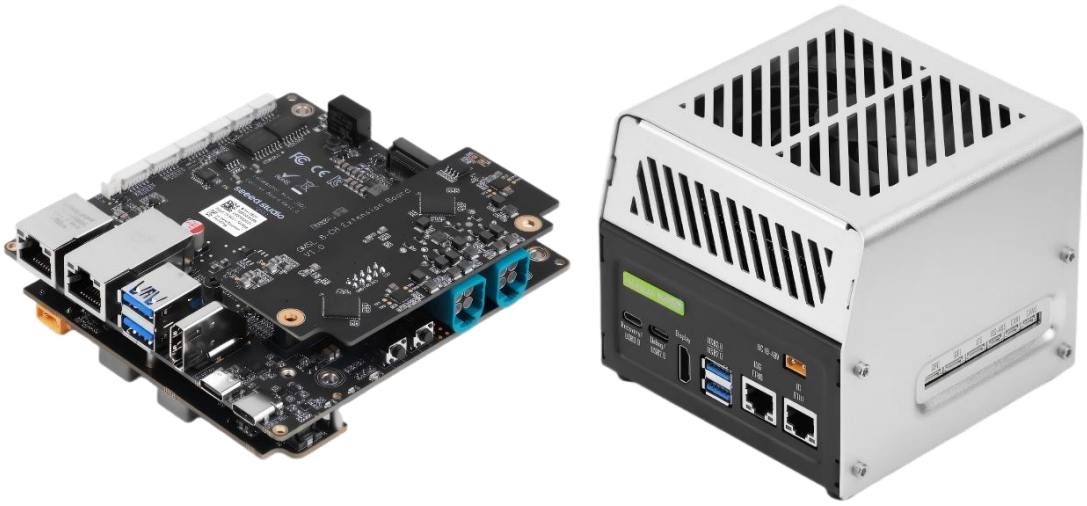
reComputer Mini J501

User Manual & Datasheet



Introduction

The reComputer Mini J501 is a compact yet powerful edge AI Box with Jetson AGX Orin 32GB/64GB module, delivering up to 275 TOPS. Built for development and production, it features M.2 Key E/M, 8×GMSL(optional), 10Gb Ethernet, 1Gb Ethernet, 2x USB3.2, HDMI, RS-485, I2S and CAN, ensuring seamless integration. It can be served as brain of humanoid.

The AI Box supports LLM & Physical AI frameworks like NVIDIA Isaac, HuggingFace, PyTorch, and ROS2/1, it bridges AI and robotics. With optimized real-time processing, it runs vision AI, transformers, and multimodal models, unlocking advanced AI for edge devices. It can be directly used in 48V systems.

Feature

- **Powerful Embodied AI Platform**

Paired with the Jetson AGX Orin 32GB/64GB, offering up to 275 TOPS. Perfect platform for embodied AI and ultra-compact edge application development.

- **Ultra-Compact Size**

119mm x 119mm footprint, suitable for robot prototyping and development, especially robots that has tight footprint such as humanoids.

- **Wide Voltage Input Range**

Can be used in 48V power system (max 54V input).

- **Rich IO Capabilities**

Equipped with M.2 Key E/M, 10Gb Ethernet, 1Gb Ethernet, 2x USB3.2, 1x HDMI 2.1, 8× GMSL(optional), 1x RS-485, 1x I2S and 2x CAN.

- **Vision AI Support**

Features 8x GMSL2 cameras, making it ideal for vision AI applications such as BEV, Occupancy Grid, SLAM etc.

