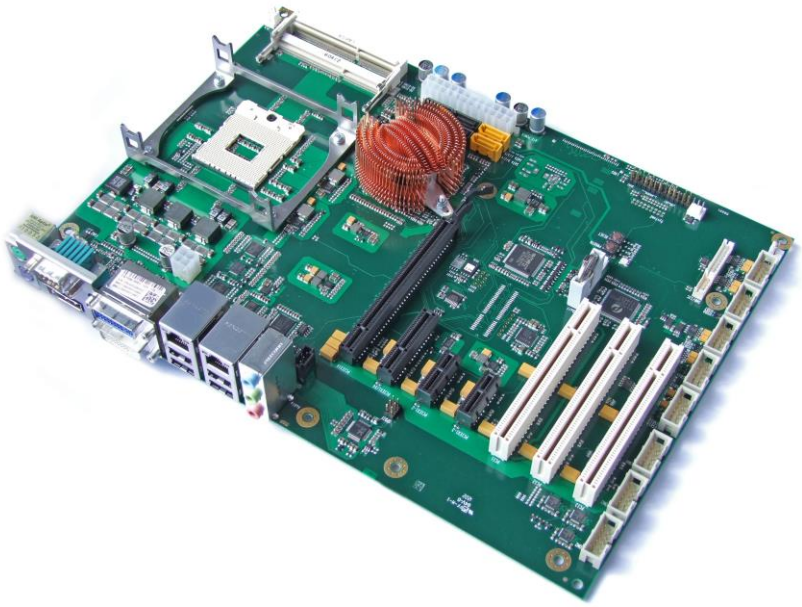
BECKHOFF

CB1056

Manual

rev 0.5



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Contents

0 Document History

Version	Changes
0.1	first pre-release
0.2	updated BIOS setup
0.3	updated BIOS setup
0.4	chapter 3.5.1: amended note
0.5	updated chapter 3.4.9; updated LAN pinout in chapter 3.2.6

NOTE

1 Introduction

1.1 Notes on the Documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards. It is essential that the following notes and explanations are followed when installing and commissioning these components.

1.1.1 Liability Conditions

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.
The documentation has been prepared with care. The products described are, however, constantly under development. For that reason the documentation is not in every case checked for consistency with performance data, standards or other characteristics. None of the statements of this manual represents a guarantee (Garantie) in the meaning of § 443 BGB of the German Civil Code or a statement about the contractually expected fitness for a particular purpose in the meaning of § 434 par. 1 sentence 1 BGB. In the event that it contains technical or editorial errors, we retain the right to make alterations at any time and without warning. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

1.1.2 Copyright

1.2 Safety Instructions

Please consider the following safety instructions and descriptions. Product specific safety instructions are to be found on the following pages or in the areas mounting, wiring, commissioning etc.

1.2.1 Disclaimer

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH.

1.2.2 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.

1.3 Essential Safety Measures

1.3.1 Operator's Obligation to Exercise Diligence

The operator must ensure that

- the product is only used for its intended purpose
- the product is only operated in sound condition and in working order
- the instruction manual is in good condition and complete, and always available for reference at the location where the products are used
- the product is only used by suitably qualified and authorised personnel
- the personnel is instructed regularly about relevant occupational safety and environmental protection aspects
- the operating personnel is familiar with the operating manual and in particular the safety notes contained herein

1.3.2 National Regulations Depending on the Machine Type

Depending on the type of machine and plant in which the product is used, national regulations governing the controllers of such machines will apply, and must be observed by the operator. These regulations cover, amongst other things, the intervals between inspections of the controller. The operator must initiate such inspections in good time.

1.3.3 Operator Requirements

- Read the operating instructions

All users of the product must have read the operating instructions for the system they work with.

- System know-how

All users must be familiar with all accessible functions of the product.

1.4 Functional Range

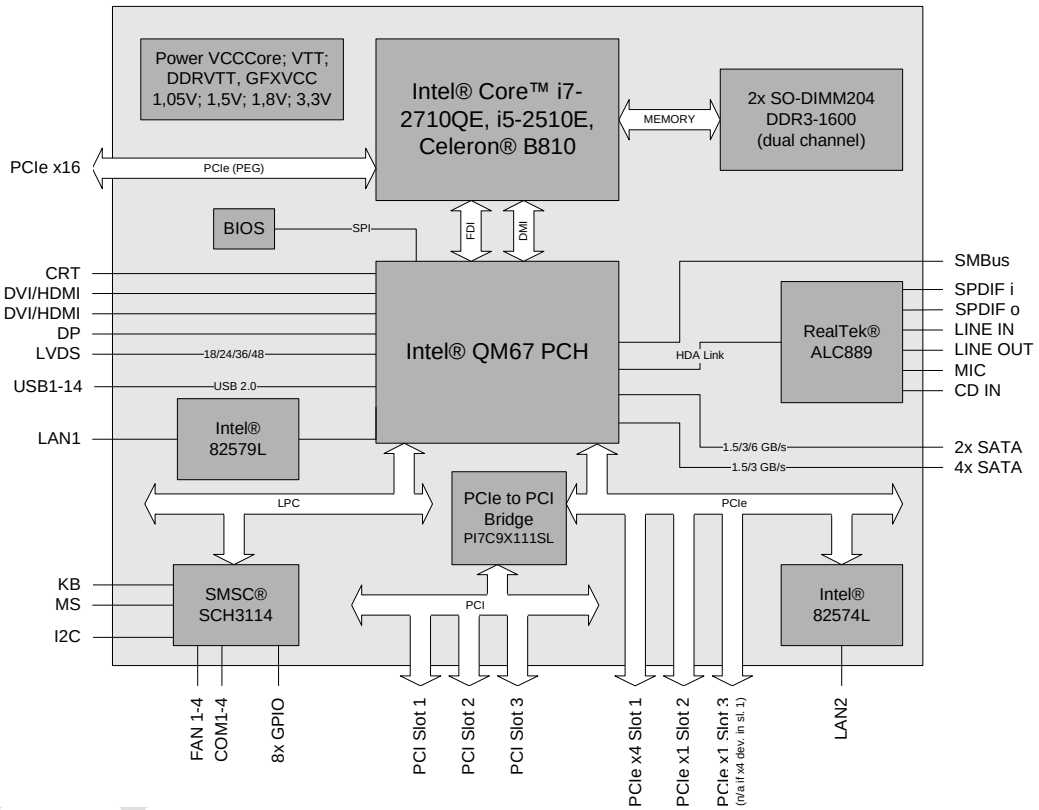
NOTE

The descriptions contained in the present documentation represent a detailed and extensive product description. As far as the described motherboard was acquired as an integral component of an Industrial PC from Beckhoff Automation GmbH, this product description shall be applied only in limited scope. Only the contractually agreed specifications of the corresponding Industrial PC from Beckhoff Automation GmbH shall be relevant. Due to several models of Industrial PCs, variations in the component placement of the motherboards are possible. Support and service benefits for the built-in motherboard will be rendered by Beckhoff Automation GmbH exclusively as specified in the product description (inclusive operation system) of the particular Industrial PC.

2 Overview

2.1 Features

The CB1056 is a computer motherboard for industrial applications. Complying to the ATX form factor and based on Intel®'s QM67 PCH chipset, it is equipped with an rPGA988B CPU socket for Intel® CPUs of the 2nd Generation Core™ and Celeron® families. Modern DDR3 technology provides top-notch memory performance, accommodating up to 16 GByte of RAM (DDR3-1066/1333/1600) via SO-DIMM204. Expansion cards can be added into three PCI slots, two PCIeX1 slots, one PCIeX4 slot and one PCIeX16 slots. The CB1056 also offers a wide range of internal and external connectors, such as four serial ports, two LAN connectors, 14 USB channels, six SATA connectors (two of which offering up to 6Gb/s), digital and analogue audio, VGA/DVI/HDMI connectors, DisplayPort connector, LCD connector, etc.



- Socket rPGA988B
- Suitable CPUs: Intel® Core™ i7-2710QE, i5-2510E, Celeron® B810
- Chipset Intel® QM67 PCH
- Two SO-DIMM204 sockets for up to 16 GByte DDR3-1066/1333/1600 RAM
- Three PCI sockets
- Two PCIe-x1 sockets
- One PCIe-x4 socket
- One PCIe-x16 socket
- Four serial interfaces COM1 to COM4
- Two LAN interfaces Ethernet 10/100/1000 (Base-T)
- Six SATA channels (two of which up to 6Gb/s transfer rate)
- PS2 keyboard / mouse interface
- 14 USB 2.0 interfaces
- BIOS AMI® Aptio

- 1x DVI-I
- 1x DVI-D, 1x internal HDMI (can't be used simultaneously)
- CRT connection
- TFT connection via LVDS 18/24/36/48
- HDA compatible sound controller with SPDIF in and out
- 8x GPIO
- RTC with external CMOS battery
- ATX power connector incl. 2x2pin 12V connector
- Format: ATX (305mm x 220mm)

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.

- ATX Specification
  Version 2.2
  www.formfactors.com
- PCI Specification
  Version 2.3 resp. 3.0
  www.pcisig.com
- PCI Express® Base Specification
  Version 2.0
  www.pcisig.com
- ACPI Specification
  Version 3.0
  www.acpi.info
- ATA/ATAPI Specification
  Version 7 Rev. 1
  www.t13.org
- USB Specifications
  www.usb.org
- SM-Bus Specification
  Version 2.0
  www.smbus.org
- Intel® Chipset Description
  Intel® 6 Series Chipset datasheet
  www.intel.com
- Intel® Chip Description
  2nd Gen. Intel® Core™ Processor Family Mobile datasheet
  www.intel.com
- Intel® Chip Description
  82579L Datasheet
  www.intel.com
- Intel® Chip Description
  82574L Datasheet
  www.intel.com
- SMSC® Chip Description
  SCH3114 Datasheet
  www.smsc.com
  (NDA required)
- Realtek® Chip Description
  ALC885/889 Datasheet
  www.realtek.com.tw
- ICS® Chip Description
  ICS9LPRS501 Datasheet
  www.idt.com
- American Megatrends®
  Aptio™ Text Setup Environment (TSE) User Manual
  www.ami.com

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

3 Connectors

This section describes all the connectors found on the CB1056.

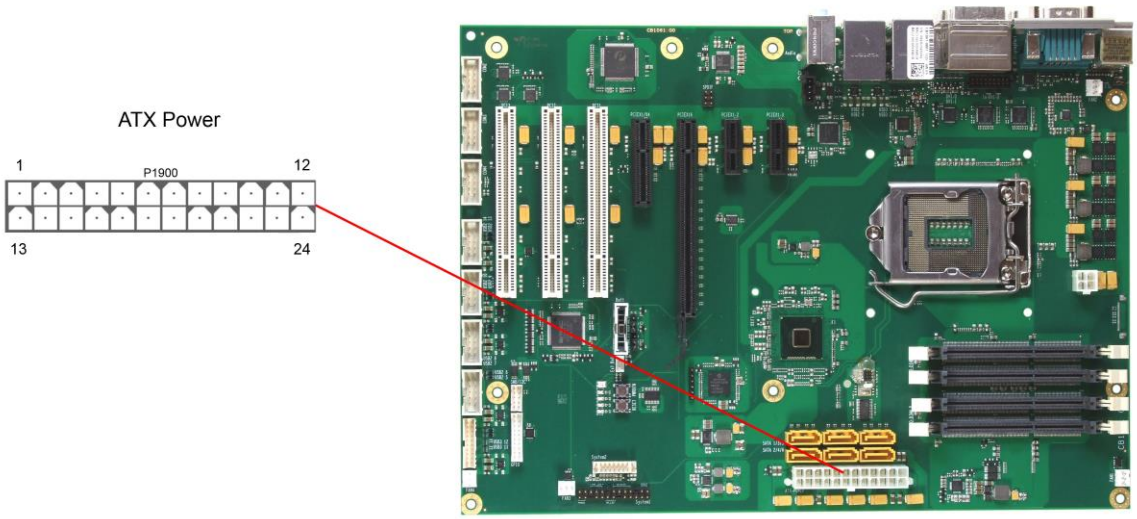
CAUTION

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.

3.1 Power Supply, System Connectors, CPU

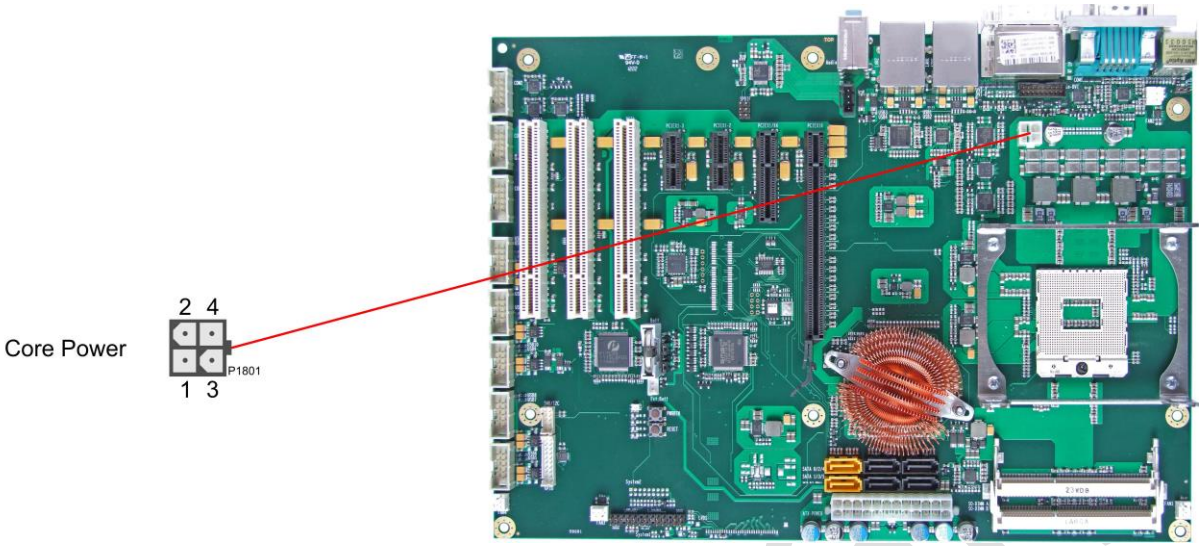
3.1.1 Power Supply

The connector for the power supply is a 2x10pin ATX connector ("ATX20", Foxconn HM3510E-P2). It is accompanied by a 2x2pin connector, which must be used to provide the COREIN power supply.



Pinout "ATX20" power connector:

Description	Name	Pin		Name	Description
3.3 volt supply	3.3V	1	11	3.3V	3.3 volt supply
3.3 volt supply	3.3V	2	12	-12V	12 volt supply
ground	GND	3	13	GND	ground
5 volt supply	VCC	4	14	PWRBTN#	powerbutton
ground	GND	5	15	GND	ground
5 volt supply	VCC	6	16	GND	ground
ground	GND	7	17	GND	ground
power on	PWR_ON	8	18	-5V	volt supply -5V
standby supply 5V	SVCC	9	19	VCC	5 volt supply
12 volt supply	12V	10	20	VCC	5 volt supply

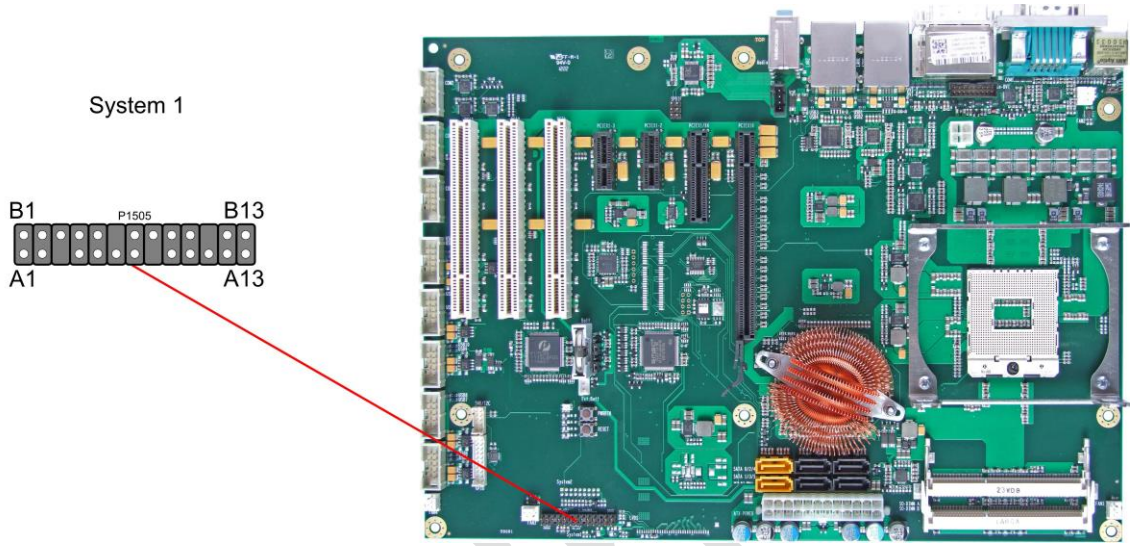


Pinout ATX power connector 2x2:

Description	Name	Pin		Name	Description
ground	GND	1	3	COREIN	12 volt supply
ground	GND	2	4	COREIN	12 volt supply

3.1.2 System

Typical signals for system control are provided through a 2x13 IDC socket connector with a spacing of 2.54mm. This connector combines signals for power button, reset, keyboard lock, IrDA, and several LEDs.



Pinout IDC socket connector "System 1":

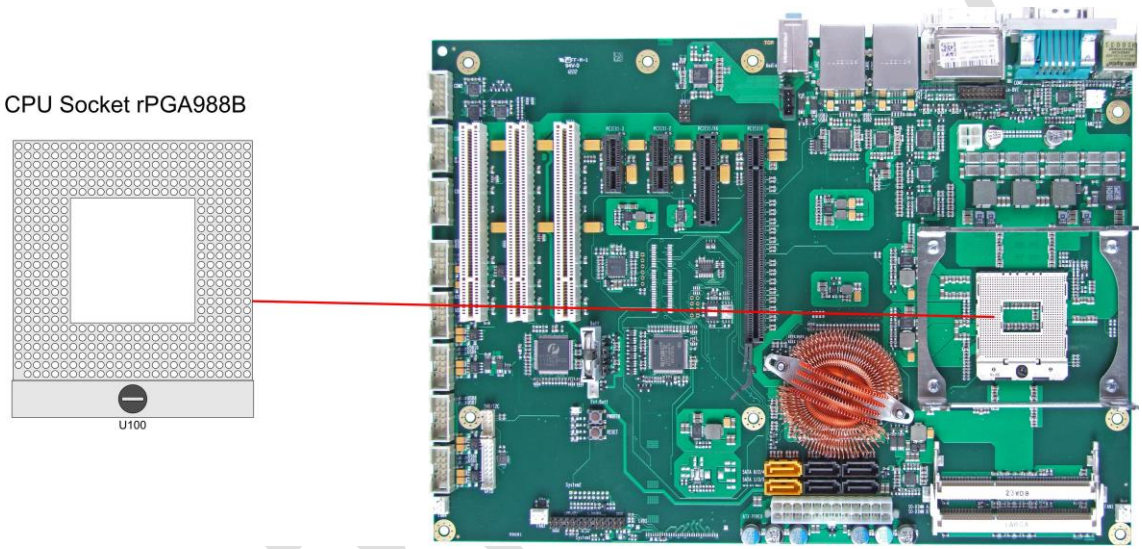
Description	Name	Pin		Name	Description
on/suspend button	PWRBTN#	A1	B1	GND	ground
ground	GND	A2	B2	KBLOCK	keyboard lock
reserved	N/C	A3	B3	PWLED#	power LED
ground	GND	A4	B4	N/C	reserved
5 volt supply	VCC	A5	B5	PWLED	3.3 volt supply
harddisk LED	HDLED#	A6	B6	N/C	reserved
5 volt supply	VCC	A7	B7	VCC	5 volt supply
reserved	N/C	A8	B8	GND	ground
IrDA transmit	IRTX	A9	B9	N/C	reserved
ground	GND	A10	B10	BEEP	speaker
IrDA receive	IRRX	A11	B11	N/C	reserved
IrDA control	CIRRX	A12	B12	GND	ground
5 volt supply	VCC	A13	B13	RESET#	reset

3.1.3 CPU Socket

The CB1056 board has an rPGA988B CPU socket accomodating certain versions of Intel®'s 2nd generation Core™ architecture CPUs. The rPGA988B is a ZIF (Zero Insertion Force) socket, which means that you can insert the processor without there being any resistance. There is only one orientation in which the processor will fit into the socket. Once the processor is in place, the fastening screw must be tightened to ensure proper electrical contact.

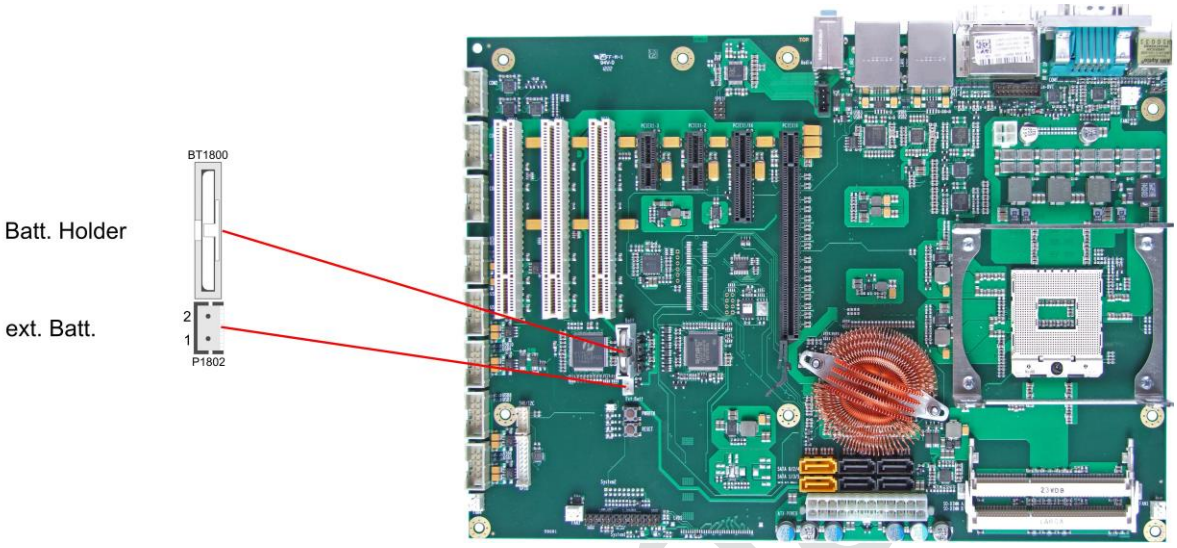
NOTE

Processors must be ordered separately. The board ships without a CPU.



3.1.4 CMOS Battery

The board ships with a CR2032 battery holder (Renata VBH2032-1) and 3V battery. Alternatively, an external battery can be connected via a 2pin connector (JST B2B-EH-A, mating connector: EHR-2).



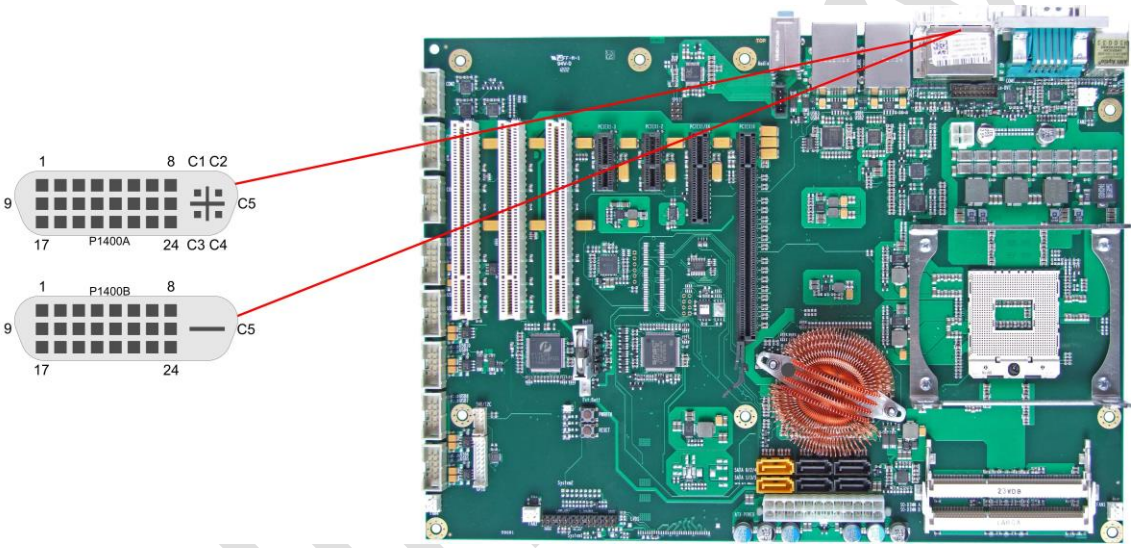
Pin	Name	Description
1	BATT	battery 3.3 volt
2	GND	ground

3.2 Back Panel Connectors

The board complies with the ATX form factor and thus honours the "I/O Connector Area" as defined in the ATX specification. A range of standard connectors are available: You can connect PS/2 keyboard and mouse, displays, speakers, microphone, LAN, USB etc. If the board is mounted in a normal ATX compliant case, these connectors are located on the back side of the case.

3.2.1 DVI Connectors

The CB1056 has one DVI-I connector and one DVI-D connector combined in one component (Foxconn QH11121-DADF-4F). With an appropriate adapter, you can connect a CRT display to the DVI-I connector. Digital DVI or HDMI displays can be attached to both connectors. The CPU's graphics system supports up to two independent displays.



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

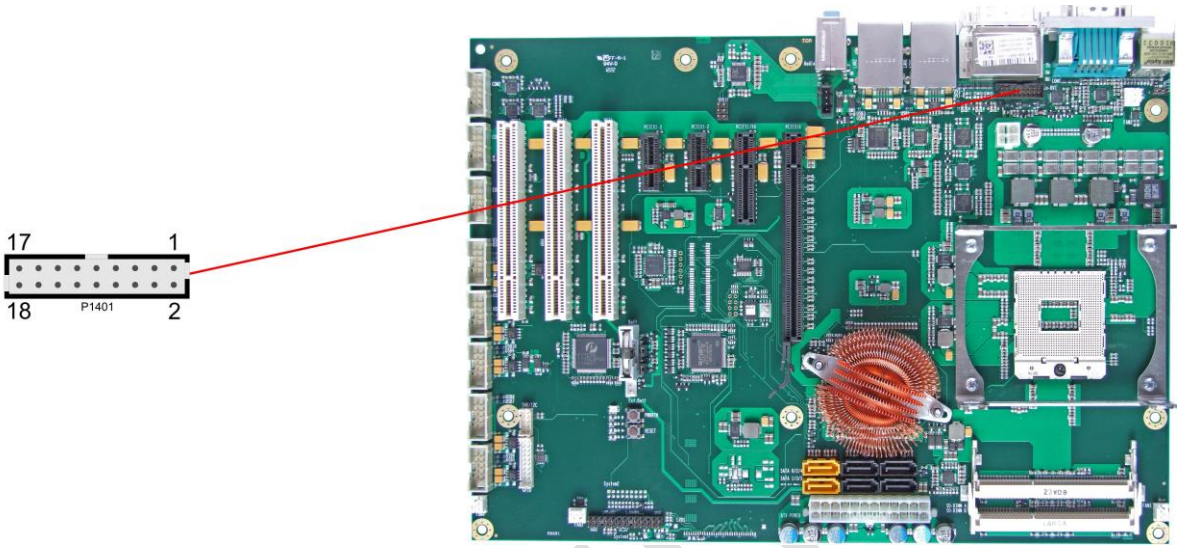
Pin	Name	Description
21	N/C	reserved
22	GND	ground
23	TMDS CLK	DVI clock
24	TMDS CLK#	DVI clock
C1	RED	VGA red
C2	GREEN	VGA green
C3	BLUE	VGA blue
C4	HSYNC	VGA horizontal sync
C5	GND	ground

Pinout DVI-D:

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

3.2.2 DVI/HDMI

The CB1056 provides a second DVI interface which is realized as a 2x9pin header (Molex 87831-1820, mating connector e.g. Molex 0791098658-ND). Analog VGA is not available on this connector. However, an HDMI device can be connected. This connector and the DVI-D connector cannot be used simultaneously.

