VIPER

Industrial Compact Enclosure (ICE)

Technical Manual

EuroTech Ltd

A MEMBER OF THE EUROTECH GROUP

Definitions

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Trademarks

All trademarks recognized**.**

Revision History

Manual	*PCB*	*Date*	*Comments*
Issue A		11th June 2003	First full release of manual.
Issue B		13th August 2004	Updated layout, minor modifications.
Issue C		13th January 2005	Addition of EMC conformity certificate, minor modifications.
Issue D		1st October 2007	Minor updates, Eurotech rebranding.

For contact details, see page 22.

ISO 9001
FM12961

Contents

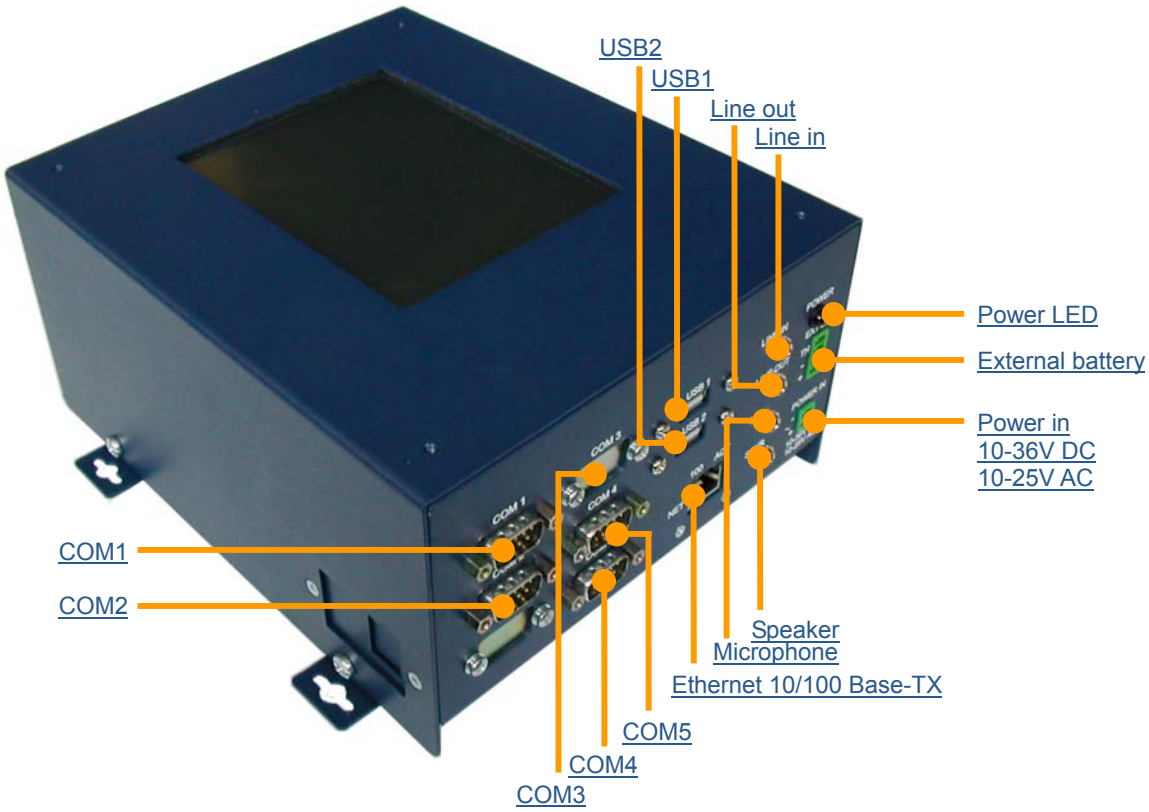
Introduction

The VIPER ICE provides a comprehensive enclosure solution for Eurotech Ltd's VIPER, a high-performance, high-functionality single board computer. The enclosure can be configured to suit a complete range of embedded applications with options for LCD display (with or without touchscreen) and analog or GSM modems. In addition there is expansion room for up to two PC/104 I/O cards.

The enclosure contains:

- The VIPER single board computer.
- Uninterruptible Power Supply (UPS) module.
- External battery connection (applicable only to high temp UPS option).
- 5 x serial ports (D-sub 9-way plugs).
- RJ45 Ethernet connection (10/100 Base-TX).
- 2 x USB 1.1 ports.
- 4 x 3.5mm mini jacks for stereo line input, stereo line output, microphone input and speaker output.
- Expansion space for up to two PC/104 I/O cards.
- Optional analog modem.
- Optional GSM modem.
- Optional LCD display and flat panel interface (FPIF).
- Optional analog resistive touchscreen and touchscreen controller.

