BECKHOFF New Automation Technology

Operating Manual | EN CB1076 Computerboard



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1 Documentation issue status

Version	Modifications
0.1	First preliminary version, HW version G1
1.0	First release with BIOS version 0.08, revision 1

2 Notes on the documentation

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

For installation and commissioning of the components, it is absolutely necessary to observe the documentation and the following notes and explanations.

It is the duty of the responsible staff 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.

Origin of the document

This documentation was originally written in German. All other languages are derived from the German original.

Disclaimer

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

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3 Safety instructions

Safety regulations

Please observe the following safety instructions and explanations! Product-specific safety instructions can be found on 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. 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 technology 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!

Serious risk of injury!

Failure to follow the safety instructions associated with this symbol directly endangers human life and health!

▲ WARNING

Risk of injury!

Failure to follow the safety instructions associated with this symbol endangers human life and health!

Personal injuries!

Failure to follow the safety instructions associated with this symbol can lead to physical injuries!

NOTICE

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.



This symbol indicates important information regarding UL approval.



Intended use

The CB1076 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.

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

Any other use is regarded as inappropriate.

4 Overview

4.1 **Properties**

The CB1076 is an industrial motherboard in the ATX form factor. It is based on Intel®'s latest hybrid technology. Intel® processors of the 12th and 13th generation (Core[™], Celeron[™] and Pentium) are installed. The Intel® R680E-PCH chipset is used.

This new hybrid design has a combination of performance and efficiency cores. Up to 24 kB are available. It can be equipped with up to 128 GB of memory via four SO-DIMM slots. A maximum clock rate of up to 5600 MHz is possible.

The large number of internal and external connections make the CB1076 a very versatile motherboard:

- 14x USB interfaces, including 7x USB3.1 Gen2, 1x USB-C, 6x USB2.0
- 1x LAN connection 1 Gb
- 2x LAN connections 2.5 Gb
- DVI/HDMI and DisplayPort connection
- 1x M.2 Key M (SATA/NVME)
- 1x PCIe x16 slot
- 2x serial interfaces, 1x external, 1x onboard
- 2x PCle x1
- 4x PCle x4
- 6x SATA ports 6G onboard

The board provides basic safety functions via the integrated Trusted Platform Module (TPM) as a Trusted Computing Platform.



Fig. 1: CB1076 block diagram

4.2 List of features

CB1076	ATX-Board
CPU	Intel® processors of the 12th/13th generation Alder Lake and Raptor Lake
	Intel® Celeron® G6900E
	Intel® Pentium® G7400E
	Intel® Core™ i3-13100E
	Intel® Core™ i5-13400E
	Intel® Core™ i7-13700E
	Intel® Core™ i9-13900E
Chipset	Intel® R680E-PCH
Socket	LGA 1700
Memory	4x SO-DIMM up to 128 GB, DDR5 up to 5600 MHz
I/O external	1x USB-C
	6x USB3.1 Gen2
	1x LAN 1 Gb
	2x LAN 2.5 Gb
	1x DP 1.2
	2x DVI-D (DVI or HDMI 1.4)
	1x COM
I/O internal	1x M.2 (M) (SATA, NVME)
	1x COM
	6x SATA 3.0, RAID 0/1/5/10
	2x PCle x1 (3.0)
	4x PCle x4 (3.0)
	1x PCle x16 (5.0)
	6x USB 2.0
	1x USB3
	8x GPIO
	5x fans (of which 3 are controlled fans)
	1x SMB connection
	1x 2x9-pin connector system
	1x 2x13-pin connector ATX Bh system
Graphic resolution	DisplayPort1.2: 4096x2304@60 Hz
	HDMI1.4: 4096x2160@30 Hz
RTC	Internal or external CMOS battery
BIOS	AMI® Aptio V
Power supply	Standard ATX power supply
Format	305 x 220 mm



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Availability of the processors

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

4.3 Specifications and documents

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

- PCI specification
- Version 2.3 or 3.0
- www.pcisig.com
- PCI Express® Base Specification
- Version 5.0
- www.pcisig.com
- ACPI specification
- Version 5.0
- www.acpi.info
- ATA/ATAPI specification
- · Version 7 Rev. 1
- www.t13.org
- USB specifications
- www.usb.org
- SMBus specification
- Version 2.0
- www.smbus.org
- Intel® chip descriptions
- Intel® Core™ Processor Product Family datasheet
- www.intel.com
- Intel® chip description
- i219 Datasheet
- i225/226 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[™] 5.x Status Codes
- www.ami.com

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6 Interfaces

6.1 Interface overview

The figures show the interfaces of the CB1076 board in a top view. The table shows the function of the respective interface as well as a reference to the manual page for further information. The listing is clockwise, starting with P1304 USB-C



Fig. 2: CB1076 interfaces

Number	Function (designation)	Page	
P1304	USB-C	USB-C Port (P1304) [▶ 15]	
P501	4-pin connector (FAN)	FAN 1 – 5 (P500/1/2/3/4) [▶_16]	
P1602 2x5-pin connector (USB2.0)		USB 2.0 (P1602/P1609/P1611) [▶ 17]	
P1601	2x5-pin connector (COM2)	Serial interfaces COM2 (P1601) [▶_18]	
P1305	5-pin connector (programming port)	Programming port (P1305) [> 19]	
P1701	2-pin connector (RTC-BAT)	Battery (BT1700/P1701) [▶ 20]	
BT1700	Battery holder for CR2032	Battery (BT1700/P1701) [▶ 20]	
J1700/ J1701	Jumper Clear CMOS 1/CMOS2		
U600/700	SO-DIMM262 A1 and A2	Memory (U600, U700, U601, U701) [> 21]	
P1614	2x4-pin connector MiniFit 12 V	Power supply (P1614/P1616) [28]	
U601/701	SO-DIMM262 B1 and B2	Memory (U600, U700, U601, U701) [▶ 21]	
P504	4-pin connector (FAN)	FAN 1 – 5 (P500/1/2/3/4) [▶_16]	
P500	4-pin connector (FAN)	FAN 1 – 5 (P500/1/2/3/4) [▶_16]	
P1616	2x12-pin connector ATX-Power	Power supply (P1614/P1616) [] 28]	
P1604/06/08	SATA 2/4/6	SATA (P1603 – P1608) [▶ 29]	
P1603/05/07	SATA 1/3/5	SATA (P1603 – P1608) [) 29]	
P1612	2x9-pin connector system	Reserved	
P1610	2x13-pin connector ATX Bh system	System Port (P1610) [) 29]	
P502	4-pin connector FAN	<u>FAN 1 – 5 (P500/1/2/3/4) [▶ 16]</u>	
P1700	M.2M PCIe/SATA	M.2 Key-M (P1700) [30]	
P503	4-pin connector (FAN)	FAN 1 – 5 (P500/1/2/3/4) [▶_16]	
P1613	Connector USB3.0	USB3.1 Gen2 Typ A (P1613) [▶_33]	
P1615	2x10-pin connector (GPIO)	<u>GPIO (P1615) [▶_34]</u>	
P1600	2x5-pin connector (SMBus)	SMB/I ² C (P1600) [▶_34]	
P1611	2x5-pin connector USB 2.0	USB 2.0 (P1602/P1609/P1611) [> 17]	
P1609	2x5-pin connector USB 2.0	USB 2.0 (P1602/P1609/P1611) [> 17]	
P1205/06/04	PCIe x4 socket	PCIe x4 (P1205/P1206/P1204/P1201) [> 35]	
P1200	PCIe x1 socket	PCle x1 (P1200/P1203) [▶_36]	
P1202	PCIe x16 socket	PCle x16 (P1202) [▶_37]	
P1203	PCIe x1 socket	PCle x1 (P1200/P1203) [▶ 36]	
P1201	PCIe x4 socket	PCIe x4 (P1205/P1206/P1204/P1201) [35]	
P1402	LAN 2.5 Gb + USB3.1Gen2	LAN 2.5 Gbit and USB 3.1Gen2 (P1402/P1401/	
		<u>P1400) [▶ 40]</u>	
P1401	LAN 2.5 Gb + USB3.1Gen2	LAN 2.5 Gbit and USB 3.1Gen2 (P1402/P1401/ P1400) [▶_40]	
P1400	LAN 1 Gb + USB3.1Gen2	LAN 2.5 Gbit and USB 3.1Gen2 (P1402/P1401/ P1400) [▶ 40]	
P1500	DVI-D A+B	DVI-D (P1500A/B) [▶ 42]	
P1403	DSUB9M (COM1)	Serial interface COM1 (P1403) [▶ 43]	
P1501	DisplayPort	Display Port (P1501) [▶ 43]	

6.2 USB-C Port (P1304)

24-pin USB-C connector. Signals with up to 10 Gbit/s can be led out via this connector.



Fig. 3: CB1076 USB-C

Pin assignment USB-C							
Description	Name	Pin		Name	Description		
Ground	GND	A1	B12	GND	Ground		
Transmit+	TX1+	A2	B11	RX1+	Receive+		
Transmit-	TX1-	A3	B10	RX1-	Receive-		
Voltage	VBUS1	A4	B9	VBUS3	Voltage		
Configuration channel	CC1	A5	B8	SBU2	Sideband Use2		
USB2.0-Signal+	D0+	A6	B7	D1-	USB2.0-Signal-		
USB2.0-Signal-	D0-	A7	B6	D1+	USB2.0-Signal+		
Sideband Use1	SBU1	A8	B5	Vconn/ CC2	Configuration channel		
Voltage	VBUS2	A9	B4	VBUS4	Voltage 5 V		
Receive-	RX2-	A10	B3	TX2-	Transmit-		
Receive+	RX2+	A11	B2	TX2+	Transmit+		
Ground	GND	A12	B1	GND	Ground		

6.3 FAN 1 – 5 (P500/1/2/3/4)

The module has five 4-pin fan connections, with which you can connect fans with a supply voltage of 12 V directly to the module. The connections FAN1, FAN2 and FAN3 have a speed monitoring function. The connected fan must supply a corresponding tachometer signal if this is to be used.



Fig. 4: CB1076 FAN 1-5

Pin assignment FAN 1 (P500)					
P500	Pin	Description			
	1	FANON	Ground switched fan 1		
	2	12 V	12 V		
	3	TACH1	Monitoring fan 1		
	4	PWM1	Fan 1 power management		

Pin assignment FAN 2 (P501)					
P501 Pin Name Description					
	1	FANON	Ground switched fan 2		
	2	12 V	12 V		
	3	TACH2	Monitoring fan 2		
	4	PWM2	Fan 2 power management		

Pin assignment FAN 3 (P502)						
P502 Pin Name Description						
	1	FANON	Ground switched fan 3			
	2	12 V	12 V			
	3	TACH3	Monitoring fan 3			
	4	PWM3	Fan 3 power management			

Pin assignment FAN 4 (P503)					
P503	Pin	Name	Description		
	1	FANON	Ground switched fan 4		
	2	12 V	12 V		
	3	N/C			
	4	PWM3	Fan 3 power management		

Pin assignment FAN 5 (P504)					
P504 Pin Name Description					
	1	FANON	Ground switched fan 5		
	2	12 V	12 V		
	3	N/C			
	4	PWM1	Fan 1 power management		

Parallel assignment for FAN1/5 and FAN 3/4

These connectors are supplied in parallel via the PWM signal.

6.4 USB 2.0 (P1602/P1609/P1611)

Six USB signals are made available via these three 2x5-pin connectors.

The signals comply with USB specification 2.0.

All necessary settings for USB can be made by the BIOS. 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.

The individual USB interfaces can supply a current of up to 500 mA and are electronically protected.



Fig. 5: CB1076 USB 2.0 internal

Pin assignment internal USB 2.0 connector:							
Description	Name	Pin		Name	Description		
5 V for USB	VCC	1	6	VCC	5 V for USB		
Minus data channel USB	USB-	2	7	USB-	Minus data channel USB		
Plus data channel USB	USB+	3	8	USB+	Plus data channel USB		
Ground	GND	4	9	GND	Ground		
Not connected	N/C	5	10	N/C	Not connected		

6.5 Serial interfaces COM2 (P1601)

An additional serial interface COM2 is installed on the board in a 2x5-pin connector. The signals correspond to the RS232 standard.

The port address and the interrupt used are set with the help of the BIOS setup.

2x5-pin connector:



Fig. 6: CB1076 COM 2

Pin assignment COM connector										
Description	Name	Pin		Name	Description					
Data Carrier Detect-	DCD#	1	2	DSR#	Data Set Ready-					
Receive Data	RXD	3	4	RTS	Request to Send					
Transmit Data	TXD	5	6	CTS	Clear to Send					
Data Terminal Ready-	DTR#	7	8	RI#	Ring Indicator-					
Ground	GND	9	10	VCC	Supply voltage 5 V					

6.6 Programming port (P1305)

You can transfer programming signals to the board via this 5-pin connection. The supply voltage is 3.3 V.



Fig. 7: CB1076 Programming port

Pin assignment programming port							
Pin	Signal Description						
1	3.3 V	Supply voltage 3.3 V					
2	EEP-SMBCLK	SMB-Clock					
3	EEP-SMBDAT	SMB Data					
4	PMCALERT#	PMC Alert-					
5	GND	Ground					

6.7 Battery (BT1700/P1701)

The board is supplied with a CR2032 battery holder (BT1700) including a 3 V battery, but can also be connected to an external battery via a two-pin housing connector (P1701) in order to keep the integrated clock supplied in case of a power failure.



Fig. 8: CB1076 Battery

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

6.8 Memory (U600, U700, U601, U701)

Four vertical SO-DIMM memory slots, DDR5- 5600 MT/s, max. 128 GB RAM are installed on the CB1076 board. For technical and mechanical reasons, it is possible that certain memory modules cannot be used. Information regarding the recommended memory modules can be obtained from your distributor.

NOTICE

Memory modules

When populating the memory sockets, make sure that you use identical memory modules.

All timing parameters for the different makes and versions are automatically set by the BIOS.



Fig. 9: CB1076 SODIMM-262

E C

Pin assignment memory socket U600/U700									
Description	Signal	Pi	Pin1 Signal		Description				
Supply voltage 5 V	M_VIN	1	2	SA0	Ground				
Supply voltage 5 V	M_VIN	3	4	SCL	SMBus-CLK				
Reserved	Res1	5	6	SDA	SMBus-Data				
Powergood	PWRGOOD	7	8	PWR_EN	Power Enable				
Ground	GND	9	10	GND	Ground				
Data line A3	ADQ0	11	12	ADQ1	Data line A2				
Ground	GND	13	14	GND	Ground				
Data line A0	ADQ2	15	16	ADQ3	Data line A1				
Ground	GND	17	18	GND	Ground				
Ground	ADM0	19	20	ADQS#0	Data Strobe A0 -				
Ground	GND	21	22	ADQS0	Data Strobe A0+				
Data line A5	ADQ4	23	24	GND	Ground				
Ground	GND	25	26	ADQ5	Data line A6				
Data line A4	ADQ6	27	28	GND	Ground				
Ground	GND	29	30	ADQ7	Data line A7				
Data line A11	ADQ8	31	32	GND	Ground				
Ground	GND	33	34	ADQ9	Data line A10				
Data line A8	ADQ10	35	36	GND	Ground				
Ground	GND	37	38	ADQ11	Data line A9				
Data Strobe A1 -	ADQS#1	39	40	GND	Ground				
Data Strobe A1 +	ADQS1	41	42	ADM1	Ground				
Ground	GND	43	44	GND	Ground				
Data line A12	ADQ12	45	46	ADQ13	Data line A13				
Ground	GND	47	48	GND	Ground				
Data line A15	ADQ14	49	50	ADQ15	Data line A14				
Ground	GND	51	52	GND	Ground				
Data line A17	ADQ16	53	54	ADQ17	Data line A16				
Ground	GND	55	56	GND	Ground				
Data line A19	ADQ18	57	58	ADQ19	Data line A18				
Ground	GND	59	60	GND	Ground				
Ground	ADM2	61	62	ADQS#2	Data Strobe A2 -				
Ground	GND	63	64	ADQS2	Data Strobe A2 +				
Data line A20	ADQ20	65	66	GND	Ground				
Ground	GND	67	68	ADQ21	Data line A21				
Data line A23	ADQ22	69	70	GND	Ground				
Ground	GND	71	72	ADQ23	Data line A22				
Data line A25	ADQ24	73	74	GND	Ground				
Ground	GND	75	76	ADQ25	Data line A24				
Data line A27	ADQ26	77	78	GND	Ground				
Ground	GND	79	80	ADQ27	Data line A26				
Data Strobe A3 -	ADQS#3	81	82	GND	Ground				
Data Strobe A3 +	ADQS 3	83	84	ADM3	Ground				
Ground	GND	85	86	GND	Ground				
Data line A30	DQ28	87	88	ADQ29	Data line A31				
Ground	GND	89	90	GND	Ground				
Data line A28	ADQ30	91	92	ADQ31	Data line A29				

Pin assignment memory socket U600/U700										
Description	Signal	Pi	n1	Signal	Description					
Ground	GND	93	94	GND	Ground					
Data line A32	ACB0	95	96	ACB1	Data line A33					
Ground	GND	97	98	GND	Ground					
Data line A35	ACB2	99	100	ADQS#4	Data Strobe A4 -					
Ground	GND	101	102	ADQS4	Data Strobe A4 +					
Data line A34	ACB3	103	104	GND	Ground					
Ground	GND	105	106	ACS#0	Control A0 -					
Command A0	ACA0	107	108	ALERT#	Alert -					
Command A1	ACA1	109	110	ACS#1	Control A1 -					
Ground	GND	111	112	GND	Ground					
Command A2	ACA2	113	114	ACA3	Command A3					
Command A4	ACA4	115	116	ACA5	Command A5					
Ground	GND	117	118	GND	Ground					
Command A6	ACA6	119	120	ACA7	Command A7					
Command A8	ACA8	121	122	ACA9	Command A9					
Ground	GND	123	124	GND	Ground					
Command A10	ACA10	125	126	ACA11	Command A11					
Command A12	ACA12	127	128	RES2	Reserved					
Ground	GND	129	130	GND	Ground					
Clock-Signal A0 +	ACK0	131	132	ACK1	Clock-Signal A1+					
Clock-Signal A0 -	ACK#0	133	134	ACK#1	Clock-Signal A1-					
Ground	GND	135	136	Ground	GND					
Clock-Signal B0 +	BCK0	137	138	BCK1	Clock-Signal B1 +					
Clock-Signal B0 -	BCK#0	139	140	BCK#1	Clock-Signal B1 -					
Ground	GND	141	142	GND	Ground					
Reserved	RES3	143	144	BCA12	Command B12					
Command B11	BCA11	145	146	BCA10	Command B10					
Ground	GND	147	148	GND	Ground					
Command B9	BCA9	149	150	BCA8	Command B8					
Command B7	BCA7	151	152	BCA6	Command B6					
Ground	GND	153	154	GND	Ground					
Command B5	BCA5	155	156	BCA4	Command B4					
Command B3	BCA3	157	158	BCA2	Command B2					
Ground	GND	159	160	GND	Ground					
Command 0 -	BCS#0	161	162	BCA1	Command B1					
Reset	RESET	163	164	BCA0	Command B0					
Command 1 -	BCS#1	165	166	GND	Ground					
Ground	GND	167	168	BCB0	Data line B35					
Data Strobe B4 -	BDQS#4	169	170	GND	Ground					
Data Strobe B4 +	BDQS4	171	172	BCB1	Data line B32					
Ground	GND	173	174	GND	Ground					
Data line B33	BCB3	175	176	BCB2	Data line B34					
Ground	GND	177	178	GND	Ground					
Data line B3	BDQ0	179	180	BDQ1	Data line B2					
Ground	GND	181	182	GND	Ground					
Data line B0	BDQ2	183	184	BDQ3	Data line B1					
Ground	GND	185	186	GND	Ground					

