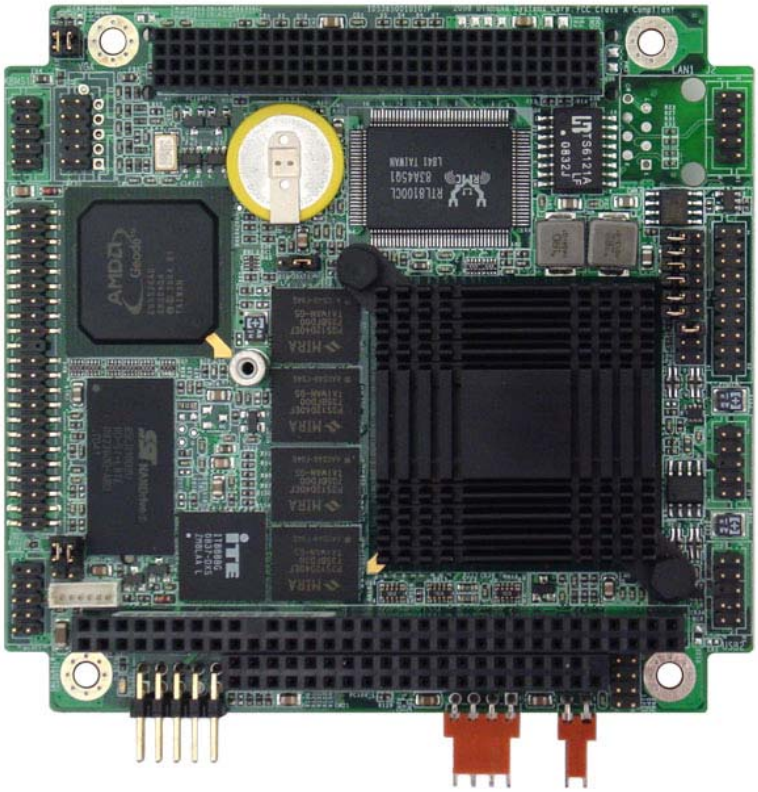
DIAMOND SYSTEMS CORPORATION

Pegasus User Manual

Low-power 500MHz PC/104 Single Board Computer

User Manual v1.2



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Introduction

This manual provides information needed to configure and operate the Pegasus single board computer (SBC), and includes the following topics:

- An introduction to Pegasus features.
- Connectors and signals descriptions.
- Jumper settings.
- Hardware and software installation and configuration guides.
- Boot procedures.
- BIOS setup.
- System I/O description and reference.
- Watchdog timer programming.
- Flashdisk module reference.
- Flashdisk programmer board reference.
- Connector cables list.
- Specification reference, additional resources list and contact information.

Feature Overview

The Pegasus SBC provides mid-range computing power with low power consumption, in the PC/104 small form factor. This section lists the basic Pegasus features.

Processor, Memory, Buses

- 500MHz (fanless) AMD Geode LX800 processor.
- 256MB DDR SDRAM system memory, soldered on-board.
- PC/104-*Plus* ISA+PCI bus interface with expansion stackthrough.
- IDE interface capable of supporting:
  - Up to two UDMA-33 IDE hard drives
  -
- Type II IDE/CompactFlash socket.
- 33MHz PCI Bus.

Standard Peripheral Interfaces

- Two serial ports.
  - COM1: 16450-compatible RS-232 port.
  - COM2: 16450-compatible port with 128-byte FIFO. This port provides RS-232, RS-422 and automatic RS-485 half-duplex capability with RS-422/RS-485 termination.
- Four USB 2.0 ports.
- PS/2 keyboard and mouse ports.

Ethernet

- Realtek 8100CL 10/100Mbps Ethernet. (Wake-on-LAN capability supported in BIOS.)

Video

- VGA CRT and 1280x1024 LCD.

Power Supply

- An on-board DC-DC converter, allowing an input range of +5VDC, ±5%. (Jumper selection allows power to be taken from the PC-104 bus and not from the on-board converter.)

Battery Backup

- Backup battery for the real-time clock and BIOS settings. (The battery is directly soldered to the board and provides a minimum 7 year backup lifetime at 25°C.)
- The on-board battery may be bypassed with a jumper or replaced with an external battery connected to an external battery connector.

Watchdog Timer

- A watchdog timer (WDT) with programmable interval from 1 to 255 seconds.

Software

- BIOS: Phoenix
- Operating system compatibility:
  - Windows XP
  - Windows XPe
  - Windows CE 5.0
  - Linux

Available Models

The Pegasus board is available in the following model:

Model	***Description***
PGS800-256	• 500MHz LX800 • 256MB on-board DRAM
•	• •

Note: The Diamond Systems cable kit, part number C-PGS-KIT, is available for all models.

Functional Overview

This section highlights the basic functionality provided by the Pegasus SBC.

Processor and Chipset

An AMD Geode LX800 single chip processor provides 486-class performance, operating at 500MHz. Combined with the AMD Geode CS5536 companion device, the pair provide a versatile, low-power embedded system solution that can natively run Windows and Linux operating systems.

In addition to core processor functions, the chipset implements the following capabilities:

- Memory Controller
- Graphics Processor
- Display Controller
- Video Processor
- PCI Bridge
- Security Block

Memory

On-board system memory includes 256MB soldered DDR SDRAM.

Ethernet

A Realtek 8100CL chips implements the MAC and PHY to provide complete 10/100Mbps Ethernet link functionality.

The board provides standard Ethernet signal isolation characteristics, and includes a 10-pin header, LAN1.

Standard Peripherals

The board provides the following standard peripherals:

Peripheral	***Description***
PS/2 keyboard and mouse ports	The keyboard and mouse interfaces are implemented by the AMD Geode LX800 chip. Signals have ESD protection.
USB ports	Four USB 2.0 ports are provided by the AMD Geode CS5536 companion device. Each port has a minimum 500mA per port drive capability with short circuit/overcurrent protection. Signals have ESD protection.
IDE ports	One UDMA-33 channel with master/slave support is provided on the standard 44-pin connector.

Video

VGA is supported by the AMD Geode LX800 processor. The minimal CRT and flat panel resolution is 1280x1024. The video controller shares main memory for its frame buffer.

Serial Ports

Two serial ports, COM1 and COM2, have full RS-232 handshake capability using 115.2kbps transceivers with ESD protection. COM2 has additional support for RS-422 and RS-485.

In RS-422 and RS-485 mode, the serial ports have jumper-configurable 120 ohm termination resistors and jumper-configurable pull-up/down resistors.

A console redirection feature, using a serial port for keyboard input and terminal display via a link to a second computer, is provided in the BIOS.

Solid State Storage

IDE/Flashdisk Connector

The board provides a standard 44-pin header for connecting an IDE drive on one channel. This connector can also be used for mounting a solid state IDE flashdisk module.

CompactFlash Socket

On the bottom side, the board includes an IDE Type II CompactFlash socket.

Battery Backup

The board includes a backup battery for CMOS RAM and real-time clock backup. The battery provides a minimum five year lifetime, at Ta = 25°C and 0% power duty cycle.

Note: The battery is an integrated unit with soldered terminals, and not replaceable.

A connector and jumper are provided to disable the on-board battery and enable the use of an external battery. The jumper also clears the CMOS RAM, if it is removed when no external battery is attached.

PC/104 Bus Expansion

The PC/104-*Plus* (ISA and PCI) bus connectors are provided for mounting additional I/O boards. The standard configuration uses stackthrough connectors to allow expansion boards to be mounted both above and below the Pegasus board.

MTBF

The minimum MTBF is 87,400 hours.

BIOS Features

The BIOS provides the following key features:

- Boot from LAN (PXE) or USB, or A:, C: or D: drives.
- User selectable Master boot device selection.
- Free boot sequence configuration.
- Support for various LCD configurations supported by the video chipset.
- Console (display and keyboard) redirection to serial port.
- BIOS recovery through USB floppy or other means.
- DSC-configurable default settings in configurations without a battery backup.
- Customizable splash screen.

Watchdog Timer

The board contains a watchdog timer circuit with programmable delay time. The watchdog can be enabled, disabled and retriggered in software. If the watchdog times out before it is retriggered, it causes a system reset.

Jumper Configuration

The following configurations are jumper-selectable. For rugged applications, all settings can also be implemented using zero-ohm resistors in place of jumpers.

