# SMART DISPLAY SPECIFICATION


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# RL0F00043000WGDAASA00

## SPECIFICATION

CUSTOMER:

| | |
|---|---|
| **APPROVED BY** | |
| PCB VERSION | |
| DATE | |

FOR CUSTOMER USE ONLY

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
|---|---|---|---|
| | | | |

Release DATE:

TFT Display Inspection Specification: https://www.raystar-optronics.com/download/products.htm
Precaution in use of TFT module: https://www.raystar-optronics.com/download/declaration.htm

# Revision History

| VERSION | DATE | REVISED PAGE NO. | Note |
|---|---|---|---|
| 0 | 2022/4/11 | | First issue |
| | | 8 | Update Contour drawing |
| | | 9 | Add PCBA Part number |
| A | 2022/04/15 | 15 | Add description of default selection |
| B | 2023/9/13 | 9 | Add note in 6.Electrical Characteristics |
| | | 6 | Revise Operating voltage & |
| | | 7 | Dot pitch, Electrical |
| C | 2023/09/19 | 9 | Characteristics, and Check |
| | | 13 | samples by meter VIN, Isystem |
| D | 2024/2/7 | 11 | Revise CN1 Pin 4&8 to Input |
| E | 2024/11/14 | 6 | Revised the content of feature |
| F | 2025/3/5 | 9 | Revised the note in the Electrical Characteristics |

# Contents

# 1. Smart Display Classification Information

| R | L | 0F | 000430 | 00W | G | D | AA | S | A | 00 |
|---|---|---|---|---|---|---|---|---|---|---|
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ | ⑪ |

| | | | | |
|---|---|---|---|---|
| ① | R:RAYSTAR products | | | |
| ② | Type: L:Standard K:Customization | | | |
| ③ | Display Type: | Standard: | 0H: Character STN<br>0X: Graphic STN (TAB/COF)<br>0F: TFT<br>EH: Character OLED<br>EX: OLED (TAB/COF) | 0G: Graphic STN<br>0P: Graphic STN (COG)<br><br>EG: Graphic OLED<br>EP: OLED (COG) |
| | | Customization: | DH: Character<br>DN: Graphic<br>ED: OLED | DG: Graphic STN<br>0J: TFT |
| ④ | Display size: (diagonal) / Display format: (resolution) | Character STN:<br>Graphic STN: | e.g., 8x1: 000801 16x2: 001602 24x4: 002404<br>e.g., 128x64: 012864 320x240: 320240 | |
| | | TFT Size (inch): | 000096-0.96” / 000350-3.5” / 000430-4.3” / 000570-5.7”<br>000700-7.0” / 000800-8.0” / 001020-10.2” / 001210-12.1”<br>(The last two digits are two digits after the decimal point) | |
| | | OLED: | e.g., 128x64: 012864 Customization: 0001XX | |
| ⑤ | Serial No: | 0A1 ~ 0ZZ | Customization STN: 000 | |

| | | | | |
|---|---|---|---|---|
| ⑥ | Touch Panel Type: | N: Without TP T: RTP G: CTP | | |
| ⑦ | Model Interface: | A: CAN<br>B: Bluetooth<br>C:Controller Specified<br>D: RS485<br>E: RS232<br>F: USART<br>G: Logic I/O | H: HDMI<br>R: Memory Specified<br>N: Ethernet<br>J: Analog I/O<br>K: USB<br>L: WIFI<br>M: Zigbee | X: Combined<br>Y: Proprietary interface |
| ⑧ | Interface Serial No.: | AA ~ ZZ | | |
| ⑨ | Control Category: | S: Smart Display N: Non-specified E: Entry | | |
| ⑩ | Special Code: | A → Generic B → Industrial C →Automotive D →Medical | | |
| ⑪ | Model code: | 00 ~ ZZ | | |

