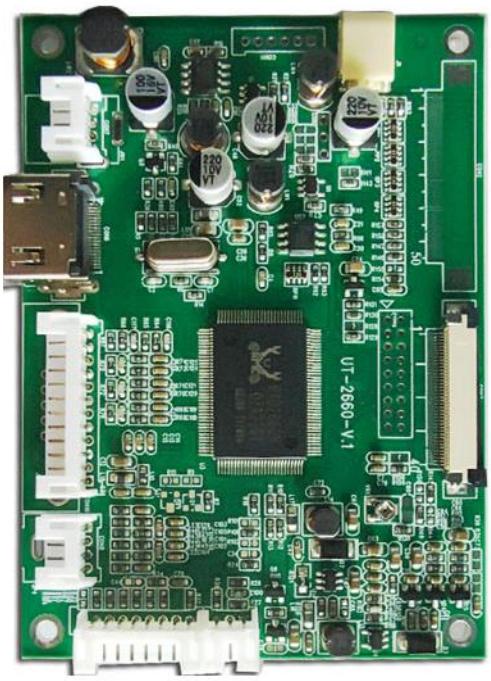
# SPECIFICATION FOR APPROVAL




客　户　名　称（CUSTOMER）：_____

客　户　料　号（PART NO.）：_____

客　户　品　名（DESCRIPTION）：_____

客　户　品　名（DESCRIPTION）：JC-2660

日　　期　　（DATE）：2015-11-25

# Table of Contents

## Change Description

| Version | Release Date | Modification Content | Remarks |
|---|---|---|---|
| V1.0 | November 25, 2015 | Initial formulation | |

### 1. Scope of Application

TTL: Applicable to the inspection of driver boards for liquid crystal display modules such as EJ050NA - 01G, AT070TN92, AT070TN94, AT080TN64, AT080TN52, EJ080NA - 05A, EJ080NA - 05B, TM080RDH01, and AT090TN12.
LVDS: Applicable to the inspection of high - definition 40PIN liquid crystal display module driver boards such as EJ070NA - 01J, N070LGE - L41, HJ070NA - 13A, HJ070NA - 13B, EJ070NA - 01F, ZJ070NA - 01P, NJ070NA - 23A, P070BAG - CM1, TM070JDHG30, EJ080NA - 04C, HE080IA - 01D, HJ080NA - 04L, HJ080IA - 01F, TM080TDH01, and TM080TDHG01.

### 2. Product Function Description

2.1 Supports HDMI, VGA, and CVBS video signal input.
2.2 The power input is DC +12V.
2.3 Features multi - function OSD operation.
2.4 Optional remote control function is available.
2.5 Auto - power - off when no signal is detected.

### 3. Signal Input Standards

3.1 HDMI: (Universal version 1.2).
3.2 VGA: Supports resolutions of 800×480, 800×600, 1024×600, 1024×768, 1280×800 (refresh rate 60 - 75Hz).
3.3 CVBS: 1.0Vp - p 75Ω.

