

ISIS ICE

Industrial Compact Enclosure (ICE)

Issue B – November 2010 – ETH_ISIS_ICE_USM

WARRANTY

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

TRADEMARKS

All trademarks both marked and not marked appearing in this document are the property of their respective owners.

REVISION HISTORY

<i>Issue no.</i>	<i>Date</i>	<i>Comments</i>
A	22 December 2009	First full release of manual.
B	2 November 2010	ISIS ICE MKII release

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See [Eurotech Worldwide Presence](#), page 23, for full contact details.

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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 handling 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  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 its 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.

[Eurotech Worldwide Presence](#), page 23, 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 ISIS 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 ISIS ICE.

The labels will also display product conformity marking.

Product overview



The ISIS Industrial Compact Enclosure (ICE) encloses the DURAMAR ISIS Single Board Computer (SBC). The DURAMAR ISIS can plug directly into the ISIS ICE interface PCB thereby transferring essential interconnection signals such as USB, Video, Ethernet, RS232, GPIO and power to the connector panels. The ISIS ICE also protects the DURAMAR ISIS, and provides a CE-compliant product for use straight out of the box.

The ISIS ICE consists of two extruded 'U' shaped sections fitted together and held in place by end panels. The end panels are fitted with PC style breakout connectors.

Up to three TNC style RF connectors can be added to provide breakouts for the optional GPS, GPRS, and WiFi modules.



The GPS requirement must be specified when ordering as this is not an after-market option.

For all detailed information on the setting up and use of the DURAMAR ISIS, please refer to the ISIS Single Board Computer user manual available on the Eurotech website: www.eurotech.com.

An optional hard disc drive can be fitted in the ISIS ICE. This option is available as an after-market accessory from Eurotech.

Variants

The ISIS ICE is available in three sizes according to the size of the extruded 'U' section. The three sizes available are:

- High-High (as shown on the previous page). Includes the ISIS ICE LINUX High/High variant and the ISIS ICE XPe High/High variant. These variants offer the largest available I/O expansion with the addition of up to two PC/104 I/O cards. Space for a third PC/104 card is available. For details on how to add the third PC/104 card please contact Eurotech sales.
- High-Low. Includes the ISIS ICE LINUX High/Low variant and the ISIS ICE XPe High/Low variant which allow for one additional PC/104 I/O card to be fitted.
- Low-Low. Includes the ISIS ICE LINUX Low/Low variant and the ISIS ICE XPe Low/Low variant. This option is much more compact, but offers no I/O expansion.

Interface PCB

All variants of the ISIS ICE contain the main ISIS ICE interface PCB. The ISIS plugs directly into the ISIS ICE interface PCB which acts as the main PC interface to the PC/104 stack. Any expansion boards required in the system plug into the PC/104 stack connectors. The PCB contains a PSU module, a Mini PCI socket, a SIMM card socket, a memory backup battery and the breakout connectors for the VGA, USB and Ethernet. Two RS232 connectors are routed out to the front connector panel.

Mini PCI modules

GPRS and Wi-Fi options can be made available by the addition of a Mini PCI express module. The GPRS Mini PCI Express module should be fitted to the ISIS ICE interface PCB where the site for the SIMM card is situated. The Wi-Fi Mini PCI Express module should be fitted directly to the ISIS. Please refer to the ISIS Single Board Computer user manual available on the Eurotech website: www.eurotech.com.

This product was tested with the following Mini PCI card products:

- GPRS, Sierra Wireless MC 8790.
- Wi-Fi, Gigabit model GW-WS50G-RH.

PC/104 expansion

A comprehensive range of PC/104 I/O cards are available from Eurotech. These are fitted to the PC/104 stack. Many Eurotech PC/104 I/O cards are available with interconnect breakout cables which fit directly into the 25 way 'D' positions provided on the ISIS ICE for this purpose.

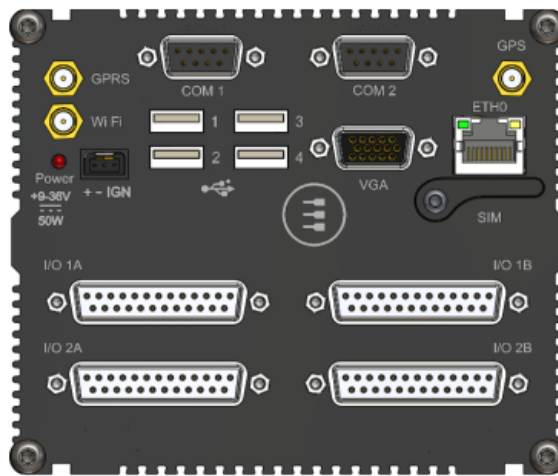
ISIS ICE end panels

The illustrations below show the positions of the connectors on all three ISIS ICE variants. Connector designations are marked. The RF connectors shown are normally blanked off because GPS, Wi-Fi and GPRS are optional. The PC section is common to all three variants.