VIPER ICE ‘at a glance’



Using the enclosure safely

Environmental

The VIPER ICE is fitted with the VIPER UPS. The battery fitted to the VIPER UPS is a 7-cell battery pack containing Varta V500 HRT NiMH (Nickel Metal Hydride) cells. These cells contain 0% lead, 0% mercury and 0% cadmium.

Anti-Static handling

The VIPER and other circuit boards fitted inside the VIPER ICE contain CMOS devices. These could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling circuit boards. This includes storing boards in appropriate anti-static packaging and wearing a wrist strap when handling.

Packaging

Please ensure that should a system need to be returned to Eurotech Ltd, it is adequately packed, preferably in the original packing material. Damage caused in transit may invalidate any warranty claim.

Safe battery use

The VIPER UPS (standard variant) is designed to operate between 0°C (32°F) and 65°C (149°F). Exposure to temperatures above 65°C (149°F) is dangerous and could cause the NiMH battery cells to vent, releasing hydrogen gas. For this reason, the VIPER UPS must not be fitted into airtight environments.

Do not dispose of the VIPER UPS or its NiMH battery in a fire or in an incinerator since this may rupture or dissemble the battery. The NiMH cells contain potassium hydroxide electrolyte, which can cause injury. In the event that electrolyte gets on skin or in eyes, flush immediately with water and seek medical advice.

The VIPER UPS has a resettable thermal fuse designed to prevent continuous short circuit of the battery. In the event of a fault causing a prolonged battery short circuit, the thermal fuse breaks before the battery generates excessive heat and starts venting.

For further information about VIPER UPS operating and storage temperatures, see the VIPER UPS Technical Manual.

Using an external battery

If using an external battery, it must conform to the requirements specified in the External battery section on page 14.

If you use an external lead acid battery, it must have a rating of at least 1000mAh. A lower rated battery could be overcharged during recharging.

Jumper settings

It is extremely important that the user selectable jumpers are set correctly for the type of battery fitted to the VIPER UPS. Ensure that the jumpers are set as detailed in the *Jumper Settings* section of the VIPER UPS Technical Manual, before powering up or connecting a battery. Operating the VIPER UPS with incorrect jumper settings is dangerous, could cause serious injury and will invalidate the warranty of the VIPER UPS.

About this manual

This manual provides information about the hardware for the VIPER Industrial Compact Enclosure (ICE). It details the hardware configuration of this unit, concentrating on the mechanical constraints, considerations and connector breakout.

Related documents

This guide is normally supplied as part of the VIPER Development Kit, which also includes:

- VIPER Technical Manual.
- VIPER UPS Technical Manual.

These and other manuals are also provided on the CD-ROM that accompanies your Development Kit and can be obtained from the Eurotech Ltd Web site at www.eurotech-ltd.co.uk.

Conventions

Symbols

The following symbols are used in this guide:

Symbol	Explanation
	Note - information that requires your attention.
	Tip - a handy hint that may provide a useful alternative or save time.
	Caution - proceeding with a course of action may damage your equipment or result in loss of data.

Overview of the VIPER ICE ports

The VIPER ICE has a number of ports. These are listed below:

COM1	9-way D-sub break out for COM1 (RS232). See page 10.
COM2	9-way D-sub break out for COM2 (RS232). See page 10.
COM3	9-way D-sub break out for COM3 (RS232). See page 11.
COM4	9-way D-sub break out for COM4 (RS232). See page 11.
COM5	9-way D-sub break out for COM5 (RS485/RS422). See page 11.
USB 2.0	One USB1.1 port. See page 12.
Ethernet	One RJ45 Ethernet port (10/100Base-TX). See page 12.
Audio	Line in, line out, microphone and speaker ports. See page 13.
Power input jack	Requires a 10-36V DC or 10-25V AC supply. See page 14.
External battery connector	If you have the high temp variant of the VIPER UPS you can use an external (user supplied) battery, which can be either NiMH nominally 8.4V, or 12V lead acid ($PbSO_4$). See page 14.
Spare I/O	It is possible to fit up to two additional PC/104 cards in to the VIPER enclosure. I/O break out for these cards is provided at the rear of the enclosure. These locations are fitted with blanking plates as standard. See page 15.

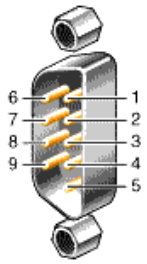
Connector details

Serial ports 1-5

The following tables show the pin assignments for the five serial ports and the USB, Ethernet and audio ports. These connectors are compatible with a standard desktop machine. However, not all the COM ports have the full handshaking capability so care must be taken when assigning ports if full communication capability is required.

