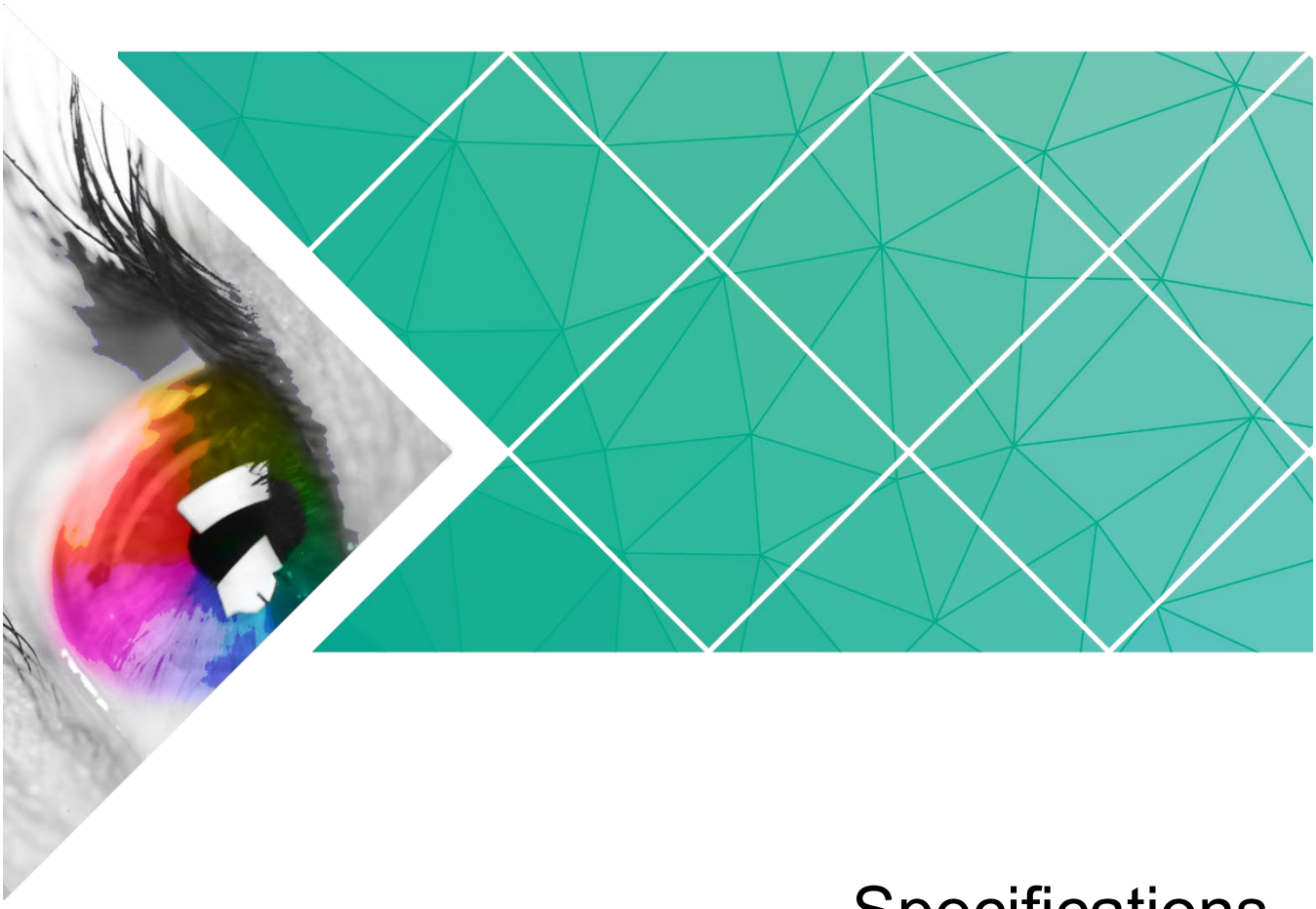
TR100

Receiving Card



Specifications

Version: V1.0.0

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Change History

Version	Release Date	Description
V1.0.0	2017-06-22	First release

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1 General

The TR100 is a new generation of receiving card developed by NovaStar. A single TR100 loads up to 384x384 pixels.