### 4. Operating Environment

4.1 Operating temperature: - 10℃～+60℃.
4.2 Operating humidity: 90%RH (no condensation allowed).

### 5. Storage Environment

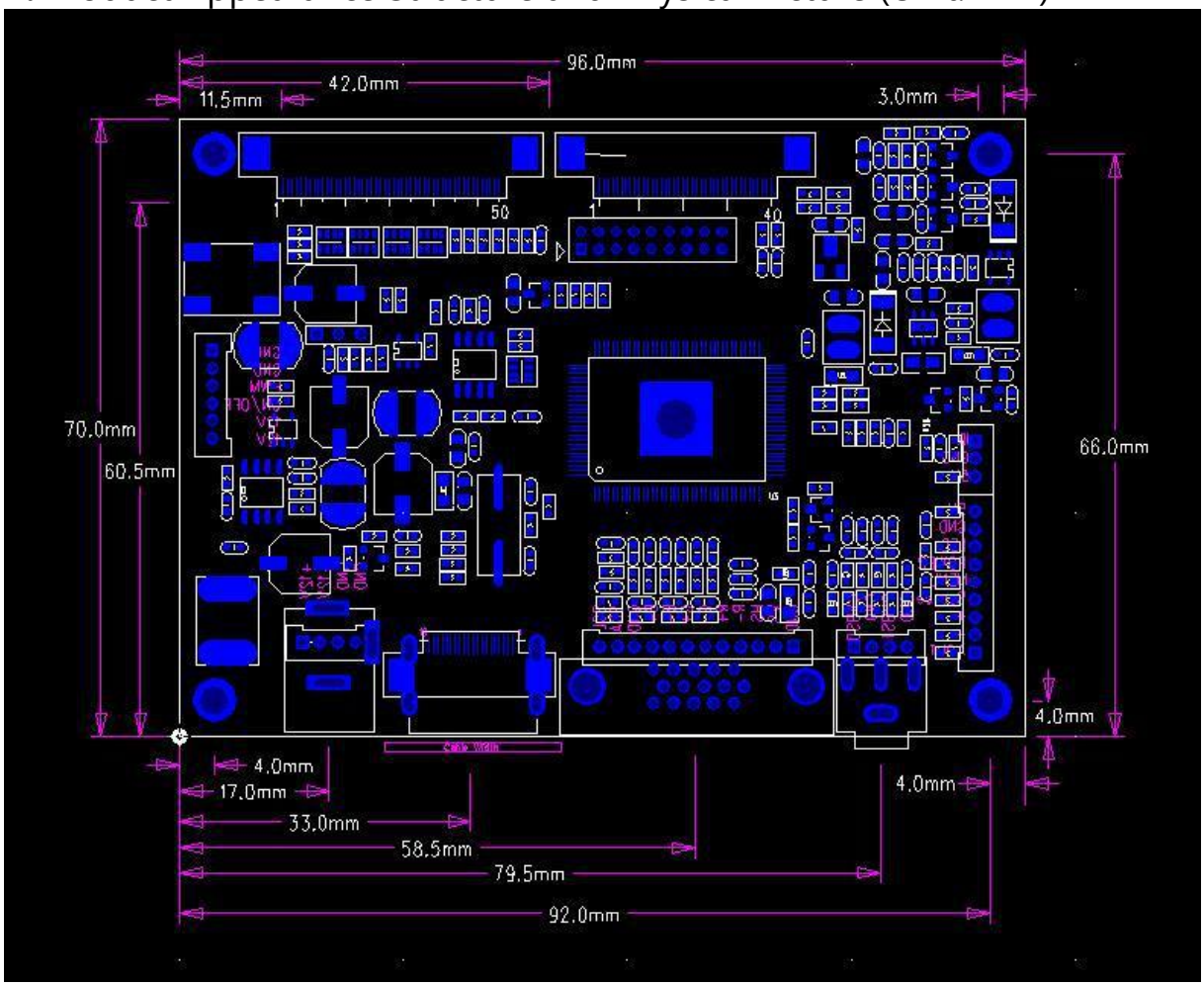
5.1 Storage temperature: - 20℃～+70℃.
5.2 Storage humidity: 90%RH (no condensation allowed).

