EmbeddedDNA®

EuroTecH

COM-1240

User Manual

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Introduction

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Eurotech Spa reserves the right to change the contents and form of this document, as well as the features and specifications of its products at any time, without notice, particularly because of continuous upgrades.
Eurotech Spa informs you that the information contained in this manual is continuously being updated in line with the technical alterations and improvements made by Eurotech Spa to the products and thus this manual only reflects the technical status of the products at the time of printing.
Updated versions will become available on the Eurotech website: www.eurotech.it.
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E-mail: sales@eurotech.it

Conventions

The following table lists the conventions that are used throughout this manual.

Icon	Notice Type	Description
	**Information note**	Important features or instructions
	**Warning**	Information to alert you to potential damage to a program, system or device or potential personal injury

The "Mode" of the register:

R/W Read and write register.
RO Read only register
W Meaning of the register when written
R Meaning of the register when read

Hexadecimal numbers:

Hexadecimal numbers are indicated with an "h" suffix (for example: 11Ch)

Other:

NC Not internally connected
Reserved Use reserved by Eurotech

Environmental safety

When disposing of the equipment, we suggest separating all of its components when possible, and disposing of them in accordance with local waste disposal legislations.
Be sure to dispose of used batteries as required by local waste disposal legislation. Never throw batteries into a fire (risk of explosion) or household garbage can.

The symbol  on the product or on its packaging indicates that this product may not be treated as household waste. Instead it should be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local civic office, your household waste disposal service or the shop where you purchased the product.

Antistatic precautions

Always use appropriate antistatic precautions when handing any board
This is to avoid damage caused by ESD (Electro Static Discharge)

Contents

Chapter 1 Product Overview

Block diagram

Figure 1 shows the functional blocks of the COM-1240.

