ADLE3800HD

Manual

rev. 0.1

Contents

Contents

0 Document History

Version	Changes
0.1	first pre-release

| i | *NOTE*
|---|

All company names, brand names, and product names referred to in this manual are registered or unregistered trademarks of their respective holders and are, as such, protected by national and international law.

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:

o You must discharge your body from electricity before touching this board.
o Tools you use must be discharged from electricity as well.
o 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.
o Please do not touch any devices or components on the board.

⚠ *CAUTION*

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:

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

ACUTE RISK OF INJURY!

If you do not adhere to the safety advise next to this symbol, there is immediate danger to life and health of individuals!

RISK OF INJURY!

If you do not adhere to the safety advise next to this symbol, there is danger to life and health of individuals!

HAZARD TO INDIVIDUALS, ENVIRONMENT, DEVICES, OR DATA!

If you do not adhere to the safety advise next to this symbol, there is obvious hazard to individuals, to environment, to materials, or to data.

NOTE OR POINTER

This symbol indicates information that contributes to better understanding.

1.6 RoHS

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

2 Overview

2.1 Features

The ADLE3800HD is a highly complex 3,5-inch board which incorporates complete motherboard functionality. It's based on a System-On-Chip (SoC) of Intel®'s Atom E3800 product family. Modern low voltage DDR3L technology provides top-notch memory performance, accomodating up to 8 GByte of RAM (DDR3L-1333) via SO-DIMM204. It also provides a PCI-Express bus (via a 2x40 pin custom connector, configurable as one 1x) and additional peripheral devices such as a serial interface, three Gigabit Ethernet interfaces (LAN), two SATA channels (offering up to 3Gb/s), an audio interface (HDA 7.1), nine USB channels, and two DVI/HDMI connectors with CRT available through DVI-I, and DisplayPort available on a 30pin I-PEX connector. Input voltage is 24V, which is galvanically isolated from the voltages generated on the board.
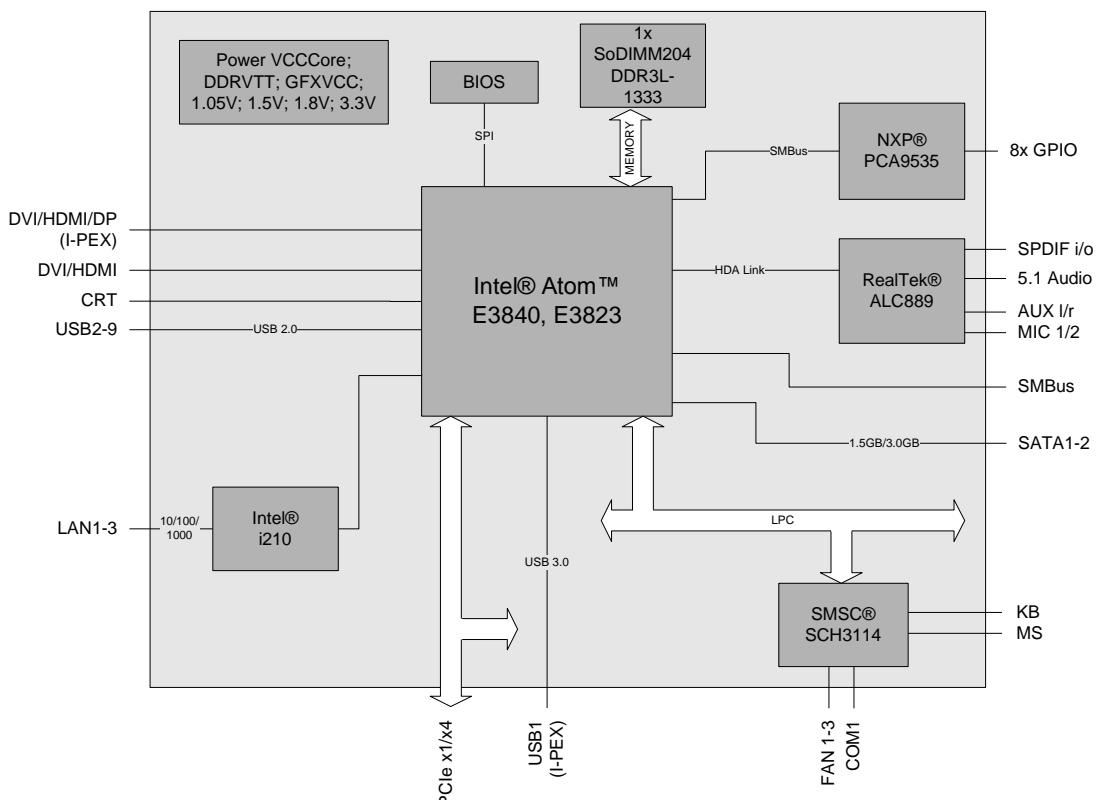
- o Single-Chip-Processor Intel® Atom™ E3840, E3823
- o SO-DIMM204 socket for one DDR3L-1333 module of up to 8 GByte
- o PCI-Express bus (x1) via 2x40pin custom connector
- o Serial interface COM1
- o Three LAN interfaces Ethernet 10/100/1000 (Base-T)
- o Two SATA channels (up to 3Gb/s transfer rate)
- o PS2 keyboard / mouse interface
- o Nine USB 2.0 interfaces (4x external, 4x internal, 1x on I-PEX connector)
- o BIOS AMI® Aptio
- o CRT connection
- o Two DVI/HDMI connectors (1x DVI-I, 1x I-PEX with DisplayPort capability)
- o HDA compatible sound controller with SPDIF in and out

- o   8x GPIO
- o   RTC with external CMOS battery
- o   24V supply, galvanically isolated
- o   Format: 102 mm x 147 mm

2.2   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.

o   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 spezifications
    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

▪   SMSC® Chip Description
    SCH3114 Datasheet
    www.smsc.com
    (NDA required)

▪   Realtek® Chip Description
    ALC885/889 Datasheet
    www.realtek.com.tw

▪   American Megatrends®
    Aptio™ Text Setup Environment (TSE) User Manual
    www.ami.com

▪   American Megatrends®
    Aptio™ 4.x Status Codes
    www.ami.com

3 Detailed Description

3.1 Power Supply / UPS

The ADLE3800HD needs an external power supply of 24V (will tolerate 20V-30V). This input is galvanically isolated from the board's internal circuitry. It is also used for charging any UPS device that may be present. This UPS device is either capacitor-based or connected externally as a Pb-battery pack. With a UPS installed and charged, the module can stay operational even when a power failure occurs. A capacitor-based UPS can keep the board alive only for a few seconds while a Pb-battery typically allows for several minutes of continued operation. The exact amount of time is hard to predict as it also depends on factors such as the UPS' charge level at the time of the power failure, CPU/chipset power consumption etc. Generally, a Pb-battery needs a much longer time to reach full charge level compared to a capacitor-based UPS.

3.2 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 512 KByte. They also offer many features known from the desktop range such as MMX2, serial number, loadable microcode etc.
The Atom™ CPU operates in an extended range of thermal conditions and therefore is   capable for use in industrial systems.

3.3 SUPS

Optionally the ADLE3800HD can be equipped with a plug-in SUPS, which can keep the board alive for a few seconds 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.

3.4 Memory

There is one conventional SO-DIMM204 socket available to equip the board with memory. For technical and mechanical reasons it is possible that particular memory modules cannot be employed. Please ask your sales representative for recommended memory modules.
With currently available SO-DIMM204 modules a memory extension up to 8 GByte is possible (DDR3L-1333).

ⓘ *NOTE*

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 ADLE3800HD.

⚠ *CAUTION*

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.
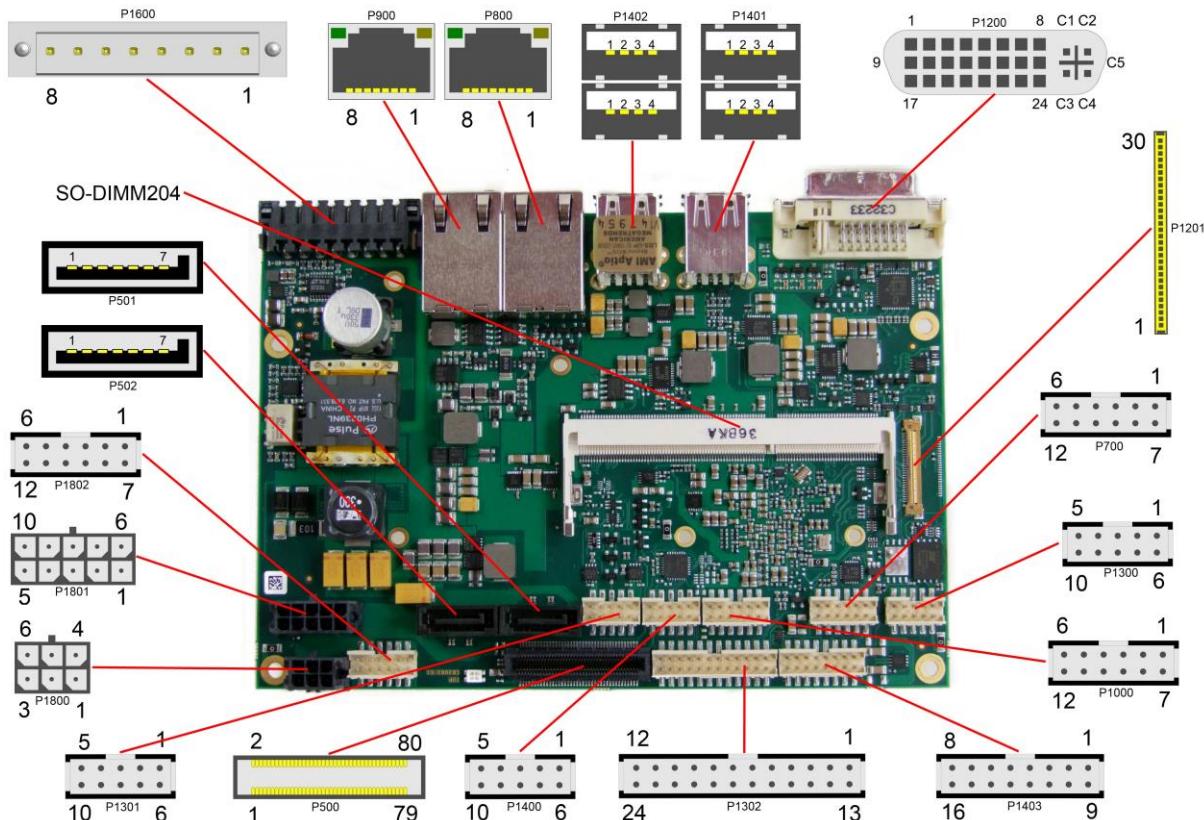
Ref.-No.	Function	Page
P500	"PCI-Express",	p. 34
U600	"Memory"	p. 20
P501/2	"SATA Interfaces"	p. 32
P700	"GPIO"	p. 36
P800/900/1000	"LAN"	p. 29
P1200	"VGA/DVI"	p. 23
P1201	"DVI/HDMI/DisplayPort"	p. 25
P1300	"Audio"	p. 31
P1301	"Fan Connectors"	p. 37
P1302	"System"	p. 19
P1400	"Serial Interface COM 1"	p. 33
P1401/2	"USB 3-6"	p. 27
P1403	"USB 2, 7-9"	p. 28
P1600	"Power Supply"	p. 15
P1800	"Power Connector"	p. 16
P1801	"SUSV"	p. 18
P1802	"Power Connector"	p. 17

4.2 Power Supply

The power supply of the hardware module is realized via an 8pin connector (Weidmüller 180537-0000). The main 24V power lines are assigned to pins 5 and 6. An external Pb-battery can be connected to pins 1 and 2 to provide UPS functionality. Contact your sales person to discuss suitable battery packs.
Pin 3 (VOUT) is a 24V output (max. 2A), which is supported by the UPS (Pb-accu or capacitors) in the event of a power failure. One possible application would be to use this output to supply a display device which would then be able to display information about the power failure and the imminent system shutdown.
If a UPS is present you need to have a possibility to shut down the board in a regular way without activating the UPS, thereby preventing premature aging of UPS components. That's what pin 7 (PC_START) is for. When pulled high (24V) a regular shutdown without UPS activity is triggered. As a part of this regular shutdown pins 3 (VOUT) and 8 (PC_AKTIV) are pulled from 24V to 0V. Any devices connected to VOUT will thus also be switched off without discharging the UPS.
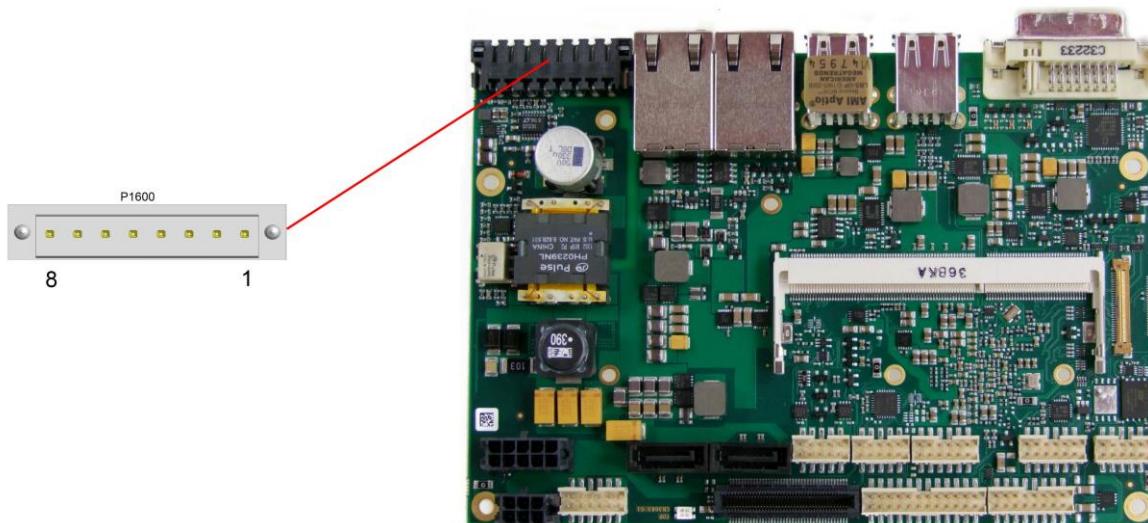
Pin	Name	Description
1	GND	ground
2	BAT+	battery
3	Vout	output voltage
4	S_GND	ground (shield)
5	P_VIN#	power supply -
6	P_VIN	power supply +
7	PC_START	PC start
8	PC_AKTIV	power status

4.3 Power Connector

The board is equipped with a 2x3pin connector offering standard 5V and 12V power supplies for additional peripheral devices. Maximum current is 2 amperes for VCC/SVCC combined, and also 2 amperes for 12V. In the case of a power failure theses supplies are supported by the UPS circuit, but only if the UPS is a Pb-battery or if a SUPS is connected.
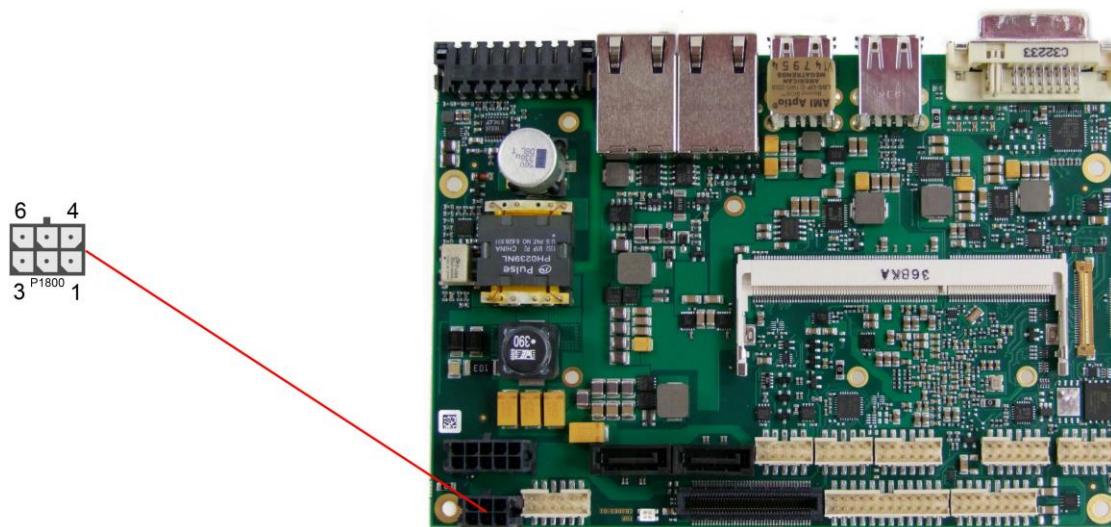
Pinout power connector Molex 2x3:

Description	Name	Pin		Name	Description
ground	GND	1	4	VCC	power supply 5V
ground	GND	2	5	VCC	power supply 5V
power supply 3.3V	3.3V	3	6	12V	power supply 12V

