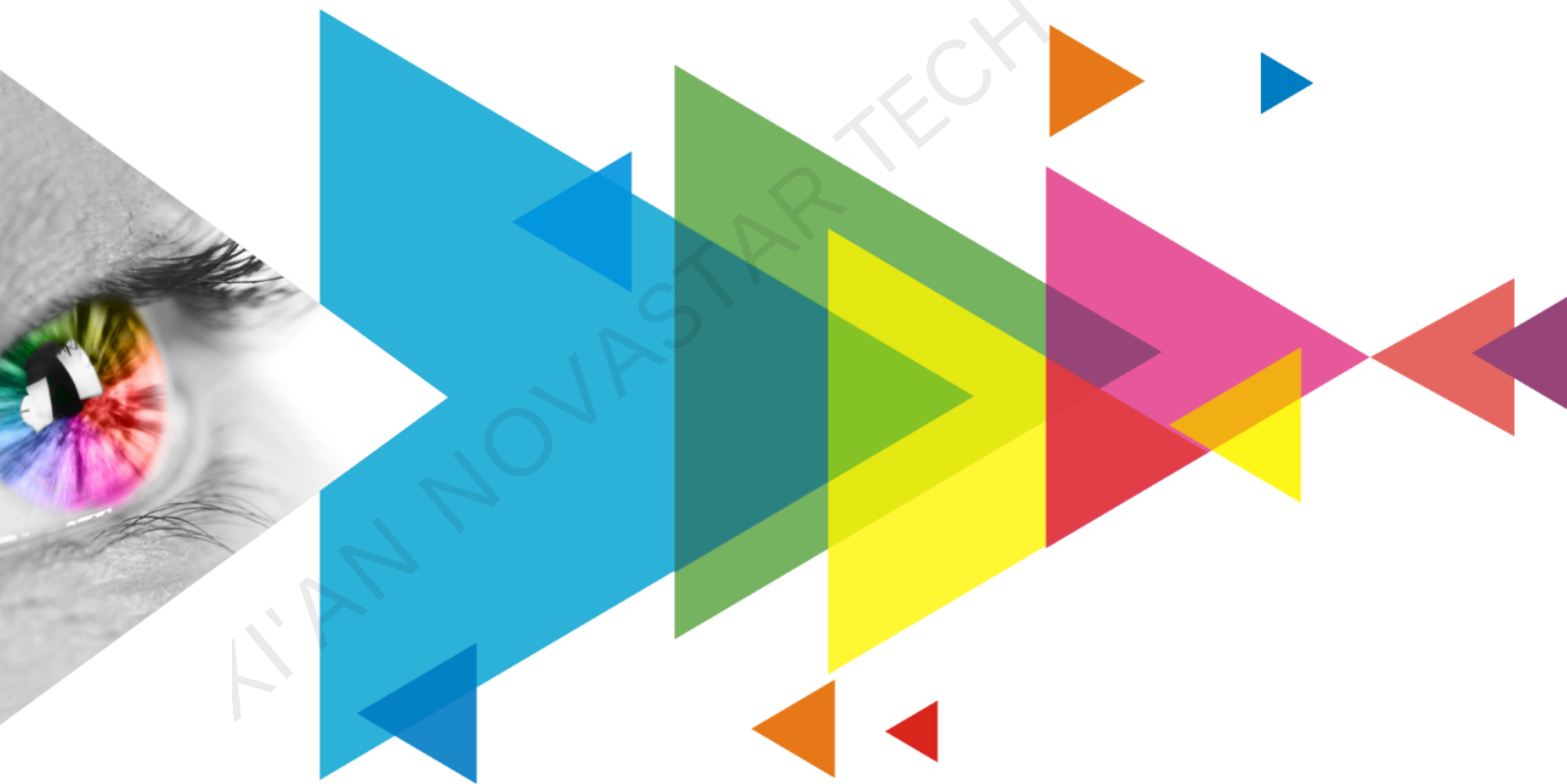


A6s

Receiving Card

V1.0.1



Specifications

Change History

Document Version	Firmware Version	Release Date	Description
V1.0.1	V4.6.2.0	2020-04-09	- Updated the firmware version. - Updated the indicator description. - Updated the side dimensions diagram.
V1.0.0	V4.6.1.0	2020-01-01	First release

Introduction

The A6s is a general small receiving card developed by NovaStar. A single A6s loads up to 512×256 pixels. With various highlights such as pixel level brightness and chroma calibration, individual Gamma adjustment for RGB, 3D function, 18bit+ and low latency, the A6s can greatly improve the display effect and user experience.

