

# A5s Plus

Receiving Card



## Specifications

## Change History

| Document Version | Release Date | Description                                                                                                                                                                                                                                                                    |
|------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1.4.1           | 2025-05-20   | <ul style="list-style-type: none"><li>• Added an installation diagram.</li><li>• Added information on expansion features.</li><li>• Added details about static protection.</li><li>• Updated the description for uploading coefficients.</li></ul>                             |
| V1.4.0           | 2025-02-25   | <ul style="list-style-type: none"><li>• Added support for multi-batch adjustment.</li><li>• Updated the appearance diagram.</li><li>• Updated the storage environment temperature range.</li><li>• Deleted seam correction with mobile phones from product features.</li></ul> |
| V1.3.1           | 2024-10-29   | Updated the appearance diagram.                                                                                                                                                                                                                                                |
| V1.3.0           | 2024-07-15   | <ul style="list-style-type: none"><li>• Added seam correction with mobile phones.</li><li>• Updated the load capacity information.</li><li>• Updated the description for the mapping feature.</li><li>• Updated the dimensions diagram.</li></ul>                              |
| V1.2.2           | 2023-12-30   | Updated product feature descriptions.                                                                                                                                                                                                                                          |

## Introduction

The A5s Plus is a general small-size 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 A5s Plus can significantly improve the display effect and user experience.

The A5s Plus uses 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 A5s Plus has improved electromagnetic compatibility and is suitable for various on-site setups.

- For PWM driver ICs, the maximum load capacity per card is:

- 512×384@60Hz (For 8bit video sources)
- 256×384@60Hz (For 10bit and 12bit video sources)
- For common driver ICs, the maximum load capacity per card is:
  - 384×384@60Hz (For 8bit video sources)
  - 192×384@60Hz (For 10bit and 12bit video sources)

## Certifications

RoHS, EMC Class B

**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

For PWM driver ICs, the latency of video source on the receiving card end can be reduced to 1 frame. To use low latency with DCLK continuous PWM driver ICs, a customized firmware is required.

- 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

- Smart Module (dedicated firmware required)

Work with the smart module to support module ID management, storage of calibration coefficients and module parameters, monitoring of module temperature, voltage and flat cable communication status, and LED error detection

- 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.

- Uploading Calibration Coefficients

Upload calibration coefficients to the receiving card quickly or in a stable manner, with acceleration support if needed.

- Module Flash Management

For modules with flash memory, the information stored can be managed, allowing for the storage and readback of calibration coefficients and module IDs.

- 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

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.

- Status Detection of Dual Power Supplies

When two power supplies are used, their working status can be detected.

- 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 Card Backup and Status Monitoring

In an application requiring high reliability, two receiving cards can be mounted onto a single hub board for backup. When the primary card fails, the backup card can serve immediately to ensure uninterrupted operation of the display.

The working status of the primary and backup receiving cards can be monitored in NovaLCT V5.2.0 or later.

- 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



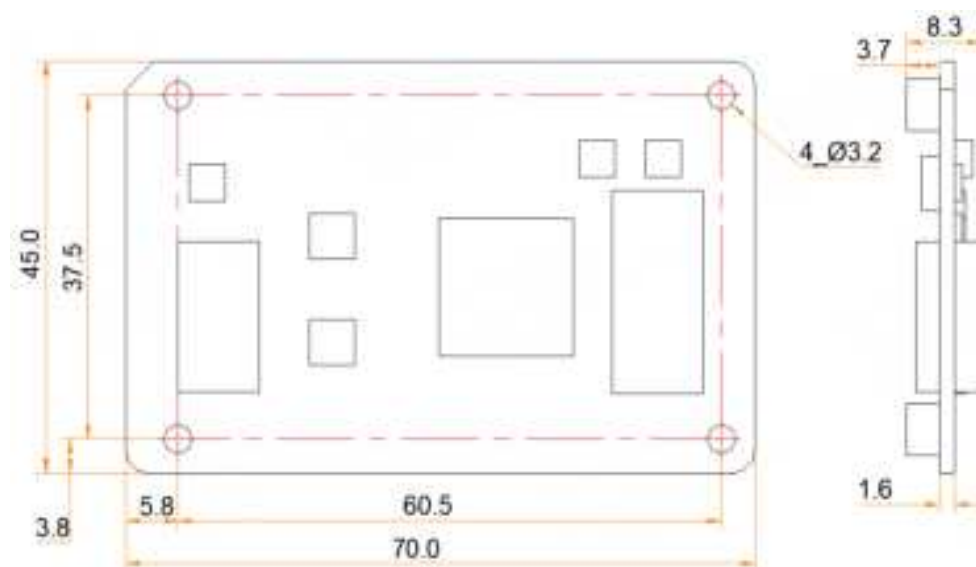
All product pictures shown in this document are for illustration purpose only. Actual product may vary.