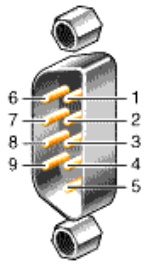
COM1

VIPER PL4	Signal name	9-way D-sub plug
31	Data Carrier Detect (DCD)	1
32	Data Set Ready (DSR)	6
33	Receive Data (RX)	2
34	Request To Send (RTS)	7
35	Transmit Data (TX)	3
36	Clear To Send (CTS)	8
37	Data Terminal Ready (DTR)	4
38	Ring Indicator (RI)	9
39	Ground	5



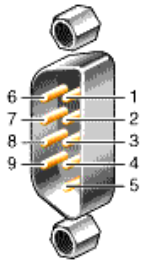
COM2

VIPER PL4	Signal name	9-way D-sub plug
13	Receive Data (RX)	2
14	Request To Send (RTS)	7
15	Transmit Data (TX)	3
16	Clear To Send (CTS)	8
17	Ground	5



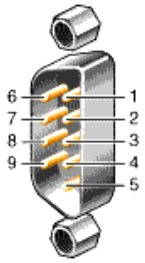
COM3

VIPER PL4	Signal name	9-way D-sub plug
10	Receive Data (RX)	2
11	Transmit Data (TX)	3
12	Ground	5



COM4

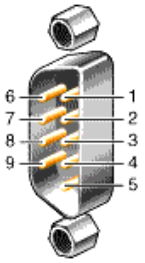
VIPER PL4	Signal name	9-way D-sub plug
21	Data Carrier Detect (DCD)	1
22	Data Set Ready (DSR)	6
23	Receive Data (RX)	2
24	Request To Send (RTS)	7
25	Transmit Data (TX)	3
26	Clear To Send (CTS)	8
27	Data Terminal Ready (DTR)	4
28	Ring Indicator (RI)	9
29	Ground	5



COM5

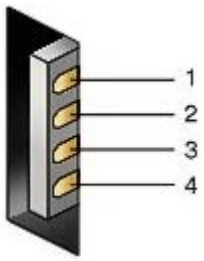
COM 5 supports either RS485 or RS422. Selection is made by moving the appropriate links on the VIPER. See the VIPER Technical Manual for details.

VIPER PL4	Signal name	9-way D-sub plug
5	TXB / (RXB 485)	3
6	TXA / (RXA 485)	8
7	RXB	4
8	RXA	9
9	Ground	5



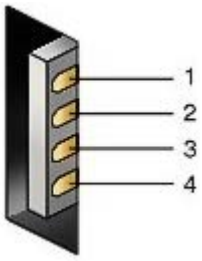
USB1

VIPER PL2	Signal name	USB
1	Power	USB1 pin1
3	- Data 1	USB1 pin2
5	+ Data 1	USB1 pin3
7	Ground	USB1 pin4
9	Ground	USB1 pin4



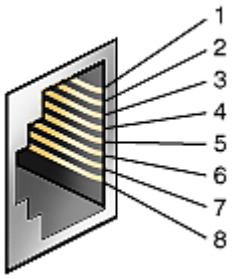
USB2

VIPER PL2	Signal name	USB
2	Power	USB2 pin1
4	- Data 2	USB2 pin2
6	+ Data 2	USB2 pin3
8	Ground	USB2 pin4
10	Ground	USB2 pin4



Ethernet (10/100 BaseTX)

Pin	Signal name
1	Transmit +
2	Transmit -
3	Receive +
4	Reserved
5	Reserved
6	Receive -
7	Reserved
8	Reserved



Audio

VIPER PL7	Mic (mono jack)	Line in (stereo jack 1)	Line out (stereo jack 2)	Speaker out
Pin 1	n/c	Tip (left)	n/c	
Pin 2	n/c	n/c	Tip (left)	
Pin3	n/c	Sleeve (GND)	n/c	
Pin4	n/c	n/c	Sleeve (GND)	
Pin5	n/c	Ring (right)	n/c	
Pin6	n/c	n/c	Ring (right)	
Pin7	Sleeve (GND)	n/c	n/c	
Pin8	n/c	n/c	n/c	Tip (left)
Pin9	Tip (signal)	n/c	n/c	
Pin10	N/C	n/c	n/c	
Pin11	N/C	n/c	n/c	
Pin12	N/C	n/c	n/c	Ring (right)

The speaker out generates a 200mW per channel amplified output. A 4-8Ω load should be connected to this output.

Main power input

2-way 0.2" MSTB 2-part screw terminal connector.

