Colorlight

i10

Receiving Card

Specification V2.0.0

Overview

i10 is a small pixel pitch and high-end receiving card developed by Colorlight.
i10 single card can load up to 1024×384 pixels and support up to 32 groups of parallel data or 64 groups of serial data, which can be expanded to 128 groups of serial data.
i10 adopts DDR2 SODIMM interface, and can conveniently integrate with the HUB or display module, making the design of display module structure more flexible and convenient.
i10 has not only the functions of mainstream receiver cards, but also a series of practical and strong functions developed for high-end displays, increasing the additional value of the card. i10 can be used in high-end rental displays and LED screens with small pixel pitch.

Features

Display effect

- Support 8bit/10bit/12bit Video source input
- Support HDR-HDR10, HDR-HLG
- Support 10/12bit full gamma independent adjustment
- Support Infi-bit grayscale compensation technology
- Support low latency
- Support color temperature adjustment
- Support grayscale refinement
- Support better gray at low brightness

Correction processing

- Support low-grayscale calibration
- Support multi-layer calibration
- Support 14bit pixel-to-pixel calibration in brightness and chromaticity

Easy maintenance

- Support advanced softedge technology
- Support highlight and OSD
- Support color gamut adjustment
- Support screen rotation
- Support pre-stored pictures
- Support 16-way of intelligent module to save calibration coefficients and other

information on module

- Supports quick firmware upgrade and quick release of correction coefficients
- Support any pumping row, pumping column and pumping point
- Support monitoring of cabinet temperature, voltage and power

Stable and reliable

- Support loop redundancy
- Support receiver card redundancy
- Support ethernet cable status monitoring
- Support firmware program redundancy and readback
- Support dual power redundancy
- Support 7×24h uninterrupted work

Feature details

Display effect	
12bit	It supports the highest 12bit color depth video input and output, showing that the gray scale is 16 times the normal 8bit video source, making the display screen grayscale transition more uniform and more delicate.
HDR	With the support of HDR master control, HDR display of various HDR10 / HLG standards can be realized, presenting images with high dynamic range, high contrast and wide color gamut.
Frame rate	Adaptive frame rate technology, not only supports 23.98/24/29.97/30/50/59.94/60Hz regular and non-integer frame rates, but also outputs and displays 120/144/240Hz high frame rate pictures, which greatly improves picture fluency and reduces drag film. (Note: it will affect the load).
Better gray at low brightness	By optimizing the gamma meter algorithm, the display screen can maintain the integrity and perfect display of gray scale when reducing the brightness, showing the display effect of low brightness and high gray scale.
14bit calibration	14bit high-precision brightness and chromaticity correction point by point, which can effectively eliminate the chromatic aberration of the lamp point, ensure the uniformity and consistency of the color brightness of the entire screen, and improve the overall display effect.
Multi-layer calibration	Support storage and processing of multiple correction coefficients under different brightness, 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	The use of dynamic compensation grayscale technology can significantly increase the grayscale of the LED display, effectively improving the details of the low-gray picture, making the grayscale transition smoother and the display effect more perfect.
Low-grayscale calibration	Solve the problem of low grayscale color blocks in the small-pitch cabinet based on the existing brightness correction. Additive compensation for the low grayscale is independent of the brightness and chromaticity correction.
Grayscale refinement	With the use of a luminance meter and LEDVISION software, the actual screen display conditions are measured, and the screen grayscale can be accurately corrected, which perfectly solves the gray jump and low gray color cast caused by the hardware.
Shortcut operation	
Cabinet highlight	Using the control software, you can quickly mark the selected target cabinet, display a flashing box on the front of the cabinet, and change the flashing frequency of the cabinet indicator at the same time, which is convenient for front and rear maintenance.
Quick OSD	Using the control software, you can quickly mark the actual hardware connection serial number of the receiving card corresponding to the Ethernet port, which is convenient for setting the connection relationship of the screen.
Advanced softedge	Using the control software, it can quickly and efficiently realize the seam processing, eliminate the visual bright and dark lines caused by hardware splicing, and support one-key reset, which can be used repeatedly in rental scenes.
Color adjustment	Using the control software, you can quickly and easily realize the color gamut adjustment and transformation of a single cabinet or screen, support custom adjustment and one-key restoration, and cooperate with the photometer to achieve high-precision color restoration, which can meet the needs of different scenes.
Image rotation	Support the single cabinet image to be rotated at 90°/180°/270° angles, and with part of the main control, the single cabinet image can be rotated and displayed at any angle.
Pre-stored pictures	Supports customizing the screen of the display when the power is turned on, the network cable is disconnected, and there is no video source signal.
Hardware monitoring	
Bit error detection	It supports the detection of data transmission quality and error code between receiving cards, and can easily and quickly identify the cabinet with abnormal hardware connection, which is convenient for maintenance.
Humidity monitoring	It supports cabinet humidity monitoring (requires cabinet design), can be sent back to the upper computer in real time, can be viewed on the software, and supports custom humidity abnormality reminders.
Temperature monitoring	It supports cabinet temperature monitoring(requires cabinet design), can be sent back to the upper computer in real time, can be viewed on the software, and supports custom setting of high temperature reminder. Monitoring receiving card's own temperature, no need for peripherals, 1 port for each card.
Power supply monitoring	It supports the monitoring of 4-way power supply of the cabinet (requires cabinet design), which can be sent back to the upper computer in real time, can be viewed on the software, and supports the reminder of abnormal power status.

