



AI Development Carrier Board

Y-C28

Datasheet



Version V1.0

Date 2025-08-20

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Y-C28 Product Manual Revision History

Version	Date	Description of Change	Hardware Version
V 1.0	2025-08-20	Create a document	V 1.0

Product Hardware Revision History

Version	Date	Description of Change
V 1.0	2025-08-20	Y-C28 Product launch

Electronic components and circuits are very sensitive to electrostatic discharge, although the company will design the main interface on the board card to do anti-static protection design, but it is difficult to do anti-static safety protection for all components and circuits. Therefore, it is recommended that you take ESD safety measures when handling any circuit board component.

ESD safety measures include but are not limited to the following:

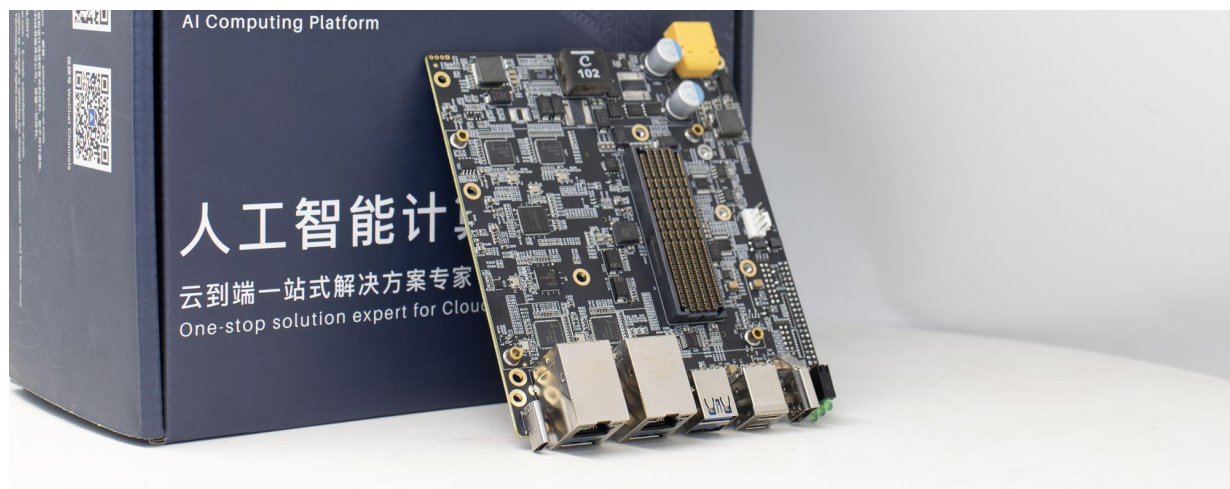


1. Put the card in an ESD bag during transportation or storage. Do not take out the card until installation and deployment.
2. Before touching the board, release the static electricity stored in the body: Wear a grounding wrist strap.
3. Operate circuit boards only in electrostatic discharge safe areas.
4. Avoid moving circuit boards in carpeted areas.
5. Avoid direct contact with electronic components on the board through edge contact.

Table of Contents

1	Product Introduction-----	5
2	Basic parameters and IO interfaces-----	7
3	External interfaces and functions-----	8
4	Dimension drawing-----	14
5	Y-C28 Interface description-----	15
6	Order Information-----	30
7	Recovery Mode-----	30
8	Method of Application-----	31
9	GPIO Test-----	32
10	CAN Test-----	33
11	Serial Port Test-----	34
12	Special Instructions-----	35

Product Introduction



The Y-C28 is a carrier board that is compatible with the NVIDIA Jetson AGX Thor series core modules. It is suitable for compact deployment requirements. The main interfaces have been designed with electrostatic safety protection, and a highly reliable power application scheme has been adopted. The input power has overvoltage and reverse polarity protection functions, and it has a rich set of external interfaces. All the components on the board are of wide-temperature models. To facilitate the design of the enclosure structure, the important interfaces of the Y-C28 carrier board are all designed to be led out on one side.

In terms of communication and network expansion, the carrier board is equipped with a 3050-sized M.2 Key B connector and a flip-up Nano SIM card slot, which can be compatible with 4G/5G modules; at the same time, a MiniPCle connector is provided for installing Wi-Fi modules, and there is a network expansion pin connector and an MGBE expansion signal connector for expanding gigabit Ethernet functionality. In addition, the two RJ45 connectors onboard further enhance the wired network access capability.

The storage expansion options include a 2280-sized M.2 Key M interface, which can be used to install NVMe SSDs, significantly increasing storage capacity and read/write speed.

The multimedia has excellent connection capabilities with external devices, providing one HDMI video output interface and four USB 3.0 connectors, which fully meet the requirements for display output and high-speed peripheral access. The dedicated camera connector also facilitates the integration of camera modules, making it suitable for machine vision-related applications.

In terms of industrial and functional expansion, the development board provides a multi-functional signal expansion interface, integrating various common signals such as SPI, GPIO, CAN, and UART, which greatly facilitates secondary development and the realization of customized functions. Additionally, it also offers a power expansion output connector, which can supply power to peripheral devices.

To ensure the reliability of the system, the development board also incorporates an RTC power supply connector, which is used to connect the RTC battery, ensuring that the real-time clock can continue to operate even in the event of power failure.

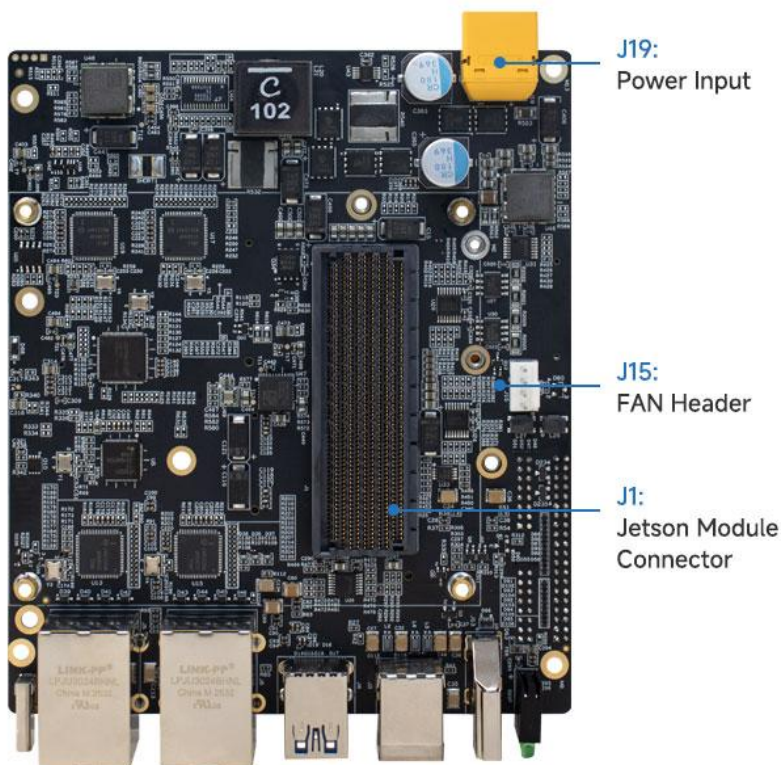
Basic parameters and IO interfaces

Basic parameters	
Carrier Board	Y-C28
Adaptive Module	NVIDIA Jetson AGX Thor Modules
Temperature	-40 ~ +85°C
Dimensions (L×W×H)	140mm * 120mm * 37.6mm (L/W Not Including I/O ports and mounting holes)
Weight	208g
Power Input	DC 9~36V

