



BCT-PICMG-P4

Full Length PICMG Single Board PC

User Manual

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INTRODUCTION

COMPANY PROFILE

Blue Chip Technology is a leading specialist PC product manufacturer in Europe, providing innovation with quality design and manufacturing from a single source.

Based in the North West of England, our purpose built complex contains both advanced research and development facilities, and manufacturing facilities.

Specialising in the provision of industrial computing and electronic solutions for a wide range of UK and European organisations, Blue Chip Technology has one of the UK's largest portfolios of industrial PCs, Single Board Computers, peripherals and data acquisition cards. This extensive range of products, coupled with our experience and expertise, enables Blue Chip Technology to offer an industrial processing solution for any application. This is one of the products from our portfolio, providing you with a cost effective product development and volume production tool.

A unique customisation and specialised system integration service is also available, delivering innovative solutions to customers problems. The company's success and reputation in this area has led to a number of large design and manufacturing projects for major companies.

British Standards Institute approval (BS EN 9001) means that all of Blue Chip Technology's design and manufacturing procedures are strictly controlled, ensuring the highest levels of quality, reliability and performance.

Blue Chip Technology are committed to the single European market, and continue to invest in the latest technology and skills to provide high performance computer and electronic solutions for a world-wide customer base.

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RELATED PUBLICATIONS

The following publications will provide useful information related to the Standard Personal Computer and can be used in conjunction with this manual.

- IBM Personal Computer AT Technical Reference, 1502494, IBM, 1984.
- IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference, 15F0306, IBM, 1987.
- The Programmers PC Sourcebook, Microsoft
- The Winn L. Rosch Hardware Bible, Brady
- PCI Specification 2.2

TRADEMARKS

All trademarks and registered names acknowledged.

IBM, PC, AT and PS/2 are trademarks of International Business Machines Corporation (IBM).

Phoenix BIOS is a trademark of Phoenix Technologies Inc

Intel is a registered trademark of the Intel Corporation.

All 80x86 and Pentium processors are registered trademarks of Intel Corporation.

MS-DOS and WINDOWS are registered trademarks of the Microsoft Corporation.

Linux is a registered trademark of Linus Torvalds.

PRECAUTIONS

Certain precautions are necessary when designing with, handling, and using circuit boards. *It is imperative that precautions are taken at all stages to avoid electro-static discharges, which will damage boards. Those boards fitted with an on-board lithium battery must be handled carefully to avoid maltreatment of the battery that could create a hazard.*

ELECTRO-STATIC DISCHARGES

The devices on this card can be totally destroyed by static electricity. Also bear in mind that the damage caused by static electricity may be partial and not immediately obvious. This could have an effect on your product's reliability and warranty. Ensure that you take necessary static precautions, ideally you should wear an approved wrist strap or if that is not possible, touch a suitable ground to discharge any static build up. This should be repeated if the handling is for any length of time.

When carrying the board around, please place it into the anti-static bag in which it came. This will prevent any static electricity build up. Do not use black anti-static bags because these tend to be conductive and will discharge any on-board battery.

ON-BOARD BATTERY

The BCT-PICMG-P4 board has an on-board lithium cell of type CR2032 3V connected. To that end the following precautions apply and should be observed. If the battery is mistreated in any way there is a very real possibility of fire, explosion, and harm. Great care should be taken with this type of battery. Under NO circumstances should it be:

- short-circuited
- exposed to temperatures in excess of 100 °C or burnt
- immersed in water
- unsoldered
- recharged
- disassembled

Expired batteries remain hazardous and must be disposed of in a safe manner.

BIOS & CMOS RAM

Please be aware that on single board computer products, it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings on the base board being used for details).

ELECTROMAGNETIC COMPATIBILITY

This product meets the requirements of the European EMC Directive (89/336/EEC) and is eligible to bear the CE mark.

It has been assessed operating in a Blue Chip Technology Industrial PC. However, because the board can be installed in a variety of computers, certain conditions have to be applied to ensure that the compatibility is maintained. Subject to those conditions, it meets the requirements for an industrial environment (Class A product).

- The board must be installed in a computer system chassis that provides screening suitable for an industrial environment.
- Any recommendations made by the computer system manufacturer/supplier must be complied with regarding earthing and the installation of boards.
- Any metal back plate must be securely screwed to the chassis of the computer to ensure good metal-to-metal (i.e. earth) contact.
- Connector bodies must be securely connected to the enclosure.
- The external cabling to boards causes most EMC problems. It is imperative that any external cabling to the board is 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. It is recommended that round, screened cables with a braided wire screen are used in preference to those with a foil screen and drain wire. 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.

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.

USER GUIDE

MANUAL ORGANISATION

This manual describes in detail the Blue Chip Technology BCT-PICMG-P4 Single Board processor card.

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 BCT-PICMG-P4.

We strongly recommend that you study this manual carefully before attempting to interface with BCT-PICMG-P4 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 THE BOARD.***

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.

OVERVIEW

1.1 Introduction

The Blue Chip Technology BCT-PICMG-P4 Single Board PC sets new standards for integration of the latest advances in processor, graphics, memory, and I/O technologies. The BCT-PICMG-P4 complies with the PICMG form factor providing ISA and PCI bus interfaces on a single PC/AT plug-in card. The PICMG single board PC is an ideal platform for the increasing requirements of today and tomorrow's embedded applications.

This Full-length PICMG design is optimized for socket 478 FC-PGA processor, supporting 533/400MHz Front Side Bus. The memory sub-system is designed to support up to 2Gb DDR SDRAM

The BCT-PICMG-P4 single board PC uses the Intel 845GV AGP chipset to provide outstanding graphics performance and increased integration over other single board PC designs.

The BCT-PICMG-P4 provides PCI Bus Mastering IDE DMA Mode2 controller with two high performance Enhanced IDE interfaces allowing up to four IDE devices (such as hard drives, CD-ROM readers, etc.)

Networking capability is provided by on board Intel® 82562EM Ethernet device, which supports 10/100 Mbps. This device can auto-negotiate network speeds and comes complete with drivers for most network environments

Four USB ports provide easy IO expansion to USB Specification Rev 2.0 compliant devices.

The Other I/O Function include: floppy interface, two serial ports, one DOC socket, Watch Dog Timer, parallel port, keyboard and mouse (PS/2) controller.

The BCT-PICMG-P4 also provides for driving up to four external PCI local bus non bridged slots. These provide a high bandwidth data path for data-movement intensive functions such as frame grabbing or networking. Larger numbers of PCI slots can be supported through PCI bridged backplanes. The BCT-PICMG-P4 provides a buffered ISA bus. This permits up to Five ISA slots to be driven to complete the I/O capability. The BCT-PICMG-P4 should only be used in PICMG back-planes. ISA only back-planes are not recommended for use with BCT-PICMG-P4 as power should be drawn from both the PCI and ISA connectors of the PICMG connectors.

In addition to the superior hardware capabilities, a full set of software drivers and utilities are available to allow advanced operating systems such as Windows™ 2000/ Xp to take full advantage of the hardware capabilities. Features such as bus mastering and Advanced Power Management (APM) are available for the BCT-PICMG-P4.

