深圳市拓普微科技开发有限公司
SHENZHEN TOPWAY TECHNOLOGY CO., LTD.

HKT043CMC-C

LCD Module User Manual

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Song Mao Date: 2023-09-25	Date:	Date:

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0.1	- Preliminary Draft release	Song Mao	2023-08-10
0.1	- Update Section 7	Song Mao	2023-09-25

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1 Basic Specification

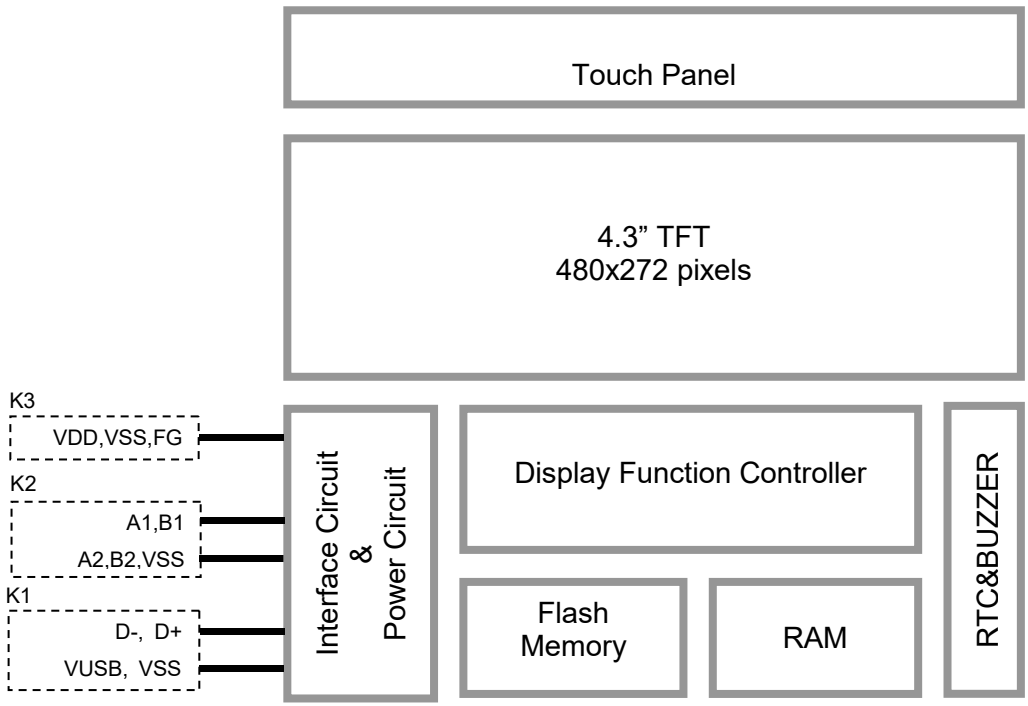
TOPWAY HKT043CMC-C is a Smart TFT Module with 32bit MCU on board. Its graphics engine provides numbers of outstanding features. It supports TOPWAY SGTools for preload and pre-design display interface that simplify the host operation and development time. Suitable for industry control, instrumentation, medical electronics, power electric equipment applications.

1.1 General Specification

Screen Size(Diagonal) :	4.3”
Resolution :	480(RGB) x 272
Color Depth :	65k color (16bit)
Pixel Configuration :	RGB Stripe
Display Mode :	Transmissive / Normal White
Viewing Direction :	12H (*1) (gray-scale inverse) 6H (*2)
Outline Dimension :	128.0 x 102.0 x 32.0 (max) (mm) (see attached drawing for details)
Active Area :	95.04 x 53.86 (mm)
Backlight :	LED
Command I/F:	RS485
Power Supply:	8.0 ~ 58.0V
Project Download:	by U-Drive
Operating Temperature :	-20 ~ +70°C
Storage Temperature :	-30 ~ +80°C
Highlight	RTC without battery, Casing, Support 90 degrees rotation, Lua script engine, Buzzer，256MB flash

Note:
*1. For saturated color display content (eg. pure-red, pure-green, pure-blue, or pure-colors-combinations).
*2. For “color scales” display content.

1.2 Block Diagram



1.3 Terminal Function

USB Interface Terminal (K1,USBA)

Pin No.	Pin Name	I/O	Descriptions
1	VUSB	P	Power supply(5.0V)
2	D-	I/O	USB DATA negative signal
3	D+	I/O	USB DATA positive signal
4	VSS	P	Ground, (0V)

Note.
*1. TML files and image files preload through this terminal
*2. During the files transfer, all others display functions will be suspended

RS485 Interface Terminal (K2,DB9)

Pin No.	Pin Name	I/O	Descriptions
1	B2	I/O	RS485 Differential Signal B
2	A2	I/O	RS485 Differential Signal A
3	NC	--	No connection, leave open
4	NC	--	No connection, leave open
5	VSS	P	Ground, (0V)
6	NC	--	No connection, leave open
7	B1	I/O	RS485 Differential Signal B
8	A1	I/O	RS485 Differential Signal A
9	NC	--	No connection, leave open

Note.
*1. User data and commands transfer through this terminal
*2. HW hand shake is suggested

Power Interface Terminal (K3,P5.08×3)