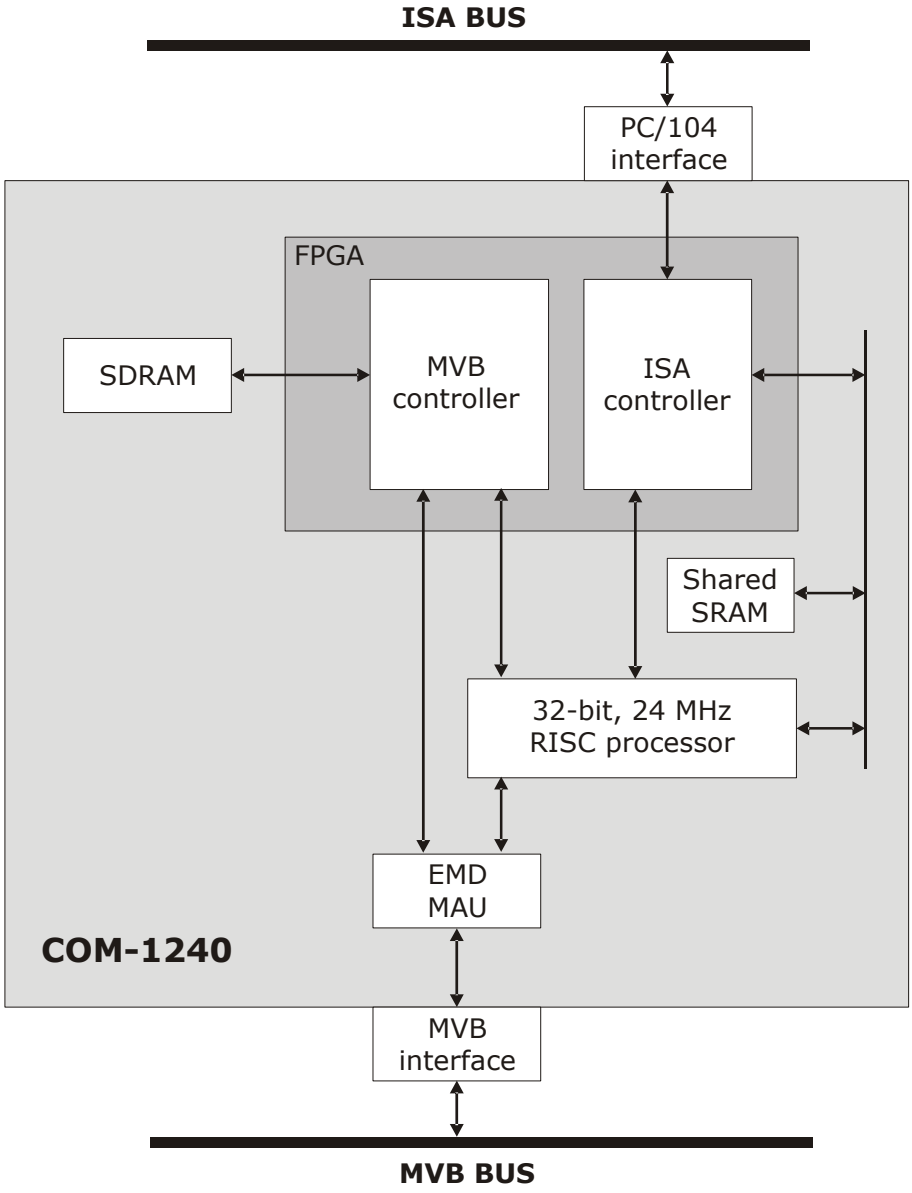

Figure 1. COM-1240 Block diagram

Features

The COM-1240 is a ruggedised PC/104 communications module developed for interfacing between PC/104 systems and the MVB (Multifunctional Vehicle Bus), as widely used in railway applications.

The board features an EMD (Electrical Middle Distance) device connector with onboard transformers, and is built around a 32bit, 24MHz RISC microprocessor, this allows for the management of the complete TCN (Train Communication Network) protocol stack, up to the session layer of Class 3 devices (Optionally Class 4)

The module is EN50155 compliant and resistant to high levels of vibration, humidity and temperature.

Architecture:	PC/104 compliant
MVB Device Class:	3 (Optionally 4)
Device interface:	EMD (Electrical Middle Distance)
Internal CPU:	32bit, 24MHz RISC processor
SRAM:	1 MB accessible from host
Supported O. S.:	Linux, Windows CE and QNX
Power supply:	+5.0 Volts ± 5%
Power consumption:	3.5 Watts
Operating temperature range:	-25°C to +85°C (EN50155 compliant)
Relative Humidity:	95% max (non condensing)
Dimensions (L x W x H):	90 x 96 x 15 mm

For a complete description of Eurotech standard products and systems please visit: www.eurotech.it

Chapter 2 Product Description

Connector Layout

Note: Eurotech products have pin 1 of all jumpers and connectors marked with a square solder pad.

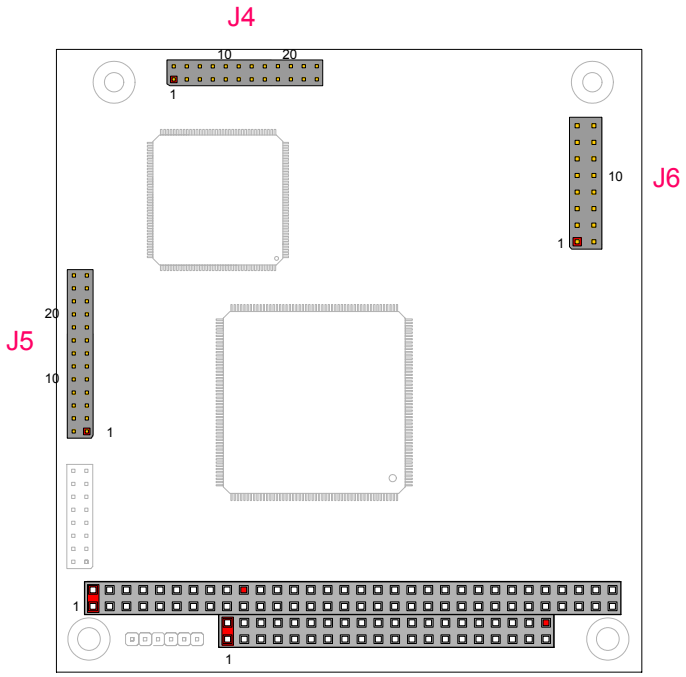

Figure 2. Connector layout

Note: in the above figure, a red square pad indicates pin 1 of each connector.

