ADLE3800SEC

Manual

Rev. 1.0

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Contents

0 Document History

Version	Changes
0.1	first pre-release
1.0	first released version

1 Introduction

1.1 Important Notes

Please read this manual carefully before you begin installation of this hardware device. To avoid Electrostatic Discharge (ESD) or transient voltage damage to the board, adhere to the following rules at all times:

- You must discharge your body from electricity before touching this board.
- Tools you use must be discharged from electricity as well.
- Please ensure that neither the board you want to install, nor the unit on which you want to install this board, is energized before installation is completed.
- Please do not touch any devices or components on the board.

⚠WARNING **As soon as the board is connected to a working power supply, touching the board may result in electrical shock, even if the board has not been switched on yet. Please also note that the mounting holes for heat sinks are connected to ground, so when using an externally AC powered device, a substantial ground plane differential can occur if the external device's AC power supply or cable does not include an earth ground. This could also result in electrical shock when touching the device and the heat sink simultaneously.**

1.2 Technical Support

Technical support for this product can be obtained in the following ways:

- By contacting our support staff at +1 858-490-0597 or +49 (0) 271 250 810 0
- By contacting our staff via e-mail at support@adl-usa.com or support@adl-europe.com
- Via our website at www.adl-usa.com/support or www.adl-europe.com/support

1.3 Warranty

This product is warranted to be free of defects in workmanship and material. ADL Embedded Solutions' sole obligation under this warranty is to provide replacement parts or repair services at no charge, except shipping cost. Such defects which appear within 12 months of original shipment of ADL Embedded Solutions will be covered, provided a written claim for service under warranty is received by ADL Embedded Solutions no less then 30 days prior to the end of the warranty period of within 30 days of discovery of the defect – whichever comes first. Warranty coverage is contingent upon proper handling and operation of the product. Improper use such as unauthorized modifications or repair, operation outside of specified ratings, or physical damage may void any service claims under warranty.

1.4 Return Authorization

All equipment returned to ADL Embedded Solutions for evaluation, repair, credit return, modification, or any other reason must be accompanied by a Return Material Authorization (RMA) number. ADL Embedded Solutions requires a completed RMA request form to be submitted in order to issue an RMA number. The form can be found under the Support section at our website: www.adl-usa.com or www.adl-europe.com. Submit the completed form to support@adl-usa.com or fax to +1 858-490-0599 for the USA office, or to rma@adl-europe.com or fax to +49 (0) 271 250 810 20 to request an RMA from the European office in Germany. Following a review of the information provided, ADL Embedded Solutions will issue an RMA number.

1.5 Description of Safety Symbols

The following safety symbols are used in this documentation. They are intended to alert the reader to the associated safety instructions.

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to address practices not related to physical injury.

1.6 RoHS

The PCB and all components are RoHS compliant (RoHS = Restriction of Hazardous Substances Directive). The soldering process is lead free.

1.7 FCC Approval for Canada

FCC: Canadian Notice

This equipment does not exceed the Class A limits for radiated emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

1.8 FCC Approvals for the United States of America

FCC: Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2 Overview

2.1 Features

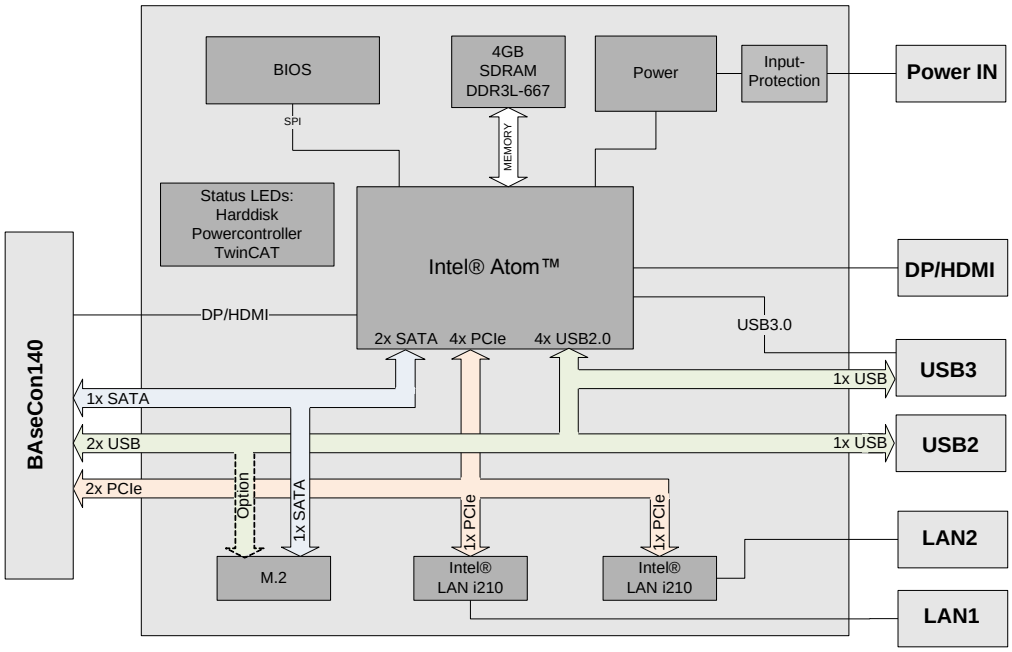
The ADLE3800SEC is designed as mini computing unit. It combines basic I/O functions, onBoard memory and an efficient CPU on a minimum of space.

The frontpanel provides standard interfaces, such as DisplayPort/HDMI, 1x USB2.0, 1x USB3.0 and 2x Gbit-LAN interfaces.

With the BAseCon140 connector on its reverse side, the ADLE3800SEC provides a flexible option for additional IOs. The connector offers up to 8 PCIe-lanes, from which 4 can be muxed with SATA and further 4 with USB3.0 signals. A backplane takes over the IO configuration. All configuration data are stored in an EEProm on the backplane. The backplane communicates the data to the board via SMB and therefore enables an uncomplicated and self-configuring IO extension.

An RGB LED signals the state of powercontroller. Input voltage is 24V.

Even though the ADLE3800SEC is designed in an extremely compact and small format, it offers the full motherboard functionality.



2.2 Feature List

ADLE3800SEC	3,5"-Board
CPU	Atom™ E3845 (QC, 2M, 1.91 GHz), TDP 10W
	Atom™ E3827 (DC, 1M, 1.75 GHz), TDP 8W
	Atom™ E3815 (SC, 1M, 1.46 GHz), TDP 5W
Memory	OnBoard DRAM-1,35V / DDR3 (depending on CPU up to 1333MHz, up to 2GB)
	OnBoard DRAM-1,35V / DDR3 (depending on CPU up to 1333MHz, up to 4GB)
I/O	2x LAN 10/100/1000 via frontpanel
	1x USB 2.0 via frontpanel
	1x DisplayPort via frontpanel
	1x USB 3.0 via frontpanel
	1x M.2 Key B 2242 with SATA 2.0 (3G)
	1x BAseCon140 with DisplayPort, 1x SATA 2.0, 2x PCIe x1, 1x USB 2.0, SM-Bus, 1-Wire-Interface
Graphics	HDMI1.4 / DVI: 1920 x 1200
	DP1.1a: 2560 x 1600
RTC	With external CMOS battery (via 2-pin connector or backplane)
BIOS	AMI® Aptio V
Power Supply	16V - 30V input voltage range
	Overvoltage- and undervoltage protection
	Reverse voltage protection
	Not galvanically isolated
Format	75 mm x 75 mm

NOTICE **The feature list specifies all suitable CPUs. Their actual availability is manufacturer-specific.**

2.3 Specifications and Documents

In making this manual and for further reading of technical documentation, the following documents, specifications and web-pages were used and are recommended.

- PCI specification
  Version 2.3 bzw. 3.0
  www.pcisig.com
- PCI Express® Base specification
  Version 2.0
  www.pcisig.com
- ACPI specification
  Version 3.0
  www.acpi.info
- ATA/ATAPI specification
  Version 7 Rev. 1
  www.t13.org
- USB specifications
  www.usb.org
- SM-Bus specification
  Version 2.0
  www.smbus.org
- Intel® Chip Description
  Intel® Atom™ Processor E3800 Product Family datasheet
  www.intel.com
- Intel® Chip Description
  i210 Datasheet
  www.intel.com
- American Megatrends®
  Aptio™ Text Setup Environment (TSE) User Manual
  www.ami.com
- American Megatrends®
  Aptio™ 4.x Status Codes
  www.ami.com
- M.2 specification
  Version 1.0
  www.pcisig.com
- DisplayPort specification
  Version 1.2
  www.vesa.org

3 Detailed Description

3.1 CPU

The motherboard employs an Intel® Atom™ processor of the E3800 family, which is a system-on-chip (SoC) being optimized for low power consumption, while at the same time providing state-of-the-art computing performance.
The processors include a second level cache of 256 KByte. They also offer many features known from the desktop range such as SSE4.1/4.2, loadable microcode etc.
The Atom™ CPU operates in an extended range of thermal conditions and therefore is capable for use in industrial systems.

3.2 Memory

The ADLE3800SEC is equipped with four fixed DRAM memory modules.
Depending on the product variant, there are different memory modules in use, as there are a DDR3 variant with 2GByte and another one with 4GByte memory. The ADLE3800SEC supports a maximum frequency of 1333MHz, depending on the CPU type.

3.3 M.2

Depending on the type of card, add-in cards, which comply with the M.2 specification, come in a very small format and with flexible dimensions. Different key IDs support different interfaces, as there are up to four PCI Express lanes, SATA and/or USB3.0 (see table below).

M.2 cards can be easily inserted: just plug them into the slot and fix it with a fixing screw.

Cards of different types have different keyings. Depending on the supported type, one port can receive add-in cards of one ore various types.

Key ID	Available Interfaces
A	PCIe x2, USB 2.0, I²C and DP
B*	PCIe x2, SATA, USB 2.0/3.0 Audio, UIM, HSIC, SSIC, I²C, SMBus
C, D	Reserved
E	PCIe x2, USB2.0, I²C, SDIO, UART, PCM
F	Future Memory Interface (FMI)
G, H, J, K, L	Reserved
M	PCIe x4, SATA and SMBus

* With its M.2 socket the ADLE3800SEC supports keying B M.2 modules.

NOTICE

For optimal driver compatibility we recommend the use of a Microsoft® Windows® 8 operating system.
If you use an add-in card, which is not or not fully supported, the BIOS will display an error message.

4 Connectors

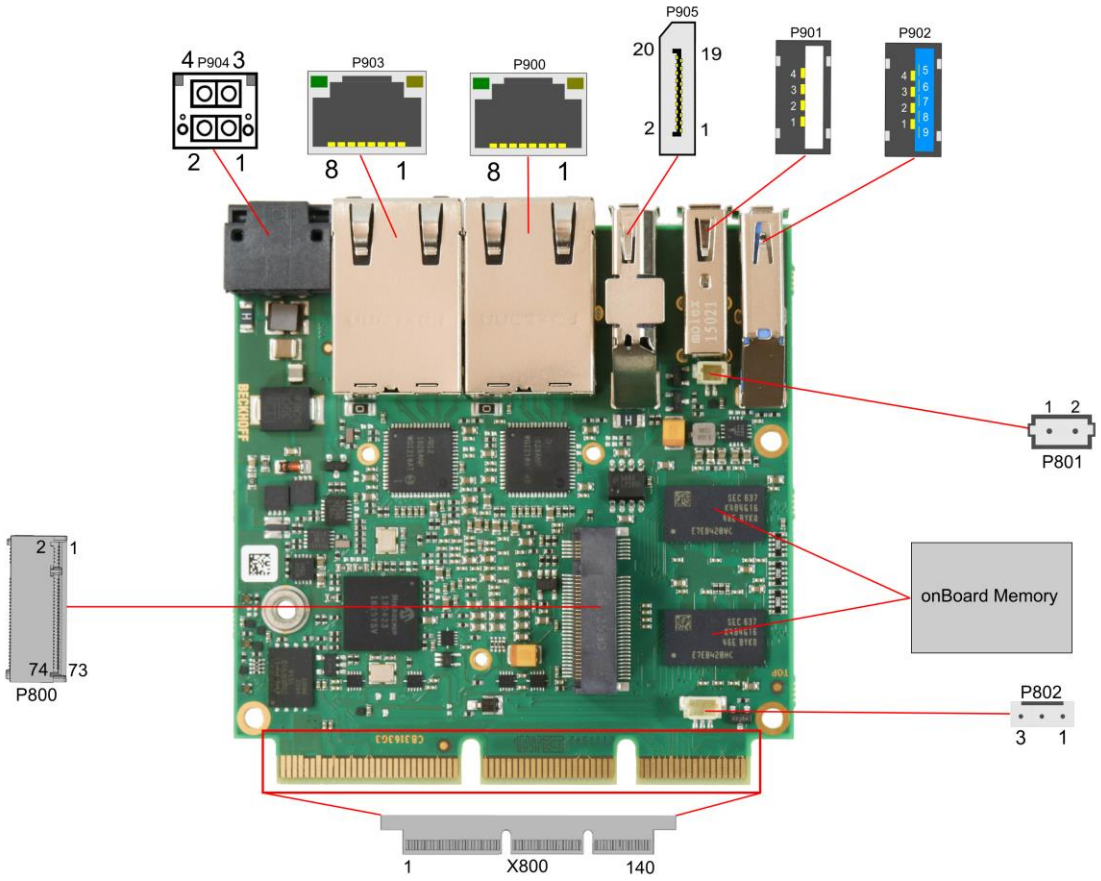
This section describes all the connectors found on the ADLE3800SEC.

NOTICE

Please consider the requirements on the cabling!
For most interfaces, the cables must meet certain requirements. For instance, USB 2.0 requires twisted and shielded cables to reliably maintain full speed data rates. Restrictions on maximum cable length are also in place for many high speed interfaces and for power supply. Please refer to the respective specifications and use suitable cables at all times.

4.1 Connector Map

Please use the connector map below for quick reference. Only connectors on the component side are shown. For more information on each connector refer to the table below.



Ref.-No.	Function	Page
U500/01/02/03	"DRAM Memory"	p. 19
P800	"M.2 2242 (Keying B)"	p. 20
P801	"External Battery"	p. 26
P802	"FAN Connector"	p. 27
P900/03	"LAN"	p. 18
P901/02	"USB"	p. 16
P904	"Power Supply"	p. 15
P905	"Display Port"	p. 22
X800	"BAseCon140 Connector"	p. 23

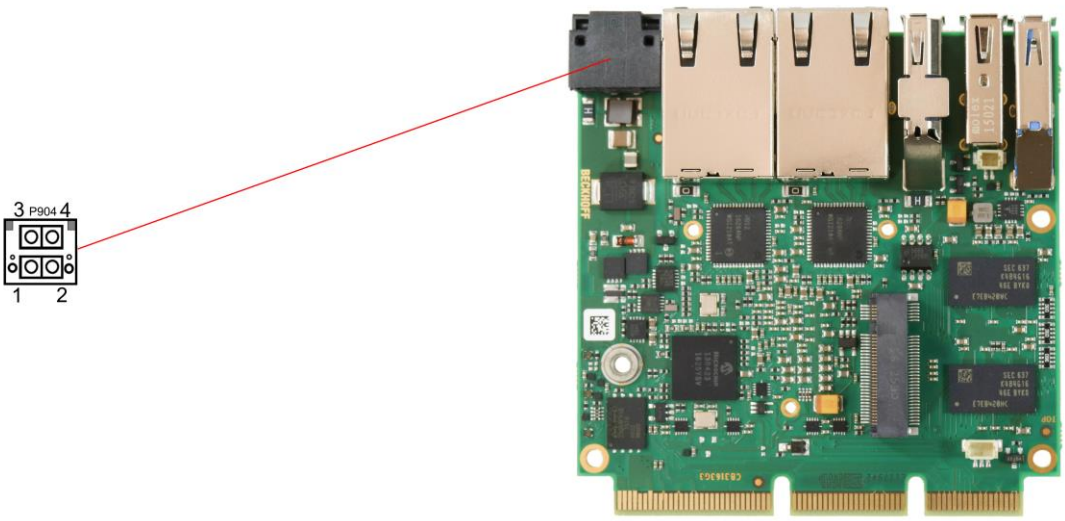
4.2 Front Panel Connectors

A range of standard connectors are available: You can connect displays, USB, LAN etc. The following connectors are located on the front panel of the ADLE3800SEC.

4.2.1 Power Supply

The power supply of the ADLE3800SEC is realized via a 2x2pin connector (P20THR-1787014). The main 24V power lines are assigned to pin 3.

Manufacturer	Description	Mating Connector
Phoenix	P20THR-1787014	DFMC 1,5/ 2-ST-3,5-LR- 1790292



NOTICE

Since this is a 90-degree connector, the symbol in the drawing below represents the connector face as seen from the side (PCB on bottom) rather than from above.

Description	Name	Pin		Name	Description
PC Start	PC_START	1	3	Vin	Power Supply 24V
PC Status	PC-AKTIV	2	4	GND	Ground

4.2.2 USB

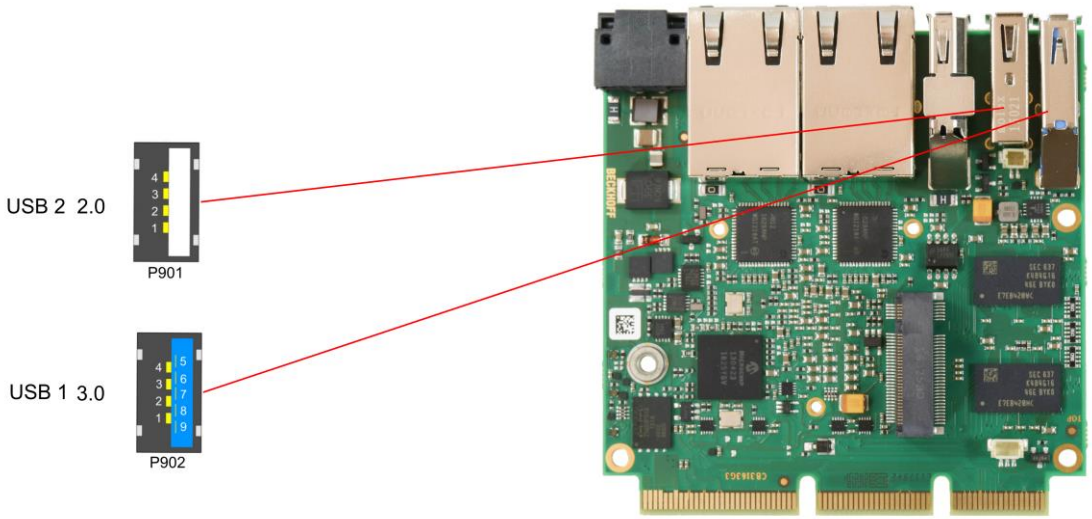
USB channels 1 and 2 are provided via two standard USB connectors.

USB channel 1 supports USB 2.0 and provides up to 500 mA current.

USB channel 2 supports USB 3.0. Contrary to the USB3.0 specification, channel 2 only provides 500mA current. For higher power requirements, you must use devices with an integrated power supply.

Both interfaces, USB 2.0 and USB 3.0, are protected by an electronically resettable fuse.

You may note that the setting of USB keyboard or USB mouse support in the BIOS-setup is only necessary and advisable, if the OS offers no USB-support. BIOS-setup can be changed with a USB keyboard without enabling USB keyboard support. Running Windows with these features enabled may lead to significant performance or functionality limitations.



NOTICE

Both Standard USB ports are protected by a combined overcurrent detection. In case of an overcurrent, even at one port, the overcurrent protection will turn off both USB ports.

