A6X

Receiving card

User Manual

Document version:： V2.0

CONTENT

1 Update records

Document version	Hardware version	Release time	update record
V4.0	A6X（V1.0.1）	June 19(th), 2025	First release

2 product introduction

A6X is a small-size full-function receiving card independently developed by Mooncell, and the maximum on-load resolution of a single card is 512×512@60Hz(PWM).

Support 18-bit, pixel by pixel chromaticity correction, low delay, RGB independent Gamma adjustment, 90 multiple rotation of the screen, serial number detection of the receiving card, configuration parameter readback and other functions to improve the screen display effect and user experience;

Adopt 84PIN high-precision connector interface for communication, dustproof and shockproof, and support 32 sets of RGB parallel data at most; The hardware has MCU design, which improves the flexibility of product application, supports dual-card backup work, improves stability and reliability, has strong LED driver chip compatibility, and is suitable for the construction of various field environments.

3 product characteristics

3.1 Improve the display effect

- 18bit

  Enabling 18bit in the software can increase the gray scale of LED display screen by 4 times, effectively deal with the gray scale loss caused by brightness reduction of LED display screen, optimize the pitting problem caused by low gray, make the low gray transition natural, and make the image display more delicate.

- Brightness correction by pixel

  With the correction software, the brightness and chromaticity of each pixel of the large screen are corrected, which effectively eliminates the color difference, makes the brightness and chromaticity of the display screen highly consistent, and improves the image quality of the display screen.

- Low delay

  Reduce the delay of the video source at the receiving card end, and the delay is as low as 1 frame (for the lamp board of the driving IC using built-in RAM).

- 3D

  The 3D picture effect needs to be viewed with 3D glasses, and the format of the 3D signal is transmitted to the 3D glasses by connecting the 3D signal transceiver.

- RGB independent Gamma adjustment

  With the independent master control and software supporting RGB independent Gamma adjustment, the problems such as uneven low gray and white balance drift of the display screen are effectively controlled by adjusting "red", "green" and "blue" respectively, making the picture more realistic.

- 90 multiple rotation of the picture.

  With the help of AutoLED software, the picture is displayed in multiples of 90 (0, 90, 180, 270).

- Picture scaling

  With the help of AutoLED software, the pixels loaded on the receiving card can be scaled multiple times, and the display screen can be enlarged and reduced.

- Broken line display setting

  Set the receiving card interrupt communication display status (black screen, standby picture, last frame).

3.2 Improve maintainability

- Receiving card serial number detection

  With the network port debugging function in AutoLED software, the receiving card number and network port information will be displayed on the target box, and the user can know the position serial number and connection line of the receiving card.

- Data interface customization

  With AutoLED software, the output data of the receiving card can be detected and edited.

- Complex structure box

  In the advanced layout of AutoLED software, boxes can be arranged and constructed at will quickly.

- Construct complex large screen

  In the complex display screen connection of AutoLED software, boxes can be arranged and constructed at will quickly.

- Communication monitoring

  Monitor the working state of receiving card in real time on AutoLED.

- Error detection

  On the AutoLED, the communication signal quality of the network cable connected with the system hardware can be monitored in real time, so as to quickly judge the quality of the network cable and troubleshoot.

- Configuration parameter readback

  The configuration parameters of the current receiving card can be read back on the AutoLED. Read back the configuration parameters of the receiving card and save them locally.

- Loop backup

  The network port is connected through the loop of the main and standby network cables to increase the reliability of the serial connection of the receiving cards. When one of the main and standby series lines fails, the other one can ensure the normal display of the screen.

- Dual power supply backup

  Detect the power status and feed back the software.

- FPGA dual program startup

  When the FPGA main program configuration is unsuccessful, it enters the standby BOOT program to work and realize normal communication.

- online update

  Support software to upgrade the firmware of the receiving card online.

3.3 Function customization

- Hot backup of receiving card (customized)

  The equipment connected with the receiving card increases the reliability of the equipment operation through the main backup mechanism. At a certain time, only the main equipment is in operation. When the main equipment fails, the standby equipment starts to work to ensure the normal display of the screen.