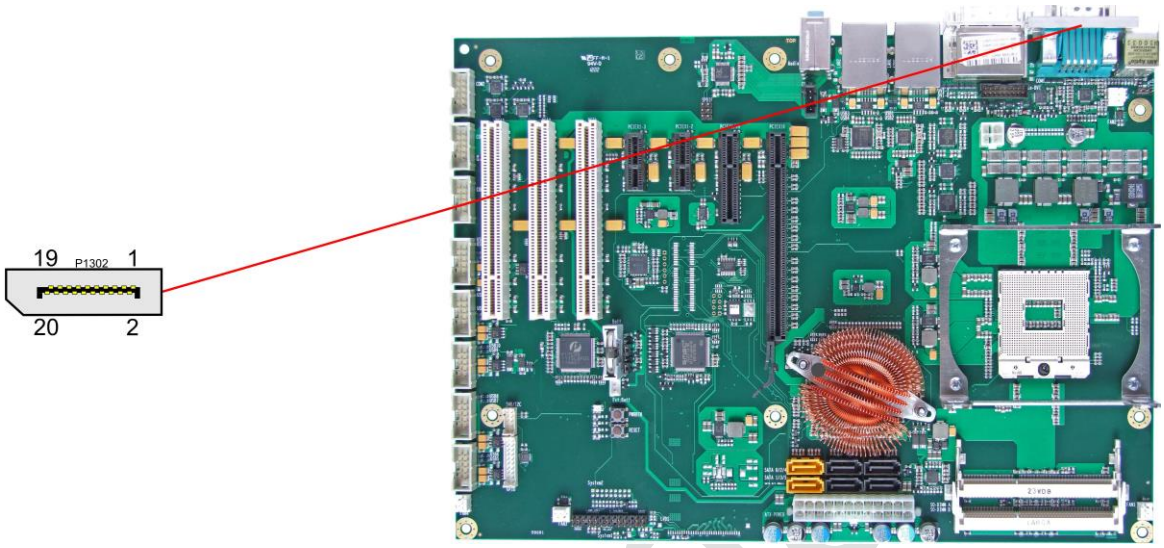


Pinout 2x9pin connector DVI/HDMI:

Description	Name	Pin		Name	Description
HDMI panel detected	HPD_SINK	1	2	N/C	reserved
SMBus clock (DDC)	SCL_SINK	3	4	SDA_SINK	SMBus dat (DDC)
5 volt supply	VCC	5	6	GND	ground
ground	GND	7	8	TMDS_CLK#	DVI clock -
DVI data 0 -	TMDS_D0#	9	10	TMDS_CLK	DVI clock +
DVI data 0 +	TMDS_D0	11	12	GND	ground
ground	GND	13	14	TMDS_D1#	DVI data 1 -
DVI data 2 -	TMDS_D2#	15	16	TMDS_D1	DVI data 1 +
DVI data 2 +	TMDS_D2	17	18	GND	ground

3.2.3 Display Port

For DisplayPort devices, a suitable standard connector is available (Foxconn 3VD11207-H7AB-4H).

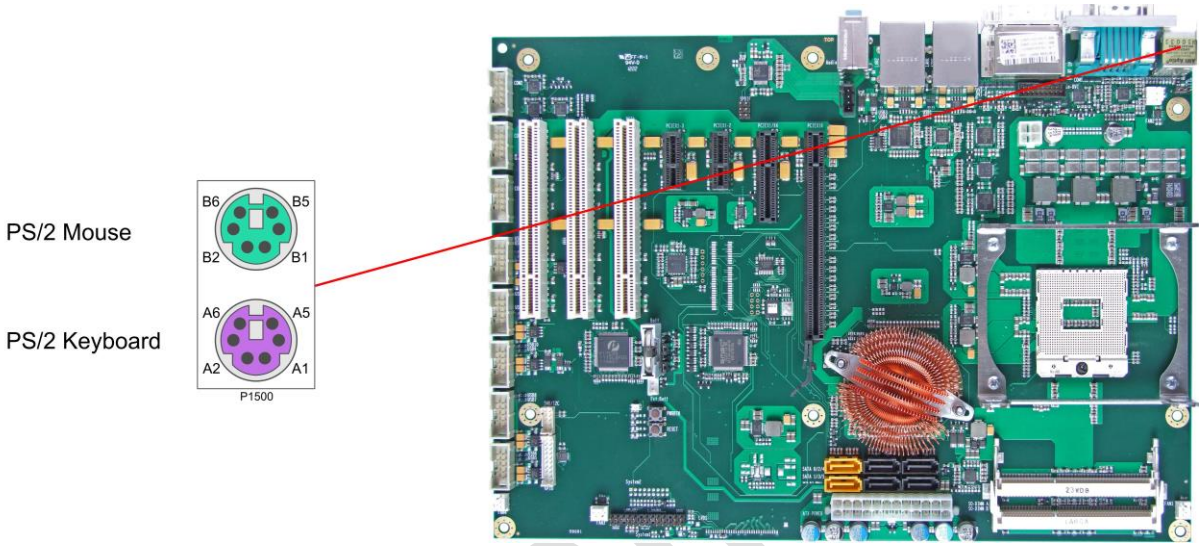


Pinout DisplayPort connector:

Description	Name	Pin		Name	Description
displayport lane 0 +	DPL0	1	2	GND	ground
displayport lane 0 -	DPL0#	3	4	DPL1	displayport lane 1 +
ground	GND	5	6	DPL1#	displayport lane 1 -
displayport lane 2 +	DPL2	7	8	GND	ground
displayport lane 2 -	DPL2#	9	10	DPL3	displayport lane 3 +
ground	GND	11	12	DPL3#	displayport lane 3 -
ground	GND	13	14	GND	ground
displayport aux +	DPAUX	15	16	GND	ground
displayport aux -	DPAUX#	17	18	HPD	hotplug detect
ground	GND	19	20	3.3V	3.3V supply

3.2.4 PS/2 Keyboard and Mouse

PS/2 mice and keyboards are connected via standard mini-DIN connectors. If you want to use the keyboard or mouse to wake up the board from standby or suspend mode you have to activate this functionality by adjusting the KBPWR jumper settings (page 51). With this jumper you can switch from normal power supply (VCC) to standby power supply (SVCC) for keyboard/mouse. Some relevant settings will have to be adjusted in BIOS setup.



Pinout PS/2 mouse:

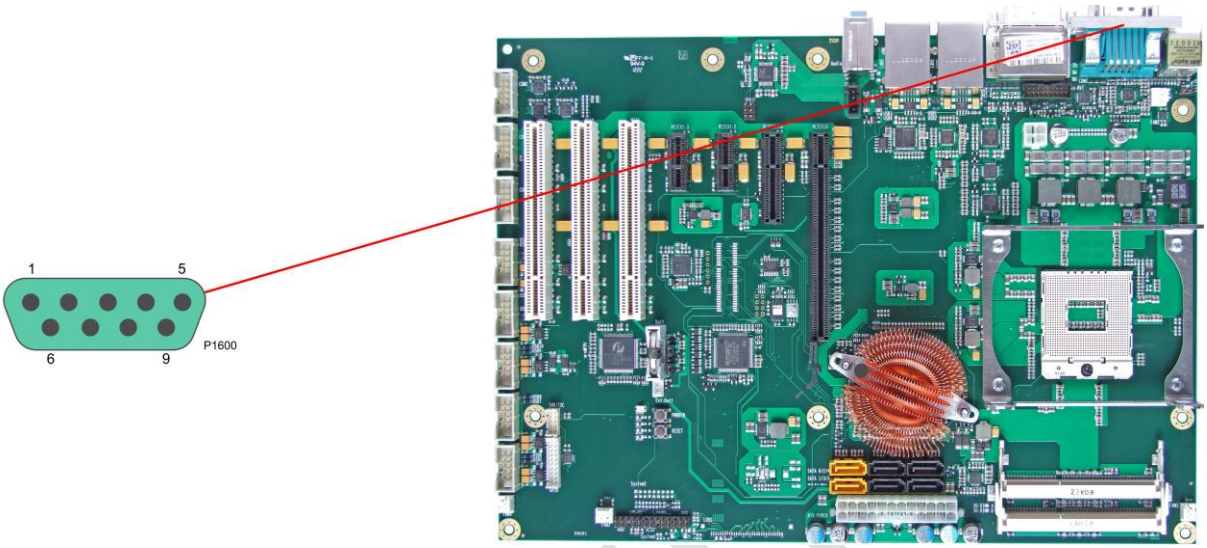
Description	Name	Pin		Name	Description
mouse data	MDAT	B1	B2	N/C	reserved
ground	GND	B3	B4	(S)VCC	5 volt supply
mouse clock	MCLK	B5	B6	N/C	reserved

Pinout PS/2 keyboard:

Description	Name	Pin		Name	Description
keyboard data	KDAT	A1	A2	MDAT	mouse data
ground	GND	A3	A4	(S)VCC	5 volt supply
keyboard clock	KCLK	A5	A6	MCLK	mouse clock

3.2.5 Serial Interface COM1

The serial interface COM1 is made available via a 9-pin standard DSUB-connector (male, e.g. Foxconn DM10152-H5W3-4F). Signal level is RS232.
The port address and the interrupt are set via the BIOS setup.

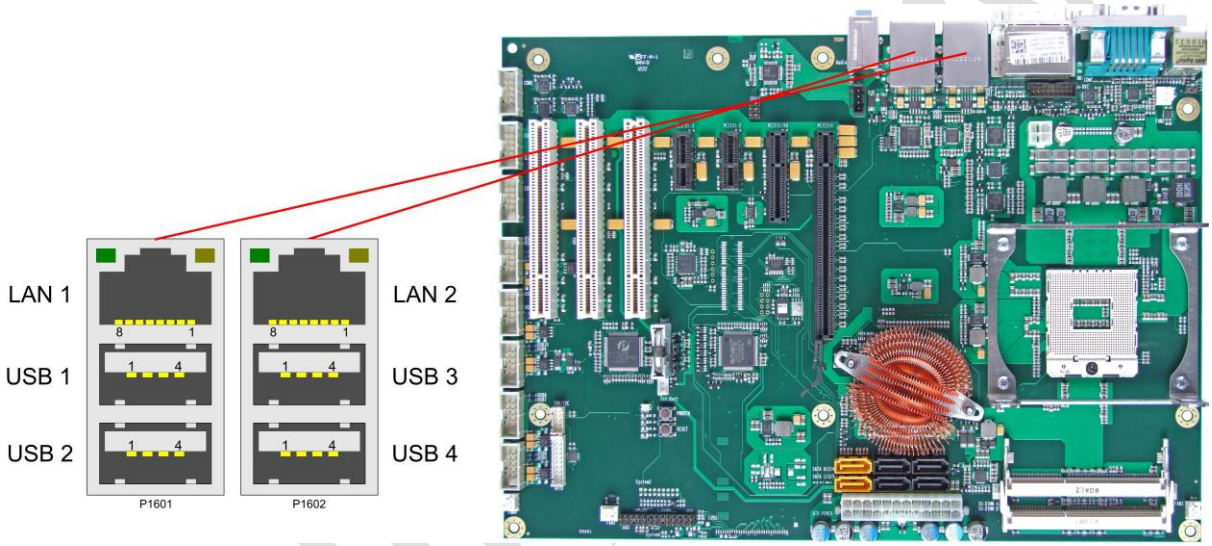


Pinout serial port (DSUB connector):

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

3.2.6 USB and LAN

To save space USB and LAN connectors are provided in the form of combo connectors. These either comprise two USB connectors or two USB connectors and one LAN connector. This way all board variants provide four external USB channels.
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.
The board comes in different variants, some with one Gigabit-LAN connector, others with two. All LAN connectors support 10/100/1000 Ethernet with automatic bandwith selection. Controller chips are the ICH9R (MAC) accompanied by the 82579L (PHY, LAN1) and, if present, the 82574L (MAC/PHY, LAN2).



Pinout USB connector for channel X:

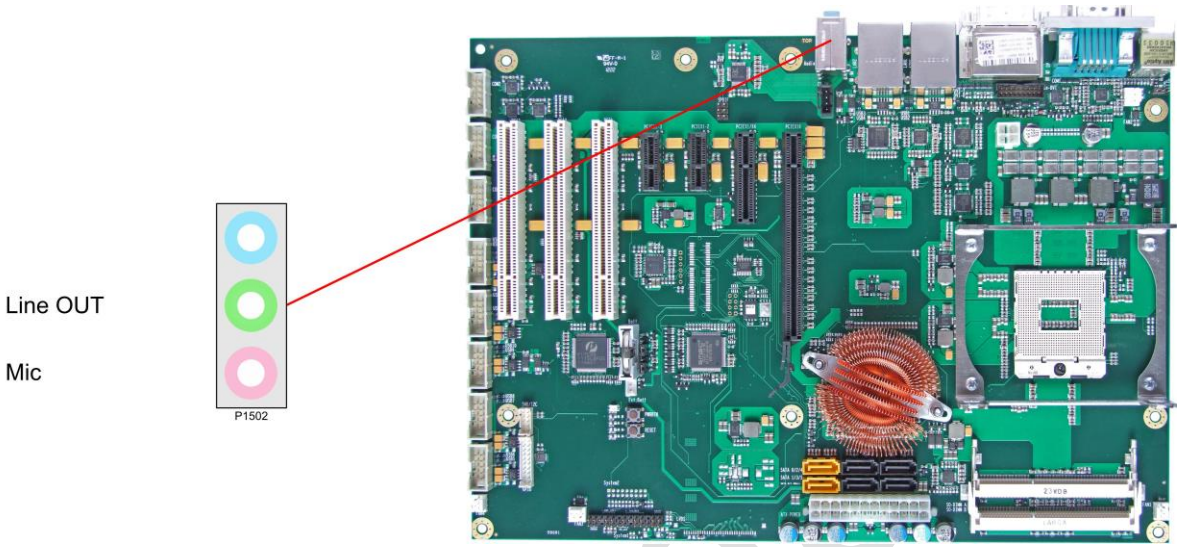
Pin	Name	Description
1	VCC	5 volt for USBX
2	USBX#	minus channel USBX
3	USBX	plus channel USBX
4	GND	ground

Pinout LAN 10/100/1000:

Pin	Name	Description
1	LAN2-0	LAN2 channel 0 plus
2	LAN2-0#	LAN2 channel 0 minus
3	LAN2-1	LAN2 channel 1 plus
4	LAN2-2	LAN2 channel 2 plus
5	LAN2-2#	LAN2 channel 2 minus
6	LAN2-1#	LAN2 channel 1 minus
7	LAN2-3	LAN2 channel 3 plus
8	LAN2-3#	LAN2 channel 3 minus

3.2.7 Audio Connectors

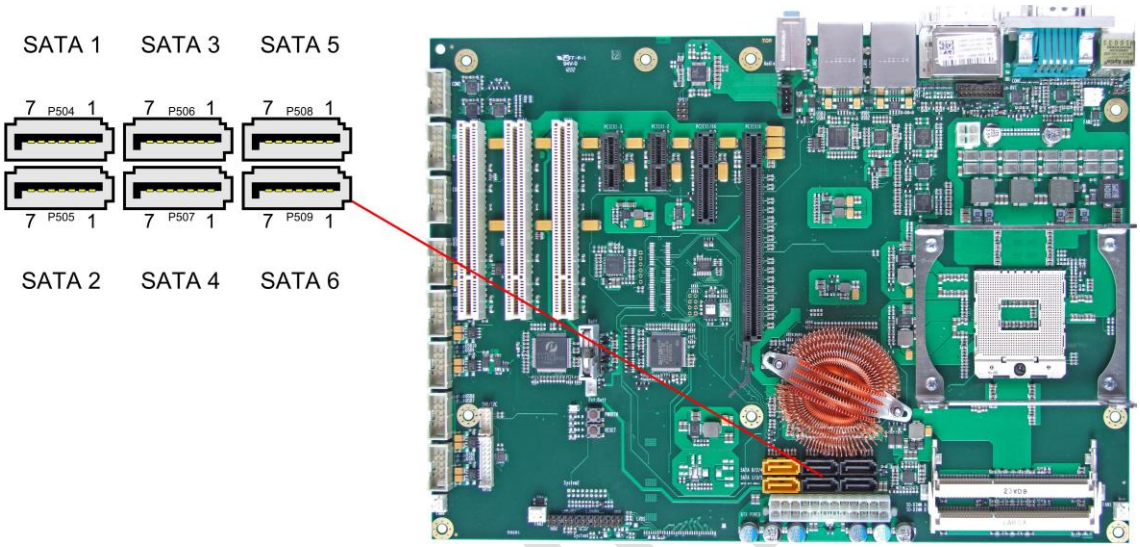
Line-in, line-out, and microphone signals are provided in the form of three 3,5mm-TRS-connectors.



3.3 SATA and Memory

3.3.1 SATA Interfaces

The CB1056 provides six SATA interfaces. They all support transfer rates of 1,5GB/s and 3GB/s. Additionally, SATA1 & SATA2 support 6GB/s.

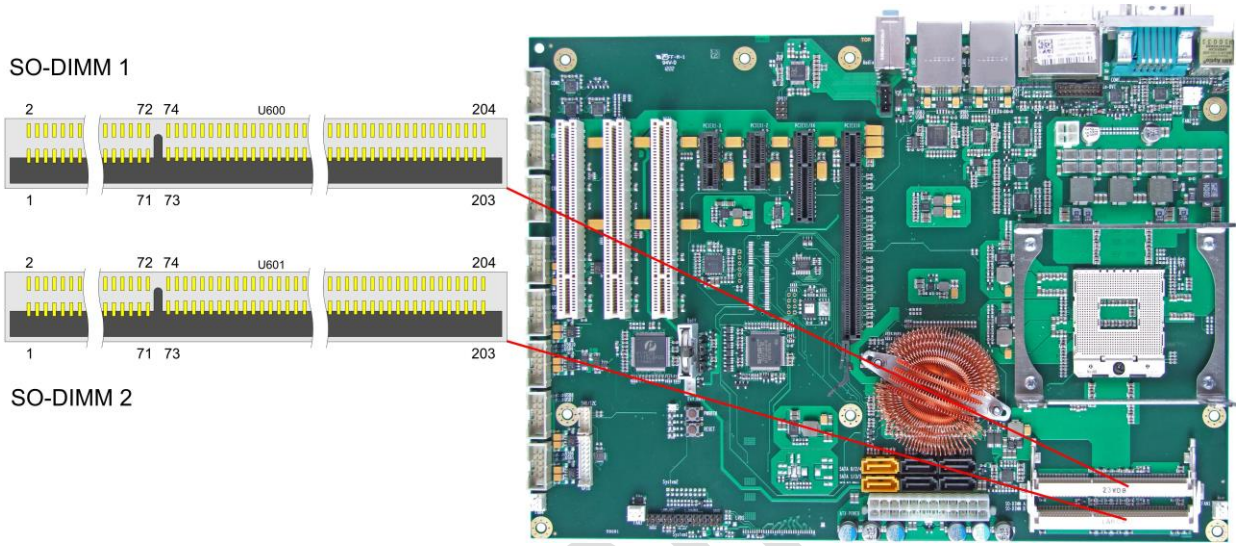


Pinout SATA:

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

3.3.2 Memory

The CB1056 is equipped with two SO-DIMM204 sockets for DDR3-1066/1333/1600-RAM. For technical and mechanical reasons it is possible that particular memory modules cannot be employed. Please ask your distributor for recommended memory modules
With currently available memory modules a memory extension up to 16 GByte is possible.
All timing parameters for different memory modules are automatically set by BIOS.



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
data 18	DQ18	51	52	DQ23	data 23

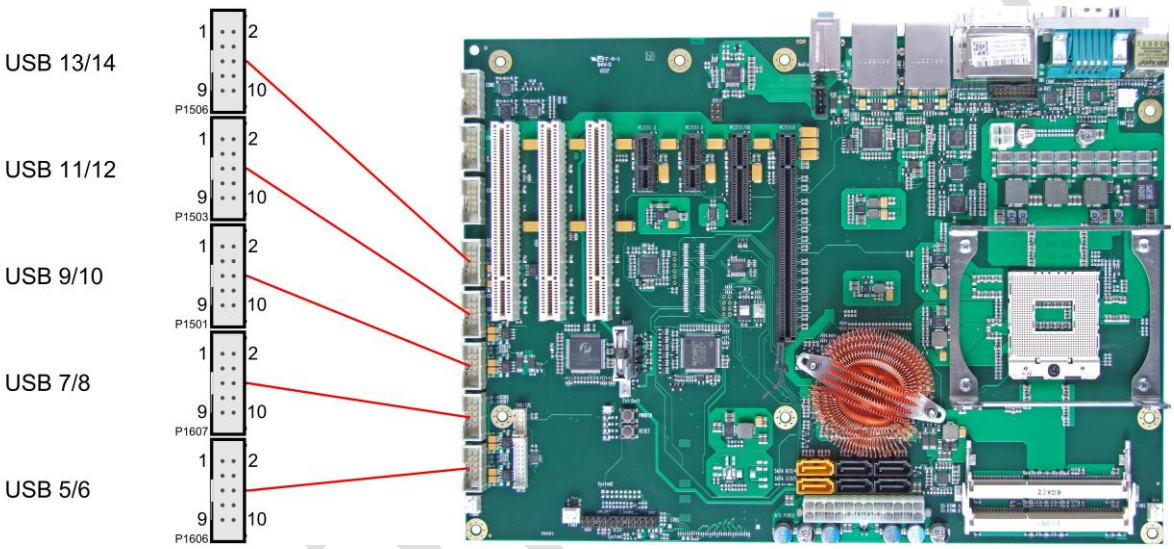
Description	Name	Pin		Name	Description
data 19	DQ19	53	54	GND	ground
ground	GND	55	56	DQ28	data 28
data 24	DQ24	57	58	DQ29	data 29
data 25	DQ25	59	60	GND	ground
ground	GND	61	62	DQS3#	data strobe 3 -
data mask 3	DQM3	63	64	DQS3	data strobe 3 +
ground	GND	65	66	GND	ground
data 26	DQ26	67	68	DQ30	data 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
ground	GND	161	162	GND	ground

Description	Name	Pin		Name	Description
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

3.4 Internal Connectors

3.4.1 USB 5-14

The USB channels 5 to 14 are provided via five 2x5 pin connectors (FCI 75869-301LF, mating connector FCI 71600-610LF).
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.

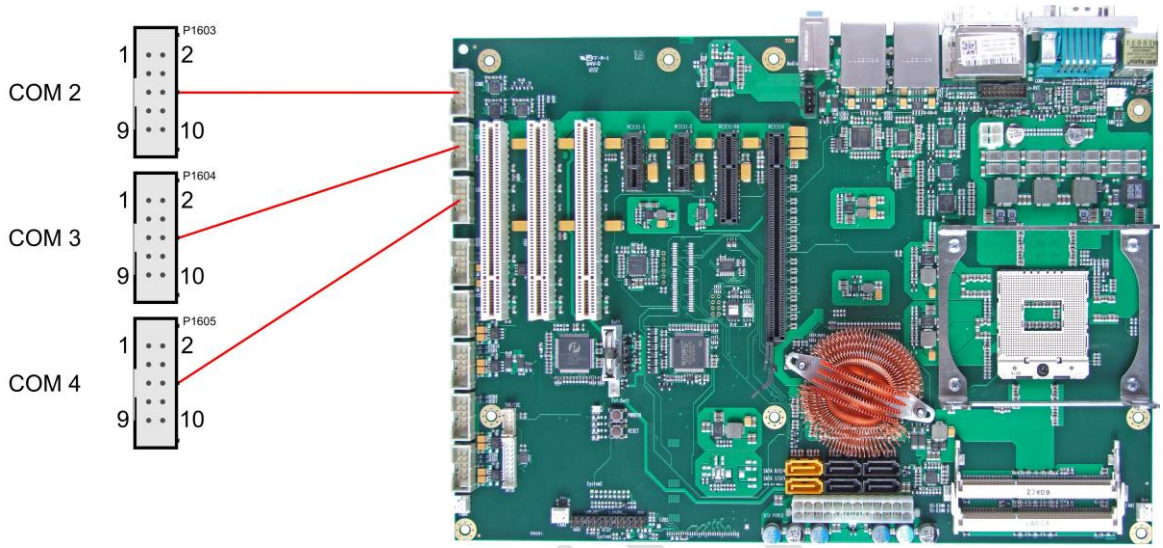


Pinout 2x5 pin connector USB x/y:

Description	Name	Pin		Name	Description
5 volt for USBx	VCC	1	2	VCC	5 volt for USBy
minus channel USBx	USBx#	3	4	USBy#	minus channel USBy
plus channel USBx	USBx	5	6	USBy	plus channel USBy
ground	GND	7	8	GND	ground
reserved	N/C	9	10	N/C	reserved

3.4.2 Serial ports COM2 to COM4

The three serial ports COM2 to COM4 are made available via a 2x5 pin connector each (FCI 75869-301LF, mating connector FCI 71600-610LF). Signals are RS232.
The port address and the interrupt are set via the BIOS setup.

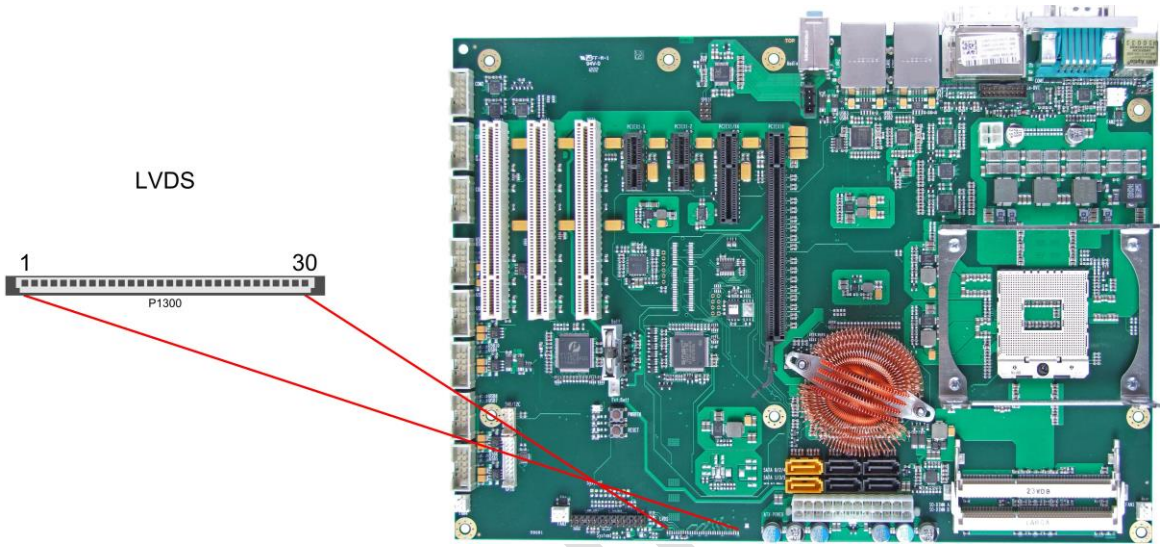


Pinout COM connector:

Description	Name	Pin		Name	Description
data carrier detect	DCD	1	2	DSR	data set ready
receive data	RXD	3	4	RTS	request to send
transmit data	TXD	5	6	CTS	clear to send
data terminal ready	DTR	7	8	RI	ring indicator
ground	GND	9	10	VCC	5 volt supply

3.4.3 LVDS

The board also offers the possibility to use displays with LVDS interface. These can be connected via a 30 pin flat-cable plug (JAE FI-X30S-HF-NPB, mating connector: FI-X30C(2)-NPB). Only shielded and twisted cables may be used. The display type is to be chosen over the BIOS setup. The connector has two additional shield pins S1 and S2 which are omitted in the pinout table below.



