

COM-HPC Client Evaluation Carrier

Rev. 0.3 Preliminary

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 COM-HPC CLIENT EVALUATION CARRIER – USER GUIDE

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CAUTION

Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Please follow the "General Safety Instructions" supplied with the system.

NOTICE

You find the most recent version of the "General Safety Instructions" online in the download area of this product.

NOTICE

This product is not suited for storage or operation in corrosive environments, in particular under exposure to sulfur and chlorine and their compounds. For information on how to harden electronics and mechanics against these stress conditions, contact Kontron Support.

Revision History

Revision	Brief Description of Changes	Date of Issue	Author
0.1	Initial issue	2022-September-15	hjs
0.2	L110/L111 for CE	2023-July-12	MK
0.3	Several corrections, dummy chapters removed	2023-Oct-17	MK

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Customer Support

Find Kontron contacts by visiting: <https://www.kontron.com/support-and-services>.

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As a trusted technology innovator and global solutions provider, Kontron extends its embedded market strengths into a services portfolio allowing companies to break the barriers of traditional product lifecycles. Proven product expertise coupled with collaborative and highly-experienced support enables Kontron to provide exceptional peace of mind to build and maintain successful products.

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Customer Comments

If you have any difficulties using this user guide, discover an error, or just want to provide some feedback, contact [Kontron support](#). Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website.

Symbols

The following symbols may be used in this user guide

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE indicates a property damage message.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.



This symbol indicates general information about the product and the user guide.

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠ CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

⚠ CAUTION



Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

CAUTION

Danger of explosion if the battery is replaced incorrectly.

- ▶ Replace only with same or equivalent battery type recommended by the manufacturer.
 - ▶ Dispose of used batteries according to the manufacturer's instructions.
-

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit <https://www.kontron.com/about-kontron/corporate-responsibility/quality-management>.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- ▶ Reduce waste arising from electrical and electronic equipment (EEE)
- ▶ Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- ▶ Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- ▶ Improve the environmental performance of all those involved during the lifecycle of EEE



Environmental protection is a high priority with Kontron.
Kontron follows the WEEE directive
You are encouraged to return our products for proper disposal.

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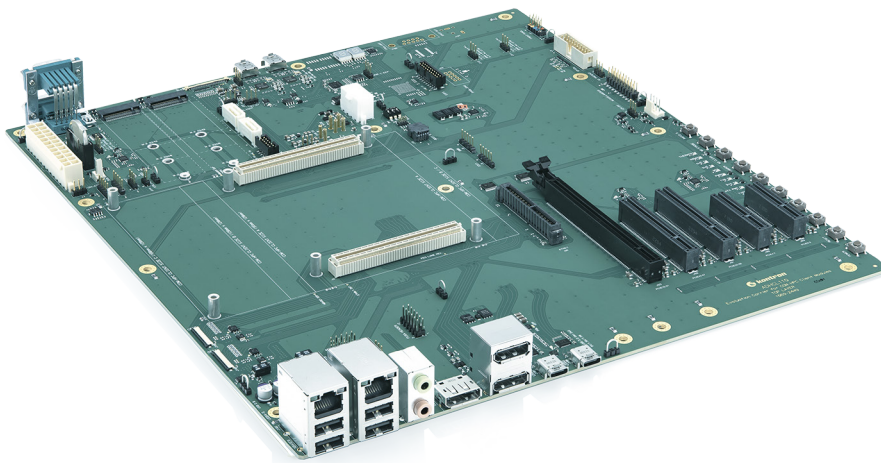
1/ Introduction

1.1. Product Description

COM-HPC Client Evaluation Carrier (ADHC) is an evaluation, testing and validation carrier board (baseboard) for COM-HPC® modules in ATX form factor. The ADHC will allow more flexibility with respect to the 10 GbE configurations. Main purpose of this carrier board is to bring out all the signals from COM-HPC® connector of COMh modules to industry standard interfaces. The key features are:

- ▶ Support of 64 PCIe lanes via various PCIe and M.2 slots
- ▶ 8x SFP28 cages
- ▶ 1x 10/1GBase-T interface
- ▶ 4x USB 3.2 Gen2.1
- ▶ 2x SATA
- ▶ BIOS POST-Code display

Figure 1: COM-HPC Client Evaluation Carrier (ADHC)



1.2. Product Naming Clarification

COM-HPC® defines a Computer-on-Module, or COM, with all the components necessary for a bootable host computer, packaged as a super component. The product name for Kontron COM-HPC® Computer-On-Modules consists of:

Industry standard short form

▶ COMh-

Two different pin-out types:

▶ c = client
▶ s = server

Module form factor

▶ a = 95 mm x 120 mm
▶ b = 120 mm x 120 mm
▶ c = 160 mm x 120 mm
▶ d = 160 mm x 160 mm
▶ e = 200 mm x 160 mm

The COM-HPC Client Evaluation Carrier (ADHC) fits all types of modules.

1.3. Understanding COM-HPC® Functionality

All Kontron COM-HPC® extended, basic and compact modules contain two 2x 100pin connectors; each of it has two rows called Row A & B on primary connector and Row C & D on secondary connector. The COM-HPC® Computer-On-Module (COM) features the following maximum amount of interfaces according to the PCI Industrial Computer Manufacturers Group (PICMG) module Pin-out type.

Table 1: Features

Feature	COM-HPC Client Evaluation Carrier (ADHC)
10 Gbit Ethernet	1x
SFP+	8x
COM-HPC Connec.	2x COM-HPC Connectors
USB	4x USB double stacked
COM	2x DSUB-9
SATA	2x standard slots
PCIe slots	1x PCIe Gen4 x16 slot (PCIe Lane Group 1) 4x PCIe Gen4 x8 to 4x PCIe card slots (PCIe Lane Group 2 and 3) 2x PCIe Gen4 x4 to 2x PCIe card slots (PCIe Lane Group 0 Low) 2x PCIe Gen3 x4 to 2x m.2 2242/2280 slots (PCIe Lane Group 0 High)

1.4. COM-HPC® Documentation

The COM-HPC® Specification defines the COM-HPC® module form factor, pin-out, and signals. This document is available at the PICMG® website by filling out the order form.

1.5. COM-HPC® Benefits

COM-HPC® modules are compact and highly integrated computers. All modules feature a standardized form factor and connector layout which carry a specified set of signals. Each COM is based on the COM-HPC® specification. This standardization allows designers to create a single-system baseboard that can accept present and future COM-HPC® modules.

The baseboard designer can optimize exactly how each of these functions implements physically. Designers can place connectors precisely where needed for the application on a baseboard designed to optimally fit a system's packaging.

A single baseboard design can use a range of COM-HPC® modules with different sizes and pin-outs. This flexibility can differentiate products at various price/performance points. The modularity of a COM-HPC® solution also ensures against obsolescence when computer technology evolves. A properly designed COM-HPC® baseboard can work with several successive generations of COM-HPC® modules.

A COM-HPC® baseboard design has many advantages of a customized computer-board design and, additionally, delivers better obsolescence protection, heavily reduced engineering effort, and faster time to market.

2/ System specifications

2.1. Component Main Data

The table below summarizes the features of the motherboard.