Pin	Input (DC)	Input (AC)
1	10-36V DC	10-25V AC (fused input)
2	GND (input 0V)	10-25V AC

External battery and thermistor input (applicable to UPS high temp option only)

4-way 0.2" MSTB 2-part screw terminal connector.

Pin	Signal
1	Battery positive terminal
2	Battery negative terminal
3	Thermistor A
4	Thermistor B (GND)

The high temp variant of the VIPER UPS may be used in the VIPER ICE. This variant is designed to use an external (user supplied) battery, which can be either NiMH or lead acid ($PbSO_4$).

Before selecting a battery please read the VIPER UPS Technical Manual for details about suitable battery types. This manual is supplied on the VIPER development kit CD or can be obtained from the Eurotech Ltd web site at www.eurotech-ltd.co.uk.

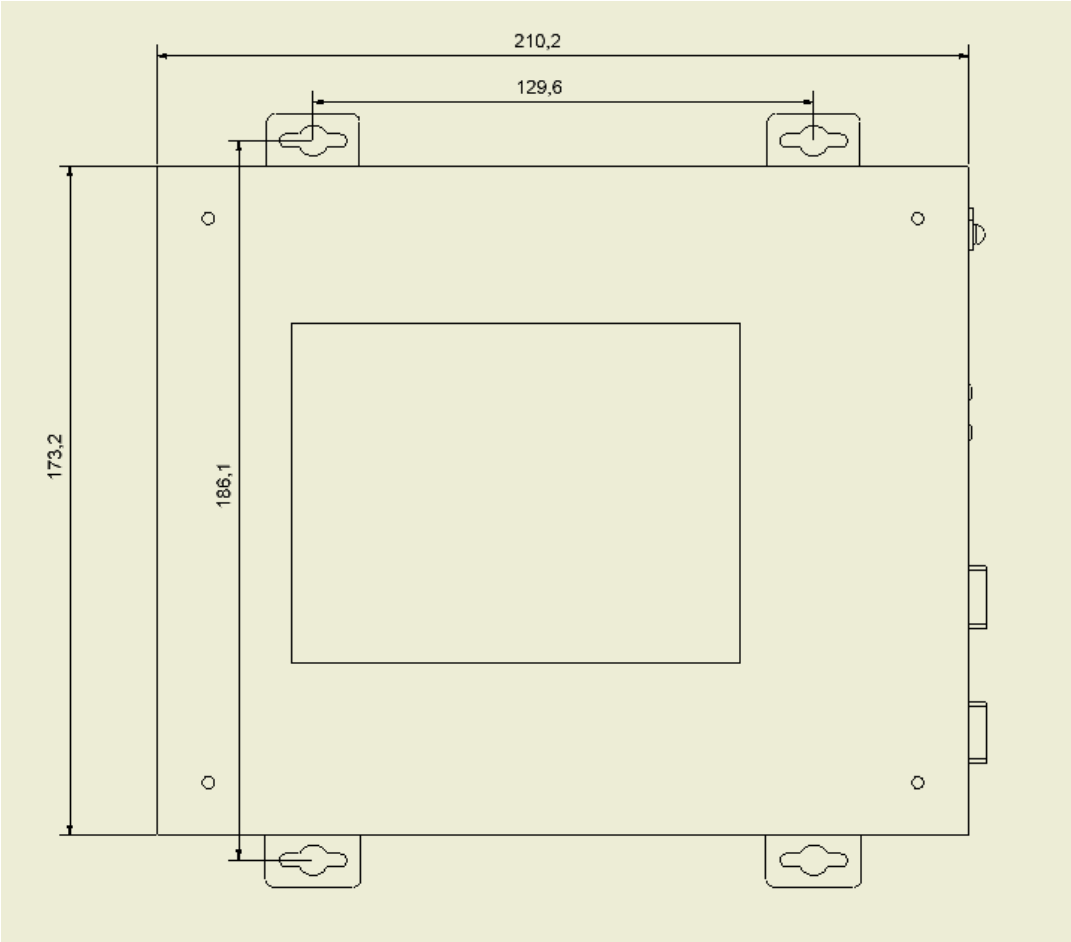
Additional I/O breakout

The ICE can be fitted with up to two PC/104 I/O cards. (Only one PC/104 expansion module can be added if the flat panel display is fitted.) When fitted, these break out through the rear of the enclosure. The following table shows the generic conversion from the 50-way IDC connector to the two off 25-way D-sub connectors that appear on the outside of the ICE.

