DMG40400F016_06WTC

Features:

- **Based on T5L0-Q88, running DGUS II system.**
- **1.6-inch, 400*400 Pixels resolution, 262K Colors, IPS circular LCD , Wide viewing angle.**
- **Optical bonding capacitive touch panel, black cover plate.**
- **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		

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2 Specification Parameters

2.1 Product Parameters

Main Chip	T5L0-Q88*2
User Interface	10Pin_1.0mm FPC
FLASH	16M Bytes
UI Version	DGUSII / TA
Power Supply	HDL662K adapter board power supply
Display Color	262K colors
Dimensions	1.6-inch
Resolution	400*400
Active Area	39.84mm (W)×39.84mm (H)
View Area	39.84mm (W)×39.84mm (H)
Viewing Angle	IPS wide viewing angle, 85°/85°/85°/85° (L/R/U/D)
Backlight Service Life	＞10000 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)
TP Type	CTP (Capacitive Touch Panel)
TP Structure	G+FF structure
Touch Mode	Single point touch, support continuous sliding touch
Surface Hardness	6H
Light Transmittance	Over 85%
Life	Over 1,000,000 times touch

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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
	80mA	VCC=5V, backlight off
Recommended power supply: 5V 1A DC		

2.4 Operating Environment

Operating Temperature	-10℃~60℃ (5V @ 60% RH)
Storage Temperature	-20℃~70℃
Operating Humidity	10%~90%RH, typical value of 60% RH

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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 standard : ☐EN 61000-4-2:2009 ☑IEC 61000-4-2:2008 ☐GB/T 17626.2-2018
☐Other:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-8kV	+8kV	-15kV	+15kV
Screen	/	/	A	A	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Locations	Test Levels							
	-2kV	+2kV	-4kV	+4kV	-6kV	+6kV	-8kV	+8kV
Border	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

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3.2 High and Low Temperature Test

Test temperature:-20~70℃

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℃）	A
Low temperature（-20℃）	A

Performance Criterion:

A. Normal performance within limits specified by the manufacturer, requestor or purchaser;

B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;

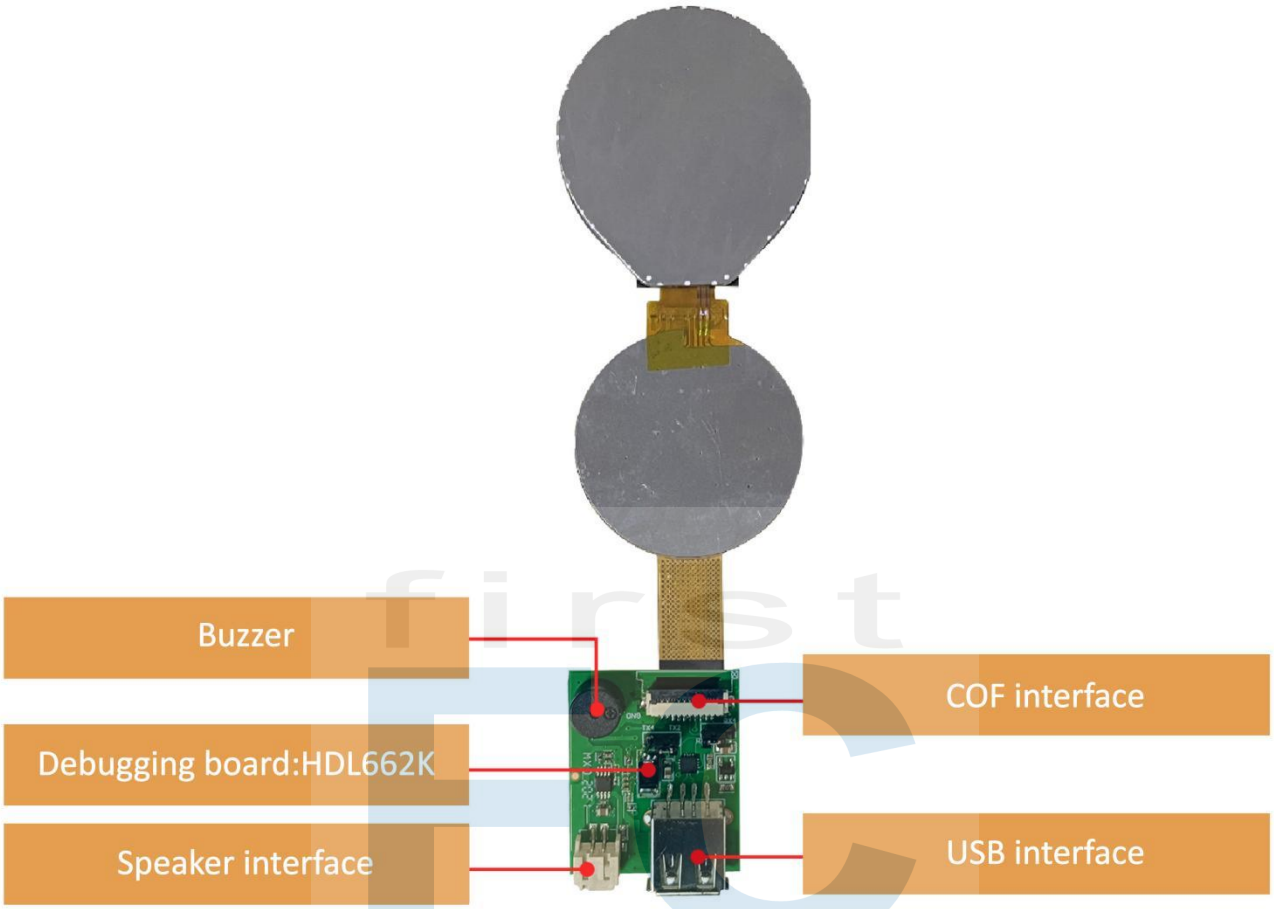
C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;

