MXE-1400 Series

MXE-1401

Fanless Embedded Computer

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
2.00	July 29, 2016	Initial Release
2.50	Sept. 5, 2016	Section 2.2 Adaptors & Additional Accessories added

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Preface

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Conventions

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



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



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



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

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1 Introduction



1.1 Overview

ADLINK's new Matrix MXE-1400 series of rugged quad-core fanless computers, featuring the latest generation of Intel® Atom™ E3845 (codename: BayTrail) delivers outstanding processor performance with minimum power consumption.

The MXE-1400 series accommodates rich I/O variety in a compact system, with DisplayPort, DVI-I (supporting both DVI and VGA signals), 3 GbE by Intel network interface controllers, 6 USB 2.0, 1 USB 3.0 with dedicated bandwidth, 8 isolated DIO, and 6 COM ports, with 4 BIOS-configurable among RS-232/422 and 485 with auto flow control. Versatile connection to a wide range of applications is provided by dual mini-PCIe slots and USIM socket allowing the MXE-1400 to act as a communications hub for a variety of wireless connections, such as BT/WiFi and 3G/LTE.

Leveraging proprietary mechanical engineering, the MXE-1400 series continues to offer all the popular features of the Matrix E series, including cable-free construction, wide operating temperature ranges, and 5 Grms vibration resistance. The entire ADLINK Matrix line undergoes rigorous testing for operational integrity.

In addition, the MXE-1400 accommodates the most recent modular design available in the Matrix series, keeping essential interfaces on the Mainboard, assigning flexible I/O expandability to the

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AFM (Adaptive Function Modules), whereby selection or customization of I/O interfaces based on application requirements.

Combing superior processor performance, wireless capability, and rich I/O with flexible expandability, all in a compact and robust package, the ADLINK MXE-1400 is an ideal choice for a wide range of applications including intelligent transportation, in-vehicle multimedia, surveillance, and factory automation.

1.2 Features

- Quad-core Intel® Atom™ E3845
- Single side I/O access with SATA drive bay
- Compact 210(W) x 170(D) x 70(H) mm size
- Flexible modular design for I/O expansion
- Built-in ADLINK SEMA management solution
- Rugged construction provides fanless -40°C to 70°C operability (w/industrial SSD)
- Rich I/O :
  - DVI-I+DisplayPort, 6x USB 2.0, 1x USB 3.0, 3x GbE ports, 6x COM ports, 8x isolated DI/O
  - 1x SATA-II (3.0 Gb/s), 2x mPCIe slots



NOTE:

Industrial SSD option guarantees cold system boot at -40°C and operation with 100% loading at 70°C when installed.

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1.3 Specifications

MXE-1401	
System Core	
Processor	Intel® Atom™ E3845
Chipset	SoC design
Video	2 independent displays out of 3 channels 1x VGA+ DVI by DVI-I connector 1x Display ports supports up to 2560 x 1600
Memory	2 GB DDR3L 1066 MHz SODIMM module (Up to 8 GB support)
I/O Interface	
Ethernet	3 GbE ports (3x Intel® I211 AT)
Serial Ports	4 BIOS configurable RS-232/422/485 (COM1 ~ COM4) 2 RS-232 (COM5 & COM6)
USB	6 USB 2.0 ports + 1 USB 3.0 port
DIO	8 DIO w/ 1.5KV isolation
Audio	1 mic-in and 1 line-out
Mini PCIe	2 internal PCIe mini card sockets
USIM	1 USIM socket for 3G communication (used for a 3G-mini module)
WDT	Supports watchdog timer
Power Supply	
DC Input	Built-in 9-32 VDC wide-range DC input 3P pluggable connectors with latch (GND, V-, V+)
AC Input	Optional 80 W external AC-DC adapter for AC Input
Storage	
SATA HDD	1 onboard SATA-II port for 2.5" HDD/SSD Installation with drive bay
CompactFlash	1 CFAST slot, supporting PI/O and DMA modes
Mechanical	
Dimensions	210(W) x 170(D) x 70(H) mm
Weight	2.0 kg (4.42 lbs)

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MXE-1401	
Mounting	Wall-mount kit
Environmental	
Operating Temperature	Standard: 0°C to 50°C (w/HDD) Extended Temperature: -40°C to 70°C (w/industrial SSD or CFAST)
Storage Temperature	-40°C to 85°C (excl. HDD/SDD/CFAST)
Humidity	Approx. 95% @ 40°C (non-condensing)
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes (w/ CFAST or SSD)
	Operating, 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)
ESD	Contact +/-4 KV and Air +/-8 KV
Shock	Operating, 50 G, half sine 11 ms duration (w/ CFAST or SSD)
EMC	CE and FCC Class A

Power Consumption		
Power off	5.76W	In shutdown mode with DC input and only USB keyboard/mouse
System Idle	13.92W	Under Windows Desktop with no application programs executed
Processor full load	19.92W	Under Windows with 100% CPU utilization and 2D/3D graphics load
System full load	43.2W	Under Windows with 100% CPU utilization and simultaneous access to all I/O devices.
Recommended power supply	80W	With consideration of voltage de-rating under high environmental temperature.

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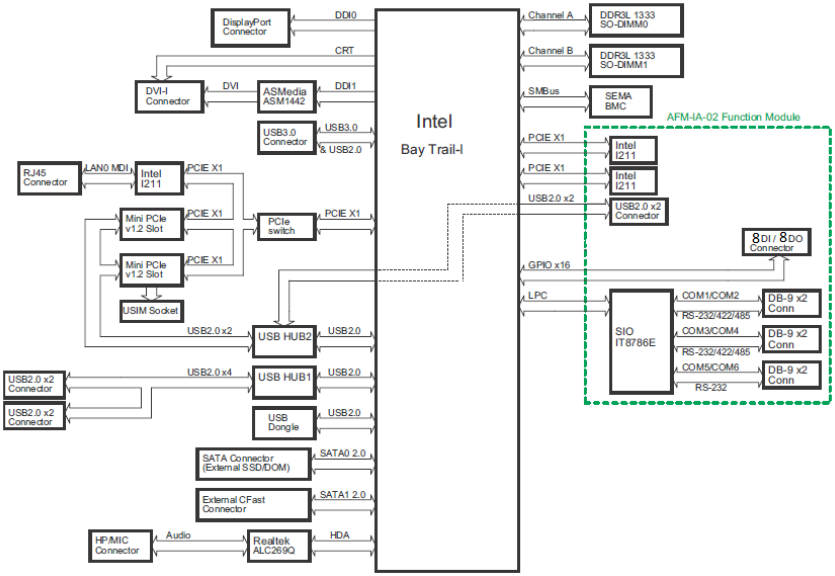


Figure 1-1: MXE-1400 Functional Block Diagram

1.4 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- MXE-1401 controller
- Wall-mount bracket (in Accessory Box)
- Screw pack for wall-mounting and HDD fixing (in Accessory Box)
- Quick Start Guide

1.5 Mechanical Drawings

Shown with wall-mount brackets installed. For more information, see “Wall-mounting the MXE-1400” on page 31.

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NOTE:

All dimensions shown are in millimeters (mm) unless otherwise stated.

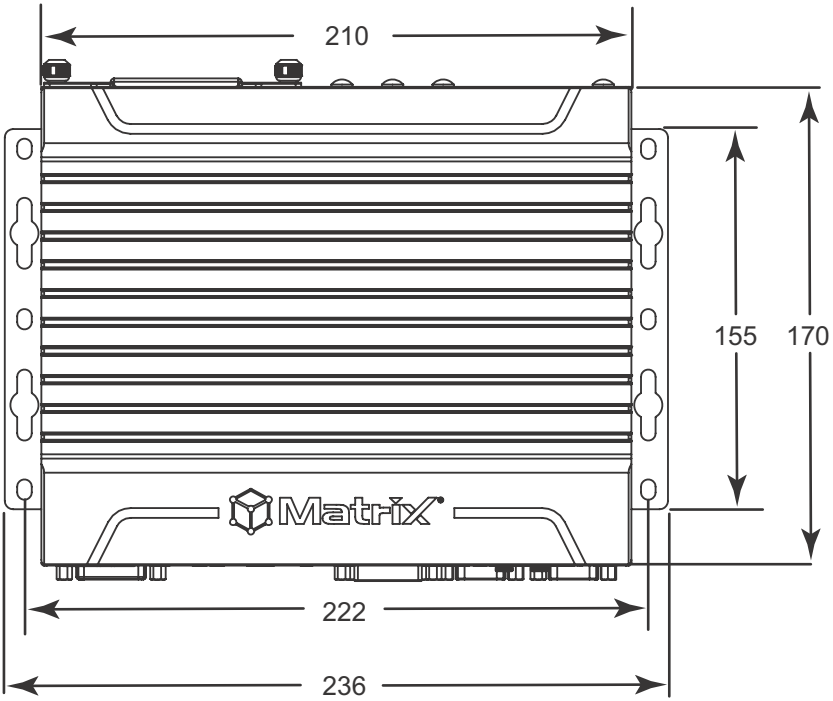


Figure 1-2: Top View

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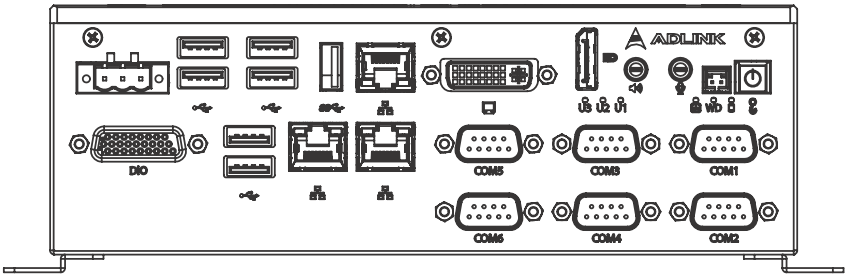


Figure 1-3: Front View

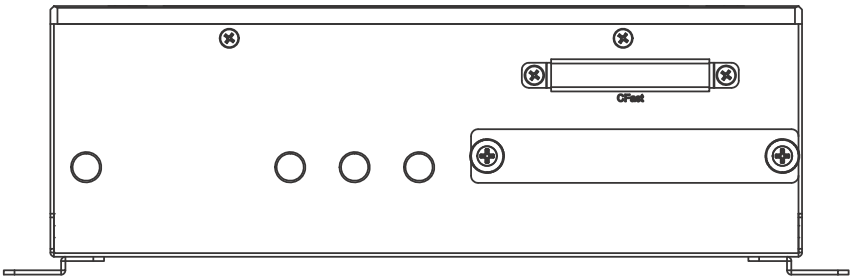


Figure 1-4: Rear View

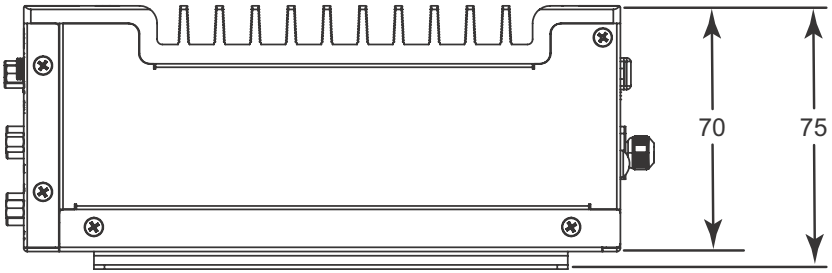


Figure 1-5: (Left) Side View

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1.6 Front Panel I/O Connectors

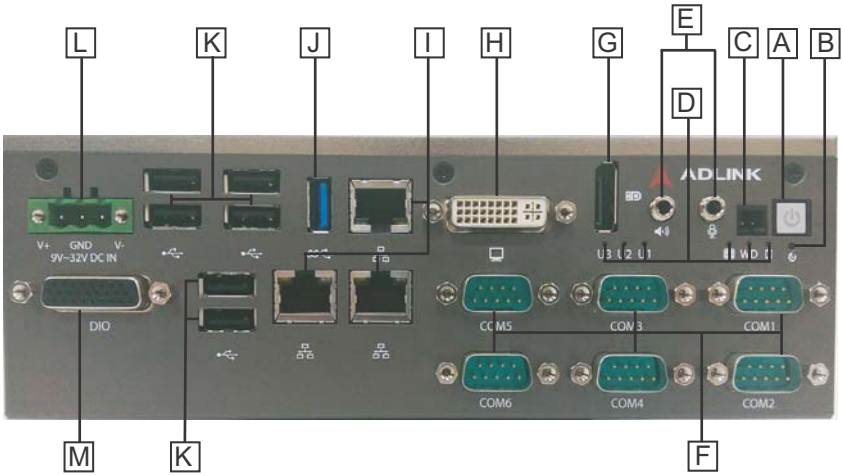


Figure 1-6: Front Panel I/O

A	Power
B	Reset
C	Power header
D	LED indicators
E	Audio
F	UART
G	DisplayPort
H	DVI-I
I	I211Gigabit Ethernet
J	USB 3.0 (1600mA supported)
K	USB 2.0
L	DC power supply
M	DB-26P digital I/O

Table 1-1: Front Panel I/O Legend

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1.6.1 Power Button

Non-latched push button with a blue LED indicator. System is turned on when button is pressed, and the power LED lit. If the system hangs, depressing the button for 5 seconds powers down the system.

