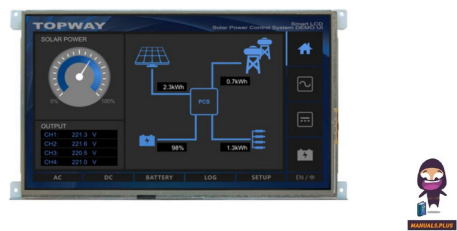


TOPWAY HKT101BTA-C LCD Module



# TOPWAY HKT101BTA-C LCD Module User Manual

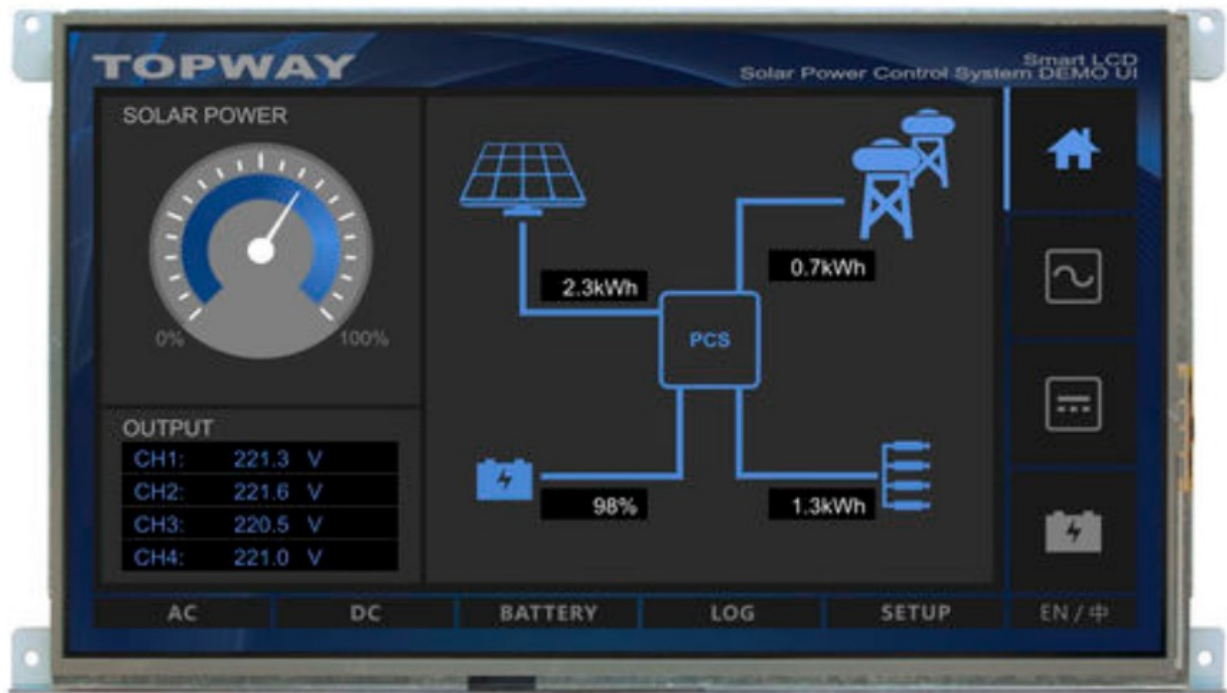
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TOPWAY HKT101BTA-C LCD Module



## Product Usage Instructions

### Installation

Follow the installation guidelines provided in the user manual to mount the LCD module securely.

### Power Connection

Ensure proper power supply connections as per the electrical characteristics mentioned in the manual.

### Interface Connections

Connect the UART Interface Terminal (K3) and USB TYPE-C Interface Terminal (K2) based on your requirements.

### Display Operation

Use the TOPWAY SGTools for preload and pre-design display interfaces. Refer to the Basic Operation Function Descriptions for detailed information on operating the display.

## FAQ

- **Q: What is the recommended operating temperature range for the LCD module?**

A: The recommended operating temperature range is provided in the specifications section of the user manual.

- **Q: Can I use the LCD module for medical electronics applications?**

A: Yes, the LCD module is suitable for medical electronics applications as mentioned in the product description.

## Basic Specification

TOPWAY HKT101BTA-C is a Smart TFT Module with 32bit MCU on board. Its graphics engine provides numbers of outstanding features. It supports TOPWAY SGTools for preload and pre-design display interface that simplifies the host operation and development time. Suitable for industry control, instrumentation, medical electronics, power electric equipment applications.