- Intelligent module (to be customized)

  The intelligent module consists of Flash and MCU; Flash can store correction coefficients. The MCU can communicate with the receiving card to monitor the temperature, voltage and communication status of the flat cable at the module level, and the intelligent module can make the monitoring user not need to install a separate monitoring card, thus saving the box space.

- Automatic module calibration (optional function)

  After the lamp board is replaced, the new lamp board ID and correction coefficient will be automatically read when the receiving card is powered on, and saved in the Flash of the receiving card.

- Support voltage detection (need to be customized)

  Support to detect the working voltage of the receiving card.

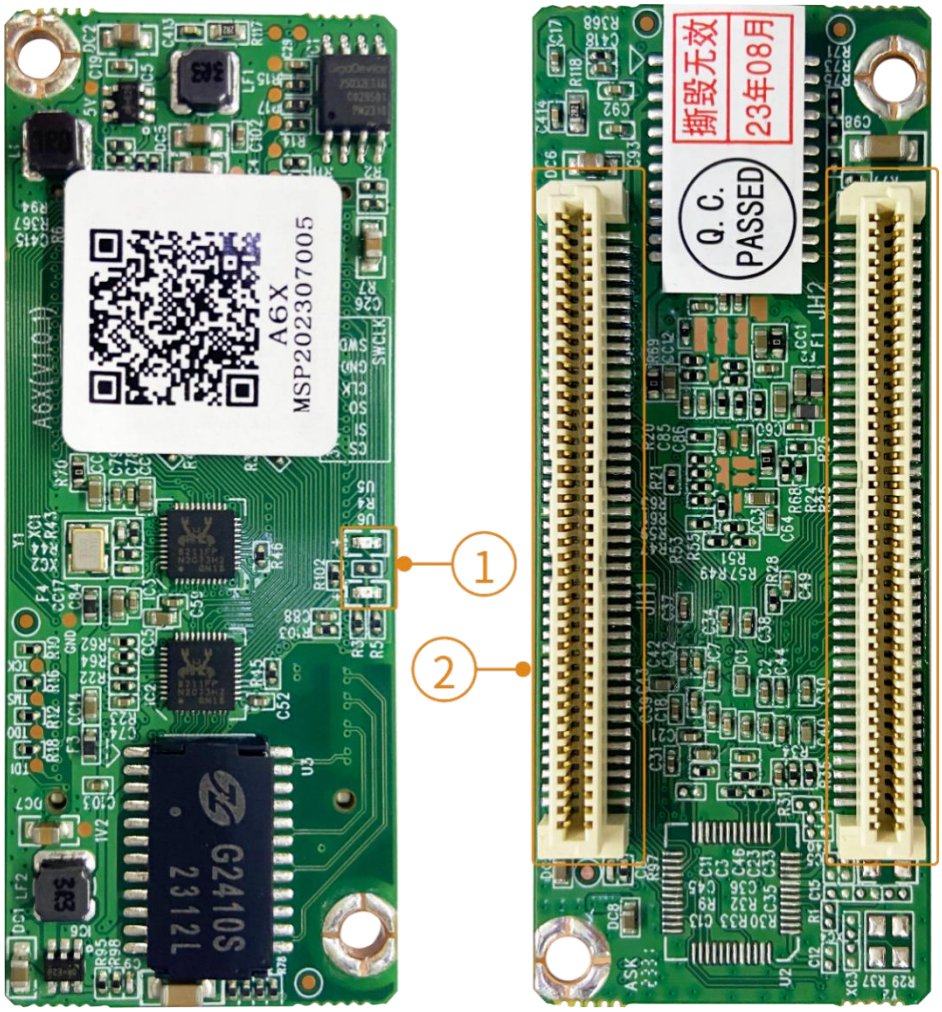
- Support temperature detection (need to be customized)

  Support to detect the working temperature of the receiving card.

- Liquid crystal module (to be customized)

  The LCD module is connected to the HUB board and used to display the temperature, voltage, single running time and total running time of the receiving card.