The rear panel of the ISIS ICE variants differs due to the amount of I/O breakout available with each. All I/O positions are normally fitted with blanking covers, as in the High-Low variant shown on the next page.

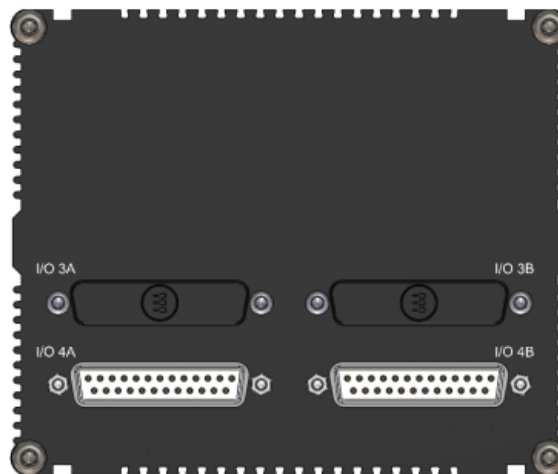
ISIS ICE High-High variant

Front view



The I/O connectors shown here are optional positions, available in addition to those on the rear panel.

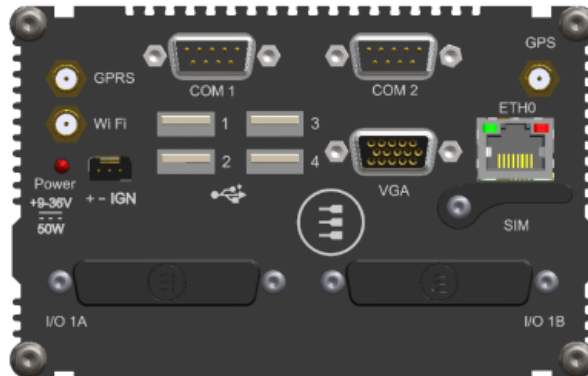
Rear view



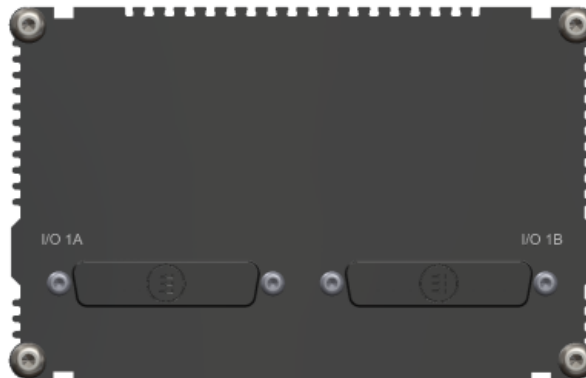
Optional positions for O/I connectors are available for use depending upon cable runs.

ISIS ICE High-Low variant

Front view

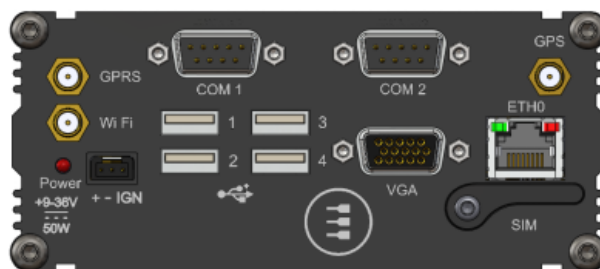


Rear view



ISIS ICE Low-Low variant

Front view



Rear view



I/O is not available on this variant.