Table 2: Component Main Data

COM-HPC Client Evaluation Carrier (ADHC) Size D and E	
Dimensions	305 mm x 330 mm (E-ATX)
Ethernet	1x RJ45 – max. 10G-BASE-T, 8x SFP28 cages via 2x Intel C827-IM
PCI Express®	1x PCIe Gen4 x16 slot (PCIe Lane Group 1), 4x PCIe Gen4 x8 to 4x PCIe card slots (PCIe Lane Group 2 and 3), 2x PCIe Gen4 x4 to 2x PCIe card slots (PCIe Lane Group 0 Low), 2x PCIe Gen3 x4 to 2x M.2 2242/2280 slots (PCIe Lane Group 0 High)
USB	4x USB 3.2 Gen 2x1
Serial	2x DSUB9 - COM ports (RX/TX)
Visual Control BIOS Post-Code	4x 7-segment display, Various LEDs
Onboard Header	2x SATA, 1x I2C, 1x eSPI, 1x SMBus, 1x GPIO, 1x Fan, 1x Feature Connector
Various	BIOS flash-socket, Battery holder
Power Supply	ATX power supply 24 + 8 pin

▲ CAUTION

Danger of explosion if the lithium battery is incorrectly replaced.

- Replace only with the same or equivalent type recommended by the manufacturer
- Dispose of used batteries according to the manufacturer's instructions

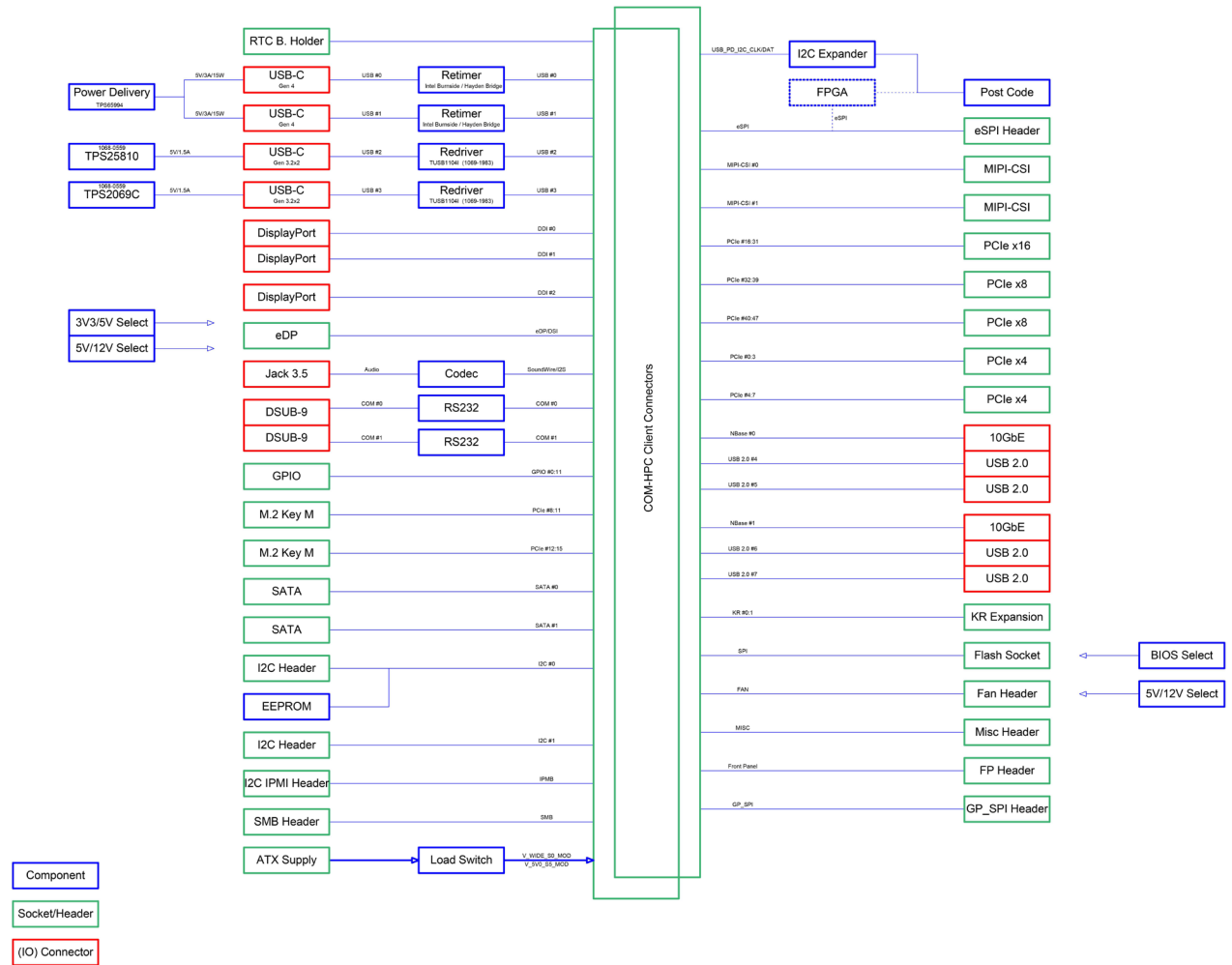
2.2. Environmental Conditions

Table 3: Environmental Conditions

Operating	-0°C to +60°C Some connectors and supercap has operating temperature only 0°C to +70°C, relative humidity (non-condensing) 10 % to 93 % at 40°C
Storage	-30°C to +85°C relative humidity (non-condensing) 10 % to 93 % at 40°C
Theoretical MTBF	not applicable
Compliance	CE/UKCA, RoHS II, WEEE

2.3. Block diagram

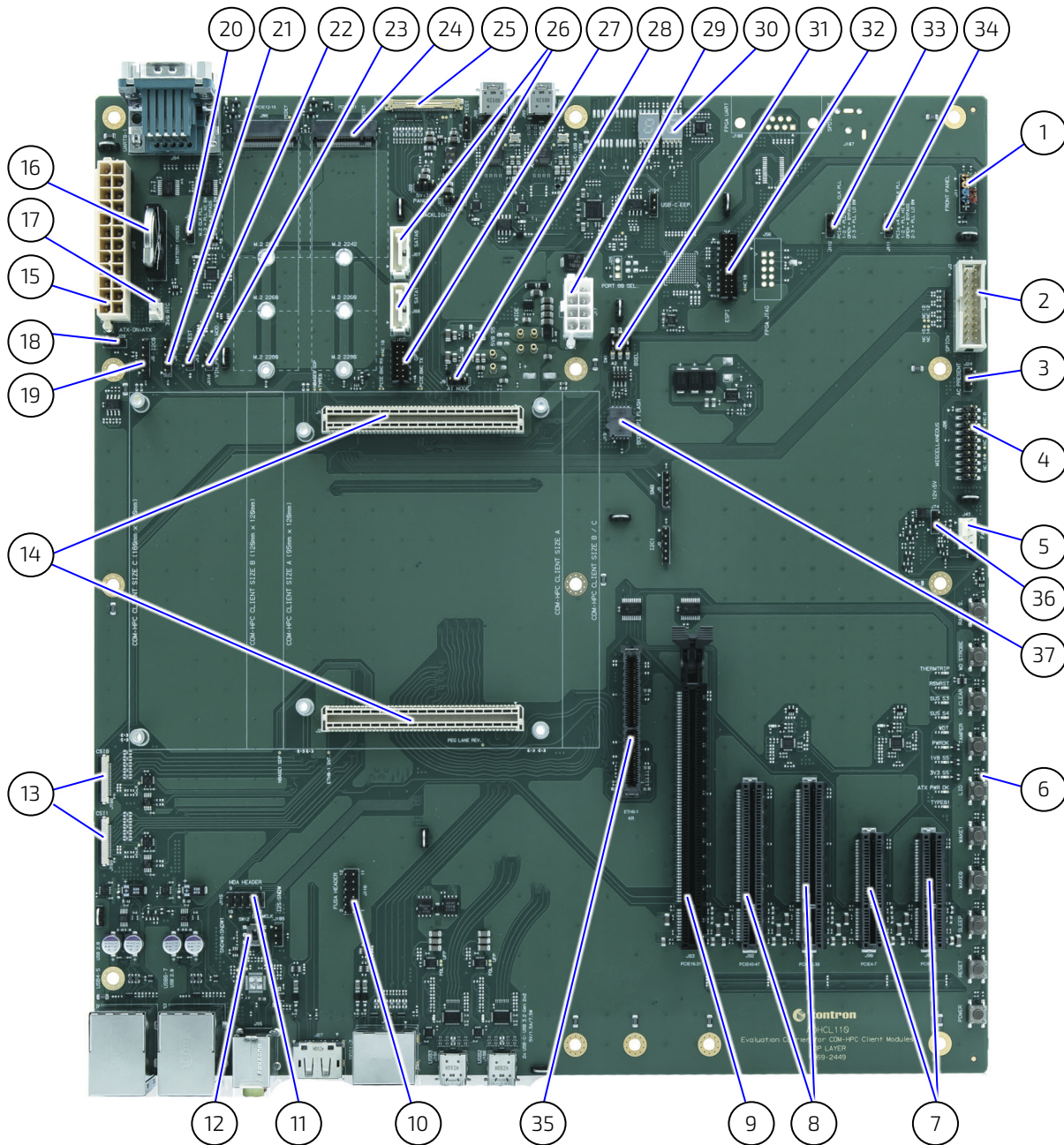
Figure 2: Block Diagram COM-HPC Client Evaluation Carrier (ADHC)



