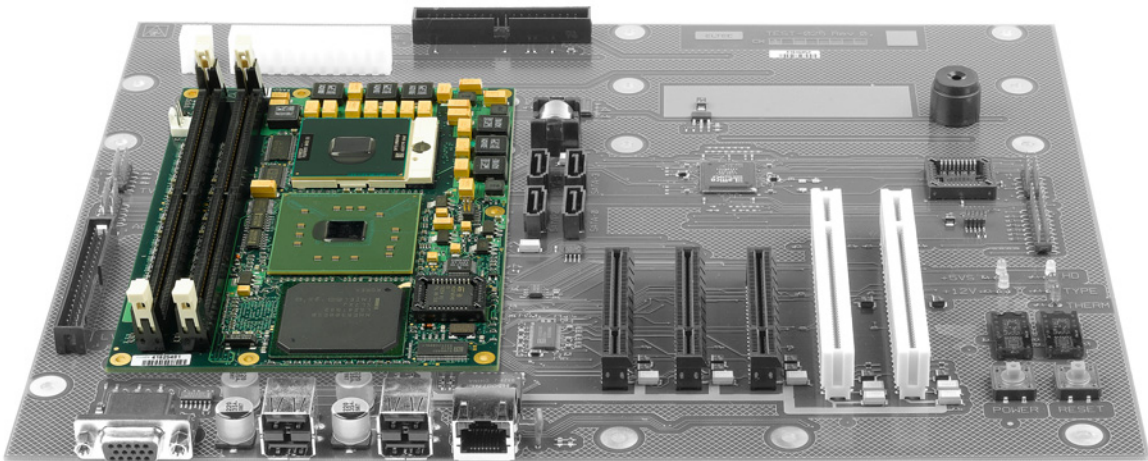


ELTEC

systems

EUROCOM 400

Dual-Core Intel® Xeon® Processor LV 2.0 GHz-based CPU Board



HARDWARE DOCUMENTATION

Revision 1B

Revision

Revision	Changes	Date / Name
0A	First Edition	07.02.06 / ac
1A	Updated BIOS and minor Errors	14.03.06 / ac
1B	Update for new layout and new carrier, Disclaimer new	17.11.06 / ac
1C	Block diagram changed	26.06.08 / hh

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Federal communications commission statement

- This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian department of communications statement

- This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.
- This class B digital apparatus complies with Canadian ICES-003

SAFETY INFORMATION

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before reloading the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add device.
- Before connecting or removing signals cables from motherboard, ensure that all power cables are unplugged.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

EMC Rules

This unit has to be installed in a shielded housing. If not installed in a properly shielded enclosure, and used in accordance with the instruction manual, this product may cause radio interference in which case the user may be required to take adequate measures at his or her own expense.

IMPOTANT INFORMATION

This product is not an end user product. It was developed and manufactured for further processing by trained personnel.

RECYCLING



Please recycle packaging environmentally friendly:

Packaging materials are recyclable. Please do not dispose packaging into domestic waste but recycle it.



Please recycle old or redundant devices environmentally friendly:

Old devices contain valuable recyclable materials that should be reutilized. Therefore please dispose old devices at collection points which are suitable.

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1. Specification

1.1. Blockdiagram

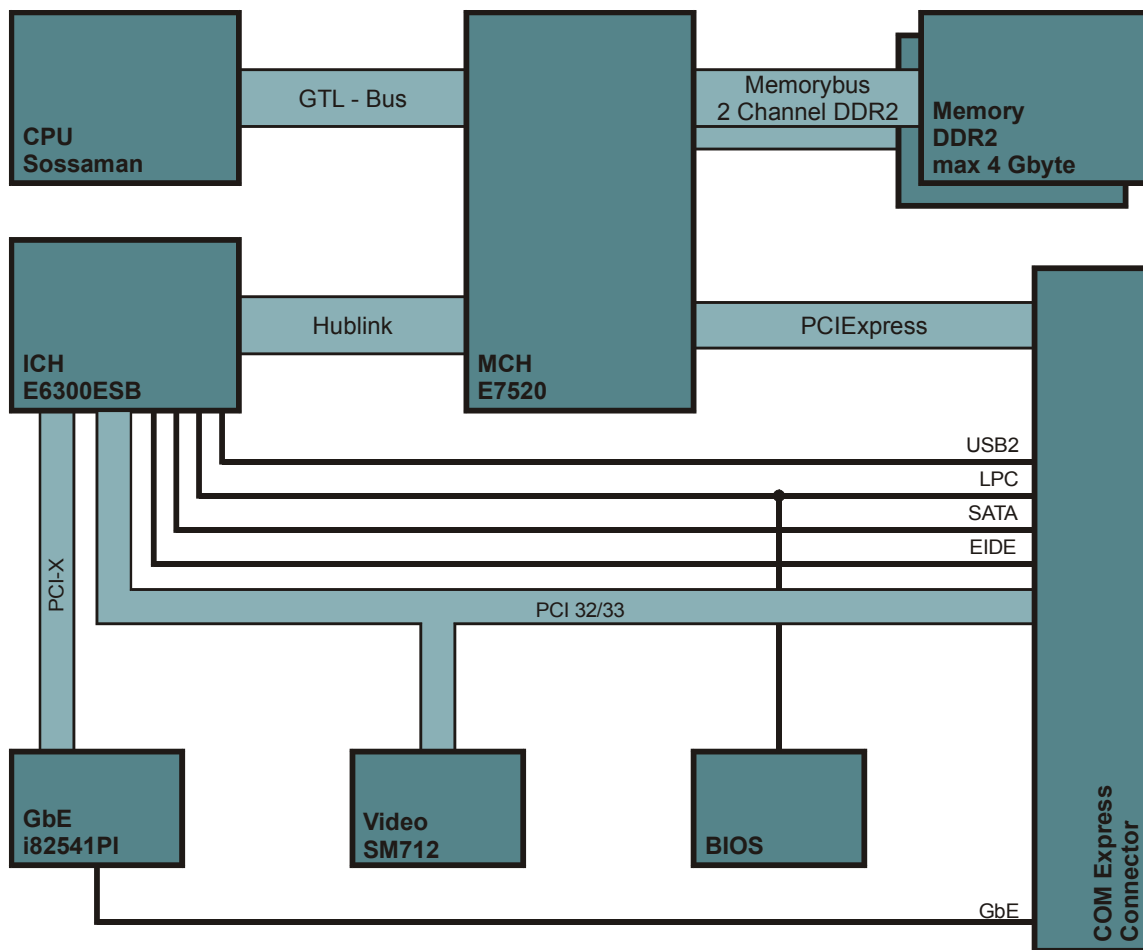


Figure 1.1: Blockdiagram

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1.2. Main Features

- COM Express CPU board
- Dual Core Intel Xeon processor LV 2,0 GHz or Dual Core Intel Xeon processor ULV 1,67 GHz
- Up to 4 GB DDR2-400 memory on two DIMM modules
- 10/100/1000 Mbps network interface, attached to PCI-X
- On-board graphics up to 1280*1024
- COM Express format with PCI and PCI Express interfaces
- USB 2.0