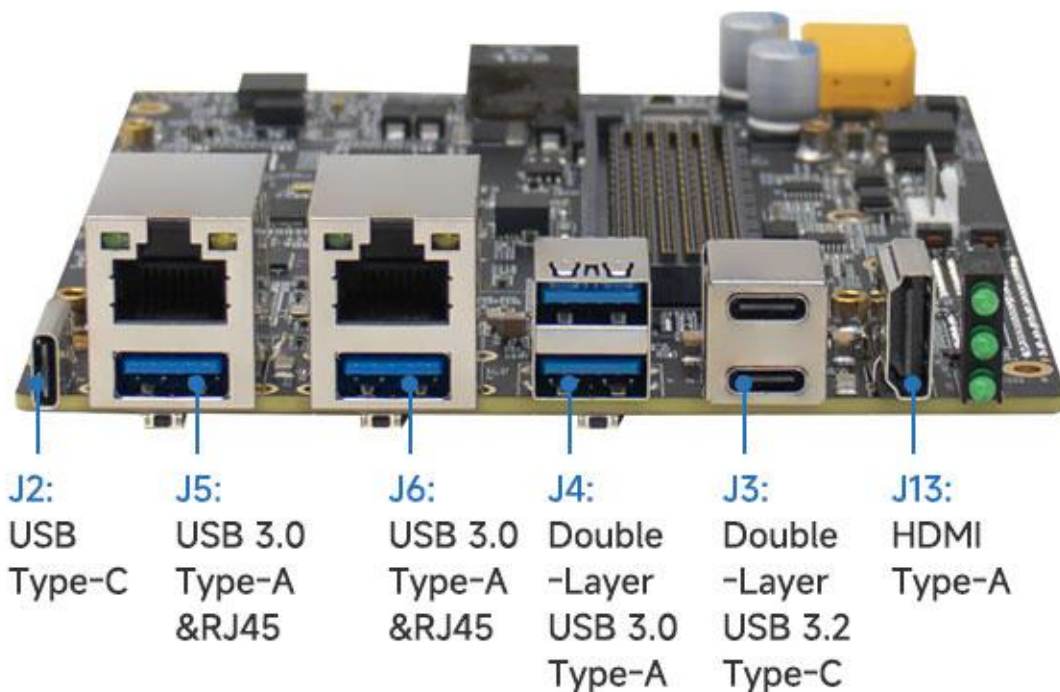
IO Interface

Interface	Quantity	Interface	Quantity
USB3.0 Type-A	4	USB 3.2 Type-C	2
miniPCle Slot	1	USB Type-C(OTG)	1
M.2 Key M Slot (2280)	1	Nano SIM Card	1
RTC Battery Connector	1	HDMI	1
Camera Connector	1	Power Jack	1
Fan Header	1	M.2 Key B Slot (3050)	1
40pin Expansion Header	1 (1*SPI /1* I2S 2*I2C 4*CAN 2*GPIO 4*UART)	Ethernet	4(2*RJ45 2*16pin Header)

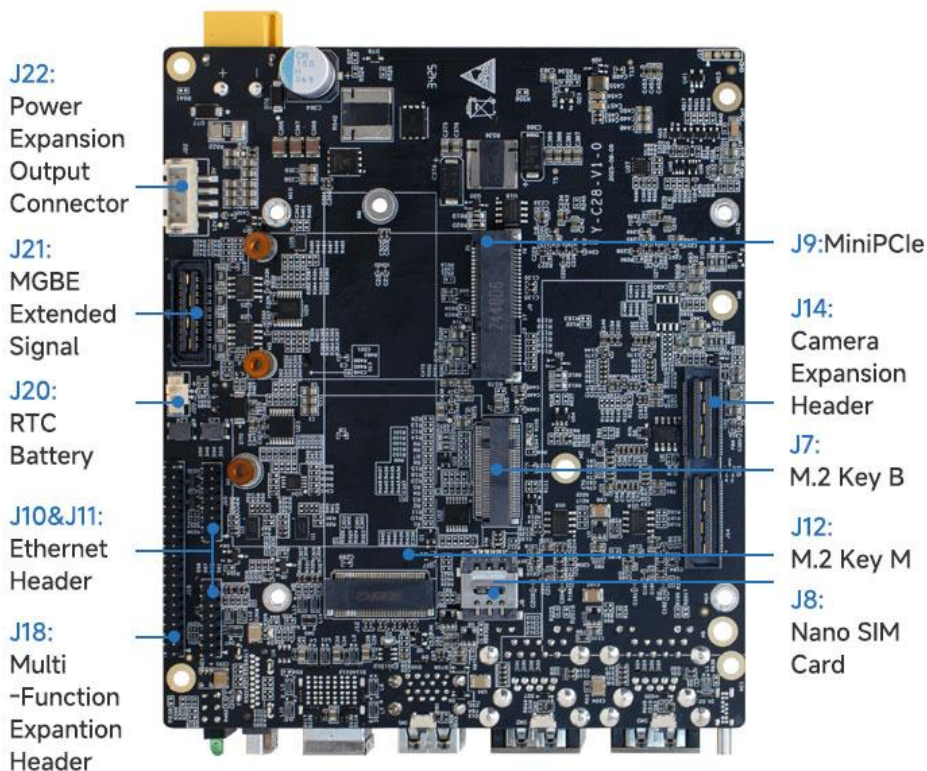
External interfaces and functions



Sign	Function	Sign	Function
J1	Jetson Module Connector	J15	Fan Header
J19	Power Input (XT60)		



Sign	Function	Sign	Function
J13	HDMI Type-A	J3	Double-Layer USB 3.2 Type-C
J5	RJ45&USB3.0 Type-A	J6	RJ45&USB3.0 Type-A
J4	Double-Layer USB 3.0 Type-A	J2	USB Type-C(flash system)



Sign	Function	Sign	Function
J14	Camera Expansion Header	J7	3050 M.2Key B
J9	Minipcie	J12	2280 M.2Key M
J10/J11	Ethernet Header	J8	Nano SIM Card
J18	Multi-Function Expansion Header	J20	RTC Battery
J21	MGBE Extender Signal	J22	Power Expansion Output Connector
SW1	POWER	SW2	RESET
SW3	FORCE_RECOVERY		

AdaptationJetson AGX Thor T5000

Module parameters

Module	Jetson AGX Thor T5000
AI Performance	2070 TFLOPS (FP4—sparse)
GPU	2560-core NVIDIA Blackwell architecture GPU with 96 fifth-gen Tensor Cores Multi-Instance GPU with 10 TPCs
GPU Max Frequency	1.57 GHz
CPU	14-core Arm® Neoverse®-V3AE 64-bit CPU 64 KB I-Cache, 64 KB D-Cache 1 MB L2 cache per core 16 MB shared system L3 cache
CPU Max Frequency	2.6 GHz
Memory	128 GB 256-bit LPDDR5X 273 GB/s
Storage	Supports NVMe through PCIe Supports SSD through USB3.2
Video Encode	6x 4Kp60 (H.265) 12x 4Kp30 (H.265) 24x 1080p60 (H.265) 50x 1080p30 (H.265) 48x 1080p30 (H.264) 6x 4Kp60 (H.264)
Video Decode	4x 8Kp30 (H.265) 10x 4Kp60 (H.265) 22x 4Kp30 (H.265) 46x 1080p60 (H.265) 92x 1080p30 (H.265) 82x 1080p30 (H.264) 4x 4Kp60 (H.264)
Power	40 W–130 W

AdaptationJetson AGX Thor T4000

Module parameters

Module	Jetson AGX Thor T4000
AI Performance	1200 TFLOPS (FP4—sparse)
GPU	1536-core NVIDIA Blackwell architecture GPU with 64 fifth-gen Tensor Cores Multi-Instance GPU with 6 TPCs
GPU Max Frequency	1.57 GHz
CPU	12-core Arm® Neoverse®-V3AE 64-bit CPU 64 KB I-Cache, 64 KB D-Cache 1 MB L2 cache per core 16 MB shared system L3 cache
CPU Max Frequency	2.6 GHz
Memory	64 GB 256-bit LPDDR5X 273 GB/s
Storage	Supports NVMe through PCIe Supports SSD through USB3.2
Video Encode	6x 4Kp60 (H.265) 12x 4Kp30 (H.265) 24x 1080p60 (H.265) 50x 1080p30 (H.265) 48x 1080p30 (H.264) 6x 4Kp60 (H.264)
Video Decode	4x 8Kp30 (H.265) 10x 4Kp60 (H.265) 22x 4Kp30 (H.265) 46x 1080p60 (H.265) 92x 1080p30 (H.265) 82x 1080p30 (H.264) 4x 4Kp60 (H.264)
Power	40 W–70 W