1.6.2 Power Button Header

Allows connection of external power control cable.

1.6.3 Reset Button

Executes hard reset for the MXE-1400.

1.6.4 LED Indicators

In addition to the LED of the power button, LEDs on the front panel indicate the following operations.

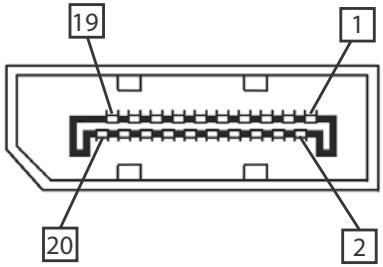
LED	Color	Description	
Diagnostic (DG)	Green	Lit	No physical storage is connected
		Blinking	No memory is installed on either SO-DIMM socket.
Watchdog (WD)	Yellow	Flashes when watchdog timer starts	
Hard disk drive (HD)	Red	Blinking indicates SATA HDD is active	
User-defined (U1, U2, U3)	White	As set in GPIO	

Table 1-2: LED Indicator Legend

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1.6.5 DisplayPort Connector

Provides connection to VGA, DVI, HDMI monitor via DisplayPort 1.2 to VGA adapter cable, to DVI adapter cable, and to HDMI adapter cable.



Pin	Signal	Pin	Signal
1	CN_DDPx0+	11	GND
2	GND	12	CN_DDPx3-
3	CN_DDPx0-	13	CN_DDPx_AUX_SEL
4	CN_DDPx1+	14	CN_DDPx_CONFIG2
5	GND	15	CN_DDPx_AUX+
6	CN_DDPx1-	16	GND
7	CN_DDPx2+	17	CN_DDPx_AUX-
8	GND	18	CN_DDPx_HPD
9	CN_DDPx2-	19	GND
10	CN_DDPx3+	20	+V3.3_DDPx_PWR

Table 1-3: DisplayPort Pin Assignment

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Multi-Display Option

With the computing and graphic performance enhancements of Intel HD Graphics Engine, the MXE-1400 supports two independent displays, configured as follows.

Display 1	DP	DP	VGA by DP
Display 2	DVI	VGA	DVI
Max. Res Display 1	2560 x 1600 @60Hz	2560 x 1600 @60Hz	2048 x 1280 @60Hz
Max. Res Display 2	1920 x 1200 @60Hz	2048 x 1280 @60Hz	1920 x 1200 @60Hz

Table 1-4: Multi-Display Configuration

Optional Accessories for DP to VGA/DVI Adapters

Accessory	P/N
DisplayPort to DVI Active cable	30-01157-0000
DisplayPort to VGA cable	30-01121-0000
DisplayPort to DVI cable	30-01120-0000
DisplayPort to HDMI cable	30-01119-0000

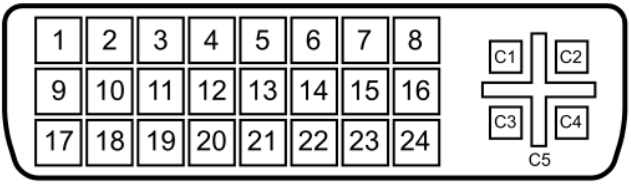
1.6.6 Audio Connector

Provides connection of Mic and Headphone/Speaker channels, as marked.

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1.6.7 DVI-I Connector

For connection to external monitor, which can separate into individual VGA and DVI-D (single link) interfaces.



Pin	Signal	Pin	Signal	Pin	Signal
1	DVI_Data2-	11	GND	21	N/C
2	DVI_Data2+	12	N/C	22	GND
3	GND	13	N/C	23	DVI clock+
4	CRT DDC clock	14	+5V	24	DVI clock-
5	CRT DDC data	15	GND		
6	DVI DDC clock	16	Hot plug detect	C1	Analog Red
7	DVI DDC data	17	DVI_Data0-	C2	Analog Green
8	Analog vertical sync	18	DVI_Data0+	C3	Analog Blue
9	DVI_Data1-	19	GND	C4	Analog / horizontal sync
10	DVI_Data1+	20	N/C	C5	Analog GND

Table 1-5: DVI-I Connector Pin Assignment

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1.6.8 Gigabit Ethernet Ports

3 Gigabit Ethernet ports are based on the Intel i211-AT GbE controller, featuring:

- IEEE 802.3az Energy Efficient Ethernet
- IEEE 1588/802.1AS precision time synchronization
- IEEE 802.3Qav traffic shaper
- Interrupt moderation, VLAN support, IP checksum offload
- PCIe OBFF (optimized buffer flush/fill) improves system power management
- Four transmit and four receive queues
- RSS and MSI-X to lower CPU utilization in multicore systems
- ECC (error correcting memory) in packet buffers
- Wake-On-LAN support
- NC-SI increases bandwidth passthrough
- Preboot eXecution Environment (PXE) flash interface support
- Jumbo frame support

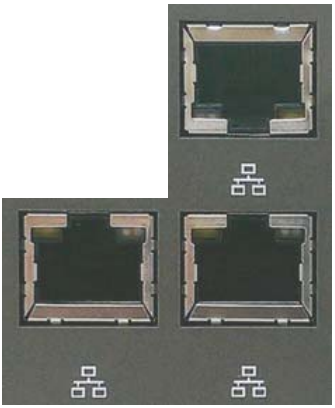


Figure 1-7: Gigabit Ethernet Ports

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LED	Color	Status	Description
Active/Link	Yellow	Unlit	Ethernet port is disconnected.
		Lit	Ethernet port is connected with no activity.
		Flashing	Ethernet port is connected and active.
Speed	Green/ Orange	Unlit	10Mbps
		Green	100 Mbps
		Orange	1000 Mbps

Table 1-6: Gigabit Ethernet Port LED Function

1.6.9 COM Port Connectors

Of 6 COM ports through D-sub 9-pin connectors, COM1 to COM4 support RS-232/422/485 modes via BIOS setting, and COM5 and COM6 support only RS-232.

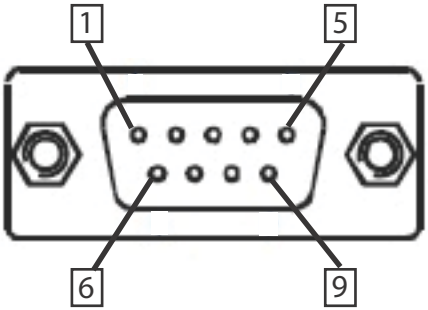


Figure 1-8: COM Port Connector

Pin	Signal		
	RS232	RS422	RS485
1	DCD#	TXD422-	485DATA-

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Pin	Signal		
2	RXD	TXD422+	485DATA+
3	TXD	RXD422+	N/S
4	DTR#	RXD422-	N/S
5	GND	N/S	N/S
6	DSR#	N/S	N/S
7	RTS#	N/S	N/S
8	CTS#	N/S	N/S
9	RI#	N/S	N/S

Table 1-7: COM Port Pin Assignments

1.6.10 USB 3.0 Ports

USB 3.0 supporting Type A connection is compatible with Super-Speed, Hi-Speed, full-speed and low-speed USB devices, with support for multiple boot devices, including USB flash, USB external HDD, and USB CD-ROM drivers and boot priority and boot device configured in BIOS.

NOTE:

- When using USB CD-ROM via USB 3.0 port to re-install or repair the OS, cold boot should be utilized
- USB 3.0 port supports additional current up to 1600mA, positioned as shown in Table 1-1 on page 8

1.6.11 CFast Port

A type II push-push CFast host connector on the front panel connects to the host controller by SATA interface, with data transfer rates up to 3.0Gb/s(300MB/s)/1.5Gb/s(150MB/s) supported.

1.6.12 USB 2.0 Ports

6 Type A USB 2.0 ports support multiple boot devices, including USB flash, USB external HDD, and USB CD-ROM drivers, with Boot Priority and Device configured via BIOS.

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1.6.13 DC Power Connector

The DC power supply connector consists of V+, chassis ground, and V- pins (from right to left), with V+ and V- pins accepting DC power input and chassis ground pin enhancing EMC compatibility. The DC power input accepts input from 9V DC to 32 VDC.

Pin	Signal
1	V+(DC_IN)
2	GND(CHGND)
3	V- (DGND)

Table 1-8: DC Power Supply Connector Signals

1.6.14 DB-26P Digital I/O Connector

8CH isolated digital input and 8CH isolated digital output are provided through the DB-26P connector. General purpose input/output application with isolation requirement is recommended.

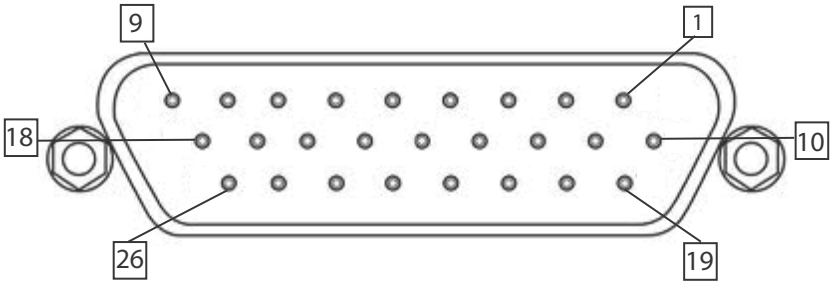


Figure 1-9: DB-26P Digital I/O Connector

Pin	Signal Name	Pin	Signal Name
1	IDI_0L	14	IDI_4H
2	IDI_1L	15	IDI_5H
3	IDI_2L	16	IDI_6H

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Pin	Signal Name	Pin	Signal Name
4	IDI_3L	17	IDI_7H
5	IDI_45L	18	EOGND
6	EOGND	19	IDO_0
7	IDI_67L	20	IDO_1
8	+VDD	21	IDO_2
9	+5DIO_CN_ISO	22	IDO_3
10	IDI_0H	23	IDO_4
11	IDI_1H	24	IDO_5
12	IDI_2H	25	IDO_6
13	IDI_3H	26	IDO_7

Table 1-9: DB-26P Connector Pin Assignment

8CH Isolated DI	8CH Isolated DO
Logic high: 5 to 24V	Output: Open Drain N- Channel Power MOSFET driver
Logic low: 0 to 1.5V	250mA for all channels @ 60°C, 100% duty
Input resistance: 2.4kΩ @ 0.5W	Supply voltage: 5 to 35 VDC
Interrupt source: DI	Isolation voltage: 1.5kVDC channel 0 to 7
Isolation voltage: 1.5kV DC channel 0 to 7	200mA for +V5DIO_ISO (max.)

Table 1-10: Digital I/O Specifications

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Optional Accessories for DB-26P Digital I/O Connector

Accessory	P/N
DIN-37D-01 Terminal board with one 37-pin D-sub connector and DIN-rail mounting	91-14025-1020
DIO-to-DIN37 cable (26-pin to 37-pin)	30-01143-0000

Isolated Digital Input Circuits

The input can accept voltages up to 24V, with 2.4kΩ input resistors. Connections between outside signals are as follows.