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1.3. Overview

1.3.1. Technical Details

The EUROCOM 400 is a Dual-Core Intel® Xeon® processor LV 2.0 GHz or Dual Core Intel Xeon processor ULV 1,66 GHz based single board computer on a COM Express board for compact industrial real-time systems. The board is based on the Intel chip set i7520 (Lindenhurst) for Xeon systems, which is on Intel's Embedded Program for long-lifetime products. The COM module contains all of a CPU's logic, user-specific I/O can be implemented on an easytodo carrier board.

1.3.1.1. CPU

A Dual-Core Intel® Xeon® processor is supported; Dual-Core Intel® Xeon® processor is the successor of the Xeon CPU. CPU clocks between 1.67 and 2.0 GHz are supported. The CPU has FPU, MMU, first level cache (32kB each for instruction and data) and a L2 cache (2 MB unified) on the chip. Each of the two cores contains dual integer units, that can operate in parallel for certain instructions. Special care has been taken to achieve a low power consumption and a good relationship between clock and computing performance: the new CPUs do not increase clock speeds whole sacrificing power consumption; instead, they use a parallel implementation with relatively low consumption. The second-level cache, due to its location in the CPU itself, runs with the full CPU clock.

CPU	Dual-Core Intel® Xeon® processor LV 2.0 GHz	Dual-Core Intel® Xeon® processor ULV 1.67 GHz
L1 cache (Instr/Data)	32/32 KB	32/32 KB
L2 cache	2 MB on-chip	2 MB on-chip
Bus speed (FSB)	667 MHz	667 MHz
CPU core	Sossaman (Dual Core)	Sossaman (Dual Core)
Speedstep	x	x
CPU speed	2 GHz	1.67 GHz
Power consumption	31 W	16 W

The low power consumption of the CPU makes it possible to build systems withstanding high ambient temperatures with simple cooling.

1.3.1.2. Memory Configuration

The 64-bit wide memory allows configurations of up to 4 GBytes with DDR2-400 RAMs in two DIMM modules, error detection and single-bit error correction is supported. The DIMMs must be registered and must support ECC.

1.3.1.3. Chip Set

The chip set, an Intel E7520, contains the DDR2 RAM memory controller with ECC, the interrupt controller, three 8-lane (x8) PCI Express ports and the PCI host bridge for 32-bit/33-MHz PCI, as well as for PCI-X. Additionally, it has logic to access an 8-bit ROM, it has timers, a DMA controller, and it generates clocks.

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1.3.1.4. Graphics Interface

The on-board graphics controller is a PCI-based chip (SM 712). Maximum display resolution is 1280 * 1024 * 60 Hz @24 bit/pixel.

Resolution	fps
800x600	60, 75, 85
1024x768	60, 75, 85
1280x1024	60

1.3.1.5. Boot PROM

Boot code is stored in a Flash EPROM (size 1024 kB) which enables easy code updates. The boot proms contains the BIOS, an version from AMI with PXE netboot.

1.3.1.6. Ethernet Interfaces

The network interfaces uses a PCI-X-based Ethernet controller i82541PI for 10/100/1000 Mbps transfers with 10BaseT (twisted pair), 100Base TX or 1000Base TX connectivity. Automatic speed detection is included. A Link signal and an Activity signal allow a connection of LEDs for an easy first check if the Ethernet connection works.

1.3.1.7. COM Express Interface

The COM Express interface is implemented as type 2. The interface uses the signals: two x8 PCIe, one x4 PCIe, one x1 PCIe, PCI 33/32, VGA, UB 2.0, one Ethernet port, IDE, serial ATA.

1.3.1.8. Timer

The EUROCOM 400 has three standard PC programmable timers for timing interrupts in the 1 us to 1000 ms range.

1.3.1.9. Operating Systems

As a Xeon based CPU board with a complete BIOS, the EUROCOM 400 can of course be run under Windows. Compliant with the ELTEC Linux Initiative, the EUROCOM 400 additionally supports implementations of Standard Linux and Embedded Linux - applications for both operating systems can be designed under Linux. Linux is best when a full operating system is needed. Embedded Linux is for applications with the smallest footprint.

1.3.1.10. Miscellaneous

The EUROCOM 400 is intended for use on COM Express carrier boards, that can be equipped with additional I/O, such as network interfaces, super I/O chips, field busses, as well as all I/O connectors that are needed.

1.3.1.11. Industry-grade Case

As an option, the EUROCOM 400 can be ordered in an industrial-grade case, made of steel. This case has a motherboard-style carrier with three free PCIe slots and two free PCI slots; it has a power supply with sufficient cooling fans for the EUROCOM 400 and the peripheral boards.

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1.4. Installation

1.4.1. Introduction

Do always observe precautions for handling electrostatic devices when unplugging boards from the rack or otherwise handling boards. Avoid touching integrated circuits except in an electrostatic free environment. Electrostatic discharge can damage circuits or shorten their lifetime.

- Carefully remove the board from the shipping carton.
- Save the original shipping container and packing material for storing or reshipping the board.
- Inspect the board for any shipping damage. If undamaged, the board can be prepared for system installation.

