



coolMONSTER/P3

coolMONSTER/C3

User's Guide

Document Revision 2.2



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1. USER INFORMATION

1.1 *About This Manual*

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KONTRON Embedded Modules is certified to ISO 9000 standards.

1.5 ***Warranty***

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

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

The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specifications or improper installation or maintenance.

KONTRON Embedded Modules will not be responsible for any defects or damages to other products not supplied by KONTRON Embedded Modules that are caused by a faulty KONTRON Embedded Modules product.

1.6 *Technical Support*

Technicians and engineers from KONTRON Embedded Modules and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and will help you use our products in your systems.

Before contacting KONTRON Embedded Modules technical support, please consult our Web site for the latest product documentation, utilities, and drivers. If the information does not help solve the problem, contact us by telephone.

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2. INTRODUCTION

2.1 *coolMONSTER/P3 and coolMONSTER/C3*

coolMONSTER/P3 and coolMONSTER/C3 component SBC modules support the Intel® Mobile Pentium® III with 256 KB and the Intel® Mobile Celeron® low voltage CPU with 128KB L2 cache memory on die. The coolMONSTER/P3 and coolMONSTER/C3 integrate the complete functionality of a Pentium® III class motherboard with CPU, System BIOS, up to 256MB or 512MB SDRAM, keyboard controller, real-time clock, onboard VGA with LCD interface, and additional peripheral functions.

The coolMONSTER/P3 and coolMONSTER/C3 follow the PISA format, which provides the functionality of a PCI and ISA bus on one well-defined bus. To connect a backplane with a PISA board, you need an EISA-like, edge-card connector.

The pinout of the upper row of the PISA bus connector corresponds to the pinout of the ISA bus connector. The lower row provides PCI signals, which makes it easy to design backplanes with up to four PCI slots and additional ISA slots.

2.2 *The coolMONSTER PISA® Family*

coolMONSTER products represent the best scaleable half-size Slot SBC family. Each coolMONSTER module is characterized by the same mechanical and electrical pinout for the Keyboard, COM A-D, Sound, IrDA, EIDE 40pin and 44pin, LPT, LAN, VGA, USB, and Floppy. These homogeneous features facilitate easier upgrades within the Kontron Embedded Modules GmbH coolMONSTER product family.

PISA® is the proven space saving concept that provides full PCI and ISA bus signals on just half-size Slot boards. The ancestors were full-sized PICMG boards that have PCI and ISA card edges in a row. PISA squeezed them to just half-size, which still serves full PCI and ISA buses, which enabled smaller and cheaper enclosures when possible while maintaining all PCI and ISA periphery.

Whenever a LCD panel is required, coolMONSTER products with onboard graphics controllers are the right choice. Display connections are simplified when using these units, which come with a JUMPtect Intelligent LVDS Interface (JILI) or JUMPtect Intelligent Display Adaption (JIPA). The interface can recognize which display is connected and then independently set all video parameters.

As part of the standard features package, all coolMONSTER modules come with a JUMPtect Intelligent Device Architecture (JIDA) interface, which is integrated into the BIOS of the SBC modules. This interface enables hardware independent access to coolMONSTER 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 coolMONSTER module feature.

3. GETTING STARTED

The easiest way to get the coolMONSTER/P3 or coolMONSTER/C3 board running is to use a PISA baseboard from Kontron Embedded Modules GmbH. Take the following steps:

1. Turn off the power supply.
2. Connect the power supply to the baseboard or the coolMONSTER.
3. Plug a memory module into the memory socket of the coolMONSTER.
4. Plug the coolMONSTER to the PISA baseboard.
5. Connect the CRT monitor to the CRT interface or a LCD panel to the JILI interface by using the corresponding adapter cable.
6. Plug the keyboard to the PS/2 keyboard connector and the mouse to the PS/2 mouse connector.
7. Connect the floppy drive cable to the coolMONSTER floppy interface. Attach the floppy drive to the connector at the opposite end of the cable.
8. Connect the power supply to the floppy's power connector.
9. Plug a hard-drive data cable to one of the coolMONSTER hard-disk interfaces. 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. Make sure all your connections have been made correctly.
12. Turn on power.
13. Enter the BIOS by pressing the F2 key during boot-up. Make all changes in the BIOS setup. See the BIOS chapter of this manual for details.

4. SPECIFICATIONS

4.1 *Functional Specifications*

- **Processor**
 - Intel® Mobile Pentium® III processor with 256KB L2 cache memory on die
 - Intel® Mobile Celeron® low voltage (LV) CPU with 128KB L2 cache memory on die
- **Chipset**
 - Intel® BX 440
or
 - Intel® GX 440 (only on boards equipped with the 850MHz processor)
- **Power Supply**
 - 5V only supply
 - Onboard power supply to low voltage technology
- **Memory**
 - One DIMM socket for up to 256Mbyte (BX 440 chipset) or 512Mbyte (GX 440 chipset) unregistered SDRAM-DIMM module
 - Supporting SDRAM PC100 and SDRAM PC133 with 100 MHz Speed
- **Four Serial Ports (COM A, COM B, COM C and COM D)**
 - Three standard RS232C serial ports, 16550 compatible (COM A, COM B and COM C)
 - One serial port as RS232 or RS485 (COM D)
 - One serial port as RS232 or IrDA (COM B)
- **Infrared Device Association (IrDA) Interface**
- **One Parallel Port (LPT1)**
 - Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP) with bi-directional capability
- **Floppy Interface**
- **System Monitor Controller for Temperature and Fan**
- **Enhanced Intelligent Drive Electronics (EIDE)**
 - Two UDMA PCI Bus Master EIDE ports (up to 4 IDE Devices)
- **Universal Serial Bus (USB)**
 - Two USB 1.0 ports (UHCI)
 - USB legacy keyboard and mouse support

- **Ethernet**
 - Intel® 82559ER 10/100 Mbps PCI Fast Ethernet controller
- **Onboard Video Graphics Array (VGA)**
 - ATI RAGE™Mobility-M LCD-VGA Controller with integrated 4MB Video RAM
or
 - ATI RAGE™Mobility-M1 LCD-VGA Controller with integrated 8MB Video RAM
(only on boards with 700MHz or 850MHz processor)
 - Cathode ray tube (CRT) and low voltage differential signaling (LVDS)
LCD/flat-panel interfaces
- **Onboard Sound PCI Audiodrive® Solution**
 - ESS Solo-1™ (ES1938S)
- **Phoenix BIOS, 256KB Flash BIOS**
- **NV-EEPROM for CMOS Setup Retention without Battery**
- **PS/2 Keyboard Controller**
- **PS/2 Mouse Controller**
- **Watchdog timer (WDT)**
- **Real-time Clock with Onboard Battery Supply**

4.2 Mechanical Specifications

- **PISA Bus Connector**
 - Edge card connector, EISA standard, AMP 650226-1 (or compatible)
- **Dimensions**
 - Length x Width: 176 mm x 125mm (6.9" x 4.9")
- **Height on Top**
 - Maximum 60 mm (2.36") on 850MHz version
 - Ca. 40mm (1.58") on all other versions
 - Height is depending upon SDRAM module and CPU cooler/fan. This can block PCI or ISA slots on some backplanes.
- **Height on Bottom**
 - Maximum 6.5 mm (0.25")
- **Weight**
 - 346g (full featured maximum performance version without SDRAM)

4.3 Electrical Specifications

4.3.1. Supply Voltage

- 5V DC +/- 5%

4.3.2. Supply Voltage Ripple

- 100 mV peak to peak 0 - 20 MHz

4.3.3. Supply Current (typical)

Power-consumption tests were executed during the DOS prompt and with 100% CPU load. The tested boards were equipped with 256MB SDRAM.

CPU	Fan	Graphic	DOS Prompt	100% CPU load
Celeron 300 MHz	no	4MB ATI Rage Mobility	1.93A	2.07A
PIII 400 MHz mobile	yes	4MB ATI Rage Mobility	2.67A	2.92A
PIII 700 MHz mobile	yes	8MB ATI Rage Mobility	3.59A	4.00A
PIII 850 MHz mobile	yes	8MB ATI Rage Mobility	5.32A	6.27A

4.3.4. Supply Current (maximum)

CPU	Graphic	Current
Celeron 300 MHz	4MB ATI Rage Mobility	TO BE DONE
PIII 400 MHz mobile	4MB ATI Rage Mobility	TO BE DONE
PIII 700 MHz mobile	8MB ATI Rage Mobility	TO BE DONE
PIII 850 MHz mobile	8MB ATI Rage Mobility	TO BE DONE

(calculated theoretical values from all components maximum supply currents)

4.3.5. Real-time Clock (RTC) Battery

- Voltage range: 3.0V-4.2V
- Max current: 10µA

English:

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

Deutsch:

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

French:

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

Danish:

ADVARSEL ! Lithiumbatteri – Eksplosionsfare ved fejlagtig Håndtering. Udskiftning må kun skedes med batteri af samme fabrikant og type. Lever det brugte batteri tilbage til leverandøren.

Finnish:

VAROITUS ! Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Havita käytetty paristo valmistajan ohjeiden mukaisesti.

Spanish:

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

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

4.4 MTBF

The following MTBF (Mean Time Between Failure) values were calculated using a combination of manufacturer's test data, if the data was available, and a Bellcore calculation for the remaining parts. The Bellcore calculation used is "Method 1 Case 1". Using this 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. Manufacturer's data has been used wherever possible. The manufacturer's data, when used, is specified at 50° C, so in that sense the following results are slightly conservative. The MTBF values shown below are for a 40° C office or telecommunications environment. Higher temperatures and other environmental stresses such as extreme altitude, vibration, and salt-water exposure will lower the MTBF values.

- **System MTBF (hours) : 123.388 for coolMONSTER/P3 400MHz**

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

4.5 Environmental Specifications

4.5.1. Temperature

The Intel® Mobile Pentium® III processor and the Intel® Mobile Celeron® low voltage (LV) CPU are specified for proper operation when the junction temperature is within the specified range of 0°C to 100°C. The system controller can measure the temperature.

- **Operating: 0 to +70°C (*) (with appropriate airflow)
0 to + 60°C (*) (with appropriate airflow) for 850MHz version**
- **Non-operating: -10 to +85 °C (noncondensing)**

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

For devices that are specified for higher case temperatures, please see the following table.

Device	Function	Max. Case Temperature
Intel® 82443BX	Chipset (Host Bridge)	+105°C
ATI® Rage™ Mobility	Graphic Controller	+85°C
LT1702	DC/DC Converter	+70°C
LT1702 (on 850MHz)	DC/DC Converter (ext.- Temp)	+85°C
MOSFETs	Transistors	+85°C

4.5.2. Humidity

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

5. CPU, CHIPSET, AND SUPER I/O

5.1 CPU

The central processing unit (CPU) consists of either a:

- Intel® Mobile Pentium® III processor with 256KB L2 cache memory on die.
- Intel® Mobile Celeron® low voltage CPU with 128KB L2 cache memory on die.