## General Specification

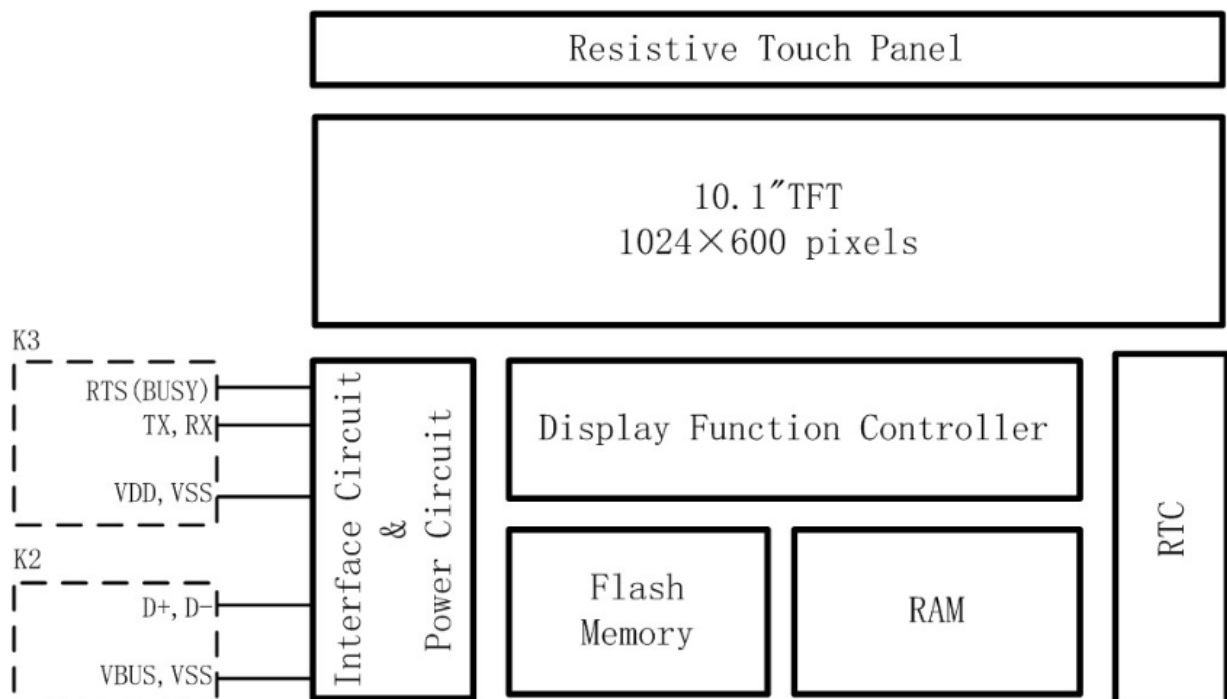
- **Screen Size(Diagonal): 10.1"**

- **Resolution:** 1024(RGB) x 600
- **Color Depth:** 65k color (16bit)
- **Pixel Configuration:** RGB Stripe
- **Display Mode:** Transmissive / Normal Black
- **Viewing Direction:** 6H (\*1) (gray-scale inverse) 12H (\*2)
- **Outline Dimension:** 271 x 190x 40 (mm) (see attached drawing for details)
- **Active Area:** 222.72 x 125.28(mm)
- **Backlight:** LED
- **Command VF:** RS-232C
- **Project Download:** by PC or by U-Drive (with OTG cable)
- **Surface Treatment:** Anti-Glare Treatment
- **Touch Panel:** Resistive Touch Panel
- **Operating Temperature:** -20 ~ +70°C
- **Storage Temperature:** -30 ~ +80°C
- **Highlight:**
  - RTC with battery, Support 90 degrees rotation,
  - Lua script engine, Buzzer 256MB Flash

#### Note:

1. For saturated color display content (eg. pure-red, pure-green, pure-blue, or pure-colours-combinations).
2. For “color scales” display content.
3. Color tone may slightly change by Temperature and Driving Condition.

#### Block Diagram



#### Terminal Function

### 1. UART Interface Terminal (K3)

| Pin No. | Pin Name  | I/O | Descriptions   |
|---------|-----------|-----|--|
| 1,      | VDD       | P   | Power supply   |
| 2       | RX        | I   | Data Input   |
| 3       | TX        | O   | Data output  |
| 4       | RTS(BUSY) | O   | Request To Send (function as busy BUSY signal)<br>1 Busy 0 No busy |
| 5       | NC        | NC  | No connection  |
| 6       | VSS       | P   | Ground, (0V)   |

#### Note.

1. User data and commands transfer through this terminal
2. HW hand shake is suggested

### 2. USB TYPE-C Interface Terminal (K2)

| Pin No. | Pin Name | IO    | Descriptions                |
|---------|----------|-------|-----------------------------|
| A1/B12  | VSS      | Power | Power Supply GND (0V)       |
| A4/B9   | VBUS     | Power | Positive Power Supply(5.0V) |
| A5/B5   | ID       | I     | USB_ID,1:Client , 0:HOST    |
| A6/B6   | D+       | I/O   | USB D+ Signal               |
| A7/B7   | D-       | I/O   | USB D- Signal               |
| A8/B8   | NC       | –     | No connection               |
| B4/A9   | VBUS     | Power | Positive Power Supply(5.0V) |
| A12/B1  | VSS      | Power | Power Supply GND (0V)       |

#### Note.

1. XML files and image files preload through this terminal.
2. Do NOT connect USB TYPE-C terminal ,while VDD(K3) is present.

