

IDK-1107WP Series

TFT-LCD 7" WVGA (LED Backlight) with Projected Capacitive Touchscreen

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Warnings, Cautions, and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! Notes provide optional additional information.



Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
11. Never pour any liquid into an opening. This may cause fire or electrical shock.
12. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
13. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
14. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -25° C (-13° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT.
15. This equipment has been tested and found to comply with the requirements for a Class A digital device. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications; in such events, users are required to correct this interference.
16. This equipment is sold without a power cord. Users are advised to purchase a CCC-certified power cord.

CAUTION: THE COMPUTER IS PROVIDED WITH A BATTERY-POWERED REAL-TIME CLOCK CIRCUIT. THERE IS A DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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Chapter 1

General Description and Features

This manual is for the 7" inch color TFT LCD module IDK-1107WP-50WVA1E which is designed with a wide viewing angle, wide operating temperature, and long life LED backlights which are well suited to display units for Industrial Applications. An LED driving board for the backlight unit is included in this panel and the structure of the LED unit is replaceable. IDK-1107WP-50WVA1E has a built in timing controller and LVDS interface. The screen format is intended to support the SVGA (800(H) x 480(V)) screen and 16.2M (RGB 8-bits) or 262k colors (RGB 6-bits). IDK-1107WP-50WVA1E is a RoHS compliant product.

1.1 Display Characteristics

The following table items are display characteristics under 25°C conditions.

Items	Unit	Specifications
Screen Diagonal	[inch]	7.0 (177.8mm)
Active Area	[mm]	152.40(H) x 91.44(V)
Pixels H x V		800x3(RGB) x 480
Pixel Pitch	[mm]	0.1905 x 0.1905
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN, Normally White
Nominal Input Voltage VDD	[Volt]	3.3 typ
Typical Power Consumption	[Watt]	3.56 typ.
Weight	[Grams]	160 ± 10
Physical Size	[mm]	187.6(W) x 126.64(H) x 12.36(D) typ.
Electrical Interface		1 channel LVDS
Surface Treatment		Clear, Haze: <2%
Support Color		262K(6-bit) / 16.2M(8-bit)
Temperature Range		
Operating	[°C]	-20 to +70 (panel surface temperature)
Storage (Non-Operating)	[°C]	-40 to +80
RoHS Compliance		RoHS Compliance

1.2 Optical Characteristics

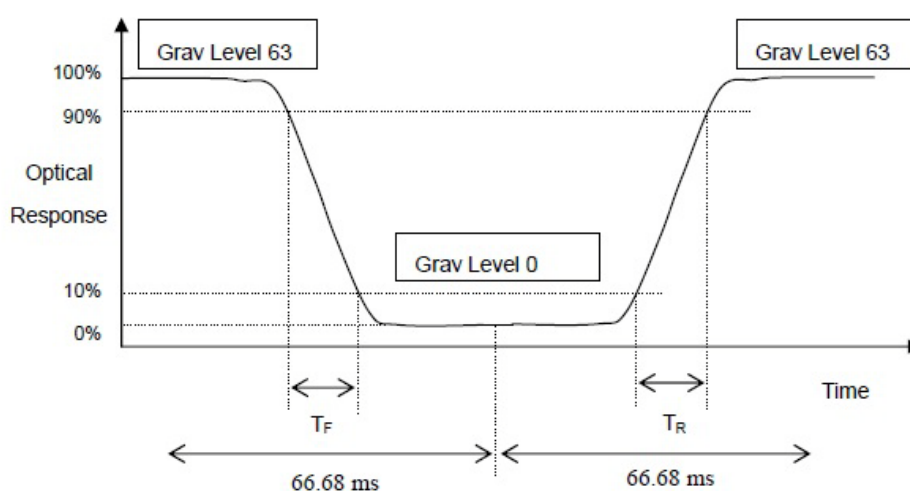
Optical characteristics are measured under stable conditions at 25°C (Room Temperature):

Item	Unit	Conditions	Min.	Typ.	Max.	Note
White Luminance	[cd/m2]	IF= 80mA (center point)	400	500	-	4
Uniformity	%	5 Points		75%		1,5
Contrast Ratio			500	600	-	3
Response Time	[msec]	Rising	-	5	10	
	[msec]	Falling	-	11	16	2
	[msec]	Rising + Falling	-	16	26	
Viewing Angle	[degree]	Horizontal (Right)	60	70	-	
	[degree]	CR ≥ 10 (Left)	60	70	-	
	[degree]	Vertical (Upper)	50	60	-	
	[degree]	CR ≥ 10 (Lower)	50	60	-	6

Color/Chromaticity Coordinates (CIE 1931)	Red x		0.645	
	Red y		0.341	
	Green x		0.312	
	Green y	Typ	0.625	Typ
	Blue x	- 0.03	0.153	+0.03
	Blue y		0.053	
	White x		0.313	
	White y		0.329	
Contrast Gamut	%		72	- 1

Note1 These items are measured by BM-5A(TOPCON) or CA-1000 (MINOLTA) in the dark room (no ambient light) After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.

