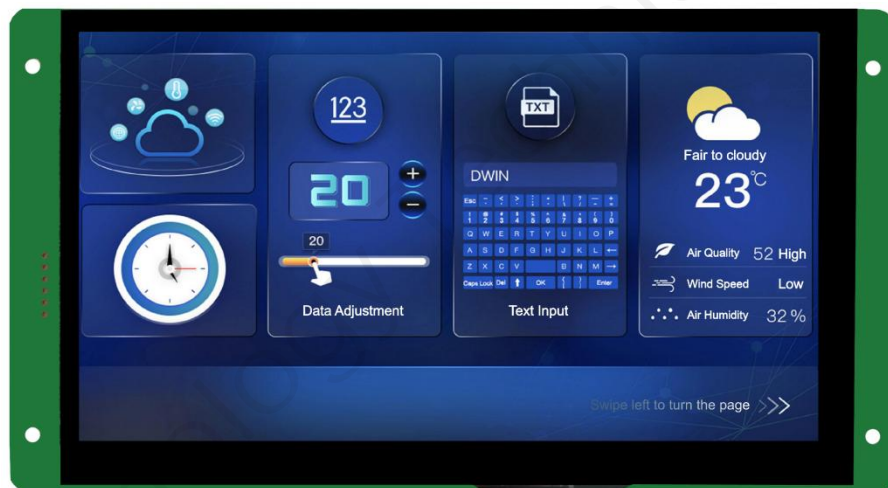


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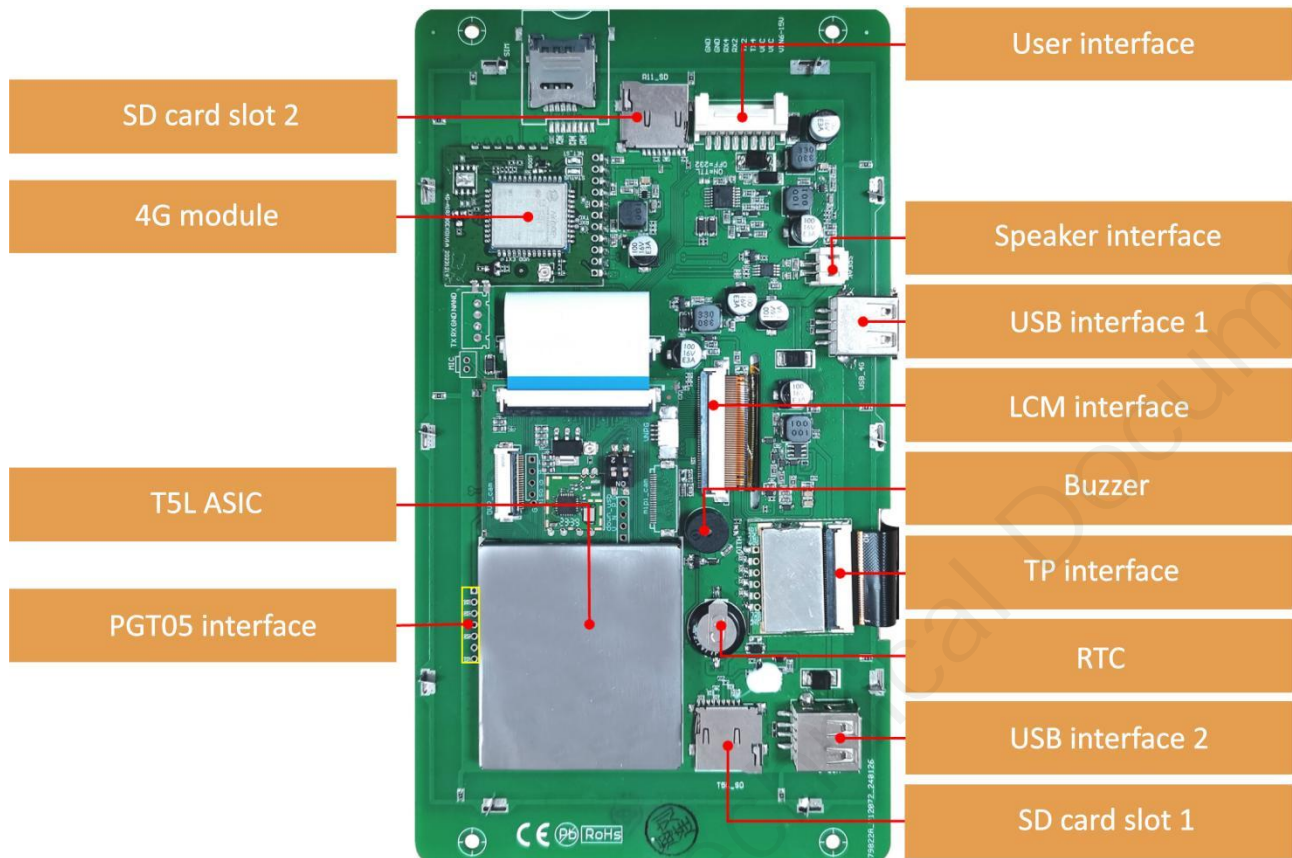
Features:

- Based on the T5L2 ASIC CPU, running the DGUS II human-machine interaction software platform, smart LCM for commercial-grade applications.
- 7.0-inch, 800*480 pixels, 16.7 M colors true-color display, TN-TFT 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	16MBytes (1*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	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
5	Buzzer	3V passive buzzer
6	Speaker interface	2Pin_2.0mm socket, external speaker interface
7	SD card slot 1	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
8	SD card slot 2	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 1&2	Both 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	R11 video decoding module	Model:DG-T20-10B,Built-in WIFI module, supports 2.4GHz/5GHz frequency bands
11	PGT05 interface	Used for reprogramming the underlying DGUS firmware
12	4G module	Enable 4G connectivity

2. Specification parameters

2.1 Display parameters

LCD Type	TN process TFT display screen
Viewing Angle	Normal viewing angle (typical values are 70°/70°/50°/70°)
Resolution	800×480 pixels (0°/90°/180°/270°)
Color	16.7M color (24-bit 8R8G8B)
Active Area (A.A.)	154.08mm (W)×85.92mm (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	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)
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, I _{out} = -4mA	4.78	5.0	-	V
	Output 0, I _{out} = 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	<4W	
Operating Voltage	6~15V, typical value of 12V	
Operating Current	320mA	VCC=12V, max backlight
	180mA	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

