

# MRV412-N

Receiving Card



## Specifications

## Change History

Document Version	Release Date	Description
V1.0.3	2025-05-20	Added detection of Ethernet cable disconnections to product features.
V1.0.2	2025-01-10	Updated the appearance and dimension diagrams.
V1.0.1	2025-01-02	Added certification information.
V1.0.0	2024-09-19	First release.

## Introduction

The MRV412-N is a general receiving card developed by NovaStar Tech Co., Ltd. (hereinafter referred to as NovaStar). Supporting various functions such as Color Management, 18bit+, Pixel Level Brightness and Chroma Calibration, Quick Adjustment of Dark or Bright Lines, Multi-batch Adjustment, Low Latency, 3D, Individual Gamma Adjustment for RGB, and 90° Image Rotation, the MRV412-N can significantly improve the display effect and user experience.

The MRV412-N uses 12 standard HUB75E connectors for communication. It supports up to 24 groups of parallel RGB data and is suitable for various on-site setups.

When working with 8bit video sources, the maximum load capacity per card is:

- 512×512@60Hz (PWM driver IC)
- 512×384@60Hz (common driver IC)

## Certifications

RoHS, EMC Class A

**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.**

## Features

### Improvements to Display Effect

- Color Management

Support standard (Rec.709 / DCI-P3 / Rec.2020) and custom color gamuts, enabling more precise colors on the screen.

- 18bit+

Improve the LED display grayscale by 4 times to avoid grayscale loss due to low brightness and allow for a smoother image.

- Pixel Level Brightness and Chroma Calibration

Work with NovaStar's 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.

- Multi-batch Adjustment

Adjust the brightness of cabinets or modules to minimize display discrepancies caused by variations in production batches.

- Low Latency

Low Latency can be enabled or disabled as required, default is disabled. When enabled, 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.

- Individual Gamma Adjustment for RGB

Working with NovaLCT and the controller that supports this function, the receiving card supports individual adjustment to 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.

- 90° Image Rotation

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

## Improvements to Maintainability

- 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

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

- Cabinet LCD

The LCD module of the cabinet can display the temperature, voltage, single run time and total run time of the receiving card.

- Bit Error Detection

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

- Detection of Ethernet Cable Disconnections

Monitors the number of times the Ethernet cable to the receiving card is disconnected, assisting in identifying potential communication link issues.

- 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

- 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.

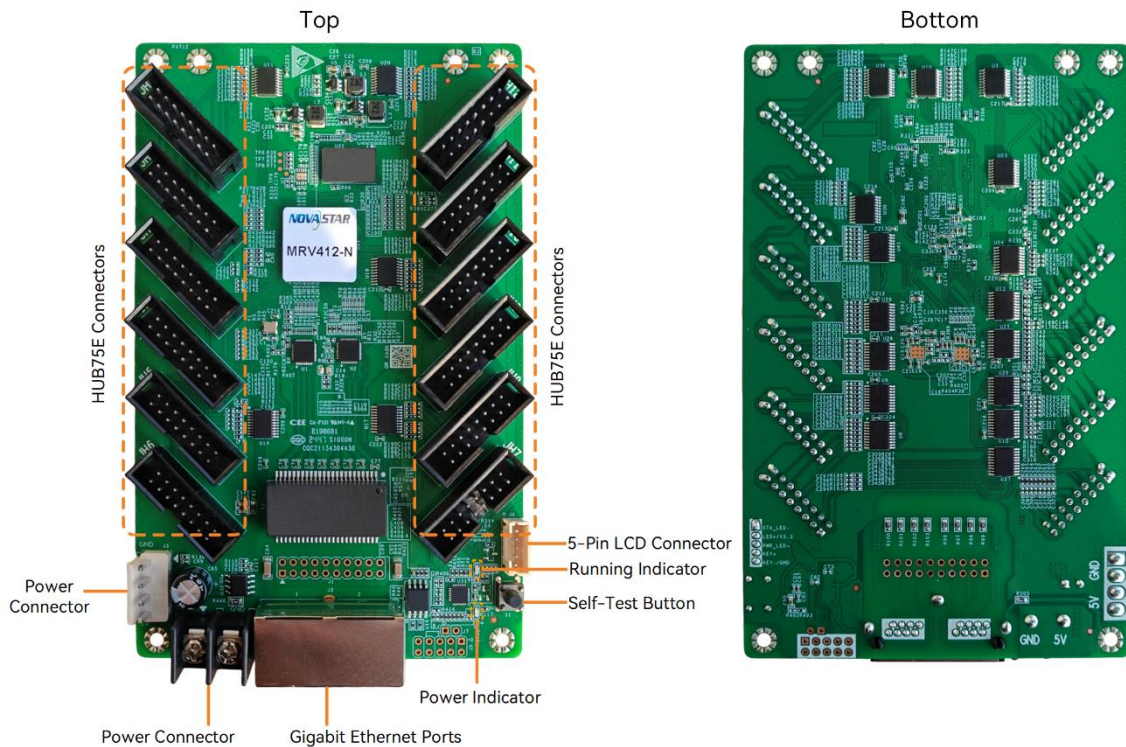
- Dual Backup of Configuration Parameters

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.

