L4S Pro

Receiving card

User Manual

Document version:： V2.0

CONTENT

1 Update Records

Document version	Hardware version	Release time	Update record
V4.0	L4S Pro（V3.1）	June 19(th), 2025	First release

2 Product Introduction

L4S Pro is a small sized receiving card that fully researched and 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;

120PIN high-precision connector interface is used for communication, which is dustproof and shockproof, with high stability and supports 32 sets of RGB parallel data at most; The hardware is designed with MCU, which enhances product application flexibility, supports dual-card backup work, enhances stability and reliability, and has strong LED driver chip compatibility capabilities, making it suitable for the construction of a variety of 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 pixels

  With the correction software, the brightness and chromaticity of each pixels 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.

- Interrupt communication 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.

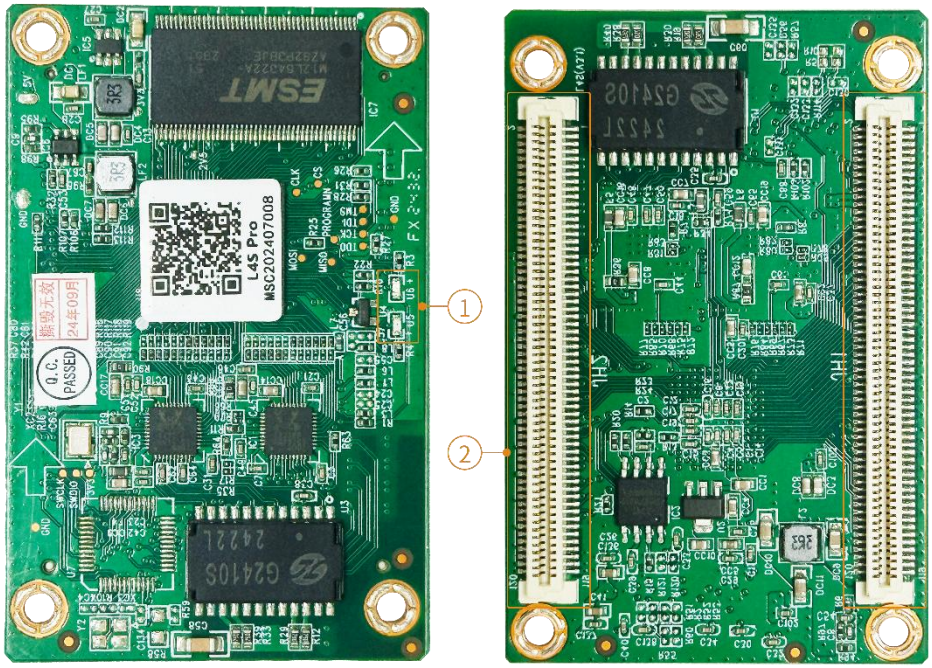
- FPGA dual program startup

  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.

