



**MAGNUM ETX**  
**Biscuit Format Single Board PC**  
**User Guide**

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## Contents

Copyright .....	4
Limitations of Liability .....	4
Trademarks .....	4
Regulatory Statements .....	5
Safety Warning for North America .....	5
Manual Organisation .....	6
Introduction .....	7
Specification .....	8
General Precautions .....	10
PS/2 Devices .....	10
Electro-Static Discharges .....	10
On-Board Battery .....	10
BIOS & CMOS Memory .....	11
Electromagnetic Compatibility .....	11
Quick Start .....	12
Assembly .....	13
Daughter Board connector locations .....	13
Cooling .....	15
Stack Heights and Clearances .....	17
Connections .....	18
J1 PCI VIO Select .....	19
J2 V <sub>cc</sub> LCD .....	19
SW1 Power + CF Selector .....	19
P1 Auxiliary USB .....	20
P7 Parallel Port .....	20
P8 SMI Bus .....	20
P9 IDE Connector .....	20
P10 Power On / Reset .....	21
P11 Fan Connector .....	21
P12 Power .....	21
P14 GPIO Audio .....	21
P15, P16 P17 LCD/LVDS Support .....	22
System Software .....	24
Operating System Install .....	24
Operating System API Functions .....	24
System BIOS .....	25
BIOS Menus .....	25
Main Menu .....	26
Advanced Menu .....	27

Power Menu..... 30  
Security Menu..... 31  
Boot Menu ..... 32  
Exit Menu ..... 33  
Maintenance ..... 34  
Amendment History ..... 35

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## **Regulatory Statements**

CE

This product meets the essential protection requirements of the European EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC), and is eligible to bear the CE mark.

**Warning**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC

NOTE:

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 his own expense.

WARNING:

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

## **Safety Warning for North America**

If the power lead (cord) is not supplied with the computer, select a power lead according to your local electrical regulations. In the USA use a 'UL listed' lead. In Canada use a CSA approved or 'cUL listed' lead.

Si le cordon secteur n'est pas livré avec l'ordinateur, utiliser un cordon secteur en accord avec votre code électrique nationale. En l'Etat Unis utiliser un cordon secteur 'UL listed'. En Canada utiliser un cordon secteur certifié CSA, ou 'cUL listed'.

## **Manual Organisation**

This manual describes the Magnum ETX Single Board PC.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of the product.

The manual is sectioned as follows:

- Introduction;
- Overview, listing the unit's features and specification;
- Installation, including what software to install
- Layout, showing where the various connectors are located, and their pin-out details;
- How to upgrade the system;
- Bios Setup
- Connector Details
- Design Considerations
- Maintenance details

We strongly recommend that you study this manual carefully before attempting to interface with board or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

***IT IS PARTICULARLY IMPORTANT THAT YOU READ THE SECTION 'PRECAUTIONS' BEFORE HANDLING ANY COMPONENTS INSIDE THE UNIT.***

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Technical Services department with the relevant details.

## Introduction

The Blue Chip Technology Magnum ETX is the latest offering in the Biscuit format Single Board PC range, integrating the latest advances in low power processor, memory, and I/O technologies to provide an ideal platform for embedded applications. The Magnum ETX consists of a processor daughter card that complies with the embedded ETX standard version 3.02, and a baseboard that contains the I/O interfaces. The concept of ETX is to provide the user with a standard connector interface with fixed connector locations and predefined IO functions. This modular approach provides a cost effective means of system upgrade and allows the user to easily validate a number of CPU board price/power/performance options.

The product is available with CPU build options of Ultra Low Voltage VIA Eden 500Mhz, VIA C7 nanobga2 1GHz and the VIA C7 nanobga2 2GHz processors. On-board voltage regulator circuits provide the required voltages for the processor from the incoming 5 volt power supply. The 500MHz version is targeted at lower cost, power conscious, performance driven applications. Where reduced power is less of a requirement then the 1GHz and 2GHz versions offer a higher performance solution.

The processor maintains full backward compatibility with the 8086, 80286, i386™ and Intel486™ processors. It supports both read and write burst mode bus cycles, and includes separate on-chip code and data caches which employ a write-back policy. Cache is integrated within the CPU and operates at the full CPU frequency giving excellent performance. Cache size is 128K L1 and 128K L2. Also integrated into the processor is an advanced numeric co-processor which significantly increases the speed of floating point operations, whilst maintaining backward compatibility with Intel486™ math co-processor and complying with ANSI/IEEE standard 754-1985.

The memory interface supports up to 1GB of DDR2 SDRAM, in a standard 200 pin SODIMM socket.

The Magnum ETX utilises the VIA CN700 Northbridge and VT8237R Plus Southbridge to integrate many peripherals. These include: VGA controller with CRT, LVDS and LCD interfaces, ATA-100 IDE interface, 10/100 Fast Ethernet controller, quad USB ports, dual serial ports, parallel port, real-time clock, keyboard and mouse (PS/2) controller, AC'97 audio interface. The VT8237R also provides SATA interface which is accessed via two SATA connectors positioned on the daughter board in accordance with the ETX V3.02 specification.

The MAGNUM ETX will drive a single PCI card, as well as mini-PCI and Compact Flash.

## Specification

CPU	VIA ULV Eden 500MHz VIA C7 nanobga2 1GHz/2GHz
Chipset:	VIA CN700 Northbridge VIA VT8237R Plus Southbridge
BIOS:	Phoenix BIOS, with Ethernet Boot ROM option
Memory:	512MB to 1GB PC2-4200/5300 DDR2 400/533 SDRAM using Horizontal 200 pin SODIMM, 1.8V operation. DDR2 667MHz can be used but will operate at 533MHz
Cache:	128KB L1 and 128KB L2 Cache is integrated into the CPU
Onboard Peripherals	
Graphics:	Integrated graphics controller based on the Unichrome Pro 3D/2D Graphics controller. CRT, 18bit TFT LCD and LVDS SVGA up to 1920 x 1440 resolution
Ethernet:	Integrated controller providing 10/100 Base-T Ethernet Boot ROM option within the BIOS setup for remote booting (PXE) <b><i>Note: the host board must carry the magnetic for network isolation</i></b>
Storage:	Integrated into Southbridge, providing support for SATA 1 (dual ports dual connectors) and ATA 133/100/66/33 EIDE HDD (quad ports, dual connectors) 512MB I <sup>2</sup> C EEPROM providing non-volatile storage
Audio:	Integrated AC97 controller, Line In/Out, Microphone In
Communications:	Quad USB ver 2 compliant Two 16C550 compatible serial ports <b><i>Note: Host board must provide transceivers</i></b> Parallel port giving SPP/EPP/ECP Floppy Interface supporting single 1.44MB drive <b><i>Note: the floppy or parallel port operation is determined at boot time By strapping a pin on the host board. The devices are mutually exclusive</i></b> PS/2 compatible keyboard and mouse port
Monitoring:	CPU Core thermal monitoring On board thermistor for system thermal monitoring CPU Core, 1.8V, 2.5V, 3.3V and 5V voltage monitors Hardware Watchdog timer with configurable timeout BIOS or Software enabled/disabled. The time out results in a System Reset
Miscellaneous:	PC standard Real time Clock is integrated into the Southbridge The battery has to be located on the host board. Speaker, Power/Reset switch, Hard Disk Activity LED, Suspend Switch and external Lithium coin cell are all supported but located on the Host board

Expansion Bus:	Single PCI v2.2 compliant slot with switchable 5V/3V signalling Single Mini PCI expansion slot
Power:	5Volt only operation ( $5V \pm 5\%$ ) with connectivity for +12V pass through To PCI connector and Fan connector
5-Volt Power Consumption	7.5W, 500MHz with 512 MB RAM 8.5W, 1GHz with 512 MB RAM 12.5W, 2GHz with 512 MB RAM
* Typical Power consumption measured running Windows XP at 0% CPU utilisation	
General Operating:	Storage Temperature: $-20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ Operating Temperature: $0^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ <i>Note: faster CPU speeds will require active cooling to achieve Operating limit</i> Relative humidity: 10 – 90% non-condensing
Operating System Support:	Datalight ROM-DOS and TCP/IP Sockets Windows CE 6.0 Windows XP Professional Windows XP Embedded Windows Vista Linux QNX
Compliance	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC RoHS Compliant
Safety	Designed to meet EN 60950-1
EMC	EN55022 Class A EN55024
Dimensions	Assembled Unit            145mm x 115.5mm x 40mm {Large heatsink(s) may increase these dimensions}

## **General Precautions**

Your Single Board Computer is susceptible to damage by electrostatic discharges. In order to avoid damage, you should work at an anti-static bench and observe normal anti-static precautions. Wear an anti-static wrist strap connected to an earth point *before* opening any packaging.

