

DT321X190020Z240101I

产品特点:

- 基于 T5L2 ASIC，运行 DGUS II 人机交互软件平台，商业级智能屏。
- 18.5 英寸，1920*1080 分辨率，IPS 液晶显示屏，2K 高清智能屏。
- 板载视频解码模块，实现 WIFI/4G 联网和音视频播放功能。
- GFF 结构电容触摸屏。

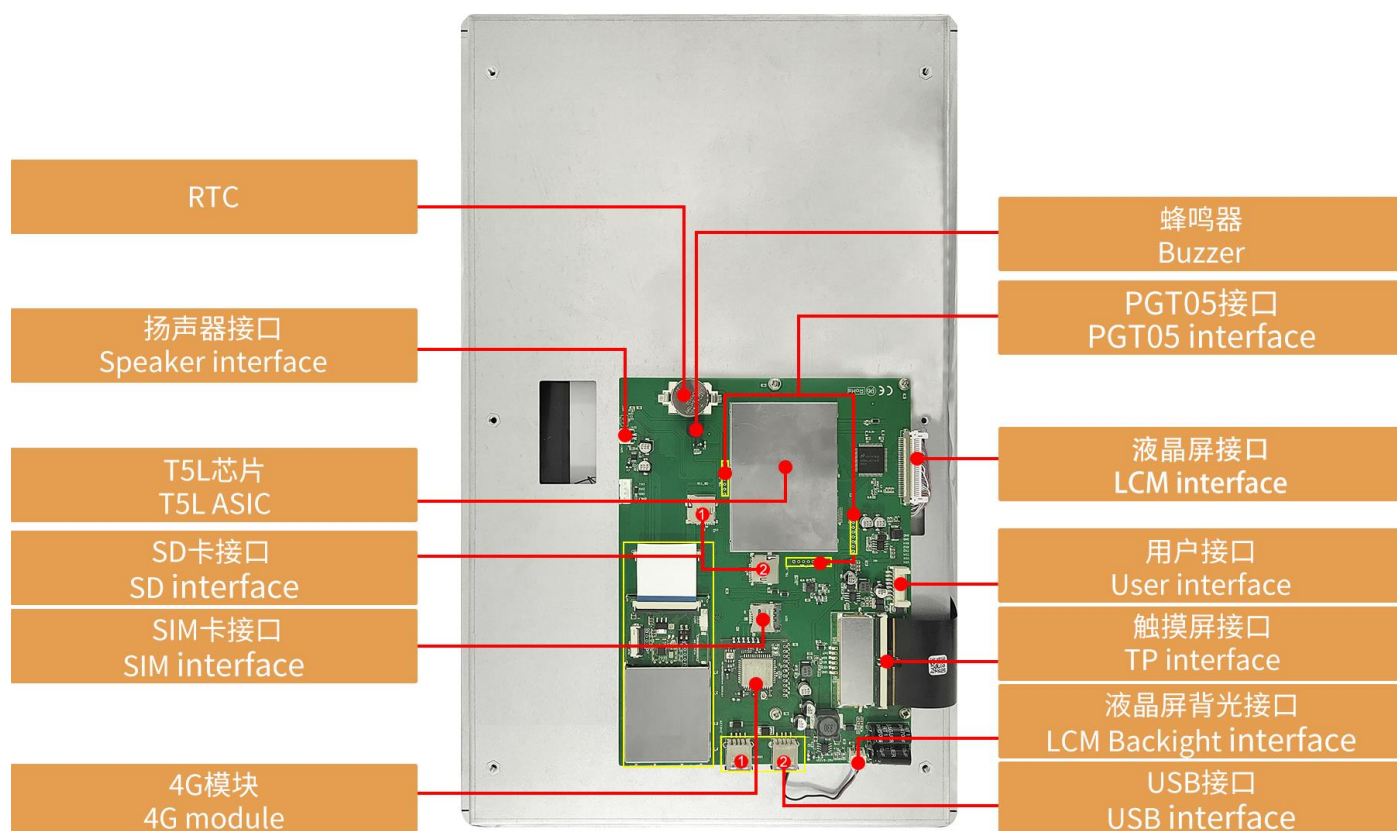
Features:

- Powered by T5L2 ASIC, running DGUS II HMI platform, commercial-grade smart LCM.
- 18.5 inch, 1920*1080 resolution, IPS-TFT LCD, 2K HD smart screen.
- Onboard video decoding module, enabling WIFI/4G connectivity and audio/video playback functionality.
- Capacitive touch screen with GFF structure.