4 product appearance



Front/Back Side

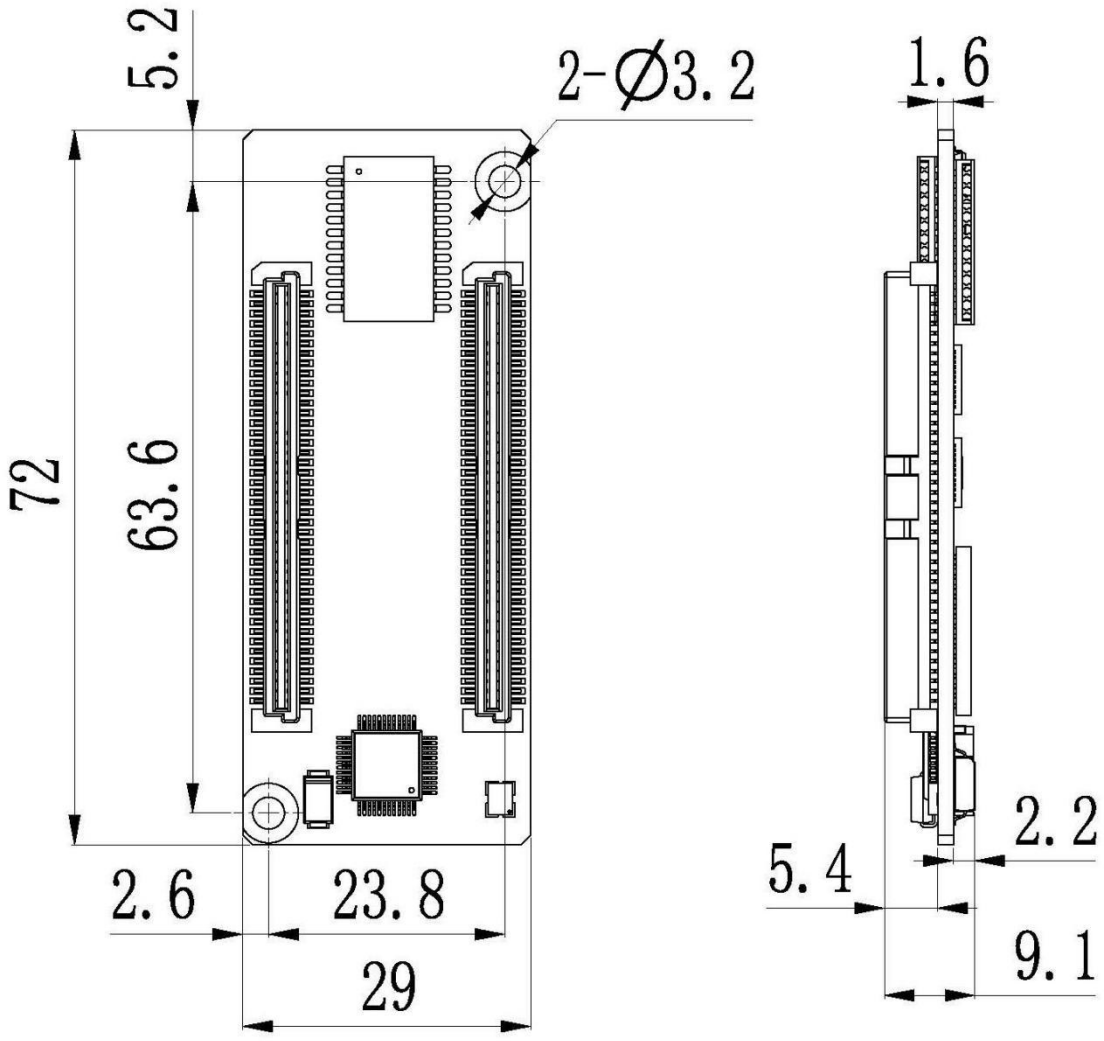
* Product photos are for reference only, please refer to the products actually purchased.