Where a wrist strap is not available, discharge any static charge you may have built-up by touching an earth point. Avoid any further movement that could build up another static charge. Touch an earth point from time to time to avoid further build-up, and remove the items from their anti-static bags only when required

## **PS/2 Devices**

It is important that PS/2 devices (mouse and keyboard) are not connected or disconnected with the unit powered on. Damage or data corruption may occur if this precaution is not observed.

## **Electro-Static Discharges**

If you are going to open up the unit, it is important to realise that the devices on the cards within this unit can be damaged by static electricity. Bear in mind that the damage caused by static electricity may vary from total destruction to partial damage, which may not be immediately obvious. This could have an effect on the product's reliability and warranty. Before opening the chassis, ensure that you take necessary static precautions. Ideally you should work at an anti-static bench and wear an approved wrist strap or if that is not possible, touch a suitable ground to discharge any static build up before touching the electronics. This should be repeated if the handling continues for any length of time.

If it is necessary to remove a board or electronic assembly, place it into an anti-static bag. This will prevent any static electricity build up damaging the board. Metallised bags are preferred. Do not use black anti-static bags for any item containing a battery because these tend to be conductive and will discharge the battery.

## **On-Board Battery**

The MAGNUM ETX board has an on-board Lithium cell connected. Great care should be taken with this type of battery. If the battery is mistreated in any way there is a very real possibility of fire, explosion, and personal harm. Under NO circumstances should it be short-circuited, exposed to temperatures in excess of 100°C or burnt, immersed in water, recharged or disassembled.

Expired batteries remain hazardous and must be disposed of in a safe manner, according to local regulations.

Le panneau de processeur est équipé d'une batterie de lithium. Le grand soin devrait être pris avec ce type de batterie. Si la batterie est mistreated il y a de dans de toute façon un possibility très vrai du feu, d'explosion et de mal personnel. Dans au cunes circonstances il est sous peu circuité, exposé aux températures au dessus de 100 degrés de centigrade ou brûlé, immergé dans l'eau, rechargée ou dissassembled.

Les batteries expirées restent dazaedous et doivent être reejetées d'une façon sûre, selon des règlements locaux.

## **BIOS & CMOS Memory**

Please be aware that with personal computer products, it is possible to create configurations within the BIOS make booting impossible. Unlike most personal computer products, the MAGNUM ETX stores the BIOS settings in Flash memory rather than CMOS which allows these settings to be remembered even if there is no battery present.

If settings are used which make the MAGNUM ETX unstable, then clearing the CMOS as in other personal computers to return to defaults will not work. The only way to reset default BIOS settings is to enter BIOS at boot time and Load Default Settings.

**WARNING:** If you are uncertain as to consequences of making specific changes to BIOS settings, then consult Blue Chip Technology Technical Support for advice

## **Electromagnetic Compatibility**

This product has been assessed operating in representative, standard configurations. As with any PC product, however, final installation & configuration can vary significantly, and so the following guidelines are offered to help ensure that compatibility is maintained.

- All components added to a system should either carry appropriate equivalent levels of compliance, or be tested for compliance as part of the final system, and should be installed in accordance with supplier recommendations.
- The external enclosure should be securely fastened (with standard lids and covers in place) to ensure good metal-to-metal contact around the internal electronics
- Any metal back plate must be securely screwed to the chassis of the computer to ensure good metal-to-metal (i.e. earth) contact.
- Metal, screened, connector bodies should be securely connected to the enclosure.
- The external cabling to boards causes most EMC problems. It is recommended that any external cabling to the board be totally screened, and that the screen of the cable connects to the metal end bracket of the board or the enclosure and hence to earth. Round, screened cables with a braided wire screen are used in preference to those with a foil screen and drain wire. Wherever possible, use metal connector shells that connect around the full circumference of the cable screen: they are far superior to those that earth the screen by a simple “pig-tail”.
- The keyboard and mouse will play an important part in the compatibility of the processor card since they are ports into the board. Similarly, they will affect the compatibility of the complete system. Fully compatible peripherals must be used otherwise the complete system could be degraded. They may radiate or behave as if keys/buttons are pressed when subject to interference. Under these circumstances it may be beneficial to add a ferrite clamp on the leads as close as possible to the connector. A suitable type is the Chomerics type H8FE-1004-AS.
- USB cables should be high quality screened types.
- Ensure that the screens of any external cables are bonded to a good RF earth at the remote end of the cable.

Failure to observe these recommendations may invalidate the EMC compliance.

## Quick Start

The following sections explain how to install the MAGNUM ETX Single Board PC.

First ensure that you are familiar with the contents of the section "Precautions". It contains important information to avoid damage to the board.

If choosing your own cooling solution, then check the CPU application notes from the VIA website. This is to ensure that your solution is capable of cooling the processor throughout the desired operating temperature range. Note that the upper operating limit of 60°C is for the board operation in free air, which would equate to the air temperature inside an enclosure with the lid closed. It is important to ensure that the operating temper inside the system unit in the vicinity of the processor board does not exceed the 60°C limit.

Some higher powered CPU options may have a lower operating limit than 60°C, so refer to individual datasheets for precise operating conditions

## Assembly

The following section describes the assembly of the ETX daughter board to the motherboard board. Although the Magnum ETX will be provided in an assembled state, this section is useful for instances where repair or upgrade are required

### Daughter Board connector locations

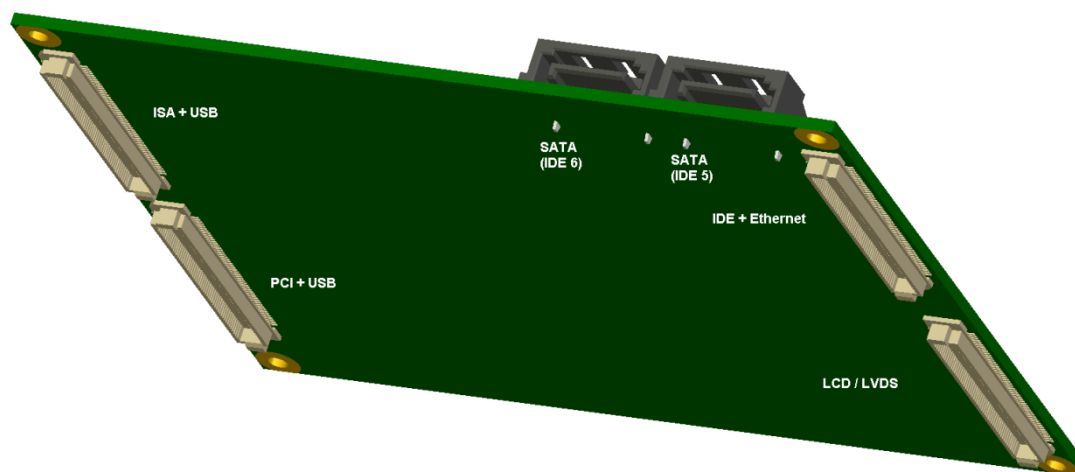


Figure 1: Connector Locations

With an ETX daughter board, the main connections for Keyboard, Mouse, Video, IDE, USB etc are made via the Host Board. On the ETX CN700 there are only two direct connections, both of which are SATA connectors.

Connection to the host board is with four Hirose plug connectors (part number FX8-100P-SV) which mate with corresponding Hirose socket connectors (eg part number FX8-100S-SV). There are four mounting holes of 2.5mm diameter available for securing the daughter board to the host board

Refer to [Appendix 1](#) for details of the connector pin descriptions

When installing or removing the daughter board onto the host board, ensure that all power has been removed, including 5V stand-by if present and any external Lithium cell or RTC back-up battery.

Before assembling the daughter board onto the host board, check that the mounting fittings are fitted to the host board as shown below in Figure 2.

