AI Development Carrier Board
GC-A101
Datasheet

Date 2024-04-10

PLink-AI Ascend

品立科技 | 昇腾APN合作伙伴

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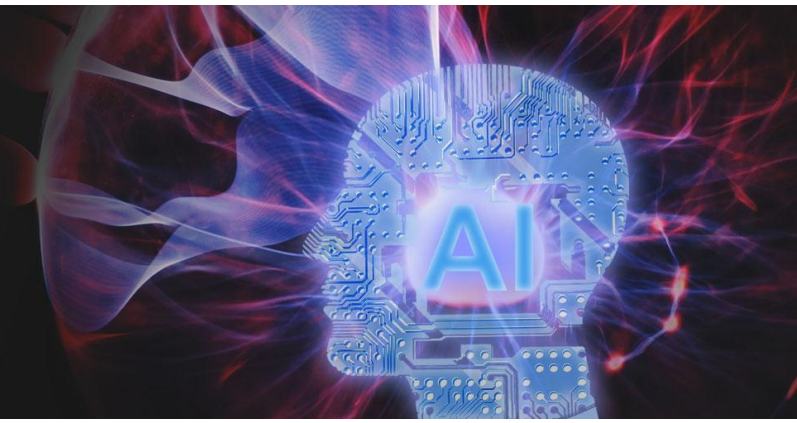

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GC-A101 Datasheet Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2024-04-10	Create the document	V 1.1

Product hardware revision history

Hardware version	Revised date	Revised contents
V 1.1	2024-04-10	Initial version

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.

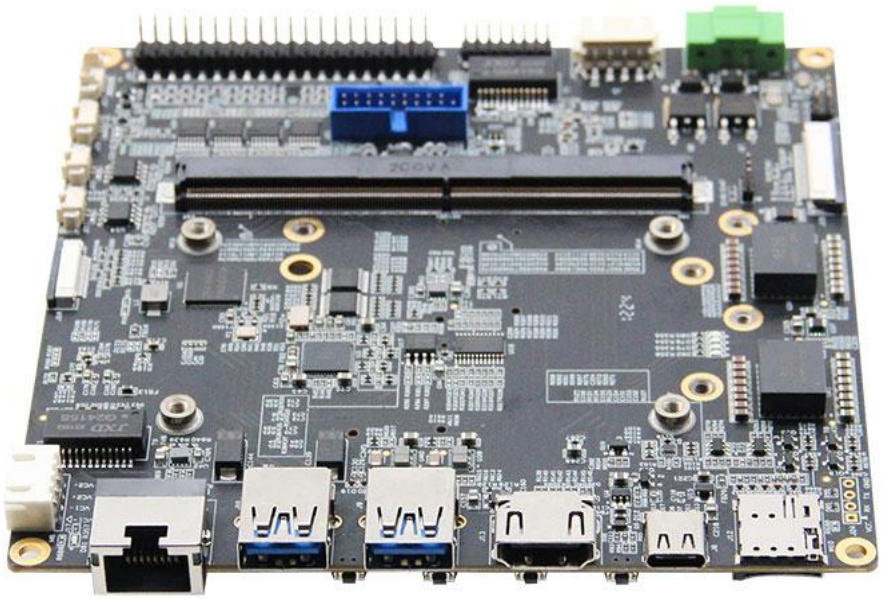
CONTENS

1 Introduction

GC-A101 Artificial Intelligence development board is a high-performance AI board for the Atlas 200I A2 acceleration module, the Atlas 200I A2 acceleration module integrates the Senter 310 series AI processor, which can provide 8 TOPS/20 TOPS AI computing power. It can be widely used in artificial intelligence processing scenarios such as intelligent monitoring, education and robotics.

All the devices on the board are wide-temperature industrial models, the main interface is designed for electrostatic safety protection, and the power supply application scheme with high reliability is adopted, with a rich external interface. The carrier board comes with a TF card slot, and a carrier board with multiple starting media provides greater flexibility and compatibility.

- **Appearance**



2 Product Specification

Carrier board	GC-A101
Module	Ascend Atlas 200I A2 module
Dimensions (L+W+H)	130.8mm x 128.5mm x 18.8mm (L/W Not Including I/O ports and mounting holes)
Weight	113g
Power Supply	DC 19V~36V
OS	openEuler/Ubuntu

