



KU968

COM Express Compact Module User's Manual

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COM Express Specification Reference

PICMG[®] COM Express Module[™] Base Specification.

http://www.picmg.org/

FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

- 1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- 2. Shielded interface cables must be used in order to comply with the emission limits.

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Warranty

- 1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
- 2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
- 3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
- 4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

- 1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
- 2. Wear an antistatic wrist strap.
- 3. Do all preparation work on a static-free surface.
- 4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
- 5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:

• Use the correct AC input voltage range.

To reduce the risk of electric shock:

• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- One KU968 board
- One heat sink (Height: 23.8mm)

Optional Items

- COM332-B carrier board kit
- Heat spreader (Height: 11mm)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

• Storage devices such as hard disk drive, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

SYSTEM	Processor	7th Generation Intel [®] Core [™] Processors, BGA 1356 Intel [®] Core [™] i7-7600U Processor, Dual Core, 4M Cache, 2.8GHz (3.9GHz), 15W Intel [®] Core [™] i5-7300U Processor, Dual Core, 3M Cache, 2.6GHz (3.5GHz), 15W	WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
		Intel [®] Core [™] i3-7100U Processor, Dual Core, 3M Cache, 2.4GHz, 15W	SECURITY	TPM	Available Upon Request
	Memory	Intel® Celeron® Processor 3965, Dual Core, 2M Cache, 2.2GHz, 15W 16GB DDR4 Memory Down	POWER	Туре	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
	Dual Channel DDR4 2133MHz			Consumption	Typical: 3965U: 12V @ 0.2134A (2.5608W) Max.: 3965U: 12V @ 1.3592A (16.3104W)
	BIOS	Insyde SPI 128Mbit	OS SUPPORT		Windows: Windows 10 IoT Enterprise 64-bit
GRAPHICS	Controller	Intel [®] HD Graphics	05 SUPPORT		LINUX: Yocto Project v2.2
	Feature	Ature OpenGL 5.0, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: AVC/H.264, MPEG2, JPEG, HEVC/H265, VP8, VP9		Temperature	Operating : 0 to 60°C : -45 to 85°C (with heat spreader)
	Display	1 x VGA/DDI (DDI available upon request) 1 x LVDS/eDP (eDP available upon request)			Storage: -40 to 85°C
		1 x DDI VGA: resolution up to 1920x1200 @ 60Hz		Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
		LVDS: dual channel 24-bit, resolution up to 1920x1200 @ 60Hz eDP: resolution up to 4096x2304 @ 60Hz HDMI: resolution up to 4096x2160 @ 30Hz DP++: resolution up to 4096x2304 @ 60Hz		MTBF	866,065 hrs @ 25°C; 422,194 hrs @ 45°C; 238,613 hrs @ 60°C Calculation Model: Telcordia Issue 2 Environment: GB, GC – Ground Benign, Controlled
Triple Displays VGA + LVDS + DDI		VGA + LVDS + DDI DDI + eDP + DDI	MECHANICAL	Dimensions	COM Express [®] Compact 95mm (3.74") x 95mm (3.74")
EXPANSION	Interface	5 PCIe x1 or 4 PCIe x1 + 1 PCIe x4 or 3 PCIe x1 + 2 PCIe x2 (support up to 5 devices and 8 lanes) 1 x LPC 1 x I ² C 1 x SMBus 2 x UART (TX/RX)		Compliance	PICMG COM Express [®] R2.1, Type 6
AUDIO	Interface	HD Audio			
ETHERNET	Controller	1 x Intel [®] I219LM with iAMT11.0 PCIe (10/100/1000Mbps)			
1/0	USB	4 x USB 3.0 8 x USB 2.0			
	SATA	3 x SATA 3.0 (up to 6Gb/s) RAID 0/1/5			
	DIO	1 x 8-bit DIO			

Features

• Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

• DDR4

DDR4 delivers increased system bandwidth and improves performance. DDR4 improves the performance at a lower power than DDR3/DDR2.

Graphics

The integrated Intel[®] HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It delivers enhanced media conversion rates and higher frame rates on 4K Ultra HD videos. These enhancements deliver the performance and compatibility to meet the demand for business and home entertainment applications. Supports 1 x VGA/DDI (DDI available upon request), 1 x LVDS/eDP (eDP available upon request) and 1 x DDI display interfaces.

Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s. The bandwidth of the SATA 3.0 will be limited by carrier board design.

• Gigabit LAN

The Intel® I219LM Gigabit LAN PHY controller supports up to 1Gbps data transmission.

• USB

The system board supports the new USB 3.0. It is capable of running at a maximum transmission speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.0 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

Chapter 2 - Concept

COM Express Module Standards

The figure below shows the dimensions of the different types of COM Express modules.

KU968 is a COM Express Compact module. The dimension is 95mm x 95mm.



- \bigcirc Extended only
- Basic only
- Compact only
- \bigcirc Compact and Basic only
- $\mathcal{O}_{\mathcal{D}}$ Mini only



Chapter 2

Specification Comparison Table

The table below shows the COM Express standard specifications and the corresponding specifications supported on the KU968 module.

Module Pin-out - Required and Optional Features A-B Connector. PICMG® COM.0 Revision 2.1

		COM Express Module Base	
		Specification Type 6	Туре б
Connector	Feature		
		(No IDE or PCI, add DDI+	
		USB3) Min / Max	
A-B		System I/O	
A-B	PCI Express Lanes 0 - 5	1/6	6
A-B	LVDS Channel A	0/1	1
A-B	LVDS Channel B	0/1	1
A-B	eDP on LVDS CH A pins	0/1	1
A-B	VGA Port	0/1	0/1 (Option : DDI2 or VGA)
A-B	TV-Out	NA	NA
A-B	DDI 0	NA	NA
A-B ¹	Serial Ports 1 - 2	0 / 2	2
A-B	CAN interface on SER1	0/1	0
A-B	SATA / SAS Ports	1/4	3
A-B	AC'97 / HDA Digital Interface		1
A-B	USB 2.0 Ports	4/8	8
A-B	USB Client	0/1	0
A-B	USB 3.0 Ports	NA	NA
A-B	LAN Port 0	1/1	1
A-B	Express Card Support	1/2	2
A-B	LPC Bus	1/1	1
A-B	SPI	1/2	1
A-B		System Managen	ient
A-B ²	SDIO (muxed on GPIO)	0/1	0
	General Purpose I/O	8/8	8
A-B	SMBus	1/1	1
A-B	I2C	1/1	1
A-B	Watchdog Timer	0/1	1
A-B	Speaker Out	1/1	1
A-B	External BIOS ROM Support	0/2	1
A-B	Reset Functions	1/1	1
A-B		Power Managem	
A-B	Thermal Protection	0/1	1
A-B	Battery Low Alarm	0 / 1	1
A-B	Suspend/Wake Signals	0/3	1
A-B	Power Button Support	1/1	1
A-B	Power Good	1/1	1
A-B	VCC_5V_SBY Contacts	4 / 4	4
A-B ¹	Sleep Input	0/1	1
A-B ¹	Lid Input	0 / 1	1
A-B ¹	Fan Control Signals	0/2	2
A-B	Trusted Platform Modules	0/1	1
A-B		Power	
A-B	VCC 12V Contacts	12 / 12	12
		1	1

Module Pin-out - Required and Optional Features C-D Connector. PICMG® COM.0 Revision 2.1

Connector	Specification Type 6 T		DFI KU968 Type 6	
C-D		System I/O		
	PCI Express Lanes 16 - 31	0 / 16	0	
	PCI Express Graphics (PEG)	0/1	0	
C-D ²	Muxed SDVO Channels 1 - 2	NA	NA	
	PCI Express Lanes 6 - 15	0/2	2	
	PCI Bus - 32 Bit	NA	NA	
	PATA Port	NA	NA	
	LAN Ports 1 - 2	NA	NA	
	DDIs 1 - 3	0/3	1/2 (Option : DDI2 or VGA)	
C-D ²	USB 3.0 Ports	0/4	4	
C-D		Power		
C-D	VCC_12V Contacts	12 / 12	12	

• 1 Indicates 12V-tolerant features on former VCC_12V signals.

• 2 Cells in the connected columns spanning rows provide a rough approximation of features sharing connector pins.

Chapter 3 - Hardware Installation

Board Layout



Bottom View

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Important:

Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

System Memory

The system board is equipped with 16GB DDR4 system memory onboard supporting 2133MHz, dual channel memory interface.



Important:

When the Standby Power LED is red, it indicates that there is power on the board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the board and components.



Top View



Bottom View

Chapte	er 3

Connectors

CPU Fan Connector



Connect the CPU fan's cable connector to the CPU fan connector on the board. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and board components.

BIOS Setting

"PC Health Status" submenu in the Advanced menu of the BIOS will display the current speed of the cooling fan. Refer to chapter 4 of the manual for more information.

COM Express Connectors

The COM Express connectors are used to interface the KU968 COM Express board to a carrier board. Connect the COM Express connectors (located on the solder side of the board) to the COM Express connectors on the carrier board.

Refer to the "Installing KU968 onto a Carrier Board" section in this chapter for more information.



Refer to the following pages for the pin functions of these connectors.

COM Express Connectors

Row A	4	Row I	3	Row A		Row E	3
A1	GND (FIXED)	B1	GND (FIXED)	A56	PCIE_TX4-	B56	PCIE_RX4-
A2	GBE0_MDI3-	B2	GBE0_ACT#	A57	GND	B57	GPO2
A3	GBE0_MDI3+	B3	LPC_FRAME#	A58	PCIE_TX3+	B58	PCIE_RX3+
A4	GBE0_LINK100#	B4	LPC_AD0	A59	PCIE_TX3-	B59	PCIE_RX3-
A5	GBE0_LINK1000#	B5	LPC_AD1	A60	GND (FIXED)	B60	GND (FIXED)
A6	GBE0_MDI2-	B6	LPC_AD2	A61	PCIE_TX2+	B61	PCIE_RX2+
A7	GBE0 MDI2+	B7	LPC AD3	A62	PCIE TX2-	B62	PCIE_RX2-
A8	GBE0 LINK#	B8	LPC DRQ0#	A63	GPI1	B63	GPO3
A9	GBE0_MDI1-	B9	LPC_DRQ1#	A64	PCIE_TX1+	B64	PCIE_RX1+
A10	GBE0 MDI1+	B10	LPC CLK	A65	PCIE TX1-	B65	PCIE RX1-
A11	GND (FIXED)	B11	GND (FIXED)	A66	GND	B66	WAKE0#
A12	GBE0_MDI0-	B12	PWRBTN#	A67	GPI2	B67	WAKE1#
A13	GBE0_MDI0+	B13	SMB CK	A68	PCIE_TX0+	B68	PCIE_RX0+
A14	GBE0_CTREF	B14	SMB DAT	A69	PCIE TX0-	B69	PCIE RX0-
A15	SUS S3#	B15	SMB_DAT	A70	GND (FIXED)	B70	GND (FIXED)
				-			
A16	SATA0_TX+	B16	SATA1_TX+	A71	LVDS_A0+	B71	LVDS_B0+
A17	SATA0_TX-	B17	SATA1_TX-	A72	LVDS_A0-	B72	LVDS_B0-
A18	SUS_S4#	B18	SUS_STAT#	A73	LVDS_A1+	B73	LVDS_B1+
A19	SATA0_RX+	B19	SATA1_RX+	A74	LVDS_A1-	B74	LVDS_B1-
A20	SATA0_RX-	B20	SATA1_RX-	A75	LVDS_A2+	B75	LVDS_B2+
A21	GND (FIXED)	B21	GND (FIXED)	A76	LVDS_A2-	B76	LVDS_B2-
A22	SATA2_TX+	B22	NA	A77	LVDS_VDD_EN	B77	LVDS_B3+
A23	SATA2_TX-	B23	NA	A78	LVDS_A3+	B78	LVDS_B3-
A24	SUS_S5#	B24	PWR_OK	A79	LVDS_A3-	B79	LVDS_BKLT_EN
A25	SATA2_RX+	B25	NA	A80	GND (FIXED)	B80	GND (FIXED)
A26	SATA2_RX-	B26	NA	A81	LVDS_A_CK+	B81	LVDS_B_CK+
A27	BATLOW#	B27	WDT	A82	LVDS_A_CK-	B82	LVDS_B_CK-
A28	(S)ATA_ACT#	B28	NA	A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTR
A29	AC/HDA_SYNC	B29	AC/HDA SDIN1	A84	LVDS_I2C_DAT	B84	VCC 5V SBY
A30	AC/HDA _RST#	B30	AC/HDA SDIN0	A85	GPI3	B85	VCC_5V_SBY
A31	GND (FIXED)	B31	GND (FIXED)	A86	RSVD	B86	VCC 5V SBY
A32	AC/HDA BITCLK	B32	SPKR	A87	RSVD	B87	VCC_5V_SBY
A33	AC/HDA SDOUT	B33	I2C CK	A88	PCIE0_CLK_REF+	B88	BIOS DIS1#
A34	BIOS_DIS0#	B34	I2C_DAT	A89	PCIE0_CLK_REF-	B89	VGA RED
A34 A35	THRMTRIP#	B35	THRM#	A09 A90		B09	
A36	USB6-	B36	USB7-	A91	GND (FIXED) SPI POWER	B91	GND (FIXED)
				_	_	_	VGA_GRN
A37	USB6+	B37	USB7+	A92	SPI_MISO	B92	VGA_BLU
A38	USB_6_7_OC#	B38	USB_4_5_OC#	A93	GPO0	B93	VGA_HSYNC
A39	USB4-	B39	USB5-	A94	SPI_CLK	B94	VGA_VSYNC
A40	USB4+	B40	USB5+	A95	SPI_MOSI	B95	VGA_I2C_CK
A41	GND (FIXED)	B41	GND (FIXED)	A96	NA	B96	VGA_I2C_DAT
A42	USB2-	B42	USB3-	A97	TYPE10#	B97	SPI_CS#
A43	USB2+	B43	USB3+	A98	SER0_TX	B98	RSVD
A44	USB_2_3_OC#	B44	USB_0_1_OC#	A99	SER0_RX	B99	RSVD
A45	USB0-	B45	USB1-	A100	GND (FIXED)	B100	GND (FIXED)
A46	USB0+	B46	USB1+	A101	SER1_TX	B101	FAN_PWMOUT
A47	VCC_RTC	B47	EXCD1_PERST#	A102	SER1_RX	B102	FAN_TACHIN
A48	EXCD0_PERST#	B48	EXCD1_CPPE#	A103	LID#	B103	SLEEP#
A49	EXCD0_CPPE#	B49	SYS_RESET#	A104	VCC_12V	B104	VCC_12V
A50	LPC_SERIRQ	B50	CB_RESET#	A105	VCC_12V	B105	VCC_12V
A51	GND (FIXED)	B51	GND (FIXED)	A106	VCC_12V	B106	VCC_12V
A52	PCIE_TX5+	B52	PCIE_RX5+	A107	VCC_12V	B107	VCC_12V
A53	PCIE TX5-	B53	PCIE_RX5-	A108	VCC 12V	B108	VCC 12V
A54	GPI0	B54	GP01	A109	VCC 12V	B109	VCC 12V
	PCIE_TX4+	B55	PCIE_RX4+	A110	GND (FIXED)	B110	GND (FIXED)

