

DMG48480F021_06WTC

Features:

- Powered by T5L0-Q88 ASIC, running DGUS II HMI platform.
- 2.1-inch, 480*480 resolution, IPS circular LCD , Wide viewing angle.
- OCA bonding CTP, Black cover glass.
- COF structure. The entire core circuit of the smart screen is fixed on the FPC of LCM, featured by light and thin structure, low cost and easy production.



1. External interface

PIN	Definition	Type	Functional Description
1	+5V	P	Power supply, DC4.5-5.5V
2	+5V		
3	RX2	I	UART2 Input
4	TX2	O	UART2 Output
5	RX1	I	UART1 Input
6	TX1	O	UART1 Output
7	SPK	O	External MOSFET to drive buzzer or speaker
8	GND	P	GND
9	GND		
10	GND		

2. Specification parameters

2.1 Product parameters

Main Chip	T5L0-Q88
User Interface	10Pin_1.0mm FPC
FLASH	8M Bytes
UI Version	DGUS II / TA
Debugging Tools	HDL662K adapter board power supply
Size	2.1 inch
Resolution	480*480
Active Area (AA)	53.28mm (W)×53.28mm (H)
Viewing Area (VA)	53.88mm (W)×53.88mm (H)
Viewing Angle	IPS wide viewing angle, 85°/85°/85°/85° (L/R/U/D)
Backlight Service Life	>10,000 hours
Brightness	350nit
Brightness Control	100-level brightness adjustment (Flickering may occur at 1%-30% of max brightness; not recommended for use in this range)
Type	Capacitive touch panel
Structure	G+FF structure with tempered glass surface and hardness ≥ 6H
Light Transmittance	>85%

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	UART1: TTL UART2: TTL				
Data Format	N81				

2.3 Electrical specifications

Rated Power	<2W	
Operating Voltage	4.5-5.5V, typical value of 5V.	
Operating Current	160mA	VCC=5V, max backlight.
	90mA	VCC=5V, backlight off.
Recommended power supply: 5V 1A DC		

2.4 Operating environment

Operating Temperature	-10℃ to 60℃ (5V @ 60% RH)
Storage Temperature	-20℃ to 70℃
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 test bench fixture (approximately 15cm in height), and perform contact and air discharge tests on the smart LCM. Observe if any freezing, black or white screen, flickering, or rebooting occurs during the test.

Test conclusion: The product's ESD performance meets GB/T 17626.2 Class B standards.

Discharge Type	Discharge Value	Result
Air discharge	±8KV	Normal operation

3.2 High and low temperature test

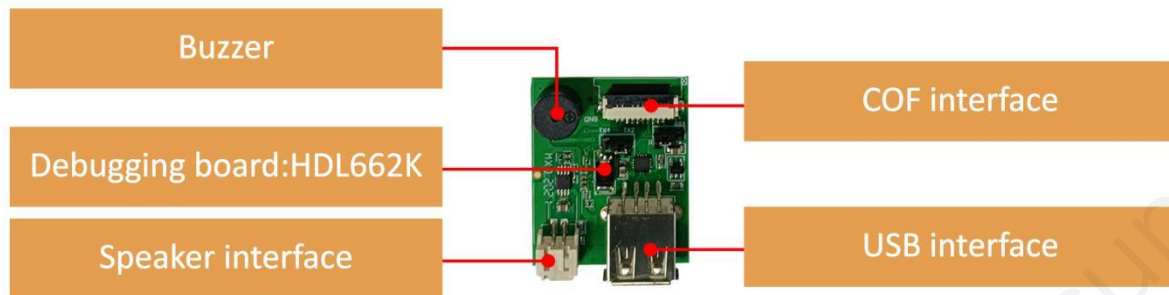
Test temperature:-20~70°C.

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. Debug

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



Please pay attention to the wiring sequence between the debugging board and the COF screen, do not reverse connect.

5. T5L0 ASIC

T5L0 Q88 ASIC is a small package, 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 2023.

(1) Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 400MHz, 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 backend 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.
- 15 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 online simulation and debugging with unlimited breakpoints.
- Upgrade code online through DGUS system.

