Mooncell

Shenzhen Mooncell Electronics Co., Ltd

FPGA Receiving Card Series

A6X Product Specifications

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Content

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Updates History

File Version	Hardware Version	Released Date	Updates Records
V3.0	V1.0.0	23/8/2023	First Edition
V3.1	V1.0.0	12/9/2023	Modify the number of serial data interface groups
V3.2	V1.0.0	19/10/2023	Modify brightness and chromaticity correction load capacity

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1 Product Overview

Product Introduction

*A4X is a small sized receiving card that fully researched and developed by Mooncell; it adopted the high-precision **84 PIN** connector; it can supports the maximum **32** groups of the parallel connection data;the maximum loading capacity could reach up to **384*512** pixels; with strong processing ability, supper reliability and high competitive price.*

Product Features

- *It features the small size and thickness, saving a lot more space for the narrow cabinet and space of the led strip(bar).*
- *It features high precision connector, which is dust-proof & shock proof; with high reliability and stability.*
- *Integrated Network Transformer, Simplified Design, Improved Electromagnetic Compatibility.*
- *With strong LED Driver IC compatibility.*

Application Scenarios

It could be widely used for high-end LED display area that requires high standards; and has significant advantages in application scenarios such as led rental display, TV Broadcast, LED display for respectable Event,High-end project,etc.

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2 Function Introduction

Displaying Effect

Support low brightness and high gray (18bit +)	Improve the effect of low gray display, smoother screen transition
Support low latency	Support low-delay control and display of the receiving card, that is, on the basis of using the sending card, the time delay between the output of the signal source and the display of the light board is 2 frames
Support 3D	3D picture effect, you need to use 3D glasses to watch; transmit the format of the 3D signal to the 3D glasses by connecting the 3D signal transmitter.
Support RGB standalone gamma	Can independently customize the GAMMA value of RGB
Support point-by-point lighting and chromaticity correction	It can cooperate with the correction software to correct the brightness and chromaticity of each lamp on the large screen, effectively eliminate the color difference and make the brightness and chromaticity of the display screen highly consistent, and improve the image quality of the display screen.
Support a variety of display effect schemes	Cooperate with AutoLED software to achieve refresh priority and grey release priority effects.
Support screen 90 ° multiple rotation	With AutoLED software, it can rotate the receiving card screen by a multiple of 90 °.
Support screen zoom	With AutoLED software, the pixels carried on the receiving

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function	*card can be multiplied and scaled to realize the enlargement and reduction of the display screen.*
Support disconnected display settings	*Set the status of the communication display when the receiving card is interrupted, such as (black screen, standby picture, last frame)*

Enhanced Operability:

The Receiving Card is Supported to detect its own Sequence number	*Using the Network Port testing function on Mooncell AutoLED Software, the receiving card serial number and the Network Port Information will be displayed on the target cabinet. Users will be able to get to know the locations of the receiving cards as well as its Connection diagram.*
Data Port User-Defined is supported	*Using it with the Mooncell AutoLED Software, you can detect and edit the output data of the receiving cards.*
To build up a complicated cabinet is supported	*On AutoLED Software, there is an 'Advanced Setting', from here you can quickly arrange or structure the modules at your option.*
To structure a complicated Led Screen is supported	*On AutoLED Software, there is a "Complicated Led Screen Connection", from here you can quickly arrange or structure the cabinet modules on your option.*
Support smart modules (Customized function)	*The smart module consists of Flash and MCU. Flash can store correction coefficients. MCU can communicate with the receiving card to realize module-level monitoring of*

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	temperature, voltage, and cable communication status. The smart module can monitor, and users do not need to install a separate monitoring card, saving box space.
Support module automatic correction (Optional function)	*After the lamp board is replaced, the new lamp board ID and correction factor will be automatically read when the receiving card is powered on, and saved in the receiving card's Flash.*

