VPX3001 Series

Performance Rugged Conduction Cooled
3U VPX 3rd Gen Intel® Core™ i7
Processor Blade



Manual Rev.: 1.0

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Part No: 50-15102-2000

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Revision History

Revision	Release Date	Description of Change(s)
1.0	2019/06/03	Initial release

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Preface

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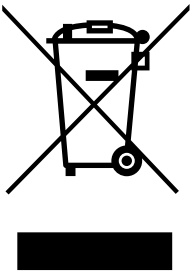
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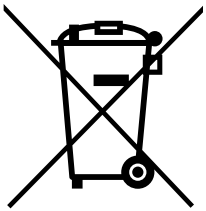
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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The VPX3001 Series is a 3U VPX processor blade featuring the 3rd Generation Intel® Core™ i7 processor with Mobile Intel® QM77 Express Chipset. The VPX3001 provides up to 8GB DDR3-1066/1333 dual channel ECC memory soldered onboard, one PCI Express x8 XMC.3 site with VITA 46.9 rear IO, and onboard soldered 32GB SLC SATA solid state drive. Rear I/O via P1 and P2 includes 2x 1000BASE-T or 2x 1000BASE-BX (BOM option), 1x SATA 6 Gb/s, 1x SATA 3 Gb/s, 2x USB 2.0, 6x GPIO, VGA, 1x RS-232, and 1x RS-232/422.

A VPX-R3001 Rear Transition Module is available to access rear I/O signals and a 9-slot 3U VPX Test Frame is available for users to validate VPX3001 functionality.

The VPX3001 Series is rugged conduction cooled with conformal coating, making it ideal for mission critical applications in radar; intelligence, surveillance and reconnaissance (ISR); and UAV/UGV platforms.

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1.2 Features

- 3U VPX VITA 46, OpenVPX VITA 65, VPX REDI 48
- 4HP (0.8") rugged conduction cooled 3U VPX blade with conformal coating
- Intel® 3rd generation Core™ i7-3612QE Processor (4 cores, 6M cache, 2.1 GHz, 35W TDP)
- Dual channel DDR3-1333/1666 SDRAM with ECC soldered onboard, up to 8GB
- Intel® QM77 PCH
- Intel® HD Graphics 4000 with DX11, OpenGL 3.1 and OCL 1.1
- Onboard PCI Express x8 XMC site with VITA 46.9 rear I/O
- Onboard 32GB SLC SATA Solid State Drive
- Data Plane: VITA 46.4 PCIe 2.0 x8, or 2x PCIe 2.0 x4 to P1, supports NTB function
- Control Plane: VITA 46.6 2x 1000BASE-T or 2x 1000BASE-BX (BOM option)
- Rear I/O:
  - P1: 2x 1000BASE-T or 1000BASE-BX (BOM option), 1x SATA 6 Gb/s, 2x USB 2.0, 1x RS-2326x GPIO
  - P2: VGA, DVI, RS-232/422, XMC-x24s+x8d+x12d
- RAID 0/1/5/10 support
- uEFI BIOS 64Mb SPI flash
- Module Profile: MOD3-PAY-2F2T-16.2.5-3 or MOD3-PAY-2F2U-16.2.3-3 (BOM option)
- Slot Profile: SLT3-PAY-2F2U-14.2.5 or SLT3-PAY-2F2U-14.2.3 (BOM option)

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1.3 Block Diagrams

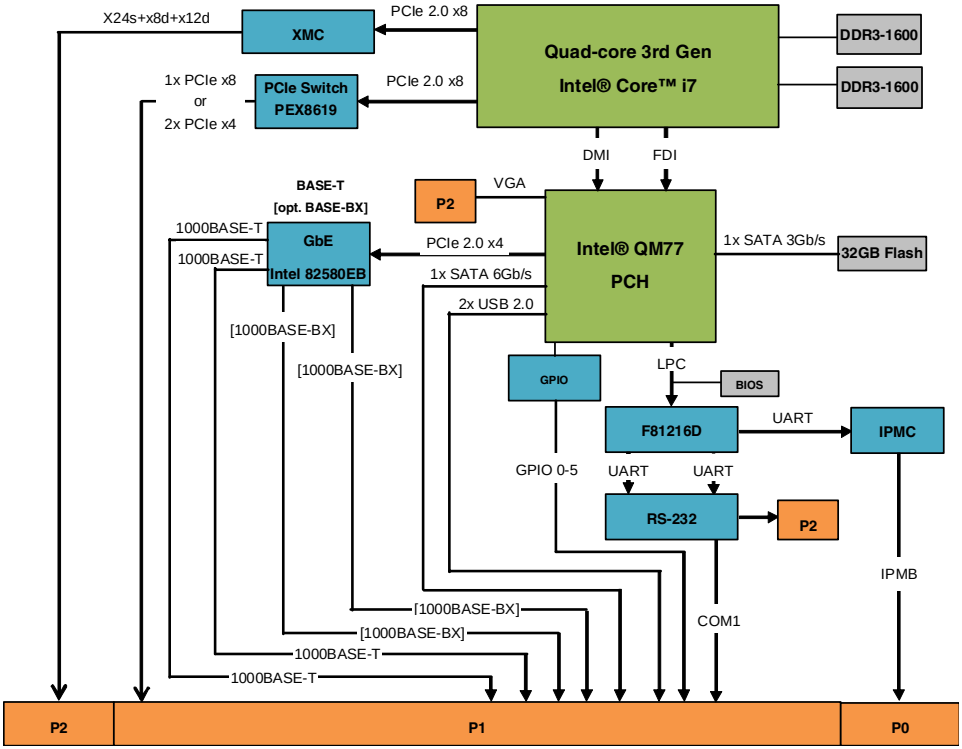


Figure 1-1: VPX3001 Functional Block Diagram

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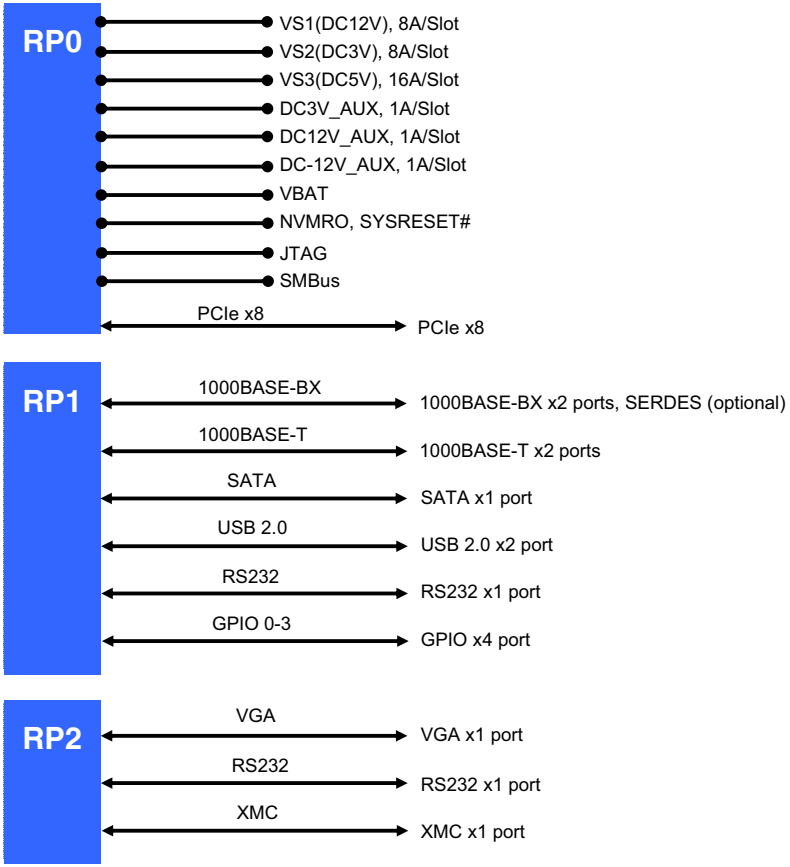


Figure 1-2: VPX-R3001 RTM Functional Block Diagram

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1.4 Model Number Decoder - Processor Blade

VPX3001/3612/M8/S32-R1

(A) (B) (C) (D)

(A) CPU Code

- **3612** = Quad-Core Intel® i7-3612QE processor
- **3555** = Dual-Core Intel® i7-2655LE processor

(B) Memory Size Code

- **M8** = Onboard 8GB DDR3-1333/1600 memory
- **M16** = Onboard 16GB DDR3-1333/1600 memory

(C) SATA NAND Flash Size Code

- **S32** = Onboard 32GB

(D) Ruggedized Level Code

- R1 = Conduction Cooled version with conformal coating supporting -40°C to +75°C at card edge
- R2 = Conduction Cooled version with conformal coating supporting -40°C to +85°C at card edge

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1.5 Package Contents

The VPX3001 is packaged with the following components. If any of the items on the contents list are missing or damaged, retain the shipping carton and packing material and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK. The packing contents of the VPX3001 are non-standard configurations and may vary depending on customer requests.

Processor Blade

- VPX3001
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board

Rear Transition Module

- VPX-R3001 RTM

Test Backplane

- tBP-VPX3000 test backplane


NOTE:

The contents of non-standard VPX3001 configurations may vary depending on the customer requirements.


CAUTION:

This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

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2 Specifications

2.1 VPX3001 Blade Specifications

VITA Standards	• VITA 46.0 VPX Base Standard • VITA 46.4 PCI Express on VPX Fabric Connector • VITA 46.6 Gigabit Ethernet Control Plane on VPX • VITA 46.9 PMC/XMC/Ethernet Signal Mapping to 3U/6U VPX • VITA 46.11(draft) System Management on VPX • VITA 48.0 Ruggedized Enhanced Design Implementation Mechanical Base Specification • VITA 65 OpenVPX Architecture Framework for VPX
Mechanical	• IEEE 1101.1-1998 - Mechanical Core Specifications for Microcomputers • IEEE 1101.2-1992 - Conduction Cooled VME Mechanics • 3U 4HP (0.8") • Board size: 100mm x 160mm • P0, P1, P2 connectors; alignment key 1 & 2 equipped
Processor	• Intel® Core™ i7-3612QE Processor, 2.1 GHz, 6MB LLC cache, FCBGA1023, TDP 35W • Intel® Core™ i7-3555LE Processor, 2.5 GHz, 4MB LLC cache, FCBGA1023, TDP 25W • Passive ruggedized heatsink
Chipset	• Intel® BD82QM77 Platform Controller Hub (PCH)
Memory	• Dual channel DDR3-1333/1600 ECC memory • Soldered onboard with 256Mb*8*18 devices • Up to 8GB
PCI Express	• PCI Express 2.0 x8, or 2x PCIe x4 to P1 by switch setting • Supports NTB function
Gigabit Ethernet	• One Intel® 82580EB Gigabit Ethernet Controller • Two 10/100/1000BASE-T port or two 1000BASE-BX SerDes ports to P1 (BOM option)
Graphics	• Integrated in Intel® Core™ i7 processor • Intel HD Graphics 4000 • Analog VGA routed to P2 • Analog monitor support up to 2048x1536 at 75Hz

Table 2-1: VPX3001 Blade Specifications

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XMC	• One PCIe 2.0 x8 conduction cooled XMC.3 site • XMC I/O connector compliant to VITA 46.9, X24s+X8d+X12d
Front Panel I/O	• Reset button • Power LED
Storage Interfaces[1]	• Onboard SATA NAND flash on SATA 3 Gb/s, up to 32GB • One SATA 6 Gb/s port to P1
BIOS	• AMI EFI BIOS, 64Mbit SPI flash memory
P1 Interface	• 1x SATA ports • 2x USB 2.0 • 1x RS-232 • 6x GPIO • PCIe x8 • 2x 1000BASE-T Gigabit Ethernet Ports or 2x 1000BASE-BX SerDes Port
P2 Interface	• VGA • RS-232/422 • XMC X24s+X8d+X12d
Environmental	• Operating Temperature: R1: -40°C to +75°C at card edge R2: -40°C to +85°C at card edge • Storage Temperature: -50°C to 100°C • Humidity: 95%, non-condensing • Shock: Sawtooth 40G, 11ms, each axis, operating • Vibration: 15Hz-2KHz, 12Grms, random, each axis, operating • Altitude: 60,000 feet, operating
EMI	• CE EN55022 • FCC Class A

Table 2-1: VPX3001 Blade Specifications

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2.2 VPX-R3001 RTM Specifications

VITA Standards	• VITA 46.10 Rear Transition Module on VPX
Mechanical	• 100mm x 80mm
Faceplate I/O	• VGA port • 2x 1000BASE-BX connectors
Onboard Interfaces	• 2x 1000BASE-T vertical connectors • 1x SATA 6Gb/s ports • 2x 5 pin header for RS-232 x2 • 2x 5 pin header for USB x2 • 2x 5 pin header for JTAG • 1x 5 pin header for SMBus • 8x pin headers for GPIO • XMC port • 4x status LEDs for GPIO • 1x reset push button

Table 2-2: VPX-R3001 RTM Specifications

Note: Specifications are subject to change without prior notice.

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2.3 Power Consumption

This section provides information on the power consumption of the VPX3001 Series when using Intel® Core i7 processors with Dual Channel 8GB DDR3-1333 soldered memory and soldered onboard 32GB SATA SSD. The VPX3001 is powered by 12V, 5V and 3.3V. Power consumption at 100% CPU usage was measured by running PassMark BurnInTest and Intel Thermal Analysis Tool (TAT).

Quad-Core Intel® Core™ i7-3612QE 2.1 GHz, 6MB cache, 35W

Item	BIOS EIST/C-state Enabled		BIOS EIST/C-state Disabled	
	Current(A)/ Voltage(V)	Power(W)	Current(A)/ Voltage(V)	Power(W)
S1	1.69/5 0.47/12 0.69/3.3	16.367	1.67/5 0.47/12 0.71/3.3	16.333
Windows 7 (idle)	2.04/5V 0.11/12V 0.68/3.3V	13.764	2.04/5V 0.34/12V 0.67/3.3V	16.491
Windows 7 (typical)*	2.55/5V 2.18/12V 0.64/3.3	41.022	2.61/5V 1.45/12V 0.69/3.3	33.177
Windows 7 (max loading)**	2.81/5V 3.29/12V 0.68/3.3	55.774	2.43/5V 3.08/12V 0.67/3.3	51.321

*Windows 7 (Typical) power consumption running BurnInTest at 100% loading.
**Windows 7 (Max loading) power consumption running Intel TAT test at 100% loading.

