Colorlight

i9+

Receiving Card

Specification

Overview

i9+ is a high-end receiving card developed for fine-pitch LED screens featuring a large load capacity and up to 32 parallel data groups or 64 serial data groups. Due to its small form factor, i9+ is best fit into concise cabinets. With DDR2 SODIMM socket, it can be effortlessly integrated into the HUBs and the display modules, allows for flexible screen design.

i9+ not only has all the functions of mainstream receiving cards, but also a series of practical and powerful features helping high-end displays to maximize video performance with stunning clarity. i9+ can be perfectly used in high-end rentals as well as fine-pitch fix-installed LED screens.

Features

Display effect

- 8bit/10bit video source input.
- HDR10 and HLG.
- 10bit full gamma independent adjustment.
- Infi-bit color extension.
- Low latency.
- Color temperature adjustment.
- Grayscale refinement.
- Better gray at low brightness.

Calibration

- Low-grayscale calibration.
- Multi-layer calibration.
- High precise per-pixel calibration in brightness and chromaticity.

Easy maintenance

- Seam correction.
- Highlight and OSD.
- Color gamut adjustment.
- Screen rotation.
- Up to 16 intelligent modules.
- Quick firmware upgrade and calibration coefficients download.
- Cabinet temperature, humidity, voltage and power monitoring.

Stable and reliable

- Loop redundancy.

- Dual receiving card hot backup.
- PSU redundancy.
- Firmware redundancy and readback.
- Ethernet cable status monitoring.
- 7×24h uninterrupted work.

Feature details

Display effect	
10bit	Maximum 10bit color depth video input and output, it presents a grayscale 4 times the normal 8bit video source, which offers smoother screen grayscale transition.
HDR	Presenting images with high dynamic range, high contrast and wide color gamut.
High frame rate	Supports not only conventional and non-integer frame rates such as 23.98/24/29.97/30/50/59.94/60Hz, but also outputs and displays 120/144/240Hz high frame rate images, greatly improving picture smoothness and reducing smearing.(This feature affects the load capacity).
14bit calibration	Supports the 14bit calibration coefficients, and real-time processing of the calibration coefficient according to the actual playback content to improve the uniformity and consistency of the screen body at different gray levels.
Multi-layer calibration	Storage and processing of multiple copies of the calibration coefficient for different brightness levels, real-time dynamic adjustment of the correction coefficients according to the actual playback content, and improve the uniformity and consistency of the screen under different gray levels.
Infi-bit	Grayscale dynamic compensation technology, it can significantly improve the grayscale of the LED screen, which is at least 64 times higher than the original level, effectively improving the details of low-gray pictures, making the grayscale transition smoother and presenting more vivid colors.
Low-grayscale calibration	The low gray level of the fine-pitch cabinet is independently calibrated, to solve the problem that such cabinet is prone to presenting low gray color bands and level unevenness with conventional calibration.
Grayscale refinement	With the use of a luminance meter, the actual screen display conditions are measured, and the screen grayscale can be accurately calibrated, which perfectly solves the gray level jitters and low gray color cast caused by the hardware.
Shortcuts	
Cabinet highlight	Mark quickly a target cabinet, by displaying a flashing rectangle indicator on the cabinet screen, which greatly facilitates front and rear maintenance.
Quick OSD	Mark quickly the index of a receiving card corresponding to a specific Ethernet port, allow for setting up the connection relationship of the screen easily.
Seam correction	Quickly and efficiently eliminate the perceptible bright and dark lines caused by physical screen splicing. It can be used repeatedly in rental scenarios, thanks to its advanced one-click reset feature.