Row C		Row [Row D		;	Row D		
C1	GND (FIXED)	D1	D1 GND (FIXED)		C56 NA		D56 NA	
C2	GND	D2	GND	C57	TYPE1#	D57	TYPE2#	
C3	USB SSRX0-	D3	USB SSTX0-	C58	NA	D58	NA	
C4	USB_SSRX0+	D4	USB_SSTX0+	C59	NA	D59	NA	
C5	GND	D5	GND	C60	GND (FIXED)	D60	GND (FIXED)	
C6	USB_SSRX1-	D6	USB_SSTX1-	C61	NA	D61	NA	
C7	USB SSRX1+	D7	USB SSTX1+	C62	NA	D62	NA	
C8	GND	D8	GND	C63	RSVD	D63	RSVD	
C9	USB SSRX2-	D9	USB SSTX2-	C64	RSVD	D64	RSVD	
C10	USB_SSRX2+	D10	USB_SSTX2+	C65	NA	D65	NA	
C11	GND (FIXED)	D11	GND (FIXED)	C66	NA	D66	NA	
C12	USB_SSRX3-	D12	USB_SSTX3-	C67	RSVD	D67	GND	
C13	USB_SSRX3+	D13	USB SSTX3+	C68	NA	D68	NA	
C14	GND	D14	GND	C69	NA	D69	NA	
C15	NA	D15	DDI1_CTRLCLK_AUX+	C70	GND (FIXED)	D70	GND (FIXED)	
C16	NA	D16	DDI1 CTRLDATA AUX-	C71	NA	D71	NA	
C17	RSVD	D10	RSVD	C72	NA	D72	NA	
C18	RSVD	D17	RSVD	C73	GND	D72	GND	
C19	PCIE RX6+	D10	PCIE TX6+	C74	NA	D74	NA	
C20	PCIE RX6-	D19	PCIE_TX6-	C74	NA	D74	NA	
C20	GND (FIXED)	D20	GND (FIXED)	C76	GND	D76	GND	
C22	PCIE_RX7+	D21	PCIE_TX7+	C77	RSVD	D77	RSVD	
C23	PCIE RX7-	D22	PCIE TX7-	C78	NA	D78	NA	
C24	DDI1 HPD	D23	RSVD	C79	NA	D79	NA	
C25	NA	D24	RSVD	C80	GND (FIXED)	D80	GND (FIXED)	
C26	NA	D26	DDI1_PAIR0+	C81	NA	D00	NA	
C27	RSVD	D27	DDI1_PAIR0-	C82	NA	D82	NA	
C28	RSVD	D28	RSVD	C83	RSVD	D83	RSVD	
C29	NA	D29	DDI1 PAIR1+	C84	GND	D84	GND	
C30	NA	D30	DDI1_PAIR1-	C85	NA	D85	NA	
C31	GND (FIXED)	D30	GND (FIXED)	C86	NA	D86	NA	
C32	DDI2 CTRLCLK AUX+	D31	DDI1 PAIR2+	C87	GND	D87	GND	
C33	DDI2_CTRLDATA_AUX-	D33	DDI1 PAIR2-	C88	NA	D88	NA	
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL	C89	NA	D89	NA	
C35	RSVD	D34	RSVD	C90	GND (FIXED)	D90	GND (FIXED)	
C36	NA	D36	DDI1 PAIR3+	C91	NA	D91	NA	
C37	NA	D37	DDI1 PAIR3-	C92	NA	D92	NA	
C38	NA	D38	RSVD	C93	GND	D93	GND	
C39	NA	D39	DDI2_PAIR0+	C94	NA	D94	NA	
C40	NA	D40	DDI2_PAIR0-	C95	NA	D95	NA	
C41	GND (FIXED)	D40	GND (FIXED)	C96	GND	D96	GND	
C42	NA	D41	DDI2_PAIR1+	C97	RSVD	D97	RSVD	
C43	NA	D42	DDI2_PAIR1-	C98	NA	D98	NA	
C44	NA	D44	DDI2_HPD	C99	NA	D99	NA	
C45	RSVD	D44 D45	RSVD	C100	GND (FIXED)	D100	GND (FIXED)	
C46	NA	D46	DDI2 PAIR2+	C101	NA	D100	NA	
C47	NA	D47	DDI2_PAIR2-	C102	NA	D102	NA	
C48	RSVD	D48	RSVD	C102	GND	D102	GND	
C49	NA	D49	DDI2_PAIR3+	C104	VCC_12V	D104	VCC 12V	
C50	NA	D50	DDI2_PAIR3-	C105	VCC 12V	D105	VCC 12V	
C51	GND (FIXED)	D51	GND (FIXED)	C106	VCC 12V	D106	VCC 12V	
C52	NA	D52	NA	C107	VCC_12V	D100	VCC 12V	
C53	NA	D52	NA	C108	VCC_12V	D108	VCC 12V	
C54	TYPE0#	D54	PEG_LANE_RV#	C109	VCC_12V	D100	VCC 12V	
		004		C110	GND (FIXED)	D110	GND (FIXED)	

COM Express Connectors Signals and Descriptions

Pin Types I Input to the Module O Output from the Module I/O Bi-directional input / output signal OD Open drain output

AC97/HDA Signals D	escriptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
AC/HDA_RST#	A30	O CMOS	3.3V Suspend/3.3V		Connect to CODEC pin 11 RESET#	Reset output to CODEC, active low.
AC/HDA_SYNC	A29	O CMOS	3.3V/3.3V		Connect to CODEC pin 10 SYNC	Sample-synchronization signal to the CODEC(s).
AC/HDA_BITCLK	A32	I/O CMOS	3.3V/3.3V		Connect to CODEC pin 6 BIT_CLK	Serial data clock generated by the external CODEC(s).
AC/HDA_SDOUT	A33	O CMOS	3.3V/3.3V		Connect to CODEC pin 5 SDATA_OUT	Serial TDM data output to the CODEC.
AC/HDA_SDIN2	B28	I/O CMOS	3.3V Suspend/3.3V	NA		
AC/HDA_SDIN1	B29	I/O CMOS	3.3V Suspend/3.3V			Serial TDM data inputs from up to 2 CODECs.
AC/HDA_SDIN0	B30	I/O CMOS	3.3V Suspend/3.3V		Connect 33 Ω in series to CODEC0 pin 8 SDATA_IN	

Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
GBE0_MDI0+	A13	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI0+/-	Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3. The MDI can operate in 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following: 1000BASE-T 100BASE-TX 10BASE-T MDI[0]+/- B1_DA+/- TX+/- TX+/- MDI[1]+/- B1_DB+/- RX+/- RX+/- MDI[2]+/- B1_DC+/- MDI[3]+/- B1_DD+/-
GBE0_MDI0-	A12	I/O Analog	3.3V max Suspend			
GBE0_MDI1+	A10	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI1+/-	
GBE0_MDI1-	A9	I/O Analog	3.3V max Suspend			
GBE0_MDI2+	A7	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI2+/-	
GBE0_MDI2-	A6	I/O Analog	3.3V max Suspend			
GBE0_MDI3+	A3	I/O Analog	3.3V max Suspend		Connect to Magnetics Module MDI3+/-	
GBE0_MDI3-	A2	I/O Analog	3.3V max Suspend			
GBE0_ACT#	B2	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150 Ω to 3.3VSB	Gigabit Ethernet Controller 0 activity indicator, active low.
GBE0_LINK#	A8	OD CMOS	3.3V Suspend/3.3V		NC	Gigabit Ethernet Controller 0 link indicator, active low.
GBE0_LINK100#	A4	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150 Ω to 3.3VSB	Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.
GBE0_LINK1000#	A5	OD CMOS	3.3V Suspend/3.3V		Connect to LED and recommend current limit resistor 150 Ω to 3.3VSB	Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.

SATA Signals Desc	criptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
SATA0_TX+	A16	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA0 Conn TX pin	Serial ATA or SAS Channel 0 transmit differential pair.
SATA0_TX-	A17	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATAO Conn TX pin	Senar ATA or SAS Channer o transmit differential pair.
SATA0_RX+	A19	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA0 Conn RX pin	Serial ATA or SAS Channel 0 receive differential pair.
SATA0_RX-	A20	I SATA	AC coupled on Module	AC Coupling capacitor		Senar ATA OF SAS Channel o Teceive uniferential pair.
SATA1_TX+	B16	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA1 Conn TX pin	Serial ATA or SAS Channel 1 transmit differential pair.
SATA1_TX-	B17	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATAT Conn TX pin	Senar ATA or SAS Channer 1 transmit differential pair.
SATA1_RX+	B19	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA1 Conn RX pin	Serial ATA or SAS Channel 1 receive differential pair.
SATA1_RX-	B20	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA1 Conn RA pin	Senai ATA or SAS Channel 1 receive differential pair.
SATA2_TX+	A22	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA2 Conn TX pin	Serial ATA or SAS Channel 2 transmit differential pair.
SATA2_TX-	A23	O SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATAZ Conin TX pin	Serial ATA or SAS Channel 2 transmit differential pair.
SATA2_RX+	A25	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATA2 Conn RX pin	Serial ATA or SAS Channel 2 receive differential pair.
SATA2_RX-	A26	I SATA	AC coupled on Module	AC Coupling capacitor	Connect to SATAZ Conn RA pin	Senar ATA or SAS Channel 2 receive universitial pair.
SATA3_TX+	B22	O SATA	AC coupled on Module	NA		Serial ATA or SAS Channel 3 transmit differential pair.
SATA3_TX-	B23	O SATA	AC coupled on Module	NA		Serial ATA OF SAS Channel'S transmit universitial pair.
SATA3_RX+	B25	I SATA	AC coupled on Module	NA		Serial ATA or SAS Channel 3 receive differential pair.
SATA3_RX-	B26	I SATA	AC coupled on Module	NA		Serial ATA OF SAS Channel S receive uniferential pair.
(S)ATA ACT#	A28	I/O CMOS	3.3V / 3.3V	PU 10K to 3.3V	Connect to LED and recommend current limit resistor 2200 to 3.3V	ATA (parallel and serial) or SAS activity indicator, active low.

PCI Express Lanes Signals	Descriptions						
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description	
PCIE_TX0+	A68	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 0	
PCIE_TX0-	A69	0 FCIL	AC COUPIEU OIT MOUUIE	AC Coupling capacitor		rui Express Direrentuar Hansmit Paris U	
PCIE_RX0+	B68	I PCIE	AC coupled off Module	Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 0		
PCIE_RX0-	B69	I PCIE	AC coupled off Module		Slot - Connect to PCIE Conn pin		
PCIE_TX1+	A64	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 1	
PCIE_TX1-	A65	U PCIE	AC coupled off Module	AC Coupling capacitor		PCI Express Differential Transmit Pairs 1	
PCIE_RX1+	B64	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 1	
PCIE_RX1-	B65	IFUL	AC COUPIEU OIT MODUle		Slot - Connect to PCIE Conn pin	rut Lipress Dilicicilual Receive rails 1	

PCI Express Lanes Signa	als Descripti	ons				
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
PCIE_TX2+	A61	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 2
PCIE_TX2-	A62	0. GL	, to coupied off module	AC Coupling capacitor		
PCIE_RX2+ PCIE_RX2-	B61 B62	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Pairs 2
PCIE_TX3+	A58	0.0075		AC Coupling capacitor		
PCIE_TX3-	A59	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 3
PCIE_RX3+ PCIE_RX3-	B58 B59	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Pairs 3
PCIE_RX3- PCIE_TX4+	A55			AC Coupling capacitor		
PCIE_TX4-	A56	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 4
PCIE_RX4+	B55	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 4
PCIE_RX4- PCIE_TX5+	B56 A52	-		AC Coupling capacitor	Slot - Connect to PCIE Conn pin	
PCIE_TX5-	A53	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 5
PCIE_RX5+	B52	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 5
PCIE_RX5- PCIE_TX6+	B53 D19		ne coupled on module	AC Coupling capacitor	Slot - Connect to PCIE Conn pin	
PCIE_TX6-	D19 D20	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 6
PCIE_RX6+	C19	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 6
PCIE_RX6-	C20	TFCIL	Ac coupled on Module		Slot - Connect to PCIE Conn pin	PCI Express Differential Receive Fails 0
PCIE_TX7+ PCIE_TX7-	D22 D23	O PCIE	AC coupled on Module	AC Coupling capacitor AC Coupling capacitor	Connect to PCIE device or slot	PCI Express Differential Transmit Pairs 7
PCIE_RX7+	C22	I PCIE	AC coupled off Module		Device - Connect AC Coupling cap 0.1uF	PCI Express Differential Receive Pairs 7
PCIE_RX7-	C23		AC COUPIED OIT MODULE		Slot - Connect to PCIE Conn pin	•
PCIE0_CLK_REF+ PCIE0_CLK_REF-	A88 A89	O PCIE	PCIE		Connect to PCIE device, PCIe CLK Buffer or slot	Reference clock output for all PCI Express and PCI Express Graphics lanes.
PCIEU_CEK_REF-	AO9					laires.
PEG Signals Description						
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
PEG_TX0+ PEG_TX0-	D52 D53	O PCIE	AC coupled on Module	NA	_	PCI Express Graphics transmit differential pairs 0
PEG_RX0+	C52	1.0015		NA		
PEG_RX0-	C53	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 0
PEG_TX1+ PEG_TX1-	D55 D56	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 1
PEG_RX1+	C55			NA		
PEG_RX1-	C56	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 1
PEG_TX2+	D58	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 2
PEG_TX2- PEG_RX2+	D59 C58			NA		
PEG_RX2-	C59	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 2
PEG_TX3+	D61	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 3
PEG_TX3- PEG_RX3+	D62 C61			NA		
PEG_RX3-	C62	I PCIE	AC coupled off Module	NA	—	PCI Express Graphics receive differential pairs 3
PEG_TX4+	D65	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 4
PEG_TX4- PEG_RX4+	D66 C65	OTCLE	Ac coupled on Housie	NA		
PEG_RX4-	C66	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 4
PEG_TX5+	D68	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 5
PEG_TX5-	D69	OFGE	Ac coupied on module	NA		
PEG_RX5+ PEG_RX5-	C68 C69	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 5
PEG_TX6+	D71	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 6
PEG_TX6-	D72	UPUE	AC COUPIED ON MODULE	NA		
PEG_RX6+ PEG_RX6-	C71 C72	I PCIE	AC coupled off Module	NA	_	PCI Express Graphics receive differential pairs 6
PEG_TX7+	D74	O PCIE	AC coupled on Madula	NA		DCI Everano Cranhico transmit differential naire 7
PEG_TX7-	D75	U PLIE	AC coupled on Module -	NA		PCI Express Graphics transmit differential pairs 7
PEG_RX7+ PEG_RX7-	C74 C75	I PCIE	AC coupled off Module	NA	_	PCI Express Graphics receive differential pairs 7
PEG_RX7- PEG_TX8+	D78			NA		
PEG_TX8-	D79	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 8
PEG_RX8+	C78	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 8
PEG_RX8- PEG_TX9+	C79 D81			NA		
PEG_TX9-	D82	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 9
PEG_RX9+	C81	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 9
PEG_RX9- PEG_TX10+	C82 D85			NA NA		
PEG_TX10+ PEG_TX10-	D85	O PCIE	AC coupled on Module	NA	—	PCI Express Graphics transmit differential pairs 10
PEG RX10+	C85	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 10
PEG_RX10-	C86	I I CIL	, a coupied on moudle	NA		
PEG_TX11+ PEG_TX11-	D88 D89	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 11
PEG_RX11+	C88	I PCIE	AC coupled off Mark	NA		DCI Everano Crambico receivo differential pairo 11
PEG_RX11-	C89	I PUIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 11

PEG Signals Descrip	ptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
PEG_TX12+	D91	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 12
PEG_TX12-	D92	OFCIL	Ac coupled on Housie	NA		FOI Express Graphics transmit differential pairs 12
PEG_RX12+	C91	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 12
PEG_RX12-	C92	I T CIL	The coupled on Thouse	NA		
PEG_TX13+	D94	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 13
PEG_TX13-	D95		····	NA		
PEG_RX13+	C94	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 13
PEG_RX13-	C95	-		NA		
PEG_TX14+	D98	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 14
PEG_TX14-	D99			NA		
PEG_RX14+ PEG_RX14-	C98 C99	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 14
PEG_KX14- PEG_TX15+	D101		-	NA		
PEG_TX15+ PEG_TX15-	D101 D102	O PCIE	AC coupled on Module	NA		PCI Express Graphics transmit differential pairs 15
PEG_RX15+	C101		+	NA		
PEG RX15-	C101	I PCIE	AC coupled off Module	NA		PCI Express Graphics receive differential pairs 15
PEG_LANE_RV#	D54	I CMOS	3.3V / 3.3V	PU 10K to 3.3V		PCI Express Graphics lane reversal input strap. Pull low on the Carrier board to reverse lane order.