### Absolute Maximum Ratings

| Items                 | Symbol | Min. | Max. | Unit | Condition       |
|-----------------------|--------|------|------|------|-----------------|
| Power Supply voltage  | VDD    | -0.3 | 26   | V    |                 |
| Operating Temperature | TOP    | -20  | 70   | °C   | No Condensation |
| Storage Temperature   | TST    | -30  | 80   | °C   | No Condensation |

**Note:**

1. This rating applies to all parts of the module and should not be exceeded.
2. The operating temperature only guarantees operation of the circuit. The contrast, response speed, and the other specification related to electro-optical display quality is determined at the room temperature, TOP=25°C
3. Ambient temperature when the backlight is lit (reference value)
4. Any stresses exceeding the Absolute Maximum Ratings may cause substantial damage to the device. Using the display under conditions beyond those listed is not advised, which will affect device's reliability.

## Electrical Characteristics

### 1. DC Characteristics

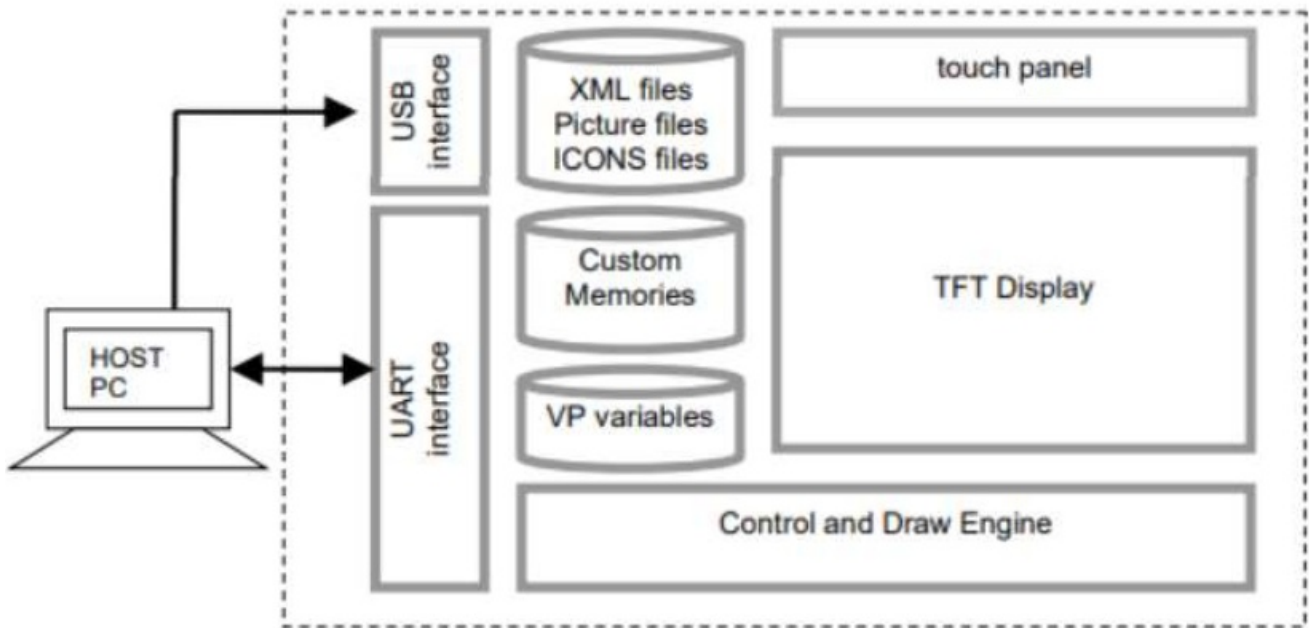
| Items                  | Symbol | MIN. | TYP. | MAX.  | Unit | Applicable Pin |
|------------------------|--------|------|------|-------|------|----------------|
| Operating Voltage      | VDD    | 11   | 12.0 | 26    | V    | VDD            |
| RxD Input MARK(1)      | VRxDM  | -3.0 | —    | -15.0 | V    | Rx             |
| RxD Input SPACE(0)     | VRXDS  | +3.0 | —    | +15.0 | V    | Rx             |
| TxD Output MARK(1)     | VTXDM  | -3.0 | —    | -15.0 | V    | Tx             |
| TxD Output SPACE(0)    | VTXDS  | +3.0 | —    | +15.0 | V    | Tx             |
| RTS Output High        | VTXDH  | -3.0 | —    | -15.0 | V    | RTS(BUSY)      |
| RTS Output Low         | VTXDL  | +3.0 | —    | +15.0 | V    | RTS(BUSY)      |
| Operating Current      | IDD    | —    | 350  | —     | mA   | VDD (*1)       |
| Battery Supply Current | IBAT   | —    | 0.6  | —     | uA   |                |

