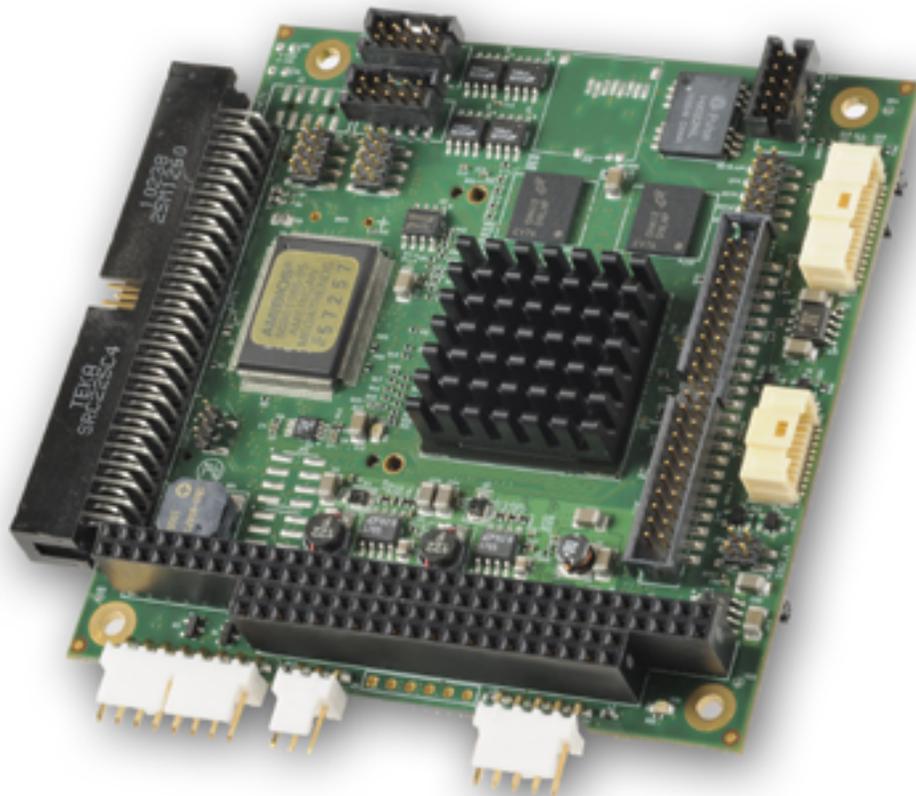




PCM-VDX-1-256

PC/104 Single Board Computer
with Vortex86DX Processor

PRODUCT MANUAL



WinSystems, Inc.
715 Stadium Drive
Arlington, TX 76011

<http://www.winsystems.com>

MANUAL REVISION HISTORY

P/N 400-0373-000

Revision Date Code	ECO Number
110708	Initial release
110725	
110727	
110819	
111117	
120809	
140203	ECO 14-
140807	14-75

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BEFORE YOU BEGIN

WinSystems offers best practice recommendations for using and handling WinSystems embedded PCs. These methods include valuable advice to provide an optimal user experience and to prevent damage to yourself and/or the product.

YOU MAY VOID YOUR WARRANTY AND/OR DAMAGE AN EMBEDDED PC BY FAILING TO COMPLY WITH THESE BEST PRACTICES.

Reference [Appendix - A](#) for **Best Practices**.

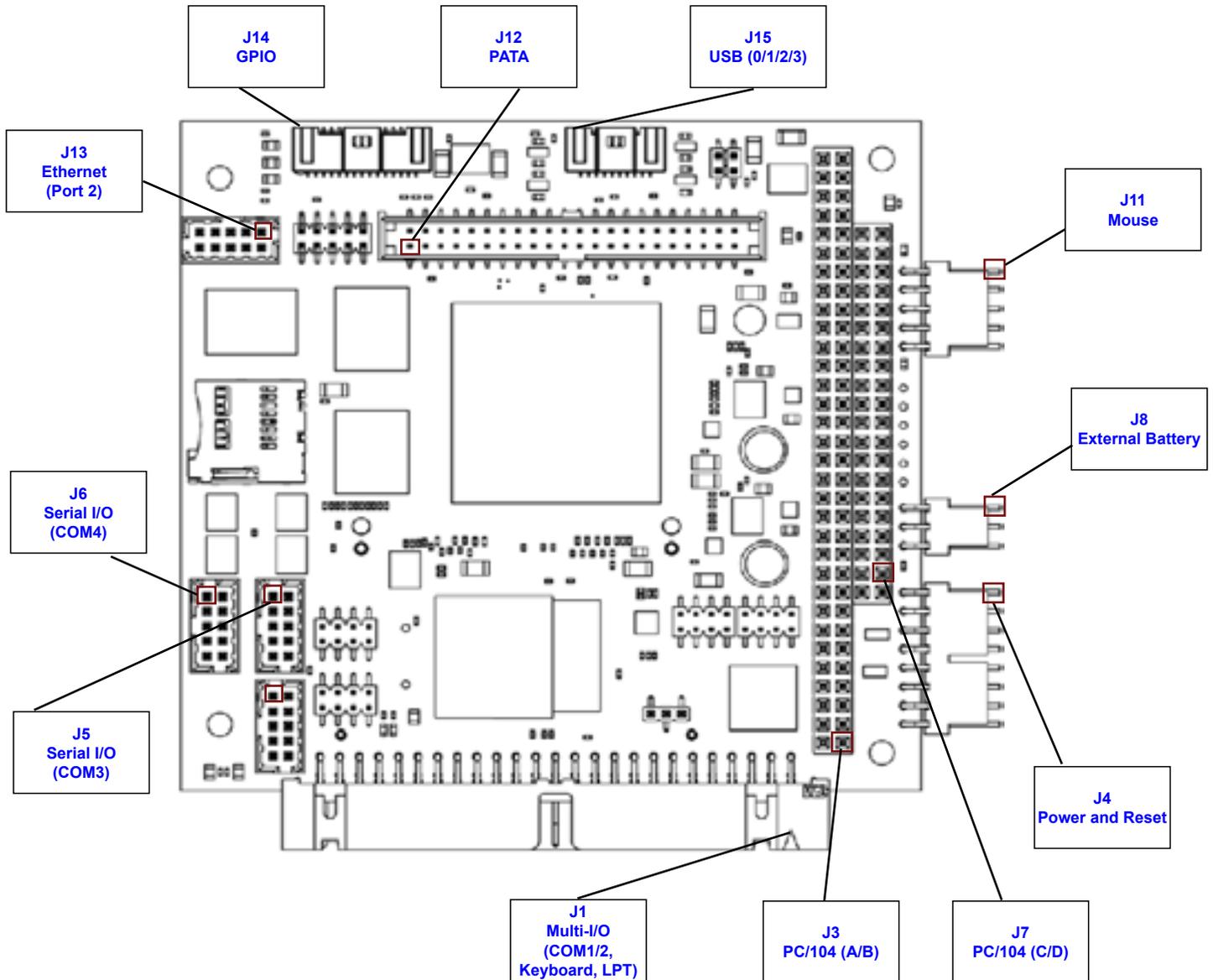


Please review these guidelines carefully and follow them to ensure you are successfully using your embedded PC.

This product ships with a heat sink. Product warranty is void if the heat sink is removed from the product.

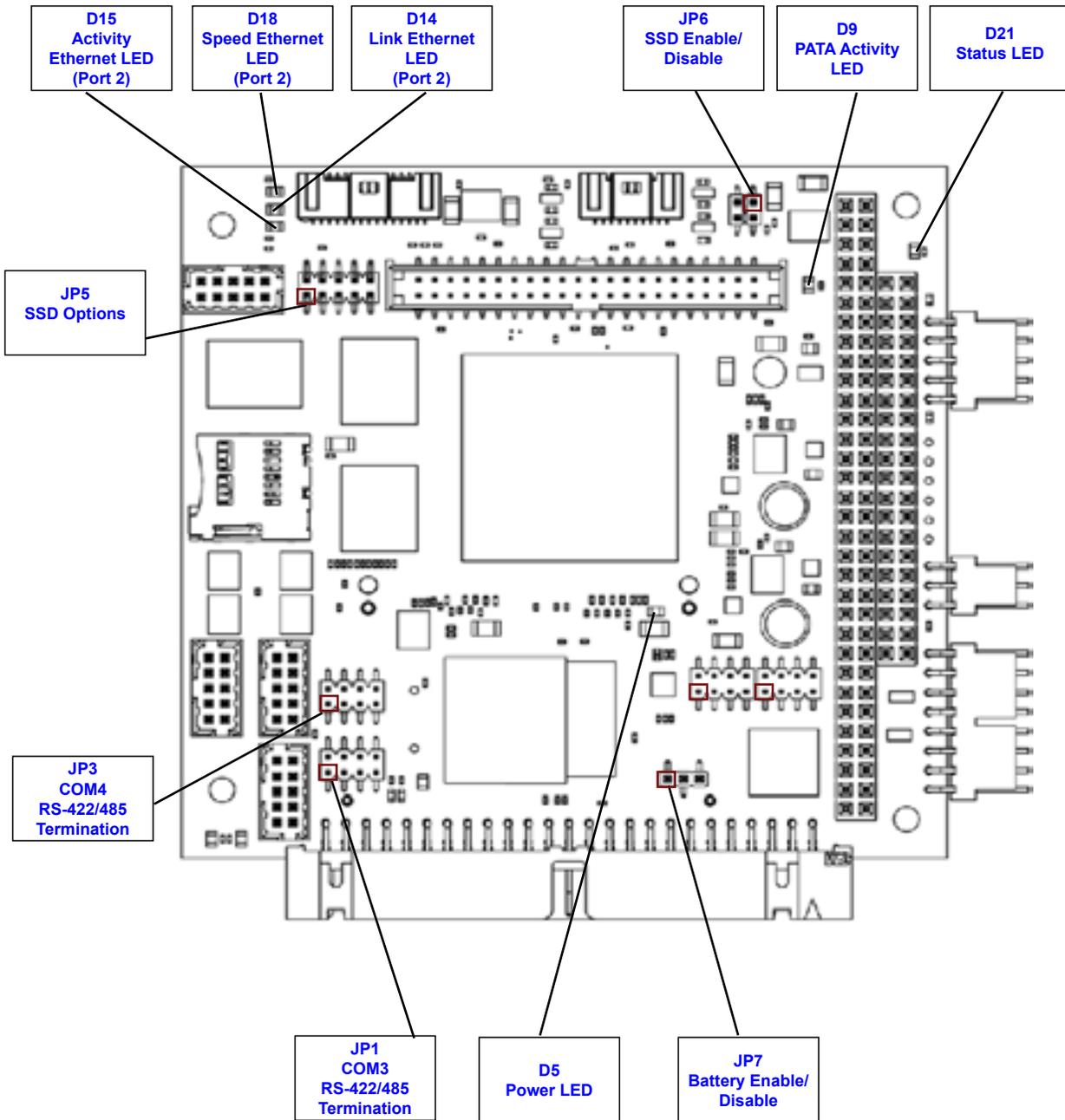
For any questions you may have on WinSystems products, contact our Technical Support Group at (817) 274-7553, Monday through Friday, between 8 AM and 5 PM Central Standard Time (CST).

