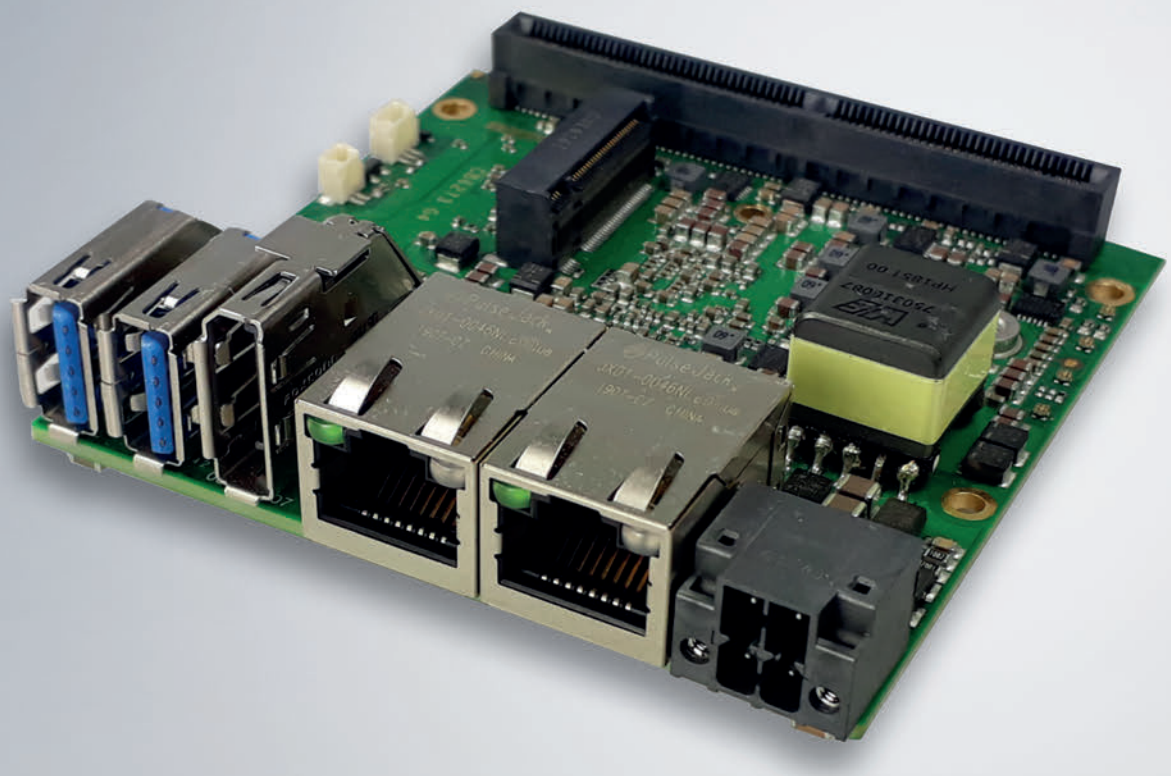
BECKHOFF New Automation Technology

Manual for | EN

CB6283

Computerboard



13.10.2025 | Version: 1.1

1 Documentation issue status

Version	Modifications
0.1	First preliminary version, mechanical only
0.2	LEDs added
0.3	BIOS version 0.03 added
1.0	First release, BIOS revision 2, version 0.05 added, LAN controller changed to i226 and USB3.2 adapted
1.1	Removal of the 900 mA current limit on the USB 3.2 port

2 Safety instructions

Safety regulations

Please observe the following safety instructions and explanations!
Product-specific safety instructions can be found on the following pages or in the mounting, wiring, commissioning areas, etc.

Exclusion of liability

All of the components are supplied in specific hardware and software configurations depending on the application requirements. Changes to the hardware or software configurations other than those described in the documentation are not permitted and will result in the exclusion of liability on the part of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation, and drive technology who are familiar with the applicable national standards.

Description of symbols

This documentation uses the following symbols with an adjacent safety instruction or note. The safety instructions must be read carefully and followed without fail!

⚠ DANGER

Serious risk of injury!

Failure to follow the safety instructions next to this symbol will result in immediate danger to life and health!

⚠ WARNING

Risk of injury!

Failure to follow the safety instructions next to this symbol will result in danger to life and health!

⚠ CAUTION

Personal injuries!

Failure to follow the safety instructions next to this symbol may result in personal injury!

NOTICE

Damage to the environment or devices

Failure to follow the safety instructions next to this symbol may result in damage to the environment or equipment.

Tip or pointer

This symbol indicates information that contributes to better understanding.

UL note

This symbol indicates important information regarding UL approval.

Intended use

The CB6283 Computer Board was designed and developed exclusively for configuration in automation processes. To that end the board is equipped with external interfaces in order to acquire or output digital or analog signals or forward them to higher-level components.

Any other use is considered improper use.

The specified limits for electrical and technical data must be adhered to.

3 Overview

The following documents, specifications, or webpages, in their current or most recent versions, have been used in the preparation of this manual or as additional technical documentation.

PCI specification

www.pcisig.com

PCI Express® Base Specification

www.pcisig.com

ACPI specification

www.acpi.info

ATA/ATAPI specification

www.t13.org

USB specifications

www.usb.org

SMBus specification

www.smbus.org

Intel® chip descriptions

Intel® Celeron™, Core™ Tiger Lake-H Processor Product Family datasheet

www.intel.com

Intel® chip description

i226 Datasheet

www.intel.com

SMSC® chip description

SCH3114 Datasheet (NDA required)

www.smsc.com

American Megatrends®

Aptio™ Text Setup Environment (TSE) User Manual

www.ami.com

American Megatrends®

Aptio™ Status Codes

www.ami.com

3.1 Properties

The CB6283 is conceived as a compact PC. It offers basic functions, on-board main memory and a powerful Intel® Elkhart Lake generation CPU in the smallest possible space.

The CB6283 provides 1x DisplayPort/HDMI, 2x USB3.2 and 2x Gigabit LAN as I/O interfaces via the front panel.

The BeaCon140 connector allows flexible expansion of the CB6283's I/O functions. It provides one SATA Gen3 (6GBit) lane and up to five PCIe® lanes, two of which can be multiplexed with USB3.2 signals. The I/O functions are configured by the PIC on the expansion card. The PIC contains the configuration data, which are communicated to the board upon connection and thus enable an uncomplicated and self-configuring extension of the I/O options.

A status LED provides information about the status of the power controller.

Despite its extremely small format, the CB6283 offers the full functionality of a motherboard.

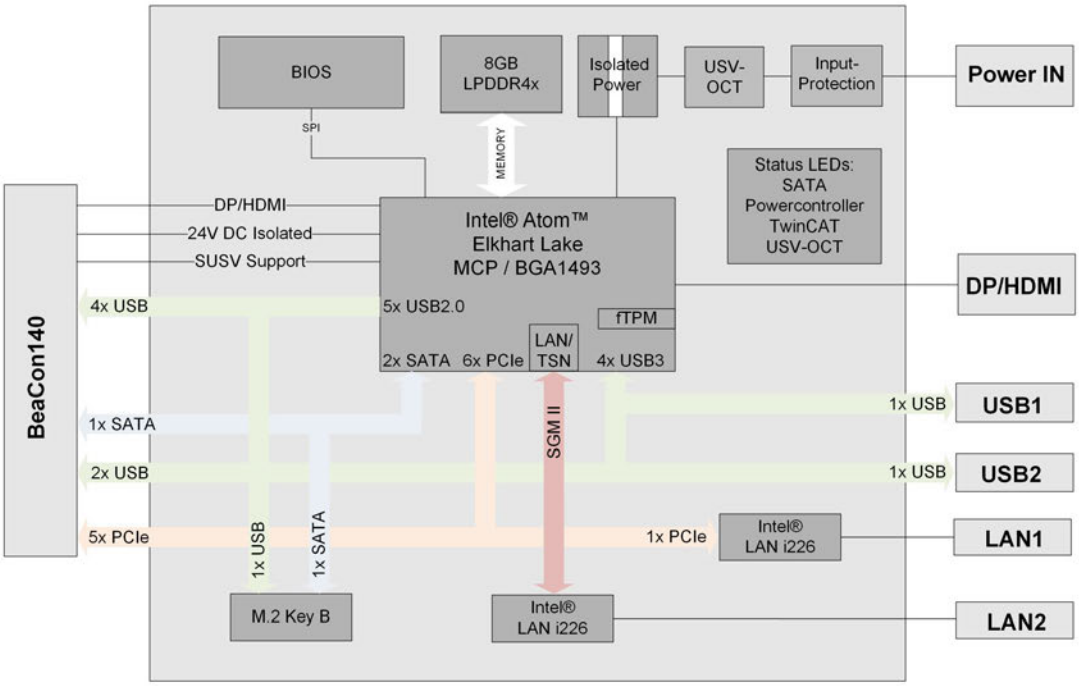


Fig. 1: Block diagram CB6283

3.2 List of features

CB6283	75 x 75 Board
CPU	Intel® Atom™ x6212RE (DC/1.5M/1.2 GHz), TDP6W Intel® Atom™ x6414RE (QC/1.5M/1.5 GHz), TDP9W Intel® Atom™ x6425RE (QC/1.5M/1.9 GHz), TDP12W
Socket	FCBGA1493
Memory	4 x LPDDR4 / 3200 MHz (up to 32 GB)
I/O front panel	1 x power 1x DisplayPort (connection of an HDMI adapter for an HDMI signal is possible) 2x LAN 10/100/1000/2500 2x USB 3.2
I/O internal	1x M.2 (B) socket, signals dependent on chipset, see: Internal: M.2 (Key B) [▶ 19] 1x BeaCon140, signals, see: Internal: BeaCon140 [▶ 22]
Graphics resolution	HDMI 2.0b: 4096x2160 @ 60 Hz DisplayPort 1.4/eDP 1.3: 4096x2160 @ 60 Hz 4K support @60 Hz
RTC	With external CMOS battery (via 2-pin contact strip or expansion card)
BIOS	AMI® Aptio® V
Power supply	20 V - 30 V input voltage overvoltage and undervoltage protection reverse polarity protection, UPS-OCT possible, electrically isolated
Format	75 x 75 mm

Availability of the processors

The list of features lists all the processors that can be ordered. Their actual availability depends on the manufacturer.

4 Detailed description

4.1 CPU

The processors used are System-on-a-Chip models from Intel®. These SoCs are based on processors from the Atom™- X product series, which are characterized by very low power consumption while still offering modern performance with clock speeds of currently up to 2 GHz. Despite its extremely small size and low power consumption, the processor offers a second-level cache of 256 kB per core and familiar standard features such as SSE4.1/4.2, loadable microcode, etc.

Intel® processors of the Atom™- X product series have an extended ambient temperature range and are therefore particularly suitable for use in industrial systems.

4.2 Memory

Four SDRAM memory modules up to a maximum of 32 GB are permanently installed on the CB6283 board.

Depending on the component variant, these are 4 GB or 8 GB DDR4 or LPDDR4 memory variants. Depending on the CPU used, a maximum clock frequency of 3200 MHz is supported.

4.3 M.2 socket

M.2 cards can easily and simply be inserted by plugging them into the slot and fixing them with a screw. Cards of different types have different recesses (keys). Depending on which types are supported, ports can accept expansion cards of one or more types. The M.2 socket of the CB6283 supports M.2 modules with Key B. SATA signals that allow an SSD to be connected are output via the interface.

5 Interfaces

5.1 Interface overview

The following figure shows the interfaces of the CB6283 board. The table below shows the function of each interface, as well as the manual page where you can find more detailed information.

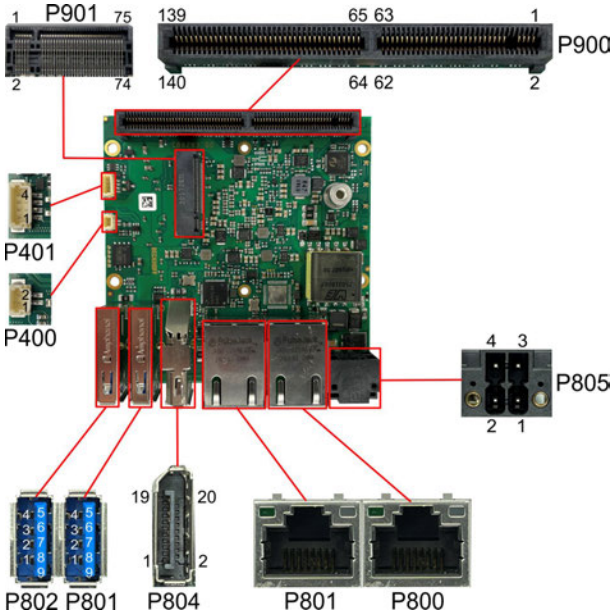


Fig. 2: CB6283 interface overview

5.2 List of interfaces

Number	Function (designation)	Page
P805	Vin	Front panel: power supply (P805) [▶ 14]
P800	LAN 1	Front panel: LAN (P800, P803) [▶ 15]
P803	LAN 2	Front panel: LAN (P800, P803) [▶ 15]
P804	DisplayPort	Front panel: DisplayPort / HDMI / DVI (P804) [▶ 16]
P801	USB3.2	Front panel: USB 3.2 (P801, P802) [▶ 17]
P802	USB3.2	Front panel: USB 3.2 (P801, P802) [▶ 17]
P400	RTC connector (two-pin)	Internal: RTC [▶ 18]
P401	Fan connection housing connector (four-pin)	Internal: FAN [▶ 19]
P901	M.2 socket	Internal: M.2 (Key B) [▶ 19]
P900	BeaCon140	Internal: BeaCon140 [▶ 22]

Interfaces order

The interfaces are listed in clockwise order, starting with the P805 power connection.

5.3 Note on the use of cables

Requirement for the cabling!

The cables used must meet certain requirements for most interfaces. For example, twisted and shielded cables are necessary for a reliable USB 2.0 connection. Limitations in the maximum cable length are also no rarity. All of these interface-specific requirements are to be taken from the respective specifications and observed accordingly.

5.4 External interfaces

This chapter describes the external interfaces.

5.4.1 Front panel: power supply (P805)

The connection to the power supply is implemented as a 2x2-pin housing connector (Phoenix Contact P20THR-1818504). The main power supply (24 V) for the module is on pin 3. This can also be implemented as UPS-OCT (One Cable Technology), i.e. the signal for the UPS is also transmitted to the board via this cable.

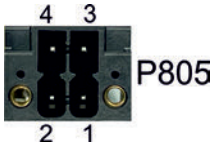


Fig. 3: CB6283 Power P805

Pin assignment of the power plug:					
Description	**Signal**	**Pin**		**Signal**	**Description**
PC On: Input for starting and shutting down the PC. Low (0 V or open contact): PC starts. High (>3 V): PC shuts down.	PC_ON	1	3	Vin	Supply voltage 24 V, UPS-OCT is supported.
Power status: Output of the power status. The voltage corresponds to the positive supply voltage and can be loaded with 1 A. Low (0V): PC is off. High (Vin): PC is on.	POWER STATUS	2	4	GND	Ground

Function restrictions PC_On switch

Please note that there are system states in which the activation of a connected PC_On switch is ignored by the system, e.g. during booting of a Windows operating system.

In this case, repeat the operation of the switch after a few seconds.

The same applies to connected PC_On buttons.

5.4.2 Front panel: LAN (P800, P803)

The board has two Gigabit-LAN connections. 10/100/1000/2500BaseT-compatible network components can be connected to all of them. The required speed is selected automatically. TSN, Auto-Cross and Auto-Negotiate are available as well as PXE and RPL functionality. The controller is an Intel® i226-IT.

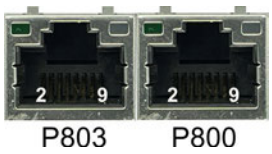


Fig. 4: CB6283 LAN P800, P803

90° plug

As the plug is a 90° plug, the plug symbol in the illustration is oriented to what you see when you look at the board from the side (instead of from above).

Pin assignment of LAN connector:		
Pin	**Name**	**Description**
2	LAN-3#	LAN line 3 -
3	LAN-3	LAN line 3 +
4	LAN-2#	LAN line 2 -
5	LAN-2	LAN line 2 +
6	LAN-1#	LAN line 1 -
7	LAN-1	LAN line 1 +
8	LAN-0#	LAN line 0 -
9	LAN-0	LAN line 0 +

i226: The LEDs of the LAN interfaces indicate the activity and speed of the data transmission (Mbit/s). The left LED lights up when there is a connection and activity, and the right LED during data transmission:

Left LED **Steadily lit when there is a connection,** **flashing during data transmission**	**Right LED** **Steadily lit during data transmission**	**Mbit/s**
Green	Green	2500
Green	Orange	1000
Green	Off	100/10

5.4.3 Front panel: DisplayPort / HDMI / DVI (P804)

An appropriate standard connector is available for devices with a DisplayPort connection.

The interface additionally provides HDMI/DVI signals that can be used with aid of an adapter. Please consult your distributor with regard to a suitable adapter.

90° plug

As the plug is a 90° plug, the plug symbol in the illustration is oriented to what you see when you look at the board from the side (instead of from above).

Fig. 5: CB6283 DP P804

Pin assignment DisplayPort A and B:					
Description	**Signal**	**Pin**		**Signal**	**Description**
Display Port Lane 0 +	L0	1	2	GND	Ground
Display Port Lane 0 -	L#0	3	4	L1	Display Port Lane 1 +
Ground	GND	5	6	L#1	Display Port Lane 1 -
Display Port Lane 2 +	L2	7	8	GND	Ground
Display Port Lane 2 -	L#2	9	10	L3	Display Port Lane 3 +
Ground	GND	11	12	L#3	Display Port Lane 3 -
DP / HDMI	HDMI#	13	14	GND	Ground
Auxiliary plus	AUX	15	16	GND	Ground
Auxiliary minus	AUX#	17	18	HPD	Hot Plug Detect
Ground	GND	19	20	3.3 V	Supply voltage 3.3 V

Switching to HDMI

DisplayPort signals are led out via the interface by default. With the use of a level shifter cable the board switches according to the DisplayPort specification 1.1 automatically to HDMI signals.

5.4.4 Front panel: USB 3.2 (P801, P802)

The USB channels are made available via standard USB connectors.

The USB channels support the USB specification 3.2. Devices with their own current supply must be used for higher power demands. The USB interfaces are electronically protected.

All necessary settings for USB can be made in the BIOS. This applies to both USB interfaces. Note that the "USB Mouse and Keyboard" functionality of the BIOS setup is only required if the operating system does not provide USB support. This function should not be selected for settings in the setup and for booting Windows with a USB mouse and keyboard connected, because this would lead to considerable performance limitations.

Fig. 6: CB6283 USB P801, P802

USB 3.2 connector pin assignment:		
Pin	**Signal**	**Description**
1	VCC	Supply voltage 5 V
2	D-	Data - (USB 2.0)
3	D+	Data + (USB 2.0)
4	GND	Ground
5	SSRX-	Receive line - (USB 3.2)
6	SSRX+	Receive line + (USB 3.2)
7	GND	Ground
8	SSTX-	Transmit line - (USB 3.2)
9	SSTX+	Transmit line + (USB 3.2)

5.5 Internal interfaces

This chapter describes the internal interfaces.

5.5.1 Internal: RTC

You can connect the CB6283 to an external RTC battery via a two-pin housing connector (JST BM02B-SRSS-TBT(LP)(SN)). This means that the integrated clock continues to be supplied even if the supply voltage is lost. The battery voltage must not exceed 3.3 V.

Fig. 7: CB6283 RTC P400

Pin assignment RTC battery connector:		
Pin	**Name**	**Description**
1	BATT	3.3 V battery voltage
2	GND	Ground

UL conformity

All technical measures for UL conformity are already integrated on the board.

Accordingly, no additional actions are necessary for the connection of an RTC battery. The battery must be connected directly.

Synchronism of the RTC

The quartz of the RTC reacts to temperature fluctuations. Therefore, correct synchronism of the RTC is possible only with suitable and sufficient cooling!

5.5.2 Internal: FAN

The CB6283 computer board has a four-pin fan connector. This allows you to connect a fan with a supply voltage of 5 V directly to the computer board. A signal for monitoring the fan speed is also available.

Fig. 8: CB6283 FAN P401

Pin assignment of fan connector:		
Pin	**Signal**	**Description**
1	GND	Ground (PWM-controlled)
2	VCC	Supply voltage 5 V, regulated
3	FANCTRL	Speed monitoring
4	FANON	Speed control

5.5.3 Internal: M.2 (Key B)

The CB6283 is equipped with an M.2 connector that accepts an M.2-2242 card (B button). SATA signals (GEN3) are routed out via this socket, enabling the connection of an M.2 SSD card. Alternatively, you can also feed out 1x PCIe® signals.

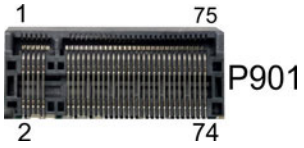


Fig. 9: CB6283 M.2 P901

Pin assignment M.2 connector:					
Description	**Signal**	**Pin**		**Signal**	**Description**
Configuration pin	CONFIG_3	1	2	3.3V1	Standby supply voltage S3.3 V
Ground	GND	3	4	3.3V2	Standby supply voltage S3.3 V
Ground	GND	5	6	FCPWROFF#	Full Card Power OFF active low
USB Channel 2 Data +	USB D+	7	8	WDISABLE#	(not led out)
USB Channel 2 Data -	USB D-	9	10	GPIO9 DAS DDS LED1	(not led out)
Ground	GND	11	12	Connector Key	
Connector Key		13	14		
		15	16		
		17	18		
		19	20	GPIO5	(not led out)
Configuration pin	Config 0	21	22	GPIO6	(not led out)
(not led out)	GPIO11	23	24	GPIO7	(not led out)
(not led out)	DPR	25	26	GPIO10	(not led out)
Ground	GND	27	28	GPIO8	(not led out)
(not led out)	PER1# USB3RX# SSICRX#	29	30	UIM RST	(not led out)
(not led out)	PER1 USB3RX SSICRX	31	32	UIM CLK	(not led out)
Ground	GND	33	34	UIM DATA	(not led out)
(not led out)	PET1# USB3TX# SSICTX#	35	36	UIM PWR	(not led out)
(not led out)	PET1 USB3TX SSICTX	37	38	DEVSLP	(not led out)
Ground	GND	39	40	GPIO0	(not led out)
SATA Lane 1 Receive plus	PER0 SATAB	41	42	GPIO1	(not led out)
SATA Lane 1 Receive minus	PER0# SATAB#	43	44	GPIO2	(not led out)
Ground	GND	45	46	GPIO3	(not led out)
SATA Lane 1 Transmit minus	PET0# SATAA#	47	48	GPIO4	(not led out)
SATA Lane 1 Transmit plus	PET0 SATAA	49	50	PRST#	PCIe® Reset active low
Ground	GND	51	52	CLKREQ#	(not led out)

Pin assignment M.2 connector:					
Description	**Signal**	**Pin**		**Signal**	**Description**
(not led out)	REFCLK#	53	54	PEWAKE#	(not led out)
(not led out)	REFCLK	55	56	N/C	(not led out)
Ground	GND	57	58	N/C	(not led out)
(not led out)	ANTCTL0	59	60	COEX3	(not led out)
(not led out)	ANTCTL1	61	62	COEX2	(not led out)
(not led out)	ANTCTL2	63	64	COEX1	(not led out)
(not led out)	ANTCTL3	65	66	SIM DETECT	(not led out)
Powergood	RESET#	67	68	SUSCLK	Suspendclock
Configuration pin	CFG1	69	70	3.3 V	Standby supply voltage S3.3 V
Ground	GND	71	72	3.3 V	Standby supply voltage S3.3 V
Ground	GND	73	74	3.3 V	Standby supply voltage S3.3 V
Configuration pin	CFG2	75			

5.5.4 Internal: BeaCon140

The BeaCon140 connector (Samtec HSEC-170-01-L-DV-A-K-TR) enables flexible expansion of the I/O functions of the CB6283. It provides one SATA Gen3 (6GBit) lane and up to five PCIe® lanes, two of which can be multiplexed with USB3.1 signals. DisplayPort, HSIC, SMBus and 1Wire signals are also led out via the BeaCon connector. The extension board takes care of the configuration of the I/O functions. A PIC on the expansion card contains the configuration data, which are communicated to the board upon connection and thus enable an uncomplicated and self-configuring extension of the I/O options.

Observe the current limits!

In order to avoid damaging the device, it is essential to observe the following current limits:

A maximum load of 2.8 A per pin must not be exceeded. On account of the different current consumptions of the usable processors the actual current consumption may be lower. The respective maximum values can be obtained from your distributor on inquiry.

Irrespective of the CPU in use, a maximum total load of 100 W must not be exceeded.

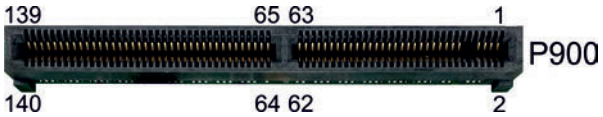


Fig. 10: CB6283 BeaCon140 P900

Pin assignment of BeaCon140 connector:					
Description	**Signal**	**Pin**		**Signal**	**Description**
SUPS output 24 V	VOLOAD1	1	2	P_VIN/VIN1	SUPS input 24 V
SUPS output 24 V	VOLOAD2	3	4	P_VIN/VIN2	SUPS input 24 V
(not led out)	5V1/NC1	5	6	GND	Ground
(not led out)	5V2/NC2	7	8	GND	Ground
		INSULATION			
SVCC 5 V	S5V	13	14	S3.3V	Standby supply voltage 3.3 V
Ground	GND	15	16	GND	Ground
PCIe® Lane 1 Transmit +	PE1/ SATA4-TX	17	18	RX-SATA4/ PE1	PCIe® Lane 1 Receive +
PCIe® Lane 1 Transmit -	PE1/ SATA4-TX#	19	20	RX-SATA4/ PE1#	PCIe® Lane 1 Receive -
Ground	GND	21	22	GND	Ground
PCIe Clock Lane 1 +	PECLK1	23	24	PECLK2	PCIe Clock Lane 2 +
PCIe Clock Lane 1 -	PECLK1	25	26	PECLK2#	PCIe Clock Lane 2 -
Ground	GND	27	28	GND	Ground
PCIe® Lane 2 Transmit +	PE2/ SATA3-TX	29	30	RX-SATA3/ PE2	PCIe® Lane 2 Receive +
PCIe® Lane 2 Transmit -	PE2/ SATA3-TX#	31	32	RX-SATA3/ PE2#	PCIe® Lane 2 Receive -
Ground	GND	33	34	GND	Ground
PCIe® Lane 3 Transmit +	PE3/ SATA2-TX	35	36	RX-SATA2/ PE3	PCIe® Lane 3 Receive +
PCIe® Lane 3 Transmit -	PE3/ SATA2-TX#	37	38	RX-SATA2/ PE3#	PCIe® Lane 3 Receive -
Ground	GND	39	40	GND	Ground
PCIe Clock Lane 3 +	PECLK3	41	42	PECLK4	(not led out)
PCIe Clock Lane 3 -	PECLK3#	43	44	PECLK4#	(not led out)
Ground	GND	45	46	GND	Ground
PCIe® Lane 4 Transmit +	PE4/ SATA1-TX	47	48	RX-SATA1/ PE4	PCIe® Lane 4 Receive +
PCIe® Lane 4 Transmit -	PE4/ SATA1-TX#	49	50	RX-SATA1/ PE4#	PCIe® Lane 4 Receive -
Ground	GND	51	52	GND	Ground
PCIe® Clock Enable Lane 1 active low	PCKE1#	53	54	PCKE2#	PCIe® Clock Enable Lane 2 active low
PCIe® Clock Enable Lane 3 active low	PCKE3#	55	56	PCKE4#	PCIe® Clock Enable Lane 4 active low
PCIe® Reset active low	PERST#	57	58	PEWAKE#	PCIe Wake active low
SMBus Clock	SMBCLK	59	60	SMBDAT	SMBus Data
		KEY			
SMBus Alert active low	SMB-Alert#	61	62	1Wire	1-Wire
PCIe® Clock Enable Lane 5 active low	PCKE5/ OC4#	63	64	OC3/ PCKE6#/	PCIe® Clock Enable Lane 6 active low
PCIe® Clock Enable Lane 7 active low	PCKE7/ OC2#	65	66	OC1/ PCKE8#	PCIe® Clock Enable Lane 8 active low
Ground	GND	67	68	GND	Ground

Pin assignment of BeaCon140 connector:					
Description	**Signal**	**Pin**		**Signal**	**Description**
(not led out)	PE5/ USB3-4/ USBC1-TX	69	70	RX-USBC1/ USB3-4 RX/ PE5	(not led out)
(not led out)	PE5/ USB3-4/ USBC1-TX#	71	72	RX-USBC1/ USB3-4/ PE5#	(not led out)
USB4.D+	USB2-4 (GND)	73	74	(GND) USB2-3	USB3.D +
Ground	PECLK5/ USBC-SBU1 (GND)	75	76	(GND) PECLK6	Ground
Ground	PECLK5#/ USBC- SBU2 (GND)	77	78	(GND) PECLK6#	Ground
USB4.D-	USB2-4# (GND)	79	80	(GND) USB2-3 D#	USB3.D -
(not led out)	PE6/ USB3-3/ USBC2-TX	81	82	RX-USBC2/ USB3-3/ PE6	(not led out)
(not led out)	PE6/ USB3-3/ USBC2-TX#	83	84	RX-USBC2/ USB3-3/ PE6#	(not led out)
Ground	GND	85	86	GND	Ground
PCIe® Lane 7 Transmit +	PE7/ USB3-2-TX	87	88	RX-SSIC/ USB3-2/ PE7	PCIe® Lane 7 Receive +
PCIe® Lane 7 Transmit -	PE7/ USB3-2- TX#	89	90	RX-SSIC/ USB3-2/ PE7#	PCIe® Lane 7 Receive -
USB 2.D+	USB2-2 (GND)	91	92	(GND) USB2-1	USB 1.D +
PCIe Clock Lane 7 +	PECLK7 (GND)	93	94	(GND) PECLK8	PCIe Lane 8 Clock +
PCIe Clock Lane 7 -	PECLK7# (GND)	95	96	(GND) PECLK8#	PCIe Lane 8 Clock -
USB 2.D-	USB2-2# (GND)	97	98	(GND) USB2-1#	USB 1.D -
PCIe® Lane 8 Transmit +	PE8/ USB3-1-TX	99	100	RX-USB3-1/ PE8	PCIe® Lane 8 Receive +
PCIe® Lane 8 Transmit -	PE8/ USB3-1 TX#	101	102	RX-USB3-1/ PE8#	PCIe® Lane 8 Receive -
Ground	GND	103	104	GND	Ground
SATA GP1	SATAGP1	105	106	SATAGP2	(not led out)
(not led out)	SATAGP3/ USBC-CC1	107	108	USB-CC2/ SATAGP4	(not led out)
TwinCAT LED Red	TCLEDR	109	110	TCLEDG	TwinCAT LED Green
TwinCAT LED Blue	TCLEDB	111	112	RES	LAN-SYNC
SATA LED active low	SATALED	113	114	USBPWREN	USB Power Enable
Battery	BATT	115	116	PWRFAIL	SUPS
(not led out)	PME#	117	118	PWRGOOD	Powergood
Power button active low	PWRBTN#	119	120	MRST#	Reset button active low

Pin assignment of BeaCon140 connector:					
Description	**Signal**	**Pin**		**Signal**	**Description**
PSON	PSON	121	122	ATXPWRGD	ATX Powergood
Ground	GND	123	124	GND	Ground
DPB#-HDMIB	DP/DVI#	125	126	DDCC/ DPAUX	DDC Clock/ DisplayPort Aux +
DPB.HDP	DPHPD	127	128	DDCD/ DPAUX#	DDC data/ DisplayPort Aux -
Ground	GND	129	130	GND	Ground
DisplayPort Lane 0 +	DPL0/ TMDSD2	131	132	TMDSD1/ DPL1	DisplayPort Lane 1+
DisplayPort Lane 0 -	DPL0/ TMDSD2#	133	134	TMDSD1/ DPL1#	DisplayPort Lane 1 -
Ground	GND	135	136	GND	Ground
DisplayPort Lane 2 +	DPL2/ TMDSD0	137	138	TMDSCLK/ DPL3	DisplayPort Lane3 +
DisplayPort Lane 2 -	DPL2/ TMDSD0#	139	140	TMDSCLK/ DPL3#	DisplayPort Lane 3 -

6 LEDs

6.1 LED: TwinCAT

An RGB LED indicates the status of TwinCAT activity.