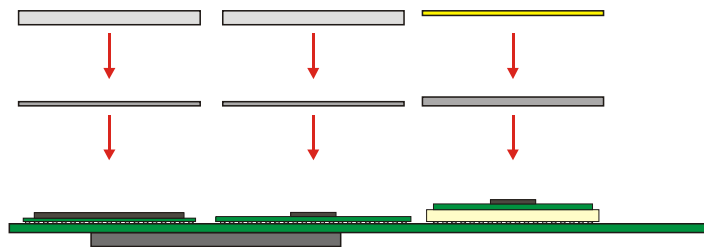
1.4.2. DIMM Installation

If the EUROCOM 400 is not shipped with DRAM DIMMs, the user must insert his own DIMMs (PC3200, registered, with ECC) on the board. The EUROCOM 400 is not able to run without DRAM. DIMM installation can be done easily. The board has two DIMM sockets, X501 and X601. The BIOS software detects automatically if the banks are populated. Also the size of the DIMMs is detected automatically. The DIMMs are simply plugged into the socket (it fits only in one orientation). The two latches on the socket must hold the DIMMs. Otherwise the DIMMs are not properly connected. As the chipset provides a two channel memory interface it is recommended two populate both sockets to get best memory performance

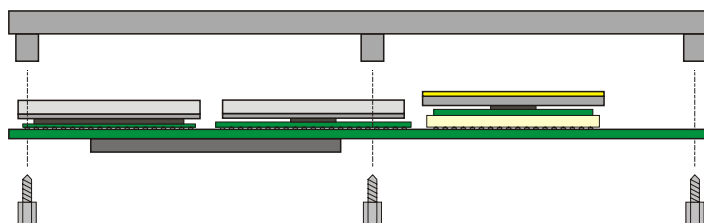
1.4.3. Board Installation

All add-on modules on the EUROCOM 400 are already installed when shipped. There is no reason to remove add-on modules. The EUROCOM 400 requires a carrier board. Before the board has plugged onto the carrier, the heatspreader and heatsink must be installed.

First install the heat conducting paste on the CPU and the chipset, followed by the small heatspreader and the Gap Pads.

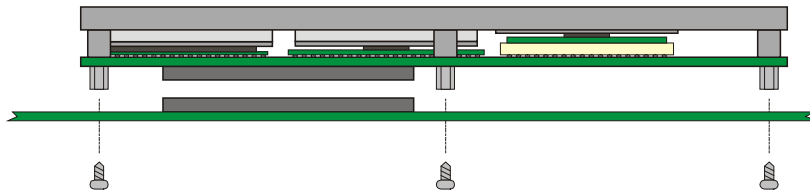


Then connect the large heatspreader.



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At least plug the modul onto the carrierboard and fix it.



Make sure that the power supply within the rack meets the power requirements specified in Section "Power Requirements". Also the operating requirements must meet the values specified in Section "Environmental Conditions".

1.5. Cooling Requirements

Cooling of the EUROCOM 400 and especially of the processor is essential. Depending on the processor frequency and the type of heatsink used different maximum air temperatures can be tolerated. See Section 'Environmental Conditions' for a detailed list of specified air temperatures.

1.6. Testing the Installation

After power is switched on the BIOS displays a message on the CRT screen. It takes some time before the BIOS is ready to display. After system boot from harddisk or floppy drive the keyboard should work. The driver software for the mouse should detect the mouse device. If a network is installed, other network devices (if existent) should be accessible (e.g. from Windows file manager). These default configurations may be different depending on the required CPU frequency.

2. BIOS

The EUROCOM 400 is delivered with an BIOS from AMI. The BIOS includes a setup menu to configure basic settings. ELTEC ships the EUROCOM 400 with optimized BIOS settings. If desired, most of the BIOS settings can be changed (some settings are hardwired). Also if the battery for the CMOS RAM is weak, the RAM may loose its contents making a new setting of the setup necessary. Caution should be taken because some changes of settings may cause an erroneous system behaviour.

It may happen that the values in the nonvolatile memory inhibit starting of the EUROCOM 400. In this case board can be reset to the default values by the following procedure:

- remove the board from the carrierboard
- wait about 10 seconds
- reinstall board

For a documentation of BIOS functionality, see the extra AMI documentation, available on request from ELTEC's support.

2.1.1. Power On Self Test

When the EUROCOM 400 is powered on, the BIOS tests and initializes the hardware and programs the chipset and other peripheral components. During this time, Power On Self Test (POST) progress codes are written by the system BIOS to

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I/O port 80h, allowing the user to monitor the progress with a special monitor. A later chapter lists the POST codes and their meanings.

During early POST, no video is available to display error messages should a critical error be encountered; therefore, POST uses beeps on the speaker to indicate the failure of a critical system component during this time. A later chapter lists the Beep codes and their meanings.

2.2. Intel Boot Agent / PXE

The Intel Boot Agent is a software product that allows the EUROCOM 400 to boot using a program code image supplied by a remote server. The Intel Boot Agent complies with the Pre-boot eXecution Environment (PXE) Version 2.1 Specification.

2.2.1. Boot Agent Setup

To enter the Boot Agent setup, press Ctrl+S on the keyboard while the POST is running.

2.2.2. Setup Screen options

The setup contains a single screen with four options.