4.4 Power Connector

In addition the board is equipped with a 2x6pin connector (FCI 98424-G52-12LF, mating connector FCI 90311-012LF)   offering standard 5V and 12V power supplies for additional peripheral devices. Maximum current is 2 amperes for VCC/SVCC combined, and also 2 amperes for 12V. In the case of a power failure theses supplies are supported by the UPS circuit, but only if the UPS is a Pb-battery or if a SUPS is connected.
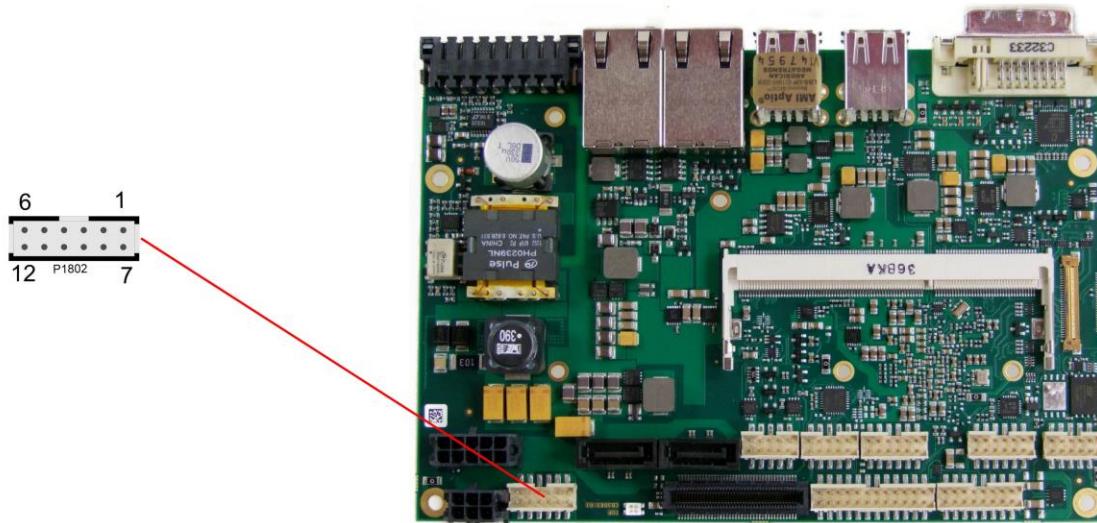
Pinout Molex connector 2x6:

Description	Name	Pin		Name	Description
power supply 5V	VCC	1	7	VCC	power supply 5V
power supply 5V	VCC	2	8	GND	ground
ground	GND	3	9	GND	ground
ground	GND	4	10	GND	ground
power supply 12V	12V	5	11	GND	ground
power supply 12V	12V	6	12	12V	power supply 12V

4.5 SUSV

A SUPS can be connected via a 2x6pin connector (Molex 43045-1013, mating connector Molex 43025-1013). Depending on the used capacity and the power consumption it is possible to hold power of the ADLE3800HD for several seconds.
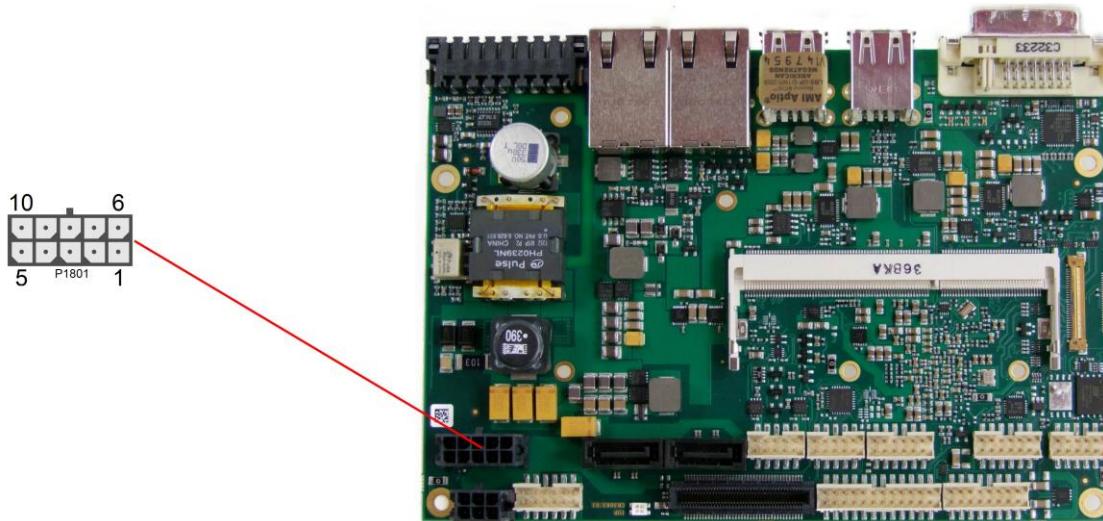
Pinout Molex 2x5:

Description	Name	Pin		Name	Description
output voltage	Voutreg	1	6	Voutreg	output voltage
output voltage	Vout	2	7	Vout	output voltage
ground	GND	3	8	GND	ground
SUSV	SUSV	4	9	SMBALERT#	SMB alert
SMB data	SMB-DAT	5	10	SMB-CLK	SMB clock

4.6 System

A number of signals for system control and for SMBus communication are provided through a 2x12 pin connector (FCI 98424-G52-24LF, mating connector FCI 90311-024LF). This connector combines signals for power button, reset, keyboard, speaker, and several LEDs such as harddisk LED, and 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.
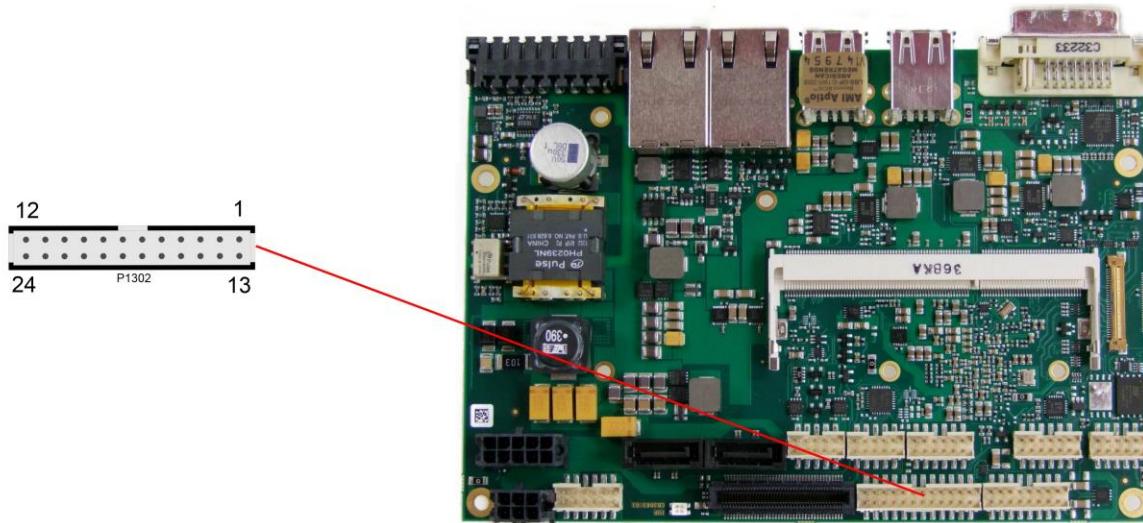
Pinout 2x12pin connector:

Description	Name	Pin		Name	Description
ground	GND	1	13	3.3V	3.3V supply
reset to ground	RSTBTN#	2	14	PWRBTN#	on/suspend button
LED suspend / ACPI	S-LED	3	15	S3.3V	standby supply 3.3V
LED harddisk	SATALED	4	16	GPIOLED3	LED GPIO device 3
LED GPIO device 1	GPIOLED1	5	17	BATT	battery
LED GPIO device 2	GPIOLED2	6	18	SMBALERT#	SMB alert
SMB Clock	SMBCLKEX	7	19	SMBDATEX	SMB data
speaker to 5V	SPEAKER	8	20	SVCC	standby supply 5V
keyboard clock	KCLK	9	21	KDAT	keyboard data
ground	GND	10	22	VCC	5V supply
ground	GND	11	23	VCC	5V supply
ground	GND	12	24	VCC	5V supply

4.7 Memory

Conventional SO-DIMM204 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-DIMM204 modules a memory extension up to 8 GByte is possible (DDR3L-1333).
All timing parameters for different memory modules are automatically set by BIOS.
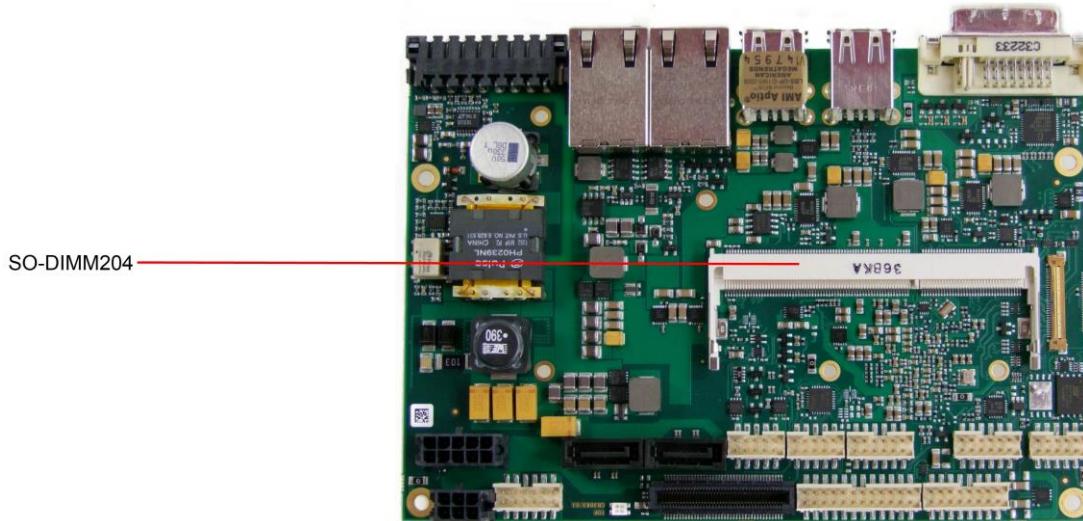
SO-DIMM204

Pinout SO-DIMM204:

Description	Name	Pin		Name	Description
memory reference current	REF-DQ	1	2	GND	ground
ground	GND	3	4	DQ4	data 4
data 0	DQ0	5	6	DQ5	data 5
data 1	DQ1	7	8	GND	ground
ground	GND	9	10	DQS0#	data strobe 0 -
data mask 0	DM0	11	12	DQS0	data strobe 0 +
ground	GND	13	14	GND	ground
data 2	DQ2	15	16	DQ6	data 6
data 3	DQ3	17	18	DQ7	data 7
ground	GND	19	20	GND	ground
data 8	DQ8	21	22	DQ12	data 12
data 9	DQ9	23	24	DQ13	data 13
ground	GND	25	26	GND	ground
data strobe 1 -	DQS1#	27	28	DM1	data mask 1
data strobe 1 +	DQS1	29	30	RESET#	Reset
ground	GND	31	32	GND	ground
data 10	DQ10	33	34	DQ14	data 14
data 11	DQ11	35	36	DQ15	data 15
ground	GND	37	38	GND	ground
data 16	DQ16	39	40	DQ20	data 20
data 17	DQ17	41	42	DQ21	data 21
ground	GND	43	44	GND	ground
data strobe 2 -	DQS2#	45	46	DM2	data mask 2
data strobe 2 +	DQS2	47	48	GND	ground
ground	GND	49	50	DQ22	data 22

Description	Name	Pin		Name	Description
data 18	DQ18	51	52	DQ23	data 23
data 19	DQ19	53	54	GND	ground
ground	GND	55	56	DQ28	data 28
data 24	DQ24	57	58	DQ29	data 29
data 25	DQ25	59	60	GND	ground
ground	GND	61	62	DQS3#	data strobe 3 -
data mask 3	DQM3	63	64	DQS3	data strobe 3 +
ground	GND	65	66	GND	ground
data 26	DQ26	67	68	DQ30	data 30
data 27	DQ27	69	70	DQ31	data 31
ground	GND	71	72	GND	ground
clock enables 0	CKE0	73	74	CKE1	clock enables 1
1.5 volt supply	1.5V	75	76	1.5V	1.5 volt supply
reserved	N/C	77	78	(A15)	reserved
SDRAM bank 2	BA2	79	80	A14	address 14
1.5 volt supply	1.5V	81	82	1.5V	1.5 volt supply
address 12 (burst chop)	A12/BC#	83	84	A11	address 11
address 9	A9	85	86	A7	address 7
1.5 volt supply	1.5V	87	88	1.5V	1.5 volt supply
address 8	A8	89	90	A6	address 6
address 5	A5	91	92	A4	address 4
1.5 volt supply	1.5V	93	94	1.5V	1.5 volt supply
address 3	A3	95	96	A2	address 2
address 1	A1	97	98	A0	address 0
1.5 volt supply	1.5V	99	100	1.5V	1.5 volt supply
Clock 0 +	CK0	101	102	CK1	clock 1 +
Clock 0 -	CK0#	103	104	CK1#	clock 1 -
1.5 volt supply	1.5V	105	106	1.5V	1.5 volt supply
address 10 (auto precharge)	A10/AP	107	108	BA1	SDRAM bank 1
SDRAM Bank 0	BA0	109	110	RAS#	row address strobe
1.5 volt supply	1.5V	111	112	1.5V	1.5 volt supply
write enable	WE#	113	114	S0#	chip select 0
column address strobe	CAS#	115	116	ODT0	on die termination 0
1.5 volt supply	1.5V	117	118	1.5V	1.5 volt supply
address 13	A13	119	120	ODT1	on die termination 1
Chip Select 1	S1#	121	122	N/C	reserved
1.5 volt supply	1.5V	123	124	1.5V	1.5 volt supply
reserved	(TEST)	125	126	REF-CA	reference current
ground	GND	127	128	GND	ground
data 32	DQ32	129	130	DQ36	data 36
data 33	DQ33	131	132	DQ37	data 37
ground	GND	133	134	GND	ground
data strobe 4 -	DQS4#	135	136	DQM4	data mask 4
data strobe 4 +	DQS4	137	138	GND	ground
ground	GND	139	140	DQ38	data 38
data 34	DQ34	141	142	DQ39	data 39
data 35	DQ35	143	144	GND	ground
ground	GND	145	146	DQ44	data 44
data 40	DQ40	147	148	DQ45	data 45
data 41	DQ41	149	150	GND	ground
ground	GND	151	152	DQS5#	data strobe 5 -
data mask 5	DQM5	153	154	DQS5	data strobe 5 +
ground	GND	155	156	GND	ground
data 42	DQ42	157	158	DQ46	data 46
data 43	DQ43	159	160	DQ47	data 47

Description	Name	Pin		Name	Description
ground	GND	161	162	GND	ground
data 48	DQ48	163	164	DQ52	data 52
data 49	DQ49	165	166	DQ53	data 53
ground	GND	167	168	GND	ground
data strobe 6 -	DQS6#	169	170	DQM6	data mask 6
data strobe 6	DQS6	171	172	GND	ground
ground	GND	173	174	DQ54	data 54
data 50	DQ50	175	176	DQ55	data 55
data 51	DQ51	177	178	GND	ground
ground	GND	179	180	DQ60	data 60
data 56	DQ56	181	182	DQ61	data 61
data 57	DQ57	183	184	GND	ground
ground	GND	185	186	DQS7#	data strobe 7 -
data mask 7	DQM7	187	188	DQS7	data strobe 7 +
ground	GND	189	190	GND	ground
data 58	DQ58	191	192	DQ62	data 62
data 59	DQ59	193	194	DQ63	data 63
ground	GND	195	196	GND	ground
SPD address 0	SA0	197	198	EVENT#	Event
3.3 volt supply	3.3V	199	200	SDA	SMBus data
SPD address 1	SA1	201	202	SCL	SMBus clock
termination current	VTT	203	204	VTT	termination current

4.8   VGA/DVI

The module is equipped with a standard DVI-I-connector, which can be used to connect a DVI capable device, a standard VGA monitor or an HDMI capable device. External cable adapters that convert from DVI to VGA or HDMI are required to connect standard VGA or HDMI devices.
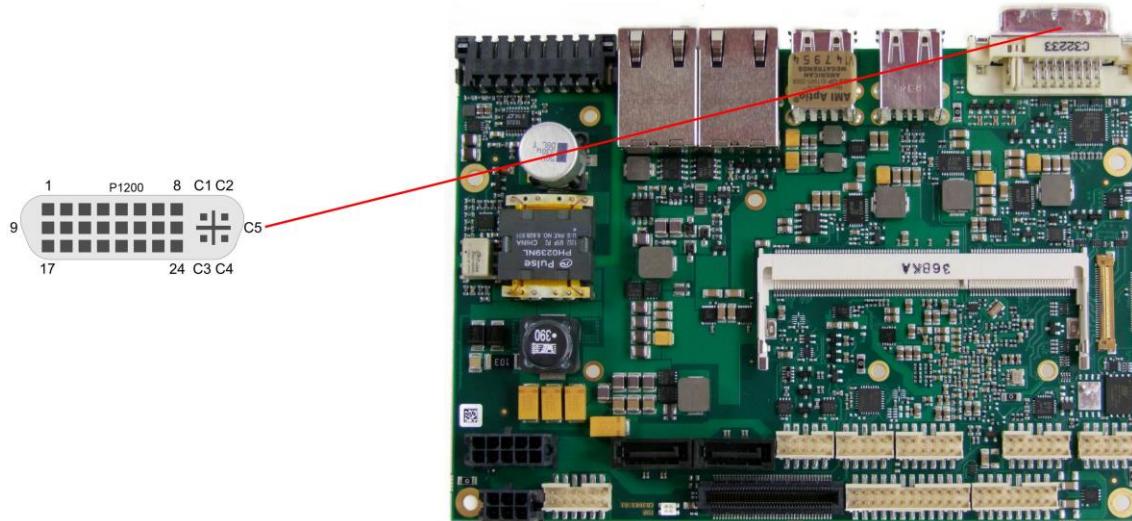
Pinout DVI-I:

