# EA TFT043-42BITC/ EA R480X-43ALW

**DISPLAY VISIONS**
ELECTRONIC ASSEMBLY

**ELECTRONIC ASSEMBLY**
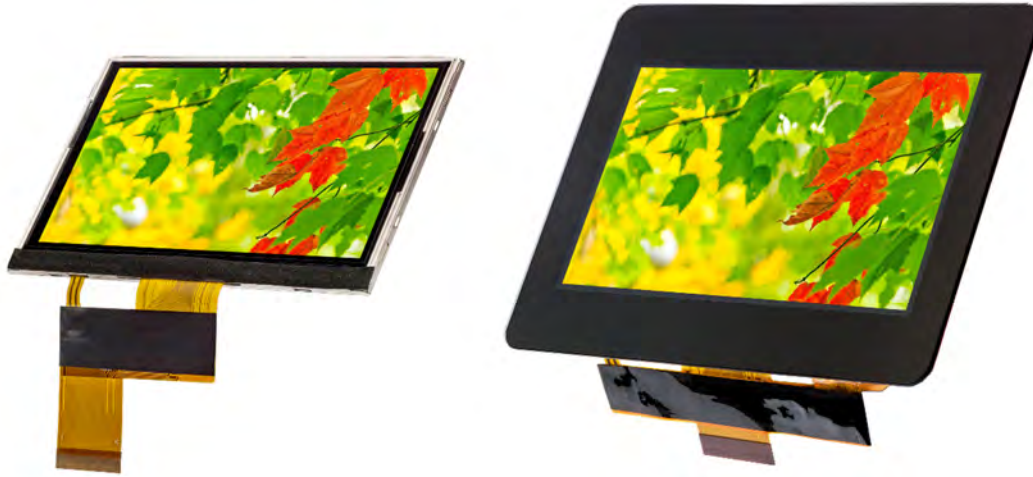*new display design*

## Full color IPS Display with 24 Bit RGB interface

*Left: 105.4x67.1x2.65mm*

*Right: 114.0x84.0x4.8mm (incl. PCAP)*

## FEATURES

- 4.3" TFT FULL COLOR
- AACS TECHNOLOGY WITH IPS FOR UNLIMITED VIEWING ANGLE
- 480x272x3 DOTS
- 1000/800cd/m² WITHOUT/WITH TOUCHPANEL
- 24-BIT RGB INTERFACE
- INTEGRATED CONTROLLER SC7283
- SINGLE SUPPLY 3.3V
- WIDE TEMPERATURE RANGE ($T_{OP}$ -20°C - +70°C)
- OPTIONALLY WITH PCAP AND TOUCH CONTROLLER GT911

## ORDERING CODES

- 4.3" TFT, 480x272 IPS, 1000cd/m²                          **EA R480X-43ALW**
- AS ABOVE BUT WITH OPTICALLY BONDED PCAP          **EA TFT043-42BITC**

## ACCESSORY

- ZIF CONNECTOR 0.5mm, BOTTOM CONTACT              **EA WF050-40S**
- ZIF CONNECTOR 0.5mm, TOP CONTACT                    **EA WF050-40ST**

# CONTENTS

## 1. General Features

| Item | Spec | Remark |
|---|---|---|
| Display Mode | Normally Black Transmissive | |
| Viewing Direction | FREE | |
| Input Signals | RGB 24 bit | |
| Outside Dimensions | 105.4(W) x67.1(H) x2.65(D) | |
| | 114.0(W) x84.0(H) x4.77(D) | With CTP |
| Active Area | 95.04mm(W)×53.86mm(H) | |
| Number of Pixels | 480(RGB)×272 | |
| Dot Pitch | 0.198mm(H）×0.198mm(W) | |
| Pixel Arrangement | RGB Vertical stripes | |
| Drive IC | SC7283 | |
| CTP IC | GT911 | With CTP |

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## 2. Absolute Maximum Ratings

The following are maximum values which, if exceeded may cause operation or damage to the unit.

| ITEM | Sym. | Min. | Typ. | Max. | Unit | Remark |
|---|---|---|---|---|---|---|
| Power for Circuit Driving | Vdd | -0.3 | - | 4.6 | V | |
| Power for Circuit Logic | Vt | -0.3 | - | Vdd+0.3 | V | |
| Storage Humidity | $H_{ST}$ | 10 | - | | %RH | |
| Storage Temperature | $T_{ST}$ | -30 | - | 80 | ℃ | At 25±5℃ |
| Operating Ambient Humidity | $H_{OP}$ | 10 | - | | %RH | |
| Operating Ambient temperature | $T_{OP}$ | -20 | - | 70 | ℃ | |

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# 3. Electrical Specification

## 3.1 Driving TFT LCD Panel

| Item | | Sym. | Min | Typ. | Max | Unit | Note |
|------|------|------|-----|------|-----|------|------|
| Power for Circuit Driving | | VDD | 3.0 | 3.3 | 3.6 | V | |
| Logic Input Voltage | Low Voltage | $V_{IL}$ | 0 | - | 0.3Vdd | V | |
| | High Voltage | $V_{IH}$ | 0.7Vdd | - | Vdd | V | |
| Logic Output Voltage | Low Voltage | $V_{OL}$ | 0 | - | 0.2Vdd | V | |
| | High Voltage | $V_{OH}$ | 0.8Vdd | - | - | V | |
| Power Consumption | Black Mode | $P_b$ | T.B.D | T.B.D | T.B.D | mW | |
| | Standby Mode | $P_w$ | T.B.D | T.B.D | T.B.D | mW | |

## 3.2 Driving Backlight

| Item | Sym. | Min | Typ. | Max | Unit | Note |
|------|------|-----|------|-----|------|------|
| Backlight driving voltage | $V_F$ | 24.4 | 25.6 | 27.2 | V | |
| Backlight driving current | $I_F$ | - | 40 | - | mA | |
| Backlight Power Consumption | $W_{BL}$ | - | 1024 | - | mW | |
| Life Time | - | - | 30,000 | - | | Note 3 |

Note 1: (Unless specified, the ambient temperature Ta=25℃)

Note 2: The recommended operating conditions refer to a range in which operation of this product is guaranteed. Should this range is exceeded, the operation cannot be guaranteed even if the values may be without the absolute maximum ratings.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

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## 4.Optical Specifications

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 ℃. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of Φ and θ equal to $0°$.

| Item | Sym. | Values | | | Unit | Note |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Contrast Ratio | C/R | 640 | 800 | - | | FIG.1 |
| Module Luminance | | 900 | 1000 | | cd/m$^2$ | EA R480X-43ALW |
| | L | 700 | 800 | - | | EA TFT043-42BITC |
| Response time | Tr+Tf | - | 30 | 40 | ms | FIG.2 |
| Viewing Angle | θ$_T$ | 70 | 80 | - | Degree | FIG.3 |
| | θ$_B$ | 70 | 80 | - | | |
| | θ$_L$ | 70 | 80 | - | | |
| | θ$_R$ | 70 | 80 | - | | |
| )Chromaticity | Wx | 0.280 | 0.320 | 0.360 | | |
| | Wy | 0.305 | 0.345 | 0.384 | | |
| | Rx | - | - | - | | |
| | Ry | - | - | - | | |
| | Gx | - | - | - | | |
| | Gy | - | - | - | | |
| | Bx | - | - | - | | |
| | By | - | - | - | | |

◆

## ◆ Measurement System

Notes:

1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 1.

3. Response time is the time required for the display to transition from white to black (Rising Time, Tr) and from black to white (Falling Time, Tf). For additional information see FIG 2.

4. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

## FIG. 1 Optical Characteristic Measurement Equipment and Method
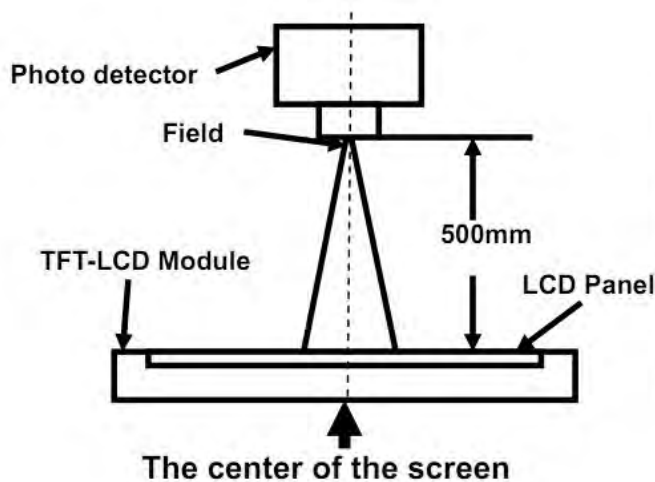


| Item | Photo detector | Field |
|------|----------------|-------|
| Contrast Ratio | SR-3A | 1° |
| Luminance | | |
| Chromaticity | | |
| Lum Uniformity | | |
| Response Time | BM-7A | 2° |