BCT-PICMG-P4 PROCESSOR BOARD PHOTO



Fig 1: Full-length BCT-PICMG-P4 Single Board PC

BOARD LEVEL FEATURES

CPU: Socket 478 Intel Pentium 4 / Celeron Processors
Front Side Bus 400 / 533 Mhz

Chipset: Intel 845GV
Intel ICH4 South bridge Controller

BIOS: Award Plug and Play BIOS

Memory: 184 DIMM x 2 for DDR SDRAM up to 2Gb
Supports 200/266 DDR SDRAM

Solid State Disk: Solid State Disk Socket supporting M-Systems Disk-on-Chip
Up to 288MB capacity

Onboard Peripherals:

Graphics:

Integrated AGP (x4) Graphics controller

Ethernet:

10/100 Base-TX Ethernet using Intel 82562EM

Storage:

ATA100/66/33 EIDE HDD (quad drives, dual connectors) provided by South Bridge.

Monitoring:

Winbond W83627HF IC with provision for
System and CPU thermal monitoring
CPU and Chassis Fan Speed
Vcore and other Power rails
Hardware Watchdog timer with configurable timeout.

Communications:

Quad USB Ver 2.0 Compliant
Two 16C550 compatible serial ports at TTL level signalling.
Note: Com1 is dedicated RS-232: Com2 can be configurable as RS-232/422/485 depending on settings of jumpers at JPI
Parallel port with Bi-directional, EPP & ECP.
Floppy interface with support for dual 1.44MB FDD
PS/2 compatible keyboard and mouse port. Connector located on baseboard

Miscellaneous:

PC standard Real Time Clock with on-board battery.
PICMG compliant PCI and ISA expansion buses providing support for

4 PCI expansion slots and 5 ISA expansion slots

Board Profile:

13.3" x 4.8" (338 x 122mm)

Power:

ATX Power supply Required

Operating System Support:

Microsoft Windows 9x
Microsoft Windows NT
Microsoft Windows 2000
Microsoft Windows XP

SPECIFICATION:

5-Volt Power Requirement	+5 V \pm 5%	} Not required for board operation.
	+12 V \pm 5%	
	+3.3 V \pm 5%	
	-5 V \pm 5%	
	-12 V \pm 5%	
Typical System Consumption	56 Watts (12V) 8.5 Watt (5V)	} Pentium IV 2.4Ghz, 256 MB DDR SDRAM, 40 GB HDD, 52X CD-R
Temperature	Non-Operating	-20°C to +80°C
	Operating	+0°C to +60°C
EMC	Emissions	EN55022 (A)
	Immunity	EN55024 in a Blue Chip ICON Industrial PC Chassis
MTBF	Calculated	51,918 Hours
Dimensions	Board only	338 x 122 mm

Power Consumption figures given are for a typical configuration.

This information is preliminary and is provided only as a guide to calculating approximate total system power usage when additional resources are added.

INSTALLATION

ELECTRO-STATIC DISCHARGE

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.

CPU INSTALLATION

The BCT-PICMG-P4 board supports a single PGA (pin grid array) Pentium 4 / Celeron Processor. The processor connects to the board using a 478 pin levered ZIF socket.

Before installing the processor, raise the lever on the side of ZIF socket 478, perpendicular to the board. Rotate the processor to the correct orientation and then insert it into the socket. When fully seated, lower the lever to secure the processor. Apply Heatsink Thermal compound to the top of the CPU ensuring an even distribution.

The BCT-PICMG-P4 has a Heatsink Retention module to facilitate the attachment of a Fan /Heatsink assembly. Fit the Fan /Heatsink assembly to the retention module ensuring that there is good contact between the CPU and heatsink.

Caution: Insufficient contact, incorrect types of Fans, Heatsinks or Thermal Compound used, or improper amounts of Thermal compound applied, can cause the processor to overheat and may result in the System crashing.

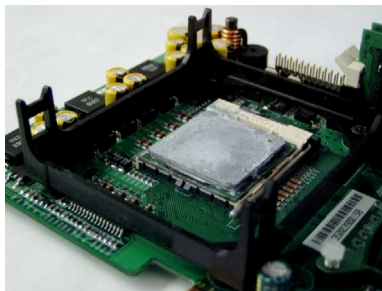


Fig 2: Retention Module



Fig 3: Example of Fan module



Fig 4: Example of Heatsink

MEMORY INSTALLATION

The BCT-PICMG-P4 supports two 184 pin, DDR SDRAM modules providing upto 2Gb of System Memory.

The Memory Modules are fitted, by placing them vertically into the socket, in the correct orientation, and pressing down firmly until it is locked in place by the tabs at either end.

JUMPER SETTINGS

The BCT-PICMG-P4 has a number of jumpers to allow the user to configure the board to suit specific applications. The functions of these jumpers is listed below:

JP3: CMOS Clearing Link

This jumper is used to clear the contents of the battery backed CMOS memory. The CMOS memory retains the system settings such as drive information, boot sequence and certain peripheral device information. To clear the contents, move the jumper from the normal operating position "Pins 1-2" to the clear position "Pins 2-3". Wait 5 seconds, and then return the jumper to the normal position.

JP2: Watchdog Timer Setting Select

Refer to the Watchdog Facility section for more details

Function	JP2
NMI	1-2
Reset System (Default)	2-3

JP1: COM Port Setting

The following jumper positions relate to the output of COM2, which is accessed via Header CN5

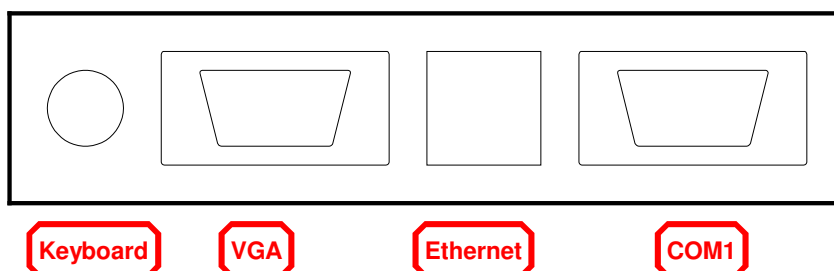
Function	JP1					
	1-2	3-4	5-6	7-8	9-10	11-12
RS-232	Off	Off	Off	Off	Off	On
RS-422	On (Term.)	On (Term.)	Off	On	On	Off
RS-485	On (Term.)	On (Term.)	Off	Off	On	Off

CONNECTORS

There are three sets of connectors included on the BCT-PICMG-P4 PC board. These provide connections to standard external peripherals available through the back panel connectors (network, serial ports, monitor, keyboard, etc.), in-chassis peripherals (floppy disk, EIDE, etc.), and bus devices i.e. ISA and PCI.

Back panel connectors

The back panel provides external access to the UTP Ethernet, VGA, PS/2 keyboard/mouse, and the first serial communications port interfaces. All the connectors follow the industry standard.



100/10 Base-t UTP Ethernet, CN14

8-way RJ45 socket. Mating connector: 8-way RJ45 plug.

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	TX Data +ve	2	TX Data -ve
3	RX Data +ve	4	75R to UTP ground
5	75R to UTP ground	6	RX Data -ve
7	75R to UTP ground	8	75R to UTP ground

Video Connector, CN16

15-way Condensed D-type. Mating connector: standard monitor D-type connector.

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	Analogue RED	2	Analogue GREEN
3	Analogue BLUE	4	1K pull up
5	0 Volts (Ground)	6	0 Volts (Ground)
7	0 Volts (Ground)	8	0 Volts (Ground)
9	DDC +ve supply (SC protected)	10	0 Volts (Ground)
11	1K pull up	12	DDC Data
13	Horizontal Sync	14	Vertical Sync
15	DDC Clock		

Combined PS/2 Mouse and keyboard Port, CN19

6-way mini-DIN socket. Mating connector: 6-way mini-DIN keyboard plug.

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	Keyboard Data	2	Mouse Data
3	Ground	4	+5 Volts
5	Keyboard Clock	6	Mouse Clock

RS232 Serial Port 1, CN13

9-way D-type plug. Mating connector: 9-way D-type socket.

