COM Express

Express-GFC

User's Manual



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ADLINK TECHNOLOGY INC.

Revision History

Release	Date	Change
2.00	September 27, 2013	Initial release

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Table of Contents

Preface **5**

1 Introduction **7**

1.1 Description 7

2 Specifications **8**

2.1 General 8
2.2 Expansion Busses 8
2.3 Video 9
2.4 Audio 9
2.5 LAN 9
2.6 Multi I/O 9
2.8 TPM (Trusted Platform Module) optional 10
2.7 IP on Carrier 10
2.9 Power Specifications 10
2.10 Power Consumption 11
2.11 Operating Systems 12
2.12 Mechanical and Environmental 12

3 Function Diagram **13**

4 Mechanical Dimensions **14**

5 PICMG Pinout and Signal Descriptions **15**

5.1 COM Express® Type 6 compatible pinout 15
5.2 Carrier Board Design Guide 15
5.3 Pin Definitions 16
5.4 Signal Descriptions 18
5.5 Onboard Fan Connector 26

6 Module Connectors and Switches **27**

6.1 Onboard Fan Connector 27

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7 Embedded Functions 28
7.1 Watchdog Timer 28
7.2 GPIO 29
7.3 Hardware Monitoring 30

8 System Resources 31
8.1 System Memory Map 31
8.2 Direct Memory Access Channels 31
8.3 Legacy I/O Map 32
8.4 Interrupt Request (IRQ) Lines 33
8.5 PCI Configuration Space Map 34
8.6 PCI Interrupt Routing Map 35

9 BIOS Setup Utility 36
9.1 Starting the BIOS 36
9.2 Main Setup 41
9.3 Advanced Setup 43
9.5 Boot Setup 59
9.6 Security Setup 61
9.7 Save & Exit 62

Important Safety Instructions 64

Getting Service 66

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Preface

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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.



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



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



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 Description

The Express-GFC is a COM Express® COM.0 R2.0 Type 6 Compact size module supporting the AMD Fusion™ G-Series APU with a new x86 processor design that combines CPU, GPU and memory controller in a single Accelerated Processing Unit. Based on the latest Mobile AMD A50M Controller Hub, the Express-GFC is specifically designed for customers who need high performance multimedia content delivery in a cost effective product solution.

The Express-GFC's graphics outputs include VGA, dual channel 24-bit LVDS and two DDI ports supporting DisplayPort/HDMI. The integrated GPU supporting Unified Video Decoder and 3D engine includes features such as DirectX Video Acceleration (DXVA) support for full AVC/VC1/MPEG2 hardware decode and UVD3 for DivX and Xvid via MPEG-4 Part 2 decoding, Blu-ray 3D via MVC and 120Hz stereo 3D support.

The Express-GFC has dual stacked SODIMM sockets for up to 8 GB DDR3 single channel non-ECC memory. With up to six free PCIe x1 lances in total, four lanes from the A50M can be optional configure to one PCIe x4. The Express-GFC features a single onboard Gigabit Ethernet port, up to two USB 3.0, eight USB 2.0 ports, and four SATA 6 Gb/s ports with optional support for RAID 0/1.

The Express-GFC power design supports wide voltage input from 4.75 to 19V with or without standby power at 4.75 to 5.25V. Support is provided for SMBus and I2C. The module is equipped with SPI AMI APTIO UEFI BIOS supporting embedded features such as remote console, CMOS backup, hardware monitor, and watchdog timer.

The Express-GFC is a RoHS compliant and lead-free product.

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2 Specifications

2.1 General

- **CPU:** **AMD Fusion™ G-Series Processor**
  AMD G-T56N 1.65 GHz Dual Core (L2 cache 512 KB x2, 18W)
  AMD G-T40N 1.0 GHz Dual Core (L2 cache 512 KB x2, 9W)
  AMD G-T52R 1.5 GHz Single Core (L2 cache 512 KB, 18W)
  AMD G-T44R 1.2 GHz Single Core (L2 cache 512 KB, 9W)
  AMD G-T16R 615 MHz Single Core (L2 cache 512 KB, 4.5W)
- **Memory:** Single channel non-ECC 1066/1333 MHz DDR3 memory up to 8 GB in dual stacked SODIMM socket
- **Chipset:** AMD A50M Control Hub
- **L2 Cache:** 1 MB for G-T56N and G-T40N
  512 KB for G-T52R and G-T44R
- **BIOS:** AMI APTIO UEFI with CMOS backup in 16 Mbit SPI BIOS
- **Debug Interface:** XDP SFF-26 extension for ICE debug
- **Hardware Monitor:** Supply voltages and CPU temperature
- **Watchdog Timer:** Programmable timer ranges to generate RESET

2.2 Expansion Busses

- **On Processor:** No PCI Express x16 Graphics supported
- **On Processor / Chipset:**
  - 6 PCI Express x1: 0/1/2/3/4/5 are free (0,1,2,3 optional 1 x4), lane 6 is occupied by GbE LAN and lane 7 occupied by USB 3.0 controller
- **LPC** bus, **SMBus** (system), **I²C** (user)

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2.3 Video

- **Integrated in Processor UVD and 3D Engine integrated with G-series processor**
- **Integrated Video** DirectX 11 and UVD3
  DirectX Video Acceleration (DXVA) support for full AVC/VC1/MPEG2 Hardware Decode
  UVD3 includes support for DivX and Xvid via MPEG-4 Part 2 decoding, Blu-ray 3D via MVC and 120Hz stereo 3D support
- **Multi Display Support:** 2 independent displays
- **Display Interfaces**

  Analog CRT: Analog monitor support up to 2560x1600 at 60 Hz

  LVDS: single/dual channel 18/24-bit LVDS through eDP to LVDS bridge Chrontel CH7511B with resolutions of 800x600 up to 1900x1200 (WUXGA) @ 60 Hz

  Digital Display Ports: Display Port – resolution up to 2560 x 1200 x 60 Hz
  HDMI/DVI - resolution up to 1920 x 1200 x 60 Hz

2.4 Audio

- **Chipset:** IIntegrated on AMD A50M
- **Audio Codec:** on Express-BASE6 (ALC888)

2.5 LAN

- **Chipset**: Realtek RTL8111E
- **Interface:** 10/100/1000 Mbps Ethernet

2.6 Multi I/O

- **SATA**: Supports four SATA ports at 6 Gb/s
- **USB**: Supports up to six ports USB 2.0 (USB2/3/4/5/6/7) and two ports USB 3.0 (USB0/1)

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2.8 **TPM** (Trusted Platform Module) optional

- **Chipset**: Infineon SLB9635TT1.2
- **Type:** TPM 1.2

2.7 IP on Carrier

Super I/O (on Carrier using LPC -bus)

- **Chipset:** Winbond W83627HG-AW AND W83627DHG-P
- **Parallel Port:** LPT1
- **Serial Ports:** COM1 / COM2 (with console redirection)

Audio

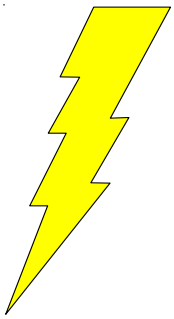
- **Integrated:** Intel® HD Audio integrated in Lynx Point (QM87) Express Chipset
- **Audio Codec:** on Express-BASE6 (ALC888)

2.9 Power Specifications

- **Power Modes:** AT and ATX mode
- **Wide Voltage Input:** ATX = 8.5~20 V / 5Vsb ±5% or AT = 8.5 ~20V
- **Power Management:** ACPI 3.0 compliant, Smart battery support.
- **Power States:** supporting S0, S1, S3, S4, S5
- **Smart Battery Support:** yes

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2.10 Power Consumption



The 12V measurement is power to the module only (excluding carrier board power draw). The 5Vsb measurement (in S3/S5 mode) includes both module power consumption plus active 5Vsb powered peripherals (such as PS/2 and USB) on the carrier that are needed for wakeup. Although all voltages were measured, only 12 V and 5 5Vsb are relevant because they are the only ones used by the Express module. The *Idle* power level was measured under Windows XP with no applications running (login screen). *Max Load* was measured under Windows XP running BurnIn software. Measurements were made with single 4GB 1066 MHz DDR3 SODIMM memory modules installed.

AMD G-T56N 1.65 GHz Dual Core

Power State	+12V (A)	$+5V_{SB}$ (A)	Power Consumption (W)
Idle (WinXP Login)	0.54	N.S.	6.48
Max. Load (WinXP Burnin)	1.4	N.S.	16.8
S3 (suspend to RAM)	_	0.12	0.6
S5 (soft off)	_	0.09	0.45

AMD G-T40N 1.0 GHz Dual Core

Power State	+12V (A)	$+5V_{SB}$ (A)	Power Consumption (W)
IIdle (WinXP Login)	0.52	N.S.	6.24
Max. Load (WinXP Burnin)	1.04	N.S.	12.29
S3 (suspend to RAM)	_	0.12	0.6
S5 (soft off)	_	0.09	0.45

AMD G-T52R 1.5 GHz Single Core

Power State	+12V (A)	$+5V_{SB}$ (A)	Power Consumption (W)
Idle (WinXP Login)	0.5	N.S.	6
Max. Load (WinXP Burnin)	1.16	N.S.	13.62
S3 (suspend to RAM)	_	0.12	0.6
S5 (soft off)	_	0.09	0.45

AMD G-T44R 1.2 GHz Single Core

Power State	+12V (A)	$+5V_{SB}$ (A)	Power Consumption (W)
Idle (WinXP Login)	0.5	N.S.	6
Max. Load (WinXP Burnin)	0.95	N.S.	11.20
S3 (suspend to RAM)	_	0.12	0.6
S5 (soft off)	_	0.09	0.45

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AMD G-T16R 615 MHz Single Core

Power State	+12V	$+5V_{SB}$	Power Consumption
Idle (WinXP Login)	0.49	N.S.	5.88
Max. Load (WinXP Burnin)	0.75	N.S.	8.87
S3 (suspend to RAM)	_	0.12	0.6
S5 (soft off)	_	0.08	0.40

2.11 Operating Systems

- **Standard Support**
  - Windows XP 32/64-bit

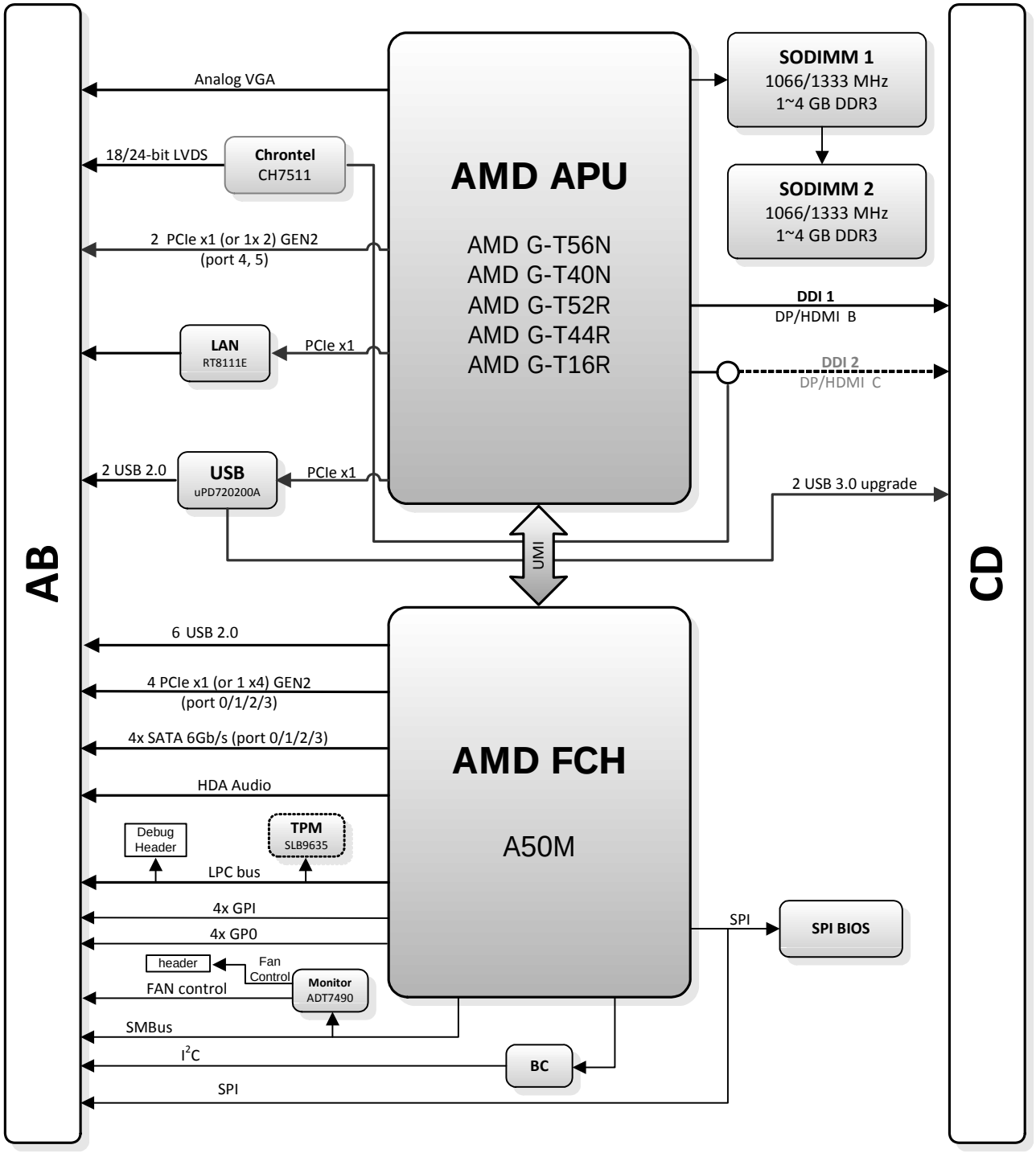
- **Extended Support (BSP)**
  - Embedded XP WES2009 BSP
  - Embedded Win7
  - WEC 7
  - Linux 3.x.xx
  - AIDI Library for Windows XP(e), Windows 7 32/64-bit and Linux

2.12 Mechanical and Environmental

- **Form Factor:** PICMG COM.0 R2, COM Express™ Compact form factor
- **Type:** PICMG COM.0 R2.1, COM Express™ Type 6 pinout
- **Dimensions:** 95 x 95 mm
- **Standard Operating Temperature:** 0°C to 60°C
- **Relative Humidity:** up to 90% at 60°C

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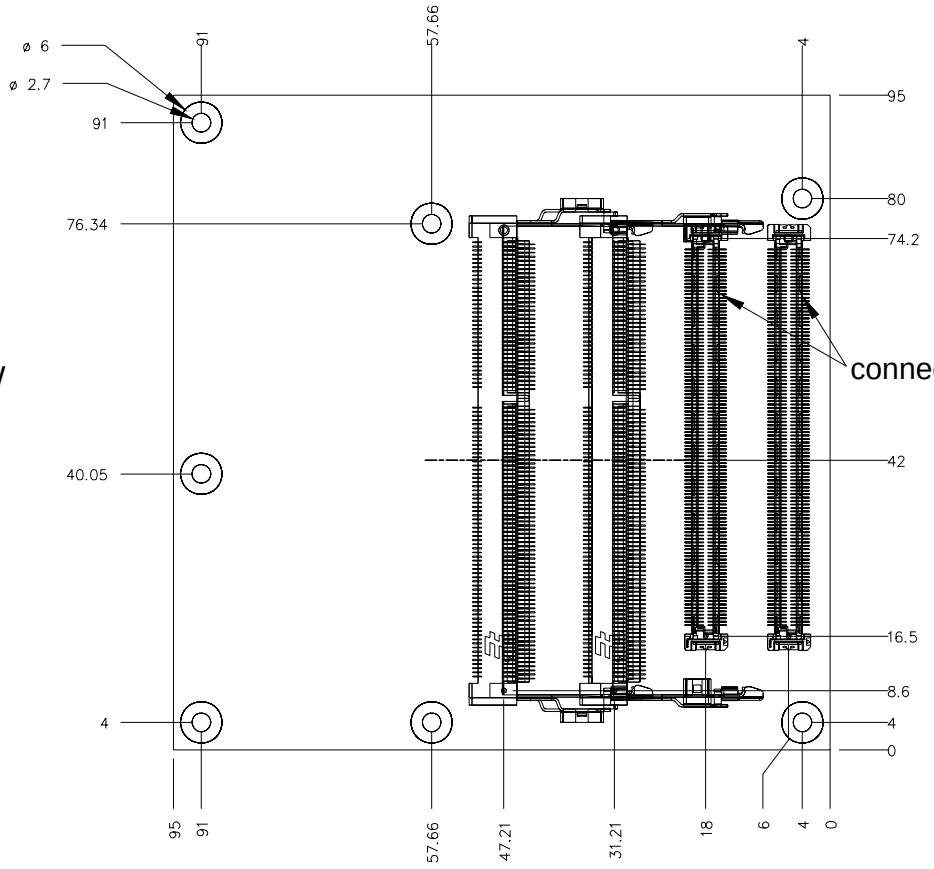
3 Function Diagram



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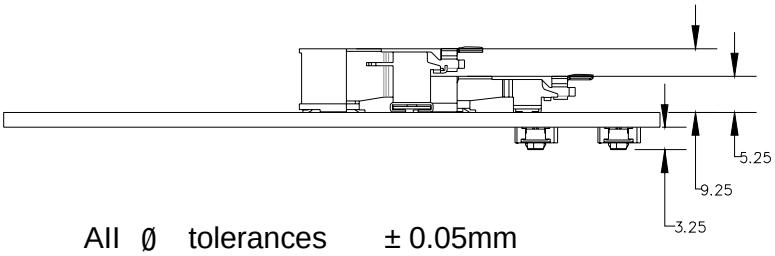
4 Mechanical Dimensions

TOP VIEW



connector on bottom side

SIDE VIEW



All Ø tolerances ± 0.05mm
Other tolerances ± 0.2mm

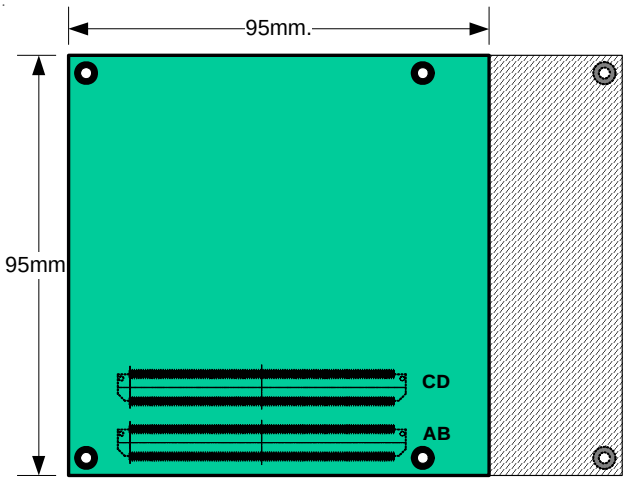
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5 PICMG Pinout and Signal Descriptions

5.1 COM Express® Type 6 compatible pinout

All signals on AB and CD connectors of the Express-HR comply with pinouts and conventions used in the original "**PICMG® COM.0 R2.1: COM Express® Module Base Specification"**.