## FIG. 2 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".
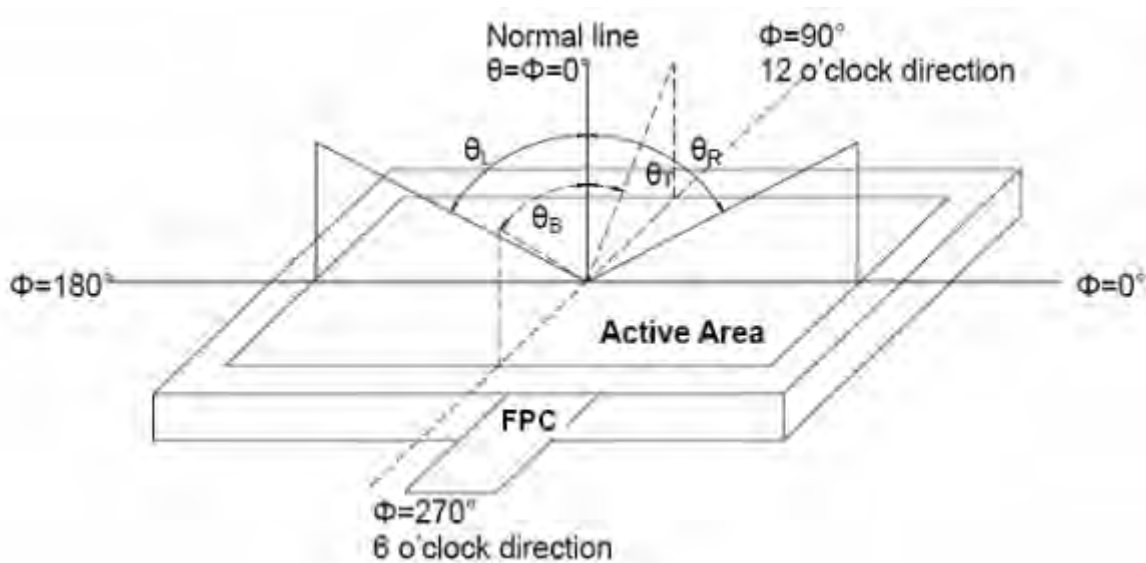
Response Time = Rising Time(Tr) + Falling Time(Tf)

- Rising Time(Tr) : Full White 90% → Full White 10% Transmittance.
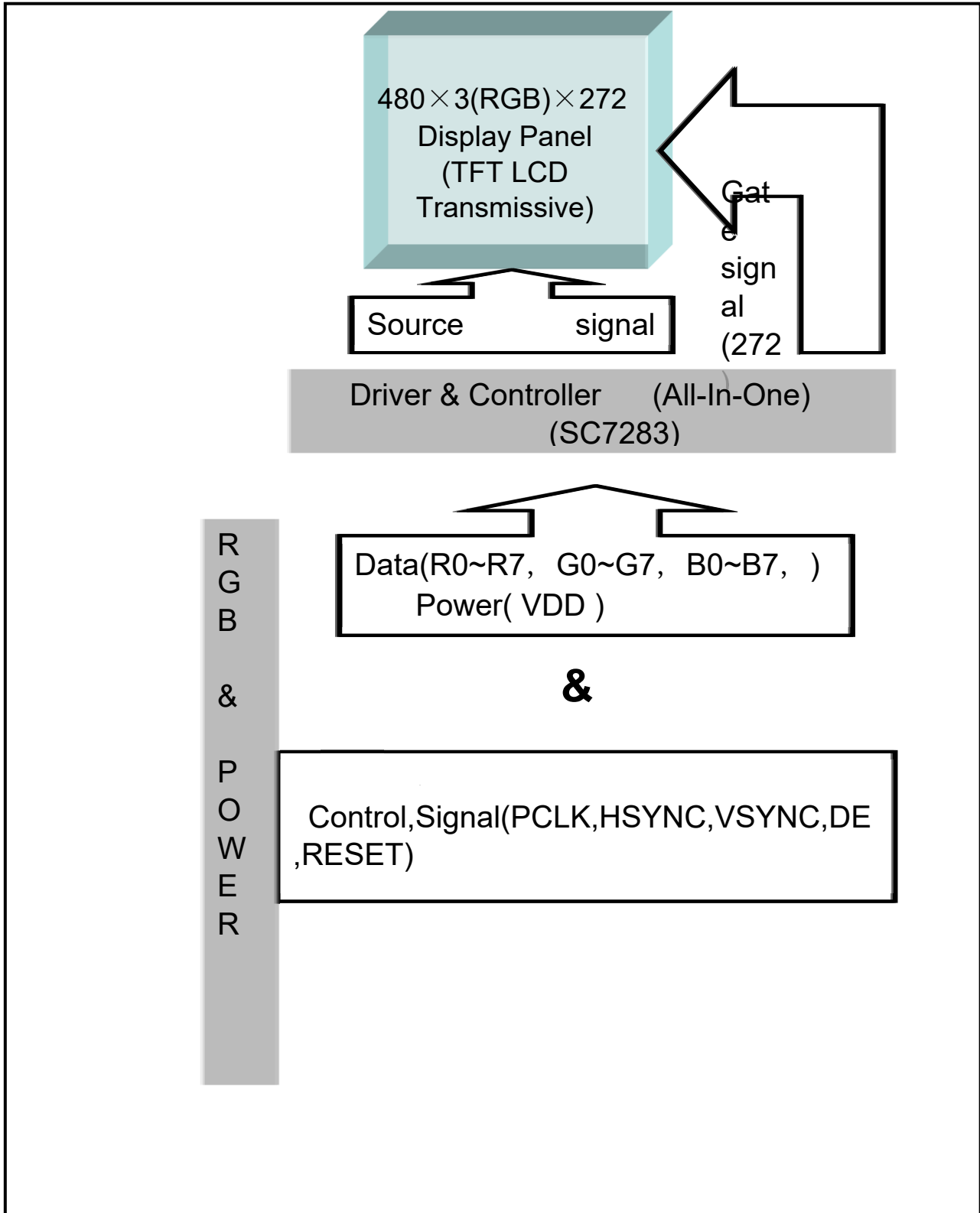- Falling Time(Tf) : Full White 10% → Full White 90% Transmittance.
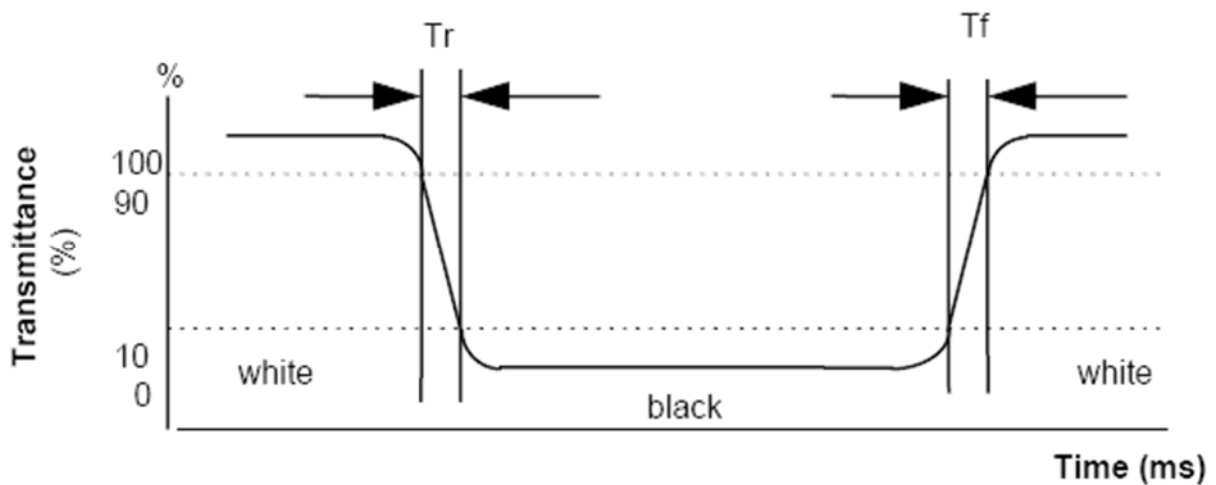


## FIG. 3 The definition of Viewing Angle

Use Fig. 1(Test Procedure) under Measurement System to measure the contrast from the measuring direction specified by the conditions as the following figure.