D. Loss of function or degradation of performance which is not recoverable, due to damage to hardware or software, or loss of data.

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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.

Operation steps: open serial assistant - custom function command - set command - send.

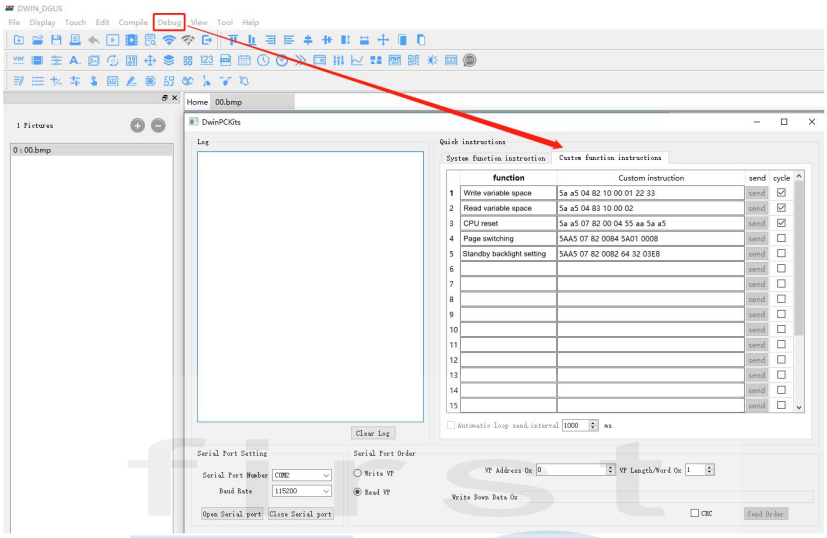
For example:

（1）Page switching

Tx：5AA5 07 82 0084 5A01 0008

（2）Standby backlight setting

Tx：5AA5 07 82 0082 64 32 03E8



DGUS operation

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5 T5L0-Q88 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.

