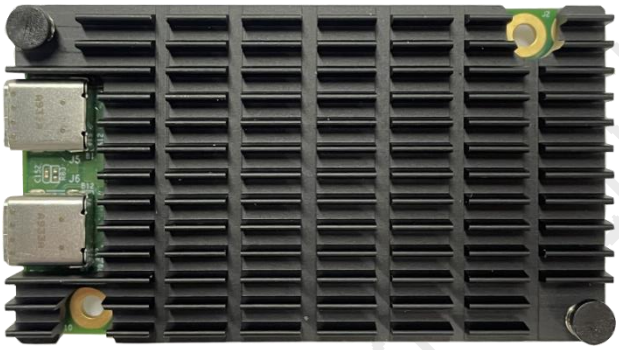
Colorlight



RV5000

Receiving Card

Specification V1.0

Overview

RV5000 is a 5G high-end receiving card designed by Colorlight for small-pitch screens in high-end fixed display and flexible rental scenarios. It adopts high-density connectors and Type-C network communication ports with a transmission rate of 5Gb/s. Compared with the conventional Gigabit Ethernet system, it can better support high frame rate and high color depth, effectively increase the loading capacity of a single Ethernet cable and the number of maximum cascaded cabinets, and greatly reduce the connection cables between the screen and the LED controller, which provides convenience for designing LED cabinet structure and improves overall stability.

RV5000 has the functions of current mainstream receiving cards, and has developed a series of practical and powerful functions for high-end display screens, which provide larger control area and higher precision calibration, greatly improve the display effect and performance, and add additional value to customers' products. RV5000 can be widely used in fields such as national defense security, radio and television, smart security, education and scientific research, and stage leasing.

Features

- Support 5Gb/s high-speed data signal transmission
- Support 32 groups of RGB signal parallel output, 64 groups of RGB signal serial output
- Support 8bit/10bit/12bit video source input
- Support high frame rate display（120/144/240Hz）
- Support 14bit pixel-to-pixel calibration in brightness and chromaticity
- Support HDR 10 / HLG standard HDR display
- Support Infi-bit grayscale compensation technology
- Support grayscale refinement
- Support 10bit/12bit Gamma individual adjustment
- Support low-grayscale calibration
- Support color gamut adjustment
- Support color temperature adjustment
- Support advanced softedge technology
- Support any pumping row, pumping column and pumping point
- Support intelligent module: save calibration coefficients and other information

on modules

- Support highlight and OSD
- Support better gray at low brightness
- Support quick upgrade
- Support reading back programs
- Support firmware backup and safe upgrade
- Support loop redundancy and dual card redundancy
- Support control of small LCD modules
- Support bit error detection
- Support fan control and monitoring of cabinet temperature, humidity and power supply
- Support up to 1/64 scan
- Compatible with Colorlight 5G-series sending devices

