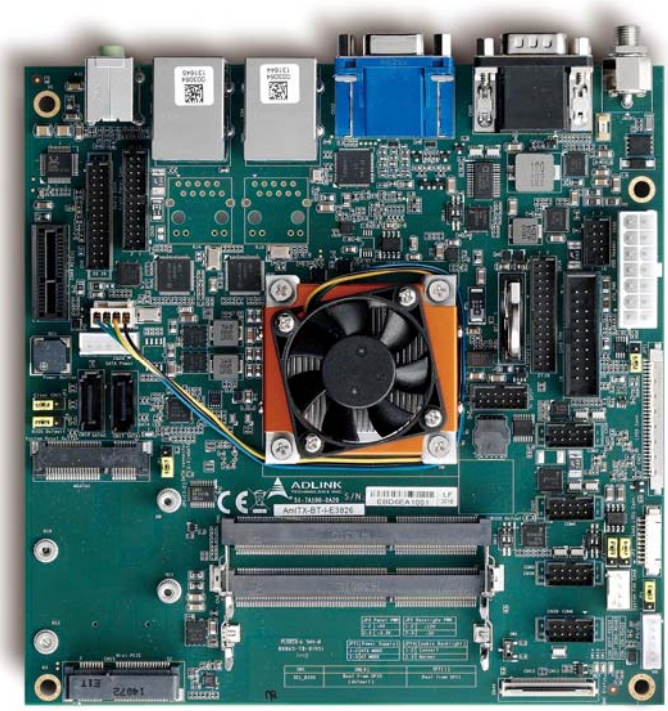
AmITX-BT-I

User's Manual

Mini-ITX Embedded Motherboard with

4th Gen Intel® Atom™ Processor E3800



Manual Revision:	1.02
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Part Number:	50-1X011-1020

ADLINK TECHNOLOGY INC.

Revision History

Revision	Description	Date	By
1.00	Initial release	2015-11-19	JC
1.01	Correct Front Panel CN26 connector information	2016-03-15	JC
1.02	Correct JP5/JP6 jumper setting table headings	2017-02-10	JC

Preface

Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer. In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Environmental Responsibility

ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

AmITX-BT-I is a RoHS compliant and leadfree product

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Table of Contents

1. Introduction

The AmITX-BT-I is a Mini-ITX motherboard supporting the Intel® Atom™ processor E3800 Series and Intel® Celeron® processor system-on-chip (SoC). The AmITX-BT-I is specifically designed for customers who need high-level processing and graphics performance with low power consumption in a long product life solution.

The Intel® Atom™ processor E3800 and Intel® Celeron® processor support non-ECC type DDR3L dual-channel memory at 1066/1333 MHz to provide excellent overall performance. Integrated Intel® Gen7 HD Graphics includes features such as OpenGL 3.1, DirectX 11, OpenCL 1.1 and support for H.264, MPEG2, VC1, VP8 hardware decode. Graphics outputs include VGA, DDI ports supporting HDMI and optional dual-channel 18/24-bit LVDS. The AmITX-BT-I has dual stacked SODIMM sockets for up to 8 GB non-ECC type DDR3L memory.

The AmITX-BT-I features dual Gigabit Ethernet port, USB 3.0 ports and USB 2.0 ports, and SATA 3 Gb/s ports. Support is provided for SMBus and I²C. The module is equipped with SPI AMI EFI BIOS, supporting embedded features such as hardware monitor and watchdog timer.

CPU	Intel Bay Trail SoC	Core Speed	Total Design Power
AmITX-BT-I-E3845	Atom™ E3845 (4 cores)	1.91 GHz	10W
AmITX-BT-I-E3827	Atom™ E3827 (2 cores)	1.75 GHz	8W
AmITX-BT-I-E3826	Atom™ E3826 (2 cores)	1.46 GHz	7W
AmITX-BT-I-E3825	Atom™ E3825 (2 cores)	1.33 GHz	6W
AmITX-BT-I-E3815	Atom™ E3815 (1 core)	1.46 GHz	5W
AmITX-BT-I- N2930	Celeron® N2930 (4 cores)	1.83/2.16 (Burst) GHz	7.5W
AmITX-BT-I-J1900	Celeron® J1900 (4 cores)	2.0/2.42 (Burst) GHz	10W

Latest revision of the datasheet, user's manual, BIOS, drivers, and board support packages, can be downloaded from the product webpage: www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1444.

1.1. Packing List

- AmITX-BT-I 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: 34-25313-0000)

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)

2. Specifications

2.1. Core System

- CPU: Single, dual or quad-core Intel® Atom™ or Celeron® Processor
  - Atom™ E3845 1.91 GHz 542/792 (Turbo) 10W (4C/1333)
  - Atom™ E3827 1.75 GHz 542/792 (Turbo) 8W (2C/1333)
  - Atom™ E3826 1.46 GHz 533/667 (Turbo) 7W (2C/1066)
  - Atom™ E3825 1.33 GHz 533 (No Turbo) 6W (2C/1066)
  - Atom™ E3815 1.46 GHz 400 (No Turbo) 5W (1C/1066)
  - Celeron® N2930 1.83/2.16 (Burst) GHz, 313/854 (Turbo) 7.5W (4C/1333)
  - Celeron® J1900 2.0/2.42 (Burst) GHz, 688/854 (Turbo) 10W (4C/1333)

  Supports: Single, dual or quad Out-of-Order Execution (OOE) processor cores, Intel® VT-x, Intel® SSE4.1 and SSE4.2, Intel® 64 architecture, IA 32-bit, PCLMULQDQ Instruction, DRNG, Intel® Thermal Monitor (TM1 & TM2)

  Note: Availability of features dependent on processor SKU.
- Cache: Primary 32 kB, 8-way L1 instruction cache and 24 kB, 6-way L1 write-back data cache
- Memory: Dual channel non-ECC 1066/1333 MHz DDR3L memory up to 8GB in dual stacked SODIMM sockets
- Embedded BIOS: AMI EFI in 8MB SPI BIOS

2.2. Rear I/O Connectors

- Display: VGA and HDMI
- LAN: Dual GbE RJ-45
- USB: 4x USB 3.0
- Serial: 1x RS-232 (COM1 supports console redirection), 1x RS-232/422/485
- Aduio: Line-Out, Mic-In
- Power: Screw Jack for 12V DC-in

2.3. Internal Headers and Connectors

- PCIe x1
- 2x Mini PCIe: one PCIe+USB (top side); one mSATA+USB (bottom side)
- USB: 2x USB 2.0 via onboard header, 2x USB 2.0 via front panel connector
- SATA: 2x SATA 3Gb/s (SATA0, SATA1)
- SATA Power Connector
- eMMC: Soldered on Module Bootable eMMC Flash Storage 8 to 64 GB (optional)
- Serial: 2x RS-232 headers, 2x RS-232/422/485 headers with 5V power (12V by BOM option)
- LVDS: Supports non-EDID type LCD panels only
- SIM Card Holder:
- Front Panel Header
- Audio Header
- Feature Connector Header
- PS/2 KB/MS Connector
- TPM Header
- 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: 7th generation graphics Intel core architecture with four execution units supporting two independent displays
  - 3D graphics hardware acceleration
  - Support for DirectX11, OCL 1.1, OGL ES Halt/2.0/1.1, OGL 3.2
  - Video decode hardware acceleration including support for H.264, MPEG2, VC-1, WMV and VP8 formats
  - Video encode hardware acceleration including support for H.264, MPEG2 and MVC formatsPlayback of Blu-ray disc S3D content using HDMI (1.4a spec compliant with 3D)

  Note: Availability of features may vary between operating systems.

- Display Interface support
  - VGA: Analog VGA supporting resolutions up to 2560x1600 x24bpp at 60 Hz
  - HDMI: HDMI 1.3a
  - LVDS: Supports non-EDID type LCD panels only, Single/Dual Channel 18 and 24-bit, supports 1920 x 1200 at 60 Hz resolution in dual LVDS bus mode

2.8. Audio

- Integrated: Intel® HD Audio integrated in SOC
- Audio Codec: ALC886

2.9. LAN

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

2.10. 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)

2.11. Operating Temperatures

- Standard: 0°C to 60°C
- Extreme Rugged™: -40°C to 85°C* (optional)

*Note: Intel® Atom™ E3800 Series processors only

2.12. 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

2.13. Operating Systems

- Standard Support: Windows 7/8 32/64-bit, Linux 32/64-bit
- Extended Support (BSP): WES7, WE8S, WEC7, Linux, VxWorks

2.14. Power Consumption

System Configuration	
Processor	Intel® Atom™ Processor E3845 (2M Cache, 1.91 GHz)
Memory Slot1	Transcend 8G 2Rx8 DDR3L 1600 SODIMM
Memory Slot2	Transcend 8G 2Rx8 DDR3L 1600 SODIMM
Graphics	Intel® HD Graphics
Storage	WD WD3200BUDT 320GB, 2.5" SATA 3Gb/s HDD
Monitor	BenQ GW2255
Power Supply	FSP FSP350-60PFG 350W ATX
Video Resolution	1920 x 1080 @32-bit

