



**EuroTech**

***COM-1273***

**User's Manual**

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## ABOUT THIS MANUAL

This manual is meant for engineers and programmers to assist them in the development of systems based on the Eurotech COM-1273 PC/104 isolated CAN controller module. It contains a full technical specification, describes the connectors and main hardware sections as well as documentation on the internal registers and software. Included are instruction on installation, configuration and troubleshooting of your COM-1273 module.



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## NOTICE



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## Conventions

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

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

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## Environmental safety



When disposing 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.

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# Chapter 1 Product Overview

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The COM-1273 is a dual-channel galvanically isolated PC/104 CAN-bus interface board. The COM-1273 is based on two Philips SJA1000 network controllers that are commonly used in the industry. This board is designed to operate in noisy electrical environments commonly encountered in vehicles and industry. The extensive use of SMD technology increases reliability. The use of modern FPGA technology allows for high functionality integration as well as flexible customization to meet the requirements of custom applications. The on-board I2C-bus may be used for external device interfacing or remote system diagnostics. The COM-1273 is designed to be compliant with RoHS regulations.

For a complete description of our standard products and systems please visit our web site: [www.eurotech.fi](http://www.eurotech.fi) and **www.eurotech.it**

In the following paragraphs you will find a brief description of the characteristics of the COM-1273 board.

## COM-1273 Block diagram

The figure below shows the functional blocks of the COM-1273. The power supplies are omitted for clarity.

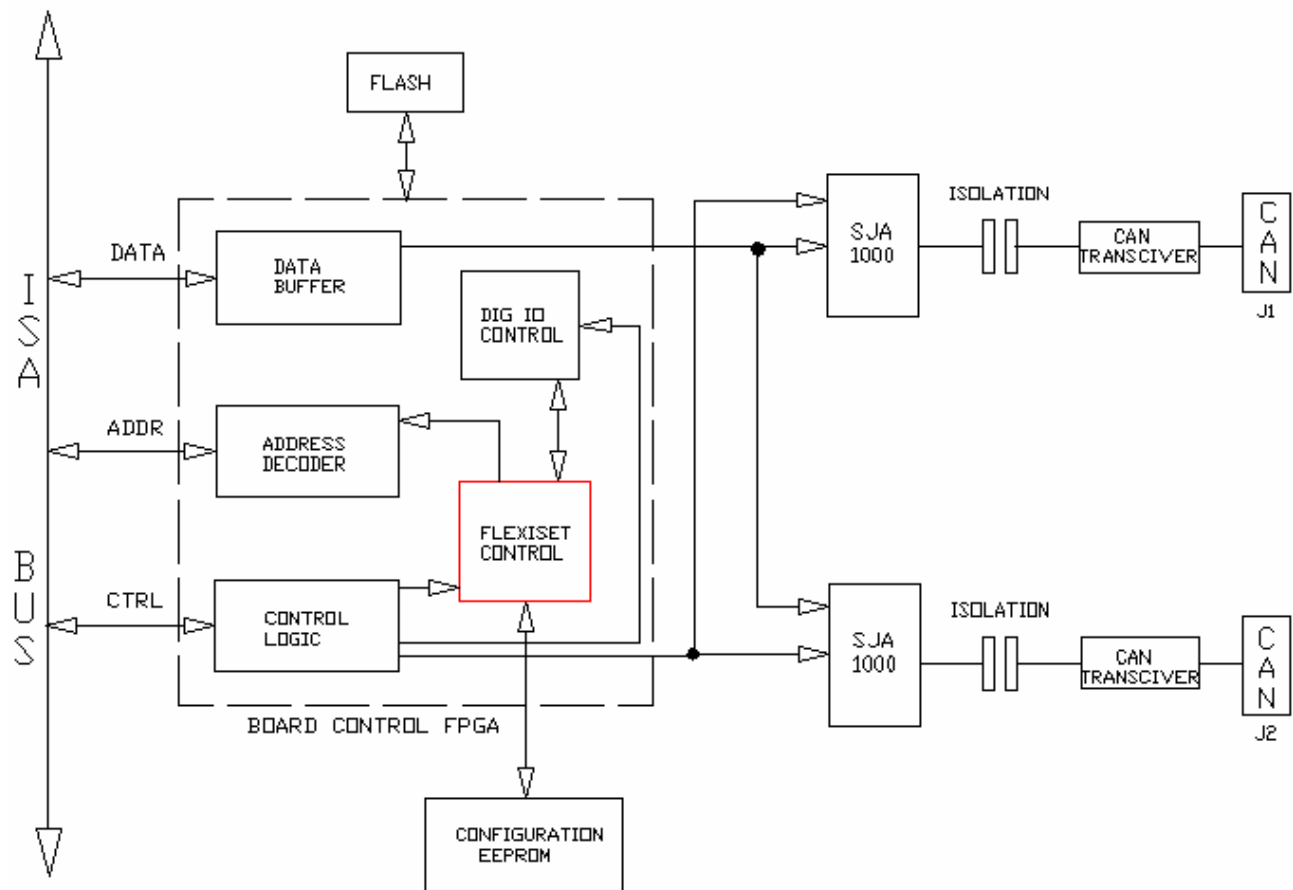


Figure 1. Functional blocks of the COM-1273 CAN-bus interface board

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## Product Description

### *COM-1273 PC/104 Dual Channel CAN module*

- PC/104 Form Factor: 90 X 96 mm (3.6"X3.8"), height: 15 mm (0.6")
- Low power consumption
- Two SJA-1000 CAN controllers, independently configurable
- 16MHz clock for both CAN channels
- 16-bit programmable direction digital I/O
- Onboard 120 Ohm bus termination, jumper selectable
- Software configurable FlexiSet™ jumperless setup
- High reliability, wide operating temperature range
- Operating systems supported: DOS (from 3.0 to 6.22), QNX, Windows 2000, Windows NT, Windows XP, WINCE.NET, Linux.