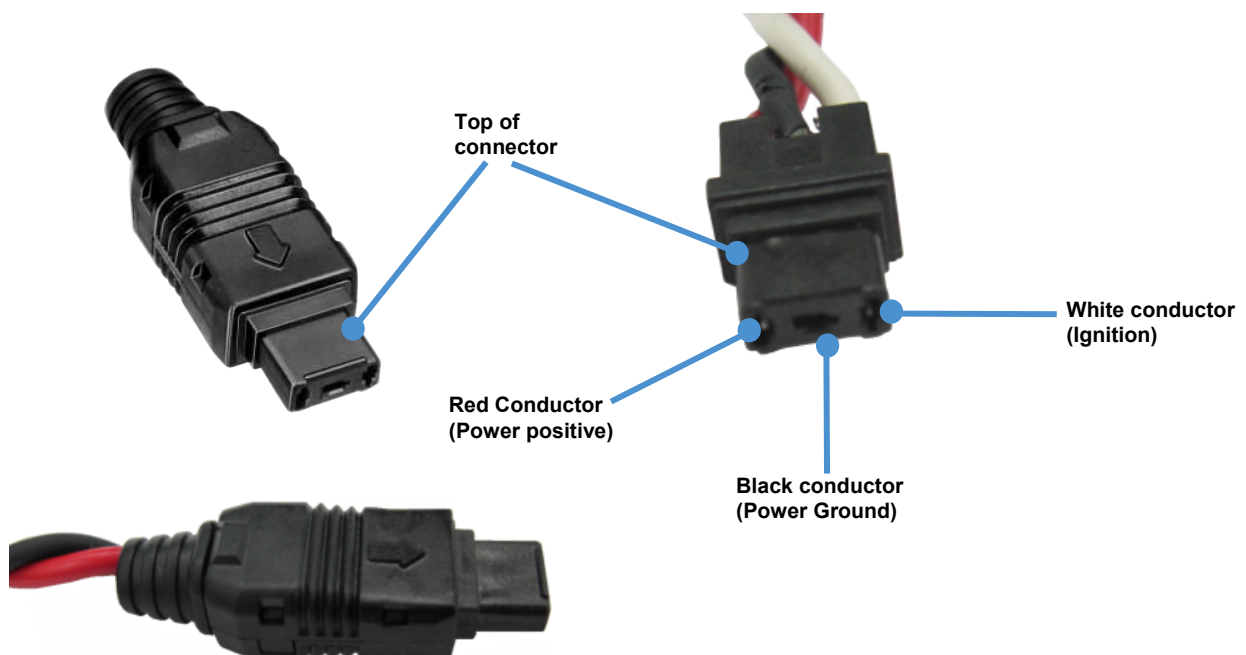
ISIS ICE power supply

The ISIS ICE runs from a DC power-supply in the range 9-36V DC, taking a maximum of 5.5A at the lower DC voltage. The unit is over voltage protected and will shut down if the protection current is exceeded.

The required power connector for this product is provided with the ISIS ICE complete with cable this cable is also available as a spare part from Eurotech.

Connector: Hirose RP34L-5PA-3SC (71).

Crimps: Hirose RP34L-SC1-212(01).



For normal non-automotive use, the Ignition conductor must be permanently connected to the positive conductor for the ISIS ICE to power up.

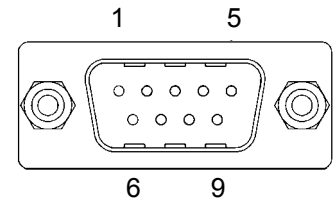
If a switch is put in series with the ignition conductor (Ignition switch) and power is connected, the unit will only power up when the ignition switch contacts are closed. However if the ignition switch contacts are subsequently opened the unit will not power down unless the power positive cable is also disconnected. In order to power down when the ignition line is open circuit software control must be implemented. The hardware built onto the ISIS ICE baseboard is capable of doing this as the hardware communicates with the ISIS via software driven GPIO lines.

In order to utilise the ignition line to obtain a controlled shut down, the GPIO driver software must be implemented as part of the operating regime.

Connectors

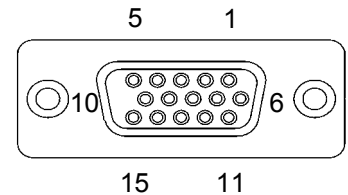
RS232 connectors COM1 and COM2

Pin	Signal name	Pin	Signal name
1	Data Carrier Detect (DCD)	2	Receive Data (RX)
3	Transmit Data (TX)	4	Data Terminal Ready (DTR)
5	Ground	6	Data Set ready (DSR)
7	Request To Send (RTS)	8	Clear To Send (CTS)
9	Ring Indicator (RI)		



VGA CRT connector

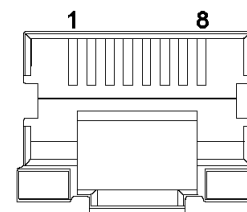
Pin	Signal name	Pin	Signal name
1	Red	2	Green
3	Blue	4	No Connect
5	Ground	6	Ground
7	Ground	8	Ground
9	+5V (Fused)	10	Ground
11	No Connect	12	DDCSDA
13	HSYNC	14	VSYNC
15	DDCSCL		



LAN (Ethernet)

RJ-45 10/100Mb/s.