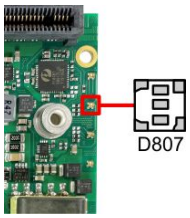


Fig. 11: CB6283 TCLED D807

Color	Interval	Meaning
Green	Steadily lit	TwinCAT Run Mode
Blue	Steadily lit	TwinCAT Config Mode
Red	Steadily lit	TwinCAT Stop

6.2 LED: SATA

A further RGB LED indicates the hard disk activity.

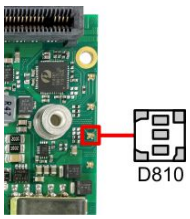


Fig. 12: CB6283 SATALED D810

Color	Interval	Meaning
Green	Steadily lit	Activity (access)

6.3 LED: Power control

There is an RGB LED on the board with which status messages of the power controller are output by means of colors and flashing intervals.

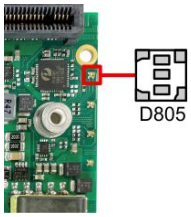


Fig. 13: CB6283 PWRLED D805

Color	Interval	Meaning
None	Steadily lit	System in error state
White	Steadily lit	Power fail
Cyan	Steadily lit	Reserved
Magenta	Steadily lit	S UPS active (if present)
Blue	Steadily lit	Reserved
Yellow	Steadily lit	S5 state
Green	Steadily lit	S0 state
Red	Steadily lit	Reset/Start
Green/yellow	Flashing	Bootloader running without error
Red/yellow	Flashing	Bootloader is starting (start sequence is being run through)
Yellow	Flashing (6 s)	S4 state
Yellow	Flashing (3 s)	S3 state
Magenta	Flashing (0.5 s)	S UPS capacitance test (if S UPS present)
Red/magenta	Flashing	Checksum error during I^2C transmission in the boot loader

A steadily lit red LED can indicate a hardware error.

Adaptation of the status codes

It is possible to adapt the status codes (e.g. as TwinCAT LED). To do this, the system colors can be changed with the aid of an SMB command. This change remains in force until the next restart or reset. A change of the default colors is indicated by the additional flashing of the white LED.

6.4 LED: UPS-OCT

There is an RGB LED on the board with which the transmission quality of the OCT signals is indicated by means of colors and flashing intervals.

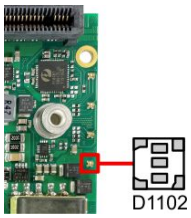


Fig. 14: CB6283 OCTLED D1102

Color	Interval	Meaning
None	Steadily lit	No UPS-OCT connected
Blue	Flashing	Boot loader active
Yellow	Flashing	Moderate signal quality
Green	Flashing	Good signal quality
Red	Flashing	Poor signal quality

If the LED is not lit, no UPS-OCT is connected.

Adaptation of the status codes

It is possible to adapt the status codes (e.g. as UPS-OCT-LED). To do this, the system colors can be changed with the aid of an SMB command. This change remains in force until the next restart or reset.

7 BIOS

7.1 Using the setup

Within the individual setup pages the last saved settings can be restored can at any time with F2 (“Previous Values”). Use F3 (“Optimized Defaults”) to load the factory defaults. Use F2/F3 to load the complete set of settings and F4 to save them (“Save & Reset”).

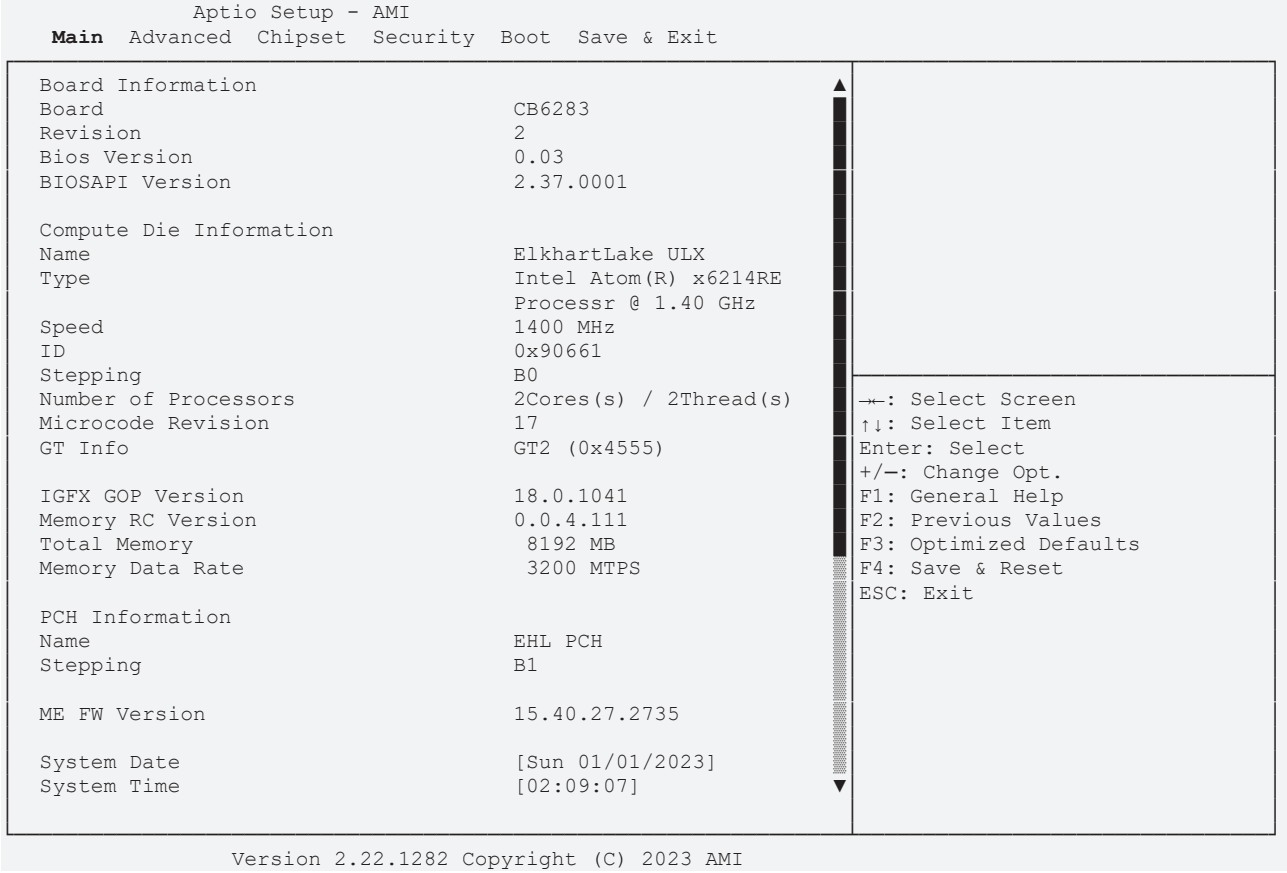
A “►” sign in front of the menu item indicates that a submenu is available. Use the arrow keys to navigate between menu items. Use the Enter key to select menu items and call submenus or selection dialogs.

For each setup option a help text is displayed at the top right, which in many cases contains useful information about the option and permitted values, etc.

Note on Setup Documentation

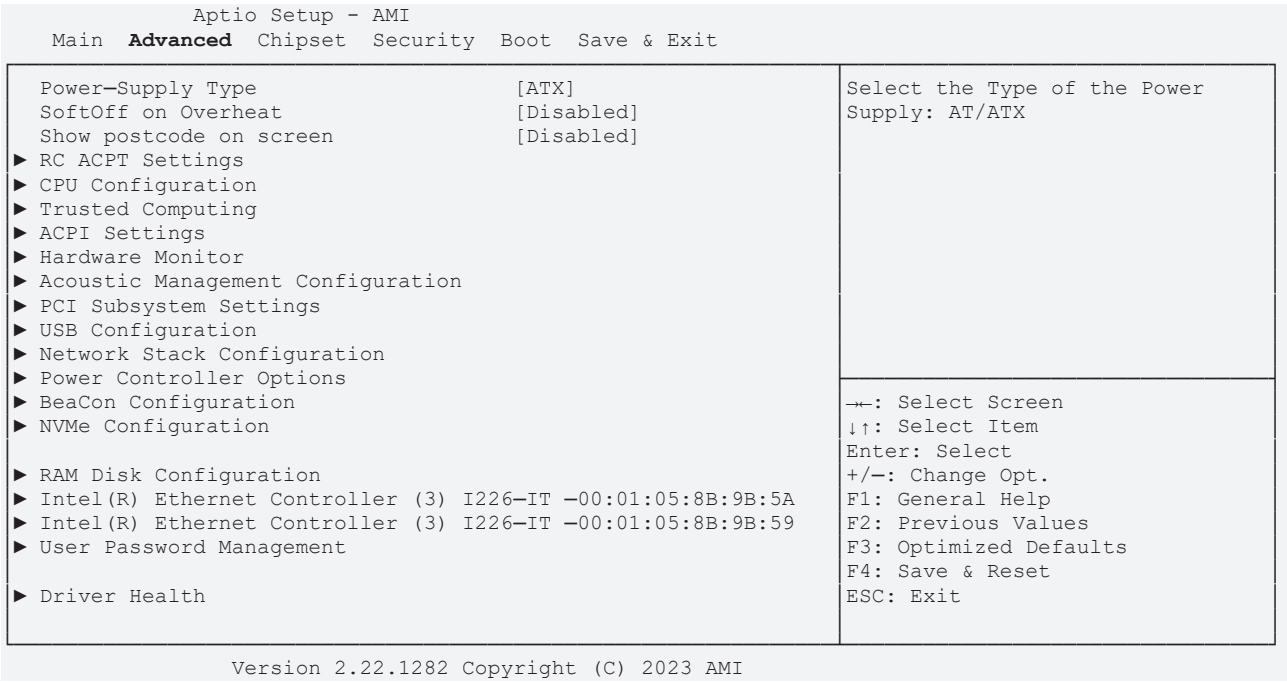
The BIOS is regularly updated so that the available setup options can change at any time without notice. This may result in differences between the options actually available and those described below. It should also be noted that the settings shown in the setup menus below are not necessarily the recommended or default settings. Which settings must be selected depends on the application scenario in which the board is operated.

7.2 Main CB6283



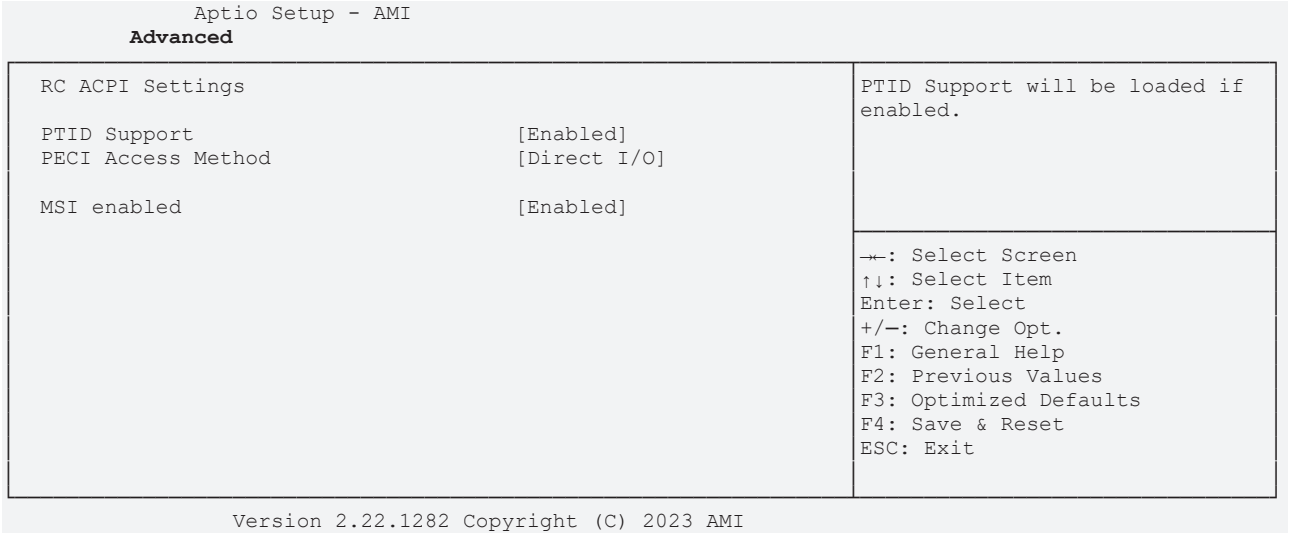
Setup entry	Option
Board	None
Revision	None
Bios Version	None
BIOSAPI Version	None
Compute Die Information	None
Name	None
Type	None
Speed	None
ID	None
Stepping	None
Number of Processors	None
Microcode Revision	None
GT Info	None
IGFX GOP Version	None
Memory RC version	None
Total Memory	None
Memory Data Rate	None
PCH Information	None
Name	None
Stepping	None
ME FW version	None
Memory Information	
System Date	Set the system date here.
System Time	Set the system time here.

7.3 Advanced



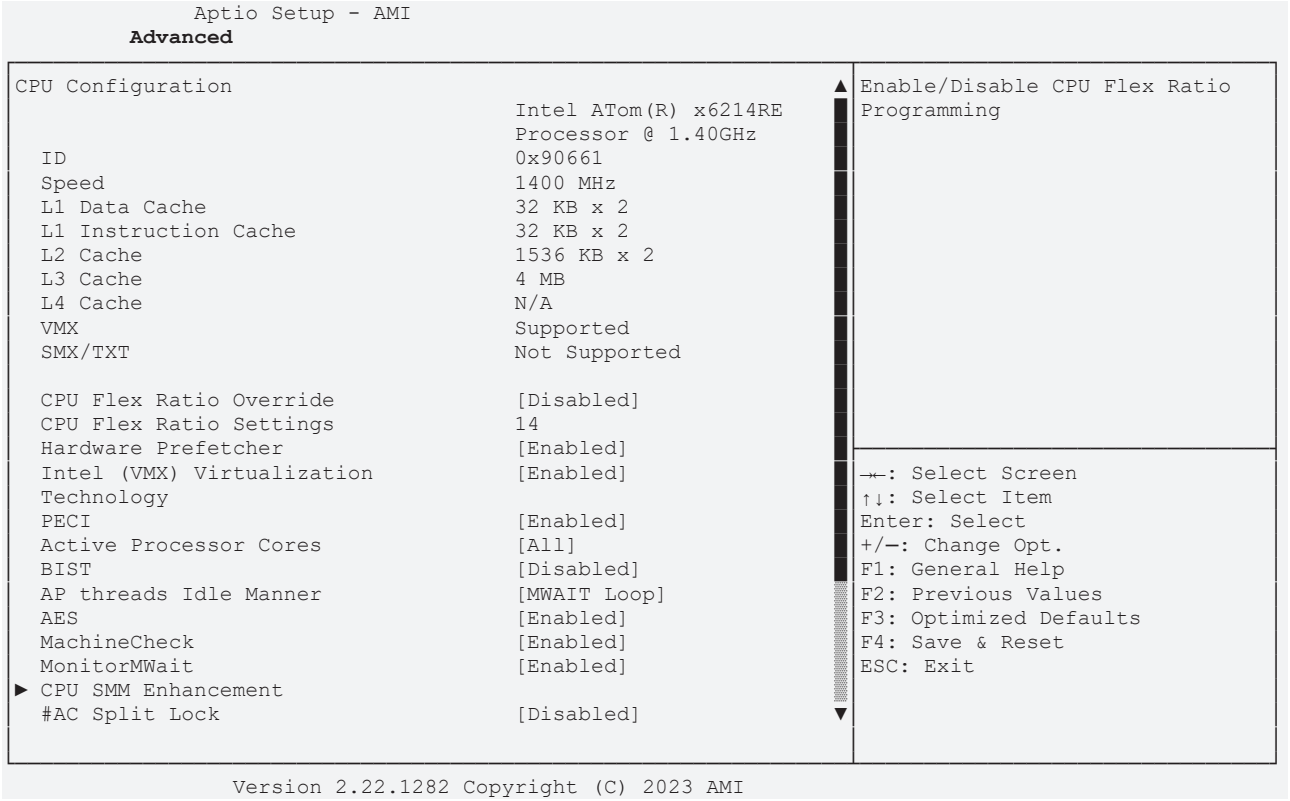
BIOS entry	Option
Power-Supply Type	ATX / AT
SoftOff on Overheat	Disabled / Enabled
Show postcode on screen	Disabled / Enabled
▶ RC ACPI Settings	Submenu: RC ACPI settings [▶ 32]
▶ CPU Configuration	Submenu: CPU Configuration [▶ 33]
▶ Trusted Computing	Submenu: Trusted Computing [▶ 35]
▶ ACPI Settings	Submenu: ACPI Settings [▶ 36]
▶ Hardware Monitor	Submenu: Hardware Monitor [▶ 36]
▶ Acoustic Management Configuration	Submenu: Acoustic Management Configuration [▶ 37]
▶ PCI Subsystem Settings	Submenu: PCI Subsystem Settings [▶ 37]
▶ USB Configuration	Submenu: USB Configuration [▶ 38]
▶ Network Stack Configuration	Submenu: Network Stack Configuration Disabled [▶ 39]
▶ Power Controller Options	Submenu: Power Controller Options [▶ 40]
▶ BeaCon Configuration	Submenu: BeaCon Configuration [▶ 41]
▶ NVME Configuration	Submenu: NVMe Configuration [▶ 41]
▶ RAM Disk Configuration	Submenu: RAM Disk Configuration [▶ 42]
▶ Intel® Ethernet Controller I226-IT - 00:01:05:8B:9B:5A	Submenu: Intel Ethernet Controller I226-IT [▶ 43]
▶ Intel® Ethernet Controller I226-IT - 00:01:05:8B:9B:59	Submenu: Intel Ethernet Controller I226-IT [▶ 44]
▶ User Password Management	Submenu: User Password Management [▶ 45]
▶ Driver Health	Submenu: Driver Health [▶ 45]

7.3.1 RC ACPI settings



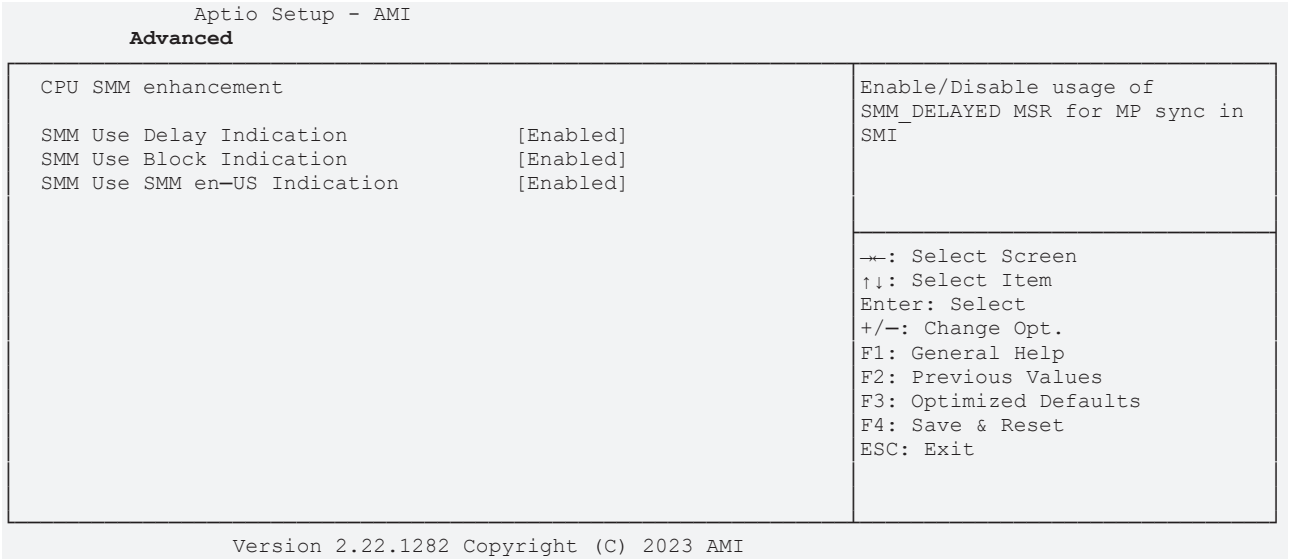
BIOS entry	Options
RC ACPI Settings	
PTID Support	Enabled / Disabled
PECI Access Method	Direct I/O / ACPI
MSI enabled	Enabled / Disabled

7.3.2 CPU Configuration



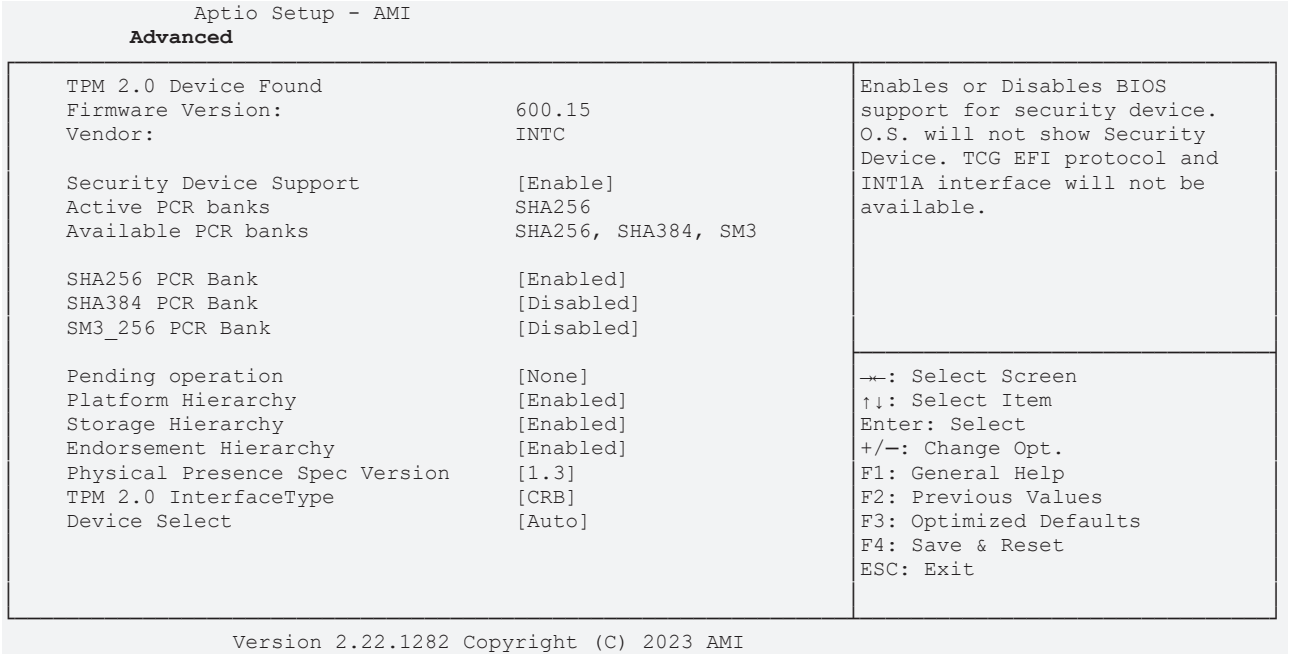
BIOS entry	Options
CPU Configuration	
Type	None
ID	None
Speed	None
L1 Data Cache	None
L1 Instruction Cache	None
L2 Cache	None
L3 Cache	None
L4 Cache	None
VMX	None
SMX/TXT	None
CPU Flex Ratio Override	Disabled / Enabled
CPU Flex Ratio Settings	None
Hardware Prefetcher	Enabled / Disabled
Adjacent Cache Line Prefetch	Enabled / Disabled
Intel® (VMX) Virtualization Technology	Enabled / Disabled
PECI	Enabled / Disabled
Active Processor Cores	All / 1 / 2 / 3
BIST	Disabled / Enabled
AP threads Idle Manner	MWait Loop / Halt Loop / Run Loop
AES	Enabled / Disabled
MachineCheck	Enabled / Disabled
Monitor MWait	Enabled / Disabled
►CPU SMM Enhancement	Submenu: CPU SMM Enhancement [▶ 34]
#AC Split Lock	Disabled / Enabled