Pinout USB2.0 connector for channel X:

Pin	Name	Description
1	VCC	5 volt for USBX
2	USBX#	minus channel USBX
3	USBX	plus channel USBX
4	GND	ground

Pinout USB3.0 connector for channel X:

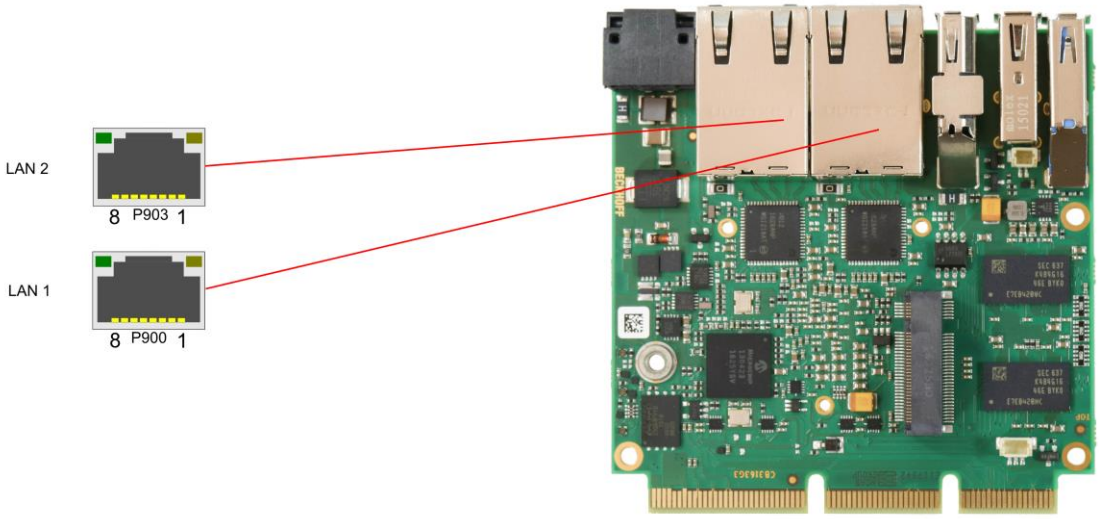
Pin	Name	Description
1	VCC	5 volt for USBX
2	USBX#	Minus channel USBX
3	USBX	Plus channel USBX
4	GND	ground
5	StdA_SSRX-	SuperSpeed Receiver -

Pin	Name	Description
6	StdA_SSRX+	SuperSpeed Receiver +
7	GND	ground
8	StdA_SSTX-	SuperSpeed Transmitter -
9	StdA_SSTX+	SuperSpeed Transmitter +

4.2.3 LAN

The module has two LAN interfaces both of which support 10BaseT, 100BaseT, and 1000BaseT compatible net components with automatic bandwidth selection. Controller chip is Intel®'s i210. Auto-cross and auto-negotiate functionality is available as is PXE and WOL.

Manufacturer	Description	Mating Connector
Foxconn	JFM3811F-2101-4F	(Standard LAN connector)



Pinout LAN 10/100/1000:

Pin	Name	Description
1	LAN1-0	LAN1 channel 0 plus
2	LAN1-0#	LAN1 channel 0 minus
3	LAN1-1	LAN1 channel 1 plus
4	LAN1-1#	LAN1 channel 1 minus
5	LAN1-2	LAN1 channel 2 plus
6	LAN1-2#	LAN1 channel 2 minus
7	LAN1-3	LAN1 channel 3 plus
8	LAN1-3#	LAN1 channel 3 minus

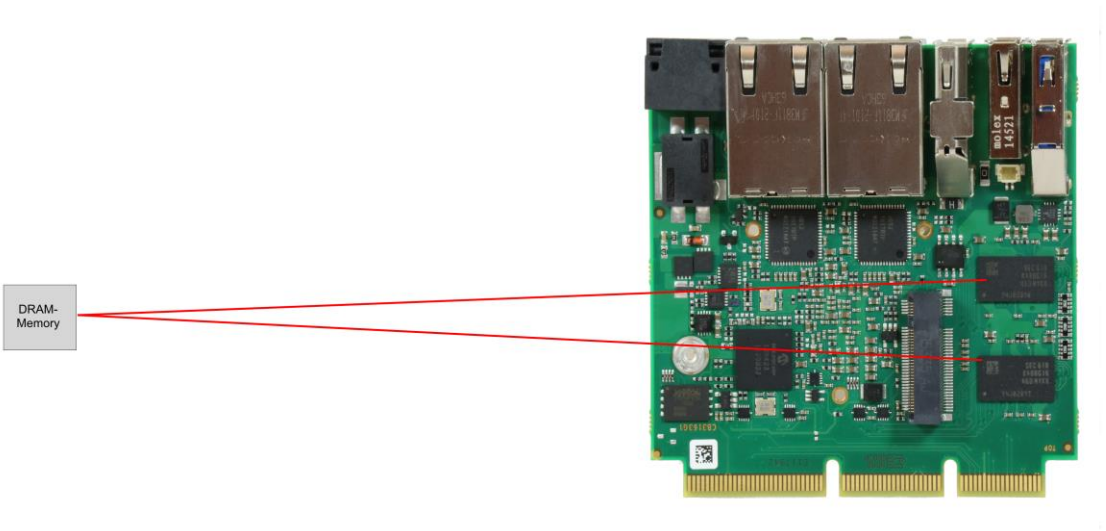
The LEDs show activity and speed of data transfer:

Mbit/s	flashing at data transfer	permanent
1000	green	green
100	green	orange
10	green	-

4.3 Memory and internal connectors

4.3.1 DRAM Memory

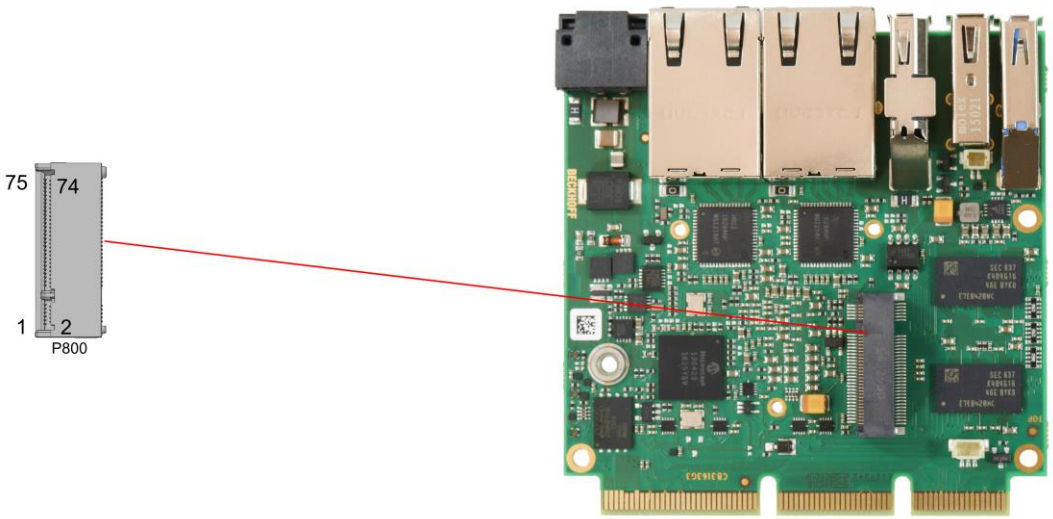
The ADLE3800SEC is equipped with four fixed DRAM memory modules DDR3-667.
Depending on the hardware variant, there are two different memory modules in use, which are one DDR3 variant with 2GByte and one DDR3L variant with 4GByte memory.
All timing parameters for different memory modules are automatically set by BIOS.



4.3.2 M.2 2242 (Keying B)

The ADLE3800SEC is equipped with a further M.2 socket, in which M.2-2242 cards (keying B) can be inserted. The socket leads SATA signals (up to 3 Gb/s) through, and therefore enables the use of an M.2 SSD card.

Manufacturer	Description	Mating Connector
FCI	10128796-0004RLF	(M.2 card)



Description	Name	Pin		Name	Description
Configuration pin	CONFIG_3	1	2	3.3V1	Standby power supply S3,3V
ground	GND1	3	4	3.3V2	Standby power supply S3,3V
ground	GND2	5	6	FCPWROFF#	Full Card Power OFF active low
USB channel 3 data +	USB_D+	7	8	WDISABLE#	*(not available)*
USB channel 3 data -	USB_D-	9	10	GPIO9 DAS DDS LED1	*(not available)*
ground	GND3	11	12	connector key	
connector key		13	14		
		15	16		
		17	18		
		19	20	GPIO5	*(not available)*
Configuration pin	CONFIG_0	21	22	GPIO6	*(not available)*
(not available)	GPIO11	23	24	GPIO7	*(not available)*
(not available)	DPR	25	26	GPIO10	*(not available)*
ground	GND4	27	28	GPIO8	*(not available)*
(not available)	PER1# USB3RX# SSICRX#	29	30	UIM_RST	*(not available)*
(not available)	PER1 USB3RX SSICRX	31	32	UIM_CLK	*(not available)*

Description	Name	Pin		Name	Description
ground	GND5	33	34	UIM_DATA	*(not available)*
(not available)	PET1# USB3TX# SSICTX#	35	36	UIM_PWR	*(not available)*
(not available)	PET1 USB3TX SSICTX	37	38	DEVSLP	*(not available)*
ground	GND6	39	40	GPIO0	*(not available)*
SATA lane 2 receive +	PER0# SATAB	41	42	GPIO1	*(not available)*
SATA lane 2 receive -	PER0 SATAB#	43	44	GPIO2	*(not available)*
ground	GND7	45	46	GPIO3	*(not available)*
SATA lane 2 transmit -	PET0# SATAA#	47	48	GPIO4	*(not available)*
SATA lane 2 transmit +	PET0 SATAA	49	50	PRST#	PCIe Reset active low
ground	GND8	51	52	CLKREQ#	*(not available)*
(not available)	REFCLK#	53	54	PEWAKE#	*(not available)*
(not available)	REFCLK	55	56	N/C	*(not available)*
ground	GND9	57	58	N/C	*(not available)*
(not available)	ANTCTL0	59	60	COEX3	*(not available)*
(not available)	ANTCTL1	61	62	COEX2	*(not available)*
(not available)	ANTCTL2	63	64	COEX1	*(not available)*
(not available)	ANTCTL3	65	66	SIM_DETECT	*(not available)*
Powergood	RESET#	67	68	SUSCLK	system clock
Configuration pin	CFG1	69	70	3.3V3	Standby power supply S3,3V
ground	GND10	71	72	3.3V4	Standby power supply S3,3V
ground	GND11	73	74	3.3V5	Standby power supply S3,3V
configuration pin	CFG2	75			

NOTICE

The column 'Name' lists all ressources, provided by the chipset. Those ressources, which are made available, are listed in the column 'Description'.

Items marked with (*) are optional ressources.

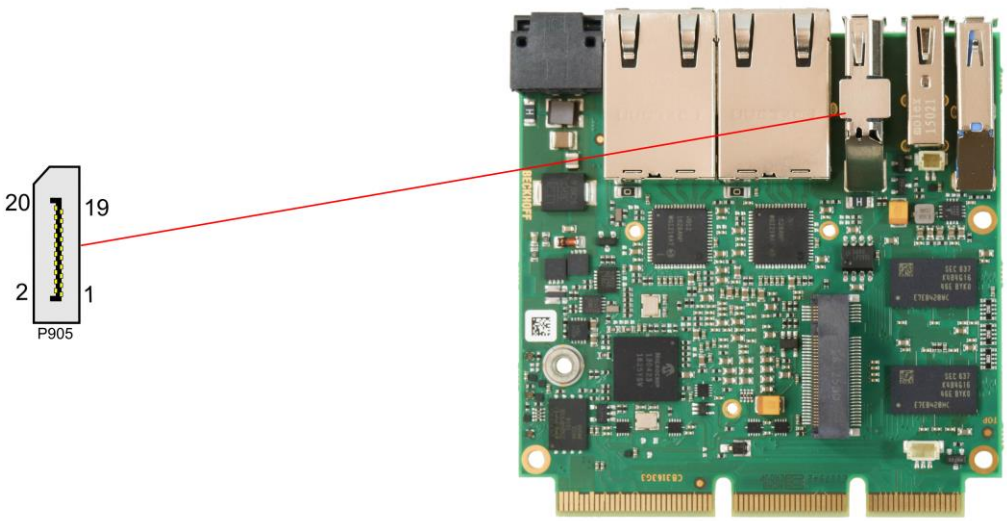
If you use an add-in card, which is not or not fully supported, the BIOS will display an error message.

4.3.3 Display Port

For DisplayPort devices, a suitable standard connector is available.

Additionally, the interface offers HDMI/DVI signaling which can be made available using an adapter. Mating adapters are available, please contact your distributor.

Manufacturer	Description	Mating Connector
Foxconn	3VD21207-H7U0-4H	(Standard DisplayPort connector)



Pinout DisplayPort connector:

Description	Name	Pin		Name	Description
Displayport Lane 0 +	DPL0	1	2	GND	Ground
Displayport Lane 0 -	DPL0#	3	4	DPL1	Displayport Lane 1 +
Ground	GND	5	6	DPL1#	Displayport Lane 1 -
Displayport Lane 2 +	DPL2	7	8	GND	Ground
Displayport Lane 2 -	DPL2#	9	10	DPL3	Displayport Lane 3 +
Ground	GND	11	12	DPL3#	Displayport Lane 3 -
Configuration pin 1	Config1	13	14	Config2	Configuration pin 2
Displayport Aux +	DPAUX	15	16	GND	Ground
Displayport Aux -	DPAUX#	17	18	HPD	Hotplug Detect
Ground	GND	19	20	3.3V	Power supply 3,3V

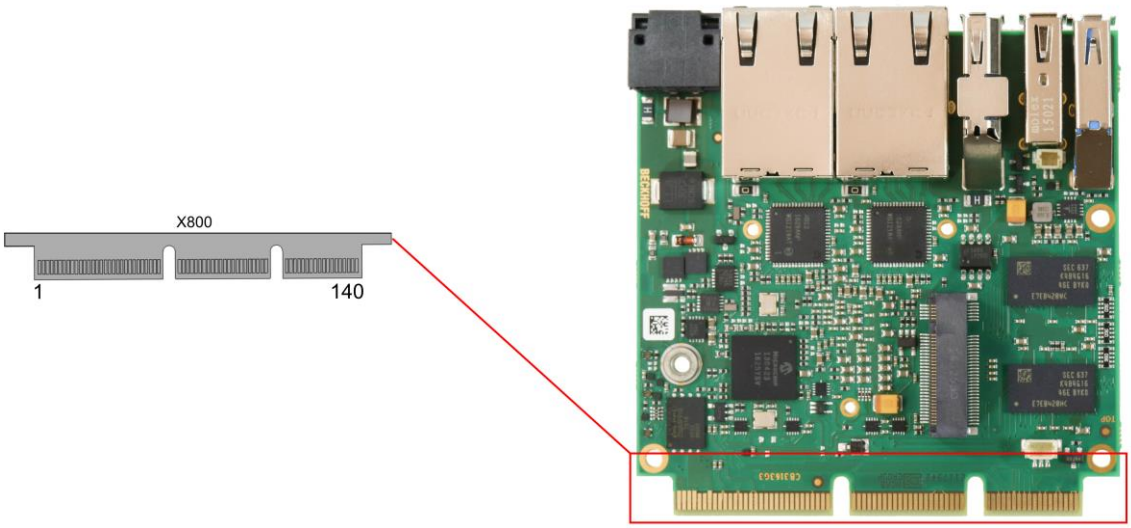
NOTICE

Switching to HDMI
By default, the interface offers DisplayPort signals. According to DisplayPort specification 1.1., the ADLE3800SEC will automatically switch to HDMI, when using a level shifter cable.

4.3.4 BAseCon140 Connector

With the BAseCon140 connector the ADLE3800SEC provides a flexible and uncomplicated add-on of additional IO interfaces. The BAseCon140 connector offers up to 8 PCIe lanes, from which 4 can be muxed with SATA2.0 (3G) and the other 4 can be muxed with USB3.0 signals. It also leads through DisplayPort-, HSIC-, SMBus- and 1Wire-signals. All configuration data are saved on the backplane EEProm. The backplane communicates the data to the board via SMB and therefore enables an uncomplicated and self-configuring IO extension.

Notice current limits as follows: maximum load for S3.3V and 3.3V is 1A. For SVCC and VCC the maximum load is 1.5A.



Pinout BAseCon140

Description	Name	Pin		Name	Description
SUPS output	SUSV OUT1	1	2	SUSV IN1	SUPS input
SUPS output	SUSV OUT2	3	4	SUSV IN2	SUPS input
VCC	5V1	5	6	GND16	Ground
VCC	5V2	7	8	GND17	Ground
Ground	GND1	9	10	3,3V1	Power supply 3.3V
Ground	GND2	11	12	3,3V2	Power supply 3.3V
SVCC	S5V	13	14	S3,3V	Standby power supply 3.3V
Ground	GND3	15	16	GND18	Ground
PCIe Lane 1 transmit +	PE1 TX/ SATA4 TX	17	18	SATA4 RX/ PE1 RX	PCIe Lane 1 receive +
PCIe Lane 1 transmit -	PE1 TX#/ SATA4 TX#	19	20	SATA4 RX #/ PE1 RX#	PCIe Lane 1 receive -
Ground	GND4	21	22	GND19	Ground
PCIe Clock Lane 1 +	PECLK1	23	24	PECLK2	PCIe clock Lane 2 +
PCIe Clock Lane 1 -	PECLK1#	25	26	PECLK2#	PCIe clock Lane 2 -
Ground	GND5	27	28	GND20	Ground
PCIe Lane 2 transmit +	PE2 TX/ SATA3 TX	29	30	SATA3 RX/ PE2 RX	PCIe Lane 2 Receive +
PCIe Lane 2 transmit -	PE2 TX#/ SATA3 TX#	31	32	SATA3 RX #/ PE2 RX#	PCIe Lane 2 Receive -

Description	Name	Pin		Name	Description
Ground	GND6	33	34	GND21	Ground
(not available)	PE3-TX/ SATA2-TX	35	36	SATA2 RX/ PE3 RX	*(not available)*
(not available)	PE3-TX#/ SATA2-TX#	37	38	SATA2 RX#/ PE3 RX#	*(not available)*
Ground	GND7	39	40	GND22	Ground
(not available)	PECLK3	41	42	PECLK4	*(not available)*
(not available)	PECLK3#	43	44	PECLK4#	*(not available)*
Ground	GND8	45	46	GND23	Ground
SATA Lane 2 transmit +	PE4-TX/ SATA1-TX	47	48	SATA1 RX/ PE4 RX	SATA Lane 2 receive +
SATA Lane 2 transmit -	PE4-TX#/ SATA1-TX#	49	50	SATA1 RX #/ PE4 RX #	SATA Lane 2 receive -
Ground	GND9	51	52	GND24	Ground
PCIe Clock Enable Lane 1 active low	PCKE1#	53	54	PCKE2#	*PCIe Lane 2 Clock Enable active low*
(not available)	PCKE3#	55	56	PCKE4#	*(not available)*
PCIe reset active low	PERST#	57	58	PEWAKE#	PCIe Wake active low
SMBus clock	SMBCLK	59	60	SMBDAT	SMBus data active high
Key					
SMBus alert active low	SMB-Alert#	61	62	1Wire	1-Wire
(not available)	PCKE5/OC4 #	63	64	PCKE6#/ OC3#	*(not available)*
(not available)	PCKE7/OC2 #	65	66	PCKE8#/ OC1#	USB Overcurrent active low
Ground	GND10	67	68	GND25	Ground
(not available)	PE5-TX/ USB3-4-TX/ USBC1-TX	69	70	USBC1 RX/ USB3-4 RX/ PE5 RX	*(not available)*
(not available)	PE5-TX#/ USB3-4-TX#/ USBC1_TX#	71	72	USBC1 RX#/ USB3-4 RX#/ PE5 RX#	*(not available)*
(not available)	USB2-4 (GND)	73	74	USB2-3 (GND)	*(not available)*
(not available)	PECLK5/US BC_SBU1 (GND)	75	76	PECLK6 (GND)	*(not available)*
(not available)	PECLK5#/ USBC-SBU2 (GND)	77	78	PECLK6# (GND)	*(not available)*
(not available)	USB2-4# (GND)	79	80	USB2-3 (GND)	*(not available)*
(not available)	PE6-TX/ USB3-3-TX/ USBC2-TX	81	82	USBC2 RX/ USB3-3 RX/ PE5 RX	*(not available)*
(not available)	PE6-TX#/ USB3-3-TX#/ USBC2-TX#	83	84	USBC2 RX#/ USB3-3 RX#/ PE5 RX#	*(not available)*
Ground	GND11	85	86	GND26	Ground

Description	Name	Pin		Name	Description
(not available)	PE7-TX/ USB3-2-TX/ SSIC-TX	87	88	SSIC RX/ USB3-2 RX/ PE7 RX	*(not available)*
(not available)	PE7-TX#/ USB3-2-TX#/ SSIC-TX#	89	90	SSIC RX#/ USB3-2 RX#/ PE6 RX#	*(not available)*
USB 2.0 channel 3 +	USB2-2 (GND)	91	92	USB2-1 (GND)	USB 2.0 channel 4 +
Ground	PECLK7 (GND)	93	94	PECLK8 (GND)	Ground
Ground	PECLK7# (GND)	95	96	PECLK8# (GND)	Ground
USB 2.0 channel 3 -	USB2-2# (GND)	97	98	USB2-1# (GND)	USB 2.0 channel 4 -
(not available)	PE8-TX/ USB3-1-TX	99	100	USB3-1 RX/ PE8 RX	*(not available)*
(not available)	PE8-TX#/ USB3-1-TX#	101	102	USB3-1 RX#/ PE8 RX#	*(not available)*
Ground	GND12	103	104	GND27	Ground
Key					
SATA GP1	GPIO1/ SATAGP1	105	106	SATAGP2/ GPIO2	*(not available)*
(not available)	N/A	107	108	USB-CC2/ SATAGP4/ GPIO4	*(not available)*
TwinCAT LED red	GPIO5/ TCLEDR	109	110	GPIO6/ TCLEDG	TwinCAT LED green
TwinCAT LED blue	GPIO7/ TCLEDB	111	112	GPIO8	*(not available)*
SATA LED active low	SATA-LED	113	114	USBPWREN	USB Power Enable
RTC-Battery	BATT	115	116	PWRFAIL	SUSV
Power Management Event active low	PME#	117	118	PWRGOOD	Powergood
Powerbutton active low	PWRBTN#	119	120	MRST#	Resetbutton active low
PSON	PSON	121	122	ATXPWRGD	ATX Powergood
Ground	GND13	123	124	GND28	Ground
DisplayPort + / DVI -	DP/DVI#	125	126	DDCC/ DPAUX	DisplayPort Aux +
DisplayPort Hot Plug Detect	DPHPD	127	128	DDCD/ DPAUX#	DisplayPort Aux -
Ground	GND14	129	130	GND29	Ground
DisplayPort Lane 0 +	DPL0	131	132	DPL1	DisplayPort Lane 1 +
DisplayPort Lane 0 -	DPL0#	133	134	DPL1#	DisplayPort Lane 1 -
Ground	GND	135	136	GND30	Ground
DisplayPort Lane 2 +	DPL2	137	138	DPL3	DisplayPort 3 +
DisplayPort Lane 2 -	DPL2#	139	140	DPL3#	DisplayPort 3 -

NOTICE

The column 'Name' lists all ressources, provided by the chipset. Those ressources, which are made available, are listed in the column 'Description'.

