

BECKHOFF New Automation Technology

Manual | EN

CB8273

Computerboard in IP65/67 design



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1 Documentation issue status

Version	Changes
0.1	First preliminary version (draft)
0.2	Preliminary version with current BIOS 0.41.1; EtherCAT-P LEDs added
0.3	Preliminary version, Power-Status and PC_ON signals at the power input changed
1.0	First release version

2 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 documentation and the following notes and explanations are followed when installing and commissioning the components.

It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

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.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

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.

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents:

EP1590927, EP1789857, DE102004044764, DE102007017835

with corresponding applications or registrations in various other countries.

The TwinCAT Technology is covered, including but not limited to the following patent applications and patents:

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3 Safety instructions

Safety regulations

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

Exclusion of liability

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 & Co. KG.

Personnel qualification

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

Description of symbols

In this documentation the following symbols are used with an accompanying 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 associated with this symbol directly endangers the life and health of persons.

WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.

CAUTION

Personal injuries!


Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.

NOTE


Damage to the environment or devices

Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.

Tip or pointer

 This symbol indicates information that contributes to better understanding.

UL pointer

 This symbol indicates important information about the UL-compliant.

Intended use

The CB8273 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 regarded as inappropriate.

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

4 Notes on information security

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5 Overview

5.1 Properties

The CB8273 is designed as compact, powerful IP-65/67-motherboard. On account of its wide variety of interfaces (3 x LAN, 2 x USB, mini DisplayPort, EtherCAT-P), at least 40 GB M.2 SSD with 3D flash and integrated Intel Atom® CPU (quad-core at most) with universal multi-core support for TwinCAT3, the sturdy Industrial PC can be used for simultaneous, high-performance automation under hard real-time conditions, visualization and communication: from the classic machine controller to modern Industrie 4.0 concepts as an edge device.

The integrated EtherCAT-P connection offers undreamt-of possibilities for the direct connection of actuators and sensors via EtherCAT-P Box modules with IP 67 protection.

The compact format of the CB8273 offers the full range of functions of a motherboard for a space-saving and universally mountable industrial PC hardware and modern Industrie 4.0 concepts.

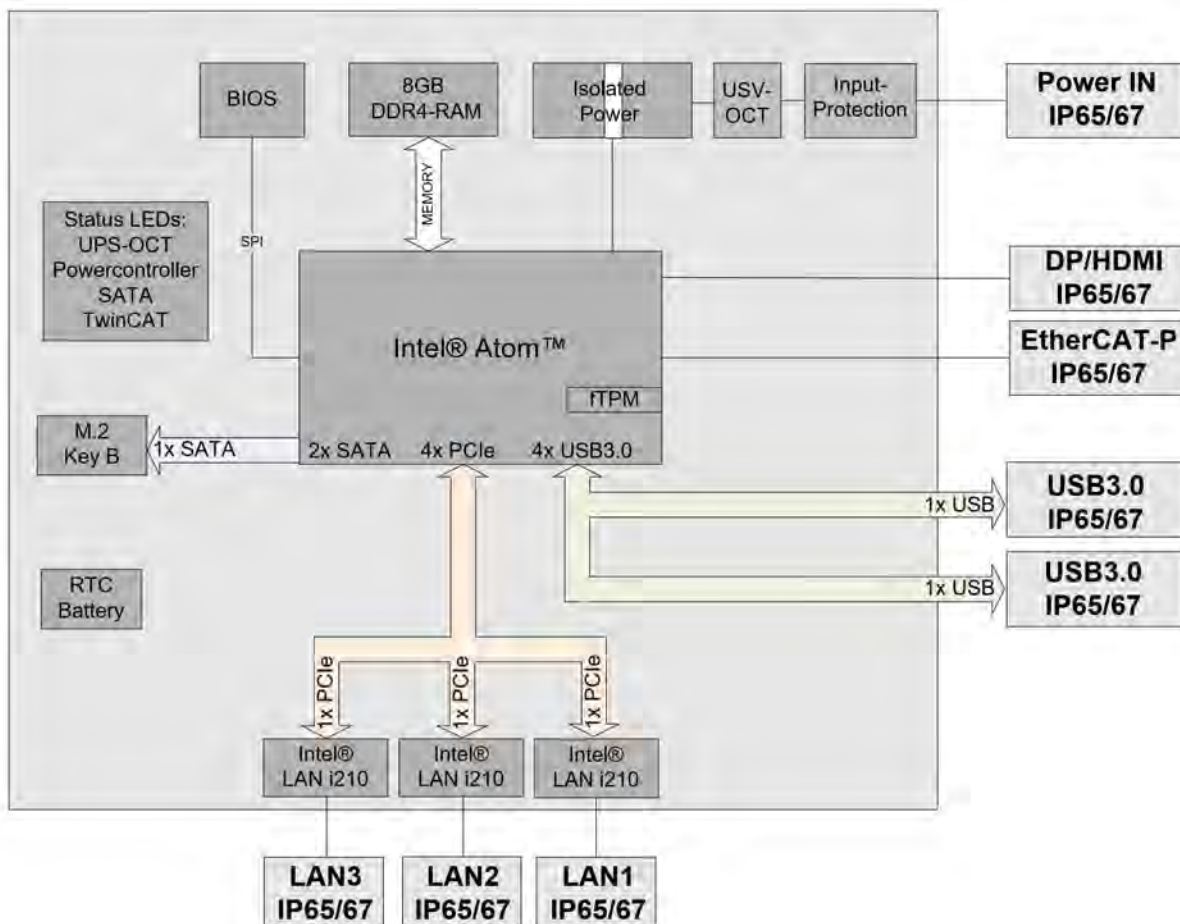


Fig. 1: CB8273 Block diagram

5.2 List of features

● Availability of the processors



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

List of features	
CB8273	135 x 75-Board
CPU	Intel® Atom™ x7-E3950 (QC, 2M, 1.6 GHz), TDP 12 W Intel® Atom™ x5-E3940 (QC, 2M, 1.6 GHz), TDP 9,5 W Intel® Atom™ x5-E3930 (DC, 2M, 1.3 GHz), TDP 6,5 W
Socket	BGA1296
Memory	OnBoard DRAM-1.1V / LPDDR4 (depending on CPU up to 2400 MHz, up to 8 GB)
I/O Front panel	1x EtherCAT-P connection 1x Power IP65/67 1x DisplayPort (connection of HDMI-adapter for HDMI-signal is possible.) 3x LAN 10/100/1000 2x USB 3.0
Internal I/O	1x M.2 (B) socket, signals depend on chipset (see M.2 2242/2280 (Key B) [▶ 22])
Graphic resolution	HDMI 1.4b: 3840x2160 @ 30 Hz DisplayPort 1.2a/eDP 1.3: 4096x2160 @ 60 Hz MIPI-DSI: 2560x1600 @ 60 Hz
RTC	CR2032 Battery (socketed)
BIOS	AMI® Aptio V
Power supply	20 V - 30 V input voltage Overvoltage- and undervoltage protection Polarity protection, UPS-OCT possible
Format	Galvanically isolated

5.3 Specifications and documents

The following documents, specifications or webpages were used for the preparation of this manual or as further technical documentation respectively.

PCI-Spezifikation

Version 2.3 bzw. 3.0

www.pcisig.com

PCI Express® Base Specification

Version 2.0

www.pcisig.com

ACPI-Spezifikation

Version 3.0

www.acpi.info

ATA/ATAPI-Spezifikation

Version 7 Rev. 1

www.t13.org

USB-Spezifikationen

www.usb.org

SM-Bus-Spezifikation

Version 2.0

www.smbus.org

Intel®-Chipbeschreibungen

Intel® Atom™ Processor E3900 Product Family datasheet

www.intel.com

Intel®-Chipbeschreibung

i210 Datasheet

www.intel.com

SMSC®-Chipbeschreibung

SCH3114 Datasheet (NDA erforderlich)

www.smsc.com

American Megatrends®

Aptio™ Text Setup Environment (TSE) User Manual

www.ami.com

American Megatrends®

Aptio™ 4.x Status Codes

www.ami.com

6 Detailed description

6.1 Power supply

The board is supplied with an isolated input voltage with a nominal rating of 24 V. In normal operation the DC/DC power rail is supplied with this voltage. A UPS can also be implemented via an OCT signal (OCT = One Cable Technology).