AB Connector
1 Gigabit Ethernet port
LPC and SPI bus
4 Serial ATA channels
High Definition Audio
8 USB 2.0 ports
6 PCI Express Lanes x1
Dual 24-bit LVDS channels
Analog VGA
8 GPIO pins
SMBus and I²C bus
Fan Control Signals
SPI bus
+12V primary power input
+5V standby

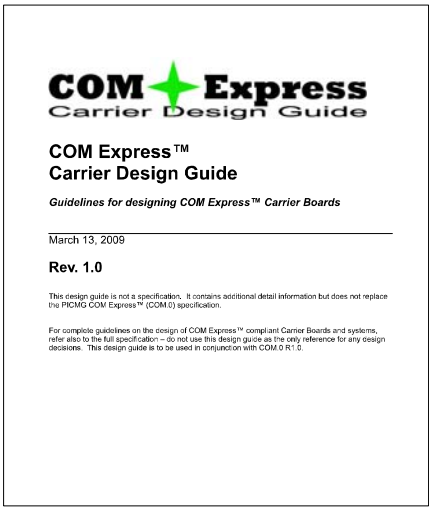


CD Connector
USB3.0 addtional signals to upgrade 4 USB ports on AB to USB3.0
2 PCI Express Lanes x1
3 DDI Channels for Displayport/HDMI/DVI
PCI Express x16 for Graphics or General purpose PCIe
+12V power input

NOTE: The above function mappings are a generic description of COM Express type 6 pinout, and not necessarily supported on the module described in this manual.

5.2 Carrier Board Design Guide

The PICMG COM Express Carrier Design Guide is a 160-page document that provides information on designing a custom carrier board for COM Express modules. The design guide includes reference schematics for the external circuitry required to implement the various COM Express peripheral functions, explains how to extend the supported buses, and how to add additional peripherals and expansion slots to a COM Express-based system. You can download the document Carrier Design Guide at: http://www.adlinktech.com/ccps/picmg_comdg_100.pdf


COM Express
Carrier Design Guide

COM Express™
Carrier Design Guide

Guidelines for designing COM Express™ Carrier Boards

March 13, 2009

Rev. 1.0

This design guide is not a specification. It contains additional detail information but does not replace the PICMG COM Express™ (COM.0) specification.

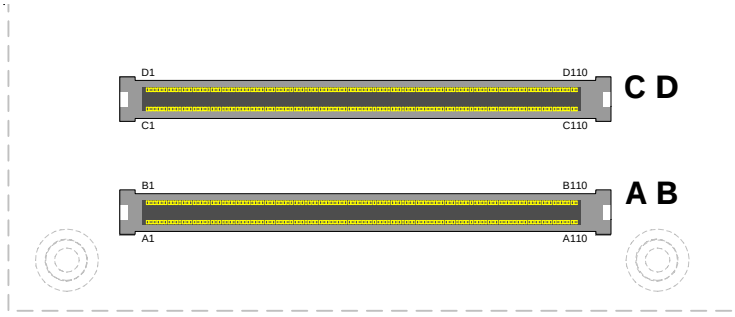
For complete guidelines on the design of COM Express™ compliant Carrier Boards and systems, refer also to the full specification – do not use this design guide as the only reference for any design decisions. This design guide is to be used in conjunction with COM.0 R1.0.

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5.3 Pin Definitions

Pinouts for:

COM.0 R2.1 Type 6



Row A		Row B		Row C		Row D	
Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
A1	GND (FIXED)	B1	GND (FIXED)	C1	GND FIXED)	D1	GND FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	GND	D2	GND
A3	GBE0_MDI3+	B3	LPC_FRAME#	C3	USB_SSRX0-	D3	USB_SSTX0-
A4	GBE0_LINK100#	B4	LPC_AD0	C4	USB_SSRX0+	D4	USB_SSTX0+
A5	GBE0_LINK1000#	B5	LPC_AD1	C5	GND	D5	GND
A6	GBE0_MDI2-	B6	LPC_AD2	C6	USB_SSRX1-	D6	USB_SSTX1-
A7	GBE0_MDI2+	B7	LPC_AD3	C7	USB_SSRX1+	D7	USB_SSTX1+
A8	GBE0_LINK#	B8	LPC_DRQ0#	C8	GND	D8	GND
A9	GBE0_MDI1-	B9	LPC_DRQ1#	C9	~~USB_SSRX2-~~	D9	~~USB_SSTX2-~~
A10	GBE0_MDI1+	B10	LPC_CLK	C10	~~USB_SSRX2+~~	D10	~~USB_SSTX2+~~
A11	GND (FIXED)	B11	GND (FIXED)	C11	GND (FIXED)	D11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#	C12	~~USB_SSRX3-~~	D12	~~USB_SSTX3-~~
A13	GBE0_MDI0+	B13	SMB_CK	C13	~~USB_SSRX3+~~	D13	~~USB_SSTX3+~~
A14	GBE0_CTREF	B14	SMB_DAT	C14	GND	D14	GND
A15	SUS_S3#	B15	SMB_ALERT#	C15	~~DDI1_PAIR6+~~	D15	DDI1_CTRLCLK_AUX+
A16	SATA0_TX+	B16	SATA1_TX+	C16	~~DDI1_PAIR6-~~	D16	DDI1_CTRLDATA_AUX-
A17	SATA0_TX-	B17	SATA1_TX-	C17	RSVD	D17	RSVD
A18	SUS_S4#	B18	SUS_STAT#	C18	RSVD	D18	RSVD
A19	SATA0_RX+	B19	SATA1_RX+	C19	~~PCIE_RX6+~~	D19	~~PCIE_TX6+~~
A20	SATA0_RX-	B20	SATA1_RX-	C20	~~PCIE_RX6-~~	D20	~~PCIE_TX6-~~
A21	GND (FIXED)	B21	GND (FIXED)	C21	GND (FIXED)	D21	GND (FIXED)
A22	SATA2_TX+	B22	SATA3_TX+	C22	~~PCIE_RX7+~~	D22	~~PCIE_TX7+~~
A23	SATA2_TX-	B23	SATA3_TX-	C23	~~PCIE_RX7-~~	D23	~~PCIE_TX7-~~
A24	SUS_S5#	B24	PWR_OK	C24	DDI1_HPD	D24	RSVD
A25	SATA2_RX+	B25	SATA3_RX+	C25	~~DDI1_PAIR4+~~	D25	RSVD
A26	SATA2_RX-	B26	SATA3_RX-	C26	~~DDI1_PAIR4-~~	D26	DDI1_PAIR0+
A27	BATLOW#	B27	WDT	C27	RSVD	D27	DDI1_PAIR0-
A28	(S)ATA_ACT#	B28	AC/HDA_SDIN2	C28	RSVD	D28	RSVD
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1	C29	~~DDI1_PAIR5+~~	D29	DDI1_PAIR1+
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0	C30	~~DDI1_PAIR5-~~	D30	DDI1_PAIR1-
A31	GND (FIXED)	B31	GND (FIXED)	C31	GND (FIXED)	D31	GND (FIXED)
A32	AC/HDA_BITCLK	B32	SPKR	C32	(DDI2_CTRLCLK_AUX+)	D32	DDI1_PAIR2+
A33	AC/HDA_SDOUT	B33	I2C_CK	C33	(DDI2_CTRLDATA_AUX-)	D33	DDI1_PAIR2-
A34	BIOS_DIS0#	B34	I2C_DAT	C34	(DDI2_DDC_AUX_SEL)	D34	DDI1_DDC_AUX_SEL
A35	THRMTRIP#	B35	THRM#	C35	RSVD	D35	RSVD
A36	USB6-	B36	USB7-	C36	~~DDI3_CTRLCLK_AUX+~~	D36	DDI1_PAIR3+
A37	USB6+	B37	USB7+	C37	~~DDI3_CTRLDATA_AUX-~~	D37	DDI1_PAIR3-
A38	USB_6_7_OC#	B38	USB_4_5_OC#	C38	~~DDI3_DDC_AUX_SEL~~	D38	RSVD
A39	USB4-	B39	USB5-	C39	~~DDI3_PAIR0+~~	D39	(DDI2_PAIR0+)
A40	USB4+	B40	USB5+	C40	~~DDI3_PAIR0-~~	D40	(DDI2_PAIR0-)
A41	GND (FIXED)	B41	GND (FIXED)	C41	GND (FIXED)	D41	GND (FIXED)
A42	USB2-	B42	USB3-	C42	~~DDI3_PAIR1+~~	D42	(DDI2_PAIR1+)
A43	USB2+	B43	USB3+	C43	~~DDI3_PAIR1-~~	D43	(DDI2_PAIR1-)
A44	USB_2_3_OC#	B44	USB_0_1_OC#	C44	~~DDI3_HPD~~	D44	(DDI2_HPD)
A45	USB0-	B45	USB1-	C45	RSVD	D45	RSVD
A46	USB0+	B46	USB1+	C46	~~DDI3_PAIR2+~~	D46	(DDI2_PAIR2+)
A47	VCC_RTC	B47	EXCD1_PERST#	C47	~~DDI3_PAIR2-~~	D47	(DDI2_PAIR2-)
A48	EXCD0_PERST#	B48	EXCD1_CPPE#	C48	RSVD	D48	RSVD
A49	EXCD0_CPPE#	B49	SYS_RESET#	C49	~~DDI3_PAIR3+~~	D49	(DDI2_PAIR3+)
A50	LPC_SERIRQ	B50	CB_RESET#	C50	~~DDI3_PAIR3-~~	D50	(DDI2_PAIR3-)

NOTE ~~XXX~~ DDI2 Strikethrough pin names indicates that the signal is not supported on this module. signals can be supported by BOM option (loosing the LVDS functionallity)

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Row A		Row B		Row C		Row D	
Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
A51	GND (FIXED)	B51	GND (FIXED)	C51	GND (FIXED)	D51	GND (FIXED)
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	~~PEG_RX0+~~	D52	~~PEG_TX0+~~
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	~~PEG_RX0-~~	D53	~~PEG_TX0-~~
A54	GPI0	B54	GPO1	C54	TYPE0#	D54	PEG_LANE_RV#
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	~~PEG_RX1+~~	D55	~~PEG_TX1+~~
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	~~PEG_RX1-~~	D56	~~PEG_TX1-~~
A57	GND	B57	GPO2	C57	TYPE1#	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	~~PEG_RX2+~~	D58	~~PEG_TX2+~~
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	~~PEG_RX2-~~	D59	~~PEG_TX2-~~
A60	GND (FIXED)	B60	GND (FIXED)	C60	GND (FIXED)	D60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	~~PEG_RX3+~~	D61	~~PEG_TX3+~~
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	~~PEG_RX3-~~	D62	~~PEG_TX3-~~
A63	GPI1	B63	GPO3	C63	RSVD	D63	RSVD
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	RSVD	D64	RSVD
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	~~PEG_RX4+~~	D65	~~PEG_TX4+~~
A66	GND	B66	WAKE0#	C66	~~PEG_RX4-~~	D66	~~PEG_TX4-~~
A67	GPI2	B67	WAKE1#	C67	RSVD	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	~~PEG_RX5+~~	D68	~~PEG_TX5+~~
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	~~PEG_RX5-~~	D69	~~PEG_TX5-~~
A70	GND (FIXED)	B70	GND (FIXED)	C70	GND (FIXED)	D70	GND (FIXED)
A71	LVDS_A0+	B71	LVDS_B0+	C71	~~PEG_RX6+~~	D71	~~PEG_TX6+~~
A72	LVDS_A0-	B72	LVDS_B0-	C72	~~PEG_RX6-~~	D72	~~PEG_TX6-~~
A73	LVDS_A1+	B73	LVDS_B1+	C73	GND	D73	GND
A74	LVDS_A1-	B74	LVDS_B1-	C74	~~PEG_RX7+~~	D74	~~PEG_TX7+~~
A75	LVDS_A2+	B75	LVDS_B2+	C75	~~PEG_RX7-~~	D75	~~PEG_TX7-~~
A76	LVDS_A2-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN	B77	LVDS_B3+	C77	RSVD	D77	RSVD
A78	LVDS_A3+	B78	LVDS_B3-	C78	~~PEG_RX8+~~	D78	~~PEG_TX8+~~
A79	LVDS_A3-	B79	LVDS_BKLT_EN	C79	~~PEG_RX8-~~	D79	~~PEG_TX8-~~
A80	GND (FIXED)	B80	GND (FIXED)	C80	GND (FIXED)	D80	GND (FIXED)
A81	LVDS_A_CK+	B81	LVDS_B_CK+	C81	~~PEG_RX9+~~	D81	~~PEG_TX9+~~
A82	LVDS_A_CK-	B82	LVDS_B_CK-	C82	~~PEG_RX9-~~	D82	~~PEG_TX9-~~
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL	C83	TPM_PP	D83	RSVD
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_SBY	C85	~~PEG_RX10+~~	D85	~~PEG_TX10+~~
A86	RSVD	B86	VCC_5V_SBY	C86	~~PEG_RX10-~~	D86	~~PEG_TX10-~~
A87	RSVD	B87	VCC_5V_SBY	C87	GND	D87	GND
A88	PCIE0_CK_REF+	B88	BIOS_DIS1#	C88	~~PEG_RX11+~~	D88	~~PEG_TX11+~~
A89	PCIE0_CK_REF-	B89	VGA_RED	C89	~~PEG_RX11-~~	D89	~~PEG_TX11-~~
A90	GND (FIXED)	B90	GND (FIXED)	C90	GND (FIXED)	D90	GND (FIXED)
A91	SPI_POWER	B91	VGA_GRN	C91	~~PEG_RX12+~~	D91	~~PEG_TX12+~~
A92	SPI_MISO	B92	VGA_BLU	C92	~~PEG_RX12-~~	D92	~~PEG_TX12-~~
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	SPI_CLK	B94	VGA_VSYNC	C94	~~PEG_RX13+~~	D94	~~PEG_TX13+~~
A95	SPI_MOSI	B95	VGA_I2C_CK	C95	~~PEG_RX13-~~	D95	~~PEG_TX13-~~
A96	TPM_PP	B96	VGA_I2C_DAT	C96	GND	D96	GND
A97	TYPE10#	B97	SPI_CS#	C97	RSVD	D97	RSVD
A98	~~SER0_TX~~	B98	RSVD	C98	~~PEG_RX14+~~	D98	~~PEG_TX14+~~
A99	~~SER0_RX~~	B99	RSVD	C99	~~PEG_RX14-~~	D99	~~PEG_TX14-~~
A100	GND (FIXED)	B100	GND (FIXED)	C100	GND (FIXED)	D100	GND (FIXED)
A101	~~SER1_TX~~	B101	FAN_PWMOUT	C101	~~PEG_RX15+~~	D101	~~PEG_TX15+~~
A102	~~SER1_RX~~	B102	FAN_TACHIN	C102	~~PEG_RX15-~~	D102	~~PEG_TX15-~~
A103	LID#	B103	SLEEP#	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)	C110	GND (FIXED)	D110	GND (FIXED)

NOTE ~~XXX~~ Strikethrough pin names indicates that the signal is not supported on this module.
DDI2 signals can be supported by BOM option (loosing the LVDS functionallity)

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5.4 Signal Descriptions

Row A

Pin	Signal	Description	Type	PU/PD	Comment
A1	GND	Ground	PWR	-	-
A2	GBE0_MDI3-	Ethernet Media Dependent Interface -	I/O - DP	-	-
A3	GBE0_MDI3+	Ethernet Media Dependent Interface +	I/O - DP	-	-
A4	GBE0_LINK100#	Ethernet Speed LED (100Mb)	OD	-	On at 100Mb/s
A5	GBE0_LINK1000#	Ethernet Speed LED (1000Mb)	OD	-	On at 1000Mb/s
A6	GBE0_MDI2-	Ethernet Media Dependent Interface -	I/O - DP	-	-
A7	GBE0_MDI2+	Ethernet Media Dependent Interface +	I/O - DP	-	-
A8	GBE0_LINK#	LAN Link LED	O-3.3		-
A9	GBE0_MDI1-	Ethernet Media Dependent Interface -	I/O - DP	-	-
A10	GBE0_MDI1+	Ethernet Media Dependent Interface +	I/O - DP	-	-
A11	GND	Ground	PWR	-	-
A12	GBE0_MDI0-	Ethernet Media Dependent Interface -	I/O - DP	-	-
A13	GBE0_MDI0+	Ethernet Media Dependent Interface +	I/O - DP	-	-
A14	GBE0_CTREF	ETHCTREF	NC	-	
A15	SUS_S3#	PM_SLP_S#3	O-3.3	-	-
A16	SATA0_TX+	SATA0_TX+ | SATA 0 Transmit Data +	O - DP	-	-
A17	SATA0_TX-	SATA0_TX- | SATA 0 Transmit Data -	O - DP	-	-
A18	SUS_S4#	PM_SLP_S#4	O-3.3	-	-
A19	SATA0_RX+	SATA0_RX+ | SATA 0 Receive Data +	I - DP	-	-
A20	SATA0_RX-	SATA0_RX - | SATA 0 Receive Data -	I - DP	-	-
A21	GND	Ground	PWR	-	-
A22	SATA2_TX+	SATA2_TX+ | SATA 2 Transmit Data +	O - DP	-	-
A23	SATA2_TX-	SATA2_TX- | SATA 2 Transmit Data -	O - DP	-	-
A24	SUS_S5#	PM_SLP_S#5	O-3.3	-	-
A25	SATA2_RX+	SATA2_RX+ | SATA 2 Receive Data +	I - DP	-	-
A26	SATA2_RX-	SATA2_RX- | SATA 2 Receive Data -	I - DP	-	-
A27	BATLOW#	PM_BATLOW# | Battery Low	I-3.3	PU 10k 3.3Vsb	-
A28	ATA_ACT#	ATA_LED# | SATA LED	O-3.3	PU 10k 3.3V	
A29	AC_SYNC	AC_SYNC | AC'97 Sync	O-3.3	-	
A30	AC_RST#	AC_RST# | AC'97 Reset	O-3.3	-	
A31	GND	Ground	PWR	-	
A32	AC_BITCLK	AC_BITCLK | AC'97 Clock	O-3.3	-	
A33	AC_SDOUT	AC_SDATAOUT | AC'97 Data	O-3.3	PD 10k	strap A50M perf. mode
A34	BIOS_DISABLE#	BIOS_DISABLE#	I-3.3	PU 10k 3.3Vsb	-
A35	THRMTRIP#	PM_THRMTRIP#_CON	O-3.3	PU 1k 3.3V	-
A36	USB6-	USB_PN6 | USB Data – Port6	I/O - DP	-	
A37	USB6+	USB_PP6 | USB Data + Port6	I/O - DP	-	
A38	USB_6_7_OC#	USB_OC#_6_7 | USB OverCurrent Port 6/7	I-3.3	PU 10k 3.3Vsb	
A39	USB4-	USB_PN4 | USB Data - Port4	I/O - DP	-	
A40	USB4+	USB_PP4 | USB Data + Port4	I/O - DP	-	
A41	GND	Ground	PWR	-	
A42	USB2-	USB_PN2 | USB Data - Port2	I/O - DP	-	
A43	USB2+	USB_PP2 | USB Data + Port2	I/O - DP	-	
A44	USB_2_3_OC#	USB_OC#_2_3 | USB OverCurrent Port 2/3	I-3.3	PU 10k 3.3Vsb	
A45	USB0-	USB_PN0 | USB Data - Port0	I/O - DP	-	
A46	USB0+	USB_PP0 | USB Data + Port0	I/O - DP	-	
A47	VCC_RTC	V_BAT	PWR	-	-
A48	EXCD0_PERST#	Express Card Support [0]|card reset	O-3.3	PU to 3.3Vsb	-
A49	EXCD0_CPPE#	Express Card Support [0]| capable request	I-3.3	PU 10k 3.3V	-
A50	LPC_SERIRQ	INT_SERIRQ | Serial Interrupt Request	IO-3.3		
A51	GND	Ground	PWR	-	-
A52	PCIE5_TX+	PCI Express 5 Transmit +	O - DP	-	-
A53	PCIE5_TX-	PCI Express 5 Transmit -	O - DP	-	-
A54	GPI0	General Purpose Input 0	I-3.3	PU 10k 3.3V	-
A55	PCIE4_TX+	PCI Express 4 Transmit +	O - DP	-	-