Items marked with (*) are optional ressources.

If you use an add-in card, which is not or not fully supported, the BIOS will display an error message.

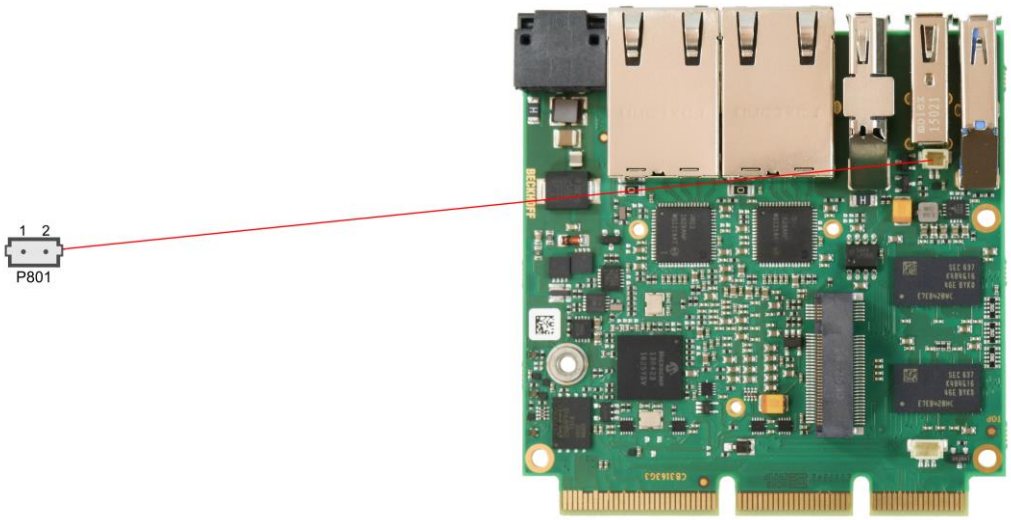
4.3.5 External Battery

In order to supply the ADLE3800SEC in case of a powerfail, it can be plugged into an external RTC battery via a 2pin connector. The maximum battery voltage is 3.3V.

Manufacturer	Description	Mating Connector
JST	BM02B-SRSS-TB(LF)(SN)	e.g. JST455-1392-ND

NOTICE

UL Conformity: The board already implements all required technical measures for UL conformity.
Connect the battery directly. There are no further technical measures required!



NOTICE

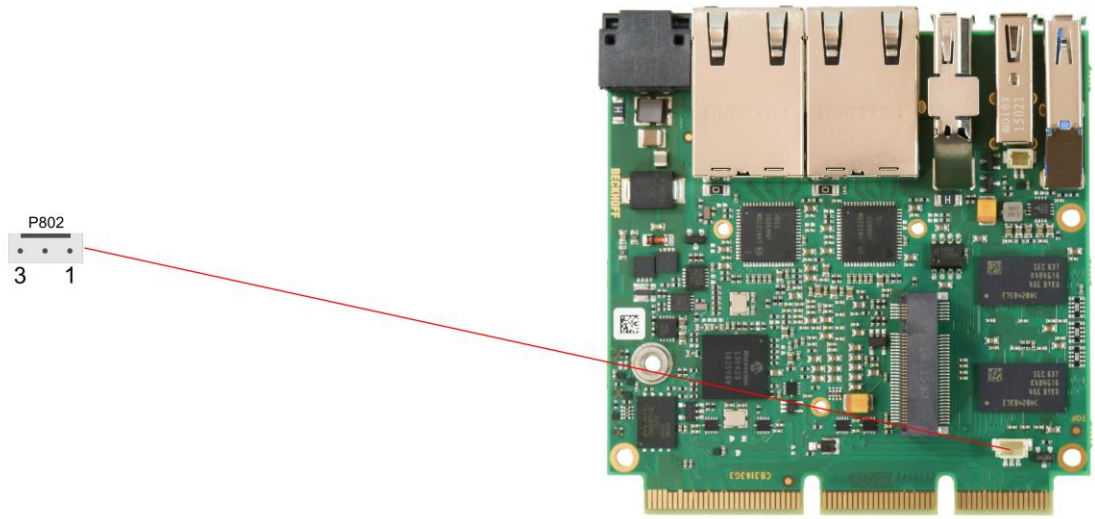
Synchronicity of RTC: The RTC quartz is sensitive to thermal fluctuation. Therefore the synchronicity can only be achieved with sufficient cooling!

Pin	Name	Description
1	BATT	battery 3.3 volt
2	GND	ground

4.3.6 FAN Connector

A 3-pin connector is available for controlling and monitoring an external fan (5 volt). For the monitoring the fan must provide a corresponding speed signal.

Manufacturer	Description	Mating Connector
JST	BM03B-SRSS-TB(LF)(SN)	z.B. JST SHR-03V-S

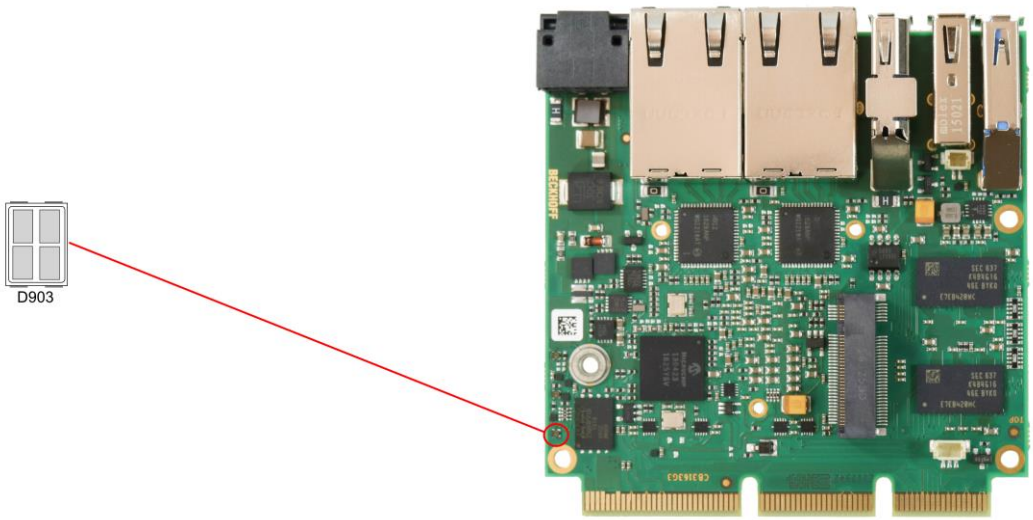


Pin	Name	Description
1	FANON	Control signal FAN
2	VCC	Power supply 5V regulated
3	FANCTRL	Monitoring signal FAN

4.4 LED Signaling

4.4.1 RGB LED

The ADLE3800SEC has a tricolor LED, which signals status messages by using different colors and flash intervals.



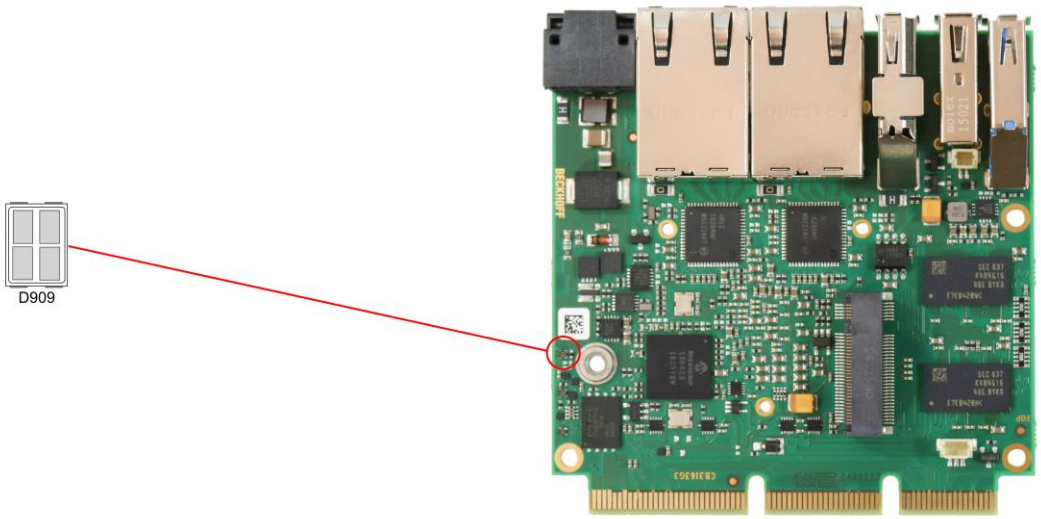
Color	Interval		Meaning
non	solid		Invalid system state
White	once		Powerfail
Cyan	solid		Reserved
Magenta	solid		SUPS active
Blue	solid		Reserved
Yellow	solid		S5 state
Green	solid		S0 state
Red	solid		Reset/Start
Green/Yellow	flashing		Bootloader operates normal
Red/Yellow	flashing		Bootloader starting (running starting sequence)
Yellow	flashing (6s)		S4 state
Yellow	flashing (3s)		S3 state
Magenta	flashing (0,5s)		SUPS test of capacity
Red/Magenta	flashing		Bootloader: checksum error at I2C transmission

NOTICE

The status codes can be customized, e.g. for TwinCAT LED. The system colors can be altered via SMB command. The alteration remains until the following restart or reset of the system. Additionally, a flashing white LED light displays the change of default colors.

4.4.2 Harddisk-LED

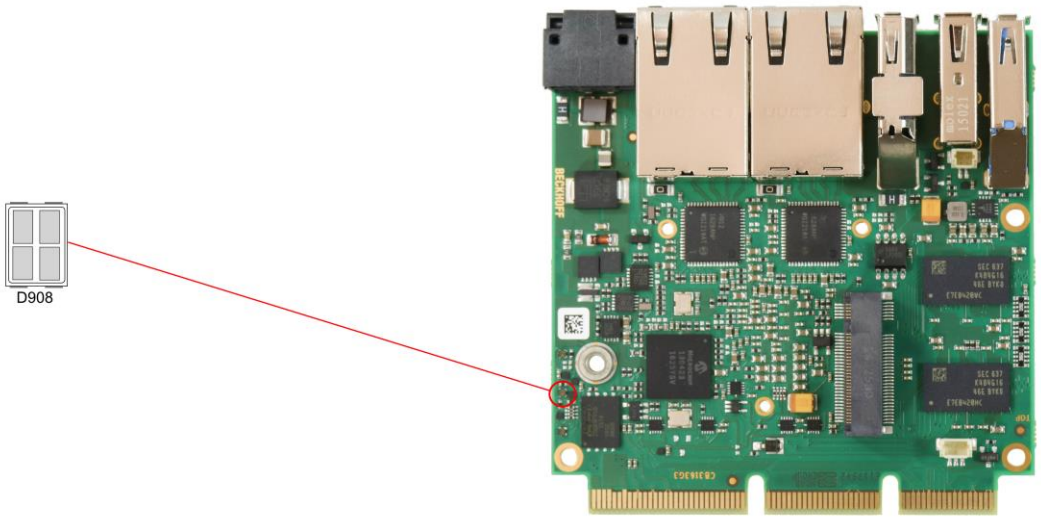
An additional RGB LED signals the harddisk activity.



Colours	Interval	State
Red	intermittent	active

4.4.3 TwinCAT-LED

The TwinCAT activity is signaled through a further RGB LED:



Colour	Interval		State
Green	permanent		TwinCAT Run Mode
Blue	permanent		TwinCAT Config Mode
Red	permanent		TwinCAT Stop

5 BIOS Settings

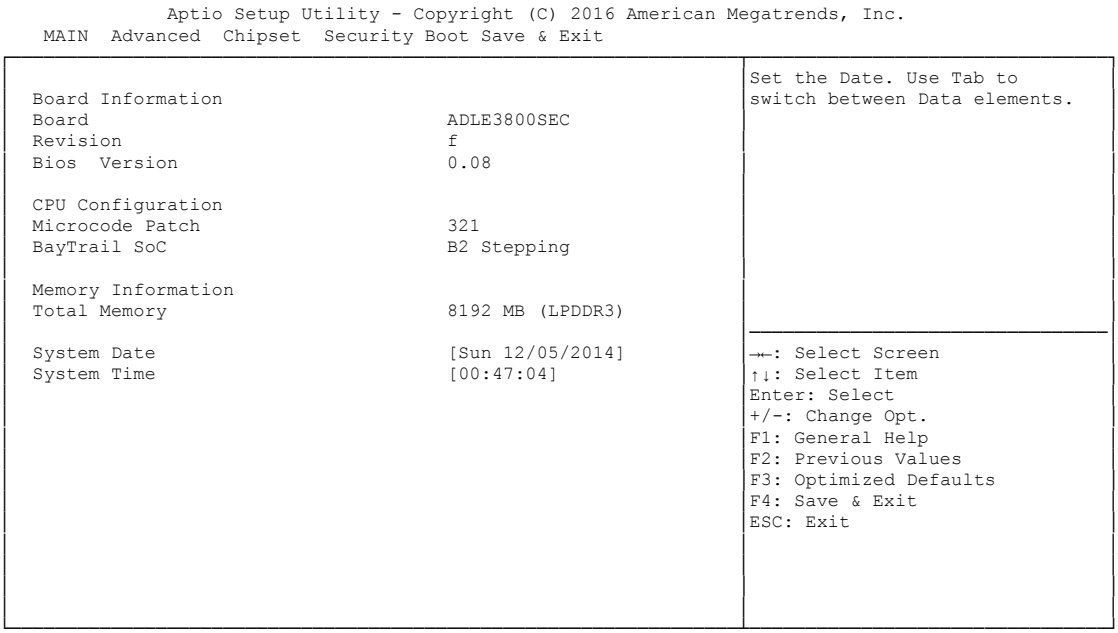
5.1 General Remarks

In each setup page, standard values for all setup entries can be loaded. Previously saved settings are loaded by pressing F2 and factory defaults are loaded with F3. Both F2 and F3, and also F4 ("Save & Exit") always affect the whole set of setup entries.
Setup entries starting with a „►" sign represent submenus. Navigation between entries is done using the arrow keys on the keyboard, with the <Enter> key being used to select an entry, which either opens up a dialog box or opens a whole new submenu of setup entries.
Each setup entry has a short help text associated with it. This is displayed in the upper right hand corner of the screen.

NOTICE

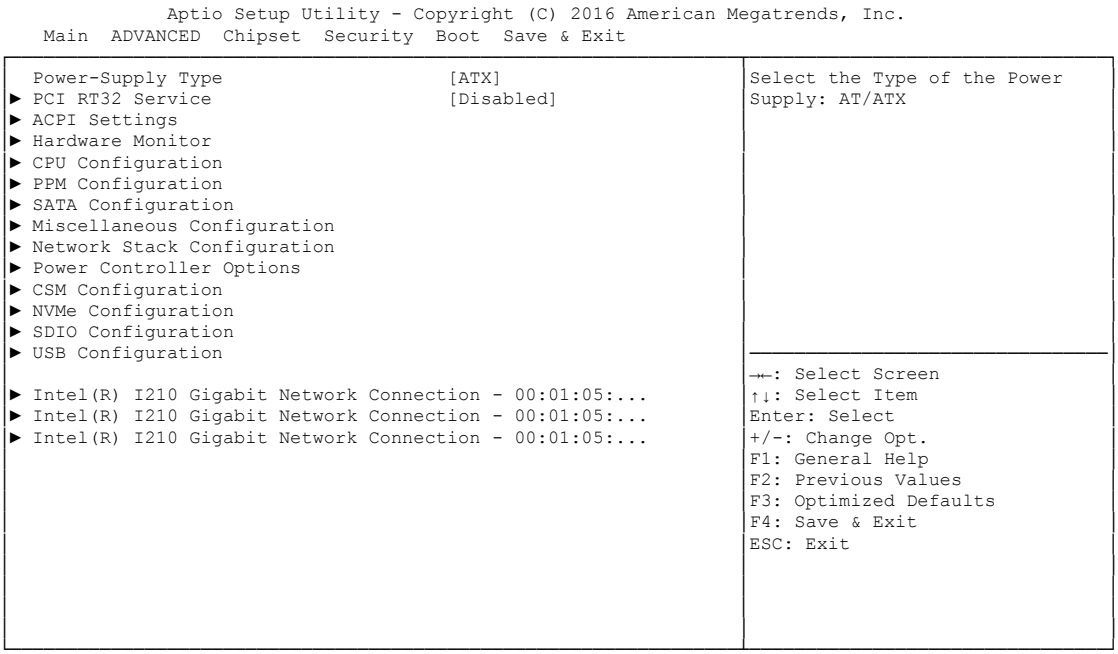
BIOS features and setup options are subject to change without notice. The settings displayed in the screenshots on the following pages are meant to be examples only. They do not represent the recommended settings or the default settings. Determination of the appropriate settings is dependent upon the particular application scenario in which the board is used.

5.2 Main



- ✓ **Board**
  Options: none
- ✓ **Revision**
  Options: none
- ✓ **Bios Version**
  Options: none
- ✓ **Microcode Patch**
  Options: none
- ✓ **BayTrail SoC**
  Options: none
- ✓ **Total Memory**
  Options: none
- ✓ **System Date**
  Options: The system date can be adjusted here.
- ✓ **System Time**
  Options: The system time can be adjusted here.