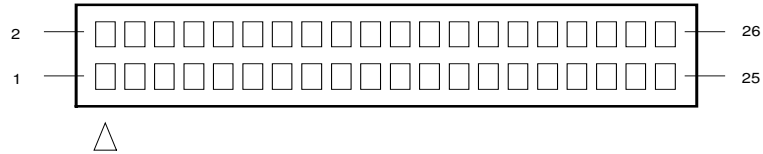
PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	Data Carrier Detect	6	-Data Set Ready
2	-Receive Data	7	-Ready To Send
3	-Transmit Data	8	-Clear To Send
4	-Data Terminal Ready	9	Ringing Indicator
5	Ground		

On-board connectors

There are connectors on-board for dual EIDE, Floppy Disk Drive, a second serial port (RS232/422/485), a parallel port, USB, internal mouse header, utilities header, ATX Connector and sensing fan connectors. See the PCB layout diagram at the end of the manual for the position of the connectors.

Utility Connector CN1

26-way boxed pin header. Mating connector: 26-way 0.1" (IDC) socket.

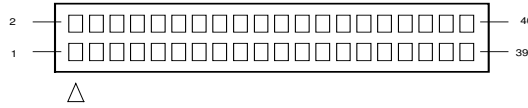


PIN NO	ASSIGNMENT	PIN NO	ASSIGNMENT SIGNAL
IR		RESET	
1	+5V	2	RESET+
3	FIRTX	4	RESET-
5	IRRX	SPEAKER	
7	Ground	8	SPKR(default)
9	IRTX	10	BUZZ(Default)
HDD LED		12	Ground
13	HD LED+	14	+5V
15	HD LED-	PWR LED	
		18	PWLED+
19	NC	20	NC
21	NC	22	PWLED-
PWR ON		KEYLOCK	
23	PWRBT+	24	KBLOCK
25	PWRBT-	26	Ground

Primary EIDE Connector, CN2

40-way boxed pin header with housing. Mating connector: 40-way 0.1" IDC socket.

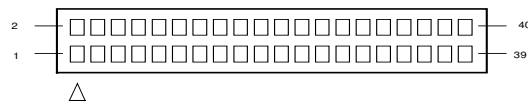
A suitable cable is supplied in the optional standard cable kit.



PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	-Reset	2	Ground
3	Data bit 7 (HD)	4	Data bit 8 (HD)
5	Data bit 6 (HD)	6	Data bit 9 (HD)
7	Data bit 5 (HD)	8	Data bit 10 (HD)
9	Data bit 4 (HD)	10	Data bit 11 (HD)
11	Data bit 3 (HD)	12	Data bit 12 (HD)
13	Data bit 2 (HD)	14	Data bit 13 (HD)
15	Data bit 1 (HD)	16	Data bit 14 (HD)
17	Data bit 0 (HD)	18	Data bit 15 (HD)
19	Ground	20	Key
21	Drive Request	22	Ground
23	-IO Write (HD)	24	Ground
25	-IO Read (HD)	26	Ground
27	Drive Ready	28	ALE
29	Drive Acknowledge	30	Ground
31	IRQ14	32	Not Used
33	Address 1 (HD)	34	Not Used
35	Address 0 (HD)	36	Address 2 (HD)
37	-Chip Select 0 (HD)	38	-Chip Select 1 (HD)
39	IDE LED Drive	40	Ground

SECONDARY IDE Connector, CN4

40-way boxed pin header with housing. Mating connector: 40-way 0.1" IDC socket.

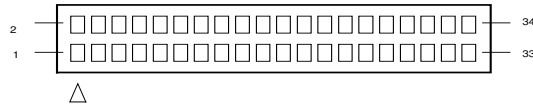


PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	-Reset	2	Ground
3	Data bit 7 (HD)	4	Data bit 8 (HD)
5	Data bit 6 (HD)	6	Data bit 9 (HD)
7	Data bit 5 (HD)	8	Data bit 10 (HD)
9	Data bit 4 (HD)	10	Data bit 11 (HD)
11	Data bit 3 (HD)	12	Data bit 12 (HD)
13	Data bit 2 (HD)	14	Data bit 13 (HD)
15	Data bit 1 (HD)	16	Data bit 14 (HD)
17	Data bit 0 (HD)	18	Data bit 15 (HD)
19	Ground	20	Key
21	Drive Request	22	Ground
23	-IO Write (HD)	24	Ground
25	-IO Read (HD)	26	Ground
27	Drive Ready	28	ALE
29	Drive Acknowledge	30	Ground
31	IRQ15	32	Not Used
33	Address 1 (HD)	34	Not used
35	Address 0 (HD)	36	Address 2 (HD)
37	-Chip Select 0 (HD)	38	-Chip Select 1 (HD)
39	IDE LED Drive	40	Ground

FLOPPY DISK DRIVE CONNECTOR, CN9

34-way boxed pin header with housing. Mating connector: 34-way 0.1" (IDC) socket.

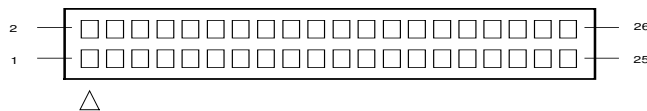
A suitable cable is supplied in the optional standard cable kit.



PIN NO	SIGNAL	PIN NO	SIGNAL
1	Ground	2	RPM/Low Current
3	Ground	4	Key
5	Ground	6	+Rate
7	Ground	8	-Index
9	Ground	10	-Motor 0
11	Ground	12	-Drive select 1
13	Ground	14	-Drive select 0
15	Ground	16	-Motor 1
17	Ground	18	+Direction
19	Ground	20	-Step
21	Ground	22	-Write Data
23	Ground	24	-Write Gate
25	Ground	26	-Track 0
27	Ground	28	-Write Protect
29	Ground	30	-Read Data
31	Ground	32	+Head Select
33	Ground	34	+Disk Change

ECP/EPP PARALLEL PORT, CN10

26-way boxed pin header with housing. Mating connector: 26-way 0.1" (IDC) socket.



PIN NO	SIGNAL	PIN NO	SIGNAL
1	-Strobe	2	Data bit 0
3	Data bit 1	4	Data bit 2
5	Data bit 3	6	Data bit 4
7	Data bit 5	8	Data bit 6
9	Data bit 7	10	ACK
11	BUSY	12	Paper Empty
13	Select	14	Auto Feed
15	Error	16	Initialize
17	Select	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground	26	Key

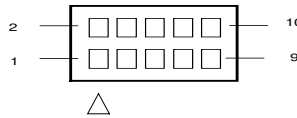
COM2 RS-232/422/485 SERIAL PORT, CN5

14-way boxed pin header with housing. Mating connector: 14-way 0.1" (IDC) socket.

PIN NO	SIGNAL	PIN NO	SIGNAL
1	DCD Data Carrier Detect	2	RXD Receive Data
3	TXD Transmit Data	4	DTR Data Terminal Ready
5	Ground	6	DSR Data Set Ready
7	RTS Request To Send	8	CTS Clear To send
9	RI Ring Indicator	10	Ground
11	TXD+ Transmit Data+	12	TXD- Transmit Data-
13	RXD+ Receive Data+	14	RXD- Receive Data-

USB connector, CN11

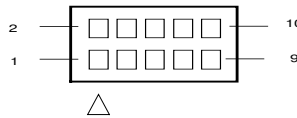
10-way boxed pin header. Mating connector: 10-way 0.1" (IDC) socket.