The A6s uses high-density connectors for communication to limit effects of dust and vibration, resulting in high stability and reliability. It supports up to 32 groups of parallel RGB data or 64 groups of serial data (extendable to 128 groups of serial data). Its reserved pins allow for custom functions of users. Thanks to its EMC Class B compliant hardware design, the A6s has improved electromagnetic compatibility and is suitable to many applications.

Features

Improvements to Display Effect

- Pixel level brightness and chroma calibration
Working with NovaLCT and NovaCLB, the receiving card supports brightness and chroma calibration on each LED, which can effectively remove color discrepancies and greatly improve LED display brightness and chroma consistency, allowing for better image quality.
- Quick seam correction
Working with NovaLCT, the receiving card supports quick adjustment of bright or dark lines caused by splicing of cabinets and modules. This function is easy to use and the adjustment takes effect immediately.
In NovaLCT (V5.2.0 or later), seam correction can be performed without using or changing the video source.
- Low latency
The receiving card can reduce the frame latency of video source on the receiving card end to one frame (only when using modules with driver IC with built-in RAM).
- 3D function
When the receiving card works with the independent controller which supports 3D function, users can enable the 3D function in NovaLCT or on operation panel of the controller, and set 3D parameters to allow for 3D display effects.
- Individual Gamma adjustment for RGB

Working with NovaLCT (V5.2.0 or later) and the independent controller which supports this function, the receiving card supports individual adjustment of red Gamma, green Gamma and blue Gamma, which can effectively control image non-uniformity under low grayscale and white balance offset, allowing for a more realistic image.

- 18Bit+
Activation of 18Bit+ mode in NovaLCT can improve LED display grayscale by 4 times, avoiding grayscale loss due to low brightness and allowing for a finer image.
- Image rotation in 90° increments
In NovaLCT, the display image can be set to rotate in multiples of 90° (0°, 90°, 180° and 270°).

Improvements to Maintainability

- Smart module (supported by dedicated firmware)
The smart module is composed of Flash and MCU.
Flash can store calibration coefficients and module parameters. MCU can communicate with the receiving card to monitor temperature, voltage and ribbon cable communication status at the module level. Working with the driver chip, MCU also supports LED error detection.
The smart module allows for a smaller monitoring unit, requiring no independent monitoring card and saving cabinet space.
- Automatic module calibration

After the module (with module Flash) has been replaced and power is supplied, the receiving card can automatically read the new module ID and calibration coefficients, and save them to the receiving card.

- **Module Flash management**
Module Flash information can be managed in NovaLCT. The module ID can be managed, and calibration coefficients and module parameters can be stored in the module Flash.
- **One-click application of calibration coefficients saved in module Flash**
In the event of network outage, users can hold down the self-test button to read the calibration coefficients in module Flash back to the receiving card.
- **Mapping function**
After the Mapping function is enabled in NovaLCT, each of the target cabinets will display the receiving card number and Ethernet port information, allowing users to easily obtain the location and wiring route of receiving cards.
- **Setting of pre-stored image on receiving card**
In NovaLCT, a specified image can be set as the LED screen startup image or as the image to be displayed on LED screen when the Ethernet cable is disconnected or no video signal is available.
- **Voltage and temperature monitoring**
The voltage and temperature of the receiving card can be monitored without using peripherals. The monitoring data can be checked in NovaLCT.
- **Cabinet LCD**
The receiving card supports the LCD connected to the cabinet. The LCD can display temperature, voltage, single operating time and total operating time of the receiving card.
- **Bit error rate monitoring**
The receiving card can work with NovaLCT (V5.2.0 or later) to monitor the network communication quality between the sending

device and receiving card, or between receiving cards, and record the number of erroneous packets to help troubleshoot network communication problems.

- **Readback of firmware program**
In NovaLCT (V5.2.0 or later), the receiving card firmware program can be read back and saved to local computer.
- **Readback of configuration parameters**
In NovaLCT, the receiving card configuration parameters can be read back and saved to local computer.

