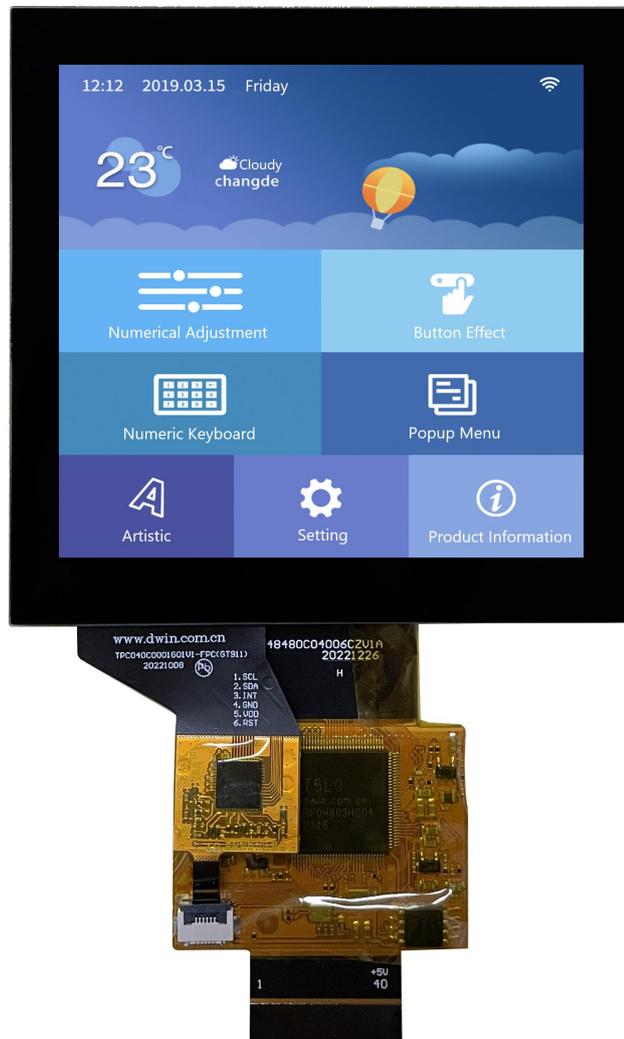


TC48480C040-06WTC

Features:

- Based on T5L0, running DGUS II system.
- 4 inch, 480*480 pixels resolution, 262K colors, IPS-TFT-LCD, wide viewing angle.
- Full lamination CTP, beautiful product and reliable structure.
- Special COF screen for Thermostat.



1 Interface definition

| Pin | Definition | Function |
|-------|-------------|---------------|
| 1~2 | GND | GND |
| 3~19 | IO1~IO17 | IO interface |
| 20 | RX2 | DIN |
| 21 | TX2 | DOUT |
| 22 | TR5 | 485 /TR |
| 23 | TR4 | 485 /TR |
| 24 | RX5 | 485 /UART_RX5 |
| 25 | TX5 | 485 /UART_TX5 |
| 26 | RX4 | 485 /UART_RX4 |
| 27 | TX4 | 485 /UART_TX5 |
| 28 | ADC6 | ADC6 |
| 29 | ADC7 | ADC7 |
| 30 | VBAT | RTC |
| 31 | SPK | Speaker |
| 32 | VCC_EN | Power |
| 33 | SD_CLK | SD_CLK |
| 34 | SD_CMD | SD_CMD |
| 35~38 | DATA0~DATA3 | DATA |
| 39~40 | +5V | Power |

2 Specification Parameters

2.1 Product Parameters

| | |
|-------------------------------|---|
| Main Chip | T5L0 |
| User Interface | 40Pin_0.5mm FPC |
| FLASH | 16M Bytes |
| UI Version | DGUSII / TA |
| Display Color | 262K colors |
| Dimensions | 4 inch |
| Resolution | 480*480 |
| Active Area (A.A.) | 71.86mm (W) * 70.18mm (H) |
| View Area (V.A.) | 71.86mm (W) * 67.96mm (H) |
| Viewing Angle | Wide viewing angel, typical value of 85°/85°/85°/85°(L/R/U/D) |
| Backlight Service Life | >20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness) |
| Brightness | 250nit |
| Brightness Control | 0~100 grade (When the brightness is adjusted to 1%~30% of the maximum brightness, flickering may occur and is not recommended to use in this range) |
| Type | CTP (Capacitive Touch Panel) |
| Structure | G+G structure |
| Touch Mode | Support point touch and drag |
| Surface Hardness | 6H |
| Light Transmittance | Over 90% |
| Life | Over 1,000,000 times touch |

