ADLQ170HD

Manual

Rev. 0.1

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Contents

0 Document History

Version	Changes
0.1	first pre-release

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	**DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ WARNING	**WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
⚠ CAUTION	**CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**
NOTICE	**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.

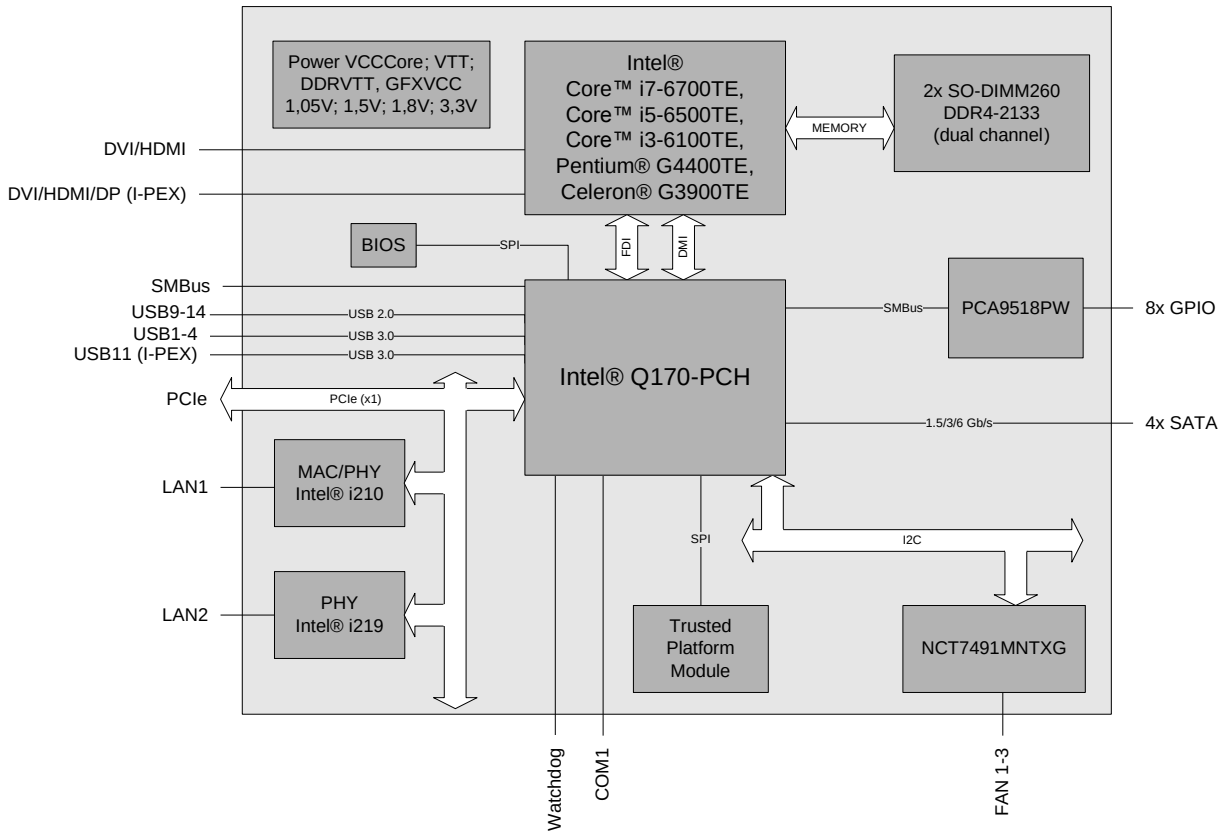
2 Overview

2.1 Features

The ADLQ170HD is a highly complex 3,5-inch board which incorporates complete motherboard functionality.

The motherboard is based on Intel®'s Q170 chipset and equipped with an Intel® Core™, Pentium™ or Celeron™ processor of the Skylake-S family.

Such processors are optimized for real-time systems with a low power consumption, while at the same time providing state-of-the-art computing performance and a huge I/O flexibilty.
Modern low voltage DDR4 technology provides top-notch memory performance, accomodating up to 32 GByte of RAM (DDR4-2133) via SO-DIMM260. It also provides a PCI-Express bus (via a 2x40-pin custom connector, configurable as one x4 or four x1) and additional peripheral devices such as a serial interface, two Gigabit Ethernet interfaces (LAN), four SATA channels (offering up to 6Gb/s), eleven USB channels, DVI/HDMI, and DisplayPort available on a 30-pin I-PEX connector. Input voltage is 5V.



2.2 Feature List

ADLQ170HD	3,5"-Board	
CPU	Intel® Core™ i7-6700TE (8M, 4 Cores, 35W TDP)	
	Intel® Core™ i5-6500TE (6M, 4 Cores, 35W TDP)	
	Intel® Core™ i3-6100TE (3M, 2 Cores, 35W TDP)	
	Intel® Pentium™ G4400TE (3M, 2 Cores, 35W TDP)	
	Intel® Celeron™ G3900TE (2M, 2 Cores, 35W TDP)	
Chipset	Intel® Q170	
Memory	2 sockets, each with DDR4@2133MHz à 16GB, SODIMM260	
I/O	External	1x DVI-D (DVI or HDMI 1.4)
		4x USB3.0
		2x GBit-LAN, Intel® i219 and i210
		1x COM
	Internal	1x I-PEX (HDMI1.4 or DP1.2 and USB3.0)
		4x SATA 3.0, RAID 0/1/5/10
		1x PCIe Gen3 (1x PCIe x4 or 4x PCIe x1)
		6x USB2.0
		8x GPIO
Graphics	HDMI / DP: 3840 x 2160	
	DVI: 1920 x 1200	
RTC	external CMOS battery	
BIOS	AMI® Aptio V	
Power Supply	5V / S5V / 3,3V / 12V	
Format	102 mm x 147 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 specification
  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
- NCT7491MNTXG
  NCT7491 chip description
  www.onsemi.com
- American Megatrends®
  Aptio™ Text Setup Environment (TSE) User Manual
  www.ami.com
- American Megatrends®
  Aptio™ 5.x Status Codes
  www.ami.com

3 Detailed Description

3.1 Power Input

The connector for power supply is a 2x10-pin connector.

The 12V voltage supply is needed for employment of PCI-Express cards and FAN connectors. COM RXD and TXD also can be used for PSU, e.g. the UPS functionality.

Communication is carried out via SMBus signaling (SMB_CLK/SMB_DAT).

3.2 SUPS

Optionally the ADLQ170HD can be equipped with a plug-in SUPS, which can keep the board alive over a short period of time in case of power failure or voltage fluctuation. The exact amount of time is hard to predict as it also depends on factors such as the SUPS' capacitors and the boards' power consumption etc. The capacitors size is only limited by the required space.

CAUTION

Do not use accumulator and S-UPS simultaneously! The ADLQ170HD can be used either with an accumulator or with an S-UPS module. To avoid loss of data, both components may not be used simultaneously!

3.3 CPU

The motherboard is based on Intel®'s Q170 chipset and employs an Intel® Core™, Pentium™ or Celeron™ processor of the Skylake-S family.

Such processors are optimized for real-time systems with a low power consumption, while at the same time providing state-of-the-art computing performance and a huge I/O flexibilty. The CPUs feature a very low power consumption and, depending on the variant, up to 2.7GHz processor base frequency. They also offer many features known from the desktop range such as SSE4.1/4.2, loadable microcode etc. The employed Intel®-CPUs operate in an extended range of thermal conditions and therefore are capable for use in industrial systems.

3.4 Memory

Conventional SO-DIMM260 memory modules, as familiar from notebook computers, are used to equip the board with memory. For technical and mechanical reasons it is possible that particular memory modules cannot be employed. Please ask your distributor for recommended memory modules.
With currently available SO-DIMM260 modules a memory extension up to 32 GByte is possible (DDR4-2133).
If both memory sockets are in use, notice that you must use identical memory modules.
All timing parameters for different memory modules are automatically set by BIOS.

NOTICE

For optimal driver compatibility we recommend the use of a Microsoft® Windows® 8 operating system.

4 Connectors

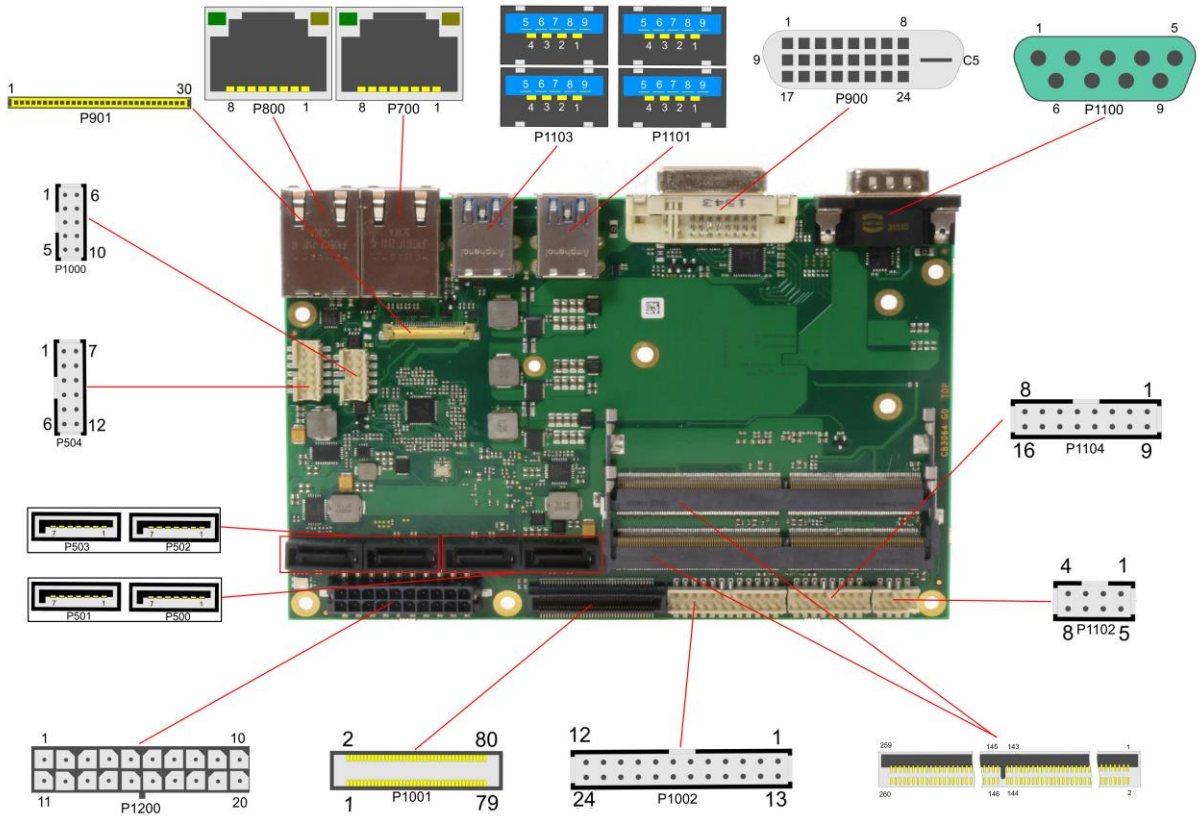
This section describes all the connectors found on the ADLQ170HD.

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
P500/1/2/3	"SATA Interfaces"	p. 26
P504	"GPIO"	p. 30
P700/800	"LAN"	p. 25
P900	"DVI"	p. 19
P901	"DVI/HDMI/DisplayPort and USB3.0"	p. 20
P1000	"Fan Connectors"	p. 31
P1001	"PCI-Express",	p. 28
P1002	"System"	p. 32
P1100	"Serial Interface COM1"	p. 27
P1101/3	"USB 3-6"	p. 22
P1102/4	"USB2.0 (internal)"	p. 23
P1200	"Power Input"	p. 12

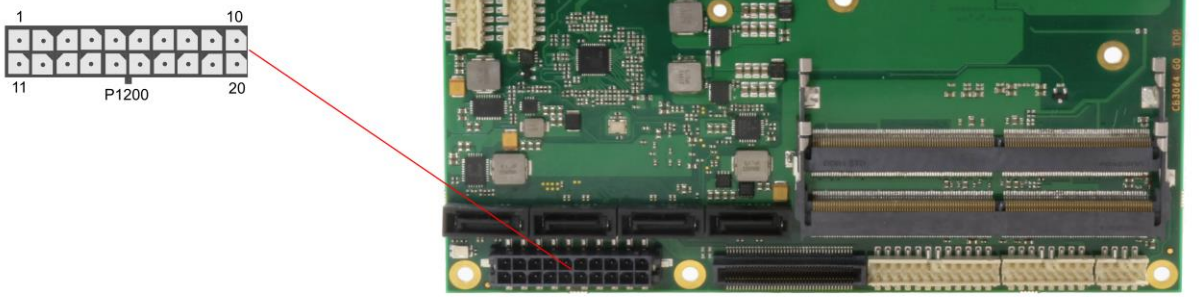
4.2 Power Input

The connector for power supply is a 2x10-pin connector.

The 12V voltage supply is needed for employment of PCI-Express cards and FAN connectors. COM RXD and TXD also can be used for PSU, e.g. the UPS functionality.

Communication is carried out via SMBus signaling (SMB_CLK/SMB_DAT).

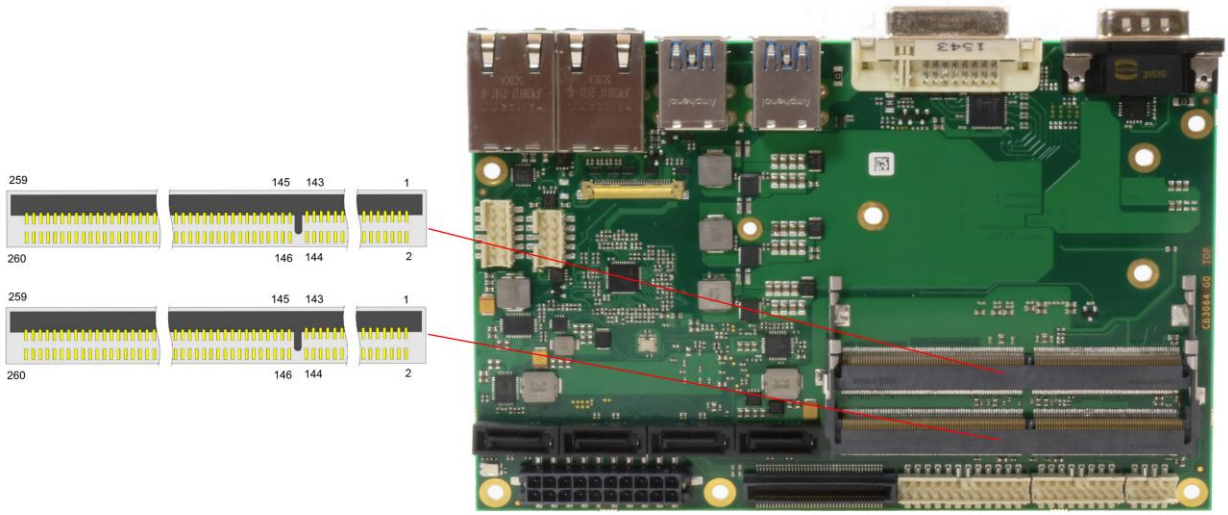
Manufacturer	Description	Mating Connector
Molex	43045-2019	z.B. 43025-2000



Description	Name	Pin		Name	Description
3.3V / 10A	3.3V	1	11	3.3V	3.3V / 10A
S-UPS active output: Low (0V) = S-UPS inactive High (3.3V) = S-UPS active	SUSV	2	12	GND	ground
5V / 17A	VCC	3	13	VCC	5V / 17A
5V / 17A	VCC	4	14	VCC	5V / 17A
ground	GND	5	15	GND	ground
ground	GND	6	16	GND	ground
12V / 8A	12V	7	17	12V	12V / 8A
S5V / 5A	SVCC	8	18	PWRBTN	powerbutton output to turn on/off the connected PC
'ATX powergood' output signals that all voltages are turned on: Low (0V) = voltage not ok Open Drain = voltage ok	ATX_PWRGD	9	19	PSON	'power supply on'-input to turn on all output voltages: Low (0V) = turn voltages on High (5V) = turn voltages off
communication with the PC: UART = transmit output I²C = slave data	SMB_SDA/TX	10	20	SMB_SCL/RX	communication wit the PC: UART = Receive input I²C = slave clock

4.3 Memory

The ADLQ170HD is equipped with two SO-DIMM260 sockets for DDR4-2133-RAM. For technical and mechanical reasons it is possible that particular memory modules cannot be employed. Please ask your distributor for recommended memory modules
With currently available memory modules a memory extension up to 32 GByte is possible.
All timing parameters for different memory modules are automatically set by BIOS.



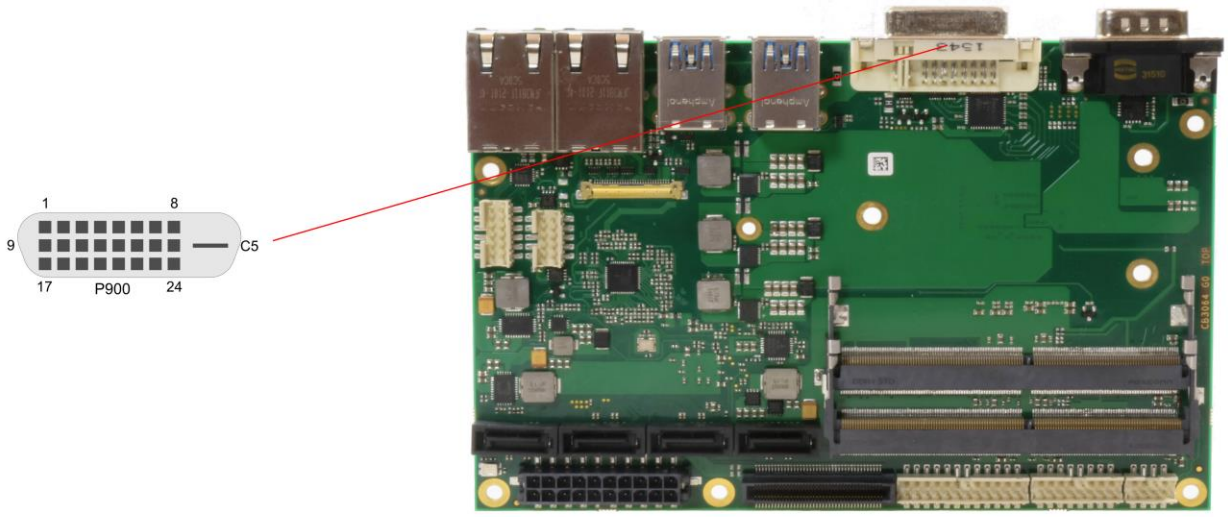
Description	Name	Pin		Name	Description
Ground	GND	1	2	GND	Ground
Data lane 5	DQ5	3	4	DQ4	Data lane 4
Ground	GND	5	6	GND	Ground
Data lane 1	DQ1	7	8	DQ0	Data lane 0
Ground	GND	9	10	GND	Ground
Data Strobe 0 -	DQS0_c	11	12	NC	Reserved
Data Strobe 0 +	DQS0_t	13	14	GND	Ground
Ground	GND	15	16	DQ6	Data lane 6
Data lane 7	DQ7	17	18	GND	Ground
Ground	GND	19	20	DQ2	Data lane 2
Data lane 3	DQ3	21	22	GND	Ground
Ground	GND	23	24	DQ12	Data lane 12
Data lane 13	DQ13	25	26	GND	Ground
Ground	GND	27	28	DQ8	Data lane 8
Data lane 9	DQ9	29	30	GND	Ground
Ground	GND	31	32	DQS1_c	Data Strobe 1 -
Reserved	NC	33	34	DQS1_t	Data Strobe 1 +
Ground	GND	35	36	GND	Ground
Data lane 15	DQ15	37	38	DQ14	Data lane 14
Ground	GND	39	40	GND	Ground
Data lane 10	DQ10	41	42	DQ11	Data lane 11
Ground	GND	43	44	GND	Ground
Data lane 21	DQ21	45	46	DQ20	Data lane 20
Ground	GND	47	48	GND	Ground
Data lane 17	DQ17	49	50	DQ16	Data lane 16
Ground	GND	51	52	GND	Ground

Description	Name	Pin		Name	Description
Data Strobe 2 -	DQS2_c	53	54	NC	Reserved
Data Strobe 2 +	DQS2_t	55	56	GND	Ground
Ground	GND	57	58	DQ22	Data lane 22
Data lane 23	DQ23	59	60	GND	Ground
Ground	GND	61	62	DQ18	Data lane 18
Data lane 19	DQ19	63	64	GND	Ground
Ground	GND	65	66	DQ28	Data lane 28
Data lane 29	DQ29	67	68	GND	Ground
Ground	GND	69	70	DQ24	Data lane 24
Data lane 25	DQ25	71	72	GND	Ground
Ground	GND	73	74	DQS3_c	Data Strobe 3 -
Reserved	NC	75	76	DQS3_t	Data Strobe 3 +
Ground	GND	77	78	GND	Ground
Data lane 30	DQ30	79	80	DQ31	Data lane 31
Ground	GND	81	82	GND	Ground
Data lane 26	DQ26	83	84	DQ27	Data lane 27
Ground	GND	85	86	GND	Ground
Reserved	NC	87	88	NC	Reserved
Ground	GND	89	90	GND	Ground
Reserved	NC	91	92	NC	Reserved
Ground	GND	93	94	GND	Ground
Data Strobe 8 -	DQS8_c	95	96	NC	Reserved
Data Strobe 8 +	DQS8_t	97	98	GND	Ground
Ground	GND	99	100	NC	Reserved
Reserved	NC	101	102	GND	Ground
Ground	GND	103	104	NC	Reserved
Reserved	NC	105	106	GND	Ground
Ground	GND	107	108	RESET_n	Reset
Clock Enable 0	CKE0	109	110	CKE1	Clock Enable 1
Power supply 1,2V	VCC	111	112	VCC	Power supply 1,2V
Bank Group Input 1	BG1	113	114	ACT_n	Activation Command Input
Bank Group Input 0	BG0	115	116	ALERT_n	Alert
Power supply 1,2V	VCC	117	118	VCC	Power supply 1,2V
Address lane 12	A12	119	120	A11	Address lane 11
Address lane 9	A9	121	122	A7	Address lane 7
Power supply 1,2V	VCC	123	124	VCC	Power supply 1,2V
Address lane 8	A8	125	126	A5	Address lane 5
Address lane 6	A6	127	128	A4	Address lane 4
Power supply 1,2V	VCC	129	130	VCC	Power supply 1,2V
Address lane3	A3	131	132	A2	Address lane 2
Address lane 1	A1	133	134	EVENT_n	Event
Power supply 1,2V	VCC	135	136	VCC	Power supply 1,2V
Clock-Signal 0 +	CK0_t	137	138	CK1_t	Clock 1 +
Clock-Signal 0 -	CK0_c	139	140	CK1_c	Clock 1 -
Power supply 1,2V	VCC	141	142	VCC	Power supply 1,2V
Even parity check	Parity	143	144	A0	Address lane 0
SDRAM Bank 2	BA1	145	146	A10/AP	Address lane 10/Autoprecharge
Power supply 1,2V	VCC	147	148	VCC	Power supply 1,2V
Chip Select 0	CS0_n	149	150	BA0	Bank Adress 0
Address lane 14/Write Enable	A14/WE_n	151	152	A16/RAS_n	Address lane 16/Row Address Strobe
Power supply 1,2V	VCC	153	154	VCC	Power supply 1,2V
On Die Termination 0	ODT0	155	156	A15/CAS_n	Address lane 15/Column Address Strobe

Description	Name	Pin		Name	Description
Chip Select 1	CS1_n	157	158	A13	Address lane 13
Power supply 1,2V	VCC	159	160	VCC	Power supply 1,2V
On Die Termination 1	ODT1	161	162	NC	Reserved
Power supply 1,2V	VCC	163	164	VREFCA	Reference voltage
Reserved	NC	165	166	SA2	SPD address 2
Ground	GND	167	168	GND	Ground
Data lane 37	DQ37	169	170	DQ36	Data lane 36
Ground	GND	171	172	GND	Ground
Data lane 33	DQ33	173	174	DQ32	Data lane 32
Ground	GND	175	176	GND	Ground
Data Strobe 4 -	DQS4_c	177	178	NC	Reserved
Data Strobe 4 +	DQS4_t	179	180	GND	Ground
Ground	GND	181	182	DQ39	Data lane 39
Data lane 38	DQ38	183	184	GND	Ground
Ground	GND	185	186	DQ35	Data lane 35
Data lane 34	DQ34	187	188	GND	Ground
Ground	GND	189	190	DQ45	Data lane 45
Data lane 44	DQ44	191	192	GND	Ground
Ground	GND	193	194	DQ41	Data lane 41
Data lane 40	DQ40	195	196	GND	Ground
Ground	GND	197	198	DQS5_c	Data Strobe 5 -
Reserved	NC	199	200	DQS5_t	Data Strobe 5 +
Ground	GND	201	202	GND	Ground
Data lane 46	DQ46	203	204	DQ47	Data lane 47
Ground	GND	205	206	GND	Ground
Data lane 42	DQ42	207	208	DQ43	Data lane 43
Ground	GND	209	210	GND	Ground
Data lane 52	DQ52	211	212	DQ53	Data lane 53
Ground	GND	213	214	GND	Ground
Data lane 49	DQ49	215	216	DQ48	Data lane 48
Ground	GND	217	218	GND	Ground
Data Strobe 6 -	DQS6_c	219	220	NC	Reserved
Data Strobe 6 +	DQS6_t	221	222	GND	Ground
Ground	GND	223	224	DQ54	Data lane 54
Data lane 55	DQ55	225	226	GND	Ground
Ground	GND	227	228	DQ50	Data lane 50
Data lane 51	DQ51	229	230	GND	Ground
Ground	GND	231	232	DQ60	Data lane 60
Data lane 61	DQ61	233	234	GND	Ground
Ground	GND	235	236	DQ57	Data lane 57
Data lane 56	DQ56	237	238	GND	Ground
Masse	GND	239	240	DQS7_c	Data Strobe 7 -
Reserved	NC	241	242	DQS7_t	Data Strobe 7 +
Ground	GND	243	244	GND	Ground
Data lane 62	DQ62	245	246	DQ63	Data lane 63
Ground	GND	247	248	GND	Ground
Data lane 58	DQ58	249	250	DQ59	Data lane 59
Ground	GND	251	252	GND	Ground
SMBus Clock	SCL	253	254	SDA	SMBus Data
I²C Power for SPD EEProm	VCCSPD	255	256	SA0	SPD address 0
DRAM Activating Power	VPP	257	258	VTT	Termination voltage
DRAM Activating Power	VPP	259	260	SA1	SPD address 1

4.4 DVI

The ADLQ170HD is connected to an external display via a DVI-D connector. Only digital displays are supported.