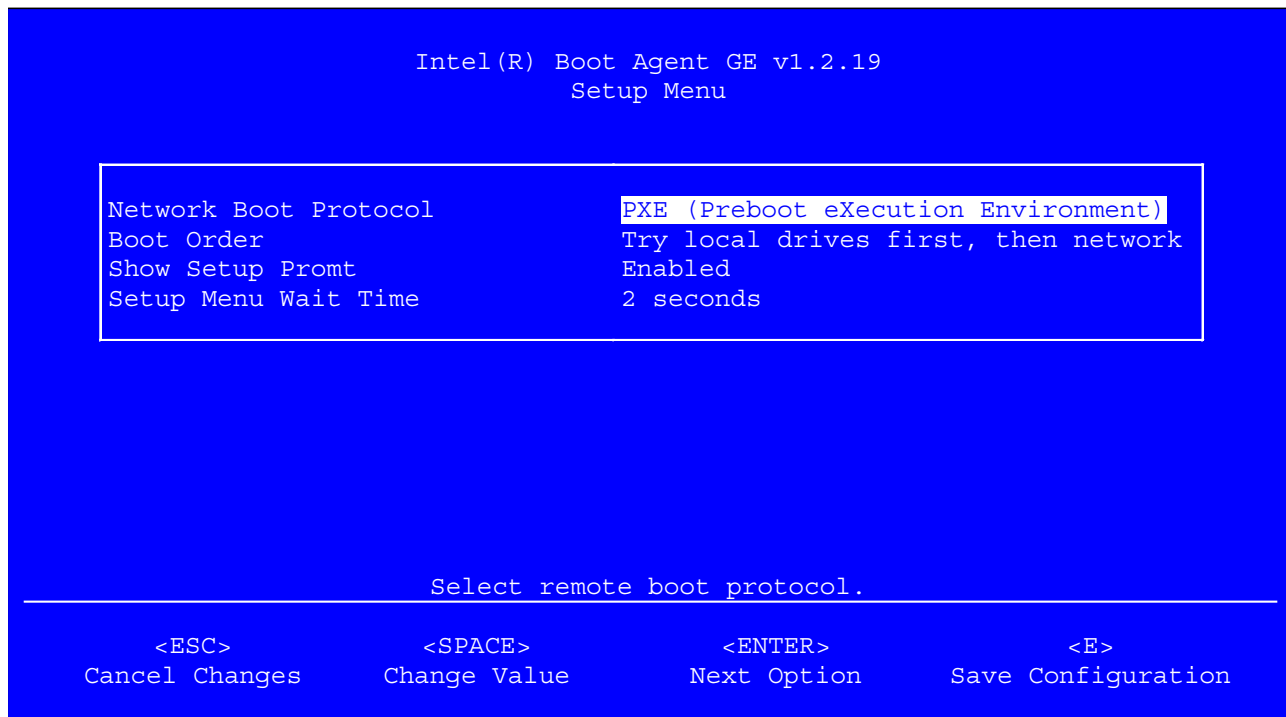


Figure 2.1: Intel Boot Agent Setup Screen

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Network Boot Protocol

This option selects a remote boot protocol. At this time is “PXE (Preboot eXecution Environment) “ the only possible selection.

Boot Order

This option selects the boot order between local drives and network boot.

Try local drives first, then network

If this option is selected then the BOOT Agent tries to boot from the local drives first. If this fails then the network boot is tried.

Try network only

If this option is selected then the BOOT Agent tries to boot from the network. Local drives are ignored.

Try local drives only

If this option is selected then the BOOT Agent tries to boot from the local drives only.

Try network first, then local drives

If this option is selected then the BOOT Agent tries to boot from the network first. If this fails then the local drives are tried.

Show Setup Prompt

Select whether Ctrl+S message appears during initialization. Possible choices are Enabled and Disabled.

Setup Menu Wait Time

Select the number of seconds to wait for Ctrl+S during initialization. Possible choices are 0, 2, 3 and 5 seconds.

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2.2.3. Diagnostics Information

Anytime the configuration setup menu is displayed, you may press the D key to display diagnostics information on the screen. The information displayed appears similar to that shown in the lower half of the screen image below. Once you press the D key, the information displayed remains until you reboot your computer.