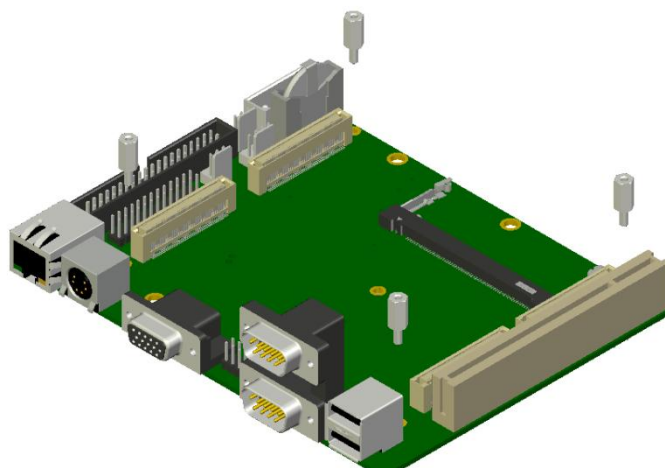


Figure 2: ensure mounting pillars are fitted to host board

The next action is to carefully align the connectors of the daughter board with those on the host board and carefully press together.

Note: The Hirose connectors are offset from each other, so the daughter board will only fit on one orientation. Trying to force the daughter board in the wrong orientation may damage the connectors

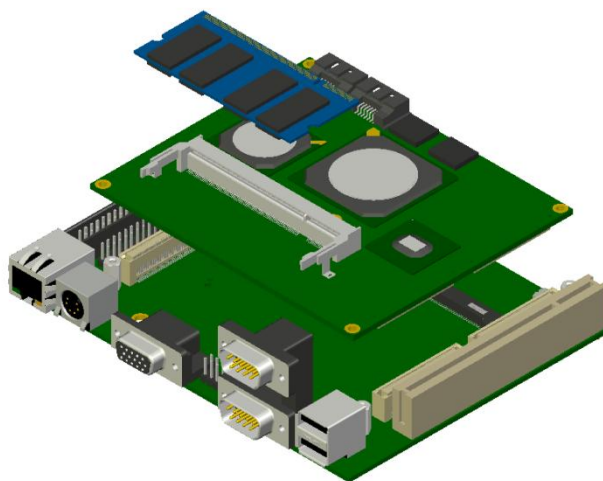


Figure 3: Align daughter board connectors with the host board

If the memory module is not already fitted, then carefully fit the memory module onto the memory socket. The socket is notched to indicate the orientation of the module

At this stage, the cooling solution should be applied. There are several different methods of cooling the Magnum ETX

## Cooling

Efficient cooling is essential for long and reliable operation of any electronic equipment. The VIA Eden/C7 CPU, the VIA CN700 Northbridge and VIA VT8237 Southbridge do get hot in normal operation, and in an elevated ambient temperature will require additional cooling. Cooling requirements will vary with application, desired operating temperature, CPU load, and memory size and board orientation.

Mounting the PCB vertically will aid natural convection and create a chimney effect. Passive heat sinks can be used for the CPU, Northbridge and Southbridge. A fan, whilst not always desirable, will provide a high degree of cooling even for a relatively slow airflow.

Further options that may be considered are sinking heat to the chassis or enclosure and in extreme situations the use of a heat pipe.

The CPU is equipped with an onboard thermal diode for temperature monitoring. A thermistor is available to monitor the temperature of critical and potential hot spots on the board. Temperatures can be monitored in the BIOS Set-up. If you wish to monitor these temperatures from your application please contact the Blue Chip Technology Technical Support team.

When designing an enclosure, bear in mind that the greater the volume of air that can flow through the enclosure, the greater the cooling effect and the lower the temperature rise above the ambient air temperature. However, the volume produced by any fan will vary with the pressure against which it has to work. The resistance to airflow (the back-pressure on the fan) will depend upon the enclosure, the mounting and restrictions. Therefore, when mounting and cabling the board, it is essential that the free circulation of the cooling airflow is not impeded.

The calculation of airflow through an enclosure is not straightforward, and depends on many factors. The method of meeting the cooling requirements will be specific for each system. Consequently, the system builder is responsible for ensuring adequate cooling. However, interpreting airflow volumes is not intuitive. As an aid to selecting suitable cooling, the following example is offered. A 60 mm axial fan (such as a Papst type 612NGH) blowing over the board can supply up to 46 m<sup>3</sup>/hour when unrestricted. Restrictions to the airflow will reduce this volume.

Blue Chip Technology offers several cooling solutions to help manage cooling:

- Heat plate designed to allow contact with a larger cooling area such as direct contact with a metal enclosure
- A passive finned heatsink
- An active solution based on the finned heatsink with a fan (12 m<sup>3</sup>/hour) attached

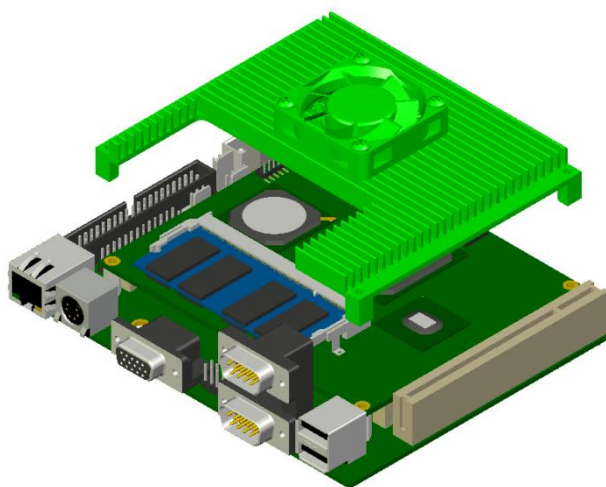


Figure 4: Position Heatsink above daughter board

The Active solution has thermal pads attached to the bosses on the base of the finned heatsink which make direct contact with the surface of Northbridge, Southbridge and two voltage regulators on the daughter card to help dissipate heat into the heatsink.

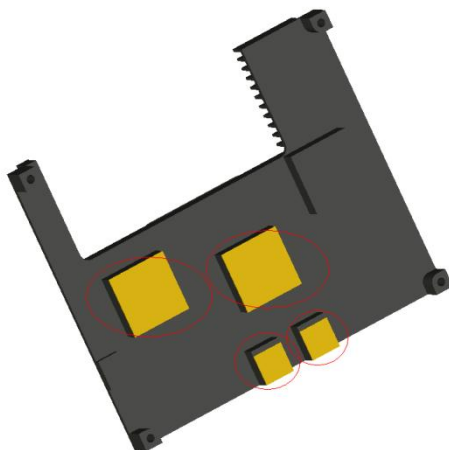


Figure 5: Heatsink bosses and thermal pads

Before fitting the active solution, it is necessary to spread some thermal grease to the surface of the boss which will contact the CPU. Thermal grease is required as thermal pads provide less thermal conductivity than required for the CPU. Note: the minimum amount of thermal grease should be used

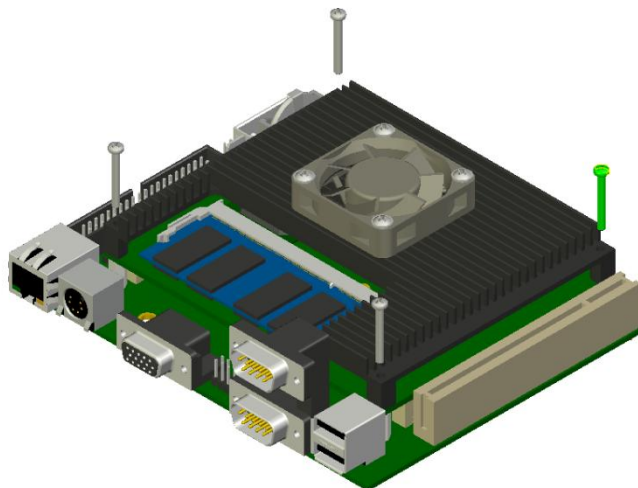


Figure 6: secure the assembly using screws

To finish of the assembly, it is necessary to use screws to secure the active solution in place. This also protects against the daughter board coming unseated from the host board during operation



Figure 6a: Passive cooler

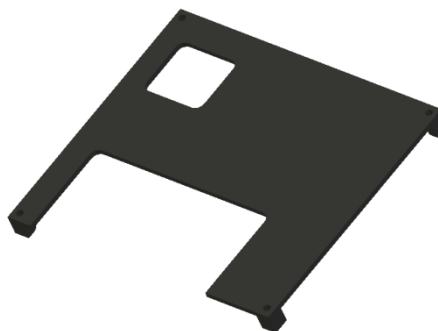


Figure 6b: Heat Spreader

Stack Heights and Clearances

The Magnum ETX with an Active cooling solution stack heights are shown below.