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3 Functional Description

The following sections describe the VPX3001 features and functions.

3.1 Processors

The 3rd Generation Intel® Core™ i7 Processor is the next generation of 64-bit, multi-core mobile processors built on 22-nanometer process technology. Based on a new micro-architecture, the processor is designed for a two-chip platform. The two-chip platform consists of a processor and Platform Controller Hub (PCH). The platform enables higher performance, lower cost, easier validation, and improved x-y footprint. The processor includes an integrated display engine, processor graphics, integrated memory controller, and integrated I/O on a single silicon die.

Features	Core™ i7-3612QE	Core™ i7-3555LE
Clock	2.1 GHz	2.5 GHz
Max. Single Core Turbo Freq.	3.1 GHz	3.2 GHz
Last Level Cache	6 MB	4 MB
No. of Cores/Threads	4/8	2/4
Maximum Power (TDP[1])	35 W	25 W
$T_{junction,MAX}$ [2]	105°C	105°C

Notes:

1. The highest expected sustainable power while running known power intensive applications. TDP is not the maximum power that the processor can dissipate.
2. The maximum supported operating temperature.

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Supported Technologies

- Intel® Virtualization Technology for Directed I/O (Intel® VT-d)
- Intel® Virtualization Technology (Intel® VT-x)
- Intel® vPro Technology (Intel® VT)
- Intel® Trusted Execution Technology (Intel® TXT)
- Intel® Hyper-Threading Technology
- Intel® 64 Architecture
- Intel® Turbo Boost Technology 2.0
- AES New Instructions
- Intel® My WiFi Technology
- Enhanced Intel SpeedStep® Technology
- Thermal Monitoring Technologies
- Intel® Fast Memory Access
- Execute Disable Bit
- Intel® VT-x with Extended Page Tables (EPT)

Interfaces

- Dual channel DDR3 memory with one channel of unbuffered SODIMM and one channel of soldered SDRAM
- Memory DDR3 data transfer rates of 1333 MT/s and 1600 MT/s
- 64-bit wide channels plus 8-bits of ECC support for each channel
- System Memory Interface I/O Voltage of 1.35V and 1.5V
- 1-Gb, 2-Gb, and 4-Gb DDR3 DRAM technologies supported
  - Using 4Gb DRAM device technologies, the largest memory capacity possible is 8 GB.
  - Intel Fast Memory Access:
    Just-in-Time Command Scheduling
    Command Overlap
    Out-of Order Scheduling
- The PCI Express lanes are fully-compliant with the PCI Express Base Specification, Revision 3.0, including support for 8.0 GT/s transfer speeds.

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3.2 Chipset

The VPX3001 incorporates the Mobile Intel® QM77 Express Chipset (Intel® BD82QM77 PCH).

Mobile Intel® QM77 Express Chipset

- PCI Express Base Specification, Revision 2.0 support for up to eight ports with transfer rate up to 5 GT/s
- Supports dual display
- ACPI Power Management Logic Support, Revision 4.0a
- Enhanced DMA controller, interrupt controller, and timer functions
- Integrated Serial ATA host controllers with independent DMA operation on up to six ports and SATA 6.0 Gb/s up to two ports
- Supports USB 2.0, USB 3.0
- USB host interface with two EHCI high-speed USB 2.0 Host controllers and two rate matching hubs provide support for up to fourteen USB 2.0 ports
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices
- Supports Intel Trusted Execution Technology
- Support vPro Technology
- Supports Intel® High Definition Audio
- Supports Intel® Rapid Storage Technology
- Supports Intel® Virtualization Technology for Directed I/O
- Low Pin Count (LPC) interface
- Serial Peripheral Interface (SPI) support

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3.3 Intel® Turbo Boost Technology

Intel Turbo Boost Technology is a feature that allows the processor to opportunistically and automatically run faster than its rated operating core and/or render clock frequency when there is sufficient power headroom, and the product is within specified temperature and current limits. The Intel Turbo Boost Technology feature is designed to increase performance of both multi-threaded and single-threaded workloads. The processor supports a Turbo mode where the processor can use the thermal capacity associated with package and run at power levels higher than TDP power for short durations. This improves the system responsiveness for short, bursty usage conditions.

Turbo Mode availability is independent of the number of active cores; however, the Turbo Mode frequency is dynamic and dependent on the instantaneous application power load, the number of active cores, user configurable settings, operating environment, and system design. If the power, current, or thermal limit is reached, the processor will automatically reduce the frequency to stay with its TDP limit.

3.4 Intel® Hyper Threading Technology

The processor supports Intel® Hyper-Threading Technology (Intel® HT Technology), that allows an execution core to function as two logical processors. While some execution resources (such as caches, execution units, and buses) are shared, each logical processor has its own architectural state with its own set of general-purpose registers and control registers. This feature must be enabled using the BIOS and requires operating system support.

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3.5 XMC Site

The VPX3001 Series supports one XMC site for rear I/O expansion. The XMC site provides a x8 PCI Express 2.0 lane. Jn6 rear XMC I/O connector is compliant to VITA 46.9, X8d+X12d.

3.6 Real Time Clock

The Intel® QM77 PCH contains a Motorola MC146818B-compatible real-time clock (RTC) with 256 bytes of RAM. The real-time clock performs two key functions: keeping track of the time of day and storing system data. The RTC operates on a 32.768 KHz crystal and is powered by P3V3_AUX or VBAT. There is no external RTC battery on the VPX3001 to power the RTC after the system is powered off.

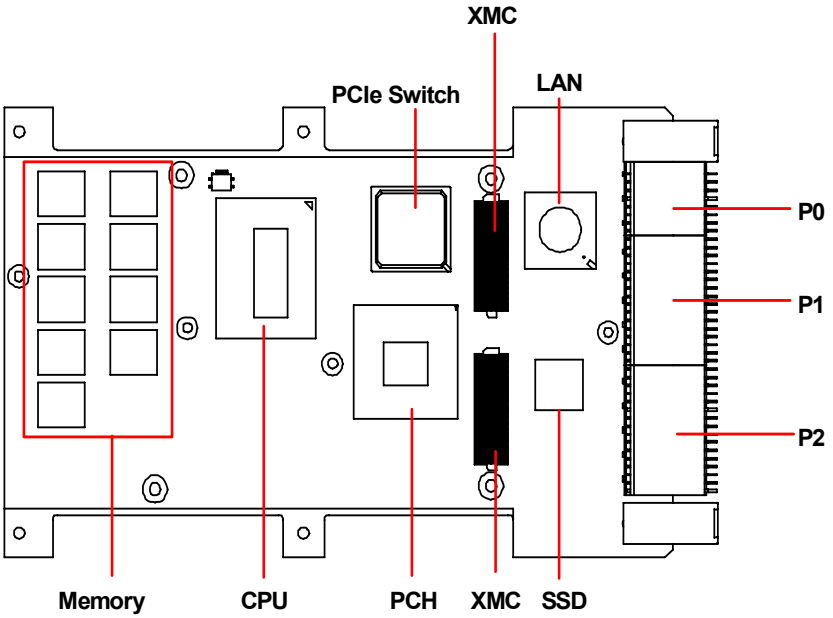
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4 VPX3001 Board Interfaces

4.1 VPX3001 Board Layout

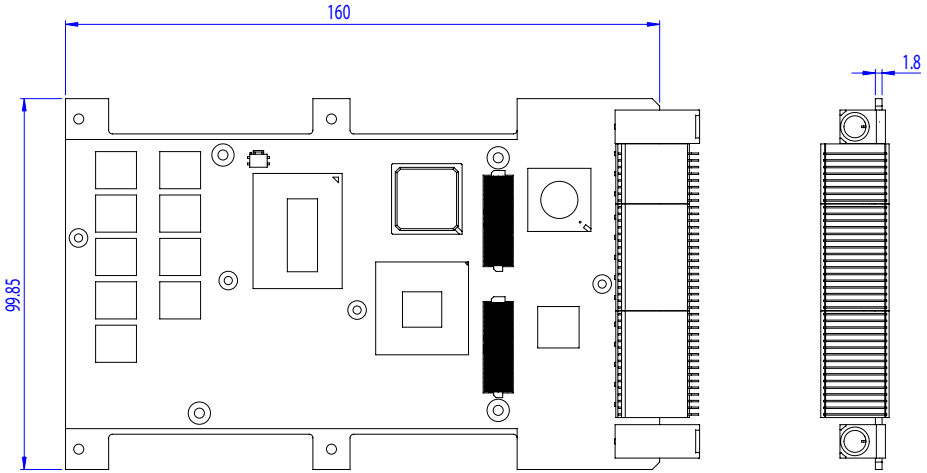


CPU	Intel Core Processor	**SSD**	32GB SATA NAND flash
PCH	Intel QM77 PCH	**XMC**	XMC connectors
PCIe Switch	Pericom PEX8619 Bridge	**Memory**	DDR3 memory chips
LAN	Intel 82580EB Ethernet Controller	**P0-2**	VPX connectors

Figure 4-1: VPX3001 Board Layout

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4.2 VPX3001 Mechanical Drawing



Dimensions in mm

Figure 4-2: VPX3001 Mechanical Dimensions

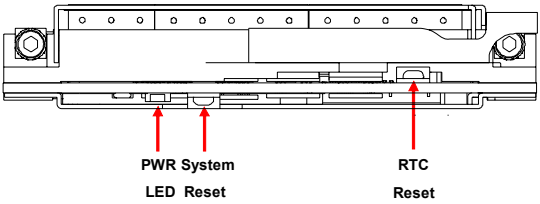


Figure 4-3: VPX3001 Front View

Power LED

LED	Color	Condition	Indication
Power	Green	OFF	System is off
		ON	System is on

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System Reset

Resets the system.

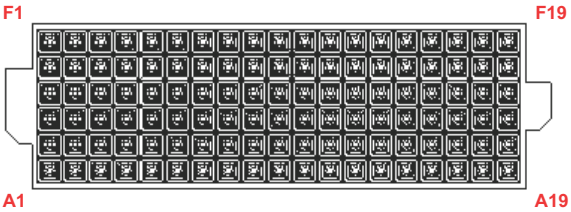
RTC Reset

Resets BIOS settings to factory default settings.

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4.3 VPX3001 Connector Pin Assignments

XMC Connectors



JN1 Connector

Pin	A	B	C	D	E	F
1	RXP0	RXN0	+3.3V	RXP1	RXN1	VPWR
2	GND	GND	TRST#	GND	GND	MRSTI#
3	RXP2	RXN2	+3.3V	RXP3	RXN3	VPWR
4	GND	GND	TCK	GND	GND	MRSTO#
5	RXP4	RXN4	+3.3V	RXP5	RXN5	VPWR
6	GND	GND	TMS	GND	GND	+12V
7	RXP6	RXN6	+3.3V	RXP7	RXN7	VPWR
8	GND	GND	TDI	GND	GND	-12V_AUX
9	NC	NC	NC	NC	NC	NC
10	GND	GND	TDO	GND	GND	GA0
11	TXP0	TXN0	MBIST#	TXP1	TXN1	VPWR
12	GND	GND	GA1	GND	GND	MPRSENT#
13	TXP2	TXN2	+3.3V_AUX	TXP3	TXN3	VPWR
14	GND	GND	GA2	GND	GND	DATA
15	TXP4	TXN4	NC	TXP5	TXN5	VPWR
16	GND	GND	MVMRO	GND	GND	CLK
17	TXP6	TXN6	NC	TXP7	TXN7	NC
18	GND	GND	NC	GND	GND	NC
19	CLK-P	CLK-N	NC	WAKE#	ROOT#	NC

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JN2 Connector

Pin	A	B	C	D	E	F
1	P2-E7	P2-D7	NC	P2-B7	P2-A7	NC
2	GND	GND	NC	GND	GND	NC
3	P2-F8	P2-E8	NC	P2-C8	P2-B8	NC
4	GND	GND	NC	GND	GND	NC
5	P2-E11	P2-D11	NC	P2-B11	P2-A11	NC
6	GND	GND	NC	GND	GND	NC
7	P2-F12	P2-E12	NC	P2-C12	P2-B12	NC
8	GND	GND	P2-E1	GND	GND	P2-B1
9	P2-E13	P2-D13	P2-D1	P2-B13	P2-A13	P2-A1
10	GND	GND	P2-F2	GND	GND	P2-C2
11	P2-E9	P2-D9	P2-E2	P2-B9	P2-A9	P2-B2
12	GND	GND	P2-E3	GND	GND	P2-B3
13	P2-F10	P2-E10	P2-D3	P2-C10	P2-B10	P2-A3
14	GND	GND	P2-F4	GND	GND	P2-C4
15	P2-F14	P2-E14	P2-E4	P2-C14	P2-B14	P2-B4
16	GND	GND	P2-E5	GND	GND	P2-B5
17	P2-E15	P2-D15	P2-D5	P2-B15	P2-A15	P2-A5
18	GND	GND	P2-F6	GND	GND	P2-C6
19	P2-F16	P2-E16	P2-E6	P2-C16	P2-B16	P2-B6

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VPX Connectors

P0 Connector

Pin	G	F	E	D	C	B	A
1	+12V	+12V	+12V	None	+3.3V	+3.3V	+3.3V
2	+12V	+12V	+12V	None	+3.3V	+3.3V	+3.3V
3	+5V	+5V	+5V	None	+5V	+5V	+5V
4	I2C_CLK	I2C_DAT	GND	+12V_AUX	GND	SYSRESET	NC
5	GAP	GA4	GND	+3.3V_AUX	GND	SM0_CLK	SM1_DATA
6	GA3	GA2	GND	+12V_AUX	GND	GA1	GA0
7	TCK	GND	TDO	TDI	GND	TMS	TRST
8	GND	REF_CLK-	REF_CLK+	GND	NC	NC	GND

