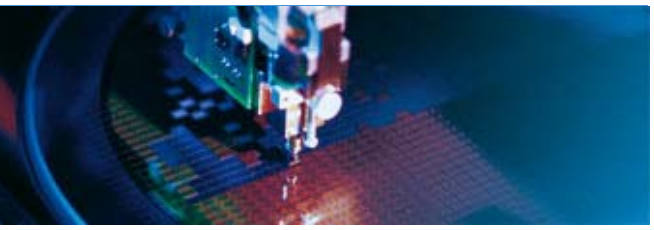
USER MANUAL



GEMINI 1U ICE

19" 1U Rack Mount Industrial Compact Enclosure

Issue D – March 2010 – ETH_GEMINI_1U_ICE_USM

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WARRANTY

For Warranty terms and conditions users should contact their local Eurotech Sales Office.

TRADEMARKS

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REVISION HISTORY

Issue no.	*PCB*	*Date*	*Comments*
A		November 2007	First full release of manual.
B		May 2008	Minor updates.
C		August 2009	Minor updates and new branding.
D		March 2010	Minor updates and layout changes.

See Eurotech Worldwide Presence (on the back cover) for full contact details.

Table of contents

Important user information

In order to lower the risk of personal injury, electric shock, fire or equipment damage, users must observe the following precautions as well as good technical judgment, whenever this product is installed or used.

All reasonable efforts have been made to ensure the accuracy of this document; however, Eurotech assumes no liability resulting from any error/omission in this document, or from the use of the information contained herein.

Eurotech reserves the right to revise this document and to change its contents at any time without obligation to notify any person of such revision or changes.

Safety notices and warnings

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 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 of. 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.

Installation in cupboards and safes

In the event that the product is placed within a cupboard or safe, together with other heat generating equipment, ensure proper ventilation.

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.

Alerts that can be found throughout this manual

The following alerts are used within this manual and indicate potentially dangerous situations:

Danger, electrical shock hazard:
Information regarding potential electrical shock hazards:

- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
- Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.

Warning:
Information regarding potential hazards:

- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
- Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.

Information and/or Notes:
These will highlight important features or instructions that should be observed.

Use an appropriate power supply

Only start the product with a power supply that conforms to the voltage requirements as displayed on the voltage label attached to the system. In case of uncertainty about the required power supply, please contact your local Eurotech Technical Support Team (see page 6) or the electricity authority.

Use power supplies that are compliant with SELV regulation.

Use certified power cables. The power cable must fit the product, the voltage and the required current.

Position cable with care, Avoid positioning cables in places where they may be trampled on or compressed by objects placed on it. Take particular care of the plug, power-point and outlet of power cable.

Avoid overcharging power-points.

Antistatic precautions

To avoid damage caused by ESD (Electro Static Discharge), always use appropriate antistatic precautions when handing any electronic equipment.

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 Eurotech.

CE notice

The product described in this manual is marked with the CE label in accordance with the 1999/5/EC regulation.

Eurotech shall not be liable for use of its products with equipment (i.e. power supplies, personal computers, etc.) that are not CE marked.

WEEE

The information below is issued in compliance with the regulations as set out in the 2002/96/EC directive, subsequently superseded by 2003/108/EC. It refers electrical and electronic equipment and the waste management of such products.

When disposing of a device, including all of its components, subassemblies and materials that are an integral part of the product, you should consider the WEEE directive.

The symbol to the right has been attached to the equipment or, if this has not been possible, on the packaging, instruction literature and/or the guarantee sheet. By using this symbol, it states that the device has been marketed after August 13th 2005, and implies that you must separate all of its components when possible, and dispose of them in accordance with local waste disposal legislations.

Because of the substances present in the equipment, improper use or disposal of the refuse can cause damage to human health and to the environment.

With reference to WEEE, it is compulsory not dispose of the equipment with normal urban refuse, arrangements should be instigated for separate collection and disposal.

Contact your local waste collection body for more detailed recycling information.

In case of illicit disposal, sanctions will be levied on transgressors.

RoHS

This device, including all it components, subassemblies and the consumable materials that are an integral part of the product, has been manufactured in compliance with the European directive 2002/95/EC known as the RoHS directive (Restrictions on the use of certain Hazardous Substances). This directive targets the reduction of certain hazardous substances previously used in electrical and electronic equipment (EEE).

Technical assistance

For any technical questions, or if you cannot isolate a problem with your device, or for any enquiry about repair and returns policies, feel free to contact your local Eurotech Technical Support Team.

See Eurotech Worldwide Presence (the back cover) for full contact details.

Transportation

When transporting any module or system, for any reason, it should be packed using anti-static material and placed in a sturdy box with enough packing material to adequately cushion it.

Any product returned to Eurotech that is damaged due to inappropriate packaging will not be covered by the warranty!

Device labelling

The GEMINI 1U ICE serial label is affixed to the end panel of the enclosure this contains the Eurotech part number which in turn contains information on the version and issue of this product the label also contains a serial number which is unique to each individual GEMINI 1U ICE.

The labels will also display product conformity marking.

Internal battery

The GEMINI SBC is fitted with a 3V Lithium battery that is used to maintain the GEMINI's real time clock and static RAM while the main supply is removed. The battery is fitted in a socket to allow easy replacement. The battery has a service life of 5 years at +25°C (77°F).

Safe battery use

Lithium batteries that are found to be damaged, leaking, corroded or flat (low or no voltage) must be disposed of in a safe manner following the relevant COSHH regulations.

Damaged, leaking, or corroded batteries (especially lithium batteries) must only be handled with caution. Use non-conductive tools and wear suitable protection, e.g. safety glasses, rubber gloves, etc.

All faulty batteries must be segregated in a suitable, clearly marked non-conductive container. They must be periodically disposed of by a recognised company specialising in the disposal of poisonous waste, who comply with 'The Disposal of Poisonous Waste Regulations Act.'

Replace with the same or equivalent type recommended by the manufacturer.

Dispose of batteries according to the manufacturer's instructions.

Do not attempt to recharge, disassemble, heat above 100°C (212°F), or incinerate the Lithium battery.

Introduction

The GEMINI 1U ICE system serves as a high performance, compact 19" rack mount ruggedised PC system for applications in IT systems, machine control, and kiosk solutions. The GEMINI 1U ICE is powered by an Intel Core 2 Duo / Core Duo / Core Solo / Celeron M processor based single board computer designed and manufactured by Eurotech. The motherboard and system components are designed for long life support with scalable CPU options from the Celeron M 440 1.86GHz for a wide operating temperature, up to powerful server grade systems fitted with the Core 2 Duo T7400 2.16GHz CPU.

This ruggedised system has a full compliment of PC features including quad Ethernet (with Gigabit capability), USB ports, serial ports, multiple video outputs and a number of additional features for creating secure systems. The system can also be fitted with 2 PCI add-on cards.

The front panel LCD display and navigation buttons can be used for user-defined configuration and control for deeply ‘embedded systems’ which do not have access to a display. Please refer to the *GEMINI user manual* for detailed information about the performance and operation of the GEMINI SBC.

