

# MRV532

## Receiving Card



## Specifications

# 1 Change History

Document Version	Release Date	Description
V1.0.2	2024-05-23	<ul style="list-style-type: none"><li>• Added a note for line decoding signal.</li><li>• Updated the load capacity description.</li></ul>
V1.0.1	2024-05-15	<ul style="list-style-type: none"><li>• Updated the load capacity description.</li><li>• Updated the product features.</li><li>• Updated the HUB connector name.</li></ul>
V1.0.0	2024-05-07	First release

## 2 Introduction

The MRV532 is a receiving card designed for PWM driver ICs by Xi'an NovaStar Tech Co., Ltd. (hereinafter referred to as NovaStar). For 8bit video sources, a single card supports resolutions up to 512×512@60Hz. For 10bit or 12bit video sources, a single card supports resolutions up to 512×384@60Hz. The MRV532 also supports various functions such as Seam Correction, Pixel Level Brightness and Chroma Calibration, Quick Adjustment of Dark or Bright Lines, Low Latency, 3D, and 90° Image Rotation. As a result, it can significantly improve the display effect and user experience.

The MRV532 uses 10 standard HUB320F connectors to ensure highly stable communication, supporting up to 40 groups of RGB real pixel data, 40 groups of 3-color sub-pixel data, or 30 groups of 4-color sub-pixel data.

## 3 Certifications

None

**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.**

## 4 Features

### Improvements to Display Effect

- 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.

- Seam Correction with Mobile App

Use the mobile app to automatically or manually correct the different brightness of seams caused by splicing of modules or cabinets to improve the visual experience. (Work with the TU series)

- 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.

- Low Latency

The latency of video source on the receiving card end can be reduced to 1 frame (only when using modules with driver IC with built-in RAM).

- 3D

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

- 90° Image Rotation

The display image can be rotated in multiples of 90° (0°/90°/180°/270°).

## Improvements to Maintainability

- Automatic Module Calibration

After a new module with flash memory is installed to replace the old one, the calibration coefficients stored in the flash memory can be automatically uploaded to the receiving card when it is powered on, which ensures unchanged uniform display brightness and chroma.

- Module Auto Light-up (dedicated firmware required)

After a new module with flash memory is installed to replace the old one, the configuration file stored in the memory can be automatically uploaded to the receiving card when it is powered on. This ensures the module can be lighted up without issue.

- 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 memory of the module to the receiving card.

- Mapping 1.1

The cabinets can display the controller number, receiving card number, and Ethernet port

information, allowing users to easily obtain the locations and connection topology of receiving cards.

- Settings of a Stored Image in the 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

Real-time monitoring of the temperature and voltage of the receiving card, without the need for other external devices.

- 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.

- 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.

## Improvements to Reliability

- Dual NCP Backup

The NCP file is stored in the application area and factory area of the receiving card at the same time. Users typically use the NCP file in the application area. However, users can retrieve the NCP file from the factory area when performing a factory reset.

