1. General Description

1.1. Overview

AB-MLD13-07-40 is a 7” TFT Liquid Crystal Display module with Mini-LED Backlight unit and 50 pins TTL RGB interface. This module supports 800xRGBx480 AAS mode and can display 262k or 16.7M colors. This Mini-LED LCM is a set of displays with standard mechanical dimensions and select electrical interface requirements for an industry standard 7” WVGA LCD panel and the mini LED 384 zones local dimming driving device for Backlight

1.2. Features

Excellent brightness (4,000 nits) 384 Zones local dimming.

Ultra-high contrast ratio (10000:1)

Fast response time (TR + TF =25 ms)

WXGA (800 x 480 pixels) resolution

DE (Data Enable) only mode

TTL (RGB) interface

Ultra-wide viewing angle: 169(H)/ 169(V) (CR>10) AAS technology

180 degree rotation display option

Wide operation temperature

1.3. Applications

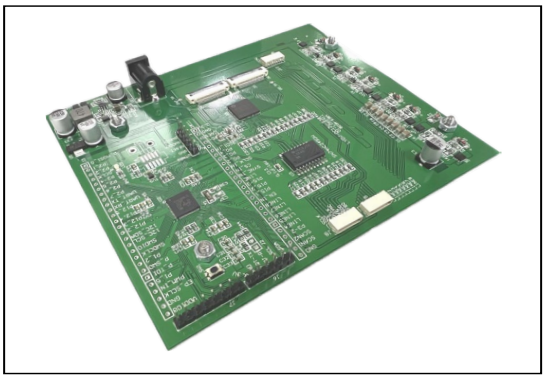
TFT LCD monitor

Industrial applications

1.4. Module Structure

LCM：LCD + Mini-LED