- COM2 protocol: RS-232, RS-422, RS-485
- COM2 120 ohm termination: enabled/disabled
- COM2 pull-up/pull-down resistors: enabled/disabled
- CMOS backup battery: connected/disconnected (also clears CMOS)
- LCD power: 3.3V/5V
- LCD backlight power: 5V/12V

Power Supply

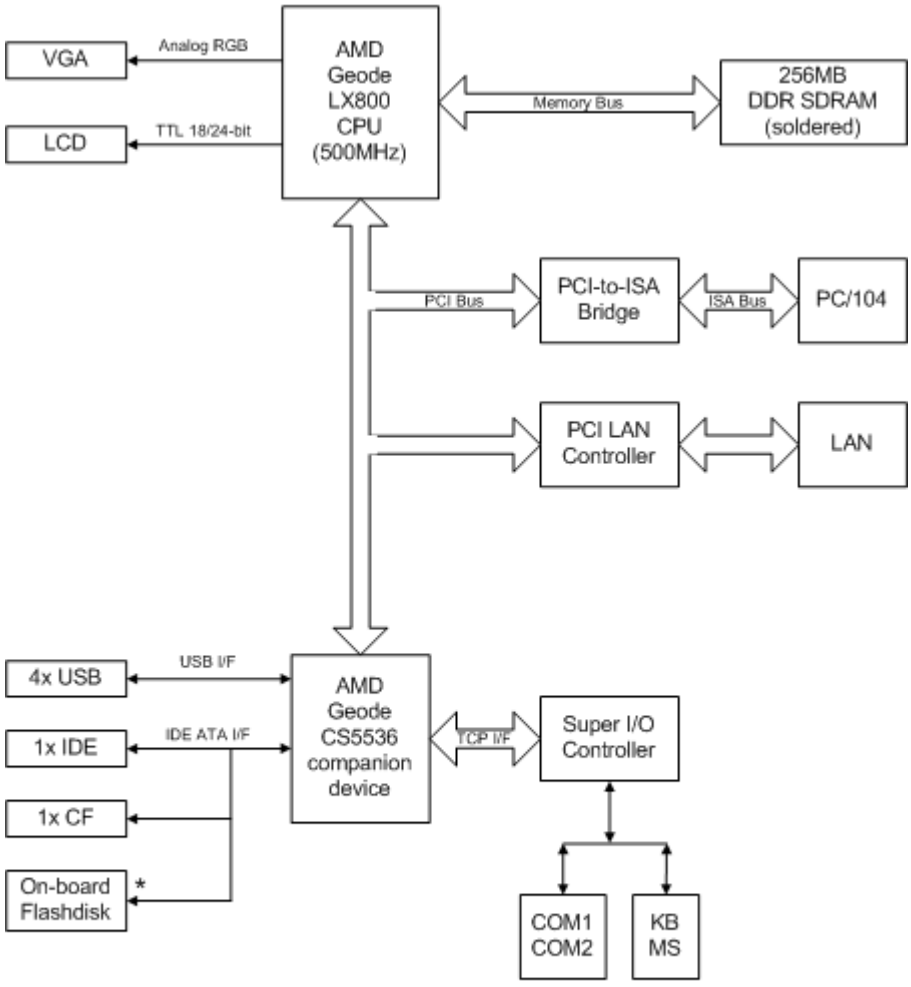
The board requires only +5VDC input voltage and supports routing of +3.3VDC, +12VDC, and -12VDC voltages to various connectors. All power supplies on the PC/104 and PC/104-*Plus* connectors are routed directly to the input power connector. Maximum allowable reflected ripple, measured at the voltage input connector, is 50mV p-p. All switching power supply stages are synchronized to reduce random non-synchronized overlapping spikes.

An auxiliary power connector is provided with +5V and +12V power for use with IDE peripherals.

Functional Block Diagram

Figure 1 shows the Pegasus functional blocks.

Figure 1: Pegasus Functional Block Diagram



* Model PGS800-256-2G only
Pegasus supports only two IDE devices.

Board Diagram

Figure 2 and Figure 3 show the Pegasus board layout, including connectors, jumper blocks and mounting holes.

Figure 2: Pegasus Board Layout (top)

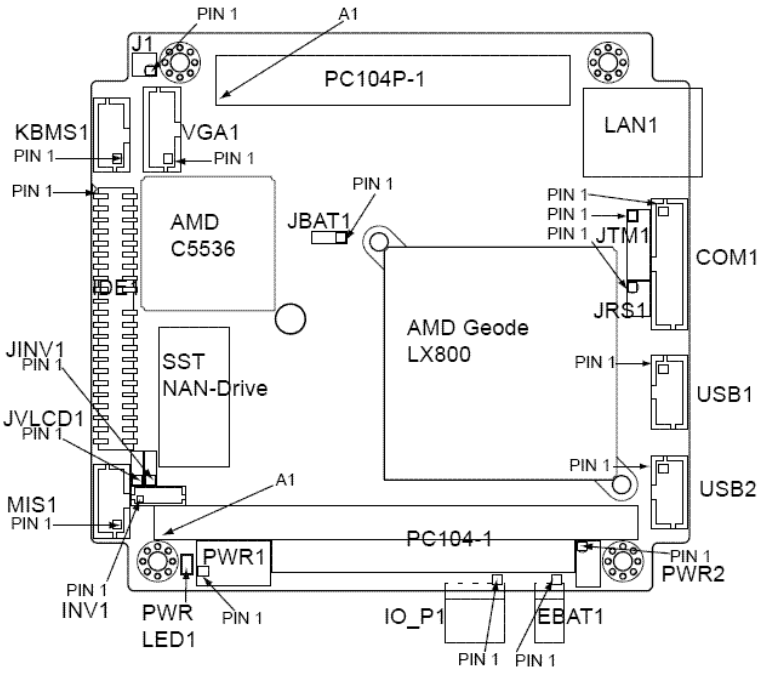
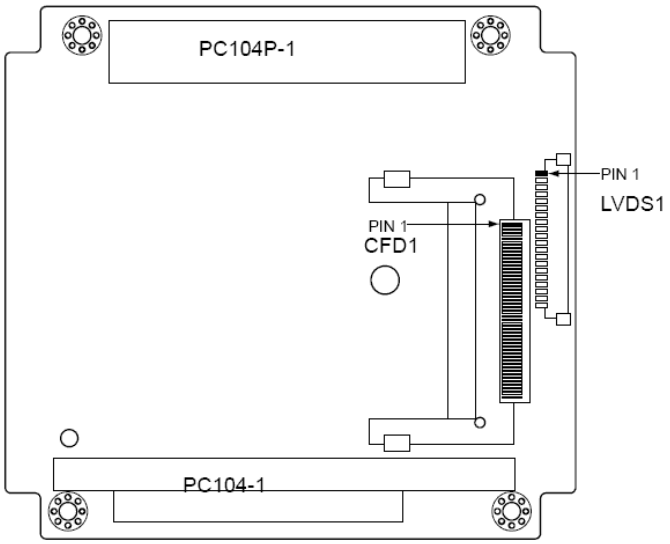


Figure 3: Pegasus Board Layout (bottom)



Connector Summary

The following table lists the Pegasus board connectors.

Connector	*Description*
PC104P1	PC/104 ISA Bus
KBMS1	PS/2 Mouse and Keyboard
VGA1	VGA
IDE1	IDE Bus
MISC1	Miscellaneous
LVDS1	LCD Panel - LVDS Interface
COM1/2	COM1/2 Serial Port I/O
LAN1	Ethernet
USB1	USB 2.0 Ports (0/1)
USB2	USB 2.0 Ports (2/3)
PWR1	Main Input Power
PWR2	Panel Power Input
IO_P1	I/O Power
EBAT1	External Battery
INV1	LCD Backlight

Jumper Summary

The following table lists the Pegasus board jumpers block.

Jumper	*Description*
JRS1	COM2 RS-232/422/485 select
JTM1	COM2 RS-232/RS-485 configuration
J1	LCD configuration
JVCC01	LVDS panel voltage configuration
JINV1	LCD backlight voltage configuration
JBAT1	CMOS setup

Connectors

This section describes the on-board Pegasus connectors.

Note: Pins marked as "key" are cut away or removed, unless otherwise indicated.

PC/104 ISA Bus (PC104P1)

These two connectors carry the ISA bus signals. The following diagram shows the PC/104 pin layout.

IOCHCHK-	A1	B1	Ground
SD7	A2	B2	RESETDRV
SD6	A3	B3	+5V
SD5	A4	B4	IRQ9
SD4	A5	B5	-5V
SD3	A6	B6	DRQ2
SD2	A7	B7	-12V
SD1	A8	B8	ENDXFR-
SD0	A9	B9	+12V
IOCHRDY	A10	B10	Key
AEN	A11	B11	SMEMW-
SA19	A12	B12	SMEMR-
SA18	A13	B13	IOW-
SA17	A14	B14	IOR-
SA16	A15	B15	DACK3-
SA15	A16	B16	DRQ3
SA14	A17	B17	DACK1-
SA13	A18	B18	DRQ1
SA12	A19	B19	REFRESH-
SA11	A20	B20	SYSCLK
SA10	A21	B21	IRQ7
SA9	A22	B22	IRQ6
SA8	A23	B23	IRQ5
SA7	A24	B24	IRQ4
SA6	A25	B25	IRQ3
SA5	A26	B26	DACK2-
SA4	A27	B27	TC
SA3	A28	B28	BALE
SA2	A29	B29	+5V
SA1	A30	B30	OSC
SA0	A31	B31	Ground
Ground	A32	B32	Ground

Ground	C0	D0	Ground
SBHE-	C1	D1	MEMCS16--
LA23	C2	D2	IOCS16-
LA22	C3	D3	IRQ10
LA21	C4	D4	IRQ11
LA20	C5	D5	IRQ12
LA19	C6	D6	IRQ15
LA18	C7	D7	IRQ14
LA17	C8	D8	DACK0-
MEMR-	C9	D9	DRQ0
MEMW-	C10	D10	DACK5-
SD8	C11	D11	DRQ5
SD9	C12	D12	DACK6-
SD10	C13	D13	DRQ6
SD11	C14	D14	DACK7-
SD12	C15	D15	DRQ7
SD13	C16	D16	+5
SD14	C17	D17	MASTER-
SD15	C18	D18	Ground
Key	C19	D19	Ground

PS/2 Mouse and Keyboard (KBMS1)

Connector KBMS1 provides the standard PS/2 keyboard and mouse signals.

+5V	1	2	+5V
KB Data	3	4	MS Data
KB Clock	5	6	MS Clock
Ground	7	8	Key
NC	9	10	Ground

Signal	*Definition*
+5V	keyboard PS/2 pin 4
KB Data	keyboard PS/2 pin 1
KB Clock	keyboard PS/2 pin 5
MS Data	mouse PS/2 pin 1
MS Clock	mouse PS/2 pin 5
Ground	PS/2 pin 3

VGA (VGA1)

Connector VGA1 is used to connect a VGA monitor.