- Intel® Atom™ processor E3845 @ 1.91 GHz

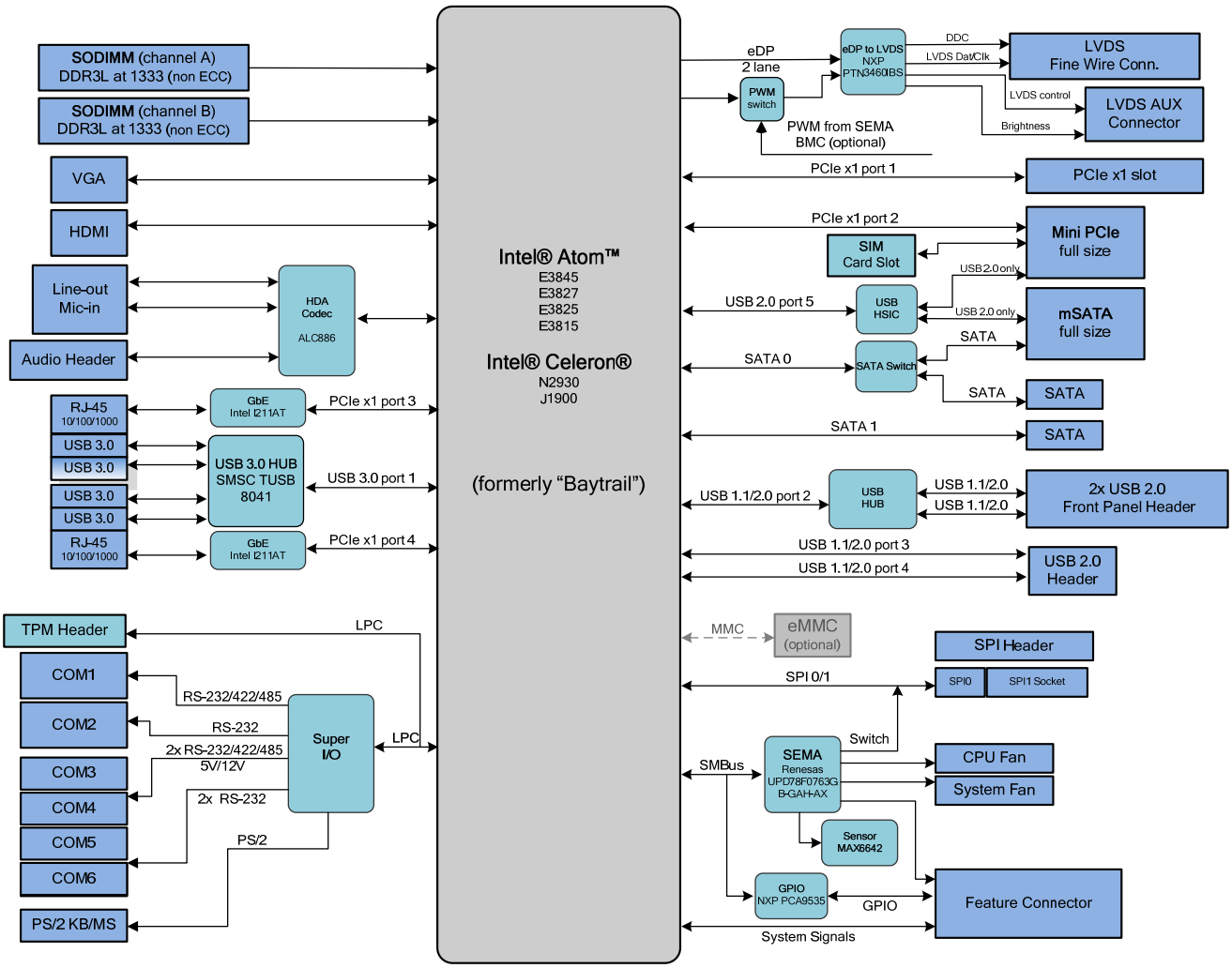
Power State	Current(A) / Voltage (V)	Power (W)
Windows 7 (Idle)	0.61/11.82	7.2102
Windows 7 (Typical)	0.92/11.78	10.8376
Windows 7 (Max loading)	1.08/11.77	12.7116
S3	0.3/5.02	1.506

- Intel Celeron CPU N2930 @ 1.83GHz

System Configurations	
Processor	Intel® Celeron® Processor N2930 (2M Cache, 1.83 GHz)
Memory Slot1	Transcend 8G 2Rx8 DDR3L 1600 SODIMM
Memory Slot2	Transcend 8G 2Rx8 DDR3L 1600 SODIMM
Graphics	Intel® HD Graphics
HDD	WD WD3200BUDT 320GB, 2.5" SATA II HD
Monitor	Hanns.G HZ222
Power Supply	FSP FSP600-80PSA 600W ATX
Video Resolution	1680 x 1050 @32-bit

Power State	Current(A) / Voltage (V)	Power (W)
Windows 7 (Idle)	0.58/12.03	6.9774
Windows 7 (Typical)	0.89/12.03	10.7067
Windows 7 (Max loading)	1.02/12.03	12.2706
S3	0.25/5.00	1.25

