



User Manual

IDK-1105 Series

TFT-LCD 5.7" VGA (LED Backlight)

ADVANTECH

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Contents

Chapter 1	General Description and Features	1
1.1	Display Characteristics.....	2
1.1.1	IDK-1105R-50VGA1E	2
1.2	Optical Characteristics	2
1.2.1	IDK-1105R-50VGA1E	2
1.3	Absolute Maximum Ratings	5
1.3.1	Absolute Ratings of TFT LCD Module	5
1.3.2	Absolute Ratings of Environment.....	5
1.4	Outline Dimensions.....	5
1.4.1	Front View.....	5
1.4.2	Rear View	6
Chapter 2	Electrical Characteristics.....	7
2.1	TFT LCD Module.....	8
2.1.1	Power Specifications.....	8
	Table 2.1: Power Specifications	8
2.1.2	Signal Electrical Characteristics.....	8
	Table 2.2: Signal Electrical Characteristics	8
2.2	Backlight Unit	9
2.2.1	Parameter Guidelines for LED backlight.....	9
	Table 2.3: For IDK-1105.....	9
Chapter 3	Signal Characteristics	11
3.1	Signal Description	12
3.1.1	Signal Description	12
	Table 3.1: Symbol Description.....	12
3.2	Interface Timing	13
3.2.1	Timing Characteristics	13
	Table 3.2: Timing Characteristics	13
3.2.2	Input Timing Diagram.....	14
Chapter 4	Touchscreen	15
4.1	Touch Characteristics	16
Chapter 5	Touch Controller	17
5.1	Touch Controller Characteristics.....	18
5.2	Specifications	18
5.3	Environmental Features	18
5.4	Pin Assignment and Description	19
5.4.1	Connector and LED Location.....	19
5.4.2	Combo Interface Connector, JP1, Pins and Signal Descriptions	19
	Figure 5.1 Board mounted header.....	20
5.4.3	Touchscreen Connector, JP2, Pins and Signal Descriptions.....	20
5.4.4	Physical Dimensions.....	21
	Figure 5.2 Physical Dimensions	21

Appendix A	Handling Precautions	23
A.1	Handling Precautions.....	24

Chapter 1

General Description
and Features

This specification applies to the 5.7" inch color TFT LCD module IDK-1105R.

IDK-1105R is designed to operate in a wide range of operating temperatures and has long life LED backlights that are well-suited to display units for industrial applications. An LED driving board for backlight unit is included in this panel and the structure of the LED unit is replaceable.

IDK-1105R has a built-in, 4-wire resistive touchscreen, timing controller and LVDS interface.

The screen format is intended to support the VGA 640(H) x 480(V) screen and 262k colors (RGB 6-bits). IDK-1105 is a RoHS 2.0 compliant product.

1.1 Display Characteristics

1.1.1 IDK-1105R-50VGA1E

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

Items	Unit	Specifications
Active Area (H x V)	[mm]	116.2 x 87.3
Pixels (H x V)		640x3(RGB) x 480
Pixel Pitch (H x V)	[mm]	0.18 x 0.18
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN, Normally White
Nominal Input Voltage VDD	[Volt]	3.3 typ (Min.:3.0 ; Max.:3.6)
Typical Power Consumption	[Watt]	1.8 typ.
Weight	[Grams]	230 ± 10
Physical Size (W x H x D)	[mm]	127.0 x 99.30 x 9.26
Electrical Interface		1 channel LVDS
Surface Treatment		Anti-glare, Hardness 3H
Color Support		262K(6-bit)
Temperature Range		
Operating	[°C]	-20 ~ 70
Storage (Non-Operating)	[°C]	-30 ~ 80
RoHS Compliance		RoHS Compliance 2.0

1.2 Optical Characteristics

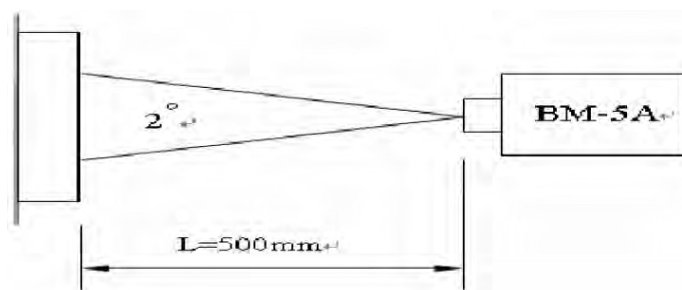
Optical characteristics are measured under stable conditions at 25°C (room temperature):

