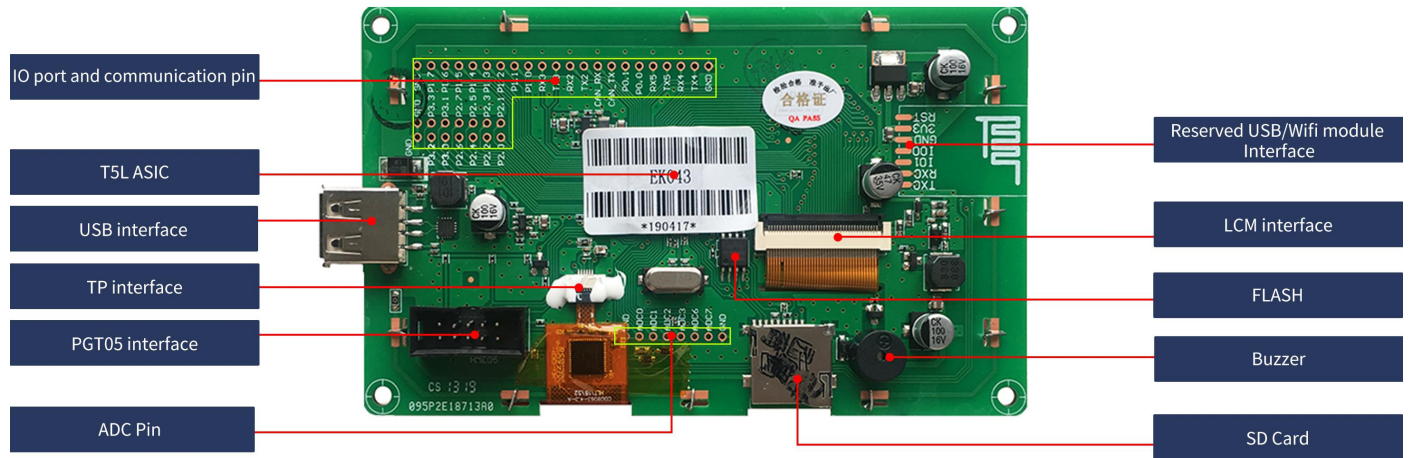# EKT043

Features:

- **Based on T5L1, running DGUS II system, Development board.**

- **4.3-inch, 480*272 Pixels resolution, 16.7M Colors, TN-TFT-LCD, Normal viewing angle.**

- **Capacitive touch screen.**

- **2.54mm pitch pad pins, including IO, UART, CAN and AD from user CPU core for easy secondary development.**

1. Hardware and interface

1.1 Hardware interface

| IO port and communication pin |
| T5L ASIC |
| USB interface |
| TP interface |
| PGT05 interface |
| ADC Pin |

| Reserved USB/Wifi module Interface |
| LCM interface |
| FLASH |
| Buzzer |
| SD Card |

Hardware interface

1.2 Interface description

No.	Name	Description
1	T5L1 ASIC	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	LCM interface	FPC40_0.5mm, RGB interface
3	CTP interface	6Pin_0.5mm, IIC interface
4	USB interface	USB power supply interface, option UART1
5	Flash	16MBytes NOR Flash, for fonts, pictures and audio files. Rewrite cycle: over 100,000 times
6	Buzzer	3V passive buzzer. Power: <1W
7	SD interface	FAT32. Download files by SD interface can be displayed in statistics. Download rate: 4Mb/s
8	Reserved module interface	Wi-Fi module: connect to the cloud platform to update remotely
9	HME05 interface	Connect the JTAG interface of T5L for code IAP debugging and simulation operation in KEIL development environment

1.3 Pin definition of 2.54mm pitch land pattern

Pin NO.	Definition	Description	Remark
1	GND	common ground	
2	TX4	UART4 data sending	
3	RX4	UART4 data sending	
4	TX5	UART5 data sending	
5	RX5	UART5 data sending	
6	P0.0	IO	
7	P0.1	IO	
8	CAN_TX	CAN interface data transmission	
9	CAN_RX	CAN interface data transmission	
10	TX2	UART2 data sending	
11	RX2	UART2 data reception	
12	TX3	UART3 data sending	
13	RX3	UART3 data reception	
14	P1.0	IO	
15	P1.1	IO	
16	P1.2	IO	
17	P1.3	IO	
18	P1.4	IO	
19	P1.5	IO	
20	P1.6	IO	
21	P1.7	IO	
22	GND	common ground	
23	P2.0	IO	
24	P2.1	IO	
25	P2.2	IO	
26	P2.3	IO	
27	P2.4	IO	
28	P2.5	IO	