### 6. Operating Power Supply Requirements (AT070TN92)

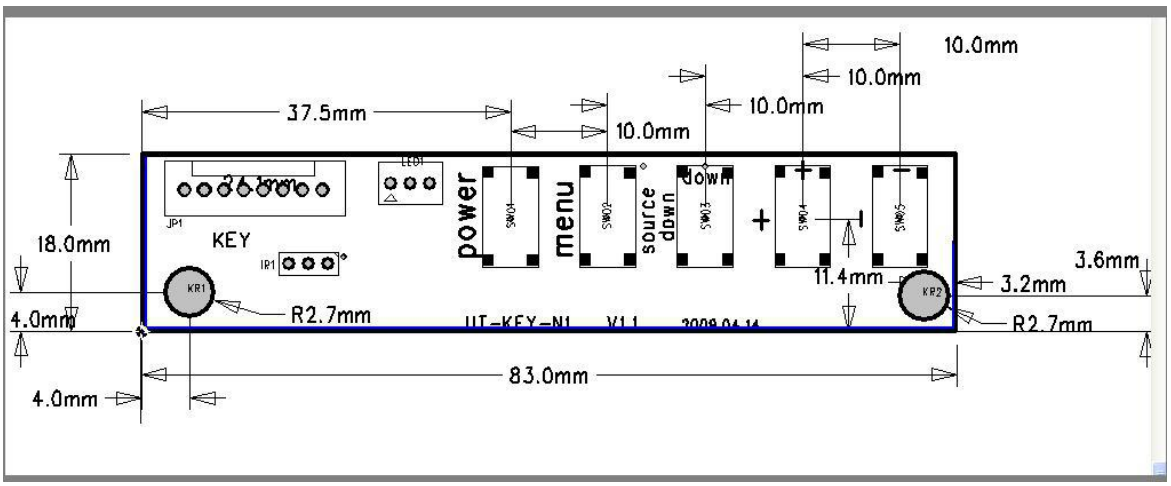
| | Minimum Value | Typical Value | Maximum Value | Unit |
|---|---|---|---|---|
| Operating Voltage | +6V | +12V | 14V | V |

| | Minimum Value | Typical Value | Maximum Value | Unit |
|---|---|---|---|---|
| Operating Current | 580mA | 300mA | 250mA | mA |

## **7.** Product Appearance Structure and Physical Picture (Unit: mm)




## 8. Key Structure Diagram



## Product Interface Definition

CON8 (CVBS Signal Input) 4PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | CVBS2 | AV2 signal input |
| 2 | GND | Ground |
| 3 | CVBS1 | AV1 signal input |
| 4 | GND | Ground |

CON10 (VGA Input) 12PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | GND | Empty |
| 2 | VS | Vertical Synchronization Signal |
| 3 | HS | Horizontal Synchronization Signal |
| 4 | GND | Empty |
| 5 | R+ | Red Signal |
| 6 | GND | Ground |
| 7 | G+ | Green Signal+ |
| 8 | GND | +Ground |
| 9 | B+ | Blue Signal+ |
| 10 | GND | Ground |
| 11 | SDA | I2C Channel |
| 12 | SCL | I2C Channel |

CON6 (HDMI Input) Interface

| Pin Number | Definition | Description |
|---|---|---|

| Pin Number | Definition | Description |
|---|---|---|
| 1 | TMDS Data 2+ | |
| 2 | TMDS Data Shield | |
| 3 | TMDS Data 2- | |
| 4 | TMDS Data 1+ | |
| 5 | TMDS Data Shield | |
| 6 | TMDS Data 1- | |
| 7 | TMDS Data 0+ | |
| 8 | TMDS Data Shield | |
| 9 | TMDS Data 0- | |
| 10 | TMDS Clock+ | |
| 11 | TMDS Clock Shield | |
| 12 | TMDS Clock - | |
| 13 | CEC | |
| 14 | NC | |
| 15 | SCL | |
| 16 | SDL | |
| 17 | DDC/CEC GND | |
| 18 | +5V | |
| 19 | Hot Plug Detect | |

CON11 (INVERTER Control) 6PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | GND | Ground |
| 2 | GND | Ground |

| Pin Number | Definition | Description |
|---|---|---|
| 3 | PWM | PWM |
| 4 | ON/OFF | Input Backlight Voltage Switch |
| 5 | VCC_12V | INVERTER Power Supply 12V |
| 6 | VCC_12V | INVERTER Power Supply 12V |