7.3.2.1 CPU SMM Enhancement



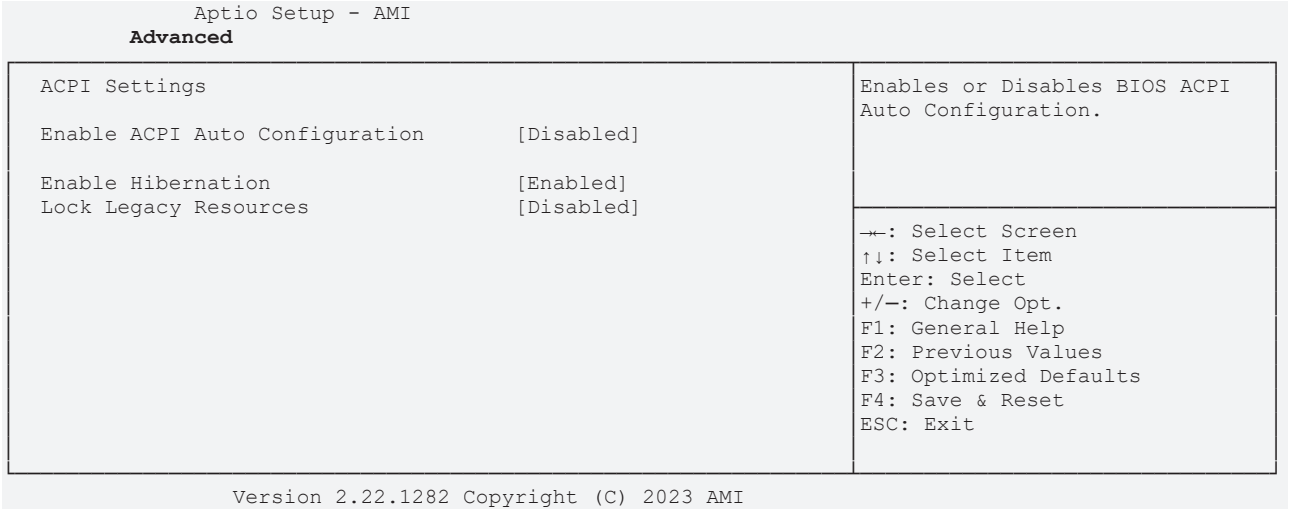
BIOS entry	Options
CPU SMM Enhancement Information	
SMM Use Delay Indication	Enabled / Disabled
SMM Use Block Indication	Enabled / Disabled
SMM Use SMM en - US Indication	Enabled / Disabled

7.3.3 Trusted Computing



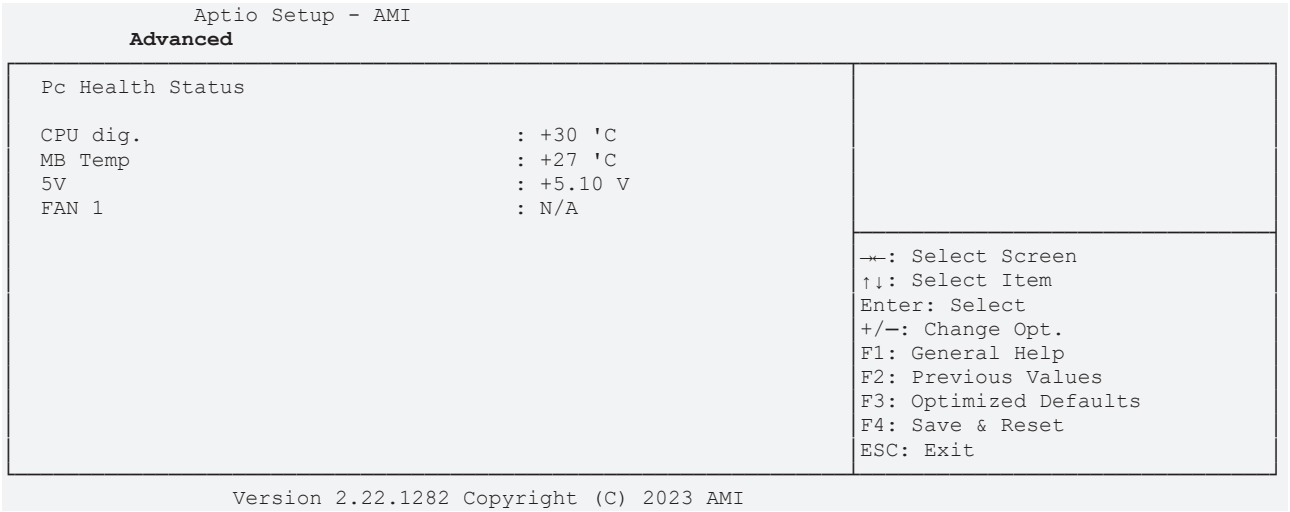
BIOS entry	Options
Configuration	
Security Device Support	Enable / Disable
SHA256 PCR Bank	Enabled / Disabled
SHA384 PCR Bank	Disabled / Enabled
SM_3256PCR Bank	Disabled/ Enabled
Pending Operation	None / TPM Clear
Platform Hierarchy	Enabled / Disabled
Storage Hierarchy	Enabled / Disabled
Endorsement Hierarchy	Enabled / Disabled
Physical Presence Spec Version	1.3 / 1.2
TPM 2.0 InterfaceType	None
Device Select	Auto / TPM 1.2 / TPM 2.0

7.3.4 ACPI Settings



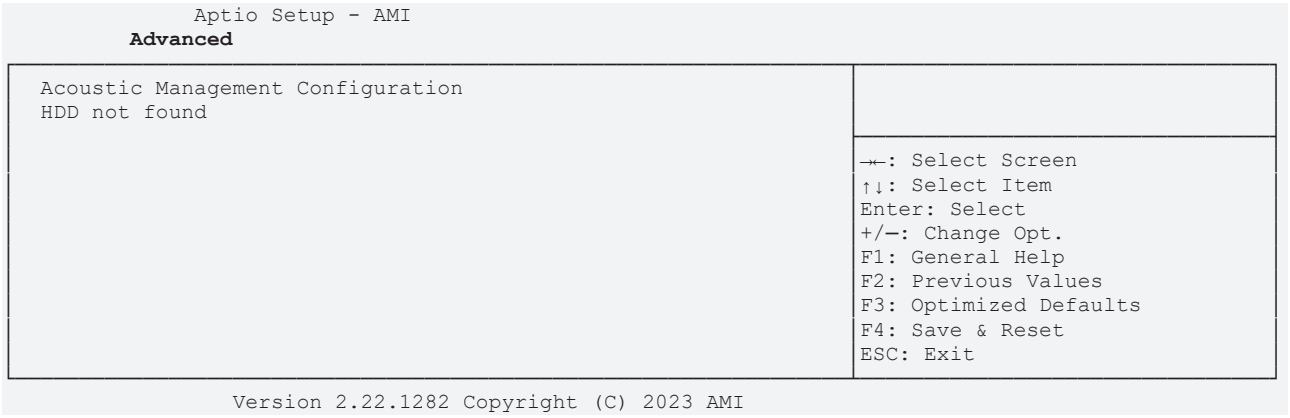
BIOS entry	Options
ACPI Settings	
Enable ACPI Auto Configuration	Disabled / Enabled
Enable Hibernation	Enabled / Disabled
Lock Legacy Resources	Disabled / Enabled

7.3.5 Hardware Monitor



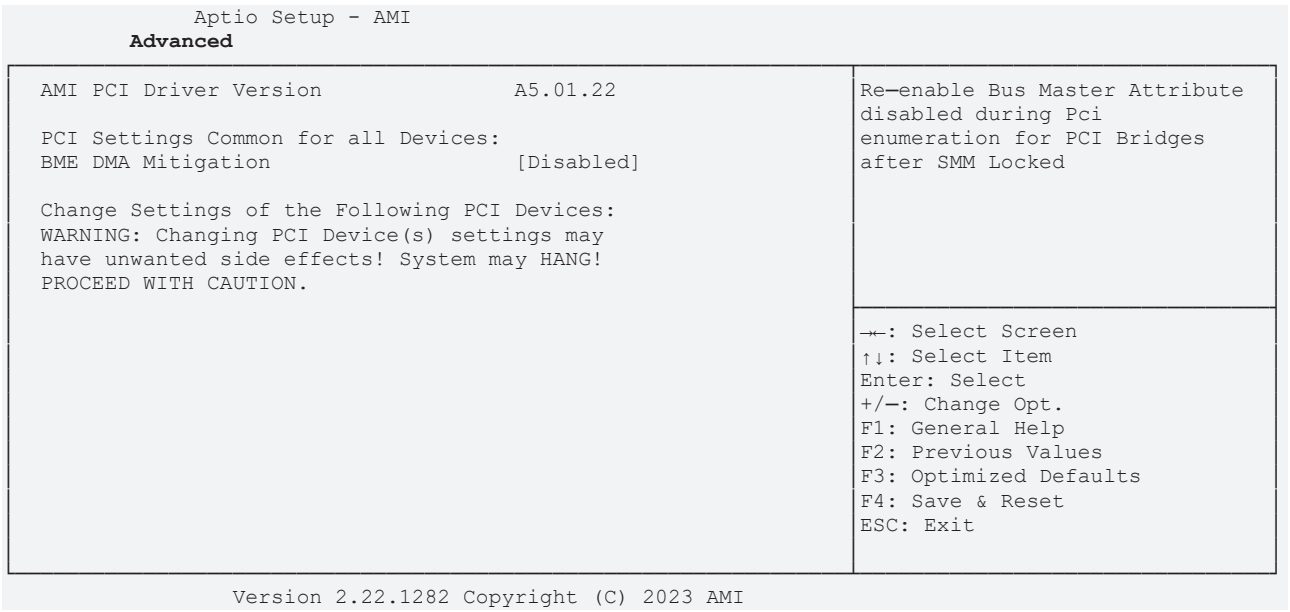
BIOS entry	Options
PC Health Status	None

7.3.6 Acoustic Management Configuration



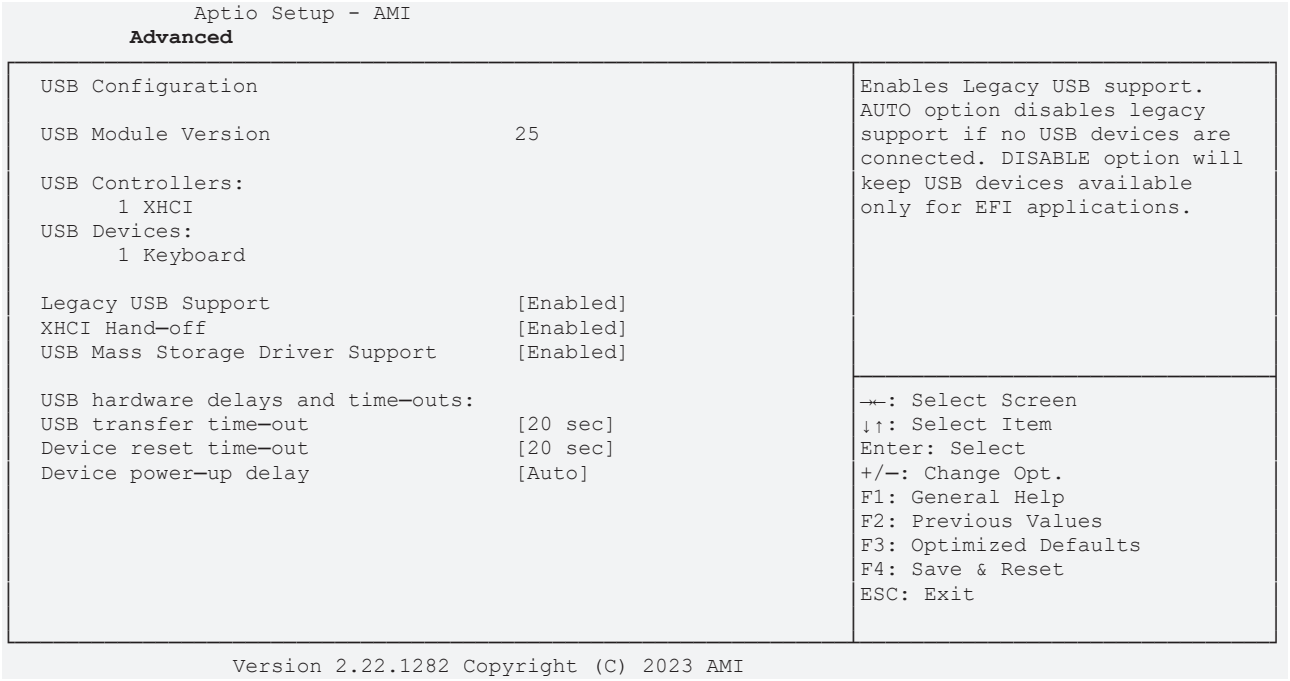
BIOS entry	Options
Acoustic Management Configuration	
HDD not found	None

7.3.7 PCI Subsystem Settings



BIOS entry	Options
AMI® PCI Driver Version:	None
PCI Settings Common for all Devices:	
BME DMA Mitigation	Disabled / Enabled

7.3.8 USB Configuration

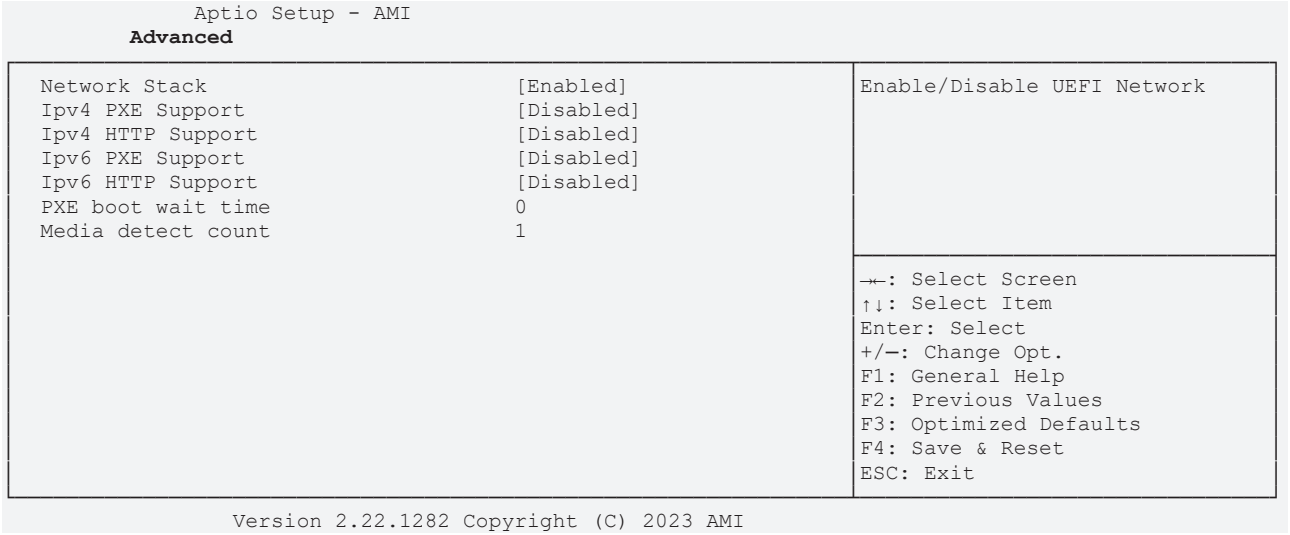


BIOS entry	Options
USB Configuration	
USB Module Version	None
USB Devices	None
Legacy USB support	Enabled / Disabled / Auto
XHCI Hand-off	Enabled / Disabled
USB Mass Storage Driver Support	Enabled / disabled
USB hardware delays and time-outs:	
USB transfer time-out	1 / 5 / 10 / 20 sec
Device reset time-out	10 / 20 / 30 / 40 sec
Device power-up delay	Auto / Manual

7.3.9 Network Stack Configuration Disabled

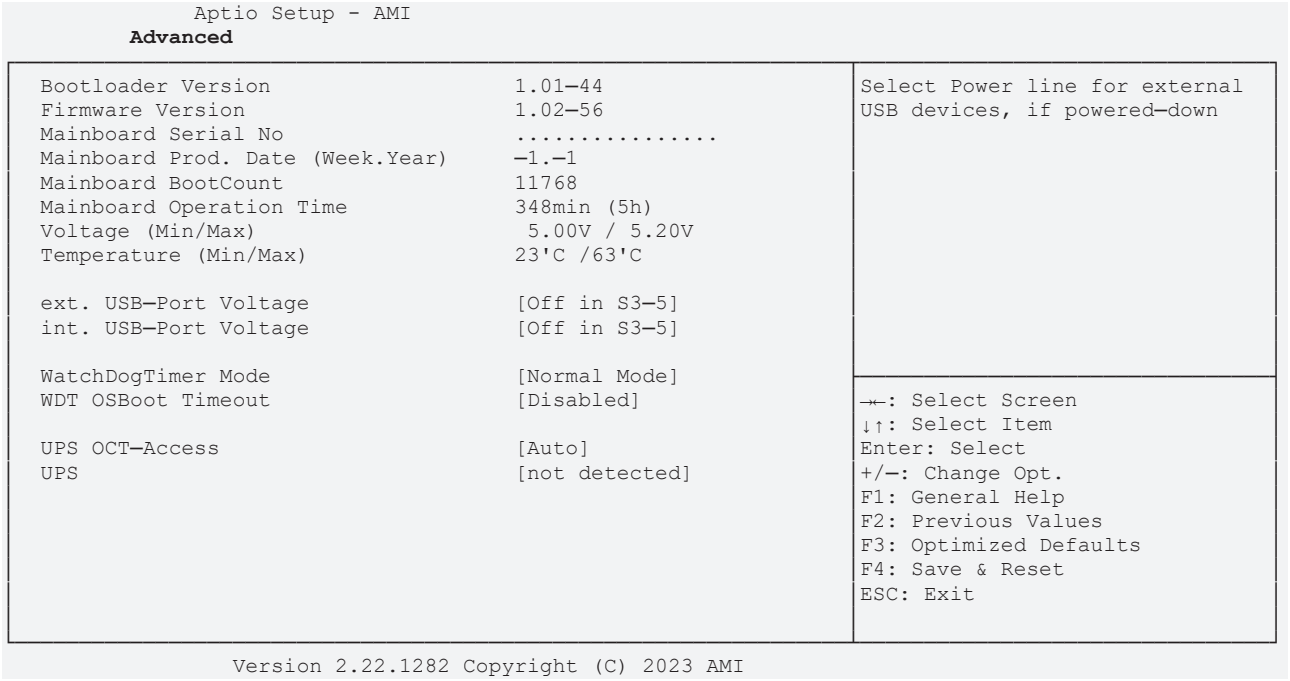
BIOS entry	Options
Network Stack	Disabled / Enabled

7.3.10 Network Stack Configuration Enabled



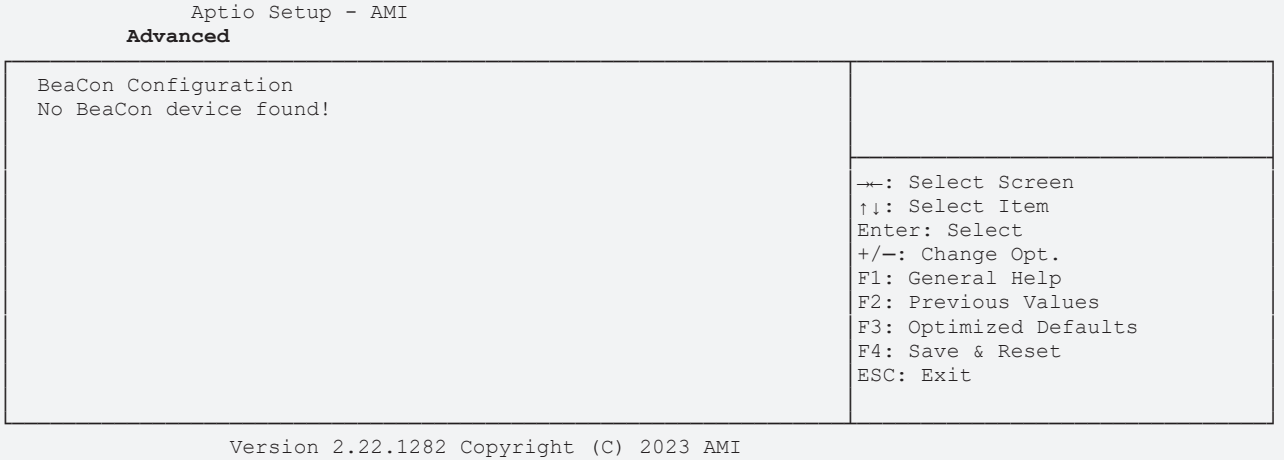
BIOS entry	Options
Network Stack	Enabled / Disabled
Ipv4 PXE Support	Enabled / Disabled
Ipv4 HTTP Support	Enabled / Disabled
Ipv6 PXE Support	Enabled / Disabled
Ipv6 HTTP Support	Enabled / Disabled
PXE boot wait time	None
Media detect count	None

7.3.11 Power Controller Options



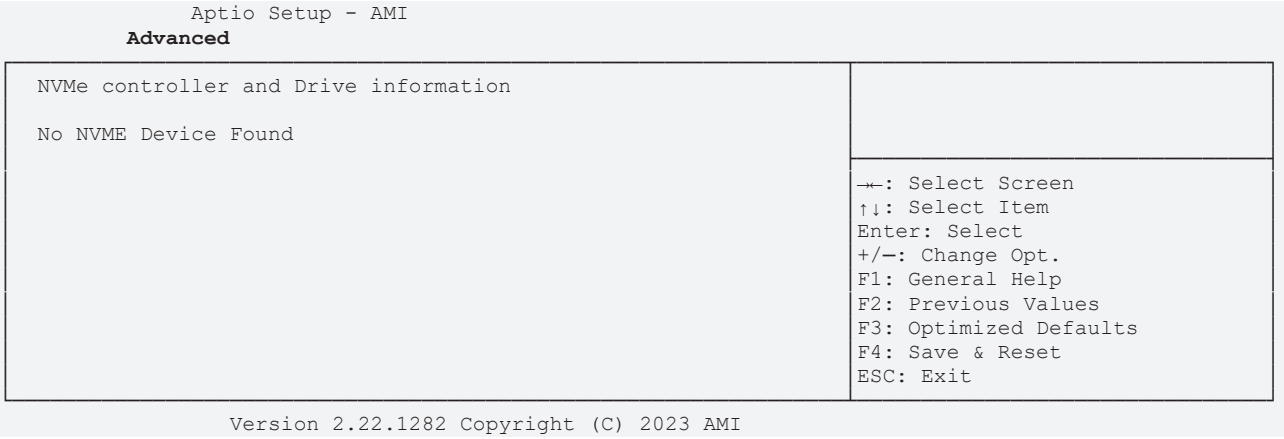
BIOS entry	Options
Bootloader version	None
Firmware version	None
Mainboard Serial No	None
Mainboard Prod. Date (Week.Year)	None
Mainboard BootCount	None
Mainboard Operation Time	None
Voltage (Min/Max)	None
Temperature (Min/Max)	None
ext. USB-Port Voltage	Off in S3-5 / by SVCC
Int. USB-Port Voltage	Off in S3-5 / by SVCC
WatchDogTimer Mode	Normal Mode / Compatibility Mode
WDT OSBoot Timeout	Disabled / 45/60/75…225/240/255 Seconds
UPS OCT-Access	Auto / Off
UPS	None

7.3.12 BeaCon Configuration



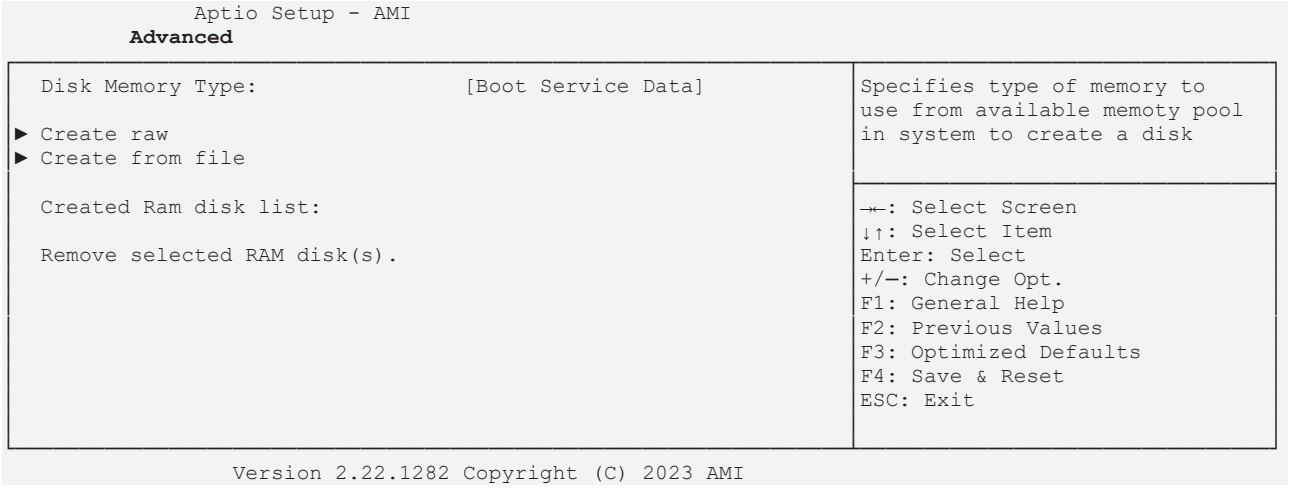
BIOS entry	Options
BeaCon Configuration	
No BeaCon device found!	None

7.3.13 NVMe Configuration



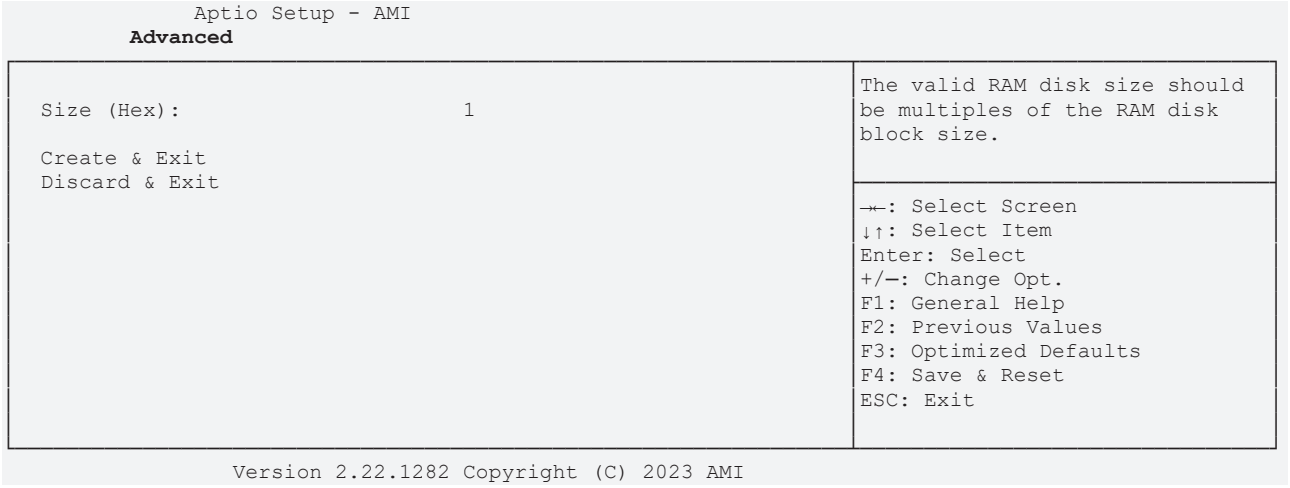
BIOS entry	Options
NVMe Configuration	
No NVME Device Found	None

7.3.14 RAM Disk Configuration



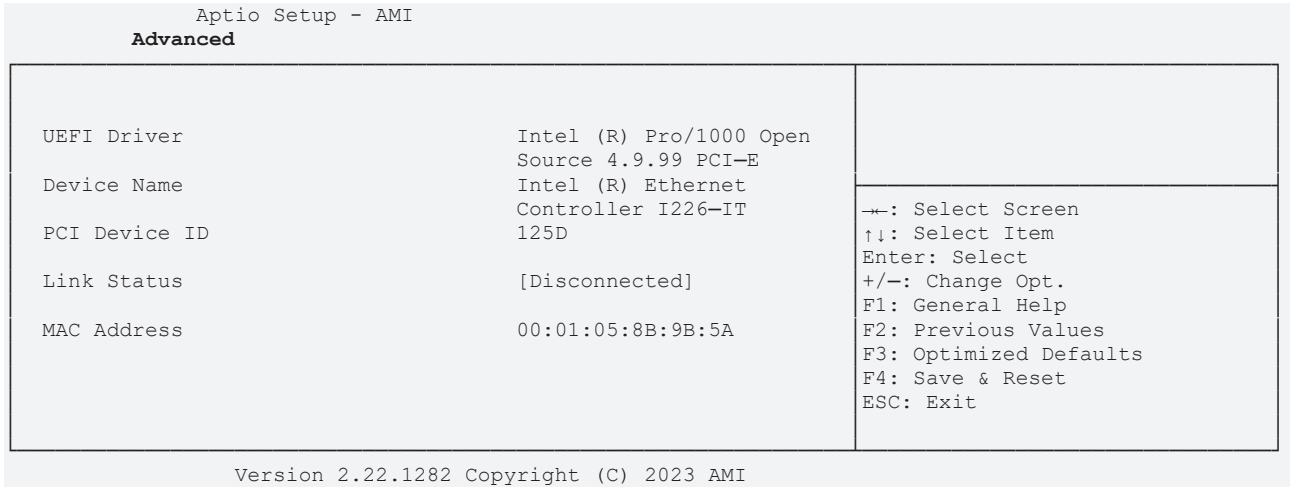
BIOS entry	Options
Disk Memory Type:	Boot Service Data / Reserved
► Create raw	Submenu: Create raw [▶ 42]
► Create from file	None
Created RAM disk list:	
Remove selected RAM disk(s).	None