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	VSYNC	VGA vertical sync
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	RED	VGA red
C2	GREEN	VGA green
C3	BLUE	VGA blue
C4	HSYNC	VGA horizontal sync

Pin	Name	Description
C5	GND	ground

4.9 DVI/HDMI/DisplayPort

The ADLE3800HD provides a second DVI interface which is realized as a 30pin flat cable header (I-PEX Cabline-VS 20455-030E-12). 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. Please note that a custom cable design is required.
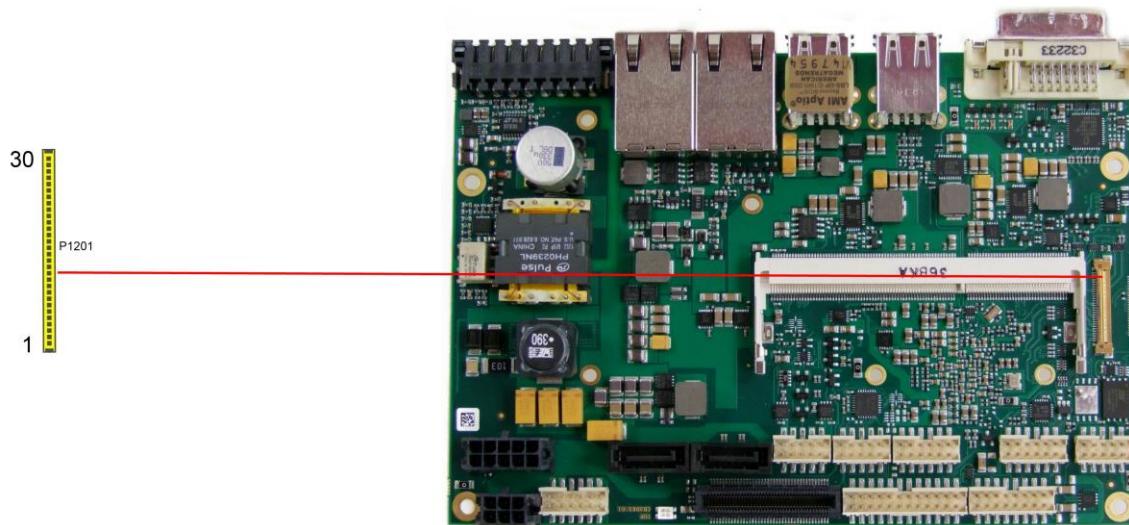
Pinout 30pin connector DVI/HDMI/DisplayPort:

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

Pin	Name	Description
28	VCC	5V supply
29	VCC	5V supply
30	VCC	5V supply

4.10 USB 3-6

The USB channels 3 to 6 are available as standard USB connectors.
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.
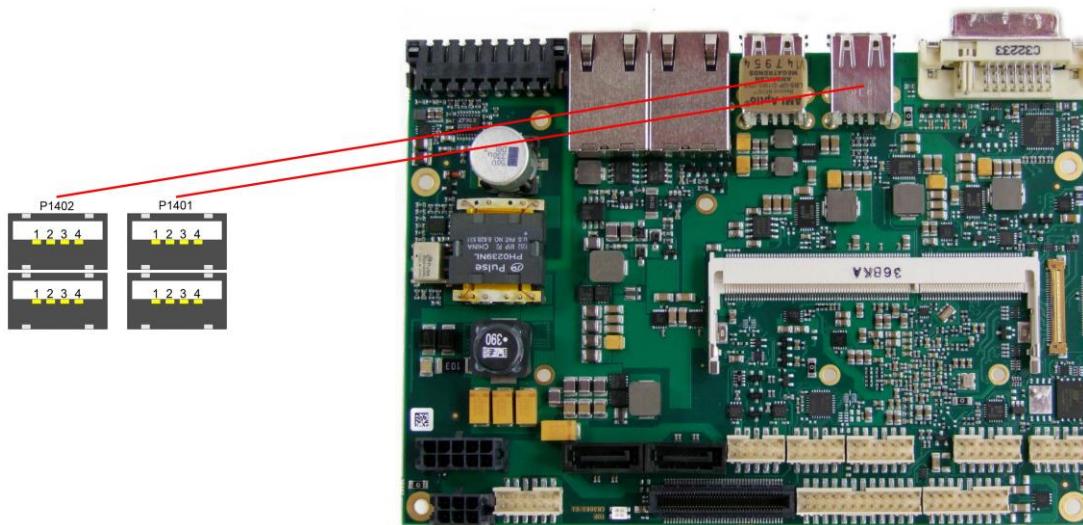
Pinout USB connector for channel X:

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

4.11 USB 2, 7-9

The USB channels 2 and 7 to 9 are available via a 2x8pin connector (FCI 98424-G52-16LF, mating connector FCI 90311-016LF).
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.
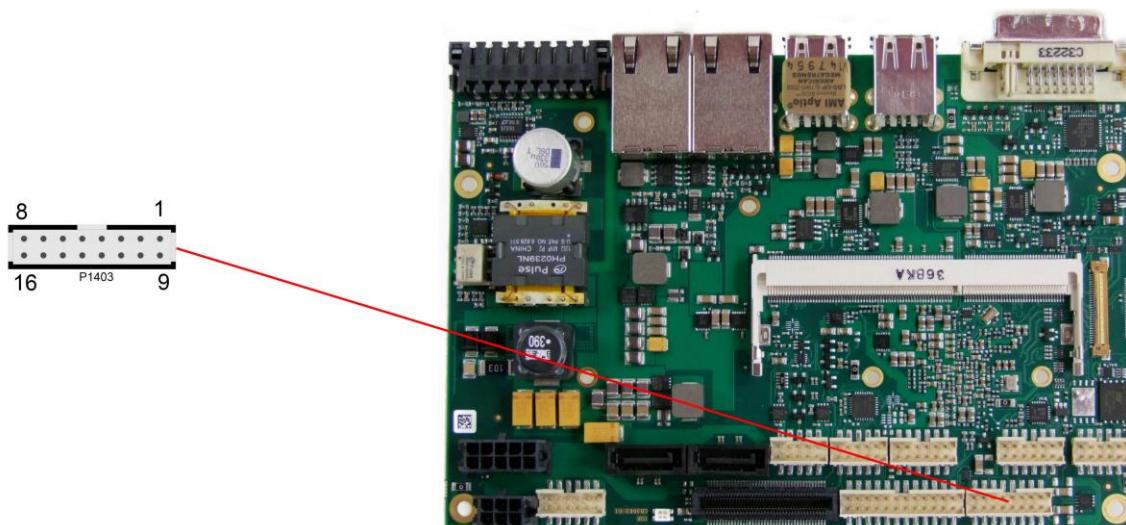
Pinout USB

Description	Name	Pin		Name	Description
5 volt for USB2	VCC	1	9	VCC	5 volt for USB7
minus channel USB2	USB2-	2	10	USB7-	minus channel USB7
plus channel USB2	USB2+	3	11	USB7+	plus channel USB7
ground	GND	4	12	GND	ground
ground	GND	5	13	GND	ground
plus channel USB8	USB8+	6	14	USB9+	plus channel USB9
minus channel USB8	USB8-	7	15	USB9-	minus channel USB9
5 volt for USB8	VCC	8	16	VCC	5 volt for USB9

4.12 LAN

The module has three LAN interfaces. All interfaces 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, RPL and WOL.
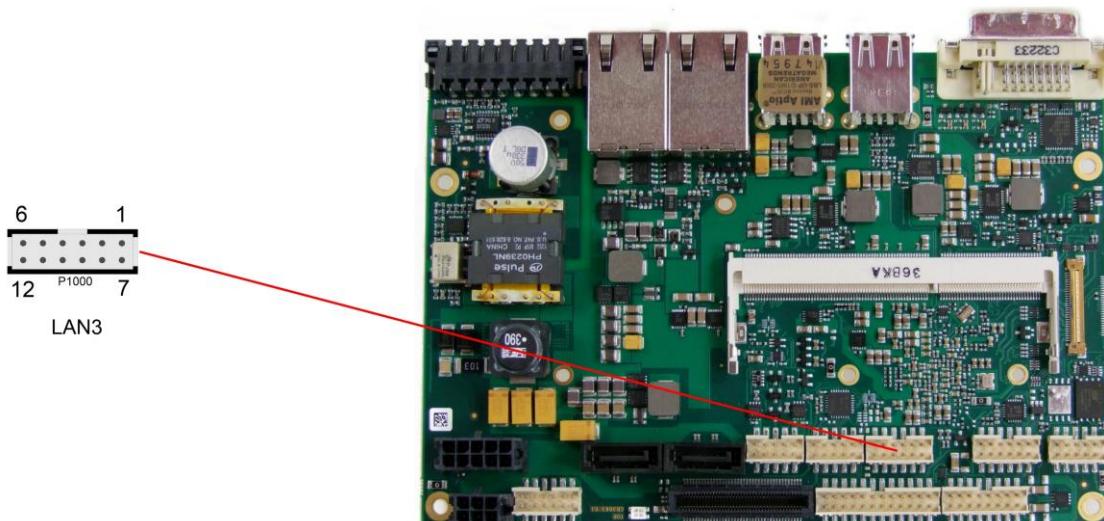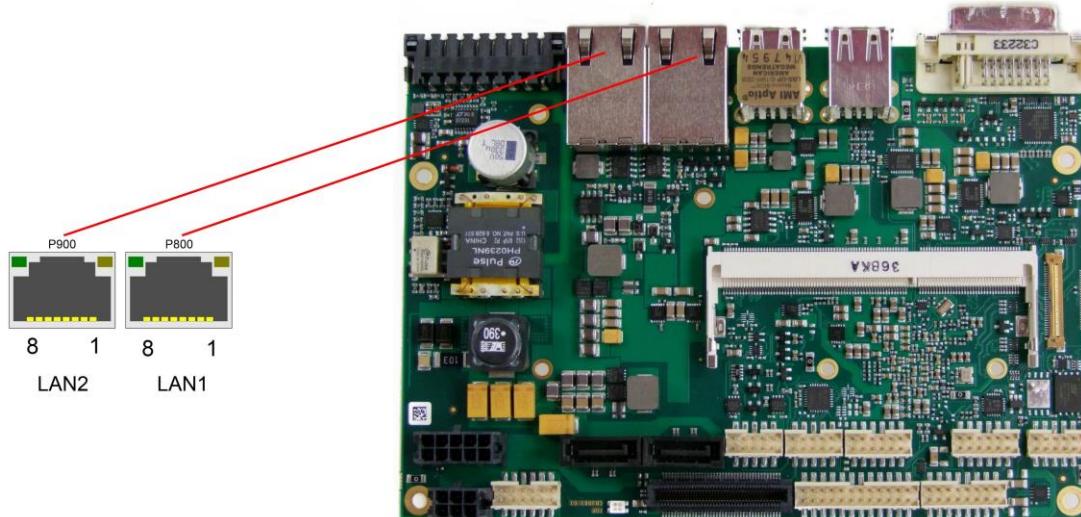
Pinout LAN 10/100/1000:

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-1#	LAN channel 1 minus
5	LAN-2	LAN channel 2 plus
6	LAN-2#	LAN channel 2 minus
7	LAN-3	LAN channel 3 plus
8	LAN-3#	LAN channel 3 minus

Pinout LAN interface:

Description	Name	Pin		Name	Description
LAN activity	LINKACT	1	7	SPEED1000	LAN speed 1000Mbit
LAN channel 1 plus	LAN1	2	8	LAN0	LAN channel 0 plus
LAN channel 1 minus	LAN1#	3	9	LAN0#	LAN channel 0 minus
LAN channel 3 plus	LAN3	4	10	LAN2	LAN channel 2 plus
LAN channel 3 minus	LAN3#	5	11	LAN2#	LAN channel 2 minus
LAN speed 100Mbit	SPEED100	6	12	3.3V	3.3 volt supply

4.13 Audio

Audio input and output functions can be accessed via a 2x5 pin connector (FCI 98424-G52-10LF, mating connector FCI 90311-010LF). There are two ways to use this connector. Default functionality is the familiar audio in, audio out, and microphone. OS dependent device drivers can switch these signals to support a 5.1 output; thus in this mode no audio input signals are available.
Signals "SPDIFI" and "SPDIFO" provide digital input and output. If a transformation to a coaxial or optical connector is necessary this must be performed externally.
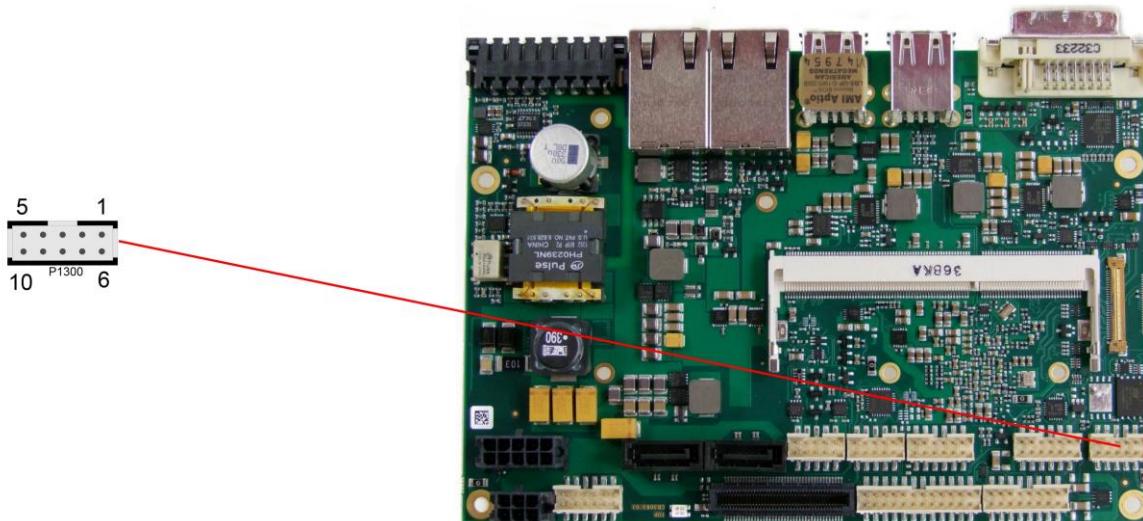
Pinout audio 2x5 pin connector:

Description	Name	Pin		Name	Description
digital output SPDIF	SPDIFO	1	6	3.3V	3.3 volt supply
digital input SPDIF	SPDIFI	2	7	S_AGND	analog ground sound
sound output right / front output right	LOUT_R / FRONT_R	3	8	LOUT_L / FRONT_L	sound output left / front output left
AUX input right / rear output right	AUXA_R / REAR_R	4	9	AUXA_L / REAR_L	AUX input left / rear output left
microphone input 1 / center output	MIC1 / CENTER	5	10	MIC2 / LFE	microphone input 2 / LFE output

4.14 SATA Interfaces

The ADLE3800HD provides two SATA interfaces which allow transfer rates of up to 3 Gb/s. These
interfaces are made available via 7pin connectors   and support RAID 0/1/5/10.
The required settings are made in the BIOS setup.
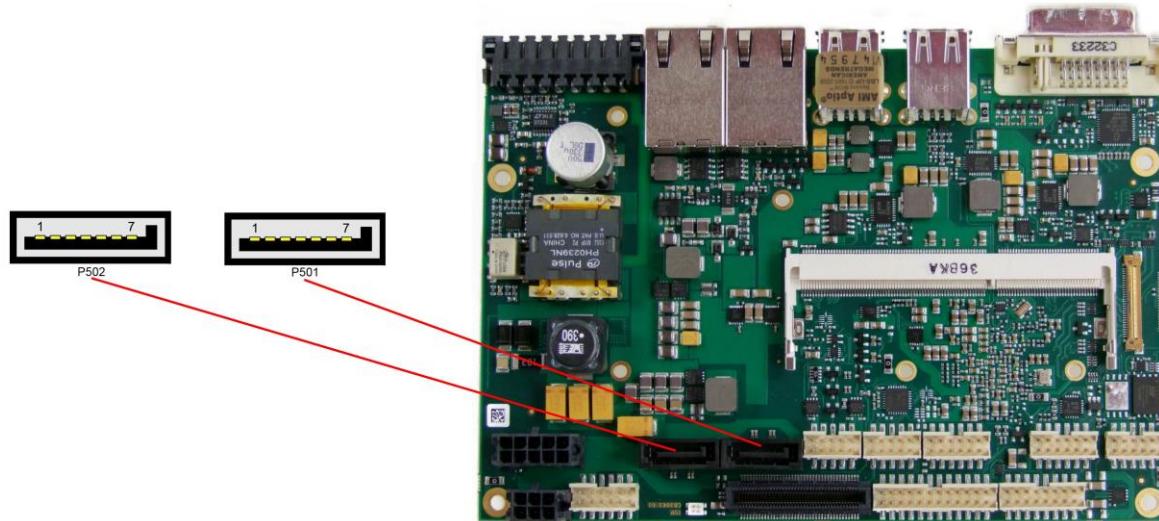
Pinout SATA:

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

4.15 Serial Interface COM 1

The serial interface COM1 is made available via a 2x5pin connector (FCI   98424-G52-10LF, mating connector FCI 90311-010LF). Signals default to RS232 level.
The port address and the interrupt are set via the BIOS setup.
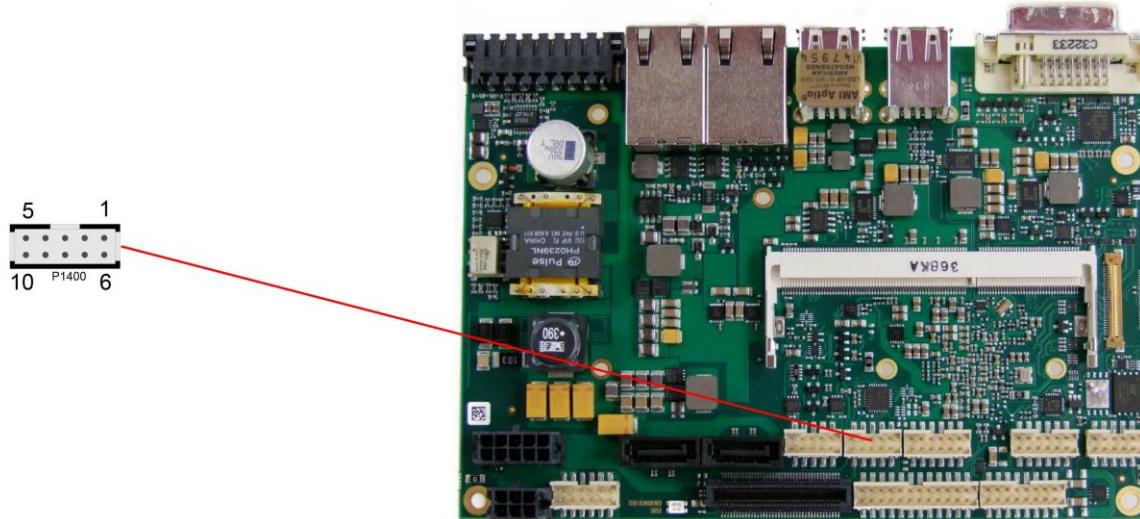
Pinout COM connector:

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	10	VCC	5 volt supply

When the module is ordered in standard configuration, the 2x5pin connector offers mouse and keyboard signals.