Pinout DVI-D:

Pin	Name	Description
1	TMDSDAT2#	DVI data 2 -
2	TMDSDAT2	DVI data 2 +
3	GND	ground
4	N/C	reserved
5	N/C	reserved
6	DDC CLK	DDC clock (DVI/VGA)
7	DDC DAT	DDC data (DVI/VGA)
8	N/C	reserved
9	TMDSDAT1#	DVI data 1 -
10	TMDSDAT1	DVI data 1 +
11	GND	ground
12	N/C	reserved
13	N/C	reserved
14	VCC	5 volt supply
15	GND	ground
16	HP_DETECT	hot plug detect
17	TMDSDAT0#	DVI data 0 -
18	TMDSDAT0	DVI data 0 +
19	GND	ground
20	N/C	reserved
21	N/C	reserved
22	GND	ground
23	TMDS CLK	DVI clock +
24	TMDS CLK#	DVI clock -
C1	N/C	reserved
C2	N/C	reserved
C3	N/C	reserved
C4	N/C	reserved
C5	GND	ground

4.5 DVI/HDMI/DisplayPort and USB3.0

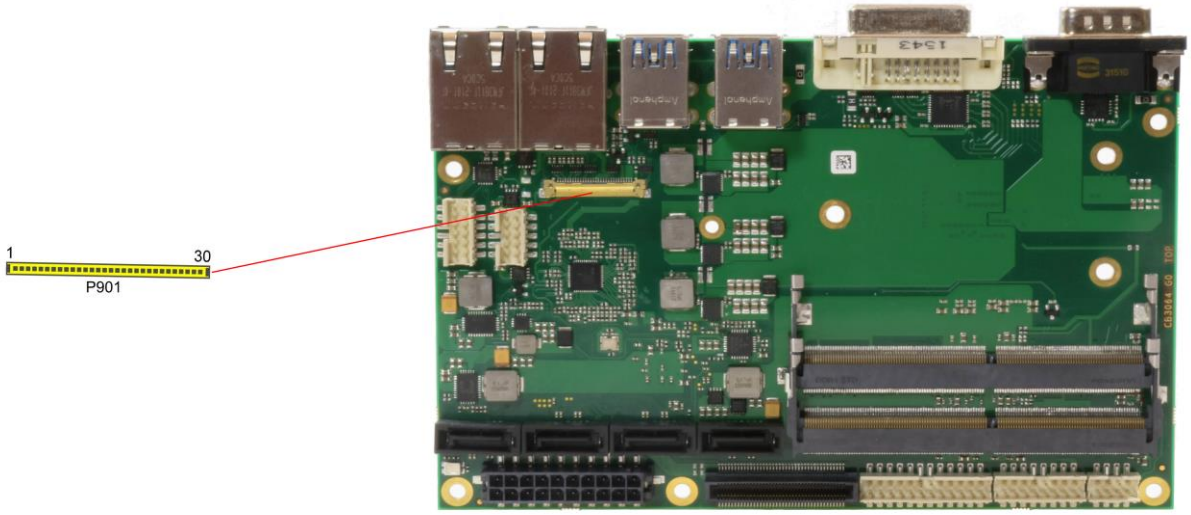
The ADLQ170HD provides a second DVI interface which is realized as a 30-pin flat cable header. Analog VGA is not available on this connector. However, an HDMI device or DisplayPort device can be connected.
This custom connector also carries an additional USB interface. The USB interface supports USB 3.0. It provides up to 900 mA current and is protected by an electronically resettable fuse.

When cabling, please make sure that receive lines are always connected to the transmit lines and vice versa.

Maximum current is 2 amperes for VCC combined (0.5A per contact), and 1 ampere for 3.3V (0.5A per contact).

Please note that a custom cable design is required.

Manufacturer	Description	Mating Connector
I-PEX	20455-030E-12	custom design



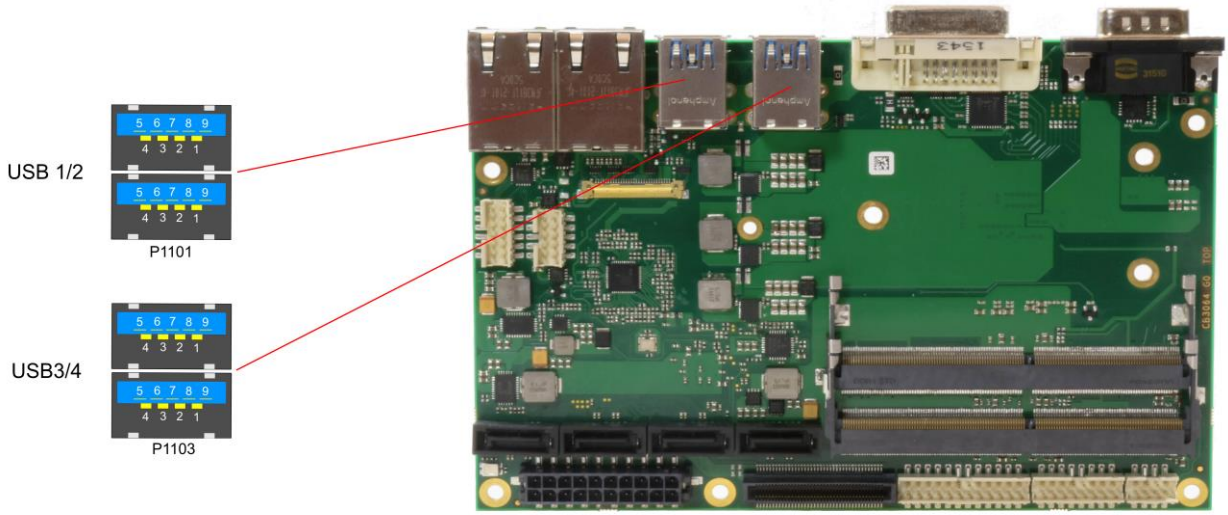
Pinout 30pin connector DVI/HDMI/DisplayPort:

Pin	Name	Description
1	TMDS0#/DP2#	DVI Data 0 - / DP Lane 2 -
2	TMDS0/DP2	DVI Data 0 + / DP Lane 2 +
3	TMDS1#/DP1#	DVI Data 1 - / DP Lane 1 -
4	TMDS1/DP1	DVI Data 1 + / DP Lane 1 +
5	TMDS2#/DP0#	DVI Data 2 - / DP Lane 0 -
6	TMDS2/DP0	DVI Data 2 + / DP Lane 0 +
7	TMDSCLK#/DP3#	DVI Clock - / DP Lane 3 -
8	TMDSCLK/DP3	DVI Clock + / DP Lane 3 +
9	N/C	reserved
10	SEL_DVI/DP#	DVI-DisplayPort Select
11	DDCK/DPAUX	EDID Clock / DP Aux +
12	DDDA/DPAUX#	EDID Data / DP Aux -
13	VCC	5V supply
14	GND	ground
15	HPD	hot plug detect
16	USBVCC	5V supply for USB

Pin	Name	Description
17	USBVCC	5V supply for USB
18	N/C	reserved
19	N/C	reserved
20	SSRX#	Super Speed receiver -
21	SSRX	Super Speed receiver +
22	USB#	USB -
23	USB	USB +
24	SSTX#	Super Speed transmitter -
25	SSTX	Super Speed transmitter
26	3.3V	3.3V supply
27	3.3V	3.3V supply
28	VCC	5V supply
29	VCC	5V supply
30	VCC	5V supply

4.6 USB 3-6

USB channel 1 to 4 are made available via standard USB connectors.
The USB channels support USB 3.0. 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.
Every USB interface provides up to 900 mA current and is protected by an electronically resettable fuse.



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

4.7 USB2.0 (internal)

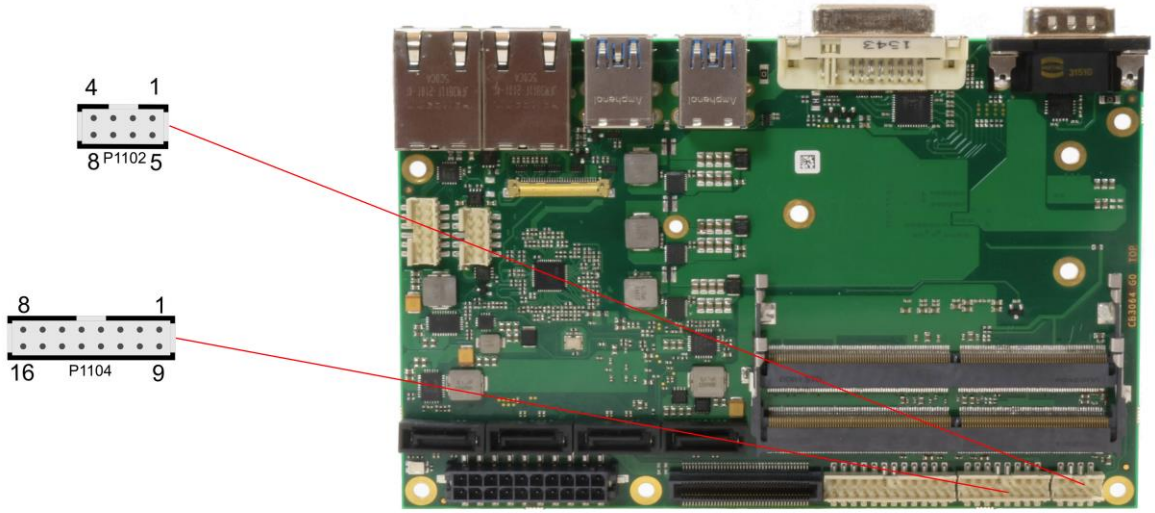
The USB channel 9 to 14 are made available via two connectors.

Channel 9 to 12 are provided via a 2x8-pin connector, channel 13 and 14 are provided via a 2x4-pin connector.
The USB channels support USB 2.0. 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.
Every USB interface provides up to 500 mA current and is protected by an electronically resettable fuse.

Manufacturer	Description	Mating Connector
FCI	98424-G52-08LF	90311-008LF

2x8-pin connector:

Manufacturer	Description	Mating Connector
Amphenol FCI	98424-G52-16LF	e.g. 89947-716LF



Pinout 2x8-pin USB connector:

Description	Name	Pin		Name	Description
5V for USB9	VCC	1	9	VCC	5V for USB10
Minus data channel USB9	USB9-	2	10	USB10-	Minus data channel USB10
Plus data channel USB9	USB9+	3	11	USB10+	Plus data channel USB10
Ground	GND	4	12	GND	Ground
Ground	GND	5	13	GND	Ground
Plus data channel USB12	USB12+	6	14	USB11+	Plus data channel USB11
Minus data channel USB12	USB12-	7	15	USB11-	Minus data channell USB11
5V for USB12	VCC	8	16	VCC	5V for USB11

Pinout 2x4-pin USB connector:

Description	Name	Pin		Name	Description
5V for USB13	VCC	1	5	VCC	5V for USB14
Minus data channel USB13	USB9-	2	6	USB14-	Minus data channel USB14

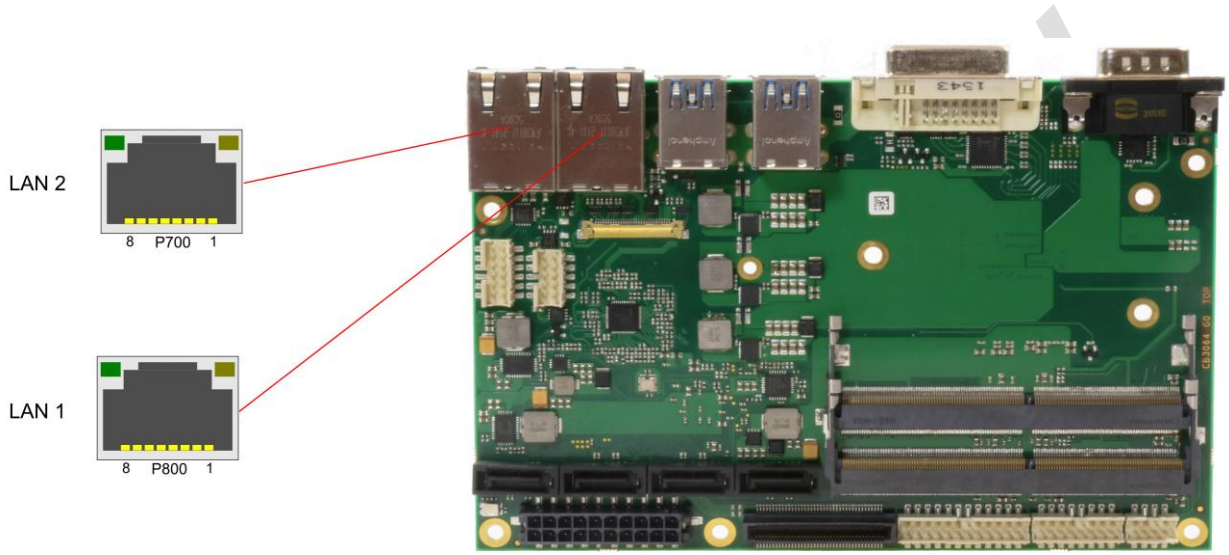
Description	Name	Pin		Name	Description
Plus data channel USB13	USB9+	3	7	USB14+	Plus data channel USB14
Ground	GND	4	8	GND	Ground

4.8 LAN

The module has two LAN interfaces. All interfaces support 10BaseT, 100BaseT, and 1000BaseT compatible net components with automatic bandwidth selection. Controller chip are Intel®'s i210 (MAC/PHY, LAN1) and i219 (PHY, LAN2). Auto-cross and auto-negotiate functionality is available as is PXE and WOL.

NOTICE

For realtime applications, the external controller (MAC/PHY) is to prefer.

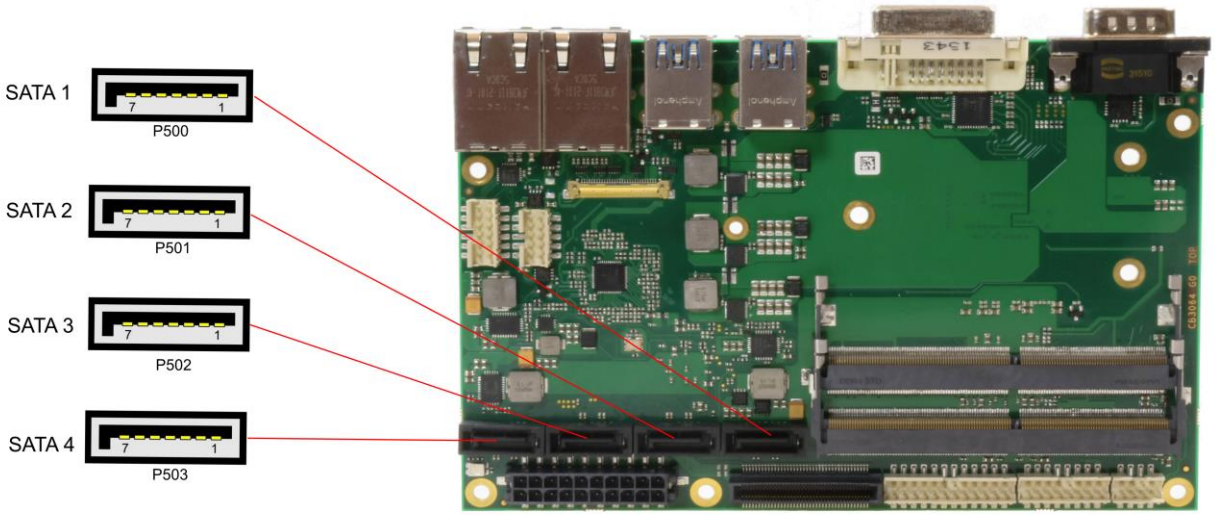


Pinout LAN 10/100/1000:

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

4.9 SATA Interfaces

The ADLQ170HD provides four SATA interfaces which allows transfer rates of up to 6 Gb/s. The interface is made available via a standard SATA connector and supports RAID 0/1/5/10.
The required settings are made in the BIOS setup.



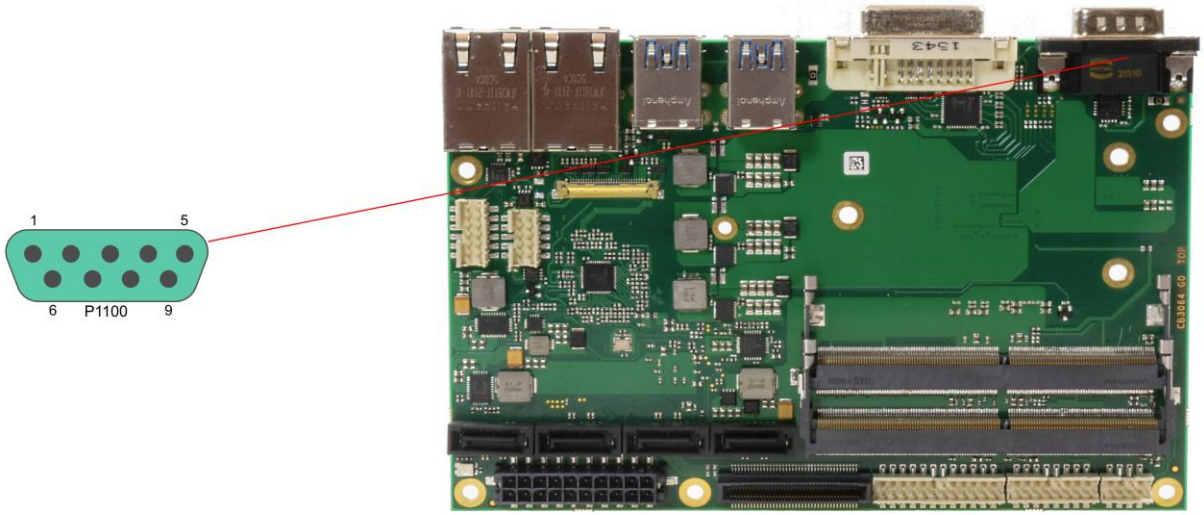
Pinout SATA:

Pin	Name	Description
1	GND	ground
2	SATATX	SATA transmit +
3	SATATX#	SATA transmit -
4	GND	ground
5	SATARX	SATA receive -
6	SATARX#	SATA receive +
7	GND	ground

4.10 Serial Interface COM1

The serial interface COM1 is made available via a 9-pin standard DSUB-connector (male). RS232 standard signals are provided.

The port address and the interrupt are set via the BIOS setup.

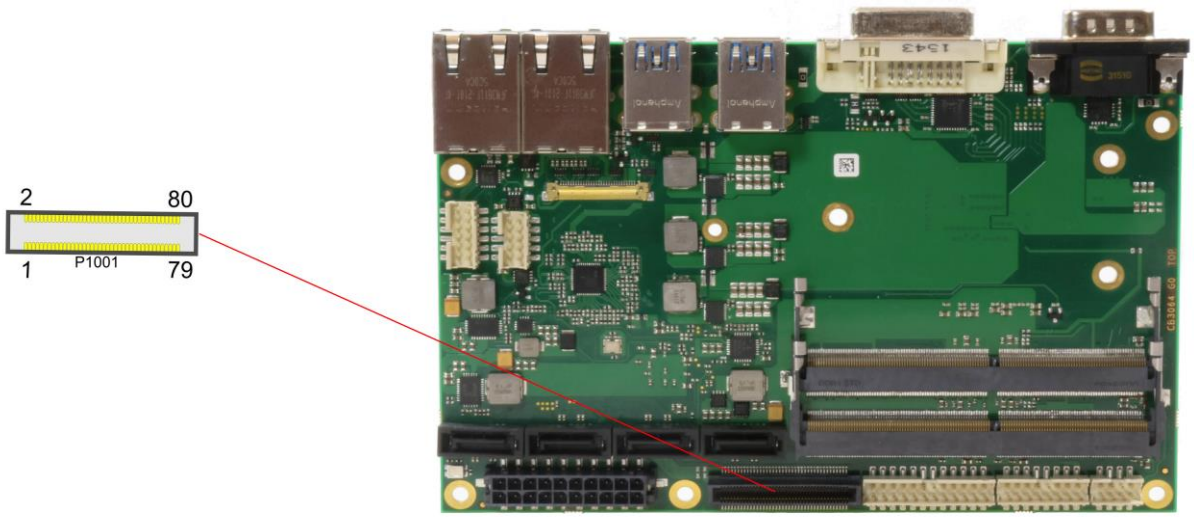


Pinout serial port (DSUB connector):

Description	Name	Pin		Name	Description
data carrier detect	DCD	1	6	DSR	data set ready
receive data	RXD	2	7	RTS	request to send
transmit data	TXD	3	8	CTS	clear to send
data terminal ready	DTR	4	9	RI	ring indicator
ground	GND	5			

4.11 PCI-Express

The ADLQ170HD offers a 2x40pin custom connector for the PCI-Express bus. You can connect one PCIe x4 device here. Alternatively, up to four PCIe x1 devices can be connected. Adapter cards featuring standard PCIe sockets or a PCIe Mini Card connector are available. Please contact your sales representative for these cards.



Pinout 2x40-pin connector:

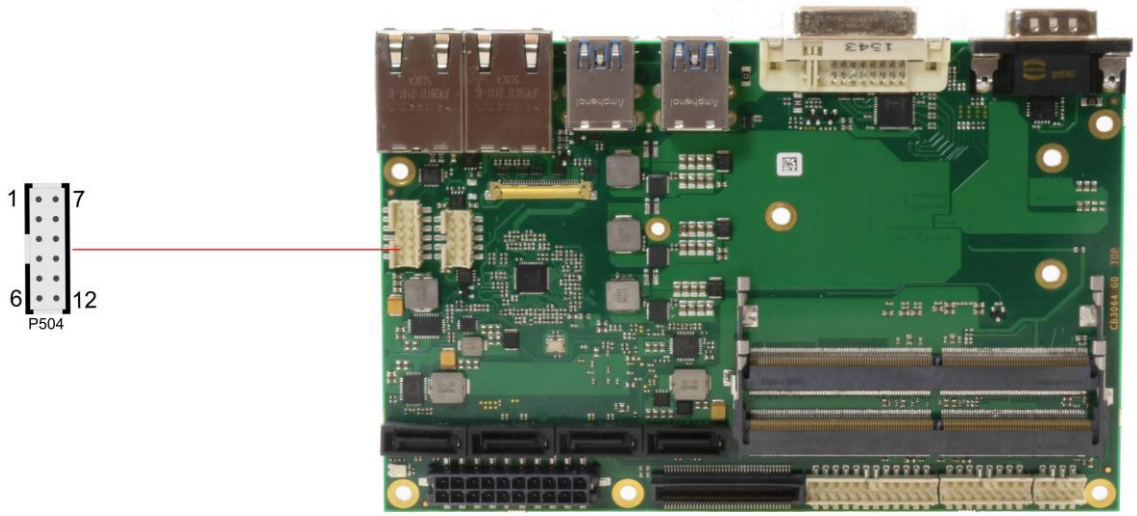
Description	Name	Pin		Name	Description
3.3 volt supply	3.3V	1	2	12V	12 volt supply
3.3 volt supply	S3.3V	3	4	SMBCLK1	SMB Clock Slot 1
PCIe Reset	PLTPCIE#	5	6	SMBDAT1	SMB Dat Slot 1
Link Reactivation	PEWAKE#	7	8	GND	ground
ground	GND	9	10	PECLK0	PCIe Clock 0 +
Transmit Lane 1 +	PET1	11	12	PECLK0#	PCIe Clock 0 -
Transmit Lane 1 -	PET1#	13	14	GND	ground
ground	GND	15	16	PER1	Receive Lane 1 +
Clock Enable 1	PE1CLKEN#	17	18	PER1#	Receive Lane 1 -
ground	GND	19	20	GND	ground
3.3 volt supply	3.3V	21	22	12V	12 volt supply
3.3 volt standby power supply	S3.3V	23	24	N/C	reserved
reserved	N/C	25	26	N/C	reserved
reserved	N/C	27	28	GND	ground
ground	GND	29	30	N/C	reserved
reserved	N/C	31	32	N/C	reserved
reserved	N/C	33	34	GND	ground
ground	GND	35	36	N/C	reserved
reserved	N/C	37	38	N/C	reserved
ground	GND	39	40	GND	ground
3.3 volt supply	3.3V	41	42	12V	12 volt supply
3.3 volt power supply	S3.3V	43	44	N/C	reserved
reserved	N/C	45	46	N/C	reserved
reserved	N/C	47	48	GND	ground
ground	GND	49	50	N/C	reserved
reserved	N/C	51	52	N/C	reserved
reserved	N/C	53	54	GND	ground

Description	Name	Pin		Name	Description
ground	GND	55	56	N/C	reserved
reserved	N/C	57	58	N/C	reserved
ground	GND	59	60	GND	ground
3.3 volt supply	3.3V	61	62	12V	12 supply
3.3 volt supply	S3.3V	63	64	N/C	reserved
reserved	N/C	65	66	N/C	reserved
reserved	N/C	67	68	GND	ground
ground	GND	69	70	N/C	reserved
reserved	N/C	71	72	N/C	reserved
reserved	N/C	73	74	GND	ground
ground	GND	75	76	N/C	reserved
reserved	N/C	77	78	N/C	reserved
reserved	N/C	79	80	GND	ground

4.12 GPIO

The General Purpose Input/Output interface is made available through a 2x6-pin connector. To make use of this interface the GPIO chip (PCA9535BS) must be programmed accordingly. Please refer to your distributor for information on available software support.

Manufacturer	Description	Mating Connector
FCI	FCI 98424-G52-12LF	FCI 90311-012LF



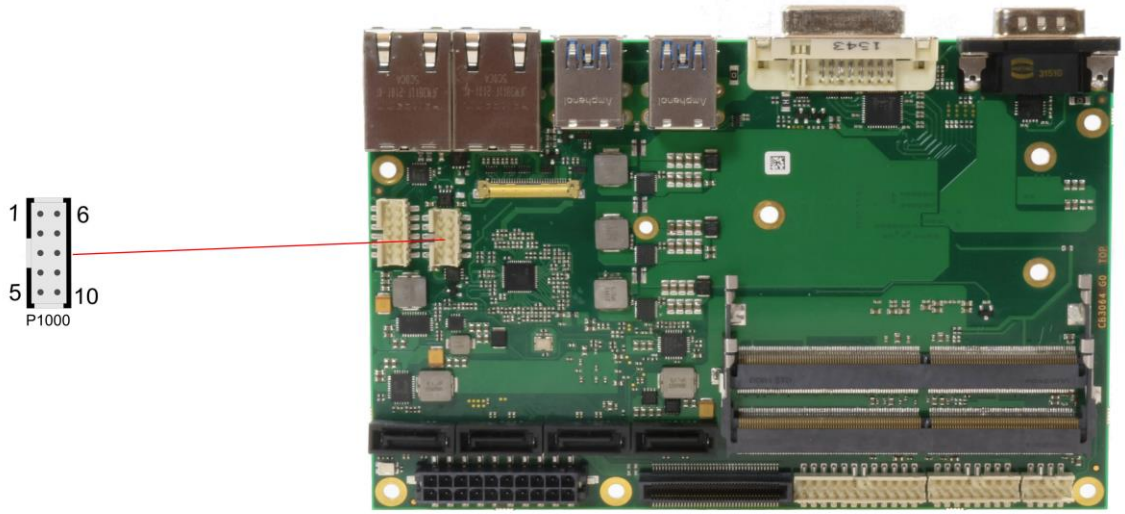
Pinout GPIO connector:

Description	Name	Pin		Name	Description
5 volt supply	VCC	1	7	VCC	5 volt supply
GP input/output 10	GPIO10	2	8	GPIO14	GP input/output 14
GP input/output 11	GPIO11	3	9	GPIO15	GP input/output 15
GP input/output 12	GPIO12	4	10	GPIO16	GP input/output 16
GP input/output 13	GPIO13	5	11	GPIO17	GP input/output 17
ground	GND	6	12	GND	ground

4.13 Fan Connectors

Three external fans (12V) can be connected to the board using a 2x5-pin connector. Monitoring signals are available. For the monitoring to work the fans must provide a corresponding speed signal.

