

# coolMONSTER/S

## User's Guide

Document Revision 1.4



**kontron**  
*... always a Jump ahead!*



# CONTENTS

<b>1. USER INFORMATION</b> .....	<b>1</b>
1.1 About This Manual.....	1
1.2 Copyright Notice.....	1
1.3 Trademarks.....	2
1.4 Standards .....	2
1.5 Warranty.....	2
1.6 Technical Support .....	3
<b>2. INTRODUCTION</b> .....	<b>4</b>
2.1 coolMONSTER/S .....	4
2.2 coolMONSTER PISA® Family.....	5
<b>3. GETTING STARTED</b> .....	<b>6</b>
<b>4. SPECIFICATIONS</b> .....	<b>7</b>
4.1 Functional Specifications .....	7
4.2 Mechanical Specifications .....	9
4.3 Electrical Specifications .....	9
4.3.1. Supply Voltage .....	9
4.3.2. Supply Voltage Ripple .....	9
4.3.3. Supply Current (typical, DOS PROMPT).....	9
4.3.4. Supply Current (maximum).....	9
4.3.5. Real-time Clock (RTC) and Battery .....	10
4.4 MTBF.....	11
4.5 Environmental Specifications .....	11
4.5.1. Temperature .....	11
4.5.2. Humidity.....	12
<b>5. CPU, CHIPSET, AND SUPER I/O</b> .....	<b>13</b>
5.1 CPU.....	13
5.2 Chipset.....	13
5.3 Super I/O .....	13
<b>6. VIDEO CONTROLLER</b> .....	<b>14</b>
6.1 Video Subsystem Block Diagram .....	14
6.2 Supported Display Types.....	14
6.2.1. Current Panel Information.....	14
6.2.2. Available Video Modes.....	15
<b>7. SYSTEM MEMORY AND CACHE</b> .....	<b>16</b>
7.1 System Memory .....	16
7.2 Second Level Cache .....	16
<b>8. PISA BUS</b> .....	<b>17</b>

<b>9. FRONT PANEL .....</b>	<b>18</b>
<b>10. KEYBOARD AND MOUSE INTERFACES.....</b>	<b>19</b>
10.1 Keyboard Connector .....	19
10.2 Mouse Connector .....	19
10.3 Configuration.....	19
<b>11. USB INTERFACE.....</b>	<b>20</b>
11.1 Connector .....	20
11.2 Configuration.....	20
<b>12. ETHERNET INTERFACE.....</b>	<b>21</b>
12.1 Connector .....	22
12.2 Configuration.....	22
<b>13. GRAPHICS INTERFACE .....</b>	<b>23</b>
13.1 CRT Connector .....	23
13.2 Digital Panel Interface (JIPA) Connector .....	23
13.3 Configuration.....	24
<b>14. SERIAL-COMMUNICATION INTERFACES .....</b>	<b>25</b>
14.1 Serial Ports COM A-D .....	25
14.2 RS-232 Connectors.....	25
14.3 Configuration.....	26
14.4 RS-485 Connector .....	26
14.5 Configuration.....	26
14.5.1. RS-485 Diagram .....	27
<b>15. IRDA INTERFACE.....</b>	<b>28</b>
15.1 Sharp-IR .....	28
15.2 IrDA SIR Mode.....	28
15.3 Connector .....	29
15.4 Configuration.....	29
<b>16. PARALLEL-PORT INTERFACE .....</b>	<b>30</b>
16.1 Connector .....	30
16.2 Configuration.....	31
<b>17. EIDE INTERFACES.....</b>	<b>32</b>
17.1 Connectors .....	32
17.1.1. Primary EIDE Pin-out .....	33
17.1.2. Secondary EIDE Pin-out .....	34
17.2 Signal Descriptions .....	35
17.3 Configuration.....	35
<b>18. FLOPPY INTERFACE .....</b>	<b>36</b>
18.1 Connector .....	36
18.2 Configuration.....	36

<b>19. SOUND INTERFACE .....</b>	<b>37</b>
19.1 Connector .....	38
19.2 Configuration.....	38
<b>20. FEATURE INTERFACE .....</b>	<b>39</b>
20.1 Connector .....	39
20.2 Configuration.....	39
20.3 Signal Description.....	40
<b>21. FAN INTERFACE .....</b>	<b>42</b>
21.1 Connector .....	42
21.2 Configuration.....	42
<b>22. POWER INTERFACE.....</b>	<b>43</b>
22.1 Connector .....	43
22.2 Configuration.....	44
<b>23. WATCHDOG TIMER .....</b>	<b>45</b>
23.1 Configuration.....	45
23.2 Programming .....	45
23.2.1. Initialization .....	45
23.2.2. Trigger .....	45
<b>24. APPENDIX A: SYSTEM-RESOURCE ALLOCATION .....</b>	<b>46</b>
24.1 Interrupt Request (IRQ) Lines.....	46
24.2 Direct Memory Access (DMA) Channels .....	46
24.3 Memory Map .....	47
24.3.1. Using Expanded Memory Managers .....	48
24.4 I/O Address Map .....	49
24.5 Peripheral Component Interconnect (PCI) Devices.....	50
<b>25. APPENDIX B: BIOS OPERATION.....</b>	<b>51</b>
25.1 Determining the BIOS Version.....	51
25.2 Configuring the System BIOS .....	52
25.2.1. Start Phoenix BIOS Setup Utility .....	52
25.2.2. General Information.....	52
25.3 Main Menu .....	54
25.3.1. Master or Slave Submenus .....	55
25.3.2. Memory Shadow Submenu .....	56
25.3.3. Memory Cache Submenu.....	56
25.3.4. Advanced Menu.....	57
25.3.5. Advanced Chipset Control Submenu .....	58
25.3.6. PCI Configuration Submenu .....	59
25.3.7. PCI Device, Slot #X sub menu:.....	60
25.3.8. PCI/PNP ISA UMB Region Exclusion Submenu.....	60
25.3.9. PCI/PNP ISA IRQ Resource Exclusion Submenu .....	61
25.3.10. Keyboard Features Submenu .....	61
25.3.11. I/O Device Configuration Submenu .....	62

25.3.12.	Watchdog Settings Submenu .....	63
25.4	Security Menu .....	64
25.5	Power Menu .....	65
25.5.1.	Advanced Options sub menu: .....	66
25.6	Boot Menu.....	67
25.6.1.	Dark Boot .....	67
25.7	MultiBoot 3 .....	68
25.7.1.	Boot First Submenu.....	70
25.8	Exit Menu .....	70
25.9	Kontron BIOS Extensions .....	71
25.9.1.	JIDA BIOS extension .....	71
25.9.2.	LAN RPL ROM .....	71
25.10	Updating or Restoring BIOS Using PhoenixPhlash .....	72
25.10.1.	Flashing a BIOS.....	72
25.10.2.	Preventing Problems When Updating or Restoring BIOS .....	73
<b>26.</b>	<b>APPENDIX C: BLOCK DIAGRAM.....</b>	<b>74</b>
<b>27.</b>	<b>APPENDIX D: MECHANICAL DIMENSIONS .....</b>	<b>75</b>
<b>28.</b>	<b>APPENDIX E: CONNECTOR LAYOUT .....</b>	<b>76</b>
28.1	Connector Functions and Interface Cables .....	77
28.2	Pin-out Table .....	78
<b>29.</b>	<b>APPENDIX F: PC ARCHITECTURE INFORMATION.....</b>	<b>80</b>
29.1	Buses .....	80
29.1.1.	PISA .....	80
29.1.2.	ISA, Standard PS/2 - Connectors .....	80
29.1.3.	PCI .....	80
29.2	General PC Architecture .....	81
29.3	Ports .....	81
29.3.1.	RS-232 Serial.....	81
29.3.2.	Serial ATA .....	82
29.3.3.	USB .....	82
29.4	Programming .....	82
<b>30.</b>	<b>APPENDIX G: DOCUMENT REVISION HISTORY .....</b>	<b>83</b>

# 1. USER INFORMATION

## 1.1 *About This Manual*

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

## 1.2 *Copyright Notice*

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- **IBM, XT, AT, PS/2 and Personal System/2 are trademarks of International Business Machines Corp.**
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- **Intel is a registered trademark of Intel Corp.**
- **All other products and trademarks mentioned in this manual are trademarks of their respective owners.**

### 1.4 **Standards**

KONTRON Embedded Modules is certified to ISO 9000 standards.

### 1.5 **Warranty**

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

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

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

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



## 1.6 *Technical Support*

Technicians and engineers from KONTRON Embedded Modules and/or its subsidiaries 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/S*

The *coolMONSTER/S* integrates the complete functionality of a Pentium motherboard with CPU, system BIOS, 8MB to 128MB SDRAM memory, keyboard controller, real-time clock, onboard VGA with LCD interface and additional peripheral functions like serial ports, parallel port, floppy interface, EIDE hard-disk interfaces, USB interface, IrDA interface, watchdog, Ethernet access, and audio.