Part list

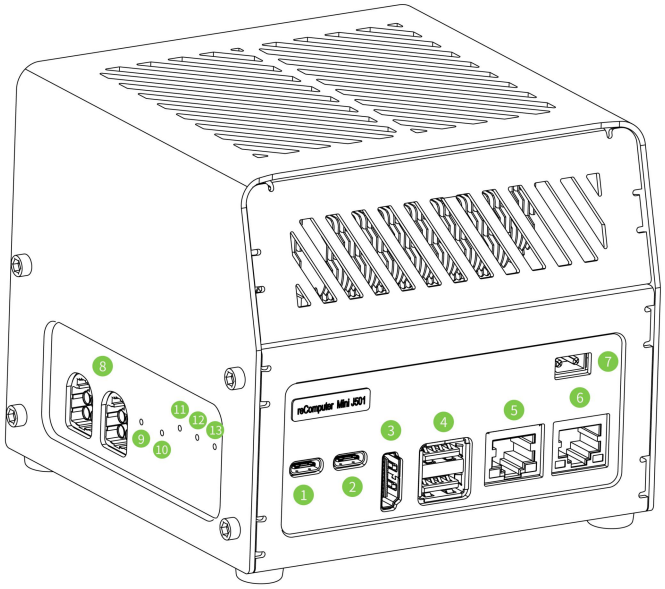
- Seeed reComputer Mini J501 x1
- Jetson AGX Orin Module x1
- GMSL Extension Board (Optional) x1
- Power Board x1
- Heatsink with Fan x1
- 128GB SSD x1
- XT-30 to DC Power Cable x1
- USB Type-C to Type-A Cable x1
- JST Cable x6
- User Manual x1

Document History

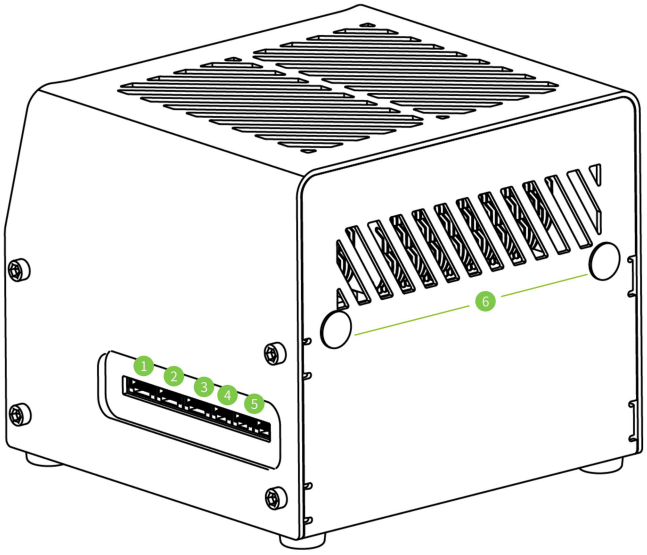
Version	Data	Editor	Desctiption
v1.0	2026/7/10	Ruby Huang	Initial version

Table of Contents

reComputer J501 Mini Interface

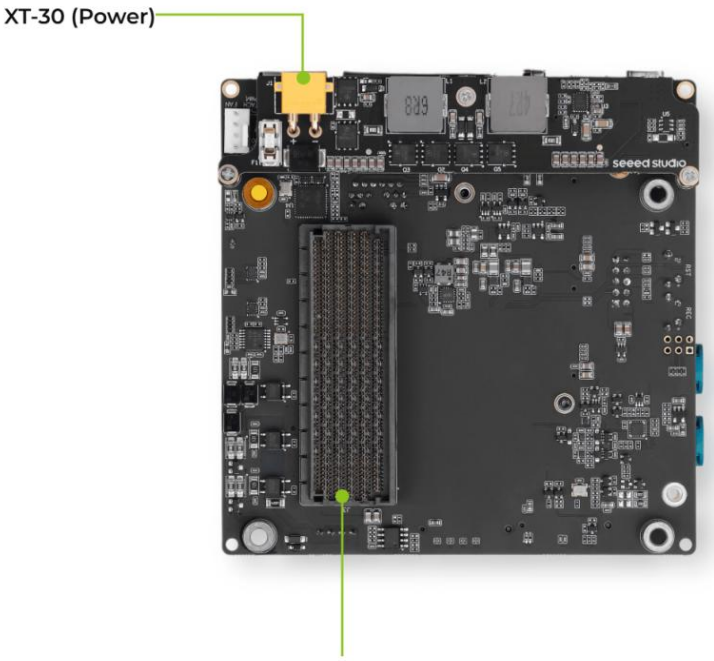


1. USB 3.0 Type-C
2. USB 2.0 Type-C
3. HDMI 2.1
4. USB 3.2 Type-A x2
5. 10 Gb Ethernet
6. 1 Gb Ehernet
7. Power In (XT30 19~48V)
8. GMSL2 x8
9. Recovery Button (Pinhole)
10. Reset Button (Pinhole)
11. USR LED
12. ACT LED
13. PWR LED