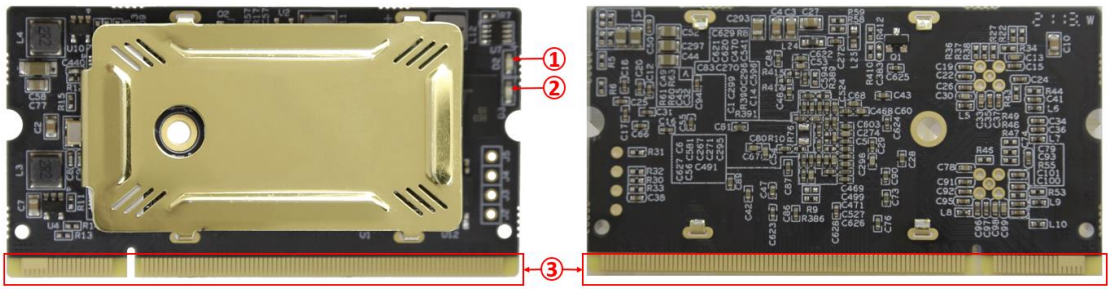
Color adjustment	Allow you to quickly and easily adjust the color gamut of individual cabinet or screen. Support customized adjustment and one-click restore. Achieve high-precision color reproduction in combination with the use of the photometer.
Image rotation	Support the rotation of the cabinet image at an angle of 90°/180°/270°. Any angle rotation is also available in combination with supported LED sender models from Colorlight.
Hardware monitoring	
Bit error rate detection	Quickly identify the cabinet with abnormal connection, thanks to the feature of data transmission quality detection between receiving card and LED sender.
Humidity monitoring	Monitor the cabinet (need support from the cabinet design), and send to the computer in real-time the running cabinet humidity. With the software, users can monitor current humidity and be alerted on any abnormal condition.
Temperature monitoring	Monitor the cabinet (need support from the cabinet design), and send to the computer in real-time the running cabinet temperature. With the software, users can monitor current temperature and be alerted on any abnormal condition.
Power supply monitoring	Support 2-way power fault monitoring of the cabinet (need support from the cabinet design), and send to the computer in real-time the running power status. From the software, users can monitor current power status and be alerted on any abnormal condition.
Pixel-by-pixel monitoring	Monitoring cabinet pixel health (need support from the cabinet design), and send to the computer in real-time each pixel status. With the software, users can check current pixels status and be alerted on the amount of bad pixels above a predefined threshold.
Smoke Monitoring	Monitoring cabinet smoke (requires M3 in cabinet design), and send to the computer in real-time the smoke status. With the software, users can check current smoke status and be alerted on cabinet smoke.
Fan control	Control the fan (requires support from the cabinet design) manually from the software, even allow automatic fan switching on current cabinet temperature status (requires support from the cabinet design).
LCD monitoring	Display on the cabinet LCD screen the temperature, voltage, running time and other status, support one-click self-test.
Redundancy	
Loop redundancy	The receiving card switches signal source to the other Ethernet port, when one receiving channel fail, maintaining the normal display of the LED screen.
Receiving card hot backup	Two receiving cards connect to the HUB board to control a single cabinet at the same time. When the main receiving card is abnormal, the backup card will take over the display immediately.
Firmware redundancy	Support firmware backup. Users can safely upgrade firmware without worrying about losing firmware due to cable disconnections or power failure during the upgrade process.

Basic parameters

Control System Parameters	
Load Capacity	256x1024 pixels.
Ethernet Port exchange	Ethernet port changeable.
Display Module Compatibility	
Supported Chips	PWM chips, Shixin chips.
Scan Type	Up to 128 scan lines.
Module Dimension	Up to 16384 pixels per data group
Cable Direction	Route from left to right, from right to left, from top to bottom, from bottom to top.
Data Group	32 groups of parallel RGB data and 64 groups of serial RGB data, the later can be extended to 128 groups. Data groups can be exchanged freely.
Data Fold	Horizontal or vertical 2~8 folds.
Monitoring Function (work with the module with corresponding sensor)	
Temperature Monitoring	Operating temperature range:-25°C~75°C.
Humidity Monitoring	Measuring range: 25%~95%RH.
Power Supply Monitoring	Operating power supply status, 2 monitoring ports available each card.
Net cable Monitoring	Operating total number of packets, error packets and network quality.
Cabinet monitoring	With M3, support monitoring such as cabinet door open, fan, smoke, etc.
Pixel-by-Pixel Calibration	
Brightness Calibration	Up to 14bit calibration accuracy.
Chromaticity Calibration	Up to 14bit calibration accuracy.
Other features	
Redundancy	Loop redundancy, receiving card redundancy, PSU redundancy, firmware redundancy.
Optional functions	Cabinet LCD display, module hot swap, prestore picture, irregular screen design etc.