UPS-OCT

The UPS OCT can only be implemented with the Beckhoff CU81XX-xxxx UPS.

6.2 CPU

The processors employed are System-on-a-Chip models from Intel®. These SoCs are based on processors from the Atom™-E3900-Single-Core family, which are characterized by very low power consumption, but nevertheless offer a contemporary performance with clock rates of currently up to 2 GHz. Despite its extremely small size and low power consumption, the processor offers a second-level cache of 2 MB and familiar standard features such as SSE4.1/4.2, loadable microcode, etc.

6.3 Memory

Four permanently installed DDR4-RAM memory modules are used on the CB8273 board.

Depending on the component variant, these are 2GByte or 4GByte LPDDR4 memory variants. A clock frequency of max. 2133 MHz for the CPUs x5-E39xx and max. 2400 MHz for the CPU x7-E3950 are supported.

6.4 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 CB8273 supports M.2 modules with Key B. SATA signals that allow an SSD to be connected are led out via the interface.

7 Connections

7.1 Note on the use of cables

NOTE

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.

NOTE

Cable specification for power connector

The cables for the power connector must be selected with regard to the current consumption, line-cross section, voltage drop, cable length and surrounding.

7.2 Plug connections overview

The plug connections of the CB8273 board are summarized in the illustration below. The function of the respective plug connection can be taken from the table below the illustration, as well as the page of the manual on which further information about this connection can be read.

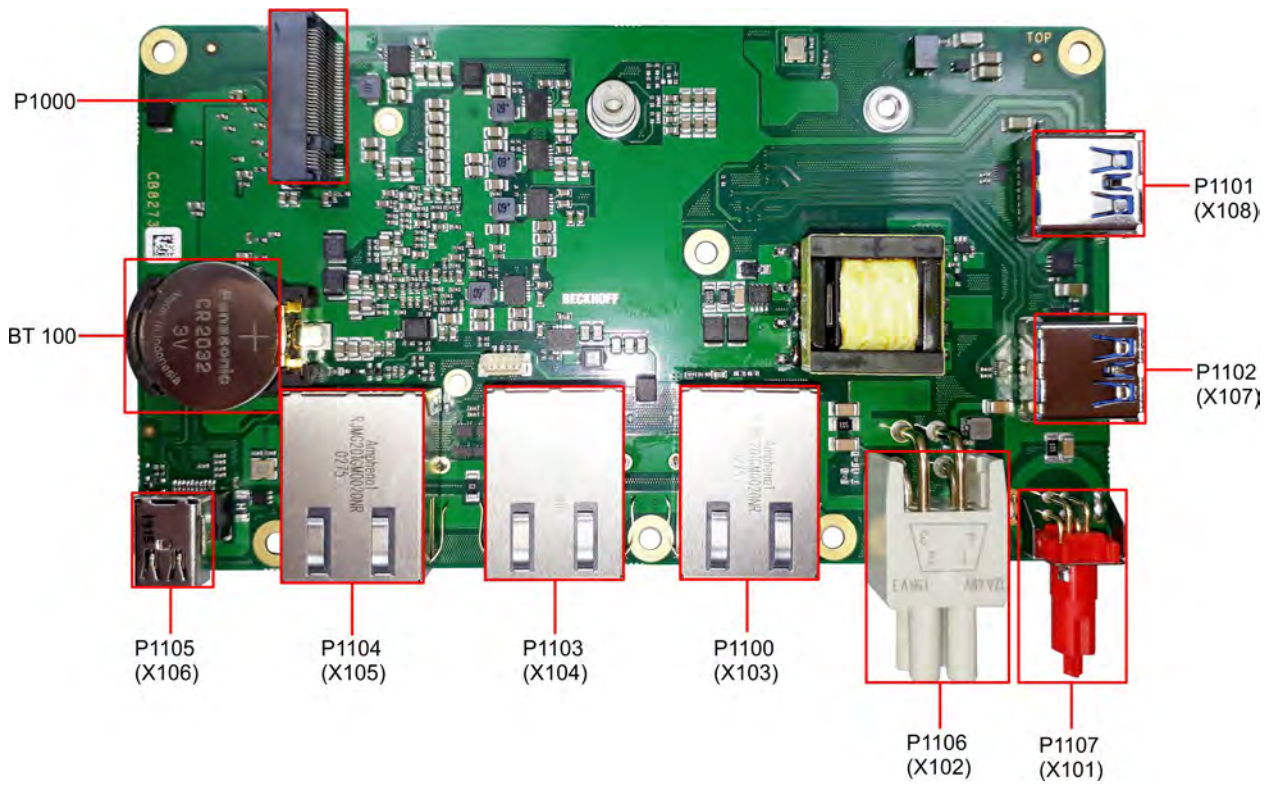


Fig. 2: CB8273 Plug connections overview

7.3 List of plug connections

Number	Function (designation)	Page
P1101	USB3.0 (X108)	USB 3.0 IP65/67 (X107, X108) [▶ 21]
P1102	USB3.0 (X107)	USB 3.0 IP65/67 (X107, X108) [▶ 21]
P1107	EtherCAT P(X101)	EtherCAT-P IP65/67 (X101) [▶ 17]
P1106	Vin/SUSV (X102)	Power supply connection IP65/67(X102) [▶ 18]
P1100	LAN 1 (X103)	LAN IP65/67 (X102, X103, X105) [▶ 19]
P1103	LAN 1 (X104)	LAN IP65/67 (X102, X103, X105) [▶ 19]
P1104	LAN 2 (X105)	LAN IP65/67 (X102, X103, X105) [▶ 19]
P1105	DisplayPort (X106)	Mini DisplayPort (X106) [▶ 20]
BT100	BT100	Battery [▶ 25]
P1000	M.2 socket	M.2 2242/2280 (Key B) [▶ 22]



The numbers in brackets correspond to the labeling of the external interfaces on the housing on the front panel of the Industrial PC.



Order of plug connections

The plug connections are listed clockwise, starting with port P1101 (USB3.0).

7.4 External plug connections

7.4.1 EtherCAT-P IP65/67 (X101)

EtherCAT-P (EtherCAT + Power) is an extension of the EtherCAT technology in the field of cabling. This connector in IP 65/67 design allows you to use the four-core Ethernet cable (according to IP65/67) for data, and for two galvanically isolated, individually switchable 24 V/3 A supplies. So you can cascade several EtherCAT devices. For connection and power supply of I/O and field devices you only need one cable.



Fig. 3: P1107 EtherCAT-P connection M8 (X101)

Pin assignment EtherCAT-P-connection IP65/67		
Pin	Signal	Description
1	LAN41+	LAN-signal + and ground
2	LAN40 +	LAN-signal + and ground
3	LAN40 -	LAN-signal - and supply voltage 24 V
4	LAN41 -	LAN-Signal - and supply voltage 24 V

7.4.2 Power supply connection IP65/67(X102)

The connection for the power supply is implemented as a 2x2-pin housing plug in IP65/67 design. The main power supply (24 V) for the module is on pin 1.

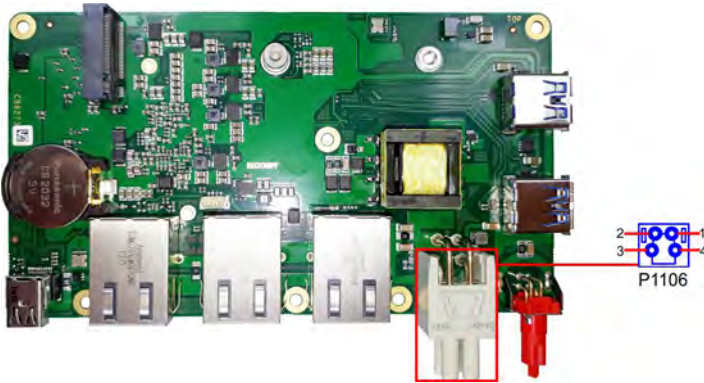


Fig. 4: P1106 Power supply connection IP65/67 (X102)

● 90° plug

i 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 the power supply connection					
Description	Signal	Pin	Pin	Signal	Description
24 V supply voltage	Vin	2	1	GND	Ground
Power-Status: Output of the power-status. The voltage corresponds to the positive supply voltage and can be loaded with 1 A. Low (0 V): PC is off. High (Vin): PC is on.	Power-Status	3	4	PC_ON	PC_ON: Input for start and shut down the PC. Low (0 V or open contact): PC starts. High (>3 V): PC shuts down.