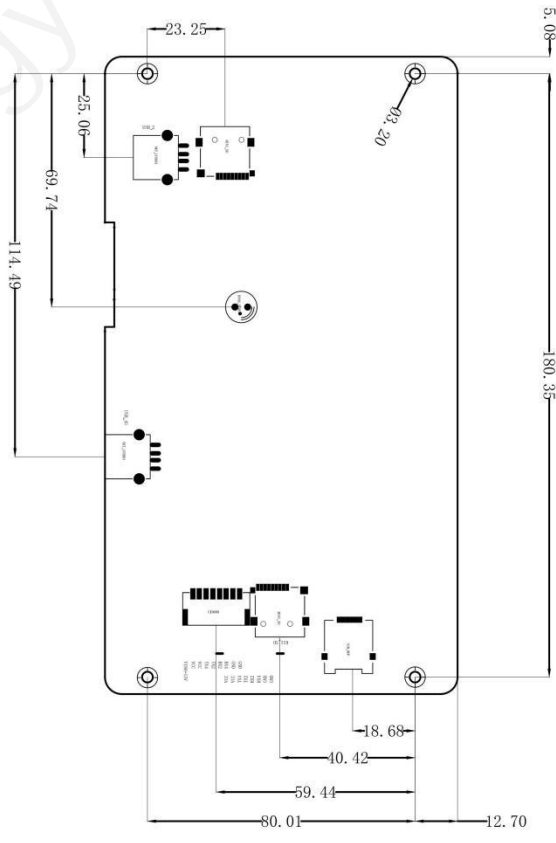
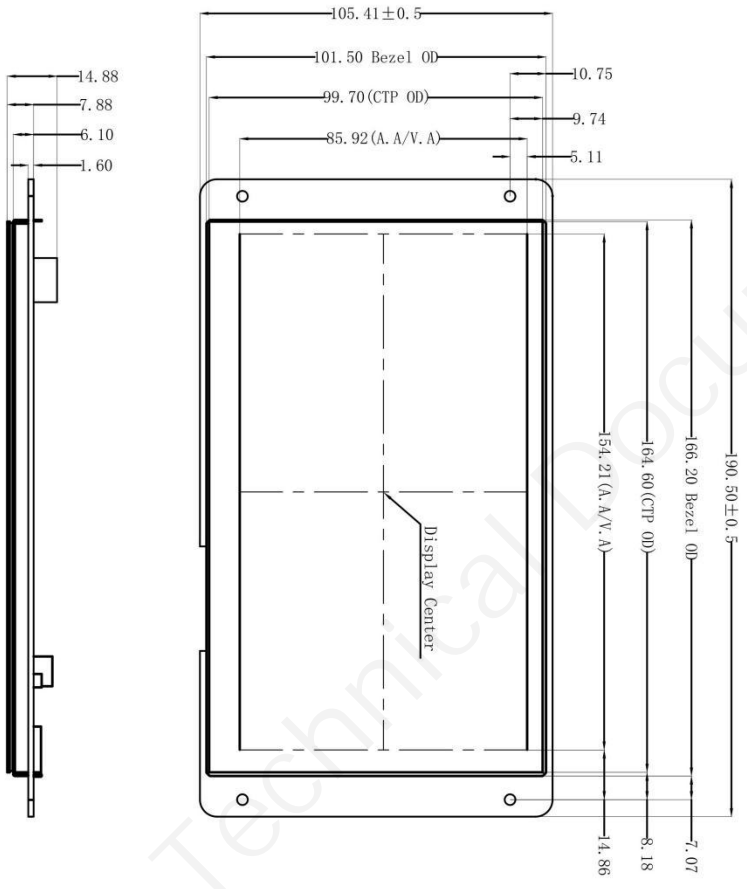
Test temperature: 25°C. Test humidity: 50%RH.

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	190.50mm (W)×105.41mm (H)×14.88mm (T)			
Installation Dimensions	Positioning hole: 166.2 (+0.3mm)×101.5 (+0.3mm)			
Net Weight	-			
Packaging Standards				
Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	220mm(L)×160mm(W)×47mm (H)	-	-	-
Carton2:	250mm(L)×200mm(W)×80mm (H)	1	2	2
Carton3:	320mm(L)×270mm(W)×80mm (H)	1	4	4
Carton4:	450mm(L)×350mm(W)×300mm(H)	2	10	20
Carton5:	600mm(L)×450mm(W)×300mm(H)	2	17	34