Pin assignment memory socket U600/U700									
Description	Signal	Pi	n1	Signal	Description				
Ground	BDM0	187	188	BDQS#0	Data Strobe B0 -				
Ground	GND	189	190	BDQS0	Data Strobe B0 +				
Data line B4	BDQ4	191	192	GND	Ground				
Ground	GND	193	194	BDQ5	Data line B5				
Data line B6	BDQ6	195	196	GND	Ground				
Ground	GND	197	198	BDQ7	Data line B7				
Data line B8	BDQ8	199	200	GND	Ground				
Ground	GND	201	202	BDQ9	Data line B10				
Data line B11	BDQ10	203	204	GND	Ground				
Ground	GND	205	206	BDQ11	Data line B9				
Data Strobe B1 -	BDQS#1	207	208	GND	Ground				
Data Strobe B1 +	BDQS1	209	210	BDM1	Ground				
Ground	GND	211	212	GND	Ground				
Data line B12	BDQ12	213	214	BDQ13	Data line B13				
Ground	GND	215	216	GND	Ground				
Data line B15	BDQ14	217	218	BDQ15	Data line B14				
Ground	GND	219	220	GND	Ground				
Data line B16	BDQ16	221	222	BDQ17	Data line B17				
Ground	GND	223	224	GND	Ground				
Data line B18	BDQ18	225	226	BDQ19	Data line B19				
Ground	GND	227	228	GND	Ground				
Ground	BDM2	229	230	BDQS#2	Data Strobe B2 -				
Ground	GND	231	232	BDQS2	Data Strobe B2 +				
Data line B23	BDQ20	233	234	GND	Ground				
Ground	GND	235	236	BDQ21	Data line B21				
Data line B22	BDQ22	237	238	GND	Ground				
Ground	GND	239	240	BDQ23	Data line B20				
Data line B25	BDQ24	241	242	GND	Ground				
Ground	GND	243	244	BDQ25	Data line B24				
Data line B22	BDQ26	245	246	GND	Ground				
Ground	GND	247	248	BDQ27	Data line B26				
Data Strobe B3 -	BDQS#3	249	250	GND	Ground				
Data Strobe B3 +	BDQS3	251	252	BDM3	Ground				
Ground	GND	253	254	GND	Ground				
Data line B31	BDQ28	255	256	BDQ29	Data line B28				
Ground	GND	257	258	GND	Ground				
Data line B29	BDQ30	259	260	BDQ31	Data line B30				
Ground	GND	261	262	GND	Ground				

Pin assignment memory socket U601/U701										
Description	Signal	Pi	n1	Signal	Description					
Supply voltage 5 V	M_VIN	1	2	SA0	Ground					
Supply voltage 5 V	M_VIN	3	4	SCL	SMBus-CLK					
Reserved	Res1	5	6	SDA	SMBus-Data					
Powergood	PWRGOOD	7	8	PWR_EN	Power Enable					
Ground	GND	9	10	GND	Ground					
Data line A0	ADQ0	11	12	ADQ1	Data line A1					
Ground	GND	13	14	GND	Ground					
Data line A2	ADQ2	15	16	ADQ3	Data line A3					
Ground	GND	17	18	GND	Ground					
Ground	ADM0	19	20	ADQS#0	Data Strobe A0 -					
Ground	GND	21	22	ADQS0	Data Strobe A0+					
Data line A5	ADQ4	23	24	GND	Ground					
Ground	GND	25	26	ADQ5	Data line A7					
Data line A4	ADQ6	27	28	GND	Ground					
Ground	GND	29	30	ADQ7	Data line A6					
Data line A11	ADQ8	31	32	GND	Ground					
Ground	GND	33	34	ADQ9	Data line A9					
Data line A8	ADQ10	35	36	GND	Ground					
Ground	GND	37	38	ADQ11	Data line A10					
Data Strobe A1 -	ADQS#1	39	40	GND	Ground					
Data Strobe A1 +	ADQS1	41	42	ADM1	Ground					
Ground	GND	43	44	GND	Ground					
Data line A12	ADQ12	45	46	ADQ13	Data line A13					
Ground	GND	47	48	GND	Ground					
Data line A15	ADQ14	49	50	ADQ15	Data line A14					
Ground	GND	51	52	GND	Ground					
Data line A16	ADQ16	53	54	ADQ17	Data line A17					
Ground	GND	55	56	GND	Ground					
Data line A20	ADQ18	57	58	ADQ19	Data line A19					
Ground	GND	59	60	GND	Ground					
Ground	ADM2	61	62	ADQS#2	Data Strobe A2 -					
Ground	GND	63	64	ADQS2	Data Strobe A2 +					
Data line A18	ADQ20	65	66	GND	Ground					
Ground	GND	67	68	ADQ21	Data line A23					
Data line A22	ADQ22	69	70	GND	Ground					
Ground	GND	71	72	ADQ23	Data line A21					
Data line A25	ADQ24	73	74	GND	Ground					
Ground	GND	75	76	ADQ25	Data line A24					
Data line A26	ADQ26	77	78	GND	Ground					
Ground	GND	79	80	ADQ27	Data line A27					
Data Strobe A3 -	ADQS#3	81	82	GND	Ground					
Data Strobe A3 +	ADQS 3	83	84	ADM3	Ground					
Ground	GND	85	86	GND	Ground					
Data line A31	DQ28	87	88	ADQ29	Data line A29					
Ground	GND	89	90	GND	Ground					
Data line A30	ADQ30	91	92	ADQ31	Data line A28					

Pin assignment memory socket U601/U701									
Description	Signal	Pin1		Signal	Description				
Ground	GND	93	94	GND	Ground				
Data line A32	ACB0	95	96	ACB1	Data line A34				
Ground	GND	97	98	GND	Ground				
Data line A33	ACB2	99	100	ADQS#4	Data Strobe A4 -				
Ground	GND	101	102	ADQS4	Data Strobe A4 +				
Data line A35	ACB3	103	104	GND	Ground				
Ground	GND	105	106	ACS#0	Control A0 -				
Command A0	ACA0	107	108	ALERT#	Alert -				
Command A1	ACA1	109	110	ACS#1	Control A1 -				
Ground	GND	111	112	GND	Ground				
Command A2	ACA2	113	114	ACA3	Command A3				
Command A4	ACA4	115	116	ACA5	Command A5				
Ground	GND	117	118	GND	Ground				
Command A6	ACA6	119	120	ACA7	Command A7				
Command A8	ACA8	121	122	ACA9	Command A9				
Ground	GND	123	124	GND	Ground				
Command A10	ACA10	125	126	ACA11	Command A11				
Command A12	ACA12	127	128	RES2	Reserved				
Ground	GND	129	130	GND	Ground				
Clock-Signal A0 +	ACK0	131	132	ACK1	Clock-Signal A1+				
Clock-Signal A0 -	ACK#0	133	134	ACK#1	Clock-Signal A1-				
Ground	GND	135	136	GND	Ground				
Clock-Signal B0 +	BCK0	137	138	BCK1	Clock-Signal B1 +				
Clock-Signal B0 -	BCK#0	139	140	BCK#1	Clock-Signal B1 -				
Ground	GND	141	142	GND	Ground				
Reserved	RES3	143	144	BCA12	Command B12				
Command B11	BCA11	145	146	BCA10	Command B10				
Ground	GND	147	148	GND	Ground				
Command B9	BCA9	149	150	BCA8	Command B8				
Command B7	BCA7	151	152	BCA6	Command B6				
Ground	GND	153	154	GND	Ground				
Command B5	BCA5	155	156	BCA4	Command B4				
Command B3	BCA3	157	158	BCA2	Command B2				
Ground	GND	159	160	GND	Ground				
Command 0 -	BCS#0	161	162	BCA1	Command B1				
Reset	RESET	163	164	BCA0	Command B0				
Command 1 -	BCS#1	165	166	GND	Ground				
Ground	GND	167	168	BCB0	Data line B35				
Data Strobe B4 -	BDQS#4	169	170	GND	Ground				
Data Strobe B4 +	BDQS4	171	172	BCB1	Data line B34				
Ground	GND	173	174	GND	Ground				
Data line B33	BCB3	175	176	BCB2	Data line B32				
Ground	GND	177	178	GND	Ground				
Data line B1	BDQ0	179	180	BDQ1	Data line B0				
Ground	GND	181	182	GND	Ground				
Data line B3	BDQ2	183	184	BDQ3	Data line B2				
Ground	GND	185	186	GND	Ground				

Pin assignment memory socket U601/U701										
Description	Signal	Pin1		Signal	Description					
Ground	BDM0	187	188	BDQS#0	Data Strobe B0 -					
Ground	GND	189	190	BDQS0	Data Strobe B0 +					
Data line B5	BDQ4	191	192	GND	Ground					
Ground	GND	193	194	BDQ5	Data line B4					
Data line B6	BDQ6	195	196	GND	Ground					
Ground	GND	197	198	BDQ7	Data line B7					
Data line B11	BDQ8	199	200	GND	Ground					
Ground	GND	201	202	BDQ9	Data line B10					
Data line B8	BDQ10	203	204	GND	Ground					
Ground	GND	205	206	BDQ11	Data line B9					
Data Strobe B1 -	BDQS#1	207	208	GND	Ground					
Data Strobe B1 +	BDQS1	209	210	BDM1	Ground					
Ground	GND	211	212	GND	Ground					
Data line B13	BDQ12	213	214	BDQ13	Data line B15					
Ground	GND	215	216	GND	Ground					
Data line B14	BDQ14	217	218	BDQ15	Data line B12					
Ground	GND	219	220	GND	Ground					
Data line B17	BDQ16	221	222	BDQ17	Data line B16					
Ground	GND	223	224	GND	Ground					
Data line B19	BDQ18	225	226	BDQ19	Data line B21					
Ground	GND	227	228	GND	Ground					
Ground	BDM2	229	230	BDQS#2	Data Strobe B2 -					
Ground	GND	231	232	BDQS2	Data Strobe B2 +					
Data line B20	BDQ20	233	234	GND	Ground					
Ground	GND	235	236	BDQ21	Data line B22					
Data line B23	BDQ22	237	238	GND	Ground					
Ground	GND	239	240	BDQ23	Data line B18					
Data line B25	BDQ24	241	242	GND	Ground					
Ground	GND	243	244	BDQ25	Data line B24					
Data line B27	BDQ26	245	246	GND	Ground					
Ground	GND	247	248	BDQ27	Data line B26					
Data Strobe B3 -	BDQS#3	249	250	GND	Ground					
Data Strobe B3 +	BDQS3	251	252	BDM3	Ground					
Ground	GND	253	254	GND	Ground					
Data line B28	BDQ28	255	256	BDQ29	Data line B30					
Ground	GND	257	258	GND	Ground					
Data line B31	BDQ30	259	260	BDQ31	Data line B29					
Ground	GND	261	262	GND	Ground					

6.9 Power supply (P1614/P1616)

The connection for the power supply is implemented as a 2x12-pin standard ATX socket ("ATX24"). This is supplemented by a 2x4-pin housing socket via which the CORE-IN voltage must be provided.

12		ATX Power 1									1
٠	Ω	Ω	٠	٠	Ω	Ω	٠	٠	Ω	•	•
Ω	٠	٠	٥	•	٠	·	•	•	٠	٠	
24				P	16	516					13

Fig. 10: CB1076 2x12-pin ATX Power

Pin assignment 2x12-pin socket ATX-Power										
Description	Name	Pin		Name	Description					
Supply voltage 3.3 V	3.3 V	1	13	3.3 V	Supply voltage 3.3 V					
Supply voltage 3.3 V	3.3 V	2	14	-12 V	Supply voltage -12 V					
Ground	GND	3	15	GND	Ground					
Supply voltage 5 V	VCC	4	16	PS_ON	On/Off signal					
Ground	GND	5	17	GND	Ground					
Supply voltage 5 V	VCC	6	18	GND	Ground					
Ground	GND	7	19	GND	Ground					
ATX Powergood	PWR_ON	8	20	-5 V	Supply voltage -5 V					
Standby 5 V	SVCC	9	21	VCC	Supply voltage 5 V					
Supply voltage 12 V	12 V	10	22	VCC	Supply voltage 5 V					
Supply voltage 12 V	12 V	11	23	VCC	Supply voltage 5 V					
Supply voltage 3.3 V	3.3 V	12	24	GND	Ground					



Fig. 11: CB1076 2x4-pin MiniFit

Pin assignment 2x4-in socket MiniFit										
Description	Name	Pin		Name	Description					
Ground	GND	1	5	COREIN	Supply voltage 12 V					
Ground	GND	2	6	COREIN	Supply voltage 12 V					
Ground	GND	3	7	COREIN	Supply voltage 12 V					
Ground	GND	4	8	COREIN	Supply voltage 12 V					

6.10 SATA (P1603 – P1608)

Six SATA sockets are available for the connection of SATA devices. All SATA channels support the speed modes 1.5 Gbit/s, 3 Gbit/s and 6 Gbit/s.



Fig. 12: CB1076 SATA sockets

Pin assignment SATA sockets							
Pin	Name	Description					
1	GND	Ground					
2	SATATX	SATA Transmit +					
3	SATATX#	SATA Transmit -					
4	GND	Ground					
5	SATARX#	SATA Receive -					
6	SATARX	SATA Receive +					
7	GND	Ground					

6.11 System Port (P1610)

The board has a 2x13-pin standard pin contact strip for piercing connection with a spacing of 2.54 mm, via which the signals for power button, speaker, reset and various status LEDs are provided. This connector is coded for Beckhoff.



Fig. 13: CB1076 System Port

Pin assignment connector system 1								
Description	Name	Pin		Name	Description			
On/Suspend button	PWRBTN#	A1	B1	GND	Ground			
Ground	SVCC	A2	B2	N/C	Not connected			
Not available	N/C	A3	B3	PWLED#	Power LED			
Ground	GND	A4	B4	N/C	Not connected			
Supply voltage 5 V	VCC	A5	B5	PWLED	Supply voltage 3.3 V			
Hard disk LED	HDLED#	A6	B6	N/C	Not available			
Supply voltage 5 V	VCC	A7	B7	VCC	Supply voltage 5 V			
Not available	N/C	A8	B8	GND	Ground			
Not connected	N/C	A9	B9	N/C	Not connected			
Ground	GND	A10	B10	BEEP	Speaker			
Not connected	N/C	A11	B11	N/C	Not available			
Not connected	N/C	A12	B12	GND	Ground			
Supply voltage 5 V	VCC	A13	B13	RESET#	Reset			

System Port 2

The board is prepared for an additional 2x9-pin System Port (P1612) and can be fitted with it.

6.12 M.2 Key-M (P1700)

The CB1076 is equipped with an M.2 Key-M socket. SATA and PCIe signals are led out via these sockets. SATA SSD and SATA NVME cards (M.2-2280) can be operated. SATA RAID 0, 1, 5 and 10 are supported. Adapter cards with standard connectors are available as accessories. Please contact your distributor for this.



Fig. 14: CB1076 M.2M P1700

Pin assignment M.2 Key-M (P1700):							
Description	Signal	Pi	n	Signal	Description		
Ground	GND	1	2	3.3 V1	Standby Supply voltage S3.3 V		
Ground	GND	3	4	3.3 V2	Standby Supply voltage S3.3 V		
PCIe Lane 3 Receive -	PER3#	5	6	N/C	(not led out)		
PCIe Lane 3 Receive +	PER3	7	8	N/C	(not led out)		
Ground	GND	9	10	GPIO9 DAS DDS LED1	NVMELED-		
PCle Lane 3 Transmit -	PET3#	11	12	3.3 V3	Standby Supply voltage S3.3 V		
PCIe Lane 3 Transmit +	PET3	13	14	3.3 V4	Standby Supply voltage S3.3 V		
Ground	GND	15	16	3.3 V5	Standby Supply voltage S3.3 V		
PCIe Lane 2 Receive -	PER2#	17	18	3.3 V6	Standby Supply voltage S3.3 V		
PCIe Lane 2 Receive +	PER2	19	20	N/C	(not led out)		
Ground	GND	21	22	N/C	(not led out)		
PCIe Lane 2 Transmit -	PET2#	23	24	N/C	(not led out)		
PCIe Lane 2 Transmit +	PET2	25	26	N/C	(not led out)		
Ground	GND	27	28	N/C	(not led out)		
PCIe Lane 1 Receive -	PER1#	29	30	N/C	(not led out)		
PCIe Lane 1 Receive	PER1	31	32	N/C	(not led out)		
Ground	GND	33	34	N/C	(not led out)		
PCIe Lane 1 Transmit -	PET1#	35	36	N/C	(not led out)		
PCle Lane 1 Transmit +	PET1	37	38	DEVSLP	(not led out)		
Ground	GND	39	40	N/C	(not led out)		
PCIe Lane 0 Receive +	PER0# SATAB	41	42	N/C	(not led out)		
PCle Lane 0 Receive -	PER0 SATAB#	43	44	N/C	(not led out)		
Ground	GND	45	46	N/C	(not led out)		
PCle Lane 0 Transmit -	PET0# SATAA#	47	48	N/C	(not led out)		
PCIe Lane 0 Transmit +	PET0 SATAA	49	50	PRST#	PCIe Reset active low		

Pin assignment M.2 Key-M (P1700):							
Description	Signal	Pi	n	Signal	Description		
Ground	GND	51	52	CLKREQ#	PCIe Clock Enable active low		
PCIe Lane Reference Clock -	REFCLK#	53	54	PEWAKE#	Link Reactivation active low		
PCIe Lane Reference Clock +	REFCLK	55	56	N/C	(not led out)		
Ground	GND	57	58	N/C	(not led out)		
(not led out)	N/C	59	60	N/C	(not led out)		
(not led out)	N/C	61	62	N/C	(not led out)		
(not led out)	N/C	63	64	N/C	(not led out)		
(not led out)	N/C	65	66	N/C	(not led out)		
(not led out)	N/C	67	68	SUSCLK	System clock		
Configuration pin	CFG_PCle/ SATA	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		
Ground	GND	75					

6.13 USB3.1 Gen2 Typ A (P1613)

USB3.0 is made available via this internal USB interface.



P1613

Fig. 15: CB 1076 USB 3.1 type A

Pin assignment internal USB 3.1 connector						
Pin	Name	Description				
1	VCC	5 V for USB				
2	USB-D#	Minus data channel USB				
3	USB-D	Plus data channel USB				
4	GND1	Ground				
5	SSRX-	SuperSpeed Receiver -				
6	SSRX+	SuperSpeed Receiver +				
7	GND2	Ground				
8	SSTX-	SuperSpeed Transmitter -				
9	SSTX+	SuperSpeed Transmitter +				

6.14 GPIO (P1615)

The board has a general purpose input/output interface that feeds the signals out via a 2x10-pin connector. By programming the associated chip (Super-IO) accordingly, I/O functions can be created here in a very flexible manner. Ask your distributor about appropriate software support.



Fig. 16: CB1076 GPIO socket

Pin assignment GPIO connector							
Description	Name	Р	in	Name	Description		
Supply voltage 5 V	VCC	1	11	VCC	Supply voltage 5 V		
GP Input/Output 0	GPIO0	2	12	N/C	Not connected		
GP Input/Output 1	GPIO1	3	13	N/C	Not connected		
GP Input/Output 2	GPIO2	4	14	N/C	Not connected		
GP Input/Output 3	GPIO3	5	15	N/C	Not connected		
GP Input/Output 4	GPIO4	6	16	N/C	Not connected		
GP Input/Output 5	GPIO5	7	17	N/C	Not connected		
GP Input/Output 6	GPIO6	8	18	N/C	Not connected		
GP Input/Output 7	GPIO7	9	19	N/C	Not connected		
Ground	GND	10	20	GND	Ground		

6.15 SMB/I²C (P1600)

The module can communicate with other switching elements via the SMBus or I²C protocol. The connections for this are realized in a 2x5-pin socket. The SMBus signals are processed by the chipset, the I²C signals by the SIO chip.



Fig. 17: CB1076 SMB-I2C socket

Pin assignment SMB/I ² C connector							
Description	Name	Pin		Name	Description		
Supply voltage 3.3 V	3.3 V	1	6	GND	Ground		
SMBus Clock	SMBCLK	2	7	SMBDAT	SMBus Data		
SMBus Alarm	SMBALERT#	3	8	SVCC	Standby supply 5 V		
I ² C-Bus Clock	I2CLK	4	9	I2DAT	I ² C-Bus Data		
Supply voltage 5 V	VCC	5	10	GND	Ground		

6.16 PCIe x4 (P1205/P1206/P1204/P1201)

Four PCI-Express x4 expansion card slots are available on the CB1076 board. x1 expansion cards can also be operated in these slots.



