ADLINK TECHNOLOGY INC.

AmITX-HL-G

User's Manual

Mini-ITX Motherboard with
4th Gen Intel® Core™ i7/i5/i3 Processor
and Intel® Q87/H81 Chipset



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Revision History

Revision	Description	Date	By
1.00	Initial release	2015-11-24	JC
1.01	Correct Front Panel CN26 connector information	2016-03-04	JC

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Preface

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1. Introduction

The AmITX-HL-G is a Mini-ITX motherboard supporting the Desktop 4th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor with Intel® Q87/H81 Chipset. The AmITX-HL-G is specifically designed for customers who need high-level processing and graphics performance with a long product life solution.

The AmITX-HL-G features three DisplayPorts, dual Gigabit Ethernet ports, USB 3.0 ports, USB 2.0 ports, SATA 6 Gb/s ports, and High Definition Audio with 7.1 channels. Expansion is provided by one PCIe x16, one PCIe x1, and two mini-PCIe slots. The onboard feature connector provides GPIO, SMBus, and I²C support. The board is equipped with SPI AMI EFI BIOS, supporting embedded features such as hardware monitor and watchdog timer.

Available Models

Model Number	Chipset
AmITX-HL-G-Q87	Q87
AmITX-HL-G-H81	H81

Latest revision of the datasheet, user's manual, BIOS, drivers, and board support packages, can be downloaded from the product webpage: http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1446.

1.1. Packing List

- AmITX-HL-G Mini-ITX motherboard
- ATX/AT power cable (P/N: 30-20872-0000)
- SATA dual power cable (P/N: 30-20875-0000)
- SATA cable (P/N: 30-10057-0600)
- Rear I/O shield (P/N: 34-25314-0000)

1.2. Optional Accessories

- COM port cable, 1 port (P/N: 30-20876-0000)
- PS/2 KB/MS cable (P/N: 30-20873-0000)
- USB 2.0 cable, 2 ports (P/N: 30-20874-1000)

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2. Specifications

2.1. Core System

- CPU: Desktop 4th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, Socket H3, LGA1150 package
  - Core™ i7-4770S Processor, 3.1 GHz, 4C, 65W
  - Core™ i7-4770TE Processor, 2.3GHz, 4C, 45W
  - Core™ i5-4570S Processor, 2.9 GHz, 4C, 65W
  - Core™ i5-4570TE Processor, 2.7 GHz, 2C, 35W
  - Core™ i3-4330 Processor, 3.5 GHz, 2C, 54W
  - Core™ i3-4330TE Processor, 2.4 GHz, 2C, 35 W
  - Pentium® G3420 Processor, 3.2GHz, 2C, 3M, 54W
  - Pentium® G3320TE Processor, 2.3GHz, 2C, 3M, 35W
  - Celeron® G1820 Processor, 2.7GHz, 2C, 2M, 54W
  - Celeron® G1820TE Processor, 2.2GHz, 2C, 2M, 35W

  "Haswell Refresh"
  - Core™ i7-4790S Processor, 3.2GHz, 4C, 8M, 65W
  - Core™ i5-4590S Processor, 3.0GHz, 4C, 4M, 65W
  - Core™ i3-4360 Processor, 3.7GHz, 2C, 4M, 54W
  - Core™ i3-4350T Processor, 3.1GHz, 2C, 4M, 35W
- Chipset: Intel® Q87/H81 Chipset
- Memory: Dual channel non-ECC 1333/1600 MHz DDR3/DDR3L(1.5V support) memory up to 16GB in dual stacked SODIMM sockets
- Embedded BIOS: AMI EFI in 16MB/8MB(Q87/H81) SPI BIOS

2.2. Rear I/O Connectors

- Display: 3x DisplayPort
- LAN: Dual GbE RJ-45
- USB: 4x USB 3.0, 4x USB 2.0 (Q87); 2x USB 3.0, 6x USB 2.0 (H81)
- Audio: 7.1 channel audio via 5 jacks and S/PDIF output on rear I/O

2.3. Internal Headers and Connectors

- PCI Express: PCIe x16 (Gen3), PCIe x1 (Gen2)
- 2x Mini PCIe: one PCIe+USB (top side); one PCIe+USB or mSATA by jumper setting (bottom side)
- USB: 2x USB 2.0 via onboard header, 2x USB 2.0 via front panel connector, one vertical USB 2.0 port
- SATA: 3x SATA ports (Q87 supports 3x SATA 6 Gb/s, H81 supports 2x SATA 6 Gb/s, 1x SATA 3 Gb/s)
- SATA Power Connector
- Serial: 3x RS-232 headers, 1x RS-232/422/485 headers with 5V power (12V by BOM option)
- LVDS (optional): Supports non-EDID type LCD panels only
- Front Panel Header
- Audio Header
- Feature Connector Header

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- PS/2 KB/MS Connector
- SPI Header
- ATX Power Connector

2.4. Form Factor

- Mini-ITX: 170mm x 170mm

2.5. SEMA Board Controller

- ADLINK Smart Embedded Management Agent (SEMA)
  - Voltage/Current monitoring
  - Power sequence debug support
  - AT/ATX mode control
  - Logistics and Forensic information
  - Flat Panel Control
  - General Purpose I2C
  - Failsafe BIOS (dual BIOS)
  - Watchdog Timer and Fan Control

2.6. Debug Header

- 40-pin Multipurpose Flat Cable Connector:, used in combination with DB-40 debug module providing BIOS POST code LED, BMC access, SPI BIOS flashing, Power Testpoints, Debug LEDs

2.7. Video

- GPU Feature Support
  - Intel® HD Graphics 4600 supports DirectX11.1, OpenGL 3.2 and OpenCL 1.2; triple simultaneous display output on Q87 and dual simultaneous display output on H81

- Display Interface support
  - 3x DisplayPort v1.2 with resolution up to 3840 x 2160 @ 60Hz
  - LVDS (optional): Supports non-EDID type LCD panels only; Single/Dual Channel 18 and 24-bit; 1920 x 1200 @ 60 Hz resolution in dual LVDS bus mode

2.8. Audio

- Integrated: Intel® HD Audio on chipset
- Audio Codec: ALC886

2.9. LAN

- Intel PHY: Intel® i218LM (PHY) Ethernet controller
  - Supports Intel® AMT 9.0 on Q87
  - Supports Intel® vPro™ on Q87

- Intel MAC/PHY: Intel® i211AT (MAC/PHY) Ethernet controller
- Interface: 10/100/1000 GbE connection

2.10. Trusted Platform Module (TPM)

- Chipset: Atmel AT97SC3204 (optional)
- Type: TPM1.2

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2.11. Power Specification

- Power Modes: AT and ATX mode (AT mode start controlled by BMC)
- Standard Voltage Input: ATX = 12V ±5%, 5Vsb ±5% or AT = 12V ±5%
- Power Management: ACPI 4.0 compliant
- Power States: Supports C1-C6, S0, S1, S4, S3, S5, (Wake-on-USB S3/S4, WoL S3/S4/S5)

2.12. Temperatures

- Operating Temperature: 0°C to 60°C
- Storage Temperature: -20°C to 80°C

2.13. Environmental

- Humidity: 10-90% RH operating, non-condensing
  5-95% RH storage (and operating with conformal coating)
- Shock and Vibration: IEC 60068-2-64 and IEC-60068-2-27
  MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D
- HALT: Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

2.14. Operating Systems

- Standard Support: Windows 7/8 32/64-bit, Linux 32/64-bit
- Extended Support (BSP): WES7, WE8S, Linux, VxWorks

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2.15. Power Consumption

System Configuration	
Memory Slot1	Kingston 8G KVR16LS11/8 DDR3L SODIMM (1600MHZ)
Memory Slot2	Kingston 8G KVR16LS11/8 DDR3L SODIMM (1600MHZ)
Graphics	Intel® HD Graphics 4600
HDD	ADLink ASD26-MT1064-CT SSD 64GB
Monitor	Hanns.G HZ222
Cooler	CoolJag JYC9L06AGC-A
Power Supply	FSP Group INC. FSP600-80PSA 600W
Video Resolution	1920 x 1080 x32bit
BIOS	1.06
FW	2v0
Utility	PassMark BurnInTest 7.1

- Intel® Core™ i7-4770S 3.1GHz (65W)

Power State	BIOS EIST/C-state Enabled		BIOS EIST/C-state Disabled	
	Current (A)/Voltage (V)	Power (W)	Current (A)/Voltage (V)	Power (W)
S1(1)	N/A	N/A		
S3	0.29/5.01	1.45		
S5(2)	0.21/5.01	1.05		
Windows 7 (Idle)	1.22/12.05	14.70	1.37/12.13	16.62
Windows 7 (Typical)	5.21/12.02	62.62	4.32/12.06	52.10
Windows 7 (Max loading)	7.56/11.96	90.42	7.41/11.96	88.62

Notes: (1) ACPI/S1 mode not supported by BIOS.
(2) ECO mode not supported by BIOS.

- Intel® Core™ i5-4570S Processor 2.9GHz (65W)

Power State	BIOS EIST/C-state Enabled		BIOS EIST/C-state Disabled	
	Current (A)/Voltage (V)	Power (W)	Current (A)/Voltage (V)	Power (W)
S1(1)	N/A	N/A		
S3	0.23/5.01	1.15		
S5(2)	0.16/5.01	0.80		
Windows 7 (Idle)	1.18/12.05	14.22	1.32/12.09	15.96
Windows 7 (Typical)	3.63/12.06	43.78	3.25/12.08	39.26
Windows 7 (Max loading)	7.27/11.96	86.95	6.66/11.97	79.72

Notes: (1) ACPI/S1 mode not supported by BIOS.
(2) ECO mode not supported by BIOS.

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- Intel® Core™ i3-4330 Processor 3.5GHz (54W)

Power State	BIOS EIST/C-state Enabled		BIOS EIST/C-state Disabled	
	Current (A)/Voltage (V)	Power (W)	Current (A)/Voltage (V)	Power (W)
S1(1)	N/A	N/A		
S3	0.18/5.06	0.91		
S5(2)	0.14/5.06	0.71		
Windows 7 (Idle)	1.08/12.1	13.07	1.18/12.1	14.28
Windows 7 (Typical)	3.62/12.09	43.77	3.13/12.16	38.06
Windows 7 (Max loading)	6.04/12.09	73.02	5.92/12.04	71.28`

Notes: (1) ACPI/S1 mode not supported by BIOS.
(2) ECO mode not supported by BIOS.

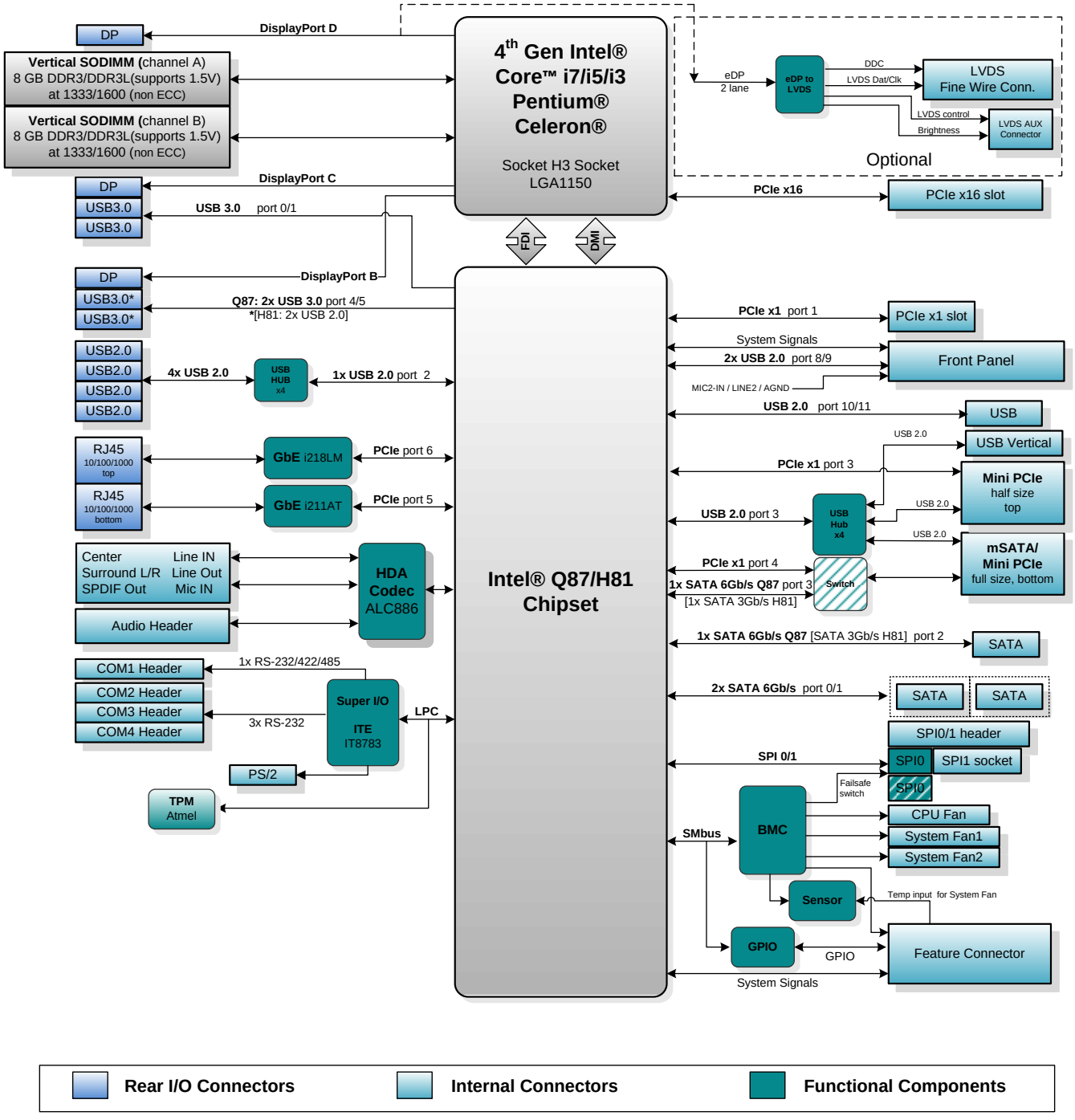
- Intel® Pentium® Processor G3420 3.2GHz (53W)

