BR203-N

LED Display Control Board

Specifications

Change History

Document Version	Release Date	Description
V1.0.0	2024-03-01	First release

Introduction

The BR203-N is a LED display control board developed by NovaStar Tech Co., Ltd. (hereinafter referred to as NovaStar). A BR203-N supports resolutions up to 384×256@60Hz. The product supports up to 6 groups of parallel RGB data and is mainly used for fixed indoor screen installation.

The BR203-N integrated a power module converts 100 V to 240 V alternating current into 4.2 V direct current, which directly powers the screen modules. Furthermore, the product offers functions such as overvoltage, overcurrent, overpower, and short circuit protection, ensuring safety, high efficiency, and good reliability.

Features

- Combines a power module and a receiving card into one package

    The product supports input voltage of 100 Vac to 240 Vac and converts it to 4.2 Vdc to directly power the modules. Furthermore, the product offers functions such as overvoltage, overcurrent, overpower, and short circuit protection.

- Pixel Level Brightness and Chroma Calibration

    Work with NovaStar's high-precision calibration system to calibrate the brightness and chroma of each pixel, effectively eliminating differences and enabling high consistency for both brightness and chroma.

- Quick Adjustment of Dark or Bright Lines

    The different brightness of seams caused by splicing of modules or cabinets can be corrected to improve the visual experience. The correction is easy and takes effect immediately.

- 3D

    Work with the controller that supports 3D function to enable 3D output.

- Mapping 1.0

The cabinets can display the receiving card number and Ethernet port information, allowing users to easily obtain the locations and connection topology of receiving cards.

- Temperature and Voltage Monitoring

The receiving card temperature and voltage can be monitored without using external devices.

- Bit Error Detection

Real-time monitoring of the communication of the Ethernet port on the receiving card which helps users troubleshoot network communication problems.

- Firmware Program Readback

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

- Configuration Parameter Readback

The receiving card configuration parameters can be read back and saved to the local computer.

- Loop Backup

The receiving card and controller 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 abnormally during program update.

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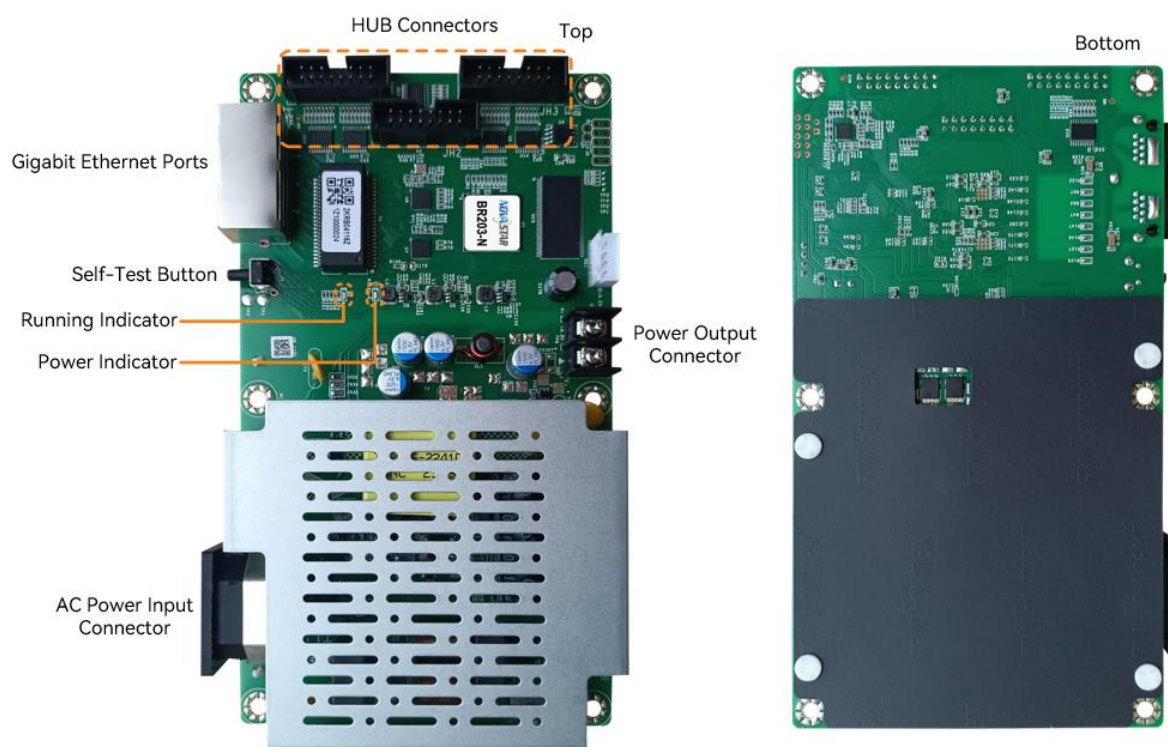
All product pictures shown in this document are for illustration purpose only. Actual product may vary.