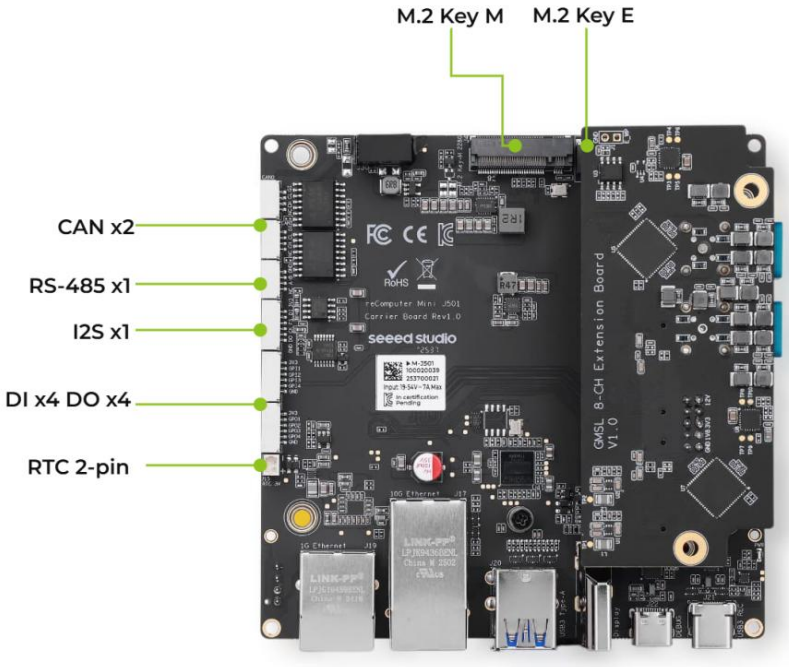


1. GPI x4
2. GPO x4
3. I2S
4. RS-485
5. CAN x2
6. ANT x2

Carrier Board - Top View



Carrier Board - Bottom View



reComputer Mini J501 Feature List

Product	reComputer Mini J5011	reComputer Mini J5012
Module	Jetson AGX Orin 32GB	Jetson AGX Orin 64GB
AI Performance	200 TOPS	275 TOPS
NVIDIA GPU Cores	1792 CUDA Cores with 56 Tensor Cores	2048 CUDA Cores with 64 Tensor Cores
GPU Max Frequency	930 MHz	1.3 GHz
CPU	8x A78 2.2 GHz	12x A78 2.2 GHz
Memory	32GB 256-bit LPDDR5 204.8GB/s	64GB 256-bit LPDDR5 204.8GB/s
Storage	64GB eMMC5.1	
Video Encoder	1x 4K60 (H.265) 3x 4K30 (H.265) 6x 1080p60 (H.265) 12x 1080p30 (H.265)	2x 4K60 (H.265) 4x 4K30 (H.265) 8x 1080p60 (H.265) 16x 1080p30 (H.265)
Video Decoder	1x 8K30 (H.265) 2x 4K60 (H.265) 4x 4K30 (H.265)	1x 8K30 (H.265) 3x 4K60 (H.265) 7x 4K30 (H.265)

	9x 1080p60 (H.265) 18x 1080p30 (H.265)	11x 1080p60 (H.265) 22x 1080p30 (H.265)
Module Power	15W | 40W	15W | 60W
JetPack	JetPack 6.2 (support JP7.2)	

Carrrier Board Specifications

Module Compatibility	Jetson AGX Orin™ 32GB / 64GB
PCB Size	110mm*110mm*38mm (without Jetson AGX Orin Module)
Display	1x HDMI 2.1
USB	2x USB 3.2 Type-A (10Gbps) 1x USB 2.0 Type C (Debug) 1x USB 3.0 Type C (Recovery)
Ethernet	1x RJ45 10GbE 1x RJ45 1GbE
M.2 Key M	1x M.2 Key M, for NVMe 2280 SSD
M.2 Key E	1x M.2 Key E, for M.2 2230 WIFI Module
FAN	1x 4 Pin Fan Connector(12V PWM)
JST Port	2x CAN JST 4-Pin Connector 1x RS-485 JST 4-Pin Connector 1x I2S JST 6-Pin Connector 1x DI 6-Pin Connector 1x DO 6-Pin Connector
RTC	RTC 2-Pin
LED	1x PWR LED, Green