Improvements to Reliability

- **Dual-card backup and status monitoring**
In an environment with requirements for high reliability, two receiving cards can be mounted onto a single HUB board. In the case that main receiving card fails, the backup card will serve to ensure uninterrupted operation of the display.
The working status of main and backup receiving cards can be monitored in NovaLCT (V5.2.0 or later).
- **Status monitoring of dual power supplies**
The receiving card supports dual power supplies and can detect whether their working statuses are normal.
- **Loop backup**
The receiving card can improve the reliability for cascading of receiving cards through main and backup redundant mechanism. If either main or backup cascading lines fail, the other will begin to work to ensure uninterrupted operation of the display.
- **Dual backup of program**
Two copies of application programs are saved in the receiving card at the factory to avoid the problem that the receiving card may get stuck due to program update exception.

Appearance



Power Indicator Running Indicator



High-Density Connector

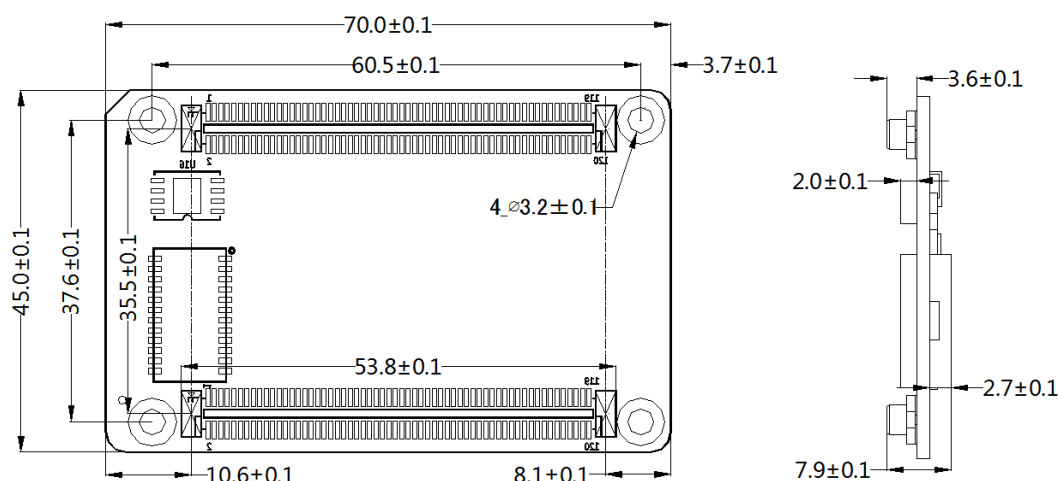
All product pictures shown in this document are for illustration purpose only. Actual product may vary.

Indicators

Indicator	Color	Status	Description
Running indicator	Green	Flashing once every other 1s	Receiving card is functioning normally. Ethernet cable connection is normal, and video source input is available.
		Flashing once every other 3s	Ethernet cable connection is abnormal.
		Flashing 3 times every other 1s	Ethernet cable connection is normal, but no video source input is available.
		Flashing every other 0.2s	Receiving card failed to load the program in the application area and now is using the backup program.
		Flashing 8 times every other 1s	A redundancy switchover occurred on the Ethernet port and the loop backup has taken effect.
Power indicator	Red	Always on	The power input is normal.