7.3.14.1 Create raw



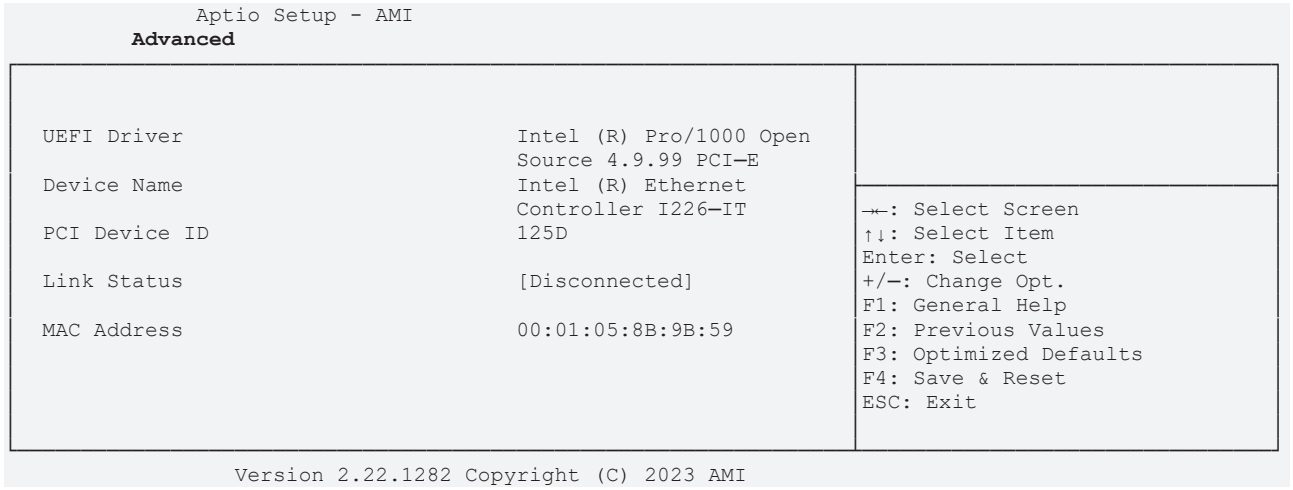
BIOS entry	Options
Size (Hex):	None
Create & Exit	None
Discard & Exit	None

7.3.15 Intel Ethernet Controller I226-IT



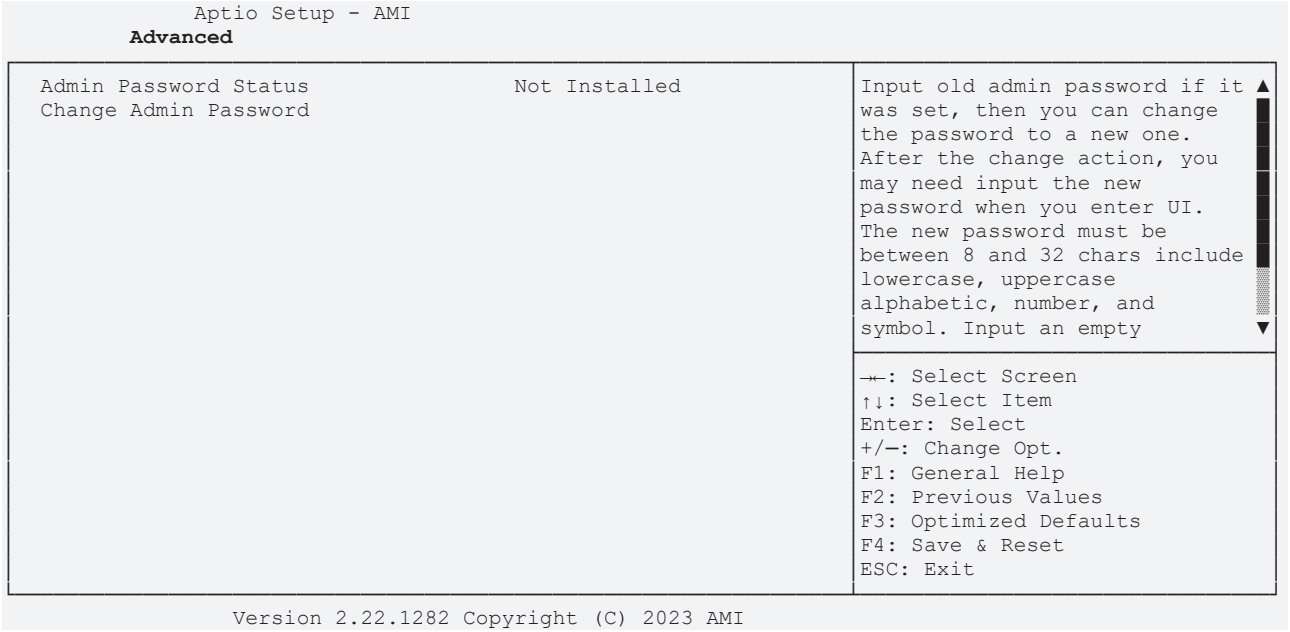
BIOS entry	Options
UEFI Driver	None
Device Name	None
PCI Device ID	None
Link Status	None
MAC Address	None

7.3.16 Intel Ethernet Controller I226-IT



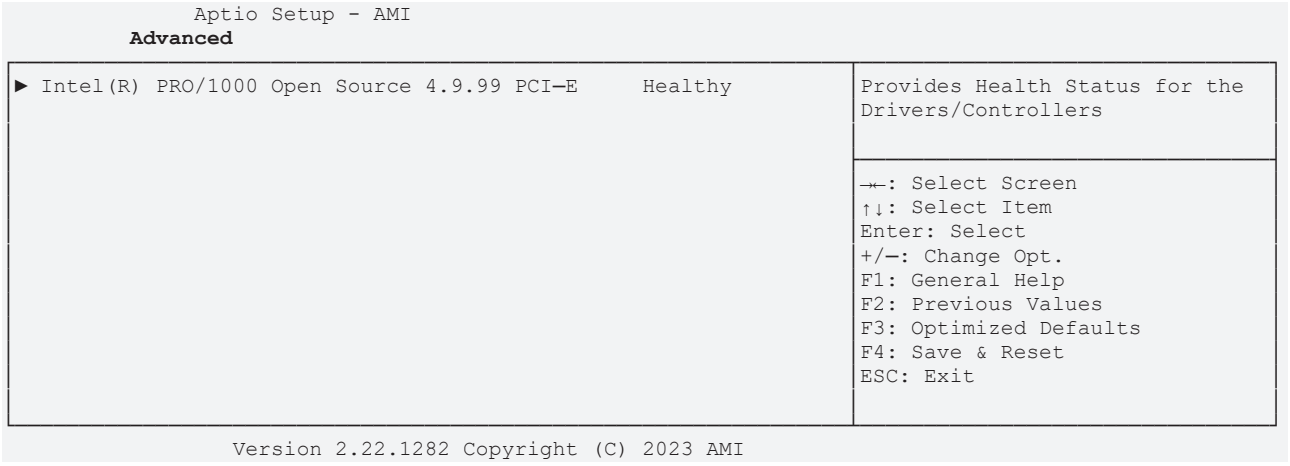
BIOS entry	Options
UEFI Driver	None
Device Name	None
PCI Device ID	None
Link Status	None
MAC Address	None

7.3.17 User Password Management



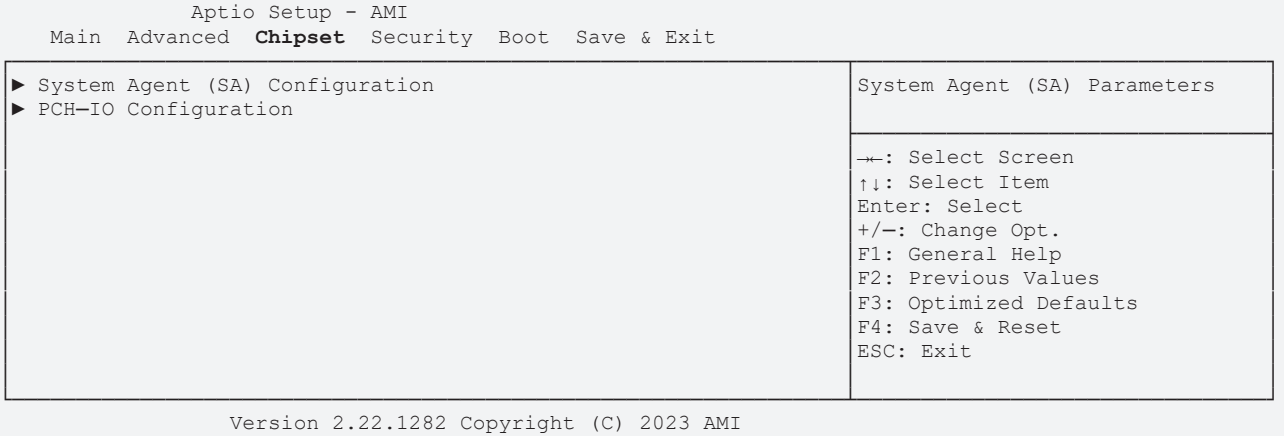
BIOS entry	Options
Admin Password Status	None
Change Admin Password	None

7.3.18 Driver Health



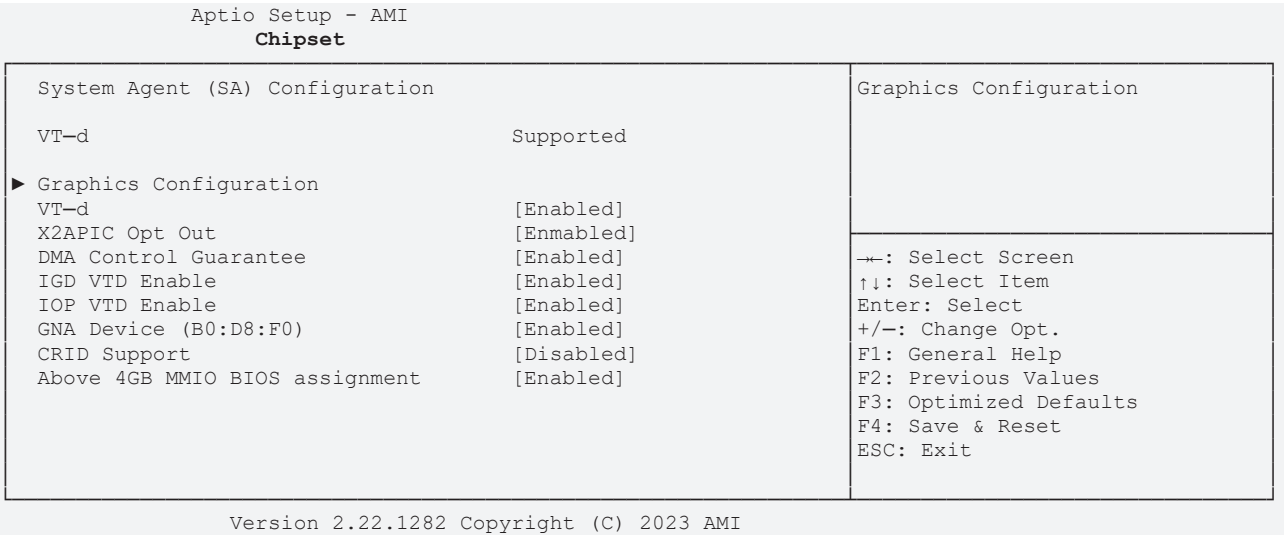
BIOS entry	Options
► Intel(R) PRO/1000 Open Source 4.9.99 PCIe®	None

7.4 Chipset



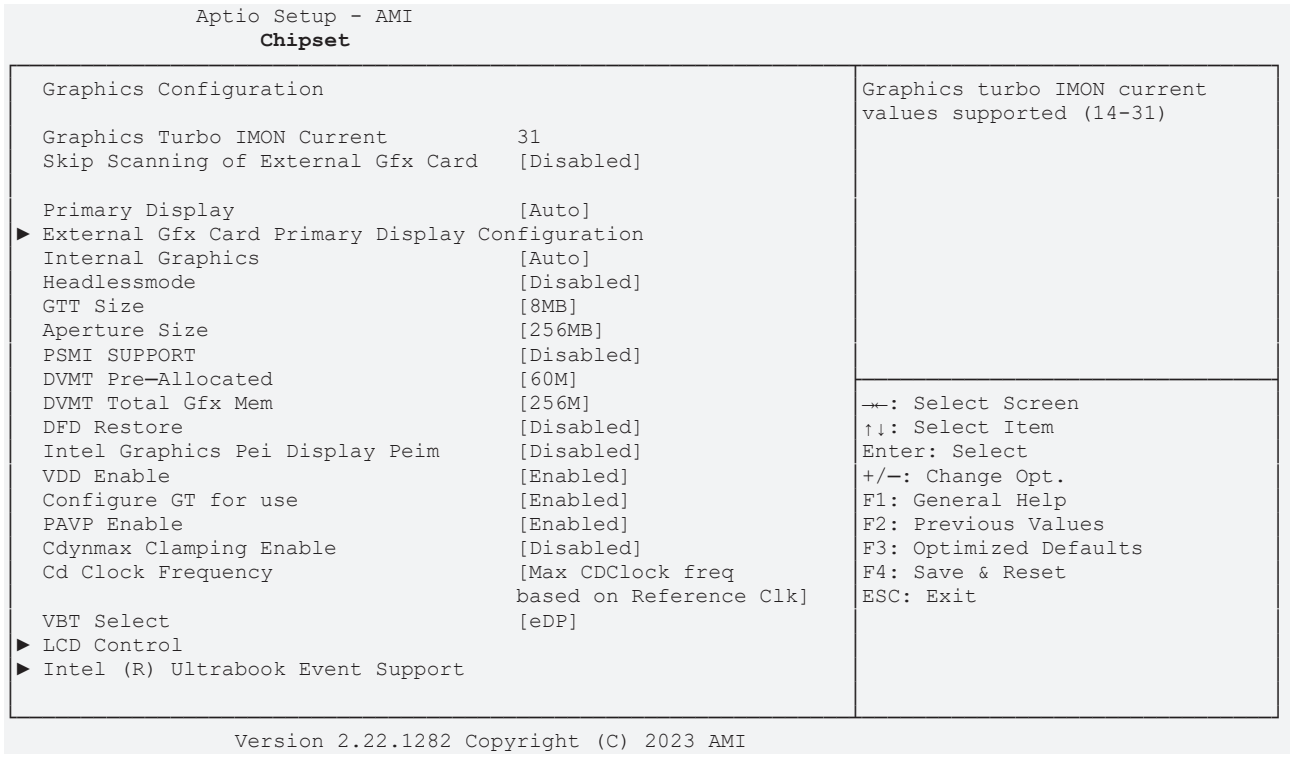
BIOS entry	Options
▶System Agent (SA) Configuration	Submenu: System Agent (SA) Configuration [▶ 46]
▶PCH-IO Configuration	Submenu: PCH-IO Configuration [▶ 51]

7.4.1 System Agent (SA) Configuration



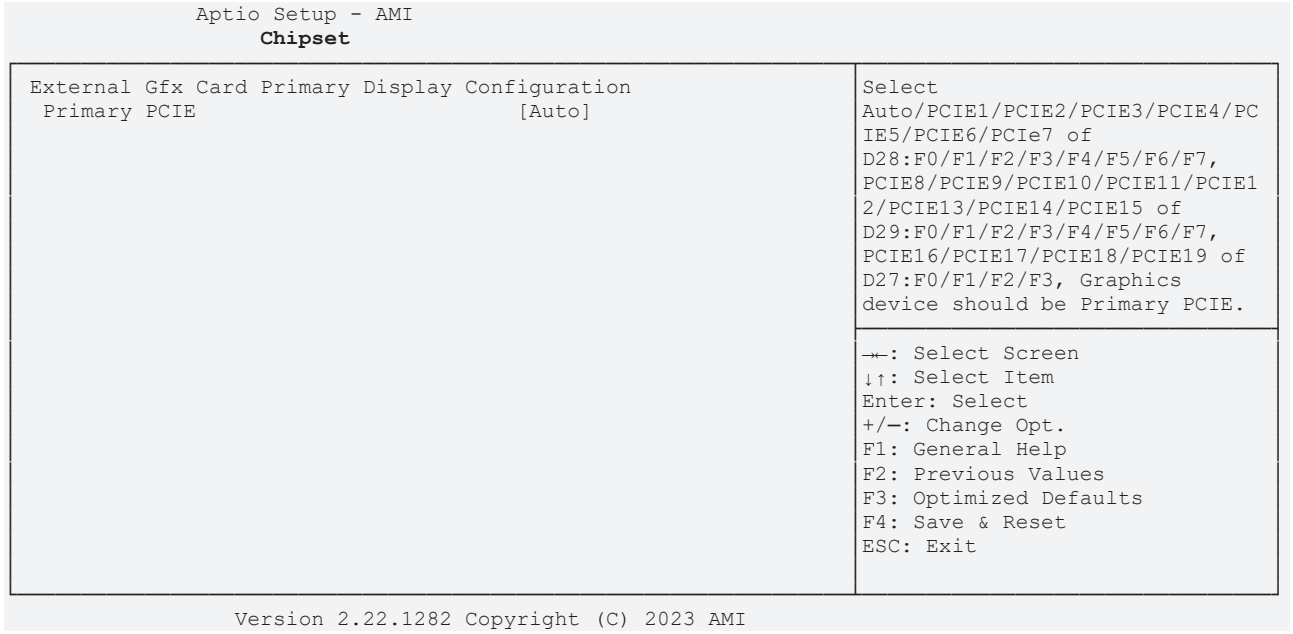
BIOS entry	Options
System Agent (SA) Configuration	
VT-d	None
▶ Graphics Configuration	Submenu: Graphics Configuration [▶ 47]
VT-d	Enabled / Disabled
X2APIC Opt Out	Disabled / Enabled
DMA Control Guarantee	Enabled / Disabled
IGD VTD Enable	Enabled / Disabled
IOP VTD Enable	Enabled / Disabled
GNA Device (B0:D8:F0)	Enabled / Disabled
CRID Support	Disabled / Enabled
Above 4GB MMIO BIOS assignment	Enabled / Disabled

7.4.1.1 Graphics Configuration



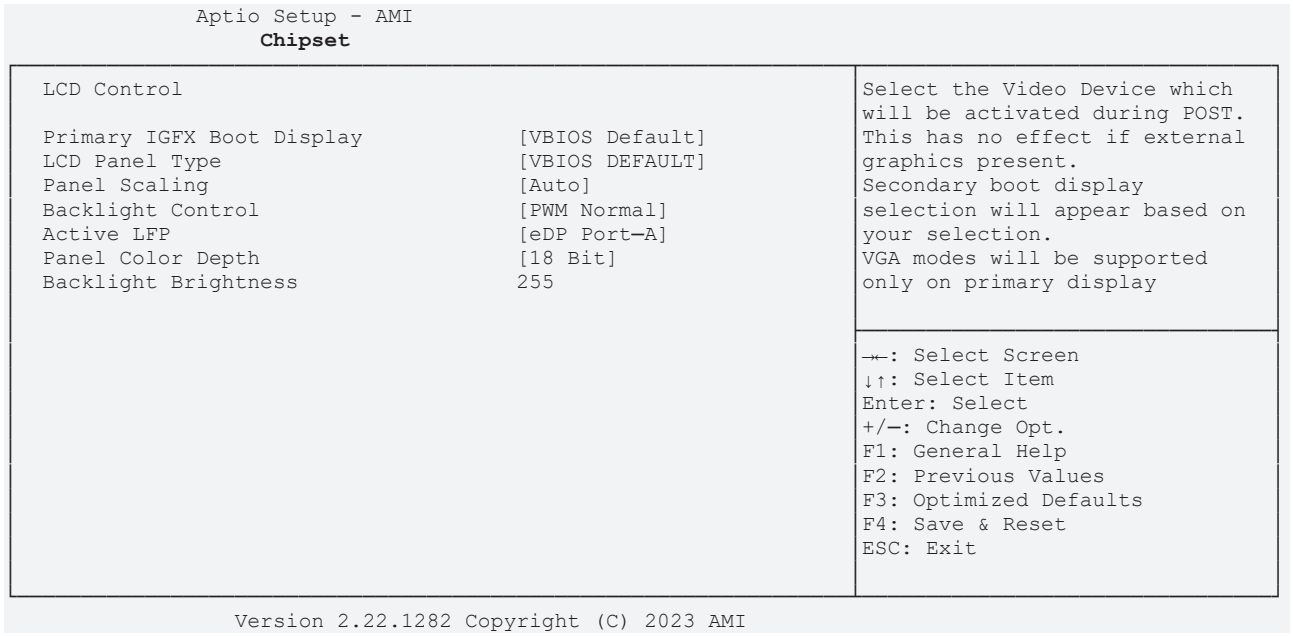
BIOS entry	Options
Graphics Configuration	
Graphics Turbo IMON Current	None
Skip Scanning of External Gfx Card	Disabled / Enabled
Primary Display	Auto / IGFX / PEG Slot / PCH PCI / HG
► External Gfx Card Primary Display Configuration	Submenu: External Gfx Card Primary Display Configuration [▶ 48]
Internal Graphics	Auto / Disabled / Enabled
GTT Size	2 / 4 / 8 MB
Aperture Size	128 / 256 / 512 / 1024 MB
PSMI SUPPORT	Disabled / Enabled
DVMT Pre-Allocated	0M, 32M…64M, 96M, 128M, 160M
DVMT Total Gfx Mem	128M / 256M / MAX
DiSM Size	0 – 7 GB
Intel® Graphics Pei Display Peim	Disabled / Enabled
VDD Enable	Enabled / Disabled
Configure GT for use	Disabled / Enabled
PAVP Enable	Enabled / Disabled
Cdynmax Clamping Enable	Disabled / Enabled
Cd Clock Frequency	172.8 / 307.2 / 556.8 / 652.8 Mhz Max CdClock freq based on Reference Clk
VBT Select	eDP / MIPI
► LCD Control	Submenu: LCD Control [▶ 49]
► Intel® Ultrabook Event Support	Submenu: Intel® Ultrabook Event Support [▶ 50]

7.4.1.1.1 External Gfx Card Primary Display Configuration



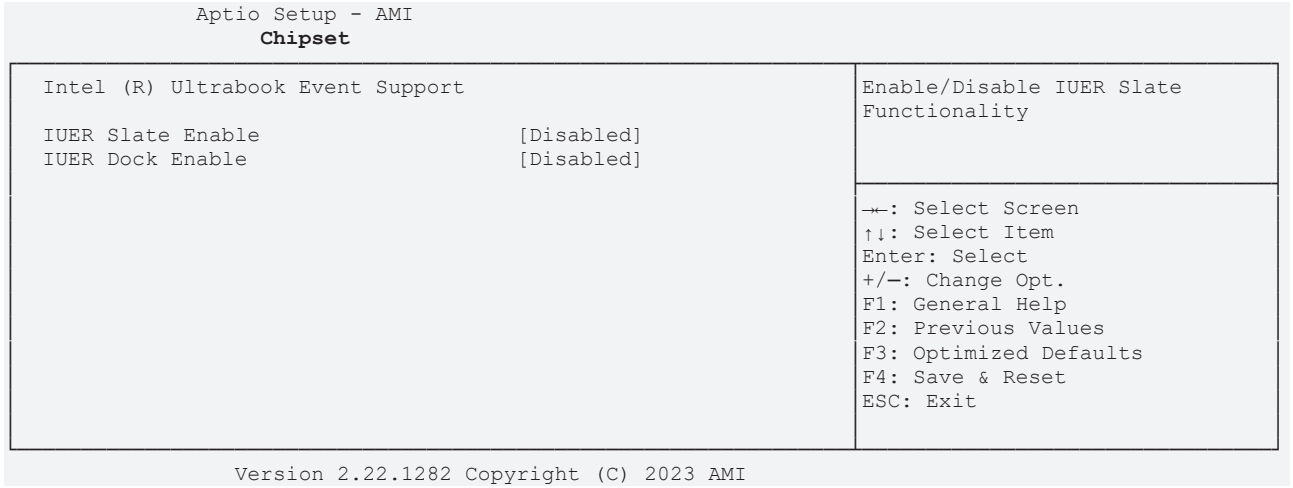
BIOS entry	Options
External Gfx Card Primary Display Configuration	
Primary PCIE	Auto / PCI1 - PCIE19

7.4.1.1.2 LCD Control



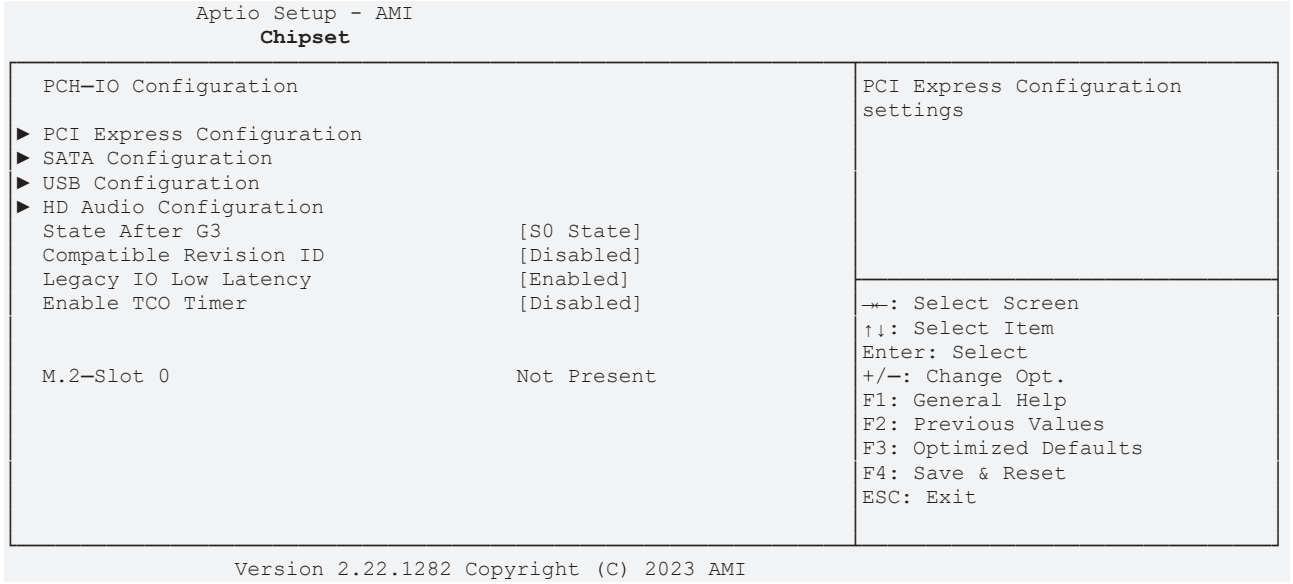
BIOS entry	Options
LCD Control	
Primary IGFX Boot Display	VBIOS Default / EFP / LFP / EFP3 / EFP2 / EFP3
LCD Panel Type	VBIOS Default / Various LVDS Resolutions
Panel Scaling	Auto / Off / Force Scaling
Backlight Control	PWM Normal / PWM Inverted
Active LFP	eDP Port / No eDP
Panel Color Depth	18 Bit / 24 Bit
Backlight Brightness	None

7.4.1.1.3 Intel® Ultrabook Event Support



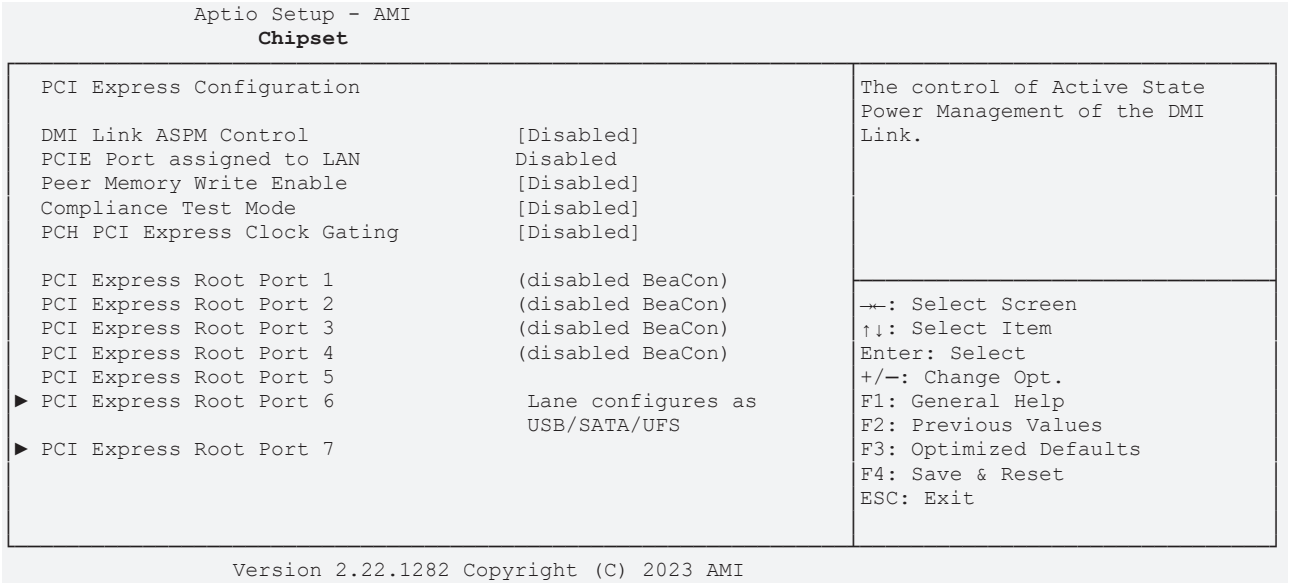
BIOS entry	Options
Intel® Ultrabook Event Support	
IUER Slate Enable	Disabled / Enabled
IUER Dock Enable	Disabled / Enabled