Hardware Stability

Ethernet Cable Backup(Hot Backup)	*The main cable will be having the loop connection. If there's one cable breaks then still there will have another one to make sure the led display work properly.*
	Dual receiving cards backup is supported(Dual Circuit backup design) Customized :when the main working receiving card fails, the other one (backup) will take its job to keep the led display working properly.
Support dual power backup	*Detect power status and feed back to software*
Support voltage detection	*Support detecting the working voltage of the receiving card.*
Support temperature detection	*Support detecting the working temperature of the receiving card.*
Support humidity detection	*Support detecting the humidity of the receiving card and feeding it back to the software display*

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Support LCD module (customized)	*The liquid crystal module is connected to the HUB board, which is used to display the temperature, voltage, single running time and total running time of the receiving card.*
Support reset function	*After the hardware online upgrade is completed, the receiving card can restart the online hardware by itself.*
FPGA dual program startup	*When the FPGA main program configuration is unsuccessful, enter the standby BOOT program to work, Achieve normal communication.*

Smart Software and Hardware Stability

The receiving card can read the configuration data back from where it has been stored	*You will be able to do this on Mooncell AutoLED Software.*
It supports to detect the error rates of the network cable	*On the Mooncell AutoLED Software, you can detect the network cable connectivity in real time to tell the condition of the network cables, so that you can get rid of any errors immediately.*
Communication Monitoring Function	*On Mooncell AutoLED Software, you can monitor the Working Status of the receiving cards in real time.*

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3Product Parameters

Basic Parameters

RGB Parallel	Data Connection/qty	The Maximum Loading Capacity(Pixels)		Loading Capacity After lightness Calibrating （Pixels）	Loading Capacity after Color Calibrating(Pixels)
32 Groups	84PIN/2PCS	PWM Driver IC	384*512	256*512	256*320
		Conventional Driver IC	512*512	512*512	256*320

Single Network Pot Cascading Quantity	Scanning Lines Supported		
≤1000PCS	1-64 Scan		

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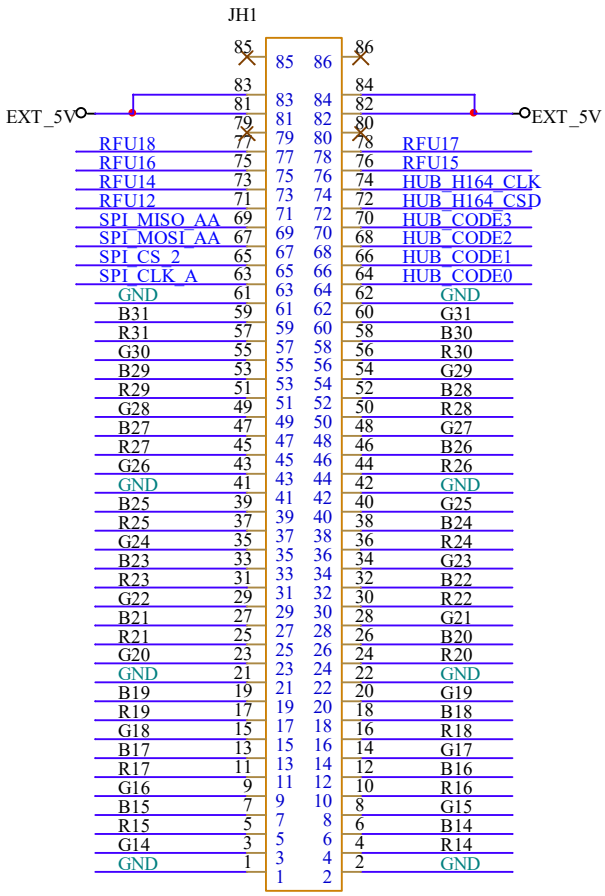
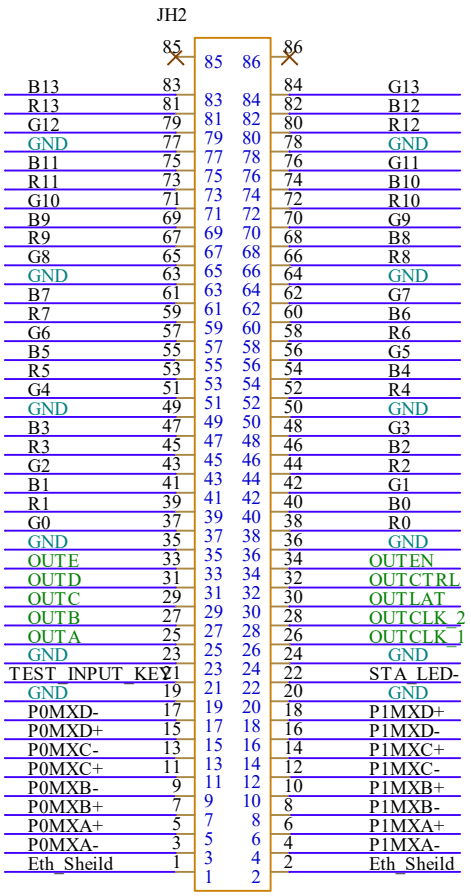
Hardware Introduction