1.2.1 IDK-1105R-50VGA1E

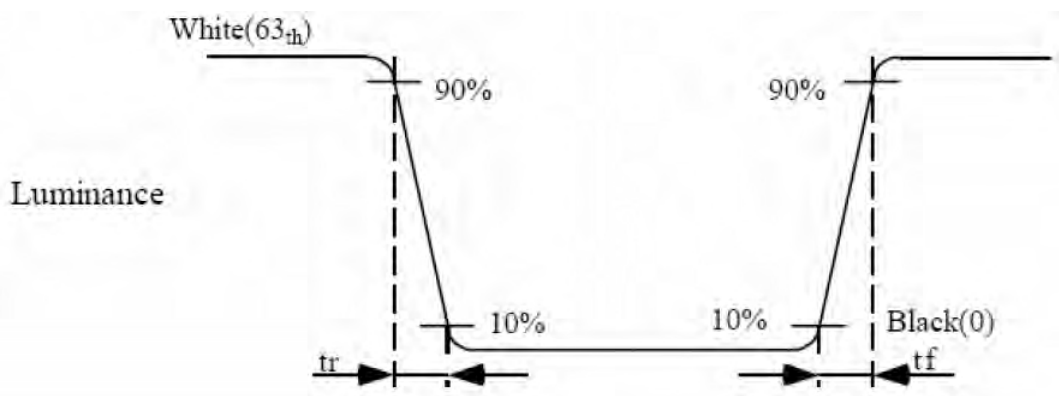
Item	Unit	Conditions	Min.	Typ.	Max.	Note
White Luminance	[cd/m ²]		400	500	-	1,4
Uniformity	%	9 Points	70	75	-	1,4
Contrast Ratio			200	250	-	1,3,4
Response Time	[msec]	Rising + Falling	-	50	-	1,2,4

Viewing Angle	[degree]	Horizontal	Point - 5	120	140	-	1,4,6
			CR ≥ 10				
	[degree]	Vertical	Point - 5	80	100	-	
			CR ≥ 10				
Color/Chromaticity Coordinates (CIE 1931)		Red x		0.566	0.616	0.666	1,4
		Red y		0.302	0.352	0.402	
		Green x		0.308	0.358	0.408	
		Green y		0.518	0.568	0.618	
		Blue x		0.096	0.146	0.196	
		Blue y		0.086	0.136	0.186	
		White x		0.296	0.346	0.396	
	White y		0.328	0.378	0.428		

Note 1: Measurement conditions: 25°C±2°C, 60±10%RH under 10Lux, in a dark room by BM-7TOPCON), viewing 2°, VCC=3.3V, VDD=3.3V.



Note 2: Definition of Response Time (White-Black)