4.1 Data Interface Description

#	Interface name	Interface description	
1	Status indicator U6	Uniform slow flash	The receiving card works normally, the network cable is connected normally, and no DVI signal is input.
		Uniform flash	The receiving card works normally, the network cable is connected normally, and there is DVI signal input.
		Constant extinction	No gigabit network signal

		Flash 3 times at intervals	The receiving card works normally, the network cable loop is connected, and there is DVI signal input.
1	Power indicator U5	The red light is always on, which means the power supply is normal.	
2	communication interface	84PIN high-density plug-in interface	

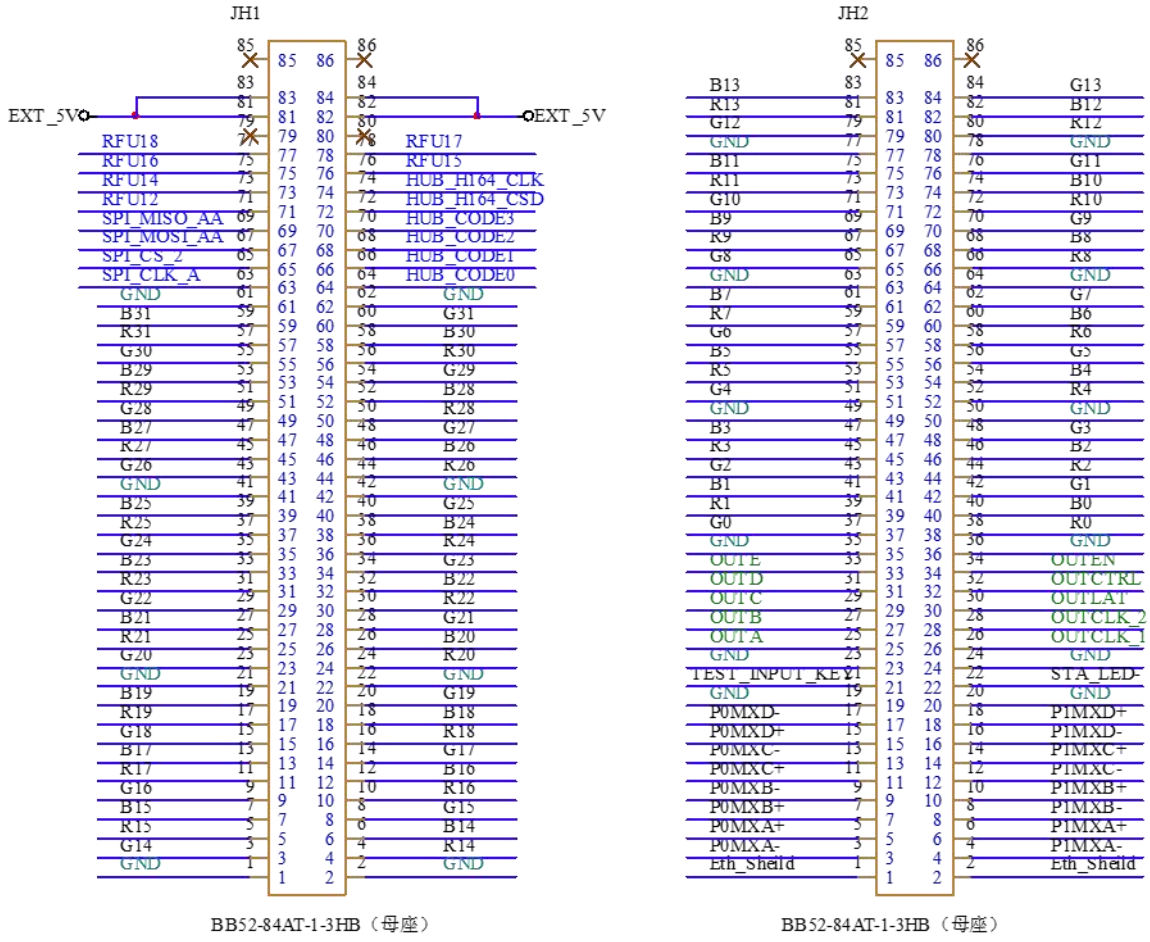
4.2 Product dimensions



Tolerance: 0.3 unit: mm

4.3 Definition of output interface

32 groups of parallel data interface definitions



JH1 data interface definition

Instructions	Definition	Pin	Pin	Definition	Instructions
5V	EXT_5V	83	84	OEXT_5V	5V
		81	82		
	NC	79	80	NC	
reserve	RFU18	77	78	RFU17	reserve
	RFU16	75	76	RFU15	
	RFU14	73	74	HUB_H164_CLK	
	RFUI2	71	72	HUB_H164_CSD	
	SPI_MISO_AA	69	70	HUB_CODE3	
	SPI_MOSI_AA	67	68	HUB_CODE2	