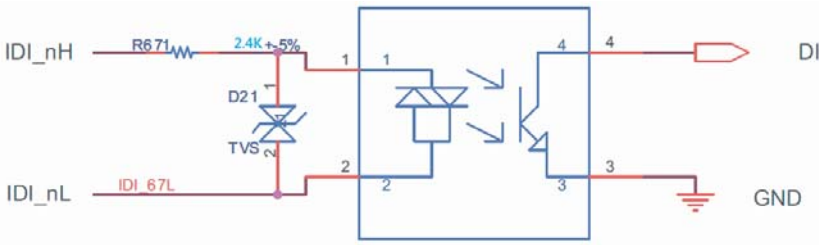


Figure 1-10: Isolated/Differential Digital Input Circuit

Isolated Digital Output Circuits

Each isolation digital output channel adopts a MOSFET transistor, capable of driving peak current up to 250mA (sustained current up to 100 mA) with voltage ranges from 5V to 35V.The VDD pin is connected in serial with a flywheel diode to protect the driver during inductance loading, such as relay, motor, or solenoid. The VDD must connect to external power to form a flywheel current loop.

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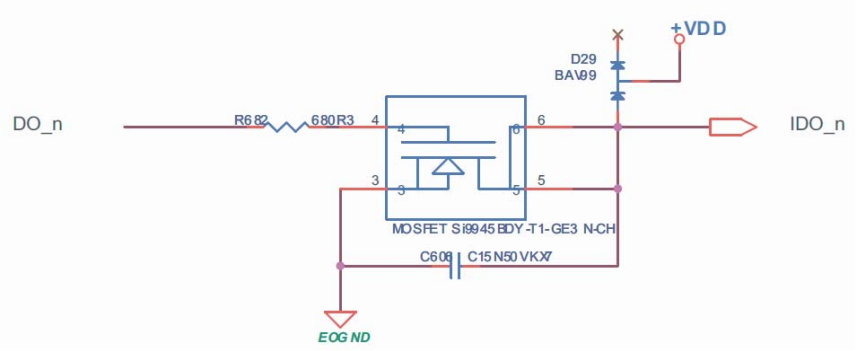


Figure 1-11: Isolated Digital Output Circuits

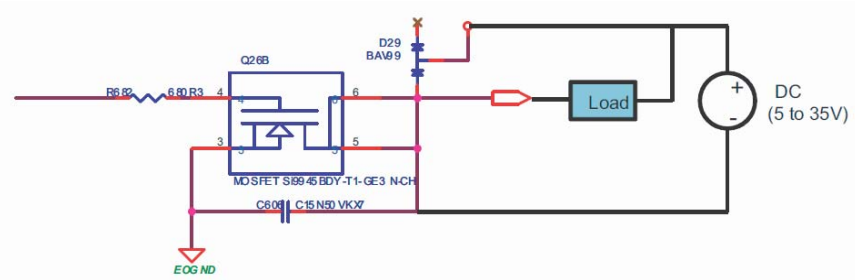


Figure 1-12: Isolated Digital Output Sample Application Circuit

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1.7 Rear Panel



Figure 1-13: Rear Panel I/O

A	Antenna connection plugs (X4)
B	CFast Slot
C	HDD Fast Plug Slot

Table 1-11: MXE-1400 Rear Panel I/O Connector Legend

1.7.1 CFast Slot

The Type II push-push CFast host connector on the back panel connects to the host controller by SATA interface, supporting data transfer up to 3.0Gb/s (300MB/s)/1.5Gb/s (150MB/s).

1.7.2 HDD Fast Plug Slot

The Fast Plug host connector connecting to the host controller by SATA interface supports data transfer up to 3.0Gb/s (300MB/s)/ 1.5Gb/s (150MB/s).

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1.8 Internal I/O Connectors

NOTE:

Mainboard is shown in default configuration, with stacked AFM board

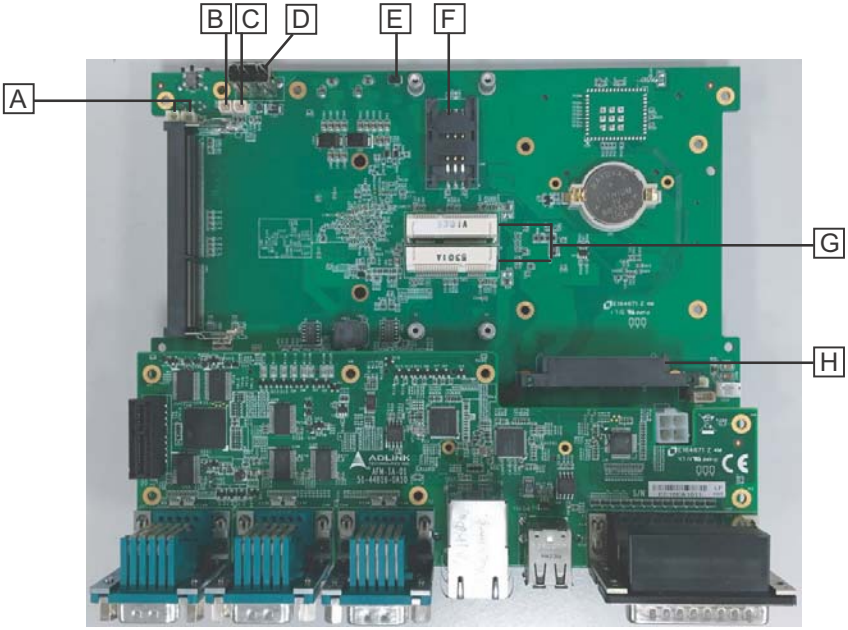


Figure 1-14: Internal I/O

A	Extended Reset/LED wafer
B	GPS module power header – 5V
C	GPS module power header – 3.3V
D	USB 2.0 connector
E	Clear CMOS jumper
F	USIM slot
G	Mini-PCIE slot
H	SATA Connector

Table 1-12: Internal I/O Legend

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1.8.1 Clearing CMOS Jumper

Under conditions in which the MXE-1400 fails to boot, clearing the BIOS content stored in CMOS and restoring the default settings may be effective. To clear CMOS, short Pin #1 and Pin #2 of JP1 and remove the jumper, after which the CMOS will be restored to factory default settings.

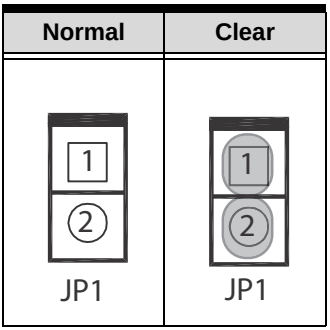


Figure 1-15: Clear CMOS Jumper Pin Settings

Pin	Description
1	RTCRST#
2	Gnd

Table 1-13: Clear CMOS Jumper Pin Assignment

1.8.2 DC 5V and 3.3V Connectors for GPS Module

The two power connectors, for GPS module use, carry a maximum current rating of 1A each.

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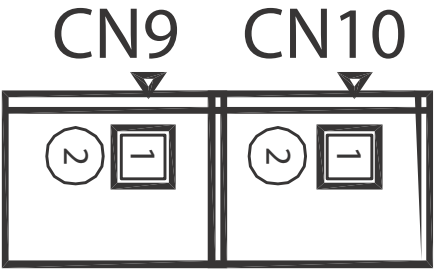


Figure 1-16: DC 5V and 3.3V Connectors Configuration

Pin	Description
CN9	
1	+5V
2	Gnd
CN10	
1	+3.3V
2	Gnd

Table 1-14: DC 5V and 3.3V Connectors Pin Assignments

1.8.3 USIM Port

Use of 3.5G mini-PCIe module requires a SIM card for communication with a telecom operator. The MXE-1400 provides a USIM port connected to the mini-PCIe connector, with which a SIM card and 3.5G mini-PCIe module can be installed to facilitate 3.5G communication.

1.8.4 SATA Connectors

The SATA connectors support data transfer up to 3.0Gb/s (300MB/ s), with a SATA host controller supporting legacy mode using I/O space and AHCI mode using memory space. The SATA connector is compatible with a 2.5in. hard disk drive (HDD) or solid

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state disk (SSD), requiring installation into the SATA connector with a HDD bracket.

1.8.5 Extended Power/Reset/LED

Internal LED connectors power indicators for the Power (from CN27) and Reset buttons (CN31), assigned as shown.

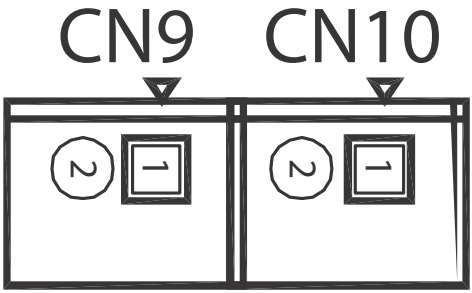


Figure 1-17: Extended Reset/LED Configuration

Pin	Description
CN27	
1	+V3.3SB
2	Power LED
CN31	
1	Reset Button
2	Gnd

Table 1-15: Extended Reset/LED Pin Assignments

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2 Getting Started

This chapter discusses installation of hard disk drive, mini-PCIe module, and CFast card. In addition to connection and use of DIO and COM ports, wall-mount installation is also described.

2.1 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- MXE-1400 controller
- Wall-mount bracket (in Accessory Box)
- Screw pack for wall-mounting and HDD fixing (in Accessory Box)
- Quick Start Guide

2.2 Adaptors & Additional Accessories

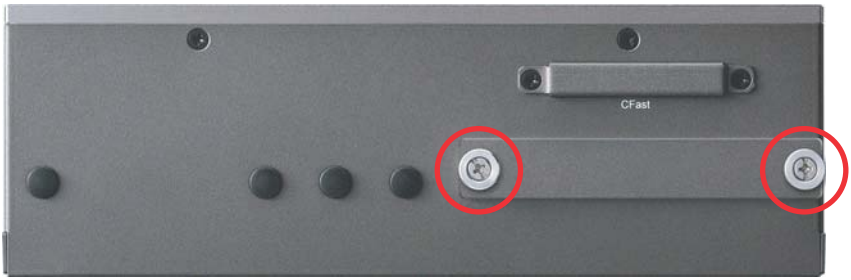
Device adaptors and other optional accessories should only be obtained through your ADLINK dealer. For more information, see “Getting Service” on page 87.

2.3 Installing a Hard Disk Drive

Before installing hard disk drives, the HDD bracket must first be removed.

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1. Remove thumbscrews fixing the HDD hatch.



2. Withdraw the HDD bracket.



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3. Place the HDD or SSD into the bracket.



4. Use the 4 provided M3 screws to fix the unit to the bracket.



5. Gently slide the bracket back into the bay until the SATA connector on the PCB is engaged.

6. Refasten the thumbscrews.

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2.4 Installing a Mini-PCIe Device

Remove the bottom cover before installing.

1. Remove 6 bottom screws.



2. Remove 4 side screws (2 from each side).

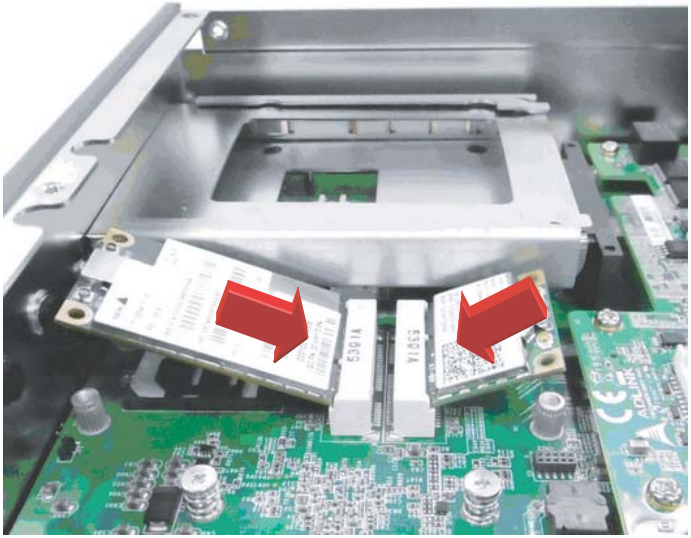


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3. Lift the bottom cover



4. Insert the mini-PCI-E wireless module into the slot at an angle.



5. Gently seat the mini-PCI-E wireless module and fix with the 4 M2.5-P-head-L5 screws.

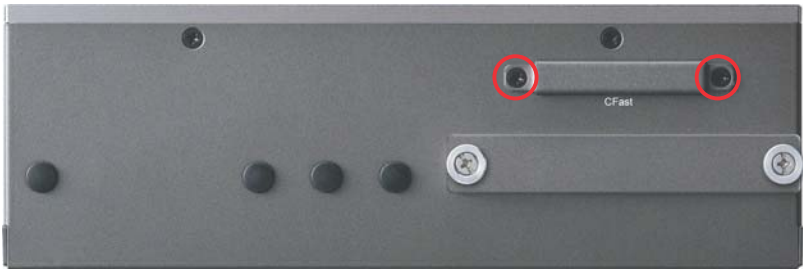
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6. Replace the cover and refasten the 10 screws.