● Function restrictions PC_On switch

i 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.

7.4.3 LAN IP65/67 (X102, X103, X105)

The board has three Gigabit-LAN connections in IP65/67 design. Network components compatible with 10BaseT, 100BaseT and 1000BaseT can be connected to all of them. The required speed is selected automatically. Auto-Cross and Auto-Negotiate are available as well as PXE and RPL functionality. Controller is Intel®'s i210.

i 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).

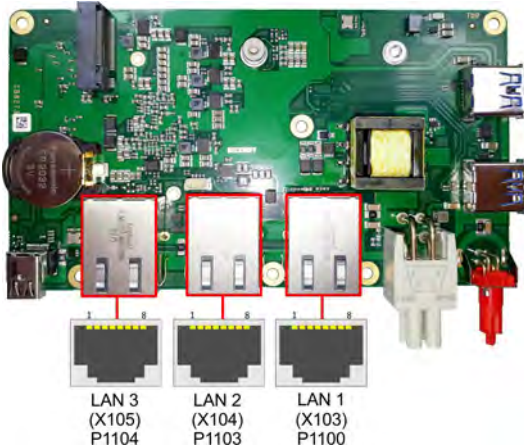


Fig. 5: P1100-P1104 LAN IP65/67 (X103-X105)

Pin assignment of LAN connection		
Pin	Name	Description
1	LAN-0	LAN line 0 +
2	LAN-0#	LAN line 0 -
3	LAN-1	LAN line 1 +
4	LAN-2	LAN line 2 +
5	LAN-2#	LAN line 2 -
6	LAN-1#	LAN line 1 -
7	LAN-3	LAN line 3 +
8	LAN-3#	LAN line 3 -

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

Right-hand LED Permanent with connection, Flashing during data transmission	Left-hand LED Permanent during data transmission	Mbit/s
Green	Green	1000
Green	Orange	100
Green	None	10

7.4.4 Mini DisplayPort (X106)

The board has a Mini DisplayPort in IP65/67 design.

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**

i 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).

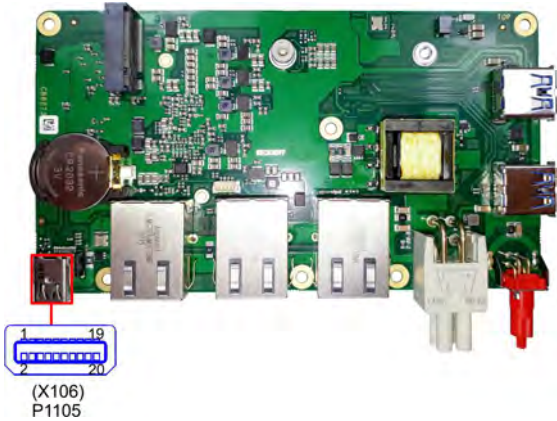


Fig. 6: P1105 Mini DisplayPort IP 65/67 (X106)

Pin assignment of DisplayPort plug					
Description	Signal	Pin		Signal	Description
DisplayPort Lane 0 +	L0	1	2	GND	Ground
DisplayPort Lane 0 -	L#0	3	4	L1	Line 1 plus
Ground	GND	5	6	L#1	Line 1 minus
Line 2 plus	L2	7	8	GND	Ground
Line 2 minus	L#2	9	10	L3	Line 3 plus
Ground	GND	11	12	L#3	Line 3 minus
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	3.3 V supply voltage

● **Switching to HDMI**

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

7.4.5 USB 3.0 IP65/67 (X107, X108)

USB channel 1 and 2 are made available via a standard USB plug connector in IP65/67 design.

These USB channels support the USB 3.0 specification. Contrary to the specification, the USB 3.0 channel only supplies current up to 500 mA. Devices with their own current supply must be used for higher power demands. The USB interfaces are electronically fused.

All necessary settings for USB can be made in the BIOS. This applies to both USB interfaces. Note that the "USB mouse and keyboard" function in the BIOS setup is only required if the operating system does not offer 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. 7: P1101-P1102-USB3.0 IP65/67

Pin assignment of USB 3.0 connector		
Pin	Signal	Description
1	VCC	5 V supply voltage
2	D-	Data - (USB 2.0)
3	D+	Data + (USB 2.0)
4	GND	Ground
5	RX-	Receive lane - (USB 3.0)
6	RX+	Receive lane + (USB 3.0)
7	GND	Ground
8	TX-	Transmit lane - (USB 3.0)
9	TX+	Transmit lane + (USB 3.0)

7.5 Internal plug connections

7.5.1 M.2 2242/2280 (Key B)

The CB8273 is equipped with a M.2 socket, into which a M.2 2242/2280 card (Key B) can be inserted. SATA signals (up to 3 Gb/s), which enable the connection of a M.2-SSD card, are fed out via this socket.



Fig. 8: P1000 - M.2 2242/2280 KeyB

Pin assignment of M.2 2242/2280 connector					
Description	Signal	Pin		Signal	Description
Configuration pin	CFG3	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 Channel2 Data +	USB_D+	7	8	WDISABLE#	(not led out)
USB Channel2 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	CFG0	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)
(not led out)	REFCLK#	53	54	PEWAKE#	(not led out)
(not led out)	REFCLK	55	56	N/C1	(not led out)
Ground	GND	57	58	N/C2	(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)
Power good	RESET#	67	68	SUSCLK	Suspend clock

Pin assignment of M.2 2242/2280 connector					
Description	Signal	Pin		Signal	Description
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			

7.5.2 Battery

The board is delivered with a CR2032 battery holder (socketed) including a 3 V battery.

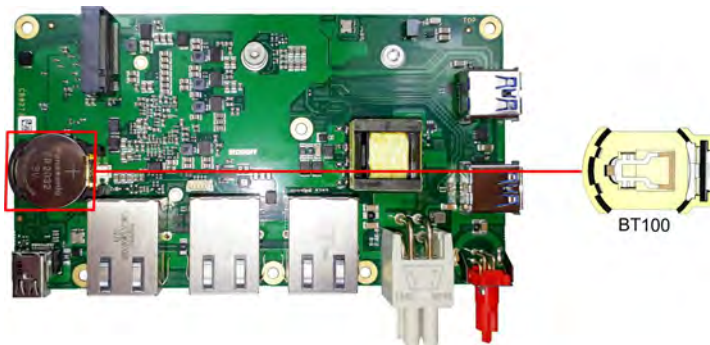


Fig. 9: BT100 - Battery holder

i 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.

8 LEDs

The LEDs for the status messages of the CB8273 motherboard are provided on the LED board C9900-A083. This is screwed onto the housing cover. The connection to the board is made with a cable via the 4-pin connector (P100). The power supply of the board is 3.3 V.

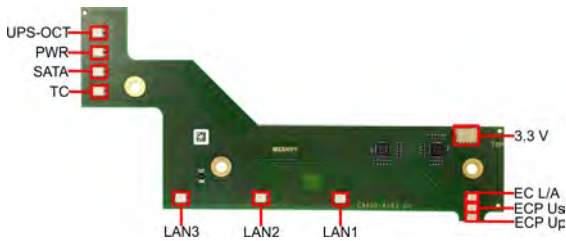


Fig. 10: LED-Card

8.1 LED: UPS-OCT

The RGB LED indicates by means of colors and flashing intervals the transmission quality of the UPS-OCT signals

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

If the LED does not light up, no UPS-OCT is connected.

● Adaptation of the status codes

i 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.

8.2 LED: PWR (D100)

The RGB LED indicates by means of colors and flashing intervals the status messages of the power controller.

Color	Interval	Meaning
None	Steadily lit	PC is off / System in error state
White	Steadily lit	Power fail
Cyan	Steadily lit	Reserved
Magenta	Steadily lit	S UPS active (if existent)
Blue	Steadily lit	Reserved
Yellow	Steadily lit	S5 state, Windows shut down, supply voltage still present
Green	Steadily lit	S0 state, normal operation
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, normal operation
Yellow	Flashing (3 s)	S3 state
Magenta	Flashing (0.5 s)	S UPS capacitance test (if S UPS exists)
Red/magenta	Flashing	Checksum error during the I ² C transmission in the bootloader

A steadily lit red LED can indicate a hardware error.