Visual Index - Top View (Connectors)



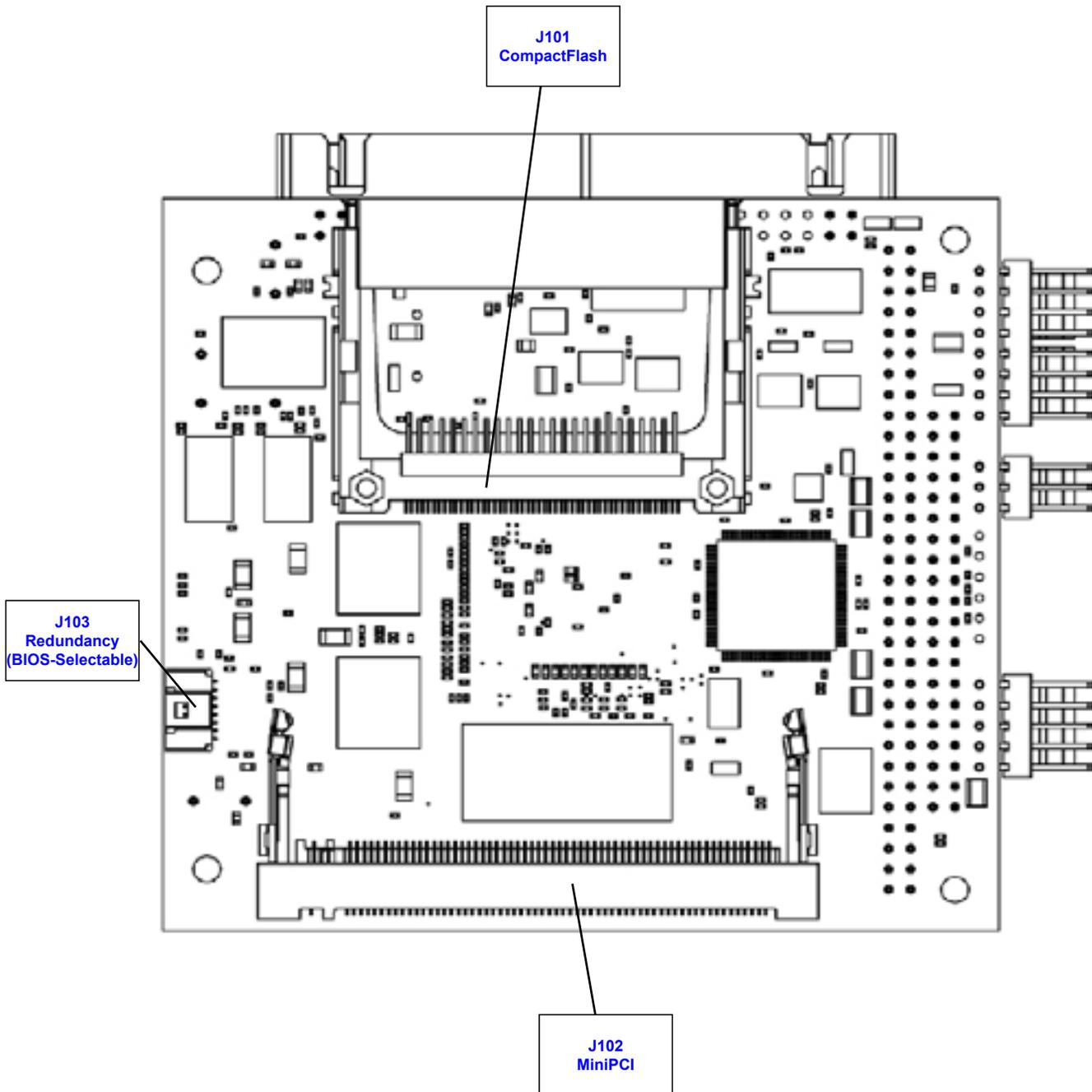
NOTE: The reference line to each component part has been drawn to Pin 1, and is also highlighted with a square, where applicable.

Visual Index - Top View (Jumpers & LEDs)



NOTE: The reference line to each component part has been drawn to Pin 1, and is also highlighted with a square, where applicable.

Visual Index - Bottom View



NOTE: The reference line to each component part has been drawn to Pin 1, and is also highlighted with a square, where applicable.

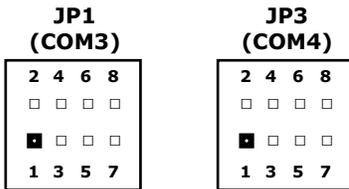
Jumper Reference

NOTE: Jumper Part# SAMTEC 2SN-BK-G is applicable to all jumpers. These are available in a ten piece kit from WinSystems (Part# KIT-JMP-G-200).

JP5 - Solid State Disk Options

JP5	
CompactFlash Master (default)	1-2
CompactFlash Slave	1 2
Silicon Disk Master	3-4
Silicon Disk Slave	3 4
Silicon Disk Write Protect Enable	5-6
Silicon Disk Read/Write	5 6
Reserved	7-8
Reserved	7 8
Reserved	9-10
Reserved	9 10

JP1 - COM3, JP3 - COM4



RS-422 Termination and Biasing Resistors		
TX (100):	Places a 100Ω Resistor across the TX± pair	7-8
RX (100):	Places a 100Ω Resistor across the RX± pair	1-2
TX/RX(300):	Places a 100Ω Resistor from +5V to TX+	5-6
	Places a 100Ω Resistor between TX±	7-8
	Places a 100Ω Resistor from Ground to TX-	3-4

Revision prior to E PCB products require a wire-wrap jumper from 2-3.

Revision prior to E PCB products require a wire-wrap jumper from 1-4.

RS-485 Termination and Biasing Resistors		
TX (100):	Places a 100Ω Resistor across the TX/RX± pair	7-8
TX/RX(300):	Places a 100Ω Resistor from +5V to TX/RX+	5-6
	Places a 100Ω Resistor between TX/RX±	7-8
	Places a 100Ω Resistor from Ground to TX/RX-	3-4

Revision prior to E products require a wire-wrap jumper from 1-4.

JP7 - On-board Battery (Enable/Disable)

Master Battery Enable

JP7	
Enables On-board Battery*	1-2
Enables External Battery (default)	1 2
NC	2-3

*Applicable to OEM models only.

INTRODUCTION

This manual is intended to provide the necessary information regarding configuration and usage of the PCM-VDX-1-256 single board computer. WinSystems maintains a Technical Support Group to help answer questions not adequately addressed in this manual. Contact Technical Support at (817) 274-7553, Monday through Friday, between 8 AM and 5 PM Central Standard Time (CST).

FEATURES

CPU

- 500 MHz DMP Vortex (PCM-VDX-1-256)

Compatible Operating Systems

- Linux, DOS, x86 RTOS

Memory

- 256 MB of DDR2 SDRAM (Soldered)
- 512 MB SSD (Optional on-board Flashdisk)

BIOS

- AMI

Ethernet

- One 10/100 Mbps (using RTL8100C LAN)

Digital I/O

- 16 lines General Purpose Input/Output (GPIO)

Power

- +5V required, 800 mA typical

Serial I/O

- 2 serial ports (RS-232)
- 2 serial ports (RS-232/422/485)

USB

- 4 USB 2.0 ports

PATA

- 1 PATA controller

CompactFlash

- Types I & II

Line Printer Port

- ECP/EPP

Watchdog Timer

- Up to 255 minute reset

Bus Expansion

- PC/104
- MiniPCI

Industrial Operating Temperature

- -40°C to 85°C

Form Factor

- 3.60" x 3.80" (90 mm x 96 mm)

Additional Features

- RoHS compliant
- Real-time clock/calendar
- Activity status LEDs on-board
- PS/2 Keyboard and Mouse

System

The PCM-VDX-1-256 is a fanless PC/104 single board computer (SBC) based upon the ultra low power Vortex86DX processor. It requires about 4 Watts under full load while operating over an extended temperature range of -40°C to 85°C. The board has 256 MB soldered on DDR2 SDRAM, Ethernet, USB, serial and parallel I/O, as well as PC/104, MiniPCI expansion, and optional external battery. This board replaces older generation WinSystems' and other manufacturers' 386SX, 486DX, 586, and SC520 based SBCs. A 1 GHz model is also available.

Memory

The PCM-VDX-1-256 board is built with 256 MB of SDRAM soldered directly to the PCB. Additionally, 512 MB of soldered-on flash SSD is optional for this board.

FUNCTIONALITY

I/O Port Map

Following is a list of I/O ports used on the PCM-VDX-1-256. I/O addresses marked with a ** are generally unused and should be the first choice in I/O address selection for external I/O boards.

NOTE: The PCM-VDX-1-256 uses a PnP BIOS resource allocation. Care must be taken to avoid contention with resources allocated by the BIOS.

HEX Range	Usage
0000h-000Fh	DMA 8237-1
0010h-0017h	Reserved Redundancy
0018h-001Fh	Free
0020h-0021h	PIC 8259-1
0022h-0023h	6117D configuration port
0024h-002Dh	Free
002Eh-002Fh	Forward to LPC BUS
0030h-003Fh	Free
0040h-0043h	Timer counter 8254
0044h-0047h	Free
0048h-004Bh	PWM counter 8254
004Ch-004Dh	Free
004Eh-004Fh	Forward to LPC Bus
0050h-005Fh	Free
0060h	Keyboard data port
0061h	Port B + NMI control port
0062h-0063h	8051 download 4K address counter
0064h	Keyboard status port
0065h	Watchdog0 reload counter (Vortex internal WD)
0066h	8051 download 8-bit data port
0067h	Watchdog1 reload counter (Vortex internal WD)
0068h-006Dh	Watchdog1 control register (Vortex internal WD)
006Eh-006Fh	Free
0070h-0071h	CMOS RAM port
0072h-0075h	MTBF counter
0076h-0077h	Free
0078h-007Ch	GPIO port 0,1,2,3,4 default setup
007Dh-007Fh	Free
0080h-008Fh	DMA page register
0090h-0091h	Free
0092h	System control register
0093h-0097h	Free
0098h-009Ch	GPIO direction control
00A0h-00A1h	PIC 8259-2
00A2h-00BFh	Free
00C0h-00DFh	DMA 8237-2
00E0h-00FFh	Free
0100h-0101h	GPCS1 default setting address
0102h-016Fh	Free
0170h-0177h	Reserved IDE1
01E8h-01ECh	Reserved
01EDh	Status LED
01EEh-01EFh	Watchdog Timer Control (Legacy)

HEX Range	Usage
01F0h-01EFh	IDE0 (IRQ 14)
1F80h-0219h	Free
0220h-0227h	Free
0228h-02AFh	Free
02B0h-02DFh	Video Controllers (typically reserved, video)
02E0h-02E7h	Free
02E8h-02EFh	COM4 (IRQ11) (default)
02F0h-02F7h	Free
02F8h-02FFh	COM2 (IRQ3) (default)
0300h-0375h	Free
0376h	IDE1 ATAPI device control write only register
0378h-037Bh	LPT Default (IRQ7, DM0) (default)
037Ch-03AFh	Free
03B0h-03BBh	Video Controllers (typically reserved, video)
03C0h-03DFh	Video Controllers (typically reserved, video)
03E0h-03E7h	Free
03E8h-03EFh	COM3 (IRQ9) (default)
03F0h-03F7h	Reserved Legacy Floppy
03F8h	IDE0 ATAPI device control write only register
03F8h-03FFh	COM1 (IRQ4) (default)
0480h-048Fh	DMA High page register
0490h-0499h	Instruction counter register
04D0h-04D1h	8259 Edge/level control register
0564h-0568h	Advanced Watchdog
0CF8h-0CFFh	PCI configuration port
D400h-D4FFh	On-board LAN
FC00h-FC05h	SPI Flash BIOS control register
FC08h-FC0Dh	External SPI Bus control register (output pin configurable GPIO3[0-3])

Memory Map

HEX Range	Usage
0000:0000-9000:FFFF	System RAM
A000:0000-A000:FFFF	EGA/VGA Video Memory
B000:0000-B000:7FFF	MDA RAM, Hercules graphics display RAM
B000:8000-B000:FFFF	CGA display RAM
C000:0000-C000:7FFF	EGA/VGA BIOS ROM
C000:8000-C000:FFFF	Boot ROM enable.
D000:0000-D700:FFFF	Expansion ROM space.
D800:0000-DB00:FFFF	SPI FLASH Emulation Floppy A Enable
DC00:0000-DF00:FFFF	Expansion ROM space.
E000:0000-E000:FFFF	USB Legacy SCSI ROM space.
F000:0000-F000:FFFF	Motherboard BIOS

Interrupt Map

Hardware Interrupts (IRQs) are supported for both PC/104 (ISA) and PCIe devices. The user must reserve IRQs in the BIOS CMOS configuration for use by legacy devices. The PCIe/PnP BIOS will use unreserved IRQs when allocating resources during the boot process. The table below lists IRQ resources as used by the PCM-VDX-1-256.