GEMINI ICE specification

The GEMINI ICE includes the following standard features:

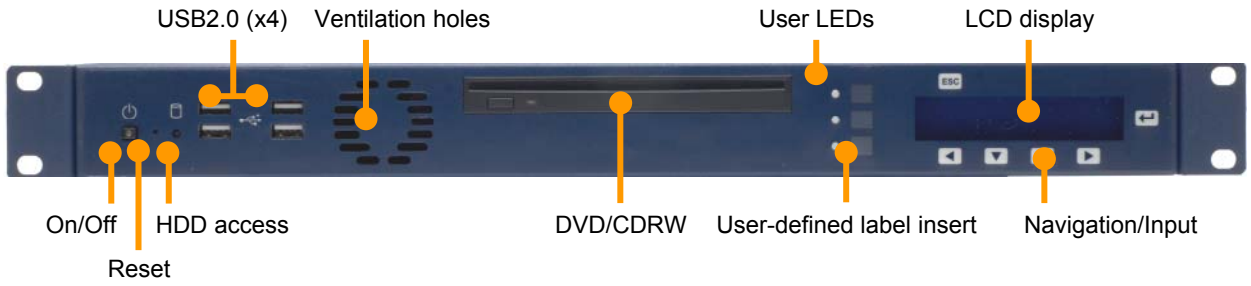
- 1U 19" standard 'ruggedised' enclosure.
- Intel Core 2 Duo/Duo/Solo/Celeron M processor performance options.
- Up to 3GB system DRAM.
- Dual independent video with VGA / DVI / TV outputs.
- Four 10/100/1000 base T Ethernet ports.
- Three serial ports.
- Six USB 2.0 compliant ports.
- 5.1 surround sound audio on standard Mic/Line-in/Line-out mini-jack connectors.
- Front panel board providing a 2 line, 24 character LCD display, user LEDs and navigation buttons.
- PSU:180W integrated ATX supply or wide input range DC input.
- Two PCI (rev 2.2) expansion slots via an internal flexible riser.
- Internal DVD/CDRW drive. Speeds: 24x CD-R/CD-RW writing, 24x CD-ROM reading, 8x DVD-ROM reading.
- Option for USB Solid State Drive interfaced on the sixth USB port (not accessible on the front panel in this case).
- Option for up to two internal high shock resistant 2.5" SATA hard disk drives.
- Operating temperature: +5°C to +55°C (41°F to 131°F).
- Approximate weight: 6.0kg (13.20lbs).
- EMC conformity: CE/FCC compliant (see page 31).
- Safety compliance: UL, cUL, CB (power supply).

Configurations available include:

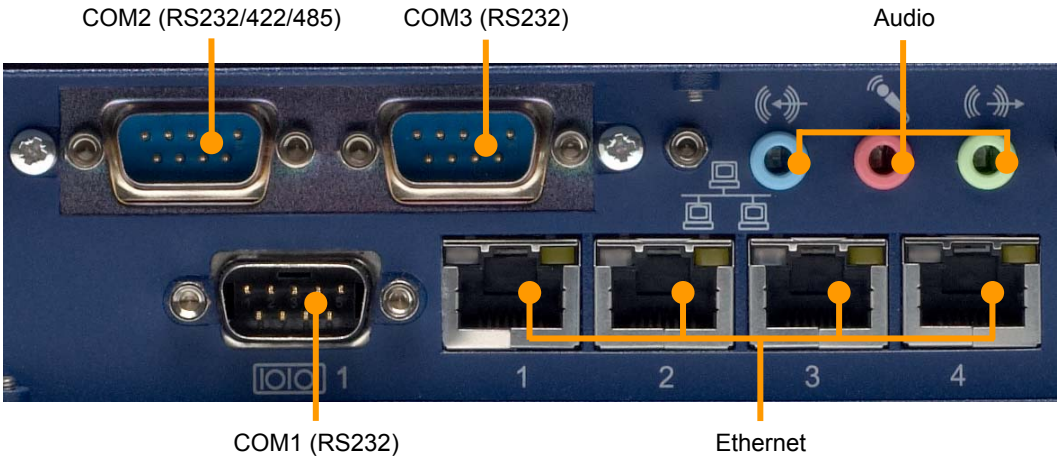
- PSU options:
  - AC version: Auto-ranging 90-265VAC, 47-63Hz, 180W Flex-ATX.
  - DC version: 8-24VDC power input supply.
- CPU options:
  - Intel Celeron M 440 1.86 GHz.
  - Intel Core Duo T2500 2 GHz.
  - Intel Core 2 Duo T7400 2.16Ghz (64bit processor).
- Memory options:
  - Two 512MB PC5300 DDR2 SDRAM DIMM.
  - Two 1GB PC5300 DDR2 SDRAM DIMM.
  - 2GB + 1GB PC5300 DDR2 SDRAM DIMM.
  - Other processor, fan and memory options available on request. Please contact our sales team for price and availability (see Eurotech Worldwide Presence).
- Disk options:
  - Mechanical 2.5inch SATA or IDE hard drive.
  - Solid State USB flash module.
- GEMINI 1U ICE (AC version) fitted with parallel port on SUBD25 instead of the two DB9 serial ports COM2 and COM3.

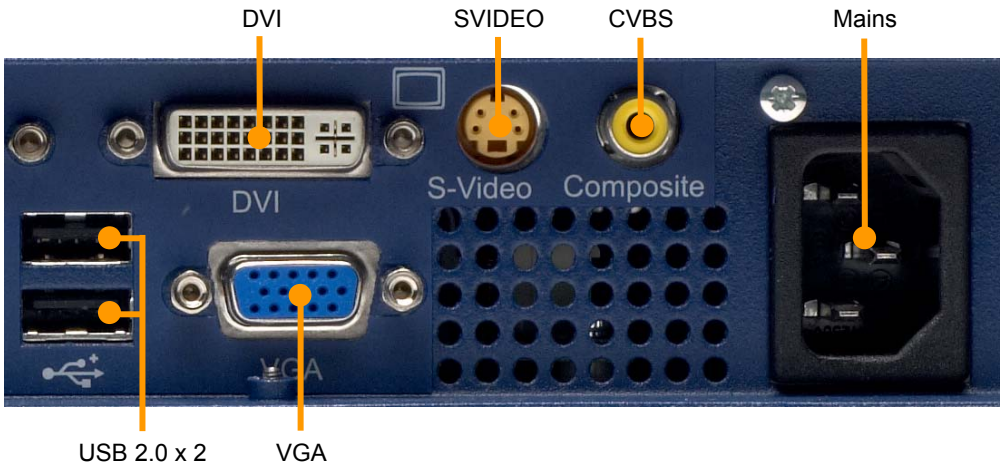
GEMINI 1U ICE ‘at a glance’

Front panel view (both AC and DC versions)