Pin No.	Pin Name	I/O	Descriptions
1	VDD	P	Power supply (8.0~58.0 V)
2	VSS	P	Ground, (0V)
3	FG	--	Case Ground

2 Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit	Condition
Power Supply voltage	V_{dd}	-0.3	58.0	V	
RS485 A/B Input Voltage	V_{AB}	-7.0	13.0	V	
Operating Temperature	T_{OP}	-20	70	°C	No Condensation
Storage Temperature	T_{ST}	-30	80	°C	No Condensation

Notes:
*1.This rating applies to all parts of the module and should not be exceeded.
*2.The operating temperature only guarantees operation of the circuit. The contrast, response speed and the other specification related to electro-optical display quality is determined at the room temperature, TOP=25℃ Ambient temperature when the backlight is lit (reference value)
*3.Any Stresses exceeding the Absolute Maximum Ratings may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

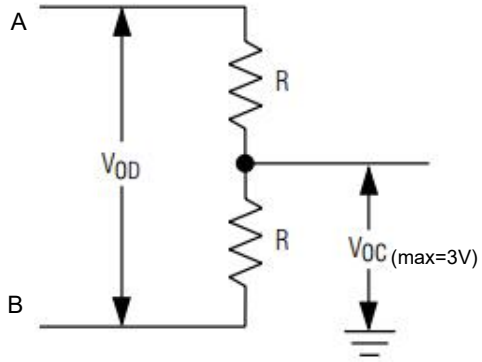
3 Electrical Characteristics

3.1 DC Characteristics

VSS=0V, VDD=12.0V, T_{OP} =25°C

Items	Symbol	MIN.	TYP.	MAX.	Unit	Applicable Pin/FUNC
Operating Voltage	V_{DD}	8.0	12.0	58.0	V	VDD
Differential Driver Output (with load)R=50Ω (*1)	V_{OD}	2	-	5	V	A/B
Receiver Differential Threshold Voltage	V_{TH}	-0.2	-	0.2	V	A/B
Operating Current	I_{DD}	-	150	-	mA	VDD (*2)
Battery Supply Current	I_{BAT}	-	1.2	-	uA	

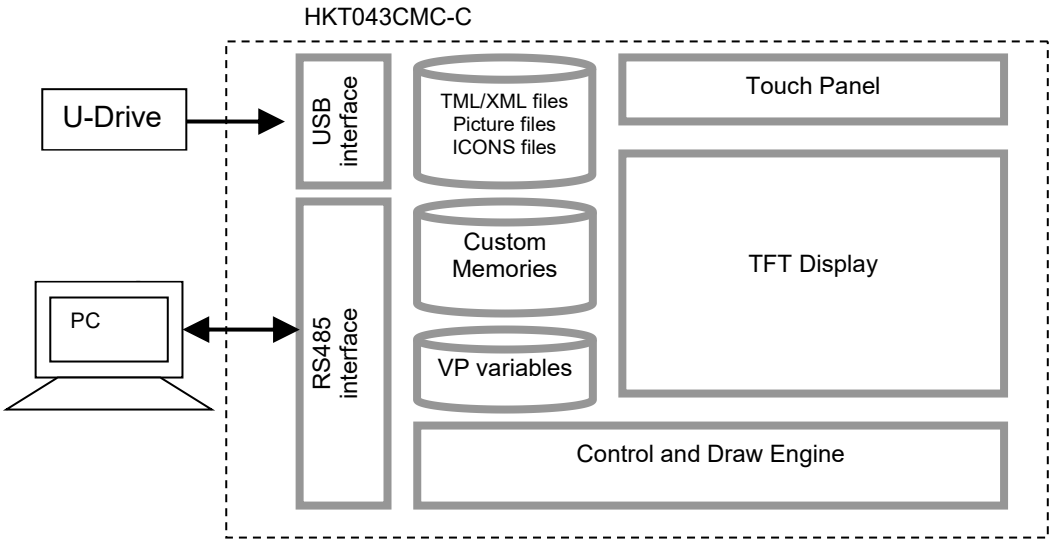
Notes:
*1.



The Matching resistance at both ends of A and B is 120Ω;
A internal pull up at 1K;
B internal pull down at 1K;
*2.Normal display condition

4 Function Specifications

4.1 Basic Operation Function Descriptions



- TML files, images, icons are stored inside the flash memory area. They are pre-loaded into the HKT043CMC-C via USB-Drive.
- The GUI's appearance and responses are based on the preloaded TML files
- The Control- and Drawing- Engine executes RS485 / Modbus RTU commands.
-

4.2 Modbus configuration Descriptions

The HKT043CMC-C needs to add the configuration file "modbus.xml" to the project generated by the TOPWAY RGTools to describe the relationship between the screen variables and the registers of the Modbus Slave device.

