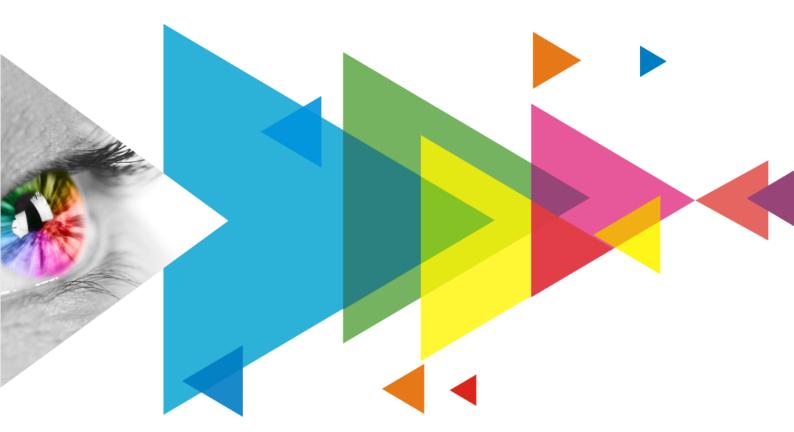
A4s
Receiving Card



Specifications

## **Change History**

Document Version	Release Date	Description
V2.1.4	2021-08-25	Updated the appearance diagram.
		Updated the side-view dimensions diagram.
V2.1.3	2021-07-30	Updated the description of features.
		Added the certification related description.
V2.1.2	2021-02-06	Added the dimensions diagram description.
		Updated the packing information.
V2.1.1	2020-07-01	Updated the firmware version.
		Updated the indicator description.
		Updated the side dimensions diagram.
		Optimized the feature description.
		Optimized the pin description tables.

### Introduction

The A4s is a general small receiving card developed by NovaStar. A single A4s loads up to 256x256 pixels. Supporting the pixel level brightness and chroma calibration, individual gamma adjustment for RGB, and 3D functions, the A4s can significantly improve the display effect and user experience.

The A4s uses high-density connectors for communication to limit the effects of dust and vibration, resulting in high stability. It supports up to 24 groups of parallel RGB data or 64 groups of serial data (expandable 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 A4s has improved electromagnetic compatibility and is suitable for various on-site setups.

### **Features**

#### **Improvements to Display Effect**

- Pixel level brightness and chroma calibration
  Working with NovaLCT and calibration platform
  (CalCube MiniLED V1.1.0 or later
  recommended), the receiving card supports
  brightness and chroma calibration on each LED,
  which can effectively remove brightness
  differences and chroma differences and greatly
  improve display brightness consistency and
  chroma consistency, allowing for better image
  quality.
- Quick adjustment of dark or bright lines
   The dark or bright lines caused by splicing of
   cabinets or modules can be adjusted to improve
   the visual experience. This function is easy to
   use and the adjustment takes effect immediately.
- 3D function
   Working with the sending card that supports 3D function, the receiving card supports 3D image output.
- Individual gamma adjustment for RGB

- Working with NovaLCT (V5.2.0 or later) and the sending card that supports this function, the receiving card supports individual adjustment of red gamma, green gamma and blue gamma, which can effectively control image non-uniformity at low grayscale conditions and white balance offset, allowing for a more realistic image.
- Image rotation in 90° increments
   The display image can be set to rotate in multiples of 90° (0°/ 90°/180°/270°).

#### Improvements to Maintainability

- Smart module (dedicated firmware required) Working with the smart module, the receiving card supports module ID management, storage of calibration coefficients and module parameters, monitoring of module temperature, voltage and flat cable communication status, LED error detection, and recording of the module run time.
- Quick uploading of calibration coefficients

The calibration coefficients can be quickly uploaded to the receiving card, improving efficiency greatly.