7.4.2 PCH-IO Configuration



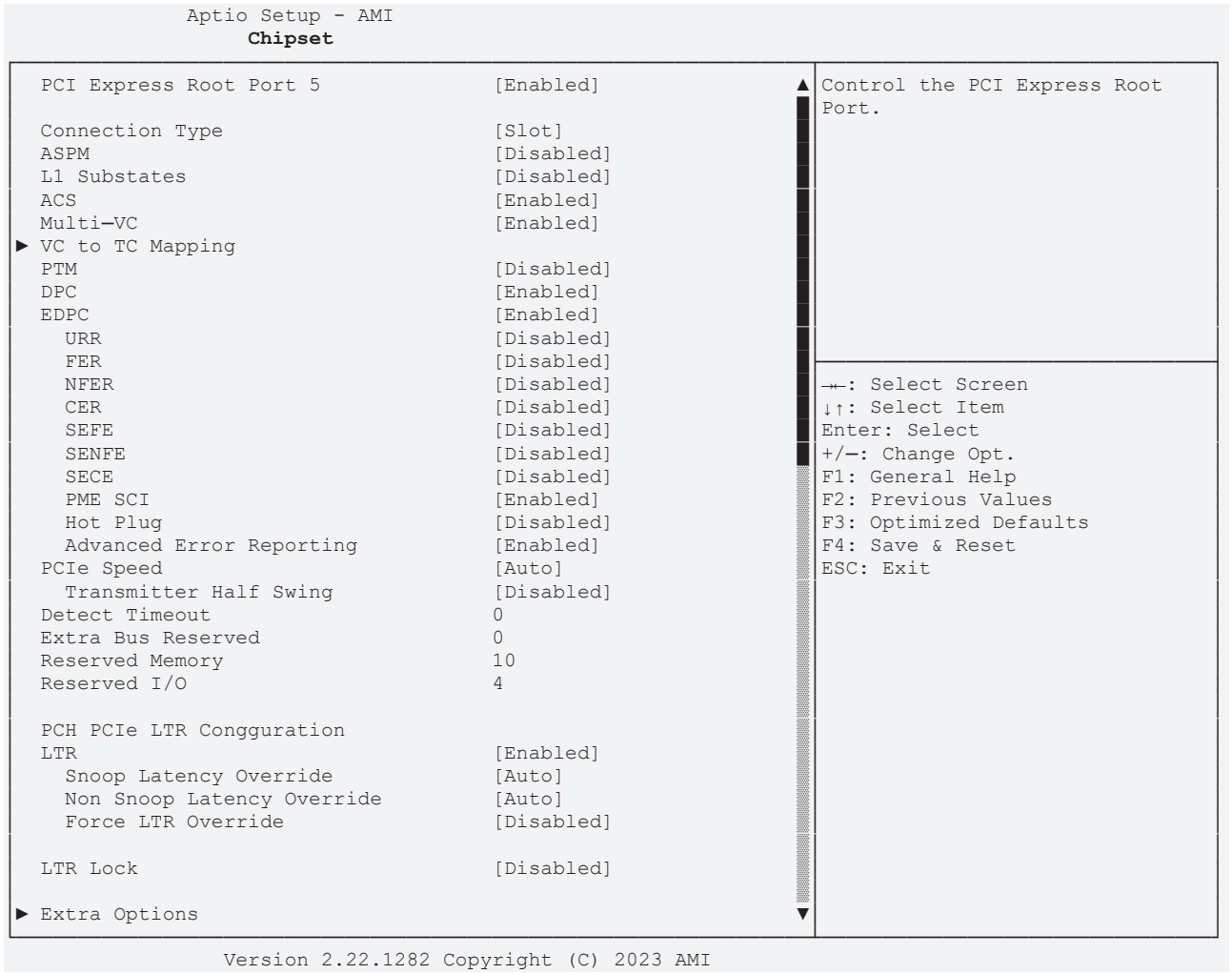
BIOS entry	Options
PCH-IO Configuration	
▶ PCI Express Configuration	Submenu: PCI Express Configuration [▶ 52]
▶ SATA Configuration	Submenu: SATA Configuration [▶ 61]
▶ USB Configuration	Submenu: USB Configuration [▶ 64]
▶ HD Audio Configuration	Submenu: HD Audio Configuration [▶ 65]
State After G3	S0 State / S5 State
Compatible Revision ID	None
Legacy IO Low Latency	Disabled / Enabled
Enable TCO Timer	Enabled / Disabled
M.2-Slot 0	Not Present

7.4.2.1 PCI Express Configuration



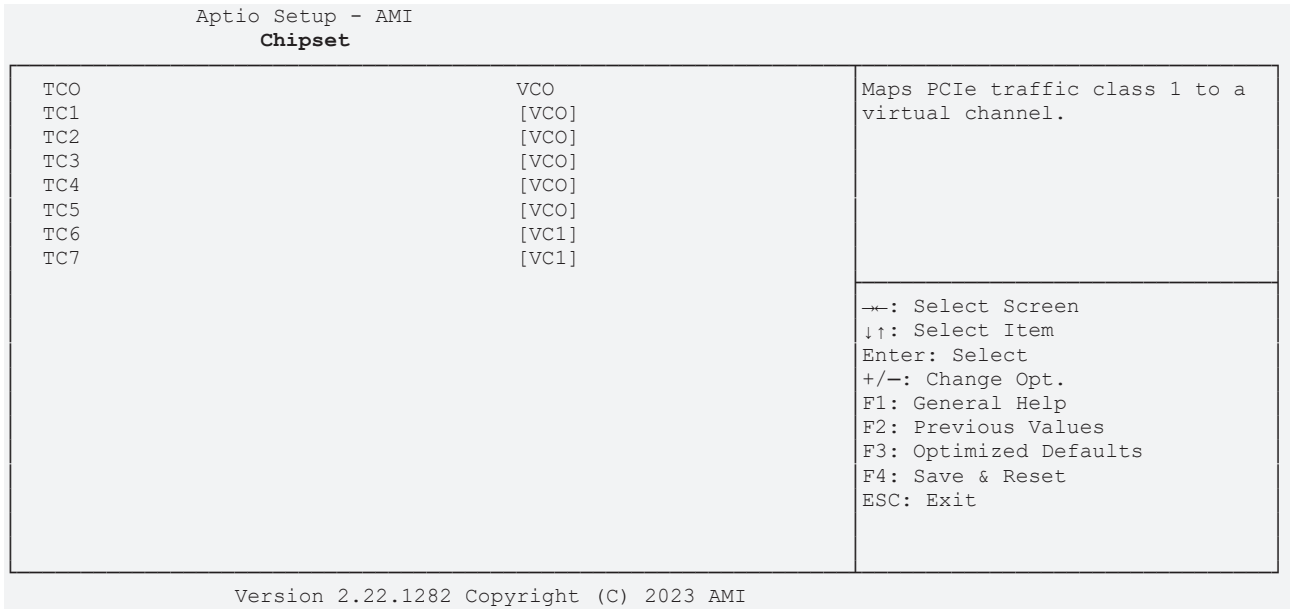
BIOS entry	Options
PCI Express Configuration	
DMI Link ASPM Control	Disabled / L0s / L1 / L0sL1 / Auto
PCIE Port assigned to LAN	Disabled
Peer Memory Write Enable	Disabled / Enabled
Compliance Test Mode	Disabled / Enabled
PCH PCI Express Clock Gating	Disabled / Enabled
PCI Express Root Port 1	None
PCI Express Root Port 2	None
PCI Express Root Port 3	None
PCI Express Root Port 4	None
► PCI Express Root Port 5	Submenu: PCI Express Root Port 5 [▶ 53]
PCI Express Root Port 6	None
► PCI Express Root Port 7	Submenu: PCI Express Root Port 7 [▶ 57]

7.4.2.1.1 PCI Express Root Port 5



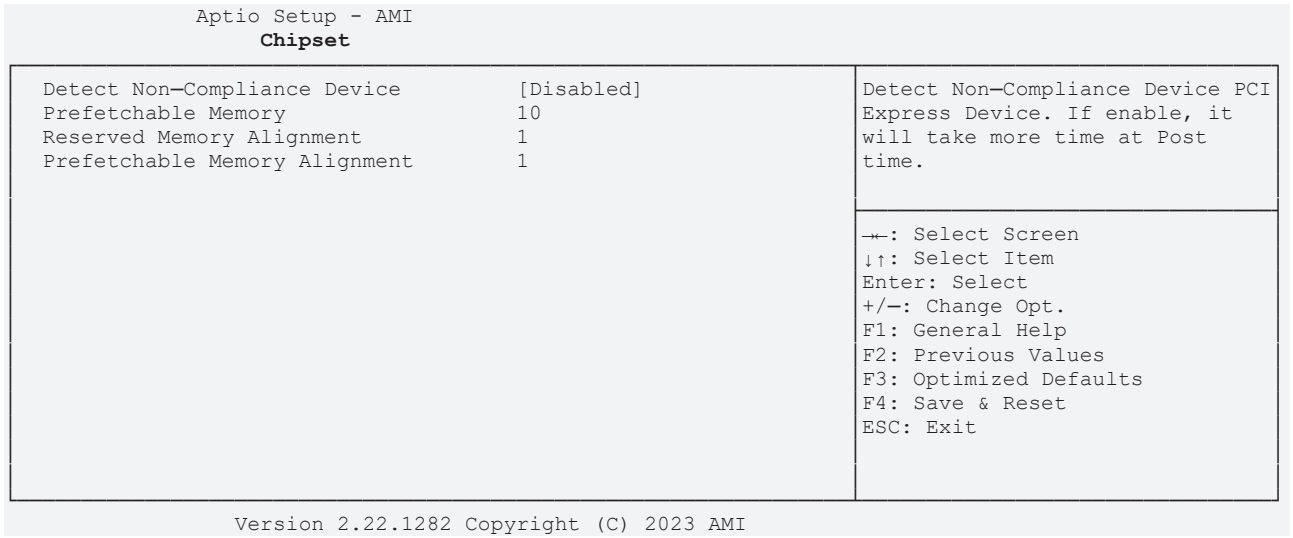
BIOS entry	Options
PCI Express Root Port 5	Enabled / Disabled
Connection Type	Slot / Built-in
ASPM	Disabled / Enabled
L1 Substates	Disabled / L1.1 & L1.2 / L1.1
ACS	Enabled / Disabled
Multi-VC	Enabled / Disabled
► VC to TC Mapping	Submenu: VC to TC Mapping [▶ 55]
PTM	Enabled / Disabled
DPC	Enabled / Disabled
EDPC	Enabled / Disabled
URR	Disabled / Enabled
FER	Disabled / Enabled
NFER	Disabled / Enabled
CER	Disabled / Enabled
SEFE	Disabled / Enabled
SENFE	Disabled / Enabled
SECE	Disabled / Enabled
PME SCI	Disabled / Enabled
Hot Plug	Enabled / Disabled
Advanced Error Reporting	Enabled / Disabled
PCIe Speed	Auto / Gen1 / Gen2 / Gen3
Transmitter Half Swing	Disabled / Enabled
Detect Timeout	None
Extra Bus Reserved	None
Reserved Memory	None
Reserved I/O	None
PCH PCIe LTR Configuration	
LTR	Enabled / Disabled
Snoop Latency Override	Auto / Manual / Disabled
Non Snoop Latency Override	Auto / Manual / Disabled
Force LTR Override	Disabled / Enabled
LTR Lock	Disabled / Enabled
► Extra Options	Submenu: Extra Options [▶ 56]

7.4.2.1.1.1 VC to TC Mapping



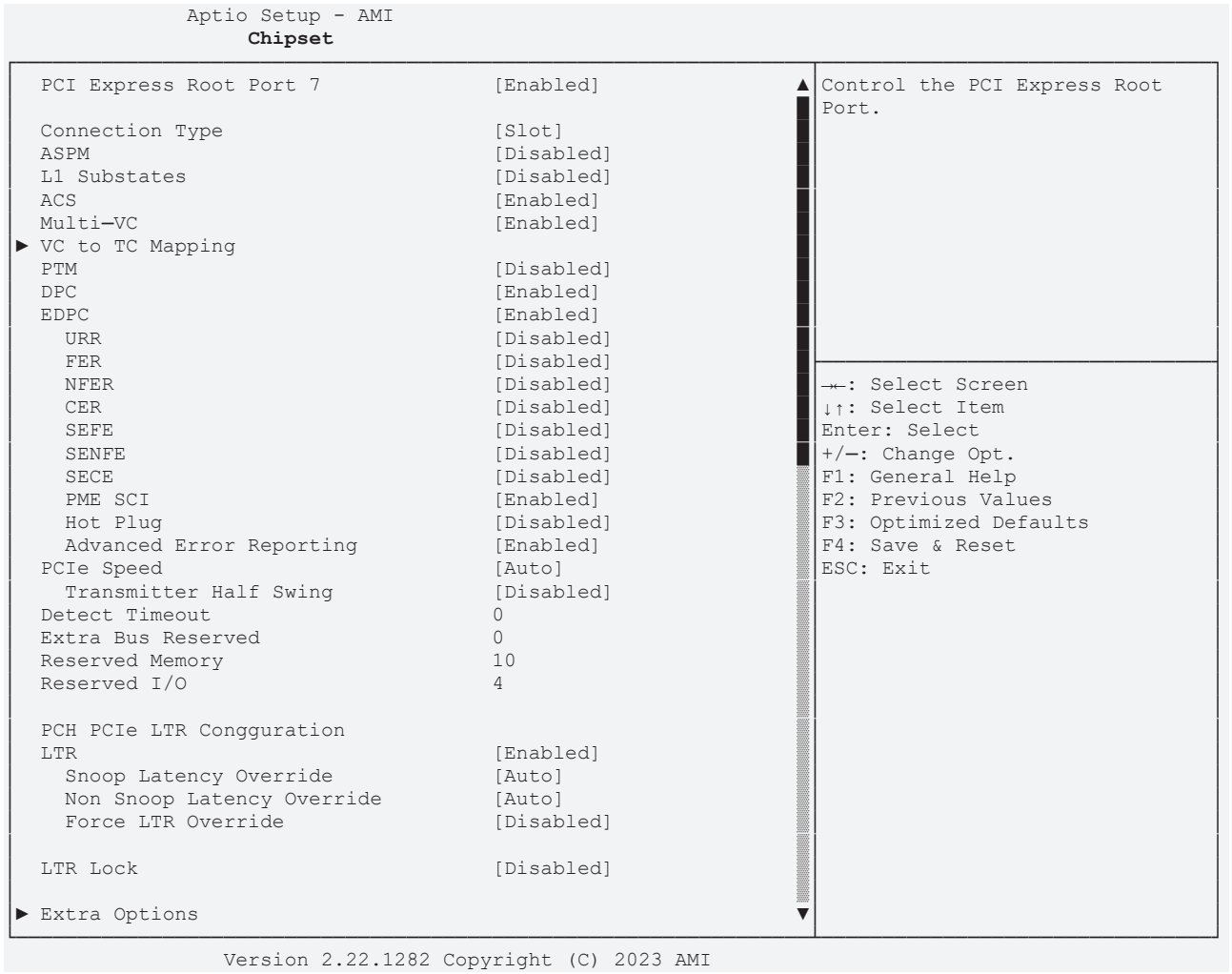
BIOS entry	Options
TCO	None
TCO1	VC0 / VC1
TCO2	VC0 / VC1
TCO3	VC0 / VC1
TCO4	VC0 / VC1
TCO5	VC0 / VC1
TCO6	VC1 / VC0
TCO7	VC1 / VC0

7.4.2.1.1.2 Extra Options



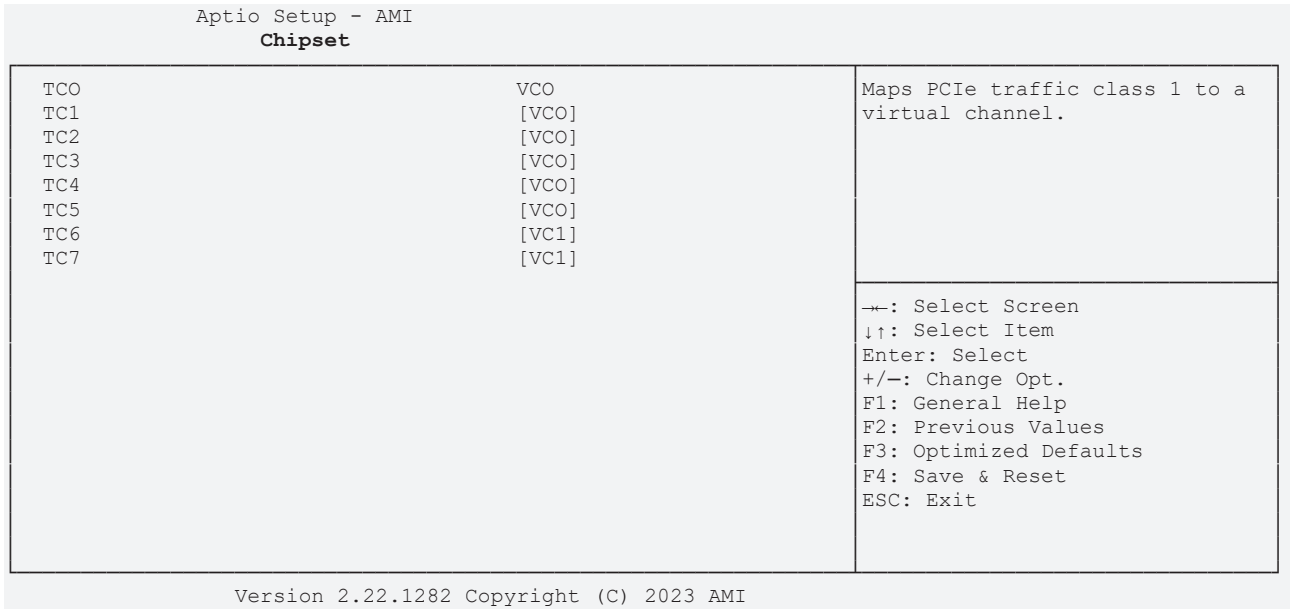
BIOS entry	Options
Detect Non-Compliance Device	Disabled / Enabled
Prefetchable Memory	None
Reserved Memory Alignment	None
Prefetchable Memory Alignment	None

7.4.2.1.2 PCI Express Root Port 7



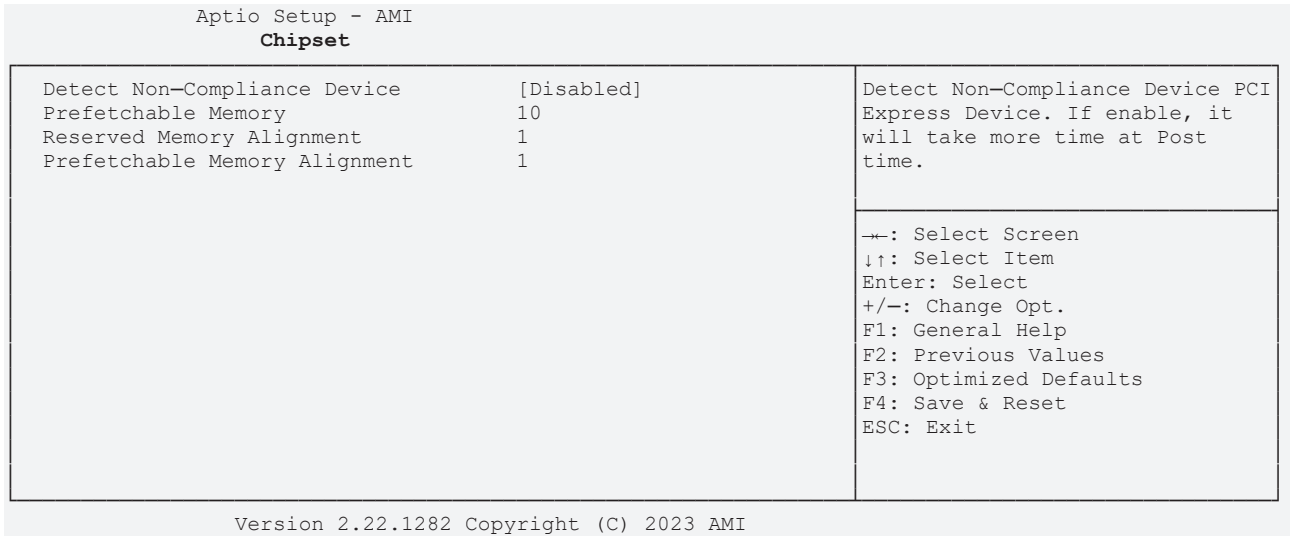
BIOS entry	Options
PCI Express Root Port 7	Enabled / Disabled
Connection Type	Slot / Built-in
ASPM	Disabled / Enabled
L1 Substates	Disabled /L1.1 & L1.2 / L1.1
ACS	Enabled / Disabled
Multi-VC	Enabled / Disabled
► VC to TC Mapping	Submenu: VC to TC Mapping [▶ 59]
PTM	Enabled / Disabled
DPC	Enabled / Disabled
EDPC	Enabled / Disabled
URR	Disabled / Enabled
FER	Disabled / Enabled
NFER	Disabled / Enabled
CER	Disabled / Enabled
SEFE	Disabled / Enabled
SENFE	Disabled / Enabled
SECE	Disabled / Enabled
PME SCI	Disabled / Enabled
Hot Plug	Enabled / Disabled
Advanced Error Reporting	Enabled / Disabled
PCIe Speed	Auto / Gen1 / Gen2 / Gen3
Transmitter Half Swing	Disabled / Enabled
Detect Timeout	None
Extra Bus Reserved	None
Reserved Memory	None
Reserved I/O	None
PCH PCIe LTR Configuration	
LTR	Enabled / Disabled
Snoop Latency Override	Auto / Manual / Disabled
Non Snoop Latency Override	Auto / Manual / Disabled
Force LTR Override	Disabled / Enabled
LTR Lock	Disabled / Enabled
► Extra Options	Submenu: Extra Options [▶ 60]

7.4.2.1.2.1 VC to TC Mapping



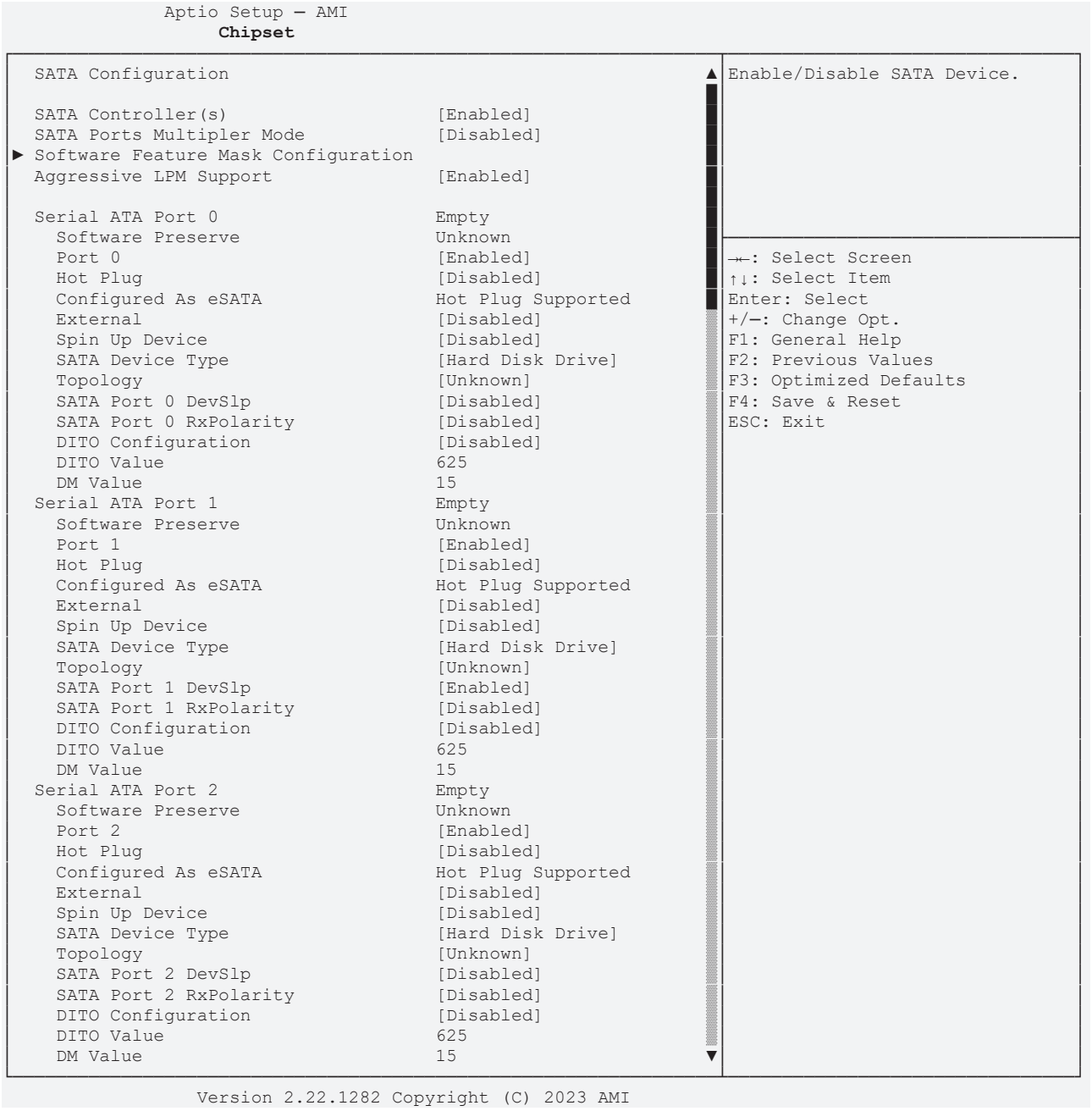
BIOS entry	Options
TCO	None
TCO1	VC0 / VC1
TCO2	VC0 / VC1
TCO3	VC0 / VC1
TCO4	VC0 / VC1
TCO5	VC0 / VC1
TCO6	VC1 / VC0
TCO7	VC1 / VC0

7.4.2.1.2.2 Extra Options



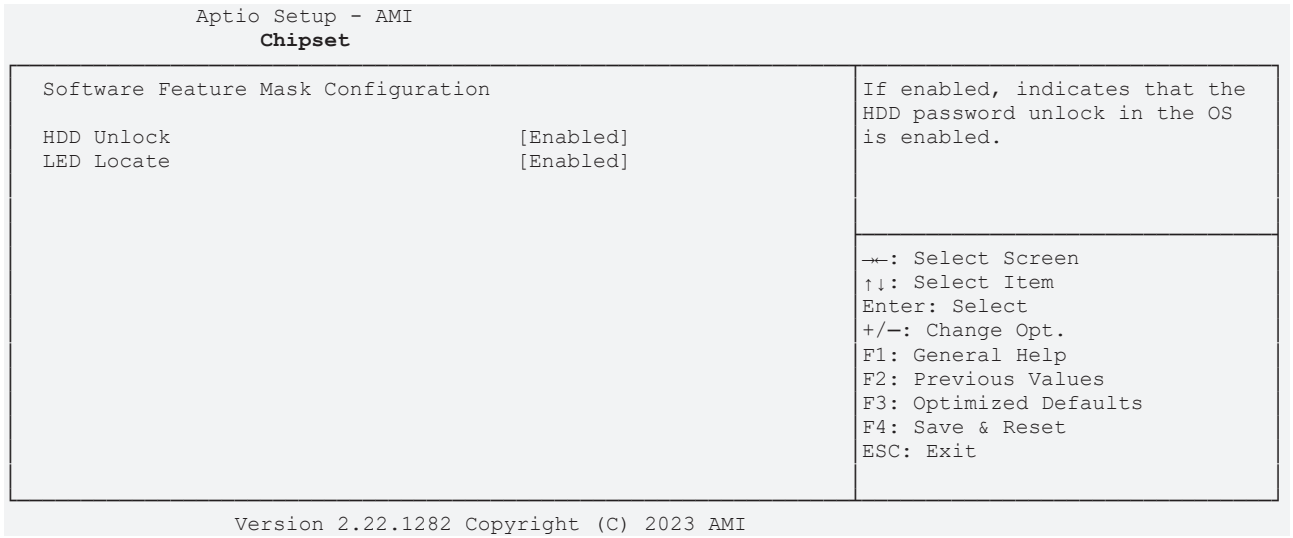
BIOS entry	Options
Detect Non-Compliance Device	Disabled / Enabled
Prefetchable Memory	None
Reserved Memory Alignment	None
Prefetchable Memory Alignment	None