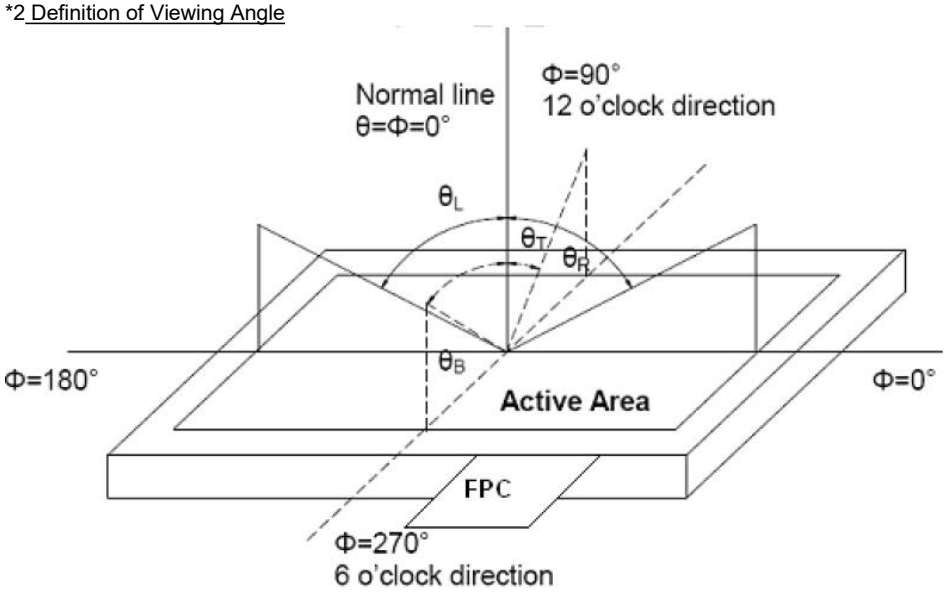
Please refer to Appendix A for "Modbus.xml" formating.

5 Optical Characteristics

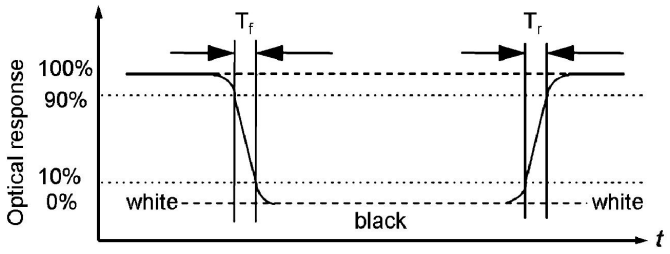
Item	Symbol	Condition	MIN.	TYP.	MAX.	UNIT	Note.
Viewing angle (CR⩾10)	θ_L	9 o'clock	70	80	-	degree	*2
	θ_R	3 o'clock	70	80	-		
	θ_T	12 o'clock	70	80	-		
	θ_B	6 o'clock	50	60	-		
Response Time	T_f	Normal θ=0°	-	20	30	msec	*3
	T_r						
Contrast ratio	CR		700	900	-	-	*1
Color chromaticity	W_X		0.255	0.305	0.355	-	
	W_Y		0.277	0.327	0.377	-	
Luminance	L		-	300	-	cd/m^2	*4
Luminance uniformity	Y_U		75	80	-	%	*4

Note:
*1. Definition of Contrast Ratio
The contrast ratio could be calculate by the following expression:
Contrast Ratio (CR) = Luminance with all pixels white / Luminance with all pixels black

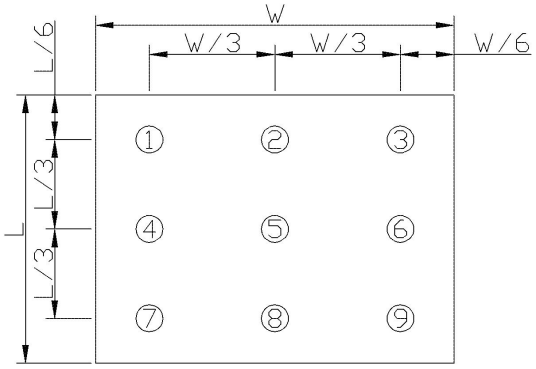
*2 Definition of Viewing Angle



*3 Definition of response time



*4 Definition of Luminance Uniformity
Luminance uniformity (Lu)=
Min. Luminance form pt1~pt9 / Max Luminance form Pt1~pt9



6 LCD Module Design and Handling Precautions

- Please ensure V0, VCOM is adjustable, to enable LCD module get the best contrast ratio under different temperatures, view angles and positions.

- Normally display quality should be judged under the best contrast ratio within viewable area. Unexpected display pattern may come out under abnormal contrast ratio.
- Never operate the LCD module exceed the absolute maximum ratings.
- Never apply signal to the LCD module without power supply.

- Keep signal line as short as possible to reduce external noise interference.
- IC chip (e.g. TAB or COG) is sensitive to light. Strong light might cause malfunction. Light sealing structure casing is recommended.

- Make sure there is enough space (with cushion) between case and LCD panel, to prevent external force passed on to the panel; otherwise that may cause damage to the LCD and degrade its display result.
- Avoid showing a display pattern on screen for a long time (continuous ON segment).
- LCD module reliability may be reduced by temperature shock.
- When storing and operating LCD module, avoids exposure to direct sunlight, high humidity, high or low temperature. They may damage or degrade the LCD module.
- Never leave LCD module in extreme condition (max./min storage/operate temperature) for more than 48hr.
- Recommend LCD module storage conditions is 0 C~40 C <80%RH.
- LCD module should be stored in the room without acid, alkali and harmful gas.
- Avoid dropping & violent shocking during transportation, and no excessive pressure press, moisture and sunlight.
- LCD module can be easily damaged by static electricity. Please maintain an optimum anti-static working environment to protect the LCD module. (eg. ground the soldering irons properly)
- Be sure to ground the body when handling LCD module.
- Only hold LCD module by its sides. Never hold LCD module by applying force on the heat seal or TAB.
- When soldering, control the temperature and duration avoid damaging the backlight guide or diffuser which might degrade the display result such as uneven display.
- Never let LCD module contact with corrosive liquids, which might cause damage to the backlight guide or the electric circuit of LCD module.