2.5 Installing CFast Card

The MXE-1400 provides an external CFast socket to accommodate one CFast card for additional storage.

1. Remove the 2 screws and the CFast cover from the rear panel.



2. Gently insert the CFast card into the CFast socket.



3. Replace the CFast cover and refasten the 2 screws.

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2.6 Connecting DC power

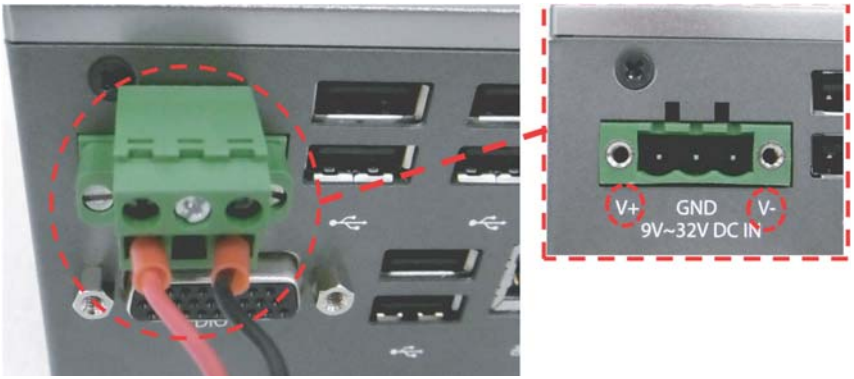
WARNING:

Before introducing DC power to the MXE-1400, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

The DC power input connector of the MXE-1400 utilizes V+, V- , and chassis ground pins, and accepts input voltage as shown previously.

1. Connect DC power.

2. Fix the DC connector using the 2 screws.



2.7 Wall-mounting the MXE-1400

The MXE-1400 is shipped with wall-mount brackets and accessory screws, with mounting procedures as follows.

NOTE:

All dimensions shown are in millimeters (mm) unless otherwise stated.

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CAUTION:

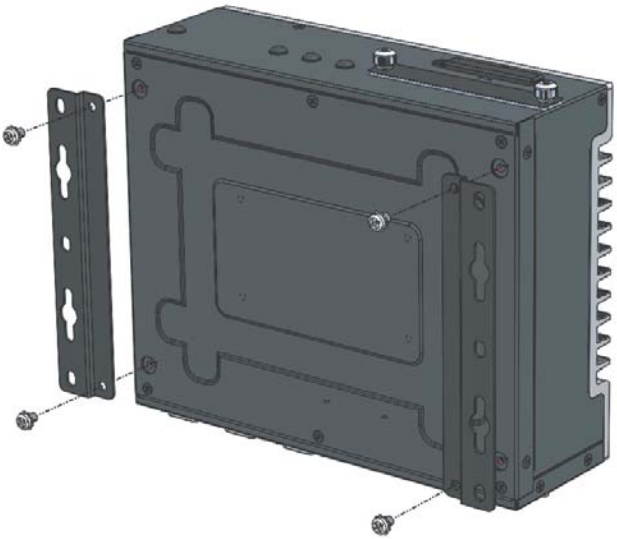
To sustain structural integrity, the device should not be wall-mounted with the rear panel on the bottom.

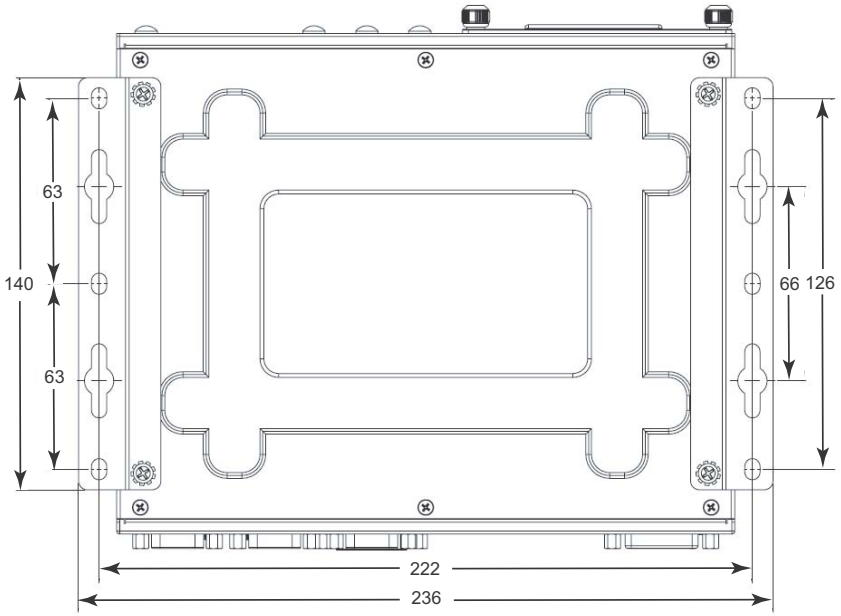
1. Remove the 4 plastic pads from the underside panel corners.



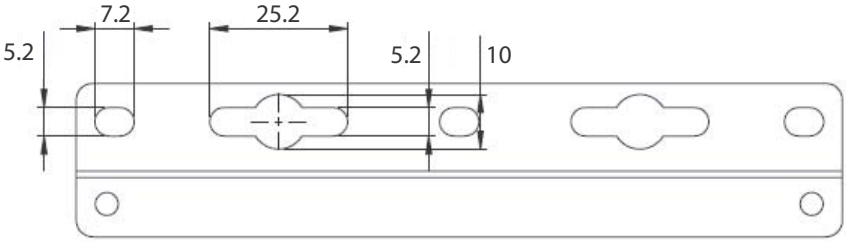
2. Use the 4 M4 screws shipped with the controller to fix the 2 wall-mount brackets, also included, to the chassis, according to the spacing dimensions of the screw holes and brackets, as shown.

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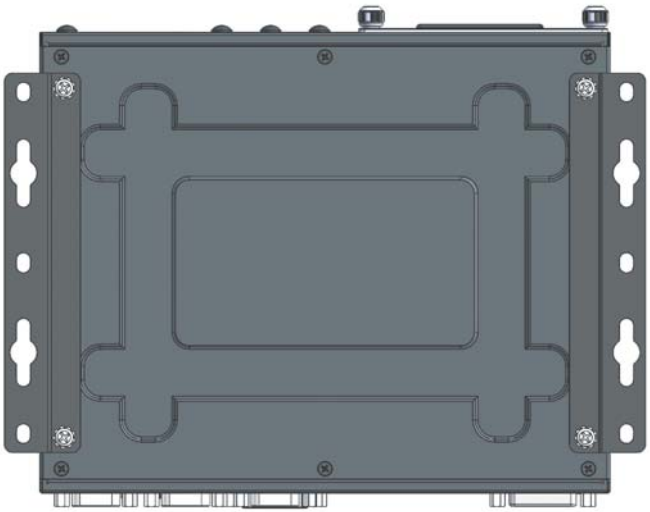




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3. Once final assembly as shown is complete, mount the MXE-1400 series controller on the wall via screw holes.



2.8 Cooling Considerations

Heat-generating components of the MXE-1400 (such as CPU and PCH) are all situated on the top of the system. These components directly contact the heat sink via thermal pads and dissipate heat generated by the components. To maximize efficiency of heat dissipation, maintain a minimum of 2 inches (5cm) clearance on the top of the MXE-1400.

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2.9 Driver Installation

Download requisite drivers, as follows, for your system from http://www.adlinktech.com and install.

- Audio
- Chipset
- Graphic
- LAN
- USB 3.0

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Appendix A Watchdog Timer (WDT) & DI/O Function Libraries

This appendix describes use of the watchdog timer (WDT) function library for the MXE-1400.

The watchdog timer is a hardware mechanism provided to reset the system if the operating system or an application stalls. After starting, the watchdog timer in the application must be periodically reset before the timer expires. Once the watchdog timer expires, a hardware-generated signal is sent to reset the system.

DI/O provides input/output to support inter-device communications. Simple programming guides allow easy transmission of digital signals between the system and attached peripherals.

A.1 WDT with API/Windows

Matrix WDT API library files and a demo program (incl. source code) can be downloaded from http://www.adlinktech.com.

To use the WDT function library for MXE-1400 series, include the header file matrix_wdt.h and linkage library matrix_wdt.lib in the C++ project.

InitWDT

Initializes watchdog timer function of MXE-1400. InitWDT must be called before the invocation of any other WDT function.

@ Syntax

C/C++

```
BOOL InitWDT()
```

@ Parameters

None

@ Return code

TRUE if watchdog timer is successfully initialized.

FALSE if watchdog timer fails to initialize.

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SetWDT

Sets the timeout value of the watchdog timer. There are two parameters for this function to indicate the timeout ticks and unit. ResetWDT or StopWDT should be called before the expiration of watchdog timer, or the system will reset.

@ Syntax

C/C++

```
BOOL SetWDT(BYTE tick, BYTE unit)
```

@ Parameters

`tick`

Specify the number of ticks for watchdog timer. A valid value is 1 - 255.

`unit`

Specify the timeout ticks of the watchdog timer.

Value	Description
0	The unit for one tick is one second. For example, when one tick is specified as 100 and the unit as 0, the timeout value is 100 seconds.
1	The unit for one tick is one minute. For example, whenone tick is specified as 100 and the unit as 1, the timeout value is 100 minutes.

@ Return codes

TRUE if timeout value of watchdog timer is successfully set.

FALSE if timeout value of watchdog timer is failed to set.

StartWDT

Starts watchdog timer function. Once the StartWDT is invoked, the watchdog timer starts. ResetWDT or StopWDT should be called before the expiration of watchdog timer, or the system will reset.

@ Syntax

C/C++

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```
BOOL StartWDT()
```

@ **Parameters**

None

@ **Return codes**

TRUE if watchdog timer is successfully started.

FALSE if watchdog timer is failed to start.

ResetWDT

Resets the watchdog timer. The invocation of ResetWDT allows restoration of the watchdog timer to the initial timeout value specified in SetWDT function. ResetWDT or StopWDT should be called before the expiration of the watchdog timer, or the system will reset.

@ **Syntax**

C/C++

```
BOOL ResetWDT()
```

@ **Parameters**

None

@ **Return codes**

TRUE if watchdog timer is successfully reset.

FALSE if watchdog timer fails to reset.

StopWDT

Stops the watchdog timer.

@ **Syntax**

C/C++

```
BOOL StopWDT()
```

@ **Parameters**

None

@ **Return codes**

TRUE if watchdog timer is successfully stopped.

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FALSE if watchdog timer fails to stop.

A.2 DI/O with API/Windows

Matrix DI/O API library files and a demo program (incl. source code) are located on the included driver CD or downloaded from http://www.adlinktech.com.

To use the DI/O function library for MXE-1400 series, include the header file matrix_dio.h and linkage library matrix_dio.lib in the C++ project.

DI/O functions are as follows.

GPIO_Init

Reserves system resources for digital input/output API service.It is necessary to call this function before using other MXE-1400 DI/O functions.

@ **Syntax**

C/C++

```
I16 GPIO_Init(void)
```

@ **Parameters**

None

@ **Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

GPI_Read()

Reads the digital logic state of the digital input line..

@ **Syntax**

C/C++

```
I16 GPI_Read(U16 *pwState)
```

@ **Parameters**

pwState

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Returns the digital logic state of MXE-1400 digital input channels 1 to 8 (bit 0 to 7)

@ **Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

GPO_Write()

Sets the digital logic state of the digital output line.

@ **Syntax**

C/C++

```
I16 GPO_Write(U16 wState)
```

@ **Parameters**

State

Sets the digital logic state of MXE-1400 digital output channels 1 to 8 (bit 0 to 7) to 0 or 1.

@ **Return code**

```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

GPO_Read()

Reads the digital logic state of the digital output line.

@ **Syntax**

C/C++

```
I16 GPO_Read(U16 *pwState)
```

@ **Parameters**

pwState

Returns the digital logic state of MXE-1400 digital output channels 1 to 8 (bit 0 to 7).