Fig. 18: CB1076 PCIe x4 socket

Pin assignment PCI-Express x4 socket							
Description	Name	Р	in	Name	Description		
Hot Plug Detect 1	PRSNT1	A1	B1	12 V	Supply voltage 12 V		
Supply voltage 12 V	12 V	A2	B2	12 V	Supply voltage 12 V		
Supply voltage 12 V	12 V	A3	B3	RSVD	Not connected		
Ground	GND	A4	B4	GND	Ground		
Not connected	ТСК	A5	B5	SMBCLK	SMBus Clock PCle		
Not connected	TDI	A6	B6	SMBDAT	SMBus Data PCIe		
Not connected	TDO	A7	B7	GND	Ground		
Not connected	TMS	A8	B8	3.3 V	Supply voltage 3.3 V		
Supply voltage 3.3 V	3.3 V	A9	B9	TRST	Not connected		
Supply voltage 3.3 V	3.3 V	A10	B10	S3.3V	Standby voltage 3.3 V		
PCle Reset -	PERST#	A11	B11	WAKE#	Link Reactivation -		
Ground	GND	A12	B12	RSVD	Not connected		
Reference Clock +	REFCLK	A13	B13	GND	Ground		
Reference Clock -	REFCLK#	A14	B14	PET0	Transmit Lane 0 +		
Ground	GND	A15	B15	PET0#	Transmit Lane 0 -		
Receive Lane 0 +	PER0	A16	B16	GND	Ground		
Receive Lane 0 -	PER0#	A17	B17	PRSNT2#	PCIe Clock Enable -		
Ground	GND	A18	B18	GND	Ground		
Not connected	RSVD	A19	B19	PET1	Transmit Lane 1 +		
Ground	GND	A20	B20	PET1#	Transmit Lane 1 -		
Receive Lane 1 +	PER1	A21	B21	GND	Ground		
Receive Lane 1 -	PER1#	A22	B22	GND	Ground		
Ground	GND	A23	B23	PET2	Transmit Lane 2 +		
Ground	GND	A24	B24	PET2#	Transmit Lane 2 -		
Receive Lane 2 +	PER2	A25	B25	GND	Ground		
Receive Lane 2 -	PER2#	A26	B26	GND	Ground		
Ground	GND	A27	B27	PET3	Transmit Lane 3 +		
Ground	GND	A28	B28	PET3#	Transmit Lane 3 -		
Receive Lane 3 +	PER3	A29	B29	GND	Ground		
Receive Lane 3 -	PER3#	A30	B30	RSVD	Not connected		
Ground	GND	A31	B31	PRSNT2#	Hot Plug Detect 1		
Not connected	RSVD	A32	B32	GND	Ground		

6.17 PCIe x1 (P1200/P1203)

Two PCI-Express x1 expansion card slots are available on the CB1076 board.



Fig. 19: CB1076 PCIe x1 socket

NOTICE

Observe pin assignment

In the pin assignment table below, note that for certain signals there are necessary differences between the different PCIe-x1 connectors on the board. This applies to the clock signals (A13, A14), the receive signals (A16, A17) and the transmit signals (B14, B15).

Pin assignment PCI-Express x1 socket								
Description	Name	Pin		Name	Description			
Hot Plug Detect 1	PRSNT1#	A1	B1	12 V	Supply voltage 12 V			
Supply voltage 12 V	12 V	A2	B2	12 V	Supply voltage 12 V			
Supply voltage 12 V	12 V	A3	B3	RSVD	Not connected t			
Ground	GND	A4	B4	GND	Ground			
Not connected	TCK	A5	B5	SMBCLK	SMBus Clock PCle			
Not connected	TDI	A6	B6	SMBDAT	SMBus Data PCIe			
Not connected	TDO	A7	B7	GND	Ground			
Not connected	TMS	A8	B8	3.3 V	Supply voltage 3.3 V			
Supply voltage 3.3 V	3.3 V	A9	B9	TRST	Not connected			
Supply voltage 3.3 V	3.3 V	A10	B10	S3.3V	Standby voltage 3.3 V			
PCIe Reset -	PERST#	A11	B11	PEWAKE#	Link Reactivation			
Ground	GND	A12	B12	RSVD	Not connected			
Reference Clock +	REFCLK	A13	B13	GND	Ground			
Reference Clock -	REFCLK#	A14	B14	PET0	Transmit Lane 0 +			
Ground	GND	A15	B15	PET0#	Transmit Lane 0 -			
Receive Lane 0 +	PER0	A16	B16	GND	Ground			
Receive Lane 0 -	PER0#	A17	B17	PRSNT2#	Hot Plug Detect 1			
Ground	GND	A18	B18	GND	Ground			
6.18 PCIe x16 (P1202)

A slot for a PCIe x16 card is available on the CB1076 board. PCIe x16 graphics cards, x1 or x4 expansion cards can be used in this slot.



Fig. 20: CB1076 PCIe x16 socket

Pin assignment PCI-Express x16 socket

Hot Plug Detect 1- PRNT1# A1 B1 12 V Supply voltage 12 V Supply voltage 12 V 12 V A2 B2 12 V Supply voltage 12 V Ground GND A4 B4 GND Ground Test Clock TCK A5 B5 SMBCLK SMBus Clock PCIe Not connected TD0 A7 B7 GND Ground Not connected TD0 A7 B7 GND Ground Not connected TMS A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A9 B9 TST Not connected Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Stanby voltage 3.3 V Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Stanby voltage 1.2 V Ground GND A12 B12 RSVD Not connected RSVD Reference Clock + REFCLK A18 B16 GND Ground Gn	Description	Name	Р	in	Name	Description
Supply voltage 12 V 12 V A2 B2 12 V Supply voltage 12 V Supply voltage 12 V 12 V A3 B3 RSVD Reserved Ground GND A4 B4 GND Ground Test Clock TCK A5 B5 SMBDAT SMBus Data PCIe Not connected TD0 A6 B6 SMBDAT SMBus Data PCIe Not connected TD0 A7 B7 GND Ground Not connected TD0 A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A9 B9 TRST Not connected Supply voltage 3.3 V 3.3 V A9 B1 TRST Not connected Reference Clock + REFCLK A13 B11 WAKE# Link Reactivation - Ground GND A16 B16 GND Ground Receive Lane 0 + PERO A16 B16 GND Ground Receive Lane 0 - PERO	Hot Plug Detect 1 -	PRSNT1#	A1	B1	12 V	Supply voltage 12 V
Supply voltage 12 V12 VA3B3RSVDReservedGroundGNDA4B4GNDGroundTest ClockTCKA5B5SMBCLKSMBus Data PCIeNot connectedTDOA7B7GNDGroundNot connectedTDOA7B7GNDGroundNot connectedTMSA8B83.3 VSupply voltage 3.3 VSupply voltage 3.3 V3.3 VA9B9TRSTNot connectedSupply voltage 3.3 V3.3 VA10B10S.3.3 VStandby voltage 3.3 VPCle ResetPERST#A11B11WAKE#Link Reactivation -GroundGNDA12B12RSVDNot connectedReference Clock +REFCLKA13B13GNDGroundReceive Lane 0 +PERO#A16B16GNDGroundReceive Lane 0 +PERO#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA20B20PET1#Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 +GroundGNDA23B23PET2Transmit Lane 1 +GroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 1 +GroundGNDA28B23PET3Transmit Lane 3 -Receive Lane 1 +PER2A25GSDGroundGround	Supply voltage 12 V	12 V	A2	B2	12 V	Supply voltage 12 V
Ground GND A4 B4 GND Ground Test Clock TCK A5 B5 SMBCLK SMBus Data PCle Not connected TDO A7 B7 GND Ground Not connected TMS A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Standby voltage 3.3 V Ground GND A12 B12 RSVD Not connected Ground GND A12 B12 RSVD Not connected Ground GND A12 B12 RSVD Not connected Reference Clock + REFCLK A13 B14 PETO Transmit Lane 0 + Ground GND A15 B15 PETO# Transmit Lane 0 + Receive Lane 0 + PERO A16 B10 Ground Ground Not connected RSVD A19 B19 PET1 Transmit Lane 1 + Ground GND <	Supply voltage 12 V	12 V	A3	B3	RSVD	Reserved
Test Clock TCK A5 B5 SMBCLK SMBus Clock PCle Not connected TD0 A7 B7 GND Ground Not connected TD0 A7 B7 GND Ground Not connected TMS A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Standby voltage 3.3 V PCle Reset PERST# A11 B11 WAKE# Link Reactivation - Ground GND A12 B12 RSVD Not connected Reference Clock + REFCLK A13 B13 GND Ground Coround Receive Lane 0 + PERO# A16 B16 GND Ground Ground GND A18 B18 GND Ground Not connected RSVD A19 B19 PET1 Transmit Lane 1 + Ground GND A20 B20 PET1# Transmit Lane 1 - Receive Lane 1 + PE	Ground	GND	A4	B4	GND	Ground
Not connectedTDIA6B6SMBDATSMBus Data PCleNot connectedTDOA7B7GNDGroundNot connectedTMSA8B83.3 VSupply voltage 3.3 VSupply voltage 3.3 V3.3 VA10B10S3.3VStandby voltage 3.3 VPCle ResetPERST#A11B11WAKE#Link Reactivation -GroundGNDA12B12RSVDNot connectedReference Clock +REFCLK#A13B13GNDGroundReference Clock -REFCLK#A14B14PETOTransmit Lane 0 +GroundGNDA15B15PETO#Transmit Lane 0 +GroundGNDA18B18GNDGroundReceive Lane 0 +PERO#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GroundGroundGroundGNDA22B22GNDGroundGroundGNDA24B21PET2#Transmit Lane 2 -Receive Lane 2 +PER2#A26B26GNDGroundGroundGNDA24B21PET3Transmit Lane 3 +GroundGNDA28B23GROUGroundReceive Lane 3	Test Clock	TCK	A5	B5	SMBCLK	SMBus Clock PCIe
Not connected TDO A7 B7 GND Ground Not connected TMS A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Standby voltage 3.3 V Supply voltage 3.3 V 3.3 V A10 B10 S3.3 V Standby voltage 3.3 V PCIe Reset PERST# A11 B11 WAKE# Link Reactivation - Ground GND A12 B12 RSVD Not connected Reference Clock + REFCLK# A13 B14 PET0 Transmit Lane 0 - Receive Lane 0 - PERØ# A17 B17 PRSNT2# Hot Plug Detect 2 - Ground GND A18 B18 GND Ground Ground Not connected RSVD A19 B19 PET1 Transmit Lane 1 - Ground GND A22 B22 GND Ground Ground Receive Lane 1 + PER1 A21 B21 PET2	Not connected	TDI	A6	B6	SMBDAT	SMBus Data PCIe
Not connected TMS A8 B8 3.3 V Supply voltage 3.3 V Supply voltage 3.3 V 3.3 V A9 B9 TRST Not connected Supply voltage 3.3 V 3.3 V A10 B10 S3.3V Standby voltage 3.3 V PCle Reset PERST# A11 B11 WAKE# Link Reactivation - Ground GND A12 B12 RSVD Not connected Reference Clock + REFCLK# A14 B14 PET0 Transmit Lane 0 + Ground GND A15 B15 PET0# Transmit Lane 0 - Receive Lane 0 + PER0# A16 B16 GND Ground Not connected RSVD A18 B18 GND Ground Not connected RSVD A18 B19 PET1# Transmit Lane 1 + Ground GND A22 B22 GND Ground Ground Receive Lane 1 + PER1# A22 B22 GND Ground Ground<	Not connected	TDO	A7	B7	GND	Ground
Supply voltage 3.3 V3.3 VA9B9TRSTNot connectedSupply voltage 3.3 V3.3 VA10B10S3.3 VStandby voltage 3.3 VPCle ResetPERST#A11B11WAKE#Link Reactivation -GroundGNDA12B12RSVDNot connectedReference Clock +REFCLK#A13B13GNDGroundReceive Lane 0 +PEROA16B16GNDGroundReceive Lane 0 -PERO#A16B16GNDGroundReceive Lane 0 -PERO#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundReceive Lane 1 -PER1#A22B22GNDGroundGroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET3Transmit Lane 3 +GroundGNDA28B26GNDGroundReceive Lane 2 -PER2#A26B26GNDGroundReceive Lane 3 +PER3#A30B30RSVDNot connectedGroundGNDA28B29GNDGroundReceive Lane 3 +PER3#A30B30RSVDNot connectedGrou	Not connected	TMS	A8	B8	3.3 V	Supply voltage 3.3 V
Supply voltage 3.3 V3.3 VA10B10S3.3 VStandby voltage 3.3 VPCIe ResetPERST#A11B11WAKE#Link Reactivation -GroundGNDA12B12RSVDNot connectedReference Clock +REFCLKA13B13GNDGroundReceive Lane 0 +PER0A15B15PET0#Transmit Lane 0 +GroundGNDA15B15PET0#Transmit Lane 0 -Receive Lane 0 +PER0A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1#A21B21GroundGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2#A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B29PET3#Transmit Lane 3 -Receive Lane 3 +PER3#A29B29GNDGroundGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundGroundGNDA28B29GNDGround	Supply voltage 3.3 V	3.3 V	A9	B9	TRST	Not connected
PCIe ResetPERST#A11B11WAKE#Link Reactivation -GroundGNDA12B12RSVDNot connectedReference Clock +REFCLKA13B13GNDGroundGroundGNDA15B15PET0Transmit Lane 0 +GroundGNDA15B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA22B22GNDGroundGroundGNDA24B24PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET3Transmit Lane 2 +GroundGNDA24B24PET3Transmit Lane 3 +GroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28GNDGroundGroundGNDA28B28GNDGroundGroundGNDA32B32RSVDNot connectedGroundGNDA32B32GNDGroundGroundGNDA34B34PET4Transmit Lane 3 +<	Supply voltage 3.3 V	3.3 V	A10	B10	S3.3V	Standby voltage 3.3 V
GroundGNDA12B12RSVDNot connectedReference Clock +REFCLKA13B13GNDGroundReference Clock -REFCLK#A14B14PET0Transmit Lane 0 +GroundGNDA15B15PET0#Transmit Lane 0 -Receive Lane 0 +PER0A16B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundGnudNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA24B24PET3#Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA32B32GNDGroundReceive Lane 3 -PER3#A30B33PET4Transmit Lane 4 -Receive Lane 3	PCIe Reset	PERST#	A11	B11	WAKE#	Link Reactivation -
Reference Clock +REFCLKA13B13GNDGroundReference Clock -REFCLK#A14B14PET0Transmit Lane 0 +GroundGNDA15B15PET0#Transmit Lane 0 -Receive Lane 0 +PER0A16B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1#A21B21GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 +PER2A26B26GNDGroundGroundGNDA28B28PET3#Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B33PET4Transmit Lane 4 +GroundGNDA31B31PESNT2#Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 +<	Ground	GND	A12	B12	RSVD	Not connected
Reference Clock -REFCLK#A14B14PET0Transmit Lane 0 +GroundGNDA15B15PET0#Transmit Lane 0 -Receive Lane 0 +PER0A16B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3#Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A29B29GNDGroundGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not con	Reference Clock +	REFCLK	A13	B13	GND	Ground
GroundGNDA15B15PET0#Transmit Lane 0 -Receive Lane 0 +PER0A16B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detct 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA22B22GNDGroundGroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 3 +GroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 +GroundGNDA28B29GNDGroundGroundGNDA31B31PRSNT2#Hot Plug Detct 2 -Not connectedRSVDA32B32GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detct 2 -Not connectedRSVDA32B32GNDGroundGroundGNDA34B34PET4#Transmit Lane 4 +GroundGNDA34B34 <t< td=""><td>Reference Clock -</td><td>REFCLK#</td><td>A14</td><td>B14</td><td>PET0</td><td>Transmit Lane 0 +</td></t<>	Reference Clock -	REFCLK#	A14	B14	PET0	Transmit Lane 0 +
Receive Lane 0 +PER0A16B16GNDGroundReceive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundReceive Lane 1 -PER1#A22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 -PER2#A26B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA32B34PET4#Transmit Lane 4 +Receive Lane 4 +PER4A36B35GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 5 +GroundGNDA37B37PET5Transmit Lane 5 -Receive Lane 4 +	Ground	GND	A15	B15	PET0#	Transmit Lane 0 -
Receive Lane 0 -PER0#A17B17PRSNT2#Hot Plug Detect 2 -GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA22B22GNDGroundGroundGNDA22B22GNDGroundGroundGNDA24B24PET2#Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA24B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA32B33PET4Transmit Lane 4 +GroundGNDA34B34PET5#Transmit Lane 5 -GroundGNDA37B35GNDGroundGroundGNDA38B38PET5#T	Receive Lane 0 +	PER0	A16	B16	GND	Ground
GroundGNDA18B18GNDGroundNot connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundReceive Lane 1 -PER1#A22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundGroundGNDA31B31PRSNT2#Hot ConnectedGroundGNDA32B32GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedRSVDA32B32GNDGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A36B36GNDGroundReceive Lane 5 +PER5A30B30RCoundGroundGroundGNDA37B37PET5Transmit Lane 5 - <td>Receive Lane 0 -</td> <td>PER0#</td> <td>A17</td> <td>B17</td> <td>PRSNT2#</td> <td>Hot Plug Detect 2 -</td>	Receive Lane 0 -	PER0#	A17	B17	PRSNT2#	Hot Plug Detect 2 -
Not connectedRSVDA19B19PET1Transmit Lane 1 +GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundGroundGNDA34B34PET4#Transmit Lane 5 +GroundGNDA34B34PET4#Transmit Lane 5 +GroundGNDA38B38PET5Transmit Lane 5 +GroundGNDA38B38PET5Transmit Lane 5 +GroundGNDA38B38PET5Transmit Lane 5 -Receive Lane 5 +PER5 <td>Ground</td> <td>GND</td> <td>A18</td> <td>B18</td> <td>GND</td> <td>Ground</td>	Ground	GND	A18	B18	GND	Ground
GroundGNDA20B20PET1#Transmit Lane 1 -Receive Lane 1 +PER1A21B21GNDGroundReceive Lane 1 -PER1#A22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA27B27PET3Transmit Lane 3 -GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundGroundGNDA37B37PET5Transmit Lane 5 -GroundGNDA38B38PET5#Transmit Lane 5 -GroundGNDA34B40GNDGroundGroundGNDA34B41PET6Transmit Lane 6 -GroundGNDA41B41 </td <td>Not connected</td> <td>RSVD</td> <td>A19</td> <td>B19</td> <td>PET1</td> <td>Transmit Lane 1 +</td>	Not connected	RSVD	A19	B19	PET1	Transmit Lane 1 +
Receive Lane 1 +PER1A21B21GNDGroundReceive Lane 1 -PER1#A22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 5 +GroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 +GroundGNDA44B44GNDGroundReceive Lane 5 +PER6#A43	Ground	GND	A20	B20	PET1#	Transmit Lane 1 -
Receive Lane 1 -PER1#A22B22GNDGroundGroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA27B27PET3Transmit Lane 3 -GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6# </td <td>Receive Lane 1 +</td> <td>PER1</td> <td>A21</td> <td>B21</td> <td>GND</td> <td>Ground</td>	Receive Lane 1 +	PER1	A21	B21	GND	Ground
GroundGNDA23B23PET2Transmit Lane 2 +GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 -PER2#A26B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6#A44B44GNDGroundReceive Lane 6 -PER6# </td <td>Receive Lane 1 -</td> <td>PER1#</td> <td>A22</td> <td>B22</td> <td>GND</td> <td>Ground</td>	Receive Lane 1 -	PER1#	A22	B22	GND	Ground
GroundGNDA24B24PET2#Transmit Lane 2 -Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 -PER2#A26B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 +PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6#A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A23	B23	PET2	Transmit Lane 2 +
Receive Lane 2 +PER2A25B25GNDGroundReceive Lane 2 -PER2#A26B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6#A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A24	B24	PET2#	Transmit Lane 2 -
Receive Lane 2 -PER2#A26B26GNDGroundGroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 +PER4A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 2 +	PER2	A25	B25	GND	Ground
GroundGNDA27B27PET3Transmit Lane 3 +GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 2 -	PER2#	A26	B26	GND	Ground
GroundGNDA28B28PET3#Transmit Lane 3 -Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA32B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA41B41PET6#Transmit Lane 6 -Receive Lane 6 +PER6#A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A27	B27	PET3	Transmit Lane 3 +
Receive Lane 3 +PER3A29B29GNDGroundReceive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGround	Ground	GND	A28	B28	PET3#	Transmit Lane 3 -
Receive Lane 3 -PER3#A30B30RSVDNot connectedGroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 3 +	PER3	A29	B29	GND	Ground
GroundGNDA31B31PRSNT2#Hot Plug Detect 2 -Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -GroundGNDA38B39GNDGroundReceive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6#A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 3 -	PER3#	A30	B30	RSVD	Not connected
Not connectedRSVDA32B32GNDGroundNot connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -GroundGNDA38B39GNDGroundReceive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A31	B31	PRSNT2#	Hot Plug Detect 2 -
Not connectedRSVDA33B33PET4Transmit Lane 4 +GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Not connected	RSVD	A32	B32	GND	Ground
GroundGNDA34B34PET4#Transmit Lane 4 -Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Not connected	RSVD	A33	B33	PET4	Transmit Lane 4 +
Receive Lane 4 +PER4A35B35GNDGroundReceive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A34	B34	PET4#	Transmit Lane 4 -
Receive Lane 4 -PER4#A36B36GNDGroundGroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 4 +	PER4	A35	B35	GND	Ground
GroundGNDA37B37PET5Transmit Lane 5 +GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 4 -	PER4#	A36	B36	GND	Ground
GroundGNDA38B38PET5#Transmit Lane 5 -Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A37	B37	PET5	Transmit Lane 5 +
Receive Lane 5 +PER5A39B39GNDGroundReceive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A38	B38	PET5#	Transmit Lane 5 -
Receive Lane 5 -PER5#A40B40GNDGroundGroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 5 +	PER5	A39	B39	GND	Ground
GroundGNDA41B41PET6Transmit Lane 6 +GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Receive Lane 5 -	PER5#	A40	B40	GND	Ground
GroundGNDA42B42PET6#Transmit Lane 6 -Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A41	B41	PET6	Transmit Lane 6 +
Receive Lane 6 +PER6A43B43GNDGroundReceive Lane 6 -PER6#A44B44GNDGround	Ground	GND	A42	B42	PET6#	Transmit Lane 6 -
Receive Lane 6 - PER6# A44 B44 GND Ground	Receive Lane 6 +	PER6	A43	B43	GND	Ground
	Receive Lane 6 -	PER6#	A44	B44	GND	Ground
Ground GND A45 B45 PET7 Transmit Lane 7 +	Ground	GND	A45	B45	PET7	Transmit Lane 7 +
Ground GND A46 B46 PET7# Transmit Lane 7 -	Ground	GND	A46	B46	PET7#	Transmit Lane 7 -
Receive Lane 7 + PER7 A47 B47 GND Ground	Receive Lane 7 +	PER7	A47	B47	GND	Ground