ExpressCard Signals Descri	ExpressCard Signals Descriptions											
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description						
EXCD0_CPPE#	A49	I CMOS	3.3V / 3.3V	PU 10k to 3.3V		PCI ExpressCard: PCI Express capable card request, active low, one per						
EXCD1_CPPE#	B48	1 CM05	5.50 / 5.50	PU 10k to 3.3V		card						
EXCD0_PERST#	A48	O CMOS	3.3V / 3.3V			PCI ExpressCard: reset, active low, one per card						
EXCD1_PERST#	B47	J CMOS	5.50 / 5.50			PCI Expression reset, active low, one per card						

DDI Signals Descriptions	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
DDI1 PAIR0+/SDVO1 RED+	D26	//		NU300	Connect AC Coupling Capacitors 0.1uF to Device	
DII_PAIR0+/SDVOI_RED+	D26	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.10F to Device	DDI 1 Pair 0 differential pairs/Serial Digital Video B red output differential pair
DII_PAIR0-7SDV01_RED- DII PAIR1+/SDV01 GRN+	D27				Connect AC Coupling Capacitors 0.10F to Device	
	D29	O PCIE	AC coupled off Module			DDI 1 Pair 1 differential pairs/Serial Digital Video B green output differential pair
DI1_PAIR1-/SDV01_GRN-					Connect AC Coupling Capacitors 0.1uF to Device	
DI1_PAIR2+/SDVO1_BLU+	D32	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 2 differential pairs/Serial Digital Video B blue output differential pair
DI1_PAIR2-/SDVO1_BLU-	D33				Connect AC Coupling Capacitors 0.1uF to Device	
DI1_PAIR3+/SDVO1_CK+	D36	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 1 Pair 3 differential pairs/Serial Digital Video B clock output differential pair
DI1_PAIR3-/SDVO1_CK-	D37	01012	ne coupied on module		Connect AC Coupling Capacitors 0.1uF to Device	
DI1_PAIR4+/SDVO1_INT+	C25	I PCIE	AC coupled off Module	NA		Serial Digital Video B interrupt input differential pair.
DI1_PAIR4-/SDVO1_INT-	C26			NA		
DI1_PAIR5+/SDVO1_TVCLKIN+	C29	I PCIE	AC coupled off Module	NA		Serial Digital Video TVOUT synchronization clock input differential pair.
DI1_PAIR5-/SDVO1_TVCLKIN-	C30	TICIL	Ac coupied on module	NA		
DI1_PAIR6+/SDVO1_FLDSTALL+	C15	I PCIE	AC coupled off Module	NA		Serial Digital Video Field Stall input differential pair.
DI1 PAIR6-/SDVO1 FLDSTALL-	C16	IPCIE	AC COUPIED ON MODULE	NA		Sena Digital video rielo stali input diferential pait.
		I/O PCIE	AC coupled on Module	PD 100K to GND (S/W IC between Rpu/PCH)	Connect to DP AUX+	DP AUX+ function if DDI1_DDC_AUX_SEL is no connect
DI1_CTRLCLK_AUX+/SDVO1_CTRLCLK	D15	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V, PD 100K to GND (S/W IC between Rpu/Rpd resistor)	Connect to HDMI/DVI I2C CTRLCLK	HDMI/DVI 12C CTRLCLK if DDI1_DDC_AUX_SEL is pulled high
		I/O PCIE	AC coupled on Module	PU 100K to 3.3V (S/W IC between Rpu/PCH)	Connect to DP AUX-	DP AUX- function if DDI1_DDC_AUX_SEL is no connect
DDI1_CTRLDATA_AUX- SDVO1_CTRLDATA	D16	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V/PU 100K to 3.3V (S/W IC between 4.7K/100K resistor)	Connect to HDMI/DVI I2C CTRLDATA	HDMI/DVI 12C CTRLDATA if DDI1_DDC_AUX_SEL is pulled high
DI1_HPD	C24	I CMOS	3.3V / 3.3V		PD 1M and Connect to device Hot Plug Detect	DDI Hot-Plug Detect
DI1_DDC_AUX_SEL	D34	I CMOS	3.3V / 3.3V	PD 1M to GND	PU 100K to 3.3V for DDC(HDMI/DVI)	Selects the function of DDI1_CTRLCLK_AUX+ and DDI1_CTRLDATA_AUX DDI[n]_DDC_AUX_SEL shall be pulled to 3.3V on the Carrier with a 100K Ohm resistor to configure the DDI[n]_AUX pair as the DDC channel. Carrier DDI[n]_DDC_AUX_SEL should be connected to pin 13 of the DisplayPort
DI2 PAIR0+	D39				Connect AC Coupling Capacitors 0.1uF to Device	
12 PAIRO-	D40	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 2 Pair 0 differential pairs
DI2 PAIR1+	D42				Connect AC Coupling Capacitors 0.1uF to Device	
DI2 PAIR1-	D43	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 2 Pair 1 differential pairs
DI2 PAIR2+	D46				Connect AC Coupling Capacitors 0.1uF to Device	
DI2_PAIR2+	D40	O PCIE	AC coupled off Module		Connect AC Coupling Capacitors 0.1uF to Device	DDI 2 Pair 2 differential pairs
DI2_PAIR2- DI2_PAIR3+	D47 D49				Connect AC Coupling Capacitors 0.1uF to Device	
DI2_PAIR3+ DI2_PAIR3-	D49 D50	O PCIE	AC coupled off Module			DDI 2 Pair 3 differential pairs
J12_PAIR3-	050		-	PD 400// L CND	Connect AC Coupling Capacitors 0.1uF to Device	
		I/O PCIE	AC coupled on Module	PD 100K to GND (S/W IC between Rpu/PCH)	Connect to DP AUX+	DP AUX+ function if DDI2_DDC_AUX_SEL is no connect
DI2_CTRLCLK_AUX+	C32	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V, PD 100K to GND (S/W IC between Rpu/Rpd resistor)	Connect to HDMI/DVI I2C CTRLCLK	HDMI/DVI I2C CTRLCLK if DDI2_DDC_AUX_SEL is pulled high
		I/O PCIE	AC coupled on Module	PU 100K to 3.3V (S/W IC between Rpu/PCH)	Connect to DP AUX-	DP AUX- function if DDI2_DDC_AUX_SEL is no connect
DI2_CTRLDATA_AUX-	C33	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V/PU 100K to 3.3V (S/W IC between 4.7K/100K resistor)	Connect to HDMI/DVI I2C CTRLDATA	HDMI/DVI I2C CTRLDATA if DDI2_DDC_AUX_SEL is pulled high

DDI Signals Description	าร					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
DDI2_HPD	D44	I CMOS	3.3V / 3.3V		PD 1M and Connect to device Hot Plug Detect	DDI Hot-Plug Detect
DDI2_DDC_AUX_SEL	C34	I CMOS	3.3V / 3.3V	PD 1M to GND	PU 100K to 3.3V for DDC(HDMI/DVI)	Selects the function of DDI2_CTRLCLK_AUX+ and DDI2_CTRLDATA_AUX DDI[n]_DDC_AUX_SEL shall be pulled to 3.3V on the Carrier with a 100K Ohm resistor to configure the DDI[n]_AUX pairs as the DDC channel. Carrier DDI[n]_DDC_AUX_SEL should be connected to pin 13 of the DisplayPort
DDI3_PAIR0+	C39	O PCIE	AC coupled off Module	NA		DDI 3 Pair 0 differential pairs
DDI3_PAIR0- DDI3_PAIR1+	C40 C42			NA NA		
DDI3_PAIR1+ DDI3_PAIR1-	C42	O PCIE	AC coupled off Module	NA		DDI 3 Pair 1 differential pairs
DDI3_PAIR2+	C46	0.0015		NA		
DDI3_PAIR2-	C47	O PCIE	AC coupled off Module	NA		DDI 3 Pair 2 differential pairs
DDI3_PAIR3+	C49	O PCIE	AC coupled off Module	NA		DDI 3 Pair 3 differential pairs
DDI3_PAIR3-	C50	I/O PCIE	AC coupled on Module	NA		DP AUX+ function if DDI3_DDC_AUX_SEL is no connect
DDI3_CTRLCLK_AUX+	C36	I/O OD CMOS	3.3V / 3.3V	NA		HDMI/DVI I2C CTRLCLK If DDI3_DDC_AUX_SEL is pulled high
DDI3_CTRLDATA_AUX-	C37	I/O PCIE	AC coupled on Module	NA		DP AUX- function if DDI3_DDC_AUX_SEL is no connect
DDI3_CIREDATA_A0A-	07	I/O OD CMOS	3.3V / 3.3V	NA		HDMI/DVI I2C CTRLDATA if DDI3_DDC_AUX_SEL is pulled high
DDI3 HPD	211	I CMOS	3.3V / 3.3V	NA		
DDI3_HPD	C44	I CMOS	3.3V / 3.3V	NA		DDI Hot-Plug Detect
DDI3_DDC_AUX_SEL	C38	I CMOS	3.3V / 3.3V	NA		Selects the function of DD13_CTRLCLK_AUX+ and DD13_CTRLDATA_AUX- DDI[n]_DDC_AUX_SEL shall be pulled to 3.3V on the Carrier with a 100K Ohm resistor to configure the DDI[n]_AUX pair as the DDC channel. Carrier DDI[n]_DDC_AUX_SEL should be connected to pin 13 of the DisplayPort
USB Signals Description				101020		les i si
Signal USB0+	Pin# A46	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board Connect 90 @ @100MHz Common Choke in series and ESD suppressors to GND to USB	Description
USB0-	A45	I/O USB	3.3V Suspend/3.3V		connector	USB differential pairs 0
USB1+	B46	T/O LICP	2.21/ 000000000000000000000000000000000000		Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	UCD differential action 4
USB1-	B45	I/O USB	3.3V Suspend/3.3V		connector	USB differential pairs 1
USB2+	A43	I/O USB	3.3V Suspend/3.3V		Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	USB differential pairs 2
USB2-	A42	1,0 000	5151 505pend/5151		connector	
USB3+ USB3-	B43 B42	I/O USB	3.3V Suspend/3.3V		Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 3
USB4+	A40				Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	
USB4-	A39	I/O USB	3.3V Suspend/3.3V		connector	USB differential pairs 4
USB5+	B40	I/O USB	3.3V Suspend/3.3V		Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	USB differential pairs 5
USB5-	B39 A37	1,0 000	Sist Suspend, Sist		connector	
USB6+ USB6-	A37 A36	I/O USB	3.3V Suspend/3.3V		Connect 90 2 @100MHz Common Choke in series and ESD suppressors to GND to USB connector	USB differential pairs 6
USB7+	B37				Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	
USB7-	B36	I/O USB	3.3V Suspend/3.3V		connector	USB differential pairs 7
USB_0_1_OC#	B44	I CMOS	3.3V Suspend/3.3V	PU 10k to 3V3_DU	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 0 and 1. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_2_3_OC#	A44	I CMOS	3.3V Suspend/3.3V	PU 10k to 3V3_DU	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 2 and 3. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_4_5_OC#	B38	I CMOS	3.3V Suspend/3.3V	PU 10k to 3V3_DU	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 4 and 5. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_6_7_OC#	A38	I CMOS	3.3V Suspend/3.3V	PU 10k to 3V3_DU	Connect to Overcurrent of USB Power Switch	USB over-current sense, USB channels 6 and 7. A pull-up for this line shall be present on the Module. An open drain driver from a USB current monitor on the Carrier Board may drive this line low. Do not pull this line high on the Carrier Board.
USB_SSTX0+	D4	O PCIE	AC coupled on Module	AC Coupling capacitor	Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB	Additional transmit signal differential pairs for the SuperSpeed USB data path.
USB_SSTX0- USB_SSRX0+	D3 C4			AC Coupling capacitor	connector	
USB_SSRX0+ USB_SSRX0- USB_SSTX1+	C4 C3 D7	I PCIE	AC coupled off Module	AC Coupling capacitor	Connect 90.2 @100MHz Common Choke in series and ESD suppressors to GND to USB connector Connect 90.2 @100MHz Common Choke in series and ESD suppressors to GND to USB	Additional receive signal differential pairs for the SuperSpeed USB data path.
USB_SSTX1-	D6	O PCIE	AC coupled on Module	AC Coupling capacitor	connector	Additional transmit signal differential pairs for the SuperSpeed USB data path.
USB_SSRX1+ USB_SSRX1-	C7 C6	I PCIE	AC coupled off Module	100 1	Connect 90 © @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Additional receive signal differential pairs for the SuperSpeed USB data path.
USB_SSTX2+ USB_SSTX2-	D10 D9	O PCIE	AC coupled on Module	AC Coupling capacitor AC Coupling capacitor	Connect 90 @ @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Additional transmit signal differential pairs for the SuperSpeed USB data path.
USB_SSRX2+ USB_SSRX2-	C10 C9	I PCIE	AC coupled off Module		Connect 90 © @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Additional receive signal differential pairs for the SuperSpeed USB data path.
USB_SSTX3+ USB_SSTX3-	D13 D12	O PCIE	AC coupled on Module	AC Coupling capacitor AC Coupling capacitor	Connect 90 © @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Additional transmit signal differential pairs for the SuperSpeed USB data path.
USB_SSRX3+ USB_SSRX3-	C13 C12	I PCIE	AC coupled off Module		Connect 90 Q @100MHz Common Choke in series and ESD suppressors to GND to USB connector	Additional receive signal differential pairs for the SuperSpeed USB data path.