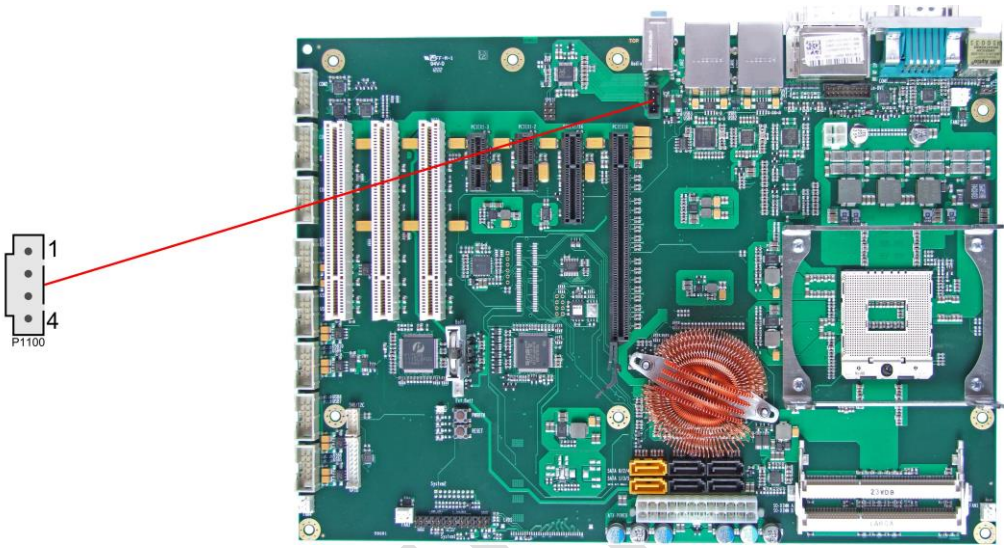
Pinout LVDS connector:

Pin	Name	Description
1	TXO00#	LVDS even data 0 -
2	TXO00	LVDS even data 0 +
3	TXO01#	LVDS even data 1 -
4	TXO01	LVDS even data 1 +
5	TXO02#	LVDS even data 2 -
6	TXO02	LVDS even data 2 +
7	GND	ground
8	TXO0C#	LVDS even clock -
9	TXO0C	LVDS even clock +
10	TXO03#	LVDS even data 3 -
11	TXO03	LVDS even data 3 +
12	TXO10#	LVDS odd data 0 -
13	TXO10	LVDS odd data 0 +
14	GND	ground
15	TXO11#	LVDS odd data 1 -
16	TXO11	LVDS odd data 1 +
17	GND	ground
18	TXO12#	LVDS odd data 2 -
19	TXO12	LVDS odd data 2 +
20	TXO1C#	LVDS odd clock -
21	TXO1C	LVDS odd clock +
22	TXO13#	LVDS odd data 3 -
23	TXO13	LVDS odd data 3 +
24	GND	ground
25	3.3V	3.3 volt supply
26	DDC_CLK	EDID clock for LCD
27	DDC_DAT	EDID data for LCD

Pin	Name	Description
28	FP_3.3V	switched 3.3 volt for display
29	FP_BL	switched 5 volt for backlight
30	VCC	5 volt supply

3.4.4 CD-In

In addition to the external TRS connectors mentioned above, the CB1056 offers an internal 4 pin connector (Foxconn HF1104E-P1), providing customers with even more possibilities to connect audio devices (analogue signals).

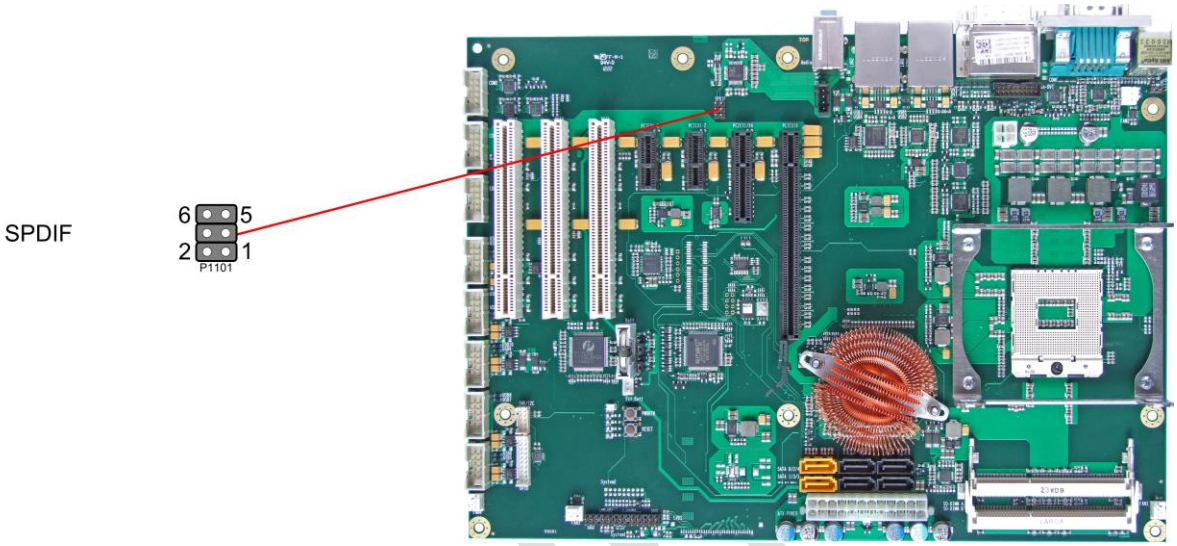


Pinout CD-in connector:

Pin	Name	Description
1	CD_L	CD left channel
2	CD_GND	CD ground
3	CD_GND	CD ground
4	CD_R	CD right channel

3.4.5 S/PDIF

For digital audio signals an SPDIF interface is available, which can be accessed using an internal 2x3 pin IDC socket connector with a spacing of 2,54mm.

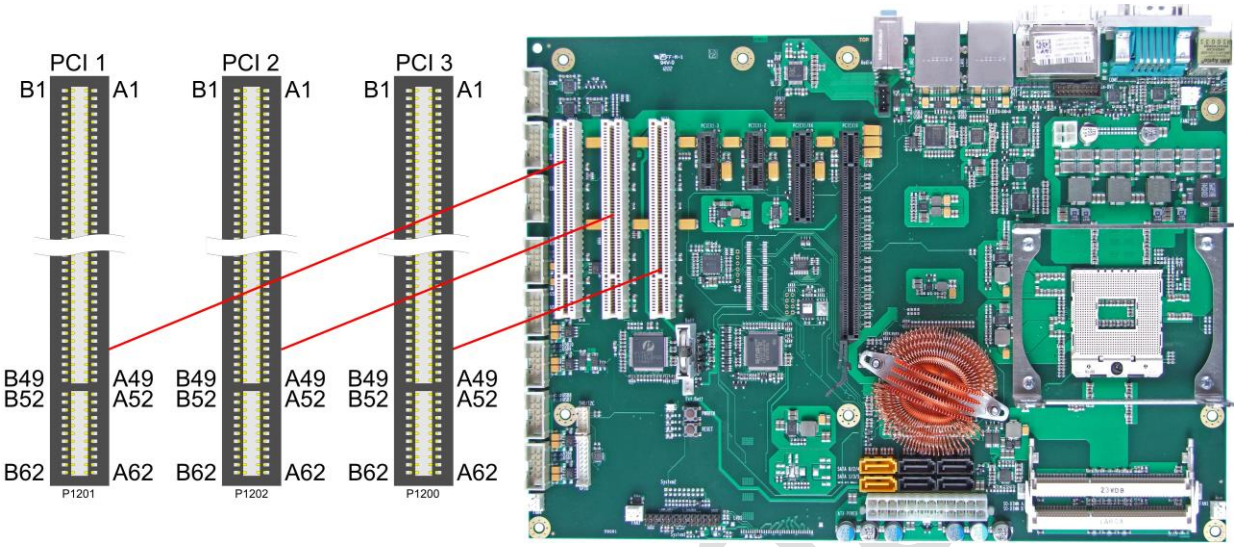


Pinout SPDIF connector:

Description	Name	Pin		Name	Description
ground	GND	1	2	SPDIFO	SPDIF out
3.3 volt supply	3,3V	3	4	VCC	5 volt supply
ground	GND	5	6	SPDIFI	SPDIF in

3.4.6 PCI interfaces

There are three standard PCI slots available on the CB1056.



NOTE

Please note that due to the nature of the PCI bus some signals in the following table are different from one PCI slot to the other. This applies to the test signals (A4, B4), the interrupt signals (A6, A7, B7, B8), the clock signal (B16), the grant signal (A17), the request signal (B18), and the ID-select signal (A26).

Pinout PCI slot:

Description	Name	Pin		Name	Description
test logic reset	TRST#	A1	B1	-12V	-12 volt supply
12 volt supply	12V	A2	B2	TCK	test clock
test mde select	TMS	A3	B3	GND	ground
test data input	TDI	A4	B4	TDO	test data output
5 volt supply	VCC	A5	B5	VCC	5 volt supply
interrupt A	INTA#	A6	B6	VCC	5 volt supply
interrupt C	INTC#	A7	B7	INTB#	interrupt B
5 volt supply	VCC	A8	B8	INTD#	interrupt D
reserved	N/C	A9	B9	GND	ground
5 volt supply	VCC	A10	B10	N/C	reserved
reserved	N/C	A11	B11	GND	ground
ground	GND	A12	B12	GND	ground
ground	GND	A13	B13	GND	ground
3.3 volt supply	3.3VAux	A14	B14	N/C	reserved
PCI reset	PRST#	A15	B15	GND	ground
5 volt supply	VCC	A16	B16	PCLK	clock
grant PCI use	GNT#	A17	B17	GND	ground
ground	GND	A18	B18	REQ#	request
power management event	PME#	A19	B19	VCC	5 volt supply
address/data 30	AD30	A20	B20	AD31	address/data 31
3.3 volt supply	3.3V	A21	B21	AD29	address/data 29
address/data 28	AD28	A22	B22	GND	ground
address/data 26	AD26	A23	B23	AD27	address/data 27
ground	GND	A24	B24	AD25	address/data 25

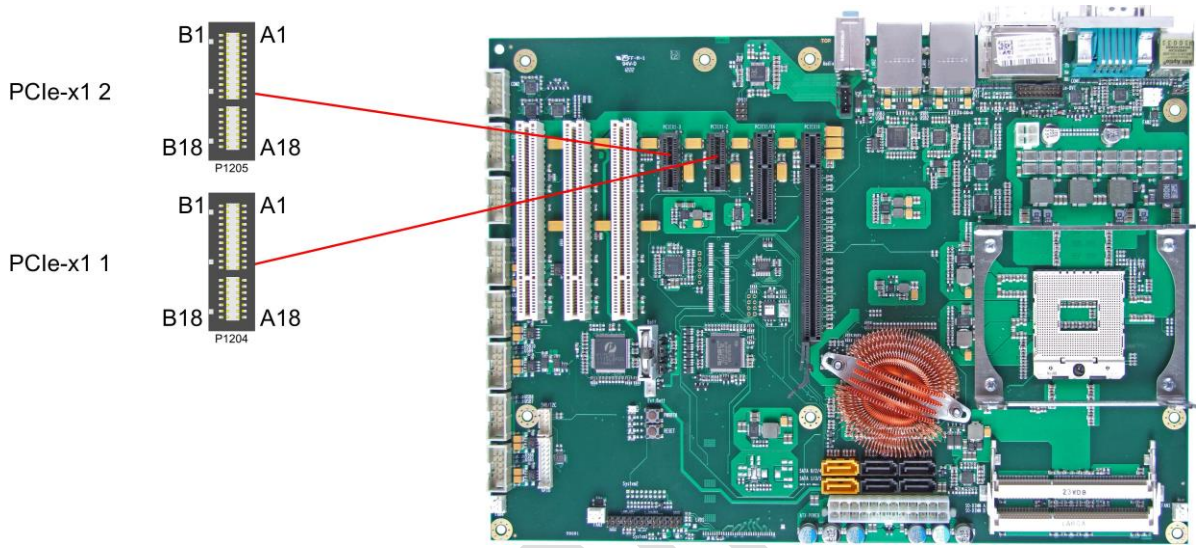
Description	Name	Pin		Name	Description
address/data 24	AD24	A25	B25	3.3V	3.3 volt supply
init device select	IDSEL	A26	B26	CBE3#	command, byte enable 3
3.3 volt supply	3.3V	A27	B27	AD23	address/data 23
address/data 22	AD22	A28	B28	GND	ground
address/data 20	AD20	A29	B29	AD21	address/data 21
ground	GND	A30	B30	AD19	address/data 19
address/data 18	AD18	A31	B31	3.3V	3.3 volt supply
address/data 16	AD16	A32	B32	AD17	address/data 17
3.3 volt supply	3.3V	A33	B33	CBE2#	command, byte enable 2
cycle frame	FRAME#	A34	B34	GND	ground
ground	GND	A35	B35	IRDY#	initiator ready
Target Ready	TRDY#	A36	B36	3.3V	3.3 volt supply
ground	GND	A37	B37	DEVSEL#	device select
stop request by target	STOP#	A38	B38	GND	ground
3.3 volt supply	3.3V	A39	B39	PLOCK#	lock bus
SMBus clock PCI	SMBCLK	A40	B40	PERR#	parity error
SMBus data PCI	SMBDAT	A41	B41	3.3V	3.3 volt supply
ground	GND	A42	B42	SERR#	system error
parity	PAR	A43	B43	3.3V	3.3 volt supply
address/data 15	AD15	A44	B44	CBE1#	command, byte enable 1
3.3 volt supply	3.3V	A45	B45	AD14	address/data 14
address/data 13	AD13	A46	B46	GND	ground
address/data 11	AD11	A47	B47	AD12	address/data 12
ground	GND	A48	B48	AD10	address/data 10
address/data 9	AD9	A49	B49	GND	ground
coded	N/C	A50	B50	N/C	coded
coded	N/C	A51	B51	N/C	coded
command, byte enable 0	CBEO#	A52	B52	AD8	address/data 8
3.3 volt supply	3.3V	A53	B53	AD7	address/data 7
address/data 6	AD6	A54	B54	3.3V	3.3 volt supply
address/data 4	AD4	A55	B55	AD5	address/data 5
ground	GND	A56	B56	AD3	address/data 3
address/data 2	AD2	A57	B57	GND	ground
address/data 0	AD0	A58	B58	AD1	address/data 1
5 volt supply	VCC	A59	B59	VCC	5 volt supply
reserved	N/C	A60	B60	VCC	5 volt supply
5 volt supply	VCC	A61	B61	VCC	5 volt supply
5 volt supply	VCC	A62	B62	VCC	5 volt supply

3.4.7 PCI-express Interfaces (x1)

The CB1056 board has two slots for PCIe-x1 expansion cards.

NOTE

When the motherboard PCIe-x4 slot (page 43) is occupied with a x4 device, then x1 slot 2 is de-activated.



NOTE

Please note that some signals in the following table are different from one PCIe slot to the other. This applies to the clock signals (A13, A14), the receive signals (A16, A17), and the transmit signals (B14, B15).

Pinout PCI-express-x1 connector:

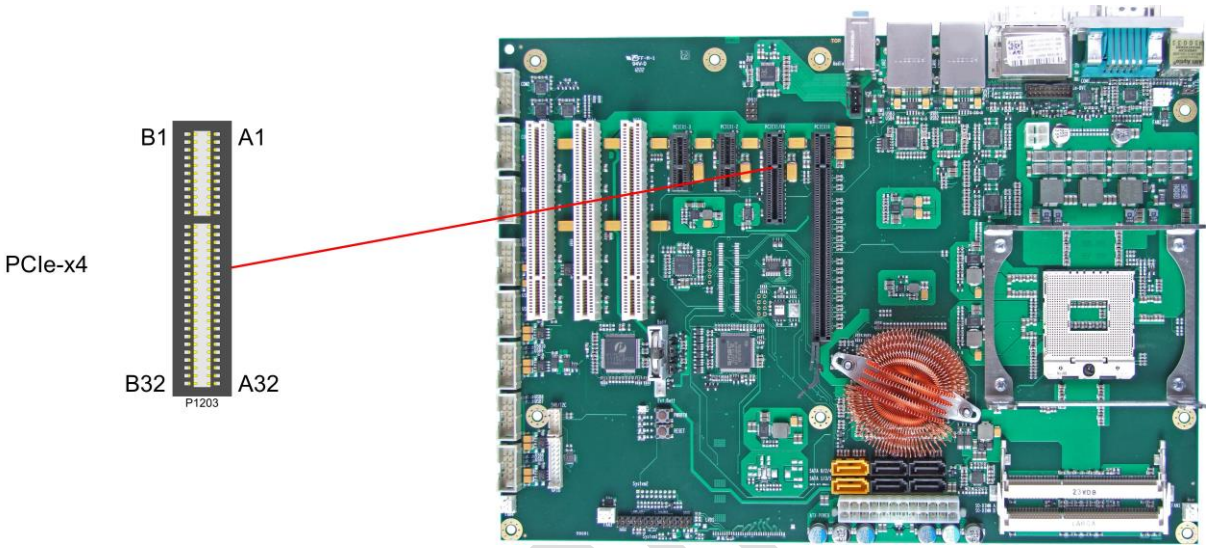
Description	Name	Pin		Name	Description
hot plug detect 1	PRSNT1#	A1	B1	12V	12 volt supply
12 volt supply	12V	A2	B2	12V	12 volt supply
12 volt supply	12V	A3	B3	N/C	reserved
ground	GND	A4	B4	GND	ground
reserved	N/C	A5	B5	SMBCLK	SMBus clock PCIe
reserved	N/C	A6	B6	SMBDAT	SMBus data PCIe
reserved	N/C	A7	B7	GND	ground
reserved	N/C	A8	B8	3.3V	3.3 volt supply
3.3 volt supply	3.3V	A9	B9	N/C	reserved
3.3 volt supply	3.3V	A10	B10	S3.3V	3.3V standby-supply
PCIe reset	PERST#	A11	B11	PEWAKE#	link reactivation
ground	GND	A12	B12	N/C	reserved
reference clock +	REFCLK	A13	B13	GND	ground
reference clock -	REFCLK#	A14	B14	PET0	transmit lane 0 +
ground	GND	A15	B15	PET0#	transmit lane 0 -
receive lane 0 +	PER0	A16	B16	GND	ground
receive lane 0 -	PER0#	A17	B17	PRSNT2#	hot plug detect 2
ground	GND	A18	B18	GND	ground

3.4.8 PCI-express interface (x4)

The CB1056 has one slot for PCIe-x4 expansion cards. This slot also accomodates x1 expansion cards.

NOTE

When the slot is occupied with an x4 device, PCIe-x1 slot 2 (s. p. 42) is de-activated.



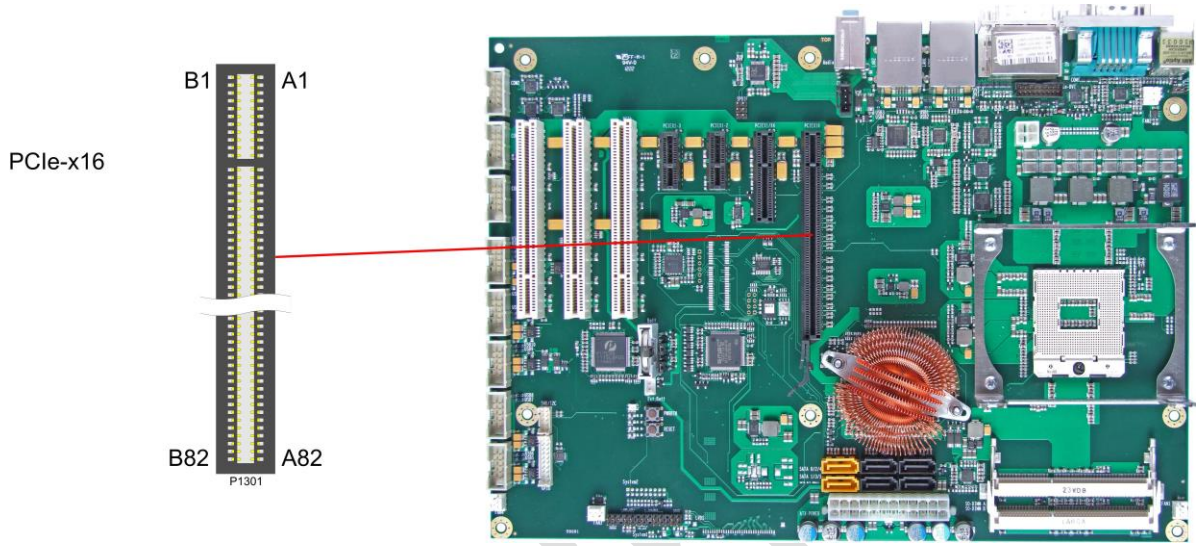
Pinout PCI-express-x1 connector:

Description	Name	Pin		Name	Description
hot plug detect 1	PRSNT1#	A1	B1	12V	12V supply
12V supply	12V	A2	B2	12V	12V supply
12V supply	12V	A3	B3	N/C	reserved
ground	GND	A4	B4	GND	ground
reserved	N/C	A5	B5	SMBCLK	SMBus clock PCIe
reserved	N/C	A6	B6	SMBDAT	SMBus data PCIe
reserved	N/C	A7	B7	GND	ground
reserved	N/C	A8	B8	3,3V	3.3V supply
3.3V supply	3,3V	A9	B9	N/C	reserved
3.3V supply	3,3V	A10	B10	S3,3V	3.3V standby
PCIe reset	PERST#	A11	B11	PEWAKE#	link reactivation
ground	GND	A12	B12	N/C	reserved
reference clock +	REFCLK	A13	B13	GND	ground
reference clock -	REFCLK#	A14	B14	PET0	transmit lane 0 +
ground	GND	A15	B15	PET0#	transmit lane 0 -
receive lane 0 +	PER0	A16	B16	GND	ground
receive lane 0 -	PER0#	A17	B17	PRSNT2#	hot plug detect 2
ground	GND	A18	B18	GND	ground
reserved	N/C	A19	B19	PET1	transmit lane 1 +
ground	GND	A20	B20	PET1#	transmit lane 1 -
receive lane 1 +	PER1	A21	B21	GND	ground
receive lane 1 -	PER1#	A22	B22	GND	ground
ground	GND	A23	B23	PET2	transmit lane 2 +
ground	GND	A24	B24	PET2#	transmit lane 2 -
receive lane 2 +	PER2	A25	B25	GND	ground
receive lane 2 -	PER2#	A26	B26	GND	ground

Description	Name	Pin		Name	Description
ground	GND	A27	B27	PET3	transmit lane 3 +
ground	GND	A28	B28	PET3#	transmit lane 3 -
receive lane 3 +	PER3	A29	B29	GND	ground
receive lane 3 -	PER3#	A30	B30	N/C	reserved
ground	GND	A31	B31	PRSNT2#	hot plug detect 2
reserved	N/C	A32	B32	GND	ground

3.4.9 PCI-express interface (x16)

One slot for PCI-express-x16-cards makes the expansion options on the CB1056 complete. You can use this slot for PCIe-x16 graphic adapters. This slot also acommodates x1 or x4 expansion cards.