Pin assignment PCI-Express x16 socket					
Description	Name	P	in	Name	Description
Receive Lane 7 -	PER7#	A48	B48	PRSNT2#	Hot Plug Detect 2 -
Ground	GND	A49	B49	GND	Ground
Not connected	N/C	A50	B50	PET8	Transmit Lane 8 +
Ground	GND	A51	B51	PET8#	Transmit Lane 8 -
Receive Lane 8 +	PER8	A52	B52	GND	Ground
Receive Lane 8 -	PER8#	A53	B53	GND	Ground
Ground	GND	A54	B54	PET9	Transmit Lane 9 +
Ground	GND	A55	B55	PET9#	Transmit Lane 9 -
Receive Lane 9 +	PER9	A56	B56	GND	Ground
Receive Lane 9 -	PER9#	A57	B57	GND	Ground
Ground	GND	A58	B58	PET10	Transmit Lane 10 +
Ground	GND	A59	B59	PET10#	Transmit Lane 10 -
Receive Lane 10 +	PER10	A60	B60	GND	Ground
Receive Lane 10 -	PER10#	A61	B61	GND	Ground
Ground	GND	A62	B62	PET11	Transmit Lane 11 +
Ground	GND	A63	B63	PET11#	Transmit Lane 11 -
Receive Lane 11 +	PER11	A64	B64	GND	Ground
Receive Lane 11 -	PER11#	A65	B65	GND	Ground
Ground	GND	A66	B66	PET12	Transmit Lane 12 +
Ground	GND	A67	B67	PET12#	Transmit Lane 12 -
Receive Lane 12 +	PER12	A68	B68	GND	Ground
Receive Lane 12 -	PER12#	A69	B69	GND	Ground
Ground	GND	A70	B70	PET13	Transmit Lane 13 +
Ground	GND	A71	B71	PET13#	Transmit Lane 13 -
Receive Lane 13+	PER13	A72	B72	GND	Ground
Receive Lane 13-	PER13#	A73	B73	GND	Ground
Ground	GND	A74	B74	PET14	Transmit Lane 14 +
Ground	GND	A75	B75	PET14#	Transmit Lane 14 -
Receive Lane 14 +	PER14	A76	B76	GND	Ground
Receive Lane 14 -	PER14#	A77	B77	GND	Ground
Ground	GND	A78	B78	PET15	Transmit Lane 15 +
Ground	GND	A79	B79	PET15#	Transmit Lane 15 -
Receive Lane 15 +	PER15	A80	B80	GND	Ground
Receive Lane 15 -	PER15#	A81	B81	DDAT- PRSNT	Reserved
Ground	GND	A82	B82	RSVD	Not connected

6.19 LAN 2.5 Gbit and USB 3.1Gen2 (P1402/P1401/P1400)

The USB socket and LAN socket are implemented as combined sockets, each providing two USB ports and one LAN port. In this way, six USB channels and three LAN ports are led out with all board variants.

All USB channels support the 3.1 Gen2 specification.

All necessary settings for USB can be made by the BIOS. Note that the "USB Mouse and Keyboard" functionality of the BIOS setup is only required if the operating system does not provide USB support. Do not select this function for settings in the setup and for booting Windows with a connected USB mouse and keyboard, because this would result in significant performance limitations.

The individual USB interfaces can supply a current of up to 900 mA and are electronically protected.

You can connect 10BaseT, 100BaseT, 1000BaseT and 2500BaseT-compatible network components to the P1401 A and P1402 A LAN ports. The required speed is selected automatically. TSN, Auto-Cross and Auto-Negotiate are available as well as PXE and RPL functionality. Controller is Intel® i219 for Lan1 1Gbit with WOL (P1400 A) and i226 for LAN2 and 3, 2.5Gbit (P1401 A and P1402 A).



Fig. 21: CB1076 LAN USB socket

Pin assignment LAN socket i219 (P1400)				
Pin	Name	Description		
1	LAN10	LAN line 1 +		
2	LAN10#	LAN line 1 -		
3	LAN11	LAN line 2 +		
4	LAN11#	LAN line 2 -		
5	LAN12	LAN line 3 +		
6	LAN12#	LAN line 3 -		
7	LAN13	LAN line 4 +		
8	LAN13#	LAN line 4 -		

Pin assignment LAN socket i226 (P1401/P1402)				
Pin	Name	Description		
1	LAN20/30	LAN line 1 +		
2	LAN20#/30#	LAN line 1 -		
3	LAN21/31	LAN line 2 +		
4	LAN21#/31#	LAN line 2 -		
5	LAN22/32	LAN line 3 +		
6	LAN22#/32	LAN line 3 -		
7	LAN23//33	LAN line 4 +		
8	LAN23#/33#	LAN line 4 -		

Real-time applications

The Ethernet port connected via PCIe is usually suitable for cycle times <= 1 ms and for distributed clock applications with EtherCAT.

The Ethernet port integrated in the chipset is usually suitable for real-time Ethernet applications with cycle times > 1 ms (without distributed clocks).

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Pin assi	Pin assignment USB3.1 Gen2 socket (P1400/P1401/P1402):				
Pin	Signal	Description			
1	VCC	Supply voltage 5 V			
2	D-	Data - (USB 3.1)			
3	D+	Data + (USB 3.1)			
4	GND	Ground			
5	SSRX-	Receive line - (USB 3.1)			
6	SSRX+	Receive line + (USB 3.1)			
7	GND	Ground			
8	SSTX-	Transmit line - (USB 3.1)			
9	SSTX+	Transmit line + (USB 3.1)			

6.20 DVI-D (P1500A/B)

The CB1076 has two DVI-D sockets in a combined component (Foxconn QH11121-DBDF-4F). You can connect digital DVI or HDMI displays to both sockets. Analog signals are not available on this connector. The CPU graphics support a maximum of three independent displays.



Fig. 22: CB1076 DVI-D socket

Pin assignment DVI-D:				
Pin	Name	Description		
1	TMDSDAT2#	DVI data 2 -		
2	TMDSDAT2	DVI data 2 +		
3	GND	Ground		
4	N/C	Reserved		
5	N/C	Reserved		
6	DDC CLK	DDC Clock (DVI/VGA)		
7	DDC DAT	DDC Data (DVI/VGA)		
8	N/C	Reserved		
9	TMDSDAT1#	DVI data 1 -		
10	TMDSDAT1	DVI data 1 +		
11	GND	Ground		
12	N/C	Reserved		
13	N/C	Reserved		
14	VCC	Supply voltage 5 V		
15	GND	Ground		
16	HP_DETECT	Hot Plug Detect		
17	TMDSDAT0#	DVI data 0 -		
18	TMDSDAT0	DVI data 0 +		
19	GND	Ground		
20	N/C	Reserved		
21	N/C	Reserved		
22	GND	Ground		
23	TMDS CLK	DVI-Clock		
24	TMDS CLK#	DVI-Clock		

6.21 Serial interface COM1 (P1403)

The serial interface COM1 is led out via a 9-pin standard DSUB socket. The signals correspond to the RS232 standard.

You can set the port address and the interrupt used with the help of the BIOS setup.



Fig. 23: CB1076 COM1 socket

Pin assignment COM1:					
Description	Name	Р	in	Name	Description
Data Carrier Detect	DCD#	1	6	DSR#	Data Set Ready
Receive Data	RXD	2	7	RTS#	Request to Send
Transmit Data	TXD	3	8	CTS#	Clear to Send
Data Terminal Ready	DTR#	4	9	RI#	Ring Indicator
Ground	GND	5			

6.22 Display Port (P1501)

A corresponding standard socket

(Foxconn 3VC11203-D7AB-4H) 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.



Fig. 24: CB1076 Display Port

Pin assignment Display Port					
Description	Signal	Pi	in	Signal	Description
Display Port Lane 0 +	LO	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

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

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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

Aptio Setup - AMI Main Advanced Chipset Security	Boot Save & Exit	
Board Information Board Revision	CB1076	
Bios Version Processor Information	0.08	
Name Type	RaptorLake DT 13th Gen Intel(R) Core (TM) i7—13700E	
Speed ID Stepping	1900 MHz 0xB0671 BO	: Select Screen
Number of Efficient-cores Number of Performance-cores Microcode Revision GT Info	8Core(s) / 8Thread(s) 8Core(s) / 8Thread(s) 123 0xA780	<pre>Fil: Select Item Enter: Select +/-: Change Opt. Fil: General Help F2: Previous Values F3: Optimized Defaults</pre>
IGFX GOP Version Memory RC Version Total Memory Memory Frequency	17.0.1081 0.0.4.219 32768 MB 4000 MHz	F4: Save & Reset ESC: Exit
PCH Information Name Stepping	PCH-S B1	
ME FW Version	16.1.30.2361	
System Date System Time	[Fri 02/23/2024] [07:12:55]	

BIOS entry	Option
Board information	
Board	None
Revision	None
Bios Version	None
Processor Information	i
Name	None
Туре	None
Speed	None
ID	None
Stepping	None
Number of Efficient-cores	None
Number of Performance-cores	None
Microcode Revision	None
GT Info	None
IGFX GOP Version	None
Memory RC Version	None
Total Memory	None
Memory Frequency	None
PCH Information	
Name	None
Stepping	None
	i
ME FW Version	None
System Date	Here you can change the system date.
System Time	Here you can change the system time.

Advanced Menu 7.3

Aptio Setup - AMI Main **Advanced** Chipset Security Boot Save & Exit Firmware Update

	······································	I
Power-Supply Type	[ATX]	Select the Type of the Power
Show postcode on screen	[Disabled]	Supply: AT/ATX
▶ RC ACPI Settings		
► CPU Configuration		
Trusted Compting		
► ACPI Settings		
▶ Hardware Monitor		
▶ AMI Graphic Output Protocol Ploicy		
PCI Subsystem Setting		
▶ USB Configuration		
Network Stack Configuration		
▶ Power Controller Options		
NVME Configuration		
TLs Auth Configuration		
▶ Intel(R) RapidStorage Technology		→←: Select Screen
▶ Intel(R) Ethernet Controller I226-IT ·	- 00:01:05:9C87:9C	↑↓: Select Item
▶ Intel(R) Ethernet Controller I226-IT ·	- 00:01:05:9C87:9D	Enter: Select
		+/-: Change Opt.
▶ Driver Health		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Reset
		ESC: Exit
L		

BIOS entry	Option
Power-Supply Type	ATX / AT
Show Postcode on screen	Disabled / Enabled
RC ACPI Settings	Submenu see: <u>RC ACPI Settings [) 48]</u>
CPU Configuration	Submenu see: CPU Configuration [▶ 49]
Trusted Computing	Submenu see: Trusted Computing [> 53]
ACPI Settings	Submenu see: <u>ACPI Settings Disabled [> 54]</u>
Hardware Monitor	Submenu see: <u>Hardware Monitor</u> [▶ <u>55]</u>
AMI Graphic Output Protocol Policy	Submenu see: <u>AMI Graphic Output Protocol Policy</u> [▶ <u>56]</u>
PCI Subsystem Settings	Submenu see: PCI Subsystem Settings [> 56]
USB Configuration	Submenu see: USB Configuration [> 57]
Network Stack Configuration	Submenu see: <u>Network Stack Configuration</u> enabled [▶ 58]
Power Controller Options	Submenu see: Power Controller Options [> 59]
NVMe Configuration	Submenu see: <u>NVMe Configuration [▶ 60]</u>
TIs Auth Configuration	Submenu see: <u>TLs Auth Configuration [) 61]</u>
Intel ® Rapid Storage Technology	Submenu see: Intel Rapid Storage Technology [▶_63]
Intel® Ethernet Controller I226-IT – 00:01:05:9C:87:9C	Submenu see: Intel Ethernet Controller I226-IT [▶_64]
Intel® Ethernet Controller I226-IT - 00:01:05:9C:87:9D	Submenu see: Intel Ethernet Controller I226-IT [▶_65]
Driver Health	None

7.3.1 RC ACPI Settings

Aptio Setup - AMI Advanced

RC ACPI Settings		PTID Support will be loaded if enabled.
PTID Support PECI Access Method Native PCIE Enable BDAT ACPI Table Support ACPI Debug DUIC Enable	[Enabled] [Direct I/O] [Enabled] [Disabled] [Disabled]	
PUIS ENADIE	[DISADIEG]	→-: Select Screen
PCI Delay Optimization	[Disabled]	↑↓: Select Item
MSI enabled	[Enabled]	+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

BIOS entry	Options
RC ACPI Settings	
PTID Support	Enabled / Disabled
PECI Access Method	Direct I/O / ACPI
Native PCIE Enable	Enabled / Disabled
BDAT ACPI Table Support	Disabled / Enabled
ACPI Debug	Disabled / Enabled
PUIS Enable	None
PCI Delay Optimization	Disabled / Enabled
MSI enabled	Enabled / Disabled

CPU Configuration 7.3.2

Aptio Setup - AMI Advanced

CPU	Configuration	

CPU Configuration	<u></u>	Displays the E-core Information
Efficient-core Information		
 Performance-core Information 		
7.5	0.50(71	
ID Prand String	13th Con Intol (P)	
Brand String	Core (TM) $i7-13100F$	
VMX	Supported	
SMX /TXT	Not Supported	
01111, 1111	Noe Supported	
C6DRAM	[Enabled]	
CPU Flex Ratio Override	[Disabled]	
CPU Flex Ratio Settings	19	
Hardware Prefetcher	[Enabled]	
Adjacent Cache Line Prefetch	[Enabled]	
Intel (VMX) Virtualization	[Enabled]	→ : Select Screen
Technology		↑↓: Select Item
PECI	[Enabled]	Enter: Select
AVX	[Enabled]	+/-: Change Opt.
Active Performance-cores	[All]	F1: General Help
Active Efficient-cores	[All]	F2: Previous Values
Hyper—Threading	[Disabled]	F3: Optimized Defaults
BIST	[Disabled]	F4: Save & Reset
AP threads Idle Manner	[MWAIT Loop]	ESC: Exit
AES	[Enabled]	
MachineCheck	[Enabled]	
Intel Trusted Execution Technology	[Disabled]	
Alias Check Request	[Enabled]	
DPR Memory Size (MB)	4	
MachineCheck	[Enabled]	
CPU SMM Enhancement	▼	
Total MemoryEncryption	[Disabled]	

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BIOS entry	Options	
CPU Configuration		
Efficient-core Information	Submenu see:	
Performance-core Information	Submenu see: Efficient-core Information [> 51]	
ID	None	
Brand String	None	
VMX	None	
SMX/TXT	None	
C6DRAM	Enabled / Disabled	
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	
AVX	Enabled / Disabled	
Active Performance-cores	All / 1 / 2 / 3	
Efficient Performance-cores	All / 1 / 2 / 3	
Hyper-Threading	Disabled / Enabled	
BIST	Disabled / Enabled	
AP threads Idle Manner	MWAIT Loop / HALT Loop / Run Loop	
AES	Enabled / Disabled	
MachineCheck	Enabled / Disabled	
Intel Trusted Execution Technology	Disabled / Enabled	
Alias Check Request	Disabled / Enabled	
DPR Memory Size (MB)	None	
Reset Aux Comment	None	
CPU SMM Enhancement	Submenu see: CPU SMM Enhancement [> 52]	
Total Memory Encryption	Disabled / Enabled	

7.3.2.1 Efficient-core Information

Aptio Setup - AMI Advanced

Efficient-core Information		
L1 Data Cache L1 Instruction L2 Cache L3 Cache	32 KB x 8 64 KB x 8 4096 KB x 2 30 MB	
		<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
Efficient-core Information	
L1 Data Cache	None
L1 Instruction	None
L2 Cache	None
L3 Cache	None

7.3.2.2 Performance-core Information

Aptio Setup - AMI Advanced

Performance-core Information		
L1 Data Cache L1 Instruction L2 Cache L3 Cache	48 KB x 8 32 KB x 8 2048 KB x 8 30 MB	
		<pre>→-: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</pre>

BIOS entry	Options
Performance-core Information	
L1 Data Cache	None
L1 Instruction	None
L2 Cache	None
L3 Cache	None



7.3.2.3 CPU SMM Enhancement

Aptio Setup - AMI Advanced

CPU SMM enhancement SMM Use Delay Indication SMM Use Block Indication	[Enabled] [Enabled]	Enable/Disable usage of SMM_DELAYED MSR for MP sync in SMI
SMM Use en-US Indication	[Enabled]	
		→ : Select Scheen ↑↓: Select Item Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F3: Optimized Defaults
		F4: Save & Reset ESC: Exit

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

7.3.3 Trusted Computing

Aptio Setup - AMI Advanced

TPM 2.0 Device Found	600 10	Enables or Disables BIOS
FILMWALE VEISION:	000.10	support for security device.
Vendor:	INTC	O.S. will not show Security
		Device. TCG EFI protocol and
Security Device Support	[Enable]	INT1A interface will not be
Active PCR banks	SHA256	available.
Available PCR banks	SHA256, SHA384, SM3	
SHA256 PCR Bank	[Enabled]	
SHA384 PCR Bank	[Disabled]	
SM3 256 PCB Bank	[Disabled]	
	[21000100]	
Pending operation	[None]	→←: Select Screen
Platform Hierarchy	[Enabled]	↑1: Select Item
Storage Hierarchy	[Enabled]	Enter: Select
Endorsement Hierarchy	[Enabled]	+/-: Change Opt
Physical Presence Spec Version	[1 3]	F1. Ceneral Help
Thysical rieschee spee version		E2. Drowiewa Walwaa
IPM 2.0 Incertacetype		F2: Fievious values
Device Select	[Auto]	F3: Optimized Deraults
		F4: Save & Reset
		ESC: Exit

BIOS entry	Options	
2M 2.0 Device Found		
Firmware Version: 600.18	None	
Vendor: INTC	None	
Security Device Support	Enable / Disable	
Active PCR banks	None	
Available PCR banks	None	
SHA256 PCR Bank	Enabled / Disabled	
SHA384 PCR Bank	Disabled / Enabled	
SM3_256 PCR 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 Disabled

Aptio Setup - AMI Advanced

ACPI Settings		Enables or Disables BIOS ACPI	
Enable ACPI Auto Configuration	[Disabled]	Auto configuration.	
Enable Hibernation Lock Legacy Resources	[Enabled] [Disabled]		
		<pre>→+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</pre>	

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

Aptio Setup - AMI Advanced

Pc Health Status	
CPU dig. : +30 'C VCCCORE : +0.78 V 5V : +5.06 V 12V : +12.49 V Memory VDD : +1.08 V 3.3V : +3.35 V FAN 1 N/A FAN 2 : +3883 RPM FAN 3 : +3883 RPM MB Temp : +26 'C Memory Temp : +29 'C PwrCtrlVCC : +5.10 V FAI : Select Item FAI : Select Item FAI : Select Item FAI : Select Item Fair : Select Screen Fi: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	

BIOS entry	Options	
PC Health Status		
CPU dig.	None	
VCCCORE	None	
5 V	None	
12 V	None	
Memory VDD	None	
3.3 V	None	
FAN1	None	
FAN 2	None	
FAN 2	None	
MB Temp	None	
Memory Temp	None	
PwrCtrlTemp	None	
PwrCtrlVCC	None	

7.3.6 AMI Graphic Output Protocol Policy

Aptio Setup - AMI Advanced

Intel(R) Graphics Controller Intel(R) GOP Driver [17.0.1081] Output Select	[DVI3[ACTIVE]]	Output Interface
		<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	
Intel® Graphics Controller Intel® GOP Driver [17.0.1081]		
Output Select	None	

7.3.7 PCI Subsystem Settings

Aptio Setup - AMI Advanced

AMI PCI Driver Version	A5.01.29	If system has Resizable BAR
PCI Settings Common for all De	vices:	option Enables or Disables
Re-Size BAR Support	[Enabled]	Resizable BAR Support.
BME DMA Mitigation	[Disabled]	
Change Settings of the Followi	ng PCI Devices:	
WARNING: Changing PCI Device(s have unwanted side effects! Sy PROCEED WITH CAUTION.) settings may stem may HANG!	
		→←: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F4. Save & Reset
		ESC: Exit

BIOS entry	Options
AMI PCI Bus Driver Version	None
PCI Device Common Settings:	
Re-Size BAR Support	Enabled / Disabled
BME DMA Mitigation	Disabled / Enabled

7.3.8 USB Configuration

Aptio Setup - AMI Advanced

	USB Configuration		Enables Legacy USB support.
	USB Module Version	34	support if no USB devices are connected. DISABLE option will
	USB Controllers:		keep USB devices available
	USB Devices: 1 Keyboard		
	Legacy USB Support	[Enabled]	
	XHCI Hand—off off	[Enabled]	
	USB Mass Storage Driver Support	[Enabled]	
	USB hardware delays and time-outs:		→←: Select Screen
	USB transfer time—out	[20 sec]	↑↓: Select Item
ļ	Device reset time-out	[20 sec]	Enter: Select
	Device power—up delay	[Auto]	+/-: Change Opt.
			F1: General Help
			F2: Previous Values
			F3: Optímized Defaults
			F4: Save & Reset
			ESC: Exit

BIOS entry	Options	
USB Configuration		
USB Module Version None		
USB Controllers: 1XHCI	None	
USB Devices: 1 Keyboard	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 enabled

Aptio Setup - AMI Advanced

Network Stack Ipv4 PXE Support Ipv4 HTTP Support Ipv6 PXE Support Ipv6 HTTP Support PXE boot wait time Media detect count	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] 0 1	Enable/Disable UEFI Network 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	Disabled / 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

NOTICE

PXE Boot available

PXE Boot is available if you set Network Stack and Ipv4 PXE support to "Enable".