5.2 Chipset

The coolMONSTER/P3 and coolMONSTER/C3 PISA Boards operate with the Intel® 440BX AGPset, which consists of the 82443BX Host Bridge and the 82371EB PIIX4E. The 850MHz version of the coolMONSTER/P3 comes with the 82443GX Host Bridge. The chipset provides the following features:

- 82443BX/GX Host Bridge Controller
- 82371EB PCI ISA IDE Accelerator (PIIX4E)
- Full Support for up to Mobile Pentium III /Celeron LV processors, with system bus frequencies of 100 MHz
- 100 MHz SDRAM Memory Interface
- PCI Add-in Slots, PCI Specification Rev 2.1 Compliant
- 1 AGP Slot, AGP Interface Specification Rev 1.0 Compliant, AGP 66/133 MHz, 3.3V device support
- Integrated IDE Controller with Ultra DMA/33 support, PIO Mode 4 transfer, PCI IDE Bus Master support
- Integrated Universal Serial Bus (USB) UHCI Controller with 2 USB ports; USB 1.0 compliant
- Integrated System Power Management Support
- ISA add-in slots

5.3 *Super I/O*

There are two super I/O devices onboard of the coolMONSTER/P3 and coolMONSTER/C3. The first one is the Winbond W83977EF and provides the following features:

- **Keyboard controller**
- **PS/2 Mouse interface**
- **Two serial interface (COM A and COM B)**
- **Parallel interface (LPT)**
- **Floppy Disk Drive controller**
- **IrDA interface**

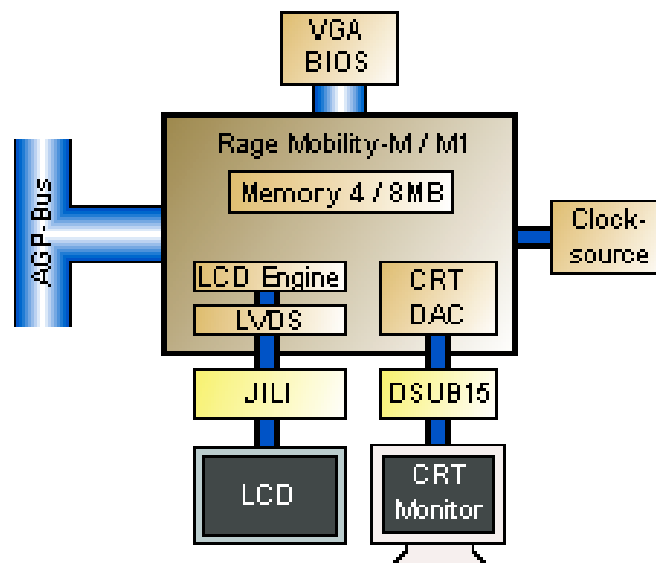
An additional SMsC FD37C669 offers two more serial interfaces (COM C and COM D).

6. VIDEO CONTROLLER

The COOLMONSTER/P3 and COOLMONSTER/C3 use the ATI RAGE™Mobility-M LCD-VGA Controller with 4MB integrated video memory. The 700MHz and 850MHz versions of this board come with the ATI RAGE™Mobility-M1 LCD-VGA-Controller with 8MB of integrated video memory. The controller features:

- Motion Compensation for full frame rate software DVD playback
- Resolution up to 1600x1200 (CRT) and 1280x1024 (TFT) respectively
- Application-proven 2D and 3D acceleration
- Dual-View for simultaneous and independent LCD and CRT outputs
- Integrated dual channel 110MHz LVDS transmitter
- Innovative ratiometric expansion enables source images to fit any panel resolution up to 1280x1024
- Support for every major OS and environment

6.1 Video Subsystem Block Diagram



6.2 Supported Display Types

The RAGE Mobility has a built-in interface to a range of LCD panels including TFT and STN panels with different color depth and pixel packing format. The LVDS transmitter is implemented to reduce EMI and narrow the interface to the panel.

The coolMONSTER/P3 and coolMONSTER/C3 include JILI plug-and-play panel interfacing. That means a vast variety of panels all configured by a dedicated cable for each panel is supported. There is no jumper setting or software setup required. Because nearly all LCDs have different connectors, pinout or LCD voltages, this is the easiest and safest way to configure different panels.

The coolMONSTER/P3 and coolMONSTER/C3 BIOS supports different panel types, which can be identified via the video BIOS by reading the configuration on internal panel connector.

6.2.1. Current Panel Information

To find out whether your panel is supported by the coolMONSTER/P3 and coolMONSTER/C3, check the Kontron Embedded Modules GmbH support pages on the Internet for the actual panel lists. A "Panel Configurator" offers the latest information about all adapted and tested LCDs and is regularly updated.

6.2.2. Available Video Modes

Single Display Mode Support (CRT/TFT, no DVD/Video Overlay and no 3D)

Display Width	Display Height	Refresh (Hz)	Color Depth			
			8 bpp	16 bpp	24 bpp	32 bpp
640	480	60	ok	ok	ok	ok
		75	ok	ok	ok	ok
		85	ok	ok	ok	ok
		100	ok	ok	ok	ok
800	600	60	ok	ok	ok	ok
		75	ok	ok	ok	ok
		85	ok	ok	ok	ok
		100	ok	ok	ok	ok
1024	768	60	ok	ok	ok	ok
		75	ok	ok	ok	ok
		85	ok	ok	ok	ok
		100	ok	ok	ok	ok
1280	1024	60	ok	ok	ok	—
		75	ok	ok	ok	—
		85	ok	ok	ok	—
		100	ok	ok	—	—
1600	1200	60	ok	ok	—	—
		75	ok	ok	—	—
		85	ok	ok	—	—
		100	ok	ok	—	—

Dual Display Mode Support (CRT/TFT, no DVD/Video Overlay and no 3D, 75 Hz Refresh on Both Displays)

Disp1		Disp2		Maximum Secondary Display Color Depth (bpp) vs Primary Display Color Depth			
Width	Height	Width	Height	8bpp	16bpp	24bpp	32bpp
640	480	640	480	32	32	32	32
		800	600	32	32	32	32
		1024	768	32	32	32	24
		1280	1024	16	16	16	16
800	600	640	480	32	32	32	32
		800	600	32	32	32	32
		1024	768	32	32*	24	16
		1280	1024	16	16	16	8
1024	768	640	480	32	32	32	24
		800	600	32	32	24	16*
		1024	768	32	24	16	8
		1280	1024	16	8	8	—
1280	1024	640	480	32	24	—	—
		800	600	32	24	—	—
		1024	768	24	8	—	—
		1280	1024	16	8	—	—
1600	1200	640	480	32	8*	—	—
		800	600	24	—	—	—
		1024	768	16	—	—	—
		1280	1024	8	—	—	—

Note: * indicates memory requirements are within 100KB of memory capacity.

7. SYSTEM MEMORY

The COOLMONSTER/P3 and COOLMONSTER/C3 use only Dual Inline Memory Modules (DIMMs). One socket is available for 3.3 Volt (power level) unbuffered Synchronous Dynamic Random Access Memory (SDRAM) of 8, 16, 32, 64, 128 and 256MB on boards with the Intel® 440BX chipset. Boards with the Intel® 440GX chipset support 512MB.

The height of the SDRAM-DIMM module can block PCI or ISA slots on some backplanes.

8. PISA BUS

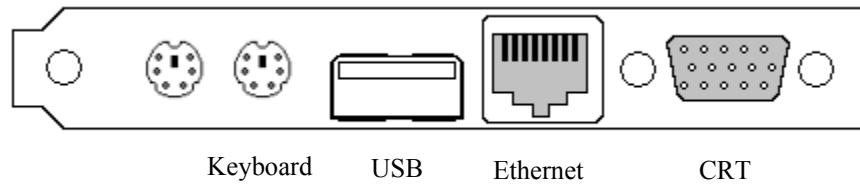
PISA® is the proven space saving concept that provides full PCI and ISA Bus signals on just half-size Slot boards. The edge card connector provides the ISA signals on the upper row and the PCI signals on the lower row and uses the same connector known from EISA systems.

A detailed description of the signals and its timing characteristics is beyond the scope of this document. Refer to the PISA specification PISAD?? (three question marks holding the revision number) available on the Kontron web sites and the official ISA- and PCI-specifications for further details.

9. FRONT PANEL

The coolMONSTER/P3 and coolMONSTER/C3 come with a front panel interface that provides the following connectivity:

- **CRT interface**
- **Ethernet interface**
- **USB interface**
- **PS/2 keyboard connector**
- **PS/2 mouse connector**




10. KEYBOARD AND MOUSE INTERFACES

The mouse connector is available through Connector X11 (6 pins). The keyboard connector is available through Connector X10 (6 pins).


10.1 Keyboard Connector

The following table shows the pinout of the PS/2 keyboard connector on the front panel.

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

10.2 Mouse Connector

The following table shows the pinout of the PS/2 mouse connector on the front panel.

Header	Pin	Signal Name	Function
	1	MSDAT	PS/2 Mouse data
	2	NC	For internal use only
	3	KEYGND	Ground (filtered)
	4	KEYVCC (*)	+5V (filtered)
	5	MSCLK	PS/2 Mouse clock
	6	NC	For internal use only

Note: (*) To protect external power lines of peripheral devices, make sure that

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.

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

10.3 Configuration

Refer to the Keyboard Features submenu in the Appendix B: BIOS chapter for information on configuration.


11. USB INTERFACE

The chipset of the COOLMONSTER/P3 or COOLMONSTER/C3 features one USB host controller with integrated root hub. The controller serves two USB ports (1 and 2). Port 1 can be accessed at the USB connector in the front and Port 2 at the feature connector.

For further information, please see Appendix F: PC Architecture Information.

11.1 Connector

The USB interface is available through the X9 connector (4 pins).

Header	Pin	Signal Name	Function
	1	USB_5V	USB-supply (max. 500mA)
	2	USB1-	Universal serial bus port 1 (-) of controller 0
	3	USB1+	Universal serial bus port 1 (+) of controller 0
	4	USB_GND	USB Ground

11.2 Configuration

You can disable or enable the legacy USB support from the I/O Device Submenu in the BIOS Setup Utility. For more information, see the I/O Device Submenu section in Appendix B: BIOS Operation.

12. ETHERNET INTERFACE

The COOLMONSTER/P3 and COOLMONSTER/C3 Ethernet interface use the 82559ER from Intel®. This is a fully integrated 10BASE-T/100BASE-TX LAN solution. The 82559ER consists of both the Media Access Controller (MAC) and the physical layer (PHY) interface combined into a single component solution. The 32-bit PCI controller provides enhanced scatter-gather bus mastering capabilities and enables the 82559ER to perform high-speed data transfers over the PCI bus. The 82559ER also includes an interface to a serial EEPROM. The EEPROM provides power-on initialization for hardware and software configuration parameters.

The 82559ER provides the following features:

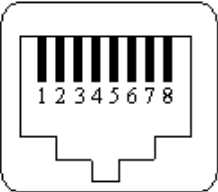
- **Integrated IEEE 802.3 10BASE-T and 100BASE-TX compatible PHY**
- **Full duplex support at both 10 and 100Mbps**
- **IEEE 802.3u autonegotiation support**
- **IEEE 802.3x 100BASE-TX flow control support for full duplex mode**
- **Half duplex enhancement by a proprietary collision reduction mechanism**
- **Improved dynamic transmit chaining with multiple priorities transmit queues**
- **Fast back-to-back transmission support with minimum interframe spacing**
- **Glueless 32-bit PCI master interface**
- **3KB transmit and 3KB receive FIFOs**
- **Wired for Management support**
- **System Management Bus support**
- **Clockrun protocol support**
- **Low power 3.3 V device**

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

12.1 Connector

The 10/100Base-T connector is a standard 8-pin RJ45 jack (X20).

The following table shows the pinout.