Power State	BIOS EIST/C-state Enabled		BIOS EIST/C-state Disabled	
	Current (A)/Voltage (V)	Power (W)	Current (A)/Voltage (V)	Power (W)
S1(1)	N/A	N/A		
S3	0.18/5.06	0.91		
S5(2)	0.17/5.06	0.86		
Windows 7 (Idle)	1.07/12.1	12.95	1.17/12.1	14.16
Windows 7 (Typical)	2.52/12.18	30.69	2.43/12.18	29.6
Windows 7 (Max loading)	4.73/12.08	57.14	4.75/12.08	57.38

Notes: (1) ACPI/S1 mode not supported by BIOS.
(2) ECO mode not supported by BIOS.

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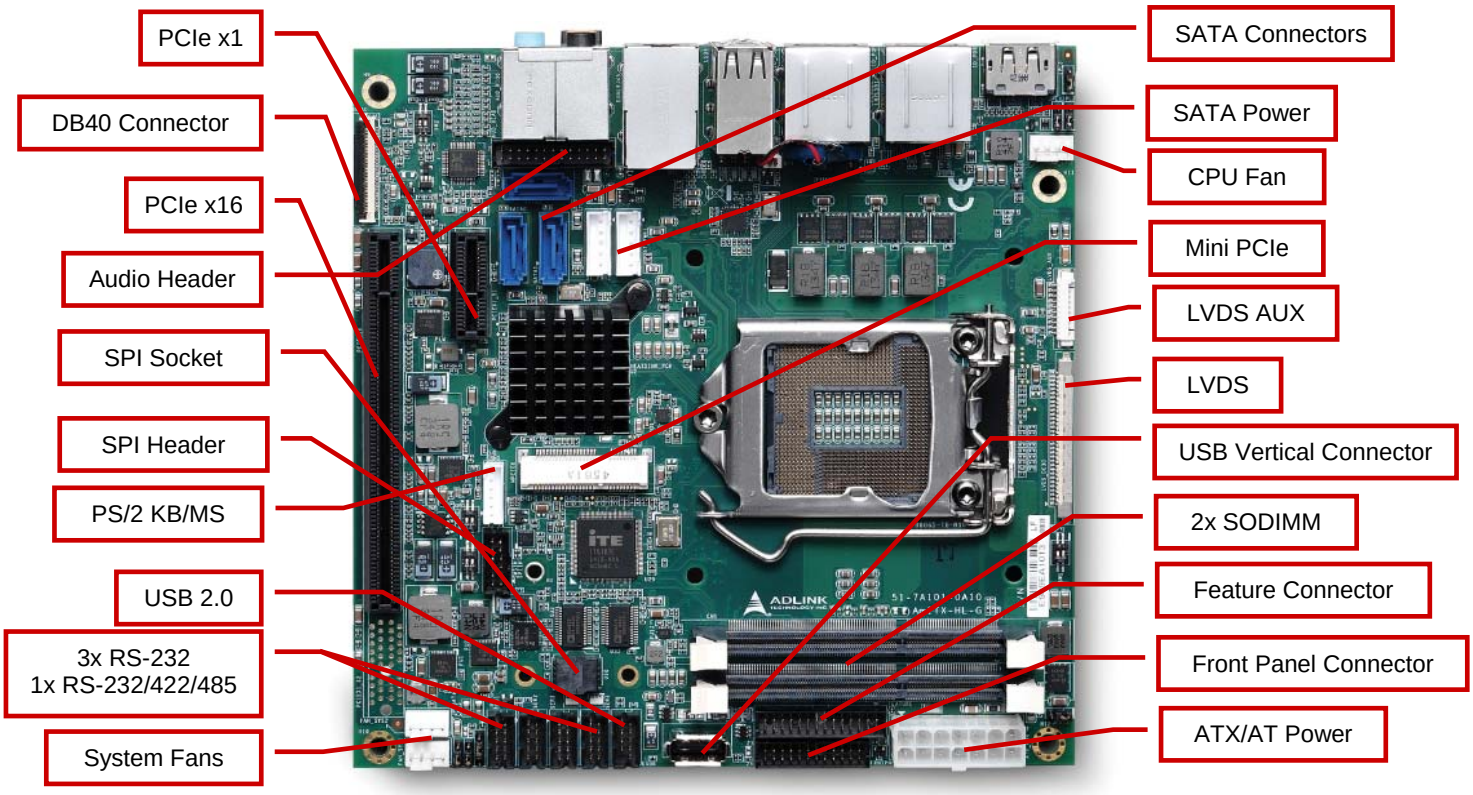
2.16. Functional Diagram



3. Mechanical Layout

3.1. Connector Locations

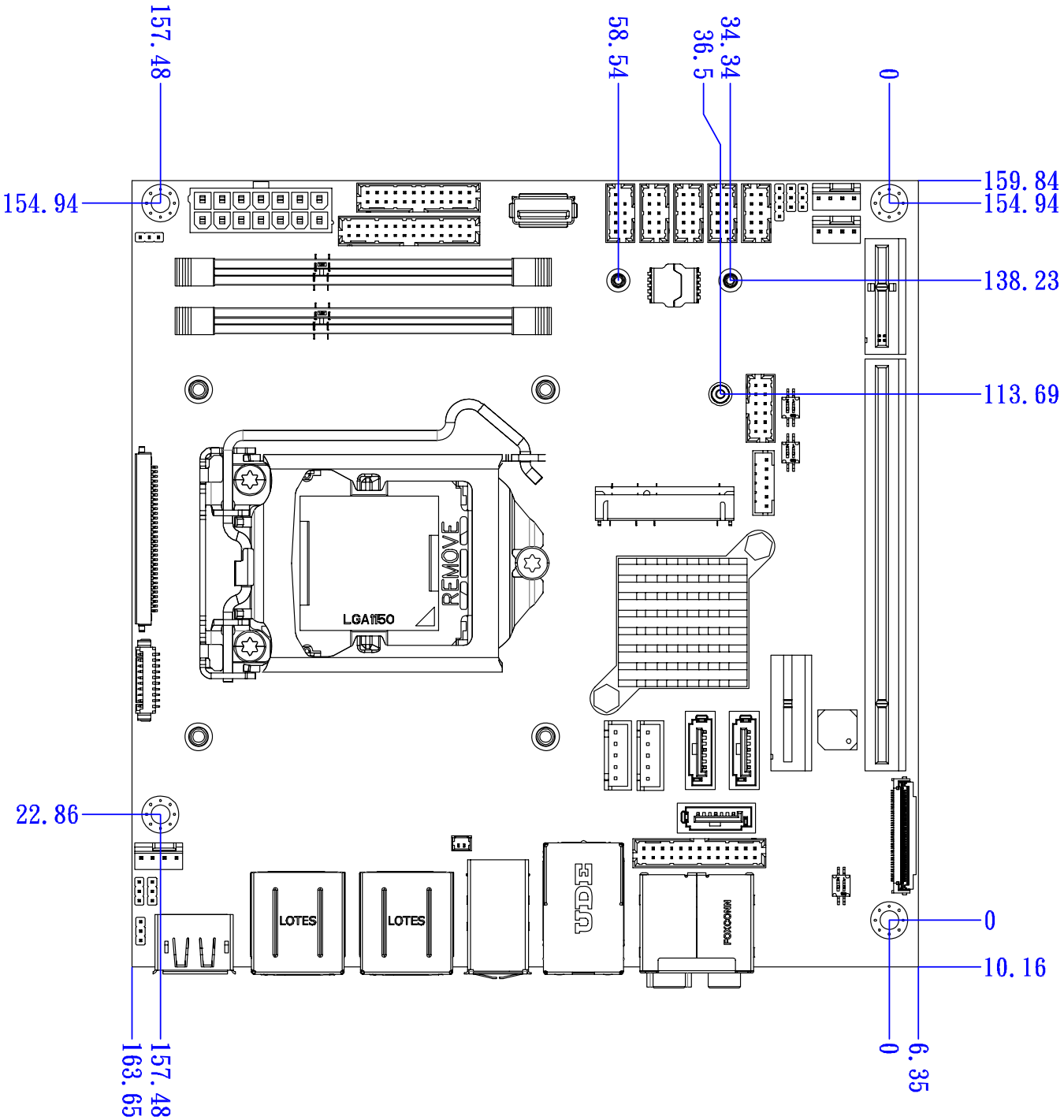




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3.2. Mechanical Dimensions

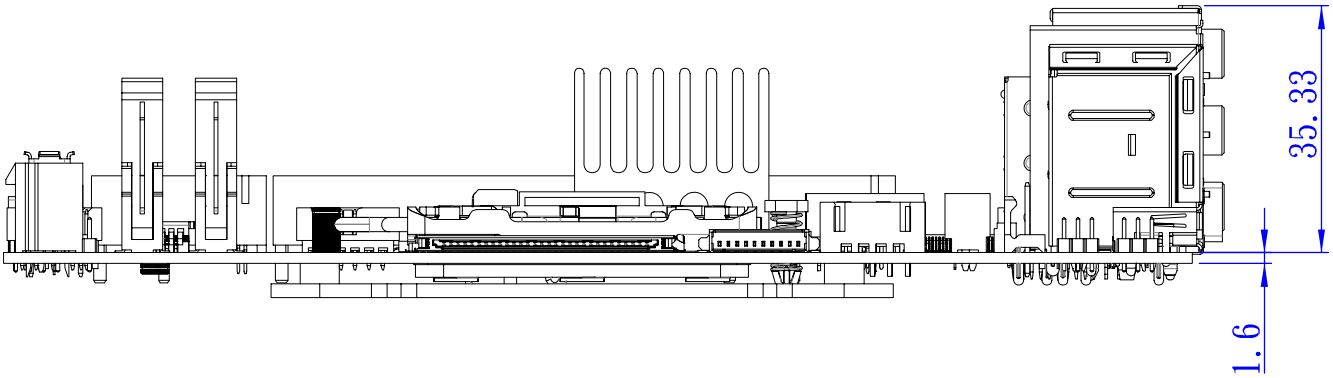
Top View



Dimensions: mm

All tolerances ±0.2mm

Side View

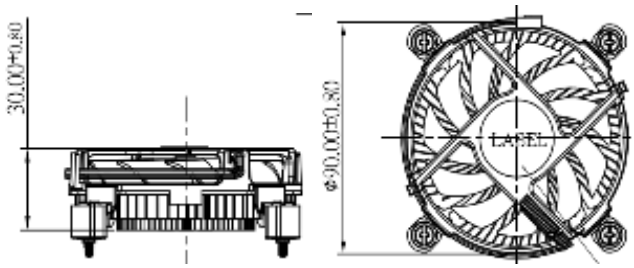
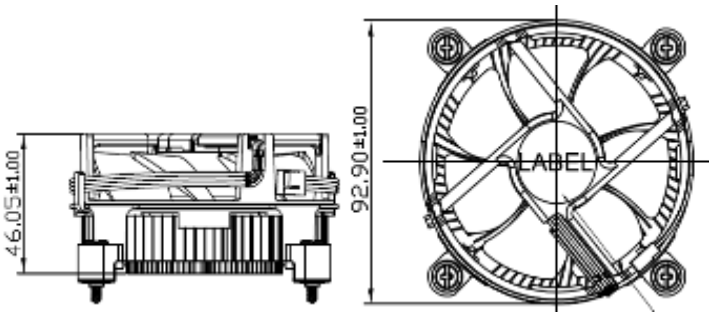
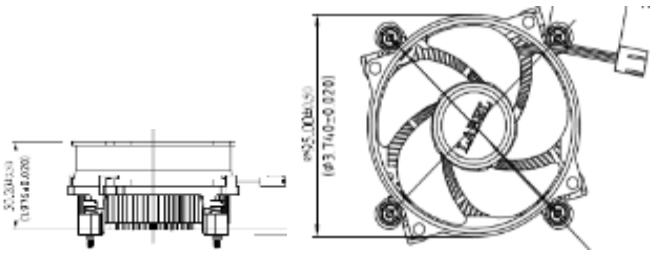