Hardware

Appearance



Interface

S/N	Name	Function	
1	Signal indicator	Flash once per second	Receiving card: normal. Ethernet cable connection: normal.
		Flash 10 times per second	Receiving card: normal. Cabinet: Highlight.
		Flash 4 times per second	Receiving card: working with back up channel (Loop redundancy status).
2	Power indicator	Constant red: normal.	
3	Connecting finger	Used to connect with the HUB or unit board.	

* i9+ uses DDR2 SODIMM socket, please refer to the connector specification for details. The product photos in this article are for reference only.

Equipment Specifications

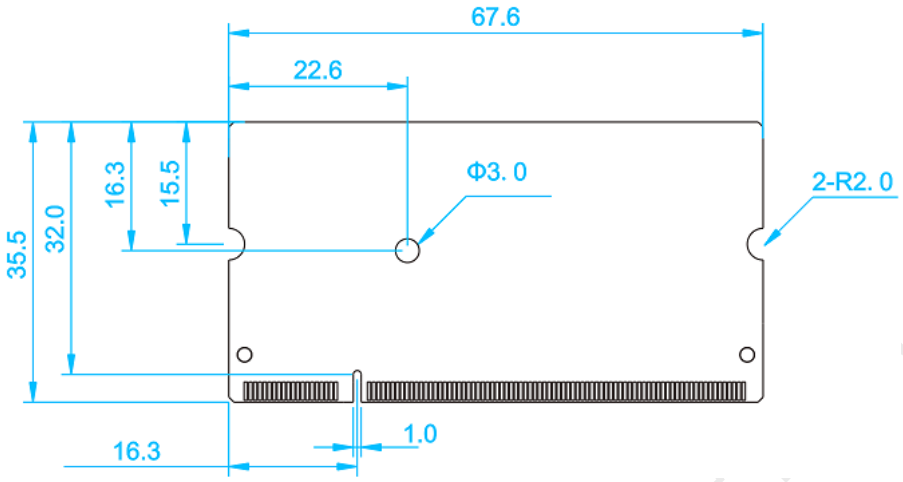
Physical Specifications	
Hardware interface	DDR2 SODIMM socket
Ethernet port transmission rate	1Gb/s
Communication Distance	Recommended: CAT5e cable≤100m
Compatible with Transmission Equipment	Gigabit switch, Gigabit fiber converter, Gigabit fiber switch
Size[1]	L×W×H / 67.6mm(2.7")×35.5mm(1.4")×4.5mm(0.2")
Weight	14g/0.03lbs, with heat sink.
Electrical specification	
Power input	DC 3.8~5.5V, 0.6A
Rated power consumption	3.0W
ESD Resistance (HBM)	2kV
Operating environment	
Temperature	-25°C~75°C (-13°F~167°F)
Humidity	0%RH-80%RH, no condensation
Storage and transport environment	
Temperature	-40°C~125°C (-40°F~257°F)
Humidity	0%RH-90%RH, no condensation
Packing information	
Packing	Standard blister box, 6 cards per box, 600 cards per carton
Packing size	L×W×H / 550.0mm(21.7")×398.0mm(15.7")×180.0mm(7.1")
Certification	
* RoHS certification, EMC Class A certification, EMC needs to work with the cabinet design, please contact technical support for assistance.	

[1] Size and weight vary by manufacturing process.