4 Product Appearance



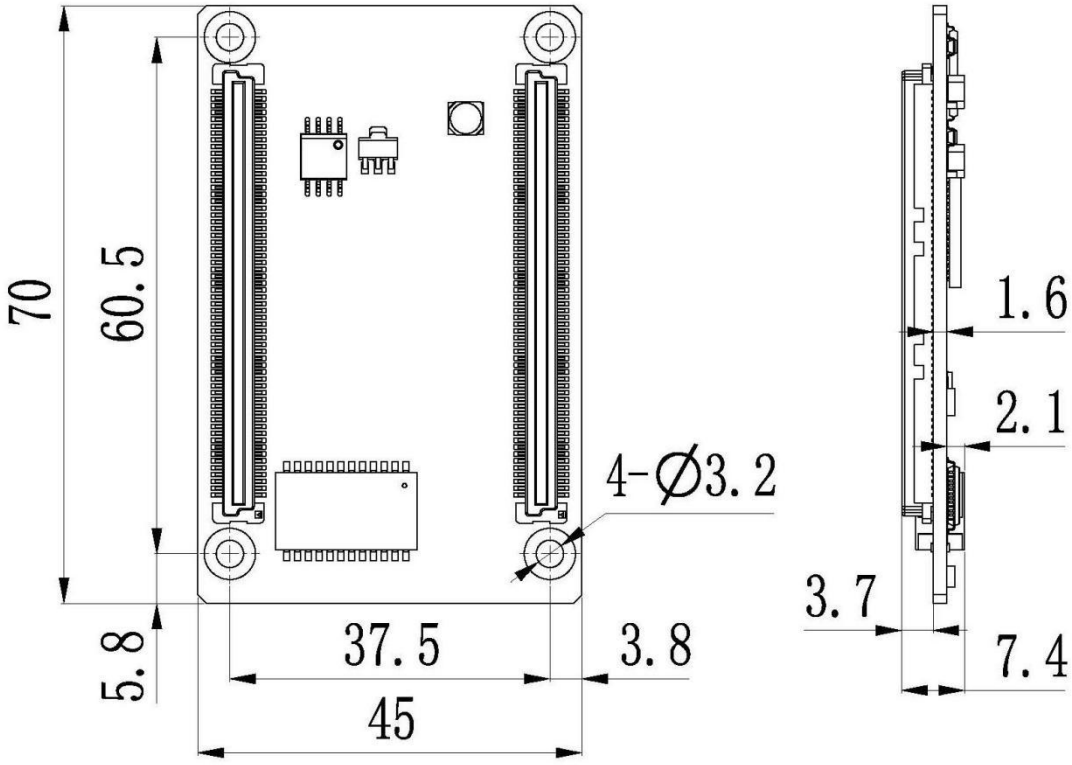
Front Side Back Side

* 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	High density plug-in interface	