**Note.** Normal display condition and no usb connect.

## Function Specifications

### Basic Operation Function Descriptions

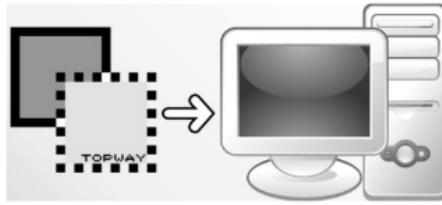
## HKT101BTA-C



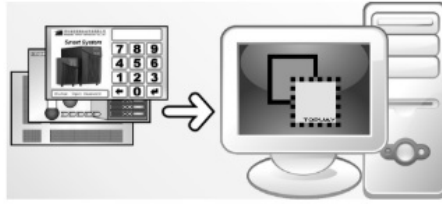
- XML files, Picture files, ICON files are stored inside FLASH memory area.
- They are preloaded to HKT101BTA-C for stand alone interface use.
- Those files are preloaded via USB interface as an USB drive.
- All the interface flow and the touch response are based on the preloaded XML files.
- VP variables memory is inside RAM area.
- it provides real time access via UART by the HOST or display onto the TFT by XML file.
- Custom Memories are inside FLASH memory area.
- It can be accessed via UART interface by the HOST.
- Control and Draw Engine executes HOST commands and response respectively.
- It also reports the real time Touch Key number to the HOST.

### Quick Start Guide

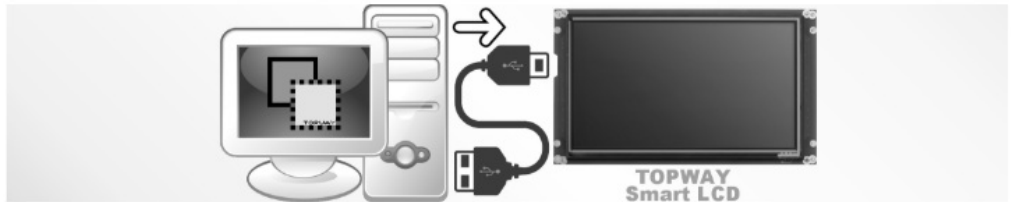
1. Install TOPWAY Graphics Editor



2. Import pictures design UI flow



3. Download to Smart LCD



4. power on & display



5. Connect to host Show real time data



## Command Descriptions

Please refer to "SMART LCD Command Manual".

## Optical Characteristics

| Item           | Symbol     | Condition          | Min             | Typ   | Max   | Unit   | Remark   |
|----------------|------------|--------------------|-----------------|-------|-------|--------|----------|
| View Angles    | $\theta T$ | $CR \geq 10$       | 65              | 75    | —     | Degree | Note 2,3 |
|                | $\theta B$ |                    | 70              | 80    | —     |        |          |
|                | $\theta L$ |                    | 70              | 80    | —     |        |          |
|                | $\theta R$ |                    | 70              | 80    | —     |        |          |
| Contrast Ratio | CR         | $\theta = 0^\circ$ | 400             | 500   | —     |        | Note 3   |
| Response Time  | TON        | 25°C               | —               | 16    | 28    | ms     | Note 4   |
|                | TOFF       |                    |                 |       |       |        |          |
| Chromaticity   | White      | x                  | Backlight is on | 0.263 | 0.313 | 0.363  | Note 1,5 |
|                |            | y                  |                 | 0.267 | 0.329 | 0.379  |          |
|                | Red        | x                  |                 | 0.524 | 0.574 | 0.624  | Note 1,5 |
|                |            | y                  |                 | 0.285 | 0.335 | 0.385  |          |
|                | Green      | x                  |                 | 0.280 | 0.330 | 0.380  | Note 1,5 |
|                |            | y                  |                 | 0.525 | 0.575 | 0.625  |          |
|                | Blue       | x                  |                 | 0.108 | 0.158 | 0.208  | Note 1,5 |
|                |            | y                  |                 | 0.090 | 0.140 | 0.190  |          |
| Uniformity     | U          |                    | 70              | 80    | —     | %      | Note 6   |
| NTSC           |            |                    | —               | 47    | —     | %      | Note 5   |
| Luminance      | L          |                    | —               | 250   | —     | cd/    | Note 7   |