The *coolMONSTER/S* comes with a low-power, 266MHz Intel Pentium® processor with MMX™ Technology in an HL-PBGA-package. This processor is specified for proper operation when case temperature is within the specified range of 0°C to 95°C. The board can operate in the temperature range specified for this board without using a heatsink. (See the Specifications section.)

Unlike previous versions of *coolMONSTER* products, this *coolMONSTER/S* is equipped with a right angle SDRAM-socket, which limits the complete height to 25mm.

The *coolMONSTER/S* is designed in the PISA format, which provides the functionality of the PCI and ISA bus on one well-defined bus. When connecting the backplane to the PISA board, just one EISA-like edge card connector is used.

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

## 2.2 *coolMONSTER PISA® Family*

coolMONSTER products represent the best scalable half-size Slot SBC family. Each coolMONSTER module is characterized by the same mechanical and electrical pin-out for the Keyboard, COM A-D, Sound, IrDA, EIDE 40pin and 44pin, LPT, LAN, VGA, USB, and Floppy. These homogeneous features make upgrades easier 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 fully sized PICMG boards that had 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/S 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 JIPA 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® Pentium® Processor with MMX™ Technology on 0.25 Micron (HL-PBGA-package)  
- 266 MHz (66Mhz bus clock)
- **Chipset**
  - Ali® Aladdin V AGPset consisting of:
    - Ali® M1541 or 1542 north bridge
    - Ali® M1543C-A1 or B1 south bridge
- **Cache**
  - 512Kbyte 2<sup>nd</sup> level pipelined burst cache
- **Power Supply**
  - 5V-only supply
  - Dual onboard power supply to support Intel® MMX™ technology
- **Memory**
  - One DIMM socket for 8/16/32/64/128 or 256MB DIMM SDRAM-module
- **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**
- **Enhanced Intelligent Drive Electronics (EIDE)**
  - 2 x PCI Bus Master EIDE ports (up to 4 IDE devices)
    - supports Ultra 33 DMA Mode Transfers up to Mode 2 Timing (33MB/sec)
    - supports PIO Modes up to Mode 4 Timings and Multiword DMA Mode 0,1,2
- **Universal Serial Bus (USB)**
  - Two USB 1.0a ports (OHCI)
  - USB legacy keyboard and mouse support

- **Ethernet**
  - Intel® 82559ER or 82551ER 10/100 megabits/ps PCI Fast Ethernet controller
  - Follows the common criteria of the embedded technology market segment
- **Onboard Video Graphics Array (VGA)**
  - C&T 69000 LCD-VGA-Controller with integrated 2MB Video RAM
  - Cathode ray tube (CRT) and plug and play digital panel interfacing (JIPA - JUMPtec® Intelligent Panel Adaption)
- **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 20 mm (0.79") on standard version
- **Height on Bottom**
  - Maximum 6.5 mm (0.25")
- **Weight**
  - 212g (full featured 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, DOS PROMPT)

- 2.3A (with 256MB SDRAM)

### 4.3.4. Supply Current (maximum)

- 4,125A + current DRAM

(calculated theoretical values from all components maximum supply currents)

#### 4.3.5. Real-time Clock (RTC) and Battery

- Dallas DS12887 or compatible
- Self-contained subsystem includes Lithium, quartz and support circuitry
- Totally nonvolatile with more than 10 years of life in the absence of power

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**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 denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

**French:**

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

**Danish:**

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

**Finnish:**

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

**Spanish:**

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

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

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## 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) : 221390**

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**Notes:** Fans shipped with Kontron Embedded Modules GmbH products have 50,000-hours of typical operating life.  
 The estimates assume that a passive heat sink is used.  
 Estimated RTC battery life (as opposed to battery failures) is not accounted for in the above figures and needs to be considered separately. Battery life depends on temperature and operating conditions. When the Kontron unit has external power; battery drain occurs from leakage paths.

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## 4.5 **Environmental Specifications**

### 4.5.1. **Temperature**

The Intel Pentium® Processor with MMX™ Technology on 0.25 Micron is specified for proper operation when case temperature is within the specified range of 0°C to 95°C.

- **Operating: 0 to +60°C (\*) (with appropriate airflow)**
- **Non-operating: -10 to +85°C**

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**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.

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#### 4.5.2. Humidity

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

## 5. CPU, CHIPSET, AND SUPER I/O

### 5.1 CPU

- Intel® Pentium® Processor with MMX™ Technology on 0.25 Micron (HL-PBGA-package) 266 MHz.

### 5.2 Chipset

The *coolMONSTER/S* board operates with the Pentium chipset Ali Aladdin V AGPset, which consists of the M1541 (north bridge) and M1543C-B1 (south bridge). Older versions of this board may as well be equipped with the M1542 (north bridge) and the M1543C-A1 (south bridge). The chipset provides the following features:

- **North Bridge M1541**
  - Pipelined-burst SRAM/Memory cache
  - SDRAM DRAMs
  - Synchronous/pseudo synchronous 3.3V/5V tolerance PCI interface
  - Enhanced power management
  - Accelerated graphics port (AGP) interface
- **South Bridge M1543C:**
  - PCI 3.3V/5V tolerance interface
  - Buffers control
  - Provides steerable PCI interrupts for PCI device Plug-and-Play
  - Enhanced DMA controller
  - Interrupt controller
  - Counters/timers
  - Distributed DMA supported
  - Serialized IRQ supported
  - Plug-and-Play supported
  - Built-in keyboard controller
  - Positive/subtractive decode for ISA device
  - PMU features
  - Built-in PCI IDE controller
  - USB interface
  - Super I/O controller for two serial interfaces, parallel and floppy drive interfaces

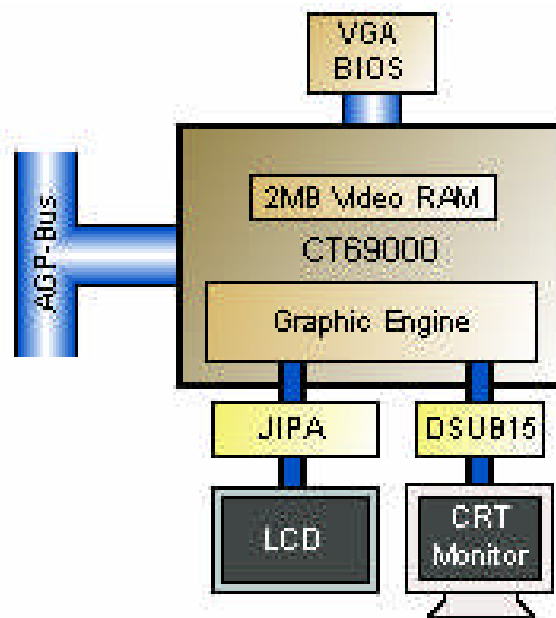
### 5.3 Super I/O

An additional SMsC FDC37C669 offers two more serial interfaces (COM C and COM D). The I/O port addresses of these two more serial interfaces are mirrored every 800hex because the address decoding here is only done with the address lines SA0 to SA10.

## 6. VIDEO CONTROLLER

The **coolMONSTER/S** comes with an AGP graphic controller CT69000 from Asiliant. The controller features a LCD and CRT simultaneous true 64-bit graphics engine and accelerator and integrated 2MB of video memory (SDRAM).

### 6.1 Video Subsystem Block Diagram



### 6.2 Supported Display Types

The graphics controller supports mono-LCD, TFT, and STN displays with resolutions up to SXGA (1280x1024). The **coolMONSTER/S** video BIOS is integrated in the system BIOS and supports different panel types, which are identified via the configuration pins on the LCD panel connector. The **coolMONSTER/S** can support a variety of panel, which are all configured by a dedicated cable for each panel. Setting jumpers or changing software is not required. Because nearly all LCDs use different connectors, pin-out, or LCD voltages, this is the easiest and safest way to configure different panels.

#### 6.2.1. Current Panel Information

To find out whether your panel is supported by the **coolMONSTER/S**, 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

The following list shows the video modes supported by the graphic controller. When using a LCD panel on the JIPA interface, not all of the below video modes may be available. Availability depends upon display capabilities.