7.4.2.2 SATA Configuration



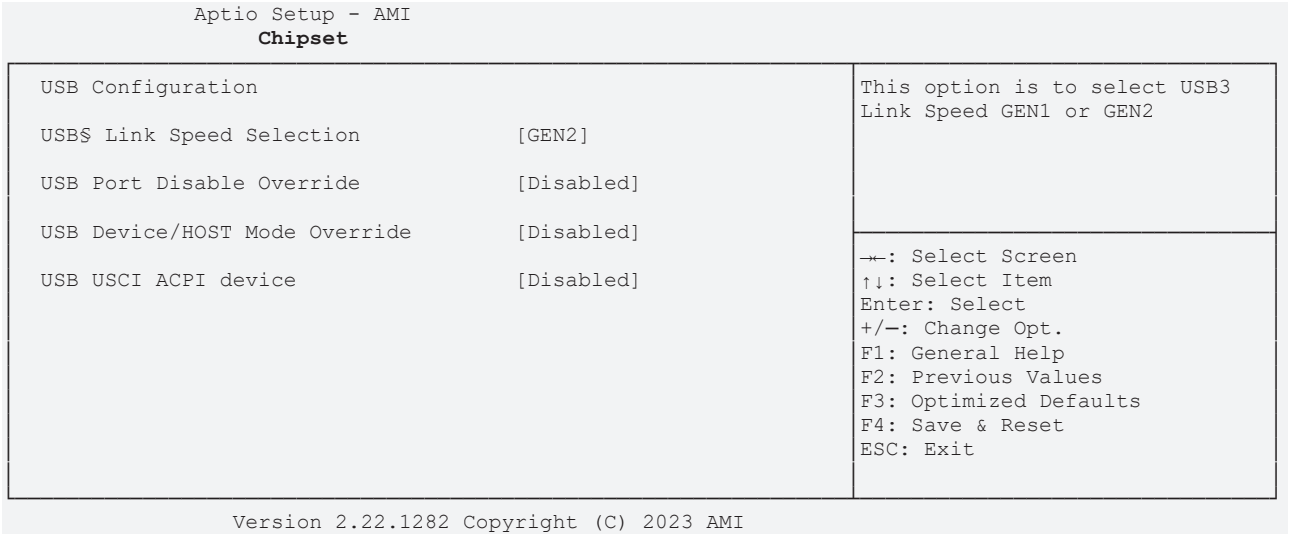
BIOS entry	Options
SATA Configuration	
SATA Controller(s)	Enabled / Disabled
SATA Mode Selection	None
SATA Test Mode	Disabled / Enabled
► Software Feature Mask Configuration	Submenu: Software Feature Mask Configuration [▶ 63]
Aggressive LPM Support	Enabled / Disabled
Serial ATA Port 0	None
Software Preserve	None
Port 0	Enabled / Disabled
Hot Plug	Disabled / Enabled
Configured As eSATA	None
External	Disabled / Enabled
Spin Up Device	Disabled / Enabled
SATA Device Type	Hard Disk Drive / Solid State Drive
Topology	Unknown / ISATA / Direct Connect / Flex / M2
SATA Port 0 DevSlp	Enabled / Disabled
SATA Port 0 RxPolarity	Enabled / Disabled
DITO Configuration	Disabled / Enabled
DITO Value	None
DM Value	None
Serial ATA Port 1	None
Software Preserve	None
Port 1	Enabled / Disabled
Hot Plug	Disabled / Enabled
Configured As eSATA	None
External	Disabled / Enabled
Spin Up Device	Disabled / Enabled
SATA Device Type	Hard Disk Drive / Solid State Drive
Topology	Unknown / ISATA / Direct Connect / Flex / M2
SATA Port 1 DevSlp	Enabled / Disabled
DITO Configuration	Disabled / Enabled
DITO Value	None
DM Value	None
Serial ATA Port 2	None
Software Preserve	None
Port 2	Enabled / Disabled
Hot Plug	Disabled / Enabled
Configured As eSATA	None
External	Disabled / Enabled
Spin Up Device	Disabled / Enabled
SATA Device Type	Hard Disk Drive / Solid State Drive
Topology	Unknown / ISATA / Direct Connect / Flex / M2
SATA Port 2 DevSlp	Enabled / Disabled
DITO Configuration	Disabled / Enabled
DITO Value	None
DM Value	None

7.4.2.2.1 Software Feature Mask Configuration



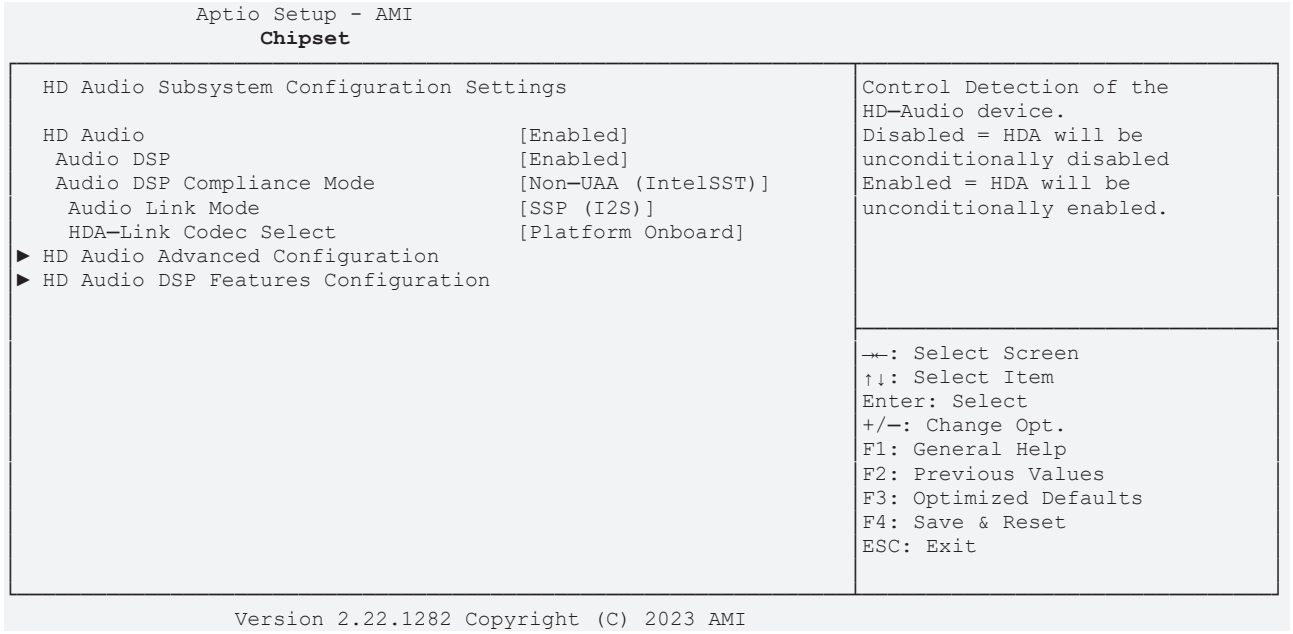
BIOS entry	Options
Software Feature Mask Configuration	
HDD Unlock	Enabled / Disabled
LED Locate	Enabled / Disabled

7.4.2.3 USB Configuration



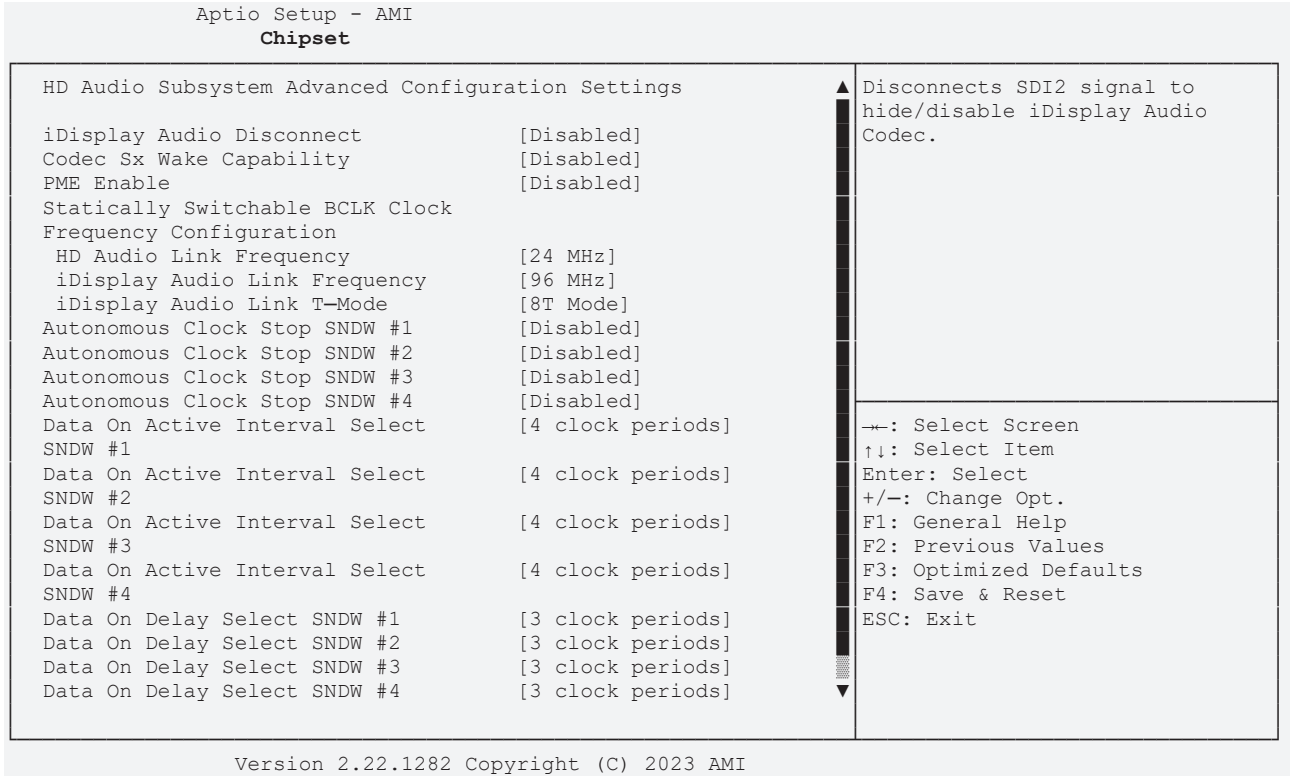
BIOS entry	Options
USB Configuration	
USB3 Link Speed Selection	Gen2 / Gen1
USB Port Disable Override	Disabled / Select Per-Pin
USB Device/HOST Mode Override	Disabled / Select Per-Pin
USB USCI ACPI device	Disabled / Enabled

7.4.2.4 HD Audio Configuration



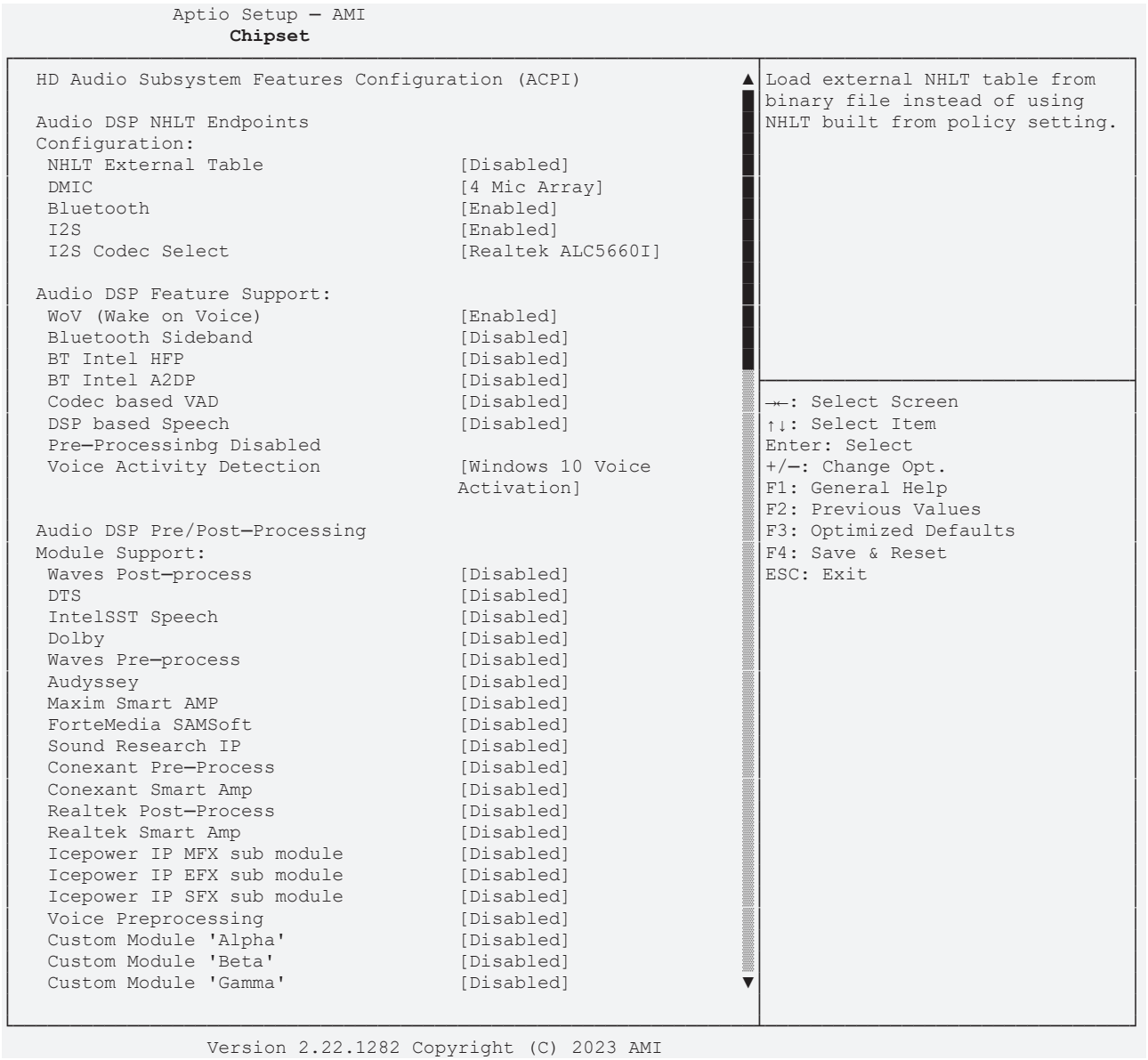
BIOS entry	Options
HD Audio Subsystem Configuration Settings	
HD Audio	Enabled / Disabled
Audio DSP	Enabled / Disabled
Audio DSP Compliance Mode	Non-UAA (Intel® SST) / UAA (HDA Inbox/Intel® SST)
Audio Link Mode	SSP (I2S) / HD Audio Link / SoundWire / Advanced Link Config
HDA-Link Codec Select	Platform Onboard / External Kit
► HD Audio Advanced Configuration	Submenu: HD Audio Advanced Configuration [▶ 66]
► HD Audio DSP Features Configuration	Submenu: HD Audio DSP Features Configuration [▶ 67]

7.4.2.4.1 HD Audio Advanced Configuration



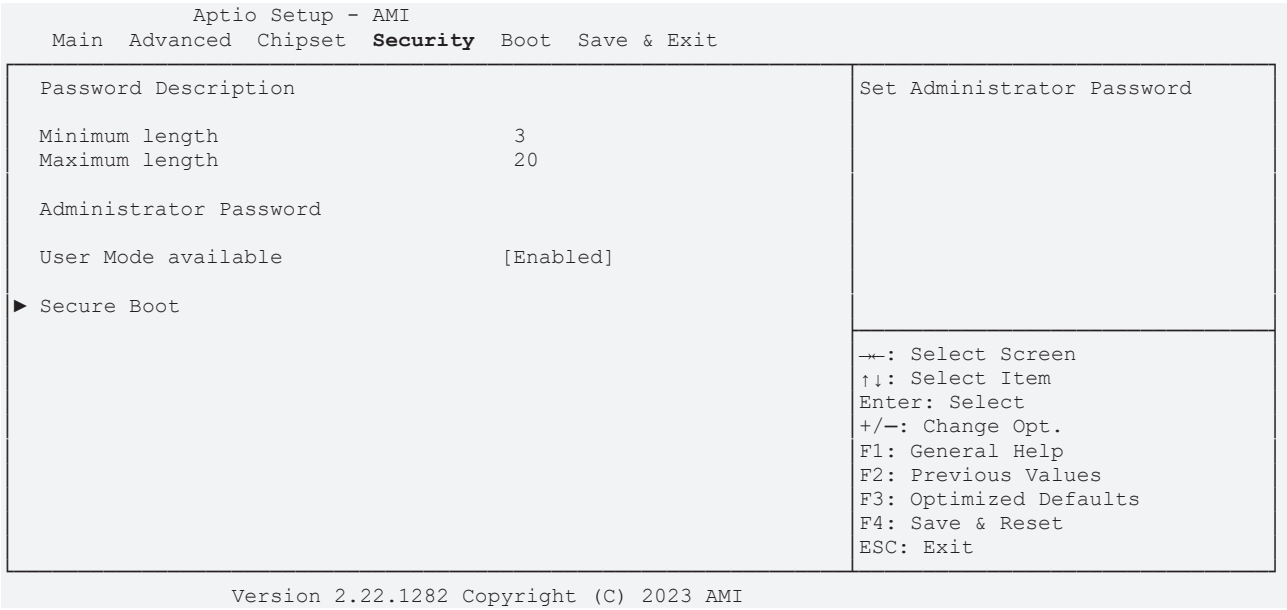
BIOS entry	Options
HD Audio Subsystem Advanced Configuration Settings	
iDisplay Audio Disconnect	Disabled / Enabled
Codec Sx Wake Capability	Disabled / Enabled
PME Enable	Disabled / Enabled
Statically Switchable BCLK Clock DPC Frequency Configuration:	
HD Audio Link Frequency	6 MHz / 12 MHz / 24 MHz
iDisplay Audio Link Frequency	48 MHz / 96 MHz
iDisplay Audio Link T–Mode FER	2T Mode / 4T Mode / 8T Mode / 16T Mode
Autonomous Clock Stop SNDW #1	Disabled / Enabled
Autonomous Clock Stop SNDW #2	Disabled / Enabled
Autonomous Clock Stop SNDW #3	Disabled / Enabled
Autonomous Clock Stop SNDW #4	Disabled / Enabled
Data On Active Interval Select SNDW #1	3 / 4 / 5 / 6 clock periods
Data On Active Interval Select SNDW #2	3 / 4 / 5 / 6 clock periods
Data On Active Interval Select SNDW #3	3 / 4 / 5 / 6 clock periods
Data On Active Interval Select SNDW #4	3 / 4 / 5 / 6 clock periods
Data On Delay Select SNDW #1	2 / 3 clock periods
Data On Delay Select SNDW #2	2 / 3 clock periods
Data On Delay Select SNDW #3	2 / 3 clock periods
Data On Delay Select SNDW #4	2 / 3 clock periods

7.4.2.4.2 HD Audio DSP Features Configuration



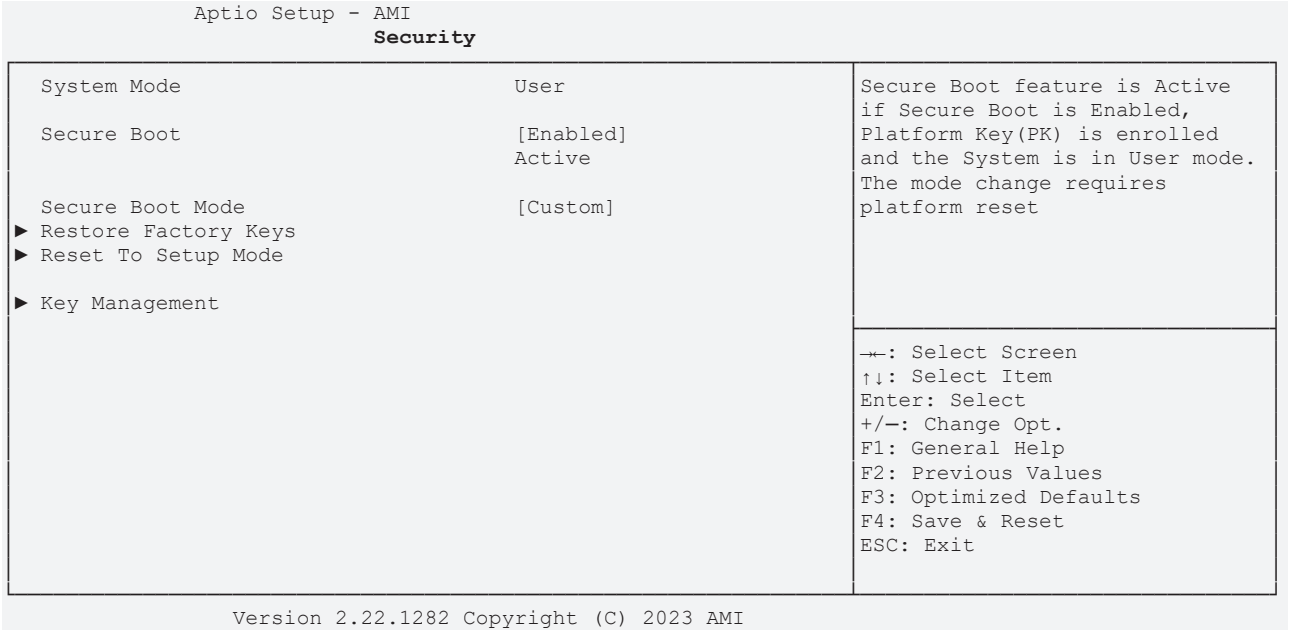
BIOS entry	Options
HD Audio Subsystem Features Configuration (ACPI)	
Audio DSP NHLT Endpoints Configuration:	
NHLT External Table	Disabled / Enabled
DMIC	Disabled / 1 / 2 / 4 Mic Array
Bluetooth	Enabled / Disabled
I2S	Enabled / Disabled
I2S Codec Select	Realtek ALC274 / Realtek ALC5660I / Disabled
Audio DSP Feature Support:	
WoV (Wake on Voice)	Enabled Disabled
Bluetooth Sideband	Disabled / Enabled
BT Intel® HFP	None
BT Intel® A2DP	None
Codec based VAD	Disabled / Enabled
DSP based Speech	None
Pre-Processing disabled	
Voice Activity Detection	Intel® Wake on Voice / Windows 10 Voice Activation
Audio DSP Pre/Post-Processing Module Support:	
Waves Post-process	Disabled / Enabled
DTS	Disabled / Enabled
Intel® SST Speech	Disabled / Enabled
Dolby	Disabled / Enabled
Waves Pre-process	Disabled / Enabled
Audyssey	Disabled / Enabled
Maxim Smart AMP	Disabled / Enabled
ForteMedia SAMSoft	Disabled / Enabled
Sound Research IP	Disabled / Enabled
Conexant Pre-Process	Disabled / Enabled
Conexant Smart Amp	Disabled / Enabled
Realtek Post-Process	Disabled / Enabled
Realtek Smart Amp	Disabled / Enabled
Icepower IP MFX sub module	Disabled / Enabled
Icepower IP EFX sub module	Disabled / Enabled
Icepower IP SFX sub module	Disabled / Enabled
Voice Preprocessing	Disabled / Enabled
Custom Module 'Alpha'	Disabled / Enabled
Custom Module 'Beta'	Disabled / Enabled
Custom Module 'Gamma'	Disabled / Enabled

7.5 Security



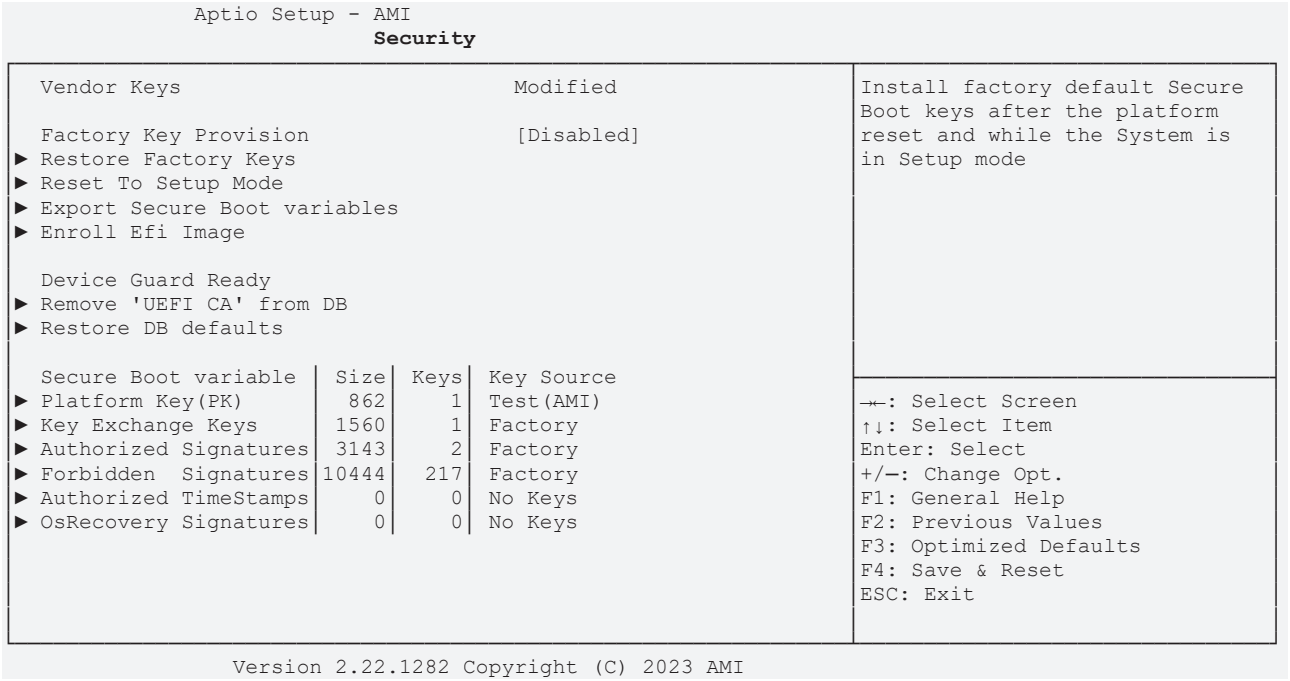
BIOS entry	Options
Password Description	
Minimum Length	None
Maximum Length	None
Administrator Password	Set an administrator password here.
User Mode available	Enabled / Disabled
Secure Boot menu	Submenu: Secure Boot [▶ 70]

7.5.1 Secure Boot



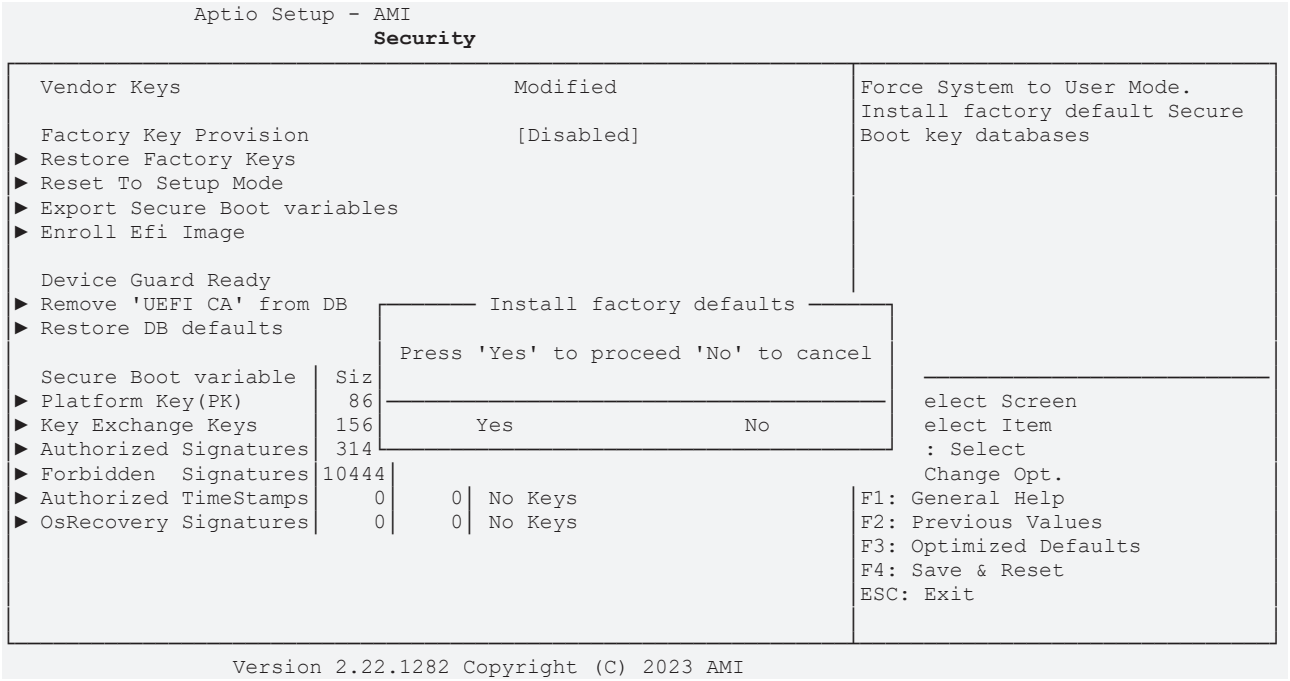
BIOS entry	Options
System Mode	None
Secure Boot	Enabled / Disabled
Secure Boot Mode	Standard / Custom
► Restore Factory Keys	Press enter key
► Reset To Setup Mode	Press enter key
► Key Management	Submenu: Key Management [▶ 71]