The TR100 supports 1.0/2.3 (SAA) coaxial connectors, ensuring more reliable system connection and data transmission. Benefiting from the SerDes technology, the TR100 also features lower latency. What's more, the TR100 supports 18Bit+ grayscale output. It can effectively avoid grayscale loss caused by brightness reduction on LED display and make the display smoother.

2 Features

2.1 Improvement in Display Effect

Characteristics	Description
Supporting pixel level brightness and chroma calibration	Pixel level brightness and chroma calibration on NovaLCT could remove color difference effectively, make the brightness and chroma of the whole screen highly consistent, and improve display effect.
Supporting image rotation (90°, 180°, 270° and 360°)	Image rotation (90°, 180°, 270° and 360°) could be set on the NovaLCT.
Supporting 18Bit+ grayscale output	Enabling of 18 bit mode could improve LED display grayscale by 4 times, and therefore avoid grayscale loss caused by brightness reduction and make images finer.
Supporting low-latency output	The lowest latency is one frame.

2.2 Improvement in Maintainability

Characteristics	Description
Supporting the smart module	The smart module is composed of Flash and MCU. Flash could store calibration coefficients and lamp panel information. MCU could communicate with the receiving card to realize monitoring over temperature, voltage and wiring communication status, as well as LED error detection. The smart module could make monitoring unit smaller, requiring no independent monitoring card and saving cabinet space.
Supporting module auto calibration	After the lamp panel has been replaced, the receiving card can automatically read the new lamp panel ID and calibration coefficient which could be saved to calibration system files.
Supporting Mapping function	Enable the Mapping function on NovaLCT, then the target cabinet will display the cabinet number and Ethernet port information, and the user could get the

Characteristics	Description
	receiving card’s location and wiring route.
Supporting stored image setting of the receiving card	On NovaLCT, the specified images could be set as the startup image and images used when there is no network or video source.
Supporting lamp panel Flash management	On NovaLCT, lamp panel Flash could be enabled.
Supporting monitoring over temperature, voltage and wiring status	On NovaLCT, temperature, voltage and wiring status of the receiving card could be checked.
Supporting LCD module	Support NovaStar’s product 5pin LCD module which is connected to HUB to display temperature, voltage, single operating time and total operating time of the receiving card.
Support one-click module Flash calibration coefficient	In the event of network outage, hold down the self-test button to read the module Flash calibration coefficient back to the receiving card.