- Module Flash management
   For modules with flash memory, the information stored in the memory can be managed. The calibration coefficients and module ID can be stored and read back.
- One click to apply calibration coefficients in module Flash
   For modules with flash memory, when the Ethernet cable is disconnected, users can hold down the self-test button on the cabinet to upload the calibration coefficients in the flash memory of the module to the receiving card.
- Mapping function
   The cabinets display the receiving card number and Ethernet port information, allowing users to easily obtain the locations and connection topology of receiving cards.
- Setting of a pre-stored image in receiving card
  The image displayed during startup, or displayed
  when the Ethernet cable is disconnected or
  there is no video signal can be customized.
- Temperature and voltage monitoring
   The temperature and voltage of the receiving
   card can be monitored without using peripherals.
- Cabinet LCD
   The LCD module connected to the cabinet can display the temperature, voltage, single run time and total run time of the receiving card.
- Bit error detection
   The Ethernet port communication quality of the receiving card can be monitored and the number of erroneous packets can be recorded to help troubleshoot network communication problems.

   NovaLCT V5.2.0 or later is required.
- Status detection of dual power supplies

When two power supplies are used, their working status can be detected by the receiving card.

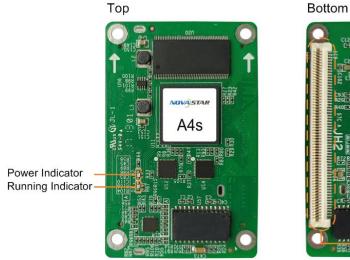
- Firmware program readback
   The firmware program of the receiving card can be read back and saved to the local computer.

   NovaLCT V5.2.0 or later is required.
- Configuration parameter readback
   The configuration parameters of the receiving card can be read back and saved to the local computer.
- LVDS transmission (dedicated firmware required)
   Low-voltage differential signaling (LVDS)
   transmission is used to reduce the number of
   data cables from the hub board to module,
   increase the transmission distance, and improve
   the signal transmission quality and
   electromagnetic compatibility (EMC).

#### Improvements to Reliability

- Loop backup
  The receiving cards and the sending card form a loop via the primary and backup line connections.
  When a fault occurs at a location of the lines, the screen can still display the image normally.
- Dual backup of configuration parameters The receiving card configuration parameters are stored in the application area and factory area of the receiving card at the same time. Users usually use the configuration parameters in the application area. If necessary, users can restore the configuration parameters in the factory area to the application area.
- Dual program backup
   Two copies of firmware program are stored in
   the receiving card at the factory to avoid the
   problem that the receiving card may get stuck
   due to program update exception.

## **Appearance**





**High-Density Connectors** 

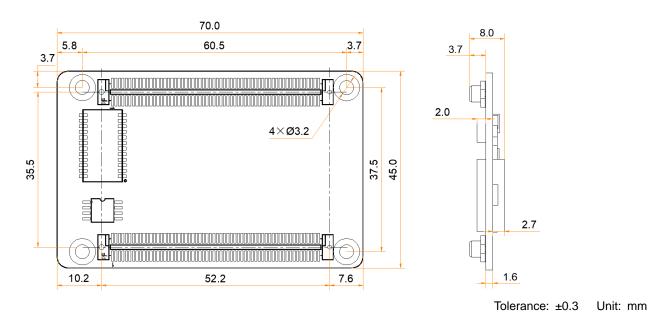
All product pictures shown in this document are for illustration purpose only. Actual product may vary.

## **Indicators**

Indicator	Color	Status	Description
Running indicator	Green	Flashing once every 1s	The receiving card is functioning normally. Ethernet cable connection is normal, and video source input is available.
		Flashing once every 3s	Ethernet cable connection is abnormal.
		Flashing 3 times every 0.5s	Ethernet cable connection is normal, but no video source input is available.
		Flashing once every 0.2s	The receiving card failed to load the program in the application area and is now using the backup program.
		Flashing 8 times every 0.5s	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**

The board thickness is not greater than 2.0 mm, and the total thickness (board thickness + thickness of components on the top and bottom sides) is not greater than 8.5 mm. Ground connection (GND) is enabled for mounting holes.