7.5.1.1 Key Management



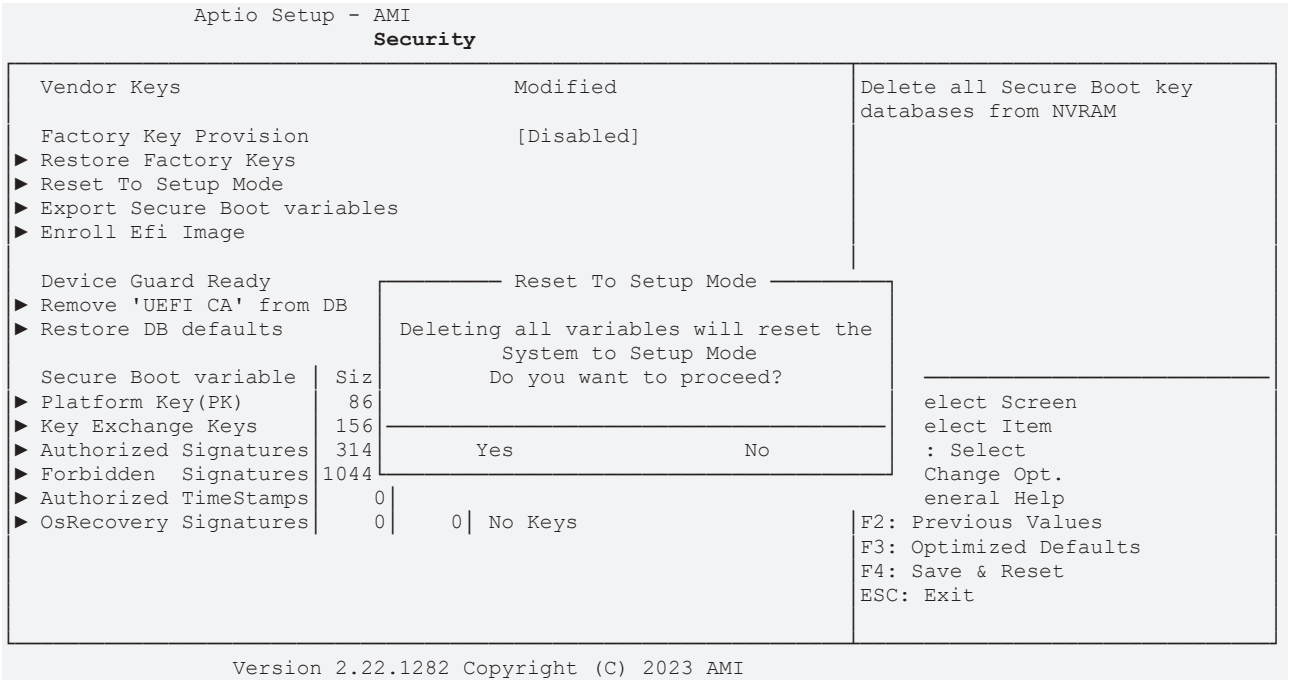
BIOS entry	Options
Vendor Keys	None
Factory Key Provision	Disabled / Enabled
▶ Restore Factory Keys	Press enter key
▶ Reset To Setup Mode	Press enter key
▶ Export Secure Boot variables	Press enter key
▶ Enroll Efi Image	Press enter key
Device Guard Ready	
▶ Remove 'UEFI CA' from DB	Press enter key
▶ Restore DB defaults	Press enter key
Secure Boot variables	
▶ Platform Key(PK)	Press enter key
▶ Key Exchange Keys	Press enter key
▶ Authorized Signatures	Press enter key
▶ Forbidden Signatures	Press enter key
▶ Authorized TimeStamps	Press enter key
▶ OS Recovery Signatures	Press enter key

7.5.1.1.1 Restore factory keys



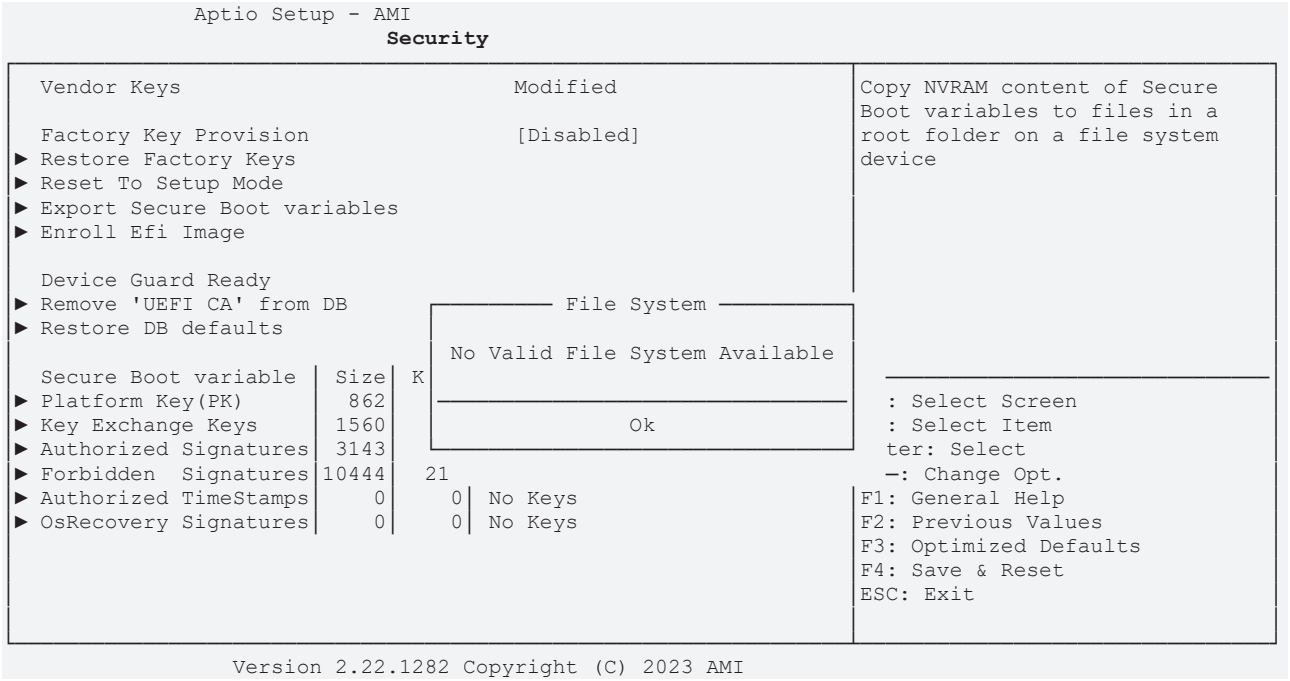
BIOS entry	Options
Vendor Keys	None
► Restore Factory Keys	See box

7.5.1.1.2 Reset To Setup Mode



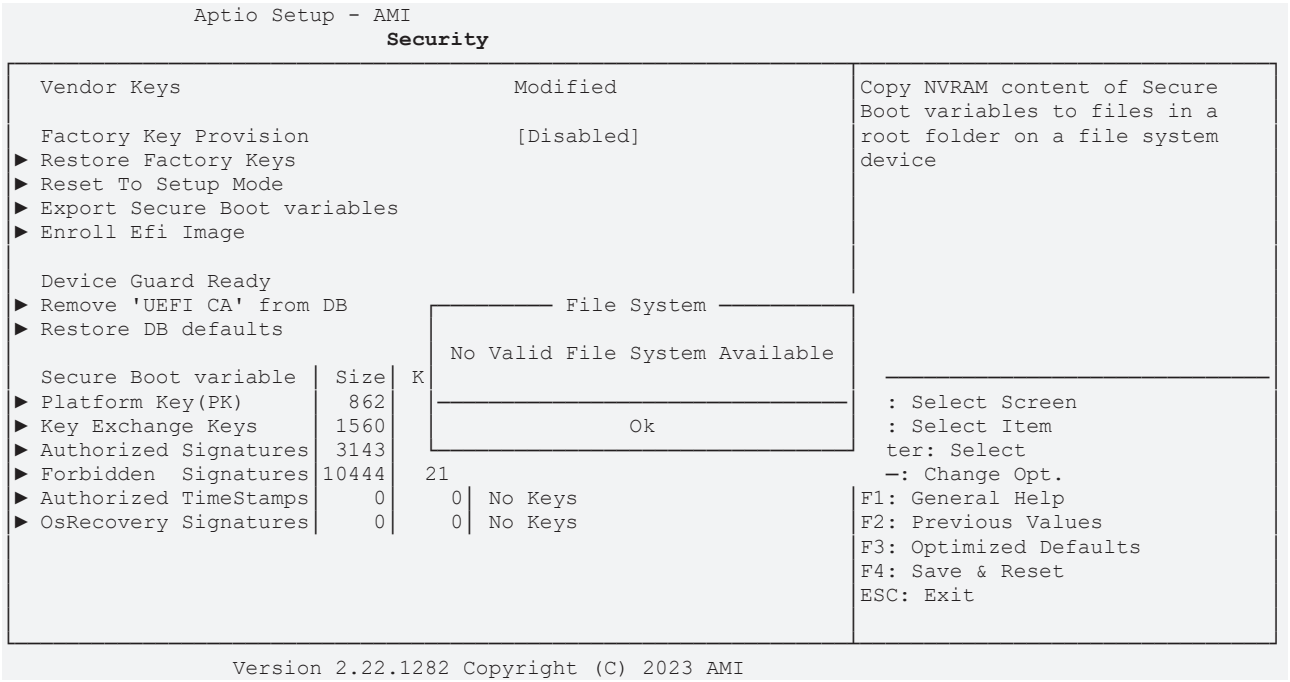
BIOS entry	Options
Vendor Keys	None
Restore To Setup Mode	See box

7.5.1.1.3 Export Secure Boot Variables



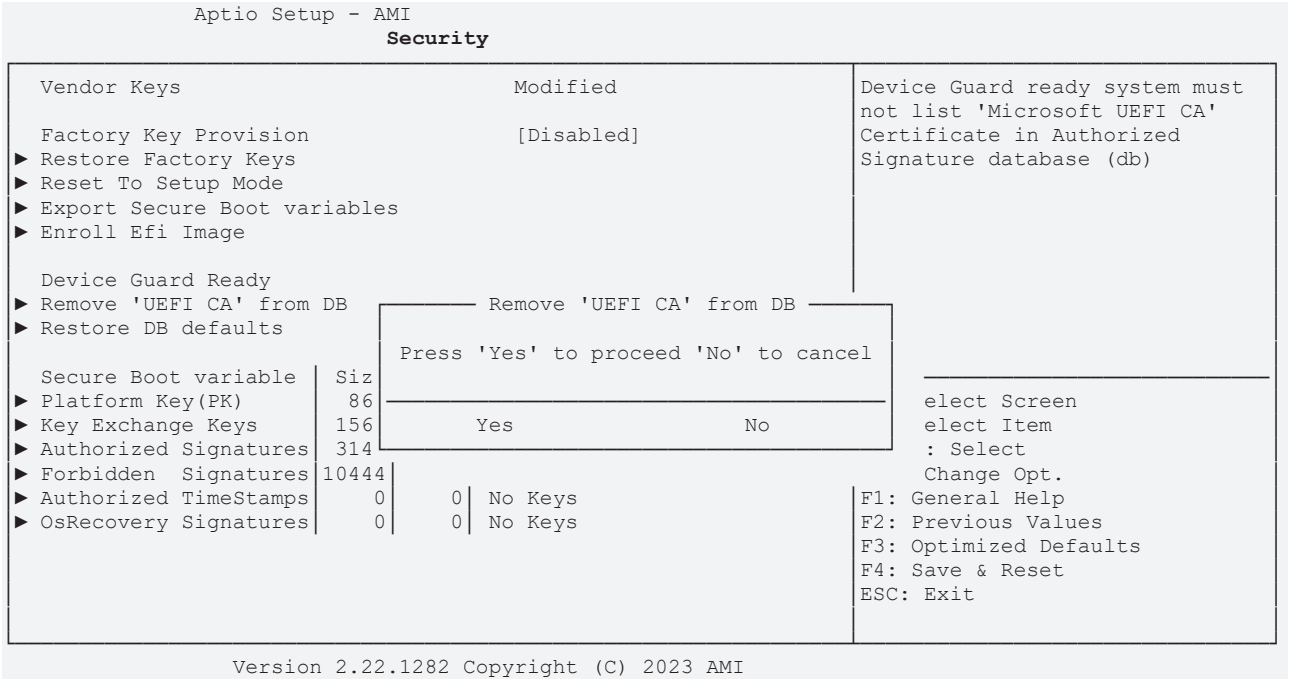
BIOS entry	Options
Vendor Keys	None
Export Secure Boot Variables	See box

7.5.1.1.4 Enroll Efi Image



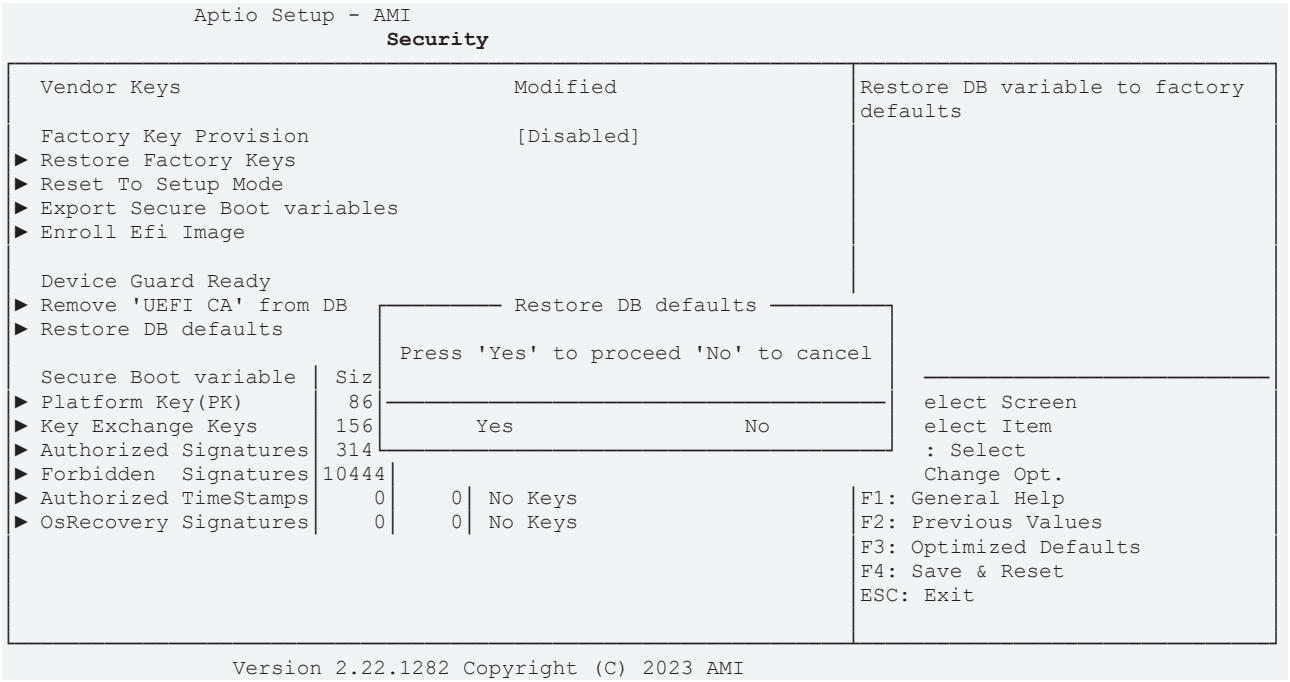
BIOS entry	Options
Vendor Keys	None
Enroll Efi Image	See box

7.5.1.1.5 Remove UEFI CA from DB



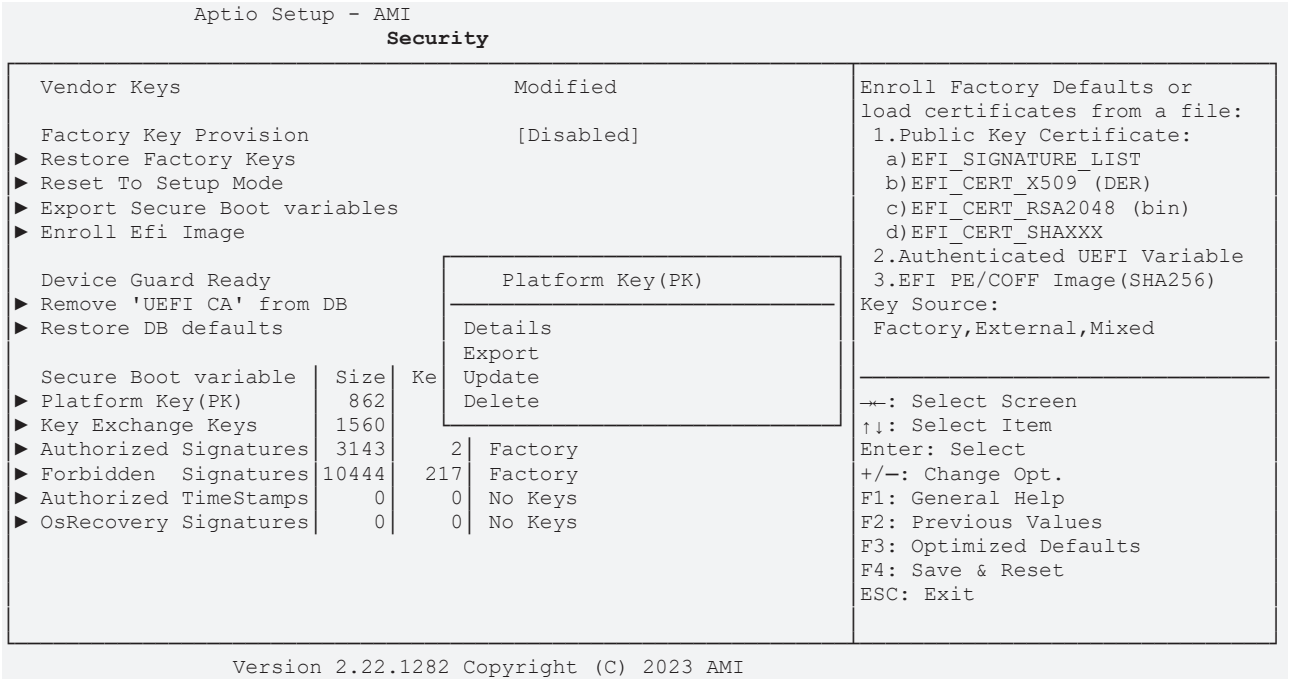
BIOS entry	Options
Vendor Keys	None
Remove ‘UEFI CA‘ from DB	See box

7.5.1.1.6 Restore DB faults



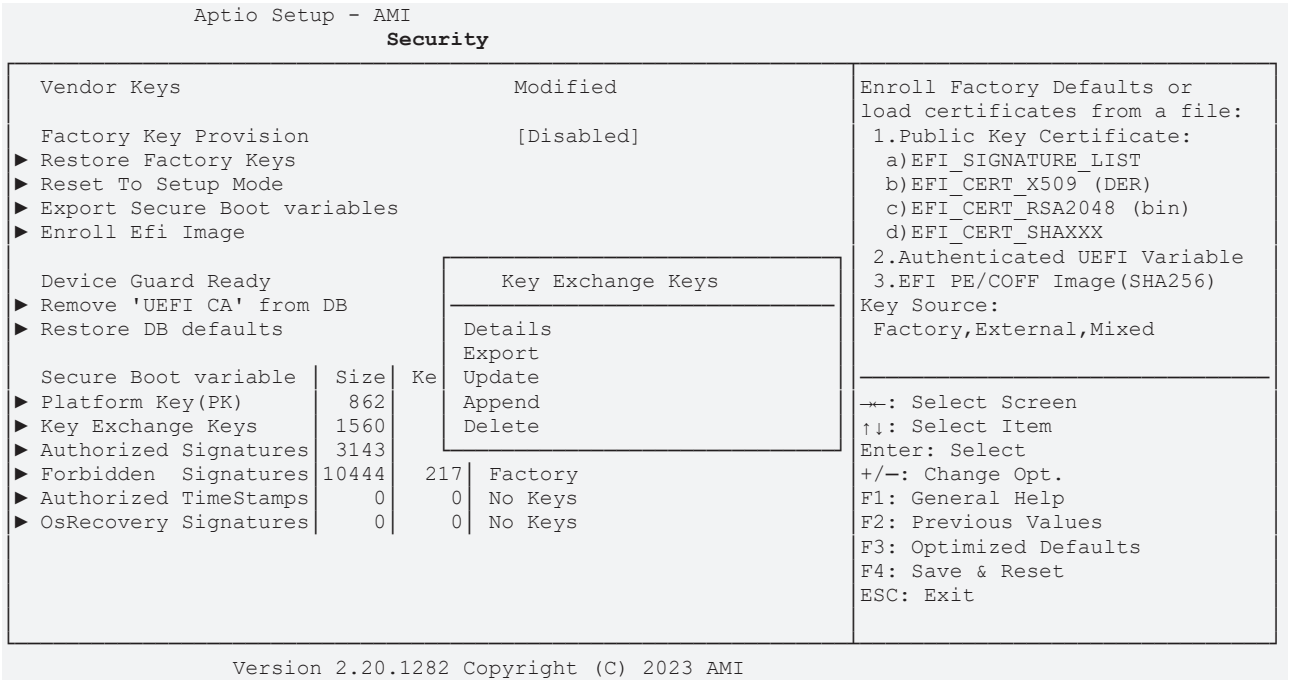
BIOS entry	Options
Vendor Keys	None
Restore DB Faults	See box

7.5.1.1.7 Platform Key (PK)



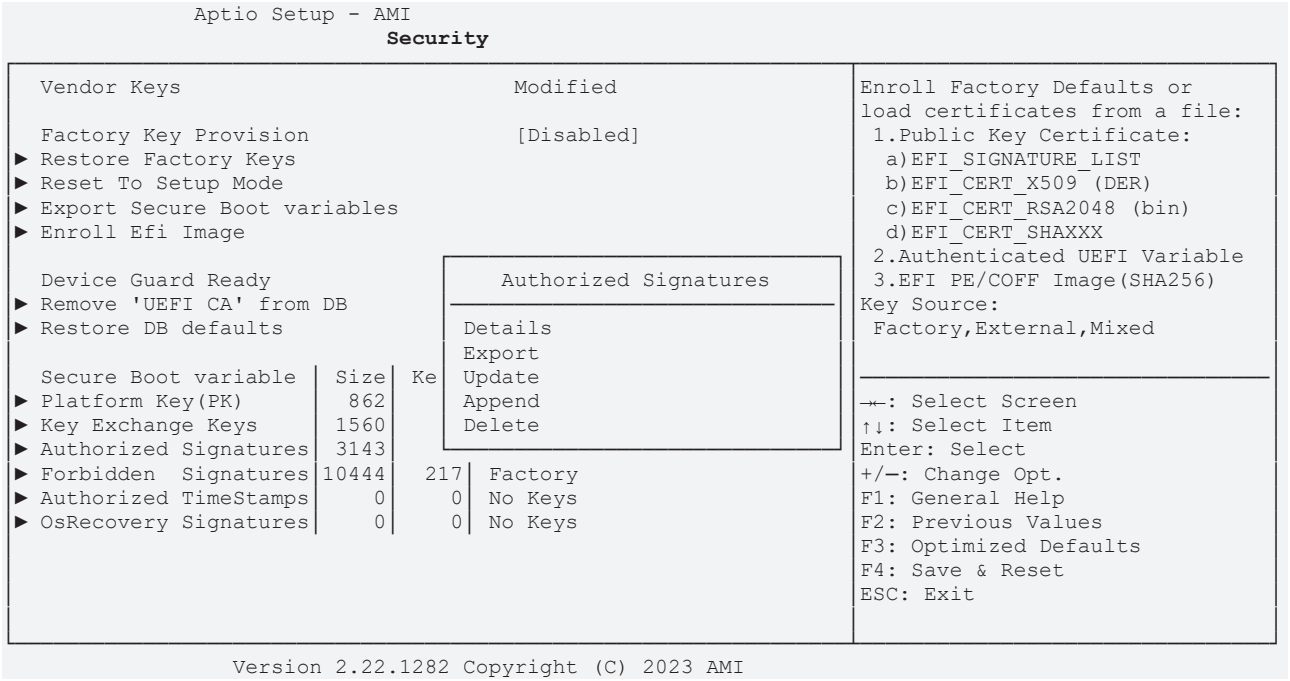
BIOS entry	Options
Vendor Keys	None
Platform Key (PK)	See box

7.5.1.1.8 Key Exchange Keys



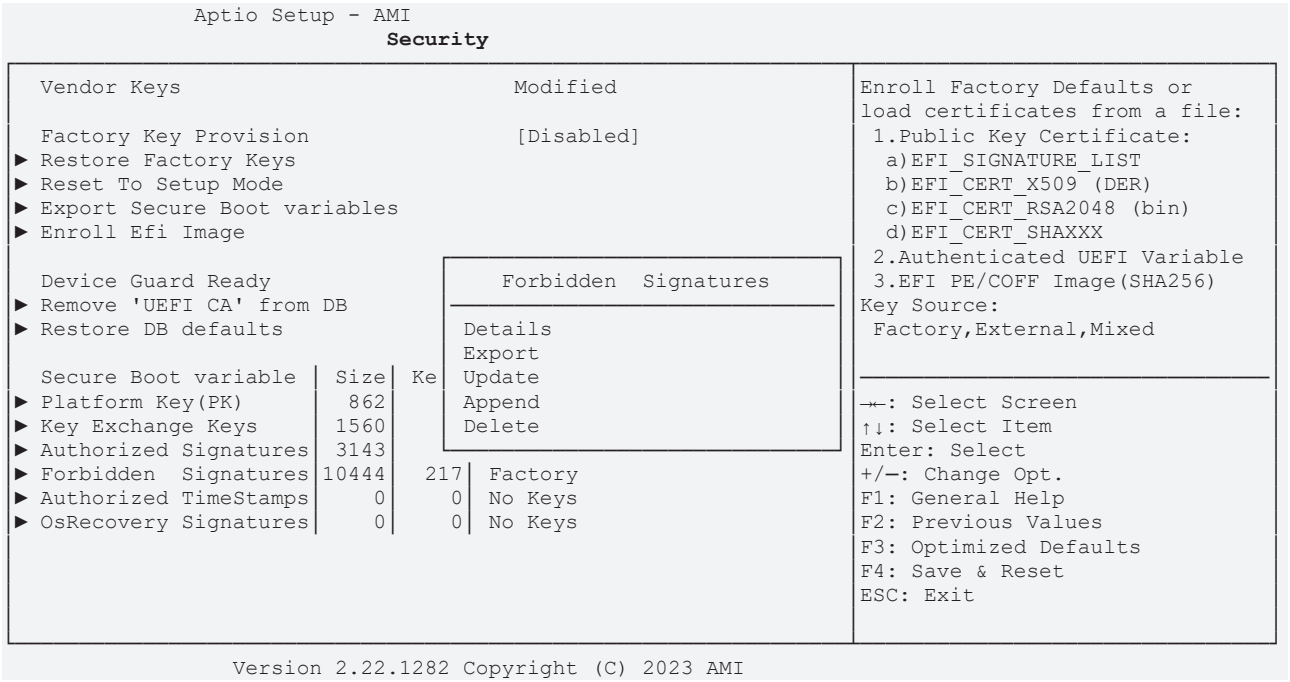
BIOS entry	Options
Vendor Keys	None
Key Exchange Keys	See box