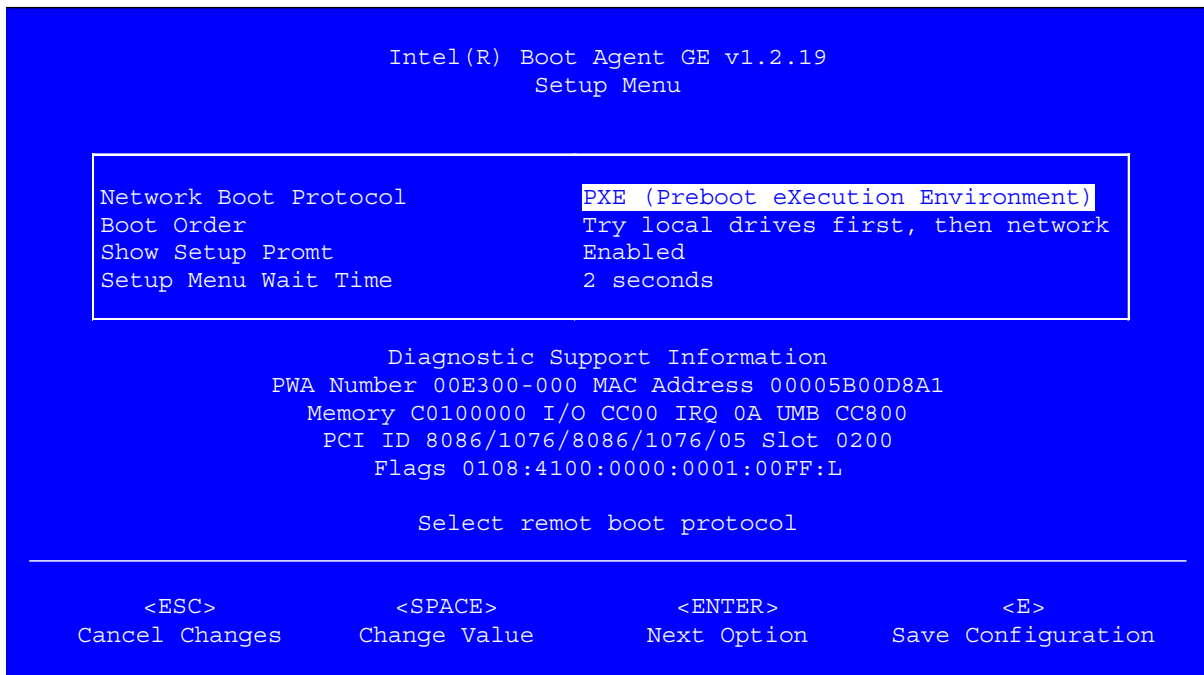


Figure 2.2: Setup Screen with Diagnostic Messages

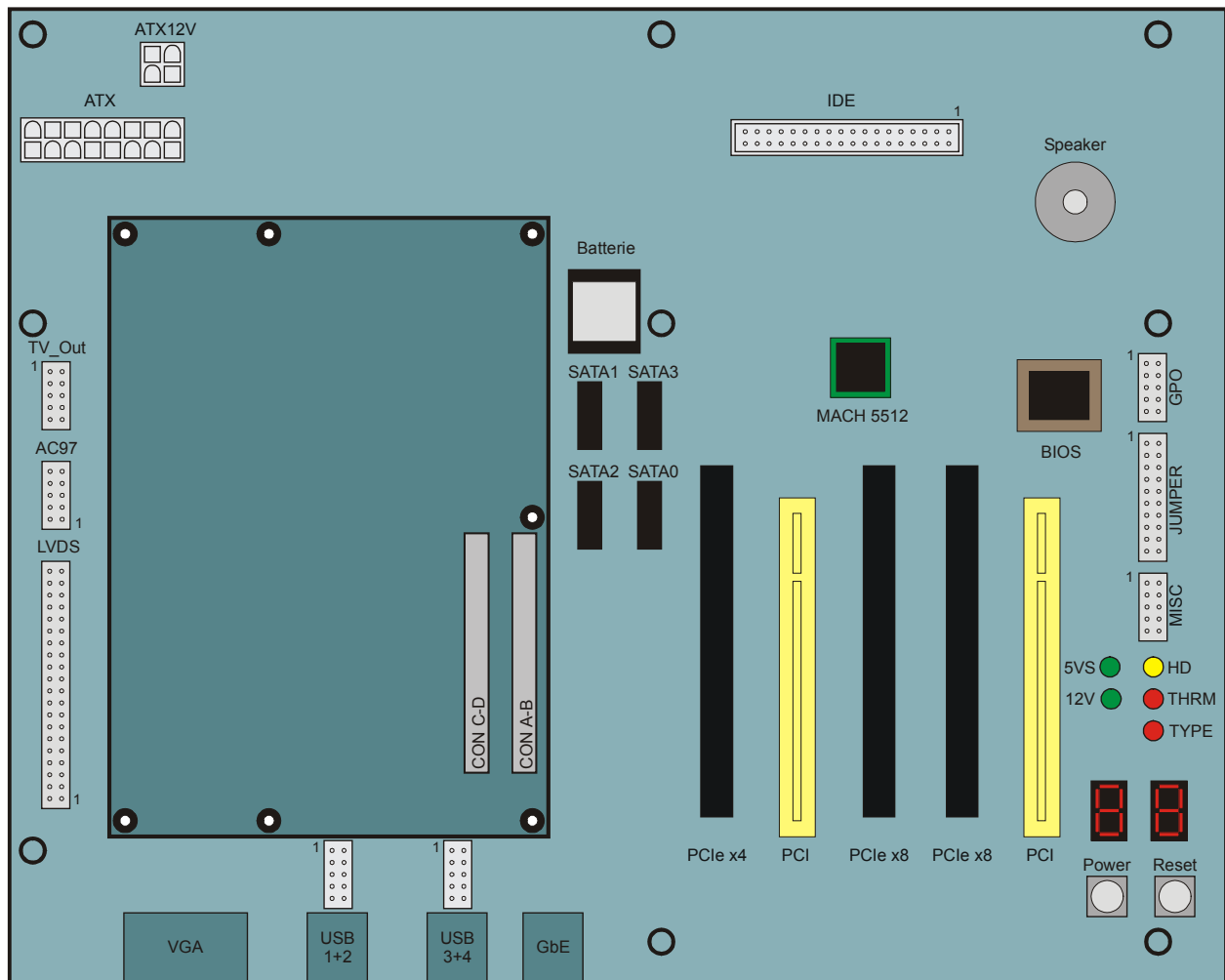
Diagnostics information may include the following items:

Item	Description
PWA Number	The Printed Wire Assembly number identifies the adapter's model and version.
MAC Address	The unique ethernet address assigned to the device.
I/O	The I/O address for PCI access determined by the software. On cards without an I/O address, all zeroes are displayed.
Memory	The memory map PCI access address determined by the software.
Slot	The slot number

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3. Carrierboard (MODB-200)

The MODB-200 is a COMExpress Carrierboard for Basic and Extended Formfactor. It supports COMExpress module with type 2 and needs a ATX12V power supply.



3.1. VGA

If a CRT monitor is used, a standard VGA cable (15 pins) is connected between the monitor and the VGA connector of the carrierboard. Make sure that your monitor is capable of displaying the video resolutions. If a video mode generates horizontal frequencies much higher than the maximum value of your monitor, the monitor may be damaged! If your monitor is not able to display a mode, switch off or disconnect the monitor in advance and select an appropriate video mode for the monitor.

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3.2. Keyboard

A standard USB keyboard can be connected to a USB connector.

3.3. Mouse

A standard USB mouse can be connected to a USB connector.

3.4. Ethernet

A Network can be connect using 10BaseT, 100BaseTX or 1000BaseT standard. It can be connected to the GbE connector.

3.5. USB

Up to four USB devices can be connected to the carrierboard.

3.6. Port 80

This Display shows the Port80 debug information (Postcode) of the AMI BIOS.

3.7. Status LEDs

3.7.1. 5V_SBY

This green LED shows the presence of the 5V standby voltage from the ATX main power.

3.7.2. 12V

This green LED shows the presence of the 12V voltage from the ATX main power.

3.7.3. HDD

This yellow LED shows activity on either the DIE interface or the SATA interfaces.

3.7.4. Type

This red LED shows a mismatch of the COMExpress types. The MODB-200 carrierboard is designed for type 2 COMExpress modules and can not used with other types. The main power will not turn on if there is a mismatch.

3.7.5. Therm

This red LED shows a critical thermal shutdown of the system.