P1 Connector

Pin	G	F	E	D	C	B	A	
1	NC	GND	L0-TX-	L0-TX+	GND	L0-RX-	L0-RX+	PCIe x8
2	GND	L1-TX-	L1-TX+	GND	L1-RX-	L1-RX+	GND	
3	P1_VBAT	GND	L2-TX-	L2-TX+	GND	L2-RX-	L2-RX+	
4	GND	L3-TX-	L3-TX+	GND	L3-RX-	L3-RX+	GND	
5	SYSCON#	GND	L4-TX-	L4-TX+	GND	L4-RX-	L4-RX+	
6	GND	L5-TX-	L5-TX+	GND	L5-RX-	L5-RX+	GND	
7	NC	GND	L6-TX-	L6-TX+	GND	L6-RX-	L6-RX+	
8	GND	L7-TX-	L7-TX+	GND	L7-RX-	L7-RX+	GND	
9	COM01_TXD	GND	SATA00-TXN SATA0	SATA00-TXP SATA0	GND	SATA00-RXN SATA0	SATA00-RXP SATA0	SATA
10	GND	USB1_N RFCIO	USB1_P RFCIO	GND	USB0_N RFCIO	USB0_P	GND	USB
11	COM01_RXD	GND	GPIO1	GPIO0	GND	P5V_USB1	P5V_USB0	
12	GND	GPIO5 RFCIO	GPIO4 RFCIO	GND	GPIO3 RFCIO	GPIO2 RFCIO	GND	GPIO
13	NC	GND	L0-TX-	L0-TX+	GND	L0-RX-	L0-RX+	1GBASE-T/BX
14	GND	L1-TX-	L1-TX+	GND	L1-RX-	L1-RX+	GND	
15	P1_VBAT	GND	L2-TX-	L2-TX+	GND	L2-RX-	L2-RX+	
16	GND	L3-TX-	L3-TX+	GND	L3-RX-	L3-RX+	GND	

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P2 Connector

Pin	G	F	E	D	C	B	A
1	VGA0_RED	GND	J16-C8	J16-C9	GND	J16-F8	J16-F9
2	GND	J16-C10	J16-C11	GND	J16-F10	J16-F11	GND
3	VGA0_GREEN	GND	J16-C12	J16-C13	GND	J16-F12	J16-F13
4	GND	J16-C14	J16-C15	GND	J16-F14	J16-F15	GND
5	VGA0_BLUE	GND	J16-C16	J16-C17	GND	J16-F16	J16-F17
6	GND	J16-C18	J16-C19	AGND	J16-F18	J16-F19	AGND
7	VGA0_VSYNC	GND	J16-A1	J16-B1	GND	J16-D1	J16-E1
8	GND	J16-A3	J16-B3	GND	J16-D3	J16-E3	GND
9	VGA0_HSYNC	GND	J16-A11	J16-B11	GND	J16-D11	J16-E11
10	GND	J16-A13	J16-B13	GND	J16-D13	J16-E13	GND
11	COM02_RXD	GND	J16-A5	J16-B5	GND	J16-D5	J16-E5
12	GND	J16-A7	J16-B7	GND	J16-D7	J16-E7	GND
13	DDC_CLK	GND	J16-A9	J16-B9	GND	J16-D9	J16-E9
14	GND	J16-A15	J16-B15	GND	J16-D15	J16-E15	GND
15	DDC_DATA	GND	J16-A17	J16-B17	GND	J16-D17	J16-E17
16	GND	J16-A19	J16-B19	GND	J16-D19	J16-E19	GND

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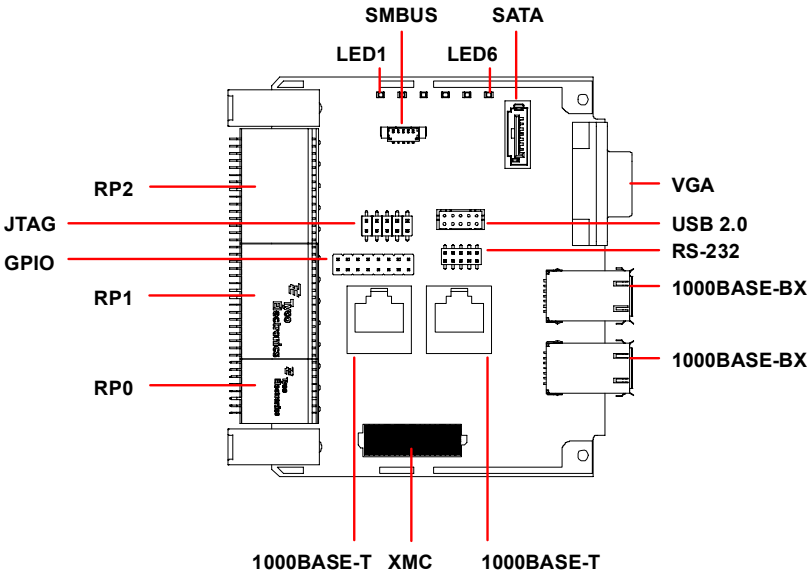
5 VPX-R3001 RTM

5.1 VPX-R3001 Specifications

Form Factor	• VPX RTM
IO Ports	• Two USB 2.0 ports on board. • Two RJ-45 LAN ports.(two ports SERDES optional) • One SATA 6Gb/s ports • One RS-232 port on board • One VPX JTAG port. • One VGA ports.
GPIO	• 16 pin header
Dimension	• 187x199.7mm
Buttons	• One reset button
Environmental	• Operating Temperature: -45°C to +85°C • Storage Temperature: -55°C to +100°C • Relative Humidity: 95% non-condensing

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5.2 VPX-R3001 RTM Board Layout



SMBUS	VPX SMBus pin header
SATA	SATA connector (7-pin)
VGA	VGA connector (DB-15)
1000BASE-BX	1000BASE-BX Connector
JTAG	VPX JTAG Connector
USB 2.0	USB 2.0 pin header
GPIO	GPIO connector
RS-232	RS-232 pin header
1000BASE-T	1000BASE-T connectors (RJ-45)
XMC	XMC connector
RP0-2	VPX connectors

Figure 5-1: VPX-R3001 RTM Board Layout

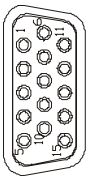
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5.3 VPX-R3001 RTM Connector Pin Assignments

Rear I/O Connectors

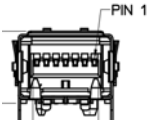
VGA Connector

Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
+5V.	9	10	GND
N.C.	11	12	CRTDATA
HSYNC	13	14	VSYNC
CRTCLK	15		



BX Connectors

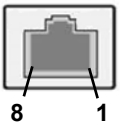
Pin #	GbE Signal
1	GND1
2	TP2_R
3	TN2_R
4	GND2
5	RN2_R
6	RP2_R
7	GND3



Onboard Connectors

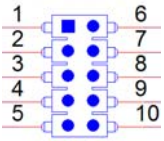
Gigabit Ethernet Connectors (RJ-45, (CN9/10)

Pin #	Signal
1	MX0+
2	MX0-
3	MX1+
4	MX2+
5	MX2-
6	MX1-
7	MX3+
8	MX3-



RS-232 Header (CN20)

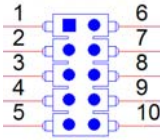
Pin #	Signal
1	N.C.
2	P1_SOUT
3	P1_SIN
4	N.C.
5	GND
6	N.C.
7	P2_SOUT
8	P2_SIN
9	N.C.
10	GND



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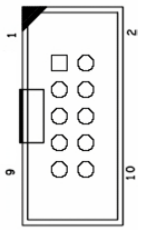
VPX JTAG Header (CN22)

Pin #	Signal
1	P0_TCK
2	GND
3	P0_TDO
4	NC
5	P0_TMS
6	P3V3_PSU
7	P3V3_PSU
8	P0_TRST
9	P0_TDI
10	GND



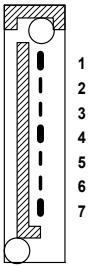
USB 2.0 Connector (CN30)

Pin #	Signal
1	P5V_USB
2	P5V_USB
3	USB_N6_L
4	USB_N0_L
5	USB_P6_L
6	USB_P0_L
7	GND
8	GND
9	GND
10	GND



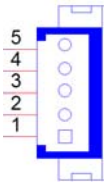
SATA Connector (CN32/36)

Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



VPX SMBus 2 & 3 (CN95)

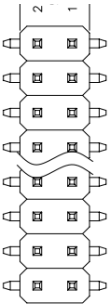
Pin #	Signal
1	IPMB_DAT
2	GND
3	IPMB_CLK
4	P5V_PSU
5	P5V_PSU



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GPIO Connector (JP11)

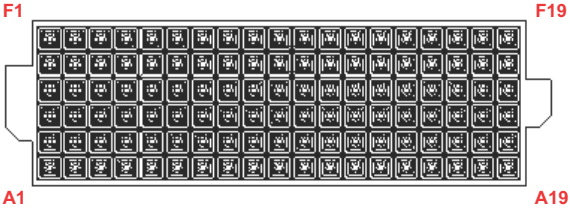
Pin #	Signal
1	SMBUS_GPIO0
2	GND
3	SMBUS_GPIO1
4	GND
5	SMBUS_GPIO2
6	GND
7	SMBUS_GPIO3
8	GND
9	SMBUS_GPIO4
10	GND
11	SMBUS_GPIO5
12	GND
13	GND
14	GND
15	GND
16	GND



GPIO LEDs

LED #	Signal
LED1	GPIO0
LED2	GPIO1
LED3	GPIO2
LED4	GPIO3
LED5	GPIO4
LED6	GPIO5

XMC Connector (CN83)



Pin	A	B	C	D	E	F
1	JN6-A1	JN6-B1	NC	JN6-D1	JN6-E1	NC
2	GND	GND	NC	GND	GND	NC
3	JN6-A3	JN6-B3	NC	JN6-D3	JN6-E3	NC
4	GND	GND	NC	GND	GND	NC
5	JN6-A5	JN6-B5	NC	JN6-D5	JN6-E5	NC
6	GND	GND	NC	GND	GND	NC
7	JN6-A7	JN6-B7	NC	JN6-D7	JN6-E7	NC
8	GND	GND	JN6-C8	GND	GND	JN6-F8
9	JN6-A9	JN6-B9	JN6-C9	JN6-D9	JN6-E9	JN6-F9
10	GND	GND	JN6-C10	GND	GND	JN6-F10
11	JN6-A11	JN6-B11	JN6-C11	JN6-D11	JN6-E11	JN6-F11
12	GND	GND	JN6-C12	GND	GND	JN6-F12
13	JN6-A13	JN6-B13	JN6-C13	JN6-D13	JN6-E13	JN6-F13
14	GND	GND	JN6-C14	GND	GND	JN6-F14
15	JN6-A15	JN6-B15	JN6-C15	JN6-D15	JN6-E15	JN6-F15
16	GND	GND	JN6-C16	GND	GND	JN6-F16
17	JN6-A17	JN6-B17	JN6-C17	JN6-D17	JN6-E17	JN6-F17
18	GND	GND	JN6-C18	GND	GND	JN6-F18
19	JN6-A19	JN6-B19	JN6-C19	JN6-D19	JN6-E19	JN6-F19

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RTM VPX Connectors

RP0 Connector

Pin	G	F	E	D	C	B	A
1	NC	NC	NC	NC	NC	NC	NC
2	P12V	P12V	P12V	P3V3	P3V3	P3V3	P3V3
3	P5V	P5V	P5V	NC	P5V	P5V	P5V
4	I2C_CLK	I2C_DAT	GND	NC	GND	NC	NC
5	NC	NC	GND	NC	GND	IPMB_CLK	IPMB_DAT
6	NC	NC	GND	NC	GND	NC	NC
7	TCK	GND	TDO	TDI	GND	TMS	TRST
8	GND	NC	NC	GND	NC	NC	GND
9	NC	GND	NC	NC	GND	NC	NC
10	GND	NC	NC	GND	NC	NC	GND
11	NC	GND	NC	NC	GND	NC	NC
12	GND	NC	NC	GND	NC	NC	GND
13	NC	GND	NC	NC	GND	NC	NC
14	GND	NC	NC	GND	NC	NC	GND
15	NC	GND	NC	NC	GND	NC	NC
16	GND	NC	NC	GND	NC	NC	GND

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RP1 Connector

Pin	G	F	E	D	C	B	A
1	COM1_TX	GND	SATA_TX0-	SATA_TX0+	GND	SATA_RX0-	SATA_RX0+
2	GND	USB1-	USB1+	GND	USB0-	USB0+	GND
3	COM1_RX	GND	GPIO1	GPIO0	GND	P5V_USB1	P5V_USB0
4	GND	GPIO5	GPIO4	GND	GPIO3	GPIO2	GND
5	COM2_TX	GND	MDI1_B-	MDI1_B+	GND	MDI1_A-	MDI1_A+
6	GND	MDI1_D-	MDI1_D+	GND	MDI1_C-	MDI1_C+	GND
7	MASK_RESET-L	GND	MDI2_B-/ BX1_T-	MDI2_B+/ BX1_T+	GND	MDI2_A-/ BX1_R-	MDI2_A+/ BX1_R+
8	GND	MDI2_D-/ BX0_T-	MDI2_D+/ BX0_T+	GND	MDI2_C-/ BX0_R-	MDI2_C+/ BX0_R+	GND
9	VGA_R	GND	JN6-C8	JN6-C9	GND	JN6-F8	JN6-F9
10	GND	JN6-C10	JN6-C11	GND	JN6-F10	JN6-F11	GND
11	VGA_G	GND	JN6-C12	JN6-C13	GND	JN6-F12	JN6-F13
12	GND	JN6-C14	JN6-C15	GND	JN6-F14	JN6-F15	GND
13	VGA_B	GND	JN6-C16	JN6-C17	GND	JN6-F16	JN6-F17
14	GND	JN6-C18	JN6-C19	GND	JN6-F18	JN6-F19	GND
15	VGA_VSYNC	GND	JN6-A1	JN6-B1	GND	JN6-D1	JN6-E1
16	GND	JN6-A3	JN6-B3	GND	JN6-D3	JN6-E3	GND

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RP2 Connector

Pin	G	F	E	D	C	B	A
1	VGA_HSYNC	GND	JN6-A11	JN6-B11	GND	JN6-D11	JN6-E11
2	GND	JN6-A13	JN6-B13	GND	JN6-D13	JN6-E13	GND
3	COM2_RX	GND	JN6-A5	JN6-B5	GND	JN6-D5	JN6-E5
4	GND	JN6-A7	JN6-B7	GND	JN6-D7	JN6-E7	GND
5	DDC_CLK	GND	JN6-A9	JN6-B9	GND	JN6-D9	JN6-E9
6	GND	JN6-A15	JN6-B15	GND	JN6-D15	JN6-E15	GND
7	DDC_DATA	GND	JN6-A11	JN6-B11	GND	JN6-D11	JN6-E11
8	GND	JN6-A19	JN6-B19	GND	JN6-D19	JN6-E19	GND

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6 Getting Started

This chapter describes the installation of the following components:

- VPX Blade installation to chassis
- RTM installation to chassis

6.1 Installing the VPX3001 to the Chassis

These instructions are for reference only. Refer to the user guide that comes with the chassis for more information.