IR (Remote Control Receiver Interface) 3PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | IR | |
| 2 | GND | |
| 3 | VCC | |

CON12 (Keypad Definition) 9PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | VCC | 5v Power Supply |
| 2 | GND | Ground |
| 3 | LED | Power Indicator |
| 4 | POWER | Switch |
| 5 | MENU | Menu |
| 6 | SOURCE | Signal Switch Menu |
| 7 | LEFT | Increase Key |
| 8 | RIGH | Decrease Key |
| 9 | AOUT | Auto - Adjustment Key (Optional) |

CON7 (Power Interface) 4PIN/2.0

| Pin Number | Definition | Description |
|---|---|---|
| 1 | +12V | Power Supply |

| Pin Number | Definition | Description |
|---|---|---|
| 2 | +12V | Power Supply |
| 3 | GND | Ground |
| 4 | GND | Ground |

J1 (Backlight Interface) 2PIN Narrow - Mouth High - Voltage Socket

| Pin Number | Definition | Description |
|---|---|---|
| 1 | LED+ | LED Voltage Positive Terminal |
| 2 | LED- | LED Voltage Negative Terminal |

CON2 (FPC Socket Definition) 50PIN/0.5MM

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 1 | LED+ | P | |
| 2 | LED+ | P | |
| 3 | LED- | P | |
| 4 | LED- | P | |
| 5 | GND | P | |
| 6 | VCOM | I | |
| 7 | VCC | p | |
| 8 | MODE | I | |
| 9 | DE | I | |
| 10 | VS | I | |
| 11 | HS | I | |
| 12 | B7 | I | |
| 13 | B6 | I | |
| 14 | B5 | I | |
| 15 | B4 | I | |

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 16 | B3 | I | |
| 17 | B2 | I | |
| 18 | B1 | I | |
| 19 | B0 | I | |
| 20 | G7 | I | |
| 21 | G6 | I | |
| 22 | G5 | I | |
| 23 | G4 | I | |
| 24 | G3 | I | |
| 25 | G2 | I | |
| 26 | G1 | I | |
| 27 | G0 | I | |
| 28 | R7 | I | |
| 29 | R6 | I | |
| 30 | R5 | I | |
| 31 | R4 | I | |
| 32 | R3 | I | |
| 33 | R2 | I | |
| 34 | R1 | I | |
| 35 | R0 | I | |
| 36 | GND | P | |
| 37 | DCLK | I | |
| 38 | GND | P | |
| 39 | L/R | I | |
| 40 | U/D | I | |

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 41 | VGH | P | |
| 42 | VGL | P | |
| 43 | AVDD | P | |
| 44 | RESET | I | |
| 45 | NC | | |
| 46 | VCOM | I | |
| 47 | DITHB | I | |
| 48 | GND | P | |
| 49 | NC | | |
| 50 | NC | | |

CON3 (FPC Socket Definition) 40PIN/0.5MM

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 1 | VCOM | P | |
| 2 | VDD | P | |
| 3 | VDD | P | |
| 4 | NC | | |
| 5 | RESET | I | |
| 6 | STBYB | I | |
| 7 | GND | P | |
| 8 | RXINO- | I | |
| 9 | RXINO+ | I | |
| 10 | GND | P | |
| 11 | RXIN1- | I | |
| 12 | RXIN1+ | I | |

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 13 | GND | P | |
| 14 | RXIN2- | I | |
| 15 | RXIN2+ | I | |
| 16 | GND | P | |
| 17 | RXCLKIN- | I | |
| 18 | RXCLKIN+ | I | |
| 19 | GND | P | |
| 20 | RXIN3- | I | |
| 21 | RXIN3+ | I | |
| 22 | GND | P | |
| 23 | NC | | |
| 24 | NC | | |
| 25 | GND | P | |
| 26 | NC | | |
| 27 | DIMO | O | |
| 28 | SELB | I | |
| 29 | AVDD | P | |
| 30 | GND | P | |
| 31 | LED- | P | |
| 32 | LED- | P | |
| 33 | L/R | I | |
| 34 | U/D | I | |
| 35 | VGL | P | |
| 36 | NC | | |
| 37 | NC | | |

| Pin | Symbol | I/O | Remarks |
|---|---|---|---|
| 38 | VGH | P | |
| 39 | LED+ | P | |
| 40 | LED+ | P | |