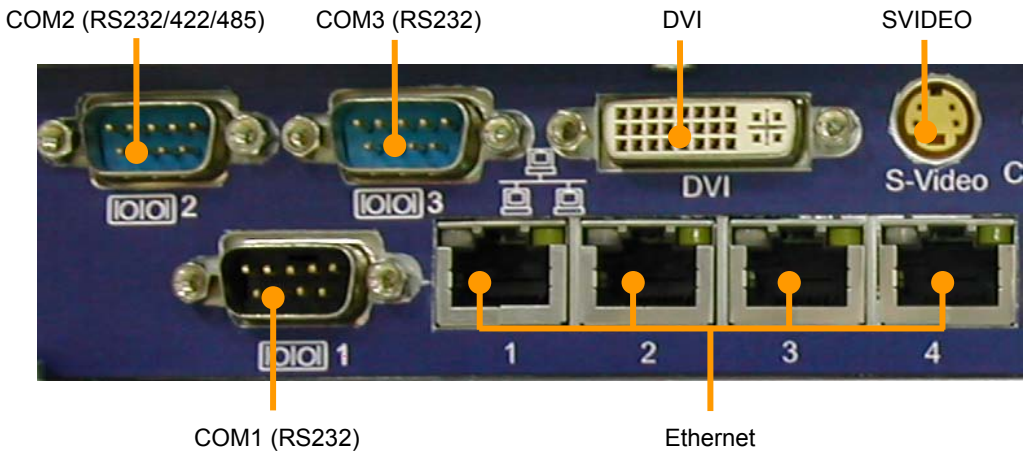


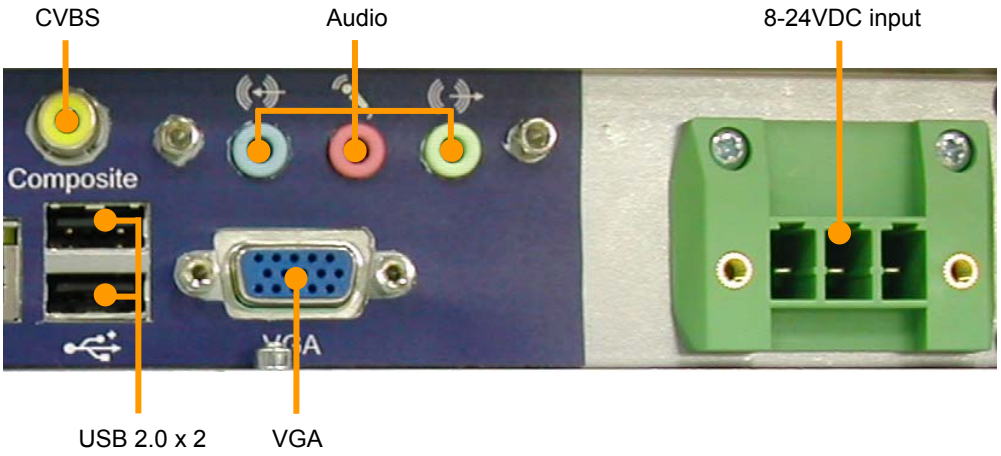
Rear panel views (AC version)





Rear panel views (DC version)





Features of the GEMINI ICE

The GEMINI 1U high 19" Rack Mount enclosure offers the features listed below:

Front panel

- On/Off momentary switch with integral blue power LED.
- Access hole to recessed reset switch.
- SATA/IDE access activity LED.
- Four USB 2.0 ports (down to 3 if VSSD in use).
- Ventilation hole (cool air flows into the GEMINI ICE).
- Slot-loading DVD/CDRW drive.
- User-defined ‘identification’ label and status LED’s.
- LCD character display – 2 rows x 24 characters (with blue backlight).
- User navigation and input switches.

Rear panel

- Two PCI card breakout positions.
- Three serial ports (2x RS232 and 1x RS232/422/485).
- Four 10/100/1000 Ethernet ports (Gigabit Ethernet).
- Three stereo audio jacks (supporting 5.1 outputs).
- Two USB 2.0 ports.
- One VGA connector.
- One DVI port.
- One SVideo output.
- One video composite output.
- AC input (IEC connector) or DC input connector.
- PSU fan.

Additional features

The GEMINI ICE also has an internal hard disk drive and/or an USB flash module.

Fan control

There are two fans in the GEMINI 1U ICE constantly spinning at maximum speed, the CPU fan, and the system fan.

The AC PSU's fan is thermally controlled. It therefore runs at a speed proportional to the power consumption.

There is also a controllable system fan supplied in the GEMINI 1U ICE which helps to cool down the PCI cards and to extract warm air out of the box. It might be required to turn it on when one or two high-power PCI cards dissipating some additional heat are fitted. This extra fan is controlled by the FPI board and its command is automated so the system decides whether the fan needs to speed up or slow down.

Control of the system fan is implemented using drivers supplied by Eurotech. These functions are fully programmable and are available as user-defined controls for OEM customers. Drivers are available for Windows XP and Linux.

Contact Eurotech Technical Support for further information (see page Eurotech Worldwide Presence).

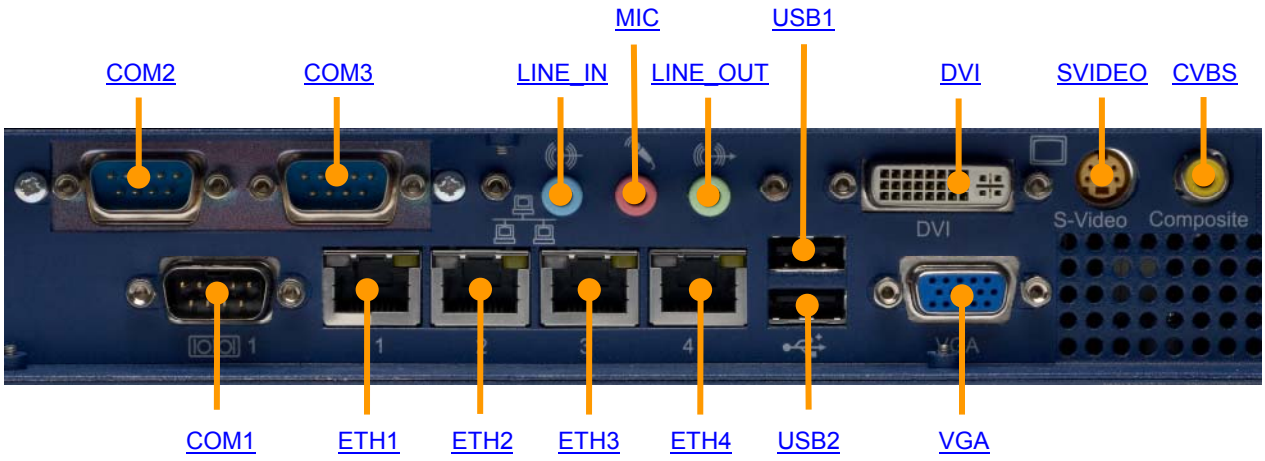
Connectors

The connectors on the GEMINI let you connect external devices such as keyboards, mouse devices, printers etc.