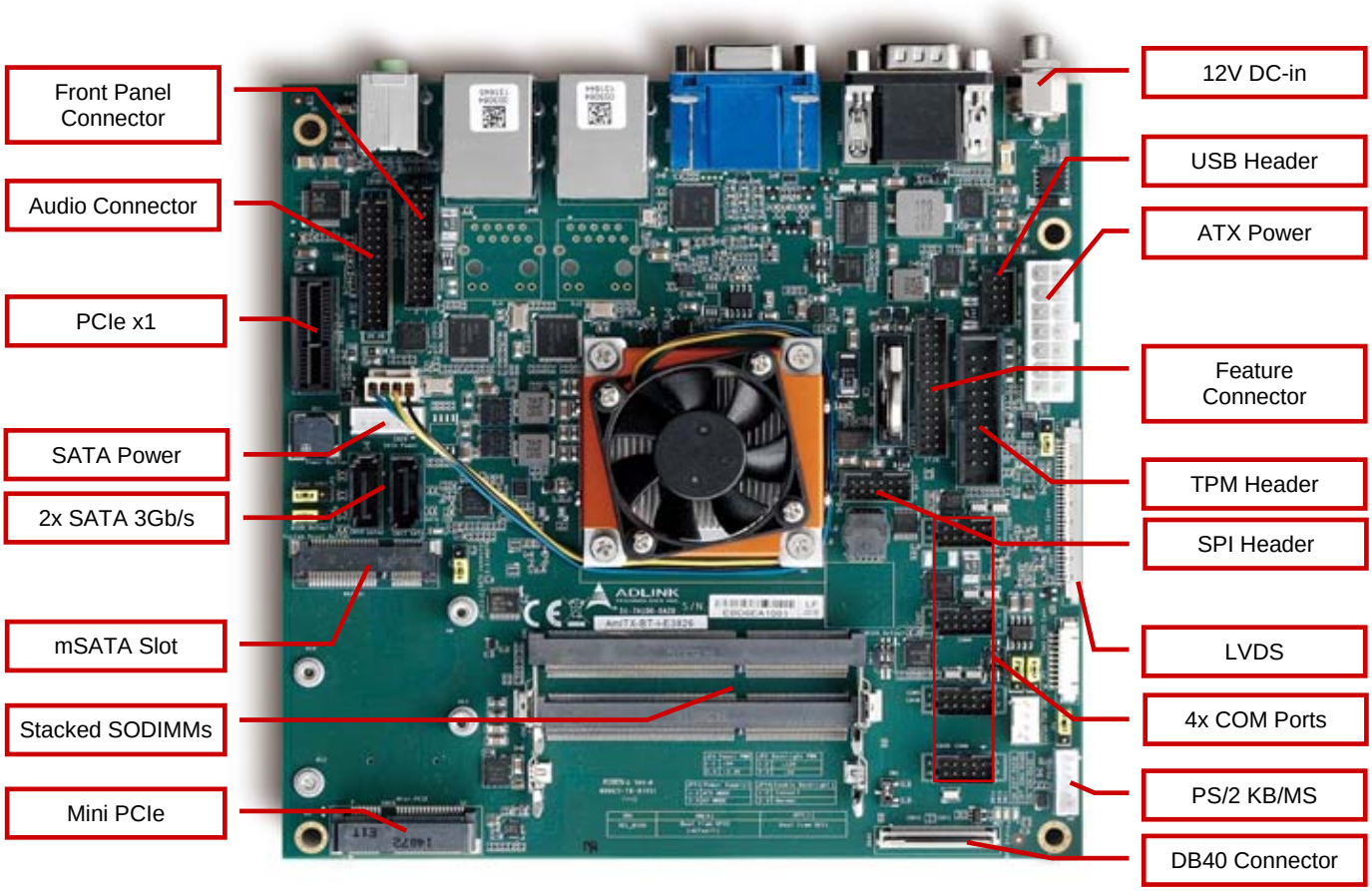
2.15. Functional Diagram

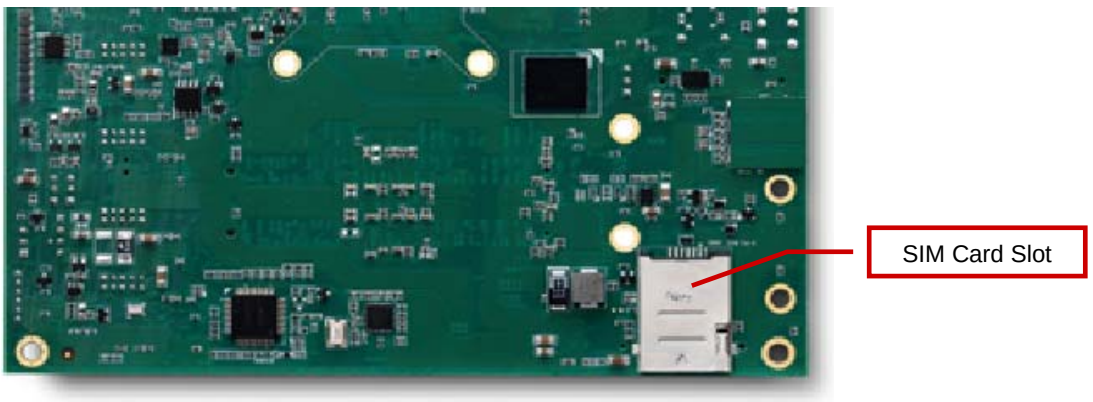


3. Mechanical Layout

3.1. Connector Locations

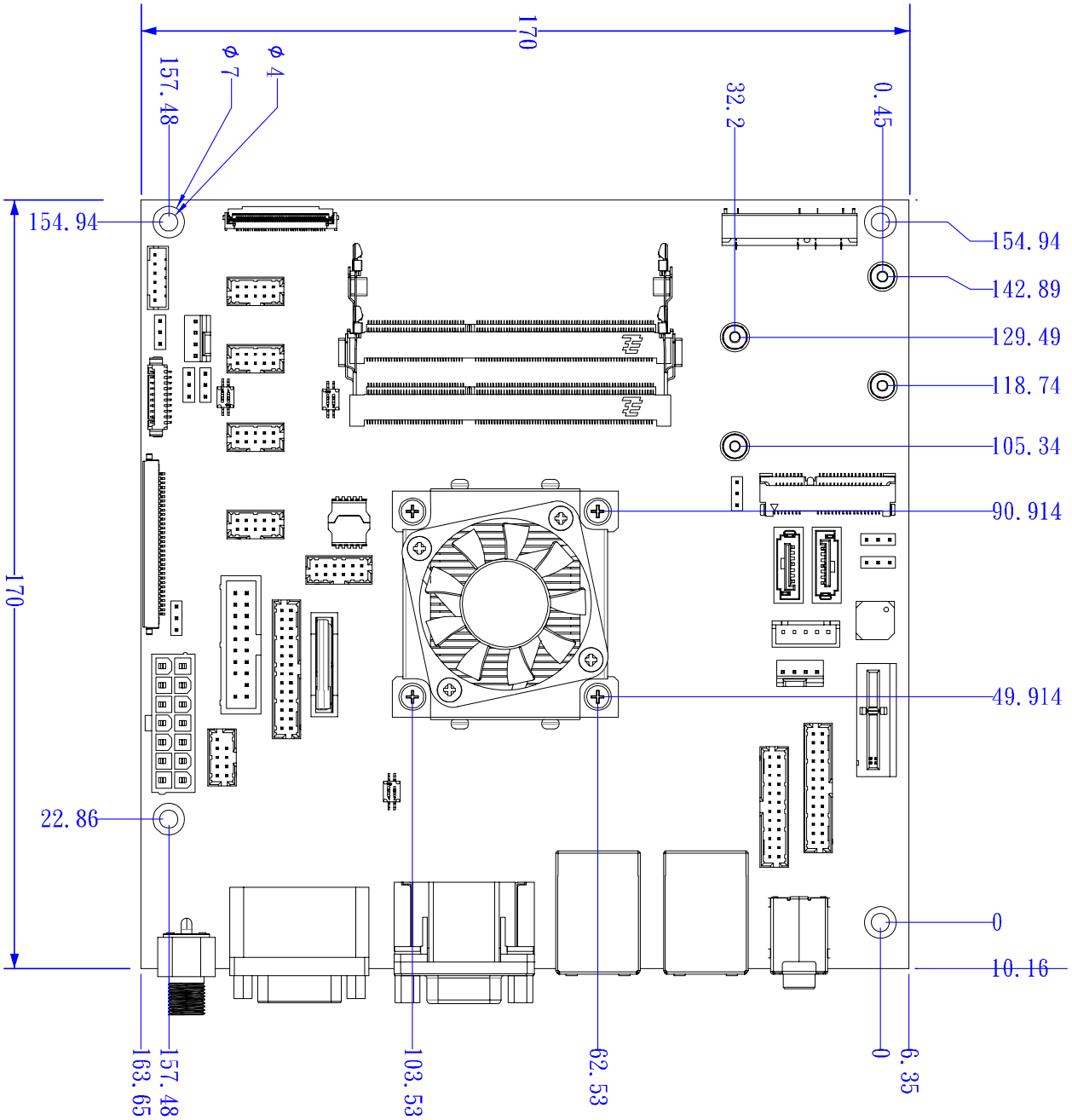
12V DC-in | COM1 COM2 | VGA HDMI | LAN USB 3.0 | LAN USB 3.0 | Line-out Mic-in





3.2. Mechanical Dimensions

Top View

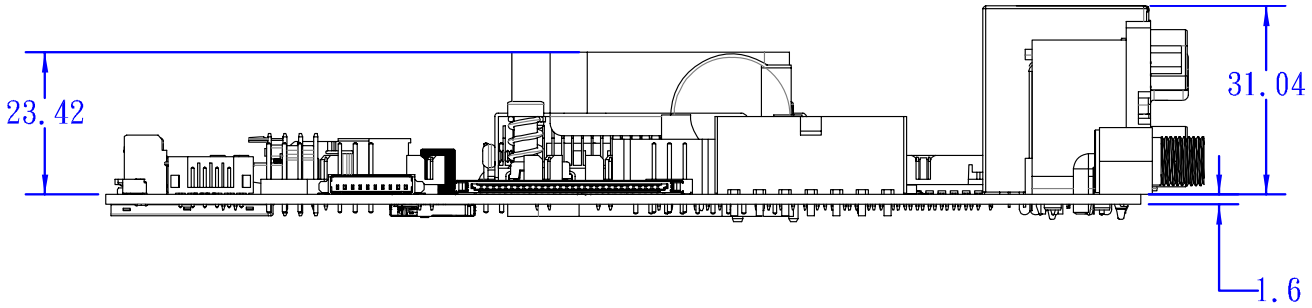


Dimensions: mm

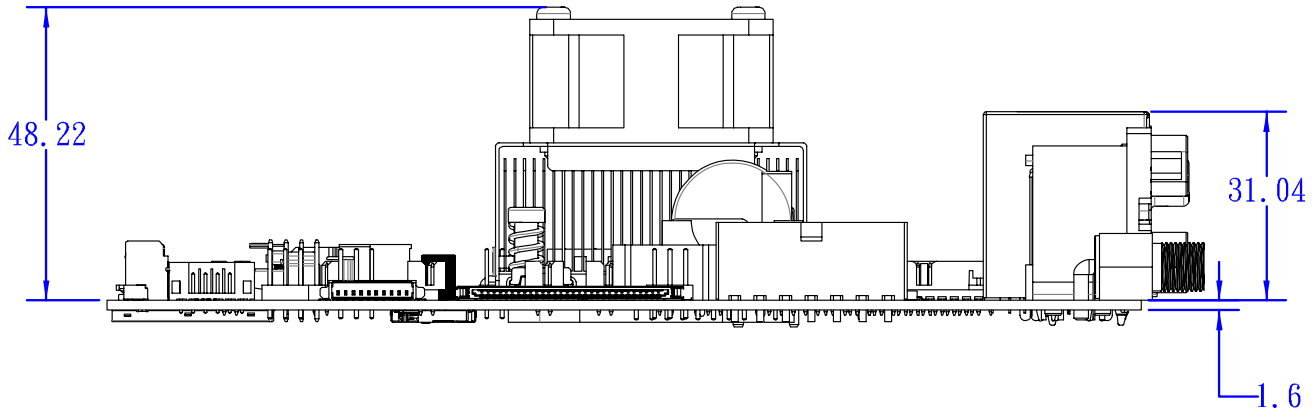
All Φ tolerances ±0.05mm
Other tolerances ±0.2mm

Side View

With AmITX-BT_4010- CJ Cooler (Standard Temp.: 0°C to +60°C)



With AmITX-BT_4020-CJ Cooler (Extreme Rugged™: -40°C to +85°C, Intel® Atom™ E38xx only)



Dimensions: mm

All tolerances ±0.2mm

3.3. Thermal Solutions

AmITX-BT_4010-RG Cooler with Fan
Standard Temp.: 0°C to 60°C
P/N: 32-20493-1000

AmITX-BT_4010- CJ Cooler with Fan
Standard Temp.: 0°C to 60°C
P/N: 32-20493-0000

AmITX-BT_CU-CJ Passive Heatsink
Standard Temp.: 0°C to 60°C
P/N: 32-20510-0000

AmITX-BT_4020-CJ Cooler with Fan
Extreme Rugged™: -40°C to +85°C (Atom™ E38xx only)
P/N: 32-20494-0000

4. Connectors and Jumpers

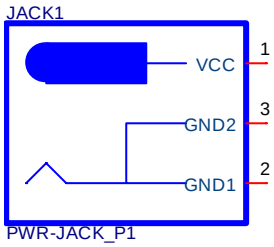
See 3.1 Connector Locations on page 13 for connector locations.

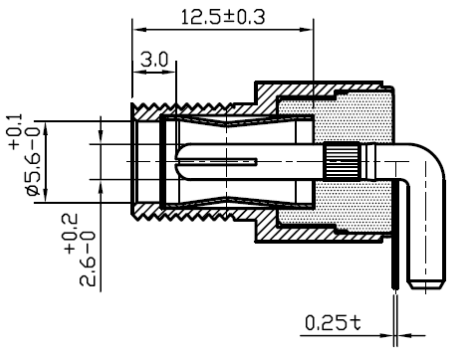
4.1. Rear IO Connectors

4.1.1. DC Power Inlet

The AmITX-BT-I supports a screw-type external 12V DC-in power connector. Maximum current draw is 10A.

Note: Either the DC Power Inlet or the internal ATX Power Connector (ATX_PWR) must be used to supply the motherboard with +12V ±5%.





Caution:

Hot-plugging the power supply is not supported. Doing so may damage the board.

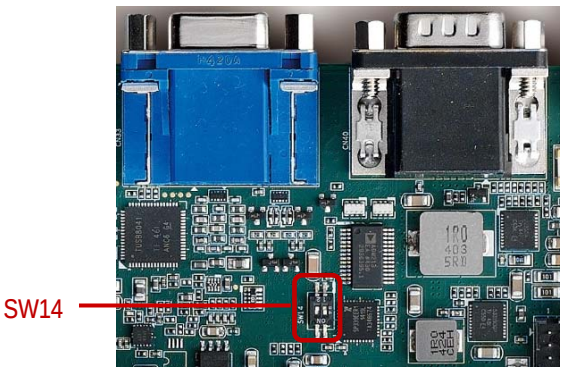
Only connect ONE power supply to the board. Connecting power to both the 12V DC-inlet and the internal ATX Power Connector may damage the board.

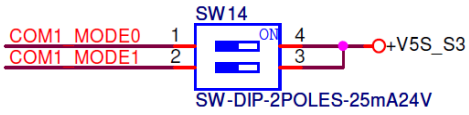
4.1.2. Serial COM Ports (COM1, COM2)

- COM1: Supports RS-232/422/485
- COM2: Supports RS-232 only

Pin #	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	RTX-
2	RXD, Receive Data	TX+	RTX+
3	TXD, Transmit Data	RX+	N/A
4	DTR, Data Terminal Ready	RX-	N/A
5	GND	N/A	N/A
6	DSR, Data Set Ready	N/A	N/A
7	RTS, Request To Send	N/A	N/A
8	CTS, Clear To Send	N/A	N/A
9	RI, Ring Indicator	N/A	N/A

- SW14: Switch for mode selection of COM1 (default RS-232).

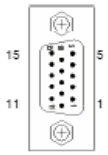




1 ON, 2 OFF - RS232
1 OFF, 2 ON - RS485
1 ON, 2 ON - RS422

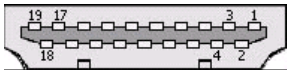
4.1.3. VGA Connector (VGA)

Signal	Pin #	Pin #	Signal
Red	1	2	Green
Blue	3	4	VCC pull-up
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
VCC pull-up	11	12	DDC2B DATA
HSYNC	13	14	VSYNC
DDC2B CLK	15		



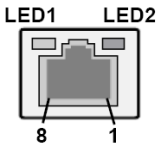
4.1.4. HDMI Connector

Pin #	Signal	Pin #	Signal
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2–	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1–
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0–	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock–
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5 V Power
19	Hot Plug Detect		



4.1.5. Ethernet Connectors (LAN1, LAN2)

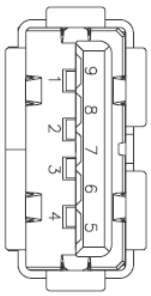
Pin #	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	LAN_MDI0+
2	TX-	LAN_MDI0-
3	RX+	LAN_MDI1+
4	--	LAN_MDI2+
5	--	LAN_MDI2-
6	RX-	LAN_MDI1-
7	--	LAN_MDI3+
8	--	LAN_MDI3-



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

4.1.6. USB 3.0 Connectors (USB1-4)

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



4.1.7. Audio Connectors (Line-out, Mic-in)

Jack	Contact	Signal
Line-out	Tip	FRONT-OUT-L
	Ring	FRONT-OUT-R
	Sleeve	GND
Mic-in	Tip	MIC1-L
	Ring	MIC1-R
	Sleeve	GND

Note: Shared with onboard Audio Header; un-amplified codec output.