IRQ0	18.2 Hz heartbeat
IRQ1	Keyboard
IRQ2	Chained to Slave controller (IRQ9)
IRQ3	COM2 *
IRQ4	COM1 *
IRQ5	USB/On-board Ethernet
IRQ6	USB
IRQ7	LPT *
IRQ8	Real-Time Clock
IRQ9	COM3 *
IRQ10	Available
IRQ11	COM4 *
IRQ12	Mouse
IRQ13	Floating point processor
IRQ14	IDE
IRQ15	Available

*	These IRQ references are default settings that can be changed by the user in the CMOS Settings utility. Reference the PCI Configurations section under Advanced Settings.
**	IRQ9 is commonly used by ACPI when enabled and may be unavailable (depending on operating system) for other uses.
***	IRQ15 is currently unavailable under the Windows operating systems.
Some IRQs can be freed for other uses if the hardware features they are assigned to are not being used. To free an interrupt, use the CMOS setup screens to disable any unused board features or their IRQ assignments.	

DMA Map

DMA#	Description	Usage
DMA0	Available	
DMA1	Available	
DMA2	Available	
DMA3	Available	
DMA4	Available	
DMA5	Available	
DMA6	Available	
DMA7	Available	

Watchdog Timer

The PCM-VDX-1-256 features an advanced watchdog timer which can be used to guard against software lockups. Two interfaces are provided to the watchdog timer. The Advanced interface is the most flexible and recommended for new designs. The other interface option is provided for software compatibility with older WinSystems single board computers.

Advanced

The watchdog timer can be enabled in the BIOS Settings by entering a value for Watchdog Timeout on the Chipset → SouthBridge Configuration screen. Once the operating system is loaded, the watchdog can be disabled or reconfigured in the application software.

NOTE: It is recommended that a long timeout be used if the watchdog is enabled when trying to boot any operating system.

The watchdog can be enabled, disabled or reset by writing the appropriate values to the configuration registers located at I/O addresses 565h and 566h. The watchdog is enabled by writing a timeout value other than zero to the I/O address 566h and disabled by writing **00h** to this I/O address. The watchdog timer is serviced by writing the desired timeout value to I/O port 566h. If the watchdog has not been serviced within the allotted time, the circuit resets the CPU.

The timeout value can be set from 1 second to 255 minutes. If port 565h bit 7 equals **0**, the timeout value written into I/O address 566h is in minutes. The timeout value written to address 566h is in seconds if port 565 bit 7 equals **1**.

Watchdog Timer Examples

Port Address	Port Bit 7 Value	Port Address	Value	Reset Interval
565H	x	566H	00h	DISABLED
565H	1	566H	03h	3 SECONDS
565H	1	566H	1Eh	30 SECONDS
565H	0	566H	04h	4 MINUTES
565H	0	566H	05h	5 MINUTES

Software watchdog timer PET = PORT 566H, write the timeout value.

Legacy

This interface is provided for legacy software support only and is not recommended for new development.

The watchdog can be enabled or disabled via software by writing an appropriate timeout value to I/O port 1EEH. See the chart provided below.

Port Address	Value	Reset Interval
1EEH	00h	DISABLED
	01h	2 SECONDS
1EFH	ANY	RESET TIMER

Real-Time Clock/Calendar

A real-time clock is used as the AT-compatible clock/calendar. It supports a number of features including periodic and alarm interrupt capabilities. In addition to the time and date keeping functions, the system configuration is kept in CMOS RAM contained within the clock section. A battery must be installed for the real-time clock to retain time and date during a power down.

CONNECTOR REFERENCE

POWER

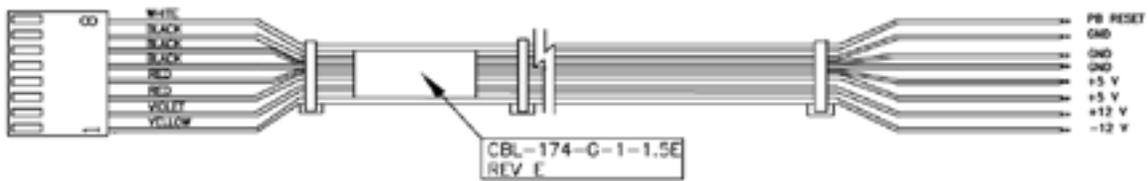
J4 - Power and Reset

Visual
Index

PCB Connector: MOLEX 22-12-2084 (J4)
Mating Connector: MOLEX 10-11-2083 (Housing)
MOLEX 08-55-0124 (Crimp)

J4

1	■	-12V
2	□	+12V
3	□	+5V
4	□	+5V
5	□	GND
6	□	GND
7	□	GND
8	□	PBRESET



CBL-174-G-1-1.5

Power is applied to the PCM-VDX-1-256 via the connector at **J4**. WinSystems offers the cable [CBL-174-G-1-1.5](#) to simplify this connection.

BATTERY BACKUP

J8 - External Battery

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PCB Connector: **MOLEX 22-12-2034 (J8)**
Mating Connector: **MOLEX 22-01-3037 (Housing)**
MOLEX 08-55-0102 (Crimp)

J8

1 <input checked="" type="checkbox"/>	GND	(For external battery. Provides battery backup to RTC and BIOS CMOS.)
2 <input type="checkbox"/>	+VBAT	
3 <input type="checkbox"/>	NC	

An optional external battery, connected at **J8**, supplies the PCM-VDX-1-256 board with standby power for the real-time clock and CMOS setup RAM. An extended temperature lithium battery is available from WinSystems, part number BAT-LTC-E-36-16-1 or BAT-LTC-E-36-27-1.

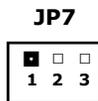
A power supervisory circuit contains the voltage sensing circuit and an internal power switch to route the battery or standby voltage to the circuits selected for backup. The battery automatically switches ON when the VCC of the systems drops below the battery voltage and back OFF again when VCC returns to normal.

For OEM applications, an on-board battery may be populated. Please contact your WinSystems' Application Engineer for additional information.

JP7 - On-board Battery (Enable/Disable)

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Master Battery Enable



Enables On-board Battery*	1-2
Enables External Battery (default)	1 2
NC	2-3

*Applicable to OEM models only.

SPEAKER

SP1 - Speaker

Speaker

An on-board speaker, **SP1**, is available for sound generation.

MOUSE

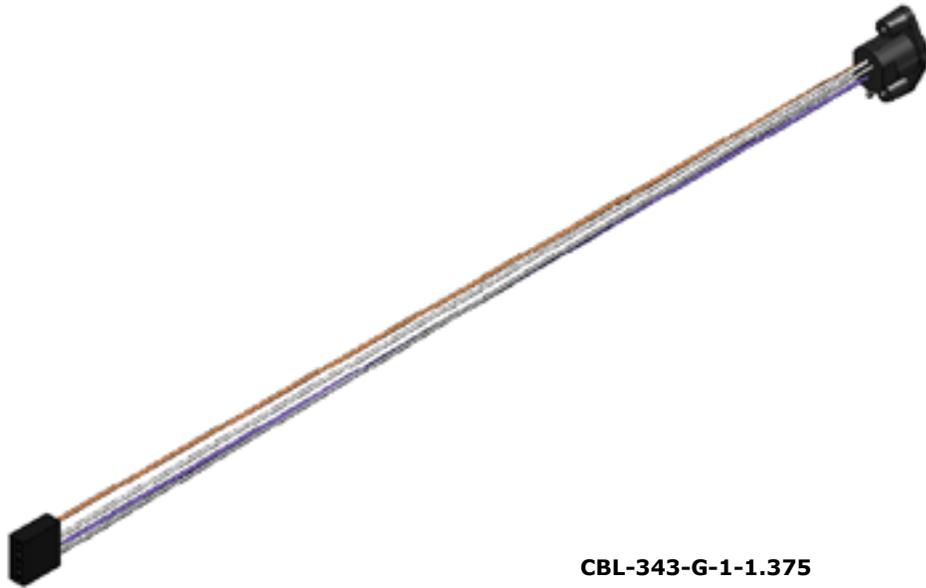
J11 - Mouse



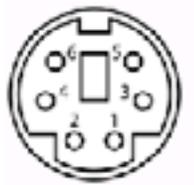
PCB Connector: MOLEX 22-12-2054 (J11)
Mating Connector: MOLEX 22-01-2057 (Housing)
MOLEX 08-55-0102 (Crimp)

J11

1	■	MSDATA
2	□	NC
3	□	GND
4	□	VCC
5	□	MSCLK



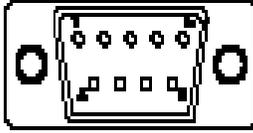
CBL-343-G-1-1.375



Pin	Description
1	MSDATA
2	NC
3	GND
4	VCC
5	MSCLK
6	N/C

A PS/2 mouse port provides connection for a compatible mouse and is terminated at **J11**. An adapter cable, [CBL-343-G-1-1.375](#), is available from WinSystems to simplify the connection. Optionally, a USB mouse can be connected in addition to, or instead of the standard PS/2 mouse. The pinout for the cable is listed above.

COM1, COM2 [DB9 Male]



Pin	RS-232
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTR
9	RI

All serial ports are configured as Data Terminal Equipment (DTE). Both the send and receive registers of each port have a 16-byte FIFO. All serial ports have 16C550-compatible UARTs. The RS-232 transceivers have charge pumps to generate the plus and minus voltages so the PCM-VDX-1-256 only requires +5V to operate.

Each port is setup to provide internal diagnostics such as loopback and echo mode on the data stream. An independent, software programmable baud rate generator is selectable from 50 through 115.2 kbps. Individual modem handshake control signals are supported for all ports.

COM1 and COM2 Configuration Options in BIOS

1. RS-232 Mode

LPT [DB25 Female]

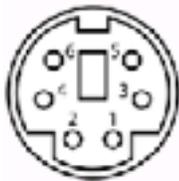


Pin	SPP Signal
1	STROBE
2-9	PD0-PD7
10	ACK
11	BUSY
12	PE
13	SLCT
14	AUTOFD
15	ERROR
16	INIT
17	SLCTIN
18-25	GND

The LPT port is a multimode parallel printer port that supports the PS/2 Standard Bidirectional Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capabilities (ECP) functionality. The output drivers support 8 mA per line.

The printer port can also be used as two additional general-purpose I/O ports if a printer is not required. The first port is configured as eight input or output only lines. The other port is configured as five input and three output lines.

PS/2 Keyboard [6-Position]



Pin	Description
1	KDATA
2	NC
3	GND
4	+5V
5	KCLK
6	NC

This connector supports a PS/2 keyboard interface. The pinout for the cable is listed above.