2.2 Interface Parameters

| Item | Conditions | Min | Typ | Max | Unit |
|----------------------|---|------|--------|---------|------|
| Baud Rate | User Set(Configure the CFG file) | 3150 | 115200 | 3225600 | bps |
| Output Voltage (TXD) | Output 1 | 3.0 | 3.3 | - | V |
| | Output 0 | - | 0 | 0.3 | V |
| Input Voltage (RXD) | Input 1 | - | - | 3.3 | V |
| | Input 0 | 0 | - | 0.5 | V |
| Interface | UART2: TTL; UART4: RS485; (Only available after OS configuration) UART5: RS485; (Only available after OS configuration) | | | | |
| Data Format | UART2: N81; UART4: N81/E81/O81/N82; 4 modes (OS configuration) UART5: N81/E81/O81/N82; 4 modes (OS configuration) | | | | |

2.3 Electrical specifications

| | | |
|---|-------------------------------|-----------------------|
| Rated Power | <2W | |
| Operating Voltage | 4.5~5.5V, typical value of 5V | |
| Operating Current | 280mA | VCC=5V, max backlight |
| | 80mA | VCC=5V, backlight off |
| Recommended power supply: 5V 0.5A DC | | |

2.4 Operating Environment

| | |
|-----------------------|------------------------------------|
| Operating Temperature | -10°C~60°C |
| Storage Temperature | -20°C~70°C |
| Operating Humidity | 10%~90%RH, typical value of 60% RH |

3 Reliability Test

Before mass production of smart screens, a series of procedural reliability tests need to be conducted according to actual application requirements and product specification control standards to ensure product quality.

3.1 ESD Test

Test temperature: 25°C

Test process: the product was placed on the test bench to perform contact and air discharge in turn of the serial screen iron frame and display area. During the experimental process, it was observed whether the screen is dead, black, white, splash, or reboot. According to the experiment results, the performance is in line with the criteria GB/T 17626.2 B level and above.

| Discharge Type | Discharge Value | Result |
|-------------------|-----------------|------------------|
| Contact discharge | ±4KV | Normal operation |
| Air discharge | ±8KV | Normal operation |

3.2 High and Low Temperature Test

Test temperature:-20~70°C

Test process: the product will be placed obliquely in the high and low temperature test chamber for 12h for 20 on and off cycles. Then it will be check at room temperature after power on for the appearance and function, CTP offset situation, jumping point, page random switching and failure.

| Temperature | Result |
|------------------------|------------------|
| High temperature(70°C) | Normal operation |
| Low temperature(-20°C) | Normal operation |

4 Debugging tools

It is recommended for new users of DWIN smart LCMs to purchase official accessories. For more details, please refer to customer service center.



HDL 672 debug board

5 T5L0 ASIC

T5L0 ASIC is a low-power, cost-effective, GUI and application highly integrated single-chip dual-core ASIC designed by DWIN Technology for small-size LCD and mass produced in 2020.

(1) Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 250MHz, 1T(single instruction cycle)high speed operation.

(2) Separate GUI CPU core running DGUS II System:

- High-speed display memory, 2.4GB/S bandwidth. 18-bit color display resolution support up to 1024*768 (TA mode), 854*480 (DGUS mode).
- 2D hardware acceleration and the UI with animation and icons as its main feature is extremely cool and smooth.
- Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
- High quality ratio and sound restoration and playback.
- 128Kbytes variable storage space for exchanging data with OS CPU Core and memory.
- 2 10-bit 800KHz DC/DC controllers simplify LED backlight, analog power design and save cost and space.
- Support DGUS development and simulation on PC. Support back-end remote upgrade.

(3) Separate CPU (OS CPU) core runs user 8051 code or DWIN OS system and user CPU is omitted in practical application:

- Standard 8051 core and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.
- 64-bit integer mathematical operation unit (MDU), including 64-bit MAC and 64-bit divider.
- Built-in software WDT, 3 16-bit Timers, 12 interrupt signals support up to four levels of interrupt nesting.
- Support IAP online simulation and debugging with unlimited breakpoints.
- Upgrade code online through DGUS system.

(4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.

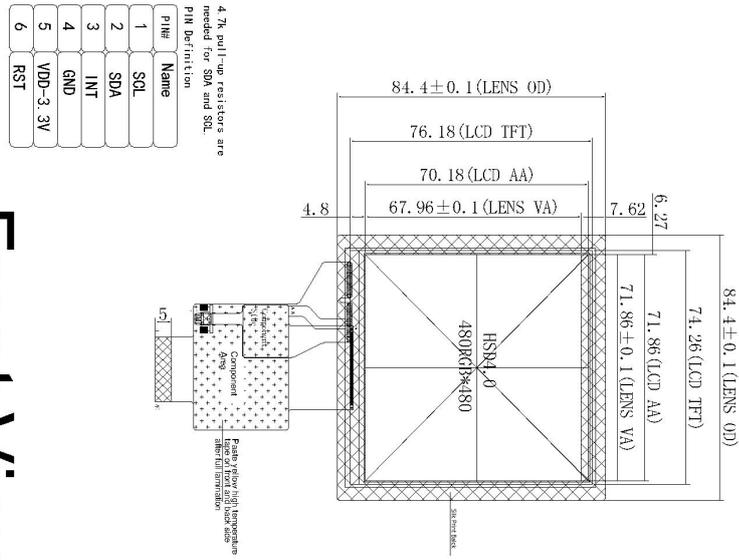
(5) Operating temperature ranges from -40°C to +85°C (IC operating temperature customizable from -55°C to 105°C).