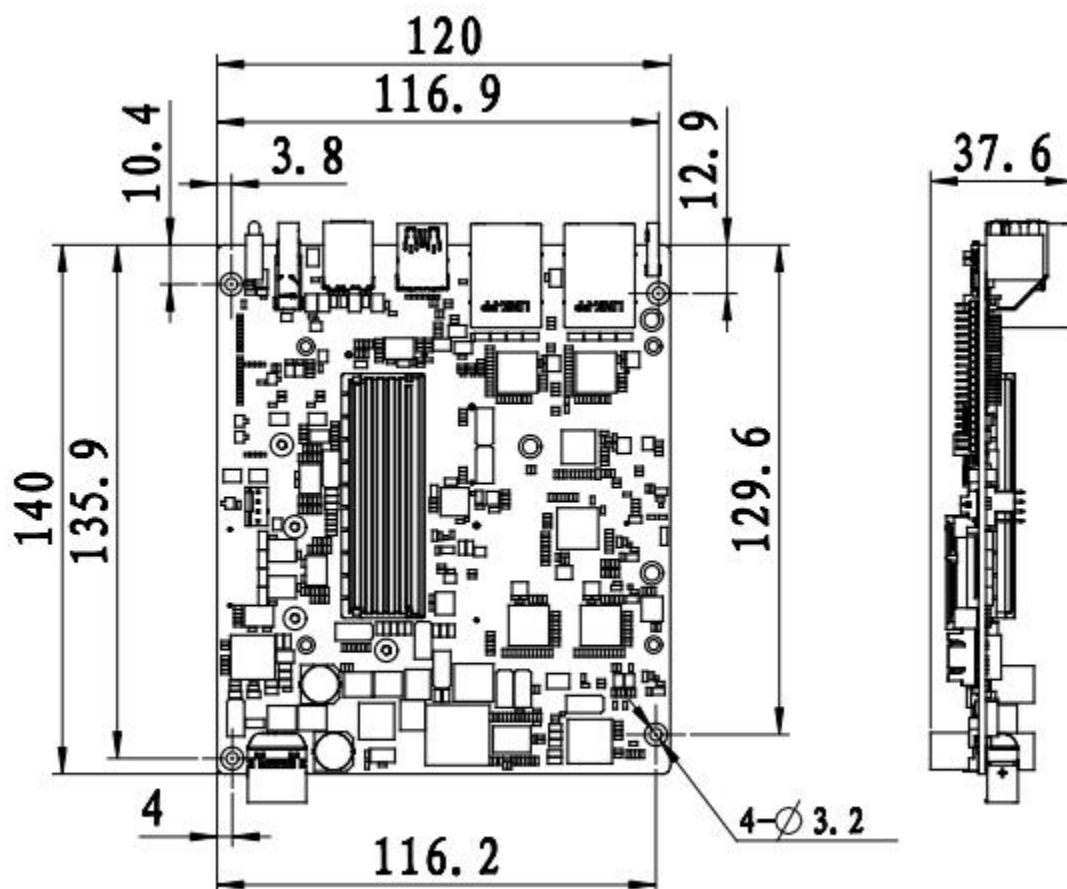
AdaptationJetson AGX ORIN 64G/32G

AGX ORIN I Module parameters

Module	Jetson AGX ORIN I	Jetson AGX Orin 32GB	Jetson AGX Orin 64GB
AI Performance	248TOPS	200 TOPS	275 TOPS
GPU	2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores	1792-core NVIDIA Ampere architecture GPU with 56 Tensor Cores	2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores
GPU Max Frequency	1.2GHz	930MHz	1.3GHz
CPU	12-core Arm® Cortex®-A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3	12-core Arm® Cortex®-A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3
CPU Max Frequency	2.0GHz	2.2GHz	
Memory	64GB 256 位 LPDDR5 (+ ECC)204.8GB/s	32GB 256-bit LPDDR5 204.8 GB/s	64GB 256-bit LPDDR5 204.8 GB/s
Storage	64GB eMMC 5.1		
Video Encode	1x 4K60 (H.265) 3x 4K30 (H.265) 7x 1080p60 (H.265) 15x 1080p30 (H.265)	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 Decode	1x 8K30 (H.265) 3x 4K60 (H.265) 7x 4K30 (H.265) 11x 1080p60 (H.265) 23x 1080p30 (H.265)	1x 8K30 (H.265) 2x 4K60 (H.265) 4x 4K30 (H.265) 9x 1080p60 (H.265) 18x 1080p30 (H.265)	1x 8K30 (H.265) 3x 4K60 (H.265) 7x 4K30 (H.265) 11x 1080p60 (H.265) 22x 1080p30 (H.265)
Power	15W - 75W	15W - 40W	15W - 60W

Dimension drawing

unit: mm



Y-C28 Interface description

Jetson Module Connector (J1)		
Function	Connection NVIDIA Jetson Thor T5000 module	
Sign	J1	
Type/Model	2034560003	
Pin definition	The pin definitions of this connector can be found in the pin definition description section of the NVIDIA Jetson Thor T5000 series core module data manual.	

USB Type-C(flash system) (J2)																																												
Function	USB TYPEC Connector(flash system)																																											
Sign	J2																																											
Type/Model	Standard Type C USB connector (Used for burning the operating system)																																											
Pin definition	<table><thead><tr><th>Pin</th><th>Signal</th></tr></thead><tbody><tr><td>B12</td><td>GND</td></tr><tr><td>A12</td><td>GND</td></tr><tr><td>B6</td><td>USB0_P</td></tr><tr><td>A6</td><td>USB0_P</td></tr><tr><td>B5</td><td>NC</td></tr><tr><td>B9</td><td>VBUS_B</td></tr><tr><td>A9</td><td>VBUS_A</td></tr><tr><td>25</td><td>TAB</td></tr><tr><td>27</td><td>TAB</td></tr></tbody></table>		Pin	Signal	B12	GND	A12	GND	B6	USB0_P	A6	USB0_P	B5	NC	B9	VBUS_B	A9	VBUS_A	25	TAB	27	TAB	<table><thead><tr><th>Pin</th><th>Signal</th></tr></thead><tbody><tr><td>B1</td><td>GND</td></tr><tr><td>A1</td><td>GND</td></tr><tr><td>B7</td><td>USB0_N</td></tr><tr><td>A7</td><td>USB0_N</td></tr><tr><td>A5</td><td>NC</td></tr><tr><td>B4</td><td>VBUS_B</td></tr><tr><td>A4</td><td>VBUS_A</td></tr><tr><td>26</td><td>TAB</td></tr><tr><td>28</td><td>TAB</td></tr></tbody></table>		Pin	Signal	B1	GND	A1	GND	B7	USB0_N	A7	USB0_N	A5	NC	B4	VBUS_B	A4	VBUS_A	26	TAB	28	TAB
	Pin	Signal																																										
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A4	VBUS_A																																											
26	TAB																																											
28	TAB																																											
																																												