Item	Specification
Temperature	-40°C~85°C

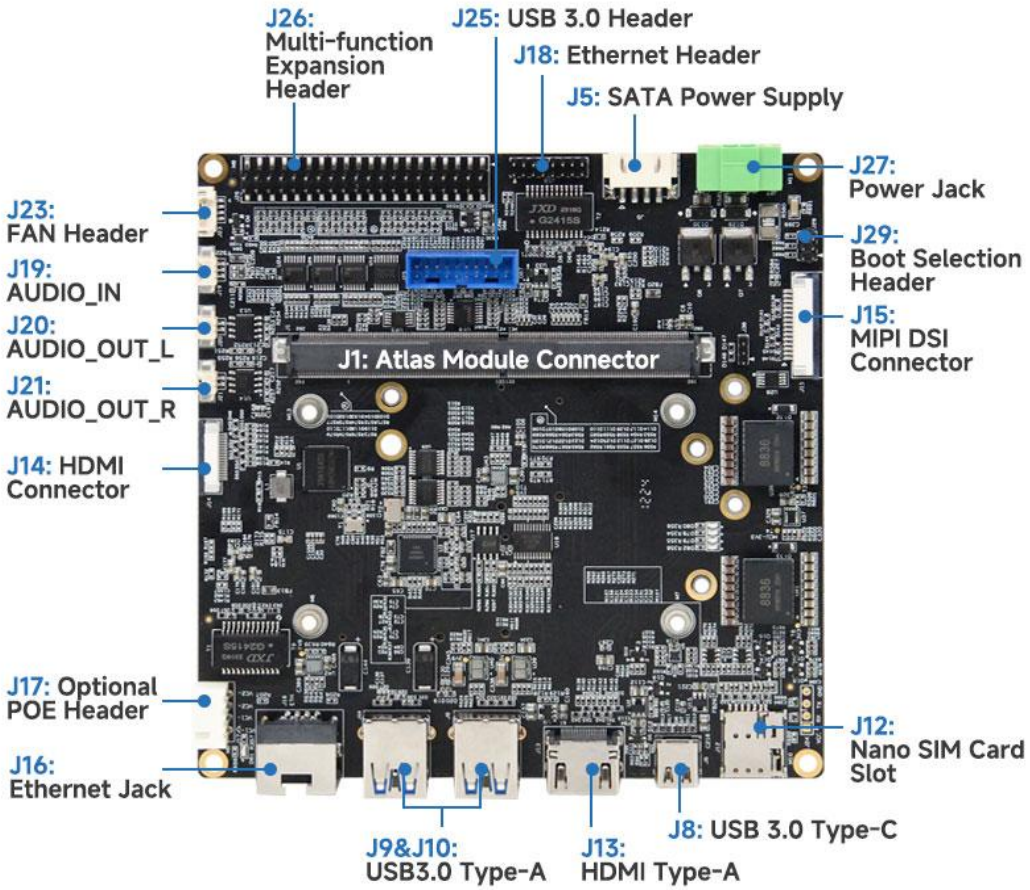
I/O Feature

Interface	Quantity	Interface	Quantity
Ethernet Jack	1	USB Type-C	1
Ethetnet Header	1	USB 3.0 Type-A	2
Nano SIM Card Slot	1	USB 3.0 Header (2xUSB3.0)	1
Boot Selection Header	1	HDMI Connector	1
SATA Signal Connector	1	HDMI Type A	1
Power Input	1	FAN Header	1
Micro SD Card Solt	1	AUDIO_IN	1
MIPI DSI	1	AUDIO_OUT	2
Optional POE Header	1	M.2 Key B	1
M.2 Key M	1	M.2 Key E	1
Multi-function Expansion Header	1 (GPIO, I2C, SPI, I2S, UART.....)		

3 Module Specification (Ascend Atlas 200I A2)

	20 TOPS 12GB	20 TOPS 8GB	8 TOPS 4GB
AI Compute Power	20 TOPS INT8 10 TFLOPS FP16		8 TOPS INT8 4 TFLOPS FP16
Memory	12GB 96bit LPDDR4x 4266 Mbps (ECC)	8GB 64bit LPDDR4x 4266 Mbps (ECC)	4GB 64bit LPDDR4x 3200 Mbps (ECC)
Encoding	20x 1080p 30fps(H.264/H.265) 3x 4k 50fps(H.264/H.265)		12x 1080p 30fps (H.264/H.265) 2x 4k 50fps (H.264/H.265)
Decoding	40x 1080p 30fps(H.264/H.265) 4x 4k 75fps(H.264/H.265)		20x 1080p 30fps (H.264/H.265) 2x 4k 75fps (H.264/H.265)
JPEG Encoding	1080p 256fps		1080p 256fps
JPEG Decoding	1080p 512fps		1080p 512fps
Power	25W	24.5W	21W