Manufacturer	Description	Mating Connector
FCI	98424-G52-10LF	90311-010LF



Pinout 2x5-pin connector:

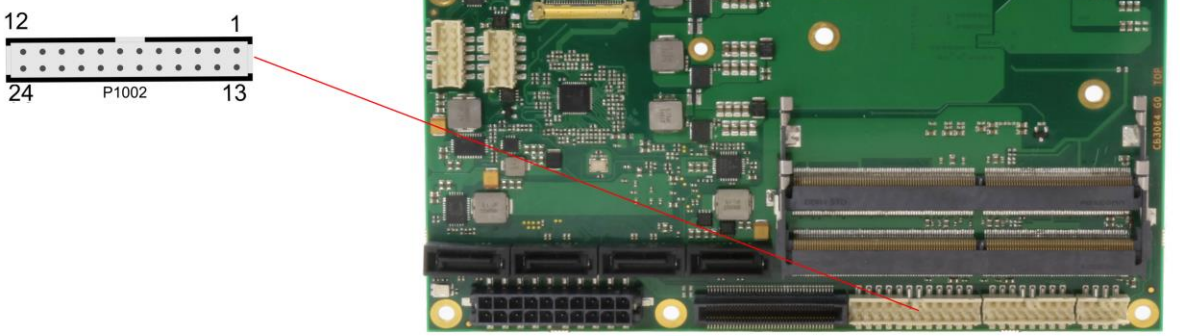
Description	Name	Pin		Name	Description
FAN 1 ON	FANON1	1	6	FANON2	FAN 2 ON
12V	12V	2	7	12V	12V
FAN1 control	FANCTRL1	3	8	FANCTRL2	Fan 2 control
12V	12V	4	9	FANCTRL3	Fan 3 control
FAN 3 ON	FANON3	5	10	GND	ground

4.14 System

A number of signals for system control and for SMBus communication are provided through a 2x12-pin connector. This connector combines signals for power button, speaker, and several LEDs such as a suspend LED, and three additional LEDs which are driven by GPIOs. Of these three GPIO-LEDs, LED1 and LED2 are already provided with a series resistor. SMBus capable devices can also be connected.

2x12-pin connector:

Manufacturer	Description	Mating Connector
Amphenol FCI	98424-G52-24LF	e.g. 89947-124LF



Pinout 2x12-pin connector:

Description	Name	Pin		Name	Description
Ground	GND	1	13	3.3V	Power supply 3,3V
Reset to ground	RSTBTN#	2	14	PWRBTN#	On/Suspend button
LED suspend / ACPI	S-LED	3	15	S3.3V	Standby power supply 3.3V
LED harddisk	SATALED	4	16	GPIOLED3	LED GPIO device 3
LED GPIO device 1	GPIOLED1	5	17	BATT	RTC battery
LED GPIO device 2	GPIOLED2	6	18	SMBALERT#	SMB alert
SMB clock	SMBCLKEX	7	19	SMBDATEXT	SMB data
Speaker	SPEAKER	8	20	SVCC	Standby power supply 5V
Not connected	N/C	9	21	N/C	Not connected
Ground	GND	10	22	VCC	Power supply 5V
Ground	GND	11	23	VCC	Power supply 5V
Ground	GND	12	24	VCC	Power supply 5V

5 State LEDs

5.1 RGB LED

The ADLQ170HD 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

Permanently red LED: If the board appears to be in Reset (Red LED lit) then this could also indicate a PCI104-Express "stacking error". Such an error could occur when the stack contains a peripheral card which has the wrong type of connector (PCI104-Express Type 1 instead of Type 2 or vice versa).

6 BIOS Settings

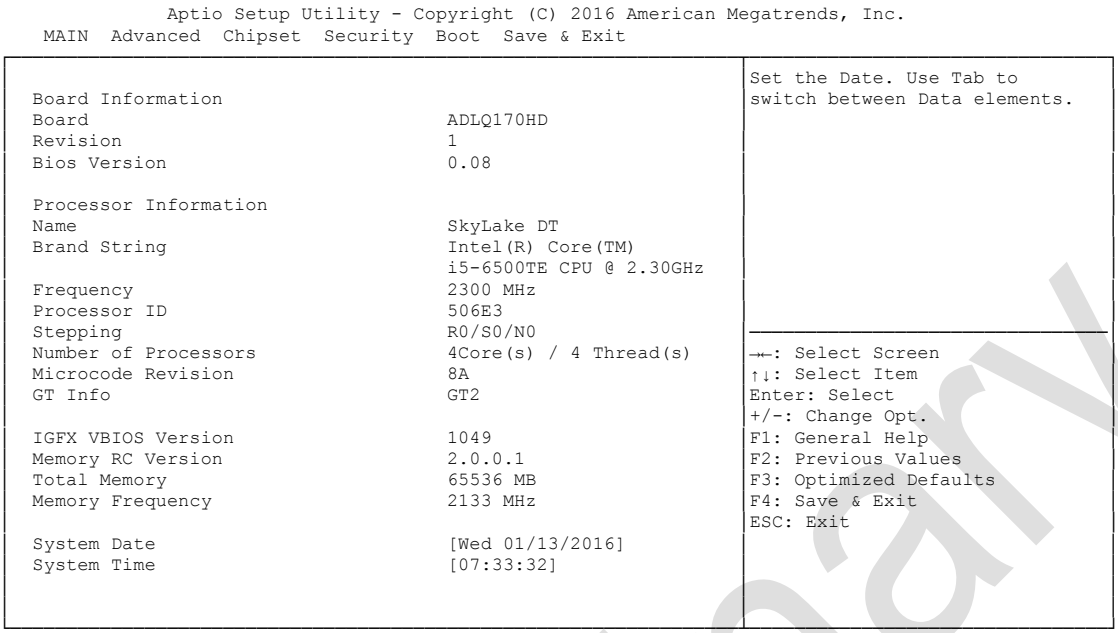
6.1 General Remarks

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.

6.2 Main



- ✓ **Board**
  Options: none
- ✓ **Revision**
  Options: none
- ✓ **Bios Version**
  Options: none
- ✓ **Processor Information**
  Options: none
- ✓ **Name**
  Options: none
- ✓ **Brand String**
  Options: none
- ✓ **Frequency**
  Options: none
- ✓ **Processor ID**
  Options: none
- ✓ **Stepping**
  Options: none
- ✓ **Number of Processors**
  Options: none
- ✓ **Microcode Revision**
  Options: none

- ✓ **GT Info**
  Options: none

- ✓ **IGFX VBIOS Version**
  Options: none

- ✓ **Memory RC Version**
  Options: none

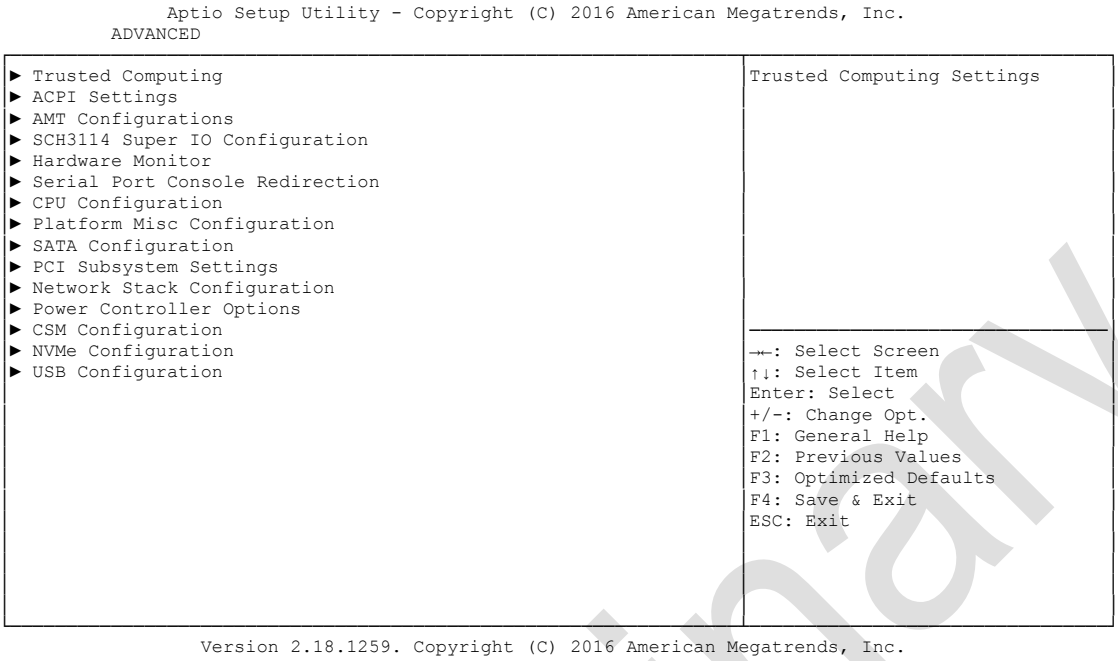
- ✓ **Total Memory**
  Options: none

- ✓ **Memory Frequency**
  Options: none

- ✓ **System Date**
  Options: The system date can be adjusted here.

- ✓ **System Time**
  Options: The system time can be adjusted here.

6.3 Advanced



- ✓ **Trusted Computing**
  Sub menu: see "Trusted Computing" (page 39)

- ✓ **ACPI Settings**
  Sub menu: see "ACPI Settings" (page 41)

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

- ✓ **SCH3114 Super IO Configuration**
  Sub menu: see "SCH3114 Super IO Configuration" (page 44)

- ✓ **H/W Monitor**
  Sub menu: see "H/W Monitor" (page 46)

- ✓ **Serial Port Console Redirection**
  Sub menu: see "Serial Port Console Redirection" (page 48)

- ✓ **CPU Configuration**
  Sub menu: see "CPU Configuration" (page 52)

- ✓ **Platform Misc Configuration**
  Sub menu: see "Platform Misc Configuration Configuration" (page 55)

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

- ✓ **PCI Subsystem Settings**
  Sub menu: see "PCI Subsystem Settings" (page 65)

- ✓ **Network Stack**
  Sub menu: see "Network Stack" (page 67)

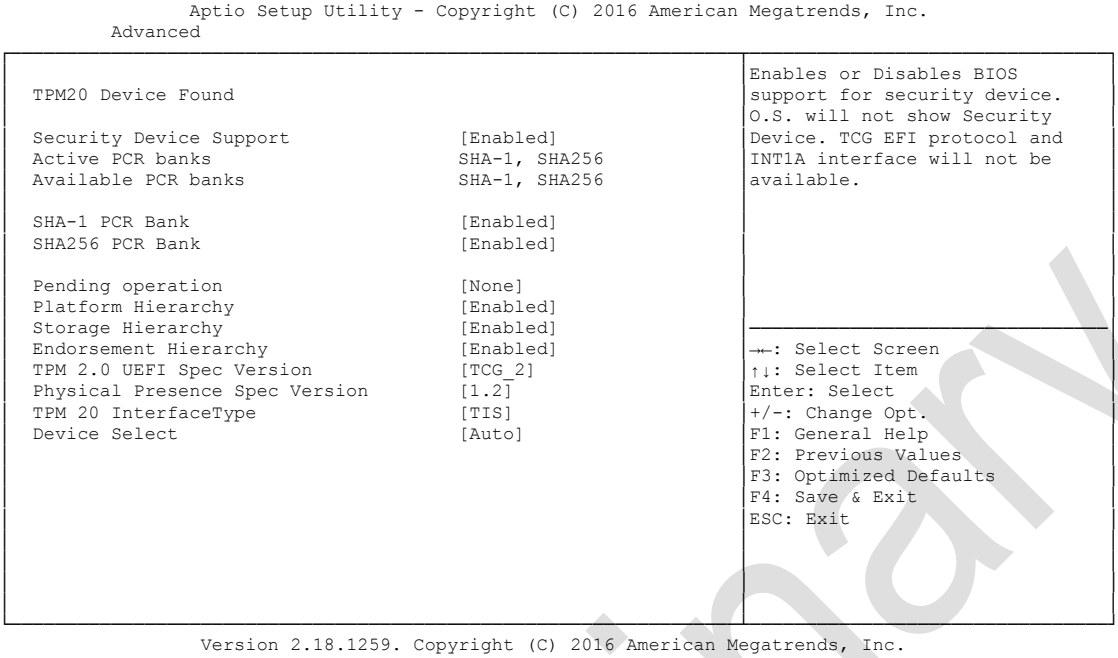
- ✓ **Power Controller Options**
  Sub menu: see "Power Controller Options" (page 68)

- ✓ **CSM Configuration**
  Sub menu: see "Compatibility Support Module Configuration" (page 70)

- ✓ **NVMe Configuration**
  Sub menu: see "NVMe Controller and Drive Information" (page 71)

- ✓ **USB Configuration**
  Sub menu: see "USB Configuration" (page 72)

6.3.1 Trusted Computing

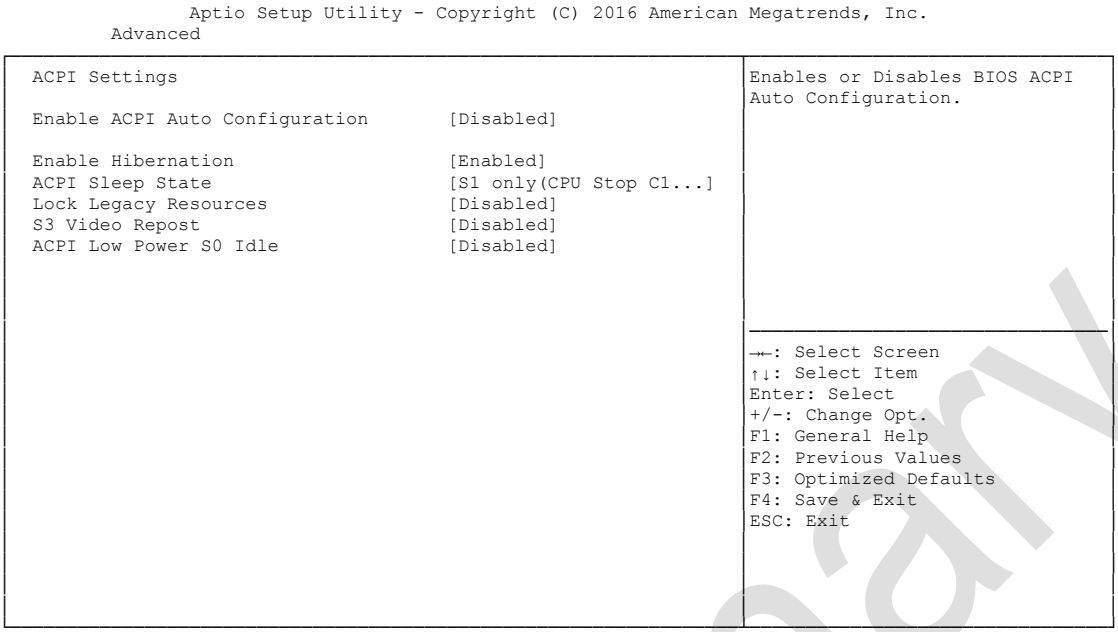


- ✓ **Security Device Support**
  Options: Enabled / Disabled
- ✓ **Active PCR banks**
  Options: none
- ✓ **Available PCR banks**
  Options: none
- ✓ **SHA-1 PCR Bank**
  Options: Enabled / Disabled
- ✓ **SHA256 PCR Bank**
  Options: Enabled / Disabled
- ✓ **Pending operation**
  Options: None / TPM Clear
- ✓ **Platform Hierarchy**
  Options: Enabled / Disabled
- ✓ **Storage Hierarchy**
  Options: Enabled / Disabled
- ✓ **Endorsement Hierarchy**
  Options: Enabled / Disabled
- ✓ **TPM2.0 UEFI Spec Version**
  Options: TCG_1_2 / TCG_2
- ✓ **Physical Presence Spec Version**
  Options: 1.2 / 1.3

- ✓ **TPM 20 InterfaceType**
  Options: none

- ✓ **Device Select**
  Options: TPM 1.2 / TPM 2.0 / Auto

6.3.2 ACPI Settings



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

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

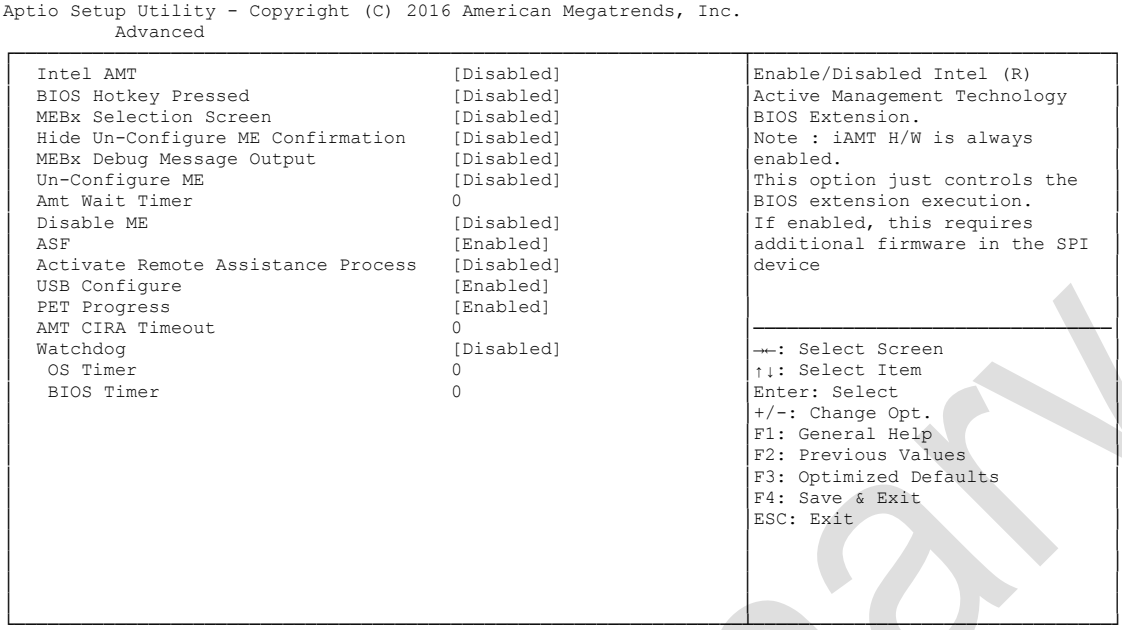
- ✓ **ACPI Sleep State**
  Options: Suspend Disabled / S1 (CPU Stop Clock)

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

- ✓ **S3 Video Repost**
  Options: Enabled / Disabled

- ✓ **ACPI Low Power S0 Idle**
  Options: Disabled / Enabled

6.3.3 AMT Configuration



- ✓ **Intel AMT**
  Options: Disabled / Enabled

- ✓ **BIOS Hotkey Pressed**
  Options: Disabled / Enabled

- ✓ **MEBx Selection Screen**
  Options: Disabled / Enabled

- ✓ **Hide Un-Configure ME Configuration Prompt**
  Options: Disabled / Enabled

- ✓ **MEBx Debug Message Output**
  Options: Disabled / Enabled

- ✓ **Un-Configure ME**
  Options: Disabled / Enabled

- ✓ **Amt Wait Timer**
  Options: none

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

- ✓ **Activate Remote Assistance Process**
  Options: Disabled / Enabled

- ✓ **USB Provisioning of AMT**
  Options: Disabled / Enabled

- ✓ **PET Progress**
  Options: Disabled / Enabled

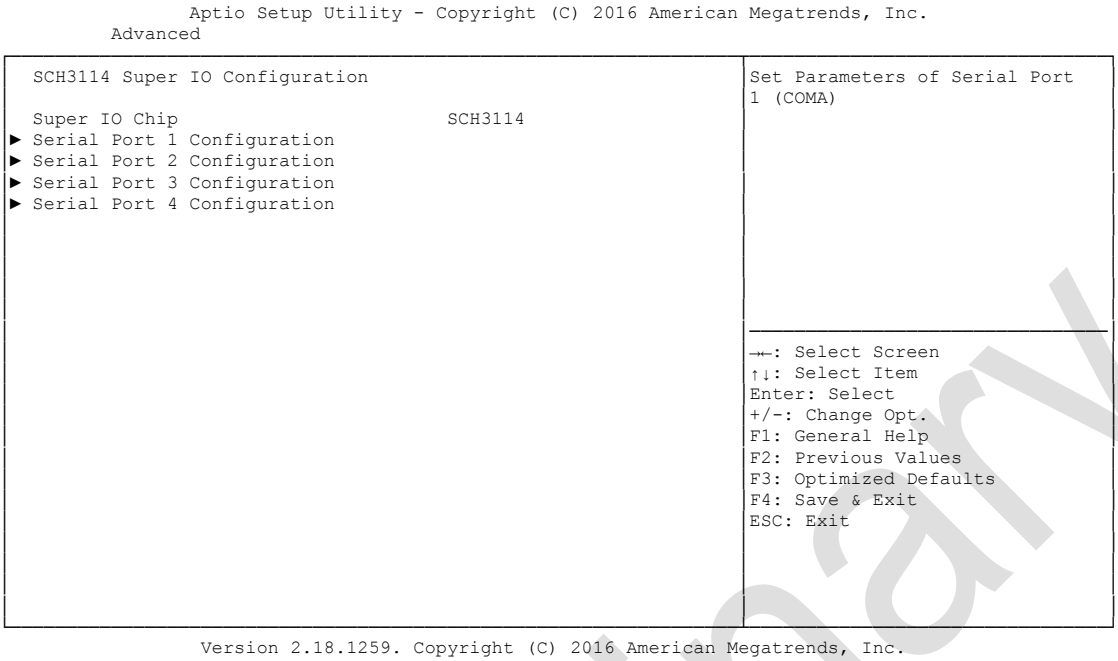
- ✓ **AMT CIRA Timeout**
  Options: none

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

- ✓ **OS Timer**
  Options: none

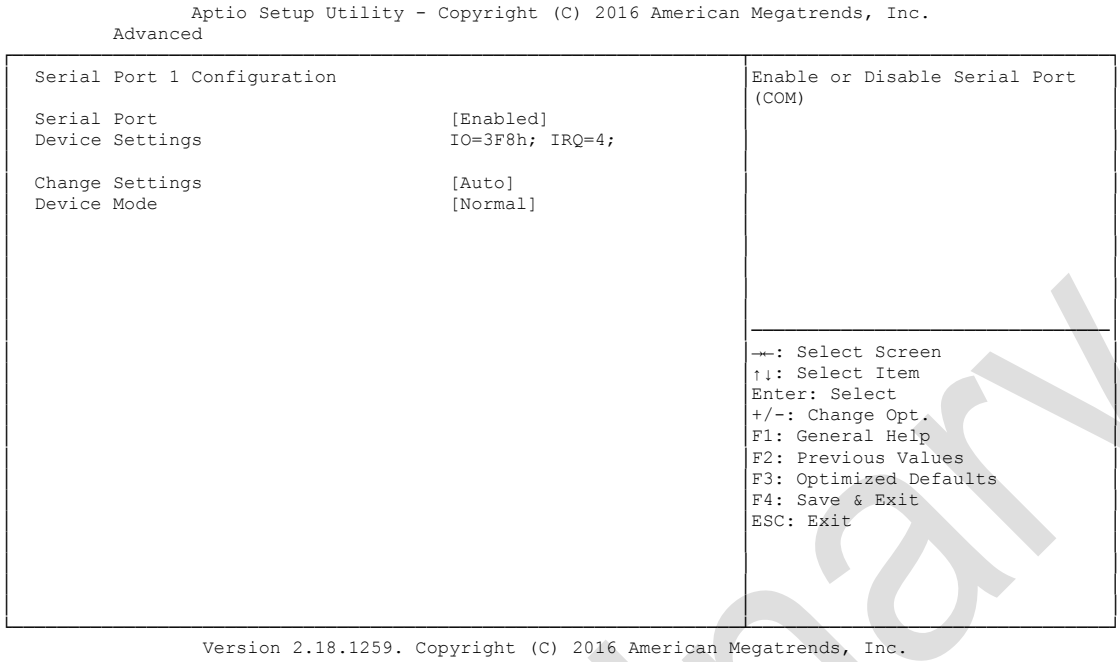
- ✓ **BIOS Timer**
  Options: none

6.3.4 SCH3114 Super IO Configuration



✓ **Serial Port X Configuration**
Sub menu: see "Serial Port X Configuration" (page 45)

6.3.4.1 Serial Port X Configuration



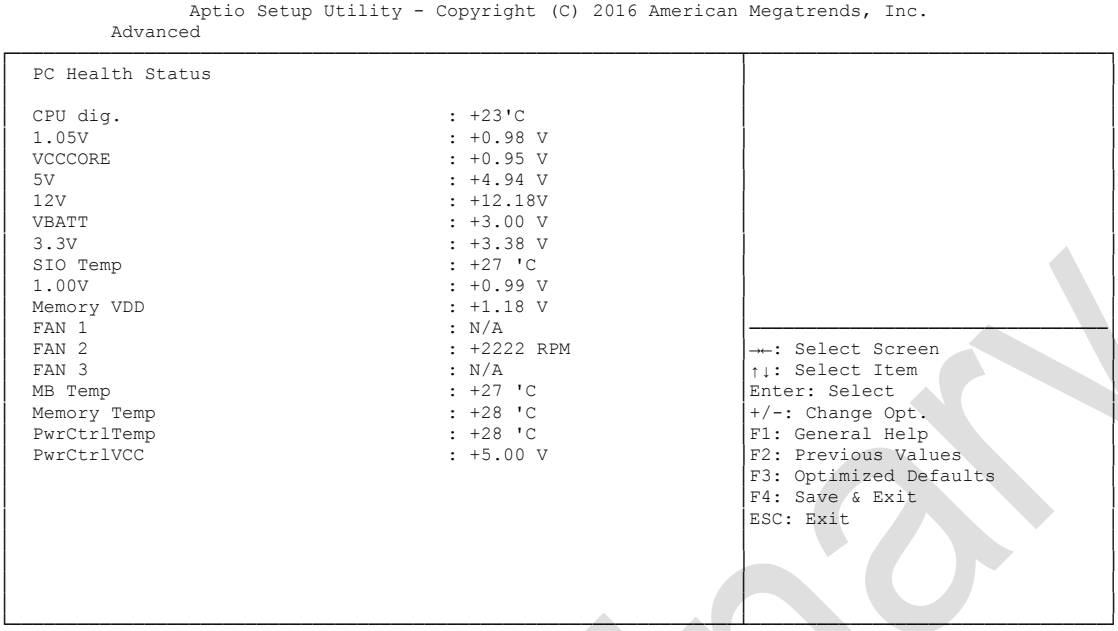
- ✓ **Serial Port**
  Options: Enabled / Disabled