Alternative pinout of COM-connector:

Description	Name	Pin		Name	Description
keyboard clock	KCLK	1	6	MCLK	mouse clock
keyboard data	KDAT	2	7	MDAT	mouse data
reserved	N/C	3	8	N/C	reserved
reserved	N/C	4	9	N/C	reserved
ground	GND	5	10	3.3V	3.3 volt supply

ⓘ *NOTE*

The ADLE3800HD provides a further serial interface (COM2). However, this interface is only available for internal communication between powercontroller and Super I/O chip, e.g. for monitoring or controlling options.

4.16 PCI-Express

The ADLE3800HD offers a 2x40pin custom connector for the PCI-Express bus. You can connect one PCIe1x device here. Adapter cards featuring standard PCIe sockets or a PCIe Mini Card connector are available. Please contact your sales representative for these cards.
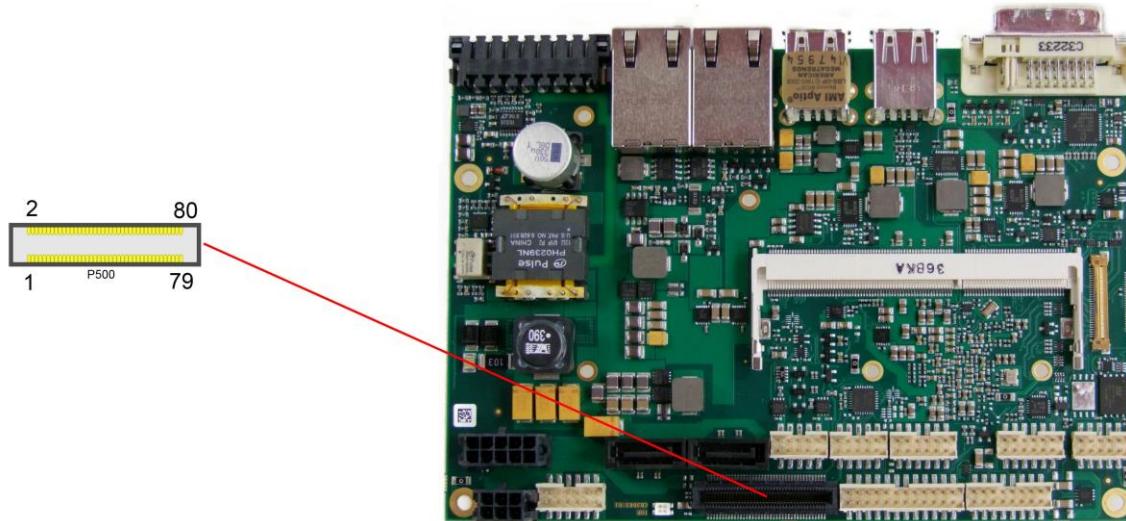
Pinout

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
ground	GND	55	56	N/C	reserved

Description	Name	Pin		Name	Description
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

4.17 GPIO

The General Purpose Input/Output interface is made available through a 2x6 pin connector (FCI 98424-G52-12LF, mating connector FCI 90311-012LF). 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.
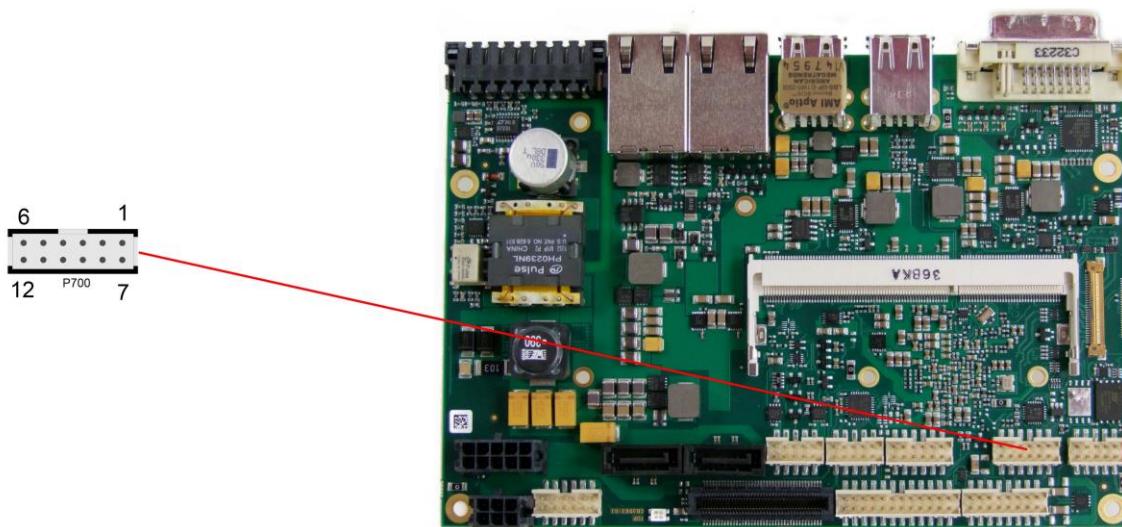
Pinout GPIO connector:

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

4.18 Fan Connectors

Three external fans (12V) can be connected to the board using a 2x5pin connector (FCI 98424-G52-10LF, mating connector FCI 90311-010LF). Monitoring signals are available. For the monitoring to work the fans must provide a corresponding speed signal.
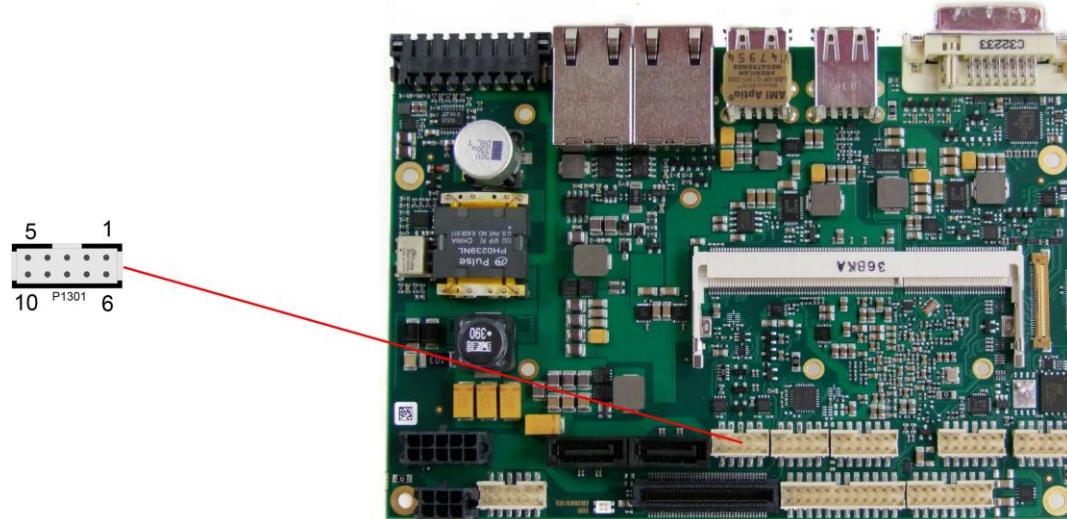
Description	Name	Pin		Name	Description
FAN 1 ON	FANON1	1	6	FANON2	FAN 2 ON
12V	12V	2	7	12V	12V
FAN1 control	FANCTRL1	3	8	FANCTRL2	Fan 2 control
12V	12V	4	9	FANCTRL3	Fan 3 control
FAN 3 ON	FANON3	5	10	GND	ground

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.

i *NOTE*

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

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   MAIN  Advanced  Chipset  Boot  Security  Save & Exit
┌──────────────────────────────────────────────────┬───────────────────────────┐
│                                                    │ Set the Date. Use Tab to  │
│ Board Information                                  │ switch between Data elements.│
│ Board                      ADLE3800HD              │                           │
│ Revision                   f                       │                           │
│ Bios Version               0.09                    │                           │
│                                                    │                           │
│ CPU Configuration                                  │                           │
│ Microcode Patch            321                     │                           │
│ BayTrail SoC               B2 Stepping             │                           │
│                                                    │                           │
│ Memory Information                                 │                           │
│ Total Memory               4096 MB (LPDDR3)        │                           │
│                                                    ├───────────────────────────│
│ System Date                [Fri 07/01/2014]        │ →←: Select Screen         │
│ System Time                [22:16:34]              │ ↑↓: Select Item           │
│                                                    │ Enter: Select             │
│                                                    │ +/-: Change Opt.          │
│                                                    │ F1: General Help          │
│                                                    │ F2: Previous Values       │
│                                                    │ F3: Optimized Defaults    │
│                                                    │ F4: Save & Exit           │
│                                                    │ ESC: Exit                 │
│                                                    │                           │
│                                                    │                           │
│                                                    │                           │
└──────────────────────────────────────────────────┴───────────────────────────┘
        Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Main  ADVANCED  Chipset  Security  Boot  Save & Exit
 ┌─────────────────────────────────────────────────────┬──────────────────────────────┐
 │ Power-Supply Type                  [ATX]             │ Select the Type of the Power │
 │ ▶ ACPI Settings                                      │ Supply: AT/ATX               │
 │ ▶ Hardware Monitor                                   │                              │
 │ ▶ Serial Port Console Redirection                    │                              │
 │ ▶ CPU Configuration                                  │                              │
 │ ▶ PPM Configuration                                  │                              │
 │ ▶ SATA Configuration                                 │                              │
 │ ▶ Miscellaneous Configuration                        │                              │
 │ ▶ LPSS & SCC Configuration                           │                              │
 │ ▶ Network Stack Configuration                        │                              │
 │ ▶ Power Controller Options                           │                              │
 │ ▶ CSM Configuration                                  │──────────────────────────────│
 │ ▶ SDIO Configuration                                 │ →←: Select Screen            │
 │ ▶ USB Configuration                                  │ ↑↓: Select Item              │
 │ ▶ Security Configuration                             │ Enter: Select                │
 │                                                      │ +/-: Change Opt.             │
 │ ▶ SIO Configuration                                  │ F1: General Help             │
 │                                                      │ F2: Previous Values          │
 │                                                      │ F3: Optimized Defaults       │
 │                                                      │ F4: Save & Exit              │
 │                                                      │ ESC: Exit                    │
 │                                                      │                              │
 │                                                      │                              │
 │                                                      │                              │
 └─────────────────────────────────────────────────────┴──────────────────────────────┘
           Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

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

✓ **ACPI Settings**
   Sub menu: see   "ACPI Settings" (page 42)

✓ **H/W Monitor**
   Sub menu: see   "H/W Monitor" (page 43)

✓ **Serial Port Console Redirection**
   Sub menu: see   "Serial Port Console Redirection" (page 45)

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

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

✓ **SATA Configuration**
   Sub menu: see   "SATA Configuration" (page 53)

✓ **Miscellaneous Configuration**
   Sub menu: see   "Miscellaneous Configuration" (page 54)

✓ **LPSS & SCC Configuration**
   Sub menu: see   "LPSS & SCC Configuration" (page 55)

✓ **Network Stack**
   Sub menu: see   "Network Stack" (page 57)

✓ **Power Controller Options**
   Sub menu: see   "Power Controller Options" (page 58)

✓ **CSM Configuration**
   Sub menu: see "CSM Configuration" (page 60)

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

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

✓ **Security Configuration**
   Sub menu: see "Security Configuration" (page 63)

✓ **Super IO Configuration**
   Sub menu: see "SIO Configuration" (page 64)

5.3.1   ACPI Settings

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
┌─────────────────────────────────────────────────┬──────────────────────────┐
│ ACPI Settings                                    │ Enables or Disables BIOS ACPI │
│                                                  │ Auto Configuration.      │
│ Enable ACPI Auto Configuration    [Disabled]     │                          │
│                                                  │                          │
│ Enable Hibernation                [Enabled]      │                          │
│ ACPI Sleep State                  [Suspend Disabled] │                      │
│ Lock Legacy Resources             [Disabled]     │                          │
│                                                  │                          │
│                                                  │                          │
│                                                  │                          │
│                                                  │ ──────────────────────── │
│                                                  │ →←: Select Screen        │
│                                                  │ ↑↓: Select Item          │
│                                                  │ Enter: Select            │
│                                                  │ +/-: Change Opt.         │
│                                                  │ F1: General Help         │
│                                                  │ F2: Previous Values      │
│                                                  │ F3: Optimized Defaults   │
│                                                  │ F4: Save & Exit          │
│                                                  │ ESC: Exit                │
│                                                  │                          │
│                                                  │                          │
└─────────────────────────────────────────────────┴──────────────────────────┘
        Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced
```

```
 Pc Health Status

 CPU dig.                        : +44 'C
 1.05V                           : +1.04 V
 VCCCORE                         : +0.71 V
 5V                              : +5.05 V
 12V                             : +12.18 V
 VBATT                           : +0.3
 FAN 1                           : N/A
 FAN 2                           : N/A
 FAN 3                           : N/A
 MB Temp                         : +44 'C
 Memory Temp                     : +44 'C
 PwrCtrlTemp                     : +47 'C          →←: Select Screen
 PwrCtrlVCC                      : +7.70 V         ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit
```

```
        Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **CPU dig.**
  Options: none

- ✓ **1.05V**
  Options: none

- ✓ **VCCCORE**
  Options: none

- ✓ **5V**
  Options: none

- ✓ **12V**
  Options: none

- ✓ **VBATT**
  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

5.3.3   **Serial Port Console Redirection**

```
          Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
      Advanced
```

```
┌─────────────────────────────────────────────────────┬──────────────────────────┐
│                                                      │ Console Redirection Enable or │
│   COM0                                               │ Disable.                 │
│  Console Redirection              [Enabled]          │                          │
│ ► Console Redirection Settings                       │                          │
│                                                      │                          │
│   COM1                                               │                          │
│  Console Redirection              [Disabled]         │                          │
│ ► Console Redirection Settings                       │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │ ─────────────────────────│
│                                                      │ →←: Select Screen        │
│                                                      │ ↑↓: Select Item          │
│                                                      │ Enter: Select            │
│                                                      │ +/−: Change Opt.         │
│                                                      │ F1: General Help         │
│                                                      │ F2: Previous Values      │
│                                                      │ F3: Optimized Defaults   │
│                                                      │ F4: Save & Exit          │
│                                                      │ ESC: Exit                │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
└─────────────────────────────────────────────────────┴──────────────────────────┘
          Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

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

✓ **Console Redirection Settings**
   Sub menu: see   "Console Redirection Settings" (page 46)

5.3.3.1   Console Redirection Settings