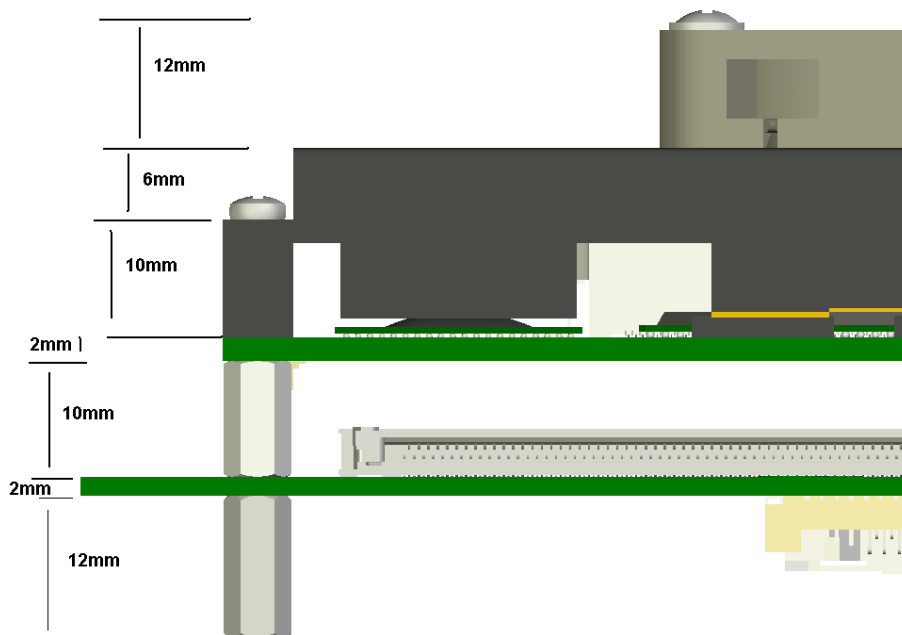


Figure 7: MagnumX with Active Cooling Stack dimensions

Using the above example, the overall height from the inside base of an enclosure to the top edge of the screw would be 54mm. As the fan draws air down from the top and pushes out through the sides, in this instance, there is a requirement for at least 25mm clear space above the fan to ensure the fan operates efficiently. This could be achieved two ways: firstly, a gap of 25mm between the top of the fan and the inside of the top cover, or secondly, the cover could be just above the fan, with ventilation holes in the cover to allow air to flow freely into the fan as shown in Figure 8 below.

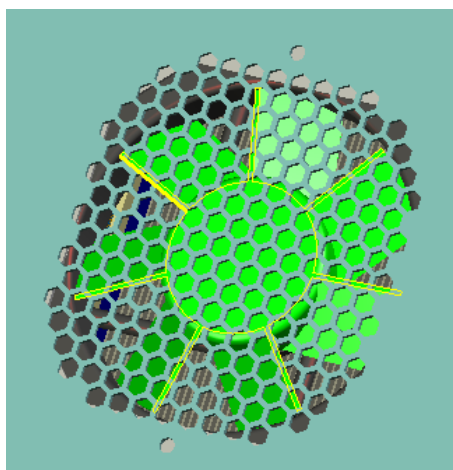


Figure 8: Example of Cover close to top of fan

Connections

All connections to the Magnum ETX are made via the Carrier board. Connector positions are shown below

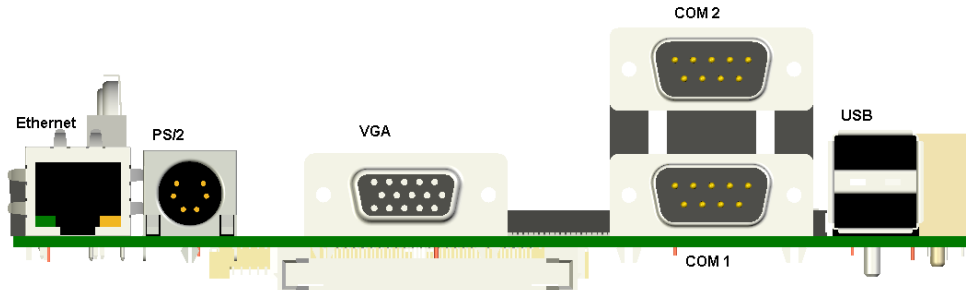


Figure 9: Front Connectors

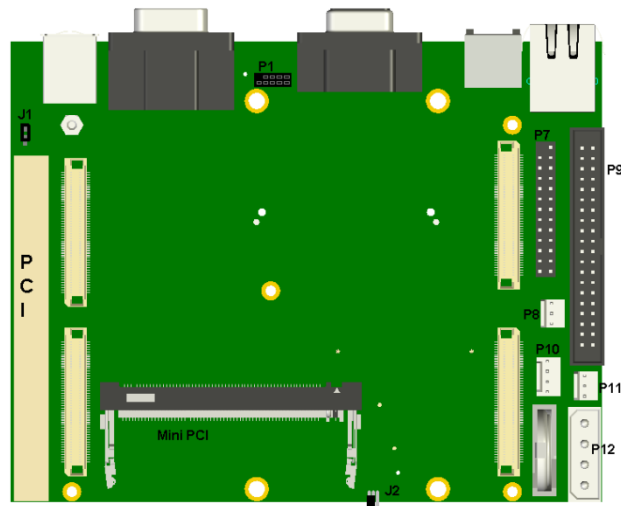


Figure 10: Top Side Connectors

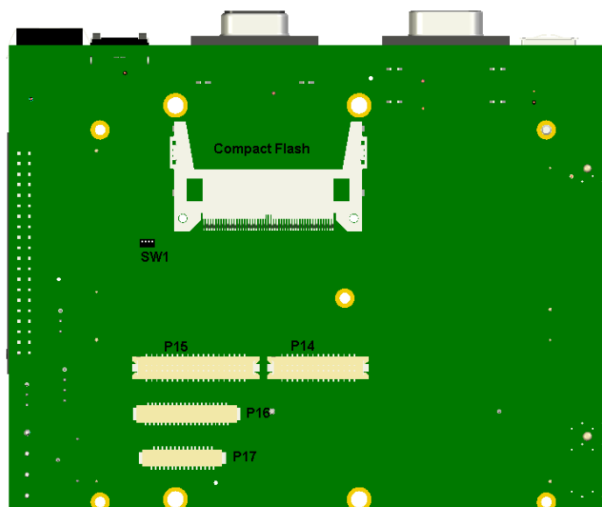


Figure 11: Bottom Side Connectors

Connector	Description	Connector	Description
J1	PCI VIO Select	J2	V <sub>cc</sub> LCD
SW1	Power + CF Selector	P1	USB Header
P7	Parallel Port	P8	SM Bus
P9	IDE Connector	P10	Power On/Reset
P11	Fan Power	P12	Power In
P14	GPIO / Audio	P15	LCD
P16	LCD	P17	LCD

**J1 PCI VIO Select**

Connect	Output
1-2	5V
2-3	3V3

Note: If 5V is selected, some modern PCI cards which are 3V3 Signalling may not work. Conversely, if 3V3 is selected, then older legacy 5V signalling cards may not work

**J2 V<sub>cc</sub> LCD**

Connect	Output
1-2	5V
2-3	3V3

**SW1 Power + CF Selector**

<b>SW1-1</b>	
On	Auto Power On
Off	Follow P10 Power On/Off switch
<b>SW1-2</b>	
On	CF Master
Off	CF Slave
<b>SW1-3</b>	
On	CF DMA Enabled
Off	CF DMA Disabled
<b>SW1-4</b>	
On	CF DMA Enabled
Off	CF DMA Disabled

## P1 Auxiliary USB

Pin	Description	Pin	Description
1	+5V	2	+5V
3	USBP2-	4	USBP3-
5	USBP2+	6	USBP3+
7	Ground	8	Ground
9	NC	10	NC

## P7 Parallel Port

Pin	Assignment	Pin	Assignment
1	PSTRB#	2	P_AFD#
3	PPD0	4	P_ERR#
5	PPD1	6	P_INIT#
7	PPD2	8	P_SLIN#
9	PPD3	10	GND
11	PPD4	12	GND
13	PPD5	14	GND
15	PPD6	16	GND
17	PPD7	18	GND
19	P_ACK#	20	GND
21	P_BUSY	22	GND
23	P_PE	24	GND
25	P_SLCT		