Indicator

Indicators	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 video source input is unavailable.
		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	A redundancy switchover occurred on the

Indicators	Color	Status	Description
		every 0.5s	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 27.5 mm.
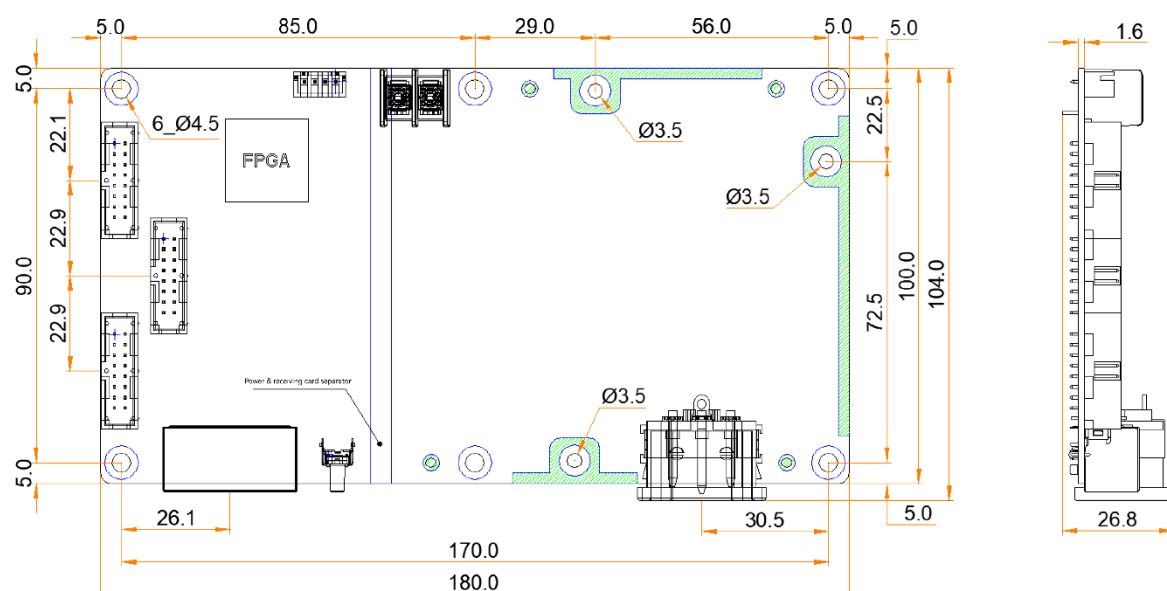
Tolerance: ±0.3 Unit: mm

Note

To make molds or trepan mounting holes, please contact NovaStar for a higher-precision structural drawing.