5.3 Advanced



- ✓ **Power-Supply Type**
  Options: ATX / AT

- ✓ **PCI RT32 Service**
  Options: Enabled / Disabled

- ✓ **ACPI Settings**
  Sub menu: see "ACPI Settings" (page 35)

- ✓ **H/W Monitor**
  Sub menu: see "H/W Monitor" (page 36)

- ✓ **CPU Configuration**
  Sub menu: see "CPU Configuration" (page 37)

- ✓ **PPM Configuration**
  Sub menu: see "PPM Configuration" (page 40)

- ✓ **SATA Configuration**
  Sub menu: see "SATA Configuration" (page 41)

- ✓ **Miscellaneous Configuration**
  Sub menu: see "Miscellaneous Configuration" (page 42)

- ✓ **Network Stack**
  Sub menu: see "Network Stack" (page 43)

- ✓ **Power Controller Options**
  Sub menu: see "Power Controller Options" (page 44)

- ✓ **CSM Configuration**
  Sub menu: see "CSM Configuration" (page 45)

- ✓ **NVMe Configuration**
  Sub menu: see "Advanced-Menü-NVMe Configuration" (page 46)

- ✓ **SDIO Configuration**
  Sub menu: see "SDIO Configuration" (page 47)

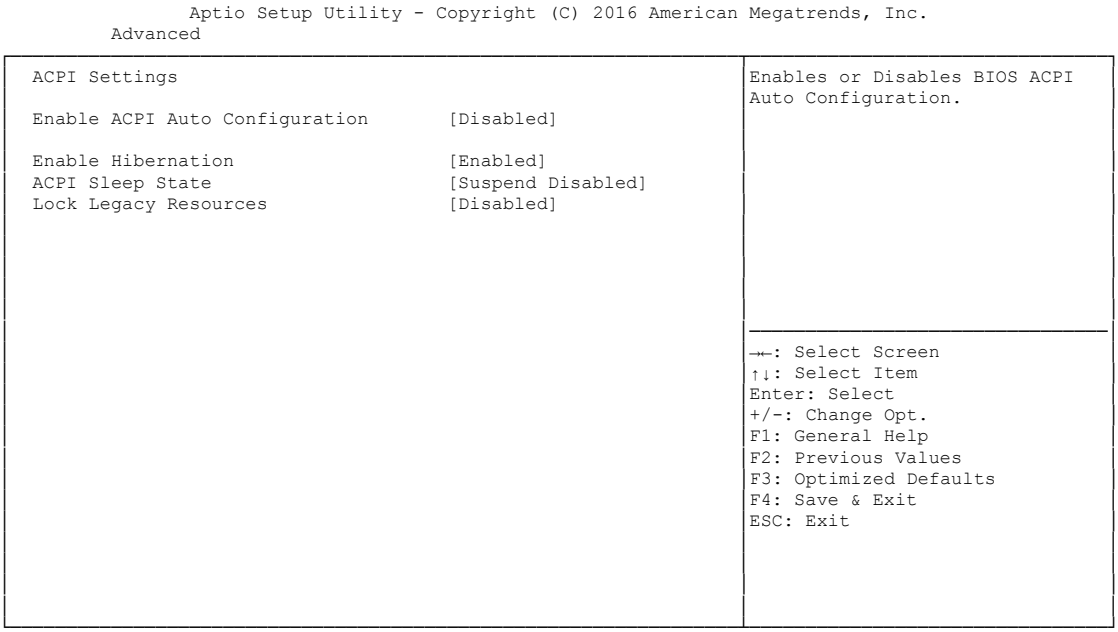
- ✓ **USB Configuration**
  Sub menu: see "USB Configuration" (page 48)

- ✓ **Security Configuration**
  Sub menu: see "Security Configuration" (page 49)

- ✓ **Intel(R) Gigabit Network Connection**
  Sub menu: see "Intel(R) I210 Gigabit Network Connection" (page 50)

- ✓ **Driver Health**
  Sub menu: see "Driver Health" (page 52)

5.3.1 ACPI Settings



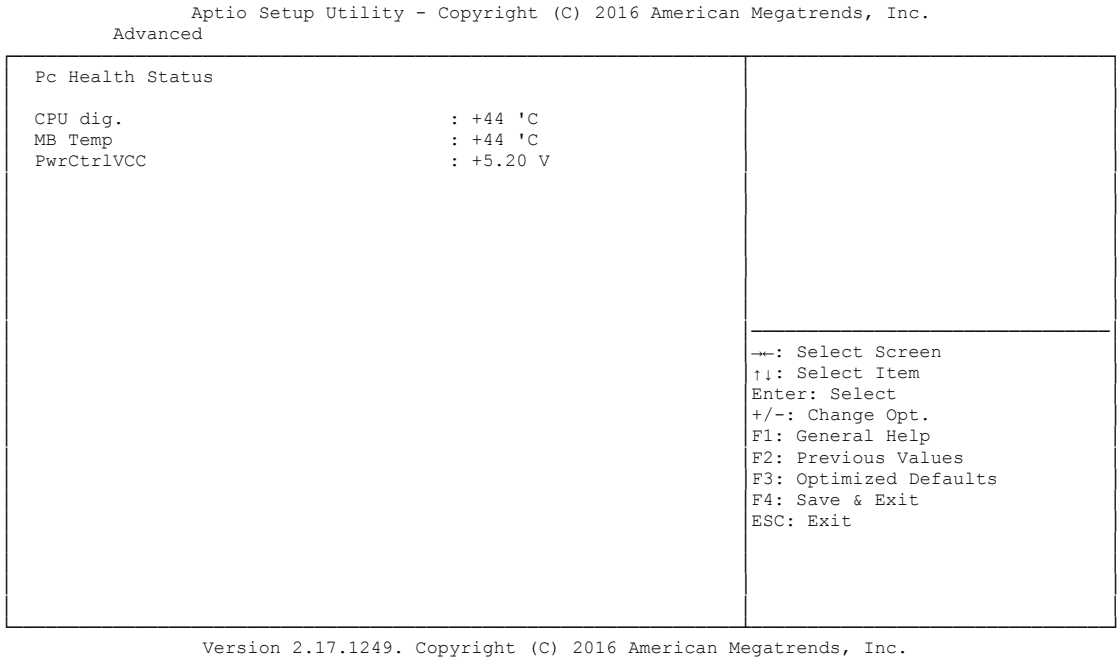
- ✓ **Enable ACPI Auto Configuration**
  Options: Enabled / Disabled

- ✓ **Enable Hibernation**
  Options: Enabled / Disabled

- ✓ **ACPI Sleep State**
  Options: Suspend Disabled / S1 (CPU Stop Clock)

- ✓ **Lock Legacy Resources**
  Options: Enabled / Disabled

5.3.2 H/W Monitor

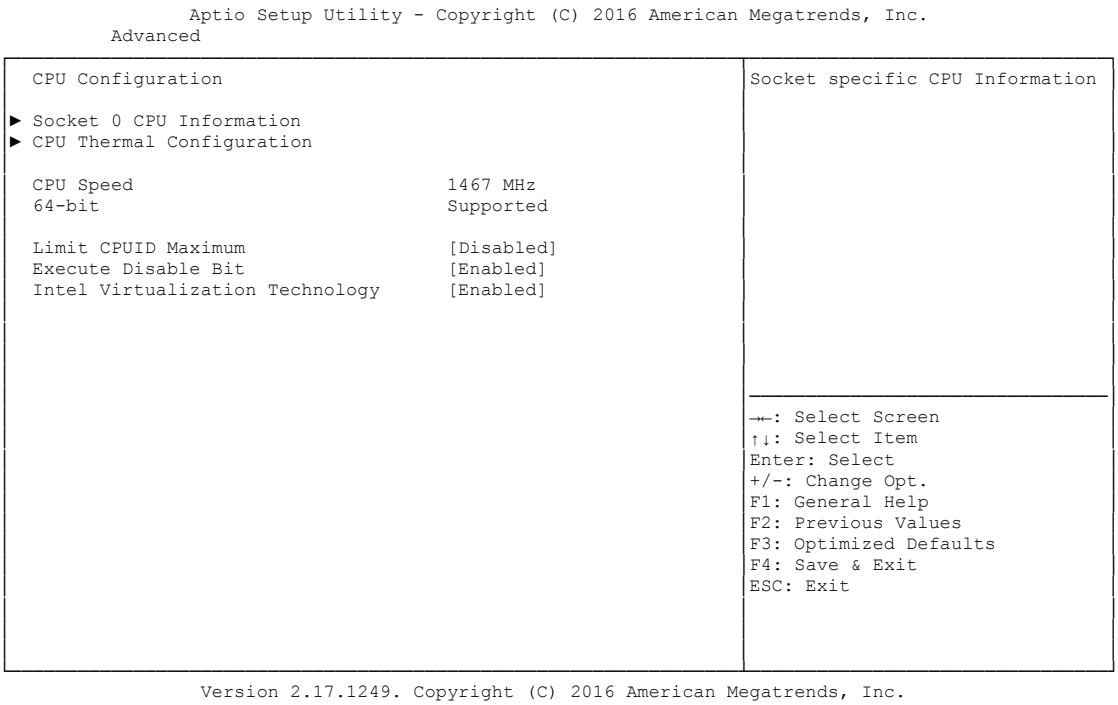


- ✓ **CPU dig.**
  Options: none

- ✓ **MB Temp**
  Options: none

- ✓ **PwrCtrlVCC**
  Options: none

5.3.3 CPU Configuration



- ✓ **Socket 0 CPU Information**
  Sub menu: see "Socket CPU Information" (page 38)

- ✓ **CPU Thermal Configuration**
  Sub menu: see "CPU Thermal Configuration" (page 39)

- ✓ **CPU Speed**
  Options: none

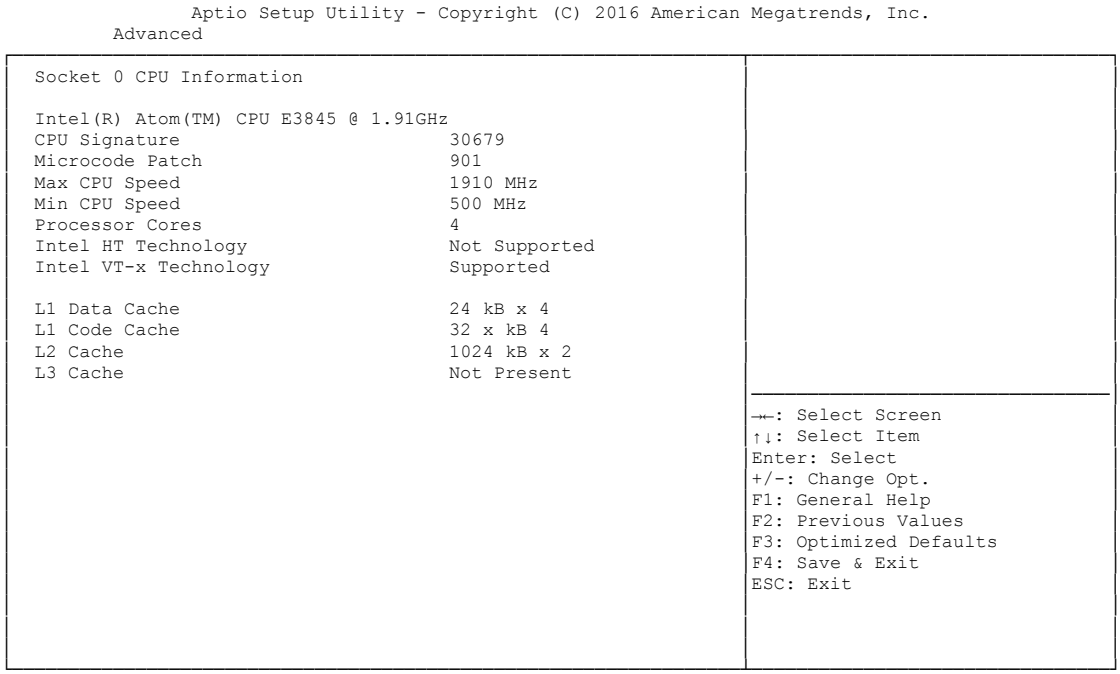
- ✓ **64-bit**
  Options: none

- ✓ **Limit CPUID Maximum**
  Options: Enabled / Disabled

- ✓ **Execute Disable Bit**
  Options: Enabled / Disabled

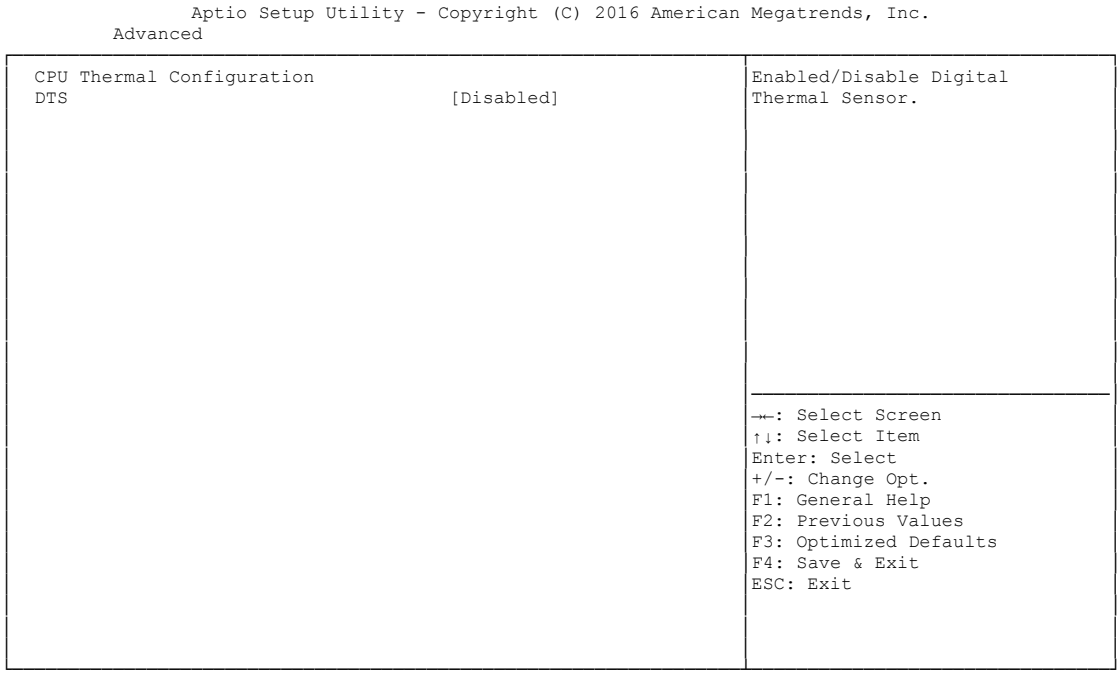
- ✓ **Intel Virtualization Technology**
  Options: Enabled / Disabled

5.3.3.1 Socket CPU Information



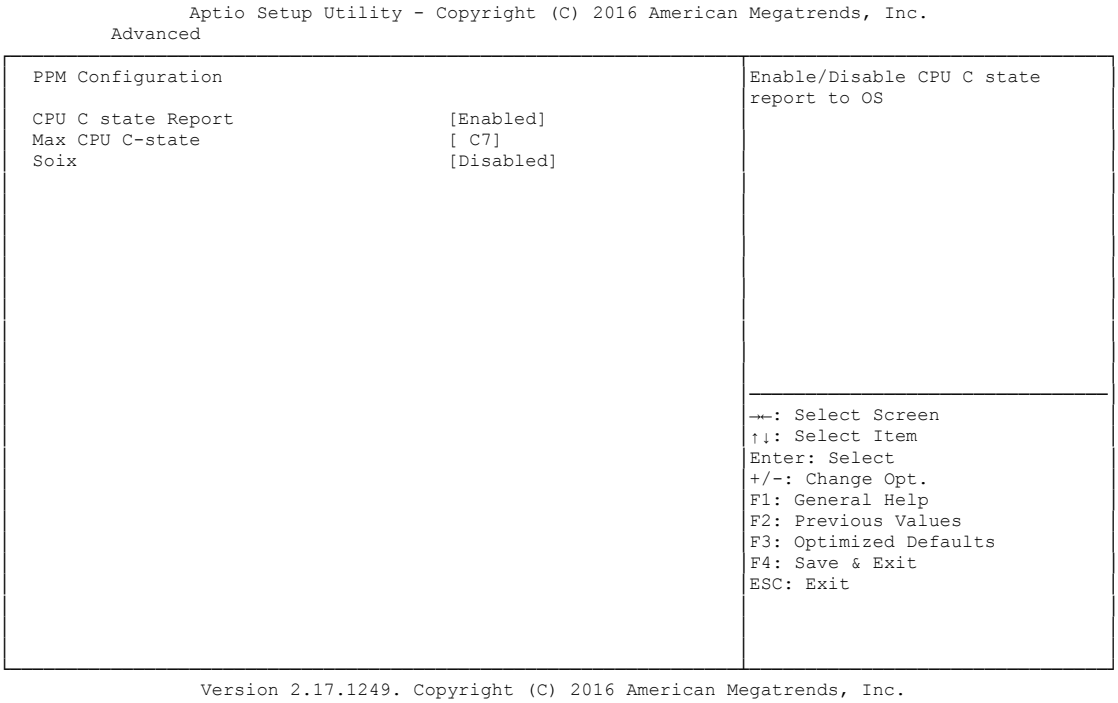
- ✓ **CPU Signature**
  Options: none
- ✓ **Microcode Patch**
  Options: none
- ✓ **Max CPU Speed**
  Options: none
- ✓ **Min CPU Speed**
  Options: none
- ✓ **Processor Cores**
  Options: none
- ✓ **Intel HT Technology**
  Options: none
- ✓ **Intel VT-x Technology**
  Options: none
- ✓ **L1 Data Cache**
  Options: none
- ✓ **L1 Code Cache**
  Options: none
- ✓ **L2 Cache**
  Options: none
- ✓ **L3 Cache**
  Options: none

5.3.3.2 CPU Thermal Configuration



✓ **DTS**
Options: Enabled / Disabled

5.3.4 PPM Configuration

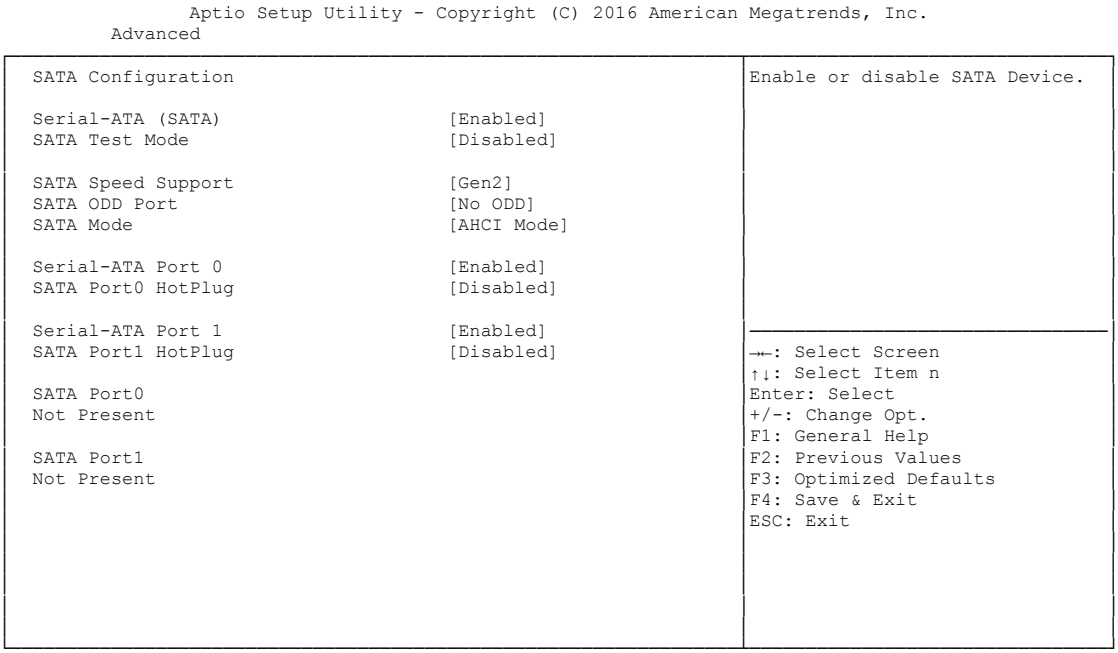


- ✓ **CPU C state Report**
  Options: Disabled / Enabled

- ✓ **Max CPU C-state**
  Options: C7 / C6 / C1

- ✓ **S0ix**
  Options: Disabled / Enabled

5.3.5 SATA Configuration



- ✓ **Serial-ATA (SATA)**
  Options: Enabled / Disabled

- ✓ **SATA Test Mode**
  Options: Enabled / Disabled

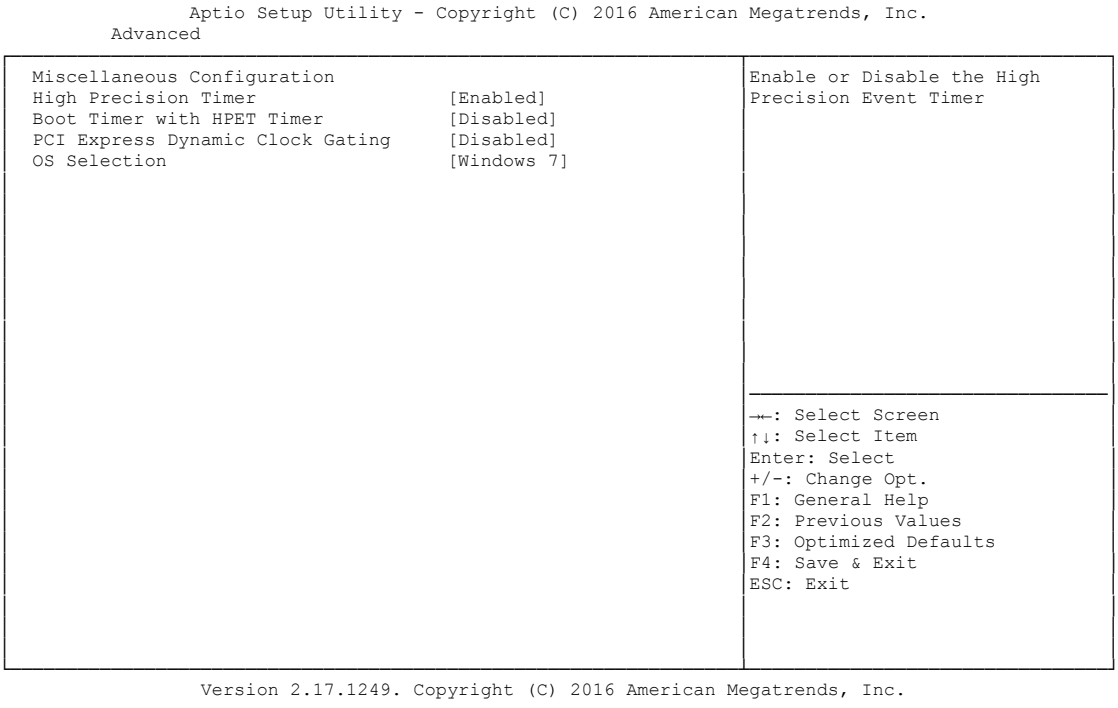
- ✓ **SATA Speed Support**
  Options: Gen1 / Gen2