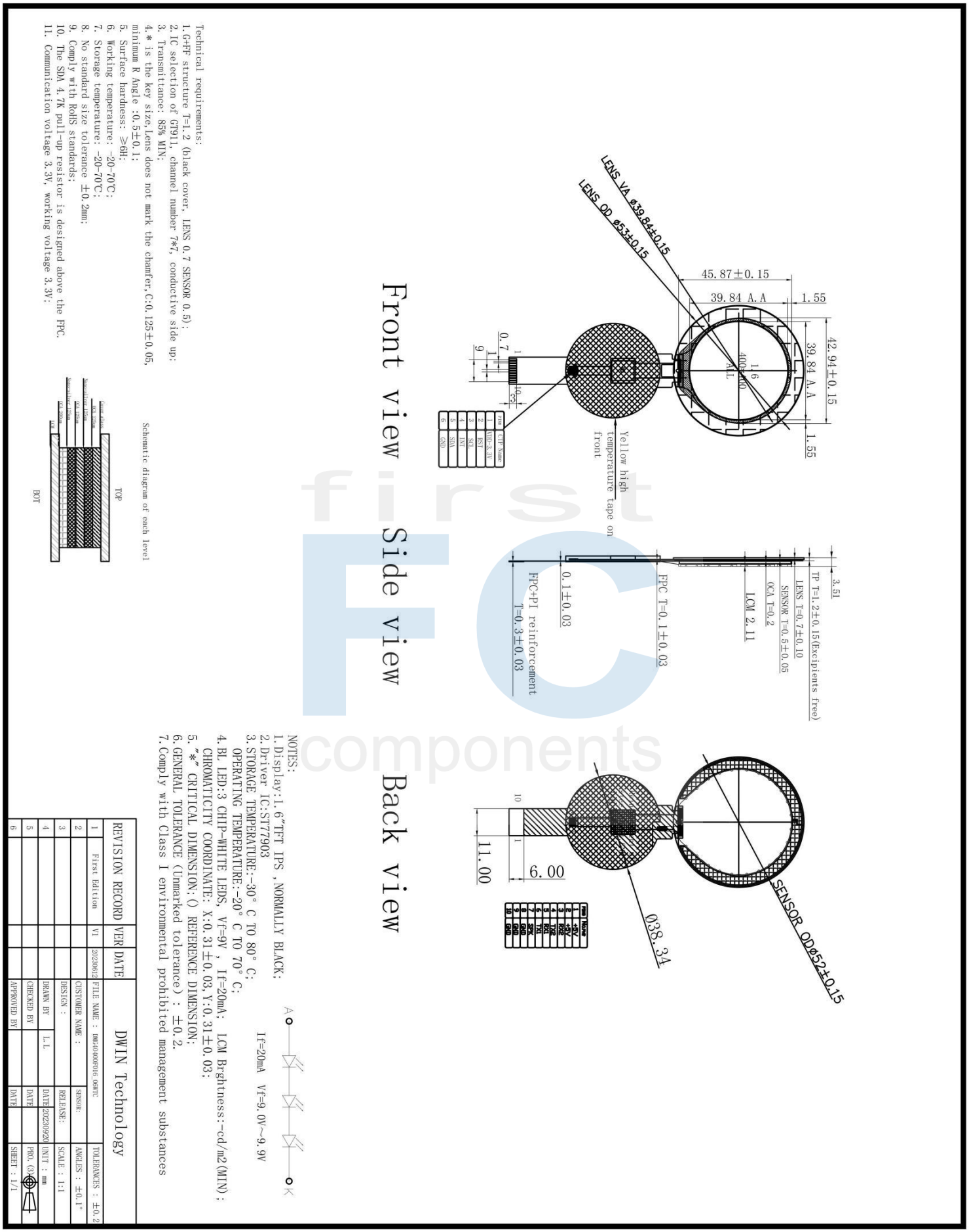
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6 Packing Capacity & Dimension

Dimension				
Dimension	53.00(W) ×53.00(H) ×3.51(T) mm			
Net Weight	20g			
Packing Capacity				
Model	**Size**	**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)	-	-	-
Carton4：	450mm(L)×385mm(W)×205mm(H)	-	-	100

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

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Technical requirements:

1. G+FF structure T=1.2 (black cover, LENS 0.7 SENSOR 0.5);
2. IC selection of GT911, channel number 7*7, conductive side up;
3. Transmittance: 85% MIN;
4. * is the key size,Lens does not mark the chamfer,C:0.125±0.05, minimum R Angle :0.5±0.1;
5. Surface hardness: ≥6H;
6. Working temperature: -20-70℃;
7. Storage temperature: -20-70℃;
8. No standard size tolerance ±0.2mm;
9. Comply with RoHS standards;
10. The SDA 4.7K pull-up resistor is designed above the FPC.
11. Communication voltage 3.3V, working voltage 3.3V;

NOTES:

1. Display:1.6"TFT IPS ,NORMALLY BLACK;
2. Driver IC:ST77903
3. STORAGE TEMPERATURE:-30° C TO 80° C;
   OPERATING TEMPERATURE:-20° C TO 70° C;
4. BL LED:3 CHIP-WHITE LEDS, Vf=9V , If=20mA; LCM Brghtness:-cd/m2(MIN);
   CHROMATICITY COORDINATE: X:0.31±0.03, Y:0.31±0.03;
   If=20mA Vf=9.0V~9.9V
5. "*" CRITICAL DIMENSION; () REFERENCE DIMENSION;
6. GENERAL TOLERANCE (Unmarked tolerance) : ±0.2.
7. Comply with Class I environmental prohibited management substances

REVISION RECORD	VER	DATE	DWIN Technology		
1 First Edition	V1	20230612	FILE NAME : DMG40400F016_06WTC		TOLERANCES : ±0.2
2			CUSTOMER NAME :	SENSOR:	ANGLES : ±0.1°
3			DESIGN :	RELEASE:	SCALE : 1:1
4			DRAWN BY L.L	DATE 20230920	UNIT : mm
5			CHECKED BY	DATE	PRO. (3)
6			APPROVED BY	DATE	SHEET : 1/1

7 Revision records

Rev	Revise Date	Content	Editor
00	2023-10-24	First Edition	Xu Ying
01	2023-12-07	Adjusting accessories	Xu Ying

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