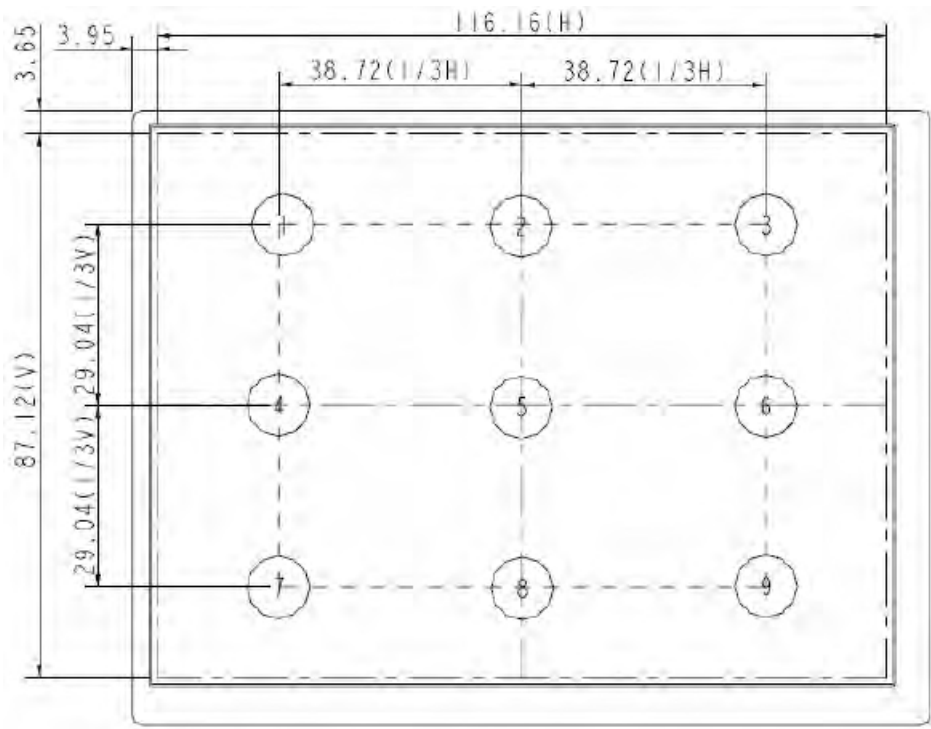
Note 3: Definition of Contrast Ratio

Contrast ratio is calculated with the following formula:

$$\text{Contrast Ratio (CR)} = \frac{\text{(White) Luminance of ON}}{\text{(Black) Luminance of OFF}}$$

Note 4: Definition of Luminance

Measurement of luminance of white state at center point (Point 5)



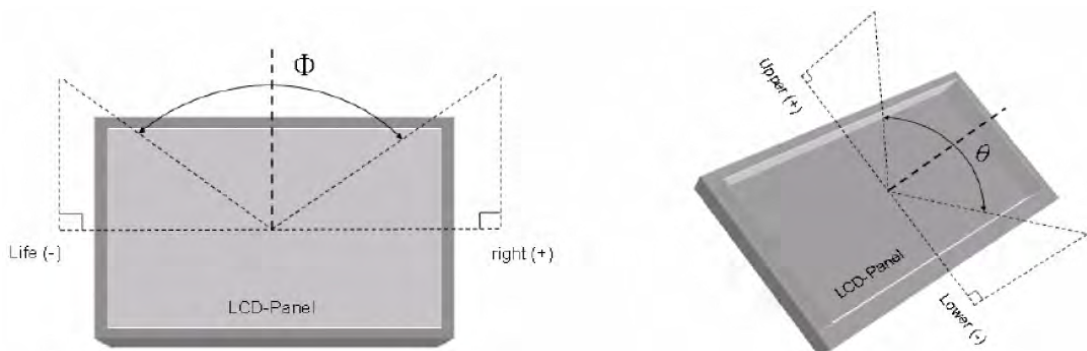
Note 5: Definition of Luminance Uniformity

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

Luminance Uniformity is calculated with the following formula:

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

Note 6: Definition of Viewing Angle



1.3 Absolute Maximum Ratings

1.3.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min.	Max.	Unit
LCD Voltage	V _{CC}	-0.5	+5	[Volt]
LED B/L Voltage	V _{LED}	+4.5	+5.5	[Volt]
Signal Input Voltage	DCLK, DE R0~R5 G0~G5	-0.5	V _{CC} + 0.5	[Volt]

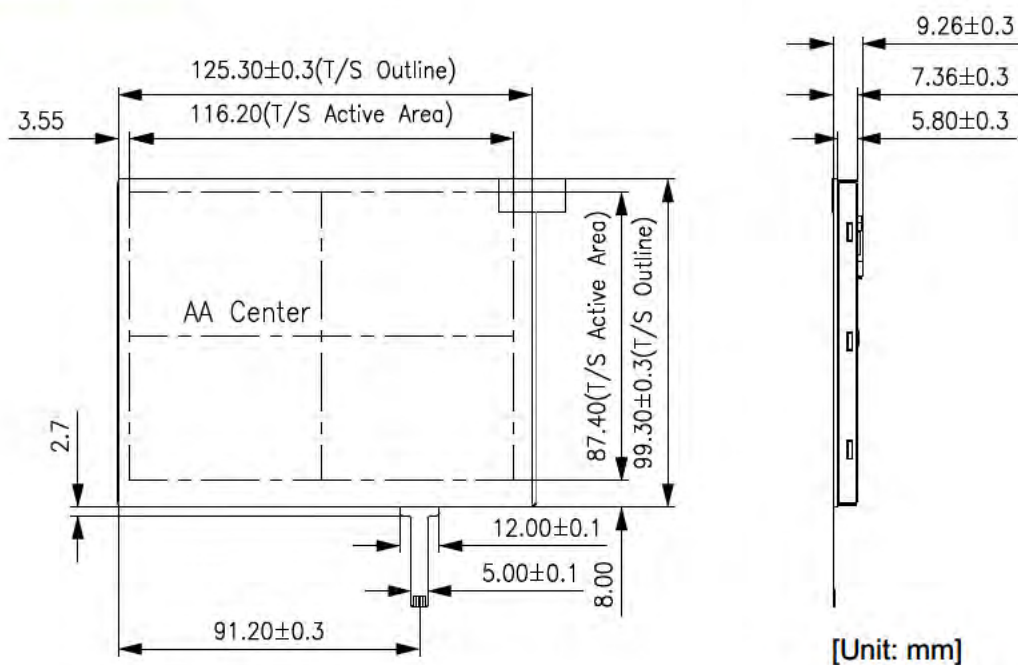
1.3.2 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit
Operating Temperature	T _{OP}	-20	+70	[°C]
Operation Humidity	H _{OP}	5	90	[%RH]
Storage Temperature	T _{ST}	-30	+80	[°C]