SERIAL

J5 (COM3), J6 (COM4)

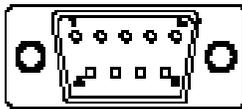
Visual
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PCB Connector: MOLEX 87832-1006 (J5, J6)
Mating Connector: MOLEX 051110-1060 (Housing)
MOLEX 50394-8100 (Crimp)

The connectors for COM3 (J5) and COM4 (J6) are listed below.

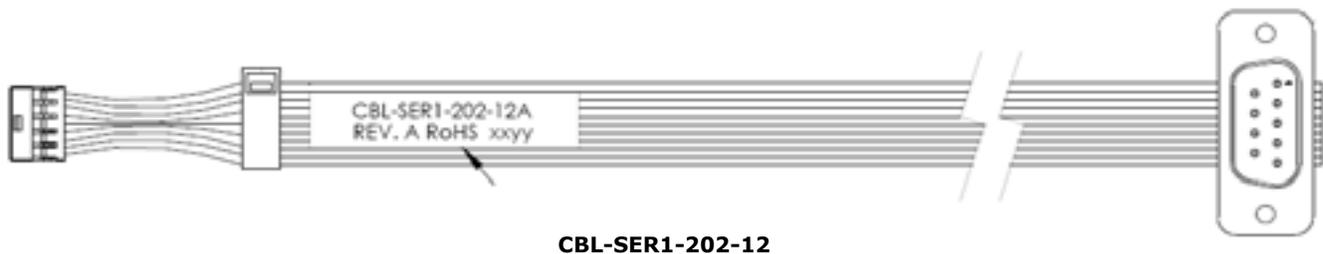
RS-232	
DCD	1 ■ □ 2 DSR
RXD	3 □ □ 4 RTS
TXD	5 □ □ 6 CTC
DTR	7 □ □ 8 RI
GND	9 □ □ 10 VCC

COM3, COM4 [DB9 Male]



Pin	RS-232	RS-422	RS-485
1	DCD	N/A	N/A
2	RX	TX+	TX/RX+
3	TX	TX-	TX/RX-
4	DTR	N/A	N/A
5	GND	GND	GND
6	DSR	RX+	N/A
7	RTS	RX-	N/A
8	CTR	N/A	N/A
9	RI	N/A	N/A

Both ports are configured as Data Terminal Equipment (DTE). Both the send and receive registers of each port have a 16-byte FIFO. All serial ports have 16C550-compatible UARTs. The RS-232 has a charge pump to generate the plus and minus voltages so the PCM-VDX-1-256 only requires +5V to operate. An independent, software programmable baud rate generator is selectable from 50 through 115.2 kbps. Individual modem handshake control signals are supported for all ports.



COM3 and COM4 Configuration Options in BIOS

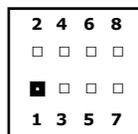
1. RS-232 Mode
2. RS-422 Mode with RTS transmitter enable
3. RS-422 Mode with auto transmitter enable
4. RS-485 Mode with RTS transmitter enable
5. RS-485 Mode with RTS transmitter enable and echo back
6. RS-485 Mode with auto transmitter enable
7. RS-485 Mode with auto transmitter enable and echo back

Mode(s)	Configuration Note
2, 4, 5	Require the RTS bit (MCR Bit 1) to be set in order to transmit.
3, 6, 7	Require TX/RX(300) termination on one node.
4	Requires the RTS (MCR Bit 1) be de-asserted in order to receive.
* Each of the RS-422/RS-485 modes allow for jumper selection of transmit and/or receive termination and biasing resistor(s). An 8-pin configuration jumper is provided for each port.	

Termination Resistors

COM3 = JP1

COM4 = JP3



RS-422 Termination and Biasing Resistors		
TX (100):	Places a 100Ω Resistor across the TX± pair	7-8
RX (100):	Places a 100Ω Resistor across the RX± pair	1-2
TX/RX(300):	Places a 100Ω Resistor from +5V to TX+	5-6
	Places a 100Ω Resistor between TX±	7-8
	Places a 100Ω Resistor from Ground to TX-	3-4

Revision prior to E PCB products require a wire-wrap jumper from 2-3.

Revision prior to E PCB products require a wire-wrap jumper from 1-4.

RS-485 Termination and Biasing Resistors		
TX (100):	Places a 100Ω Resistor across the TX/RX± pair	7-8
TX/RX(300):	Places a 100Ω Resistor from +5V to TX/RX+	5-6
	Places a 100Ω Resistor between TX/RX±	7-8
	Places a 100Ω Resistor from Ground to TX/RX-	3-4

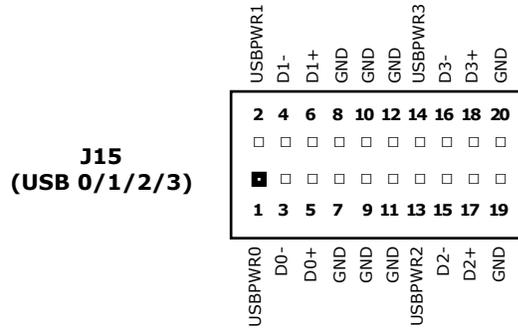
Revision prior to E products require a wire-wrap jumper from 1-4.

USB

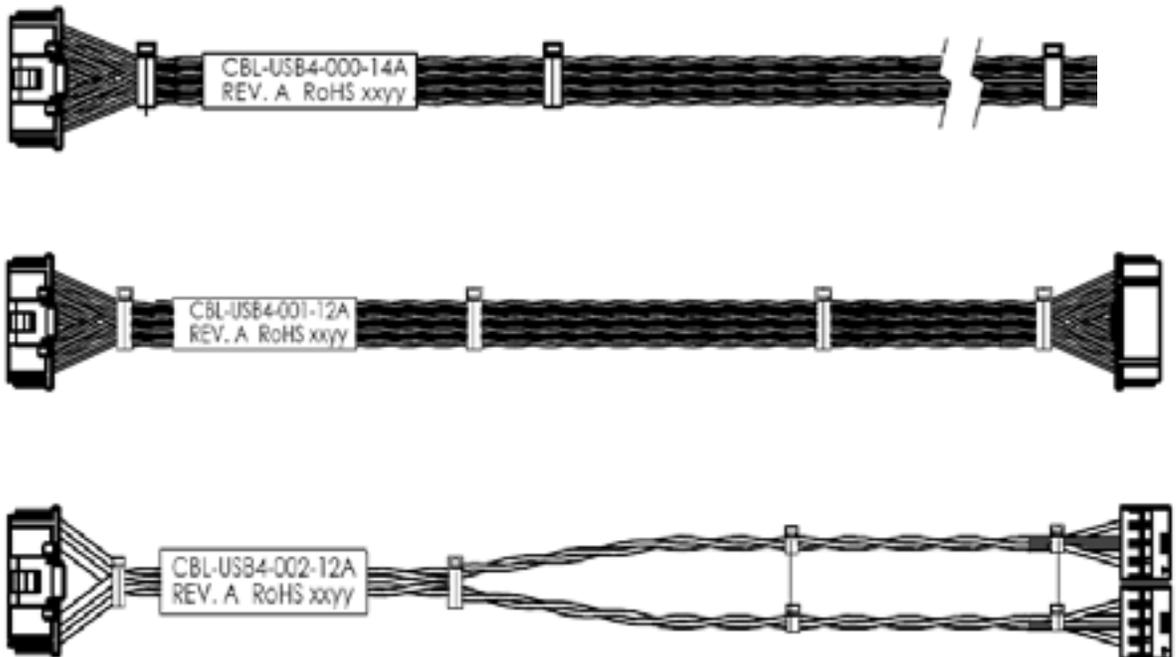
J15 - USB



PCB Connector: MOLEX 501571-2007 (J15)
Mating Connector: MOLEX 501189-2010 (Housing)
MOLEX 501193-2000 (Crimp)



CBL-USB4-000-14, CBL-USB4-001-12, CBL-USB4-002-12



A USB cable may be attached to the PCM-VDX-1-256 via the connector for a total of four USB 2.0 ports. Adapter cables [CBL-USB4-000-14](#), [CBL-USB4-001-12](#), and [CBL-USB4-002-12](#) are available from WinSystems for connection.

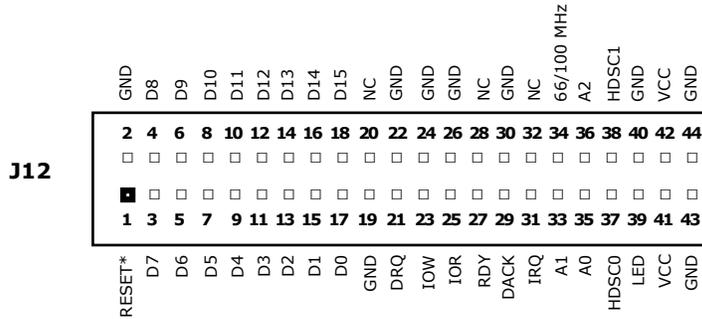
PARALLEL ATA

J12 - PATA

Visual Index

PCB Connector: SAMTEC STMM-122-02-G-D-SM-P-TR (J12)

Mating Connector: SAMTEC ASP-129789-01



The PCM-VDX-1-256 supports the PATA interface at **J12** (44-pin primary). WinSystems offers cable [CBL-266-G-2-0.75](#) to simplify this connection.

COMPACTFLASH

J101 - COMPACTFLASH

Visual Index

When using a CompactFlash device, Master/Slave selection is made using jumper field **JP5**. The PCM-VDX-1-256 supports solid state CompactFlash storage devices for applications where the environment is too harsh for mechanical hard disks.

The CompactFlash socket at **J101** supports modules with TrueIDE support. WinSystems offers industrial grade CompactFlash modules that provide high performance and extended temperature operation (-40°C to +85°C). A PATA activity LED is present at **D9**.

The CompactFlash is a PATA device. Use of a CompactFlash device therefore reduces the number of available PATA devices to one.

JP6

SSD Enabled	1-2, 3-4
SSD Disabled	1 2 , 3 4

Optional On-board Flash Disk

The PCM-VDX-1-256M can be populated with an optional on-board Flash disk for rugged OEM applications where a removal device is not desirable. The Flash disk is connected to the PATA controller but must be enabled by installing jumpers at **JP6** 1-2, 3-4. Removing the jumpers at **JP6** 1 2, and 3 4, effectively removes the device from the PATA bus, giving the user the ability to connect two additional devices to the PATA controller. Since the on-board Flash disk may co-exist with another PATA device, it can be set as Master by installing a jumper at **JP5** pins 3-4 or Slave when the **JP5** pins 3 and 4 are open.

A jumper at **JP5** 5-6 write protects the on-board Flash disk. When **JP5** pins 5 and 6 are open, read/write access is available to the on-board Flash disk.

Please contact an Applications Engineer if you are interested in this optional feature.