PIN NO	SIGNAL	PIN NO	SIGNAL
1	+5V	2	+5V
3	Port 0 -ve	4	Port 1 -ve
5	Port 0 +ve	6	Port 1 +ve
7	Ground	8	Ground
9	Key	10	NC

USB connector, CN12

10-way boxed pin header. Mating connector: 10-way 0.1" (IDC) socket.



PIN NO	SIGNAL	PIN NO	SIGNAL
1	+5V	2	+5V
3	Port 2 -ve	4	Port 3 -ve
5	Port 2 +ve	6	Port 3 +ve
7	Ground	8	Ground
9	Key	10	NC

ATX 12V Power Connector: CN3

Note: Without power applied to this connector, the BCT-PICMG-P4 will not boot up.

PIN NO	SIGNAL	PIN NO	SIGNAL
1	Ground	2	Ground
3	+12V	4	+12V

ATX Control Power Connector: CN6

PIN NO	SIGNAL
1	PME
2	5VSB
3	PWRON
4	Ground

BUS CONNECTORS

The board incorporates the standard PC/AT 16-bit ISA bus, and PCI bus connectors to passive backplanes. See the appendices for the pin-out details. Note that the PCI connector details the signals at the BCT-PICMG-P4 processor connector. These are different for each PCI slot on a backplane.

ISA Bus XT Connections

A= Large gold fingers on **main** component side

B= Large gold fingers on reverse side

PIN NO.	SIGNAL	PIN NO.	SIGNAL
A1	-IOCHCK	B1	Ground
A2	SD7	B2	RESET
A3	SD6	B3	+5 Volts
A4	SD5	B4	IRQ9
A5	SD4	B5	-5 Volts
A6	SD3	B6	DREQ2
A7	SD2	B7	-12 Volts
A8	SD1	B8	-0WS
A9	SD0	B9	+12 Volts
A10	IOCHRDY	B10	Ground
A11	AEN	B11	-SMEMW
A12	SA19	B12	-SMEMR
A13	SA18	B13	-IOW
A14	SA17	B14	-IOR
A15	SA16	B15	-DACK3
A16	SA15	B16	DREQ3
A17	SA14	B17	-DACK1
A18	SA13	B18	DREQ1
A19	SA12	B19	-REFRESH
A20	SA11	B20	SYSCLK (typ 8.3MHz)
A21	SA10	B21	IRQ7
A22	SA9	B22	IRQ6
A23	SA8	B23	IRQ5
A24	SA7	B24	IRQ4
A25	SA6	B25	IRQ3
A26	SA5	B26	-DACK2
A27	SA4	B27	T/C
A28	SA3	B28	BALE
A29	SA2	B29	+5 Volts
A30	SA1	B30	OSC (14MHz)
A31	SA0	B31	Ground

ISA Bus AT Connections

C= Large gold fingers on **main** component side

D= Large gold fingers on reverse side

PIN NO.	SIGNAL	PIN NO.	SIGNAL
C1	-SBHE	D1	-MEMCS16
C2	LA23	D2	-IOCS16
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ15
C7	LA18	D7	IRQ14
C8	LA17	D8	-DACK0
C9	-MEMR	D9	DREQ0
C10	-MEMW	D10	-DACK5
C11	SD8	D11	DREQ5
C12	SD9	D12	-DACK6
C13	SD10	D13	DREQ6
C14	SD11	D14	-DACK7
C15	SD12	D15	DREQ7
C16	SD13	D16	+5 Volts
C17	SD14	D17	-Master
C18	SD15	D18	Ground

PCI CONNECTORS

PIN	SIGNAL NAME	PIN	SIGNAL NAME
A1	GND	B1	-12V
A2	+12V	B2	No Connect
A3	No Connect	B3	GND
A4	No Connect	B4	No Connect
A5	Vcc	B5	Vcc
A6	INTC#	B6	Vcc
A7	INTA#	B7	INTB#
A8	Vcc	B8	INTD#
A9	CLK3	B9	REQ4#
A10	Vcc	B10	REQ2#
A11	CLK4	B11	GNT4#
A12	GND	B12	GND
A13	GND	B13	GND
A14	GNT2#	B14	CLK1
A15	SPCIRST-	B15	GND
A16	Vcc	B16	CLK2
A17	GNT1#	B17	GND
A18	GND	B18	REQ1#
A19	REQ3#	B19	Vcc
A20	AD30	B20	AD31
A21	3.3V	B21	AD29
A22	AD28	B22	GND
A23	AD26	B23	AD27
A24	GND	B24	AD25
A25	AD24	B25	3.3V (NC)
A26	GNT3#	B26	CBE3-
A27	3.3V (NC)	B27	AD23
A28	AD22	B28	GND
A29	AD20	B29	AD21
A30	GND	B30	AD19
A31	AD18	B31	3.3V (NC)
A32	AD16	B32	AD17
A33	3.3V (NC)	B33	CBE2-
A34	FRAME-	B34	GND
A35	GND	B35	IRDY-
A36	TRDY-	B36	3.3V
A37	GND	B37	DEVSEL-
A38	STOP-	B38	GND
A39	3.3V	B39	PLOCK-
A40	SDONE	B40	PERR-
A41	SBO-	B41	3.3V
A42	GND	B42	SERR-
A43	PAR	B43	3.3V
A44	AD15	B44	CBE1-
A45	3.3V	B45	AD14
A46	AD13	B46	GND
A47	AD11	B47	AD12
A48	GND	B48	AD10
A49	AD9	B49	GND
KEY			
A50	CBE0-	B50	AD8
A51	3.3V	B51	AD7
A52	AD6	B52	3.3V
A53	AD4	B53	AD5
A54	GND	B54	AD3
A55	AD2	B55	GND
A56	AD0	B56	AD1
A57	Vcc	B57	Vcc
A58	SREQ64-	B58	SACK64-
A59	Vcc	B59	Vcc
A60	Vcc	B60	Vcc

NOTE: The PCI connector details shown here are for the BCT-PICMG-P4 processor card. The PCI connectors of a backplane differ slightly, some pins having a position dependent signal.

USING THE BOARD

DISK-ON-CHIP SUPPORT

The BCT-PICMG-P4 supports the use of M-Systems' DiskOnChip 2000 or DiskOnChip Millennium Flash Modules as solid-state disks. The notes below detail the use of the device with MS-DOS. If support is required for other operating systems, please consult Blue Chip Technology Technical Services, or M-Systems web-site at www.m-sys.com, for drivers and application notes.

The DiskOnChip 2000 and Millennium contain a built-in copy of the M-Systems industry-standard TrueFFS software, which allows the DiskOnChip to operate as a standard disk drive. The DiskOnChip may also contain the operating system thereby permitting systems to boot without a hard disk. The DiskOnChip may also be configured as the boot device in systems with a hard disk (see the section "Configuring the diskonchip as the First Drive").

The DiskOnChip is a self-contained device, the installation of which does not necessarily require any software installation. The basic design of the DiskOnChip allows for full upward and downward compatibility by supporting an unlimited capacity. Future DiskOnChip devices with higher densities will be fully compatible with today's capacities of 2 to 288 MBytes, and the standard DiskOnChip socket.

INSTALLING THE DISK-ON-CHIP

Before installing or removing the DiskOnChip, please read the section on Electro-Static Discharges at the beginning of this manual. It is essential that you discharge any static electricity from your body before touching the board or DiskOnChip module. Use the following procedure to install the DiskOnChip:

- Align pin 1 on the DiskOnChip with pin 1 of the socket (adjacent to the battery).
- Push the DiskOnChip into the socket carefully until it is fully seated.
- Check that the DiskOnChip is installed securely, and that there are no bent pins.