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Signal Descriptions (cont'd)

Row A

Pin	Signal	Description	Type	PU/PD	Comment
A56	PCIE4_TX-	PCI Express 4 Transmit -	O - DP	-	-
A57	GND	Ground	PWR	-	-
A58	PCIE3_TX+	PCI Express 3 Transmit +	O - DP	-	-
A59	PCIE3_TX-	PCI Express 3 Transmit -	O - DP	-	-
A60	GND	Ground	PWR	-	-
A61	PCIE2_TX+	PCI Express 2 Transmit +	O - DP	-	-
A62	PCIE2_TX-	PCI Express 2 Transmit -	O - DP	-	-
A63	GPI1	General Purpose Input 1	I-3.3	PU 10k 3.3V	-
A64	PCIE1_TX+	PCI Express 1 Transmit +	O - DP	-	-
A65	PCIE1_TX-	PCI Express 1 Transmit -	O - DP	-	-
A66	GND	Ground	PWR	-	-
A67	GPI2	General Purpose Input 2	I-3.3	PU 10k 3.3V	-
A68	PCIE0_TX+	PCI Express 0 +	O - DP	-	-
A69	PCIE0_TX-	PCI Express 0 -	O - DP	-	-
A70	GND	Ground	PWR	-	-
A71	LVDS_A0+	LVDS_AP0 | LVDS Channel A	O - DP	-	-
A72	LVDS_A0-	LVDS_AN0 | LVDS Channel A	O - DP	-	-
A73	LVDS_A1+	LVDS_AP1 | LVDS Channel A	O - DP	-	-
A74	LVDS_A1-	LVDS_AN1 | LVDS Channel A	O - DP	-	-
A75	LVDS_A2+	LVDS_AP2 | LVDS Channel A	O - DP	-	-
A76	LVDS_A2-	LVDS_AN2 | LVDS Channel A	O - DP	-	-
A77	LVDS_VDD_EN	LVDS_VDDEN | LVDS Panel Power	O-2,5	PU to 3.3V	-
A78	LVDS_A3+	LVDS_AP3 | LVDS Channel A	O - DP	-	-
A79	LVDS_A3-	LVDS_AN3 | LVDS Channel A	O - DP	-	-
A80	GND	Ground	PWR	-	-
A81	LVDS_A_CK+	LVDS_CLKAP | LVDS Channel A	O - DP	-	-
A82	LVDS_A_CK-	LVDS_CLKAN | LVDS Channel A	O - DP	-	-
A83	LVDS_I2C_CK	LVDS_DDCPCLK | JILI I2C Clock	IO-3.3	PU 10k 3.3V	-
A84	LVDS_I2C_DAT	LVDS_DDCPDATA | JILI I2C Data	IO-3.3	PU 10k 3.3V	-
A85	GPI3	General Purpose Input 3	I-3.3	PU 10k 3.3V	-
A86	RSVD	NC	NC		-
A87	RSVD	NC	NC		-
A88	PCIE_CK_REF+	CLK_PCIE_REF P	O - DP	-	-
A89	PCIE_CK_REF-	CLK_PCIE_REF N	O - DP	-	-
A90	GND	Ground	PWR	-	-
A91	SPI_POWER	Power supply for Carrier Board SPI	O-3.3	-	-
A92	SPI_MISO		IO	-	-
A93	GPO0	General Purpose Output 0	O-3.3		-
A94	SPI_CLK	Clock from Module to Carrier SPI	IO	-	-
A95	SPI_MOSI	Data out from Module to Carrier SPI	IO	-	-
A96	TPM_PP	Trusted Platform Module	IO-3.3	-	-
A97	TYPE10#	Module type ID pin 10	NC	-	-
A98	SER0_TX	serial port transmitter	NC	-	-
A99	SER0_RX	serial port receiver	NC	-	-
A100	GND	Ground	PWR	-	-
A101	SER1_TX	serial port transmitter	NC	-	-
A102	SER1_RX	serial port receiver	NC	-	-
A103	LID#	LID button.	OD	PU 10k 3.3Vsb	-
A104	VCC_12V	Power 12V	PWR	-	-
A105	VCC_12V	Power 12V	PWR	-	-
A106	VCC_12V	Power 12V	PWR	-	-
A107	VCC_12V	Power 12V	PWR	-	-
A108	VCC_12V	Power 12V	PWR	-	-
A109	VCC_12V	Power 12V	PWR	-	-
A110	GND	Ground	PWR	-	-

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Signal Descriptions (cont'd)

Row B

Pin	Signal	Description	Type	PU/PD	Comment
B1	GND	Ground	PWR	-	-
B2	GBE0_ACT#	LAN_ACTLED# | Ethernet Activity LED	OD		
B3	LPC_FRAME#	LPC_FRAME# | LPC Frame Indicator	O-3.3	-	-
B4	LPC_AD0	LPC_AD0 | LPC Adress & DATA Bus	IO-3.3	-	
B5	LPC_AD1	LPC_AD1 | LPC Adress & DATA Bus	IO-3.3	-	
B6	LPC_AD2	LPC_AD2 | LPC Adress & DATA Bus	IO-3.3	-	
B7	LPC_AD3	LPC_AD3 | LPC Adress & DATA Bus	IO-3.3	-	
B8	LPC_DRQ0#	SIO_DRQ#0 | LPC Serial DMA Request 0	I-3.3	-	
B9	LPC_DRQ1#	SIO_DRQ#1 | LPC Serial DMA Request 1	I-3.3	-	
B10	LPC_CLK	CLK_SIOEXTPCI	O-3.3	-	-
B11	GND	Ground	I-3.3	-	-
B12	PWRBTN#	Power Button	I-5	PU 10k 3.3Vsb	
B13	SMB_CK	SMBUS Clock	O-3.3	PU 2k2 3.3Vsb	-
B14	SMB_DAT	SMBUS Data	IO-3.3	PU 2k2 3.3Vsb	-
B15	SMB_ALERT#	SMB_ALERT#	I-3.3	PU 10k 3.3Vsb	-
B16	SATA1_TX+	SATA1_TX+ | SATA 1 Transmit Data +	O - DP	-	-
B17	SATA1_TX-	SATA1_TX- | SATA 1 Transmit Data -	O - DP	-	-
B18	SUS_STAT#	PM_SUS_STAT#	O-3.3	-	-
B19	SATA1_RX+	SATA1_RX+ | SATA 1 Receive Data +	I - DP	-	-
B20	SATA1_RX-	SATA1_RX - | SATA 1 Receive Data -	I - DP	-	-
B21	GND	Ground	PWR	-	-
B22	SATA3_TX+	SATA3_TX+ | SATA 3 Transmit Data +	O - DP	-	-
B23	SATA3_TX-	SATA3_TX- | SATA 3 Transmit Data -	O - DP	-	-
B24	PWR_OK	Power OK	I,3.3	PU 10K to 3.3V	
B25	SATA3_RX+	SATA3_RX+ | SATA 3 Receive Data +	I - DP	-	-
B26	SATA3_RX-	SATA3_RX - | SATA 3 Receive Data -	I - DP	-	-
B27	WDT	Watch Dog Timer	O-3.3		-
B28	AC_SDIN2	AC_SDATAIN2	I-3.3	-	
B29	AC_SDIN1	AC_SDATAIN1	I-3.3	-	
B30	AC_SDIN0	AC_SDATAIN0	I-3.3	-	
B31	GND	Ground	PWR	-	
B32	SPKR	AC_SPKR	O-3.3	-	
B33	I2C_CK	I2CLK	O-3.3	PU 4k7 3.3Vsb	-
B34	I2C_DAT	I2DAT	IO-3.3	PU 4k7 3.3Vsb	-
B35	THRM#	PM THRM# CON | Over Temperature	I-3.3		-
B36	USB7-	USB_PN7 | USB Data – Port7	I/O - DP	-	
B37	USB7+	USB_PP7 | USB Data + Port7	I/O - DP	-	
B38	USB_4_5_OC#	USB_OC#_4_5 | USB OverCurrent Port	I-3.3	PU 10k 3.3Vsb	
B39	USB5-	USB_PN5 | USB Data- Port5	I/O - DP	-	
B40	USB5+	USB_PP5 | USB Data+ Port5	I/O - DP	-	
B41	GND	Ground	I-3.3	-	-
B42	USB3-	USB_PN3 | USB Data- Port3	I/O - DP	-	
B43	USB3+	USB_PP3 | USB Data+ Port3	I/O - DP	-	
B44	USB_0_1_OC#	USB_OC#_0_1 | USB OverCurrent Port	I-3.3	PU 10k 3.3Vsb	
B45	USB1-	USB_PN1 | USB Data- Port1	I/O - DP	-	
B46	USB1+	USB_PP1 | USB Data+ Port1	I/O - DP	-	
B47	EXCD1_PERST#	Express Card Support [1]|card reset	O-3.3	PU to 3.3Vsb	-
B48	EXCD1_CPPE#	Express Card Support [1]| capable c.	I-3.3	PU 10k 3.3V	-
B49	SYS_RESET#	ETX_SYS_RESET# | Reset Input	I-3.3	PU 10k 3.3Vsb	-
B50	CB_RESET#	PCI_RST# | PCI Bus Reset	O-3.3	-	-
B51	GND	Ground	PWR	-	-
B52	PCIE5_RX+	PCI Express 5 Recieve +	I - DP	-	-
B53	PCIE5_RX-	PCI Express 5 Receive -	I - DP	-	-
B54	GPO1	General Purpose Output 1	O-3.3		-
B55	PCIE4_RX+	PCI Express 4 Recieve +	I - DP	-	-

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Signal Descriptions (cont'd)

Row B

Pin	Signal	Description	Type	PU/PD	Comment
B56	PCIE4_RX-	PCI Express 4 Receive -	I - DP	-	-
B57	GPO2	General Purpose Output 2	O-3.3		-
B58	PCIE3_RX+	PCI Express 3 Recieve +	I - DP	-	-
B59	PCIE3_RX-	PCI Express 3 Receive -	I - DP	-	-
B60	GND	Ground	PWR	-	-
B61	PCIE2_RX+	PCI Express 2 Receive +	I - DP	-	-
B62	PCIE2_RX-	PCI Express 2 Receive -	I - DP	-	-
B63	GPO3	General Purpose Output 3	O-3.3		-
B64	PCIE1_RX+	PCI Express 1 Receive +	I - DP	-	-
B65	PCIE1_RX-	PCI Express 1 Receive -	I - DP	-	-
B66	WAKE0#	PCIE_WAKE!#	I-3.3	PU 10k 3.3Vsb	-
B67	WAKE1#	WAKE1#	I-3.3	PU 10k 3.3Vsb	-
B68	PCIE0_RX+	PCI Express 0 Receive +	I - DP	-	-
B69	PCIE0_RX-	PCI Express 0 Receive -	I - DP	-	-
B70	GND	Ground	PWR	-	-
B71	LVDS_B0+	LVDS_BP0 | LVDS Channel B Data0+	O - DP	-	-
B72	LVDS_B0-	LVDS_BN0 | LVDS Channel B Data0-	O - DP	-	-
B73	LVDS_B1+	LVDS_BP1 | LVDS Channel B Data1+	O - DP	-	-
B74	LVDS_B1-	LVDS_BN1 | LVDS Channel B Data1-	O - DP	-	-
B75	LVDS_B2+	LVDS_BP2 | LVDS Channel B Data2+	O - DP	-	-
B76	LVDS_B2-	LVDS_BN2 | LVDS Channel B Data2-	O - DP	-	-
B77	LVDS_B3+	LVDS_BP3 | LVDS Channel B Data3+	O - DP	-	-
B78	LVDS_B3-	LVDS_BN3 | LVDS Channel B Data3-	O - DP	-	-
B79	LVDS_BKLT_EN	LVDS Panel Backlight Enable	O-3.3	PD 10k	-
B80	GND	Ground	PWR	-	-
B81	LVDS_B_CK+	LVDS_CLKBP | LVDS Channel B	O - DP	-	-
B82	LVDS_B_CK-	LVDS_CLKBM | LVDS Channel B	O - DP	-	-
B83	LVDS_BKLT_CTRL	Backlight Brightness	O-3.3		-
B84	VCC_5V_SBY	5V Standby	PWR	-	-
B85	VCC_5V_SBY	5V Standby	PWR	-	-
B86	VCC_5V_SBY	5V Standby	PWR	-	-
B87	VCC_5V_SBY	5V Standby	PWR	-	-
B88	BIOS_DS1#	Selection straps to determine BIOS boot device	I-3.3	PU 10k 3.3Vsb	-
B89	VGA_RED	Analog Video RGB-RED	OA	PD 150R	-
B90	GND	Ground	PWR	-	-
B91	VGA_GRN	Analog Video RGB-GREEN	OA	PD 150R	-
B92	VGA_BLU	Analog Video RGB-BLUE	OA	PD 150R	-
B93	VGA_HSYNC	Analog Video H-Sync	O-3.3	-	-
B94	VGA_VSYNC	Analog Video V-Sync	O-3.3	-	-
B95	VGA_I2C_CK	Display Data Channel - Clock	O-3.3	PU 2k2 3.3V	-
B96	VGA_I2C_DAT	Display Data Channel - Data	IO-3.3	PU 2k2 3.3V	-
B97	SPI_CS#	Chip select for Carrier Board SPI	O-3.3	-	-
B98	RSVD	NC	NC	-	-
B99	RSVD	NC	NC	-	-
B100	GND	Ground	PWR	-	-
B101	FAN_PWMOUT	Fan speed control.	O-3.3	-	-
B102	FAN_TACHIN	Fan tachometer input forfan with 2 pulse output	I-3.3	-	-
B103	SLEEP#	Sleep button.	OD	PU 10k 3.3Vsb	-
B104	VCC_12V	Power 12V	PWR	-	-
B105	VCC_12V	Power 12V	PWR	-	-
B106	VCC_12V	Power 12V	PWR	-	-
B107	VCC_12V	Power 12V	PWR	-	-
B108	VCC_12V	Power 12V	PWR	-	-
B109	VCC_12V	Power 12V	PWR	-	-
B110	GND	Ground	PWR	-	-

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Signal Descriptions (cont'd)