LVDS Signals Descri	iptions						
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description	
VDS_A0+	A71				Connect to LVDS connector	LVDS Channel A differential pairs	
VDS_A0-	A72	O LVDS	LVDS			Ther LVDS flat panel differential pairs (LVDS_A[0:3]+/-, LVDS_B[0:3]+/-, LVDS_A_CK+/-,	
/DS_A1+	A73	O LVDS	LVDS		Connect to LVDS connector	LVDS_B_CK+/-) shall have 100Ω terminations across the pairs at the destination. These terminations may be on the Carrier Board if the Carrier Board implements a LVDS deserializer	
DS_A1-	A74	O LVDS	LVDS			on-board	
DS_A2+	A75	O LVDS	LVDS		Connect to LVDS connector		
DS_A2-	A76	U LVDS	LVDS				
DS_A3+	A78	O LVDS	LVDS		Connect to LVDS connector		
DS_A3-	A79	U LVDS	LVDS				
DS_A_CK+	A81	O LVDS	LVDS		Connect to LVDS connector	LVDS Channel A differential clock	
DS_A_CK-	A82	0 LVD3	EVDS				
DS_B0+	B71	O LVDS	LVDS		Connect to LVDS connector		
DS_B0-	B72					LVDS Channel B differential pairs	
DS_B1+ DS_B1-	B73 B74	O LVDS	LVDS		Connect to LVDS connector	Ther LVDS flat panel differential pairs (LVDS_A[0:3]+/-, LVDS_B[0:3]+/ LVDS_A_CK+/-,	
DS_B1- DS_B2+	B75				Connect to LVDS connector	LVDS_B_CK+/-) shall have 100Ω terminations across the pairs at the destination. These	
DS_B2+ DS_B2-	B75	O LVDS	LVDS		Connect to LVDS connector	terminations may be on the Carrier Board if the Carrier Board implements a LVDS deserializer	
DS_B3+	B70				Connect to LVDS connector	on-board	
DS B3-	B78	O LVDS	LVDS		connect to EVDS connector		
DS B CK+	B81				Connect to LVDS connector		
DS B CK-	B82	O LVDS	LVDS			LVDS Channel B differential clock	
DS_VDD_EN	A77	O CMOS	3.3V / 3.3V		Connect to enable control of LVDS panel power circuit	LVDS panel power enable	
DS_BKLT_EN	B79	O CMOS	3.3V / 3.3V		Connect to enable control of LVDS panel backlight power circuit.	LVDS panel backlight enable	
DS_BKLT_CTRL	B83	O CMOS	3.3V / 3.3V		Connect to brightness control of LVDS panel backlight power circuit.	LVDS panel backlight brightness control	
/DS_I2C_CK	A83	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V	Connect to DDC clock of LVDS panel	I2C clock output for LVDS display use	
VDS_I2C_DAT	A84	I/O OD CMOS	3.3V / 3.3V	PU 4.7K to 3.3V	Connect to DDC data of LVDS panel	I2C data line for LVDS display use	

LPC Signals Descriptions						
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
LPC_AD0	B4					
LPC_AD1	B5	I/O CMOS	3.3V / 3.3V			LPC multiplexed address, command and data bus
LPC_AD2	B6	1/0 CM05	3.30 / 3.30		Connect to LPC device	Lee multiplexed address, command and data bus
LPC_AD3	B7					
LPC_FRAME#	B3	O CMOS	3.3V / 3.3V			LPC frame indicates the start of an LPC cycle
LPC_DRQ0# LPC_DRQ1#	B8	I CMOS	3.3V / 3.3V	PU 10K to 3.3V	NC	LPC serial DMA request
LPC_DRQ1#	B9	I CMOS	5.50 / 5.50	PU 10K to 3.3V	NC	LPC Serial Dink request
LPC_SERIRQ	A50	I/O CMOS	3.3V / 3.3V	PU 10K to 3.3V	Connect to LPC device	LPC serial interrupt
LPC_CLK	B10	O CMOS	3.3V / 3.3V		Connect to Er C device	LPC clock output - 24MHz nominal

Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description							
PI CS#	B97	O CMOS	3.3V Suspend/3.3V		Connect to Carrier Board SPI Device CS# pin	Chip select for	Carrier Boar	d SPI - may be	sourced from	chipset SPIC	or SPI1		
PI_MISO	A92	I CMOS	3.3V Suspend/3.3V		Connect a series resistor 33 Ω to Carrier Board SPI Device SO pin	Data in to Mod	dule from Car	rrier SPI					-
SPI_MOSI	A95	O CMOS	3.3V Suspend/3.3V		Connect a series resistor 33 Ω to Carrier Board SPI Device SI pin	Data out from	Module to C	arrier SPI					-
SPI_CLK	A94	O CMOS	3.3V Suspend/3.3V		Connect a series resistor 33 Ω to Carrier Board SPI Device SCK pin	Clock from Mo	dule to Carri	er SPI					
SPI_POWER	A91	0	3.3V Suspend/3.3V			3.3V. The Mod Carriers shall u shall only be u	lule shall pro use less than sed to powe	100mA of SPI_ r SPI devices of	n of 100mA on POWER. SPI_F n the Carrier Be	SPI_POWER			
BIOS_DIS0#	A34					The Carrier she below table for	ould only floa r strapping o	ine the BIOS bo at these or pull options of BIOS	them low, plea disable signals	i.		Diag	Re
						BIOS DIS1#	BIOS DIS0#	Chipset SPI CS1# Destination	Chipset SPI CS0# Destination	Carrier SPI_CS#	SPI Descriptor	Bios Entry	Lir
		I CMOS	NA			1	1	Module	Module	High	Module	SPI0/SPI1	0
		i chos				1	0	Module	Module	High	Module	Carrier FWH	1
BIOS DIS1#	B88					0	1	Module	Carrier	SPI0	Carrier	SPI0/SPI1	2
						0	0	Carrier (Default)	Module (Default)	SPI1 (Default)	Module (Default)	SPI0/SPI1 (Default)	3

VGA Signals Descriptions						
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
VGA_RED	B89	O Analog	Analog	PD 150 to GND	PD 150R, connect to VGA connector with EMI filter & ESD protect component.	Red for monitor. Analog output
VGA_GRN	B91	O Analog	Analog	PD 150 to GND	PD 150R, connect to VGA connector with EMI filter & ESD protect component.	Green for monitor. Analog output
VGA_BLU	B92	O Analog	Analog	PD 150 to GND	PD 150R, connect to VGA connector with EMI filter & ESD protect component.	Blue for monitor. Analog output
VGA_HSYNC	B93	O CMOS	3.3V / 3.3V		Connect to VGA connector with a3.3V Buffer IC to isolate PCH & Display Device	Horizontal sync output to VGA monitor
VGA_VSYNC	B94	O CMOS	3.3V / 3.3V		Connect to VGA connector with a 33V Buffer IC to isolate PCH & Display Device	Vertical sync output to VGA monitor
VGA_I2C_CK	B95	I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V	Connect to VGA connector with a 3.3V to 5V Level shift circuit.	DDC clock line (I2C port dedicated to identify VGA monitor capabilities)
VGA_I2C_DAT	B96	I/O OD CMOS	3.3V / 3.3V	PU 2.2K to 3.3V	Connect to VGA connector with a 3.3V to 5V Level shift circuit.	DDC data line.

Serial Interface Signals Descriptions										
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description				
SER0 TX	A98	O CMOS	5V/12V		PD 4.7K to GND	General purpose serial port 0 transmitter				
SERU_1A	A90	0 CM05	50/120		PD 4.7K to GND	(Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)				
SER0 RX	A99	I CMOS	5V/12V	PU 10K to 3.3V		General purpose serial port 0 receiver				
SERU_RA	A99	I CMOS	50/120	PU 10K to 5.3V		(Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)				
SER1_TX	A101	O CMOS	5V/12V		PD 4.7K to GND	General purpose serial port 1 transmitter				
JERT-IN	A101	0 0103	J V/ 1 Z V			(Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)				
SER1 RX	A102	I CMOS	5V/12V	PU 10K to 3.3V		General purpose serial port 1 receiver				
JERI_RA	_KX A102 I CMOS	1 CHOS	50/120	PU 10K to 5.5V		(Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC 12V)				

Miscellaneous Signal	Descriptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
I2C_CK	B33	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3V3_DU_EC		General purpose I2C port clock output
I2C_DAT	B34	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3V3_DU_EC		General purpose I2C port data I/O line
SPKR	B32	O CMOS	3.3V / 3.3V			Output for audio enunciator - the "speaker" in PC-AT systems. This port provides the PC beep signal and is mostly intended for debugging purposes.
WDT	B27	O CMOS	3.3V / 3.3V			Output indicating that a watchdog time-out event has occurred.
FAN_PWMOUT	B101	O OD CMOS	3.3V / 3.3V			Fan speed control. Uses the Pulse Width Modulation (PWM) technique to control the fan's RPM. (Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)
FAN_TACHIN	B102	I OD CMOS	3.3V / 3.3V	PU 47K to 3V3		Fan tachometer input for a fan with a two pulse output. (Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)
TPM_PP	A96	I CMOS	3.3V / 3.3V	NA		Trusted Platform Module (TPM) Physical Presence pin. Active high. TPM chip has an internal pull down. This signal is used to indicate Physical Presence to the TPM.

Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
PWRBTN#	B12	I CMOS	3.3V Suspend/3.3V	PU 10K to 3V3_DU_EC	PU 4.7K to 3V3_SB	A falling edge creates a power button event. Power button events can be used to bring a system out of S5 soft off and other suspend states, as well as powering the system down.
SYS_RESET#	B49	I CMOS	3.3V Suspend/3.3V	PU 10K to 3V3_DU	NC PU 4.7K to 3V3_SB	Reset button input. Active low request for Module to reset and reboot. May be falling edge sensitive. For situations when SYS_RESET# is not able to reestablish control of the system, PWR_OK or a power cycle may be used.
CB_RESET#	B50	O CMOS	3.3V Suspend/3.3V	PD 100K to GND		Reset output from Module to Carrier Board. Active low. Issued by Module chipset and may result from a low SYS_RESET# input, a low PWR_OK input, a VCC_12V power input that falls below the minimum specification, a watchdog timeout, or may be initiated by the Module software.
PWR_OK	B24	I CMOS	3.3V / 3.3V	PU 10K to 3V3		Power OK from main power supply. A high value indicates that the power is good. This signal can be used to hold off Module startup to allow Carrier based PFGAs or other configurable devices time to be programmed.
SUS_STAT#	B18	O CMOS	3.3V Suspend/3.3V			Indicates imminent suspend operation; used to notify LPC devices.
5US_S3#	A15	O CMOS	3.3V Suspend/3.3V	PD 100K to GND		Indicates system is in Suspend to RAM state. Active low output. An inverted copy of SUS 23# on the Carrier Board may be used to enable the non-standby power on a typical ATX supply.
SUS_S4#	A18	O CMOS	3.3V Suspend/3.3V	PD 100K to GND		Indicates system is in Suspend to Disk state. Active low output.
US_S5#	A24	O CMOS	3.3V Suspend/3.3V	PD 100K to GND		Indicates system is in Soft Off state.
VAKE0#	B66	I CMOS	3.3V Suspend/3.3V	PU 1K to 3V3_DU		PCI Express wake up signal.
NAKE1#	B67	I CMOS	3.3V Suspend/3.3V	PU 1K to 3V3_DU		General purpose wake up signal. May be used to implement wake-up on PS2 keyboard or mouse activity.
BATLOW#	A27	I CMOS	3.3V Suspend/ 3.3V	PU 10K to 3V3_DU		Indicates that external battery is low. This port provides a battery-low signal to the Module for orderly transitioning to power saving or power cut-off ACPI modes.
LID#	A103	I OD CMOS	3.3V Suspend/12V	PU 47K to 3V3_DU_EC		LID switch. Low active signal used by the ACPI operating system for a LID switch. (Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)

Power and System Mana	Power and System Management Signals Descriptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
SLEEP#	B103	I OD CMOS	3.3V Suspend/12V	PU 10K to 3V3_DU		Sleep button. Low active signal used by the ACPI operating system to bring the system to sleep state or to wake it up again. (Recommend add Protecting Logic Level Signals on Pins Reclaimed from VCC_12V)
THRM#	B35	I CMOS	3.3V / 3.3V	PU 4.7K to 3V3		Input from off-Module temp sensor indicating an over-temp situation.
THRMTRIP#	A35	O CMOS	3.3V / 3.3V	PU 10K to 3.3V		Active low output indicating that the CPU has entered thermal shutdown.
SMB_CK	B13	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3V3_DU_EC		System Management Bus bidirectional clock line.
SMB_DAT	B14	I/O OD CMOS	3.3V Suspend/3.3V	PU 2.2K to 3V3_DU_EC		System Management Bus bidirectional data line.
SMB_ALERT#	B15	I CMOS	3.3V Suspend/3.3V	PU 2.2K to 3V3_DU_EC		System Management Bus Alert – active low input can be used to generate an SMI# (System Management Interrupt) or to wake the system.

GPIO Signals De	GPIO Signals Descriptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
GPO0	A93					
GPO1	B54	O CMOS	3.3V / 3.3V			General purpose output pins.
GPO2	B57	0 CM05	5.57 / 5.57			Upon a hardware reset, these outputs should be low.
GPO3	B63					
GPI0	A54			PU 100K to 3.3V		
GPI1	A63	I CMOS	3.3V / 3.3V	PU 100K to 3.3V		General purpose input pins.
GPI2	A67	1 CMOS	3.34 / 3.34	PU 100K to 3.3V		Pulled high internally on the Module.
GPI3	A85			PU 100K to 3.3V		

Power and GND Signa	ower and GND Signal Descriptions					
Signal	Pin#	Module Pin Type	Pwr Rail / Tolerance	KU968	Carrier Board	Description
VCC_12V	A104~A109 B104~B109 C104~C109 D104~D109	Power				Primary power input: +12V nominal. All available VCC_12V pins on the connector(s) shall be used.
VCC_5V_SBY	B84~B87	Power				Standby power input: +5.0V nominal. If VCC5_SBY is used, all available VCC_5V_SBY pins on the connector(s) shall be used. Only used for standby and suspend functions. May be left unconnected if these functions are not used in the system design.
VCC_RTC	A47	Power				Real-time clock circuit-power input. Nominally +3.0V.
GND	A1, A11, A21, A31, A41, A51, A57, A60, A66, A70, A80, A90, A100, A110, B1, B11, B21, B31, B41, B51, B60, B70, B80, B90, B100, B110, C1, C2, C5, C8, C111 C14, C21, C31, C41, C51, C60, C70, C73, C76, C80, C84, C87, C90, C93, C96, C100, C103, C110, D1, D2, D5, D8, D11, D14, D21, D31, D51, D60, D67, D70, D73, D76, D80, D84, D87, D90, D93, D96, D100, D103, D110					Ground - DC power and signal and AC signal return path. All available GND connector pins shall be used and tied to Carrier Board GND plane.