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3.8. Ethernet Status LEDs

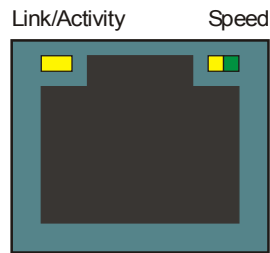


Figure 3.1: Location Ethernet Status LEDs

Table 3.1: Speed LED

green	1000Mb/s
yellow	100Mb/s
off	10Mb/s or not active

Table 3.2: Link / Activity LED

yellow	linkpulse detected
blinking	Activity

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4. Interface Connectors

4.1. COMExpress Connector

Table 4.1: COMExpress Connector

Row A		Row B		Row C		Row D	
A1	GND	B1	GND	C1	GND	D1	GND
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	IDE_D7	D2	IDE_D5
A3	GBE0_MDI3+	B3	LPC_FRAME#	C3	IDE_D6	D3	IDE_D10
A4	GBE0_LINK100#	B4	LPC_AD0	C4	IDE_D3	D4	IDE_D11
A5	GBE0_LINK1000#	B5	LPC_AD1	C5	IDE_D15	D5	IDE_D12
A6	GBE0_MDI2-	B6	LPC_AD2	C6	IDE_D8	D6	IDE_D4
A7	GBE0_MDI2+	B7	LPC_AD3	C7	IDE_D9	D7	IDE_D0
A8	GBE0_LINK#	B8	LPC_DRQ0#	C8	IDE_D2	D8	IDE_REQ
A9	GBE0_MDI1-	B9	LPC_DRQ1#	C9	IDE_D13	D9	IDE_IOW#
A10	GBE0_MDI1+	B10	LPC_CLK	C10	IDE_D1	D10	IDE_ACK#
A11	GND	B11	GND	C11	GND	D11	GND
A12	GBE0_MDI0-	B12	PWRBTN#	C12	IDE_D14	D12	IDE_IRQ
A13	GBE0_MDI0+	B13	SMB_CK	C13	IDE_IORDY	D13	IDE_A0
A14	GBE0_CTREF	B14	SMB_DAT	C14	IDE_IOR#	D14	IDE_A1
A15	SUS_S3#	B15	SMB_ALERT#	C15	PCI_PME#	D15	IDE_A2
A16	SATA0_TX+	B16	SATA1_TX+	C16	PCI_GNT2#	D16	IDE_CS1#
A17	SATA0_TX-	B17	SATA1_TX-	C17	PCI_REQ2#	D17	IDE_CS3#
A18	SUS_S4#	B18	SUS_STAT#	C18	PCI_GNT1#	D18	IDE_RESET#
A19	SATA0_RX+	B19	SATA1_RX+	C19	PCI_REQ1#	D19	PCI_GNT3#
A20	SATA0_RX-	B20	SATA1_RX-	C20	PCI_GNT0#	D20	PCI_REQ3#
A21	GND	B21	GND	C21	GND	D21	GND
A22	SATA2_TX+	B22	SATA3_TX+	C22	PCI_REQ0#	D22	PCI_AD1
A23	SATA2_TX-	B23	SATA3_TX-	C23	PCI_RESET#	D23	PCI_AD3
A24	SUS_S5#	B24	PWR_OK	C24	PCI_AD0	D24	PCI_AD5
A25	SATA2_RX+	B25	SATA3_RX+	C25	PCI_AD2	D25	PCI_AD7
A26	SATA2_RX-	B26	SATA3_RX-	C26	PCI_AD4	D26	PCI_C/BE0#
A27	BATLOW#	B27	WDT	C27	PCI_AD6	D27	PCI_AD9
A28	ATA_ACT#	B28	AC_SDIN2	C28	PCI_AD8	D28	PCI_AD11
A29	AC_SYNC	B29	AC_SDIN1	C29	PCI_AD10	D29	PCI_AD13
A30	AC_RST#	B30	AC_SDIN0	C30	PCI_AD12	D30	PCI_AD15
A31	GND	B31	GND	C31	GND	D31	GND
A31	GND	B31	GND	C31	GND	D31	GND
A32	AC_BITCLK	B32	SPKR	C32	PCI_AD14	D32	PCI_PAR
A33	AC_SDOUT	B33	I2C_CK	C33	PCI_C/BE1#	D33	PCI_SERR#
A34	BIOS_DISABLE#	B34	I2C_DAT	C34	PCI_PERR#	D34	PCI_STOP#
A35	THRMTRIP#	B35	THRM#	C35	PCI_LOCK#	D35	PCI_TRDY#
A36	USB6-	B36	USB7-	C36	PCI_DEVSEL#	D36	PCI_FRAME#
A37	USB6+	B37	USB7+	C37	PCI_IRDY#	D37	PCI_AD16
A38	USB_6_7_OC#	B38	USB_4_5_OC#	C38	PCI_C/BE2#	D38	PCI_AD18
A39	USB4-	B39	USB5-	C39	PCI_AD17	D39	PCI_AD20
A40	USB4+	B40	USB5+	C40	PCI_AD19	D40	PCI_AD22
A41	GND	B41	GND	C41	GND	D41	GND
A42	USB2-	B42	USB3-	C42	PCI_AD21	D42	PCI_AD24
A43	USB2+	B43	USB3+	C43	PCI_AD23	D43	PCI_AD26
A44	USB_2_3_OC#	B44	USB_0_1_OC#	C44	PCI_C/BE3#	D44	PCI_AD28
A45	USB0-	B45	USB1-	C45	PCI_AD25	D45	PCI_AD30
A46	USB0+	B46	USB1+	C46	PCI_AD27	D46	PCI_IRQC#
A47	VCC_RTC	B47	EXCD1_PERST#	C47	PCI_AD29	D47	PCI_IRQD#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#	C48	PCI_AD31	D48	PCI_CLKRUN#
A49	EXCD0_CPPE#	B49	SYS_RESET#	C49	PCI_IRQA#	D49	PCI_M66EN
A50	LPC_SERIRQ	B50	CB_RESET#	C50	PCI_IRQB#	D50	PCI_CLK
A51	GND	B51	GND	C51	GND	D51	GND
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	PEG_RX0+	D52	PEG_TX0+
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	PEG_RX0-	D53	PEG_TX0-
A54	GPI0	B54	GPO1	C54	TYPE0#	D54	PEG_LANE_RV#
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PEG_RX1+	D55	PEG_TX1+

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A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PEG_RX1-	D56	PEG_TX1-
A57	GND	B57	GPO2	C57	TYPE1#	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PEG_RX2+	D58	PEG_TX2+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PEG_RX2-	D59	PEG_TX2-
A60	GND	B60	GND	C60	GND	D60	GND
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PEG_RX3+	D61	PEG_TX3+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PEG_RX3-	D62	PEG_TX3-
A63	GPI1	B63	GPO3	C63	RSVD	D63	RSVD
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	RSVD	D64	RSVD
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	PEG_RX4+	D65	PEG_TX4+
A66	GND	B66	WAKE0#	C66	PEG_RX4-	D66	PEG_TX4-
A67	GPI2	B67	WAKE1#	C67	RSVD	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	PEG_RX5+	D68	PEG_TX5+
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	PEG_RX5-	D69	PEG_TX5-
A70	GND	B70	GND	C70	GND	D70	GND
A71	LVDS_A0+	B71	LVDS_B0+	C71	PEG_RX6+	D71	PEG_TX6+
A72	LVDS_A0-	B72	LVDS_B0-	C72	PEG_RX6-	D72	PEG_TX6-
A73	LVDS_A1+	B73	LVDS_B1+	C73	SDVO_DATA	D73	SDVO_CLK
A74	LVDS_A1-	B74	LVDS_B1-	C74	PEG_RX7+	D74	PEG_TX7+
A75	LVDS_A2+	B75	LVDS_B2+	C75	PEG_RX7-	D75	PEG_TX7-
A76	LVDS_A2-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN	B77	LVDS_B3+	C77	RSVD	D77	IDE_CBLID#
A78	LVDS_A3+	B78	LVDS_B3-	C78	PEG_RX8+	D78	PEG_TX8+
A79	LVDS_A3-	B79	LVDS_BKLT_EN	C79	PEG_RX8-	D79	PEG_TX8-
A80	GND	B80	GND	C80	GND	D80	GND
A81	LVDS_A_CK+	B81	LVDS_B_CK+	C81	PEG_RX9+	D81	PEG_TX9+
A82	LVDS_A_CK-	B82	LVDS_B_CK-	C82	PEG_RX9-	D82	PEG_TX9-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL	C83	RSVD	D83	RSVD
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_SBY	C85	PEG_RX10+	D85	PEG_TX10+
A86	KBD_RST#	B86	VCC_5V_SBY	C86	PEG_RX10-	D86	PEG_TX10-
A87	KBD_A20GATE	B87	VCC_5V_SBY	C87	GND	D87	GND
A88	PCIE0_CK_REF+	B88	RSVD	C88	PEG_RX11+	D88	PEG_TX11+
A89	PCIE0_CK_REF-	B89	VGA_RED	C89	PEG_RX11-	D89	PEG_TX11-
A90	GND	B90	GND	C90	GND	D90	GND
A91	RSVD	B91	VGA_GRN	C91	PEG_RX12+	D91	PEG_TX12+
A92	RSVD	B92	VGA_BLU	C92	PEG_RX12-	D92	PEG_TX12-
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	RSVD	B94	VGA_VSYNC	C94	PEG_RX13+	D94	PEG_TX13+
A95	RSVD	B95	VGA_I2C_CK	C95	PEG_RX13-	D95	PEG_TX13-
A96	GND	B96	VGA_I2C_DAT	C96	GND	D96	GND
A97	VCC_12V	B97	TV_DAC_A	C97	RSVD	D97	PEG_ENABLE#
A98	VCC_12V	B98	TV_DAC_B	C98	PEG_RX14+	D98	PEG_TX14+
A99	VCC_12V	B99	TV_DAC_C	C99	PEG_RX14-	D99	PEG_TX14-
A100	GND	B100	GND	C100	GND	D100	GND
A101	VCC_12V	B101	VCC_12V	C101	PEG_RX15+	D101	PEG_TX15+
A102	VCC_12V	B102	VCC_12V	C102	PEG_RX15-	D102	PEG_TX15-
A103	VCC_12V	B103	VCC_12V	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND	B110	GND	C110	GND	D110	GND