Note: While the DDC serial detection pins are present, a 5V power supply is not provided, and the legacy "Monitor ID" pins are also not used.

Red	1	2	Ground
Green	3	4	Key
Blue	5	6	Ground
HSYNC	7	8	DDC Data
VSYNC	9	10	DDC Clock

Signal	*Definition*
Red	RED signal (positive, 0.7Vpp into 75 Ohm load)
Green	GREEN signal (positive, 0.7Vpp into 75 Ohm load)
Blue	BLUE signal (positive, 0.7Vpp into 75 Ohm load)
DDC Clock/Data	Digital serial I/O signals used for monitor detection (DDC1 specification)
HSYNC	Horizontal sync
VSYNC	Vertical sync
Ground	Ground return

IDE Bus (IDE1)

The IDE connector, IDE1, is used to connect two IDE drives, including hard disks, CD-ROMs and Flashdisk modules.

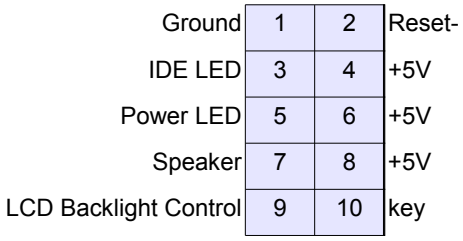
This connector mates with Diamond Systems cable part number 6981004.

Reset -	1	2	Ground
D7	3	4	D8
D6	5	6	D9
D5	7	8	D10
D4	9	10	D11
D3	11	12	D12
D2	13	14	D13
D1	15	16	D14
D0	17	18	D15
Ground	19	20	Key
DRQ	21	22	Ground
IDEIOW-	23	24	Ground
IDEIOR-	25	26	Ground
IORDY	27	28	Ground
DACK-	29	30	Ground
IRQ14	31	32	Pulled low for 16-bit operation
A1	33	34	NC
A0	35	36	A2
CS0-	37	38	CS1-
LED-	39	40	Ground
+5v	41	42	+5v
Ground	43	44	NC

Signal	***Definition***
Reset -	Reset
D0-D15	16-bit data
Ground	Ground
DRQ	DDRQ
DACK-	DDACK
IDEIOW-	I/O write
IDEIOR-	I/O read
IORDY	IOC HRDY
IRQ14	IRQ
A0-A2	Address 0-2
CS0-	Chip select 1P
CS1-	Chip select 3P
LED-	Activity indication
+5V	+5VDC

Miscellaneous (MISC1)

Connector MISC1 provides access to common auxiliary signals.



Signal	***Definition***
IDE LED	IDE drive activity indication LED.
Power LED	Power enabled LED.
LCD Backlight Control	User-provided brightness control for the LCD backlight. See the description for connector INV1. 0V = max. 5V = min.
Speaker	Speaker connection; referenced to +5V.
+5V	+5VDC power.
Reset-	Connect this pin to ground to cause a reset condition.
Ground	Ground

LCD Panel - LVDS Interface (LVDS1)

Connector LVDS1 provides access to the internal LVDS LCD display drivers.

Note: The LCD also requires the backlight (connector INV1) to be connected to function correctly.

1	NC
2	NC
3	SD
4	FRC
5	SigGround
6	PClk+
7	PClk-
8	SigGround
9	D2+
10	D2-
11	SigGround
12	D1+
13	D1-
14	SigGround
15	D0+
16	D0-
17	PwrGround
18	PwrGround
19	VDD Sel
20	VDD Sel

Signal	*Definition*
SD	Scan Direction; controlled by jumper J1 (default low). High = Reverse scan. Low/open = Normal scan.
FRC	Frame Rate Control; controlled by jumper J1 (default low). High = On. Low/open = Off.
PClk+	Pixel clock +.
PClk-	Pixel clock -.
VDD Sel	VCC 3.3v or 5V (Jumper JVLCD1 configured).
SigGround	Signal ground.
PwrGround	Power ground.

Serial Port I/O (COM1/2)

Connector COM1/2 provides access to the two serial ports of the AMD Geode CPU. PORT1 is RS-232, only. PORT2 is independently, jumper-configurable for either RS-232, RS-485 or RS-422 protocol. Jumpers JRS1 and JTM1 are used to select the protocol.

Connector pins are dedicated to a port, as shown in the following table.

Port No.	*Pin Assignment*
PORT1	Pins 1 - 10
PORT2	Pins 11 - 20

The following tables list the signals and associated DE-9 pin numbers for each of the protocols; pin assignment differs, depending on the protocol selected.

RS-232 Pin Assignments

COM1:	DCD1	1	2	DSR1
	RXD1	3	4	RTS1
	TXD1	5	6	CTS1
	DTR1	7	8	RI1
	Ground	9	10	Ground
COM2:	DCD2	11	12	DSR2
	RXD2	13	14	RTS2
	TXD2	15	16	CTS2
	DTR2	17	18	RI2
	Ground	19	20	Ground

Signal	*Definition*	*DE-9 Pin*	*Direction*
DCD*n*	Data Carrier Detect	pin 1	Input
DSR*n*	Data Set Ready	pin 6	Input
RXD*n*	Receive Data	pin 2	Input
RTS*n*	Request to Send	pin 7	Output
TXD*n*	Transmit Data	pin 3	Output
CTS*n*	Clear to Send	pin 8	Input
DTR*n*	Data Terminal Ready	pin 4	Output
RI*n*	Ring Indicator	pin 9	Input
Ground	Ground	-	-

RS-485 Pin Assignment

Only COM1/2 connector pins 11 through 20, PORT2, is used for RS-485.

COM2:	NC	11	12	NC
	TXD/RXD+	13	14	TXD/RXD-
	NC	15	16	NC
	NC	17	18	NC
	Ground	19	20	Ground

Signal	***Definition***	***DE-9 Pin***	***Direction***
TXD/RXD+	Differential Transceiver Data (HIGH)	pin 2	bi-directional
TXD/RXD-	Differential Transceiver Data (LOW)	pin 7	bi-directional
Ground	Ground	-	-
NC	(not connected)	-	-

RS-422 Pin Assignment

Only COM1/2 connector pins 11 through 20, PORT2, is used for RS-422.

COM2:	NC	11	12	NC
	TXD+	13	14	TXD-
	RXD+	15	16	RXD-
	NC	17	18	NC
	Ground	19	20	Ground

Signal	***Definition***	***DE-9 Pin***	***Direction***
TXD+/TXD-	Differential transmit data	-	Output
RXD+/RXD-	Differential receive data	-	Input
Ground	Ground	-	-
NC	(not connected)	-	-

Ethernet (LAN1)

The 10/100 Base-T, full-duplex Ethernet interface is provided by connector LAN1.

TX+	1	2	TX-
NC	3	4	RX-
RX+	5	6	Link LED-
Link LED+	7	8	Act+
Key	9	10	Act-

Signal	*Definition*
TX+/TX-	Transmit data.
RX+/RX-	Receive data.
Link LED	Link activity indication; referenced to ground.
Act+/Act-	Activity LED indicator.

USB 2.0 Ports (USB1, USB2)

The board features four USB 2.0 ports. Connector USB1 interfaces to USB port 0/1 and connector USB2 interfaces to USB ports 2/3. USB 2.0 provides a 480Mbps maximum data transfer rate.

USB1

Ground	1	2	USB0 VCC
USB0 Data+	3	4	USB0 Data-
Key	5	6	Ground
Ground	7	8	USB1 VCC
USB1 Data+	9	10	USB1 Data-

USB2

Ground	1	2	USB2 VCC
USB2 Data+	3	4	USB2 Data-
Key	5	6	Ground
Ground	7	8	USB3 VCC
USB3 Data+	9	10	USB3 Data-

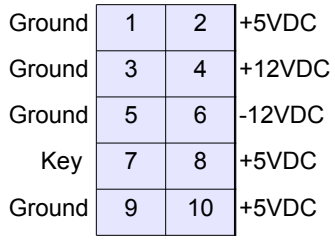
Signal	*Definition*
USB0-3 VCC	+5V power for USB ports 0-3
USB0-3 Data+	Data + for USB ports 0-3
USB0-3 Data-	Data - for USB ports 0-3
Ground	Ground; tied to system ground.

Main Input Power (PWR1)

Input power may be supplied using either PWR1, the I/O power connector (IO_P1), an external supply, or directly through the PC/104 bus power pins, if a PC/104 power supply is used with the SBC.

The board only requires +5VDC input power to operate. All other required voltages are generated on board. However, the PC/104 bus may be used to supply ±5V and ±12V, if needed.

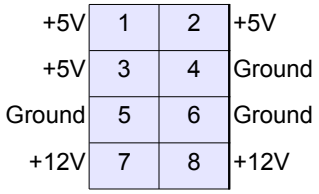
Multiple +5V and ground pins are provided for extra current carrying capacity, if needed. Each pin is rated at 3A max. For applications requiring less than 3A, the first four pins may be connected to a standard 4-pin miniature PC power connector, or the alternate power I/O connector may be used. For a larger PC/104 stack the total power requirements should be calculated to determine whether additional wires are necessary.



Signal	*Definition*
+5VDC	+5V input. Only +5VDC power is required for board operation.
+12VDC	+12V input.
-12VDC	-12V input.
Ground	Ground

Panel Power Input (PWR2)

Connector PWR2 provides power to the board when connected to the I/O panel board. All signals are routed to their corresponding pins on the PC/104 connector.

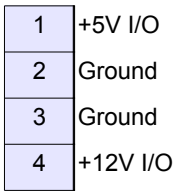


Signal	*Definition*
+5V	+5V input. Only +5VDC power is required for board operation.
+12V	+12V input. Provided as a pass-through to the PC/104 bus connector.
Ground	Ground

I/O Power (IO_P1)

Connector IO_P1 provides an alternate connector for either input power to the system or output power for use with external drives.