Caution: The DiskOnChip may be permanently damaged if installed incorrectly!

To install the DiskOnChip as drive C on a system without a hard disk, set the CMOS setup of drive C to "not installed" (indicating that no physical magnetic disk is installed), and reboot the computer. The DiskOnChip will install as drive C. The DiskOnChip should then be formatted with the System files in order for it to be a bootable drive. See "*Configuring the DiskOnChip as the BOOT device*" below.

To install the DiskOnChip as drive D on a system with a hard disk, reboot the system, and the DiskOnChip will automatically install as drive D.

To install the DiskOnChip as Drive C on a system with a hard disk, see below "*Configuring the DiskOnChip as the First Drive*".

CONFIGURING THE DISK-ON-CHIP AS THE BOOT DEVICE

To configure the DiskOnChip as the boot device, the operating system files have to be copied to it. Copying the operating system files into DiskOnChip is done in exactly the same way as any other hard disk. The following is an example of a typical initialisation process:

- Set the DiskOnChip as a regular drive in your system (not a boot drive).
- Install a bootable floppy diskette in drive A and boot the system.
- At the DOS prompt, type `SYS C:` to transfer the DOS system files to the DiskOnChip (assuming the DiskOnChip is installed as drive C).
- Copy any files needed into the DiskOnChip.
- Remove the floppy diskette and reboot the system.

The system will boot from the DiskOnChip, and will allow you to run and access any files that have been copied into the DiskOnChip.

CONFIGURING THE DISK-ON-CHIP AS THE FIRST DRIVE

The DiskOnChip can be configured to be installed as the last drive (default), or as the first drive in the system. When configured as the last drive, the DiskOnChip is installed as disk D if there is one other hard drive installed, and as drive C if no other hard disk is installed. When configured as the first drive, the DiskOnChip is always installed as drive C. The DiskOnChip is shipped from the factory, configured to install as the last drive. To configure the DiskOnChip to be installed as the first drive, proceed as follows:

- Boot the system and make sure the DiskOnChip is installed correctly as drive D
- At the DOS prompt type: `DUPDATE D: /FIRST /S:DOC123.EXB`

After re-booting the system, the DiskOnChip will appear as drive C:

LOADING OPERATING SYSTEMS & DRIVERS

Some operating systems provide in-built support for the chipset used on this board. A CD-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.intel.com

For example for a fresh install of Windows 2000 or Windows Xp operating systems, drivers can be installed as follows

Drivers are located on the BCT CD in the following Directory

`\SBPC\Disks\bctpicmg`

First install the Intel Chipset drivers. This is done, by running the Setup.exe program, from the `..\chipset` directory on the BCT Support CD. Next the Video Device Drivers can be installed in a similar manner from the `..\VGA` directory.

The Ethernet drivers, can then be installed from the `..\Lan` directory.

Lastly, the USB 2.0 drivers need to be installed from within Windows Device Manager.

Highlight the USB device and select properties [highlight then click using the Right mouse button]. From the Properties page, select the Driver Tab and then click on "update driver". Follow the on-screen prompts, and when asked, select Browse and direct the path to the relevant directory on the CD which is `..\USB2.0`

For other operating Systems, follows the method recommended by the OS Vendor

PROGRAMMING THE BOARD

The Winbond 83627HF device also supports a Watchdog timer, which uses INT15 provided in BIOS.

To check & clear watchdog status

input : AX - SIO_WATCHDOG_BY_ISR (E8DCh)

BL - 0/1 >>> second / minute

BH - count value , 0 = disabled , 1~ 255 seconds / minute

To check watchdog value.

input : AX - SIO_WATCHDOG_BY_ISR+1 (E8DDh)

output : NC : Watchdog Timer Counting , CY : Watchdog Timer Time-out Occured

BL bit0 - 0/1 >>> second / minute

BH - counting value

To clear watchdog status

input : AX - SIO_WATCHDOG_BY_ISR+2 (E8DEh)

output : None

Sample Program: 1>. MOV AX,E8DC ;password

MOV BX,xx0X ;xx=01-FF(1-255)

X=0/1=sec/min

INT 15 ; WDT for xx sec/min restart

2>. mov ax,e8dc ;password

mov bx,0000 ;bh=00 disable

int 15 ; Clear WDT status

3>. Mov ax,E8DE ; clear WDT status

4>. Mov ax,E8DD ; check WDT value

BIOS SETTINGS

The board contains an implementation of Award's ROM BIOS, which provides a built-in Setup program, which allows user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will stay unchanged unless there is a configuration change in the system, such as hard drive replacement or a device is added. It is possible for the CMOS battery to fail, this will cause data loss in the CMOS only. If this does happen you will need to reconfigure your BIOS settings.

Certain combinations of BIOS settings may prevent the BCT-PICMG-P4 from working correctly. If problems or lock-ups are experienced on boot-up, clear the CMOS memory and restart. The default settings will usually work in most instances. The CMOS memory is cleared using the jumper on the base board. To clear the CMOS, switch off the power to the board, then move the jumper to the Pins 2-3 for a few seconds, and then return it to its original position. The power may then be restored.

Press the keyboard key during the boot-up operation to enter the BIOS set-up screen. Various information is available on the set-up and interpretation of the BIOS in the following files:

MAIN MENU

Once you enter the AwardBIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

CMOS Setup Utility - Copyright © 1984 - 2001

Standard CMOS Feature Advanced BIOS Feature Advanced Chipset Feature Integrated Peripherals Power Management Setup PnP/PCI Configurations PC Health Status	Frequency/Voltage Control Load Fail-Safe Defaults Load Optimized Defaults Set Supervisor Password Set User Password Save & Exit Setup Exit Without Saving
Esc: Quit F6: Save CMOS To BIOS F10: Save & Exit Setup	↑ ↓ ← →: Select Item F7: Load CMOS From BIOS
Time, Date, Hard Disk Type	

Note: that a brief description of each highlighted selection appears at the bottom of the screen

Setup Items:

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features:

Use this menu for basic system configuration. See Section 2 for the details.

Advanced BIOS Features:

Use this menu to set the Advanced Features available on your system. See Section 3 for the details.

Advanced Chipset Features:

Use this menu to change the values in the chipset registers and optimise your system's performance. See section 4 for the details.

Integrated Peripherals:

Use this menu to specify your settings for integrated peripherals. See section 4 for the details.

Power Management Setup:

Use this menu to specify your settings for power management. See section 5 for the details.

PnP / PCI Configuration:

This entry appears if your system supports PnP / PCI. See section 6 for the details.

PC Health Status:

Use this menu to show your system temperature, speed and voltage status.

Frequency/Voltage Control:

Use this menu to specify your settings for frequency/voltage control. See section 7 for the details.

Load Fail-Safe Defaults:

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate. See section 8 for the details.

Load Optimised Defaults:

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximise performance, the factory has the right to change these defaults to meet their needs. See section 8 for the details.

Supervisor/User Password:

Use this menu to set User and Supervisor Passwords. See section 9 for the details.

Save & Exit Setup:

Save CMOS value changes to CMOS and exit setup. See section 10 for the details.

Exit Without Save:

Abandon all CMOS value changes and exit setup. See section 10 for the details.

Standard CMOS Features

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Standard CMOS Features

Date (mm:dd:yy): Mon, Aug 5 2002		Item Help
Time (hh:mm:ss): 16:19:20		
➤ IDE Primary Master	2557 MB	Menu Level ➤ Change the day, month, year and century
➤ IDE Primary Slave	None	
➤ IDE Secondary Master	None	
➤ IDE Secondary Slave	None	
Drive A	1.44M, 3.5 in	
Drive B	None	
Video	EGA/VGA	
Halt On	All, But Keyboard	
Based Memory	640K	
Extended Memory	64512K	
Total Memory	65536K	
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

Date: Options Month/DD/YYYY

Set the system date. Note that the ‘Day’ automatically changes when you set the date.