Row C

Pin	Signal	Description	Type	PU/PD	Comment
C1	GND	Ground	PWR	-	-
C2	GND	Ground	PWR		-
C3	USB_SSRX0-	RX- for the SuperSpeed USB USB0	I-DP	-	-
C4	USB_SSRX0+	RX+ for the SuperSpeed USB USB0	I-DP	-	-
C5	GND	Ground	PWR	-	-
C6	USB_SSRX1-	RX- for the SuperSpeed USB USB1	I-DP	-	-
C7	USB_SSRX1+	RX+ for the SuperSpeed USB USB1	I-DP	-	-
C8	GND	Ground	PWR	-	-
C9	USB_SSRX2-	RX- for the SuperSpeed USB USB2	NC	-	-
C10	USB_SSRX2+	RX+ for the SuperSpeed USB USB2	NC	-	-
C11	GND	Ground	PWR	-	-
C12	USB_SSRX3-	RX- for the SuperSpeed USB USB3	NC	-	-
C13	USB_SSRX3+	RX+ for the SuperSpeed USB USB3	NC	-	-
C14	GND	Ground	PWR	-	-
C15	DDI_PAIR6+	SDVO1_FLDSTALL+	NC	-	no SDVO support
C16	DDI_PAIR6-	SDVO1_FLDSTALL-	NC	-	no SDVO support
C17	RSVD		NC	-	-
C18	RSVD		NC	-	-
C19	PCIE_RX6+	PCI Express 6 Receive +	NC	-	-
C20	PCIE_RX6-	PCI Express 6 Receive -	NC	-	-
C21	GND	Ground	PWR	-	-
C22	PCIE_RX7+	PCI Express 7 Receive +	NC	-	-
C23	PCIE_RX7-	PCI Express 7 Receive -	NC	-	-
C24	DDI1_HPD	DP1/HDMI1 Hot-Plug Detect	I-3.3	PD 100k	-
C25	DDI1_PAIR4+	SDVO1_INT+	NC	-	no SDVO support
C26	DDI1_PAIR4-	SDVO1_INT-	NC	-	no SDVO support
C27	RSVD		NC	-	-
C28	RSVD		NC	-	-
C29	DDI1_PAIR5+	SDVO1_TVCLKIN+	NC	-	no SDVO support
C30	DDI1_PAIR5-	SDVO1_TVCLKIN-	NC	-	no SDVO support
C31	GND	Ground	PWR	-	-
C32	DDI2_CTRLCLK_AUX+	DP2_AUX+ / HDMI2_CTRLCLK	IO-3.3	-	-
C33	DDI2_CTRLDATA_AUX-	DP2_AUX- / HDMI2_CTRLDATA	IO-3.3	-	-
C34	DDI2_DDC_AUX_SEL	DP2 and HDMI2 Select mode	IO-3.3	PD 1M	OEM option
C35	RSVD		NC	-	-
C36	DDP3_CTRLCLK_AUX+	DP3 AUX+ / HDMI3 CTRLCLK	NC	-	-
C37	DDP3_CTRLCLK_AUX-	DP3 AUX- / HDMI3 CTRLDATA	NC	-	-
C38	DDI3_DDC_AUX_SEL	DP3 and HDMI3 Select mode	NC	-	-
C39	DDI3_PAIR0+	DP3_LANE0+ / TMDS3_DATA2+	NC	-	-
C40	DDI3_PAIR0-	DP3_LANE0- / TMDS3_DATA2-	NC	-	-
C41	GND	Ground	PWR	-	-
C42	DDI3_PAIR1+	DP3_LANE1+ / TMDS3_DATA1+	NC	-	-
C43	DDI3_PAIR1-	DP3_LANE1- / TMDS3_DATA1-	NC	-	-
C44	DDI3_HPD	DP3/HDMI3 Hot-Plug Detect	NC	-	-
C45	RSVD		NC	-	-
C46	DDI3_PAIR2+	DP3_LANE2+ / TMDS3_DATA0+	NC	-	-
C47	DDI3_PAIR2-	DP3_LANE2- / TMDS3_DATA0-	NC	-	-
C48	RSVD		NC	-	-
C49	DDI3_PAIR3+	DP3_LANE3+ / TMDS3_CLK+	NC	-	-
C50	DDI3_PAIR2-	DP3_LANE3- / TMDS3_CLK-	NC	-	-
C51	GND	Ground	PWR	-	-
C52	PEG_RX0+	PCIe 0 Recieve +	NC	-	-
C53	PEG_RX0-	PCIe 0 Recieve -	NC	-	-
C54	TYPE0#	Module type ID pin 0	NC	-	not connected
C55	PEG_RX1+	PCIe 1 Recieve +	NC	-	-

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Signal Descriptions (cont'd)

Row C

Pin	Signal	Description	Type	PU/PD	Comment
C56	PEG_RX1-	PCIe 1 Recieve -	NC	-	-
C57	TYPE1#	Module type ID pin 1	NC	-	not connected
C58	PEG_RX2+	PCIe 2 Recieve +	NC	-	-
C59	PEG_RX2-	PCIe 2 Recieve -	NC	-	-
C60	GND	Ground	PWR	-	-
C61	PEG_RX3+	PCIe 3 Recieve +	NC	-	-
C62	PEG_RX3-	PCIe 3 Recieve -	NC	-	-
C63	RSVD	NC	NC	-	-
C64	RSVD	NC	NC	-	-
C65	PEG_RX4+	PCIe 4 Recieve +	NC	-	-
C66	PEG_RX4-	PCIe 4 Recieve -	NC	-	-
C67	RSVD	FAN_PWM_CTRL	NC	-	-
C68	PEG_RX5+	PCIe 5 Recieve +	NC	-	-
C69	PEG_RX5-	PCIe 5 Recieve -	NC	-	-
C70	GND	Ground	PWR	-	-
C71	PEG_RX6+	PCIe 6 Recieve +	NC	-	-
C72	PEG_RX6-	PCIe 6 Recieve -	NC	-	-
C73	RSVD	NC	NC	-	-
C74	PEG_RX7+	PCIe 7 Recieve +	NC	-	-
C75	PEG_RX7-	PCIe 7 Recieve -	NC	-	-
C76	GND	Ground	PWR	-	-
C77	RSVD	FAN_TACH	NC	-	-
C78	PEG_RX8+	PCIe 8 Recieve +	NC	-	-
C79	PEG_RX8-	PCIe 8 Recieve -	NC	-	-
C80	GND	Ground	PWR	-	-
C81	PEG_RX9+	PCIe 9 Recieve +	NC	-	-
C82	PEG_RX9-	PCIe 9 Recieve -	NC	-	-
C83	RSVD	Physical Presence	NC	-	-
C84	GND	Ground	PWR	-	-
C85	PEG_RX10+	PCIe 10 Recieve +	NC	-	-
C86	PEG_RX10-	PCIe 10 Recieve -	NC	-	-
C87	GND	Ground	PWR	-	-
C88	PEG_RX11+	PCIe 11 Recieve +	NC	-	-
C89	PEG_RX11-	PCIe 11 Recieve –	NC	-	-
C90	GND	Ground	PWR	-	-
C91	PEG_RX12+	PCIe 12 Recieve +	NC	-	-
C92	PEG_RX12-	PCIe 12 Recieve -	NC	-	-
C93	GND	Ground	PWR	-	-
C94	PEG_RX13+	PCIe 13 Recieve +	NC	-	-
C95	PEG_RX13-	PCIe 13 Recieve -	NC	-	-
C96	GND	Ground	PWR	-	-
C97	RSVD	NC	NC	-	-
C98	PEG_RX14+	PCIe 14 Recieve +	NC	-	-
C99	PEG_RX14-	PCIe 14 Recieve -	NC	-	-
C100	GND	Ground	PWR	-	-
C101	PEG_RX15+	PCIe 15 Recieve +	NC	-	-
C102	PEG_RX15-	PCIe 15 Recieve -	NC	-	-
C103	GND	Ground	PWR	-	-
C104	VCC_12V	Power 12V	PWR	-	-
C105	VCC_12V	Power 12V	PWR	-	-
C106	VCC_12V	Power 12V	PWR	-	-
C107	VCC_12V	Power 12V	PWR	-	-
C108	VCC_12V	Power 12V	PWR	-	-
C109	VCC_12V	Power 12V	PWR	-	-
C110	GND	Ground	PWR	-	-

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Signal Descriptions (cont'd)

Row D

Pin	Signal	Description	Type	PU/PD	Comment
D1	GND	Ground	PWR	-	-
D2	GND	Ground	PWR	-	-
D3	USB_SSTX0-	TX- for the SuperSpeed USB USB0	O - DP	-	-
D4	USB_SSTX0+	TX+ for the SuperSpeed USB USB0	O - DP	-	-
D5	GND	Ground	PWR	-	-
D6	USB_SSTX1-	TX- for the SuperSpeed USB USB1	O - DP	-	-
D7	USB_SSTX1+	TX+ for the SuperSpeed USB USB1	O - DP	-	-
D8	GND	Ground	PWR	-	-
D9	USB_SSTX2-	TX- for the SuperSpeed USB USB2	NC	-	-
D10	USB_SSTX2+	TX+ for the SuperSpeed USB USB2	NC	-	-
D11	GND	Ground	PWR	-	-
D12	USB_SSTX3-	TX- for the SuperSpeed USB USB3	NC	-	-
D13	USB_SSTX3+	TX+ for the SuperSpeed USB USB3	NC	-	-
D14	GND	Ground	PWR	-	-
D15	DDP1_CTRLCLK_AUX+	DP1 AUX+ / HDMI1/SDVO1_CTRLCLK	O-3.3	PD 100k	-
D16	DDP1_CTRLDATA_AUX-	DP1 AUX- / HDMI1/SDVO1_CTRLDATA	O-3.3	PU 100k to 3.3V	-
D17	RSVD		NC	-	-
D18	RSVD		NC	-	-
D19	PCIE_TX6+	PCI Express 6 Receive +	NC	-	
D20	PCIE_TX6-	PCI Express 6 Receive -	NC		-
D21	GND	Ground	PWR	-	-
D22	PCIE_TX7+	PCI Express 7 Receive +	NC	-	-
D23	PCIE_TX7-	PCI Express 7 Receive -	NC	-	-
D24	RSVD		NC	-	-
D25	RSVD		NC	-	-
D26	DDI1_PAIR0+	DP1_LANE0+ / TMDS1_DATA2+	O - DP	-	-
D27	DDI1_PAIR0-	DP1_LANE0- / TMDS1_DATA2-	O - DP	-	-
D28	RSVD		NC	-	-
D29	DDI1_PAIR1+	DP1_LANE1+ / TMDS1_DATA1+	O - DP	-	-
D30	DDI1_PAIR1-	DP1_LANE1- / TMDS1_DATA1-	O - DP	-	-
D31	GND	Ground	PWR	-	-
D32	DDI1_PAIR2+	DP1_LANE2+ / TMDS1_DATA0+	O - DP	-	-
D33	DDI1_PAIR2-	DP1_LANE2- / TMDS1_DATA0-	O - DP	-	-
D34	DDI1_DDC_AUX_SEL	DP1 and HDMI1 Select mode	IO-3.3	PD 1M	-
D35	RSVD		NC	-	-
D36	DDI1_PAIR3+	DP1_LANE3+ / TMDS1_CLK+	O - DP	-	-
D37	DDI1_PAIR3-	DP1_LANE3- / TMDS1_CLK-	O - DP	-	-
D38	RSVD		NC	-	-
D39	DDI2_PAIR0+	DP2_LANE0+ / TMDS2_DATA2+	O - DP	-	OEM option
D40	DDI2_PAIR0-	DP2_LANE0- / TMDS2_DATA2-	O - DP	-	OEM option
D41	GND	Ground	PWR	-	-
D42	DDI2_PAIR1+	DP2_LANE1+ / TMDS2_DATA1+	O - DP	-	OEM option
D43	DDI2_PAIR1-	DP2_LANE1- / TMDS2_DATA1-	O - DP	-	OEM option
D44	DDI3_HPD	DP3/HDMI3 Hot-Plug Detect	NC	-	-
D45	RSVD		NC	-	-
D46	DDI2_PAIR2+	DP2_LANE2+ / TMDS2_DATA0+	O - DP	-	OEM option
D47	DDI2_PAIR2-	DP2_LANE2- / TMDS2_DATA0-	O - DP	-	OEM option
D48	RSVD		NC	-	-
D49	DDI2_PAIR3+	DP2_LANE3+ / TMDS2_CLK+	O - DP	-	OEM option
D50	DDI2_PAIR3-	DP2_LANE3- / TMDS2_CLK-	O - DP	-	OEM option
D51	GND	Ground	PWR	-	-
D52	PEG_TX0+	PCIe 0 Transmit +	NC	-	-
D53	PEG_TX0-	PCIe 0 Transmit -	NC	-	-
D54	PEG_LANE_RV#	PCIe Lane Reversal	NC	-	not supported
D55	PEG_TX1+	PCIe 1 Transmit +	NC	-	not supported

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Signal Descriptions (cont'd)

Row D

Pin	Signal	Description	Type	PU/PD	Comment
D56	PEG_TX1-	PCIe 1 Transmit -	NC	-	-
D57	TYPE2#	Module type ID pin 2	STO	connect to GND	
D58	PEG_TX2+	PCIe 2 Transmit +	NC	-	-
D59	PEG_TX2-	PCIe 2 Transmit -	NC	-	-
D60	GND	Ground	PWR	-	-
D61	PEG_TX3+	PCIe 3 Transmit +	NC	-	-
D62	PEG_TX3-	PCIe 3 Transmit -	NC	-	-
D63	RSVD	NC	NC	-	-
D64	RSVD	NC	NC	-	-
D65	PEG_TX4+	PCIe 4 Transmit +	NC	-	-
D66	PEG_TX4-	PCIe 4 Transmit -	NC	-	-
D67	GND	Ground	PWR	-	-
D68	PEG_TX5+	PCIe 5 Transmit +	NC	-	-
D69	PEG_TX5-	PCIe 5 Transmit -	NC	-	-
D70	GND	Ground	PWR	-	-
D71	PEG_TX6+	PCIe 6 Transmit +	NC	-	-
D72	PEG_TX6-	PCIe 6 Transmit -	NC	-	-
D73	GND	Ground	PWR	-	-
D74	PEG_TX7+	PCIe 7 Transmit +	NC	-	-
D75	PEG_TX7-	PCIe 7 Transmit -	NC	-	-
D76	GND	Ground	PWR	-	-
D77	RSVD		NC		-
D78	PEG_TX8+	PCIe 8 Transmit +	NC	-	-
D79	PEG_TX8-	PCIe 8 Transmit -	NC	-	-
D80	GND	Ground	PWR	-	-
D81	PEG_TX9+	PCIe 9 Transmit +	NC	-	-
D82	PEG_TX9-	PCIe 9 Transmit -	NC	-	-
D83	RSVD	NC	NC	-	-
D84	RSVD		NC	-	-
D85	PEG_TX10+	PCIe 10 Transmit +	NC	-	-
D86	PEG_TX10-	PCIe 10 Transmit -	NC	-	-
D87	GND	Ground	PWR	-	-
D88	PEG_TX11+	PCIe 11 Transmit +	NC	-	-
D89	PEG_TX11-	PCIe 11 Transmit -	NC	-	-
D90	GND	Ground	PWR	-	-
D91	PEG_TX12+	PCIe 12 Transmit +	NC	-	-
D92	PEG_TX12-	PCIe 12 Transmit -	NC	-	-
D93	GND	Ground	PWR	-	-
D94	PEG_TX13+	PCIe 13 Transmit +	NC	-	-
D95	PEG_TX13-	PCIe 13 Transmit -	NC	-	-
D96	GND	Ground	PWR	-	-
D97	RSVD		NC	-	-
D98	PEG_TX14+	PCIe 14 Transmit +	NC	-	-
D99	PEG_TX14-	PCIe 14 Transmit -	NC	-	-
D100	GND	Ground	PWR	-	-
D101	PEG_TX15+	PCIe 15 Transmit +	NC	-	-
D102	PEG_TX15-	PCIe 15 Transmit -	NC	-	-
D103	GND	Ground	PWR	-	-
D104	VCC_12V	Power 12V	PWR	-	-
D105	VCC_12V	Power 12V	PWR	-	-
D106	VCC_12V	Power 12V	PWR	-	-
D107	VCC_12V	Power 12V	PWR	-	-
D108	VCC_12V	Power 12V	PWR	-	-
D109	VCC_12V	Power 12V	PWR	-	-
D110	GND	Ground	PWR	-	-

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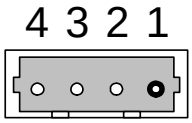
Signal Descriptions (cont'd)

Signal Type Legend	
IO-2,5	Bi-directional 2,5 V Input/Output
IO-3,3	Bi-directional 3,3 V Input/Output
IO-5	Bi-directional 5 V Input/Output
I-3,3	3,3 V Input
I-5	5 V Input
O-2,5	2,5 V Output
O-3,3	3,3 V Output
O-5	5 V Output
IO	Input/Output
OA	Analog Output
OD	Digital Output
I/O - DP	Differential Pair Input/Output
O - DP	Differential Pair Output
I - DP	Differential Pair Input
PWR	Power or Ground
STO	Strapping Output
PU	Pull Up Resistor
PD	Pull Down Resistor
NC	Not Connected / Reserved

5.5 Onboard Fan Connector

The Express-GFC has an onboard fan connector (FAN1: 3-pin 1.25 mm Wafer) on the underside of the board, next to the SODIMM socket.

FAN1: 12V Fan Power



Pin	Signal
1	HWM_PWM2
2	P12V
3	HWM_TACH2
4	GND

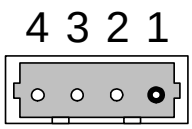
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6 Module Connectors and Switches

6.1 Onboard Fan Connector

The Express-GFC has an onboard fan connector (FAN1: 4-pin 1.25 mm Wafer) on the topside of the board, close to the CPU. The PWM / TAG signals on the 4-pin connector are shared with the AB pins PWM and TAG signals leading to the carrier board. For this reason only one fan can be regulated at a time. !

FAN1: 12V Fan Power



Pin	Signal
1	HWM_PWM2
2	P12V
3	HWM_TACH2
4	GND

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7 Embedded Functions

All embedded board functions on ADLINK's Computer on Modules are supported at the operating system level using the ADLINK Intelligent Device Interface (AIDI) library. The AIDI API programming interface is compatible and identical across all ADLINK Computer on Modules and all supported operating systems. The AIDI library includes a demo program to demonstrate the library's functionallity.

7.1 Watchdog Timer

The Express-GFC implements a Watchdog timer that can be used to automatically detect software execution problems or system hangs and reset the board if necessary. The Watchdog timer consists of a counter that counts down from an initial value to zero. When the system is operating normally, the software that sets the intial value periodically resets the counter so that the it never reaches zero. If the counter reaches zero before the software resets it, the system is presumed to be malfunctioning and a reset signal is asserted.

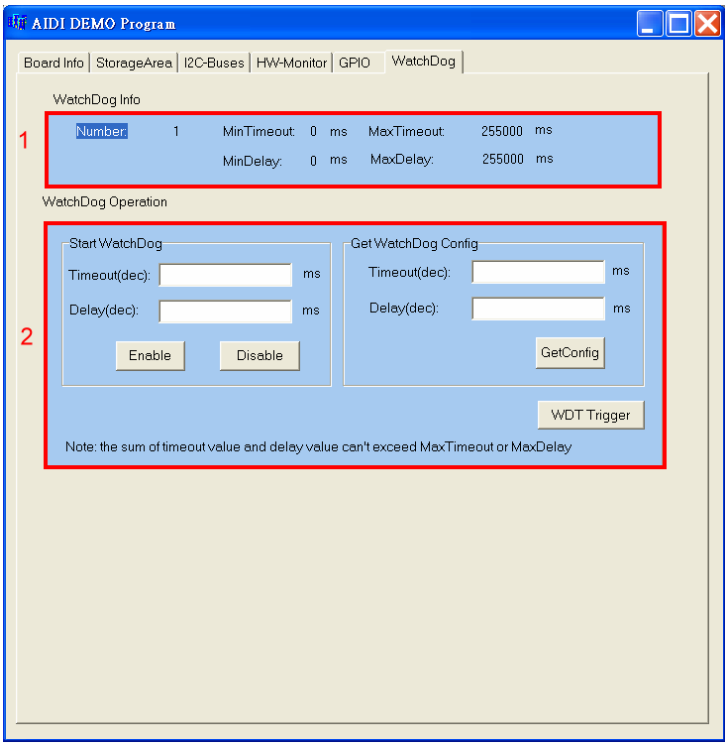


The AIDI Library Watchdog functions support Watchdog control of the board. If the Watchdog begins countdown and reaches zero, it will access the CPU's RESET signal to reset the system. This application must call another function named AidiWDogTrigger that triggers the Watchdog to restart to prevent system reset.