8.3 LED: SATA (D106)

The RGB LED indicates the hard disk activity.

Color	Interval	Meaning
Red	Flashing	Activity (access)

8.4 LED: TwinCAT (D104)

The RGB LED indicates by means of colors and flashing intervals the status messages for the TwinCAT.

Color	Interval	Meaning
Green	Steadily lit	TwinCAT Run Mode
Blue	Steadily lit	TwinCAT Config Mode
Red	Steadily lit	TwinCAT Stop
-	-	TwinCAT not started

i 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.

8.5 LED: LAN 1 – LAN 3 (D101, D103, D105)

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

Right-hand LED Permanent with connection Flashing during data transmission	Left-hand LED Permanent during data transmission	Mbit/s
Green	Green	1000
Green	Orange	100
Green	None	10

8.6 EtherCAT-P LEDs

These LED show the various status of the EtherCAT-P connection.

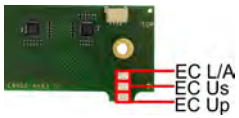


Fig. 11: EtherCAT-P LEDs

LED	Interval	Meaning
EC L/A	Green on	Connection to network
	Green flashing	Data transmission in progress
EC U _s	Green on	System voltage in normal range (24 V)
	Red on	System voltage outside normal range
EC U _p	Green on	Peripheral voltage in normal range (24 V)
	Red on	Peripheral voltage outside normal range

8.7 Supply voltage LED card

The LED card is supplied with a voltage of 3.3 V via a 4-pin plug.

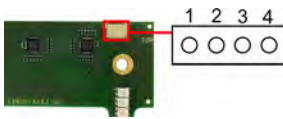


Fig. 12: Supply voltage LED-card

Pin assignment supply voltage connector plug		
Pin	Name	Description
1	3,3V	Voltage 3,3 V +
2	SCLK	Serial Clock Signal
3	SDAT	Serial DATA Signal
4	GND	Ground

9 BIOS

9.1 Using the setup

Within the individual setup pages the last saved settings can be restored 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.

9.2 Main CB8273

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Main Advanced Chipset Security Boot Save & Exit

<pre> Board Information Board CB8273 Revision 3 Bios Version 0.41.1 Platform Information Intel(R) Atom(TM) Processor E3930 @ 1.30GHz CPU Signature 506CA CPU Stepping F1 Microcode Patch 1A MRC Version 0.56 PMC FW 03.20 TXE FW 3.1.75.2351 GOP 10.0.1038 Memory Information Total Memory 4096 MB Memory Speed 2133 MHz System Date [Wed 01/01/2020] System Time [03:03:08] </pre>	<p>Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 2005-2099 Months: 1-12 Days: dependent on month</p> <hr/> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
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Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.

Bios-Entry	Options
Board	None
Revision	None
Bios Version	None
Platform Information	
Intel®Atom™ Processor E3930 @ 1.30GHz	
CPU Signature	None
CPU Stepping	None
Microcode Patch	None
MRC Version	None
PMC FW	None
TXE FW	None
GOP	None
Memory Information	
Total Memory	None
Memory Speed	None
System Date	Set here the system date.
System Time	Set here the system time.

9.3 Advanced CB8273

Aptio Setup Utility -Copyright (C) 2020 American Megatrends, Inc.
 Main **Advanced** Chipset Security Boot Save & Exit

<pre> Power-Supply Type [ATX] SoftOff on Overheat [Disabled] Show postcode on screen [Disabled] ▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX ▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX ▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX ▶ Driver Health ▶ Trusted Computing ▶ ACPI Settings ▶ Hardware Monitor ▶ CPU Configuration ▶ AMI Graphic Output Protocol Policy ▶ PCI Subsystem Settings ▶ USB Configuration ▶ Network Stack Configuration ▶ Power Controller Options ▶ NVMe Configuration ▶ SATA Configuration ▶ Miscellaneous Configuration ▶ System Component </pre>	<pre> Select the Type of the Power Supply: AT/ATX </pre> <hr/> <pre> ←→: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit </pre>
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Bios-Entry	Options
Advanced	
Power-Supply Type [ATX]	ATX/AT
SoftOff on Overheat [Disabled]	Disabled/Enabled
Show postcode on screen [Disabled]	Disabled/Enabled
▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX	Submenu: see NIC Configuration 1 [▶ 35]
▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX	Submenu: see NIC Configuration 2 [▶ 36]
▶ Intel(R) I210 Gigabit Network Connection - 00:01:05:XX:XX:XX	Submenu: see NIC Configuration 3 [▶ 37]
▶ Driver Health	Submenu: see Driver Health [▶ 38]
▶ Trusted Computing	Submenu: see Trusted Computing [▶ 38]
▶ ACPI Settings	Enabled/Disabled
▶ Hardware Monitor	Submenu: see Hardware Monitor [▶ 39]
▶ CPU Configuration	Submenu: see CPU Configuration [▶ 40]
▶ AMI Graphic Output Protocol Policy	Submenu: see AMI Graphic Output Protocol Policy [▶ 42]
▶ PCI Subsystem Settings	Submenu: see PCI Subsystem Settings [▶ 43]
▶ USB Configuration	Submenu: see USB Configuration [▶ 45]
▶ Network Stack Configuration	Disabled/Enabled
▶ Power Controller Options	Submenu: see Power Controller Options [▶ 47]
▶ NVMe Configuration	No NVME Device Found
▶ SATA Configuration	Submenu: see SATA Configuration [▶ 49]
▶ Miscellaneous Configuration	Submenu: see Miscellaneous Configuration [▶ 51]
▶ System Component	Submenu: see System Component [▶ 51]

● Mac address



The Mac address is made up of the fixed Beckhof part 00:01:05 and the board-specific part XX: XX: XX.

9.3.2 NIC Configuration 2

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Advanced

<p>▶ NIC Configuration</p> <p>Blink LEDs 0</p> <p>UEFI Driver Intel(R) PRO/1000 Ope...</p> <p>Adapter PBA 000300 00</p> <p>Device Name Intel(R) I210 Gigabit...</p> <p>Chip Type Intel i210</p> <p>PCI Device ID 157B</p> <p>PCI Address 02:00:00</p> <p>Link Status [Disconnected]</p> <p>MAC Address 00:01:05:XX:XX:XX</p>	<p>Click to configure the network device port.</p> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
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Bios-Entry	Options
▶ NIC Configuration	Link Speed Input
Blink LEDs	None
UEFI Driver	None
Adapter PBA	None
Device Name	None
Chip Type	None
PCI Device ID	None
PCI Address	None
Link Status	None
MAC Address	None

9.3.4 Driver Health

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Advanced

Intel(R) PRO/1000 Open Source 8.3.10 PCI E Healthy	Provides Health Status for the Drivers/Controllers
	←: Select Screen ↑↓: Select Item Enter: Select +/ : Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.

Bios-Entry	Options
Intel(R) PRO/1000 Open Source 8.3.10 PCI-E	None

9.3.5 Trusted Computing

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Advanced

Configuration Security Device Support [Disable] NO Security Device Found	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
	↑↓: Select Screen ←: Select Item Enter: Select +/ : Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.