7.3.10 Power Controller Options

Aptio Setup - AMI Advanced

Bootloader Version Firmware Version	1.02-05 1.02-66	Select Power line for external USB devices, if powered-down
Mainboard Serial No		
Mainboard Prod. Date (Week.Year)	-11	
Mainboard BootCount	30	
Mainboard Operation Time	21071min (351h)	
Voltage (Min/Max)	4.90V / 5.20V	
Temperature (Min/Max)	24'C /41'C	
ext. USB-Port Voltage	[Off in S3-5]	
int. USB-Port Voltage	[Off in S3-5]	
Malab Dar Mala		
WatchDogTimer Mode	[Normal Mode]	. Calast Causar
WDT OSBOOL TIMEOUL	[DISADIEd]	→←: Select Screen
		TI: Select Item
		Liller. Serect
		F1: Conoral Holp
		F2. Provious Values
		F3. Optimized Defaults
		F4. Save & Reset
		ESC. Evit
		LUC. HALL

BIOS entry	Options
Bootloader Version	None
Firmaware 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	Nomal Mode / Compatibility Mode
WDT OSBoot Timeout	Disabled / 45 / 60 / / 255 Seconds



7.3.11 NVMe Configuration

Aptio Setup - AMI Advanced

NVMe Conf:	guration	
No NVME De	vice Found	
		<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
NVMe Configuration	
No NVME Device Found	None

7.3.12 TLs Auth Configuration

Aptio Setup - AMI Advanced

Server CA Configuration	Press <enter> to configure Server CA.</enter>
Client Cert Configuration	
	<pre>: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F2: Optimized Packet</pre>
	F3: Optimized Defaults F4: Save & Reset ESC: Exit

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BIOS entry	Options
Server CA Configuration	Submenu see: Server CA Configuration [61]
Client Cert Configuration	None

7.3.12.1 Server CA Configuration

Aptio Setup - AMI Advanced

Press <Enter> to enroll cert.

Press <Enter> to enroll cert.

---: Select Screen

1: Select Item
Enter: Select
+--: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit

BIOS entry	Options
Enroll Cert	Submenu see: Enroll Cert [▶ 62]
Delete Cert	None



7.3.12.1.1 Enroll Cert

Aptio Setup - AMI Advanced

 Enroll Cert Using File Cert GUID Commit Changes and Exit Discard Changes and Exit 	Enroll Cert Using File
	: Select Screen ti: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

BIOS entry	Options	
Enroll Cert Using File	None	
Cert GUID	None	
Commit Changes and Exit	None	
Discard Changes and Exit	None	

7.3.13 Intel Rapid Storage Technology

Aptio Setup - AMI Advanced

No disks connected to System →-: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset	Intel (R) RST19.5.0.5676 RST VMD Driver	
ESC: Exit	No disks connected to System	: Select Screen ti: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

BIOS entry	Options
Intel(R) RST 19.5.0.5676 RST VMD Driver	
No disks connected to system	None

7.3.14 Intel Ethernet Controller I226-IT

Aptio Setup - AMI Advanced

UEFI Driver	Intel (R) Pro/1000 Open	
	Source 4.9.99 PCI-E	
Device Name	Intel (R) Ethernet	
	Controller I226-IT	: Select Screen
PCI Device ID	125D	↑↓: Select Item
		Enter: Select
Link Status	[Disconnected]	+/-: Change Opt.
		F1: General Help
PCI Address	00:01:05:9C:87:9C	F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Reset
		ESC: Exit

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

7.3.15 Intel Ethernet Controller I226-IT

Aptio Setup - AMI Advanced

UEFI Driver	Intel (R) Pro/1000 Open	
	Source 4.9.99 PCI-E	
Device Name	Intel (R) Ethernet	
	Controller I226-IT	→←: Select Screen
PCI Device ID	125D	↑↓: Select Item
		Enter: Select
Link Status	[Disconnected]	+/-: Change Opt.
		F1: General Help
PCI Address	00:01:05:9C:87:9D	F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Reset
		ESC: Exit

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



7.3.16 Driver Health

Aptio Setup - AMI Advanced

▶ Intel(R	PRO/1000	Open Source	4.9.99 PCI-E	Healthy	Provides Health Status for the Drivers/Controllers
					<pre>→-: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</pre>

BIOS entry	Options
► Intel [®] PRO/1000 Open Source 4.9.99 PCI-E	None

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7.4 Chipset

Aptio Setup - AMI Main Advanced Chipset Security Boot Save & Exit	
 System Agent (SA) Configuration PCH-IO Configuration 	System Agent (SA) Parameters
	<pre>→-: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit</pre>

BIOS entry	Options
System Agent (SA) Configuration	Submenu see: System Agent (SA) Configuration
	[▶ <u>68]</u>
PCH-IO Configuration	Submenu see: <u>PCH-IO Configuration [▶ 80]</u>

7.4.1 System Agent (SA) Configuration

Aptio Setup - AMI Chipset

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

BIOS entry	Options	
System Agent (SA) Configuration		
VT-d	None	
Graphics Configuration	Submenu see: Graphics Configuration [69]	
VMD setup menu	Submenu see: VMD setup menu [) 72]	
PCI Express Configuration	Submenu see: PCI Express Configuration [73]	
	· · ·	
Stop Grant Configuration	Auto / Manual	
VT-d	Enabled / Disabled	
Control Iommu Pre-boot Behavior	Enable / Disable	
X2APIC Opt Out	Enabled / Disabled	
DMA Control Guarantee	Enabled / Disabled	
Thermal Device (B0:D4:F0)	Disabled / Enabled	
GNA Device (B0:D8:F0)	Enabled / Disabled	
CRID Support	Enabled / Disabled	
WRC Feature	Enabled / Disabled	
Above 4GB MMIO BIOS assignment	Enabled / Disabled	
Program Grant Count	Disabled / Enabled	

7.4.1.1 Graphics Configuration

Aptio Setup - AMI Chipset

<u> </u>			
	Graphics Configuration		Graphics turbo IMON current values supported (14-31)
	Graphics Turbo IMON Current	31	
	Skip Scaning of External Gfx Card	[Disabled]	
	- I J		
İ.	Primary Display	[Auto]	
	External Gfx Card Primary Display Con	nfiguration	
	Internal Graphics	[Auto]	
	GTT Size	[8MB]	
	Aperture Size	[256MB]	
	DVMT Pre-Allocated	[60M]	
İ	DVMT Total Gfx Mem	[256M]	
	Igfx Gsm2	[OM]	→←: Select Screen
	Intel Graphics Pei Display Peim	[Disabled]	↓↑: Select Item
	VDD Enable	[Enabled]	Enter: Select
	Configure GT for use	[Enabled]	+/-: Change Opt.
	RC1p Support	[Disabled]	F1: General Help
	PAVP Enable	[Enabled]	F2: Previous Values
	Cdynmax Clamping Enable	[Disabled]	F3: Optimized Defaults
	Cd Clock Frequency	[Max CDClock freq	F4: Save & Reset
		based on Reference Clk]	ESC: Exit
	Skip Full CD Clock Unit	[Disabled]	
	VBT Select	[eDP]	
	Enable Display Audio Limnk in	[Disabled]	
	Pre-OS		
	IUER Button Enable	[Disabled]	
	LCD Control	•	7

BIOS entry	Options		
Graphics Configuration			
Graphics Turbo IMON Current	None		
Skip Scaning of External Gfx Card	Disabled / Enabled		
Primary Display	Auto / IGFX / PCI / SG		
External Gfx Card Primary Display Configuration	None		
Internal Graphics	Auto / Disabled / Enabled		
GTT Size	2 / 4 / 8 MB		
Aperture Size	128 / 256 / 512 / 1024 / 2048 MB		
DVMT Pre-Allocated	0M, 32M60M		
DVMT Total Gfx Mem	128M / 256M / MAX		
lgfx Gsm2	0GB, 2GB, 4GB, 6GB32GB		
Intel Graphics Pei Display Peim	Disabled / Enabled		
VDD Enable	Enabled / Disabled		
Configure GT for use	Enabled / Disabled		
RC1p Support	Disabled / Enabled		
PAVP Enable	Enabled / Disabled		
Cdynmax Clamping Enable	Enabled / Disabled		
Cd Clock Frequency	Max CdClock freq based on Reference Clk / 192 / 307.2 / 326.4 / 556.8 / 652.8 Mhz		
Skip Full CD Clock Unit	Disabled / Enabled		
VBT Select	eDP, MIPI, RPLS S17 RVP, RPLS S14 RVP		
Enable Display Audio Link in Pre-OS	Disabled / Enabled		
IUER Button Enable	Disabled / Enabled		
LCD Control	Submenu see:		

7.4.1.1.1 External GFX Card Primary Display Configuration

Aptio Setup - AMI Chipset

External Gfx Card Primary Display Configuration	
	<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
External Gfx Card Primary Display Configuration	

7.4.1.1.2 LCD Control

Aptio Setup - AMI Chipset

LCD Control Primary IGFX Boot Display LCD Panel Type Panel Scaling Backlight Control Active LFP Panel Color Depth Backlight Brightness	[VBIOS Default] [VBIOS Default] [Auto] [PWM Normal] [eDP Port-A] [18 Bit] 255	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display
		: Select Screen +: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

BIOS entry	Options
LCD Control	
Primary IGFX Boot Display	VBIOS / EFP / LFP / EFP3 / EFP 2 / EFP4
LCD Panel Type	VBIOS Default / Various LVDS
Panel Scaling	Auto / Off / Force Scaling
Backlight Control	PWM Normal / PWM Inverted
Active LFP	eDP Port-A / No eDP
Panel Color Depth	18 / 24 Bit
Backlight Brightness	None

7.4.1.2 VMD setup menu

Aptio Setup - AMI Chipset

VMD Configuration		Enable/Disable to VMD
Enable VMD controller	[Disabled]	controller
Enable VMD Global Mapping Map this Root Port under VMD Root Port BDF details	[Enabled] [Enabled] SATA Controller	
RAIDO RAID1 RAID5 RAID10	[Enabled] [Enabled] [Enabled]	<pre></pre>

BIOS entry	Options
VMD Configuration	
Enable VMD controller	Disabled / Enabled
Enable VMD Global Mapping	Enabled / Disabled
Map this Root Port under VMD	Enabled / Disabled
Root Port BDF details	None
RAID0	Enabled / Disabled
RAID1	Enabled / Disabled
RAID5	Enabled / Disabled
RAID10	Enabled / Disabled
7.4.1.3 PCI Express Configuration

Aptio Setup - AMI Chipset

PCI Express Configuration		Load Fia Configuration if
Fia Programming Compliance Test Mode CDR Relock	[Enabled] [Disabled] [Enabled]	
ASSELLION ON LINK DOWN GPIOS	[DISabled]	
PCI Express Slot Selection	[MZ]	
PCI Express Root Port 1		
PCI Express Root Port 2		
PCI Express Root Port 3		→ Select Screen
		↓↑: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Reset
		ESC: Exit

BIOS entry	Options
PCI Express Configuration	
Fia Programming	Enabled / Disabled
Compliance Test Mode	Disabled / Enabled
CDR Relock	Enabled / Disabled
Assertion on Link Down GPIOs	Disabled / Enabled
PCI Express Slot Selection	M2 / CEMx4 slot
PCI Express Root Port 1	Submenu see: PCI Express Root Port 1 [▶ 74]
PCI Express Root Port 2	Submenu see: PCI Express Root Port 2 [> 76]
PCI Express Root Port 3	Submenu see: PCI Express Root Port 3 [> 78]



7.4.1.3.1 PCI Express Root Port 1

Aptio Setup - AMI Chipset

PCI Express Root Port 1	[Enabled]	Control the PCI Express Root
Connection Type	[Slot]	Port.
PCI Express Clock Gating	[Disabled]	
PCI Express Power Gating	[Enabled]	
ASPM	[Disabled]	
L1 Substates	[Disabled]	
Gen3 Eq Phase3 Method	[Hardware]	
Gen4 Eq Phase3 Method	[Hardware]	
ACS	[Enabled]	
	[Enabled]	
EOM Geometrication Delieu		
FOM Scoreboard Control Policy	[AULO]	
Multi-VC	[Enabled]	
EDPC	[Enabled]	
URR	[Enabled]	
FER	[Enabled]	
NFER	[Enabled]	→ : Select Screen
CER	[Enabled]	↓↑: Select Item
СТО	[Disabled]	Enter: Select
SEFE	[Disabled]	+/-: Change Opt.
SENFE	[Disabled]	F1: General Help
SECE	[Disabled]	F2: Previous Values
PME SCT	[Enabled]	F3. Optimized Defaults
Advanced Error Reporting	[Enabled]	F4: Save & Reset
PCTe Speed		FSC. Fyit
Frahlo ClockBog Mossaging	[Ruco] [Epsblod]	LOC. LAIC
Enable Clockkey Messaging	[Enabled]	
Detect Timesut	[DISabled]	
Detect Timeout		
P2P Support	[Disabled]	
SA PCIe LTR Congguration		
Τ.T'R	[Enabled]	
Snoop Latency Override	[Auto]	
Non Snoop Latency Override		
Force LTR Override	[Disabled]	
TOTCE HIR OVELLIGE	[Disabica]	
TTP Took	[Displad]	
LIK LOCK	[DISADIEU]	
CDIL DCTA CARS HWED Config		
UDED	F	
DDED	5	
DPTP	/	
CPU PCIE Gen4 HWEQ Config	0	
UPTP	8	
DPTP	9	
		•

PIOS ontry	Ontions	
PCI Express Post Port 1	Enabled / Disabled	
Connection Type	Slot / Built in	
PCI Express Clock Cating	None	
PCI Express Clock Galling	Enabled / Disabled	
	Nono	
	None	
Con2 Eq Phaso2 Method	Hardware / Static Cooff	
Gen/ Eq Phase3 Method	Hardware / Static Coeff	
	Enabled / Disabled	
	None	
	Enabled / Disabled	
EOM Scoreboard Control Policy	Auto / Gen3 / Gen4 / Gen3/Gen4 / Gen5	
Multi VC	None	
	Enabled / Disabled	
	Disabled / Enabled	
FFR	Disabled / Enabled	
NEER	Disabled / Enabled	
CER	Disabled / Enabled	
SEE		
SENEE	Disabled / Enabled	
SECE	Disabled / Enabled	
PME SCI	Enabled / Disabled	
Advanced Error Reporting	Disabled / Enabled	
PCIe Speed	Auto / Gen1 / Gen2 / Gen3 / Gen4	
Enable ClockReg Messaging	Enabled / Disabled	
Transmitter Half Swing	Disabled / Enabled	
Detect Timeout	None	
P2P Support	Disabled / Enabled	
SA 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	
CPU PCIe Gen3 HWEQ Config		
UPTP	None	
DPTP	None	
CPU PCIe Gen4 HWEQ Config		
UPTP	None	
DPTP	None	



7.4.1.3.2 PCI Express Root Port 2

Aptio Setup - AMI Chipset

PCI Express Root Port 2	[Enabled]	Control the PCI Express Root
Connection Type	[Slot]	Port.
PCI Express Clock Gating	[Disabled]	
PCI Express Power Gating	[Enabled]	
ASPM	[Disabled]	
I.1 Substates	[Disabled]	
Gen3 Fg Phase3 Method	[Hardware]	
Gend Eq Phase3 Method	[Hardware]	
Ace	[Inatuwate]	
DEM		
PIM		
FUM Scoreboard Control Policy		
Multi-VC	[Enabled]	
EDPC	[Enabled]	
URR	[Enabled]	
F.F.K	[Enabled]	
NFER	[Enabled]	→←: Select Screen
CER	[Enabled]	↓↑: Select Item
CTO	[Disabled]	Enter: Select
SEFE	[Disabled]	+/-: Change Opt.
SENFE	[Disabled]	F1: General Help
SECE	[Disabled]	F2: Previous Values
PME SCI	[Enabled]	F3: Optimized Defaults
Advanced Error Reporting	[Enabled]	F4: Save & Reset
PCIe Speed	[Auto]	ESC: Exit
Enable ClockReq Messaging	[Enabled]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
P2P Support	[Disabled]	
SA PCIe LTR Congguration		
LTR	[Enabled]	
Snoop Latency Override	[Auto]	
Non Snoop Latency Override	[Auto]	
Force LTR Override	[Disabled]	
LTR Lock	[Disabled]	
CPU PCIe Gen3 HWEQ Config		
UPTP	7	
DPTP	7	
CPU PCIe Gen4 HWEQ Config		
UPTP	7	
DPTP	5	
CPU PCIe Gen5 HWEQ Config		
UPTP	5	
DPTP	5	
		L

PIOS ontry	Ontions	
PCI Express Post Port 2		
	Slot / Ruilt in	
Connection Type	Slot / Bull-III	
PCI Express Clock Galling	Enabled / Disabled	
	Enabled / Disabled	
LT Substates	LI.I & LI.2 / LI.I / Disabled	
Gen3 Eq Phase3 Method	Hardware / Static Coeff.	
	Hardware / Static Coeff.	
FOM Scoreboard Control Policy	Auto / Gen3 / Gen4 / Gen3 / Gen4	
Multi-VC		
	Enabled / Disabled	
	Disabled / Enabled	
	Disabled / Enabled	
NFER	Disabled / Enabled	
CER	Disabled / Enabled	
СТО	Disabled / Enabled	
SEFE	Disabled / Enabled	
SENFE	Disabled / Enabled	
SECE	Disabled / Enabled	
PME SCI	Enabled / Disabled	
Advanced Error Reporting	Disabled / Enabled	
PCIe Speed	Auto / Gen1 / Gen2 / Gen3 / Gen4	
Enable ClockReq Messaging	Enabled / Disabled	
Transmitter Half Swing	Disabled / Enabled	
Detect Timeout	None	
P2P Support	Disabled / Enabled	
SA 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	
CPU PCIe Gen3 HWEQ Config	1	
UPTP	None	
DPTP	None	
CPU PCIe Gen4 HWEQ Config	1	
UPTP	None	
DPTP	None	
CPU PCIe Gen5 HWEQ Config	1	
UPTP	None	
DPTP	None	