## 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 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 8.7 mm. Ground connection (GND) is enabled for mounting holes.



Tolerance:  $\pm 0.3$  Unit: mm

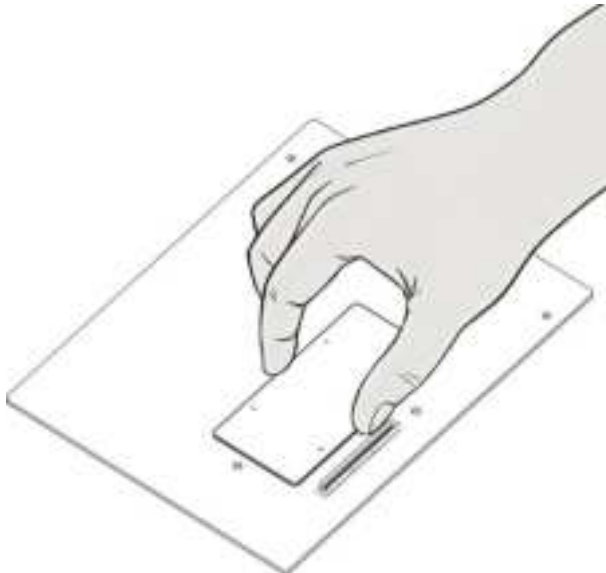
#### Note

The distance between outer surfaces of the product and hub boards after their high-density connectors fit together is 5.0 mm. A 5.0 mm copper pillar is recommended.

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

## Installation

Please refer to the diagram below. Hold the product securely from the sides (long edges) near the center, and press it into the HUB board to install.