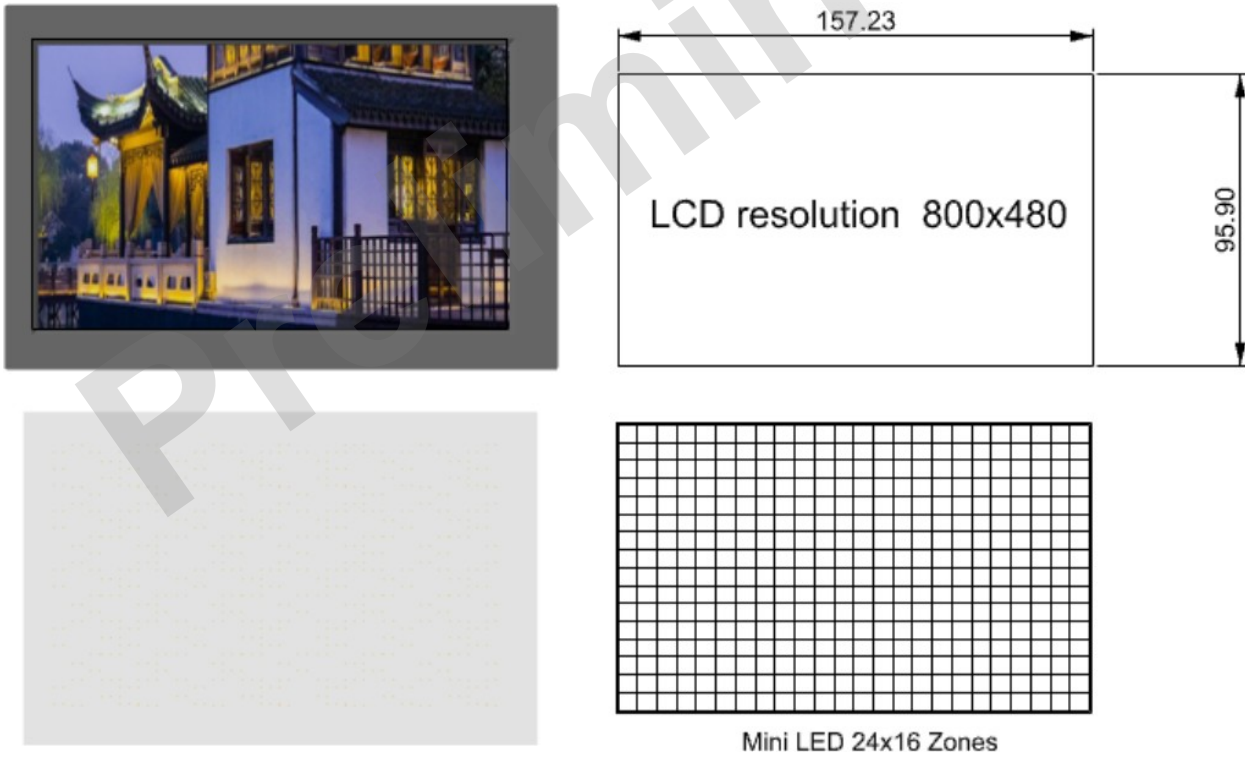
Driver board



2. General Specifications:

Item	Specification	Unit	Note
Screen Size	7” Real diagonal		(1)
Driver Element	A-SI TFT active matrix	-	-
Pixel Number	800 x R.G.B. x 480	Pixel	-
Pixel Pitch	0.1905 (H) x 0.1905 (V)	mm	-
Pixel Arrangement	RGB stripe	-	-
Display Colors	16.7M / 262K	color	-
Transmissive Mode	Normally Black	-	-
Surface Treatment	AG type, 3H hard coating,	-	-
Luminance, White	4,000 (Typ.)	Cd/m2	
Color Gamut	70% of NTSC (Typ.)	-	-
Power Consumption	Max.20.5 W , AVG. 13.6W (Typ.)		(2)

7 “ LCD VS Mini LEDs Mapping



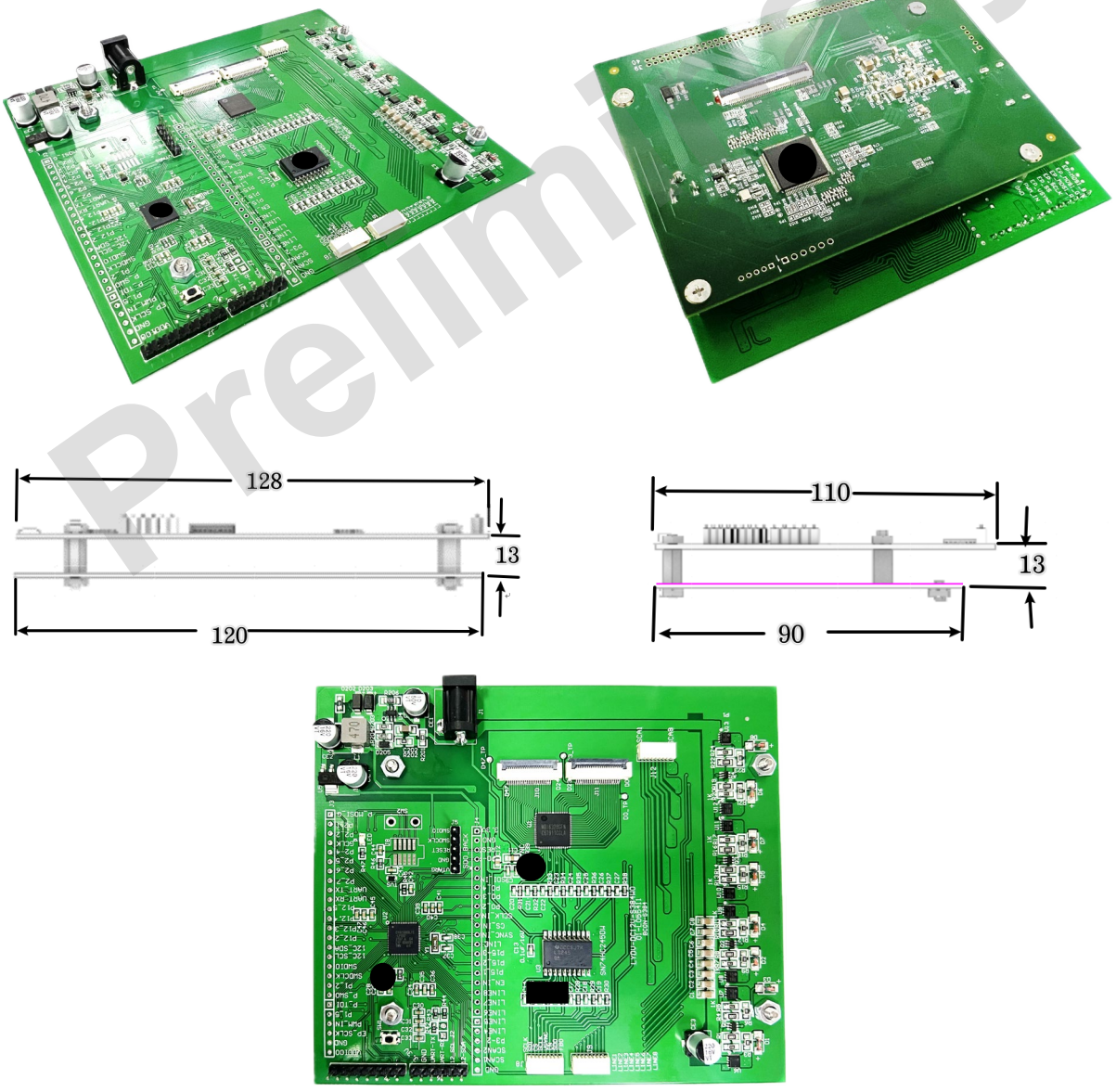
Note (1).Please refer to the attached drawings for more information of front and back outline immersions.
(2). The power consumption of mini LED local dimming varies with the LCD image, because different images have different power consumption, we use the full white screen to calculate the maximum power consumption, and the average power is based on 2/3 of the power consumption.