2.3 Improvement in Hardware Reliability

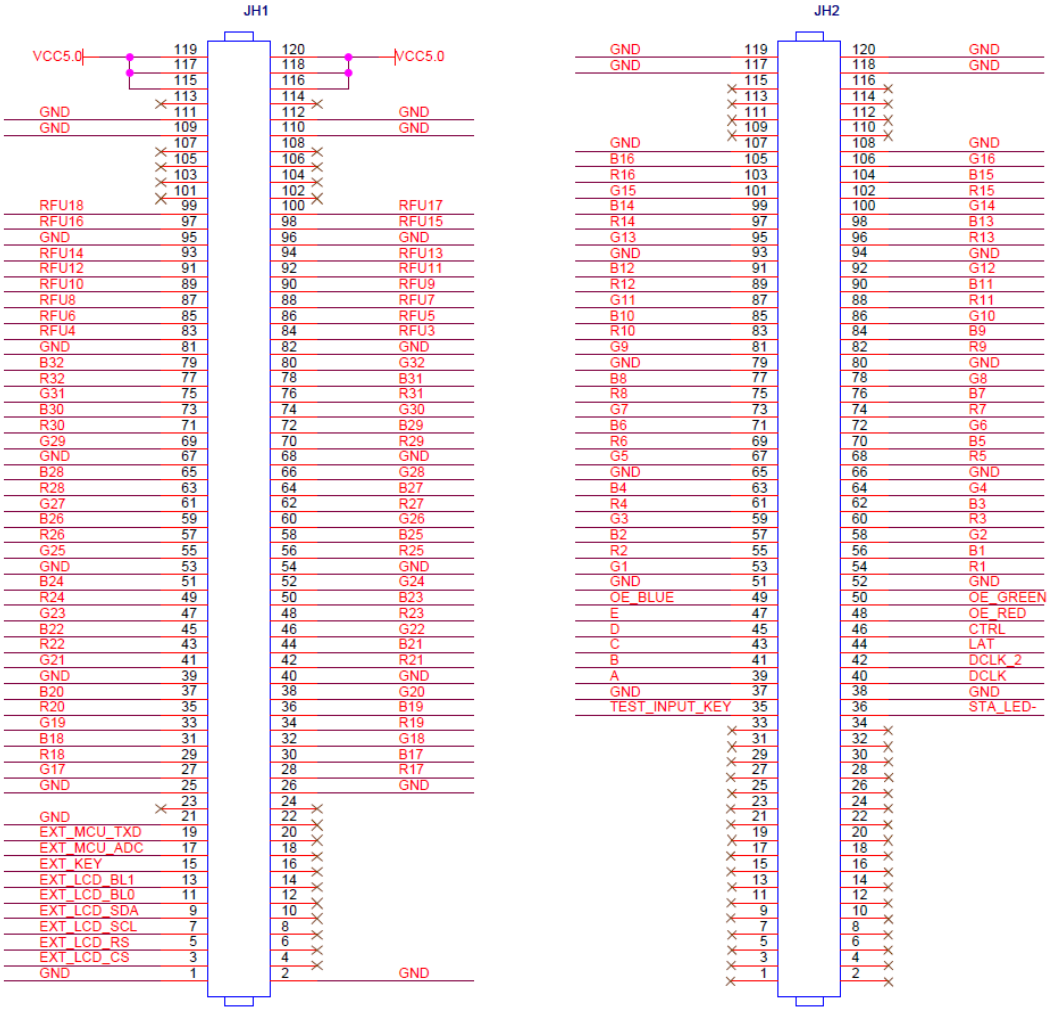
Characteristics	Description
Supporting dual-card backup	In the high-reliability environment, single HUB board could be populated with two TR100 receiving cards. In case that the main receiving card fails, the standby one will serve in a timely manner to ensure normal operation of the display.
Supporting dual-power backup & detection	Two power supplies could be simultaneously connected, and operating status of the power supplies could be detected.
Supporting hot backup	Hot backup is used to improve business and connection reliability: Device redundant backup: The device connected to the receiving card improves business reliability through main and standby redundant mechanism. Only the main device is running at a certain time. The standby device begins to work to ensure the normal operation of the display while the main device fails.

2.4 Improvement in Software Reliability

Characteristics	Description
Supporting firmware read back	Information saved in the receiving card could be read back on the NovaLCT.
Supporting dual-backup and restoring of the calibration coefficient	Calibration coefficients could be saved to both the factory area and application area at the same time. Calibration coefficients in the factory area is default as the delivery value, while the calibration coefficient in the application area could be modified or be restored to the factory reset by the user on NovaLCT.
Supporting configuration parameter backup for the receiving card	The user could back up configuration parameters on NovaLCT.