CON04 (LVDS) 18P/2.0MM

| Pin | Symbol | Remarks |
|---|---|---|
| 1 | VCC | |
| 2 | VCC | |
| 3 | VCC | |
| 4 | GND | |
| 5 | GND | |
| 6 | GND | |
| 7 | RX00- | |
| 8 | RX00+ | |
| 9 | RX01- | |
| 10 | RX01+ | |
| 11 | RX02- | |
| 12 | RX02+ | |
| 13 | GND | |
| 14 | GND | |
| 15 | RXCLKIN- | |
| 16 | RXCLKIN+ | |
| 17 | RX03- | |
| 18 | RX03+ | |

## 9. Electrical Parameters

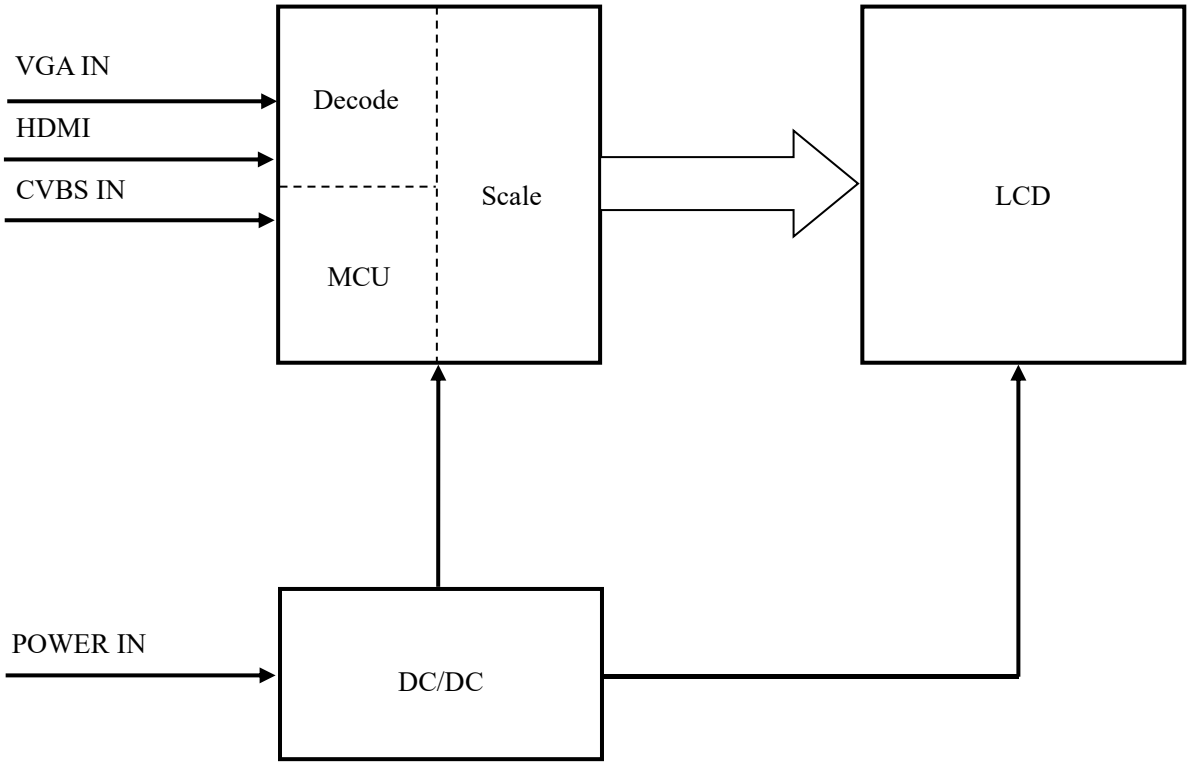
### 9.1 Power Consumption Details of the Driver Board (AT070N92)