(6) Low power consumption and strong anti-interference ability. It can work stably on double-sided PCB and passes EMC/EMI test easily.

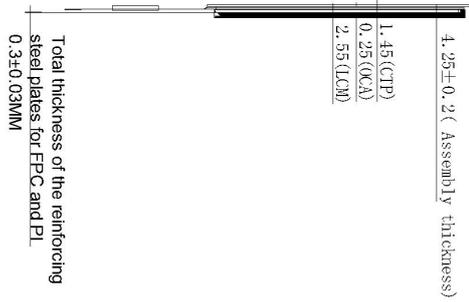
6 Packing Capacity & Dimension

| Dimension | | | | |
|------------------|--------------------------------|-------|----------------|---------------|
| Dimension | 84.4(W) * 84.4(H) * 4.25(T) mm | | | |
| Net Weight | 55g | | | |
| Packing Capacity | | | | |
| Model | Size | Layer | Quantity/Layer | Quantity(Pcs) |
| Carton: | 415mm(L)*250mm(W)*200mm(H) | - | - | 100 |

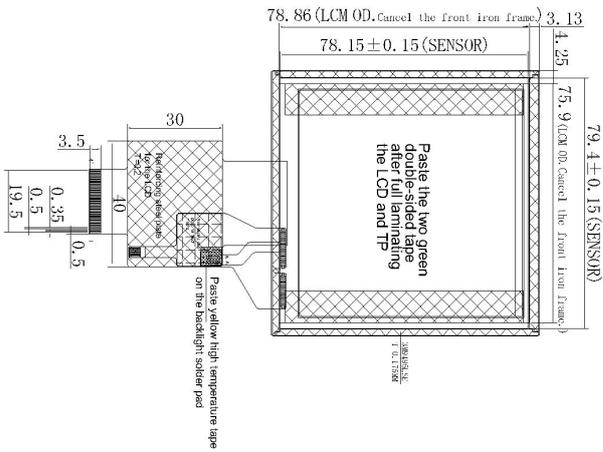
Disclaimer: The product design is subject to alternation and improvement without prior notice.



Front View



Side View



Back View

| Pin# | Name | 21 | TX2 |
|------|------|----|--------|
| 1 | GND | 22 | TR5 |
| 2 | GND | 23 | TR4 |
| 3 | I01 | 24 | RX5 |
| 4 | I02 | 25 | TX5 |
| 5 | I03 | 26 | RX4 |
| 6 | I04 | 27 | TX4 |
| 7 | I05 | 28 | AD06 |
| 8 | I06 | 29 | AD07 |
| 9 | I07 | 30 | VBAT |
| 10 | I08 | 31 | SPK |
| 11 | I09 | 32 | VCC_EN |
| 12 | I10 | 33 | SD_CLK |
| 13 | I11 | 34 | SD_CMD |
| 14 | I12 | 35 | DATA0 |
| 15 | I13 | 36 | DATA1 |
| 16 | I14 | 37 | DATA2 |
| 17 | I15 | 38 | DATA3 |
| 18 | I16 | 39 | +5V |
| 19 | I17 | 40 | +5V |
| 20 | RX2 | | |



IC: ST7701S
LCD: HSD040BPNI-A (IPS)

| REVISION RECORD | | VER | DATE | DWIN Technology Co., Ltd | |
|-----------------|---------------|------|----------|-------------------------------|-------------------|
| 1 | First release | V1-1 | 20230104 | FILE NAME : TC48480C040-06WTC | TOLERANCES : ±0.2 |
| 2 | | | | CUSTOMER NAME : | SENSE : |
| 3 | | | | DESIGN : | SCALE : 1:1 |
| 4 | | | | DESIGN BR : | DATE : |
| 5 | | | | CHECKED BR : | DATE : |
| 6 | | | | APPROVAL BR : | DATE : |



7 Record of Revision

| Rev | Date | Content | Editor |
|-----|------------|---------------|--------|
| 00 | 2023-04-23 | First Edition | YML |

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Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!

DWIN Technology Technical Document