Video Mode	Display Mode	Characters/Pixels	Colors/Gray val.	Refresh Rate
00h/01h	Text	40x25	16	70
02h/03h	Text	80x25	16	70
04h/05h	Graphics	320x200	4	70
06h	Graphics	640x200	2	70
07h	Text	80x25	Mono	70
0Dh	Graphics	320x200	16	70
0Eh	Graphics	640x200	16	70
0Fh	Graphics	640x350	Mono	70
10h	Graphics	640x350	16	70
11h	Graphics	640x480	2	60
12h	Graphics	640x480	16	60
13h	Graphics	320x200	256	70
14h	Graphics	320x200	256	70
15h	Graphics	320x200	64k	70
16h	Graphics	320x200	16M	70
17h	Graphics	320x240	256	60
18h	Graphics	320x240	64k	60
19h	Graphics	320x240	16M	60
1Ah	Graphics	400x300	256	60
1Bh	Graphics	400x300	64k	60
1Ch	Graphics	400x300	16M	60
1Dh	Graphics	512x384	256	60
1Eh	Graphics	512x384	64k	60
1Fh	Graphics	512x384	16M	60
20h	Graphics	640x480	16	85
22h	Graphics	800x600	16	85
24h	Graphics	1024x768	16	85
28h	Graphics	1280x1024	16	60
30h	Graphics	640x480	256	85
31h	Graphics	640x400	256	70
32h	Graphics	800x600	256	85
34h	Graphics	1024x768	256	85
38h	Graphics	1280x1024	256	60
40h	Graphics	640x480	32k	85
41h	Graphics	640x480	64k	85
42h	Graphics	800x600	32k	85
43h	Graphics	800x600	64k	85
44h	Graphics	1024x768	32k	85
45h	Graphics	1024x768	64k	85
50h	Graphics	640x480	16M	85
52h	Graphics	800x600	16M	85
62h	Graphics	640x400	64k	70
63h	Graphics	640x400	16M	70
64h	Graphics	1024x768	16	85
68h	Graphics	1280x1024	16	60
6Ah	Graphics	800x600	16	85
70h	Graphics	640x480	256	85
71	Graphics	640x400	256	70
72	Graphics	800x600	256	85
74	Graphics	1024x768	256	85
78	Graphics	1280x1024	256	60

## 7. SYSTEM MEMORY AND CACHE

### 7.1 *System Memory*

The *coolMONSTER/S* uses Dual Inline Memory Modules (DIMMs). One socket is available for 3.3 Volt (power level) unbuffered Synchronous Dynamic Random Access Memory (SDRAM) up to 256MB.

### 7.2 *Second Level Cache*

The *coolMONSTER/S* board is equipped with 512KB, second-level, pipelined-burst cache for highest system efficiency. You can enable/disable the second level cache in the system setup.

## 8. PISA BUS

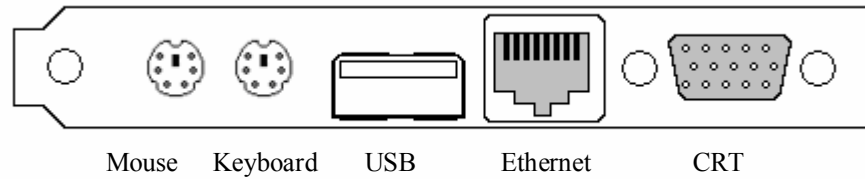
PISA® is the proven space saving concept that provides full PCI and ISA Bus signals on just half-size Slot boards. The edge card connector provides the ISA signals on the upper row and the PCI signals on the lower row and uses the same connector known from EISA systems.

A detailed description of the signals and its timing characteristics is beyond the scope of this document. Refer to the PISA specification PISAD???. (the three questionmarks are 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/S* comes 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 pin-out 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 pin-out 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.

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

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/S** features one USB host controller with integrated root hub following OHCI specification 1.0a. 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 Connector X9 (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/S** Ethernet interface uses the 82551ER from Intel®. Boards of older revisions may be equipped with the 82559ER Ethernet controller. These are fully integrated 10BASE-T/100BASE-TX LAN solutions. The 82551ER 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 82551ER to perform high-speed data transfers over the PCI bus. The 82551ER also includes an interface to a serial EEPROM. The EEPROM provides power-on initialization for hardware and software configuration parameters.

The 82551ER and 82559ER provide the following features:

- **Integrated IEEE 802.3 10BASE-T and 100BASE-TX Compatible PHY**
- **Full Duplex Support at both 10/100 megabits/ps**
- **IEEE 802.3u Auto-negotiation 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**
- **System Management Bus**
- **Clockrun Protocol**
- **Low-power 3.3V Device**

All major network-operating systems and several real-time and embedded operating systems support the interface. The 82551ER and 82559ER use the same drivers.

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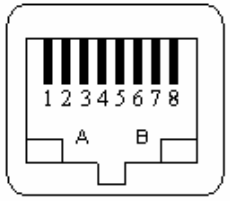
**Note:** The Ethernet interface works according to the common criteria of the embedded technology market segment.

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## 12.1 Connector

The 10/100Base-T connector is a standard 8-pin RJ45 jack (X20) with two integrated LEDs for Link and Activity. On older board revisions, the connector is not equipped with the two LEDs.

The following table shows the pin-out.

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	
	A	LLED	Link LED	Output Green
	B	ACTLED	Activity LED	Output Yellow

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

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

## 12.2 Configuration

Please refer to the KONTRON Web site and the corresponding readme and setup/install files included in the driver download files.

## 13. GRAPHICS INTERFACE

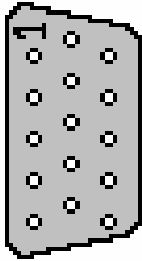
The onboard CT69000 LCD-VGA-Controller from Asilant drives two interfaces on the *coolMONSTER/S*.

- **Cathode Ray Tube (CRT) Interface**
- **Digital Panel Interface (JIPA)**

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

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

### 13.2 Digital Panel Interface (JIPA) Connector

The JUMPttec Intelligent Panel Adaption (JIPA) Interface is KONTRON's standard flat panel interface for digital LCD graphics. The implementation of this subsystem complies with the JIPA Specification, which you can find on the KONTRON Web site.

The digital panel interface connector is available through Connector X23 (72 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.

Please refer to the KONTRON Web site and the corresponding readme and setup/install files included in the driver download files.

## 14. SERIAL-COMMUNICATION INTERFACES

### 14.1 Serial Ports COM A-D

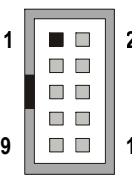
Four fully functional serial ports (COMA, COMB, COMC, and COMD) provide asynchronous serial communications. The serial ports support RS-232 operation modes and are compatible with the serial-port implementation used on the IBM Serial Adapter. You also can use COM D (Connector X18) for RS-485 purposes 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 Connector X14 (10 pins) and COM B through the Connector X15 (10 pins). COM C is available through the Connector X16 (10 pins) and COM D through either Connector X17 (10 pins) for RS-232 or the Connector X18 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 pin-outs 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

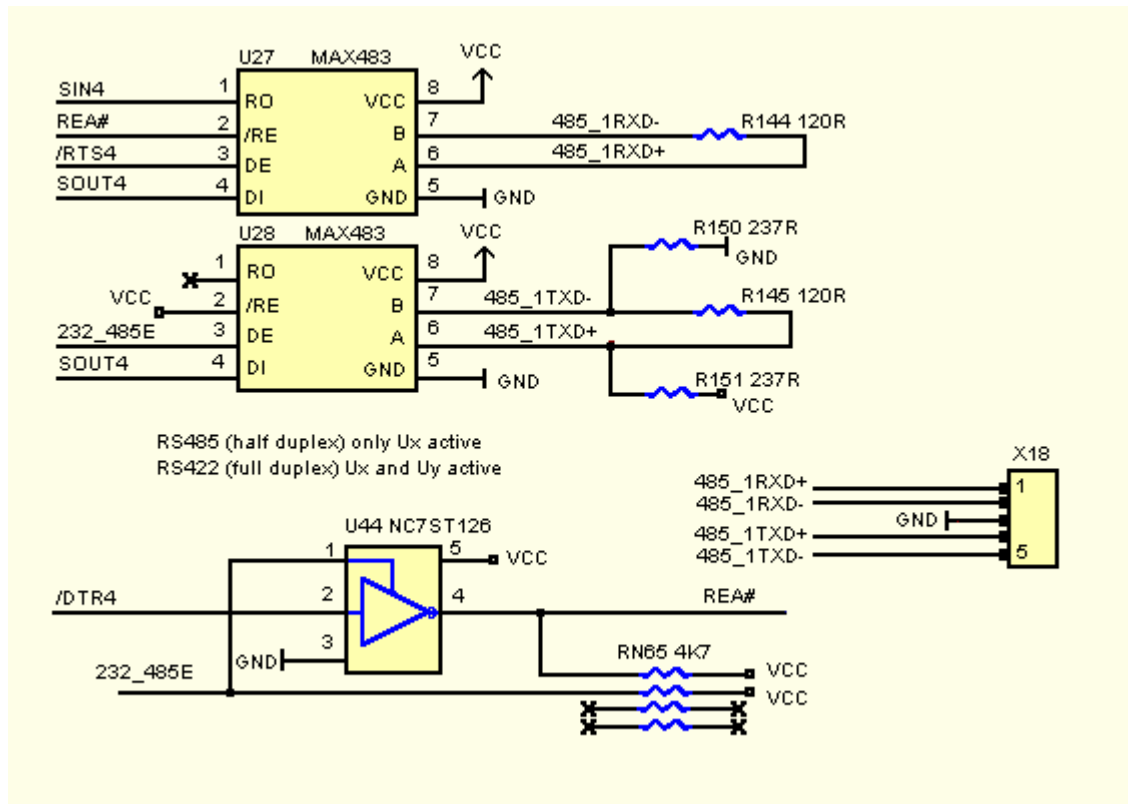
The connector for connecting RS485 to **coolMONSTER/S** is from manufacturer JST. For mating connector information see Appendix E: Connector Layout.