1、硬件及接口 Hardware and interface

1.1 硬件接口图 Hardware interface diagram



硬件接口图

Hardware interface diagram

1.2 硬件及接口说明 Hardware and interface description

序号 No.	名称 Name	说明 Description
1	T5L2 芯片 T5L2 ASIC	迪文自主研发，2019 年量产。芯片采用双 8051 核架构，GUI 和应用分别在一颗 8051 核中运行。 DWIN independently developed, mass production in 2019. Dual 8051 cores, GUI and application run on separate 8051 cores.
2	用户接口 User interface	用于供电和串口通讯，8Pin_2.0mm 座子。 8Pin_2.0mm socket for power supply and serial communication.
3	Flash	32MBytes (2*16MBytes NOR Flash)，可用于存放字库、图片、音乐等用户 UI 文件，擦写次数>100,000 次。 32MBytes (2*16MBytes NOR Flash) for storing UI files like fonts, images, music, with over 100,000 erase/write cycles.
4	扩展 Flash 焊盘 Expand Flash pads	有 2 个扩展位，支持扩展 NOR Flash、NAND Flash。 最大可拓展到 64Mbytes（4*16MBytes NOR Flash）或 48Mbytes+512Mbytes（3*16MBytes NOR Flash+1*512Mbytes NAND Flash）。 Two expansion slots support NOR or NAND Flash, up to 64MB (4x16MB NOR Flash) or 48MB+512MB (3x16MB NOR Flash + 512MB NAND Flash).
5	RTC	纽扣电池供电，精度：±20ppm@25℃。 Button cell for power supply. Accuracy: ±20ppm@25℃.
6	蜂鸣器 Buzzer	3V 无源蜂鸣器。 3V passive buzzer.
7	扬声器接口 Speaker interface	2Pin_2.0mm 座子，外接扬声器。 2Pin_2.0mm socket, speaker interface.
8	SD 卡座 SD card slot	用于 DGUS 工程文件下载（UI 文件、CFG 文件、内核等），下载速率：4Mb/s。 For DGUS project file downloads (UI, CFG files, kernel, etc.), 4 Mb/s rate.
9	USB 接口 USB interface	供视频解码模块使用，可用于存放 MP4 视频文件或连接 USB 外设（如 USB 摄像头等）。 For use with the video decoding module, it can be used to store MP4 video files or connect USB peripherals (such as USB cameras, etc.).
10	4G 模块 4G module	实现 4G 联网功能。 Enable 4G connectivity.
11	PGT05 接口 PGT05 interface	用于烧录 DGUS 底层程序。 For programming DGUS firmware.

2、规格参数 Specification parameters

2.1 显示参数 Display parameters

显示屏类型 LCD Type	IPS TFT 液晶屏。 IPS, TFT LCD.
视角 Viewing Angle	视角宽（典型值是 85°/85°/85°/85°），对比度高、色彩还原好。 Wide viewing angle (85°/85°/85°/85° typical), high contrast, and good color reproduction.
分辨率 Resolution	1920×1080（支持 0°/90°/180°/270°显示模式） 1920×1080 (0°/90°/180°/270°)
有效显示区域 Active Area (AA)	410.0mm (W)×231.0mm (H)
可视区域 Viewing Area (VA)	410.0mm (W)×231.0mm (H)
背光 Backlight	LED
背光寿命 Backlight Service Life	>20000 小时 >20000 hours
亮度 Brightness	200nit
亮度调节 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：长时间显示固定画面可能导致残影现象，建议设置动态屏保进行规避。 Note: Use dynamic screen saver to prevent afterimages from prolonged fixed page display.	