Note2 Definition of Response Time (White-Black)



Note3 Definition of Contrast Ratio

Contrast ratio is calculated with the following formula :

Contrast Ratio (CR)=(White) Luminance of ON $\div$ (Black) Luminance of OFF

Note4 Definition of Luminance

Measure the luminance of white state at center point.

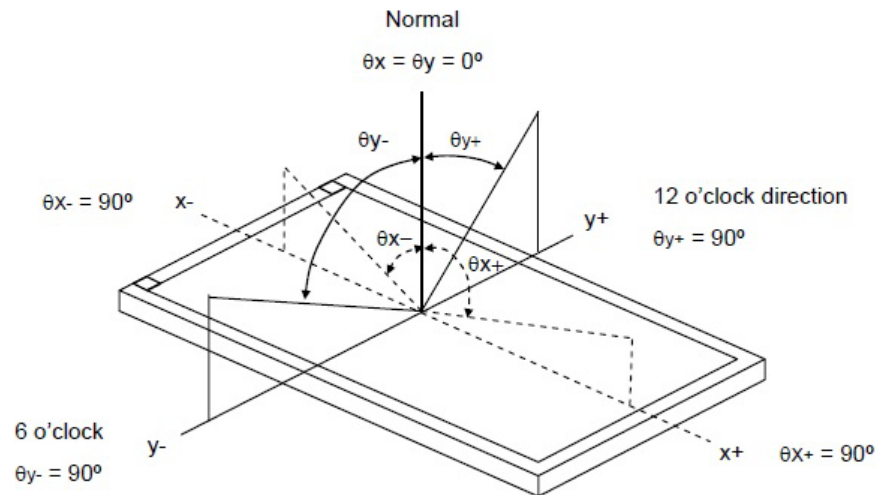
Note5 Definition of Luminance Uniformity

Measured Maximum luminance [L(MAX)] and Minimum luminance [L(MIN)] on the 9 points

Luminance Uniformity is calculated with the following formula:

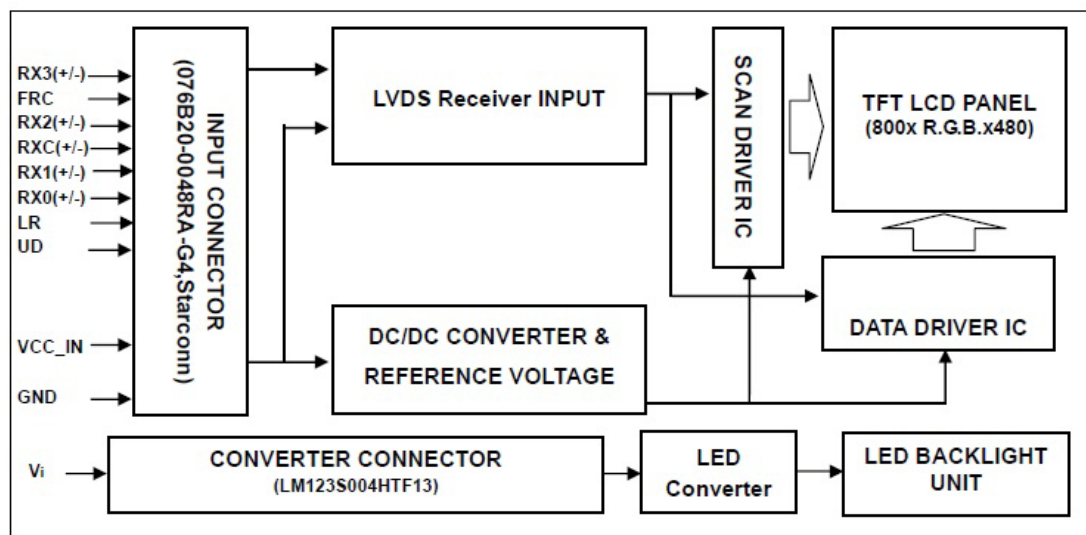
$$\Delta L = [L(MIN) / L(MAX)] \times 100\%$$

Note6 Definition of Viewing Angle



1.3 Functional Block Diagram

The following diagram shows the functional block of the 7 inches Color TFT-LCD Module:



1.4 Absolute Maximum Ratings

1.4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min.	Max.	Unit
Power Supply Voltage	Vcc	-0.3	+4	[Volt]