29	P2.6	IO	
30	P2.7	IO	
31	P3.0	IO	
32	P3.1	IO	
33	P3.2	IO	
34	P3.3	IO	
35	GND	common ground	
36	GND	common ground	
37	GND	common ground	
38	ADC0	AD input	
39	ADC1	AD input	
40	ADC2	AD input	
41	ADC3	AD input	
42	ADC6	AD input	
43	ADC7	AD input	
44	GND	common ground	

2. Specification parameters

2.1 Display parameters

LCD Type	TN, TFT LCD
Viewing Angle	Wide viewing angle, 70°/70°/50°/70° (L/R/U/D)
Resolution	480×272 pixels (0°/90°/180°/270°)
Color	24-bit 8R8G8B
Active Area (A.A.)	96.54mm (W)×55.36mm (H)
View Area (V.A.)	-
Backlight Mode	LED
Backlight Service Life	>20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)
Brightness	270nit
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)
Note: Long time display of high contrast still image over 30 minutes may lead to display residual shadow, please use screen saver to avoid this problem.	

2.2 Touch parameters

Type	CTP (Capacitive touch panel)
Structure	G+G structure with surface cover of Asahi tempered glass
Touch Mode	Support point touch and drag
Surface Hardness	6H
Light Transmittance	Over 90%
Life	Over 1,000,000 times touch

2.3 Serial interface parameters

Mode	UART1: TTL/CMOS;				
Voltage Level	Test Condition	Min	Typ	Max	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
Baud Rate	921600bps				
Data Format	UART1: N81				
Interface Cable	Dual-male-USB:HDLUSB1 connect to computer				

2.4 Electrical specifications

Rated Power	<5W	
Operating Voltage	4.5~5.5V, typical value of 5V	
Operating Current	210mA	VCC=5V, max backlight
	70mA	VCC=5V, backlight off
Recommended power supply: 5V 1A DC		

2.5 Operating environment

Operating Temperature	-20℃~70℃ (5V @ 60% RH)
Storage Temperature	-30℃~80℃
Conformal Coating	None
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: 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 as shown in Fig.3.1 below. 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.

3.1 Electrostatic discharge test

Discharge Type	Discharge Value	Result
Contact discharge	±4KV	Normal operation
Air discharge	±4KV	Normal operation

3.2 EFT test

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

Test process: the product was placed on the test bench to perform contact and the smart screen is energized by the power supply coupled with a EFT generator as shown in Fig. 3.2 below. During the experimental process, it was observed whether abnormal reset, display or touch phenomena occurs. According to the experiment results, the performance is in line with the criteria GB/T 17626.2 B level and above.

3.2 EFT test

Test Item	Test Standard	Result
Power supply	±1KV;100KHz	Normal operation

4. Packaging & dimensions

Form Factor	127.3(W) ×73.2(H) ×17.5(T) mm
Installation Dimensions	Positioning hole: 106.5(+0.3mm)×68.3(+0.3mm)
Net Weight	115g

Packaging Standards

Model	Dimensions	Layer	Quantity/Layer	Quantity(Pcs)
Carton1:	220mm(L)×160mm(W)×47mm (H)	1	2	2
Carton2:	250mm(L)×200mm(W)×80mm (H)	2	2	4
Carton3:	320mm(L)×270mm(W)×80mm (H)	2	4	8
Carton4:	435mm(L)×335mm(W)×290mm(H)	-	-	-
Carton5:	600mm(L)×430mm(W)×290mm(H)	2	60	120