ETHERNET

J13 - 10/100 Mbps Ethernet

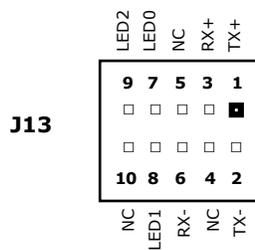


PCB Connector: **MOLEX 87832-1006 (J13)**
 MOLEX 51110-1051 (Housing)
 MOLEX 50394-8100 (Crimp)

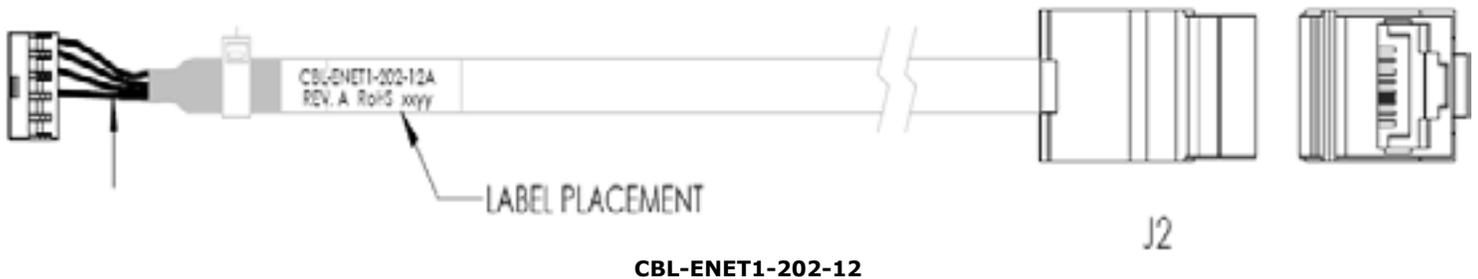
10/100 Mbps Ethernet Controllers

The PCM-VDX-1-256 is equipped with a Realtek 8100C Ethernet controller (**J13**). It provides a standard IEEE 802.3 Ethernet interface for 100/10BASE-T networks.

On-board Ethernet activity LEDs **D14, D18 and D15** are provided. See tables below for signal and pin definitions.



LED	Color	Signal	Off-board
D14	GREEN	LINK	LED0
D18	RED	SPEED100	LED2
D15	YELLOW	ACTIVITY	LED1



STATUS LED

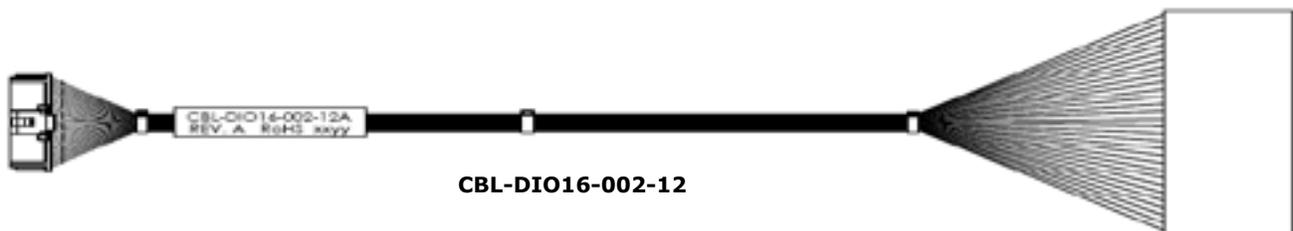
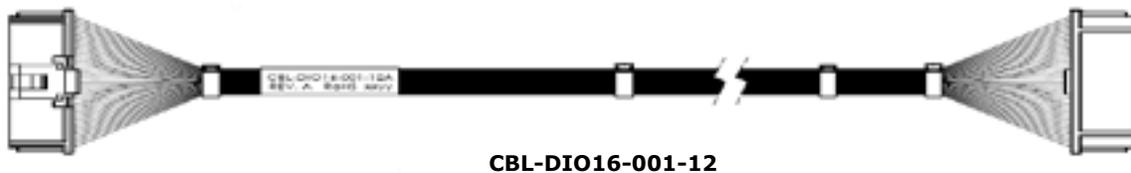
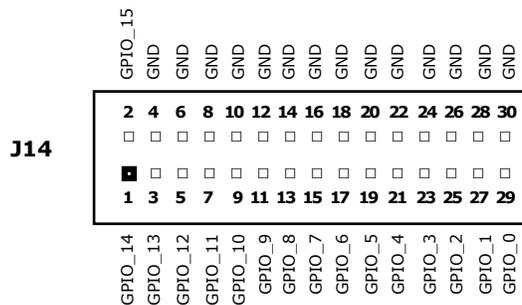
D21 - Status LED

Visual
Index

A status LED is populated on the board at **D21** which can be used for any application specific purpose. The LED can be turned on in software applications by writing a **1** to I/O port 1EDH. The LED can be turned off by writing a **0** to 1EDH. The Activity LED will turn on and off as packets are received and transmitted.

D21	--	GREEN	STATUS
-----	----	-------	--------

PCB Connector: MOLEX 501571-3007 (J14)
 Mating Connector: MOLEX 501189-3010 (Housing)
 MOLEX 501193-2000 (Crimp)



The PCM-VDX-1-256 Digital I/O consists of sixteen dedicated programmable I/O pins consisting of two individual 8-bit ports. Each port can be configured as GPIO or Pulse Width Modulation (PWM) outputs.

All GPIO pins are independent and can be configured as inputs or outputs. When configured as outputs, pins have 8 mA drive capability and are unterminated. When configured as inputs, pins are pulled-high with a 75k Ω resistance. Each input pin also supports interrupt triggers.

All PWM pins are independent and can be configured to output a continuous frequency or a fixed number of pulses. The frequency is selected by programming high and low pulse count values. An interrupt can be used to indicate when a pulse count has completed.

The features are configured and controlled utilizing PCI configuration and I/O access instructions.

Setup GPIO Registers

	Port 0	Port 1	Description
Data Register	78H	79H	
Direction Register	98H	99H	0: GPIO pin is input mode 1: GPIO pin is output mode

If send value 0FH to port 98H, it means that GPIO port 0 [7-4] are input mode and port[3-0] are output mode.

If send value 00H to port 98H, it means that GPIO port 0 [7-0] are input mode.

If send value FFH to port 98H, it means that GPIO port 0 [7-0] are output mode.

If send value 03H to port 98H, it means that GPIO port 0 [7-2] are input mode and port[1-0] are output mode.

GPIO with Interrupt

The Vortex86DX GPIO ports 0 and 1 support interrupt trigger. To save CPU performance, interrupt can be used instead of polling GPIO. GPIO port 0 interrupt registers are at offset DCh~DFh south bridge and GPIO1 registers are at offset E0h~E3h.

Steps to setup GPIO to trigger interrupt:

1. Configure interrupt mask register to determine which GPI can trigger interrupt individually.
2. Set trigger level (high or low) for each GPI.
3. Set period time that interrupt will be generated while the event loading time of any one of GPI[7-0] is longer than the time parameters.
4. Select IRQ.
5. Set interrupt trigger once or continuously.

For more information on programming GPIO, see [Software Drivers & Examples](#) section on our website.

PCB Connector: **TEKA SBL PC232-A-1A7-M (J3)**
 TEKA SBL PC220-A-1A7-M (J7)

The PC/104 bus is electrically equivalent to the 16-bit ISA bus. Standard PC/104 I/O cards can be populated on PCM-VDX-1-256's connectors, located at **J3** and **J7**. The interface does not support hot swap capability. The PC/104 bus connector pin definitions are provided below for reference. Refer to the [PC/104 Bus Specification](#) for specific signal and mechanical specifications.

J7			
(C/D)			
GND	D0 ■ □ C0	GND	
MEMCS16#	D1 □ □ C1	SBHE#	
IOCS16#	D2 □ □ C2	LA23	
IRQ10	D3 □ □ C3	LA22	
IRQ11	D4 □ □ C4	LA21	
IRQ12	D5 □ □ C5	LA20	
IRQ15	D6 □ □ C6	LA19	
IRQ14	D7 □ □ C7	LA18	
DACK0#	D8 □ □ C8	LA17	
DRQ0	D9 □ □ C9	MEMR#	
DACK5#	D10 □ □ C10	MEMW#	
DRQ5	D11 □ □ C11	SD8	
DACK6#	D12 □ □ C12	SB9	
DRQ6	D13 □ □ C13	SD10	
DACK7#	D14 □ □ C14	SD11	
DRQ7	D15 □ □ C15	SD12	
+5V	D16 □ □ C16	SD13	
MASTER#	D17 □ □ C17	SD14	
GND	D18 □ □ C18	SD15	
GND	D19 □ □ C19	KEY	

J3			
(A/B)			
IOCHK#	A1 ■ □ B1	GND	
SD7	A2 □ □ B2	RESET	
SD6	A3 □ □ B3	+5V	
SD5	A4 □ □ B4	IRQ	
SD4	A5 □ □ B5	-5V	
SD3	A6 □ □ B6	DRQ2	
SD2	A7 □ □ B7	-12V	
SD1	A8 □ □ B8	SRDY#	
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	BCLK	
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	GND	
GND	A32 □ □ B32	GND	

= Active Low Signal

NOTES:

1. Rows C and D are not required on 8-bit modules.
2. B10 and C19 are key locations. WinSystems uses key pins as connections to GND.
3. Signal timing and function are as specified in ISA specification.
4. Signal source/sink current differ from ISA values.

The PCM-VDX-1-256 includes a MiniPCI socket at **J102**. Though the socket can support other devices, it is primarily intended for adding a video module. WinSystems offers MPCPI-VGA-Z9S to simplify the connection. Additionally, wireless activity is optional via MiniPCI.

MiniPCI Device Interface (CN1)

PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	N/C	2	N/C	63	3.3V	64	FRAME#
	KEY		KEY	65	CLKRUN#	66	TRDY#
3	N/C	4	N/C	67	SERR#	68	STOP#
5	N/C	6	N/C	69	GROUND	70	3.3V
7	N/C	8	N/C	71	PERR#	72	DEVSEL#
9	N/C	10	N/C	73	C/BE(1)#	74	GROUND
11	N/C	12	N/C	75	AD(14)	76	AD(15)
13	N/C	14	N/C	77	GROUND	78	AD(13)
15	N/C	16	RESERVED	79	AD(12)	80	AD(11)
17	INTB#	18	5V	81	AD(10)	82	GROUND
19	3.3V	20	INTA#	83	GROUND	84	AD(09)
21	RESERVED	22	RESERVED	85	AD(08)	86	C/BE(0)#
23	GROUND	24	3.3V AUX	87	AD(07)	88	3.3V
25	CLK	26	RST#	89	3.3V	90	AD(06)
27	GROUND	28	3.3V	91	AD(05)	92	AD(04)
29	REQ#	30	GNT#	93	RESERVED	94	AD(02)
31	3.3V	32	GROUND	95	AD(03)	96	AD(00)
33	AD(31)	34	PME#	97	5V	98	RESERVED_WIP ⁵
35	AD(29)	36	RESERVED	99	AD(01)	100	RESERVED_WIP ⁵
37	GROUND	38	AD(30)	101	GROUND	102	GROUND
39	AD(27)	40	3.3V	103	N/C	104	M66EN
41	AD(25)	42	AD(28)	105	N/C	106	N/C
43	RESERVED	44	AD(26)	107	N/C	108	N/C
45	C/BE(3)#	46	AD(24)	109	N/C	110	N/C
47	AD(23)	48	IDSEL	111	N/C	112	RESERVED_WIP ⁵
49	GROUND	50	GROUND	113	N/C	114	GROUND
51	AD(21)	52	AD(22)	115	N/C	116	N/C
53	AD(19)	54	AD(20)	117	N/C	118	N/C
55	GROUND	56	PAR	119	N/C	120	N/C
57	AD(17)	58	AD(18)	121	RESERVED	122	N/C
59	C/BE(2)#	60	AD(16)	123	N/C	124	3.3V AUX
61	IRDY#	62	GROUND				

General Information

The PCM-VDX-1-256 includes an AMI BIOS to assure full compatibility with PC operating systems and software. The basic system configuration is stored in battery backed CMOS RAM within the clock/calendar. As an alternative, the BIOS configuration may be stored in internal Flash for operation without a battery. For more information on CMOS configuration, see the [BIOS Settings Storage Options](#) section of this manual.

Entering Setup

To enter setup, power up the computer and press **Delete** to enter the setup menu. It may take a few seconds before the main setup menu screen is displayed.