Dimensions

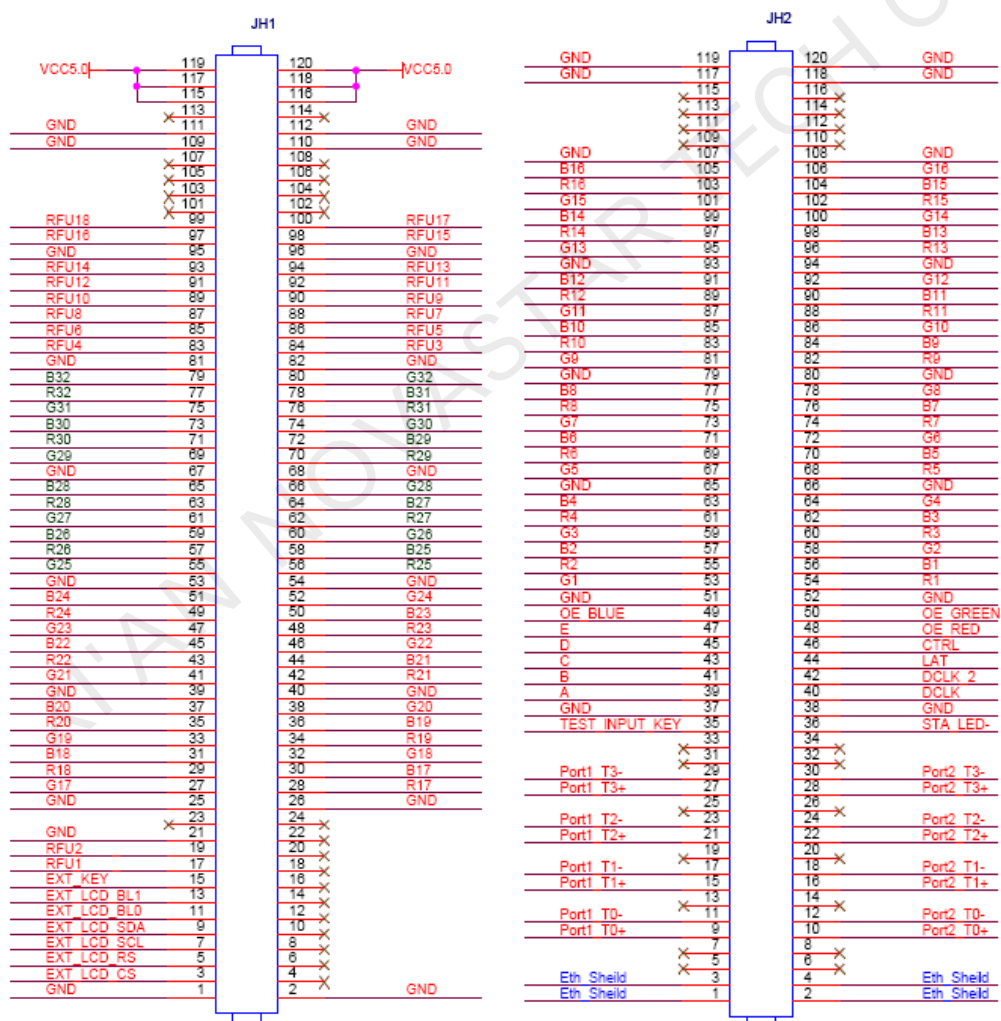
Board thickness is not greater than 2.0 mm, and the total thickness (board thickness + thickness of components on front and back panels) is not greater than 8 mm. Ground connection is enabled for mounting holes (GND).