- ✓ **Device Settings**
  Options: none

- ✓ **Change Settings**
  Options: Auto / IO=3F8h; IRQ=4 / IO=3F8h; IRQ=3, ...12 / IO=2F8h; IRQ=3, ...12 / IO=3E8h; IRQ=3, ...12 / IO=2E8h; IRQ=3, ...12

- ✓ **Device Mode**
  Options: Normal / High Speed

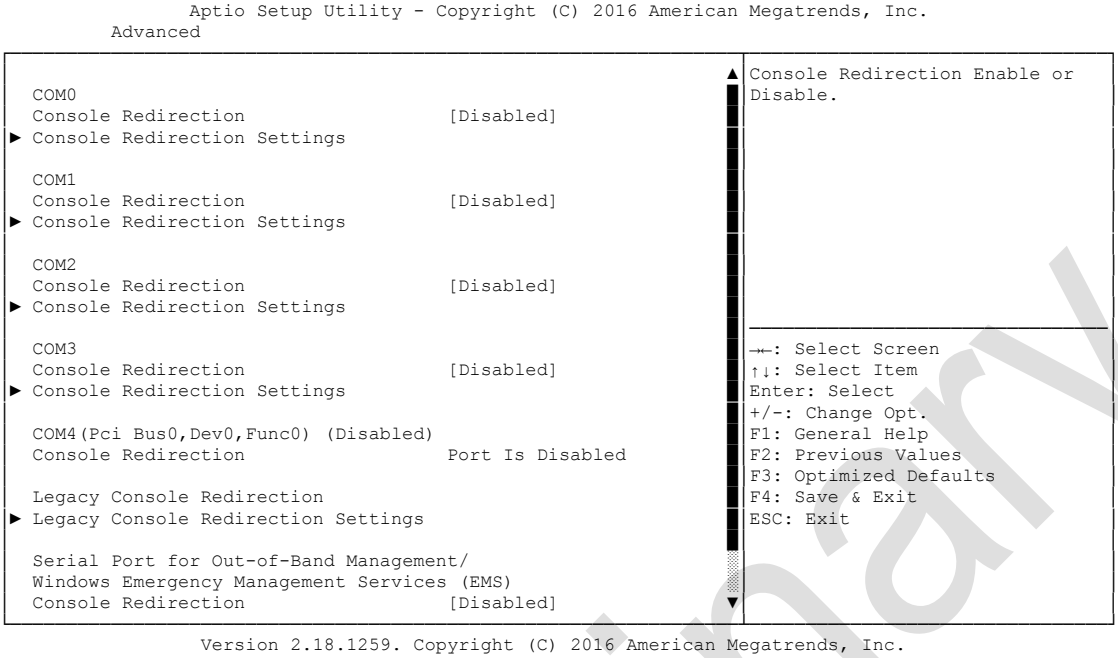
6.3.5 H/W Monitor



- ✓ **CPU dig.**
  Options: none
- ✓ **1.05V**
  Options: none
- ✓ **VCCCORE**
  Options: none
- ✓ **5V**
  Options: none
- ✓ **12V**
  Options: none
- ✓ **VBATT**
  Options: none
- ✓ **3.3V**
  Options: none
- ✓ **SIO Temp**
  Options: none
- ✓ **1.00V**
  Options: none
- ✓ **Memory VDD**
  Options: none
- ✓ **FAN 1**
  Options: none

- ✓ **FAN 2**
  Options: none
- ✓ **FAN 3**
  Options: none
- ✓ **MB Temp**
  Options: none
- ✓ **Memory Temp**
  Options: none
- ✓ **PwrCtrlTemp**
  Options: none
- ✓ **PwrCtrlVCC**
  Options: none

6.3.6 Serial Port Console Redirection

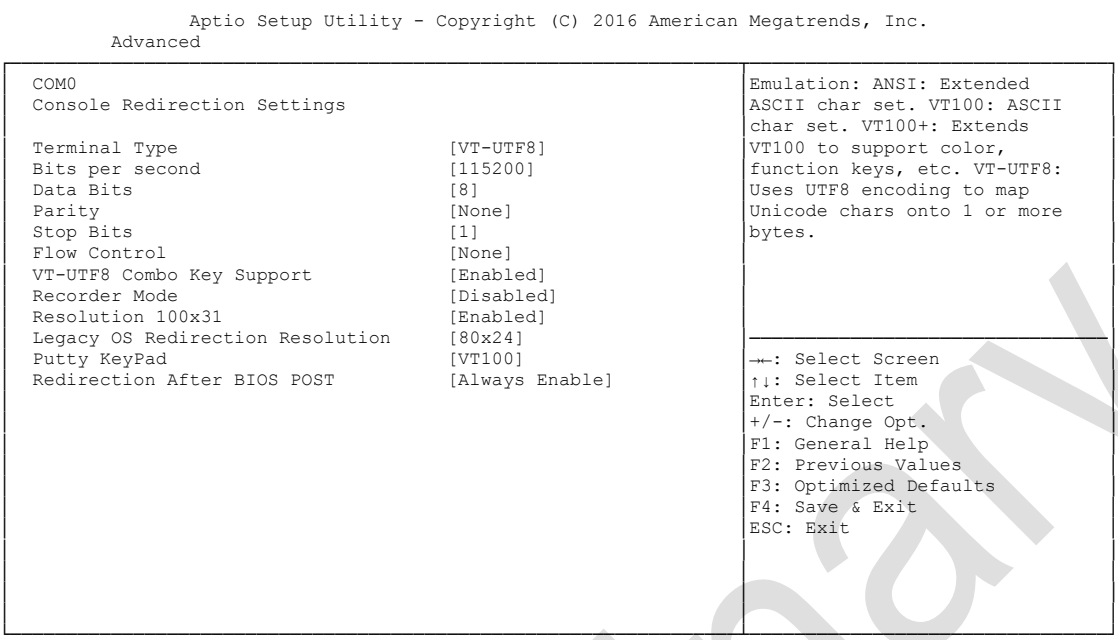


- ✓ **Console Redirection**
  Options: Enabled / Disabled

- ✓ **Console Redirection Settings**
  Sub menu: see "Console Redirection Settings" (page 49)

- ✓ **Legacy Console Redirection Settings**
  Sub menu: see "Legacy Serial Redirection Port" (page 51)

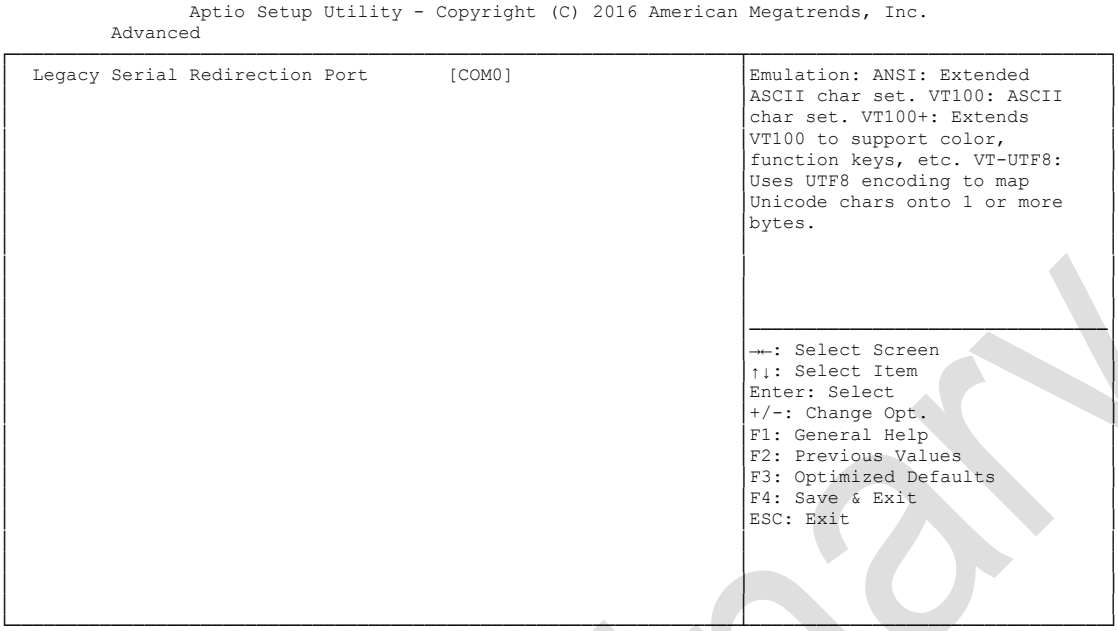
6.3.6.1 Console Redirection Settings



- ✓ **Terminal Type**
  Options: VT100 / VT100+ / VT-UTF8 / ANSI
- ✓ **Bits per second**
  Options: 9600 / 19200 / 38400 / 57600 / 115200
- ✓ **Data Bits**
  Options: 7 / 8
- ✓ **Parity**
  Options: None / Even / Odd / Mark / Space
- ✓ **Stop Bits**
  Options: 1 / 2
- ✓ **Flow Control**
  Options: None / Hardware RTS/CTS
- ✓ **VT-UTF8 Combo Key Support**
  Options: Disabled / Enabled
- ✓ **Recorder Mode**
  Options: Disabled / Enabled
- ✓ **Resolution 100x31**
  Options: Disabled / Enabled
- ✓ **Legacy OS Redirection Resolution**
  Options: 80x24 / 80x25
- ✓ **Putty KeyPad**
  Options: VT100 / LINUX / XTERMR6 / SCO / ESCN / VT400

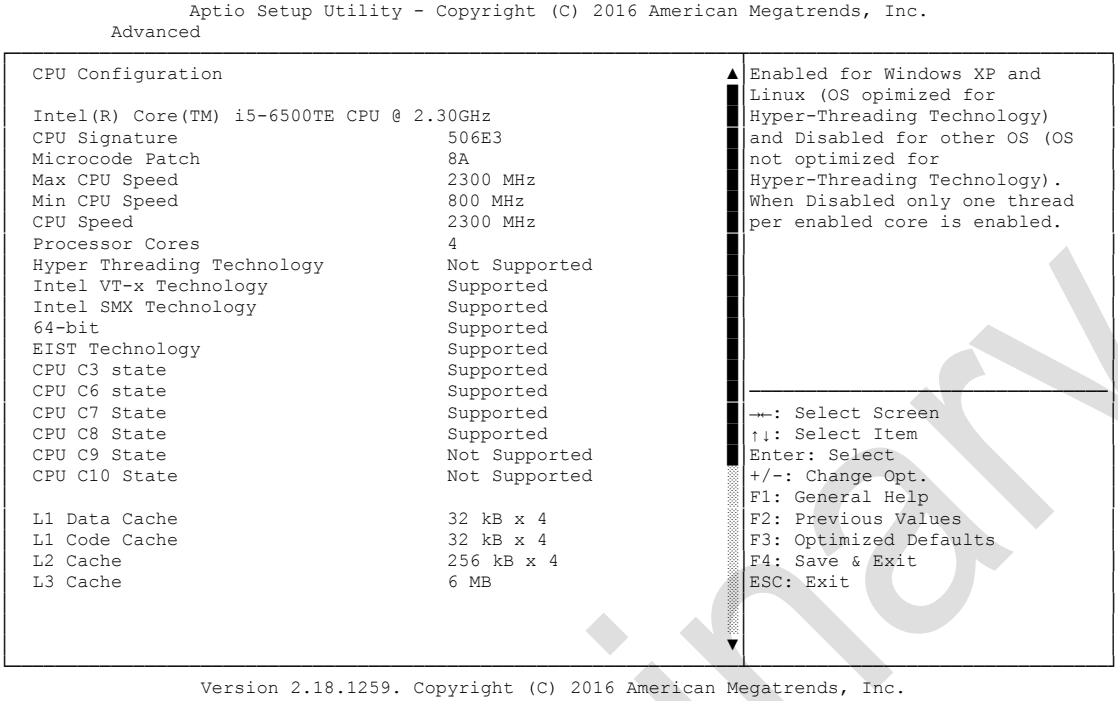
✓ **Redirection After BIOS POST**
Options: Always Enable / BootLoader

6.3.6.2 Legacy Serial Redirection Port



✓ **Legacy Serial Redirection Port**
Options: COM0 / COM1 / COM2 / COM3 / COM4 (Pci Bus0, Dev0, Func0) (Disabled)

6.3.7 CPU Configuration



- ✓ **CPU Signature**
  Options: none
- ✓ **Processor Family**
  Options: none
- ✓ **Microcode Patch**
  Options: none
- ✓ **FSB Speed**
  Options: none
- ✓ **Max CPU Speed**
  Options: none
- ✓ **Min CPU Speed**
  Options: none
- ✓ **CPU Speed**
  Options: none
- ✓ **Processor Cores**
  Options: none
- ✓ **Intel HT Technology**
  Options: none
- ✓ **Intel VT-x Technology**
  Options: none
- ✓ **Intel SMX Technology**
  Options: none

- ✓ **64-bit**
  Options: none

- ✓ **EIST Technology**
  Options: none

- ✓ **CPU C3 state**
  Options: none

- ✓ **CPU C6 state**
  Options: none

- ✓ **CPU C7 state**
  Options: none

- ✓ **L1 Data Cache**
  Options: none

- ✓ **L1 Code Cache**
  Options: none

- ✓ **L2 Cache**
  Options: none

- ✓ **L3 Cache**
  Options: none

- ✓ **Hyper-threading**
  Options: Enabled / Disabled

- ✓ **Active Processor Cores**
  Options: All

- ✓ **Overclocking lock**
  Options: Disabled / Enabled

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

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

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

- ✓ **Hardware Prefetcher**
  Options: Disabled / Enabled

- ✓ **Adjacent Cache Line Prefetch**
  Options: Disabled / Enabled

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

- ✓ **Turbo Mode**
  Options: Enabled / Disabled

- ✓ **Package power limit lock**
  Options: Disabled / Enabled

- ✓ **CPU Power Limit1**
  Options: 0..255

- ✓ **CPU Power Limit1 Time**
  Options: 0..255

- ✓ **CPU Power Limit 2**
  Options: 0..255

- ✓ **Platform power limit lock**
  Options: Disabled / Enabled

- ✓ **CPU Power Limit3**
  Options: 0..255

- ✓ **CPU Power Limit3 Time**
  Options: 0..255

- ✓ **CPU Power Limit3 Duty Cycle**
  Options: 0..100

- ✓ **DDR Power Limit1**
  Options: 0..255

- ✓ **DDR Power Limit1 Time**
  Options: 0..255

- ✓ **DDR Power Limit2**
  Options: 0..255

- ✓ **1-Core Ratio Limit**
  Options: 0..255

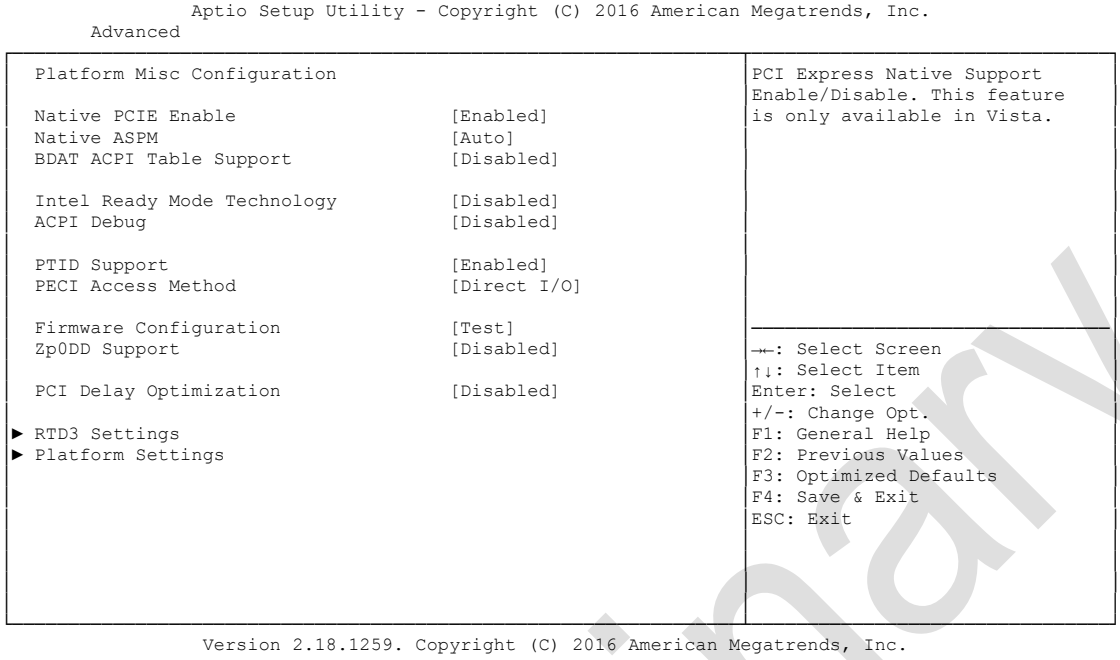
- ✓ **2-Core Ratio Limit**
  Options: 0..255

- ✓ **TCC Activation Offset**
  Options: 0...15

- ✓ **ACPI T State**
  Options: Disabled / Enabled

- ✓ **CPU DTS**
  Options: Disabled / Enabled

6.3.8 Platform Misc Configuration Configuration



- ✓ **Native PCIE Enable**
  Options: Disabled / Enabled

- ✓ **Native ASPM**
  Options: Disabled / Enabled / Auto

- ✓ **BDAT ACPI Table Support**
  Options: Disabled / Enabled

- ✓ **Intel Ready Mode Technology**
  Options: Disabled / Enabled

- ✓ **ACPI Debug**
  Options: Disabled / Enabled

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

- ✓ **PECI Access Method**
  Options: Direct I/O / ACPI

- ✓ **Firmware Configuration**
  Options: Ignore Policy Update / Production / Test

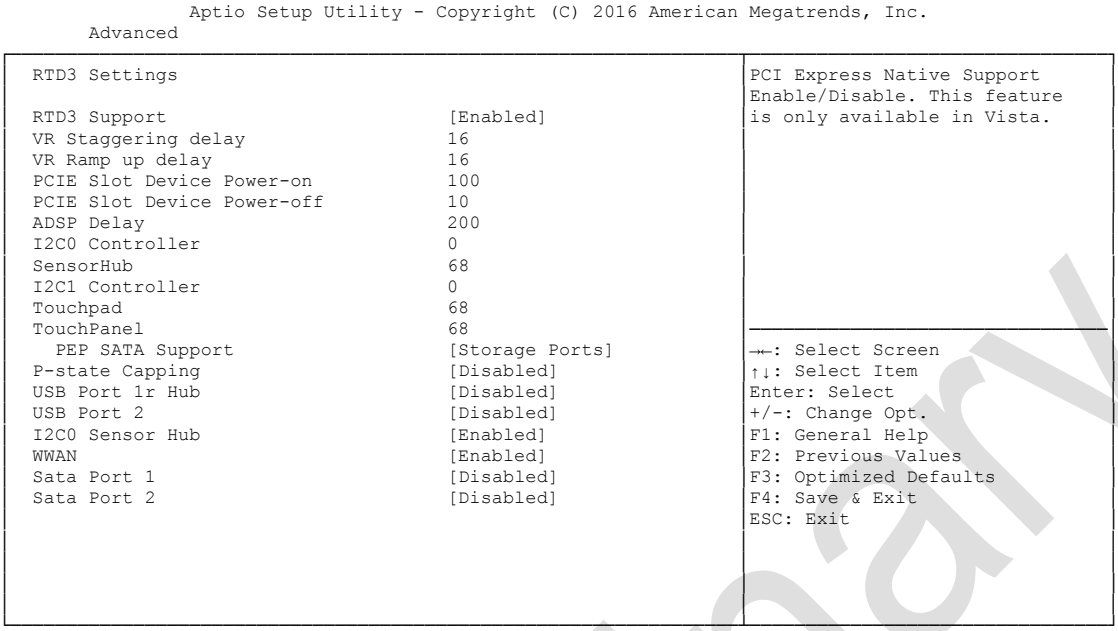
- ✓ **Zp0DD Support**
  Options: Disabled / Enabled

- ✓ **PCI Delay Optimization**
  Options: Disabled / Enabled

- ✓ **RTD3 Settings**
  Sub menu: see "RTD3 Settings" (page 57)

✓ **Platform Settings**
Sub menu: see "Platform Settings" (page 59)

6.3.8.1 RTD3 Settings



- ✓ **RTD3 Support**
  Options: Disabled / Enabled
- ✓ **VR Staggering delay**
  Options: none
- ✓ **VR Ramp up delay**
  Options: none
- ✓ **PCIE Slot Device Power-on**
  Options: none
- ✓ **PCIE Slot Device Power-off**
  Options: none
- ✓ **ADSP Delay**
  Options: none
- ✓ **I2C0 Controller**
  Options: none
- ✓ **SensorHub**
  Options: none
- ✓ **I2C1 Controller**
  Options: none
- ✓ **TouchPad**
  Options: none
- ✓ **TouchPanel**
  Options: none

- ✓ **PEP SATA Support**
  Options: No Constraints / Storage Ports / Storage Controller / PCIe SSD Controller / PCIe SSD Port

- ✓ **P-state Capping**
  Options: Disabled / Enabled

- ✓ **USB Port 1**
  Options: Disabled / High Speed / Super Speed

- ✓ **USB Port 2**
  Options: Disabled / High Speed / Super Speed / Super Speed WWAN

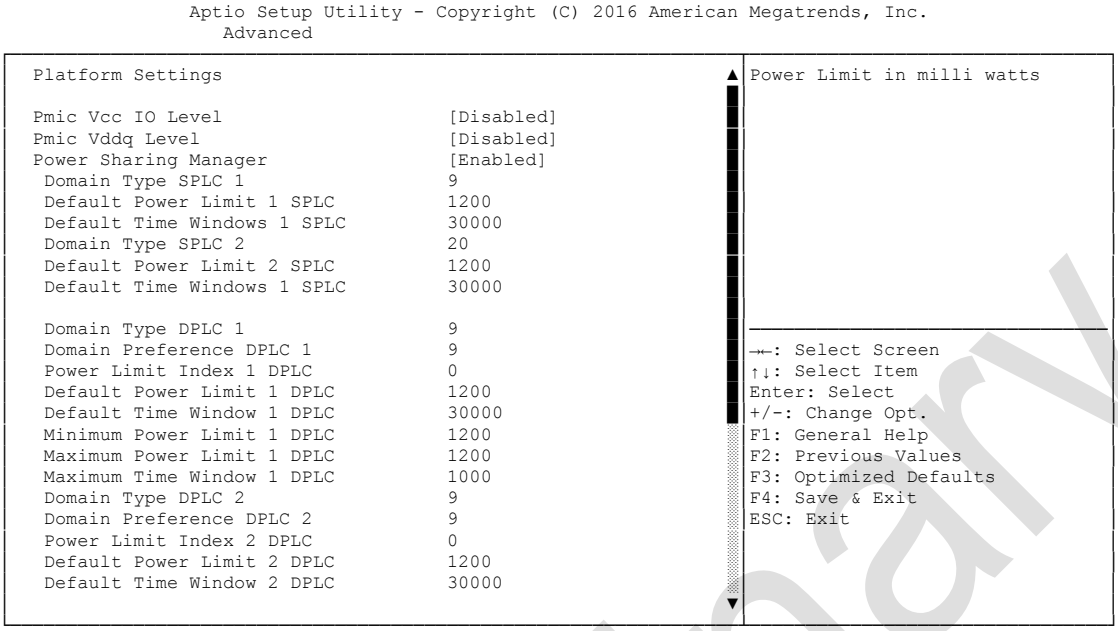
- ✓ **I2C0 Sensor Hub**
  Options: Disabled / Enabled

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

- ✓ **Sata Port 1**
  Options: Disabled / Enabled

- ✓ **Sata Port 2**
  Options: Disabled / Enabled

6.3.8.2 Platform Settings



- ✓ **Pmic Vcc IO Level**
  Options: Disabled / Enabled

- ✓ **Pmic Vddq Level**
  Options: Disabled / Enabled

- ✓ **Power Sharing Manager**
  Options: Disabled / Enabled

- ✓ **Domain Type SPLC 1**
  Options: 1..50

- ✓ **Default Power Limit 1 SPLC**
  Options: 1..10000

- ✓ **Default Time Windows 1 SPLC**
  Options: 1..100000

- ✓ **Domain Type SPLC 2**
  Options: 1..50

- ✓ **Default Power Limit 2 SPLC**
  Options: 1..10000

- ✓ **Default Time Windows 1 SPLC**
  Options: 1..100000

- ✓ **Domain Type DPLC 1**
  Options: 1..50

- ✓ **Domain Preference DPLC 1**
  Options: 1..50

- ✓ **Power Limit Index 1 DPLC**
  Options: 1..10

- ✓ **Default Power Limit 1 DPLC**
  Options: 1..10000

- ✓ **Default Time Window 1 DPLC**
  Options: 1..100000

- ✓ **Minimum Power Limit 1 DPLC**
  Options: 1.10000

- ✓ **Maximum Power Limit 1 DPLC**
  Options: 1..10000

- ✓ **Maximum Time Window 1 DPLC**
  Options: 1..10000

- ✓ **Domain Type DPLC 2**
  Options: 1..50

- ✓ **Domain Preferences DPLC 2**
  Options: 1..50

- ✓ **Power Limit Index 2 DPLC**
  Options: 1..10

- ✓ **Default Power Limit 2 DPLC**
  Options: 1..10000

- ✓ **Default Time Window 2 DPLC**
  Options: 1..100000

- ✓ **Minimum Power Limit 2 DPLC**
  Options: 1.10000

- ✓ **Maximum Power Limit 2 DPLC**
  Options: 1..10000

- ✓ **Maximum Time Window 2 DPLC**
  Options: 1..10000

- ✓ **Select Camera**
  Options: IVCAM / DS4

- ✓ **Enable 3D Camera DFU device**
  Options: Disabled / Enabled

- ✓ **Wireless device**
  Options: Disabled / Enabled

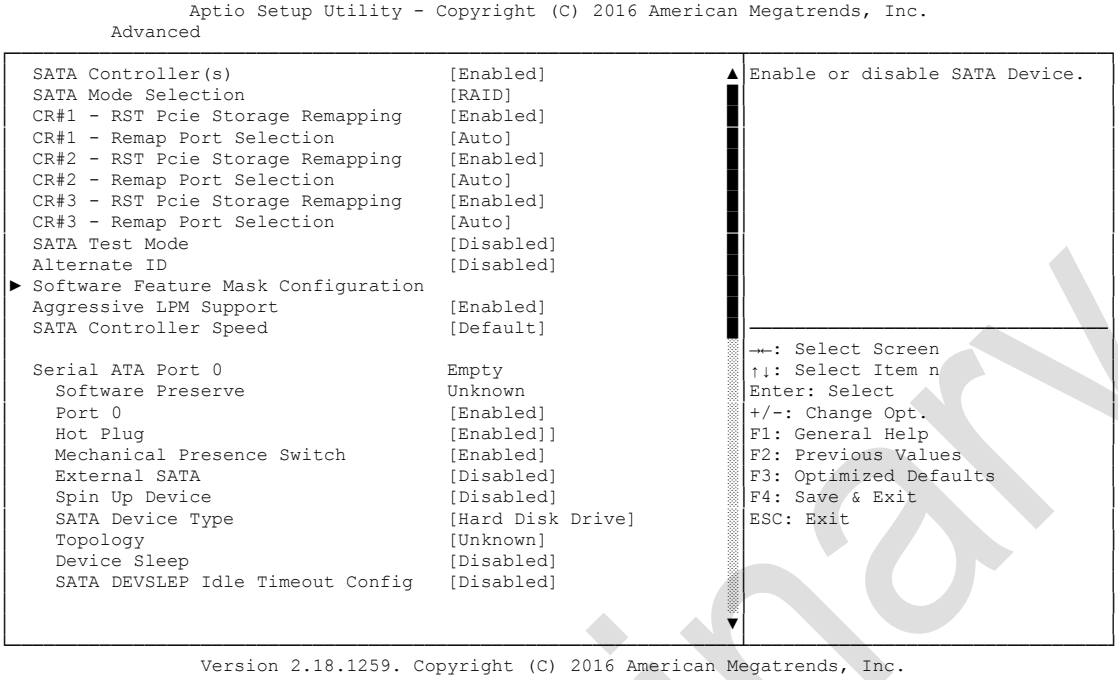
- ✓ **WiFi SAR**
  Options: Disabled / Enabled