Pins

Pin Definitions (JH1 as an example)					
/	R1	1	2	G1	/
/	B1	3	4	GND	/
/	R2	5	6	G2	/
/	B2	7	8	HE1	Line decoding signal
Line decoding signal	HA1	9	10	HB1	Line decoding signal
Line decoding signal	HC1	11	12	HD1	Line decoding signal
Shift clock	HDCLK1	13	14	HLAT1	Latch signal.
Display enable signal	HOE1	15	16	GND	/

Electrical Specifications

Input Specifications

Input voltage range	90 Vac to 264 Vac
Rated input voltage range	100 Vac to 240 Vac
Input voltage frequency	47Hz to 63Hz
Starting voltage	90 Vac
Maximum input current	≤1.3 A
Standby power consumption	< 0.5 W
Inrush current@25℃	< 60 A @220 Vac cold start

Output Specifications

Rated output current	13 A Note: Derating is necessary when the input voltage is low and the ambient temperature is high. Please refer to the derating curve for more details.
Rated output voltage	4.2 V

Output voltage accuracy	≤ ±2%
Line regulation	≤ ±2%
Load regulation	≤ ±2%
Peak output power	≤ 65 W (duration 10 minutes/input 220 Vac) Note: When the power supply is used with LED loads, the peak output current can reach 15 A.
Output ripple	<120 mV
Efficiency	≥ 84%
Dynamic load performance	1.3 A–13 A<± 500 mV 6.5 A–13 A<±400 mV 1.3 A–13 A<±300 mV
Startup time	≤ 3s (Input: 220 Vac, output: 13 A load)
Output hold time	≥ 10ms (Input: 220 Vac, output: 13 A load)
Voltage overshoot	<5.0% (i.e., output overvoltage < 4.41 V)

Input Voltage–Load derating curve

Ambient Temperature-Load curve

```
Load (%)
100% ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
 90%
 80%
 70% ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
 60%
 50% ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
 40%
 30%
 20%
 10%
    -20    0    25  50 55 60 65 70
         Ambient Temperature (℃)
```
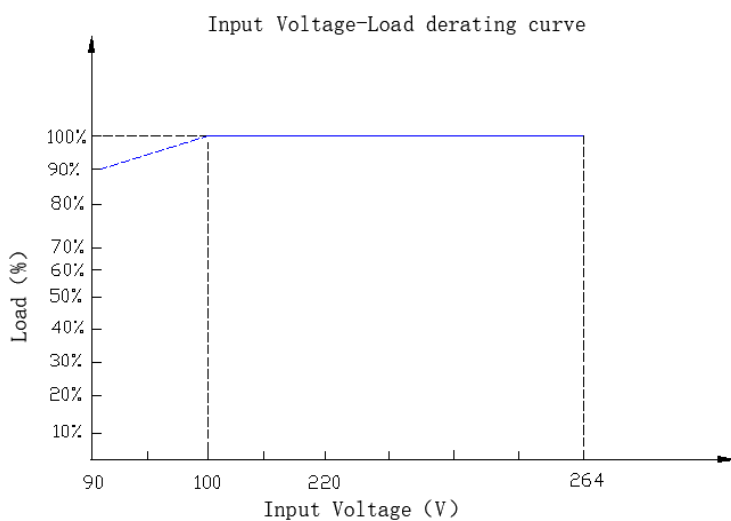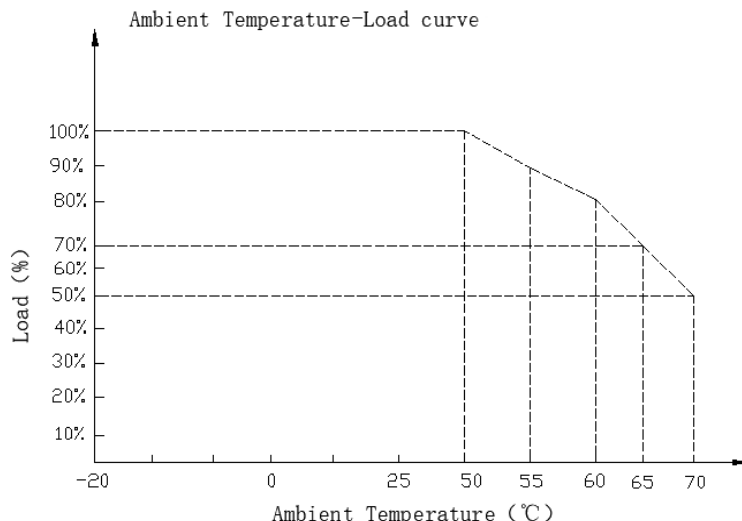
Note