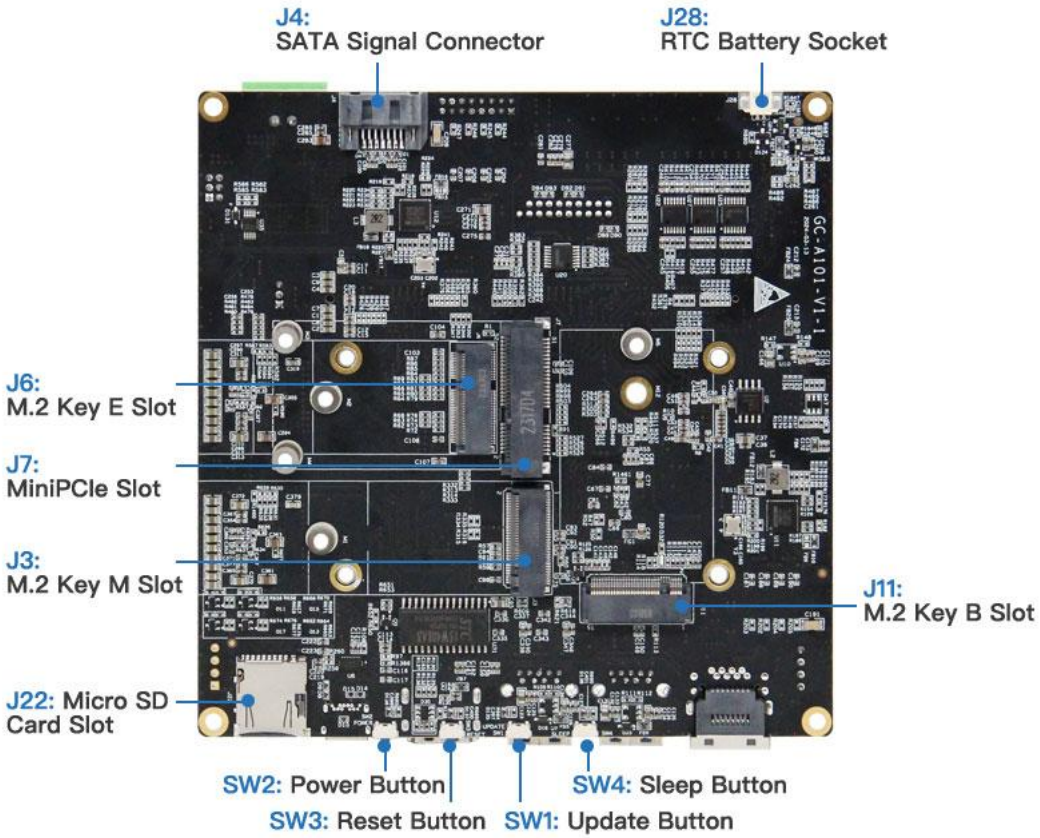
4 Ports on the Front Panel



Front function connector

Sign	Function	Sign	Function
J1	Atlas Module Connector	J16	Ethernet Jack
J10/ J9	USB3.0 Type A	J13	HDMI Type A
J8	USB Type-C	J12	Nano SIM Card Slot
J15	MIPI DSI	J29	Boot Selection Header
J27	Power Jack	J5	SATA Power Supply
J18	Ethetnet Header	J25	USB3.0 Header
J23	Fan Header	J19	AUDIO_IN
J20/ J21	AUDIO_OUT(L/R)	J14	HDMI Connector
J17	Opetional POE Header	J26	Mulit-function Expansion Header

