

DMG72720T041_06WTC

产品特点:

- 基于 T5L1 芯片，运行 DGUS II 系统，工业级产品。
- 4.1 英寸，720*720 分辨率，16.7M 色，IPS 屏，宽视角。
- Incell 电容触摸屏。

Features:

- Based on T5L1, running DGUS II system, industrial grade.
- 4.1-inch, 720*720 pixels resolution, 16.7M colors, IPS-TFT-LCD, wide viewing angle.
- Incell capacitive touch screen.



1、硬件及接口 Hardware and interface

1.1 硬件接口图 Hardware interface



硬件接口图
Hardware interface

1.2 硬件及接口说明 Hardware and interface description

序号 No.	名称 Name	说明 Description
1	T5L1 芯片 T5L1 ASIC	迪文自主研发，2019 年量产，1MBytes 片内 Nor Flash，其中 512KBytes 用于存储用户数据库，擦写次数>100,000 次 Developed by DWIN. Mass production in 2019, 1MBytes Nor Flash on the chip, 512KBytes used to store the user database. Rewrite cycle: over 100,000 times
2	INCELL 屏接口 INCELL LCM interface	FPC40_0.5mm, MIPI 接口 FPC40_0.5mm, MIPI interface
3	用户接口 User interface	FCC50_0.5 mm (定义见附件: 表 1) FCC50_0.5 mm (See Annex for definitions: table1)
4	Flash	16MBytes NOR Flash, 存放字库、图片、音乐文件，擦写次数>100,000 次 16MBytes NOR Flash, for fonts, pictures and audio files. Rewrite cycle: over 100,000 times
5	SD 卡接口 SD interface	FAT32 格式，下载文件，文件可在屏幕统计显示，下载速率：4Mb/s FAT32. Download files by SD interface can be displayed in statistics. Download rate: 4Mb/s

2、规格参数 Specification parameters

2.1 显示参数 Display parameters

显示屏类型 LCD Type	IPS, TFT LCD
视角 Viewing Angle	宽视角, 典型值 85°/85°/85°/85° (L/R/U/D) Wide viewing angle, 85°/85°/85°/85° (L/R/U/D)
分辨率 Resolution	720×720 (支持 0°/90°/180°/270°显示模式) 720×720 pixels (support 0°/90°/180°/270°)
色彩 Color	24 位 8R8G8B 24-bit 8R8G8B
AA 区 Active Area (A.A.)	73.98mm (W)×73.98mm (H)
VA 区 View Area (V.A.)	74.6mm (W)×74.6mm (H)
背光模式 Backlight Mode	LED
背光寿命 Backlight Service Life	>10000 小时 (以最高亮度连续工作, 亮度减半时间) >10000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
背光亮度 Brightness	400nit
背光调节 Brightness Control	100 级亮度调节 (当亮度调节至最高亮度的 1%~30%时, 可能出现闪烁现象, 不建议在此范围使用) 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)
注: 长时间固定画面显示可能导致屏幕残影, 可以用动态图片切换做屏保解决。 Note: You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time.	

2.2 触摸参数 Touch parameters

触摸屏类型 Type	电容式触摸面板 CTP (Capacitive touch panel)
触摸屏结构 Structure	INCELL 结构 INCELL structure
触摸方式 Touch Mode	单点触摸, 支持连续滑动触摸 Support point touch and drag
表面硬度 Surface Hardness	-
透光率 Light Transmittance	95%以上 Over 95%
触控次数 Life	>1,000,000 次 Over 1,000,000 times touch

2.3 串口参数 Serial interface parameters

串口模式 Mode	TTL/CMOS				
串口电平 Voltage Level	测试条件 Test Condition	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
	Output 1, Iout = 1mA	3.0	3.3	-	V
	Output 0, Iout = -1mA	-	0	0.3	V
	Input 1, Iin = 1mA	2.4	3.3	5.0	V
	Input 0, Iin = -1mA	0	-	0.5	V
串口波特率 Baud Rate	3150~3225600bps, 典型值: 115200bps 3150~3225600bps, typical value of 115200bps				
数据格式 Data Format	N81				
接口排线 Interface Cable	FCC50_0.5 mm				

2.4 电气规格 Electrical specifications

额定功率 Rated Power	<5W	
工作电压 Operating Voltage	7~15V, 典型值 12V 7~15V, typical value of 12V	
工作电流 Operating Current	160mA	VCC=12V, 背光亮度最大 VCC=12V, max backlight
	80mA	VCC=12V, 背光关闭 VCC=12V, backlight off
推荐工作电源: 12V 1A 的直流稳压电源 Recommended power supply: 12V 1A DC		