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	

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

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

12.2 Configuration

Please refer to the KONTRON Web site and the corresponding readme and setup/install files.

13. GRAPHIC INTERFACES

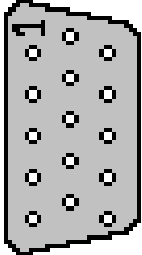
The onboard ATI RAGE™Mobility-M/M1 LCD-VGA-Controller drives two interfaces on the coolMONSTER/P3 and coolMONSTER/C3.

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

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

13.1 CRT Connector

The CRT (Cathode Ray Tube) interface is available through Connector X21 (15 pins).

Header	Pin	Signal Name	Function
	1	RED	Red Video
	2	GRN	Green Video
	3	BLU	Blue Video
	4	NC	For internal use only
	5	GND	Ground
	6	GND	Ground
	7	GND	Ground
	8	GND	Ground
	9	NC	For internal use only
	10	GND	Ground
	11	NC	For internal use only
	12	DDA	DDC Serial Data Line
	13	HSYNC	Horizontal Sync
	14	VSYNC	Vertical Sync
	15	DCK	DDC Data Clock Line

13.2 Flat Panel LVDS Interface (JILI) Connector

The JUMPtect Intelligent LVDS Interface (JILI) is KONTRON's standard flat panel interface for high-end graphics. Its definition is based on standard LVDS chipsets widely used in notebooks and TFT monitors. The implementation of this subsystem complies with the JILI Specification, which you can find on the KONTRON Web site.

The flat panel LVDS connector is available through Connector X8 (40 pins).

13.3 *Configuration*

In the BIOS Setup Utility, go to the Advanced Chipset Submenu to the aperture size options. You can select the size of the Graphic Aperture throughout the range of 4Mb to 256Mb. For more information, see Appendix B: BIOS Operation.

14. SERIAL-COMMUNICATION INTERFACES

14.1 Serial Ports COMA-D

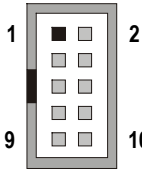
Four fully functional serial ports (COMA, COMB, COMC, and COMD) provide asynchronous serial communications. The serial ports support RS-232 operation modes and are compatible with the serial-port implementation used on the IBM Serial Adapter. You also can use COM D (Connector X18) for RS-485 purposes and COM B for IrDA connectivity. The ports are 16550 high-speed UART compatible and support 16-byte FIFO buffers for transfer rates up to 115.2Kbaud.

14.2 RS-232 Connectors

COM A is available through the X14 connector (10 pins) and COM B through the X15 connector (10 pins). COM C is available through the X16 connector (10 pins) and COM D through either the X17 connector (10 pins) for RS-232 or the X18 connector for RS-485. If COM B is configured for IrDA modes, use connector X2.

To have the signals available on the standard serial interface connectors DSUB9 or DSUB25, an adapter cable is required. A 9-pin DSUB cable is available from KONTRON (KAB-DSUB9-2, Part Number 96017-0000-00-0).

The following table shows the pinouts for COM A, COM B, COM C, and COM D (all RS-232) as well as necessary connections for the DSUB adapters.

Header	Pin	Signal Name	Function	In / Out	DSUB-25	DSUB-9
	1	DCD1/2/3/4	Data Carrier Detect	In	8	1
	2	DSR1/2/3/4	Data Set Ready	In	6	6
	3	SIN1/2/3/4	Receive Data	In	3	2
	4	RTS1/2/3/4	Request to Send	Out	4	7
	5	SOUT1/2/3/4	Transmit Data	Out	2	3
	6	CTS1/2/3/4	Clear to Send	In	5	8
	7	DTR1/2/3/4	Data Terminal Ready	Out	20	4
	8	RI1/2/3/4	Ring Indicator	In	22	9
	9	GND	Signal Ground	--	7	5
	10	VCC (*)	+5V	--	--	--

Note: (*) To protect external power lines of peripheral devices, make sure that

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.


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

14.3 Configuration

You can set all serial input/output interfaces to base I/O-addresses 3F8h, 2F8h, 3E8h, or 2E8h. The modes range from disabled, enabled, and AUTO. You can set COM A and COM B interrupts to IRQ3 or IRQ4. You can set COM C and COM D interrupts to IRQ 10 and IRQ 11. All settings are changeable from the BIOS menu. For COM D, your choice of interface includes RS232 (default setting) or RS485. Refer to the I/O Device Configuration submenu in the Appendix B: BIOS Operation chapter for information on configuration.

14.4 RS-485 Connector

You can use Connector X18 (COM D) for RS-485 purposes.

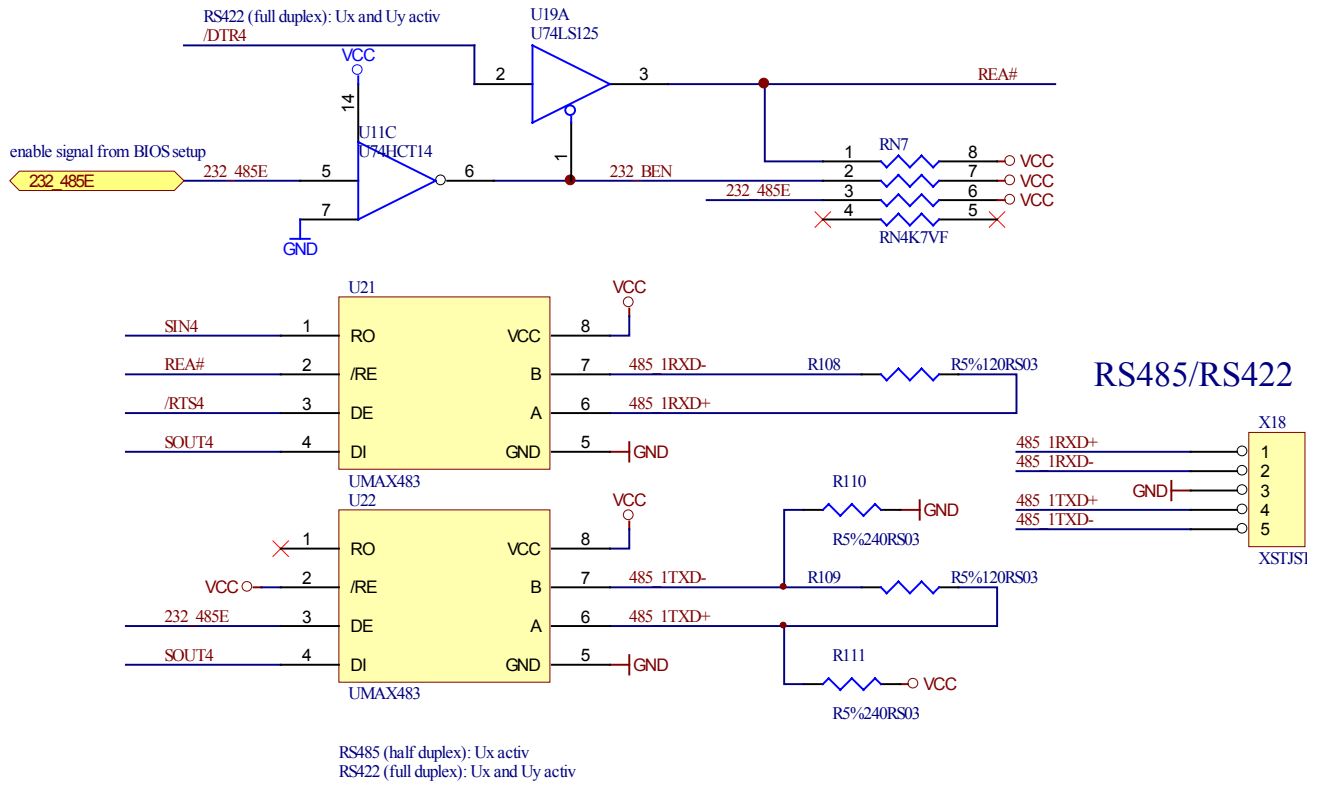
Header	Pin	Signal Name	Function
	1	485_1RXD+	Channel A positive terminal
	2	485_1RXD-	Channel A negative terminal
	3	GND	Ground
	4	485_1TXD+	Channel B positive terminal
	5	485_1TXD-	Channel B negative terminal

The connector for connecting RS485 to COOLMONSTER/P3 or COOLMONSTER/C3 is from manufacturer JST. For mating connector information see Appendix E: Connector Layout.

14.5 Configuration

You can choose IRQ 10 or 11 for COM D (RS-485). You can set COM D to one of the following base I/O-addresses: 3F8h, 2F8h, 3E8h, or 2E8h. Refer to the I/O Device Configuration submenu in the Appendix B: BIOS Operation chapter for additional information on configuration.

14.5.1. RS-485 Diagram



for informations about MAX483 pls. refer www.maximic.com

15. IRDA INTERFACE

IrDA (named after the standardizing group "InfraRed Data Association") defines a standard for high-speed infrared data transfer over distances of about 1 meter.

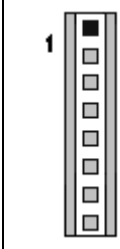
15.1 IrDA SIR Mode

This is an operation mode similar to Sharp-IR. The IrDA 1.0 SIR allows serial communication at baud rates up to 115.2K Baud. The data format is the same as Sharp-IR mode except no parity bit is needed. Sending a single infrared pulse signals a zero. A one is signaled by not sending a pulse. The width of each pulse is 3/16ths of a single bit time. The device operation in IrDA 1.0 SIR mode is similar to the operation in UART. The main difference is that the data transfer is normally performed in half duplex fashion, and the modem control and status signals are not used. The transfer signals route to IRRX and IRTX.

For the infrared feature to be available, you must connect an infrared module to the IrDA connector and configure the infrared settings in BIOS Setup Utility. The IrDA connector supports the optional wireless transmitting and receiving infrared module.

15.2 Connector

The IrDA is available through the X2 connector (8 pins).

Header	Pin	Signal Name	Function
	1	NC (**)	For internal use only
	2	NC (**)	For internal use only
	3	IRTX	Infrared transmit (serial data output signal)
	4	GND	Ground
	5	IRRX	Infrared receive (serial data input signal)
	6	VCC (*)	+5V
	7	NC (**)	For internal use only
	8	NC (**)	For internal use only

The connector with eight positions used on COOLMONSTER/P3 or COOLMONSTER/C3 for connecting an infrared module is from manufacturer BERG. For mating connector information see Appendix E: Connector Layout.

Note: (*) To protect external power lines of peripheral devices, make sure that

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.

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

15.3 *Configuration*

You can set IrDA for COM B. Choices for mode of operation include Normal, IrDA, and ASK-IR. You can make your choices in the I/O Device Configuration Submenu in the BIOS Setup Utility.

16. PARALLEL-PORT INTERFACE

The COOLMONSTER/P3 and COOLMONSTER/C3 incorporate an IBM XT/AT compatible parallel port. It supports unidirectional, EPP and ECP operating modes.

16.1 Connector

The parallel port is available through the X7 connector (26 pins). To have the signals available on a standard, parallel-interface connector DSUB-25, an adapter cable is required, which is available from KONTRON (KAB-DSUB25-1, Part Number 96015-0000-00-0).

The following table shows the pinout 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

Note: (*) To protect external power lines of peripheral devices, make sure that

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.