Bios-Entry	Options
Configuration	
Security Device Support	Enable/Disable
NO Security Device Found	None

9.3.6 ACPI Settings

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Advanced

ACPI Settings Enable ACPI Auto Configuration [Enabled]	Enables or Disables BIOS ACPI Auto Configuration. ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
ACPI Settings	
Enable ACPI Auto Configuration	Enabled / Disabled

9.3.7 Hardware Monitor

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Advanced

Pc Health Status CPU dig. : +62 'C MB Temp : +57 'C 5V : +5.10 V 1.05V : +1.02 V VCCCORE : +0.82 V 12 V : +12.37 V VBATT : N/A 3.3V : +3.30 V FAN 1 : N/A FAN 2 : N/A FAN 3 : N/A SIO Temp : +47 'C Memory Temp : +58 'C	←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Pc Health Status	None

9.3.8 CPU Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Advanced

<p>CPU Configuration</p> <ul style="list-style-type: none"> ▶ Socket 0 CPU Information <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 35%;">Speed</td> <td style="width: 30%;">1600 MHz</td> <td style="width: 35%;"></td> </tr> <tr> <td>64-bit</td> <td>Supported</td> <td></td> </tr> </table> ▶ CPU Power Management <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 35%;">Active Processor Cores</td> <td style="width: 30%;">[Disabled]</td> <td style="width: 35%;"></td> </tr> <tr> <td>Intel Virtualization Technology</td> <td>[Enabled]</td> <td></td> </tr> <tr> <td>VT-d</td> <td>[Disabled]</td> <td></td> </tr> <tr> <td>Bi-directional PROCHOT</td> <td>[Enabled]</td> <td></td> </tr> <tr> <td>Thermal Monitor</td> <td>[Enabled]</td> <td></td> </tr> <tr> <td>Monitor Mwait</td> <td>[Auto]</td> <td></td> </tr> <tr> <td>DTS</td> <td>[Disabled]</td> <td></td> </tr> </table> 	Speed	1600 MHz		64-bit	Supported		Active Processor Cores	[Disabled]		Intel Virtualization Technology	[Enabled]		VT-d	[Disabled]		Bi-directional PROCHOT	[Enabled]		Thermal Monitor	[Enabled]		Monitor Mwait	[Auto]		DTS	[Disabled]		<p>Socket specific CPU Information</p> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
Speed	1600 MHz																											
64-bit	Supported																											
Active Processor Cores	[Disabled]																											
Intel Virtualization Technology	[Enabled]																											
VT-d	[Disabled]																											
Bi-directional PROCHOT	[Enabled]																											
Thermal Monitor	[Enabled]																											
Monitor Mwait	[Auto]																											
DTS	[Disabled]																											

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Bios-Entry	Options
CPU Configuration	
▶ Socket 0 CPU Information	Submenu: see Socket O CPU Information [▶ 41]
Speed	None
64-bit	None
▶ CPU Power Management	Submenu: see CPU Power Management [▶ 42]
Active Processor Cores	Disabled/Enabled
Intel Virtualization Technology	Enabled/Disabled
VT-d	Disabled/Enabled
Bi-directional PROCHOT	Enabled/Disabled
Thermal Monitor	Enabled/Disabled
Monitor Mwait	Auto/Enabled/Disabled
DTS	Disabled/Enabled

9.3.8.1 Socket O CPU Information

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Advanced

<p>Socket 0 CPU Information</p> <pre> Intel(R) Atom(TM) Processor E3930 @ 1.30GHz CPU Signature 506C9 Microcode Patch 3C Max CPU Speed 1600 MHz Min CPU Speed 800 MHz Processor Cores 4 Intel HT Technology Not Supported Intel VT-x Technology Supported L1 Data Cache 24 kB x 4 L1 Code Cache 32 kB x 4 L2 Cache 1024 kB x 2 L3 Cache Not Present </pre>	<pre> ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit </pre>
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Bios-Entry	Options
Socket O CPU Information	
Intel(R) Atom(TM) Processor E3930 @ 1.30GHz	
CPU Signature	None
Microcode Patch	None
Max CPU Speed	None
Min CPU Speed	None
Processor Cores	None
Intel HT Technology	None
Intel VT-x Technology	None
L1 Data Cache	None
L1 Code Cache	None
L2 Cache	None
L3 Cache	None

9.3.8.2 CPU Power Management

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Advanced

CPU Power Management Configuration EIST [Enabled] Boot performance mode [Max Performance] C-States [Disabled]	Enable/Disable Intel SpeedStep ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
CPU Power Management Configuration	
EIST	Enabled/Disabled
Boot performance mode	Max Performance/Max Battery
C-States	Disabled/Enabled

9.3.9 AMI Graphic Output Protocol Policy

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Advanced

Intel(R) Graphics Controller Intel(R) GOP Driver [10.0.1036] Output Select [DVI1]	Output Interface ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Intel(R) Graphics Controller Intel(R) GOP Driver [10.0.1036]	
Output Select	None

9.3.10 PCI Subsystem Settings

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Advanced

<p>PCI Bus Driver Version A5.01.12</p> <p>PCI Devices Common Settings:</p> <p> PCI Latency Timer [32 PCI Bus Clocks]</p> <p> PCI-X Latency Timer [64 PCI Bus Clocks]</p> <p> VGA Palette Snoop [Disabled]</p> <p> PERR# Generation [Disabled]</p> <p> SERR# Generation [Disabled]</p> <p> Above 4G Decoding [Disabled]</p> <p> BME DMA Mitigation [Disabled]</p> <p>▶ PCI Hot-Plug Settings</p>	<p>Value to be programmed into PCI Latency Timer Register.</p>
<p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>	

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Bios-Entry	Options
PCI Bus Driver Version A5.01.12	None
PCI Devices Common Settings:	
PCI Latency Timer	32 PCI Bus Clocks/(32 - 248)
PCI-X Latency Timer	64 PCI Bus Clocks/(32 - 248)
VGA Palette Snoop	Disabled/Enabled
PERR# Generation	Disabled/Enabled
SERR# Generation	Disabled/Enabled
Above 4G Decoding	Disabled/Enabled
BME DMA Mitigation	Disabled/Enabled
▶ PCI Hot-Plug Settings	Submenu: see PCI Hot-Plug Settings 44

9.3.10.1 PCI Hot-Plug Settings

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Advanced

<pre> PCI Hot-Plug Settings BIOS Hot-Plug Support [Enabled] PCI Buses Padding [1] I/O Resources Padding [4 K] MMIO 32 bit Resources Padding [16 M] PFMMIO 32 bit Resources Padding [16 M] </pre>	<p>If ENABLED allows BIOS build in Hot-Pug support. Use this feature if OS does not support PCI Express and SHPC hot-plug natively.</p> <hr/> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
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Bios-Entry	Options
PCI Hot-Plug Settings	
BIOS Hot-Plug Support	Enabled/Disabled
PCI Buses Padding	1 (Disabled, 1 - 5)
I/O Resources Padding	4K (Disabled, 4K, 8 K, 16 K, 32K)
MMIO 32 bit Resources Padding	16 M (Disabled, 1 M, 2 M, 4 M ... 64 M, 128 M)
PFMMIO 32 bit Resources Padding	16 M (Disabled, 1 M, 2 M, 4 M ... 64 M, 128 M)

9.3.11 USB Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

Advanced

<p>USB Configuration</p> <p>USB Module Version 22</p> <p>USB Controllers: 1 XHCI</p> <p>USB Devices: 1 Keyboard</p> <p>XHCI Hand-off [Enabled]</p> <p>USB Mass Storage Driver Support [Enabled]</p> <p>USB hardware delays and time-outs:</p> <p>USB transfer time-out [20 sec]</p> <p>Device reset time-out [20 sec]</p> <p>Device power-up delay [Manual]</p> <p>Device power-up delay in seconds 5</p>	<p>This is a workaround for OSES without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.</p>
	<p>→: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>

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Bios-Entry	Options
USB Configuration	
USB Module Version	None
USB Controllers: 1 XHCI	None
USB Devices: 1 Keyboard	None
XHCI Hand-off	Enabled/Disabled
USB Mass Storage Driver Support	Enabled/Disabled
USB hardware delays and time-outs:	None
USB transfer time-out	20 sec (1, 5, 10, 20 sec)
Device reset time-out	20 sec (10, 20, 30, 40 sec)
Device power-up delay	Auto/Manual
Device power-up delay in seconds	None

9.3.12 Network Stack Configuration

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Advanced

Network Stack [Enabled] Ipv4 PXE Support [Disabled] Ipv4 HTTP Support [Disabled] Ipv6 PXE Support [Disabled] Ipv6 HTTP Support [Disabled] PXE boot wait time 0 Media detect count 1	Enable/Disable UEFI Nnetwork Stack ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Network Stack	Enabled
Ipv4 PXE Support	Disabled/Enabled
Ipv4 HTTP Support	Disabled/Enabled
Ipv6 PXE Support	Disabled/Enabled
Ipv6 HTTP Support	Disabled/Enabled
PXE boot wait time	None
Media detect count	None

9.3.13 Power Controller Options

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Advanced

Bootloader Version 2.00-08 Firmware Version 2.00-27 Mainboard Serial No 0000000000000000 Mainboard Prod. Date (Week.Year) -1.-1 Mainboard BootCount 1516 Mainboard Operation Time 183192min (3053h) Voltage (Min/Max) 4.40V / 5.00V Temperature (Min/Max) 20'C /62'C WDT OSBoot Timeout [Disabled] No OCT-Transmitter available No OCT-UPS detected USB disabled or USB-cable not connected UPS-ACPI-Device [Disabled]	WDT OSBoot Timeout ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Advanced	
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
WDT OSBoot Timeout	Disabled/45...255 Seconds (in steps +15)
No OCT-Transmitter available	None
No OCT-UPS detected	None
USB disabled or USB-cable not connected	None
UPS-ACPI-Device	Disabled/Prefer OCT/Prefer USB/Use OCT/Use USB

9.3.14 NVMe Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

Advanced

NVMe controller and Drive information No NVMe Device Found	←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.