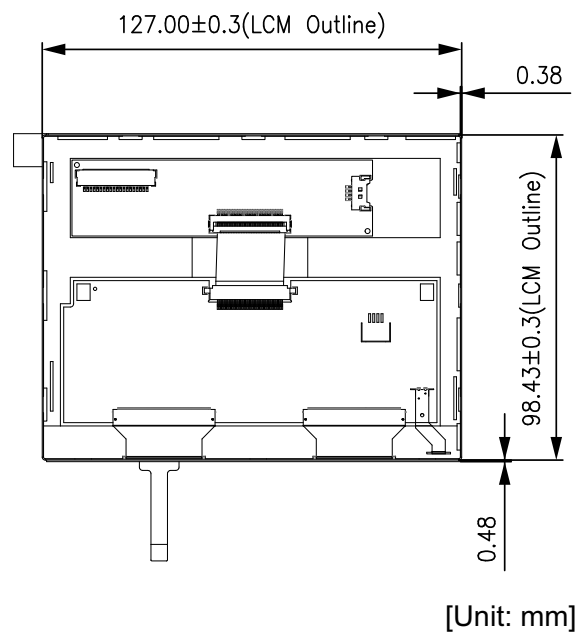
Note: After 24 hour room temperature and test.

1.4 Outline Dimensions

1.4.1 Front View



1.4.2 Rear View



Chapter 2

Electrical
Characteristics

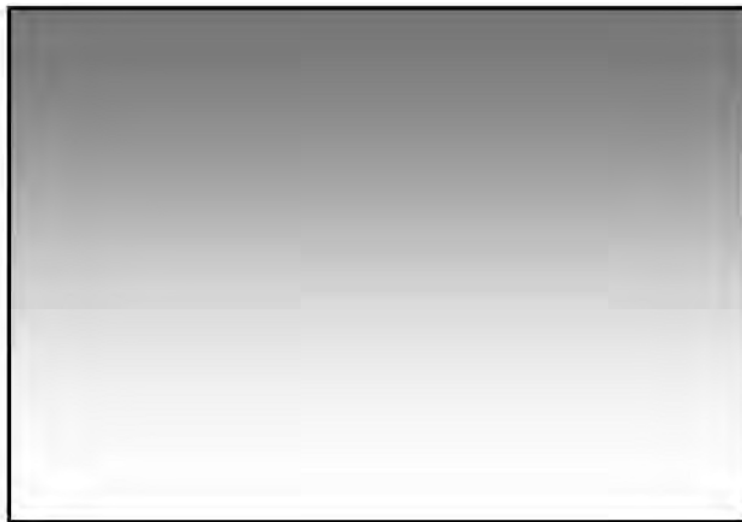
2.1 TFT LCD Module

2.1.1 Power Specifications

Table 2.1: Power Specifications

Item	Symbol	Values			Unit	Remarks	
		Min.	Typ.	Max.			
Power Voltage For LCD	V_{CC}	3.0	3.3	3.6	V		
Power Voltage For Backlight LED	V_{LED}	4.5	5.0	5.5	V	$V_{LED} = 5V$	
LCD Power Current	I_{CC}	-	106	-	mA	Note 1	
LED Backlight Power Current	I_{LED}	-	290	-	mA		
Logic Input Voltage	Input Voltage	V_{IN}	-0.5	-	$V_{CC}+0.5$	V	
	Logic Input High Voltage	V_{INH}	$0.7V_{CC}$	-	V_{CC}	V	LVDS
	Logic Input Low Voltage	V_{INL}	GND	-	$0.3V_{CC}$	V	LVDS

Note 1: Typical: Under 64 gray pattern.