2.5 工作环境 Operating environment

工作温度 Operating Temperature	-20℃~70℃ (12V @ 60% RH)
存储温度 Storage Temperature	-30℃~80℃
三防漆工艺 Conformal coating	有 Yes
工作湿度 Operating Humidity	10%~90%RH, 典型值 60%RH 10%~90%RH, typical value of 60% RH

3、可靠性测试 Reliability test

3.1 静电放电测试 Electrostatic discharge test

测试环境温度：25°C，测试环境湿度：50%RH。

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

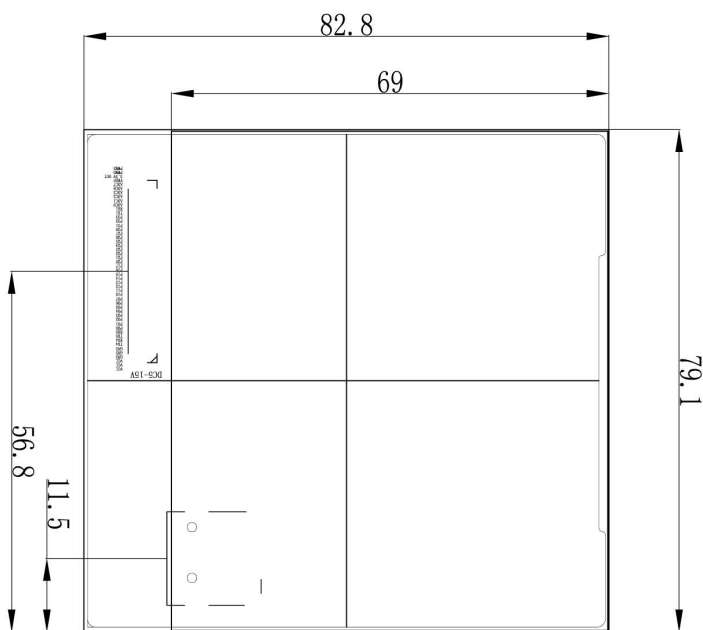
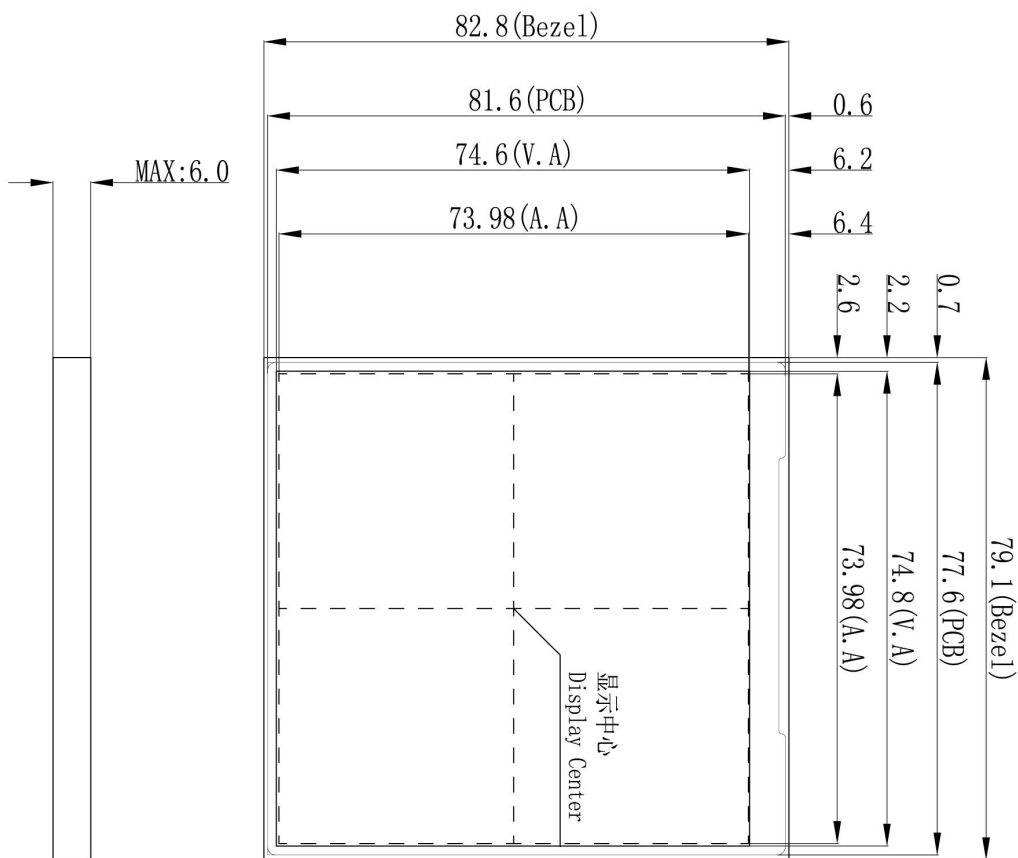
试验过程：将产品平置于测试台上，针对串口屏铁框和显示区域依次进行接触和空气放电；实验过程观察屏幕有无死机、黑屏、白屏、花屏、重启等异常现象。性能符合判据 GB/T 17626.2 B 级及以上。

