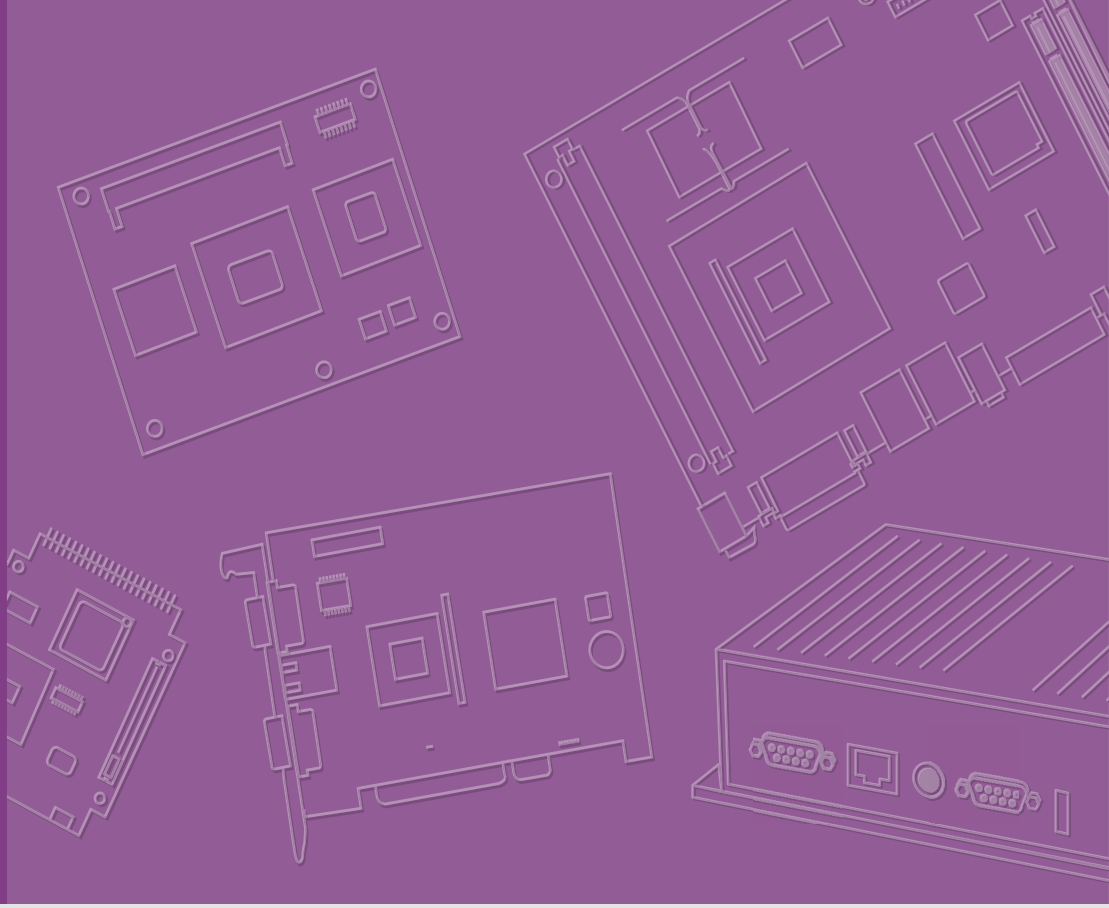


User Manual

IDK-1108R-50SVB1

8.4" SVGA Industrial Display Kit with 4-Wire Resistive Touch Solution

ADVANTECH

Enabling an Intelligent Planet

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1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
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3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

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Chapter 1

Overview

1.1 General Description

The Advantech IDK-1108 series comes with a 8.4" industrial grade LCD display with 4-wire resistive touch. The series is also available with flexible options for LCD screens enhanced treatment such as Anti-Reflection surface treatment and optical bonding solution. IDK-1108 series supports 4-wire resistive touch with low power consumption at the maximum of 3.24 W. IDK-1108 series is ideal for embedded applications which customers have maximum flexibility for mechanical design.