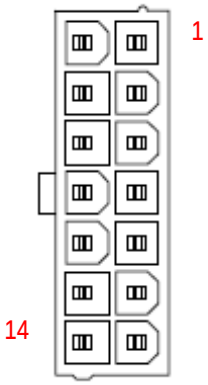
4.2. Internal Connectors

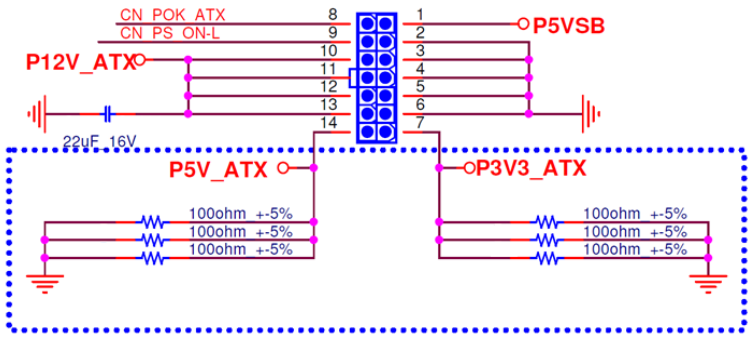
4.2.1. ATX Power Connector (ATX_PWR, proprietary)

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

Note: Either the DC Power Inlet or the internal ATX Power Connector (ATX_PWR) must be used to supply the motherboard with +12V ±5%.

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

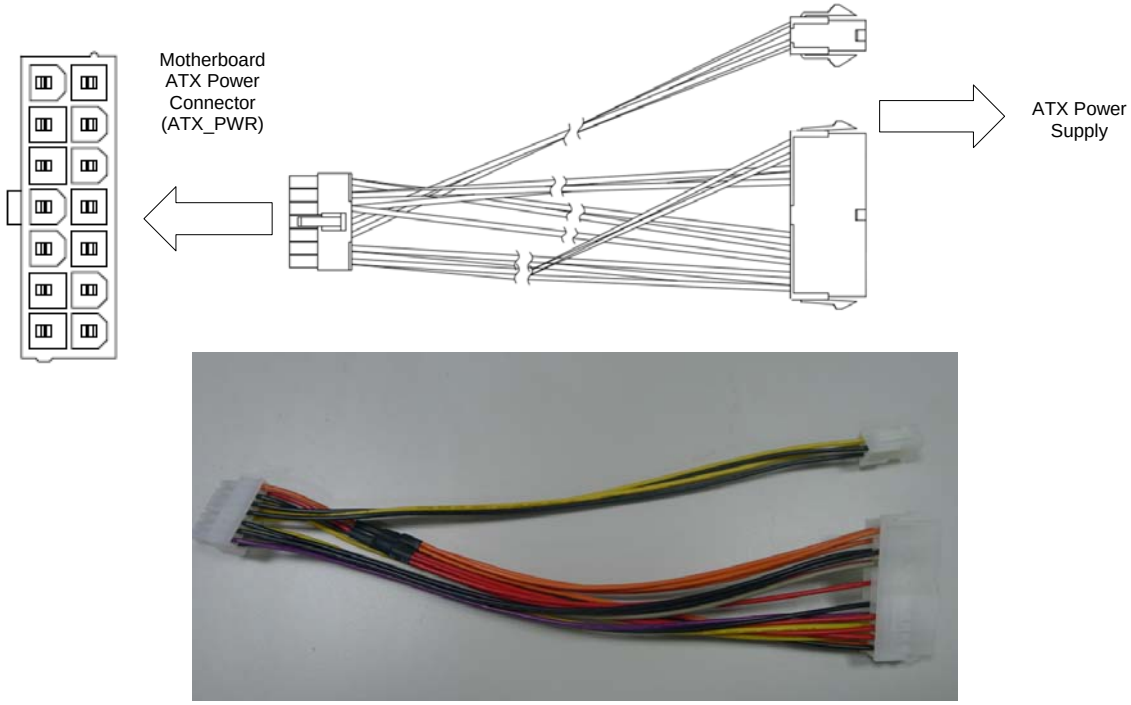




CAUTION

Only connect ONE power supply to the board. Connecting power to both the 12V DC-inlet and the internal ATX Power Connector may damage the board.

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



4.2.2. SATA Connectors (SATA1, SATA2)

Two SATA ports are available on the AmITX-BT-I and support SATA Gen2 (3.0/1.5Gb/s).

Note: If mSATA is installed, SATA2 is disabled. See 4.3.4 SATA2/mSATA Select (JP1).

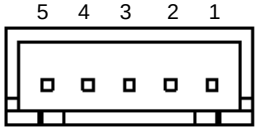
Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

SATA Power

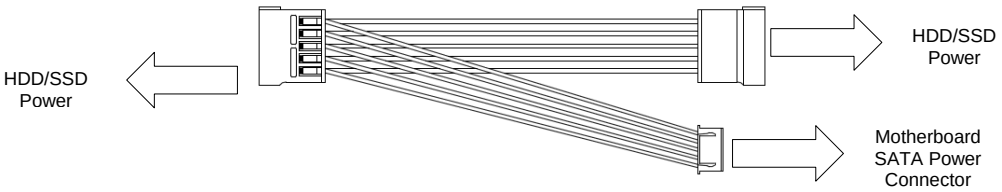
SATA2 SATA1

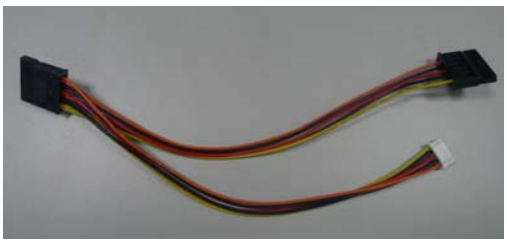
4.2.3. SATA Power Connector (ST_PWR)

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



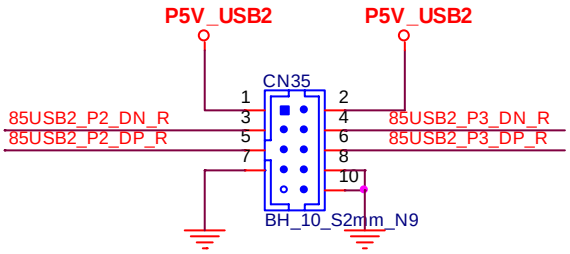
SATA Power Cable: ADLINK Part. No.: 30-20875-0000 (length 200 mm)



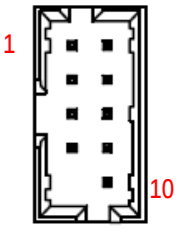


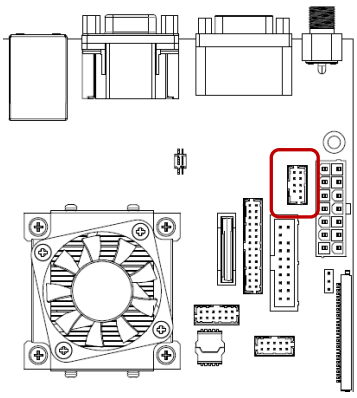
4.2.4. USB Header

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

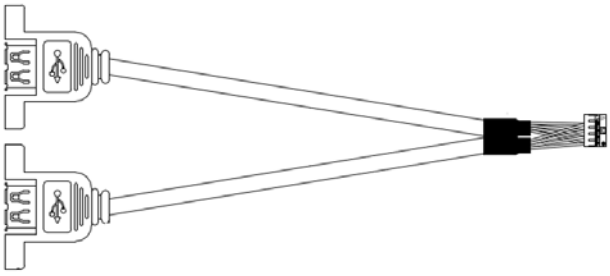


Pin #	Signal	Pin #	Signal
1	P5V_USB	2	P5V_USB
3	P2_DN_R-	4	P3_DN_R
5	P2_DP_R	6	P3_DP_R
7	GND	8	GND
9	KEY	10	GND





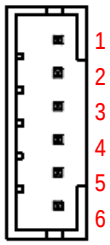
USB Cable (optional):
USB 2.0 Header to 2x Female Type-A Cable (length 200mm), P/N: 30-20874-1000

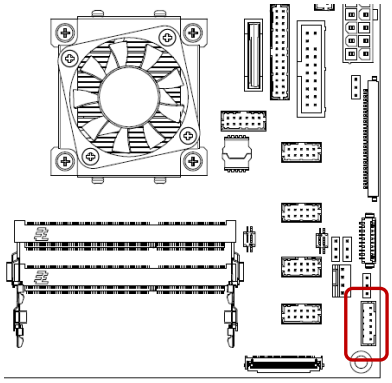


4.2.5. PS/2 Keyboard and Mouse Connector

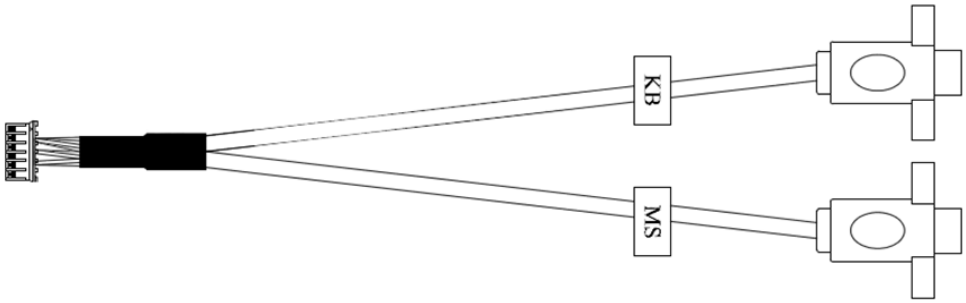
6 pin 2.0 pitch standard wafer connector. No support for PS/2 KB/MS wake function