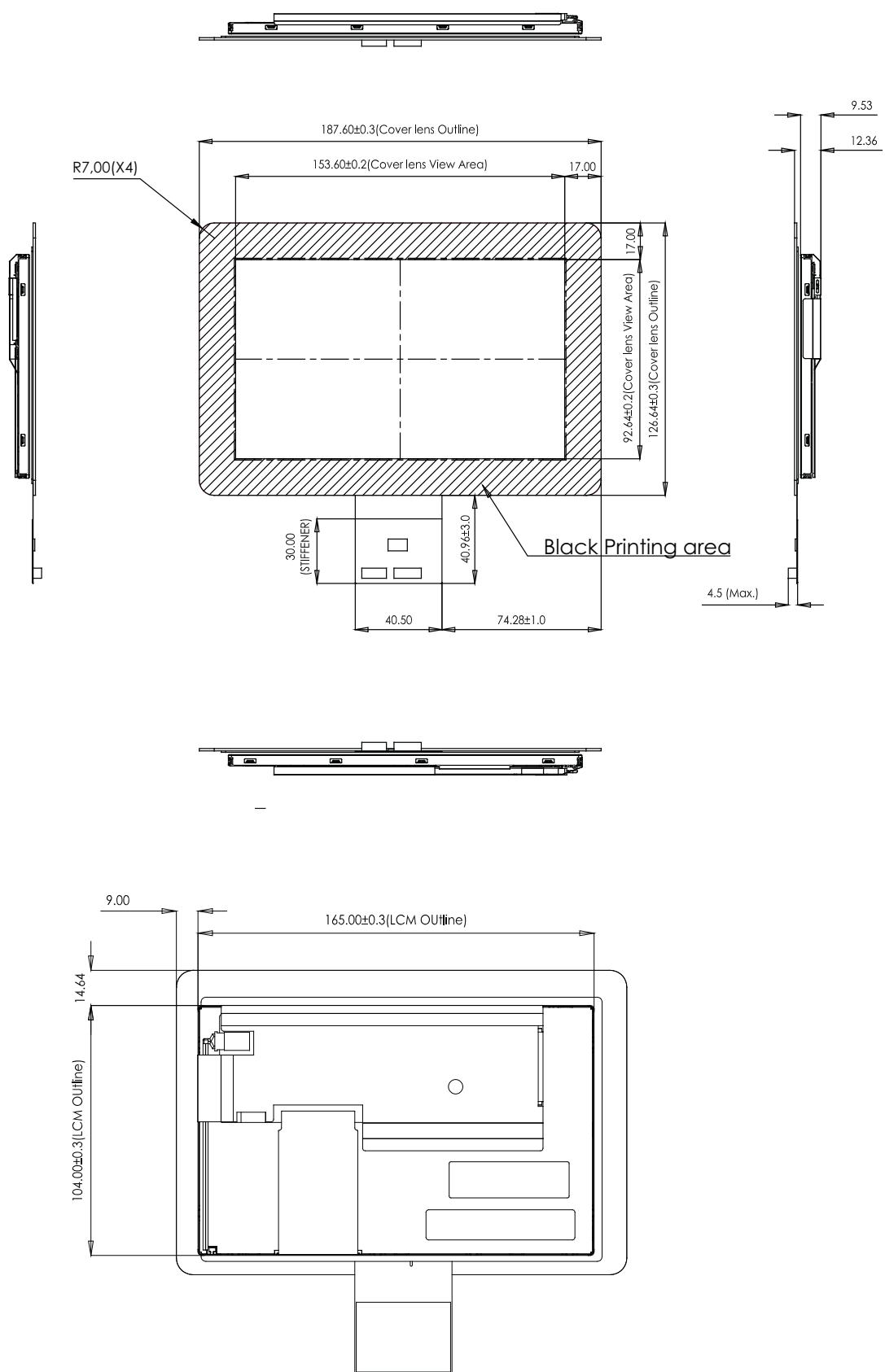
1.4.2 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit
Operating Temperature	TOP	-20	+70	[°C]
Operation Humidity	HOP		85	[%RH]
Storage Temperature	TST	-40	+80	[°C]
Storage Humidity	HST		85	[%RH]

Note 1: Maximum Wet-Bulb should be 38°C and no condensation.

Note 2: The module should be inspected after 1 hour storage in normal conditions (15~35°C, 45~65%RH).

1.5 Dimensions



[Unit: mm]