## 5.Block Diagram

480×3(RGB)×272
Display Panel
(TFT LCD
Transmissive)

Gate signal (272

Source          signal

Driver & Controller     (All-In-One)
(SC7283)

R G B & P O W E R

Data(R0~R7，G0~G7，B0~B7，)
Power( VDD )

&

Control,Signal(PCLK,HSYNC,VSYNC,DE,RESET)

# 6.Pin Description
## 6.1 EA R480X-43ALW

| Item | Symbol | Description |
|---|---|---|
| 1 | VLED- | B/L Power input PIN Cathode |
| 2 | VLED+ | B/L Power input PIN anode |
| 3 | NC | |
| 4 | VDD | Power supply |
| 5--12 | R0--R7 | Red Data |
| 13--20 | G0--G7 | Green Data |
| 21--28 | B0--B7 | Blue Data |
| 29 | GND | Ground |
| 30 | DCLK | Data clock signal |
| 31 | NC | |
| 32 | HSYNC | Horizontal synchronizing signal |
| 33 | VSYNC | Vertical synchronizing signal |
| 34 | DE | Data ENABLE signal |
| 35 | NC | NC |
| 36 | GND | Ground |
| 37 | NC | |
| 38 | NC | |
| 39 | NC | |
| 40 | NC | |

*Note: FPC 40 pins, 0.5mm pitch*

## 6.2 EA TFT043-42BITC with Touchpanel

| Item | Symbol | Description |
|------|--------|-------------|
| 1 | VLED- | B/L Power input PIN Cathode |
| 2 | VLED+ | B/L Power input PIN anode |
| 3 | TFT/CTP GND | TFT/CTP Ground |
| 4 | TFT/CTP VDD | TFT/CTP Power input |
| 5--12 | R0--R7 | Red Data |
| 13--20 | G0--G7 | Green Data |
| 21--28 | B0--B7 | Blue Data |
| 29 | TFT/CTP GND | TFT/CTP Ground |
| 30 | DCLK | Data clock signal |
| 31 | DISP | Standby Mode<br>DISP="1", Normal operation<br>DISP="0", Standby mode. |
| 32 | HSYNC | Horizontal synchronizing signal |
| 33 | VSYNC | Vertical synchronizing signal |
| 34 | DE | Data ENABLE signal |
| 35 | NC | NC |
| 36 | TFT RST | TFT reset pin |
| 37 | CTP RST | CTP reset pin |
| 38 | CTP SCL | CTP I2C clock |
| 39 | CTP SDA | CTP I2C data |
| 40 | CTP INT | CTP interrupt |

*Note: FPC 40 pins, 0.5mm pitch*

# 7.Timing Characteristics

## 7.1 Timing Diagram and Input Setup Timing setting
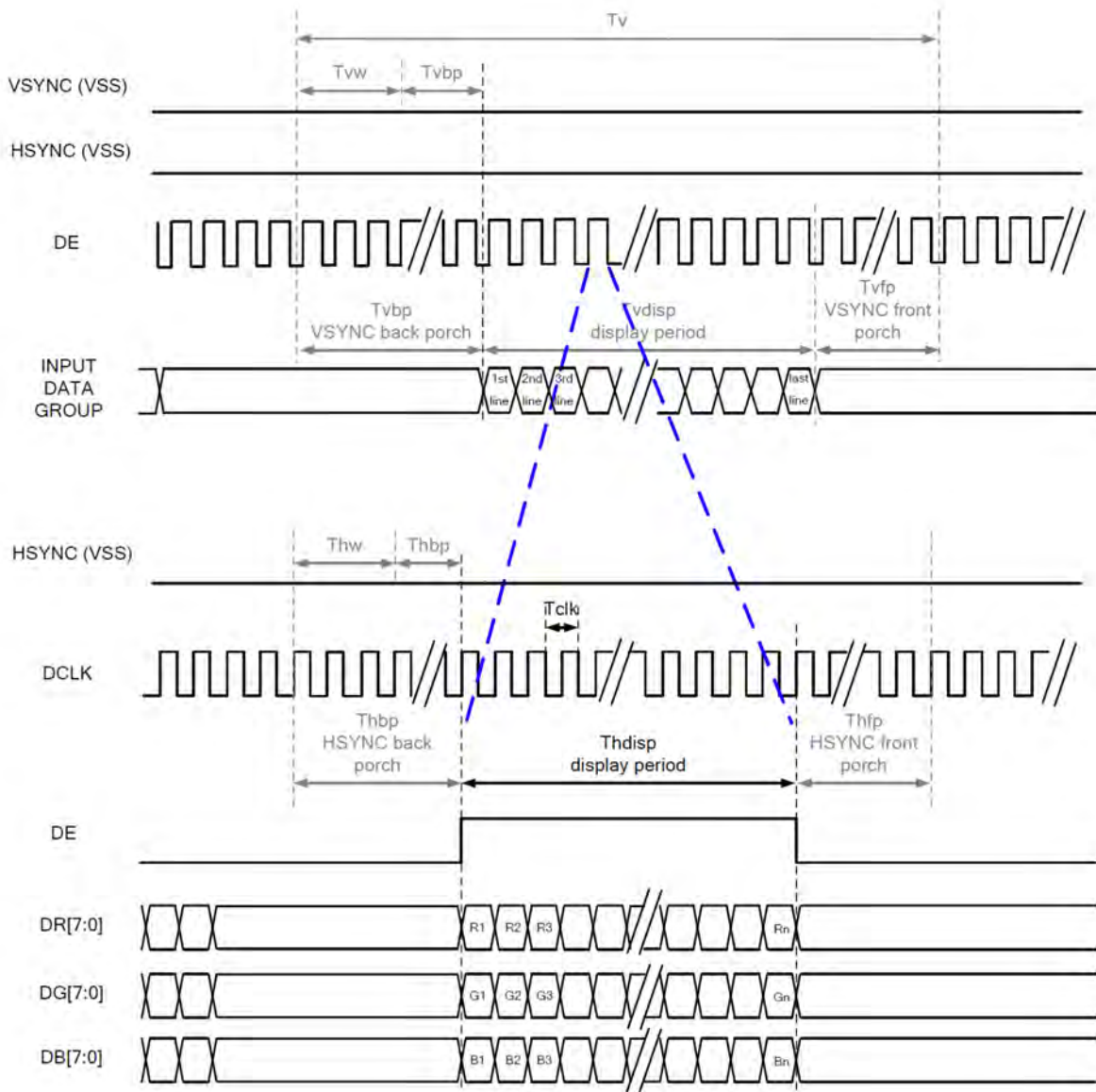
### 7.1.1 SYNC Mode Timing Diagram
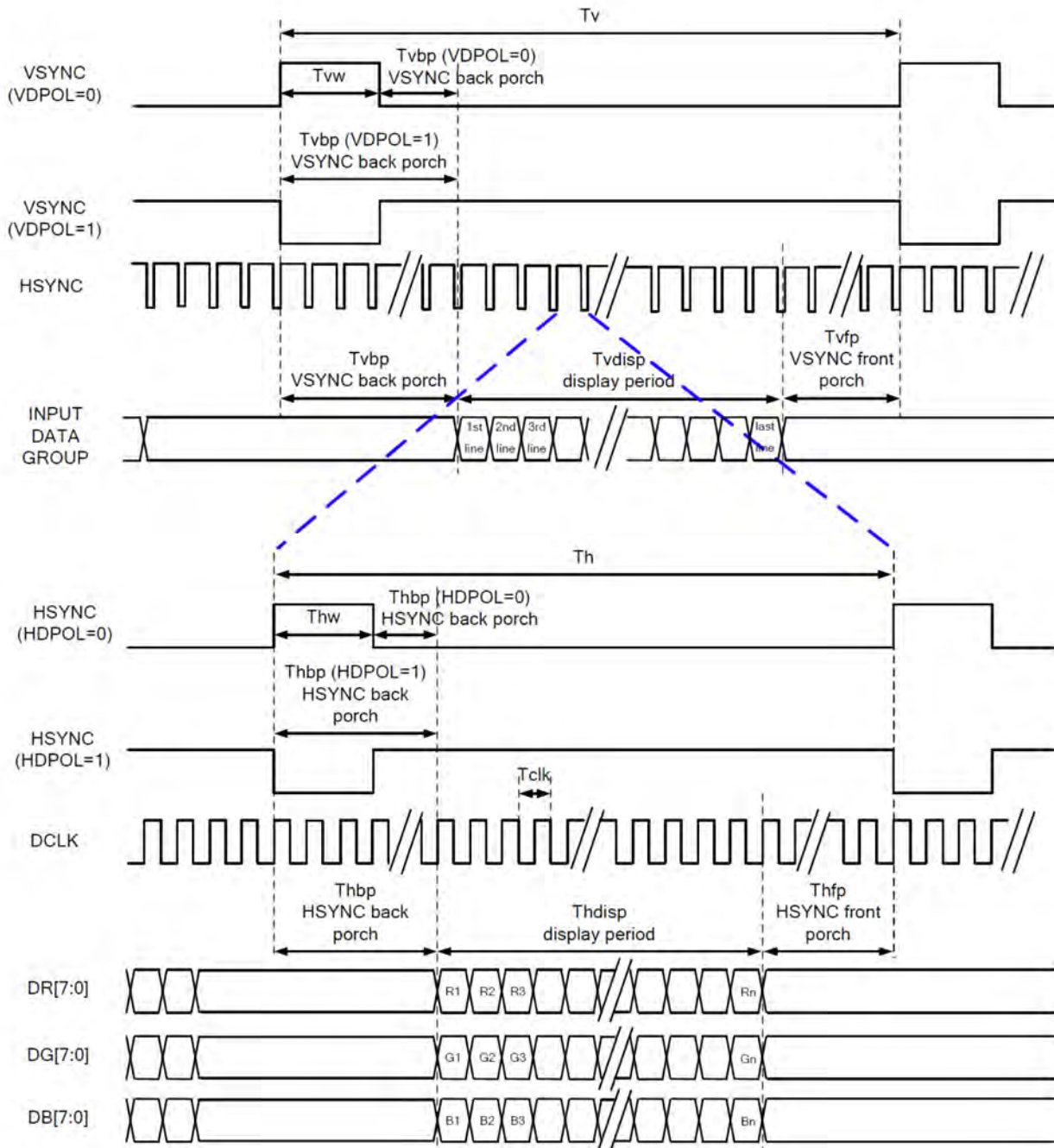
## 7.1.2 SYN-DE Mode Timing Diagram
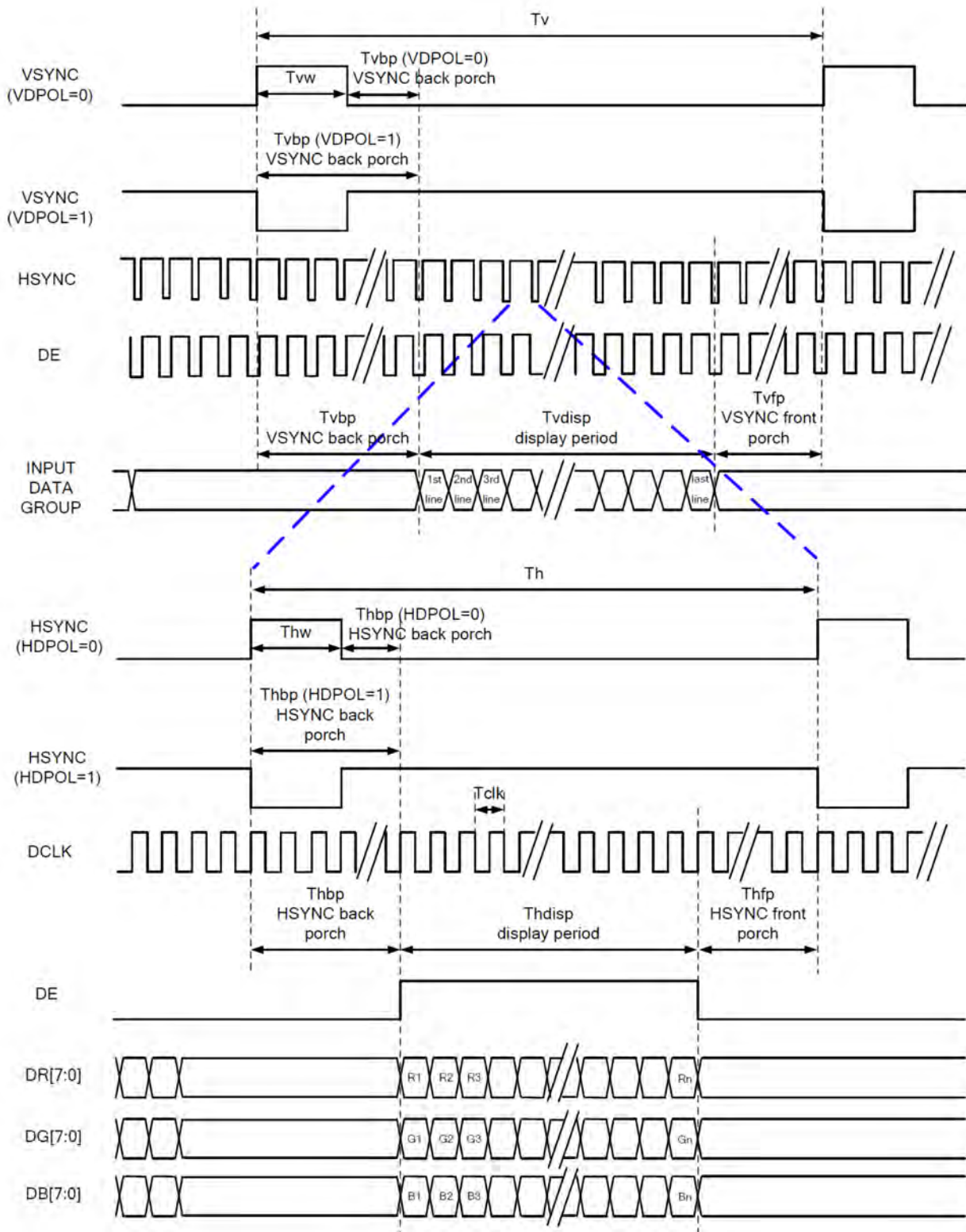
### 7.1.3 DE Mode Timing Diagram



