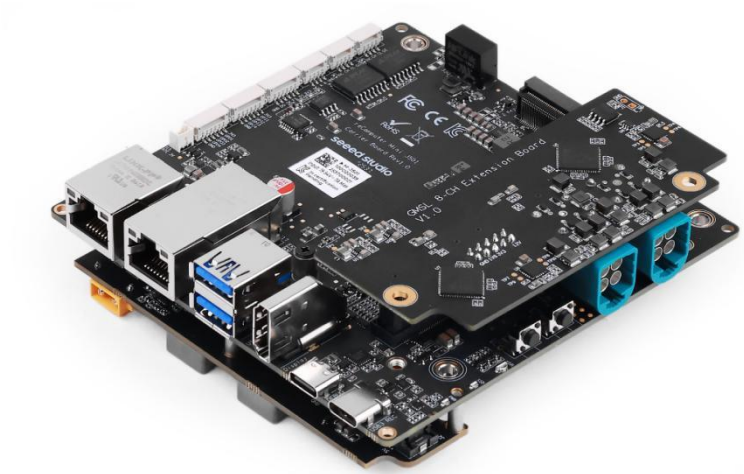
reComputer Mini J501 Carrier Board

Datasheet



Introduction

reComputer Mini J501 carrier board is a carrier board designed for NVIDIA Jetson AGX Orin. It is equipped with rich IOs such as USB, Ethernet, CAN, RS-485, I2S and GMSL(optional). The carrier board along with NVIDIA Jetson module is designed to be the brain of various types of robots, especially humanoids. It is also a perfect candidate of carrier board for fast prototyping. It can be directly used in 48V systems.

Part list

- Seeed Carrier Board (reComputer J501 Mini) x1
- GMSL Extension Board (Optional) x1
- Power Board x1
- XT30 to DC power connector x1
- USB Type-C to Type-A cable x1
- JST cable x6
- User Manual x1

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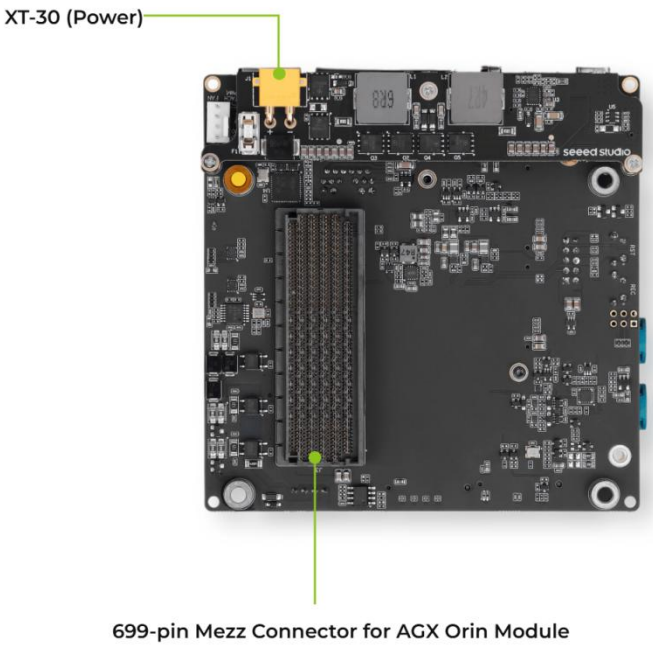
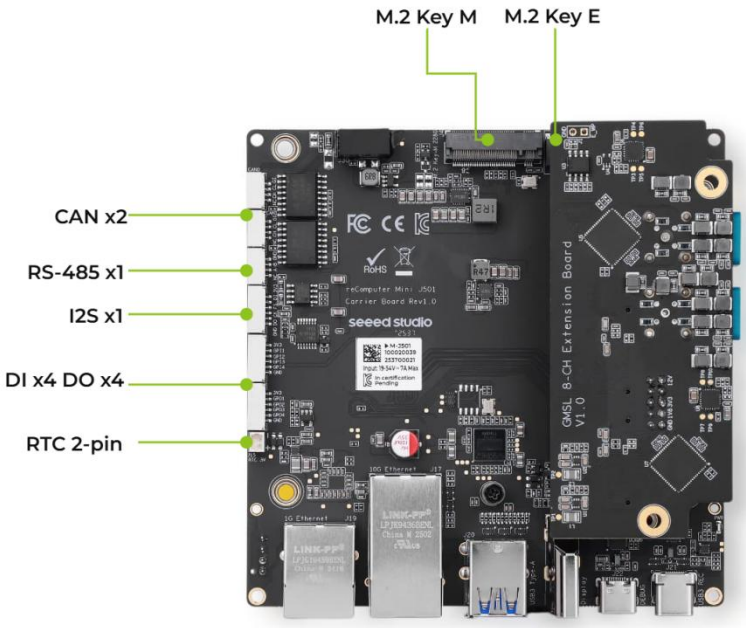
reComputer J501 Mini Carrier Board