Reference dimensions

Unit: mm

Tolerance: ±0.3mm

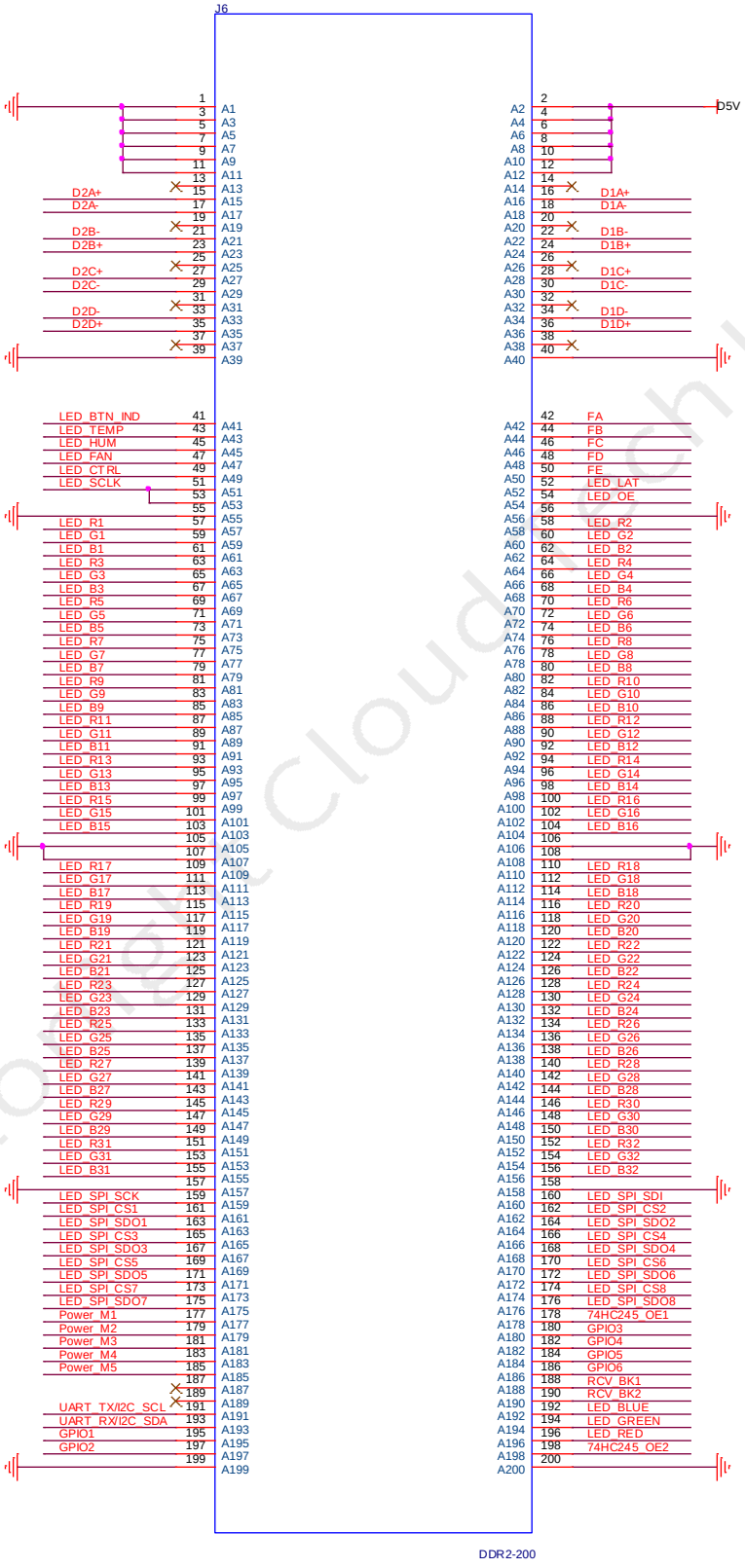


*Studs are not recommended for further fixing.

*If you need to use studs, please contact technical support.