| RGB Mode Selection Table | DCLK | HSYNC | VSYNC | DE |
|---|---|---|---|---|
| SYNC - DE Mode | Input | Input | Input | Input |
| SYNC Mode | Input | Input | Input | GND |
| DE Mode | Input | GND | GND | Input |

Note: "Input" means these signals are driven by host side.

## 7.2 Parallel 24 bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

| 480RGB X 272 Resolution Timing Table | | | | | | | |
|---|---|---|---|---|---|---|---|
| Item | | Symbol | Min. | Typ. | Max. | Unit | Remark |
| DCLK Frequency | | Fclk | 8 | 9 | 12 | MHz | |
| DCLK Period | | Tclk | 83 | 111 | 125 | ns | |
| HSYNC | Period Time | Th | 485 | 531 | 598 | DCLK | |
| | Display Period | Thdisp | | 480 | | DCLK | |
| | Back Porch | Thbp | 3 | 43 | 43 | DCLK | By H_BLANKING setting |
| | Front Porch | Thfp | 2 | 8 | 75 | DCLK | |
| | Pulse Width | Thw | 2 | 4 | 43 | DCLK | |
| VSYNC | Period Time | Tv | 276 | 292 | 321 | HSYNC | |
| | Display Period | Tvdisp | | 272 | | HSYNC | |
| | Back Porch | Tvbp | 2 | 12 | 12 | HSYNC | By V_BLANKING setting |
| | Front Porch | Tvfp | 2 | 8 | 37 | HSYNC | |
| | Pulse Width | Tvw | 2 | 4 | 12 | HSYNC | |

Note: It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.
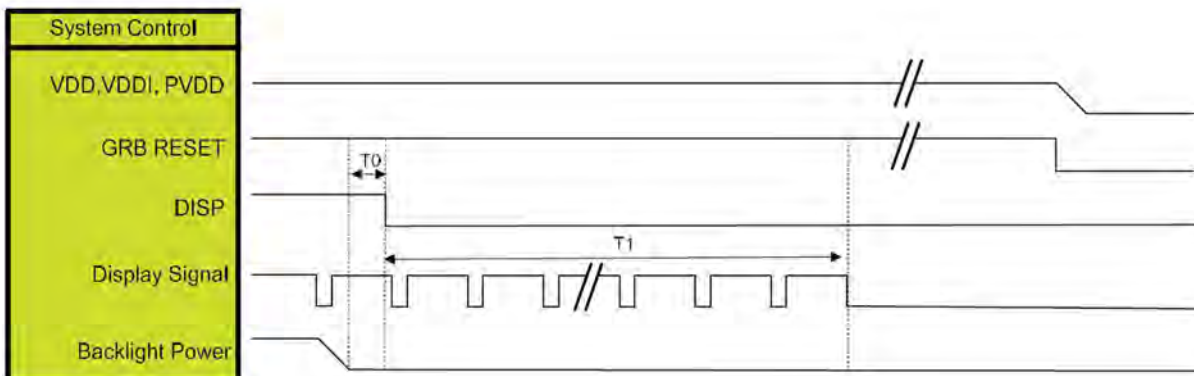
## 7.3 Power ON/OFF Sequence

### 7.3.1 Power On Sequence
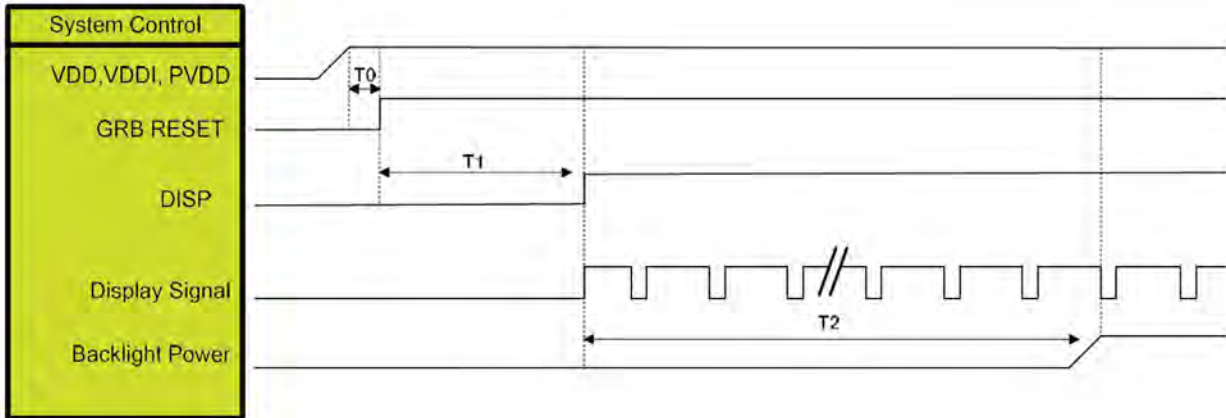


| Symbol | Description | Min. Time | Unit |
|--------|-------------|-----------|------|
| T0 | System power stability to GRB RESET signal | 0 | ms |
| T1 | GRB RESET= "High" to DISP="High" | 10 | ms |
| T2 | Display Signal output to Backlight Power on | 250 | ms |

### 7.3.2 Power Off Sequence



| Symbol | Description | Min. Time | Unit |
|--------|-------------|-----------|------|
| T0 | Backlight Power off to DISP="Low" | 5 | ms |
| T1 | DISP="Low" to IC internal voltage discharge complete | 80 | ms |