This connector mates with Diamond Systems cable part number 6981006, which provides a standard full-size power connector for a hard drive or CD-ROM drive and a standard miniature power connector for a floppy drive.



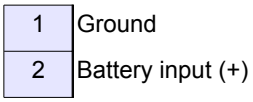
Signal	*Definition*
+5V I/O	This is provided by the on-board power supply, derived from the input power. It is switched off when the board is powered down.
+12V I/O	This is provided by the 12V input pin on the main power connector. It is switched off when the board is powered down.
Ground	These are 0V ground references for the power output voltage rails.

External Battery (EBAT1)

Connector EBAT1 is used to connect an external battery to augment or replace the on-board backup battery.

In addition to the external battery, the on-board battery is another possible sources for maintaining the Real-Time Clock and the CMOS BIOS settings for various system configurations. The battery that has the highest voltage will see the majority of the current draw, which is minimal.

Note: There must be a battery voltage input for the default power-up mode.



Signal	*Definition*
Battery Input	Battery input voltage. The battery voltage for this input should be 3V. The current draw averages under 5µA at 3V.
Ground	Battery ground.

LCD Backlight (INV1)

Connector INV1 provides the backlight power and control for the optional LCD panel. See the description for connector LVDS1 for detailed information on the LCD data interface.

The control signal is used to allow the system to power-down the backlight when the system enables monitor-power-down during power management control.

Note: If needed, 12V must be provided, either on one of the input power connectors or on the 12V pin (B9) of the PC/104 connector, for the LCD backlight to operate. The board does not generate the voltage, internally.

1	INV Sel
2	INVSel
3	Ground
4	Ground
5	Dispen
6	Brightness

Signal	***Definition***
INV Sel	+5V or +12V power supply for LCD Backlight assembly, jumper J18 selectable. The +12V supply is removed when the system is powered down.
Dispen	Enable (GPIO output) 0 = disable. open circuit = enable. GP35 0 = disable. 1 = enable. (**Default**)
Brightness	Brightness, 0-5VDC. 0V = max. 5V = min. GP36 0 = max. (**Default**) 1 = min.
Ground	Ground for LCD Backlight assembly.

Board Configuration Jumper

The following jumpers provide the board configuration options:

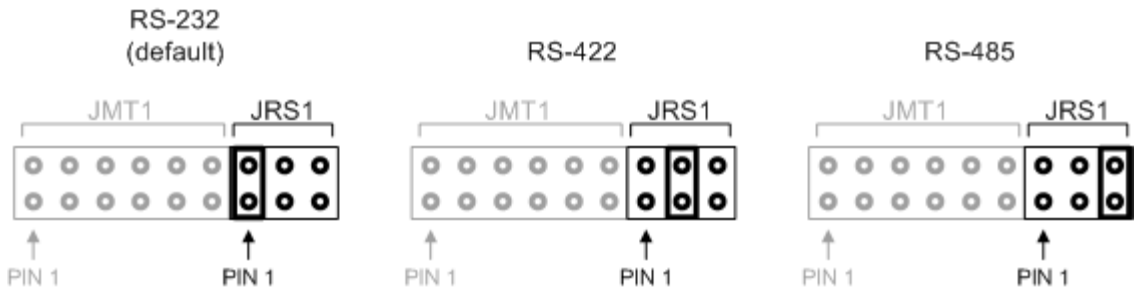
Jumper Block	*Configuration Functions*
JRS1	COM2 RS-232/422/485 select.
JTM1	COM2RS-232/RS-485 configuration.
J1	LCD configuration.
JVLCD1	LVDS panel voltage configuration.
JINV1	LCD backlight voltage configuration.
JBAT1	CMOS setup.

COM2 RS-232/422/485 Select (JRS1)

Use jumper JRS1 to select the COM2 RS-232/RS-422/RS-485 protocol option and RS-422/RS-485 termination, as shown in Figure 4.

Note: The JRS1 and JMT1 jumpers share the same jumper block.

Figure 4: Jumper Block JRS1 Settings

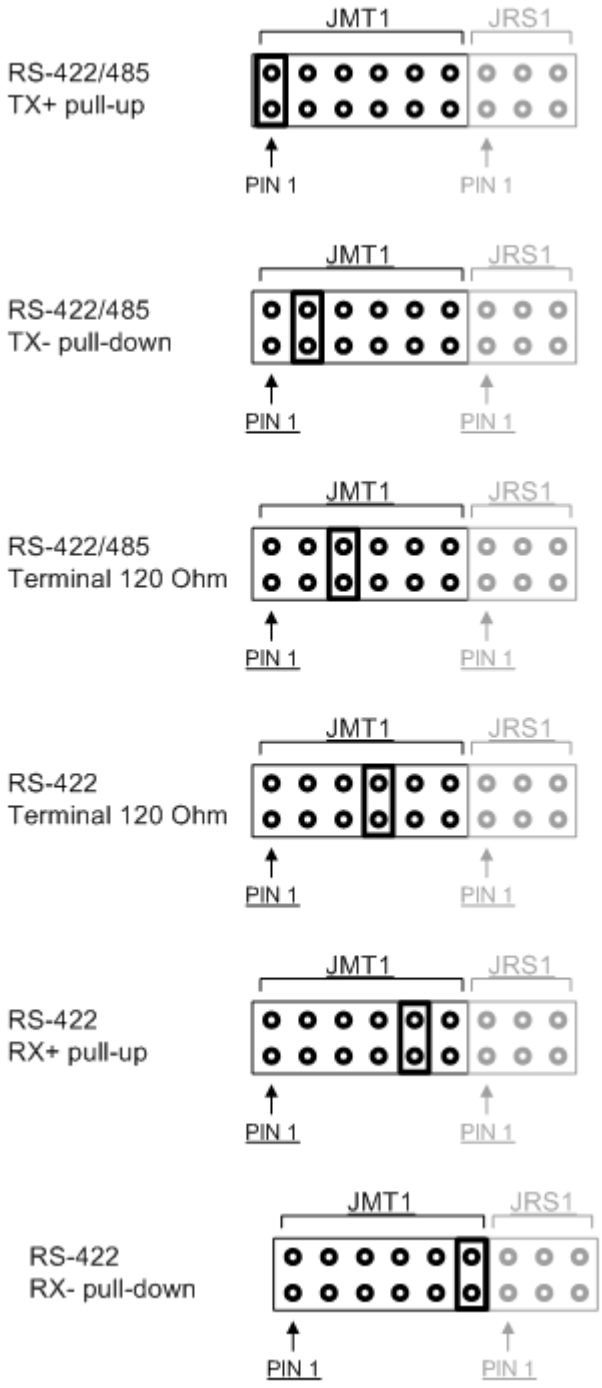


COM2 RS-232/RS-485 Configuration (JTM1)

Use jumper block JTM1 to configure the COM2 port in RS-422/485 modes, as shown in Figure 5. The default setting is with no jumpers installed.

Note: The JMT1 and JRS1 jumpers share the same jumper block.

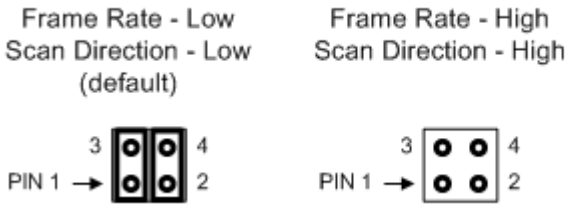
Figure 5: Jumper Block JTM1 Settings



LCD Configuration (J1)

Jumper block J1 configures the LCD frame rate and scan direction.

Figure 6: LCD Configuration Jumper Settings

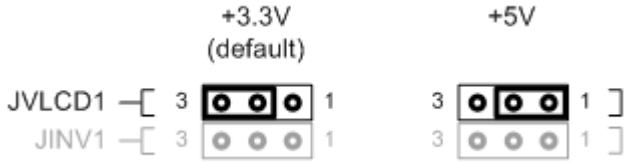


LVDS Panel Voltage Configuration (JVLCD1)

Jumper block JVLCD1 sets the LCD input voltage to +5V or +3.3V.

Note: The JVLCD1 and JINV1 jumpers share the same jumper block.

Figure 7: LVDS Panel Voltage Configuration

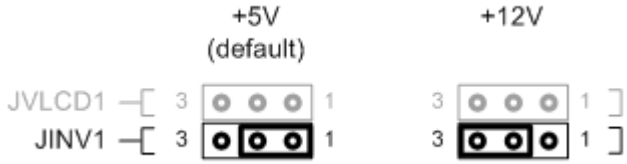


LCD Backlight Voltage Configuration (JINV1)

Jumper block JINV1 sets the LCD backlight voltage to +5V or +12V.

Note: The JINV1 and JVLCD1 jumpers share the same jumper block.

Figure 8: LCD Backlight Voltage Configuration



CMOS Setup (JBAT1)

The three-pin jumper block, JBAT1 shown in Figure 9, is used to maintain or clear the CMOS settings. Jumpering pins 1-2, the SBC powers up with the default BIOS settings and battery power is maintained to CMOS.

Figure 9: Jumper Block JBAT1 Settings

Follow these steps to clear the CMOS RAM.

1. Power-down the SBC.
2. Remove the JBAT1 jumper and move it to the clear CMOS position, jumpering pins 2-3.
3. Wait ten seconds.
4. Insert the jumper on pins 1-2.
5. Power-up the SBC.

Note: Before erasing CMOS RAM, record any custom BIOS settings.

Installation and Configuration

This section describes the steps needed to get your Pegasus board up and running, and assumes that you have also purchased the Pegasus Development Kit. The development kit includes all cables described in the previous section, a power supply, USB floppy drive, mounting hardware, IDE flashdisk and the flashdisk programmer board.