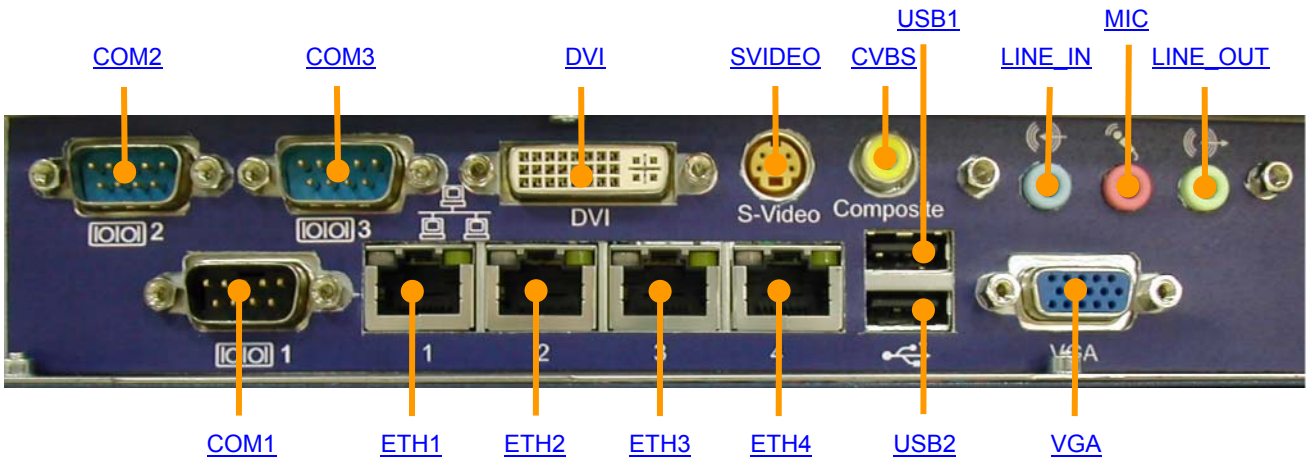
Connector	Function	See ...
COM1	Serial port 1 (RS232)	Page 15.
COM2	Serial port 2 (RS232/422/485)	Page 15.
COM3	Serial port 3 (RS232)	Page 15.
ETH1/2/3/4	Ethernet ports 10/100/1000Mb/s	Page 15.
LINE_IN	Audio line in	Page 16.
MIC	Micro in	Page 16.
LINE_OUT	Audio line out	Page 17.
USB1/2	USB ports 1 and 2	Page 17.
VGA	VGA monitor	Page 17.
DVI	DVI monitor	Page 18.
SVIDEO	Super video out	Page 18.
VIDEO	Composite video out	Page 18.
DC	DC input source	Page 19.

The connectors are illustrated in the following diagrams.

AC version



DC version

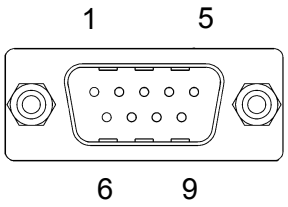


Further details about these connectors are provided in the following sections.

COM1/2/3 – RS232 serial ports (RS422/485 option on COM2 only)

DB9 male

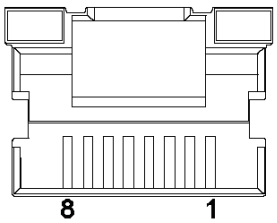
Pin	Signal name	Pin	Signal name
1	DCD/422TX-/485-	2	RXD/422TX+/485+
3	TXD/422RX+	4	DTR/422RX-
5	Ground	6	DSR
7	RTS	8	CTS
9	RI		



ETH1/2/3/4 – LAN

RJ-45 10/100/1000Mb/s.

Pin	Signal name (10/100)	Signal name (10/100/1000)
1	TX+	MD0+
2	TX-	MD0-
3	RX+	MD1+
4	No Connect	MD2+
5	No Connect	MD2-
6	RX-	MD1-
7	No Connect	MD3+
8	No Connect	MD3-



For a Gigabit Ethernet connection the network cable should be a CAT5 or above and include all four pairs.

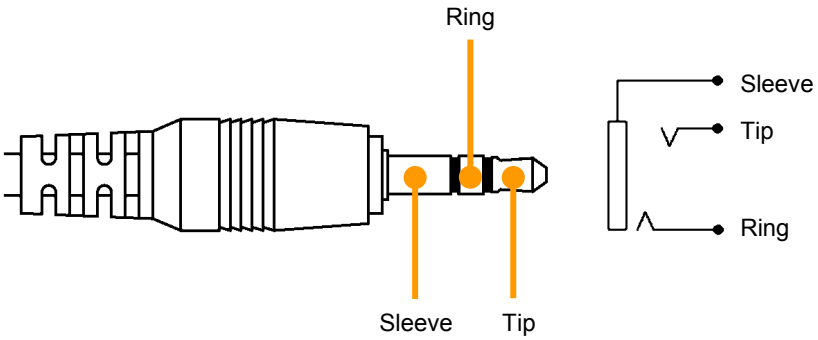
LINE_IN, MIC, LINE_OUT – Audio connectors

3.5mm stereo audio jacks are used for audio connection. The audio codec can operate in either of the following modes:

- 2.0 mode, which allows for microphone in, line in and line out operation.
- 5.1 mode, which provides six-channel surround sound output. The microphone input and line in are not available during six channel mode.

Selection of 2.0 or 5.1 mode is made under software control.

The audio connectors are illustrated in the following diagram:



The pin settings for each connector are described in the following sections.

LINE_IN - 3.5mm stereo jack

PC99 colour: light blue.

Pin	Signal name 2.0 mode	Signal name 5.1 mode
Tip	Line in left	Rear surround left
Ring	Line in right	Rear surround right
Sleeve	Ground	Ground

MIC - 3.5mm stereo jack

PC99 colour: pink.

Pin	Signal name 2.0 mode	Signal name 5.1 mode
Tip	Microphone 2	Low frequency effects
Ring	Microphone 1	Surround centre
Sleeve	Ground	Ground

LINE_OUT- 3.5mm stereo jack

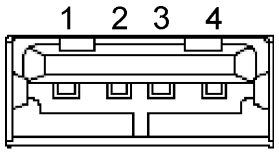
PC99 colour: lime.

Pin	Signal name 2.0 mode	Signal name 5.1 mode
Tip	Line out left	Front surround left
Ring	Line out right	Front surround right
Sleeve	Ground	Ground

USB1/2 – USB ports 1 and 2

USB type A connector.

Pin	Signal name
1	VBUS
2	Data-
3	Data+
4	Ground

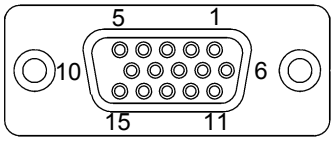


VGA – VGA connector

DB15 Female

PC99 colour: Blue

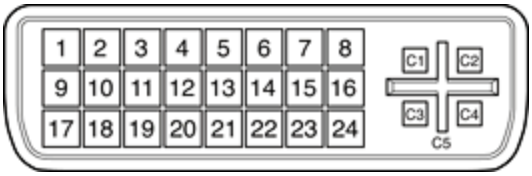
Pin	Signal name	Pin	Signal name
1	Red	2	Green
3	Blue	4	No Connect
5	Ground	6	Ground
7	Ground	8	Ground
9	+5V (Fused)	10	Ground
11	No Connect	12	DDCSDA
13	Hsync	14	Vsync
15	DDCSCL		



DVI – DVI connector

DVI-I (Digital Visual Interface – Digital single link & Analogue)

Pin	Signal name	Pin	Signal name
1	TMDS D2–	13	No Connect
2	TMDS D2+	14	+5V Power
3	TMDS D2 Shield	15	Ground
4	No Connect	16	Hot Plug Detect
5	No Connect	17	TMDS D0–
6	DDC Clock	18	TMDS D0+
7	DDC Data	19	TMDS D0 Shield
8	Vertical Synchro	20	No Connect
9	TMDS D1–	21	No Connect
10	TMDS D1+	22	TMDS Clock Shield
11	TMDS D1 Shield	23	TMDS Clock+
12	No Connect	24	TMDS Clock–
C1	Analogue Red	C2	Analogue Green
C3	Analogue Blue	C4	Horizontal Synchro
C5	Analogue Ground		

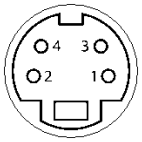


The analogue video signals are shared with the VGA connector, so you cannot connect an analogue monitor to the DVI port if a VGA monitor is already plugged in the VGA connector..