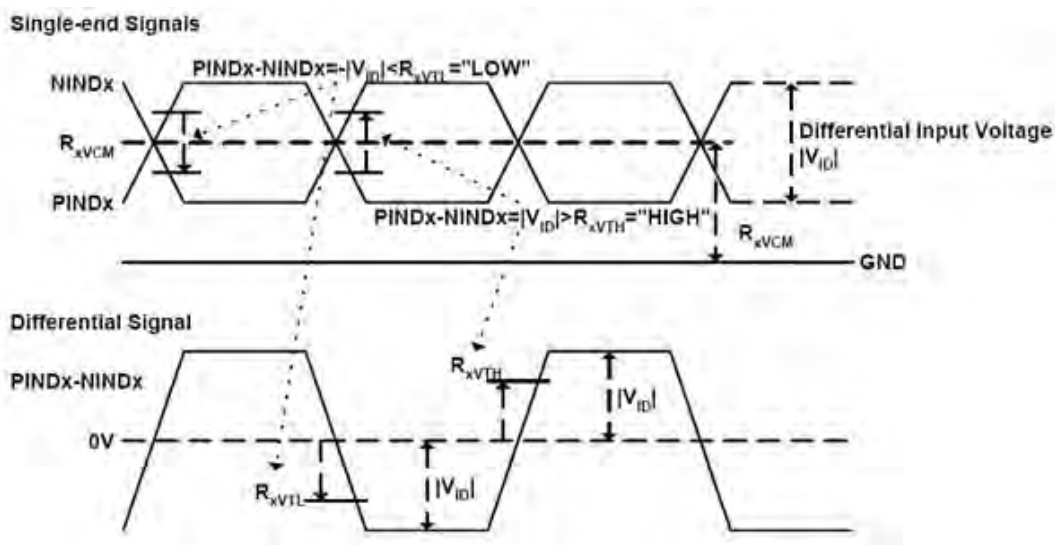
2.1.2 Signal Electrical Characteristics

Table 2.2: Signal Electrical Characteristics

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Differential Input High Threshold Voltage	RxV_{TH}	-	-	+0.1	V	$RxV_{CM}=1.2V$
Differential Input Low Threshold Voltage	RxV_{TH}	-0.1	-	-	V	
Input Voltage Range (Single-end)	RxV_{IN}	0	-	2.4	V	
Differential Input Common Mode Voltage	RxV_{CM}	$ VID /2$	-	$2.4- VID /2$	V	
Differential Voltage	$ VID $	0.2	-	0.6	V	

Table 2.2: Signal Electrical Characteristics

Differential Input Leakage Current	RVxlz	-10	-	+10	uA
------------------------------------	-------	-----	---	-----	----



2.2 Backlight Unit

2.2.1 Parameter Guidelines for LED backlight

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

Table 2.3: For IDK-1105

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED Driver Power Voltage	V_{LED}	4.5	5	5.5	V	
LED Driver Current Consumption	I_{LED}	-	290	-	mA	
ADJ (Dimming) Input Voltage	V_{ADJH}	3	-	5	V	
	V_{ADJL}	GND	-	0.3	V	duty=100% Note2
LED life time	-	-	50,000	-	Hr	Note1

Note 1: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

Note 2: V_{ADJ} is PWM signal input. It is for brightness control.

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 “Not Connected.”

3.1.1 Signal Description

J2 LVDS connector: CSTAR CP100-S20G-H16

Table 3.1: Symbol Description

Pin No.	Symbol	Description	Note
1	VCC	Power Voltage for Logic: 3.3V	
2	VCC	Power Voltage for Logic: 3.3V	
3	GND	Ground	
4	GND	Ground	
5	IN0-	- LVDS differential data input 1	
6	IN0+	+ LVDS differential data input 1	
7	GND	Ground	
8	IN1-	- LVDS differential data input 2	
9	IN1+	+ LVDS differential data input 2	
10	GND	Ground	
11	IN2-	- LVDS differential data input	
12	IN2+	+ LVDS differential data input	
13	GND	Ground	
14	CLK-	-Sampling Clock	
15	CLK+	+Sampling Clock	
16	GND	Ground	
17	NC	No Connect	
18	NC	No Connect	
19	GND	Ground	
20	GND	Ground	