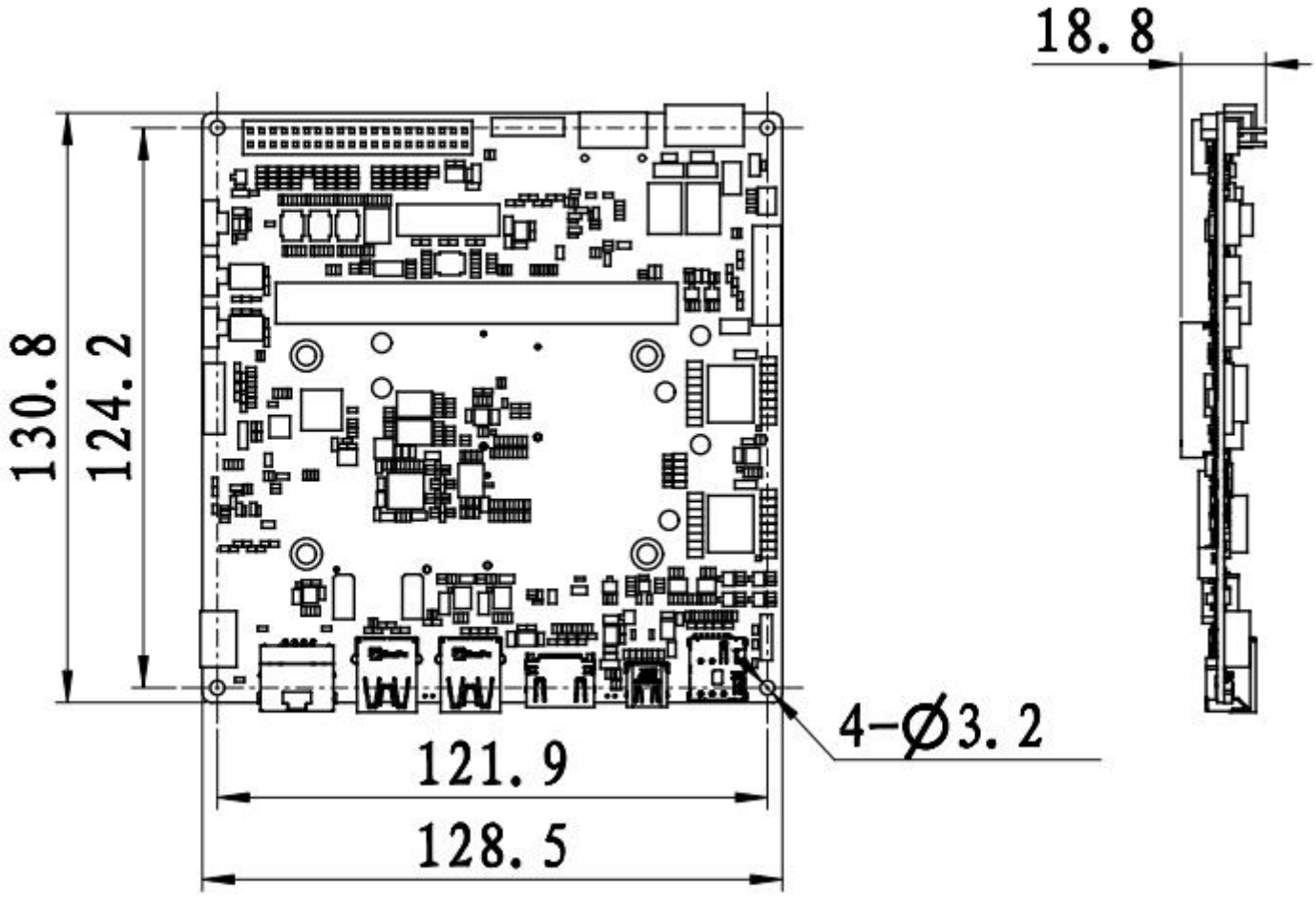
Rear external interface



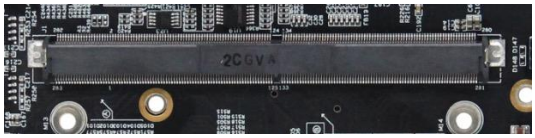
Backside function connector

Sign	Function	Sign	Function
J4	SATA Signal Connector	J28	RTC Battery Socket
SW4	Sleep Button	SW2	Power Button
SW3	Reset Button	SW1	Update Button
J7	miniPCIe Slot	J6	M.2 Key E Slot
J3	M.2 Key M Slot	J11	M.2 Key B Slot
J22	Micro SD Card Slot		

5 Dimension figure



6 GC-A101Interface definition description

Atlas Module Connector（J1）		
Function	Connect the Atlas 200I A2 accelerator module	
Sign	J1	
Type/Moder	AS0B826-S55B-7H	
Pin definition	For pin definitions of this connector, refer to the pin definition instructions in the Connection Atlas 200I A2 Accelerator Module data book	

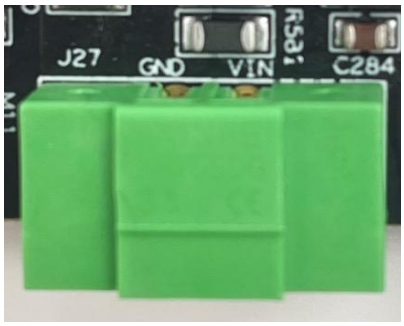
USB3.0 Type A （J9/J10）		
Function	TYPE A USB3.0 connector	
Sign	J9/J10	
Type/Moder	Type-A Standard USB 3.0 port	
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>VBUS</td><td>2</td><td>DN</td></tr><tr><td>3</td><td>DP</td><td>4</td><td>GND</td></tr><tr><td>5</td><td>RX_N</td><td>6</td><td>RX_P</td></tr><tr><td>7</td><td>GND</td><td>8</td><td>TX_N</td></tr><tr><td>9</td><td>TX_P</td><td>10</td><td>GND</td></tr><tr><td>11</td><td>GND</td><td></td><td></td></tr></table>	

Power Input（J27）

Function	Power input terminal (female)
Sign	J27
Type/Moder	XK15EDGRM-3.5MM-2P
Pin definition	

Pin	Signal	Pin	Signal
1	GND(-)	2	VIN(+)

DC19~36V

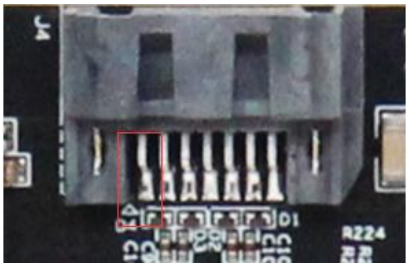


SATA Signal Connector (J4)

Function	SATA connector
Sign	J4
Type/Moder	XUTS-0727-0332(J4)
Pin definition	

Pin	Signal	Pin	Signal
1	GND	2	A+
3	A-	4	GND
5	B-	6	B+
7	GND	8	TAB
9	TAB1		

Pin 1 Position: right picture identification.

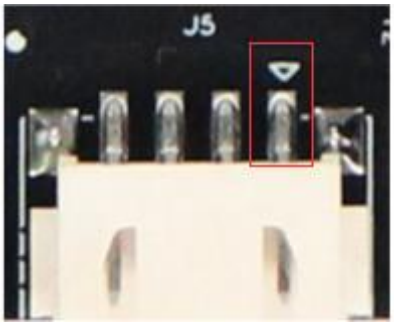


STAT Power Supply(J5)

Function	STAT Power Supply
Sign	J5
Type/Moder	XUTS-0727-0332(J4)
Pin definition	

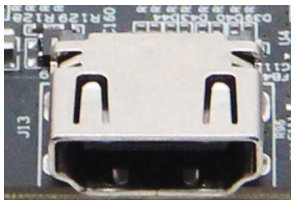
Pin	Signal	Pin	Signal
1	VCC(12V)	2	GND
3	GND	4	VCC(5V)

Pin 1 Position: right picture identification.



