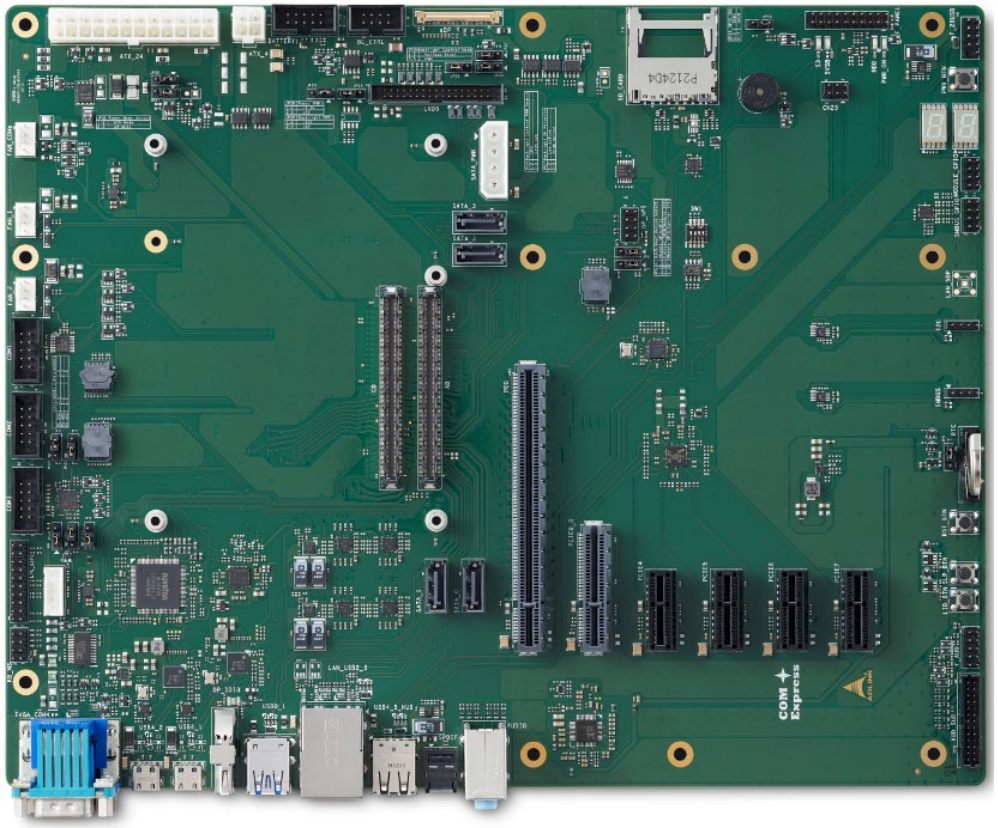
Express BASE6 R3.1

User's Guide



COM Express®

Revision: Rev. 0.2
Date: 2023-12-28
Part Number: 50M-77107-1000

ADLINK
LEADING EDGE COMPUTING

Revision History

Revision	Description	Date	Author
0.1	Preliminary release	2023-10-30	CC
0.2	Additional spec added	2023-12-28	CC

Preface

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ADLINK is committed to fulfil its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

California Proposition 65 Warning: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Safety Instructions

For user safety, please read and follow all Instructions, **WARNING**s, **CAUTION**s, and **NOTE**s marked in this manual and on the associated equipment before handling/operating the equipment.

Read these safety instructions carefully.

- Keep this manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- Turn off power and unplug any power cords/cables when installing/mounting or un-installing/removing equipment.
- To avoid electrical shock and/or damage to equipment:
- Keep equipment away from water or liquid sources;
- Keep equipment away from high heat or high humidity;
- Keep equipment properly ventilated (do not block or cover ventilation openings);
- Make sure to use recommended voltage and power source settings;
- Always install and operate equipment near an easily accessible electrical socket outlet;
- Secure the power cord (do not place any object on/over the power cord);
- Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
- If the equipment will not be used for long periods of time, turn off the power source and unplug the equipment.

Conventions

The following conventions may be used throughout this manual, denoting special levels of information

Note: This information adds clarity or specifics to text and illustrations.

Caution: This information indicates the possibility of minor physical injury, component damage, data loss, and/or program corruption.

Warning: This information warns of possible serious physical injury, component damage, data loss, and/or program corruption.

Getting Service

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1. Introduction

The COM Express approach of custom carrier combined with off-the-shelf system cores relieves developers the need to design their own system core, thereby not only accelerating their proof of concept significantly but also empowers them to upgrade to later-generation processors without having to redesign. It fits most system integration projects with production volumes ranging from 500 to 10,000 pcs per year. The COM Express concept reduces engineering complexity, lowers the threshold for total project quantity, and last but not least brings your product to the market in no time. The average time to design a carrier board is less than half the time of a full custom OEM board.

The Express-BASE6 R3.1, based on PICMG COM-Express R3.1, is an extended ATX size carrier board. Together with the COM Express Type 6 module of your choice and off-the-shelf add-on cards, you can quickly emulate the functionality of your desired end product for software development and hardware verification.

To build a functional prototype of your target system, you will need:

- COM Express Type 6 module
- Express-BASE6 R3.1 carrier
- PCI Express-based storage or SATA storage (SATA storage solutions are dependent on module specifications)

The Express-BASE6 R3.1 carrier is compatible with Basic size and Compact size COMe modules and may accommodate:

- 1x PCI Express x16 slot, 1x PCI Express x4 slots, 4x PCI Express x1 slots
- 1x VGA, 1x DP, 1x general purpose LAN, 2x USB 4.0, 4x USB 3.2, 2x USB 2.0, 1x DB-9 COM port, 1x SPDIF, 1x Line-in/Mic-in/Speaker-out (at rear I/O)

2. Special Features

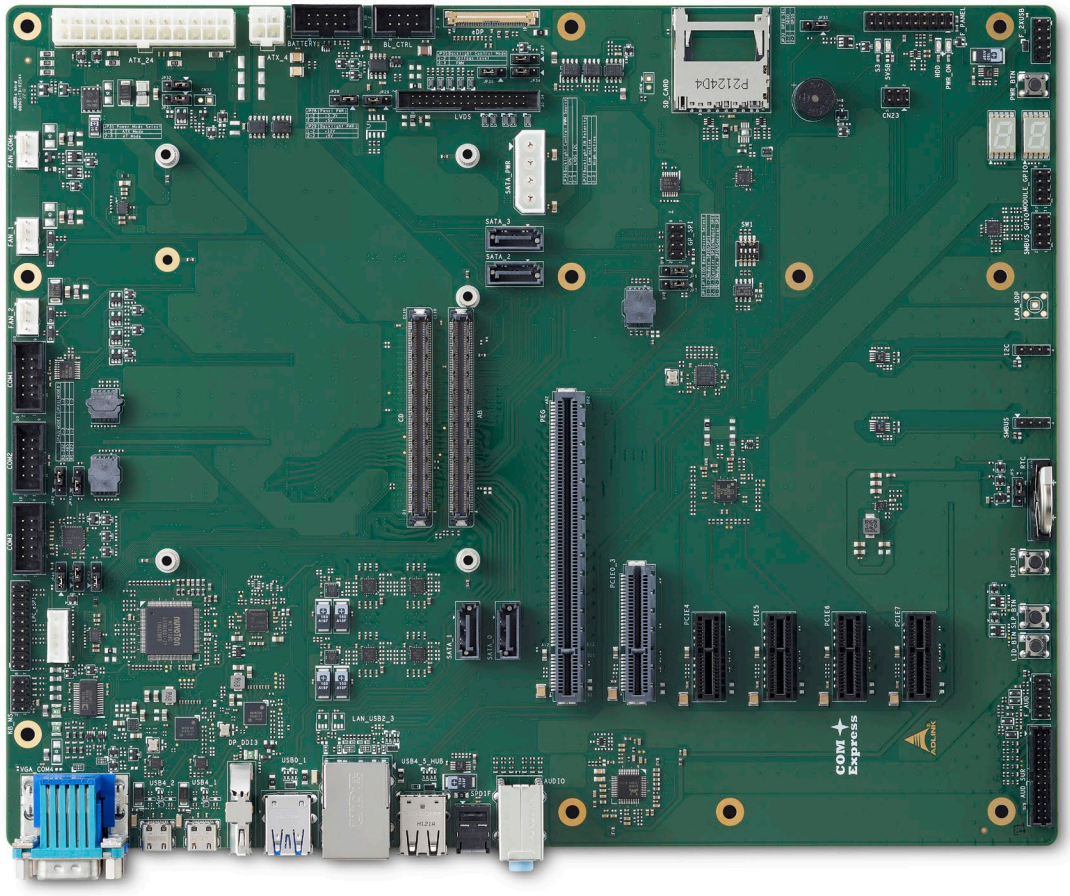


Figure 1 – Carrier top view

2.1. One PCI Express Gen4 x16 slot + One x4 Slot

1x FHFL PCI Express Gen4 card at PEG slot and 1x PCI Express Gen4 card at PCIE0_3 slot

2.2. Two USB4 Type-C Connectors

2x USB Type-C connector that support USB4 spec (Thunderbolt 4 compatible), can be used to transmit data or output images

2.3. Display

1x VGA, 1x DP, 1x LVDS and 1x eDP (BOM option) connector onboard, can display without going through T6DDI

2.4. SD Card

1x SD Card connector (with GPIO function by BOM option)

2.5. RS-232/422/485

1x DB9 connector and 3x pin header onboard

Note: Before installing an USB, PCIe Gen4, or SD card module, make sure the function is supported by your module.