- ✓ **HID Event Filter Driver**
  Options: Disabled / Enabled

- ✓ **Enable Wireless Charge Support**
  Options: Disabled / Enabled

✓ **Enable FFU Support**
Options: Disabled / Enabled

6.3.9 SATA Configuration



- ✓ **SATA Controller(s)**
  Options: Enabled / Disabled

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

- ✓ **CR# 1 - RST Pcie Storage Remapping**
  Options: Enabled / Disabled

- ✓ **CR# 1 - Remap Port Selection**
  Options: Auto / Port 9 / Port 10 / Port 11 / Port 12

- ✓ **CR# 2 - RST Pcie Storage Remapping**
  Options: Enabled / Disabled

- ✓ **CR# 2 - Remap Port Selection**
  Options: Auto / Port 13 / Port 14 / Port 15 / Port 16

- ✓ **CR# 3 - RST Pcie Storage Remapping**
  Options: Enabled / Disabled

- ✓ **CR# 3 - Remap Port Selection**
  Options: Auto / Port 17 / Port 18 / Port 19 / Port 20

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

- ✓ **Alternate ID**
  Options: Enabled / Disabled

- ✓ **Software Feature Mask Configuration**
  Sub menu: see "Software Feature Mask Configuration" (page 64)

- ✓ **Aggressive LPM Support**
  Options: Enabled / Disabled

- ✓ **SATA Controller Speed**
  Options: Default / Gen1 / Gen2 / Gen3

- ✓ **Serial ATA Port X**
  Options: none

- ✓ **Software Preserve**
  Options: none

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

- ✓ **Hot Plug**
  Options: Enabled / Disabled

- ✓ **Mechanical Presence Switch**
  Options: Disabled / Enabled

- ✓ **External SATA**
  Options: Enabled / Disabled

- ✓ **Spin Up Device**
  Options: Enabled / Disabled

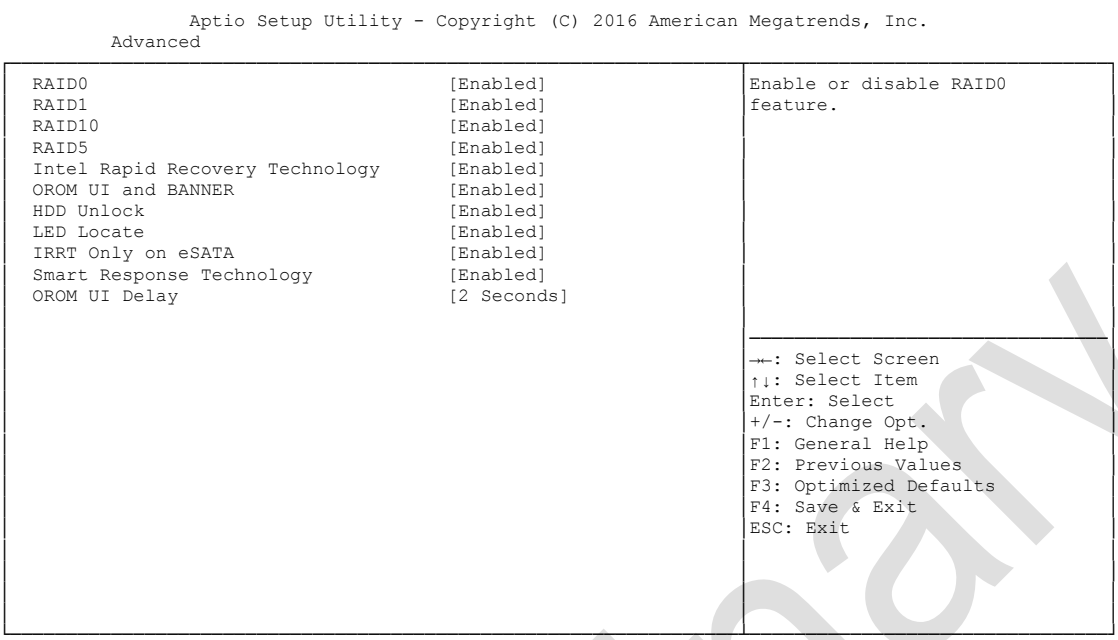
- ✓ **SATA Device Type**
  Options: Hard Disk Drive / Solid State Drive

- ✓ **Topology**
  Options: Unknown / ISATA / Direct Connect / Flex / M2

- ✓ **Device Sleep**
  Options: Disabled / Enabled

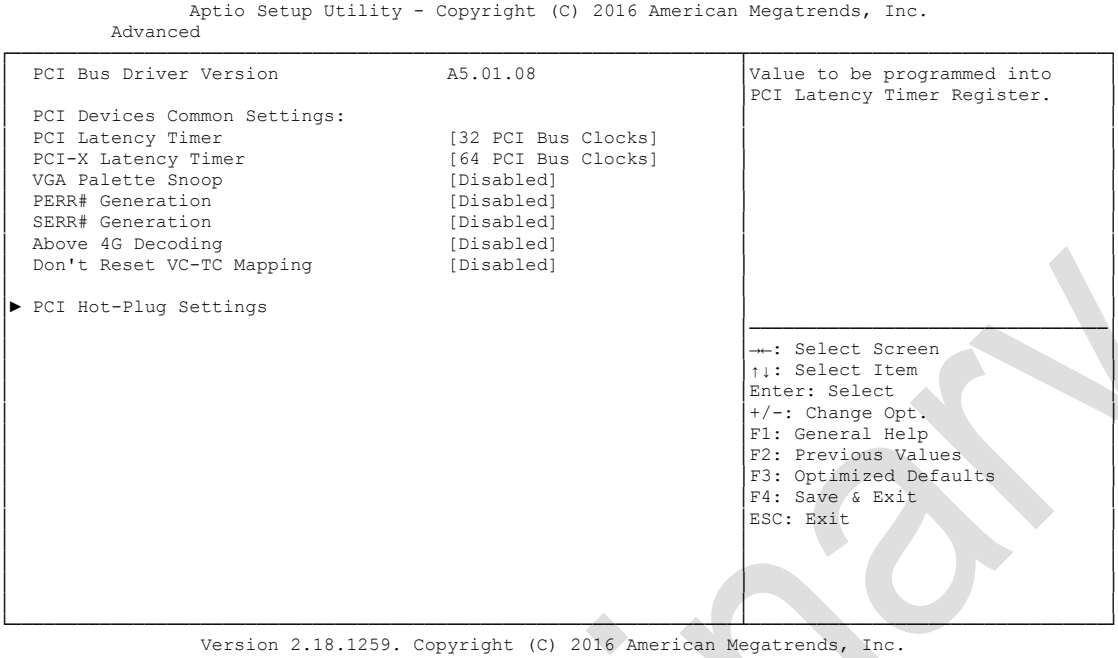
- ✓ **SATA DEVSLEP Idle Timeout Config**
  Options: Disabled / Enabled

6.3.9.1 Software Feature Mask Configuration



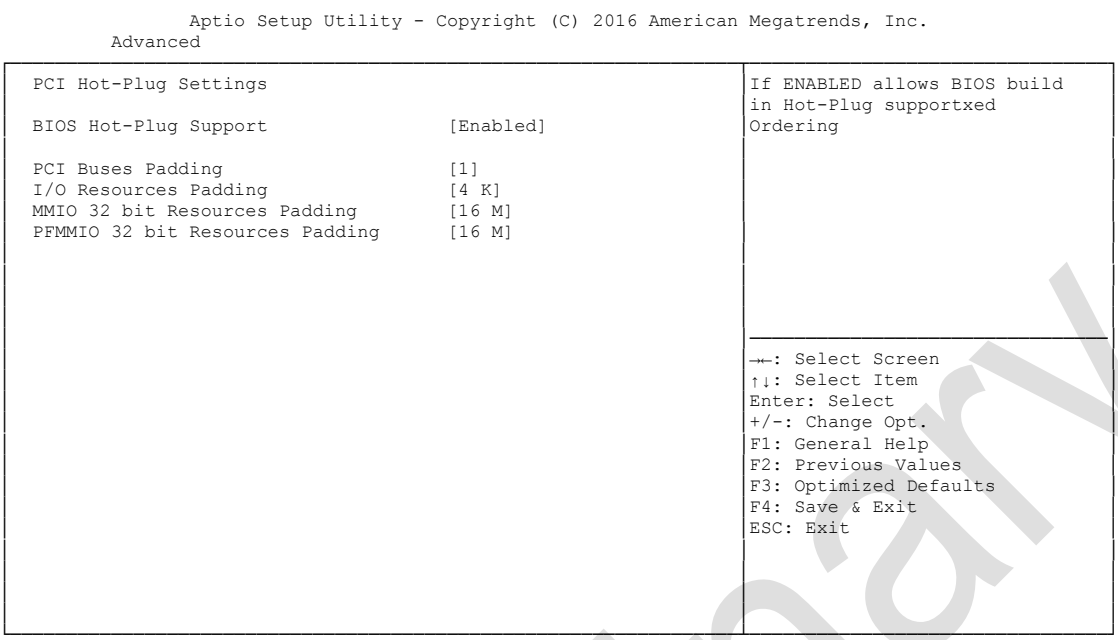
- ✓ **RAID0**
  Options: Enabled / Disabled
- ✓ **RAID1**
  Options: Enabled / Disabled
- ✓ **RAID10**
  Options: Enabled / Disabled
- ✓ **RAID5**
  Options: Enabled / Disabled
- ✓ **Intel Rapid Recovery Technology**
  Options: Enabled / Disabled
- ✓ **OROM UI and BANNER**
  Options: Enabled / Disabled
- ✓ **HDD Unlock**
  Options: Enabled / Disabled
- ✓ **LED Locate**
  Options: Enabled / Disabled
- ✓ **IRRT Only on eSATA**
  Options: Enabled / Disabled
- ✓ **Smart Response Technology**
  Options: Enabled / Disabled
- ✓ **OROM UI Delay**
  Options: 2 / 4 / 6 / 8 Seconds

6.3.10 PCI Subsystem Settings



- ✓ **PCI Latency Timer**
  Options: 32, 64,...224, 248 PCI Bus Clocks
- ✓ **PCI-X Latency Timer**
  Options: 32, 64,...224, 248 PCI Bus Clocks
- ✓ **VGA Palette Snoop**
  Options: Disabled / Enabled
- ✓ **PERR# Generation**
  Options: Disabled / Enabled
- ✓ **SERR# Generation**
  Options: Disabled / Enabled
- ✓ **Above 4G Decoding**
  Options: Enabled / Disabled
- ✓ **Don't Reset VC-TC Mapping**
  Options: Enabled / Disabled
- ✓ **PCI Hot-Plug Settings**
  Sub menu: see "PCI Hot-Plug Settings" (page 66)

6.3.10.1 PCI Hot-Plug Settings



- ✓ **BIOS Hot-Plug Support**
  Options: Enabled / Disabled

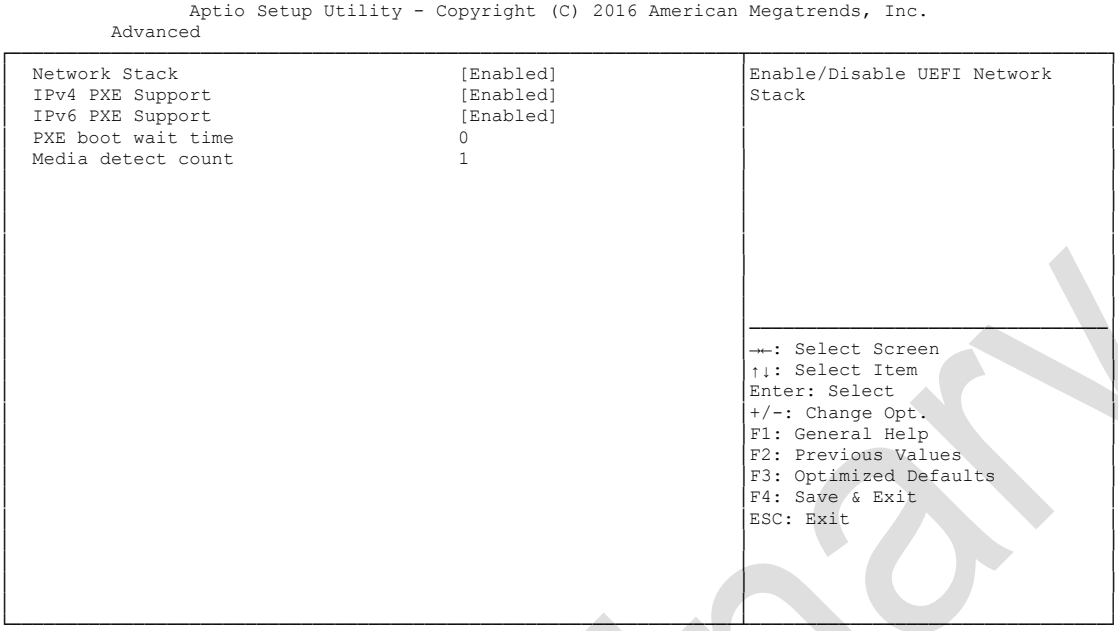
- ✓ **PCI Buses Padding**
  Options: Disabled / 1 / 2 / 3 / 3 / 5

- ✓ **Í/O Resources Padding**
  Options: Disabled / 4 K / 8 K / 16 K / 32 K

- ✓ **MMIO 32 bit Resources**
  Options: Disabled / 4 K / 8 K / 16 K / 32 K

- ✓ **PFMMIO 32 bit Resources**
  Options: Disabled / 1 M / 2 M / 4 M / 8 M / 16 M / 32 M / 64 M / 64 M

6.3.11 Network Stack



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

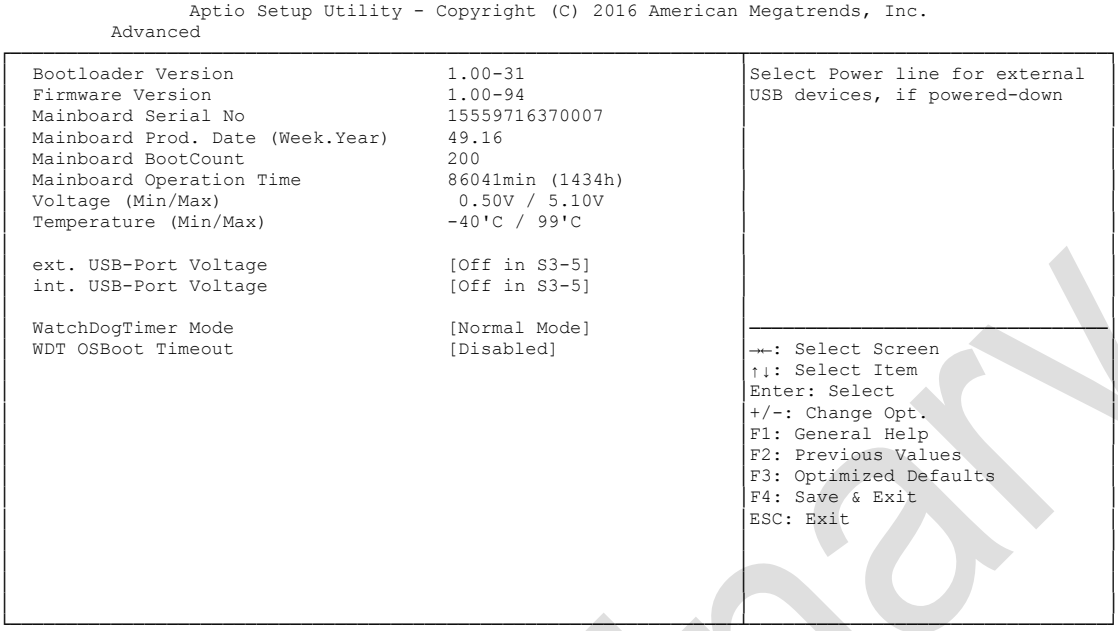
- ✓ **IPv4 PXE Support**
  Options: Disabled / Enabled

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

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

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

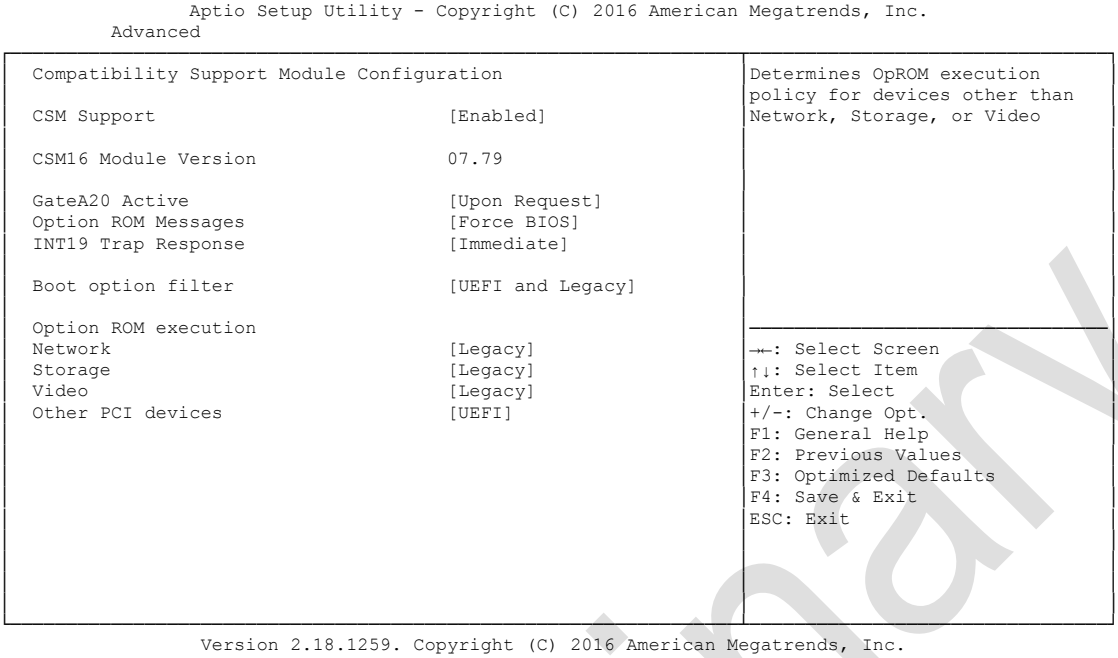
6.3.12 Power Controller Options



- ✓ **Bootloader Version**
  Options: none
- ✓ **Firmware Version**
  Options: none
- ✓ **Mainboard Serial No**
  Options: none
- ✓ **Mainboard Prod. Date (Week.Year)**
  Options: none
- ✓ **Boot Count**
  Options: none
- ✓ **Minute Meter**
  Options: none
- ✓ **Voltage (Min/Max)**
  Options: none
- ✓ **Temperature (Min/Max)**
  Options: none
- ✓ **ext. USB-Port Voltage**
  Options: Off in S3-5 / by SVCC
- ✓ **int. USB-Port Voltage**
  Options: Off in S3-5 / by SVCC
- ✓ **WatchDogTimer Mode**
  Options: Normal Mode / Compatibility Mode

✓ **WDT OSBoot Timeout**
Options: Disabled / 45 Seconds ... 255 Seconds

6.3.13 Compatibility Support Module 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

- ✓ **INT9 Trap Response**
  Options: Immediate / Postponed

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

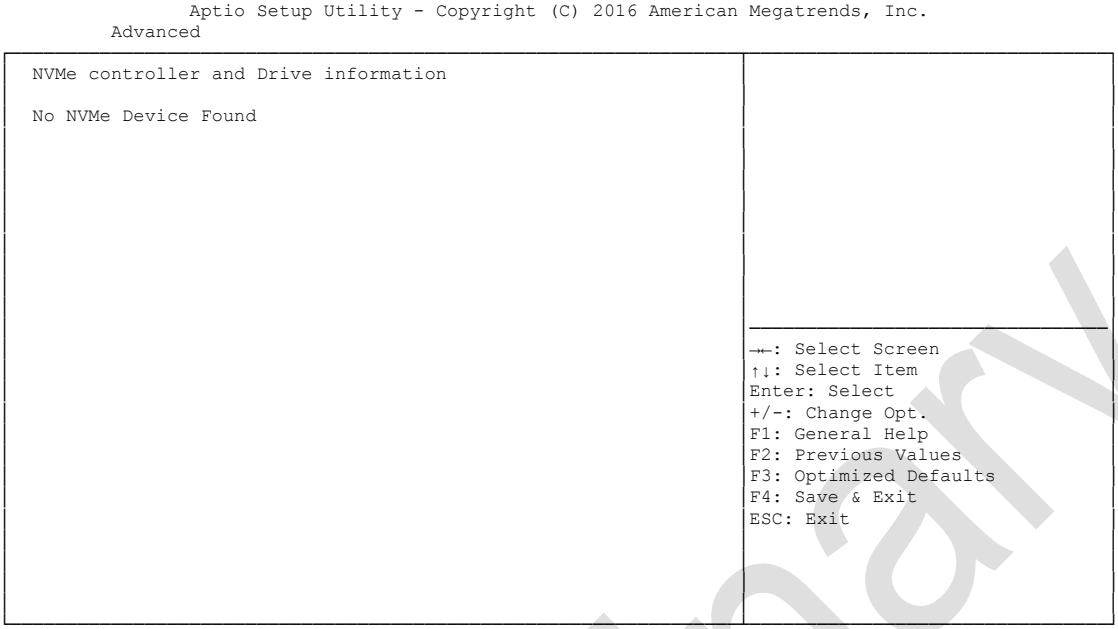
- ✓ **Network**
  Options: Do not launch / UEFI only / Legacy only

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

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

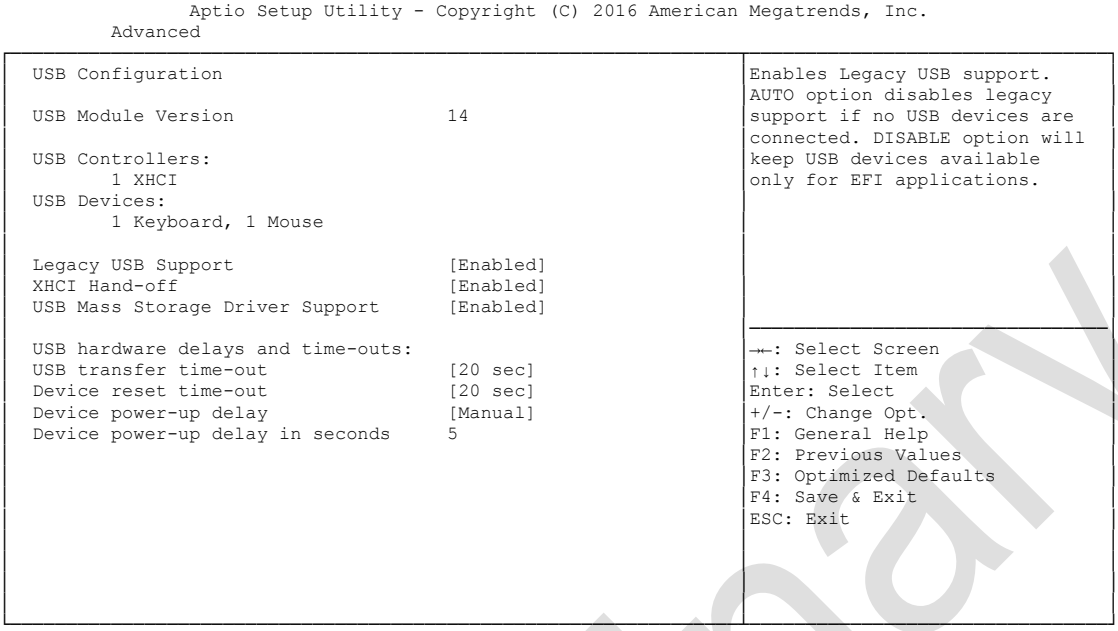
- ✓ **Other PCI devices**
  Options: Do not launch / UEFI / Legacy

6.3.14 NVMe Controller and Drive Information



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

6.3.15 USB Configuration



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

- ✓ **USB Devices**
  Options: none

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

- ✓ **USB3.0 Support**
  Options: Enabled / Disabled

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

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

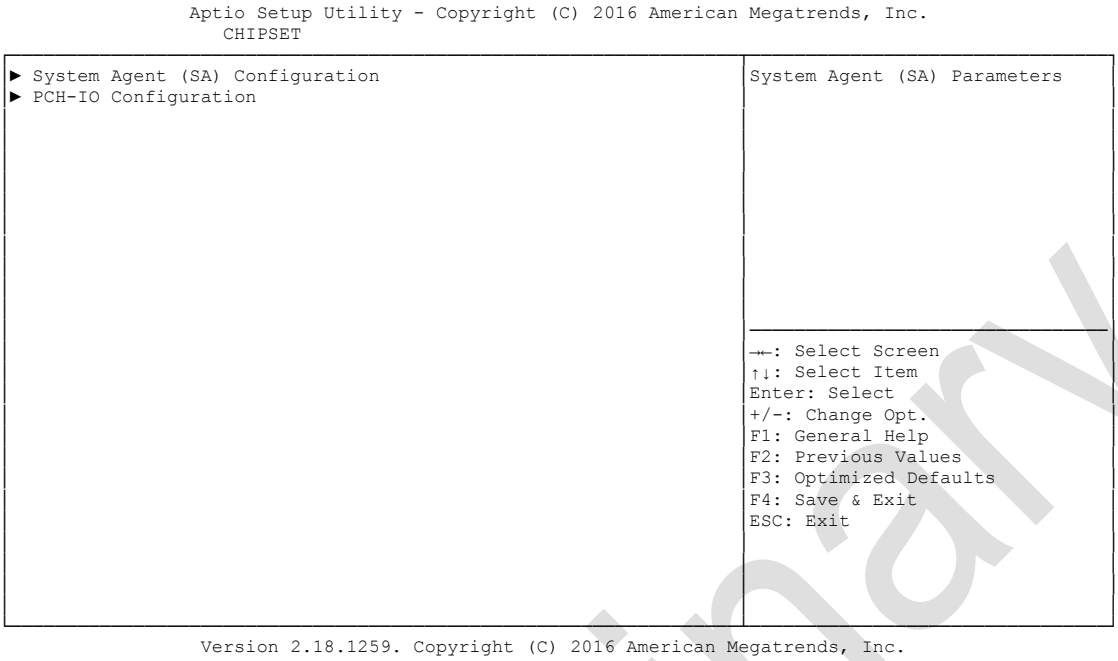
- ✓ **USB transfer time-out**
  Options: 5 sec / 10 sec / 20 sec