```
           Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced
┌──────────────────────────────────────────────────────┬─────────────────────────────────┐
│  COM0                                                  │ Emulation: ANSI: Extended       │
│  Console Redirection Settings                          │ ASCII char set. VT100: ASCII    │
│                                                        │ char set. VT100+: Extends       │
│  Terminal Type                     [VT-UTF8]           │ VT100 to support color,         │
│  Bits per second                   [115200]            │ function keys, etc. VT-UTF8:    │
│  Data Bits                         [8]                 │ Uses UTF8 encoding to map       │
│  Parity                            [None]              │ Unicode chars onto 1 or more    │
│  Stop Bits                         [1]                 │ bytes.                          │
│  Flow Control                      [None]              │                                 │
│  VT-UTF8 Combo Key Support         [Enabled]           │                                 │
│  Recorder Mode                     [Disabled]          │─────────────────────────────────│
│  Resolution 100x31                 [Enabled]           │                                 │
│  Legacy OS Redirection Resolution  [80x24]             │→←: Select Screen                │
│  Putty KeyPad                      [VT100]             │↑↓: Select Item                  │
│  Redirection After BIOS POST       [Always Enable]     │Enter: Select                    │
│                                                        │+/-: Change Opt.                 │
│                                                        │F1: General Help                 │
│                                                        │F2: Previous Values              │
│                                                        │F3: Optimized Defaults           │
│                                                        │F4: Save & Exit                  │
│                                                        │ESC: Exit                        │
│                                                        │                                 │
│                                                        │                                 │
└──────────────────────────────────────────────────────┴─────────────────────────────────┘
           Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

5.3.4   CPU Configuration

```
         Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
```

```
┌─────────────────────────────────────────────────────────┬──────────────────────────────┐
│  CPU Configuration                                        │ Socket specific CPU Information│
│ ► Socket 0 CPU Information                                │                              │
│ ► CPU Thermal Configuration                               │                              │
│                                                           │                              │
│  CPU Speed                          1467 MHz              │                              │
│  64-bit                             Supported             │                              │
│                                                           │                              │
│  Active Processor Cores             [All]                 │                              │
│  Limit CPUID Maximum                [Disabled]            │                              │
│  Execute Disable Bit                [Enabled]             │                              │
│  Hardware Prefetcher                [Enabled]             │                              │
│  Adjacent Cache Line Prefetch       [Enabled]             │                              │
│  Intel Virtualization Technology    [Enabled]             │                              │
│  Power Technology                   [Custom]              │──────────────────────────────│
│  EIST                               [Enabled]             │ →←: Select Screen            │
│  P-STATE Coordination               [HW_ALL]             │ ↑↓: Select Item              │
│  CPU C6 report                      [Enabled]             │ Enter: Select                │
│  Package C State limit              [No Limit]            │ +/-: Change Opt.             │
│                                                           │ F1: General Help             │
│                                                           │ F2: Previous Values          │
│                                                           │ F3: Optimized Defaults       │
│                                                           │ F4: Save & Exit              │
│                                                           │ ESC: Exit                    │
│                                                           │                              │
│                                                           │                              │
└─────────────────────────────────────────────────────────┴──────────────────────────────┘
         Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **Socket 0 CPU Information**
   Sub menu: see   "Socket CPU Information" (page 50)

✓ **CPU Thermal Configuration**
   Sub menu: see   "CPU Thermal Configuration" (page 51)

✓ **CPU Speed**
   Options: none

✓ **64-bit**
   Options: none

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

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

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

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

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

✓ **Power Technology**
   Options: Disable / Energy Efficient / Custom

✓ **EIST**
   Options: Disabled / Enabled

✓ **C6 report**
   Options: Disabled / Enabled

✓ **Package C State limit**
   Options: C0 / C1 / C3 / C6 / C7 / No Limit

5.3.4.1   Socket CPU Information

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
```

```
 Socket 0 CPU Information

 Intel(R) Atom(TM) CPU E3810 @ 1.46GHz
 CPU Signature                   30673
 Microcode Patch                 31e
 Max CPU Speed                   1460 MHz
 Min CPU Speed                   533 MHz
 Processor Cores                 1
 Intel HT Technology             Not Supported
 Intel VT-x Technology           Supported

 L1 Data Cache                   24 kB x 1
 L1 Code Cache                   32 x kB 1
 L2 Cache                        512 kB x 0
 L3 Cache                        Not Present
                                                  ─────────────────────────
                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit



```
```
          Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

5.3.4.2   CPU Thermal Configuration

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
┌─────────────────────────────────────────────────────┬──────────────────────────┐
│  CPU Thermal Configuration                           │ Enabled/Disable Digital  │
│  DTS                            [Disabled]           │ Thermal Sensor.          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │                          │
│                                                      │ ─────────────────────    │
│                                                      │ →←: Select Screen        │
│                                                      │ ↑↓: Select Item          │
│                                                      │ Enter: Select            │
│                                                      │ +/-: Change Opt.         │
│                                                      │ F1: General Help         │
│                                                      │ F2: Previous Values      │
│                                                      │ F3: Optimized Defaults   │
│                                                      │ F4: Save & Exit          │
│                                                      │ ESC: Exit                │
│                                                      │                          │
│                                                      │                          │
└─────────────────────────────────────────────────────┴──────────────────────────┘
        Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **DTS**
   Options: Enabled / Disabled

5.3.5   PPM Configuration

```
         Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
```

```
┌─────────────────────────────────────────────────────┬─────────────────────────────┐
│  PPM Configuration                                   │ Enable/Disable Intel SpeedStep│
│                                                      │                             │
│  EIST                              [Enabled]         │                             │
│  CPU C state Report                [Enabled]         │                             │
│  Max CPU C-state                   [ C7]             │                             │
│  S0ix                              [Disabled]        │                             │
│                                                      │                             │
│                                                      │                             │
│                                                      │                             │
│                                                      │                             │
│                                                      │                             │
│                                                      │─────────────────────────────│
│                                                      │ →←: Select Screen           │
│                                                      │ ↑↓: Select Item             │
│                                                      │ Enter: Select               │
│                                                      │ +/-: Change Opt.            │
│                                                      │ F1: General Help            │
│                                                      │ F2: Previous Values         │
│                                                      │ F3: Optimized Defaults      │
│                                                      │ F4: Save & Exit             │
│                                                      │ ESC: Exit                   │
│                                                      │                             │
│                                                      │                             │
└─────────────────────────────────────────────────────┴─────────────────────────────┘
         Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **EIST**
  Options: Disabled / Enabled

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

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

✓ **S0ix**
  Options: Disabled / Enabled

5.3.6   SATA Configuration

```
          Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
      Advanced
┌──────────────────────────────────────────────────────────┬─────────────────────────────┐
│  SATA Controller(s)              [Enabled]                │ Enable or disable SATA Device. │
│                                                           │                             │
│  Serial-ATA (SATA)               [Enabled]                │                             │
│  SATA Test Mode                  [Disabled]               │                             │
│                                                           │                             │
│  SATA Speed Support              [Gen2]                   │                             │
│  SATA ODD Port                   [No ODD]                 │                             │
│  SATA Mode                       [AHCI Mode]              │                             │
│                                                           │                             │
│  Serial-ATA Port 0               [Enabled]                │                             │
│  SATA Port0 HotPlug              [Disabled]               │                             │
│                                                           ├─────────────────────────────│
│  Serial-ATA Port 1               [Enabled]                │                             │
│  SATA Port1 HotPlug              [Disabled]               │ →←: Select Screen            │
│                                                           │ ↑↓: Select Item n            │
│  SATA Port0                                               │ Enter: Select                │
│  Not Present                                              │ +/−: Change Opt.             │
│                                                           │ F1: General Help             │
│  SATA Port1                                               │ F2: Previous Values          │
│  Not Present                                              │ F3: Optimized Defaults       │
│                                                           │ F4: Save & Exit              │
│                                                           │ ESC: Exit                    │
│                                                           │                             │
│                                                           │                             │
│                                                           │                             │
└──────────────────────────────────────────────────────────┴─────────────────────────────┘
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```

- ✓ **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

5.3.7   Miscellaneous Configuration

```
          Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
      Advanced

   Miscellaneous Configuration                              Enable or Disable the Hight
   High Precision Timer              [Enabled]              Precision Event Timer
   Boot Timer with HPET Timer       [Disabled]
   PCI Express Dynamic Clock Gating  [Disabled]




                                                            ─────────────────────────────
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/−: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


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```

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

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

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

5.3.8   LPSS & SCC Configuration

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          Advanced
 ┌────────────────────────────────────────────────────────────┬─────────────────────────────┐
 │  LPSS & SCC Devices Mode              [PCI mode]            │ LPSS & SCC Devices Mode     │
 │                                                            │ Settings                    │
 │  SCC Configuration                                         │                             │
 │  SCC eMMC Support                     [eMMC AUTO MODE]      │                             │
 │  SCC eMMC 4.5 DDR50 Support           [Enabled]            │                             │
 │  SCC eMMC 4.5 HS200 Support           [Disabled]           │                             │
 │  SCC SD Card Support                  [Enabled]            │                             │
 │  SDR25 Support for SDCard             [Disabled]           │                             │
 │  DDR50 Support for SDCard             [Enabled]            │                             │
 │  MIPI HSI Support                     [Disabled]           │                             │
 │                                                            │                             │
 │  LPSS Configuration                                        │                             │
 │  LPSS DMA #1 Support                  [Enabled]            │                             │
 │  LPSS DMA #2 Support                  [Enabled]            │                             │
 │  LPSS I2C #1 Support                  [Enabled]            │                             │
 │  LPSS I2C #2 Support                  [Enabled]            │─────────────────────────────│
 │                                                            │ →←: Select Screen           │
 │  I2C touch Device Address             [Auto]               │ ↑↓: Select Item             │
 │  LPSS HSUART #1 Support               [Enabled]            │ Enter: Select               │
 │  LPSS HSUART #2 Support               [Disabled]           │ +/-: Change Opt.            │
 │                                                            │ F1: General Help            │
 │                                                            │ F2: Previous Values         │
 │                                                            │ F3: Optimized Defaults      │
 │                                                            │ F4: Save & Exit             │
 │                                                            │ ESC: Exit                   │
 │                                                            │                             │
 │                                                            │                             │
 └────────────────────────────────────────────────────────────┴─────────────────────────────┘
              Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **LPSS & SCC Devices Mode**
   Options: ACPI mode / PCI mode

✓ **SCC eMMC Support**
   Options: Enable eMMC 4.5 Support / Enable eMMC 4.41 Support / eMMC AUTO MODE /
                Disabled

✓ **SCC eMMC 4.5 DDR50 Support**
   Options: Enabled / Disabled

✓ **SCC eMMC 4.5 HS200 Support**
   Options: Enabled / Disabled

✓ **SCC SD Card Support**
   Options: Enabled / Disabled

✓ **SDR25 Support for SDCard**
   Options: Disabled

✓ **DDR50 Support for SDCard**
   Options: Enabled / Disabled

✓ **MIPI HSI Support**
   Options: Enabled / Disabled

✓ **LPSS DMA #X Support**
   Options: Enabled / Disabled

✓ **LPSS I2C #X Support**
   Options: Enabled

✓ **LPSS HSUART #X Support**
   Options: Enabled / Disabled

5.3.9 Network Stack

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced
┌─────────────────────────────────────────────────────────┬──────────────────────────────┐
│  Network stack                       [Enabled]           │ Enable/Disable UEFI network  │
│  IPv4 PXE Support                    [Enabled]           │ stack                        │
│  IPv6 PXE Support                    [Enabled]           │                              │
│  PXE boot wait time                  0                   │                              │
│                                                          │                              │
│                                                          │                              │
│                                                          │                              │
│                                                          │                              │
│                                                          │                              │
│                                                          │ ───────────────────────────  │
│                                                          │ →←: Select Screen            │
│                                                          │ ↑↓: Select Item              │
│                                                          │ Enter: Select                │
│                                                          │ +/-: Change Opt.             │
│                                                          │ F1: General Help             │
│                                                          │ F2: Previous Values          │
│                                                          │ F3: Optimized Defaults       │
│                                                          │ F4: Save & Exit              │
│                                                          │ ESC: Exit                    │
│                                                          │                              │
│                                                          │                              │
└─────────────────────────────────────────────────────────┴──────────────────────────────┘
            Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

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

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

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

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

5.3.10 Power Controller Options

```
              Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
        Advanced

  Bootloader Version              1.00-23            Select Power line for external
  Firmware Version                1.00-43            USB devices, if powered-down
  Mainboard Serial No             0948251130007
  Mainboard Prod. Date (Week.Year) 14.14
  Mainboard BootCount             114
  Mainboard Operation Time        10470min (17h)
  Voltage (Min/Max)                3.10V / 4.80V
  Temperature (Min/Max)           24'C /59'C

  ext. USB-Port Voltage           [Off in S3-5]
  int. USB-Port Voltage           [Off in S3-5]
                                                    ────────────────────────────
  WatchDogTimer Mode              [Normal Mode]
  WDT OSBOOT Timeout              [Disabled]         →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit




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```

✓ **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

✓ **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

5.3.11 CSM Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced

  Compatibility Support Module Configuration              Enable/Disable CSM Support.

  CSM Support                        [Enabled]

  CSM16 Module Version               07.71

  GateA20 Active                     [Upon Request]
  Option ROM Messages                [Force BIOS]
  INT19 Trap Response                [Immediate]

  Boot option filter                 [UEFI and Legacy]
                                                          _____
  Option ROM execution order
                                                          →←: Select Screen
  Network                            [UEFI only]          ↑↓: Select Item
  Storage                            [UEFI only]          Enter: Select
  Video                              [Legacy only]        +/-: Change Opt.
  Other PCI devices                  [UEFI only]          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit




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```

- ✓ **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: UEFI only / Legacy only

5.3.12 SDIO Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced
┌────────────────────────────────────────────────────────┬─────────────────────────────┐
│  SDIO Configuration                                     │ Auto Option: Access SD device │
│                                                         │ in DMA mode if controller    │
│  SDIO Access Mode                    [AUTO]             │ supports it, otherwise in PIO │
│                                                         │ mode. DMA Option: Access SD  │
│                                                         │ device in DMA mode.PIO Option:│
│                                                         │ Access SD device in PIO mode. │
│                                                         │                             │
│                                                         │                             │
│                                                         │                             │
│                                                         │                             │
│                                                         │─────────────────────────────│
│                                                         │ →←: Select Screen            │
│                                                         │ ↑↓: Select Item              │
│                                                         │ Enter: Select                │
│                                                         │ +/-: Change Opt.             │
│                                                         │ F1: General Help             │
│                                                         │ F2: Previous Values          │
│                                                         │ F3: Optimized Defaults       │
│                                                         │ F4: Save & Exit              │
│                                                         │ ESC: Exit                    │
│                                                         │                             │
│                                                         │                             │
└────────────────────────────────────────────────────────┴─────────────────────────────┘
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```

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

5.3.13 USB Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced
```

```
  USB Configuration                                        Enables Legacy USB support.
                                                           AUTO option disables legacy
  USB Module Version              8.11.01                  support if no USB devices are
                                                           connected. DISABLE option will
  USB Devices:                                             keep USB devices available
       1 Keyboard, 2 Hubs                                  only for EFI applications.

  Legacy USB Support              [Enabled]
  XHCI Hand-off                   [Enabled]
  EHCI Hand-off                   [Disabled
  USB Mass Storage Driver Support [Enabled]

                                                           ─────────────────────────
  USB hardware delays and time-outs:                       →←: Select Screen
  USB transfer time-out           [20 sec]                 ↑↓: Select Item
  Device reset time-out           [20 sec]                 Enter: Select
  Device power-up delay           [Manual]                 +/-: Change Opt.
  Device power-up delay in seconds    5                    F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



```
```
            Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **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

5.3.14 Security Configuration

```
          Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
      Advanced

 Intel(R) TXE Configuration                              Send EOP Message Before Enter OS
 TXE                           [Enabled]
 TXE HMRFPO                    [Disabled]
 TXE Firmware Update           [Enabled]
 TXE EOP Message               [Enabled]
 TXE Unconfiguration Perform



                                                         ────────────────────────────
                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit




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```

✓ **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

5.3.15 SIO Configuration

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced
┌─────────────────────────────────────────────────────┬──────────────────────────┐
│  AMI SIO Driver Version:    A5.03.03                  │ View and Set Basic properties │
│                                                       │ of the SIO Logical device.    │
│  Super IO Chip Logical Device(s) Configuration        │ Like IO Base, IRQ Range, DMA  │
│ ▶ [*Active*]  Serial Port  1                           │ Channel and Device Mode.      │
│ ▶ [*Active*]  Serial Port  2                           │                               │
│ ▶ [*Active*]  PS2 Controller(KB&MS)                    │                               │
│                                                       │                               │
│  WARNING: Logical Devices state showing at the left side of │                          │
│  the controll, reflects current Logical Device state.  │                              │
│  Changes made during Setup Session will be shown after you │                          │
│  restart the system.                                  │                               │
│                                                       │ ────────────────────────── │
│                                                       │ →←: Select Screen             │
│                                                       │ ↑↓: Select Item               │
│                                                       │ Enter: Select                 │
│                                                       │ +/-: Change Opt.              │
│                                                       │ F1: General Help              │
│                                                       │ F2: Previous Values           │
│                                                       │ F3: Optimized Defaults        │
│                                                       │ F4: Save & Exit               │
│                                                       │ ESC: Exit                     │
│                                                       │                               │
│                                                       │                               │
└─────────────────────────────────────────────────────┴──────────────────────────┘
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```

✓ **Serial Port X**
Sub menu: see   "Serial Port Configuration" (page 65)