HDMI Type A（J13）

Function	Type A HDMI connector
Sign	J13
Type/Moder	Type-A 标准HDMI 连接器



Pin definition

Pin	Signal	Pin	Signal
1	D2+	2	D2_SHIELD
3	D2-	4	D1+
5	D1_SHIELD	6	D1-
7	D0+	8	D0_SHIELD
9	D0-	10	CK+
11	CK_SHIELD	12	CK-
13	CEC	14	RESERVED
15	SCL	16	SDA
17	DDC/CEC_GND	18	+5V
19	HP_DET	20	SHIELD1
21	SHIELD2		

AUDIO OUT L（J20） / AUDIO OUT R(J21)

Function	AUDIO OUT
Sign	J20/J21
Type/Moder	A1251WR-S-2P

Pin definition

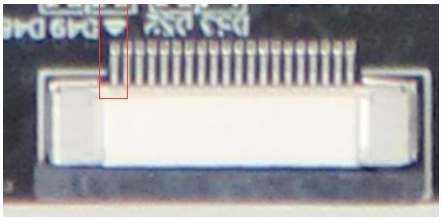
引脚	信号	引脚	定义
1	VO1	2	VO2

J20:Left channel output
J21:Right channel output

Power output per channel amplifier: 3w@3 ohm
Pin 1 Position: right picture identification.

HDMI Connector（J14）

Function	HDMI connector
Sign	J14
Type/Moder	AFC07-S20FCC-00



Pin definition

Pin	Signal	Pin	Signal
1	NC	2	HDMI_TX2_P
3	HDMI_TX2_N	4	GND
5	HDMI_TX1_P	6	HDMI_TX1_N
7	GND	8	HDMI_TX0_P
9	HDMI_TX0_N	10	GND
11	HDMI_TXC_P	12	HDMI_TXC_N
13	GND	14	GND
15	HDMI1_CEC_3V3	16	HDMI_SCL_5V
17	HDMI_SDA_5V	18	HDMI1_HOTPLUG_3V3
19	NC	20	VCC_HDMI1_TX_5V
21	GND	22	GND

Pin 1 Position: up picture identification.

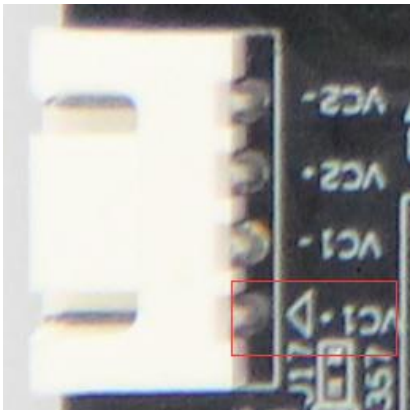
Optional POE Header（J17）

Function	Optional POE Header
Sign	J17
Type/Moder	XH-4AW

Pin definition

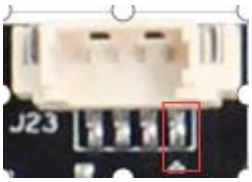
Pin	Signal	Pin	Signal
1	VC1+	2	VC1-
3	VC2+	4	VC2-

Pin 1 Position: right picture identification.



Fan Header（J23）

Function	Speed regulating fan connector
Sign	J23
Type/Moder	HCZZ0015-4



Pin definition

Pin	Signal	Pin	Signal
1	GND	2	VCC(12V)
3	TECH0	4	PWM0

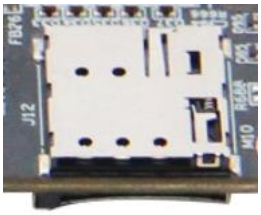
Pin 1 Position: up picture identification.

Nano SIM Card Slot（J12）

Function	Bullet sim card slot
Sign	J12
Type/Moder	XDSM-0420-2182B

Pin definition

Pin	Signal	Pin	Signal
C1	USIM1_VDD	C2	USIM1_RST
C3	USIM1_CLK	CD	USIM1_DET
C5	GND	C6	NC
C7	USIM1_DATA		



Boot Selection Header（J29）

Function	Select boot mode	
Sign	J29	
Type/Moder	HDR200M-2X3	

Pin definition

Pin	Signal	Pin	Signal
1	BOOT_SEL0	2	GND
3	BOOT_SEL1	4	GND
5	BOOT_SEL2	6	GND

The Atlas 200I A2 module supports boot media as shown in the following table
The BOOT_SEL[2:0] value is used to select the boot media.
BOOT_SEL[2:0] is pulled up on the Atlas 200I A2 module by default.
The boot mode needs to be selected together with the mainboard.

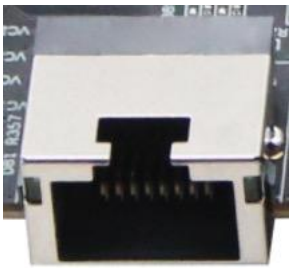
Pin 1 Position: up picture identification.

