

# Specification

Module No. : GEA-156B01-DC9521-G020

Version No. : A2

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# 1. Overview

This specification document is issued for the 15.6" TFT Liquid Crystal Display bonded with Capacitive-Type Touch Panel delivered by General Electrical Touch Co., Limited. This document defined the general provisions for the specific module listed at the front page of this document. In the event of conflict between this document and other documents, this document including the attachments and drawing, is highest-level specification for this products.

## 2. Feature

### 2.1 Module Structure

Main Component	Materials	Remarks
Cover Glass	2mm chemical strengthened glass	black printed board
Adhesive	SCA	0.25 mm
Touch Sensor	0.7mm DITO glass + COF FPC	SIS9521 Controller
Air Bonding Tape	3M 4905	0.50 mm
Display	TFT LCD	INNOLUX G156HCE-L01

### 2.2 General Specifications

Item	Specifications	Remark
Display Active Area	344.16(H) × 193.59(V) mm	
Display Resolution	1920(H) × R.G.B. × 1080(V)	
Pixel Pitch	0.17925 × 0.17925 mm	
Pixel Arrangement	R.G.B. Vertical Stripe	
Display Colors	16.2M colors	
Display Brightness	450 cd/m <sup>2</sup>	Typ.
Display Mode	Normally Black	
Display Surface Treatment	AG type, 3H hard coating	
Electrical Interface	Display: 2ch- LVDS	
	Touch: USB and I <sup>2</sup> C	
Touch Activation	Multi-finger touch	
Touch Resolution	36X, 63Y	
Touch Controller	SIS9521	
Bonding Method	CG to touch sensor: optical bonding TP module to display: tape bonding	
Outline Dimension	392.20(H) × 241.50(V) × 12.75(Max) mm	

## 3. Interface Definition

### 3.1 Touch Panel Interface Connection

Connector type: USB-MINI-B and Molex 53261-1071.

The Molex connector interface pin assignments are listed in below table:

Pin	Definition	Description
1	V <sub>CC</sub>	5V
2	USB Data+	
3	USB Data-	
4	SDA	I <sup>2</sup> C serial data
5	SCL	I <sup>2</sup> C serial clock
6	INT/CHG	Interrupt pin sending request to HOST
7	Reset	Low active power on reset signal
8	GPIO0	General purpose input/output port
9	GND	
10	GND-Shielding	

## 3.2 Display Interface Connection

The LVDS connector interface pin assignments are listed in below table.

Connector model number: 20455-040E-76

Manufacturer: I-PEX

Pin	Name	Description
1	LED_Vcc	+12V Vi power supply
2	LED_Vcc	+12V Vi power supply
3	LED_Vcc	+12V Vi power supply
4	LED_Vcc	+12V Vi power supply
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	LED_EN	Enable pin
10	LED_PWM	Backlight Adjust
11	LCD_VCC	LCD logic and driver power 3.3V
12	LCD_VCC	LCD logic and driver power 3.3V
13	LCD_VCC	LCD logic and driver power 3.3V
14	NC	Not connection, this pin should be open
15	NC	Not connection, this pin should be open
16	NC	Not connection, this pin should be open
17	LCD GND	LCD logic and driver ground
18	RXO0-	Negative LVDS differential data input. Channel O0 (odd)
19	RXO0+	Positive LVDS differential data input. Channel O0 (odd)
20	RXO1-	Negative LVDS differential data input. Channel O1 (odd)
21	RXO1+	Positive LVDS differential data input. Channel O1 (odd)
22	RXO2-	Negative LVDS differential data input. Channel O2 (odd)
23	RXO2+	Positive LVDS differential data input. Channel O2 (odd)
24	LCD GND	LCD logic and driver ground
25	RXOC-	Negative LVDS differential clock input. (odd)
26	RXOC+	Positive LVDS differential clock input. (odd)
27	LCD GND	LCD logic and driver ground
28	RXO3-	Negative LVDS differential data input. Channel O3(odd)
29	RXO3+	Positive LVDS differential data input. Channel O3 (odd)
30	RXE0-	Negative LVDS differential data input. Channel E0 (even)
31	RXE0+	Positive LVDS differential data input. Channel E0 (even)
32	RXE1-	Negative LVDS differential data input. Channel E1 (even)
33	RXE1+	Positive LVDS differential data input. Channel E1 (even)
34	LCD GND	LCD logic and driver ground
35	RXE2-	Negative LVDS differential data input. Channel E2 (even)
36	RXE2+	Positive LVDS differential data input. Channel E2 (even)
37	RXEC-	Negative LVDS differential clock input. (even)
38	RXEC+	Positive LVDS differential clock input. (even)
39	RXE3-	Negative LVDS differential data input. Channel E3 (even)
40	RXE3+	Positive LVDS differential data input. Channel E3 (even)

## 4. Reliability Test

The reliability test items and its conditions are shown in below.

No	Test Items	Conditions
1	High temperature storage test	Ta =80°C, 240 hrs
2	Low temperature storage test	Ta =-30°C, 240 hrs
3	High temperature & high humidity operation test	Ta =60°C, 90%RH, 240hrs
4	High temperature operation test	Ta =70°C, 240hrs
5	Low temperature operation test	Ta =-20°C, 240hrs
6	Thermal shock	Ta = -30°C ↔ 80°C (0.5hr), 100 cycle
7	Vibration test	Frequency: 10~50 Hz Stoke: 1.5mm Sweep: 10~55~10 Hz
8	Impact Resistance	Steel ball: 64 g Height: 30 cm

## 5. General Precaution

### 5.1 Handing

1. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
2. Please make sure to avoid external forces applied to the Source PCB or FPC and D-IC during the process of handling or assembling. If not, It causes panel damage or malfunction.
3. Do not pull or fold the source D-IC which connect the source PCB or FPC and the panel. Do not pull or fold the LED wire.
4. After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with alcohol or purified water.
5. Since the Touch-LCD module is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.
6. Do not disassemble the module.
7. If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
8. Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly. Keep products as far away from static electricity as possible.
9. Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
10. Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
11. In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

## 5.2 Operating Precautions

1. Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
2. Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.
3. Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
4. Connectors are precise devices for connecting PCB and transmitting electrical signals. Operators should insert and unplug MDL in parallel when assembling MDL.
5. Do not connect or disconnect the cable to/ from the module at the "Power On" condition.

## 5.3 Storage Precautions

When storing modules as spares for a long time, the following precautions are necessary.

- It is recommended that they be stored in the container in which they were shipped.  
Temperature: 5 ~ 40°C
- Humidity: 35 ~ 75%RH
- Period: 6 months
- Control of ventilation and temperature is necessary.
- Please make sure to protect the product from strong light exposure, water or moisture.  
Be careful for condensation.
- Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.
- Do not store the LCD near organic solvents or corrosive gasses.

## 5.4 Others

1. When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.
2. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.
3. For the crash damaged or unnecessary LCD, it is recommended to wash off liquid crystal by either of solvents such as acetone and ethanol and should be burned up later.
4. If you should swallow the liquid crystal, first, wash your mouth thoroughly with water, then drink a lot of water and induce vomiting, and then, consult a physician.
5. If the liquid crystal should get in your eyes, flush your eyes with running water for at least fifteen minutes.

## 6. Packing

TBD

# 7. Mechanical Drawing