3/ Mainboard Views

3.1. Top View

Figure 3: Top View of COM-HPC Client Evaluation Carrier (ADHC)



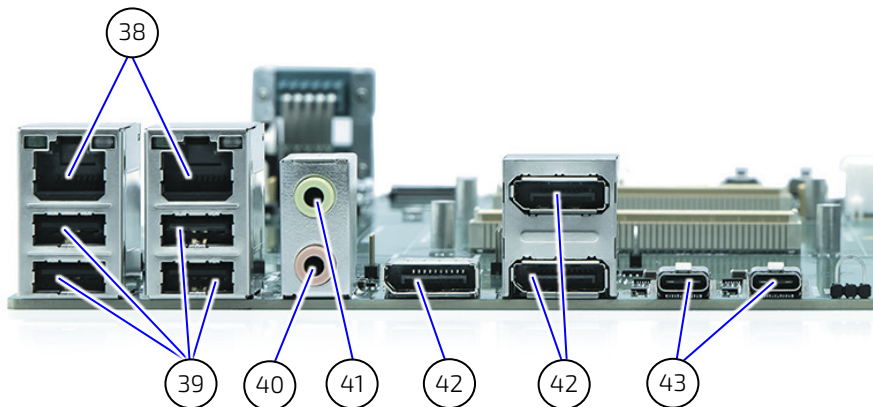
1. Front Panel (J11)
2. GPIO (J3)
3. AC Present (J24)
4. Miscellaneous (J28)

5. Fan (J47)
6. 10x Button Switches (J32)
7. PCIe x4 (J89, J90)
8. 2x PCIe x8 (J91/J92)

9. PCIe x16 (J93)
10. FUSA Header (J116)
11. HDA Header (J115)
12. Switch (SW12)
13. 2x CSIO, CS11 (J108, J109)
14. 2x COM-HPC Connectors (J1, J2)
15. ATX power connector 24 pins (J16)
16. RTC Battery CR2032 (J21)
17. 3V0 RTC (J78)
18. ATX-On (J29)
19. I2CO (J6)
20. M.2 Jumper (J110)
21. IPMB (J4)
22. Test (J13)
23. VIN_PWROK (J114)
24. 2x M.2 (J85, J86)
25. EDP (J10)
26. 2x SATA (J87, J88)
27. GP SPI (J10)
28. AT Mode (J9)
29. ATX Power (8 pins, J17)
30. POST Code Display
31. BSEL (SW1)
32. ESPI (J4)
33. PCIe x8 Slots (J112)
34. PCIe x4 Slots (J111)
35. 10 GB Ethernet Add-in Card Connector
36. Jumper Fan Voltage 5/12 V (J74)
37. BIOS Flash Socket (J19)

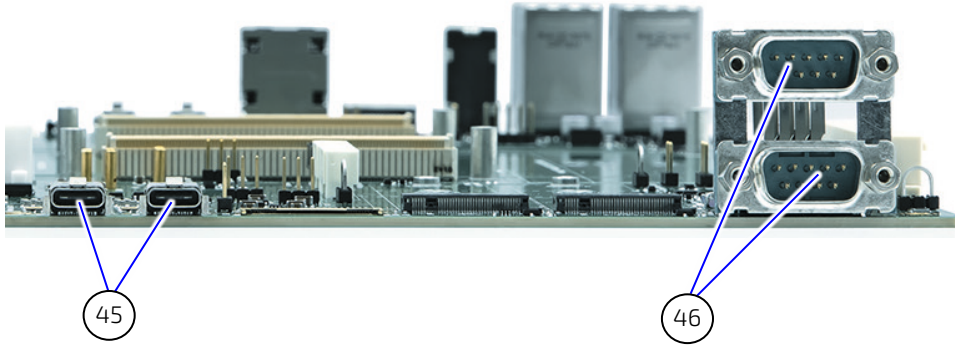
3.2. IOs

Figure 4: IOs (front)



38. 2x Ethernet (J102, J103)
39. 4x USB (J102, J103)
40. Audio in (J15)
41. 1x DisplayPort (J27)
42. 1x Double DisplayPort (J96)
- 43.
44. Audio out (J15)
45. 2x USB Type-C (J100, J101)

Figure 5: IOs (back)