Output Port Definition

Port Definition of the 32 Groups of parallel connection data



BB52-84AT-1-3HB（母座）



BB52-84AT-1-3HB（母座）

JH1 Definition：

illustration	Definition	PIN	PIN	Definition	illustration
5V	EXT_5V	83	84	OEXT_5V	5V
		81	82		
	NC	79	80	NC	
Reserved	RFU18	77	78	RFU17	Reserved
	RFU16	75	76	RFU15	
	RFU14	73	74	HUB_H164_C	
	RFUI2	71	72	LK HUB_H164_C	

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				SD	
	SPI_MISO_AA	69	70	HUB_CODE3	
	SPI_MOSI_AA	67	68	HUB_CODE2	
	SPI_CS_2	65	66	HUB_CODE1	
	SPI_CLK_A	63	64	HUB_CODE0	
Ground connection	GND	61	62	GND	Ground connection
	B31	59	60	G31	
	R31	57	58	B30	
	G30	55	56	R30	
	B29	53	54	G29	
	R29	51	52	B28	
	G28	49	50	R28	
	B27	47	48	G27	
	R27	45	46	B26	
	G26	43	44	R26	
Ground connection	GND	41	42	GND	Ground connection
	B25	39	40	G25	
	R25	37	38	B24	
	G24	35	36	R24	
	B23	33	34	G23	
	R23	31	32	B22	
	G22	29	30	R22	
	B21	27	28	G21	
	R21	25	26	B20	
	G20	23	24	R20	
Ground connection	GND	21	22	GND	Ground connection
	B19	19	20	G19	
	R19	17	18	B18	
	G18	15	16	R18	
	B17	13	14	G17	
	R17	11	12	B16	