6 液晶显示模块设计和使用须知

- 请注意 VO，VCOM 的设定，以确保液晶显示模块在不同的使用温度下以及在不同的视角和位置观察模块显示，均能达到最佳对比度，请务必将应用电路上设置为对比度可调。
- 请注意液晶显示模块的显示品质判定是指在正常对比度下以及视窗(V.A)范围内进行的，非正常对比度下液晶可能会出现非预期的显示不良，应注意区分。
- 请勿在最大额定值以外使用液晶显示模块。
- 请勿在没有接通电源的条件下，给液晶显示模块输送信号。
- 请尽可能缩短信号线的连接，以避免对液晶显示模块的信号干扰。
- 集成电路因 IC 芯片(如 TAB 或 COG)对紫外线极为敏感，强光环境下可能会引起液晶显示模块功能失效，故应采用不透光的外壳。
- 请在液晶显示模块与外壳之间保留足够的空间(可使用衬垫)，以缓冲外力对液晶显示模块的损坏或因受力不均而产生的显示不匀等异常现象。
- 避免液晶显示屏在某一画面下长时间点亮，否则有出现残影的风险；请通过软件每隔一段时间改变一次画面。
- 液晶显示模块的可靠性可能因温度冲击而降低。
- 请勿在阳光直射、高湿、高温或低温下储存和使用液晶显示模块，这将造成液晶显示模块的损坏或失效。

- 请勿在极限环境(最大/最小存储/工作温度)下使用或放置液晶显示模块超过 48 小时以上。
- 液晶显示模块建议存储条件为：0 C~40 C <80%RH。
- 请勿让液晶显示模块存储于带有 酸性，碱性，有害气体环境之中。
- 在运输过程中，请勿让液晶显示模块跌落与猛烈震动，同时避免 异常挤压，高湿度，与阳光照射.
- 液晶显示模块极易受静电损坏，请务必保证液晶显示模块在防静电的工作环境中使用或保存。(如：烙铁正确接地,等)
-
- 拿取液晶显示模块时需注意操作人员的接地情况。
- 请手持液晶显示模块的边沿取放模块，防止热压纸或 TAB 部位受力。
- 焊接液晶模块时，请注意控制烙铁的温度、焊接时间，以免烫坏导光板或偏光片，导致显示不匀等不良现象发生。
- 请勿使用洗板水等腐蚀性液体接触液晶模块，以免腐蚀导光板或模块电路。

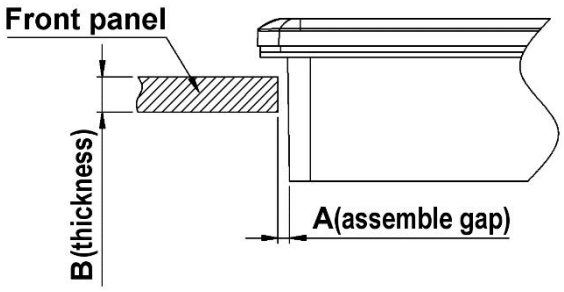
- Only clean LCD with a soft dry cloth, Isopropyl Alcohol or Ethyl Alcohol. Other solvents (e.g. water) may damage the LCD.
- Never add force to components of LCD module. It may cause invisible damage or degrade the module's reliability.
- When mounting LCD module, please make sure it is free from twisting, warping and bending.
- Do not add excessive force on surface of LCD, which may cause the display color change abnormally.
- LCD panel is made with glass. Any mechanical shock (e.g. dropping from high place) will damage the LCD module.
- Protective film is attached on LCD screen. Be careful when peeling off this protective film, since static electricity may be generated.
- Polarizer on LCD gets scratched easily. If possible, do not remove LCD protective film until the last step of installation.
- When peeling off protective film from LCD, static charge may cause abnormal display pattern. The symptom is normal, and it will turn back to normal in a short while.
- LCD panel has sharp edges, please handle with care.
- Never attempt to disassemble or rework LCD module.
- If display panel is damaged and liquid crystal substance leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes promptly wash it off using soap and water.

- 仅可使用柔软的干布，异丙醇或乙醇清洁液晶屏表面，其他任何溶剂(如:水)都有可能损坏液晶模块。
- 请勿挤压液晶显示模块上的元器件，以避免产生潜在的损坏或失效而影响产品可靠性。
- 装配液晶显示模块时，请务必注意避免液晶显示模块的扭曲或变形。
- 请勿挤压液晶显示屏表面，这将导致显示颜色的异常。
- 液晶屏由玻璃制作而成，任何机械碰撞(如从高处跌落)均有可能损坏液晶显示模块。
- 液晶屏表面带有保护膜，揭除保护膜时需要注意可能产生的静电。
- 因液晶显示屏表面的偏光片极易划伤，安装完成之前请尽量不要揭下保护膜。
- 请缓慢揭除保护膜，在此过程中液晶显示屏上可能会产生静电线，此为正常情况，可在短时间内消失。
- 请注意避免被液晶显示屏的边缘割伤。
- 请不要试图拆卸或改造液晶显示模块。
- 当液晶显示屏出现破裂，内部液晶液体可能流出；相关液体不可吞吃，绝对不可接触嘴巴，如接触到皮肤或衣服，请使用肥皂与清水彻底清洗.