	SPI_CS_2	55	56	HUB_CODE1	
	SPI_CLK_A	53	54	HUB_CODE0	
Ground Connection	GND	51	52	GND	Ground Connection
	B31	49	50	G31	
	R31	47	48	B30	
	G30	45	46	R30	
	B29	43	44	G29	
	R29	41	42	B28	
	G28	39	40	R28	
	B27	37	38	G27	
	R27	35	36	B26	
	G26	33	34	R26	
Ground Connection	GND	31	32	GND	Ground Connection
	B25	29	30	G25	
	R25	27	28	B24	
	G24	25	26	R24	
	B23	23	24	G23	
	R23	21	22	B22	
	G22	55	56	R22	
	B21	53	54	G21	
	R21	51	52	B20	
	G20	49	50	R20	
Ground Connection	GND	47	48	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 data interface definition

Instructions	Definition	Pin	Pin	Definition	Instructions
	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	pilot 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 key	TEST_INPUT_KEY	21	22	STA_LED-	Running indicator lamp
Ground Connection	GND	19	20	GND	Ground Connection
Gigabit network port	POMXD-	17	18	PIMXD+	Gigabit network 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-	
Enclosure grounding	Eth_Sheild	1	2	Eth_Sheild	Enclosure grounding

96 groups of serial data interfaces

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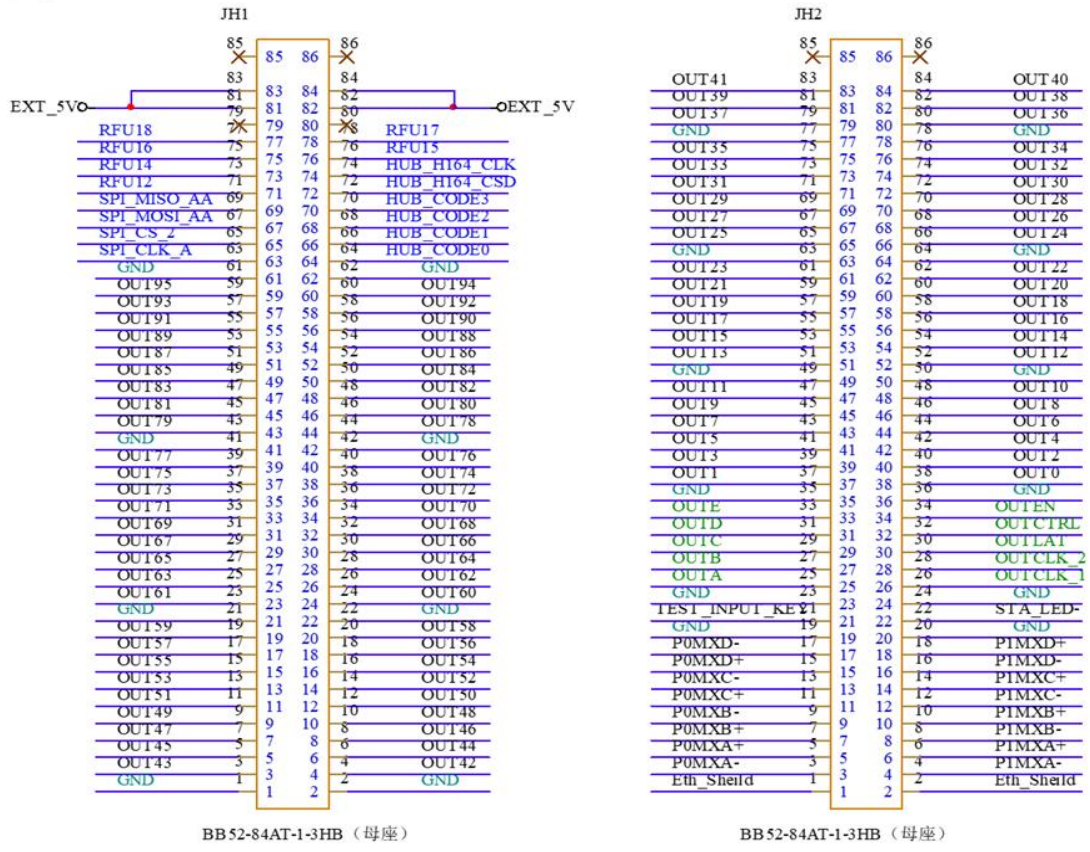