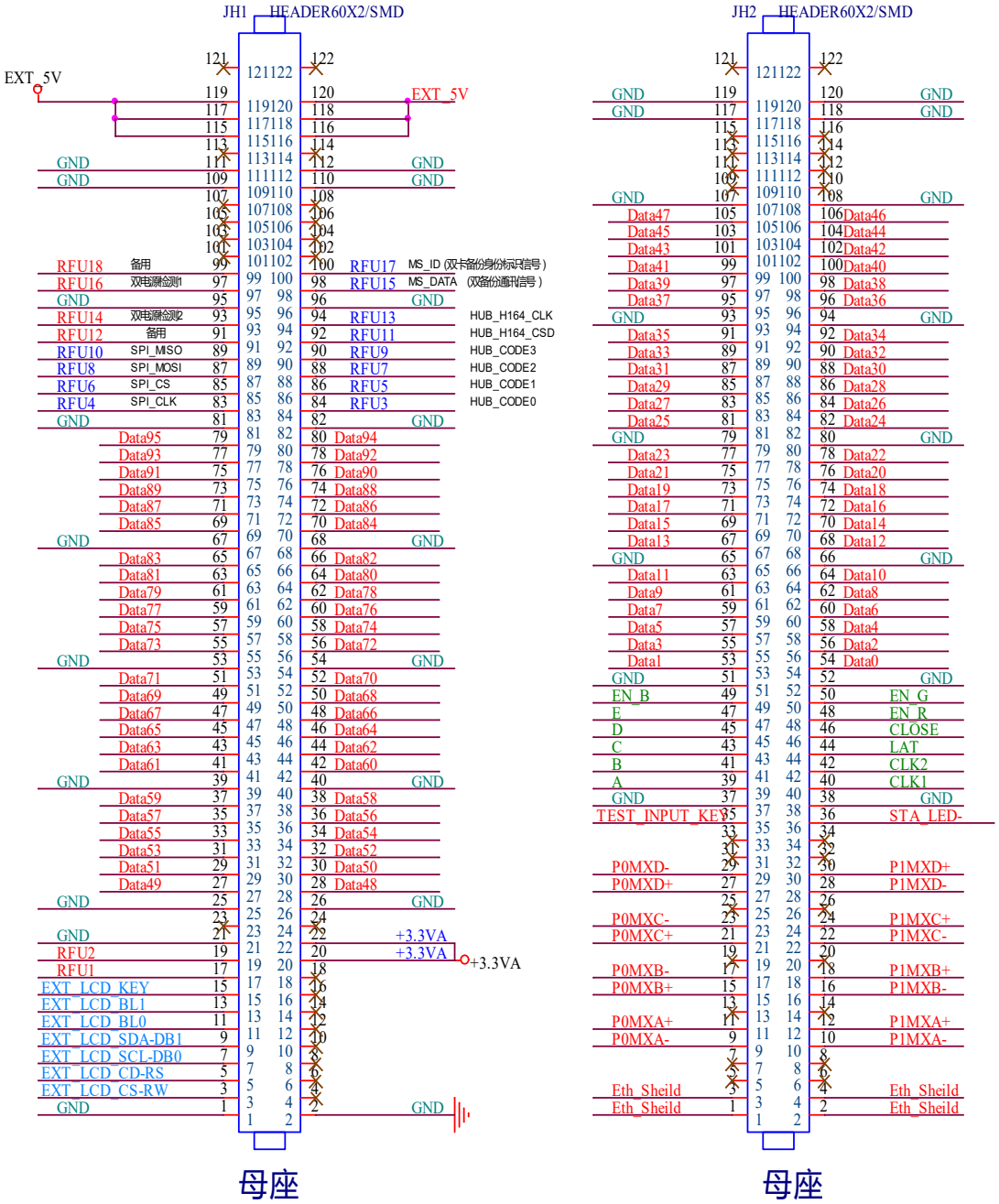
	G16	9	10	R16	
	B15	7	8	G15	
	RI5	5	6	B14	
	G14	3	4	R14	
Ground connection	GND	1	2	GND	Ground connection

JH2 Definition：

illustration	*Definition*	*PIN*	*PIN*	*Definition*	*illustration*
	B13	83	84	G13	
	R13	81	82	B12	
	G12	79	80	R12	
Ground connection	GND	77	78	GND	Ground connection
	B11	75	76	G11	
	R11	73	74	B10	
	G10	71	72	R10	
	B9	69	70	G9	
	R9	67	68	B8	
	G8	65	66	R8	
Ground connection	GND	63	64	GND	Ground connection
	B7	61	62	G7	
	R7	59	60	B6	
	G6	57	58	R6	
	B5	55	56	G5	
	R5	53	54	B4	
	G4	51	52	R4	
Ground connection	GND	49	50	GND	Ground connection
	B3	47	48	G3	
	R3	45	46	B2	
	G2	43	44	R2	
	B1	41	42	G1	