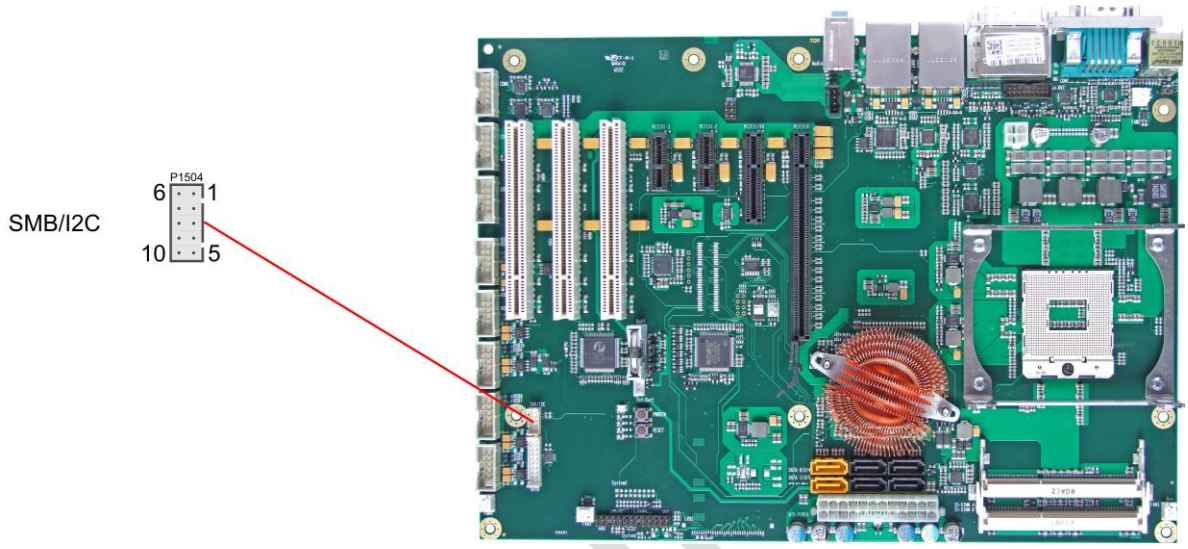
Pinout PCI-express-x16 connector:

Description	Name	Pin		Name	Description
hot plug detect 1	PRSNT1#	A1	B1	12V	12 volt supply
12 volt supply	12V	A2	B2	12V	12 volt supply
12 volt supply	12V	A3	B3	N/C	reserved
ground	GND	A4	B4	GND	ground
reserved	N/C	A5	B5	SMBCLK	SMBus clock PCIe
reserved	N/C	A6	B6	SMBDAT	SMBus data PCIe
reserved	N/C	A7	B7	GND	ground
reserved	N/C	A8	B8	3.3V	3.3 volt supply
3.3 volt supply	3.3V	A9	B9	N/C	reserved
3.3 volt supply	3.3V	A10	B10	S3.3V	3.3V standby-supply
PCIe reset	PERST#	A11	B11	PEWAKE#	link reactivation
ground	GND	A12	B12	N/C	reserved
reference clock +	REFCLK	A13	B13	GND	ground
reference clock -	REFCLK#	A14	B14	PET0	transmit lane 0 +
ground	GND	A15	B15	PET0#	transmit lane 0 -
receive lane 0 +	PER0	A16	B16	GND	ground
receive lane 0 -	PER0#	A17	B17	PRSNT2#	hot plug detect 2
ground	GND	A18	B18	GND	ground
reserved	N/C	A19	B19	PET1	transmit lane 1 +
ground	GND	A20	B20	PET1#	transmit lane 1 -
receive lane 1 +	PER1	A21	B21	GND	ground
receive lane 1 -	PER1#	A22	B22	GND	ground
ground	GND	A23	B23	PET2	transmit lane 2 +
ground	GND	A24	B24	PET2#	transmit lane 2 -
receive lane 2 +	PER2	A25	B25	GND	ground
receive lane 2 -	PER2#	A26	B26	GND	ground
ground	GND	A27	B27	PET3	transmit lane 3 +
ground	GND	A28	B28	PET3#	transmit lane 3 -
receive lane 3 +	PER3	A29	B29	GND	ground

Description	Name	Pin		Name	Description
receive lane 3 -	PER3#	A30	B30	N/C	reserved
ground	GND	A31	B31	PRSNT2#	hot plug detect 2
reserved	N/C	A32	B32	GND	ground
reserved	N/C	A33	B33	PET4	transmit lane 4 +
ground	GND	A34	B34	PET4#	transmit lane 4 -
receive lane 4 +	PER4	A35	B35	GND	ground
receive lane 4 -	PER4#	A36	B36	GND	ground
ground	GND	A37	B37	PET5	transmit lane 5 +
ground	GND	A38	B38	PET5#	transmit lane 5 -
receive lane 5 +	PER5	A39	B39	GND	ground
receive lane 5 -	PER5#	A40	B40	GND	ground
ground	GND	A41	B41	PET6	transmit lane 6 +
ground	GND	A42	B42	PET6#	transmit lane 6 -
receive lane 6 +	PER6	A43	B43	GND	ground
receive lane 6 -	PER6#	A44	B44	GND	ground
ground	GND	A45	B45	PET7	transmit lane 7 +
ground	GND	A46	B46	PET7#	transmit lane 7 -
receive lane 7 +	PER7	A47	B47	GND	ground
receive lane 7 -	PER7#	A48	B48	PRSNT2#	hot plug detect 2
ground	GND	A49	B49	GND	ground
reserved	N/C	A50	B50	PET8	transmit lane 8 +
ground	GND	A51	B51	PET8#	transmit lane 8 -
receive lane 8 +	PER8	A52	B52	GND	ground
receive lane 8 -	PER8#	A53	B53	GND	ground
ground	GND	A54	B54	PET9	transmit lane 9 +
ground	GND	A55	B55	PET9#	transmit lane 9 -
receive lane 9 +	PER9	A56	B56	GND	ground
receive lane 9 -	PER9#	A57	B57	GND	ground
ground	GND	A58	B58	PET10	transmit lane 10 +
ground	GND	A59	B59	PET10#	transmit lane 10 -
receive lane 10 +	PER10	A60	B60	GND	ground
receive lane 10 -	PER10#	A61	B61	GND	ground
ground	GND	A62	B62	PET11	transmit lane 11 +
ground	GND	A63	B63	PET11#	transmit lane 11 -
receive lane 11 +	PER11	A64	B64	GND	ground
receive lane 11 -	PER11#	A65	B65	GND	ground
ground	GND	A66	B66	PET12	transmit lane 12 +
ground	GND	A67	B67	PET12#	transmit lane 12 -
receive lane 12 +	PER12	A68	B68	GND	ground
receive lane 12 -	PER12#	A69	B69	GND	ground
ground	GND	A70	B70	PET13	transmit lane 13 +
ground	GND	A71	B71	PET13#	transmit lane 13 -
receive lane 13+	PER13	A72	B72	GND	ground
receive lane 13-	PER13#	A73	B73	GND	ground
ground	GND	A74	B74	PET14	transmit lane 14 +
ground	GND	A75	B75	PET14#	transmit lane 14 -
receive lane 14 +	PER14	A76	B76	GND	ground
receive lane 14 -	PER14#	A77	B77	GND	ground
ground	GND	A78	B78	PET15	transmit lane 15 +
ground	GND	A79	B79	PET15#	transmit lane 15 -
receive lane 15 +	PER15	A80	B80	GND	ground
receive lane 15 -	PER15#	A81	B81	N/C	reserved
ground	GND	A82	B82	N/C	reserved

3.4.10 SMB/I2C

The CB1056 can communicate with external devices via the SMBus protocol or the I2C protocol. The signals for these protocols are available through a 2x5 pin connector (JST B10B-PHDSSLFSN, mating connector: PHDR-10VS). The SMBus signals are processed by the chipset, the I2C signals are processed by the SIO unit.

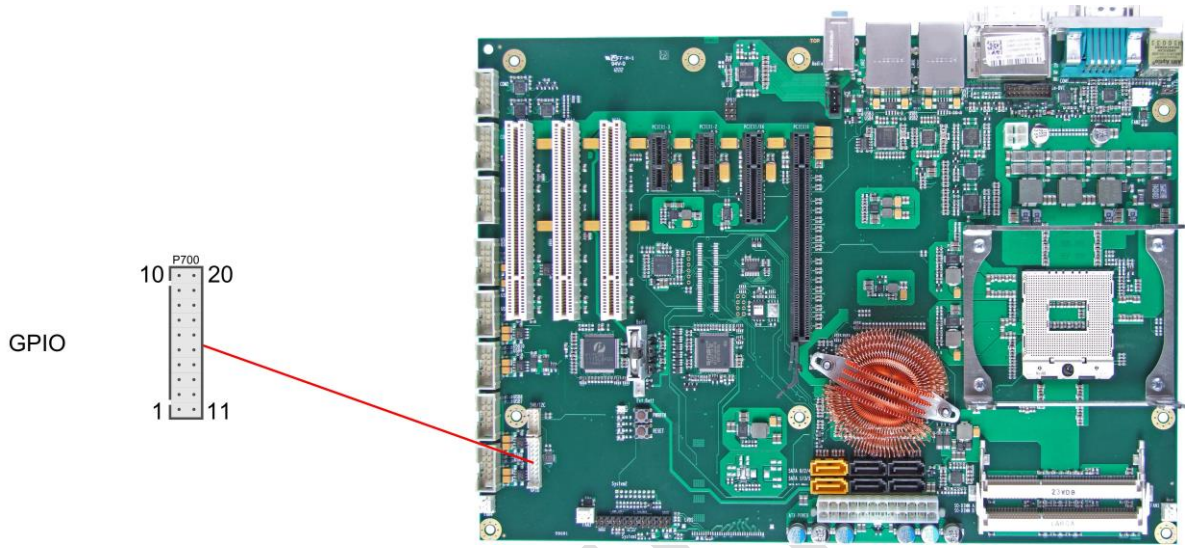


Pinout SMBus/I2C connector:

Description	Name	Pin		Name	Description
3.3 volt supply	3.3V	1	6	GND	ground
SMBus clock	SMBCLK	2	7	SMBDAT	SMBus data
SMBus alarm	SMBALRT#	3	8	SVCC	standby supply 5V
I2C bus clock	I2CLK	4	9	I2DAT	I2C bus data
5 volt supply	VCC	5	10	GND	ground

3.4.11 GPIO

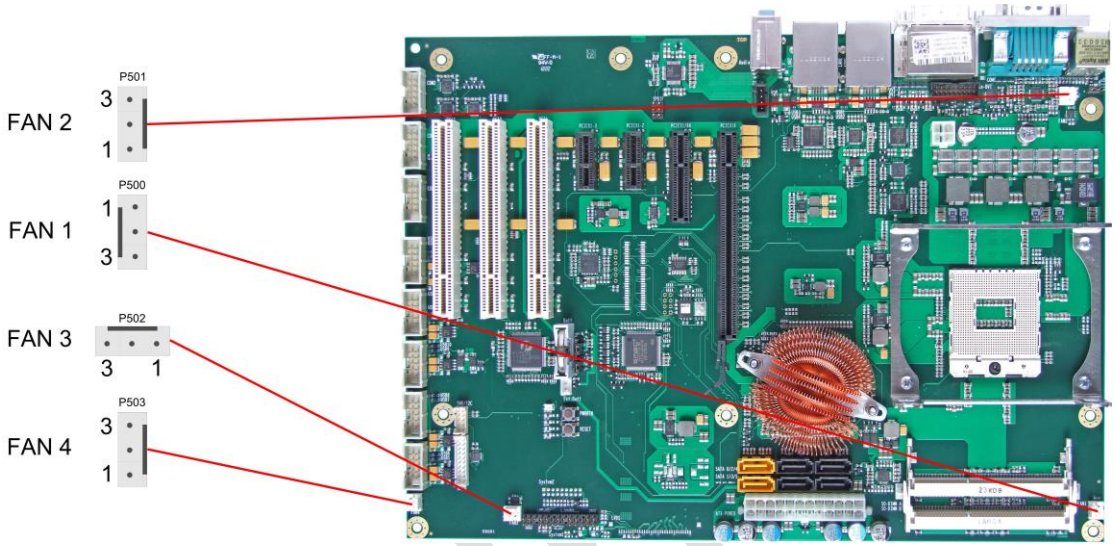
The General Purpose Input/Output interface is made available through a 2x10 pin connector (JST B20B-PHDSSLFSN, mating connector: PHDR-20VS). To make use of this interface the SIO unit must be programmed accordingly. Please refer to your distributor for information on available software support.



Description	Name	Pin		Name	Description
5 volt supply	VCC	1	11	VCC	5 volt supply
GP input/output 10	GPIO10	2	12	N/C	reserved
GP input/output 11	GPIO11	3	13	N/C	reserved
GP input/output 12	GPIO12	4	14	N/C	reserved
GP input/output 13	GPIO13	5	15	N/C	reserved
GP input/output 14	GPIO14	6	16	N/C	reserved
GP input/output 15	GPIO15	7	17	N/C	reserved
GP input/output 16	GPIO16	8	18	N/C	reserved
GP input/output 17	GPIO17	9	19	N/C	reserved
ground	GND	10	20	GND	ground

3.4.12 Fan Connectors

Four 3 pin connectors are available for attaching external 12V fans. All connectors except FAN4 can monitor fan speed. For this to work the fans must provide a corresponding speed signal.



Pinout fan connector:

Pin	Name	Description
1	GND	ground
2	12V	12 volt supply regulated
3	TACHO	fan monitoring signal

NOTE

The FAN4 connector doesn't have pin 3 connected (N/C).

3.5 Jumper Settings

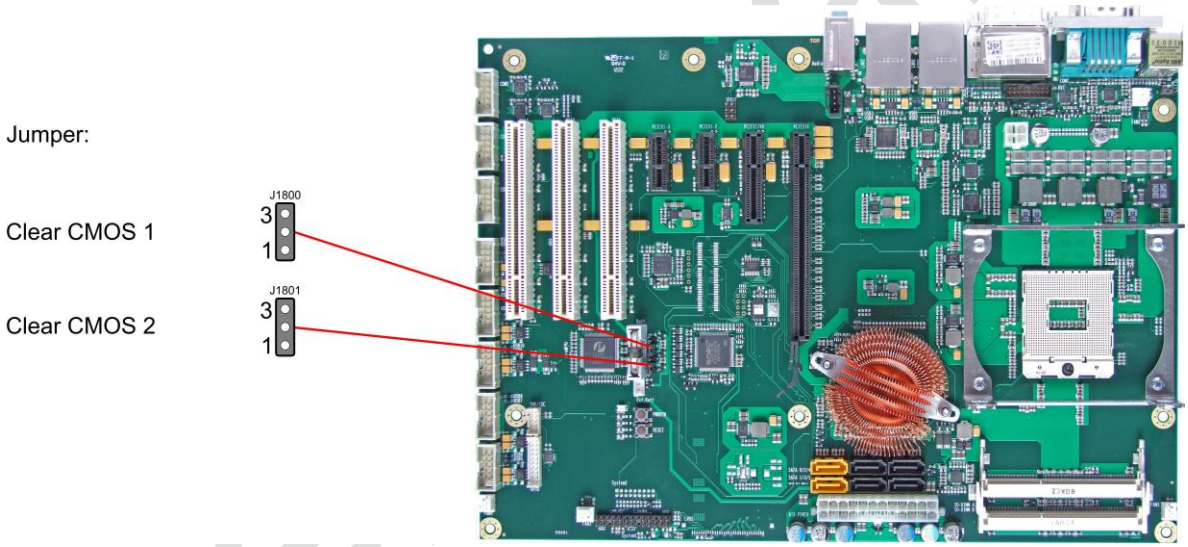
3.5.1 Clear CMOS

In case the board doesn't start up anymore and BIOS setup is inaccessible there is a "last resort": You can use the "Clear CMOS" jumpers to reset all CMOS settings to factory defaults. In order to do so you need to shut down the computer, change the jumper settings from normal (pins 1 & 2 short) to "Clear CMOS" (pins 2 & 3 short) first on jumper Clear CMOS 1 and then on jumper Clear CMOS 2, wait a few seconds, put the jumpers back into normal position and reboot.

CAUTION

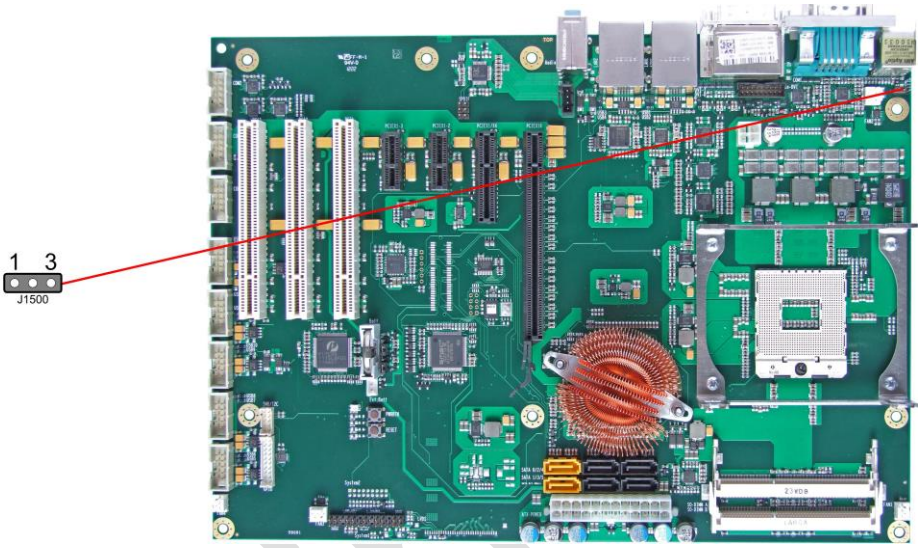
In order to avoid an undefined system state it is essential to ensure that the shorting of jumper Clear CMOS 1 (J1800) takes place BEFORE and only combined with the shorting of jumper Clear CMOS 2 (J1801).

Furthermore please notice, that if you reset the CMOS this does not only bring all settings made in BIOS setup back to default values, it also clears the date and time information stored in CMOS. So don't forget that, after the Clear CMOS procedure, you will have to set the clock again.



3.5.2 Jumper: Keyboard Power (KBPWR)

Power supply for keyboard and mouse can be provided in two different ways, either using normal power supply VCC or standby power supply SVCC. You can switch between the two by using the KBPWR jumper. For VCC you need to short pins 1 and 2, for SVCC please short pins 2 and 3.



4 BIOS Settings

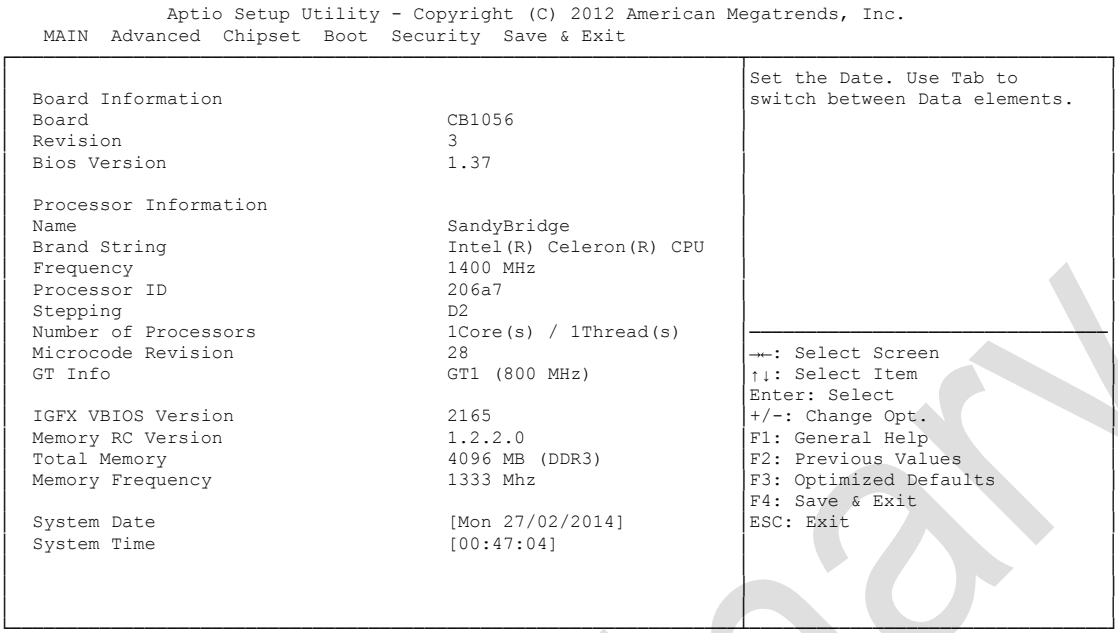
4.1 General Remarks

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.

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.

4.2 Main



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

- ✓ **GT Info**
  Options: none

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

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

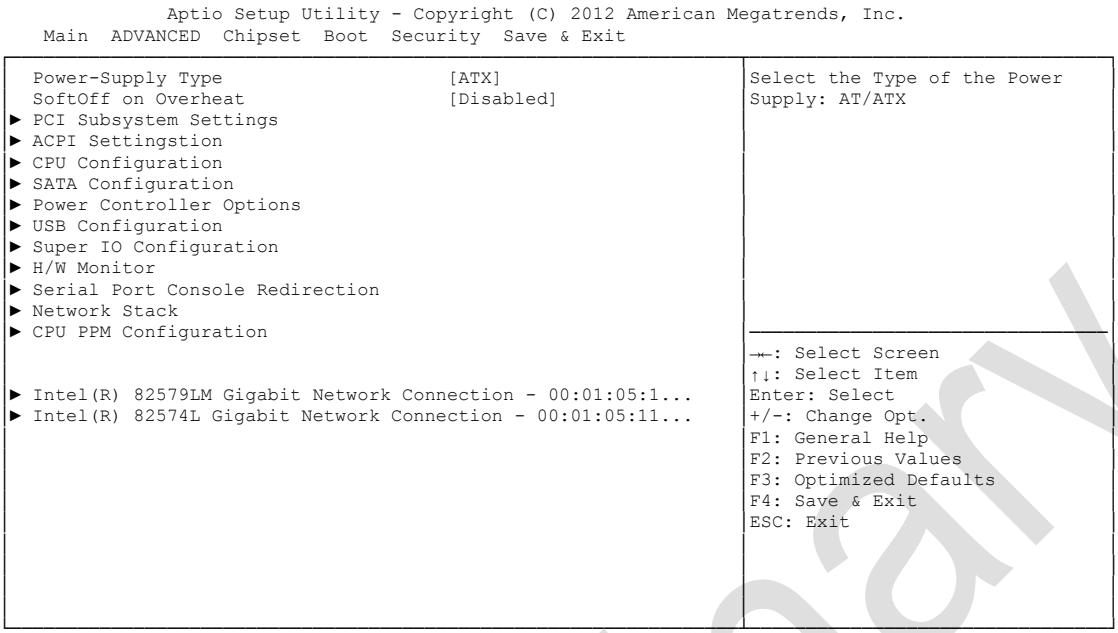
- ✓ **Total Memory**
  Options: none

- ✓ **Memory Frequency**
  Options: none

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

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

4.3 Advanced



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

- ✓ **SoftOff on Overheat**
  Options: Disabled / Enabled

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

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

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

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

- ✓ **Power Controller Options**
  Sub menu: see "Power Controller Options" (page 67)

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

- ✓ **Super IO Configuration**
  Sub menu: see "Super IO Configuration" (page 70)

- ✓ **H/W Monitor**
  Sub menu: see "H/W Monitor" (page 72)

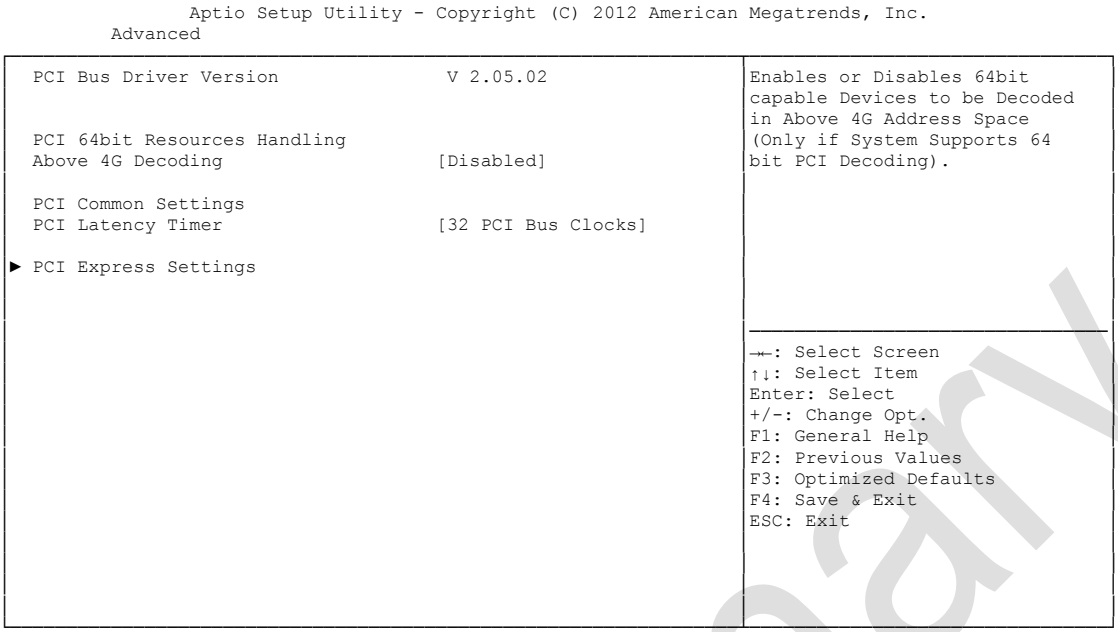
- ✓ **Serial Port Console Redirection**
  Sub menu: see "Serial Port Console Redirection" (page 74)

- ✓ **Network Stack**
  Sub menu: see "Network Stack" (page 76)

- ✓ **CPU PPM Configuration**
  Sub menu: see "CPU PPM Configuration" (page 77)

- ✓ **Intel(R) Gigabit Network Connection**
  Sub menu: see "Intel(R) GigabitNetworkConnection" (page 78)

4.3.1 PCI Subsystem Settings

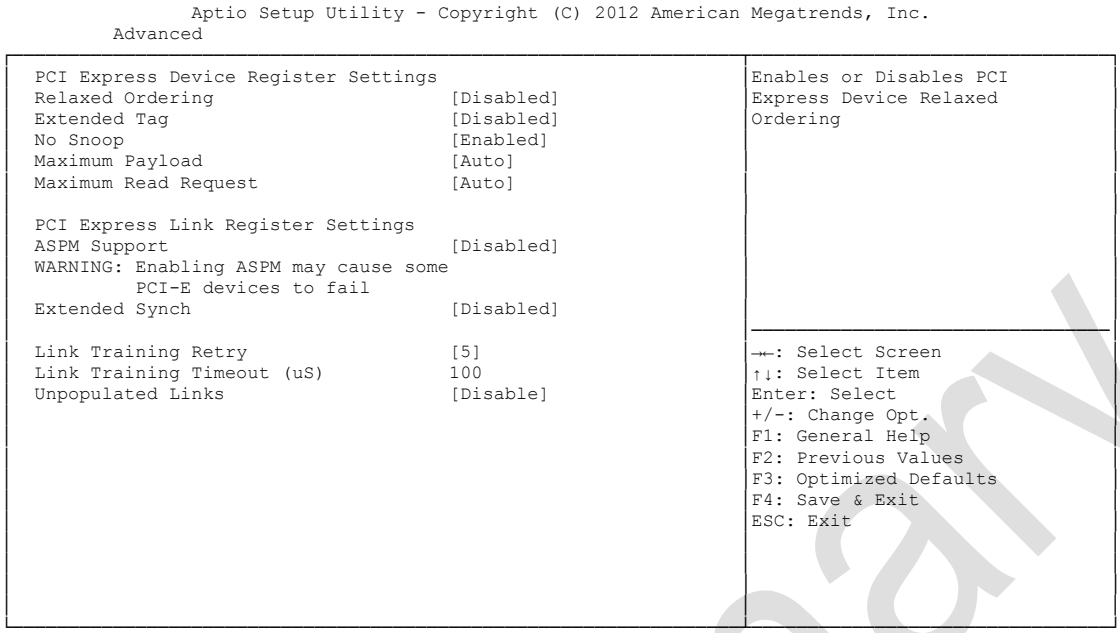


- ✓ **Above 4G Decoding**
  Options: Enabled / Disabled

- ✓ **PCI Latency Timer**
  Options: 32, 64,...224, 248 PCI Bus Clocks

- ✓ **PCI Express Settings**
  Sub menu: see "PCI Express Settings" (page 58)

4.3.1.1 PCI Express Settings



- ✓ **Relaxed Ordering**
  Options: Enabled / Disabled

- ✓ **Extended Tag**
  Options: Enabled / Disabled

- ✓ **No Snoop**
  Options: Enabled / Disabled

- ✓ **Maximum Payload**
  Options: Auto / 128 Bytes / 256 Bytes / 512 Bytes / 1024 Bytes / 2048 Bytes / 4096 Bytes

- ✓ **Maximum Read Request**
  Options: Auto / 128 Bytes / 256 Bytes / 512 Bytes / 1024 Bytes / 2048 Bytes / 4096 Bytes

- ✓ **ASPM Support**
  Options: Disabled / Auto / Force L0s

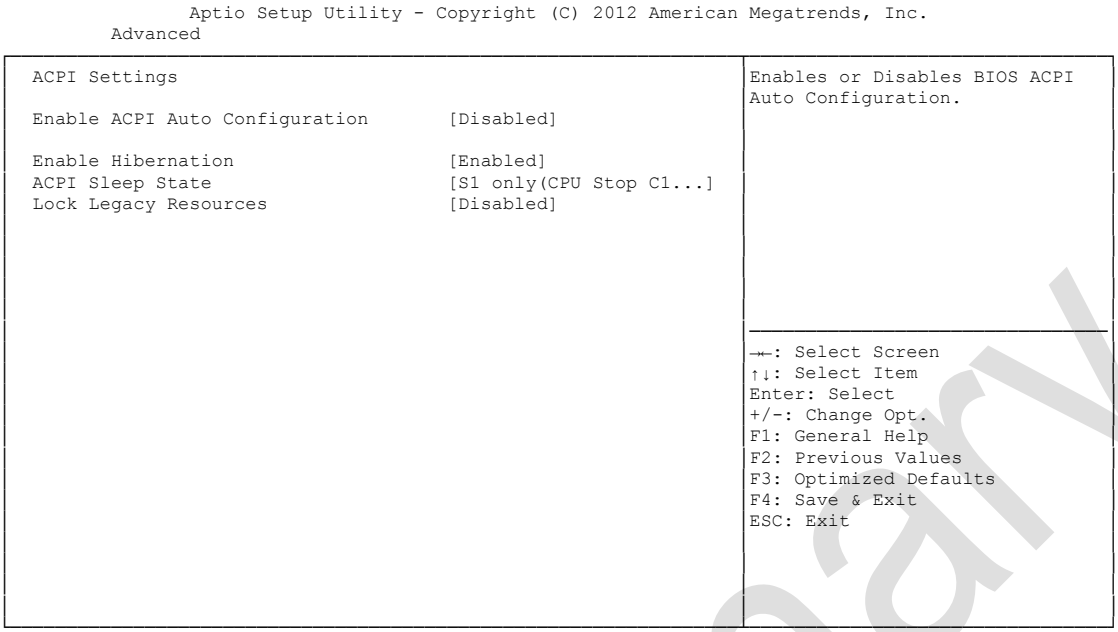
- ✓ **Extended Synch**
  Options: Enabled / Disabled