3. Mechanical Specifications

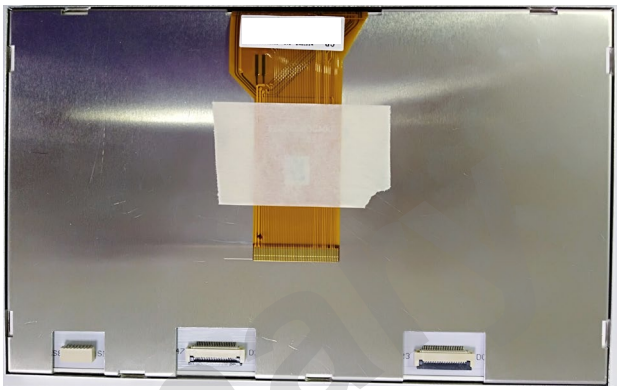
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	179.2	179.7	180.2	mm	(1) (2)
	Vertical (V)	110.92	111.42	111.92	mm	
	Thickness (T)	7.4	7.7	8.0	mm	
Bezel Area	Horizontal	155.58	156.08	156.58	mm	
	Vertical	87.42	87.92	88.42	mm	
Active Area	Horizontal	-	154.08	-	mm	
	Vertical	-	85.92	-	mm	
Weight			190		g	

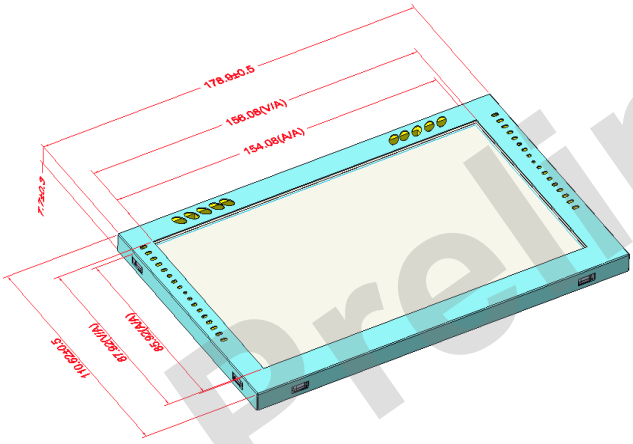
Note (1) Please refer to the attached drawings for more information of front and back outline dimension
(2) the outer dimension not included bolt height.