3. Component Location

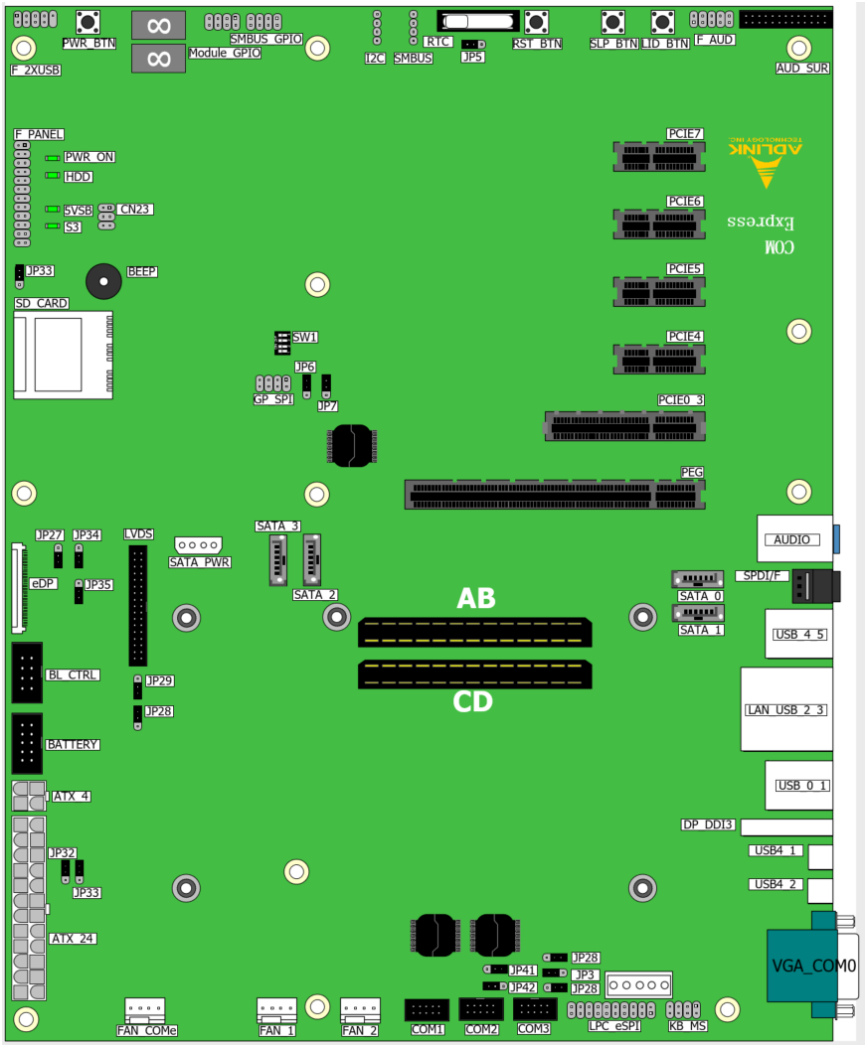


Figure 2 – Component location

4. Functional Diagram

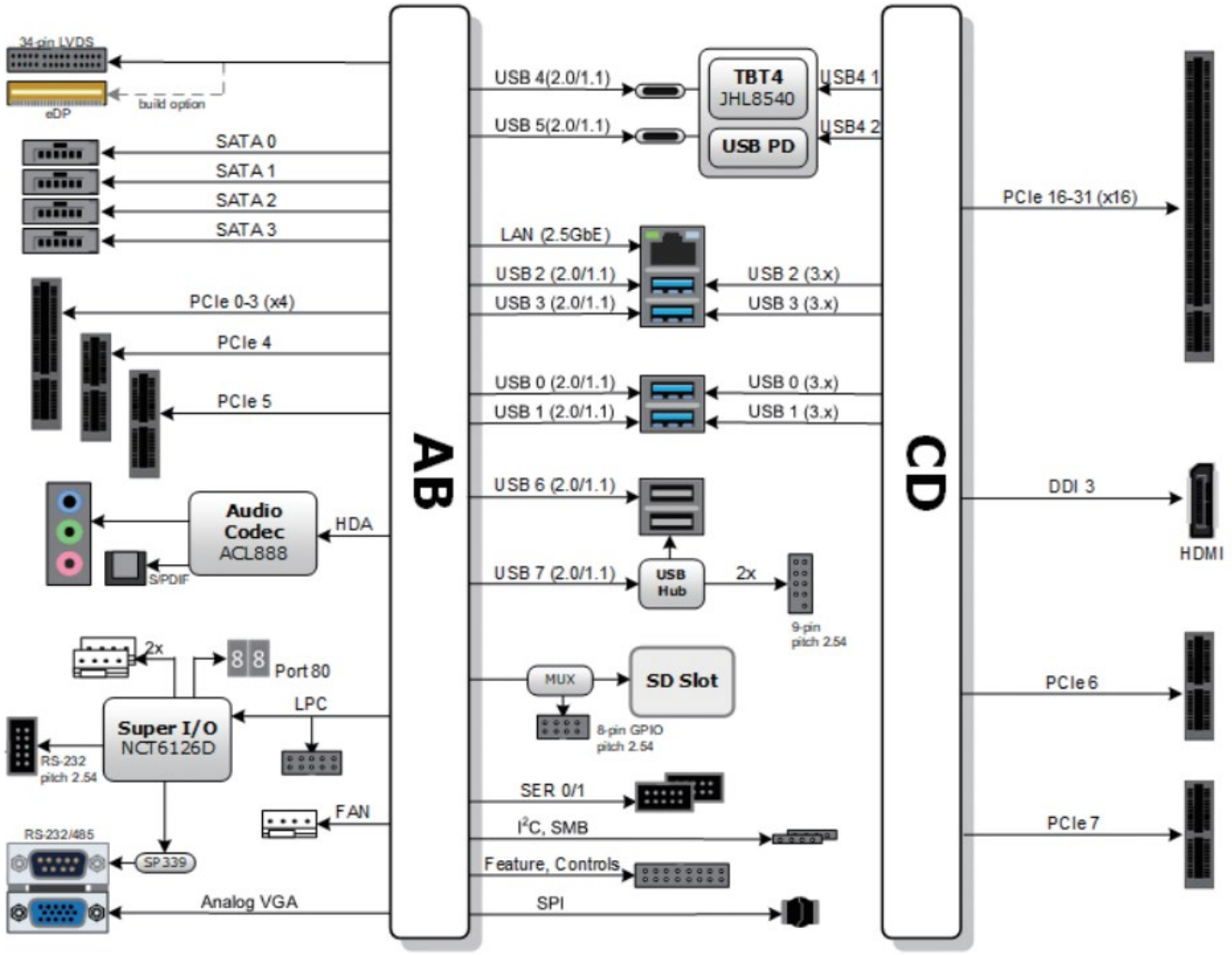


Figure 3 – Functional diagram

5. Mechanical Dimension

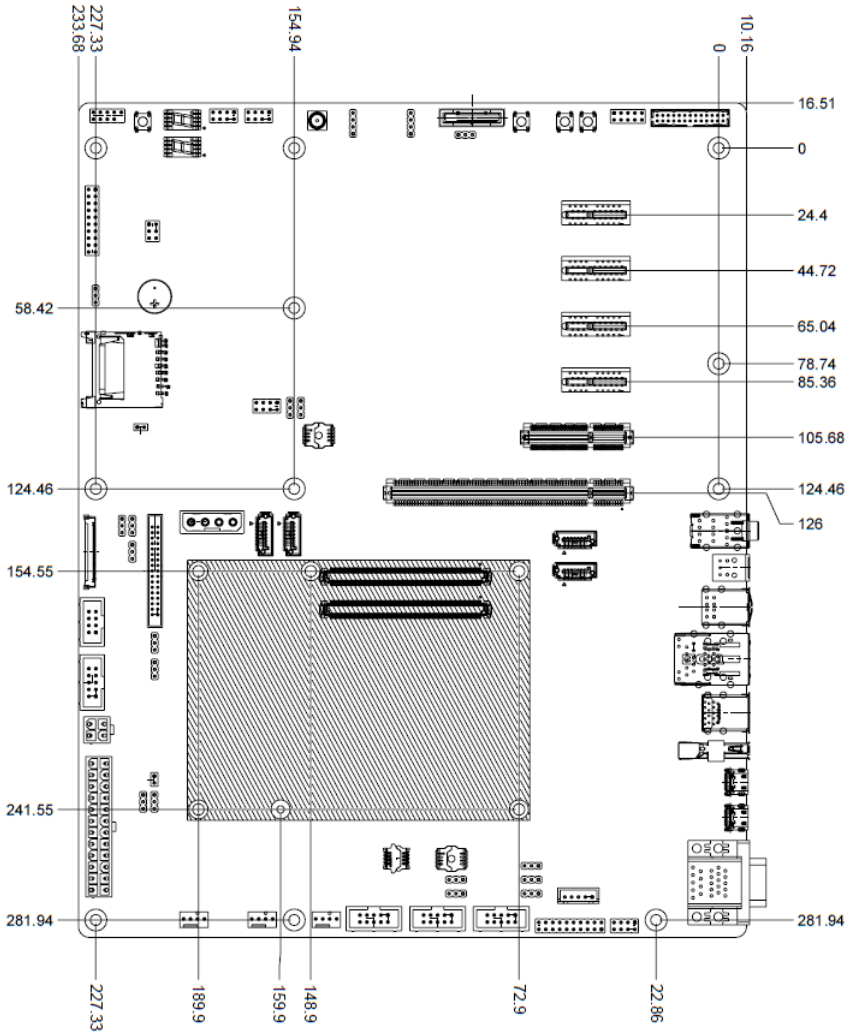
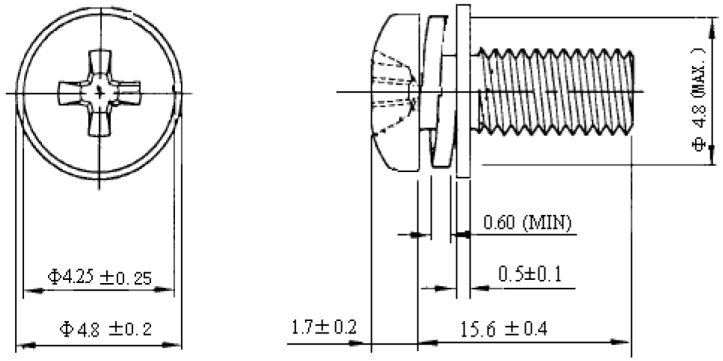


Figure 4 – Mechanical dimensions

Note:

1. All dimensions are shown in millimeters with a tolerance of ± 0.25mm unless otherwise noted.

2. To install a Basic size module, you can lock it in place using self-supplied screws via the yellow and green locations of the carrier.
3. To install a Compact size module, you can lock it in place using self-supplied screws via the blue and green locations of the carrier.
4. The screws used to lock the module onto the carrier shall be of the following specifications:



6. Connectors and Pinouts

6.1. Carrier Board Signals — Type 6

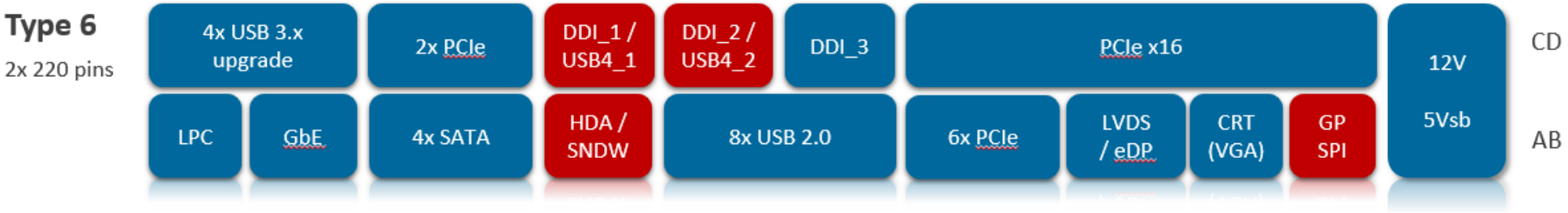


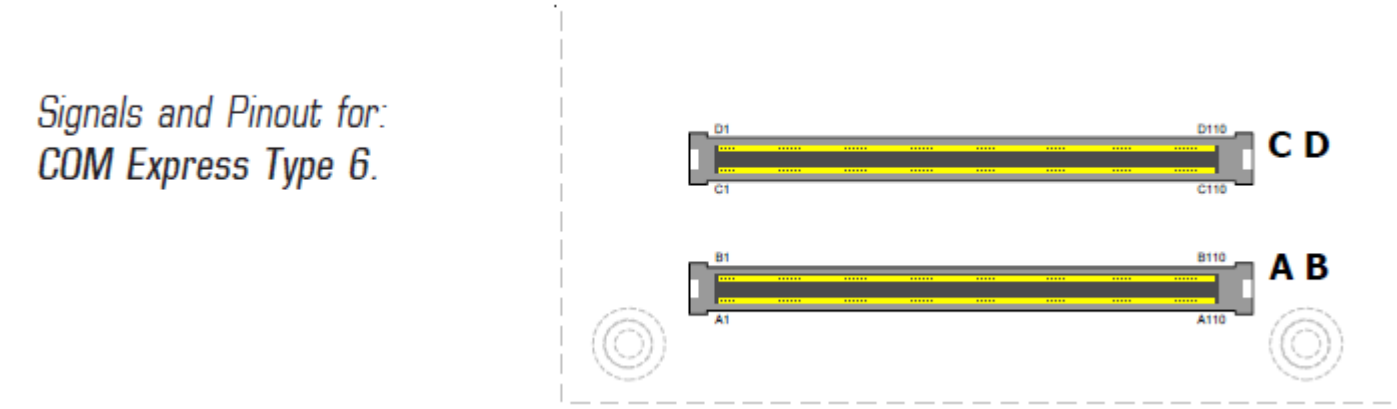
Figure 5 – Carrier board signals, type 6 pinout

New Features of COM.0 R3.1

- PCIe Gen4 support
- USB4 over current DDI (USB port 1,2 overlap with DDI 1,2)
- General-purpose SPI added
- Sound Wire over current HDA added

6.2. Connector Location and Pinout Compatibility

Connector positions and pinouts comply with the pinout and signal descriptions within *PICMG® COM.0 - COM Express Module Base specification, Revision 3.1*. This document includes description of pinouts, signal descriptions and mechanical characteristics of the COM Express specification. The Express-BASE6 R3.1 is compatible with COM Express modules in Basic and Compact form factor, Type 6 pinout, COM.0 Rev. 3.1.



6.3. Carrier Board Design