| Input Voltage (VIN) | Input Current (IIN) | Input Current (IIN) | Input Current (IIN) | Input Current (IIN) | Remarks |
|---|---|---|---|---|---|
| | Minimum Value | Typical Value | Maximum Value | Unit | |
| +12V | 260mA | 280mA | 300mA | mA | |

## 10. LCD Specifications (AT070TN92)

| Item | Specification | Unit |
|---|---|---|
| Screen Size | 8.0 (Diagonal) | inch |
| Pixel Number | 800×(R,G,B)×480 | dot |
| Effective Display Area | 162(H)×121.5(V) | mm |
| Pixel Size | 0.10675(H)×0.2025(V) | mm |

## 11. Electrical Circuit




## 12. Basic Operation Instructions

12.1 Key Operations:
There are five operation keys in total: POWER, MENU, SOURCE, LEFT, and RIGHT. (Six keys can be selected.)
12.1.1 Key Definitions:

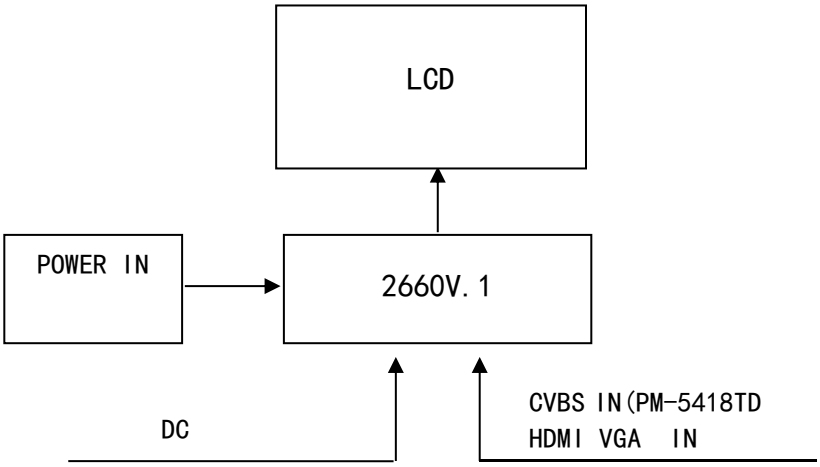
- POWER: In the shutdown state, press the POWER key once to turn on the device. In the startup state, press the POWER key once to turn off the device.
- SOURCE: When there is no OSD menu, it is used for source switching. When the OSD menu is present, it functions as the ESC key.
- MENU: It is the main menu. Press it again when the menu appears to select and confirm.
- +: When the menu is not selected, it is used as the DOWN key. When the menu is selected, it is used as the LEFT key.
- -: When the menu is not selected, it is used as the UP key. When the menu is selected, it is used as the RIGHT key.
  12.1.2 Remote Control Operations:
  The remote control has six operation keys: POWER, MENU, LEFT, RIGHT, UP, and DOWN, and the operations are the same as those of the keys.

## 13. Testing Equipment

13.1 PHILIPS PM - 5418TD Video Signal Generator;
13.2 PS - 305D DC Power Supply;
13.3 Fluke 45 Multimeter;
13.4 Lecroy Wave Surfer 454/Tektronix TDS 1012 Oscilloscope;
13.5 Temperature - Humidity Chamber.

## 14. Function Testing (Ta = 25℃)

14.1 Display Test under CVBS Input Signal
14.1.1 Connect the PCB to be tested as shown in the following figure.



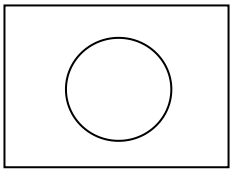

14.1.2 Connect the power supply and signal, and carefully observe whether the display

screen shows normally.