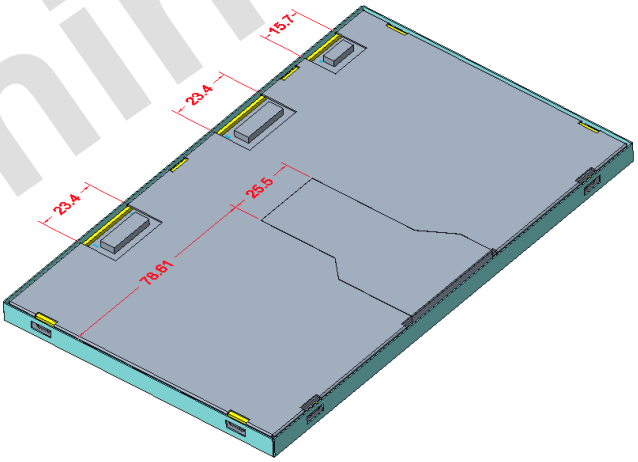
3.1. Driver module:



3.2 LCM (LCD + Mini-LED Back light)







4. Absolute Maximum Ratings

4.1. Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	Tst	-30	75	℃	(1), (2)
Operating Ambient Temperature	Top	-20	70	℃	

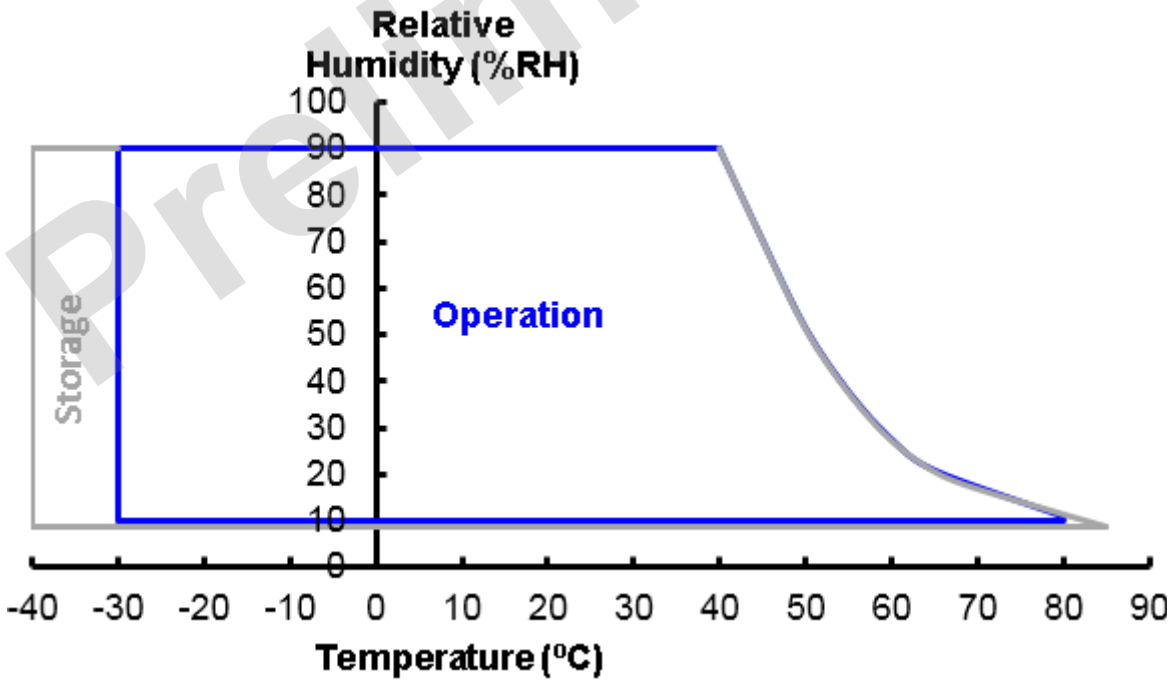
Note (1)

4.1.1. 90 %RH Max.

4.1.2. Wet-bulb temperature should be 39 ºC Max.

4.1.3. No condensation.

Note (2) Panel surface temperature should be 0℃ min. and 90℃ max under Vcc=5.0V, fr =60Hz, typical LED string current, 25℃ ambient temperature, and no humidity control . Any condition of ambient operating temperature ,the surface of active area should be keeping not higher than 85℃.