AIDI Demo Program
- Watchdog Tab

The AIDI Demo Program allows retrieval of the current Watchdog status and updating of the Watchdog settings

If the Watchdog is enabled, the user can click the *WDT Trigger* button to manually reset the counter and prevent the system from resetting



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7.2 GPIO

GPIO library support is limited to GPIO signals that originate from the Computer on Module and extend to the carrier board. COM Express modules support 4 GPO and 4 GPI signals.

GPIO signals can be monitored and controlled by using the ADLINK Intelligent Device Interface (AIDI) library that is compatible and identical across all ADLINK COM Express modules and all supported operating systems.

The COM Express Type 6 standard assigns the following pins for either GPI or GPO

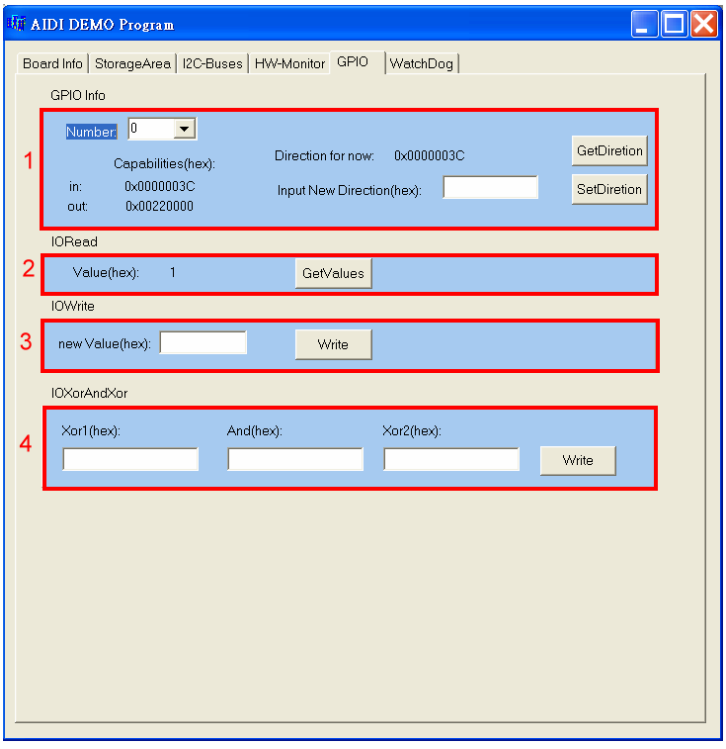
Pin	Signal Type #	AIDI ID (bit)	Remark
A54	GPI0	0	Express-HR can configure this pin for GPI and GPO
A63	GPI1	1	Express-HR can configure this pin for GPI and GPO
A67	GPI2	2	Express-HR can configure this pin for GPI andGPO
A85	GPI3	3	Express-HR can configure this pin for GPI andGPO
A93	GPO0	4	Express-HR can configure this pin for GPI and GPO
B54	GPO1	5	Express-HR can configure this pin for GPI and GPO
B57	GPO2	6	Express-HR can configure this pin for GPI and GPO
B63	GPO3	7	Express-HR can configure this pin for GPI and GPO

AIDI Demo Program - GPIO Tab

The AIDI Demo Program displays current GPI or GPO status and allows reading of GPI and writing to GPO.

The table above links logical port numbers in AIDI to physical port numbers on the COM Express board-to-board connector.

For boards that support *multi-direction* the "SetDirection" button can configure the port for either GPI or GPO



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7.3 Hardware Monitoring

To ensure system health of your embedded system ADLINK's COM Express modules come with built in support for monitoring and control of CPU and system temperatures, fan speed and critical module voltage levels.

The AIDI Library provides simple APIs at the application level to support these functions and adds alarm functions when voltage or temperature levels exceed the upper or lower limit set by the user.

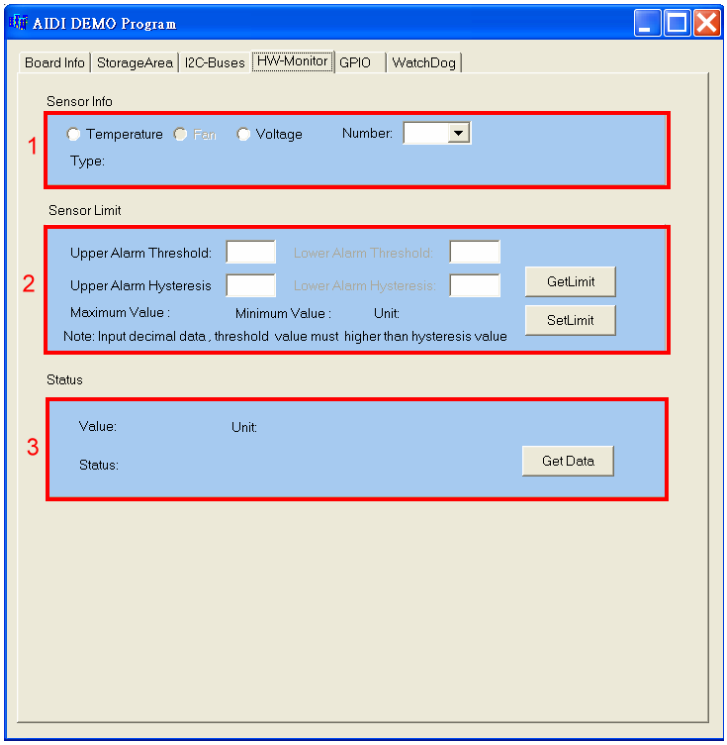
On the Express-GFC the following monitored values can be read from the module: CPU temperature, system temperature, Vcore, 1.8V, 5V, 3.3V and 12V.

AIDI Demo Program
- HW Monitor Tab

Field 1 displays detected sensors (number).

Field 2 allows setting of upper and lower alarm limits.

Field 3 displays read out information of sensors.



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8 System Resources

8.1 System Memory Map

Address Range (dec.)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 - FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) - (4GB-17MB-1)	FEE00000 - FEEFFFFF	1 MB	FSB Interrupt Memory Space
(4GB-20MB) - (4GB-19MB-1)	FEC00000 - FECFFFFF	1 MB	APIC Configuration Space
960 K - 1024 K	F0000 - FFFFF	64 KB	System BIOS Area
896 K - 960 K	E0000 - EFFFF	64 KB	Extended System BIOS Area
768 K - 896 K	C0000 - DFFFF	128 KB	PCI expansion ROM area C0000 - C7FFF: Onboard VGA BIOS
640 K - 768 K	A0000 - BFFFF	128 KB	Video Buffer & SMM space
0 K - 640 K	00000 - 9FFFF	640 KB	DOS Area

8.2 Direct Memory Access Channels

Channel Number	Data Width	System Resource	Comment
0	8-bits	Open	
1	8-bits	Open	
2	8-bits	Open	
3	8-bits	Open	
4		Reserved - cascade channel	
5	16-bits	Open	
6	16-bits	Open	
7	16-bits	Open	

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8.3 Legacy I/O Map

Address Range (hex)	Description
	DMA controller 1, 8237A-5 equivalent
020-02D and 030-03F	Interrupt controller 1, 8259 equivalent
04E-04F 040-042	LPC SIO (W83627DHG) configuration index/data registers
050-052	Timer, 8254-2 equivalent
060, 062, 064, 066	8742 equivalent (keyboard)
061	NMI control and status
070-077	Real Time Clock Controller(bit 7 -NMI mask)
080-091	DMA page register
092	Reset (Bit 0)/ Fast Gate A20 (Bit 1)
093-09F	DMA page registers continued
0A0-0B1 and 0B4-0BD	Interrupt controller 2, 8259 equivalent
0B2 and 0B3	APM control
0C0-0DF	DMA controller 2, 8237A-5 equivalent
0F0	Read: PCI and Master abort. (Note 1) Write: FERR#/ IGNNE# /Interrupt controller
290	SIO_PME_BASE_ADDRESS
2F8-2FF	Serial port 2
3F8-3FF	Serial port 1
4D0 and 4D1	Interrupt controller
B00	SMBUS IO base
CF9	Reset Control register (8 bit I/O)

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8.4 Interrupt Request (IRQ) Lines

PIC Mode

IRQ#	Typical Interrupt Resource	Connected	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2)	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	SCI / PCI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	PCI / ISA	N/A	No
11	PCI / ISA	N/A	No
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	PCI / ISA	N/A	No

APIC Mode

IRQ#	Typical Interrupt Resource	Connected	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	PCI / ISA	N/A	No
3	Serial Port 2 (COM2) / PCI / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	ACPI-Compliant system	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	PCI / ISA	USB controller	Note (1)
11	PCI / ISA	Ethernet controller	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	N/A	N/A	Note (1)
15	N/A	N/A	Note (1)
16	N/A	HDA controller, AMD PCI-to-PCI Bridge#1	
ATI PCI-to-PCI Bridge#1/2/3/4		Yes	
17	N/A	EHCI USB Controller#0/1/2	Yes
18	N/A	AMD PCI-to-PCI Bridge#3,OHCI USB Controller#0/1/2	
Yes			
19	N/A	HDA controller, AMD PCI-to-PCI Bridge#4	Yes

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8.5 PCI Configuration Space Map

Bus No.	Device No.	Function No.	Routing	Description
00h	00h	00h	N/A	AMD Host Bridge
00h	01h	00h	Internal	ATI VGA Controller
00h	01h	01h	Internal	ATI HD Audio Device
00h	04h	00h	Internal	AMD PCI-to-PCI Bridge#1
00h	06h	00h	Internal	AMD PCI-to-PCI Bridge#3
00h	07h	00h	Internal	AMD PCI-to-PCI Bridge#4
00h	11h	00h	Internal	ATI IDE Controller#0
00h	12h	00h	Internal	ATI OHCI Controller#0
00h	12h	02h	Internal	ATI EHCI Controller#0
00h	13h	00h	Internal	ATI OHCI Controller#1
00h	13h	02h	Internal	ATI EHCI Controller#1
00h	14h	00h	Internal	ATI SMBus Controller
00h	14h	01h	Internal	ATI IDE Controller#1
00h	14h	02h	Internal	ATI HD Audio Device
00h	14h	03h	Internal	ATI ISA Bridge
00h	14h	04h	Internal	ATI PCI-to-PCI Bridge#0
00h	15h	00h	Internal	ATI PCI-to-PCI Bridge#1
00h	15h	01h	Internal	ATI PCI-to-PCI Bridge#2
00h	15h	02h	Internal	ATI PCI-to-PCI Bridge#3
00h	15h	03h	Internal	ATI PCI-to-PCI Bridge#4
00h	16h	00h	Internal	ATI OHCI Controller#2
00h	16h	02h	Internal	ATI EHCI Controller#2
00h	18h	00h	N/A	AMD Host Bridge#0
00h	18h	01h	N/A	AMD Host Bridge#1
00h	18h	02h	N/A	AMD Host Bridge#2
00h	18h	03h	N/A	AMD Host Bridge#3
00h	18h	04h	N/A	AMD Host Bridge#4
00h	18h	05h	N/A	AMD Host Bridge#5
00h	18h	06h	N/A	AMD Host Bridge#6
00h	18h	07h	N/A	AMD Host Bridge#7
02h	00h	00h	Internal	RealTek Ethernet Controller
03h	00h	00h	Internal	NEC USB Controller

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8.6 PCI Interrupt Routing Map

PIRQ	INT Line	ATI VGA Controller	ATI IDE Controller#1	ATI IDE Controller#0	SMBUS controller	OHCI 0/1/2	ATI HD Audio Device	Realtek Ethernet Controller	ATI PCI-to-PCI Bridge#1	ATI PCI-to-PCI Bridge#2	ATI PCI-to-PCI Bridge#3	ATI PCI-to-PCI Bridge#4	AMD PCI-to-PCI Bridge#1	AMD PCI-to-PCI Bridge#2	AMD PCI-to-PCI Bridge#3	AMD PCI-to-PCI Bridge#4
A	INTA	INTC	INTA	INTD		INTC	INTA	INTA	INTA	INTB	INTC	INTD	INTA	INTB	INTC	INTD
B	INTB	INTD	INTB			INTB			INTB	INTC	INTD	INTA	INTB	INTC	INTD	INTA
C	INTC								INTC	INTD	INTA	INTB	INTC	INTD	INTA	INTB
D	INTD								INTD	INTA	INTB	INTC	INTD	INTA	INTB	INTC

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9 BIOS Setup Utility

The following chapter describes basic navigation for the UEFI BIOS setup utility for the ADLINK Express-HR COM Express module.

NOTE: The following content is for BIOS ver. A1.0.

9.1 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 following text prompt:

   < Press DEL or Delete to run Setup >

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.

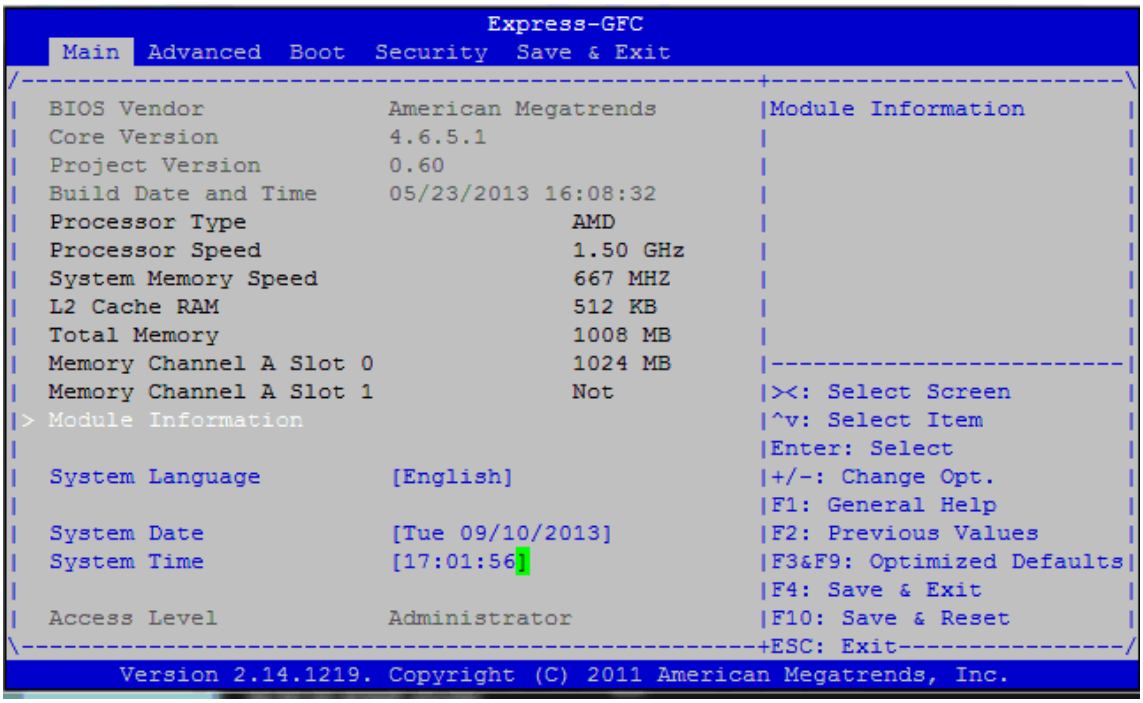
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9.1.1 Main Setup Menu

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.

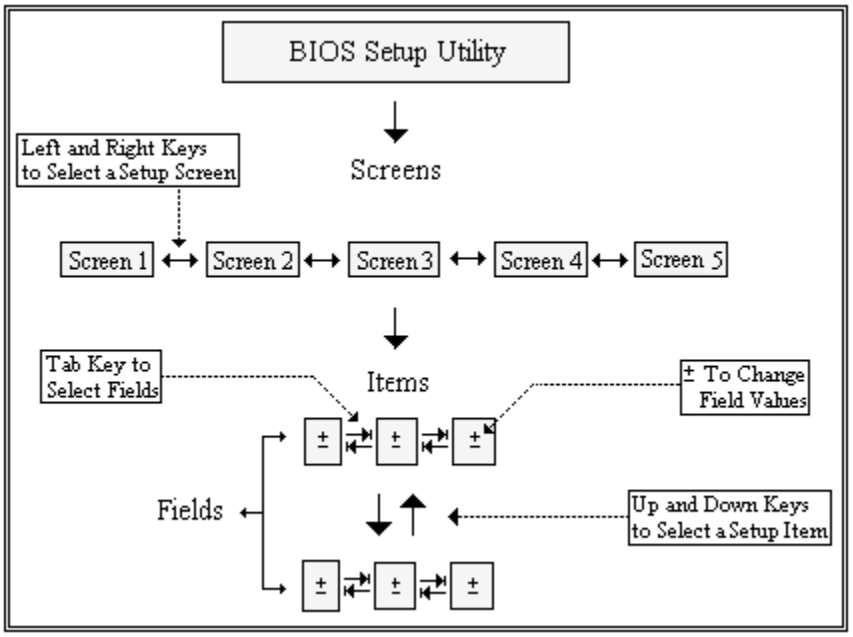
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



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9.1.2 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 >, < F10 >, < Enter >, < ESC >, < Arrow > keys, and so on.

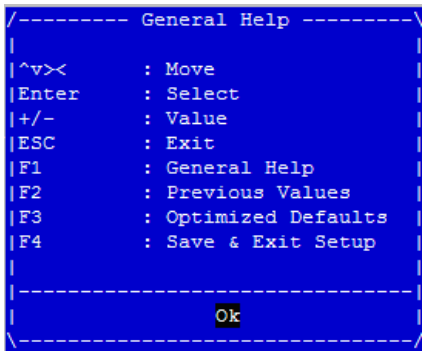


NOTE: There is a hot key legend located in the right frame on most setup screens.

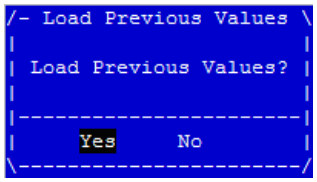
Navigation	
→←	Left/Right The *Left and Right* < Arrow > keys allow you to select a setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
↑↓	Up/Down The *Up and Down* < Arrow > keys allow you to select a setup item or sub-screen.
+ −	Plus/Minus The *Plus and Minus* < Arrow > 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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Hot Key	Description
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*.