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

16.2 *Configuration*

The parallel-port mode, I/O addresses, and IRQs are changeable from the BIOS Setup Utility. You can enable, disable or set the parallel port to auto. You can program the base I/O-address 378h (default), 3BCh or 278h. You can set the parallel port mode to output only, bi-directional, EPP and ECP. 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.

17. EIDE INTERFACES

The COOLMONSTER/P3 and COOLMONSTER/C3 feature UDMA IDE controller interfaces compatible with IBM PC/XT and PC/AT embedded hard-disk drives. The board can support up to four IDE drives such as hard disks and a CD-ROM in a master/slave configuration. If you only use one drive, set it as the master.

The fast IDE controller supports PIO Mode 4 and bus master transfer as well as Ultra-DMA/33 synchronous DMA mode transfer.

17.1 Connector

IDE interface 1 is available through Connector X12 (40 pins). This interface is designed in 0.1" grid for optimal connectivity to a 3.5" hard drive. IDE interface 2 is available through Connector X13 (44 pins.) It is designed in a 2mm grid for optimal connectivity to a 2.5" hard drive.

For IDE interface 1 a standard IDE cable can be used which is also available from Kontron (KAB-IDE-1, Part Number 96022-0000-00-0). There are several accessories available for IDE interface 2 connectivity.

You can use two cables to directly connect a hard disk in a 2.5" form factor (KAB-IDE-2MM, Part Number 96021-0000-00-0) or a 3.5" form factor (KAB-IDE-25, Part Number 96020-0000-00-0).

You can plug a KONTRON chipDISK, which is an EIDE hard disk that uses Flash technology, into the 2mm IDE interface and mechanically mount it by using a mini spacer on the chipDISK hole. You also can use a chipDISK adapter (chipDISK-ADA1, Part Number 96004-0000-00-0) or compact Flash adapter (CFC-ADA1, Part Number 96004-0000-00-2) for more disk support.

17.1.1. Primary EIDE Pinout

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	
	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	PRI_PD1	IDE1 Cable Select (470Ω to Ground)
	29	/PIDE_AK	Primary IDE DACKJ for IDE master
	30	NC	
	31	SIRQI	IDE IRQ Primary
	32	NC	
	33	PIDE_A1	Primary IDE ATA address bus
	34	NC	
	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	/DASP_P	Primary master/slave select
	40	GND	Ground

To find the location of EIDE-controller interfaces, please see the Appendix E: Connector Layout chapter.

17.1.2. Secondary EIDE Pinout

Header	Pin	Signal Name	Function
	1	/HDRST	Reset
	2	GND	Ground
	3-18	SIDE_D1..D15	Secondary IDE ATA data bus
	19	GND	Ground
	20	NC	
	21	SIDE_DRQ	Secondary IDE DMA Request for IDE master
	22	GND	Ground
	23	/SIDE_IOW	Secondary IDE IOWJ Command
	24	GND	Ground
	25	/SIDE_IOR	Secondary IDE IORJ Command
	26	GND	Ground
	27	SIDE_RDY	Secondary IDE ready
	28	SEC_PD1	IDE2 Cable Select (470Ω to Ground)
	29	/SIDE_AK	Secondary IDE DACKJ for IDE master
	30	GND	Ground
	31	SIRQII	IDE IRQ Secondary
	32	NC	
	33	SIDE_A1	Secondary IDE ATA address bus
	34	NC	
	35	SIDE_A0	Secondary IDE ATA address bus
	36	SIDE_A2	Secondary IDE ATA address bus
	37	/SIDE_CS1	IDE chipselect 1 for secondary channel 0
	38	/SIDE_CS3	IDE chipselect 2 for secondary channel 1
	39	/DASP_S	Secondary master/slave select
	40	GND	Ground
	41	VCC (*)	+5V
	42	VCC (*)	+5V
	43	GND	Ground
	44	NC	

Note: (*) To protect external power lines of peripheral devices, make sure that

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.

To find the location of EIDE-controller interfaces, please see the Appendix E: Connector Layout chapter.

17.2 *Signal Descriptions*

/HDRST (Reset)

The reset signal is active low during power up and inactive thereafter.

DASP_P, DASP_S (Primary, secondary master/slave select)

This signal drives a LED whenever a connected hard disk is being accessed or when a second drive is present. This signal is active low when the hard disk is busy.

17.3 *Configuration*

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

18. FLOPPY INTERFACE

The floppy-drive controller can support two floppy drive disk drives (3.5" and 5.25") and densities that range from 360kB to 2.88MB. The controller is 100% IBM compatible.

18.1 Connector

The floppy disk interface is available on Connector X19 (34 pins).

The following table shows the connector pinout.

Header	Pin	Signal Name	Function	Pin	Signal Name	Function
	1	GND	Ground	2	/RPM	Density select
	3	GND	Ground	4	DRATE0	Data rate 0
	5	NC		6	NC	
	7	GND	Ground	8	/INDEX	Index
	9	GND	Ground	10	/MTR0	Motor on 0
	11	GND	Ground	12	/DR1	Drive select 1
	13	GND	Ground	14	/DR0	Drive select 0
	15	GND	Ground	16	/MTR1	Motor on 1
	17	GND	Ground	18	/FDIR	Direction
	19	GND	Ground	20	/STEP	Step
	21	GND	Ground	22	/WDATA	Write data
	23	GND	Ground	24	/WGATE	Write gate
	25	GND	Ground	26	/TRK0	Track 0
	27	GND	Ground	28	/WRTPRT	Write protect
	29	NC		30	/RDATA	Read data
	31	GND	Ground	32	/HDSEL	Head select
33	GND	Ground	34	/DSKCHG	Disk change	

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

18.2 Configuration

You can configure floppy drive settings from the BIOS Setup Utility, using the I/O Device Configuration Submenu and the Main Menu. Density options range from 360 kilobits to 2.88MB. The default density is 1.44/1.25MB 3.5". See Appendix B: BIOS Operation for more information.

19. SOUND INTERFACE

The COOLMONSTER/P3 and COOLMONSTER/C3 use an ESS Solo-1™ PCI AudioDrive® solution. It provides high-quality audio processing while maintaining full legacy DOS game compatibility. The Solo-1 forms a complete audio subsystem on a single chip.

The ESS Solo-1 (ES1938S) features:

- Single, high-performance, mixed-signal, 16-bit stereo VLSI chip
- PCI bus specification, revision 2.1 compliant
- Full native DOS games compatibility, via three technologies:
 - TDMA
 - DDMA
 - PC/PCI
- High-Quality ESFM music synthesizer
- Dynamic range (SNR) over 80 dB
- Integrated Spatializer® 3-D audio effects processor

Record and Playback Features

- Record, compress, and play back voice, sound, and music
- 16-bit stereo ADC and DAC
- Programmable independent sample rates from 4 kHz up to 48 kHz for record and playback
- Full-duplex operation for simultaneous record and playback

Inputs and Outputs

- Stereo input for auxiliary A (CD audio) and a mono input for microphone

Mixer Features

- 8-channel mixer with stereo inputs for auxiliary line, music synthesizer, digital audio (wave files), and mono input for microphone
- Programmable 6-bit logarithmic master volume control


Power

- Advanced power management meets ACPI standards

Compatibility

- Supports PC games and applications for Sound Blaster™ and Sound Blaster™ Pro
- Supports Microsoft® Windows™ Sound System®
- Meets PC 97/PC 98 and WHQL specifications

19.1 Connector

Header	Pin	Signal Name	Function
	1	RECHTS	Line-level stereo output right.
	2	ASGND	Analog ground.
	3	LINKS	Line-level stereo output left.
	4	AUXAR_C	Auxiliary A input right. Normally intended for connection to an internal or external CD-ROM analog output.
	5	MIC_C	Mono Microphone input.
	6	AUXAL_C	Auxiliary A input left. Normally intended for connection to an internal or external CD-ROM analog output.

The sound connector is available through Connector X1 (6 pins). For mating connector information see Appendix E: Connector Layout.

19.2 Configuration

Please refer to the KONTRON Web site and the corresponding readme and setup/install files.

20. FEATURE INTERFACE

20.1 Connector

The feature connector is available through the X6 connector (26 pins) and controls functions such as the PS/2 keyboard clock and data, hard-disk LED, USB serial bus port, and ATX power signals.

Pin	Signal Name	Function	Pin	Signal Name	Function
1	KBCLK	PS/2 Keyboard clock	2	MSCLK	PS/2 Mouse clock
3	KBDAT	PS/2 Keyboard data	4	MSDAT	PS/2 Mouse data
5	VCC (*)	+5V	6	-5V (*)	-5V
7	-12V (*)	-12V	8	GND	Ground
9	H_LED	Hard-disk LED	10	NC (**)	For internal use only!
11	NC (**)	For internal use only!	12	SPEAKER	Speaker out
13	KBLOCK	Keyboard Lock	14	NC (**)	For internal use only!
15	GND	Ground	16	RESIN	Reset input
17	NC (**)	For internal use only!	18	NC (**)	For internal use only!
19	5V_SB	ATX standby supply	20	LILED	Link integrity LED
21	PS-ON	ATX power on signal	22	SPEEDLED	Speed LED
23	PWRBTN	ATX power button	24	ACTLED	Activity LED
25	USB2-	Universal serial bus port 2 (-)	26	USB2+	Universal serial bus port 2 (+)

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

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.
- The current of the pins on this connector is limited to 0.5A.

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

20.2 Configuration

You cannot configure the Feature interface from the BIOS Setup Utility.

20.3 *Signal Description*

KBCLK/KBDAT/MSCLK/MSDAT

Keyboard and PS/2 mouse data and clock signal.

Do not use the keyboard and the mouse signals at the same time as the signals on the front bracket.

H_LED (Hard-disk LED)

Shows activity on primary and secondary IDE drive. Connect the cathode of the LED to the H_LED pin and the anode of the LED to the VCC supply voltage pin. The required 470R resistor is already mounted on board of the coolMONSTER/P3 and coolMONSTER/C3.

SPEAKER (Speaker Out)

This pin controls the speaker output. Connect the loudspeaker between this pin and GND.

RESIN (Reset Input)

You can use this pin as a low active hardware reset.

Connect with GND to force a system hard reset condition.

LILED (Link Integrity LED)

This pin indicates link integrity on the LAN. If the link is valid in either 10 or 100 MPS, the LED is on; if link is invalid, the LED is off. Connect the cathode of the LED to the LILED pin and the anode of the LED to the VCC supply voltage pin. The required 470R resistor is already mounted on board of the coolMONSTER/P3 and coolMONSTER/C3.

SPEEDLED (Speed LED)

This pin indicates the speed of the LAN. The LED will be on at 100MPS and off at 10MPS.

Connect the SPEEDLED pin with the cathode of a LED. Connect the cathode of the LED to the SPEEDLED pin and the anode of the LED to the VCC supply voltage pin. The required 470R resistor is already mounted on board of the coolMONSTER/P3 and coolMONSTER/C3.

ACTLED (Activity LED)

This pin indicates either transmit or receive activity. When activity is present, the activity LED is on; when no activity is present, the LED is off. Connect the cathode of the LED to the ACTLED pin and the anode of the LED to the VCC supply voltage pin. The required 470R resistor is already mounted on board of the coolMONSTER/P3 and coolMONSTER/C3.