Double-Layer USB 3.2 Type-C （J3）																																																												
Function	Double-Layer USB 3.2 Type-C connector																																																											
Sign	J3																																																											
Type /Model	XUBF-0336-24B02																																																											
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>B12</td><td>GND</td><td>B1</td><td>GND</td></tr><tr><td>A12</td><td>GND</td><td>A1</td><td>GND</td></tr><tr><td>B6</td><td>USB1_P</td><td>B7</td><td>USB1_N</td></tr><tr><td>A6</td><td>USB1_P</td><td>A7</td><td>USB1_N</td></tr><tr><td>B2</td><td>TYPECO_TX2_P</td><td>B3</td><td>TYPECO_TX2_N</td></tr><tr><td>A11</td><td>TYPECO_RX2_P</td><td>A10</td><td>TYPECO_RX2_N</td></tr><tr><td>A2</td><td>TYPECO_TX1_P</td><td>A3</td><td>TYPECO_TX1_N</td></tr><tr><td>B11</td><td>TYPECO_RX1_P</td><td>B10</td><td>TYPECO_RX1_N</td></tr><tr><td>B8</td><td>NC</td><td>A8</td><td>NC</td></tr><tr><td>B5</td><td>TYPECO_CC2</td><td>A5</td><td>TYPECO_CC1</td></tr><tr><td>B9</td><td>VBUS_B</td><td>B4</td><td>VBUS_B</td></tr><tr><td>A9</td><td>VBUS_A</td><td>A4</td><td>VBUS_A</td></tr><tr><td>1</td><td>TAB</td><td>2</td><td>TAB</td></tr></table>				Pin	Signal	Pin	Signal	B12	GND	B1	GND	A12	GND	A1	GND	B6	USB1_P	B7	USB1_N	A6	USB1_P	A7	USB1_N	B2	TYPECO_TX2_P	B3	TYPECO_TX2_N	A11	TYPECO_RX2_P	A10	TYPECO_RX2_N	A2	TYPECO_TX1_P	A3	TYPECO_TX1_N	B11	TYPECO_RX1_P	B10	TYPECO_RX1_N	B8	NC	A8	NC	B5	TYPECO_CC2	A5	TYPECO_CC1	B9	VBUS_B	B4	VBUS_B	A9	VBUS_A	A4	VBUS_A	1	TAB	2	TAB
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	B6	USB1_P	B7	USB1_N																																																								
	A6	USB1_P	A7	USB1_N																																																								
	B2	TYPECO_TX2_P	B3	TYPECO_TX2_N																																																								
	A11	TYPECO_RX2_P	A10	TYPECO_RX2_N																																																								
	A2	TYPECO_TX1_P	A3	TYPECO_TX1_N																																																								
	B11	TYPECO_RX1_P	B10	TYPECO_RX1_N																																																								
	B8	NC	A8	NC																																																								
	B5	TYPECO_CC2	A5	TYPECO_CC1																																																								
	B9	VBUS_B	B4	VBUS_B																																																								
	A9	VBUS_A	A4	VBUS_A																																																								
	1	TAB	2	TAB																																																								
Note: J3B (lower layer) B6B7A6A7 use USB 2. TYPE uses TYPEC1. The other pins are the same.																																																												





Double-Layer USB 3.0 Type-A (J4)

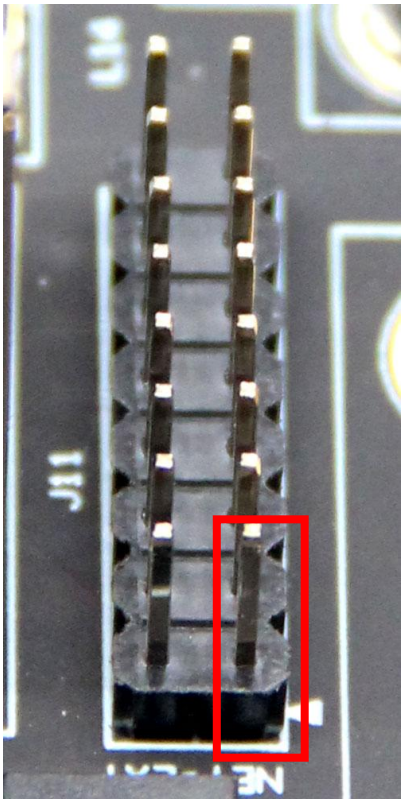
Function	Double-Layer USB 3.0 Type-A Connector					
Sign	J4					
Type/Model	USB-303WSD-BRW					
Pin definition						
	Pin	Signal	Pin	Signal		
	1	VBUS	2	DN		
	3	DP	4	GND		
	5	RX_N	6	RX_P		
	7	GND	8	TX_N		
	9	TX_P	19	TAB		
	20	TAB1				

RJ45&USB3.0 Type-A (J6/J5)

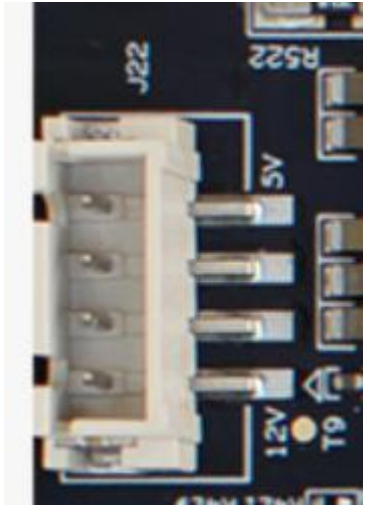
Function	RJ45&USB3.0 Type-A Connector			
Sign	J6/J5			
Type/Model	Standard RJ45 type network cable connector / USB connector			
Pin definition	The definitions of J5A/J6A are as follows. J5B/J6B are the same as the USB definitions mentioned above.			
	Pin	Signal	Pin	Signal
	1	GND	L1	VCC_3V3
	L2	LED2_3V3	L3	VCC_3V3
	2	MDI0_P	3	MDI0_N
	4	MDI1_P	5	MDI1_N
	6	MDI2_P	7	MDI2_N
	8	MDI3_P	9	MDI3_N
	L4	LED1_3V3	10	GND



Ethernet Header (J10/J11)				
Function	Ethernet Header			
Sign	J10/J11			
Type/Model	2.0 mm pitch, 2*8-pin dual-row straight-mount pins HDR200M-2X8			
Pin definition	Pin	Signal	Pin	Signal
	1	GND	2	VCC_3V3
	3	VCC_3V3	4	VCC_3V3
	5	LED1_3V3	6	LED2_3V3
	7	NC	8	NC
	9	MDI0_N	10	MDI0_P
	11	MDI1_N	12	MDI1_P
	13	MDI2_N	14	MDI2_P
	15	MDI3_N	16	MDI3_P
	Pin 1 position: At the marked area on the right image.			



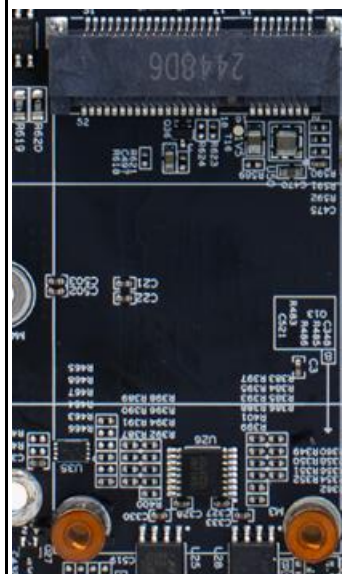
Power Expansion Output Connector (J22)				
Function	Power Expansion Output Connector			
Sign	J22			
Type/Model	HC-XH-4ALT			
Pin definition	Pin	Signal	Pin	Signal
	1	VCC (12V)	2	GND
	3	GND	4	VCC (5V)



HDMI Type-A (J13)				
Function	HDMI Type-A			
Sign	J13			
Type/Model	HDMI-001C			
Pin definition	Pin	Signal	Pin	Signal
	1	D2_P	2	GND
	3	D2_N	4	D1_P
	5	GND	6	D1_N
	7	D0_P	8	GND
	9	D0_N	10	TXC_P
	11	GND	12	TXC_N
	13	CEC_1V8	14	NC
	15	DDC_SCL_1V8	16	DDC_SDA_1V8
	17	GND	18	VCC
	19	HPD_1V8		
				

Fan Header (J15)				
Function	Connect the external cooling fan			
Sign	J15			
Type/Model	47053-1000			
Pin definition	Pin	Signal	Pin	Signal
	1	GND	2	POWER(12V)
	3	TACH	4	PWM
				

MiniPCle (J9)				
Function	MiniPCle Connector			
Sign	J9			
Type/Model	MiniPCle connector supporting full-length and half-length expansion cards (PCIE-52P90H)			
Pin definition	Pin	Signal	Pin	Signal
	1	PEX_WAKE_N_3V3	2	VCC_3V3_PCIE
	3	NC	4	GND
	5	NC	6	VCC_1V5_PCIE
	7	PXE_C2_CLKREQ_N	8	NC
	9	GND	10	NC
	11	UPHY_REFCLK5_P	12	NC
	13	UPHY_REFCLK5_N	14	NC
	15	GND	16	NC
	17	NC	18	GND
	19	NC	20	NC
	21	GND	22	PXE_C2_RST_N_3V3
	23	UPHY_RX4_N	24	VCC_3V3_PCIE
	25	UPHY_RX4_P	26	GND
	27	GND	28	VCC_1V5_PCIE
	29	GND	30	NC
	31	UPHY_TX4_N	32	NC
	33	UPHY_TX4_P	34	GND
	35	GND	36	NC
	37	GND	38	NC
	39	VCC_3V3_PCIE	40	GND
	41	VCC_3V3_PCIE	42	NC
	43	GND	44	NC
	45	NC	46	NC
	47	NC	48	VCC_1V5_PCIE
	49	NC	50	GND
	51	NC	52	VCC_3V3_PCIE