Express-BASE6 R3.1 follows the PICMG COM Express Carrier Design Guide where possible, and its design and schematic have been fully verified. It is recommend to utilize them as references for your carrier board design. Express-BASE6 R3.1 schematics and mechanical files, as well as the CDG, can be downloaded from ADLINK COM's webpage.

6.4. COM Express R3.1 Type 6 Board-to-board Connectors

Signals and Pinouts of COM Express R3.1 Type 6. Differences of R3.1 (from R3.0) are marked as **bold**.

Row A		Row B		Row C		Row D	
A1	GND	B1	GND	C1	GND	D1	GND
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	GND	D2	GND
A3	GBE0_MDI3+	B3	LPC_FRAME#/ESPI_CS0#	C3	USB_SSRX0-	D3	USB_SSTX0-
A4	GBE0_LINK100#	B4	LPC_AD0/ESPI_IO_0	C4	USB_SSRX0+	D4	USB_SSTX0+
A5	GBE0_LINK1000#	B5	LPC_AD1/ESPI_IO_1	C5	GND	D5	GND
A6	GBE0_MDI2-	B6	LPC_AD2/ESPI_IO_2	C6	USB_SSRX1-	D6	USB_SSTX1-
A7	GBE0_MDI2+	B7	LPC_AD3/ESPI_IO_3	C7	USB_SSRX1+	D7	USB_SSTX1+
A8	GBE0_LINK#	B8	LPC_DRQ0#/ESPI_ALERT0#	C8	GND	D8	GND
A9	GBE0_MDI1-	B9	LPC_DRQ1#/ESPI_ALERT1#	C9	USB_SSRX2-	D9	USB_SSTX2-
A10	GBE0_MDI1+	B10	LPC_CLK/ESPI_CK	C10	USB_SSRX2+	D10	USB_SSTX2+
A11	GND	B11	GND	C11	GND	D11	GND
A12	GBE0_MDI0-	B12	PWRBTN#	C12	USB_SSRX3-	D12	USB_SSTX3-
A13	GBE0_MDI0+	B13	SMB_CK	C13	USB_SSRX3+	D13	USB_SSTX3+
A14	GBE0_CTREF	B14	SMB_DAT	C14	GND	D14	GND
A15	SUS_S3#	B15	SMB_ALERT#	C15	**USB4_1_LSTX**	D15	**DDI1_CTRLCLK_AUX+/USB4_1_AUX+**
A16	SATA0_TX+	B16	SATA1_TX+	C16	**USB4_1_LSRX**	D16	**DDI1_CTRLDATA_AUX-/USB4_1_AUX-**
A17	SATA0_TX-	B17	SATA1_TX-	C17	**USB4_RT_ENA**	D17	**USB4_PD_I2C_ALERT#**
A18	SUS_S4#	B18	SUS_STAT#/ESPI_RESET#	C18	GND	D18	**PMCALERT#**
A19	SATA0_RX+	B19	SATA1_RX+	C19	PCIE_RX6+	D19	PCIE_TX6+
A20	SATA0_RX-	B20	SATA1_RX-	C20	PCIE_RX6-	D20	PCIE_TX6-
A21	GND	B21	GND	C21	GND	D21	GND
A22	SATA2_TX+	B22	SATA3_TX+	C22	PCIE_RX7+	D22	PCIE_TX7+