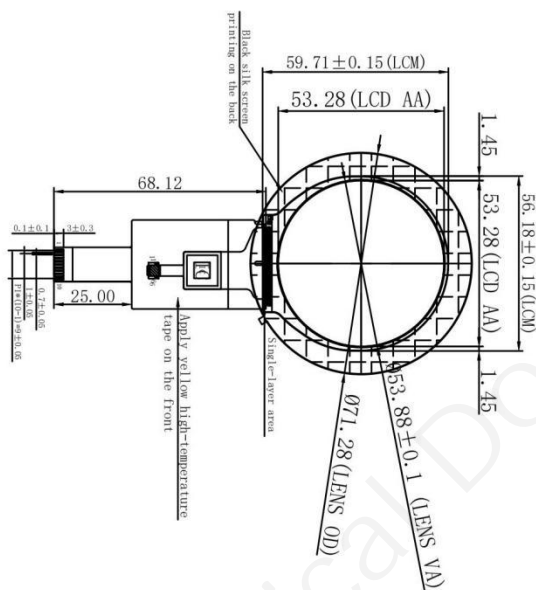
(4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.

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

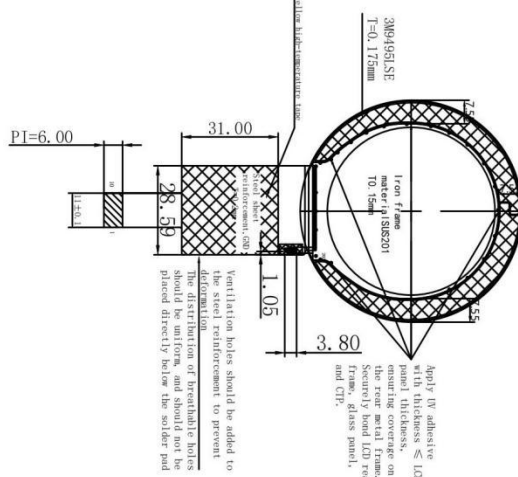
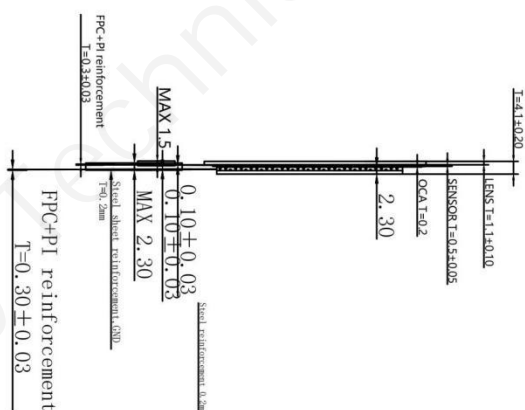
DWIN encourages users to design your own customized product based on T5L.

6. Packing capacity & dimension

Dimension				
Dimension	71.28(W) ×71.28(H) ×4.10(T) mm			
Net Weight	30g			
Packing Capacity				
Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	220mm(L)×160mm(W)×47mm(H)	1	4	4
Carton2:	250mm(L)×200mm(W)×80mm(H)	1	8	8
Carton3:	320mm(L)×270mm(W)×80mm(H)	1	16	16
Carton4:	415mm(L)×315mm(W)×165mm(H)	-	-	80



Front view



pin	Name
1	+5V
2	+5V
3	Rx2
4	Tx2
5	Rx1
6	Tx1
7	SPK
8	GND
9	GND
10	GND

Side view

Back view

Design parameters:
1. Structure: G+FF

2. IC: 67911, operating voltage and communication voltage 3.3V
3. Transmittance: 85% MN;
4. * For key dimensions, lens is not marked with inverted edges
5. 0.125 ± 0.05 , minimum R-angle: 0.5 ± 0.1 ;
6. Surface hardness: $\geq 6H$;
6. Operating temperature: $-20 \sim 70^\circ\text{C}$;
7. Storage temperature: $-30 \sim 80^\circ\text{C}$;
8. Non standard dimensional tolerance $\pm 0.2\text{mm}$;
9. Compliant with RoHS standards;
10. SDA and SCL 4, 7K pull-up resistors are designed on PFC
11. Require that the etching pattern is not visible to the naked eye
12. Resolution $480 * 480$

[illegible]

7. Revision records

Rev	Revise Date	Content	Editor
00	2025-04-02	First Edition	Xu Ying

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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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