1. Be sure to select the system slot to install the blade. The system power may now be powered on or off.
2. Align the module's top and bottom edges to the chassis card guides, and then carefully slide the module into the chassis. A slight resistance may be felt when inserting the module. If the resistance it too strong, check if there are wedge lock screwed or if the board's connector pins are not properly aligned with connectors on the back-plane. Then push the board until it is completely flush with the chassis.
3. Ensure the module in place, and then screw the wedge lock on the module

6.2 Installing the VPX-R3001 to the Chassis

The installation and removal procedures for a RTM are the same as those for VPX boards. Because they are shorter than front boards, pay careful attention when inserting or removing RTMs.

Refer to previous sections for peripheral connectivity of all I/O ports on the RTM. When installing the VPX3001 Series and related RTMs, make sure the RTM is the correct matching model.

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6.3 Driver Installation

The VPX3001 drivers are available from the ADLINK website (**www.adlinktech.com**). ADLINK provides validated drivers for Windows 7.

Follow the steps below to install the drivers for Windows 7 64-bit.

1. Install the **Windows operating system** before installing any driver. Most standard I/O device drivers are installed during Windows installation.
2. Install the **chipset driver** by extracting and running the program in **Intel Chipset Device Software_AllOS_ 9.3.0.1026.zip**
3. Install the **LAN drivers** by extracting and running the program in **Intel Network_Adapter_WIN7_64_v 18.0.zip**
4. Install the **graphics driver and utilities** by extracting and running the program in **Intel_HD_Graphics_Family_ WIN7_64_ 15.28.12.64.2932.zip**
5. Install the **audio drivers and utilities** by extracting and running the program in **Realtek_High Definition Audio_ Win7_64_6.0.1.6662.zip**
6. Install the **RAID Drivers** by extracting and running the program in **Intel RST Driver Files_F6 Install_64bit_ 11.7.0.1013.zip**
7. Install the **IME interface driver** by extracting and running the program in **Intel Management Engine Interface 8.0.10.1464.zip**
8. Install the **USB 3.0 driver** by extracting and running the program in **Intel(R) USB 3.0 eXtensible Host Controller Driver AllOS_1.0.4.225.zip**

We recommend using the drivers provided on the ADLINK website to ensure compatibility. VxWorks BSPs can aldo be downloaded from the VPX3001 product page.

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7 Utilities

7.1 Watchdog Timer

This section describes the operation of the VPX3000's watchdog timer (WDT). The primary function of the WDT is to monitor the VPX3000's operation and to reset the system if a software application fails to function as programmed. The following WDT functions may be controlled using a software application:

- enabling and disabling
- set and get current configuration
- reloading timeout value

The VPX3000 custom WDT circuit is implemented using the IPMC and operated by IPMI commands.

Watchdog Timer IPMI Commands

The following section describes the IPMI commands for controlling watchdog timer (WDT) functions. For more details about IPMI commands, please refer to the IPMI specification: "*Intelligent Platform Management Interface Specification Second Generation v2.0*" .

WDT Command Table

Command	NetFn Code	Cmd Code
Reset Watchdog Timer	App (18h)	22h
Set Watchdog Timer	App (18h)	24h
Get Watchdog Timer	App (18h)	25h

The WDT IPMI commands allow the user to set the countdown period and reload the timeout value periodically to keep it from resetting the system. If the timer countdown value is not reloaded, the watchdog resets the system hardware after its counter reaches zero.

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Reset Watchdog Timer

This command is used to reload the WDT.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	22h	Defined command
Response	0	Complete Code	00h means OK

Set Watchdog Timer:

This command is used to set the parameters of the WDT.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	24h	Defined command
	2	[7] - 1b = don't log [6] - 1b = don't stop timer [5:3] - reserved [2:0] - timer use 000b = reserved 001b = BIOS FRB2 010b = BIOS/POST 011b = OS Load 100b = SMS/OS 101b = OEM 110b -111b = reserved	Timer Use
	3	[7] - reserved [6:4] - pre-timeout interrupt 000b = none 001b = SMI (optional) 010b = NMI / Diagnostic Interrupt (optional) 011b = Messaging Interrupt 100b,111b = reserved [3] - reserved [2:0] - timeout action 000b = no action 001b = Hard Reset 010b = Power Down 011b = Power Cycle 100b,111b = reserved	Timer Actions

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Action	Byte	Value	Description
Request	4	1h~ffh (‘1h’ based.)	Pre-timeout interval in seconds.
	5	[7] - reserved [6] - reserved [5] - OEM [4] - SMS/OS [3] - OS Load [2] - BIOS/POST [1] - BIOS FRB2 [0] - reserved 0b = leave alone 1b = clear timer use expiration bit	Timer Use Expiration flags clear
	6	00h~ffh ,LS byte (100 ms/count)	Initial countdown value
	7	00h~ffh ,MS byte (100 ms/count)	Initial countdown value
Response	0	Complete Code	00h means OK

Get Watchdog Timer

This command is used to get the current configuration in WDT.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	25h	Defined command
Response	0	Complete Code	00h means OK
	1	[7] - 1b = don’t log [6] - 1b = don’t stop timer [5:3] - reserved [2:0] - timer use 000b = reserved 001b = BIOS FRB2 010b = BIOS/POST 011b = OS Load 100b = SMS/OS 101b = OEM 110b -111b = reserved	Timer Use

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Action	Byte	Value	Description
Response	2	[7] - reserved [6:4] - pre-timeout interrupt 000b = none 001b = SMI (optional) 010b = NMI / Diagnostic Interrupt (optional) 011b = Messaging Interrupt 100b,111b = reserved [3] - reserved [2:0] - timeout action 000b = no action 001b = Hard Reset 010b = Power Down 011b = Power Cycle 100b,111b = reserved	Timer Actions
	3	1h~ffh ('1h' based.)	Pre-timeout interval in seconds.
	4	[7] - reserved [6] - reserved [5] - OEM [4] - SMS/OS [3] - OS Load [2] - BIOS/POST [1] - BIOS FRB2 [0] - reserved 0b = leave alone 1b = clear timer use expiration bit	Timer Use Expiration flags clear
	5	00h~ffh ,LS byte (100 ms/count)	Initial countdown value
	6	00h~ffh ,MS byte (100 ms/count)	Initial countdown value
	7	00h~ffh ,LS byte (100 ms/count)	Present countdown value
	8	00h~ffh ,MS byte (100 ms/count)	Present countdown value

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Example of WDT Process

The sample program written in C shown below offers an interactive way to test the Watchdog Timer under DOS.

Configure WDT Parameters

```
0x40 : Don't stop timer.
0x01 : Hard Reset.
0x01 : Pre-timeout interval in 1 second.
0x08 : Timer Use Expiration flags clear by OS Load.
0x50 : 80 count. 100ms * 80 = 8000ms = 8 seconds.

[18 00 24 40 01 01 08 50 00]
```

Reset WDT

```
[18 00 22]
```


NOTE:

After setting a new configuration, the Reset WDT command must be sent. Then the WDT will be activated.

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8 BIOS Setup

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

8.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the ADLINK Logo (Quiet Boot enabled) or the text prompt: < Press DEL to run Setup > (Quiet Boot disabled).
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.





Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

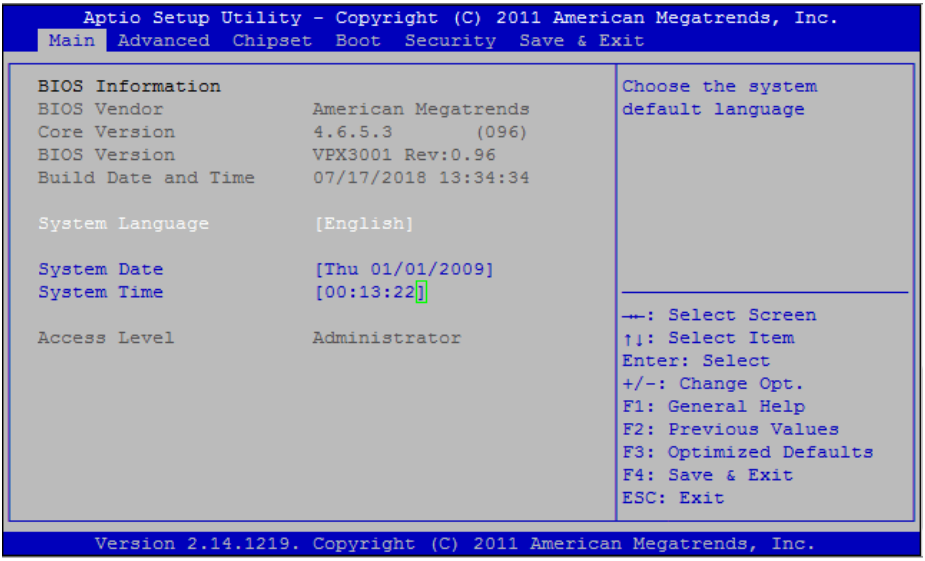
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Setup Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

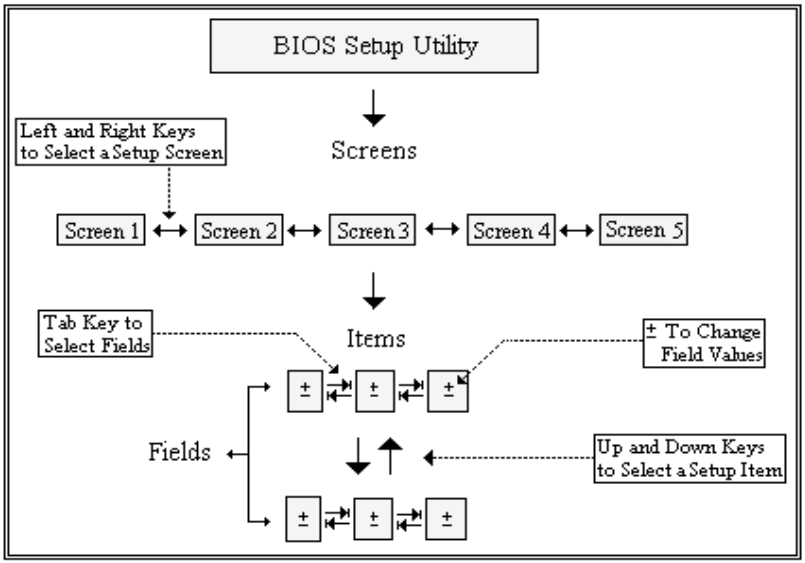
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



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Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include < F1 >, < F4 >, < Enter >, < ESC >, < Arrow > keys, and so on.



NOTE: There is a hot key legend located in the right frame on most setup screens.

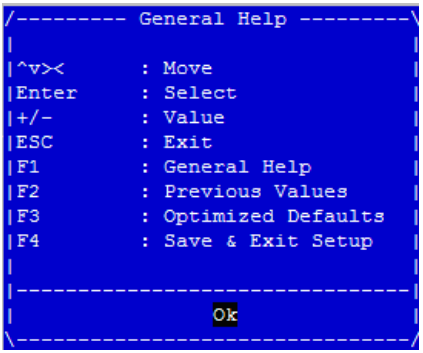
→←	Left/Right. The Left and Right < Arrow > keys allow you to select a setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
↑↓	Up/Down The Up and Down < Arrow > keys allow you to select a setup item or sub-screen.
+-	Plus/Minus The Plus and Minus < Arrow > keys allow you to change the field value of a particular setup item. For example: Date and Time.
Tab	The < Tab > key allows you to select setup fields.

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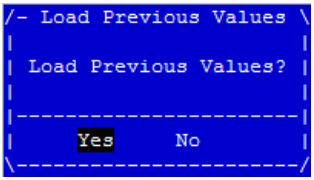
Hotkey Descriptions

Enter The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

F1 The < F1 > key allows you to display the General Help screen. Press the < F1 > key to open the General Help screen.



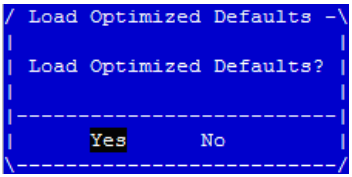
F2 The < F2 > key on your keyboard is the previous values key. It is not displayed on the key legend by default. To set the previous values settings of the BIOS, press the < F2 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The previous values settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.



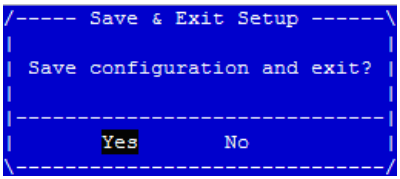
F3 The < F3 > key on your keyboard is the optimized defaults key. To set the optimized defaults settings of the BIOS, press the < F3 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The optimized defaults settings allow the motherboard to boot up with the optimized defaults of options set. This can lessen the probability of

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conflicting settings.