@ **Return code**

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```
NoError
ErrorOpenDriverFailed
ErrorDeviceIoctl
```

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Appendix B BIOS Setup


NOTE:

BIOS options in the manual are for reference only, and are subject to configuration. Users are welcome to download the latest BIOS version from the ADLINK website.

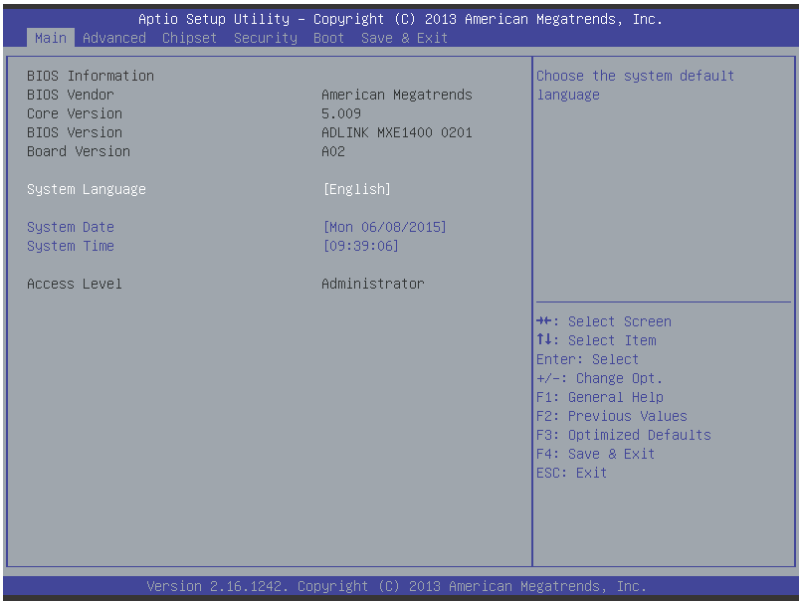
The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features applied to the MXE-1400. The BIOS setup program includes menus for configuring settings and enabling features of the MXE-1400 series. Most users do not need to use the BIOS setup program, as the MXE-1400 ships with default settings that work well for most configurations.


WARNING:

Changing BIOS settings may lead to incorrect controller behavior and possible inability to boot. In such a case, Section 1.8.1 on page 22 provides instruction on clearing the CMOS and restoring default settings

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B.1 Main



B.1.1 BIOS Information

Shows current system BIOS core version, BIOS version and Board version.

B.1.2 System Time/System Date

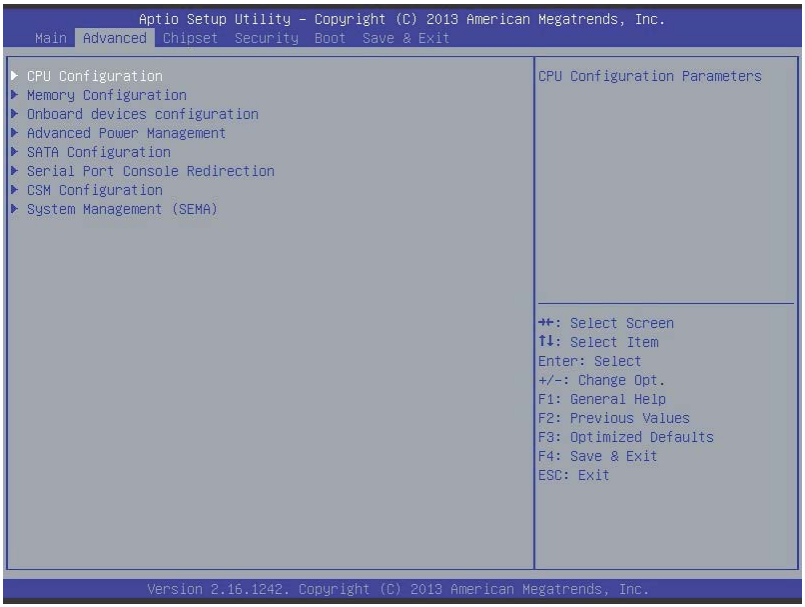
Changes system time and date. Highlight System Time or System Date using the up or down <Arrow> keys. Enter new values using the keyboard then <Enter>. Use < Tab > to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

NOTE:

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

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B.2 Advanced

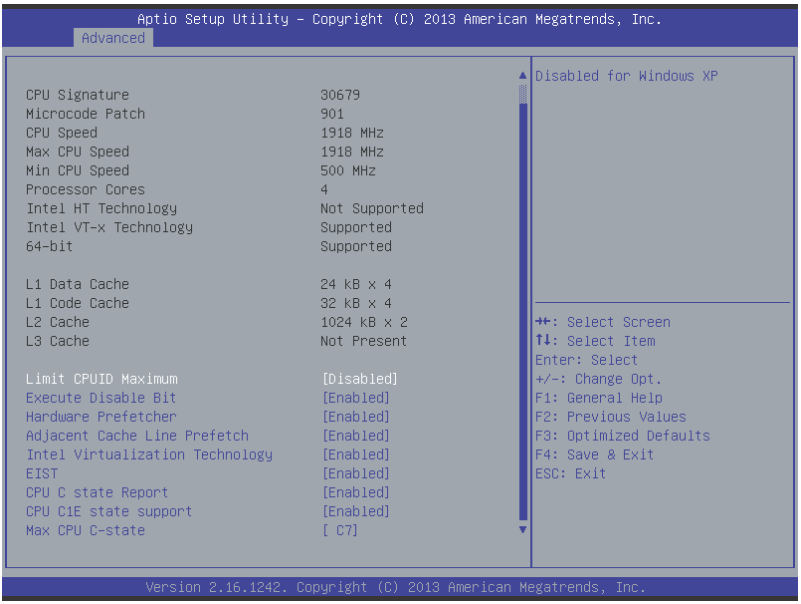


CAUTION:

Setting incorrect or conflicting values in Advanced BIOS Setup may cause system malfunction.

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CPU Configuration



Hyper-Threading

Enabled for OS optimized for Hyper-Threading Technology and disabled for those not optimized. When disabled only one thread per enabled core is enabled

Active Processor Cores

Number of cores to enable in each processor package.

Limit CPUID Maximum

Limits the CPUID return value, should be disabled in older OS to avoid system error.

Execute Disable Bit

Can prevent certain classes of malicious buffer overflow.

Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology

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Hardware Prefetcher

Enables/disables the Mid Level Cache (L2) streamer prefetcher

Adjacent Cache Line Prefetch

Enables/disables prefetching of adjacent cache lines.

CPU AES

Enables/Disables CPU Advanced Encryption Standard instructions.

EIST

Enables/disables Intel SpeedStep Technology.

Turbo Mode

Enables/disables Intel TurboBoost Technology.

Energy Performance

Optimizes performance/power saving ratio.

CPU C state

Enables/disables CPU C states

Package C State limit

CPU Package C State limit.

ACPI CTDP BIOS

Enables/Disables ACPI CTDP BIOS support.

Configurable TDP Level

Allows reconfiguration of TDP levels based on current power and thermal delivery capabilities of the system.

Config TDP Lock

Locks the Config TDP Control register.

TCC Activation Offset

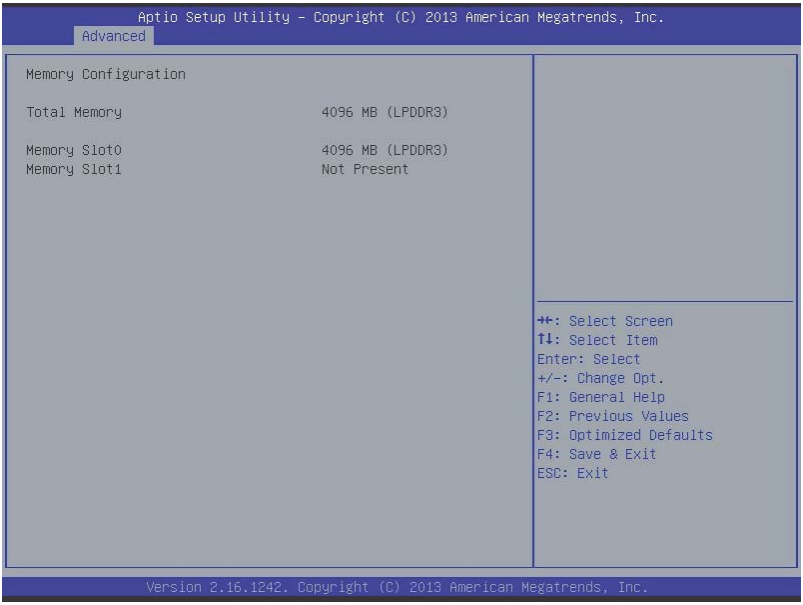
Offset from the factory TCC activation temperature

Intel TXT (LT) Support

Enables/Disables Intel® TXT(LT) support.

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Memory Configuration



Memory Frequency Limiter

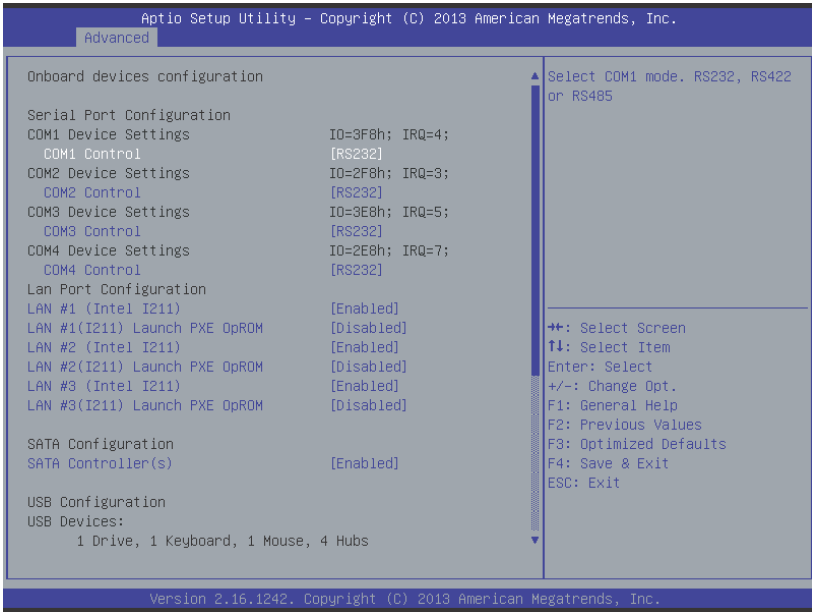
Maximum memory frequency, set in MHz.

Memory Remap

Enables/Disables memory remap over 4G.

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Onboard Device Configuration



COM1 Control

Select COM1 mode from among RS232, RS422 or RS485.

COM2 Control

Select COM2 mode from among RS232, RS422 or RS485.

LAN #1 (Intel I217)

Enables/disables onboard Intel I217 LAN controller.

Launch PXE OpROM

Enables/Disables execution of LAN boot-rom to add boot option for legacy network devices.

LAN #2 (Intel 210)

Enables/Disables onboard Intel 210 LAN controller.

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Launch PXE OpROM

Enables/Disables execution of LAN boot-rom to add boot option for legacy network devices.

LAN #3 (Intel 210)

Enables/disables onboard Intel 210 LAN controller.

Launch PXE OpROM

Enables/disables execution of LAN boot-rom to add boot option for legacy network devices.

LAN #4 (Intel 210)

Enables/disables onboard Intel 210 LAN controller.

Launch PXE OpROM

Enables/disables execution of LAN boot-rom to add boot option for legacy network devices.

SATA Controller(s)

Enables/disables SATA Device.

Legacy USB Support

AUTO option disables legacy support if no USB devices are connected, DISABLE option keeps USB devices available only for EFI applications.

USB 3.0 Support

Enables/Disables USB 3.0 (XHCI) controller support, allowing

USB 3.0 devices to be used in DOS environment.

XHCI Hand-Off

Enables BIOS support of XHCI Hand-Off feature. Default option is Enabled.

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Advanced Power Management



Restore On AC Power Loss

Determines the state entered when power is restored after a power loss, from among Last State, Power On, and Power Off.

Power Off	When set, powers the system down when power is restored.
Power On	When set, powers the system on when power is restored.
Last State	When set, powers the system down or on depending on the last system power state when power is restored.

Table B-1: Restore On Power Loss Settings

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Wake System With Fixed Time

Enables/Disables System Wake on Alarm event. When enabled, system will wake at the hr::min::sec specified.

Wake On Ring

Disables/Enables RI ping for Wake On Ring function.

OS Watchdog

Enables/Disables OS Watchdog.

BIOS POST Watchdog

Sets watchdog timer for BIOS POST process.

SATA Configuration



SATA Mode Selection

Allows selection of the SATA channel configuration from among (1) IDE Mode, (2) AHCI Mode, or (3) RAID Mode.

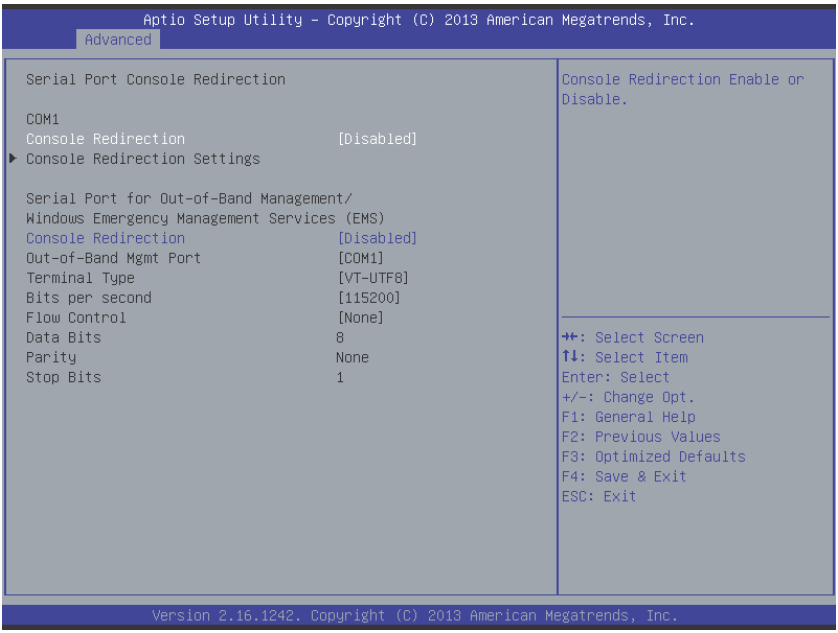
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SATA Port 0 / SATA Port 1 / CFAST Card / eSATA / mSATA / mSATA

Port X: Enables or disables SATA Port X

Hot Plug: Sets the port as hot pluggable.

Serial Port Console Redirection



COM1 COM Console Redirection

Enables/disables Console Redirection of COM1, from [Disabled (Default)/ Enabled]

Enabled:

Console Redirection Settings

Terminal Type

Selects transmission protocol for the remote terminal console from VT100/ VT100+/ VT-UTF8/ ANSI (Default)]

VT100

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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

Selects serial port transmission speed, which must be matched on the other side, with long or noisy lines possibly requiring lower speeds, from [9600/ 19200/ 57600/ 115200 (Default)]

Data Bits, from [7/ 8 (Default)]

Parity

A parity bit can be sent with the data bits to detect some transmission errors, from [None (Default)/ Even/ Odd/ Mark/ Space]

Even

Parity bit is 0 if the num of 1's in the data bits is even.

Odd

Parity bit is 0 if num of 1's in the data bits is odd.

Mark

Parity bit is always 1.

Space

Parity bit is always 0.

Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit, from [1 (Default)/ 2]

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Flow Control

Flow control can prevent data loss from buffer overflow, from [None (Default)/ Hardware RTS/ CTS]

Recorder Mode

When enabled only text will be sent, to capture Terminal data, from [Disabled (Default)/ Enabled]

Resolution 100x31

Enables or disables extended terminal resolution, from [Disabled (Default)/ Enabled]

Legacy OS Redirection Resolution

On Legacy OS, the Number of Rows and Columns supported redirection, from [80x24 (Default)/ 80x25]

Putty KeyPad

Select Function Key and KeyPad on Putty, from [VT100 (Default)/ LINUX/XTERMR6/SCO/ESCN/VT400]

Redirection After BIOS POST

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, from [Always Enable (Default)/BootLoader]

(EMS) Console Redirection

Enables/disables Console Redirection of Out-of-Band Mgmt Port, from [Disabled (Default)/ Enabled]

Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows remote management of a Windows Server OS through a serial port, from [COM1(Disable)(Default)/COM1(Pci Bus8,Dev0,Func0)]

Terminal Type

Selects transmission protocol for the remote terminal console from [VT100/ VT100+/ VT-UTF8 (Default)/ ANSI]

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Bits per second

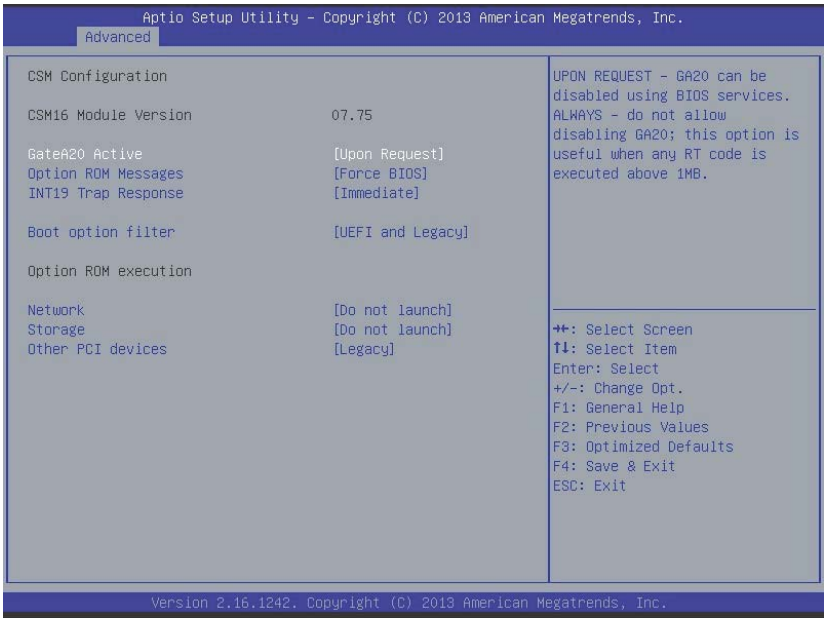
Selects serial port transmission speed, which must be matched on the other side, with long or noisy lines possibly requiring lower speeds, from [9600/ 19200/ 57600/ 115200 (Default)]

Flow Control

Can prevent data loss from buffer overflow, from [None (Default)/ Hardware RTS/ CTS]

CSM Configuration

Compatibility Support Module to support legacy Option ROM binaries and OS requiring a legacy BIOS runtime interface.



GateA20 Active

Switches memory access mode for compatible old and new OSs, from [Upon Request (Default)/ Always]

Upon Request

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GateA20 can be disabled using BIOS services.

Always

Disallows disabling of GateA20, for when any RT code is executed above 1MB.

Option ROM Messages

Sets display mode for Option ROM, whether Option ROM information is displayed during boot, from [Force BIOS (Default)/ Keep Current]

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM, from [Immediate (Default)/ Postponed]

Immediate

Executes trap immediately.

Postponed

Executes trap during legacy boot.

Boot option filter

Controls to what devices system can boot, from [UEFI and Legacy (Default)/ Legacy only/ UEFI only]

Launch Network OpROM policy

Controls the execution of UEFI and Legacy PXE OpROM, from [Do not launch(Default)/ UEFI only / Legacy only]

Launch Storage OpROM policy

Controls execution of UEFI and Legacy Storage OpROM, from [Do not launch(Default)/ UEFI only/ Legacy only]

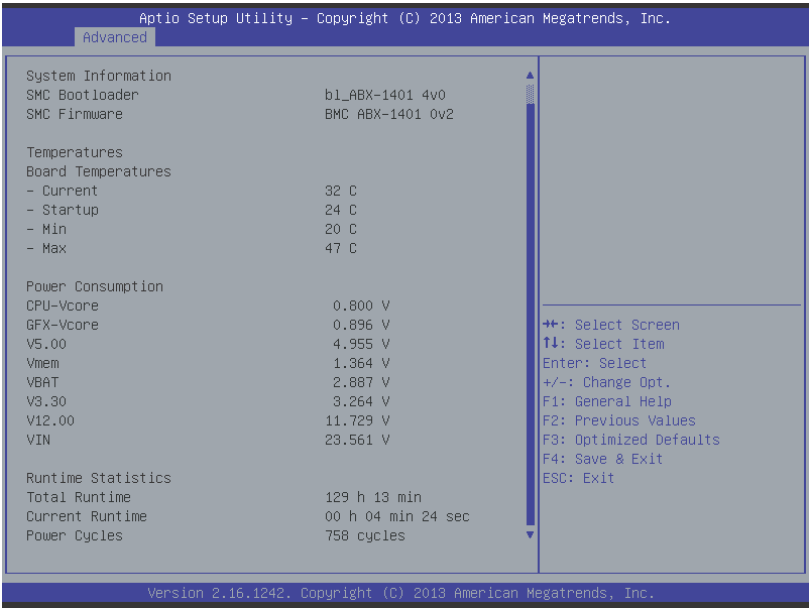
Other PCI device ROM priority

For PCI devices other than Network, Mass storage, or Video, defines the OpROM to launch, from [UEFI only / Legacy only(Default)]

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System Management (SEMA)

HW monitoring information from ADLINK Smart Embedded Management Agent (SEMA)



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B.3 Chipset



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USB Configuration



XHCI Mode

xHCI controller mode of operation, from [Enabled/ Disabled/ Auto (Default)/ Smart Auto]

USB 2.0 (EHCI) Support

Controls the USB EHCI (USB 2.0) functions, wherein one EHCI controller must always be enabled, from [Disabled (Default)/ Enabled]

High Precision Timer

Enables/disables High Precision event timer, from [Enabled (Default)/Disabled]

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Intel IGD configuration

Integrated Graphics Device

[Enabled (Default)/Disabled]

When Enabled, Integrated Graphics Device (IGD) is the Primary Video Adaptor

IGD Turbo Enable

Enables/disables IGD Turbo, from [Enabled (Default)/Disabled]

Primary Display

Select the IGD/PCI Graphics device to be Primary Display, from [Auto/IGD (Default)/PCI]

GFX Boost

Enables/disables GFX Boots from [Enabled/Disabled (Default)]

DVMT Pre-Allocated

Selects DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device, from [64MB (Default)/ 96MB/ 128MB/ 160MB/ 192MB/ 224MB/ 256MB/ 288MB/ 320MB/ 352MB/ 384MB/ 416MB/ 448MB/ 480MB/ 512MB]

DVMT Total Gfx Mem

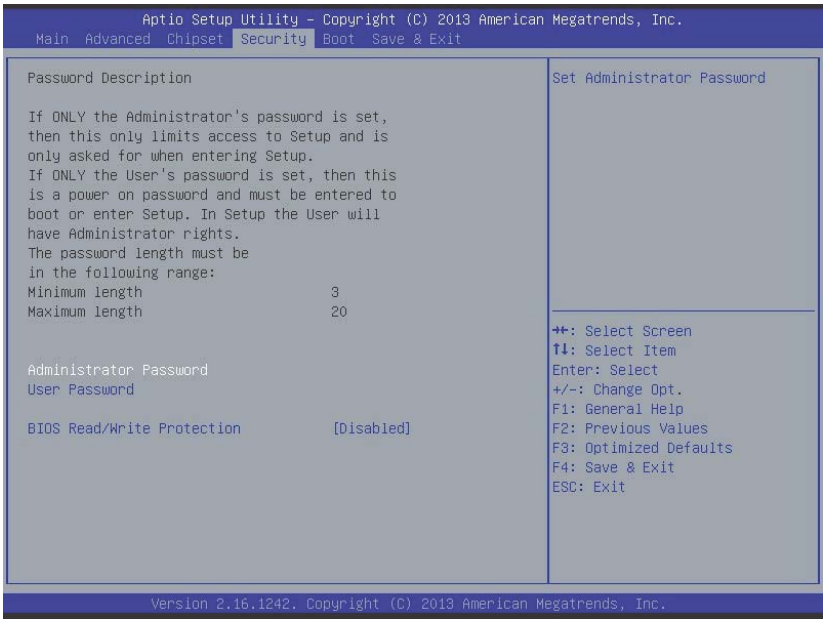
Sets DVMT5.0 total graphic memory size used by the Internal Graphics Device, from [128MB/ 256MB (Default)/ MAX]

Aperture Size

Selects aperture size, from [128MB/ 256MB (Default)/ 512MB]

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B.4 Security



If only the Administrator's password is set, only access to Setup is limited and the password only requested when entering Setup. If only the user's password is set, power on requires a password which must be accepted to boot or enter setup. In Setup the user has Administrator rights.

Administrator Password

Sets Administrator password

User Password

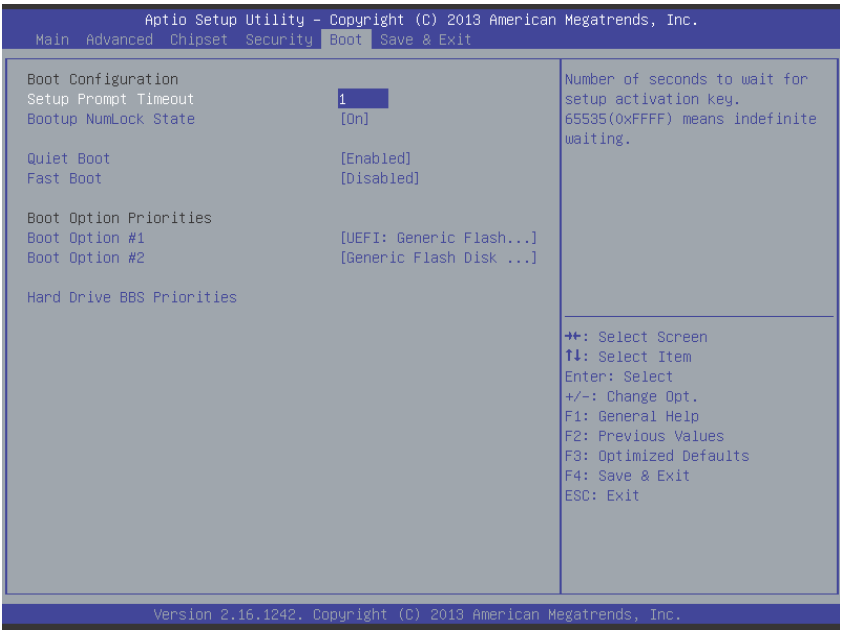
Sets boot/setup User password

BIOS Read/Write Protection

Allows only OEM proprietary utility update, from [Enabled/Disabled (Default)]

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B.5 Boot



Boot Configuration

Setup Prompt Timeout

Number of seconds to wait for setup activation key (DEL).

Bootup Num-Lock State

Allows Number Lock setting to be modified during boot.

Quiet Boot

When Disabled, directs BIOS to display POST messages. When Enabled, directs BIOS to display the OEM logo.