## P8 SMI Bus

Pin	Assignment
1	GND
2	SM_SDA
3	SM_SCL

## P9 IDE Connector

Standard IDE Connector

**P10 Power On / Reset**

Pin	Assignment
1	Reset
2	Ground
3	Power On / Off
4	Ground

**P11 Fan Connector**

Pin	Assignment
1	GND
2	12V
3	NC

**P12 Power**

Pin	Assignment
1	+12V
2	0V
3	0V
4	+5V

**P14 GPIO Audio**

Pin	Assignment	Pin	Assignment
1	GPIO 0	2	GPIO 1
3	GPIO 2	4	GPIO 3
5	GPIO 4	6	GPIO 5
7	GPIO 6	8	GPIO 7
9	5V	10	5V
11	GPIO 8	12	GPIO 9
13	GPIO 10	14	GPIO 11
15	GPIO 12	16	GPIO 13
17	GPIO 14	18	GPIO 15
19	GND	20	GND
21	AGND	22	AGND
23	LineINR	24	LineINL
25	AGND	26	AGND
27	LineoutR	28	LineoutL
29	AGND	30	MICIN

## P15, P16 P17 LCD/LVDS Support

For LCD output there is a choice of 3 connector types. Connectors P16 and P17 provide quick connection for pre-assembled 1 to 1 cables using type DF9-41P and DF9-31P connectors, such as produced by AXON Cables (<http://www.axon-cable.com/product/axon/fdc/fdc.htm>). Connector P15 allows for custom cable design using mating connector DF13-40DS.

NOTE 1: Only one connection is allowed

NOTE 2: Remember to set the appropriate  $V_{cc}$  for the Panel using J2

### P15 LCD/LVDS DF13-40DP

Pin	LCD	LVDS	Pin	LCD	LVDS
1	INVPWR	INVPWR	2	INVPWR	INVPWR
3	GND	GND	4	GND	GND
5	VCCLCD	VCCLCD	6	VCCLCD	VCCLCD
7	VPOT	VPOT	8	GND	GND
9	CB5	ZC+	10	CB4	ZC-
11	CB3	Z2+	12	CB2	Z2-
13	CB1	Z1+	14	CB0	Z1-
15	N/C	N/C	16	N/C	N/C
17	CG5	Z0+	18	CG4	Z0-
19	CG3	N/C	20	CG2	N/C
21	CG1	YC+	22	CG0	YC-
23	N/C	N/C	24	N/C	N/C
25	CR5	Y2+	26	CR4	Y2-
27	CR3	Y1+	28	CR2	Y1-
29	CR1	Y0+	30	CR0	Y0-
31	N/C	N/C	32	N/C	N/C
33	GND	GND	34	GND	GND
35	CCLK	CCLK	36	CFLM	CFLM
37	CDE	CDE	38	CLP	CLP
39	ENAB	ENAB	40	DIGON	DIGON

### P17 LCD DF9-31S

Pin	Assignment	Pin	Assignment
1	GND	2	CCLK
3	CLP	4	CFLM
5	GND	6	CR0
7	CR1	8	CR2
9	CR3	10	CR4
11	CR5	12	GND
13	CG0	14	CG1
15	CG2	16	CG3
17	CG4	18	CG5
19	GND	20	CB0
21	CB1	22	CB2
23	CB3	24	CB4
25	CB5	26	GND
27	CDE	28	VCCLCD
29	VCCLCD	30	CA
31	CB		

*P16 LCD DF9-41S*

Pin	Assignment	Pin	Assignment
1	GND	2	CCLK
3	GND	4	CLP
5	CFLM	6	GND
7	GND	8	GND
9	CR0	10	CR1
11	CR2	12	GND
13	CR3	14	CR4
15	CR5	16	GND
17	GND	18	GND
19	CG0	20	CG1
21	CG2	22	GND
23	CG3	24	CG4
25	CG5	26	GND
27	GND	28	GND
29	CB0	30	CB1
31	CB2	32	GND
33	CB3	34	CB4
35	CB5	36	GND
37	CDE	38	CA
39	VCCLCD	40	VCCLCD
41	CB		

## System Software

### Operating System Install

A DVD-ROM is supplied with each board, containing most common operating system drivers. Bear in mind that suppliers continually update their drivers, so it is always a good idea to check on the Internet for later ones.

The following websites are good starting points:

[www.viaarena.com](http://www.viaarena.com)

[www.viatech.com](http://www.viatech.com)

[www.intel.com](http://www.intel.com)

For example for a fresh install of Windows XP operating system, drivers can be installed as follows

First install the Magnum ETX Chipset #1 drivers. This driver includes the graphics driver, and there are several choices as to which particular driver to choose depending on your requirements. Refer to the readme file in the Drivers\SBPC\ETXCN700\Chipset 1 sub directory for more information on the choices

Next install the Chipset 2 driver by executing the setup.exe file in the Drivers\SBPC\ETXCN700\Chipset 2 folder. This installs the necessary IDE/SATA/Raid driver for the VT8237 Southbridge device

For Audio driver, run the setup.exe file from the Drivers\SBPC\ETXCN700\Audio folder.

Lastly, for the LAN driver, use Device Manager and when prompted, point the install to the Drivers\SBPC\ETXCN700\LAN\MS\X86 folder

### **Operating System API Functions**

#### *System Health Monitor*

The support for the hardware monitor on the MAGNUM ETX processor board will be incorporated into the unified system health monitor API library (SYSMON) and as such supports the following API calls...

```
DWORD BCTEnableHwMonitor(VOID);  
DWORD BCTDisableHwMonitor(VOID);  
DWORD BCTReadVoltage(BYTE bVoltageSource, DOUBLE *pdVoltageReading);  
DWORD BCTReadTemp(BYTE bTempSource, DOUBLE *pdTempReading);
```

#### *Watchdog / EEPROM*

The support for the watchdog and EEPROM on the MAGNUM ETX processor board will be provided through a board specific BCTAPI library and as such support the following API calls...

```
DWORD BCTOpen(WORD wDevice);  
DWORD BCTClose(WORD wDevice);  
DWORD BCTWatchdog(BYTE bWdgAction, BYTE bTimeout, BYTE bRange);  
DWORD BCTWriteEeprom(WORD wOffset, BYTE bVal);  
DWORD BCTReadEeprom(WORD wOffset, PBYTE pbVal);  
DWORD BCTEraseEepromByte(WORD wOffset);  
DWORD BCTEraseEeprom(VOID);
```

## System BIOS

The MAGNUM ETX Single board PC uses the Phoenix BIOS, which has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in on-board flash for retention when the power is turned off. Date and time information is in a battery-backed RAM (CMOS RAM) that retains the information each time the power is turned off.

To enter the BIOS setup pages, press the <F2> key just after powering on the unit

If you want to temporarily change the BOOT order, for example to boot from a USB device, then during POST or when the Splash screen is being displayed, press the <ESC> key to enter the BOOT selection Menu.

## BIOS Menus

The following pages show the Menu pages found when entering the BIOS. These pages can be used as a reference guide and descriptions of the main user configurable options are provided for information.

The following pages do not go into great depth, so if you require more in-depth data on particular BIOS settings please contact Blue Chip Technology Technical Support staff via the web interface at

<http://support.bluechiptechnology.co.uk/>

***Caution: Changing settings to the wrong values can result in an unreliable or non working unit.***

If changing settings, then it is recommended that these are recorded in a safe place for later reference by field engineers