Name	Description
HUB75E Connectors	Connect to the module.
Power Connector	Connect to the input power. Either of the connectors can be chosen.
Gigabit Ethernet Ports	Connect to the sending card, and cascade other receiving cards. Each connector can be used as input or output.

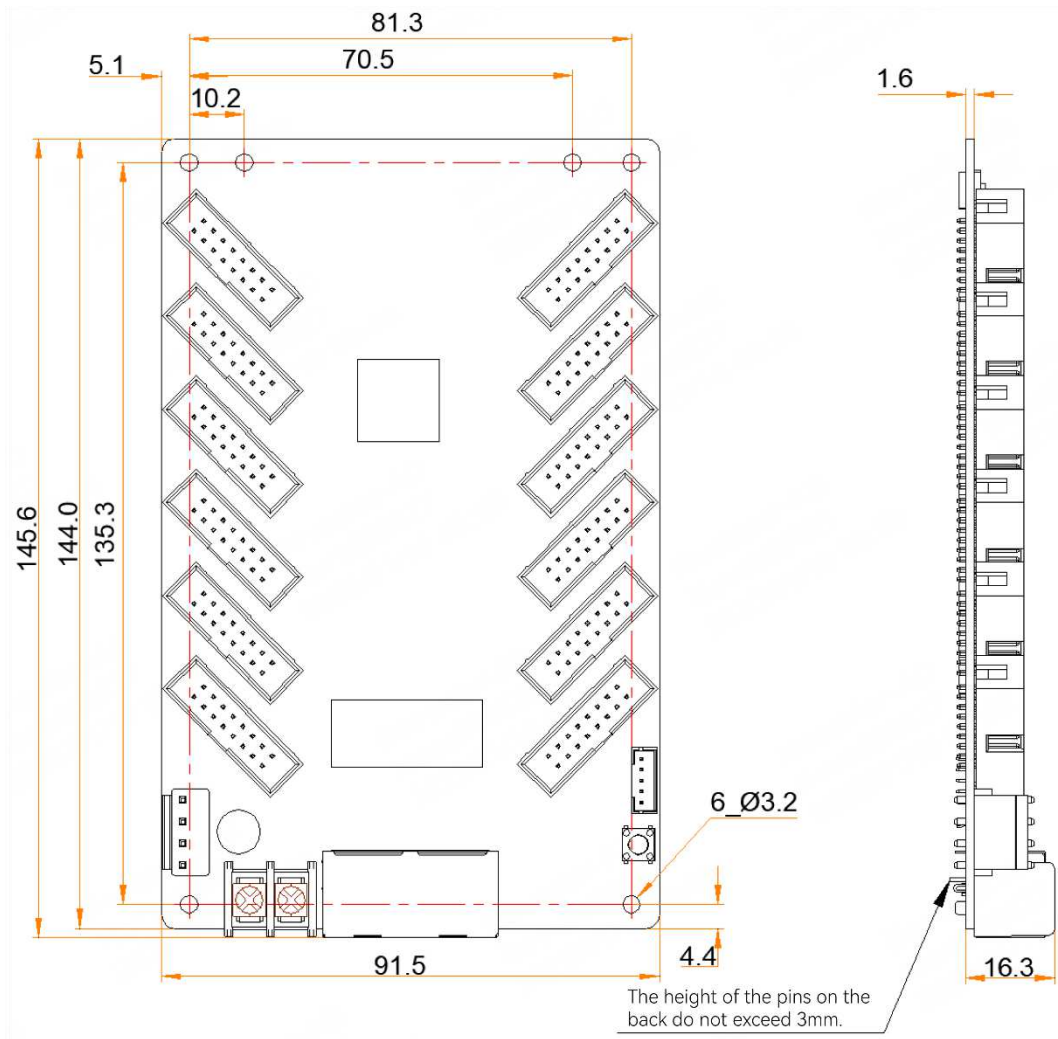
Name	Description
Self-Test Button	Set the test pattern.  After the Ethernet cable is disconnected, press the button twice, and the test pattern will be displayed on the screen. Press the button again to switch the pattern.
5-Pin LCD Connector	Connect to the LCD.