2.2 触摸参数 Touch parameters

触摸屏类型 Type	电容式触摸面板。 Capacitive touch panel.
触摸屏结构 Structure	G+FF 结构，表层为钢化玻璃，玻璃硬度≥6H。 G+FF structure with tempered glass surface and hardness ≥ 6Hs.
透光率 Light Transmittance	>90%
触控寿命 Life	>20,000H

2.3 串口参数 Serial interface parameters

串口模式 Mode	UART2: ON=TTL/CMOS; OFF=RS232				
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 = -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
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	UART2: N81				
接口端子 Interface Cable	8Pin_2.0mm				

2.4 电气规格 Electrical specifications

额定功率 Rated Power	<22W	
工作电压 Operating Voltage	15~36V, 典型值 15V。 15~36V, typical value of 15V.	
工作电流 Operating Current	1350mA	VCC=15V, 背光亮度最大。 VCC=15V, max backlight.
	400mA	VCC=15V, 背光关闭。 VCC=15V, backlight off.
推荐工作电源: 15V 2A 的直流稳压电源。 Recommended power supply: 15V 2A DC.		

2.5 工作环境 Operating environment

工作温度 Operating Temperature	0℃~50℃ (15V @ 60% RH)
存储温度 Storage Temperature	-20℃~60℃
防紫外线 Anti-UV	无 N
三防漆 Conformal coating	无 N
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.

测试过程：将产品放置在测试台面的测试工装上（测试工装高度约 15cm），针对智能屏进行接触放电和空气放电测试，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。

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.

测试结论：产品 ESD 性能达到 GB/T 17626.2 B 级。

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

■ 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
屏幕					A	A		
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

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

3.2 电快速瞬变脉冲群测试 EFT 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.

测试过程：将产品平置于测试台上，通过脉冲群发生仪耦合脉冲群后的电源对智能屏进行供电；实验过程观察屏幕是否出现复位重启、异常显示、触摸异常等现象。

Test process: Place the product flat on the test bench, power the smart LCM through the power supply coupled with an impulse generator. Observe if any reboot, abnormal display, or touch malfunction occurs during the test.

测试结论：产品 EFT 性能达到 GB/T 17626.4 B 级。

Test conclusion: The product's EFT performance meets GB/T 17626.4 Class B standards.

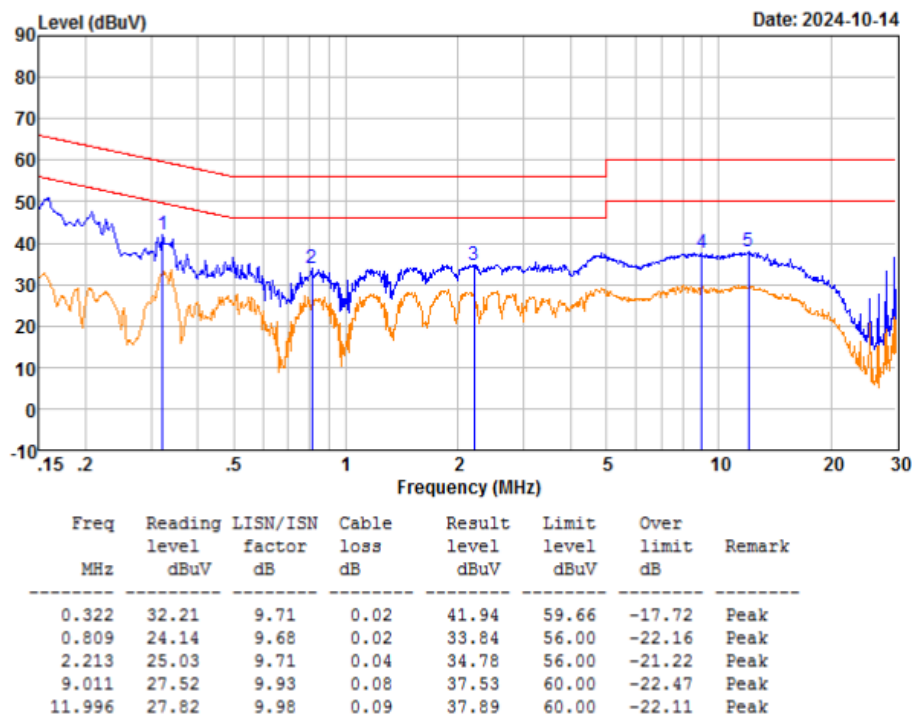
■ Test standard : ☐ EN 61000-4-4:2012 ☐ IEC 61000-4-4:2012 ☐ GB/T 17626.4-2018
☐ Other:

Test Points		Test Levels(kV)							
		-0.5	+0.5	-1.0	+1.0	-2.0	+2.0	-4.0	+4.0
AC Power ports	L	A				A	A		
	N					A	A		
	Earth					A	A		
	L+N					A	A		
	L + Earth					A	A		
	N + Earth					A	A		
	L+N+Earth					A	A		
Signal ports									

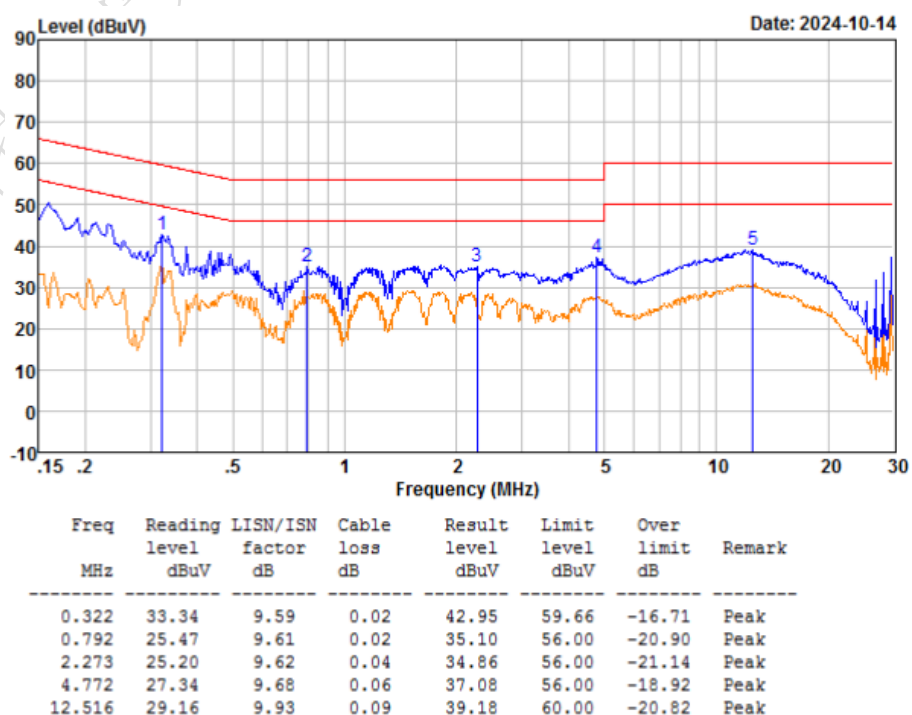
3.3 传导干扰测试 CE test

测试项目 Test Item	测试标准 Test Standard	结果 Result
传导干扰 CE	ClassB-6dB	正常工作 Normal operation