Time: Options HH : MM : SS

Set the system time.

IDE Primary Master: Options are in its sub menu (described in Table X)

Press <Enter> to enter the sub menu of detailed options.

IDE Primary Slave: Options are in its sub menu (described in Table X)

Press <Enter> to enter the sub menu of detailed options.

IDE Secondary Master: Options are in its sub menu (described in Table X)

Press <Enter> to enter the sub menu of detailed options.

IDE Secondary Slave: Options are in its sub menu (described in Table X)

Press <Enter> to enter the sub menu of detailed options.

The IDE adapters control the hard disk drive. Use a separate sub menu to configure each hard disk drive
 IDE Primary Master

IDE HDD Auto-Detection	Press Enter	Item Help
IDE Primary Master Access Mode	Auto 2557 MB Auto	Menu Level > To auto-detect the HDD's size, head... on this channel
Cylinder	4956	
Head	16	
Precomp	0	
Landing Zone	4955	
Sector	63	
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

IDE HDD Auto-detection: Options Press Enter

Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.

IDE Primary Master: Options None, Auto and Manual

Selecting "Manual" lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !

Capacity: Options Auto Display your disk drive size

Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.

Access Mode: Options Normal, LBA, Large and Auto

Choose the access mode for this hard disk

The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'

Cylinder: Options Min = 0, Max = 65535

Set the number of cylinders for this hard disk.

Head: Options Min = 0, Max = 255

Set the number of read/write heads

Precomp: Options Min = 0, Max = 65535

**** Warning: Setting a value of 65535 means no hard disk

Landing zone: Options Min = 0, Max = 65535

Sector: Options Min = 0, Max = 255

Number of sectors per track

Drive A/ Drive B: Options None 360K, 5.25 in/1.2M, 5.25 in/720K, 3.5 in/1.44M, 3.5 in/2.88M, 3.5 in
Select the type of floppy disk drive installed in your system.

Video: Options EGA/VGA/CGA 40/CGA 80/MONO

Select the default video device.

Halt On: Options All Errors/No Errors/All, but Keyboard/All, but Diskette/All, but Disk/Key

Select the situation in which you want the BIOS to stop the POST process and notify you.

Base Memory: Option N/A

Displays the amount of conventional memory detected during boot up.

Extended Memory: Option N/A

Displays the amount of extended memory detected during boot up

Total Memory: Option N/A

Displays the total memory available in the system

ADVANCED BIOS FEATURES

This section allows you to configure your system for basic operation. You have the opportunity to select the system’s default speed, boot-up sequence, keyboard operation, shadowing and security.

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Advanced BIOS Features

Virus Warning Enabled CPU L1 & L2 Cache Enabled Quick Power On Self Test Enabled First Boot Device Floppy Second Boot Device HDD-0 Third Boot Device LS-120 Boot Other Device Enabled Swap Floppy Drive Disabled Boot Up Floppy Seek Enabled Boot Up NumLock Status On Gate A20 Option Normal Typematic Rate Setting Disabled X Typematic Rate (Chars/Sec) 6 X Typematic Delay (Msec) 250 Security Option Setup APIC Mode Disabled X MPS Version Control For OS 1.1 OS Select For DRAM > 64MB Non-OS2 Report No FDD For Win 95 No	Item Help Menu Level > Allow you to choose the VIRUS warning feature for IDE Hard Disk Boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults	

Virus Warning:

Allow you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, BIOS will show a warning message on screen and alarm beep.

Enabled---Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.

Disabled---No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU L1& L2 Cache:

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled---Enable cache

Disabled---Disable cache

Quick Power On Self Test:

This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST.

Enabled---Enable quick POST

Disabled--- Normal POST

First/Second/Third/Other Boot Device:

The BIOS attempts to load the operating system from the devices in the sequence selected in these items.

The Choice: Floppy, LS/ZIP, HDD, SCSI, CDROM and Disabled.

Swap Floppy Drive:

If the system has two floppy drives, you can swap the logical drive name assignments.

The choice: Enabled, Disabled.

Boot Up Floppy Seek:

Seeks disk drives during boot up. Disabling speeds boot up.

The choice: Enabled, Disabled.

Boot Up NumLock Status:

Select power on state for NumLock.

The choice: Enabled, Disabled.

Gate A20 Option:

Select if chipset or keyboard controller should control GateA20.

Normal---A pin in the keyboard controller controls GateA20

Fast---Lets chipset control GateA20

Typematic Rate Setting:

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected.

The choice: Enabled, Disabled.

Typematic Rate (Chars/Sec):

Sets the number of times a second to repeat a keystroke when you hold the key down.

The choice: 6, 8, 10, 12, 15, 20, 24 and 30.

Typematic Delay (Msec):

Sets the delay time after the key is held down before it begins to repeat the keystroke.

The choice: 250, 500, 750 and 1000.

Security Option:

Select whether the password is required every time the system boots or only when you enter setup.

System---The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.

Setup---The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

APIC Mode:

This item allows you to enable/disable APIC Mode.

The choice: Enabled, Disabled.

MPS Version Control For OS:

Select the operating system that is Multi-Processors Version Control for OS.

The choice: 1.4, 1.1.

OS Select For DRAM > 64MB:

Select the operating system that is running with greater than 64MB of RAM on the system.

The choice: Non-OS2, OS2.

Report No FDD For Win 95:

Whether report no FDD for Win 95 or not.

The choice: Yes, No.

ADVANCED CHIPSET FEATURES

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also co-ordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

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Advanced Chipset Features

DRAM Timing Selectable By SPD X CAS Latency Time 2.5 X Active to Precharge Delay 6 X DRAM RAS# to CAS# Delay 2 X DRAM RAS# Precharge 3 Turbo Mode Disabled Memory Frequency For Auto System BIOS Cacheable Enabled Video BIOS Cacheable Disabled Memory Hole At 15M-16M Disabled Delayed Transaction Enabled Delay Prior to Thermal 16Min AGP Aperture Size (MB) 64 **On-Chip VGA Setting** On-Chip VGA Enabled On-Chip Frame Buffer Size 8MB Disk On Chip Address DC000H-DFFFFH	Item Help Menu Level >
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults	

DRAM Timing Selectable:

Select the operating system that is selecting DRAM timing, so select SPD for setting SDRAM timing by SPD.

The choice: Manual, SPD

CAS Latency Time:

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing.

The choice: 2, 3

Active To Precharge Delay:

Select the operating system that is active to precharge delay.

The choice: 6, Auto.

DRAM RAS# to CAS# Delay:

You can select RAS to CAS Delay time in HCLKs of 2/2 or 3/3.

The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

The choice: 2, 3 and Auto.

DRAM RAS# Precharge:

If an insufficient number of cycles are allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. Fast gives faster performance; and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.

The choice: 2, 3 and Auto.

Turbo Mode:

You can use this item to select turbo mode for the main system memory.

The choice: Enabled, Disabled.

Memory Frequency For:

You can use this item to select operating frequency for the main system memory.

The choice: Auto, 100MHz and 133MHz

System BIOS Cacheable:

Selecting "Enabled" allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

Video BIOS Cacheable:

Select "Enabled" allows caching of the video BIOS, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

Memory Hole At 15M-16M:

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements.