Name	Use	Qty Pins	Pin Format	Pitch (mm)
J1	ISA Bus	64	2x32	2.54
J2	ISA Bus	40	2x20	2.54
J4	Reserved	24	2x12	2.00
J5	Reserved	26	2x13	2.00
J6	MVB interface	16	2x8	2.54

J1 and J2: ISA Bus

The ISA BUS

Connectors J1 and J2 contain the signals for the PC/AT ISA-bus.
These signals match definitions of the IEEE P996 standard.

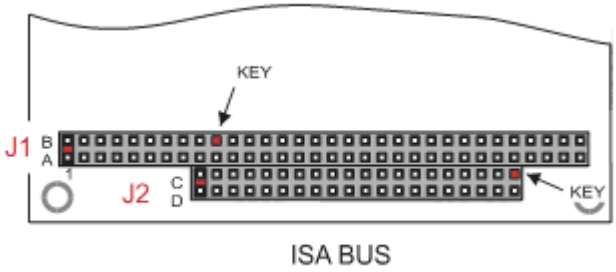

Figure 3. J1 & J2 Connectors

According to PC/104 specifications, two KEY pins on the connector are closed on the upper side and the equivalent pins are removed on the bottom side of the bus connector. Keying of the connectors avoids board failure due to wrong insertion in/of another module on the bus.

For further information about the ISA-bus please visit the Industry Standards section of the Eurotech website.

The ISA base address

The ISA address is factory set and fixed at 0x328h.
The board requires 4 bytes of the I/O space starting from the base address.
You must contact Eurotech if for any reason you need to change the factory value of the ISA base address.

Module Handling

We strongly recommend that you follow the procedure below to ensure that stacking of the modules does not damage any of the connectors or components, failure to follow these instructions may result in irreparable board damage or failure, which would not be covered by warranty.

1. Turn off all power to the PC/104 computer and its peripheral devices.
2. Select and install standoffs to properly position the module on the PC/104 stack. See Module Stacking
3. Remove the module from its antistatic bag.
4. Check that the KEY pins in the bus connector are properly positioned.
5. Check the stacking order; make sure an XT bus card are not placed between two AT bus cards as this will interrupt the AT bus signals.
6. Hold the module by its edges and orient it so that the bus connector pins line up with the matching connector on the stack.
7. Using even pressure carefully press the module onto the PC/104 stack.

Module Stacking

The picture below shows a typical module stack with 2 PC/104 Plus modules, 1 PC/104 16-BIT module, and 1 PC/104 8-BIT module. The maximum configuration for the PCI bus of PC/104 Plus modules is 4 plus the Host Board. If standard PC/104 modules are used in the stack, they must be the top module(s) because they will normally not include the PCI bus.