LINE



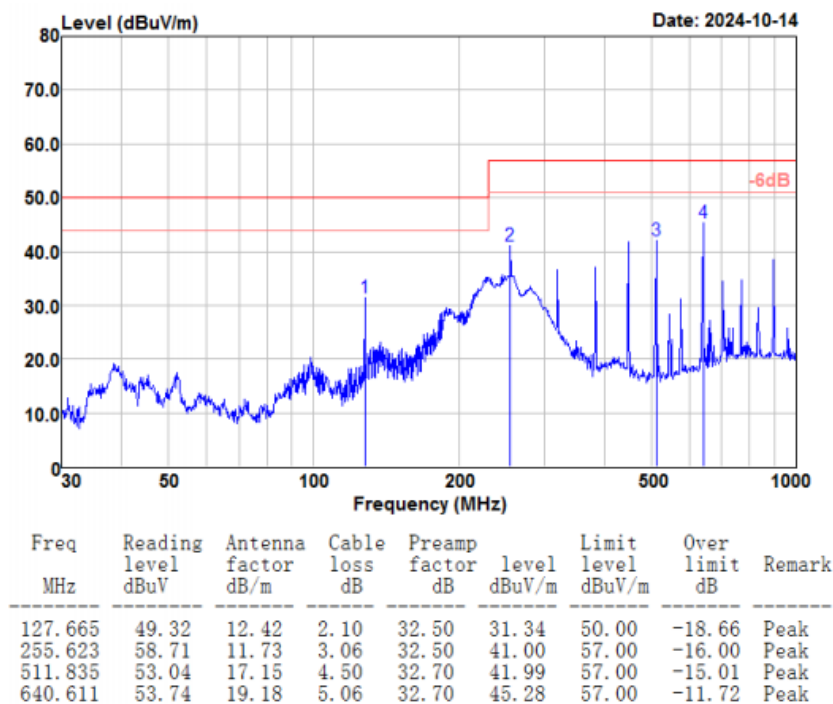
NEUTRAL



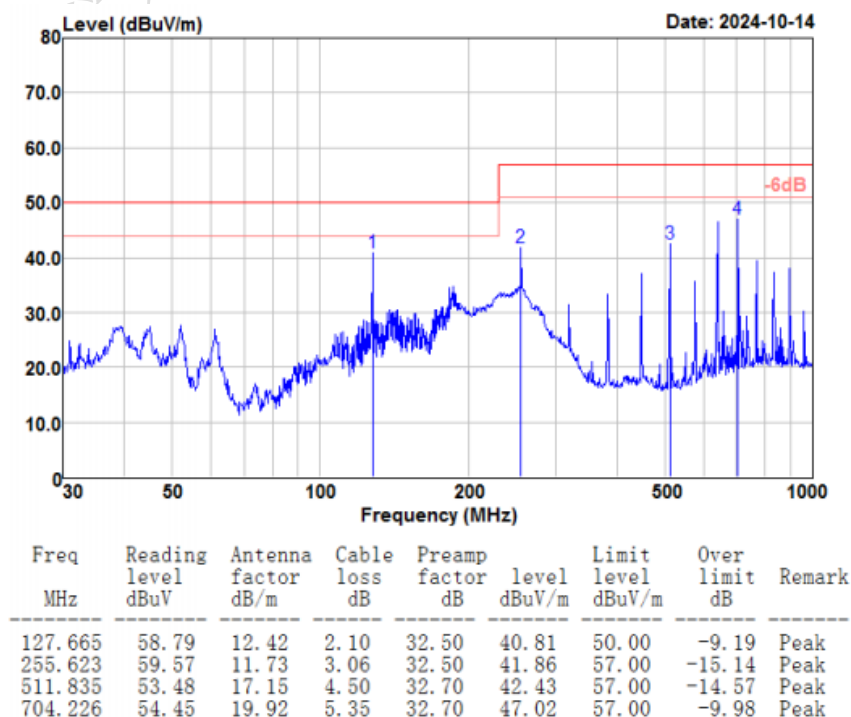
3.4 辐射干扰测试 RE test

测试项目 Test Item	测试标准 Test Standard	结果 Result
辐射干扰 RE	ClassB-6dB	正常工作 Normal operation

HORIZONTAL



VERTICAL



3.5 传导骚扰抗扰度测试 CS test

- Test standard : ☐ EN 61000-4-6:2014 ☐ IEC 61000-4-6:2013 ☐ GB/T 17626.6-2017
☐ Other:
 ■ Modulation: ☒ Amplitude 80%,1kHz sine wave ☐ Amplitude 80%,2Hz sine wave ☐ Other:
 ■ Dwell time: ☒ 1s ☐ 3s ☐ other:
 ■ Frequency Step Size : ☒ 1 % of preceding frequency value ☐ other:

Coupling Line	Frequency Range (MHz)	Voltage Level(e.m.f.) (V)	Result
AC power line	0.15-80	10	A