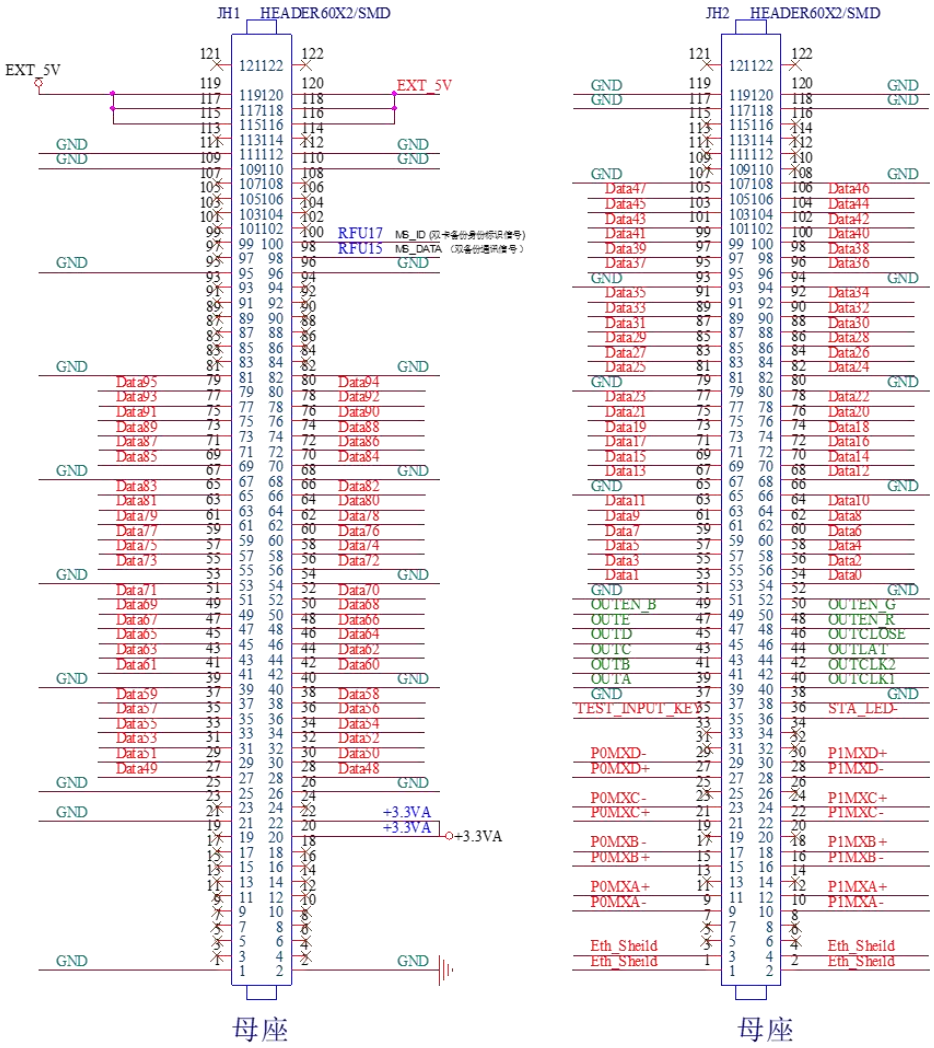
4.2 Product Dimensions



Tolerance: 0.3 Unit: mm

4.3 Definition of Output Interface

32 groups of parallel data interface definitions



JH1 data interface definition

Illustration	Definition	Pin	Pin	Definition	Illustration
	GND	1	2	GND	
/	NC	9	10	NC	
/	NC	11	12	NC	
/	NC	13	14	NC	
/	NC	15	16	NC	
/	NC	17	18	NC	
	NC	19	20	3.3V_LED	3.3V auxiliary output

	GND	21	22		
	NC	23	24	NC	
	GND	25	26	GND	
	G17	27	28	R17	
	R18	29	30	B17	
	B18	31	32	G18	
	G19	33	34	R19	
	R20	35	36	B19	
	B20	37	38	G20	
	GND	39	40	GND	
	G21	41	42	R21	
	R22	43	44	B21	
	B22	45	46	G22	
	G23	47	48	R23	
	R24	49	50	B23	
	B24	51	52	G24	
	GND	53	54	GND	
	G25	55	56	R25	
	R26	57	58	B25	
	B26	59	60	G26	
	G27	61	62	R27	
	R28	63	64	B27	
	B28	65	66	G28	
	GND	67	68	GND	
	G29	69	70	R29	
	R30	71	72	B29	
	B30	73	74	G30	
	G31	75	76	R31	

	R32	77	78	B31	
	B32	79	80	G32	
	GND	81	82	GND	
/	NC	83	84	NC	/
	NC	85	86	NC	
	NC	87	88	NC	
	NC	89	90	NC	
/	NC	91	92	NC	/
/	NC	93	94	NC	/
	GND	95	96	GND	
/	NC	97	98	RFU15	Dual backup communication signal
/	NC	99	100	RFU17	Dual SIM backup ID signal
	NC	101	102	NC	
	NC	103	104	NC	
	NC	105	106	NC	
	NC	107	108	NC	
	GND	109	110	GND	
	GND	111	112	GND	
	NC	113	114	NC	
	VCC	115	116	VCC	
	VCC	117	118	VCC	
	VCC	119	120	VCC	
	NC	121	122	NC	
	GND	1	2	GND	
/	NC	9	10	NC	
/	NC	11	12	NC	