	1x SSD LED, Green 1x USR LED, RGB
Button	1x Recovery Button 1x RST Button
GMSL	2x Mini-Fakra Connector (For 8x GMSL2 Cameras)（Optional）
Temperature	-10℃~60℃ (with thermal grease) -10℃~55℃ (with thermal pad)
Power supply	XT30 Connector, DC 19-48V
Jetpack	Jetpack 6.2

GMSL Extension Board Specifications (Optional)

De-serializer	MAX96712
GMSL Interface	2x Mini-Fakra Male Connector
GMSL Input	Up to 8x GMSL2 Cameras
Connection Method	GMSL2 Fakra 1-to-4 M-M Cable
POC Interface Feature	Supports simultaneous power and data transmission

Pin Connector Descriptions

USB Ports

The carrier board supports several USB Connectors. One of them is a USB 2.0 Type-C connector for debug. The other USB Type-C connector is for recovery mode. There are two USB 3.2 Type A connectors with 10Gbps speed for Host mode only.

USB Port List

Carrier Board			
2 x	USB 3.2 Type-A	Host Mode	J20
1 x	USB 3.0 Type-C	Recovery, For Flashing	J21
1 x	USB 2.0 Type-C	Debug	J22

USB 3.2 Type-A Connector Pin Description- J20

Pin #	Module Pin Name	Module Pin #	Net Name	Usage/Description	Type/Dir
1	-	-	-	VBUS Supply	Power
2	USB3_N	G10	USB2_3_N	USB 2.0, Port 3 Data	Bidir
3	USB3_P	G11	USB2_3_P		
4	-	-	-	Ground	Ground
5	UPHY_RX20_N	C35	UPHY0_RX2_N	UPHY block 0, Receive Lane 2	Input
6	UPHY_RX20_P	C34	UPHY0_RX2_P		
7	-	-	-	Ground	Ground
8	UPHY_TX20_N	K33	UPHY0_TX2_N	UPHY block 0, Transmit Lane 2	Output
9	UPHY_TX20_P	K32	UPHY0_TX2_P		
10	-	-	-	VBUS Supply	Power
11	USB1_N	C10	USB2_1_N	USB 2.0, Port 1 Data	Bidir
12	USB1_P	C11	USB2_1_P		

13	-	-	-	Ground	Ground
14	UPHY_RX0_N	A23	UPHY0_RX0_N	UPHY block 0, Receive Lane 0	Input
15	UPHY_RX0_P	A22	UPHY0_RX0_P		
16	-	-	-	Ground	Ground
17	UPHY_TX0_N	J23	UPHY0_TX0_N	UPHY block 0, Transmit Lane 0	Output
18	UPHY_TX0_P	J22	UPHY0_TX0_P		

USB 3.0 Type-C Connector Pin Description - J21

Pin #	Module Pin Name	Module Pin #	Net Name	Usage/Description	Type/Dir Default
A4/A9				VBUS Supply	Power
B4/B9					
A5	-	-	CC1	USB Type-C Configuration Channel	-
B5	-	-	CC2		
B10	UPHY_RX1_N	C22	UPHY_RX1_N	UPHY block 0, Receive Lane 1	Input
B11	UPHY_RX1_P	C23	UPHY_RX1_P		
A3	UPHY_TX1_N	G22	UPHY_TX1_N	UPHY block 0, Transmit Lane 0	Output
A2	UPHY_TX1_P	G23	UPHY_TX1_P		
A10	UPHY_RX1_N	C22	UPHY_RX1_N	UPHY block 0, Receive Lane 1	Input
A11	UPHY_RX1_P	C23	UPHY_RX1_P		
B3	UPHY_TX1_N	G22	UPHY_TX1_N	UPHY block 0, Transmit Lane 0	Output
B2	UPHY_TX1_P	G23	UPHY_TX1_P		
A7/B7	USB0_N	F13	USB2_0_N	USB 2.0 Port 0 Data	Bidir
A6/B6	USB0_P	F12	USB2_0_P		

A1/B1	-	-	-	Ground	Ground
A12/B12					
S1/S2					
S3/S4					

USB 2.0 Type-C - J22

Pin #	Module Pin Name	Module Pin #	Net Name	Usage/Description	Type/Dir Default
B9/B4	-	-	-	VBUS Supply	Power
A5	-	-	CC1_2	-	-
B5	-	-	CC2_2	-	-
A7/B7	-	-	UART_USB_DN	-	Bidir
A6/B6	-	-	UART_USB_DP	-	
B1/B12	-	-	-	Ground	Ground
S1/S2/S3/S4/S5/S6					