USB2-/USB2+ (Universal Serial Bus Port 2 -/+)

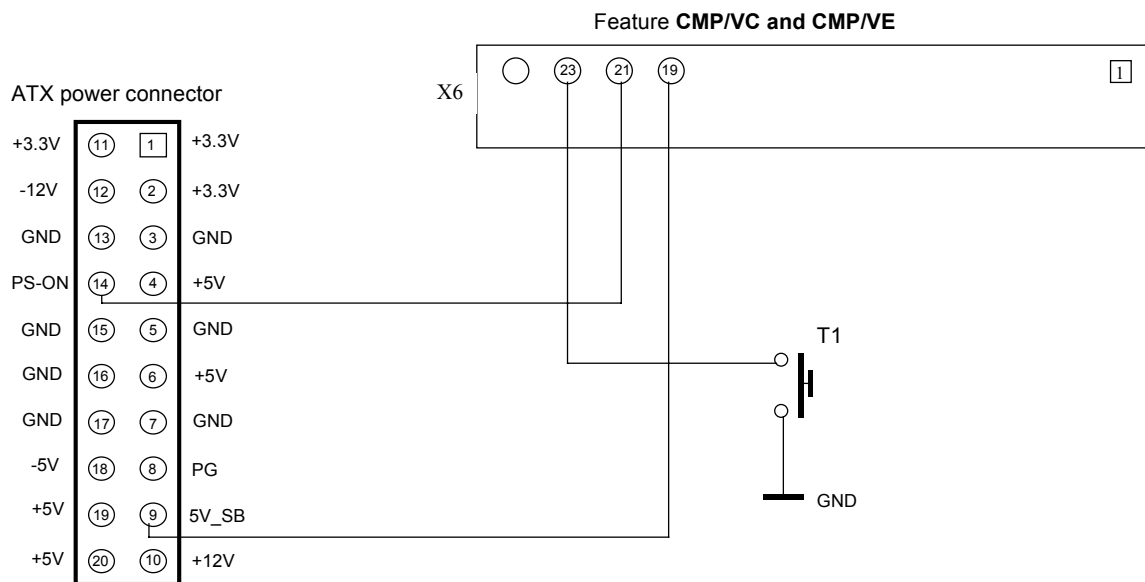
This is the serial data pair for USB Port 2.

5V_SB, PS-ON, PWRBTN (ATX Power Support Signals)

For ATX support please connect the signals in the following manner:

- Connect **Pin 19** of feature connector X6 with **Pin 9** of ATX power connector (5V standby).
- Connect **Pin 21** of feature connector X6 with **Pin 14** of ATX power connector (power supply on).

When connected in the following manner, (Pin 23 of feature connector X6 – Button power on), you can switch the board on with the key T1 and switch it off by using the power down option implanted in the particular OS such as Windows 9X.



NC (Internal Use Only!)


Do not connect any connector to this pin. Otherwise you could create a hazard to system, make the system instable, or even destroy it.

21. FAN INTERFACE

Use the fan 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.

21.1 Connector

The fan interface is available on connector J3 (3 pins).

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

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

21.2 Configuration

You do not need to configure this feature.

22. POWER INTERFACE

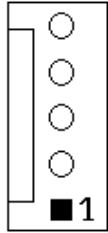
The coolMONSTER/P3 and coolMONSTER/C3 are not a replacement for a power supply. They are +5V only boards. Additional voltages (+12V, -12V, and -5V as well as +3.3V for external PCI-devices) are not generated onboard. If peripheral devices require these voltages, they have to be supplied through the backplane and the PISA bus.

In some applications, the COOLMONSTER/P3 and COOLMONSTER/C3 are intended for use as stand-alone modules without a backplane. You need to have a power connector available on the boards for direct power supply.

Power signals on the feature connector (X6) are not meant for power supply purpose.

22.1 Connector

The power connector is available through the X4 connector (5 pins) and enables +5V and +12V power supplies to the system. For ATX power supply signals refer to additional information in the Feature Connector section.

Header	Pin	Signal Name	Function
	1	+12V	+12V
	2	VCC (*)	+5V
	3	VCC (*)	+5V
	4	GND	Ground
	5	GND	Ground

The connector is from manufacturer MOLEX. To find the location of the connector and obtain information about mating connector, see Appendix E: Connector Layout.

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

- the wires have the right diameter to withstand maximum available current
- the enclosure of the peripheral device fulfils fire-protection requirements
- of IEC/EN 60950.

The current of the pins on this connector is limited to 7A/pin.

22.2 Configuration

In the BIOS Setup Utility, you can set up a power management system 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 use the Hardware Monitor Submenu in the BIOS Setup Utility to obtain information on power plane voltages and to check the temperatures on the CPU die.

23. WATCHDOG TIMER

The watchdog timer is integrated in the Winbond W83977EF of the coolMONSTER/P3 and coolMONSTER/C3 and can issue a reset to the system or generate a nonmaskable 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.

23.1 Configuration

You can set the watchdog timer to disabled, reset or NMI mode. You can specify the timeout (trigger period) from 10 seconds up to 10 minutes. 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.

23.2 Programming

23.2.1. Initialization

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

23.2.2. 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 by using low-level programming or with help of the JIDA programmer's interface.

For information about low-level programming for the watchdog timer, refer to Application Note WdogLEU6_E???.DOC, which you can request from Kontron technical support.

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.

24. SYSTEM CONTROLLER

Winbond's W83782D monitors several critical hardware parameters of the system, including power-supply voltages, fan speeds, and temperatures, which are very important for a high-end computer system to remain stable and properly. The W83782D is connected via the system management (SM) bus to the chipset.

The following parameters are monitored:

- CPU temperature with on-die diode (T CPU)
- CPU core voltage (VCore)
- +3.3V from onboard DC/DC (VCC 3.3V)
- +5V (VCC 5V)
- Transceiver Logic voltage (VTT)
- Stand by voltage (VSB)
- CPU fan speed

24.1 Connector

There is no physical connector to this chip.

24.2 Configuration

There are several monitoring programs on the market that can work with SM-Bus controllers like the W83782D (e.g. MBM Motherboard Monitor or Hardware Monitor). Please search the Web for such monitoring programs.

KONTRON does not provide support for these tools, because they are not sold from us.

To monitor temperatures and voltages on the board, use the Hardware Monitor Submenu in the BIOS Setup Utility to obtain information on power plane voltages and to check the temperatures on the CPU die.

25. APPENDIX A: SYSTEM-RESOURCE ALLOCATION

25.1 *Interrupt Request (IRQ) Lines*

IRQ #	Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	No	Note (1)
4	COM1	No	Note (1)
5	-	Yes	Note (2)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	-	Yes	
10	COM4	No	Note (1)
11	COM3	No	Note (1)
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1)
15	IDE1	No	Note (1)

Notes:

(1) If the „used for“ device is disabled in setup, the corresponding interrupt is available for other devices.

(2) Possible setting for LPT1. IRQ7 is the default setting.

25.2 *Direct Memory Access (DMA) Channels*

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

Notes:

(1) If the „used for“ device is disabled in setup, the corresponding DMA channel is available for other devices.

(2) Possible setting for LPT1 if configured for ECP mode.

25.3 Memory Map

The coolMONSTER/P3 and coolMONSTER/C3 processor modules can support up to 256MB/512MB of memory depending on the chipset. The first 640KB of DRAM are used as main memory.

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

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

Upper Memory	Use	Available	Comment
A0000h – BFFFFh	VGA Memory	No	Mainly used by graphic adapter cards. If a PCI graphic card is in the system this memory area is mapped to the PCI bus.
C0000h – CBFFFh	VGA BIOS	No	
CC000h – DFFFFh		Yes	Free for ISA bus or shadow RAM in standard configurations. If onboard LAN RPL ROM is enabled, 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 – EFFFFh	System BIOS	No	
FFFFh – F0000h	System BIOS	No	

25.3.1. Using Expanded Memory Managers

coolMOSTER/P3 or coolMONSTER/C3 extension BIOSes may be mapped to an upper memory area. (See 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 for location of extension BIOS).

MS-DOS Example

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

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

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

25.4 I/O Address Map

The I/O-port addresses of the COOLMONSTER/P3 and COOLMONSTER/C3 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	Use	Available	Comment
000h-01Fh	Master DMA Controller	No	
020h-03Fh	Master Interrupt Controller	No	
040h-05Fh	Timer / Counter	No	
060h-06Fh	Keyboard Controller	No	
070h-077h	Real Time Clock / CMOS / NMI-Disable	No	
080h	Post Diagnostic	No	
081h-08Fh	DMA Page Register	No	
090h-09Fh	System Control	No	
0A0h-0BFh	Slave Interrupt Controller	No	
0C0h-0DFh	Slave DMA Controller	No	
0E0h-0FFh	Available for system control only	No	
100h-10Fh	System Control	No	KONTRON specific area.
170h-177h	Hard Disk Drive (Secondary)	No	Available if IDE port not used.
1F0h-1F7h	Hard Disk Drive (Primary)	No	Available if IDE port not used.
278h-27Fh	LPT	Yes	Possible address for LPT
2E8h-2EFh	COM4	No	Available if COM4 not used.
2F8h-2FFh	COM2	No	Available if COM2 not used.
370h-377h	Configuration space for SMC controller	No	
378h-37Fh	LPT	No	Available if LPT not used.
3BCh-3C3h	LPT	Yes	Possible address for LPT
3E8h-3EFh	COM3	No	Available if COM3 not used.
3F8h-3FFh	COM1	No	Available if COM1 not used.

25.5 Peripheral Component Interconnect (PCI) Devices

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

PCI Device (IDSEL)	PCI IRQ	REQ / GNT	Comment
AGP Graphic	INTA#	-	
Ethernet (AD13)	INTD#	REQ4 / GNT4	
Sound (AD14)	INTA#	REQ3 / GNT3 (*)	
USB Controller	INTD#	-	Integrated in Intel chipset.

Note: The PISA specification allows 4 external masters (REQ0, REQ1, REQ2, REQ3). Because REQ3 is already used by onboard Sound, the 4th external PCI slot is not capable of bus master operation.

26. APPENDIX B: BIOS OPERATION

The COOLMONSTER/P3 and COOLMONSTER/C3 come with Phoenix BIOS 4.0, Release 6.0, 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.

26.1 *Determining the BIOS Version*

To determine the BIOS version of the coolMONSTER/P3 and coolMONSTER/C3, 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 6.0
Copyright 1985-2000 Phoenix Technology Ltd.
All Rights Reserved
Kontron(R) BIOS Version <LEU6R124>
(C)Copyright 2003 Kontron Embedded Modules GmbH
```

Whenever you contact technical support about BIOS issues, providing a BIOS version <LEU6R??> 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: YN3050103

CPU = Intel (R) Mobile Celeron (TM) processor 400MHz
640K System RAM Passed
63M Extended RAM Passed
128K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed

UMB upper limit segment address: E787
```

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

In the example above, the board with the serial number YN3050103 was manufactured in year 2003, lot 5 of that year, and is board number 103 of that lot.

26.2 Configuring the System BIOS

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

BIOS setup menus represent those found in most models of the COOLMONSTER/P3 and COOLMONSTER/C3. The BIOS setup utility for specific models can differ slightly.

Note:

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

26.2.1. 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.