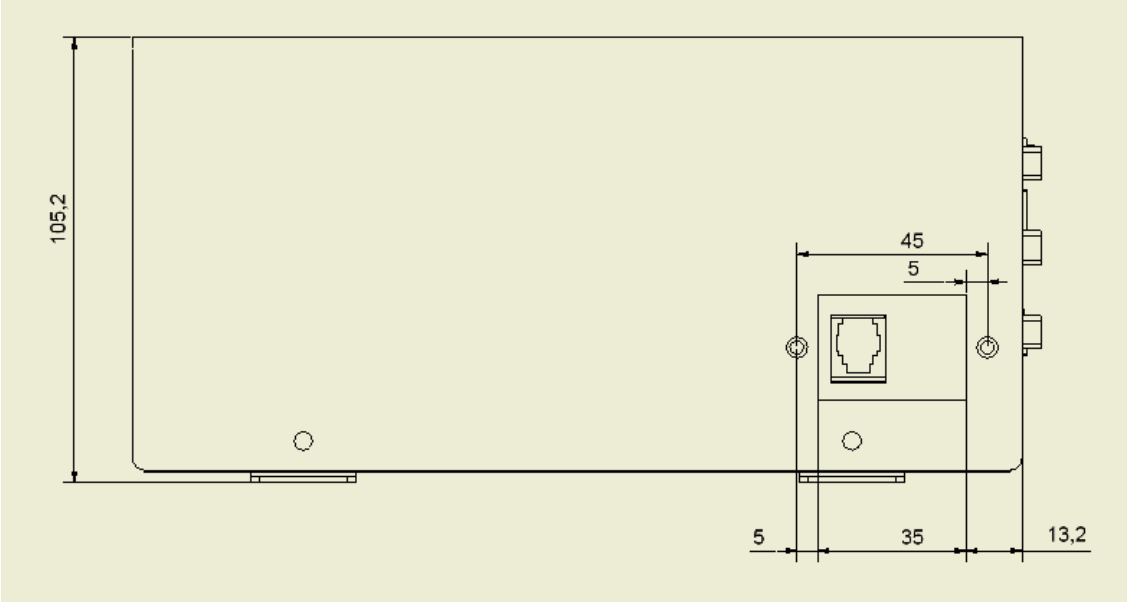
Eurotech Ltd PC/104 I/O card 50-way IDC pin no.	25-way pin no. [B]	25-way pin no. [A]	Eurotech Ltd PC/104 I/O card 50-way IDC pin no.	25-way pin no. [B]	25-way pin no. [A]
1	1		**26**		1
2	14		**27**		14
3	2		**28**		2
4	15		**29**		15
5	3		**30**		3
6	16		**31**		16
7	4		**32**		4
8	17		**33**		17
9	5		**34**		5
10	18		**35**		18
11	6		**36**		6
12	19		**37**		19
13	7		**38**		7
14	20		**39**		20
15	8		**40**		8
16	21		**41**		21
17	9		**42**		9
18	22		**43**		22
19	10		**44**		10
20	23		**45**		23
21	11		**46**		11
22	24		**47**		24
23	12		**48**		12
24	25		**49**		25
25	13		**50**		13