1. IF= 20 mA, and the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

#### Note 1:

The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment SR-3A (1°)

Measuring condition:

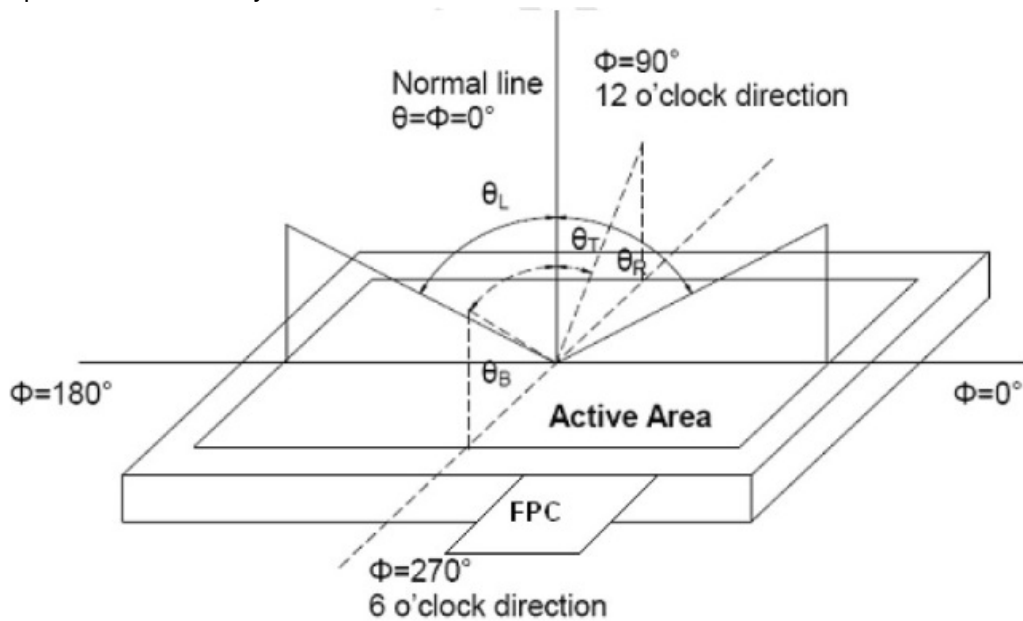
- Measuring surroundings: Dark room
- Measuring temperature:  $T_a = 25^\circ\text{C}$ .
- Adjust operating voltage to get optimum contrast at the center of the display.



**Note 2:**

The definition of viewing angle:

Refer to the graph below marked by  $\theta$  and  $\Phi$ .

**Note 3:**

The definition of contrast ratio (Test LCM using SR-3A (1°)):

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance When LCD is at "White" state}}{\text{Luminance When LCD is at "Black" state}}$$

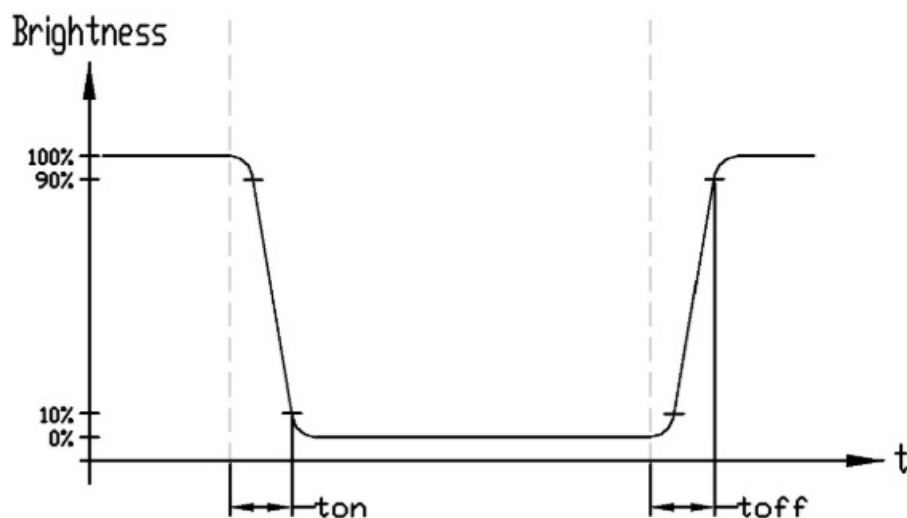
(Contrast Ratio is measured in optimum common electrode voltage)

**Note 4:**

Definition of Response time. (Test LCD using BM-7A(2°)):

The output signals of photodetector are measured when the input signals are changed from "black" to "white" (falling time) and from "white" to "black" (rising time), respectively.