# 2. Summary

**4.3 Inch Smart Display (RS485 series) Features**

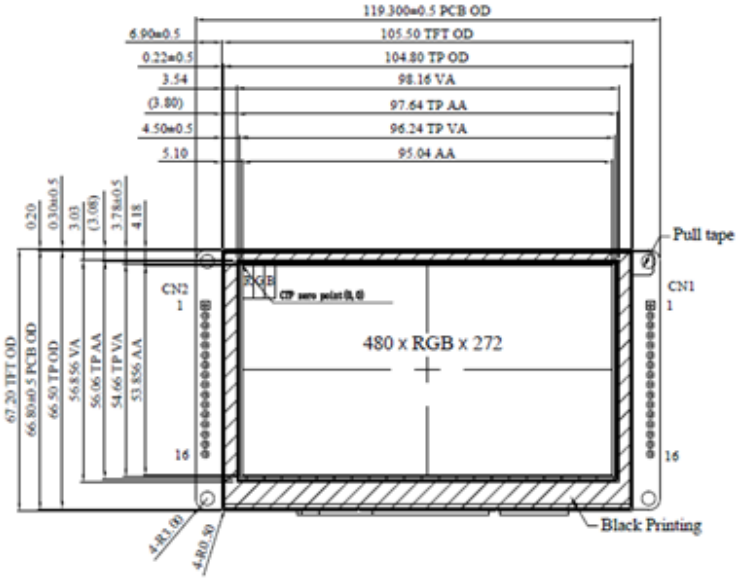
1. DC 5-24V working voltage.
2. Self-testing after booting function.
3. RS485 communication interface with Modbus protocol.
4. Built in 16MB flash memory, store the fonts and pictures.
5. Support capacitive touch panel (CTP).
6. Embedded buzzer controlled by Master Device.
7. Demo set HOST can be used on multiple platforms, such as Computer (with USB to RS-485 Dongle), MCU.

# 3. Product information

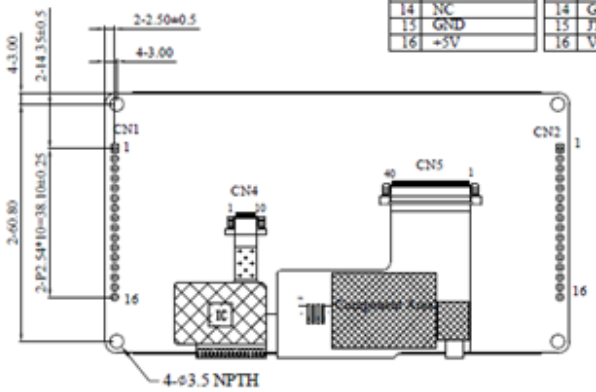
## General information

| Item | Standard Value | Unit |
|---|---|---|
| Operating voltage | 5-24 | Vdc |
| Communication Interface | RS485 | |
| MCU | STM32F750 | N/A |
| Flash Memory | 16 | MB |
| SDRAM Frequency | 108 | Mhz |
| LCD display size | 4.3 | inch |
| Dot Matrix | 480 × RGB × 272(TFT) | dots |
| Module dimension | 119.3(W) × 67.2(H) × 12.45(D) | mm |
| Active area | 95.04(W) × 53.856(H) | mm |
| Pixel pitch | 0.198(H) × 0.198(V) | mm |
| LCD type | TFT, Normally Black, Transmissive | |
| View Direction | 80/80/80/80 | |
| Aspect Ratio | 16:9 | |
| With /Without TP | With CTP | |
| Surface | Glare | |

# 4. Contour Drawing








CN1

| PIN | SYMBOL |
|---|---|
| 1 | GND |
| 2 | RS485+ |
| 3 | RS485- |
| 4 | VDD_5V |
| 5 | GND |
| 6 | NC |
| 7 | NC |
| 8 | VDD_5V |
| 9 | NC |
| 10 | NC |
| 11 | GND |
| 12 | GND |
| 13 | NC |
| 14 | NC |
| 15 | GND |
| 16 | +5V |

CN2

| PIN | SYMBOL |
|---|---|
| 1 | NC |
| 2 | NC |
| 3 | NC |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | NC |
| 9 | NC |
| 10 | GND |
| 11 | JTAG_SWDO |
| 12 | NRST |
| 13 | JTAG_SWDI |
| 14 | GND |
| 15 | JTAG_SWCLK |
| 16 | VDD3V |

| | | |
|---|---|---|
| 1 | Lcd Type | TFT |
| 2 | Viewing Angle | 80/80/80/80 |
| 3 | Surface | Glare |
| 4 | Screen size | 4.3"(diagonal) |
| 5 | Display format | 480 x RGB x 272 |
| 6 | Operating Temperature | -30*C ~80*C |
| 7 | Storage Temperature | -30*C ~80*C |
| 8 | Active area | 95.04(H) x 53.856(V) mm |
| 9 | Pixel pitch | 0.198(H) x 0.198(V) mm |
| 10 | Color arrangement | RGB-STRIPE |
| 11 | Brightness | 300min. 400typ. cd/m2 |
| 12 | CTP IC | ILI2130 or equivalent |
| 13 | CTP Resolution | 16384*16384 |

The non-specified tolerance of dimension is ±0.3 mm .