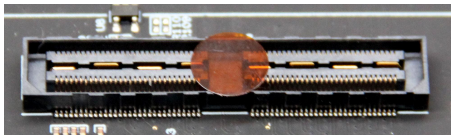
M.2 Key M (J12)

Function	M.2 Key M Slot							
Sign	J12							
Type /Model	Key M , 2280							
Pin definition	Standard M.2 Key M							
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
	1	GND	2	VCC_3V3	3	GND	4	VCC_3V3
	5	UPHY_RX11_N	6	NC	7	UPHY_RX11_P	8	NC
	9	GND	10	NC	11	UPHY_TX11_N	12	VCC_3V3
	13	UPHY_TX11_P	14	VCC_3V3	15	GND	16	VCC_3V3
	17	UPHY_RX10_N	18	VCC_3V3	19	UPHY_RX10_P	20	NC
	21	GND	22	NC	23	UPHY_TX10_N	24	NC
	25	UPHY_TX10_P	26	NC	27	GND	28	NC
	29	UPHY_RX9_N	30	NC	31	UPHY_RX9_P	32	NC
	33	GND	34	NC	35	UPHY_TX9_N	36	NC
	37	UPHY_TX9_P	38	NC	39	GND	40	NC
	41	UPHY_RX8_N	42	NC	43	UPHY_RX8_P	44	NC
	45	GND	46	NC	47	UPHY_TX8_N	48	NC
	49	UPHY_TX8_P	50	PXE_C5_RST_N_3V3	51	GND	52	_PXE_C5_CLKREQ_N_3V3
	53	UPHY_REFCLK3_N	54	PXE_WAKE_N_3V3	55	UPHY_REFCLK3_P	56	NC
	57	GND	58	NC	59	NC	60	NC
	61	NC	62	NC	63	NC	64	NC
	65	NC	66	NC	67	NC	68	NC
	69	NC	70	VCC_3V3	71	GND	72	VCC_3V3
	73	GND	74	VCC_3V3	75	GND		
	Note: When paired with AGX ORIN 64/32G or AGX ORIN Industrial Edition, this interface cannot be used							

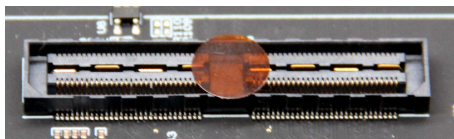
M.2 Key B (J7)

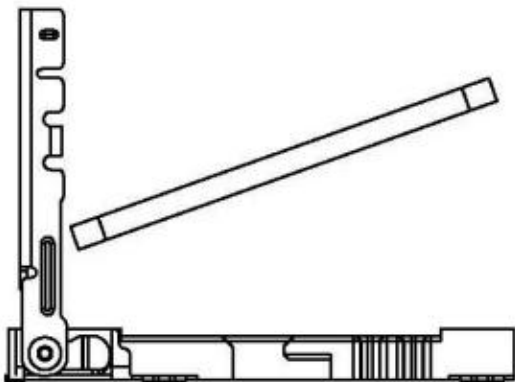
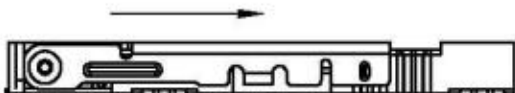
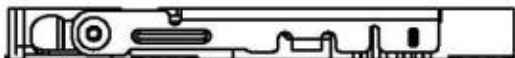
Function	M.2 Key B Slot					
Sign	J7					
Type /Model	B Key , 3050					
Pin definition	Pin	Signal	Pin	Signal	Pin	Signal
	1	NC	2	VCC_3V9	3	GND
	4	VCC_3V9	5	GND	6	FULL_CARD_POWER_OFF
	7	USB20_D_P3	8	W_DISABLE1	9	USB20_D_N3
	10	WWAN_LED	11	GND	12	NC
	13	NC	14	NC	15	NC
	16	NC	17	NC	18	NC
	19	NC	20	NC	21	NC
	22	NC	23	WAKE_WAN_N_1V8	24	NC
	25	NC	26	W_DISABLE2	27	GND
	28	NC	29	USB30_RX_N3	30	USIM1_RESET
	31	USB30_RX_P3	32	USIM1_CLK	33	GND
	34	USIM1_DATA	35	USB30_TX_N3	36	USIM1_VDD
	37	USB30_TX_P3	38	NC	39	GND
	40	NC	41	NC	42	NC
	43	NC	44	NC	45	GND
	46	NC	47	NC	48	NC
	49	NC	50	NC	51	GND
	52	NC	53	NC	54	NC
	55	NC	56	NC	57	GND
	58	NC	59	NC	60	NC
	61	NC	62	NC	63	NC
	64	NC	65	NC	66	NC
	67	RM_RESET_N	68	NC	69	NC
	70	VCC_3V9	71	GND	72	VCC_3V9
	73	GND	74	VCC_3V9	75	NC
	76	GND				

Camera Expansion Header (J14)