Row A		Row B		Row C		Row D	
A23	SATA2_TX-	B23	SATA3_TX-	C23	PCIE_RX7-	D23	PCIE_TX7-
A24	SUS_S5#	B24	PWR_OK	C24	DDI1_HPD	D24	GND
A25	SATA2_RX+	B25	SATA3_RX+	C25	**SML0_CLK**	D25	GND
A26	SATA2_RX-	B26	SATA3_RX-	C26	**SML0_DAT**	D26	**DDI1_PAIR0+/USB4_1_SSTX0+**
A27	BATLOW#	B27	WDT	C27	**SML1_CLK**	D27	**DDI1_PAIR0-/USB4_1_SSTX0-**
A28	(S)ATA_ACT#	B28	**HDA_SDIN2/SNDW0_CLK**	C28	**SML1_DAT**	D28	GND
A29	HDA_SYNC	B29	**HDA_SDIN1/SNDW0_DAT**	C29	**USB4_PD_I2C_CLK**	D29	**DDI1_PAIR1+/USB4_1_SSRX0+**
A30	HDA_RST#	B30	HDA_SDIN0	C30	**USB4_PD_I2C_DAT**	D30	**DDI1_PAIR1-/USB4_1_SSRX0-**
A31	GND	B31	GND	C31	GND	D31	GND
A32	HDA_BITCLK	B32	SPKR	C32	**DDI2_CTRLCLK_AUX+/USB4_2_AUX+**	D32	**DDI1_PAIR2+/USB4_1_SSTX1+**
A33	HDA_SDOUT	B33	I2C_CK	C33	**DDI2_CTRLDATA_AUX-/USB4_2_AUX-**	D33	**DDI1_PAIR2-/USB4_1_SSTX1-**
A34	BIOS_DIS0#/ESPI_SAFS	B34	I2C_DAT	C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
A35	THRMTRIP#	B35	THRM#	C35	**USB4_2_LSTX**	D35	**USB4_2_LSRX**
A36	USB6-	B36	USB7-	C36	DDI3_CTRLCLK_AUX+	D36	**DDI1_PAIR3+/USB4_1_SSRX1+**
A37	USB6+	B37	USB7+	C37	DDI3_CTRLDATA_AUX-	D37	**DDI1_PAIR3-/USB4_1_SSRX1-**
A38	USB_6_7_OC#	B38	USB_4_5_OC#	C38	DDI3_DDC_AUX_SEL	D38	GND
A39	USB4-	B39	USB5-	C39	DDI3_PAIR0+	D39	**DDI2_PAIR0+/USB4_2_SSTX0+**
A40	USB4+	B40	USB5+	C40	DDI3_PAIR0-	D40	**DDI2_PAIR0-/USB4_2_SSTX0-**
A41	GND	B41	GND	C41	GND	D41	GND
A42	USB2-	B42	USB3-	C42	DDI3_PAIR1+	D42	**DDI2_PAIR1+/USB4_2_SSRX0+**
A43	USB2+	B43	USB3+	C43	DDI3_PAIR1-	D43	**DDI2_PAIR1-/USB4_2_SSRX0-**
A44	USB_2_3_OC#	B44	USB_0_1_OC#	C44	DDI3_HPD	D44	DDI2_HPD
A45	USB0-	B45	USB1-	C45	**GP_SPI_CS0#**	D45	GND
A46	USB0+	B46	USB1+	C46	DDI3_PAIR2+	D46	**DDI2_PAIR2+/USB4_2_SSTX1+**
A47	VCC_RTC	B47	ESPI_EN#	C47	DDI3_PAIR2-	D47	**DDI2_PAIR2-/USB4_2_SSTX1-**
A48	**RSMRST_OUT#**	B48	USB0_HOST_PRSNT	C48	**RSVD**	D48	GND
A49	GBE0_SDP	B49	SYS_RESET#	C49	DDI3_PAIR3+	D49	**DDI2_PAIR3+/USB4_2_SSRX1+**
A50	LPC_SERIRQ/ESPI_CS1#	B50	CB_RESET#	C50	DDI3_PAIR3-	D50	**DDI2_PAIR3-/USB4_2_SSRX1-**
A51	GND	B51	GND	C51	GND	D51	GND
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	PEG_RX0+	D52	PEG_TX0+
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	PEG_RX0-	D53	PEG_TX0-
A54	GPI0	B54	GPO	C54	TYPE0#	D54	PEG_LANE_RV#
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PEG_RX1+	D55	PEG_TX1+
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PEG_RX1-	D56	PEG_TX1-
A57	GND	B57	GPO2	C57	TYPE1#	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PEG_RX2+	D58	PEG_TX2+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PEG_RX2-	D59	PEG_TX2-

Row A		Row B		Row C		Row D	
A60	GND	B60	GND	C60	GND	D60	GND
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PEG_RX3+	D61	PEG_TX3+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PEG_RX3-	D62	PEG_TX3-
A63	GPI1	B63	GPO3	C63	GND	D63	GND
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	GND	D64	GND
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	PEG_RX4+	D65	PEG_TX4+
A66	GND	B66	WAKE0#	C66	PEG_RX4-	D66	PEG_TX4-
A67	GPI2	B67	WAKE1#	C67	RAPID_SHUTDOWN	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	PEG_RX5+	D68	PEG_TX5+
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	PEG_RX5-	D69	PEG_TX5-
A70	GND	B70	GND	C70	GND	D70	GND
A71	LVDS_A0+	B71	LVDS_B0+	C71	PEG_RX6+	D71	PEG_TX6+
A72	LVDS_A0-	B72	LVDS_B0-	C72	PEG_RX6-	D72	PEG_TX6-
A73	LVDS_A1+	B73	LVDS_B1+	C73	GND	D73	GND
A74	LVDS_A1-	B74	LVDS_B1-	C74	PEG_RX7+	D74	PEG_TX7+
A75	LVDS_A2+	B75	LVDS_B2+	C75	PEG_RX7-	D75	PEG_TX7-
A76	LVDS_A2-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN	B77	LVDS_B3+	C77	GND	D77	GND
A78	LVDS_A3+	B78	LVDS_B3-	C78	PEG_RX8+	D78	PEG_TX8+
A79	LVDS_A3-	B79	LVDS_BKLT_EN	C79	PEG_RX8-	D79	PEG_TX8-
A80	GND	B80	GND	C80	GND	D80	GND
A81	LVDS_A_CK+	B81	LVDS_B_CK+	C81	PEG_RX9+	D81	PEG_TX9+
A82	LVDS_A_CK-	B82	LVDS_B_CK-	C82	PEG_RX9-	D82	PEG_TX9-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL	C83	GND	D83	GND
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_SBY	C85	PEG_RX10+	D85	PEG_TX10+
A86	**GP_SPI_MOSI**	B86	VCC_5V_SBY	C86	PEG_RX10-	D86	PEG_TX10-
A87	eDP_HPD	B87	VCC_5V_SBY	C87	GND	D87	GND
A88	PCIE_CLK_REF+	B88	BIOS_DIS1#	C88	PEG_RX11+	D88	PEG_TX11+
A89	PCIE_CLK_REF-	B89	VGA_RED	C89	PEG_RX11-	D89	PEG_TX11-
A90	GND	B90	GND	C90	GND	D90	GND
A91	SPI_POWER	B91	VGA_GRN	C91	PEG_RX12+	D91	PEG_TX12+
A92	SPI_MISO	B92	VGA_BLU	C92	PEG_RX12-	D92	PEG_TX12-
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	SPI_CLK	B94	VGA_VSYNC	C94	PEG_RX13+	D94	PEG_TX13+
A95	SPI_MOSI	B95	VGA_I2C_CK	C95	PEG_RX13-	D95	PEG_TX13-
A96	TPM_PP	B96	VGA_I2C_DAT	C96	GND	D96	GND