### *CAN bus controller*

- Philips SJA1000 controller
- Supports CAN Specification 2.0b
- Supports standard and extended data and remote frames
- Programmable global message Identifier mask
- 15 message objects of 8-byte data length and a programmable bit rate
- Supports all the functionality and services of the CAN-bus protocol
- Internal 64 byte receive FIFO for block mode data transfer from the CAN controller chip

### *Digital I/O*

- 16 bit programmable digital I/O, +5V tolerant
- Software configurable pull-up/down on digital I/O port in groups of 4 bits
- Advanced operating modes can be integrated into I/O pins, call Eurotech for details on available options

## ***Bus Interface***

- 16-bit bus PC/104bus connector
- 8-bit data bus, XT and AT interrupt support
- Software configurable interrupt and base address selection

## ***FlexiSet™ Configuration***

- No Jumpers needed for serial port base addresses or interrupts
- Software configurable board configuration stored in EEPROM
- Board serial number and board type identification
- Base address and interrupt channel stored in memory
- Advanced setup program for board parameter configuration
- Support for user data storage in non volatile EEPROM

## **Chapter 2 Jumper Description**

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This chapter shows the jumpers layouts and explains how to set up the board correctly.

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## Jumper Layout and Configuration

Described in the figure below, is the general jumper layout of the COM-1273 module.

In the below figure, the jumpers are indicated as **RED** followed by the jumper's number, while pin #1 of every jumper is indicated by a square pad.

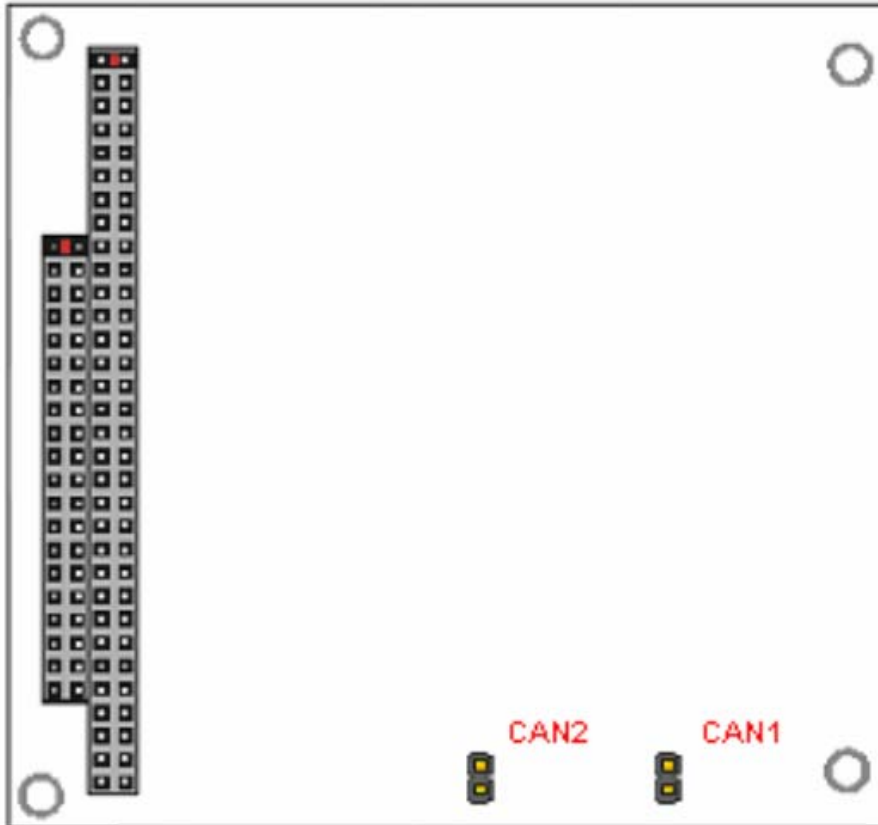


Figure 2. Jumpers and solder jumpers on the COM-1273 board

The following jumpers are located on the module (Jumper configurable version of COM-1273):

Two 2-pin jumpers for CAN bus termination, located next to CAN-bus headers:

- connecting jumper -> 120 Ohm termination connected on the board for CAN-channel
- removing jumper -> no termination connected on the board for CAN-channel (termination of the bus is performed in a different CAN-bus node)

The following table provides a quick cross-reference for the COM-1273 module's jumpers.

Table 1. Jumper Settings (factory configured)

LABEL	Type	Function	Default
TERM	2 pin jumper	Selection of 120 Ohm termination Closed : 120 Ohm termination on board Open : No termination	Closed

## **Chapter 3 Connector Description**

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This chapter provides a brief description of the COM-1273 connectors, describing their positions and functionality.

---

## Connector Layout

The figure below highlights the connector positions.

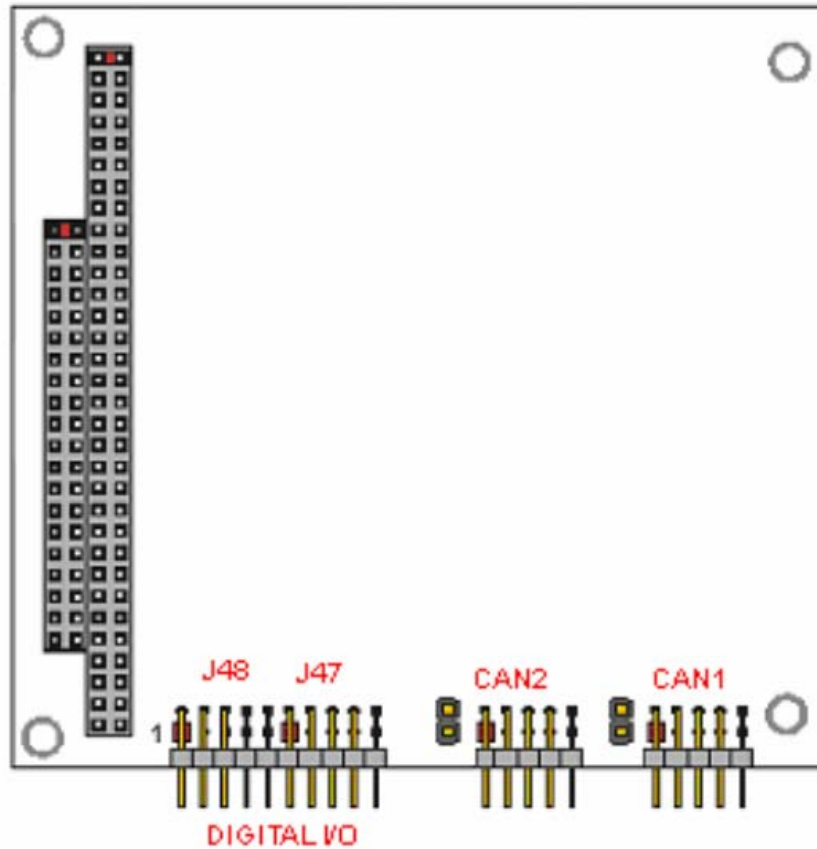


Figure 3. Connector layouts



**Note:** in the previous figure, a red square pad indicates Pin 1 of each connector.

Table below lists the name of the connectors with their function and the reference page.