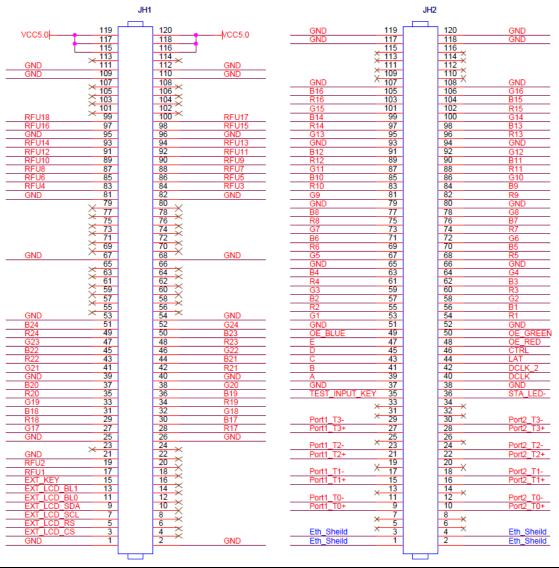


Note

The distance between outer surfaces of the A4s and hub boards after their high-density connectors fit together is 5.0 mm. A 5-mm copper pillar is recommended.

### **Pins**

### 24 Groups of Parallel RGB Data



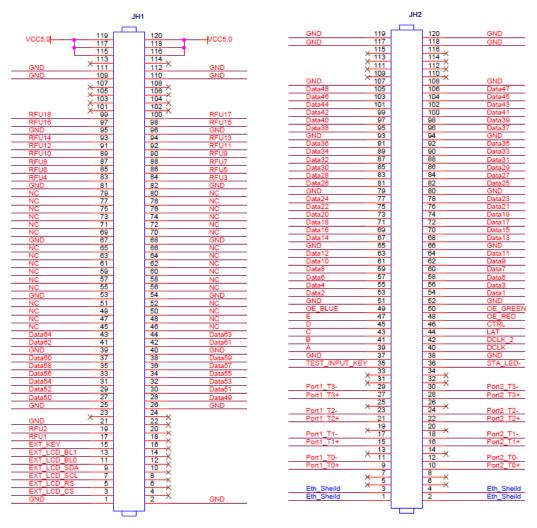
	JH1					
	GND	1	2	GND		
LCD CS signal	EXT_LCD_CS	3	4	NC		
LCD RS signal	EXT_LCD_RS	5	6	NC		
LCD clock signal	EXT_LCD_SCL	7	8	NC		
LCD data signal	EXT_LCD_SDA	9	10	NC		
LCD backlight signal 1	EXT_LCD_BL0	11	12	NC		
LCD backlight signal 2	EXT_LCD_BL1	13	14	NC		
LCD control button	EXT_KEY	15	16	NC		
/	RFU1	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	/	

		JH	1		
/	R22	43	44	B21	/
/	B22	45	46	G22	/
/	G23	47	48	R23	/
/	R24	49	50	B23	/
/	B24	51	52	G24	/
	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	
/	RFU4	83	84	RFU3	/
/	RFU6	85	86	RFU5	/
/	RFU8	87	88	RFU7	/
/	RFU10	89	90	RFU9	/
/	RFU12	91	92	RFU11	/
/	RFU14	93	94	RFU13	/
	GND	95	96	GND	
/	RFU16	97	98	RFU15	/
/	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	
	VCC	115	116	VCC	
	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		
	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-		
Gigabit Ethernet port	NC	19	20	NC	Gigabit Ethernet port	
	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-	Running indicator (active low)	
	GND	37	38	GND		
Line decoding signal	А	39	40	DCLK	Shift clock output 1	
Line decoding signal	В	41	42	DCLK_2	Shift clock output 2	
Line decoding signal	С	43	44	LAT	Latch signal output	
Line decoding signal	D	45	46	CTRL	Afterglow control signal	

		Jŀ	<del>1</del> 2		
Line decoding signal	Е	47	48	OE_RED	Display enable
Display enable	OE_BLUE	49	50	OE_GREEN	Display enable
	GND	51	52	GND	
1	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 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		
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	/	
/	Data64	43	44	Data63	/	
	NC	45	46	NC		
	NC	47	48	NC		
	NC	49	50	NC		
	NC	51	52	NC		
	GND	53	54	GND		