Ethernet

10 Gigabit Ethernet - J17

Pin #	Module Pin Name	Module Pin #	Net Name	Usage/Description	Type/ Dir
1	TCT3	-	-	-	-
2	TD3-	-	-	-	Bidir
3	TD3+	-	-	-	Bidir
4	TD2+	-	-	-	Bidir
5	TD2-	-	-	-	Bidir
6	TCT2	-	-	-	-
7	TCT4	-	-	-	-
8	TD4+	-	-	-	Bidir
9	TD4-	-	-	-	Bidir
10	TD1-	-	-	-	Bidir
11	TD1+	-	-	-	Bidir
12	TCT1	-	-	-	-
13	GRNA	-	RJ45_GRNA	Yellow LED Anode	Input
14	GRNC	-	RJ45_GRNC	Yellow LED Cathode. On	Output

				indicates activity	
15	YLWA	-	RJ45_YLWA	Green LED Anode	Input
16	YLWC	-	RJ45_YLWC	Green LED Cathode	Output
S1 S2	-	-	-	Shield Ground	Ground
Note: 1. 10 Gigabit Ethernet 2. Normal working condition: Green LED: Always on, Yellow LED: Flashing					

Gigabit Ethernet - J19

Pin #	Module Pin Name	Module Pin #	Net Name	Usage/Description	Type/ Dir
1	CT5	-	-	-	Ground
2	TD1+	-	-	-	Bidir
3	TD1-	-	-	-	Bidir
4	TD2+	-	-	-	Bidir
5	TD2-	-	-	-	Bidir
6	TD3+	-	-	-	Bidir

7	TD3-	-	-	-	Bidir
8	TD4+	-	-	-	Bidir
9	TD4-	-	-	-	Bidir
10	-	-	-	-	-
11	YLWA	-	RJ45_YLWA	Green LED Anode	Input
12	YLWC	-	RJ45_YLWC	Green LED Cathode	Output
13	GRNA	-	RJ45_GRNA	Yellow LED Anode	Input
14	GRNC	-	RJ45_GRNC	Yellow LED Cathode. On indicates activity	Output
S1	-	-	-	Shield Ground	Ground
S2					

Note:

1. Gigabit Ethernet (10/100/1000M)

2. Normal working condition: Green LED: Always on, Yellow LED: Flashing

M.2 Key M Slot - J4

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
3				
5	UPHY_RX22_N	D32	UPHY block 0, Receive Lane 4	Input
7	UPHY_RX22_P	D33		
9	-	-	Ground	Ground
11	UPHY_TX22_N	J34	UPHY block 0, Transmit Lane 4	Output
13	UPHY_TX22_P	J35		
15	-	-	Ground	Ground
17	UPHY_RX23_N	A35	UPHY block 0, Receive Lane 5	Input
19	UPHY_RX23_P	A34		
21	-	-	Ground	Ground
23	UPHY_TX23_N	H33	UPHY block 0, Transmit Lane 5	Output
25	UPHY_TX23_N	H32		
27	-	-	Ground	Ground
29	UPHY_RX10_N	B13	UPHY block 0, Receive Lane 6	Input

31	UPHY_RX10_P	B12		
33	-	-	Ground	Ground
35	UPHY_TX10_N	K12	UPHY block 0, Transmit Lane 6	Output
37	UPHY_TX10_P	K13		
39	-	-	Ground	Ground
41	UPHY_RX11_N	D13	UPHY block 0, Receive Lane 7	Input
43	UPHY_RX11_P	D12		
45	-	-	Ground	Ground
47	UPHY_TX11_N	H13	UPHY block 0, Transmit Lane 7	Output
49	UPHY_TX11_P	H12		
51	-	-	Ground	Ground
53	PCIE4_CLK_N	E22	PCIe output Reference Clock for controller #4	Output
55	PCIE4_CLK_P	E23		
57	-	-	Ground	Ground
59	-	-	Unused (Key)	Unused
61				
63				
65				

67 69	-	-	Unused	Unused
71 73 75	-	-	Ground	Ground

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
2 4	-	-	Main 3.3V Supply	Power
6 8	-	-	Unused	Unused
10			SSD LED	Output
12 14 16 18	-	-	Main 3.3V Supply	Power
20	-	-	Unused	Unused