# 8. PCAP TOUCHPANEL

Table 9

| Item | Specification | Unit |
|---|---|---|
| Touch panel Size | 2.8 inches | |
| Active Area (Sensor) | 45.4 (H) x 59.8 (V) | mm |
| Input type | 5 Point multi touch | |
| Controller | GT911 | |
| Interface mode | I²C | |
| Normal mode operating current | typ. 8 | mA |

## TIMING SPECIFICATIONS FOR CTP

I²C Communication

This module provides standard I²C interface for communication. In the system, this module always works in slave mode, all communications are initiated by master, and the baud rate can be up to 400K bps. The definition of I²C timing is as following:
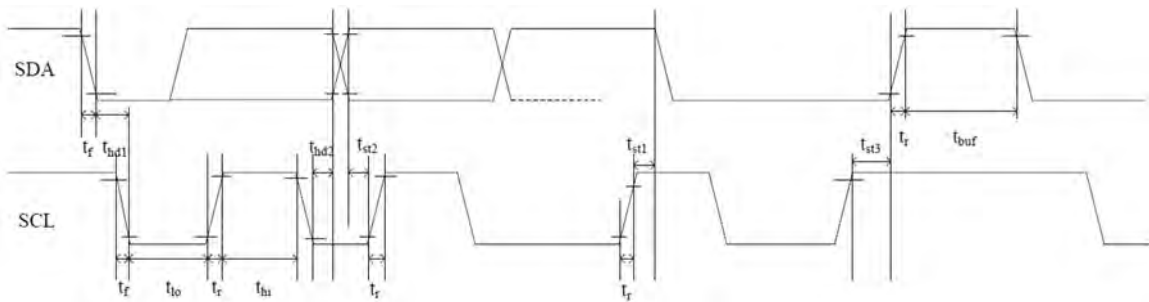


Fig.6 RGB Interface Timing Characteristics
Test condition: 3.3V communication interface, 400Kbps, pull up resistor is 2K ohm

| Parameter | Symbol | MIN. | Max. | Unit |
|---|---|---|---|---|
| SCL low period | $t_{lo}$ | 0.9 | - | us |
| SCL high period | $t_{hi}$ | 0.8 | - | us |
| SCL setup time for START condition | $t_{st1}$ | 0.4 | - | us |
| SCL setup time for STOP condition | $t_{st3}$ | 0.4 | - | us |
| SCL hold time for START condition | $t_{hd1}$ | 0.3 | - | us |
| SDA setup time | $t_{st2}$ | 0.4 | - | us |
| SDA hold time | $t_{hd2}$ | 0.4 | - | us |

This module has 2 sets of slave address 0xBA/0xBB & 0x28/29. Master can control Reset & INT pin to configure the slave address in power on initial state like following:
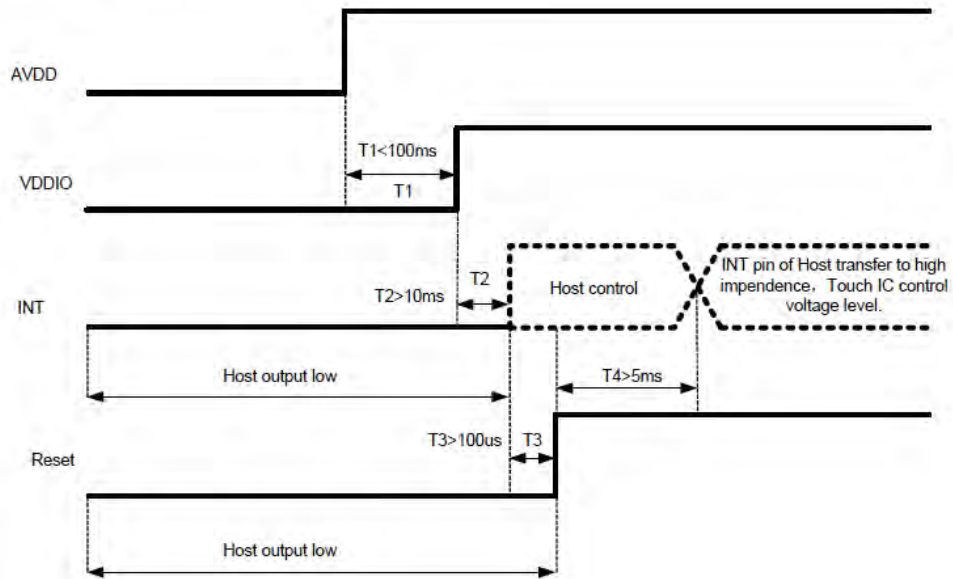
## Power on diagram:



Fig.7 Power on diagram
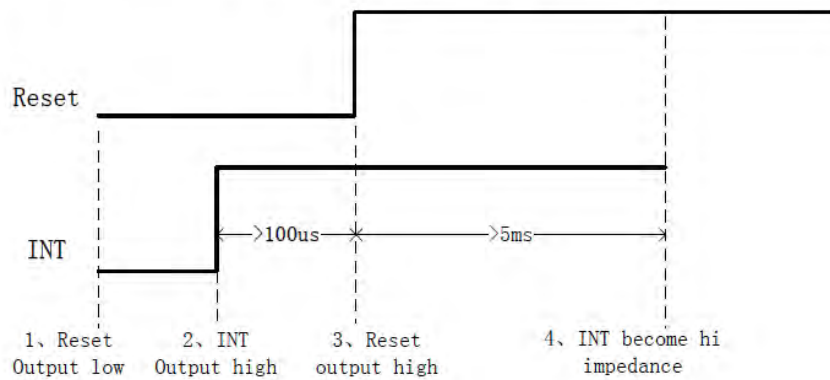
## Timing of setting slave address to 0x28/0x29:



Fig.8(a) Timing of setting slave address

## Timing of setting slave address to 0xBA/0xBB:
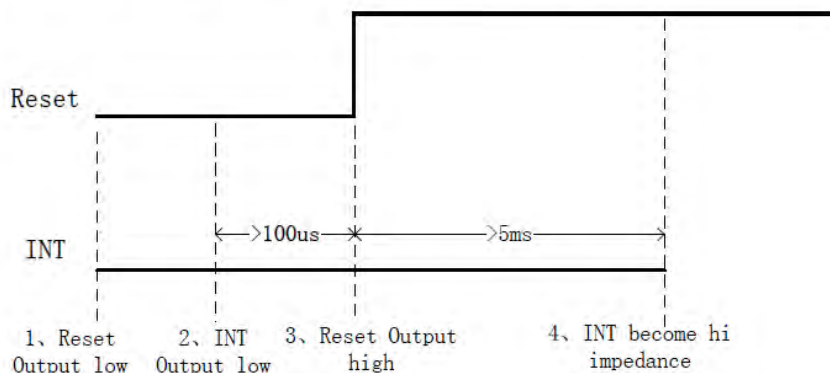


Fig.8(b) Timing of setting slave address

## Data Transmission

(ex: slave address is 0xBA/0xBB)

Communication is always initiated by master, A high-to-low transition of SDA with SCL high is a start condition.

All addressing signal are serially transmitted to and from on bus in 8-bit word. This module sends a "0" to acknowledge when the addressing word is 0xBA/BB (or 0x28/0x29 ). This happens during the ninth clock cycle. If the slave address is not matched, this module will stay in idle state.

The data words are serially transmitted to and from in 9-bit formation: 8-bit data+1-bit ACK or NACK sent by module. Data changes during SCL low periods & keeps valid during SCL high.

A low-to-high transition of SDA with SCL high is a stop condition.

## Write Data to module

(ex: slave address is 0xBA/0xBB)
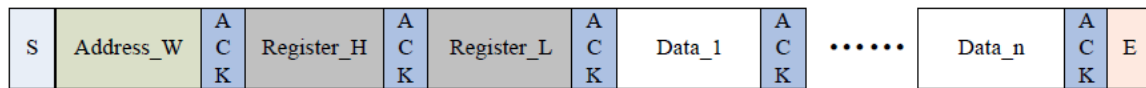


Please check the above figure, master start the communication first, and then sends device address 0XBA preparing for a write operation.

After receiving ACK from module, master sends out 16-bit register address, and then the data word in 8-bit, which is going to be wrote into module.

The address pointer of module will automatically increase one after one byte writing, so master can sequentially write in one operation. When operation finished, master stop the communication.

## Read Data from module

(ex: slave address is 0xBA/0xBB)
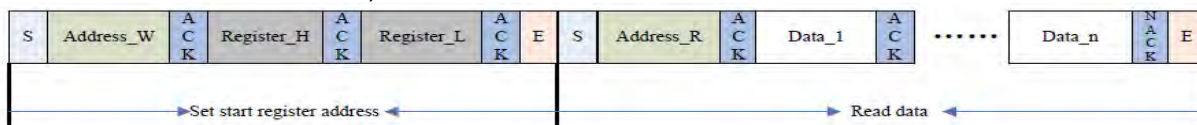


Please check the above figure, master start the communication first, and then sends device address 0xBA for a write operation.

After receiving ACK from module, master sends out 16-bit register address, to set the address pointer of module. After receiving ACK, master produce start signal once again & send device address 0xBB , then read data word from module in 8-bit.

Module also supports sequential read operation, and the default setting is sequential read mode. Master shall send out ACK after every byte reading successfully but NACK after the last one. Then sends stop signal to finish the communication.