Table 2. Connector Functions

Connector	Function	Page
J1-J2	ISA BUS (PC/XT)	
J47, J48	Digital I/O Connector	
CAN1	CAN channel #1	
CAN2	CAN channel #1	

---

## J1 and J2 for the 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. Below is shown a picture of the PC/104 ISA-bus connector

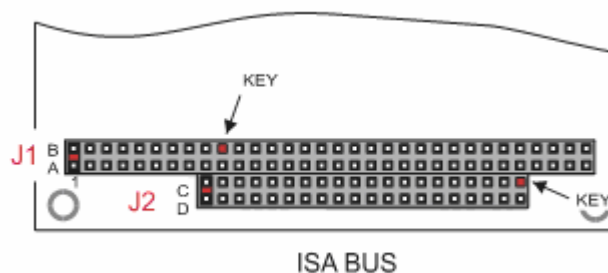


Figure 4. PC/104 BUS layout and definitions

According to PC/104 specifications, two KEYS on the connector are closed on the upper side and the equivalent pins is 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 Eurotech website at ([www.eurotech.it](http://www.eurotech.it)), section Industry Standards.

### *How to connect to the CPU other PC/104 & PC/104 devices: the stack assembly*

The ISA Bus connectors of the module are designed to allow the connection onto a stack of other PC/104 and/or PC/104Plus devices. We recommend you to follow the procedure below to ensure that stacking of the modules does not damage any connectors or electronics parts. Failure to follow these instructions may result in irreparable board damage or failure.

1. Turn off all power to the PC/104 computer and its peripheral devices.
2. Touch a grounded metal part of the rack to discharge any accumulation of static electricity.
3. Select and install standoffs to properly position the module on the PC/104 stack.
4. Remove the module from its anti-static bag.
5. Check that keying pins in the bus connector are properly positioned.
6. Check the stacking order; make sure an XT bus card will not be placed between two AT bus cards or it will interrupt the AT bus signals.
7. Hold the module by its edges and orient it so that the bus connector pins line up with the matching connector on the stack.
8. Press evenly the module onto the PC/104 stack.

The picture below shows a typical module stack with 2 PC/104 modules, 1 PC/104 16-BIT module, and 1 PC/104 8-BIT module. The maximum configuration for the PCI bus of PC/104 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.

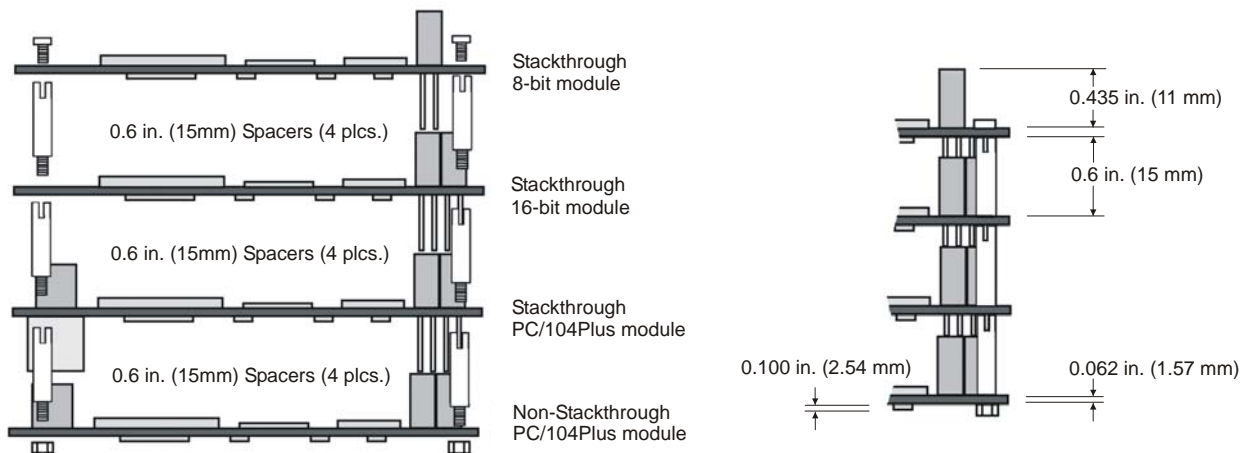


Figure 5. The PC/104 module stack



**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.**

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## J47 and J48 Digital I/O connector

J47 and J48 are connected together to form a 20-pin double row 10 x 2 pin with 2.54-mm step connector allowing the connection of up to TTL-level 16 digital I/O signals to the COM-1273 board. Additional +5V power and ground pins are available in both connectors. Note that the digital I/O signals that are connected to the board may not exceed CMOS/TTL levels under any circumstances. Exceeding these limits may cause permanent damage to the board or system.

### *J47 and J48 Digital I/O connector*

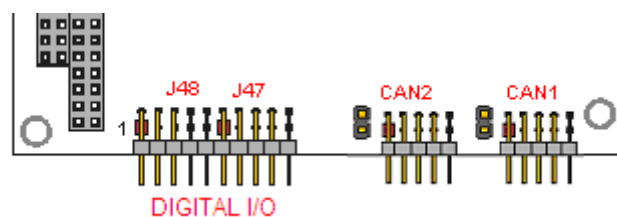


Figure 6. J47/J48 Connector layout

This digital I/O connector implements the following functions:

- Universal Digital I/O
  - 16 bit-programmable digital I/O, +3.3V output levels, +5V tolerant inputs
  - Programmable pull-up or pull-down in 4 groups of four bits with 10K resistor
  - Two ground pins and two +5V pins for external device connection

Below is shown the connector pin out, pin 1 is starting from connector J47, 11 continues with J48:

Table 3. Digital I/O connector

Pin	Signal	Function
1	GND	Ground
2	IO_0	Digital I/O channel 0
3	IO_1	Digital I/O channel 1
4	IO_2	Digital I/O channel 2
5	IO_3	Digital I/O channel 3
6	IO_4	Digital I/O channel 4
7	IO_5	Digital I/O channel 5
8	IO_6	Digital I/O channel 6
9	IO_7	Digital I/O channel 7
10	+5V	Power
11	GND	Ground
12	IO_8	Digital I/O channel 8
13	IO_9	Digital I/O channel 9
14	IO_10	Digital I/O channel 10
15	IO_11	Digital I/O channel 11
16	IO_12	Digital I/O channel 12
17	IO_13	Digital I/O channel 13
18	IO_14	Digital I/O channel 14
19	IO_15	Digital I/O channel 15
20	+5V	Power

The digital I/O signals can be programmed to inputs or outputs, each channel independently. This allows for maximum flexibility in wiring and system interconnection. The 10K Ohm pull-up or pull-down resistor on these channels can be configured through software in groups of four bits ie. channels 0-3 share the same mode, either pull-up or pull-down set in a configuration register bit. Other channel groups are channels 4-7, channels 8-11 and channels 12-15.