✓ **PS2 Controoler (KB&MS)**
Sub menu: see   "PS2 Controller(KB&MS) Configuration" (page 66)

5.3.15.1 Serial Port Configuration
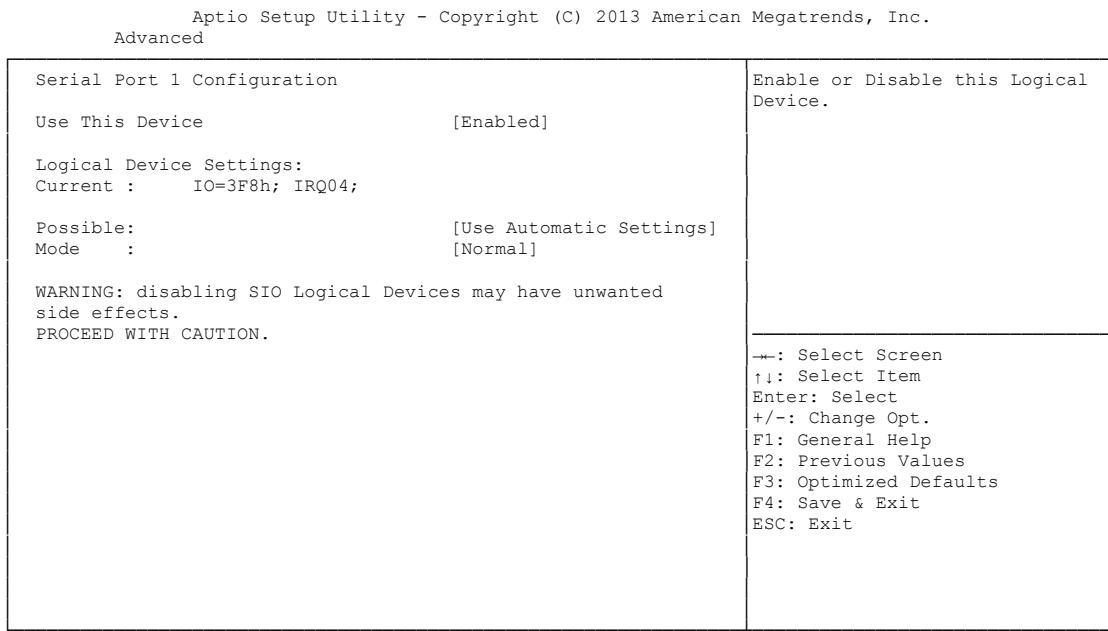
```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced
┌──────────────────────────────────────────────────────┬──────────────────────────────┐
│  Serial Port 1 Configuration                          │ Enable or Disable this Logical│
│                                                       │ Device.                       │
│  Use This Device                     [Enabled]        │                               │
│                                                       │                               │
│  Logical Device Settings:                             │                               │
│  Current :     IO=3F8h; IRQ04;                        │                               │
│                                                       │                               │
│  Possible:                           [Use Automatic Settings]                         │
│  Mode    :                           [Normal]         │                               │
│                                                       │                               │
│  WARNING: disabling SIO Logical Devices may have unwanted                             │
│  side effects.                                        │                               │
│  PROCEED WITH CAUTION.                                │ ─────────────────────────────│
│                                                       │ →←: Select Screen             │
│                                                       │ ↑↓: Select Item               │
│                                                       │ Enter: Select                 │
│                                                       │ +/-: Change Opt.              │
│                                                       │ F1: General Help              │
│                                                       │ F2: Previous Values           │
│                                                       │ F3: Optimized Defaults        │
│                                                       │ F4: Save & Exit               │
│                                                       │ ESC: Exit                     │
│                                                       │                               │
│                                                       │                               │
│                                                       │                               │
└──────────────────────────────────────────────────────┴──────────────────────────────┘
              Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **Use This Device**
   Options: Disabled / Enabled

✓ **Current**
   Options: none

✓ **Possible**
   Options: Use Automatic Settings / IO=3F8h; IRQ=4; DMA / IO=3F8h; IRQ=3,4,5,7,9,10,11,12;
                DMA / IO=2F8h; IRQ 3,4,5,7,9,10,11,12; DMA; / IO=3E8h; IRQ 3,4,5,7,9,10,11,12; DMA;
                / IO=2E8h; IRQ 3,4,5,7,9,10,11,12; DMA;

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

5.3.15.2 PS2 Controller(KB&MS) Configuration
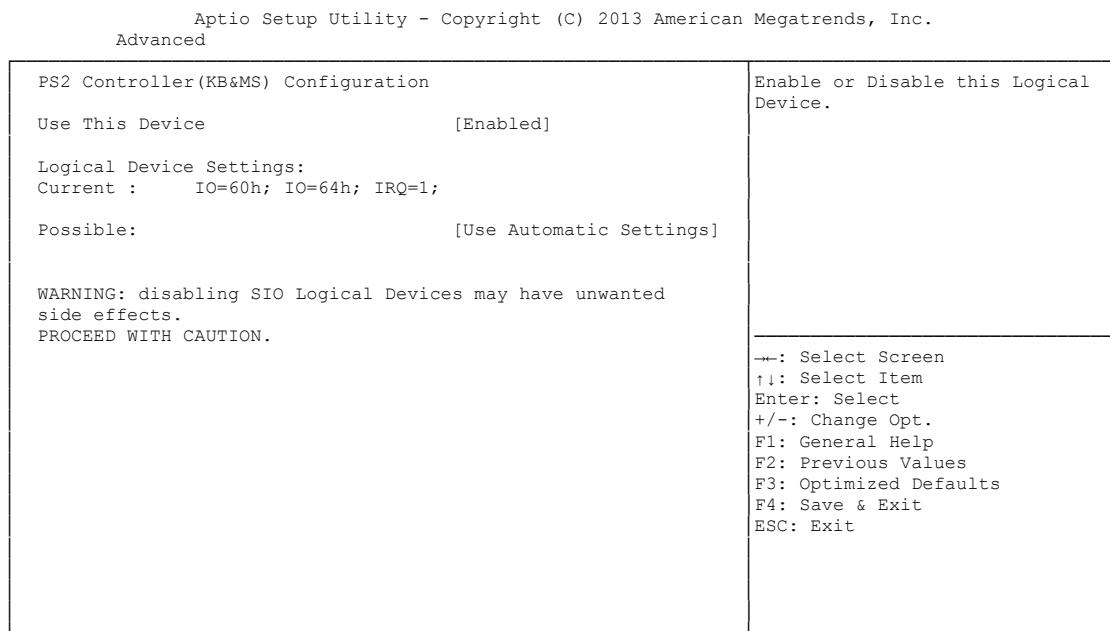
```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced
 ┌─────────────────────────────────────────────────────────┬──────────────────────────────┐
 │ PS2 Controller(KB&MS) Configuration                      │ Enable or Disable this Logical│
 │                                                          │ Device.                       │
 │ Use This Device                    [Enabled]             │                               │
 │                                                          │                               │
 │ Logical Device Settings:                                 │                               │
 │ Current :      IO=60h; IO=64h; IRQ=1;                    │                               │
 │                                                          │                               │
 │ Possible:                          [Use Automatic Settings]│                             │
 │                                                          │                               │
 │                                                          │                               │
 │ WARNING: disabling SIO Logical Devices may have unwanted │                               │
 │ side effects.                                            │                               │
 │ PROCEED WITH CAUTION.                                    │───────────────────────────────│
 │                                                          │→←: Select Screen              │
 │                                                          │↑↓: Select Item                │
 │                                                          │Enter: Select                  │
 │                                                          │+/-: Change Opt.               │
 │                                                          │F1: General Help               │
 │                                                          │F2: Previous Values            │
 │                                                          │F3: Optimized Defaults         │
 │                                                          │F4: Save & Exit                │
 │                                                          │ESC: Exit                      │
 │                                                          │                               │
 │                                                          │                               │
 │                                                          │                               │
 └─────────────────────────────────────────────────────────┴──────────────────────────────┘
              Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **Use This Device**
  Options: Disabled / Enabled

- ✓ **Current**
  Options: none

- ✓ **Possible**
  Options: Use Automatic Settings / IO=60h; IO=64h; IRQ=1;

5.4 Chipset

```
         Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main   Advanced   CHIPSET   Boot   Security   Save & Exit
```
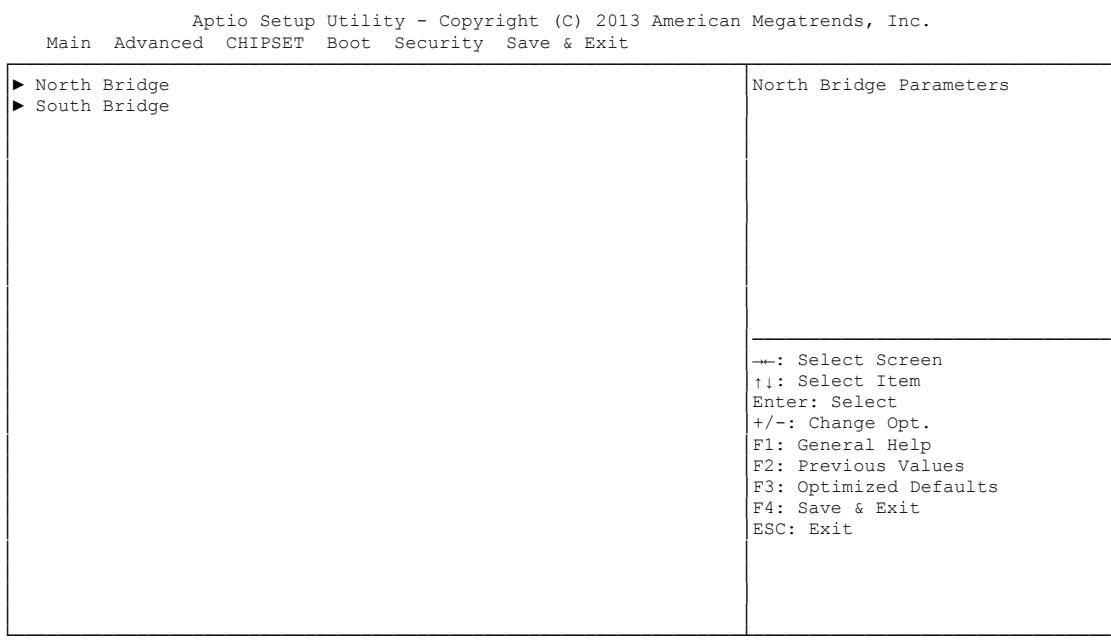
```
┌────────────────────────────────────────────────┬─────────────────────────────────┐
│  ▶ North Bridge                                 │ North Bridge Parameters         │
│  ▶ South Bridge                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │                                 │
│                                                 │─────────────────────────────────│
│                                                 │ →←: Select Screen               │
│                                                 │ ↑↓: Select Item                 │
│                                                 │ Enter: Select                   │
│                                                 │ +/-: Change Opt.                │
│                                                 │ F1: General Help                │
│                                                 │ F2: Previous Values             │
│                                                 │ F3: Optimized Defaults          │
│                                                 │ F4: Save & Exit                 │
│                                                 │ ESC: Exit                       │
│                                                 │                                 │
│                                                 │                                 │
└────────────────────────────────────────────────┴─────────────────────────────────┘
         Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **North Bridge**
Sub menu: see   "North Bridge" (page 68)

✓ **South Bridge**
Sub menu: see   "South Bridge" (page 72)

5.4.1   North Bridge

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    Chipset
┌──────────────────────────────────────────────────────┬─────────────────────────────┐
│ ▶ Intel IGD Configuration                             │ Config Intel IGD Settings.  │
│ ▶ Graphics Power Management Control                   │                             │
│                                                       │                             │
│   Memory Information                                  │                             │
│                                                       │                             │
│   Total Memory                       8192 MB (LPDDR3) │                             │
│                                                       │                             │
│   Memory Slot0                       8192 MB (LPDDR3) │                             │
│   Memory Slot1                       Not Present      │                             │
│                                                       │                             │
│   Max TOLUD                          [Dynamic]        │                             │
│                                                       ├─────────────────────────────│
│                                                       │ →←: Select Screen           │
│                                                       │ ↑↓: Select Item             │
│                                                       │ Enter: Select               │
│                                                       │ +/-: Change Opt.            │
│                                                       │ F1: General Help            │
│                                                       │ F2: Previous Values         │
│                                                       │ F3: Optimized Defaults      │
│                                                       │ F4: Save & Exit             │
│                                                       │ ESC: Exit                   │
│                                                       │                             │
│                                                       │                             │
│                                                       │                             │
└──────────────────────────────────────────────────────┴─────────────────────────────┘
              Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **Intel IGD Configuration**
  Sub menu: see   "Intel IGD Configuration" (page 69)

- ✓ **Graphics Power Management Control**
  Sub menu: see   "Graphics Power Management Control" (page 71)

- ✓ **Total Memory**
  Options: none

- ✓ **Memory SlotX**
  Options: none

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

5.4.1.1   Intel IGD Configuration

```
           Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                 Chipset
 ┌──────────────────────────────────────────────────┬──────────────────────────┐
 │  GOP Configuration                                │ Enable: Enable Integrated│
 │  Enable GOP-driver via CSM Configuration-Video    │ Graphics Device (IGD)    │
 │                                                   │ when selected as the     │
 │  Intel IGD Configuration                          │ Primary Video            │
 │                                                   │ Adaptor. Disable: Always │
 │  Integrated Graphics Device        [Enabled]      │ disable IGD              │
 │                                                   │                          │
 │  IGD Turbo Enable                  [Enabled]      │                          │
 │  Primary Display                   [IGD]          │                          │
 │  PAVC                              [LITE Mode]    │                          │
 │  DVMT Pre-Allocated                [64M]          │                          │
 │  DVMT Total Gfx Mem                [256MB]        │──────────────────────────│
 │  Aperture Size                     [256MB]        │→←: Select Screen         │
 │  DOP CG                            [Enabled]      │↑↓: Select Item           │
 │  GTT Size                          [2MB]          │Enter: Select             │
 │  Spread Spectrum Clock             [Disabled]     │+/-: Change Opt.          │
 │                                                   │F1: General Help          │
 │  ISP Enable/Disable                [Enabled]      │F2: Previous Values       │
 │  ISP PCI Device Selection          [Disabled]     │F3: Optimized Defaults    │
 │                                                   │F4: Save & Exit           │
 │  Vcc, Vnn Configuration for Power state2:         │ESC: Exit                 │
 │  Vcc_Vnn Config for Power state2   [Disabled]     │                          │
 │                                                   │                          │
 │                                                   │                          │
 │                                                   │                          │
 └──────────────────────────────────────────────────┴──────────────────────────┘
           Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

✓ **ISP PCI Device Selection**

5.4.1.2   Graphics Power Management Control

```
                    Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                         Chipset
 ┌─────────────────────────────────────────────────────────┬────────────────────────────┐
 │ Graphics Power Management Control                        │ Check to enable render standby │
 │ RC6(Render Standby)                     [Enabled]        │ support.                   │
 │                                                          │                            │
 │                                                          │                            │
 │                                                          │                            │
 │                                                          │                            │
 │                                                          │                            │
 │                                                          │ ───────────────────────────│
 │                                                          │ →←: Select Screen          │
 │                                                          │ ↑↓: Select Item            │
 │                                                          │ Enter: Select              │
 │                                                          │ +/-: Change Opt.           │
 │                                                          │ F1: General Help           │
 │                                                          │ F2: Previous Values        │
 │                                                          │ F3: Optimized Defaults     │
 │                                                          │ F4: Save & Exit            │
 │                                                          │ ESC: Exit                  │
 │                                                          │                            │
 │                                                          │                            │
 │                                                          │                            │
 └─────────────────────────────────────────────────────────┴────────────────────────────┘
                    Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

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

5.4.2 South Bridge

```
                 Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
                     Chipset
┌─────────────────────────────────────────────────────┬───────────────────────────────────┐
│ ▶ Azalia HD Audio                                    │ Azalia HD Audio Options           │
│ ▶ USB Configuration                                  │                                   │
│ ▶ PCI Express Configuration                          │                                   │
│                                                      │                                   │
│   High Precision Timer              [Enabled]        │                                   │
│   Restore AC Power Loss             [Power On]       │                                   │
│                                                      │                                   │
│   Onboard Device Configuration                       │                                   │
│   Onboard Gigabit LAN 1             [Enabled]        │                                   │
│   Onboard Gigabit LAN 2             [Enabled]        │                                   │
│   Onboard Gigabit LAN 3             [Enabled]        │                                   │
│                                                      ├───────────────────────────────────┤
│                                                      │ →←: Select Screen                 │
│                                                      │ ↑↓: Select Item                   │
│                                                      │ Enter: Select                     │
│                                                      │ +/-: Change Opt.                  │
│                                                      │ F1: General Help                  │
│                                                      │ F2: Previous Values               │
│                                                      │ F3: Optimized Defaults            │
│                                                      │ F4: Save & Exit                   │
│                                                      │ ESC: Exit                         │
│                                                      │                                   │
│                                                      │                                   │
│                                                      │                                   │
└─────────────────────────────────────────────────────┴───────────────────────────────────┘
              Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **Azalia HD Audio**
  Sub menu: see   "Azalia HD Audio" (page 73)

- ✓ **USB Configuration**
  Sub menu: see   "Azalia HD Audio" (page 73)