Unit: mm

Pins

32 Groups of Parallel RGB Data



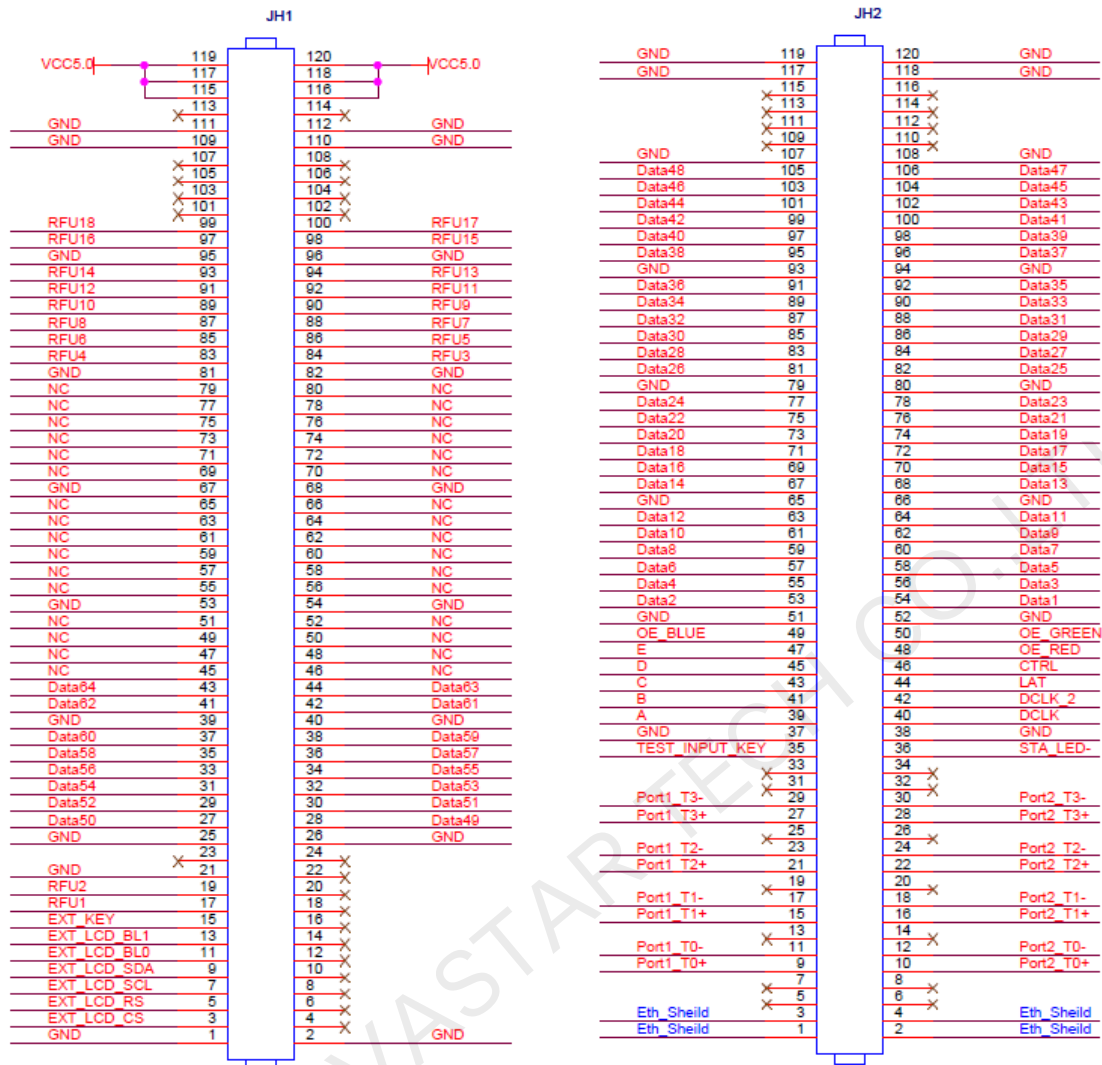
JH1							
LCD		GND	1	2	GND		
	LCD CS signal	EXT_LCD_CS	3	4	NC		
	LCD RS signal	EXT_LCD_RS	5	6	NC		
	LCD clock signal	EXT_LCD_SCL	7	8	NC		
	LCD data signal	EXT_LCD_SDA	9	10	NC		

JH1							
	LCD backlight signal 1	EXT_LCD_BL0	11	12	NC		
	LCD backlight signal 2	EXT_LCD_BL1	13	14	NC		
	LCD control button	EXT_KEY	15	16	NC		
Note 4	/	RFU1	17	18	NC		
	/	RFU2	19	20	NC		
		GND	21	22	NC		
		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		
Note 4	/	RFU4	83	84	RFU3	/	Note 4
	/	RFU6	85	86	RFU5	/	
	/	RFU8	87	88	RFU7	/	
	/	RFU10	89	90	RFU9	/	
	/	RFU12	91	92	RFU11	/	
	/	RFU14	93	94	RFU13	/	
		GND	95	96	GND		
Note 4	/	RFU16	97	98	RFU15	/	Note 4
	/	RFU18	99	100	RFU17	/	
		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		
Note 1		VCC	115	116	VCC		Note 1
		VCC	117	118	VCC		
		VCC	119	120	VCC		

JH2							
	Chassis ground	Eth_Sheild	1	2	Eth_Sheild	Chassis ground	
	Chassis ground	Eth_Sheild	3	4	Eth_Sheild	Chassis ground	
		NC	5	6	NC		
		NC	7	8	NC		
Gigabit Ethernet port	/	Port1_T0+	9	10	Port2_T0+	/	Gigabit Ethernet port
	/	Port1_T0-	11	12	Port2_T0-	/	
		NC	13	14	NC		
	/	Port1_T1+	15	16	Port2_T1+	/	