### ***CAN1, CAN2 CAN-bus interface connectors***

Two CAN-bus ports are available on the board for direct field-bus connection. These devices can be connected to the two header connector connectors (10pins, 2,54-mm step) shown below.

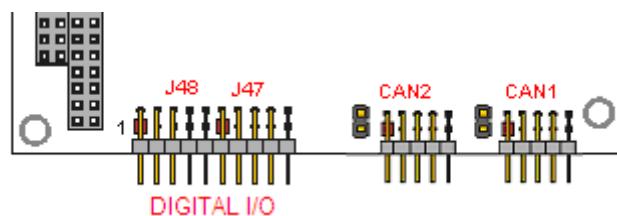


Figure 7. CAN-bus Connector Layout

The CAN-bus pin-outs are listed below conforms to the ISO-11898/2 CAN connector specification. If you crimp a 9-pin D connector using a flat ribbon cable you will have the correct D-9 pin-out according to ISO-11898/2. The isolated +5V power is unregulated and is derived from the 1W DC/DC converter on each channel; the power output must not be overloaded. Diode protection is up to 30V is provided against 24V-CAN bus power connections.

Table 4. CAN-bus ports (both ports identical)

Pin	Signal	Function	DB9
1	NC	Not connected	1
2	GND	Isolated GND	6
3	Bus_L	CAN_low	2
4	Bus_H	CAN_high	7
5	GND	Isolated GND	3
6	NC	Not connected	8
7	NC	Not connected	4
8	+5V	Isolated +5V	9
9	GND	Isolated GND	5
10	NC	Not connected	NA

# Chapter 4 Board Setup and Configuration

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## *How to use set the board (Configuration using FlexiSet™ program “FX.exe”)*

The configuration of the board is done using the FlexiSet™ configuration utility “FX.EXE”. With this software you are able to configure all the parameters of the board including:

- a. Base address of the COM-1273 CAN controllers and digital I/O
- b. Interrupt channel selection for CAN controllers
- c. Digital I/O channel direction and pull-up or pull-down configuration
- d. Disabling of onboard resources

These settings are stored on the board in a non-volatile EEPROM. During each startup of the system your COM-1273 board is configured automatically once power is applied.

## *I/O map of the COM-1273 board*

Table 2. The I/O map of the COM-1273

ADDRESS	FUNCTION	NOTE
CANBASE#1	Address channel #1	Address inside CAN chip
CANBASE#1 + 1	Data of Address channel #1	Data of register pointed by address
CANBASE#1 + 2	CAN Channel #1 reset	Read or Write
CANBASE#2	Address channel #2	Address inside CAN chip
CANBASE#2 + 1	Data of Address channel #2	Data of register pointed by address
CANBASE#2 + 2	CAN Channel #2 reset	Read or Write
IOBASE	Data I/O register	Digital I/O data/direction register
IOBASE + 2	Control	I2C-bus and control register

## **IOBASE Digital I/O Port – Direction configuration**

### **Function in Digital I/O mode**

- READ - Reads digital input data
- WRITE - Writes digital output data

### **Function in Direction configuration mode**

- READ - Reads direction configuration byte
- WRITE - Writes direction configuration byte

## **IOBASE + 02h I2C-bus interface and digital I/O configuration register**

- READ - Reads data from I2C-bus interface and digital I/O configuration register
- WRITE - Writes data to I2C-bus interface and digital I/O configuration register

Bit - 00	SDA drive	0 – drive low 1 – High impedance state
Bit - 01	SCL drive	0 – drive low 1 – High impedance state
Bit - 02	SDA state	logical state of SDA line
Bit - 03	SCL state	logical state of SCL line
Bit - 04	Digital I/O mode	0 – read/write digital I/O data to Digital I/O port IOBASE 1 – read/write direction data to Digital I/O port IOBASE
Bit - 05	Digital I/O byte	0 – read/write low byte data (Channels 1-7) of IOBASE 1 – read/write high byte data (Channels 8-15)
Bit - 06	RESERVED	
Bit - 07	RESERVED	



The digital I/O port mapped in IOBASE is used to interface and control the 16 bit-programmable digital I/O. The 16 digital I/O channels and their bit direction configuration are addressed in two bytes that are selected by Bit – 05. The configuration for direction is configured by Bit – 04.

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## ***Hardware collision” Error Message when using FX.exe***

Definition of the following message:

Read: 0xFC from 0x209  
Invalid return value basic from 0x208  
Possible hardware collision  
Press any key to exit...

Each card has two kinds of addresses as follows:

CONFIGURATION base address  
It's the same for all the cards and is only active if FX.exe is running  
FUNCTIONAL base address(s)  
Like 3f8, 2f8 etc of the serial boards

### ***CONFIGURATION base address***

When using the FX.exe program, it will detect all the Eurotech FlexiSet™ modules in the system using the CONFIGURATON base address, and communicates with them through the CONFIGURATION BASE to CONFIGURATION BASE+3 I/O window.

The default CONFIGURATION base address is 0x208 (so the FX.exe programme uses the 0x208-0x20B I/O window to access the configuration for all the boards in the system)

In some cases the default address (0x208) is used by another card in the system as a FUNCTIONAL base address blocking access to the FlexiSet™ configuration I/O window. Another address window must then be used. At first the FX.exe program runs it tries to check the range 0x208-0x20B to verify if there are other peripherals devices in this I/O window.

So the error message below indicates an address collision:

Read: 0xFC from 0x209 (There was a collision)

In this case it will be necessary to tell the FX.exe programme to use a different CONFIGURATION base address rather than 0x208. This can be done using the following command line instruction with the new base address as the argument:

FX 300

This will attempt to reconfigure the FlexiSet™ cards to use 0x300 as the CONFIGURATION base address; this alternative I/O window can be mapped into the range 0x200 to 0x3FC. The required window size is four consecutive bytes.