Mounting details

Top view showing overall dimensions



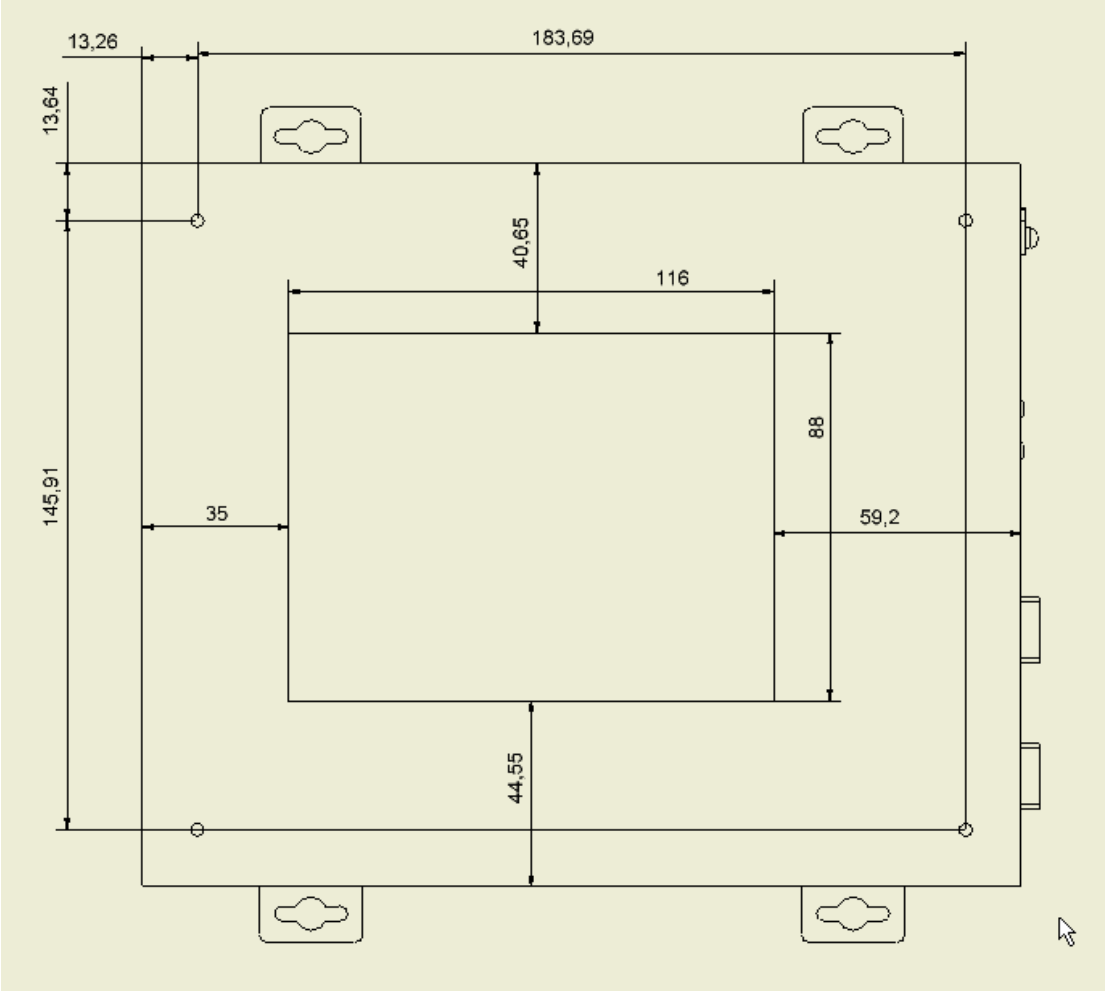
Side view showing overall dimensions



This view includes the modem plate detail.

Top view showing mounting hole and display cut-out details

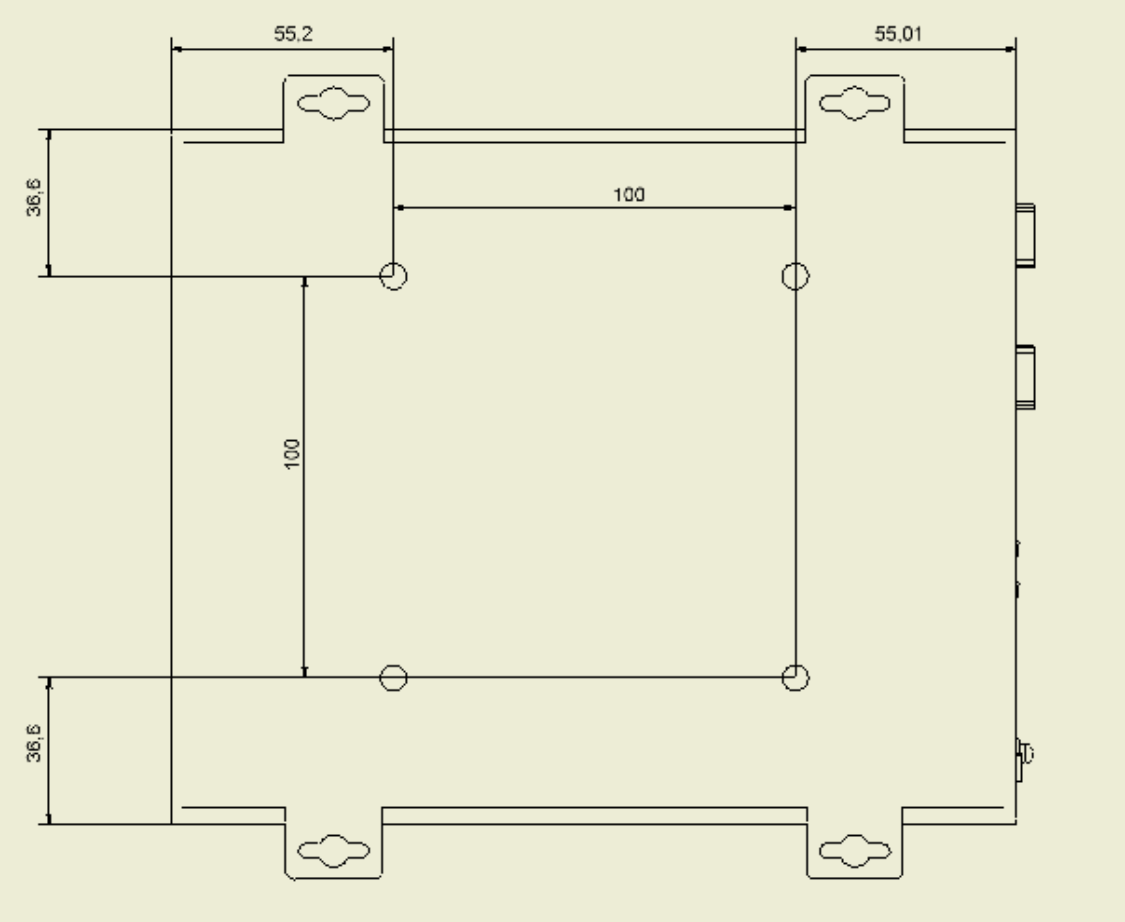
The VIPER ICE can be mounted into an OEM enclosure by cutting out an aperture for the display and screwing the VIPER ICE into place using the M3 threaded fixings shown in the following diagram:



The threaded bushes allow for a maximum penetration of 5mm.

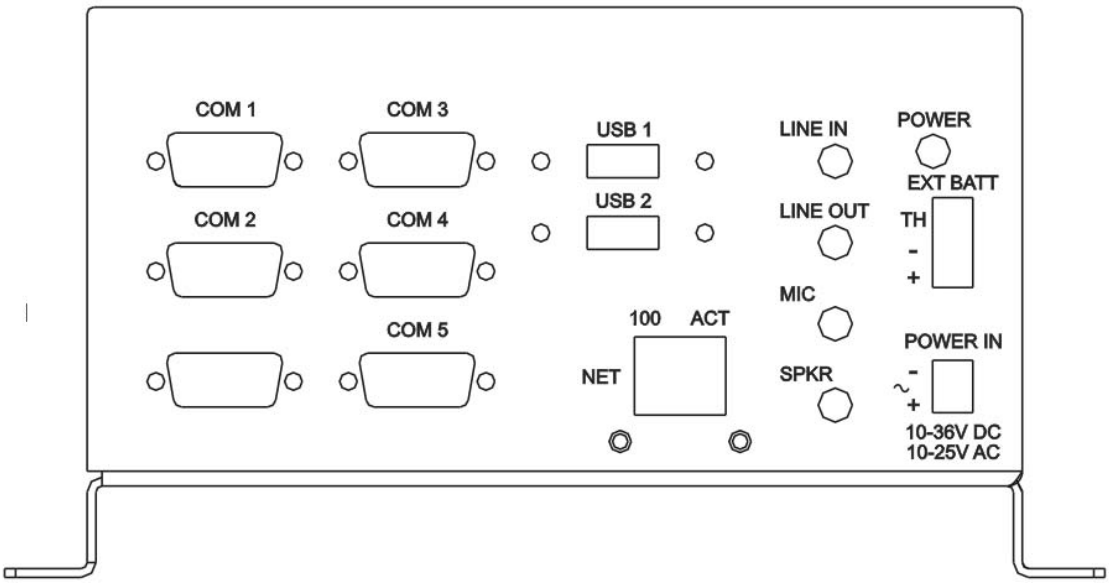
Underside view showing mounting to a stand or fixing plate

The VIPER ICE has provision for mounting onto a stand or fixing plate. The base of the enclosure has four mounting holes with M5 inserts 4mm deep. Threaded bushes are provided and positioned as shown in the following diagram:



End panel details

The following diagram shows the connector end panel detail:



Additional information

LCD display

The LCD display is a 320 x 240 TFT color LCD module manufactured by NEC. The display part number is NL3224BC35-20 and a full data sheet is included on the VIPER Development Kit CD. For additional information on this display please go to www.nec-lcd.com/english.

VIPER-FPIF (LCD interface board)

The VIPER FPIF is the interface PCB that converts the signals required by the LCD from the signals provided by the VIPER Single Board Computer (SBC). This board is essentially a breakout board for the display components providing power and data signals from the VIPER. If you suspect problems with this board contact Eurotech technical support (see page 22).

LCD display backlight inverter

The LCD backlight inverter is manufactured by NEC LCD Technologies Ltd. The inverter part number is 55PW131 and a full data sheet is included on the VIPER Development Kit CD. For additional information about this display please go to www.nec-lcd.com/english.

Resistive touchscreen

The resistive touchscreen is manufactured by Dynapro. The touchscreen part number is RES-5.7-PL4. A full data sheet is included on the VIPER development kit CD. For further technical information see 3M Touch Systems (formally 3M Dynapro and Microtouch Systems) at www.3mtouch.com/3MTouchSystems.