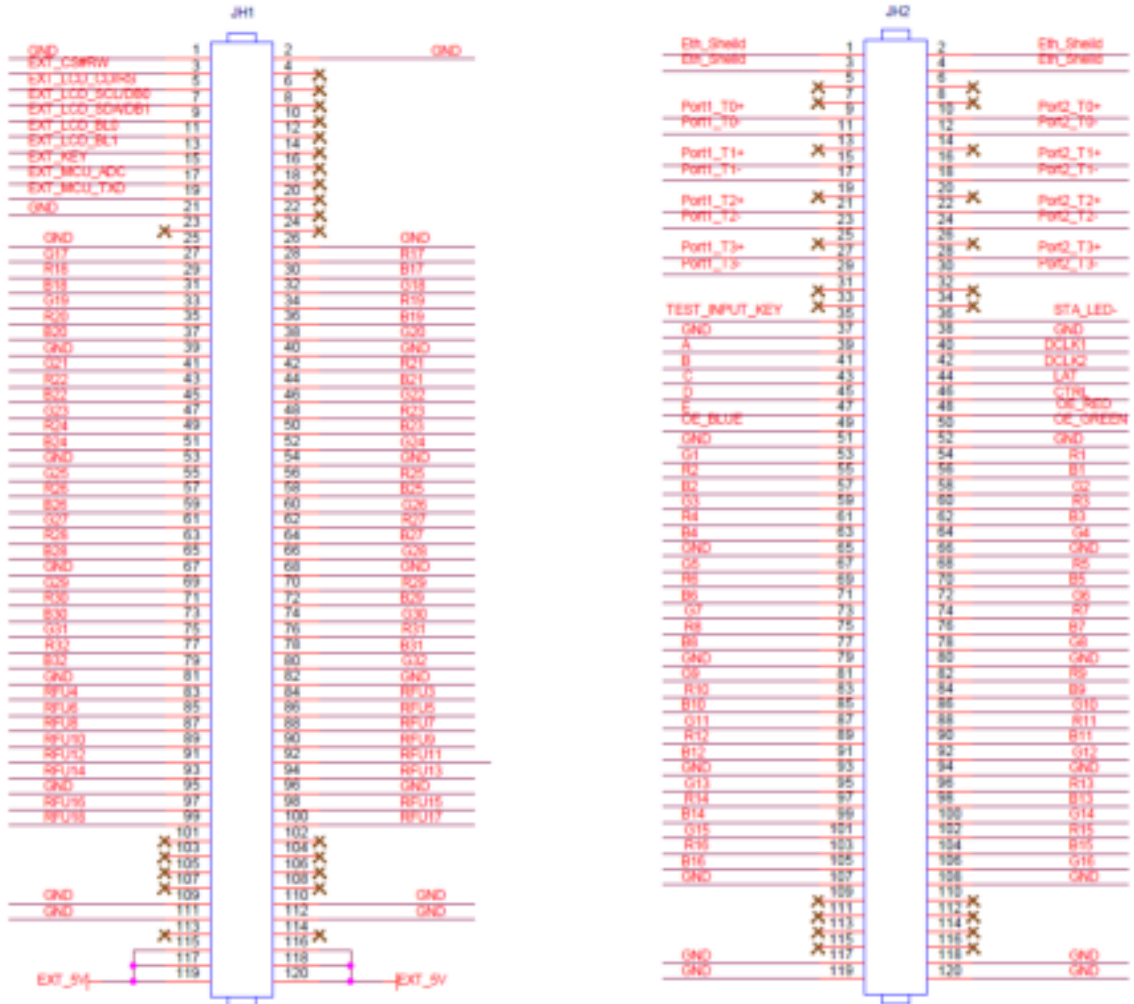


#### Caution

The product's static resistance is 2 kV. Be mindful of static protection during handling.

## Pins

### 32 Groups of Parallel RGB Data



| JH1                    |                 |    |    |     |   |
|------------------------|-----------------|----|----|-----|---|
| /                      | GND             | 1  | 2  | GND | / |
| LCD CS signal          | EXT_CS#RW       | 3  | 4  | NC  | / |
| LCD RS signal          | EXT_LCD_CD/RS   | 5  | 6  | NC  | / |
| LCD clock signal       | EXT_LCD_SCL/DB0 | 7  | 8  | NC  | / |
| LCD data signal        | EXT_LCD_SDA/DB1 | 9  | 10 | NC  | / |
| LCD backlight signal 1 | EXT_LCD_BL0     | 11 | 12 | NC  | / |
| LCD backlight signal 2 | EXT_LCD_BL1     | 13 | 14 | NC  | / |
| LCD control button     | EXT_KEY         | 15 | 16 | NC  | / |

| JH1                                  |             |    |    |     |   |
|--------------------------------------|-------------|----|----|-----|---|
| A reserved pin for connection to MCU | EXT_MCU_ADC | 17 | 18 | NC  | / |
| A reserved pin for connection to MCU | EXT_MCU_TXD | 19 | 20 | NC  | / |
| /                                    | GND         | 21 | 22 | NC  | / |
| /                                    | NC          | 23 | 24 | NC  | / |
| /                                    | GND         | 25 | 26 | GND | / |
| /                                    | G17         | 27 | 28 | R17 | / |
| /                                    | R18         | 29 | 30 | B17 | / |
| /                                    | B18         | 31 | 32 | G18 | / |
| /                                    | G19         | 33 | 34 | R19 | / |
| /                                    | R20         | 35 | 36 | B19 | / |
| /                                    | B20         | 37 | 38 | G20 | / |
| /                                    | GND         | 39 | 40 | GND | / |
| /                                    | G21         | 41 | 42 | R21 | / |
| /                                    | R22         | 43 | 44 | B21 | / |
| /                                    | B22         | 45 | 46 | G22 | / |
| /                                    | G23         | 47 | 48 | R23 | / |
| /                                    | R24         | 49 | 50 | B23 | / |
| /                                    | B24         | 51 | 52 | G24 | / |
| /                                    | GND         | 53 | 54 | GND | / |
| /                                    | G25         | 55 | 56 | R25 | / |
| /                                    | R26         | 57 | 58 | B25 | / |
| /                                    | B26         | 59 | 60 | G26 | / |
| /                                    | G27         | 61 | 62 | R27 | / |
| /                                    | R28         | 63 | 64 | B27 | / |
| /                                    | B28         | 65 | 66 | G28 | / |
| /                                    | GND         | 67 | 68 | GND | / |