- 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

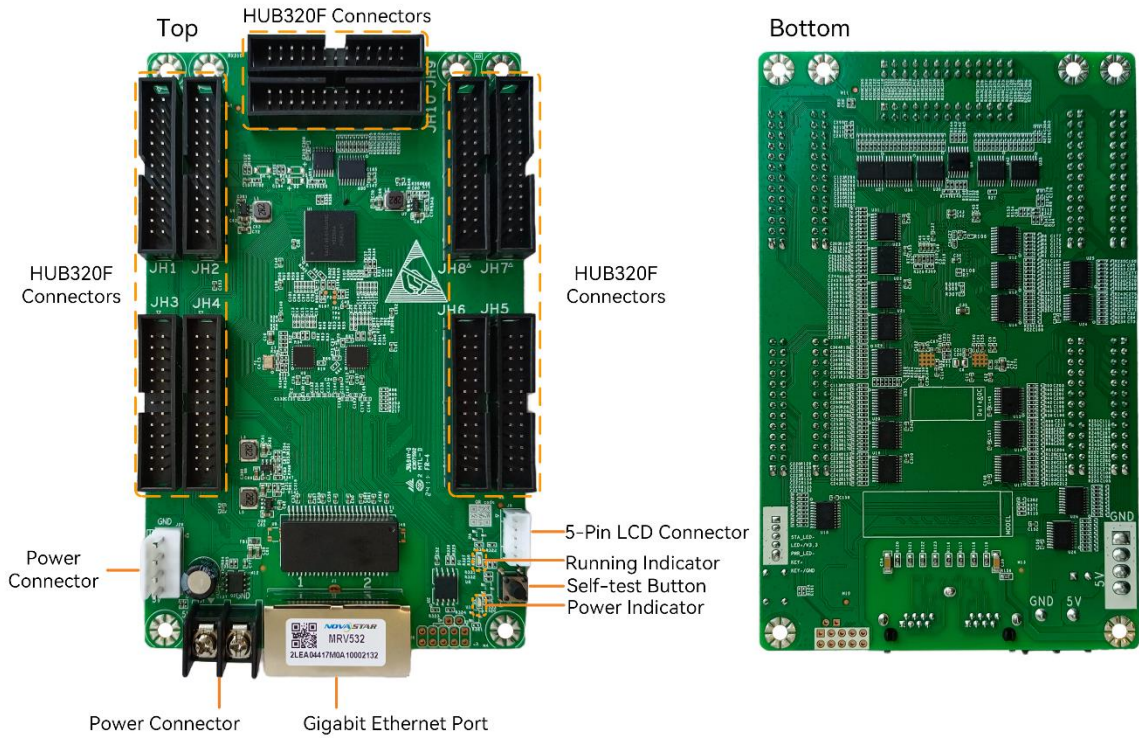
The receiving card configuration parameters are stored in the application area and factory area of the receiving card at the same time. Users usually use the configuration parameters in the application area. If necessary, users can restore the configuration parameters in the factory area to the application 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.



# 5 Appearance



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

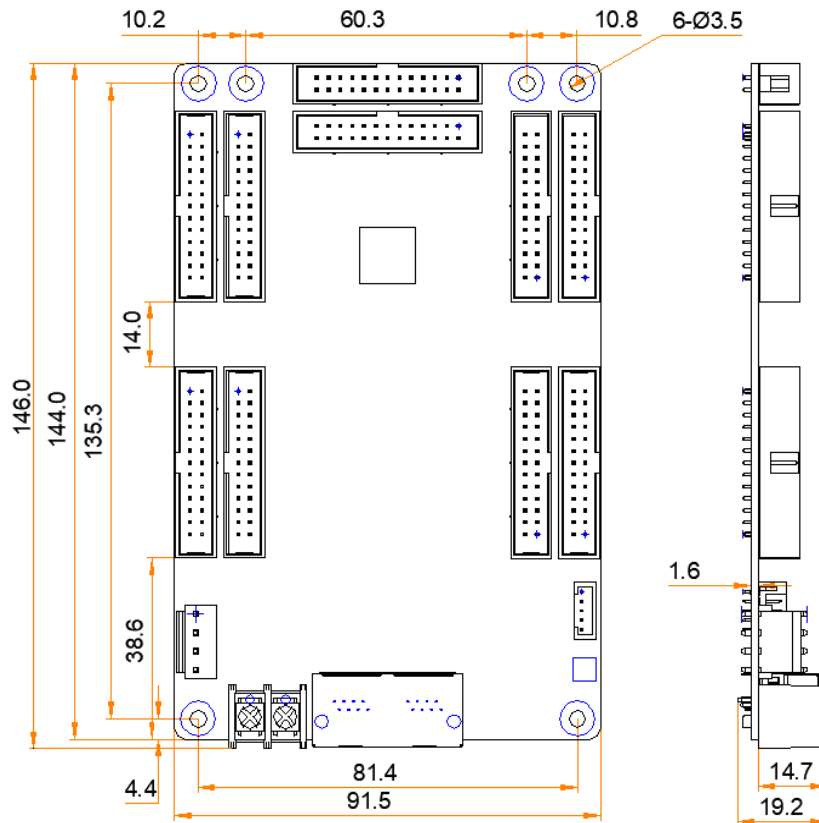
Name	Description
HUB320F Connector	Connect to the module.
Power Connector	Connect to the input power. Either of the connectors can be chosen.
Gigabit Ethernet Port	Connect to the sending card, and cascade other receiving cards. Each connector can be used as input or output.
Self-Test Button	Set the test pattern.  After the Ethernet cable is disconnected, press the button twice, and the test pattern will be displayed on the screen. Press the button again to switch the pattern.
5-Pin LCD Connector	Connect to the LCD.