# 5. Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature | TOP | -30 | — | +80 | ℃ |
| Storage Temperature | TST | -30 | — | +80 | ℃ |

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above
1. Temp. ≦60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃

# 6. Electrical Characteristics

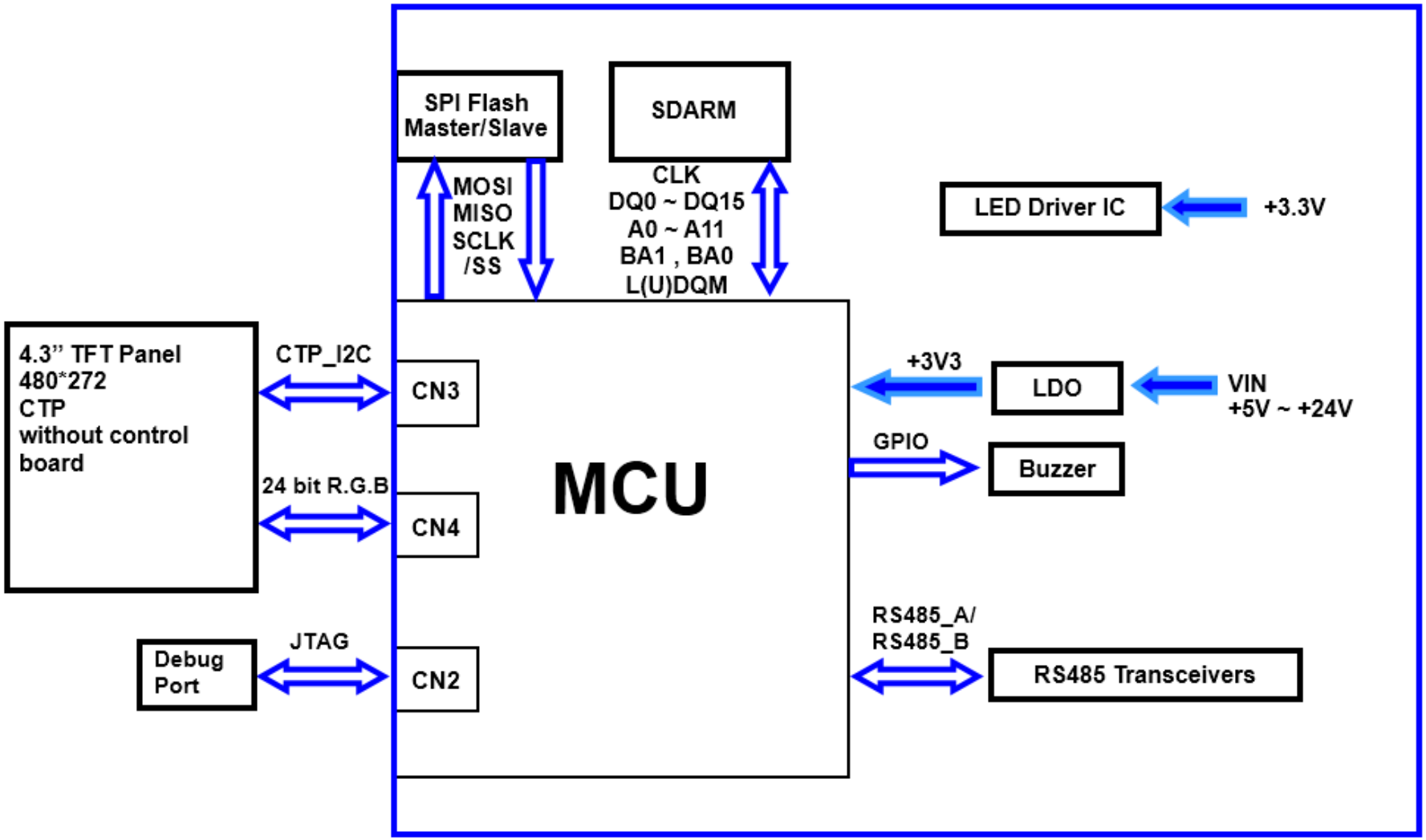
| Item | Symbol | Min | Typ | Max | Unit | Remark |
|---|---|---|---|---|---|---|
| Supply Voltage | VCC | 5 | 12 | 24 | V | |
| Supply Current | ICC | - | 170 | - | mA | |

Note: To ensure reliable operation, it is recommended to maintain the power supply voltage within the specified range. Excessive voltage surges beyond the rated limits may impact device performance or longevity.