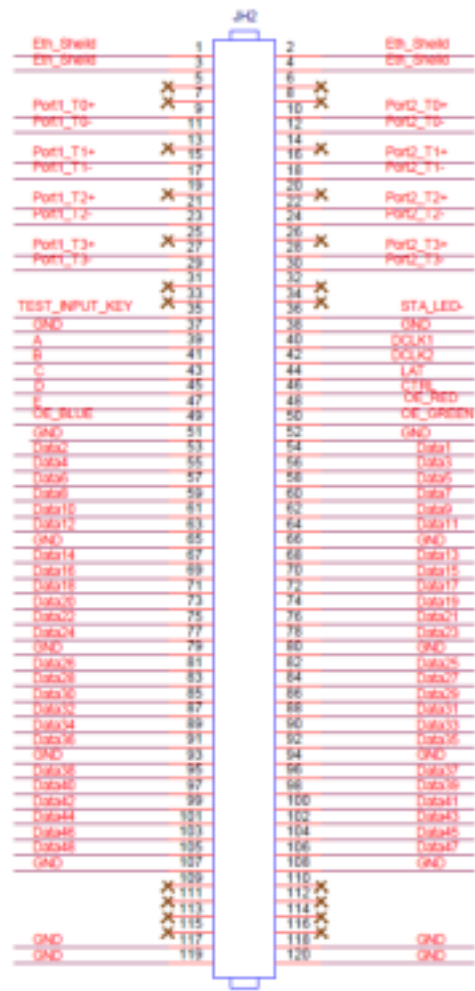
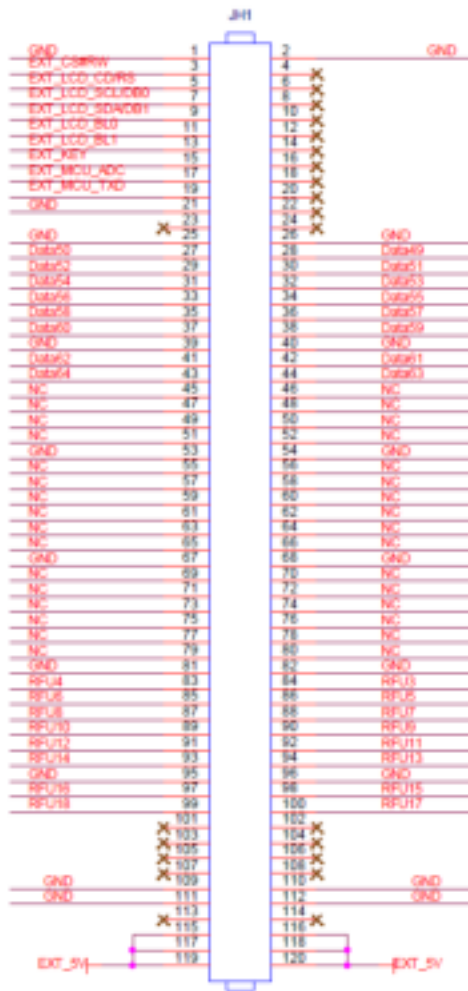
| JH1 |       |     |     |       |   |
|-----|-------|-----|-----|-------|---|
| /   | G29   | 69  | 70  | R29   | / |
| /   | R30   | 71  | 72  | B29   | / |
| /   | B30   | 73  | 74  | G30   | / |
| /   | G31   | 75  | 76  | R31   | / |
| /   | R32   | 77  | 78  | B31   | / |
| /   | B32   | 79  | 80  | G32   | / |
| /   | GND   | 81  | 82  | GND   | / |
| /   | RFU4  | 83  | 84  | RFU3  | / |
| /   | RFU6  | 85  | 86  | RFU5  | / |
| /   | RFU8  | 87  | 88  | RFU7  | / |
| /   | RFU10 | 89  | 90  | RFU9  | / |
| /   | RFU12 | 91  | 92  | RFU11 | / |
| /   | RFU14 | 93  | 94  | RFU13 | / |
| /   | GND   | 95  | 96  | GND   | / |
| /   | RFU16 | 97  | 98  | RFU15 | / |
| /   | 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    | 111 | 111 | NC    | / |