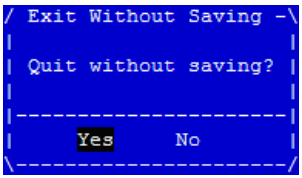


F4 The < F4 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

ESC The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:

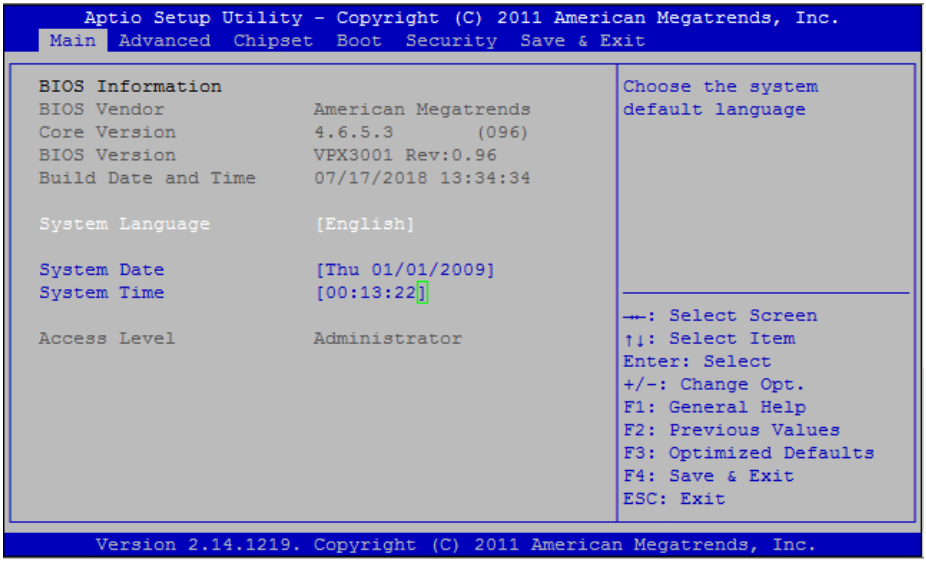


Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

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8.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. The Main BIOS Setup screen is shown below.



System & Board Info

The Main BIOS setup screen reports BIOS and Board version information.

System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

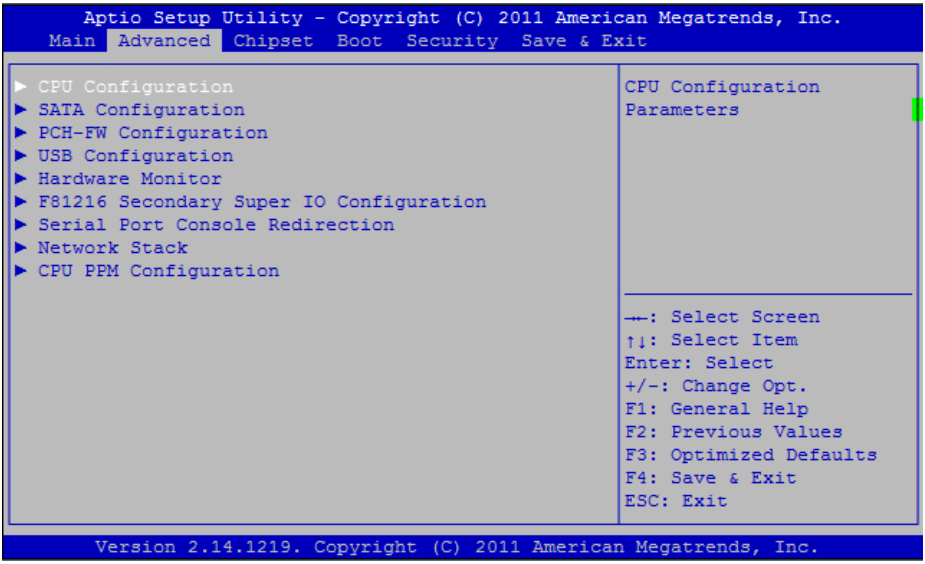
NOTE: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

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8.3 Advanced BIOS Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

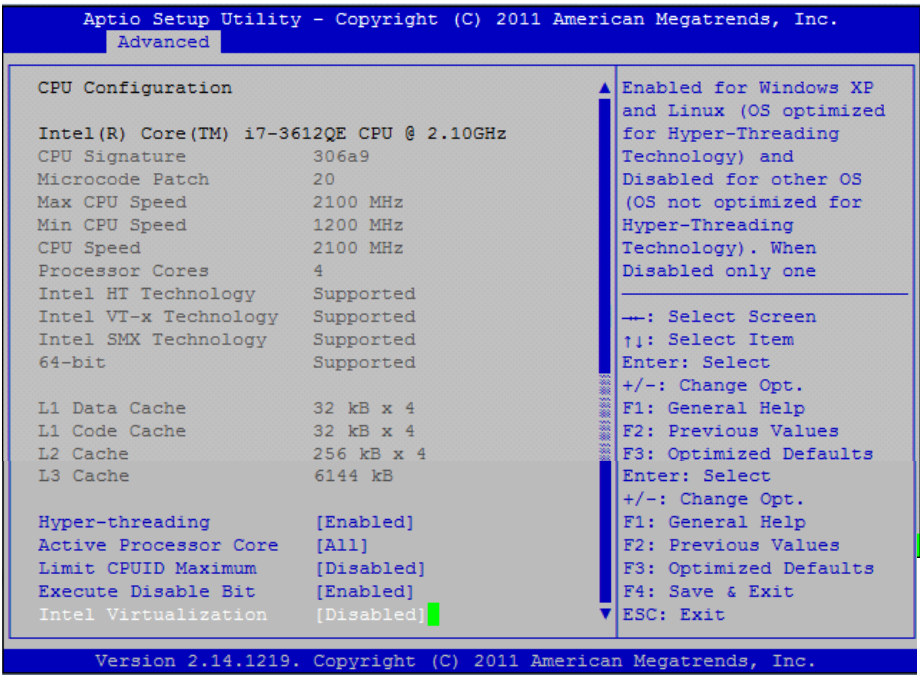
The sub menus are described on the following pages.



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8.3.1 CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.



Hyper-Threading

- **Enabled:** for Windows and Linux (OS optimized for Hyper-Threading Technology).
- **Disabled:** for other OS (OS not optimized for Hyper-Threading Technology).

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Adjacent Cache Line Prefetch

When enabled, the processor will retrieve the currently requested cache line, as well as the subsequent cache line. When disabled, the processor will only retrieve the currently requested cache line.

Limit CPUID Maximum

When the computer is booted up, the operating system executes the CPUID instruction to identify the processor and its capabilities. Before it can do so, it must first query the processor to find out the highest input value CPUID recognized. This determines the kind of basic information CPUID can provide the operating system. This option allows you to circumvent problems with older operating systems.

When Enabled, the processor will limit the maximum CPUID input value to 03h when queried, even if the processor supports a higher CPUID input value. When Disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

Execute-Disable Bit

Intel's Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system. Execute Disable Bit allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempt to insert code in the buffer, the processor disables code execution, preventing damage and worm propagation.

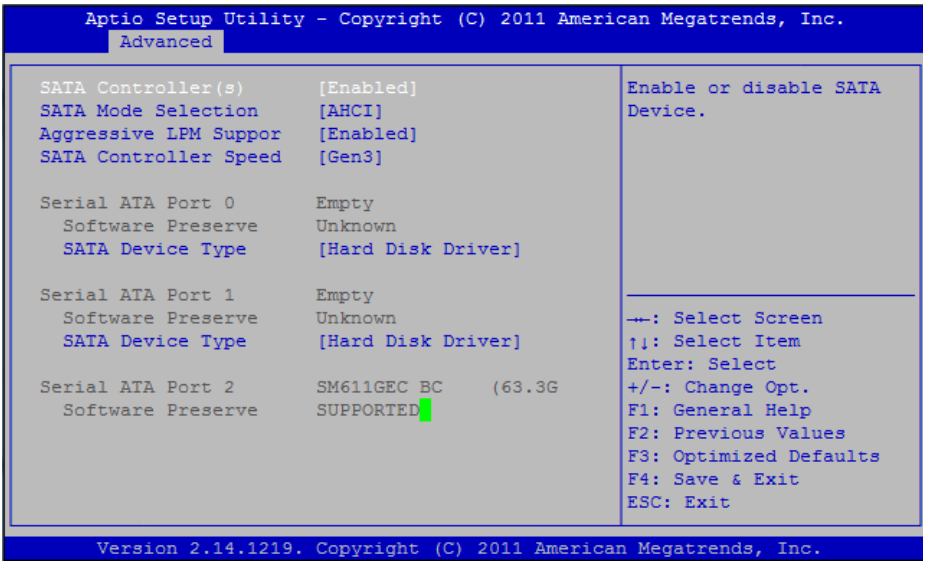
Intel Virtualization Tech

When enabled, a VMM can utilize the additional hardware capability provided by Vanderpool Technology. Set this value to Enabled/ Disabled.

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8.3.2 SATA Configuration

You can use this screen to select options for the SATA Configuration Settings. An example of the SATA Configuration screen is shown below.



SATA Controller(s)

Enable or disable SATA device.

SATA Mode Selection

The SATA can be configured as a legacy IDE, RAID and AHCI mode.

Aggressive LPM Suppor

Enable PCH to aggressively enter link power state.

SATA Controller Speed

Indicates the maximum speed the SATA controller can support. Select speed item Gen1, Gen2, and Gen3.

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SATA Port 0~2

Display SATA device name string.

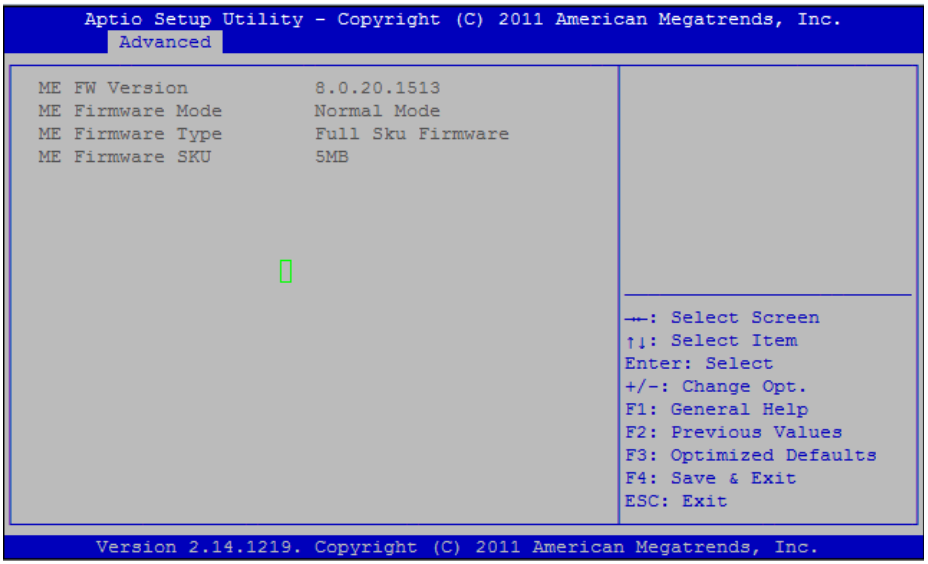
SATA Device Type

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

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8.3.3 PCH-FW Configuration

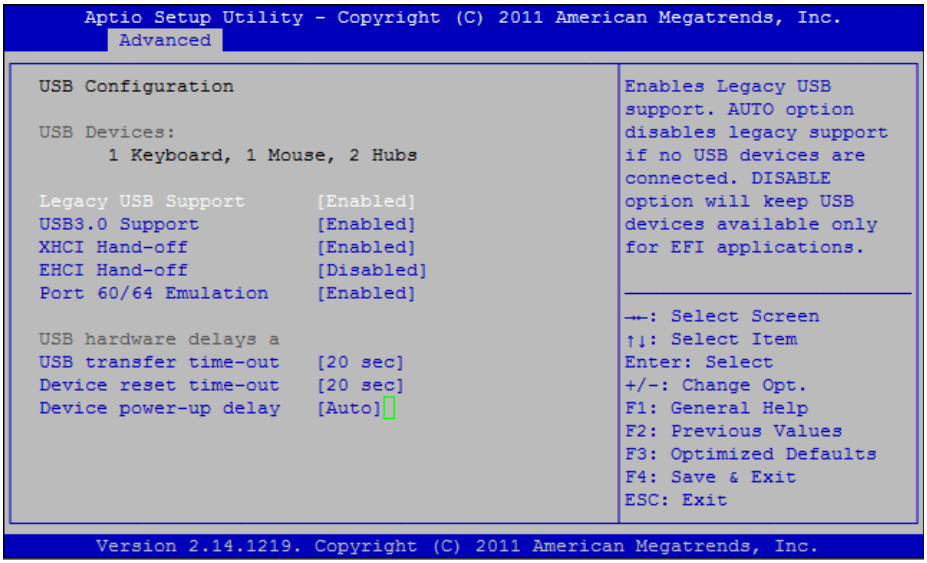
You can use this screen to get the Intel ME FW version.



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8.3.4 USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. The screen is shown below.



Legacy USB Support

Enables legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications. Set this value to Enabled/Disabled/Auto.

USB 3.0 Support

To enable or disable USB 3.0 (XHCI) controller support. Set this value to Enabled/Disabled.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver. Set this value to Enabled/Disabled.

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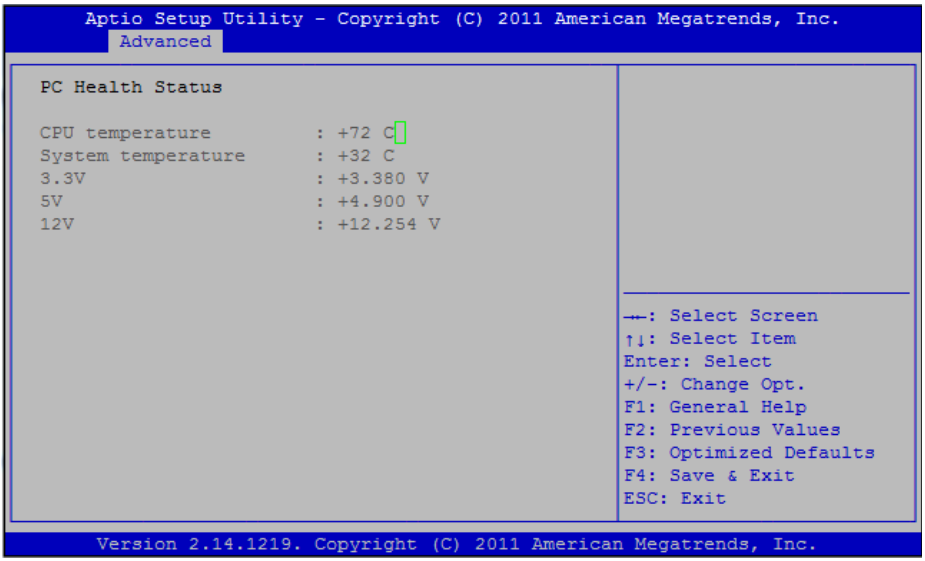
EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by the EHCI driver. Set this value to Enabled/Disabled.