- ✓ **Link Training Retry**
  Options: Disabled / 2 / 3 / 5

- ✓ **Link Training Timeout (uS)**
  Options: 10...1000

- ✓ **Unpopulated Links**
  Options: Keep Link ON / Disable Link

4.3.2 ACPI Settings



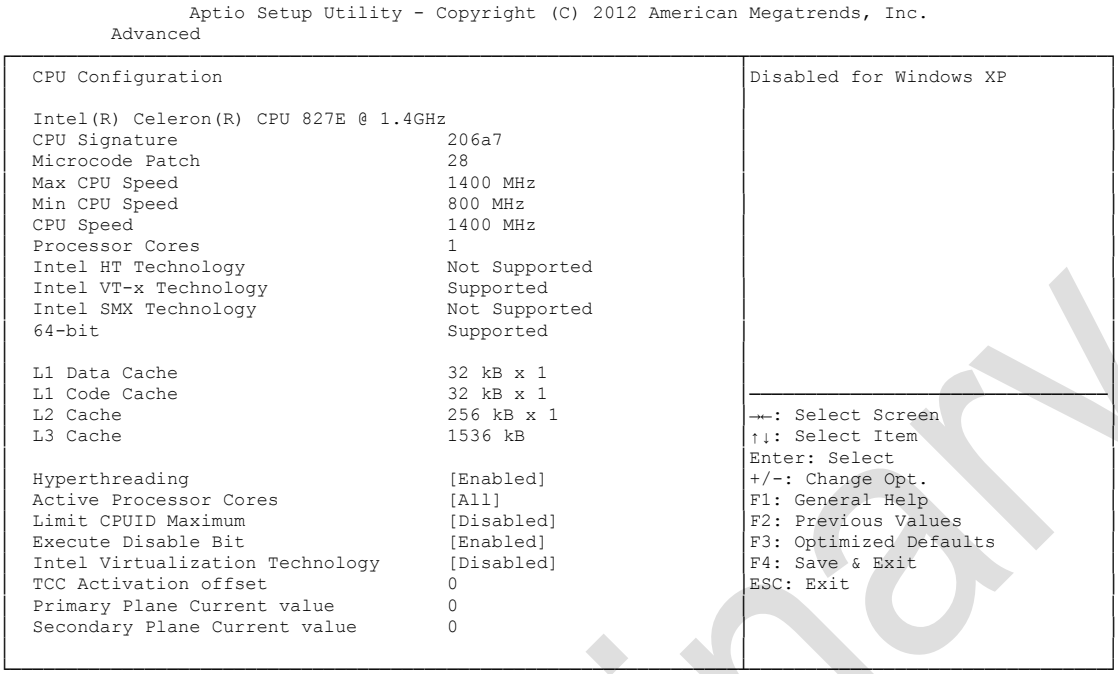
- ✓ **Enable ACPI Auto Configuration**
  Options: Enabled / Disabled

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

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

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

4.3.3 CPU Configuration



- ✓ **CPU Signature**
  Options: none
- ✓ **Microcode Patch**
  Options: none
- ✓ **Max CPU Speed**
  Options: none
- ✓ **Min CPU Speed**
  Options: none
- ✓ **CPU Speed**
  Options: none
- ✓ **Processor Cores**
  Options: none
- ✓ **Intel HT Technology**
  Options: none
- ✓ **Intel VT-x Technology**
  Options: none
- ✓ **Intel SMX Technology**
  Options: none
- ✓ **64-bit**
  Options: none
- ✓ **L1 Data Cache**
  Options: none

- ✓ **L1 Code Cache**
  Options: none

- ✓ **L2 Cache**
  Options: none

- ✓ **L3 Cache**
  Options: none

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

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

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

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

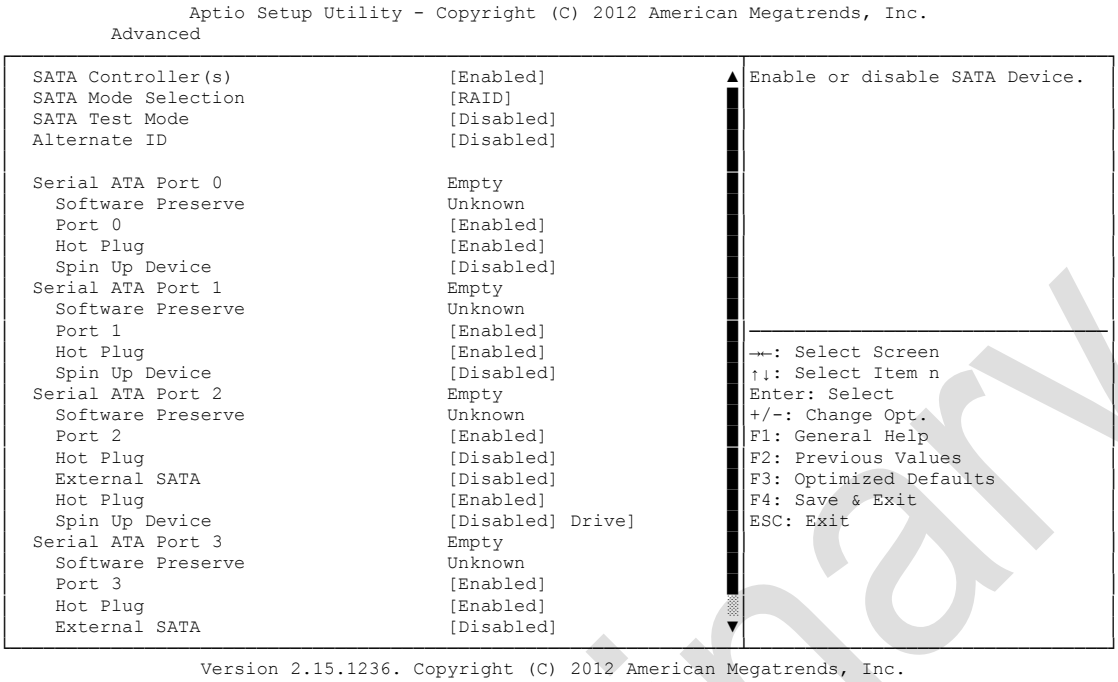
- ✓ **Intel Virtualization Technology**
  Options: Enabled / Disabled

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

- ✓ **Primary Plane Current value**
  Options: 0...255

- ✓ **Secondary Plane Current value**
  Options: 0...255

4.3.4 SATA Configuration



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

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

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

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

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

- ✓ **Software Preserve**
  Options: none

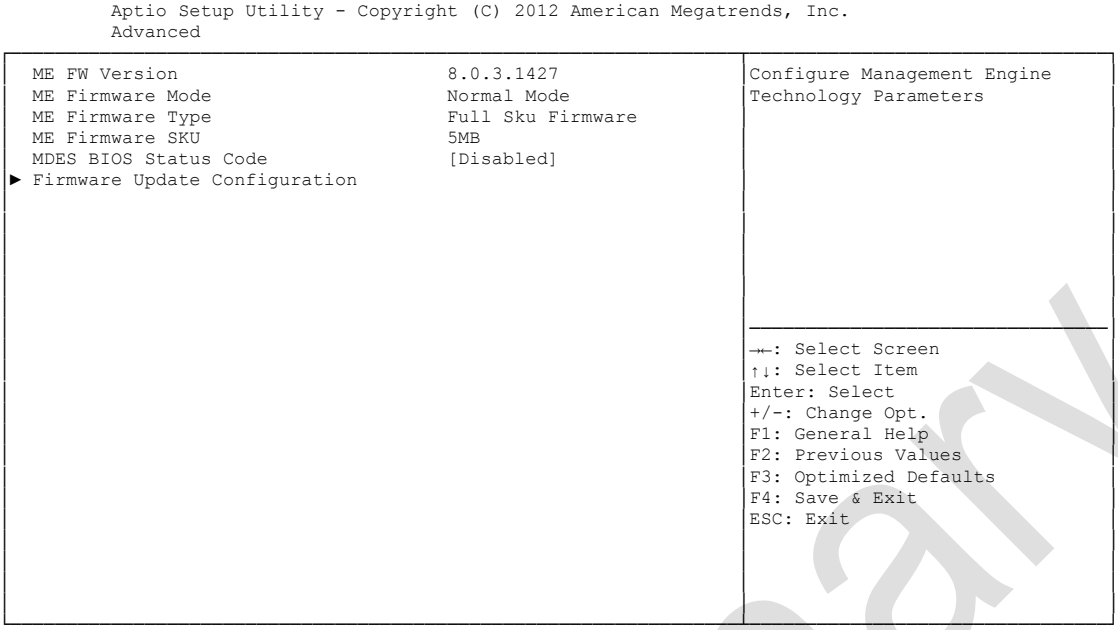
- ✓ **Port X**
  Options: Enabled / Disabled

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

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

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

4.3.5 PCH FW Configurations



- ✓ **ME FW Version**
  Options: none

- ✓ **ME Firmware Mode**
  Options: none

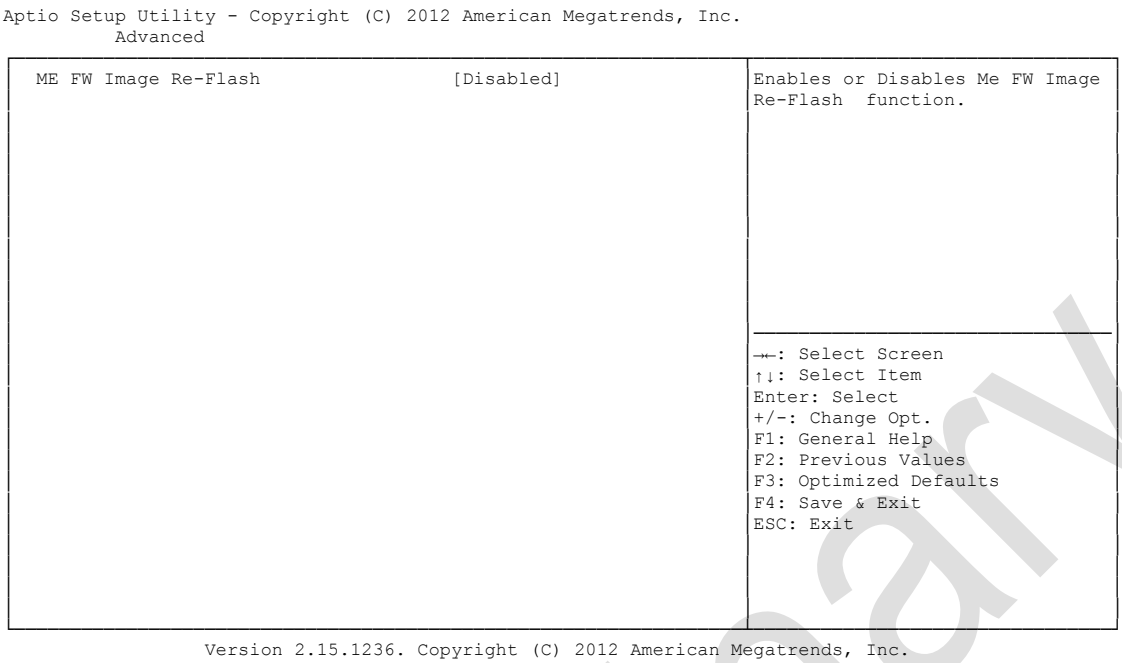
- ✓ **ME Firmware Type**
  Options: none

- ✓ **ME Firmware SKU**
  Options: none

- ✓ **MDES BIOS Status Code**
  Options: Disabled / Enabled

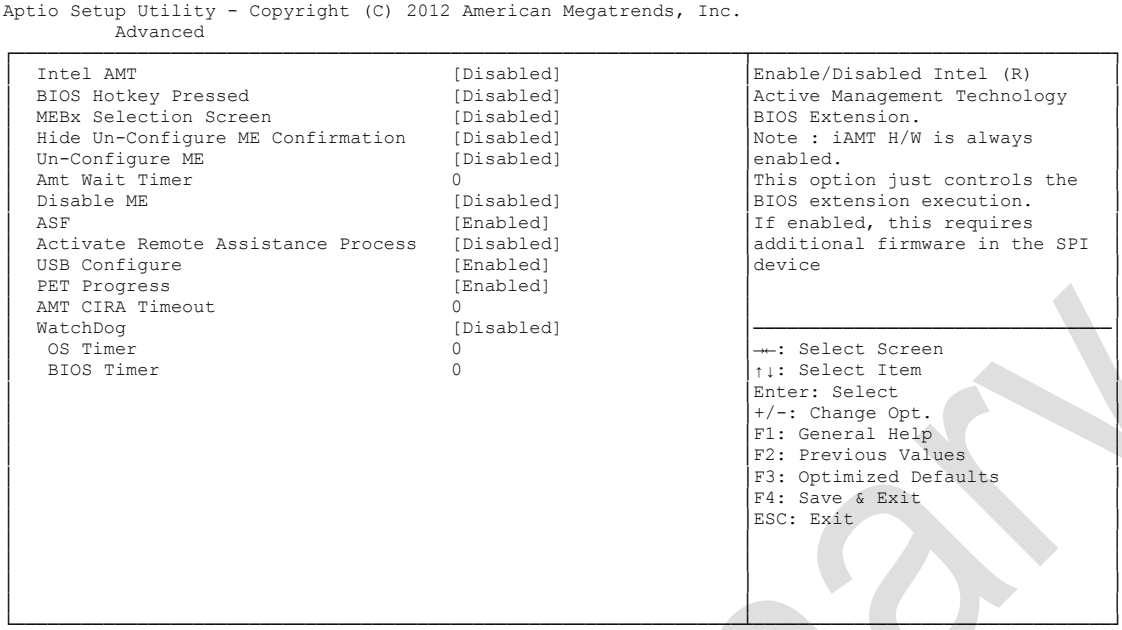
- ✓ **Firmware Update Configuration**
  Sub menu: see "Firmware Update Configuration" (page 64)

4.3.5.1 Firmware Update Configuration



✓ **ME FW Image Re-Flash**
Options: Disabled / Enabled

4.3.6 AMT Configuration



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

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

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

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

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

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

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

- ✓ **Disable ME**
  Options: Disabled / Enabled

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

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

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

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

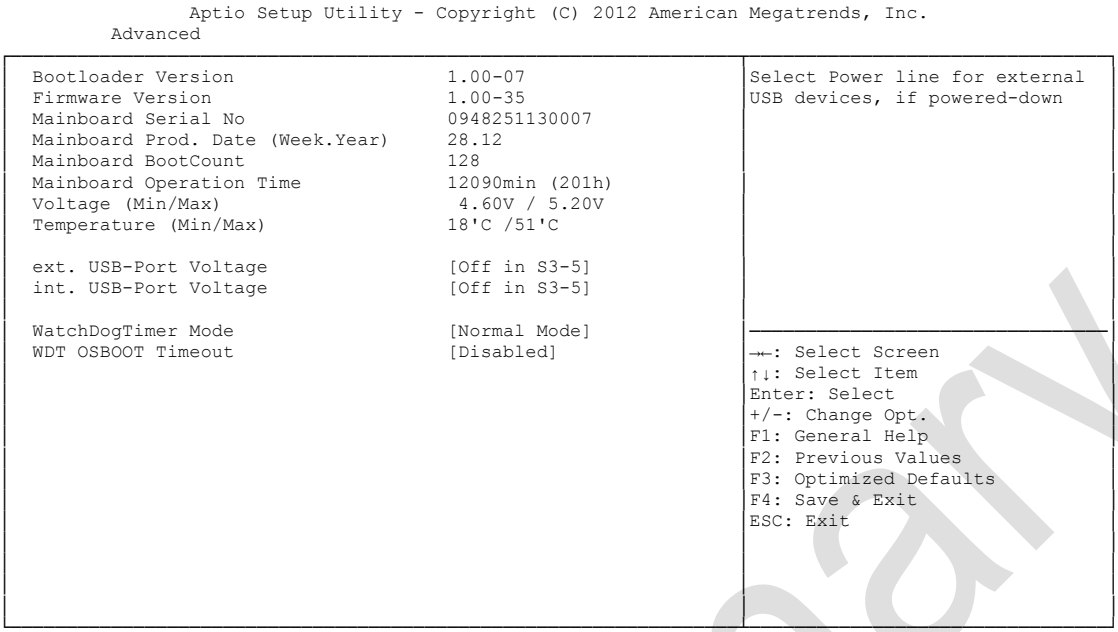
- ✓ **AMT CIRA Timeout**
  Options: none

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

- ✓ **OS Timer**
  Options: none

- ✓ **BIOS Timer**
  Options: none

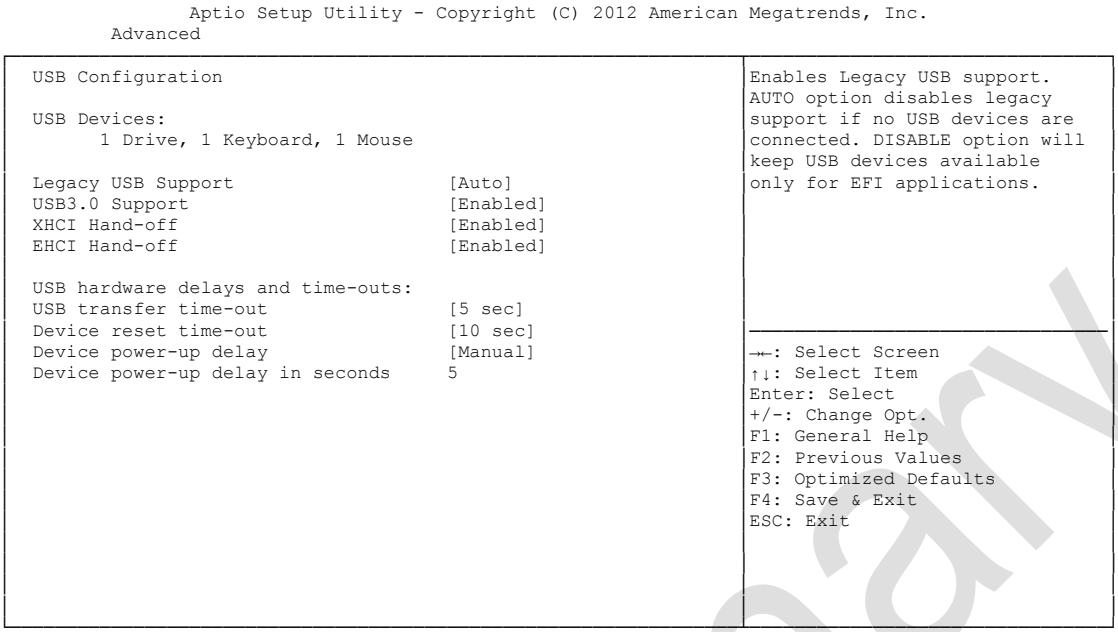
4.3.7 Power Controller Options



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

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

4.3.8 USB Configuration



- ✓ **USB Devices**
  Options: none

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

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

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

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

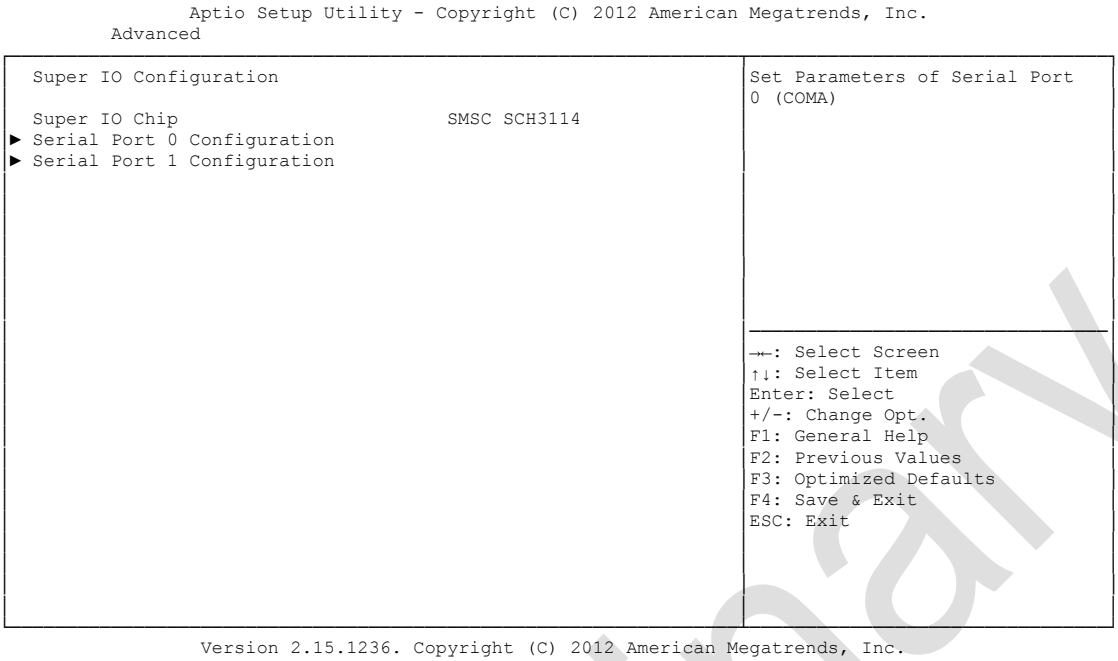
- ✓ **USB transfer time-out**
  Options: 5 sec / 10 sec / 20 sec

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

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

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

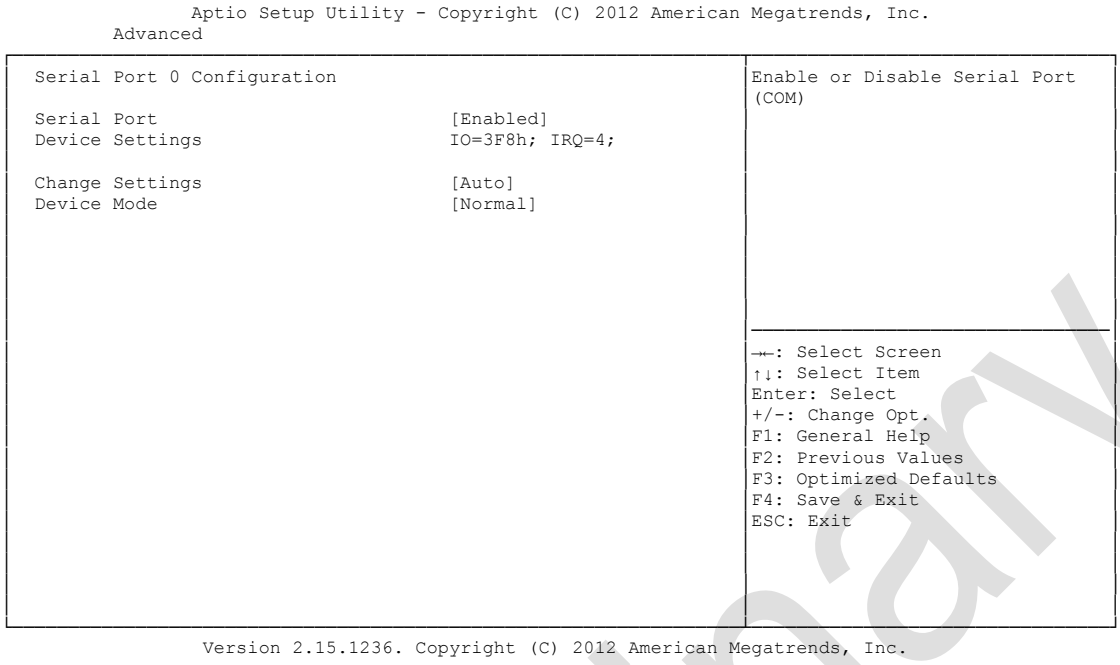
4.3.9 Super IO Configuration



✓ **Super IO Chip**
Options: none

✓ **Serial Port X Configuration**
Sub menu: see "Serial Port Configuration" (page 71)

4.3.9.1 Serial Port Configuration



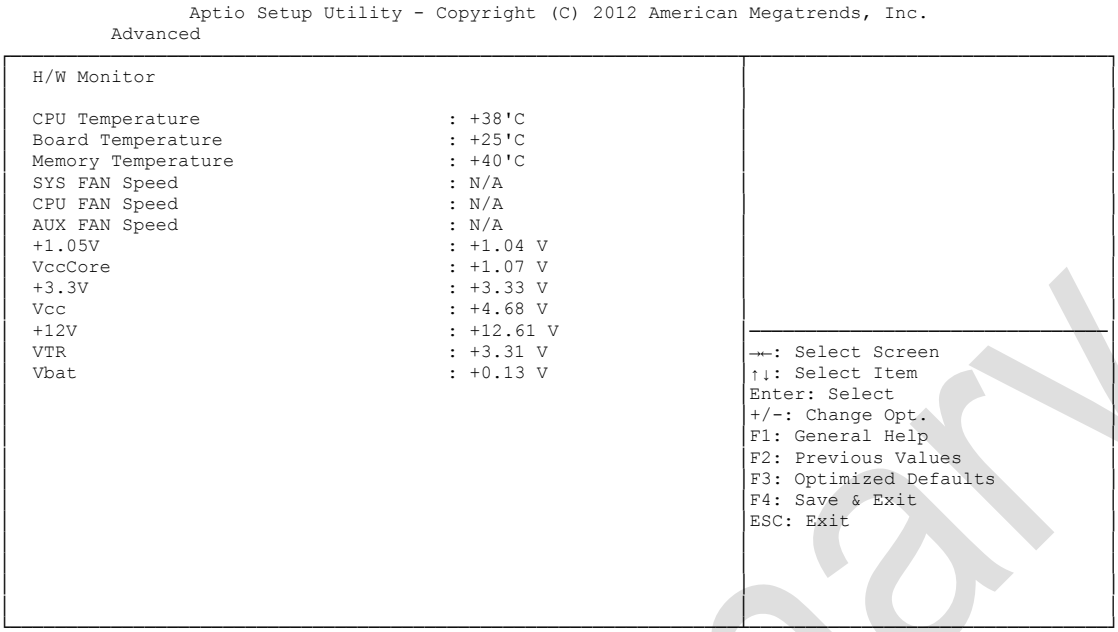
- ✓ **Serial Port**
  Options: Enabled / Disabled