| JH1                   |                |         |         |            |                                |
|-----------------------|----------------|---------|---------|------------|--------------------------------|
|                       |                | 3       | 4       |            |                                |
| /                     | EXT_5V         | 11<br>5 | 11<br>6 | EXT_5V     | /                              |
| /                     | EXT_5V         | 11<br>7 | 11<br>8 | EXT_5V     | /                              |
| /                     | EXT_5V         | 11<br>9 | 12<br>0 | EXT_5V     | /                              |
| JH2                   |                |         |         |            |                                |
| Chassis ground        | Eth_Sheild     | 1       | 2       | Eth_Sheild | Chassis ground                 |
| Chassis ground        | Eth_Sheild     | 3       | 4       | Eth_Sheild | Chassis ground                 |
| /                     | NC             | 5       | 6       | NC         | /                              |
| /                     | NC             | 7       | 8       | NC         | /                              |
| Gigabit Ethernet port | Port1_T0+      | 9       | 10      | Port2_T0+  | Gigabit Ethernet port          |
|                       | Port1_T0-      | 11      | 12      | Port2_T0-  |                                |
|                       | NC             | 13      | 14      | NC         |                                |
|                       | Port1_T1+      | 15      | 16      | Port2_T1+  |                                |
|                       | Port1_T1-      | 17      | 18      | Port2_T1-  |                                |
|                       | NC             | 19      | 20      | NC         |                                |
|                       | Port1_T2+      | 21      | 22      | Port2_T2+  |                                |
|                       | Port1_T2-      | 23      | 24      | Port2_T2-  |                                |
|                       | NC             | 25      | 26      | NC         |                                |
|                       | Port1_T3+      | 27      | 28      | Port2_T3+  |                                |
|                       | Port1_T3-      | 29      | 30      | Port2_T3-  |                                |
| /                     | NC             | 31      | 32      | NC         | /                              |
| /                     | NC             | 33      | 34      | NC         | /                              |
| Test button           | TEST_INPUT_KEY | 35      | 36      | STA_LED-   | Running indicator (active low) |
| /                     | GND            | 37      | 38      | GND        | /                              |
| Line decoding signal  | A              | 39      | 40      | DCLK1      | Shift clock output 1           |

| JH1                   |         |    |    |          |                          |
|-----------------------|---------|----|----|----------|--------------------------|
| Line decoding signal  | B       | 41 | 42 | DCLK2    | Shift clock output 2     |
| Line decoding signal  | C       | 43 | 44 | LAT      | Latch signal output      |
| Line decoding signal  | D       | 45 | 46 | CTRL     | Afterglow control signal |
| Line decoding signal  | E       | 47 | 48 | OE_RED   | Display enable signal    |
| Display enable signal | OE_BLUE | 49 | 50 | OE_GREEN | Display enable signal    |
| /                     | GND     | 51 | 52 | GND      | /                        |
| /                     | G1      | 53 | 54 | R1       | /                        |
| /                     | R2      | 55 | 56 | B1       | /                        |
| /                     | B2      | 57 | 58 | G2       | /                        |
| /                     | G3      | 59 | 60 | R3       | /                        |
| /                     | R4      | 61 | 62 | B3       | /                        |
| /                     | B4      | 63 | 64 | G4       | /                        |
| /                     | GND     | 65 | 66 | GND      | /                        |
| /                     | G5      | 67 | 68 | R5       | /                        |
| /                     | R6      | 69 | 70 | B5       | /                        |
| /                     | B6      | 71 | 72 | G6       | /                        |
| /                     | G7      | 73 | 74 | R7       | /                        |
| /                     | R8      | 75 | 76 | B7       | /                        |
| /                     | B8      | 77 | 78 | G8       | /                        |
| /                     | GND     | 79 | 80 | GND      | /                        |
| /                     | G9      | 81 | 82 | R9       | /                        |
| /                     | R10     | 83 | 84 | B9       | /                        |
| /                     | B10     | 85 | 86 | G10      | /                        |
| /                     | G11     | 87 | 88 | R11      | /                        |
| /                     | R12     | 89 | 90 | B11      | /                        |
| /                     | B12     | 91 | 92 | G12      | /                        |
| /                     | GND     | 93 | 94 | GND      | /                        |
| /                     | G13     | 95 | 96 | R13      | /                        |

| JH1 |     |     |     |     |   |
|-----|-----|-----|-----|-----|---|
| /   | 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 | / |