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

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

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

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

5.4.2.1   Azalia HD Audio

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    Chipset
 ┌─────────────────────────────────────────────────────┬───────────────────────────┐
 │  Audio Configuration                                 │ Control Detection of the  │
 │                                                      │ Azalia device. Disabled = │
 │                                                      │ Azalia will be unconditionally │
 │  Audio Controller              [Enabled]             │                           │
 │   Azalia VCi Enable            [Enabled]             │                           │
 │   Azalia PME Enable            [Enabled]             │                           │
 │   Azalia HDMI Codec            [Enabled]             │                           │
 │    HDMI Port B                 [Enabled]             │                           │
 │    HDMI Port C                 [Enabled]             │                           │
 │                                                      │ ─────────────────────────│
 │                                                      │ →←: Select Screen         │
 │                                                      │ ↑↓: Select Item           │
 │                                                      │ Enter: Select             │
 │                                                      │ +/-: Change Opt.          │
 │                                                      │ F1: General Help          │
 │                                                      │ F2: Previous Values       │
 │                                                      │ F3: Optimized Defaults    │
 │                                                      │ F4: Save & Exit           │
 │                                                      │ ESC: Exit                 │
 │                                                      │                           │
 │                                                      │                           │
 │                                                      │                           │
 └─────────────────────────────────────────────────────┴───────────────────────────┘
            Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **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

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                Chipset
┌─────────────────────────────────────────────────────┬───────────────────────────┐
│  USB Configuration                                    │ Mode of operation of xHCI │
│                                                       │ controller                │
│  XHCI Mode                          [Enabled]         │                           │
│  USB2 Link Power Management         [Enabled]         │                           │
│                                                       │                           │
│  USB 2.0(EHCI) Support              [Disabled]        │                           │
│  USB Per Port Control               [Enabled]         │                           │
│  USB Port 0                         [Enabled]         │                           │
│  USB Port 1                         [Enabled]         │                           │
│  USB Port 2                         [Enabled]         │                           │
│  USB Port 3                         [Enabled]         │                           │
│                                                       ├───────────────────────────│
│                                                       │ →←: Select Screen         │
│                                                       │ ↑↓: Select Item           │
│                                                       │ Enter: Select             │
│                                                       │ +/-: Change Opt.          │
│                                                       │ F1: General Help          │
│                                                       │ F2: Previous Values       │
│                                                       │ F3: Optimized Defaults    │
│                                                       │ F4: Save & Exit           │
│                                                       │ ESC: Exit                 │
│                                                       │                           │
│                                                       │                           │
│                                                       │                           │
└─────────────────────────────────────────────────────┴───────────────────────────┘
          Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **XHCI Mode**
  Options: Enabled / Disabled / Auto / Smart Auto

- ✓ **USB2 Link Power Management**
  Options: Enabled / Disabled

- ✓ **USB 2.0(EHCI) Support**
  Options: Disabled / Enabled

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

- ✓ **USB Port x**
  Options: Disabled / Enabled
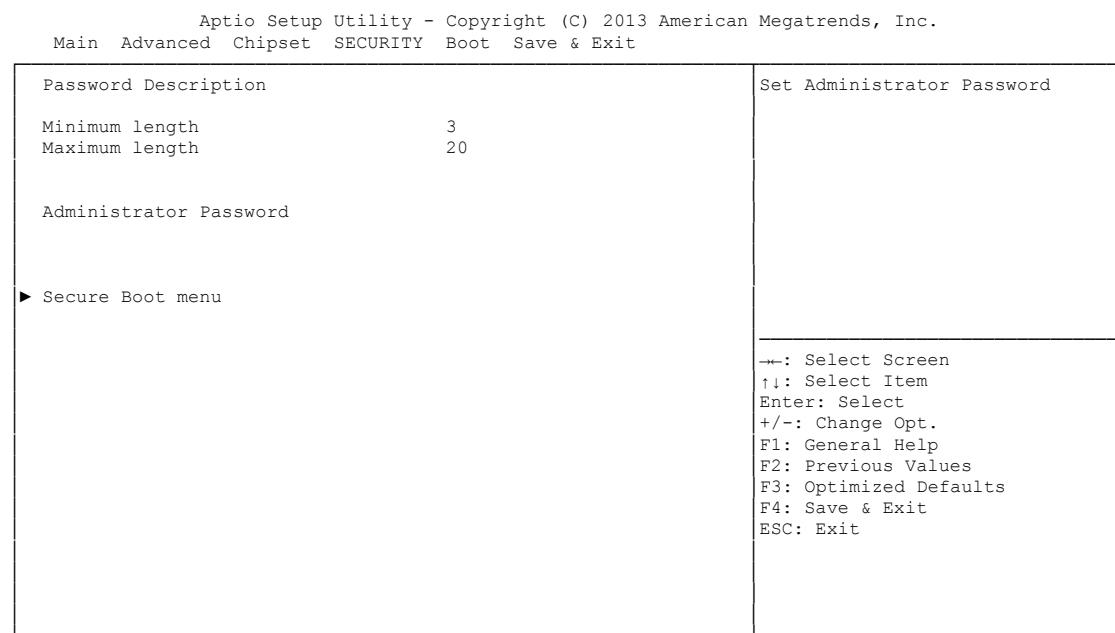
5.4.2.3   PCI Express Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                  Chipset
┌──────────────────────────────────────────────────┬──────────────────────────┐
│  PCI Express Configuration                         │ Enable or Disable the PCI│
│                                                    │ Express Port 2 and Port 3 in│
│  PCI Express Port 0 is assigned to LAN 1           │ the Chipset.             │
│  PCI Express Port 1 is assigned to LAN 2           │                          │
│  PCI Express Port 2 is assigned to LAN 3           │                          │
│                                                    │                          │
│  PCI Express Port 3              [Enabled]         │                          │
│   Hot Plug                       [Disabled]        │                          │
│   Speed                          [Auto]            │                          │
│  Extra Bus Reserved              0                 │                          │
│  Reserved Memory                 10                │                          │
│  Reserved Memory Alignment       1                 │──────────────────────────│
│  Prefetchable Memory             10                │ →←: Select Screen        │
│  Prefetchable Memory Alignment   1                 │ ↑↓: Select Item          │
│  Reserved I/O                    4                 │ Enter: Select            │
│                                                    │ +/-: Change Opt.         │
│                                                    │ F1: General Help         │
│                                                    │ F2: Previous Values      │
│                                                    │ F3: Optimized Defaults   │
│                                                    │ F4: Save & Exit          │
│                                                    │ ESC: Exit                │
│                                                    │                          │
│                                                    │                          │
│                                                    │                          │
└──────────────────────────────────────────────────┴──────────────────────────┘
            Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

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

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

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

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

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

✓ **Reserved Memory Alignment**
   Options: 0...31

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

✓ **Prefetchable Memory Alignment**
   Options: 0...31

✓ **Reserved I/O**
   Options: 0 / 4 / 8 / 12 / 16 / 20

5.5 Security

```
           Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main  Advanced  Chipset  SECURITY  Boot  Save & Exit
 ┌─────────────────────────────────────────────────┬─────────────────────────────┐
 │ Password Description                             │ Set Administrator Password  │
 │                                                  │                             │
 │ Minimum length                3                  │                             │
 │ Maximum length                20                 │                             │
 │                                                  │                             │
 │                                                  │                             │
 │ Administrator Password                           │                             │
 │                                                  │                             │
 │                                                  │                             │
 │ ► Secure Boot menu                               │                             │
 │                                                  │                             │
 │                                                  ├─────────────────────────────│
 │                                                  │ →←: Select Screen           │
 │                                                  │ ↑↓: Select Item             │
 │                                                  │ Enter: Select               │
 │                                                  │ +/-: Change Opt.            │
 │                                                  │ F1: General Help            │
 │                                                  │ F2: Previous Values         │
 │                                                  │ F3: Optimized Defaults      │
 │                                                  │ F4: Save & Exit             │
 │                                                  │ ESC: Exit                   │
 │                                                  │                             │
 │                                                  │                             │
 │                                                  │                             │
 └─────────────────────────────────────────────────┴─────────────────────────────┘
           Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **Secure Boot menu**
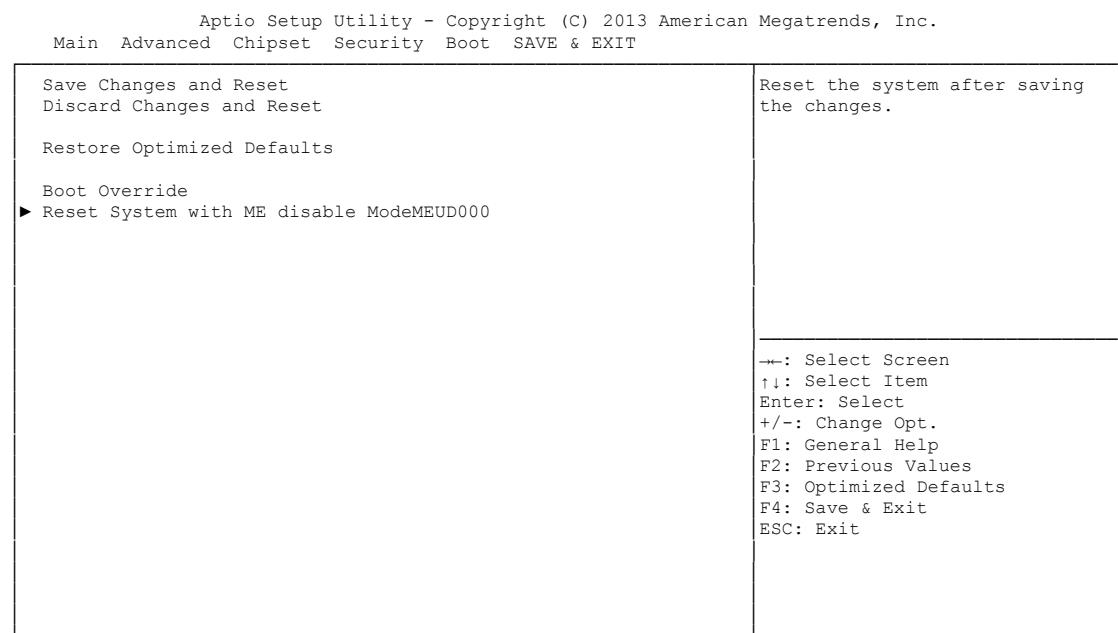Sub menu: see "Secure Boot menu" (page 77)

5.5.1   Secure Boot menu

```
             Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
      Main  Advanced  Chipset  SECURITY  Boot  Save & Exit

   ┌─────────────────────────────────────────────────┬──────────────────────────────┐
   │                                                 │ Secure Boot can be enabled if│
   │   Sytem Mode                      Setup         │ 1.System running in User mode│
   │   Secure Boot                     Not Active    │ with enrolled Platform Key(PK)│
   │                                                 │ 2.CSM function is disabled   │
   │   Secure Boot                     [Disabled]    │                              │
   │   Secure Boot Mode                [Custom]      │                              │
   │ ▶ Key Management                                │                              │
   │                                                 │                              │
   │                                                 │                              │
   │                                                 │                              │
   │                                                 │ ─────────────────────────────│
   │                                                 │ →←: Select Screen            │
   │                                                 │ ↑↓: Select Item              │
   │                                                 │ Enter: Select                │
   │                                                 │ +/-: Change Opt.             │
   │                                                 │ F1: General Help             │
   │                                                 │ F2: Previous Values          │
   │                                                 │ F3: Optimized Defaults       │
   │                                                 │ F4: Save & Exit              │
   │                                                 │ ESC: Exit                    │
   │                                                 │                              │
   │                                                 │                              │
   └─────────────────────────────────────────────────┴──────────────────────────────┘
             Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

✓ **System Mode**
   Options: none

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

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

✓ **Key Management**
   Sub menu: see   "Key Management" (page 78)

5.5.1.1   Key Management

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                               Security

  Default Key Provision            [Enabled]                   Install Factory default Secure
                                                               Boot Keys when System is in
▶ Enroll All Factory Default Keys                              Setup Mode.K,KEK,db,dbt,dbx).
▶ Save   All Secure Boot Variables                             Change takes effect after
                                                               reboot.
  Platform Key
▶ Delete PK                        INSTALLED
▶ Set new PK

  Key Exchange Key                 INSTALLED
▶ Delete  KEK
▶ Set new KEK                                                  ─────────────────────────────
▶ Append  KEK
  Authorized Signatures            INSTALLED                   →←: Select Screen
▶ Delete  DB                                                   ↑↓: Select Item
▶ Set new DB                                                   Enter: Select
▶ Append  DB                                                   +/-: Change Opt.
  Authorized TimeStamps            NOT INSTALLED               F1: General Help
▶ Delete  DBT                                                  F2: Previous Values
▶ Set new DBT                                                  F3: Optimized Defaults
▶ Append  DBT                                                  F4: Save & Exit
  Forbidden Signatures             INSTALLED                   ESC: Exit
▶ Delete  DBX
▶ Set new DBX
▶ Append  DBX

                Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **Default Key Provision**
  Options: Disabled / Enabled

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

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

- ✓ **Delete PK**
  Options: Press [Enter]

- ✓ **Set new PK**
  Options: Press [Enter]

- ✓ **Delete KEK**
  Options: Press [Enter]

- ✓ **Set new KEK**
  Options: Press [Enter]

- ✓ **Append KEK**
  Options: Press [Enter]

- ✓ **Delete DB**
  Options: Press [Enter]

- ✓ **Set new DB**
  Options: Press [Enter]

- ✓ **Append DB**
  Options: Press [Enter]

✓ **Delete DBT**
  Options: Press [Enter]

✓ **Set new DBT**
  Options: Press [Enter]

✓ **Append DBT**
  Options: Press [Enter]

✓ **Delete DBX**
  Options: Press [Enter]

✓ **Set new DBX**
  Options: Press [Enter]

✓ **Append DBX**
  Options: Press [Enter]

5.6 Boot

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          Main  Advanced  Chipset  Security  BOOT  Save & Exit

      ┌─────────────────────────────────────────────────────┬──────────────────────────┐
      │ Boot Configuration                                  │ Number of 1/10 sec. to wait │
      │ Setup Prompt Timeout           5                    │ for setup activation key. 0 │
      │ Bootup NumLock State           [On]                 │ means no wait.             │
      │                                                     │                            │
      │ Full Screen Logo               [Enabled]            │                            │
      │ Fast Boot                      [Enabled]            │                            │
      │  VGA Support                   [EFI Driver]         │                            │
      │  USB Support                   [Partial Initial]    │                            │
      │  PS2 Devices Support           [Enabled]            │                            │
      │  NetWork Stack Driver Support  [Disabled]           │                            │
      │                                                     │                            │
      │ Boot mode select               [LEGACY]             │                            │
      │                                                     │ ──────────────────────────  │
      │ FIXED BOOT ORDER Priorities                         │ →←: Select Screen          │
      │ Boot Option #1                 [Hard Disk]          │ ↑↓: Select Item            │
      │ Boot Option #2                 [CD/DVD]             │ Enter: Select              │
      │ Boot Option #3                 [USB Hard Disk]      │ +/-: Change Opt.           │
      │ Boot Option #4                 [USB CD/DVD]         │ F1: General Help           │
      │ Boot Option #5                 [USB Key]            │ F2: Previous Values        │
      │ Boot Option #6                 [USB Floppy]         │ F3: Optimized Defaults     │
      │ Boot Option #7                 [Network]            │ F4: Save & Exit            │
      │                                                     │ ESC: Exit                  │
      │                                                     │                            │
      │                                                     │                            │
      │                                                     │                            │
      └─────────────────────────────────────────────────────┴──────────────────────────┘
                Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **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: Review or change the sequence of available boot devices

5.7 Save & Exit

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  SAVE & EXIT
 ┌─────────────────────────────────────────────┬───────────────────────────────┐
 │ Save Changes and Reset                       │ Reset the system after saving │
 │ Discard Changes and Reset                    │ the changes.                  │
 │                                              │                               │
 │ Restore Optimized Defaults                   │                               │
 │                                              │                               │
 │ Boot Override                                │                               │
 │▶ Reset System with ME disable ModeMEUD000    │                               │
 │                                              │                               │
 │                                              │                               │
 │                                              │                               │
 │                                              ├───────────────────────────────│
 │                                              │ →←: Select Screen             │
 │                                              │ ↑↓: Select Item               │
 │                                              │ Enter: Select                 │
 │                                              │ +/-: Change Opt.              │
 │                                              │ F1: General Help              │
 │                                              │ F2: Previous Values           │
 │                                              │ F3: Optimized Defaults        │
 │                                              │ F4: Save & Exit               │
 │                                              │ ESC: Exit                     │
 │                                              │                               │
 │                                              │                               │
 │                                              │                               │
 └─────────────────────────────────────────────┴───────────────────────────────┘
            Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

- ✓ **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.

⚠ *CAUTION*

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.

⚠ *CAUTION*

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

6.1 PCB: Mounting Holes

A true dimensioned drawing can be found in the PC/104 specification.