- ✓ **Device Settings**
  Options: none

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

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

4.3.10 H/W Monitor

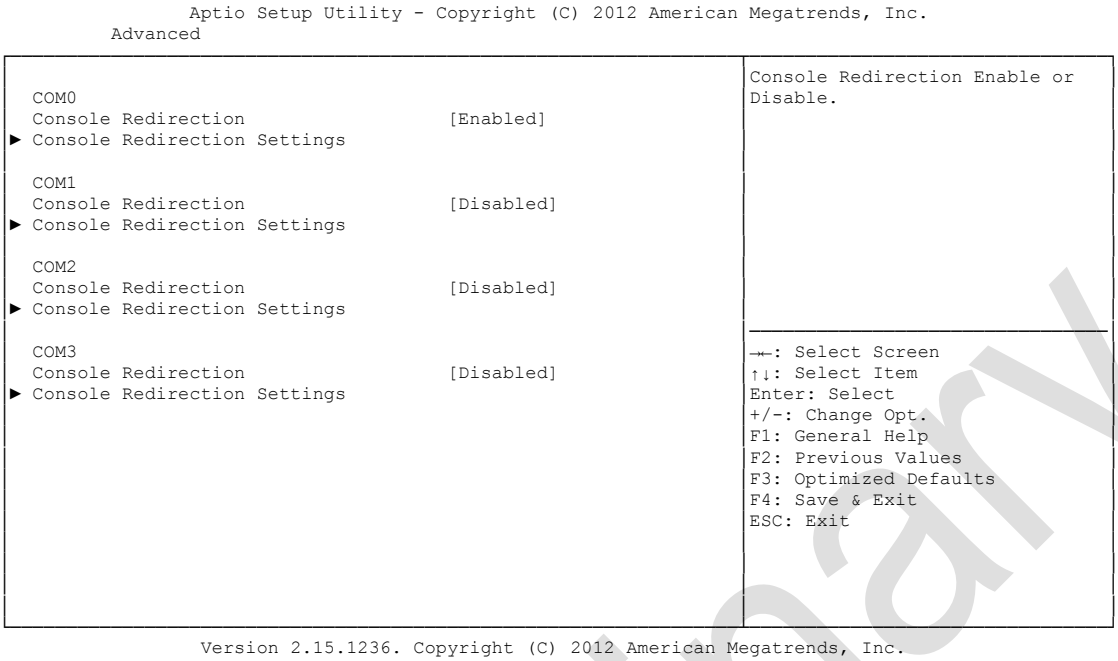


- ✓ **CPU Temperature**
  Options: none
- ✓ **Board Temperature**
  Options: none
- ✓ **Memory Temperature**
  Options: none
- ✓ **SYS FAN Speed**
  Options: none
- ✓ **CPU FAN Speed**
  Options: none
- ✓ **AUX FAN Speed**
  Options: none
- ✓ **+1.05V**
  Options: none
- ✓ **VccCore**
  Options: none
- ✓ **+3.3V**
  Options: none
- ✓ **Vcc**
  Options: none
- ✓ **+12V**
  Options: none

- ✓ **VTR**
  Options: none

- ✓ **Vbat**
  Options: none

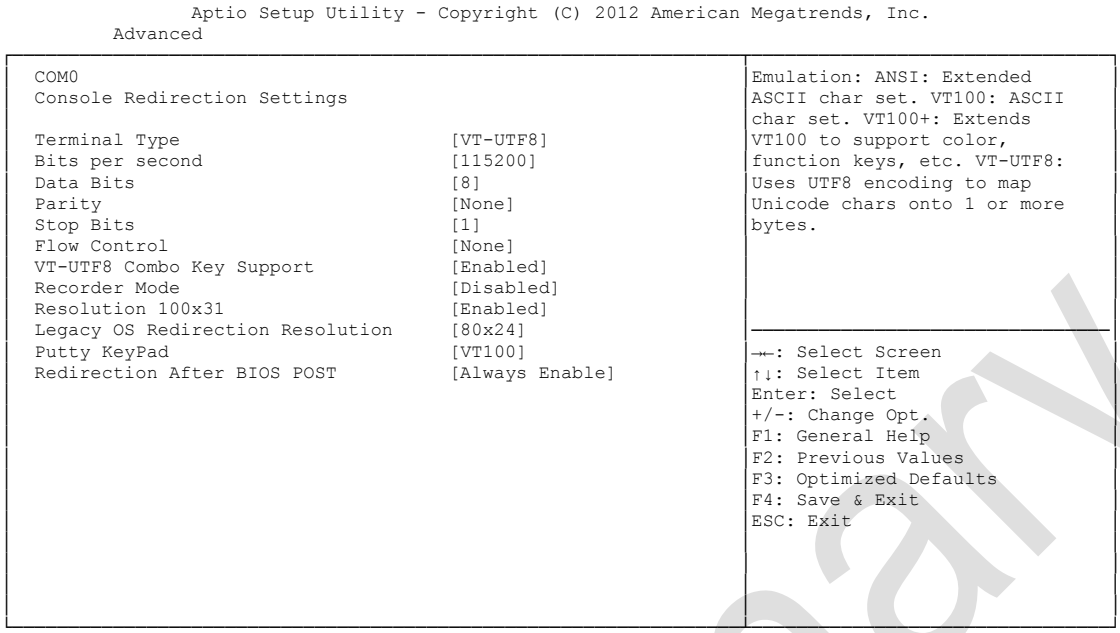
4.3.11 Serial Port Console Redirection



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

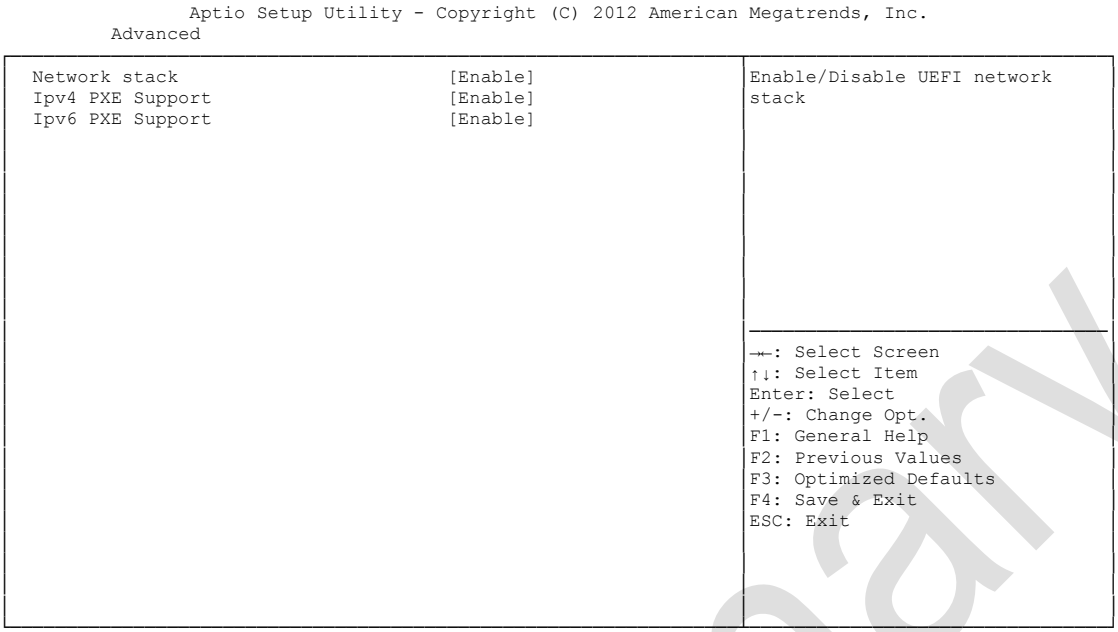
- ✓ **Console Redirection Settings**
  Sub menu: see "Console Redirection Settings" (page 75)

4.3.11.1 Console Redirection Settings



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

4.3.12 Network Stack

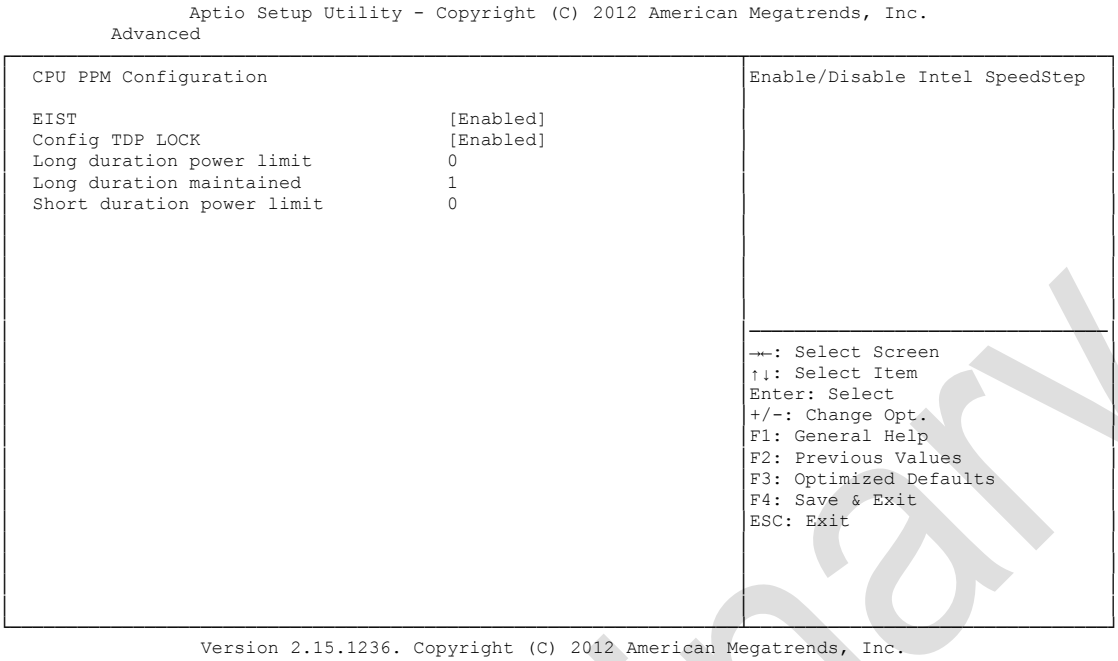


- ✓ **Network Stack**
  Options: Disabled / Enabled

- ✓ **Ipv4 PXE Support**
  Options: Disabled / Enabled

- ✓ **Ipv6 PXE Support**
  Options: Disabled / Enabled

4.3.13 CPU PPM Configuration



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

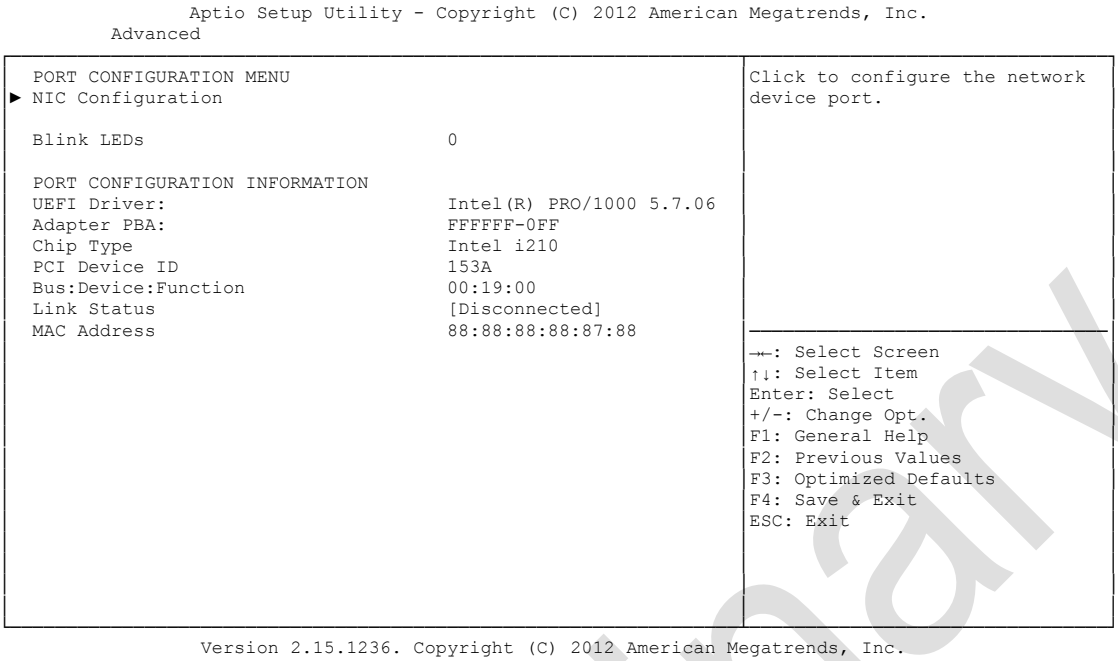
- ✓ **Config TDP LOCK**
  Options: Disabled / Enabled

- ✓ **Long duration power limit**
  Options: 0-255

- ✓ **Long duration power maintained**
  Options: 1-120

- ✓ **Short duration power limit**
  Options: 0-255

4.3.14 Intel(R) GigabitNetworkConnection



- ✓ **NIC Configuration**
  Sub menu: see "NIC Configuration" (page 79)

- ✓ **Blink LEDs**
  Options: none

- ✓ **UEFI Driver:**
  Options: none

- ✓ **Adapter PBA:**
  Options: none

- ✓ **Chip Type**
  Options: none

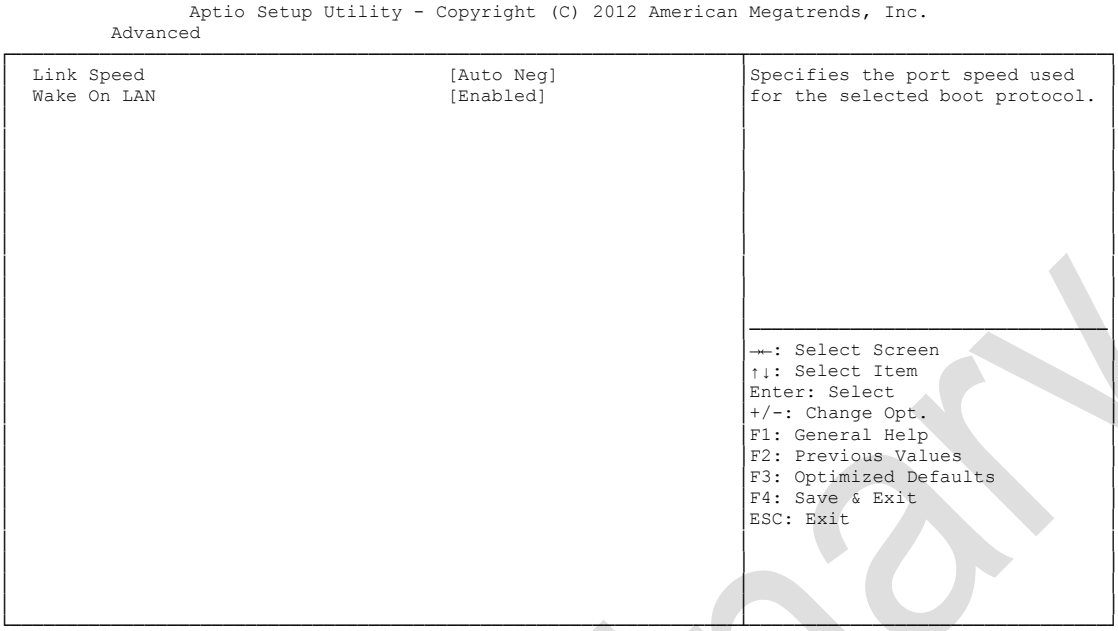
- ✓ **PCI Device ID**
  Options: none

- ✓ **PCI Bus:Device:Function**
  Options: none

- ✓ **Link Status**
  Options: none

- ✓ **Factory MAC Adress**
  Options: none

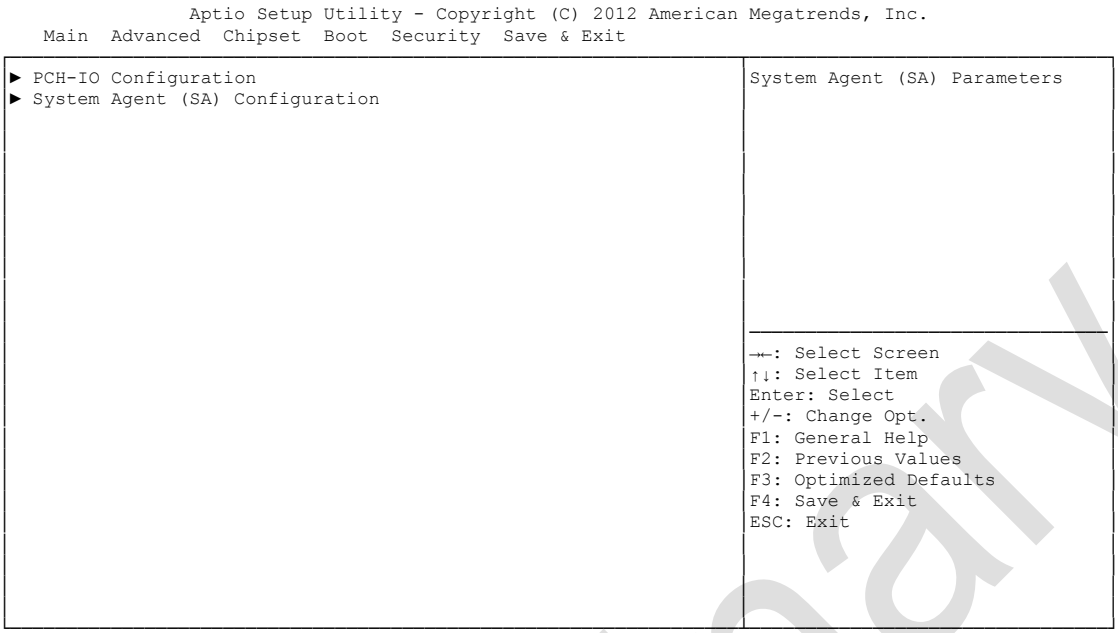
4.3.14.1 NIC Configuration



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

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

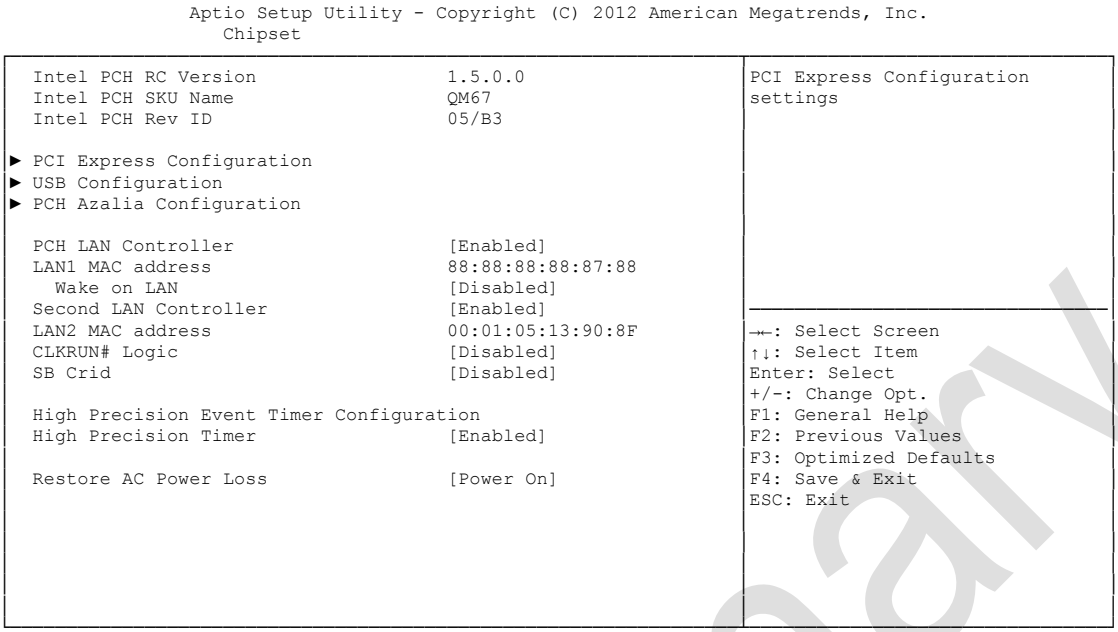
4.4 Chipset



- ✓ **PCH-IO Configuration**
  Sub menu: see "PCH-IO Configuration" (page 81)

- ✓ **System Agent (SA) Configuration**
  Sub menu: see "System Agent (SA) Configuration" (page 88)

4.4.1 PCH-IO Configuration



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

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

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

- ✓ **PCI Express Configuration**
  Sub menu: see "PCI Express Configuration" (page 83)

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

- ✓ **PCH Azalia Configuration**
  Sub menu: see "PCH Azalia Configuration" (page 87)

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

- ✓ **LAN1 MAC address**
  Options: none

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

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

- ✓ **LAN2 MAC address**
  Options: none

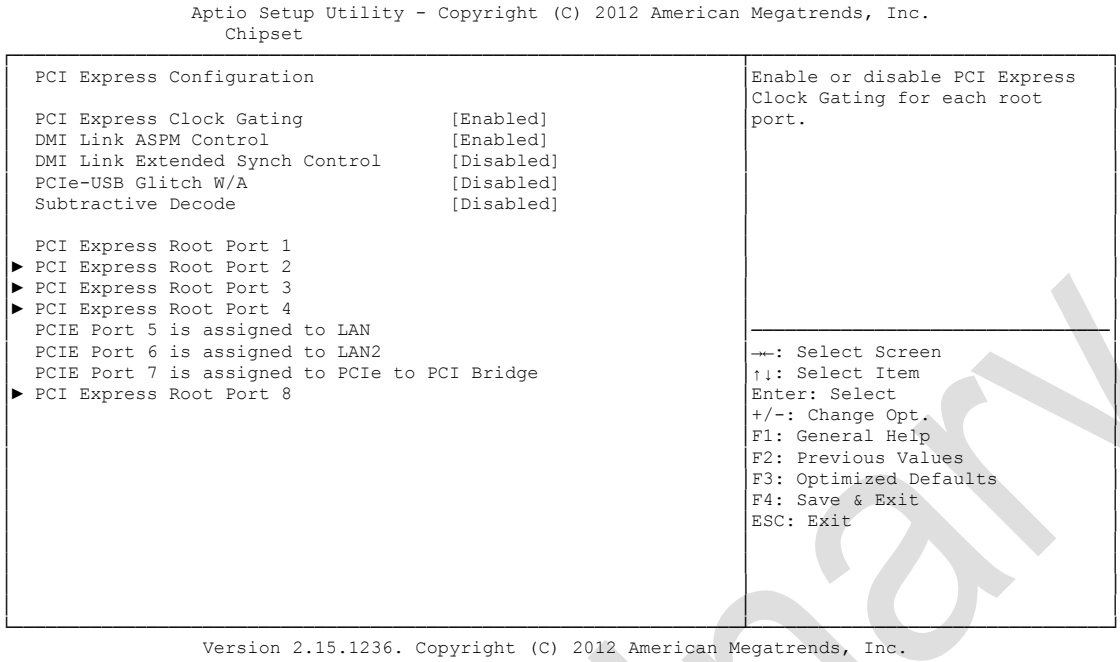
- ✓ **CLKRUN# Logic**
  Options: Disabled

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

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

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

4.4.1.1 PCI Express Configuration



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

- ✓ **DMI Link ASPM Control**
  Options: Disabled / Enabled

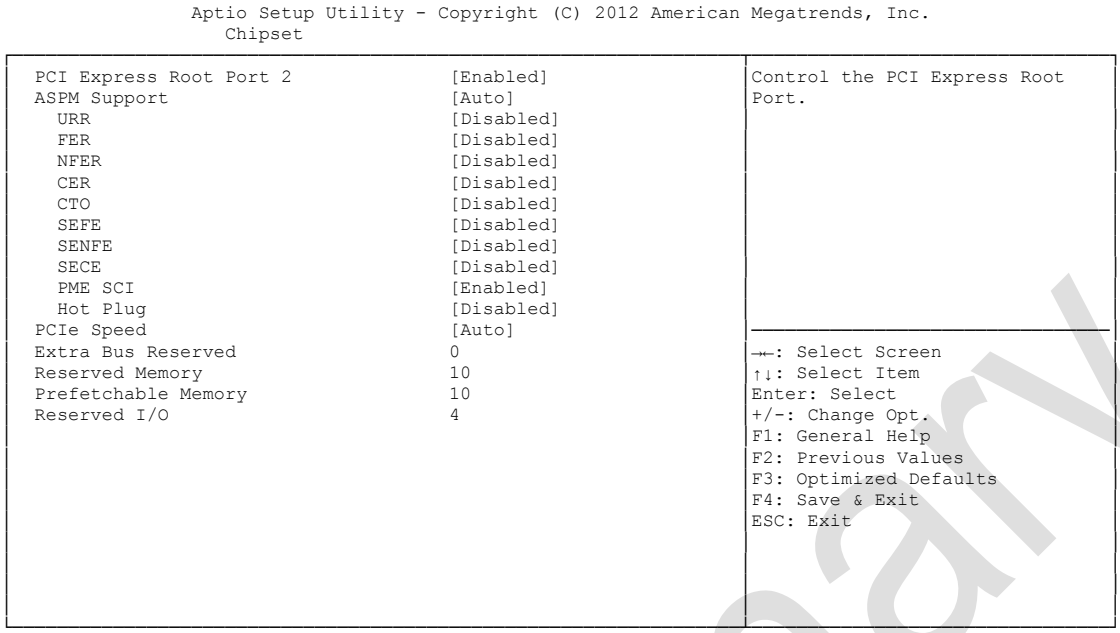
- ✓ **DMI Link Extended Synch Control**
  Options: Disabled / Enabled

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

- ✓ **Subtractive Decode**
  Options: Disabled

- ✓ **PCI Express Root Port X**
  Sub menu: see "PCI Express Settings" (page 84)

4.4.1.1.1 PCI Express Root Port



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

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

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

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

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

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

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

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

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

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

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

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

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

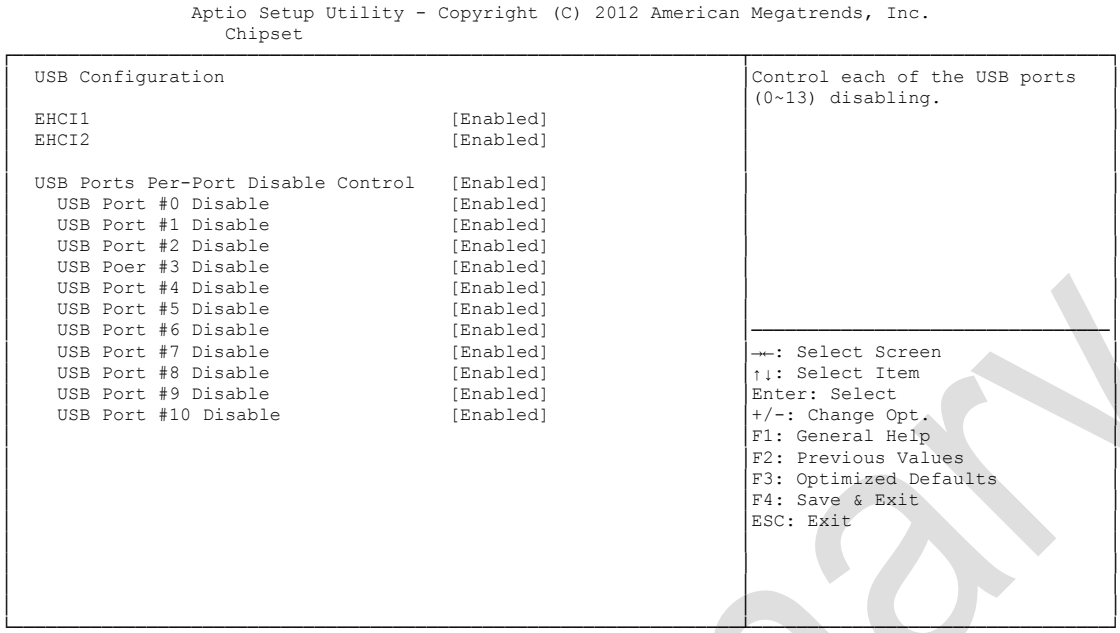
- ✓ **Extra Bus Reserved**
  Options: 0...7