Func tion	Camera Expansion Header																																																																																																																																																					
Sign	J14																																																																																																																																																					
Type /Mod el	0.5mm pitch, 120-pin QSH-060-01-H-D-A-K-TR connector																																																																																																																																																					
Pin defin ition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>CSI0_D0_P</td><td>2</td><td>CSI1_D0_P</td><td>3</td><td>CSI0_D0_N</td></tr><tr><td>4</td><td>CSI1_D0_N</td><td>5</td><td>GND</td><td>6</td><td>GND</td></tr><tr><td>7</td><td>CSI0_CLK_P</td><td>8</td><td>CSI1_CLK_P</td><td>9</td><td>CSI0_CLK_N</td></tr><tr><td>10</td><td>CSI1_CLK_N</td><td>11</td><td>GND</td><td>12</td><td>GND</td></tr><tr><td>13</td><td>CSI0_D1_P</td><td>14</td><td>CSI1_D1_P</td><td>15</td><td>CSI0_D1_N</td></tr><tr><td>16</td><td>CSI1_D1_N</td><td>17</td><td>GND</td><td>18</td><td>GND</td></tr><tr><td>19</td><td>CSI2_D0_P</td><td>20</td><td>CSI3_D0_P</td><td>21</td><td>CSI2_D0_N</td></tr><tr><td>22</td><td>CSI3_D0_N</td><td>23</td><td>GND</td><td>24</td><td>GND</td></tr><tr><td>25</td><td>CSI2_CLK_P</td><td>26</td><td>CSI3_CLK_P</td><td>27</td><td>CSI2_CLK_N</td></tr><tr><td>28</td><td>CSI3_CLK_N</td><td>29</td><td>GND</td><td>30</td><td>GND</td></tr><tr><td>31</td><td>CSI2_D1_P</td><td>32</td><td>CSI3_D1_P</td><td>33</td><td>CSI2_D1_N</td></tr><tr><td>34</td><td>CSI3_D1_N</td><td>35</td><td>GND</td><td>36</td><td>GND</td></tr><tr><td>37</td><td>CSI4_D0_P</td><td>38</td><td>CSI6_D0_P</td><td>39</td><td>CSI4_D0_N</td></tr><tr><td>40</td><td>CSI6_D0_N</td><td>41</td><td>GND</td><td>42</td><td>GND</td></tr><tr><td>43</td><td>CSI4_CLK_P</td><td>44</td><td>CSI6_CLK_P</td><td>45</td><td>CSI4_CLK_N</td></tr><tr><td>46</td><td>CSI6_CLK_N</td><td>47</td><td>GND</td><td>48</td><td>GND</td></tr><tr><td>49</td><td>CSI4_D1_P</td><td>50</td><td>CSI6_D1_P</td><td>51</td><td>CSI4_D1_N</td></tr><tr><td>52</td><td>CSI6_D1_N</td><td>53</td><td>GND</td><td>54</td><td>GND</td></tr><tr><td>55</td><td>VCC_CAM_12V</td><td>56</td><td>VCC_CAM_12V</td><td>57</td><td>VCC_CAM_12V</td></tr><tr><td>58</td><td>VCC_CAM_12V</td><td>59</td><td>CSI5_D0_P</td><td>60</td><td>CSI7_D0_P</td></tr><tr><td>61</td><td>CSI5_D0_N</td><td>62</td><td>CSI7_D0_N</td><td>63</td><td>GND</td></tr><tr><td>64</td><td>GND</td><td>65</td><td>CSI5_CLK_P</td><td>66</td><td>CSI7_CLK_P</td></tr><tr><td>67</td><td>CSI5_CLK_N</td><td>68</td><td>CSI7_CLK_N</td><td>69</td><td>GND</td></tr></table>						Pin	Signal	Pin	Signal	Pin	Signal	1	CSI0_D0_P	2	CSI1_D0_P	3	CSI0_D0_N	4	CSI1_D0_N	5	GND	6	GND	7	CSI0_CLK_P	8	CSI1_CLK_P	9	CSI0_CLK_N	10	CSI1_CLK_N	11	GND	12	GND	13	CSI0_D1_P	14	CSI1_D1_P	15	CSI0_D1_N	16	CSI1_D1_N	17	GND	18	GND	19	CSI2_D0_P	20	CSI3_D0_P	21	CSI2_D0_N	22	CSI3_D0_N	23	GND	24	GND	25	CSI2_CLK_P	26	CSI3_CLK_P	27	CSI2_CLK_N	28	CSI3_CLK_N	29	GND	30	GND	31	CSI2_D1_P	32	CSI3_D1_P	33	CSI2_D1_N	34	CSI3_D1_N	35	GND	36	GND	37	CSI4_D0_P	38	CSI6_D0_P	39	CSI4_D0_N	40	CSI6_D0_N	41	GND	42	GND	43	CSI4_CLK_P	44	CSI6_CLK_P	45	CSI4_CLK_N	46	CSI6_CLK_N	47	GND	48	GND	49	CSI4_D1_P	50	CSI6_D1_P	51	CSI4_D1_N	52	CSI6_D1_N	53	GND	54	GND	55	VCC_CAM_12V	56	VCC_CAM_12V	57	VCC_CAM_12V	58	VCC_CAM_12V	59	CSI5_D0_P	60	CSI7_D0_P	61	CSI5_D0_N	62	CSI7_D0_N	63	GND	64	GND	65	CSI5_CLK_P	66	CSI7_CLK_P	67	CSI5_CLK_N	68	CSI7_CLK_N	69	GND
	Pin	Signal	Pin	Signal	Pin	Signal																																																																																																																																																
	1	CSI0_D0_P	2	CSI1_D0_P	3	CSI0_D0_N																																																																																																																																																
	4	CSI1_D0_N	5	GND	6	GND																																																																																																																																																
	7	CSI0_CLK_P	8	CSI1_CLK_P	9	CSI0_CLK_N																																																																																																																																																
	10	CSI1_CLK_N	11	GND	12	GND																																																																																																																																																
	13	CSI0_D1_P	14	CSI1_D1_P	15	CSI0_D1_N																																																																																																																																																
	16	CSI1_D1_N	17	GND	18	GND																																																																																																																																																
	19	CSI2_D0_P	20	CSI3_D0_P	21	CSI2_D0_N																																																																																																																																																
	22	CSI3_D0_N	23	GND	24	GND																																																																																																																																																
	25	CSI2_CLK_P	26	CSI3_CLK_P	27	CSI2_CLK_N																																																																																																																																																
	28	CSI3_CLK_N	29	GND	30	GND																																																																																																																																																
	31	CSI2_D1_P	32	CSI3_D1_P	33	CSI2_D1_N																																																																																																																																																
	34	CSI3_D1_N	35	GND	36	GND																																																																																																																																																
	37	CSI4_D0_P	38	CSI6_D0_P	39	CSI4_D0_N																																																																																																																																																
	40	CSI6_D0_N	41	GND	42	GND																																																																																																																																																
	43	CSI4_CLK_P	44	CSI6_CLK_P	45	CSI4_CLK_N																																																																																																																																																
	46	CSI6_CLK_N	47	GND	48	GND																																																																																																																																																
	49	CSI4_D1_P	50	CSI6_D1_P	51	CSI4_D1_N																																																																																																																																																
	52	CSI6_D1_N	53	GND	54	GND																																																																																																																																																
	55	VCC_CAM_12V	56	VCC_CAM_12V	57	VCC_CAM_12V																																																																																																																																																
	58	VCC_CAM_12V	59	CSI5_D0_P	60	CSI7_D0_P																																																																																																																																																
	61	CSI5_D0_N	62	CSI7_D0_N	63	GND																																																																																																																																																
	64	GND	65	CSI5_CLK_P	66	CSI7_CLK_P																																																																																																																																																
67	CSI5_CLK_N	68	CSI7_CLK_N	69	GND																																																																																																																																																	

Camera Expansion Header (J14)

Function	Camera Expansion Header					
Sign	J14					
Type /Model	0.5mm pitch, 120-pin QSH-060-01-H-D-A-K-TR connector					
Pin definition	Pin	Signal	Pin	Signal	Pin	Signal
	70	GND	71	CSI5_D1_P	72	CSI7_D1_P
	73	CSI5_D1_N	74	CSI7_D1_N	75	I2C3_CLK_1V8
	76	CAM_ERROR1_1V8	77	I2C3_DAT_1V8	78	CAM_ERROR2_1V8
	79	GND	80	GND	81	VCC_2V8
	82	VCC_2V8	83	VCC_2V8	84	CAM_ERROR3_1V8
	85	CAM_FRSYNC1_1V8	86	CAM_FRSYNC_INPUT_1V8	87	I2C2_CLK_1V8
	88	MCLK03_CAM1_MCLK_1V8	89	I2C2_SDA_1V8	90	CAM1_PWDN_1V8
	91	CAM0_MCLK02_1V8	92	CAM1_RST_1V8	93	CAM0_PWDN_1V8
	94	MCLK04_CAM2_MCLK_1V8	95	CAM0_RST_1V8	96	CAM_FRSYNC4_1V8
	97	CAM_FRSYNC3_1V8	98	CAM_FRSYNC2_1V8	99	GND
	100	GND	101	CAM_TE_RSV_1V8	102	VCC_1V8
	103	CAM_INT3_1V8	104	CAM_INT4_1V8	105	I2C9_SCL_1V8
	106	CAM_INT2_1V8	107	I2C9_SDA_1V8	108	VCC_3V3
	109	CAM_BACKLIGHT_PWM_1V8	110	VCC_3V3	111	CAM_SPI_SCK_1V8
	112	CAM_SPI_MOSI_1V8	113	CAM_SPI_CS0_N_1V8	114	CAM_SPI_MISO_1V8
	115	GND	116	CAM_ID_SEL	117	CAM_INT1_1V8
	118	VCC_3V3	119	CAM_VDD_SYS_EN_1V8	120	VCC_3V3
	121	GND	122	GND	123	GND
	124	GND	125	GND	126	GND
	127	GND	128	GND		

Nano SIM Card Slot (J8)																												
Function	Flip-top Nano SIM card slot																											
Sign	J8																											
Type/Model	XD5M-0639-0250																											
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>GND</td><td>2</td><td>GND</td></tr><tr><td>3</td><td>GND</td><td>4</td><td>GND</td></tr><tr><td>C3</td><td>USIM1_CLK</td><td>C7</td><td>USIM1_D ATA</td></tr><tr><td>C2</td><td>USIM1_RST</td><td>C6</td><td>NC</td></tr><tr><td>C1</td><td>USIM1_VD D</td><td>C5</td><td>GND</td></tr></table>				Pin	Signal	Pin	Signal	1	GND	2	GND	3	GND	4	GND	C3	USIM1_CLK	C7	USIM1_D ATA	C2	USIM1_RST	C6	NC	C1	USIM1_VD D	C5	GND
	Pin	Signal	Pin	Signal																								
	1	GND	2	GND																								
	3	GND	4	GND																								
	C3	USIM1_CLK	C7	USIM1_D ATA																								
	C2	USIM1_RST	C6	NC																								
	C1	USIM1_VD D	C5	GND																								
																												