Chapter 2

Electrical Characteristics

2.1 TFT LCD Module

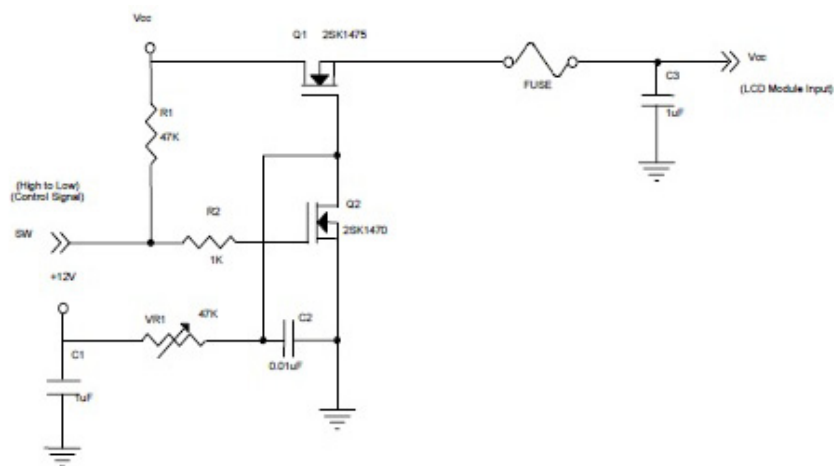
2.1.1 Power Specification

Table 2.1: Power Specification

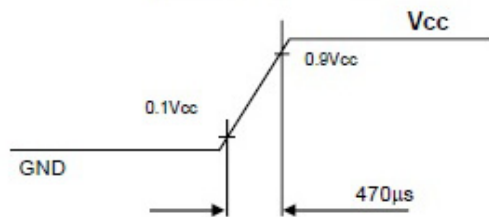
Symbol	Parameter	Min.	Typ.	Max.	Unit	Remark
V _{CC}	Power Supply Voltage	3.0	3.3	3.6	V	
I _{RUSH}	Rush Current			1.5	A	
	Power Supply Current	White	140		mA	3
		Black	170		mA	3

Note 1: The assembly should be always operated within the above ranges.

Note 2: Measurement condition:



V_{CC} rising time is 470μs



Note 3: The specified power supply current is under the conditions at V_{CC}=3.3V, T_a=25± 2°C, f_v=60Hz, whereas a power dissipation check pattern below is displayed.

2.1.2 Signal Electrical Characteristics

Table 2.2: Signal Electrical Characteristics

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
V _{TH}	Differential Input High Threshold	-	-	100	[mV]	V _{CM} =1.2V
V _{TL}	Differential Input Low Threshold	-100	-	-	[mV]	V _{CM} =1.2V
V _{CM}	Common Mode Voltage		1.2		[V]	

2.2 Backlight Unit

2.2.1 Parameter Guideline for LED Backlight

Following characteristics are measured under a stable condition using an inverter at 25°C (Room Temperature):

Table 2.3: Parameter Guideline for LED Backlight

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Converter Power Supply Voltage	V_i	10.8	12	13.2	V	
Converter Power Supply Current	I_i	-	0.25	-	A	@ $V_i=12V$ (Duty 100%)
Converter Power Consumption	P_{LED}	-	3	-	W	@ $V_i=12V$ (Duty 100%)
EN Control Level	Backlight on	2.0	-	3.3	V	
	Backlight off	0	-	0.8	V	
PWM Control Level	PWM High Level	2.0	-	3.3	V	
	PWM Low Level	0	-	0.15	V	
PWM Control Duty Ratio		20		100	%	
PWM Control Frequency	f_{PWM}	190	200	210	Hz	
LED Life Time	L_L	50,000			Hrs	

Note 1: LED current is measured by utilizing a high frequency current meter as shown below:

Note 2: The lifetime of the LED is defined as the time when it continues to operate under the conditions at $T_a=25\pm2^\circ\text{C}$ and $I_{LED}=50\text{mA}$ (LED forward current) until the brightness becomes $\leq 50\%$ of its original value.

Chapter 3

Signal Characteristics

3.1 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device. The connector pin definition is as below.

Note: "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connected."

3.1.1 Signal Description

Table 3.1: Symbol Description

Pin No.	Symbol	Description
1	RX3+	LVDS differential data input Pair 3
2	RX3-	
3	NC	No connected
4	FRC	Dithering control setting When FRC=H, the width of data input 8 bits When FRC=L, the width of data input 6 bits and set Dx0 and Dx1 to logical low (Default pull low)
5	GND	Ground
6	RXC+	LVDS differential Clock input Pair
7	RXC-	
8	GND	Ground
9	RX2+	LVDS differential data input Pair 2
10	RX2-	
11	GND	Ground
12	RX1+	LVDS differential data input Pair 1
13	RX1-	
14	GND	Ground
15	RX0+	LVDS differential data input Pair 0
16	RX0-	
17	LR	Shift direction of Source Driver IC internal shift register is controlled by this pin as show below: LR=H SO1 ->..... SO1200 (Default pull high) LR=L SO1200 ->..... SO1
18	UD	Gate Driver Up/Down scan setting When UD=H, reverse scan When UD=L, normal scan (Default pull low)
19	VCC_IN	Digital power supply (+3.3V)
20	VCC_IN	Digital power supply (+3.3V)

Note: User's connector Part No.: 076B20-0048RA-G4, Starconn, or equivalent.