### 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



## 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). The **coolMONSTER/S** provides infrared communications capabilities. It operates in the following modes:

- **Sharp-IR**
- **IrDA SIR (IrDA 1.0)**

### 15.1 *Sharp-IR*


This mode supports bi-directional data communication with a remote device using infrared radiation as the transmission medium. Sharp-IR uses Amplitude Shift Key (ASK) and allows serial communication at baud rates up to 38.4K Baud. The format of the serial data is similar to the UART data format, a zero value start bit, followed by up to 8 data bits, an optional parity bit, and ending with at least one stop bit with a binary value of one. A 0 is signaled by sending a 500KHz continuous pulse train of infrared radiation. A 1 is signaled by the absence of any infrared signal. The device operation in Sharp-IR 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.

### 15.2 *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.

## 15.3 Connector

The IrDA interface is available through the Connector X2 (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	OVCROFF	Infrared mode switching (IBM like module)
	8	FIR	Infrared control signal high speed receiver signal input (HP like transceiver module) control output for SD/MODE signal (IBM like transceiver module)

**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!

The connector with eight positions used on **coolMONSTER/S** for connecting an infrared module is from manufacturer BERG. For mating connector information see Appendix E: Connector Layout.

## 15.4 Configuration

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

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.

For more information about IrDA please refer to the corresponding IrDA specifications.

## 16. PARALLEL-PORT INTERFACE

The **coolMONSTER/S** incorporates an IBM XT/AT compatible parallel port. It supports unidirectional, EPP and ECP operating modes.

### 16.1 Connector

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

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

Header	Pin	Signal Name	Function	In / Out	DSUB-25
	1	/STB	Strobe	Out	1
	3	PD0	Data 0	I/O	2
	5	PD1	Data 1	I/O	3
	7	PD2	Data 2	I/O	4
	9	PD3	Data 3	I/O	5
	11	PD4	Data 4	I/O	6
	13	PD5	Data 5	I/O	7
	15	PD6	Data 6	I/O	8
	17	PD7	Data 7	I/O	9
	19	/ACK	Acknowledge	In	10
	21	/BUSY	Busy	In	11
	23	PE	Paper out	In	12
	25	/SLCT	Select out	In	13
	2	/AFD	Autofeed	Out	14
	4	/ERR	Error	In	15
	6	/INIT	Init	Out	16
	8	/SLIN	Select in	Out	17
	26	VCC (*)	+ 5 V	--	NC
	10,12	GND	Signal Ground	--	18 - 25
	14,16	GND	Signal Ground	--	18 - 25
	18,20	GND	Signal Ground	--	18 - 25
	22,24	GND	Signal Ground	--	18 - 25

**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/S** feature UDMA EIDE 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 Connectors

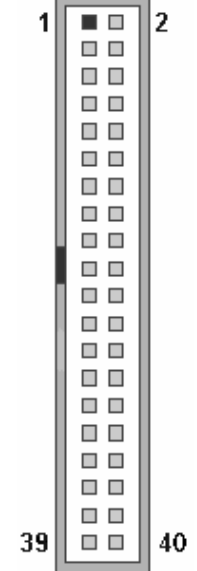
IDE interface 1 is available through Connector X12 (40 pins). This interface is designed in 0.1" grid for optimal connectivity to a 3.5" hard drive. IDE interface 2 is available through Connector X13 (44 pins.) It is designed in a 2mm grid for optimal connectivity to a 2.5" hard drive.

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.

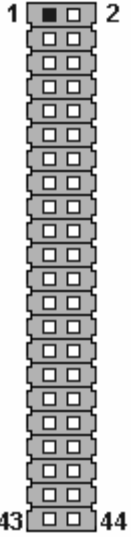
## 17.1.1. Primary EIDE Pin-out

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

**Note: (\*\*)** This signal is only supported on boards since hardware revision CE?32 older boards don't support cable select drives.

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

### 17.1.2. Secondary EIDE Pin-out

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.

**(\*\*)** This signal is only supported on boards since hardware revision CE?32  
older boards don't support cable select drives.

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 pin-out.

Header	Pin	Signal Name	Function	Pin	Signal Name	Function
	1	GND	Ground	2	/RPM	Density select
	3	GND	Ground	4	NC	
	5	GND	Ground	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	GND	Ground	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/S** uses an ESS Solo-1™ PCI AudioDrive® solution, which provides high-quality audio processing while maintaining full legacy DOS game compatibility. The Solo-1 forms a complete audio subsystem on a single chip.

### 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 4kHz up to 48kHz 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 X28 (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 Connector X6 (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	NC (**)	Internal use only!
7	NC (**)	For internal use only!	8	GND	Ground
9	H_LED	Hard-disk LED	10	NC (**)	Internal use only!
11	NC (**)	For internal use only!	12	SPEAKER	Speaker out
13	KBLOCK	Keyboard Lock	14	NC (**)	Internal use only!
15	GND	Ground	16	/RESIN	Reset input
17	NC (**)	For internal use only!	18	NC (**)	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!

(\*\*\*) Since hardware revision CE?32 the LEDs for LINK and ACTIVITY are already integrated in the RJ45 connector.

### 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 the 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/S*.

### **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 the 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 the board of the *coolMONSTER/S*. Starting with hardware revision CE?32, the LED for the LINK has been integrated in the RJ45 connector.

### **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/S*.

### **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/S*. Starting with hardware revision CE?32, the LED for the LINK has been integrated in the RJ45 connector.

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

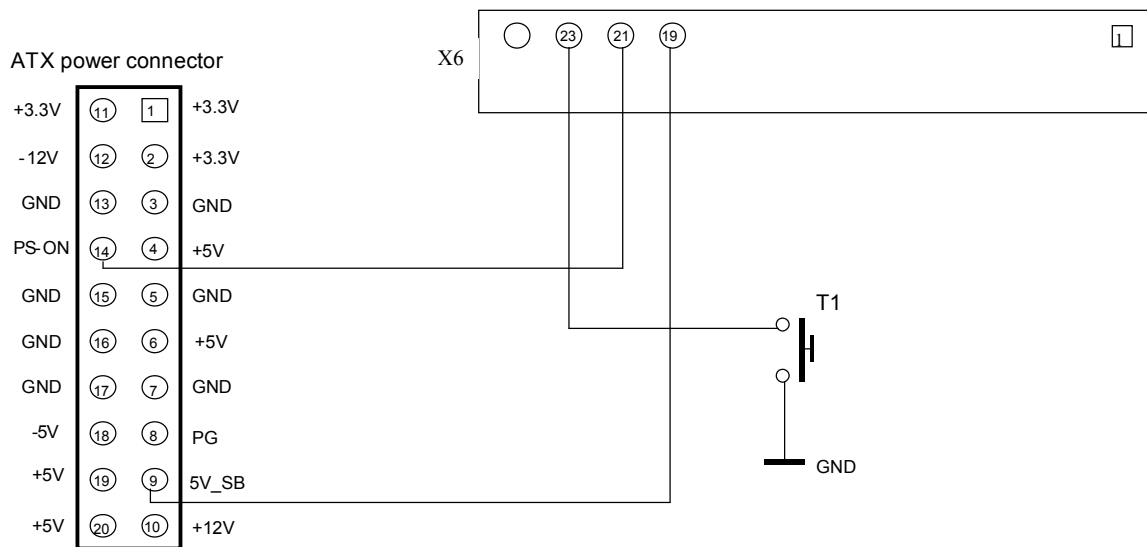
This is the serial data pair for USB Port 2.

## 5V\_SB, PS-ON, PWRBTN (ATX Power Support Signals)

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

- Connect **Pin 19** of Connector X6 with **Pin 9** of the ATX power connector (5V standby).
- Connect **Pin 21** of Connector X6 with **Pin 14** of the 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 unstable, or even destroy it.

## 21. FAN INTERFACE

Normally the *coolMONSTER/S* is shipped without active cooling, but if required, you can use the fan interface to connect your own fan to cool the CPU. This connector supports +12V fans only. The +12V are not generated onboard of the *coolMONSTER/S* and have to be supplied externally through the bus or power connector.