	R1	39	40	B0	
	G0	37	38	R0	
Ground connection	GND	35	36	GND	Ground connection
Line decoded signal	OUTE	33	34	OUTEN	Display enable
	OUTD	31	32	OUTCTRL	Control signal
	OUTC	29	30	OUTLAT	latch signal
	OUTB	27	28	OUTCLK_2	Shift clock
	OUTA	25	26	OUTCLK_1	Shift clock
Ground connection	GND	23	24	GND	Ground connection
Test button	TEST_INPUT_KEY	21	22	STA_LED-	Operation indicator
Ground connection	GND	19	20	GND	Ground connection
Gigabit Ethernet port	POMXD-	17	18	PIMXD+	Gigabit Ethernet port
	POMXD+	15	16	PIMXD-	
	POMXC-	13	14	PIMXC+	
	POMXC+	11	12	PIMXC-	
	POMXB-	9	10	PIMXB+	
	POMXB+	7	8	PIMXB-	
	POMXA+	5	6	PIMXA+	
	POMXA-	3	4	PIMXA-	
Earthing of casing	Eth_Sheild	1	2	Eth_Sheild	Earthing of casing

96 Groups of Serial Connection Data Port



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JH1 *Definition*：

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5V	EXT_5V	83	84	OEXT_5V	5V
		81	82		
	NC	79	80	NC	
Reserved	RFU18	77	78	RFU17	Reserved
	RFU16	75	76	RFU15	
	RFU14	73	74	HUB_H164_CLK	
	RFU12	71	72	HUB_H164_CSD	
	SPI_MISO_AA	69	70	HUB_CODE3	
	SPI_MOSI_AA	67	68	HUB_CODE2	
	SPI_CS_2	65	66	HUB_CODE1	
	SPI_CLK_A	63	64	HUB_CODE0	
Ground Connection	GND	61	62	GND	Ground Connection
	OUT95	59	60	OUT94	
	OUT93	57	58	OUT92	
	OUT91	55	56	OUT90	
	OUT89	53	54	OUT88	
	OUT87	51	52	OUT86	
	OUT85	49	50	OUT84	
	OUT83	47	48	OUT82	
	OUT81	45	46	OUT80	
	OUT79	43	44	OUT78	
Ground Connection	GND	41	42	GND	Ground Connection
	OUT77	39	40	OUT76	
	OUT75	37	38	OUT74	
	OUT73	35	36	OUT72	
	OUT71	33	34	OUT70	
	OUT69	31	32	OUT68	
	OUT67	29	30	OUT66	
	OUT65	27	28	OUT64	
	OUT63	25	26	OUT62	
	OUT61	23	24	OUT60	

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Ground Connection	GND	21	22	GND	Ground Connection
	OUT59	19	20	OUT58	
	OUT57	17	18	OUT56	
	OUT55	15	16	OUT54	
	OUT53	13	14	OUT52	
	OUT51	11	12	OUT50	
	OUT49	9	10	OUT48	
	OUT47	7	8	OUT46	
	OUT45	5	6	OUT44	
	OUT43	3	4	OUT42	
Ground Connection	GND	1	2	GND	Ground Connection

JH2 Definition：

Illustration	Definition	Pin	Pin	Definition	Illustration
	OUT41	83	84	OUT40	
	OUT39	81	82	OUT38	
	OUT37	79	80	OUT36	
Ground Connection	GND	77	78	GND	Ground Connection
	OUT35	75	76	OUT34	
	OUT33	73	74	OUT32	
	OUT31	71	72	OUT30	
	OUT29	69	70	OUT28	
	OUT27	67	68	OUT26	
	OUT25	65	66	OUT24	
Ground Connection	GND	63	64	GND	Ground Connection
	OUT23	61	62	OUT22	
	OUT21	59	60	OUT20	
	OUT19	57	58	OUT18	
	OUT17	55	56	OUT16	
	OUT15	53	54	OUT14	
	OUT13	51	52	OUT12	
Ground Connection	GND	49	50	GND	Ground Connection
	OUT11	47	48	OUT10	
	OUT9	45	46	OUT8	
	OUT7	43	44	OUT6	