	STEP 1 INSERT NANO SIM CARD																											
																												
STEP 2 PUSH THE SHELL																												
																												
STEP 3 FINISH																												

MGBE Extender Signal (J21)					
Function	MGBE Extender Signal Connector				
Sign	J21				
Type/Model	80SH05-40V01G10DPT				
Pin definition	Pin	Signal	Pin	Signal	
	1	3.3V	2	5V	
	3	3.3V	4	5V	
	5	1.8V	6	NC	
	7	1.8V	8	NC	
	9	NC	10	I2C3_SDA_1V8	
	11	NC	12	I2C3_SCL_1V8	
	13	XFI3_MDC_1V8	14	XFI0_MDC_1V8	
	15	XFI3_MDIO_1V8	16	XFI0_MDIO_1V8	
	17	XFI3_RST_N_1V8	18	XFI0_RST_N_1V8	
	19	XFI3_INT_N_1V8	20	XFI0_INT_N_1V8	
	21	UPHY_REFCLK2_N	22	XFI_DETECT_N_1V8	
	23	UPHY_REFCLK2_P	24	NC	
	25	UPHY_TX15_N	26	UPHY_TX12_N	
	27	UPHY_TX15_P	28	UPHY_TX12_P	
	29	UPHY_RX15_N	30	UPHY_RX12_N	
	31	UPHY_RX15_P	32	UPHY_RX12_P	
	33	UPHY_TX14_N	34	UPHY_TX13_N	
	35	UPHY_TX14_P	36	UPHY_TX13_P	
	37	UPHY_RX14_N	38	UPHY_RX13_N	
	39	UPHY_RX14_P	40	UPHY_RX13_P	
	41	GND	42	GND	
	43	GND	44	GND	
Note: When paired with AGX ORIN 64/32G or AGX ORIN Industrial Edition, this interface cannot be used					

Multi-Function Expantion Header (J18)																																																																																								
Function		Multi-Function Expantion Header																																																																																						
Sign		J18																																																																																						
Type/Model		2.0mm pitch, 2*20-pin dual-row straight-pin arrangement																																																																																						
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>3.3V</td><td>2</td><td>5V</td></tr><tr><td>3</td><td>3.3V</td><td>4</td><td>GND</td></tr><tr><td>5</td><td>UART1_TX_3V3</td><td>6</td><td>SPI1_CLK_3V3</td></tr><tr><td>7</td><td>UART1_RX_3V3</td><td>8</td><td>SPI1_MISO_3V3</td></tr><tr><td>9</td><td>UART2_TX_3V3</td><td>10</td><td>SPI1_MOSI_3V3</td></tr><tr><td>11</td><td>UART2_RX_3V3</td><td>12</td><td>SPI1_CS0_N_3V3</td></tr><tr><td>13</td><td>UART3_TX_3V3</td><td>14</td><td>SPI1_CS1_N_3V3</td></tr><tr><td>15</td><td>UART3_RX_3V3</td><td>16</td><td>GND</td></tr><tr><td>17</td><td>UART5_TX_3V3</td><td>18</td><td>I2S4_DIN_3V3</td></tr><tr><td>19</td><td>UART5_RX_3V3</td><td>20</td><td>I2S4_DOUT_3V3</td></tr><tr><td>21</td><td>I2C4_SDA_3V3</td><td>22</td><td>I2S4_FS_3V3</td></tr><tr><td>23</td><td>I2C4_SCL_3V3</td><td>24</td><td>I2S4_SCLK_3V3</td></tr><tr><td>25</td><td>I2C7_SDA_3V3</td><td>26</td><td>GPIO08_3V3</td></tr><tr><td>27</td><td>I2C7_SCL_3V3</td><td>28</td><td>GPIO09_3V3</td></tr><tr><td>29</td><td>GND</td><td>30</td><td>GND</td></tr><tr><td>31</td><td>CAN0_H</td><td>32</td><td>CAN2_H</td></tr><tr><td>33</td><td>CAN0_L</td><td>34</td><td>CAN2_L</td></tr><tr><td>35</td><td>CAN1_H</td><td>36</td><td>CAN3_H</td></tr><tr><td>37</td><td>CAN1_L</td><td>38</td><td>CAN3_L</td></tr><tr><td>39</td><td>GND</td><td>40</td><td>GND</td></tr></table>		Pin	Signal	Pin	Signal	1	3.3V	2	5V	3	3.3V	4	GND	5	UART1_TX_3V3	6	SPI1_CLK_3V3	7	UART1_RX_3V3	8	SPI1_MISO_3V3	9	UART2_TX_3V3	10	SPI1_MOSI_3V3	11	UART2_RX_3V3	12	SPI1_CS0_N_3V3	13	UART3_TX_3V3	14	SPI1_CS1_N_3V3	15	UART3_RX_3V3	16	GND	17	UART5_TX_3V3	18	I2S4_DIN_3V3	19	UART5_RX_3V3	20	I2S4_DOUT_3V3	21	I2C4_SDA_3V3	22	I2S4_FS_3V3	23	I2C4_SCL_3V3	24	I2S4_SCLK_3V3	25	I2C7_SDA_3V3	26	GPIO08_3V3	27	I2C7_SCL_3V3	28	GPIO09_3V3	29	GND	30	GND	31	CAN0_H	32	CAN2_H	33	CAN0_L	34	CAN2_L	35	CAN1_H	36	CAN3_H	37	CAN1_L	38	CAN3_L	39	GND	40	GND		
	Pin	Signal	Pin	Signal																																																																																				
	1	3.3V	2	5V																																																																																				
	3	3.3V	4	GND																																																																																				
	5	UART1_TX_3V3	6	SPI1_CLK_3V3																																																																																				
	7	UART1_RX_3V3	8	SPI1_MISO_3V3																																																																																				
	9	UART2_TX_3V3	10	SPI1_MOSI_3V3																																																																																				
	11	UART2_RX_3V3	12	SPI1_CS0_N_3V3																																																																																				
	13	UART3_TX_3V3	14	SPI1_CS1_N_3V3																																																																																				
	15	UART3_RX_3V3	16	GND																																																																																				
	17	UART5_TX_3V3	18	I2S4_DIN_3V3																																																																																				
	19	UART5_RX_3V3	20	I2S4_DOUT_3V3																																																																																				
	21	I2C4_SDA_3V3	22	I2S4_FS_3V3																																																																																				
	23	I2C4_SCL_3V3	24	I2S4_SCLK_3V3																																																																																				
	25	I2C7_SDA_3V3	26	GPIO08_3V3																																																																																				
	27	I2C7_SCL_3V3	28	GPIO09_3V3																																																																																				
	29	GND	30	GND																																																																																				
	31	CAN0_H	32	CAN2_H																																																																																				
	33	CAN0_L	34	CAN2_L																																																																																				
	35	CAN1_H	36	CAN3_H																																																																																				
	37	CAN1_L	38	CAN3_L																																																																																				
	39	GND	40	GND																																																																																				
	Pin 1 position: At the marked area on the right image.																																																																																							

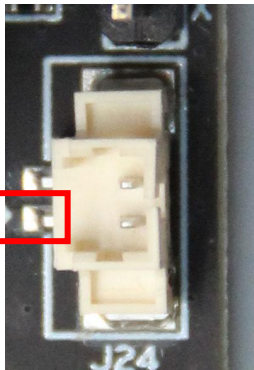
Multi-Function Expansion Header (J18)

Function	Multi-Function Expantion Header			
Sign	J18			
Type/Model	2.0mm pitch, 2*20-pin dual-row straight-pin arrangement			
Device name				
	UART1	UART2	UART5	UART3
	/dev/ttyAMA9	/dev/ttyAMA10	/dev/ttyAMA5	debugport,115200, 8N1
	Note: All serial ports are TTL serial ports.			
	GPIO08	GPIO09	I2c4	I2c7
	PDD.03	PDD.04	/dev/i2c-3	/dev/i2c-7
	SPI1	/dev/spidev0.0		

Note: When paired with the Jetson AGX T4000 module
CAN0, CAN1, CAN2, and CAN3 cannot be used.