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8.3.5 Hardware Monitor

This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures.



CPU Temperature

Display current CPU temperature.

System Temperature

Display current System thermal diode temperature.

3.3V

Display current system 3.3V voltage.

5V

Display current system 5V voltage.

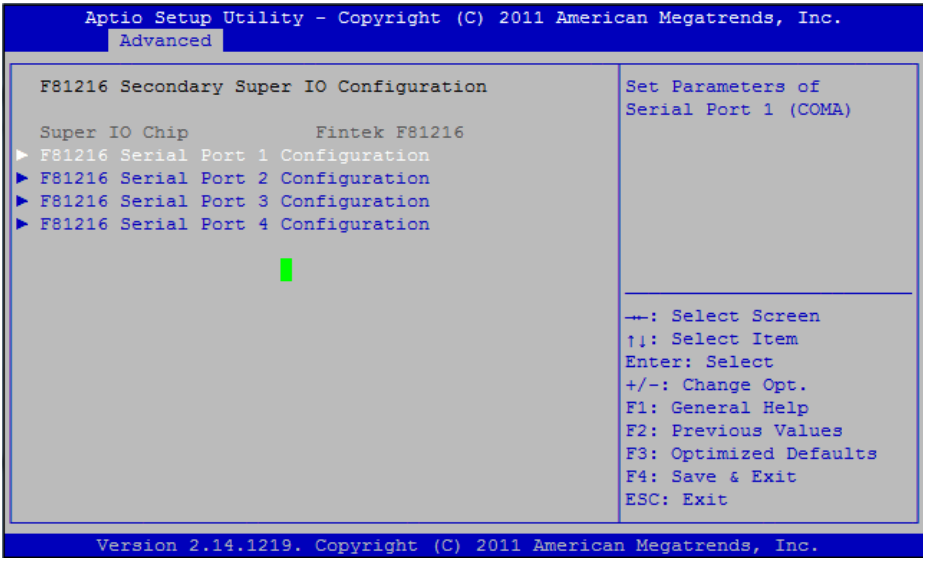
12V

Display current system 12V voltage.

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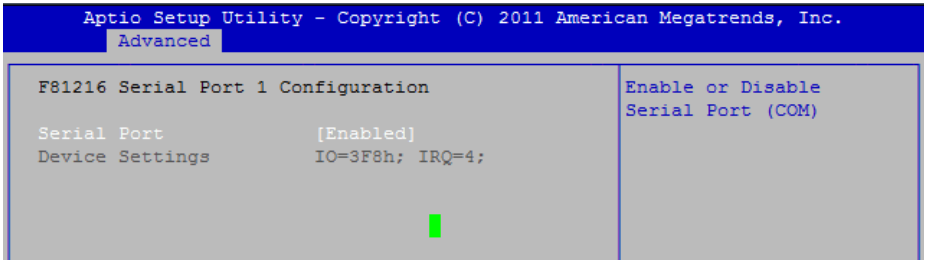
8.3.6 Super IO Configuration

You can use this screen to select options for the Super IO settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Serial Port 1, 2, 3, 4 Configuration

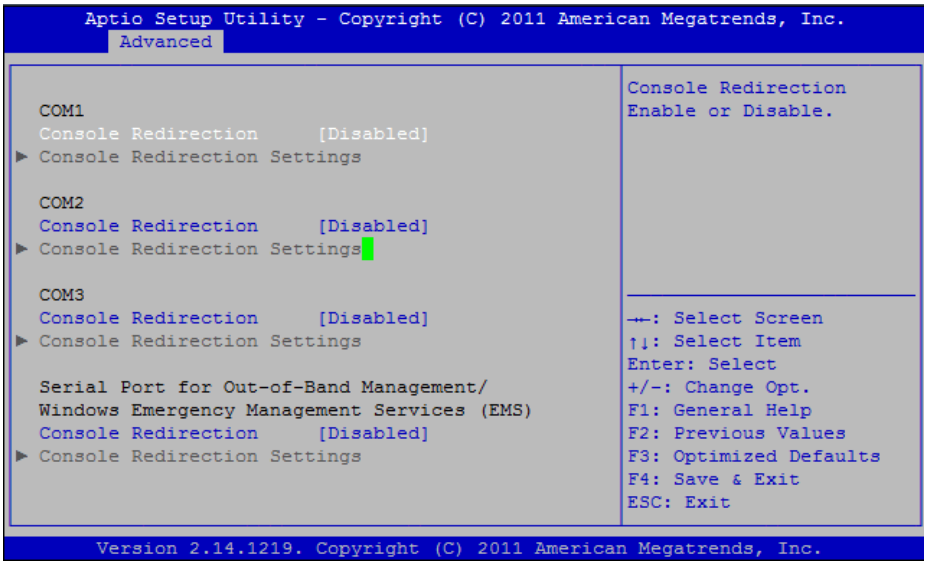
Sub-menus allow you to Enabled/Disabled and set the parameters of Serial Ports 1, 2, 3,4 (F81216: COM A, B,C,D). The Serial Port 1 screen is shown below.



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8.3.7 Serial Port Console Redirection

You can use this screen to select options for the serial port console redirection settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the Serial Port Console Redirection screen is shown below.



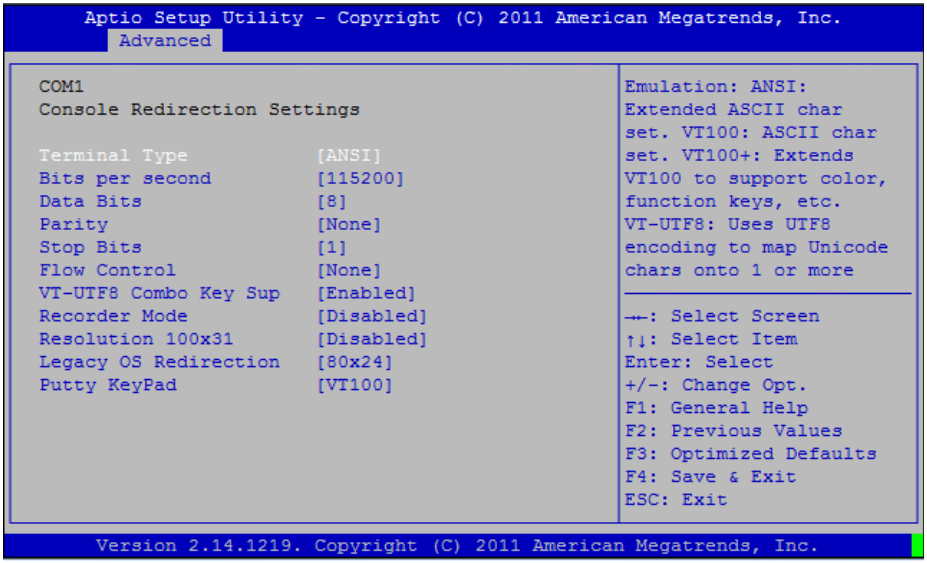
Console Redirection

Set this value to Enabled/Disabled.

COM1/2/3 Console Redirection Settings

The settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings. The screen is shown below.

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Terminal Type

VT100+ is the preferred terminal type for out-of-band management. Configuration options: VT100, VT100+, VT-UTF8, ANSI.

Bits per second

Select the bits per second you want the serial port to use for console redirection. The options are 115200, 57600, 38400, 19200, 9600.

Data Bits

Select the data bits you want the serial port to use for console redirection. Set this value to 7, 8.

Parity

Set this option to select Parity for console redirection. The settings for this value are None, Even, Odd, Mark, Space.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit.

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Communication with slow devices may require more than 1 stop bit. Set this value to 1 and 2.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Enables VT-UTF8 combination key support for ANSI/VT100 terminals.Set this value to Enabled/Disabled.

Recorder Mode

When this mode is enabled, only text will be sent. This is to capture terminal data. Set this value to Enabled/Disabled.

Resolution 100x31

Set this option to extended terminal resolution. Set this value to Enabled/Disabled.

Legacy OS Redirection

On legacy OS, the number of rows and columns supported for redirection. Set this value to 80x24, 80x25.

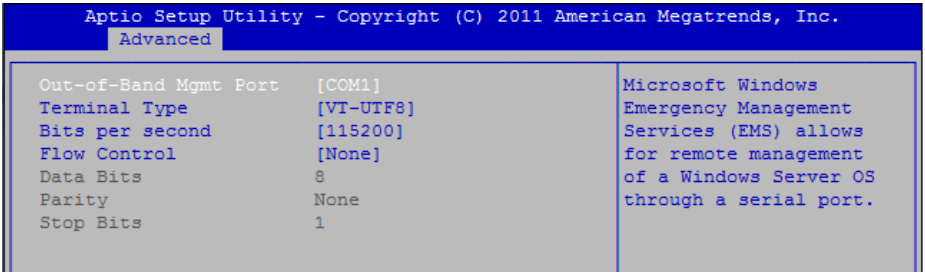
Putty Key Pad

Select FunctionKey and KeyPad on Putty. Set this value to VT100, LINUX, XTERMR6, SCO, ESCN, VT400.

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Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The following functions control the presence and content of the ACPI serial port redirection table (SPCR). This table is mainly used by the Windows server variants to provide Windows Emergency Management Services (EMS). This functionality is totally independent from serial redirection of other console output. OoB Management or EMS makes it possible to control selected components of (Windows) servers, even when a server is not connected to the network or the network is not available. In short: EMS allows for remote management of a Windows Server OS through a serial port



Out-of-Band Mgmt Port

Microsoft Windows emergency management services (EMS) allows for remote management of a Windows Server OS through a serial port. Set this value to COM0, COM1, COM2 (Disabled), COM3 (Disabled)

Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation. Configuration options: VT100, VT100+, VT-UTF8, ASNI.

Bits per second

Select the bits per second you want the serial port to use for console redirection. The options are 115200 ,57600 ,38400, 19200, 9600.

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Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None and Hardware RTS/CTS.

Data Bits

This is a display-only function providing information about the frame width for the Out-of-Band Management.

Parity

This is a display-only function providing information about the parity for Out-of-Band Management.

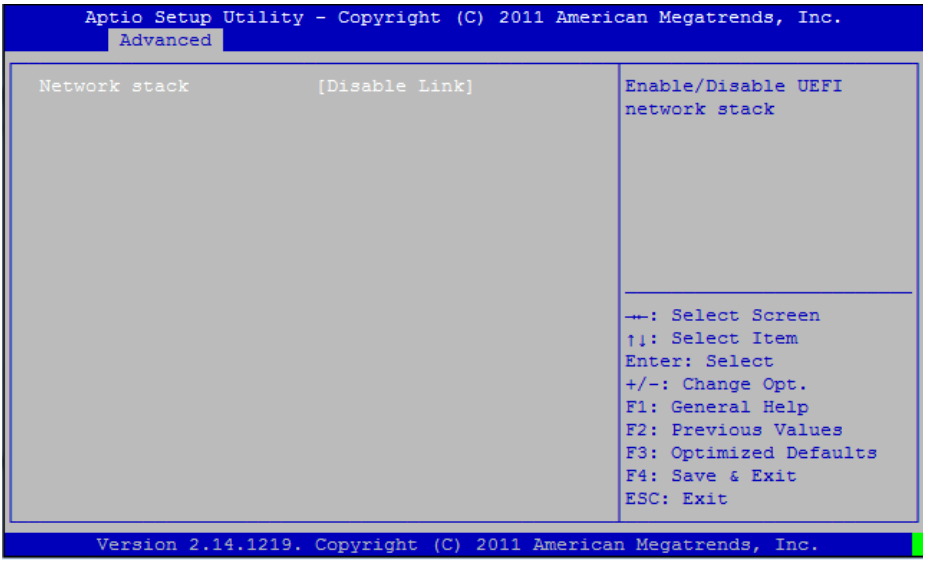
Stop Bits

This is a display-only function providing information about the number of stop bits for Out-of-Band Management.

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8.3.8 Network Stack

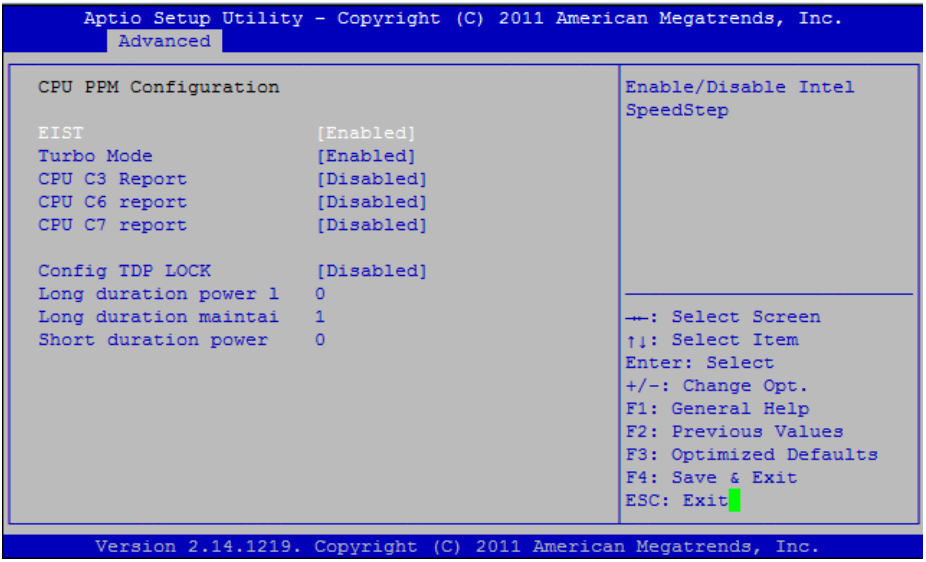
Enable or disable the UEFI network stack.