Bios-Entry	Options
NVMe controller and Drive information	
No NVME Device Found	None

9.3.15 SATA Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

Advanced

SATA Configuration		Enable/s or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
Chipset-SATA Controller Configuration		
Chipset SATA	[Enable]	
SATA Mode Selection	[AHCI]	
SATA Test Mode	[Disabled]	
Aggressive LPM Support	[Disabled]	
SATA Controller Speed	[Default]	
SATA Port 0	[Not Installed]	
Software Preserve	Unknown	
Port 0	[Enabled]	
SATA Port 0 Hot Plug Capability	[Disabled]	
Configured as eSATA	Hot Plug supported	
Mechanical Presence Switch	[Enabled]	
Spin Up Device	[Disabled]	
SATA Port 0 DevSlp	[Disabled]	
DITO Configuration	[Disabled]	
SATA Port 1	[Not Installed]	←: Select Screen
Software Preserve	Unknown	↑↓: Select Item
Port 1	[Enabled]	Enter: Select
SATA Port 1 Hot Plug Capability	[Disabled]	+/-: Change Opt.
Configured as eSATA	Hot Plug supported	F1: General Help
Mechanical Presence Switch	[Enabled]	F2: Previous Values
Spin Up Device	[Disabled]	F3: Optimized Defaults
SATA Port 1 DevSlp	[Disabled]	F4: Save & Reset
DITO Configuration	[Disabled]	ESC: Exit

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Bios-Entry	Options
SATA Configuration	
Chipset-SATA Controller Configuration	
Chipset SATA	Enable/Disable
SATA Mode Selection	AHCI
SATA Test Mode	Disabled/Enabled
Aggressive LPM Support	Disabled/Enabled
SATA Controller Speed	Default/Gen1/Gen2/Gen3
SATA Port 0	Not Installed
Software Preserve	None
Port 0	Enabled/Disabled
SATA Port 0 Hot Plug Capability	Disabled/Enabled
Configured as eSATA	Hot Plug supported
Mechanical Presence Switch	Enabled/Disabled
Spin Up Device	Disabled/Enabled
SATA Device Type	Hard Disk Drive/Solid State Drive
SATA Port 0 DevSlp	Disabled/Enabled
DITO Configuration	Disabled/Enabled
SATA Port 1	Not Installed
Software Preserve	None
Port 1	Enabled/Disabled
SATA Port 1 Hot Plug Capability	Disabled/Enabled
Configured as eSATA	Hot Plug supported
Mechanical Presence Switch	Enabled/Disabled
Spin Up Device	Disabled/Enabled
SATA Port 1 DevSlp	Disabled/Enabled
DITO Configuration	Disabled/Enabled

9.3.16 Miscellaneous Configuration

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Advanced

Miscellaneous Configuration 8254 Clock Gating [Disable] State After G3 [S0 State] Power Button Debounce Mode [Enable] UART Interface Selection [Internal UART]	Enable or Disable 8254 Clock Gating <hr/> ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Miscellaneous Configuration	
8254 Clock Gating	Enable/Disable
State After G3	S0 State/S5 State/Last State
Power Button Debounce Mode	Enable/Disable
UART Interface Selection	Internal UART/Super IO UART

9.3.17 System Component

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Advanced

CRID Setting [CRID_0] PNP Setting [Power&Performance] OS Reset Select [Cold Reset] PS2 Keyboard and Mouse [Auto]	Select the Revision ID reflected in PCI config space <hr/> ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
CRID Setting	CRID_0/CRID_1/CRID_2/Disable
PNP Setting	Power&Performance/Disable
OS Reset Select	Cold Reset/Warm Reset
PS2 Keyboard and Mouse	Auto/Enable/Disable

9.4 Chipset CB8273

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
 Main Advanced **Chipset** Security Boot Save & Exit

<ul style="list-style-type: none"> ▶ North Bridge ▶ South Bridge 	North Bridge Parameters ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
▶ North Bridge	Submenu: see North Bridge [▶ 53]
▶ South Bridge	Submenu: see South Bridge [▶ 55]

9.4.1.1 GOP Configuration

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Chipset

GOP Configuration Force GT Frequency to [400 MHz] IGD Configuration Integrated Graphics Device [Enable] Primary Display [IGD] RC6(Render Standby) [Disable] GTT Size [8MB] Aperture Size [256MB] DVMT Pre-Allocated [64M] DVMT Total Gfx Mem [256M] Cd Clock Frequency [624 MHz] GT PM Support [Disable] PAVP Enable [Enable]	Overrides SoC fuses GT OP frequency and force to specific frequency →: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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Bios-Entry	Options
GOP Configuration	
Force GT to Frequency to	100...400 MHz
IGD Configuration	
Integrated Graphics Device	Enable/Disable
Primary Display	IGD/PCIe/HG
RC6(Render Standby)	Disable/Enable
GTT Size	2MB, 4MB, 8MB
Aperture Size	None
DVMT Pre-Allocated	64M/various values up to 512M
DVMT Total Gfx Mem	128M, 256M/MAX
GT PM Support	Disable/Enable
PAVP Enable	Enable/Disable

9.4.2 South Bridge

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<ul style="list-style-type: none"> ▶ HD-Audio Configuration ▶ PCI Express Configuration ▶ USB Configuration <p>Serial IRQ Mode [Quiet] SMBus Support [Enabled] OS Selection [Windows] PCI CLOCK RUN [Enabled] Real Time Option [RT Enabled, Agent D...]</p>	<p>HD-Audio Configuration Settings</p> <hr/> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
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Bios-Entry	Options
▶ HD-Audio Configuration	Submenu: see HD-Audio Configuration [▶ 56]
▶ PCI Express Configuration	Submenu: see PCI Express Configuration [▶ 57]
▶ USB Configuration	Submenu: see USB Configuration [▶ 60]
Serial IRQ Mode	Quiet/Continuous
SMBus Support	Enabled/Disabled
OS Selection	Windows/Android/Win7/Intel Linux
PCI CLOCK RUN	Enabled/Disabled
Real Time Option	RT Enabled, Agent D...

9.4.2.1 HD-Audio Configuration

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HD-Audio Configuration HD-Audio Support [Enable]	Enable/Disable HD-Audio Support ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
-----------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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Bios-Entry	Options
HD-Audio Configuration	
HD-Audio Support	Disable/Enable

9.4.2.2 PCI Express Root Port 2

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Chipset

<p>PCI Express Configuration</p> <p>PCI Express Port 1 is assigned to LAN 1 PCI Express Port 2 is assigned to LAN 2 PCI Express Port 3 is assigned to LAN 3</p> <p>PCI Express Clock Gating [Enabled]</p> <p>Port8xh Decode [Disabled] Peer Memory Write Enable [Disabled] Compliance Mode [Disabled]</p> <p>▶ PCI Express Root Port 1 ▶ PCI Express Root Port 2 ▶ PCI Express Root Port 3 ▶ PCI Express Root Port 4</p>	<p>PCI Express Clock Gating Enable/Disable for each root port.</p>
←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	

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Bio-Entry	Options
PCI Express Configuration	
PCI Express Port 1 is assigned to LAN 1	
PCI Express Port 2 is assigned to LAN 2	
PCI Express Port 3 is assigned to LAN 3	
PCI Express Clock Gating	Enabled/Disabled
Port8xh Decode	Disabled/Enabled
Peer Memory Write Enable	Disabled/Enabled
Compliance Mode	Disabled/Enabled
▶ PCIe Root Port 1	None
▶ PCIe Root Port 2	Submenu: see PCIe Root Port 2
▶ PCIe Root Port 3	Submenu: see PCIe Root Port 3
▶ PCIe Root Port 4	Submenu: see PCIe Root Port 4

NOTE

PCIe root settings Port 2 - 4
 The root settings at the ports 2 - 4 are identically. Port 2 is shown as example.