### 21.1 Connector

The fan interface is available on Connector X3 (2 pins).

Header	Pin	Signal Description	Function
	1	+12V	Fan Power
	2	GND	Fan 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

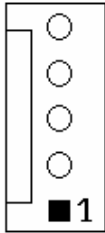
The **coolMONSTER/S** is not a replacement for a power supply. It is a +5V only board. Additional voltages (+12V, -12V, and -5V as well as +3.3V for external PCI-devices) are not generated onboard. If peripheral devices require these voltages, they have to be supplied through the backplane and the PISA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

In some applications, the **coolMONSTER/S** is intended for use as stand-alone module without a backplane. You need to have a power connector available on the board for direct power supply.

Power signals from Connector X6 are not meant to supply power.

### 22.1 Connector

The power connector is available through the Connector X4 (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**

## 23. WATCHDOG TIMER

The watchdog timer is integrated in the chipset of the **coolMONSTER/S** and can issue a reset to the system or generate a non-maskable interrupt (NMI). The watchdog timer circuit has to be triggered within a specified time by the application software. If the watchdog is not triggered because proper software execution fails or a hardware malfunction occurs, it will reset the system or generate the NMI.

### 23.1 Configuration

You can set the watchdog timer to disabled, reset or NMI mode. You can specify the delay time from 1 second up to 30 minutes and the timeout (trigger period) from 0.4 seconds up to 10 minutes. The delay time is the time until the watchdog gets active the first time and the timeout starts to count down. 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 the 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 the low-level programming for the watchdog timer, refer to the Application Note WdogLEU2\_3\_E???.DOC. It can be requested from the 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. APPENDIX A: SYSTEM-RESOURCE ALLOCATION

### 24.1 Interrupt Request (IRQ) Lines

IRQ #	Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	No	Note (1), Note (3)
4	COM1	No	Note (1)
5	IRDA	No	Note (1), Note (2)
6	FDC	No	Note (1)
7	LPT1	No	Note (1), Note (3)
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.

(3) Possible setting for IRDA. IRQ5 is the default setting.

---

### 24.2 Direct Memory Access (DMA) Channels

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

---

**Notes:**

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

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

---

## 24.3 Memory Map

The **coolMONSTER/S** processor modules can support up to 256MB of memory. 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 or USB Legacy Support is enabled, a 16K block is shadowed for BIOS extension, starting with first free area at CC000h ,D0000h, D4000h, D8000h or DC000h. (BIOS extensions do not use the whole shadow block.)
E0000h – EFFFFh	System BIOS	No	
EFFFFh – F0000h	System BIOS	No	

### 24.3.1. Using Expanded Memory Managers

*coolMONSTER/S* extension BIOSes can 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 must share the upper memory area with the Expanded Memory Manager's EMS frame. This often causes several problems.

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.

## 24.4 I/O Address Map

The I/O-port addresses of the **coolMONSTER/S** 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.
238h- 23Fh	IRDA	Yes	Possible address for IRDA
278h-27Fh	LPT	Yes	Possible address for LPT
2E8h-2EFh	COM4	No	Available if COM4 not used.
2F8h-2FFh	COM2 or IRDA	No	Available if COM2 and IRDA not used.
338h- 33Fh	IRDA	No	Available if IRDA 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
3C4h- 3DFh	Video	No	
3E8h-3EFh	COM3	No	Available if COM3 not used.
3F8h-3FFh	COM1	No	Available if COM1 not used.
480h- 48Fh	DMA page	No	
4D0h- 4D7h	PCI interrupt	No	

---

### Note:

The I/O port addresses of the additional serial ports COM C and COM D are mirrored every 800hex because the address decoding of the SMsC controller is only done with address lines SA0 to SA10.

---

## 24.5 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	-	-	Integrated in ALi chipset.

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



## 25. APPENDIX B: BIOS OPERATION

The **coolMONSTER/S** comes with a 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.

### 25.1 Determining the BIOS Version

To determine the BIOS version of the **coolMONSTER/S**, 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 <LEU3R112>
(C)Copyright 2004 Kontron Embedded Modules GmbH
```

Whenever you contact technical support about BIOS issues, providing a BIOS version <LEU3R??> 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: YL4240011

CPU = Pentium with MMX266 MHz
637K System RAM Passed
63M Extended RAM Passed
512K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed

UMB upper limit segment address: E823
```

The board's serial number has value to technical support. **coolMONSTER/S** serial numbers always start with YL 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 YL4240011 was manufactured in year 2004, lot 24 of that year, and is board number 11 of that lot.

## 25.2 *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/S**. 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>.

---

### 25.2.1. 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.

### 25.2.2. 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.

## 25.3 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 “ <b>1.44/1.25 MB, 3 ½ “</b> 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 “ <b>Disabled</b>	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.

---

## 25.3.1. Master or Slave Submenus

Feature	Option	Description
Type	None User <b>Auto</b> CD-ROM IDE Removable ATAPI Removable Other ATAPI	None = Autotyping is not able to supply the drive type or end user has selected None, disabling any drive that may be installed. User = End user supplies hdd information. Auto = Autotyping. The drive itself supplies the information. CD-ROM = CD-ROM drive. ATAPI Removable = Read- and writeable media e.g. LS120 and USB-ZIP. Other ATAPI = for ATAPI devices not supported by other HDD features.
Cylinders	1 to 65,536	Number of cylinders.
Heads	1 to 256	Number of read/write heads.
Sectors	1 to 63	Number of sectors per track.
Maximum Capacity	N/A	Displays the calculated size of the drive in CHS.
Total Sectors	N/A	Number of total sectors in LBA mode.
Maximum Capacity	N/A	Displays the calculated size of the drive in LBA.
Multi-Sector Transfer	<b>Disabled</b> 2 sectors 4 sectors 8 sectors 16 sectors	Any selection except Disabled determines the number of sectors transferred per block.
LBA Mode Control	<b>Disabled</b> Enabled	Enabling LBA causes Logical Block Addressing to be used in place of CHS.
32-Bit I/O	<b>Disabled</b> Enabled	Enables 32-bit communication between CPU and IDE card. Requires PCI or local bus.
Transfer Mode	<b>Standard</b> 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.
SMART Monitoring	<b>Disabled</b> Enabled	Displays whether the device supports SMART monitoring (Enabled) or not (Disabled).

---

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

---

### 25.3.2. Memory Shadow Submenu

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

---

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

---

### 25.3.3. Memory Cache Submenu

Feature	Option	Description
Memory Cache	Disabled <b>Enabled</b>	Enables or Disables L2 cache.
Cache System BIOS area	Disabled <b>Enabled</b>	Enables or Disables caching of System BIOS area.
Cache Video BIOS area	Disabled <b>Enabled</b>	Enables or Disables caching of Video BIOS area.
CC00 – CFFF D000 – D3FF D400 – D7FF D800 – DBFF DC00 – DFFF	Disabled <b>Enabled</b>	Disabled: block is not cached. Enabled: block is cached.

---

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

---

## 25.3.4. Advanced Menu

Feature	Option	Description
▸ Advanced Chipset Control	Submenu	Opens Advanced Chipset Control submenu.
Plug & Play (PNP) OS Installed	Yes <b>No</b>	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	<b>No</b> 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	<b>Yes</b> No	Yes prevents a Plug and Play OS from changing system settings.
▸ PCI Configuration	Submenu	Opens PCI Advanced submenu.
PS/2 Mouse	<b>Auto Detect</b> 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. Auto Detect 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.
Large Disk Access Mode	<b>DOS</b> 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	<b>Yes</b> No	Determines if errors cause system to halt.

---

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

---

### 25.3.5. Advanced Chipset Control Submenu

Feature	Option	Description
AT bus clock frequency	7.159 MHz <b>PCICLK/4</b> PCICLK/3	Allows selection of ISA bus clock frequency. NOTE: Some ISA devices might not work at PCICLK/3 (11 MHz)!
CAS Latency	<b>3T</b> 2T	Controls SDRAM CAS latency.
DRAM Timing	Slow <b>Normal</b> Fast	Controls the general DRAM timing. NOTE: Memory modules that are of poor quality can cause problems with fast timing!
SDRAM Burst X-1-1-1-1-1-1-1	Disabled <b>Enabled</b>	Enables SDRAM burst cycles for higher system performance.
Pipe Function	Disabled <b>Enabled</b>	Enables the asserting of NA (Next Address) when the cycle is a L2 access cycle.
Passive Release	Disabled <b>Enabled</b>	Enables more efficient ISA Bus master cycles to PCI.
Delay Transaction	<b>Disabled</b> Enabled	Latches PCI-to-ISA cycles into buffer to free the PCI bus. DO NOT ENABLE IF PASSIVE RELEASE IS ENABLED!
ISA Master Line Buffer	Disabled <b>Enabled</b>	Enables ISA master line buffer to enhance performance.
DMA Line Buffer	Disabled <b>Enabled</b>	Enables DMA line buffer to enhance performance.
PCI to ISA Posted Write Buffer	Disabled <b>Enabled</b>	Enables PCI to ISA posted write buffer.
Graphics Aperture	16 MB, 32 MB, <b>64 MB</b> , 128 MB, 256 MB	Select size of AGP graphics aperture. In most cases, half of the system memory size is the best choice.
VGA Frame Buffer	Disabled <b>Enabled</b>	Enables burst PCI cycles for VGA fixed frame buffer at A0000h – BFFFFh.
Data Merge	<b>Disabled</b> Enabled	If enabled, only the words which address are consecutive linear can be merged into one line.
Parity Check (*)	<b>Disabled</b> Enabled	When Enabled, system issues NMI to CPU on SERR, IOCHK and PCI bus parity error.