3.1.2 Backlight Signal Description

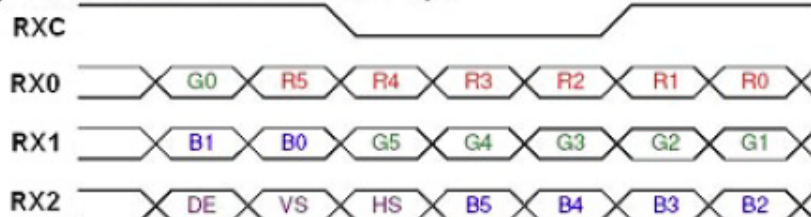
Pin No.	Symbol	Description	Note
1	V _i	Converter input voltage	
2	ADJ	Backlight adjust	
3	EN	Enable pin	
4	V _{GND}	Converter ground	

Note: User's connector Part No.: LM123S004HTF13, 4 PIN, UNE.

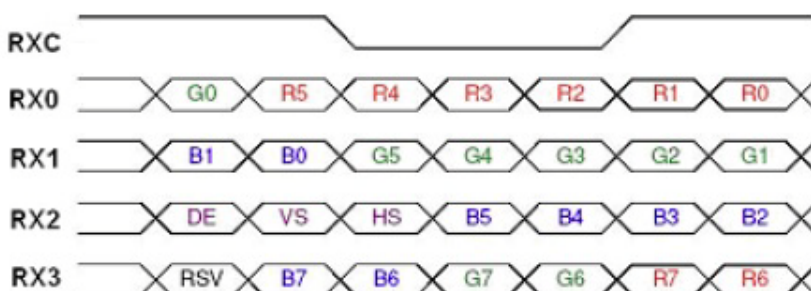
3.2 The Input Data Format

3.2.1 SEL68

FRC = "Low" or "NC" for 6 bits LVDS Input



FRC = "High" for 8 bits LVDS Input



Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data Each red pixel's brightness data consists of these 8 bits pixel data.
R6	Red Data 6	
R5	Red Data 5	
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
G6	Green Data 6	
G5	Green Data 5	
G4	Green Data 4	
G3	Green Data 3	
G2	Green Data 2	
G1	Green Data 1	
G0	Green Data 0 (LSB)	

B7	Blue Data 7 (MSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 8 bits pixel data.
B6	Blue Data 6	
B5	Blue Data 5	
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RxCLKIN+ RxCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

3.3 Interface Timing

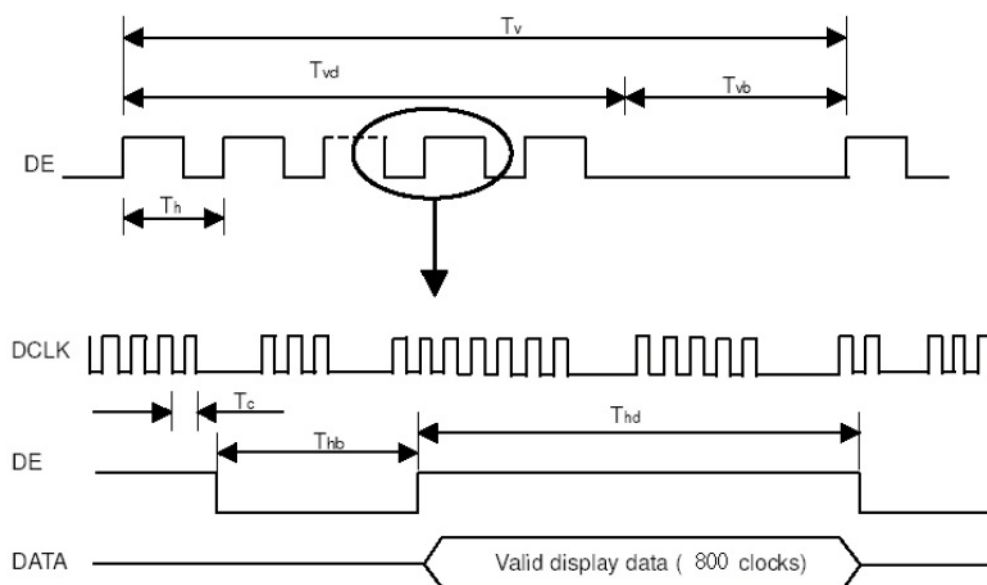
3.3.1 Timing Characteristics

Table 3.2: Timing Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	1/ T _{Clock}	27	29.5	33	MHz	
Vertical Section	Period	T _V	490	500	550	
	Active	T _{VD}	480		T _H	
	Blanking	T _{VB}	10	20	70	
Horizontal Section	Period	T _H	930	992	1090	
	Active	T _{HD}	800		T _{Clock}	
	Blanking	T _{HB}	130	192	290	

Note1: Frame rate is 60 Hz.