## REGISTER INFORMATION OF MODULE

### a) Real Time Order

(Write Only)

| Addr | Name | bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|---|---|---|---|---|---|---|---|---|---|
| 0x8040 | Command | 0：read coordinate 1：read diff data or raw data 2：software reset3:baseline update 4: baseline calibration 5: screen off 3&4 are still internal test | | | | | | | |

### b) Configuration Information

(R/W)

| | Config Data | bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|---|---|---|---|---|---|---|---|---|---|
| 0x8047 | Config_Version | Version of the configuration | | | | | | | |
| 0x8048 | X Output Max (Low Byte) | Resolution of X axis | | | | | | | |
| 0x8049 | X Output Max (High Byte) | | | | | | | | |
| 0x804A | Y Output Max (Low Byte) | Resolution of Y axis | | | | | | | |
| 0x804B | Y Output Max (High Byte) | | | | | | | | |
| 0x804C | Touch Number | Reserved | | | | Touch number：1~5 | | | |
| 0x804D | Module_Switch1 | Reserved | | Stretch_rank | | X2Y | Reserved | INT trigger method 00：rising edge trigger 01：falling edge trigger | |

| | | | | 02：low level enquiry 03：high level enquiry |
|---|---|---|---|---|
| 0x804E | Module_switch2 | Reserved | | |
| 0x804F | Shake_Count | Reserved | | Finger shake count |
| 0x8050 | Filter | First_Filter | Normal_Filter (filtering value of original coordinate window, coefficiency is 1) | |
| 0x8051 | Large_Touch | Number of touch in large area | | |
| 0x8052 | Noise_Reduction | Reserved | | Value of noise elimination (coefficient is 1, 0~15) |
| 0x8053 | Screen_Touch_Level | Threshold of touch grow out of nothing | | |
| 0x8054 | Screen_Leave_Level | Threshold of touch grow out of nothing | | |
| 0x8055 | Low_Power_Control | Reserved | | Time to low power consumption (0~15s) |
| 0x8056 | Refresh_Rate | Reserved | | Coordinate report rate (Cycle: 5+N ms) |
| 0x8057 | x_threshold | Reserved | | |
| 0x8058 | y_threshold | | | |
| 0x8059 | X_Speed_Limit | Reserved | | |
| 0x805A | Y_Speed_Limit | | | |
| 0x805B | Space | Blank area of boarder-top (coefficient is 32) | | Blank area of Boarder-bottom (coefficient is 32) |
| 0x805C | | Blank area of boarder-left (coefficient is 32) | | Blank area of Boarder-right (coefficient is 32) |
| 0x805D | Stretch_Rate | Reserved | | Level of weak stretch (Stretch X/16 Pitch) (beta version is valid，published version is not.) |
| 0x805E | Stretch_R0 | Interval 1 coefficient | | |
| 0x805F | Stretch_R1 | Interval 2 coefficient | | |
| 0x8060 | Stretch_R2 | Interval 3 coefficient | | |
| 0x8061 | Stretch_RM | All intervals base number | | |
| 0x8062 | Drv_GroupA_Num | All_Driving | Reserved | Driver_Group_A_number |
| 0x8063 | Drv_GroupB_ | Reserved | | Driver_Group_B_number |

| | Num | | | |
|---|---|---|---|---|
| 0x8064 | Sensor_Num | Sensor_Group_B_Number | | Sensor_Group_A_Number |
| 0x8065 | FreqA_factor | Driver frequency double frequency coefficient of Driver group A<br>GroupA_Frequence = Multiplier factor * baseband | | |
| 0x8066 | FreqB_factor | Driver frequency double frequency coefficient of Driver group B<br>GroupB_Frequence = Multiplier factor * baseband | | |
| 0x8067 | Pannel_BitFreqL | Baseband of Driver group A\B (1526HZ<baseband<14600Hz) | | |
| 0x8068 | Pannel_BitFreqH | | | |
| 0x8069 | Pannel_Sensor_TimeL | Time interval of the neibouring two driving signal (Unit: us), Reserved. | | |
| 0x806A | Pannel_Sensor_TimeH | | | |
| 0x806B | Pannel_Tx_Gain | Reserved | Pannel_Drv_output_R<br>4 gears | Pannel_DAC_Gain<br>0:Gain maximum<br>7: Gain minimum |
| 0x806C | Pannel_Rx_Gain | Pannel_PGA_C | Pannel_PGA_R | Pannel_Rx_Vcmi (4 gears) | Pannel_PGA_Gain (8 gears) |
| 0x806D | Pannel_Dump_Shift | Reserved | | Magnification coefficient of original value (The Nth power of 2) |
| 0x806E | Drv_Frame_Control | Reserved | SubFrame_DrvNum | Repeat_Num |
| 0x806F | NC | Reserved | | |
| 0x8070 | NC | Reserved | | |
| 0x8071 | NC | Reserved | | |
| 0x8072 | Stylus_Tx_Gain | Undefined    (invalid when stylus_priority=0) | | |
| 0x8073 | Stylus_Rx_Gain | Undefined    (invalid when stylus_priority=0) | | |
| 0x8074 | Stylus_Dump_Shift | Magnification coefficient of original value (The Nth power of 2), Reserved | | |
| 0x8075 | Stylus_Driver_Touch_Level | Stylus effective threshold (driving), Reserved | | |
| 0x8076 | Stylus_Sensor_Touch_Level | Stylus effective threshold (sensing), Reserved | | |
| 0x8077 | Stylus_Control | Pen mode escape time out period (Unit: Sec) | | |
| 0x8078 | Base_reduce | S-Style improve quantity | | Reserved |
| 0x8079 | NC | Reserved | | |

| | | | | | |
|---|---|---|---|---|---|
| 0x807A | Freq_Hopping_Start | Frequency hopping start frequency (Unit: 2KHz, 50 means 100KHz ) | | | |
| 0x807B | Freq_Hopping_End | Frequency hopping stop frequency (Unit: 2KHz, 150 means 300KHz ) | | | |
| 0x807C | Noise_Detect_Times | Detect_Stay_Times | Detect_Confirm_Times | | |
| 0x807D | Hopping_Flag | Hopping_En | Reserved | Detect_Time_Out | |
| 0x807E | Hoppging_Threshold | Large_Noise_Threshold | | Hopping_Hit_Threshold | |
| 0x807F | Noise_Threshold | Threshold of noise level | | | |
| 0x8080 | NC | Reserved | | | |
| 0x8081 | NC | Reserved | | | |
| 0x8082 | Hopping_seg1_BitFreqL | Frequency hopping segment band 1 central frequency (for driver A/B) | | | |
| 0x8083 | Hopping_seg1_BitFreqH | | | | |
| 0x8084 | Hopping_seg1_Factor | Frequency hopping segment 1 central frequency coefficient | | | |
| 0x8085 | Hopping_seg2_BitFreqL | Frequency hopping segment band 2 central frequency (for driver A/B) | | | |
| 0x8086 | Hopping_seg2_BitFreqH | | | | |
| 0x8087 | Hopping_seg2_Factor | Frequency hopping segment 2 central frequency coefficient | | | |
| 0x8088 | Hopping_seg3_BitFreqL | Frequency hopping segment band 3 central frequency (for driver A/B) | | | |
| 0x8089 | Hopping_seg3_BitFreqH | | | | |
| 0x808A | Hopping_seg3_Factor | Frequency hopping segment 3 central frequency coefficient | | | |
| 0x808B | Hopping_seg4_BitFreqL | Frequency hopping segment band 4 central frequency (for driver A/B) | | | |
| 0x808C | Hopping_seg4_ | | | | |

| | BitFreqH | |
|---|---|---|
| 0x808D | Hopping_seg4_Factor | Frequency hopping segment 4 central frequency coefficient |
| 0x808E | Hopping_seg5_BitFreqL | Frequency hopping segment band 5 central frequency (for driver A/B) |
| 0x808F | Hopping_seg5_BitFreqH | |
| 0x8090 | Hopping_seg5_Factor | Frequency hopping segment 5 central frequency coefficient |
| 0x8091 | NC | Reserved |
| 0x8092 | NC | Reserved |
| 0x8093 | Key 1 | Key 1 Position: 0-255 valid (0 means no touch, it means independent touch key when 4 of the keys are 8 multiples |
| 0x8094 | Key 2 | Key 2 position |
| 0x8095 | Key 3 | Key 3 position |
| 0x8096 | Key 4 | Key 4 position |
| 0x8097 | Key_Area | Time limit for long press(1~16 s) / Touch valid interval setting: 0-15 valid |
| 0x8098 | Key_Touch_Level | Key threshold of touch key |
| 0x8099 | Key_Leave_Level | Key threshold of touch key |
| 0x809A | Key_Sens | KeySens_1(sensitivity coefficient of key 1, same below) / KeySens_2 |
| 0x809B | Key_Sens | KeySens_3 / KeySens_4 |
| 0x809C | Key_Restrain | Finger from screen left after inhibition of key time(Unit:100ms,0 means 600ms) / The independent button pro key inhibition parameters |
| 0x809D | NC | Reserved |
| 0x809E | NC | Reserved |
| 0x809F | NC | Reserved |
| 0x80A0 | NC | Reserved |
| 0x80A1 | NC | Reserved |
| 0x80A2 | Proximity_Drv_Select | Drv_Start_Ch (start channel of driving direction) / Drv_End_Ch (End channel) |
| 0x80A3 | Proximity_Sens_Select | Sens_Start_Ch (start channel of sensing direction) / Sens_End_Ch (End channel) |
| 0x80A4 | Proximity_Touch_Level | Proximity effective threshold value |
| 0x80A5 | Proximity_Leave_Level | Proximity ineffective threshold value |