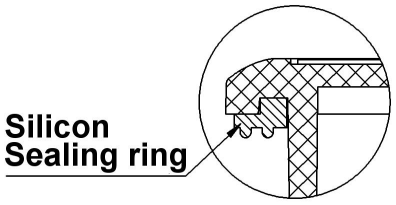
7 Assemble Precaution

安装注意事项

1. Customer front panel opening and thickness for TOPWAY display module should be fit for its assembling and sealing.
   The suggested assemble gap(A) should be about 0.3~0.5mm on each side.
   The suggested front panel thickness(B) should be about 1.5~4.0mm.
   客户面板开窗及厚度应适合 TOPWAY 显示模块的安装及密封.
   - 建议每边安装间隙(A)约为 0.3 ~0.5mm.
   - 建议面板厚度(B) 约为 1.5~4.0mm.



2. A silicon sealing ring ships with TOPWAY display module. It should be in place before assembling to the front panel.
   TOPWAY 显示模块上的硅胶密封圈在安装时确保嵌入到位.



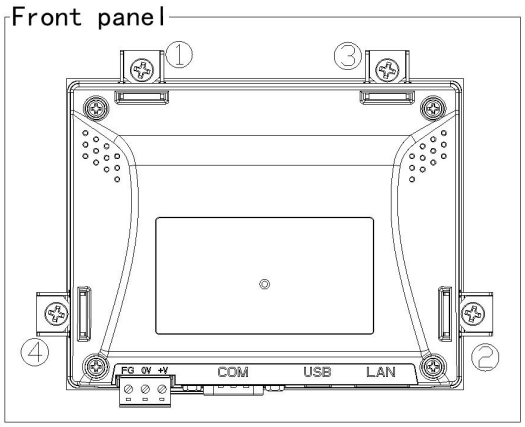
3. It should fix the TOPWAY display module into the front panel with two steps.

   Pre-fixing: Slightly tighten the screws on beam clamp in sequence as picture on the right side.

   Final-fixing: Tighten the fixing screws on beam clamp in sequence as well with twist torque about 4~6kg.cm (*1) . and put the beam clamp straight.

   Note:

   *1. Over tightening might damage the shell and cause bad sealing result.



   应分两步将 TOPWAY 显示模块固定在面板上.

   - 预紧: 将卡扣螺钉按右图所示顺序稍加预紧.
   - 紧定: 再次按顺序用 **4~6kg.cm** 扭力拧紧卡扣螺钉(* 1), 并注意卡扣置正无歪斜.

   注:

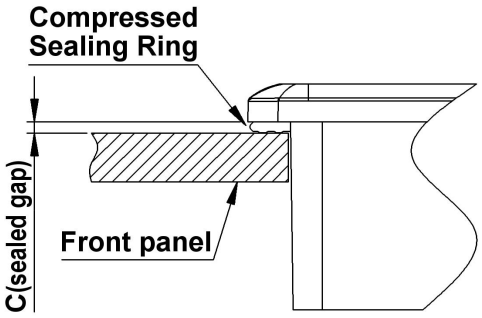
   *1. 过度拧紧可能会损坏外壳和影响密封效果.

4. It is strongly suggested to check the seal balancing of the four-side of the TOPWAY display module.

   The suggested after assemble sealed gap(C) should be about 0.8~1.2mm.

   需注意检查 TOPWAY 显示模块四周在安装后保证平衡密封.

   - 建议组装后的密封间隙(C)约为 0.8 ~1.2 mm.



5. Others:

   Never hot plug the device! Power off the device before connect or disconnect the display module.

   Don't forget to remove the cover protective film for normal operation.

   其它:

   - 视频线禁止带电插拔！ 在连接或断开显示模块之前先关闭设备电源.
   - 使用前请揭去保护膜.

Warranty

This product has been manufactured to our company's specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

- We cannot accept responsibility for any defect, which may arise form additional manufacturing of the product (including disassembly and reassembly), after product delivery.
- We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.
- We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product has passed our company's acceptance inspection procedures.
- When the product is in CCFL models, CCFL service life and brightness will vary according to the performance of the inverter used, leaks, etc. We cannot accept responsibility for product performance, reliability, or defect, which may arise.
- We cannot accept responsibility for intellectual property of a third part, which may arise through the application of our product to our assembly with exception to those issues relating directly to the structure or method of manufacturing of our product.