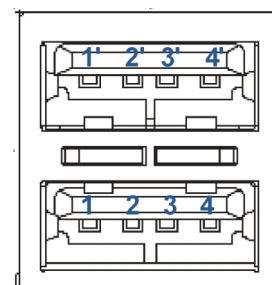
Pin	Signal name
1	TX+
2	TX-
3	RX+
4	No Connect
5	No Connect
6	RX-
7	No Connect
8	No Connect



USB connectors

Two USB type A dual stacked connectors.

Pin	Signal name	Pin	Signal name
1	VBUS1	1'	VBUS2
2	D1-	2'	D2-
3	D1+	3'	D2+
4	GND	4'	GND

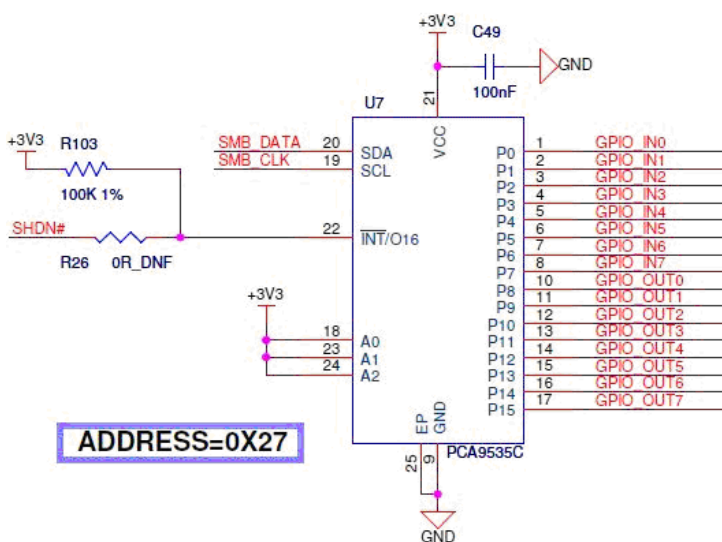


External GPIO connector

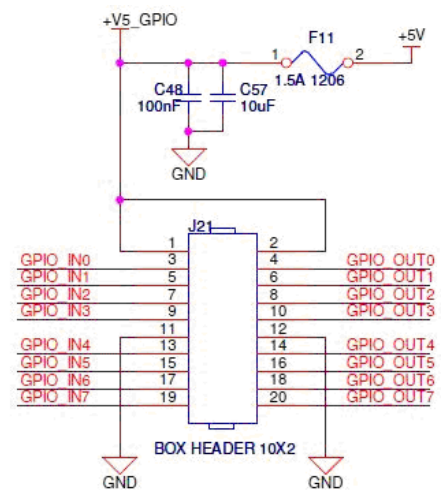
ISIS-ICE GPIO (DB-25)

Pin	Signal name	Pin	Signal name
1	+5V	14	+5V
2	IN0	15	OUT0
3	IN1	16	OUT1
4	IN2	17	OUT2
5	IN3	18	OUT3
6	GND	19	GND
7	IN4	20	OUT4
8	IN5	21	OUT5
9	IN6	22	OUT6
10	IN7	23	OUT7
11	No Connect	24	No Connect
12	No Connect	25	No Connect
13	No Connect	-	-

GPIO expander



ADDRESS=0X27



Adding GPRS, Wi-Fi and PC104 I/O

To add the optional Wi-Fi, GPRS and PC/104 I/O modules, access to the inside of the enclosure is required. You must dismantle the ISIS ICE to gain access. To do this, you need the following tools:

- 2mm and 2.5mm hexagon key/Allen keys (size measured across the flats).
- A Pozidrive screwdriver suitable for M3 Pozidrive screws.
- A medium sized flat bladed screwdriver.



Observe antistatic precautions when dismantling the ISIS ICE and when handling the ISIS.

To access the ISIS ICE board assembly, follow these steps:

1. Remove the four bottom M4 dome head hexagon drive fixing screws, two on the front cover and two on the back cover.
2. Carefully remove the extrusion. (If a hard disk drive has previously been fitted, we recommend that the complete rear cover be removed before attempting to remove the bottom extrusion.)