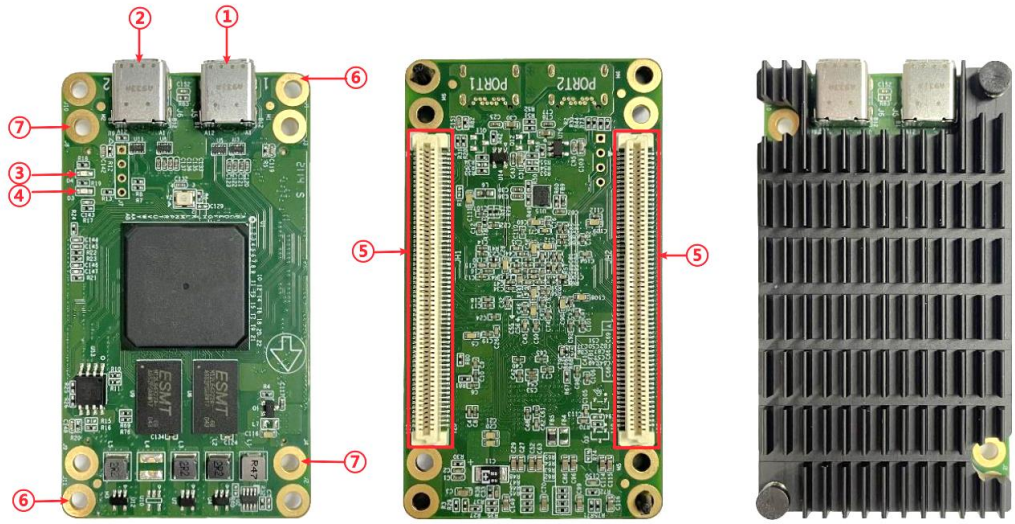
Specification

Control System Parameters	
Control Area	When Infi-bit is supported and low latency is not supported: 512×512 pixels When low latency is supported and Infi-bit is not supported: 1024×384 pixels
Ethernet Port Exchange	Supported, arbitrary use
Gray Level	Maximum 65536 levels (When Infi-bit is turned on: maximum 4194304 levels)
Video Source	8bit/10bit/12bit
Display Module Compatibility	
Chip Support	PWM chips
Scan Type	Support up to 1/64 scan
Module Specifications Supported	Support modules of any row and column within 16384 pixels
Cable Direction	Supports 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, 64 groups of serial RGB data
Data Folded	Supports 2~8 any split
Data Exchange	32 groups of data for any exchange

Module Pumping Point	Supports any pumping point
Interface Type and Physical Parameters	
Communication Distance	Recommended: Type C cable≤2m
United Communications Equipment	F5000mini
Dimensions	81.0mm×45.0mm×13.7mm
Input Voltage	DC 3.8-5.5V
Rated Current	1.2A
Rated Power Consumption	6W
Storage and Transport Temperature	-40°C~125°C
Operating Temperature	-25°C~75°C
Body Static Resistance	2kV
Weight	49g
Monitoring Function	
Temperature Monitoring	Ambient temperature of cabinets: between -25°C~75°C 1 port for each card
Humidity Monitoring	Ambient humidity of receiver cards: between 20%~95% RH 1 port for each card
Bit Error Monitoring	Monitor the total number of data packets and error packets to check network quality
Power Supply Monitoring	2 ports for each card
Full Color LCD	Supported
Cabinet Monitoring Module	Monitor cabinet door, fan and smoke when in conjunction with M3
Pixel to Pixel Calibration	
Brightness Calibration	Supported
Chromaticity Calibration	Supported

Other Features	
Redundancy	Supports loop redundancy, receiver card redundancy and PSU redundancy