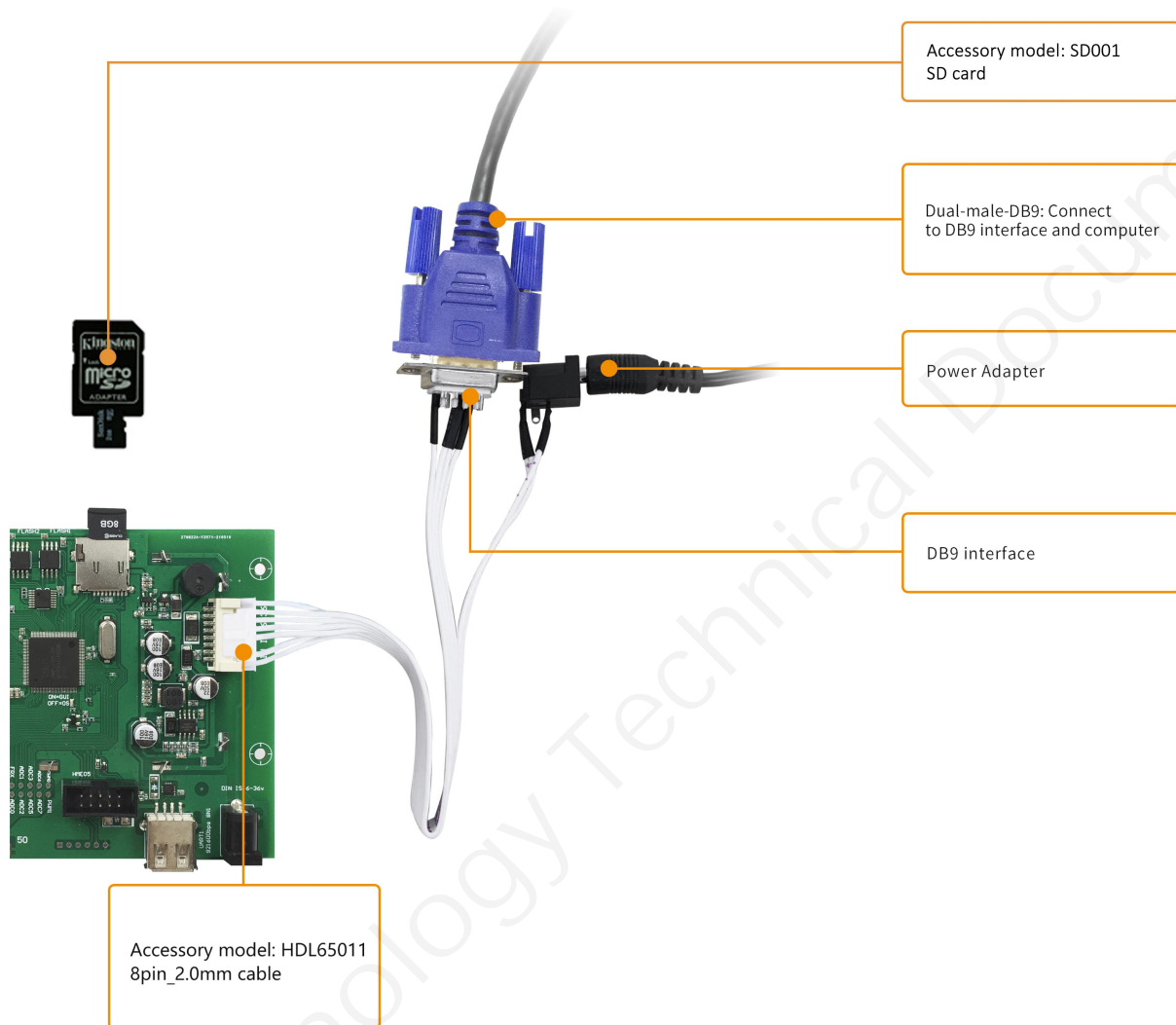
Definition	Pin#	Type	Description
VCC	1, 2	P	Power Input
TX4	3	0	UART4 Output
TX2	4	0	UART2 Output
RX2	5	I	UART2 Input
RX4	6	I	UART4 Input
GND	7, 8	P	GND

Model	DT321X190020Z240101C			DWIN Technology				
Drawing	A 4	Drawn	DWIN				Date	2024.04.11
Scale	1:1	Review					Date	
Unit	MM	Approval					Date	

1. Location hole is used as position reference.
 2. Unmarked Tolerance is +/-0.3mm
 Note: Active area is marked in Dash lines

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-channle 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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- Customer service email: dwinhmi@dwin.com.cn
- DWIN Developer Forum: <https://forums.dwin-global.com/>

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

Important Disclaimer

DWIN reserves the right to make any changes to product designs without prior notice.

Customers should ensure strictly adhering to all the relevant standards and requirements during the product application process, including but not limited to functional safety, information security, and regulatory provisions.

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