Hardware Installation

General Setup

Follow these steps to power on and verify the functionality of the Pegasus SBC. This process assumes you have a Pegasus SBC and cable kit.

6. Connect a VGA monitor to the SBC. Attach VGA cable number 6981084 to the VGA connector on the SBC and connect your monitor VGA c able to the DB9 socket.

7. Connect a keyboard and mouse to the SBC. Attach the PS/2 keyboard/mouse cable, number 6981162, to the PS/2 connector on the SBC and connect your keyboard and mouse devices to the connectors on the other end of the cable.

8. (Optional for USB keyboard/mouse) If you are using a USB keyboard and mouse, attach USB cable number 6981171 to the USB0-2 connector on the SBC and connect your keyboard and mouse devices to the connectors on the other end of the cable.

9. Connect an external IDE hard drive or CD device to the SBC. Attach the IDE ribbon cable, number 6981004, to the IDE/FlashDisk connector on the SBC and connect your IDE device to the connector on the other end of the cable.

   Note: You must provide an external source of power for your IDE device.

10. (Optional for USB storage device) If you are using a USB storage device, attach USB cable number 6981171 to the USB0-1 (USB2-3, if using a USB keyboard and mouse) connector on the SBC and connet your external storage device to the USB0 (USB2-3, if using a USB keyboard and mouse) connector on the other end of the cable.

11. Connect the SBC power. Attach power cable number 6981175 to the Power In connector on the SBC. Ensure that your +5V power source is off. Connect your +5V power source to the other end of the cable.

12. Turn on the power source.

The Pegasus BIOS screen should appear, followed by the SBC beginning booting from the external storage device.

When you plug PC/104 boards onto Pegasus, the BIOS may or may not recognize the new board. If the new board is not recognized, you may need to configure the new hardware in the BIOS before being able to use it. You can configure the system's IRQ/DMA resources from the BIOS's PnP/PCI Configuration screen. The following table shows the USB2-3, if using a USB keyboard and mouse IRQ levels.

IRQ Level	*Funcxtion*
IRQ 01	PC/AT Enhances PS/2 Keyboard
IRQ 03	Communications Port
IRQ 04	Communications Port
IRQ 05	Standard Enhanced PCI-to-USB Host Controller
IRQ 05	Standard Open HCD USB Host Controller
IRQ 06	Standard Floppy Disk Controller
IRQ 10	Advanced Micro Devices Win 2K/Win Graphics Driver
IRQ 10	Geode LX AES Crypto Driver
IRQ 11	Realtek RTL8139/810x Family Fast Ethernet NIC
IRQ 12	Microsoft PS/2 Mouse
IRQ 14	Primary IDE Channel

IDE Configuration

The on-board PCI IDE connector supports two IDE devices:

- A primary master.
- A primary slave.

The supported IDE devices include the on-board FlashDisk, a CompactFlash disk, a FlashDisk plug-in module on the IDE connector, or external IDE devices. You can configure the system's IDE devices from the BIOS Standard CMOS Features screen. Many devices have on-board jumpers for configuration as a master or slave. Consult the device User Manual for details.

The following tables show the possible IDE device combinations for Pegasus.

Model PGS800-256

Master	*Slave*
Device on IDE Connector	Device on IDE Connector
CompactFlash Disk	Device on IDE Connector

DOS Operating System Installation

User the following sequence to install DOS operating systems: MS-DOS, FreeDOS and ROM-DOS.

1. Enable the following in BIOS:

    - Floppy Drive detection.
    - Legacy USB support.

2. Change the BIOS boot sequence so the system boots through the USB floppy drive.

3. Insert the DOS installation floppy disk into the USB floppy drive and start/restart the system.

4. Install any drivers needed.

    Notes:

    1. For DOS Ethernet, set *Operating System* to *other* in the BIOS.

    2. DOS Sound emulation is currently not functional.

CompactFlash Issues under DOS

CompactFlash is incompatible with some utilities, under some versions of DOS.

- CompactFlash with ROM-DOS

  The ROM-DOS FDISK utility does not work with CompactFlash drives. The ROM-DOS FORMAT and SYS do work, however. If CompactFlash already has a DOS partition, the ROM-DOS utilities can be used to FORMAT the CompactFlash and install operating system files on CompactFlash.

- CompactFlash with FreeDOS

  The FreeDOS FDISK or FORMAT utility do not work with CompactFlash. However, the FreeDOS SYS utility is functional with CompactFlash.

- CompactFlash with MS-DOS

  The MS-DOS FDISK, FORMAT, and SYS utilities are not functional when used with CompactFlash. The MS-DOS operating system files cannot be installed on CompactFlash flash.

Boot Procedures

Booting into MS-DOS, FreeDOS or ROM-DOS

This section describes how to boot into a DOS-based operating system using a bootable floppy disk.

1. Plug the USB floppy drive into one of the USB terminals of cable 6981171.
2. Insert your DOS-based boot disk into the USB floppy drive.
3. Connect the power supply to the wall (to provide power to Pegasus).
4. At this point the Pegasus will boot and you should see the BIOS power-on self test. Press F2 to enter BIOS configuration.
5. Under the "Advanced" menu, scroll to "Legacy USB Support" and enable it. (Without enabling this option, the BIOS will not boot from a disk in the USB floppy drive).
6. Reboot the system to boot from your floppy disk.

Booting into Linux

This section describes how to setup the Pegasus board in preparation for a Linux install, from an installation CD-ROM onto a laptop IDE hard drive.

1. Connect the IDE FashDisk programmer board to IDE1.
2. Connect a CD-ROM drive jumpered for the slave position to the IDE FlashDisk programmer board through the 40-pin cable.
3. Connect the CD-ROM drive using cable 6981006 attached to IO_P1. Be sure that an external 12VDC source is being suppled to the CD-ROM.
4. Connect a laptop hardvdrive jumpered for master position to the second slot of the 44-pin cable.
5. Boot the Pegasus by plugging the power supply into the wall.
6. Press F2 at the power-on self test to go to the BIOS configuration screen.
7. Go to the "Boot" menu and confirm that the CD-ROM drive is first boot device.
8. Insert the boot CD for your operating system into the CD-ROM drive.
9. Save the BIOS settings and reboot.
10. You should now be able to install your OS.

BIOS Setup

Pegasus uses a BIOS from Phoenix Technologies modified to support the custom features of the Pegasus board.

(See the detailed BIOS settings in Appendix A – BIOS CMOS Option Listing)

To change the BIOS settings, repeatedly press the delete key <Del> during system startup power-on self-test (POST).

System I/O Description

Ethernet

The Ethernet port is built into the AMD Geode chipset and is connected to the system via the board's internal PCI bus.

A DOS utility program is provided for testing the chip and accessing the configuration EEPROM. Each board is factory-configured for a unique MAC address using this program. To run the program, boot the computer to DOS because the program will not run properly in a DOS window. In normal operation this program is not required.

Additional software support includes a packet driver with software to allow a full TCP/IP implementation.

Serial Ports

Pegasus contains two serial ports. Each port is capable of transmitting at speeds up to 115.2Kbaud. Ports COM1 and COM2 are built into the AMD Geode chipset, which are standard 16550 UARTs with 16-byte FIFOs.

The serial ports use the following default system resources.

Port	*I/O Address Range*	*IRQ*
COM1	3F8-3FF	4
COM2	2F8-2FF	3

The COM1 and COM2 settings may be changed in the system BIOS. Select the *TBD* menu to modify the base address and interrupt level.

PS/2 Ports

Pegasus supports two PS/2 ports.

- Keyboard
- Mouse

Support for these ports is independent of, and in addition to, mouse and keyboard support using the USB ports.

USB Ports

Four USB 2.0 ports are intended primarily for the following devices, although, any USB-standard device should function.

- Keyboard
- Mouse
- USB Floppy Drive (This is required for Crisis Recovery of boot ROM.)
- USB flash disk

The BIOS supports the USB keyboard during BIOS initialization screens and legacy emulation for DOS-based applications.

The USB ports can be used for keyboard and mouse at the same time that the PS/2 keyboard and mouse are connected.

System Resources

The table below lists the default system resources utilized by the circuits on Pegasus.

Device	*Address*	*ISA IRQ*	*ISA DMA*
Serial Port COM1	I/O 0x3F8 – 0x3FF	4	–
Serial Port COM2	I/O 0x2F8 – 0x2FF	3	–
IDE Controller A	I/O 0x1F0 – 0x1F7	14	–
Watchdog Timer/Serial Port/FPGA Control	I/O 0x25C-0x25F	–	–
Ethernet	OS-dependent	OS-dependent	–
USB	OS-dependent	OS-dependent	–
Video	OS-dependent	OS-dependent	–

Most of these resources are configurable and, in many cases, the Operating System alters these settings. The main devices that are subject to this dynamic configuration are on-board Ethernet, sound, video, USB, and any PC/104-*Plus* cards that are in the system. These settings may also vary depending on what other devices are present in the system. For example, adding a PC/104-*Plus* card may change the on-board Ethernet resources.

The serial port settings for COM2 are jumper-selectable, using jumper block JRS1.

Console Redirection to a Serial Port

In many applications without a local display and keyboard, it may be necessary to obtain keyboard and monitor access to the CPU for configuration, file transfer, or other operations. Pegasus supports this operation by enabling keyboard input and character output onto a serial port, referred to as console redirection. A serial port on another PC can be connected to the serial port on Pegasus with a null modem cable, and a terminal emulation program, such as HyperTerminal, can be used to establish the connection. The terminal program must be capable of transmitting special characters including F2 (some programs or configurations trap special characters).