Definition of Pins

32 groups of parallel data interfaces

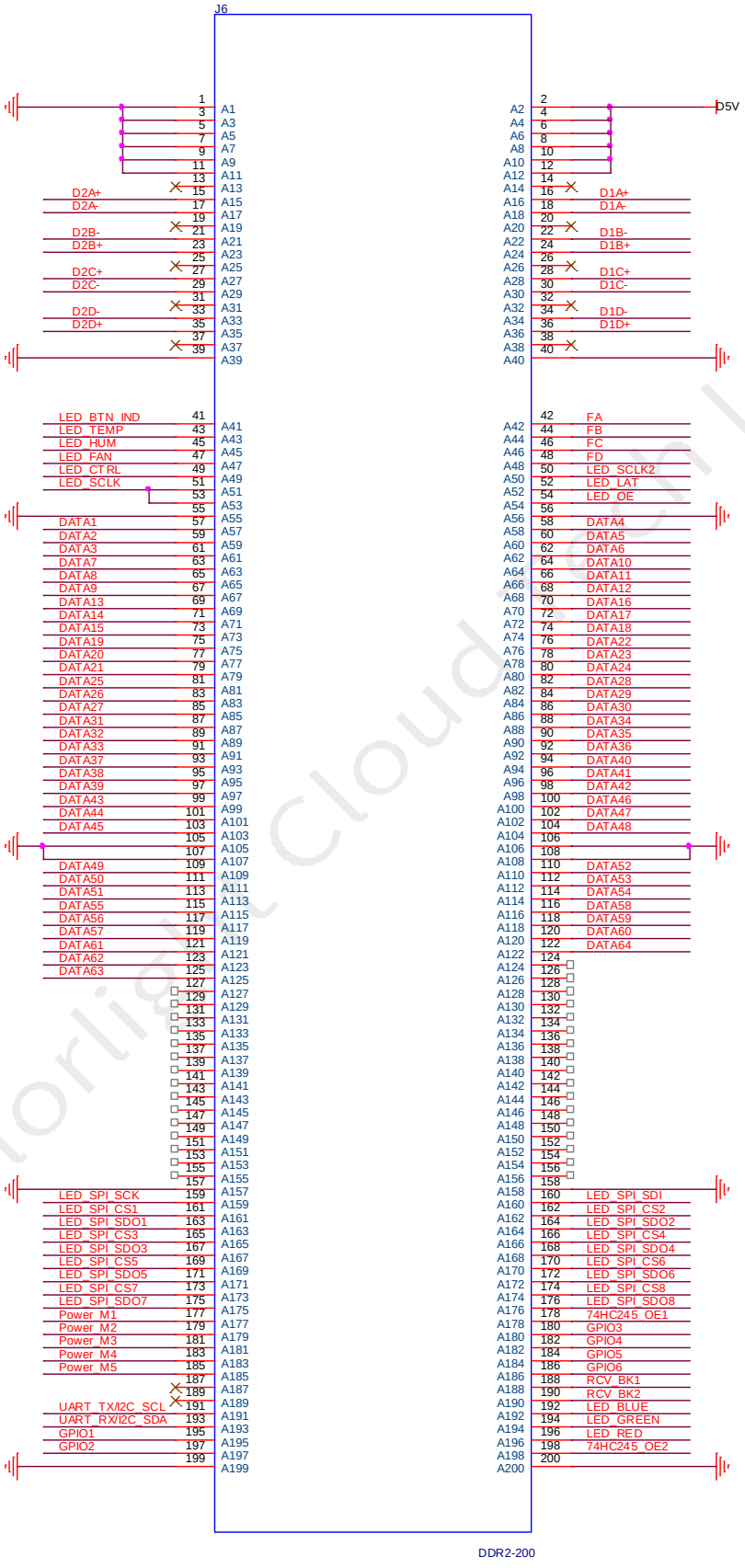


Instructions	Definition	Pin No.		Definition	Instructions
Ground connection	GND	1	2	D5V	Power supply
	GND	3	4	D5V	
	GND	5	6	D5V	
	GND	7	8	D5V	
	GND	9	10	D5V	
	GND	11	12	D5V	
Empty	NC	13	14	NC	Empty
Ethernet port 2 signal pin	D2A+	15	16	D1A+	Ethernet port 1 signal pin
	D2A-	17	18	D1A-	
	NC	19	20	NC	
	D2B-	21	22	D1B-	
	D2B+	23	24	D1B+	
	NC	25	26	NC	
	D2C+	27	28	D1C+	
	D2C-	29	30	D1C-	
	NC	31	32	NC	
	D2D-	33	34	D1D-	
	D2D+	35	36	D1D+	
Empty	NC	37	38	NC	Empty
Ground connection	GND	39	40	GND	Ground connection
Indicator, reuse button	LED_BTN_IND	41	42	FA	Row decoding signal
Temperature monitoring	LED_TEMP	43	44	FB	
Humidity monitoring	LED_HUM	45	46	FC	
Fan control	LED_FAN	47	48	FD	
Blanking	LED_CTRL	49	50	FE	
Serial clock	LED_SCLK	51	52	LED_LAT	Latch
		53	54	LED_OE	Display enable, it is GCLK when the LED display use PWM chips
Ground connection	GND	55	56	GND	Ground connection
RGB output	LED_R1	57	58	LED_R2	RGB output
	LED_G1	59	60	LED_G2	
	LED_B1	61	62	LED_B2	
	LED_R3	63	64	LED_R4	
	LED_G3	65	66	LED_G4	
	LED_B3	67	68	LED_B4	