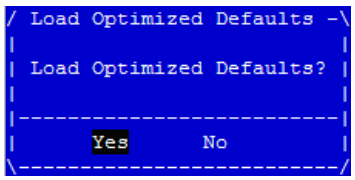


F2	The < F2 > key is the previous values key. It is not displayed on the key legend by default. To set the previous values settings of the BIOS, press the < F2 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The previous values settings allow the motherboard to boot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



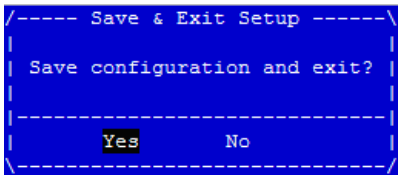
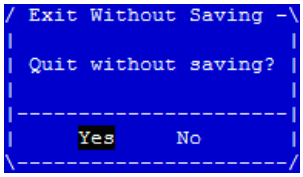
Press the < Enter > key to load previous values. You can also use the < Arrow > key to select *Cancel* and then press the < Enter > key to abort this function and return to the previous screen.

F3 & F9	The < F3 > & <F9> keys are the optimized defaults keys. 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 previous values settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.



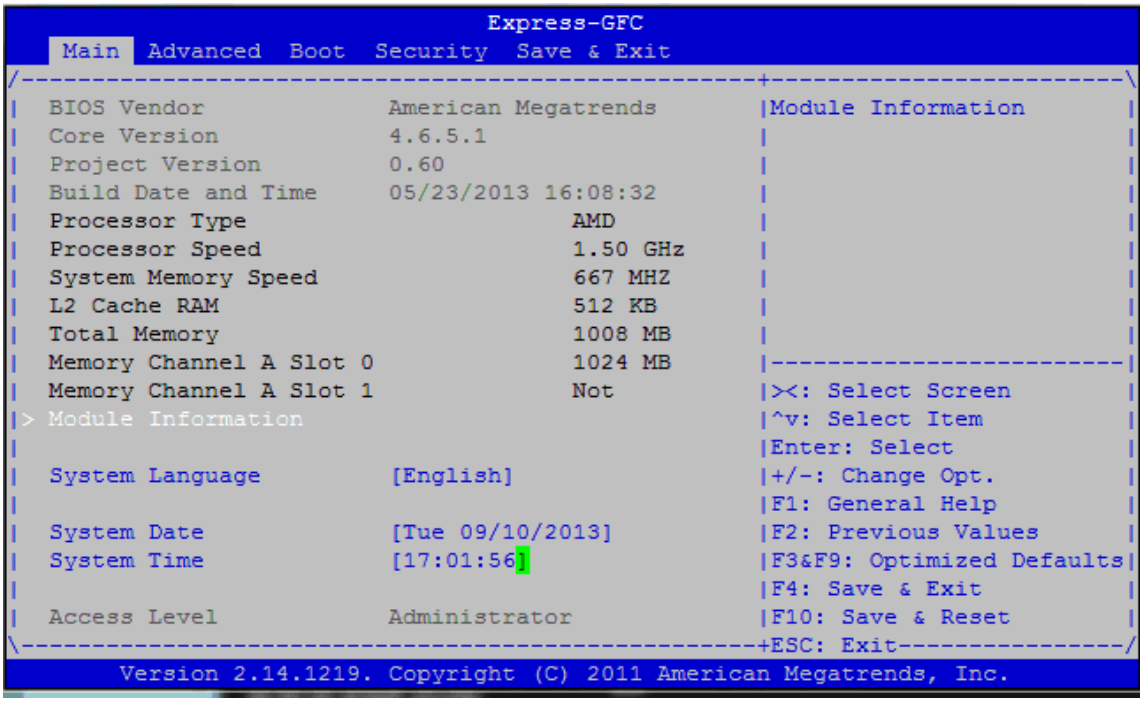
Press the < Enter > key to load optimized defaults. You can also use the <Arrow> key to select *Cancel* and then press the < Enter > key to abort this function and return to the previous screen.

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F4	The < F4 > key allows you to save any changes you have made and exit Setup. Press the < F4 > 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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9.2 Main Setup



9.2.1 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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9.2.2 Module Information

This screen displays detailed information about the module.

BC Firmware Rev.

Display the reversion of BC firmware.

Manufacture Date

Display the date of manufacture.

Last Repair Date

Display the date of last repair..

Serial Number

Serial number of this module.

Hardware Rev.

Display the reversion of hardware.

LAN MAC ID

Display the MAC ID.

Boot Counter

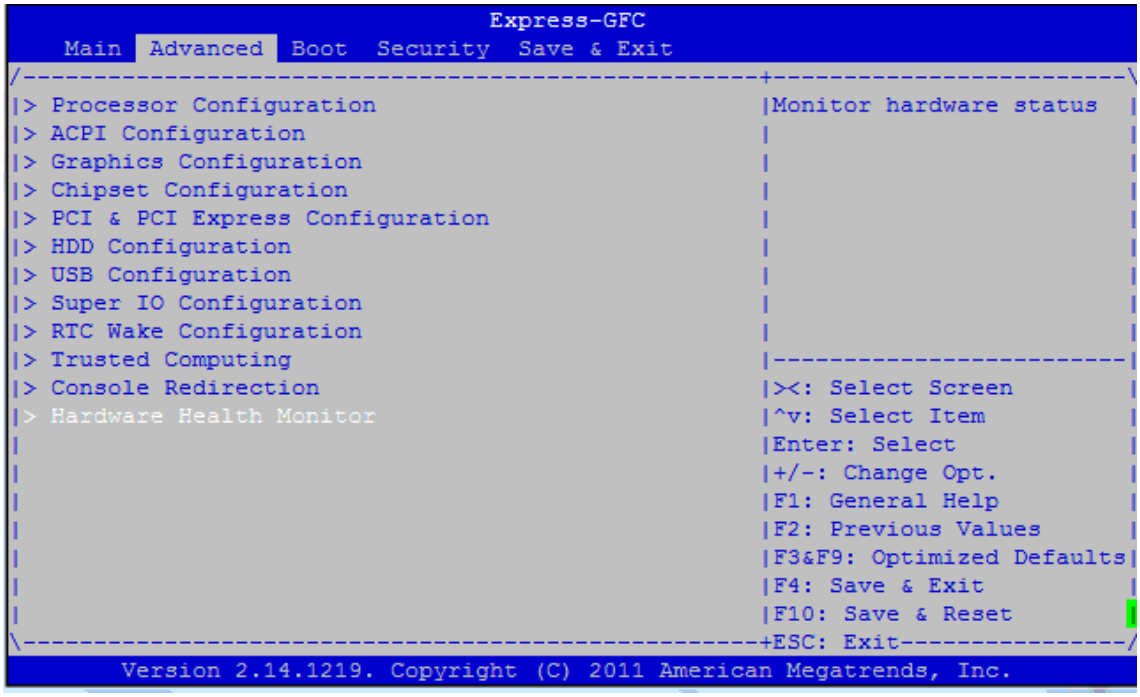
Display the boot counter from manufacture.

Running Time

Display the running time from manufacture.

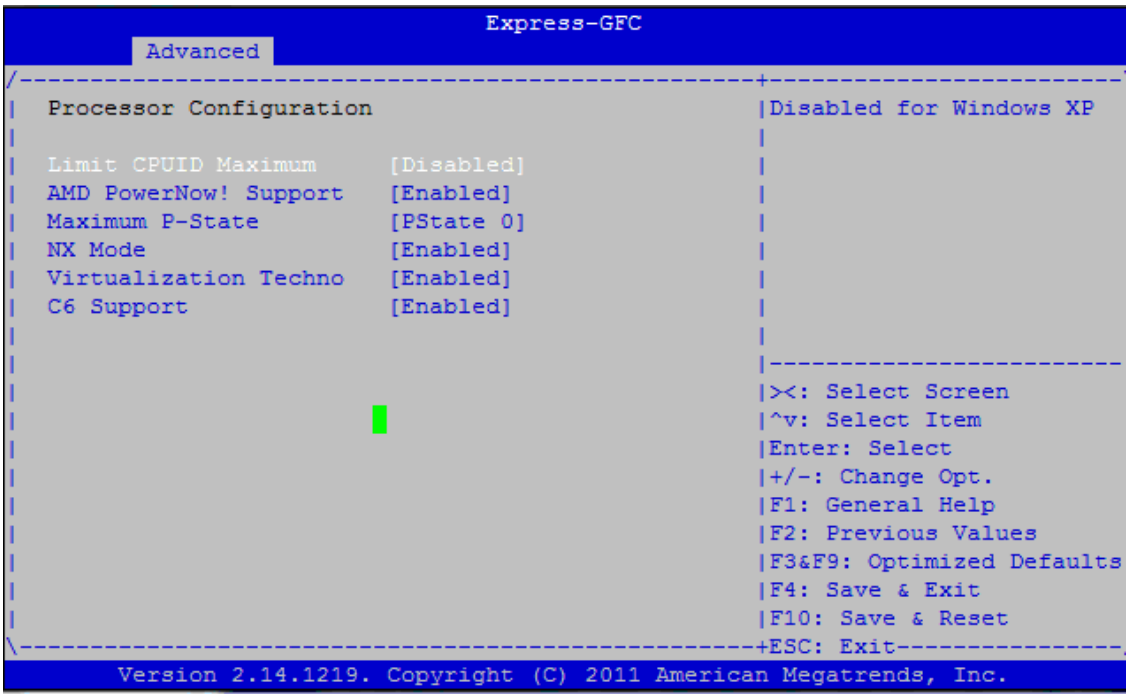
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9.3 Advanced Setup



WARNING: Setting incorrect or conflicting values in Advanced BIOS Setup may cause system malfunctions.

9.3.1 Processor Configuration



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Limit CPUID Maximum

When the computer boots, the operating system executes its 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 of CPUID recognized. This determines the kind of basic information CPUID can provide to 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.

AMD PowerNow! Support

Enables or disables CPU P-states. When enabled, the CPU frequency will vary depending on loading. When disabled, the CPU frequency will stay at maximum.

Maximum P-State

Choose the highest P-State that the system supports.

NX Mode

Enable or disable the No-Execute page protection function.

Virtualization Technology

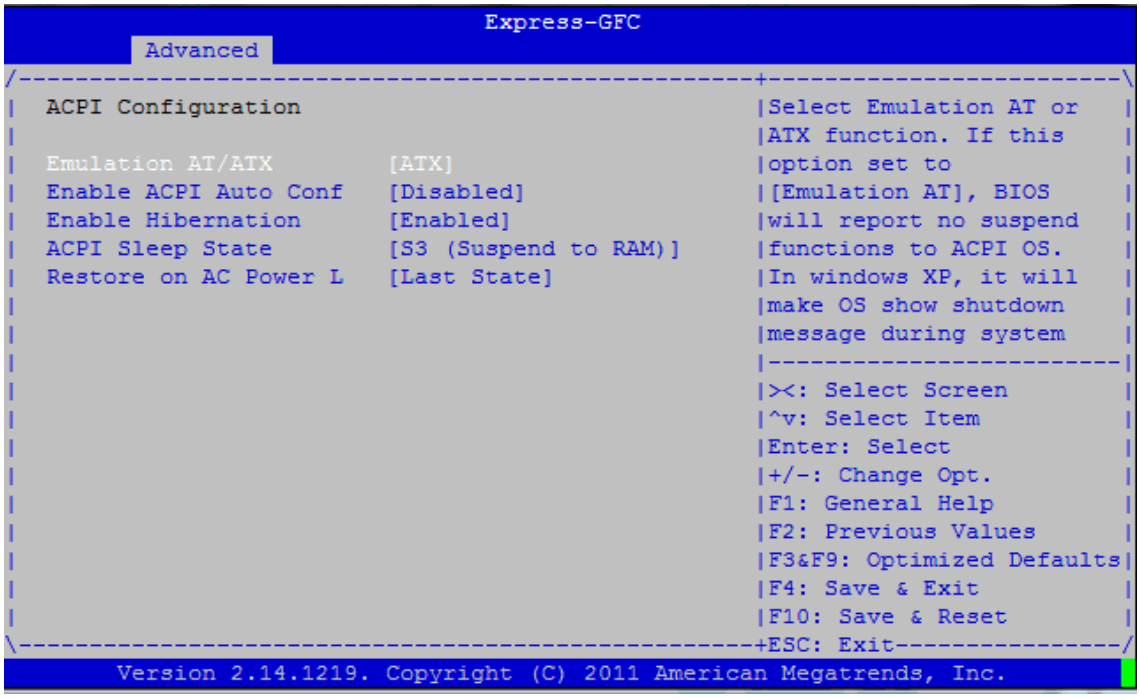
Enable or disable CPU Virtualization.

C6 Support

Enable or disable C6 support to allow CPU power savings.

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9.3.2 ACPI Settings



Emulation AT/ATX

When AT mode is set, Windows will not turn off power when performing a shutdown. Some operating systems (e.g. Windows XP) will show the "It is safe to turn off your computer" message. When ATX mode is set, the operating system will shut down power normally.

Enable APIC Auto Configuration

ACPI Auto Configuration. Set this value to Enabled/Disabled.

Enable Hibernation

Sets the system ability to Hibernate (OS/S4 Sleep State). Set this value to Enabled/Disabled.

ACPI Sleep State

Selects the highest ACPI sleep state the system will enter, when the SUSPEND button is pressed. Set this value to Suspend Disable, S1, S3, Both S1 and S3.

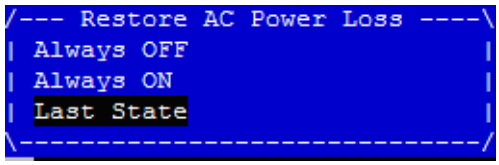
S1 only (CPU Stop Clock): CPU Stop Clock - Under this setting the system enters a low power state instead of being completely shut off. This allows the computer system to boot up in a few seconds.

S3 only (Suspend): Suspend to RAM - Under this setting the system enters a low power state instead of being completely shut off. This allows the computer system to boot up in a few seconds.

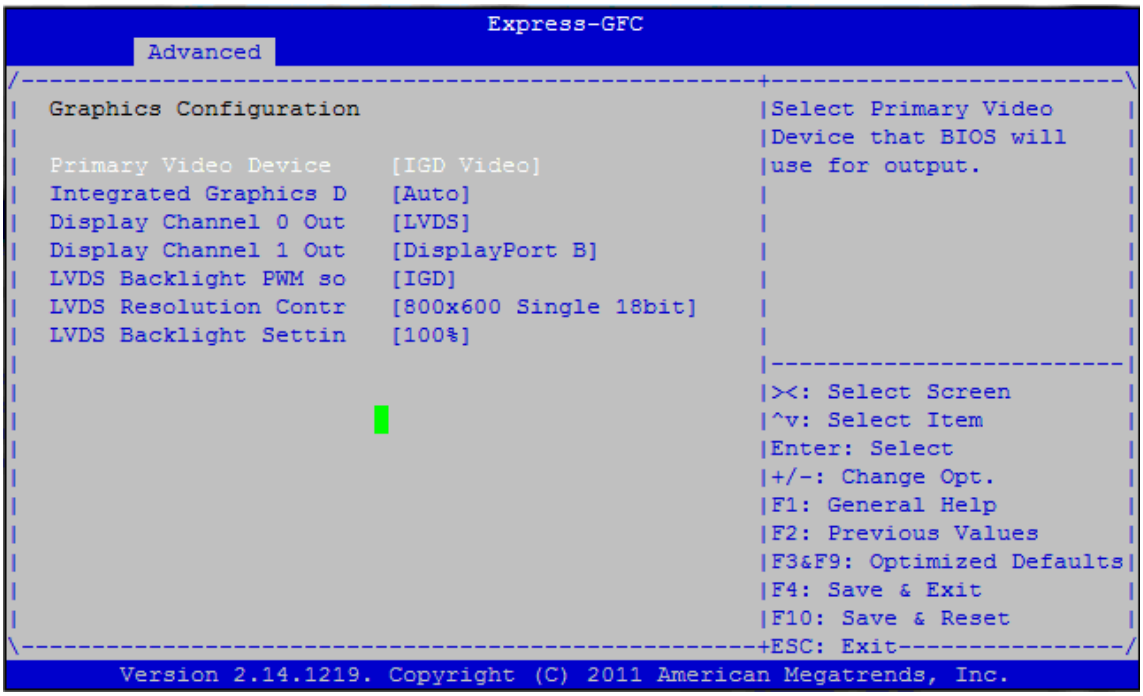
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Restore AC Power Loss

Select AC power state when power is re-applied after a power failure.

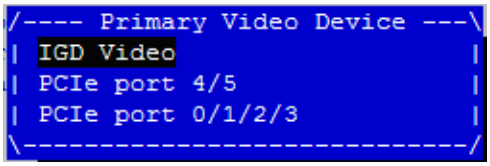


9.3.3 Graphics Configuration



Primary Video Device

Selects the primary video device.



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Integrated Graphic Device

You can choose the disable the integrated graphics device, or set it to Auto/Manual.

Display Channel 0 Output

Set Display Channel 0 to LVDS or disabled.

Display Channel 1 Output

Set Display Channel 1 to DisplayPort B ,HDMI B or disabled.

LVDS Backlight PWM source

Choose the PWM source from either the internal graphics device (IGD) or the board controller (BC).

LVDS Resolution Control

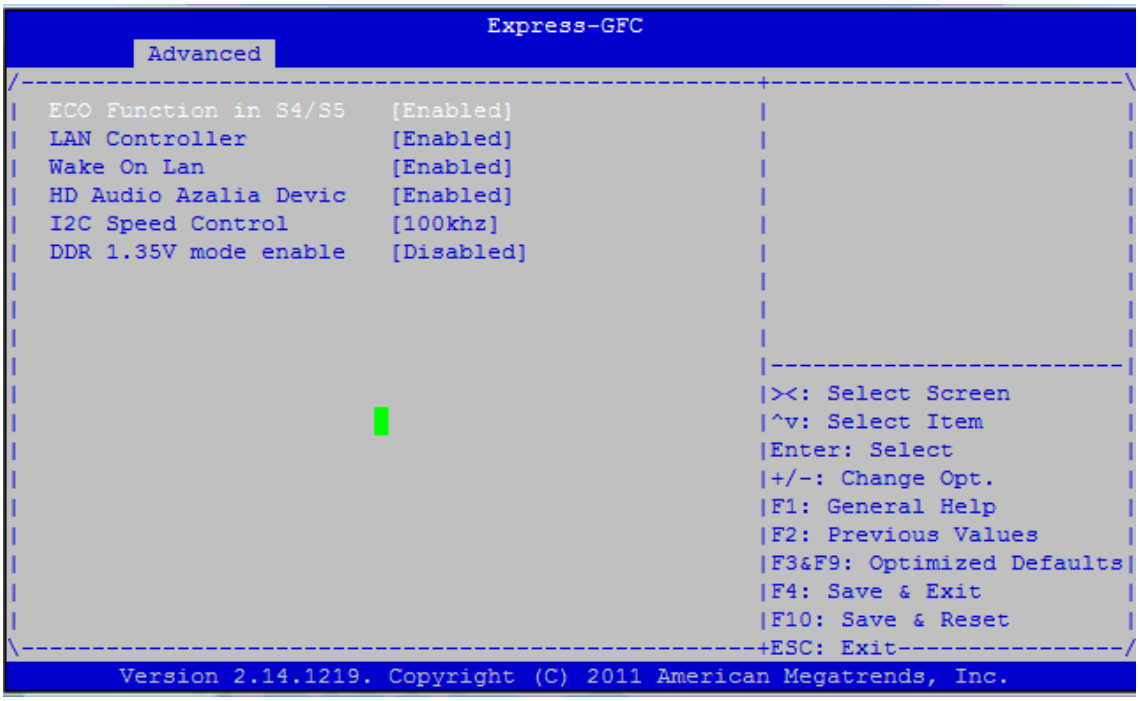
Set the resolution for LVDS.