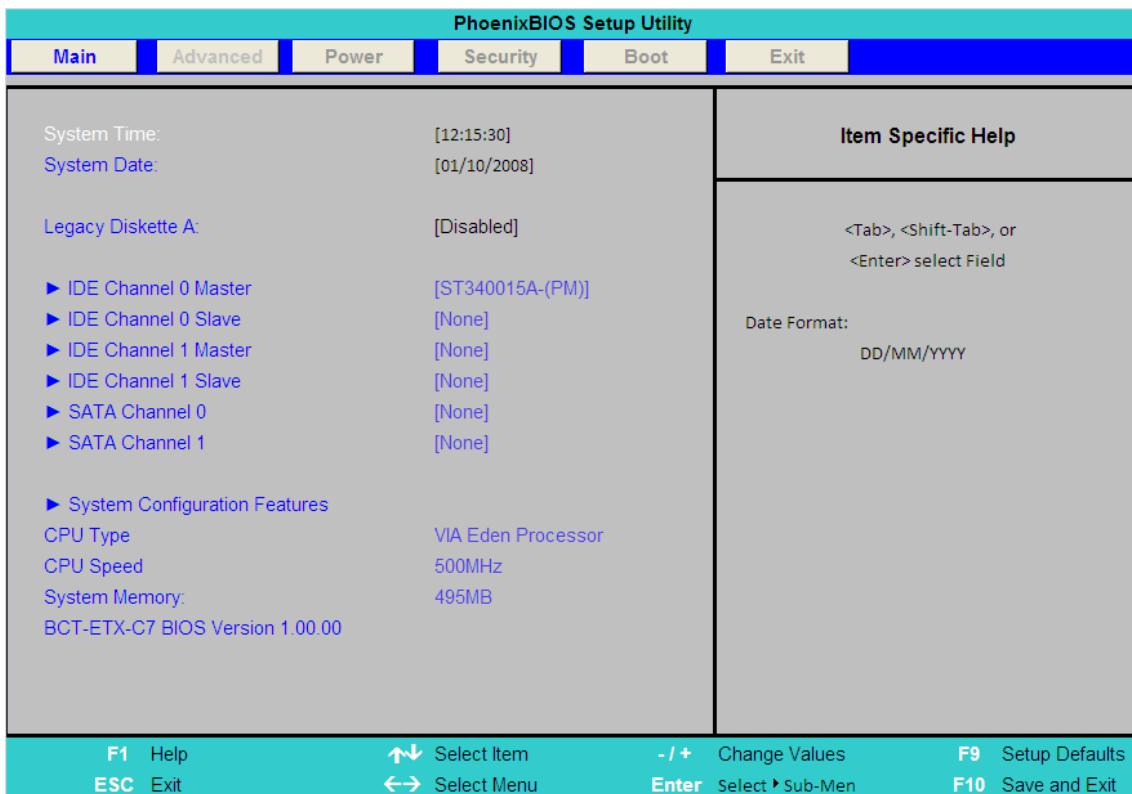
## *Navigation*

Navigation through the various pages is fairly straightforward and hints are given at the bottom of each page.

In general, when on a page, use the Up (↑), Down (↓), Left (←) and right (→) arrows to move around the page, use the Page Up <PgUp> or plus <+> key to increase the numeric value, the Page Down <PgDn> or minus <-> key to decrease the numeric value, and use the Enter <Enter> key to go to the sub menu for that particular option.

When in a Sub Menu, pressing the escape <ESC> key will return to the parent menu

Main Menu

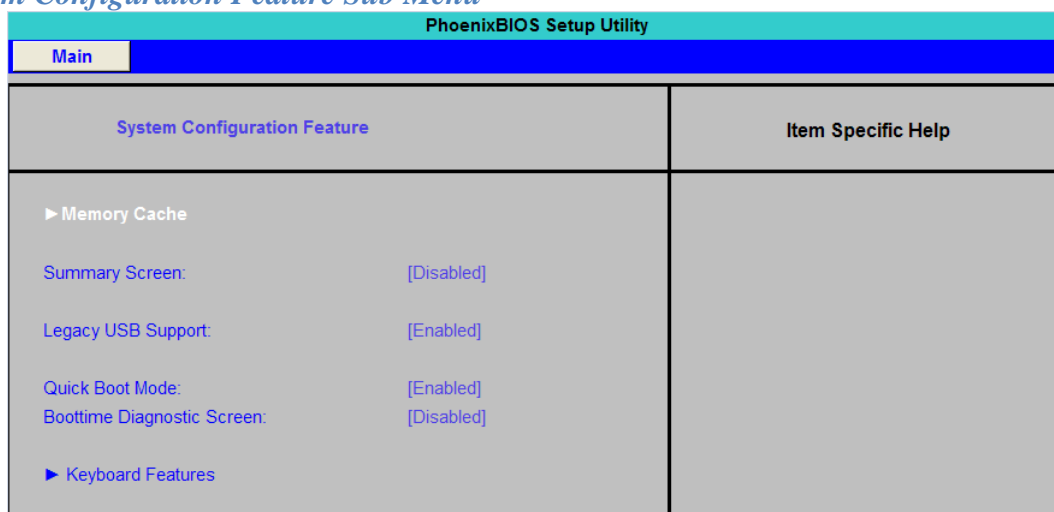


Picture B1

The Main menu allows the setting of Date and Time, as well as providing details of IDE devices fitted to the unit.

Note: In the Boot menu shown later, SATA Channel 0 and 1 are equivalent to IDE 4 and IDE 5 respectively

System Configuration Feature Sub Menu

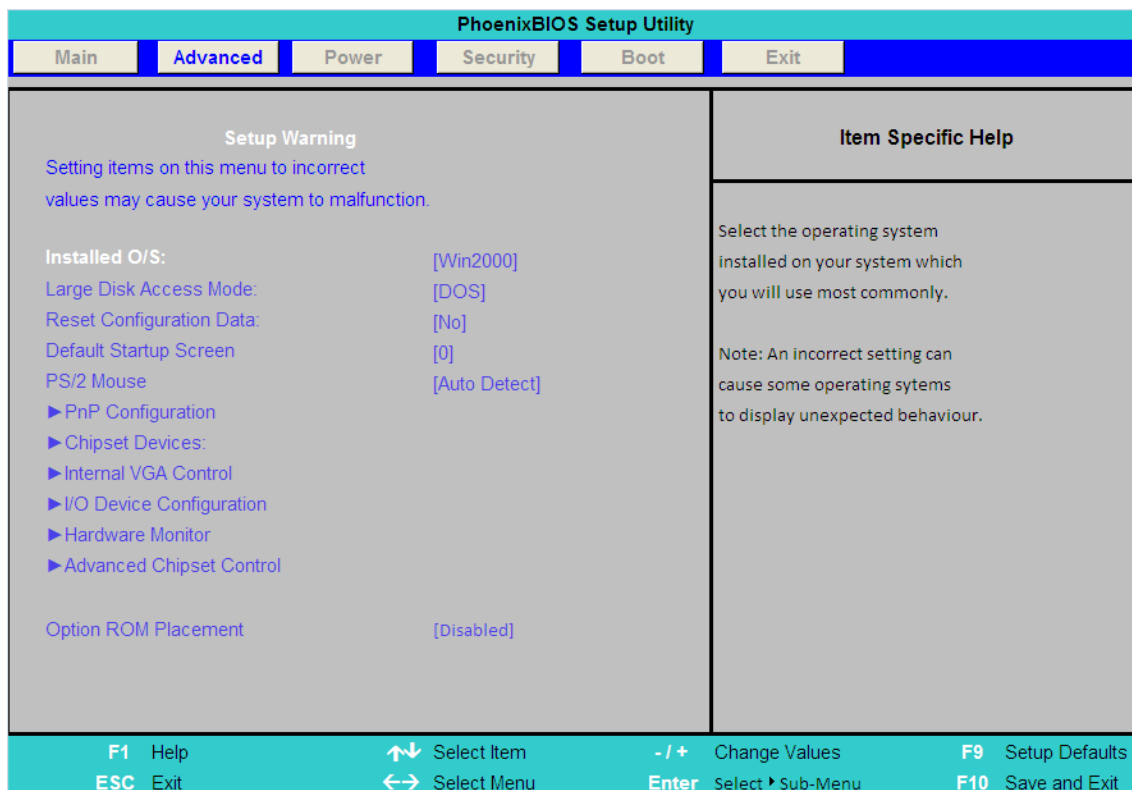


Picture B2

In this sub menu, the important features are

- Legacy USB – Enabled for USB Keyboards, Mice and FDD to be recognised during Boot
- Quick Boot Mode – Enabled for faster boot process
- Boot time Diagnostic Screen – Enabled for a summary of devices and their resources to be shown after POST and prior to OS load