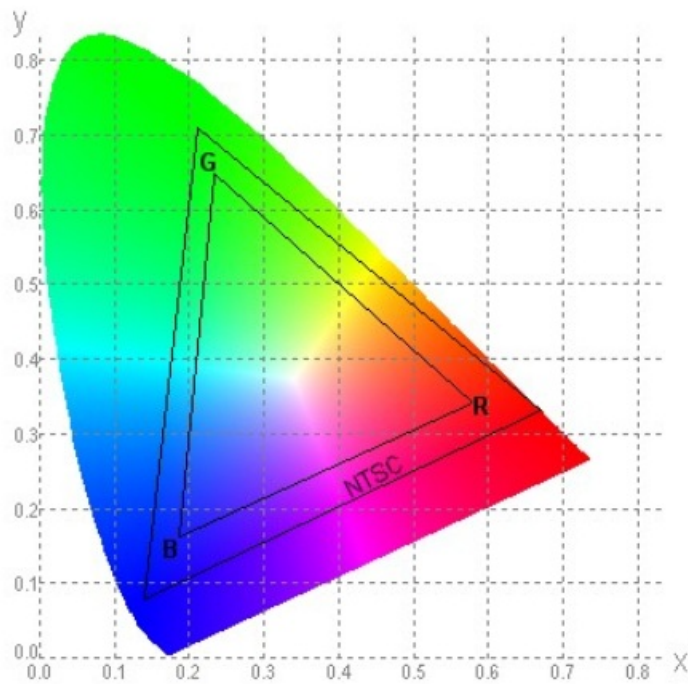
The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.

**Note 5:**

Definition of Color of CIE1931 Coordinate and NTSC Ratio.

Color gamut:

$$S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$$



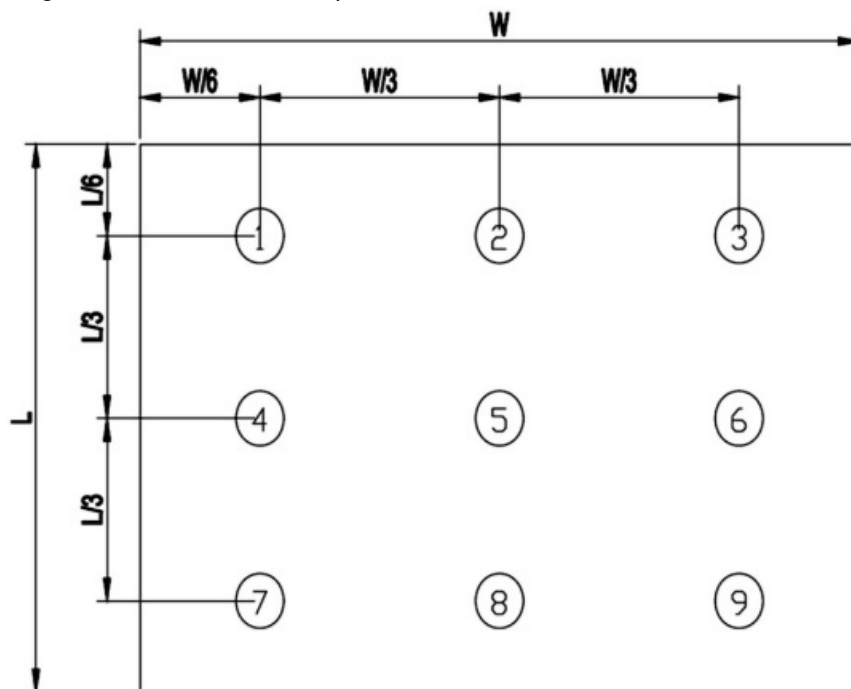
**Note 6:**

The luminance uniformity is calculated by using the following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.