BOOT_SEL2	BOOT_SEL1	BOOT_SEL0	Boot Media
0	0	0	SPI NOR Flash
0	0	1	SPI NOR Flash + UFS
0	1	0	SPI NOR Flash + PCIe
1	0	0	SPI NOR Flash +eMMC
0	1	1	SPI NOR Flash + SSD/SATA
1	0	1	SPI NOR Flash +SD card
1	1	0	SPI NOR Flash +USB
1	1	1	SPI NOR Flash + UART/GE

Ethernet Jack（J16）

Function	RJ45 connector
Sign	J16
Type/Moder	RJ010-A21-F00-106A
Pin definition	

Pin	Signal	Pin	Signal
1	MX1+	2	MX1-
3	MX2+	4	MX3+
5	MX3-	6	MX2-
7	MX4+	8	MX4-



Ethetnet Header（J18）

Function	Gigabit network 2.0mm spacing pins
Sign	J18
Type/Moder	HDR200M-2X8

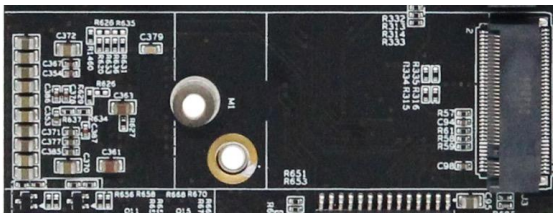
Pin definition

Pin	Signal	Pin	Signal
1	GND	2	VCC_3V3
3	VCC_3V3	4	VCC_3V3
5	RGMII1_LED0_3V3	6	RGMII1_LED2_3V3
7	NC	8	NC
9	ETH1_N_0	10	ETH1_P_0
11	ETH1_N_1	12	ETH1_P_1
13	ETH1_N_2	14	ETH1_P_2
15	ETH1_N_3	16	ETH1_P_3

Pin 1 Position: up picture identification.

M.2 Key M Slot（J3）

Function	M.2 Key M Slot
Sign	J3
Type/ Moder	APCI0107-P001A，2242



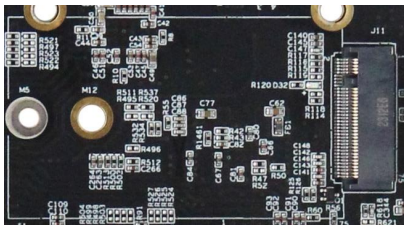
Pin definition

Standard M.2 Key M ports

引脚	信号	引脚	信号	引脚	信号	引脚	信号
1	GND	2	3.3V	3	GND	4	3.3V
5	NC	6	NC	7	NC	8	NC
9	GND	10	NC	11	NC	12	3.3V
13	NC	14	3.3V	15	GND	16	3.3V
17	NC	18	3.3V	19	NC	20	NC
21	GND	22	NC	23	NC	24	NC
25	NC	26	NC	27	GND	28	NC
29	SERDES1_RX_N	30	NC	31	SERDES1_RX_P	32	NC
33	GND	34	NC	35	SERDES1_TX_N	36	NC
37	SERDES1_TX_P	38	NC	39	GND	40	NC
41	SERDES0_RX_N	42	NC	43	SERDES0_RX_P	44	NC
45	GND	46	NC	47	SERDES0_TX_N	48	NC
49	SERDES0_TX_P	50	PERST#	51	GND	52	CLKREQ#
53	SERDES0_CLK_N	54	PEWAKE#	55	SERDES0_CLK_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	M2M_TYPE_1V8	70	3.3V	71	GND	72	3.3V
73	GND	74	3.3V	75	GND	76	NC
77	NC						

M.2 key B Slot（J11）

Function	B Key M.2 Slot
Sign	J11
Type /Moder	APCI0105-P001A,3050



Pin definition

引脚	信号	引脚	信号	引脚	信号	引脚	信号
1	NC	2	VCC	3	GND	4	VCC
5	GND	6	FULL_CARD_POWER_OFF#	7	USB20_DP2	8	W_DISABLE1#
9	USB20_DN2	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	VCC_1V8	24	NC
25	NC	26	W_DISABLE2#	27	GND	28	NC
29	USB30_RX_DN2	30	USIM1_RST	31	USB30_RX_DP2	32	USIM1_CLK
33	GND	34	USIM1_DATA	35	USB30_TX_DN2	36	USIM1_VDD
37	USB30_TX_DP2	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	USIM1_DET	67	RESET#	68	NC
69	NC	70	VCC	71	GND	72	VCC
73	GND	74	VCC	75	NC	76	GND
77	GND						

miniPCIe Slot（J7）

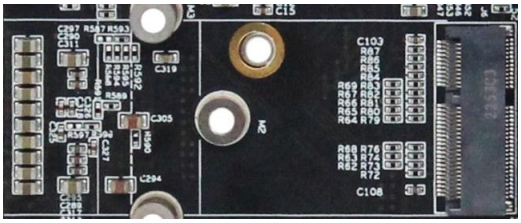
Function	miniPCIe Slot
Sign	J7
Type/Moder	PCIE-52P80H