LVDS Backlight Setting

Set the backlight brightness of the LVDS display.

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9.3.4 Chipset Configuration



ECO Function in S4/S5

Reduces the power consumption of the system.

LAN Controller

Enable or disable the LAN controller.

Wake on LAN

Choose to enable or disable the Wake on LAN function.

HD Audio Azalia Device

Choose to enable or disable the HD audio device.

I2C Speed Control

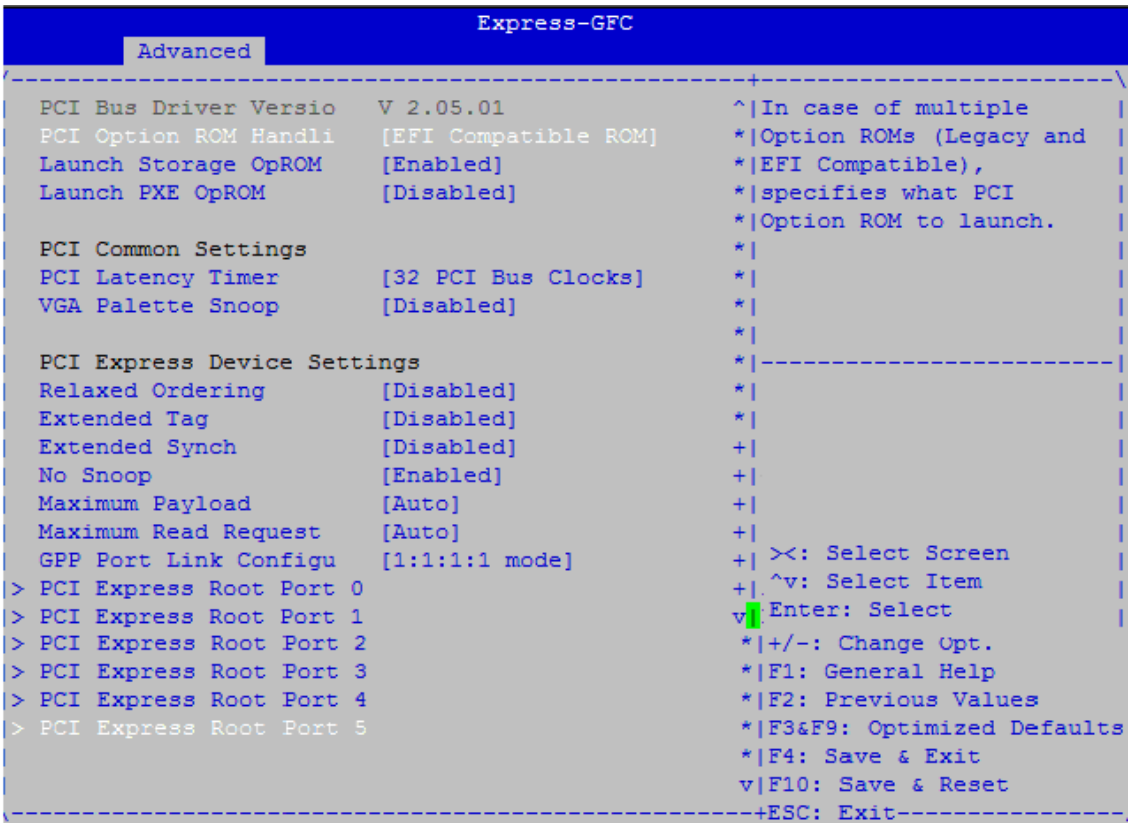
Select the I2C speed to 100, 200 or 400 KHz.

DDR 1.35V mode enable

Choose to enable or disable support for DDR 1.35V.

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9.4.5 PCI & PCI Express Configuration



PCI Option ROM Handling

Select Legacy ROM or EFI Compatible ROM

Launch Storage OpROM

Enable or disable Launch Storage OpROM.

Launch PXE ROM

Enable or disable Launch PXE ROM.

PCI Common Settings

PCI Latency Timer

Set the value to be programmed into the PCI Latency Timer Register.

VGA Palette Snoop

Enable or disable VGA Palette Register Snooping.

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PCI Express Device Settings

Relaxed Ordering

Enable or disable PCI Express Device Relaxed ordering

Extended Tag

If enabled, allows the device to use 8-bit tag field as a requester.

Extended Synch

If enabled, allows generation of Extended Synchronization patterns.

No Snoop

Enables or disables PCI Express Device No Snoop option.

Maximum Payload

Set the Maximum Payload of PCI Express Devices or allow System BIOS to select the value.

Maximum Read Request

Set the Maximum Read Request Size of PCI Express Devices or allow System BIOS to select the value.

GPP Port Link Configuration

GPP Port Link Configuration Setting.

PCI Express Root Port 0/1/2/3/4/5

PCI Express Root Port

Enable or disable the root port.

Configure PCIe Speed

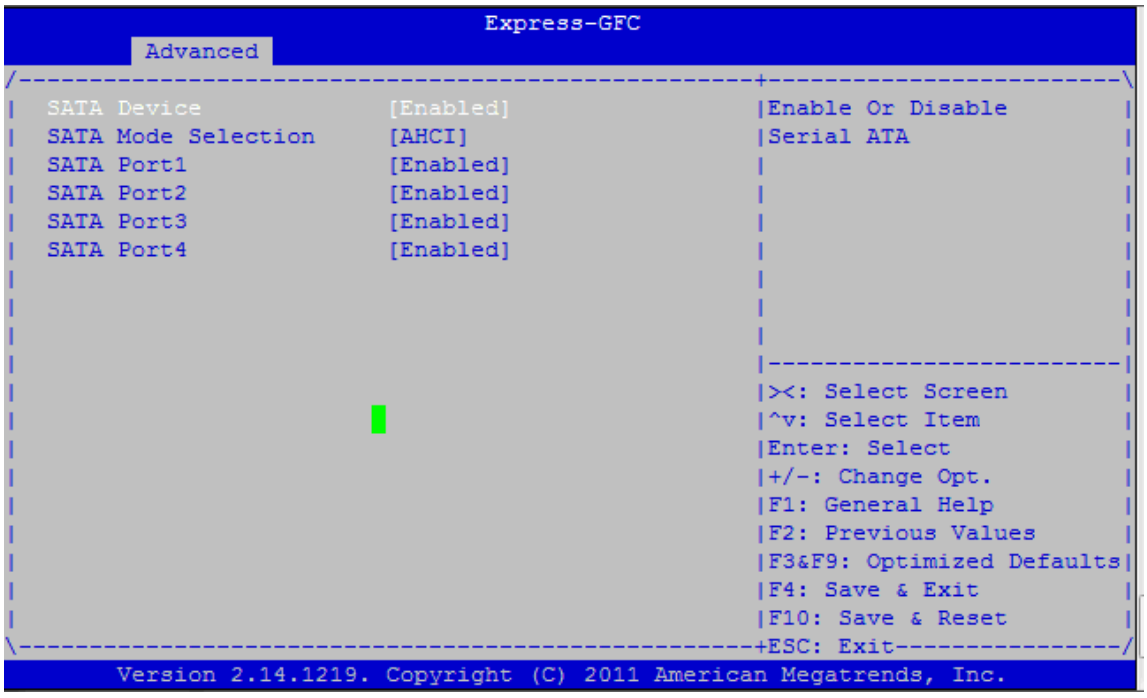
Set the PCIe Speed to Auto, Gen1 or Gen2.

HotPlug

Enable or disable the hotplug function.

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9.4.6 HDD Configuration



SATA Device

Enable or disable Serial ATA.

SATA Mode Selection

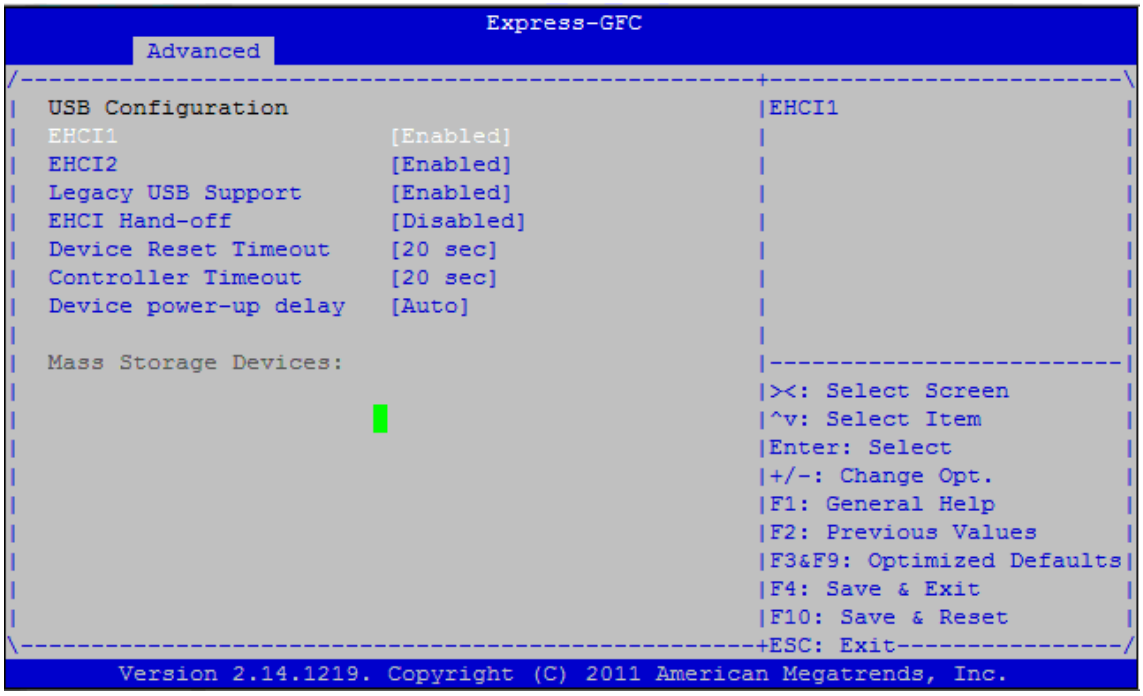
Set the SATA mode to IDE or AHCI.

SATA Port 1/2/3/4

Enable or disable SATA port 1/2/3/4.

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9.4.7 USB Configuration



EHCI1/2

Enable or disable the EHCI 1/2 controller.

Legacy USB Support

Enables and disables Legacy USB support.

EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver. Configuration options: Enable, Disable.

Device Reset Timeout

USB mass storage device Start Unit command timeout. Options: 10, 20, 30, 40 sec.

Controller Timeout

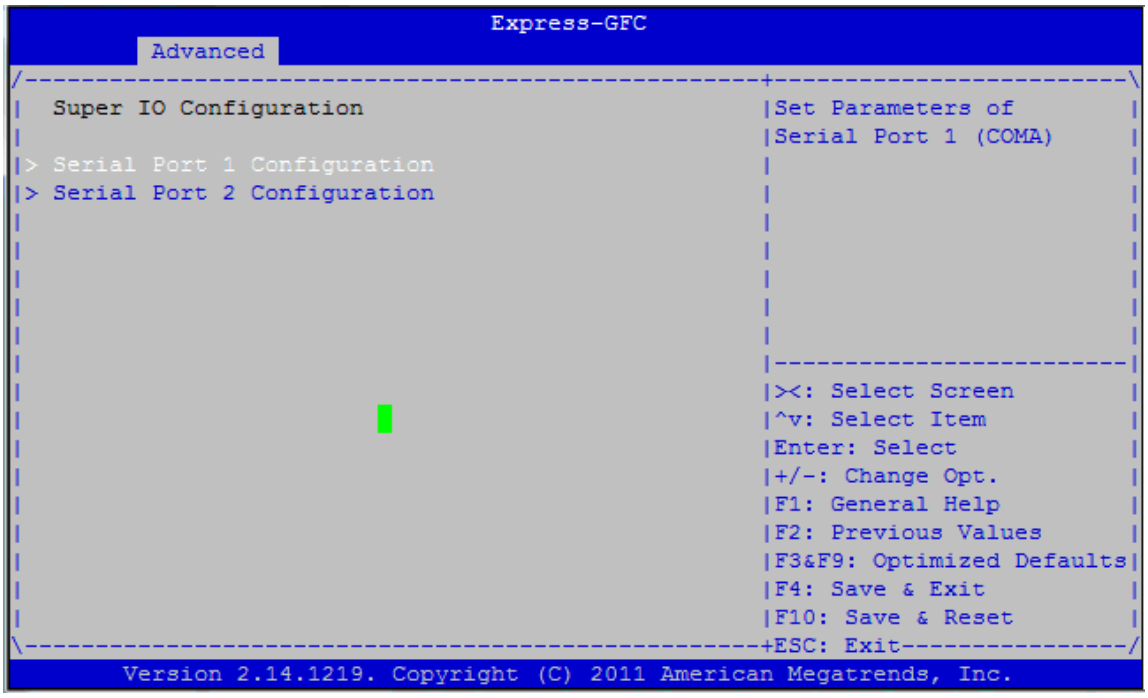
The time-out value for Control ,Bulk and Interrupt transfers.

Device Power-up Delay

Sets USB device power-up delay to Auto or Manual.

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9.4.8 Super IO Configuration



Serial Port 1/2 Configuration

Serial Port

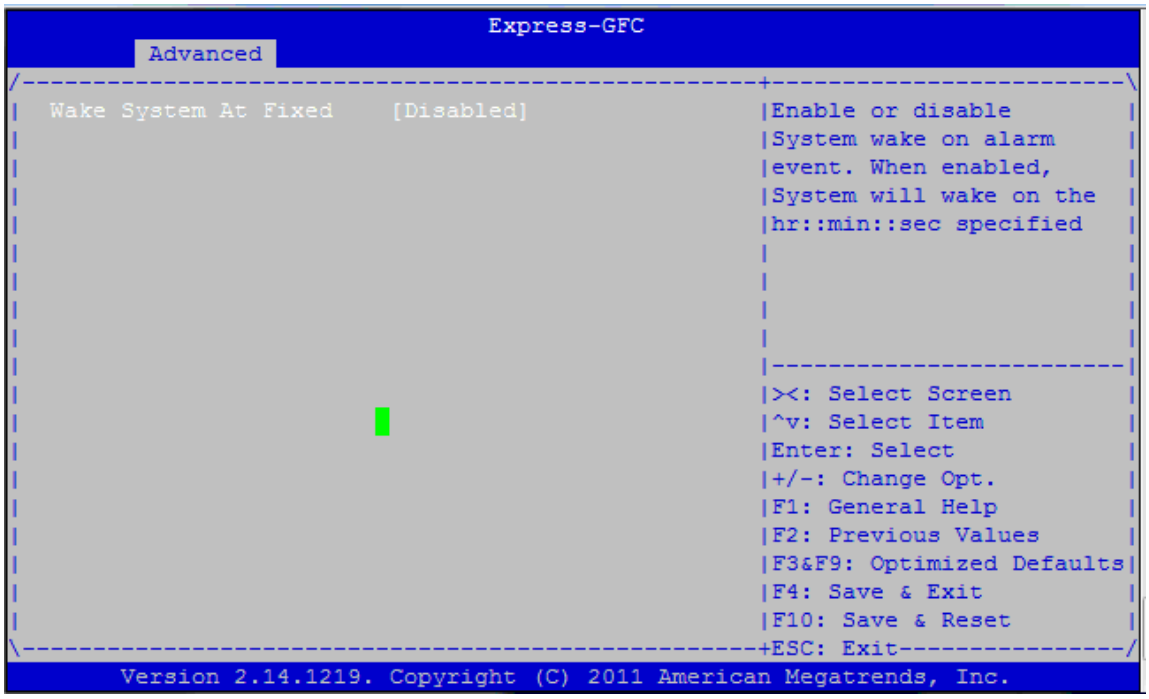
Enable or disable the serial port.

Device Settings

Displays IO port and IRQ of the device.