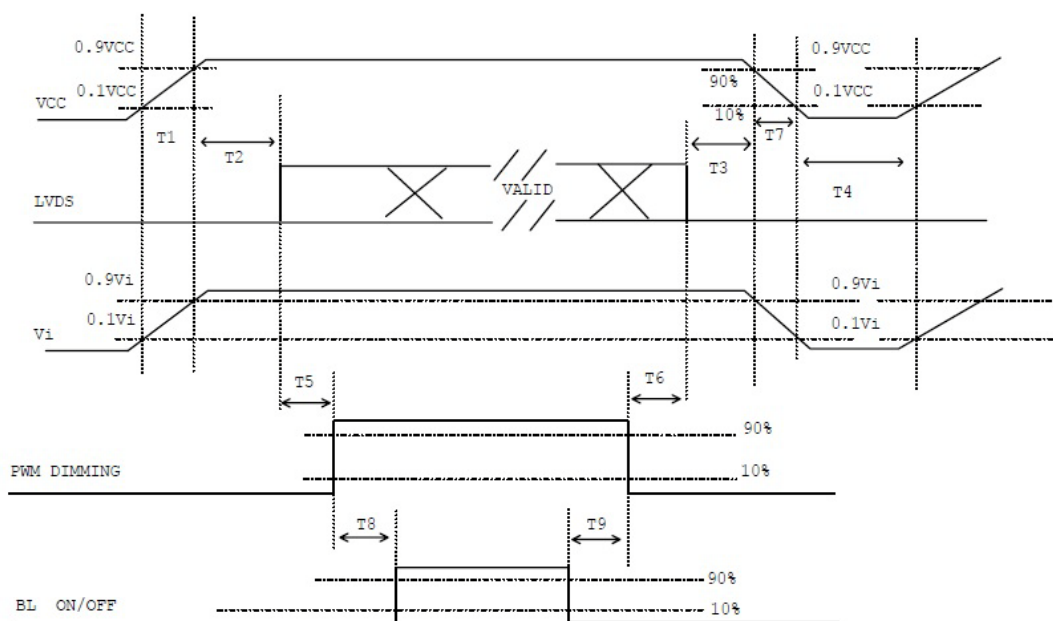
Note2: Since this assembly is operated in DE only mode, Hsync and Vsync input signals should be set to low logic level. Otherwise, this assembly would operate abnormally.

3.3.2 Input Timing Diagram



3.4 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	0	-	50	[ms]
T3	0	-	50	[ms]
T4	500	-	-	[ms]
T5	20	-	-	[ms]
T6	10	-	-	[ms]

T7	5	-	300	[ms]
T8	10	-	-	[ms]
T9	10	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

Note 1: *The supply voltage of the external system for the module input should be the same as the definition of VDD*

Note 2: *Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.*

Note 3: *In case of VDD = off level, please keep the level of input signal on the low or keep a high impedance.*

Note 4: *Interface signal shall not be kept at high impedance when the power is on.*

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

Chapter 4

Display Connector Definition

4.1 TFT LCD Signal (CN1): LVDS Connector

Table 4.1: TFT LCD Signal (CN1): LVDS Connector

Connector Name / Description	Signal Connector
Manufacturer	Starconn or compatible
Mating Model Number	076B20-0048RA-G4, Starconn or equivalent

Table 4.2: Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1	RX3+	2	RX3-
3	NC	4	FRC
5	GND	6	RXC+
7	RXC-	8	GND
9	RX2+	10	RX2-
11	GND	12	RX1+
13	RX1-	14	GND
15	RX0+	16	RX0-
17	LR	18	UD
19	VCC_IN	20	VCC_IN

4.2 LED Backlight Unit (CN2): LED Driver Connector

Connector Name / Designation	LED Connector
Manufacturer	UNE
Mating Model Number	LM123S004HTF13, 4PIN, UNE

Pin #	Symbol	Pin Description
1	Vi	Converter Input Voltage
2	ADJ	Backlight Adjust
3	EN	Enable pin
4	VGND	Converter ground

Chapter 5

Touch Screen

5.1 Touch Characteristics

This touch panel is a resistance type that customers use with flat displays like LCDs. Once an operator touches it, the circuit sends coordinate points to the PC from the voltage at contact points.

5.2 Optical Characteristics

Item	Specification	Remarks
1 TRANSPARENCY	90% ± 3%	measured by BYK-Gardner
2 HAZE	<2%	measured by BYK-Gardner

5.3 Environmental Characteristics

Item	Specification	Remarks
1 Operating temperature	-20°C ~ 70°C	When the ambient temperature is above 65°C, the humidity is allowed to be below 50%RH.
2 Storage temperature	-40°C ~ 80°C	
3 Operating Humidity	20% ~ 85%RH	
4 Storage humidity	20% ~ 90%RH	

5.4 Mechanical Characteristics

Item	Specification	Remarks
1 Hardness of surface	Pencil hardness 7H.	ASTM D3363 Pressure: 750g/45°
2 FPC peeling strength	800g by vertical 90°	for 30 sec
3 Operation force	Finger ≤ 10g, ≥ 8ψ	Within "guaranteed active area", but not on the edge.