# 7. BOM

| Item | Description | Remark |
|---|---|---|
| LCM | RFE43AW-AWW-DNG | |
| PCBA | SV10004R300WA00N0104 | |

# 8. Block diagram



# 9. Interface

**CN1 definition:**

| Pin | Symbol | Function | Remark |
|---|---|---|---|
| 1 | GND | GND | Output |
| 2 | RS485+ | RS485 D+ | I/O |
| 3 | RS485- | RS485 D- | I/O |
| 4 | +5V | VIN | Input |
| 5 | GND | GND | Output |
| 6-7 | NC | -- | -- |
| 8 | +5V | VIN | Input |
| 9-10 | NC | -- | -- |
| 11-12 | GND | GND | Output |
| 13-14 | NC | -- | -- |
| 15 | GND | Power GND | Input |
| 16 | +5V | Power +5V ~ +24V | Input |

**CN2 definition:**

| Pin | Symbol | Function | Remark |
|---|---|---|---|
| 1-9 | NC | -- | -- |
| 10 | GND | GND | Output |
| 11 | JTAG_SWDO | Data pin for JTAG interface | I/O |
| 12 | NRST | Reset pin for JTAG interface | Input |
| 13 | JTAG_SWDI | Data pin for JTAG interface | I/O |
| 14 | GND | GND for JTAG interface | Output |
| 15 | JTAG_SWCLK | CLK pin for JTAG interface | Input |
| 16 | VDD3V | 3.3V power for JTAG interface | Output |

# 10. Reliability

Content of Reliability Test (Wide temperature, -30℃~80℃)

| Environmental Test | | | |
|---|---|---|---|
| Test Item | Content of Test | Test Condition | Note |
| High Temperature storage | Endurance test applying the high storage temperature for a long time. | 80℃<br>200hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30℃<br>200hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time. | 80℃<br>200hrs | ___ |
| Low Temperature Operation | Endurance test applying the electric stress under low temperature for a long time. | -30℃<br>200hrs | 1 |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 40℃,90%RH max | 60℃,90%RH<br>96hrs | 1,2 |
| Thermal shock resistance | The sample should be allowed stand the following 10 cycles of operation<br>-30℃ 25℃ 80℃<br>30min 5min 30min<br>1 cycle | -30℃/80℃<br>10 cycles | ___ |
| Vibration test | Endurance test applying the vibration during transportation and using. | Total fixed amplitude : 1.5mm<br>Vibration Frequency : 10~55Hz<br>One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes | 3 |
| Static electricity test | Endurance test applying the electric stress to the terminal. | VS=±2KV~±6KV(contact),±2KV~±8KV (air),<br>RS=330Ω<br>CS=150pF<br>10 times | ___ |

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

# 11. Product inspection check list

**Check samples by meter $V_{IN}$, $I_{system}$**

| Item | No 1 | No 2 | No 3 | Note |
|---|---|---|---|---|
| $V_{IN}$ (V) | 12 | 12 | 12 | |
| $I_{System}$ (mA) | 169 | 171 | 170 | |

**Check sample Reliability Test**

| Item | Result | Note |
|---|---|---|
| Thermal shock | _ | -30℃/80℃ 10 cycles |
| High Temperature Operation | _ | 80℃<br>200hrs |
| Low Temperature Operation | _ | -30℃<br><br>200hrs |
| Static electricity test | _ | VS=±2KV~±6KV(contact),±2KV~±8KV (air),<br>RS=330Ω<br>CS=150pF<br>10 times |
| Vibration test | _ | Total fixed amplitude : 1.5mm<br>Vibration Frequency : 10~55Hz<br>One cycle 60 seconds to 3 directions of X,Y,Z for<br>Each 15 minutes |

- Prepare sets for testing