SVIDEO – Super video out

S-VHS 4-pin mini-DIN connector.

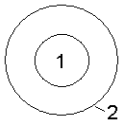
Pin	Signal name
1	GND
2	GND
3	Y
4	C



VIDEO – CVBS video out

RCA video connector.

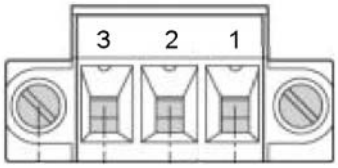
Pin	Signal name
1	CVBS
2	GND



DC – DC input source

COMBICON power connector.

Pin	Signal name
1	DC_IN[1]
2	CHASSIS
3	GND



The maximum voltage range allowed by the DC input is 8 to 24VDC. The power rating of the DC input source must be chosen in accordance to the maximum power consumption of the GEMINI 1U ICE.

Worst case: 100 Watts (figure taken with T7400 processor stressed to the absolute maximum power and with two additional PCI cards in operation)

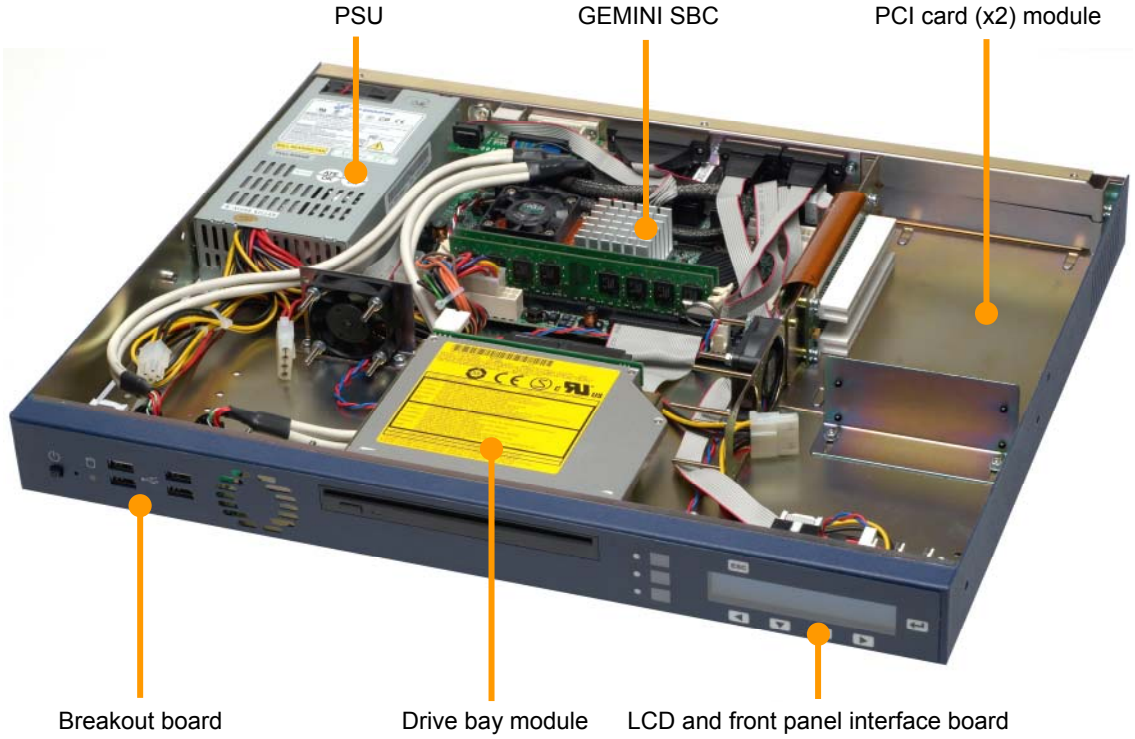
The DC input does not have any polarisation protection.

[1] The CHASSIS pin can be either left unconnected or connected to the network earth, but it must not be shorted with GND (pin3) in order not to override the EMC filter.

Internal configuration

Refer to Eurotech Worldwide Presence before proceeding any further.
The internal components of the unit must only be accessed by suitably qualified personnel using anti-static equipment. The power supply must be switched off and the AC or DC input cable unplugged.

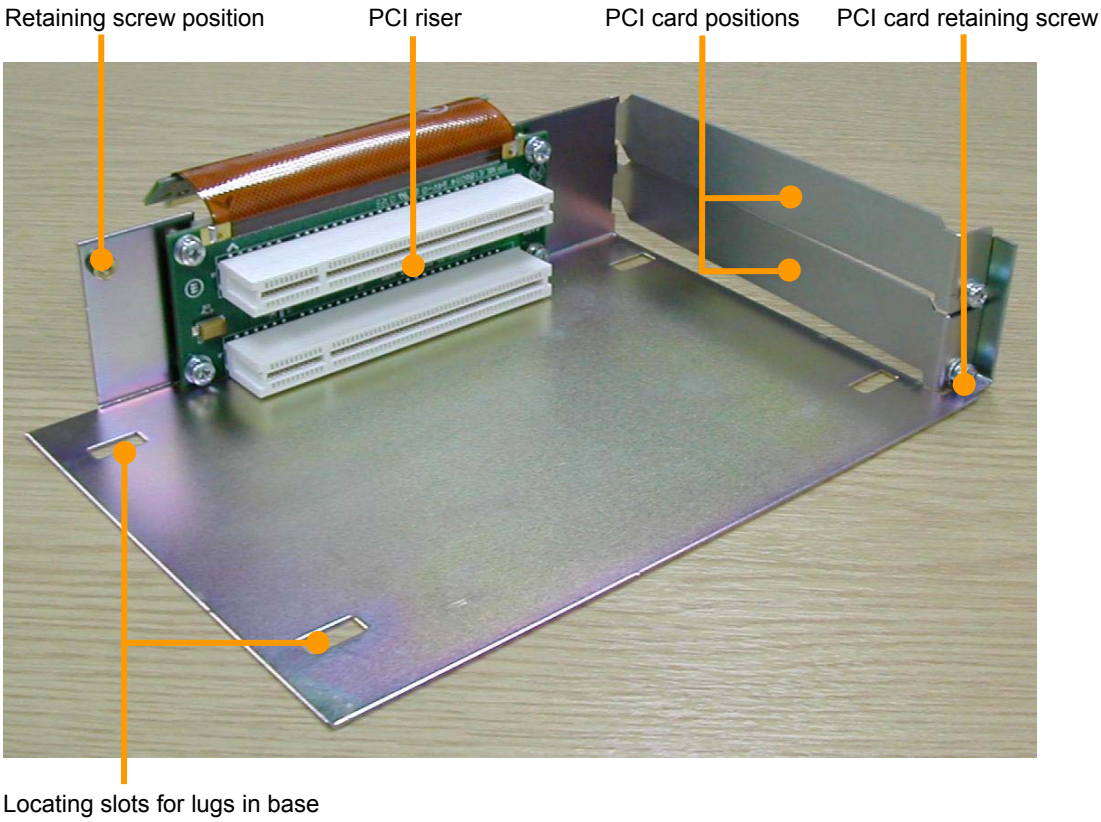
The following diagram illustrates the construction of the GEMINI ICE.