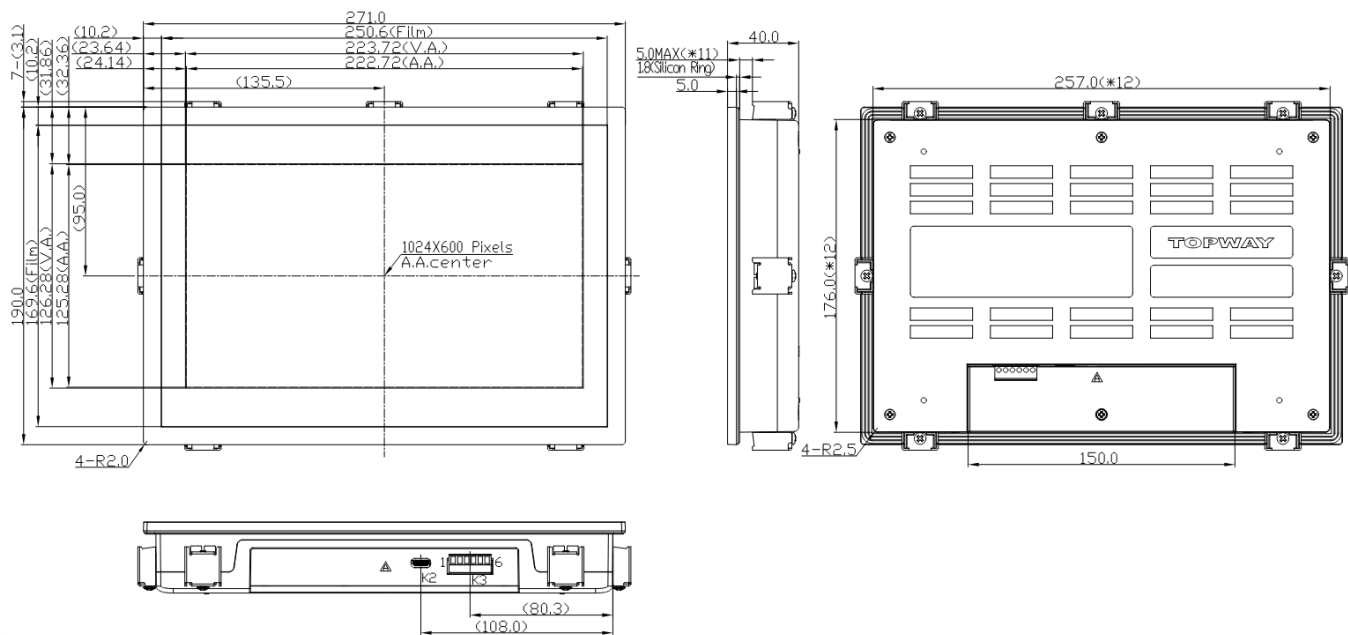
**LCD Module Design and Handling Precautions**

- Please ensure V0, VCOM is adjustable, to enable LCD module get the best contrast ratio under different temperatures, view angles and positions.
- Normally display quality should be judged under the best contrast ratio within the viewable area. Unexpected

display pattern may come out under abnormal contrast ratio.

- Never operate the LCD module exceed the absolute maximum ratings.
- Never apply signal to the LCD module without power supply.
- Keep signal line as short as possible to reduce external noise interference.
- IC chip (e.g. TAB or COG) is sensitive to light. Strong light might cause malfunction. Light sealing structure casing is recommended.
- Make sure there is enough space (with cushion) between case and LCD panel, to prevent external force passed on to the panel; otherwise that may cause damage to the LCD and degrade its display result.
- Avoid showing a display pattern on screen for a long time (continuous ON segment).
- LCD module reliability may be reduced by temperature shock.
- When storing and operating LCD module, avoids exposure to direct sunlight, high humidity, high or low temperature. They may damage or degrade the LCD module.
- Never leave LCD module in extreme condition (max./min storage/operate temperature) for more than 48hr.
- Recommend LCD module storage conditions is 0 C~40 C <80%RH.
- LCD module should be stored in the room without acid, alkali and harmful gas.
- Avoid dropping & violent shocking during transportation, and no excessive pressure press, moisture and sunlight.
- LCD module can be easily damaged by static electricity. Please maintain an optimum anti-static working environment to protect the LCD module. (eg. ground the soldering irons properly)
- Be sure to ground the body when handling LCD module.
- Only hold LCD module by its sides. Never hold LCD module by applying force on the heat seal or TAB.
- When soldering, control the temperature and duration avoid damaging the backlight guide or diffuser which might degrade the display result such as uneven display.
- Never let LCD module contact with corrosive liquids, which might cause damage to the backlight guide or the electric circuit of LCD module.
- Only clean LCD with a soft dry cloth, Isopropyl Alcohol or Ethyl Alcohol. Other solvents (e.g. water) may damage the LCD.
- Never add force to components of LCD module. It may cause invisible damage or degrade the module's reliability.
- When mounting LCD module, please make sure it is free from twisting, warping and bending.
- Do not add excessive force on surface of LCD, which may cause the display color change abnormally.
- LCD panel is made with glass. Any mechanical shock (e.g. dropping from high place) will damage the LCD module.
- Protective film is attached on LCD screen. Be careful when peeling off this protective film, since static electricity may be generated.
- Polarizer on LCD gets scratched easily. If possible, do not remove LCD protective film until the last step of installation.
- When peeling off protective film from LCD, static charge may cause abnormal display pattern. The symptom is normal, and it will turn back to normal in a short while.
- LCD panel has sharp edges, please handle with care.
- Never attempt to disassemble or rework LCD module.
- If display panel is damaged and liquid crystal substance leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes promptly wash it off using soap and water.

