

DT321X190020Z240101E

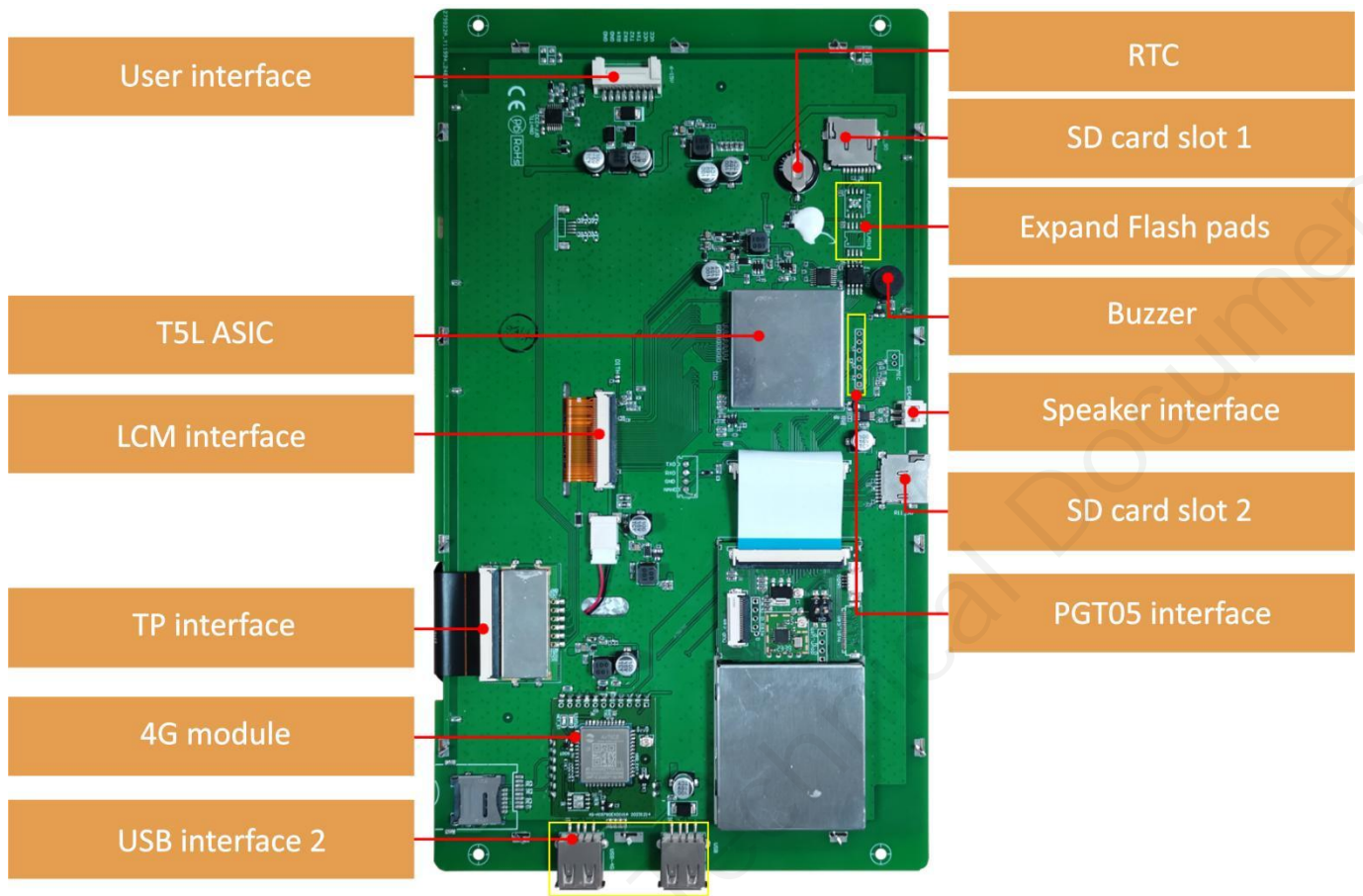
Features:

- Based on the T5L2 ASIC CPU, running the DGUS II human-machine interaction software platform, smart LCM for commercial-grade applications.
- 10.1-inch, 1024*600 pixels, 16.7 M colors true-color display, IPS LCD screen.
- Onboard R11 module for video decoding, enabling WIFI/4G connectivity and audio/video playback functionality.
- Capacitive touch screen with GG structure.