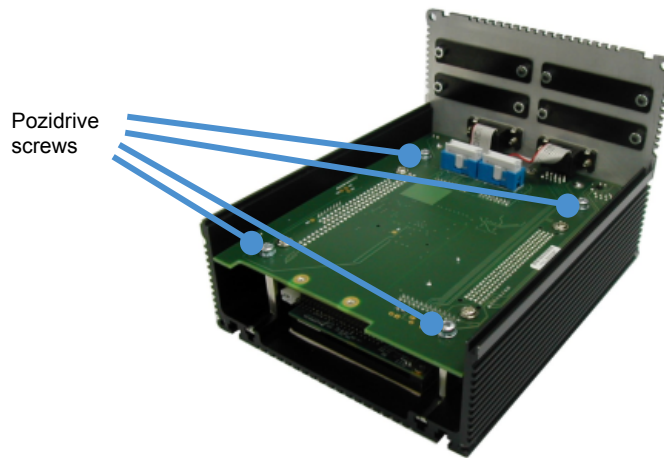
This gives complete access to the underside of the ISIS ICE interface PCB:



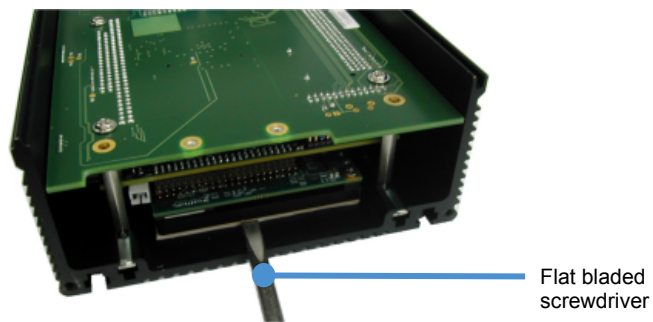
The version of the ISIS baseboard shown here does not have the PC104 stack through connectors fitted for additional PC104 cards. The stack through version of this part will be supplied.

3. Remove the four remaining M4 fixing screws on the front and rear plate.

4. Remove the four outermost front and rear M3 Pozidrive screws holding the board in place:



5. Place a medium sized flat bladed screwdriver into the space between the ISIS heatsink and the top extrusion, and twist to free the heat pad from the extrusion:



6. Remove the ISIS board assembly:



The assembly is still attached to the front panel and should not be dismantled further. Access to all serviceable parts is now available. It should not be necessary to further dismantle the ISIS ICE.

Adding the optional hard disc drive



Observe antistatic precautions when dismantling the ISIS ICE and handling the Hard Disc Drive.

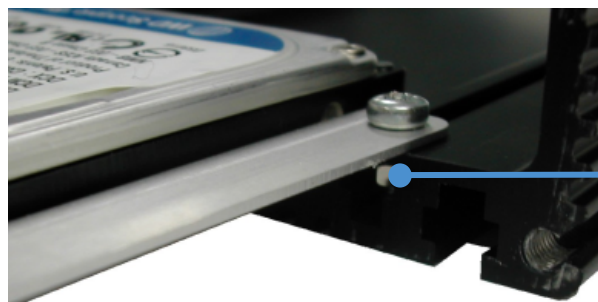
To add the optional hard disk drive, follow these steps:

1. Remove the bottom extrusion and rear panel as described in steps 1-4 of [Adding GPRS, Wi-Fi and PC104 I/O](#), page 15. (You do not need to totally dismantle the enclosure.)
2. Fit the hard disk drive to the hard disk drive mounting plate using the four screws and nuts supplied. Do not tighten the nuts, they should be quite loose.



Before proceeding, check that the orientation of the hard disk drive is correct when the two halves of the extrusion are fitted together. You can do this by trying out the positions before sliding the hard disk drive into place.

3. Fit the nuts into the grooves on the extrusion:



- Slide the hard disk drive assembly onto the base:



The hard disk drive assembly position can be adjusted to suit alignment.