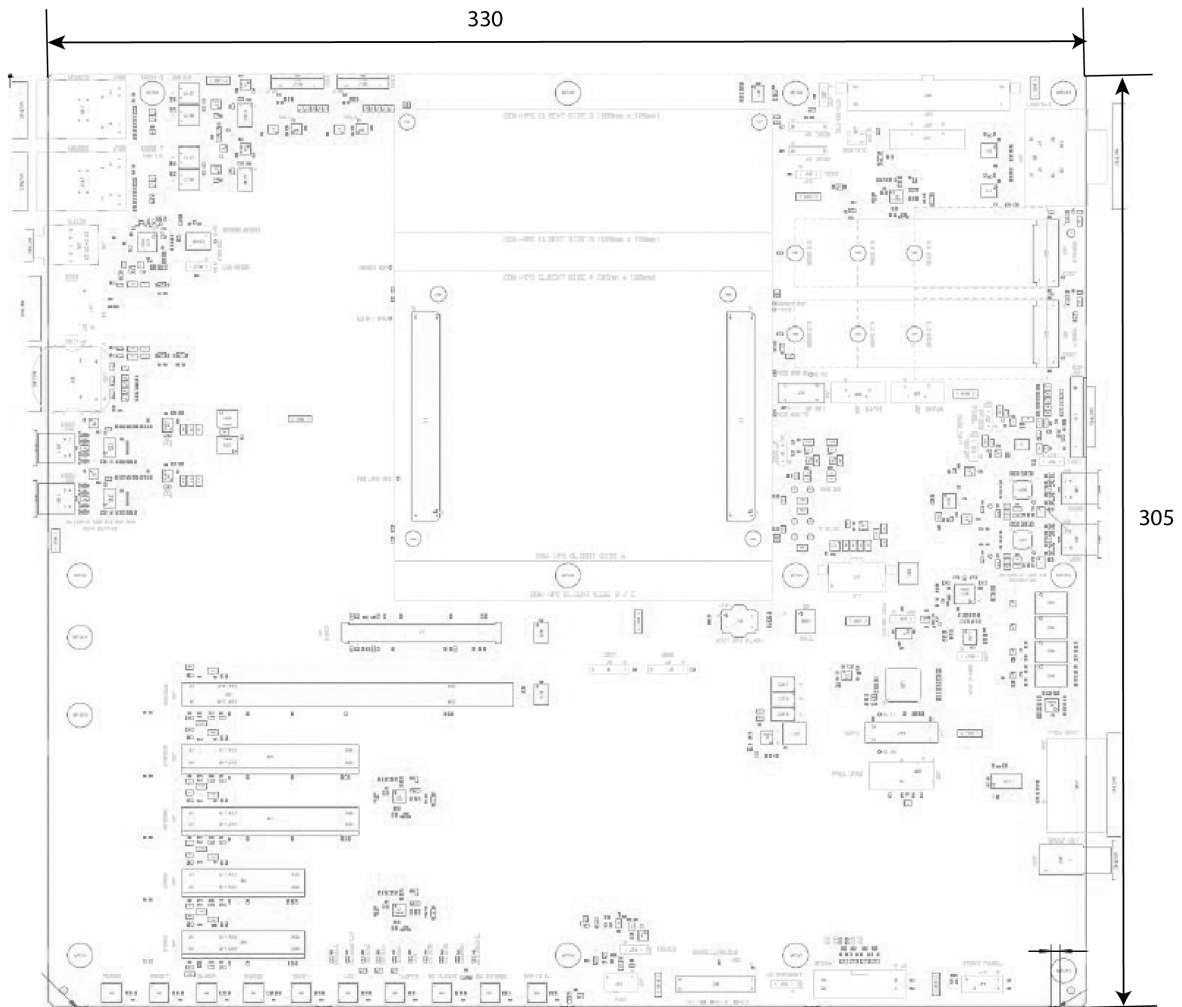
- 46. 2x USB Type-C (J98, J99)
- 47. 2x COM ports (J94)

4/ Mechanical Specification

4.1. Dimensions

The dimensions of the carrier board are 305.0 mm x 330.0 mm.

Figure 6: Board Dimensions



5/ Interfaces and Connectors

5.1. 1 GB Ethernet Connector (J102, J103)

Figure 7: 1 GB Ethernet Connector

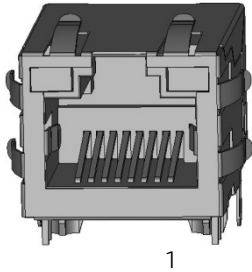


Table 4: 1 GB Ethernet Connector

Pin	Signal Name
1	CT_MDI1
2	GBEO_MDI1-
3	GBEO_MDI1+
4	GBEO_MDI2+
5	GBEO_MDI2-
6	CT_MDI2
7	CT_MDI0
8	GBEO_MDI0+
9	GBEO_MDI0-
10	GBEO_MDI3-
11	GBEO_MDI3+
12	CT_MDI3
13	GBEO_LED_ACT#
14	GBEO_LED_ACTPWR
15	GBEO_LED_R_Y
16	GBEO_LED_SPEEDPWR
17	GBEO_LED_R_G
S1	GND
S2	GND

Table 5: Signals

LED	Signal
1	green, activity
2	green, 100 MB/s
2	yellow, 1000 MB/s

5.2. USB 3.1 Double Connector (J102, 103)

Figure 8: USB 3.1 Double Connector

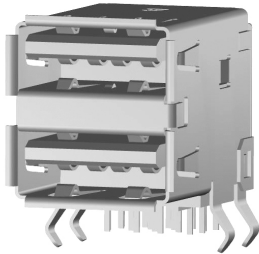


Table 6: USB 3.1 Double Connector

Pin	Signal Name - J17		Signal Name - J18	
1	V_5V0_M_USB1_CONN	BOTTOM SLOT	V_5V0_M_USB3_CONN	BOTTOM SLOT
2	USB20_D1_CONN-		USB20_D3_CONN-	
3	USB20_D1_CONN+		USB20_D3_CONN+	
4	GND		GND	
5	USB31_SSRX1_CONN-		USB31_SSRX3_CONN-	
6	USB31_SSRX1_CONN+		USB31_SSRX3_CONN+	
7	GND		GND	
8	USB31_SSTX1_CONN-		USB31_SSTX3_CONN-	
9	USB31_SSTX1_CONN+		USB31_SSTX3_CONN+	
10	V_5V0_M_USB0_CONN	TOP SLOT	V_5V0_M_USB2_CONN	TOP SLOT
11	USB20_D0_CONN-		USB20_D2_CONN-	
12	USB20_D0_CONN+		USB20_D2_CONN+	
13	GND		GND	
14	USB31_SSRX0_CONN-		USB31_SSRX2_CONN-	
15	USB31_SSRX0_CONN+		USB31_SSRX2_CONN+	
16	GND		GND	
17	USB31_SSTX0_CONN-		USB31_SSTX2_CONN-	
18	USB31_SSTX0_CONN+	USB31_SSTX2_CONN+		
19	GND		GND	
20	GND		GND	
21	GND		GND	
22	GND		GND	

5.3. COM Ports (J94)

Figure 9: Double COM Ports



Table 7: Double COM Ports

Pin	Signal Name	
1B	NC	BOTTOM SLOT
2B	SER0_RX_RS M0	
3B	SER0_TX_RS232_COM0	
4B	NC	
5B	GND	
6B	NC	
7B	NC	
8B	NC	
9B	NC	
S1B	GND	
S2B	GND	
1T	NC	
2T	SER1_RX_RS232_COM0	
3T	SER1_TX_RS232_COM0	
4T	NC	
5T	GND	
6T	NC	
7T	NC	
8T	NC	
9T	NC	
S1T	GND	
S2T	GND	

5.4. 10 GB Ethernet Add-in Card Connector (J7)

The carrier board contains 10 GB Ethernet connector that supports copper and optical 10 GB interface via extended cards.

Figure 10: 10 GB Ethernet Add-in Card Connector

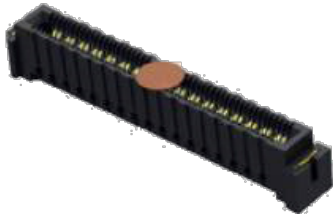


Table 8: Connector Pinning

Pin	Signal Name	Pin	Signal Name
1	V_12V0_S0	2	V_3V3_S5
3	V_12V0_S0	4	V_3V3_S5
5	V_12V0_S0	6	10G_PWR_OK
7	V_3V3_S0	8	GND
9	V_3V3_S0	10	10G_WAKE#
11	SMB_CLK	12	10G_PHY_CAP_01
13	GND	14	GND
15	SMB_DAT	16	10G_LED_SDA
17	10G_SFP_SDA1	18	10G_LED_SCL
19	GND	20	GND
21	10G_KR_RX1+	22	CB_RESET#
23	10G_KR_RX1-	24	10G_SFP_SCL1
25	GND	26	GND
27	NC	28	10G_KR_TX1-
29	10G_SFP_SDA0	30	10G_KR_TX1+
31	GND	32	GND
33	10G_KR_RX0+	34	NC
35	10G_KR_RX0-	36	10G_SFP_SCL0
37	GND	38	GND
39	NC	40	10G_KR_TX0-
41	10G_SFP_SDA3	42	10G_KR_TX0+
43	GND	44	GND
45	GND	46	GND
47	10G_KR_RX3+	48	NC
49	10G_KR_RX3-	50	10G_SFP_SCL3
51	GND	52	GND
53	NC	54	10G_KR_TX3-
55	10G_SFP_SDA2	56	10G_KR_TX3+
57	GND	58	GND