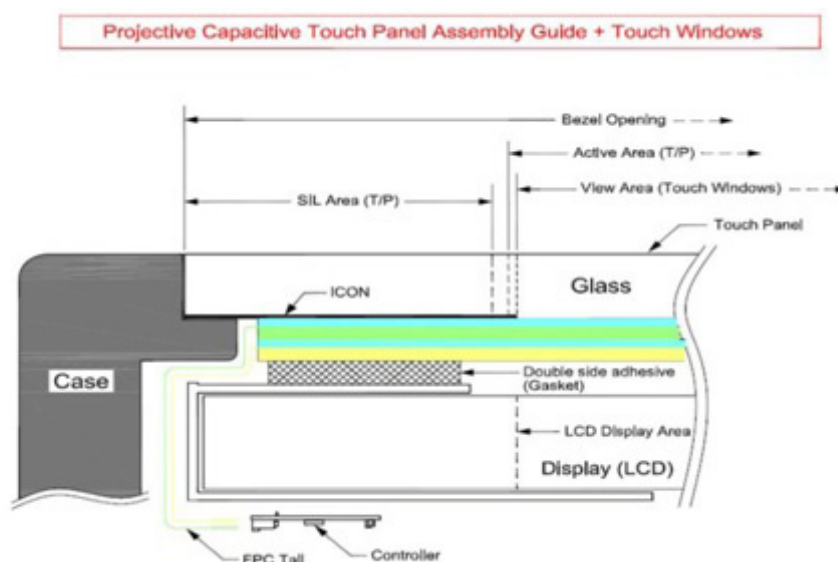
5.5 Electronic Characteristics

Item	Specification	Remarks
1 Response	< 25ms	
2 Accuracy	Line Drawing: 1pt ± 1mm offset / 10mm 2pt ± 2mm offset / 10mm touch point: 1pt ± -2.5mm 2pt ± -5.0mm Refer to Windows 7 Logo Regulation	
3 Multi-Touch Fingers Pitch	Between the Finger Pitch > 10mm	Channel Pitch Should be 5mm~7mm

5.6 Mounting Notes

5.6.1 Mounting

- The gasket of the touch panel must be designed for the outside of the viewable area to avoid pressing on the touch panel accidentally and the enclosure must be designed with enough clearance from the panel surface. To avoid pressing errors on the touch panel, please allow space between the surface of the panel and the bezel.
- We recommended elastic type materials.
- The edge of the touch panel is conductive. Don't touch it with metal after mounting.
- Please take notice of grounding while mounting the touch screen, otherwise interference may cause unstable performance.
- Please do not pull on the flex tail during assembly. Do not bend at 90 degrees and each bend angle should be no less than $R=5m/m$
- During assembly, the touch panel must be securely affixed onto the LCD panel to prevent displacement of the touch panel due to outside force pressing on touch screen or bezel/case.



5.6.2 Caution

5.6.2.1 Installing and Assembling

- Do not use excessive force or strain to the panel or tail.
- Gasket or cushion pads around the edge of the panel may segregate water and/or dust contamination.
- Maintain a minimal 5R when bending the tail to prevent dead folds or fold marks.
- Flaws in customer module design may cause functionality issues after assembly.

5.6.3 Operating

- Touch the panel with your finger or stylus only to test normal operation. Any sharp edged or hard objects should not be used.
- Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunctions to the panel.

-
- Avoid applying excessive activation force or sudden impact on the panel surface.
 - Avoid high voltages and / or static charge.

5.6.3.1 Others

- Keep the panel surface clean. Prevent any kind of adhesive or tape applied onto the touch surface.

Chapter 6

Touch Controller

6.1 Touch Controller Characteristics

EETI EXC3132 is a MCU based projected capacitive touch screen controller designed for commercial and industrial applications. EXC3132 controller supports high voltage driving signal to achieve high SNR and better wideband interference susceptibility.

EXC3132 provides different working frequencies to avoid narrow band interference. With high voltage driving and different working frequencies, EXC3132 provides excellent interference susceptibility performance. EXC3132 provides an excellent solution for not only finger operation but also with gloves, thicker glass, etc. applications.