1. Hardware and interface

1.1 Hardware interface



Hardware interface

1.2 Hardware and interface description

| No. | Name | Description |
|-----|---------------------------|---|
| 1 | T5L2 ASIC | DWIN independently developed, mass production in 2019; patented encryption technology ensures code and data security; low power consumption, strong anti-interference capability, easily passes EMC/EMI tests with dual-sided PCB design |
| 2 | User interface | 8Pin_2.0mm socket for power supply and serial communication. Download rate(typical value): 12KByte/s |
| 3 | Flash | 32MBytes (2*16MBytes NOR Flash), can be used to store user UI files such as fonts, images, music, etc., with erase/write cycles >100,000 times |
| 4 | Expand Flash pads | Two expansion slots are available, supporting expansion of NOR Flash and NAND Flash. The maximum expansion for NOR Flash is up to 64Mbytes. When combining NOR Flash and NAND Flash, the maximum expansion is up to 48Mbytes (using one expansion slots) + 512Mbytes |
| 5 | RTC | Super-capacitor supplies power to RTC, accuracy: $\pm 20\text{ppm}$ @25°C. Can maintain normal operation for 7 days after power-off. Reserved button cell power supply compatible circuit |
| 6 | Buzzer | 3V passive buzzer |
| 7 | Speaker interface | 2Pin_2.0mm socket, external speaker interface |
| 8 | SD card slot | SD card slot 1 is for use with T5L2 and supports downloading all files (user UI files, CFG files, underlying kernel firmware). The screen displays download statistics, with a download speed of 4Mb/s. When downloading files, the SD card needs to be formatted in FAT32 format, with a recommended block size of 4096. SD card slot 2 is for use with the R11 video decoding module and can be used to store MP4 video files, among others. |
| 9 | USB interface | For use with the R11 video decoding module, it can be used to store MP4 video files or connect USB peripherals (such as USB cameras, etc.) |
| 10 | 4G module | Enable 4G connectivity |
| 11 | R11 video decoding module | Model:DG-T20-10B,Built-in WIFI module, supports 2.4GHz/5GHz frequency bands |
| 12 | PGT05 interface | Used for reprogramming the underlying DGUS firmware |

2. Specification parameters

2.1 Display parameters

| | |
|---|---|
| LCD Type | IPS process TFT display screen |
| Viewing Angle | Wide viewing angle (typical values are 85°/85°/85°/85°), high contrast, and good color reproduction |
| Resolution | 1024×600 pixels (0°/90°/180°/270°) |
| Color | 16.7M color (24-bit 8R8G8B) |
| View Area (V.A.) | 222.7mm (W)×125.3mm (H) |
| Active Area (A.A.) | 222.7mm (W)×125.3mm (H) |
| Interface | RGB |
| Backlight Mode | LED |
| Backlight Service Life | >20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness) |
| Brightness | 200nit |
| 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) |
| Note: You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time. | |

2.2 Touch parameters

| | |
|----------------------------|---|
| Type | Capacitive touch panel |
| Interface | I ² C |
| Structure | G+G structure with surface cover of tempered glass |
| Touch Mode | Single point touch and support continuous sliding touch |
| Surface Hardness | 6H |
| Light Transmittance | >85% |
| Life | Over 20,000 hours touch |

2.3 Serial interface parameters

| | | | | | |
|------------------------|--|------|-----|-----|------|
| Mode | UART2: ON=TTL/CMOS; OFF=RS232 UART4: ON=TTL/CMOS; OFF=RS232 (Only available after OS configuration) | | | | |
| Voltage Level | Test Condition | Min | Typ | Max | Unit |
| | Output 1, Iout = -4mA | 4.78 | 5.0 | - | V |
| | Output 0, Iout = 4mA | - | - | 0.4 | V |
| | Input 1 | 2.5 | 5.0 | - | V |
| | Input 0 | - | - | 1.0 | V |
| Baud Rate | 3150~3225600bps, typical value of 115200bps | | | | |
| Data Format | UART2: N81 UART4: N81/E81/O81/N82 , 4 modes (OS configuration) | | | | |
| Interface Cable | 8Pin_2.0mm | | | | |

2.4 Electrical specifications

| | | |
|--|-----------------------------|------------------------|
| Rated Power | <6W | |
| Operating Voltage | 6~15V, typical value of 12V | |
| Operating Current | 440mA | VCC=12V, max backlight |
| | 160mA | VCC=12V, backlight off |
| Recommended power supply: 12V 1A DC | | |

2.5 Operating environment

| | |
|------------------------------|------------------------------------|
| Operating Temperature | -20℃~70℃ (12V @ 60% RH) |
| Storage Temperature | -30℃~80℃ |
| Conformal Coating | None |
| Operating Humidity | 10%~90%RH, typical value of 60% RH |

3. Reliability test

3.1 Electrostatic discharge test

Test temperature: 25°C. Test humidity: 50%RH.