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

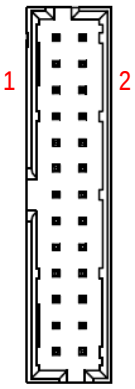


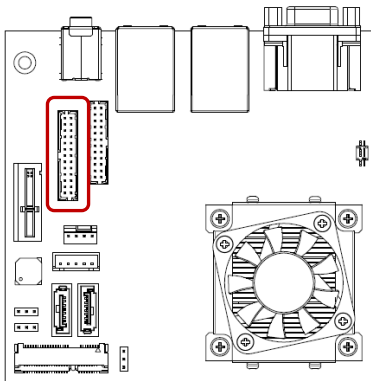
4.2.6. Internal Audio Connector

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

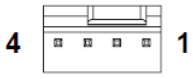


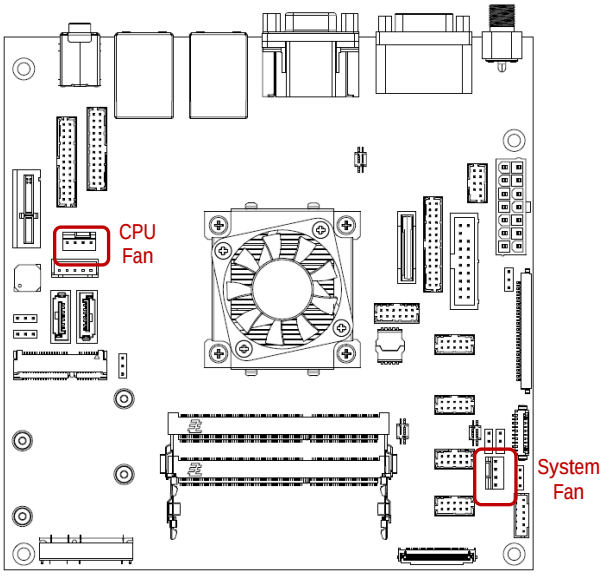


4.2.7. CPU Fan and System Fan Connectors

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

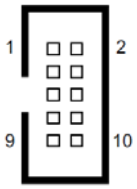


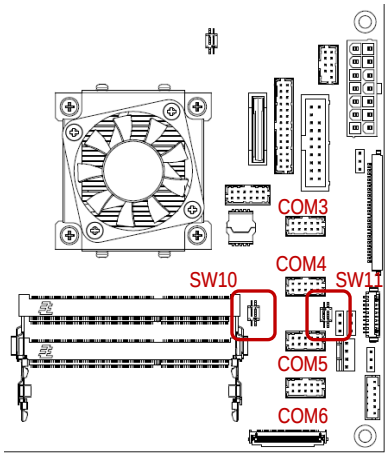


4.2.8. Serial COM Port Connectors

Four internal Serial Ports (COM3-6)

Serial Port	Functions
COM3	Supports RS-232 / RS-422 / RS-485, 5V/12V power support by BOM option (default 5V). SW10: Switch for mode selection of COM3 (default RS-232).
COM4	Supports RS-232 / RS-422 / RS-485, 5V/12V power support by BOM option (default 5V). SW11: Switch for mode selection of COM4 (default RS-232).
COM5	Supports RS-232 only, 5V/12V power support by BOM option (default 5V).
COM6	Supports RS-232 only, 5V/12V power support by BOM option (default 5V).





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

RS-422 (COM3-4 only)

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

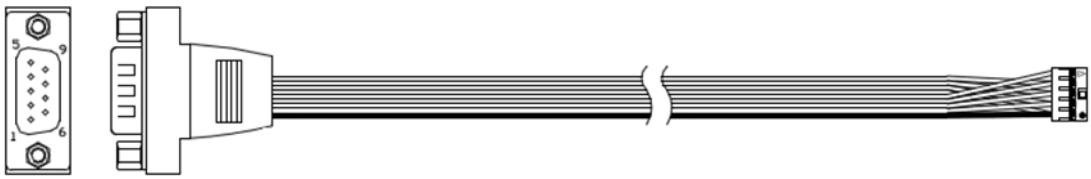
RS-485 (COM3-4 only)

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

SW10/SW11 (RS-422/485 Mode Select)			
	RS-232 (default)	RS-422	RS-485
1	ON*	ON	OFF
2	OFF*	ON	ON

See Section 4.3.8 Serial Port Mode Switch Setting (SW14, SW10, SW11)

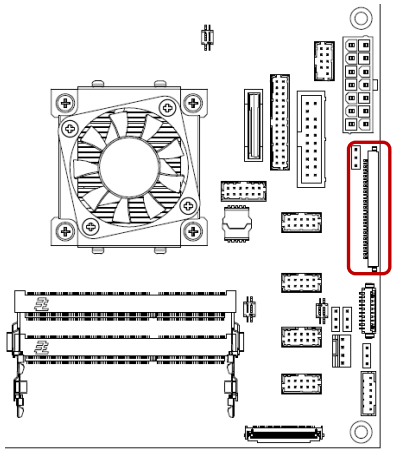
COM Cable (optional):
COM Port Cable (length 250mm), P/N: 30-20876-0000



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

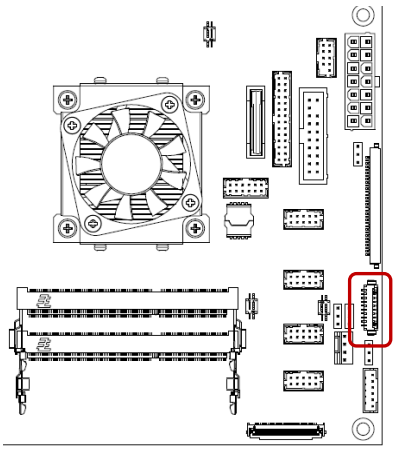


Note	Type	Signal	Pin #	Pin #	Signal	Type	Note
	LVDS	LVDS A0-	1	16	LVDS B1+	LVDS	
	LVDS	LVDS A0+	2	17	POWER GND	PWR	Max. 0.5A
	LVDS	LVDS A1-	3	18	LVDS B2-	LVDS	
	LVDS	LVDS A1+	4	19	LVDS B2+	LVDS	
	LVDS	LVDS A2-	5	20	LVDS BCLK-	LVDS	
	LVDS	LVDS A2+	6	21	LVDS BCLK+	LVDS	
Max. 0.5A	PWR	POWER GND	7	22	LVDS 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

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

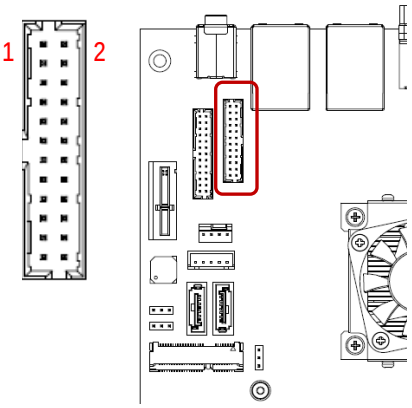
See Chapter 4.3 Jumper and Switch Settings for Backlight Power Selection (JP2), Panel Power Selection (JP3), and Panel Power Selection (JP3) settings.

4.2.11. Front Panel Connector

2x12-pin 2.0 pitch standard wafer connector

The front panel connector of AmITX-BT-I 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.

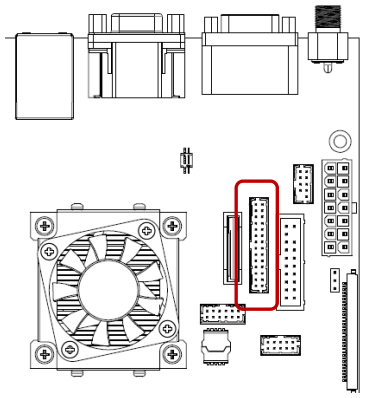
Note 2: Maximum load is 1A.

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).

4.2.12. Feature Connector

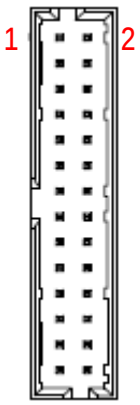
2x13-pin 2.0 pitch standard wafer connector

The feature connector of AmITX-BT-I 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	-	



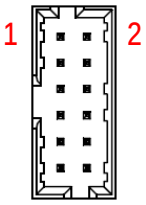
Note 1: Pull-up to +3V3Dual (+3V3 or SB3V3).

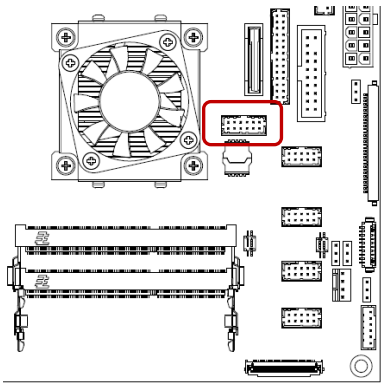
Note 2: Input to SEMA.

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

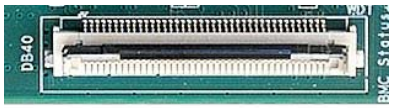




Signal	Description
CLK	Serial Clock
SB3V3	3.3V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3V power sourced via this pin.
CS0#	CS0# Chip Select 0, active low.
ADDIN	ADDIN input signal must be NC.
MOSI	Master Output, Slave 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.

4.2.14. DB40 Debug Board Connector

FPC Connector Type: FCI 59GF Flex 10042867



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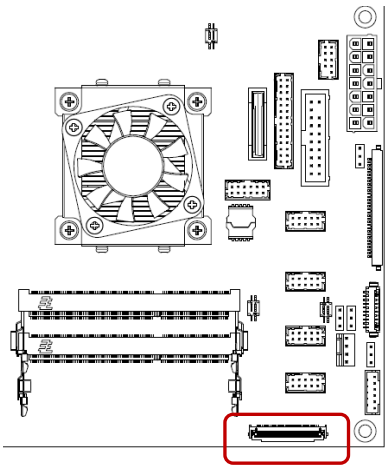


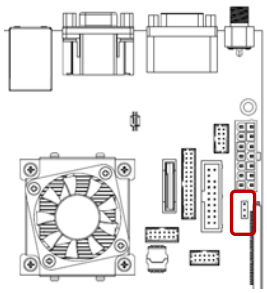
Pin	Interface	Signal	Remark	Pin	Interface	Signal	Remark
1	SPI Program interface	VCC_SPI_IN	SPI Power Input from flash tool to module. HW need add MOS FET to switch SPI power for SPI ROM	21	BMC Program interface (continued)	TXD6	
2		GND		22		RXD6	
3		SPI_BIOS_CS0#		23		FUMD0	
4		SPI_BIOS_CS1#		24		RESET_IN#	
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.