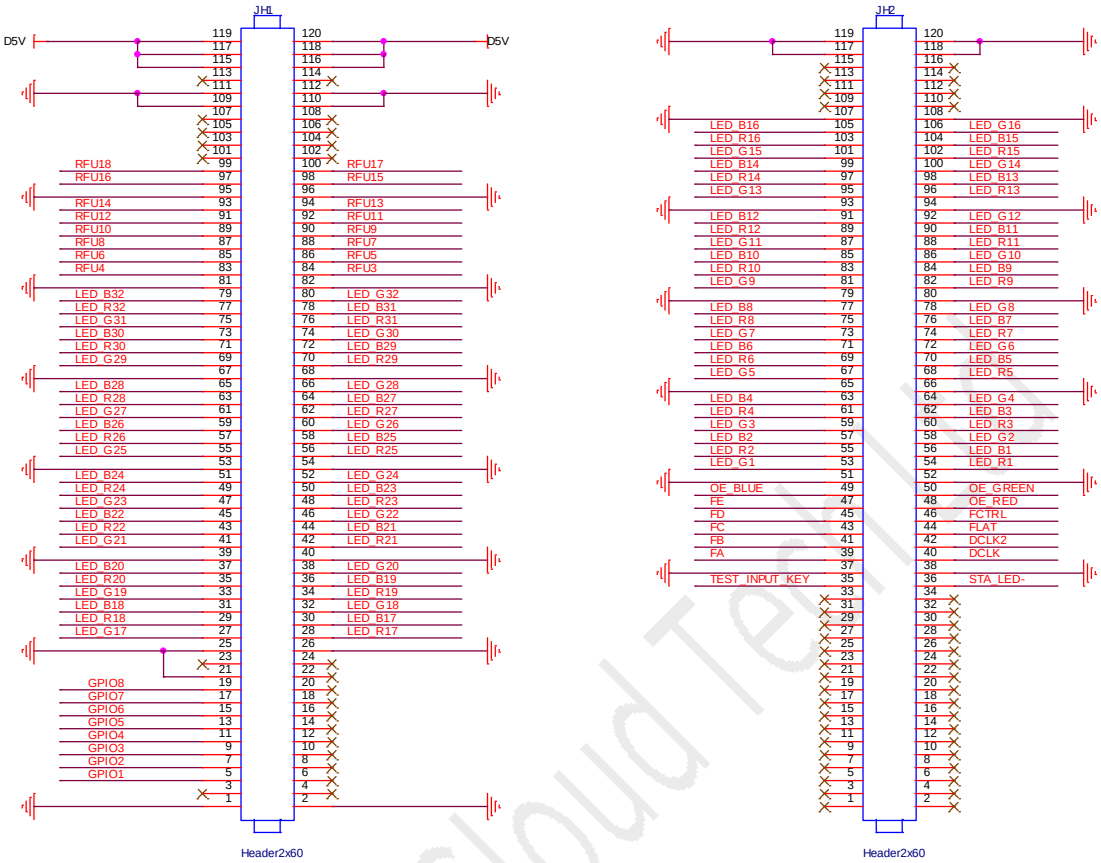
Hardware



Interface

S/N	Name	Function	
1	Type-C port1	Transmit 5G signals (Each port can be either an input or an output port. When several cards are cascaded, the up and down orientations of the USB-C connector at two ends of the USB type-C cable must be the same.)	
2	Type-C port2		
3	Power indicator	Red indicator always on indicates that the power supply is normal	
4	Signal indicator	Flashes once per second	Receiving card: normal working, Ethernet cable connection: normal
		Flashes 4 times per second	Receiving card: Redundant port is working (In loop redundancy)
		Flashes 10 times per second	Receiving card: normal working, Cabinet: Highlight
5	High-density connector	Connect to the display’ s HUB or module (See pin definition for more details)	
6	Fixed hole	Used to fix the heat sink on the receiver card	
7	Fixed hole	Used to reinforce the receiver card to improve vibration resistance	

Pin definition



JH1					
Instructions	Definition	Pin No.		Definition	Instructions
Grounding	GND	1	2	GND	Grounding
Empty	NC	3	4	NC	Empty
Reserved	GPIO1	5	6	NC	
	GPIO2	7	8	NC	
	GPIO3	9	10	NC	
	GPIO4	11	12	NC	
	GPIO5	13	14	NC	
	GPIO6	15	16	NC	
	GPIO7	17	18	NC	
	GPIO8	19	20	NC	
Grounding	GND	21	22	NC	
Empty	NC	23	24	NC	
Grounding	GND	25	26	GND	Grounding
RGB output	LED_G17	27	28	LED_R17	RGB output
	LED_R18	29	30	LED_B17	
	LED_B18	31	32	LED_G18	