- The Ripple noise should be connected to the output using a 12 twisted pair cable. The oscilloscope bandwidth should be set to 20 MHz, and the Tektronix P3010 100M probe should be used. In addition, a parallel connection of a 0.1 μF polypropylene capacitor and a 10 μF electrolytic capacitor should be made at the probe end. The oscilloscope sampling should be done using the Sample mode.
- Procedure for efficiency testing: Connect the power input to the AC SOURCE and the output to the electronic load. It is recommended to use a 12-gauge cable for the sampling cable, and the power cable should be selected based on the appropriate insulated cable diameter corresponding to the output current. For voltage measurements of the power input and output, select the measurement points at the power input and output ports.

Protection

Output overvoltage protection	5 V to 6.3 V (features hiccup protection under load and constant voltage protection with no load; pins 1 and 3 of ZU3 are short-circuited, and external voltage cannot be applied)
Output overcurrent protection	1.3 IO < OCP < 1.5 IO (hiccup protection)
Output overpower protection	65 W to 81.9 W (hiccup protection)
Output short-circuit protection	The power supply output port can sustain a short circuit for an extended period of time, and it will automatically resume normal operation once the short circuit is resolved.

Safety Regulations

Insulation resistance	Input-to-output: 10 MΩ; Input-to-chassis: 10 MΩ; Output-to-chassis: 10 MΩ.
Insulation withstand voltage	Input-to-output: 3 kVac / 10 mA; Input-to-chassis: 1.5 kVac / 10 mA; Output-to-chassis: 0.5 kVac / 10 mA. Each test has a duration of 1 minute.
Contact current	<0.75 mA 230 Vac
Ground resistance	Ground resistance < 0.1 Ω
Warning label	The primary side circuit and devices should have prominent danger warning labels
Leakage current	Prevent any possibility of electric shock in the enclosure and potentially accessible parts. Additionally, the input and output terminals should be clearly and visibly marked.

EMC

Conducted emission	CISPR32/EN55032 class A
Radiated emission	CISPR32/EN55032 class A
Harmonic current disturbance	/
Voltage fluctuation and Flicker	/
Radiated susceptibility	IEC/EN61000-4-3 level 2 criterion A
Conducted susceptibility	IEC/EN61000-4-6 level 2 criterion A
Surge susceptibility	IEC/EN61000-4-5 level 3 criterion B
EFT immunity	IEC/EN61000-4-4 level 3 criterion B
ESD immunity	IEC/EN 61000-4-2 level 3 criterion B
Voltage drop	IEC/EN61000-4-11 0%, 70% performance criterion C

> **Caution**
>
> It is required to comply with the above-mentioned standards as a whole system.
>
> If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact NovaStar to confirm or address the problem. Otherwise, the customer shall be responsible for the legal risks caused or NovaStar has the right to claim compensation.

Specifications

Maximum Resolution	384×256@60Hz	
Operating Environment	Temperature	−20℃ to +50℃ (refer to the temperature derating curve for more details)
	Humidity	20% RH to 90% RH, non-condensing
	Altitude	< 5000 m
Storage Environment	Temperature	−25℃ to +85℃
	Humidity	5% RH to 95% RH, non-condensing
	Altitude	< 5000 m
Physical Specifications	Dimensions	180.0 mm × 104.0 mm × 26.8 mm
	Net weight	247.6 g Note: It is the weight of a single receiving card only.
Packing Information	Packing specifications	Each receiving card is packaged in an anti-static bubble bag. Each packing box contains 20 receiving cards.
	Packing box	620.0 mm × 320.0 mm × 230.0 mm

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Official website
www.novastar.tech

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