Dimensions: mm

All tolerances ±0.2mm

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3.3. Thermal Solutions

LGA1150 CPU Cooler, H=30.0mm, 45W Standard Temp.: 0°C to 60°C P/N: 32-20513-0000	
LGA1150 CPU Cooler, H=46.05mm, 45W Standard Temp.: 0°C to 60°C P/N: 32-20512-0000	
LGA1150 CPU Cooler, H=50.2mm, 95W Standard Temp.: 0°C to 60°C P/N: 32-20113-0000	
LGA1150 CPU Cooler, H=61.4mm, 95W Standard Temp.: 0°C to 60°C P/N: 32-20495-0000	

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4. Connectors and Jumpers

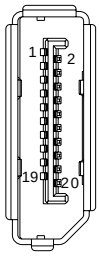
See 3.1 Connector Locations on page 14 for connector locations.

4.1. Rear IO Connectors

4.1.1. DisplayPort

Three DisplayPort v1.2 specification ports up to 3840x2160 @ 60 Hz.

Pin #	Signal	Pin #	Signal
1	CN_DP0_P	2	Ground
3	CN_DP0_N	4	CN_DP1_P
5	Ground	6	CN_DP1_N
7	CN_DP2_P	8	Ground
9	CN_DP2_N	10	CN_DP3_P
11	Ground	12	CN_DP3_N
13	CN_CAD-L	14	CN_CEC
15	CN_AUX_P	16	Ground
17	CN_AUX_N	18	DDP_HPD
19	Ground	20	P3V3

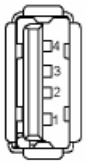


4.1.2. USB Connectors

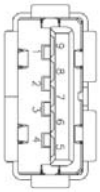
Q87: 4x USB 3.0, 4x USB 2.0 [H81: 2x USB 3.0, 6x USB 2.0]

- 5V supply for external devices;
- 5Vsb is supplied during power down to allow wakeup on USB device activity during S3~S4 state
- 1.5A for device power supply protected by a resettable 2A fuse

Pin #	Signal
1	Vcc
2	UV0-
3	UV0+
4	GND



Pin #	Signal
1	USB3.0_P5VA
2	USB2_CMAN
3	USB2_CMAP
4	GND
5	USB3A_CMRXN
6	USB3A_CMRXP
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP

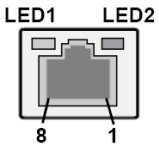


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4.1.3. Ethernet Connectors (LAN1, LAN2)

Dual 10/100/1000Mbit/s LAN Ethernet controllers based on Intel® i218LM/i211AT, support PXE and WOL over both LANs.

Pin #	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	LAN_MDI0+
2	TX-	LAN_MDI0-
3	RX+	LAN_MDI1+
4	--	LAN_MDI2+
5	--	LAN_MDI2-
6	RX-	LAN_MDI1-
7	--	LAN_MDI3+
8	--	LAN_MDI3-



LED1 (Speed)		LED2 (Link/Activity)	
Status	Description	Status	Description
Off	10 Mb connection	Off	No Link
Green	100 Mb connection	Orange	Linked
Orange	1 Gb connection	Blinking	Data Activity

4.1.4. Audio Connectors

- 7.1 channel audio via 5 jacks and S/PDIF output on rear I/O
- Intel® High Definition Audio on chipset
- Realtek ALC886 codec

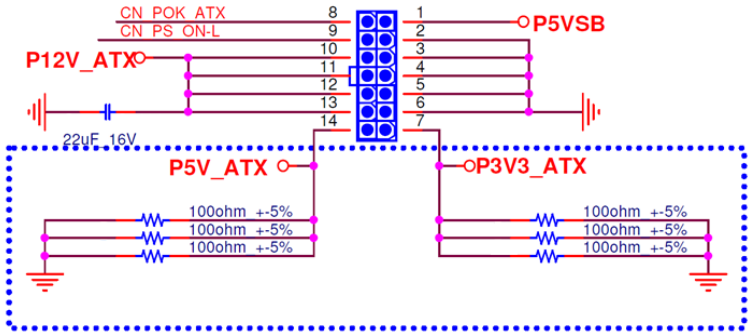
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4.2. Internal Connectors

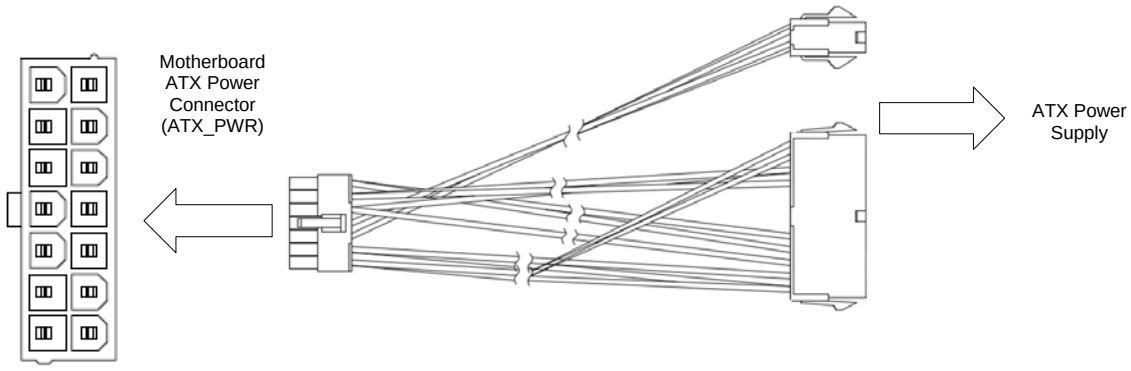
4.2.1. ATX Power Connector (ATX_PWR, proprietary)

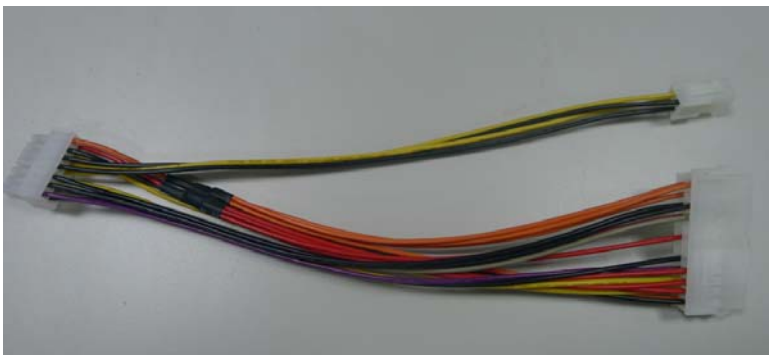
AmITX-HL-G supports a proprietary internal ATX Power Connector (ATX_PWR). An adapter cable is provided for connection to a standard ATX power supply.

Pin #	Signal	Pin #	Signal
1	SB5V	8	P_OK
2	GND	9	PS_ON#
3	GND	10	+12V
4	GND	11	+12V
5	GND	12	+12V
6	GND	13	+12V
7	3.3V	14	+5V



ATX Adapter Cable: ADLINK Part. No. 30-20872-0000 (length 250 mm)





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4.2.2. SATA Connectors (SATA0/1/2)

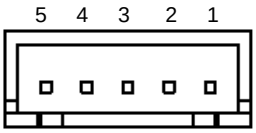
Three SATA 6 Gbps ports are available on the AmITX-HL-G (H81: 2x SATA 6 Gbps and 1x SATA 3 Gbps).

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

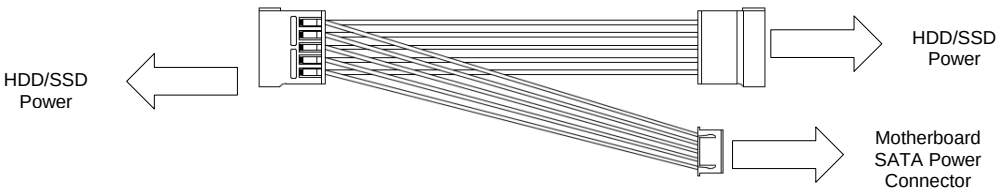


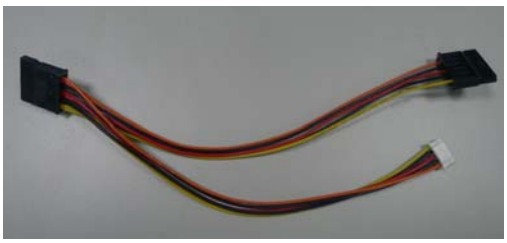
4.2.3. SATA Power Connector (ST_PWR1/2)

Pin #	Signal
1	12V
2	GND
3	5V
4	GND
5	3.3V



SATA Power Cable: ADLINK Part. No.: 30-20875-0000 (length 200 mm)

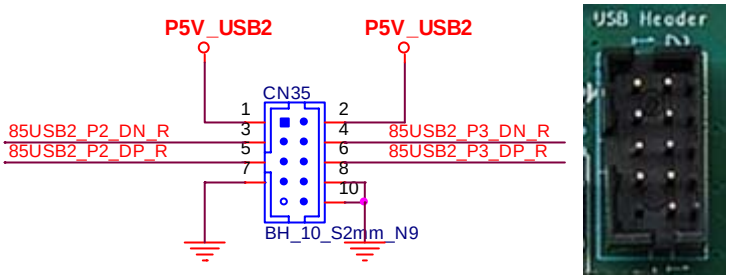




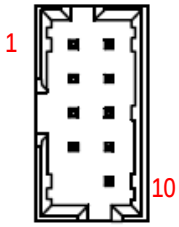
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4.2.4. USB Header

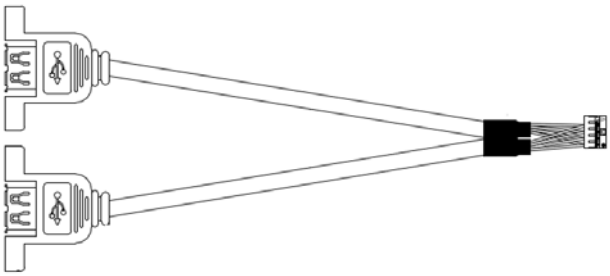
5V/SB5V: 5V supplies for external devices. SB5V is supplied during power down to allow wakeup on USB device activity during S3~S4 state.



Pin #	Signal	Pin #	Signal
1	P5V_USB	2	P5V_USB
3	P2_DN_R-	4	P3_DN_R
5	P2_DP_R	6	P3_DP_R
7	GND	8	GND
9	KEY	10	GND



USB Cable (optional):
USB 2.0 Header to 2x Female Type-A Cable (length 200mm), P/N: 30-20874-1000

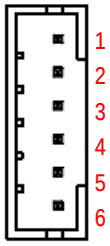


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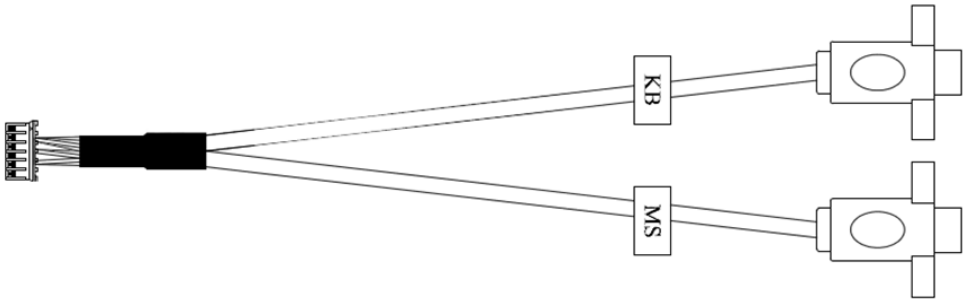
4.2.5. PS/2 Keyboard and Mouse Connector

6 pin 2.0 pitch standard wafer connector. No support for PS/2 KB/MS wake function

Pin #	Signal
1	MSCLK
2	V5S_S3
3	MSDATA
4	GND
5	KBDATA
6	KBCLK



KB/MS Cable (optional):
PS/2 KB/MS Cable (length 400mm), P/N: 30-20873-0000

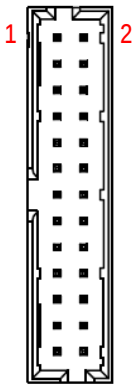


4.2.6. Internal Audio Connector

2x13-pin 2.0 pitch standard wafer connector.