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

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

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

4.4.1.2 USB Configuration



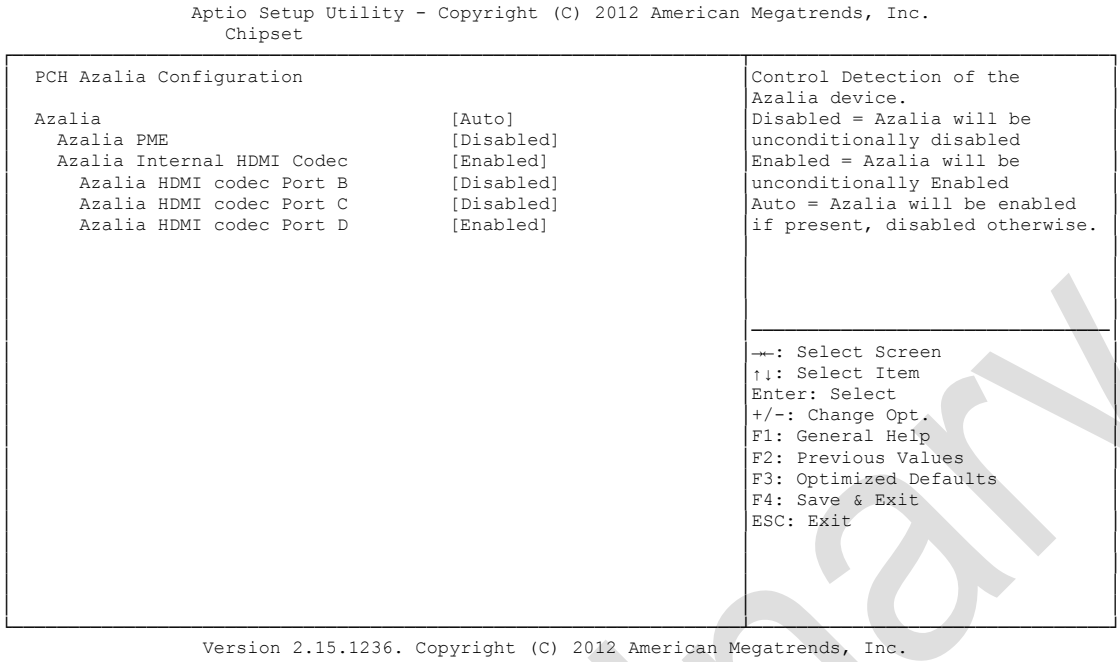
- ✓ **EHCI1**
  Options: Enabled

- ✓ **EHCI2**
  Options: Enabled

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

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

4.4.1.3 PCH Azalia Configuration



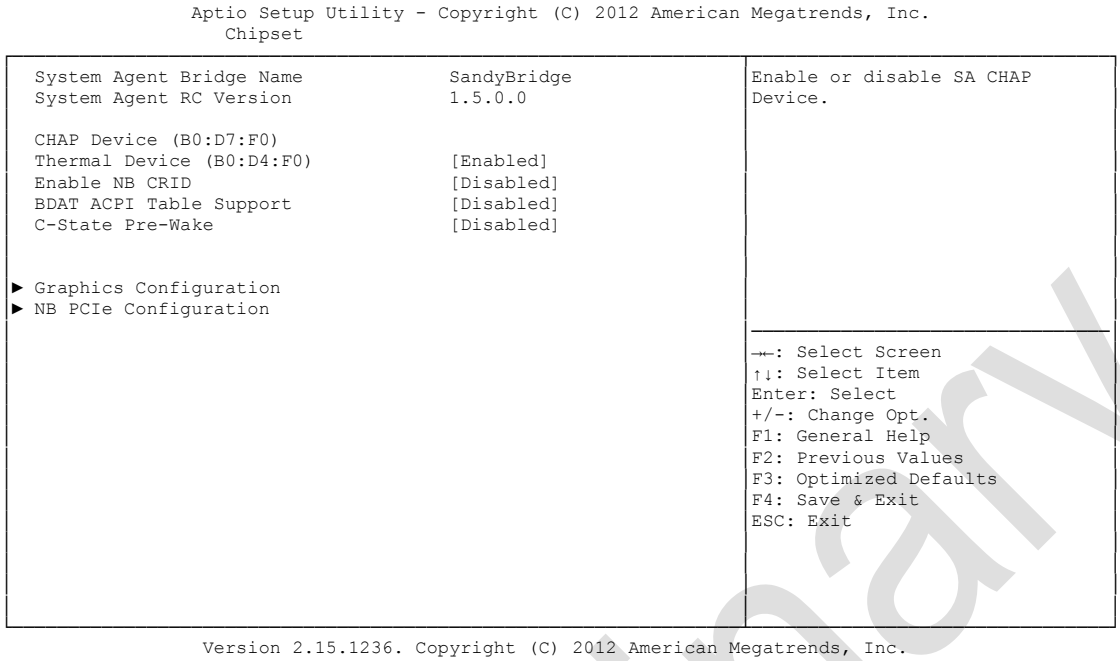
- ✓ **Azalia**
  Options: Disabled / Enabled / Auto

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

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

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

4.4.2 System Agent (SA) Configuration



- ✓ **System Agent Bridge Name**
  Options: none

- ✓ **System Agent RC Version**
  Options: none

- ✓ **VT-d Capability**
  Options: none

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

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

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

- ✓ **Enable NB CRID**
  Options: Disabled / Enabled

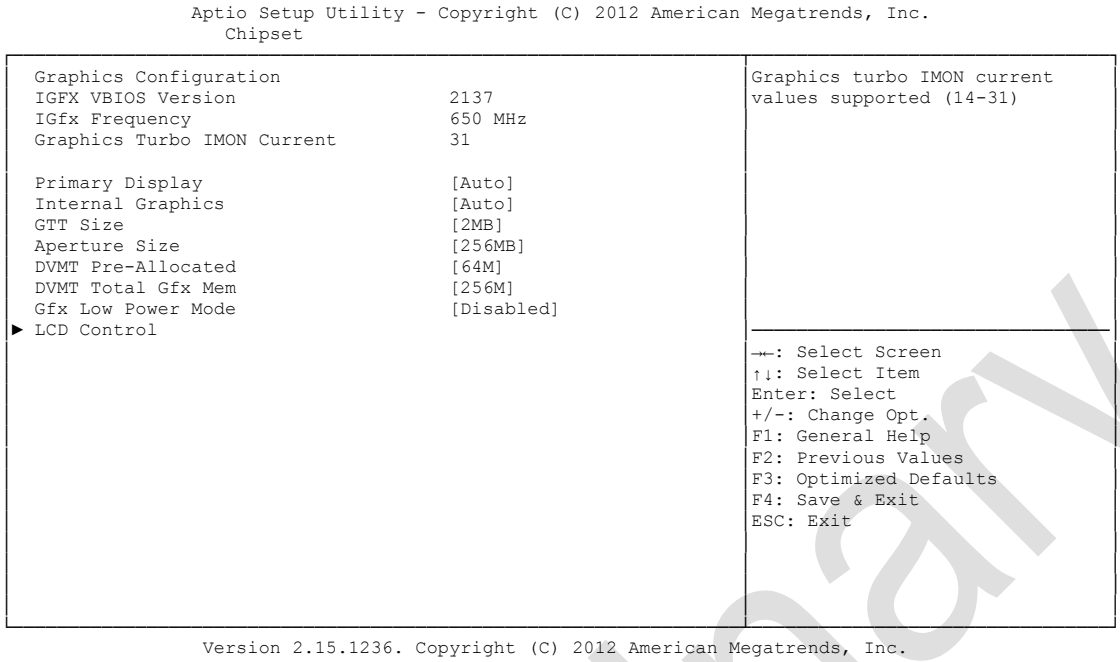
- ✓ **BDAT ACPI Table Support**
  Options: Disabled / Enabled

- ✓ **C-State Pre-Wake**
  Options: Disabled / Enabled

- ✓ **Graphics Configuration**
  Sub menu: see "Graphics Configuration" (page 89)

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

4.4.2.1 Graphics Configuration



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

- ✓ **IGFX Frequency**
  Options: none

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

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

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

- ✓ **GTT Size**
  Options: 1MB / 2MB

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

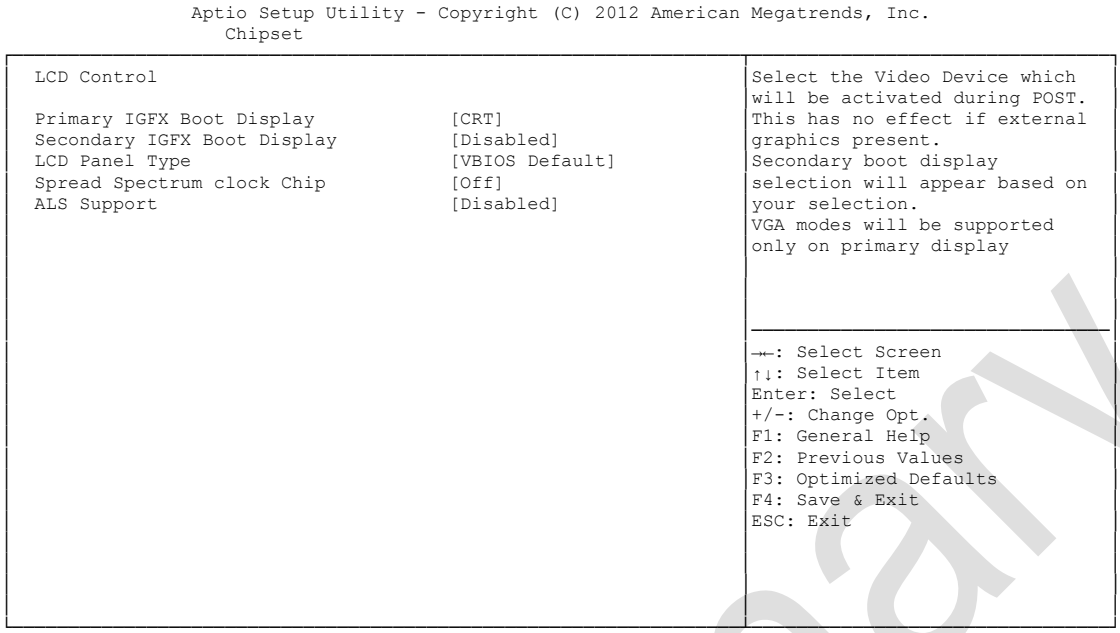
- ✓ **DVMT Pre-Allocated**
  Options: 32M / 64M ... 480M / 512M / 1024M

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

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

- ✓ **LCD Control**
  Sub menu: see "LCD Control" (page 90)

4.4.2.1.1 LCD Control



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

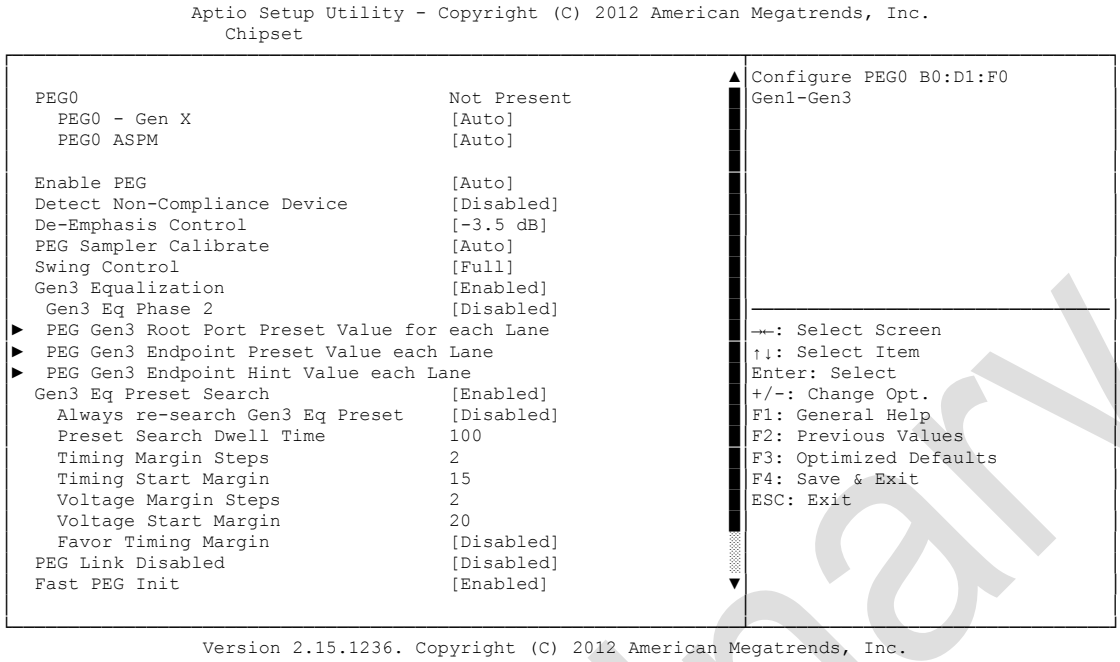
- ✓ **Secondary IGFX Boot Display**
  Options: VBIOS Default / CRT / EFP / LFP / EFP3 / EFP2 / LFP2

- ✓ **LCD Panel Type**
  Options: VBIOS Default / 640x480 LVDS ...1920x1080 LVDS / 2048x1536 LVDS

- ✓ **Spread Spectrum Clock Chip**
  Options: Off / Hardware / Software

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

4.4.2.2 NB PCIe Configuration



- ✓ **PEGn - Gen X**
  Options: Auto / Gen1 / Gen2 / Gen3

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

- ✓ **Enable PEG**
  Options: Disabled / Enabled / Auto

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

- ✓ **De-emphasis Control**
  Options: -6 dB / -3.5 dB

- ✓ **PEG Sampler Calibrate**
  Options: Auto / Disabled / Enabled

- ✓ **Swing Control**
  Options: Reduced / Half / Full

- ✓ **Gen3 Equalization**
  Options: Disabled / Enabled

- ✓ **Gen3 Eq Phase 2**
  Options: Auto / Enabled / Disabled

- ✓ **Gen3 Root Port Preset Value for each Lane**
  Sub menu: see "PEG Gen3 Root Port Preset Value for each Lane" (page 93)

- ✓ **PEG Gen3 Endpoint Preset Value for each Lane**
  Sub menu: see "PEG Gen3 Endpoint Preset Value each Lane" (page 94)

- ✓ **PEG Gen3 Endpoint Hint Value for each Lane**
  Sub menu: see "PEG Gen3 Endpoint Hint Value each Lane" (page 95)

- ✓ **Gen3 Eq Preset Search**
  Options: Enabled / Disabled

- ✓ **Always re-search Gen3 Eq Preset**
  Options: Enabled / Disabled

- ✓ **Preset Search Dwell Time**
  Options: 0-65535

- ✓ **Timing Margin Steps**
  Options: 1-255

- ✓ **Timing Start Margin**
  Options: 4-255

- ✓ **Voltage Margin Steps**
  Options: 1-255

- ✓ **Voltage Start Margin**
  Options: 4-255

- ✓ **Favor Timing Margin**
  Options: Enabled / Disabled

- ✓ **PEG Link Disabled**
  Options: Disabled / Enabled

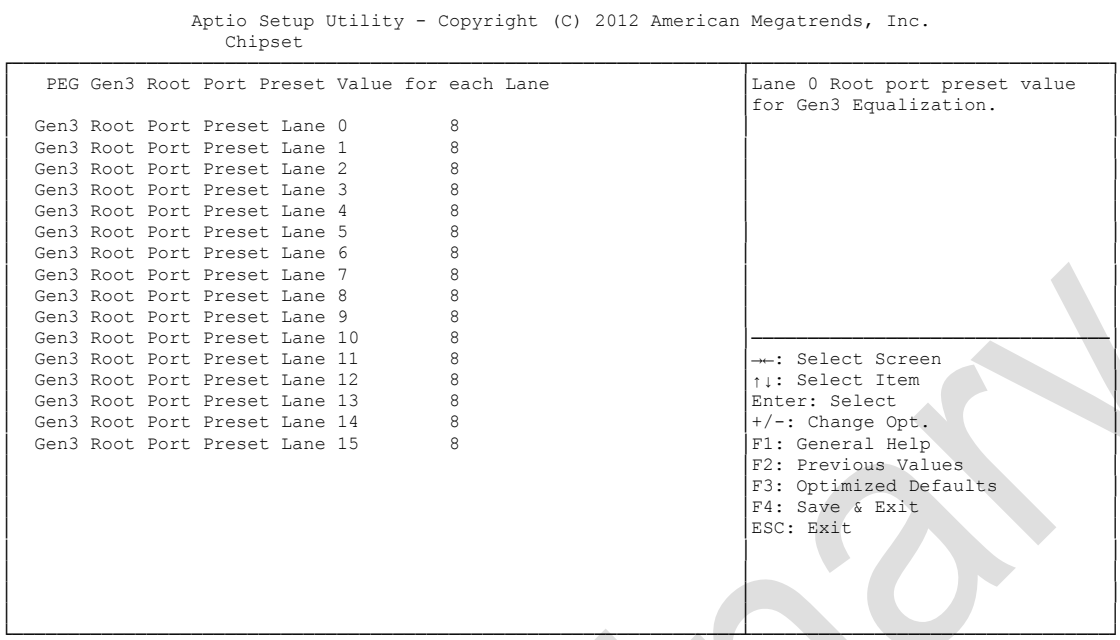
- ✓ **Fast PEG Init**
  Options: Disabled / Enabled

- ✓ **RxCEM Loop back**
  Options: Disabled / Enabled

- ✓ **RxCEM Loop back lane**
  Options: Lane 0...15

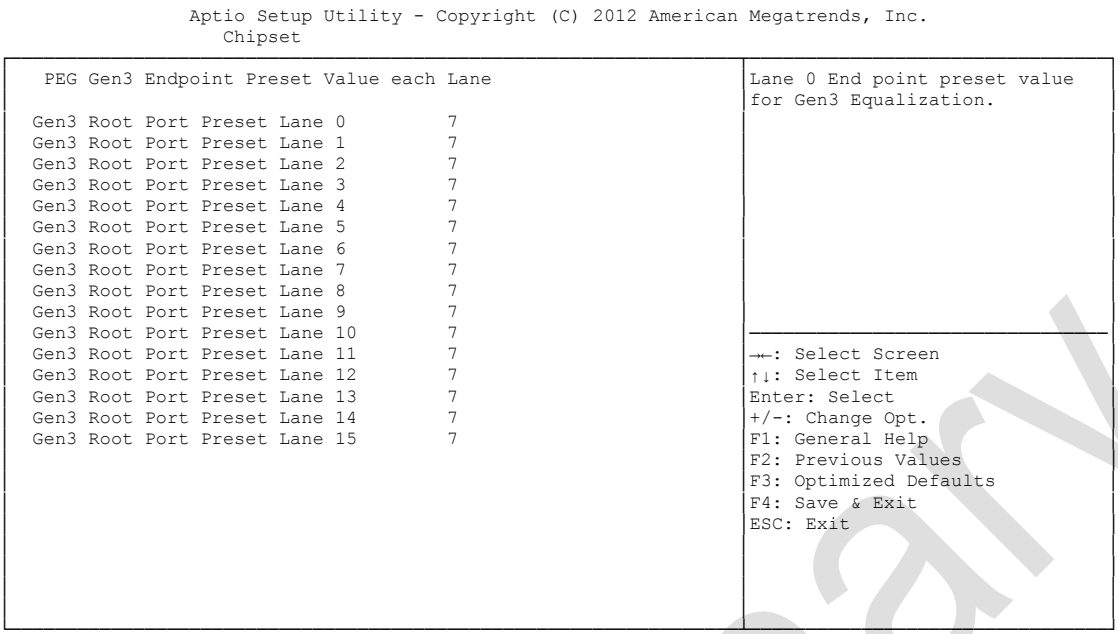
- ✓ **PCIe Gen3 RxCTLEp Setting**
  Options: 0...15

4.4.2.2.1 PEG Gen3 Root Port Preset Value for each Lane



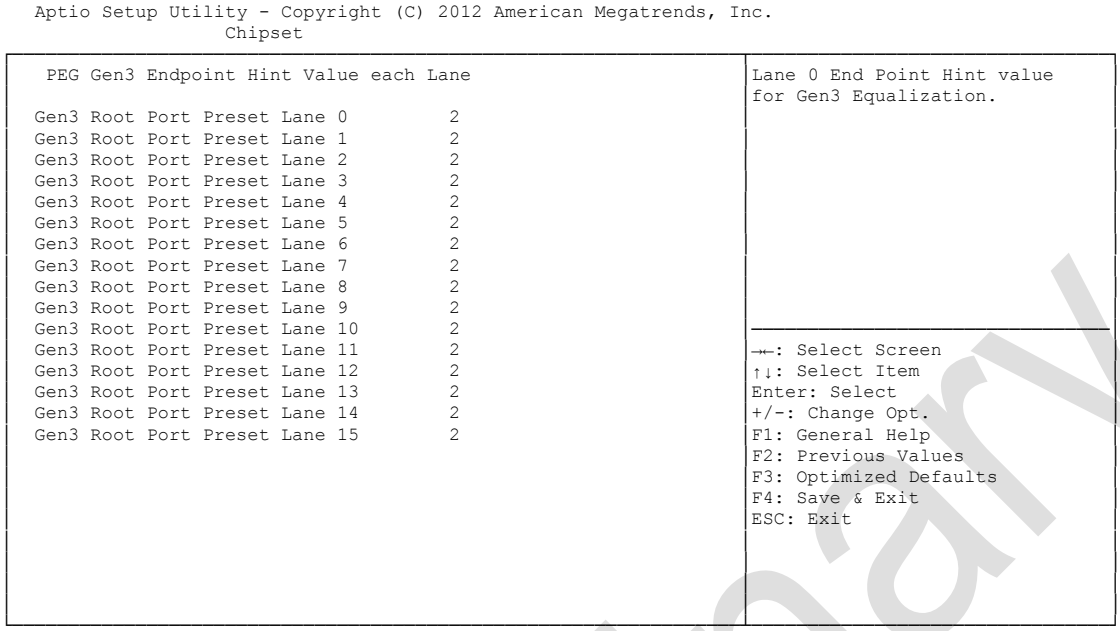
✓ **Gen3 Root Port Preset Value for each Lane**
Options: 1..11

4.4.2.2.2 PEG Gen3 Endpoint Preset Value each Lane



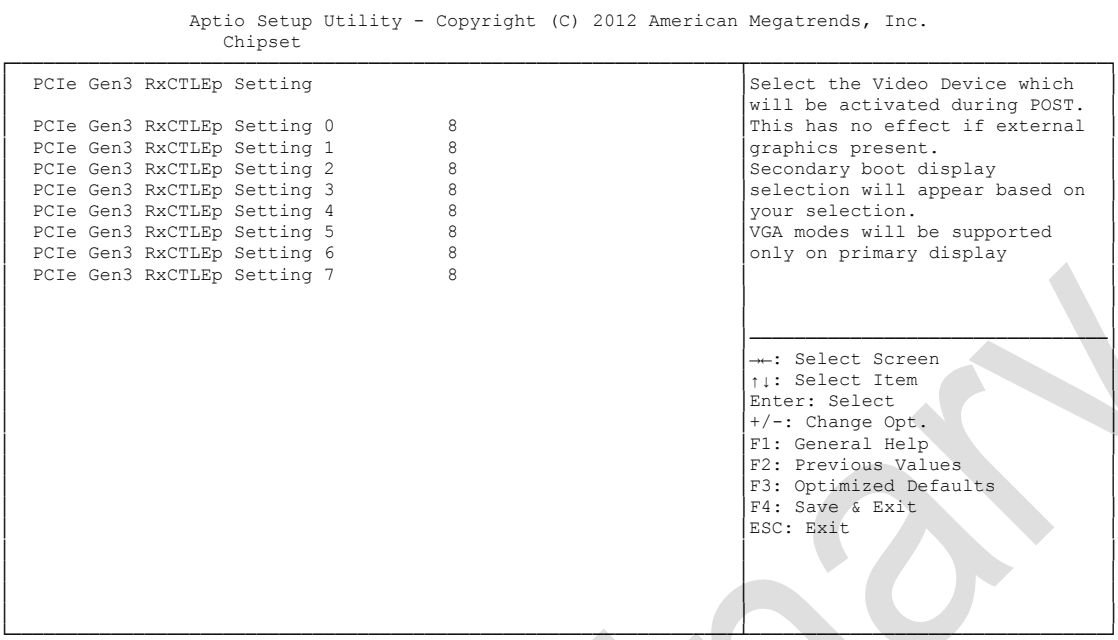
✓ **Gen3 Endpoint Preset Value each Lane**
Options: 0..11

4.4.2.2.3 PEG Gen3 Endpoint Hint Value each Lane



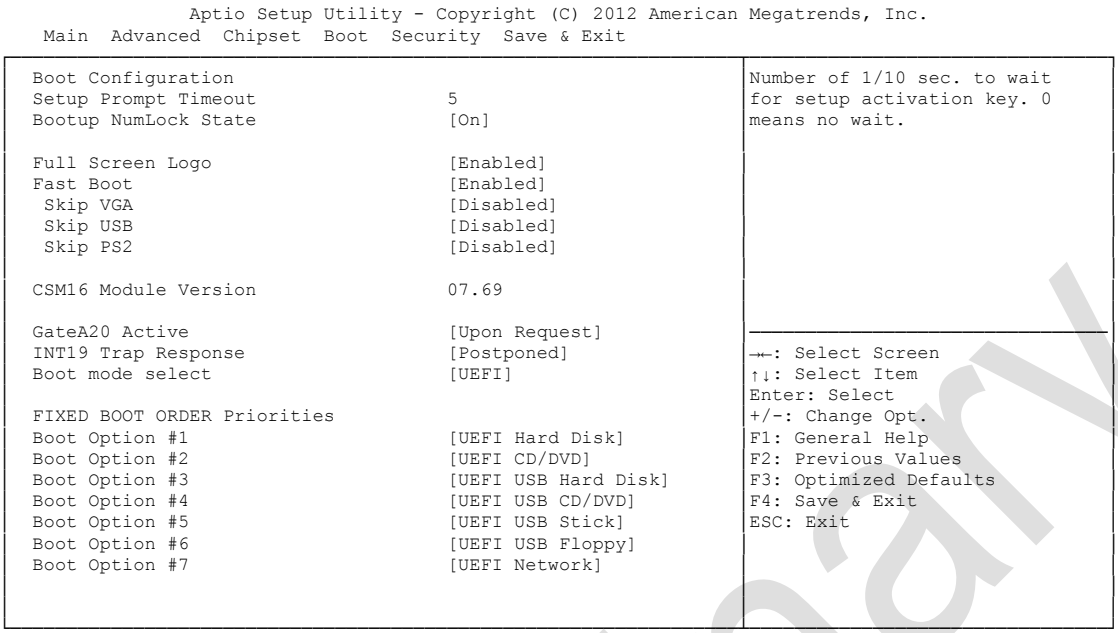
✓ **PEG Gen3 Endpoint Hint Value each Lane**
Options: 0..11