## 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 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 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.

## Pins

JH1					
R1	1	2	G1		
B1	3	4	GND		
R2	5	6	G2		
B2	7	8	HE1		
HA1	9	10	HB1		
HC1	11	12	HD1		
HDCLK1	13	14	HLAT1		
HOE1	15	16	GND		

JH2					
R3	1	2	G3		
B3	3	4	GND		
R4	5	6	G4		
B4	7	8	HE2		
HA2	9	10	HB2		
HC2	11	12	HD2		
HDCLK2	13	14	HLAT2		
HOE2	15	16	GND		

JH3					
R5	1	2	G5		
B5	3	4	GND		
R6	5	6	G6		
B6	7	8	HE3		
HA3	9	10	HB3		
HC3	11	12	HD3		
HDCLK3	13	14	HLAT3		
HOE3	15	16	GND		

JH4					
R7	1	2	G7		
B7	3	4	GND		
R8	5	6	G8		
B8	7	8	HE4		
HA4	9	10	HB4		
HC4	11	12	HD4		
HDCLK4	13	14	HLAT4		
HOE4	15	16	GND		

JH5					
R9	1	2	G9		
B9	3	4	GND		
R10	5	6	G10		
B10	7	8	HE5		
HA5	9	10	HB5		
HC5	11	12	HD5		
HDCLK5	13	14	HLAT5		
HOE5	15	16	GND		

JH6					
R11	1	2	G11		
B11	3	4	GND		
R12	5	6	G12		
B12	7	8	HE6		
HA6	9	10	HB6		
HC6	11	12	HD6		
HDCLK6	13	14	HLAT6		
HOE6	15	16	GND		

JH7					
R13	1	2	G13		
B13	3	4	GND		
R14	5	6	G14		
B14	7	8	HE7		
HA7	9	10	HB7		
HC7	11	12	HD7		
HDCLK7	13	14	HLAT7		
HOE7	15	16	GND		

JH8					
R15	1	2	G15		
B15	3	4	GND		
R16	5	6	G16		
B16	7	8	HE8		
HA8	9	10	HB8		
HC8	11	12	HD8		
HDCLK8	13	14	HLAT8		
HOE8	15	16	GND		

JH9					
R17	1	2	G17		
B17	3	4	GND		
R18	5	6	G18		
B18	7	8	HE9		
HA9	9	10	HB9		
HC9	11	12	HD9		
HDCLK9	13	14	HLAT9		
HOE9	15	16	GND		

JH10					
R19	1	2	G19		
B19	3	4	GND		
R20	5	6	G20		
B20	7	8	HE10		
HA10	9	10	HB10		
HC10	11	12	HD10		
HDCLK10	13	14	HLAT10		
HOE10	15	16	GND		

JH11					
R21	1	2	G21		
B21	3	4	GND		
R22	5	6	G22		
B22	7	8	HE11		
HA11	9	10	HB11		
HC11	11	12	HD11		
HDCLK11	13	14	HLAT11		
HOE11	15	16	GND		

JH12					
R23	1	2	G23		
B23	3	4	GND		
R24	5	6	G24		
B24	7	8	HE12		
HA12	9	10	HB12		
HC12	11	12	HD12		
HDCLK12	13	14	HLAT12		
HOE12	15	16	GND		

Pin Definitions (JH1 as an example)					
/	R1	1	2	G1	/
/	B1	3	4	GND	Ground
/	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	Ground

## Specifications

Maximum Resolution	When working with 8bit video sources, the maximum load capacity per card is:	
	<ul style="list-style-type: none"> <li>• 512×512@60Hz (PWM driver IC)</li> <li>• 512×384@60Hz (common driver IC)</li> </ul>	
Electrical	Input voltage	DC 3.8 V to 5.5 V

Parameters	Rated current	0.5 A
	Rated power consumption	2.5 W
Operating Environment	Temperature	-20°C to +70°C
	Humidity	10% RH to 90% RH, non-condensing
Storage Environment	Temperature	-40°C to +85°C
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	145.6 mm × 91.5 mm × 19.3 mm
	Net weight	96.0 g Note: It is the weight of a single receiving card only.
Packing Information	Packing specifications	Each receiving card is packaged in a blister pack. Each packing box contains 100 receiving cards.
	Packing box	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.

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