## 6 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 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 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.

## 7 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 20.0 mm.



Tolerance:  $\pm 0.3$  Unit: mm

### Note

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

# 8 Pins

## Real Pixel RGB Data Pins/3-color Sub-pixel Data Pins

<b>JH1</b> R1 JACK_SPI_CLK1 1 2 G1 R2 3 4 GND R3 JACK_SPI_MOSI1 5 6 G2 R4 7 8 GND R5 9 10 G3 R6 11 12 GND R7 13 14 G4 R8 15 16 GND HA1 17 18 HB1 HC1 19 20 JACK_SPI_CS1 HDCLK1 23 24 HLAT1 HOE1 25 26 GND	<b>JH2</b> R5 JACK_SPI_CLK2 1 2 G5 R6 3 4 GND R7 JACK_SPI_MOSI2 5 6 G6 R8 7 8 GND R9 9 10 G7 R10 11 12 GND R11 13 14 G8 R12 15 16 GND HA2 17 18 HB2 HC2 19 20 JACK_SPI_CS2 HDCLK2 23 24 HLAT2 HOE2 25 26 GND	<b>JH3</b> R9 JACK_SPI_CLK3 1 2 G9 R10 3 4 GND R11 JACK_SPI_MOSI3 5 6 G9 R12 7 8 GND R13 9 10 G11 R14 11 12 GND R15 13 14 G12 R16 15 16 GND HA3 17 18 HB3 HC3 19 20 JACK_SPI_CS3 HDCLK3 23 24 HLAT3 HOE3 25 26 GND	<b>JH4</b> R13 JACK_SPI_CLK4 1 2 G13 R14 3 4 GND R15 JACK_SPI_MOSI4 5 6 G13 R16 7 8 GND R17 9 10 G15 R18 11 12 GND R19 13 14 G16 R20 15 16 GND HA4 17 18 HB4 HC4 19 20 JACK_SPI_CS4 HDCLK4 23 24 HLAT4 HOE4 25 26 GND	<b>JH5</b> R17 JACK_SPI_CLK5 1 2 G17 R18 3 4 GND R19 JACK_SPI_MOSI5 5 6 G17 R20 7 8 GND R21 9 10 G19 R22 11 12 GND R23 13 14 G20 R24 15 16 GND HA5 17 18 HB5 HC5 19 20 JACK_SPI_CS5 HDCLK5 23 24 HLAT5 HOE5 25 26 GND
<b>JH6</b> R11 JACK_SPI_CLK6 1 2 G11 R12 3 4 GND R13 JACK_SPI_MOSI6 5 6 G11 R14 7 8 GND R15 9 10 G13 R16 11 12 GND R17 13 14 G14 R18 15 16 GND HA6 17 18 HB6 HC6 19 20 JACK_SPI_CS6 HDCLK6 23 24 HLAT6 HOE6 25 26 GND	<b>JH7</b> R15 JACK_SPI_CLK7 1 2 G15 R16 3 4 GND R17 JACK_SPI_MOSI7 5 6 G15 R18 7 8 GND R19 9 10 G17 R20 11 12 GND R21 13 14 G18 R22 15 16 GND HA7 17 18 HB7 HC7 19 20 JACK_SPI_CS7 HDCLK7 23 24 HLAT7 HOE7 25 26 GND	<b>JH8</b> R19 JACK_SPI_CLK8 1 2 G19 R20 3 4 GND R21 JACK_SPI_MOSI8 5 6 G19 R22 7 8 GND R23 9 10 G21 R24 11 12 GND R25 13 14 G22 R26 15 16 GND HA8 17 18 HB8 HC8 19 20 JACK_SPI_CS8 HDCLK8 23 24 HLAT8 HOE8 25 26 GND	<b>JH9</b> R23 JACK_SPI_CLK9 1 2 G23 R24 3 4 GND R25 JACK_SPI_MOSI9 5 6 G23 R26 7 8 GND R27 9 10 G25 R28 11 12 GND R29 13 14 G26 R30 15 16 GND HA9 17 18 HB9 HC9 19 20 JACK_SPI_CS9 HDCLK9 23 24 HLAT9 HOE9 25 26 GND	<b>JH10</b> R27 JACK_SPI_CLK10 1 2 G27 R28 3 4 GND R29 JACK_SPI_MOSI10 5 6 G27 R30 7 8 GND R31 9 10 G29 R32 11 12 GND R33 13 14 G30 R34 15 16 GND HA10 17 18 HB10 HC10 19 20 JACK_SPI_CS10 HDCLK10 23 24 HLAT10 HOE10 25 26 GND