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8.3.9 CPU PPM Configuration

Processor Power Module (PPM) configuration parameters.



EIST

Enable or disable Intel SpeedStep. Set this value to Enabled/Disabled.

Turbo Mode

Set this option to enable or disable turbo mode. Set this value to Enabled/Disabled.

CPU C3 Report

Enable or disable CPU C3 (ACPI C2) report to OS. Set this value to Enabled/Disabled.

CPU C6 Report

Enable or disable CPU C6 (ACPI C3) report to OS. Set this value to Enabled/Disabled.

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CPU C7 Report

Enable or disable CPU C7 (ACPI C3) report to OS. Set this value to Enabled/Disabled.

Config TDP Lock

Lock the Config TDP Control register. Set this value to Enabled/ Disabled.

Long duration power limit

Long duration power limit in watts, 0 means use factory default.

Long duration maintained

Time window which the long duration power is maintained.

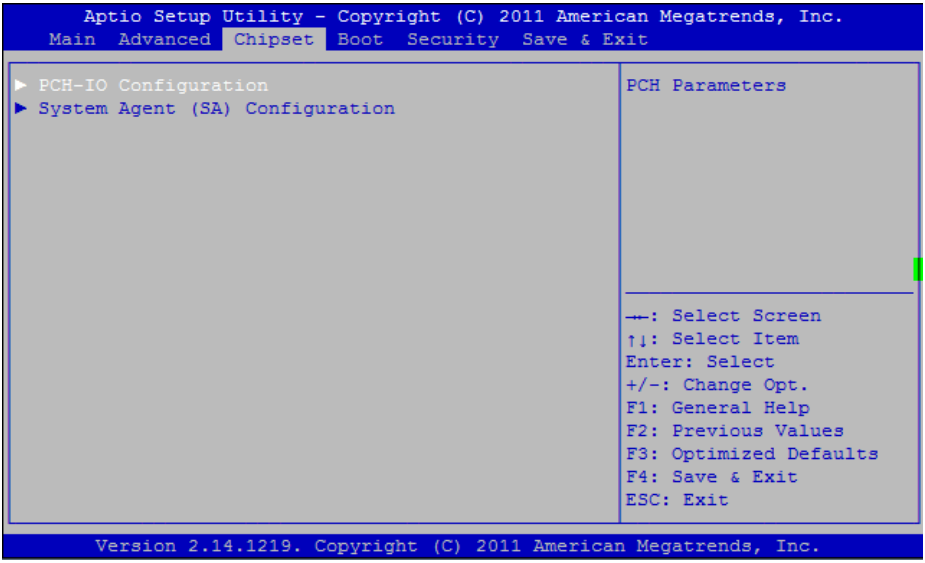
Short duration power limit

Short duration power limit in watts, 0 means use factory default.

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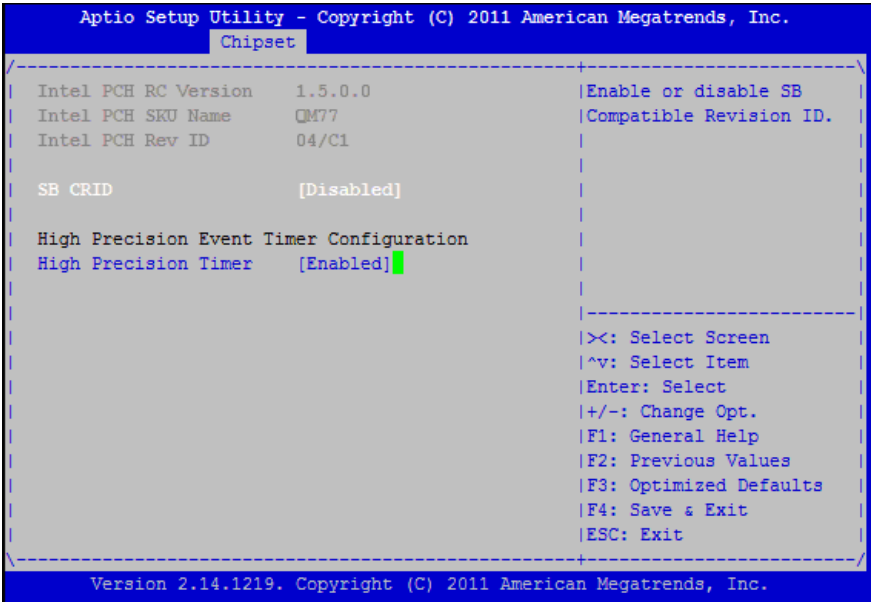
8.4 Chipset Setup

Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of Chipset BIOS Setup options by highlighting it using the < Arrow > keys. The Chipset BIOS Setup screen is shown below.



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8.4.1 PCH-IO Configuration



SB CRID

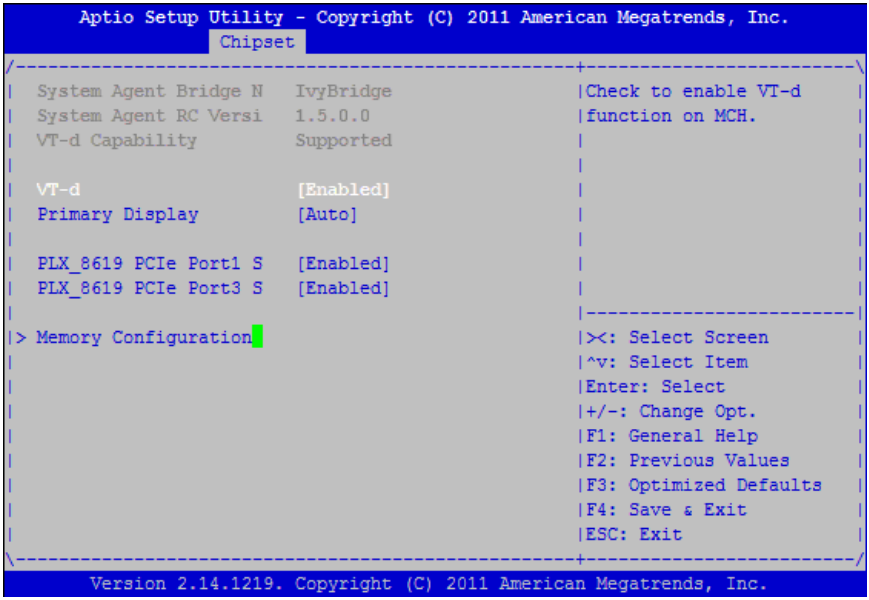
Enable or disable SB Compatible Revision ID.

High Precision Timer

Enable or disable the High Precision Event Timer.

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8.4.2 System Agent (SA) Configuration



VT-d

The Intel Virtualization Technology for Directed I/O. Set this value to Enabled/Disabled.

Primary Display

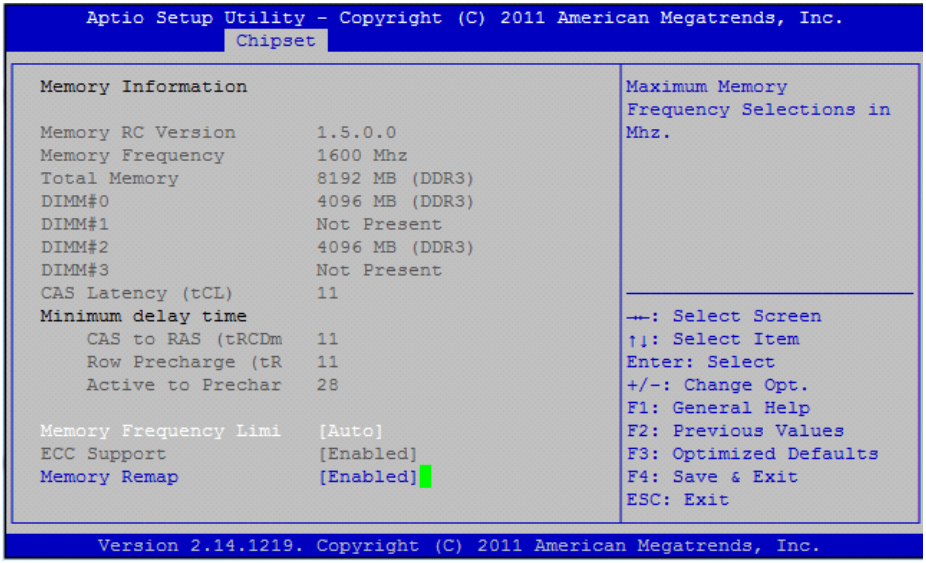
Select which graphics device should be the primary display. Set this value to Auto, IGFX, PCI.

PLX_8619 PCIe Port1/3 Support

Select which of IGFX/ PCI graphics device should be primary display. Set this value to Auto/ IGFX/ PCI.

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Memory Configuration



Memory Frequency Limit

Set the Memory Frequency Limit in MHz. Options: Auto (default), 1067, 1333, 1600, 1867, 2133, 2400, and 2667.

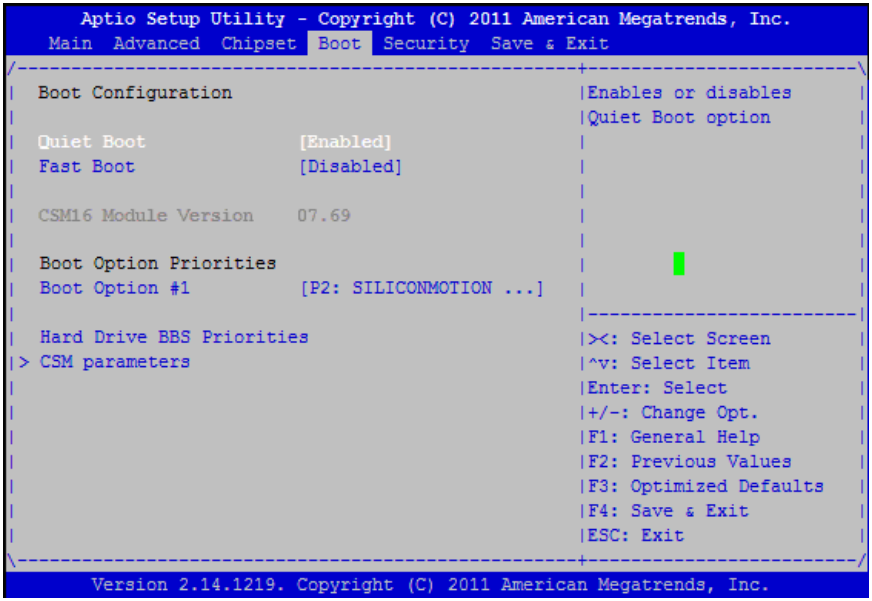
Memory Remap

Enable or disable memory remap above 4G. Set this value to Enabled/Disabled.

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8.5 Boot Settings

Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys. The Boot Settings screen is shown below:



Quiet Boot

- **Disabled** - Set this value to allow the computer system to display the POST messages.
- **Enabled** - Set this value to allow the computer system to display the OEM logo.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. Set this value to Enabled/Disabled.

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Boot Option Priorities

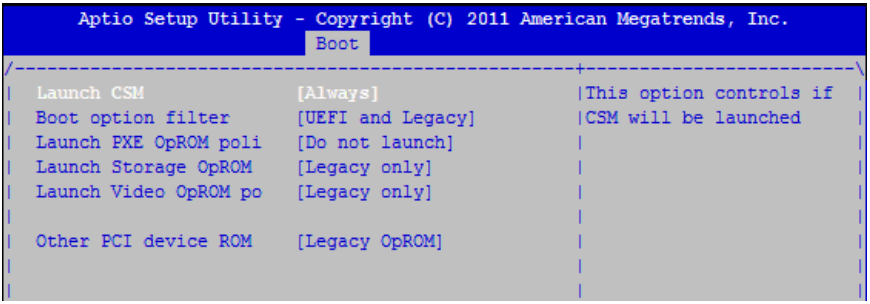
Set Boot Option #1 ~2 boot priority.

Hard Drive BBS Priorities

Specifies the boot device priority sequence from available hard drives.

8.5.1 CSM Parameter

OpROM execution, boot option filter, etc.



Launch CSM

This option controls if CSM will be launched. Set this value to Always, Never.

Boot option filter

This option controls what devices system can boot to. Set this value to UEFI and Legacy, Legacy only, UEFI only.

Launch PXE OpROM policy

This option controls the execution of UEFI and Legacy PXE OpROM. Set this value to Do not launch, Legacy only.

Launch Storage OpROM policy

This option controls the execution of UEFI and Legacy Storage OpROM. Set this value to Do not launch, UEFI only, Legacy only.

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Launch Video OpROM policy

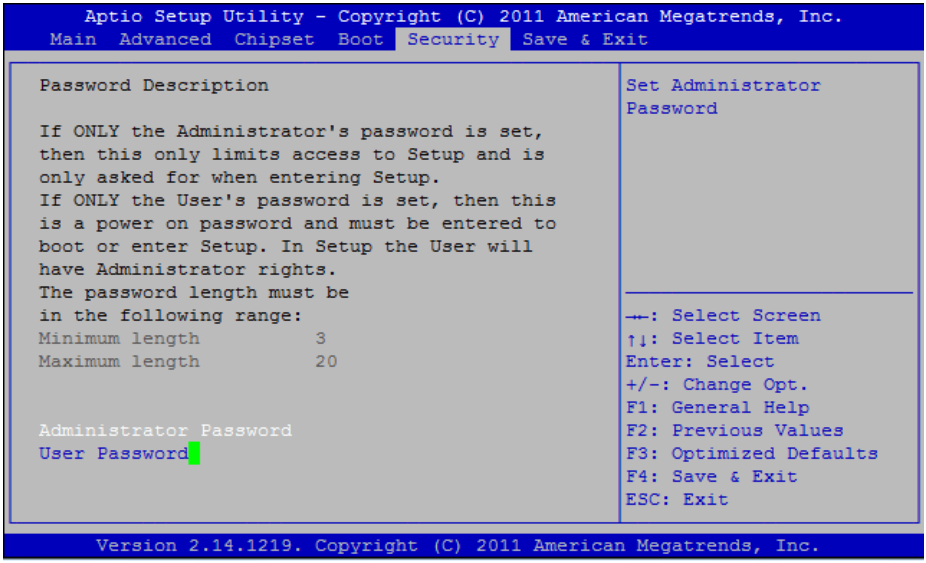
This option controls the execution of UEFI and Legacy Video OpROM. Set this value to Do not launch, UEFI only, Legacy only.