7.5.1.1.9 Authorized Signatures



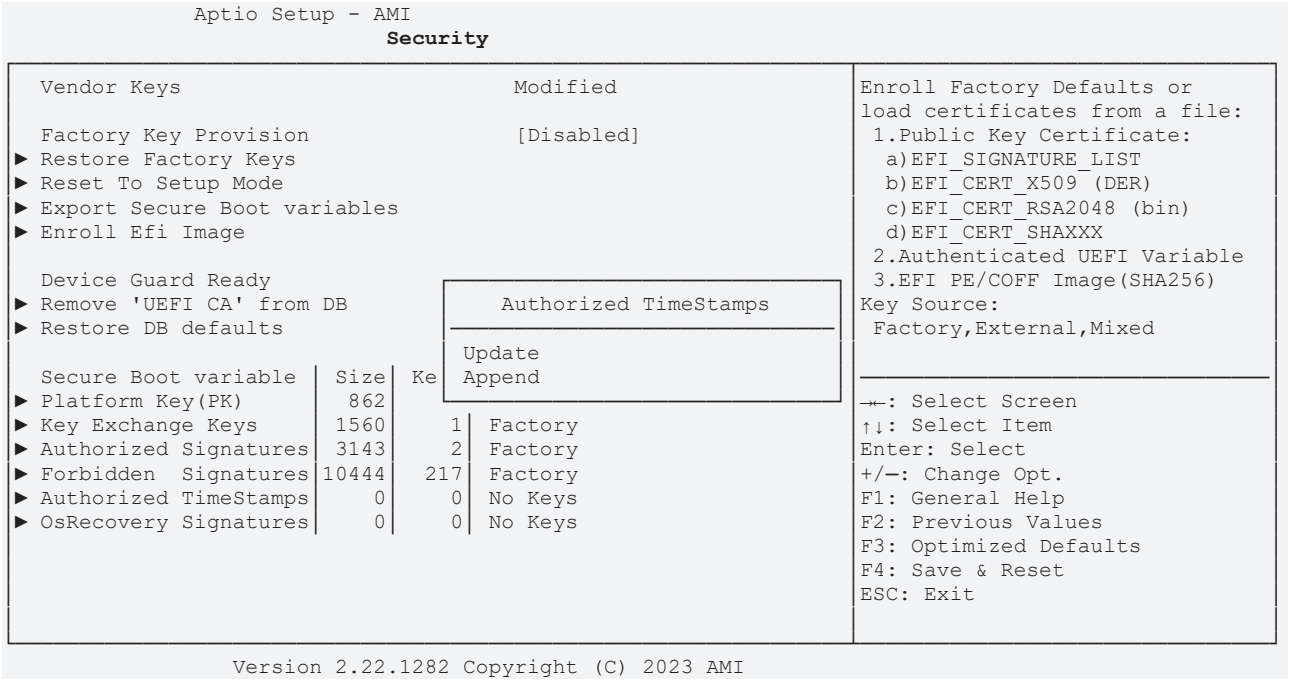
BIOS entry	Options
Vendor Keys	None
Authorized Signatures	See box

7.5.1.1.10 Forbidden Signatures



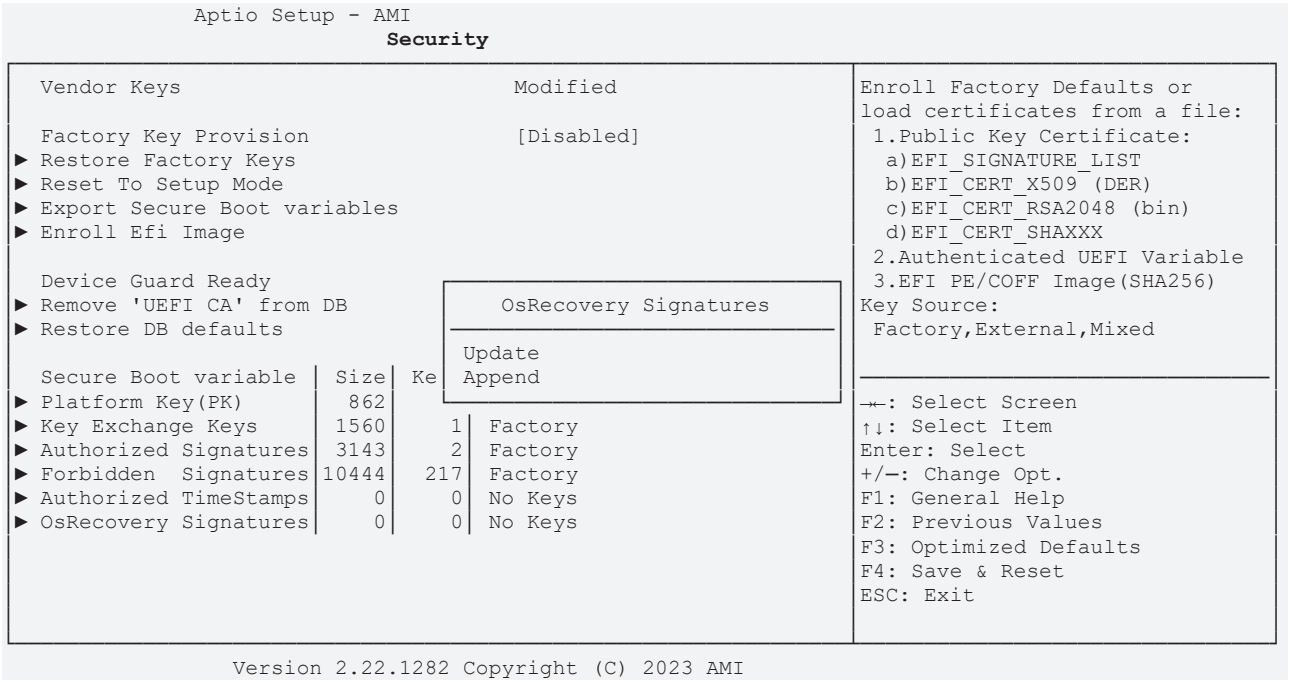
BIOS entry	Options
Vendor Keys	None
Forbidden Signatures	See box

7.5.1.1.11 Authorized TimeStamps



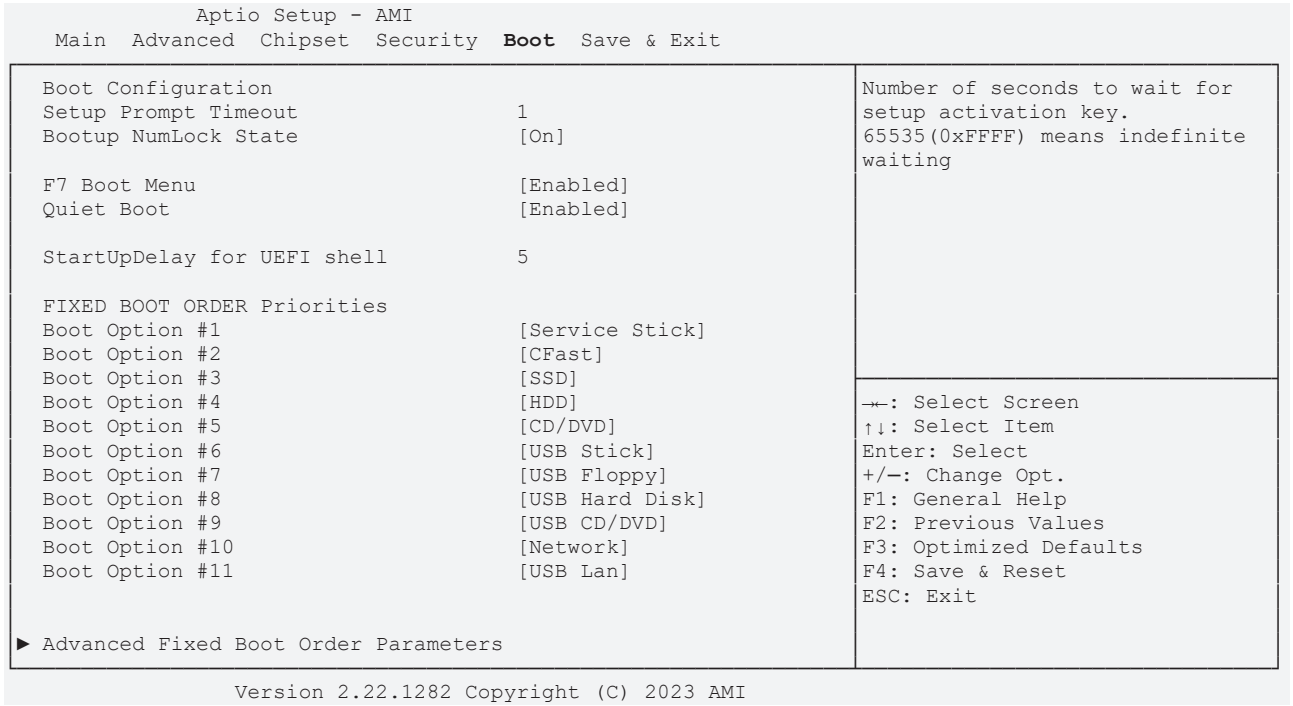
BIOS entry	Options
Vendor Keys	None
Authorized TimeStamps	See box

7.5.1.1.12 OsRecovery Signatures



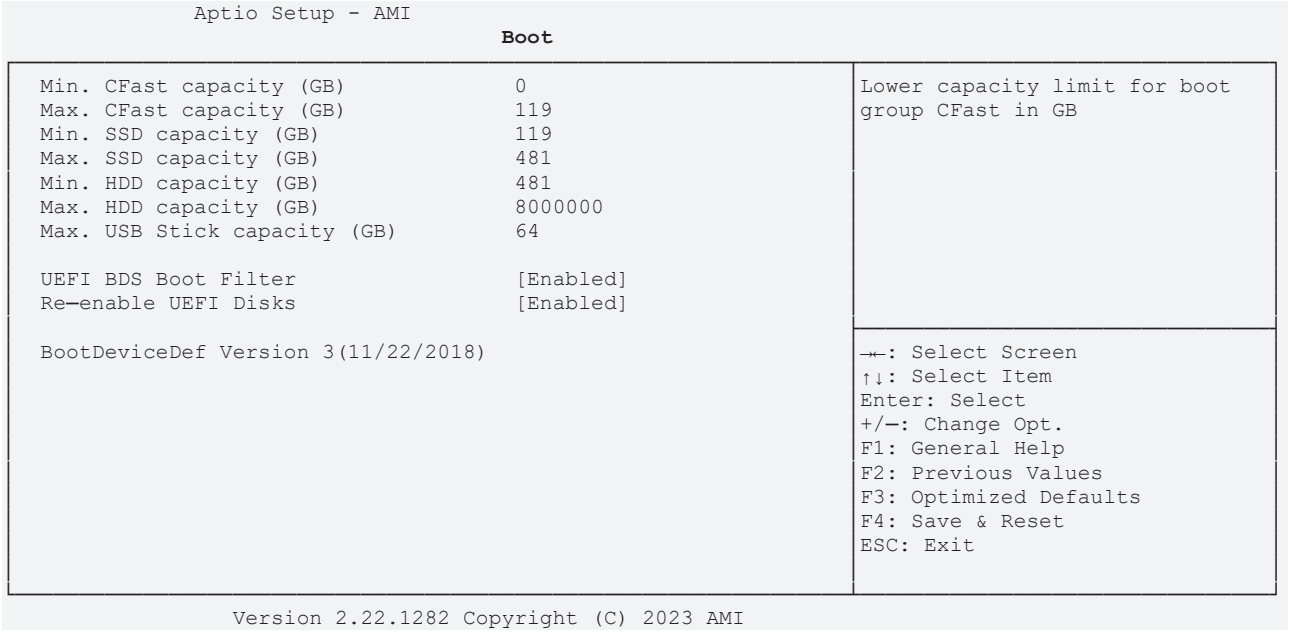
BIOS entry	Options
Vendor Keys	None
OsRecovery Signatures	See box

7.6 Boot



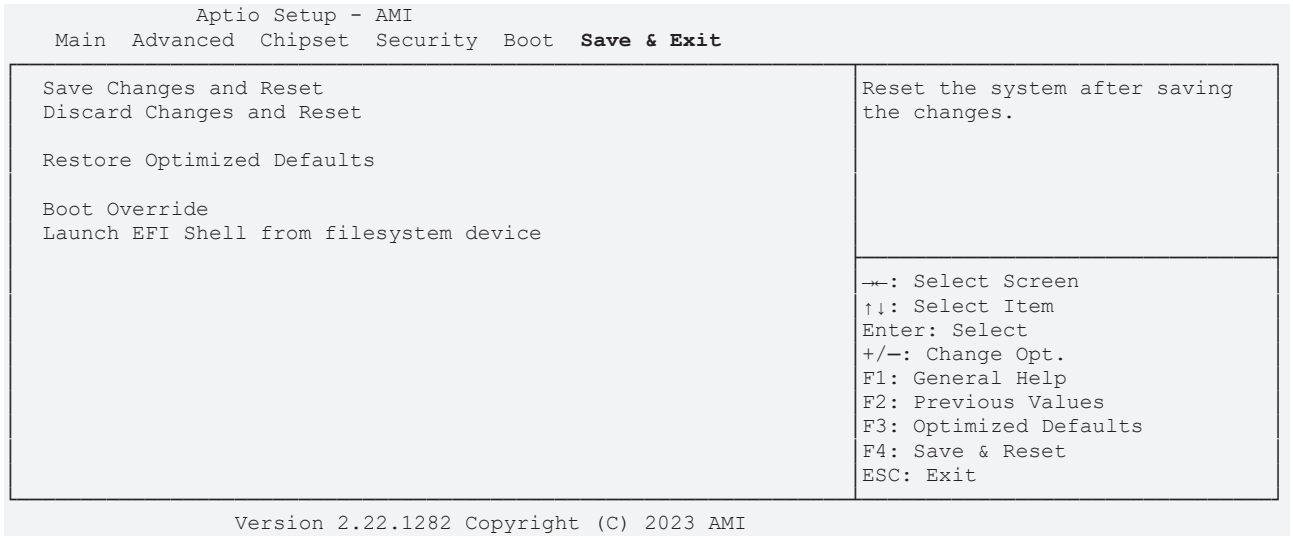
BIOS entry	Options
Boot Configuration	
Setup Prompt Timeout	None
Bootup NumLock State	On / Off
F7 Boot Menu	Disabled / Enabled
Quiet Boot	Enabled / Disabled
Fixed Boot Order Priorities	
Boot Option #1-11	Specify the order of the boot media to be used.
Advanced Fixed Boot Order Parameters	Submenu: Advanced Fixed Boot Order Parameters [▶ 79]

7.6.1 Advanced Fixed Boot Order Parameters



BIOS entry	Options
Min. CFast capacity	None
Max. CFast capacity	None
Min. SSD capacity (GB)	None
Max. SSD capacity (GB)	None
Min. HDD capacity (GB)	None
Max. HDD capacity (GB)	None
Max. USB Stick capacity (GB)	None
UEFI BDS Boot Filter	Enabled / Disabled
Re-enable UEFI Disks	Enabled / Disabled
BootDeviceDef Version 3(11/22/2018)	None

7.7 Save & Exit



BIOS entry	Options
Save Changes and Reset	Press enter key
Disacrd Changes and Reset	Press enter key
Restore Optimized Defaults	Press enter key
Boot Override	None
Launch EFI Shell from filesystem device	Press enter key

7.8 BIOS update

The "DecdFlsh" program and a bootable medium with the latest BIOS version are used if the BIOS needs to be updated. When doing this it is important to start the program from a DOS environment without a virtual memory manager such as "EMM386.EXE". If such a memory manager is loaded, the program will abort with an error message or cause a crash.

DecdFlsh is a program for the automatic updating of the BIOS on all boards with AMI-BIOS. All files contained in the zip file must be unpacked into a directory, from where

```
DecdFlsh Bios-Dateiname
```

calling takes place. The name of the BIOS file and its length are checked. The BIOS will now be programmed. DecdFlsh also exists as a UEFI tool for calling from the UEFI shell.

A running Flash procedure must never be interrupted, as otherwise the BIOS on the board will be destroyed. The Flash procedure takes about 75 seconds. The necessary firmware update takes place automatically.

Avoid damage due to incorrect update execution!

If the BIOS update is performed incorrectly, the board may become unusable. Therefore a BIOS update should only be done if the corrections / additions that the new BIOS version brings with it are really needed.

Before a planned BIOS update, it is essential to ensure that the BIOS file to be reloaded is really released for exactly this board and for exactly this board version. If an inappropriate file is used, the board will inevitably not boot afterwards.

8 Mechanical drawings

Dimensional notation

All dimensions are in mil (1 mil = 0.0254 mm). Data in square brackets are in mm.

8.1 PCB: Dimensions

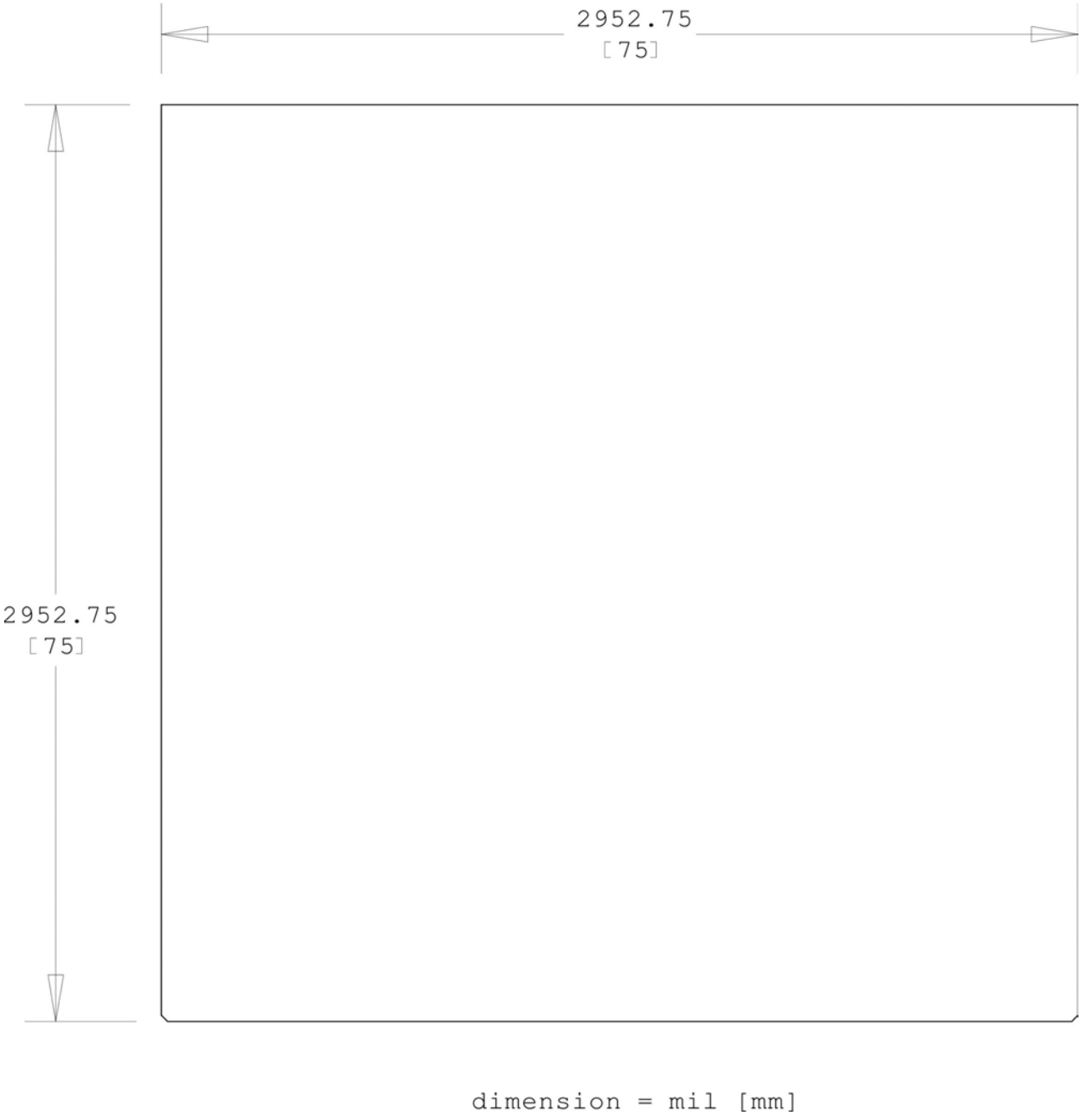


Fig. 15: CB6283 MZ

8.2 PCB: mounting holes

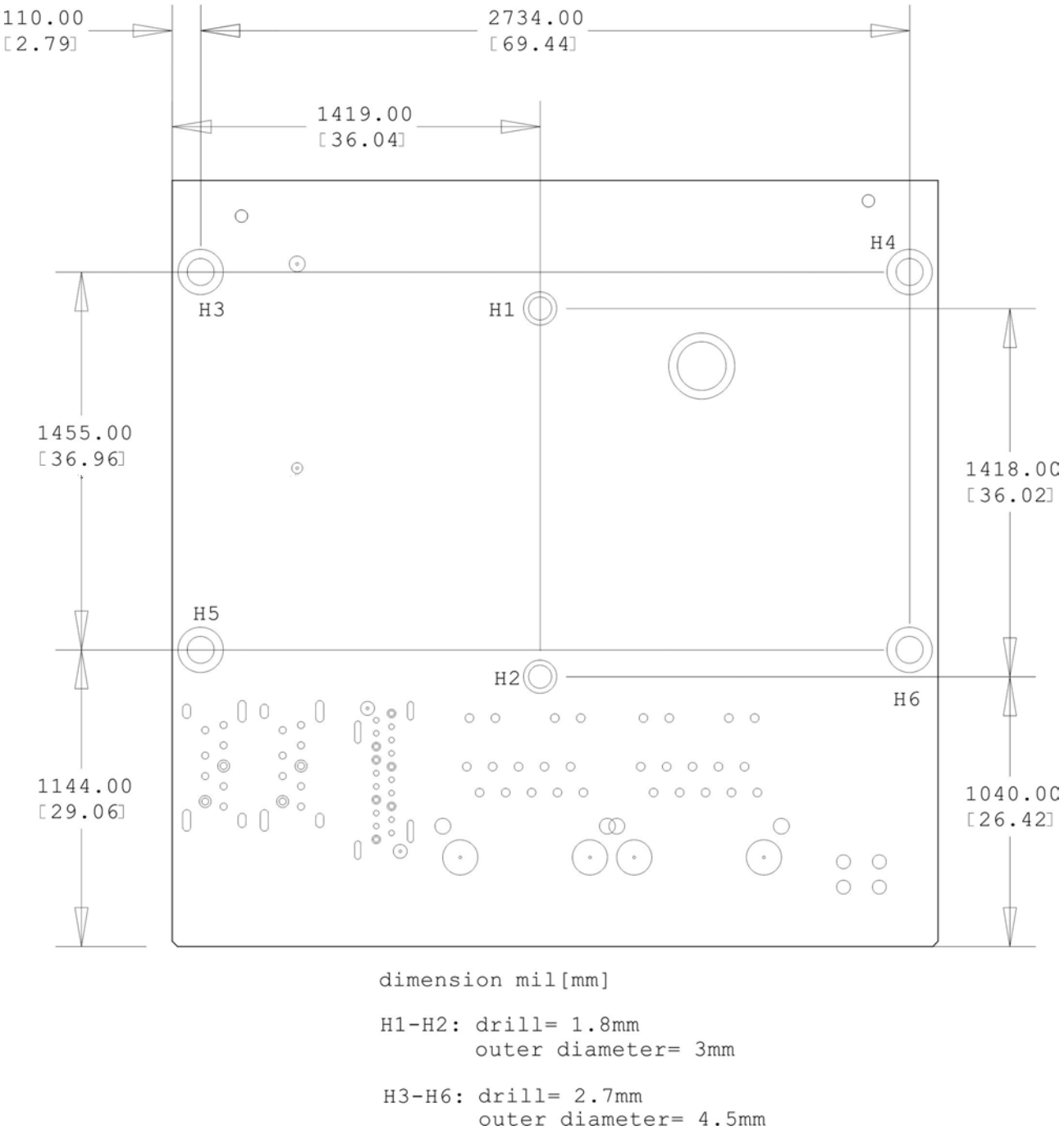


Fig. 16: CB6283 MZ MH

9 Technical data

9.1 Electrical data

Power supply	
Board	24 VDC power supply (+20 % / - 15 %)
RTC	≥3 A
Power	
Transformer	30 W continuous load 60 W peak load
Current consumption	
RTC	≤ 10 µA

9.2 Environmental conditions

Temperature range	
Operating	0 °C to +60 °C (extended temperature range on request)
Storage	-25 °C ... +85 °C
Shipping	-25 °C to +85 °C, for packed boards

Temperature changes	
Operating	0.5 °C per minute, 7.5 °C in 30 minutes
Storage	1.0 °C per minute
Shipping	1.0 °C per minute, for packed boards

Relative humidity	
Operating	5 % ... 85 % (non-condensing)
Storage	5 % ... 95 % (non-condensing)
Shipping	5 % ... 100 % (non-condensing), for packed boards

Impact	
Operating	150 m/s², 6 ms
Storage	400 m/s², 6 ms
Shipping	400 m/s², 6 ms, for packed boards

Vibrations	
Operating	10 to 58 Hz, 0.075 mm amplitude 58 to 500 Hz, 10 m/s²
Storage	5 to 9 Hz, 3.5 mm amplitude 9 to 500 Hz, 10 m/s²
Shipping	5 ... 9 Hz, 3.5 mm amplitude 9 ... 500 Hz, 10 m/s², for packed boards

Note on impact and vibration resistance

The specifications for impact and vibration resistance refer only to the motherboard itself without heat sink, memory module, cabling, etc.

9.3 Thermal specifications

The board is specified for an ambient temperature range of 0 °C to +60 °C (extended temperature range on request). In addition, care must be taken that the temperature of the processor die does not exceed 105 °C. To ensure this a suitable cooling concept must be implemented that is oriented to the maximum power consumption of the processor/chipset. It must also be ensured that any existing controllers are included in the cooling concept. The power consumption of these function blocks may be of the same order of magnitude as the power consumption of the processor.

The board is prepared with suitable holes for the use of modern cooling solutions. We have a series of compatible cooling components in our range. Your distributor will be pleased to assist you in selecting suitable solutions.

NOTICE

Do not exceed maximum die temperature!

It is the end customer's responsibility to ensure that the die temperature of the processor does not exceed 105 °C! Continuous overheating can destroy the board!

If the temperature exceeds 105 °C, the ambient temperature needs to be reduced. Ensure sufficient air circulation if necessary.

10 Appendix I: Post Codes

During the boot phase, the BIOS generates a series of status messages (so-called “POST Codes”), which can be output with the help of a suitable reading device (POST Code card). The meaning of the POST Codes is explained in the document “Aptio™ 5.x Status Codes” from American Megatrends®, which is available on the website http://www.ami.com. In addition, the following OEM POST Codes are output:

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

11 Appendix II: Resources

11.1 Interrupt

The resources used depend on the setup setting. The listed interrupts and their use are given by the AT compatibility. Exclusivity on the PCI side is neither given nor possible.

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

11.2 PCI devices

The PCI devices listed here all exist on the board, including those that are detected and configured by the BIOS. Due to the BIOS setup settings it may be the case that various PCI devices or functions of devices are not activated. If devices are disabled, the bus numbers of other devices may change as a result.

INT	REQ	Bus	Dev.	Fct.	Controller / Slot
-	-	0	0	0	Host Bridge ID0F00h
A	-	0	2	0	VGA Controller ID0F31h
A	-	0	19	0	SATA (AHCI 1.0) ID0F23h
A	-	0	20	0	XHCI Controller ID0F35h
A	-	0	27	0	HD Audio ID0F04h
A	-	0	28	0	PCI Express® Port 1 ID0F48h
B	-	0	28	1	PCI Express® Port 2 ID0F4Ah
C	-	0	28	2	PCI Express® Port 3 ID0F4ch
D	-	0	28	3	PCI Express® Port 4 ID0F4Eh
-	-	0	31	0	ISA Bridge ID0F1Ch
B	-	0	31	3	SMBus Interface ID0F12h
A	-	1	0	0	Ethernet Controller 1xID1533h
A	-	2	0	0	Ethernet Controller 1xID1533h

11.3 SMB devices

The following table lists the reserved SM-Bus device addresses in 8-bit notation.

NOTICE

These address ranges may not be used by external devices even if the component assigned in the table doesn't exist on the motherboard.

Address	Function
34-35	API access to power supply
36-39	Reserved
5C-5D	NCT7491
70-73	POST-Code Output
88-89	Slave address defined by BIOS
92-93	i210 default
A0-A7	Reserved for DDR
B0-B3	Power controller (access via BIOS-API)
B8-BB	Power controller (access via BIOS-API)

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