## 64 Groups of Serial Data



| JH1                    |                 |    |    |     |   |
|------------------------|-----------------|----|----|-----|---|
| /                      | GND             | 1  | 2  | GND | / |
| LCD CS signal          | EXT_CS#RW       | 3  | 4  | NC  | / |
| LCD RS signal          | EXT_LCD_CD/RS   | 5  | 6  | NC  | / |
| LCD clock signal       | EXT_LCD_SCL/DB0 | 7  | 8  | NC  | / |
| LCD data signal        | EXT_LCD_SDA/DB1 | 9  | 10 | NC  | / |
| LCD backlight signal 1 | EXT_LCD_BL0     | 11 | 12 | NC  | / |
| LCD backlight signal 2 | EXT_LCD_BL1     | 13 | 14 | NC  | / |
| LCD control button     | EXT_KEY         | 15 | 16 | NC  | / |
| A reserved pin for     | EXT_MCU_ADC     | 17 | 18 | NC  | / |

| JH1                                  |             |    |    |        |   |
|--------------------------------------|-------------|----|----|--------|---|
| connection to MCU                    |             |    |    |        |   |
| A reserved pin for connection to MCU | EXT_MCU_TXD | 19 | 20 | NC     | / |
| /                                    | GND         | 21 | 22 | NC     | / |
| /                                    | NC          | 23 | 24 | NC     | / |
| /                                    | GND         | 25 | 26 | GND    | / |
| /                                    | Data50      | 27 | 28 | Data49 | / |
| /                                    | Data52      | 29 | 30 | Data51 | / |
| /                                    | Data54      | 31 | 32 | Data53 | / |
| /                                    | Data56      | 33 | 34 | Data55 | / |
| /                                    | Data58      | 35 | 36 | Data57 | / |
| /                                    | Data60      | 37 | 38 | Data59 | / |
| /                                    | GND         | 39 | 40 | GND    | / |
| /                                    | Data62      | 41 | 42 | Data61 | / |
| /                                    | Data64      | 43 | 44 | Data63 | / |
| /                                    | NC          | 45 | 46 | NC     | / |
| /                                    | NC          | 47 | 48 | NC     | / |
| /                                    | NC          | 49 | 50 | NC     | / |
| /                                    | NC          | 51 | 52 | NC     | / |
| /                                    | GND         | 53 | 54 | GND    | / |
| /                                    | NC          | 55 | 56 | NC     | / |
| /                                    | NC          | 57 | 58 | NC     | / |
| /                                    | NC          | 59 | 60 | NC     | / |
| /                                    | NC          | 61 | 62 | NC     | / |
| /                                    | NC          | 63 | 64 | NC     | / |
| /                                    | NC          | 65 | 66 | NC     | / |
| /                                    | GND         | 67 | 68 | GND    | / |
| /                                    | NC          | 69 | 70 | NC     | / |

| JH1            |            |     |     |            |                |
|----------------|------------|-----|-----|------------|----------------|
| /              | NC         | 71  | 72  | NC         | /              |
| /              | NC         | 73  | 74  | NC         | /              |
| /              | NC         | 75  | 76  | NC         | /              |
| /              | NC         | 77  | 78  | NC         | /              |
| /              | NC         | 79  | 80  | NC         | /              |
| /              | GND        | 81  | 82  | GND        | /              |
| /              | RFU4       | 83  | 84  | RFU3       | /              |
| /              | RFU6       | 85  | 86  | RFU5       | /              |
| /              | RFU8       | 87  | 88  | RFU7       | /              |
| /              | RFU10      | 89  | 90  | RFU9       | /              |
| /              | RFU12      | 91  | 92  | RFU11      | /              |
| /              | RFU14      | 93  | 94  | RFU13      | /              |
| /              | GND        | 95  | 96  | GND        | /              |
| /              | RFU16      | 97  | 98  | RFU15      | /              |
| /              | 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         | /              |
| /              | EXT_5V     | 115 | 116 | EXT_5V     | /              |
| /              | EXT_5V     | 117 | 118 | EXT_5V     | /              |
| /              | EXT_5V     | 119 | 120 | EXT_5V     | /              |
| JH2            |            |     |     |            |                |
| Chassis ground | Eth_Sheild | 1   | 2   | Eth_Sheild | Chassis ground |
| Chassis ground | Eth_Sheild | 3   | 4   | Eth_Sheild | Chassis ground |