- ✓ **SATA ODD Port**
  Options: Port0 ODD / Port1 ODD / No ODD

- ✓ **SATA Mode**
  Options: IDE Mode / AHCI Mode

- ✓ **Serial-ATA Port X**
  Options: Enabled / Disabled

5.3.6 Miscellaneous Configuration



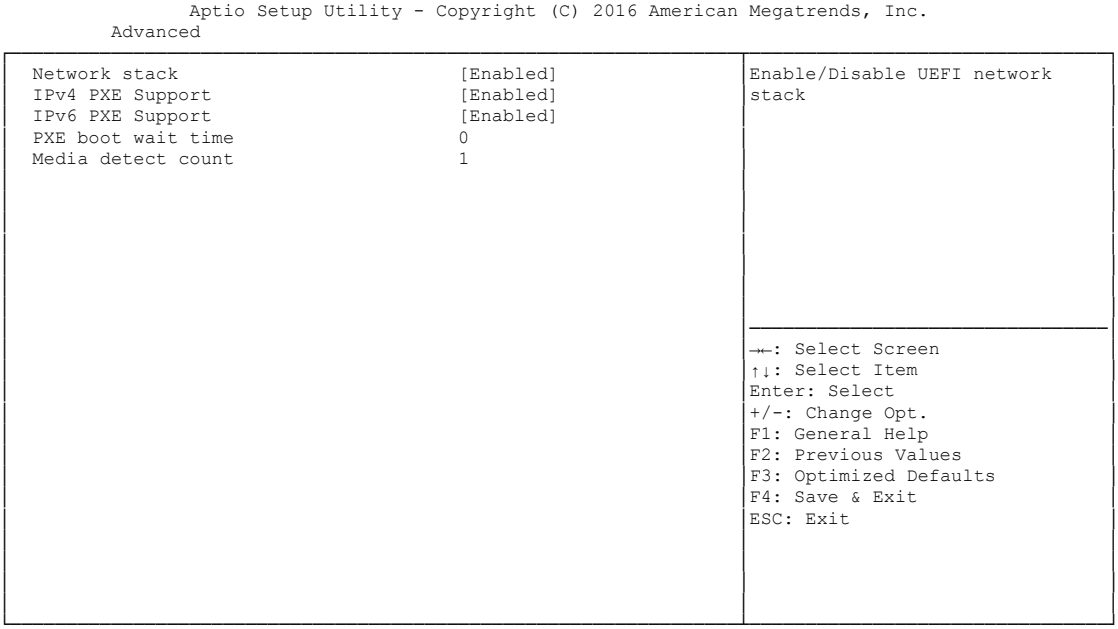
- ✓ **High Precision Timer**
  Options: Disabled / Enabled

- ✓ **Boot Timer with HPET Timer**
  Options: Enabled / Disabled

- ✓ **PCI Express Dynamic Clock Gating**
  Options: Enabled / Disabled

- ✓ **OS Selection**
  Options: Windows 8.X / Windows 7

5.3.7 Network Stack



- ✓ **Network stack**
  Options: Disabled / Enabled

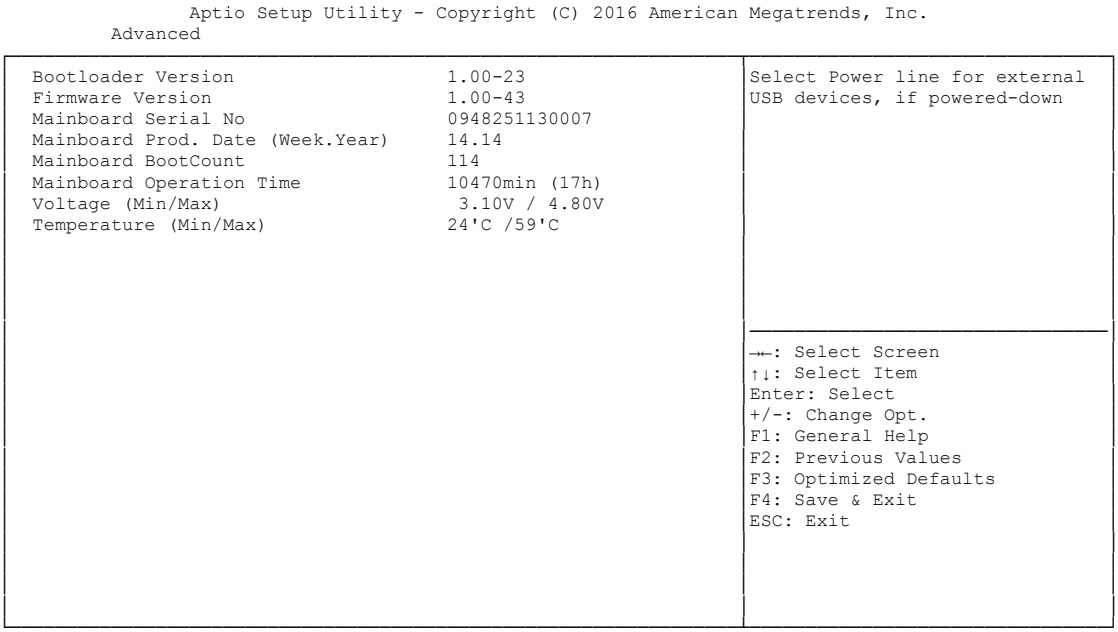
- ✓ **IPv4 PXE Support**
  Options: Disabled / Enabled

- ✓ **IPv6 PXE Support**
  Options: Disabled / Enabled

- ✓ **PXE boot wait time**
  Options: 0..5

- ✓ **Media detect count**
  Options: none

5.3.8 Power Controller Options



- ✓ **Bootloader Version**
  Options: none

- ✓ **Firmware Version**
  Options: none

- ✓ **Mainboard Serial No**
  Options: none

- ✓ **Mainboard Prod. Date (Week.Year)**
  Options: none

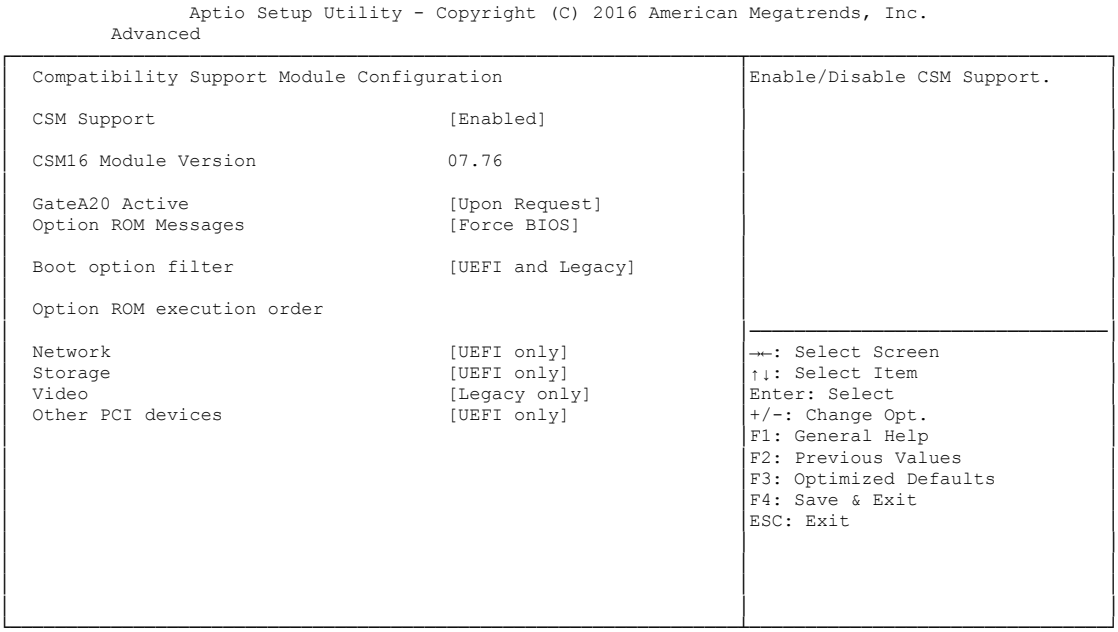
- ✓ **Mainboard Boot Count**
  Options: none

- ✓ **Mainboard Operation Time**
  Options: none

- ✓ **Voltage (Min/Max)**
  Options: none

- ✓ **Temperature (Min/Max)**
  Options: none

5.3.9 CSM Configuration



- ✓ **CSM Support**
  Options: Disabled / Enabled

- ✓ **CSM16 Module Version**
  Options: none

- ✓ **GateA20 Active**
  Options: Upon Request / Always

- ✓ **Option ROM Messages**
  Options: Force BIOS / Keep Current

- ✓ **Boot option filter**
  Options: UEFI and Legacy / Legacy only / UEFI only

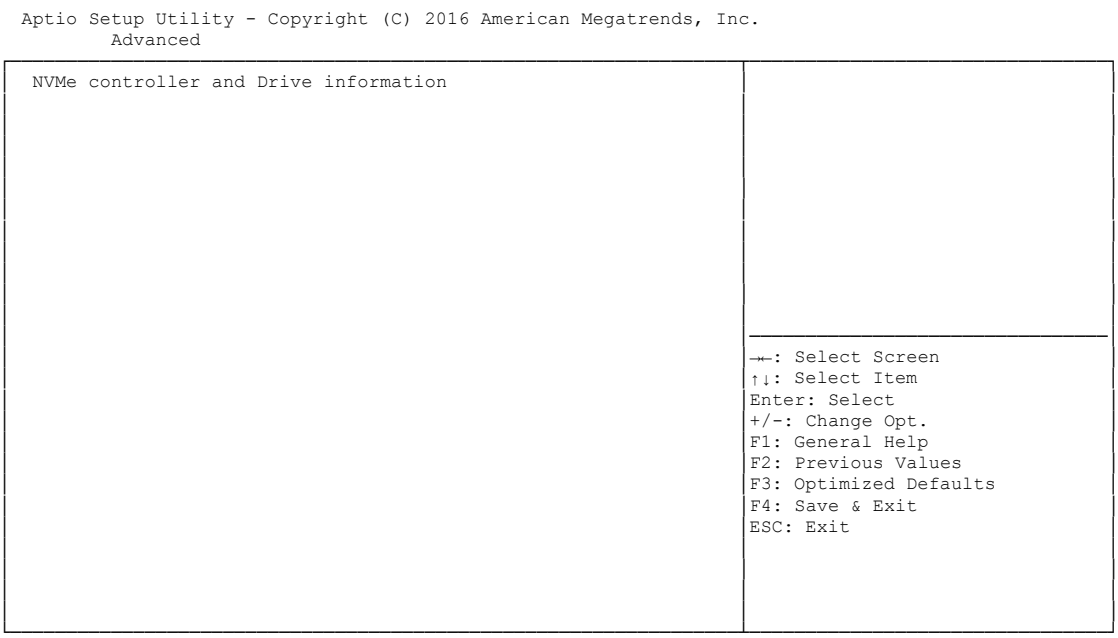
- ✓ **Network**
  Options: Do not launch / UEFI only / Legacy only

- ✓ **Storage**
  Options: Do not launch / UEFI only / Legacy only

- ✓ **Video**
  Options: Do not launch / UEFI only / Legacy only

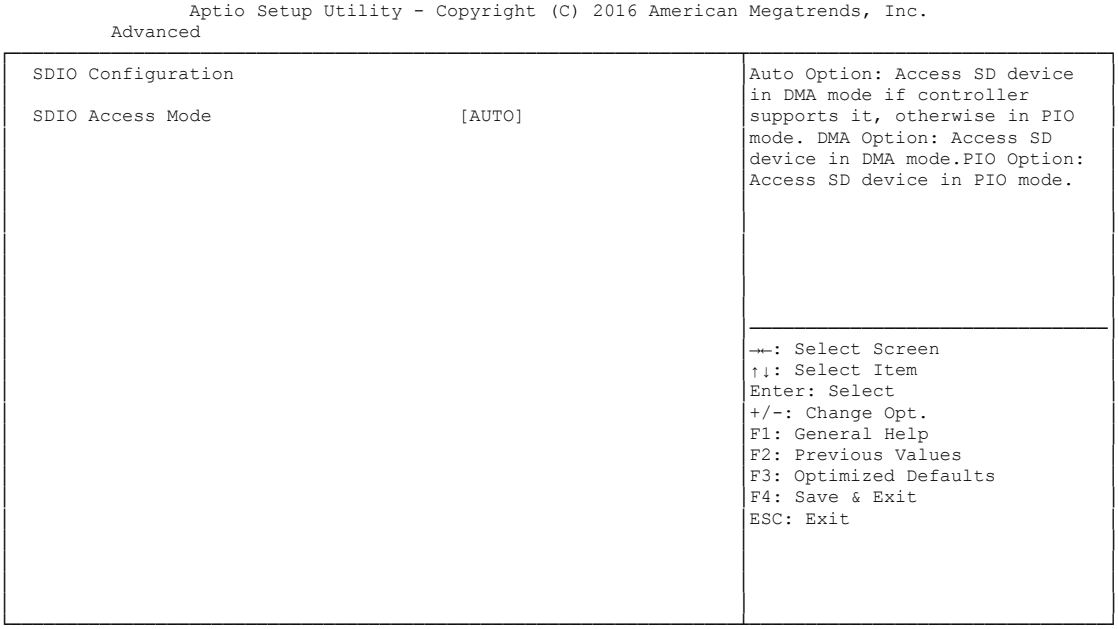
- ✓ **Other PCI devices**
  Options: Do not launch / UEFI / Legacy

5.3.10 Advanced-Menü-NVMe Configuration



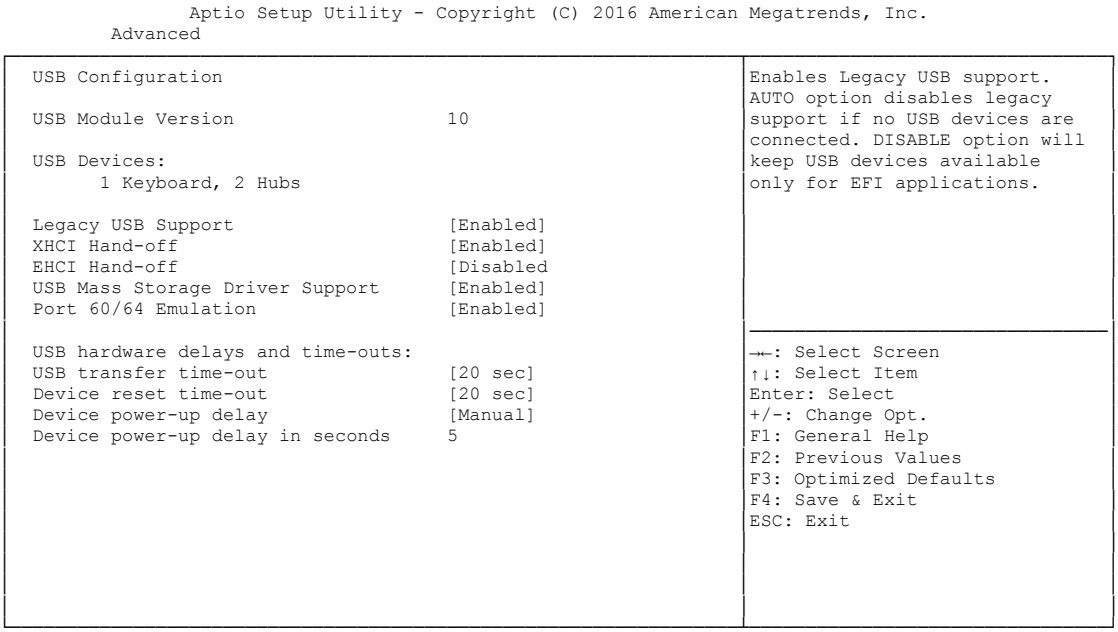
✓ **NVMe controller and Drive information**
Options: none

5.3.11 SDIO Configuration



- ✓ **SDIO Access Mode**
  Options: Auto / DMA / PIO

5.3.12 USB Configuration



- ✓ **USB Devices**
  Options: none

- ✓ **Legacy USB Support**
  Options: Enabled / Disabled / Auto

- ✓ **XHCI Hand-off**
  Options: Enabled / Disabled

- ✓ **EHCI Hand-off**
  Options: Enabled / Disabled

- ✓ **Mass Storage Driver Support**
  Options: Disabled / Enabled

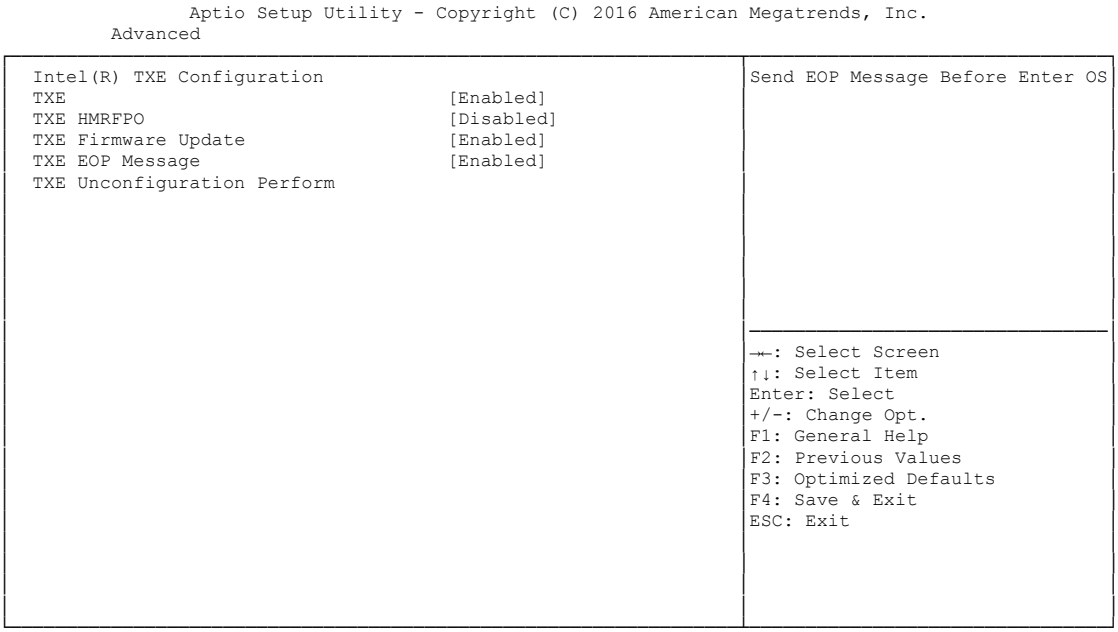
- ✓ **USB transfer time-out**
  Options: 5 sec / 10 sec / 20 sec