Note: Signals shared with Audio Connector on Rear I/O.

Signal	Pin #	Pin #	Signal
LFE-OUT	1	2	CEN-OUT
AAGND	3	4	AAGND
FRONT-OUT-L	5	6	FRONT-OUT-R
AAGND	7	8	AAGND
REAR-OUT-L	9	10	REAR-OUT-R
SIDE-OUT-L	11	12	SIDE-OUT-R
AAGND	13	14	AAGND
MIC1-L	15	16	MIC1-R
AAGND	17	18	AAGND
LINE1-L	19	20	LINE1-R
MUTE	21	22	AAGND
GND	23	24	NC
SPDIF-OUT	25	26	GND

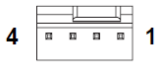


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4.2.7. CPU Fan and System Fan Connectors

Pin 3 and 4 are connected (monitored and managed) by SEMA controller.

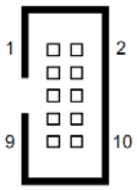
Pin #	Signal
1	GND
2	Fan Power (+12V)
3	Fan Sense
4	Fan Speed Control



4.2.8. Serial COM Port Connectors

Four internal Serial Ports (SER1-4)

Serial Port	Functions
SER1	Supports RS-232 / RS-422 / RS-485, 5V/12V power support by jumper select (JPS3P, default NC). SWS1M: Switch for mode selection of SER1 (default RS-232).
SER2	Supports RS-232 only
SER3	Supports RS-232 only
SER4	Supports RS-232 only



RS-232

Pin #	Signal	Pin #	Signal
1	DCD	2	DSR
3	RxD	4	RTS
5	TxD	6	CTS
7	DTR	8	RI
9	GND	10	5V / 12V

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RS-422 (SER1 only)

Pin #	Signal	Pin #	Signal
1	Tx-	2	Tx+
3	Rx+	4	Rx-
5	—	6	—
7	—	8	—
9	GND	10	5V / 12V

RS-485 (SER1 only)

Pin #	Signal	Pin #	Signal
1	Tx/Rx-	2	Tx/Rx+
3	—	4	—
5	—	6	—
7	—	8	—
9	GND	10	5V / 12V

SER1 Mode Switch (SWS1M)

SWS1M (SER1 MODE SEL)			
	RS-232 (default)	RS-422	RS-485
1	ON	ON	OFF
2	OFF	ON	ON

Note: See Section 4.3.5COM Port (SER1) Power Selection (JPS3P)

COM Cable (optional):
COM Port Cable (length 250mm), P/N: 30-20876-0000



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4.2.9. LVDS Connector

FFC Connector : Female, 30pin, 1mm pitch. (JAE, FI-X30SSLA-HF)
Supports non-EDID type LCD panels.

Signal	Description
LVDS A0..A3	LVDS A Channel data
LVDS ACLK	LVDS A Channel clock
LVDS B0..B3	LVDS B Channel data
LVDS BCLK	LVDS B Channel clock
VDD ENABLE	Output Display Enable.
LCDVCC	VCC supply to the display. Power-on/off sequencing depending on selected display type in the BIOS Setup. Switchable by jumper either 3.3V (default) or 5V. Maximum load is 1A total for both voltages.
DDC CLK	DDC Channel Clock
DDC DAT	DDC Channel Data

Note	Type	Signal	Pin #	Pin #	Signal	Type	Note
	LVDS	LVDS A0-	1	16	LVDS B1+	LVDS	
	LVDS	LVDS A0+	2	17	POWER GND	PWR	Max. 0.5A
	LVDS	LVDS A1-	3	18	LVDS B2-	LVDS	
	LVDS	LVDS A1+	4	19	LVDS B2+	LVDS	
	LVDS	LVDS A2-	5	20	LVDS BCLK-	LVDS	
	LVDS	LVDS A2+	6	21	LVDS BCLK+	LVDS	
Max. 0.5A	PWR	POWER GND	7	22	LVDS B3-	LVDS	
	LVDS	LVDS ACLK-	8	23	LVDS B3+	LVDS	
	LVDS	LVDS ACLK+	9	24	POWER GND	PWR	Max. 0.5A
	LVDS	LVDS A3-	10	25	DDC DATA	OT	PU 2K2Ω, 3.3V
	LVDS	LVDS A3+	11	26	VDD ENABLE	OT	3.3V level
	LVDS	LVDS B0-	12	27	DDC CLK	OT	PU 2K2Ω, 3.3V
	LVDS	LVDS B0+	13	28	LCDVCC	PWR	Max 0.5A
Max. 0.5A	PWR	POWER GND	14	29	LCDVCC	PWR	Max 0.5A
	LVDS	LVDS B1-	15	30	LCDVCC	PWR	Max 0.5A

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4.2.10. LVDS Auxiliary Connector

Wafer 1x10 pin: 1.25 mm pitch (MOLEX, 53261-1071)

Pin	Type	Signal	Note
1	OT	BKLT_EN#	3.3V level
2	PWR	GND	Max. 0.5A
3	PWR	GND	Max. 0.5A
4	PWR	BKLT_PWR	Max. 0.5A
5	PWR	BKLT_PWR	Max. 0.5A
6	PWR	BKLT_PWR	Max. 0.5A
7	PWR	BKLT_PWR	Max. 0.5A
8	PWR	GND	Max. 0.5A
9	PWR	GND	Max. 0.5A
10	OT	BKLT_CTL	3.3V level

Signal	Description
BKLT_EN#	Backlight Enable signal (active low) Optional to invert this signal to active high BKLT_EN (by jumper)
BKLT_PWR	Backlight Power switchable by jumper either 5V (default) or 12V. Maximum 1A per pin for both voltages
BKLT_CTL	Backlight control, PWM signal to implement voltage in the range 0-3.3V

See Section 4.3 Jumper and Switch Settings for Backlight Power Selection (JPL1), Panel Power Selection (JPL2), and Backlight Enable Jumper Selection (JPL3) settings.

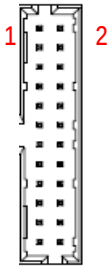
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4.2.11. Front Panel Connector

2x12-pin 2.0 pitch standard wafer connector

The front panel connector of AmITX-HL-G provides two USB2.0 header, Audio MIC-In / Line-Out, ATX power switch, Reset, HDD LED, and SUS LED (System Power LED).

Pin #	Signal	Ioh/ Iol	Type	Note		Pin #	Signal	Type	Ioh/ Iol	Note
1	USB6/7_5V	-	PWR	1		2	USB6/7_5V	PWR	-	1
3	USB6-	-				4	USB7-		-	
5	USB6+	-				6	USB7+		-	
7	GND	-	PWR			8	GND	PWR	-	
9	Mute	-	Mute			10	LINE2-L		-	
11	+5V	-	PWR	2		12	+5V	PWR	-	2
13	SATA_LED#	25/25mA	O			14	SUS_LED	O	7mA	3
15	GND	-	PWR			16	PWRBTN_IN#	I		
17	RSTIN#	-	I			18	GND	PWR	-	
19	SB3V3	-	PWR			20	LINE2-R		-	
21	AGND	-	PWR			22	AGND	PWR	-	
23	MIC2-L	-	AI			24	MIC2-R	AI	-	



Note 1: 5V/SB5V: 5V supplies for external devices. SB5V is supplied during power down to allow wakeup on USB device activity during S3~S4 state.

Note 2: Maximum load is 1A.

Note 3: SUS_LED (System Power LED): Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

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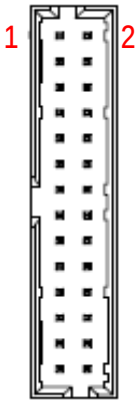
4.2.12. Feature Connector

2x13-pin 2.0 pitch standard wafer connector

The feature connector of AmITX-HL-G provides Case Open, I²C, SMBus, and GPIO(10pin).

Signal	Description
TEMPS	Analogue temp sensor, connect to analog input of BMC
EXT_BAT	Connect to RTC power
CASE_OPEN#	Any time case open occurred, system will notice/show case open alert in POST when the next booting.
I2CC / I2CD	Connect to BMC (I2C Master)
I2C	SEMA

Pin #	Signal	Pull U/D	Ioh/ Iol	Type	Note		Pin #	Signal	Type	Ioh/ Iol	Pull U/D	Note
1	CASE_OPEN#	PU 2M	-	I			2	SMBC	OT	/4mA	PU 10K	1
3	GND	-	-	PWR			4	SMBD	OT	/4mA	PU 10K	1
5	TEMPS	-		I	2		6	I2CC	OT	-	PU 10K	1
7	EXT_BAT	-		PWR			8	I2CD	OT	-	PU 10K	1
9	SB3V3	-	-	PWR			10	SB5V	PWR	-	-	
11	GND	-	-	PWR			12	GND	PWR	-	-	
13	GPIO0	-	PU10K3V3	IOT			14	GPIO1	IOT		PU10K3V3	
15	GPIO2	-	PU10K3V3	IOT			16	GPIO3	IOT		PU10K3V3	
17	GPIO4	-	PU10K3V3	IOT			18	GPIO5	IOT		PU10K3V3	
19	GPIO6	-	PU10K3V3	IOT			20	GPIO7	IOT		PU10K3V3	
21	GPIO8		PU10K3V3	IOT			22	GPIO9	IOT		PU10K3V3	
23	GND	-		PWR			24	SUS_S3#	O	25/25mA	-	
25	12V	-	-	PWR			26	SUS_S4#	O	25/25mA	-	
27	PWR_OK	-	25/25mA	O			28	SUS_S5#	O	25/25mA	-	



Note 1: Pull-up to +3V3Dual (+3V3 or SB3V3).

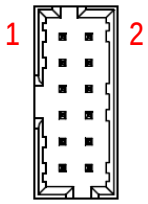
Note 2: Input to SEMA.

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4.2.13. SPI Header

2x6-pin 2.0 pitch standard wafer connector

Type	Signal	Pin #		Pin #	Signal	Type
	CLK	1		2	SB3V3	PWR
I	CS0#	3		4	ADDIN	IO
I	CS1#	5		6	NC	-
I	MOSI	7		8	ISOLATE	IO
O	MISO	9		10	GND	PWR
IO	SPI_IO2_#WP	11		12	SPI_IO3_#HOLD	IO

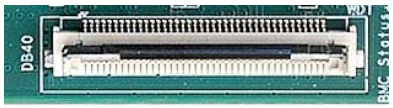


Signal	Description
CLK	Serial Clock
SB3V3	3.3V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3V power sourced via this pin.
CS0#	CS0# Chip Select 0, active low.
ADDIN	ADDIN input signal must be NC.
MOSI	Master Output, Slave Input
ISOLATE#	The ISOLATE# input, active low, is normally NC, but must be connected to GND when loading SPI flash. Power Supply to the Motherboard must be turned off when loading SPI flash. The pull up resistor is connected via diode to 5VSB.
MISO	Master Input, Slave Output
SPI_IO2_#WP	SPI Data I/O: A bidirectional signal used to support the new Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. This signal is not used in Dual Output Fast Read mode.
SPI_IO3_#HOLD	SPI Data I/O: A bidirectional signal used to support the new Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. This signal is not used in Dual Output Fast Read mode.

