

DMG40400C016_13WNZ154

产品特点:

- 基于 T5L0-Q88 ASIC，运行 DGUS II 人机交互软件平台。
- 1.6 英寸，400*400 分辨率，IPS 液晶显示屏。
- 圆形旋钮屏，带编码器外壳。

Features:

- Powered by T5L0-Q88 ASIC, running DGUS II HMI platform.
- 1.6-inch, 400*400 resolution, IPS-TFT LCD.
- Circular rotary screen with encoder shell.



1、硬件及接口说明 Hardware and interface description

序号 No.	名称 Name	说明 Description
1	T5L0-Q88 芯片 T5L0-Q88 ASIC	迪文自主研发，2023 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 2023. 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，6Pin_2.0mm 座子。 6Pin_2.0mm socket for power supply and serial communication.
3	USB 接口 USB interface	MICRO USB，供电接口（5V）。 MICRO USB, power supply interface (5V).
4	Flash	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。 16Mbytes NOR Flash, can be used to store user UI files such as fonts, images, music, etc., with erase/write cycles>100,000 times.
5	SD 卡接口 SD card interface	FPC8_0.5mm 接口，下载需外接转接板 130-SDK。FAT32 格式，下载文件，文件可在屏幕统计显示，下载速率：4Mb/s FPC8_0.5mm interface, download requires an external adapter board 130-SDK. FAT32 format, download files, files can be displayed in screen statistics, download speed: 4Mb/s
6	PGT05 接口 PGT05 interface	用于重新烧录 DGUS 底层程序。 Used for reprogramming the underlying 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	400×400 pixels
有效显示区域 Active Area (AA)	直径=39.8mm Diameter=39.8mm
背光 Backlight	LED
背光寿命 Backlight Service Life	>20000 小时（以最高亮度连续工作，亮度减半时间） >20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
亮度 Brightness	300nit

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 机械性能 Mechanical characteristics

卡点出脱力矩 Detent torque	只适用于附卡点装置：300±100gf.cm。 Only suitable for C.C, equipment.: 300±100gf.cm.
定位点数及位置 Number and Position of detents	只适用于附卡点装置：24 点定位（间隔角度 15° ±3° ）。 Only suitable for C.C, equipment.: 24 detents (Step angle : 15° ±3°).
回转寿命 Rotational life	在无负荷条件下轴以 600~1000/h 速度回转 30,000 周。 The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~1000/h without electrical load, after which measurements shall be made.
开关电路、接点数 Switch circuit and Number of pulse	单极单投（推 ON）。 Single pole and single throw (push on) .
开关移动量 Travel of switch	1.7±0.5mm
开关动作力 Operating force	6±3N (610±306gf)

2.3 串口参数 Serial interface parameters

串口模式 Mode	UART2: TTL/CMOS;				
串口电平 Voltage Level	测试条 Test Condition	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
	Output 1, Iout = -4mA	3.0	3.3	-	V
	Output 0, Iout = 4mA	-	0	0.3	V
	Input 1	2.4	3.3	5.0	V
	Input 0	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	6Pin_2.0mm				

2.4 电气规格 Electrical specifications

额定功率 Rated Power	<1W
工作电压 Operating Voltage	4.5~5.5V, 典型值 5V。 4.5~5.5V, typical value of 5V.
工作电流 Operating Current	150mA @ 5V
推荐工作电源: 5V 1A 的直流稳压电源 Recommended power supply: 5V 1A DC	

2.5 工作环境 Operating environment

工作温度 Operating Temperature	-20℃~70℃ (5V @ 60% RH)
存储温度 Storage Temperature	-30℃~80℃
三防漆工艺 Conformal coating	有 Y
工作湿度 Operating Humidity	10%~90%RH, 典型值 60%RH 10%~90%RH, typical value of 60% RH