JH2						
	/	Port1_T1-	17	18	Port2_T1-	/
		NC	19	20	NC	
	/	Port1_T2+	21	22	Port2_T2+	/
	/	Port1_T2-	23	24	Port2_T2-	/
		NC	25	26	NC	
	/	Port1_T3+	27	28	Port2_T3+	/
	/	Port1_T3-	29	30	Port2_T3-	/
		NC	31	32	NC	
		NC	33	34	NC	
	Test button	TEST_INPUT_KEY	35	36	STA_LED-	Operating indicator
		GND	37	38	GND	Note 2
	Line decoding signal	A	39	40	DCLK	Shift clock output 1
	Line decoding signal	B	41	42	DCLK_2	Shift clock output 2
	Line decoding signal	C	43	44	LAT	Latch signal output
	Line decoding signal	D	45	46	CTRL	Afterglow control signal
	Line decoding signal	E	47	48	OE_RED	Display enable
Note 3	Display enable	OE_BLUE	49	50	OE_GREEN	Display enable
		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	

64 Groups of Serial Data



JH1						
		GND	1	2	GND	
LCD	LCD CS signal	EXT_LCD_CS	3	4	NC	
	LCD RS signal	EXT_LCD_RS	5	6	NC	
	LCD clock signal	EXT_LCD_SCL	7	8	NC	
	LCD data signal	EXT_LCD_SDA	9	10	NC	
	LCD backlight signal 1	EXT_LCD_BL0	11	12	NC	
	LCD backlight signal 2	EXT_LCD_BL1	13	14	NC	
Note 4	LCD control button	EXT_KEY	15	16	NC	
	/	RFU1	17	18	NC	
	/	RFU2	19	20	NC	
		GND	21	22	NC	
		NC	23	24	NC	
		GND	25	26	GND	
	/	Data50	27	28	Data49	/
	/	Data52	29	30	Data51	/
	/	Data54	31	32	Data53	/
	/	Data56	33	34	Data55	/
	/	Data58	35	36	Data57	/
	/	Data60	37	38	Data59	/
		GND	39	40	GND	
	/	Data62	41	42	Data61	/

JH1							
	/	Data64	43	44	Data63	/	
		NC	45	46	NC		
		NC	47	48	NC		
		NC	49	50	NC		
		NC	51	52	NC		
		GND	53	54	GND		
		NC	55	56	NC		
		NC	57	58	NC		
		NC	59	60	NC		
		NC	61	62	NC		
		NC	63	64	NC		
		NC	65	66	NC		
		GND	67	68	GND		
		NC	69	70	NC		
		NC	71	72	NC		
		NC	73	74	NC		
		NC	75	76	NC		
		NC	77	78	NC		
		NC	79	80	NC		
		GND	81	82	GND		
Note 4	/	RFU4	83	84	RFU3	/	Note 4
	/	RFU6	85	86	RFU5	/	
	/	RFU8	87	88	RFU7	/	
	/	RFU10	89	90	RFU9	/	
	/	RFU12	91	92	RFU11	/	
	/	RFU14	93	94	RFU13	/	
		GND	95	96	GND		
Note 4	/	RFU16	97	98	RFU15	/	Note 4
	/	RFU18	99	100	RFU17	/	
		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		
Note 1		VCC	115	116	VCC		Note 1
		VCC	117	118	VCC		
		VCC	119	120	VCC		

JH2							
Gigabit Ethernet port	Chassis ground	Eth_Sheild	1	2	Eth_Sheild	Chassis ground	Gigabit Ethernet port
	Chassis ground	Eth_Sheild	3	4	Eth_Sheild	Chassis ground	
		NC	5	6	NC		
		NC	7	8	NC		
	/	Port1_T0+	9	10	Port2_T0+	/	
	/	Port1_T0-	11	12	Port2_T0-	/	
		NC	13	14	NC		
	/	Port1_T1+	15	16	Port2_T1+	/	
	/	Port1_T1-	17	18	Port2_T1-	/	
		NC	19	20	NC		
	/	Port1_T2+	21	22	Port2_T2+	/	
	/	Port1_T2-	23	24	Port2_T2-	/	
		NC	25	26	NC		
	/	Port1_T3+	27	28	Port2_T3+	/	
	/	Port1_T3-	29	30	Port2_T3-	/	
		NC	31	32	NC		
		NC	33	34	NC		
	Test button	TEST_INPUT_KEY	35	36	STA_LED-	Operating indicator	Note 2