| 0x80A6 | Proximity_Sample_Add_Times | Frequency multification of proximity sensing channel. |
|---|---|---|
| 0x80A7 | Proximity_Sample_Dec_ValL | Sample value minus this value (16 bit), and accumulate, low byte. |
| 0x80A8 | Proximity_Sample_Dec_ValH | Sample value minus this value (16 bit), and accumulate, high byte. |
| 0x80A9 | Proximity_Leave_Shake_Count | exit proximity jitter count |
| 0x80AA | Self_Cap_Tx_gain | self-capacitance sends gains |
| 0x80AB | Self_Cap_Rx_gain | self-capacitance receive gains |
| 0x80AC | Self_Cap_Dump_Shift | Magnification coefficient of original value of self-capacitance (The Nth power of 2) |
| 0x80AD | SCap_Diff_Up_Level_Drv | Self capacitance suppress floating rising threshold (driving direction) |
| 0x80AE | Scap_Merge_Touch_Level_Drv | Self-capacitance Touch Level (driving direction) |
| 0x80AF | SCap_Pulse_TimeL | Self-capacitance sampling time (low byte) |
| 0x80B0 | SCap_Pulse_TimeH | Self-capacitance sampling time (high byte) |
| 0x80B1 | SCap_Diff_Up_Level_Sen | Self capacitance suppress floating rising threshold (sensing direction) |
| 0x80B2 | Scap_Merge_Touch_Level_Sen | Self-capacitance Touch Level (sensing direction) |
| 0x80B3 | NC | Reserved |
| 0x80B4 | NC | Reserved |
| 0x80B5 | NC | Reserved |
| 0x80B6 | NC | Reserved |
| 0x80B7 ~ 0x80C4 | Sensor_CH0~Sensor_CH13 | ITO Sensor corresponding chip channel number |
| 0x80C5 ~ 0x80D4 | NC | Reserved |
| 0x80D5 ~ 0x80EE | Driver_CH0~Driver_CH25 | ITO Driver corresponding chip channel number |
| 0x80EF ~ | NC | Reserved |

| | | |
|---|---|---|
| 0x80FE | | |
| 0x80FF | Config_Chksum | configuration information verify   (the complement number of total byte from 0x8047 to 0x80FE) |
| 0x8100 | Config_Fresh | signal of updated configuration (the host writes) |

### c) Coordinates Information

| Addr | Access | bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|---|---|---|---|---|---|---|---|---|---|
| 0x8140 | R | Product ID ( first byte，ASCII ) | | | | | | | |
| 0x8141 | R | Product ID ( second byte，ASCII ) | | | | | | | |
| 0x8142 | R | Product ID ( third byte，ASCII ) | | | | | | | |
| 0x8143 | R | Product ID ( forth byte，ASCII ) | | | | | | | |
| 0x8144 | R | Firmware version ( HEX.low byte ) | | | | | | | |
| 0x8145 | R | Firmware version ( HEX.high byte ) | | | | | | | |
| 0x8146 | R | x coordinate resolution ( low byte ) | | | | | | | |
| 0x8147 | R | x coordinate resolution ( high byte ) | | | | | | | |
| 0x8148 | R | y coordinate resolution ( low byte ) | | | | | | | |
| 0x8149 | R | y coordinate resolution ( high byte ) | | | | | | | |
| 0x814A | R | Vendor_id ( current module option information ) | | | | | | | |
| 0x814B | R | Reserved | | | | | | | |
| 0x814C | R | Reserved | | | | | | | |
| 0x814D | R | Reserved | | | | | | | |
| 0x814E | R/W | buffer status | large detect | Reserved | | number of touch points | | | |
| 0x814F | R | track id | | | | | | | |
| 0x8150 | R | point 1 x coordinate (low byte) | | | | | | | |
| 0x8151 | R | point 1 x coordinate (high byte) | | | | | | | |
| 0x8152 | R | point 1 y coordinate (low byte) | | | | | | | |
| 0x8153 | R | point 1 y coordinate (high byte) | | | | | | | |
| 0x8154 | R | Point 1 size (low byte) | | | | | | | |
| 0x8155 | R | point 1 size (high byte) | | | | | | | |
| 0x8156 | R | Reserved | | | | | | | |
| 0x8157 | R | track id | | | | | | | |
| 0x8158 | R | point 2 x coordinate (low byte) | | | | | | | |
| 0x8159 | R | point 2 x coordinate (high byte) | | | | | | | |
| 0x815A | R | point 2 y coordinate (low byte) | | | | | | | |
| 0x815B | R | point 2 y coordinate (high byte) | | | | | | | |
| 0x815C | R | point 2 size (low byte) | | | | | | | |
| 0x815D | R | point 2 size (high byte) | | | | | | | |
| 0x815E | R | Reserved | | | | | | | |

| 0x815F | R | track id |
|--------|---|----------|
| 0x8160 | R | point 3 x coordinate (low byte) |
| 0x8161 | R | point 3 x coordinate (high byte) |
| 0x8162 | R | point 3 y coordinate (low byte) |
| 0x8163 | R | point 3 y coordinate (high byte) |
| 0x8164 | R | point 3 size (low byte) |
| 0x8165 | R | point 3 size (high byte) |
| 0x8166 | R | Reserved |
| 0x8167 | R | track id |
| 0x8168 | R | point 4 x coordinate (low byte) |
| 0x8169 | R | point 4 x coordinate (high byte) |
| 0x816A | R | point 4 y coordinate (low byte) |
| 0x816B | R | point 4 y coordinate (high byte) |
| 0x816C | R | point 4 size (low byte) |
| 0x816D | R | point 4 size (high byte) |
| 0x816E | R | Reserved |
| 0x816F | R | track id |
| 0x8170 | R | point 5 x coordinate (low byte) |
| 0x8171 | R | point 5 x coordinate (high byte) |
| 0x8172 | R | point 5 y coordinate (low byte) |
| 0x8173 | R | point 5 y coordinate (high byte) |
| 0x8174 | R | point 5 size (low byte) |
| 0x8175 | R | point 5 size (high byte) |
| 0x8176 | R | Reserved |
| 0x8177 | R | Reserved |

# FUNCTION MODE
Working Mode
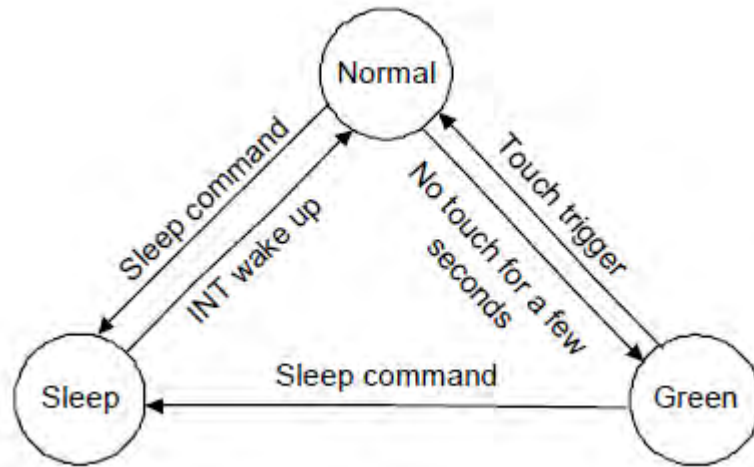


a) Normal Mode
When module is in Normal mode, touch scanning period is about 7ms ~ 10ms depending on the setting. The chip will automatically enter into Green mode if no touch for short time within 0~15s depending on setting and the step is 1s.

b) Green Mode
In Green mode, the touch scanning cycle is fixed as 40ms. It will automatically enter into Normal mode if any touch is detected.

c) Sleep Mode
For a lower consumption, Master can ask module to enter Sleep mode through I2C command (before the command, please drive low to INT pin). Drive high to the INT pin of module 2~5ms will make module return back to normal mode.
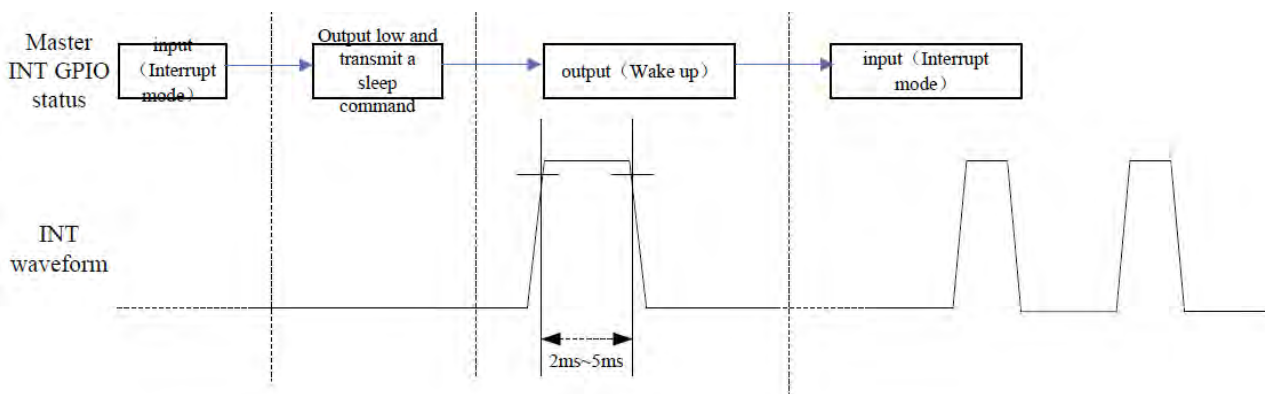


Pulse Calling
Module will inform master to read coordinate information only when touch event happen, in order to lighten the burden of master CPU. The master CPU will set trigger mode by register "INT". "0" means rising edge trigger, in this mode module will output a rising edge hopping in INT, to inform CPU; "1" means falling edge trigger.