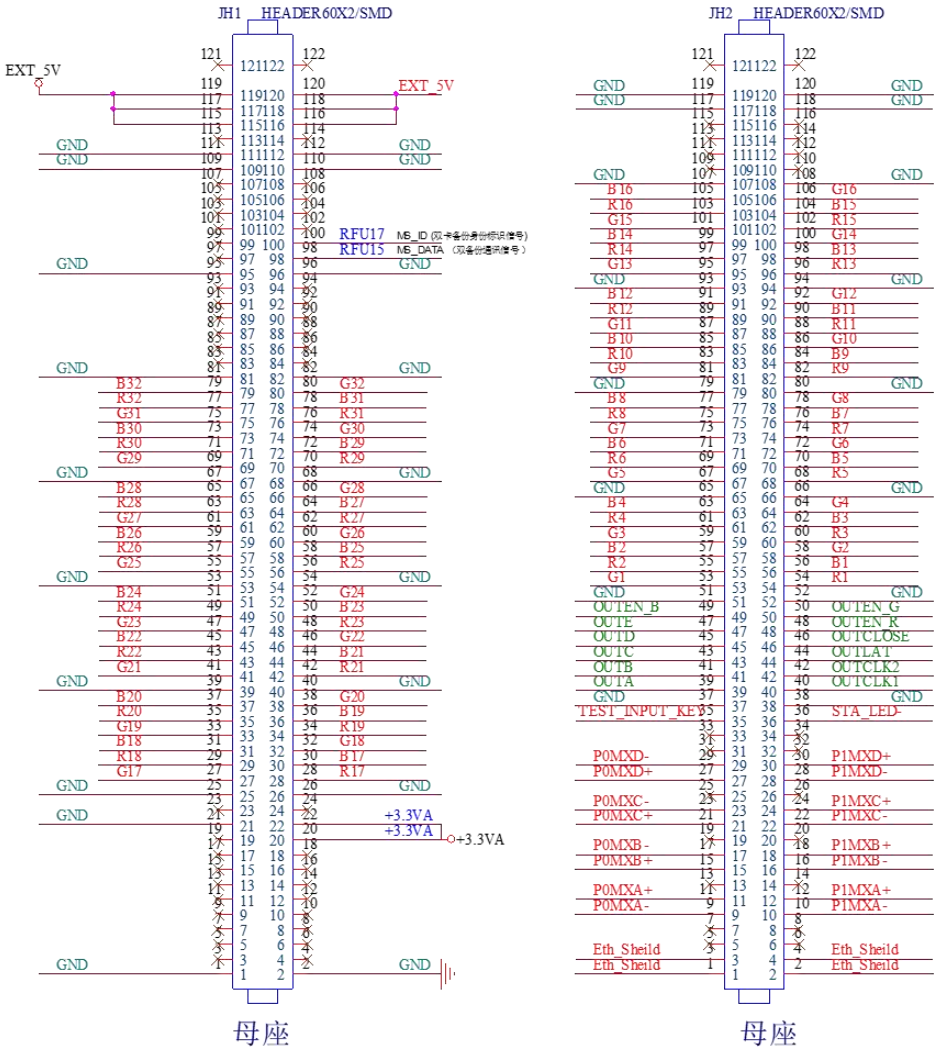
JH2 data interface definition

Illustration	Definition	Pin	Pin	Definition	Illustration
	NC	1	2	NC	
	NC	3	4	NC	
	NC	5	6	NC	
	NC	7	8	NC	
Gigabit network port	P0 MXA+	9	10	P1 MXA+	Gigabit network port
	P0 MXA-	11	12	P1 MXA-	
	NC	13	14	NC	
	P0 MXB+	15	16	P1 MXB+	
	P0 MXB-	17	18	P1 MXB-	
	NC	19	20	NC	
	P0 MXC+	21	22	P1 MXC+	
	P0 MXC-	23	24	P1 MXC-	
	NC	25	26	NC	
	P0 MXD+	27	28	P1 MXD+	
	P0 MXD-	29	30	P1 MXD-	
	NC	31	32	NC	
	NC	33	34	NC	
Test key	TEST_INPUT_KEY	35	36	STA_LED-	Running indicator (active low)
	GND	37	38	GND	
Line decoded signal	A	39	40	CLK1	First shift clock output
Line decoded signal	B	41	42	CLK2	Second shift clock output
Line decoded signal	C	43	44	LAT	Latch signal output
Line decoded signal	D	45	46	CLOSE	Blanking control signal
Line decoded signal	E	47	48	EN_R	Display enabled (OE_R is

Display enabled (OE_R is used when OE_R, G and B are not controlled separately).	EN_B	49	50	EN_G	used when OE_R, G and B are not controlled separately).
	GND	51	52	GND	
	G1	53	54	R1	
	R2	55	56	B1	
	B2	57	58	G2	
	G3	59	60	R3	
	R4	61	62	B3	
	B4	63	64	G4	
	GND	65	66	GND	
	G5	67	68	R5	
	R6	69	70	B5	
	B6	71	72	G6	
	G7	73	74	R7	
	R8	75	76	B7	
	B8	77	78	G8	
	GND	79	80	GND	
	G9	81	82	R9	
	R10	83	84	B9	
	B10	85	86	G10	
	G11	87	88	R11	
	R12	89	90	B11	
	B12	91	92	G12	
	GND	93	94	GND	
	G13	95	96	R13	
	R14	97	98	B13	
	B14	99	100	G14	