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9.4.9 RTC Wake Configuration

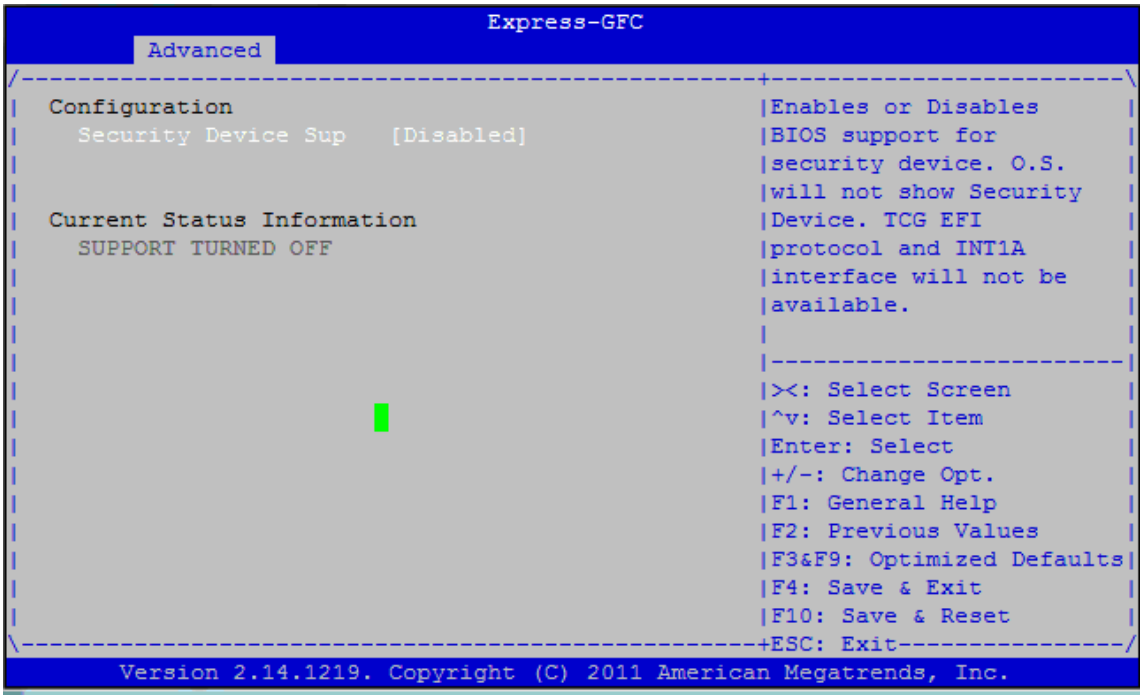


Wake System At Fixed

Enable or disable the System Wake on Alarm event. When enabled, the system will wake at the hr:min:sec specified

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9.4.10 **Trusted Computing**

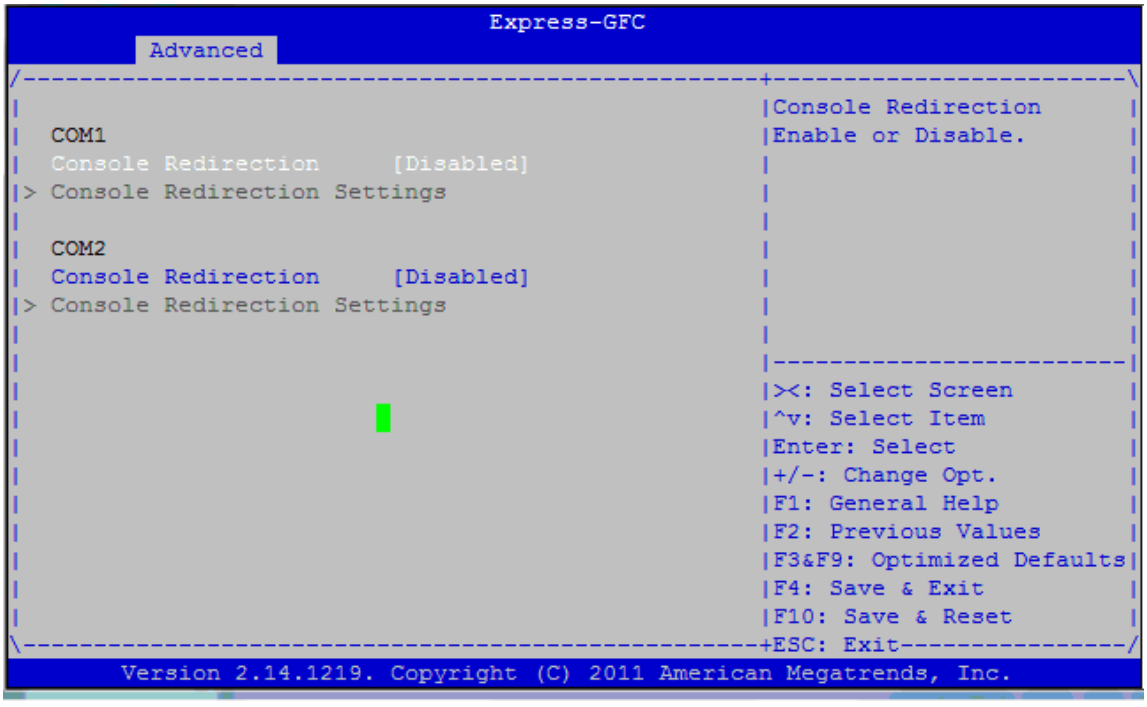


Security Device Support

Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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9.4.11 **Serial Port Console Redirection**

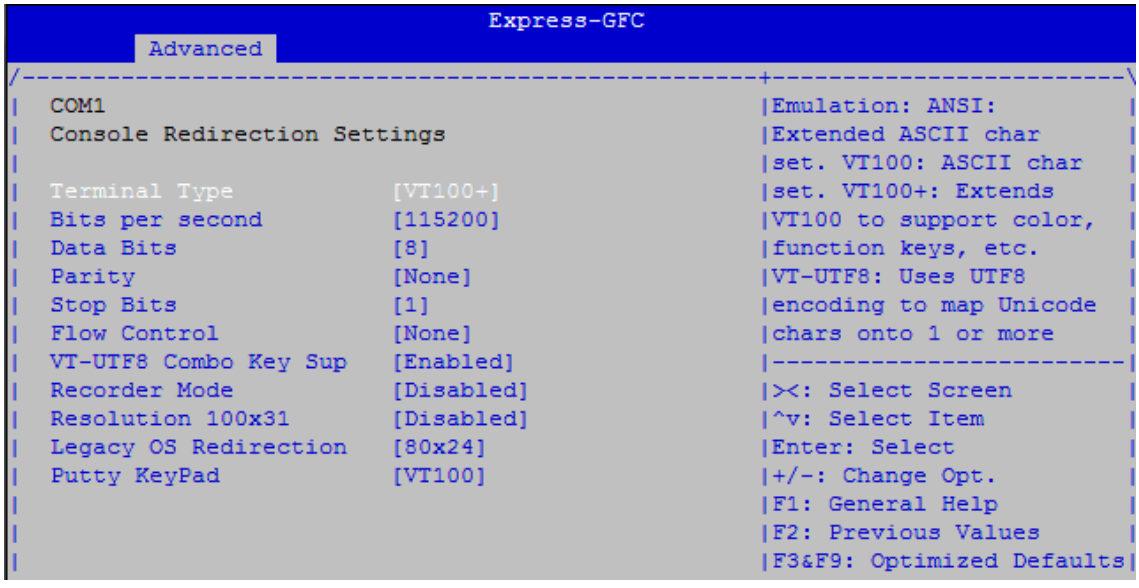


Console Redirection

Options are Enabled/Disabled.

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.



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Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. 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 ,19200, 9600.

Data Bits

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

Parity

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

Stop Bits

Stop bits indicate the end of a serial data packet. The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. Set this value to 1 or 2.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware and Software.

VT-UTF8 Combo Key Support

Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

Recorder Mode

Allows the user to enable/disable the Recorder Mode.

Resolution 100x31

Allows the user to enable/disable Resolution 100x31.

Legacy OS Redirection

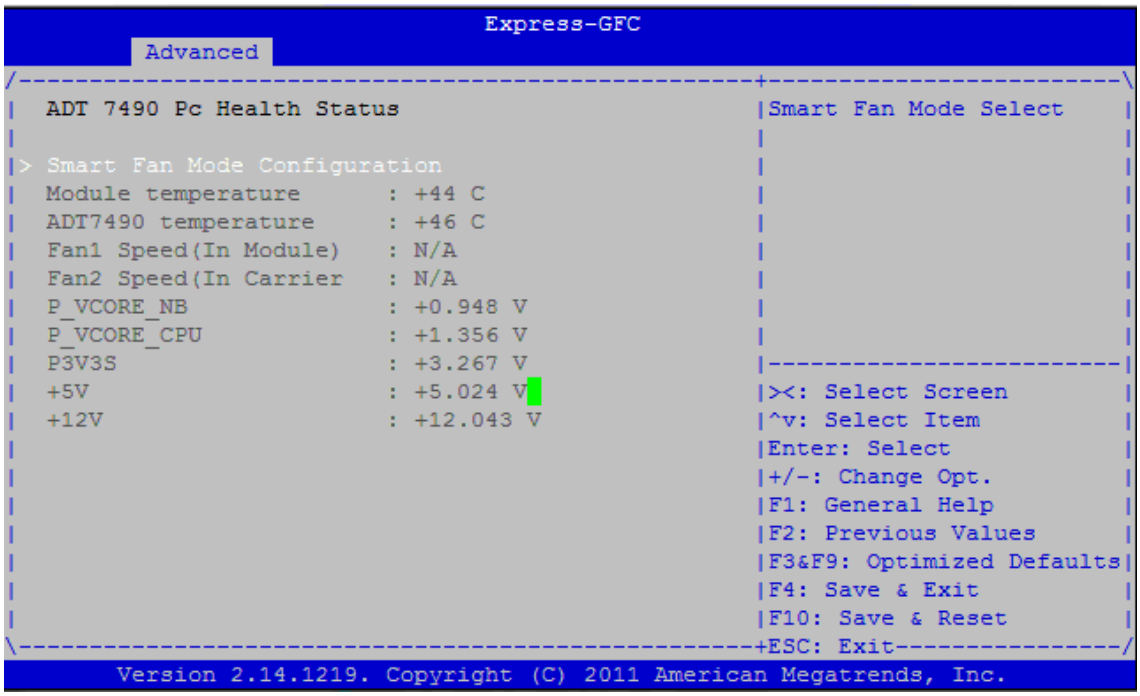
Allows the user to set Legacy OS Redirection. Options: 80x24, 80x25.

Putty KeyPad

Select Function Key and KeyPad on Putty.

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9.4.12 Hardware Health Monitor



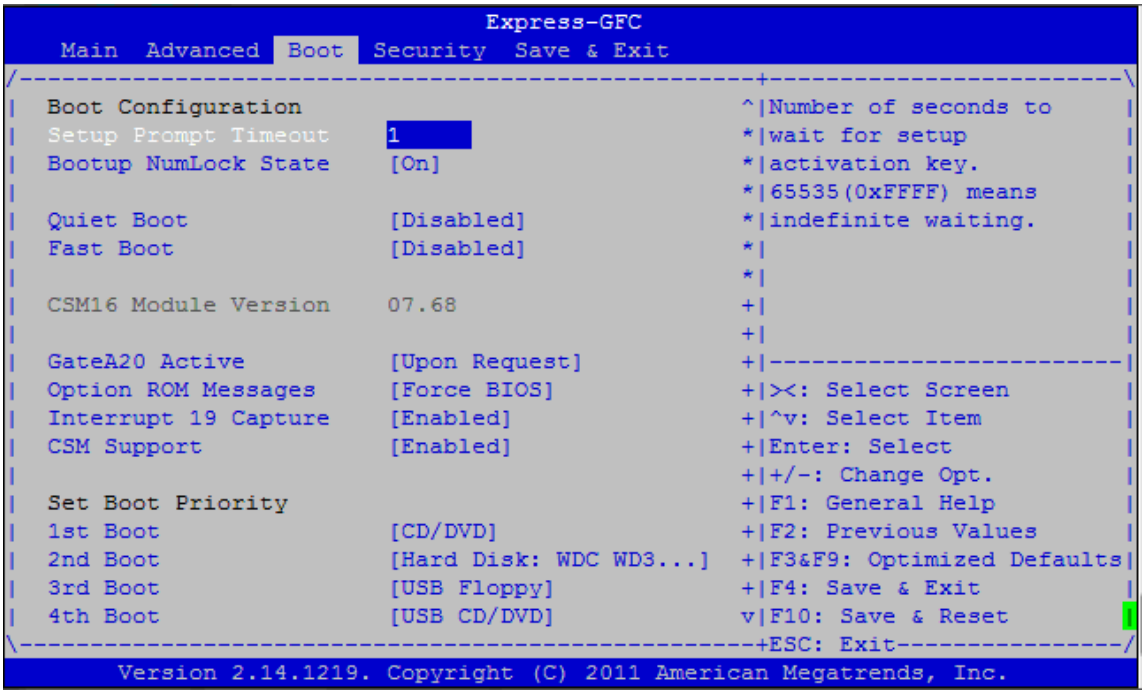
Smart Fan Mode Configuration

Fan1/2 Smart Fan Mode

Choose manual mode or auto mode controlled by the module or ADT7490.

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9.5 Boot Setup



Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535 (0xFFFF) means wait indefinitely.

Bootup Num-Lock

Set this value to allow the Number Lock setting to be modified during boot up.
Off - This option does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard will light up when the Number Lock is engaged.
On - Set this value to allow the Number Lock on the keyboard to be enabled automatically when the computer system is boot up. This allows the immediate use of 10-keys numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard will be lit.

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.

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Fast Boot

Disabled - Set this value to allow the BIOS to perform all POST tests.
Enabled - Set this value to allow the BIOS to skip certain POST tests to boot faster.

GateA20 Active

Upon Request - GA20 can be disabled using BIOS services.
Always - do not allow disabling of GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Force BIOS - Set this value to allow the system to display the Option ROM messages.
Keep Current - Set this value to not allow the Option ROM messages.

Interrupt 19 Capture

Allows option ROMs to trap Int 19. Set this value to Enabled/Disabled.

CSM Support

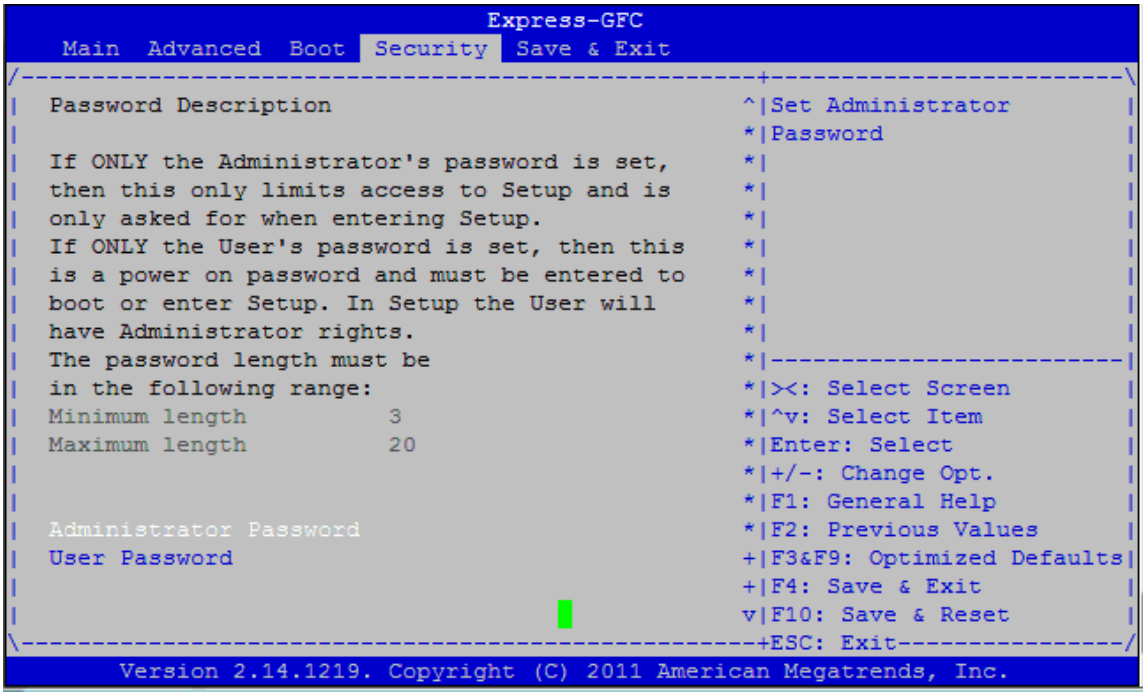
Enable/Disable CSM Support. If Auto is selected, based on OS, CSM will be enabled/disabled automatically.

Boot Option Priorities

This option sets the priorities of the boot options. The user can change the priorities by selecting the particular boot option. The device selected in Boot option #1 will be the first priority, followed by second, third and so on.

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9.6 Security Setup



Administrator Password

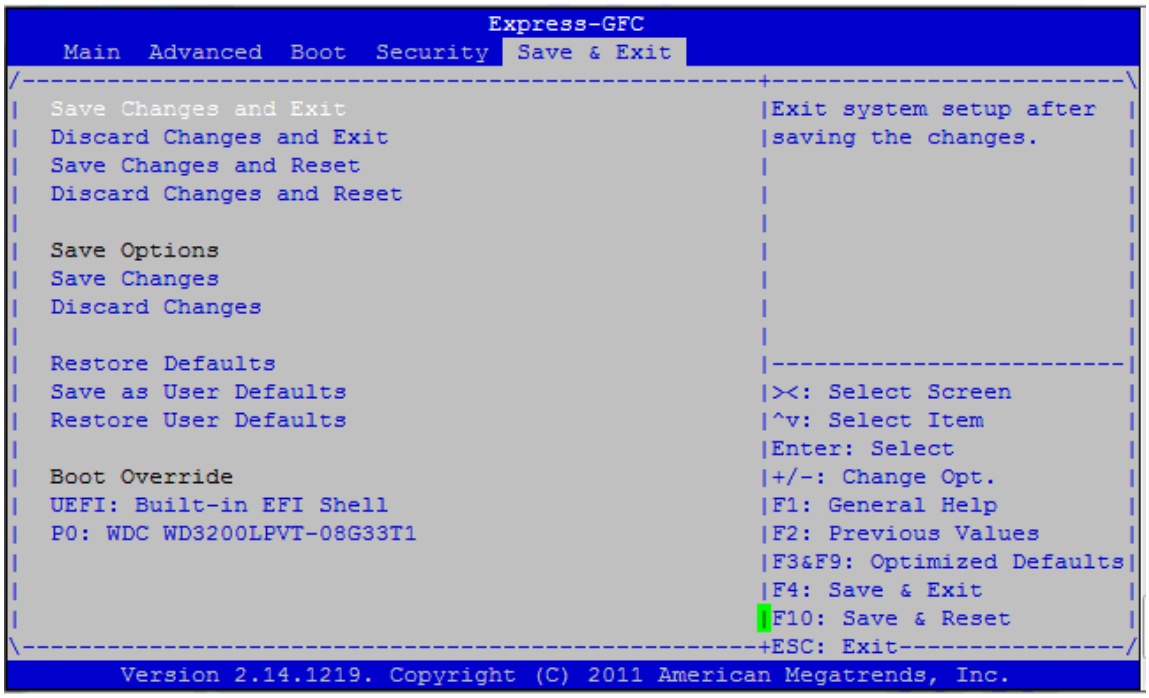
Use this option to set a password for administrators with full control of the BIOS setup utility.

User Password

Use this option to set a password for users with limited access to the BIOS setup utility.

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9.7 Save & Exit



Save Changes and Exit

When you have completed the system configuration changes, select this option to save changes and continue booting the system. New configuration parameters will take effect after the next system restart.

Discard Changes and Exit

Select this option to quit Setup without saving changes to the system configuration and continue booting.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

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Save Changes

When you have completed the system configuration changes, select this option to save your system configuration and continue. For some of the options it required to reset the system to take effect. Select YES to Save Changes and continue.

Discard Changes

Discard any unsaved changes

Restore Defaults

Restore standard default values for all the setup options.

Save as User Defaults

Save the changes made so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

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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.

- 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 by an incorrect type. Dispose of used batteries according to the instructions.

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- 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

Contact us should you require any service or assistance.

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