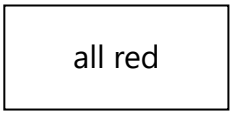
14.1.4 Select the gray - scale output on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show gray bars.

14.1.5 Select the color bar on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show color bars of eight colors (black, blue, red, magenta, green, cyan, yellow, and white).

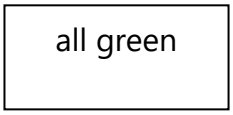
14.1.6 Select the electronic circle on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show the following pattern.



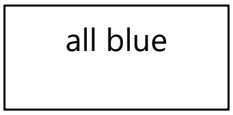
14.1.7 Select the red primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all red.



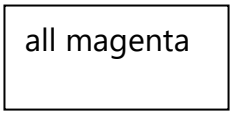

14.1.8 Select the green primary color on the testing instrument PM5418D, and carefully observe the display effect of the display screen. It should show all green.



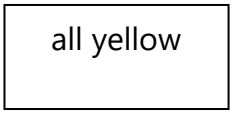

14.1.9 Select the blue primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all blue.



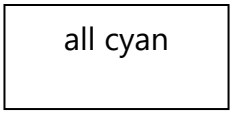

14.1.10 Select the red - blue primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all magenta.



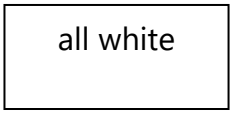

14.1.11 Select the red - green primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all yellow.



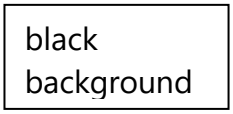

14.1.12 Select the blue - green primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all cyan.



14.1.13 Select the red - green - blue primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show all white.




14.1.14 Turn off the primary color on the testing instrument PM5418TD, and carefully observe the display effect of the display screen. It should show a black background.




14.1.15 Record the test results in the report.

14.2 Display Test under VGA Input Signal

Switch to the VGA input signal, connect to a PC, and refer to the test content in 14.1 for testing.

**15. Reliability Tests**

| Category | Test Item | Test Conditions | Number of Tests | Judgment Criteria |
|---|---|---|---|---|
| Storage Environment Tests | High - Temperature Test | +70℃, 96Hr | 2 | Normal after returning to room temperature |
| | Low - Temperature Test | -20℃, 96Hr | 2 | |
| Operating Environment Tests | High - Temperature Test | +60℃, 96Hr | 2 | Normal operation during the experiment |
| | Low - Temperature Test | -10℃, 96Hr | 2 | |
| Cold Start Test | Cold Start Test | After storing at -20℃ for 40 minutes, start | 2 | |

| Category | Test Item | Test Conditions | Number of Tests | Judgment Criteria |
|---|---|---|---|---|
| | | once. After storing for 2 hours, start 4 times (once every 5 minutes). After storing for 4 hours, repeat starting 4 times (once every 5 minutes), and check if it can start normally after 8 hours. | | |
| Thermal Cycle Test | Thermal Cycle Test | Continuous operation for 30 cycles | 2 | |
| Constant Temperature and Humidity Test | Constant Temperature and Humidity Test | +60℃, 90%RH, continuous operation for 240 hours | 2 | |

**Remarks**:

1. The tests should be carried out under non - condensing conditions.
2. After the tests, the product should be placed in the test chamber. It can be taken out after 24 hours at normal temperature and humidity.

## 16. Outgoing Inspection Standards

| NO. | Inspection Item | Inspection Method | Sampling Level | Inspection Level |
|---|---|---|---|---|
| 1 | Electrical Performance | GB2828 - 2003 | II | Critical Defect: CR = 0 |
| 2 | Dimensions | | | Major Defect: AQL = 0.65 |
| 3 | Appearance, Packaging | | | Minor Defect: AQL = 1.0 |