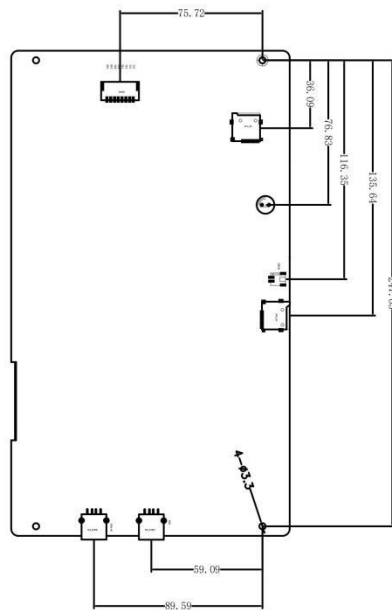
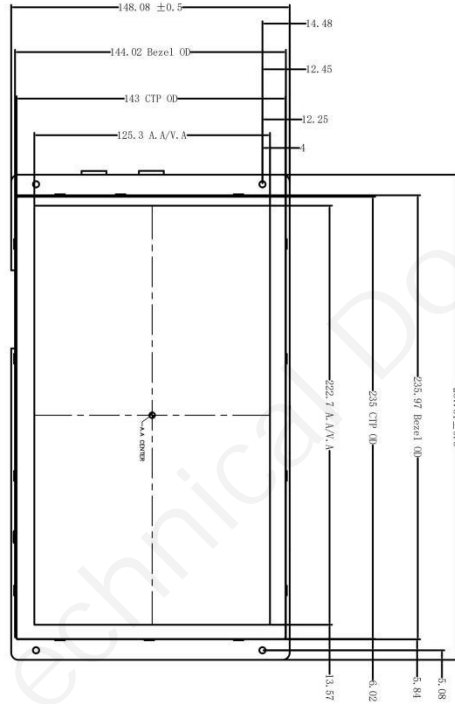
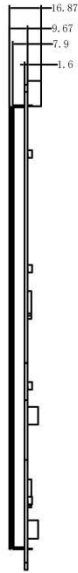
Test process: Place the product on the testing fixture of the test bench (fixture height approximately 15cm), and conduct contact discharge and air discharge tests on the smart screen, during the experimental process, it was observed whether the screen is dead, black, white, splash, or reboot. According 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 | ±6KV | Normal operation |
| Air discharge | ±8KV | Normal operation |

4. Packaging & dimensions

| Form Factor | 257.81mm (W) × 148.08mm (H) × 16.87mm (T) | | | |
|--------------------------------|---|--------------|-----------------------|----------------------|
| Installation Dimensions | Positioning hole: 235.97 (+0.3mm) × 144.02 (+0.3mm) | | | |
| Net Weight | 590g | | | |
| Packaging Standards | | | | |
| Model | Dimensions | Layer | Quantity/Layer | Quantity(Pcs) |
| Carton1: | 220mm(L)×160mm(W)×47mm (H) | - | - | - |
| Carton2: | 250mm(L)×200mm(W)×80mm (H) | - | - | - |
| Carton3: | 320mm(L)×270mm(W)×80mm (H) | 1 | 2 | 2 |
| Carton4: | 450mm(L)×350mm(W)×300mm(H) | 2 | 5 | 10 |
| Carton5: | 600mm(L)×450mm(W)×300mm(H) | 2 | 8 | 16 |

| Definition | Pin# | Type | Description |
|------------|------|------|--------------|
| VCC | 1, 2 | P | Power Input |
| TX4 | 3 | 0 | UART4 Output |
| TX2 | 4 | 0 | UART2 Output |
| RX2 | 5 | I | UART2 Input |
| RX4 | 6 | I | UART4 Input |
| GND | 7, 8 | P | GND |