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Standby Power LED



This LED will be lit when the system is in standby mode.

Cooling Option

Heat Sink



Note: The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.



Top View of the Heat Sink



Bottom View of the Heat Sink

 \bullet ``1" denotes the location of the thermal pad designed to contact the corresponding components that are on the KU968.



Important:

Remove the plastic covering from the thermal pads prior to mounting the heat sink onto the KU968.



Installing KU968 onto a Carrier Board

Important:

The carrier board (COM332-B) and COM Express module used in this section are for reference purpose only and may not resemble you carrier board and the acutal KU968 module. These illustrations are mainly to guide you on how to install KU968 onto the carrier board of your choice.

1. Grasp KU968 by its edges and position it on top of the carrier board with the mounting holes of KU968 aligning with the standoffs on the carrier board. This will also align the COM Express connectors of the two boards to each other.



COM Express connectors on KU968



Mounting standoffs on the carrier board

COM Express connectors on the carrier board

2. Press KU968 down firmly to seat it in the COM Express connectors of the carrier board.





The illustration above shows the pressing points of the module onto the carrier board. Be careful when pressing the module to avoid damages to the connectors.

3. Use the provided mounting screws to secure KU968 with heat sink to the carrie board. The photo below shows the locations of the long mounting screws.



Installing the COM Express Debug Card (Optional)



The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

1. COMe-LINK1 is the COM Express debug card designed for COM Express Compact modules to debug and display signals and codes of COM Express modules.

COMe-LINK1



Top view



2. Connect the COMe-DEBUG card to COMe-LINK1 via a cable.

COMe-DEBUG





Bottom view

3. Use the provided screws to fix the COMe-LINK1 debug card onto the carrier board.



4. Then use the instructions from the previous section to install SU968 and heat sink on the top of the COMe-LINK1 debug card.



Side View of the Module, Debug Card and Carrier Board

Chapter 4 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.



The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and keys simultaneously.

Legends

KEYs	Function
Right and Left Arrows	Moves the highlight left or right to select a menu
Up and Down Arrows	Moves the highlight up or down between submenus or fields
<esc></esc>	Exits to the BIOS setup utility
<f1></f1>	Displays general help
<f5 f6=""></f5>	Changes the highlighted value
<f9></f9>	Changes to the default setup
<f10></f10>	Saves and exits the setup program.
<enter></enter>	Press <enter> to enter the highlighted submenu.</enter>

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When " \blacktriangleright " appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

Insyde BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

	InsydeH	2O Setup Utility	Rev. 5.0
Main Advanced	Security Boot	Exit	
Project Name BIOS Version EC Version	KU968 B18A.08A 0.3		This is the help for the hour, minute, second field. Valid range is from 0 to 23, 0 to 59, 0 to 59. IN-
Processor Type CPUID CPU Speed CPU Stepping L1 Data Cache L1 Instruction Cache L2 Cache L3 Cache Number Of Processors Microcode Rev Total Memory System Memory Speed SODIMM 0	0x806E9 (KABY) 2900 MHz 09 (KBL H0/J0 Si 32 KB 256 KB 4096 KB 2 Core(s) / 4 Thre 0000008E 8192 MB 2133 MHz 4096 MB	(epping)	CŘEASE/RÉDUCE: +/
SODIMM 1 PCH Rev / SKU Intel ME Version / SKU	4096 MB 21 (C1 Stepping) 2.2 Premium 11.8.50.3434 / CC	/ SKL PCH-LP (U) iHDCP DRPORATE	
System Time System Date	[10:21:28] [11/20/2018]		
			F9 Setup Defaults F10 Save and Exit

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

System Date

The date format is <month>, <date>, <year>. Month displays the month, from 01 to 12. Date displays the date, from 01 to 31. Year displays the year, from 2000 to 2099.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.



			Insyde	H2O Setup Utility	Rev. 5.
Main	Advanced	Security	Boot	Exit	
 CPU Cot Video Cot Audio Cot SATA Cot SATA Cot USB Con PCI Expinition MEBX Cot Active M Debug Cot Device N Super IO 	Configuration Ianagement Tec onfiguration		port		ACPI Configuration Settin;
Help Exit		elect Item elect Item		F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

ACPI Configuration

This section is used to configure the system ACPI parameters.



Wake on LAN

This field is used to enable or disable the LAN signal to wake up the system.

After G3

This field is to specify what state to go when power is re-applied after a power failure (G3 state).

Always On The system working state.

Always Off Off, except for trickle current to devices such as the power button.

Wake On RTC

Automatically power the system on at a particular time every day from the Real-time clock battery.

Wake up time

When Wake On RTC is set to enabled, specify the wake up time of the day: <hour> (00~23), <minute> (00~59), <second> (00~59).



Note:

Under "Dual Boot Type" or "UEFI Boot Type" mode, if "Quiet Boot" is set to enabled, "BGRT Logo" field will appear for configuration. Refer to the "Boot" menu in this chapter for more information.

	InsydeH2O Setup Utility	Rev. 5
Advanced		
ACPI Configuration Wake on LAN After G3 BGRT Logo Wake On RTC	<disabled> <always on=""> <enabled> <disabled></disabled></enabled></always></disabled>	Support display logo wit ACPI BGRT table.
Help ↑/↓ Select I c Exit ←/→ Select I		F9 Setup Defaults F10 Save and Exit

BGRT Logo

This field is used to enable or disable to support display logo with ACPI BGRT table.

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CPU Configuration

This section is used to configure the CPU.

	InsydeH20	O Setup Utility	Rev. 5.0
Advanced			
CPU Configuration Intel Speed Step Turbo Mode CPU C States Hyper-Threading	<enabled> <enabled> <enabled> <enabled></enabled></enabled></enabled></enabled>		Allows more than two fre- quency ranges to be sup- ported.
F1Help \uparrow/\downarrow EscExit \leftarrow/\rightarrow		F6 Change Values er Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Intel Speed Step

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

Turbo Mode

Enable or disable the turbo mode.

CPU C States

Enable or disable the CPU Power Management.

Hyper-Threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology.

Video Configuration

This section configures the video settings.



Primary Display

Set the initial priority.

Internal Graphics Device

Keep IGFX enabled or disabled based on the setup options.

Boot display

Set the display device combination.



To control "Primary Display" & "Boot display", first go to "Boot" menu and select different "Boot Type". Boot Type : Legacy Boot Type -> Hide Primary Display & Show Boot display Boot Type : UEFI Boot Type -> Show Primary Display & Hide Boot display

Boot Type : Dual Boot Type -> Show Primary Display & Show Boot display



LVDS Panel Supported

This field is used to enable or disable the PTN3460 function for LVDS Panel. If enabled, "PTN3460 Configuration", "LCD Panel Type" and "Backlight Type" fields will appear for configuration.

PTN3460 Configuration

Select PTN3460 color depth configuration: 18 Bit, 24 Bit, 36 Bit or 48 Bit.

LCD Panel Type

Select LCD Panel Type: 800x480, 800x600, 1024x768, 1366x768, 1280x1024, 1920x1080 or 1920x1200.

Backlight Type

Select Backlight Type: Normal or Invert.

Audio Configuration

This section is used to configure the audio settings.



Azaliza

Control the detection of the Azaliza device.

Disabled

HDA will be unconditionally disabled.

Enabled

HDA will be unconditionally enabled.

Auto

HDA will be enabled if present, disabled otherwise.

SATA Configuration

This section is designed to select the SATA controller and the type of hard disk drive which are installed in your system unit.

	Insyc	deH2O Setup Utility	Rev. 5.0
Advanced			
SATA Controller(s) SATA Speed SATA Mode Selection Serial ATA Port 0 Serial ATA Port 1 Serial ATA Port 2	[Not Installed] [Not Installed] [Not Installed]	<enabled> <auto> <ahci></ahci></auto></enabled>	Enable/Disable SATA Device.
Port 0 Hot Plug Port 1 Hot Plug Port 2 Hot Plug		<enabled> <disabled> <enabled> <disabled> <enabled> <disabled> <disabled></disabled></disabled></enabled></disabled></enabled></disabled></enabled>	
F1 Help ↑/↓ Se Esc Exit ←/→ Se	lect Item lect Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

SATA Controller(s)

This field is used to enable or disable Serial ATA devices.

SATA Speed

This field is used to select SATA speed generation limit: Auto, Gen1, Gen2 or Gen3.

SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

AHCI

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

RAID

This option allows you to create RAID or Intel Rapid Storage configuration on Serial ATA devices.

Port 0/1/2 and Hot Plug

These fields are used to enable or disable the serial ATA ports and their hot plugs.

USB Configuration

This section is used to configure the parameters of the USB device.

	Advanced		InsydeH2O Setup Utility	Rev. 5.
Legacy USF XHCI Hand	3 Support	<en< td=""><td>abled> sabled></td><td>USB keyboard/mouse/sto age support under UEF and DOS environment. will supporting UEFI er vironment only if set t UEFI Only</td></en<>	abled> sabled>	USB keyboard/mouse/sto age support under UEF and DOS environment. will supporting UEFI er vironment only if set t UEFI Only
1 Help sc Exit		Select Item Select Item	F5/F6 Change Valu Enter Select ► Subl	

Legacy USB Support

Disabled

Disable USB keyboard/mouse/storage support under UEFI and DOS environment.

Enabled

 ${\small {\sf Enable USB \ keyboard/mouse/storage \ support \ under \ UEFI \ and \ DOS \ environment.}}$

UEFI Only

Enable USB keyboard/mouse/storage support under UEFI environment.

XHCI Hand-off

Enable or disable to clear USB Legacy SMI bit for XHCI.

PCI Express Configuration

This section configures settings relevant to PCI Express root ports.

	InsydeH2O Setup Utility	Rev. 5.0
Advanced		
 PCI Express Root Port 1 PCI Express Root Port 2 PCI Express Root Port 3 PCI Express Root Port 4 PCI Express Root Port 6 PCI Express Root Port 9 PCI Express Root Port 10 PCI Express Root Port 11 		PCI Express Root Port 1 Settings.
T1 Help ↑/↓ Select Item Ese Exit ←/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

	InsydeH2O Setup Utility	Rev. 5.0
Advanced		
PCI Express Root Port 1 PCIe Speed Hot Plug	<enabled> <auto> <disabled></disabled></auto></enabled>	Control the PCI Express Root Port.
F1 Help \uparrow/\downarrow Sele Esc Exit \leftarrow/\rightarrow Sele	zt Item F5/F6 Change Values ct Item Enter Select ≻ SubMenu	F9 Setup Defaults F10 Save and Exit

PCI Express Root Port 1/2/3/4/6/9/10/11

This field is used to enable or disable the PCI Express Root Port.

PCIe Speed

Select the speed of the PCI Express Root Port: Auto, Gen1, Gen2 or Gen3.

Hot Plug

This field is used to enable or disable the PCI Express Hot Plug.

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ME Configuration

This section configures settings relevant to flash ME region.

	InsydeH2O Setup Ut	ility Rev. 5.0
Advanced		
Me Fw Image Re-Flash	<disabled></disabled>	Enable/disable to flash ME region
l Help ↑/↓ Sele se Exit ←/→ Sele	ct Item F5/F6 Chang ct Item Enter Select	e Values F9 Setup Defaults ▶ SubMenu F10 Save and Exit

Me Fw Image Re-Flash

This field is used to enable or disable the flash ME region.

MEBX Configuration

Configure Intel[®] Active Management Technology (Intel[®] AMT) in the Intel[®] Management Engine BIOS Extension (MEBX) section. Please refer to **Chapter 6** for more information.

Active Management Technology Support

The section allows users to enable or disable the Intel[®] Active Management Technology (Intel[®] AMT). Please refer to **Chapter 6** for more information.

	Insy	deH2O Setup Utility	Rev. 5.0
A	lvanced		
Active Managen	ent Technology Support		When disabled AMT BIOS Features are no
Intel AMT Supp Un-Configure M			longer supported and user is no longer able to access MEBx Setup.
			Note : This option does not dis- able Manageability Fea- tures in FW.
F1 Help Esc Exit	↑/↓ Select Item ←/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Intel AMT Support

This field is used to enable or disable Intel[®] Active Management Technology.

Un-Configure ME

This field is used to enable or disable to un-configure ME with resetting MEBX password to default.

Debug Configuration

This section configures debug setting.



Dynamic EFI DEBUG

This field is used to turn on or off the function to output debug message from COM port. When set to on, relevant EFI debug information will display as below.

		InsydeH2O Setup Utility	Rev. 5.0
Adva	nced		
Dynamic EFI DEF EFI debug print le EFI debug serial p EFI debug baud ra	vel [ort [-On> 0x80000000] 0x3F8] 115200]	Enable it to output debug message from COM port.
F1 Help Esc Exit	†/↓ Select Item ←/→ Select Item	F5/F6 Change Values Enter Select ≻ SubMenu	F9 Setup Defaults F10 Save and Exit

Device Manager

The section configures UEFI device with option ROM, such as LAN card, etc.

	In	sydeH2O Setup Utility	Rev. 5.0
Advance	1		
Device Manager			Device Manager Setting
Device Manager			
	Exit BIOS Setur	Utility and launch Device Manager !	
F1 Help ↑/↓ Esc Exit ←/-	Select Item → Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Super IO Configuration

This section configures the system super I/O chip parameters.

	InsydeH2O Setup Utility	Rev. 5
Advanced		
COM Port 1	<enable></enable>	Configure Serial port usir
Base I/O Address	<3F8>	options: [Disable] No Co
Interrupt	<iro4></iro4>	figuration [Enable] Us
COM Port 2	<enable></enable>	Configuration
Base I/O Address	<2F8>	
Interrupt	<iro3></iro3>	
WDT	<disable></disable>	
CPU Smart Fan Control	<enable></enable>	
Boundary 1	[30]	
Boundary 2	1401	
Boundary 3	1501	
Boundary 4	[60]	
Fan Speed Count 1	[35]	
Fan Speed Count 2	[60]	
Fan Speed Count 3	[08]	
Fan Speed Count 4	[100]	
SYS Smart Fan Control	<enable></enable>	
Boundary 1	[30]	
Boundary 2	[40]	
Boundary 3	[50]	
Boundary 4	[60]	
Fan Speed Count 1	[35]	
Fan Speed Count 2	[60]	
Fan Speed Count 3	[80]	
Fan Speed Count 4	[100]	
►PC Health Status		
	DS/DC Change Volues	TO Satur Defaulte
$\begin{array}{ccc} Help & \uparrow/\downarrow & Select Iten \\ c & Exit & \leftarrow/\rightarrow & Select Iten \end{array}$		F9 Setup Defaults F10 Save and Exit

COM Port 1/2

Configure the settings to use the serial port.

DisableNo configuration**Enable**User configuration

WDT

Enable or disable the watchdog function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

CPU/SYS Smart Fan Control

Enable or disable the CPU/System smart fan. When disabled, Fix Fan Speed Count field will appear for configuration.