- ✓ **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

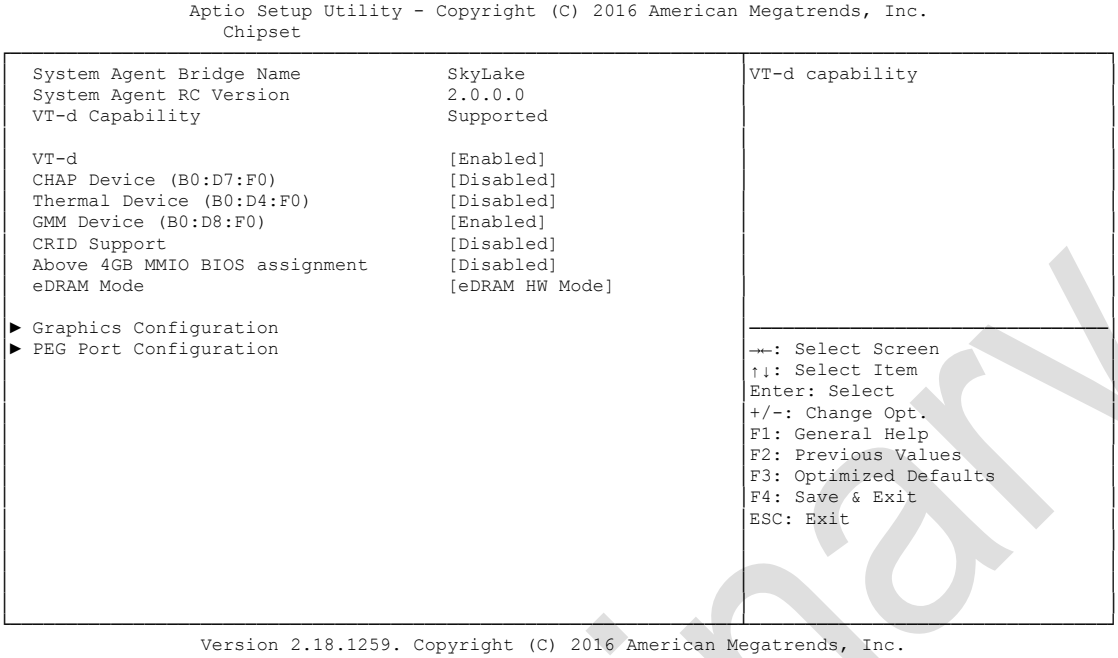
6.4 Chipset



- ✓ **System Agent (SA) Configuration**
  Sub menu: see "System Agent (SA) Configuration" (page 74)

- ✓ **PCH-IO Configuration**
  Sub menu: see "PCH-IO Configuration" (page 84)

6.4.1 System Agent (SA) Configuration



- ✓ **VT-d**
  Options: Disabled / Enabled

- ✓ **CHAP Device (B0:D7:F0)**
  Options: Disabled / Enabled

- ✓ **Thermal Device (B0:D4:F0)**
  Options: Disabled / Enabled

- ✓ **GMM Device (B0:D8:F0)**
  Options: Disabled / Enabled

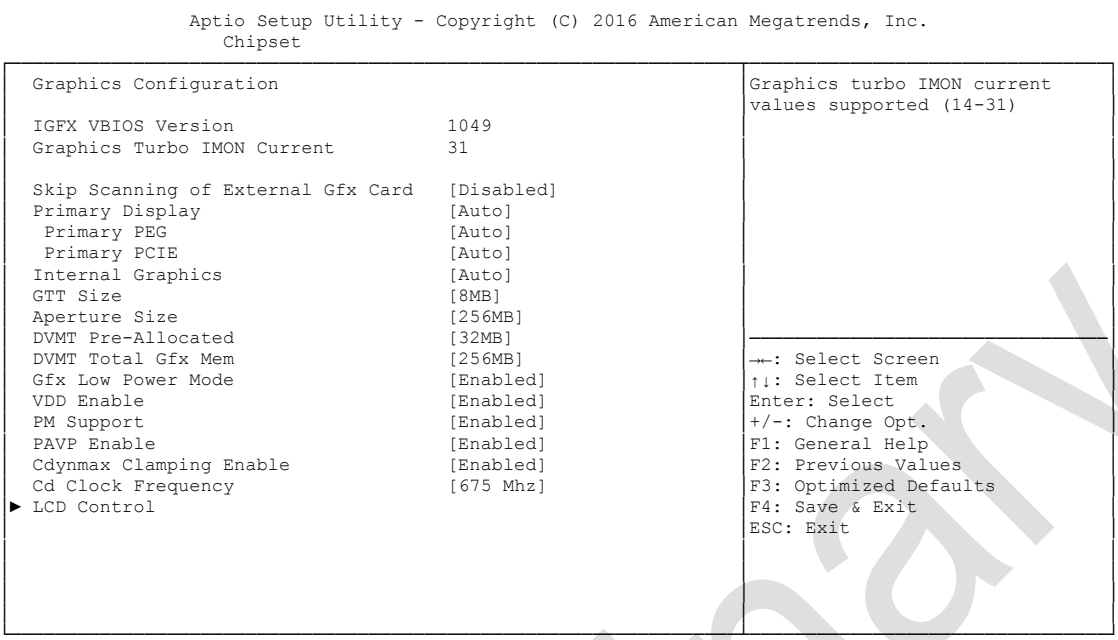
- ✓ **CRID Support**
  Options: Disabled / Enabled

- ✓ **Above 4GB MMIO BIOS assignment**
  Options: Disabled / Enabled

- ✓ **eDRAM Mode**
  Options: SW Mode eDRAM Off / SW Mode eDRAM On / eDRAM HW Mode

- ✓ **Graphics Configuration**
  Sub menu: see "Graphics Configuration" (page 75)

6.4.1.1 Graphics Configuration



- ✓ **IGFX VBIOS Version**
  Options: none

- ✓ **Graphics Turbo IMON Current**
  Options: 14...31

- ✓ **Skip scanning of external Gfx Card**
  Options: Disabled / Enabled

- ✓ **Primary Display**
  Options: Auto / IGFX / PEG / PCI

- ✓ **Primary PEG**
  Options: Auto / PEG11 / PEG 12

- ✓ **Primary PCIE**
  Options: Auto / PCIE1 / PCIE2 / ... / PCIE7

- ✓ **Internal Graphics**
  Options: Auto / Disabled / Enabled

- ✓ **GTT Size**
  Options: 1MB / 2MB

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

- ✓ **DVMT Pre-Allocated**
  Options: 32M / 64M ... 480M / 512M / 1024M

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

- ✓ **Gfx Low Power Mode**
  Options: Disabled / Enabled

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

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

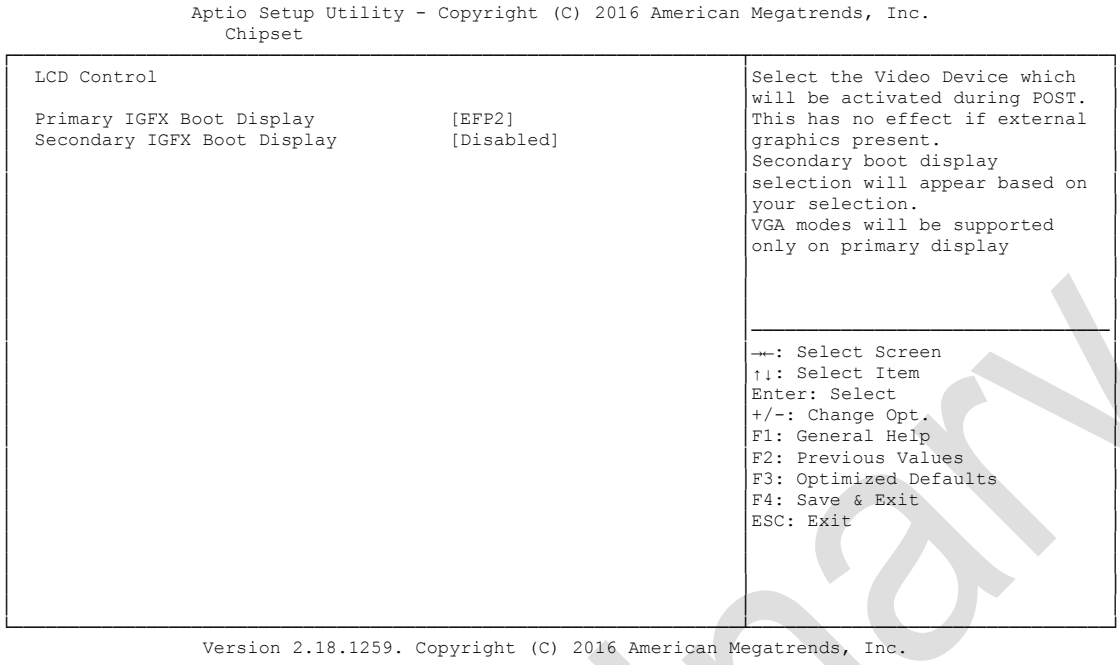
- ✓ **PAVP Enable**
  Options: Disabled / Enabled

- ✓ **Cdynmax Clamping Enable**
  Options: Disabled / Enabled

- ✓ **Cd Clock Frequency**
  Options: 337.5 Mhz / 450 Mhz / 540 Mhz / 675 Mhz

- ✓ **LCD Control**
  Sub menu: see "LCD Control" (page 77)

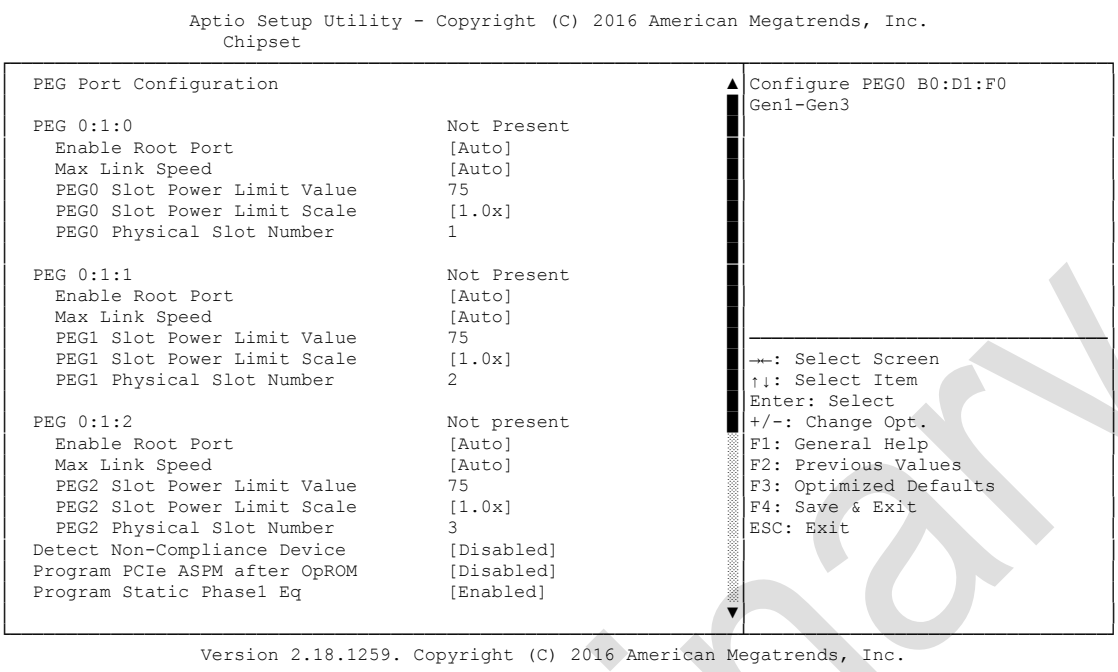
6.4.1.1.1 LCD Control



- ✓ **Primary IGFX Boot Display**
  Options: VBIOS Default / CRT / EFP / LFP / EFP3 / EFP2 / LFP2

- ✓ **Secondary IGFX Boot Display**
  Options: Disabled / EFP / EFP3 / EFP2

6.4.1.2 PEG Port Configuration



- ✓ **Enable Root Port**
  Options: Disabled / Enabled / Auto

- ✓ **Max Link Speed**
  Options: Auto / Gen1 / Gen2 / Gen3

- ✓ **PEGx Slot Power Limit Value**
  Options: 0..255

- ✓ **PEGx Slot Power Limit Scale**
  Options: 1.0x / 0.1x / 0.01x / 0.001x

- ✓ **PEGx Physical Slot Number**
  Options: 0..8191

- ✓ **Detect Non-Compliance Device**
  Options: Disabled / Enabled

- ✓ **Program PCIe ASPM after OpROM**
  Options: Enabled / Disabled

- ✓ **Program Static Phase1 Eq**
  Options: Disabled / Enabled

- ✓ **Gen3 Root Port Preset Value for each Lane**
  Sub menu: see "PEG Gen3 Root Port Preset Value for each Lane" (page 80)

- ✓ **PEG Gen3 Endpoint Preset Value for each Lane**
  Sub menu: see "PEG Gen3 Endpoint Preset Value each Lane" (page 81)

- ✓ **PEG Gen3 Endpoint Hint Value for each Lane**
  Sub menu: see "PEG Gen3 Endpoint Hint Value each Lane" (page 82)

- ✓ **Gen3 RxCTLE Control**
  Sub menu: see "Gen3 RxCTLE Control" (page 83)

- ✓ **Always Attempt SW EQ**
  Options: Enabled / Disabled

- ✓ **Number of Presets to test**
  Options: 7, 3, 5 / 0-9 / Auto

- ✓ **Allow PERST# GPIO Usage**
  Options: Disabled / Enabled

- ✓ **SW EQ Enable VOC**
  Options: Jitter Only Test Mode / Jitter & VOC Test Mode / Auto

- ✓ **Jitter Dwell Time**
  Options: 0..65535

- ✓ **Jitter Error Target**
  Options: 1..65535

- ✓ **VOC Dwell Time**
  Options: 0..65535

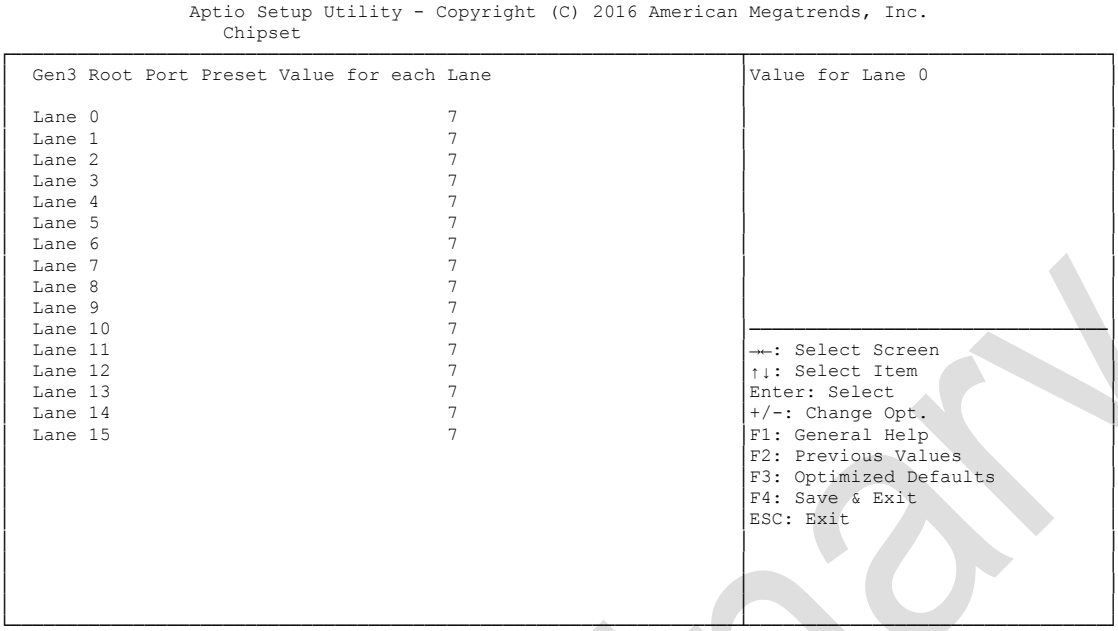
- ✓ **VOC Error Target**
  Options: 1..65535

- ✓ **Generate BDAT Margin DATA**
  Options: Disabled / Generate Port Jitter Data

- ✓ **PCIe Rx CEM Test Mode**
  Options: Disabled / Enabled

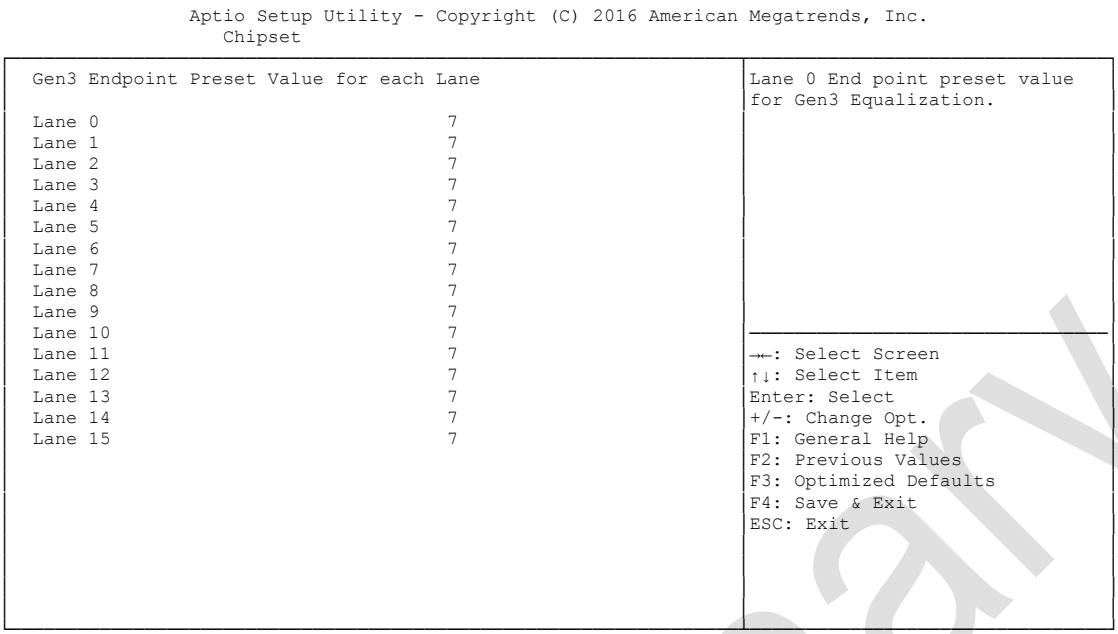
- ✓ **PCIe Spread Spectrum Clocking**
  Options: Disabled / Enabled

6.4.1.2.1 PEG Gen3 Root Port Preset Value for each Lane



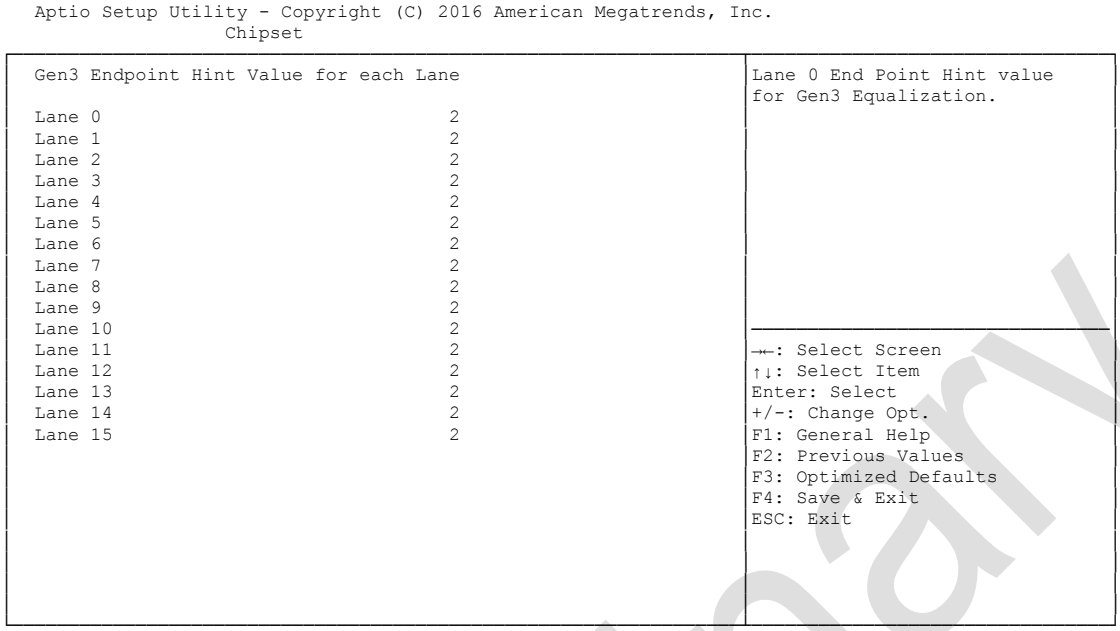
✓ **Gen3 Root Port Preset Value for each Lane**
Options: 1..11

6.4.1.2.2 PEG Gen3 Endpoint Preset Value each Lane



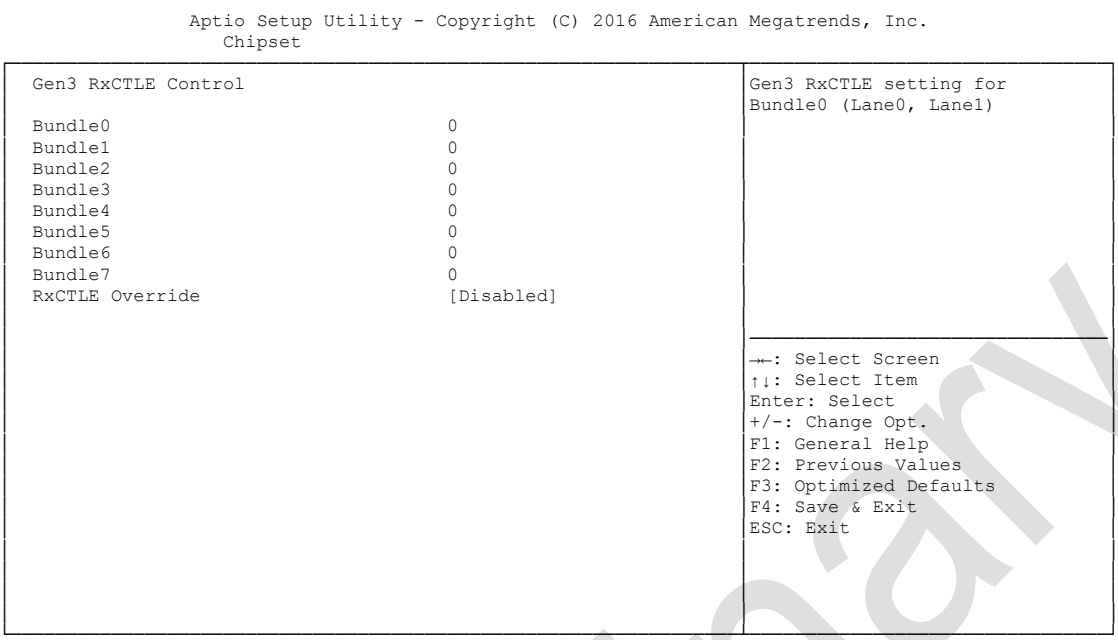
✓ **Gen3 Endpoint Preset Value each Lane**
Options: 0..11

6.4.1.2.3 PEG Gen3 Endpoint Hint Value each Lane



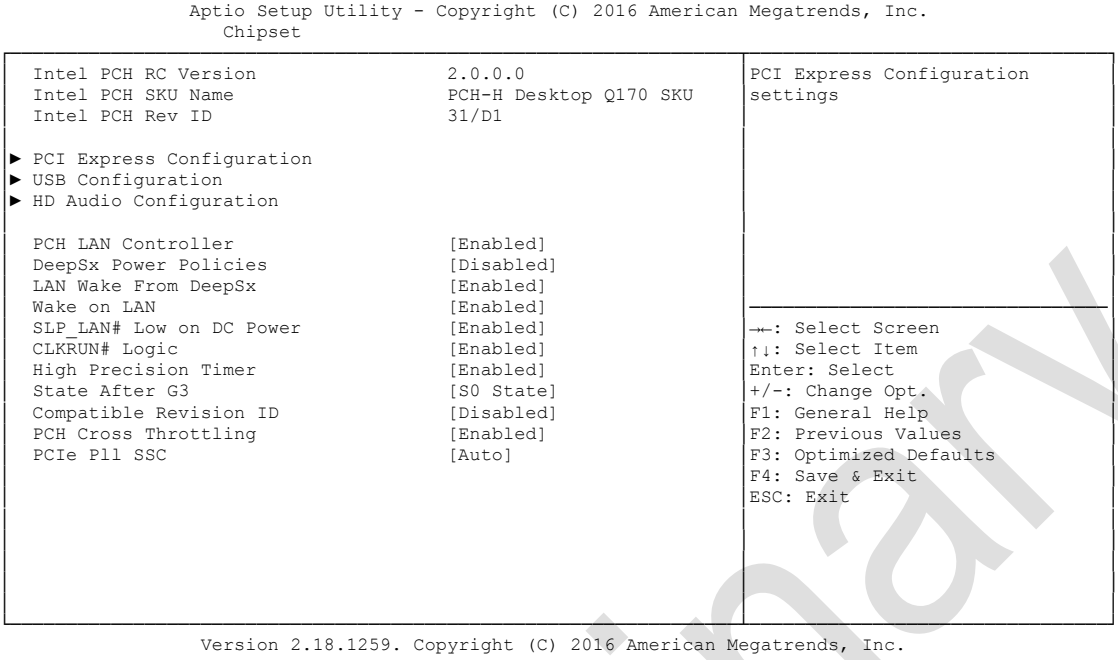
✓ **PEG Gen3 Endpoint Hint Value each Lane**
Options: 0..11