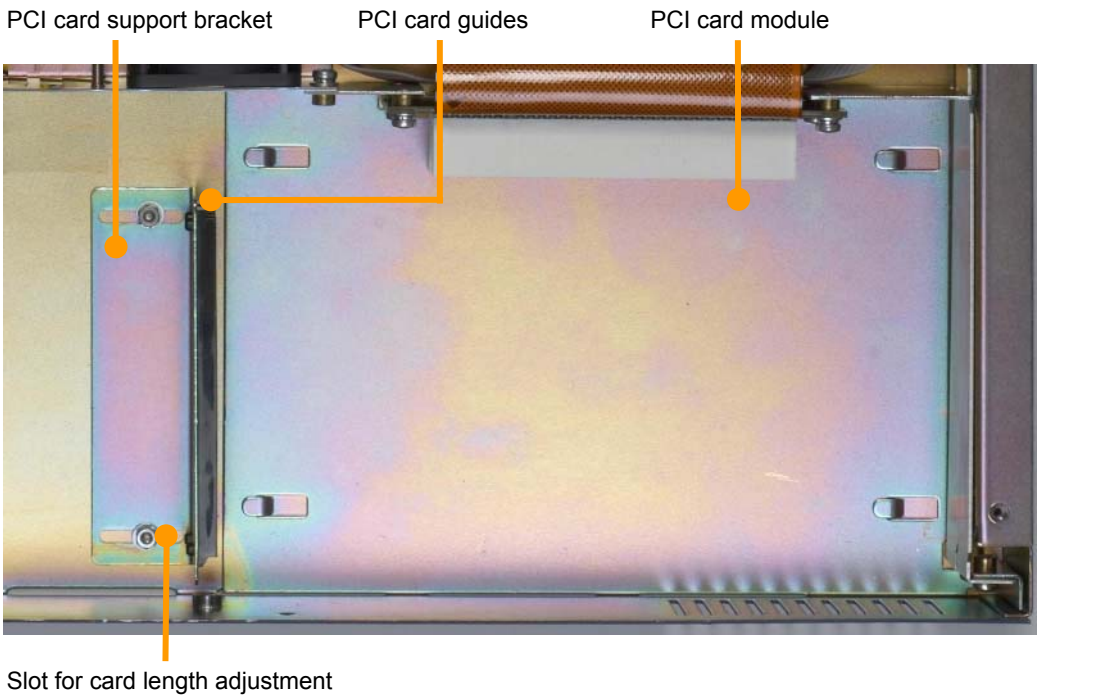


The following sections describe features of the highlighted areas above.

PCI card module

This section explains how to remove the PCI module and fit a PCI card. The components described in the procedures that follow are illustrated in the following diagram:





To remove the PCI module, follow these steps:

1 Remove any cables attached to installed PCI expansion cards.

2 Unscrew the card support bracket to free the back of the PCI boards.

3 Unplug the flexible riser connection from the GEMINI SBC.

Take care to pull out the PCI card edge rather than the flexible cable.

4 Unscrew the PCI module from the dual fan bracket and slide it back to clear the lugs on the base, and lift out.

To fit a PCI card:

1 Remove the blanking plate.

2 Plug the card into the riser.

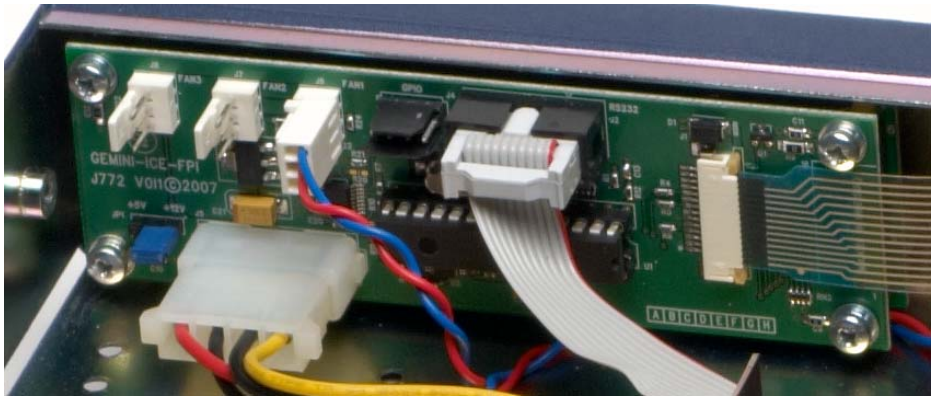
3 Tighten the retaining screw.

To install the PCI module back into the enclosure, reverse the procedure outlined on the previous page.

User status/display and navigation buttons

The LCD offers 2 x 24 character visibility with white lettering on an illuminated blue background. The Front Panel Interface enables connection to the front navigation/input switches and the three user-defined LEDs.

The LCD and Front Panel Interface are shown in the following photograph:



The Front Panel Interface is ‘stacked’ on the back of the LCD and has the tail from the front membrane plugged into a ZIF socket.

The following images illustrate how to insert the LED ident strip:

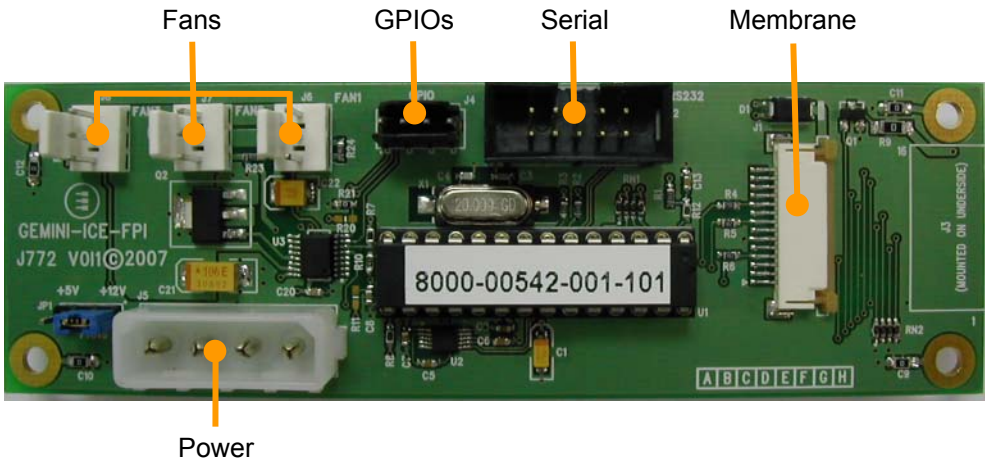
The LED ident strip can be reversed for writing legends or discarded and a printed card inserted in the open slot.

Control of the character display, LEDs and navigation keys is implemented using drivers supplied by Eurotech. These functions are fully programmable and are available as user-defined controls for OEM customers. Drivers are available for Windows XP and Linux. Contact Eurotech Technical Support for further information (see page Eurotech Worldwide Presence).