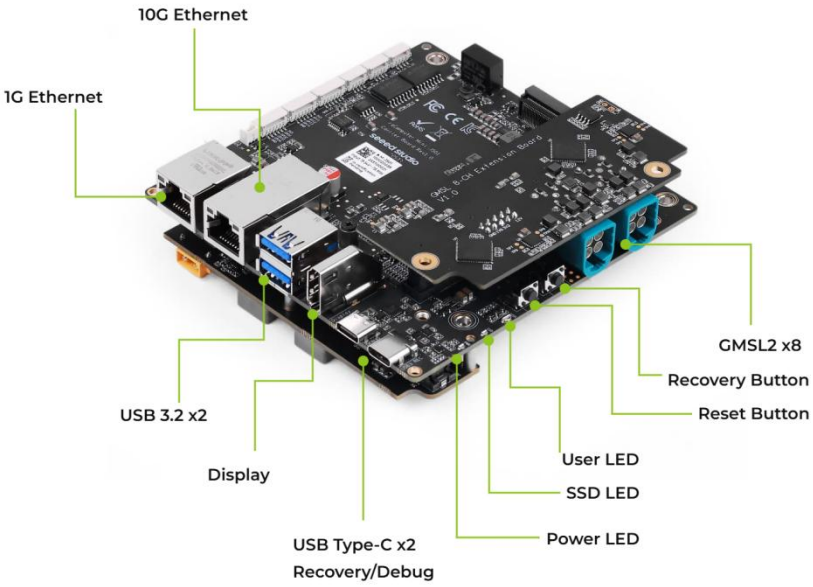
Carrier Board - Top View



Carrier Board - Bottom View



Carrier Board - Side View



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 B4/B9				VBUS Supply	Power
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

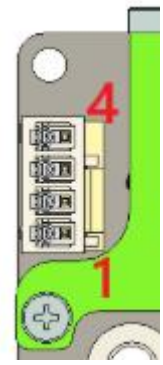
65 67	-	-	Unused	Unused
69	-	-	Ground	Ground
71 73	-	-	Unused	Unused
75	-	-	Ground	Ground

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



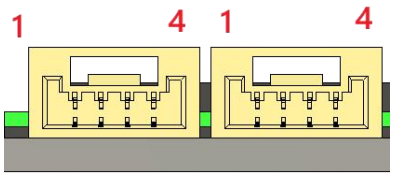
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	12V Power Supply	Power
3	FAN_TACH	E54	Fan Tachometer signal	Bidir
4	FAN_PWM	K62	Fan Pulse Width Modulation signal	Bidir

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



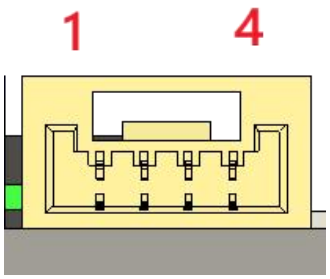
J6

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

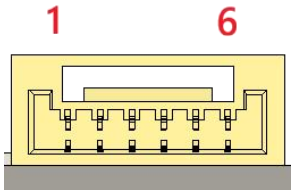
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	CAN1_L_ISO	Isolated CAN_L
3	-	-	CAN1_H_ISO	Isolated CAN_H
4	-	-	Unused	-

RS-485 - GH-1.25 Connector - J8



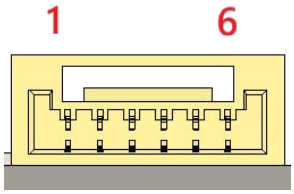
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	Ground	Ground
2	-	-	RS485_B_CON	RS485-A
3	-	-	RS485_A_CON	RS485-B
4	-	-	Unused	-

I2S - GH-1.25 Connector - J9



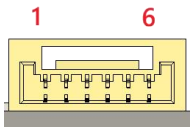
Pin #	Module Pin Name	Module Pin #	Usage/Description	Type/Dir Default
1	-	-	3V3 Power Supper	Power
2	I2S2_DIN	F6	I2S2_DIN_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Data In
3	I2S2_FS	E4	IS22_FS_3V3 (Level Shifted from 1.8V to 3.3V)	I2S Audio Port 2 Left/Right Clock
4	I2S2_CLK	G4	I2S2_SCLK_3V3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