6.4.1.2.4 Gen3 RxCTLE Control



- ✓ **PCIe Gen3 RxCTLEp Setting x**
  Options: 0..15

6.4.2 PCH-IO Configuration



- ✓ **Intel PCH RC Version**
  Options: none

- ✓ **Intel PCH SKU Name**
  Options: none

- ✓ **Intel PCH Rev ID**
  Options: none

- ✓ **PCI Express Configuration**
  Sub menu: see "PCI Express Configuration" (page 86)

- ✓ **USB Configuration**
  Sub menu: see "USB Configuration" (page 91)

- ✓ **HD Audio Configuration**
  Sub menu: see "HD Audio Configuration" (page 92)

- ✓ **PCH LAN Controller**
  Options: Disabled / Enabled

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

- ✓ **SLP_LAN# Low on DC Power**
  Options: Disabled / Enabled

- ✓ **Second LAN Controller**
  Options: Disabled / Enabled

- ✓ **DeepSx Policies**
  Options: Disabled / Enabled in S4-S5

- ✓ **LAN Wake From DeepSx**
  Options: Disabled / Enabled

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

- ✓ **SLP_LAN# Low on DC Power**
  Options: Disabled / Enabled

- ✓ **CLKRUN# Logic**
  Options: Disabled

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

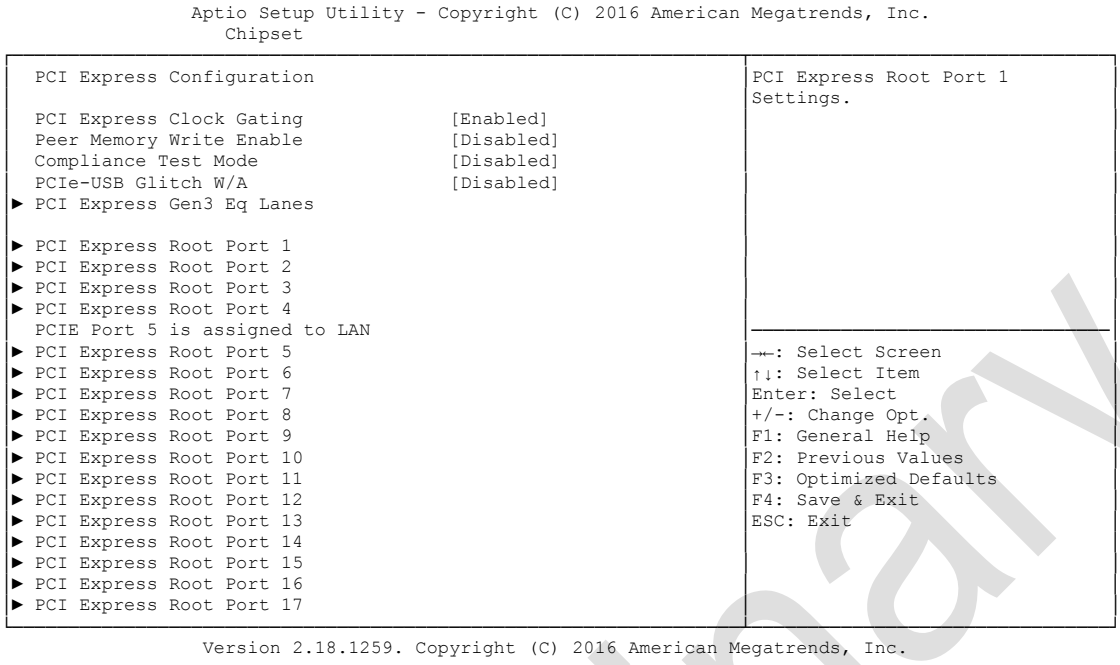
- ✓ **State After G3**
  Options: S0 State / S5 State

- ✓ **Compatible Revision ID**
  Options: Disabled / Enabled

- ✓ **PCH Cross Throttling**
  Options: Disabled / Enabled

- ✓ **PCIe Pll SSC**
  Options: Auto / 0.0% / 0.1% / 0.2% / ... / 2.0%

6.4.2.1 PCI Express Configuration



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

- ✓ **Peer Memory Write Enable**
  Options: Disabled / Enabled

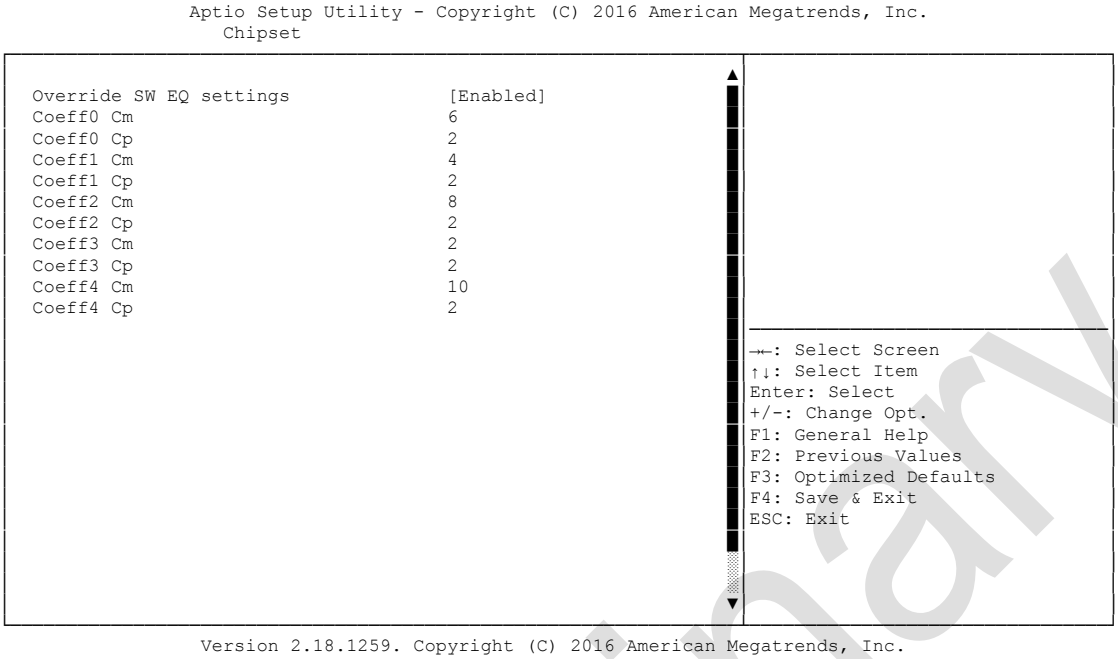
- ✓ **Compliance Test Mode**
  Options: Disabled / Enabled

- ✓ **PCIe-USB Glitch W/A**
  Options: Disabled / Enabled

- ✓ **PCI Express Gen3 Eq Lanes**
  Sub menu: see "PCI Express Gen3 Eq Lanes" (page 87)

- ✓ **PCI Express Root Port X**
  Sub menu: see "PCI Express Root Port" (page 88)

6.4.2.1.1 PCI Express Gen3 Eq Lanes

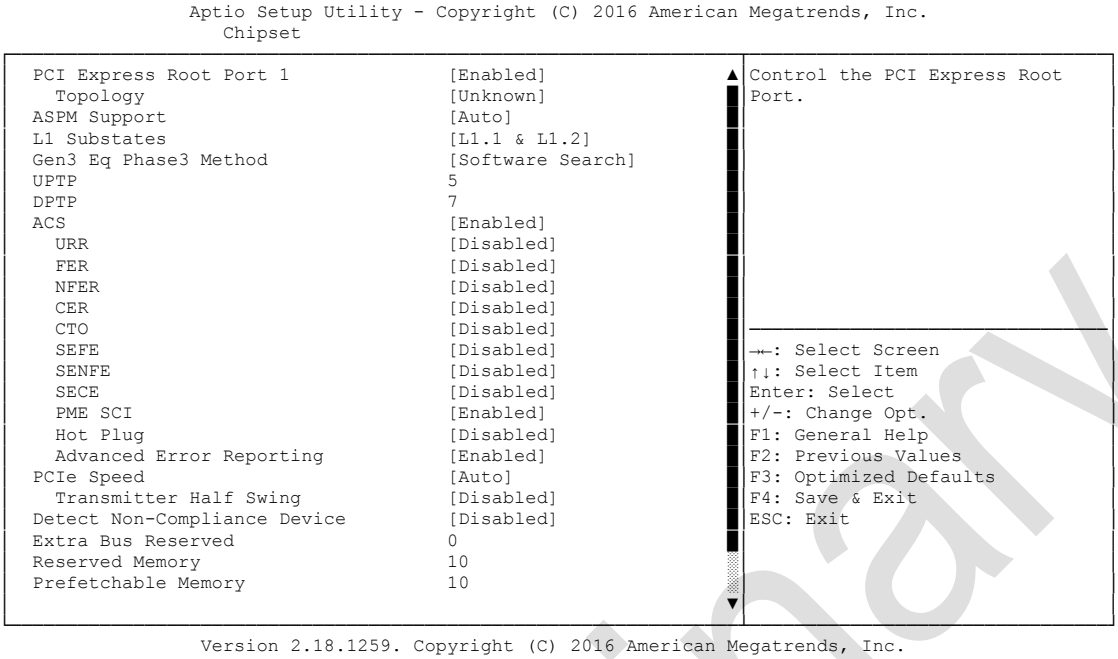


- ✓ **Override SW EQ settings**
  Options: Disabled / Enabled

- ✓ **Coeffx Cm**
  Options: 0..63

- ✓ **Coeffx Cp**
  Options: 0..63

6.4.2.1.2 PCI Express Root Port



- ✓ **PCI Express Root Port x**
  Options: Disabled / Enabled

- ✓ **Topology**
  Options: Unknown / x1 / x4 / Sata Express / M2

- ✓ **ASPM Support**
  Options: Disabled / L0s / L1 / L0sL1 / Auto

- ✓ **L1 Substates**
  Options: Disabled / L1.1 / L1.2 / L1.1 & L1.2

- ✓ **Gen3 Eq Phase3 Method**
  Options: Hardware / Static Coeff. / Software Search

- ✓ **UPTP**
  Options: 0..10

- ✓ **DPTP**
  Options: 0..10

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

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

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

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

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

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

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

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

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

- ✓ **PME SCI**
  Options: Enabled / Disabled

- ✓ **Hot Plug**
  Options: Enabled / Disabled

- ✓ **Advanced Error Reporting**
  Options: Enabled / Disabled

- ✓ **PCIe Speed**
  Options: Auto / Gen1 / Gen2

- ✓ **Transmitter Half Swing**
  Options: Disabled / Enabled

- ✓ **Detect Non-Compliance Device**
  Options: Disabled / Enabled

- ✓ **Extra Bus Reserved**
  Options: 0...7

- ✓ **Reserved Memory**
  Options: 1...20

- ✓ **Prefetchable Memory**
  Options: 1...20

- ✓ **Reserved I/O**
  Options: 4 / 8 / 12 / 16 / 20

- ✓ **PCIe Cp**
  Options: 0..63

- ✓ **PCIe Cm**
  Options: 0..63

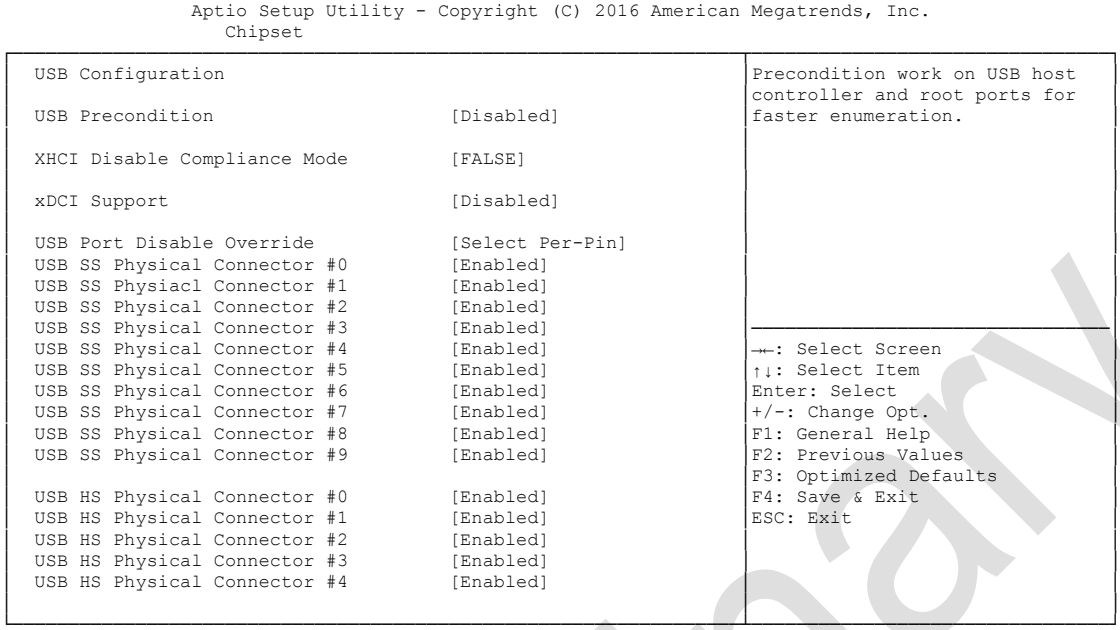
- ✓ **PCIe LTR**
  Options: Disabled / Enabled

- ✓ **PCIe LTR Lock**
  Options: Disabled / Enabled

- ✓ **PCIE1 CLKREQ Mapping Override**
  Options: Defualt / No CLKREQ / Custom Number

✓ **Snoop Latency Override**
Options: Disabled / Manual / Auto

6.4.2.2 USB Configuration



- ✓ **USB Precondition**
  Options: Disabled / Enabled

- ✓ **XHCI Disable Compliance Mode**
  Options: FALSE / TRUE

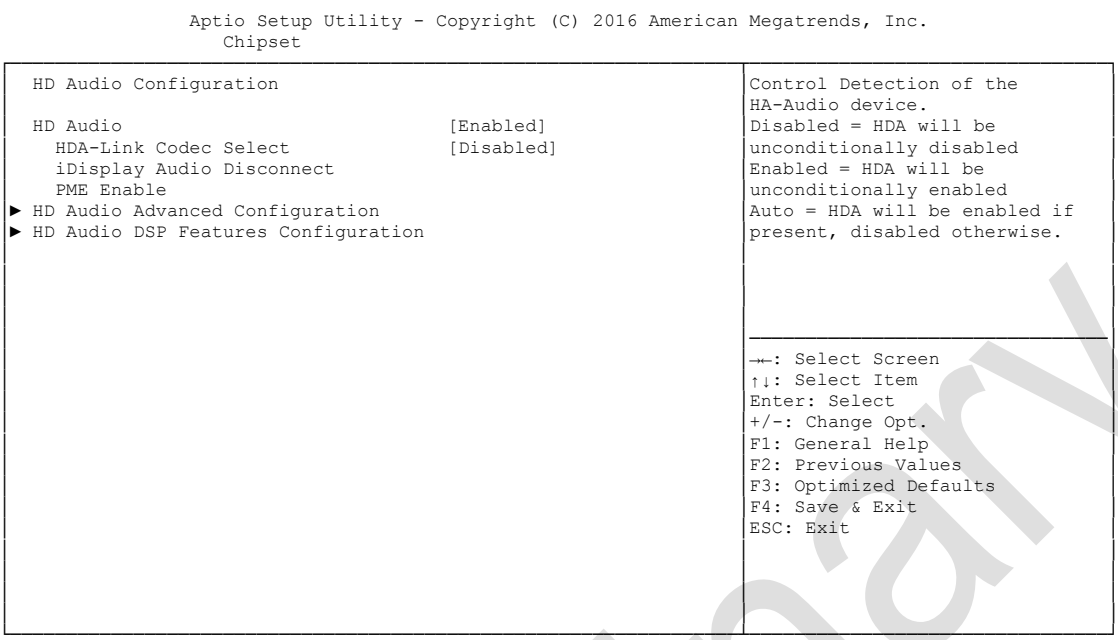
- ✓ **xDCI Support**
  Options: Disabled / Enabled

- ✓ **USB Port Disable Override**
  Options: Disabled / Select Per-Pin

- ✓ **USB SS Physical Connector #x**
  Options: Disabled / Disabled

- ✓ **USB HS Physical Connector #x**
  Options: Disabled / Disabled

6.4.2.3 HD Audio Configuration



- ✓ **HD Audio**
  Options: Disabled / Enabled / Auto

- ✓ **HDA-Link Codec Select**
  Options: Platform Onboard / External Kit

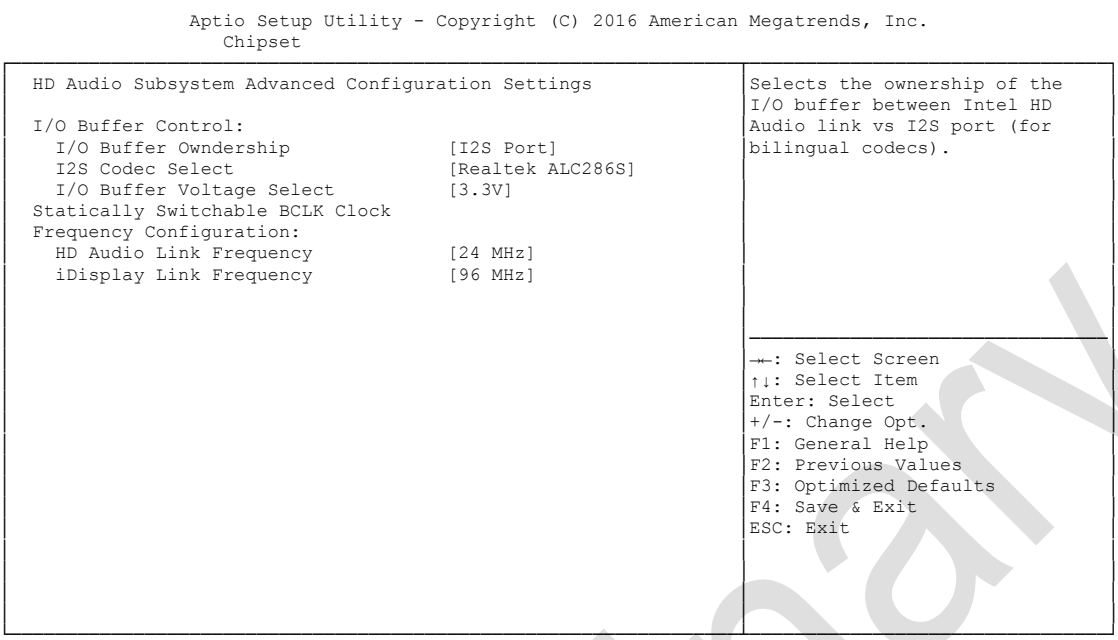
- ✓ **iDisplay Audio Disconnect**
  Options: Disabled / Enabled

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

- ✓ **HD Audio Advanced Configuration**
  Sub menu: see "HD Audio Subsystem Advanced Configuration Settings" (page 93)

- ✓ **HD Audio DSP Features Configuration**
  Sub menu: see "HD Audio Subsystem Features Configuration (ACPI)" (page 94)

6.4.2.3.1 HD Audio Subsystem Advanced Configuration Settings



- ✓ **I/O Buffer Ownership**
  Options: HD-Audio Link / HD-Audio Link/I2S Port / I2S Port

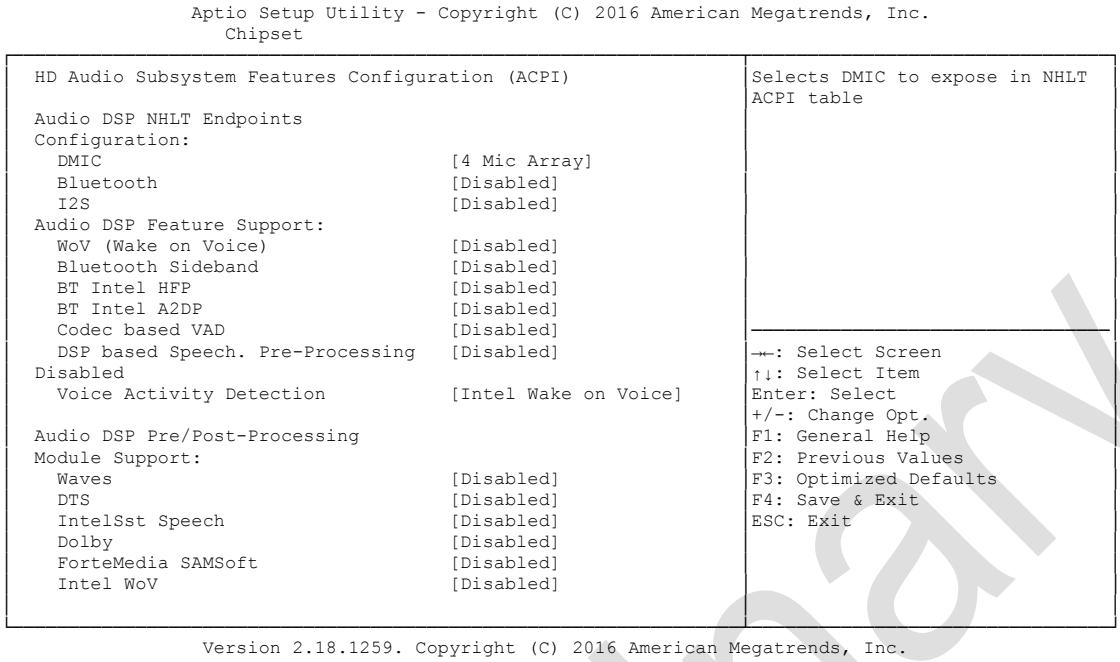
- ✓ **I2S Codec Select**
  Options: Disabled / Wolfson WM5102/WM8281 / Realtek ALC298 / Realtek ALC286S / Analog Devices SSM4567

- ✓ **I/O Buffer Voltage Select**
  Options: 3.3V / 1.8V

- ✓ **HD Audio Link Frequency**
  Options: 6 MHz / 12 MHz / 24 MHz

- ✓ **iDisplay Link Frequency**
  Options: 48 MHz / 96 MHz

6.4.2.3.2 HD Audio Subsystem Features Configuration (ACPI)



- ✓ **DMIC**
  Options: Disabled / 1 Mic Array / 2 Mic Array / 4 Mic Array

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

- ✓ **I2S**
  Options: Disabled / Enabled

- ✓ **WoV (Wake on Voice)**
  Options: Disabled / Enabled

- ✓ **Bluetooth Sideband**
  Options: Disabled / Enabled

- ✓ **BT Intel HFP**
  Options: Disabled / Enabled

- ✓ **BT Intel A2DP**
  Options: Disabled / Enabled

- ✓ **Codec based VAD**
  Options: Disabled / Enabled

- ✓ **DSP based Speech. Pre-Processing Disabled**
  Options: Disabled / Enabled

- ✓ **Voice Activity Detection**
  Options: Intel Wake on Voice / Windows 10 Voice Activation

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

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

- ✓ **IntelSst Speech**
  Options: Disabled / Enabled

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

- ✓ **ForteMedia SAMSoft**
  Options: Disabled / Enabled

- ✓ **Intel WoV**
  Options: Disabled / Enabled

- ✓ **Sound Research IP**
  Options: Disabled / Enabled

- ✓ **Conexant Pre-Process**
  Options: Disabled / Enabled

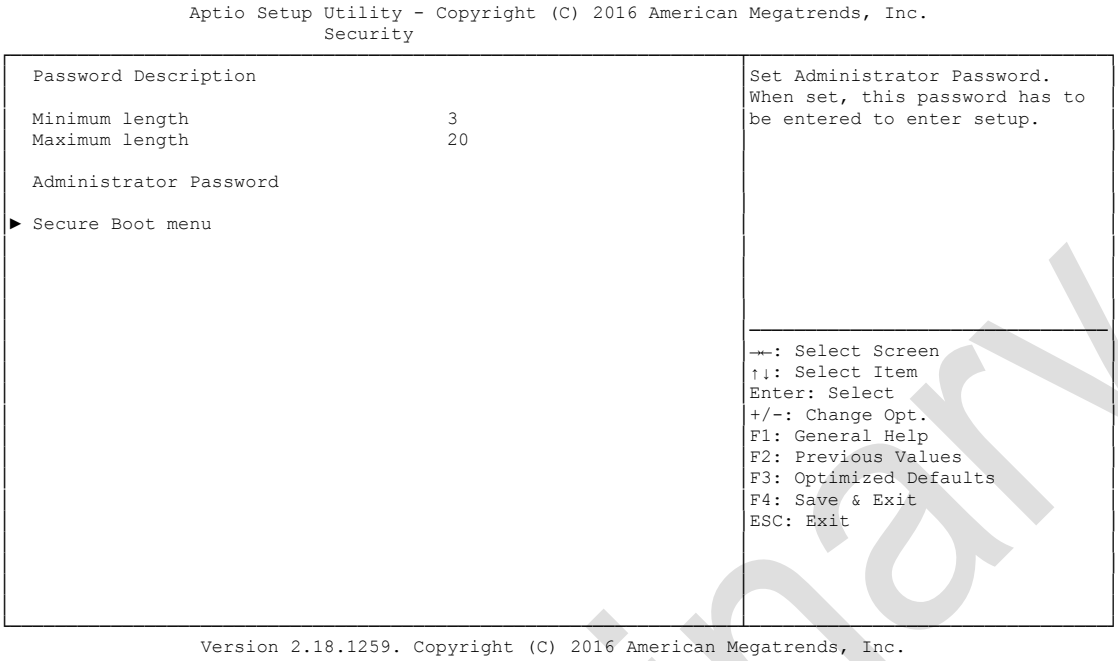
- ✓ **Conexant Smart Amp**
  Options: Disabled / Enabled

- ✓ **Custom Module 'Alpha'**
  Options: Disabled / Enabled

- ✓ **Custom Module 'Beta'**
  Options: Disabled / Enabled

- ✓ **Custom Module 'Gamma'**
  Options: Disabled / Enabled

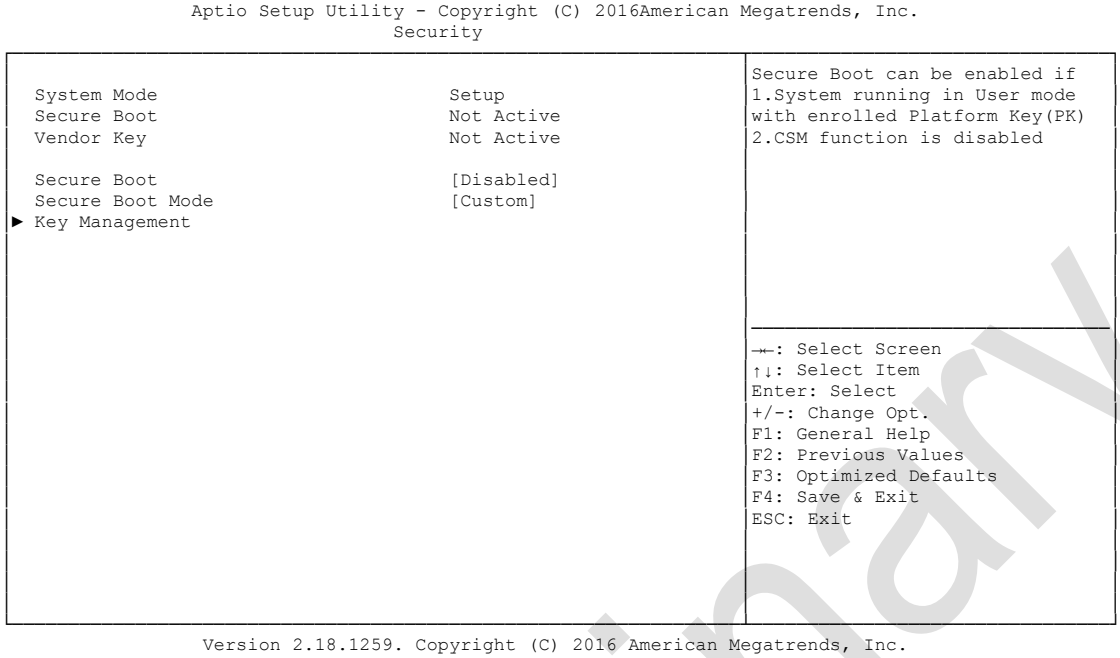
6.5 Security



- ✓ **Administrator Password**
  Options: Press [Enter]