4.3. Jumper and Switch Settings

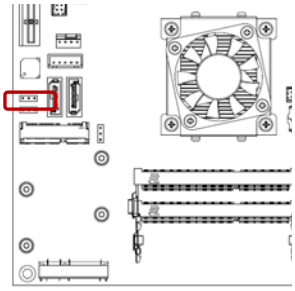
4.3.1. ATX/AT Mode Jumper Selection (JPY1)

JPY1	ATX/AT Mode
1-2	ATX (default)
2-3	AT



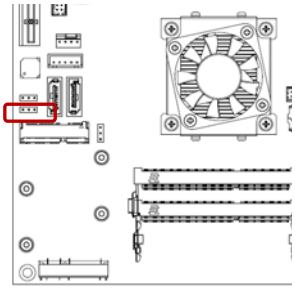
4.3.2. Clear CMOS (JP5)

JP5	Clear CMOS
1-2	Normal (default)
2-3	Clear CMOS



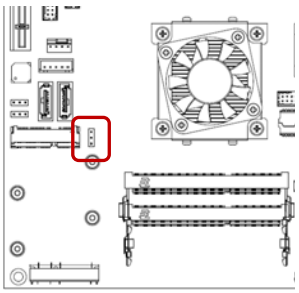
4.3.3. Reset BIOS Defaults (JP6)

JP6	BIOS Default
1-2	Normal (default)
2-3	Reset BIOS Defaults



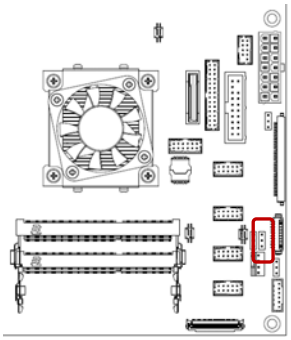
4.3.4. SATA2/mSATA Select (JP1)

JP1	SATA2/mSATA Select
1-2	SATA2 (default)
2-3	mSATA



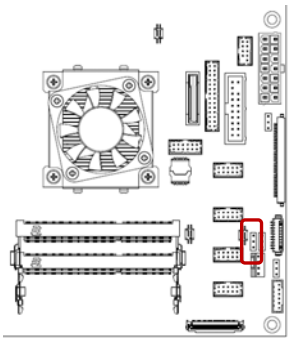
4.3.5. LVDS Backlight Power Jumper Selection (JP2)

JP1	Backlight Power
1-2	12V
2-3	5V (default)



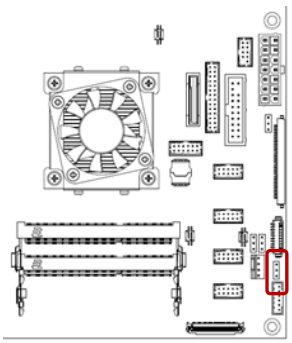
4.3.6. LVDS Panel Power Jumper Selection (JP3)

JP2	Panel Power
1-2	5V
2-3*	3.3V (default)



4.3.7. LVDS Backlight Enable Jumper Selection (JP4)

JP4	Backlight Power
1-2	Active High /Convert
2-3*	Active LowNormal (default)

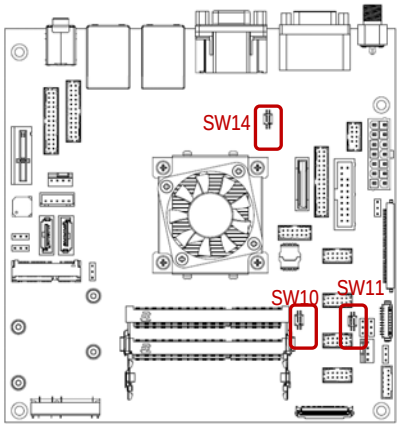


4.3.8. Serial Port Mode Switch Setting (SW14, SW10, SW11)

SW14 (SER1 MODE SEL)			
	RS-232 (default)*	RS-422	RS-485
1	ON*	ON	OFF
2	OFF*	ON	ON

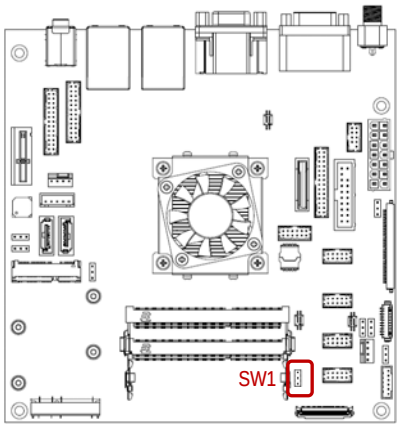
SW10 (SER3 MODE SEL)			
	RS-232 (default)	RS-422	RS-485
1	ON*	ON	OFF
2	OFF*	ON	ON

SW11 (SER4 MODE SEL)			
	RS-232 (default)	RS-422	RS-485
1	ON*	ON	OFF
2	OFF*	ON	ON



4.3.9. BIOS Switch Setting (SW1)

SW1	
ON (default)	Boot from SPI0*
OFF	Boot from SPI1



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)	

5. Driver Installation

The AmITX-BT-I 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=1444).

Windows 7 32/64-bit

Chipset	\1.Chipset\Intel_Chipset_Device_Software_WinAllOS_v10.0.20\
Display	\2.Graphic\Intel_HD_Graphics_Win7_32_v36.15.0.1091\
	\3.Graphic\Intel_HD_Graphics_Win7_64_v37.15.0.1091\
Audio	\4.Audio\Realtek_High_Definition_Audio_Win7_32_64_6.0.1.6410\
LAN	\5.LAN\WIN7\Intel_Gigabit_Network_Connection_Win7_32_v12.11.97.1\
	\6.LAN\WIN7\Intel_Gigabit_Network_Connection_Win7_64_v12.7.28.0\
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	\9.USB3.0\Intel_USB 3.0_Host_Controller_Win7_32_64_v3.0.0.34

Windows 8 32/64-bit

Chipset	\1.Chipset\Intel_Chipset_Device_Software_WinAllOS_v10.0.20\
Display	\2.Graphic\Intel_HD_Graphics_Win8_8.1_32_v15.33.19.3540\
	\3.Graphic\Intel_HD_Graphics_Win8_8.1_64_v15.33.19.64.3540\
MBI	\4.MBI\Intel_MBI_Device_Win8_8.1_32_64_v1.70.305.16316\
TXE	\5.TXE\Intel_TXE_Driver_Win8_32_64_v1.0.4.1089\

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\Intel_Chipset_Device_Software_WinAllOS_v10.0.20\\SetupChipset.exe. Follow the instructions given and reboot when instructed.
2. Install the Display driver and utilities by running the program \2. Graphic\Intel_HD_Graphics_Win7_32_v36.15.0.1091\setup.exe. Follow the instructions given and reboot when instructed.
3. Install the Audio driver by running the program \4.Audio\Realtek_High_Definition_Audio_Win7_32_64_6.0.1.6410\setup.exe. Follow the instructions given and reboot if required.
4. Install the LAN driver by running the program \5.LAN\WIN7\Intel_Gigabit_Network_Connection_Win7_32_v12.11.97.1\Intel_Gigabit_Network_Connection_Win7_32_v12.11.97.1.exe. Follow the instructions given and reboot if required.
5. Install the IO driver by running the program \7.IO\ Intel_Processor_IO_Drivers_Win7_32_v2.0.msi\Intel_Processor_IO_Drivers_Win7_32_v2.0.msi. Follow the instructions given and reboot if required.
6. Install the USB 3.0 driver by running the program \9.USB3.0\Intel_USB 3.0_Host_Controller_Win7_32_64_v3.0.0.34\setup.exe. Follow the instructions given and reboot if required.

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 cExpress-BT 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

6.1.2. Main Current

The BMC of the cExpress-BT 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 cExpress-BT.

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

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.

7. System Resources

7.1. System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
Start 128KB below 1MB	000E0000h-000FFFFFh		Low Bios
Starts 20MB below 4GB	FEC00000h-FEC0040h		IO APIC
Start 19MB below 4GB	FED00000h-FED003FFh		HPET
Start 64 KB below 4GB	FFFF0000h-FFFFFFFFh		High Bios
0K –1MB		1MB	DOS DRAM

7.2. I/O Map

7.2.1. I/O Map

Hex Range	Device
20h-21h, 24h-25h, 28h-29h, 2Ch-2Dh, 30h-31h, 34h-5h, 38h-39h, 3Ch-3Dh	8259 Master
40h-43h, 50h-53h	8254s
60h, 64h	PS2 Control
61h, 63h, 65h, 67h	NMI Controller
70h-77h	RTC
80h-83h	Port 80h
92h	Init Register
A0h-A1h, A4h-A5h, A8h-A9h, ACh-ADh, B0h-B1h,B4h-B5h, B8h-B9h, BCh-BDh, 4D0h-4D1h	8259 Slave
2E8h-2FFh	COM2
3F8h-3FFh	COM1
B2h-B3h	Active Power Management
E000	Smbus base address for SB.
500	GPIO Base Address for SB
400	PM (ACPI) Base Address for SB

7.2.2. IRQ Lines PIC mode

IRQ#	Typical Intterupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	IRQ1 via SERIRQ / PIRQ	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 (LPT)	IRQ5 via SERIRQ / PIRQ	Note (1)
6	Generic	IRQ6 via SERIRQ / PIRQ	Note (1)
7	Generic	IRQ7 via SERIRQ / PIRQ	Note (1)
8	Real-time clock	N/A	No
9	Generic	IRQ9 via SERIRQ / PIRQ	Note (1)
10	Generic	IRQ10 via SERIRQ / PIRQ	Note (1)
11	Generic	IRQ11 via SERIRQ / PIRQ	Note (1)
12	PS/2 Mouse	IRQ12 via SERIRQ / PIRQ	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller	IRQ14 via SERIRQ / PIRQ	Note (1)
15	Secondary IDE controller	IRQ15 via SERIRQ / PIRQ	Note (1)

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

7.2.3. IRQ Lines APIC mode

IRQ#	Typical Intterupt Resource	Connected to Pin	Available
0	System timer	N/A	No
1	Standard PS/2 Keyboard	N/A	No
2	N/A	N/A	
3	Communication Port(COM2)	IRQ3 via SERIRQ / PIRQ	Note (1)
4	Communication Port(COM1)	IRQ4 via SERIRQ / PIRQ	Note (1)
6	N/A	N/A	Note (1)
7	N/A	N/A	Note (1)
8	High precision event timer	N/A	No
9	N/A	N/A	Note (1)
10	N/A	N/A	Note (1)
11	N/A	N/A	Note (1)
12	PS/2 Mouse	IRQ12 via SERIRQ / PIRQ	Note (1)
13	N/A	N/A	Note (1)
14	N/A	N/A	Note (1)
15	N/A	N/A	Note (1)
16	N/A	PCIE Port 1/2/3/4, eMMC, IGD, PCI Slot 1/2/3/4	Note (1)
17	N/A	PCIE Port 1/2/3/4, SDIO Device, PCI Slot 1/2/3/4	Note (1)
18	N/A	PCIE Port 1/2/3/4, SD Device, PCI Slot 1/2/3/4	Note (1)
19	N/A	PCIE Port 1/2/3/4, AHCI controller, PCI Slot 1/2/3/4	Note (1)
20	N/A	Gbe controller, xHCI controller	Note (1)
21	N/A	Low Power Audio Engine,TXE	Note (1)
22	N/A	Intel HDA	Note (1)
23	N/A	N/A	Note (1)