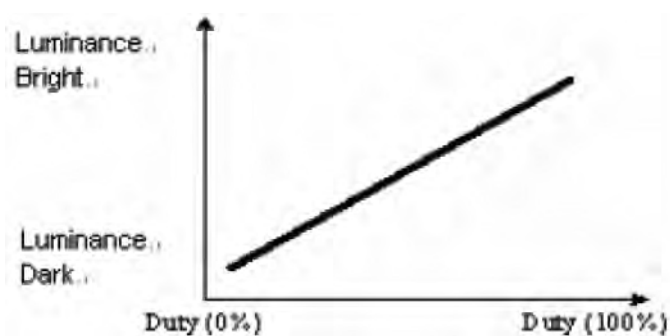
J3 LED connector: ENTERY 3808K-F05N-03L (Mating connector: ENTERY H2808K-P04N-02B)

Pin No.	Symbol	Description	Note
1	V _{LED}	Power Voltage for Backlight: 5V	
2	GND	Power Ground	
3	LED_ON/OFF	Backlight ON/OFF, “H” LED ON, “L” LED OFF.	
4	PWM	PWM input for LED brightness adjustment	

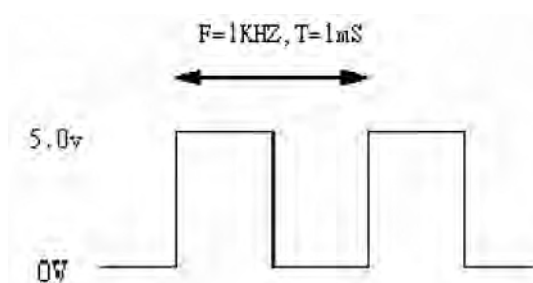
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ (Dimming) signal frequency	fPWM	0.1	--	200	KHz
ADJ signal logic level High	V _{ADJL}	3	--	5	V
ADJ signal logic level Low	V _{ADJL}	GND	--	0.3	V

Note:

1. PWM adjusts brightness to control Pin, Pulse duty the bigger the brighter.



2. PWM signal = 0 ~ 5.0V, operation frequency: 100Hz~200 KHz



3.2 Interface Timing

3.2.1 Timing Characteristics

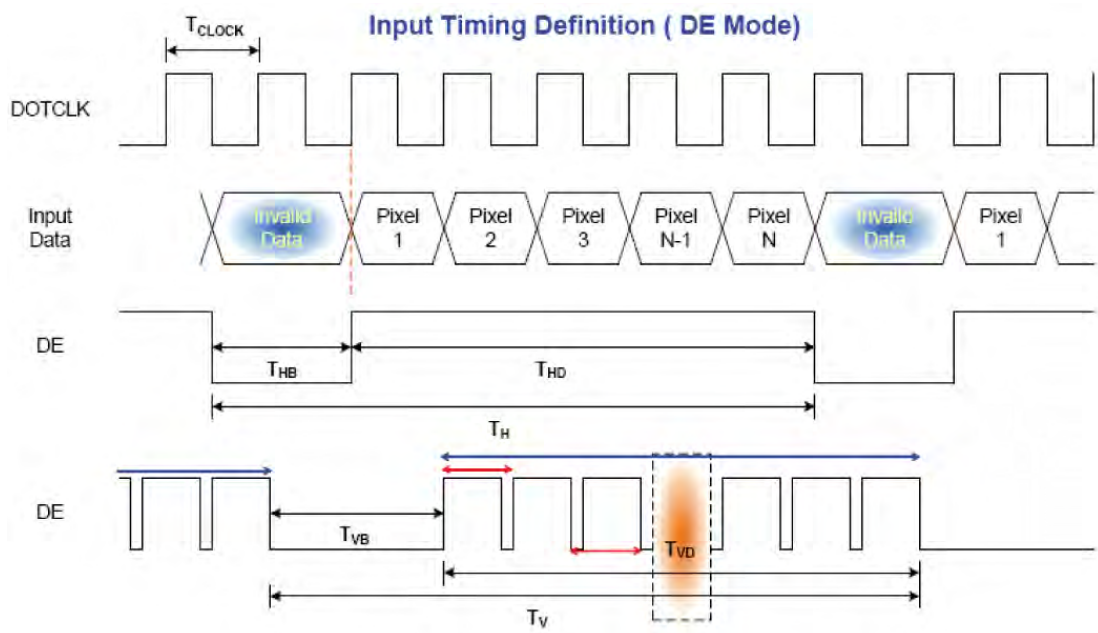
DE mode only

Table 3.2: Timing Characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Clock frequency	F_{CLK}	22.66	25.175	27.69	MHz
Clock period time	T_{CLOCK}	36.11	39.7	44.13	ns
Input data skew margin	T_{RSKM}	550	700	-	ps
Clock duty	T_{CWH}	40	50	60	%
Horizontal active time	T_{HD}	-	640	-	T_{CLOCK}
HS period time	T_H	750	800	850	T_{CLOCK}
HS pulse width	T_{WH}	5	30	-	T_{CLOCK}
HS blanking	T_{HB}	112	144	175	T_{CLOCK}
Vertical active time	T_{VD}	-	480	-	T_H
VS period time	T_V	515	525	535	T_H
VS pulse width	T_{WV}	1	3	5	T_H
VS blanking	T_{VB}	-	35	-	T_H

***Note:** When SYNC mode is used, 1st data starts from 144th CLK after HS falls (when $STHD[5:0]=00000$)

3.2.2 Input Timing Diagram



Chapter 4

Touchscreen

4.1 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.

Item	Specification	Remarks
1 Operating temperature	-20°C ~ 70°C	
2 Storage temperature	-30°C ~ 80°C	
3 Resistance	Film (Top) side: 300Ω ~ 1000Ω Glass (Bottom) side: 100Ω ~ 800Ω	FPC At connector
4 Linearity	±1.5%max initial value ±3.0%max "after environmental & life test"	
5 Insulation resistance	20MΩ min(DC 25V)	
6 Life time	> 1,000,000 times	

Chapter 5

Touch Controller

5.1 Touch Controller Characteristics

Advantech ETM-RES05C touch control board is the ultimate combo board. This touch panel controller provides optimum performance of your analog resistive touch panels for 4-wire models. It communicates with the PC system directly through USB and RS-232 connector. You can see how superior the design is in sensitivity accuracy and friendly operation. The touch panel driver emulates mouse left and right button functions.

5.2 Specifications

Electrical Features

- +5 Vdc/ 100 mA typical, 50mV peak to peak maximum ripple and noise.
- Bi-directional RS-232 serial communication and USB 1.1 full speed.
- Report rate of RS-232 is 180 points/sec (max.). And, USB is 200 points/sec (max.).
- Unaffected by environmental EMI
- Panel resistance of 4-wire resistive model is from 50 to 200 ohm (Pin to pin on same layer)
- Touch resistance under 3K ohm

Serial Interface

- EIA 232E (Serial RS-232)
- No parity, 8 data bits, 1 stop bit, 9600 baud (N, 8, 1, 9600)
- Support Windows 2000/ Vista/ XP/ 7, Windows CE 5.0/ 6.0/ 7.0, Windows NT4, Linux, DOS, QNX

USB Interface

- Conforms to USB Revision 1.1 full speed.
- If the USB is connected to the controller, the controller will communicate over the USB, and will not communicate over the serial port.
- Supports Windows 2000/ Vista/ XP/ 7, Windows CE 5.0/ 6.0/ 7.0, Linux, QNX

Touch Resolution

- 2,048 x 2,048 resolution

Response Time

- Max. 20 ms

5.3 Environmental Features

Reliability

- MTBF is 200,000 hours

Temperature Ranges

- Operating: -25°C ~ 85°C
- Storage: -25°C ~ 85°C

Relative Humidity

- 95% at 60°C, RH Non-condensing

Acquired RoHS certificate

Regulatory FCC-B, CE approvals

Dimension: 75 mm x 20 mm x 10 mm

5.4 Pin Assignment and Description

5.4.1 Connector and LED Location



5.4.2 Combo Interface Connector, JP1, Pins and Signal Descriptions

The combo interface connector: USB and RS-232, is a 2.0 mm 10-pin 90° degree male type with lock connector, intended to be used with single wired pins in a 5+5 pin header. The pins are numbered as shown in the table below.