3.6 浪涌（冲击）测试 SURGE test

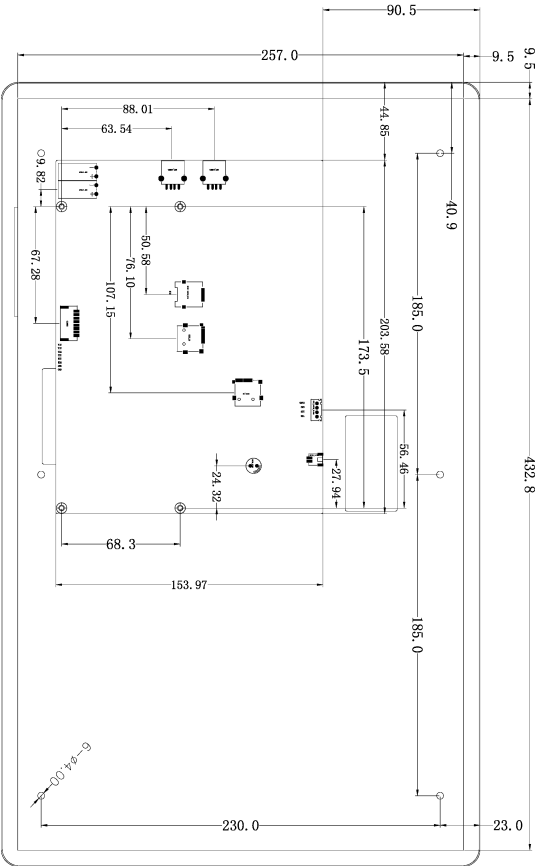
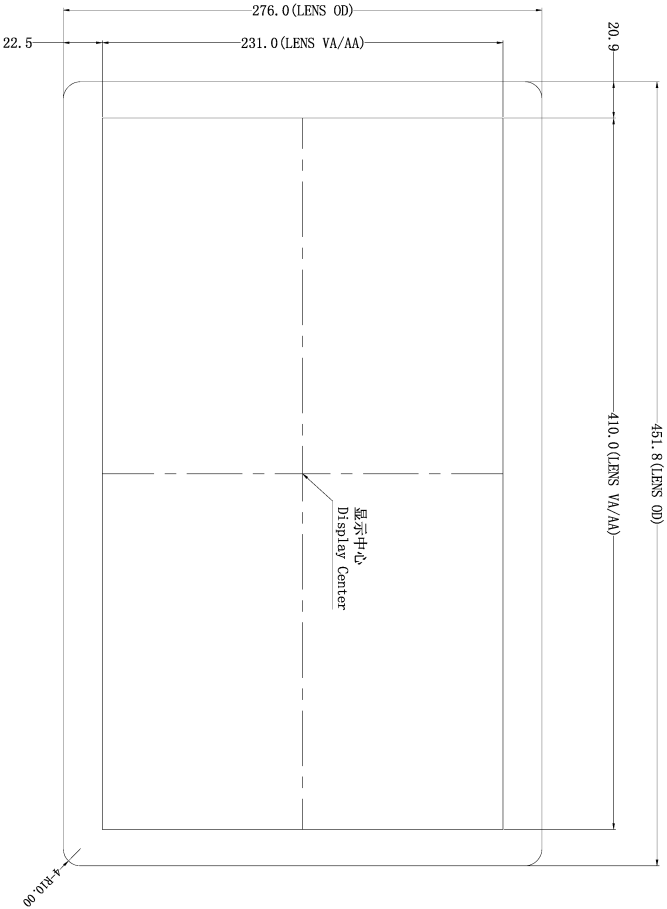
- Test standard : ☐ EN 61000-4-5:2014+A1:2017 ☐ IEC 61000-4-5:2014+A1:2017 ☐ GB/T 17626.5-2019
☐ Other:

Table 1: AC mains power input port

Level	Voltage	Polarity	Path	Result
1	0.5kV	±		
2	1kV	±	L-N, N-PE, L-PE	A
3	2kV	±	L-PE N-PE	A
4	4kV	±		

4、包装和物理尺寸 Packaging & dimensions

外形尺寸 Form Factor	451.8mm (W)×276.0mm (H)×31.4mm (T)			
安装尺寸 Installation Dimensions	开孔尺寸: 432.8 (+0.3mm) ×257.0 (+0.3mm) Positioning hole: 432.8(+0.3mm)×257.0(+0.3mm)			
净重量 Net Weight	3090g			
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)	-	-	-
2 号箱 Carton2:	250mm(L)×200mm(W)×80mm (H)	-	-	-
3 号箱 Carton3:	320mm(L)×270mm(W)×80mm (H)	-	-	-
4 号箱 Carton4:	435mm(L)×335mm(W)×290mm(H)	-	-	-
5 号箱 Carton5:	600mm(L)×430mm(W)×290mm(H)	1	5	5



定义 Definition	序号 Pin#	类型 Type	说明 Description
VIN	1, 2	P	电源输入 Power Input
TX4	3	0	串口4输出 Output
TX2	4	0	串口2输出 Output
RX2	5	I	串口2输入 Input
RX4	6	I	串口4输入 Input
GND	7, 8	P	公共接地 GND