### Pin Definitions (JH1 as an example)

/	R1	1	2	G1	/
B1 / Clock signal of serial pin	B1 / JACK_SPI_CLK1	3	4	GND	/
/	R2	5	6	G2	/
B2 / Module flash data storage input	B2 / JACK_SPI_MOSI1	7	8	GND	/
/	R3	9	10	G3	/
/	B3	11	12	GND	/
/	R4	13	14	G4	/
/	B4	15	16	GND	/
Line decoding signal	HA1	17	18	HB1	Line decoding signal
Line decoding signal	HC1	19	20	JACK_SPI_CS1	CS signal of serial pin
Module Flash data storage output	JACK_SPI_MISO1	21	22	GND	/
Shift clock	HDCLK1	23	24	HLAT1	Latch signal
Display enable	HOE1	25	26	GND	/

Pin Definitions (JH1 as an example)					
signal					

### 4-Color Sub-pixel Data Pins

<b>JH1</b> B1 JACK_SPI_CLK1 1 2 2 G1 V1 3 4 GND G2 JACK_SPI_MOSI1 5 6 R2 B2 7 8 GND V2 9 10 V2 G3 11 12 GND G4 13 14 B3 V3 15 16 GND HA1 17 18 HB1 HC1 19 20 JACK_SPI_CS1 JACK_SPI_MISO1 21 22 GND HDCLK1 23 24 HLAT1 HDCE1 25 26 26 GND	<b>JH2</b> R4 JACK_SPI_CLK2 1 2 2 G4 V4 3 4 GND G5 JACK_SPI_MOSI2 5 6 R5 B5 7 8 GND V5 9 10 V5 G6 11 12 GND G7 13 14 B5 V6 15 16 GND HA2 17 18 HB2 HC2 19 20 JACK_SPI_CS2 JACK_SPI_MISO2 21 22 GND HDCLK2 23 24 HLAT2 HDCE2 25 26 26 GND	<b>JH3</b> B7 JACK_SPI_CLK3 1 2 2 G7 V7 3 4 GND G8 JACK_SPI_MOSI3 5 6 R8 B8 7 8 GND V8 9 10 V8 G9 11 12 GND G10 13 14 B8 V9 15 16 GND HA3 17 18 HB3 HC3 19 20 JACK_SPI_CS3 JACK_SPI_MISO3 21 22 GND HDCLK3 23 24 HLAT3 HDCE3 25 26 26 GND	<b>JH4</b> B10 JACK_SPI_CLK4 1 2 2 G10 V10 3 4 GND G11 JACK_SPI_MOSI4 5 6 R11 B11 7 8 GND V11 9 10 V11 G12 11 12 GND G13 13 14 B11 V12 15 16 GND HA4 17 18 HB4 HC4 19 20 JACK_SPI_CS4 JACK_SPI_MISO4 21 22 GND HDCLK4 23 24 HLAT4 HDCE4 25 26 26 GND	<b>JH5</b> B13 JACK_SPI_CLK5 1 2 2 G13 V13 3 4 GND G14 JACK_SPI_MOSI5 5 6 R14 B14 7 8 GND V14 9 10 V14 G15 11 12 GND G16 13 14 B14 V15 15 16 GND HA5 17 18 HB5 HC5 19 20 JACK_SPI_CS5 JACK_SPI_MISO5 21 22 GND HDCLK5 23 24 HLAT5 HDCE5 25 26 26 GND
<b>JH6</b> B16 JACK_SPI_CLK6 1 2 2 G16 V16 3 4 GND G17 JACK_SPI_MOSI6 5 6 R17 B17 7 8 GND V17 9 10 V17 G18 11 12 GND G19 13 14 B17 V18 15 16 GND HA6 17 18 HB6 HC6 19 20 JACK_SPI_CS6 JACK_SPI_MISO6 21 22 GND HDCLK6 23 24 HLAT6 HDCE6 25 26 26 GND	<b>JH7</b> B19 JACK_SPI_CLK7 1 2 2 G19 V19 3 4 GND G20 JACK_SPI_MOSI7 5 6 R20 B20 7 8 GND V20 9 10 V20 G21 11 12 GND G22 13 14 B20 V21 15 16 GND HA7 17 18 HB7 HC7 19 20 JACK_SPI_CS7 JACK_SPI_MISO7 21 22 GND HDCLK7 23 24 HLAT7 HDCE7 25 26 26 GND	<b>JH8</b> B22 JACK_SPI_CLK8 1 2 2 G22 V22 3 4 GND G23 JACK_SPI_MOSI8 5 6 R23 B23 7 8 GND V23 9 10 V23 G24 11 12 GND G25 13 14 B23 V24 15 16 GND HA8 17 18 HB8 HC8 19 20 JACK_SPI_CS8 JACK_SPI_MISO8 21 22 GND HDCLK8 23 24 HLAT8 HDCE8 25 26 26 GND	<b>JH9</b> B25 JACK_SPI_CLK9 1 2 2 G25 V25 3 4 GND G26 JACK_SPI_MOSI9 5 6 R26 B26 7 8 GND V26 9 10 V26 G27 11 12 GND G28 13 14 B26 V27 15 16 GND HA9 17 18 HB9 HC9 19 20 JACK_SPI_CS9 JACK_SPI_MISO9 21 22 GND HDCLK9 23 24 HLAT9 HDCE9 25 26 26 GND	<b>JH10</b> B28 JACK_SPI_CLK10 1 2 2 G28 V28 3 4 GND G29 JACK_SPI_MOSI10 5 6 R29 B29 7 8 GND V29 9 10 V29 G30 11 12 GND G31 13 14 B29 V30 15 16 GND HA10 17 18 HB10 HC10 19 20 JACK_SPI_CS10 JACK_SPI_MISO10 21 22 GND HDCLK10 23 24 HLAT10 HDCE10 25 26 26 GND