26.2.2. General Information

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

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

Menu Bar

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

Legend Bar

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

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

Selecting an Item

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

Displaying Submenus

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

Item Specific Help Window

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

General Help Window

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

26.3 Main Menu

Feature	Option	Description
System Time	HH:MM:SS	Sets system time. Press <Enter> to move to MM or SS.
System Date	MM/DD/YYYY	Sets the system date. Press <Enter> to move to DD or YYYY.
Legacy Diskette A	360 Kb, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 Kb, 3 ½ “ 1.44/1.25 MB, 3 ½ “ 2.88 MB, 3 ½ “ Disabled	Select the type of floppy disk drive.
Legacy Diskette B	360 Kb, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 Kb, 3 ½ “ 1.44/1.25 MB, 3 ½ “ 2.88 MB, 3 ½ “ Disabled	Select the type of floppy disk drive.
▸ Primary Master	Autodetected drive	Displays result of PM autotyping.
▸ Primary Slave	Autodetected drive	Displays result of PS autotyping.
▸ Secondary Master	Autodetected drive	Displays result of PM autotyping.
▸ Secondary Slave	Autodetected drive	Displays result of PS autotyping.
▸ Memory Shadow	Submenu	Opens Memory Shadow submenu.
▸ Memory Cache	Submenu	Opens Memory Cache submenu.
System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory	N/A	Displays amount of extended memory detected during bootup.

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

26.4 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 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.
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	Selects the UDMA mode used for moving data to/from the drive. Autotype the drive to select the optimum transfer mode. This feature is autodetected.

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

26.4.1. Memory Shadow Submenu

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

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

26.4.2. Memory Cache Submenu

Feature	Option	Description
Memory Cache	Disabled Enabled	Enables or Disables L2 cache.
Cache System BIOS area	Uncached Write Protected	Controls caching of System BIOS area.
Cache Video BIOS area	Uncached Write Protected	Controls caching of Video BIOS area.
Cache Extended Memory area	Uncached Write Through Write Protected Write Back	Controls caching of system memory above 1MB.
CC00 – CFFF D000 – D3FF D400 – D7FF D800 – DBFF DC00 – DFFF	Disabled Write Through Write Protected Write Back	Disabled: block is not cached. Write Through: Write are cached and sent to main memory at once. Write Protect: Writes are ignored. Write Back: Writes are cached but not sent to main memory until necessary.

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

26.4.3. Advanced Menu

Feature	Option	Description
▸ Advanced Chipset Control	Submenu	Opens Advanced Chipset Control submenu.
Plug & Play (PNP) OS Installed	Yes No	If your system has a PNP OS, such as Win98, select Yes to let the OS configure PNP devices not required for boot. Selecting No makes the BIOS configure them.
Reset Configuration Data	No Yes	Yes erases all configuration data in Extended System Configuration Data (ESCD), which stores the configuration settings for plug-in devices. Select Yes when required to restore the manufacturer's defaults.
Secured Setup Configuration	Yes No	Yes prevents a Plug and Play OS from changing system settings.
▸ PCI Configuration	Submenu	Opens PCI Advanced submenu.
PS/2 Mouse	Auto Detect Enabled Disabled	Disabled prevents installed PS/2 mouse from functioning but frees up IRQ12. Enabled forces the PS/2 mouse port to be enabled regardless if a mouse is present. Autodetect enables the PS/2 mouse only if present.
▸ Keyboard Features	Submenu	Opens keyboard features submenu.
▸ I/O Device Configuration	Submenu	Opens I/O Device Configuration submenu.
▸ Hardware Monitor	Submenu	Opens Hardware Monitor submenu.
▸ Temperature Management	Submenu	Opens Temperature Management Submenu
Large Disk Access Mode	DOS Other	Select DOS if you have DOS. Select Other if you have another OS, such as UNIX. A large disk has more than 1024 cylinders, more than 16 heads, or more than 63 sectors per track.
Halt On Errors	Yes No	Determines if errors cause system to halt.

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

26.4.4. Advanced Chipset Control Submenu

Feature	Option	Description
Graphic Aperture	4M, 8M, 16M, 32M, 64M , 128M, 256M	Select the size of the AGP graphics aperture.
Enable Memory Gap	Disabled Conventional Extended	Turns system RAM off and frees address space (512kB-640kB or 15MB-16MB) for use with an option card.
ECC Config	Disabled EC ECC ECC Scrub	If all memory in the system supports ECC (x72) this option selects from no ECC, checking only, checking and correction or checking and correction with scrubbing.
SERR signal condition	None Single bit Multiple bit Both	Select ECC error conditions where SERR# will be asserted.
8-bit I/O Recovery	3.5, 11.5, 4.5 , 5.5, 6.5, 7.5, 8.5, 9.5, 10.5	ISA clock cycles inserted between back-to-back I/O.
16-bit I/O Recovery	3.5, 6.5, 4.5 , 5.5, 7.5	See above.

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

26.4.5. PCI Configuration Submenu

Feature	Option	Description
PCI IRQ Line 1	Disabled Auto Select IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for PCI interrupt INT A/B/C/D. Select Auto to let BIOS assign IRQ.
PCI IRQ Line 2	Disabled Auto Select IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for PCI interrupt INT A/B/C/D. Select Auto to let BIOS assign IRQ.
PCI IRQ Line 3	Disabled Auto Select IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for PCI interrupt INT A/B/C/D. Select Auto to let BIOS assign IRQ.
PCI IRQ Line 4	Disabled Auto Select IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for PCI interrupt INT A/B/C/D. Select Auto to let BIOS assign IRQ.
▸ PCI/PNP ISA UMB Region Exclusion	Submenu	Opens UMB Region Exclusion submenu.
▸ PCI/PNP ISA IRQ Resource Exclusion	Submenu	Opens IRQ Exclusion submenu.
Default Primary Video Adapter	AGP PCI	In a system with an AGP and a PCI video adapter, user can select adapter that BIOS initializes.
ISA graphics device installed	No Yes	PCI devices may need to know if an ISA graphics device is installed in the system in order to enable that card to function correctly
Assign IRQ to PCI VGA	No Yes	Determines if a PCI VGA device is assigned an IRQ. Win98SE has shutdown problems if a PCI VGA does not have an IRQ assigned.
PCISA PIRQ Routing (*)	Disabled Enabled	Select Disabled if you use a PISA backplane. Select Enabled if you use a PCISA backplane. PCISA backplanes don't follow PCI 2.1 specification in interrupt routing!

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

(*) Available since BIOS version LEU6R124.

26.4.6. PCI/PNP ISA UMB Region Exclusion Submenu

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

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

26.4.7. 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. (Visible only if primary IDE disabled.)
IRQ15	Available Reserved	See above. (Visible only if secondary IDE disabled.)

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

26.4.8. Keyboard Features Submenu

Feature	Option	Description
Numlock	Auto On Off	On or Off turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric key pad.
Key Click	Disabled Enabled	Turns audible key click on.
Keyboard auto-repeat rate	30/sec , 26.7/sec, 21.8/sec, 18,5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Sets the number of times to repeat a keystroke per second if you hold the key down.
Keyboard auto-repeat delay	¼ sec, ½ sec , ¾ sec, 1 sec	Sets the delay time after the key is held down before it begins to repeat the keystroke.

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

26.4.9. I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	Both , Primary Secondary, Disabled	Enables onboard PCI IDE devices.
Floppy Disk controller	Auto, Disabled Enabled	Enables onboard FDC controller.
Base I/O address	Primary , Secondary	Selects base address of onboard FDC controller. (Primary = 3F0h, Secondary = 370h)
Floppy Drive Swap	Disabled Enabled	Swaps drive A and B if enabled.
Serial Port A Serial Port B	Disabled Enabled Auto	Disabled turns off port. Enabled requires user to enter base I/O address and IRQ. Auto makes BIOS configure port.
Serial Port C Serial Port D	Disabled Enabled Auto	Disabled turns off port. Enabled requires user to enter base I/O address and IRQ. Auto makes BIOS configure port.
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.
IRQ (Port C and D)	IRQ 10, IRQ 11	Select IRQ of Port C and D.
Mode (Port B)	Normal , IrDA, ASK-IR	Sets mode for Serial Port B.
Interface (Port D)	RS232 , RS485	Select whether this port operates in RS232 or RS485/RS422 operation
Parallel Port	Disabled Enabled Auto	Disabled turns off port. Enabled requires user to enter base I/O address and IRQ. Auto makes BIOS configure port.
Mode	Output only, Bi-directional, EPP, ECP	Sets the mode for 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.
Legacy USB Support (*)	Disabled Enabled	Enable or disable support for USB keyboard and mouse. Enable for use with non-USB aware OSES such as UNIX and DOS.
▸ Watchdog Settings	Submenu	Opens Watchdog Settings submenu.

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

(*) If BIOS Legacy USB Support is enabled, a 16kB block of upper memory in the area from CC000h to E7FFFh will be used for USB. This area is located dynamically from the upper location at E4000h-E7FFFh down to the lower location at CC000h-CFFFFh. The BIOS reports a resource conflict if it can't find a free 16kB block in that area.

26.4.10. Watchdog Settings Submenu

Feature	Option	Description
Mode	Disabled Reset NMI	Select watchdog operation mode.
Timeout	10s, 20s, 30s , 1m, 2m, 3m, 5m, 10m	Max. trigger period.

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

26.4.11. Hardware Monitor Submenu

This submenu shows the current voltages and temperatures of the system.

Voltage/Temperature	Explanation
T (CPU)	Reports current CPU die temperature.
VCore	Reports current CPU core voltage in Volt.
VCC (3.3V)	Reports current 3.3V onboard voltage in Volt.
VCC (5V)	Reports current 5V external supply voltage in Volt.
VTT	Reports current GTL voltage in Volt.
VSB	Reports current Standby voltage in Volt.
CPU Fan 1 Speed	Reports current speed of connected fan.

26.4.12. Temperature Management Submenu

Feature	Option	Description
Auto Thermal Throttling	Disabled Enabled	Enables reducing of CPU speed for thermal protection.
CPU Performance	13% 25% 50% 75%	Percentage of CPU performance when Auto Thermal Throttling is active.
Temperature	75 °C 80 °C 85 °C 90 °C 95 °C	Over-temperature to enable Auto Thermal Throttling in degrees Celsius.
Hysteresis	3 °C 4 °C 5 °C 6 °C	Amount of degrees the temperature must decrease before CPU clock gets restored to 100% again.

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

26.5 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 Supervisor Password (*)	Up to seven alphanumeric characters	Pressing <Enter> displays the dialog box for entering the user password. In related systems, this password gives full access to setup.
Set User Password (*)	Up to seven alphanumeric characters	Pressing <Enter> displays the dialog box for entering the user password. In related systems, this password gives restricted access to setup.
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.
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.
Diskette access	User Supervisor	Enabled requires supervisor password to access floppy disk.

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

(*) Enabling Supervisor Password requires a password for entering Setup.

-- Passwords are not case sensitive.

-- User and Supervisor passwords are related. A User password is possible only

-- if a Supervisor password exists.

26.6 Power Menu

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

- **Full On State**
- **Standby State with Partial Power Reduction**
- **Suspend State with Full Power Reduction**

Feature	Option	Description
Power Savings	Disabled Customized Maximum Power Saving Maximum Performance	Maximum options select predefined values. Select Customized to make your own selections from the following fields. Disabled turns off all power management.
Standby Timeout	Off , 1min, 2min, 4min, 6min, 8min, 12min, 16min	Inactivity period required to put system in Standby mode (partial power shutdown).
Auto Suspend Timeout	Off , 5min, 10min, 15min, 20min, 30min, 40min, 60min	Inactivity period required after Standby to Suspend mode (maximum power shutdown).
Resume On Time	Off , On	On wakes up the system at a specific time.
IDE Drive x Monitoring	Disabled , Enabled	Enable activity on the IDE device to keep the system awake.
PCI Bus Monitoring	Disabled , Enabled	Enable activity on the PCI bus to keep the system awake.
Bus Utilization Threshold	0 to 255	Enter the number of data phases detected in a 256 clock cycle period.
Bus Percentage Threshold	0 to 100	Enter the percentage of time that the bus utilization threshold must be exceeded in order to reload the standby timer.