Sleep Mode
When the display is turned off or in any circumstance that operation of touch panel is not necessary, master can set module be in Sleep mode through I2C command. The master can wake up module by outputting high to INT pin & keeping 2-5ms.

Frequency Hopping Function
This module has very strong anti-interference hardware, when the driver spectrum of module overlaid with spectrum of noise signal, it can be switch to another frequency by self-adaption frequency hopping mechanism, to avoid interference.

Automatic Calibration
a) Initialization Calibration
Different temperature, humidity and physical structure will affect the sensor's baseline. According to environmental situation module will update the baseline automatically in initialized 200ms.

b) Automatic Temperature Drift
Slow change of temperature, humidity or dust and other environmental factors will also affect the sensor's baseline. module calculates and analyses historical data, and compare to the current data variation. Base on this, the baseline will be calibration automatically.

For more information, refer to the data sheet GT911:
https://www.lcd-module.de/fileadmin/eng/pdf/zubehoer/GT911%20Datasheet_English%2020150625_Rev10.pdf.

# 9.Outline Dimension
## 9.1 EA R480X-43ALW



| Display Type | Transmissive,Normally Black |
| --- | --- |
| Display Resolution | 480(RGB)X272 |
| Viewing Angle | FREE |
| LCD Controller/Driver | SCT283 |
| LCD Driving Voltage | 3.3V |
| Operation Temperature | -20°C TO 70°C |
| Storage Temperature | -30°C TO 80°C |
| Backlight Speciality | 16PCS LEDS,VF=25.6V,IF=40mA |
| Remark | Without Front Bezel<br>Luminance: 1000cd/m²<br>Use Jul-Fei CBS2606W LED<br>All materials in the drawing comply with the ROHS |

TITLE:
LCM Outline

PROJECT NO: EA R480X-ALW

DESCRIPTION: 4.3 Inch TFT with high brightness

GENERAL TOLERANCE: ±0.2

| | NAME | SIGN | DATE |
| --- | --- | --- | --- |
| DRAWN | Marvin Zhou | | 2019.08.14 |
| CHECKED | Marvin Zhou | | 2019.08.14 |
| REV: 2.0 | UNIT: MM | SCALE: 1/1 | SHEET: 1 OF 1 |

THIRD ANGLE PROJECTION

| PIN | TFT ASSIGNMENT |
| --- | --- |
| 1 | SYMBLE |
| 2 | VLED- |
| 3 | VLED+ |
| 4 | NC |
| 5 | VDD |
| 6 | R0 |
| 7 | R1 |
| 8 | R2 |
| 9 | R3 |
| 10 | R4 |
| 11 | R5 |
| 12 | R6 |
| 13 | R7 |
| 14 | G0 |
| 15 | G1 |
| 16 | G2 |
| 17 | G3 |
| 18 | G4 |
| 19 | G5 |
| 20 | G6 |
| 21 | G7 |
| 22 | B0 |
| 23 | B1 |
| 24 | B2 |
| 25 | B3 |
| 26 | B4 |
| 27 | B5 |
| 28 | B6 |
| 29 | B7 |
| 30 | DCLK |
| 31 | NC |
| 32 | HSYNC |
| 33 | VSYNC |
| 34 | DE |
| 35 | NC |
| 36 | GND |
| 37 | NC(XR) |
| 38 | NC(YD) |
| 39 | NC(XL) |
| 40 | NC(YU) |

| ISSUE | MODIFY DESCRIPTION | DATE |
| --- | --- | --- |
| 1.0 | First Issue | 2019.03.06 |
| 2.0 | Remove the front bezel | 2019.03.07 |
| 3.0 | Modify location dimension and LED part number | 2019.03.08 |
| 2.0 | Modify Backlight LED PIN | 2019.08.02 |
| 2.0 | Modify FPC Location dimension | 2019.08.14 |

LED Diagram Circuit

## 9.2 EA TFT043-42BITC with Touchpanel



| Display Type | Transmissive, Normally Black |
|---|---|
| Display Resolution | 480(RGB)X272 |
| Viewing Angle | FREE |
| Controller/Driver | SC7283(TFT)+GT911(CTP) |
| Driving Voltage | 3.3V |
| Operation Temperature | -20°C TO 70°C |
| Storage Temperature | -30°C TO 80°C |
| Backlight Speciality | 16PCS LEDS,VF=25.6V,IF=40mA |
| Remark | Luminance: 800cd/m². Use JuFei CBS206W LED. All materials in the drawing comply with the ROHS |

LED Diagram Circuit

LEDA

LEDK

**TITLE:** LCM Outline

**PROJECT NO:** EA TFT043-42BITC

**DESCRIPTION:** 4.3 Inch TFT with high brightness+Custom CTP

**GENERAL TOLERANCE:** ±0.3

THIRD ANGLE PROJECTION

| | NAME | SIGN | DATE |
|---|---|---|---|
| DRAWN | Marvin Zhou | | 2019.11.08 |
| CHECKED | Marvin Zhou | | 2019.11.08 |
| REV: 1.0 | UNIT: MM | SCALE: 1/1 | SHEET: 1 OF 1 |

CTP ASSIGNMENT:
| PIN | SYMBLE |
|---|---|
| 1 | VDD |
| 2 | GND |
| 3 | RST |
| 4 | SCL |
| 5 | SDA |
| 6 | INT |

TFT ASSIGNMENT:
| PIN | SYMBLE |
|---|---|
| 1 | VLED+ |
| 2 | VLED+ |
| 3 | TFT/CTPGND |
| 4 | TFT/CTPVDD |
| 5 | R0 |
| 6 | R1 |
| 7 | R2 |
| 8 | R3 |
| 9 | R4 |
| 10 | R5 |
| 11 | R6 |
| 12 | R7 |
| 13 | G0 |
| 14 | G1 |
| 15 | G2 |
| 16 | G3 |
| 17 | G4 |
| 18 | G5 |
| 19 | G6 |
| 20 | G7 |
| 21 | B0 |
| 22 | B1 |
| 23 | B2 |
| 24 | B3 |
| 25 | B4 |
| 26 | B5 |
| 27 | B6 |
| 28 | B7 |
| 29 | TFT/CTPGND |
| 30 | DCLK |
| 31 | DISP |
| 32 | HSYNC |
| 33 | VSYNC |
| 34 | DE |
| 35 | NC |
| 36 | TFT RST |
| 37 | CTP RST |
| 38 | CTP SCL |
| 39 | CTP SDA |
| 40 | CTP INT |

| ISSUE | MODIFY DESCRIPTION | DATE |
|---|---|---|
| 1.0 | First Issue | 2019.11.01 |
| 2.0 | | 2019.11.05 |
| 3.0 | | 2019.11.07 |
| | | 2019.11.08 |

Printing and typographical errors reserved.
ELECTRONIC ASSEMBLY reserves the right to change specification without prior note.

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## 10. Reliability and Inspection Standard

| No. | Test Item | | Test Conditions | Remark |
|---|---|---|---|---|
| 1 | High Temperature | Storage | 80℃, 120Hr | Note |
| | | Operation | 70℃, 120Hr | Note |
| 2 | Low Temperature | Storage | -30℃, 120Hr | Note |
| | | Operation | -20℃, 120Hr | |
| 3 | High Temperature and High Humidity | | 40℃, 90%RH, 120Hr | Note |
| 4 | Thermal Cycling Test(No operation) | | -20C for 30min, 70c for 30 min. 100 cycles. Then test at room temperature after 1 hour | Note |
| 5 | Vibration Test(No operation) | | Frequency :10~55 HZ; Stroke :1.5 mm;Sweep:10HZ~55HZ~10HZ; 2hours for each direction of X, Y, Z(6 hours for total) | |
| 6 | Package Drop Test | | Height:60 cm,1 corner, 3 edges, 6 surfaces | |
| 7 | Electro Static Discharge | | ±2KV,Human Body Mode, 100pF/1500Ω | |

Note:
1) Sample quantity for each test item is 5~10pcs.
2) Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Printing and typographical errors reserved.
ELECTRONIC ASSEMBLY reserves the right to change specification without prior note.
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# 11.PRECAUTIONS FOR USING LCD MODULES

## Handing Precautions

(1) The display panel is made of glass and polarizer. As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
- Isopropyl alcohol
- Ethyl alcohol
Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
- Water
- Ketone
- Aromatic solvents
Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.
- Do not alter, modify or change the shape of the tab on the metal frame.

- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

## Storage Precautions

When storing the LCD modules, the following precaution is necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desicant.
(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

## Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
-Terminal electrode sections.