9.4.2.2.1 PCI Root Port 2

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PCIe Root Port 2 If DISABLED, goto ENABLE first the ASPM L1 Substates ACS URR FER NFER CER CTO SEFE SENFEE SECE PME SCI Hot Plug PCIe Speed Transmitter Half Swing Extra Bus Reserved Reserved Memory Reserved I/O PCH PCIe LTR Configuration PCH PCIe LTR Snoop Latency Override Non Snoop Latency Override PCIe LTR Lock PCIe selectable De-emphasis	[Auto] [Disable] [L1.1 & L1.2] [Enabled] [Disable] [Disable] [Disable] [Disable] [Default Setting] [Disable] [Disable] [Disable] [Enable] [Disable] [Auto] [Disable] 0 10 4 [Enabled] [Auto] [Auto] [Disabled] [Enabled]	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
PCI Express Root Port 2	Auto/Disable/Enable
If DISABLED, goto ENABLE first the ASPM	Disable/Enable
L1 Substates	Disabled/L1.1/L1.2/L1.1 & L1.2
ACS	Enabled/Disabled
URR	Disabled/Enabled
FER	Disabled/Enabled
NFER	Disabled/Enabled
CER	Disabled/Enabled
CTO	Default Setting (various settings)
SEFE	Disabled/Enabled
SENFE	Disabled/Enabled
SECE	Disabled/Enabled
PME SCI	Enabled/Disabled
Hot Plug	Disabled/Enabled
PCIe Speed	Auto/Gen1/Gen2
Transmitter Half Swing	Disabled/Enabled
Extra Bus Reserved	None
Reserved Memory	None
Reserved I/O	None
PCH PCIe LTR Configuration	
PCH PCIE LTR	Enabled/Disabled
Snoop Latency Override	Auto/Manual/Disabled
Non Snoop Latency Override	Auto/Manual/Disabled
PCIE LTR Lock	Disabled/Enabled
PCIe selectable De-emphasis	Enabled/Disabled

9.4.2.3 USB Configuration

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Chipset

USB Port Disable Override [Disable] XHCI Disable Compliance Mode [FALSE] USB HW MODE AFE Comparators [Disable]	Selectively Enable/Disable the corresponding USB port from reporting a Device to the controller.
←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	

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Bios-Entry	Options
USB Port Disable Override	Disable/Enable
XHCI Disable Compliance Mode	FALSE/TRUE
USB HW MODE AFE Comparators	Disable/Enable

9.5 Security CB8273

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
 Main Advanced Chipset **Security** Boot Save & Exit

Password Description Minimum length 3 Maximum length 20 Setup Administrator Password User Mode available [Enabled]	Set Setup Administrator Password ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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▶ Secure Boot

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Bios-Entry	Options
Password Description	
Minimum length	None
Maximum length	None
Setup Administrator Password	
User Mode available	Enabled/Disabled
▶ Secure Boot	Submenu: see Secure Boot [▶ 62]

9.5.1 Secure Boot

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Security

System Mode Vendor Keys Secure Boot Secure Boot Customization ▶ Restore Factory Keys ▶ Reset To Setup Mode ▶ Key Management	User Modified [Disabled] Not Active [Custom]	Secure Boot activated when: Secure Boot is enabled Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM is disabled ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
System Mode	None
Vendor Keys	None
Secure Boot	Disabled Not Active
Secure Boot Customization	Custom/Standard
▶ Restore Factory Keys	Install factory defaults (Yes or No)
▶ Reset To Setup Mode	Reset To Setup Mode (Yes or No)
▶ Key Management	Submenu: see Factory Key Provision [▶ 63]

9.5.1.1 Factory Key Provision

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Security

<p>Factory Key Provision [Disabled]</p> <ul style="list-style-type: none"> ▶ Restore Factory Keys ▶ Reset To Setup Mode ▶ Export Secure Boot variables ▶ Enroll Efi Image <p>Device Guard Ready</p> <ul style="list-style-type: none"> ▶ Remove 'UEFI CA' from DB ▶ Restore DB defaults <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Secure Boot variable</th> <th style="text-align: left;">Size</th> <th style="text-align: left;">Keys</th> <th style="text-align: left;">Key Source</th> </tr> </thead> <tbody> <tr> <td>▶ Platform Key(PK)</td> <td>862</td> <td>1</td> <td>Test (AMI)</td> </tr> <tr> <td>▶ Key Exchange Keys</td> <td>1560</td> <td>1</td> <td>Factory</td> </tr> <tr> <td>▶ Authorized Signatures</td> <td>3143</td> <td>2</td> <td>Factory</td> </tr> <tr> <td>▶ Forbidden Signatures</td> <td>3724</td> <td>77</td> <td>Factory</td> </tr> <tr> <td>▶ Authorized TimeStamps</td> <td>0</td> <td>0</td> <td>No Keys</td> </tr> <tr> <td>▶ OsRecovery Signatures</td> <td>0</td> <td>0</td> <td>No Keys</td> </tr> </tbody> </table>	Secure Boot variable	Size	Keys	Key Source	▶ Platform Key(PK)	862	1	Test (AMI)	▶ Key Exchange Keys	1560	1	Factory	▶ Authorized Signatures	3143	2	Factory	▶ Forbidden Signatures	3724	77	Factory	▶ Authorized TimeStamps	0	0	No Keys	▶ OsRecovery Signatures	0	0	No Keys	<p>Provision factory default keys on next re-boot only when System in Setup Mode</p> <hr/> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</p>
Secure Boot variable	Size	Keys	Key Source																										
▶ Platform Key(PK)	862	1	Test (AMI)																										
▶ Key Exchange Keys	1560	1	Factory																										
▶ Authorized Signatures	3143	2	Factory																										
▶ Forbidden Signatures	3724	77	Factory																										
▶ Authorized TimeStamps	0	0	No Keys																										
▶ OsRecovery Signatures	0	0	No Keys																										

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Bios-Entry	Options
Factory Key Provision	Disabled/Enabled
▶ Restore Factory Keys	Press ,Yes' to proceed ,No' to cancel
▶ Reset To Setup Mode	Yes/No
▶ Export Secure Boot variables	File System
▶ Enroll Efi Image	File System
Device Guard Ready	
▶ Remove 'UEFI CA' from DB	Press ,Yes' to proceed ,No' to cancel
▶ Restore DB defaults	Press ,Yes' to proceed ,No' to cancel
Secure Boot variable	
▶ Platform Key(PK)	Push enter key
▶ Key Exchange	Push enter key
▶ Authorized Signatures	Push enter key
▶ Forbidden Signatures	Push enter key
▶ Authorized TimeStamps	Push enter key
▶ OsRecovery Signatures	Push enter key

9.6 Boot CB8273

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
 Main Advanced Chipset Security **Boot** Save & Exit

<pre> Boot Configuration Setup Prompt Timeout 5 Bootup NumLock State [On] F7 Boot Menu [Enabled] Full Screen Logo [Enabled] Fast Boot [Disable] Driver Option Priorities StartUpDelay for UEFI shell 5 FIXED BOOT ORDER Priorities Boot Option #1 [Service Stick] Boot Option #2 [CFast] Boot Option #3 [SSD] Boot Option #4 [HDD] Boot Option #5 [CD/DVD] Boot Option #6 [USB Stick] Boot Option #7 [USB Floppy] Boot Option #8 [USB Hard Disk] Boot Option #9 [USB CD/DVD] Boot Option #10 [Network] Boot Option #11 [USB Lan] </pre>	<p>Number of 1/10 sec. to wait for setup activation key. 0 means no wait.</p> <hr/> <p>←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset</p>
<p>▶ Advanced Fixed Boot Order Parameters</p>	<p>ESC: Exit</p>

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Bios-Entry	Options
Boot Configuration	
Setup Prompt Timeout	5
Bootup NumLock State	On/Off
Full Screen Logo	Enabled/Disabled
Fast Boot	Disable/Enable
StartUpDelay for UEFI shell	5
FIXED BOOT ORDER Priorities	
Boot Option #1	Service Stick (varoius options)
Boot Option #2	CFast (varoius options)
Boot Option #3	SSD (varoius options)
Boot Option #4	HDD (varoius options)
Boot Option #5	CD/DVD (varoius options)
Boot Option #6	USB Stick] (varoius options)
Boot Option #7	USB Floppy (varoius options)
Boot Option #8	USB Hard Disk (varoius options)
Boot Option #9	USB CD/DVD (varoius options)
Boot Option #10	Network (varoius options)
Boot Option #11	USB Lan (varoius options)
▶ Advanced Fixed Boot Order Parameters	Submenu: see Advanced Fixed Boot Order Parameters [▶ 66]

9.7 Save&Exit CB8273

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
 Main Advanced Chipset Security Boot **Save & Exit**

Save Changes and Reset Discard Changes and Reset Restore Optimized Defaults Boot Override Launch EFI Shell from filesystem device	Reset the system after saving the changes. ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
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Bios-Entry	Options
Save Changes and Reset	Push enter key
Discard Changes and Reset	Push enter key
Restore Optimized Default	Push enter key
Boot Override	
Launch EFI Shell from filesystem device	None

9.8 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.