Appendix A:

Modbus RTU Master Xml configure v1.01

配置文件 Modbus.xml 文档示例

```
<Modbus>
 <config>
  <relative  vpaddr="0x080000" vplen="1" slaveID="1" mbaddr="0x40000" mblen="1"/>
  <relative  vpaddr="0x080002" vplen="1" slaveID="1" mbaddr="0x40001" mblen="1"/>
  <relative  vpaddr="0x080004" vplen="1" slaveID="1" mbaddr="0x40002" mblen="1"/>
  <relative  vpaddr="0x020000" vplen="1" slaveID="1" mbaddr="0x40008" mblen="2"/>
  <relative  vpaddr="0x080034" vplen="1" slaveID="1" mbaddr="0x4000A" mblen="1"/>
 </config>
 <global>
  <Read condition = "always" vpaddr_condition="0x080004" value_condition="100"
  slaveID="1" mbaddr ="0x40008" mblen= "2" />
  <BLCtrl condition = "==" vpaddr_condition="0x080004" value_condition="100"
  value_type="const"  vpaddr_val ="64" />
  <BeepCtrl condition = "==" vpaddr_condition="0x080004" value_condition="100"
  value_type="variable" vpaddr_val ="0x80034" />
 </global>
 <Page PageNo="1">
  <Read condition = "always" vpaddr_condition="0x080004" value_condition="100"
  slaveID="1" mbaddr ="0x40000" mblen= "3" />
 </Page>
```

说明：

配置类	说明	功能
<config>	关系定义	relative - 定义 VP 与 MB 的对应关系 - 当 VP 内容被修改，模块会同时拷贝相关内容到 MB
<global>	定义全局的周期性操作	Read - 读 MB - 可按条件操作 - 模块会参考<config>，同时拷贝相关值到 VP (*1) Write - 写 VP - 可按条件操作 - 模块会参考<config>，同时拷贝相关值到 MB(*1) BLCtrl - 背光亮度设定 - 可按条件操作 BeepCtrl - 蜂鸣器控制 - 可按条件操作
< Page PageNo=n>	定页面 n 中的周期性操作	

注释:

VP=智能模块块中的 VP 变量(含 地址)

MB= MODBUS 变量(含 从设备，从地址)

注:

*1. 相关 MB 关联 VP，必须在<config>中定义

元素<relative>: 描述屏工程中变量与 modbus 地址变量的映射关系

属性	描述
vpaddr	屏的变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量
vplen	变量个数，请填入 1
slaveID	操作的 Modbus Slave 设备 ID 号
mbaddr	Modbus 寄存器地址 0x coil： 地址 0x00000~0x0270F 1x input： 地址 0x10000~0x1270F 3x input Register： 地址 0x30000~0x3270F 4x holding Redister： 地址 0x40000~0x4270F
mblen	Modbus 地址数量，需要使 modbus 和 vpaddr 地址变量比特位相等

元素<Read>: 依条件执行读取 Modbus 地址变量

属性	描述
condition	执行条件 "always",">","==","<","!=",">=","<="
vpaddr_condition	条件左值变量地址，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量 仅条件">","==","<","!=",">=","<=" 有效
value_condition	条件右值对比值，参数为 10 进制数值
slaveID	操作的 Modbus Slave 设备 ID 号
mbaddr	Modbus 寄存器地址 0x coil： 地址 0x00000~0x0270F 1x input： 地址 0x10000~0x1270F 3x input Register： 地址 0x30000~0x3270F 4x holding Redister： 地址 0x40000~0x4270F
mblen	Modbus 地址数量

元素<BLCtrl>:依条件执行控制屏背光亮度为常量或变量 vpaddr_val 的值

属性	描述
condition	执行条件 "always",">","==","<","!=",">=","<="
vpaddr_condition	条件左值变量 ，参数为 16 进制数值以"0x"开头 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量 仅条件">","==","<","!=",">=","<=" 有效
value_condition	条件右值对比值，参数为 10 进制数值
value_type	操作值为常量或者变量 参数值可选"const"，"variable"
vpaddr_val	Value_type ="const" 时，参数为 10 进制数值 Value_type ="variable" 时，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量

元素<BeepCtrl>: 依条件执行控制蜂鸣器是否响,当常量值或变量 vpaddr_val 非 0 时蜂鸣器响, 否则反之。

属性	描述
condition	执行条件 "always",">","==","<","!=",">=","<="
vpaddr_condition	条件左值变量地址，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量 仅条件">","==","<","!=",">=","<=" 有效
value_condition	条件右值对比值，参数为 10 进制数值
value_type	操作值为常量或者变量 参数值可选"const"，"variable"
vpaddr_val	Value_type ="const" 时，参数为 10 进制数值 Value_type ="variable" 时，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量

元素<Write>: 依条件执行写操作，将常量或变量 vpaddr_val 写入 vpaddr 指定的地址中

属性	描述
condition	执行条件 "always",">","==","<","!=",">=","<="
vpaddr_condition	条件左值变量地址，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量 仅条件">","==","<","!=",">=","<=" 有效
value_condition	条件右值对比值，参数为 10 进制数值
value_type	操作值为常量或者变量 参数值可选"const"，"variable"
vpaddr_val	Value_type ="const" 时，参数为 10 进制数值 Value_type ="variable" 时，参数为 16 进制数值以"0x"开头的屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量
vpaddr	需要写入操作的变量地址,对应屏变量地址 0x80000: 16 位数据变量 0x20000: 32 位数据变量 0x30000: 64 位数据变量
vplen	VP 地址数量