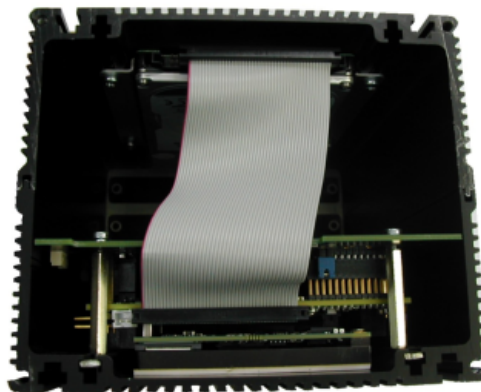
- If you are using an IDE drive then fit the IDE cable pin to pin, so that when the enclosures are joined the cable is not twisted:



- If using a SATA drive use the following SATA drive power and data cables:

- SATA DATA CABLE 2040-45912-000-000
- SATA POWER CABLE 2042-54892-000-000

- Close the two halves together and re-fit the end panel to complete the procedure:



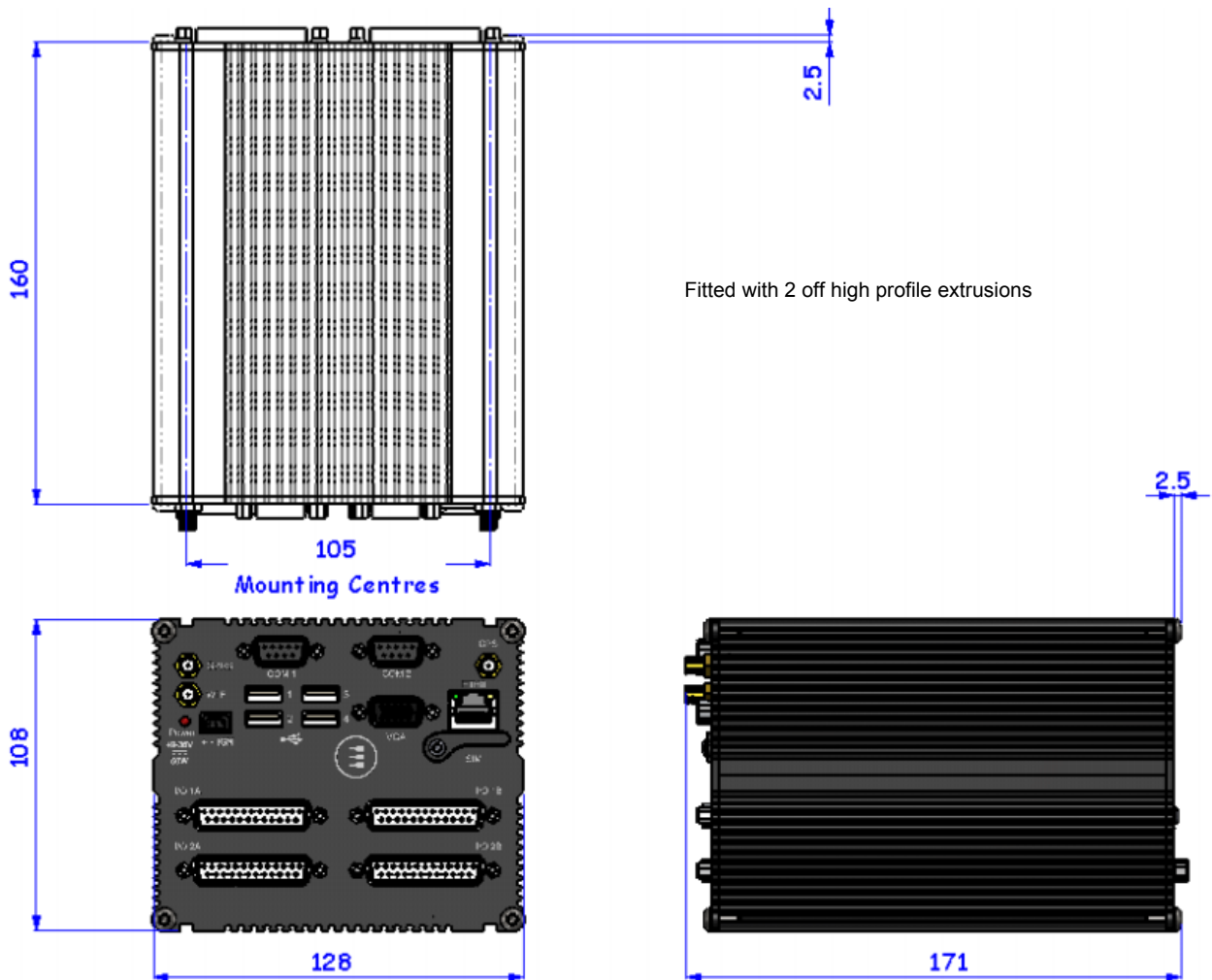
ISIS ICE dimensional drawings

This section provides dimensional drawings with mounting detail for all three ISIS ICE variants.