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.

放电类型 Discharge Type	放电值 Discharge Value	结果 Result
接触放电 Contact discharge	±6KV	正常工作 Normal operation
空气放电 Air discharge	±8KV	正常工作 Normal operation

4、包装和物理尺寸 Packaging & dimensions

外形尺寸 Form Factor	79.1mm (W)×82.8mm (H)×6.0mm (T)			
安装尺寸 Installation Dimensions	-			
净重量 Net Weight	70g			
包装标准 Packaging Standards				
包装箱型号 Model	包装箱尺寸 Dimensions	层数 (层) Layer	数量/层 (片) Quantity/Layer	总数量 (片) Quantity(Pcs)
1 号箱 Carton1:	220mm(L)×160mm(W)×47mm (H)	1	2	2
2 号箱 Carton2:	250mm(L)×200mm(W)×80mm (H)	2	2	4
3 号箱 Carton3:	320mm(L)×270mm(W)×80mm (H)	2	4	8
4 号箱 Carton4:	435mm(L)×335mm(W)×290mm(H)	2	25	50
5 号箱 Carton5:	600mm(L)×430mm(W)×290mm(H)	2	60	120



1. 尺寸定位基准为定位孔
Location hole is used as position reference.
2. 未标注公差为 $\pm 0.3\text{mm}$
Unmarked Tolerance is $\pm 0.3\text{mm}$
注: 虚线标注为有效显示区域
Active area is marked in Dash lines

型号	DMG72720T041_06WTC			迪文科技 DWIN Technologies
图纸比例	A 4	图纸审核	日期	
单位	MM	批准	日期	

5、调试工具 Debugging tools

建议首次使用迪文智能屏的用户购买标准配件。详细信息可联系客服人员。

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



HDLUSB
 连接线
 USB cable



HDL65074
 连接线
 50Pin_0.5mm cable



HDL667-V2
 专用调试板
 Debug board



SD001
 SD卡
 SD card

表 1

FCC50_0.5 接口参数

50

1

VCC	P07
VCC	P10
VCC	P11
VCC	P12
VCC	P13
VCC	P14
VCC	P15
VCC	P16
VCC	P17
VCC	P20
VCC	P21
VCC	P22
VCC	P23
VCC	P24
VCC	P25
VCC	P26
VCC	P27
VCC	P30
VCC	P31
VCC	P32
VCC	P33
VCC	TX1
VCC	RX1
VCC	ADC0
VCC	ADC1
VCC	ADC2
VCC	ADC3
VCC	ADC6
VCC	ADC7
VCC	VREF
VCC	3.3V
VCC	PWM0
VCC	PWM3
VCC	OUT