	OUT5	41	42	OUT4	
	OUT3	39	40	OUT2	
	OUT1	37	38	OUT0	
Ground Connection	GND	35	36	GND	Ground Connection
Line decoded signal	OUTE	33	34	OUTEN	Display enable
	OUTD	31	32	OUTCTRL	Control signal
	OUTC	29	30	OUTLAT	latch signal
	OUTB	27	28	OUTCLK_2	Shift clock
	OUTA	25	26	OUTCLK_1	Shift clock
Ground Connection	GND	23	24	GND	Ground Connection
Test button	TEST_INPUT_KEY	21	22	STA_LED-	Operation indicator
Ground Connection	GND	19	20	GND	Ground Connection
Gigabit Ethernet port	POMXD-	17	18	PIMXD+	Gigabit Ethernet port
	POMXD+	15	16	PIMXD-	
	POMXC-	13	14	PIMXC+	
	POMXC+	11	12	PIMXC-	
	POMXB-	9	10	PIMXB+	
	POMXB+	7	8	PIMXB-	
	POMXA+	5	6	PIMXA+	
	POMXA-	3	4	PIMXA-	
Earthing of casing	Eth_Sheild	1	2	Eth_Sheild	Earthing of casing

Extended Function Reference Design

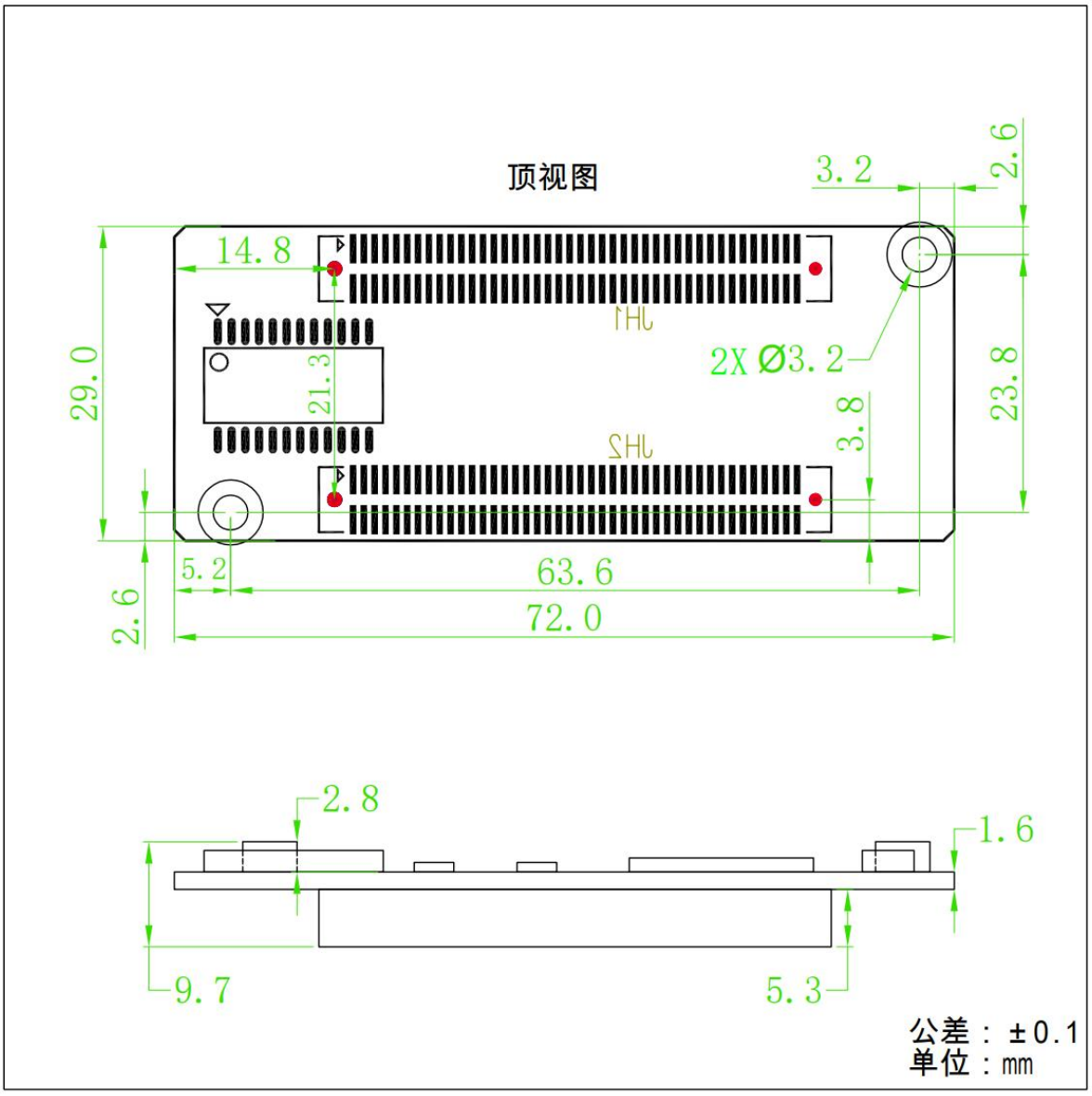
Extension interface	Recommended Smart Module Interface	Recommended light board Flash interface	Illustration
RFU1	Reserved	Reserved	Reserved pins connected to the MCU
RFU2	Reserved	Reserved	Reserved pins connected to the MCU
RFU3	HUB_CODE0	HUB_CODE0	Flash Control Interface 1
RFU4	HUB_SPI_CLK	HUB_SPI_CLK	Clock signal for serial interface
RFU5	HUB_CODE1	HUB_CODE1	Flash Control Interface 2
RFU6	HUB_SPI_CS	HUB_SPI_CS	CS signal for serial interface
RFU7	HUB_CODE2	HUB_CODE2	Flash Control Interface 3