Voltage monitoring	It supports the monitoring of the power supply voltage of the box (requires cabinet design), which can be sent back to the host computer in real time. It can monitor the voltage status of 3 channels of external power supply at the same time and monitor the voltage of 1 channel of the receiving card itself. It supports software to check the voltage monitoring value.
Point-by-point monitoring	Supports point-by-point monitoring of the cabinet (requires cabinet design), can be sent back to the host computer in real time, can be viewed on the software, and supports the reminder of too many dead pixels on the lamp board.
Smoke control	Support box smoke control (requires M3 combined with box design), can be sent back to the host computer in real time, can be viewed on the software, and supports custom smoke exception reminders.
Fan control	Support cabinet fan control (requires cabinet design), the fan switch can be set through the control software, and the fan start or speed control can be automatically controlled with temperature monitoring.
LCD monitoring	Support control box LCD liquid crystal screen display, support temperature, voltage and running time and other status information display, support no-signal button self-test test.
Redundancy	
Loop redundancy	The redundant Ethernet port is used to increase the connection with the transmitting equipment and increase the reliability of cascading between equipment. When one circuit fails, it can realize seamless switching to the other circuit and ensure the normal display of the screen.
Receiver card redundancy	Support to use two receiving cards to connect to the HUB board to control a single box at the same time. When the main receiving card is abnormal, the backup receiving card will work immediately to ensure the normal display of the screen.
Firmware redundancy	It supports firmware program backup and can be upgraded safely. There is no need to worry about the loss of firmware program due to cable disconnection or power interruption during the upgrade process.