Row A			Row B			Row C			Row D	
A97	TYPE10#		B97	SPI_CS#		C97	GND		D97	GND
A98	SER0_TX		B98	**GP_SPI_MISO**		C98	PEG_RX14+		D98	PEG_TX14+
A99	SER0_RX		B99	**GP_SPI_CK**		C99	PEG_RX14-		D99	PEG_TX14-
A100	GND		B100	GND		C100	GND		D100	GND
A101	SER1_TX		B101	FAN_PWMOUT		C101	PEG_RX15+		D101	PEG_TX15+
A102	SER1_RX		B102	FAN_TACHIN		C102	PEG_RX15-		D102	PEG_TX15-
A103	LID#		B103	SLEEP#		C103	GND		D103	GND
A104	VCC_12V		B104	VCC_12V		C104	VCC_12V		D104	VCC_12V
A105	VCC_12V		B105	VCC_12V		C105	VCC_12V		D105	VCC_12V
A106	VCC_12V		B106	VCC_12V		C106	VCC_12V		D106	VCC_12V
A107	VCC_12V		B107	VCC_12V		C107	VCC_12V		D107	VCC_12V
A108	VCC_12V		B108	VCC_12V		C108	VCC_12V		D108	VCC_12V
A109	VCC_12V		B109	VCC_12V		C109	VCC_12V		D109	VCC_12V
A110	GND		B110	GND		C110	GND		D110	GND

6.5. PCIe x16 Connectors

PEG: PCIe Gen4 x16 slot, PEG lanes 0 to 15 assigned PCIe slot

Pin	Signal	Pin	Signal
B1	+ 12V	A1	PRSNT
B2	+ 12V	A2	+ 12V
B3	+ 12V	A3	+ 12V
B4	GND	A4	GND
B5	SMB_CLK	A5	JTAG
B6	SMB_DAT	A6	JTAG
B7	GND	A7	JTAG
B8	**+3.3V**	A8	JTAG
B9	JTAG	A9	+ 3.3V
B10	+ 3.3VAUX	A10	+ 3.3V
B11	WAKE#	A11	PERST#
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	PETp0	A14	REFCLK-
B15	PETn0	A15	GND
B16	GND	A16	PERp0
B17	**PRSNT**	A17	PERn0
B18	GND	A18	GND
B19	PETp1	A19	RSVD
B20	PETn1	A20	GND
B21	GND	A21	PERp1
B64	GND	A64	PERp11
B65	GND	A65	PERn11

Pin	Signal	Pin	Signal
B22	GND	A22	PERn1
B23	PETp2	A23	GND
B24	PETn2	A24	GND
B25	GND	A25	PERp2
B26	GND	A26	PERn2
B27	PETp3	A27	GND
B28	PETn3	A28	GND
B29	GND	A29	PERp3
B30	RSVD	A30	PERn3
B31	PRSNT	A31	GND
B32	GND	A32	RSVD
B33	PETp4	A33	RSVD
B34	PETn4	A34	GND
B35	GND	A35	PERp4
B36	GND	A36	PERn4
B37	PETp5	A37	GND
B38	PETn5	A38	GND
B39	GND	A39	PERp5
B40	GND	A40	PERn5
B41	PETp6	A41	GND
B42	PETn6	A42	GND
B71	PETn13	A71	GND
B72	GND	A72	PERp13

Pin	Signal	Pin	Signal
B43	GND	A43	PERp6
B44	GND	A44	PERn6
B45	PETp7	A45	GND
B46	PETn7	A46	GND
B47	GND	A47	PERp7
B48	PRSNT	A48	PERn7
B49	GND	A49	GND
B50	PETp8	A50	RSVD
B51	PETn8	A51	GND
B52	GND	A52	PERp8
B53	GND	A53	PERn8
B54	PETp9	A54	GND
B55	PETn9	A55	GND
B56	GND	A56	PERp9
B57	GND	A57	PERn9
B58	PETp10	A58	GND
B59	PETn10	A59	GND
B60	GND	A60	PERp10
B61	GND	A61	PERn10
B62	PETp11	A62	GND
B63	PETn11	A63	GND
B78	PETp15	A78	GND
B79	PETn15	A79	GND

B66	PETp12	A66	GND
B67	PETn12	A67	GND
B68	GND	A68	PERp12
B69	GND	A69	PERn12
B70	PETp13	A70	GND

B73	GND	A73	PERn13
B74	PETp14	A74	GND
B75	PETn14	A75	GND
B76	GND	A76	PERp14
B77	GND	A77	PERn14

B80	GND	A80	PERp15
B81	PRSNT	A81	PERn15
B82	RSVD	A82	GND

6.6. PCIe x4 Connector

PCIE0_3: PCIe Gen4 x4 slot, PCIE lanes 0 to 3 assigned PCIe slot

Pin	Signal	Pin	Signal
B1	+12V	A1	PRSNT
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	JTAG
B6	SMB_DAT	A6	JTAG
B7	GND	A7	JTAG
B8	+3.3V	A8	JTAG
B9	JTAG	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE	A11	PERST#

Pin	Signal	Pin	Signal
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	PETp0	A14	REFCLK-
B15	PETn0	A15	GND
B16	GND	A16	PERp0
B17	PRSNT	A17	PERn0
B18	GND	A18	GND
B19	PETp1	A19	RSVD
B20	PETn1	A20	GND
B21	GND	A21	PERp1
B22	GND	A22	PERn1

Pin	Signal	Pin	Signal
B23	PETp2	A23	GND
B24	PETn2	A24	GND
B25	GND	A25	PERp2
B26	GND	A26	PERn2
B27	PETp3	A27	GND
B28	PETn3	A28	GND
B29	GND	A29	PERp3
B30	RSVD	A30	PERn3
B31	PRSNT	A31	GND
B32	GND	A32	RSVD

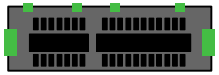
6.7. PCIe x1 Connector

PCIE4: PCIe Gen3 x1 slot, PCIe lane 4 assigned PCIe slot

PCIE5: PCIe Gen3 x1 slot, PCIe lane 5 assigned PCIe slot

PCIE6: PCIe Gen3 x1 slot, PCIe lane 6 assigned PCIe slot

PCIE7: PCIe Gen3 x1 slot, PCIe lane 7 assigned PCIe slot



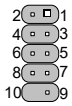
Pin	Signal	Pin	Signal
B1	+12V	A1	PRSNT
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	JTAG
B6	SMB_DAT	A6	JTAG
B7	GND	A7	JTAG
B8	+3.3V	A8	JTAG
B9	JTAG	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE	A11	PERST#

Pin	Signal	Pin	Signal
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	PETp0	A14	REFCLK-
B15	PETn0	A15	GND
B16	GND	A16	PERp0
B17	PRSNT	A17	PERn0
B18	GND	A18	GND

6.8. USB2.0 Port Header

F_2XUSB: HUB USB2.0 Port 2 and Port 3 header

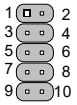
Pin	Signal		
1	+5V	2	+5V
3	HUB1_USB7_N2	4	HUB1_USB7_N3
5	HUB1_USB7_P2	6	HUB1_USB7_P3
7	GND	8	GND
9	GND	10	NC



6.9. Audio Header

F_AUD: AUDIO Front Panel header

1	MIC2_L_HD	2	AGND_AU
3	MIC2_R_HD	4	PRESENCE
5	LINE2_R_HD	6	MIC2_JD
7	AGND_AU	8	NC
9	LINE2_L_HD	10	LINE2_JD



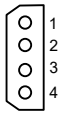
6.10. SATA Port

SATA_0/SATA_1/SATA_2/SATA_3: Serial ATA port

Pin	Signal
1	GND
2	TX_P
3	TX_N
4	GND
5	RX_P
6	RX_N
7	SATA0_P7

SATA_PWR: Voltage supply 12V and 5V to HDD device.