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4.2. LAN

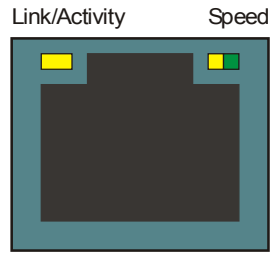


Figure 4.1: LAN Connector

Table 4.2: Pinout LAN

Pin	Signal
1	LAN1 Pair0+
2	LAN1 Pair0-
3	LAN1 Pair1+
4	LAN1 Pair2+
5	LAN1 Pair2-
6	LAN1 Pair1-
7	LAN1 Pair3+
8	LAN1 Pair3-

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4.3. USB

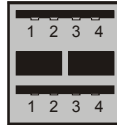


Figure 4.2: USB Connector

Table 4.3: Pinout USB Connector

Pin	Signal
1	5V
2	USB +
3	USB -
4	GND

4.4. VGA

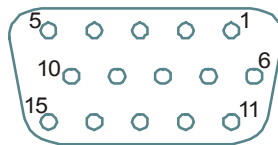


Figure 4.3: VGA Connector

Table 4.4: Pinout VGA Connector

10-Pin Connector		15-Pin VGA-Connector
Pin	Signal	Pin
1	CRTRED	1
2	GND	5
3	CRTGREEN	2
4	GND	6
5	CRTBLUE	3
6	GND	7, 8, 10
7	VGA_DDCDATA	12
8	VGA_HSYNC	13
9	VGA_VSYNC	14
10	VGA_DOCCLK	15

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4.5. LVDS

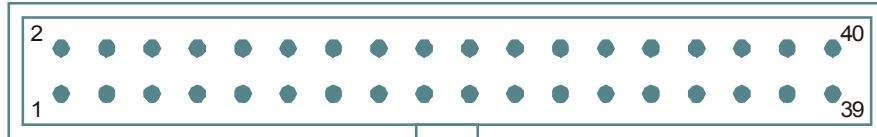


Figure 4.4: Connector LVDS

Table 4.5: Pinout LVDS Connector

Pin	Signal	Signal	Pin
1	LVDS_A0+	LVDS_A0-	2
3	LVDS_A1+	LVDS_A1-	4
5	LVDS_A2+	LVDS_A2-	6
7	LVDS_A3+	LVDS_A3-	8
9	GND	GND	10
11	LVDS_A_CLK+	LVDS_A_CLK-	12
13	GND	GND	14
15	LVDS_B0+	LVDS_B0-	16
17	LVDS_B1+	LVDS_B1-	18
19	LVDS_B2+	LVDS_B2-	20
21	LVDS_B3+	LVDS_B3-	22
23	GND	GND	24
25	LVDS_B_CLK+	LVDS_B_CLK-	26
27	GND	GND	28
29	LVDS_BKLT_EN	LVDS_VDD_EN	30
31	LVDS_I2C_CK+	LVDS_I2C_CK-	32
33	GND	LVDS_BKLT_CTRL	34
35	+5V	+5V	36
37	+3V3	+3V3	38
39	+12V	+12V	40

Der EUROCOM 400 unterstuetzt nur den LVDS-Kanal A.

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4.6. IDE

The power supply cable of the EIDE device must be directly connected to the power supply. Up to two EIDE drives (harddisk, CD-ROM) can be connected. Cable length should not exceed 40 cm to avoid instable operation. It is also recommended to use an UDMA-Cable with 80 wires.

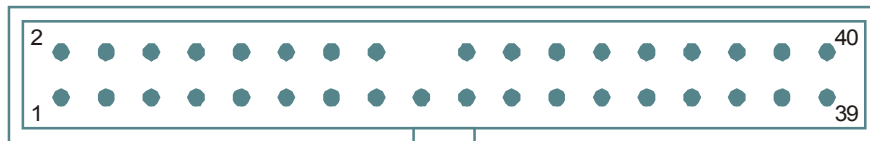


Figure 4.5: Connector IDE

Table 4.6: Pinout IDE Connector

Pin	Signal	Signal	Pin
1	/RST	GND	2
3	D7	D8	4
5	D6	D9	6
7	D5	D10	8
9	D4	D11	10
11	D3	D12	12
13	D2	D13	14
15	D1	D14	16
17	D0	D15	18
19	GND	nc	20
21	REQ	GND	22
23	/IOW	GND	24
25	/IOR	GND	26
27	IORDY	nc	28
29	/ACK	GND	30
31	IRQ14	nc	32
33	A1	nc	34
35	A0	A2	36
37	/CS1	/CS3	38
39	/ACT	GND	40

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4.7. SATA

The power supply cable of the SATA device must be directly connected to the power supply. Up to two SATA drives can be connected.