Navigation of the Menus

Use the **Up** and **Down** arrow keys to move among the selections and press **Enter** when a selection is highlighted to enter a sub-menu or to see a list of choices. Following are images of each menu screen in the default configuration along with a brief description of each option where applicable. Available options are listed in reference tables. Menu values shown in **bold** typeface are factory defaults.

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Main Menu	
System Overview	
Processor	
Vortex86DX A9121	
Speed:	500 MHz
System Memory	
Size:	256 MB
Speed:	266 MHz
System Time	
	[05:09:58]
System Date:	
	[Tue 08/12/2010]

Each available option is listed in detail in the following sections.

Navigation to the screens is located at the top of each screen's layout.

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced

Advanced Settings

WARNING: Setting wrong values in below sections may cause system to malfunction.

> CPU Configuration

> IDE Configuration

> Remote Access Configuration

> USB Configuration

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > CPU Configuration	
Module Version - 00.01	
Manufacturer:	DMP
Brand String:	Vortex86DX A9121
Frequency:	500 MHz
L1 Cache	Enabled
<i>Options:</i> Disabled Enabled	
Cache L1:	16 KB
L2 Cache	Write-Thru
<i>Options:</i> Disabled Write-Thru Write-Back	
Fetch Line Size	4 DWORD
<i>Options:</i> 4 DWORD 8 DWORD	
Cache L2:	256 KB
CPU Speed Setting By	Divide By 1
<i>Options:</i> Divide By 1 Divide By 2 Divide By 3 Divide By 4 Divide By 5 Divide By 8 Divide By 16 Divide By 32	
CPU Fast Decode Onboard Cycle	Normal
<i>Options:</i> Normal Fast	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > IDE Configuration	
Onboard PCI IDE Controller	Primary
<i>Options:</i> Disabled Primary	
> Primary IDE Master	Auto*
> Primary IDE Slave	Auto*
*Standard devices are automatically detected.	
Hard Disk Write Protect	Disabled
<i>Options:</i> Disabled Enabled	
IDE Detect Time Out (Sec)	35
<i>Options:</i> 0 5 10 15 20 25 30 35	
ATA(PI) 80Pin Cable Detection	Host & Device
<i>Options:</i> Host & Device Host Device	
Hard Disk Delay	2 Second
<i>Options:</i> Disabled 1 Second 2 Second 4 Second 8 Second	
OnBoard IDE Operate Mode	Legacy Mode
<i>Options:</i> Legacy Mode Native Mode	
Standard IDE Compatible	Disabled
<i>Options:</i> Disabled Enabled	
<i>Options:</i> Disabled Write Through Write Protect Write Back	
More Cache Memory options are continued on the next page.	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > IDE Configuration > Primary IDE Master	
Device:	Auto-Detected
Type	Auto
<i>Options:</i> Not Installed Auto CD/DVD ARMD	
LBA/Large Mode	Auto
<i>Options:</i> Disabled Auto	
Block (Multi-Sector Transfer)	Auto
<i>Options:</i> Disabled Auto	
PIO Mode	Auto
<i>Options:</i> Auto 0 1 2 3 4	
DMA Mode	Auto
<i>Options:</i> Auto SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2	
S.M.A.R.T.	Auto
<i>Options:</i> Auto Disabled Enabled	
32Bit Data Transfer	Enabled
<i>Options:</i> Disabled Enabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > IDE Configuration > Primary IDE Slave	
Device:	Auto-Detected
Type	Auto
<i>Options:</i> Not Installed Auto CD/DVD ARMD	
LBA/Large Mode	Auto
<i>Options:</i> Disabled Auto	
Block (Multi-Sector Transfer)	Auto
<i>Options:</i> Disabled Auto	
PIO Mode	Auto
<i>Options:</i> Auto 0 1 2 3 4	
DMA Mode	Auto
<i>Options:</i> Auto SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2	
S.M.A.R.T.	Auto
<i>Options:</i> Auto Disabled Enabled	
32Bit Data Transfer	Enabled
<i>Options:</i> Disabled Enabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > Remote Access Configuration	
Configure Remote Access type and parameters	
Remote Access	Disabled
<i>Options:</i> Disabled Enabled	
The following selections are available only with Remote Access enabled.	
Serial Port number	COM1
<i>Options:</i> COM1 COM2 COM3 COM4	
Base Address, IRQ	3F8h, 4
Serial Port Mode	115200 8,n,1
<i>Options:</i> 115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1	
Flow Control	None
<i>Options:</i> None Hardware Software	
Redirection After BIOS POST	Always
<i>Options:</i> Disabled Boot Loader Always	
Terminal Type	ANSI
<i>Options:</i> ANSI VT100 VT-UTF8	
VT-UTF8 Combo Key Support	Enabled
<i>Options:</i> Disabled Enabled	
Sredir Memory Display Delay	No Delay
<i>Options:</i> No Delay Delay 1 Sec Delay 2 Sec Delay 4 Sec	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Advanced > USB Configuration	
Module Version - 2.24.2-13.4	
USB Devices Enabled	Auto-Detected
USB Port 0,1	Enabled
<i>Options:</i> Enabled Disabled	
USB Port 2,3	Enabled
<i>Options:</i> Enabled Disabled	
USB 2.0 Controller Mode	HiSpeed
<i>Options:</i> FullSpeed HiSpeed	
BIOS EHCI Hand-Off	Enabled
<i>Options:</i> Disabled Enabled	
USB Beep Message	Enabled
<i>Options:</i> Disabled Enabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

PCIPnP	
Advanced PCI/PnP Settings	
Warning: Setting wrong values in below sections may cause system to malfunction.	
Plug & Play O/S	No
<i>Options:</i> No Yes	
PCI Latency Timer	128
<i>Options:</i> 32 64 96 128 160 192 224 248	
Allocate IRQ to PCI VGA	No
<i>Options:</i> Yes No	
Palette Snooping	Disabled
<i>Options:</i> Disabled Enabled	
PCI IDE BusMaster	Enabled
<i>Options:</i> Disabled Enabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

PCIPnP (cont'd)	
IRQ3	Reserved
<i>Options:</i> Available Reserved	
IRQ4	Reserved
<i>Options:</i> Available Reserved	
IRQ5	Available
<i>Options:</i> Available Reserved	
IRQ6	Available
<i>Options:</i> Available Reserved	
IRQ7	Available
<i>Options:</i> Available Reserved	
IRQ9	Available
<i>Options:</i> Available Reserved	
IRQ10	Available
<i>Options:</i> Available Reserved	
IRQ11	Available
<i>Options:</i> Available Reserved	
IRQ12	Available
<i>Options:</i> Available Reserved	
IRQ15	Available
<i>Options:</i> Available Reserved	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

PCIPnP (cont'd)	
DMA Channel 0	Available
<i>Options:</i> Available Reserved	
DMA Channel 1	Available
<i>Options:</i> Available Reserved	
DMA Channel 3	Available
<i>Options:</i> Available Reserved	
DMA Channel 5	Available
<i>Options:</i> Available Reserved	
DMA Channel 6	Available
<i>Options:</i> Available Reserved	
DMA Channel 7	Available
<i>Options:</i> Available Reserved	
Reserved Memory Size	Disabled
<i>Options:</i> Disabled 16k 32k 64k	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Boot	
Boot Settings	
> Boot Settings Configuration	
1st Boot Device	Disabled

The PCM-VDX-1-256 BIOS will not display devices which are not connected, regardless of their location in the boot order. The boot order can be adjusted by connecting ALL the desired media devices, setting the boot order and then selecting **Save Custom Defaults**.

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Boot > Boot Settings Configuration	
Boot Settings Configuration	
Quick Boot	Enabled
<i>Options:</i> Disabled Enabled	
Quiet Boot	Disabled
<i>Options:</i> Disabled Enabled	
Bootup Num-Lock	On
<i>Options:</i> Off On	
PS/2 Mouse Support	Auto
<i>Options:</i> Disabled Enabled Auto	
Interrupt 19 Capture	Enabled
<i>Options:</i> Disabled Enabled	
Boot From LAN	Disabled
<i>Options:</i> Disabled Used INT 18h Used INT 19h PnP/BEV(BBS) RPL	
Beep Function	Disabled
<i>Options:</i> Enabled Disabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Security	
Supervisor Password Is:	Not Installed
User Password Is:	Not Installed
Change Supervisor Password	
Change User Password	
Boot Sector Virus Protection	Disabled
<i>Options:</i> Disabled Enabled	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset

Advanced Chipset Settings

Warning: Setting wrong values in below sections may cause system to malfunction.

> **NorthBridge Configuration**

> **SouthBridge Configuration**

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > NorthBridge Chipset Configuration

DRAM Timing Setting By

BIOS

Options:

Manual

BIOS

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration	
P.O.S.T. Forward To	Disabled
<i>Options:</i> Disabled COM1	
> ISA Configuration	
> Serial/Parallel Port Configuration	
> WatchDog Configuration	
> Multi-Function Port Configuration	
> Redundancy Control Configuration	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration > ISA Configuration	
ISA Clock	8.3MHz
<i>Options:</i> 8.3MHz 16.6MHz	
ISA 16bits I/O wait-state	1 clock
<i>Options:</i> 1 clock 2 clock 3 clock 4 clock 5 clock 6 clock 7 clock 8 clock	
ISA 8bits I/O wait-state	4 clock
<i>Options:</i> 1 clock 2 clock 3 clock 4 clock 5 clock 6 clock 7 clock 8 clock	
ISA 16bits Memory wait-state	1 clock
<i>Options:</i> 0 clock 1 clock 2 clock 3 clock 4 clock 5 clock 6 clock 7 clock	
ISA 8bits Memory wait-state	4 clock
<i>Options:</i> 1 clock 2 clock 3 clock 4 clock 5 clock 6 clock 7 clock 8 clock	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration > Serial/Parallel Port Configuration	
SB Serial Port 1	3F8
<i>Options:</i> Disabled 3F8 2F8 3E8 2E8	
Serial Port IRQ 1	IRQ 4
<i>Options:</i> IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9 IRQ10 IRQ11 IRQ12 IRQ14 IRQ15	
Serial Port Baud Rate	115200 BPS
<i>Options:</i> 2400 BPS 4800 BPS 9600 BPS 19200 BPS 38400 BPS 57600 BPS 115200 BPS	
SB Serial Port 2	2F8
<i>Options:</i> Disabled 3F8 2F8 3E8 2E8	
Serial Port IRQ 2	IRQ3
<i>Options:</i> IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9 IRQ10 IRQ11 IRQ12 IRQ14 IRQ15	
Serial Port Baud Rate	115200 BPS
<i>Options:</i> 2400 BPS 4800 BPS 9600 BPS 19200 BPS 38400 BPS 57600 BPS 115200 BPS	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration >

Serial/Parallel Port Configuration (cont'd)

SB Serial Port 3

3E8

Options:

Disabled

3E8

2E8

3A8

2A8

Serial Port IRQ 3

IRQ 9

Options:

IRQ3

IRQ4

IRQ5

IRQ6

IRQ7

IRQ9

IRQ10

IRQ11

IRQ12

IRQ14

IRQ15

Serial Port Baud Rate

115200 BPS

Options:

2400 BPS

4800 BPS

9600 BPS

19200 BPS

38400 BPS

57600 BPS

115200 BPS

SB Serial Port 4

2E8

Options:

Disabled

3E8

2E8

3A8

2A8

Serial Port IRQ 4

IRQ11

Options:

IRQ3

IRQ4

IRQ5

IRQ6

IRQ7

IRQ9

IRQ10

IRQ11

IRQ12

IRQ14

IRQ15

Serial Port Baud Rate

115200 BPS

Options:

2400 BPS

4800 BPS

9600 BPS

19200 BPS

38400 BPS

57600 BPS

115200 BPS

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration >

Serial/Parallel Port Configuration (cont'd)

SB Parallel Port Address

378

Options:

Disabled

378

278

Parallel Port Mode

EPP 1.7 AND SPP

Options:

BPP

EPP 1.9 AND SPP

ECP

ECP AND EPP 1.9

SPP

EPP 1.7 AND SPP

ECP AND EPP 1.7

Parallel Port IRQ

IRQ7

Options:

IRQ5

IRQ7

SB Serial Port 1 Mode

RS232

SB Serial Port 2 Mode

RS232

SB Serial Port 3 Mode

RS232

Options:

RS232

RS422 RTS

RS422 AUTO

RS485 RTS

RS485 RTS+ECHO

RS485 AUTO

RS485 AUTO+ECHO

SB Serial Port 4 Mode

RS232

Options:

RS232

RS422 RTS

RS422 AUTO

RS485 RTS

RS485 RTS+ECHO

RS485 AUTO

RS485 AUTO+ECHO

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration >

WatchDog Configuration

Watchdog Timer	0
----------------	----------

Options:

0

2 Sec

20 Sec

200 Sec

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration >	
Multi-Function Port Configuration	
Port0 Function	GPIO
<i>Options:</i> GPIO 8051 P0 PWM00..PWM07	
Port0 Bit0 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit1 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit2 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit3 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit4 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit5 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit6 Direction	IN
<i>Options:</i> IN OUT	
Port0 Bit7 Direction	IN
<i>Options:</i> IN OUT	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration > Multi-Function Port Configuration (cont'd)	
Port1 Function	GPIO
<i>Options:</i> GPIO 8051 P1 PWM08..PWM15	
Port1 Bit0 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit1 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit2 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit3 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit4 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit5 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit6 Direction	IN
<i>Options:</i> IN OUT	
Port1 Bit7 Direction	IN
<i>Options:</i> IN OUT	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Chipset > SouthBridge Chipset Configuration > Redundancy Control Configuration	
Dual Port 4KB SRAM	Disabled
<i>Options:</i> Enabled Disabled	
Invalid OPCODE Condition	Disabled
<i>Options:</i> Disabled Enabled	
KB/MS System Fail	Normal
<i>Options:</i> Normal TRI-State	
GPIO PORT0 System Fail	Normal
<i>Options:</i> Normal TRI-State	
GPIO PORT1 System Fail	Normal
<i>Options:</i> Normal TRI-State	
LPT PORT System Fail	Normal
<i>Options:</i> Normal TRI-State	
UART1 System Fail	Normal
<i>Options:</i> Normal TRI-State	
UART2 System Fail	Normal
<i>Options:</i> Normal TRI-State	
UART3 System Fail	Normal
<i>Options:</i> Normal TRI-State	
UART4 System Fail	Normal
<i>Options:</i> Normal TRI-State	

Note: Defaults are indicated in **bold** for BIOS properties. Default options that cannot be user-modified are indicated with grey text.

Exit

Save Changes and Exit

Discard Changes and Exit

Discard Changes

Load Factory Defaults

Save Custom Defaults

Load Custom Defaults

BIOS SETTINGS STORAGE OPTIONS

CMOS Storage Locations

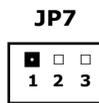
The PCM-VDX-1-256's BIOS configuration is stored in three (3) locations:

- (1) CMOS RAM (nonvolatile if battery backed)
- (2) FLASH PROM (nonvolatile storage for factory defaults)
- (3) Internal Flash (for custom settings)

Saving the CMOS Configuration

The Real-Time Clock and the CMOS RAM settings can be maintained by an optional battery when the board is powered off. When the external battery is used, simply disconnect the battery from **J8** for 20 seconds. When an optional on-board battery is used, it can be enabled or disabled at **JP7**. A battery is always required to maintain time and date functions when the board is powered off.

Master Battery Enable



Enables On-board Battery*	1-2
Enables External Battery (default)	1 2
NC	2-3

*Applicable to OEM models only.

CABLES

Part Number	Description
CBL-SET-373-G-1	Cable set for PCM-VDX-1-256 includes:
CBL-174-G-1-1.5	18-in., 8-wire power cable
CBL-247-G-1-1.0	1-ft., Multi-I/O adapter
CBL-SER1-202-12	Serial I/O Cable (COM3/COM4)
CBL-USB4-002-12	4x USB ports to two, 2-mm 2x4 connectors
ADP-IO-USB-001	Dual 8-pin, 2-mm. 4 USB ports
CBL-ENET1-202-12	Ethernet Cable with RJ-45 Jack
BAT-LTC-E-36-16-1	External 3.6V, 1600 mAH battery with plug-in connector
CBL-SET-373-G-MIN	Minimal Cable set for PCM-VDX-1-256 includes:
CBL-174-G-1-1.5	18-in., 8-wire power cable
CBL-247-G-1-1.0	1-ft., Multi-I/O adapter
BAT-LTC-E-36-16-1	External 3.6V, 1600 mAH battery with plug-in connector
Additional Cables	
CBL-174-G-1-1.5	18-in., 8-wire Power Cable
CBL-343-G-1-1.375	PS/2 Mouse Adapter
CBL-247-G-1-1.0	1-ft., Multi-I/O adapter
CBL-266-G-2-0.75	44-pin, IDE Socket Cable
CBL-DIO16-000-14	DIO Cable - Unterminated Cable
CBL-DIO16-001-12	DIO Cable with 2x_15-pin with Pico-Clasp™ connector
CBL-DIO16-002-12	DIO Cable with 2x_15-pin 0.100 center keyed female connector
CBL-ENET1-202-12	Ethernet Cable with RJ-45 Jack
CBL-ENET1-203-12	Ethernet Cable with RJ-45 Plug
CBL-SER1-202-12	Serial I/O Cable (COM3/COM4)
CBL-USB4-000-14	4x USB ports - Unterminated
CBL-USB4-001-12	4x USB ports two, 2x20-pin Pico-Clasp™ connector
CBL-USB4-002-12	4x USB ports to two, 2-mm 2x4 connectors