Front panel interface module

Eurotech ref: GEMINI-ICE-FPI 6560-00772-001-101

The front panel interface module assembly is shown below:



Features

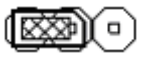
- System fan speed controller and 2x24 LCD driver.
- Front membrane interface supporting three LED's and six buttons.
- Onboard microcontroller with serial interface.
- Three additional GPIO's on 4-way dubox header.
- Three fan connectors.
- Link for system fan voltage selection.

Operation

- The FPI board is interfaced to the fourth serial port of the GEMINI mother board (COM4) with a ribbon cable. It is controlled using a custom protocol allowing the GEMINI to talk to the FPI. It can drive up to three additional fans. These fans are connected in parallel so are driven in common although the FPI can report the fan speed of each one independently.

Link setting

Used to select the fans supply voltage.

FANS	Explanation
	+5V
	+12V

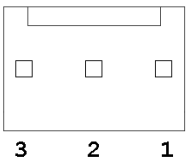
Default setting: 

Pin settings

FAN1/2/3

3-way 2.54mm (0.1") friction lock pin header

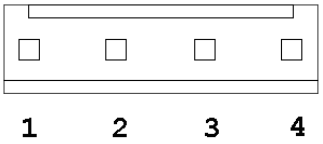
Pin	Signal
1	VFAN-
2	VFAN+ (5/12V)
3	Tachometer



GPIOs

4-way 2.54mm (0.1") Dubox header

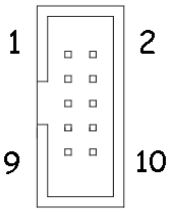
Pin	Description
1	GPIO1
2	GPIO2
3	GPIO3
4	Ground



Serial

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin boxed header

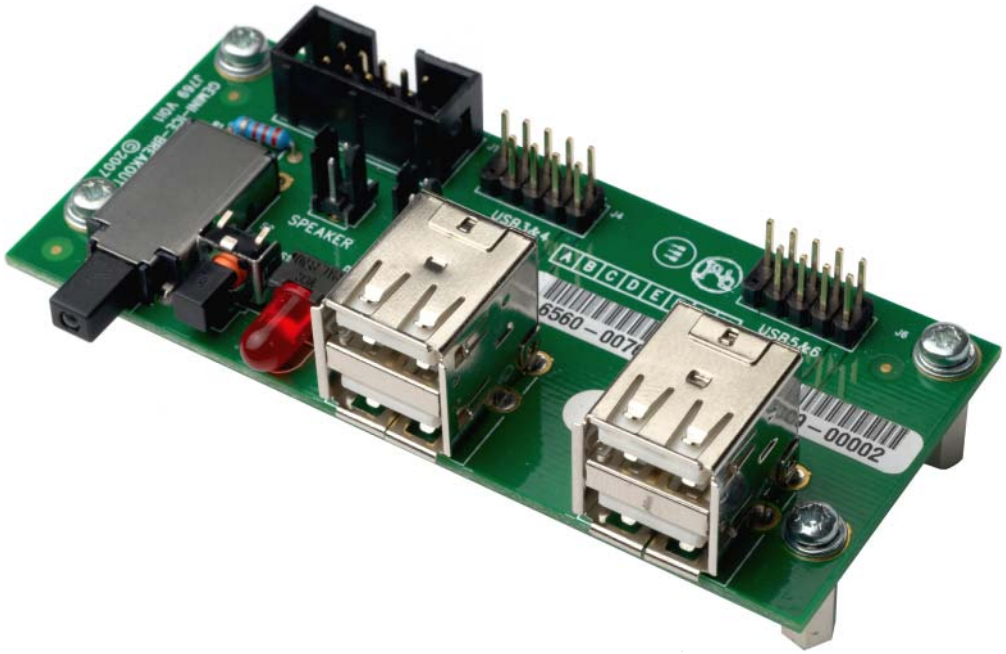
Pin	Description	Pin	Description
1	NC	2	TXD
3	RXD	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC	10	NC



Front panel breakout module

Eurotech ref: GEMINI-ICE-BREAKOUT 6560-00769-001-101

The front panel breakout module assembly is shown in the following photograph:



Features

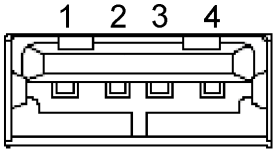
- ON/OFF momentary switch with integral blue LED.
- Reset switch.
- HDD activity indicator LED.
- USB 2.0 ports (x4).
- Speaker and remote on/off connectors available on 2-way dubox headers.

USB6 (bottom right socket) cannot be used when using a USB Solid State Drive. In this configuration, the socket is actually blanked by the front panel membrane.

Pin settings

USB 2.0 ports 3 to 6

Pin	Signal
1	VBUS
2	Data-
3	Data+
4	Ground



These pin settings are as viewed looking at the front panel.

Drive bay module

The drive bay module features:

- Slimline slot loading DVD/CDRW (Secondary Master).
- Slimline SATA or IDE 2.5" hard disk drive (Primary Master).
- CD/DVD adapter PCB.

It is shown in the following photographs:

To remove the drive bay module, follow these steps:

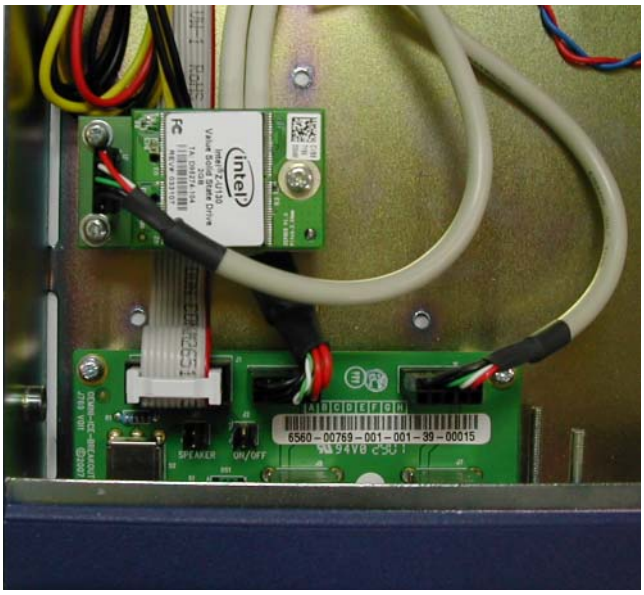
1. Unplug the IDE flat cable and the SATA one from the GEMINI SBC, and all power cables from the drives.
2. Undo the four countersunk screws through the base that retain the drive bay module in the enclosure.
3. Withdraw the whole assembly from the unit.

To install the module, reverse the above procedure.

Solid State Drive module

The USB flash module is interfaced on USB port 6 with a special USB cable (as shown below). If such a module is used, the sixth USB port broken out on the front panel of the GEMINI 1U ICE is not available and blanked by the membrane itself.

Carrier board and module fitted.