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

7.3. PCI Configuration Space Map

Bus Number	Device Number	Function Number	Routing	Description
00h	00h	00h	N/A	Soc Transaction Router
00h	02h	00h	Internal	Graphics & Display
00h	10h	00h	Internal	Storage Control Cluster(MMC Port)
00h	11h	00h	Internal	Storage Control Cluster(SDIO Port)
00h	12h	00h	Internal	Storage Control Cluster(SD Port)
00h	13h	00h	Internal	SATA
00h	14h	00h	Internal	xHCI USB
00h	18h	00h	Internal	Serial IO(SIO:DMA)
00h	18h	01h	Internal	Serial IO(SIO:I2C Port 1)
00h	18h	02h	Internal	Serial IO(SIO:I2C Port 2)
00h	1Ah	00h	Internal	Trusted Execution Engine
00h	1Bh	00h	Internal	HD Audio
00h	1Ch	00h	Internal	PCI Express Root port 1
00h	1Ch	01h	Internal	PCI Express Root port 2
00h	1Ch	02h	Internal	PCI Express Root port 3
00h	1Ch	03h	Internal	PCI Express Root port 4
00h	1Dh	00h	Internal	EHCI USB
00h	1Fh	00h	N/A	Platform Controller Unit(LPC)
00h	1Fh	03h	Internal	SMBus Controller
03h	00h	00h	Internal	Texas Instruments PCI-to-PCI Bridge
05h	00h	00h	Internal	Intel Corporation Ethernet Controller

7.4. PCI Interrupt Routing Map

INT Line	Intel IGD	PCIe Root Port #1	PCIe Root Port #2	PCIe Root Port #3	PCIe Root Port #4	SD Host #0 eMMC
Int0	INTA:16	INTA:16				INTA:16
Int1			INTB:17			
Int2				INTC:18		
Int3					INTD:19	

INT Line	SD Host#1 SDIO	SD Host#2 SD Card	SATA Controller	PCI-to-PCI Bridge	xHCI Host	Low Power Audio Engine	TXE	HDA
Int0					INTE:20	INTF:21	INTF:21	INTG:22
Int1	INTB:17							
Int2		INTC:18		INTC:18				
Int3			INTD:19					

INT Line	EHCI Controller	SMBus Controller	GbE Controller	LPSS2 DMA	LPSS2 I2C#1	LPSS2 I2C#2
Int0	INTH:23		INTE:20	INTB:17		
Int1		INTC:18				
Int2					INTD:19	
Int3						INTC:18

7.5. SMBus Slave Address

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

8. BIOS Setup

8.1. Menu Structure

This section presents the 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
- System Information - Processor Information - VGA Firmware Version - Memory Information - SOC Information - System Management ▶ - System Date - System Time	- CPU ▶ - Memory ▶ - Graphics ▶ - SATA ▶ - USB ▶ - Network ▶ - PCI and PCIe ▶ - Super IO ▶ - ACPI and Power Management ▶ - Sound ▶ - Serial Port Console ▶ - Thermal ▶ - Trusted Computing ▶ - Miscellaneous ▶ - PPM Configuration ▶	- Boot Configuration ▶ - Boot Option Priorities ▶ - CSM Parameters ▶	- Password Description - Secure Boot Menu ▶	- Reset Options - Save Options

Notes:

▶ indicates a submenu

Gray text indicates info only

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 for details of the submenus and settings.

8.2.1. System Information

Feature	Options	Description
BIOS Vendor	Info only	ADLINK BIOS Vendor
Core Version	Info only	ADLINK BIOS Core Version
Project Version	Info Only	ADLINK BIOS Version
Build Date and Time	Info only	Date the BIOS was built

8.2.2. Processor Information

Feature	Options	Description
CPU Brand String	Info only	Display CPU brand name
Max CPU Speed	Info only	Display CPU frequency
CPU Signature	Info only	Display CPU ID
Number of Processors	Info only	Display number of processor

8.2.3. VGA Firmware Version

Feature	Options	Description
IGFX VBIOS Version IGFX GOP Version	Info only	Display legacy VBIOS or GOP driver version

8.2.4. Memory Information

Feature	Options	Description
Total Memory	Info only	Display total memory information

8.2.5. SOC Information

Feature	Options	Description
BayTrail Soc	Info only	Display SOC stepping
TXE FW Version	Info only	Display version of TXE

8.2.6. System Management

8.2.6.1. System Management > Board Information

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

8.2.6.2. System Management > Temperatures and Fan Speed

Feature	Options	Description
Temperatures and Fan	Info only	
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 Fan Speed	Read only	Display system fan speed

8.2.6.3. 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
GPU-Vcore	Read only	Display actual GPU-Vcore voltage
GFX-Vcore	Read only	Display actual GFX-Vcore voltage
V1.05	Read only	Display actual V1.05 voltage

Feature	Options	Description
V1.35	Read only	Display actual V1.35 voltage
V1.00	Read only	Display actual V1.00 voltage
V3.30	Read only	Display actual V3.30 voltage
VIN	Read only	Display actual VIN voltage
AIN7	Read only	Display actual AIN7 voltage

8.2.6.4. 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.

8.2.6.5. 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

8.2.6.6. 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.
ECO Mode	Disabled Enable	Reduces the power consumption of the system
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.

8.2.6.7. System Management > LVDS Backlight

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

8.2.6.8. 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
CPU 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
CPU 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
CPU 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
CPU 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

8.2.7. System Date and Time

Feature	Options	Description
System Date	Day of Week, 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	Infor only	
CPU Brand Name	Info only	Display CPU brand name
CPU Signature	Info only	Display CPU signature
Processor Family	Info only	Display processor family
Microcode Patch	Info only	Display microcode patch
Max CPU speed	Info only	Display max. CPU speed
Min CPU speed	Info only	Display min. CPU speed
Processor Cores	Info only	Display number of processor cores
Intel HT Technology	Info only	Display Intel HT Technology support
Intel VT-x Technology	Info only	Display Intel VT-x Technology support
64-bit	Info only	Display 64-bit support
L1 Data Cache	Info only	Display cache info
L1 Code Cache	Info only	Display cache info
L2 Cache	Info only	Display cache info
L3 Cache	Inf o only	Display cache info
Limit CPUID Maximum	Disabled Enabled	Disabled for Windows XP
SB CRID	Revision ID CRID 0 CRID 1 CRID 2	Select the Revision ID (Revision ID, CRID 0, CRID 1, CRID 2) reflected in PCI config space
CPU Processor Power Management (PPM)	Info only	
EIST	Disabled Enabled	Enable/Disable Intel SpeedStep
CPU C state Report	Disabled Enabled	Enable/Disable CPU C state report to OS
CPU DTS	Disabled Enabled	Enabled/Disable digital thermal sensor

8.3.2. Memory

Feature	Options	Description
Memory	Info only	
Total Memory	Info only	Display total memory
DIMM#0/1	Info only	Display DIMM#0/1

SPD Write Protect	Enabled Disabled	Enabled: Writes to SMBus slave addresses A0h – Aeh are disabled
Max TOLUD	Dynamic	Maximum value of TOLUD

8.3.3. Graphics

Feature	Options	Description
Graphics	Info only	
IGFX VBIOS Version	Info only	
Primary Display	Auto IGD PCIE	Select which graphics device (IGD/PCI) should be primary display
Integrated Graphics Device	Enabled Disabled	Enabled: Enable Integrated Graphics Device (IGD) when selected as the primary display; Disabled: Always disable IGD
Aperture Size	256MB	Select the aperture size
DVMT Pre-Allocated	64M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	256MB	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
LVDS Backlight Mode	BMC Mode GTT Mode	Select LVDS backlight control function.
DDI function choose	DisplayPort HDMI LVDS	Choose DisplayPort, HDMI or LVDS.
AMI Graphics Output Protocol Policy [UEFI GOP only]	Submenu	User select monitor output by graphics output protocol
GT – Power Management Control	Info only	
RC6 (Render Standby)	Enabled Disabled	Enable/Disable render standby support
Data Format and Color	VESA 24 bpp JEIDA 24 bpp JEIDA/Vesa 18 bpp	Data Format and Color Depth select
LVDS Output Mode	Dual LVDS bus Single LVDS bus	Single /Dual mode select
DE Polarity	Active High Active Low	DE Polarity select
Vsync Polarity	Active High Active Low	Vsync Polarity Select
Hsync Polarity	Active High Active Low	Hsync Polarity Select

8.3.3.1. AMI Graphics Output Protocol Policy

Feature	Options	Description
Intel(R) Valley View Graphics Controller	Info only	
Intel(R) GOP Driver	Info only	
Output Select [List connect device]	CRT	Output Interface.
Brightness Setting [LFP device connect only]	255	Set GOP Brightness value
BIST Enable	Enabled Disabled	Starts or stops the built-in self-test (BIST) on the integrated display panel.

8.3.4. SATA

Feature	Options	Description
SATA	Info only	
SATA Controller(s)	Enabled Disabled	Enable/Disable Serial ATA.
SATA Mode Selection	IDE Mode AHCI Mode	Select IDE/AHCI
SATA Test Mode	Enabled Disabled	Test Mode enable/disable
SATA Controller Speed	Gen1 Gen2 Gen3	SATA speed support Gen1 or Gen2.
SATA Port Configuration	Submenu	

8.3.4.1. SATA > SATA Port Configuration

Feature	Options	Description
SATA Port Configuration	Info only	
Port X	Disabled Enabled	Enable/Disable SATA port X.
HotPlug	Enabled Disabled	Enable/Disable SATA port X hotplug.

8.3.5. USB

Feature	Options	Description
USB	Info only	
USB Module Version	Info only	
USB Devices	Info only	Drives, keyboards, mouse, hubs
Legacy USB Support	Enabled Disabled Auto	Enables legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications and setup.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI OS driver.
EHCI Hand-off	Enabled Disabled	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by the EHCI OS driver.
USB Mass Storage Driver Support	Enabled Disabled	Enable/Disable USB mass storage driver support.
Chipset USB Configuration	Submenu	
USB hardware delays and time-outs:	Info only	
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. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
Mass Storage Devices	Info only	List current USB mass storage devices.