JH1 definition:

Instructions	Definition	Pin	Pin	Definition	Instructions
5V	EXT_5V	83	84	OEXT_5V	5V
		81	82		
	NC	79	80	NC	
reserve	RFU18	77	78	RFU17	reserve
	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	

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:

Instructions	Definition	Pin	Pin	Definition	Instructions
	OUT41	83	84	OUT40	
	OUT39	81	82	OUT38	
	OUT37	79	80	OUT36	
landing	GND	77	78	GND	landing
	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	pilot 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 key	TEST_INPUT _KEY	21	22	STA_LED-	Running indicator lamp
Ground Connection	GND	19	20	GND	Ground Connection
Gigabit network port	POMXD-	17	18	PIMXD+	Gigabit network 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-	
Enclosure grounding	Eth_Sheild	1	2	Eth_Sheild	Enclosure grounding

Extended function reference design:

Expansion Interface	Recommended intelligent module interface	Recommended lamp board Flash interface	Illustration
RFU1	Reserved	Reserved	Reserved pin connected to MCU
RFU2	Reserved	Reserved	Reserved pin connected to MCU
RFU3	HUB_CODE0	HUB_CODE0	Flash control interface 1
RFU4	HUB_SPI_CLK	HUB_SPI_CLK	Clock signal of serial interface
RFU5	HUB_CODE1	HUB_CODE1	Flash control interface 2
RFU6	HUB_SPI_CS	HUB_SPI_CS	CS signal of serial interface

RFU7	HUB_CODE2	HUB_CODE2	Flash control interface 3
RFU8	/	HUB_SPI_MOSI	Flash storage data input of lamp board
	HUB_UART_TX	/	Intelligent module TX signal
RFU9	HUB_CODE3	HUB_CODE3	Flash control interface 4
RFU10	/	HUB_SPI_MISO	Flash storage data output of lamp board
	HUB_UART_RX	/	RX signal of intelligent module
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 supply detection signal 1
RFU15	MS_DATA	MS_DATA	Dual card backup connection signal
RFU16	POWER_STA2	POWER_STA2	Dual power supply detection signal 2
RFU17	MS_ID	MS_ID	Dual-card backup identification signal
RFU18	HUB_CODE4	HUB_CODE4	Flash control interface 5

5 product parameters

5.1 Basic parameters

Three-wire parallel (RGB)	Drive IC	Maximum load (pixels)	Brightness correction band load (pixel)	Chromaticity correction band load (pixel)
32 groups	Conventional	384×512	384×512	256×320
	PWM	512×512	512×512	256×320
Number of cascaded cards			Support scanning lines	
≤1000PCS			1-128 sweep	

5.2 Specification parameters

Electrical parameters	input voltage	DC3.5~5.5V
	rated current	0.6A
	rated power	3W
Working environment	Working temperature	-20℃~70℃
	Working humidity	10%RH~90%RH has no condensation.
Storage environment	temperature	-40℃~85℃
Board size	72mm×29mm	
Net weight	14g description: single card weight	
Outer packing size	490×335×120mm	
Gross weight of product	2.55Kg Description: Including wire and fittings (packing weight)	
Packing mode	100 sheets/box	
Certificate information	Comply with RoHS standards and CE-EMC standards.	

* Current and power consumption may vary according to different factors such as product usage, environment and settings.

6 Precautions

- The installation process must be completed by professionals.
- Must be antistatic.
- Please pay attention to waterproof and dust removal.

National after-sales service hotline: 400-881-3531

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