Pin definition

引脚	信号	引脚	信号
1	VCC_3V3	2	3.3Vaux
3	NC	4	GND
5	NC	6	+1.5V
7	VCC_3V3	8	NC
9	GND	10	NC
11	SERDES6_CLK_N	12	NC
13	SERDES6_CLK_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	MPCIE_PERST_N_3V3
23	SERDES6_RX_N	24	+3.3Vaux
25	SERDES6_RX_P	26	GND
27	GND	28	+1.5V
29	GND	30	NC
31	SERDES6_TX_N	32	NC
33	SERDES6_TX_P	34	GND
35	GND	36	NC
37	GND	38	NC
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+3.3Vaux

M.2 key E Slot（J6）

Function	E Key M.2 Slot
Sign	J6
Type /Moder	APCI0085-P005A,2230



Pin definition

引脚	信号	引脚	信号	引脚	信号	引脚	信号
1	GND	2	3P3V	3	NC	4	3P3V
5	NC	6	NC	7	GND	8	I2S1_BCLK_1V8
9	NC	10	I2S1_LRCK_1V8	11	NC	12	I2S1_MISO_1V8
13	NC	14	I2S1_MOSI_1V8	15	NC	16	NC
17	NC	18	GND	19	NC	20	3.3V
21	NC	22	UART3_RX_1V8	23	NC	24	NC
25	NC	26	NC	27	NC	28	NC
29	NC	30	NC	31	NC	32	UART3_TX_1V8
33	GND	34	UART3_CTX_1V8	35	SERDES3_TX_P	36	UART3_RTX_1V8
37	SERDES3_TX_N	38	NC	39	GND	40	NC
41	SERDES3_RX_P	42	NC	43	SERDES3_RX_N	44	NC
45	GND	46	NC	47	SERDES3_CLK_P	48	NC
49	SERDES3_CLK_N	50	NC	51	GND	52	M2E_PERST_N_3V3
53	M2E_CLKREQ_N_1V8	54	NC	55	M2E_WAKE_N_3V3	56	NC
57	GND	58	I2C8_SDA_1V8	59	NC	60	I2C8_SCL_1V8
61	NC	62	NC	63	GND	64	VCC_1V8
65	NC	66	NC	67	NC	68	NC
69	GND	70	NC	71	NC	72	3P3V
73	NC	74	3P3V	75	GND	76	GND
77	GND						

USB3.0 Header（J25）

Function	USB3.0 Expansion port 2.0mm pin spacing
Sign	J25
Type/Moder	A37-1BL01-111-A

Pin definition

引脚	信号	引脚	信号
1	VOUT		
2	USB30_RX_DN3	19	VOUT
3	USB30_RX_DP3	18	USB30_RX_DN4
4	GND	17	USB30_RX_DP4
5	USB30_TX_DN3	16	GND
6	USB30_TX_DP3	15	USB30_TX_DN4
7	GND	14	USB30_TX_DP4
8	USB20_DN3	13	GND
9	USB20_DP3	12	USB20_DN4
10	NC	11	USB20_DP4

Pin 1 Position: right picture identification.

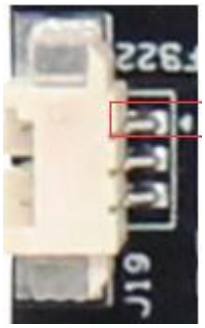
AUDIO_IN （J19）

Function	Connect the audio interface to the microphone
Sign	J19
Type/Moder	A1251WR-S-3P

Pin definition

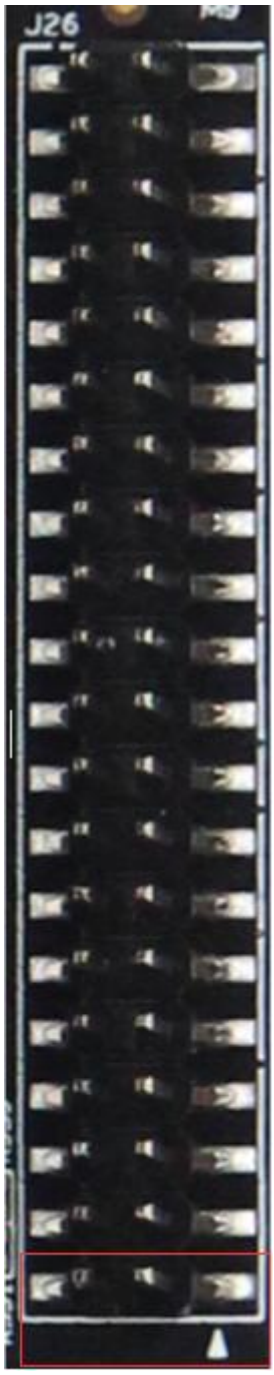
Pin	Signal	Pin	Signal
1	AUDIO_IN0R	2	AUDIO_IN0L
3	MICBIAS		

Pin 1 Position: right picture identification.