22				
24				
26				
28				
30				
32				
34				
36				
38				
40	I2C2_CLK	J61	General I2C 2 Clock	Bidir/OD, 1.8V
42	I2C2_DAT	K61	General I2C 2 Data	
44	GPIO34	A55	M.2 Key M Alert	Input, 1.8V
46	-	-	Unused	Unused
48				
50	PEX_C4_RST_N	J9	PCIe Reset for controller #4	Output, 3.3V
52	PEX_C4_CLKREQ_N	G8	PCIe Clock Request for controller #4	Bidir/OD,3.3V
54	PEX_WAKE_N	A8	PCIe Wake	Input/OD, 3.3V

56 58	-	-	Unused	Unused
60 62 64 66	-	-	Unused (Key)	Unused (Key)
68	-	-	32KHz Suspend Clock	Output, 3.3V
70 72 74	-	-	Main 3.3V Supply	Power
Note: For NVMe SSD, 2280. Supports PCIe Gen4.0.				

M.2 Key E Slot - J5

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
3			USB 2.0 #3 Data from hub	Bidir
5				
7	-	-	Ground	Ground
9	SDCARD_CLK	B6	SD Card (or SDIO) Clock	Output
11	SDCARD_CMD	A5	SD Card (or SDIO) Command	Bidir
13	SDCARD_D0	E8	SD Card (or SDIO) Data 0	Bidir
15	SDCARD_D1	F8	SD Card (or SDIO) Data 1	Bidir
17	SDCARD_D2	A4	SD Card (or SDIO) Data 2	Bidir
19	SDCARD_D3	D6	SD Card (or SDIO) Data 3	Bidir
21	GPIO02	L6	SD Card Card Detect	Bidir
23	GPIO21	B58	SD Power Enable	Output
25	-	-	Unused (Key)	Unused (Key)
27				
29				

31				
33	-	-	Ground	Ground
35	UPHY_TX21_P	G35	UPHY block 0, Transmit Lane 3	Output
37	UPHY_TX21_N	G34		
39	-		Ground	Ground
41	UPHY_RX21_P	B33	UPHY block 0, Receive Lane 3	Input
43	UPHY_RX21_N	B32		
45	-		Ground	Ground
47	PEX_CLK6_P	D49	PCIe Output Reference Clock for controller #1	Output
49	PEX_CLK6_N	D48		
51	-		Ground	Ground
53	PEX_C7_CLKREQ_N	B37	PCIe Clock Request for controller #1	Input, 3.3V
55	-	-	Unused	-
57	-	-	Ground	Ground
59	GPIO04	B59	M2E_SAR_TOUT	-
61	GPIO05	A59	M2E_AP_WAKE_BT	Output
63	-	-	Ground	Ground

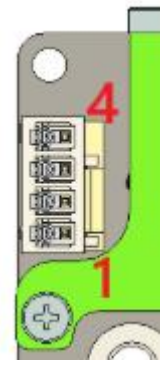
65 67	-	-	Unused	Unused
69	-	-	Ground	Ground
71 73	-	-	Unused	Unused
75	-	-	Ground	Ground

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
2 4	-	-	Main 3.3V Supply	Power
6	-	-	Unused	
8	I2S3_SCLK	C59	Audio I2S Port 3 Clock	Bidir
10	I2S3_FS	C60	I2S Audio Port 3 Left/Right Clock	Bidir
12	I2S3_DIN	J59	Audio I2S #1 Data in	Input
14	I2S3_DOUT	K59	Audio I2S #1 Data Out	Output
16	-	-	Unused	
18	-	-	Ground	

20	GPIO32	J55	M2E_BT_WAKE	Input
22	UART5_RX	H58	UART 2 Receive	Input
24	-	-	Unused (Key)	
26				
28				
30				
32	UART5_TX	J58	UART 5 Transmit	Output
34	UART5_CTS	H57	UART 5 Clear to Send	Input
36	UART5_RTS	K58	UART 5 Request to Send	Output
38	-	-	Unused	-
40	-	-	Unused	-
42	GPIO05	A59	M2E_AP_WAKE_BT	Output
44	-	-	Unused	-
46				
48				
50	-	-	SUSCLK_32KHZ_M2E	
52	PEX_C7_RST_N	B36	PCIe Reset for controller #1	Output
54	SP3_CLK	F55	M2E_BT_DISABLE_N	Output

56	GPIO01	J4	M2E_WIFI_DISABLE_N	Output
58	-	-	Unused	-
60				
62	GPIO30	B55	M2E_M_ALERT*	Input
64	-	-	Unused	-
66				
68				
70				
72	-	-	Main 3.3V Supply	Power
74				Power
Note: For 2230 WiFi Module.				