1. Location hole is used as position reference.

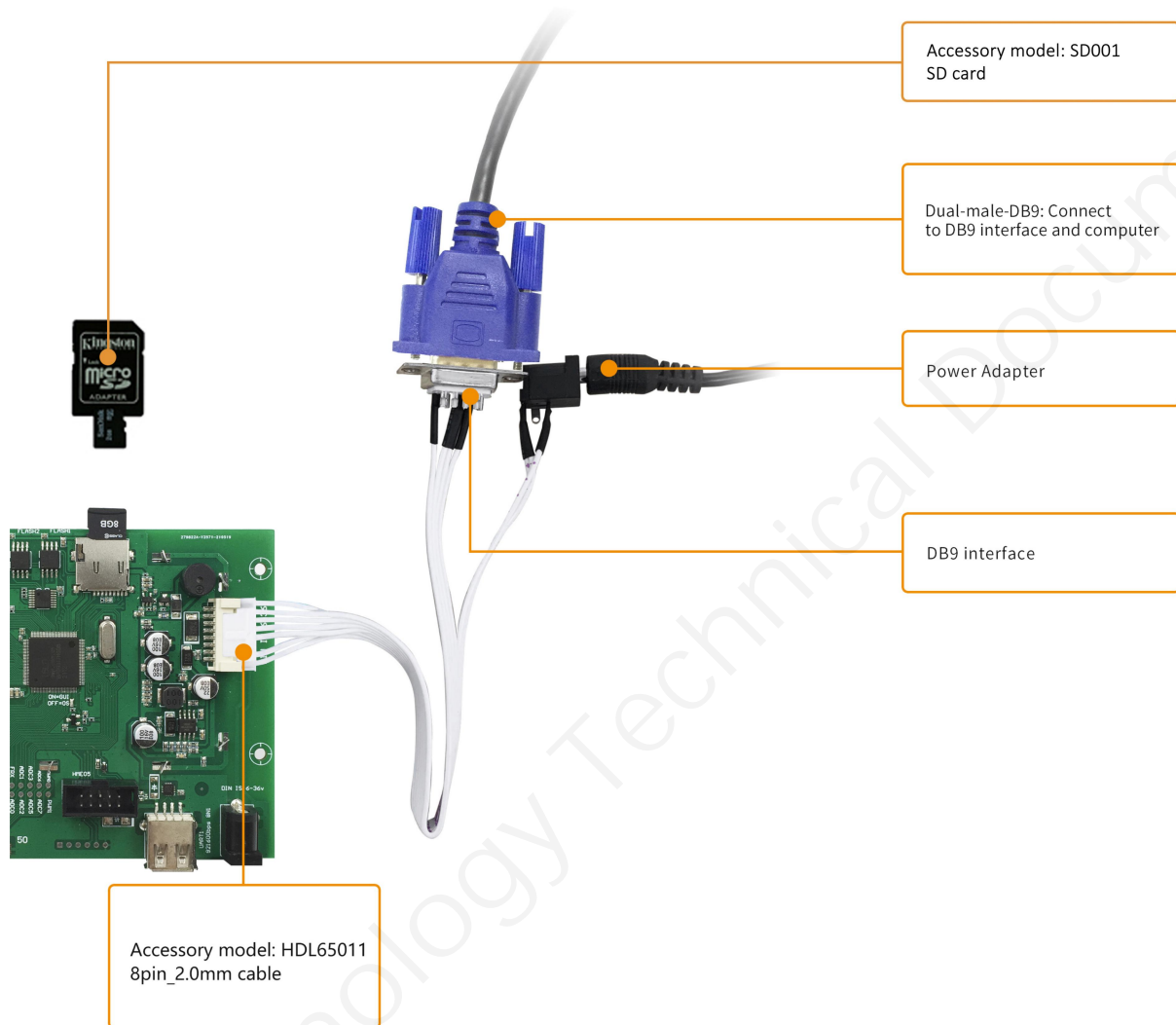
2. Unmarked Tolerance is +/-0.3mm

Note: Active area is marked in Dash lines

| | | | | | | | | | |
|---------|----------------------|----------|------|------|-----------------|--|--|--|-------------|
| Model | DT321X190020Z240101E | | | | DWIN Technology | | | | |
| Drawing | A 4 | Drawn | DWIN | Date | | | | | 2024. 4. 26 |
| Scale | 1 : 1 | Review | | Date | | | | | |
| Unit | MM | Approval | | Date | | | | | |

5. 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.



6. T5L series IC features

- (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.
 - 2D hardware acceleration, the decompression speed of JPEG is up to 200fps@1280*800 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.
 - Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.
 - 1-way 15bit 32Ksps PWM digital power amplifier driver loudspeaker, save power amplifier cost and achieve high signal-to-noise ratio and sound quality restoration.
 - 128Kbytes variable storage space for exchanging data with OS CPU Core and memory.
 - Support DGUS development and simulation on PC. Support background 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 architecture 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.
 - 28 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channel 16-bit PWM of adjustable resolution.
 - Support IAP on-line simulation and debugging with unlimited number of 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).

DWIN encourages users to design your own customized product based on T5L

7. Revision records

| Rev | Revise Date | Content | Editor |
|-----|-------------|---------------|---------|
| 00 | 2024-05-29 | First Edition | Xu Ying |

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

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

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