### ***FUNCTIONAL base address***

The FUNCTIONAL base address is just the normal base address that you would set using jumpers on older types of card, it has nothing to do with the CONFIGURATION base address.

A potential problem may arise is if you set using the FX.exe configuration program with the default parameters (0x208 as CONFIGURATION base address) and in the configuration you define the FUNCTIONAL base address for a card overlapping with this reserved I/O space. Doing this can halt your system, and also disables the ability to use the FX.exe using that default configuration base address. In this case, you will have to rerun the FX.exe program using a different CONFIGURATION base address as described above.

## Configuring the COM-1273 using FX FlexiSet™ configuration tool software

The following passage will illustrate how to change the settings of your COM-1273 module. The configuration of the COM-1273 is performed completely under software control and stored in a non-volatile EEPROM memory. Board reconfiguration and board resource management is easy even after the system is completely built.



Note that FX.EXE runs under DOS operating system. DOS is preinstalled on your Eurotech CPU module.

The pictures below illustrates the different menu options supported by the program:

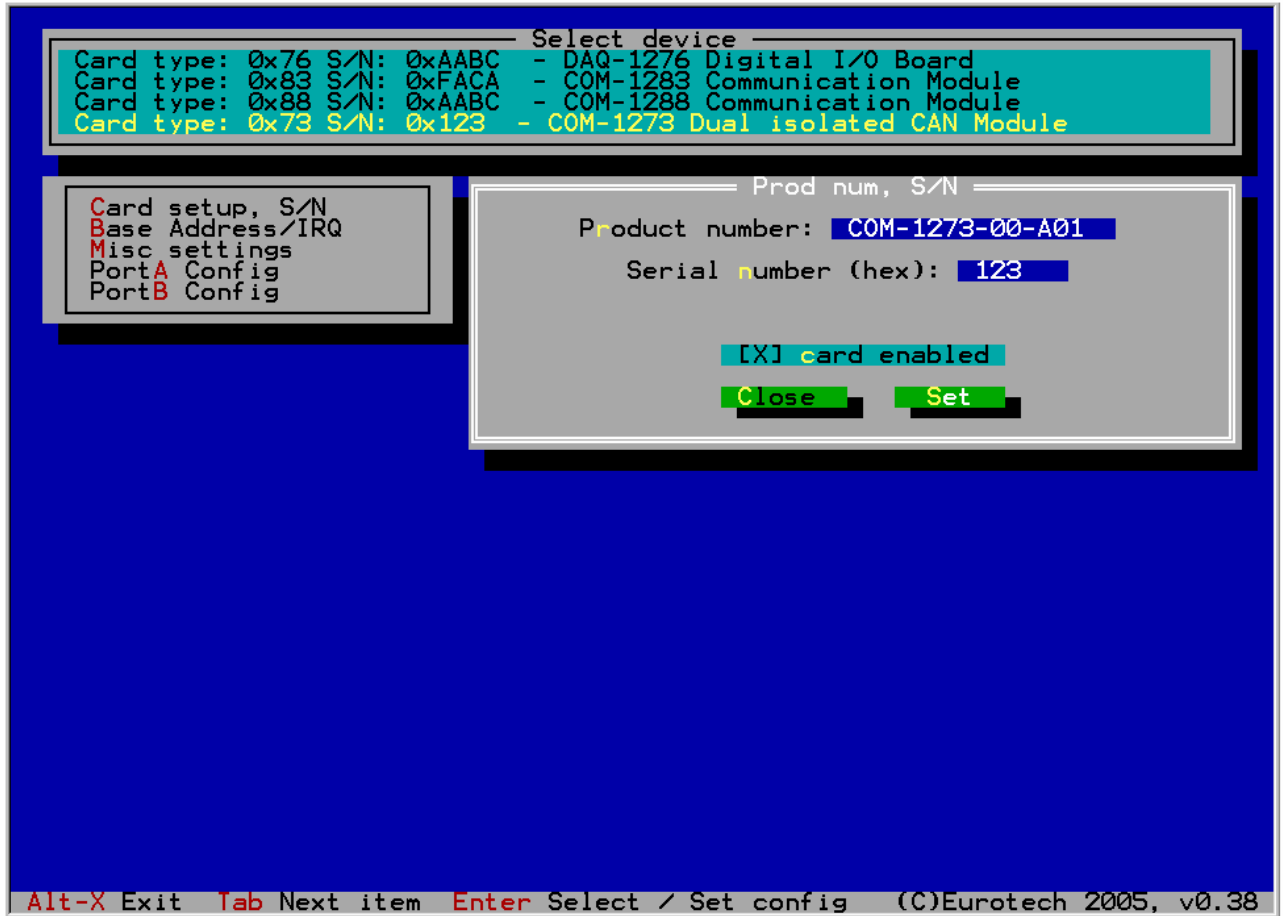


Figure 8. Setup display

The start-up screen pops up after FX successfully finds valid FlexiSet™ compatible boards on the CPU module bus. Select first the board you want to configure. The example screenshot illustrates multiple boards found in the stack. Once you have selected the board for configuration press <TAB> to move to the configuration menus.

This dialogue box shows the board type and its identifier serial number. These values are used and set by Eurotech. Use this dialogue box to enable board as shown above. Select "SET" to store data before moving on or "Close" if you wish not to save.