- ✓ **Device reset time-out**
  Options: 10 sec / 20 sec / 30 sec / 40 sec

- ✓ **Device power-up delay**
  Options: Auto / Manual

- ✓ **Device power-up delay in seconds**
  Options: 1..40

5.3.13 Security Configuration



- ✓ **TXE**
  Options: Enabled / Disabled

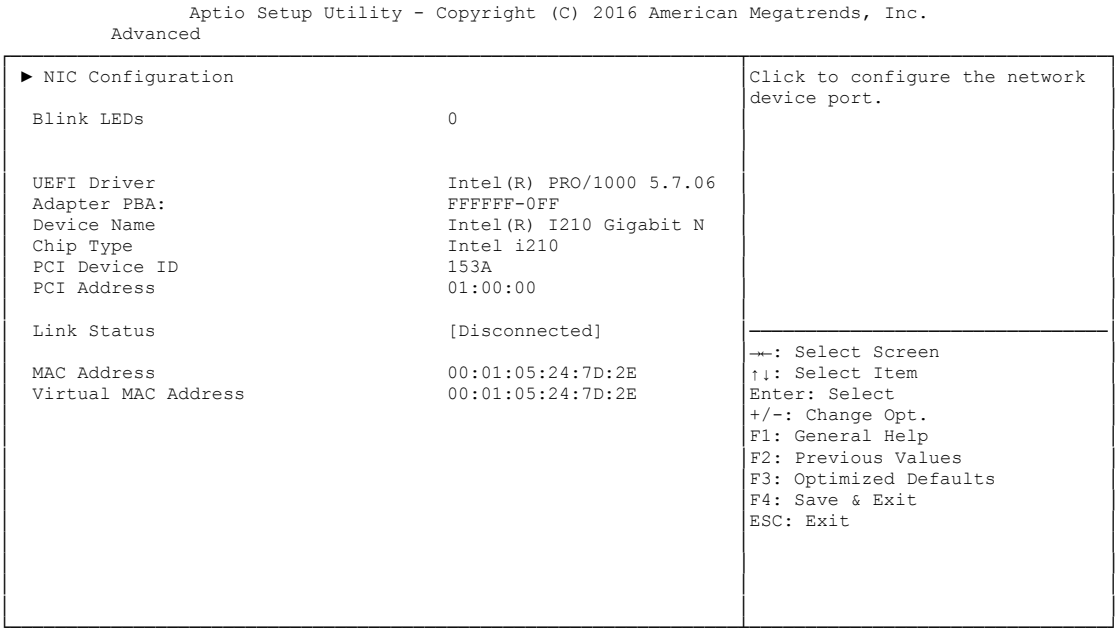
- ✓ **TXE HMRFPO**
  Options: Enabled / Disabled

- ✓ **TXE Firmware Update**
  Options: Enabled / Disabled

- ✓ **TXE EOP Message**
  Options: Enabled / Disabled

- ✓ **TXE Unconfiguration Perform**
  Options: none

5.3.14 Intel(R) I210 Gigabit Network Connection



- ✓ **NIC Configuration**
  Sub menu: see "NIC Configuration" (page 51)

- ✓ **Blink LEDs**
  Options: none

- ✓ **UEFI Driver**
  Options: none

- ✓ **Adapter PBA**
  Options: none

- ✓ **Device Name**
  Options: none

- ✓ **Chip Type**
  Options: none

- ✓ **PCI Device ID**
  Options: none

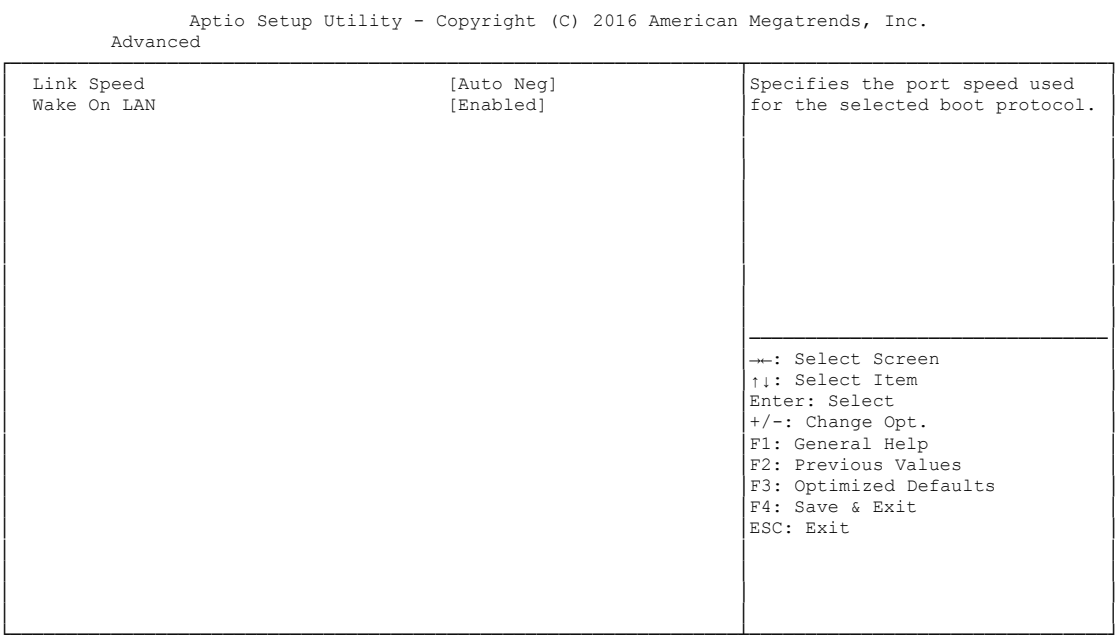
- ✓ **PCI Address**
  Options: none

- ✓ **Link Status**
  Options: none

- ✓ **MAC Address**
  Options: none

- ✓ **Virtual MAC Address**
  Options: none

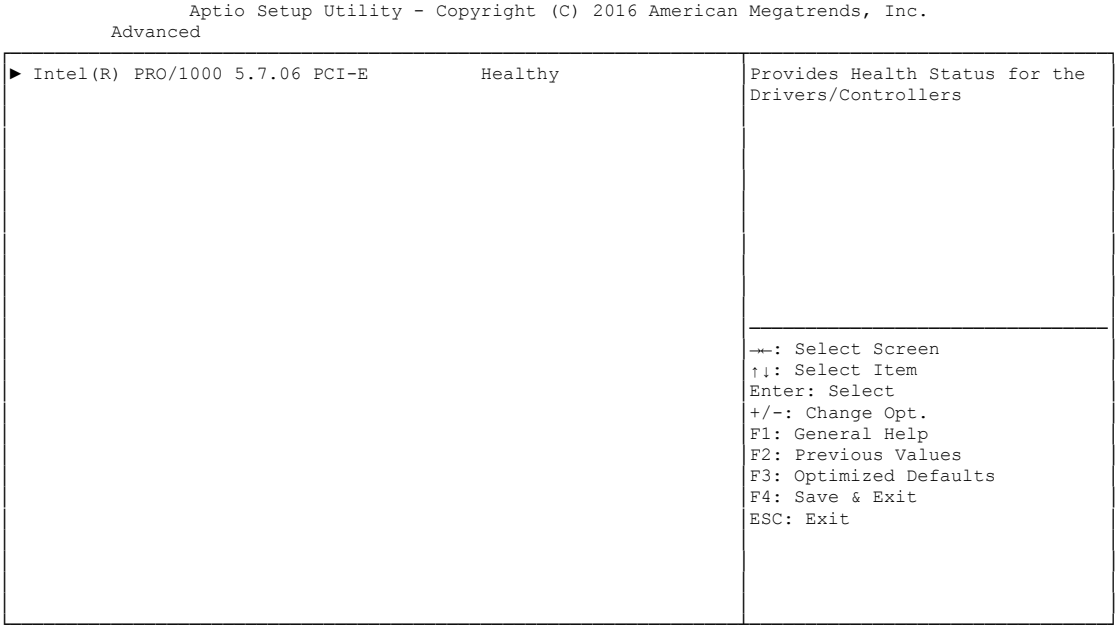
5.3.14.1 NIC Configuration



- ✓ **Link Speed**
  Options: Auto Negotiated / 10Mbps Half / 10Mbps full / 100Mbps Half / 100Mbps Full

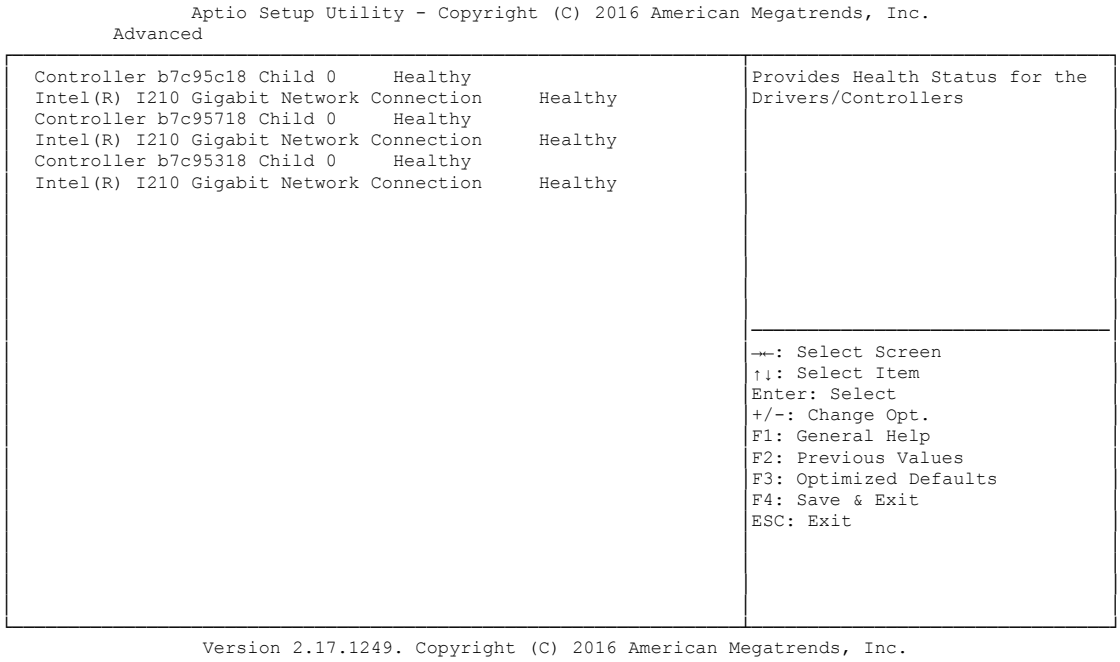
- ✓ **Wake On LAN**
  Options: Enabled / Disabled

5.3.15 Driver Health



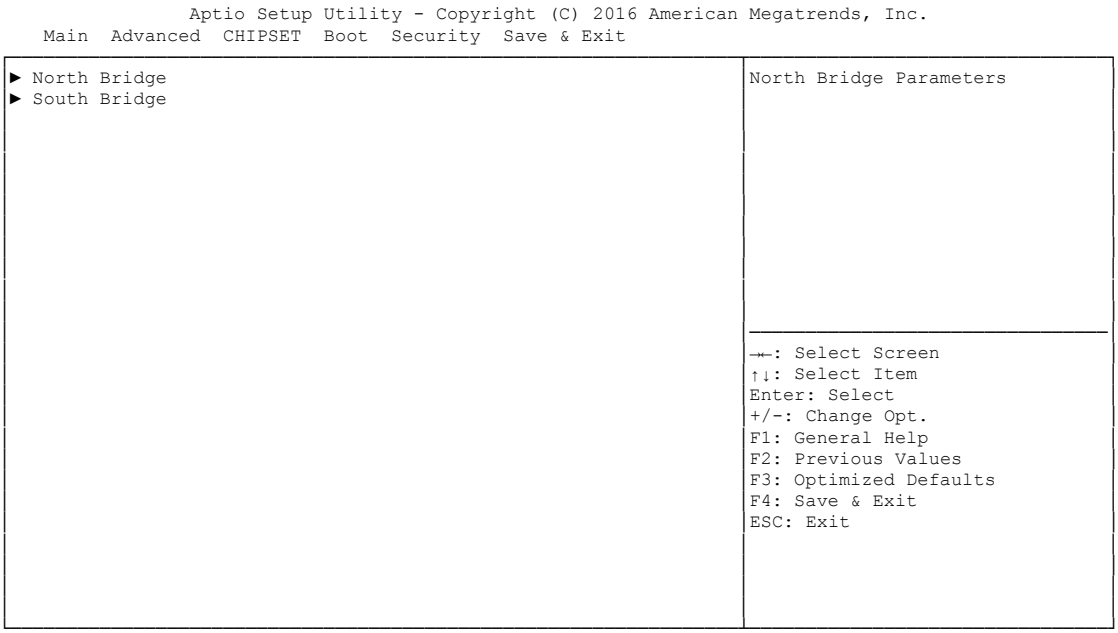
✓ **Intel(R) PRO/1000 5.7.06 PCI-E**
Sub menu: see "Intel(R) PRO/1000 PCI-E" (page 53)

5.3.15.1 Intel(R) PRO/1000 PCI-E



- ✓ **Controller x Child n**
  Options: none

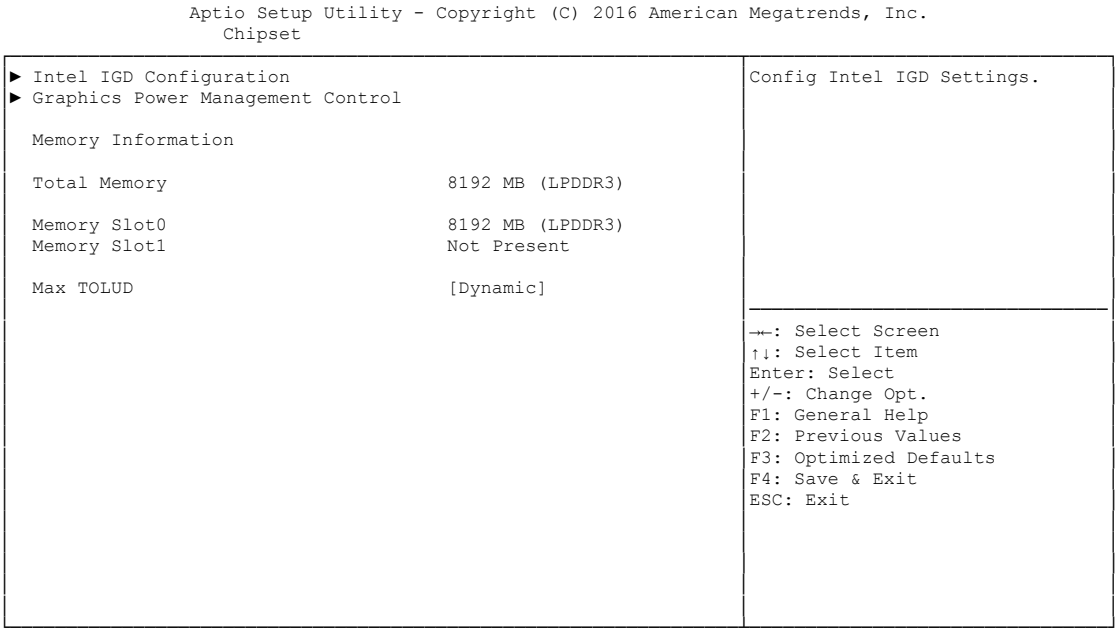
5.4 Chipset



- ✓ **North Bridge**
  Sub menu: see "North Bridge" (page 55)

- ✓ **South Bridge**
  Sub menu: see "South Bridge" (page 59)

5.4.1 North Bridge



- ✓ **Intel IGD Configuration**
  Sub menu: see "Intel IGD Configuration" (page 56)

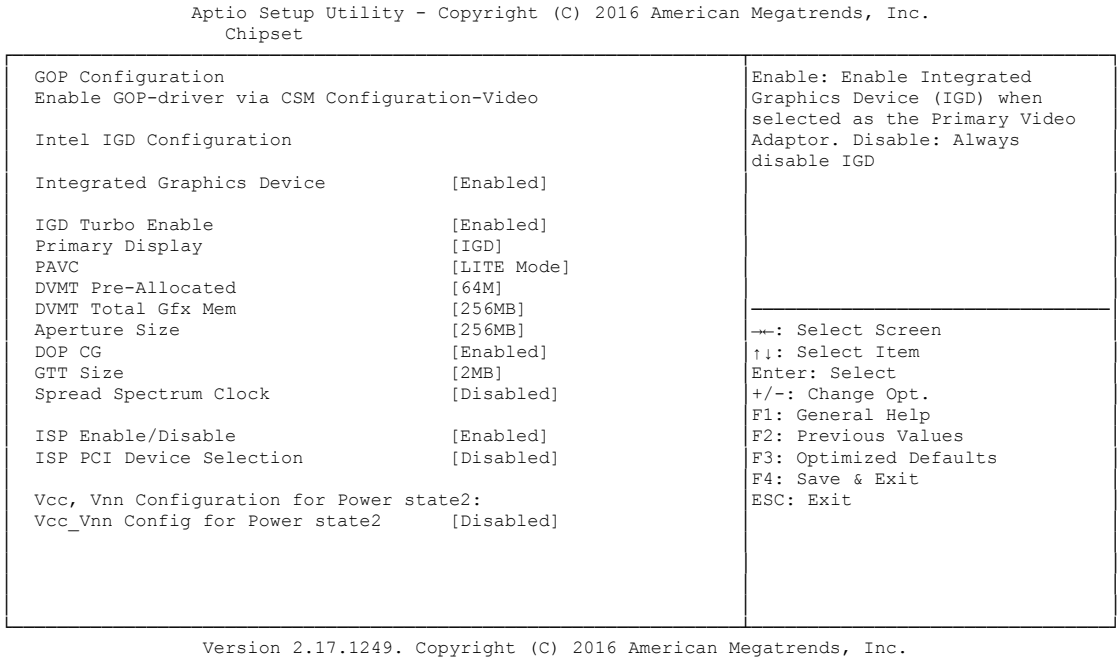
- ✓ **Graphics Power Management Control**
  Sub menu: see "Graphics Power Management Control" (page 58)

- ✓ **Total Memory**
  Options: none

- ✓ **Memory SlotX**
  Options: none

- ✓ **Max TOLUD**
  Options: Dynamic / 1GB / 1.25GB / .. / 3GB

5.4.1.1 Intel IGD Configuration



- ✓ **Integrated Graphics Device**
  Options: Enabled / Disabled

- ✓ **IGD Turbo Enable**
  Options: Enabled / Disabled

- ✓ **Primary Display**
  Options: IGD / PCI

- ✓ **PAVC**
  Options: Disabled / LITE Mode / SERPENT Mode

- ✓ **DVMT Pre-Allocated**
  Options: 32M / 64M ... 480M / 512M

- ✓ **DVMT Total Gfx Mem**
  Options: 128M / 256M / MAX

- ✓ **Aperture Size**
  Options: 128MB / 256MB / 512MB

- ✓ **DOP CG**
  Options: Enabled / Disabled

- ✓ **GTT Size**
  Options: 1MB / 2MB

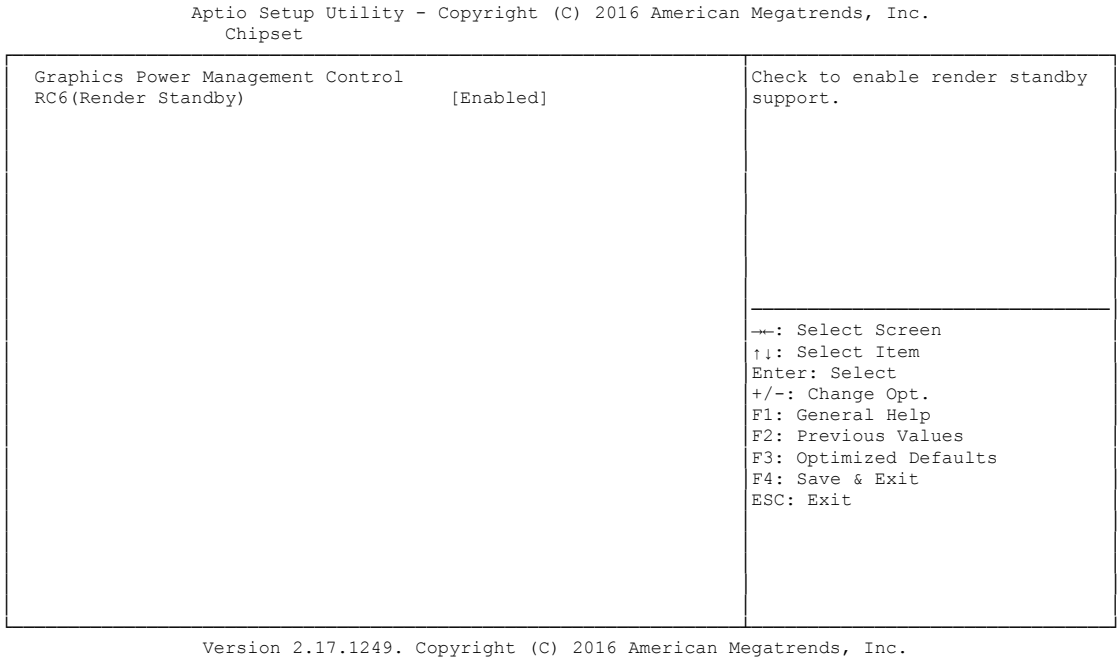
- ✓ **Spread Spectrum clock**
  Options: Enabled / Disabled