7.4.1.3.3 PCI Express Root Port 3

Aptio Setup - AMI Chipset

PCI Express Root Port 3	[Enabled]	Control the PCI Express Root
Connection Type	[Slot]	Port.
PCI Express Clock Gating	[Disabled]	
PCI Express Power Gating	[Enabled]	
ASPM	[Disabled]	
T1 Cubatataa	[Disabled]	
LI SUDScales		
Gens Eq Phases Method	[Hardware]	
Gen4 Eq Phase3 Method	[Hardware]	
ACS	[Enabled]	
PTM	[Enabled]	
DPC	[Disabled]	
FOM Scoreboard Control Policy	[Auto]	
Multi-VC	[Enabled]	
EDPC	[Enabled]	
URR	[Enabled]	
FER	[Enabled]	
NFER	[Enabled]	→←: Select Screen
CER	[Enabled]	lt: Select Item
CTO	[Disabled]	Enter: Select
SEFE	[Disabled]	+/-· Change Opt
SENER	[Disabled]	F1. Ceneral Help
CECE	[Disabled]	E2. Drowiene Maluee
DECE COL		F2: Previous values
PME SCI	[Enabled]	F3: Optimized Defaults
Advanced Error Reporting	[Enabled]	14: Save & Reset
PCIe Speed	[Auto]	ESC: Exit
Enable ClockReq Messaging	[Enabled]	
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
P2P Support	[Disabled]	
SA PCIe LTR Congguration		
LTR	[Enabled]	
Snoop Latency Override	[Auto]	
Non Snoop Latency Override	[Auto]	
Force LTR Override	[Disabled]	
	[21000100]	
LTR Lock	[Disabled]	
HIR BOOK	[bibabica]	
CDU DCTO Con3 HWEO Config		
UDED GENS NWEY CONTRY	7	
UPTP	/	
DPJP	/	
CPU PCIE Gen4 HWEQ Config		
UPTP	7	
DPTP	5	
CPU PCIe Gen5 HWEQ Config		
UPTP	5	
DPTP	5	
	V	
		l]

BIOS entry	Ontions	
PCI Express Root Port 3	Enabled / Disabled	
	Slot / Built-in	
PCI Express Clock Gating	None	
PCI Express Power Gating	Enabled / Disabled	
	Nono	
11 Substates	None	
Gen3 Ed Phase3 Method	Hardware / Static Coeff	
Gen/ Eq Phase3 Method	Hardware / Static Coeff	
	Enabled / Disabled	
PTM	None	
DPC	Enabled / Disabled	
EOM Scoreboard Control Policy	Auto / Gen3 / Gen4 / Gen3/Gen4 / Gen5	
	None	
	Disabled / Enabled	
FFR	Disabled / Enabled	
NEER	Disabled / Enabled	
CER	Disabled / Enabled	
	Disabled / Enabled	
SEE	Disabled / Enabled	
SENEE	Disabled / Enabled	
SECE	Disabled / Enabled	
	Uisabled / Enabled	
Advanced Error Reporting	Disabled / Enabled	
	Auto / Gen1 / Gen2 / Gen3 / Gen4 / Gen5	
Fole Speed	Finabled / Disabled	
Transmitter Half Swing	Disabled / Enabled	
	None	
P2P Support	Disabled / Enabled	
SA PCIe I TR Configuration		
	Enabled / Disabled	
Spoon Latency Override	Auto / Manual / Disabled	
Non Snoon Latency Override	Auto / Manual / Disabled	
	Disabled / Enabled	
	Disabled / Enabled	
LTR Lock	Disabled / Enabled	
CPU PCIe Gen3 HWEO Config		
	None	
	None	
CPU PCIe Gent HWEO Config	None	
	None	
DPTP	None	
CPU PCIe Gen5 HWEO Config		
	None	
DPTP	None	

7.4.2 PCH-IO Configuration

Aptio Setup - AMI Chipset

PCH-IO Configuration		▲ PCI Express Configuration
DCI Everyong Configuration		settings
SATA Configuration		
 MSR Configuration 		
UD Audio Configuration		
P ND Audio configuración		
PCH LAN Controller	[Enabled]	
Foxville 1225 LAN Controller	[Disabled]	
DeepSx Power Policies	[Disabled]	
PS ON Enable	[Enabled]	
Wake on WLAN and BT Enable	[Disabled]	
Disable DSX ACPRESANT PullDown	[Disabled]	
State After G3	[S0 State]	
Port 80h Redirection	[LPC Bus]	
Enhance Port 80h LPC Decoding	[Enabled]	
Compatible Revision ID	[Disabled]	
Legacy IO Low Latency	[Enabled]	
PCH Cross Throttling	[Enabled]	→←: Select Screen
PCH Energy Reporting	[Enabled]	↓↑: Select Item
LPM SO12.0	[Enabled]	Enter: Select
LPM SOi2.1	[Enabled]	+/-: Change Opt.
C10 Dynamic threshold adjustment	[Disabled]	F1: General Help
IEH Mode	[Bypass Mode]	F2: Previous Values
Enable TCO Timer	[Disabled]	F3: Optimized Defaults
Enable Timed GPIO0	[Disabled]	F4: Save & Reset
Enable Timed GPI01	[Disabled]	ESC: Exit
Pcie Pll SSC	[Auto]	
Enable 8254 Clock Gate	[Enabled]	
Lock PCH Sideband Access	[Enabled]	
Flash Protection Range Registers	[Disabled]	
(FPRR)		
SPD Write Disable	[TRUE]	
LGMR NOCE C10 werenting to Townst	[Disabled]	
HUST_CIU reporting to Target	[DISabled]	
Soliv Auto Domotion	[Enabled]	
Latch Events C10 Evit	[Disabled]	
Hybrid Storage Detection and	[Disabled]	
Configuration Mode	[Disabled]	
Extended BIOS Range Decode	[Disabled]	
ACPI L6D PME Handling	[Disabled]	
		▼

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BIOS entry	Options
PCH-IQ Configuration	
PCI Express Configuration	Submenu see: PCI Express Configuration [82]
SATA Configuration	Submenu see: SATA Configuration [] 85]
USB Configuration	Submenu see: USB Configuration [] 87]
HD Audio Configuration	Submenu see: HD Audio Configuration [] 89]
	Submenu see. <u>The Audio Configuration (</u> , <u>-051</u>
PCH LAN Controller	Enabled / Disabled
Foxville I225 LAN Controller	Enabled / Disabled
DeepSx Power Policies	Disabled / Enabled
PS ON Enable	Disabled / Enabled
Wake on LAN and BT Enable	Disabled / Enabled
Disable DSX ACPRESENT Pull Down	Disable / Enabled
State After G3	S0 State / S5 State
Port 80h Redirection	LPC Bus / PCIE Bus
Enhance Port 80h LPC Decoding	Enabled / Disabled
Compatible Revision ID	None
Legacy IO Low Latency	None
PCH Cross Throttling	Enabled / Disabled
PCH Energy Reporting	Enabled / Disabled
LPM SOi2.0	Enabled / Disabled
LPM SOi2.1	Enabled / Disabled
Second LAN Controller	Enabled / Disabled
C10 Dynamic threshold adjustment	Disabled / Enabled
IEH Mode	Bypass Mode / Enabled
Enable TCO Timer	Disabled / Enabled
Enable Timed GPIO0	Enabled / Disabled
Enable Timed GPIO1	Enabled / Disabled
Pcie PII SSC	Auto / 0.0%0.5% / Disabled
Enable 8254 Clock Gate	Enabled / Disabled
Lock PCH Sideband Access	Enabled / Disabled
Flash Protection Range Registers (FPRR)	Disabled / Enabled
SPD Write Disable	True / False
LGMR	Disabled / Enabled
HOST_C10 reporting to Target	Disabled / Enabled
OS IDLE Mode	Enabled / Disabled
SOix Auto Demotion	Enabled / Disabled
Latch Events C10 Exit	Disabled / Enabled
Hybrid Storage Detection and Configuration Mode	Disabled / Enabled
Extended BIOS Range Decode	Disabled / Enabled
ACPI L6D PME Handling	Disabled / Enabled



7.4.2.1 PCI Express Configuration

Aptio Setup - AMI Chipset

PCI Express Configuration		Enable when using Compliance
DMT Link ACDM Control	[Disabled]	Load Board
DMI LINK ASPM CONCROL		LINK.
Compliance rest Mode	[DISabled]	
▶ PCIe Root Port 1		
PCIe Root Port 2		
PCIE ROOT Port 3	Lane configured as USB/SATA/UFS	
▶ PCIe Root Port 4		
▶ PCIe Root Port 5		
▶ PCIe Root Port 6	Shadowed by x2/x4 port	
▶ PCIe Root Port 7	Shadowed by x2/x4 port	
▶ PCIe Root Port 8	Shadowed by x2/x4 port	→←: Select Screen
▶ PCIe Root Port 9		↓↑: Select Item
▶ PCIe Root Port 10	Shadowed by x2/x4 port	Enter: Select
▶ PCIe Root Port 11	Shadowed by x2/x4 port	+/-: Change Opt.
▶ PCIe Root Port 12	Shadowed by x2/x4 port	F1: General Help
PCIe Root Port 13		F2: Previous Values
PCIe Root Port 14		F3: Optimized Defaults
PCIe Root Port 15		F4: Save & Reset
PCIe Root Port 16		ESC: Exit
PCIe Root Port 17	Lane configured as USB/SATA/UFS	
PCIe Root Port 18	Lane configured as USB/SATA/UFS	
PCIe Root Port 19	Lane configured as USB/SATA/UFS	
PCIe Root Port 20	Lane configured as USB/SATA/UFS	
▶ PCIe Root Port 21		
PCIe Root Port 22	Shadowed by x2/x4 port	
PCIe Root Port 23	Shadowed by x2/x4 port	
PCIe Root Port 24	Shadowed by x2/x4 port	
▶ PCIe Root Port 25		
▶ PCIe Root Port 26	Shadowed by x2/x4 port	
▶ PCIe Root Port 27	Shadowed by x2/x4 port	
▶ PCIe Root Port 28	Shadowed by x2/x4 port	

BIOS entry	Options
PCI Express Configuration	
DMI Link ASPM Control	Disabled / Enabled
Compliance Test Mode	Disabled / Enabled
PCIe Root Port 1	Submenu see: PCI Express Root Port 1 [> 83]
PCIe Root Port 2	Submenu see: PCI Express Root Port 1 [> 83]
PCIe Root Port 3	None
PCIe Root Port 4, 5, 9, 13 - 16, 21, 25	Submenu see: PCI Express Root Port 1 [> 83]
PCIe Root Port 6 - 8, 10 - 12, 17 – 20, 22 - 24, 26 - 28	None

7.4.2.1.1 PCI Express Root Port 1

Aptio Setup - AMI Chipset

PCI Express Root Port 1	[Enabled]	Control the PCI Express Root
Connection Type	[Slot]	Port.
ASPM	[Disabled]	
L1 Substates	[Disabled]	
L1 Low	[Disabled]	
ACS	[Enabled]	
PTM	[Enabled]	
DPC	[Disabled]	
EDPC	[Enabled]	
URR	[Disabled]	
FER	[Disabled]	
NFER	[Disabled]	→←: Select Screen
CER	[Disabled]	↓↑: Select Item
SEFE	[Disabled]	Enter: Select
SENFE	[Disabled]	+/-: Change Opt.
SECE	[Disabled]	F1: General Help
PME SCI	[Enabled]	F2: Previous Values
Hot Plug	[Disabled]	F3: Optimized Defaults
Advanced Error Reporting	[Enabled]	F4: Save & Reset
PCIe Speed	[Auto]	ESC: Exit
Transmitter Half Swing	[Disabled]	
Detect Timeout	0	
Extra Bus Reserved	0	
Reserved Memory	10	
Reserved I/O	4	
PCH PCIe LTR Configuration		
LTR	[Enabled]	
Snoop Latency Override	[Auto]	
Non Snoop Latency Override	[Auto]	
LTR Lock	[Disabled]	
Peer Memory Write Enable	[Disabled]	
		▼

BIOS entry	Ontions	
PCI Express Root Port 1	Disabled / Enabled	
	Built-in / Slot	
ASPM	Disabled / Enabled	
I 1 Substates	Disabled / Enabled	
L1 Low	Disabled / Enabled	
ACS	Enabled / Disabled	
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	
PME SCI	Enabled / Disabled	
Hot Plug	Disabled / Enabled	
Advanced Error Reporting	Enabled / Disabled	
PCIe Speed	Auto / Gen1 / Gen2 / Gen3 / Gen4	
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	Disbaled / Manual / Auto	
Non Snoop Latency Override	Disbaled / Manual / Auto	
LTR Lock	Disabled / Enabled	
Peer Memory Write Enable	Disabled / Enabled	

NOTICE

PCI Express Configuration

The BIOS entries and the options on ports 1 - 2, 4, 5, 9, 13 - 16, 21, 25 are identical. Port 1 is shown as an example

SATA Configuration

7.4.2.2 SATA Configuration

Aptio Setup - AMI Chipset

SATA Controller(s) SATA Test Mode Aggressive LPM Support Serial ATA Port 0 Software Preserve Port 0 Hot Plug Configured as eSATA External Spin Up Device SATA Device Type Topology SATA Port 0 DevSlp DITO Configuration DITO Value DM Value Serial ATA Port 1 Software Preserve Port 1 Hot Plug Configured As eSATA External Spin Up Device SATA Device Type Topology SATA Port 1 DevSlp DITO Configuration DITO Value DM Value Serial ATA Port 2 Software Preserve Port 2 Hot Plug Configured As eSATA External Spin Up Device SATA Device Type Topology SATA Port 2 DevSlp DITO Configuration DITO Value DM Value Serial ATA Port 3 Software Preserve Port 3 Hot Plug Configured As eSATA External Spin Up Device SATA Device Type Topology SATA Port 3 DevSlp DITO Configuration DITO Value DM Value Serial ATA Port 4 Software Preserve Port 4 Hot Plug Configured As eSATA External Spin Up Device SATA Device Type Topology SATA Port 4 DevSlp DITO Configuration DITO Value DM Value Serial ATA Port 5 Software Preserve Port 5 Hot Plug

[Enabled] [Disabled] [Enabled] Empty Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled]

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

Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled]	
15	
IJ Empty	
Unknown [Enabled] [Disabled] Hot Plug Supported [Disabled]	
[Disabled] [Hard Disk Drive] [Unknown] [Disabled] [Disabled] 625 15	
	Hot Plug Supported [Disabled] [Disabled] [Hard Disk Drive] [Unknown] [Disabled] 625 15 Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 625 15 Empty Unknown [Enabled] [Dis

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BIOS entry	Options
SATA Configuration	
SATA Controller(s)	Enabled / Disabled
SATA Test Mode	Disabled / Enabled
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	Disabled / Enabled
DITO Configuration	Disabled / Enabled
DITO Value	None
DM Value	None

NOTICE

SATA Configuration

The BIOS entries and the options on the SATA ports 1 - 7 are identical. Port 0 is shown as an example.

7.4.2.3 USB Configuration

Aptio Setup - AMI Chipset

USB Configuration	A	Enable/Disable xDCI (USB OTG
xDCI Support	[Enabled]	
USB PDO Programming	[Enabled]	
USB Overcurrent	[Enabled]	
USB Overcurrent Lock	[Enabled]	
USB Audio Offload	[Enabled]	
Enable HSII on xHCI	[Enabled]	
USB3.1 Portx Speed Selection	0	
		→-: Select Screen
USB SS Physical Connector #0	[Enabled]	↓↑: Select Item
USB SS Physical Connector #1	[Enabled]	Enter: Select
USB SS Physical Connector #2	[Enabled]	+/-: Change Opt.
USB SS Physical Connector #3	[Enabled]	Fl: General Help
USB SS Physical Connector #4	[Enabled]	F2: Previous Values
USB SS Physical Connector #5	[Enabled]	F3: Optimized Defaults
USB SS Physical Connector #6	[Enabled]	F4: Save & Reset
USB SS Physical Connector #/	[Enabled]	ESC: EXIt
USB SS Physical Connector #8	[Enabled]	
USB SS Physical Connector #9	[Enabled]	
USB HS Physical Connector #0	[Enabled]	
USB HS Physical Connector #1	[Enabled]	
USB HS Physical Connector #2	[Enabled]	
USB HS Physical Connector #3	[Enabled]	
USB HS Physical Connector #4	[Enabled]	
USB HS Physical Connector #6		
USB HS Physical Connector #7		
USB HS Physical Connector #9		
USB HS FHYSICAL CONNector #0		
USB HS Physical Connector #10	[Enabled]	
USB HS Physical Connector #11	[Enabled]	
USB HS Physical Connector #12	[Enabled]	
USB HS Physical Connector #13	[Enabled]	
		L]

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BIOS entry	Options
USB Configuration	
xDCI Support	Enabled / Disabled
USB PDO Programming	Enabled / Disabled
USB Overcurrent	Enabled / Disabled
USB Overcurrent Lock	Enabled / Disabled
USB Audio Offload	Enabled / Disabled
Enable HSII on xHCI	Enabled / Disabled
USB3.1 Portx Speed Selection	None
USB SS Physical Connector #0	Enabled / Disabled
USB SS Physical Connector #1	Enabled / Disabled
USB SS Physical Connector #2	Enabled / Disabled
USB SS Physical Connector #3	Enabled / Disabled
USB SS Physical Connector #4	Enabled / Disabled
USB SS Physical Connector #5	Enabled / Disabled
USB SS Physical Connector #6	Enabled / Disabled
USB SS Physical Connector #7	Enabled / Disabled
USB SS Physical Connector #8	Enabled / Disabled
USB SS Physical Connector #9	Enabled / Disabled
USB HS Physical Connector #1	Enabled / Disabled
USB HS Physical Connector #2	Enabled / Disabled
USB HS Physical Connector #3	Enabled / Disabled
USB HS Physical Connector #4	Enabled / Disabled
USB HS Physical Connector #5	Enabled / Disabled
USB HS Physical Connector #6	Enabled / Disabled
USB HS Physical Connector #7	Enabled / Disabled
USB HS Physical Connector #8	Enabled / Disabled
USB HS Physical Connector #9	Enabled / Disabled
USB HS Physical Connector #10	Enabled / Disabled
USB HS Physical Connector #11	Enabled / Disabled
USB HS Physical Connector #12	Enabled / Disabled
USB HS Physical Connector #13	Enabled / Disabled

7.4.2.4 HD Audio Configuration

Aptio Setup - AMI Chipset

HD Audio Subsystem Configuration Set	tings	Control Detection of the HD-Audio device.
HD Audio	[Enabled]	Disabled = HDA will be
Audio DSP	[Enabled]	unconditionally disabled
Audio DSP Compliance Mode	[Non-UAA (IntelSST)]	Enabled = HDA will be
HDA Link	[Enabled]	unconditionally enabled.
DMIC #0	[Enabled]	-
Dmic Clock Source Select	[ClkA]	
DMIC #1	[Enabled]	
Dmic Clock Source Select	[ClkA]	
SSP #0	[Disabled]	
SSP #1	[Disabled]	
SSP #2	[Disabled]	
SNDW #1	[Disabled]	
SNDW #2	[Disabled]	→←: Select Screen
SNDW #3	[Disabled]	↓↑: Select Item
SNDW #4	[Disabled]	Enter: Select
HD Audio Advanced Configuration		+/-: Change Opt.
▶ HD Audio DSP Features Configuration		F1: General Help
HD Audio Bus Controller Subsystem	[72708086]	F2: Previous Values
Id		F3: Optimized Defaults
Virtual Channel Type	[VC0]	F4: Save & Reset
HDA Codec ALC245 Configuration	[No Dmic to codec]	ESC: Exit

BIOS entry	Options
HD Audio Subsystem Configuration Settings	
HD Audio	Enabled / Disabled
Audio DSP	Enabled / Disabled
Audio DSP Compliance Mode	Non-UAA (IntelSST) / UAA (HDA Inbox/IntelSST)
HDA Link	Enabled / Disabled
DMIC #0	Enabled / Disabled
Dmic Clock Source Select	CLKA / CLB / Both
DMIC #1	Enabled / Disabled
Dmic Clock Source Select	CLKA / CLB / Both
SSP #0	None
SSP #1	Disabled / Enabled
SSP #2	Disabled / Enabled
SNDW #1	None
SNDW #2	Disabled / Enabled
SNDW #3	None
SNDW #4	None
HD Audio Advanced Configuration	Submenu see: <u>HD Audio Subsystem Advanced</u> Configuration Settings [> 90]
HD Audio DSP Features Configuration	Submenu see: <u>HD Audio Subsystem Feature</u> Configuration (ACPI) [> 92]
HD Audio Bus Controller Subsystem ID	Various
Virtual Channel Type	VC0 / VC1
HDA Codec ALC245 Configuration	No Dmic to codec / 4 Dmic to codec / 2 Dmic to codec