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4.2.14. DB40 Debug Board Connector

FPC Connector Type: FCI 59GF Flex 10042867



1 40

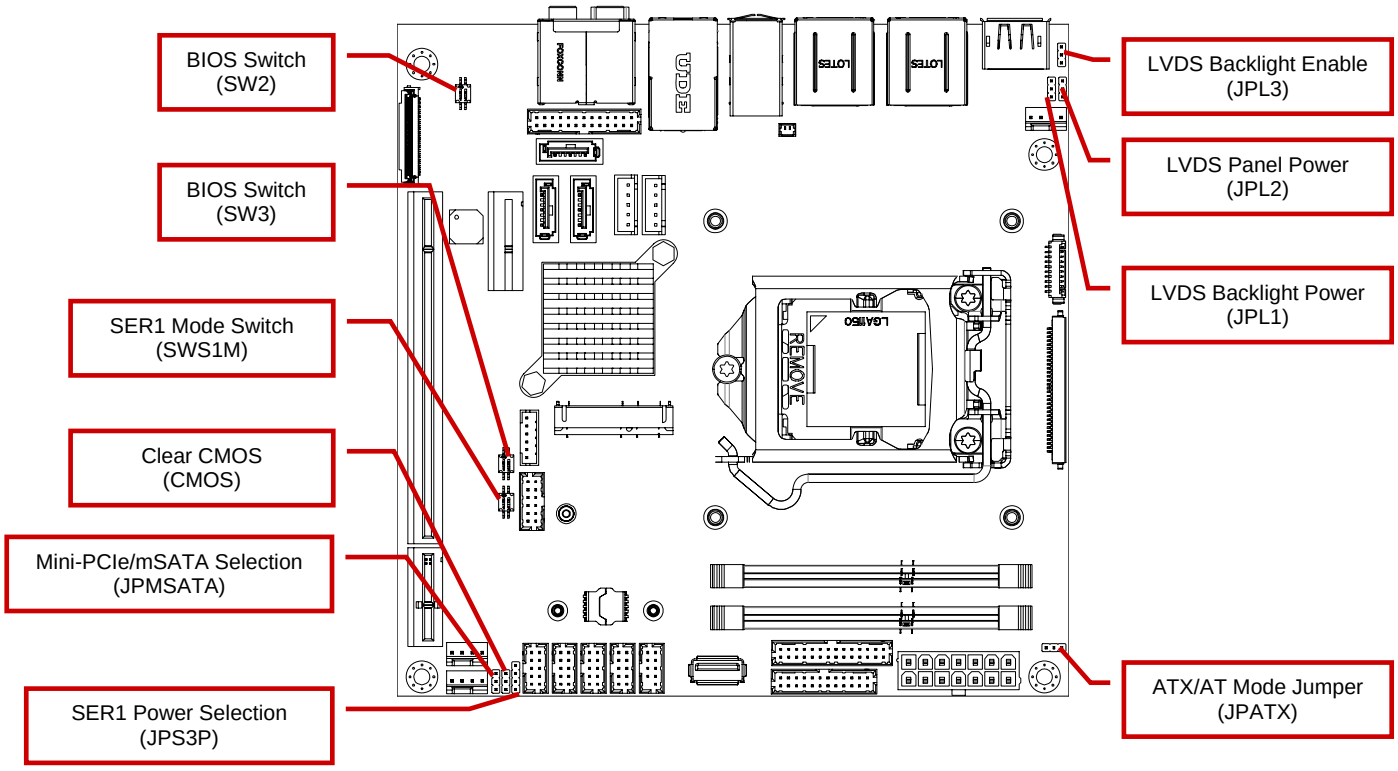
Pin	Interface	Signal	Remark	Pin	Interface	Signal	Remark
1	SPI Program interface	VCC_SPI_IN	SPI Power Input from flash tool to module. HW need add MOS FET to switch SPI power for SPI ROM	21	BMC Program interface (continued)	TXD6	
2		GND		22		RXD6	
3		SPI_BIOS_CS0#		23		FUMD0	
4		SPI_BIOS_CS1#		24		RESET_IN#	
5		SPI_BIOS_MISO		25		DATA	
6		SPI_BIOS_MOSI		26		CLK	
7		SPI_BIOS_CLK		27		OCD0A	Include a jumper to connect OCD0A via 1K0 pull-up to 3.3V_BMC
8	LPC Bus	3V3_LPC	System power 3.3V provide from COM module	28		OCD0B	Include a jumper to connect OCD0A via 1K0 pull-up to 3.3V_BMC
9		GND		29	Test points	PWRBTN#	
10		CB_RESET#	Platform Reset	30		SYS_RESET#	
11		RST#		31		CB_RESET#	
12		CLK33_LPC		32		CB_PWROK	
13		LPC_FRAME#		33		SUS_S3#	
14		LPC_AD3		34		SUS_S4#	
15		LPC_AD2		35		SUS_S5#	
16		LPC_AD1	always power 3.3V provide from COM module	36	BMC Debug signals	POSTWDT_DIS#	Connect to Jumper for Debug
17		LPC_AD0		37		SEL_BIOS	Connect to Jumper for Debug
18	BMC Program interface	3.3V_BMC	always power 3.3V provide from COM module	38		BIOS_MODE	Connect to Jumper for Debug
19		3.3V_BMC	always power 3.3V provide from COM module	39		BMC_STATUS	
20		GND		40	Reserved		

Note: the pin description on the Debug Module is the inverse of that on the motherboard.

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4.3. Jumper and Switch Settings

4.3.1. Jumper and Switch Locations



4.3.2. ATX/AT Mode Selection (JPATX)

JPATX_BOOT MODE	
1-2	ATX (default)
2-3	AT

4.3.3. Clear CMOS (CMOS)

CMOS	
1-2	Normal (default)
2-3	Clear CMOS

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4.3.4. Mini-PCE/mSATA Selection (JPMSATA)

Sets the function of the Mini PCIe slot on the bottom side of th board.

JPMSATA (Mini-PCIe/mSATA SEL)	
1-2	Mini-PCIe (default)
2-3	mSATA

4.3.5. COM Port (SER1) Power Selection (JPS3P)

JPS3P (SER1 PWR SEL)	
1-2	5V
2-3	NC (default)
3-4	12V

4.3.6. LVDS Backlight Power Selection (JPL1)

JPL1_BKLTPWR	
1-2	12V
2-3	5V (default)

4.3.7. LVDS Panel Power Selection (JPL2)

JPL2_PANELPWR	
1-2	5V
2-3	3.3V (default)

4.3.8. LVDS Backlight Enable Selection (JPL3)

JPL3_BKLTEN	
1-2	Active High
2-3	Active Low (default)

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4.3.9. BIOS Switch Setting (SW2, SW3)

Failsafe Mode (default): Boot up by SPI0 with fail safe SPI0 + SPI1 support.

Fail Safe SPI0 + SPI1 (default)		
	SW2	SW3
1	ON	OFF
2	OFF	OFF

Normal BIOS Mode: Boot up from SPI0

Boot up by SPI0		
	SW2	SW3
1	ON	OFF
2	ON	OFF

Normal BIOS Mode: Boot up by SPI2 (optional socket SPI)

Boot up by SPI2		
	SW2	SW3
1	ON	OFF
2	ON	ON

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4.4. Onboard Connector Information

Connector	CN#	Onboard Connector		Mating Connector		ADLINK Cable
		Manufacturer	Part No.	Manufacturer	Part No.	
COM Port	CN36-39	JVE	23N6850-10S10B-01G-B-01	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20876-0000 (optional)
ATX power		Molex	9359-12P	E.C.I	E.C.I 5016H-2*7P (PH4.2)	30-20872-0000 (standard)
PS/2 KB/MS	CN3	JVE	24W1140-06S10-01T-3.4-CS01	E.C.I	E.C.I 2020 -06P (PH2.0)	30-20873-0000 (optional)
USB	CN35	JVE	23N6850-10S10B-01G-B-V9-01	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20874-1000 (optional)
SATA Power	CN29	JVE	24W1170-05S10-01T-3.4-CS01	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20875-0000 (standard)
SATA	CN16-17	WIN WIN	WATM-07DBN4B2B8UW			30-10057-0600 (standard)
DB-40		Molex	502790-4091			30-30016-0000 (optional)
LVDS	CN21	JVE	FI-X30SSLA-HF	WELL-LIN ENTERPRISE	WL1058-HL-30P (PH1.0)	
LVDS Auxiliary	CN45	Molex	53261-1071	WELL-LIN ENTERPRISE	WL1025-H-10P (PH1.25)	
Feature	CN14	JVE	23N6850-28S10B-01G-C-01	JWT	JWT A2005H00-2C*14 (PH2.0)	
Audio	CN9	JVE	23N6850-26S10B-01G-C-01	JWT	JWT A2005H00-2CX13P (PH2.0)	
Front Panel	CN26	JVE	23N6850-24S10B-01G-C-01	YY	YY-1970H-2*12P(PH2.0)	

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5. Driver Installation

TheAmITX-HL-G drivers for Windows 7 (32-bit/64-bit) and Windows 8 (32-bit/64-bit) can be downloaded from the ADLINK website (www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1446).

Windows 7 32/64-bit

Chipset	\1.Chipset_Win-All\INF Update Utility_Win-All\SetupChipset_10.0.13_PV\
Display	\2.Graphics_Win-All\win32_15367\
	\3.Graphics_Win-All\win64_15367\
Audio	\4.Audio_Win-All\32bit_Win7_Win8_Win81_R275\
	\5.Audio_Win-All\64bit_Win7_Win8_Win81_R275\
LAN	\6.LAN_i218LM_Win-All\Win7\PROWin32\
	\7.LAN_i218LM_Win-All\Win7\PROWinx64\
	\8.LAN_i211_Win-All\Win7\PROWin32\
	\9.LAN_i211_Win-All\Win7\PROWin64\
IO	\7.IO\Intel_Processor_IO_Drivers_Win7_32_v2.0.msi\
	\8.IO\Intel_Processor_IO_Drivers_Win7_64_v2.0.msi\
USB 3.0	\10.Chipset_Win-All\USB_3.0_Win-All\Intel(R)_USB_3.0_eXtensible_Host_Controller_Driver_3.0.1.41\
ME	\11.Intel(R)_ME10.0_5M_10.0.25.1048_SW_Only\Installers\ME_SW_MSI\Production\

The driver installation procedure for Windows 7 32-bit is outlined below. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.

1. Install the Chipset driver by running the program \1.Chipset_Win-All\INF Update Utility_Win-All\SetupChipset_10.0.13_PV\SetupChipset.exe. Follow the instructions given and reboot when instructed.
2. Install the Display driver and utilities by running the program \2.Graphics_Win-All\win32_15367\win32_15367.exe. Follow the instructions given and reboot when instructed.
3. Install the Audio driver by running the program \4.Audio_Win-All \32bit_Win7_Win8_Win81_R275 \32bit_ Win7_Win8_Win81_R275.exe. Follow the instructions given and reboot if required.
4. Install the LAN driver for Intel i218LM by running the program \6.LAN_i218LM_Win-All\Win7\PROWin32\PROWin32.exe. Follow the instructions given and reboot if required. Install the LAN driver for Intel i211 by running the program \8.LAN_i211_Win-All\Win7\PROWin32\PROWin32.exe. Follow the instructions given and reboot if required.
5. Install the USB 3.0 driver by running the program \11.Chipset_Win-All\USB_3.0_Win-All\Intel(R)_USB_3.0 _eXtensible_Host_Controller_Driver_3.0.1.41\setup.exe. Follow the instructions given and reboot if required.
6. Install the ME driver by running the program \10.Intel(R)_ME10.0_5M_10.0.25.1048_SW_Only\Installers\ME_SW_MSI\ Production\SetupME.exe. Follow the instructions given and reboot if required.

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6. Smart Embedded Management Agent (SEMA)

The onboard microcontroller (BMC) implements power sequencing and Smart Embedded Management Agent (SEMA) functionality.

The microcontroller communicates via the System Management Bus with the CPU/chipset. The following functions are implemented.

- Total operating hours counter. Counts the number of hours the module has been run in minutes.
- On-time minutes counter. Counts the seconds since last system start.
- Temperature monitoring of CPU and board temperature. Minimum and maximum temperature values of CPU and board are stored in flash.
- Power cycles counter
- Boot counter. Counts the number of boot attempts.
- Watchdog Timer (Type-II). Set / Reset / Disable Watchdog Timer. Features auto-reload at power-up.
- System Restart Cause. Power loss / BIOS Fail / Watchdog / Internal Reset / External Reset
- Fail-safe BIOS support. In case of a boot failure, hardware signals tells external logic to boot from fail-safe BIOS.
- Flash area. 1kB Flash area for customer data
- 128 Bytes Protected Flash area. Keys, IDs, etc. can be stored in a write- and clear-protectable region.
- Board Identify. Vendor / Board / Serial number / Production Date
- Main-current & voltage. Monitors drawn current and main voltages

For a detailed description of SEMA features and functionality, please refer to the SEMA Technical Manual and SEMA Software Manual, downloadable at: http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1274

6.1. Board Specific SEMA Functions

6.1.1. Voltages

The BMC of the board implements a voltage monitor and samples several onboard voltages. The voltages can be read by calling the SEMA function “Get Voltages”. The function returns a 16-bit value divided into high-byte (MSB) and low-byte (LSB).