4.4.2.2.4 PCIe Gen3 RxCTLEp Setting



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

4.5 Boot



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

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

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

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

- ✓ **Skip VGA**
  Options: Disabled / Enabled

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

- ✓ **Skip PS2**
  Options: Disabled / Enabled

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

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

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

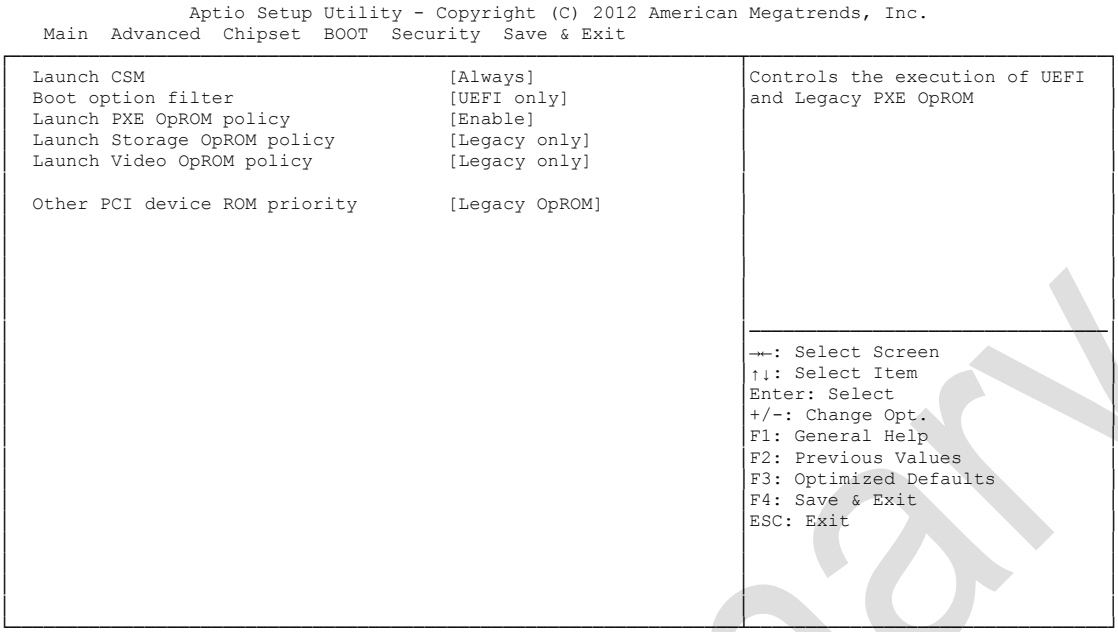
- ✓ **Boot mode select**
  Options: Legacy / UEFI / DUAL

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

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

- ✓ **CSM Parameters**
  Sub menu: see "CSM Parameters" (page 99)

4.5.1 CSM Parameters



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

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

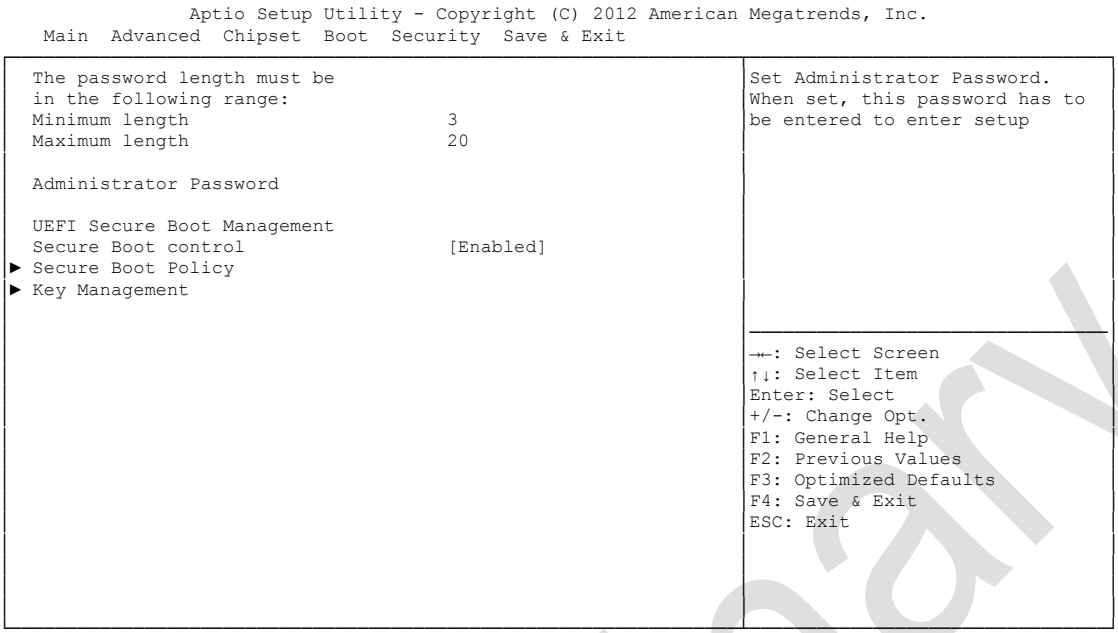
- ✓ **Launch PXE OpROM policy**
  Options: Disable / Enable

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

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

- ✓ **Other PCI device ROM priority**
  Options: UEFI OpROM / Legacy OpROM

4.6 Security



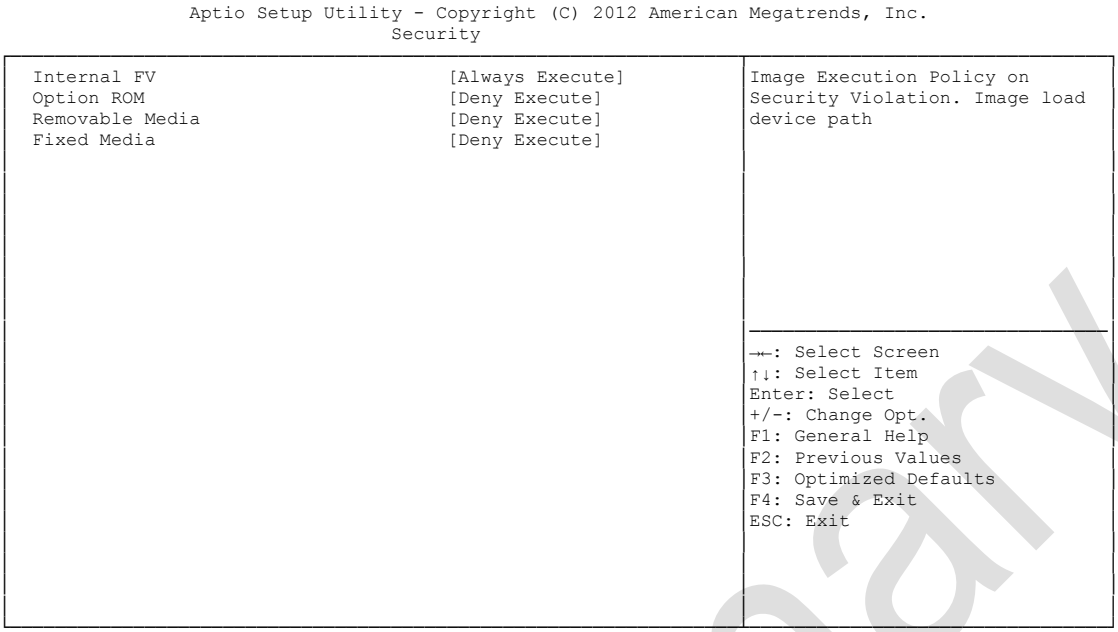
- ✓ **Administrator Password**
  Options: Press [Enter]

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

- ✓ **Secure Boot Policy**
  Sub menu: see "Secure Boot Policy" (page 101)

- ✓ **Key Management**
  Sub menu: see "Key Management" (page 102)

4.6.1 Secure Boot Policy



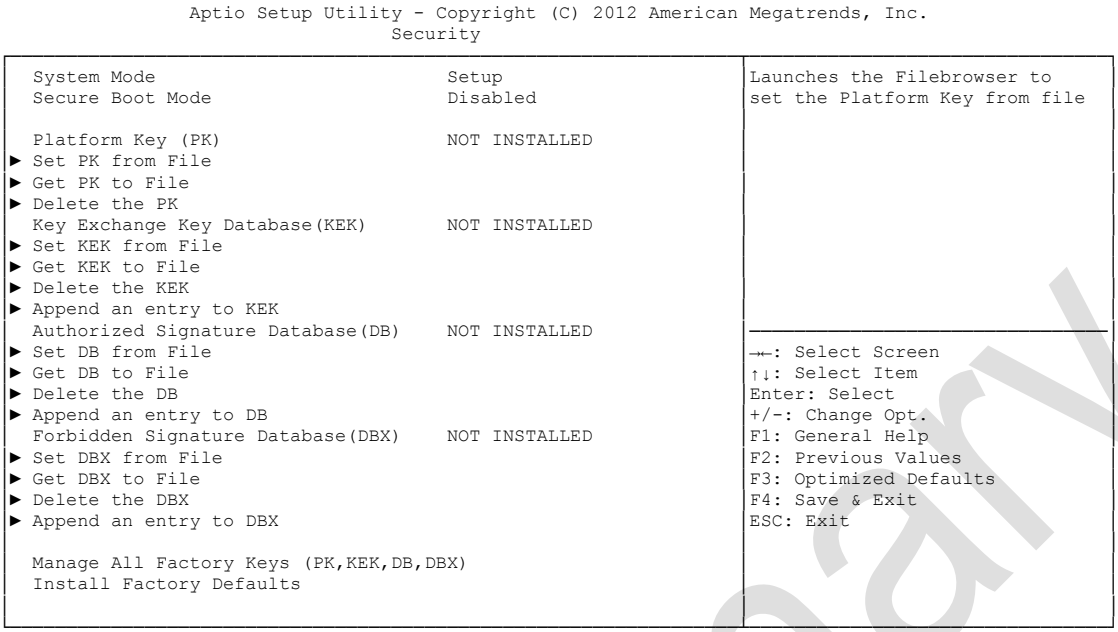
- ✓ **Internal FV**
  Options: Always Execute

- ✓ **Option ROM**
  Options: Always Execute / Always Deny / Allow Execute / Defer Execute / Deny Execute / Query User

- ✓ **Removable Media**
  Options: Always Execute / Always Deny / Allow Execute / Defer Execute / Deny Execute / Query User

- ✓ **Fixed Media**
  Options: Always Execute / Always Deny / Allow Execute / Defer Execute / Deny Execute / Query User

4.6.2 Key Management



- ✓ **System Mode**
  Options: none

- ✓ **Secure Boot Mode**
  Options: none

- ✓ **Set PK from File**
  Options: Press [Enter]

- ✓ **Get PK to File**
  Options: Press [Enter]

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

- ✓ **Set KEK from File**
  Options: Press [Enter]

- ✓ **Get KEK to File**
  Options: Press [Enter]

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

- ✓ **Append an entry to KEK**
  Options: Press [Enter]

- ✓ **Set DB from File**
  Options: Press [Enter]

- ✓ **Get DB to File**
  Options: Press [Enter]

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

- ✓ **Append an entry to DB**
  Options: Press [Enter]

- ✓ **Set DBX from File**
  Options: Press [Enter]

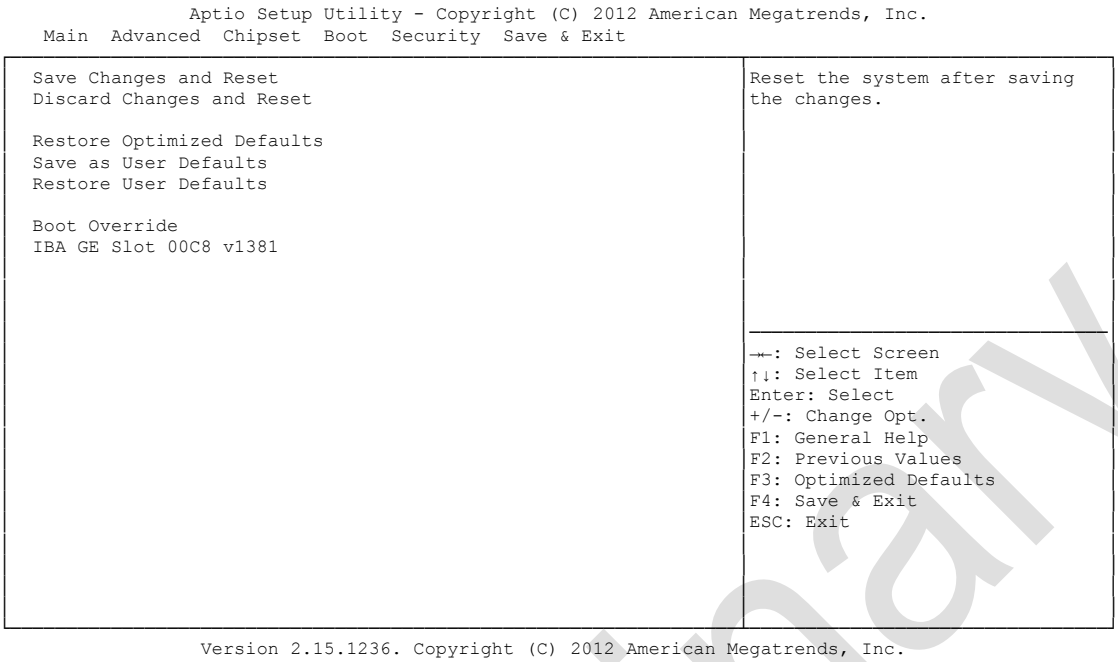
- ✓ **Get DBX to File**
  Options: Press [Enter]

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

- ✓ **Append an entry to DBX**
  Options: Press [Enter]

- ✓ **Install Factory Defaults**
  Options: Press [Enter]

4.7 Save & Exit



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

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

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

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

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

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

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

4.8 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

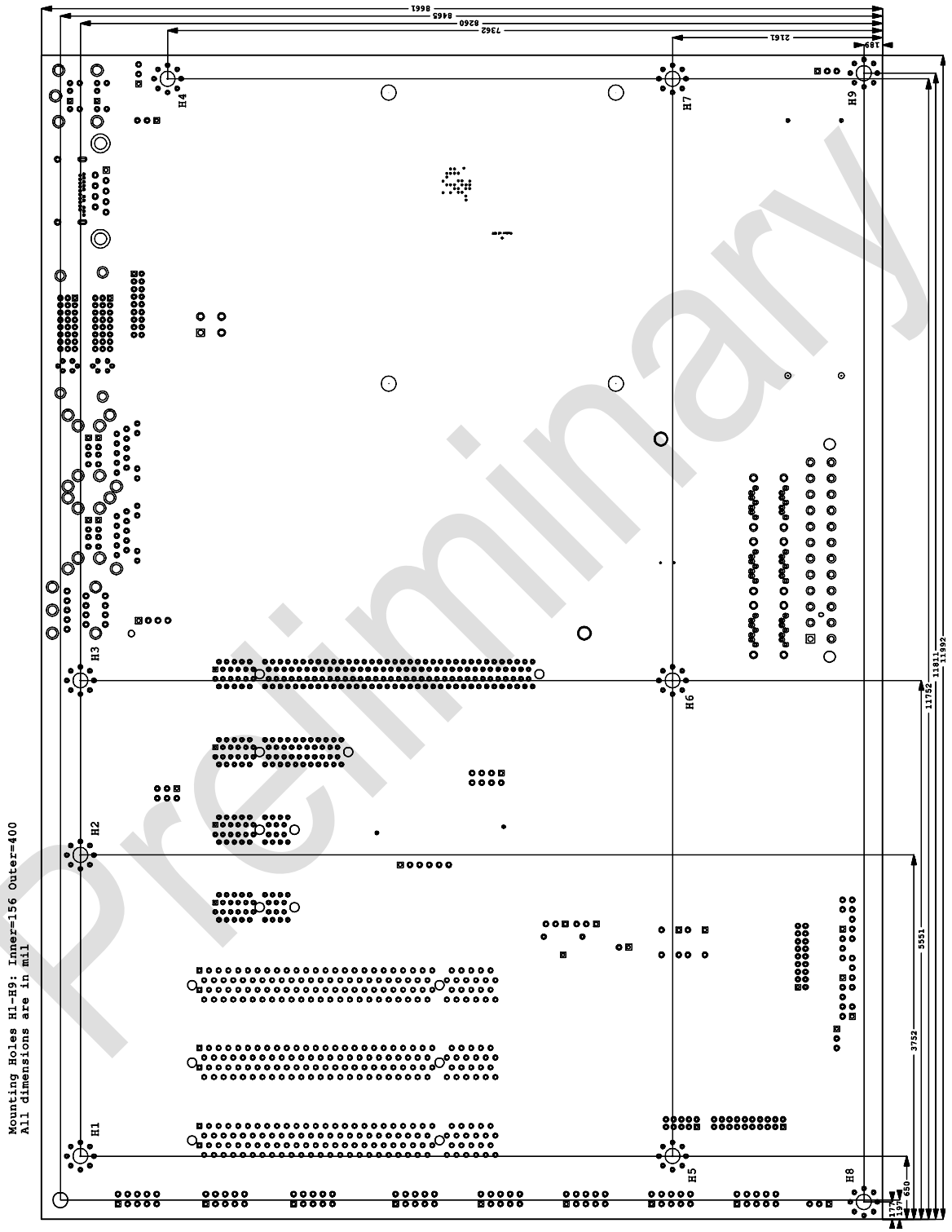
Updating the BIOS in an improper way can render the board unusable. Therefore, you should only update the BIOS if you really need the changes/corrections which come with the new BIOS version.

CAUTION

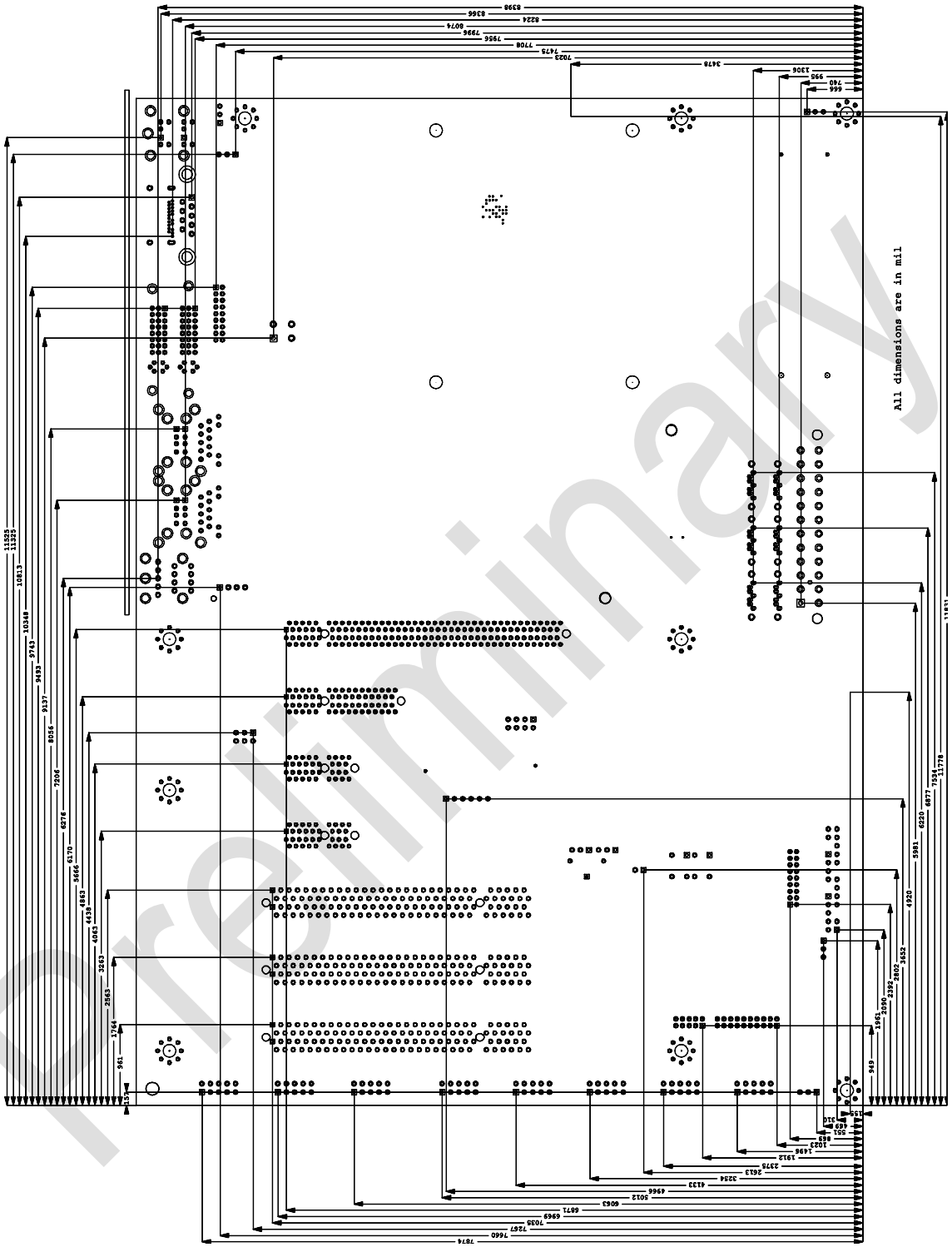
Before you proceed to update the BIOS you need to make absolutely sure that you have the right BIOS file which was issued for the exact board and exact board revision that you wish to update. If you try to update the BIOS using the wrong file the board will not start up again.

5 Mechanical Drawings

5.1 PCB: Mounting Holes



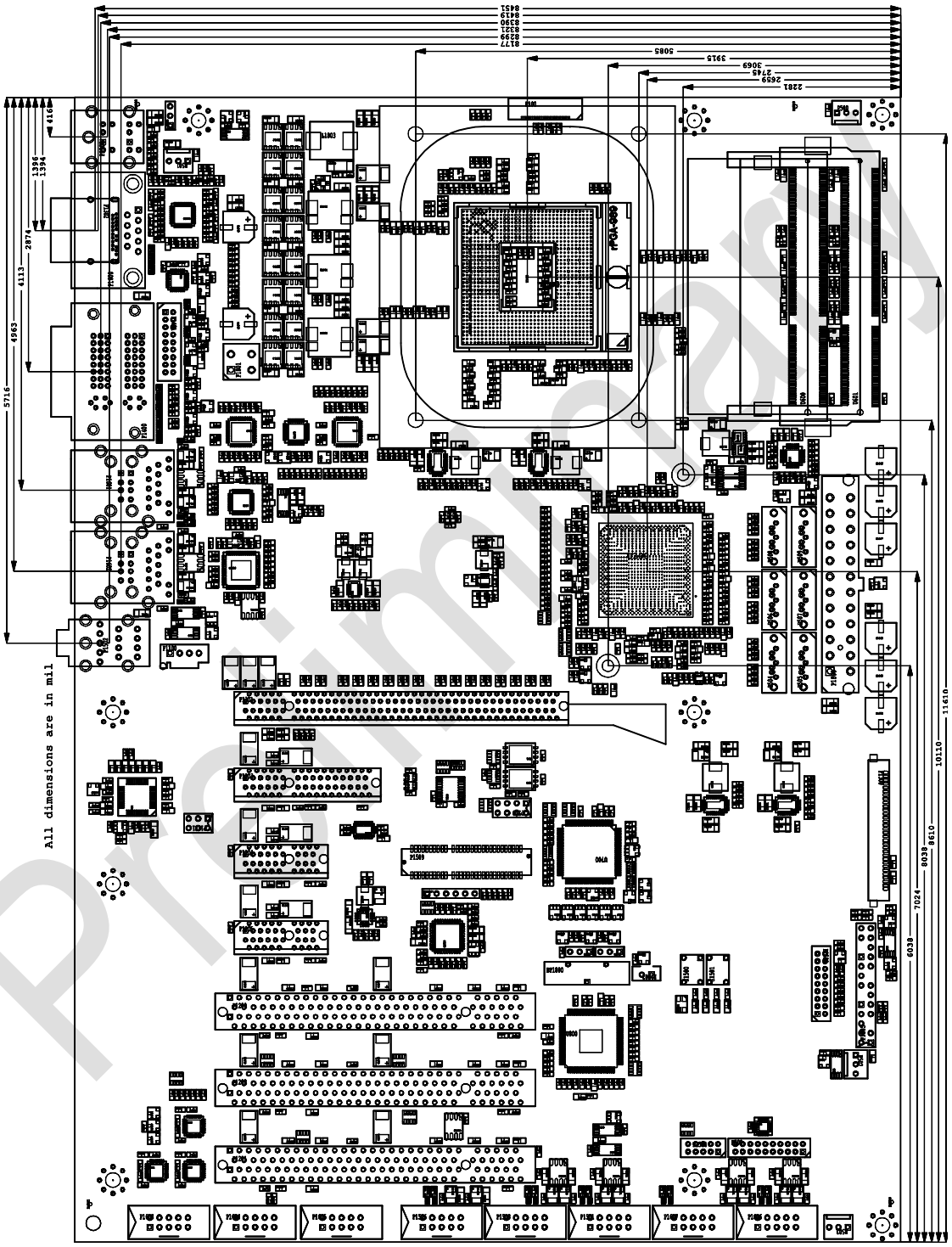
5.2 PCB: Pin 1 Dimensions



5.3 PCB: Die Center

NOTE

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



6 Technical Data

6.1 Electrical Data

Power Supply:

Board:	ATX, including 2x2pin 12V connector
RTC:	>= 3 Volt

Electric Power Consumption:

Board:	typically 10VA (CPU and expansion cards excluded)
RTC:	<= 10µA

6.2 Environmental Conditions

Temperature Range:

Operating:	0°C to +60°C (extended temperature on request)
Storage:	-25°C up to +85°C
Shipping:	-25°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.

6.3 Thermal Specifications

The board is specified to operate in an environmental temperature range from 0°C to +60°C (extended temperature on request). 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.

7 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

7.1 Beckhoff's Branch Offices and Representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products.
The addresses of Beckhoff's branch offices and representatives around the world can be found on her internet pages: http://www.beckhoff.com
You will also find further documentation for Beckhoff components there.

7.2 Beckhoff Headquarters

Beckhoff Automation GmbH
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7.2.1 Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training programs for Beckhoff system components

hotline:	+49(0)5246/963-157
fax:	+49(0)5246/963-9157
e-mail:	support@beckhoff.com

7.2.2 Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

hotline:	+49(0)5246/963-460
fax:	+49(0)5246/963-479
e-mail:	service@beckhoff.com

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.

Address	Function
0-FF	Reserved IO area of the board
170-17F	
1F0-1F7	
278-27F	
2E8-2EF	COM4
2F8-2FF	COM2
370-377	
378-37F	
3BC-3BF	
3E8-3EF	COM3
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.

Address	Function
A0000-BFFFF	VGA RAM
C0000-CFFFF	VGA BIOS
D0000-E7FFF	AHCI BIOS / RAID / PXE (if available)
E8000-FFFFF	System BIOS

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.

Address	Function
IRQ0	Timer
IRQ1	PS/2 Keyboard
IRQ2 (9)	COM3
IRQ3	COM1
IRQ4	COM2
IRQ5	COM4
IRQ6	
IRQ7	
IRQ8	RTC
IRQ9	
IRQ10	
IRQ11	
IRQ12	PS/2 Mouse
IRQ13	FPU

Address	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.	Fct.	Controller / Slot
	-	-	0	0	0	Host Bridge ID0104h
	A	-	0	2	0	VGA Graphics ID0116h
	A	-	0	25	0	LAN QM67 ID1502h
	A	-	0	26	0	USB EHCI Controller #2 QM67 ID1C2Dh
	A	-	0	27	0	HDA Controller QM67 ID1C20h
	A	-	0	28	0	PCI Express Port 1 QM67 ID1C10h
	B	-	0	28	1	[PCI Express Port 2 QM67 ID1C12h]
	C	-	0	28	2	[PCI Express Port 3 QM67 ID1C14h]
	D	-	0	28	3	[PCI Express Port 4 QM67 ID1C16h]
	A	-	0	28	4	[PCI Express Port 5 QM67 ID1C18h]
	B	-	0	28	5	PCI Express Port 6 QM67 ID1C1Ah
	C	-	0	28	6	PCI Express Port 7 QM67 ID1C1Ch
	D	-	0	28	7	[PCI Express Port 8 QM67 ID1C1Eh]
	A	-	0	29	0	USB EHCI Controller #1 QM76 ID1C26h
	-	-	0	31	0	ISA Bridge QM67 ID1C4Fh
	B	-	0	31	2	SATA Interface #1 QM67 ID1C03h
	C	-	0	31	3	SMBus Interface QM67 ID1C22h
	A	-	m	0	0	LAN 82547L ID10D3h
	A	-	n	0	0	PCIe-to-PCI Bridge IDE111h
20	A	0	o	4	0	PCI Slot 1
21	B	1	o	5	0	PCI Slot 2
22	C	2	o	6	0	PCI Slot 3

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