The default Pegasus BIOS setting disables console redirection.

There are three possible configurations for console redirection:

- POST-only (default)
- Always On
- Disabled

To modify the console redirection settings,

1. Enter the BIOS

2. Select the Advanced menu

3. Select Console Redirection.

4. In Com Port Address, select Disabled to disable the function, On-board COM A for COM1, or On-board COM B for COM2 (default).

   If you select Disabled, you will not be able to enter BIOS again during power-up through the serial port.

To reenter BIOS when console redirection is disabled, you must either install a PC/104 video board and use a keyboard and terminal or erase the CMOS RAM, which will return the BIOS to its default settings. CMOS RAM may be erased by removing the jumper on the JBAT1 jumper block.

Note: Before erasing CMOS RAM, write down any custom BIOS settings you have made.

If you erase the CMOS RAM, the next time the CPU powers up COM2 returns to the default settings of 115.2Kbaud, N, 8, 1 and operates only during POST.

If you selected COMA or COMB, continue with the configuration, as follows.

1. For Console Type, select PC ANSI.

2. You can modify the baud rate and flow control here if desired.

3. At the bottom, for Continue C.R. after POST, select Off (default) to turn off after POST or select On to remain on always.

4. Exit the BIOS and save your settings.

Watchdog Timer

Pegasus contains a watchdog timer circuit consisting of two programmable timers, WD1 and WD2, cascaded together. The input to the circuit is WDI and the output is WDO. WDI may be triggered in hardware or in software. A special "early" version of WDO may be output on the WDO pin. When this signal is connected to WDI, the watchdog circuit is re-triggered automatically.

The duration of each timer is user-programmable. When WD1 is triggered, it begins to count down. When it reaches zero, it triggers WD2, sets WDO high, and may also generate a user-selectable combination of the following events.

- System Management interrupt (SMI)
- Hardware reset

WD2 then begins to count down. When the WD2 counter reaches zero, it unconditionally causes a hardware reset. The WD2 timer gives external circuits time to respond to the WDO event before the hardware reset occurs.

The watchdog timer circuit is programmed via I/O registers located on Page 0: Base +28-31.

Flash Memory

Pegasus contains a 512KB, 16-bit wide flash memory chip for storage of BIOS and other system configuration data.

Backup Battery

Pegasus contains an integrated RTC/CMOS RAM backup battery. This battery has a capacity of 120mAH and will last over five years in power-off state.

The on-board battery is activated for the first time during initial factory configuration and test. Storage temperature of the board can affect the total battery life. Storage at 23ºC is recommended.

System Reset

Pegasus contains a chip to control system reset operation. Reset occurs under the following conditions.

- User causes reset with a ground contact on the *Reset* input.
- Input voltage drops below 4.75V.
- Over-current condition on output power line .

The ISA Reset signal is an active high pulse with a 200ms duration. The PCI Reset is active low, with a typical pulse width duration of 200 msec.

On-Board Video

Pegasus provides VGA CRT and LVDS flat panel video using the built-in AMD Geode chipset.

Watchdog Timer Programming

Pegasus contains a watchdog timer circuit consisting of one programmable timer. The input to the circuit is WDI and the output is WDO, which appear on connector J6. WDI may be triggered in hardware or in software. A special "early" version of WDO may be output on the WDO pin. When this signal is connected to WDI, the watchdog circuit is retriggered automatically.

The watchdog timer duration is user-programmable. When WDT is triggered, it begins to count down. Upon reaching zero, it generates a user-selectable combination of the following events.

- System management interrupt
- Hardware reset

The watchdog timer circuit is programmed using I/O registers located at address 0x25C. Detailed programming information is described, below.

Watchdog Timer Register Details

The registers in the following table are used to program the watchdog timer.

I/O Address	***Write Function***	***Read Function***
0x25C	WDT trigger	None, write-only
0x25D	WDT, counter	None, write-only
0x25E	Watchdog control	Readback
0x25F	Chip select enable/disable	Readback the last bits written

In the tables, below, a blank bit (-) indicates the bit is unused. A blank bit in the read registers reads back as 0 or 1, unknown state.

I/O Address: 0x25C (Write)

Bit:	7	6	5	4	3	2	1	0
Name:	-			WDTRIG	-			

WDTRIG Writing a 1 triggers an immediate software reload of the watchdog timer.

I/O Address: 0x25D (Write)

Bit:	7	6	5	4	3	2	1	0
Name:	WDT3	WDT2	WDT1	WDT0	-			

WDT0-3 Writing to bits WDT0-3 loads the watchdog timer with the 4-bit counter value. Use this register to set the countdown period. Each tick is 145ms, so the period range is 145ms (1) to 2.175ms (15).

I/O Address: 0x25E (Read/Write)

Bit:	7	6	5	4	3	2	1	0
Name:	WDIEN	WDOEN	WDSMI	WDEDGE	-			

WDIEN 0 = Disable edges on the WDI pin, retriggering watchdog timer.
1 = Enable egdes on the WDI pin retriggering watchdog timer.

WDOEN 0 = Disable edge on WDO pin when watchdog timer reaches 1.
1 = Enable edge on WDO pin when watchdog timer reaches 1.

WDSMI 0 = Disable system management interrupt signal when watchdog timer reaches 0.
1 = Enable system management interrupt signal when watchdog timer reaches 0.

WDEDGE 0 = Falling edge on WDI retriggers watchdog timer, when WDIEN = 1.
1 = Rising edge on WDI retriggers watchdog timer, when WDIEN = 1.

I/O Address: 0x25F (Read/Write)

Bit:	7	6	5	4	3	2	1	0
Name:	COM4EN	COM3EN	FPGAEN	WDEN	-			

COM4EN COM4 chip select enable.
1 = Enable COM4-CS#.
0 = Disable COM4-CS#.

COM3EN COM3 chip select enable.
1 = Enable COM3-CS#.
0 = Disable COM3-CS#.

FPGAEN FPGA chip select enable.
1 = Enable FPGA-CS#.
0 = Disable FPGA-CS#.

WDEN Watchdog enable.
1 = Watchdog timer counter enable.
0 = Watchdog timer counter disable, WDO disable, WDI disable, CPURST# disable, EXTSMI# disable.

The CPLD initializes all values to zero on power up, and the BIOS enables each resource based on BIOS settings.

Example: Watchdog Timer With Software Trigger

A software trigger relies on a thread of execution to constantly trigger watchdog timer A. If the thread is ever halted, timer A decrements to zero and starts timer B. Once timer B decrements to 0, the board resets.

In this example we set the watchdog timer to a countdown period of four seconds. Longer timeout periods are typically be used for a software-based watchdog timer, to accommodate varying software latencies, such as interrupt latencies and thread pre-emption, that may delay the watchdog trigger code.

Setting up the watchdog timer:

```
outp(base + 0, 0x00);           //set page 0
```

```
outp(base + 28, 40000 & 0xFF);  //set LSB of WD timer A (4 seconds)
outp(base + 29, (40000 >> 8) & 0xFF);   //set MSB of WD timer A
outp(base + 30, 0xFF);          //set WD timer B to 0.0255 seconds
outp(base + 31, 0x28);          //set WDEN=1, WDRST=1 (enable WD timer, reset)
```

With the timer setup and active, run the watchdog timer trigger in a continuous thread of code.

```
while (1)
{
    outp(base + 31, 0x80);  //trigger watchdog timer
    sleep(1000);            //sleep one second
}
```

If this thread is interrupted for any reason, the board resets four seconds after the last watchdog timer trigger.

Example: Watchdog Timer With Hardware Trigger

A hardware trigger relies on an external pulse to constantly trigger watchdog timer A. If the external stream of pulses ever halts, timer A decrements to zero and starts timer B. Once timer B decrements to 0, the board resets.

In this example, we will make use of the T-1 feature of timer A to automatically reset itself unless a physical connection is broken. The physical connection must be made between WDO and WDI on the data acquisition header, J6.

Since software is not involved in maintaining the timer, we can set the reset period to a much smaller value. In this example, the reset pulse travels across the physical connection every 10 milliseconds.

```
outp(base + 0, 0x00);           //set page 0
outp(base + 28, 100 & 0xFF);        //set LSB of WD timer A (10 milliseconds)
outp(base + 29, 100 >> 8) & 0xFF);      //set MSB of WD timer A
outp(base + 30, 0xFF);          //set WD timer B to 0.0255 seconds
outp(base + 31, 0x2D);          //set WDEN=1, WDRST=1, WDT-1=1, WDIEN=1
```

When timer A reaches 1, a rising edge flows from WDO to WDI, resetting the timer back to 100 and lowering WDO.

When the connection from WDO to WDI is broken, the rising edge never reaches WDI and system resets.

FlashDisk Module

Pegasus is designed to accommodate an optional solid-state FlashDisk module. Diamond Systems offers IDE flashdisk modules that contain 128MB to 4GB of solid-state non-volatile memory that operates like an IDE drive without requiring additional driver software support.

Model	*Capacity*
FD-128R-XT	128MB
FD-256R-XT	256MB
FD-512R-XT	512MB
FD-1GR-XT	1GB
FD-2GR-XT	2GB
FD-4GR-XT	4GB

Figure 10: FlashDisk Module

Installing the FlashDisk Module

The FlashDisk module installs directly on the IDE connector, IDE1, and is held down with a spacer and one screw onto a mounting hole on the board.

The FlashDisk module contains a jumper for master/slave configuration. For master mode, install the jumper over pins 1 and 2. For slave mode, install the jumper over pins 2 and 3.

Configuration

To configure the SBC to work with the FlashDisk module, enter the BIOS by pressing F2 during startup. Select the Main menu, and then select *IDE Primary Master*. Enter the settings shown in the following table.