- ✓ **ISP Enable/ Disable**
  Options: Enabled / Disabled

- ✓ **ISP PCI Device Selection**
  Options: Disabled / ISP PCI Device as B0D2F0 / ISP PCI Device as B0D3F0

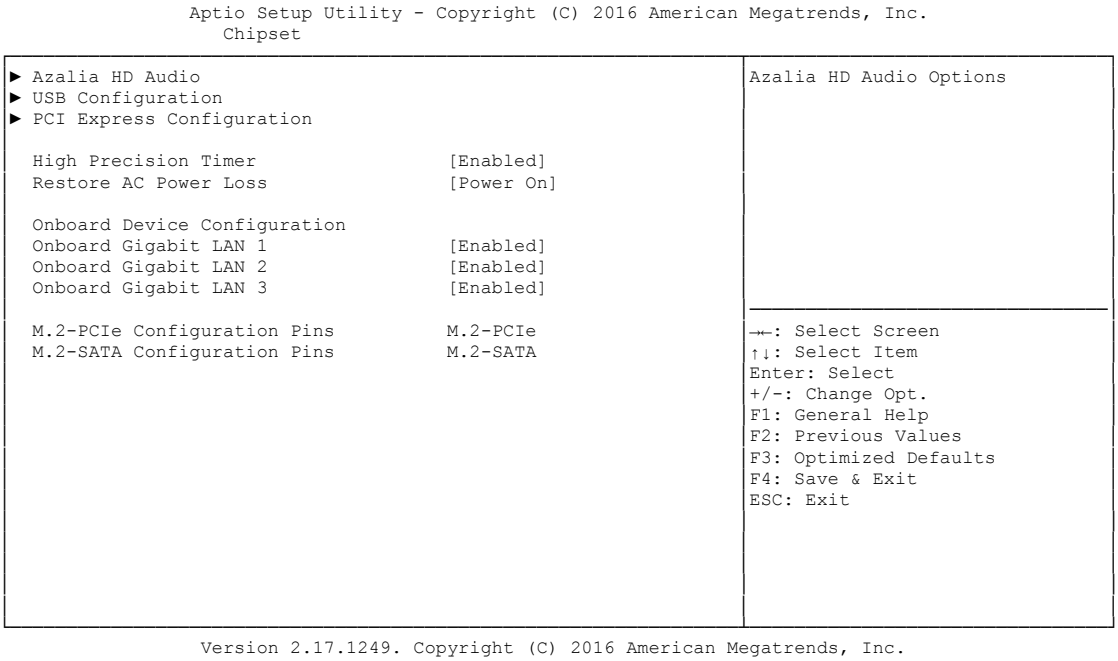
- ✓ **Vcc_Vnn Config for Power state2**
  Options: Enabled / Disabled

5.4.1.2 Graphics Power Management Control



✓ **RC6 (Render Standby)**
Options: Enabled / Disabled

5.4.2 South Bridge



- ✓ **Azalia HD Audio**
  Sub menu: see "Azalia HD Audio" (page 60)

- ✓ **USB Configuration**
  Sub menu: see "USB Configuration" (page 61)

- ✓ **PCI Express Configuration**
  Sub menu: see "PCI Express Configuration" (page 62)

- ✓ **High Precision Timer**
  Options: Disabled / Enabled

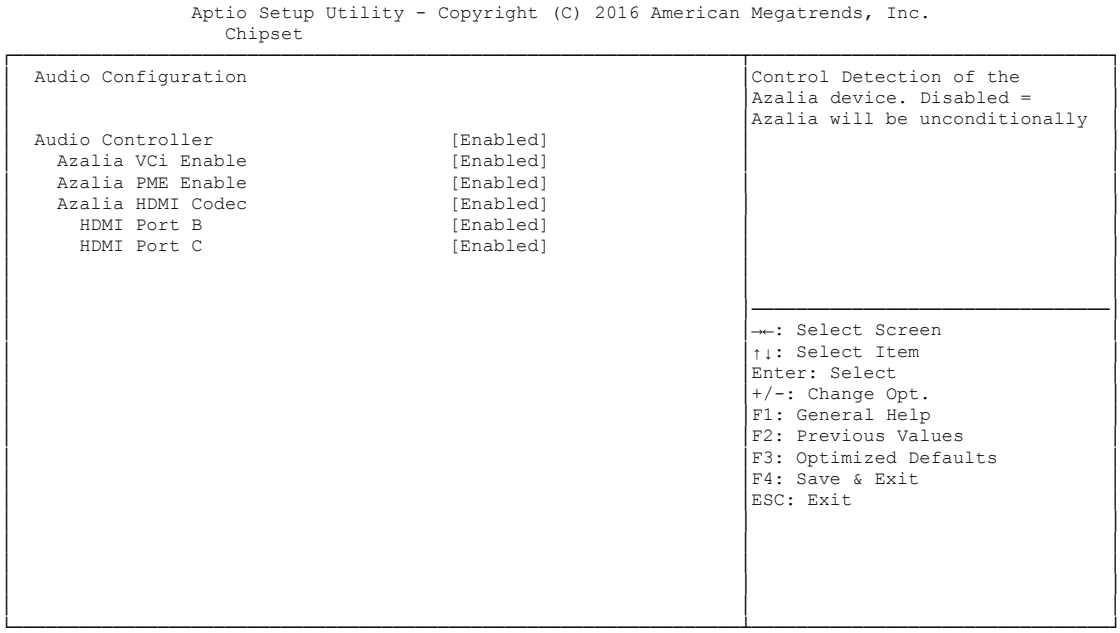
- ✓ **Restore AC Power Loss**
  Options: Power Off / Power On / Last State

- ✓ **Onboard Gigabit LAN X**
  Options: Enabled / Disabled

- ✓ **M.2-PCIe Configuration Pins**
  Options: none

- ✓ **M.2-SATA Configuration Pins**
  Options: none

5.4.2.1 Azalia HD Audio



- ✓ **Audio Controller**
  Options: Disabled / Enabled

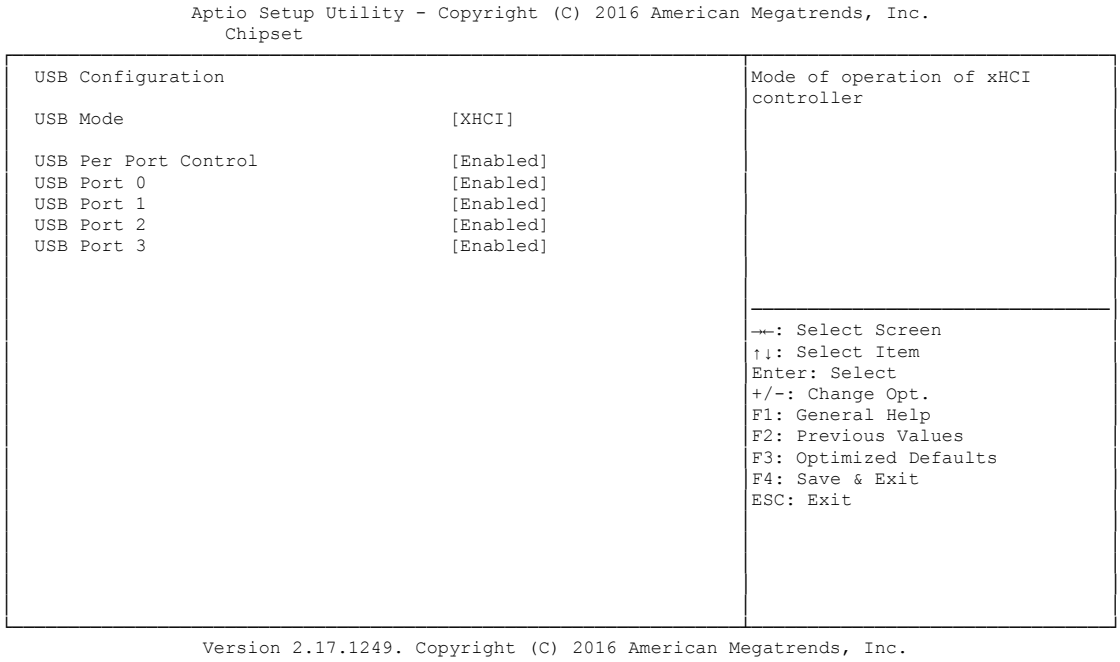
- ✓ **Azalia VCi Enable**
  Options: Disabled / Enabled

- ✓ **Azalia PME Enable**
  Options: Disabled / Enabled

- ✓ **Azalia HDMI Codec**
  Options: Disabled / Enabled

- ✓ **HDMI Port X**
  Options: Disabled / Enabled

5.4.2.2 USB Configuration

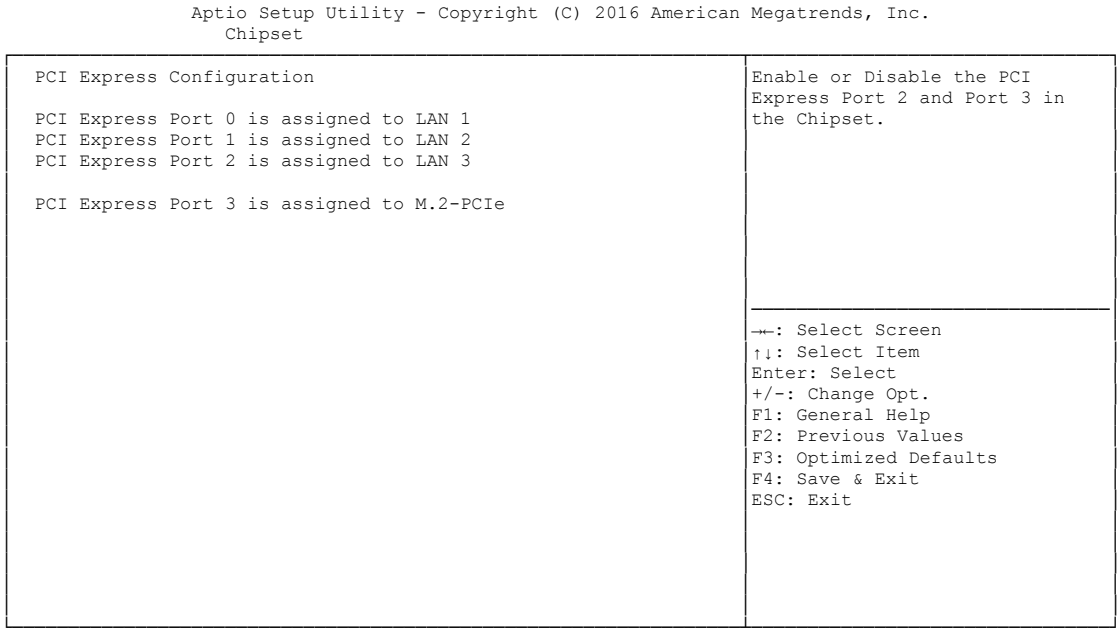


- ✓ **USB Mode**
  Options: EHCI / XHCI

- ✓ **USB Per Port Control**
  Options: Enabled / Disabled

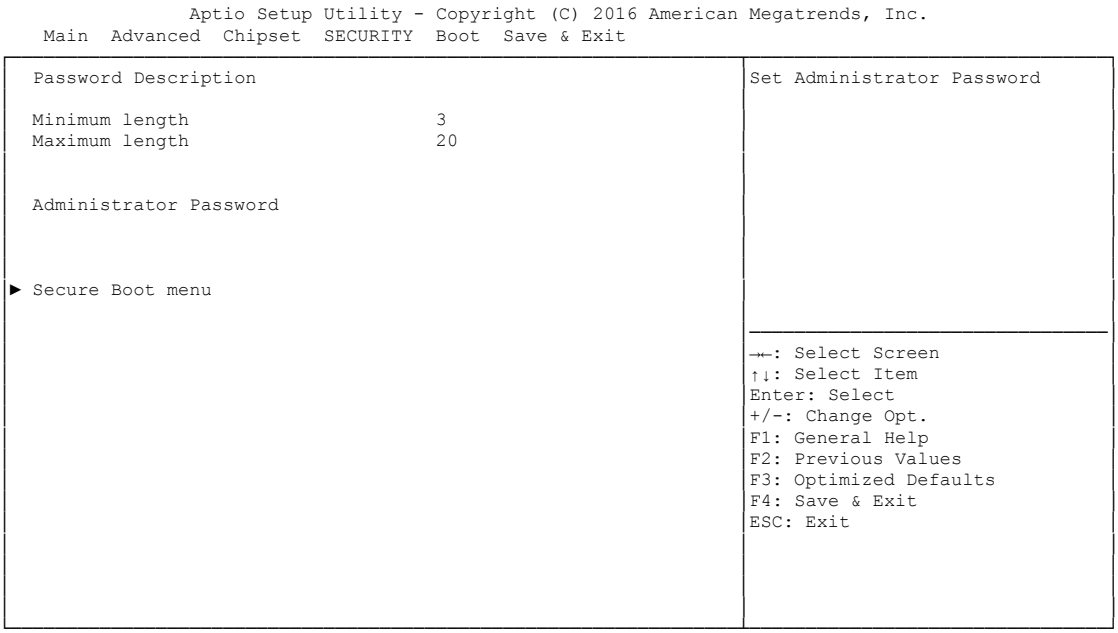
- ✓ **USB Port x**
  Options: Disabled / Enabled

5.4.2.3 PCI Express Configuration



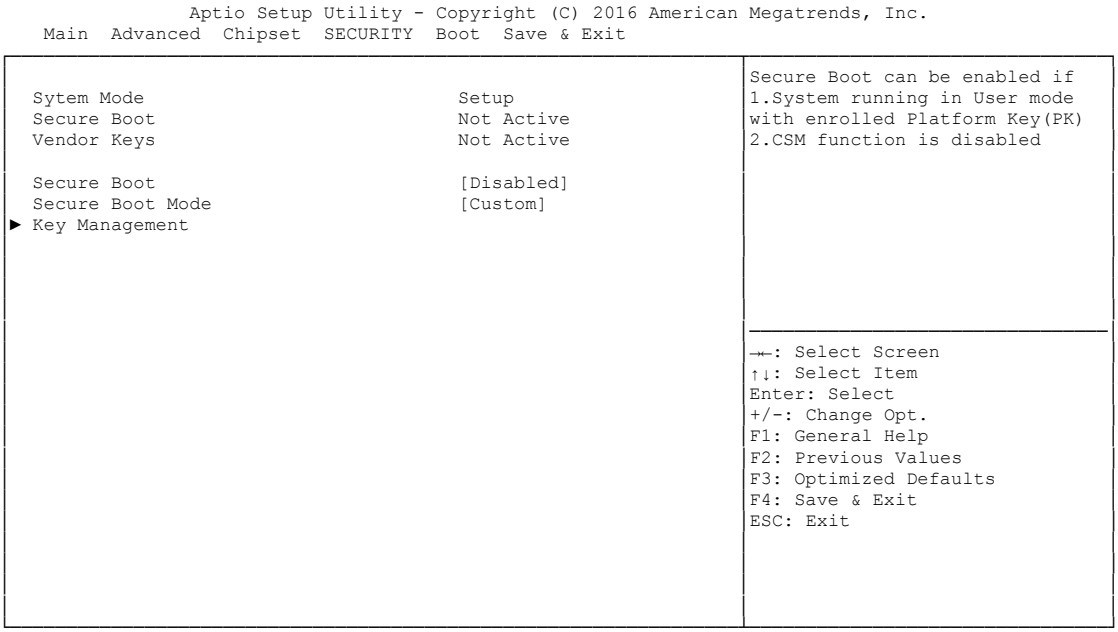
- ✓ **PCIe Port x is assigned to**
  Options: none

5.5 Security



- ✓ **Secure Boot menu**
  Sub menu: see "Secure Boot menu" (page 64)

5.5.1 Secure Boot menu



- ✓ **System Mode**
  Options: none

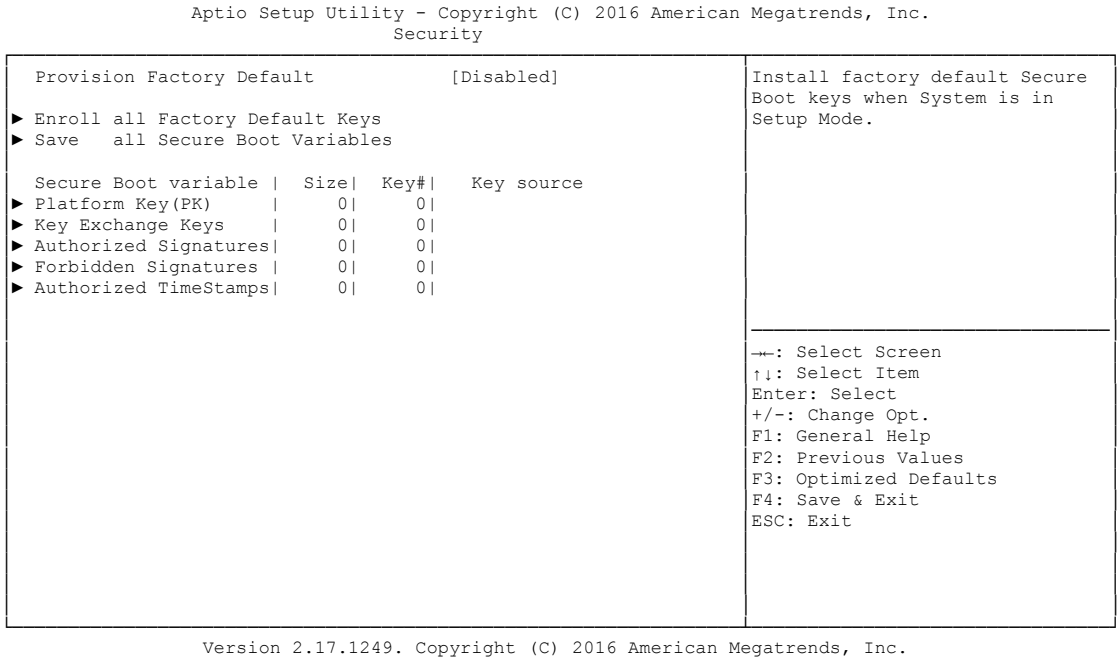
- ✓ **Secure Boot**
  Options: none

- ✓ **Vendor Keys**
  Options: none

- ✓ **Secure Boot Mode**
  Options: Standard / Custom

- ✓ **Key Management**
  Sub menu: see "Key Management" (page 65)

5.5.1.1 Key Management



- ✓ **Provision Factory Default keys**
  Options: Enabled / Disabled

- ✓ **Enroll All Factory Default Keys**
  Options: Press [Enter]

- ✓ **Save All Secure Boot Variables**
  Options: Press [Enter]

- ✓ **Platform Key(PK)**
  Options: Set New Key

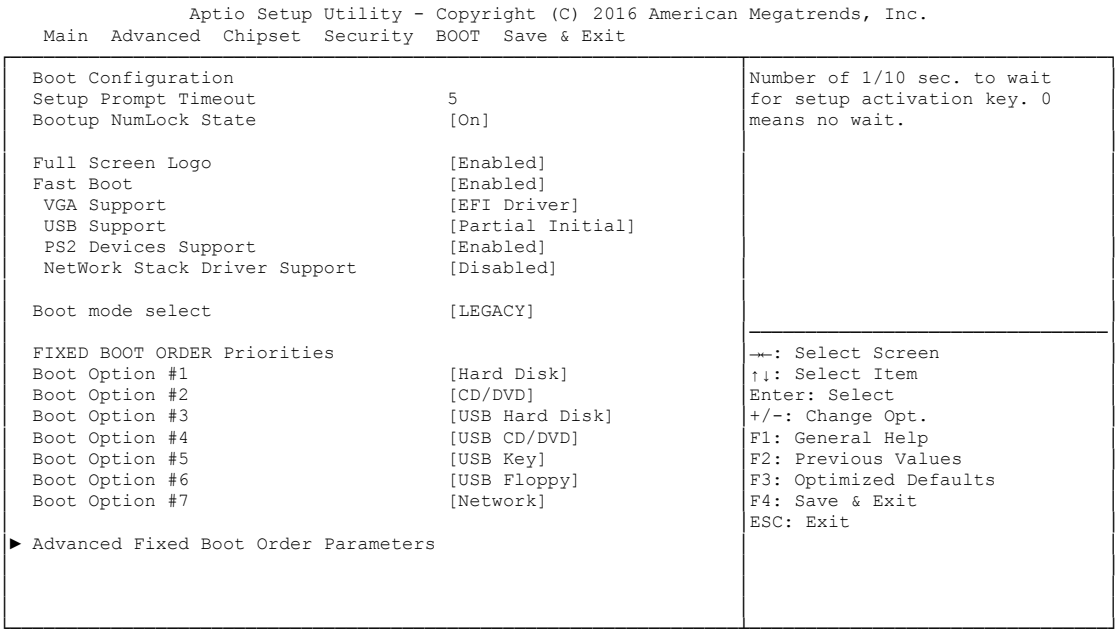
- ✓ **Key Exchange Keys**
  Options: Set New Key / Append Key

- ✓ **Authorized Signatures**
  Options: Set New Key / Append Key

- ✓ **Forbidden Signatures**
  Options: Set New Key / Append Key

- ✓ **Authorized TimeStamps**
  Options: Set New Key / Append Key

5.6 Boot



- ✓ **Setup Prompt Timeout**
  Options: 0...65535 [x 1/10 sec.]