- ✓ **Secure Boot menu**
  Sub menu: see "Secure Boot Menu" (page 97)

6.5.1 Secure Boot Menu

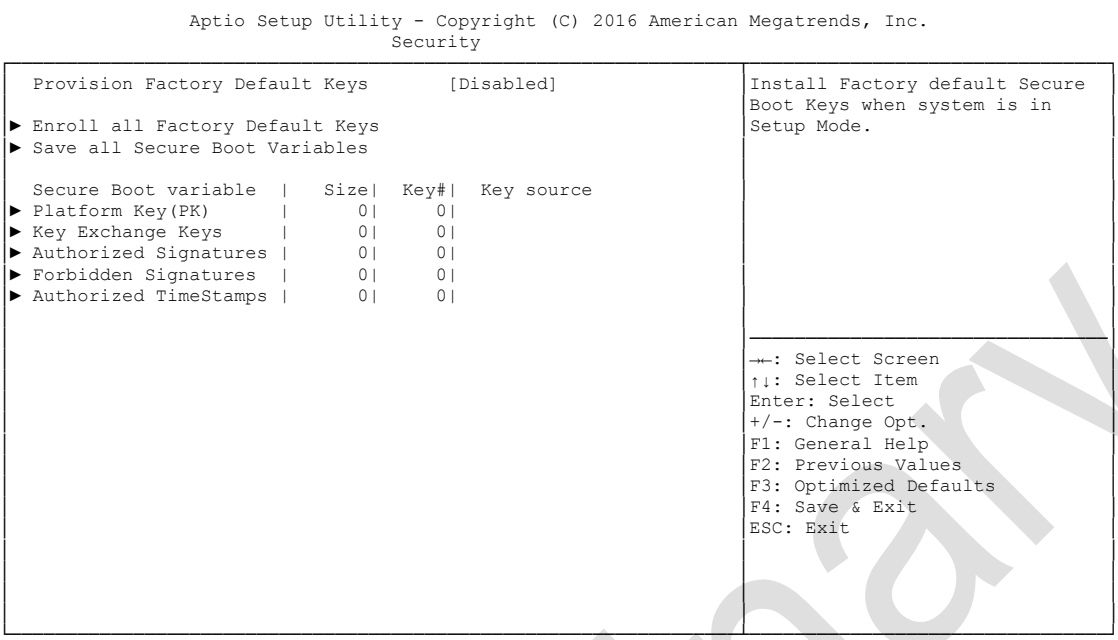


- ✓ **Secure Boot Support**
  Options: Disabled / Enabled

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

- ✓ **Key Management**
  Sub menu: see "Key Management" (page 98)

6.5.1.1 Key Management



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

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

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

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

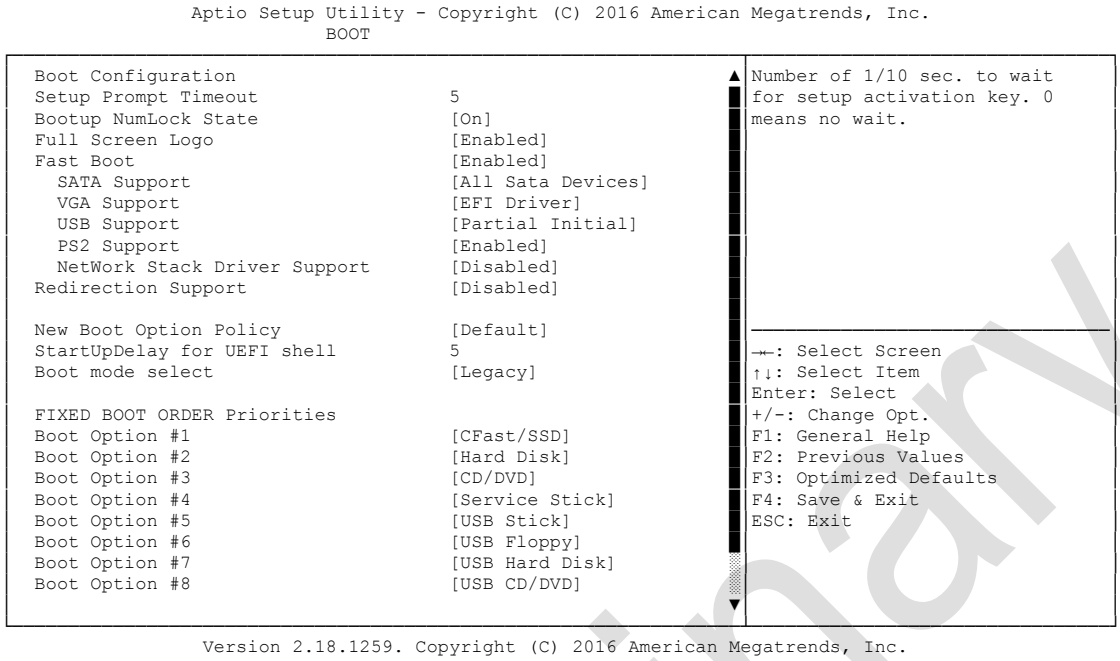
- ✓ **Key Exchange Keys**
  Options: Set New Key / Append Key

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

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

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

6.6 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

- ✓ **SATA Support**
  Options: Last Boot HDD Only / All Sata Devices / HDD Only

- ✓ **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

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

- ✓ **New Boot Option Policy**
  Options: Default / Place First / Place Last

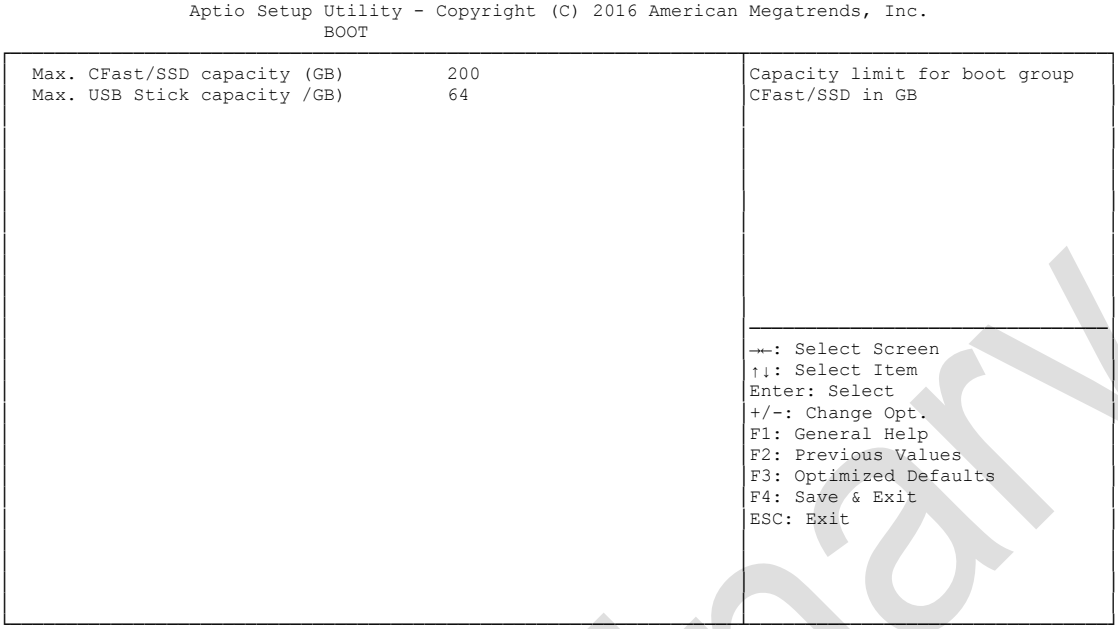
- ✓ **StartUpDelay for UEFI shell**
  Options: 0..255

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

- ✓ **Fixed Boot Order Priorities**
  Options: Review or change the sequence of available boot devices

- ✓ **Advanced Fixed Boot Order Parameters**
  Sub menu: see "Fixed Boot Order Priority" (page 101)

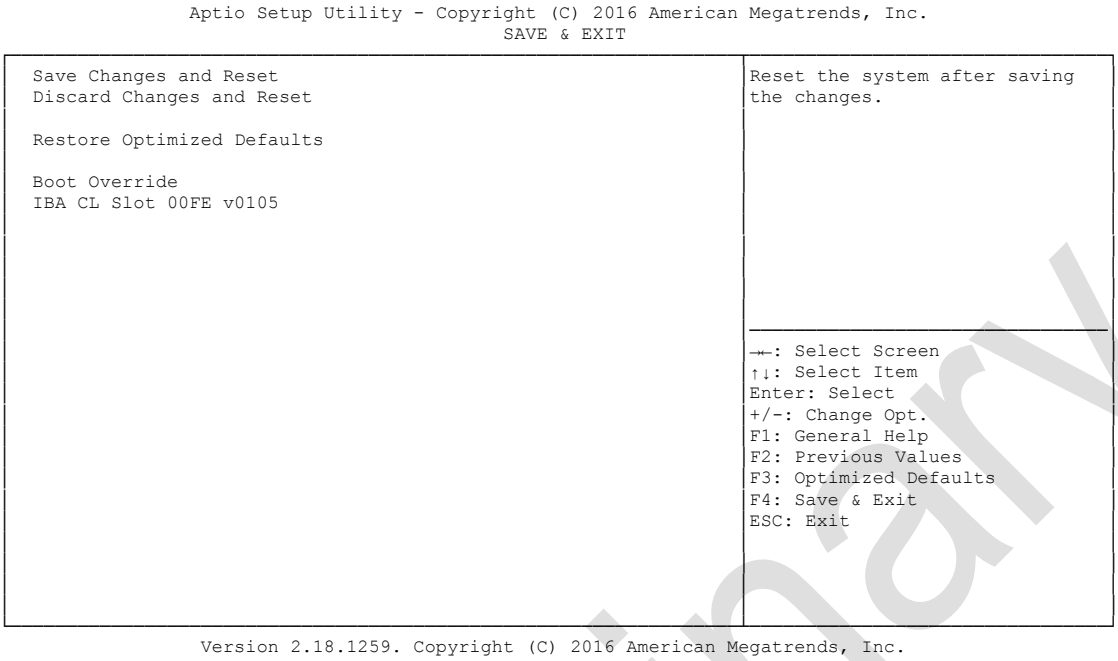
6.6.1 Fixed Boot Order Priority



- ✓ **Max. CFast/SSD capacity (GB)**
  Options: 1..16384

- ✓ **Max. USB Stick capacity (GB)**
  Options: 1..16384

6.7 Save & Exit



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

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

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

- ✓ **Save as User Defaults**
  Options: Press [Enter]

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

- ✓ **Boot Override**
  Options: Press [Enter]

- ✓ **IBA GE Slot 00C8 v1381**
  Options: none

6.8 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.

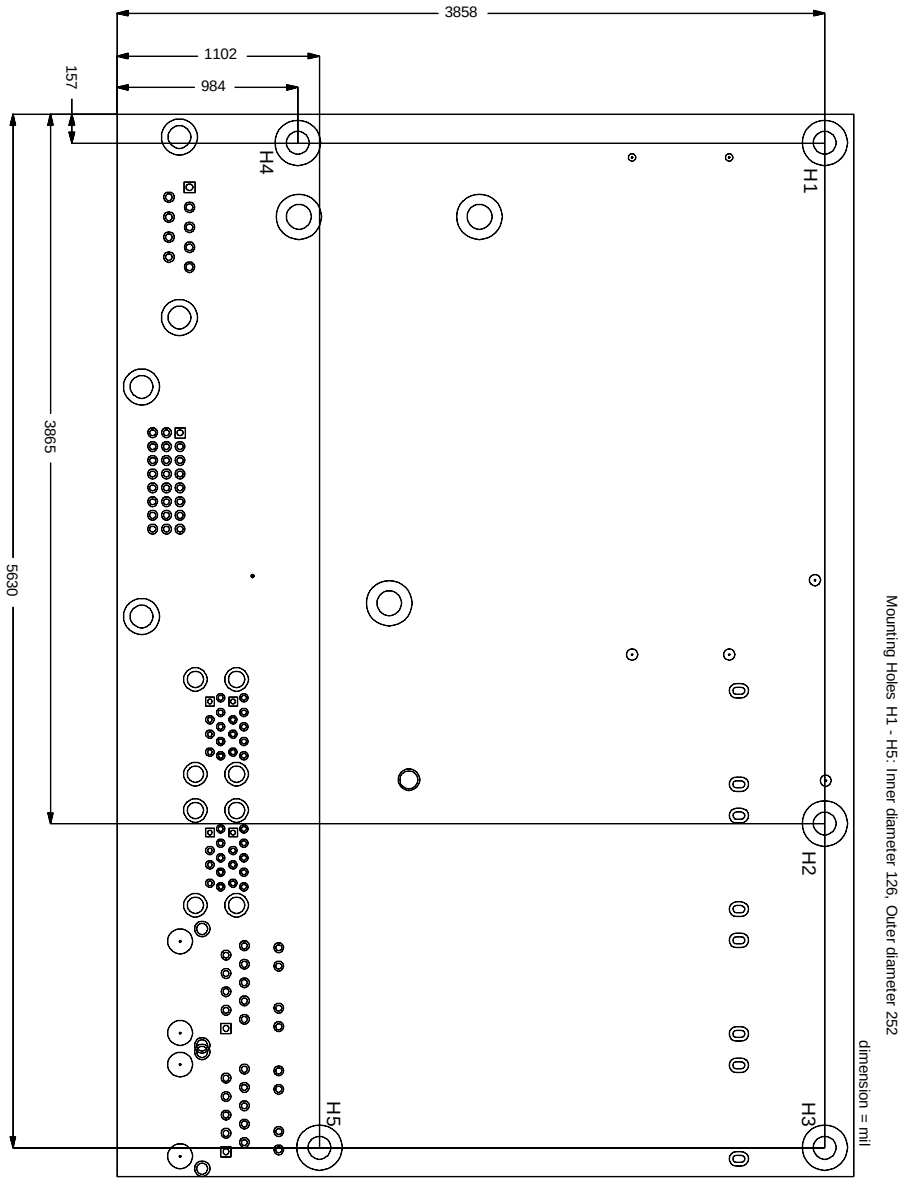
Before you proceed to update the BIOS you need to make absolutely sure that you have the right BIOS file which was issued for the exact board and exact board revision that you wish to update. If you try to update the BIOS using the wrong file the board will not start up again.

7 Mechanical Drawings

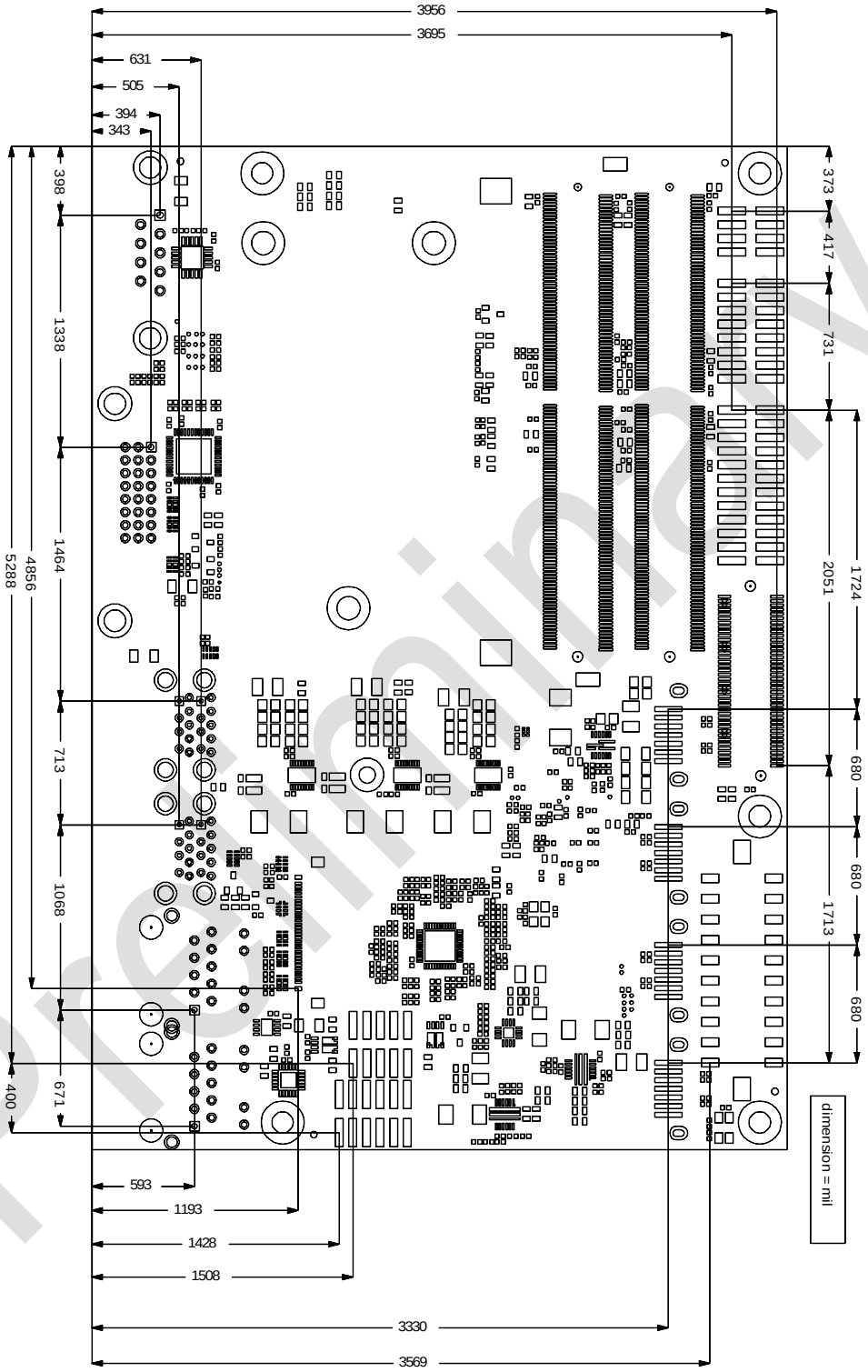
NOTICE

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

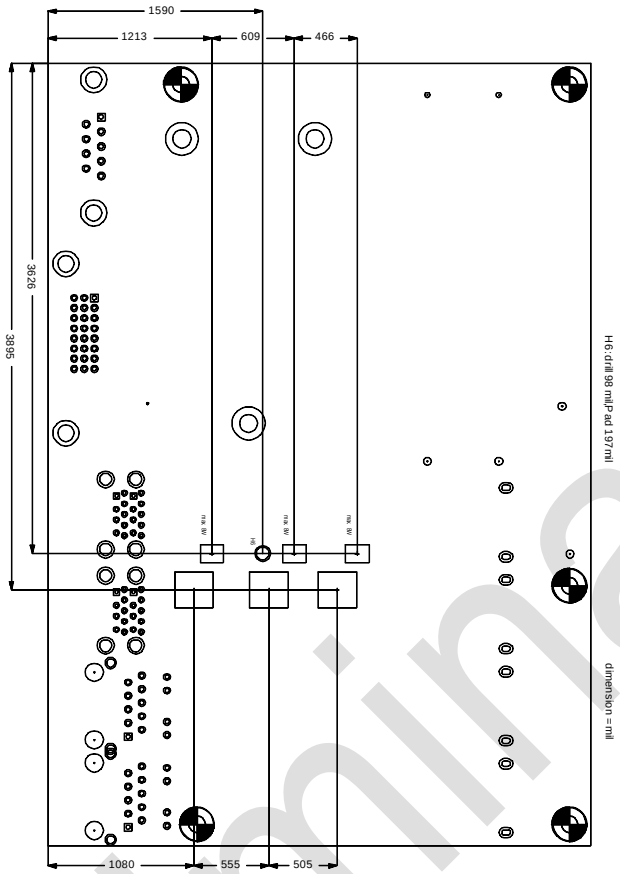
7.1 PCB: Mounting Holes



7.2 PCB: Pin 1 Dimensions

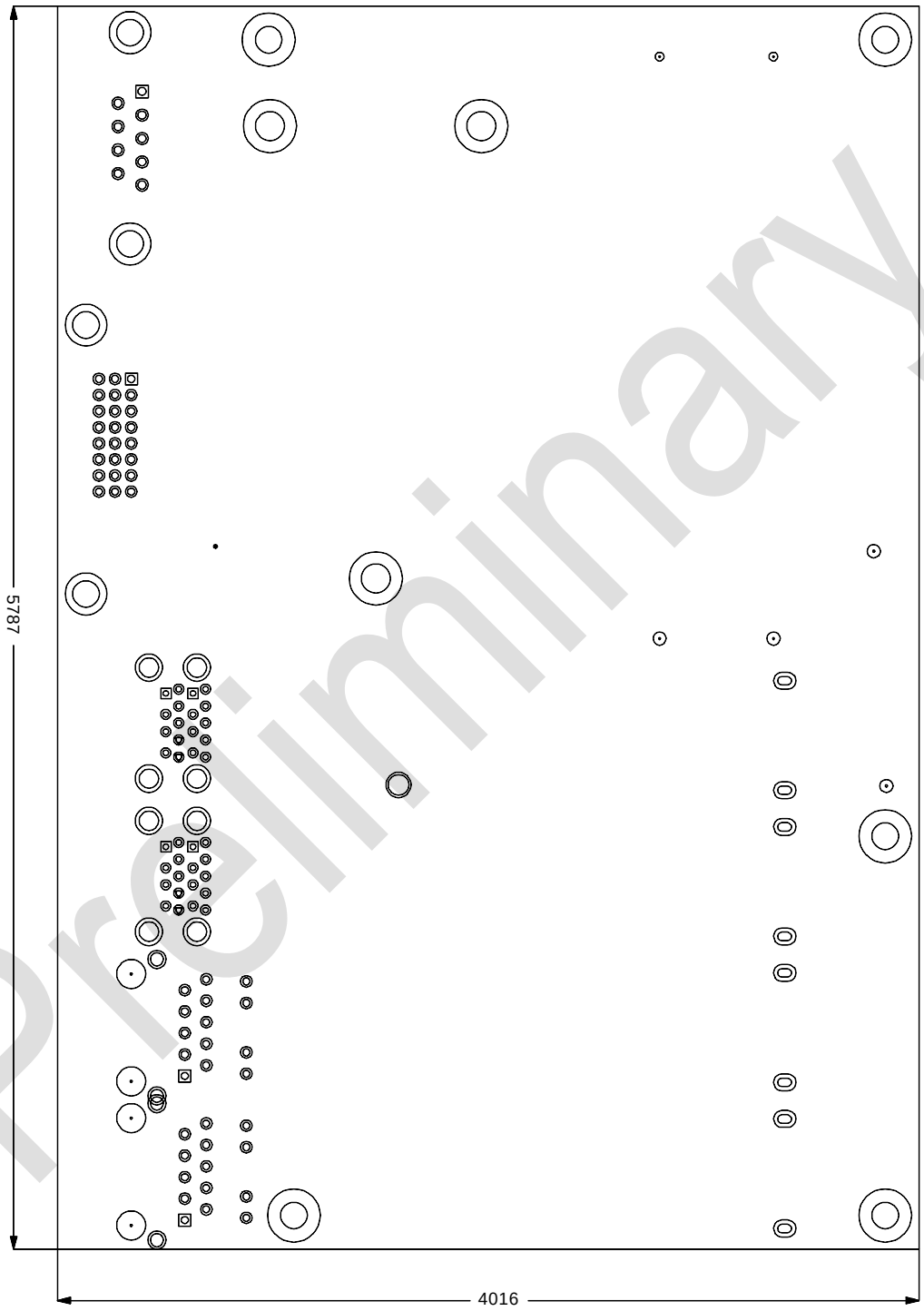


7.3 PCB: DIE Center



Solid Line = Cooling Area
Dotted Line = Chip outline
Center Point Cooling Area
Electrical isolated cooling required
Chip-DIE cooling
Mounting Hole

7.4 PCB: Outlines



8 Technical Data

8.1 Electrical Data

Power Supply:

Board:	5 Volt +/- 5% (5 Volt Suspend / 12 Volt Fan)
RTC:	>= 3 Volt

Electric Power Consumption:

RTC:	<= 10µA

8.2 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.**

8.3 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	PS/2 Keyboard
IRQ2 (8)	
IRQ3	
IRQ4	
IRQ5	
IRQ6	
IRQ7	
IRQ8	RTC
IRQ9	
IRQ10	
IRQ11	
IRQ12	Microsoft PS/2
IRQ13	FPU
IRQ14	Intel® Serial GPIO Host Controller - INT345D
IRQ15	

PCI-Devices

Die hier aufgeführten PCI-Devices sind alle auf dem Board vorhandenen inklusive der, die durch das BIOS erkannt und konfiguriert werden. Durch Setup-Einstellungen des BIOS kann es vorkommen, dass verschiedene PCI-Devices oder Funktionen von Devices nicht aktiviert sind. Wenn Devices deaktiviert werden, kann sich dadurch bei anderen Devices die Bus-Nummer ändern.

AD	INTA	REQ	Bus	Dev.	Fkt.	Kontroller / Slot
	-	-	0	0	0	Host Bridge ID191F
	A	-	0	2	0	VGA Controller ID1912
	A	-	0	08	0	System Peripheral ID1911
	A	-	0	20	0	XHCI Controller IDA12F
	A	-	0	20	2	Other DPIO Module ID1311
	A	-	0	22	0	Serial Other IDA13A
	A	-	0	22	3	Serial (16550) IDA13D
	A	-	0	23	0	SATA (AHCI 1.0) IDA102
	A	-	0	28	0	PCI Bridge (0-1)x0 (x4) IDA110
	B	-	0	28	5	PCI Bridge (0-2)x1 (x1) IDA115
		-	0	30	0	Other DPIO Module IDA127
		-	0	31	0	ISA Bridge IDA146
		-	0	31	2	Memory Controller IDA121
		-	0	31	4	SMBus Controller IDA123
	B	-	0	31	6	Ethernet Controller ID15B7
	A	-	2	00	0	Ethernet Controller x1 (x1)