Fast Boot

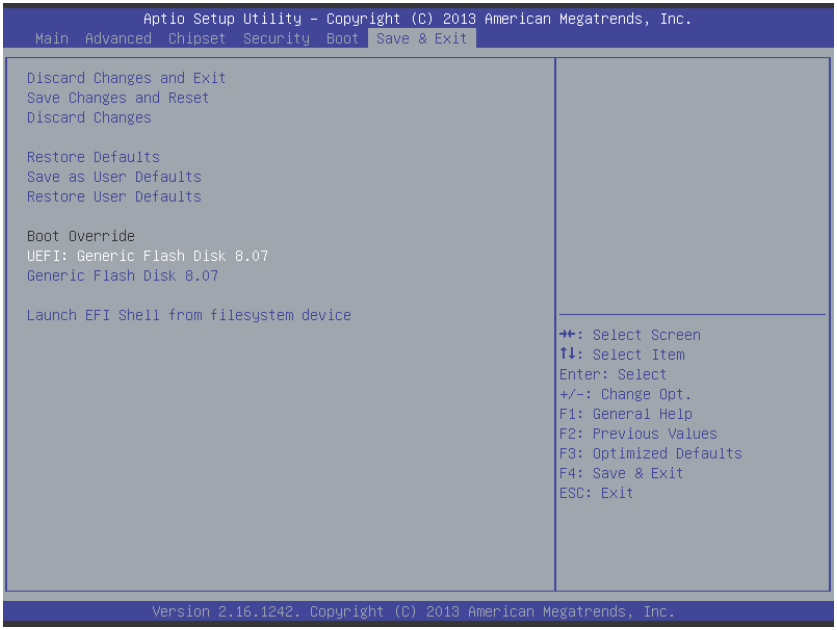
Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect on BBS boot options.

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Boot Option Priorities

Specifies the priority of boot devices, with all installed boot devices detected during POST displayed. Boot Option # specifies the desired boot device.

B.6 Exit



Discard Changes and Exit

Exits system setup without saving any changes

Save Changes and Reset

Resets the system after saving the changes

Discard Changes

Discards changes made to any of the Setup options.

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Restore Defaults

Returns all BIOS options to default settings, designed for maximum system stability, but not performance. Applicable in the event of system configuration problems.

Save as User Defaults

Saves changes made as User Defaults

Restore User Defaults

Restores User Default settings to all Setup options

Launch EFI Shell from filesystem device

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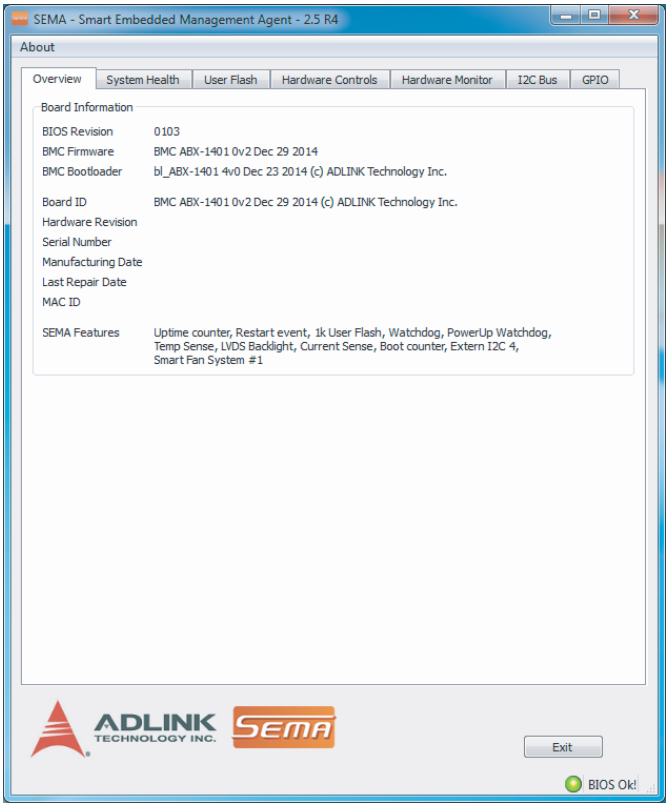
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Appendix C SEMA Utility GUI

The SEMA graphical interface is available for Windows operating systems. To get started in Windows, simply run SEMAGui.exe

C.1 System Overview Tab



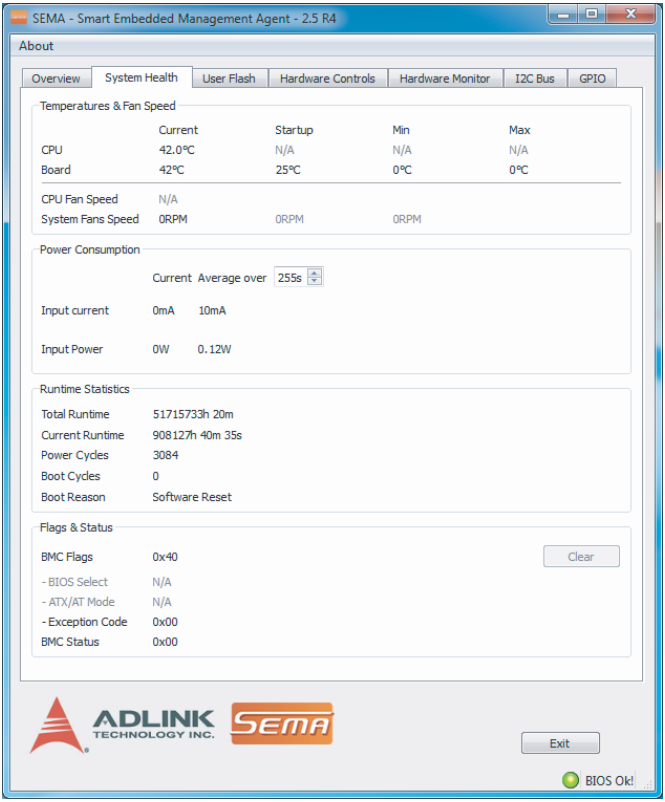
C.1.1 Board Information

This section shows general information about the board, BIOS Version and SEMA features supported. The first three lines show the firmware versions of the board. The BMC versions each contain an ID-string and the respective build date. The next lines show

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the board ID, hardware revision, serial number, manufacturing/ repair date and MAC ID of the board. The last line shows all supported SEMA features for this board.

C.2 System Health Tab



C.2.1 Temperatures & Fan Speed

This section displays the current, start-up, minimum and maximum temperatures of the CPU and environment (board). The data is displayed in °C and updated every second. Current CPU and speeds of system fans 1 to 3 are also displayed in RPM. Note that

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not all platforms supply all information as shown, in which case N/A is displayed in lieu of the value.

C.2.2 Power Consumption

Displays information for the main power supply in mA for current and W for power consumption, and are updated every second. To filter out spikes and acquire average values over a certain interval of time, a second/sample value can be selected from 0 to 255. Averaging takes place within the graphical user interface rather than within the BMC itself. The application collects the selected number of samples and present an average thereof. Note that not all platforms may provide the necessary current sensors, in which case N/A is displayed and the section will grayed out.

C.2.3 Runtime Statistics

Total	Total system uptime in hours and minutes
Current	Uptime since last boot in hours, minutes and seconds
Power cycles	Number of power cycles
Boot cycles	Number of HW/SW-Resets and successful power-ups
Boot reason	Reason for the last reboots (e.g. power loss, power down, HW reset, etc.)

C.2.4 Flags

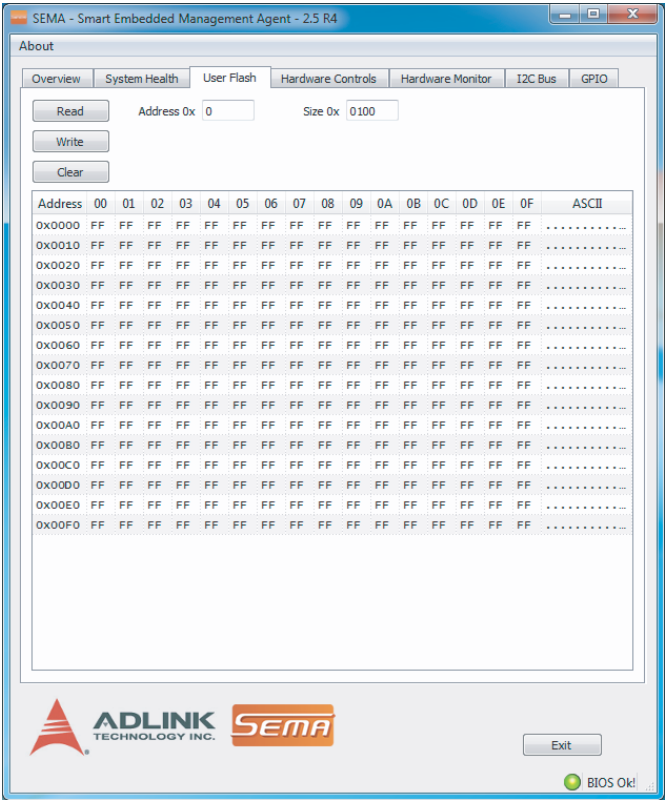
Display board-specific information about the internal status of the BMC. Please refer to the technical manual for the board, the chapter entitled “SEMA functions”. Also provided is information regarding the currently active BIOS, whether the system is in AT or ATX mode, and Exception Codes, if applicable.

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C.3 User Flash Memory Tab

NOTE: The Read/Write Raw Data Storage in SEMA Flash Memory function is reserved for advanced SEMA applications.

The Read/Write Raw Data Storage in SEMA Flash Memory function is reserved for advanced SEMA applications.



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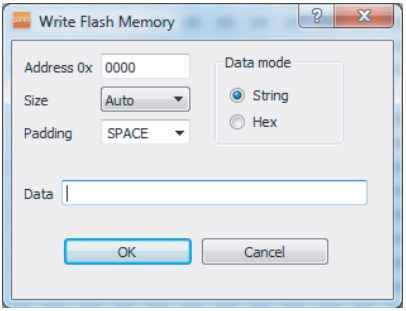
C.3.1 Memory

For Flash Memory organization, with address and size entered as hexadecimal values. Valid start addresses are multiples of 16 within the range: 0x0000-0x01F0 for 512 byte variants and 0x0000-0x03F0 for 1024 byte variants. Size can be any multiple of 16 bytes (up to the total memory size).

For example, to display the first 32 bytes from user flash memory, enter “0000” as address, “20” (hex 20 equals decimal 32) as size and press the [Read] button. Content is acquired from the BMC and displayed in the output window.

Each line contains the address of the first byte of this line, followed by 16 data bytes (displayed as hexadecimal values, with prefixes “0x” omitted for clarity) followed by the corresponding printable ASCII characters. The [Write] button opens the Write memory dialog box.

C.3.2 Write Memory



Address

The address is entered as hexadecimal value within the range of 0x0000..0x01FC (respectively 0x03FC for 1k board variants)

Size

Can be any multiple of four, up to 32 bytes or “Auto”. In Auto mode, the number of bytes to write is determined by the amount of data entered in the subsequent data field (max 32 bytes).

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Padding

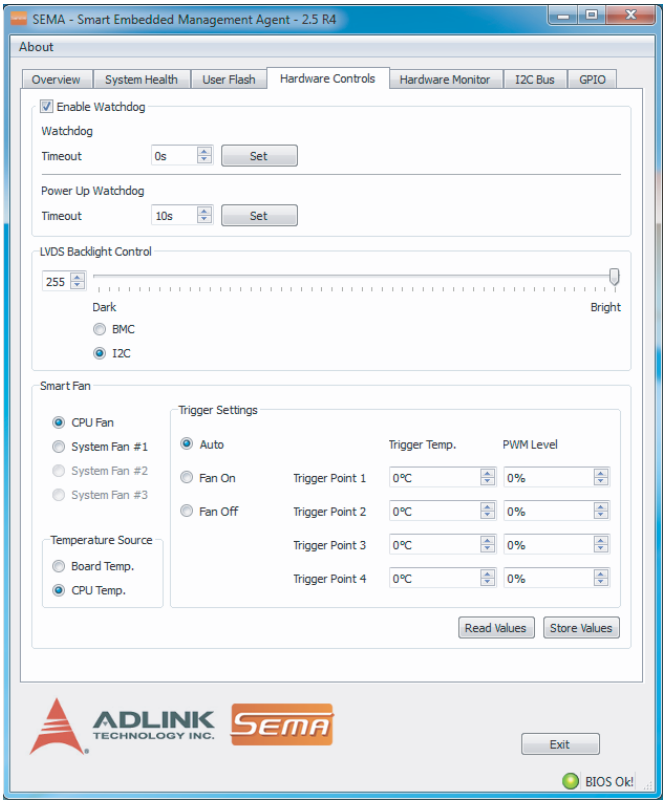
If the data length is not a multiple of four, the required number of pad (or fill) characters is appended. In String mode, a valid pad character can be any printable ASCII character or a pre-defined pad characters: - SPACE character (ASCII character 0x20) - NULL character (ASCII character 0x00) In Hex mode, any eight bit hex value (00..FF) is valid.

Data Mode

Currently supported modes are String mode, in which entered text (up to 32 characters) is converted to a byte stream, with no termination character appended, and Hex mode, in which up to 64 hex digits (0 to 9, A to F) can be entered, resulting in up to 32 bytes of data.

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C.4 Hardware Control Tab



C.4.1 Watchdog

The watchdog timeout value is given in seconds and can be set at 1 to 65535 seconds, with a value of 0 seconds disabling the watchdog. When enabled, the watchdog should be triggered repeatedly within the timeout period to avoid system reset. Note that not all platforms support watchdog functionality, in which case the section is grayed out.