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

(\*) Available since BIOS version LEU3R111.



### 25.3.6. PCI Configuration Submenu

Feature	Option	Description
▸ PCI Device, Slot #1	Submenu	Opens submenu to configure Slot 1 PCI device.
▸ PCI Device, Slot #2	Submenu	Opens sub menu to configure Slot 2 PCI device.
▸ PCI Device, Slot #3	Submenu	Opens submenu to configure Slot 3 PCI device.
▸ PCI Device, Slot #4	Submenu	Opens submenu to configure Slot 4 PCI device.
PCI IRQ Line 1:	Disabled <b>Auto Select</b> 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 <b>Auto Select</b> 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 <b>Auto Select</b> 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 <b>Auto Select</b> 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.
USB IRQ Line	Disabled <b>Auto Select</b> IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Select IRQ for USB controller. 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	<b>AGP</b> PCI	In a system with an AGP and a PCI video adapter, user can select adapter that BIOS initializes.
ISA graphics device installed	<b>No</b> 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 <b>Yes</b>	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 (*)	<b>Disabled</b> Enabled	Select Disabled if you use a PISA backplane. Select Enabled if you use a PCISA backplane. PCISA backplanes do not follow PCI 2.1 specification in interrupt routing!

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

(\*) Available since BIOS version LEU3R112.

### 25.3.7. PCI Device, Slot #X sub menu:

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

---

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

---

### 25.3.8. PCI/PNP ISA UMB Region Exclusion Submenu

Feature	Option	Description
C800 – CFFF (*)	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.
CC00 – CFFF	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.
D000 – D3FF	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.
D400 – D7FF	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.
D800 - DBFF	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.
DC00 - DFFF	<b>Available</b> Reserved	Reserves specified block of upper memory for use by legacy ISA devices.

---

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

(\*) Only set this block to reserved, when using an external graphic card. Internal graphic controller can only work correctly when available!

---

### 25.3.9. PCI/PNP ISA IRQ Resource Exclusion Submenu

Feature	Option	Description
IRQ3	<b>Available</b> Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ4	<b>Available</b> Reserved	See above.
IRQ5	<b>Available</b> Reserved	See above.
IRQ7	<b>Available</b> Reserved	See above.
IRQ9	<b>Available</b> Reserved	See above.
IRQ10	<b>Available</b> Reserved	See above.
IRQ11	<b>Available</b> Reserved	See above.
IRQ12	<b>Available</b> Reserved	See above.
IRQ14	<b>Available</b> Reserved	See above. (Visible only if primary IDE disabled.)
IRQ15	<b>Available</b> Reserved	See above. (Visible only if secondary IDE disabled.)

---

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

---

### 25.3.10. Keyboard Features Submenu

Feature	Option	Description
Numlock	<b>Auto</b> 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	<b>Disabled</b> Enabled	Turns audible key click on.
Keyboard auto-repeat rate	<b>30/sec</b> , 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	$\frac{1}{4}$ sec, $\frac{1}{2}$ <b>sec</b> , $\frac{3}{4}$ 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.

---

## 25.3.11. I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	<b>Both</b> , Primary Secondary, Disabled	Enables onboard PCI IDE devices.
Floppy Disk controller	Disabled <b>Enabled</b>	Enables onboard FDC controller.
Base I/O address	<b>Primary</b> , Secondary	Selects base address of onboard FDC controller. (Primary = 3F0h, Secondary = 370h)
Floppy Drive Swap	<b>Disabled</b> Enabled	Swaps Drive A and B if enabled.
Serial Port A Serial Port B	Disabled Enabled OS Controlled <b>Auto</b>	Disabled turns off port. Enabled requires user to enter base I/O address and IRQ. Auto makes BIOS configure port. OS Controlled lets the PNP OS configure port after bootup.
Serial Port C Serial Port D	<b>Disabled</b> 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	<b>3F8h, 2F8h</b> , 3E8h, 2E8h	Select I/O base of port.
Interrupt (Port A and B)	<b>IRQ 3, IRQ 4</b>	Select IRQ of Port A and B.
Interrupt (Port C and D)	<b>IRQ 10, IRQ 11</b>	Select IRQ of Port C and D.
Interface (Port D)	<b>RS232</b> , RS485	Select whether this port operates in RS232 or RS485/RS422 operation
IRDA Port	<b>Disabled</b> Enabled OS Controlled Auto	Disabled turns off port. Enabled requires user to configure port. Auto makes BIOS configure port. OS Controlled lets the PNP OS configure port after bootup.
Base I/O address	<b>338h</b> , 2F8h, 238h	Select I/O base of IRDA port.
Interrupt	IRQ3, <b>IRQ5</b> , IRQ7	Select IRQ of IRDA port.
Mode	<b>IrDA</b> , ASK-IR	Select mode of the IRDA port.
Duplex	<b>Half</b> , Full	Select half- or full-duplex operation of IRDA port.
Tx Polarity	<b>Active High</b> , Active Low	Select Transmit Polarity of IRDA port.
Rx Polarity	Active High, <b>Active Low</b>	Select Receive Polarity of IRDA port.

Feature	Option	Description
Parallel Port	Disabled Enabled OS Controlled <b>Auto</b>	Disabled turns off port. Enabled requires user to enter base I/O address and IRQ. OS Controlled lets the PNP OS configure the port after bootup. Auto makes BIOS configure port.
Mode	Output only, <b>Bi-directional</b> , EPP, ECP	Sets mode for parallel port.
Base I/O address	<b>378h</b> , 278h, 3BCh	Select I/O base of port.
IRQ	IRQ 5, <b>IRQ 7</b>	Select IRQ of parallel port.
DMA	<b>DMA0</b> , DMA1, DMA2, DMA3	Select DMA channel of port if in ECP mode.
USB Host Controller	<b>Disabled</b> Enabled	Enables or Disables onboard USB host controller.
USB BIOS Legacy Support (*)	<b>Disabled</b> 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 cannot find a free 16kB block in that area.

### 25.3.12. Watchdog Settings Submenu

Feature	Option	Description
Mode	<b>Disabled</b> Reset NMI	Select watchdog operation mode.
Delay	1s, 5s, 10s, <b>30s</b> , 1m, 5m, 10m, 30m	Time until watchdog timer starts to count.
Timeout	0.4s, 1s, 5s, 10s, <b>30s</b> , 1m, 5m, 10m	Max. trigger period.

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

## 25.4 Security Menu

Feature	Option	Description
Supervisor Password is	<b>Clear</b> Set	Displays whether password is set.
User Password is	<b>Clear</b> 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	<b>Disabled</b> 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	<b>Normal</b> 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 <b>Supervisor</b>	Enabled requires supervisor password to access floppy disk.
Virus check reminder	<b>Disabled</b> Daily Weekly Monthly	Displays a message during bootup asking (Y/N) if you checked for viruses backed up the system. Message returns on each boot until you respond with „Y“. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and Monthly on the first boot of the month.
System backup reminder	<b>Disabled</b> Daily Weekly Monthly	Displays a message during bootup asking (Y/N) if you backed up the system. Message returns on each boot until you respond with „Y“. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and Monthly on the first boot of the month.

**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.

## 25.5 Power Menu

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

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

Feature	Option	Description
Power Savings	<b>Disabled</b> 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	<b>Off</b> , 1min, 2min, 4min, 6min, 8min, 12min, 16min	Inactivity period required to put system in Standby mode (partial power shutdown).
Auto Suspend Timeout	<b>Off</b> , 5min, 10min, 15min, 20min, 30min, 40min, 60min	Inactivity period required after Standby to Suspend mode (maximum power shutdown).
Hard Disk Timeout	<b>Disabled</b> , 10 sec – 15 min	Inactivity period of hard disk required before standby (motor off).
▶ Advanced Options	Submenu	Opens Advanced Options submenu.
LCD Backlight Off Timer	<b>Disabled</b> , Enabled	Amount of time the LCD needs to be inactive before the backlight is turned off through the JIPA cable.