The choice: Enabled, Disabled.

Delayed Transaction:

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select "Enabled" to support compliance with PCI specification version 2.1.

The choice: Enabled, Disabled.

Delay Prior to Thermal:

Select this item allows the delay prior to thermal event.

The choice: Auto, 64Min

AGP Aperture Size (MB):

This field determines the effective size of the Graphic Aperture used for a particular GMCH configuration. It can be updated by the GMCH-specific BIOS configuration sequence, before the PCI standard bus enumeration sequence takes place. If it is not updated then a default value will select an aperture of maximum size.

The choice: 4, 8, 16, 32, 64, 128 and 256

On-Chip VGA:

You can use this item to select on-chip VGA for the main system VGA.

The choice: Enabled, Disabled.

On-Chip Frame Buffer Size:

You can use this item to select frame buffer size.

The choice: 4MB, 8MB, 16MB, 32MB, Disabled.

Disk On Chip Address:

Select this item for the Disk On Chip address at D0000H-DFFFFH.

The choice: D0000H-DFFFFH, D4000H-D7FFFH, D8000H-DBFFFH, DC000H-DFFFFH

INTEGRATED PERIPHERALS

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Integrated Peripherals

On-Chip Primary PCI IDE	Enabled	<p style="text-align: center;">Item Help</p> <hr/> <p>Menu Level ></p> <p>If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/write per sector the drive can support</p>
IDE Primary Master PIO	Auto	
IDE Primary Slave PIO	Auto	
IDE Primary Master UDMA	Disabled	
IDE Primary Slave UDMA	Disabled	
On-Chip Secondary PCI IDE	Enabled	
IDE Secondary Master PIO	Auto	
IDE Secondary Slave PIO	Auto	
IDE Secondary Master UDMA	Disabled	
IDE Secondary Slave UDMA	Disabled	
USB Controller	Enabled	
USB 2.0 Controller	Enabled	
USB Keyboard Support	Disabled	
USB Mouse Support	Disabled	
AC97 Audio	Auto	
Init Display First	PCI Slot	
IDE HDD Block Mode	Disabled	
Onboard FDC Controller	Enabled	
Onboard Serial Port 1	3F8/IRQ4	
Onboard Serial Port 2	2F8/IRQ3	
UART Mode Select	Normal	
X Rx/D, Tx/D Active	Hi, Lo	
X IR Transmission Delay	Enabled	
X UR2 Duplex Mode	Half	
X Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	378/IRQ7	
Parallel Port Mode	SPP	
X EPP Mode Select	EPP1.9	
X ECP Mode Use DMA	3	
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

OnChip Primary/Secondary PCI IDE:

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select “Enabled” to activate each channel separately.

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO:

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3 and Mode 4.

IDE Primary/Secondary Master/Slave UDMA:

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select "Auto" to enable BIOS support.

The choice: Auto, Disabled.

USB Controller:

Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals.

The choice: Enabled, Disabled.

USB 2.0 Controller:

Select "Enabled" if your system contains a Universal Serial Bus 2.0 (USB 2.0) controller and you have USB peripherals.

The choice: Enabled, Disabled.

USB Keyboard Support:

Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

The choice: Enabled, Disabled.

USB Mouse Support:

Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have a USB mouse.

The choice: Enabled, Disabled.

AC97 Audio:

This item allows you to decide to auto or disable the chipset family to support AC97 Audio.

The choice: Auto, Disabled.

Init Display First:

This item allows you to decide to active whether PCI Slot or on-chip VGA first.

The choice: PCI Slot, Onboard.

IDE HDD Block Mode:

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The choice: Enabled, Disabled

Onboard FDC Controller:

Select "Enabled" if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install and-in FDC or the system has no floppy drive, select Disabled in this field.

The choice: Enabled, Disabled.

Onboard Serial Port 1/Port 2:

Select an address and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled and Auto.

UART Mode Select:

This item allows you to determine which Infra Red (IR) function of onboard I/O chip.

The Choice: Normal, IrDA and ASKIR.

RxD, TxD Active:

This item allows you to determine the active of RxD, TxD.

The Choice: "Hi, Hi", "Lo, Lo", "Lo, Hi" and "Hi, Lo".

IR Transmission delay:

This item allows you to enable/disable IR transmission delay.

The choice: Enabled, Disabled.

UR2 Duplex Mode:

This item allows you to select the IR half/full duplex function.

The choice: Half, Full.

Use IR Pins:

This item allows you to select IR transmission routes, one is RxD2m, TxD2 (COM Port) and the other is IR-Rx2Tx2.

The choice: IR-Rx2Tx2, RxD2 and TxD2.

Onboard Parallel Port:

This item allows you to determine access onboard parallel port controller with which I/O address.

The choice: 3BC/IRQ7, 378/IRQ7, 278/IRQ5 and Disabled.

Parallel Port Mode:

Select an operating mode for the onboard parallel (printer) port. Select Normal, Compatible, or SPP unless you are certain your hardware and software both support one of the other available modes.

The choice: SPP, EPP, ECP and ECP+EPP.

EPP Mode Select:

Select EPP port type 1.7 or 1.9.

The choice: EPP1.7, 1.9.

ECP Mode Use DMA:

Select a DMA channel for the parallel port for use during ECP mode.

The choice: 3, 1.

POWER MANAGEMENT SETUP

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

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Power Management Setup

<p>ACPI Function Enabled</p> <p>Power Management User Define</p> <p>Video Off Method Blank Screen</p> <p>Video Off In Suspend No</p> <p>Suspend Type Stop Grant</p> <p>MODEM Use IRQ 3</p> <p>Suspend Mode Disabled</p> <p>HDD Power Down Disabled</p> <p>Soft-Off by PWR-BTTN Instant-Off</p> <p>CPU THRM-Throttling 87.5%</p> <p>Wake-Up by PCI card Enabled</p> <p>Power On By Ring Disabled</p> <p>Resume by Alarm Disabled</p> <p>X Date (of Month) Alarm 0</p> <p>X Time (hh:mm:ss) Alarm 0 0 0</p> <p>**Reload Global Timer Events**</p> <p>Primary IDE 0 Disabled</p> <p>Primary IDE 1 Disabled</p> <p>Secondary IDE 0 Disabled</p> <p>Secondary IDE 1 Disabled</p> <p>FDD, COM, LPT Port Disabled</p> <p>PCI PIRQ [A-D]# Disabled</p>	<p>Item Help</p> <hr/> <p>Menu Level ></p>
<p>↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults</p>	

ACPI Function:

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

Power Management:

This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

1. HDD Power Down
2. Doze Mode
3. Suspend Mode

Min. Power Saving:

Minimum power management. Doze Mode = 1 hr. Standby Mode = 1hr., Suspend Mode = 1 hr., and HDD Power Down = 15 min.

Max. Power Saving:

Maximum power management -- ONLY AVAILABLE FOR SL CPU's. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min.

User Defined:

Allow you to set each mode individually. When not disabled, each of the ranges is from 1 min. to 1 hr. except for HDD Power Down, which ranges from 1 min. to 15 min. and disable.

Video Off Method:

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank:

This selection will cause the system to turn off the vertical and horizontal synchronisation ports and write blanks to the video buffer.

Blank Screen:

This option only writes blanks to the video buffer.

DPMS:

Initial display power management signalling.

Video Off Method:

This item allows you to on/off Method function.

The choice: Yes, No.

Video Off In Suspend:

This determines the manner in which the monitor is blanked.

The choice: Yes, No.

Suspend Type:

Select the Suspend Type.

The choice: PWRON Suspend, Stop Grant.