When paired with Jetson AGX ORIN 64G, Jetson AGX ORIN 32G, or the industrial
version of Jetson AGX ORIN
CAN0 and CAN1 cannot be used.

RTC Battery (J20)

Function	Provide power support for the coreboard clock circuit				
Sign	J20				
Pin definition	Pin	Signal	Pin	Signal	
	1	VCC (3.3V)	2	GND	
Pin 1 position: At the marked area on the right image.					

Indicator light

Function	Indicator light	
Pin definition	Above: The user-defined status indicator light S is controlled by GPIO20 pin. GPIO20 system mapping number: PP.05 Middle: Power Supply Indicator Light P Lower: Module power-on indicator light R	

Ordering Information

Order Type	Function
Y-C28	NVIDIA® Jetson™ AGX Thor T5000 Interface expansion board for the core modules of the series.

E-commerce Platform

Taobao store Address: <https://shop333807435.taobao.com/>

Jingdong Store Address: <https://mall.jd.com/index-11467104.html?from=pc>

Ali International Station Address: <https://plink-ai.en.alibaba.com/>

Recovery Mode

The Jetson core module can operate in normal mode and Recovery mode. In Recovery mode, operations such as file system update, kernel update, Bootloader/UEFI update, and BCT update can be performed.

The steps to enter Recovery mode are as follows:

Shut off the power supply of the system.

- Connect the TYPEC cable to the TYPEC port (J2) of Y-C28 and the USB port of the Jetson development host.
- Press and hold the "Recovery" button (SW3), then supply power to the system. After powering on, keep the Recovery button pressed for more than 3 seconds, and then release the button.
- The system has entered the Recovery mode. At this point, you can proceed with the subsequent operations.

Method of Application

- Make sure that the voltages of all external systems have been turned off.
- Install the Jetson core module onto the J1 high-speed connector. During the installation process, pay attention to aligning the connectors properly and apply force evenly. After the module is installed in place, install the core module fixing screws.
- Install the necessary external cables. (For example: the display cable connected to the HDMI monitor, the power input cable for powering the system, the USB cable linking the keyboard and mouse, the camera, the MiniPCle function expansion module...)
- Connect the power cord to the power supply. (Before powering on, please make sure that the cooling device on the core module has been installed.)
- For systems without protective enclosures, after powering on the system, please avoid moving the hardware components and strictly prohibit touching the circuit boards and any electronic components on them with your body.

GPIO Test

The Y-C28, when paired with the Jetson module, comes with 2 GPIO ports. It can output 3.3V voltage programmatically. Please note that the input voltage should not exceed 3.3V.

When using the AGX Thor T5000 module, for example, with L4T 38.2 and GPIO 08:

- The content following the "#" symbol in the following commands is a comment and does not need to be included when executing the commands.
- `sudo apt update`
- `sudo apt install gpiod`
- `sudo gpiofind "PDD.03" #Here, it will return its group and number.`
- `# This is the measurement output method`
- `sudo gpioset --mode=wait `gpiofind "PDD.03"`=1`
 - # Use a multimeter to measure the voltage between this pin and GND, and it should be 3.3V.
 - # This is the measurement input method
- `sudo gpioget gpiochip0 21`
 - # After connecting this GPIO pin to 3.3V, the return value becomes 1
 - # After connecting this GPIO pin to GND, the return value becomes 0, which indicates that it is correct.

CAN Test

- When Y-C28 is equipped with the Jetson module, it comes with 4 channels of CAN signals. It can test two CAN channels by connecting them together, or it can connect to external devices for testing. During the test, please connect the CAN_H of the device to the CAN_H of the tested device, and CAN_L to the CAN_L of the tested device. The test command is as follows:
- `sudo apt-get install busybox can-utils`

```
sudo modprobe can
```

```
sudo modprobe can_raw
```

```
sudo modprobe mttcan
```

```
sudo ip link set can3 type can bitrate 500000 loopback  
off
```

```
sudo ip link set up can3
```

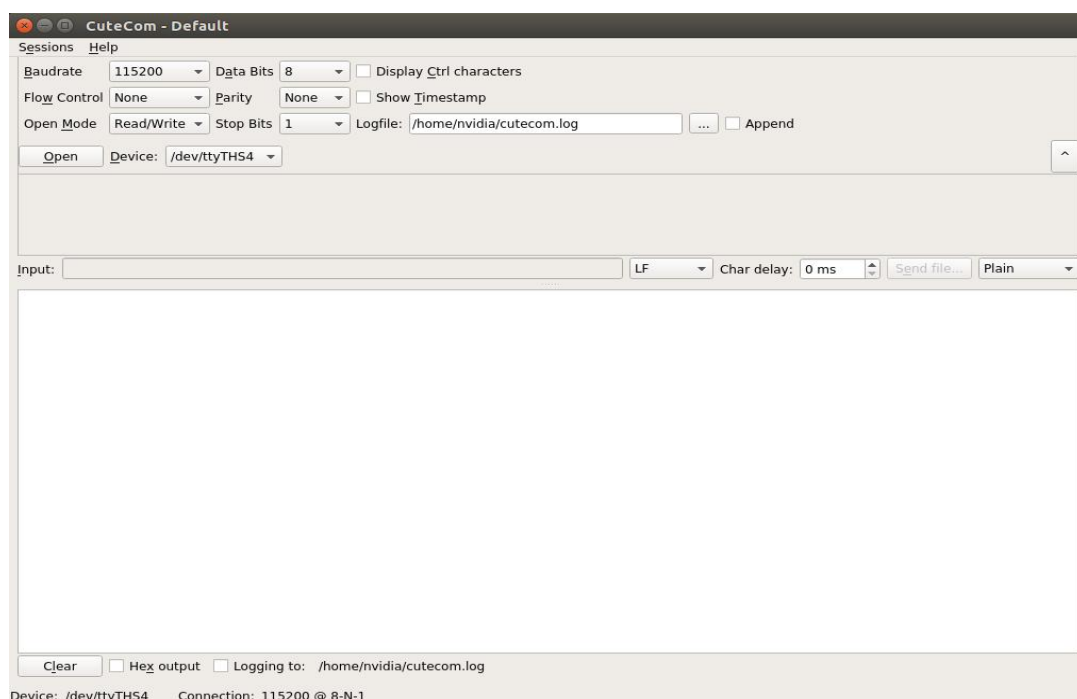
```
cansend can3 123#11223344aabbccdd
```

```
candump can3
```

Please refer to the link for the values of the module registers:
Controller Area Network (CAN) — Jetson Linux Developer Guide
documentation (nvidia.com)

Serial Port Test

- When the Y-C28 is equipped with the Jetson module, it comes with 3 TTL serial ports as standard. It can perform self-reception and self-transmission tests for a single serial port, as well as two serial port connection tests. The commands are as follows:
- `sudo apt-get install cutecom` #Install the serial port test tool
- `sudo cutecom` #For a single-serial port test, you only need to open one cutecom interface on each terminal. For a two-serial port connection test, use two terminals and open two cutecom interfaces.
- When conducting a single serial port test, please connect the RX and TX pins of the individual serial port. When testing the connection between two serial ports, connect the RX pin of COM1 to the TX pin of COM2, and the TX pin of COM1 to the RX pin of COM2.
- During the test, the serial port parameters were set in the Cutecom interface and the serial port was opened. After entering the data in the input box and sending it, the single serial port test would have data display reflected at the bottom of the Cutecom interface.
- The interface of the serial port testing tool cutecom is as follows:



Special Instructions

- Initial system username: **nvidia** , password: **nvidia**, no password su. If root permissions are required, use sudo to grant permissions, or use sudo su to access the root user.
- The pre-installed system is pure by default and does not contain Jetpack software. You can use the following command to install the software. Do not replace or modify the default software source before installation:
 - `sudo apt-get update`
 - `sudo apt-get install nvidia-jetpack`
- It can also be installed over the network using SDKmanager software.
- For more information please refer to :Jetson wiki (plink-ai.com)