12V Fan Connector - J1



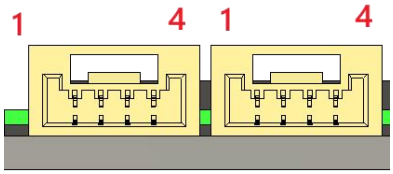
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	12V Power Supply	Power
3	FAN_TACH	E54	Fan Tachometer signal	Bidir
4	FAN_PWM	K62	Fan Pulse Width Modulation signal	Bidir

RTC 2-Pin Header - J15

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	PMIC_BBATT	D37	Real-Time Clock: Optionally used to provide back-up power for RTC in the Power Sequencer.	Input

JST Connectors

CAN GH-1.25 Connectors - J6,J7



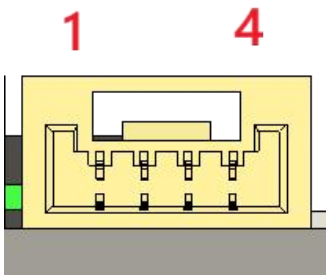
J6

Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	CAN0_L_ISO	Isolated CAN_L
3	-	-	CAN0_H_ISO	Isolated CAN_H
4	-	-	Unused	-

J7

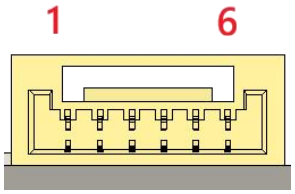
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	CAN1_L_ISO	Isolated CAN_L
3	-	-	CAN1_H_ISO	Isolated CAN_H
4	-	-	Unused	-

RS-485 - GH-1.25 Connector - J8



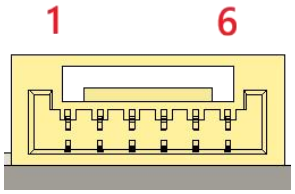
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	RS485_B_CON	RS485-A
3	-	-	RS485_A_CON	RS485-B
4	-	-	Unused	-

I2S - GH-1.25 Connector - J9



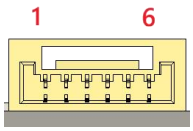
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	3V3 Power Supper	Power
2	I2S2_DIN	F6	I2S2_DIN_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Data In
3	I2S2_FS	E4	IS22_FS_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Left/Right Clock
4	I2S2_CLK	G4	I2S2_SCLK_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Clock
5	I2S2_DOUT	F5	I2S2_DOUT_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Data Out
6	-	-	Ground	Ground

GPI - GH-1.25 Connector - J12



Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	3V3 Power Supper	Power
2	GPIO17	A54	GPI_1_3V3 (Level Shifted from 1.8V to 3.3V)	Input, 3.3V
3	GPIO18	C55	GPI_2_3V3 (Level Shifted from 1.8V to 3.3V)	Input, 3.3V
4	GPIO19	K56	GPI_3_3V3 (Level Shifted from 1.8V to 3.3V)	Input, 3.3V
5	GPIO33	C54	GPI_4_3V3 (Level Shifted from 1.8V to 3.3V)	Input, 3.3V
6	-	-	Ground	Ground

GPO - GH-1.25 Connector - J14



Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	3V3 Power Supper	Power
2	UART1_TX	K53	GPO_1_3V3 (Level Shifted from 1.8V to 3.3V)	Output, 3.3V
3	UART1_RTS	L51	GPO_2_3V3 (Level Shifted from 1.8V to 3.3V)	Output, 3.3V
4	UART1_RX	K54	GPO_3_3V3 (Level Shifted from 1.8V to 3.3V)	Output, 3.3V
5	UART1_CTS	H54	GPO_4_3V3 (Level Shifted from 1.8V to 3.3V)	Output, 3.3V
6	-	-	Ground	Ground

User can configure GPO pins as UART by setting GPIO24. When GPIO24 is low, the above pins can be set as UART. By default, they are GPO pins.