4.2 Electrical Absolute Ratings

4.2.1. TFT LCD Module

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	Vcc	-0.3	3.6	V	(1)
Logic Input Voltage	V_{IN}	-0.3	3.6	V	

4.2.2. LED Converter

Item	Symbol	Value			Unit	Note
		Min.	Typ	Max.		
Converter Voltage	LED_V_{in}		12.5	13.5	V	(1), (2) Duty=100%

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for input pin of LED light bar at Ta=25±2 ℃ (Refer to 4.3.3 and 4.3.4 for further information)

5.0 Reliability Test Item

Test Item	Test Condition	Note
High Temperature Storage Test	75ºC, 240 hours	(1),(2) (4),(5)
Low Temperature Storage Test	-30ºC, 240 hours	
Thermal Shock Storage Test	-30ºC, 0.5hour←→80℃, 0.5hour; 100cycles, 1hour/cycle	
High Temperature Operation Test	70ºC, 240 hours	
Low Temperature Operation Test	-20ºC, 240 hours	
High Temperature & High Humidity Operation Test	60ºC, 90%RH, 240hours	
ESD Test (Operation)	150pF, 330Ω , 1 sec/cycle Condition 1 : panel contact, ±8 KV Condition 2 : panel non-contact ±15 KV	(1),(4)
Shock (Non-Operating)	50G, 11ms, half sine wave, 1 time for ± X, ± Y, ± Z direction	(2),(3)
Vibration (Non-Operating)	1.5G, 10 ~ 300 Hz sine wave, 10 min/cycle, 3 cycles each X, Y, Z direction	

Note (1) There should be no condensation on the surface of panel during test

Note (2) Temperature of panel display surface area should be 75ºC Max.

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note (4) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

Note (5) Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

6.0 PRECAUTIONS

6.1 ASSEMBLY AND HANDLING PRECAUTIONS

(1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.

(2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.

(3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.

(4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.

(5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.

(6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static electricity, it may cause damage to the C-MOS Gate ArrayIC.

(9) Do not disassemble the module.

(10) Do not pull or fold the lamp wire.

(11) Pins of I/F connector should not be touched directly with bare hands.

6.2 STORAGE PRECAUTIONS

(1) When storing for a long time, the following precautions are necessary.

(a) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 30°C at humidity 50+-10%RH.

(b) The polarizer surface should not come in contact with any other object.

(c) It is recommended that they be stored in the container in which they were shipped.

(d) Storage condition is guaranteed under packing conditions.

(e) The phase transition of Liquid Crystal in the condition of the low or high storage temperature will be recovered when the LCD module returns to the normal condition

(2) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.

(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.

(4) It may reduce the display quality if the ambient temperature is lower than 10 ºC. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

6.3 OTHER PRECAUTIONS

(1) Normal operating condition

(a) Display pattern: dynamic pattern (Real display)

(Note) Long-term static display can cause image sticking.

(2) Operating usages to protect against image sticking due to long-term static display

(a) Suitable operating time: under 16 hours a day.

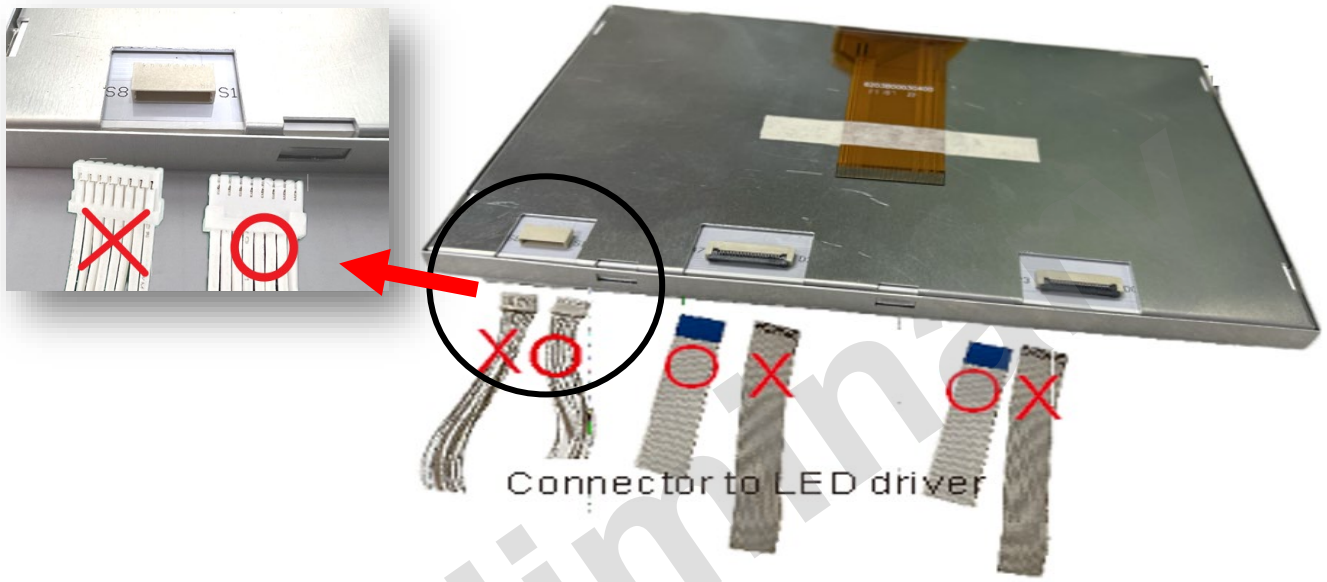
(b) Static information display recommended to use with moving image.