3 Output interface definition

3.1 32-group parallel RGB data



JH1							
		GND	1	2	GND		
LCD	CS signal of LCD	EXT_LCD_CS	3	4	NC		
	RS signal of LCD	EXT_LCD_RS	5	6	NC		
	Clock signal of LCD	EXT_LCD_SCL	7	8	NC		
	Data signal of LCD	EXT_LCD_SDA	9	10	NC		
	Backlight signal 1 of LCD	EXT_LCD_BL0	11	12	NC		
	Backlight signal 2 of LCD	EXT_LCD_BL1	13	14	NC		
	LCD control button	EXT_KEY	15	16	NC		
Refer to Note 5.	/	RFU1	17	18	NC		
	/	RFU2	19	20	NC		

JH1							
		GND	21	22	NC		
		NC	23	24	NC		
		GND	25	26	GND		
Refer to Note 2.	/	G17	27	28	R17	/	Refer to Note 2.
	/	R18	29	30	B17	/	
	/	B18	31	32	G18	/	
	/	G19	33	34	R19	/	
	/	R20	35	36	B19	/	
	/	B20	37	38	G20	/	
		GND	39	40	GND		
Refer to Note 2.	/	G21	41	42	R21	/	Refer to Note 2.
	/	R22	43	44	B21	/	
	/	B22	45	46	G22	/	
	/	G23	47	48	R23	/	
	/	R24	49	50	B23	/	
	/	B24	51	52	G24	/	
		GND	53	54	GND		
Refer to Note 2.	/	G25	55	56	R25	/	Refer to Note 2.
	/	R26	57	58	B25	/	
	/	B26	59	60	G26	/	
	/	G27	61	62	R27	/	
	/	R28	63	64	B27	/	
	/	B28	65	66	G28	/	
		GND	67	68	GND		
Refer to Note 2.	/	G29	69	70	R29	/	Refer to Note 2.
	/	R30	71	72	B29	/	
	/	B30	73	74	G30	/	
	/	G31	75	76	R31	/	
	/	R32	77	78	B31	/	
	/	B32	79	80	G32	/	
		GND	81	82	GND		
Refer to Note 5.	/	RFU4	83	84	RFU3	/	Refer to Note 5.
	/	RFU6	85	86	RFU5	/	
	/	RFU8	87	88	RFU7	/	
	/	RFU10	89	90	RFU9	/	
	/	RFU12	91	92	RFU11	/	
	/	RFU14	93	94	RFU13	/	
		GND	95	96	GND		
Refer to Note 5.	/	RFU16	97	98	RFU15	/	Refer to Note 5.
	/	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		
Refer to Note 1.		VCC	115	116	VCC		Refer to Note 1.
		VCC	117	118	VCC		
		VCC	119	120	VCC		

JH2							
		NC	1	2	NC		
		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		

JH2							
		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-	Operating indicator	Refer to Note 3.
		GND	37	38	GND		
	Line coding signal	A	39	40	DCLK	Shift clock output in the first route	
	Line coding signal	B	41	42	DCLK_2	Shift clock output in the second route	
	Line coding signal	C	43	44	LAT	Locking of the signal output	
	Line coding signal	D	45	46	CTRL	Afterglow control signal	
	Line coding signal	E	47	48	OE_RED	Display enabled	Refer to Note 4.
Refer to Note 4.	Display enabled	OE_BLUE	49	50	OE_GREEN	Display enabled	
		GND	51	52	GND		
Refer to Note 2.	/	G1	53	54	R1	/	Refer to Note 2.
	/	R2	55	56	B1	/	
	/	B2	57	58	G2	/	
	/	G3	59	60	R3		
	/	R4	61	62	B3	/	
	/	B4	63	64	G4	/	
		GND	65	66	GND		
Refer to Note 2.	/	G5	67	68	R5	/	Refer to Note 2.
	/	R6	69	70	B5	/	
	/	B6	71	72	G6	/	
	/	G7	73	74	R7	/	
	/	R8	75	76	B7	/	
	/	B8	77	78	G8	/	
		GND	79	80	GND		
Refer to Note 2.	/	G9	81	82	R9	/	Refer to Note 2.
	/	R10	83	84	B9	/	
	/	B10	85	86	G10	/	
	/	G11	87	88	R11	/	
	/	R12	89	90	B11	/	
	/	B12	91	92	G12	/	
		GND	93	94	GND		
Refer to Note 2.	/	G13	95	96	R13	/	Refer to Note 2.
	/	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		

Note 1. Voltage ranging from 3.8V to 5.5V is recommended for input power (VCC).