	InsydeH2O Setup Utility	Rev. 5.
Advanced		
COM Port 1 Base I/O Address Interrupt COM Port 2 Base I/O Address Interrupt WDT CPU Smart Fan Control Fix Fan Speed Count SYS Smart Fan Control Fix Fan Speed Count ▶PC Health Status	<enable> <3F8> <irq4> <enable> <2F8> <irq3> <disable> (100] (100] <disable> [100]</disable></disable></irq3></enable></irq4></enable>	Fan Speed set from 1-100%
Help ↑/↓ Select Iter c Exit ←/→ Select Iter		F9 Setup Defaults F10 Save and Exit

Fix Fan Speed Count

Set the fix fan speed. The range is from 1-100% (full speed).

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the operation of the fan with different fan speeds accordingly. For example, when the system or the CPU temperature reaches boundary temperature 1, the system or CPU fan should be turned on and operate at the designated speed. The range is from 0-127°C.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed. The range is from 1-100% (full speed).

PC Health Status

This section displays the PC health status.

	InsydeH2O Setup Utility	Rev. 5.			
Advanced					
PC Health Status					
Voltage VBAT VCORE VDDQ 5V +12V	3.178 V 0.829 V 1.184 V 5.102 V 11.906 V				
Temperature CPU (°C/°F)	45 C/113 F				
Fan Speed SYS FAN CPU FAN	0 RPM 0 RPM				
l Help ↑/↓ Se c Exit ←/→ Se	lect Item F5/F6 Change Values lect Item Enter Select ≻ SubMenu	F9 Setup Defaults F10 Save and Exit			
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Console Redirection

This section configures settings relevant to console redirection.

Advanced Console Redirection Setup Console Serial Redirect <disabled> Enable Console tion Function</disabled>	InsydeH2O Setup Util	y Rev. 5.
tion Function		
		Enable Console Redirec
I Help ↑/↓ Select Item F5/F6 Change Values F9 Setup Defaul se Exit ←/→ Select Item Enter Select > SubMenu F10 Save and Exi		Ilues F9 Setup Defaults IbMenu F10 Save and Exit

Console Serial Redirect

This field is used to enable or disable the console serial redirection function.

When Console Serial Redirect is set to enabled, the screen will appear like below:

	InsydeH2O Setup Utility	Rev. 5.0
Advanced		
Console Redirection Setup		Enable Console Redirec- tion Function
Console Serial Redirect Terminal Type Baud Rate Data Bits Parity Stop Bits Flow Control ►COMA Enable VT-100, 115200, N81 ►COMB Enable VT-100, 115200, N81	<embled> <vt_100> <115200> <8 Bits> <none> <1 Bit> <none></none></none></vt_100></embled>	
F1 Help ↑/↓ Select Item Esc Exit ←/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Terminal Type

Select terminal type: VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data Bits

Select data bits: 7 Bits or 8 Bits.

Parity

Select parity bits: None, Even or Odd.

Stop Bits

Select stop bits: 1 Bit or 2 Bits.

Flow Control

Select flow control type: None or XON/XOFF.

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COMA/B

			InsydeH2O Setup Utility	Rev. 5.0
	Advance	d		
	fort Enable Ise Global Setting		<enabled></enabled>	
F1 Esc	Help ↑/↓ Exit ←/→	Select Item	F5/F6 Change Values Enter Select ≻ SubMenu	F9 Setup Defaults F10 Save and Exit

When Use Global Setting is set to disabled, the screen will appear like below:

		InsydeH2O Setup Utility	Rev. 5.0
Ad	vanced		
Port Enable Use Global Set Terminal Type Baud Rate Data Bits Parity Stop Bits Flow Control	ling	<enabled> <disabled> <vt 100=""> <115200> <8 Bits> <none> <1 Bit> <none></none></none></vt></disabled></enabled>	
F1 Help Esc Exit	↑/↓ Select Item ←/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Port Enable

This field is used to enable or disable the COM port to redirect the console.

Use Global Setting

This field is to enable or disable to use global setting. When enabled the global setting, setting of the COM port will be the same as those in Console Redirection section. When disabled the global setting, setting of the COM port can be configured independently in this section.

Security

Main A	dvanced	Security	Insydel Boot	H2O Setup Utility Exit		Rev. 5.0
Current TPM TPM State TPM Operatori TPM Operatori Clear TPM Supervisor Pa: Set Supervisor	ity n ssword	d		ration>		When Hidden, don't ex- poses TPM to 0
1 Help sc Exit	$\stackrel{\uparrow/\downarrow}{\leftarrow/\rightarrow}$	Select Item Select Item		F5/F6 Change Values Enter Select ► SubMen	u	F9 Setup Defaults F10 Save and Exit

TPM Availability

Show or hide the TPM availability and its configurations.

TPM Operation

Select one of the supported operation to change TPM2 state.

Clear TPM

Remove all TPM context associated with a specific owner.

Set Supervisor Password

Set the supervisor's password and the length of the password must be greater than one character.

Boot



Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type. The options are Dual Boot Type, Legacy Boot Type or UEFI Boot Type.

If you select "Dual Boot Type" or "UEFI Boot Type", the "Network Stack", "PXE Boot capability", "USB Boot" and "Quiet Boot" will show up.

If you select "Legacy Boot Type", "PXE Boot to LAN", "USB Boot" and "Quiet Boot" will show up.



Note:

If the boot type is set to UEFI, the method for RAID volume creation will be different. Please refer to Chapter 5 - RAID for more information.

Network Stack

This field is used to enable or disable network stack.

PXE Boot capability

Disabled Support Network Stack UEFI IPv4/IPv6 Legacy Legacy PXE OPROM only

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PXE Boot to LAN

Enable or disable PXE boot to LAN.

USB Boot

Enable or disable to change USB boot devices boot order.

Quiet Boot

Enable or disable booting in text mode.

Exit



Exit Saving Changes

Select Yes and press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select YES and press <Enter> to load optimal defaults.

Discard Changes

Select YES and press <Enter> to exit the system setup without saving your changes.

Save Setting to file

Select this option to save BIOS configuration settings to a USB flash device.

Restore Setting from file

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files. You may refer to how-to-video, How to update Insyde BIOS in UEFI mode on DFI products?, at https://www.dfi.com/Knowledge/ Video/31 for updating the BIOS steps.

Notice: BIOS SPI ROM

- 1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
- 2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
- 3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:

- a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

Chapter 5 - Supported Software

Please download drivers, utilities and software applications required to enhance the performance of the system board at https://www.dfi.com/DownloadCenter .

Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows[®] INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, download "KU968 Chipset Driver" zip file at our website.

1. Setup is ready to install the utility. Click "Next".



 Go through the readme document for more installation tips then click "Install".

4. The step displays the

ress.

installing status in the prog-



Intel(R) Chipset Device Software Progress

2. Read the license agreement then click "Accept".



 After completing installation, click "Restart Now" to exit setup.

Restarting the system will allow the new software installation to take effect.



Intel Graphics Drivers

To install the driver, download "KU968 Graphics Driver" zip file at our website.

1. Setup is now ready to install the graphics driver. Click "Next".

Intel® Installation Framework	-		×
Intel® Graphics Driver			
Welcome to the Setup Program		(inl	tel)
This setup program will install the following components: - Intel® Graphics Driver - Intel® Display Audio Driver			
It is strongly recommended that you exit all programs before continuing.	Click Next	t to continu	Je.
Automatically run WinSAT and enable the Windows Aero desktop then	ie (if supj	ported).	
	xt > tel® Inst	Canc allation Fra	~.

By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click "Next".

2. Read the license agreement then click "Yes".



 Go through the readme document for system requirements and installation tips then click "Next".



Intel® Installation Framework

 Setup is now installing the driver. Click "Next" to continue.

etup Progress	(intel
Please wait while the following setup operations are performed:	
Deleting File: C: \ProgramData\Microsoft\Windows\Start Menu\Pri Deleting File: C: \ProgramData\Microsoft\Windows\Start Menu\Pri Deleting File: C: \Users\Public\Desktop\Intel(R) HD Graphics Cont Deleting File: C: \Users\Public\Desktop\Intel(R) Graphics and Med	ograms\Intel\Intel(R) Graphic ol Panel.lnk
Debting File: C: VprogramDatal Microsoft Windows (Start Heru) Vp Debting File: C: VprogramDatal Microsoft Windows (Start Heru) Vp Debting File: C: Vpersy Public Vpesktop Untel(N) inst(M) Caphic Debting File: C: Vpers Vpublic Vpesktop Untel(N) inst(M) Caphic Debting File: C: Vpers Vpublic Vpesktop Vintel Vintel(N) Inst(M) Graphic Debting Registry Key: HKLM\SOFTWARE Vintel\STVInternal\Aud Debting Registry Key: HKLM\SOFTWARE Vintel\STVInternal\Aud	ograms\Intel\Intel(R) Iris(TM) ograms\Intel(R) Iris(TM) Grap Control Panel.Ink bitos Control Panel.Ink oFix
Deleting File: C: \ProgramData\Wicrosoft\Windows\Start Menu\Pro Deleting File: C: \ProgramData\Wicrosoft\Windows\Start Menu\Pro Deleting File: C: \Users\Public\Desktop\Intel(R) Tris(TM) Graphics Deleting File: C: \Users\Public\Desktop\Intel(R) Tris(TM) Grap Deleting Registry Key: HKUMSOFTWARE\Untel(R) Tris(TM) Grap	ograms\Intel\Intel(R) Iris(TM) ograms\Intel(R) Iris(TM) Grap Control Panel.Ink bitos Control Panel.Ink oFix
Deleting File: C: (Programbate Wircosift) Windows (Start Menuly) Deleting File: C: (Programbate Wircosift) Windows (Start Menuly) Deleting File: C: (Users (Public (Desktop Untel(R)) Iris(TM) Graphics i Deleting File: C: (Users (Public (Desktop Untel(R)) Iris(TM) Graphics Deleting Registry (Key: HCM)(SCPTWARE)Intel(R); Iris(TM) Grap Deleting Registry Key: HCM)(SCPTWARE)Intel(R); Internal/Aud	ograms\Intel\Intel(R) Iris(TM) ograms\Intel(R) Iris(TM) Grap Control Panel.Ink bitos Control Panel.Ink oFix
Deleting File: C: (Programbate Wiccosht) Windows (Start Menu)/Pr Deleting File: C: (Programbate Wiccosht) Windows (Start Menu)/Pr Deleting File: C: (Users/Wulc) (Desktop) Untel (Mel) (P): Irs(M) Graphics Deleting Registry Key: HKUM(SOFTWARE(Intel/GFX)) Irs(M) Grap Deleting Registry Key: HKUM(SOFTWARE(Intel/GFX)). Deleting Registry Key: HKUM(SOFTWARE(Intel/GFX). Click Next to continue.	bgrams\Intel\Intel(R) Iris(TM) bgrams\Intel(R) Iris(TM) Grap Control Panel.Ink bhics Control Panel.Ink oFix

- Click "Yes, I want to restart this computer now" then click "Finish".
 - Restarting the system will allow the new software installation to take effect.



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Audio Drivers

To install the driver, download "KU968 Audio Driver" zip file at our website.

 Setup is ready to install the driver. Click "Next".



 Click "Yes, I want to restart my computer now" then click "Finish".

> Restarting the system will allow the new software installation to take effect.



Intel LAN Drivers

To install the driver, download "KU968 LAN Driver" zip file at our website.

- 1. Setup is ready to install the # Intel(R) Network Connections Install Wizard × driver. Click "Next". Welcome to the install wizard for Intel(R) Network Connections (intel Installs drivers, Intel(R) Network Connections, and Advanced Networking Services. WARNING: This program is protected by copyright law and international treaties. < Back Next > Cancel 2. Click "I accept the terms # Intel(R) Network Connections Install Wizard X in the license agreement" License Agreement (intel) Please read the following license agreement carefully. then click "Next". INTEL SOFTWARE LICENSE AGREEMENT IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING. Do not copy, install, or use this software and any associated materials (collectively, the "Software") provided under this license agreement ("Agreement") until you have carefully read the following terms and conditions. By copying, installing, or otherwise using the Software, you agree to be bound by the terms of this Agreement. If you do not agree to the terms of this Agreement, do not copy, install, or use the Software. LICENSES: accept the terms in the license agreement; Print \bigcirc I $\underline{d}o$ not accept the terms in the license agreement < Back Next > Cancel 3. Select the program features Intel(R) Network Connections Install Wizard ×
 - you want installed then click "Next".



4. Click "Install" to begin the installation.

Intel(R) Network Connection	s install wizaru	
Ready to Install the Program	n	linto
The wizard is ready to begin in:	stallation.	line
Click Install to begin the installa	ition.	
If you want to review or chang exit the wizard.	e any of your installation set	tings, dick Back. Click Cancel to

5. The step displays the installing status in the progress.

	🚽 Intel(R) Network Connections Install Wizard —	
	Installing Intel(R) Network Connections	intal
	The program features you selected are being installed.	
	Please wait while the install wizard installs Intel(R) Network Connections. This may take several minutes.	
Inst	alling Drivers	
	talling network drivers for: a((R) I211 Gigabit Network Connection	
	< Back Next >	Cancel

6. After completing installation, click "Finish".



Intel Management Engine Drivers

To install the driver, download "KU968 MEI Driver" zip file at our website.

1. Setup is ready to install the driver. Click "Next".



×

×

2. Read the license agreement then tick "I accept the terms in the License Agree-

ment". Click "Next".



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 Click "Next" to install to the default folder, or click "Change" to choose another destination folder.

Setup		×
Intel® Management Engine Componen Destination Folder	ts (inte	D
Click Next to install to the default folder, or click Cha	nge to choose another destination	folder.
C:\Program Files (x86)\Intel\Intel(R) Management	Engine Components	
	c	hange
Intel Corporation	< Back Next >	Cancel

4. Please wait while the product is being installed.

Intel® Management Engine Components Progress	(inte	Р
Please wait while the product is being installed.		

5. After completing installation, click "Finish".



Intel Rapid Storage Technology

The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, download "KU968 Intel Rapid Storage Driver" zip file at our website.

Intel® Installation Framework

 Setup is ready to install the utility. Click "Next".

Intel® Installation Framework		
Intel® Rapid Storage Technolog Welcome		(int
You are about to install the following produ	ct:	
Intel® Rapid Storage Technology		
It is strongly recommended that you exit al Click Next to continue, or click Cancel to ex		
Intel Corporation	< Back Nex	t> (

 Read the license agreement and click "I accept the terms in the License Agreement". Then, click "Next".

INTEL SOFTWARE LICE	NSE AGREEMENT (OEM / IH	IV / ISV Distribution & S	ingle User)
Do not use or load this s until you have carefully	FORE COPYING, INSTALLIN software and any associate read the following terms a the terms of this Agreeme are.	ed materials (collectivel) nd conditions. By loadin	g or using the
(IHV), or Independent S	Equipment Manufacturer (Software Vendor (ISV), this er, then only Exhibit A, the	complete LICENSE AGE	REEMENT applies;
For OEMs, IHVs, and IS	Vs:		
LICENSE. This Software	is licensed for use only in	conjunction with Intel o	omponent products
I accept the terms in	the License Agreement.		