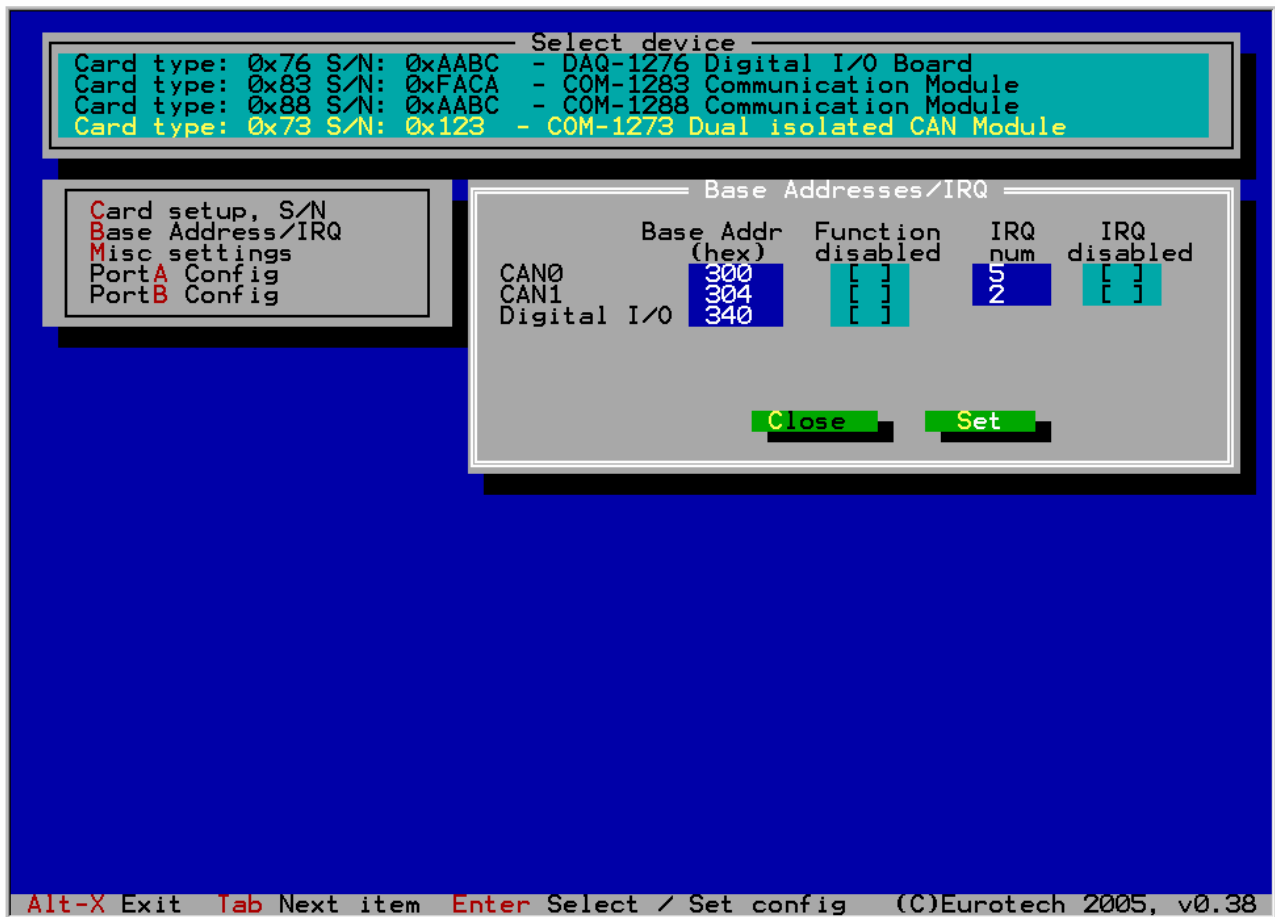


Figure 9. Board base address screen

This dialogue box shows the board peripheral devices and resources used. The peripherals can be disabled if not used. Select "SET" to store data before moving on or "Close" if you wish not to save.

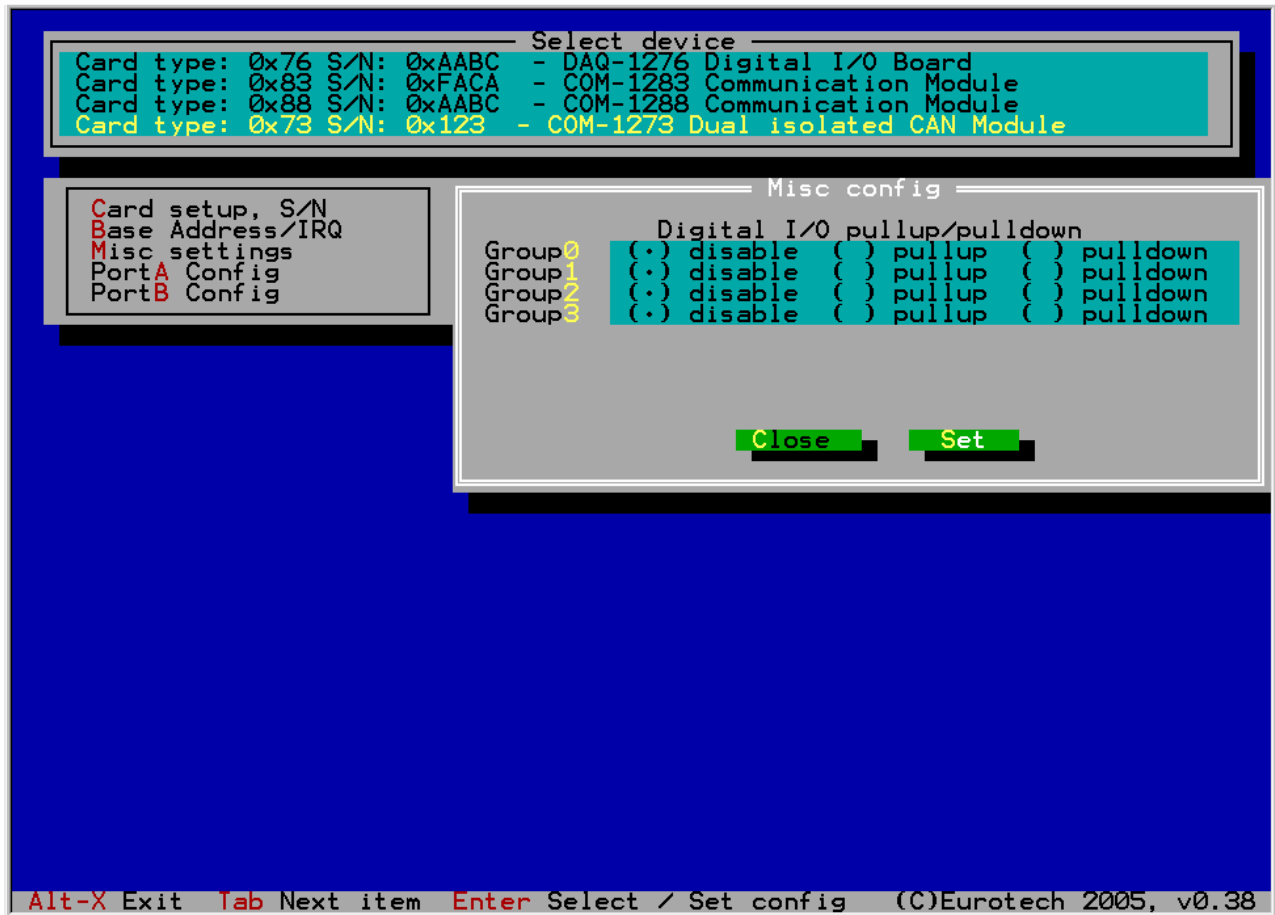


Figure 10. Miscellaneous configuration

The dialogue above lets you configure the following:

- Digital I/O pullup/pulldown selection in groups of 4 channels. Example shows disabled setting.