Note 2. RGB data groups must be used in group.

Note 3. Operating indicator that meets low level is valid.

Note 4. OE_RED, OE_GREEN and OE_BLUE are display enabled pins. In case that OE_RGB are not controlled separately, OE_RED signal is applied. When PWM chip is used, GCLK signal is enabled.

Note 5. RFU1 – 18 are the reserved extended function interfaces. Please refer to “3.2 Reference Design for Expandable Interfaces”.

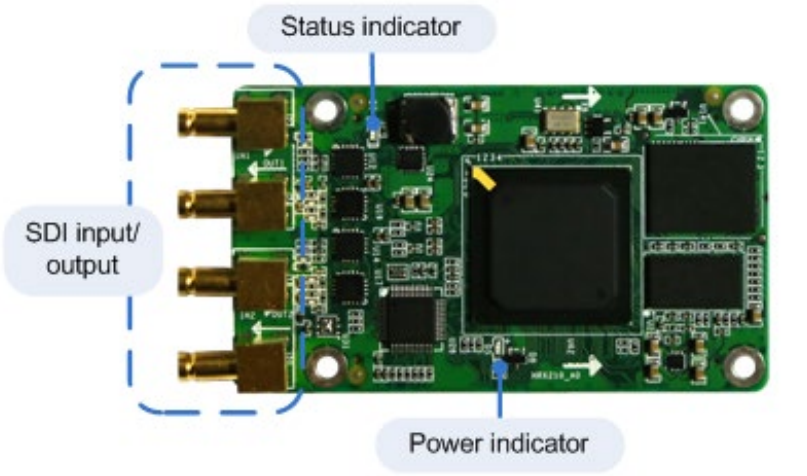
3.2 Reference Design for Expandable Interfaces

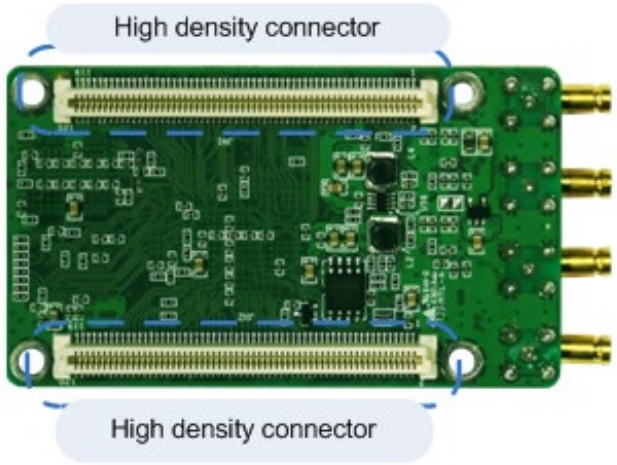
Expandable Interfaces			
Expandable Interface	Recommended Smart Module Interface	Recommended Module Flash Interface	Description
RFU1	/	/	/
RFU2	/	/	/
RFU3	HUB_CODE0	HUB_CODE0	Flash control interface 1
RFU4	HUB_SPI_CLK	HUB_SPI_CLK	Clock signal of the serial interface
RFU5	HUB_CODE1	HUB_CODE1	Flash control interface 2
RFU6	HUB_SPI_CS	HUB_SPI_CS	CS signal of the serial interface
RFU7	HUB_CODE2	HUB_CODE2	Flash control interface 3
RFU8	/	HUB_SPI_MOSI	Flash storage data input of the lamp panel
	HUB_UART_TX	/	TX signal of the smart module
RFU9	HUB_CODE3	HUB_CODE3	Flash control interface 4
RFU10	/	HUB_SPI_MISO	Flash storage data output of the lamp panel
	HUB_UART_RX	/	RX signal of the smart module
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	1Dual-power detection signal 1
RFU15	MS_DATA	MS_DATA	Dual-card backup connection signal
RFU16	POWER_STA2	POWER_STA2	2Dual-power detection signal 2
RFU17	MS_ID	MS_ID	Dual-card backup identification signal
RFU18	/	/	/