	G15	101	102	R15	
	R16	103	104	B15	
	B16	105	106	G16	
	GND	107	108	GND	
	NC	109	110	NC	
	NC	111	112	NC	
	NC	113	114	NC	
	NC	115	116	NC	
	GND	117	118	GND	
	GND	119	120	GND	
	NC	121	122	NC	

96 groups of serial data interfaces



JH1 definition：

Illustration	Definition	Pin	Pin	Definition	Illustration
	GND	1	2	GND	
/	NC	9	10	NC	
/	NC	11	12	NC	
/	NC	13	14	NC	
/	NC	15	16	NC	
/	NC	17	18	NC	
	NC	19	20	3.3V_LED	3.3V Output
	GND	21	22		
	NC	23	24	NC	

	GND	25	26	GND	
	Data49	27	28	Data48	
	Data51	29	30	Data50	
	Data53	31	32	Data52	
	Data55	33	34	Data54	
	Data57	35	36	Data56	
	Data59	37	38	Data58	
	GND	39	40	GND	
	Data61	41	42	Data60	
	Data63	43	44	Data62	
	Data65	45	46	Data64	
	Data67	47	48	Data66	
	Data69	49	50	Data68	
	Data71	51	52	Data70	
	GND	53	54	GND	
	Data73	55	56	Data72	
	Data75	57	58	Data74	
	Data77	59	60	Data76	
	Data79	61	62	Data78	
	Data81	63	64	Data80	
	Data83	65	66	Data82	
	GND	67	68	GND	
	Data85	69	70	Data84	
	Data87	71	72	Data86	
	Data89	73	74	Data88	
	Data91	75	76	Data90	
	Data93	77	78	Data92	
	Data95	79	80	Data94	
	GND	81	82	GND	
/	NC	83	84	NC	/
	NC	85	86	NC	
	NC	87	88	NC	
	NC	89	90	NC	
	NC	91	92	NC	
	NC	93	94	NC	
	GND	95	96	GND	
/	NC	97	98	RFU15	Dual backup communication signal
	NC	99	100	RFU17	Dual SIM backup ID signal
	NC	101	102	NC	
	NC	103	104	NC	
	NC	105	106	NC	
	NC	107	108	NC	

	GND	109	110	GND	
	GND	111	112	GND	
	NC	113	114	NC	
Input power VCC recommended 3.3V~ 5.5V	VCC	115	116	VCC	Input power VCC recommended 3.3V~ 5.5V
	VCC	117	118	VCC	
	VCC	119	120	VCC	

JH2 definition：

Illustration	Definition	Pin	Pin	Definition	Illustration
enclosure grounding	Eth_Sheid	1	2	Eth_Sheild	enclosure grounding
enclosure grounding	Eth_Sheid	3	4	Eth_Sheild	enclosure grounding
	NC	5	6	NC	
	NC	7	8	NC	
Gigabit Ethernet port	P0 MXA-	9	10	P1 MXA-	Gigabit Ethernet port
	P0 MXA+	11	12	P1 MXA+	
	NC	13	14	NC	
	P0 MXB+	15	16	P1 MXB+	
	P0 MXB-	17	18	Port2_B-	
	NC	19	20	NC	
	P0 MXC+	21	22	P1 MXC-	
	P0 MXC-	23	24	P1 MXC+	
	NC	25	26	NC	
	P0 MXD+	27	28	P1 MXD+	
	P0 MXD-	29	30	P1 MXD-	
	NC	31	32	NC	
	NC	33	34	NC	
test button	TEST_INPUT_ KEY	35	36	STA_LED-	Operating indicator (active at low level)
	GND	37	38	GND	
Line decoded signal	A	39	40	CLK_1	First shift clock output
Line decoded signal	B	41	42	CLK_2	Second Shift Clock Output
Line decoded signal	C	43	44	LAT	latch signal output
Line decoded signal	D	45	46	CTRL	blanking control signal
Line decoded signal	E	47	48	OE_R	Display enable (OE_R, G, B are not separated, when controlling, use OE_R)
Display enable (OE_R, G, B are not separated, when controlling, use OE_R)	OE_B	49	50	OE_G	
	GND	51	52	GND	