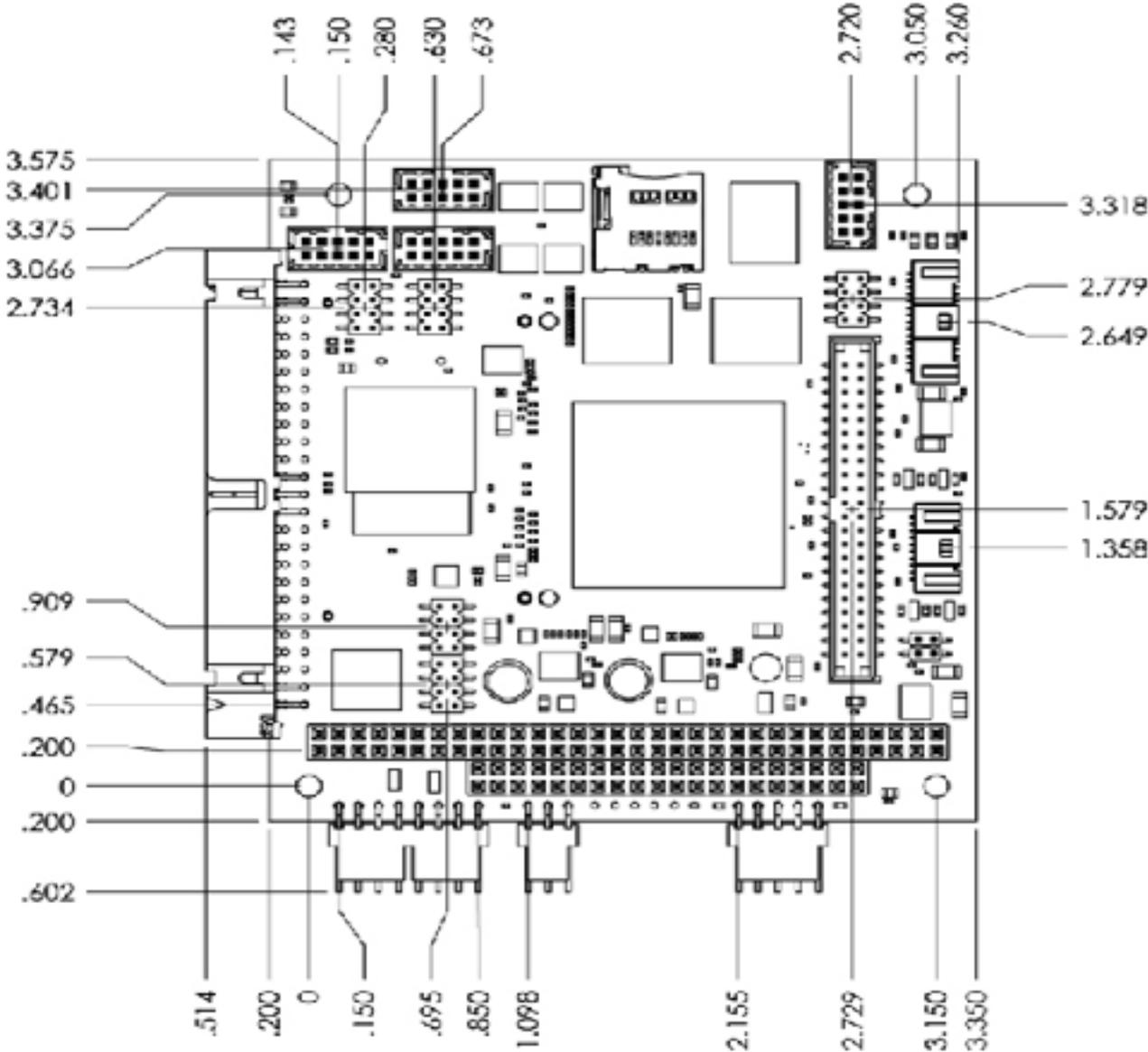
SOFTWARE DRIVERS

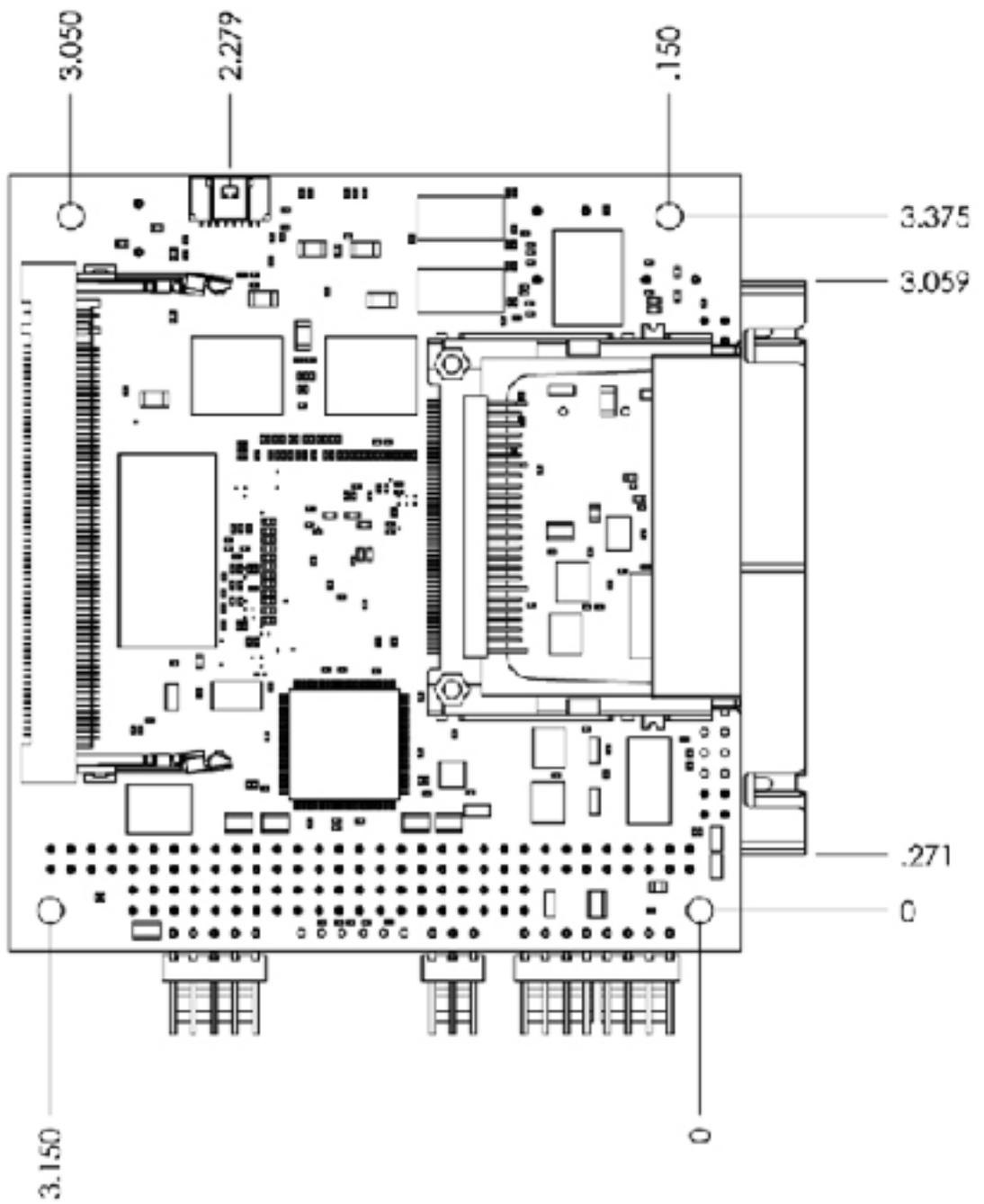
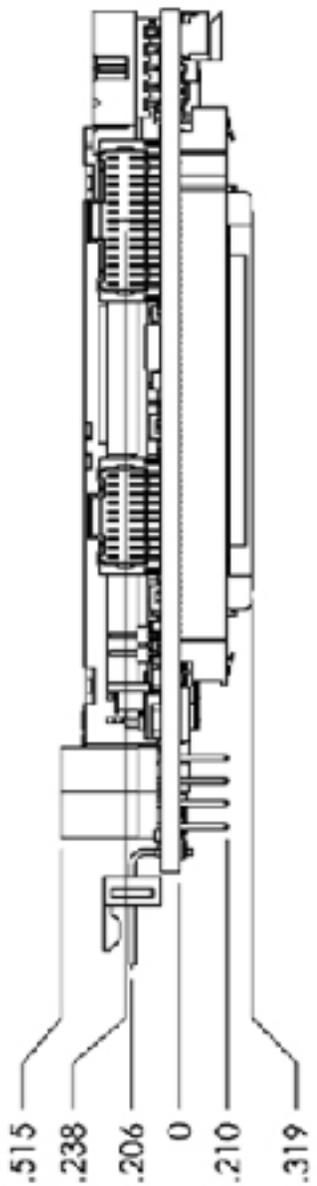
See the [WinSystems website](#).

SPECIFICATIONS

Electrical		
VCC	+5VDC ±5%	
	Typical	800 mA
MTBF	11.9 years	
Mechanical		
Dimensions	3.6" x 3.8" (90 mm x 96 mm)	
Weight	3.6 oz (102g)	
Environmental		
Operating Temperature	-40°C to 85°C	

MECHANICAL DRAWING





APPENDIX - A

BEST PRACTICES

POWER SUPPLY

The power supply and how it is connected to the Single Board Computer (SBC) is very important.



Avoid Electrostatic Discharge (ESD)

Only handle the SBC and other bare electronics when electrostatic discharge (ESD) protection is in place. Having a wrist strap and a fully grounded workstation is the minimum ESD protection required before the ESD seal on the product bag is broken.

Power Supply Budget

Evaluate your power supply budget. It is usually good practice to budget 2X the typical power requirement for all of your devices.

Zero-Load Power Supply

Use a zero-load power supply whenever possible. A zero-load power supply does not require a minimum power load to regulate. If a zero-load power supply is not appropriate for your application, then verify that the single board computer's typical load is not lower than the power supply's minimum load. If the single board computer does not draw enough power to meet the power supply's minimum load, then the power supply will not regulate properly and can cause damage to the SBC.



Use Proper Power Connections (Voltage)

When verifying the voltage, you should always measure it at the power connector on the SBC. Measuring at the power supply does not account for voltage drop through the wire and connectors.

The single board computer requires +5V ($\pm 5\%$) to operate. Verify the power connections. Incorrect voltages can cause catastrophic damage.

Populate all of the +5V and ground connections. Most single board computers will have multiple power and ground pins, and all of them should be populated. The more copper connecting the power supply to the single board computer the better.

Adjusting Voltage

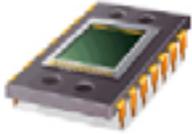
If you have a power supply that will allow you to adjust the voltage, it is a good idea to set the voltage at the power connector of the SBC to 5.1V. The SBC can tolerate up to 5.25V, so setting your power supply to provide 5.1V is safe and allows for a small amount of voltage drop that will occur over time as the power supply ages and the connector contacts oxidize.

Power Harness

Minimize the length of the power harness. This will reduce the amount of voltage drop between the power supply and the single board computer.

Gauge Wire

Use the largest gauge wire that you can. Most connector manufacturers have a maximum gauge wire they recommend for their pins. Try going one size larger; it usually works and the extra copper will help your system perform properly over time.



Contact Points

WinSystems' boards mostly use connectors with gold finish contacts. Gold finish contacts are used exclusively on high speed connections. Power and lower speed peripheral connectors may use a tin finish as an alternative contact surface. It is critical that the contact material in the mating connectors is matched properly (gold to gold and tin to tin). Contact areas made with dissimilar metals can cause oxidation/corrosion resulting in unreliable connections.

Pin Contacts

Often the pin contacts used in cabling are not given enough attention. The ideal choice for a pin contact would include a design similar to Molex's or Trifurcons' design, which provides three distinct points to maximize the contact area and improve connection integrity in high shock and vibration applications.

POWER DOWN

Make sure the system is **completely off/powering down** before connecting anything.



Power Supply OFF

The power supply should always be off before it is connected to the single board computer.

I/O Connections OFF

I/O Connections should also be off before connecting them to the single board computer or any I/O cards. Connecting hot signals can cause damage whether the single board computer is powered or not.

MOUNTING AND PROTECTING THE SINGLE BOARD COMPUTER

Do Not Bend or Flex the SBC

Never bend or flex the single board computer. Bending or flexing can cause irreparable damage. Single board computers are especially sensitive to flexing or bending around Ball-Grid-Array (BGA) devices. BGA devices are extremely rigid by design and flexing or bending the single board computer can cause the BGA to tear away from the printed circuit board.

Mounting Holes

The mounting holes are plated on the top, bottom and through the barrel of the hole and are connected to the single board computer's ground plane. Traces are often routed in the inner layers right below, above or around the mounting holes.

Never use a drill or any other tool in an attempt to make the holes larger.

Never use screws with oversized heads. The head could come in contact with nearby components causing a short or physical damage.

Never use self-tapping screws; they will compromise the walls of the mounting hole.

Never use oversized screws that cut into the walls of the mounting holes.

Always use all of the mounting holes. By using all of the mounting holes you will provide the support the single board computer needs to prevent bending or flexing.

MOUNTING AND PROTECTING THE SINGLE BOARD COMPUTER (continued)

Plug or Unplug Connectors Only on Fully Mounted Boards

Never plug or unplug connectors on a board that is not fully mounted. Many of the connectors fit rather tightly and the force needed to plug or unplug them could cause the single board computer to be flexed.

Avoid cutting of the SBC

Never use star washers or any fastening hardware that will cut into the single board computer.

Avoid Overtightening of Mounting Hardware

Causing the area around the mounting holes to compress could damage interlayer traces around the mounting holes.

Use Appropriate Tools

Always use tools that are appropriate for working with small hardware. Large tools can damage components around the mounting holes.

Placing the SBC on Mounting Standoffs

Be careful when placing the single board computer on the mounting standoffs. Sliding the board around until the standoffs are visible from the top can cause component damage on the bottom of the single board computer.

Avoid Conductive Surfaces

Never allow the single board computer to be placed on a conductive surface. Almost all single board computers use a battery to backup the clock-calendar and CMOS memory. A conductive surface such as a metal bench can short the battery causing premature failure.



ADDING PC/104 BOARDS TO YOUR STACK

Be careful when adding PC/104 boards to your stack.

Never allow the power to be turned on when a PC/104 board has been improperly plugged onto the stack. It is possible to misalign the PC/104 card and leave a row of pins on the end or down the long side hanging out of the connector. If power is applied with these pins misaligned, it will cause the I/O board to be damaged beyond repair.

OPERATIONS / PRODUCT MANUALS

Every single board computer has an Operations manual or Product manual.



Manual Updates

Operations/Product manuals are updated often. Periodically check the WinSystems website (<http://www.winsystems.com>) for revisions.

Check Pinouts

Always check the pinout and connector locations in the manual before plugging in a cable. Many single board computers will have identical headers for different functions and plugging a cable into the wrong header can have disastrous results.

Contact an Applications Engineer with questions

If a diagram or chart in a manual does not seem to match your board, or if you have additional questions, contact your Applications Engineer.

WARRANTY INFORMATION

<http://www.winsystems.com/company/warranty.cfm>

WinSystems warrants to Customer that for a period of two (2) years from the date of shipment any Products and Software purchased or licensed hereunder which have been developed or manufactured by WinSystems shall be free of any material defects and shall perform substantially in accordance with WinSystems' specifications therefore. With respect to any Products or Software purchased or licensed hereunder which have been developed or manufactured by others, WinSystems shall transfer and assign to Customer any warranty of such manufacturer or developer held by WinSystems, provided that the warranty, if any, may be assigned. Notwithstanding anything herein to the contrary, this warranty granted by WinSystems to the Customer shall be for the sole benefit of the Customer, and may not be assigned, transferred or conveyed to any third party. The sole obligation of WinSystems for any breach of warranty contained herein shall be, at its option, either (i) to repair or replace at its expense any materially defective Products or Software, or (ii) to take back such Products and Software and refund the Customer the purchase price and any license fees paid for the same. Customer shall pay all freight, duty, broker's fees, insurance charges for the return of any Products or Software to WinSystems under this warranty. WinSystems shall pay freight and insurance charges for any repaired or replaced Products or Software thereafter delivered to Customer within the United States. All fees and costs for shipment outside of the United States shall be paid by Customer. The foregoing warranty shall not apply to any Products of Software which have been subject to abuse, misuse, vandalism, accidents, alteration, neglect, unauthorized repair or improper installations.

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WARRANTY SERVICE

1. To obtain service under this warranty, obtain a return authorization number. In the United States, contact the WinSystems' Service Center for a return authorization number. Outside the United States, contact your local sales agent for a return authorization number.
2. You must send the product postage prepaid and insured. You must enclose the products in an anti-static bag to protect from damage by static electricity. WinSystems is not responsible for damage to the product due to static electricity.