注：

mbaddr: 指 Modbus 寄存器地址

0x coil : 地址 0x00000~0x0270F

1x input : 地址 0x10000~0x1270F

3x input Register : 地址 0x30000~0x3270F

4x holding Register : 地址 0x40000~0x4270F

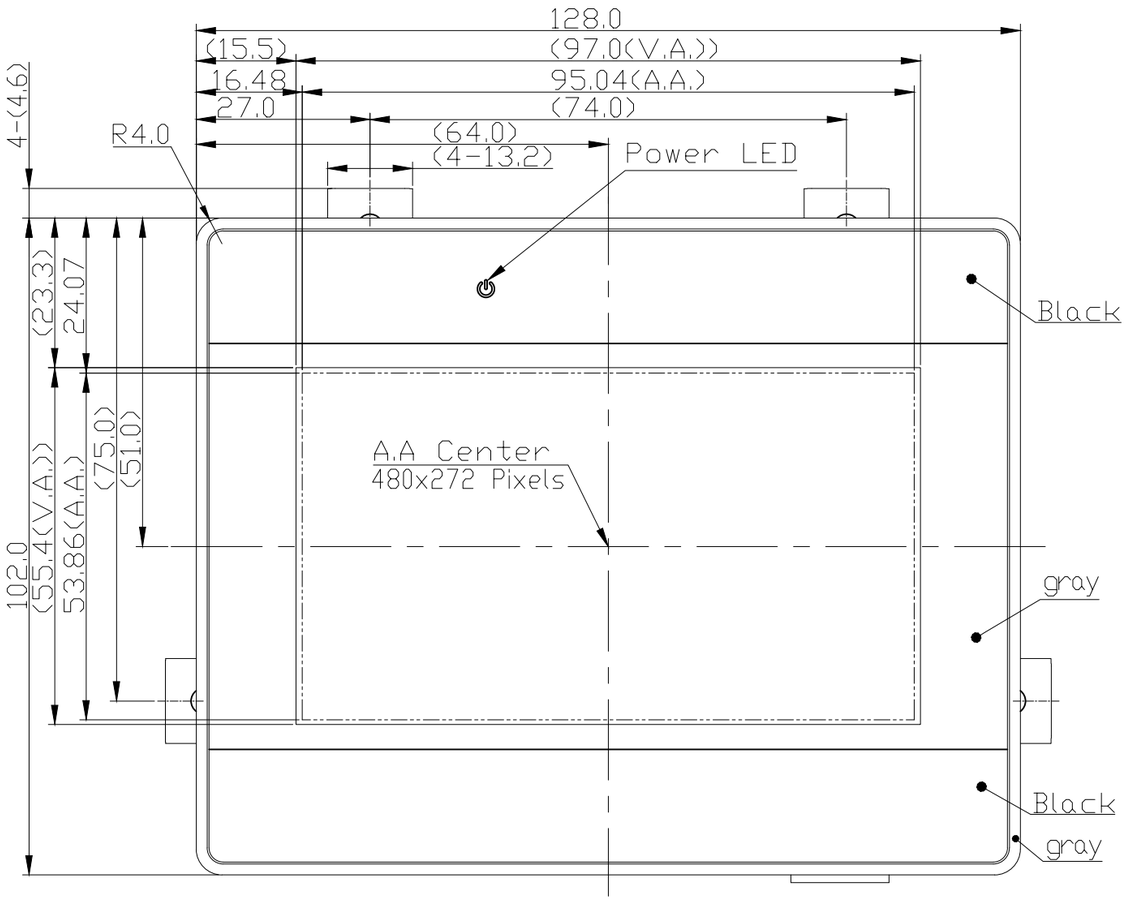
vpaddr : 指屏的变量

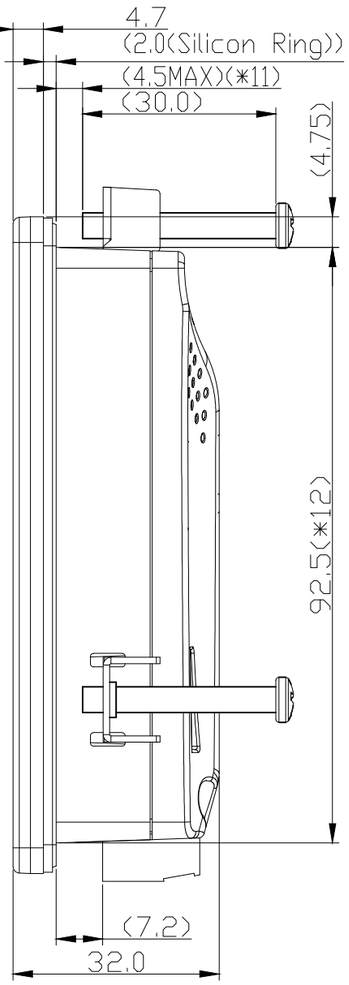
0x80000: 16 位数据变量，对应 modbus 1 个 3x 和 4x 地址,16 个 0x 和 1x 地址