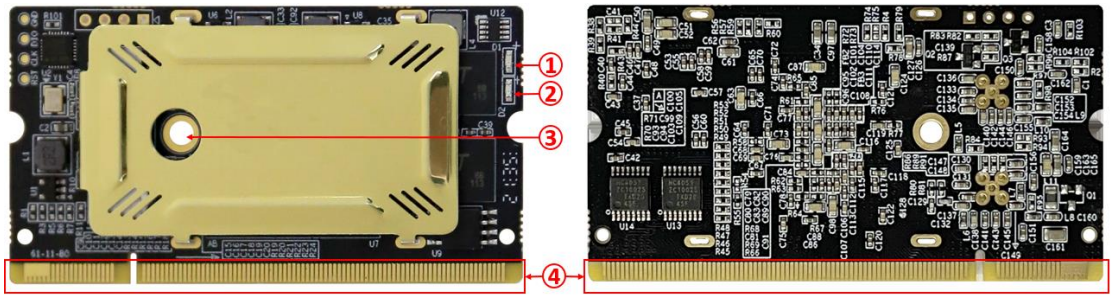
Basic parameters

Control System Parameters	
Control Area	Maximum 1024×384 pixels, there will be differences in downloading and downloading of different applications and please refer to the actual*
Ethernet Port Exchange	Supported, arbitrary use
Gray Level	Maximum 65536 levels
Display Module Compatibility	
Chip Support	PWM chips
Scan Type	Support up to 1/128 scan
Module Specifications Supported	Support module of any row and column within 16384 pixels
Cable Direction	Support route from left to right, from right to left, from top to bottom, from bottom to top
Data Group	32 groups of parallel RGB full color data and 64 groups of serial RGB data, which can be expanded to 128 groups of serial data, data groups can be exchanged freely
Data Folded	Support horizontal 2~8 fold or vertical 2~4 fold
Module pumping point, row and column	Support any pumping point and any pumping row and any pumping column
Monitoring Function (In conjunction with the monitoring module)	
Temperature Monitoring	Temperature of receiver cards: between -25°C~75°C, 1 port for each card. Monitoring receiving card's own temperature, no need for peripherals, 1 port for each card.
Humidity Monitoring	Humidity of receiver cards: between 25%~95%RH, 1 port for each card
Power Supply Monitoring	Monitor the working status of the power supply, 4 ports for each card
Power Voltage Monitoring	Monitoring receiving card's own voltage, no need for peripherals, 1 port for each card. Monitoring the working voltage of the power supply, 3 ports for each card
Bit Error Monitoring	Monitor the total number of data packets and error packets to check network quality
Cabinet monitoring	With M3, it can support monitoring functions such as cabinet door, fan, smoke, etc.
Pixel-to-Pixel Calibration	
Brightness Calibration	Support, the correction accuracy can reach 14bit
Chromaticity Calibration	Support, the correction accuracy can reach 14bit
Other features	
Redundancy	Support loop redundancy, receiver card redundancy and PSU redundancy

	and firmware redundancy
Optional functions	box LCD liquid crystal display, temperature control relay, module hot swap, shaped screen etc.

Hardware

Appearance



Interface

S/N	Name	Function	
1	Power indicator	Red indicator always on: the power supply is normal	
2	Signal indicator	Flashes once per second	Receiving card: normal working, Ethernet cable connection: normal
		Flashes 10 times per second	Receiving card: normal working, Cabinet: Highlight
		Flashes 4 times per second	Receiving card: Redundant port is working (In loop redundancy)
3	Fixed hole	Used to reinforce the receiving card to improve vibration resistance	
4	Gold finger interface	Connects with display’ s HUB or module. From the diagram above, the left side of the guide plate is first pin (Viewing from the front of card)	

Note:

1. The product photos in this article are for reference only, and only the actual purchase shall prevail.
2. For the DDR2 SODIMM socket used by i10, please refer to the connector specification for detailed specifications. Recommended 2.7mm fixed PCB solder spiral.

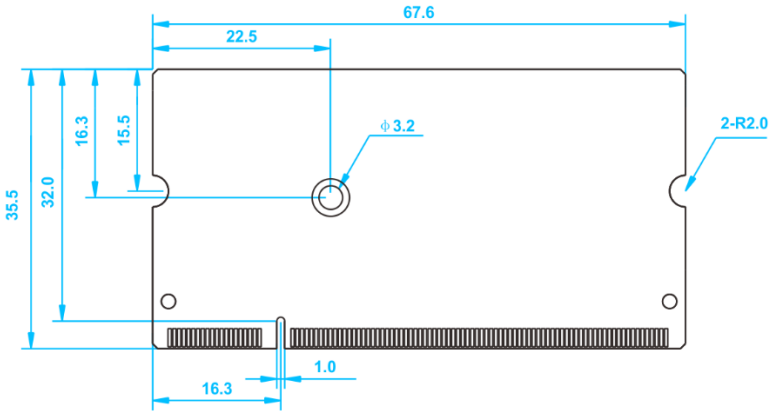
Equipment Specifications

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	67.6mm×35.5mm×4.5mm
Weight	14g (with heat sink)
Electrical specification	
Voltage	DC 3.8~5.5V，0.7A
Rated power	3.5W
Body Static Resistance	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
Package information	
Packaging rules	Standard blister box device, 6 cards per box, 600 cards per carton
Package size	550.0mm×398.0mm×180.0mm
Certification Information	
RoHS certification, EMC Class A certification, EMC needs to be matched with the cabinet design, if necessary, please contact the technical staff for assistance	