JH2							
		GND	37	38	GND		
	Line decoding signal	A	39	40	DCLK	Shift clock output 1	
	Line decoding signal	B	41	42	DCLK_2	Shift clock output 2	
	Line decoding signal	C	43	44	LAT	Latch signal output	
	Line decoding signal	D	45	46	CTRL	Afterglow control signal	
	Line decoding signal	E	47	48	OE_RED	Display enable	Note 3
Note 3	Display enable	OE_BLUE	49	50	OE_GREEN	Display enable	
		GND	51	52	GND		
	/	Data2	53	54	Data1	/	
	/	Data4	55	56	Data3	/	
	/	Data6	57	58	Data5	/	
	/	Data8	59	60	Data7	/	
	/	Data10	61	62	Data9	/	
	/	Data12	63	64	Data11	/	
		GND	65	66	GND		
	/	Data14	67	68	Data13	/	
	/	Data16	69	70	Data15	/	
	/	Data18	71	72	Data17	/	
	/	Data20	73	74	Data19	/	
	/	Data22	75	76	Data21	/	
	/	Data24	77	78	Data23	/	
		GND	79	80	GND		
	/	Data26	81	82	Data25	/	
	/	Data28	83	84	Data27	/	
	/	Data30	85	86	Data29	/	
	/	Data32	87	88	Data31	/	
	/	Data34	89	90	Data33	/	
	/	Data36	91	92	Data35	/	
		GND	93	94	GND		
	/	Data38	95	96	Data37	/	
	/	Data40	97	98	Data39	/	
	/	Data42	99	100	Data41	/	
	/	Data44	101	102	Data43	/	
	/	Data46	103	104	Data45	/	
	/	Data48	105	106	Data47	/	
		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		

Note 1 The recommended VCC power input is 5.0 V.

Note 2 The operating indicator pin is active-low.

Note 3 OE_RED, OE_GREEN and OE_BLUE are display enabled pins. In case that OE_RGB are not controlled separately, use OE_RED. When PWM chip is used, GCLK signal is enabled.

Note 4 RFU 1–18 are the reserved pins for extended functions. For details, see [Reference Design for Extended Functions](#).

Note 5 In the mode of 128 groups of serial data, Data65–Data128 use the data of Data1–Data64, respectively.

[Reference Design for Extended Functions](#)

Description of Pins for Extended Functions			
Pin	Recommended Module Flash Pin	Recommended Smart Module Pin	Description
RFU4	HUB_SPI_CLK	Reserved	Clock signal of serial pin
RFU6	HUB_SPI_CS	Reserved	CS signal of serial pin
RFU8	/	HUB_SPI_MOSI	Module Flash storage data input
	HUB_UART_TX	/	Smart module TX signal
RFU10	/	HUB_SPI_MISO	Module Flash storage data output

Description of Pins for Extended Functions			
	HUB_UART_RX	/	Smart module RX signal
RFU3	HUB_CODE0		Module Flash BUS control pin
RFU5	HUB_CODE1		
RFU7	HUB_CODE2		
RFU9	HUB_CODE3		
RFU18	HUB_CODE4		
RFU11	HUB_H164_CSD		74HC164 data signal
RFU13	HUB_H164_CLK		
RFU14	POWER_STA1		Dual power supply detection signal
RFU16	POWER_STA2		
RFU15	MS_DATA		Dual-card backup connection signal
RFU17	MS_ID		Dual-card backup identifier signal

Note:

The RFU8 and RFU10 are signal multiplex extension pins. Only one pin from either the Recommended Smart Module Pin or the Recommended Module Flash Pin can be selected at the same time.

Specifications

Maximum Loading Capacity	512×256 pixels	
Electrical Specifications	Input voltage	DC 3.3 V–5.5 V
	Rated current	0.6 A
	Rated power consumption	3.0 W
Operating Environment	Temperature	–20°C to +70°C
	Humidity	10% RH to 90% RH, non-condensing
Storage Environment	Temperature	–25°C to +125°C
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	70.0 mm × 45.0 mm × 7.9 mm
	Net weight	16.2 g
Packing Information	Packing specifications	An antistatic bag and anti-collision foam are provided for each receiving card. Each packing box contains 40 receiving cards.
	Packing box dimensions	378.0 mm × 190.0 mm × 120.0 mm
Certifications	RoHS, EMC Class B	

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