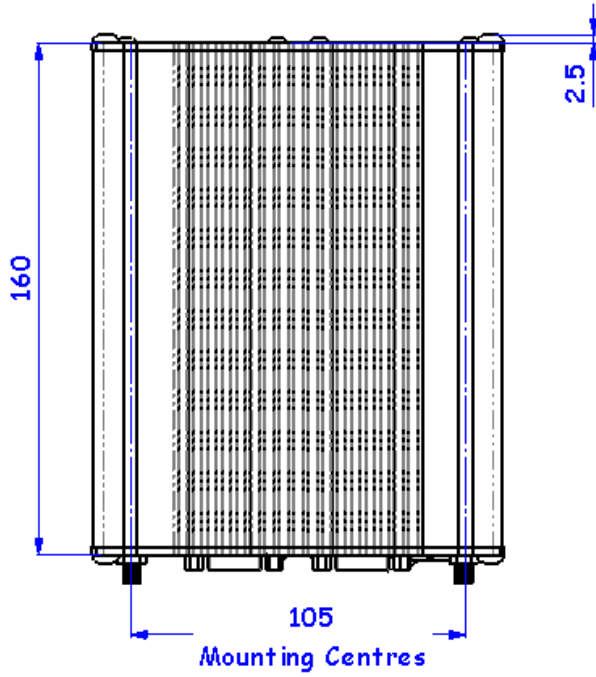


The ISIS ICE is fitted with four M4 threaded nuts. These nuts slide into the grooves in the underside of the enclosures. The measurement Mounting Centres shown below (105mm) is the distance between the centres of the M4 mounting nuts.

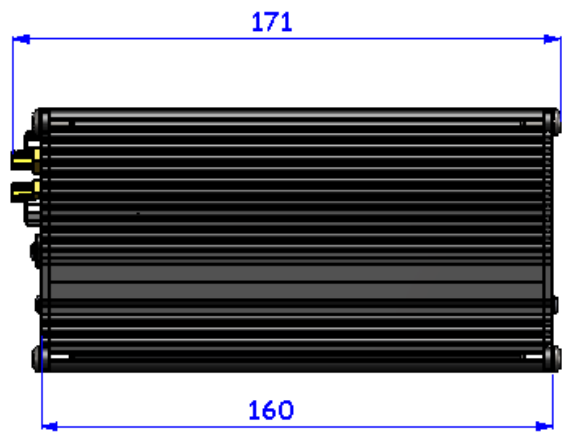
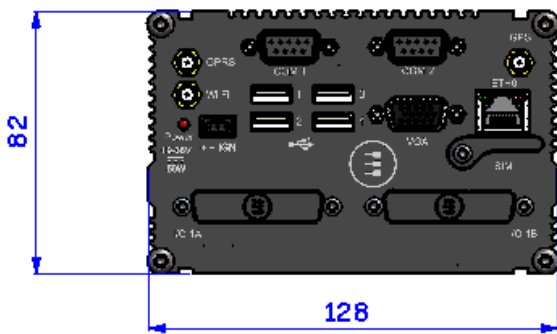
ISIS ICE High-High variant