 \times

3. Go through the readme document to view system requirements and installation information then click "Next".

Intel® Rapid Storage Technology Readme File Information	(intel
Installation Readme for Intel(R) Rapid Storage Technology (Intel(R) RST): - Intel(R) Optane(TM) Memory System Acceleration - Intel(R) Smart Response Technology ^^ - NNOTE: Support for this feature is determined		n *****
* This document makes references to products develop * restrictions on how these products may be used, and * others. Please read the Disclaimer section at the bot * your Intel field representative if you would like more *	what information may be disc tom of this document, and cont	
*******		******
* Intel is making no claims of usability, efficacy or warra * AGREEMENT contained herein completely defines the		
intel Corporation	< Back Next >	Cancel

 Click "Next" to install to the default folder or click "Change to choose another destination folder".

Intel® Rapid Storage Technology Destination Folder	(intel
Click Next to install to the default folder, or click Change	to choose another destination folder.
C:\Program Files\Intel\Intel(R) Rapid Storage Technolog	gy
	Change

5. Confirm the installation and click "Next".



6. Click "Yes, I want to restart this computer now" to complete the installation and then click "Finish".



Adobe Acrobat Reader 9.3

To install the reader, download "KU968 Driver Package" iso file at our website. Click "Adobe Acrobat Reader $9.3^{\prime\prime}$.

1. Click "Next" to install or click "Change Destination Folder" to select another folder.

👹 Adobe Reader 9.3 - Setup	×
Å	
Destination Folder Click Next to install to this folder, or click Change to install to a different folder.	
Install Adobe Reader 9.3 to: C:\Program Files (x86)\Adobe\Reader 9.0\	
WARNING: This program is protected by copyright law and international treaties.	
Adobe	cel

2. Click "Install" to begin installation.

妃 Adobe Reader 9.3 - Setup	×
Å	
Ready to Install the Program	
Click Install to begin the installation.	
If you want to review or change any of your installation folder, click Back. Click Cancel to ex setup.	it
Adobe	
< Back Install Cancel	

3. Setup is now installing the driver.

🚽 Adobe	Reader 9.3	- Setup				-		×
A								
Installin	g Adobe Re	eader 9.3						
The pro	ogram featur	es you selected a	are being instal	led.				
Þ	Please wait	while setup insta	alls Adobe Read	der 9.3. Th	is may tak	e severa	al minutes	
-	Status:	Copying new t	files					
Adobe								
			< Bac	k	Next >		Cance	el

4. Click "Finish" to exit installation. Adobe Reader 9.3 - Setup

۱.	d Adobe Reader 9.3 - Setup	х
	A	
	Setup Completed	
	Setup has successfully installed Adobe Reader 9.3. Click Finish to exit setup.	
	Adobe	

SIO Driver

To install the driver, download "KU968 SIO Driver" zip file at our website.

1. Setup is ready to install the driver. Click "Next".



3. Read the file information then click "Next".



4. Setup is ready to install the driver. Click "Next".



2. Read the license agreement care-	Setup				
fully.	Intel® Serial IO				
Click "I accept the terms in the Li-	License Agreement				
cense Agreement" then click "Next".	INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)				
	IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING. Do not use or load the software and any associated materials (collectively, the "Software") unif you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not instal or use the Software.				
	Please Mox Note: * If you are an Original Equipment Manufacturer (QEM), Independent Hardware Vendor (IfV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies; * If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT, applies.				
	For OEMs, IHVs, and ISVs:				
	LICENSE. This Software is licensed for use only in conjunction with Intel component products. Use of the Software in conjunction with non-Intel component products is not licensed				
	☑ accept the terms in the License Agreement.				

Intel Corporation

<<u>B</u>ack <u>N</u>ext > <u>C</u>ancel

х



Intel® Serial IO Progress	(intel)
Please wait while the product is being installed.	
-	

6. Click "Finish".



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Chapter 6 - RAID

The system board allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, and RAID 5.

RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

RAID 0 uses two new identical hard disk drives to read and write data in parallel, interleaved stacks. Data is divided into stripes and each stripe is written alternately between two disk drives. This improves the I/O performance of the drives at different channel; however it is not fault tolerant. A failed disk will result in data loss in the disk array.

RAID 1 (Mirroring Disk Array with Fault Tolerance)

RAID 1 copies and maintains an identical image of the data from one drive to the other drive. If a drive fails to function, the disk array management software directs all applications to the other drive since it contains a complete copy of the drive's data. This enhances data protection and increases fault tolerance to the entire system. Use two new drives or an existing drive and a new drive but the size of the new drive must be the same or larger than the existing drive.

RAID 5

RAID 5 stripes data and parity information across hard drives. It is fault tolerant and provides better hard drive performance and more storage capacity.

RAID Level	Min. Drives	Protection	Description
RAID 0	2	None	Data striping without redundancy
RAID 1	2	Single Drive Failure	Disk mirroring
RAID 5	3		Block-level data striping with distributed parity

Settings

To enable the RAID function, the following settings are required.

- 1. Connect the Serial ATA drives.
- 2. Enable Serial ATA in the Insyde BIOS.
- 3. Create a RAID volume.
- 4. Install the Intel Rapid Storage Technology Utility.

Step 1: Connect the Serial ATA Drives

Refer to Chapter 2 for details on connecting the Serial ATA drives.

🛀 Important:

- 1. Make sure you have installed the Serial ATA drives and connected the data cables otherwise you won't be able to enter the RAID BIOS utility.
- 2. Treat the cables with extreme caution especially while creating RAID. A damaged cable will ruin the entire installation process and operating system. The system will not boot and you will lost all data in the hard drives. Please give special attention to this warning because there is no way of recovering back the data.

Step 2: Enable RAID in the Insyde BIOS

- 1. Power-on the system then press to enter the main menu of the Insyde BIOS.
- 2. Go to "Advanced" menu, and select the "SATA Configuration" menu.
- 3. Change the "SATA Mode Selection" to "RAID" mode.
- 4. Save the changes in the "Save & Exit" menu.
- 5. Reboot the system.

Step 3: Create a RAID Volume

- 1. When the Intel® RST option ROM status screen displays during POST, press <Ctrl> and <I> simultaneously to enter the option ROM user interface.
- 2. Select 1: Create RAID Volume and press <Enter>.
- 3. Create a volume name and press <Enter>.
- 4. Use the up or down arrow keys to select the RAID level and press <Enter>.
- 5. Use the up or down arrow keys to select the strip size and press <Enter>.
- 6. Select the capacity and press <Enter>. You must select less than one hundred percent of the available volume space to leave space for the second volume.
- 7. Press <Enter> to create the volume.
- 8. At the prompt, press <Y> to confirm volume creation.
- 9. Select 4: Exit and press <Enter>.
- 10. Press $\langle Y \rangle$ to confirm exit.

Step 3-1: Create a RAID Volume if the boot type is UEFI

If the boot type is set to UEFI, RAID volume creation will be different. Please use the following steps to create RAID volumes. To set the boot type, enter the Insyde BIOS and go to "Boot" > "Boot Type".

1. Go to the "Advanced" menu of the Insyde BIOS and select "Device Manager".

	InsydeH2O Setup Utility		H2O Setup Utility	Rev. 5.0	
Main	Advanced	Security	Boot	Exit	
 > CPU Cor > Video Cc > Audio Cd > SATA Cc > USB Cor > PCI Expr > ME Conf > MEBX C > Active M > Debug C > Device N > Super IO 	onfiguration onfiguration onfiguration ress Configurati figuration Configuration Ianagement Teco onfiguration		port		Device Manager Setting
Help c Exit		elect Item elect Item		F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

- 2. The screen displays all available drives. Select "Create RAID volume" to create a RAID volume".
- 3. Use the up or down arrow keys to select the RAID level and press <Enter>.
- 4. Use the up or down arrow keys to scroll through the list of hard drives and press <Enter> to select the drive.
- 5. Press <Enter>.
- 6. Use the up or down arrow keys to select the strip size and press <Enter>.
- 7. Enter the volume size and press <Enter>.
- 8. At the prompt, press $\langle Y \rangle$ to confirm volume creation.

Step 4: Install the Intel Rapid Storage Technology Utility

The Intel Rapid Storage Technology Utility can be installed from within Windows. It allows RAID volume management (create, delete, migrate) from within the operating system. It will also display useful SATA device and RAID volume information. The user interface, tray icon service and monitor service allow you to monitor the current status of the RAID volume and/ or SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, please refer to Chapter 5 for more information.

Chapter 7 - Intel AMT Settings

Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solution to provide maximum system defense and protection to networked systems.

The hardware and software information are stored in non-volatile memory. With its built-in manageability and latest security applications, Intel® AMT provides the following functions.

• Discover

Allows remote access and management of networked systems even while PCs are powered off; significantly reducing desk-side visits.

• Repair

Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

• Protect

Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical software agents are removed.

Enable Intel® AMT in the Insyde BIOS

- 1. Power-on the system then press to enter the main menu of the Insyde BIOS.
- 2. In the Advanced menu, select Active Management Technology Support.

Main Advanced Security Boot Exit ACPI Configuration AMT Configuration AMT Configuration >Video Configuration >Video Configuration AMT Configuration >SATA Configuration >PCI Express Configuration AMT Configuration PCI Express Configuration >MEB Configuration >MEB Configuration >MEBX Configuration >Device Management Technology Support >Device Manager >Super IO Configuration >Console Redirection	
>ACPI Configuration >CPU Configuration >Video Configuration >Audio Configuration >SATA Configuration >UBB Configuration >PCI Express Configuration >ME Configuration >ME Configuration >Active Management Technology Support >Debug Configuration >Device Manager >Super 10 Configuration	
	ation

3. Select **Enabled** in the **Intel AMT Support** field.

Advand		deH2O Setup Utility	Rev. 5.0
Active Management T Intel AMT Support Un-Configure ME			When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note : This option does not dis- able Manageability Fea- tures in FW.
	/↓ Select Item -/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

4. In the Exit menu, select Exit Saving Changes then select Yes and press Enter.

			Insyde	H2O Setup Utility	Rev. 5.0
Main	Advanced	Security	Boot	Exit	
Load Op Discard	ing Changes timal Defaults Changes ting to file				Exit system setup and save your changes.
Help Exit	†/↓ ←/→	Select Item Select Item		F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Enable Intel[®] AMT in the Intel[®] Management Engine BIOS Extension (MEBX) Screen

- 1. After the system reboots, press to enter the main menu of the Insyde BIOS.
- 2. In the **Advanced** menu, select **MEBX Configuration**.

	InsydeH2O Setup Utility		Rev. 5.		
Main	Advanced	Security	Boot	Exit	
 CPU Cor Video Co Audio Co SATA Co USB Cor PCI Expr ME Cont MEBX Co Active M Debug Co Device M Super IO 	Configuration Ianagement Tec Configuration	ion chnology Suppo	ort		MEBX Configuration Se
Help Exit		elect Item		F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

3. Select **MEBX Configuration** and press Enter.

		InsydeH2O Setup Utility	Rev. 5.0
A	dvanced		
MEBX Configu	ration		MEBX Configuration Set
MEBX Configu			ting
F1 Help	↑/↓ Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit	\leftarrow / \rightarrow Select Item	Enter Select ► SubMenu	F10 Save and Exit

4. Select MEBx Login and press Enter. You will be prompted for a password. The default password is "admin". Enter the default password in the space provided under Intel(R) ME Password then press Enter.



- 5. Enter a new password in the space provided under Intel(R) ME New Password then press Enter. The password must include:
 - 8-32 characters
 - Strong 7-bit ASCII characters excluding : , and " characters
 - At least one digit character (0, 1, ...9)
 - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
 - Both lower case and upper case characters



6. You will be asked to verify the new password. Enter the same new password in the space provided under Verify Password then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
MAIN MENU				
MEBx Login Intel(R) ME General Settings Intel(R) AMT Configuration MEBx Exit Verify password				
Intel(R) ME Password				
$[\uparrow\downarrow]$ =Move Highlight [Enter] =Select Entry [Esc] =Exit				

7. Select Intel(R) ME General Settings then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved
MAIN MENU
 Intel(R) ME General Settings Intel(R) AMT Configuration MEBx Exit
$[\uparrow\downarrow]$ =Move Highlight [Enter] =Select Entry [Esc] =Exit

8. If you want to change ME password, select **Change ME Password** then press Enter. Enter the current password in the space provided under Intel(R) ME Password then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
INTEL(R)	ME PLATFORM CONFIGU	RATION		
Change ME Password Local FW Update	<enabled></enabled>			
	Intel(R) ME Password			
Intel(R) ME New Password				
$[\uparrow\downarrow]$ =Move Highlight	[Enter] =Select Entry	[Esc] =Exit		

- 9. Enter a new password in the space provided under Intel(R) ME New Password then press Enter. The password must include:
 - 8-32 characters
 - Strong 7-bit ASCII characters excluding : , and " characters
 - At least one digit character (0, 1, ...9)
 - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
 - Both lower case and upper case characters

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved						
INTEL(R)	INTEL(R) ME PLATFORM CONFIGURATION					
Change ME Password Local FW Update	<enabled></enabled>					
	ntel(R) ME New Password	3				
Intel(R) ME New Password						
$[\uparrow\downarrow]$ =Move Highlight	[Enter] =Select Entry	[Esc] =Exit				

10. You will be asked to verify the new password. Enter the same new password in the space provided under Verify Password then press Enter.



11. Select Local FW Update then press Enter. Select Enabled or Disabled or Password Protected then press Enter.



12. Press Esc until you return to the **Main Menu**. Select **Intel(R) AMT Configuration** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved
MAIN MENU
> Intel(R) ME General Settings
Intel(R) AMT Configuration MEBx Exit
[↑↓] =Move Highlight [Enter] =Select Entry [Esc] =Exit

13. In the Intel(R) AMT Configuration menu, select Manageability Feature Selection then press Enter. Select Enabled or Disabled then press Enter.