	LED_G19	33	34	LED_R19	
	LED_R20	35	36	LED_B19	
	LED_B20	37	38	LED_G20	
Grounding	GND	39	40	GND	Grounding
RGB output	LED_G21	41	42	LED_R21	RGB output
	LED_R22	43	44	LED_B21	
	LED_B22	45	46	LED_G22	
	LED_G23	47	48	LED_R23	
	LED_R24	49	50	LED_B23	
	LED_B24	51	52	LED_G24	
Grounding	GND	53	54	GND	Grounding
RGB output	LED_G25	55	56	LED_R25	RGB output
	LED_R26	57	58	LED_B25	
	LED_B26	59	60	LED_G26	
	LED_G27	61	62	LED_R27	
	LED_R28	63	64	LED_B27	
	LED_B28	65	66	LED_G28	
Grounding	GND	67	68	GND	Grounding
RGB output	LED_G29	69	70	LED_R29	RGB output
	LED_R30	71	72	LED_B29	
	LED_B30	73	74	LED_G30	
	LED_G31	75	76	LED_R31	
	LED_R32	77	78	LED_B31	
	LED_B32	79	80	LED_G32	
Grounding	GND	81	82	GND	Grounding
Extension pin	RFU4	83	84	RFU3	Extension pin
	RFU6	85	86	RFU5	
	RFU8	87	88	RFU7	
	RFU10	89	90	RFU9	
	RFU12	91	92	RFU11	
	RFU14	93	94	RFU13	
Grounding	GND	95	96	GND	Grounding
Extension pin	RFU16	97	98	RFU15	Extension pin
	RFU18	99	100	RFU17	
Empty	NC	101	102	NC	Empty
	NC	103	104	NC	
	NC	105	106	NC	
	NC	107	108	NC	
Grounding	GND	109	110	GND	Grounding

	GND	111	112	GND	
Empty	NC	113	114	NC	Empty
Power supply	VCC	115	116	VCC	Power supply
	VCC	117	118	VCC	
	VCC	119	120	VCC	

JH2					
Instructions	Definition	Pin No.		Definition	Instructions
Empty	NC	1	2	NC	Empty
	NC	3	4	NC	
	NC	5	6	NC	
	NC	7	8	NC	
	NC	9	10	NC	
	NC	11	12	NC	
	NC	13	14	NC	
	NC	15	16	NC	
	NC	17	18	NC	
	NC	19	20	NC	
	NC	21	22	NC	
	NC	23	24	NC	
	NC	25	26	NC	
	NC	27	28	NC	
	NC	29	30	NC	
	NC	31	32	NC	
	NC	33	34	NC	
Test button	TEST_INPUT_KEY	35	36	STA_LED-	Operation indicator
Grounding	GND	37	38	GND	Grounding
Row decoding signal	FA	39	40	DCLK	Data serial clock 1
	FB	41	42	DCLK2	Data serial clock 2
	FC	43	44	FLAT	Latch
	FD	45	46	FCTRL	Blanking
	FE	47	48	OE_RED	Display enable
Display enable	OE_BLUE	49	50	OE_GREEN	
Grounding	GND	51	52	GND	Grounding
RGB output	LED_G1	53	54	LED_R1	RGB output
	LED_R2	55	56	LED_B1	
	LED_B2	57	58	LED_G2	
	LED_G3	59	60	LED_R3	
	LED_R4	61	62	LED_B3	

	LED_B4	63	64	LED_G4	
Grounding	GND	65	66	GND	Grounding
RGB output	LED_G5	67	68	LED_R5	RGB output
	LED_R6	69	70	LED_B5	
	LED_B6	71	72	LED_G6	
	LED_G7	73	74	LED_R7	
	LED_R8	75	76	LED_B7	
	LED_B8	77	78	LED_G8	
Grounding	GND	79	80	GND	Grounding
RGB output	LED_G9	81	82	LED_R9	RGB output
	LED_R10	83	84	LED_B9	
	LED_B10	85	86	LED_G10	
	LED_G11	87	88	LED_R11	
	LED_R12	89	90	LED_B11	
	LED_B12	91	92	LED_G12	
Grounding	GND	93	94	GND	Grounding
RGB output	LED_G13	95	96	LED_R13	RGB output
	LED_R14	97	98	LED_B13	
	LED_B14	99	100	LED_G14	
	LED_G15	101	102	LED_R15	
	LED_R16	103	104	LED_B15	
	LED_B16	105	106	LED_G16	
Grounding	GND	107	108	GND	Grounding
Empty	NC	109	110	NC	Empty
	NC	111	112	NC	
	NC	113	114	NC	
	NC	115	116	NC	
Grounding	GND	117	118	GND	Grounding
Grounding	GND	119	120	GND	Grounding

Reference design for extended functions:

Description of extended function pin			
Extension Pin	ARM Intelligent Module Pin	Module Flash Pin	Description
RFU3	HUB_CODE0	HUB_CODE0	Intelligent module: Multiplex selection signal 1
RFU4	HUB_SPI_CLK	HUB_SPI_CLK	Lamp board Flash clock signal
RFU5	HUB_CODE1	HUB_CODE1	Intelligent module: Multiplex selection signal 2
RFU6	HUB_SPI_CS	HUB_SPI_CS	Lamp board Flash chip select signal
RFU7	HUB_CODE2	HUB_CODE2	Intelligent module: Multiplex selection signal 3
RFU8	/	HUB_SPI_MOSI	Lamp board Flash data input signal
	HUB_UART_TX	/	TX signal of arm intelligent module
RFU9	HUB_CODE3	HUB_CODE3	Intelligent module: Multiplex selection signal 4
RFU10	/	HUB_SPI_MISO	Lamp board Flash data output signal
	HUB_UART_RX	/	RX signal of arm intelligent module
RFU11	HUB_H164_CSD	HUB_H164_CSD	74HC164 data signal
RFU12	/	/	Reserved
RFU13	HUB_H164_CLK	HUB_H164_CLK	74HC164 clock signal
RFU14	POWER_STA1	POWER_STA0	Dual power detection signal 1
RFU15	RCV_BK2	RCV_BK2	Dual card redundancy connection signal
RFU16	POWER_STA2	POWER_STA1	Dual power detection signal 2
RFU17	RCV_BK1	RCV_BK1	Dual card redundancy identification signal
RFU18	HUB_CODE4	HUB_CODE4	Intelligent module: Multiplex selection signal 5

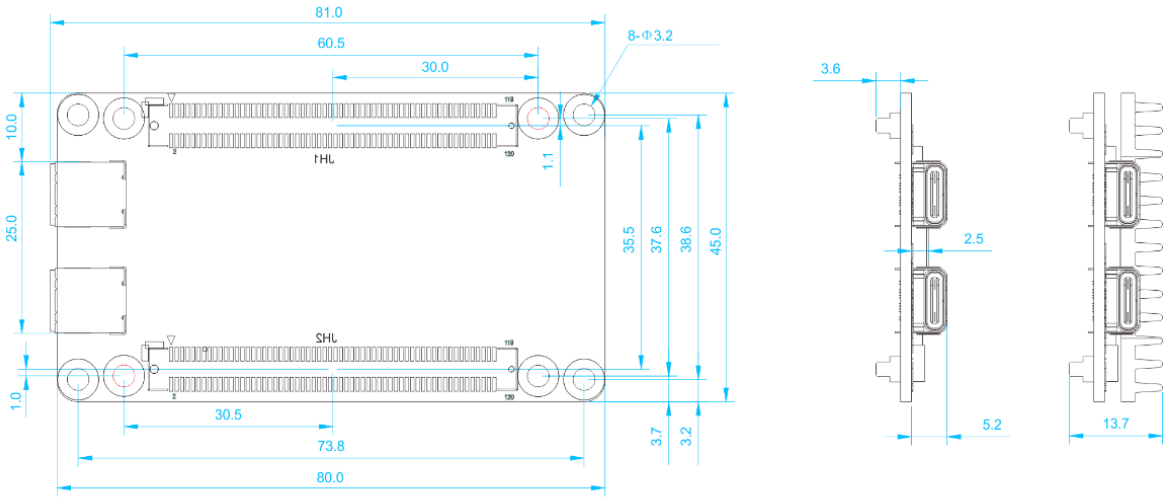
Note: RFU8 and RFU10 are signal multiplexing extension pins. Only one pin from either " arm intelligent module pin" or "recommended lamp board flash or" can be selected at the same time. In addition, for other circuit design and other function expansion, please refer to the relevant adapter board design guide.

Dimensions

Unit: mm

Tolerance: ±0.1mm

Note: The distance between outer surfaces of the RV5000 and HUB boards after their high-density connectors fit together is 5.0mm. A 5-mm copper pillar is recommended.



Statement

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