Select "SET" to store data before moving on or "Close" if you wish not to save

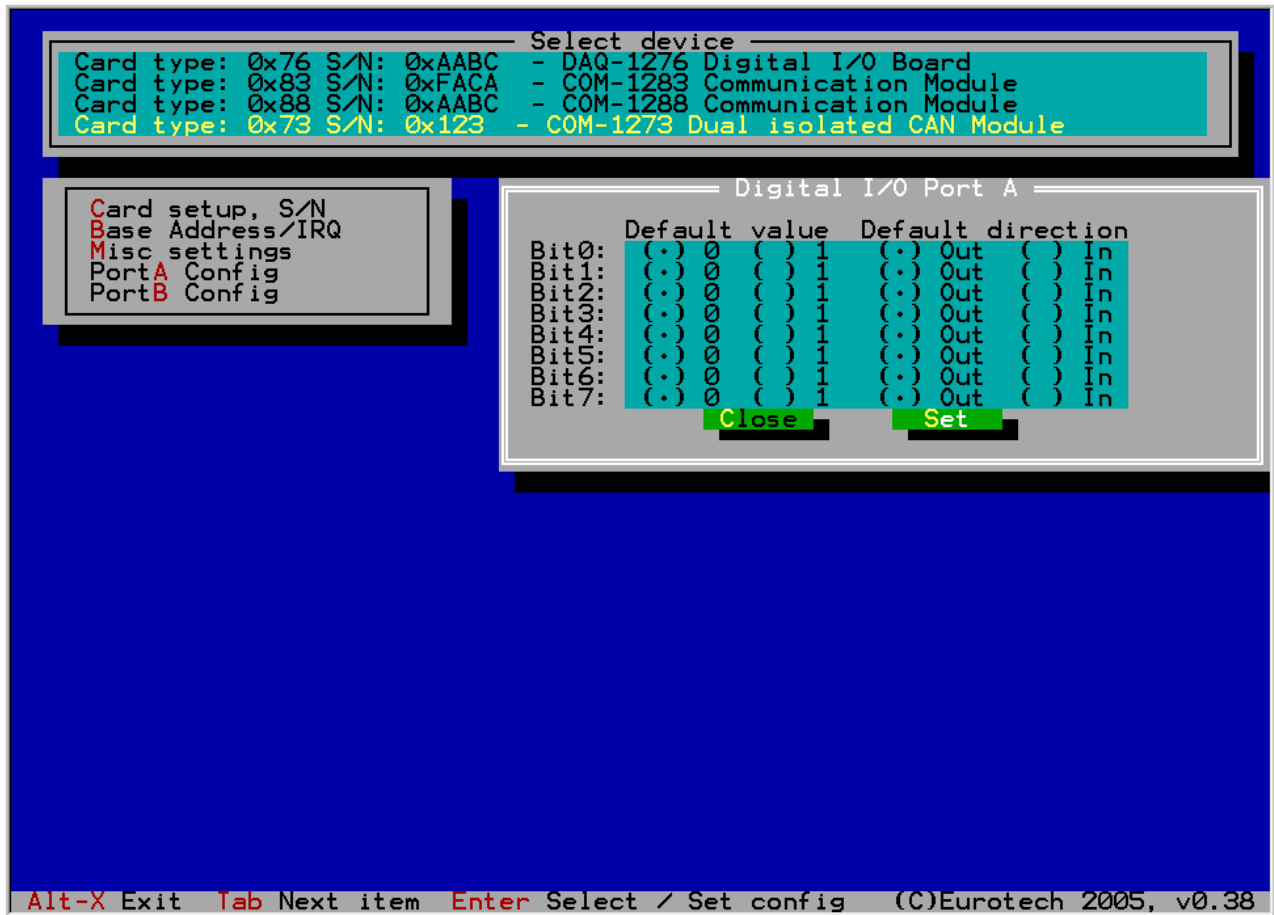


Figure 11. Digital I/O Port A default start-up condition

The dialogue above lets you configure the following:

- Digital I/O default start-up value (outputs)
- Digital I/O default start-up direction – input or output

Each digital I/O channel can be individually configured and the setting stored into memory. Note that if you need to change these settings later with software you may do that through the digital I/O control registers. Configuration for Port B is identical (fully compatible with COM-1288, COM-1283 modules)

Select “SET” to store data before moving on or “Close” if you wish not to save.

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## Common Problems and Solutions

The following table lists some of the common problems that you may encounter while using your COM-1273 module, and suggests possible solutions. If you are having problems with your COM-1273 module, please review this table *before* contacting technical support.

Table 5. Common problems and solutions

Problems and Solutions	
Board is not detected using FX	If you are using a Eurotech CPU-145X or CPU-146X series CPU the PCI to ISA bridge must be configured to be able to access the ISA bus I/O resources that are used by the board. 0x279 + 4 consecutive bytes for automatic board identification 0x208 ... 0x20B if you use FX.exe with default board CONFIGURATION base address to address EEPROM 0x280 ... 0x283 if you use FX.exe 280 with 0x280 as new set CONFIGURATION base address to address EEPROM
Board is not detected by FX and LED is OFF	The FPGA is not booted and firmware did not successfully load from the platform flash. This may occur if you are using a power supply that rises very slowly or has unstable startup behavior.
CAN communication does not work	Check the interrupt settings and verify that the interrupts you have configured are free and not shared by other resources in the system.
	Check also base address settings of the module

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## Troubleshooting a PC/104 System

If you have reviewed the preceding table and still cannot isolate the problem with your COM-1273 module, please try the following troubleshooting steps. Even if the resulting information does not help you find the problem, it will be very helpful if you contact technical support.

- **Simplify the system.** Remove items one at a time and see if one particular item seems to cause the problem.
- **Swap components.** Try replacing items in the system one-at-a-time with similar items.