Pin	Signal Name	Pin	Signal Name
59	10G_KR_RX2+	60	NC
61	10G_KR_RX2-	62	10G_SFP_SCL2
63	GND	64	GND
65	NC	66	10G_KR_TX2-
67	10G_PHY_RST_23	68	10G_KR_TX2+
69	GND	70	GND
71	V_5V0_S5	72	V_5V0_S5
73	10G_PHY_RST_01	74	10G_PHY_CAP_23
75	GND	76	GND
77	10G_INT1	78	10G_INT3
79	10G_SDP1	80	10G_SDP3
81	GND	82	GND
83	10G_PHY_MDC_SCL1	84	10G_PHY_MDC_SCL3
85	10G_PHY_MDIO_SDA1	86	10G_PHY_MDIO_SDA3
87	GND	88	GND
89	10G_INT0	90	10G_INT2
91	10G_SDP0	92	10G_SDP2
93	GND	94	GND
95	10G_PHY_MDC_SCL0	96	10G_PHY_MDC_SCL2
97	10G_PHY_MDIO_SDA0	98	10G_PHY_MDIO_SDA2
99	GND	100	GND

5.5. SATA 6 GB (J87, J88)

Figure 11: SATA 6 GB



Table 9: SATA 6 GB Connector

Pin	Signal Name - J15	Signal Name - J16
1	GND	GND
2	SATA0_TX+	SATA1_TX+
3	SATA0_TX-	SATA1_TX-
4	GND	GND
5	SATA0_RX+	SATA1_RX+
6	SATA0_RX-	SATA1_RX-
7	GND	GND

5.6. PCIe Slots

Table 10: PCIe Slots

PCIe Slot	Connector	PCIe Lanes
PCIe A x16	J93	16 lanes PCIe[16..31]
PCIe B x8	J91	8 lanes PCIe[8..15]
PCIe B x8	J92	8 lanes PCIe[8..15]
PCIe C x4	J89	4 lanes PCIe[4..7]
PCIe D x4	J90	4 lanes PCIe[0..3]

5.7. Fan Connector (J47)

Figure 12: Fan Connector with 4 pins

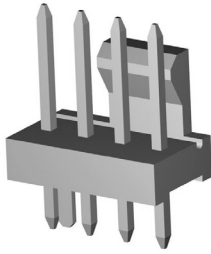


Table 11: Fan Connector

Pin	Description
1	GND
2	V_FAN
3	FAN_TACH_CON
4	FAN_PWM_CON

Figure 13: Jumper Fan Voltage (J74)



Table 12: Jumper for 5V/12V Fan Selection (J74)

Pin	Description
1	V_5V0_S0
2	V_FAN
3	V_12V0_S0

5.8. BIOS Flash Socket (J19)

Figure 14: BIOS Flash Socket

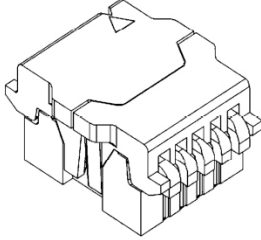


Table 13: BIOS Flash Socket Pinout

Pin	Signal	Pin	Signal
1	SPI_CS#	5	SPI_MOSI_R
2	SPI_MISO_R	6	SPI_CLK_R
3	SPI_WP#	7	SPI_HOLD#
4	GND	8	SPI_VCC

5.9. ESPI Connector (J4)

Figure 15: ESPI Connector



Table 14: ESPI Connector

Signal Name	Pin	Pin	Signal Name
V_1V8_S5	1	2	ESPI_CS0#
ESPI_IO_0	3	4	ESPI_IO_1
ESPI_IO_2	5	6	ESPI_IO_3
ESPI_ALERT0#	7	8	ESPI_ALERT1#
ESPI_CLK	9	10	ESPI_RST#
ESPI_CS1#	11	12	GND
GND	13	14	CB_RESET#
PWRBTN#	15	16	SYS_RESET#
(TP) N.C.	17	18	N.C. (TP)
V_3V3_S5	19	20	GND

5.10. GPIO - General Purpose Input and Output (J3)

The COM-HPC Client Evaluation Carrier offers 20 pins.

Figure 16: GPIO Header

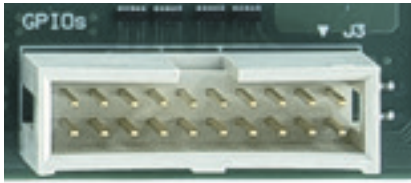


Table 15: GPIO Header with 20 pins

Pin	Signal Name
1	V_1V8_S5
2	V_3V3_S5
3	GPIO_00_J
4	GPIO_01_J
5	GPIO_02_J
6	GPIO_03_J
7	GPIO_04_J
8	GPIO_05_J
9	GPIO_06_J
10	GPIO_07_J
11	GPIO_08_J
12	GPIO_09_J
13	GPIO_10_J
14	GPIO_11_J
15	NC_GPIO_12_J
16	NC_GPIO_12_J
17	NC_GPIO_12_J
18	NC_GPIO_12_J
19	GND
20	GND

5.11. IPMB Header (J4)

Figure 17: IPMB Header



Table 16: Pinning IPMB Header

Pin	Description
1	V_3V3_S5
2	IPMB_DAT
3	IPMB_CLK
4	GND
5	NC

5.12. Miscellaneous (J26)

Figure 18: Miscellaneous



Table 17: Miscellaneous Header

Signal Name	Pin	Pin	Signal Name
V_3V3_S5	1	2	SUS_S3#
PWRBTN#	3	4	SUS_S4_S5#
RSTBTN#	5	6	N.C. (TP)
PLTRST#	7	8	WD_OUT
VIN_PWR_OK	9	10	WD_STROBE#
BATLOW#	11	12	N.C. (TP)
THERMTRIP#	13	14	N.C. (TP)
CARRIER_HOT#	15	16	WAKE0#
RAPID_SHUTDOWN	17	18	WAKE1#
GND	19	20	GND

5.13. Front Panel Header (J11)

Figure 19: Front Panel Connector



Table 18: Front Panel Header

Pin	Signal Name
1	SATA_LED+
2	POWER_LED+
3	SATA_ACT#
4	GND
5	GND
6	SW_PWRBTN#
7	SYS_RESET_R#
8	GND
9	V_5V0_S0

5.14. I2C (J6)

The I2C Interface supports clock from 127 Hz to 400 kHz (limited by on board devices and capacitive loading) and can be configured in Setup.