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

26.7 Boot Menu

Feature	Option	Description
Floppy Check	Disabled Enabled	Enabled verifies floppy type on boot; disabled speeds boot.
Summary Screen	Disabled Enabled	If enabled, a summary screen is displayed just before booting the OS to let the user see the system configuration.
QuickBoot Mode	Disabled Enabled	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Dark Boot	Disabled Enabled	If enabled, system comes up with a blank screen instead of the diagnostic screen during bootup.
▸ Boot Device Priority	Submenu	Opens boot device priority submenu.
Onboard LAN RPL ROM	Disabled Enabled	Enables RPL ROM of the onboard LAN controller. Supports Intel PXE. Check the Intel Web site for more information.

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

(*) A CMOS battery backup must be present for this selection to work properly.

26.7.1. Dark Boot

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

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

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

26.8 **MultiBoot 3**

MultiBoot 3 is a boot utility integrated in the PhoenixBIOS 4.0. MultiBoot 3 expands your boot options by letting you choose your boot device—a hard disk, floppy disk, CD-ROM or network card. 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 Submenu.

Multiboot 3 allows you to boot from the following devices:

- **Hard Drives**
- **Zip**
- **LS-120**
- **CD-ROM**

MultiBoot 3 consists of the following submenus:

- **Boot Device Priority**
- **Removable Devices**
- **Hard Drive Priority**
- **Network Boot Priority**
- **Boot First**

Boot Device Priority Submenu

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

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

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

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

Removable Devices Submenu

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

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

Hard Drive Priority Submenu

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

Network Boot Priority Submenu

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

26.8.1. Boot First Submenu

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

Use the menu to select a following option:

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

26.9 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.

26.10 Kontron BIOS Extensions

Besides the Phoenix System BIOS, the coolMONSTER/P3 and coolMONSTER/C3 come with a few BIOS extensions that support additional 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**
- **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 will not load.

26.10.1. 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.

26.10.2. LAN RPL ROM

If the onboard LAN RPL ROM is enabled in the system BIOS setup, an optional ROM for the Ethernet controller loads into memory during boot up. This optional ROM allows you to boot the coolMONSTER/P3 and coolMONSTER/C3 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 RPL ROM extension is loaded into the first free memory area between C0000hex and E0000hex and a 32K block of memory is shadowed.

26.11 Updating or Restoring BIOS Using PhoenixPflash

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

Use PhoenixPflash to:

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

26.11.1. Flashing a BIOS

Use the following procedure to update or restore a BIOS.

1. Download the Phoenix Pflash compressed file, CRDxLEU6.ZIP, from the KONTRON Embedded Modules Web site or contact your local technical support for it. It contains the following files:

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

2. Install Phoenix Pflash on a hard disk by unzipping the content of CRDxLEU6.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 copies four files onto the diskette.

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

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

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

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

```
PHLASH <bios name>           (Example: PHLASH LEU6R123.ROM)
```

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

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

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

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

26.11.2. Preventing Problems When Updating or Restoring BIOS

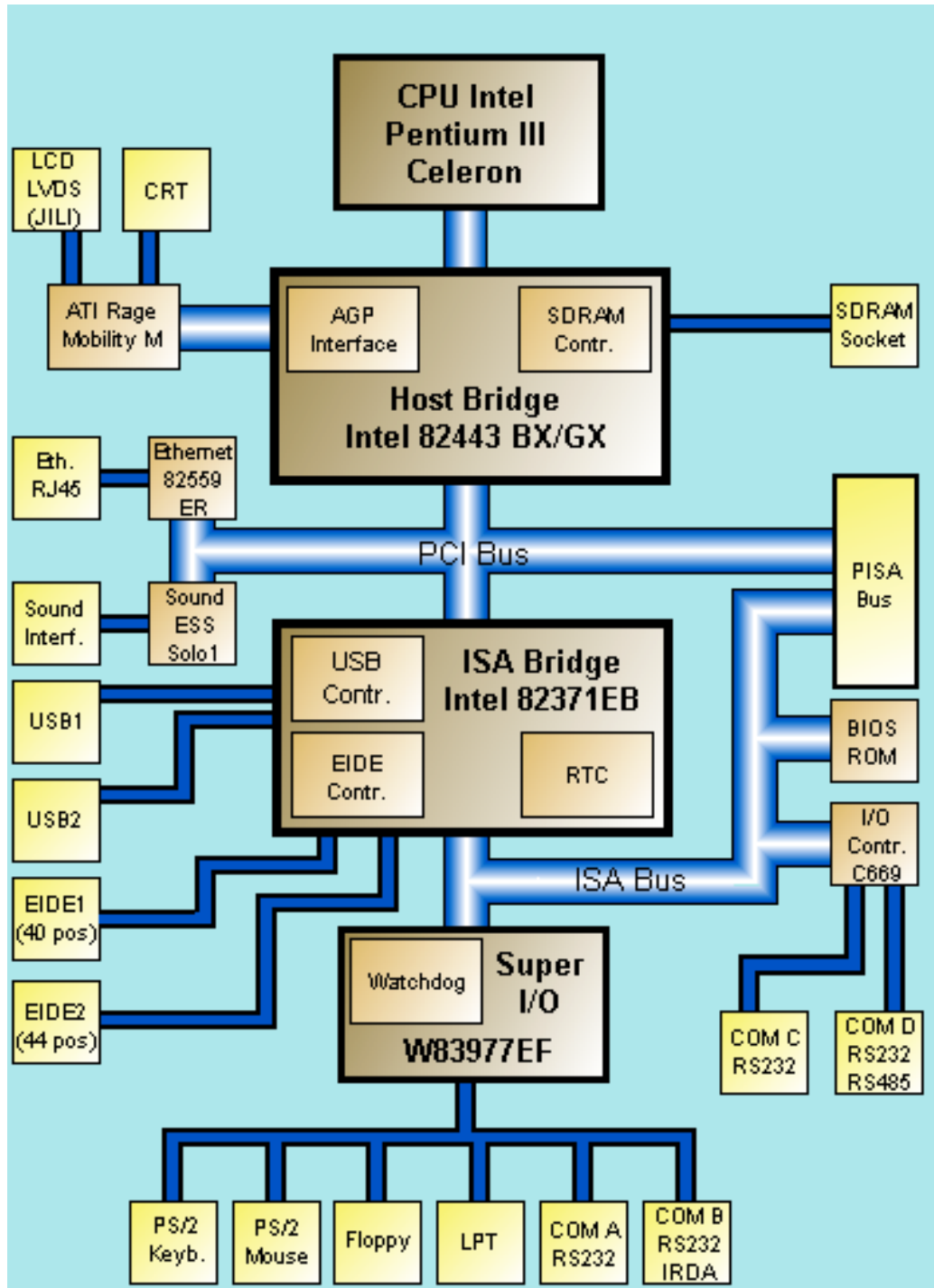
Updating the BIOS represents a potential hazard. Power failures or fluctuations can occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

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).

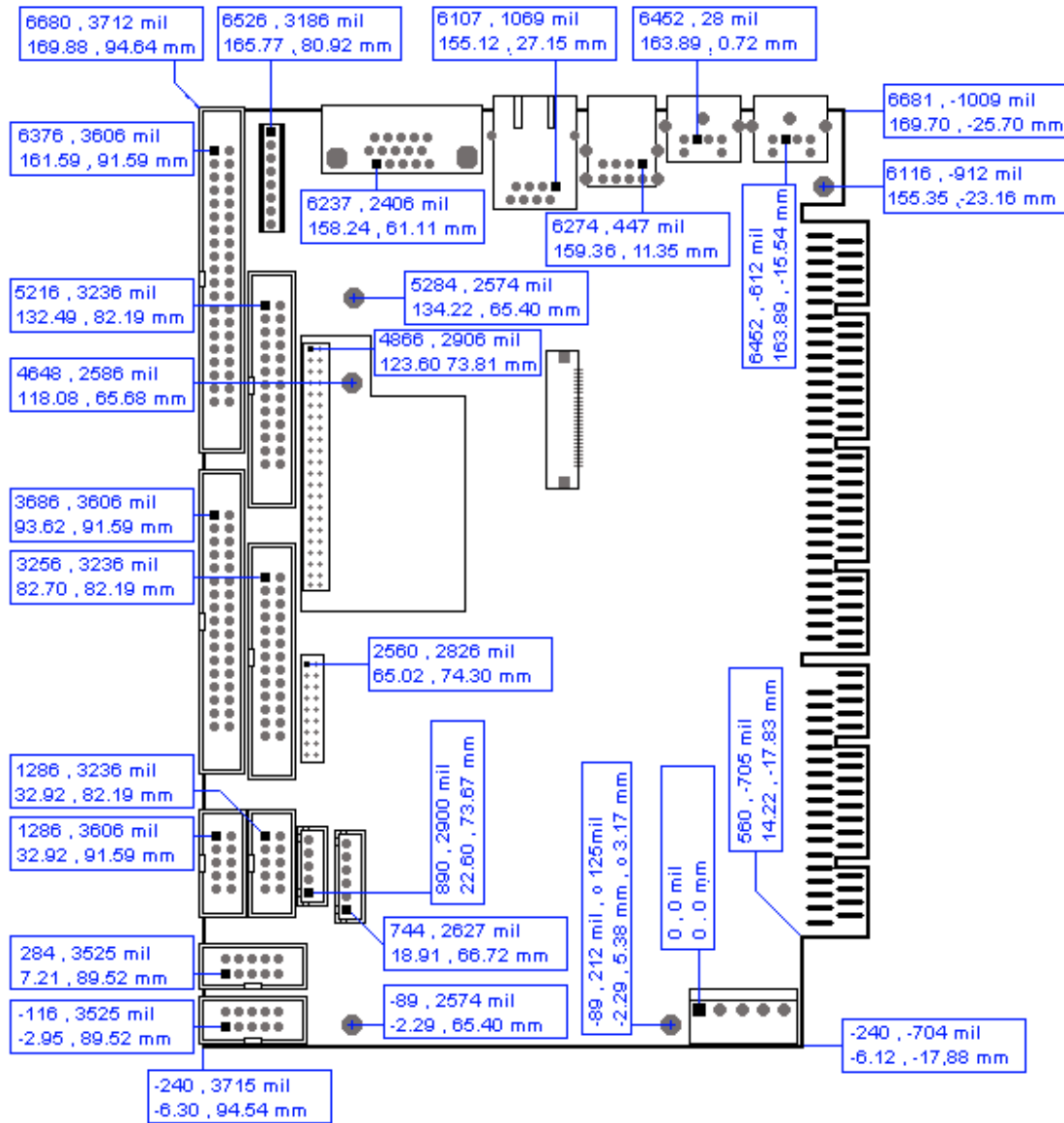
Additionally, the end user can insert an update key into the parallel port (LPT1 only) to force initiating the boot block recovery routine.

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.