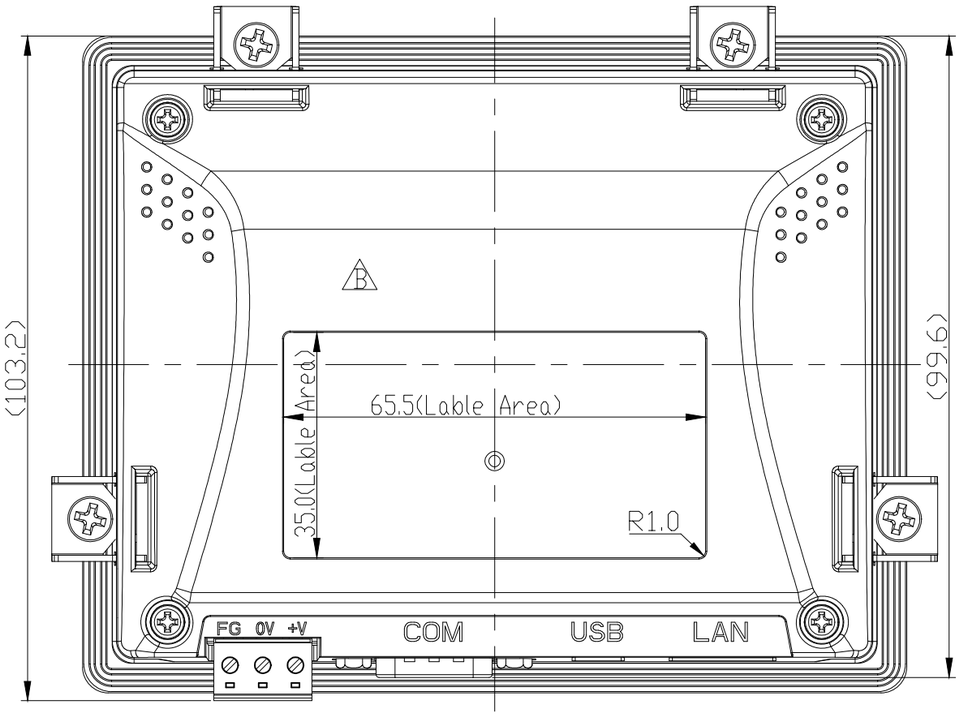
0x20000: 32 位数据变量，对应 modbus 2 个 3x 和 4x 地址,32 个 0x 和 1x 地址
0x30000: 64 位数据变量，对应 modbus 4 个 3x 和 4x 地址,64 个 0x 和 1x 地址

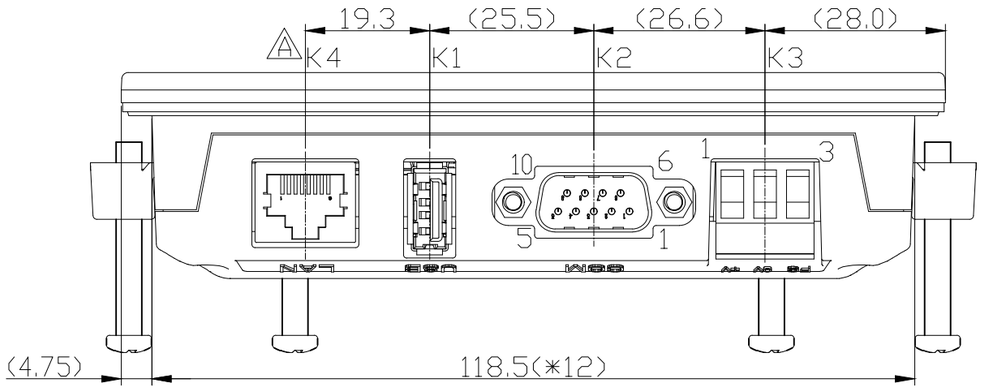
屏变量与 modbus 位地址的关系以 16 位变量对应关系为例

16 位变量	Bit15		Bit8	Bit7		Bit0
0x coil	0x0000F		0x00008	0x00007		0x00000
1x input	0x1000F		0x10008	0x10007		0x10000









K2 Terminal	
No	Pin Name
1	B2
2	A2
3	NC
4	NC
5	VSS
6	NC
7	B1
8	A1
9	NC

K3 Teriminal	
No.	Pin Name
1	VDD
2	VSS
3	FG

⚠K4 Terminal	
No	Pin Name
1	NC
2	NC
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC

Note:

*1. LCD Display Type: TFT,Transmissive
*2. Pixel Arrangment: RGB-STRIPE
*3. Operating Voltage : 8.0~58.0V
*4. Backlight : White LEDs
*5. Color Depth : 65k Colors
*6. User Interface : RS-485
*7. Terminal:
K1: 4Pin USB_Type A
K2: 9Pin D connector(Male)
K3: P5.08x3pin Phoenix or equivalent
K4: RJ45_8pin Connector ⚠

*8. Touch Panel Type: Resistive Touch Panel
*9. Operating Temperature : -20°C~70°C
*10. Storage Temperature : -30°C~80°C
*11. Applicable assemble panel thickness = 4.5MAX
*12. Applicable assemble panel Opening(Min)
*13. Unmarked Tolerace : ≤150,±0.3; >150,±0.5

Rev	Note	Date
C		
B	Revise Outline	HeHongLiang 2023-09-04
A	Refine Design	HeHongLiang 2023-08-17

Dwg Title: HKT043CMC-C Outline Dwg				
Dwg No. MK-008155b-1-1				Date 2023-08-09
Scale 1/1	Tol.	Unit mm	Paper Size A3	
Approved		Checked	Drawn HeHongLiang	

TOPWAY