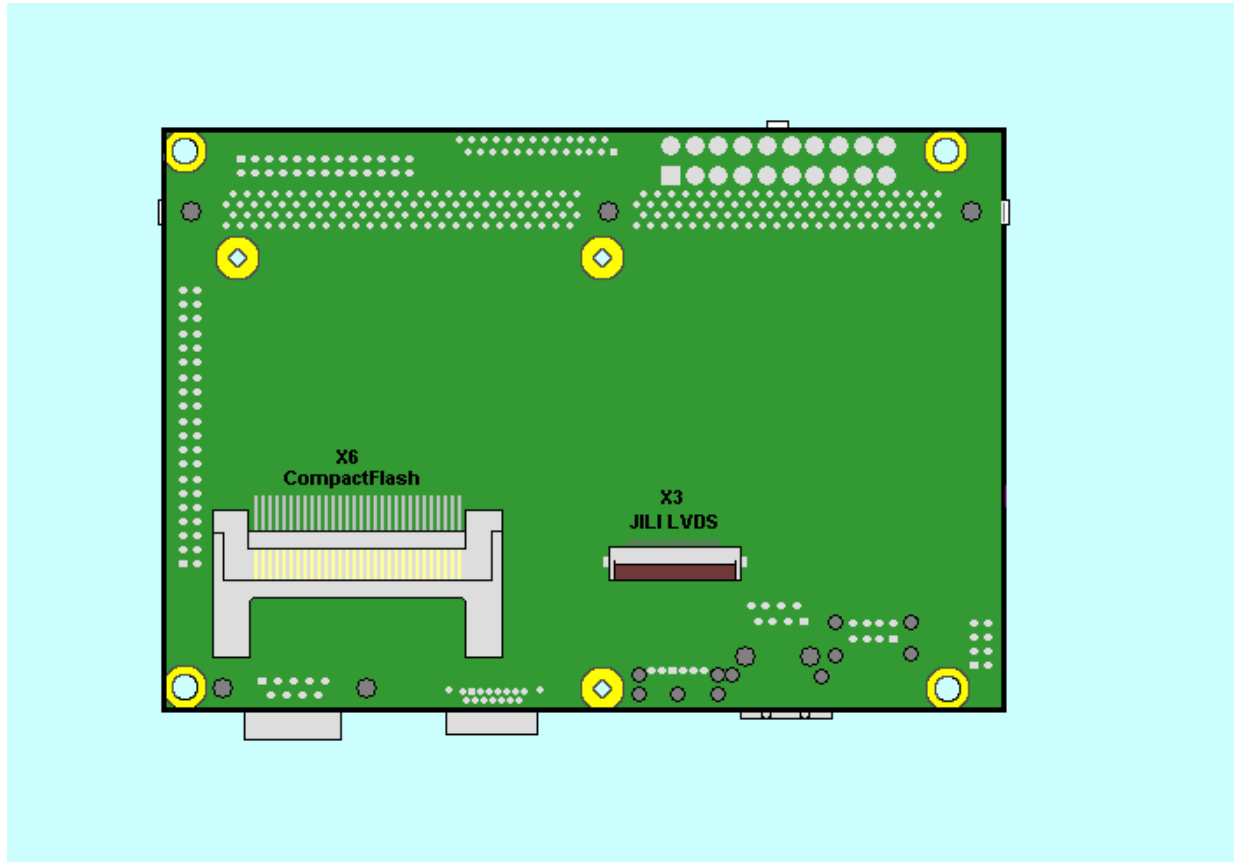
25. Appendix E: Connector Layout

25.1 Top Side



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

25.2 Bottom Side



25.3 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
X3	JILI LVDS Interface		KAB-JILI-?????? (see separate cable list)	For JILI interface cables
X4	CRT Connector	Standard DSUB15 male plug		For CRT monitor connection
X5	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
X6	CompactFlash Connector			For CompactFlash IDE storage devices (no DMA).
X7	USB Connectors	Standard USB plug		For USB device connection
X8	Ethernet Connector	Standard RJ45 plug		For Ethernet connection
X9	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.
X10	Serial Interface Connector (COM A)	Standard DSUB9 female plug.		For DSUB9 RS232 connection
X11	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.
X12	PS/2 Mouse and Keyboard Combination Connector	Standard PS/2 plug		For keyboard and mouse connection via Y-cable
X13	ATX/Reset/2LED Interface	2.54mm 8 pos. male header	ATX/Reset/2LED connector (PN 96070-0000-00-0)	For power and reset button
X14	ATX Power Connector	AMP DUAC Connector or compatible		For power connection
X15	Serial Interface Connector TTL (COM B)	1.25mm 10 pos. (Molex 51021-1000 or compatible)	KAB-DSUB9-3 (PN 96061-0000-00-0)	For serial connection
X17	AT Power Connector	Mate-N-Lok Connector (AMP 1-480424-0 or compatible)		For power connection
J1	Fan Interface			For fan connection

25.4 Pin-out Table

Pin	COM A X10	LPT X11	Floppy X9	Primary IDE X5	Compact Flash X6	ATX/Reset/ 2LED X13	CRT X4
1	DCD1	/STB	VCC *	/HDRST	GND	HDLED-	RED
2	SIN1	/AFD	/IDX	GND	D3	PLED-	GRN
3	SOUT1	PD0	VCC *	PIDE_D7	D4	HDLED+	BLU
4	DTR1	/ERR	/DR0	PIDE_D8	D5	PLED+	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 X8	PS/2 Mouse Keyboard X12	USB X7	Power ATX X14	Power AT X17	COM B X15	Fan J1
1	TXD+	KBDAT	USB0 5V *	V3.3S *	V5S *	RSLD	Sense
2	TXD-	MSDAT	USB0-	V3.3S *	GND	DSR	VCC *
3	RXD+	KEYGND	USB0+	GND	GND	RX	GND
4	NC **	KEYVCC *	USB_GND	V5S *	VCC12 *	RTS	
5	NC **	KBCLK	USB1 5V *	GND		TX	
6	RXD-	MSCLK	USB1-	V5S *		CTS	
7	NC **		USB1+	GND		DTR	
8	NC **		USB_GND	ATXPWG		RI	
9				V5SB *		GND	
10				VCC12 *		VCC *	
11				V3.3S *			
12				V-12 *			
13				GND			
14				PSON			
15				GND			
16				GND			
17				GND			
18				V-5 *			
19				V5S *			
20				V5S *			

Notes:	<p>(*) To protect the external power lines of peripheral devices, make sure that:</p> <ul style="list-style-type: none"> -- 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. <p>(**) Do not connect anything to these signals.</p>
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26. Appendix F: PC Architecture Information

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

26.1 Buses

26.1.1 JFLEX

- JFLEX Specification, Kontron Embedded Modules GmbH

26.1.2 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

26.1.3 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.

26.2 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

26.3 Ports

26.3.1 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.

26.3.2 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.

26.3.3 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.

26.4 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

27. Appendix G: Document Revision History

Version	Date	Edited by	Changes
BQBAM110	10.12.2003	WKA	Official release.
BQBAM111	17.06.2005	BHO and JL	Manual completely revised, added lots of information
BQBAM112	15.09.2005	BHO	Added Ethernet note, minor changes
BQBAM113	25.01.2007	BHO	Added 3.3V limitation for AT-version, reformatted and new style, removed the 1.1GHz and 1.6GHz information, added 800MHz and 1.5GHz information, added COM B TTL interface information, added hyperlinks, new supply current values measured under Windows XP™ instead of Windows 98, minor corrections