NOTE

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.

10 Mechanical drawing



Dimensional information

All dimensions are in mm.

10.1 Printed circuit board (PCB): dimensions and holes

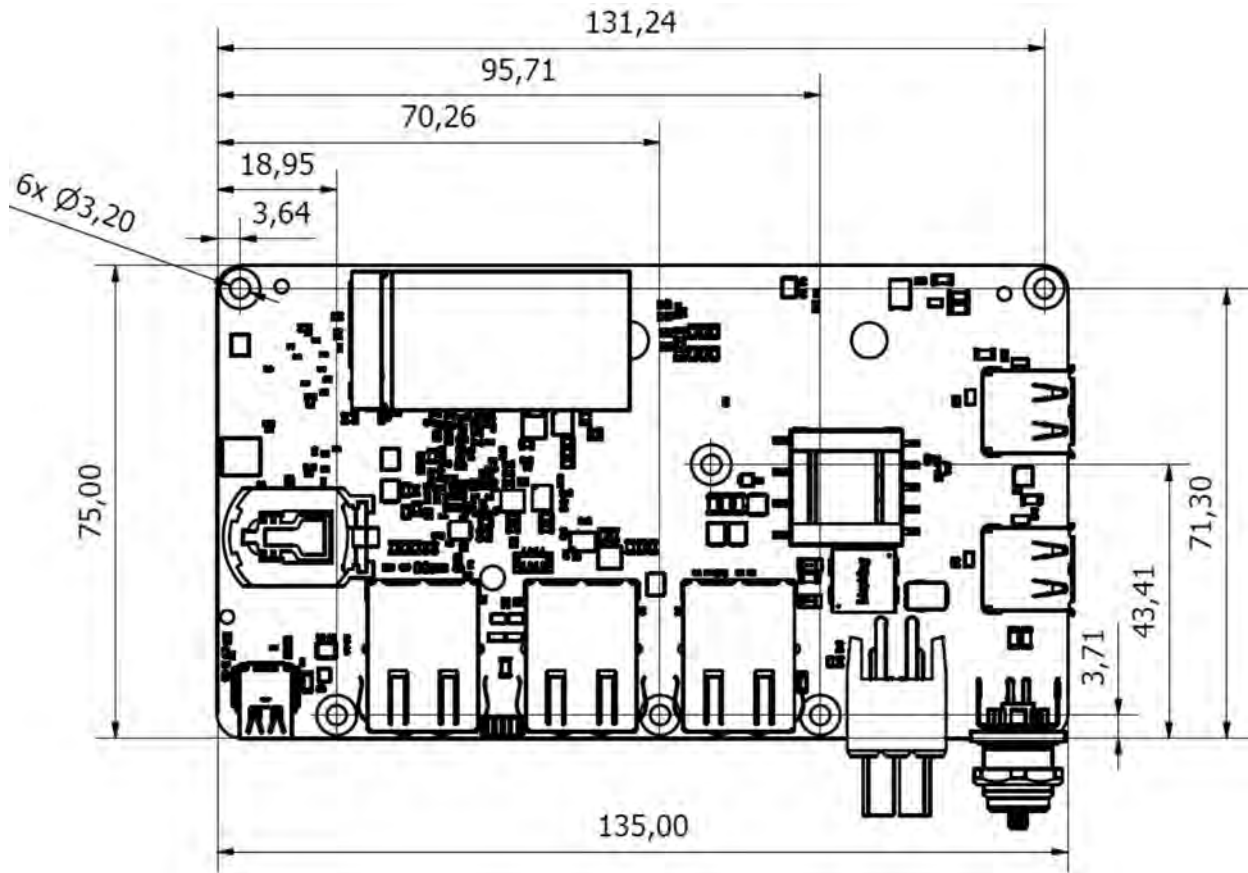


Fig. 13: CB8273 dimensions and holes

11 Technical data

11.1 Electrical data

Power supply	
Board	24 V _{DC} (+20 % / -15 %)
RTC	≥3 A

Power	
Transformer	30 W continuous load 60 W peak load

Current consumption	
RTC	≤10 μA

11.2 Environmental conditions

Temperature range	
Operating	0 °C bis +50 °C (extended temperature range on request)
Storage	-25 °C bis +85 °C
Dispatch	-25 °C bis +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
Dispatch	1,0 °C per minute, for packed boards

Relative humidity	
Operating	5 % up to 85 % (non-condensing)
Storage	5 % up to 95 % (non-condensing)
Dispatch	5 % up to 100 % (non-condensing), for packed boards

Impact	
Operating	150 m/s ² , 6 ms
Storage	400 m/s ² , 6 ms
Dispatch	400 m/s ² , 6 ms, for packed boards

Vibrations	
Operating	10 up to 58 Hz, 0,075 mm amplitude 58 up to 500 Hz, 10 m/s ²
Storage	5 up to 9 Hz, 3,5 mm amplitude 9 up to 500 Hz, 10 m/s ²
Dispatch	5 up to 9 Hz, 3,5 mm amplitude 9 up to 500 Hz, 10 m/s ² , for packed boards

i 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.

11.3 Thermal specifications

The board is specified for an ambient temperature range of 0 °C to +50 °C (extended temperature range on request). In addition, care must be taken that the temperature of the processor die does not exceed 110 °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 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.

NOTE

Prevent the maximum die temperature being exceeded!

It is the end customer's responsibility to ensure that the die temperature of the processor does not exceed 110 °C! Continuous overheating can destroy the board!

If the temperature exceeds 110 °C, the ambient temperature needs to be reduced. Ensure sufficient air circulation if necessary.

12 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.

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Further Support and Service addresses can be found on our website at <http://www.beckhoff.de>.

You will also find further documentation for Beckhoff components there.

13 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 meanings of the POST Codes are explained in the document "Aptio™ 5.x Status Codes" from American Megatrends®, which is available from 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

14 Appendix II: Resources

14.1 Interrupt CB8273

The system BIOS determines the interrupt requests (IRQs) for all devices that request interrupts. In the operating system, interrupts can be dynamically forwarded to IRQs and can support a reassignment of IRQs if there is a conflict with the current use of the interrupt.

For further information please refer to the chipset manual.

14.2 PCI-Devices CB8273

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 deactivated, the bus numbers of other devices may change as a result.

Bus	Dev.	Fkt.	Controller / Slot
00	00	00	Host Bridge ID 5AF0
00	02	00	VGA Controller ID 5A85
00	0E	00	Audio Device ID 5A98
00	0F	00	Communication Device ID 5A9A
00	12	00	AHCI Controller ID 5AE3
00	13	00	PCI-to-PCi Bridge ID 5AD8
00	13	01	PCI-to-PCi Bridge ID 5AD9
00	15	00	XHCI USB Controller ID 5AA8
00	1F	00	ISA Bridge ID 5AE8
00	1F	01	SMBus Controller ID 5AD4
02	00	00	Ethernet Controller ID 157B

14.3 SMB-Devices CB8273

The following table lists the reserved SM-Bus-Device-addresses in 8-Bit notation.

NOTE

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
B0, B2, B8, BA	PWCTR3
70, 72	PostCode
34 (old B4)	CA2000-0021/23 (power adapter)
40	PCA9535BS (16-bit I2C and SMBus, low power I/O port with interrupt)
C2	i210 (ARP) Ethernet Controller
..	SUSV

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