Setting	*Value*
Type	User
Cylinders	977 for 128MB flashdisk
Heads	8 for 128MB flashdisk
Sectors	32 for 128MB flashdisk
Multi Sector Transfer	Disable
LBA Mode Control	Enable
32 Bit I/O	Disable
Transfer Mode	Fast PIO 1
Ultra DMA Mode	Disable

Exit the BIOS and save the change. The system will now boot and recognize the FlashDisk module as drive *C:*.

Using the FlashDisk with Another IDE Drive

The FlashDisk occupies the board's 44-pin IDE connector and does not provide a pass-through connector. To utilize both the FlashDisk and a notebook drive, the Diamond Systems ACC-IDEEXT adapter and cables are required.

Power Supply

The 44-pin cable carries power from the SBC to the adapter board and powers the FlashDisk module and any drive using a 44-pin connector, such as a notebook hard drive.

A drive utilizing a 40-pin connector, such as a CD-ROM or full-size hard drive, requires an external power source through an additional cable. The power may be provided from the SBC's power out connector, IO_P1, or from one of the two 4-pin headers on the ACC-IDEEXT board. Pegasus cable number 6981006 may be used with either power connector to bring power to the drive.

FlashDisk Programmer Board

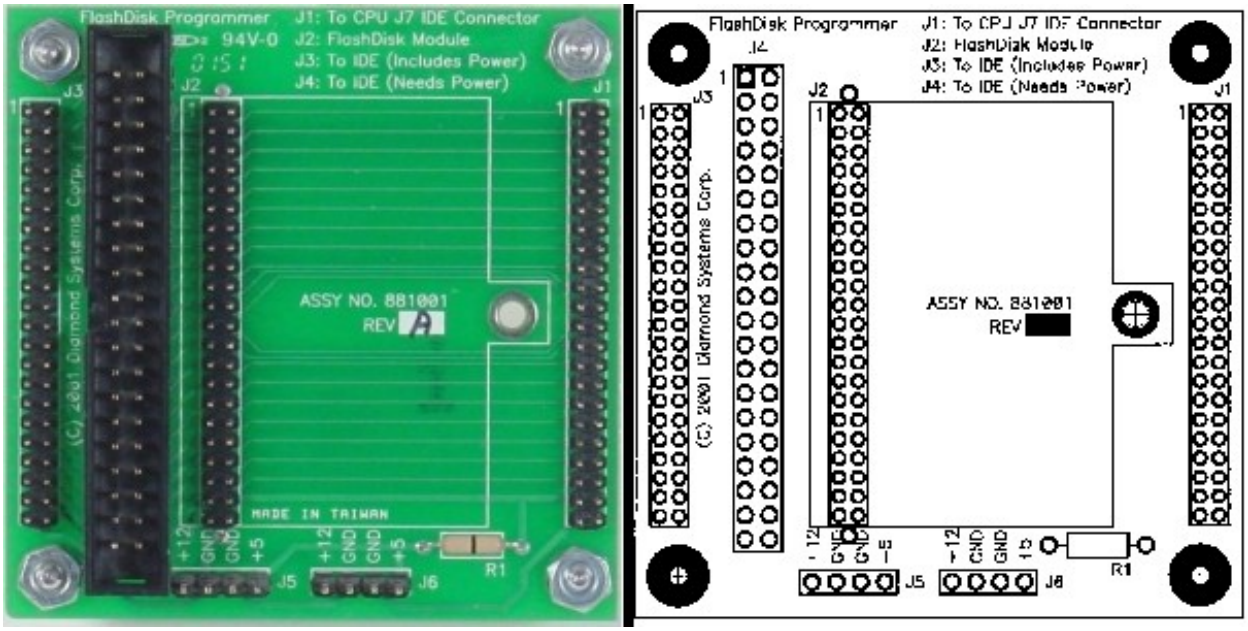
The FlashDisk Programmer Board accessory, model number ACC-IDEEXT, may be used for several purposes. Its primary purpose is to enable the simultaneous connection of both a FlashDisk module and a standard IDE hard drive or CD-ROM drive, to allow file transfers to/from the FlashDisk. This operation is normally done at system setup. The board can also be used to enable the simultaneous connection of two drives to the SBC.

Connector J1 connects to the IDE connector on Pegasus with a 44-pin ribbon cable (Diamond Systems part no. 6981004). Both 40-pin .1-inch spacing, J4, and 44-pin 2mm spacing, J3, headers are provided for the external hard drive or CD-ROM drive. A dedicated connector, J2, is provided for the FlashDisk module. Any two devices may be connected simultaneously using this board with proper master/slave jumper configurations on the devices.

The FlashDisk Programmer Board comes with a 44-wire cable no. (DSC no. 6981004) and a 40-wire cable no. (DSC no. C-40-18) for connection to external drives. The FlashDisk module is sold separately.

The 44-pin connector (J1, J2 and J3) and mating cable carry power, but the 40-pin connector and mating cable do not. Connectors J5 and J6 on the accessory board may be used to provide power to a 44-pin device attached to the board when the board is attached to a PC via a 40-pin cable. These headers are compatible with the floppy drive power connector on a standard PC internal power cable.

Figure 11: FlashDisk Programmer Board Layout



I/O Cables

Diamond Systems offers cable kit C-PGS-KIT with the following cables to connect to all I/O headers on the board. Some cables are also available separately.

Figure 12: Pegasus Cable Kit (C-PGS-KIT)

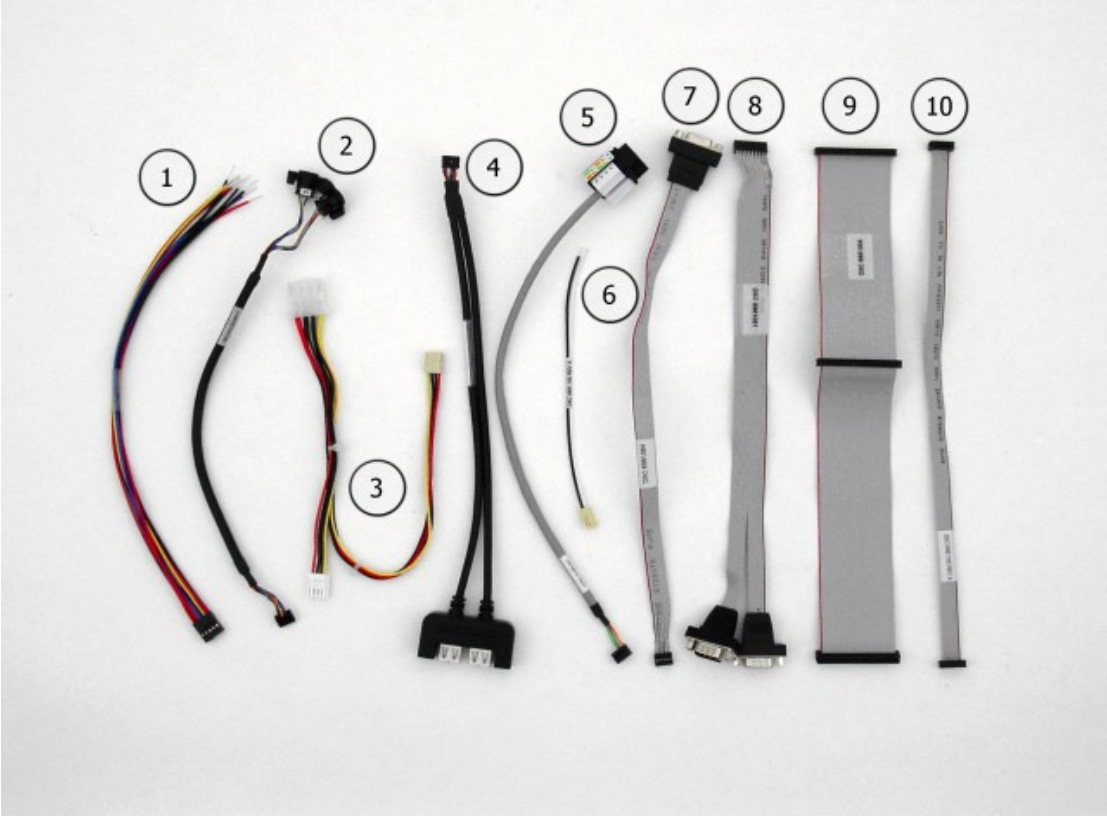


Photo No.	*Cable No.*	*Description*
1	6981175	Power in
2	6981162	Keyboard/mouse
3	6981006	Power out
4	6981171	Dual USB (quantity 2)
5	6981161	RJ45
6	6981180	External battery
7	6981084	VGA
8	6981081	2x Serial Port COM1/2
9	6981004	44-Position ribbon HDD, IDE
10	6981165	Miscellaneous

Specifications

CPU

- Processor: AMD Geode LX800
- Speed: 500MHz
- Power consumption: 5W
- Cooling: Fanless
- Operating Temperature: -40 to +85ºC

Bus and Memory

- System Bus: 100MHz
- SDRAM memory: 256MB 533MHz DDR2 soldered on-board
- Bus interface: PC/104-*Plus* (ISA+PCI)

Peripherals

- Display type: CRT or 18/24-bit dual channel LVDS flat panel
- CRT resolution: 1600 x 1200
- Flat Panel Resolution : UXGA 1280x1024
- Video memory: 64MB UMA
- USB ports: (4) USB 2.0
- Serial ports: (1) RS-232 and (1) RS-232/422/485
- Networking: 10/100Base-T Ethernet
- Mass storage interfaces: (1) IDE UDMA 33, Fashdisk interface
- Keyboard/mouse: PS/2

Power Supply

- Input Voltage: +5VDC ±5% @ 1.0A, typical

General

- Dimensions: 4.050” x 3.775”
- Weight: 4.5 oz.
  MTBF: 87,400 hours

Additional Information

Additional information can be found at the following websites.