> [i] *NOTE*

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

Mounting Holes H1-H4: Inner diameter 126; Outer diameter 252
Mounting Holes H5-H9: Inner diameter 106; Outer diameter 177
Dimension = mil
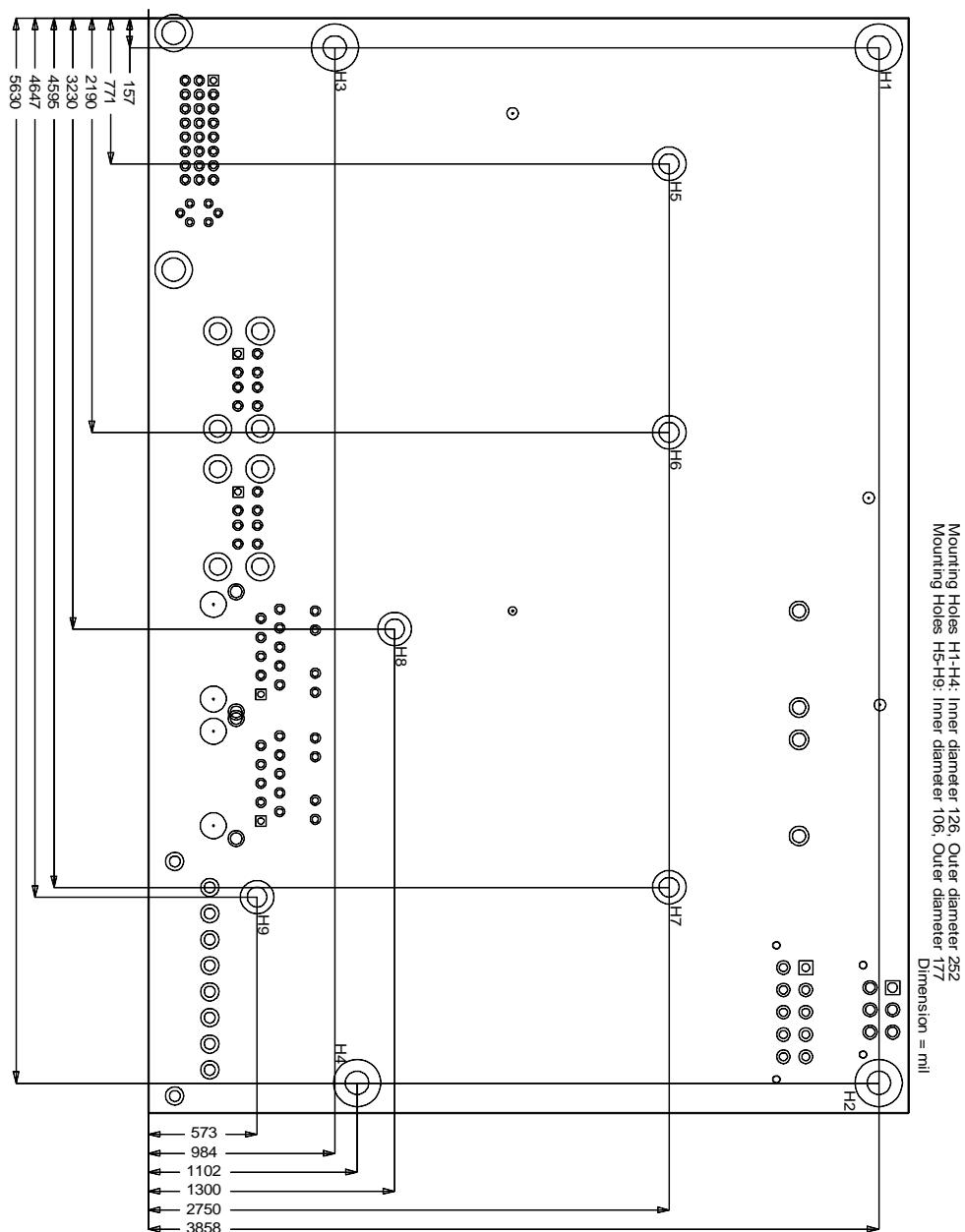
6.2   PCB: Pin 1 Dimensions

⌷ *NOTE*

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

6.3 PCB: Die Center

i *NOTE*
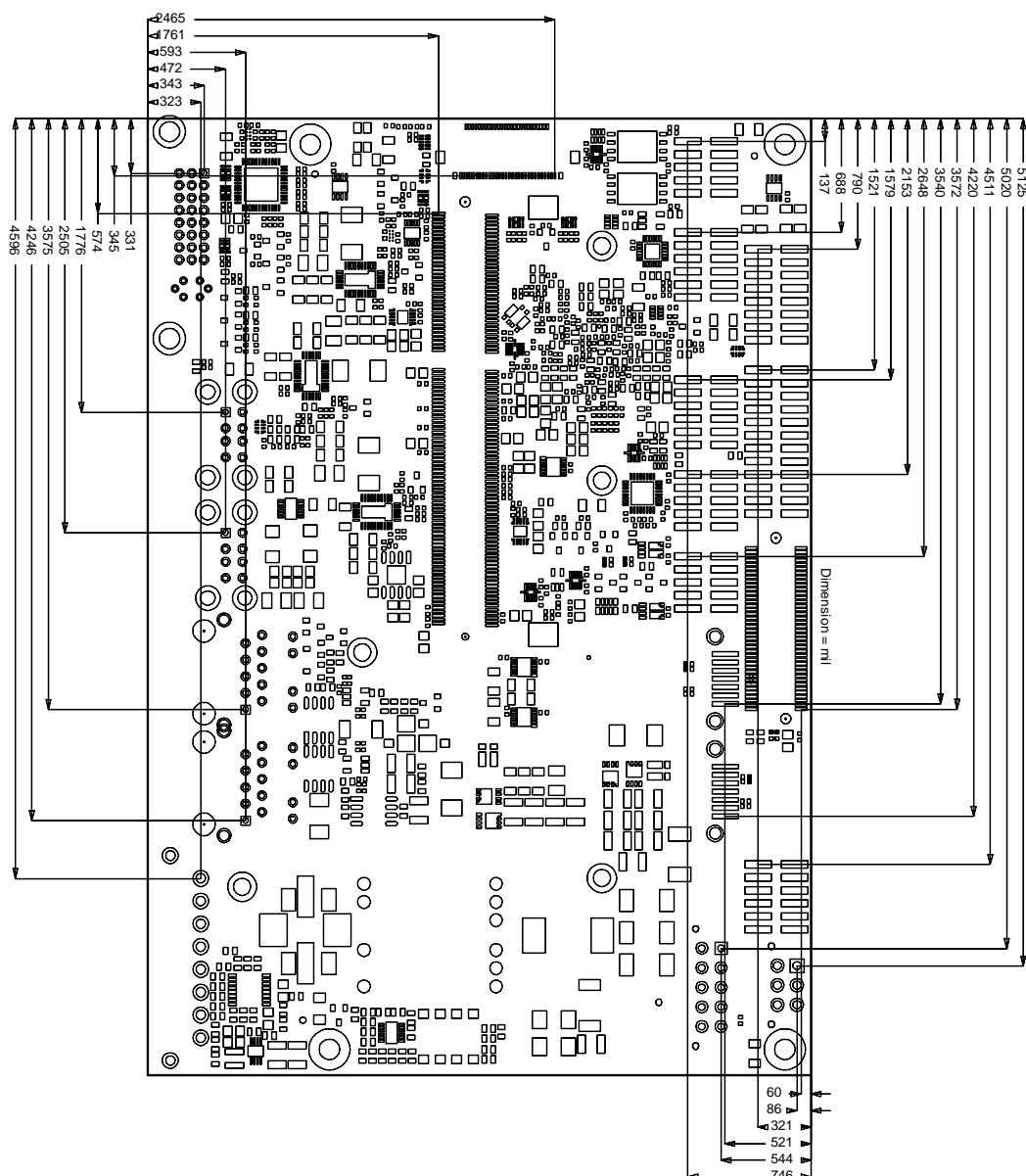
All dimensions are in mil (1 mil = 0,0254 mm)
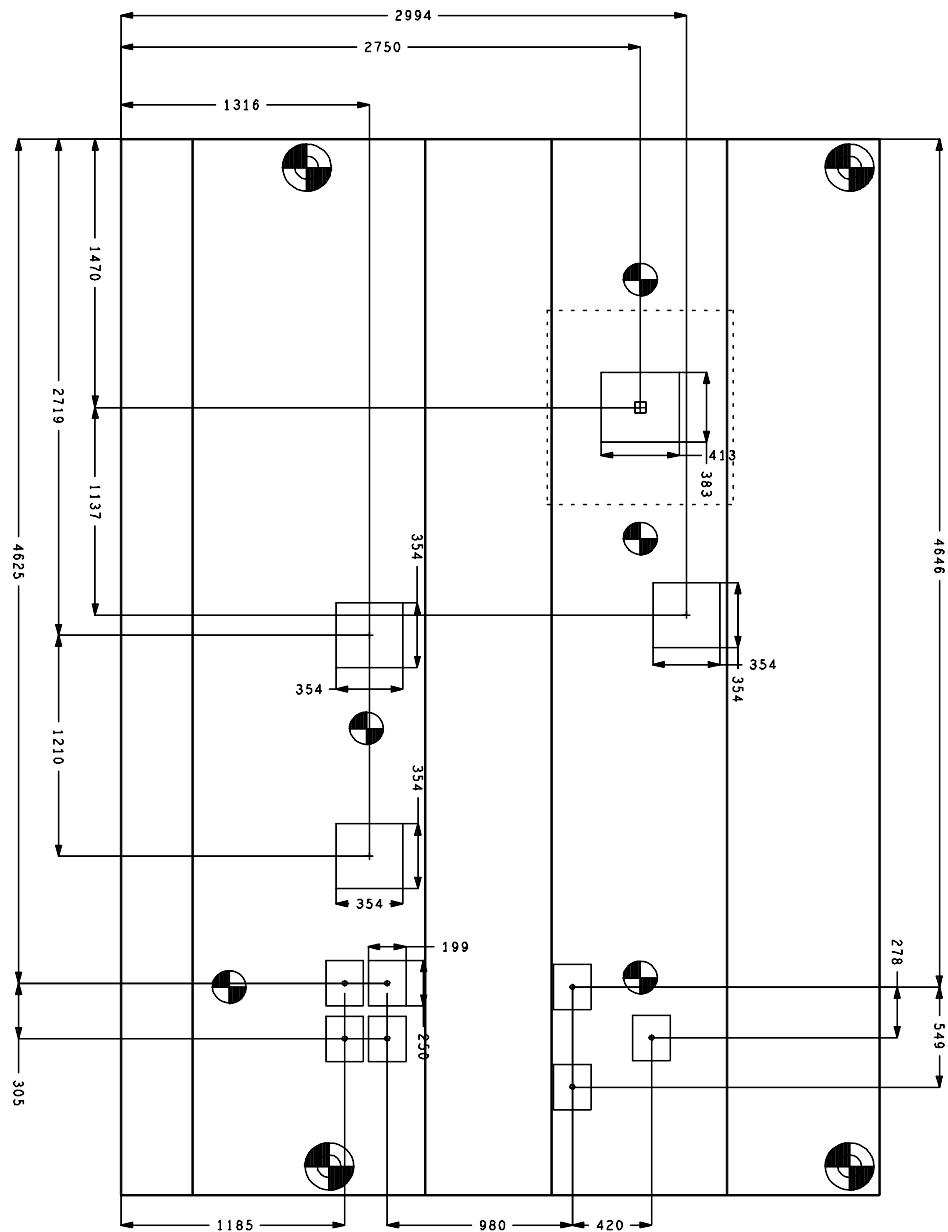
6.4 Gehäusemontage Heat Spreader

In der Zeichnung unten sind die Bohrlöcher dargestellt, die auf allen erhältlichen Kühlkörpern verfügbar sind. Diese Bohrlöcher können zur Befestigung des Moduls in einem Gehäuse oder an anderen Komponenten verwendet werden.

> ℹ️ *HINWEIS*

Maßangaben in Inch (1 in = 2,54cm; 1 mil = 0,0254 mm)
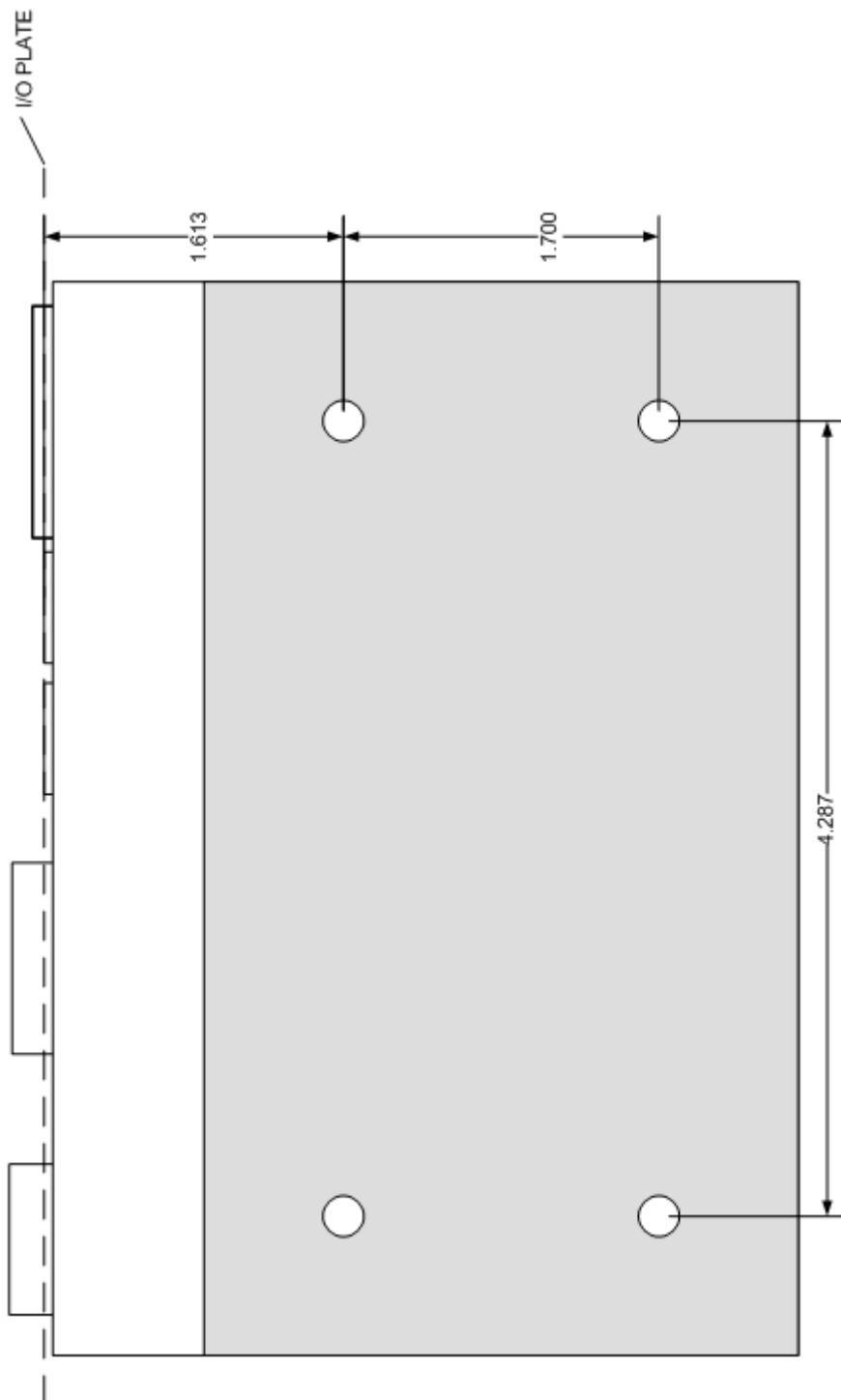
7 Technical Data

7.1 Electrical Data

Power Supply:

Board:	5 Volt +/- 5% (5 Volt Suspend / 12 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

⚠️ *CAUTION*

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.

⚠ *CAUTION*

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

IO Range

The used resources depend on setup settings.
The given values are ranges, which are fixed by AT compatibility. Other IO ranges are used, which are dynamically adjusted by Plug & Play BIOS while booting.

Adress	Function
0-FF	Reserved IO area of the board
170-17F	
1F0-1F7	
278-27F	
2E8-2EF	
2F8-2FF	COM2
370-377	
378-37F	
3BC-3BF	
3E8-3EF	
3F0-3F7	
3F8-3FF	COM1

Memory Range

The used resources depend on setup settings.
If the entire range is clogged through option ROMs, these functions do not work anymore.

Adress	Function
A0000-BFFFF	VGA-RAM
90927000-909277FF	AHCI BIOS / RAID / PXE (if available)
FF000000-FFFFFFFF	Intel(R) 82802 Firmwarehub

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	COM2
IRQ4	COM1
IRQ5	
IRQ6	
IRQ7	
IRQ8	RTC
IRQ9	
IRQ10	
IRQ11	
IRQ12	
IRQ13	

Adress	Function
IRQ14	
IRQ15	

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	18	0	SD Host Control (DMA) ID0F16h
	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
	A	-	3	0	0	Ethernet Controller x1 ID1533h

SMB Devices

The following table contains all reserved SM-Bus device addresses in 8-bit notation. Note that external devices must not use any of these addresses even if the component mentioned in the table is not present on the motherboard.

Address	Function
10-11	Standard slave address
40-41	GPIO
60-61	BIOS internal
70-73	POST code output
88-89	BIOS-defined slave address
A0-A1	DIMM 1
A2-A3	DIMM 2
A4-AF	BIOS internal
B0-BF	BIOS internal
D2-D3	Clock