Multi-function Expansion Header（J26）

Function	Multifunctional 2.54mm pin spacing signal expansion interface
Sign	J26
Type/Moder	HDR254M-2X20_SMD



Pin definition

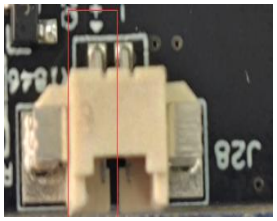
引脚	信号	引脚	信号
1	3.3V	2	5V
3	I2C7_SDA_3V3	4	5V
5	I2C7_SCL_3V3	6	GND
7	I2S0_MCLK_3V3	8	UART0_TX_3V3
9	GND	10	UART0_RX_3V3
11	UART2_RX	12	I2S0_BCLK_3V3
13	GPIO27_3V3	14	GND
15	UART1_TX	16	UART1_RX
17	3.3V	18	GPIO24_3V3
19	SPI0_MOSI_3V3	20	GND
21	SPI0_MISO_3V3	22	GPIO25_3V3
23	SPI0_CLK_3V3	24	SPI0_CS0_N_3V3
25	GND	26	UART2_RTX_3V3
27	I2C6_SDA_3V3	28	I2C6_SCL_3V3
29	I2S1_MCLK_3V3	30	GND
31	UART2_CTX_3V3	32	PWM1_3V3
33	GPIO13_3V3	34	GND
35	I2S0_LRCK_3V3	36	UART2_TX
37	GPIO26_3V3	38	I2S0_MISO_3V3
39	GND	40	I2S0_MOSI_3V3

Pin 1 Position: right picture identification.
By default, UART0 is the kernel debugging serial port, which is used to output C-BOOT, U-BOOT, and Linux kernel information. After the Linux kernel is started, UART2 is used as the serial port of the display and control terminal: 115200，8N1

RTC Battery Socket（J28）

Function	Real time clock
Sign	J28
Type/Mode r	A1251WR-S-2P
Pin definition	Pin 1 Position: right picture identification.

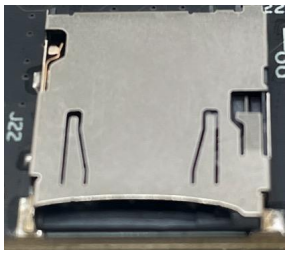
Pin	Signal	Pin	Signal
1	VCC (3V)	2	GND(-)



Micro SD Card Slot（J22）

Function	Micro SD Card Slot
Sign	J22
Type/Mode r	TF-111
Pin definition	

Pin	Signal	Pin	Signal
1	DAT2	2	CD/DAT3
3	CMD	4	VDD
5	CLK	6	VSS
7	DAT0	8	DAT1
9	SW1	10	SH1
11	SW2	12	SH2
13	SH3	14	SH4

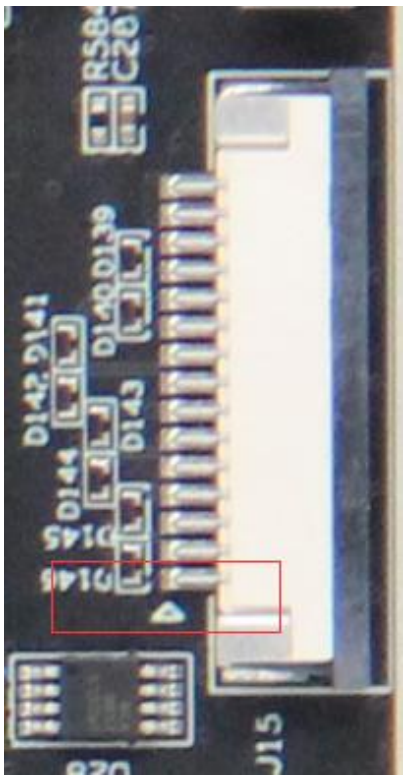


MIPI DSI Connector（J15）

Function	Interface that connects to the display device
Sign	J15
Type/Model	AFA07-S15FCC-00
Pin definition	

引脚	信号	引脚	信号
1	GND	2	MIPI_DSI_D1_N
3	MIPI_DSI_D1_P	4	GND
5	MIPI_DSI_CK_N	6	MIPI_DSI_CK_P
7	GND	8	MIPI_DSI_D0_N
9	MIPI_DSI_D0_P	10	GND
11	MIPI_DSI_I2C_SCL_3V3	12	MIPI_DSI_I2C_SDA_3V3
13	GND	14	VCC_3V3
15	VCC_3V3	16	GND
17	GND		

Pin 1 Position: right picture identification.



7 GC-A101Indicator description

Sign D82 
DescriptionCarrier power input light

Sign D79 
Description:System reset indicator

Sign D78 
Description:Overtemperature warning light (this light is red)

Sign D80 
Description:System sleep light

Sign D81 
Description:The module lights on after it is powered on, and turns off after it is powered off

8 Method of Application

- Make sure all external system voltages are turned off.
- Install necessary external cables.

(such as: the display line connected to the HDMI, the input line for the system power supply, the USB cable connecting the keyboard and mouse...)

- Connect the power cord to the power supply
- The default system is automatically powered on. It can also be set as a switch start, for specific methods, please consult our sales and technicist

Order Information

Model	Description
GC-A101	Industrial interface board for Ascend Atlas 200I A2

GC-A101If additional features are extended, please contact us.

Special Instructions

- **Initial system username：HwHiAiUser，password：Mind@123。**
- **If you want to raise rights, use su root to raise rights.**