### Advanced Menu



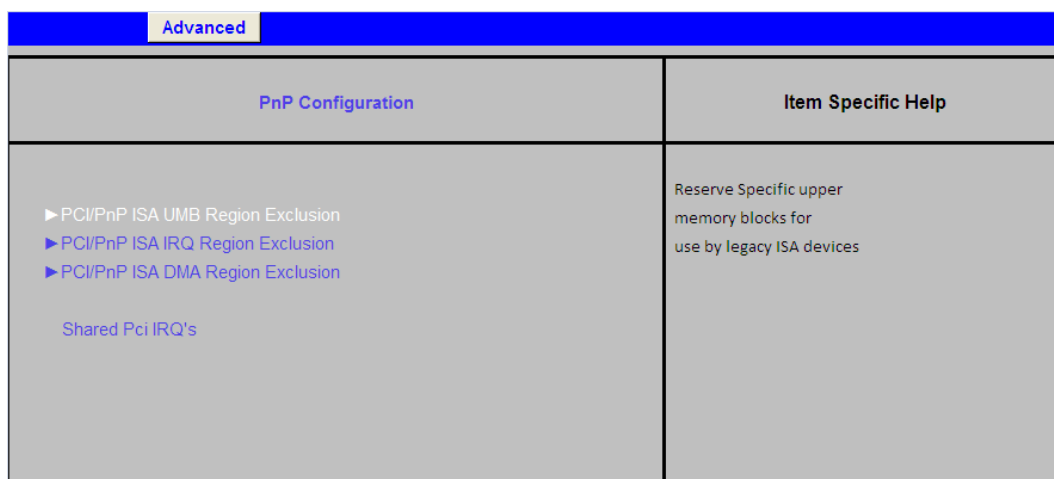
Picture B3

The Advanced Menu pages, provide the means to customise the configuration of the ETX CN700

#### *Reset Configuration Data*

If this setting is set to enabled, then when the ETX CN700 is next booted, the BIOS refreshes the configuration data, and frees up resources which were being reserved for hardware no longer installed

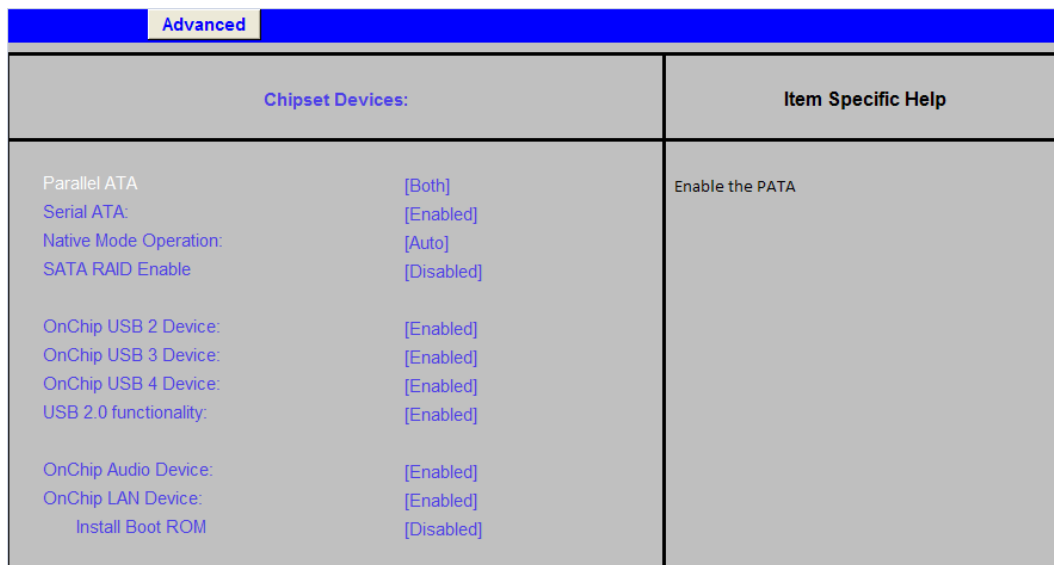
*PnP Configuration Sub Menu*



Picture B4

This sub menu allows the reservation of system resources for use with legacy ISA devices.

*Chipset Devices Sub Menu*



Picture B5

The Chipset sub menu allows for PATA, SATA, USB, Audio and LAN functionality to be enabled or disabled

Internal VGA Control Sub Menu

Advanced	
Internal VGA Control:	Item Specific Help
Frame Buffer Size [16Mb] Display Device Selection [LCD+CRT] LCD Panel Type: [800x600]	Amount of memory allocated to the onboard VGA Device 16, 32 or 64Mb

Picture B6

This sub menu allows the size of the frame buffer to be changes as well as selection of display type

I/O Device Configuration

Advanced	
I/O Device Configuration	Item Specific Help
Serial Port A: [Auto] Serial Port B: [Auto] Parallel Port: [Disabled] Floppy disk controller: [Enabled] Base I/O address: [Primary] OnChip USB 2 Device: [Enabled] OnChip USB 3 Device: [Enabled]	Configure Serial port A using options: [Disabled] No Configuration [Enabled] User Configuration [Auto] BIOS or OS chooses configuration

Picture B7

This sub menu allows for controlling the Serial, Parallel and Floppy interfaces

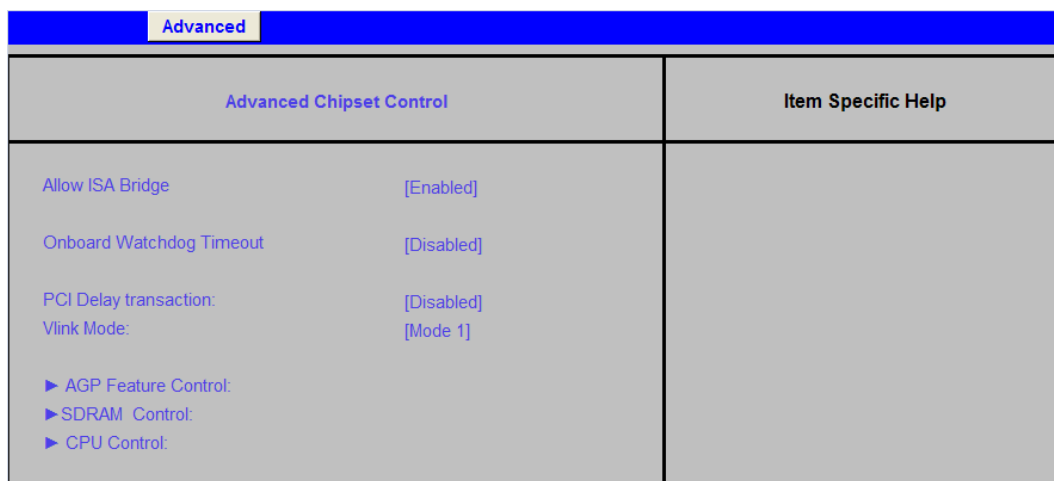
Hardware Monitor

Advanced	
Hardware Monitor	Item Specific Help
Vcore = 700 mV V(1.8) = 1.8 V V(2.5) = 2.5 V V(3.3) = 3.3 V V(5.0) = 5.0 V  Internal CPU temperature = 28 °C Motherboard temperature = 37 °C  ▶ CPU Information	

Picture B8

This sub menu shows on board voltages and temperatures for CPU and motherboard. The CPU is an internal Die reading, while the motherboard sensor is on the underside of the PCB

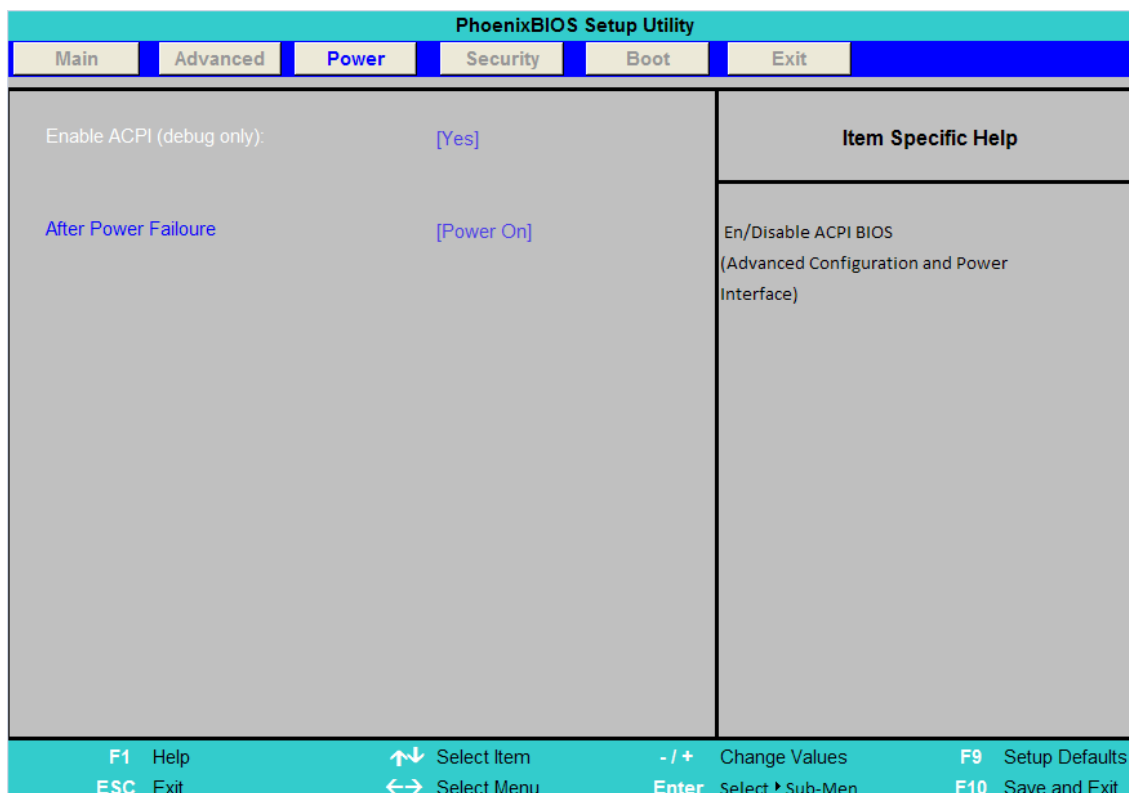
Advanced Chipset Control



Picture B9

Key settings in this submenu are the Allow ISA Bridge, which can be disabled as the host board does not support ISA cards, and the Onboard Watchdog Timeout.