(c) Cycling display between 5 minutes' information(static) display and 10 seconds' moving image.

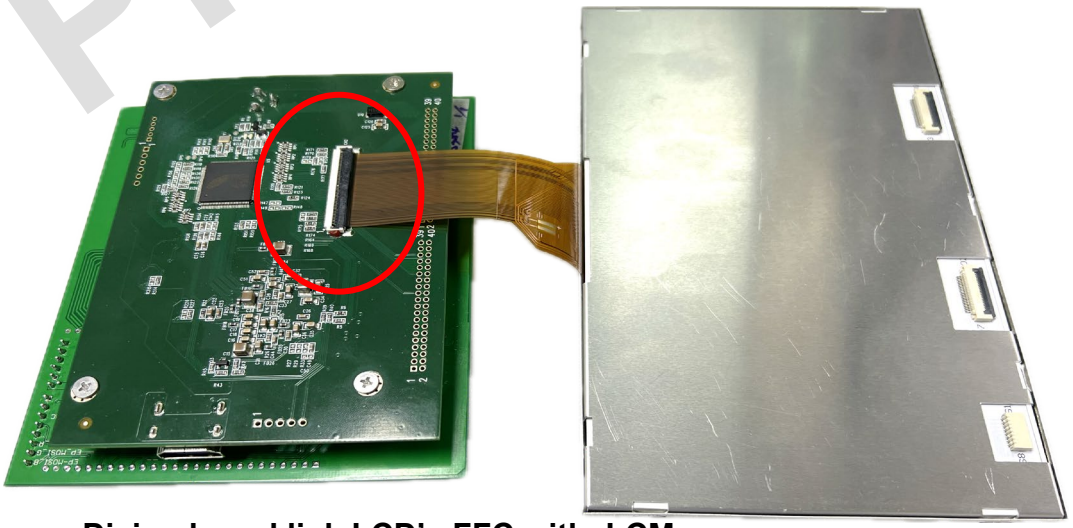
(3) Abnormal condition just means conditions except normal condition.

