

RV4-S

RECEIVING CARD



SPECIFICATION

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1 Introduction

- The RV4-S is a high-end small receiving card developed by TWT. A single RV4-S loads up to 512x256 pixels (PWM IC). Adopting the exclusive Image Booster Engine technology of TWT, the RV4-S can precisely calibrate the color gamut and grayscale of the screen, and improve the grayscale by 64 times. It also supports the pixel level brightness and chroma calibration, individual Gamma adjustment for RGB, low latency, 3D and HDR functions, greatly improving the brightness, grayscale and color performance from every aspect and offering user and ultimate visual experience with a uniform, smooth and lifelike image.
- The RV4-S user high-density connectors for communication to limit the effects of dust and vibration, resulting in high stability. It supports up to 32 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 RV4-S has improved electromagnetic compatibility and is suitable to various on-site setups that have high requirements.
- The RV4-S is a high-end Led Hub card developed by TWT, large loading capacity with a single RV4-S loading up to 16 RV4-S port.
- Can read the RV4-S parameter configuration: license date setting, operation time (lifetime) of RV4-S, current license.
- Software and hardware designs of the RV4-S concern the user deployment as well as operating and maintenance scenarios, enabling easier deployment, more stable operating and more efficient maintenance.

2 Features

- 512x256 pixels (PWM IC), 384x256 pixels (Common IC)
- 32 RGB data out
- MOM Interface
- Pixel level color & brightness calibration
- Receiving Card Backup
- RCFG Backup & Read
- Auto Calibration
- Cabinet Mapping
- 18Bit+
- Clear View
- Free Rotation
- Low Latency
- HDR10-Optima / HLG
- Remote RV4-S is a control circuit used to configure and read the parameters of RV4-S
- Communicate with PC via USB connection
- Communicate with RV4-S via RF wireless connection
- The communication is transferred asynchronously in bytes
- Protocol: RTU Modbus
- Set ID device
- Read ID device
- Set license
- Read license
- Read lifetime

Improvements to Display Effect

- Image Booster Engine
The Image Booster Engine has the following 3 functions which improve the display effect (the actual effect depends on the driver IC) from different dimensions.

- Color Management: Switch the color gamut of the screen between multiple gamuts to enable more precise colors on the screen.
 - Precise Grayscale: Individually correct the 65,536 levels of grayscale (16bit) of the driver IC to fix the display problems at low grayscale conditions, such as brightness spikes, brightness dips, color cast and mottling. This function can also better assist other display technologies, such as 18bit+ and individual Gamma adjustment for RGB, allowing for a smoother and uniform image.
 - 18bit+: Improve the LED display grayscale by 64 times to avoid grayscale loss due to low brightness and allow for more details in dark areas and a smoother image.
- Pixel level brightness and chroma calibration Working with App and App, the receiving card supports brightness and chroma calibration on each LED, which can effectively remove color discrepancies and greatly improve LED display brightness 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.
 - 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 function
 - Working with the independent controller which supports 3D function, the receiving card supports 3D image output.
 - Individual Gamma adjustment for RGB Working with App and the independent controller which supports this function, the receiving card supports individual adjustment of red Gamma, green Gamma and blue Gamma, which can effectively control image non-uniformity under low grayscale 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°).
 - Image rotation at any angle
Working with the MCTRL R5 LED display controller and App, the receiving card supports image rotation at any angle.
 - HDR
Supports HDR10 and HLG video sources.
Working with the independent controller which supports the HDR function, the receiving card can reproduce the original brightness range and color space of the video source, allowing for a more lifelike image.

Improvements to Maintainability

- Smart module (supported by dedicated firmware) 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.
- 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.
- 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 stored in module Flash
For modules with flash memory, if 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 on the screen 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 rate monitoring
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 firmware program of the receiving card can be read back and saved to the local computer.
- Configuration parameter readback
The configuration parameters of the receiving card can be read back and saved to the local computer.
- LVDS transmission (supported by dedicated firmware)
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

- **Dual card backup and status monitoring**
In an application with requirements for high reliability, two receiving cards can be mounted onto a single hub board for backup. In the case that the main receiving card fails, the backup card will serve to ensure uninterrupted operation of the display.
The working status of the main and backup receiving cards can be monitored in App V5.2.0 or later.
- **Status detection of dual power supplies**
When two power supplies are connected, their working status can be detected by the receiving card.
- **Loop backup**
The receiving cards and the sending card form a loop via the main and backup line connections. If 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 backup of the application program**
Two copies of the application 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.
- **Dual backup of calibration coefficients**
The calibration coefficients are stored in the application area and factory area of the receiving card at the same time. Users usually use the calibration coefficients in the application area. If necessary, users can restore the calibration coefficients in the factory area to the application area.

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 now is using the backup
		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.

3 Specifications

Maximum Resolution	512×256 pixels (PWM IC)	
Loading Capacity	384×256 pixels (Common IC)	
Electrical Parameters	Input voltage	DC 3.3 V to 5.5 V
	Rated current	0.6 A
	Rated power	3.0 W
Operating Environment	Temperature	-20°C to +70°C
	Humidity	10% RH to 90% RH, non-condensing
Storage Environment	Temperature	-25°C to +125°C
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	13.9 mm × 13.2mm × 15 mm
	Net weight	17.3 g
Packing Information	Packing specifications	An antistatic bag and anti-collision foam are provided for each receiving card. Each packing box contains 40 receiving cards.
	Packing box dimensions	378.0 mm × 190.0 mm × 120.0 mm
Certifications	RoHS, EMC Class B	



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ADDRESS : 68 SUNGAI KADUT LOOP # 06 - 01 NUTZ CENTER, SINGAPORE 729504
TEL : +65 6367 3272 FAX : +65 6367 0763