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## Technical/Sales Assistance

If you have a technical question, please call Eurotech Customer Support Service at one of the numbers below, or e-mail our technical support team at:

- Email: [support@eurotech.fi](mailto:support@eurotech.fi)
- Phone: +358 477 888 0
- Fax: +358 477 888 99

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

Additional and latest information is available at Eurotech website, located at:

<http://www.eurotech.fi> and <http://www.eurotech.com.cn>

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## Returning For Service

Before returning any of Eurotech's products, you must phone Eurotech at **+39-0433-485411** and **obtain a Returned Material Authorization (RMA) number.**



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

The following information is needed to expedite the shipment of a replacement to you:

- Your company name and address for invoice
- Shipping address and phone number
- Product I.D. number
- The name of a technically qualified individual at your company familiar with the mode of failure on the board
- A detailed description of the problem and of the current configuration including OS and software loaded.

If the unit is out of warranty, service is available at a predesignated service charge. Contact Eurotech for pricing and please supply a purchase order number for invoicing the repair.

Pack the board in anti-static material and ship 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

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## A.1 Electrical and Environmental Specifications

The following section provides tables and illustrations showing the electrical, mechanical and environmental specifications for the COM-1273 module.

In the following tables you will find:

- Operating Characteristics
  - Electrical operating characteristics
  - Operating temperature Range
  - Battery backup characteristics
- Absolute maximum ratings
- MTBF
- Power Consumption

### *Operating Characteristics*

#### **Electrical Operating Characteristics**

Table 6. DC Operating Characteristics

Supply Voltage	V <sub>CC</sub> =+5V±5% (4.75V to 5.25V).
----------------	---



**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-1273 module, the ambient air temperature must remain within the temperature range: -40°C to +85°C

### *Absolute Maximum Ratings*

Table 7. Absolute Maximum Ratings

Supply Voltage:	V <sub>CC</sub> : 0.00 to 5.40V
Storage Temperature Range:	-45°C to +85°C
Non-Condensing Relative Humidity:	<95% at 40°C (+104°F)
Operating Temperature Range:	-40°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.

### *MTBF*

**Hours:** 166.000      **Standard:** mil std 217 ground benign      **Temperature:** 25.0 °C

### *Power Consumption*

Table 8. Power Consumption

<b>TBD</b>		

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## A.2 Mechanical Dimensions

### *Board Dimensions*

The COM-1273 module’s mechanical dimensions are shown in the following picture:

- Dimensions: 90 X 96 mm (3.6”X3.8”), height:15 mm (0.6”)

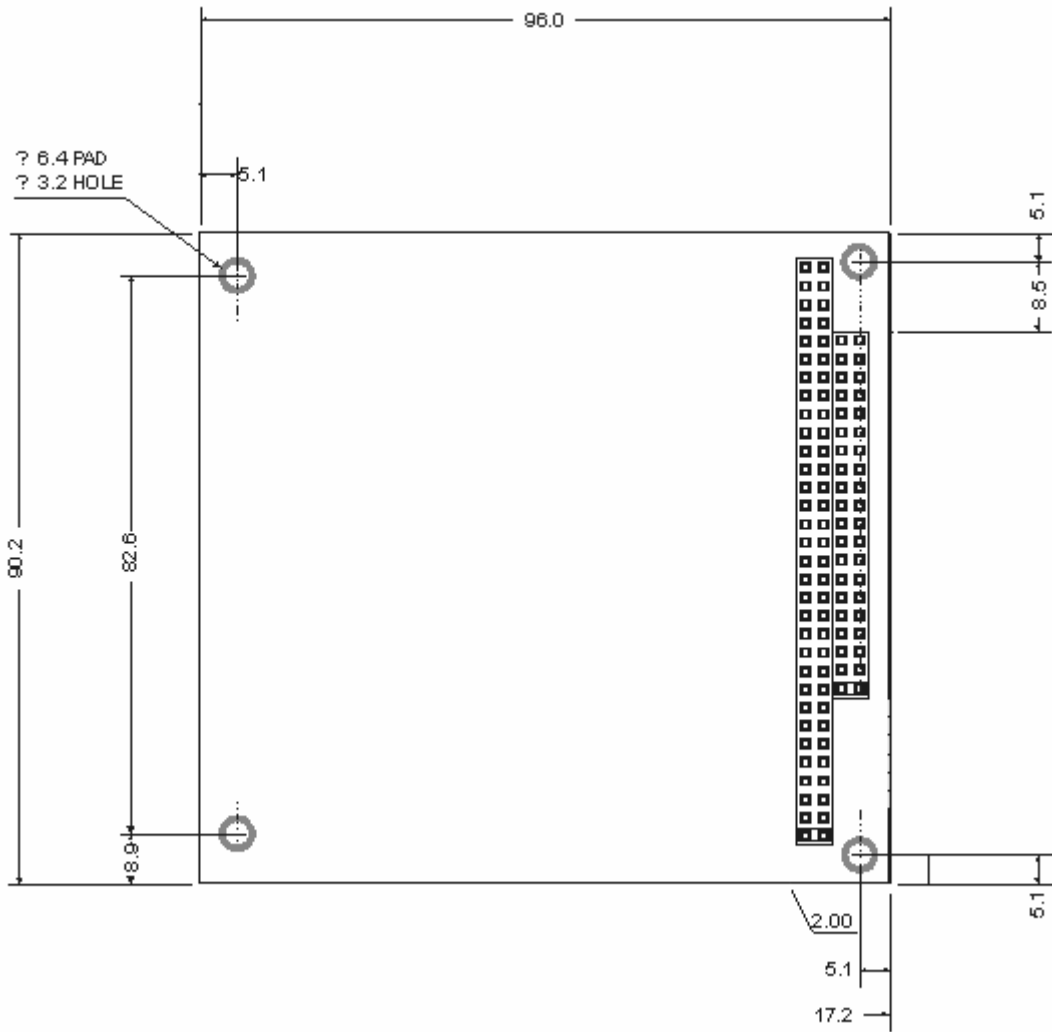


Figure 12. COM-1273 Board dimensions



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

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## **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 (IEC) 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 PCBs (printed circuit boards) are manufactured by UL-recognized manufacturers, with 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 fulfills 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***

THIS MANUAL IS PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The laws of some states and countries do not allow the disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you. As such, the above warranty disclaimer shall only apply to the extent permitted by law.

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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 unclear 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.

# Technical & Sales Assistance

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

[support@eurotech.fi](mailto:support@eurotech.fi)  
[techsupp@eurotech.it](mailto:techsupp@eurotech.it)

Other information can be found at:

[www.eurotech.it](http://www.eurotech.it)  
[www.eurotech.fi](http://www.eurotech.fi)  
[www.eurotech.com.cn](http://www.eurotech.com.cn)

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

Additional and latest information is available at Eurotech website, located at:

<http://www.eurotech.fi>