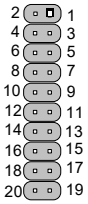
Pin	Signal
1	P12V
2	GND
3	GND
4	P5V



6.11. LPC/ eSPI Debug Header

LPC_eSPI: for LPC/ eSPI debugging connection purposes

Pin	Signal	Pin	Signal
1	CLK_DEBUG	2	GND
3	LPC_FRAMEJ / ESPI CS0#	4	NC
5	RST_DBG	6	+5V
7	eSPI_IO_3 / LPC_AD3	8	LPC_AD2/ eSPI_IO_1
9	+ 3.3VSB	10	LPC_AD1/ eSPI_IO_1
11	LPC_AD0/eSPI_IO_0	12	GND
13	SMB_CK	14	SMB_DAT
15	1V8SB	16	NC
17	GND	18	LPC_SERIRQ / eSPI_CS1#
19	LPC_DRQ0J /eSPI_ALEART0#	20	LPC_DRQ1J /eSPI_ALEART1#



6.12. PS2 Header

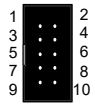
KB_MS: PS2 function from SIO6126D

Pin	Signal	Pin	Signal
1	KBVCC (5V)	2	KBVCC (5V)
3	MSDAT	4	KBDAT
5	MSCLK	6	KBCLK
7	GND	8	GND

6.13. COM Port Connector

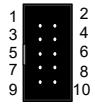
COM1: Module UART port 1

Pin	Signal	Pin	Signal
1	NC	2	NC
3	SER1_RX_R	4	NC
5	SER1_TX_R	6	NC
7	NC	8	NC
9	GND	10	NC



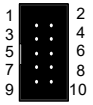
COM2: Module UART port 0

Pin	Signal	Pin	Signal
1	NC	2	NC
3	SER1_RX_R	4	NC
5	SER1_TX_R	6	NC
7	NC	8	NC
9	GND	10	NC



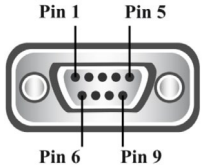
COM3: SIONCT6126D UART port B

Pin	Signal	Pin	Signal
1	CM2_DCD	2	CM2_DSR
3	CM2_RXD	4	CM2_RTS
5	CM2_TXD	6	CM2_CTS
7	CM2_DTR	8	CM2_RI
9	GND	10	NC



VGA_COM4: SIONCT6126D UART port A, D-SUB9 connector

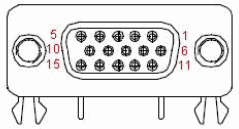
Pin	Signal	Pin	Signal
1	CM1_DCD	2	CM1_RXD
3	CM1_TXD	4	CM1_DTR
5	GND	6	CM1_DSR
7	CM1_RTS	8	CM1_CTS
9	RI		



6.14. VGA Connector

SMBUS_GPIO: BASE6 GPIO expander output GPIO 0:3

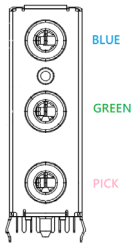
Pin	Signal	Pin	Signal
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	DDC POWER	12	DDC2B DATA
13	HSYNC	14	VSYNC
15	DDC2B CLOCK		



6.15 Audio Phone Jack

Audio: 3-port Audio Phone jack

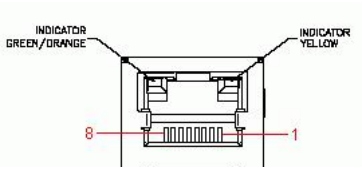
Pin	Signal
BLUE	Line-In
GREEN	Line-Out
PICK	MIC-In



6.16 LAN and USB 3.2 Gen 2

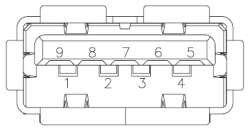
LAN_USB_2_3: 1x General purpose LAN (up to 2.5G)

Pin	Signal
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-



LAN_USB_2_3: 2x USB3.2 Gen2

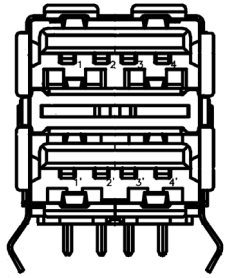
Pin	Signal
1	USB3.0_PV5A
2	USB2_CMAN
3	USB2_CMAP
4	GND
5	USB3A_CMRXN
6	USB3A_CMRXP
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP



6.17 USB Connector

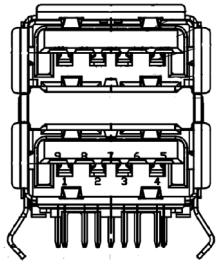
USB_4_5: USB connector supporting USB 2.0 signal

Pin	Signal
1	+5V
2	USB-
3	USB+
4	GND



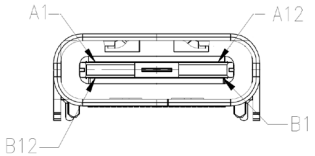
USB_0_1: USB connector supporting USB 3.2 Gen2 signal

Pin	Signal
1	VBUS
2	USB-
3	USB+
4	GND
5	SSRX-
6	SSRX+
7	GND
8	SSTX-
9	SSTX+



USB4_1/USB4_2: USB Type C connector supporting USB 3.2 Gen2 x2 signal

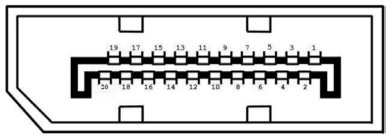
Pin	Signal	Pin	Signal
A1	VBUS	B1	GND
A2	TX+	B2	TX2+
A3	TX-	B3	TX2-
A4	VBUS	B4	VBUS
A5	CC1	B5	VCONN
A6	D+	B6	NC
A7	D-	B7	NC
A8	SUB1	B8	SUB2
A9	VBUS	B9	VBUS
A10	RX2-	B10	RX1-
A11	RX2+	B11	RX1+
A12	GND	B12	GND



6.18 DP connector

DP_DDI3: DP connector that uses DDI signal from module

Pin	Signal	Pin	Signal
1	Lane0+	2	GND
3	Lane0-	4	Lane1+
5	GND	6	Lane1-
7	Lane2+	8	GND
9	Lane21	10	Lane3+
11	GND	12	Lane3-
13	CONFIG1	14	CONFIG2
15	AUX CH+	16	GND
17	AUX CH-	18	Hot Plug
19	Return	20	DP_PWR



6.19 BASE6 GPIO Expander Header

SMBUS_GPIO: BASE6 GPIO expander outputs, GPIO 0 to 3

Pin	Signal	Pin	Signal
1	BASE_GPI0	2	BASE_GPO0
3	BASE_GPI1	4	BASE_GPO1
5	BASE_GPI2	6	BASE_GPO2
7	BASE_GPI3	8	BASE_GPO3

6.20. GPIO Header

Module GPIO: Module output GPIO Header;

Pin	Signal	Pin	Signal
1	MUX_GPI0	2	MUX_GPO0
3	MUX_GPI1	4	MUX_GPO1
5	MUX_GPI2	6	MUX_GPO2
7	MUX_GPI3	8	MUX_GPO3

6.21. SMBus Header

SMBus: additional SMBus from module

Pin	Signal
1	P3V3_SM
2	SMB_DAT_O
3	SMB_CLK_O
4	GND

6.22. I2C Header

I2C: additional I2C from module

Pin	Signal
1	P3V3_I2C
2	I2C_DAT_O
3	I2C_CLK_O
4	GND

6.23. Fan Header

FAN_COMe: Module-controlled Fan

Pin	Signal
1	GND
2	+12V_5V_FAN
3	SENSE_FAN
4	PWMOUT_FAN

FAN_1: SIO6126D-controlled FAN 1

Pin	Signal
1	GND
2	+12V_5V_FAN
3	SENSE_FAN
4	PWMOUT_FAN

FAN_2: SIO6126D-controlled FAN 2

Pin	Signal
1	GND
2	+12V_5V_FAN
3	SENSE_FAN
4	PWMOUT_FAN

6.24. General Purpose SPI Header

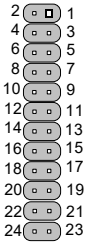
GP_SPI: General Purpose SPI

Pin	Signal	Pin	Signal
1	+3.3V	2	NC
3	GP_SPI_CS0#	4	SPI0_DIN
5	NC	6	SPI0_CLK
7	SPI0_DO	8	GND

6.25. Front Panel Control

FRONT_PANEL: Power Button, Reset Button, HDD LED, Power LED for front panel header

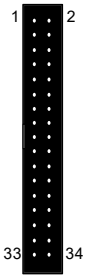
Pin	Signal	Pin	Signal
1	5VSB	2	PWR_LED_P
3	UID_LED_N	4	FAN_FAIL_LED_N
5	UID_LED_P	6	PWR_LED_N
7	SLED_G	8	HDD_LED_P
9	SLED_R	10	HDD_LED_N
11	LAN1_LED_P	12	PWR_BUT_P
13	LAN1_LED_N	14	GND
15	SENSOR_SDA	16	RST_BUT_P
17	SENSOR_SCL	18	GND
19	CASE_OPEN_N	20	R_UID_BUT_P
21	LAN2_LED_P	22	GND
23	LAN2_LED_N	24	NMI_SW