Appendix 1. How to Link cable between LCM and driving board

LCM connection

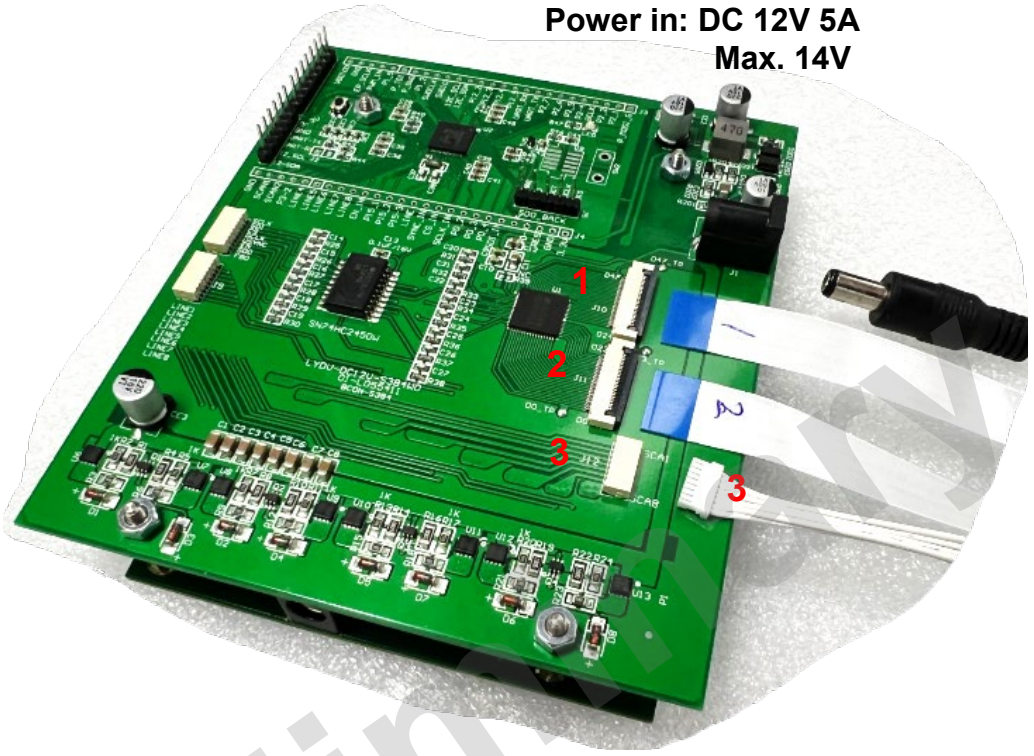


Driving board to LCD FFC



Diving board link LCD's FFC with LCM

Power in: DC 12V 5A
Max. 14V



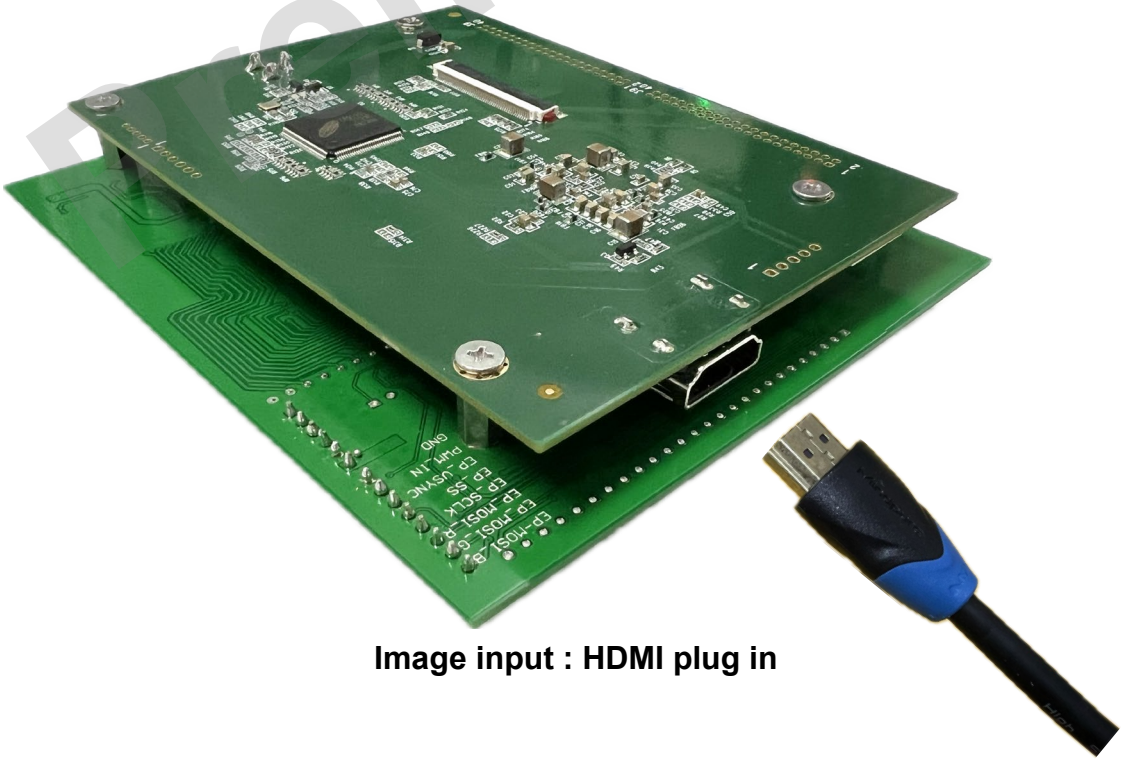


Image input : HDMI plug in