- Diamond Systems Corporation: http://www.diamondsystems.com
- AMD Geode LX Processor Family, Technical Specifications: http://www.amd.com/us-en/ConnectivitySolutions/ProductInformation/0,,50_2330_9863_13022%5E13058,00.html

Technical Support

For technical support, please email support@diamondsystems.com or contact Diamond Systems technical support at 1-650-810-2500.

Appendix A – BIOS CMOS Option Listing

This section describes the steps for modifying the BIOS settings and describes the BIOS screens.

Viewing and Modifying the BIOS Settings

During board startup, repeatedly press the delete key <Del> to enter BIOS setup mode.

The main page displays the following menu options.

- Standard CMOS Features
- Advanced Chipset Features
- Integrated Peripherals
- PnP/PCI Configurations
- PC Health Status
- Load Optimized Defaults
- Set Password
- Save & Exit Setup
- Exit Without Saving

Select the menu option to view or modify the BIOS settings for the desired configuration area. The screens displayed for each area are described, below.

The following keyboard controls for navigating the screen are available on any page, displayed at the bottom of the page.

Key	***Function***
Esc	Exit current screen.
up-/down-arrow	Select setup item.
left-/right-arrow	Select menu item.
plus/minus symbols (+/-)	Change values.
F1	Help.
F5	Save previous values.
F6	Save default values.
F7	Save optimized default values.
F10	Exit BIOS setup.

At any time, select one of the exit options from the main screen, or press <F10>, to exit BIOS setup mode. At the prompt, enter **Y** (yes) to take the selected exit action or **N** (no) to disregard the exit action and remain in the current screen.

BIOS Screen Descriptions

This section describes the screen displays for each BIOS setup area.

Where "Change Not Allowed" is indicated, it is because the configuration item is not supported by the current hardware version. The configuration item is displayed for future expansion.

Standard CMOS Features

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
System Date	00/00/00	-	Month/day/year.	-
System Time	00:00:00	-	Hours:minutes:seconds; 24-hour format.	-
IDE Primary Master	-	-	See Primary Master HDD Setup.	-
IDE Primary Slave	-	-	Same as IDE Primary Master.	-
Video	-	EGA/VGA CGA 40 CGA 80 MONO	-	-
Halt On	-	All Errors No Errors All, But Keyboard All, But Diskette All, But Disk/Key	-	-

IDE Primary Master/Slave Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
IDD HDD Auto-Detection	-	-	When this field is highlighted, press **Enter** to auto-detect the HDD size and configuration parameters. A progress message displays while the system detects the installed HDD.	-
IDE Primary Master	-	None Auto Manual	-	-
Access Mode	-	CHS LBA Large Auto	-	-

Advanced BIOS Features

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
First Boot Device	-	HDD-0 CDROM HDD-1 USB-FDD USB-ZIP USB-CDROM USB-HDD LAN	Sets the boot device priority. This field specifies the highest priority device.	-
Second Boot Device	-	(Same as FBD)	Sets the boot device priority. This field specifies the secong-highest priority device.	-
Boot Other Device	-	Disabled Enabled	Enables or disables booting from the secondary boot device.	-
Boot Up NumLock Status	-	Off On	Sets the numlock state at power-on.	-
Security Option	-	Setup System	Specifies when a password is required: only when you enter BIOS setup or whenever the system boots. The password is specified using a separate main menu entry.	-
Console Redirection	-	Disabled Enabled	Enables or disables console redirection.	-
Baud Rate	-	9600 19200 38400 57600 115200	For console redirection, specifies the desired baud rate.	-
Agent Connect via	-	Null	The agent connects directly.	-
Agent wait time (min)	-	1 2 4 8	Timeout (minutes) to wait to connect to agent.	-
Agent after boot	-	Disabled Enabled	Enables or disables agent running after OS boot.	-

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
Video Memory Size	-	NONE 8M 16M 32M 64M 128M 254M	-	-
Output display	-	Flat Panel CRT Panel & CRT	-	-
Flat Panel Configuration	-	-	See Flat Panel Configuration Setup.	-
Memory Hole At 15M-16M	-	Disabled Enabled	-	-

Flat Panel Configuration Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
Resolution	-	320 X 240 640 X 480 800 X 600 1024 X 768 1152 X 864 1280 X 1024 1600 X 1200 800 X 480	Specifies flat panel resolution.	-
Refresh Rate	-	60 Hz 70 Hz 72 Hz 75 Hz 85 Hz 90 Hz 100 Hz	Specifies flat panel refresh rate.	-

Integrated Peripherals Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
OnChip IDE Device	-	-	See OnChip IDE Device Setup.	-
SuperIO Device	-	-	See SuperIO Device Setup.	-
IT8888 ISA Decode IO	-	-	See IT8888 ISA Decode IO Setup.	-
IT8888 ISA Decode Memory	-	-	See IT8888 ISA Decode Memory Setup.	-
IT8888 DDMA	-	-	See IT8888 DDMA Setup.	-
Onboard Lan Boot ROM	-	Enabled Disabled	Enables or disables invoking the on-board boot ROM on the on-board LAN chip.	-
Init Display First	-	PCI Slot Onboard	-	-

OnChip IDE Device Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
Master Drive PIO Mode	-	Auto Mode 0 Mode 1 Mode 2 Mode 3 Mode 4	-	-
Slave Drive PIO Mode	-	(Same as Master Drive PIO Mode)	-	-
IDE Primary Master UDMA	-	Disabled Auto	-	-
IDE Primary Slave UDMA	-	Disabled Auto	-	-
IDE DMA transfer access	-	Disabled Enabled	-	-
IDE HDD Block Mode	-	Disabled Enabled	If your HDD supports block mode, select **Enable** to auto-detect the optimum number of read/writers per sector the HDD supports.	-

SuperIO Device Setup

Configuration Item	*Default Value or User Entry*	*Optional Values*	*Comments*	*Change Not Allowed*
Serial Port 1	-	Disabled 3F8/IRQ4 2F8/IRQ3 3E8/IRQ4 2E8/IRQ3 Auto	-	-
Serial Port 2	-	(Same as Serial Port 1)	-	-
Brightness Control	-	Low High	-	-

IT8888 ISA Decode IO Setup

Configuration Item	*Default Value or User Entry*	*Optional Values*	*Comments*	*Change Not Allowed*
Decode I/O Space *n*	-	Disabled Enabled	-	-
Decode I/O Speed *n*	-	Subtractive Speed Slow Speed Medium Speed Fast Speed	-	-
Decode I/O Addr. *n*	-	Min = *xxxx* Max = *xxxx*	“Key in a HEX number”	-
Decode I/O Size *n*	-	1 Bytes 2 Bytes 4 Bytes 8 Bytes 16 Bytes 32 Bytes 64 Bytes 128 Bytes	-	-

IT8888 ISA Decode Memory Setup

Configuration Item	*Default Value or User Entry*	*Optional Values*	*Comments*	*Change Not Allowed*
Decode Memory Space *n*	-	Disabled Enabled	-	-
Decode Memory Speed *n*	-	Subtractive Speed Slow Speed Medium Speed Fast Speed	This field can only be modified if *Decode Memory Space n* is *Enabled*.	-
Decode Memory Addr. *n*	-	Min = *nnnn* Max = *nnnn*	This field can only be modified if *Decode Memory Space n* is *Enabled*. Key in a HEX number.	-
Decode MemorySize *n*	-	16 KB 32 KB 64 KB 128 KB 256 KB 512 KB 1 MB 2 MB	This field can only be modified if *Decode Memory Space n* is *Enabled*.	-

IT8888 DDMA Setup

Configuration Item	*Default Value or User Entry*	*Optional Values*	*Comments*	*Change Not Allowed*
DDMA*n* Support	-	Disabled Enabled	-	-

PnP/PCI Configurations Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
PNP OS Installed	-	No Yes	If you are using a plug-and-play capable OS, select **Yes**. Otherwise, select **No** to have the BIOS configure the non-boot devices.	-
Reset Configuration Data	Disabled	Enabled Disabled	-	-
Resources Controlled By	-	Auto(ESCD) Manual	-	-
IRQ Resources	-		See IRQ Resources Setup.	-
Memory Resources	-		See Memory Resources Setup.	-
PCI/VGA Palette Snoop	-	Disabled Enabled	-	-

IRQ Resources Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
IRQ-n assisnged to	-	PCI Device Reserved	Select PCI Device for PCI or ISA devices compliant with the plug-and-play architecture. Used to configure IRQs 3, 4, 5, 9, 10, 11 and 12.	-

Memory Resources Setup

Configuration Item	***Default Value or User Entry***	***Optional Values***	***Comments***	***Change Not Allowed***
Reserved Memory Base	-	N/A C800 CC00 D000 D400 D800 DC00	-	-
Reserved Memory Length	-	8K 16K 32K 64K	This field can only be modified if a non-*N/A* Memory Base is selected.	-

PC Health Status

Select the PC Health Status menu item to monitor the following parameters:

Parameter	***Description***
Current CPU Temperature	
CPU VCore	
MEM Vcore	
VCC3	
+5V	
+12V	
VBAT(V)	

Load Optimized Defaults

Selecting the Load Optimized Defaults menu item prompts you to confirm whether or not you want to load the optimized default values. Enter **Y** (Yes) or **N** (No) to take the desired action.

Set Password

You may choose to require a password to protect BIOS parameter modification. Selecting the Set Password menu item prompts you to define a password. There are no restrictions on the length or character in the password. If you choose not to require a password, press **Enter** <CR> without entering anything in the field. A confirmation message will be displayed indicating that the password is disabled.