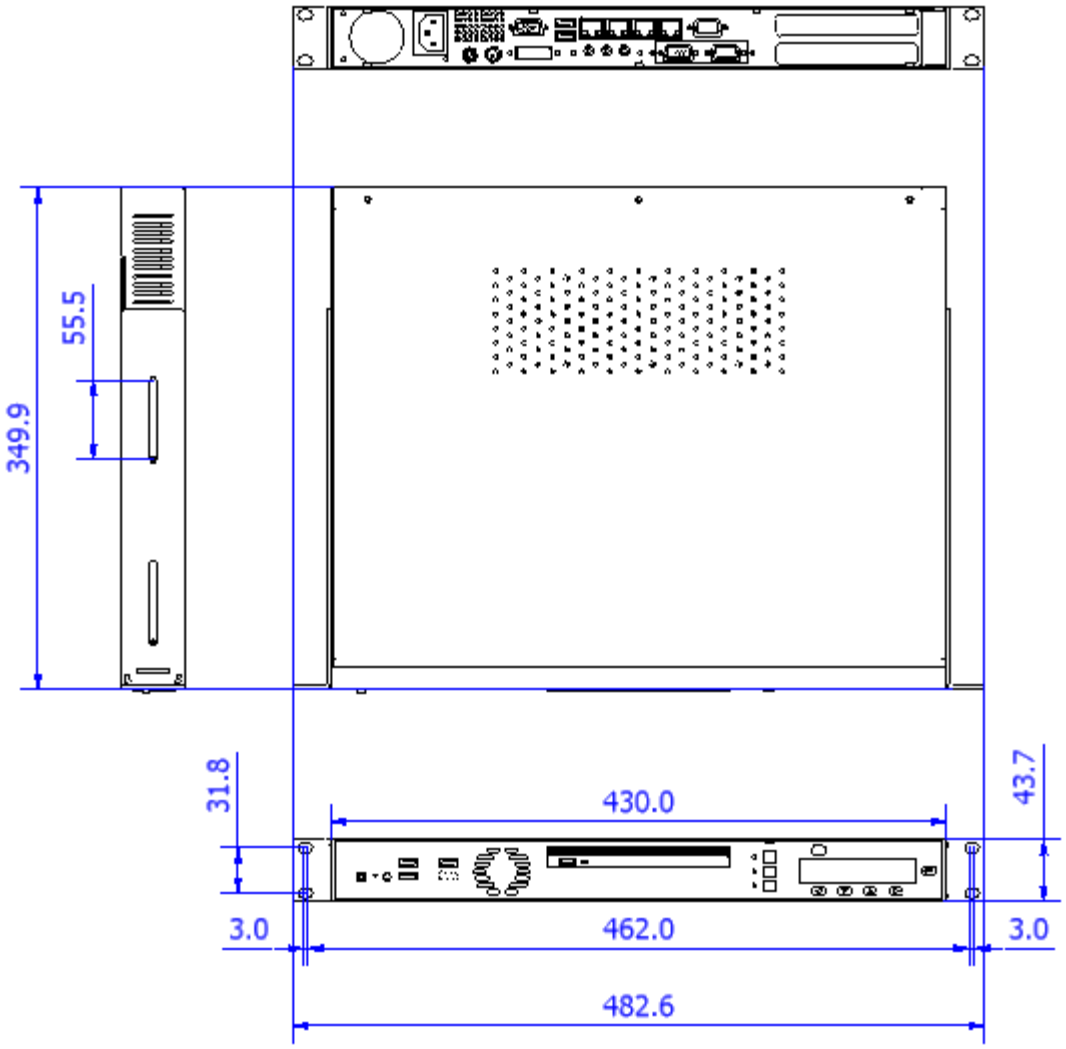


Carrier board and module fitted in the GEMINI ICE.

To remove the USB solid state drive module, undo the single fixing screw on the top of the module and detach the module from the carrier board by pulling it up.

To install the module, reverse the above procedure.

Dimension details



All dimensions above are in mm.

The unit complies with standard (IEC 60297 and IEC 60917) 19" Rack Mounting dimensions and will fit into a standard rack cabinet.

The rack mount brackets can be adjusted in order to recess front panel features (i.e. to ensure connectors clear cabinet doors etc.).

Weight details

The weight of the unit depends on the configuration used and the optional items chosen when ordering, the unit nominal weight is approximately 6.0kg (13.20lbs).

Appendix A – EMC conformity

EMC

The European Directive 89/336/EEC, on Electro-magnetic Compatibility (EMC), requires that, generated electro-magnetic disturbance must, be in accordance with European Harmonised Standards, for Electro-Magnetic Emissions and Immunity.

Generic Emissions and Immunity Standards

Emissions: EN61000-6-3

- Conducted Emissions *EN55022, A1, A2 Class A*
- Radiated Emissions *EN55022, A1, A2 Class A*
- Mains Harmonics *EN61000-3-2:2000*
- Mains Flicker *EN61000-3-3*

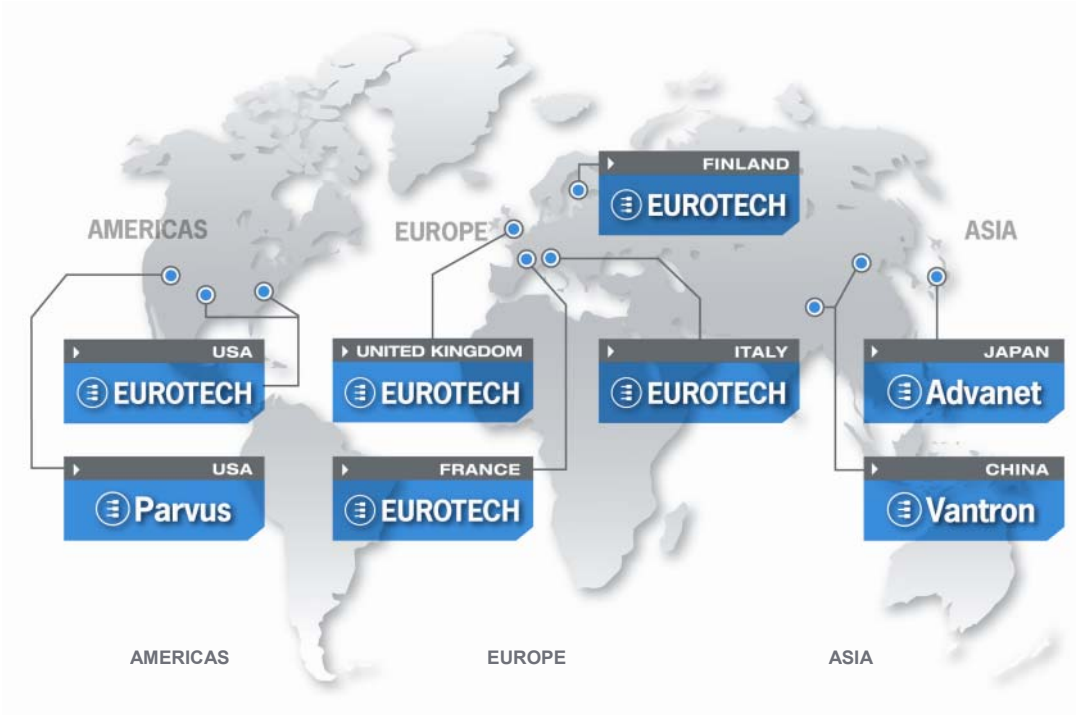
Immunity: EN61000-6-2

- Electrostatic Discharge Immunity *EN61000-4-2:1995, A1, A2*
- Radiated RF Immunity *EN61000-4-3:2002*
- Transient Immunity *EN61000-4-4:2004*
- Surges *EN61000-4-5:1995, A1*
- Conducted Immunity *EN61000-4-6:1996, A1*
- AC Voltage Dips *EN61000-4-11:1994, A1*

FCC Verification: Part 15, Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Eurotech Worldwide Presence



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