- ✓ **Bootup NumLock State**
  Options: On / Off

- ✓ **Full Screen Logo**
  Options: Disabled / Enabled

- ✓ **Fast Boot**
  Options: Disabled / Enabled

- ✓ **VGA Support**
  Options: Auto / EFI Driver

- ✓ **USB Support**
  Options: Disabled / Full Initial / Partial Initial

- ✓ **PS2 Devices Support**
  Options: Disabled / Enabled

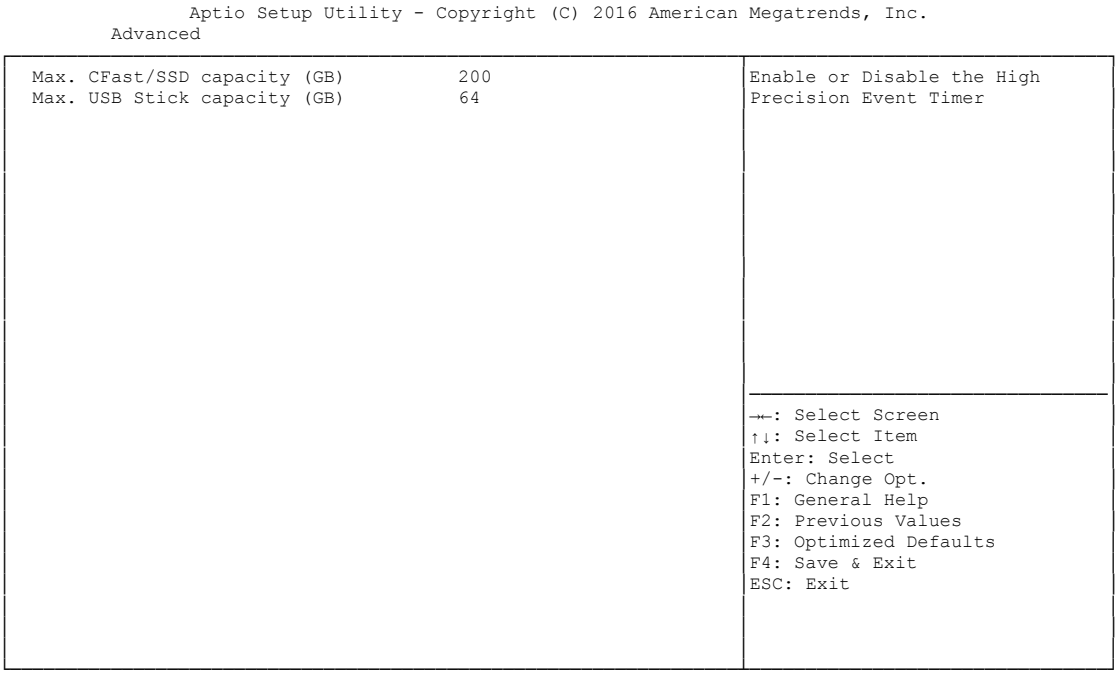
- ✓ **NetWork Stack Driver Support**
  Options: Disabled / Enabled

- ✓ **Boot mode select**
  Options: Legacy / UEFI / DUAL

- ✓ **Boot Option Priorities**
  Options: Reihenfolge der Boot-Devices überprüfen/ändern

- ✓ **Advanced Fixed Boot Order Parameters**
  Sub menu: see "Advanced Fixed Boot Order Parameters" (page 67)

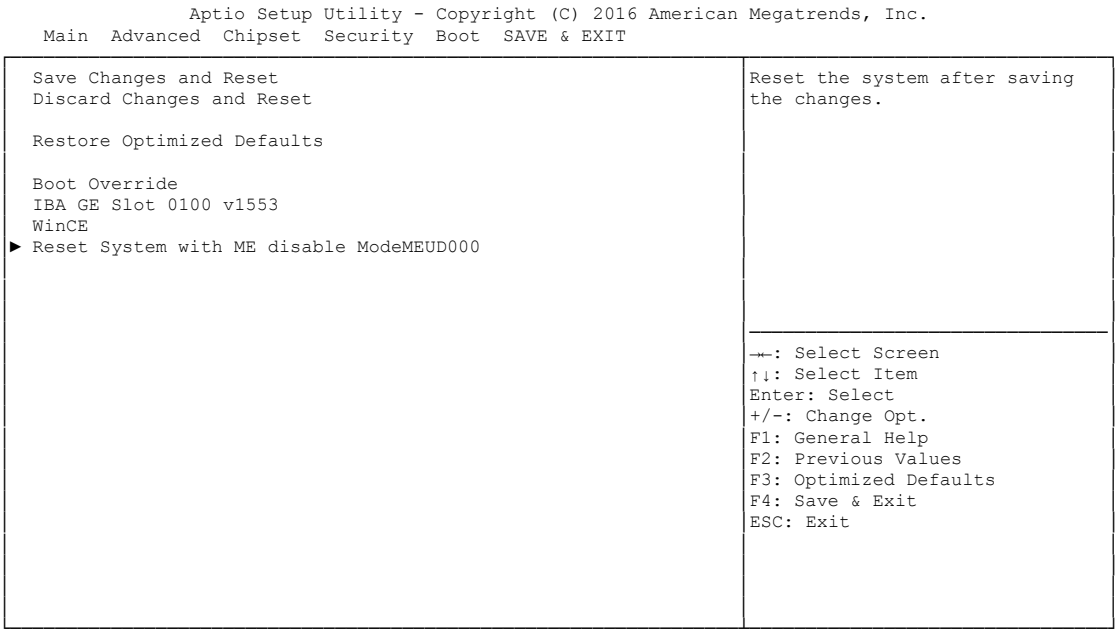
5.6.1 Advanced Fixed Boot Order Parameters



- ✓ **Max. CFast/SSD capacity (GB)**
  Options: none

- ✓ **Max USB Stick capacity (GB)**
  Options: none

5.7 Save & Exit



- ✓ **Save Changes and Reset**
  Options: Press [Enter]

- ✓ **Discard Changes and Reset**
  Options: Press [Enter]

- ✓ **Restore Defaults**
  Options: Press [Enter]

- ✓ **Reset System with ME disable ModeMEUD000**
  Options: Press [Enter]

5.8 BIOS Update

If a BIOS update needs to be done, the program “DecdFlash” as well as a bootable medium which contains the newest BIOS version is used for this. It is important, that the program is started from a DOS environment without a virtual memory manager, for example “EMM386.EXE”. In case such a memory manager is loaded, the program will stop with an error message.

DescdFlash is a program which provides automatic BIOS updates on any AMI-BIOS boards. All files need to be copied from the .zip-file in another directory.
The system may not be interrupted during the flash process, otherwise the update is stopped and the BIOS is destroyed afterwards.
The program should be started as follows:

```
DecdFlsh BIOS-Filename
```

After checking the name of the BIOS file and its length the BIOS will be programmed.
The flashing takes nearly 75 seconds. The firmware will get updated automatically.

NOTICE

A faulty BIOS-Update process may cause damages on the board!

Updating the BIOS in an improper way can render the board unusable. Therefore, you should only update the BIOS if you really need the changes/corrections which come with the new BIOS version.

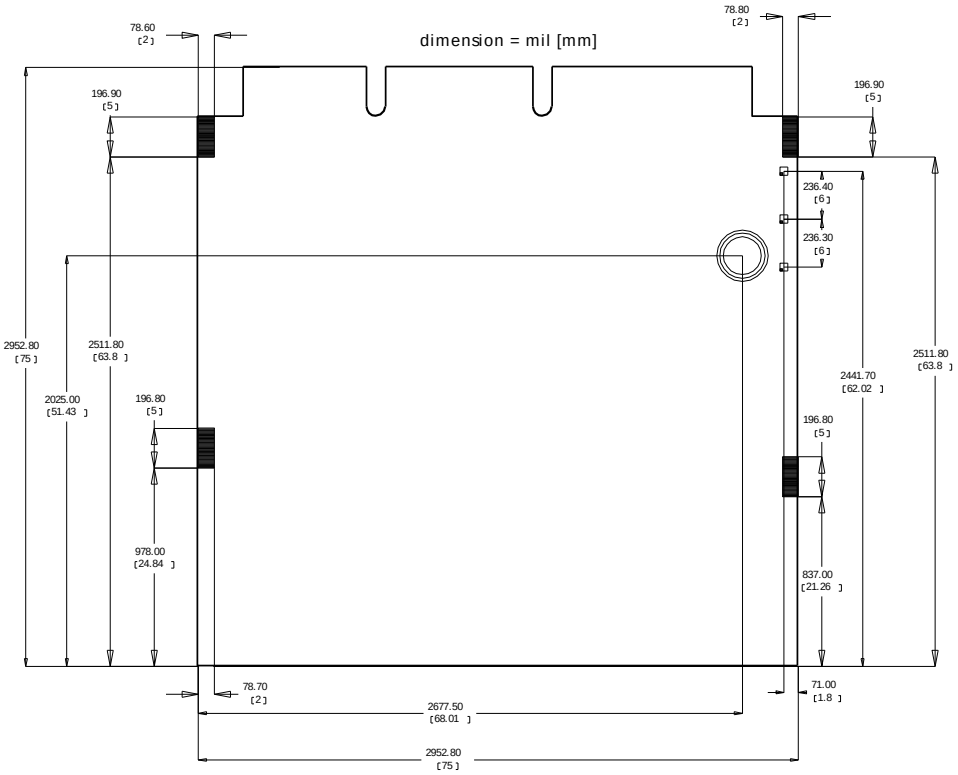
Before you proceed to update the BIOS you need to make absolutely sure that you have the right BIOS file which was issued for the exact board and exact board revision that you wish to update. If you try to update the BIOS using the wrong file the board will not start up again.

6 Mechanical Drawings

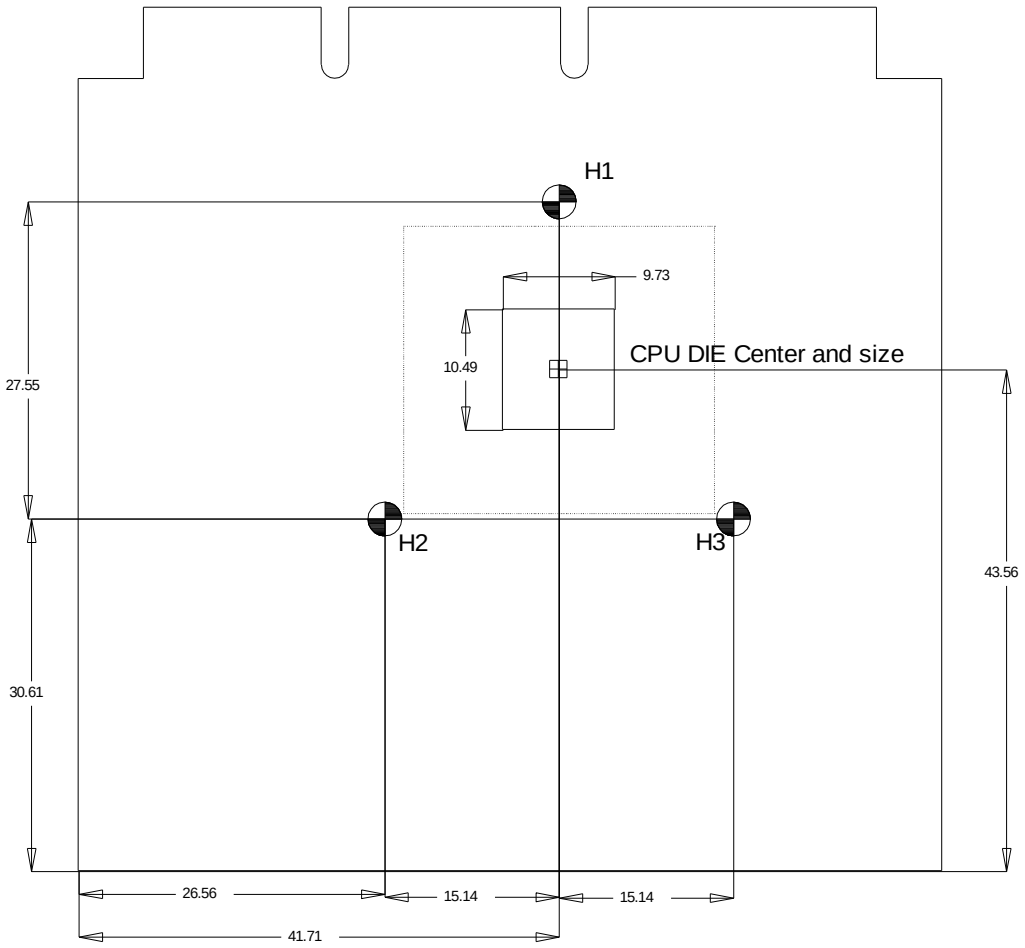
NOTICE

All dimensions are in mil (1 mil = 0,0254 mm)

6.1 PCB: Outlines



6.2 PCB: Die Center



dimension=mm
H1-H3 =1,8mm x 3mm

7 Technical Data

7.1 Elektrische Daten

Power Supply:

Board:	16-30 Volt (5 Volt Fan)
RTC:	>= 3 Volt

Electric Power Consumption:

RTC:	<= 10µA

7.2 Environmental Conditions

Temperature Range:

Operating:	-25°C to +70°C (using approved thermal solution)
	-40°C up to +85°C (when pre-screened for use with an approved thermal solution)
Storage:	-40°C up to +85°C
Shipping:	-40°C up to +85°C, for packaged boards

Temperature Changes:

Operating:	0.5°C per minute, 7.5°C per 30 minutes
Storage:	1.0°C per minute
Shipping:	1.0°C per minute, for packaged boards

Relative Humidity:

Operating:	5% up to 85% (non condensing)
Storage:	5% up to 95% (non condensing)
Shipping:	5% up to 100% (non condensing), for packaged boards

Shock:

Operating:	150m/s^2, 6ms
Storage:	400m/s^2, 6ms
Shipping:	400m/s^2, 6ms, for packaged boards

Vibration:

Operating:	10 up to 58Hz, 0.075mm amplitude
	58 up to 500Hz, 10m/s^2
Storage:	5 up to 9Hz, 3.5mm amplitude
	9 up to 500Hz, 10m/s^2
Shipping:	5 up to 9Hz, 3.5mm amplitude
	9 up to 500Hz, 10m/s^2, for packaged boards

NOTICE **Shock and vibration figures pertain to the motherboard alone and do not include additional components such as heat sinks, memory modules, cables etc.**

7.3 Thermal Specifications

The board is specified to operate in an environmental temperature range from -25°C to +70°C when using an approved thermal solution, and an extended temperature range of -40°C to +85°C when pre-screened for use with an approved thermal solution.
Maximum die temperature is 100°C. To keep the processor under this threshold an appropriate cooling solution needs to be applied. This solution has to take typical and maximum power consumption into account. The maximum power consumption may be twice as high and should be used as a basis for the cooling concept. Additional controllers may also affect the cooling concept. The power consumption of such components may be comparable to the consumption of the processor.
The board design includes thermal solution mounting points that will provide the best possible thermal interface between die and solution. Since we take thermal solutions seriously we have several advanced, aggressive cooling solutions in our product portfolio. Please contact your sales representative to order or discuss your thermal solution needs.

NOTICE

The end customer has the responsibility to ensure that the die temperature of the processor does not exceed 100°C. Permanent overheating may destroy the board!
In case the temperature exceeds 100°C the environmental temperature must be reduced. Under certain circumstances sufficient air circulation must be provided.

I Annex: Post-Codes

During boot, the BIOS generates a sequence of status codes (so-called "POST codes"), which can be viewed using a special output device (POST code card). The meaning of these codes is described in the document "Aptio™ 4.x Status Codes" by American Megatrends®, which can be downloaded from their website http://www.ami.com. The following additional OEM POST codes are generated:

Code	Description
87h	BIOS-API started
88h	PCA9535 started
89h	PWRCTRL-Firmware started

II Annex: Resources

Interrupt

The used resources depend on setup settings. The listed interrupts and their use are given through AT compatibility. If interrupts must exclusively be available on the ISA side, they have to be reserved through the BIOS setup. The exclusivity is not given and not possible on the PCI side.

Adress	Function
IRQ0	Timer
IRQ1	
IRQ2 (8)	
IRQ3	
IRQ4	
IRQ5	
IRQ6	
IRQ7	
IRQ8	RTC
IRQ9	
IRQ10	
IRQ11	SMBus Controller
IRQ12	
IRQ13	
IRQ14	
IRQ15	
IRQ16	PCI Bridge(0-1) x1(x1)
IRQ17	PCI Bridge(0-2) x1(x1)
IRQ18	PCI Bridge(0-3) x1(x1)
IRQ19	PCI Bridge(0-4) x0(x1)
IRQ20	
IRQ21	
IRQ22	High Def Audio

PCI Devices

All listed PCI devices exist on the board. Some PCI devices or functions of devices may be disabled in the BIOS setup. Once a device is disabled other devices may get PCI bus numbers different from the ones listed in the table.

AD	INTA	REQ	Bus	Dev.	Fkt.	Kontroller / Slot
	-	-	0	0	0	Host Bridge ID0F00h
	A	-	0	2	0	VGA Graphics ID0F31h
	A	-	0	19	0	SATA (AHCI 1.0) ID0F23h
	A	-	0	20	0	XHCI Controller ID0F35h
	A	-	0	27	0	HD Audio ID0F04h
	A	-	0	28	0	PCI Express Port 1 ID0F48h
	B	-	0	28	1	PCI Express Port 2 ID0F4Ah
	C	-	0	28	2	PCI Express Port 3 ID0F4Ch
	D	-	0	28	3	PCI Express Port 4 ID0F4Eh
	-	-	0	31	0	ISA Bridge ID0F1Ch
	B	-	0	31	3	SMBus Interface ID0F12h
	A	-	1	0	0	Ethernet Controller x1 ID1533h
	A	-	2	0	0	Ethernet Controller x1 ID1533h