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NOTE:

- When using the watchdog feature, all partitions must be mounted as read-only, to avoid file system corruption and data loss.
- It is not advisable to use the watchdog feature in a Windows environment, since Windows restart uses a safe shutdown procedure.

C.4.2 Backlight Control

Enables or disables the backlight of display connected via LVDS, with value adjusted by a slider or entered as a numerical, from 0 to 255. Note that not all platforms support the necessary circuitry, in which case the section is grayed out. Radio boxes allow selection of control by BMC or LVDS I2C interface.

C.4.3 Smart Fan

Provides control of either CPU or system fans (if applicable). The accessible system is also listed in SEMA Features in the System Overview Tab or via the "sema cap" command line

All fans can have a discrete independent temperature source defining the temperature sensor used for calculating speed.

Settings are as shown

Setting	Function
Auto	No other settings required
Off	Fan is disabled
On	Fan runs at maximum speed

Trigger Temp and PWM Level determine the characteristic curve of the fan control. Sample settings as shown result in fan function as follows.

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Temperature	Fan PWM level
Falls below 15°C	Turns off
Between 15°C and 60°C	30%
Between 40°C and 70°C	40%
Between 48°C and 80°C	63%
Exceeds 55°C	100%



NOTE:

If the temperature drops below one of the trigger points, the lower PWM value is taken.

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C.5 Hardware Monitor Tab

Shows Power Consumption and Temperatures information from the System Health Tab in a graphical format.



When logging is enabled, all values queried every second, such as temperatures and power consumption, are recorded to a log file.

At startup, logging is disabled by default.

To enable, check Enable Logging and select a file. New data is appended to the selected file, with existing data not overwritten. Logging ceases when Enable Logging is unchecked or the program closed, and suspended during a File Open dialog.

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Data is Recorded as simple ASCII text in tab-separated columns for easy import/export into any spreadsheet calculation program or other data processing tool. The first line written to the log file contains captions indicating the content and the respective unit of the data to be recorded. When any data is unavailable, such as when, for example, no sensor is detected, the corresponding column is skipped.

Currently available items are as follows

Caption	Content/Unit
Total[m]	Total uptime in minutes
PwrUp[s]	Uptime since last power up in seconds
Tcpu[°C]	CPU temperature in °C
Tbrd[°C]	Board temperature in °C
Tcpumin[°C]	Minimal CPU temperature in °C
Tcpumax[°C]	Maximal CPU temperature in °C
Tbrdmin[°C]	Minimal board temperature in °C
Tbrdmax[°C]	Maximal board temperature in °C
Imp[mA]	Main power current in mA
Pmp[W]	Power on main power current rail in W
n[1]	Number of samples used for filtering
Impf[mA]	Filtered main power current in mA
Pmpf[W]	Filtered power on main power current rail in W
FanSpdSys1-3[RPM]	CPU-Fan speed in RPM
FanSpdCPU[RPM]	System-Fan speed in RPM
‘VoltageName’[V]	For each monitored voltage in V

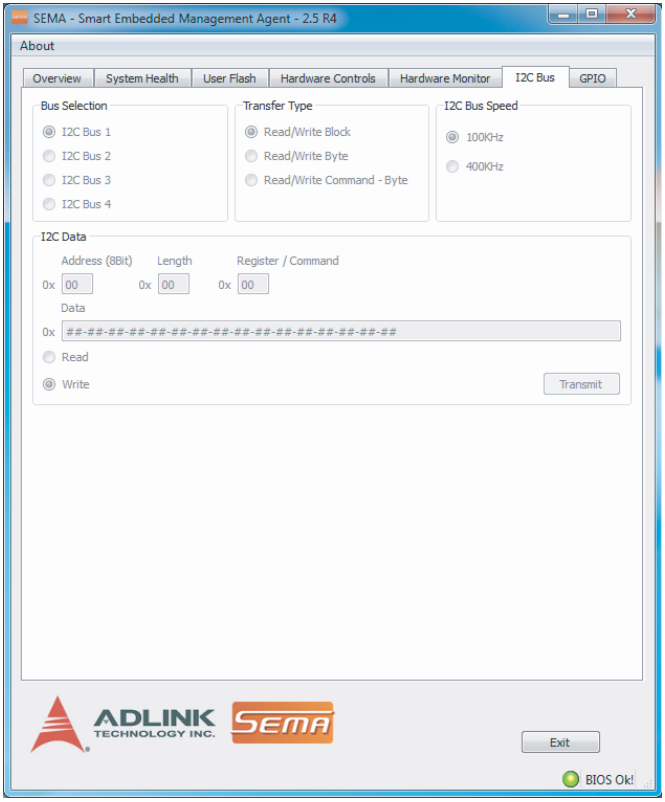
C.6 I_2C Bus Tab

The board management controller (BMC) can access up to four external I_2C busses, with byte and block access for read and write implemented. Both common bus speeds of 100 and 400kHz are supported.

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To read data from or write data to the BMC an address (8-bit) must be given as well as the amount of data to be transferred (length) plus the register offset.

Data should then be handed over in hex values forming a hex string, as shown.



Transfer Types

Different transfer types will result in I_2C bus activity as follows.

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Read/Write Block	Write	Start + Address/Write + Register /Command + Length + Data[1] + Data[2] + ... +Data[Length] + Stop
	Read	Start + Address/Write + Register /Command + Start + Address/Read + Length + Data[1] +Data[2] + ... + Data[Length] + Stop
Read/Write Byte	Write	Start + Address/Write + Data[1] + Stop
	Read	Start + Address/Read + Data[1] + Stop
Read/Write Command Byte	Write	Start + Address/Write + Register /Command + Data[1] + Stop
	Read	Start + Address/Read + Register /Command + Data[1] + Stop

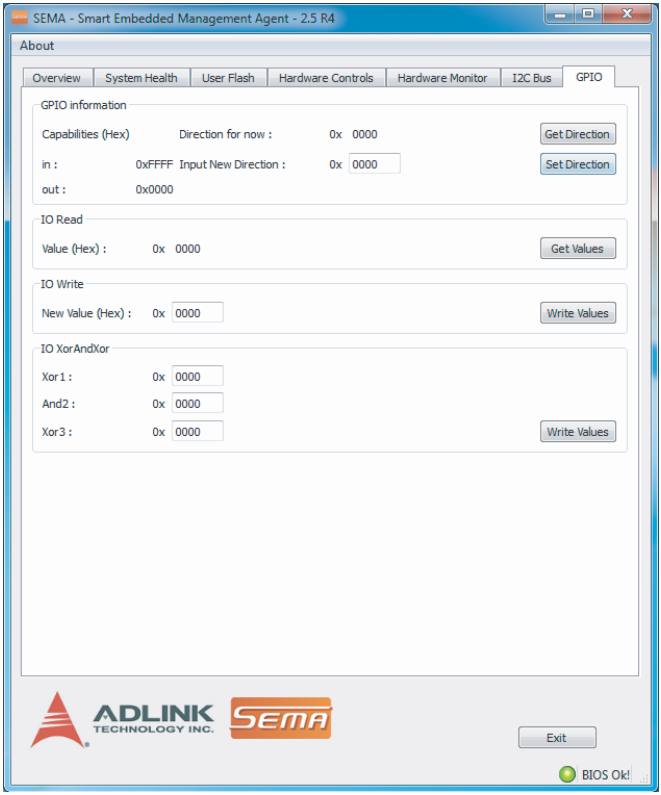


I_2C Bus 3 does not support Read/Write Command Byte transfer.

C.7 GPIO Tab

Allows control of up to 16 GPIOs provided by the ADLINK board, with the actual number of usable GPIOs board-dependent.

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C.7.1 GPIO information

Controls GPIO direction, with each bit in the shown byte representing a GPIO.

To set a GPIO for output the bit must set to 0, and for input 1. Get Direction reads the current configuration and Set Direction sets the configuration to the value entered in the Input New Direction field.

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C.7.2 IO Read

Shows the current input values for all GPIOs, with those configured as output showing current output value.

C.7.3 IO Write

Sets outputs, with GPIOs configured as input not affected.

C.7.4 IO XorAndXor

Reads the GPIO input and applies the logic operation in order of the input fields, with the result set as output value.

C.8 Status Bar

Displays a flashing red LED if the board has booted using the Failsafe BIOS, as may occur if the main BIOS has been corrupted.

	Failsafe BIOS active
	Booted from default BIOS

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Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 25.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings
- If the device will not be used for long periods of time, turn off and unplug from its power source

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- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

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	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. ***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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Getting Service

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