6.26. Panel Connector

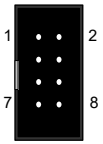
LVDS panel connector

Pin	Signal	Pin	Signal
1	LVSD_I2C_DAT	2	LVSD_I2C_CK
3	N.C	4	N.C
5	GND	6	LVDS_A0-
7	LVDS_A0+	8	LVSD_VDD_EN
9	LVDS_A1-	10	LVDS_A1+
11	LVSD_BKLT_EN	12	LVDS_A2+
13	LVDS_A2-	14	N.C
15	LVDS_A_CK-	16	LVDS_A_CK+
17	N.C	18	LVDS_A3+
19	LVDS_A3-	20	GND
21	LVDS_B0-	22	LVDS_B0+
23	GND	24	LVDS_B1-
25	LVDS_B1+	26	GND
27	LVDS_B2-	28	LVDS_B2+
29	GND	30	LVDS_B_CK+
31	LVDS_B_CK-	32	N.C
33	LVDS_B3+	34	LVDS_B3-



Smart Battery Connector

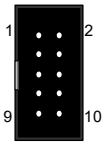
Pin	Signal	Pin	Signal
1	GND	2	Panel PWR
3	Backlight CTRL	4	GND
5	Backlight Enable	6	GND
7	N.C	8	Backlight PWR



6.27. Battery Connector

Smart Battery connector

Pin	Signal	Pin	Signal
1	I2C_CK	2	I2C_DAT
3	PWRBTN#	4	BATLOW#
5	PS_ON#	6	SUS_S45#
7	+12V	8	+5VSB
9	SUS_STAT#	10	GND

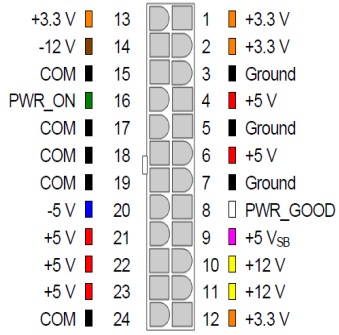


6.28. Power Connectors

ATX_24: ATX 24-pin Power Connector

Connect the ATX 24-pin (or 20-pin) connector to supply power to the COM Express Base R3.1 carrier.

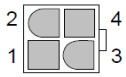
Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	COM
4	+5V	16	PWR_ON
5	GND	17	COM
6	+5V	18	COM
7	GND	19	COM
8	PWR_GOOD	20	-5V
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	COM



ATX_4: ATX 12V 4-pin Connector.

Connect the ATX 12V 4-pin connector to supply power to the COM Express Base R3.1 carrier

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



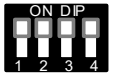
6.29. Carrier EEPROM Address Switch

SW1: COM Express BASE6 R3.1 carrier board EEPROM address setting

Default Address: **AEh**

1	0	1	0	**A2**	**A1**	**A0**	R/W
MSB							**LSB**

SW1	I2C EEPROM_U53
1-8	**A2**_OFF
2-7	**A1**_OFF
3-6	**A0**_OFF



6.30. Other Jumpers

JP33: Switching Module, GPIO or SDIO signal workable

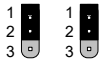
JP33	Status
1-2	SD_CARD workable (default)
2-3	Module GPIO header workable

JP3: SIO I/O address

JP3	Status
1-2	4Eh
2-3	2Eh (default)

JP6/JP7: BIOS select

JP6	JP7	Status
1-2	1-2	Module SPI (default)
2-3	1-2	Carrier FWH
1-2	2-3	Carrier SPI0
2-3	2-3	Carrier SPI1



JP27: LVDS Backlight enabler

JP27	Status
1-2	Low Active
2-3	High Active (default)

JP34: LVDS Backlight PWM control source

JP34	Status
1-2	GPU
2-3	LVDS I2C (default)

JP35: LVDS Backlight control mode

JP35	Status
1-2	Voltage level
2-3	PWM (default)

JP28: LVDS panel power

JP28	Status
1-2	3.3V (default)
2-3	5V

JP29: LVDS Panel Backlight power

JP29	Status
1-2	12V
2-3	5V (default)

JP31: Carrier Power mode

JP31	Status
1-2	ATX mode (default)
2-3	AT mode

JP32: VCC_12V On/Off during S3/S5 (In AT mode, put pin 2-3 to output 12V during S3/S5.)

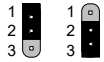
JP32	Status
1-2	ATX to Module (default)
2-3	AT to Module

JP40: BIOS boot device select

JP32	Status
1-2	LPC Mode (default)
2-3	eSPI Mode

JP41/JP42: BIOS boot device select

JP41	JP42	Status
1-2	2-3	RS-232 (default)
2-3	1-2	RS-485
1-2	1-2	RS-422



JP43: SIO enabler

JP43	Status
1-2	Enable SIO (default)
2-3	Disable SIO

JP5: Clear CMOS

To clear CMOS, turn power off and short pins 2 and 3 (short VBT to ground)

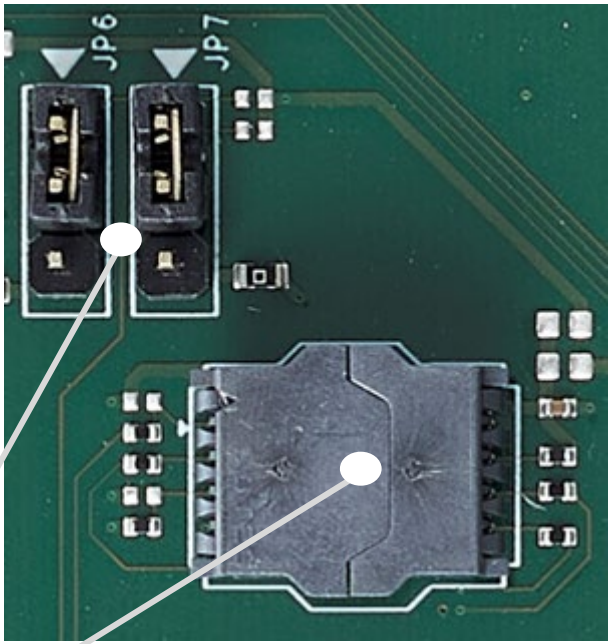
Jumper	Status
1-2	Normal <<<<
2-3	Clear CMOS

7. Secondary BIOS

The Express-BASE6 R3.1 carrier board supports Secondary BIOS for COM modules, using the Boot SPI (Serial Peripheral Interface).

Secondary BIOS solutions can be used as an alternative to the on-module BIOS and provide support for the following:

- Testing new BIOS versions
- Development of firmware modifications
- Recovery if soldered BIOS on module is corrupted



To use the BIOS on the module,
short pins 1-2 on **JP6, JP7,** reference *section 6.30*

To use the BIOS on the carrier board,
Short pins 2-3 on **JP6**, and keep pin 1-2 on **JP7**, reference *section 6.30*

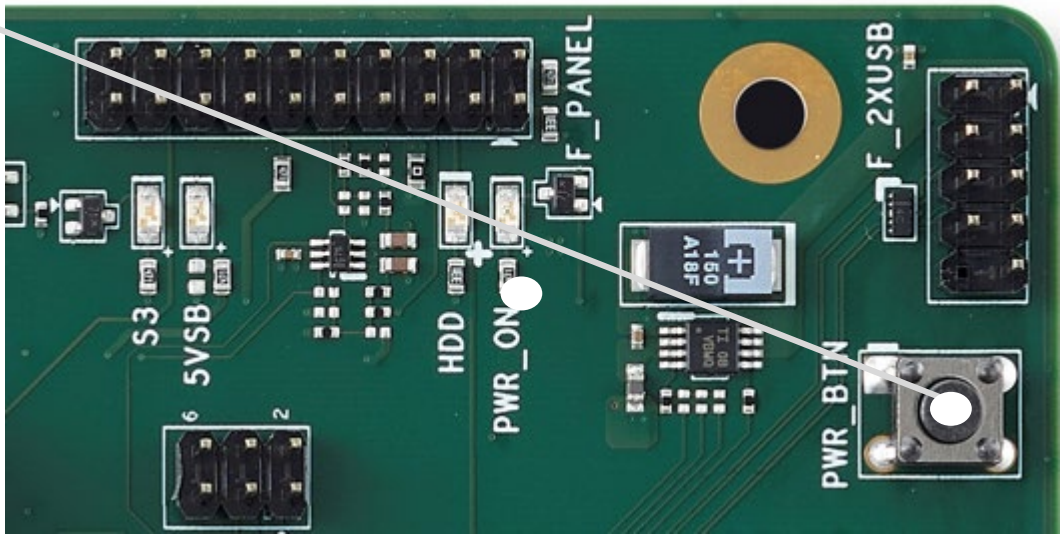
Make sure that the **secondary BIOS flash chip** has been properly installed onto the Carrier BIOS socket before Boot BIOS adjusting.