Dimensions

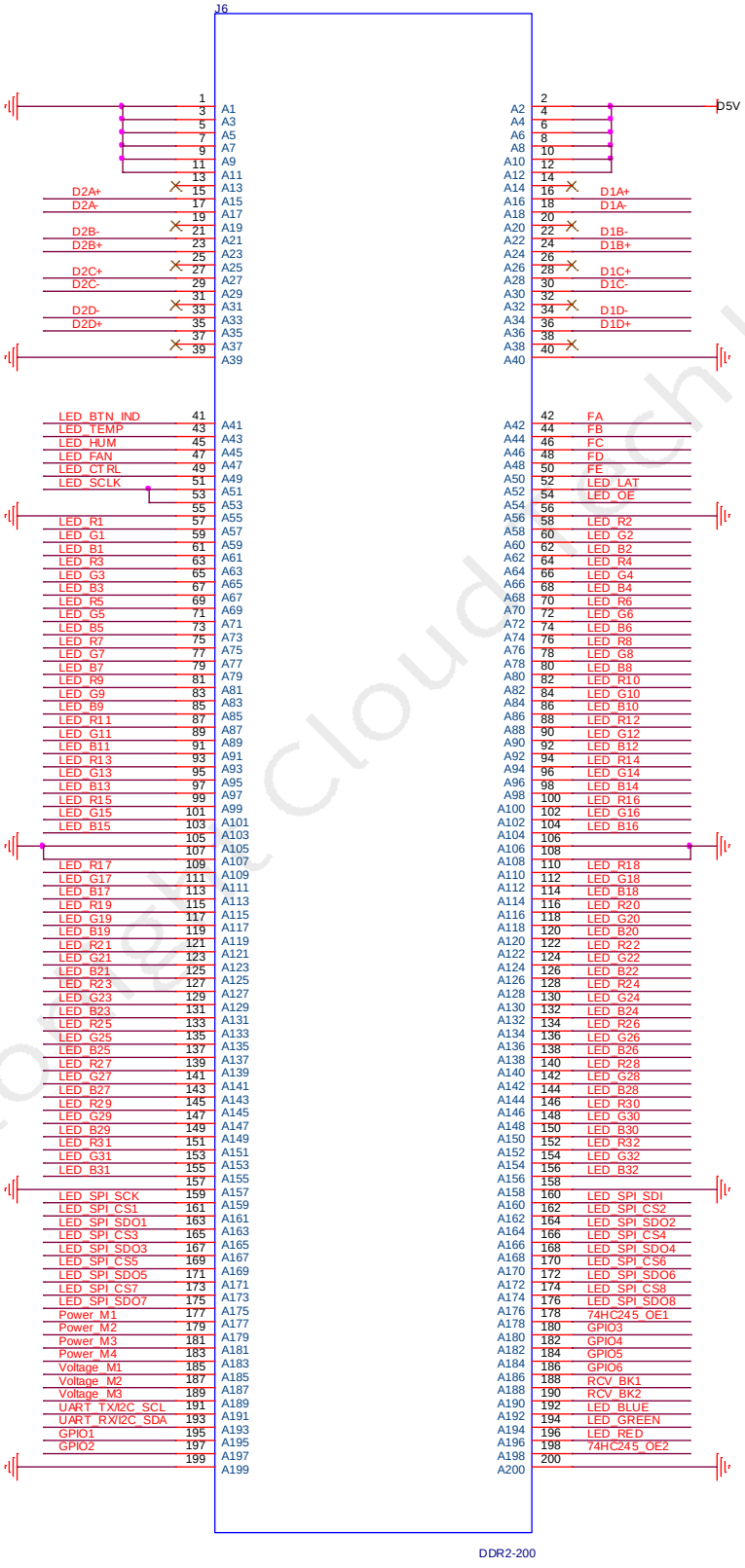
Unit: mm

Tolerance: ±0.3mm



Definition of Pins

32 groups of parallel data interfaces

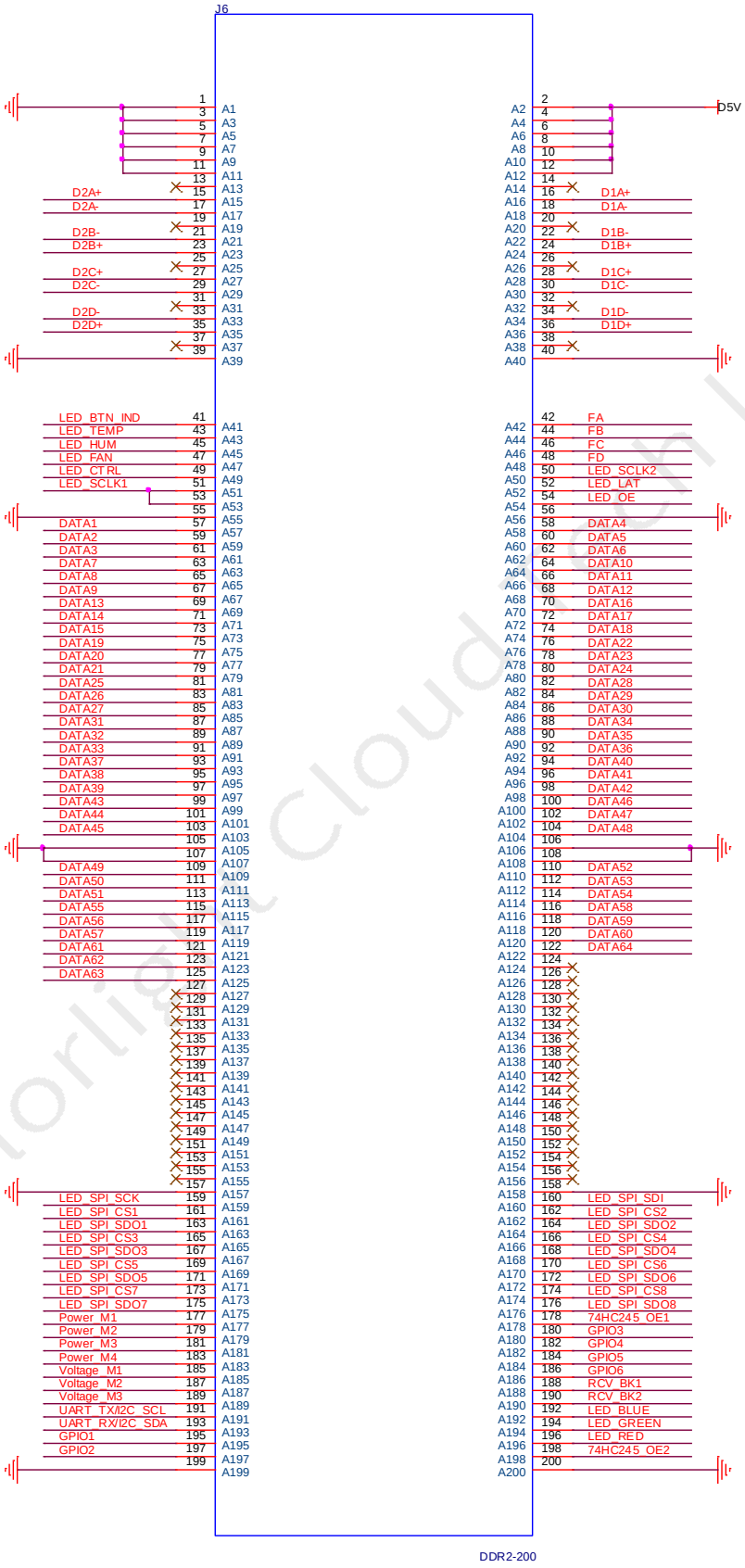


Instructions	Definition	Pin No.		Definition	Instructions
Ground connection	GND	1	2	D5V	Power supply
	GND	3	4	D5V	
	GND	5	6	D5V	
	GND	7	8	D5V	
	GND	9	10	D5V	
	GND	11	12	D5V	
Empty	NC	13	14	NC	Empty
Ethernet port 2 signal pin	D2A+	15	16	D1A+	Ethernet port 1 signal pin
	D2A-	17	18	D1A-	
	NC	19	20	NC	
	D2B-	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
	Power _M3	181	182	GPIO4	
	Power _M4	183	184	GPIO5	
Power Voltage monitoring	Voltage_M1	185	186	GPIO6	
	Voltage_M2	187	188	RCV_BK1	Dual card backup identification signal
	Voltage_M3	189	190	RCV_BK2	Dual card backup connection signal
Extension port	UART_TXD/I2C_SCL	191	192	LED_BLUE	LED RGB indicator
	UART_RXD/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	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	LED_SCLK2	Serial clock 2
Serial clock 1	LED_SCLK1	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	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	
	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
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	UART_RXD/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

Note：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, which can realize 128 groups of serial data expansion. When using 128 groups of serial data expansion mode, DATA65～DATA128 correspond to the interface data of multiplexing DATA1～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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