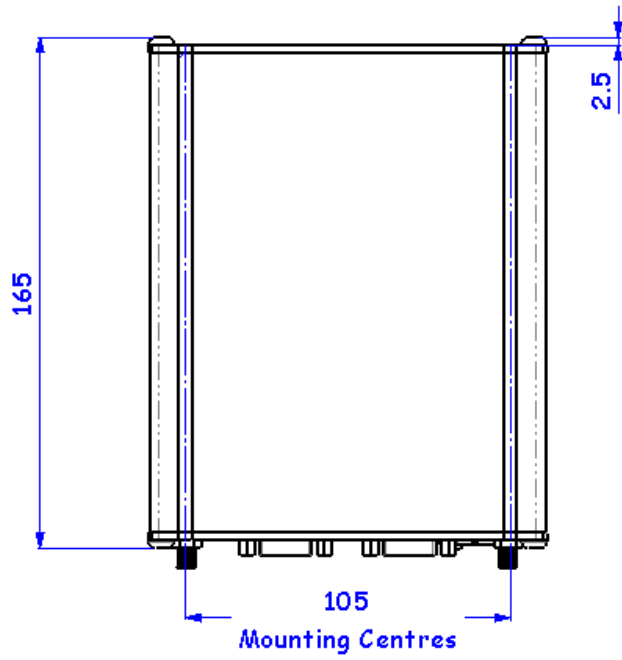
ISIS ICE High-Low variant



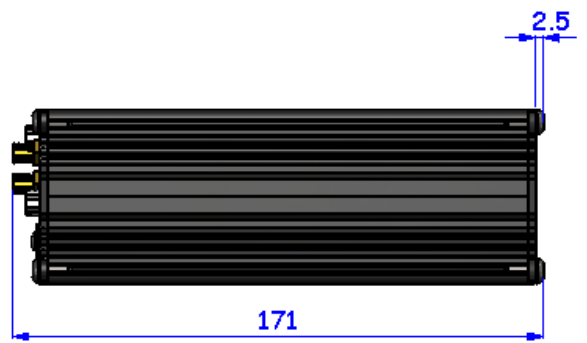
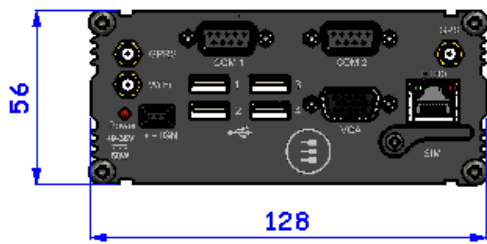
Fitted with 1 off low profile extrusion and 1 off high profile extrusion



ISIS ICE Low-Low variant



Fitted with 2 off low profile extrusions



Appendix A – ISIS ICE EMC and R&TTE compliance

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.

The ISIS ICE has been independently tested and found to meet the following standards for Light industrial and Information technology equipment & railways standards as described below for specific applications where electrostatic discharge may exceed those stated below such as trackside applications please contact Eurotech technical support for further information and advice.

- Emissions EN 50122
- Immunity: EN 55024

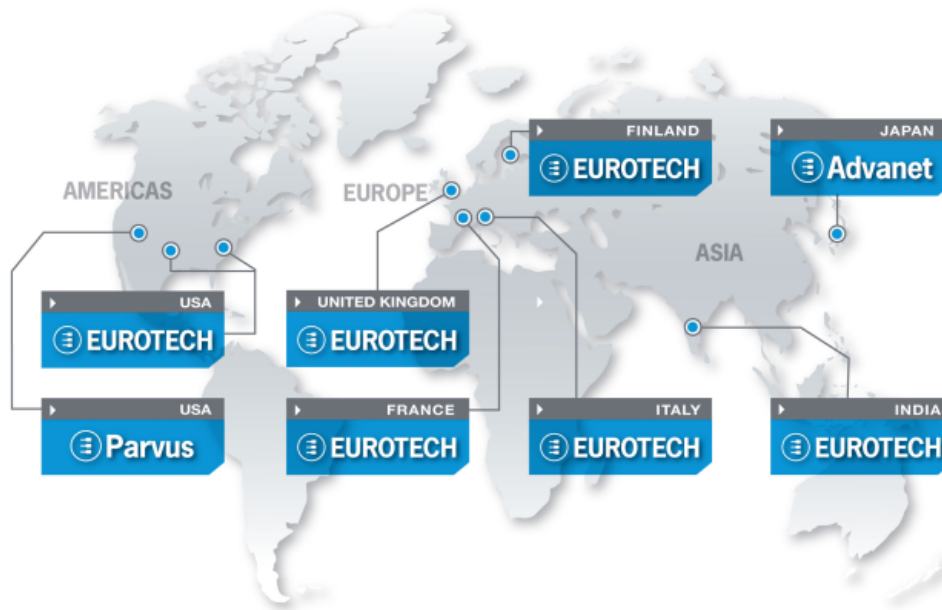
Specific emissions and immunity standards

Specifically, the Catalyst EC ICE meets the following standards:

- Radiated immunity: EN 6100-4-3:2006
(10V/m 1400MHz-2100MHz 80% 1kHz AM)
- Conducted immunity: EN 6100-4-6:1996
(11kHz 80% AM 150kHz-80MHz 10V RMS signal and DC power)
- Fast transients 2KV: EN 6100-4-4:1995
- Electrostatic discharge: EN 6100-4-2: 1995
4KV on contact and 8KV across an air gap

The ISIS ICE is designed to carry Radio transmitting equipment such as the Wi-Fi and GPRS and has been tested to meet the R&TTE requirements for equipment fitted with intentional radiators.

Eurotech Worldwide Presence



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