	Data1	53	54	Data0	
	Data3	55	56	Data2	
	Data5	57	58	Data4	
	Data7	59	60	Data6	
	Data9	61	62	Data8	
	Data11	63	64	Data10	
	GND	65	66	GND	
	Data13	67	68	Data12	
	Data15	69	70	Data14	
	Data17	71	72	Data16	
	Data19	73	74	Data18	
	Data21	75	76	Data20	
	Data23	77	78	Data22	
	GND	79	80	GND	
	Data25	81	82	Data24	
	Data27	83	84	Data26	
	Data29	85	86	Data28	
	Data31	87	88	Data30	
	Data33	89	90	Data32	
	Data35	91	92	Data34	
	GND	93	94	GND	
	Data37	95	96	Data36	
	Data39	97	98	Data38	
	Data41	99	100	Data40	
	Data43	101	102	Data42	
	Data45	103	104	Data44	
	Data47	105	106	Data46	
	GND	107	108	GND	
	NC	109	110	NC	
	NC	111	112	NC	
	NC	113	114	NC	
	NC	115	116	NC	
	GND	117	118	GND	
	GND	119	120	GND	
	NC	121	122	NC	

5 product parameters

5.1 Basic parameters

Three-wire Parallel (RGB)	Drive IC	Brightness Correction Band Load (pixel)	Chromaticity Correction Band Load (pixel)	Chroma Correction With Load (pixels)
32 Group	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	

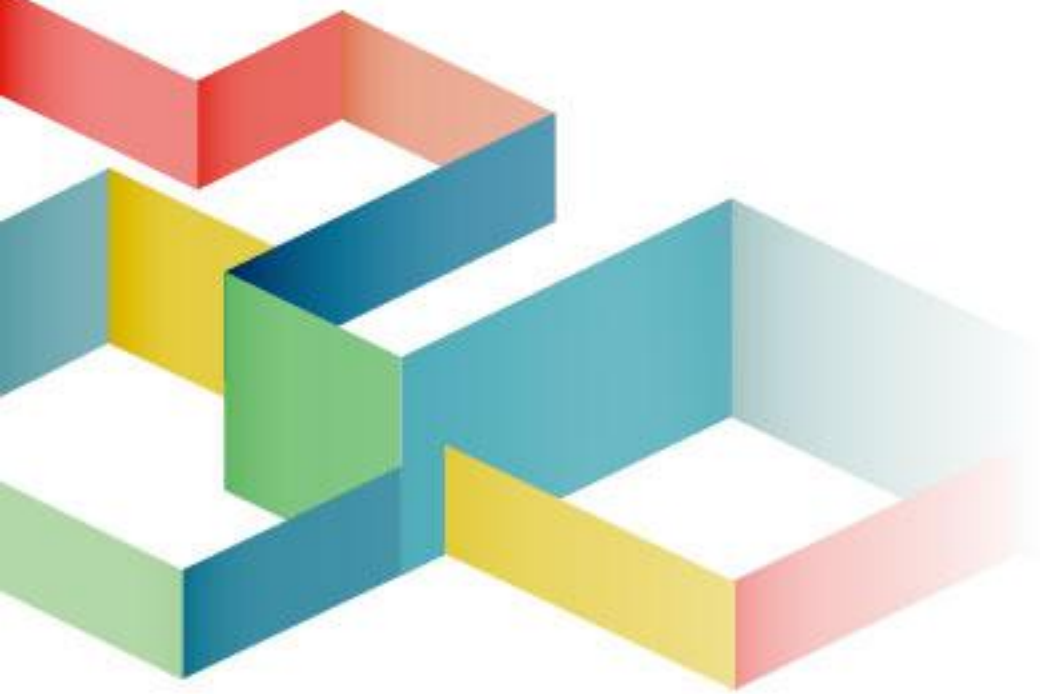
5.2 Specification Parameters

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	70mm×45mm	
Net weight	18.6g Description: Weight of single card	
Outer packing size	490×340×120mm	
Gross weight of product	3.01Kg Description: Including wire, accessories	
Packing mode	100PCS /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.



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