Disclaimer: the data is for reference only and the information of product design that do not affect performance parameters and utilization is subject to alternation without prior notice.
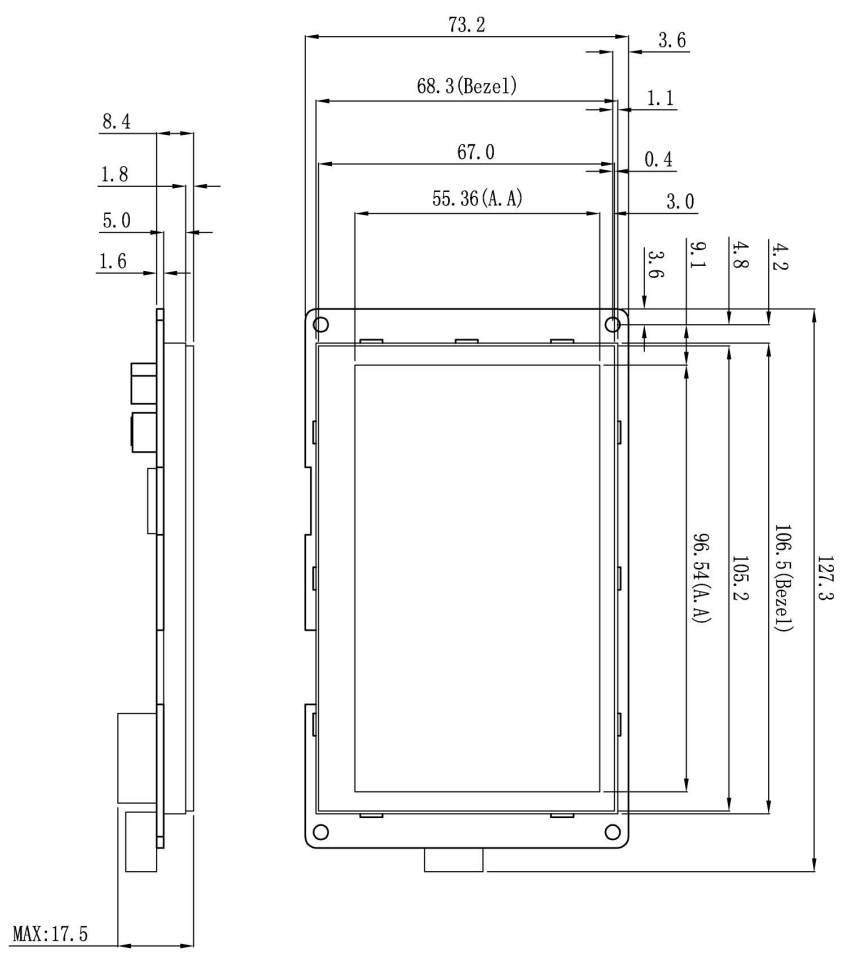
引脚名称	引脚定义	引脚类型	说　　明
GND	10	P	公共接地/GND
+3.3	9	P	电源输入/Power input
NC	8	–	未定义/Undefined
NC	7	–	未定义/Undefined
GND	6	P	公共接地/GND
TCK	5	TCK	迪文屏TCK
TDO	4	TDO	迪文屏TDO
TMS	3	TMS	迪文屏TMS
NC	2	–	未定义/Undefined
TDI	1	TDI	迪文屏TDI

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

型　号		EK043		
图　纸	A 4	图　纸	DWIN	
比　例		审　核	日期	
单　位	MM	批　准	日期	

迪文科技
DWIN Technologies

GND　TDI
NC　　NC
NC　　TMS
+3.3　TDO
GND　TCK

5. Debugging tools

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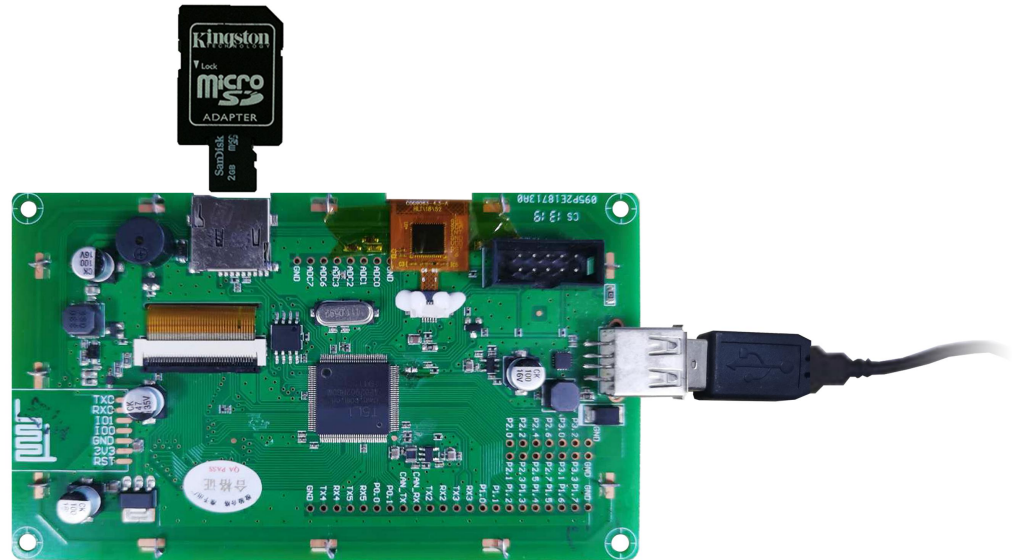
HDLUSB

SD001

6. T5L series IC features

(1) 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) Separate GUI CPU Core running DGUS II System:

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

● 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.

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

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

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

● Support DGUS development and simulation on PC. Support background 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 architecture 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.

● 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.

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

7. Revision records

Rev	Revise Date	Content	Editor
00	2019-09-29	First Edition	ZK
01	2021-11-04	Upgrade version	Guang Mingxin

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

Customer service Tel: 400 018 9008

Customer service QQ: 400 018 9008

Customer service email: dwinhmi@dwin.com.cn

DWIN Developer Forum: http://forum.dwin.com.cn

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