---

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

---

### 25.5.1. Advanced Options sub menu:

Feature	Option	Description
Primary HDD	Yes, <b>No</b>	Wakes up system on primary HDD event.
Secondary HDD	Yes, <b>No</b>	Wakes up system on secondary HDD event.
Floppy Disk Drive	Yes, <b>No</b>	Wakes up system on FDD event.
Serial I/O	<b>Yes</b> , No	Wakes up system on serial I/O event.
Parallel I/O	Yes, <b>No</b>	Wakes up system on parallel I/O event.
Keyboard	<b>Yes</b> , No	Wakes up system on keyboard event.
RTC IRQ8	Yes, <b>No</b>	Wakes up system on RTC alarm.

### Monitored Events:

Primary HDD	1F0h – 1F7h and 3F6h I/O access, primary IDE channel DMA request
Secondary HDD	170h – 177h and 376h I/O access, secondary IDE channel DMA request
FDD	3F0h – 3F7h I/O access
Serial I/O	3F8h – 3FFh, 2F8h – 2FFh, 3E8h – 3EFh, 2E8h – 2EFh, 338h – 33Fh, 238h – 23Fh
Parallel I/O	378h – 37Fh, 278h – 27Fh, 3BCh – 3BEh
Keyboard	60h and 64h I/O access
RTC	IRQ 8

The following events wake the system from its suspended state:

- **RTC Alarm IRQ8**
- **IRQ[1-7], IRQ[9-15], NMI, SMI, INIT**



## 25.6 Boot Menu

Feature	Option	Description
Floppy Check	<b>Disabled</b> Enabled	Enabled verifies floppy type on boot; disabled speeds boot.
Summary Screen	<b>Disabled</b> Enabled	If enabled, a summary screen is displayed just before booting the OS to let user see system configuration.
QuickBoot Mode	Disabled <b>Enabled</b>	Allows system to skip certain tests while booting. This decreases the time needed to boot the system.
Dark Boot	<b>Disabled</b> 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 (*)	<b>Disabled</b> 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.

(\*) Available since BIOS version LEU3R111.

### 25.6.1. 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

## 25.7 **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**
- **Floppy 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.

### 25.7.1. 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.**

## 25.8 Exit Menu

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

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

## 25.9 Kontron BIOS Extensions

Besides the Phoenix System BIOS, the **coolMONSTER/S** comes 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.

### 25.9.1. JIDA BIOS extension

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

### 25.9.2. 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/S** 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 CC000hex and E0000hex and a 32K block of memory is shadowed.

## 25.10 Updating or Restoring BIOS Using PhoenixPhlash

PhoenixPhlash allows you to update the BIOS by using a floppy disk without having to install a new ROM chip. PhoenixPhlash is a utility used to flash a BIOS to the Flash ROM installed on the **coolMONSTER/S**.

Use PhoenixPhlash to:

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

### 25.10.1. Flashing a BIOS

Use the following procedure to update or restore a BIOS.

1. Download the Phoenix Phlash compressed file, CRDxLEU3.ZIP, from the KONTRON Embedded Modules Web site or contact your local technical support for it. The file contains the following:

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 system to boot in Crisis Recovery Mode.
PHLASH.EXE	Programs the Flash ROM.
WINCRISIS.EXE	Creates 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 Phlash on a hard disk by unzipping the content of CRDxLEU3.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 the following 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>
```

### 25.10.2. Preventing Problems When Updating or Restoring BIOS

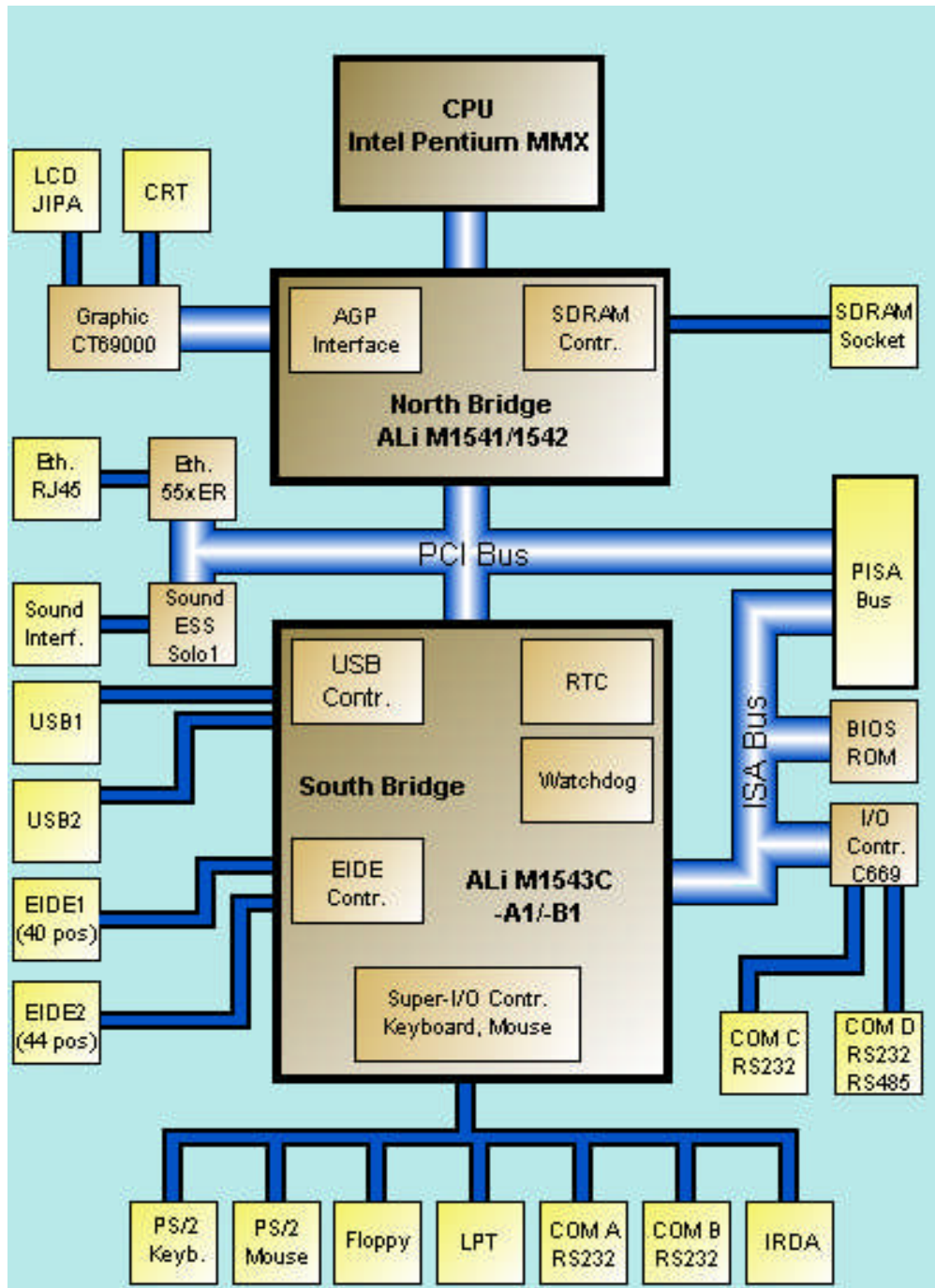
Updating the BIOS represents a potential hazard. Power failures or fluctuations can occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

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

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

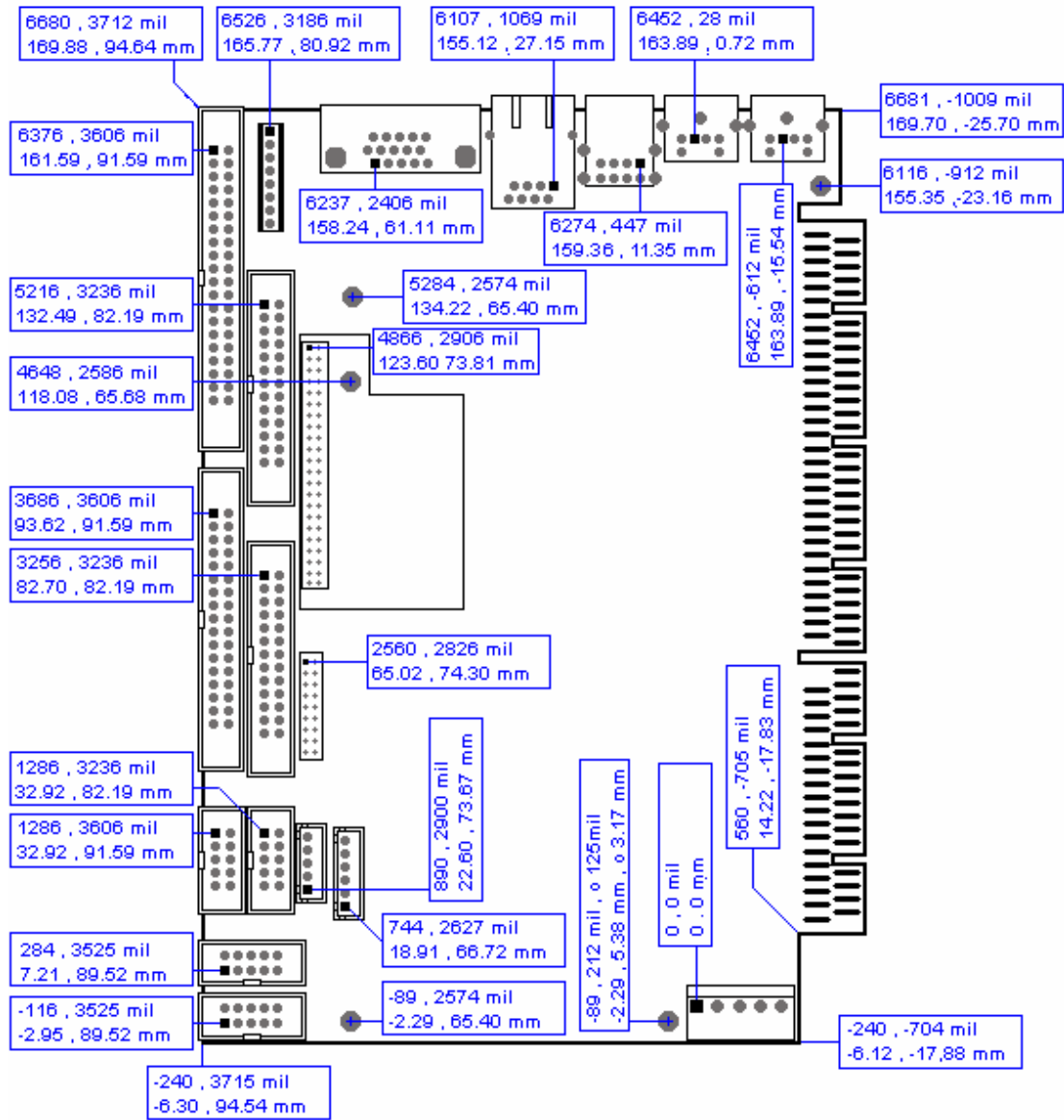
For further information on the update key and the crisis diskette, see the Application Note PHLASH\_SCE???, which is available from the KONTRON Embedded Modules Web site. The three question marks stand for the revision number of the file.

# 26. APPENDIX C: BLOCK DIAGRAM

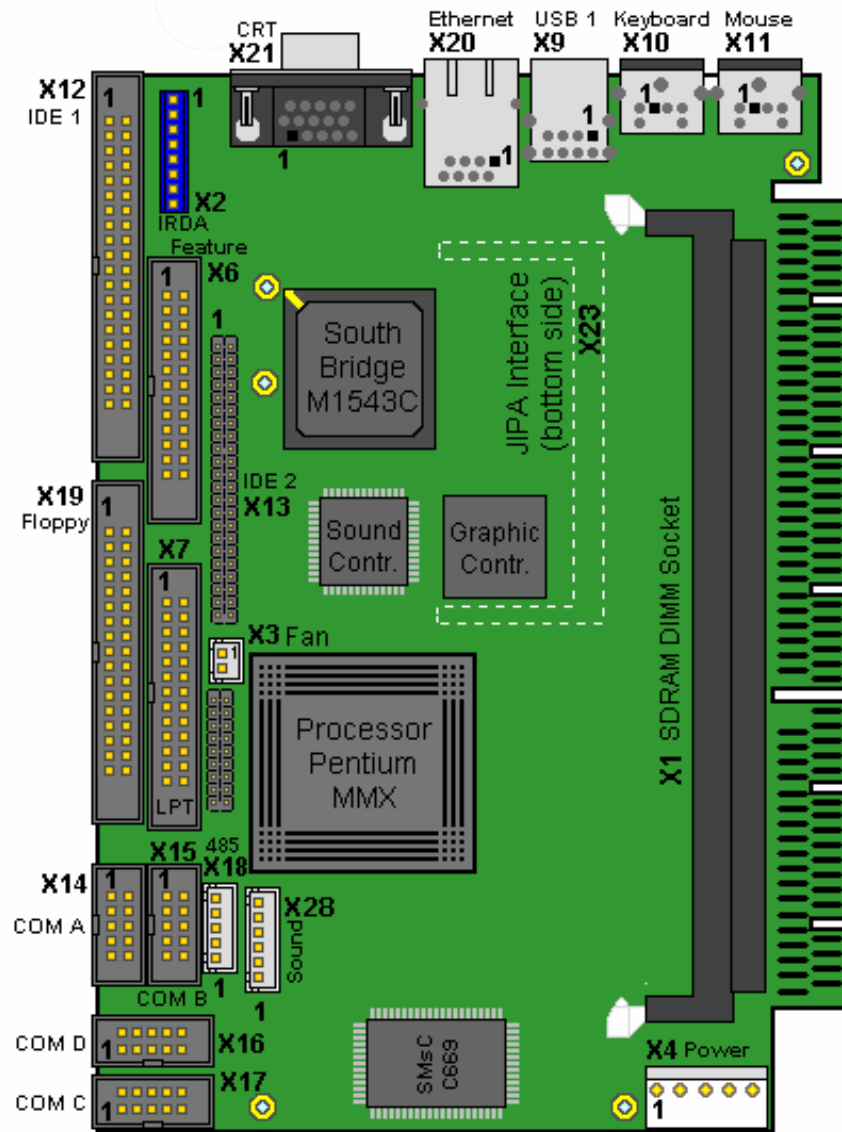




# 27. APPENDIX D: MECHANICAL DIMENSIONS



## 28. APPENDIX E: CONNECTOR LAYOUT



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

## 28.1 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
X2	IrDA Connector	2.54mm 8 pos. (BERG DUBOX 65240-008 with crimp contacts BERG DUBOX 76357-301)		
X3	Fan Connector	2.54mm 2 pos. (JST XHP-2 with crimp contacts JST SXH-001T-PO.6 or JST SXH-002T-PO.6)		
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
X28	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

## 28.2 Pin-out 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	GND	PIDE_D6	SIDE_D6	VCC (*)	GND
6	CTS		/INIT	NC	PIDE_D9	SIDE_D9	NC (**)	GND
7	DTR		PD2	GND	PIDE_D5	SIDE_D5	NC (**)	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	NC (**)	GND
11			PD4	GND	PIDE_D3	SIDE_D3	NC (**)	NC
12			GND	/DR1	PIDE_D12	SIDE_D12	SPEAKER	DDA
13			PD5	GND	PIDE_D2	SIDE_D2	KBLOCK	HSYNC
14			GND	/DR0	PIDE_D13	SIDE_D13	NC (**)	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	NC (**)	
18			GND	/FDIR	PIDE_D15	SIDE_D15	NC (**)	
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				GND	/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	X28	X10	X11	X9	X4	X3
1	TXD+	NC (**)	RECHTS	KBDAT	MSDAT	USB 5V	+12V (*)	+12V
2	TXD-	NC (**)	ASGND	MSDAT	NC (**)	USB1-	VCC (*)	GND
3	RXD+	IRTX	LINKS	KEYGND	KEYGND	USB1+	VCC (*)	
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	LLED	OVCROFF						
8	ACTLED	FIR						

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**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!

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## 29. APPENDIX F: PC ARCHITECTURE INFORMATION

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

### 29.1 *Buses*

#### 29.1.1. PISA

- PISA Bus Specification Version 1.7 June 1997

#### 29.1.2. 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

#### 29.1.3. 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.

## 29.2 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

## 29.3 Ports

### 29.3.1. 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.

### 29.3.2. Serial ATA

Serial 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.

### 29.3.3. 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.

## 29.4 *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*



**30. APPENDIX G: DOCUMENT REVISION HISTORY**

<b>Version</b>	<b>Date</b>	<b>Edited by</b>	<b>Changes</b>
LEU3M110	10.01.2000	MH	Document created based on LEU2m113.DOC, Preliminary for prototypes
LEU3M111	29.03.2000	CJR	BIOS description updated for first official BIOS release
LEU3M112	20.08.2004	BHO/JL	Manual completely reworked, brought to Kontron style.
LEU3M113	15.03.2005	BHO	Updated support addresses, added PISA bus chapter, added +3.3V information concerning external PCI devices, minor changes
LEU3M114	13.09.2005	BHO	Added Ethernet note, new drawings, added MTBF value