7.4.2.4.1 HD Audio Subsystem Advanced Configuration Settings

Aptio Setup - AMI Chipset

HD Audio Subsystem Advanced Configuration Settings		Disconnects SDI2 signal to
iDisplay Audio Disconnect Codec Sx Wake Capability	[Disabled] [Disabled]	hide/disable iDisplay Audio Codec.
PME Enable	[Disabled]	
Statically Switchable BCLK Clock		
Frequency Configuration:		
HD Audio Link Frequency	[24 MHz]	
iDisplay Audio Link Frequency	[96 MHz]	
iDisplay Audio Link T—Mode	[8T Mode]	
Autonomous Clock Stop SNDW #1	[Disabled]	
Autonomous Clock Stop SNDW #2	[Disabled]	
Autonomous Clock Stop SNDW #3	[Disabled]	
Autonomous Clock Stop SNDW #4	[Disabled]	
Data On Active Interval Select	[11 clock periods]	→←: Select Screen
SNDW #1		↓↑: Select Item
Data On Active Interval Select	[11 clock periods]	Enter: Select
SNDW #2		+/-: Change Opt.
Data On Active Interval Select	[11 clock periods]	F1: General Help
SNDW #3		F2: Previous Values
Data On Active Interval Select	[11 clock periods]	F3: Optimized Defaults
SNDW #4		F4: Save & Reset
Data On Delay Select SNDW #1	[3 clock periods]	ESC: Exit
Data On Delay Select SNDW #2	[3 clock periods]	
Data On Delay Select SNDW #3	[3 clock periods]	
Data On Delay Select SNDW #4	[3 clock periods]	
ACX SSID 305610EC Codecs Topology	[Disabled]	

BIOS entry	Ontions	
HD Audio Subsystem Advanced Configuration Set	tings	
iDisplay Audio Disconnect	Disabled / Enabled	
Codec Sx Wake Capability	Disabled / Enabled	
PME Enable	Disabled / Enabled	
Statically Switchable BCLK Clock Frequency Configuration		
HD Audio Link Frequency	24 / 6 / 12 MHz	
iDisplay Audio Link Frequency	96 / 48 MHz	
iDisplay Audio Link T-Mode	8T Mode / 1T Mode / 2T Mode / 4T 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	11 clock periods / 6, 7, 8 clock periods	
Data On Active Interval Select SNDW #2	11 clock periods / 6, 7, 8 clock periods	
Data On Active Interval Select SNDW #3	11 clock periods / 6, 7, 8 clock periods	
Data On Active Interval Select SNDW #4	11 clock periods / 6, 7, 8 clock periods	
Data On Delay Select SNDW #1	3 clock periods / 2 clock periods	
Data On Delay Select SNDW #2	3 clock periods / 2 clock periods	
Data On Delay Select SNDW #3	3 clock periods / 2 clock periods	
Data On Delay Select SNDW #4	3 clock periods / 2 clock periods	
ACX SSID 305610EC Codecs Topology	Disabled / Enabled	

7.4.2.4.2 HD Audio Subsystem Feature Configuration (ACPI)

Aptio Setup - AMI Chipset

		I
HD Audio Subsystem Features Configuration (ACPI)		Enables/Disables 1 Mic Array Endpoint in NHLT ACPI table.
Audio DSP NHLT Endpoints		XTAL: 38.4MHt.
Drie Mare 20 AMU-		
DILLC MOITO SO.4MHZ		
Dmic Stereo 38.4MHz	[Disabled]	
Dmic Quad 38.4MHz	[Disabled]	
Dmic Mono 24MHz	[Disabled]	
Dmic Stereo 24MHz	[Disabled]	
Dmic Quad 24MHz	[Disabled]	
Bluetooth 38.4MHz	[Disabled]	
Bluetooth 24MHz	[Disabled]	
I2S Alc274 38.4MHz	[Disabled]	
T2S Alc274 24MHz	[Disabled]	
LONTTUMT2S0	[Disabled]	
LONTTIMT282	[Disabled]	
EVEDECT 8316		
INC. Codos Colost		
125 Codec Select	[DISabled]	
12S Codec Bus Number	[12SCU Controller]	
Audio DSP Feature Support:		
WoV (Wake on Voice)	[Enabled]	
Bluetooth Sideband	[Enabled]	
BT Intel HFP	[Enabled]	
BT Intel A2DD	[Enabled]	
BT Intel IF Audio	[Enabled]	
DI INCEI DE AUGIO		
ACA/SDCA		
ACX/SDCA Speaker aggregation		
Codec based VAD	[Disabled]	
DSP based Speech	[Disabled]	
Pre-Processinbg disabled		→←: Select Screen
Voice Activity Detection	[Windows 10 Voice	lit: Select Item
	Activation]	Enter: Select
Audio DSP Pre/Post-Processing		+/-: Change Opt.
Module Support:		Fl: General Help
Waves Post—process	[Disabled]	F2: Previous Values
DTS	[Disabled]	F3: Optimized Defaults
IntelSST Speech	[Disabled]	F4: Save & Reset
Dolby	[Disabled]	ESC: Exit
Waves Pre-process	[Disabled]	
Audyssey	[Disabled]	
Maxim Smart AMP	[Disabled]	
ForteMedia SAMSoft	[Disabled]	
Sound Research IP	[Disabled]	
Conexant Pre-Process	[Disabled]	
Conexant Smart Amp	[Disabled]	
Realtek Post-Process	[Disabled]	
Realtek Smart Amp	[Disabled]	
Icenower ID MEY sub modulo	[Disabled]	
Icenower ID FFY sub module		
Icopower IF EFA SUD MODULE		
Repower IP SEX SUD MODULE		
voice Preprocessing		
Acoustic Context Awareness (ACA)	[Disabled]	
Custom Module 'Alpha'	[Disabled]	
Custom Module 'Beta'	[Disabled]	
Custom Module 'Gamma'	[Disabled] V	

HD Audio Subsystem Features Configuration (ACPI) Audio DSP NHLT Endpoints Configuration: Dmic Stereo 38.4MHz Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Stereo 24MHz Disabled / Enabled Dmic Stereo 24MHz Disabled / Enabled Dmic Stereo 24MHz Disabled / Enabled Bluetoni 24MHz None ESALC74 38.4MHz None ESALC74 38.4MHz None USS Alc274 38.4MHz None USS Codec Select None USS Codec Select None USS Codec Select None CAdc0 SSP Feature Support: Wolv (Wake on Voice) Enabled / Disabled BT Intel HP Enabled / Disabled ET Intel A2DP Enabled / Disabled ET Intel LE Audio DIsabled / Enabled ACX/SDCA Speaker aggregation None Codec based VAD DIsabled / Enabled DSP based Speech None Voice Audio DSP Pre/Post-Processing Module Support: Waves Post-process Disabled / Enabled DISabled / Enabled DISabled / Enabled DISABLEd / Enabled DISabled / Enabled DISabled / Enabled DISabled / Enabled DISabled / Enabled DISabled / Enabled DISABLEd / Enabled Conexant Pre-Process Disabled / Enabled Conexant Pre-Process Disabled / Enabled Conexant Pre-Process Disabled / Enabled Conexant Pre-Process Disabled / Enabl	BIOS entry	Options	
Audio DSP NHLT Endpoints Audio DSP NHLT Endpoints Orinf Quartion: Disabled / Enabled Dmic Koreo 38.4MHz Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Stereo 24MHz None Bluetooth 38.4MHz None Bluetooth 24MHz None 12S Alc274 38.4MHz None LONTIUMI2S0 None LONTIUMI2S2 None LONTIUMI2S2 None 12S Codec Select None 11 Intel HPP Enabled / Disabled Bluetooth Sideband Enabled / Disabled B1 Intel HPP Enabled / Disabled B1 Intel HPP Enabled / Disabled ACX/SDCA Disabled / Enabled ACX/SDCA Disabled / Enabled DSP based Speech <td colspan="3">HD Audio Subsystem Features Configuration (ACPI)</td>	HD Audio Subsystem Features Configuration (ACPI)		
Audio DSP NHLT Endpoints Configuration: Dmic Mono 38.4MHz Disabled / Enabled Dmic Quad 38.4MHz Disabled / Enabled Dmic Mono 24MHz Disabled / Enabled Dmic Mono 24MHz Disabled / Enabled Dmic Guad 38.4MHz Disabled / Enabled Dmic Stereo 24MHz Disabled / Enabled Dmic Guad 24MHz Disabled / Enabled Bluetooth 34.4MHz None Bluetooth 24.4MHz None 12S Alc274 38.4MHz None LONTIUMI2S0 None LONTIUMI2S2 None LONTIUMI2S2 None VERESTB316 None 12S Codec Select None 12S Codec Select None 4udio DSP Feature Support:			
Configuration: Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Quad 38.4MHz Disabled / Enabled Dmic Stereo 38.4MHz Disabled / Enabled Dmic Quad 28.4MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetoch 24MHz None Bluetoch 24MHz None LONTIUMI250 None LONTIUMI250 None LONTIUMI250 None LONTIUMI250 None L2S Codec Select None I2S Codec Sub Number None I2S Codec Bus Number None VoV (Wake on Voice) Enabled / Disabled Bluetoch Xideband Enabled / Disabled BT Intel AZDP Enabled / Disabled BT Intel AZDP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP Dased Speech None Pre-Processing Disabled None Voice Activation / Intel Wake on Voice <td< td=""><td>Audio DSP NHLT Endpoints</td><td></td></td<>	Audio DSP NHLT Endpoints		
Dmic Mono 38.4MHz Disabled / Enabled Dmic Quad 38.4MHz Disabled / Enabled Dmic Quad 38.4MHz Disabled / Enabled Dmic Mono 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetooth 38.4MHz None Bluetooth 24MHz None I2S Alc274.38.4MHz None LONTIUMI2S0 None LONTIUMI2S2 None LONTIUMI2S2 None L2S Codec Select None L2S Codec Select None L2S Codec Support: Move VoV (Wake on Voice) Enabled / Disabled Bi Intel HFP Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel L Audio Disabled / Enabled DSP Dased Speech None Codec based VAD Disabled / Enabled DSP Dased Speech None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Voice	Configuration:		
Dmic Stereo 38.4MHz Disabled / Enabled Dmic Quad 38.4MHz Disabled / Enabled Dmic Mono 24MHz Disabled / Enabled Dmic Stereo 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetoch 33.4MHz None Bluetoch 34.4MHz None IzS Alc274 38.4MHz None LONTIUMI2S0 None LONTIUMI2S2 None LONTIUMI2S2 None EVEREST8316 None IZS Codec Select None Audio DSP Feature Support: Move WoV (Wake on Voice) Enabled / Disabled B1 Intel HPP Enabled / Disabled B1 Intel A2DP Enabled / Disabled B1 Intel HPP Enabled / Disabled B1 Intel HPP Enabled / Disabled Code based VAD Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice </td <td>Dmic Mono 38.4MHz</td> <td>Disabled / Enabled</td>	Dmic Mono 38.4MHz	Disabled / Enabled	
Dmic Quad 38.4MHz Disabled / Enabled Dmic Stere 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetooth 38.4MHz None Bluetooth 38.4MHz None I2S Alc274 38.4MHz None LONTIUMI2SO None LONTIUMI2SO None LONTIUMI2SO None EVEREST8316 None LOS Codec Select None Audio DSP Feature Support:	Dmic Stereo 38.4MHz	Disabled / Enabled	
Dmic Nono 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetooth 38.4MHz None Bluetooth 24MHz None Bluetooth 24MHz None I2S AlcZ74 24MHz None I2S AlcZ74 24MHz None LONTIUMI2S0 None LONTIUMI2S2 None EVEREST8316 None I2S Codec Select None Audio DSP Feature Support:	Dmic Quad 38.4MHz	Disabled / Enabled	
Dmic Stereo 24MHz Disabled / Enabled Dmic Quad 24MHz Disabled / Enabled Bluetooth 38.4MHz None Bluetooth 38.4MHz None I2S Alc274 38.4MHz None I2S Alc274 38.4MHz None LONTIUMI2S0 None LONTIUMI2S0 None LONTIUMI2S2 None EVEREST8316 None 12S Codec Select None 4Udio DSP Feature Support: Vov (Wake on Voice) WoV (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Enabled BT Intel FA Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA Disabled / Enabled DSP based Speech None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Voice Activity Detection Disabled / Enabled DTS Disabled / Enabled Disabled / Enabled	Dmic Mono 24MHz	Disabled / Enabled	
Dmic Quad 24MHz Disabled / Enabled Bluetooth 38.4MHz None Bluetooth 24MHz None I2S Alc274 38.4MHz None I2S Alc274 24MHz None LONTIUMI2S0 None LONTIUMI2S2 None EVEREST8316 None I2S Codec Select None I2S Codec Select None I2S Codec Select None Audio DSP Feature Support: Mov (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel A2DP Enabled / Enabled Codec based VAD Disabled / Enabled DSP based Speech None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Voice Activity Detection Disabled / Enabled DTS Disabled / Enabled DTS Disabled / Enabled Disabled / Enabled Enabled Disabled / Enabled Loutows 10 Voice Acti	Dmic Stereo 24MHz	Disabled / Enabled	
Bluetooth 38.4MHz None Bluetooth 38.4MHz None Bluetooth 24MHz None Bluetooth 24MHz None I2S Alc274 24MHz None I2S Alc274 24MHz None LONTIUMI2S0 None LONTIUMI2S0 None EVEREST8316 None I2S Codec Select None I2S Codec Select None I2S Codec Select EVENEST8316 None I2S Codec Bus Number None I2S Codec Bus Number EVENEST8316 Intervention of the select of th	Dmic Quad 24MHz	Disabled / Enabled	
Bluetoch 24MHz None I2S Alc274 38.4MHz None I2S Alc274 38.4MHz None I2S Alc274 24MHz None LONTIUMI2S0 None LONTIUMI2S0 None EVEREST8316 None EVEREST8316 None I2S Codec Select None I2S Codec Sus Number None Audio DSP Feature Support: Vov (Wake on Voice) Bluetoch Sideband Enabled / Disabled Bluetoch Sideband Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel A2DP Enabled / Disabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Waves Post-process Disabled / Enabled DTs Dts Dts Dts Dts Dts Dts Dts Dts Dts	Bluetooth 38.4MHz	None	
I2S Alc274 38 4MHz None I2S Alc274 24MHz None LONTIUMI2S0 None LONTIUMI2S2 None EVEREST8316 None I2S Codec Select None I2S Codec Select None Audio DSP Feature Support: None Audio DSP Feature Support: Enabled / Disabled Bluetoott Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel I E Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Voice Audio LSP Pre/Post-Processing Disabled / Enabled Disabled / Enabled DTS Disabled / Enabled DTS Disabled / Enabled DTS Disabled / Enabled DTS Disabled / Enabled DIsabled / Enabled Disabled / Enabled <t< td=""><td>Bluetooth 24MHz</td><td>None</td></t<>	Bluetooth 24MHz	None	
I2S Akc274 24MHz None LONTIUMI2S0 None CVEREST8316 None I2S Codec Select None I2S Codec Select None I2S Codec Select None Audio DSP Feature Support:	I2S Alc274 38.4MHz	None	
LONTIUMI2S0 None LONTIUMI2S2 None EVEREST8316 None I2S Codec Select None I2S Codec Sup Number None Audio DSP Feature Support:	I2S Alc274 24MHz	None	
LONTIUMI2S2 None EVEREST8316 None I2S Codec Select None I2S Codec Sus Number None Audio DSP Feature Support: None WoV (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA Disabled / Enabled Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Voice Activity Detection Disabled / Enabled DTS Disabled / Enabled Disabled / Enabled Disabled / Enabled Dolby Disabled / Enabled Maves Pre-process Disabled / Enabled Audio DSP trepcess Disabled / Enabled Disabled / Enabled Enabled Divase Pre-process Disabled / Enabled Maves Pre-process Disabled / Enabled Audio DSP trencocess Disabled / Enabled<	LONTIUMI2S0	None	
EVEREST8316 None I2S Codec Select None I2S Codec Bus Number None Audio DSP Feature Support: None WoV (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled Bt Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processinbg Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Uisabled / Enabled Waves Post-process Disabled / Enabled DTS 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-	LONTIUMI2S2	None	
I2S Codec Select None I2S Codec Bus Number None Audio DSP Feature Support: Instant Section 1000000000000000000000000000000000000	EVEREST8316	None	
I2S Codec Bus Number None Audio DSP Feature Support: WoV (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Valdio DSP Pre/Post-Processing Module Support: Usabled / Enabled Waves Post-process Disabled / Enabled DTS Disabled / Enabled IntelSST Speech Disabled / Enabled Disabled / Enabled 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 Disab	I2S Codec Select	None	
Audio DSP Feature Support: Image: Constraint of the state of th	I2S Codec Bus Number	None	
Audio DSP Feature Support: Image: Constraint of the state of th			
WoV (Wake on Voice) Enabled / Disabled Bluetooth Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Uisabled / Enabled Waves Post-process Disabled / Enabled Disabled / Enabled Enabled Dolby Disabled / Enabled Dolby Disabled / Enabled Maxim Smart AMP Disabled / Enabled ForteMedia SAMSoft Disabled / Enabled Sound Research IP Disabled / Enabled Conexant Pre-Process Disabled / Enabled Reatlek Post-Process Disabled / Enabled Reatlek Post-Process Disabled / Enabled Reatlek Post-Process Disabled / Enabled	Audio DSP Feature Support:		
Bluetooth Sideband Enabled / Disabled BT Intel HFP Enabled / Disabled BT Intel A2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processinbg Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support:	WoV (Wake on Voice)	Enabled / Disabled	
BT Intel HFP Enabled / Disabled BT Intel L2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processinbg Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Process Disabled / Enabled DTS Disabled / Enabled DtsS 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 Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled Conexant Smar	Bluetooth Sideband	Enabled / Disabled	
BT Intel A2DP Enabled / Disabled BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processinbg Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support:	BT Intel HFP	Enabled / Disabled	
BT Intel LE Audio Disabled / Enabled ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support: Waves Post-process Waves Post-process Disabled / Enabled DISS Disabled / Enabled IntelSST Speech Disabled / Enabled Dolby Disabled / Enabled Waves Pre-process Disabled / Enabled Audyssey Disabled / Enabled Sound Research IP Disabled / Enabled Sound Research IP Disabled / Enabled Conexant Smart Amp Disabled / Enabled Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled	BT Intel A2DP	Enabled / Disabled	
ACX/SDCA Disabled / Enabled ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processing Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support:	BT Intel LE Audio	Disabled / Enabled	
ACX/SDCA speaker aggregation None Codec based VAD Disabled / Enabled DSP based Speech None Pre-Processinbg Disabled None Voice Activity Detection Windows 10 Voice Activation / Intel Wake on Voice Audio DSP Pre/Post-Processing Module Support:	ACX/SDCA	Disabled / Enabled	
Codec based VADDisabled / EnabledDSP based SpeechNonePre-Processing DisabledNoneVoice Activity DetectionWindows 10 Voice Activation / Intel Wake on VoiceAudio DSP Pre/Post-Processing Module Support:Disabled / EnabledWaves Post-processDisabled / EnabledDTSDisabled / EnabledIntelSST SpeechDisabled / EnabledDolbyDisabled / EnabledWaves Pre-processDisabled / EnabledMaxim Smart AMPDisabled / EnabledForteMedia SAMSoftDisabled / EnabledSound Research IPDisabled / EnabledConexant Pre-ProcessDisabled / EnabledRealtek Post-ProcessDisabled / EnabledRealtek Post-ProcessDisabled / EnabledDisabled / EnabledDonexant Pre-ProcessDisabled / EnabledDisabled / EnabledDisabled / EnabledDonexant Smart AmpDisabled / EnabledDest ReserverDisabled / EnabledDest ReserverDisabled / EnabledDest ReserverDisabled / Enabled	ACX/SDCA speaker aggregation	None	
DSP based SpeechNonePre-Processinbg DisabledNoneVoice Activity DetectionWindows 10 Voice Activation / Intel Wake on VoiceAudio DSP Pre/Post-Processing Module Support:Waves Post-processDisabled / EnabledDTSDisabled / EnabledIntelSST SpeechDisabled / EnabledDolbyDisabled / EnabledWaves Pre-processDisabled / EnabledMaxim Smart AMPDisabled / EnabledForteMedia SAMSoftDisabled / EnabledSound Research IPDisabled / EnabledConexant Pre-ProcessDisabled / EnabledRealtek Post-ProcessDisabled / Enabled	Codec based VAD	Disabled / Enabled	
Pre-Processinbg DisabledNoneVoice Activity DetectionWindows 10 Voice Activation / Intel Wake on VoiceAudio DSP Pre/Post-Processing Module Support:Waves Post-processDisabled / EnabledDTSDisabled / EnabledIntelSST SpeechDisabled / EnabledDolbyDisabled / EnabledWaves Pre-processDisabled / EnabledMaxies Pre-processDisabled / EnabledMaxies Pre-processDisabled / EnabledMaxim Smart AMPDisabled / EnabledForteMedia SAMSoftDisabled / EnabledSound Research IPDisabled / EnabledConexant Pre-ProcessDisabled / EnabledRealtek Post-ProcessDisabled / Enabled	DSP based Speech	None	
Voice Activity DetectionWindows 10 Voice Activation / Intel Wake on VoiceAudio DSP Pre/Post-Processing Module Support:Waves Post-processDisabled / EnabledDTSDisabled / EnabledIntelSST SpeechDisabled / EnabledDolbyDisabled / EnabledWaves Pre-processDisabled / EnabledMaxim Smart AMPDisabled / EnabledForteMedia SAMSoftDisabled / EnabledSound Research IPDisabled / EnabledConexant Pre-ProcessDisabled / EnabledRealtek Post-ProcessDisabled / EnabledDoubleDisabled / EnabledDisabled / EnabledDond Research IPDisabled / EnabledDisabled / EnabledDisabled / EnabledDonexant Pre-ProcessDisabled / EnabledDonexant Smart AmpDisabled / EnabledDonexant Smart AmpDisabled / EnabledDisabled / EnabledDisabled / Enabled	Pre-Processinbg Disabled	None	
Audio DSP Pre/Post-Processing Module Support: Disabled / Enabled Waves Post-process Disabled / Enabled DTS Disabled / Enabled IntelSST Speech Disabled / Enabled Dolby Disabled / Enabled Waves Pre-process Disabled / Enabled Maxim Smart AMP Disabled / Enabled ForteMedia SAMSoft Disabled / Enabled Sound Research IP Disabled / Enabled Conexant Pre-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled	Voice Activity Detection	Windows 10 Voice Activation / Intel Wake on	
Audio DSP Pre/Post-Processing Module Support: Waves Post-process Disabled / Enabled DTS Disabled / Enabled IntelSST 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 Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled		Voice	
Audio DSP Pre/Post-Processing Module Support: Waves Post-process Disabled / Enabled DTS Disabled / Enabled IntelSST 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 Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled			
Would Support. Waves Post-process Disabled / Enabled DTS Disabled / Enabled IntelSST 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 Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled	Audio DSP Pre/Post-Processing		
Waves Post-processDisabled / EnabledDTSDisabled / EnabledIntelSST SpeechDisabled / EnabledDolbyDisabled / EnabledWaves Pre-processDisabled / EnabledAudysseyDisabled / EnabledMaxim Smart AMPDisabled / EnabledForteMedia SAMSoftDisabled / EnabledSound Research IPDisabled / EnabledConexant Pre-ProcessDisabled / EnabledConexant Smart AmpDisabled / EnabledRealtek Post-ProcessDisabled / Enabled	Weyee Best process	Disabled / Enabled	
Disabled / Enabled IntelSST 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 Disabled / Enabled Disabled / Enabled		Disabled / Enabled	
Intersort 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 Realtek Post-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled Disabled / Enabled Disabled / Enabled	IntelSST Speech	Disabled / Enabled	
Douby 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 Disabled / Enabled Disabled / Enabled		Disabled / Enabled	
Audyssey Disabled / Enabled Audyssey Disabled / Enabled Maxim Smart AMP Disabled / Enabled ForteMedia SAMSoft Disabled / Enabled Sound Research IP Disabled / Enabled Conexant Pre-Process Disabled / Enabled Realtek Post-Process Disabled / Enabled Disabled / Enabled Disabled / Enabled	Wayes Pro process	Disabled / Enabled	
Addyssey 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 Disabled / Enabled Disabled / Enabled	Audvesory	Disabled / Enabled	
Maxim Smart AWF 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 Disabled / Enabled Disabled / Enabled	Maxim Smart AMP	Disabled / Enabled	
Sound Research IP Disabled / Enabled Conexant Pre-Process Disabled / Enabled Conexant Smart Amp Disabled / Enabled Realtek Post-Process Disabled / Enabled		Disabled / Enabled	
Sound Research IP Disabled / Enabled Conexant Pre-Process Disabled / Enabled Conexant Smart Amp Disabled / Enabled Realtek Post-Process Disabled / Enabled Disabled / Enabled Disabled / Enabled	Fulleliveula SAIVISUIL	Disabled / Enabled	
Conexant Fre-Process Disabled / Enabled Conexant Smart Amp Disabled / Enabled Realtek Post-Process Disabled / Enabled	Conevent Dre Dreeses	Disabled / Enabled	
Conexant Smart Amp Disabled / Enabled Realtek Post-Process Disabled / Enabled	Conexant Pre-Process		
Nealler Disabled / Enabled Disabled / Enabled		Disabled / Enabled	
	Realtak Post Process	Disabled / Enabled	