Figure 20: I2C header



Table 19: I2C Header (J51)

Pin	Description
1	V_3V3_S5
2	I2C_DAT
3	I2C_CLK
4	GND
5	I2C0_ALERT#

5.15. SMBus (J5)

Figure 21: SMBus header



Table 20: SMBus Header (J52)

Pin	Description
1	V_V3V_S5
2	SMB_DAT
3	SMB_CLK
4	GND
5	SMB_ALERT#

5.16. ATX Power connector (J16)

Figure 22: ATX Power connector with 24 pins

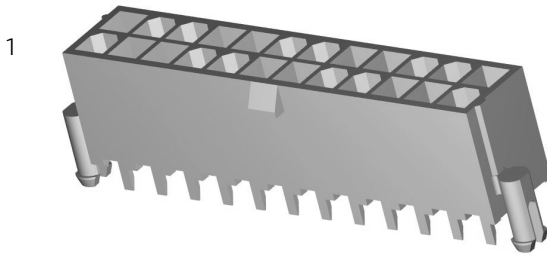


Table 21: ATX Power connector with 24 pins

Pin	Signal
1	3,3 V
2	3,3 V
3	GND
4	5 V
5	GND
6	5 V
7	GND
8	PWR_OK
9	5 VSB
10	12 V
11	12 V
12	3,3 V
13	3,3 V
14	-12 V
15	GND
16	PS ON
17	GND
18	GND
19	GND
20	NC
21	5 V
22	5 V
23	5 V
24	GND

5.17. ATX Power connector (J17)

Figure 23: ATX Power connector with 8 pins

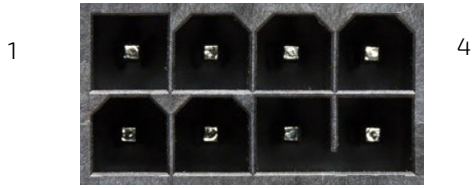


Table 22: ATX Power connector with 8 pins

Pin	Signal
1	GND
2	GND
3	GND
4	GND
5	+12 V
6	+12 V
7	+12 V
8	+12 V

5.18. RTC Socket (J21)

Figure 24: RTC Socket

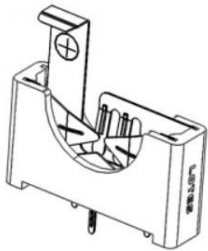


Table 23: RTC Socket

Pin	Signal Name
1	V_RTC_BAT
2	V_RTC_BAT
3	GND

5.19. BIOS Select Switch (TBD)

5.20. Button Switches (TBD)

Figure 25: Button Switches



NOTICE

Rapid shutdown requires disconnecting V_WIDE_S0_MOD and V_5V0_S5_MOD rails externally.

5.21. M.2 Key-M Socket with Spacer (J85, J86 TBD)

5.22. Jumper (TBD)

6/ Electrical Specification

6.1. Supply Voltage

- ▶ one ATX Main Power 24pin



Power supply for the module: the ATX_12V P4 connector provides a wide range of input, depending on module specification.

6.2. Power Supply Rise time

- ▶ The input voltages shall rise from $\leq 10\%$ of nominal to within the regulation ranges within 0.1ms to 20ms.
- ▶ There must be a smooth and continuous ramp of each DC input voltage from 10% to 90% of its final set-point following the ATX specification

NOTICE

If any of the supply voltages drops below the allowed operating level longer than the specified hold-up time, all the supply voltages should be shut down and left OFF for a time long enough to allow the internal board voltages to discharge sufficiently.
If the OFF time is not observed, parts of the board or attached peripherals may work incorrectly or even suffer a reduction of MTBF.
The minimum OFF time depends on the implemented PSU model and other electrical factors and needs to be measured individually for each case.

6.3. Supply Voltage Ripple

- ▶ Maximum 100 mV peak to peak 0-20MHz

NOTICE

To protect external power lines of peripheral devices, make sure that the wires have the right diameter to withstand the maximum available current. The enclosure of the peripheral device has to fulfill the fire-protection requirements of IEC/EN62368.

7/ Features (TBD)

7.1. LEDs and Indicators (TBD)

8/ COM-HPC Connector Pin-out List

NOTICE

To protect external power lines of peripheral devices, make sure that: the wires have the right diameter to withstand the maximum available current the enclosure of the peripheral device fulfills the fire-protection requirements of IEC/EN60950.

Table 24: Pin-out List Connector J1

Pin	Row A	Row B	Row C	Row D
01	VCC	VCC	VCC	VCC
02	VCC	PWRBTN#	RSTBTN#	VCC
03	VCC	VCC	VCC	VCC
04	VCC	THERMTRIP#	CARRIER_HOT#	VCC
05	VCC	VCC	VCC	VCC
06	VCC	TAMPER#	VIN_PWROK	VCC
07	VCC	VCC	VCC	VCC
08	VCC	SUS_S3#	SUS_S4_S5#	VCC
09	VCC	VCC	VCC	VCC
10	GND	WD_STROBE#	GND	WAKE0#
11	BATLOW#	WD_OUT	FAN_PWMOUT	WAKE1#
12	PLTRST#	GND	FAN_TACHIN	GND
13	GND	USB5-	GND	USB1-
14	USB7-	USB5+	USB3-	USB1+
15	USB7+	GND	USB3+	GND
16	GND	USB4-	GND	USB0-
17	USB6-	USB4+	USB2-	USB0+
18	USB6+	GND	USB2+	GND
19	GND	I2S_LRCLK/SNDW_C LK3	GND	DDIO_SDA_AUX-
20	DDI1_SDA_AUX-	I2S_DOUT/SNDW_D AT3	SNDW_DMIC_CLK1	DDIO_SCL_AUX+
21	DDI1_SCL_AUX+	I2S_MCLK	SNDW_DMIC_DAT1	GND
22	GND	I2S_DIN/SNDW_DAT 2	GND	DDIO_PAIR0-
23	DDI1_PAIR0-	I2S_CLK/SNDW_CLK 2	SNDW_DMIC_CLK0	DDIO_PAIR0+
24	DDI1_PAIR0+	VCC_5V_SBY	SNDW_DMIC_DAT0	GND
25	GND	USB67_OC#	GND	DDIO_PAIR1-
26	DDI1_PAIR1-	USB45_OC#	DDIO_DDC_AUX_SE L	DDIO_PAIR1+
27	DDI1_PAIR1+	USB23_OC#	DDI1_DDC_AUX_SE L	GND
28	GND	USB01_OC#	DDIO_HPD	DDIO_PAIR2-
29	DDI1_PAIR2-	SML1_CLK	DDI1_HPD	DDIO_PAIR2+
30	DDI1_PAIR2+	SML1_DAT	eDP_HPD	GND
31	GND	PMCALERT#	eDP_VDD_EN	DDIO_PAIR3-
32	DDI1_PAIR3-	SML0_CLK	eDP_BKLT_EN	DDIO_PAIR3+
33	DDI1_PAIR3+	SML0_DAT	eDP_BKLTCTL	GND
34	GND	USB_PD_ALERT#	GND	AC_PRESENT
35	eDP_AUX-	USB_PD_I2C_CLK	USB1_AUX-	RSVD
36	eDP_AUX+	USB_PD_I2C_DAT	USB1_AUX+	GND
37	GND	USB_RT_ENA	GND	USB1_SSTX0-
38	eDP_TX0-	USB1_LSRX	USB1_SSRX0-	USB1_SSTX0+
39	eDP_TX0+	USB1_LSTX	USB1_SSRX0+	GND
40	GND	USB0_LSRX	GND	USB1_SSTX1-
41	eDP_TX1-	USB0_LSTX	USB1_SSRX1-	USB1_SSTX1+