TSC1 (touchscreen interface board)

The TSC1 is an interface PCB that connects the resistive touchscreen to a pre-assigned COM port on the VIPER. COM 3 is the default port in the VIPER ICE. If the touchscreen is fitted, therefore, COM3 is not available for external use.

Modem

The VIPER ICE is able to accommodate either a V.34, V.90 or DUAL BAND GSM/GPRS modem module manufactured by COMTEC Holdings Ltd (www.comtech.uk.com) For further information about how to obtain and fit one of these modems please contact Eurotech sales (see page 22).

Appendix A – Contacting Eurotech

Eurotech sales

Eurotech's sales team is always available to assist you in choosing the board that best meets your requirements.

Eurotech Ltd
3 Clifton Court
Cambridge
CB1 7BN
UK

Tel: +44 (0)1223 403410
Fax: +44 (0)1223 410457
Email: sales@eurotech-ltd.co.uk

Comprehensive information about our products is also available at our web site: www.eurotech-ltd.co.uk.

While Eurotech's sales team can assist you in making your decision, the final choice of boards or systems is solely and wholly the responsibility of the buyer. Eurotech's entire liability in respect of the boards or systems is as set out in Eurotech's standard terms and conditions of sale. If you intend to write your own low level software, you can start with the source code on the disk supplied. This is example code only to illustrate use on Eurotech's products. It has not been commercially tested. No warranty is made in respect of this code and Eurotech shall incur no liability whatsoever or howsoever arising from any use made of the code.

Eurotech technical support

Eurotech has a team of dedicated technical support engineers available to provide a quick response to your technical queries.

Tel: +44 (0)1223 412428
Fax: +44 (0)1223 410457
Email: support@eurotech-ltd.co.uk

Eurotech Group

Eurotech Ltd is a subsidiary of Eurotech Group. For further details see www.eurotech.com

Appendix B – 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 Harmonized Standards, for Electro-Magnetic Emissions and Immunity.

Generic Emissions and Immunity Standards

Emissions: BS EN61000-6-3:2001

- Conducted Emissions — EN55022 Class A
- Radiated Emissions — *EN55022 Class A*

Immunity: BS EN61000-6-2: 2001

- Electromagnetic Field Immunity — EN61000-4-3 Class A
- Electrostatic Discharge Immunity — EN61000-4-2 Class A
- Fast Burst Transient Immunity — *EN61000-4-4 Class A*

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.

EU DECLARATION OF CONFORMITY

The product listed below conforms to:

EU 89/336/EEC Electromagnetic Compatibility Directive, as amended by 92/31/EEC and 93/68/EEC

Product covered by this Declaration:

Description: -
Industrial (CE) Compliant Enclosure

Model	:	VIPER ICE	
Part Nos.	:	VIPER ICE ENCLOSURE	7061-11781-001-101

Basis for conformity :

The product above complies with the requirements of the EU directives by meeting the following standards:

BS EN61000-6-3:2001 Generic Emissions Standard for Industrial Environments
BS EN61000-6-2:2001 Generic Immunity Standard for Industrial Environments

This product has been self-certified by Eurotech Ltd. This statement is verified by tests conducted at DB Technology, Cottenham, Cambs.

During testing screened cables were used for the serial communication ports, Ethernet and USB. Installation of the Viper ICE outside the above conditions may invalidate this statement of compliance for some or all of the above standards

Date : 1st October 2004 / Updated 26th Sept 2007

Signed.....

Name : Chris Houghton
Position: CEO

For Eurotech Ltd .

Responsible for documentation :

Quality Assurance Manager
Eurotech Ltd

ATTENTION!

To maintain compliance with the above directives, the attention of the specifier, purchaser, installer or user is drawn to special measures and limitations to use which must be observed when the product is taken into service. Details of these special measures and limitations to use are available on request, and are also contained in the User Manual for this product.

Appendix C - Specification

Power input requirements	10-36V DC or 10-25V rms AC.
Operating temperature range	0°C (32°F) to 55°C (131°F).
Storage temperature range	0°C (32°F) to 65°C (149°F).
Humidity	10% to 90% RH (non-condensing).
Weight	1.7Kg Including VIPER, VIPER UPS, LCD, touchscreen, interface PCBs and interconnecting cables.
Dimensions	Enclosure 200mm x 210mm x 105.2mm including mounting feet.
Power supply	The VIPER ICE is fitted with the VIPER UPS, an internal uninterruptible power supply. For further details about the VIPER UPS see the VIPER UPS manual, which is on the VIPER Development Kit CD. The input voltage of VIPER ICE can be in the range of 10-36V DC or 10-25V AC. The VIPER UPS provides +5V DC at 3.5A (max) internally as its output.

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