8. Switches, POST, and LEDs

8.1. Switches (S0-S5)

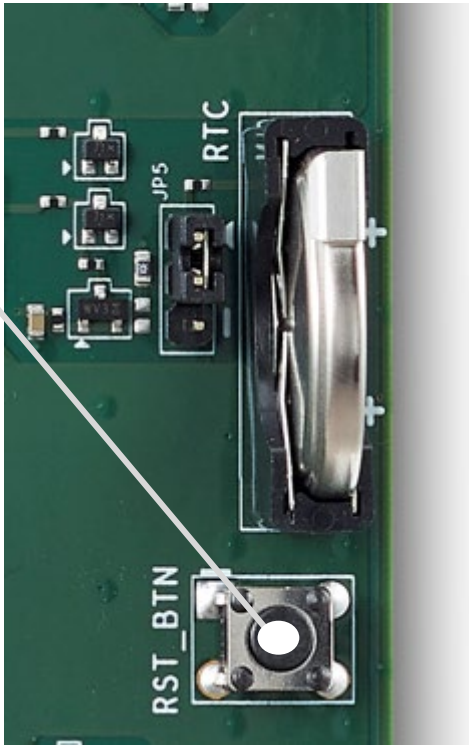
There are two switches, at the center and lower-right of the carrier.

PWR_BTN
Indicates getting into S0 from S5 of the system.



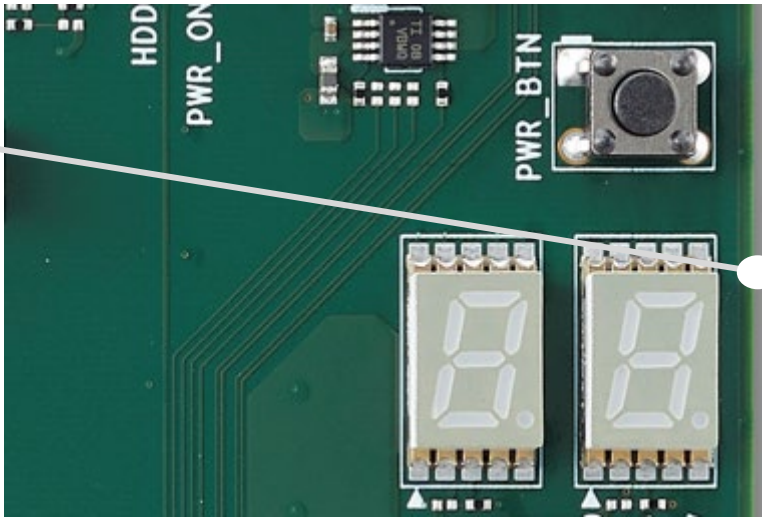
RST_BTN

Indicates resetting of the system.



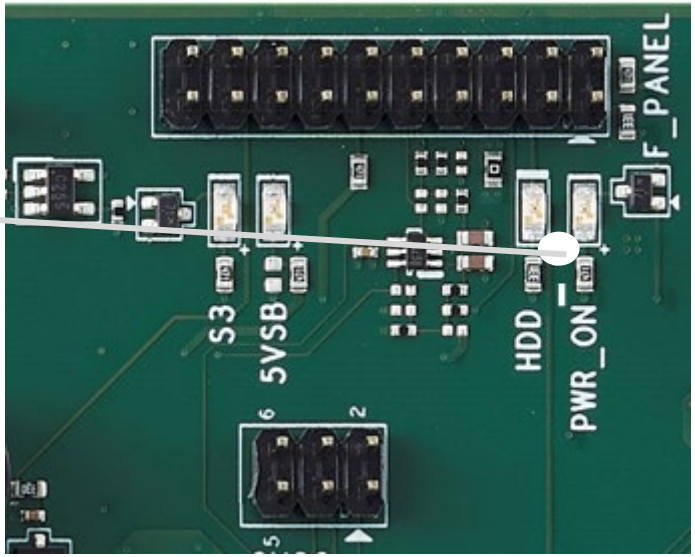
8.2. POST and Inductor LEDs

An eSPI-based POST display is added for debugging.
The two 7-SEG LEDs show the actual **POST data**.



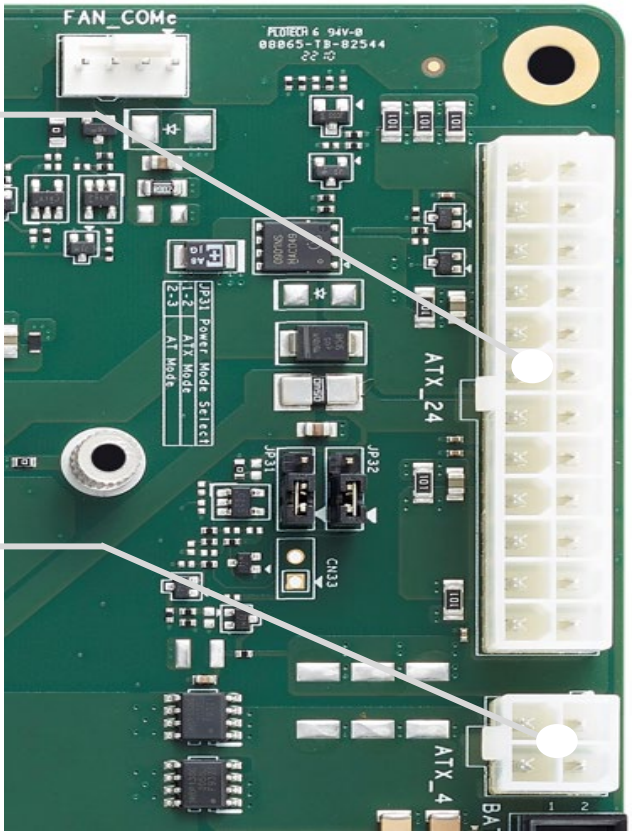
A row of mini-LEDs below the POST display indicates the following:

S3: Indicates S3 status
5VSB: ATX power attached on standby or active
HDD: Indicates HDD activity
PWR_ON: Indicates power on



8.3. ATX Power Connectors

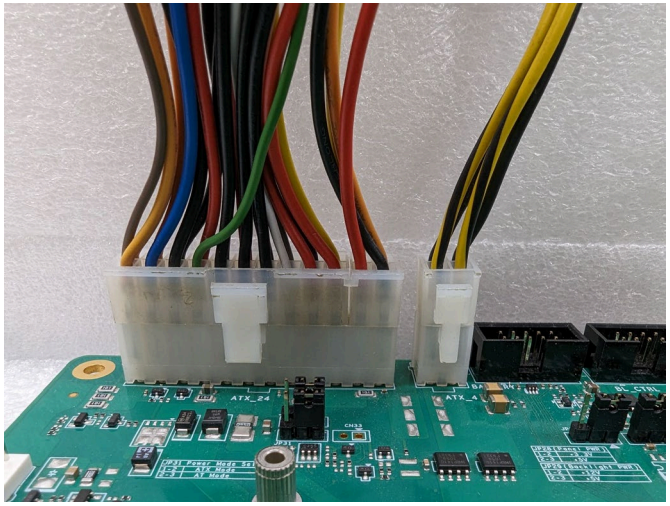
The COM Express Base6 R3.1 has one **ATX 24-pin connector** to supply power to the carrier board and one **ATX 12V 4-pin connector** to supply power to the COM module.



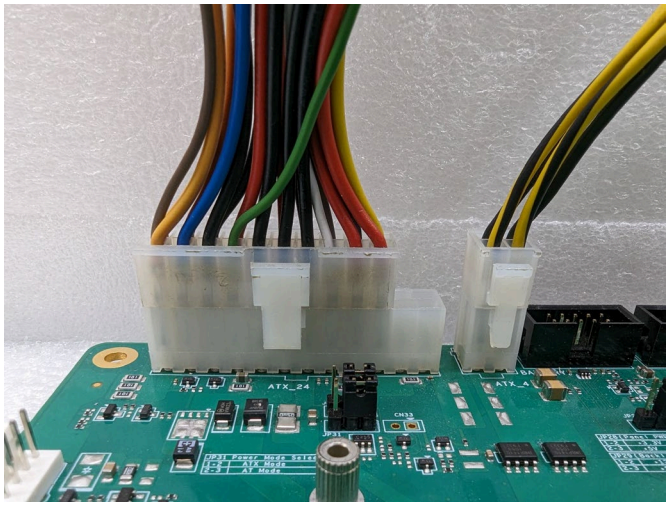
The system will not power on unless an ATX 12V 4-pin connector is connected.

If your power supply has a 24-pin ATX connector, then attach the connectors as shown.

If your power supply has a 24-pin ATX connector, then attach the connectors as shown.



If your power supply has a 20-pin ATX connector, then attach the connectors as shown.



DO NOT plug the ATX 12V 4-pin connector into the ATX 24-pin power connector.