8.3.5.1. USB > Chipset USB Configuration

Feature	Options	Description
USB Configuration	Info only	
XHCI Mode	Enabled Disabled	Mode of operation of xHCI controller.
USB 2.0 (EHCI) Support	Enabled Disabled	Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.
USB Per Port Control	Enabled Disabled	Control each of the USB ports (0~3). Enable: Enable USB per port; Disable: Use USB port x settings.
USB Port #0~3	Enabled Disabled	Enable/Disable USB port 0-3.

8.3.6. Network

Feature	Options	Description
Network	Info only	
Network Stack	Enabled **Disabled**	Enable/Disable UEFI network stack.
LAN Controller	**Enabled** Disabled	Enable/Disable LAN controller.
		.

8.3.7. PCI and PCIe

Feature	Options	Description
PCI and PCIe	Info only	
PCI Common Settings	Info only	
PCI Latency	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	Enables or Disables VGA palette registers snooping.
PERR# Generation	Enabled Disabled	Enable or Disable the PCI Express port 1 in the chipset.
SERR# Generation	Enabled Disabled	Enables or Disables PCI Device to generate SERR#.
PCI Express Settings	Info only	
Relaxed Ordering	Disabled Enabled	Enables or Disables 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	Enables or Disables 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	

Feature	Options	Description
ASPM Support WARNING: Enabling ASPM may cause some PCI-E devices to fail	**Disabled** Auto Force L0s	Set the ASPM Level: Force L0s - Force all links to L0s Auto - BIOS auto configure Disabled - Disables ASPM
Extended Synch	**Disabled** Enabled	If enabled, allows generation of Extended Synchronization patterns.
Link Training Retry	Disable 2 3 5	Defines number of retry attempts software will take to retrain the link if previous training attempt was unsuccessful.
Link Training Timeout (Us)	1000	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 Disabled.
Restore PCIE Registers	Enabled **Disabled**	On non-PCI Express aware OSes (pre Windows Vista) some devices may not be correctly reinitialized after S3. Enabling this restores PCI Express device configurations on S3 resume. Warning: Enabling this may cause issues with other hardware after S3 resume.
PCIe Configuration	Info only	
PCIe Configuration	Submenu	

8.3.7.1. PCI and PCIe > PCIe Configuration

Feature	Options	Description
PCIe Configuration	Info only	
PCI Express Root Port x	Submenu	

8.3.7.2. PCI and PCIe > PCIe Configuration > PCI Express Port x

Feature	Options	Description
PCI Express Port x	**Enabled** Disabled	Enable or disable the PCI Express port x in the chipset.
ASPM	**Auto**	PCI Express Active State Power Management settings.
URR	**Disabled** Enabled	Enable or disable PCI Express Unsupported Request Reporting.
FER	**Disabled** Enabled	Enable or disable PCI Express Device Fatal Error Reporting.
NFER	**Disabled** Enabled	Enable or disable PCI Express Device Non-Fatal Error Reporting.
CER	**Disabled** Enabled	Enable or disable PCI Express Device Correctable Error Reporting.
SEFE	**Disabled** Enabled	Enable or disable Root PCI Express System Error on Fatal Error.
SENFE	**Disabled** Enabled	Enable or disable Root PCI Express System Error on Non-Fatal Error.
SECE	**Disabled** Enabled	Enable or disable Root PCI Express System Error on Correctable Error.
PME SCI	Disabled **Enabled**	Enable or disable PCI Express PME SCI.
Hot Plug	Disabled **Enabled**	Enable or disable PCI Express hotplug.
Speed	Auto **Gen 2** Gen 1	Configure PCIe port speed.

8.3.8. Super IO

Feature	Options	Description
Super IO Chip	Info only	
IT8783 Super IO Configuration	Info only	
Serial Port 1 Configuration		
Serial Port	Enabled Disabled	Enable/Disable Serial Port 1 (COM0).
Device Settings	IO=3F8h; IRQ=4	Fixed configuration of serial port.
Change Settings	Auto IO=3F8h; IRQ=4 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.
Serial Port 2 Configuration		
Serial Port	Enabled Disabled	Enable/Disable Serial Port 2 (COM1).
Device Settings	IO=2F8h; IRQ=3	Fixed configuration of serial port.
Change Settings	Auto IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.
Serial Port 3 Configuration		
Serial Port	Enabled Disabled	Enable/Disable Serial Port 3 (COM2).
Device Settings	IO=3E8h; IRQ=6	Fixed configuration of serial port.
Change Settings	Auto IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.
Serial Port 4 Configuration		
Serial Port	Enabled Disabled	Enable/Disable Serial Port 4 (COM3).
Device Settings	IO=2E8h; IRQ=4	Fixed configuration of serial port.
Change Settings	Auto IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.
Serial Port 5 Configuration	Enabled	Enable/Disable Serial Port 5 (COM4).

Feature	Options	Description
Serial Port	Disabled	
Device Settings	IO=2F0h; IRQ=10	Fixed configuration of serial port.
Change Settings	Auto IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.
Serial Port 6 Configuration Serial Port	Enabled Disabled	Enable/Disable Serial Port 6 (COM5).
Device Settings	IO=2E0h; IRQ=11	Fixed configuration of serial port.
Change Settings	Auto IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Select an optimal setting for Super IO device.

8.3.9. ACPI and Power Management

Feature	Options	Description
ACPI and Power Management	Info only	
Enable ACPI Auto Configuration	Enabled Disabled	Enables or disables BIOS ACPI Auto Configuration.
Enable Hibernation	Enabled Disabled	Enables or disables system's ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OSes.
ACPI Sleep State	Suspend Disabled S3 (Suspend to RAM)	Select the highest ACPI sleep state the system will enter when the Suspend button is pressed.

8.3.10. Sound

Feature	Options	Description
Sound	Info only	
Azalia	Disabled Enabled	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 Docking Support	Disabled Enabled	Enable/Disable Azalia docking support of audio controller.
Azalia PME	Disabled Enabled	Enable/Disable power management capability of audio controller.

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.
COM1	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/COM1 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 57600 115200	Selects serial port transmission speed. The speed must be matched on the remote computer. Long or noisy lines may require lower speeds.
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	Select FunctionKey and KeyPad on Putty.

Feature	Options	Description
	XTERMR6 SCO ESCN VT400	
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. Thermal

Feature	Options	Description
Thermal	Info only	
CPU Temperature	Info only	
Critical Trip Point	Disabled 85 C 95 C	This value controls the temperature of the ACPI Critical Trip Point - the point at which the OS will shut the system down.
Active Cooling Trip Point	Disabled 40 C 50 C 60 C 70 C BMC Default	Active Cooling Trip Point.
Passive Trip Point	Disabled 90 C 80 C	This value controls the temperature of the ACPI Passive Trip Point - the point at which the OS will begin throtting the processor.
Passive TC1 Value	1	This value sets the TC1 value for the ACPI Passive Cooling Formula. Range 1 - 16
Passive TC2 Value	5	This value value sets the TC2 value for the ACPI Passive Cooling Formula. Range 1 - 16
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. Range 2 - 32

8.3.13. Miscellaneous

Feature	Options	Description
Miscellaneous	Info only	
High Precision Timer	Enabled Disabled	Enable or disable the High Precision Event Timer.
SCC Configuration	Submenu	
Security	Info only	
BIOS Security Configuration	Submenu	
Trusted Computing	Submenu	

8.3.13.1. Miscellaneous > SCC Configuration

Feature	Options	Description
OS Selection	Windows 8.X Android Windows 7	OS Selection
SCC Devices Mode	ACPI mode PCI mode	SCC devices mode setting.
SCC Configuration	Info only	
SCC eMMC Support	Enable eMMC 4.5 Support Enable eMMC 4.41 Support eMMC AUTO MODE Disable	SCC eMMC support enable/disable.
SCC eMMC 4.5 DDR50 Support	Enabled Disabled	SCC eMMC 4.5 DDR50 support enable/disable.
SCC eMMC 4.5 HS200 Support	Enabled Disabled	SCC eMMC 4.5 HS200 support enable/disable.
eMMC Secure Erase	Enabled Disabled	Disable/Enable eMMC secure erase. When enabled, all the data on eMMC will be erased.
SCC SD Card Support	Enabled Disabled	SCC SD card support enable/disable.
SDR25 Support for SDCard	Enabled Disabled	Disable/Enable SDR25 capability in SD Card controller.
DDR50 Support for SDCard	Enabled Disabled	Disable/Enable DDR50 capability in SD Card controller.
MIPI HIS Support	Enabled Disabled	MIPI HIS support enable/disable.
LPSS Configuration	Info only	
LPSS DMA #1 Support	Enabled Disabled	LPSS DMA #1 support enable/disable.
LPSS HSUART #1 Support	Enabled Disabled	LPSS HSUART #1 support enable/disable.

8.3.13.2. Miscellaneous > BIOS Security Configuration

Feature	Options	Description
BIOS Security Configuration	Info only	
Global SMI Lock	Enabled Disabled	Enable or disable SMI lock.

8.3.13.3. Miscellaneous > Trusted Computing

Feature	Options	Description
Coniguration	Info only	
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
Current Status Information	Info only	

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.
WIN8 Support	Disabled Enabled	If enabled, some of default settings will be configured properly for Windows8. Affected items: CSM Configuration->Boot option filter CSM Configuration->Video
Boot Option Priorities	Info only	
Hard Drive BBS Priorities	Info only	
CSM Parameters	Submenu	CSM configuration: Enable/Disable, Option ROM execution settings, etc.

8.4.1.1. Boot Configuration > CSM Parameters

Feature	Options	Description
Compatibility Support Module Configuration	Info	
CSM Support	Enabled Disable	Enable/Disable CSM Support.
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.
Boot option filter	UEFI and Legacy Legacy only UEFI only	This option controls legacy/UEFI ROM priority.
Option ROM execution order	Info only	
Network	Do not launch UEFI only Legacy only	Controls the execution of UEFI and legacy PXE OpROM.

Feature	Options	Description
Storage	Do not launch UEFI only Legacy only	Controls the execution of UEFI and legacy storage OpROM.
Video	Do not launch UEFI only Legacy only	Controls the execution of UEFI and legacy video OpROM.
Other PCI devices	Do not launch UEFI only Legacy only	Determines OpROM execution policy for devices other than network, storage or video.

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. Security > 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.

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.

Getting Service

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

ADLINK Technology, Inc.
Address: 9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
Address: 300 Fang Chun Rd., Zhangjiang Hi-Tech Park, Pudong New Area
Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Address: Hans-Thoma-Strasse 11, D-68163, Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you.