ADC Channel	Voltage Name	Voltage Formula [V]
0	CPU-Vcore	(MSB<<8 + LSB) x 3.3 / 1024
1	GFX-Vcore	(MSB<<8 + LSB) x 3.3 / 1024
2	+V1.05S	(MSB<<8 + LSB) x 3.3 / 1024
3	Vmem	(MSB<<8 + LSB) x 3.3 / 1024
4	+V1.0V	(MSB<<8 + LSB) x 3.3 / 1024
5	+V3.3V	(MSB<<8 + LSB) x 1.1 x 3.3 / 1024
6	+VIN	(MSB<<8 + LSB) x 6.000 x 3.3 / 1024
7	(MAIN CURRENT)	Use Main Current Function

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6.1.2. Main Current

The BMC of the board implements a current monitor. The current can be read by calling the SEMA function “Get Main Current”. The function returns four 16-bit values divided in high-byte (MSB) and low-byte (LSB). These 4 values represent the last 4 currents drawn by the board. The values are sampled every 250ms. The order of the 4 values is NOT in chronological order. Access by the BMC may increase the drawn current of the whole system. In this case, there are still 3 samples not influenced by the read access.

Main Current = (MSB_n<<8 + LSB_n) x 8.06mA

6.1.3. BMC Status

This register shows the status of BMC controlled signals on the board.

Status Bit	Signal
0	WDT_OUT
1	LVDS_VDDEN
2	LVDS_BKLTEN
3	BIOS_MODE
4	POSTWDT_DISn
5	SEL_BIOS
6	BIOS_DIS0n
7	BIOS_DIS1n

6.1.4. Exception Codes

In case of an error, the BMC drives a blinking code on the blue Status LED (LED1). The same error code is also reported by the BMC Flags register. The Exception Code is not stored in the Flash Storage and is cleared when the power is removed. Therefore, a “Clear Exception Code” command is not needed or supported.

Exception Code	Error Message
0	NOERROR
2	NO_SUSCLK
3	NO_SLP_S5
4	NO_SLP_S4
5	NO_SLP_S3
6	BIOS_FAIL
7	RESET_FAIL
8	POWER_FAIL
9	LOW_VIN
10	VCORE
11	VGFX
12	V1P05S
13	VMEM

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Exception Code	Error Message
14	V1P0A
15	V3P3A
16	+P12V_5V
18	CRITICAL_TEMP
19	NO_CB_PWROK
20	NO_HW_PWORK
21	NO_V1P24A_PG

6.1.5. BMC Flags

The BMC Flags register returns the last detected Exception Code since power-up and shows the BIOS in use and the power mode.

Bit	Description
[0 ~ 4]	Exception Code
[6]	0 = AT mode 1 = ATX mode
[7]	0 = Standard BIOS 1 = Fail-safe BIOS.

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7. System Resources

7.1. System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFF	1 MB	MSI Interrupts
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFF	1 MB	ISA Hole
1MB -15MB	100000 - EFFFFF	14MB	Main Memory
0K –1MB	00000 – FFFFFF	1MB	DOS Compatibility Memory

7.2. Direct Memory Access Channels

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

7.3. I/O Map

7.3.1. I/O Map

Hex Range	Device
000-01F	DMA controller 1, 8237A-5 equivalent
020-02D and 030-03F	Interrupt controller 1, 8259 equivalent
02E-02F	LPC SIO () configuration index/data registers
040-04D and 050-05F	Timer, 8254-2 equivalent
04E-04F	UART index/data registers
060, 062, 064, 066, 068-06F	8742 equivalent (keyboard)
061, 063, 065, 067	NMI control and status
070-07F	Real Time Clock Controller(bit 7 -NMI mask)
080-091	DMA page register
092	Reset (Bit 0)/ Fast Gate A20 (Bit 1)
93-9F	DMA page registers continued
0A0-0B1 and 0B4-0BF	Interrupt controller 2, 8259 equivalent
0B2 and 0B3	APM control and status port respectively
0C0-0DF	DMA controller 2, 8237A-5 equivalent

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Hex Range	Device
0E0-0EF	Available
0F0	Co-processor error register
0F1	N/A
0F2-0F3	N/A
0F4	IDE ID port
0F5-0F7	N/A
0F8	IDE Index port
0F9-0FB	N/A
0FC	IDE Data port
0FD-0FF	N/A
100-179	Available
180-181	Default AIM4 SRAM control register (May be remapped)
182-1EF	Available
1F0-1F7	Primary IDE Controller (AT Drive)
1FB-22F	Available
230 -23F	Available
240 -25F	Serial Port 1/2
260-2F7	Available
2F8-2FF	Serial Port 4
300-36F	Available
370-377	Alt. Floppy Disk Controller
378-37F	Available
380-3AF	Available
3B0-3BB and 3BF	Mono/VGA mode video
3BC-3BE	Reserved for parallel port
3C0-3DF	VGA registers
3E0-3EF	Available
3F0-3F7	Available
3F8-3FF	Serial port 3
4D0	Master PIC Edge/Level Trigger register
4D1	Slave PIC Edge/Level Trigger register
CF8-CFB	PCI configuration address register (32 bit I/O only)
CF9	Reset Control register (8 bit I/O)
CFC-CFF	PCI configuration data register
F040	Smbus base address for SB.
1C00	GPIO Base Address for SB
1800	PM (ACPI) Base Address for SB
1860	Alias for ICH TCO base address.
0A00~0AFF	Reserved for SIO functions base address (ex: PME /GPIO etc)

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7.3.2. IRQ Lines PIC mode

IRQ#	Typical Intterupt Resource	Connected to Pin	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 / PIRQ	Note (1)
4	Serial Port 1 (COM1)	IRQ4 via SERIRQ / PIRQ	Note (1)
5	Parallel Port 2 (LPT2)	IRQ5 via SERIRQ / PIRQ	Note (1)
6	Generic	IRQ6 via SERIRQ / PIRQ	No
7	Generic	IRQ7 via SERIRQ / PIRQ	Note (1)
8	Real-time clock	N/A	No
9	Generic	N/A	Note (1)
10	Serial Port 3 (COM3)	IRQ10 via SERIRQ / PIRQ	Note (1)
11	Serial Port 4 (COM4)	IRQ11 via SERIRQ / PIRQ	Note (1)
12	PS/2 Mouse	IRQ12 via SERIRQ / PIRQ	Note (1)
13	Math Processor	N/A	Note (1)
14	Primary IDE controller	IRQ14 via SERIRQ / PIRQ	Note (1)
15	Secondary IDE controller	IRQ15 via SERIRQ / PIRQ	Note (1)

Note(1): These IRQs can be used for PCI devices when onboard device is disabled.

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7.3.3. IRQ Lines APIC mode

IRQ#	Typical Intterupt Resource	Connected to Pin	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 / PIRQ	Note (1)
4	Serial Port 1 (COM1	IRQ4 via SERIRQ / PIRQ	Note (1)
5	N/A	N/A	Note (1)
6	N/A	N/A	Note (1)
7	N/A	N/A	Note (1)
8	Real-time clock	N/A	No
9	N/A	IRQ9 via SERIRQ / PIRQ	Note (1)
10	Serial Port 3 (COM3)	IRQ10 via SERIRQ / PIRQ	Note (1)
11	Serial Port 4 (COM4)	IRQ11 via SERIRQ / PIRQ	Note (1)
12	PS/2 Mouse	IRQ12 via SERIRQ / PIRQ	Note (1)
13	Math Processor	N/A	Note (1)
14	Primary IDE controller	IRQ14 via SERIRQ / PIRQ	Note (1)
15	Secondary IDE controller	IRQ15 via SERIRQ / PIRQ	Note (1)
16	N/A	Intel HDA, PCIE Port 0/1/2/3/4/5/6, EHCI Controller #2 ,P.E.G Root Port, I.G.D ,XHCI Controller	Note (1)
17	N/A	PCIE Port 0/1/2/3/4/5/6, P.E.G Root Port,	Note (1)
18	N/A	PCIE Port 0/1/2/3/4/5/6, P.E.G Root Port, SMBus Controller, EHCI Controller #2	Note (1)
19	N/A	PCIE Port 0/1/2/3/4/5/6, P.E.G Root Port,	Note (1)
20	N/A	GbE Controller	Note (1)
21	N/A		Note (1)
22	N/A	Intel HDA	Note (1)
23	N/A	EHCI Controller #1	Note (1)

Note(1): These IRQs can be used for PCI devices when onboard device is disabled.

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7.4. PCI Configuration Space Map

Bus Number	Device Number	Function Number	Routing	Description
00h	00h	00h	N/A	Intel Host Bridge
00h	02h	00h	Internal	Intel I.G.D.
00h	03h	00h	Internal	HD Audio Device
00h	14h	00h	Internal	xHCI Controller
00h	16h	00h	Internal	Intel Management Engine Interface #1
00h	16h	01h	Internal	Intel Management Engine Interface #2
00h	19h	00h	Internal	Gigabit Etherent Controller
00h	1Bh	00h	Internal	High Definition Audio controller
00h	1Ch	00h	Internal	Intel PCI Express Root port 1
00h	1Ch	01h	Internal	Intel PCI Express Root port 2
00h	1Ch	02h	Internal	Intel PCI Express Root port 3
00h	1Ch	03h	Internal	Intel PCI Express Root port 4
00h	1Ch	04h	Internal	Intel PCI Express Root port 5
00h	1Ch	05h	Internal	Intel PCI Express Root port 6
00h	1Ch	06h	Internal	Intel PCI Express Root port 7
00h	1Ch	07h	Internal	Intel PCI Express Root port 8
00h	1Dh	00h	Internal	Intel USB EHCI Controller #1
00h	1Ah	00h	Internal	Intel USB EHCI Controller #2
00h	1Fh	00h	N/A	Intel LPC Interface Bridge
00h	1Fh	02h	Internal	SATA Host Controller #1
00h	1Fh	03h	Internal	SMBus Controller
00h	1Fh	05h	Internal	SATA Host Controller #2

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7.5. PCI Interrupt Routing Map

INT Line	P.E.G Root Port	Audio Controller	xHCI Controller	ME Controller #1	ME Controller #2	IDE-R	KT	GbEt Controller	HDA Controller
Int0	INTA:16	INTA:16	INTA:16	INTA:16				INTE:20	INTG:22
Int1				INTD:19					
Int2				INTC:18					
Int3				INTB:17					

INT Line	PCIE port1	PCIE port 2	PCIE port 3	PCIE port 4	PCIE Port 5	PCIE Port 6	PCIE Port 7	PCIE port 8
Int0	INTA:16	INTB:17	INTC:18	INTD:19	INTA:16	INTB:17	INTC:18	INTD:19
Int1	INTB:17	INTC:18	INTD:19	INTA:16	INTB:17	INTC:18	INTD:19	INTA:16
Int2	INTC:18	INTD:19	INTA:16	INTB:17	INTC:18	INTD:19	INTA:16	INTB:17
Int3	INTD:19	INTA:16	INTB:17	INTC:18	INTD:19	INTA:16	INTB:17	INTC:18

INT Line	EHIC #1	EHIC #2	LPC Controller	SATA Controller #1	SMBus Controller	SATA Controller #2	Thermal Subsystem
Int0	INTH:23	INTA:16	INTF:21			INTH:23	
Int1			INTD:19	INTD:19			
Int2			INTC:18		INTC:18		INTC:18
Int3			INTA:16				

7.6. SMBus Slave Address

Device	Address
DIMM A	A0h
DIMM B	A4h
BMC	50h
Extend GPIO	40h

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8. BIOS Setup

8.1. Menu Structure

This section presents the six primary menus of the BIOS Setup Utility. Use the following table as a quick reference for the contents of the BIOS Setup Utility. The subsections in this section describe the submenus and setting options for each menu item. The default setting options are presented in bold, and the function of each setting is described in the right hand column of the respective table.

Main	Advanced	Boot	Security	Save & Exit
- BIOS Information	- CPU ▶	- Boot Configuration ▶	- Password Description ▶	- Reset Options ▶
- Memory Information	- Audio ▶	- CSM Parameters ▶	- Secure Boot Menu ▶	- Save Options ▶
- System Management ▶	- SATA ▶			
- System Date	- Thermal ▶			
- System Time	- Memory ▶			
	- Graphics ▶			
	- USB ▶			
	- ACPI and Power Management ▶			
	- PCI and PCIe ▶			
	- Super IO ▶			
	- Serial Port Console ▶			
	- Network ▶			
	- Security ▶			
	- Miscellaneous ▶			

Notes:

▶ indicates a submenu
Gray text indicates info only

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8.2. Main

The Main Menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below the screen shot of this menu for details of the submenus and settings.