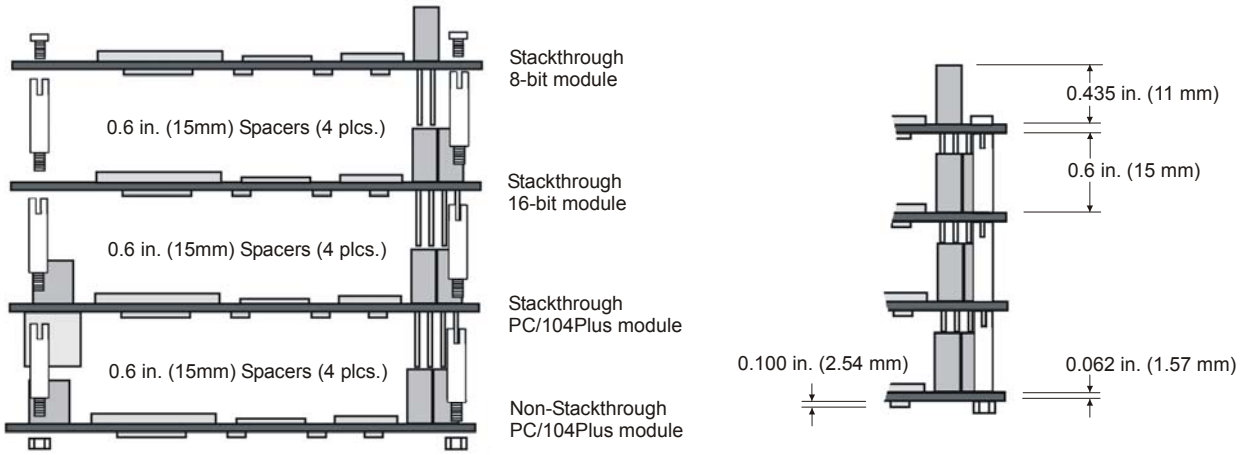

Figure 4. The PC/104 module stack

Do not force any module onto the stack! Wiggling the module or applying too much pressure may damage it. If the module does not readily press into place, remove it, check for bent pins or out-of-place keying pins, and try again.

J6: MVB interface

J6 is the MVB interface and provides access to an EMD (Electrical Middle Distance) medium by means of onboard transformers.

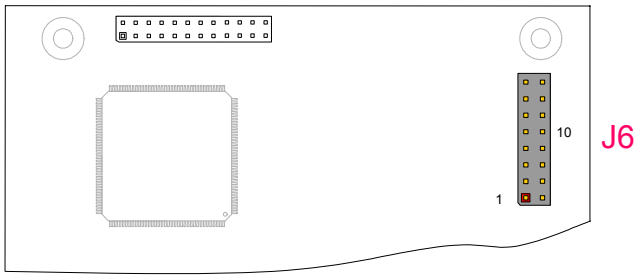

Figure 5. J6 Connector

Table 1. J6 pinout

Pin #	Signal	Pin #	Signal
1	DATA _A1+	**2**	DATA _A2+
3	DATA_A1-	**4**	DATA_A2-
5	NC	**6**	NC
7	Reserved	**8**	Reserved
9	Reserved	**10**	Reserved
11	NC	**12**	NC
13	DATA_B1+	**14**	DATA_B2+
15	DATA_B1-	**16**	DATA_B2-

NOTE: In order to connect J6 to the MVB bus it is necessary to use an appropriate adapter that provides 2 DB9 connectors (as required by the MVB standard) and the requisite termination resistors.
This adapter is available from Eurotech upon request.

Chapter 3 Troubleshooting

Technical/Sales Assistance

If you have a technical question or if you cannot isolate a problem with your PC/104 system, please call or e-mail the Eurotech Technical Support:

- techsupp@eurotech.it
- Phone: +39-0433-485 411
- Fax: +39-0433-485 499

If you have a sales question, please contact your local Eurotech Sales Representative or the Regional Sales Office for your area.

Returning For Service

Before returning any of Eurotech's products, you must contact the Eurotech Technical Support sending an email to techsupp@eurotech.it with the model number, serial number, short fault description and contact details to obtain a Returned Material Authorization (**RMA**) number.

Note. You must have the RMA number in order to return any product for any reason!

Pack the module in an anti-static material and ship it in a sturdy cardboard box with enough packing material to adequately cushion it.

Warning! Any product returned to Eurotech improperly packed will immediately void the warranty for that particular product!

Appendix

A.1 Electrical and Environmental Specifications

The following section provides tables and illustrations showing the electrical, mechanical and environmental specifications for the COM-1240 module.