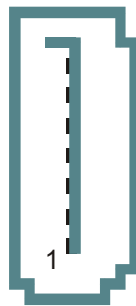


Figure 4.6: Connector SATA

Table 4.7: Pinout SATA Connector

Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

The EUROCOM 400 uses only Ports 0 and 1 of the SATA ports.

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4.8. TV out



Figure 4.7: Connector TV out

Table 4.8: Pinout TV out Connector

Pin	Signal
1	GND
2	DAC A
3	GND
4	DAC B
5	GND
6	DAC C
7	nc
8	nc
9	nc
10	nc

The EUROCOM 400 does not use this port.

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4.9. AC97



Figure 4.8: Connector AC97

Table 4.9: Pinout AC97 Connector

Pin	Signal
1	GND
2	GND
3	SDIN0
4	12V
5	SDIN1
6	BITCLK
7	SDIN2
8	nRST
9	SDOUT
10	SYNC

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5. Board Parameters

5.1. Host Bus

- 667 MHz

5.2. COM Express

COMExpress interface according to specification

- Type 2
- PCI Express (2 * x8, 1 * x4, 1 * x1)
- PCI 32/33
- 2 * SATA
- 1 * IDE
- 1 * VGA
- 1 * LVDS1
- 1 * GbE
- 4 * USB 2.0

5.3. Memory

- 2 x DIMM DDR2-400 (PC3200) up to 4096 MB

5.4. PCI Local Bus

- CPU to PCI Transfer Options:
 - Write post buffer
 - Max. 120 MB/s (peak)
- PCI to Memory Transfer Options:
 - Max. 120 MB/s (peak)
- Clock Speed: 33 MHz
- Four PCI interrupts rerouted to selectable ISA interrupts

5.5. Network

- 1 Channel
- 10BaseT/100BaseTx/1000BaseT (twisted-pair)
- Transfer Speed: max. 10/100/1000 Mbit/s

5.6. USB

- 4 ports
- USB 2.0 1.5 / 12 / 480 Mb/s
- Supply current for external devices: 500 mA (protected against shortcut).

5.7. Video I/O

- Dotclock: max. 100 MHz
- CLUT: 4/8/16/24 bit/pixel

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- 16, 256, 32 K, 64 K, 16 M colors depending on screen resolution
- Video Resolution: 640 x 480 – 1024 x 768
- Vertical Frequencies: max 85 Hz

Figure 5.1: Resolution Table

Resolution [pixel x pixel]	Colordepth [bit / pixel]	Refresh [Hz]
1280 x 1024	24	60
1024 x 768	24	85
1024 x 768	16	85
1024 x 768	8	85
800 x 600	24	85
800 x 600	16	85
800 x 600	8	85
640 x 480	24	85
640 x 480	16	85
640 x 480	8	85

5.8. MTBF Values

- t.b.d. (computed after MTL HDBK-217E)
- t.b.d. (realistic value from industry standard experience)
- ESD Values: 2 kV (Human body method)

5.9. Environmental Conditions

Storage Temperature: -40 °C - 70 °C, at 10% - 100% non-condensing.

Operating Temperature: 0 °C - 55 °C (2 m/s forced air cooling). This temperature is measured on the air intake of the PC case.

Maximum Operating Humidity: 85 % relative

5.10. Battery

- Type CR 1/3 N, 170 mAh, 3.0 V
- Approx. 4 years life time

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6. Programmers Reference

6.1. Interrupts

The EUROCOM 400 uses the PC interrupts for different purposes. First there are the PC compatible interrupt sources like timer, keyboard, EIDE, real-time clock and coprocessor. These interrupt sources require dedicated interrupt numbers, which are fixed. Never use these interrupt numbers for other modules.

The PCI interrupts INTA, INTB, INTC and INTD are routed via the ICH to one of the ISA interrupts. The used interrupt number must be defined in the BIOS setup menu. If not specified, the BIOS automatically sets the routing for the PCI interrupts.

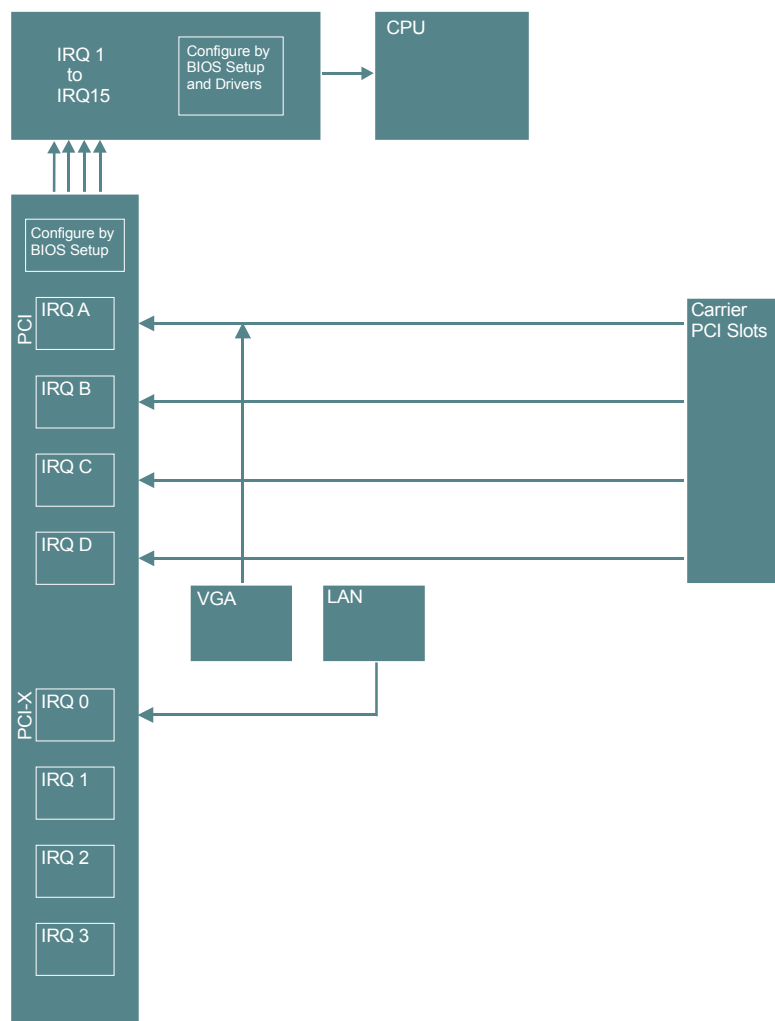


Figure 6.1: Interrupt Routing Scheme