Pin Definitions (JH1 as an example)					
/	R1	1	2	G1	/
B1 / Clock signal of serial pin	B1 / JACK_SPI_CLK1	3	4	GND	/
/	V1	5	6	R2	/
G2 / Module flash data storage input	G2 / JACK_SPI_MOSI1	7	8	GND	/
/	B2	9	10	V2	/
/	R3	11	12	GND	/
/	G3	13	14	B3	/
/	V3	15	16	GND	/
Line decoding signal	HA1	17	18	HB1	Line decoding signal
Line decoding signal	HC1	19	20	JACK_SPI_CS1	CS signal of serial pin
Module Flash data storage output	JACK_SPI_MISO1	21	22	GND	/
Shift clock	HDCLK1	23	24	HLAT1	Latch signal

**Pin Definitions (JH1 as an example)**

Display enable signal	HOE1	25	26	GND	/
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 **Note**

Line decoding only supports A, B, and C signals, and does not support D and E signals.

## 9 Specifications

<b>Maximum Resolution</b>	512×512@60Hz (8bit video sources)	
	512×384@60Hz (10bit or 12bit video sources)	
<b>Electrical Specifications</b>	Input voltage	DC 3.8 V to 5.5 V
	Rated current	0.5 A
	Rated power consumption	2.5 W
<b>Operating Environment</b>	Temperature	-20°C to +70°C
	Humidity	10% RH to 90% RH, non-condensing
<b>Storage Environment</b>	Temperature	-25°C to +125°C
	Humidity	0% RH to 95% RH, non-condensing
<b>Physical Specifications</b>	Dimensions	146.0 mm × 91.5 mm × 19.2 mm
	Net weight	99.5 g Note: It is the weight of a single receiving card only.
<b>Packing Information</b>	Packing specifications	An antistatic bag and anti-collision foam are provided for each receiving card. Each packing box contains 100 receiving cards.
	Packing box dimensions	625.0 mm × 180.0 mm × 470.0 mm

The amount of current and power consumption may vary depending on various factors such as product settings, usage, and environment.

# 10 Copyright

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