Electrical Operating Characteristics

Table 1. DC Operating Characteristics

Supply Voltage:	Vcc = +5.0V +/- 5%
Power consumption	3.5W

Note. This module is not warranted against damage caused by overheating at temperatures in the excess of +85°C

For proper operation of the COM-1240 module, the ambient air temperature must remain inside this range: -25°C to +85°C (EN50155 compliant)

Absolute Maximum Ratings

Table 2. Absolute Maximum Ratings

Supply Voltage:	Vcc: 4.75V to 5.40V
Storage Temperature Range:	-45°C to +85°C
Non-Condensing Relative Humidity:	<95% at 40°C (+104°F)
Operating Temperature Range:	-25°C to +85°C

Warning! Stressing the device beyond the "Absolute Maximum Ratings" may cause permanent damage. These are stress ratings only. Operation beyond the "Operating Conditions" is not recommended. Extended exposure beyond the "Operating Conditions" may affect device reliability.

A.2 Mechanical Dimensions

Board Dimensions

The COM-1240 module's mechanical dimensions are shown in the following picture:

- Dimensions: 90x96x15mm (3.6x3.8x0.6 inches)

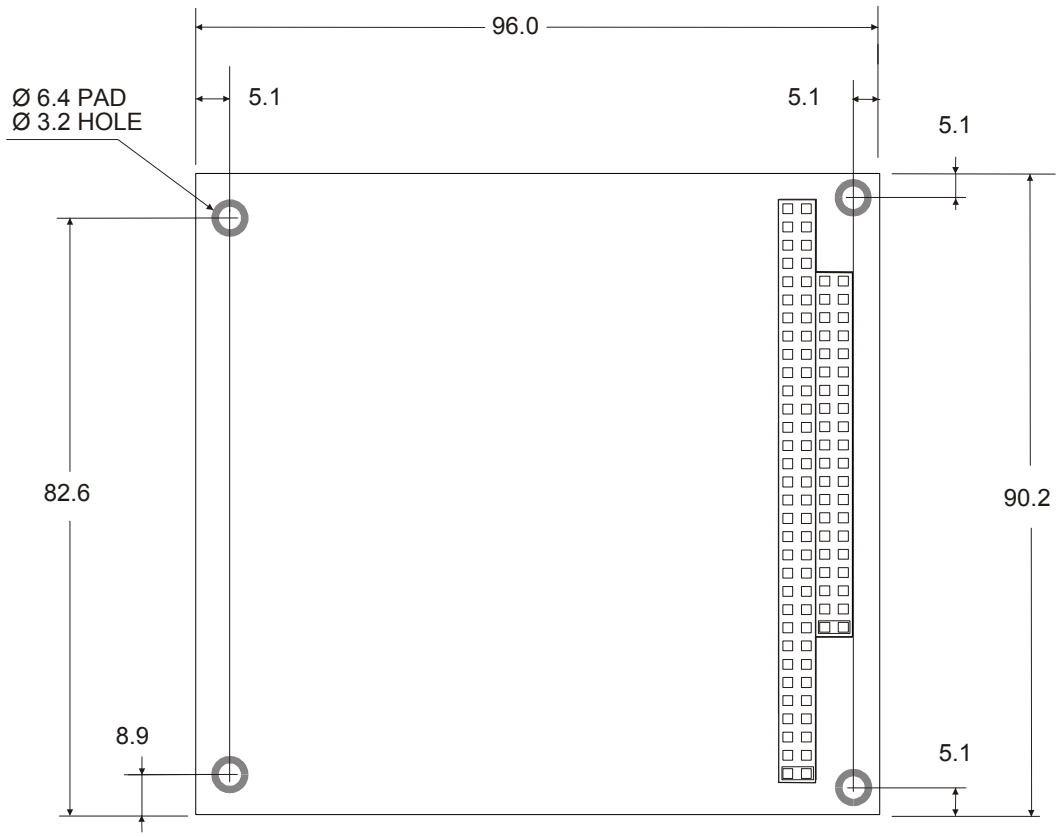

Figure 6. COM-1240 Board dimensions

Note: For further information about the mechanical dimensions of ISA buses please refer to the pc/104 consortium site: www.pc104.org

A.3 Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Eurotech SpA assumes no liability for the customer's failure to comply with these requirements.
The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. The equipment is supplied with a three-conductor ac power cable; the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electro technical Commission QEC) safety standards.