		J⊦	11		
	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	
/	RFU4	83	84	RFU3	/
/	RFU6	85	86	RFU5	/
/	RFU8	87	88	RFU7	/
/	RFU10	89	90	RFU9	/
/	RFU12	91	92	RFU11	/
/	RFU14	93	94	RFU13	/
	GND	95	96	GND	
/	RFU16	97	98	RFU15	/
/	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	
	VCC	115	116	VCC	
	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	
	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-	
Gigabit Ethernet port	NC	19	20	NC	Gigabit Ethernet port
	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-	Running indicator (active low)
	GND	37	38	GND	
Line decoding signal	A	39	40	DCLK	Shift clock output 1
Line decoding signal	В	41	42	DCLK_2	Shift clock output 2
Line decoding signal	С	43	44	LAT	Latch signal output
Line decoding signal	D	45	46	CTRL	Afterglow control signal
Line decoding signal	Е	47	48	OE_RED	Display enable
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	/

	JH2					
/	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		



The recommended VCC power input is  $5.0\ V.$ 

OE\_RED, OE\_GREEN and OE\_BLUE are display enable signals. When RGB are not controlled separately, use OE\_RED. When the PWM chip is used, they are used as GCLK signals.

In the mode of 128 groups of serial data, Data65-Data128 are multiplexed into Data1-Data64.

### **Reference Design for Extended Functions**

Pins for Extended Functions						
Pin	Recommended Smart Module Pin	Recommended Module Flash Pin	Description			
RFU1	Reserved	Reserved	A reserved pin for connection to MCU			
RFU2	Reserved	Reserved	A reserved pin for connection to MCU			
RFU3	HUB_CODE0	HUB_CODE0	Flash control pin 1			
RFU4	HUB_SPI_CLK	HUB_SPI_CLK	Clock signal of serial pin			
RFU5	HUB_CODE1	HUB_CODE1	Flash control pin 2			
RFU6	HUB_SPI_CS	HUB_SPI_CS	CS signal of serial pin			
RFU7	HUB_CODE2	HUB_CODE2	Flash control pin 3			
RFU8	/	HUB_SPI_MOSI	Module Flash data storage input			
KFU6	HUB_UART_TX	/	Smart module TX signal			
RFU9	HUB_CODE3	HUB_CODE3	Flash control pin 4			
RFU10	/	HUB_SPI_MISO	Module Flash data storage output			
KFUIU	HUB_UART_RX	/	Smart module RX signal			
RFU11	HUB_H164_CSD	HUB_H164_CSD	74HC164 data signal			
RFU12	/	/	/			
RFU13	HUB_H164_CLK	HUB_H164_CLK	74HC164 clock signal			
RFU14	POWER_STA1	POWER_STA1	Dual power supply detection signal 1			
RFU15	MS_DATA	MS_DATA	Dual card backup connection signal			
RFU16	POWER_STA2	POWER_STA2	Dual power supply detection signal 2			
RFU17	MS_ID	MS_ID	Dual card backup identifier signal			
RFU18	HUB_CODE4	HUB_CODE4	Flash control pin 5			



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	256×256 pixels				
Electrical Parameters	Input voltage	DC 3.3 V to 5.5 V			
raidilleteis	Rated current	0.5 A			
	Rated power consumption	2.5 W			
Operating Environment	Temperature	-20°C to +70°C			
Liviloriment	Humidity	10% RH to 90% RH, non-condensing			
Storage Environment	Temperature	-25°C to +125°C			
Liviloriment	Humidity	0% RH to 95% RH, non-condensing			
Physical Specifications	Dimensions	70.0 mm × 45.0 mm × 8.0 mm			
Specifications	Net weight	17.3 g			
Packing Information	Packing specifications	Each receiving card is packaged in a blister pack. Each packing box contains 80 receiving cards.			
	Packing box dimensions	378.0 mm × 190.0 mm × 120.0 mm			
Certifications	RoHS, EMC Class B				
	ot have the relevant certifications required by the countries or d, please apply for the certifications yourself or contact				

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