Description:

RFU8 and RFU10 are signal multiplexing expandable interfaces for which the interfaces of either **Recommended Smart Module Interface** or **Recommended Module Flash Interface** can be enabled in one operation。

4 Interface





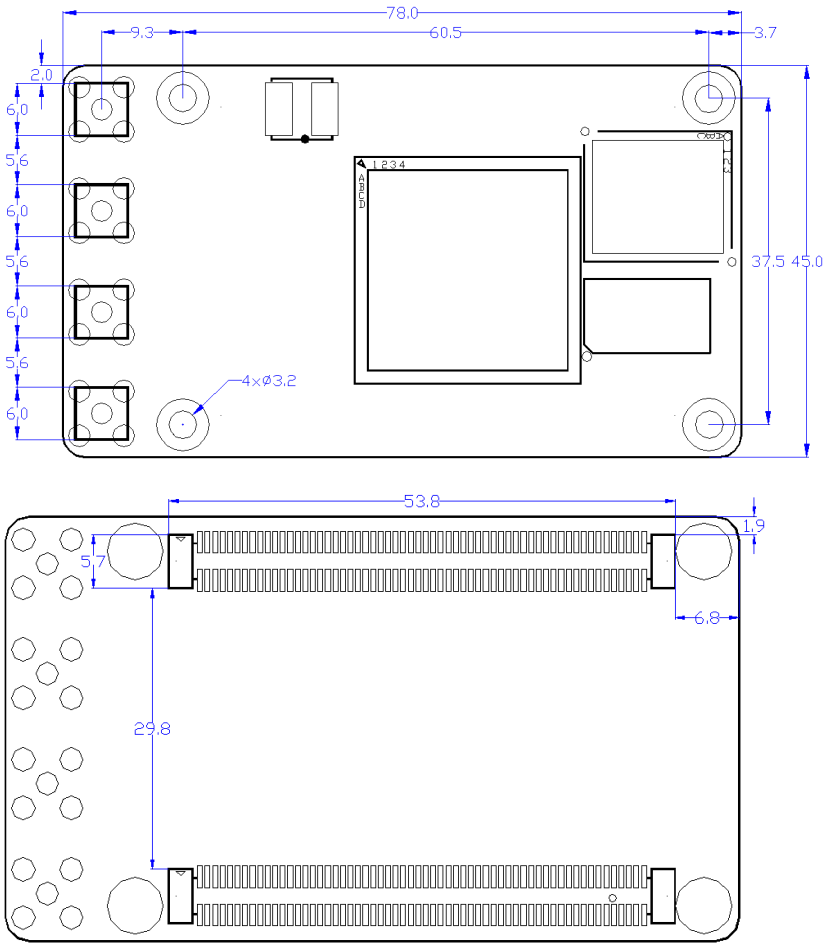
Product images provided in this file are for reference only, and the actual products (installed with cooling fins) shall prevail.

Models of the high-density receptacle and plug used by TR100 are shown in table Figure 4-1.

Figure 4-1 Model of high-density connector

Type	Brand	Material Code
Receptacle	Amphenol FCI	10140609-121802LF
PLUG	Amphenol FCI	10140607-121802LF

5 Dimensions



(Unit: mm)

6 Specifications

Input voltage	3.8V~5.5V
Rated voltage	5.0V
Rated current	1.0A
Rated power consumption	5.0W
Operating ambient temperature	-20°C~70°C
Operating ambient Humidity	0%RH~95%RH,non-condensing.
Dimension(L x W)	85.5mm×45.0mm×17.4mm
Net weight	67.5g
Certifications	EMC RoHS
Packing	The antistatic bag and anti-collision foam are prepared for each receiving card. Dimension of the packing box: 378mm×190mm×120mm, each of 30 receiving cards.