	LED_R5	69	70	LED_R6	
	LED_G5	71	72	LED_G6	
	LED_B5	73	74	LED_B6	
	LED_R7	75	76	LED_R8	
	LED_G7	77	78	LED_G8	
	LED_B7	79	80	LED_B8	
	LED_R9	81	82	LED_R10	
	LED_G9	83	84	LED_G10	
	LED_B9	85	86	LED_B10	
	LED_R11	87	88	LED_R12	
	LED_G11	89	90	LED_G12	
	LED_B11	91	92	LED_B12	
	LED_R13	93	94	LED_R14	
	LED_G13	95	96	LED_G14	
	LED_B13	97	98	LED_B14	
	LED_R15	99	100	LED_R16	
	LED_G15	101	102	LED_G16	
	LED_B15	103	104	LED_B16	
Ground connection	GND	105	106	GND	Ground connection
	GND	107	108	GND	
RGB output	LED_R17	109	110	LED_R18	RGB output
	LED_G17	111	112	LED_G18	
	LED_B17	113	114	LED_B18	
	LED_R19	115	116	LED_R20	
	LED_G19	117	118	LED_G20	
	LED_B19	119	120	LED_B20	
	LED_R21	121	122	LED_R22	
	LED_G21	123	124	LED_G22	
	LED_B21	125	126	LED_B22	
	LED_R23	127	128	LED_R24	
	LED_G23	129	130	LED_G24	
	LED_B23	131	132	LED_B24	
	LED_R25	133	134	LED_R26	
	LED_G25	135	136	LED_G26	
	LED_B25	137	138	LED_B26	
	LED_R27	139	140	LED_R28	
	LED_G27	141	142	LED_G28	
	LED_B27	143	144	LED_B28	
	LED_R29	145	146	LED_R30	
	LED_G29	147	148	LED_G30	
	LED_B29	149	150	LED_B30	

	LED_R31	151	152	LED_R32	
	LED_G31	153	154	LED_G32	
	LED_B31	155	156	LED_B32	
Ground connection	GND	157	158	GND	Ground connection
Smart module (Save calibration coefficients in module)	LED_SPI_SCK	159	160	LED_SPI_SDI	Smart module (Save calibration coefficients in module)
	LED_SPI_CS1	161	162	LED_SPI_CS2	
	LED_SPI_SDO1	163	164	LED_SPI_SDO2	
	LED_SPI_CS3	165	166	LED_SPI_CS4	
	LED_SPI_SDO3	167	168	LED_SPI_SDO4	
	LED_SPI_CS5	169	170	LED_SPI_CS6	
	LED_SPI_SDO5	171	172	LED_SPI_SDO6	
	LED_SPI_CS7	173	174	LED_SPI_CS8	
	LED_SPI_SDO7	175	176	LED_SPI_SDO8	
Power supply monitoring	Power_M1	177	178	75HC245_OE1	Extension of 16-channel of smart module, 245 enable
	Power _M2	179	180	GPIO3	Reserved
Reserved	Power _M3	181	182	GPIO4	
	Power _M4	183	184	GPIO5	
	Power_M5	185	186	GPIO6	
Empty	NC	187	188	RCV_BK1	Dual card backup identification signal
	NC	189	190	RCV_BK2	Dual card backup connection signal
Extension port	UART_TX/I2C_SCL	191	192	LED_BLUE	LED RGB indicator
	UART_RX/I2C_SDA	193	194	LED_GREEN	
Reserved	GPIO1	195	196	LED_RED	
	GPIO2	197	198	75HC245_OE2	Extension of 16-channel smart module, 245 enable
Ground connection	GND	199	200	GND	Ground connection