14. In the **Intel(R) AMT Configuration** menu, select **SOL/Storage Redirection/KVM** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL(R) AMT CONFIGURATION		
Manageability Feature Selection	<enabled></enabled>	
SOL/Storage Redirection/KVM > User Consent		
Password Policy	<anytime></anytime>	
> Network Setup		
Activate Network Access Unconfigure Network Access <pre> <full unprovision=""></full></pre>		
> Remote Setup And Configuration		
> Power Control		
[↑↓] =Move Highlight [Enter] =Selec	t Entry [Esc] =Exit	
Live more manight [Liner] Selec		

15. In the **SOL/Storage Redirection/KVM** menu, select **Username and Password** then press Enter. Select **Enabled** or **Disabled** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434		
Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
SOL/Storage Redirection/KVM		
Username and Password SOL Storage Redirection KVM Feature Selection	<pre> <enabled> <enabled> <enabled> <enabled> <enabled> </enabled> </enabled></enabled></enabled></enabled></pre>	
$\uparrow\uparrow\downarrow$ =Move Highlight <i< td=""><td>Enter> =Complete Entry [Esc] =Discard Changes</td></i<>	Enter> =Complete Entry [Esc] =Discard Changes	

16. Select **SOL** then press Enter. Select **Enabled** or **Disabled** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
SOL/Storage Redirection/KVM		
Username and password	<enabled></enabled>	
SOL	<enabled></enabled>	
Storage Redirection	<enabled></enabled>	
KVM Feature Selection	<enabled></enabled>	
	Disabled Enabled	
$[\uparrow\downarrow]$ =Move Highlight <enter></enter>	=Complete Entry [Esc] =Discard Changes	

17. Select **Storage Redirection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



18. Select **KVM Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434		
1,5 8 ()	l Corporation. All Rights Reserved	
SOL/Storage Redirection/KVM		
Username and password	<enabled></enabled>	
SOL	<enabled></enabled>	
Storage Redirection	<enabled></enabled>	
KVM Feature Selection	<enabled></enabled>	
	Disabled Enabled	
$[\uparrow\downarrow] = Move Highlight =$	Complete Entry [Esc] =Discard Changes	

19. Press Esc until you return to the Intel(R) AMT Configuration menu. Select User Consent then press Enter.



20. In the **User Consent** menu, select **User Opt-in** then press Enter. Select **NONE** or **KVM** or **ALL** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
USER CONSENT		[
User Opt-in Opt-in Configurable f	rom Remote IT	<kvm> <enabled></enabled></kvm>
	NONE KVM ALL	
$[\uparrow\downarrow] = Move Highlight$	<enter> =Complete E</enter>	ntry [Esc] =Discard Changes

21. Select **Opt-in Configurable from Remote IT** then press Enter. Select **Enabled** or **Disabled** then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.00010/Intel(R) ME v11.8.50.343- Copyright(C) 2003-16 Intel Corporation. All Rights Reserved	
USER CONSENT	
User Opt-in	<kvm></kvm>
Opt-in Configurable from Remote IT	<enabled></enabled>
	Disabled Enabled
$[\uparrow\downarrow]$ =Move Highlight <enter> =Comp</enter>	olete Entry [Esc] =Discard Changes

22. Press Esc until you return to the Intel(R) AMT Configuration menu. Select Password Policy then press Enter.

You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL(R) AMT CONFIGURATION		
Manageability Feature Selection <enabled> > SOL/Storage Redirection/KVM</enabled>		
> User Consent Password Policy > Network Setup		
Activate Network Access Unconfigure Network Access <full unprovision=""></full>		
 > Remote Setup And Configur > Power Control Default Password Only During Setup And Configuration Anytime 		
$[\uparrow\downarrow]$ =Move Highlight <enter> =Complete Entry [Esc] =Discard Changes</enter>		

23. In the Intel(R) AMT Configuration menu, select Network Setup then press Enter.



24. In the Intel(R) ME Network Setup menu, select Intel(R) ME Network Name Settings then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.00010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL(R) ME NETWORK SETUP		
Intel(R) ME Network Name Settings TCP/IP Settings		
$[\uparrow\downarrow]$ =Move Highlight [Enter] =Select Entry [Esc] =Exit		

25. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter. Enter the computer's host name then press Enter.

Copyright(C) 2	ine BIOS Extension v11.0.0.00 2003-16 Intel Corporation. All) ME NETWORK NAME S	- U
Host Name Domain Name Shared/Dedicated FQD Dynamic DNS Update	N [–] Shared> <disabled></disabled>	
Computer Host Name		
	<enter> =Complete Entry</enter>	[Esc] =Discard Changes

26. Select **Domain Name** then press Enter. Enter the computer's domain name then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434		
Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL (R) ME NET	FWORK NAME	SETTINGS
Host Name Domain Name Shared/Dedicated FQDN Dynamic DNS Update	<shared> <disabled></disabled></shared>	
Computer Domain Name		
<enter> =</enter>	Complete Entry	[Esc] =Discard Changes

27. Select **Shared/Dedicated FQDN** then press Enter. Select **Shared** or **Dedicated** then press Enter.

ntel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL(R) ME NETWO	RK NAME SETTINGS	
Host Name Domain Name Shared/Dedicated FQDN Dynamic DNS Update	– Shared> <disabled></disabled>	
Dedicated Shared		
[↑↓] =Move Highlight <enter> =Complete Entry [Esc] =Discard Changes</enter>		

28. Select **Dynamic DNS Update** then press Enter. Select **Enabled** or **Disabled** then press Enter. If **Dynamic DNS Update** is set to **Enabled**, **Periodic Update Interval** and **TTL** fields will show up.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved
INTEL(R) ME NETWORK NAME SETTINGS
Host Name – Domain Name – Shared/Dedicated FQDN <shared> Dynamic DNS Update <disabled></disabled></shared>
Disabled Enabled
$[\uparrow\downarrow]$ =Move Highlight <enter> =Complete Entry [Esc] =Discard Changes</enter>

29. Select Periodic Update Interval then press Enter. Enter value then press Enter.

	OS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 16 Intel Corporation. All Rights Reserved
INTEL(R) M	E NETWORK NAME SETTINGS
Host Name Domain Name Shared/Dedicated FQDN Dynamic DNS Update Periodic Update Interval TTL	- - - - - - - - - - - - - -
<pre></pre>	nter> =Complete Entry [Esc] =Discard Changes

30. Select **TTL** then press Enter. Enter value then press Enter.



31. Press Esc until you return to the Intel(R) ME Network Setup menu. Select TCP/IP Settings then press Enter. In the TCP/IP Settings menu, select Wired LAN IPV4 Configuration then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.00010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved
TCP/IP SETTINGS
≥ Wired LAN IPV4 Configuration
[↑↓] =Move Highlight [Enter] =Select Entry [Esc] =Exit

32. In the Wired LAN IPV4 Configuration menu, select DHCP Mode then press Enter. Select Enabled or Disabled then press Enter. If set to Disabled, IPV4 Address, Subnet Mask Address, Default Gateway Address, Preferred DNS Address and Alternate DNS Address will show up.

WIRED LAN IPV4 CONFIGURATION DHCP Mode Cenabled Disabled Enabled	Copyright(C)	ine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 2003-16 Intel Corporation. All Rights Reserved
Disabled	WIKI	ED LAN IPV4 CONFIGURATION
	DHCP Mode	Disabled
$[\uparrow\downarrow]$ =Move Highlight <enter> =Complete Entry [Esc] =Discard Changes</enter>	[1] =Move Highlight	<enter> =Complete Entry [Esc] =Discard Changes</enter>

33. Select **IPV4 Address** then press Enter. Enter address then press Enter.

	ine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 2003-16 Intel Corporation. All Rights Reserved
WIRE	ED LAN IPV4 CONFIGURATION
DHCP Mode IPV4 Address Subnet Mask Address Default Gateway Addu Preferred DNS Addres Alternate DNS Addres	ress 0.0.0.0 ss 0.0.0.0
	IP address (e.g. 123.123.100) 0.0.0.0 <enter> =Complete Entry [Esc] =Discard Changes</enter>

34. Select **Subnet Mask Address** then press Enter. Enter address then press Enter.

Intel(R) Management Engine BIOS Extensio Copyright(C) 2003-16 Intel Cor WIRED LAN IPV4 C	poration. All Rights Reserved
DHCP Mode	<disabled></disabled>
IPV4 Address	0.0.0.0
Subnet Mask Address	0.0.0.0
Default Gateway Address	0.0.0.0
Preferred DNS Address	0.0.0.0
Alternate DNS Address	0.0.0.0
Subnet mask (e.g. 2:	55.255.255.0)
0.0.00	mplete Entry [Esc] =Discard Changes

35. Select **Default Gateway Address** then press Enter. Enter address then press Enter.

	ension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Corporation. All Rights Reserved
WIRED LAN IPV	/4 CONFIGURATION
DHCP Mode IPV4 Address Subnet Mask Address Default Gateway Address Preferred DNS Address Alternate DNS Address Default Gatew 0.0.0	<disabled> 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0 vay address</disabled>
<enter> =</enter>	Complete Entry [Esc] =Discard Changes

36. Select Preferred DNS Address then press Enter. Enter address then press Enter.

Copyright(C) 2003-16 Intel Co	ion v11.0.0.0010/Intel(R) ME v11.8.50.3434 proration. All Rights Reserved CONFIGURATION
WIKED LAN IF V4	CONFIGURATION
DHCP Mode	<disabled></disabled>
IPV4 Address	0.0.0.0
Subnet Mask Address	0.0.0.0
Default Gateway Address	0.0.0.0
Preferred DNS Address	0.0.0.0
Alternate DNS Address	0.0.0.0
Preferred DNS 0.0.0.0	address
<enter> =Cc</enter>	mplete Entry [Esc] =Discard Changes

37. Select Alternate DNS Address then press Enter. Enter address then press Enter.

Copyright(C) 2003-	IOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 -16 Intel Corporation. All Rights Reserved AN IPV4 CONFIGURATION
DHCP Mode IPV4 Address Subnet Mask Address Default Gateway Address Preferred DNS Address Alternate DNS Address Alternate DNS Address	<disabled> 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0 0.0.0.0</disabled>
< <u>-</u>	Enter> =Complete Entry [Esc] =Discard Changes

38. Press Esc until you return to the **Intel(R) AMT Configuration** menu. If you want to activate the current network settings and open the ME network inferface, select **Activate Network Access**, press Enter, then press Y.



39. In the Intel(R) AMT Configuration menu, select Unconfigure Network Access then press Enter.



40. In the Intel(R) AMT Configuration menu, select Remote Setup And Configuration then press Enter.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved		
INTEL(R) AMT CON	IFIGURATION	
Manageability Feature Selection > SOL/Storage Redirection/KVM	<enabled></enabled>	
> User Consent Password Policy <anytime></anytime>		
> Network Setup Activate Network Access Unconfigure Network Access Full Unprovision>		
Remote Setup And Configuration Power Control		
$[\uparrow\downarrow]$ =Move Highlight [Enter] =Select	Entry [Esc] =Exit	

41. In the Intel(R) Remote Setup And Configuration menu, select Current Provisioning Mode then press Enter.

	ne BIOS Extension v11.0.0.0010 003-16 Intel Corporation. All R	
INTEL (R) RE	EMOTE SETUP AND CONFI	GURATION
Current Provisioning M Provisioning Record Provisioning Server IP Provisioning Server FC > RCFG > TLS PKI	V4/IPV6 _	
	Provisioning Mode: PKI	
		_
$[\uparrow\downarrow]$ =Move Highlight	[Enter] =Select Entry	[Esc] =Exit

42. In the Intel(R) Remote Setup And Configuration menu, select Provisioning Record then press Enter.

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INTEL(R) REMOTE SETUP AND CONFIGURATION
Current Provisioning Mode Provisioning Record Provisioning Server IPV4/IPV6 Provisioning Server FQDN > RCFG > TLS PKI Provision Record is not present
$\uparrow \downarrow$ =Move Highlight [Enter] =Select Entry [Esc] =Exit

43. In the Intel(R) Remote Setup And Configuration menu, select Provisioning Server IPV4/IPV6 then press Enter. Enter the address then press Enter.

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INTEL(R) REMOTE SETUP AND CONFIGURATION				
Current Provisioning Mode Provisioning Record Provisioning Server IPV4/IPV6 Provisioning Server FQDN > RCFG > TLS PKI Provisioning server address				
<enter> =Complete Entry [Esc] =Discard Changes</enter>				

44. In the Intel(R) Remote Setup And Configuration menu, select Provisioning Server FQDN then press Enter. Enter the FQDN then press Enter.

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INTEL(R) REMOTE SETUP AND CONFIGURATION				
Current Provisioning Mode Provisioning Record Provisioning Server IPV4/IPV6 Provisioning Server FQDN > RCFG > TLS PKI Enter FQDN of provisioning server				
<enter> =Complete Entry [Esc] =Discard Changes</enter>				

45. If you want to activate remote configuration, in the **Intel(R)** Remote Setup And Configuration menu, select **RCFG** then press Enter. Select Start Configuration then press Enter. Press Y to activate.



46. Press Esc until you return to the Intel(R) Remote Setup And Configuration menu. Select TLS PKI then press Enter. Select Remote Configuration ** then press Enter. Select Enabled or Disabled then press Enter.

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INTEL(R) REMOTE CONFIGURATION						
Remote Configuration PKI DNS Suffix > Manage Hashes	** <enabled> -</enabled>	I				
	Disabled Enabled					
$[\uparrow\downarrow] = Move Highlight$	<enter> =Complete Entry</enter>	[Esc] =Discard Changes				

47. Select **PKI DNS Suffix** then press Enter. Enter the PKI DNS Suffix then press Enter.

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INTEL(R) REMOTE CONFIGURATION						
Remote Configur PKI DNS Suffix > Manage Hashes	ation** <enabl< td=""><td>ed></td></enabl<>	ed>				
[Enter PKI DNS S	Suffix				
	<enter> =Complete Entry</enter>	[Esc] =Discard Changes				

48. In the **Intel(R) Remote Configuration** menu, select **Manage Hashes** then press Enter. Select the hash name then press Insert to enter custom hash certificate name, press Delete to delete hash, press Enter to view hash information, press + to activate or deactivate hash, and press Esc to exit.

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INTEL(R) REMOTE CONFIGURATION						
Hash Name	Active	Default	Algorithm			
VeriSign Class 3	Active: [*]	Default: [*]	SHA256			
VeriSign Class 3	Active: [*]	Default: [*]	SHA256			
Go Daddy Class 2	Active: [*]	Default: [*]	SHA256			
Comodo AAA CA	Active: [*]	Default: [*]	SHA256			
Starfield Class 2	Active: [*]	Default: [*]	SHA256			
VeriSign Class 3	Active: [*]	Default: [*]	SHA256			
VeriSign Class 3	Active: [*]	Default: [*]	SHA256			
VeriSign Class 3	Active: [*]	Default: [*]	SHA256			
GTE CyberTrust G1	Active: [*]	Default: [*]	SHA256			
Baltimore Cyber Tr	Active: [*]	Default: [*]	SHA256			
Cyber Trust Global	Active: [*]	Default: [*]	SHA256			
Verizon Global Ro	Active: [*]	Default: [*]	SHA256			
Entrust. net CA (2	Active: [*]	Default: [*]	SHA256			
Entrust Root CA	Active: [*]	Default: [*]	SHA256			
VeriSign Universa	Active: [*]	Default: [*]	SHA256			
Go Daddy Root CA	Active: [*]	Default: [*]	SHA256			
Entrust Root CA -	Active: [*]	Default: [*]	SHA256			
Startfield Root CA	Active: [*]	Default: [*]	SHA256 👃			
[Ins] =Add New Hash [↑↓] =Move Highlight	[Delete] =Delete Hash [Enter] =View Hash	[+] =Activate Hash [Esc] =Exit				

49. Press Esc until you return to the Intel(R) AMT Configuration menu, select Power Control then press Enter. In the Intel(R) AMT Power Control menu, select Intel(R) AMT ON in Host Sleep States then press Enter. Select an option then press Enter.

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INTEL(R) AMT POWER CONTROL



50. In the **Intel(R) AMT Power Control** menu, select **Idle Timeout** then press Enter. Enter the timeout value and press Enter.



51. Press Esc until you return to the **Main Menu**. Select **MEBx Exit** then press Enter. Press Y to exit.