| JH1                   |                |    |    |           |                                |
|-----------------------|----------------|----|----|-----------|--------------------------------|
| /                     | NC             | 5  | 6  | NC        | /                              |
| /                     | NC             | 7  | 8  | NC        | /                              |
| Gigabit Ethernet port | Port1_T0+      | 9  | 10 | Port2_T0+ | Gigabit Ethernet port          |
|                       | Port1_T0-      | 11 | 12 | Port2_T0- |                                |
|                       | NC             | 13 | 14 | NC        |                                |
|                       | Port1_T1+      | 15 | 16 | Port2_T1+ |                                |
|                       | Port1_T1-      | 17 | 18 | Port2_T1- |                                |
|                       | NC             | 19 | 20 | NC        |                                |
|                       | Port1_T2+      | 21 | 22 | Port2_T2+ |                                |
|                       | Port1_T2-      | 23 | 24 | Port2_T2- |                                |
|                       | NC             | 25 | 26 | NC        |                                |
|                       | Port1_T3+      | 27 | 28 | Port2_T3+ |                                |
|                       | Port1_T3-      | 29 | 30 | Port2_T3- |                                |
| /                     | NC             | 31 | 32 | NC        | /                              |
| /                     | NC             | 33 | 34 | NC        | /                              |
| Test button           | TEST_INPUT_KEY | 35 | 36 | STA_LED-  | Running indicator (active low) |
| /                     | GND            | 37 | 38 | GND       | /                              |
| Line decoding signal  | A              | 39 | 40 | DCLK1     | Shift clock output 1           |
| Line decoding signal  | B              | 41 | 42 | DCLK2     | Shift clock output 2           |
| Line decoding signal  | C              | 43 | 44 | LAT       | Latch signal output            |
| Line decoding signal  | D              | 45 | 46 | CTRL      | Afterglow control signal       |
| Line decoding signal  | E              | 47 | 48 | OE_RED    | Display enable signal          |
| Display enable signal | OE_BLUE        | 49 | 50 | OE_GREEN  | Display enable signal          |
| /                     | GND            | 51 | 52 | GND       | /                              |
| /                     | Data2          | 53 | 54 | Data1     | /                              |
| /                     | Data4          | 55 | 56 | Data3     | /                              |
| /                     | Data6          | 57 | 58 | Data5     | /                              |

| JH1 |        |     |     |        |   |
|-----|--------|-----|-----|--------|---|
| /   | Data8  | 59  | 60  | Data7  | / |
| /   | Data10 | 61  | 62  | Data9  | / |
| /   | Data12 | 63  | 64  | Data11 | / |
| /   | GND    | 65  | 66  | GND    | / |
| /   | Data14 | 67  | 68  | Data13 | / |
| /   | Data16 | 69  | 70  | Data15 | / |
| /   | Data18 | 71  | 72  | Data17 | / |
| /   | Data20 | 73  | 74  | Data19 | / |
| /   | Data22 | 75  | 76  | Data21 | / |
| /   | Data24 | 77  | 78  | Data23 | / |
| /   | GND    | 79  | 80  | GND    | / |
| /   | Data26 | 81  | 82  | Data25 | / |
| /   | Data28 | 83  | 84  | Data27 | / |
| /   | Data30 | 85  | 86  | Data29 | / |
| /   | Data32 | 87  | 88  | Data31 | / |
| /   | Data34 | 89  | 90  | Data33 | / |
| /   | Data36 | 91  | 92  | Data35 | / |
| /   | GND    | 93  | 94  | GND    | / |
| /   | Data38 | 95  | 96  | Data37 | / |
| /   | Data40 | 97  | 98  | Data39 | / |
| /   | Data42 | 99  | 100 | Data41 | / |
| /   | Data44 | 101 | 102 | Data43 | / |
| /   | Data46 | 103 | 104 | Data45 | / |
| /   | Data48 | 105 | 106 | Data47 | / |
| /   | GND    | 107 | 108 | GND    | / |
| /   | NC     | 109 | 110 | NC     | / |
| /   | NC     | 111 | 112 | NC     | / |
| /   | NC     | 113 | 114 | NC     | / |

| JH1 |     |     |     |     |   |
|-----|-----|-----|-----|-----|---|
| /   | NC  | 115 | 116 | NC  | / |
| /   | GND | 117 | 118 | GND | / |
| /   | GND | 119 | 120 | GND | / |

#### Note

The recommended power input is 5.0 V.