BIOS entry	Options
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
Acoustic Context Awareness (ACA	Disabled / Enabled
Custom Module 'Alpha'	Disabled / Enabled
Custom Module 'Beta'	Disabled / Enabled
Custom Module 'Gamma'	Disabled / Enabled

7.5 Security

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

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	Submenu see: Secure Boot [96]



7.5.1 Secure Boot

Aptio Setup - AMI Security

User	Secure Boot feature is Active if Secure Boot is Enabled,
[Disabled]	Platform Key(PK) is enrolled
Not Active	and the System is in User mode.
	The mode change requires
[Custom]	platform reset
	Select Screen
	It: Select Item
	Enter: Select
	+/-: Change Opt.
	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Reset
	ESC: Exit
	User [Disabled] Not Active [Custom]

BIOS entry	Options
System Mode	None
Secure Boot	Disabled / Enabled Not Active

Secure Boot Mode	Custom / Standard
Restore Factory Keys	Submenu see: <u>Restore Factory Keys [} 97]</u>
Reset To Setup Mode	Submenu see: <u>Reset To Setup Mode [▶ 98]</u>
Key Management	Submenu see: Key Management [> 99]

7.5.1.1 Restore Factory Keys

System Mode	User		Force System to User Mode.		
Secure Boot	[Disabled] Not Active		Boot key databases		
Secure Boot Mode ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Custom]				
▶ Key Management	Install facto	ory defaults ——	·		
	Press 'Yes' to proce	ed 'No' to cance	el		
			elect Screen		
	Yes	No	elect Item		
			Change Opt		
			F1: General Help		
			F2: Previous Values		
			F3: Optimized Defaults		
			F4: Save & Reset		
			ESC: Exit		
Version 2.22	Version 2.22.1293 Copyright (C) 2024 AMI				

BIOS entry	Options	
System Mode	None	
Secure Boot	Disabled / Enabled	
Secure Boot Mode	Custom / Standard	
Restore Factory Keys	Install factory defaults, see box	

7.5.1.2 Reset To Setup Mode

tio Setup - AMI

Aptio Setup	Security		
System Mode	User	De	elete all Secure Boot key
Secure Boot	[Disabled] Not Active		ALADASES IIOM NVKAM
Secure Boot Mode ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Custom]		
▶ Key Management	Reset To Setup Deleting all variables System to Setup Do you want to p	Mode will reset the Mode proceed?	elect Screen
	Yes	No F2 F3 F4 ES	: Select Change Opt. eneral Help 2: Previous Values 3: Optimized Defaults 4: Save & Reset SC: Exit

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BIOS entry	Options
System Mode	none
Secure Boot Disabled / Enabled Not Active	
Secure Boot Mode	Custom / Standard
Reset To Setup Mode	Reset To Setup Mode, see box

7.5.1.3 Key Management

Aptio Setup - AMI Security

	Vendor Keys		Modified		ified	Install factory default Secure Boot kevs after the platform
	Factory Key Provision Restore Factory Keys Reset To Setup Mode Enroll EFI Image Export Secure Boot var	iable	5	[En	abled]	reset and while the System is in Setup mode
	Secure Boot variable		Size	Keys	Key Source	
	Platform Key	(PK)	862	1	Test(AMI)	→-: Select Screen
	Key Exchange Keys	(KEK)	1560	1	Factory	↓↑: Select Item
	Authorized Signatures	(db)	3143	2	Factory	Enter: Select
	Forbidden Signatures	(dbx)	17836	71	Factory	+/-: Change Opt.
	Authorized TimeStamps	(dbt)	0	0	No Keys	F1: General Help
	OsRecovery Signatures	(dbr)	0	0	No Keys	F2: Previous Values
						F3: Optimized Defaults
İ						F4: Save & Reset
						ESC: Exit

BIOS entry	Options
Vendor Keys	None
Factory Key Provision	Disabled / Enabled
Restore Factory Keys	Submenu see: <u>Restore Factory Keys</u> [▶ 100]
Reset To Setup Mode	Submenu see: Reset To Setup Mode [101]
Enroll Efi Image	Submenu see: Enroll Efi Image [> 102]
Export Secure Boot variables	Submenu see: Export Secure Boot variables [102]
Secure Boot variables	
PlatformKey(PK)	Press enter key
Key Exchange Keys (KEK)	Press enter key
Authorized Signatures (db)	Press enter key
Forbidden Signatures (dbx)	Press enter key
Authorized TimeStamps (dbt)	Press enter key
OsRecovery Signatures (dbr)	Press enter key



7.5.1.3.1 Restore Factory Keys

Aptio Setup - AMI Security

Vendor Keys	Modified	Force System to User Mode. Install factory default Secure
Factory Key Provision Restore Factory Keys Reset To Setup Mode Export Secure Boot variable Enroll Efi Image	[Enabled]	Boot key databases
Secure Boot variable Platform Key (PK Key Exchange Keys (KEK Authorized Signatures (db) Eachiddon Signatures (db)	Size Keys Key Source Install factory defaults - Press 'Yes' to proceed 'No' to ca	ncel
 Authorized TimeStamps (dbt OsRecovery Signatures (dbr 	Yes No	elect Screen elect Item : Select Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

BIOS entry	Options
Vendor Keys	None
Restore Factory Keys	Restore Factory Keys, see box

7.5.1.3.2 Reset To Setup Mode

Aptio Setup - AMI



BIOS entry	Options
Vendor Keys	None
Reset To Setup Mode	Reset To Setup Mode, see box



7.5.1.3.3 Enroll Efi Image

Aptio Setup - AMI Security



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BIOS entry	Options
Vendor Keys	None
Enroll Efi Image	File System, see box

7.5.1.3.4 Export Secure Boot variables



BIOS entry	Options
Vendor Keys	None
Export Secure Boot variables	File System, see box

7.5.1.3.5 Platform Key (PK) Aptio Setup - AMI Security

	Security	
Vendor Keys	Modified	Enroll Factory Defaults or
Factory Key Provision Restore Factory Keys Reset To Setup Mode Enroll Efi Image Export Secure Boot variabl	[Disabled] es	<pre>1.Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2 Authenticated UEFI_Variable</pre>
Secure Boot variable	Platform Key (PK)	3.EFI PE/COFF Image(SHA256)
 Flatfolm Rey Key Exchange Keys Authorized Signatures Farbidden Signatures 	TK) Details db) Export buy) 1	Factory, Modified, Mixed
 Authorized TimeStamps (c OsRecovery Signatures (c 	bt) bt) br)	<pre>→: Select Screen it: 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
Vendor Keys	None
Platform Key (PK)	Platform Key (PK), see box

7.5.1.3.6 Key Exchange Keys

Vendor Keys		Modified	Enroll Factory Defaults or load certificates from a file:
Factory Key Provision Restore Factory Keys Reset To Setup Mode Enroll Efi Image Export Secure Boot variab	oles	[Disabled] [Disabled] (Disabled] (Disabled] (Disabled] (Disabled] (Disabled)	1.Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2.Authenticated UEFI_Variable
Secure Boot variable	(PK)	Key Exchange Keys (KEK)	3.EFI PE/COFF Image(SHA256)
 Key Exchange Keys Authorized Signatures Forbiddon Signatures 	(KEK) (db)	Details Export	Factory, Modified, Mixed
 Authorized TimeStamps OsRecovery Signatures 	(dbt) (dbt) (dbr)	Append Delete	<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
Vendor Keys	None
Key Exchange Keys	Key Exchange Keys, see box

7.5.1.3.7 Authorized Signatures

Vendor Keys	Modified	Enroll Factory Defaults or
Factory Key Provision Restore Factory Keys Reset To Setup Mode Enroll Efi Image Export Secure Boot variables	[Disabled]	<pre>load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3.EFI PE/COFF Image(SHA256) Key Source: Factory, Modified, Mixed</pre>
Secure Boot variable Platform Key (PK) Key Exchange Keys (KEK) Authorized Signatures (db)	Authorized Signatures (db) Details Export	
 Forbidden Signatures (dbx) Authorized TimeStamps (dbt) OsRecovery Signatures (dbr) 	Update Append Delete	→-: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
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BIOS entry	Options
Vendor Keys	None
Authorized Signatures	Authorized Signatures, see box

7.5.1.3.8 Forbidden Signatures

	2	
Vendor Keys	Modified	Enroll Factory Defaults or load certificates from a file:
<pre>Factory Key Provision Restore Factory Keys Reset To Setup Mode Enroll Efi Image Export Secure Boot variables</pre>	[Disabled]	1.Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2.Authenticated UEFI_Variable
Secure Boot variable Platform Key (PK)	Forbidden Signatures (dbx)	3.EFI PE/COFF Image(SHA256) Key Source:
► Key Exchange Keys (KEK) ► Authorized Signatures (db)	Details	Factory, Modified, Mixed
Forbidden Signatures (dbx) 1	Update	
► Authorized TimeStamps (dbt)	Append	→-: Select Screen
▶ OsRecovery Signatures (dbr)	Delete	↓↑: Select Item
	L]	Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F1: Save & Reset
		ESC. Exit
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BIOS entry	Options
Vendor Keys	None
Forbidden Signatures	Forbidden Signatures, see box

7.5.1.3.9 Authorized TimeStamps

Vendor Kevs	Modified	Enroll Factory Defaults or
		load certificates from a file:
Factory Key Provision	[Disabled]	1.Public Key Certificate:
▶ Restore Factory Keys		a)EFI SIGNATURE LIST
▶ Reset To Setup Mode		b)EFI CERT X509 (DER)
▶ Enroll Efi Image		c)EFI CERT RSA2048 (bin)
Export Secure Boot variables		d) EFI CERT SHAXXX
		2.Authenticated UEFI Variable
Secure Boot variable	[]	3.EFI PE/COFF Image(SHA256)
 Platform Key (PK) 	Authorized TimeStamps (dbt)	Key Source:
► Key Exchange Keys (KEK)		Factory, Modified, Mixed
► Authorized Signatures (db)	Update	
▶ Forbidden Signatures (dbx) 1	Append	
Authorized TimeStamps (dbt)	L	→←: Select Screen
► OsRecovery Signatures (dbr)	0 0 No Keys	↓↑: 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
Vendor Keys	None
Authorized TimeStamps	Authorized TimeStamps, see box

7.5.1.3.10 OsRecovery Signatures



BIOS entry	Options
Vendor Keys	None
OsRecovery Signatures	OsRecovery Signatures, see box
7.6 Boot

Aptio Setup — AMI Main Advanced Chipset Security	Boot Save & Exit		
Boot Configuration Setup Prompt Timeout Bootup NumLock State Quiet Boot	1 [Off] [Enabled]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	
Driver Option Proirities			
FIXED BOOT ORDER Priorities			
Boot Option #1	[Service Stick]		
Boot Option #2	[CFast]		
Boot Option #3	[SSD]		
Boot Option #4	[HDD]	→-: Select Screen	
Boot Option #5	[CD/DVD]	↓↑: Select Item	
Boot Option #6	[USB Stick]	Enter: Select	
Boot Option #7	[USB Floppy]	+/-: Change Opt.	
Boot Option #8	[USB Hard Disk]	F1: General Help	
Boot Option #9	[USB CD/DVD]	F2: Previous Values	
Boot Option #10	[Network]	F3: Optimized Defaults	
Boot Option #11	[USB Lan]	F4: Save & Reset	
		ESC: Exit	
Advanced Fixed Boot Order Parameter:	S		

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BIOS entry	Options	
Boot Configuration		
Setup Prompt Timeout	None	
Bootup NumLok State	On / Off	
Quiet Boot	Enabled / Disabled	
Driver Option Priorities		
Fixed Boot Order Priorities		
Boot Option #1 - 11	Here you can set the order of	
	the boot media to be used.	
Advanced Fixed Boot Order Parameters	Submenu see: Advanced Fixed Boot Order	
	Parameters [110]	

7.6.1 Advanced Fixed Boot Order Parameters

Aptio Setup - AMI

npero becap ini	Boot	
Min. CFast capacity (GB) Max. CFast capacity (GB) Min. SSD capacity (GB) Max. SSD capacity (GB) Min. HDD capacity (GB) Max. HDD capacity (GB) Max. USB Stick capacity (GB) UEFI BDS Boot Filter Re—enable UEFI Disks	0 119 119 481 481 8000000 64 [Enabled] [Enabled]	Lower capacity limit for boot group CFast in GB
BootDeviceDef Version 3(11/22/2018)		<pre>→-: Select Screen \\[\]\therefore it is 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
Min. CFast capacity (GB)	None
Max. CFast capacity (GB)	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)

7.7 Save & Exit

Aptio Setup - AMI Main Advanced Chipset Security Boot **Save & Exit**

Save Changes and Exit Discard Changes and Exit	Exit system setup after saving the changes.
Save Changes Discard Changes and Reset	
Save Changes Discard Changes	
Default Options Restore Defaults Save as User Defaults Restore User Defaults	→+: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help
Boot Override Launch EFI Shell from filesystem device	F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

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BIOS entry	Options
Save Options	
Save Changes and Exit	Press enter key
Discard Changes and Exit	Press enter key
Save Changes	Press enter key
Discard Changes and Reset	Press enter key
Save Changes	Press enter key
Discard Changes	Press enter key
Default Options	
Restore Optimized Defaults	Press enter key
Save as User Defaults	Press enter key
Restore as User Defaults	Press enter key
Boot Override	
Launch EFI Shell from filesystem device	Press enter key



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8 Mechanical drawings

8.1 PCB: dimensions

All dimensions are in mm

- 304.6 -

Fig. 25: CB1076 MZ

8.2 PCB: mounting holes

Mounting Holes H1-H9: Inner=3,962 Outher=10,16 All dimensions are in mm



Fig. 26: CB1076 MZ-MH

9 Technical data

9.1 Electrical data

Power supply		
Board	24 VDC power supply (+20 % / - 15 %)	
RTC	≥3 A	
Power		
Transformer	95 W continuous load 150 W peak load	
Current consumption		
RTC	≤ 10 µm	

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 +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
Impact	
Operating	150 m/s², 6 ms
Storage	400 m/s², 6 ms
Shipping	400 m/s ² , 6 ms, for packed boards
Vibration	
Operating	10 58 Hz, amplitude 0.075 mm
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.

I

9.3 Technical 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 100 °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

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 100 °C! Continuous overheating can destroy the board!

If the temperature exceeds 100 °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 meanings of the POST Codes are explained in the document "AptioTM 5.x Status Codes" from American Megatrends®, which is available from the website <u>http://www.ami.com</u>. In addition, the following OEM POST Codes are output:

Code	Description
87h	BIOS-API started
88h	PCA9535 started
89h	PWRCTRL firmware 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. If interrupts are to be available only on the ISA side, they must be reserved by the BIOS setup. Exclusivity on the PCI side is neither given nor possible.

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.

Bus	Dev.	Fct.	Controller / Slot
00	00	00	Host Bridge ID 3E30
00	01	00	PCI-to- PCI Bridge ID1901
00	01	01	PCI-to- PCI Bridge ID1905
00	01	02	PCI-to- PCI Bridge ID1909
00	02	00	VGA Controller ID3E98
00	08	00	System Device ID1911
00	12	00	Data Acquisition/Signal Processing Controller ID A379
00	14	00	XHCI USB Controller ID A36D
00	14	02	RAM Controller ID A36F
00	16	00	Communication Device ID A360
00	16	03	Serial Device ID A363
00	17	00	RAID Controller ID 2822
00	1D	00	PCI-to-PCI Bridge ID A330
00	1D	04	PCI-to-PCI Bridge ID A334
00	1F	02	ISA Bridge ID A306
00	1F	03	HD Audio Device ID A348
00	1F	04	SMBus Controller ID A323
00	1F	05	Controller ID A324
00	1F	06	Ethernet Controller ID 15BB
01	00	00	Ethernet Controller (PCIE) ID 1533
02	00	00	Ethernet Controller (PCIE) ID 1533
03	00	00	Ethernet Controller (PCIE) ID 1533

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
60-6F	Reserved for DDR4
70-73	POST-Code Output
88-89	Slave address defined by BIOS
A0-A7	Reserved for DDR4
B0-B3	Power controller (access via BIOS-API)
B8-BB	Power controller (access via BIOS-API)

12 Support and Service

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