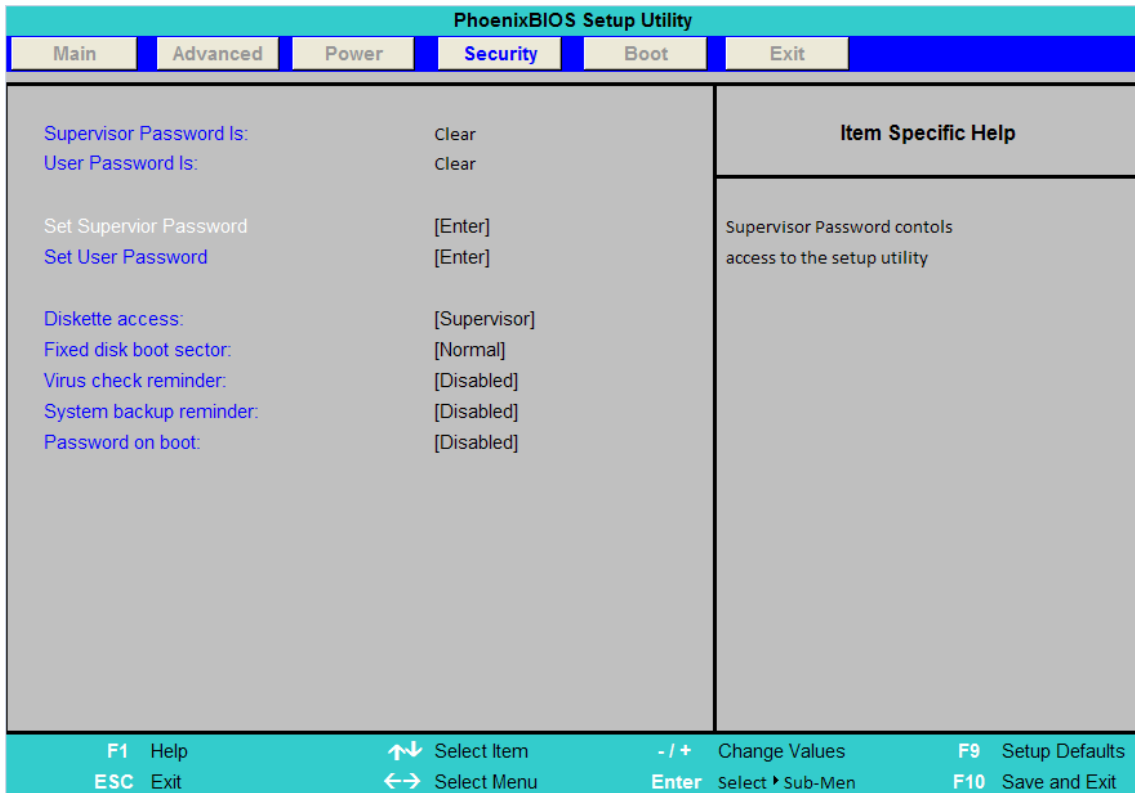
Power Menu



Picture B10

The Power Menu allows the user to set the state for power failure. Options are Off, Last State, and on. When set to on, then as soon as AC power is applied the ETX CN700 will power on

Security Menu



Picture B11

The Security menu allows for BIOS and Boot passwords to be set

### Boot Menu



Picture B12

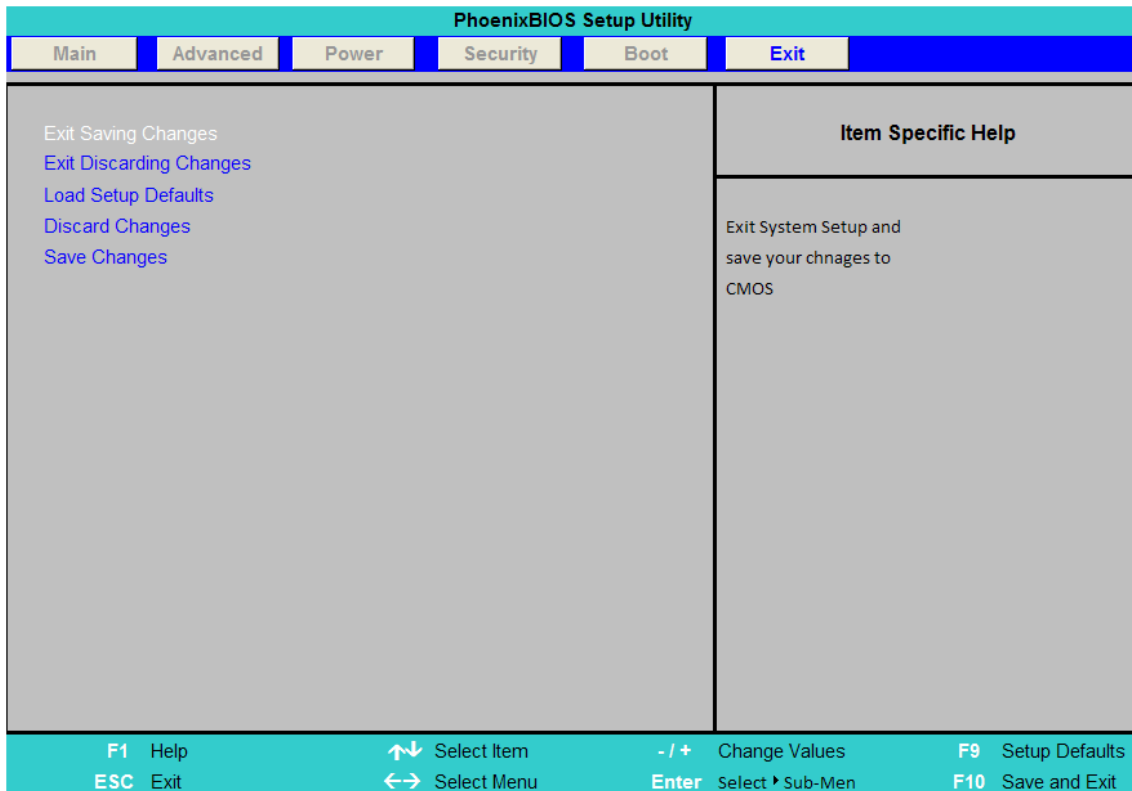
The boot menu allows for a number of boot devices to be set

In total 8 boot devices can be selected. If there are 8 devices already listed and another device is required, then one of the 8 needs to be removed from the Boot Order List by first selecting it, and then typing the “X” key

A device from the Excluded list can be added to the Boot Order list by first selecting it, and then typing the “X” key.

Devices in the Boot Order List can be moved up and down the order by selecting them and hitting “+” to increase up the order, or “-“ to move down the order

Exit Menu



Picture B13

As well as offering the means to exit with and without saving settings, this menu also allows for the System BIOS Default Settings to be restored

## **Maintenance**

The Magnum ETX Single Board PC should not require any regular maintenance. After a period of several years, it may be necessary to replace the battery, if it cannot maintain the CMOS clock whilst the AC power is disconnected. If an active cooling solution is fitted, then check on a regular basis that if dust builds up then it does not impair the performance of the fan

**Amendment History**

Issue Level	Issue Date	Author	Amendment Details
1.0	25-03-09	TMCK	First release

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