OE\_RED, OE\_GREEN and OE\_BLUE are display enable signals. When RGB are not controlled separately, use OE\_RED. When the PWM chip is used, they are used as GCLK signals.

In the mode of 128 groups of serial data, Data65–Data128 are multiplexed into Data1–Data64, respectively.

## Reference Design for Extended Functions

| Pins for Extended Functions |                                 |                                 |                                    |
|-----------------------------|---------------------------------|---------------------------------|------------------------------------|
| Pin                         | Recommended<br>Module Flash Pin | Recommended<br>Smart Module Pin | Description                        |
| RFU4                        | HUB_SPI_CLK                     | Reserved                        | Clock signal of serial pin         |
| RFU6                        | HUB_SPI_CS                      | Reserved                        | CS signal of serial pin            |
| RFU8                        | HUB_SPI_MOSI                    | /                               | Module flash data storage input    |
|                             | /                               | HUB_UART_TX                     | Smart module TX signal             |
| RFU10                       | HUB_SPI_MISO                    | /                               | Module flash data storage output   |
|                             | /                               | HUB_UART_RX                     | Smart module RX signal             |
| RFU3                        | HUB_CODE0                       |                                 | Module Flash BUS control pin       |
| RFU5                        | HUB_CODE1                       |                                 |                                    |
| RFU7                        | HUB_CODE2                       |                                 |                                    |
| RFU9                        | HUB_CODE3                       |                                 |                                    |
| RFU18                       | HUB_CODE4                       |                                 |                                    |
| RFU11                       | HUB_H164_CSD                    |                                 | 74HC164 data signal                |
| RFU13                       | HUB_H164_CLK                    |                                 |                                    |
| RFU14                       | POWER_STA1                      |                                 | Dual power supply detection signal |

| Pins for Extended Functions |            |                                    |
|-----------------------------|------------|------------------------------------|
| RFU16                       | POWER_STA2 |                                    |
| RFU15                       | MS_DATA    | Dual card backup connection signal |
| RFU17                       | MS_ID      | Dual card backup identifier signal |

 **Note**

The RFU8 and RFU10 are signal multiplex extension pins. Only one pin from either the Recommended Smart Module Pin or the Recommended Module Flash Pin can be selected at the same time.

For hub design, please contact NovaStar for detailed reference designs.

## Specifications

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Maximum Resolution      | <ul style="list-style-type: none"> <li>For PWM driver ICs, the maximum load capacity per card is: <ul style="list-style-type: none"> <li>512×384@60Hz (For 8bit video sources)</li> <li>256×384@60Hz (For 10bit and 12bit video sources)</li> </ul> </li> <li>For common driver ICs, the maximum load capacity per card is: <ul style="list-style-type: none"> <li>384×384@60Hz (For 8bit video sources)</li> <li>192×384@60Hz (For 10bit and 12bit video sources)</li> </ul> </li> </ul> |                                                                                           |
| Electrical Parameters   | Input voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | DC 3.8 V to 5.5 V                                                                         |
|                         | Rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.6 A                                                                                     |
|                         | Rated power consumption                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0 W                                                                                     |
|                         | Anti-static protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 kV                                                                                      |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 70.0 mm × 45.0 mm × 8.3 mm                                                                |
|                         | Net weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 16.2 g<br>Note: It is the weight of a single receiving card only.                         |
| Packing Information     | Packaging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Each receiving card is packaged in a blister pack. Each packing box contains 80 receiving |

|  |             |                                |
|--|-------------|--------------------------------|
|  |             | cards.                         |
|  | Packing box | 392.0 mm × 200.0 mm × 123.0 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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Official website  
[www.novastar.tech](http://www.novastar.tech)

Technical support  
[support@novastar.tech](mailto:support@novastar.tech)