MODEM Use IRQ:

This determines the IRQ in which the MODEM can use.

The choice: 3, 4, 5, 7, 9, 10, 11 and NA.

Suspend Mode:

When “Enabled” and after the set time of system inactivity. All devices except the CPU will be shut off.

The choice: Enabled, Disabled.

HDD Power Down:

When “Enabled” and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Enabled, Disabled.

Soft-Off by PWR-BTTN:

Pressing the power button for more than 4 seconds forces the system to enter the Soft-Off state when the system has “hung.”

The choice: Delay 4 Sec, Instant-Off.

CPU THRM-Throttling:

Select the CPU THRM-Throttling rate.

The choice: 12.5%, 25.0%, 37.5%, 50.0%, 62.5%, 75.0% and 87.5%.

Wake-Up by PCI Card:

An input signal from PME on the PCI card awakens the system from a soft off state.

The choice: Enabled, Disabled.

Power On by Ring:

An input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft off state.

The choice: Enabled, Disabled.

Resume by Alarm:

When “Enabled”, you can set the date and time at which the RTC (real-time clock) alarm awakens the system from Suspend mode.

The choice: Enabled, Disabled.

PM Events:

PM events are I/O events whose occurrence can prevent the system from entering a power saving mode or can awaken the system from such a mode. In effect, the system remains alert for anything, which occurs to a device, which is configured as Enabled, even when the system is in a power down mode.

Primary IDE 0

Primary IDE 1

Secondary IDE 0

Secondary IDE 1

FDD, COM, LPT Port

PCI PIRQ [A-D] #

PNP/PCI CONFIGURATIONS

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system, which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

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PnP/PCI Configurations

		Item Help
Reset Configuration Data	Disabled	Menu Level > Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot
Resources Controlled By X IRQ Resources	Auto (ESCD) Press Enter	
PCI/VGA Palette Snoop	Disabled	
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

Reset Configuration Data:

Normally, you leave this field Disabled. Select “Enabled” to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

The choice: Enabled, Disabled.

Resource controlled by:

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 95. If you set this field to “Manual” choose specific resources by going into each of the sub menu that follows this field (a sub menu is preceded by a “>”).

The choice: Auto (ESCD), Manual.

IRQ Resources:

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

PCI/VGA Palette Snoop:

Leave this field at “Disabled”.

The choice: Enabled, Disabled.

PC HEALTH STATUS

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PC Health Status

		Item Help
CPU Warning Temperature	Disabled	
Current System Temp.	33°C / 91°F	
Current CPU1 Temperature	38°C / 100°F	
Current CPU Fan Speed	3835 RPM	
Current Chassis Fan Speed	4725RPM	
VDimm (V)	2.48V	
Vcore (V)	1.45V	
VCC3.3V	3.37V	
+ 5 V	5.08V	
+12 V	11.91V	
-12 V	-12.44	
-5V	-4.99V	
VBAT (V)	3.24V	
5VSB (V)	4.80	
Shutdown temperature	Disabled	
		Menu Level >
↑↓←→Move Enter: Select +/-PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

CPU Warning Temperature:

This item will prevent CPU from overheating.

The choice: Enabled, Disabled.

Current System Temp:

Show you the current system temperature.

Current CPU1 Temperature:

Show you the current CPU temperature.

Current CPU Fan Speed:

Show you the current CPU fan operating speed.

Current Chassis Fan Speed:

Show you the current chassis fan operating speed.

IN0/1/2 (V):

Show you the voltage of Vin (0)/(1)/(2).

3.3V/+5V/+12V/-12V/-5V:

Show you the voltage of 3.3V/+5V/+12V/-12V/-5V.

Shutdown Temperature:

This item allows you to set up the CPU shutdown Temperature. This item is only effective under Windows® 98 ACPI mode.

The choice: Disabled, 60°C / 140°F, 65°C / 149°F, 70°C / 159°F and 75°C / 167°F.

FREQUENCY/VOLTAGE CONTROL

CMOS Setup Utility – Copyright © 1984 - 2001 Award Software
Frequency/Voltage Control

Auto Detect PCI Clk Enabled Spread Spectrum Disabled	Item Help
	Menu Level >
↑↓←→Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults	

Auto Detect PCI CLK:

When “Enabled”, this item will auto detect if the PCI socket have devices and will send clock signal to PCI devices. When disabled, it will send the clock signal to all PCI socket.

The choice: Enabled, Disabled.

Spread Spectrum:

This item allows you to enable/disable the spread spectrum modulated.

The choice: Enabled, Disabled.

OTHER SETTINGS

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N)? N

Pressing “Y” loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N)? N

Pressing “Y” loads the default values that are factory settings for optimal performance system operations.

Supervisor/User Password Setting

You can set either supervisor or user password, or both of them. The differences between are:

Set Supervisor Password: can enter and change the options of the setup menus.

Set User Password: just can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the centre of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorised person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorised use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

Exit Selecting

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

MAINTENANCE

The only regular maintenance required is to ensure that the cooling airflow remains unrestricted. Generally the enclosure design and the wiring layout will ensure that the cooling is stable. However, bear in mind that any air filters may become clogged thereby reducing the cooling.

After a period of time, it may be necessary to replace the on-board battery, if it cannot maintain the CMOS memory.

TROUBLESHOOTING GUIDE

This is not intended as an extensive faultfinding procedure, rather it is intended to indicate the more likely causes of failure with this product. Ensure that the power is switched off before making any hardware changes. Bear in mind that it is possible to set combinations of parameters within the BIOS that will prevent proper operation of the board. See the BIOS section for details. If in doubt, set default values or clear the CMOS memory and start again. Default values will generally provide a working but limited system.

SYMPTOM	Fail to boot
Possible Cause	Power supply incorrect
Action	Check all supply rails 5V, 12V, 5V _{STBY} ,
Possible Cause	Check that the 5Vstandby terminal is connected
Action	Link to +5V if not powered from an ATX 5Vstandby supply
Possible Cause	CMOS memory corrupt/invalid.
Action	Power off, set CMOS clear jumper to 'Clear' on base board (if it exists), then return jumper to operational position
Possible Cause	CMOS Clear jumper in wrong position
Action	Set to operational position, NOT 'Clear'
Possible Cause	Extended System Configuration Data (ESCD) memory corrupt/invalid
Action	Use BIOS Setup to clear and re-write the ESCD memory
Possible Cause	Memory not fully seated in socket
Action	Remove and refit memory
Possible Cause	Add-in board requires other voltage rails
Action	Check power requirements of expansion board, and power supplies
SYMPTOM	Time and Date incorrect, loss of CMOS memory contents
Possible Cause	Discharged / displaced battery, Clear CMOS link not fitted.
Action	Power off, replace battery (ensure correct orientation), reset CMOS values or fit link
SYMPTOM	No display on monitor
Possible Cause	Incorrect BIOS setting
Action	Clear CMOS memory, reset correct values
SYMPTOM	User EEPROM contents corrupt or inaccessible
Possible Cause	EEPROM not enabled within BIOS Set-up
Action	Enable EEPROM within BIOS
SYMPTOM	System crashes during intensive operation or after prolonged use
Possible Cause	Inadequate cooling allowing CPU/chipset to overheat
Action	Improve heatsink and / or cooling airflow
SYMPTOM	Solid-state Disk Unreliable
Possible Cause	Solid-state Disk chip not fully seated, or pin damaged.
Action	Check alignment and seating of chip

AMENDMENT HISTORY

Issue Level	Issue Date	Author	Amendment Details
1.0	04/07/03	TMK	First Draft Issue
1.1	31/08/04	tmc	correct spelling mistakes