8.2.1. System Information

Feature	Options	Description
Project Version	Info only	Project Version.
Build Date and Time	Info only	BIOS build date and time.

8.2.2. Processor Information

Feature	Options	Description
CPU brand string	Info only	CPU Brand String.
Frequency	Info only	Standard CPU frequency.
Processor ID	Info only	Processor ID.
Stepping	Info only	Processor stepping.
Number of Processors	Info only	Processor core number.
GT Info	Info only	GT speed.
IGFX VBIOS version	Info only	IGFX VBIOS version.
Total Memory	Info only	Total memory size.

8.2.3. PCH Information

Feature	Options	Description
Name	Info only	PCH name.
PCH SKU	Info only	PCH SKU.
Stepping	Info only	PCH Stepping.
ME FW version	Info only	ME FW version.
ME Firmware SKU	Info only	ME FW SKU.

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8.2.4. System Management

8.2.4.1. System Management > Board Information

Board Information	Info only	
SEMA Firmware	Read only	Display SEMA firmware
Build Date	Read only	Display SEMA firmware build date
SEMA Boot loader	Read only	Display SEMA boot loader
Build Date	Read only	Display SEMA boot loader build date
Hardware Version	Read only	Display SEMA hardware version
Serial Number	Read only	Display SEMA serial number
Manufacturing Date	Read only	Display SEMA manufacturing date
Last Repair Date	Read only	Display SEMA last repair date
MAC ID	Read only	Display SEMA MAC ID
SEMA Features:	Read only	Display SEMA features

8.2.4.2. System Management > Temperatures and Fan Speed

Feature	Options	Description
Temperatures and Fan	Info only	
CPU Temperature	Info only	
Current	Read only	Display current CPU temperature
Startup	Read only	Display CPU startup temperature
Min	Read only	Display CPU min. temperature
Max	Read only	Display CPU max. temperature
Board Temperatures	Info only	
Current	Read only	Display current board temperature
Startup	Read only	Display board startup temperature
Min	Read only	Display board min. temperature
Max	Read only	Display board max. temperature
CPU Fan Speed	Read only	Display CPU fan speed
System Fan1 Speed	Read only	Display system fan speed
System Fan2 Speed	Read only	Display system fan speed

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8.2.4.3. System Management > Power Consumption

Feature	Options	Description
Power Consumption	Info only	
Current Input Current	Read only	Display input current
Current Input Power	Read only	Display input power
VCC-Vcore	Read only	Display actual VCC-Vcore voltage
V1P0S	Read only	Display actual V1P0S voltage
VDDQ	Read only	Display actual VDDQ voltage
VRTC	Read only	Display actual VRTC voltage
V3P3S	Read only	Display actual V3P3S voltage
V3P3A	Read only	Display actual V3P3A voltage
V5_DUAL	Read only	Display actual V5_DUAL voltage
V12	Read only	Display actual V12 voltage

8.2.4.4. System Management > Runtime Statistics

Feature	Options	Description
Runtime Statistics	Info only	
Total Runtime	Read only	The returned value specifies the total time in minutes the system is running in S0 state.
Current Runtime	Read only	The returned value specifies the time in seconds the system is running in S0 state. This counter is cleared when the system is removed from the external power supply.
Power Cycles	Read only	The returned value specifies the number of times the external power supply has been shut down
Boot Cycles	Read only	The Bootcounter is increased after a HW- or SW-Reset or after a successful power-up.
Boot Reason	Read only	The boot reason is the event which causes the reboot of the system.

8.2.4.5. System Management > Flags

Feature	Options	Description
Flags	Info only	
BMC Flags	Read only	
BIOS Select	Read only	Display the selection of current BIOS ROM.
ATX/AT-Mode	Read only	Display ATX/AT-Mode.
Exception Code	Read only	System exception reason.

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8.2.4.6. System Management > Power Up

Feature	Options	Description
Power Up	Info only	
Power Up watchdog Attention: F12 disables the Power Up Watchdog.	Enabled Disabled	The Power-Up Watchdog resets the system after a certain amount of time after power-up.
Power-up Mode Attention: The Power-Up Mode only has effect, if the module is in ATX-Mode.	Turn on Remain off Last State	Turn On: The machine starts automatically when the power supply is turned on. Remain Off :To start the machine the power button has to be pressed. Last State: when powered on during a power failure the system will automatically power on when power is restored

8.2.4.7. System Management > LVDS Backlight

Feature	Options	Description
LVDS Backlight	Info only	
LVDS Backlight Bright	255	The value range starts by 0 and ends by 255.

8.2.4.8. System Management > Smart Fan

Feature	Options	Description
Smart Fan	Info only	
CPU Smart FanTemperature Source	CPU Sensor System Sensor	Select CPU smart fan source
CPU Fan Mode	AUTO (Smart Fan) Fan Off Fan On	Select CPU fan mode
Trigger Point 1	Read only	
Trigger Temperature	15	Specifies the temperature threshold at which the BMC turns on the CPU fan with the specified PWM level
PWM Level	30	Select PWM level
Trigger Point 2	Read only	
Trigger Temperature	60	Specifies the temperature threshold at which the BMC turns on CPU fan the specified PWM level
PWM Level	40	Select PWM level
Trigger Point 3	Read only	
Trigger Temperature	70	Specifies the temperature threshold at which the BMC turns on CPU fan the specified PWM level
PWM Level	63	Select PWM level
Trigger Point 4	Read only	
Trigger Temperature	80	Specifies the temperature threshold at which the BMC turns on CPU fan the specified PWM level
PWM Level	100	Select PWM level

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Feature	Options	Description
System Smart Fan1Temperature Source	CPU Sensor System Sensor	Select System smart Fan1Temperature source
System Fan1 Mode	AUTO (Smart Fan) Fan Off Fan On	Select System fan1 mode
Trigger Point 1	Read only	
Trigger Temperature	15	Specifies the temperature threshold at which the BMC turns on the System fan1 with the specified PWM level
PWM Level	30	Select PWM level
Trigger Point 2	Read only	
Trigger Temperature	60	Specifies the temperature threshold at which the BMC turns on System fan1 the specified PWM level
PWM Level	40	Select PWM level
Trigger Point 3	Read only	
Trigger Temperature	70	Specifies the temperature threshold at which the BMC turns on System fan1 the specified PWM level
PWM Level	63	Select PWM level
Trigger Point 4	Read only	
Trigger Temperature	80	Specifies the temperature threshold at which the BMC turns on System fan1 the specified PWM level
PWM Level	100	Select PWM level
System Smart Fan2Temperature Source	CPU Sensor System Sensor	Select System smart Fan2Temperature source
System Fan2 Mode	AUTO (Smart Fan) Fan Off Fan On	Select System fan2 mode
Trigger Point 1	Read only	
Trigger Temperature	15	Specifies the temperature threshold at which the BMC turns on the System fan2 with the specified PWM level
PWM Level	30	Select PWM level
Trigger Point 2	Read only	
Trigger Temperature	50	Specifies the temperature threshold at which the BMC turns on System fan2 the specified PWM level
PWM Level	40	Select PWM level
Trigger Point 3	Read only	
Trigger Temperature	58	Specifies the temperature threshold at which the BMC turns on System fan2 the specified PWM level
PWM Level	63	Select PWM level
Trigger Point 4	Read only	
Trigger Temperature	65	Specifies the temperature threshold at which the BMC turns on System fan2 the specified PWM level
PWM Level	100	Select PWM level

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8.2.5. System Date and Time

Feature	Options	Description
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds

8.3. Advanced

This menu contains the settings for most of the user interfaces in the system

8.3.1. CPU

Feature	Options	Description
CPU	Info only	
CPU Brand String	Info only	Display CPU brand string
CPU Signature	Info only	Display CPU Signature
Microcode Patch	Info only	Display CPU Microcode version
FSB Speed	Info only	Display CPU FSB frequency
Max CPU Speed	Info only	Display CPU Max frequency
Min CPU speed	Info only	Display CPU Min frequency
Processor Cores	Info only	Display number of processor
Intel HT Technology	Info only	Display Intel HT technology support
Intel VT-x Technology	Info only	Display Intel VT-x technology support
Intel SMX Technology	Info only	Display Intel SMX technology support
64-bit	Info only	Display 64-bit support
EIST Technology	Info only	Display EIST technology support
CPU C3 State	Info only	Display CPU C3 state support
CPU C6 State	Info only	Display CPU C6 state support
CPU C7 State	Info only	Display CPU C7 state support
L1 Data Cache	Info only	Display L1 data cache size
L1 Code Cache	Info only	Display L1 code cache size
L2 Cache	Info only	Display L2 cache size
L3 Cache	Info only	Display L3 cache size
Limit CPUID Maximum	Disabled Enabled	Enabled/Disabled CPUID Maximum limit.
Execute Disable Bit	Disabled Enabled	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS.
Intel Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by vanderpool technology.

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Feature	Options	Description
VT-d	Disabled **Enabled**	Check to enable VT-d function on MCH.
EIST	Disabled **Enabled**	Enabled/Disabled Intel SpeedStep.
Turbo Mode	Disabled **Enabled**	Enabled/Disabled Intel turbo mode.
CPU C3 Report	Disabled **Enabled**	Enabled/Disabled CPU C3 report to OS.
CPU C6 Report	Disabled **Enabled**	Enabled/Disabled CPU C6 report to OS.
CPU C7 Report	Disabled CPU C7 CPU C7s	Enabled/Disabled CPU C7 report to OS.
ACPI T State	**Disabled** Enabled	Enabled/Disabled ACPI T state support.

8.3.2. Audio

Feature	Options	Description
Audio		
Azalia	Disabled Enabled **Auto**	Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally enabled. Auto = Azalia will be enabled if present, disabled otherwise.
Azalia PME	Disabled **Enabled**	Enable or disable power management capability of Audio Controller.

8.3.3. SATA

Feature	Options	Description
SATA	Info only	
SATA Controller(s)	Disabled **Enabled**	Enable/Disable SATA Device.
SATA Mode Selection	IDE AHCI RAID	Determines how SATA Controller(s) operate.
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
Intel(R) Rapid Start Technology		Intel(R) Rapid Start Technology control.
SATA Port Configuration		SATA Device Options Settings.
RAID0	Disabled **Enabled**	Enable/Disable RAID0 feature.

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Feature	Options	Description
RAID1	Disabled Enabled	Enable/Disable RAID1 feature.
RAID10	Disabled Enabled	Enable/Disable RAID10 feature.
RAID5	Disabled Enabled	Enable/Disable RAID5 feature.

8.3.4. Thermal

Feature	Options	Description
Thermal		
Automatic Thermal Reporting	Disabled Enabled	Configure _CRT, _PSV, and _AC0 automatically based on values recommended in BWG thermal reporting.
Critical Trip Point	Disabled Enabled	This value is the temperature threshold of the Critical Trip Point.
Active Cooling Trip Point	Disabled 40 C 50 C 60 C 70 C BMC Default	This value is the temperature threshold of the Active Cooling Trip Point.
Passive Cooling Trip Point	Disabled Enabled	The value is the temperature threshold of the Passive Cooling Trip Point.
Passive TC1 Value	1	This value sets the TC1 value for the ACPI Passive Cooling Formula.
Passive TC2 Value	5	This value sets the TC2 value for the ACPI Passive Cooling Formula.
Passive TSP Value	10	This item sets the TSP value for the ACPI Passive Cooling Formula. It represents in tenths of a second how often the OS will read the temperature when passive cooling is enabled.
Watch ACPI Event Shutdown	Disabled Enabled	Watchdog ACPI Event Shutdown Enabled/Disabled.

8.3.5. Memory

Feature	Options	Description
Memory RC Version	Info only	Display memory RC version
Memory Frequency	Info only	Display memory frequency
Total Memory	Info only	Display tatal system memory size
Memory Voltage	Info only	Display memory voltage
DIMM#1	Info only	Display DIMM#1 status
DIMM#2	Info only	Display DIMM#2 status
GAS Latency (tCL)	Info only	Display tCL value
Minimum delay time	Info only	

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Feature	Options	Description
CAS to RAS (tRCDmin)	Info only	Display tRCDmin value
Row Precharge (tRPmin)	Info only	Display tRPmin value
Active to Precharge (tRASmin)	Info only	Display tRASmin value
Max TOLUD	Dynamic 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
MRC Fast Boot	Enabled Disabled	Enable/Disable MRC fast boot.
Memory Remap	Enabled Disabled	Enable/Disable memory remap above 4G.
Memory Thermal Management	Enabled Disabled	Enable/Disable Memory Thermal Management.