## DIMENSION



Note:

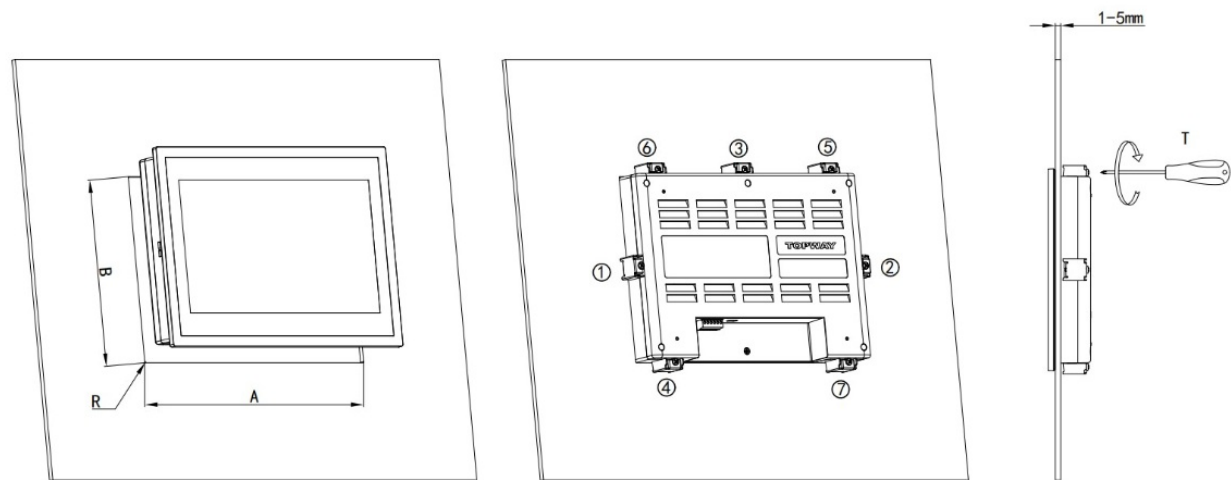
- \*1. LCD Display Type : TFT.Transmissive
- \*2. Pixel Arrangement : RGB-STRIPE
- \*3. Operating Voltage : 11.0-26.0V
- \*4. Color Depth : 65k Colors
- \*5. Backlight : White LED
- \*6. Touch Panel Type : Resistive Touch Panel
- \*7. User Interface : RS-232
- \*8. Terminal :
  - K2 : USB Type-C 16Pin
  - K3 : SY2EDGR-Y-3.81-6P Or Equivalent
- \*9. Operating Temperature : -20°C~70°C
- \*10. Storage Temperature : -30°C~80°C
- \*11. Applicable assemble panel thickness = 5.0MAX.
- \*12. Applicable assemble panel Opening(Min)
- \*13. Unmarked Tolerance :  $\leq 150, \pm 0.3$ ;  $> 150, \pm 0.5$

## Case With Brackets Mounting

### Front Mounting

- Application panel opening: The suggested assemble gap should be about 0.5~0.8mm on each side.
- Install the TFT module on strong flat surface for securing water and sealing.
- A silicon sealing ring ships with display module. It should be in place before assembling to the front panel.
- Pre-fixing: Slightly tighten the screws on beam clamp in sequence as picture on the right side.
- IFinal-fixing: Tighten the fixing screws on beam clamp in sequence as well with twist torque about 0.3-0.5N.m and put the beam clamp straight.

| Model/型号    | A     | B     | R     | T           |
|-------------|-------|-------|-------|-------------|
| HKT101BTA-C | 258mm | 177mm | 1.0mm | 0.3-0.5 N.m |




**Warranty**

This product has been manufactured to our company’s specifications as a part for use in your company’s general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

- We cannot accept responsibility for any defect, which may arise form additional manufacturing of the product (including disassembly and reassembly), after product delivery.
- We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.
- We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed our company’s acceptance inspection procedures.
- We cannot accept responsibility for intellectual property of a third part, which may arise through the application of our product to our assembly with exception to those issues relating directly to the structure or method of manufacturing of our product.

URL: [www.topwaydisplay.com](http://www.topwaydisplay.com)

**Documents / Resources**



深圳市拓普威科技有限公司  
SHENZHEN TOPWAY TECHNOLOGY CO., LTD.

HKT101BTA-C  
LCD Module User Manual

|             |         |          |
|-------------|---------|----------|
| Model No.   | Version | Page No. |
| HKT101BTA-C | 1.0     | 1/1      |

|      |                  |            |
|------|------------------|------------|
| Rev. | Rev. Description | Rev. Date  |
| 1.0  | Initial Release  | 2019-10-10 |

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HKT101BTA-C LCD Module, HKT101BTA-C, LCD Module, Module

References

- [User Manual](#)

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