引脚 Pin	信号名称 Signal name	功能 function	描述 Discription
1	VCC	P	电源输入/Input
2	VCC	P	电源输入/Input
3	VCC	P	电源输入/Input
4	GND	P	公共接地/GND
5	GND	P	公共接地/GND
6	GND	P	公共接地/GND
7	TX4	O	UART4 数据发送 TX4
8	RX4	I	UART4 数据接收 RX4
9	TX5	O	UART5 数据发送 TX5
10	RX5	I	UART5 数据接收 RX5
11	P00	-	I/O 口
12	P01	-	I/O 口
13	P02	-	I/O 口 CAN_TX
14	P03	-	I/O 口 CAN_RX
15	P04	O	UART2 数据发送 TX2
16	P05	I	UART2 数据接收 RX2
17	P06	-	I/O 口
18	P07	-	I/O 口
19	P10	-	I/O 口
20	P11	-	I/O 口
21	P12	-	I/O 口
22	P13	-	I/O 口
23	P14	-	I/O 口
24	P15	-	I/O 口
25	P16	-	I/O 口
26	P17	-	I/O 口
27	P20	-	I/O 口
28	P21	-	I/O 口
29	P22	-	I/O 口
30	P23	-	I/O 口
31	P24	-	I/O 口
32	P25	-	I/O 口
33	P26	-	I/O 口
34	P27	-	I/O 口
35	P30	-	I/O 口
36	P31	-	I/O 口
37	P32	-	I/O 口
38	P33	-	I/O 口
39	TX1	O	UART1 数据发送 TX1
40	RX1	I	UART1 数据接收 RX1
41	ADC0	I	AD 输入
42	ADC1	I	AD 输入
43	ADC2	I	AD 输入
44	ADC3	I	AD 输入
45	ADC6	I	AD 输入
46	ADC7	I	AD 输入
47	VREF	P	AD 参考电源
48	3.3V OUT	O	3.3V 输出 100mA
49	PWM0	O	16 bit PWM 输出
50	PWM3	O	16 bit PWM 输出 SPK

6、T5L 系列芯片特点 T5L series IC features

(1) 采用应用最广泛、成熟和稳定的 8051 核，1T（单指令周期）高速工作，最高主频 250MHz。

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) 单独 CPU 核（GUI CPU）运行 DGUS II 系统：

Separate GUI CPU Core running DGUS II System:

- 内置高速显存，2.4GB/S 带宽。

High-speed display memory, 2.4GB/S bandwidth.

- 2D 硬件加速，JPEG 解压缩速度高达 200fps@1280*800，UI 极其流畅。

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.

- JPEG 压缩模式存储图片、图标，大幅度缩小外置存储器到低成本的 16Mbytes SPI Flash。

Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.

- 支持电阻或电容触摸屏，灵敏度可以调节，最快 400Hz 触控打点速度。

Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.

- 1 路 15bit 32Ksps PWM 数字功放驱动扬声器，实现高品质语音压缩存储和播放。

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 变量存储器空间，存储器接口和 OS CPU 核交换数据，应用及其简单。

128Kbytes variable storage space for exchanging data with OS CPU Core and memory.

- 支持 PC 端组态开发和仿真，支持后台远程升级。

Support DGUS development and simulation on PC. Support background remote upgrade.

(3) 单独 CPU 核（OS CPU）运行用户 8051 代码，应用中省掉用户 CPU：

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

- 标准 8051 架构和指令集，64Kbytes 代码空间，32Kbytes 片内 RAM。

Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.

- 64bit 整数型数学运算单元（MDU），包括 64bit MAC 和 64bit 除法器。

64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.

- 28 个 IO，4 路 UARTs，1 路 CAN 接口，最多 8 路 12bit A/D，2 路 16bit 分辨率可调的 PWM。

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.

- 支持 IAP 在线仿真和调试，断点数量无限制。

Support IAP on-line simulation and debugging with unlimited number of breakpoints.

- 可以透过 DGUS 系统在线升级代码。

Upgrade code online through DGUS system.

- (4) 1Mbytes 片内 Flash, 迪文专利加密技术, 确保代码和数据安全, 杜绝山寨和克隆。

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

- (5) $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$ 工作温度范围 (可定制 $-55^{\circ}\text{C}\sim105^{\circ}\text{C}$ 工作温度范围 IC)。

Operating temperature ranges from -40°C to $+85^{\circ}\text{C}$ (IC operating temperature customizable from -55°C to 105°C).

迪文欢迎广大用户基于 T5L 自主设计客制化产品。

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

7、修订记录 Revision records

版本 Rev	日期 Revise Date	描述 Content	编辑人 Editor
00	2019-07-19	首次发布 First Edition	ZK
01	2020-07-24	修改工作电压 Modify Power Voltage	ZK
02	2020-08-25	更新实物图 Update physical drawing	ZK
03	2020-09-29	修改 UI 版本说明 Modify UI Version	ZK
04	2021-11-04	升级版本 Upgrade version	郑运佳
05	2022-11-14	修改尺寸说明 Modify dimension description	郑运佳

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客服邮箱 Customer service email: dwinhmi@dwin.com.cn

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