USB Pin#	Signal Name	Signal Function	RS-232 Pin#	Signal Name	Signal Function
1	G	Ground	1	G	Ground
2	V	USB Power	2	V	Power
3	G	Ground	3	G	Ground
4	D+	USB D+	4	TxD	Serial Port
5	D-	USB D-	5	RxD	Serial Port

Signal Name	DB-9 pin #	RS-232 pin #	Sourced by	Signal Description
RxD	2	5	ctrl	serial data from controller to host
TxD	3	4	host	serial data from host to controller

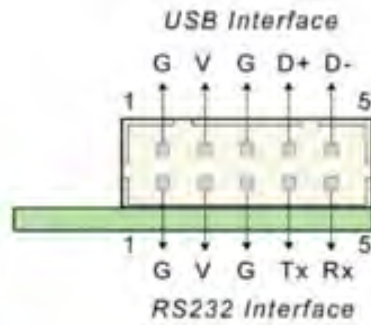


Figure 5.1 Board mounted header

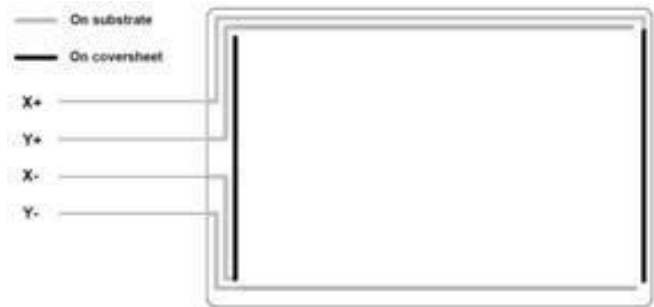
5.4.3 Touchscreen Connector, JP2, Pins and Signal Descriptions

The Touchscreen connector, JP2, is a FFC/FPC SMD 1.0 mm 4-pin 90° degree, female type connector. The pins are numbered as shown in the table below.

TS4 Pin #	Signal Name	Signal Description
1	YB	Bottom
2	XL	Left
3	YT	Top
4	XR	Right



4-Wire Touchscreen ZIF connector



4-Wire Screen viewed from cover sheet side

5.4.4 Physical Dimensions

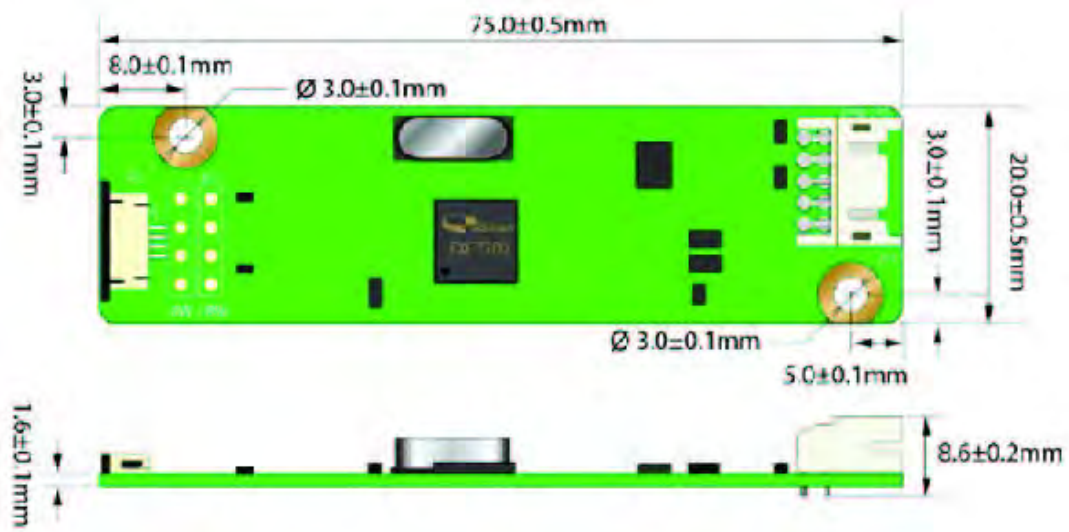


Figure 5.2 Physical Dimensions

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 drop 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 ensure a proper earth ground 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 momentarily. During enclosure design, it should be taken into consideration that no bending/twisting forces be applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12. Small amounts of materials having no flammability grade are used in the LCD module. The LCD module should be supplied by power compliant with requirements of Limited Power Source (IEC60950 or UL1950), or be applied for exemption.

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