Other PCI device ROM priority

For PCI devices other than Network, Mass storage or Video defines which OpROM to launch. Set this value to UEFI OpROM, Legacy OpROM.

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8.6 Security Setup



Administrator, User Password

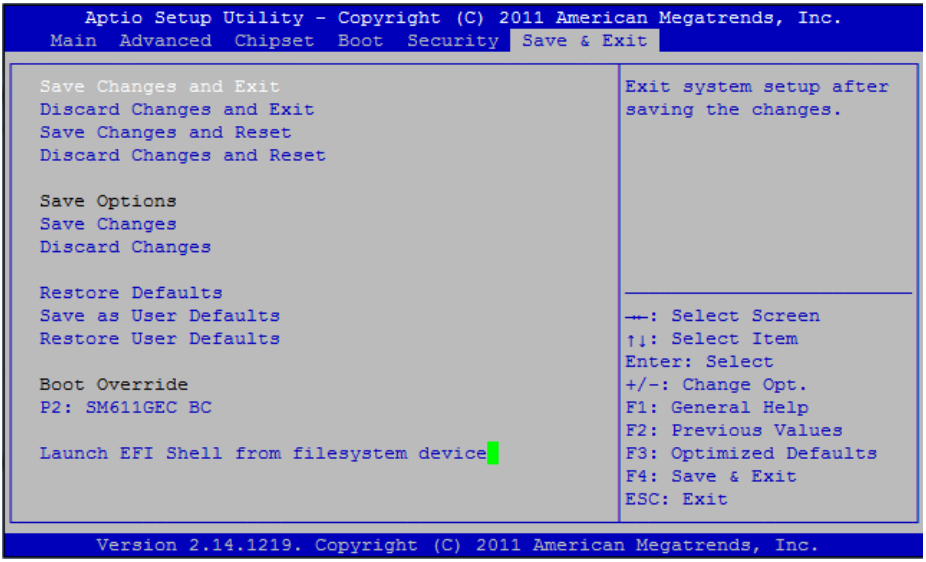
If only the administrator's password is set, then this only limits access to setup and is only asked for when entering setup.

If only the user's password is set, then this is a power on password and must be entered to boot or enter setup. In setup the user will have administrator rights.

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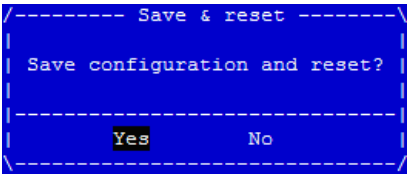
8.7 Save & Exit Menu

Select the Save & Exit tab from the setup screen to enter the Save & Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the < Arrow > keys. The Save & Exit BIOS Setup screen is shown below.



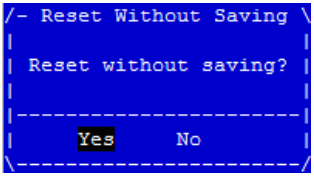
Save Changes and Reset

Reset the system after saving the changes.



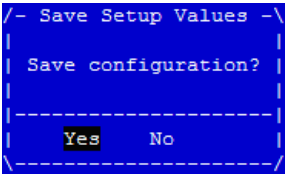
Discard Changes and Reset

Reset system setup without saving any changes.



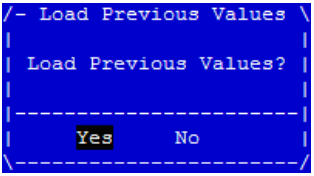
Save Changes

Save changes done so far to any of the setup options.



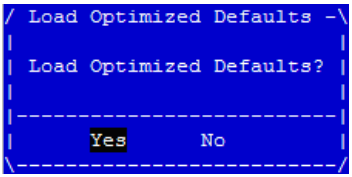
Discard Changes

Discard changes done so far to any of the setup options.



Restore Changes

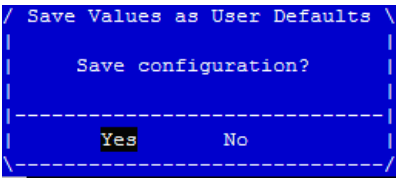
Restore/Load Defaults values for all the setup options.



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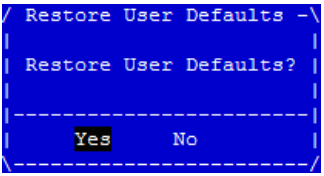
Save as User Defaults

Save the changes done so far as user defaults..



Restore User Defaults

Save changes done so far to any of the setup options.



Launch EFI Shell from Filesystem Device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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9 IPMI User Guide

9.1 Introduction

This chapter is written for those who already have a basic understanding of the newest implementation of the baseboard management controller (BMC) of the Intelligent Platform Management Interface (IPMI) specification rev. 2.0.

9.2 Summary of Commands Supported by VPX3001

The table below lists all the commands supported by the IPMC. The right most column indicates if a particular command is mandatory or optional for IPMI 2.0 and VITA 46.11.

Command Name	IPMI v2.0 Specification Section	NetFn	CMD
IPM Device "Global" Commands			
Reserved	NA	App (06h)	00h
Get Device ID	17.1	App (06h)	01h
Cold Reset	17.2	App (06h)	02h
Warm Reset	17.3	App (06h)	03h
Get Self Test Results	17.4	App (06h)	04h
BMC Watchdog Timer Commands			
Reset Watchdog Timer	21.5	App (06h)	22h
Set Watchdog Timer	21.6	App (06h)	24h
Get Watchdog Timer	21.7	App (06h)	25h
FRU Device Commands			
Get FRU Inventory Area Info	28.1	Storage (0Ah)	10h
Read FRU Data	28.2	Storage (0Ah)	11h
Write FRU Data	28.3	Storage (0Ah)	12h

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Command Name	IPMI v2.0 Specification Section	NetFn	CMD
SDR Device Commands			
Get SDR Repository Info	27.9	Storage (0Ah)	20h
Get SDR Repository Allocation Info	27.10	Storage (0Ah)	21h
Reserve SDR Repository	27.11	Storage (0Ah)	22h
Get SDR	27.12	Storage (0Ah)	23h
SEL Device Commands			
Get SEL Info	25.2	Storage (0Ah)	40h
Get SEL Allocation Info	25.3	Storage (0Ah)	41h
Reserve SEL	25.4	Storage (0Ah)	42h
Get SEL Entry	25.5	Storage (0Ah)	43h
Add SEL Entry	25.6	Storage (0Ah)	44h
Clear SEL	25.9	Storage (0Ah)	47h
Get SEL Time	25.10	Storage (0Ah)	48h
Set SEL Time	25.11	Storage (0Ah)	49h

Command Name	VITA 64.11 Specification Section	NetFn	CMD
VITA 46.11 Commands			
Get VSO Capabilities	VITA: section 10.1.3.1	VITA	00h
FRU Control	VITA: section 10.1.3.6	VITA	04h
Get FRU LED Properties	VITA: section 10.1.3.27	VITA	05h
Get LED Color Capabilities	VITA: section 10.1.3.28	VITA	06h

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Command Name	VITA 64.11 Specification Section	NetFn	CMD
Set FRU LED State	VITA: section 10.1.3.30	VITA	07h
Get FRU LED State	VITA: section 10.1.3.29	VITA	08h
Set IPMB State	VITA: section 10.1.3.7	VITA	09h
Set FRU State Policy Bits	VITA: section 10.1.3.9	VITA	0Ah
Get FRU State Policy Bits	VITA: section 10.1.3.8	VITA	0Bh
Set FRU Activation	VITA: section 10.1.3.10	VITA	0Ch
Get Device Locator Record ID	VITA: section 10.1.3.11	VITA	0Dh
Get Fan Speed Properties	VITA: section 10.1.3.12	VITA	14h
Set Fan Level	VITA: section 10.1.3.14	VITA	15h
Get Fan Level	VITA: section 10.1.3.13	VITA	16h
Get IPMB Link Info	VITA: section 10.1.3.17	VITA	18h

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9.3 Communications with IPMC

The VPX3001 communicates with the Chassis Manager through its primary IPMB (System IPMB) and responds to all mandatory commands for respective IPM Controllers (as defined in the VITA 46.11 Specification), as well as some optional ones.

9.4 IPMI Sensors List

Sensors include the mandatory sensors defined by VITA 46.11.

Sensor Number	Sensor name	Normal Reading	Sensor Reading Value of IPMI Get Sensor Reading Command
0	Hot Swap	N/A	FRU State Sensor
1	IPMB Physical	N/A	System IPMB link sensor
2	FRU#0 Health	N/A	FRU Health Sensor
3	FRU#0 Voltage	N/A	FRU Voltage Sensor
4	FRU#0 Temp	N/A	FRU Temperature Sensor
5	FRU#0 P.Test	N/A	Payload Test Result Sensor
6	FRU#0 P.TestState	N/A	Payload Test Status Sensor
7	Version change	N/A	TBD
8	3V3 AUX	3.3 V	Threshold Value
9	3V3 STB	3.3 V	Threshold Value
10	5V STB	5 V	Threshold Value
11	2.6V DRAM	2.6 V	Threshold Value
12	12V	12 V	Threshold Value
13	3.3V	3.3 V	Threshold Value
14	CPU Core Power	TBD	Threshold Value
15	1.2V DRAM	1.2V	Threshold Value
16	1.05V SOC	1.05V	Threshold Value
17	1.2V SSD	1.2V	Threshold Value

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Sensor Number	Sensor name	Normal Reading	Sensor Reading Value of IPMI Get Sensor Reading Command
18	1.8V NIC	1.8V	Threshold Value
19	1.0V NIC	1.0V	Threshold Value
20	1.5V AUX	1.5V	Threshold Value
21	0.6V DRAMD	0.6V	Threshold Value
22	Temp 1	TBD	Threshold Value
23	BMC Watchdog	N/A	Entity ID: 03h Sensor Type: 23h Event / Reading: 6Fh (sensor-specific) Timeout action: 000b = no action 001b = Hard Reset 000b = Power Down 011b = Power Cycle 100b - 111b = reserved
24	CPU Core Temp	TBD	TBD
25	Chassis Hot Swap	N/A	TBD
26	RTM Hot Swap	N/A	TBD
27	RTM Health	N/A	TBD
28	RTM Voltage	N/A	TBD
29	RTM Temp	TBD	TBD
30	1.5V PCH	1.5V	Threshold Value
0	Hot Swap	N/A	FRU State Sensor

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9.5 System Event Log (SEL)

The BMC provides a centralized, non-volatile System Event Log, or SEL. Having the SEL and logging functions managed by the BMC helps ensure that 'post-mortem' logging information is available should a failure occur that disables the system processor(s). The communication interface is used by I2C.

Example: IPMC Warm Reset

Description	NetFn	Cmd	Result
IPM Device "Global" Commands: Warm Reset	0x06	0x03	IPMITOOL: | 06/19/2018 | 01:07:39 | System Boot Initiated | Initiated by warm reset
IPMI SPEC v2.0, Table 42-1, Event/ Reading Type Code Ranges	Sensor Type Code	Sensor Class	Description
Sensor-specific	0x1D	Discrete	Sensor-specific Discrete. Indicates that the discrete state information is specific to the sensor type. State bit positions / event offsets for a particular sensor type are specified in the 'sensor-specific offset' column in Table 42-3, Sensor Type Codes
IPMI SPEC v2.0 , Table 32-1, SEL Event Records			
Record Type: 0x6F	GenID: 0x00 0x20	Sensor Number #: That is dependent in the sensor type.	
EvM Rev: 0x04	EvtDir Type: 0x6F	Event Data 1:0x02, Event Data 2:0xFF, Event Data 3:0xFF	

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9.6 FRU Information

Board Info

Mfg Date/Time = xx/xx/xxxx

Manufacturer = ADLINK

Product Name = VPX-3XXX

Serial Number = PPSxxxxxxx

Part Number = xxxxxxxxxxxx

Product Info

Manufacturer = ADLINK

Product Name = VPX-3XXX

Part/Model Number = xxxxxxxxxxxxx

Product Version = Rev A1

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9.7 Relevant Documents

- ANSI/VITA 46.0-2007 American National Standard for VPX Baseline Standard. (2007).
- ANSI/VITA 46.11-2007 System Management on VPX Draft Revision 0.11. (Nov. 18, 2013).
- ANSI/VITA 46.11-2015 System Management on VPX Draft Revision r022. (Nov. 18, 2013).
- Cortex-M3 Devices Generic User Guide. Issue A. (Dec. 16, 2010).
- IPMI- Intelligent Platform Management Interface Specification Second Generation v2.0 Rev. 1.0. (2004, 2 12).
- IPMI Platform Management FRU Information Storage Definition V1.0 Rev1.1. (1999, 9 27).
- Microsemi PPS BMR-A2F-ATCA Software Architecture Technical Specification, Revision 1.2.0. (April 17, 2013).
- Microsemi SmartFusion Microcontroller subsystem User Guide, Revision 4. (July ,2014).
- Microsemi SmartFusion Programmable Analog User Guide, Revision Draft B. (Dec.,2009).
- Pigeon Point BMR-A2F-VPX Software Architecture Technical Specification. Revision1.2.1. (Jan. 17, 2014).
- PICMG 3.0, Revision 3.0, AdvancedTCA Base Specification. (March 24, 2008).
- The Definitive Guide to the ARM Cortex-M3 Second Edition. (2010).

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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Getting Service

Ask an Expert: http://askanexpert.adlinktech.com

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