6.2 Specifications

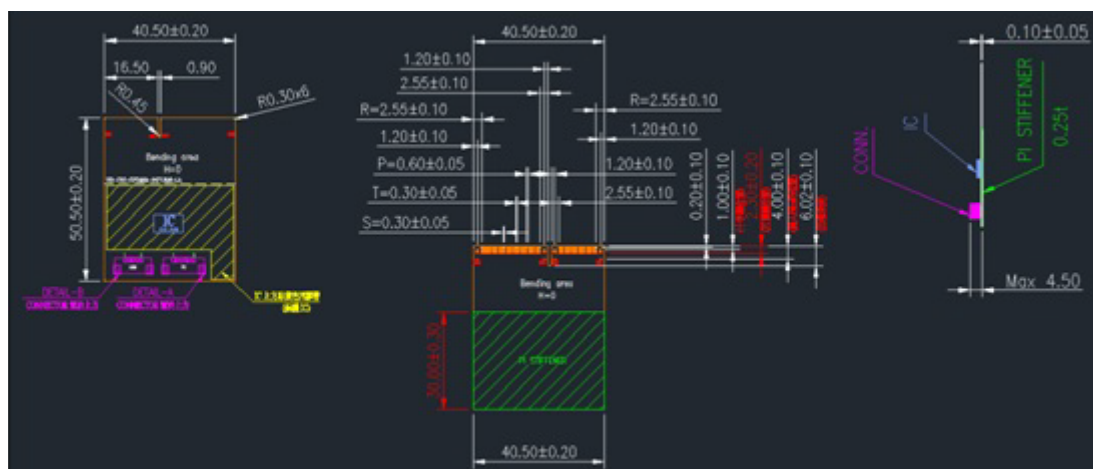
Table 6.1: Specifications

Clocks	External 12M HZ crystal
	Internal PLL
	Internal 32 bits RTC
	Clock generator for digital modules
Power Management	Clock generator for analog modules
	Power supply : 3.3~5.5 VDC
	Internal regulator for analog clock
	Internal regulator for digital core
ESD	Idle mode
	Sleep mode
	4000V(HBM)
	Up to 32 RX channels
Analog Models	Up to 18 TX channels
	Signal generator
	USB 2.0 compliant full speed with LPM L1 supported
	Configurable Serial Interface
Communication Interface	-I2C : up to 400KHZ, support 3.3V
	Timers, Watch dog Timer
	Multi-touch algorithm accelerator
	Hardware scan ending
Digital Modules	
Operation Temperature	-40 to 85°C
Storage Temperature	-40 to 90°C
Power Consumption (mA)	Active Mode: 35mA
	Idle Mode: 34mA
	Sleep Mode : <33mA
	(Operation Mode: Active Mode only)
Relative Humidity Linearity (Note 1)	95% at 60°C, RH Non-condensing
	Line drawing accuracy: 1pt +/- 1mm offset /10mm
	Line drawing accuracy: 2pt +/- 2mm offset /10mm
	Touch (point) accuracy: 1pt +/- 2.5mm
	Touch (point) accuracy: 2pt +/- 5.0mm
	Refer to Windows 7 Logo regulation

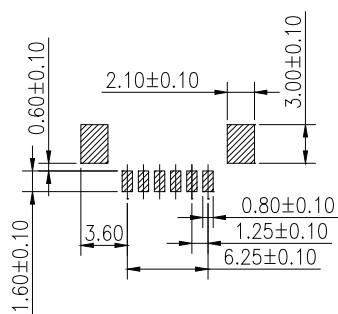
6.3 OS Driver Support

OS	Version	Interfaces
Windows	Windows 7/ 8/10	USB
	Windows Vista, XP/2000, 9x/ME	
	Windows CE 2.12/3.0/.net/5.0/6.0	
	Windows Embedded	
	Windows XP Tablet PC edition	
Linux	Mandrake (Mandrake 9.1/9.2/10, Mandriva 2005, Mandriva 2006), Red Hat (7.3/8.0/9.0), Fedora (Core I/II/III/IV/V/VI), Yellow Dog (3.X), SuSE (9.2/9.3/10/10.1), Ubuntu (5.1/6.06), Debian (3.1, Kernel 2.4.x/2.6.x)	USB (up to Kernel 2.6.x)
	Android 4.0 – Google Moblin V2/Meego - Intel	USB
Mac	Mac OS9, Mac OS X (IBM, intel CPU)	USB
QNX	QNX RTOS v6.3	USB

6.4 Circuit board dimension

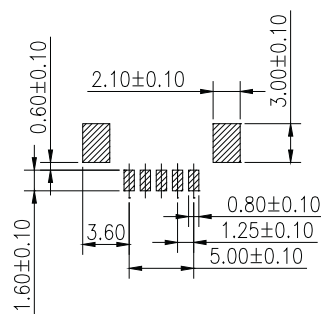


6.5 Interface



CONNECTOR: E & T (3802-E06N-01R)
P.C.B LAYOUT

DETAIL-A



CONNECTOR: E & T (3802-E05N-01R)
P.C.B LAYOUT

DETAIL-B

Appendix **A**

Handling Precautions

A.1 Handling Precautions

The optical characteristics are measured under stable conditions at 25°C (Room Temperature)

1. Since front polarizer is easily damaged, pay attention not to scratch it.
2. Be sure to turn off power supply when inserting or disconnecting from input connector.
3. Wipe off water drops immediately. Long contact with water may cause discoloration or spots.
4. When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5. Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6. Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7. Do not open or modify the Module Assembly.
8. Do not press the reflector sheet at the back of the module to any directions.
9. In case if a Module has to be put back into the packing container slot after once it was taken out from the container, please press at the far ends of the LED light bar reflector edge softly. Otherwise the TFT Module may be damaged.
10. At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11. After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12. A small amount of materials having no flammability grades have been used in the LCD module. The LCD module should be supplied by power complying with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exempt of them.



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