8.3.6. Graphics

Feature	Options	Description
IGFX VBIOS version	Info only	
IGFX Frequency	Info only	
Graphics Turbo IMON Current	31	Graphics turbo IMON current values supported(14-31).
Primary Display	Auto IGFX PEG PCIE	Select which of Auto/IGFX/PEG/PCIE Graphics device should be Primary Display.
Primary PCIE	Auto PCIE1 PCIE2 PCIE3	Select Auto/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6/PCIE7 Graphics device should be Primary PCIE.
Internal Graphics	Auto Disabled Enabled	Keep IGD enabled based on the setup options.
Aperture Size	128MB 256MB 512MB	Select the Aperture Size.
DVMT Pre-Allocated	32MB 64MB 96MB 128MB 160MB 192MB	Select DVMT 5.0 Pre-Allocated Graphics Memory size used by the Internal Graphics Device.

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Feature	Options	Description
	224MB 256MB 288MB 320MB 352MB 384MB 416MB 448MB 480MB 512MB 1024MB	
DVMT Total Gfx Mem	128M 256M MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
Gfx Low Power Mode	Enabled Disabled	This option is applicable for SFF only.
iGPU Digital Port D Mode	DP LVDS	Select mode for iGPU Digital Port D.
LVDS Backlight Mode	PCH Control BMC Control	Select LVDS Backlight Control functioin.
GTT LVDS Baclight Control	0% 20% 40% 60% 80% 100%	GTT LVDS Backlight Control.
Primary IGFX Boot Display	VBIOS Default EFP LFP EFP3 EFP2 LFP2	Select the Video Device which will be activated during POST.
LCD Panel Type	VBIOS Default 640x480 800x600 1024x768 1280x1024 1400x1050(RB) 1400x1050 1600x1200 1366x768 1680x1050 1920x1200 1440x900 1600x900 1024x768 1280x800 1920x1080 2048x1536	Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.
Panel Scaling	Auto Off Force Scaling	Select the LCD panel scaling option used by the Internal Graphics Device.

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Feature	Options	Description
GT – Power Management Control	Info only	
GT Info	Info only	Display GT speed
RC6 (Render Standby)	**Enabled** Disabled	Check to enable render standby support.

8.3.7. USB

Feature	Options	Description
USB Module version	Info only	
USB Devices:	Info only	
Legacy USB Support	**Enabled** Disabled	Enables Legacy USB support.
XHCI Hand-off	Disabled **Enabled**	This is a workaround for OSes without XHCI hand-off support.
EHCI Hand-off	**Disabled** Enabled	This is a workaround for OSes without EHCI hand-off support.
USB Mass Storage Driver Support	**Enabled** Disabled	Enable/Disable USB Mass Storage Driver Support.
PCH USB Configuration	PCH USB Configuration	
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device start unit command time-out.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the host controller.

8.3.8. ACPI and Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled** Enabled	Enable/Disable BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **Enabled**	Enable/Disable System ability to hibernate. This option may be not effective with some OS.
ACPI Sleep State	**S3 only(Suspend to RAM)** Suspend Disabled	Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
Emulation AT/ATX	Emulation AT ATX	Select Emulation AT or ATX function. If this option set to [Emulation AT], BIOS will report no suspend functions to ACPI.

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8.3.9. PCI and PCIe

Feature	Options	Description
PCI Common Settings	Info only	
PCI Latency Timer	**32 PCI Bus Clocks** 64 PCI Bus Clocks 96 PCI Bus Clocks 128 PCI Bus Clocks 160 PCI Bus Clocks 192 PCI Bus Clocks 224 PCI Bus Clocks 248 PCI Bus Clocks	Value to be programmed into PCI Latency Timer Register.
VGA Palette Snoop	**Disabled** Enabled	Enable/Disable VGA Palette Registers Snooping.
PERR# Generation	**Disabled** Enabled	Enable/Disable PCI Device to Generate PERR#.
SERR# Generation	**Disabled** Enabled	Enable/Disable PCI Device to Generate SERR#.
PCI Express Settings	Info only	
Relaxed Ordering	**Disabled** Enabled	Enable/Disable PCI Express Device Relaxed Ordering.
Extended Tag	**Disabled** Enabled	If Enabled allows Device to use 8-bit Tag field as a requester.
No Snoop	Disabled **Enabled**	Enable/Disable PCI Express Device No Snoop option.
Maximum Payload	**Auto** 128 Bytes 256 Bytes 512 Bytes 1024 Bytes 2048 Bytes 4096 Bytes	Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.
Maximum Read Request	**Auto** 128 Bytes 256 Bytes 512 Bytes 1024 Bytes 2048 Bytes 4096 Bytes	Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.
PCI Express Link Register Settings	Info only	
ASPM	**Disabled** Auto ForceL0s	PCI Express Active State Power Management settings.
Extended Synch	**Disabled** Enabled	If ENABLED allows generation of Extended Synchronization patterns.
Link Training Retry	Disabled 2 3 5	Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.

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Feature	Options	Description
Link Training Timeout (uS)	100	Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 10 to 10000 uS.
Unpopulated Links	Keep Link ON Disabled	In order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.
Restore PCIE Registers	Disabled Enabled	On non-PCI Express aware OS's (Pre Windows Vista) some devices may not be correctly reinitialized after S3. Enabling this restors PCI Express device configurations on S3 resume. Warning: Enabling this may cause issues with other hardware after S3 resume.
PEG Configuration (System Agent)	Config NB PCI Express Settings.	
PCH-PCIe Configuration	PCI Express Configuration settings.	

8.3.10. Super IO

Feature	Options	Description
IT8783F Super IO	Info only	
Serial Port 0 Configuration		Set Parameters of Serial Port 0.
Serial Port 1 Configuration		Set Parameters of Serial Port 1.
Serial Port 2 Configuration		Set Parameters of Serial Port 2.
Serial Port 3 Configuration		Set Parameters of Serial Port 3.

8.3.11. Serial Port Console

Feature	Options	Description
Serial Port Console	Info only	
COM0	Info only	
Console Redirection	Disabled Enabled	Console Redirection enable or disable.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

8.3.11.1. Serial Port Console > Console Redirection Settings

Feature	Options	Description
COM0 Console Redirection Settings	Info only	
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. ANSI: Extended ASCII char set.
Bits per second	9600 19200 38400	Selects serial port transmission speed. The speed must be matched on the remote computer. Long or noisy lines may require lower speeds.

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Feature	Options	Description
	57600 115200	
Data Bits	7 8	Select data bits.
Parity	None Even Odd Mark Space	Select parity.
Stop Bits	1 2	Select number of stop bits.
Flow Control	None Hardware RTS/CTS	Select flow control.
VT-UTF8 Combo Key Support	Disabled Enable	Enable VT-UTF8 combination key support for ANSI/VT100 terminals.
Recorder Mode	Disabled Enable	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	Disabled Enable	Enables or disables extended terminal resolution
Legacy OS Redirection	80x24 80x25	On legacy OSes, the number of rows and columns supported by redirection
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.
Redirection After BIOS Post	Always Enabled BootLoader	The Settings specify if BootLoader is selected, then legacy console redirection is disabled before booting to legacy OS. Default value is Always Enable which means legacy console redirection is enabled for legacy OS.

8.3.12. Network

Feature	Options	Description
Network	Info only	
Network Stack	Disabled Enabled	Enable/Disable Network Stack.
i218 LAN Support	Disabled Enabled	Control i218 Lan support.
Wake on LAN	Disabled Enabled	Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)
I211/i210 Lan Support	Disabled Enabled	Control i211/i210 Lan support.
AMT Configuration	Info only	
Intel AMT	Disabled Enabled	Enable/Disable Intel (R) Active Management Technology BIOS Extension. Note : iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device
BIOS Hotkey Pressed	Disabled Enabled	OEMFLag Bit 1:Enable/Disable BIOS hotkey press.

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Feature	Options	Description
MEBx Selection Screen	**Disabled** Enabled	OEMFLag Bit 2:Enable/Disable MEBx selection screen.
Hide Un-Configure ME Confirmation Prompt	**Disabled** Enabled	OEMFlag Bit 6:Hide Un-Configure ME without password Confirmation Prompt
MEBx Debug Message Output	**Disabled** Enabled	OEMFlag Bit 14:Enable MEBx debug message output.
Un-Configure ME	**Disabled** Enabled	OEMFlag Bit 15:Un-Configure ME without password.
Amt Wait Timer	0 - 65535	Set timer to wait before sending ASF_GET_BOOT_OPTIONS.
Disable ME	**Disabled** Enabled	Set ME to Soft Temporary Disabled.
ASF	Disabled **Enabled**	Enable/Disable Alert Specification Format.
Activate Remote Assistance Process	**Disabled** Enabled	Trigger CIRA boot.
USB Configure	Disabled **Enabled**	Enable/Disable USB Configure function.
PET Progress	Disabled **Enabled**	User can Enable/Disable PET Events progress to recieve PET events or not.
AMT CIRA Timeout	Info only	
WatchDog	Disabled **Enabled**	Enable/Disable WatchDog Timer.
OS Timer	0 - 65535	Set OS watchdog timer.
BIOS Timer	0 - 65535	Set BIOS watchdog timer.

8.3.13. Security

Feature	Options	Description
Security	Info only	
Intel TXT(LT) Support	**Disabled** Enabled	Enables or Disables Intel(R) TXT(LT) support.
BIOS Security Configuration	BIOS Security Configuration settings.	
Trusted Computing	Trusted Computing Settings.	

8.3.14. Miscellaneous

Feature	Options	Description
Miscellaneous	Info only	
Chassis Intrusion Support	Enabled **Disabled**	Chassis Intrusion Support
Beep Control	**Enabled** Disabled	Beep Control
RS485 Flow Control	**Receiver** Transmit	RS485 Flow Control

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8.4. Boot

8.4.1. Boot Configuration

Feature	Options	Description
Boot Configuration	Info only	
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Disabled Enabled	Enable or disables Quiet Boot option.
Fast Boot	Disabled Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect on BBS boot options.
Boot Option Priorities	Info only	
Hard Drive BBS Priorities	Info only	
CSM16 Parameters	Submenu	CSM16 configuration:GateA20 Active, Option ROM Message,Int19 Trap Response, etc.
CSM Parameters	Submenu	CSM configuration: Enable/Disable, Option ROM execution settings, etc.

8.4.1.1. Boot Configuration > CSM16 Parameters

Feature	Options	Description
CSM16 Parameters	Info	
CSM16 Module Version	Info only	
GataA20 Active	Upon Request Always	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 Keep Current	Set display mode for Option ROM.
INT19 Trap Response	Immediate Postponed	BIOS reaction on INT19 trapping by Option ROM: Immediate - execute the trap right away; Postponed – execute the trap during legacy boot.

8.4.1.2. Boot Configuration > CSM Parameters

Feature	Options	Description
Launch CSM	Enabled Disable	Launch CSM
Boot option filter	UEFI and Legacy Legacy only UEFI only	This option controls what devices system can boot to
Launch PXE OpROM policy	Do not launch UEFI only Legacy only	Controls the execution of UEFI and Legacy PXE OpROM

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Feature	Options	Description
Launch Storage OpROM policy	Do not launch UEFI only Legacy only	Controls the execution of UEFI and Legacy Storage OpROM
Launch Video OpROM policy	Do not launch UEFI only Legacy only	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device ROM priority	UEFI OpROM Legacy OpROM	For PCI devices other than Network, Mass storage or Video defines which OpROM to launch

8.5. Security

8.5.1. Password Description

Feature	Options	Description
Administrator Password	Enter password	
User Password	Enter password	
Secure Boot menu	Submenu	Customizable Secure Boot settings.

8.5.1.1. Secure Boot Menu

Feature	Options	Description
System Mode	Setup	
Secure Boot	Info only	
Secure Boot	Disabled Enabled	Secure Boot can be enabled if: 1. System running in User mode with enrolled Platform Key (PK) 2. CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot keys.

8.6. Save & Exit

Feature	Options	Description
Save Changes and Exit	Yes No	Exit system setup after saving the changes.
Discard Changes and Exit	Yes No	Exit system setup without saving any changes.
Save Changes and Reset	Yes No	Reset the system after saving the changes.
Discard Changes and Reset	Yes No	Reset system setup without saving any changes.
Save Options	Info only	
Save Changes	Yes No	Save Changes done so far to any of the setup options.
Discard Changes	Yes No	Discard Changes done so far to any of the setup options.
Restore Defaults	Yes No	Restore/Load Default values for all the setup options.
Save as User Defaults	Yes No	Save the changes done so far as User Defaults.
Restore User Defaults	Yes No	Restore the User Defaults to all the setup options.

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Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User's Manual for later 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 the 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.
  - 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.



CAUTION

Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries according to their instructions.

- 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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