Pin	Row A	Row B	Row C	Row D
42	eDP_TX1+	GND	USB1_SSRX1+	GND
43	GND	USB0_AUX-	GND	USB0_SSTX0-
44	eDP_TX2-	USB0_AUX+	USB0_SSRX0-	USB0_SSTX0+
45	eDP_TX2+	LID#	USB0_SSRX0+	GND
46	GND	SLEEP#	GND	USB0_SSTX1-
47	eDP_TX3-	VCC_BOOT_SPI	USB0_SSRX1-	USB0_SSTX1+
48	eDP_TX3+	BOOT_SPI_CS#	USB0_SSRX1+	GND
49	GND	BSEL0	GND	SATA0_RX-
50	eSPI_I00	BSEL1	BOOT_SPI_I00	SATA0_RX+
51	eSPI_I01	BSEL2	BOOT_SPI_I01	GND
52	eSPI_I02	eSPI_ALERT0#	BOOT_SPI_I02	SATA0_TX-
53	eSPI_I03	eSPI_ALERT1#	BOOT_SPI_I03	SATA0_TX+
54	eSPI_CLK	eSPI_CS0#	BOOT_SPI_CLK	GND
55	GND	eSPI_CS1#	GND	SATA1_RX-
56	PCIe_CLKREQ0_L O#	eSPI_RST#	PCIe_REFCLK0_HI-	SATA1_RX+
57	PCIe_CLKREQ0_H I#	GND	PCIe_REFCLK0_HI+	GND
58	GND	PCIe_BMC_RX-	GND	SATA1_TX-
59	PCIe_BMC_TX-	PCIe_BMC_RX+	PCIe_REFCLK0_LO-	SATA1_TX+
60	PCIe_BMC_TX+	GND	PCIe_REFCLK0_LO+	GND
61	GND	PCIe08_RX-	GND	PCIe00_TX-
62	PCIe08_TX-	PCIe08_RX+	PCIe00_RX-	PCIe00_TX+
63	PCIe08_TX+	GND	PCIe00_RX+	GND
64	GND	PCIe09_RX-	GND	PCIe01_TX-
65	PCIe09_TX-	PCIe09_RX+	PCIe01_RX-	PCIe01_TX+
66	PCIe09_TX+	GND	PCIe01_RX+	GND
67	GND	PCIe10_RX-	GND	PCIe02_TX-
68	PCIe10_TX-	PCIe10_RX+	PCIe02_RX-	PCIe02_TX+
69	PCIe10_TX+	GND	PCIe02_RX+	GND
70	GND	PCIe11_RX-	GND	PCIe03_TX-
71	PCIe11_TX-	PCIe11_RX+	PCIe03_RX-	PCIe03_TX+
72	PCIe11_TX+	GND	PCIe03_RX+	GND
73	GND	PCIe12_RX-	GND	PCIe04_TX-
74	PCIe12_TX-	PCIe12_RX+	PCIe04_RX-	PCIe04_TX+
75	PCIe12_TX+	GND	PCIe04_RX+	GND
76	GND	PCIe13_RX-	GND	PCIe05_TX-
77	PCIe13_TX-	PCIe13_RX+	PCIe05_RX-	PCIe05_TX+
78	PCIe13_TX+	GND	PCIe05_RX+	GND
79	GND	PCIe14_RX-	GND	PCIe06_TX-
80	PCIe14_TX-	PCIe14_RX+	PCIe06_RX-	PCIe06_TX+
81	PCIe14_TX+	GND	PCIe06_RX+	GND
82	GND	PCIe15_RX-	GND	PCIe07_TX-

Pin	Row A	Row B	Row C	Row D
83	PCIe15_TX-	PCIe15_RX+	PCIe07_RX-	PCIe07_TX+
84	PCIe15_TX+	GND	PCIe07_RX+	GND
85	GND	TEST#	GND	NBASET0_MDI0-
86	VCC_RTC	RSMRST_OUT#	SMB_CLK	NBASET0_MDI0+
87	SUS_CLK	UART1_TX	SMB_DAT	GND
88	GPIO_00	UART1_RX	SMB_ALERT#	NBASET0_MDI1-
89	GPIO_01	UART1_RTS#	UART0_TX	NBASET0_MDI1+
90	GPIO_02	UART1_CTS#	UART0_RX	GND
91	GPIO_03	IPMB_CLK	UART0_RTS#	NBASET0_MDI2-
92	GPIO_04	IPMB_DAT	UART0_CTS#	NBASET0_MDI2+
93	GPIO_05	GP_SPI_MOSI	I2C0_CLK	GND
94	GPIO_06	GP_SPI_MISO	I2C0_DAT	NBASET0_MDI3-
95	GPIO_07	GP_SPI_CS0#	I2C0_ALERT#	NBASET0_MDI3+
96	GPIO_08	GP_SPI_CS1#	I2C1_CLK	GND
97	GPIO_09	GP_SPI_CS2#	I2C1_DAT	NBASET0_LINK_MAX#
98	GPIO_10	GP_SPI_CS3#	NBASET0_SDP	NBASET0_LINK_MID#
99	GPIO_11	GP_SPI_CLK	NBASET0_CTREF	NBASET0_LINK_ACT#
100	TYPE0	GP_SPI_ALERT#	TYPE1	TYPE2

Table 25: Pin-out List Connector J2

Pin	Row E	Row F	Row G	Row H
01	RAPID_SHUTDOWN	RSVD	RSVD	GND
02	GND	RSVD	GND	USB2_SSTX0-
03	DDI2_SDA_AUX-	RSVD	USB2_SSRX0-	USB2_SSTX0+
04	DDI2_SCL_AUX+	RSVD	USB2_SSRX0+	GND
05	GND	RSVD	GND	USB2_SSTX1-
06	DDI2_PAIR0-	RSVD	USB2_SSRX1-	USB2_SSTX1+
07	DDI2_PAIR0+	RSVD	USB2_SSRX1+	GND
08	GND	RSVD	GND	USB3_SSTX0-
09	DDI2_PAIR1-	RSVD	USB3_SSRX0-	USB3_SSTX0+
10	DDI2_PAIR1+	RSVD	USB3_SSRX0+	GND
11	GND	RSVD	GND	USB3_SSTX1-
12	DDI2_PAIR2-	RSVD	USB3_SSRX1-	USB3_SSTX1+
13	DDI2_PAIR2+	RSVD	USB3_SSRX1+	GND
14	GND	RSVD	GND	USB2_AUX-
15	DDI2_PAIR3-	RSVD	USB3_LSRX	USB2_AUX+
16	DDI2_PAIR3+	RSVD	USB3_LSTX	GND
17	GND	RSVD	USB2_LSRX	USB3_AUX-
18	DDI2_DDC_AUX_SE L	RSVD	USB2_LSTX	USB3_AUX+
19	DDI2_HPDP	GND	PEG_LANE_REV#	GND
20	GND	PCIe32_RX-	GND	PCIe40_TX-

Pin	Row E	Row F	Row G	Row H
21	PCle32_TX-	PCle32_RX+	PCle40_RX-	PCle40_TX+
22	PCle32_TX+	GND	PCle40_RX+	GND
23	GND	PCle33_RX-	GND	PCle41_TX-
24	PCle33_TX-	PCle33_RX+	PCle41_RX-	PCle41_TX+
25	PCle33_TX+	GND	PCle41_RX+	GND
26	GND	PCle34_RX-	GND	PCle42_TX-
27	PCle34_TX-	PCle34_RX+	PCle42_RX-	PCle42_TX+
28	PCle34_TX+	GND	PCle42_RX+	GND
29	GND	PCle35_RX-	GND	PCle43_TX-
30	PCle35_TX-	PCle35_RX+	PCle43_RX-	PCle43_TX+
31	PCle35_TX+	GND	PCle43_RX+	GND
32	GND	PCle36_RX-	GND	PCle44_TX-
33	PCle36_TX-	PCle36_RX+	PCle44_RX-	PCle44_TX+
34	PCle36_TX+	GND	PCle44_RX+	GND
35	GND	PCle37_RX-	GND	PCle45_TX-
36	PCle37_TX-	PCle37_RX+	PCle45_RX-	PCle45_TX+
37	PCle37_TX+	GND	PCle45_RX+	GND
38	GND	PCle38_RX-	GND	PCle46_TX-
39	PCle38_TX-	PCle38_RX+	PCle46_RX-	PCle46_TX+
40	PCle38_TX+	GND	PCle46_RX+	GND
41	GND	PCle39_RX-	GND	PCle47_TX-
42	PCle39_TX-	PCle39_RX+	PCle47_RX-	PCle47_TX+
43	PCle39_TX+	GND	PCle47_RX+	GND
44	GND	PCle16_RX-	GND	PCle24_TX-
45	PCle16_TX-	PCle16_RX+	PCle24_RX-	PCle24_TX+
46	PCle16_TX+	GND	PCle24_RX+	GND
47	GND	PCle17_RX-	GND	PCle25_TX-
48	PCle17_TX-	PCle17_RX+	PCle25_RX-	PCle25_TX+
49	PCle17_TX+	GND	PCle25_RX+	GND
50	GND	PCle18_RX-	GND	PCle26_TX-
51	PCle18_TX-	PCle18_RX+	PCle26_RX-	PCle26_TX+
52	PCle18_TX+	GND	PCle26_RX+	GND
53	GND	PCle19_RX-	GND	PCle27_TX-
54	PCle19_TX-	PCle19_RX+	PCle27_RX-	PCle27_TX+
55	PCle19_TX+	GND	PCle27_RX+	GND
56	GND	PCle20_RX-	GND	PCle28_TX-
57	PCle20_TX-	PCle20_RX+	PCle28_RX-	PCle28_TX+
58	PCle20_TX+	GND	PCle28_RX+	GND
59	GND	PCle21_RX-	GND	PCle29_TX-
60	PCle21_TX-	PCle21_RX+	PCle29_RX-	PCle29_TX+
61	PCle21_TX+	GND	PCle29_RX+	GND
62	GND	PCle22_RX-	GND	PCle30_TX-