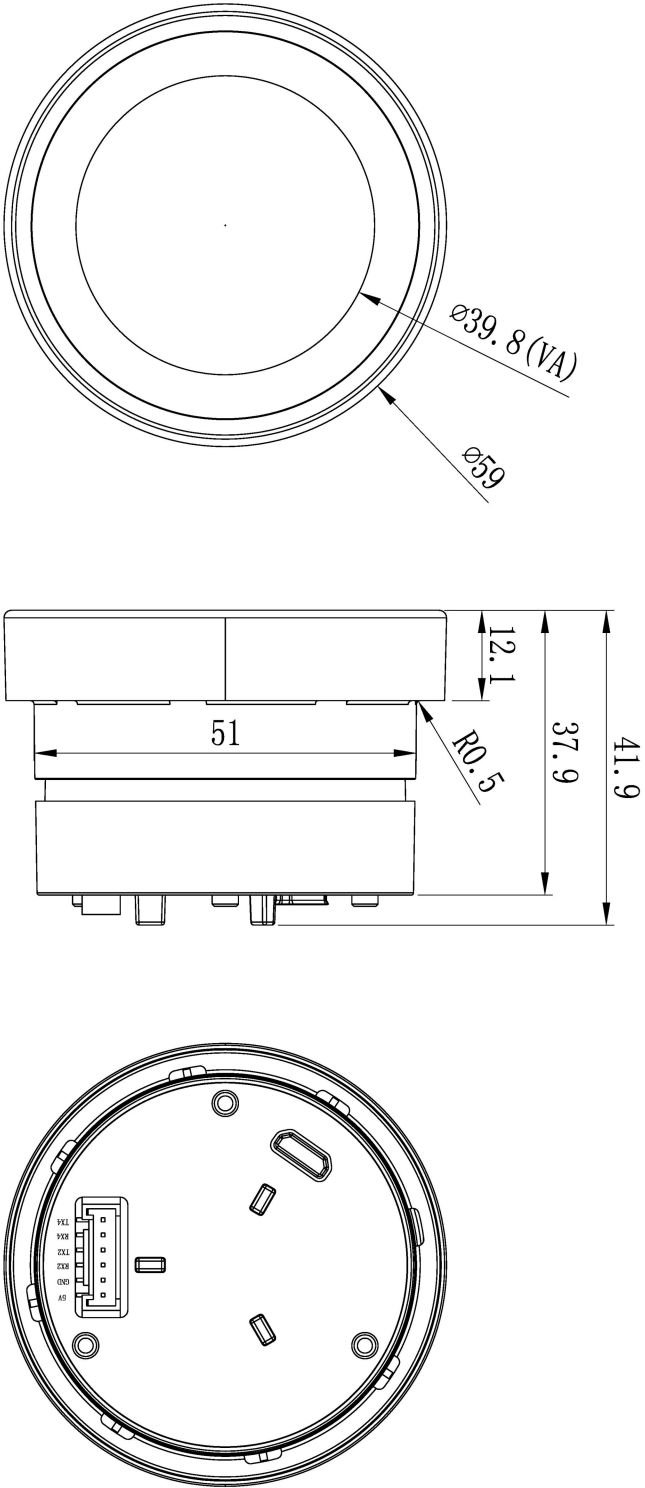
3、包装和物理尺寸 Packaging & dimensions

外形尺寸 Form Factor	直径 59.0mm*高度 41.9mm 59.0mm diameter * 41.9mm height			
净重量 Net Weight	60g			
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)
纸箱 Carton	455mm(L)×355mm(W)×250mm(H)	4	25	100

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

型号 Model	DMG40400C016-13WNZ154				迪文科技 DWIN Technologies			
图纸 Drawing	A 4	绘制 Drawn	DWIN	日期 Date	250723			
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+/-0.3mm
Unmarked Tolerance is +/-0.3mm
注：虚线标注为有效显示区域
Active area is marked in Dash lines



4、T5L0-Q88 主控芯片 T5L0-Q88 ASIC

T5L0 -Q88ASIC 是迪文科技针对小尺寸液晶应用显示而设计的小封装、低功耗、低成本、GUI 和应用高度整合的单芯片双核 ASIC，2023 年正式量产。

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) 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 400MHz。

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) 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，18bit 彩色显示分辨率支持到 1024*768（TA 模式），854*480（DGUS 模式）。

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 硬件加速，动画和图标为主的 UI 极其炫酷、流畅。

2D hardware acceleration 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.

- 高品质语音压缩存储和播放。

High quality ratio and sound restoration and playback.

- 128Kbytes 变量存储器空间，存储器接口和 OS CPU 核交换数据，应用简单。

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

- 2 路 10bit 800KHz DC/DC 控制器，简化 LED 背光、模拟电源设计并节约成本和空间。

2 10-bit 800KHz DC/DC controllers simplify LED backlight, analog power design and save cost and space.

- 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 backend remote upgrade.

- (3) 单独 CPU 核（OS CPU）运行用户 8051 代码或迪文 DWIN OS 系统，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 core 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.

- 15 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。

15 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channel 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 online simulation and debugging with unlimited 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.

5、修订记录 Revision records

版本 Rev	日期 Revise Date	描述 Content	编辑人 Editor
00	2024-02-29	首次发布 First Edition	郑运佳
01	2024-08-01	删除 RTC 数据 Delete RTC data	郑运佳
02	2025-07-24	编码器优化，更新图纸 Encoder optimization, update drawings	郑运佳

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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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