64 groups of serial data interfaces



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	GND	9	10	D5V	
	GND	11	12	D5V	
Empty	NC	13	14	NC	Empty
Ethernet port 2 signal pin	D2A+	15	16	D1A+	Ethernet port 1 signal pin
	D2A-	17	18	D1A-	
	NC	19	20	NC	
	D2B-	21	22	D1B-	
	D2B+	23	24	D1B+	
	NC	25	26	NC	
	D2C+	27	28	D1C+	
	D2C-	29	30	D1C-	
	NC	31	32	NC	
	D2D-	33	34	D1D-	
	D2D+	35	36	D1D+	
Empty	NC	37	38	NC	Empty
Ground connection	GND	39	40	GND	Ground connection
Indicator, reuse button	LED_BTN_IND	41	42	FA	Row decoding signal
Temperature monitoring	LED_TEMP	43	44	FB	
Humidity monitoring	LED_HUM	45	46	FC	
Fan control	LED_FAN	47	48	FD	
Blanking	LED_CTRL	49	50	LED_SCLK2	Serial clock 2
Serial clock 1	LED_SCLK1	51	52	LED_FLAT	Latch
		53	54	LED_OE	Display enable, it is GCLK when the LED display use PWM chips
Ground connection	GND	55	56	GND	Ground connection
RGB output	DATA1	57	58	DATA4	RGB output
	DATA2	59	60	DATA5	
	DATA3	61	62	DATA6	
	DATA7	63	64	DATA10	
	DATA8	65	66	DATA11	
	DATA9	67	68	DATA12	

	DATA13	69	70	DATA16	
	DATA14	71	72	DATA17	
	DATA15	73	74	DATA18	
	DATA19	75	76	DATA22	
	DATA20	77	78	DATA23	
	DATA21	79	80	DATA24	
	DATA25	81	82	DATA28	
	DATA26	83	84	DATA29	
	DATA27	85	86	DATA30	
	DATA31	87	88	DATA34	
	DATA32	89	90	DATA35	
	DATA33	91	92	DATA36	
	DATA37	93	94	DATA40	
	DATA38	95	96	DATA41	
	DATA39	97	98	DATA42	
	DATA43	99	100	DATA46	
	DATA44	101	102	DATA47	
	DATA45	103	104	DATA48	
Ground connection	GND	105	106	GND	Ground connection
	GND	107	108	GND	
RGB output	DATA49	109	110	DATA52	RGB output
	DATA50	111	112	DATA53	
	DATA51	113	114	DATA54	
	DATA55	115	116	DATA58	
	DATA56	117	118	DATA59	
	DATA57	119	120	DATA60	
	DATA61	121	122	DATA64	
	DATA62	123	124	NC	Empty
	DATA63	125	126	NC	
Empty	NC	127	128	NC	
	NC	129	130	NC	
	NC	131	132	NC	
	NC	133	134	NC	
	NC	135	136	NC	
	NC	137	138	NC	
	NC	139	140	NC	
	NC	141	142	NC	
	NC	143	144	NC	
	NC	145	146	NC	
	NC	147	148	NC	
	NC	149	150	NC	

	NC	151	152	NC	
	NC	153	154	NC	
	NC	155	156	NC	
Ground connection	GND	157	158	GND	Ground connection
Smart module (Save calibration coefficients in module)	LED_SPI_SCK	159	160	LED_SPI_SDI	Smart module (Save calibration coefficients in module)
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	LED_SPI_SDO3	167	168	LED_SPI_SDO4	
	LED_SPI_CS5	169	170	LED_SPI_CS6	
	LED_SPI_SDO5	171	172	LED_SPI_SDO6	
	LED_SPI_CS7	173	174	LED_SPI_CS8	
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Power supply monitoring	Power_M1	177	178	75HC245_OE1	Extension of 16-channel of smart module, 245 enable
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Reserved	Power _M3	181	182	GPIO4	
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Empty	NC	187	188	RCV_BK1	Dual card backup identification signal
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Extension port	UART_TX/I2C_SCL	191	192	LED_BLUE	LED RGB indicator
	UART_RX/I2C_SDA	193	194	LED_GREEN	
Reserved	GPIO1	195	196	LED_RED	
	GPIO2	197	198	75HC245_OE2	Extension of 16-channel smart module, 245 enable
Ground connection	GND	199	200	GND	Ground connection

* FE and LED_SCLK2 are signal multiplexing pins, which are used as row decoding signals in parallel data and as the second serial clock in serial data to achieve 128 sets of serial data expansion, DATA65~DATA128 correspond to multiplexing DATA1 Interface data for ~DATA64.

Statement

As factors such as product batches and production processes may change, in order to provide accurate product information, specification parameters, and product characteristics in order to match the actual product, the text description and picture effects in the document will be adjusted and revised appropriately. If it is necessary to carry out the above modification and adjustment without prior notice, please refer to the actual product.

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