RFU8	/	HUB_SPI_MOSI	Storage data input of light board Flash
	HUB_UART_TX	/	Smart Module TX Signal
RFU9	HUB_CODE3	HUB_CODE3	Flash Control Interface 4
RFU10	/	HUB_SPI_MISO	Storage data output of light board Flash
	HUB_UART_RX	/	Smart Module RX Signal
RFU11	HUB_H164_CSD	HUB_H164_CSD	74HC164 data signal
RFU12	/	/	/
RFU13	HUB_H164_CLK	HUB_H164_CLK	74HC164 clock signal
RFU14	POWER_STA1	POWER_STA1	Dual power detection signal 1
RFU15	MS_DATA	MS_DATA	Dual SIM backup connection signal
RFU16	POWER_STA2	POWER_STA2	Dual power detection signal 2
RFU17	MS_ID	MS_ID	Dual SIM Backup ID Signal
RFU18	HUB_CODE4	HUB_CODE4	Flash Control Interface 5

Indicator Illustration

Indicator	*Position*	*Status*	*Illustration*
Status Indicator (Green)	*U5*	*Flickering Slowly at a constant*	*The receiving card is working properly, The Ethernet Cable Connection is fine, No DVI Signal Input*
		Flickering Fast at a constant	*The receiving card is working properly, The Ethernet Cable Connection is fine, with DVI Signal Input*
		It goes out	*No Gigabit Ethernet Signal*
		Fast Flickering 3 Tunes	*The receiving card is working properly, The Ethernet Cable Loop Connection is fine, DVI Signal Input*
Status Indicator	*U4*	*Long Lasting On*	*Power is On*

Dimensions


顶视图
3.2
2.6
14.8
29.0
21.3
2X Ø3.2
23.8
3.8
5.2
63.6
72.0
2.6
2.8
1.6
9.7
5.3
公差：±0.1
单位：mm

4Product Specifications

Specifications

Electric Parameters	Input Voltage	DC3.5-5.5V
	Rated Current	0.6A
	Rated Power	3W
Operating Environment	Operating Temperature	-40℃ - 80℃
	Operating Humidity	10%RH-90%RH
Storage Environment	Temperature	-25℃～125℃
Dimensions	72mmX29mmX9.7mm	
Net Weight	14.2g	
Certifications	It conforms to RoHS and CE-EMC standards.	

Precautions

1. The testing (debugging) and installation should be done by the qualified professionals
2. Anti-Static, Water-Proof and Dust-Proof Required

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