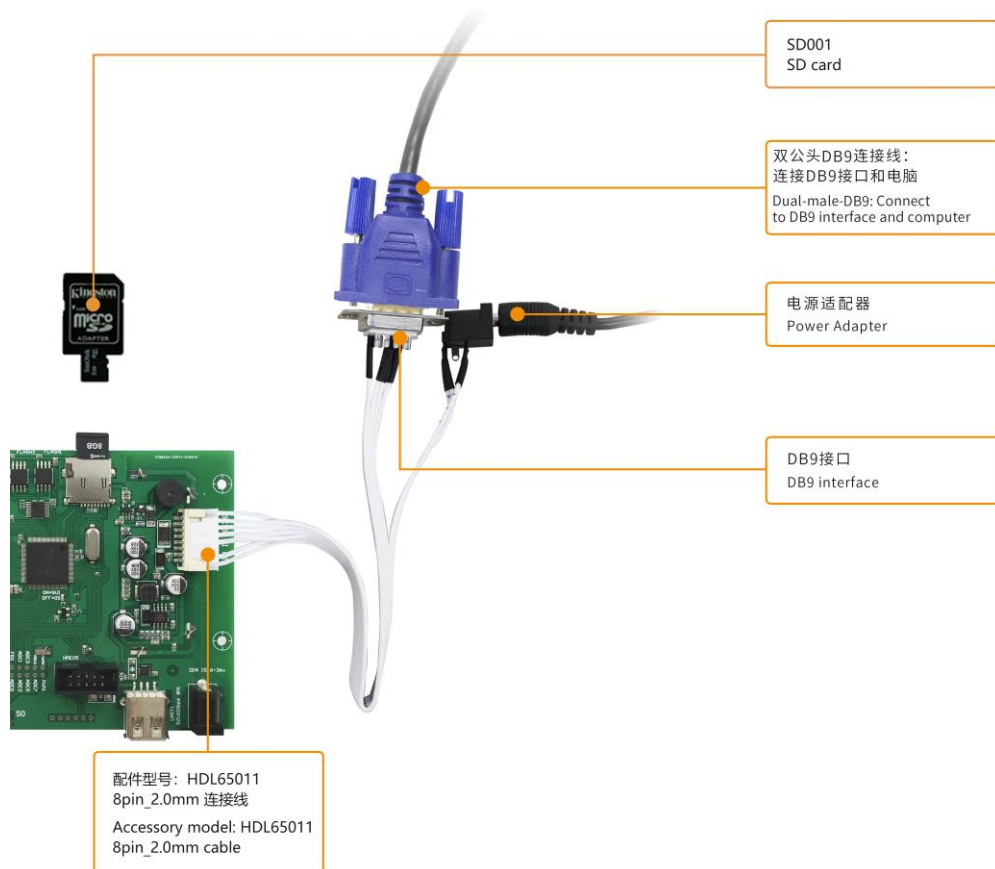
型号 Model	DT321X190020Z240101I			迪文科技 DWIN Technologies
图纸 Drawing	A 4	绘制 Drawn	日期 Date	2024.4.9
比例 Scale	1:1	审核 Review	日期 Date	
单位 Unit	MM	批准 Approval	日期 Date	

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

5、调试工具 Debug 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.



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℃~+85℃工作温度范围 (可定制 -55℃~105℃工作温度范围 IC)。

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

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

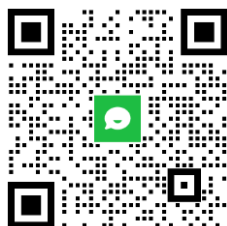
版本 Rev	日期 Revise Date	描述 Content	编辑人 Editor
00	2024-04-09	参考版本，以升级版本为准 Reference version, the upgraded version shall prevail	赵方维
01	2024-10-17	增加可靠性测试报告 Add reliability test report	赵方维
02	2024-11-04	修改 RTC 说明 Modify RTC describe	孟可

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迪文开发者论坛 DWIN Developer Forum: <http://inforum.dwin.com.cn:20080/forum.php>

感谢大家一直以来对迪文的支持，您的支持是我们进步的动力！

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

重要声明

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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.

DWIN shall not bear any joint and several liability for any consequences that may arise from customers' adoption of DWIN products. In particular, for risks that may lead to significant property losses, environmental hazards, personal injury, or even death, especially in high-risk application areas such as military applications, flammable and explosive places, and life-saving medical equipment, customers should independently assess the risks and take corresponding preventive and protective measures. DWIN shall not bear any relevant responsibility.