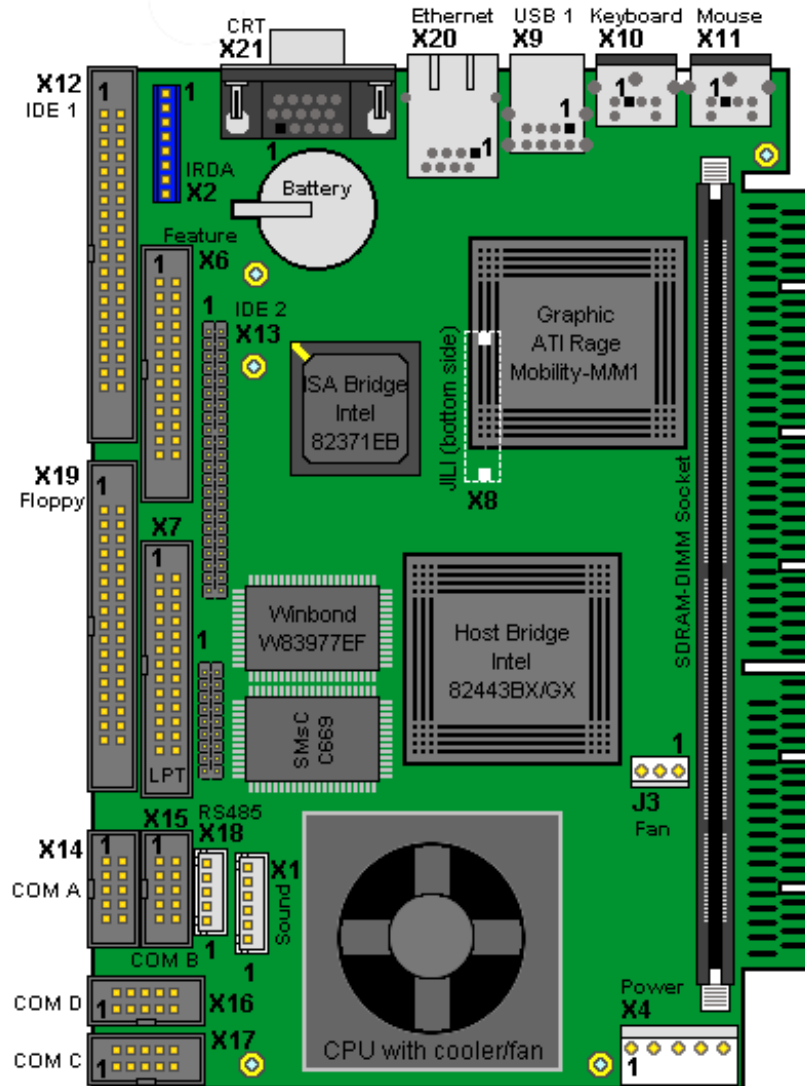
27. APPENDIX C: BLOCK DIAGRAM



28. APPENDIX D: MECHANICAL DIMENSIONS



29. APPENDIX E: CONNECTOR LAYOUT



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

29.1 Connector Functions and Interface Cables

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

Connector	Function	Mating Connector	Available Cable	Cable Description
X1	Sound Connector	2.54mm 6 pos. (JST XHP-6 with crimp contacts JST SXH-001T-PO.6 Or JST SXH-002T-PO.6)	KAB-SOUND-CMP (PN96063-0000-00-0)	Cable with open ends
X2	IrDA Connector	2.54mm 8 pos. (BERG DUBOX 65240-008 with crimp contacts BERG DUBOX 76357-301)		
X4	Power Connector	3.96mm 5 pos. (Molex SPOX 09-50-1051 with crimp contacts MOLEX SPOX 08-70-1028)		
X6	Feature	2.54mm 26 pos. (AMP 2-215882-6 or compatible)		
X7	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 adaptation.
X12	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
X13	Secondary IDE Hard Disk Interface Connector	2mm 44 pos. (Berg 89361-144 or compatible)	KAB-IDE-25 (PN 96020-0000-00-0) or KAB-IDE-2MM (PN 96021-0000-00-0)	For 3.5" HDD or 2.5" HDD.
X14, X15, X16, X17	Serial Interface Connectors (COM A - COM D)	2.54mm 10 pos. (AMP 1-215882-0 or compatible)	KAB-DSUB9-2 (PN 96017-0000-00-0)	For DSUB 9 adaptation.
X18	RS485 Interface Connector (COM D)	2.54mm 5 pos. (JST XHP-5 with crimp contacts JST SXH-001T-PO.6 or JST SXH-002T-PO.6)		
X19	Floppy Drive Interface Connector	2.54mm 34 pos. (AMP 3-215882-4 or compatible)	KAB-FLOPPY-1 (PN 96018-0000-00-0)	For 3.5" floppy

29.2 Pinout Table

Pin	COM A - COM D	COM D RS485	LPT	Floppy	Primary IDE	Secondary IDE	Feature	CRT
	X14-X17	X18	X7	X19	X12	X13	X6	X21
1	DCD	485_1RXD+	/STB	GND	/HDRST	/HDRST	KBCLK	RED
2	DSR	485_1RXD-	/AFD	/RPM	GND	GND	MSCLK	GRN
3	SIN	GND	PD0	GND	PIDE_D7	SIDE_D7	KBDAT	BLU
4	RTS	485_1TXD+	/ERR	NC	PIDE_D8	SIDE_D8	MSDAT	NC
5	SOUT	485_1TXD-	PD1	NC	PIDE_D6	SIDE_D6	VCC (*)	GND
6	CTS		/INIT	NC	PIDE_D9	SIDE_D9	-5V (*)	GND
7	DTR		PD2	GND	PIDE_D5	SIDE_D5	-12V (*)	GND
8	RI		/SLIN	/INDEX	PIDE_D10	SIDE_D10	GND	GND
9	GND		PD3	GND	PIDE_D4	SIDE_D4	H_LED	NC
10	VCC (*)		GND	/MTR0	PIDE_D11	SIDE_D11	internal use!	GND
11			PD4	GND	PIDE_D3	SIDE_D3	internal use!	NC
12			GND	/DR1	PIDE_D12	SIDE_D12	SPEAKER	DDA
13			PD5	GND	PIDE_D2	SIDE_D2	Not used	HSYNC
14			GND	/DR0	PIDE_D13	SIDE_D13	Not used	VSYNC
15			PD6	GND	PIDE_D1	SIDE_D1	GND	DCK
16			GND	/MTR1	PIDE_D14	SIDE_D14	RESIN	
17			PD7	GND	PIDE_D0	SIDE_D0	internal use!	
18			GND	/FDIR	PIDE_D15	SIDE_D15	internal use!	
19			/ACK	GND	GND	GND	5V SB	
20			GND	/STEP	NC	NC	LILED	
21			/BUSY	GND	/PIDE_DRQ	/SIDE_DRQ	PS_ON	
22			GND	/WDATA	GND	GND	SPEEDLED	
23			PE	GND	/PIDE_IOW	/SIDE_IOW	PWRBTN	
24			GND	/WGATE	GND	GND	ACTLED	
25			/SLCT	GND	/PIDE_IOR	/SIDE_IOR	USB2-	
26			VCC (*)	/TRK0	GND	GND	USB2+	
27				GND	PIDE_RDY	SIDE_RDY		
28				/WRTPRT	PRI_PD1	SEC_PD1		
29				NC	/PIDE_AK	/SIDE_AK		
30				/RDATA	NC	GND		
31				GND	SIRQI	SIRQII		
32				/HDSEL	NC	NC		
33				GND	PIDE_A1	SIDE_A1		
34				/DSKCHG	NC	NC		
35					PIDE_A0	SIDE_A0		
36					PIDE_A2	SIDE_A2		
37					/PIDE_CS1	/SIDE_CS1		
38					/PIDE_CS3	/SIDE_CS3		
39					DASP_P	DASP_S		
40					GND	GND		
41						VCC (*)		
42						VCC (*)		
43						GND		
44						NC		

Pin	Ethernet	IRDA	Sound	PS/2 Keyboard	PS/2 Mouse	USB 1	Power	Fan
	X20	X2	X1	X10	X11	X9	X4	J3
1	TXD+	NC (**)	RECHTS	KBDAT	MSDAT	USB_5V	+12V (*)	Sense
2	TXD-	NC (**)	ASGND	MSDAT	NC	USB1-	VCC (*)	5V (*)
3	RXD+	IRTX	LINKS	KEYGND	KEYGND	USB1+	VCC (*)	GND
4	NC (**)	GND	AUXAR_C	KEYVCC (*)	KEYVCC (*)	USB_GND	GND	
5	NC (**)	IRRX	MIC_C	KBCLK	MSCLK		GND	
6	RXD-	VCC (*)	AUXAL_C	MSCLK	NC			
7	NC (**)	NC (**)						
8	NC (**)	FIR						

Notes: (*) To protect external power lines of peripheral devices, make sure that
-- the wires have the right diameter to withstand maximum available current
-- the enclosure of the peripheral device fulfils fire-protection requirements
-- of IEC/EN 60950
(**) All lines NC are for internal use only. Don't connect anything to these lines!

30. APPENDIX F: PC ARCHITECTURE INFORMATION

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

30.1 Buses

30.1.1. PISA

- PISA Bus Specification Version 1.7 June 1997

30.1.2. 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

30.1.3. 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.

30.2 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

30.3 Ports

30.3.1. 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.

30.3.2. 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.

30.3.3. 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.

30.4 *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

31. APPENDIX G: DOCUMENT REVISION HISTORY

Version	Date	Edited by	Changes
LEU6M101	05.10.00	WKA	First preliminary release.
LEU6M110	06.02.01	WKA	First final release.
LEU6M111	05.03.01	WKA	Added warning for external battery. Replaced PHLASH with JAP0034.
LEU6M113	26.03.01	WKA	Added Nordic warnings for lithium battery. Added RS485 schematic.
LEU6M114	06.07.01	WKA	Added mechanical information.
LEU6M115	11.01.02	WKA	Corrected description feature connector Pin 14. Added typical power consumption.
LEU6M116	18.03.02	WKA	Added and corrected height on bottom in mechanical specification, power consumption on 850 MHz.
LEU6M117	23.04.02	WKA	<ul style="list-style-type: none"> • Added height with bigger fan on 850 MHz on top. • Added slot restriction on blocking slots on some backplanes. • Added operating temperature on 850 MHz. • Deleted reminder in Setup Security Menu. • Added Hardware Monitor and Temperature Management Menu in Advanced Setup. • Added clock throttling description on 8.7 system controller. • Removed external RTC battery pin on feature connector. • Removed documentation part number • Removed information that manuals no longer sold.
LEU6M118	03.05.02	DMA	Removed Virus Check Reminder in BIOS setup. Removed PCI Device submenus in BIOS setup. Added Temperature Management menu in BIOS setup. Added Hardware Monitoring menu in BIOS setup.
LEU6M119	16.05.02	DMA	Added Ultra DMA mode setup node in Master/Slave submenus.
LEU6M11A	11.09.02	WKA	Added Ultra DMA mode setup node in Master/Slave submenus.
LEU6M120	18.03.04	BHO/JL	Manual brought up to Kontron style. Added drawings. Added and corrected minor technical information.
LEU6M121	10.09.04	BHO	Corrected support addresses, removed USB boot devices, added information about NC signals
LEU6M122	15.03.05	BHO	Added PISA bus chapter, added +3.3V information for external PCI devices, update key is parallel port, minor changes