Do Not Operate in an Explosive Atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep Away From Live Circuits

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Do Not Substitute Parts or Modify Equipment

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact Eurotech technical staff or your local representative for service and repair to ensure that safety features are maintained.

Observe Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions, which you deem necessary for the operation of the equipment in your operating environment.

Flammability

All Eurotech Printed Circuit Boards are manufactured by UL-recognized manufacturers and have a flammability rating of UL-V0.

EMI Caution

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used in a cabinet with adequate EMI protection.

CE Notice

This product complies with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

- EN55022 (CISPR 22) Radio Frequency Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4) Electromagnetic Immunity

The product also fulfils EN60950 (product safety), which is essentially the requirement for the Low Voltage Directive (73/23/EEC).
This product was tested in a representative system to show compliance with the above-mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

Disclaimer of Warranty

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Reliability

Eurotech has taken extra care of product design in order to ensure reliability. The two major ways in which reliability is achieved are:

- The product is designed in top-down fashion, utilizing the latest in hardware and software techniques, so unwanted side effects and unclean interactions between parts of the system are eliminated.
- Eurotech tests each board by exercising its functions, burns it in under power, and retests it to ensure that the infant mortality phase is passed before the product is shipped.

Life Support Policy

Eurotech products are not authorized for use as critical components in life support devices or systems without the express written approval of the president of Eurotech.

Acronyms and Abbreviations

ACRONYM	MEANING	ACRONYM	MEANING
A	Ampere	**LCD**	Liquid Crystal Display
APM	Advanced Power Management	**LPT**	Line Printer
ATA	AT Attachment	**LVD**	Low Voltage Differential
ATAPI	ATA Packet Interface	**MAU**	Media Access Unit
BIOS	Basic I/O System	**MB**	Megabyte
DMA	Direct Memory Access	**Mbps**	Megabits per second
DOC	Disk On Chip	**MHZ**	Megahertz
DOM	Disk On Module	**MVB**	Multifunctional Vehicle Bus
ECC	Error Correction Code	**NIDS**	Network Driver Interface Specification
ECP	Enhanced Capabilities Port	**NTSC**	National Television System Committee
EMD	Electrical Middle Distance	**OEM**	Original Equipment Manufacturer
FDC	Floppy Disk Drive Controller	**PAL**	Phase Alternation Line
FDD	Floppy Disk Drive	**PCI**	Peripheral Component Interconnect
FPGA	Field-Programmable Gate Array	**PCMCIA**	Personal Computer Memory Card Int. Association
HDC	Hard Disk Drive controller	**PIC**	Programmable Interrupt Controller
HDD	Hard Disk Drive	**PIO**	Programmed I/O
I/O	Input/Output	**POST**	Power-On Self Test
IDE	Integrated Device Electronics	**RAM**	Random Access Memory
IEEE	Institute for Elec.& Electronics Eng. Inc.	**RAMDAC**	RAM digital-to-analog converter
IP	Internet Protocol	**SCSI**	Small Computer System Interface
IRQ	Interrupt Request	**SMBus**	System Management Bus
ISA	Industry Standard Architecture	**TCP/IP**	Transmission Control Protocol/Internet Protocol
KB	Kilobyte	**USB**	Universal Serial Bus
Kbps	Kilobits per Second	**V**	Volt
KHz	Kilohertz	**W**	Watt
LAN	Local Area Network	**WAN**	Wide Area Network
LBA	Logical Block Addressing		

Technical & Sales Assistance

If you have a technical question, please contact the Eurotech Customer Support Service

techsupp@eurotech.it

Other information can be found at:

www.eurotech.it

If you have a sales question, please contact your local Eurotech Sales Representative
or the Regional Sales Office for your area.