Pin	Row E	Row F	Row G	Row H
63	PCle22_TX-	PCle22_RX+	PCle30_RX-	PCle30_TX+
64	PCle22_TX+	GND	PCle30_RX+	GND
65	GND	PCle23_RX-	GND	PCle31_TX-
66	PCle23_TX-	PCle23_RX+	PCle31_RX-	PCle31_TX+
67	PCle23_TX+	GND	PCle31_RX+	GND
68	GND	RSVD	GND	RSVD
69	RSVD	RSVD	RSVD	RSVD
70	RSVD	GND	RSVD	GND
71	RSVD	NBASET1_MDIO-	GND	CSI1_RX0-
72	RSVD	NBASET1_MDIO+	CSIO_RX0-	CSI1_RX0+
73	RSVD	GND	CSIO_RX0+	GND
74	RSVD	NBASET1_MDI1-	GND	CSI1_RX1-
75	RSVD	NBASET1_MDI1+	CSIO_RX1-	CSI1_RX1+
76	RSVD	GND	CSIO_RX1+	GND
77	RSVD	NBASET1_MDI2-	GND	CSI1_RX2-
78	NBASET1_CTREF	NBASET1_MDI2+	CSIO_RX2-	CSI1_RX2+
79	NBASET1_SDP	GND	CSIO_RX2+	GND
80	NBASET1_LINK_MID#	NBASET1_MDI3-	GND	CSI1_RX3-
81	NBASET1_LINK_ACT#	NBASET1_MDI3+	CSIO_RX3-	CSI1_RX3+
82	NBASET1_LINK_MAX#	GND	CSIO_RX3+	GND
83	GND	RSVD	GND	CSI1_CLK-
84	RSVD	RSVD	CSIO_CLK-	CSI1_CLK+
85	RSVD	GND	CSIO_CLK+	GND
86	GND	ETH0_TX-	GND	CSI1_I2C_CLK
87	ETH0_RX-	ETH0_TX+	CSIO_I2C_CLK	CSI1_I2C_DAT
88	ETH0_RX+	GND	CSIO_I2C_DAT	CSI1_MCLK
89	GND	ETH1_TX-	CSIO_MCLK	CSI1_RST#
90	ETH1_RX-	ETH1_TX+	CSIO_RST#	CSI1_ENA
91	ETH1_RX+	GND	CSIO_ENA	GND
92	GND	PCle_REFCLK2-	GND	PCle_REFCLKIN0-
93	PCle_REFCLK1-	PCle_REFCLK2+	RSVD	PCle_REFCLKIN0+
94	PCle_REFCLK1+	GND	RSVD	GND
95	GND	RSVD	GND	PCle_REFCLKIN1-
96	PCle_CLKREQ1#	ETH0-1_PRSENT#	ETH0-1_I2C_CLK	PCle_REFCLKIN1+
97	PCle_CLKREQ2#	ETH0-1_PHY_RST#	ETH0-1_I2C_DAT	GND
98	PCle_CLKREQ_OUT0#	ETH0_SDP	ETH0-1_PHY_INT#	ETH0-1_MDIO_CLK
99	PCle_CLKREQ_OUT1#	ETH1_SDP	ETH0-1_INT#	ETH0-1_MDIO_DAT
100	PCle_PERST_IN0#	PCle_PERST_IN1#	PCle_WAKE_OUT0#	PCle_WAKE_OUT1#

9/ Technical Support

For technical support contact our Support department:

E-mail: support@kontron.com

Phone: +49-821-4086-888

Make sure you have the following information available when you call:

Product ID Number (PN),

Serial Number (SN)



The serial number can be found on the Type Label, located on the product's rear side.

Be ready to explain the nature of your problem to the service technician.

9.1. Warranty

Due to their limited service life, parts that by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the CMOS battery, for example.



If there is a protection label on your product, then the warranty is lost if the product is opened.

9.2. Returning Defective Merchandise

All equipment returned to Kontron must have a Return of Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay the return freight charges back to the buyer's location in the event that the equipment is repaired or replaced within the stipulated warranty period. Follow these steps before returning any product to Kontron.

1. Visit the RMA Information website:

<https://www.kontron.com/en/support/rma-information>

Download the RMA Request sheet for **Kontron Europe GmbH** and fill out the form. Take care to include a short detailed description of the observed problem or failure and to include the product identification Information (Name of product, Product number and Serial number). If a delivery includes more than one product, fill out the above information in the RMA Request form for each product.

2. Send the completed RMA-Request form to the fax or email address given below at Kontron Europe GmbH. Kontron will provide an RMA-Number.

Kontron Europe GmbH
RMA Support
Phone: +49 (0) 821 4086-0
Fax: +49 (0) 821 4086 111
Email: service@kontron.com

3. The goods for repair must be packed properly for shipping, considering shock and ESD protection.



Goods returned to Kontron Europe GmbH in non-proper packaging will be considered as customer caused faults and cannot be accepted as warranty repairs.

4. Include the RMA-Number with the shipping paperwork and send the product to the delivery address provided in the RMA form or received from Kontron RMA Support.

10/ List of Acronyms

ACPI	Advanced Configuration & Power Interface
COM-HPC	COM-HPC® - Computer on Module Express
EMC	ElectroMagnetic Compatibility
IPMB	Intelligent Platform Management Bus
ME	Management Engine
NC-SI	Network controller sideband interface
PCIe	PCI-Express
PICMG	PCI Industrial Computer Manufacturers Group
POR	Power-On Reset
PSU	Power Supply Unit
RTC	Real Time Clock
S0	ACPI OS System State 0. Indicates fully on operating state.
S3	ACPI OS System State 3. Indicates Suspend to RAM.
S5	ACPI OS System State 5. Indicates Soft Off operating state.
SIO	Super I/O
SSD	Solid-State Drive
SMB	System Management Bus.
SMBIOS	System Management BIOS
SMI	System Management Interrupt
SPD	Serial Presence Detect: A standardized way to automatically access information about a computer memory module.
WEEE	Waste Electrical and Electronic Equipment



About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). Kontron offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: www.kontron.com



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