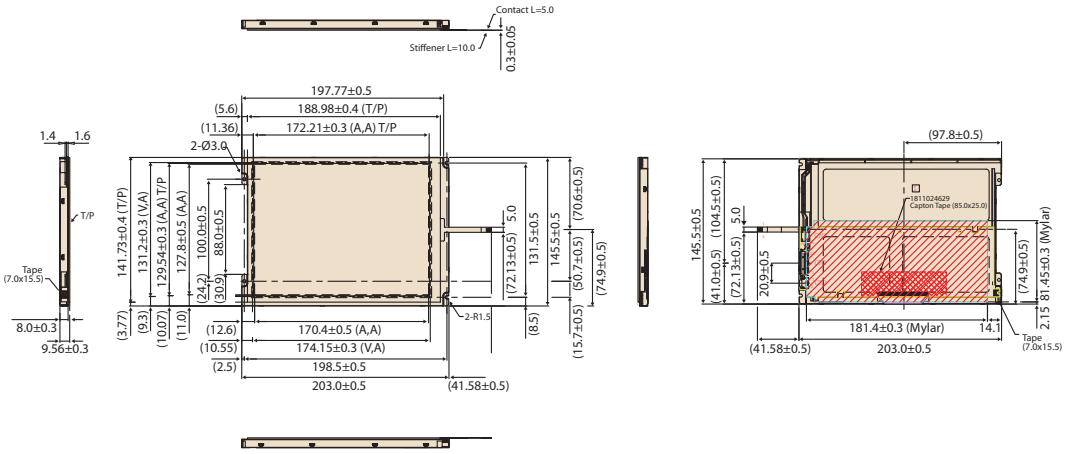
1.2 Key Specifications

Table 1.1: Specifications

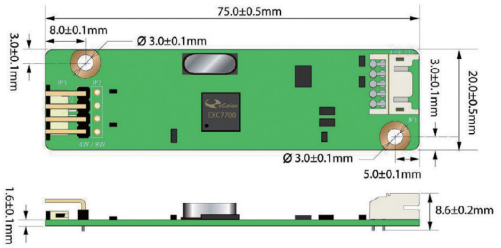
Model No.	IDK-1108R-50SVB1	
LCD Panel	Display Size	8.4", 4:3
	Resolution	800 x 600
	Viewing Angle (U/D/L/R)	80° / 60° / 80° / 80°
	Brightness	450 cd/m2
	Backlight Life (hrs)	50,000
	Contrast Ratio	600 : 1
	Response Time (ms)	16 ms
	Colors	6 Bit (262K)/8 bit (16.2 M)
	Voltage	3.3 V Power
	Consumption	3.24 W
	Signal Interface	1 channel LVDS
	Weight	250 g
	Dimensions (W x H x D)	203.0 x 145.5 x 8 mm
Touch Screen	Touch Screen	4-wire Resistive
	Transparency	82.5± 2.5%
	Surface Hardness	3H
	Durability	1 million times
Environment	Operating Temperature	-20 ~ 70° C
	Storage Temperature	-30 ~ 70° C
	Humidity	90% @ Max. 60° C, non-condensing

1.3 Mechanical Characteristics

Unit: mm



Touch Control Board



Chapter 2

LCD Display

2.1 Absolute Maximum Ratings

Table 2.1: Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Supply voltage range	VCC	-0.3	4	V	(1)
Voltage range at any terminal	VI	-0.3	VCC + 0.3	V	
Operating Temperature	Top	-20	70	°C	
Storage Temperature	Tstg	-30	80	°C	

Note! *All voltage values are with respect to the GND terminals unless otherwise noted.*

2.2 Optical Characteristics

Table 2.2: Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response Time		Tr +Tf	Θ=Φ=0°	-	16	25	ms	(1),(2),(5)
Contrast ratio		CR		480	600	-	-	(1),(2),(4)
Viewing Angle	Horizontal	ΘL	CR≥10	70	80	-	Deg.	(1),(2),(3)
		ΘR		70	80	-		
	Vertical	ΘU		70	80	-		
		ΘD		50	60	-		
Luminance (Center)		L	Θ=Φ=0° IF=150mA Ta=25°C	320	400	-	cd/m2	(1),(2),(6)
Luminance Uniformity		ΔL		-	70	-	%	(1),(2),(6)
Color chromaticity	White	Wx		Typ. -0.05	0.310	Typ. +0.05	-	(1),(2),(6)
		Wy			0.330		-	
	Red	Rx			0.603		-	
		Ry			0.336		-	
	Green	Gx			0.326		-	
		Gy			0.546		-	
	Blue	Bx			0.159		-	
		By			0.110		-	

Measuring Condition

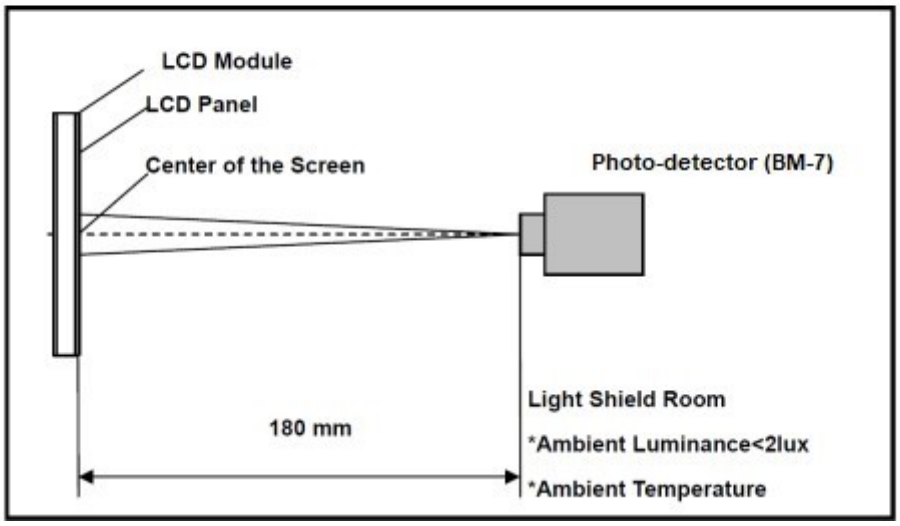
Measuring surrounding: dark room, LED current IF

Ambient temperature: 25±2°C

15min. Warm-up time

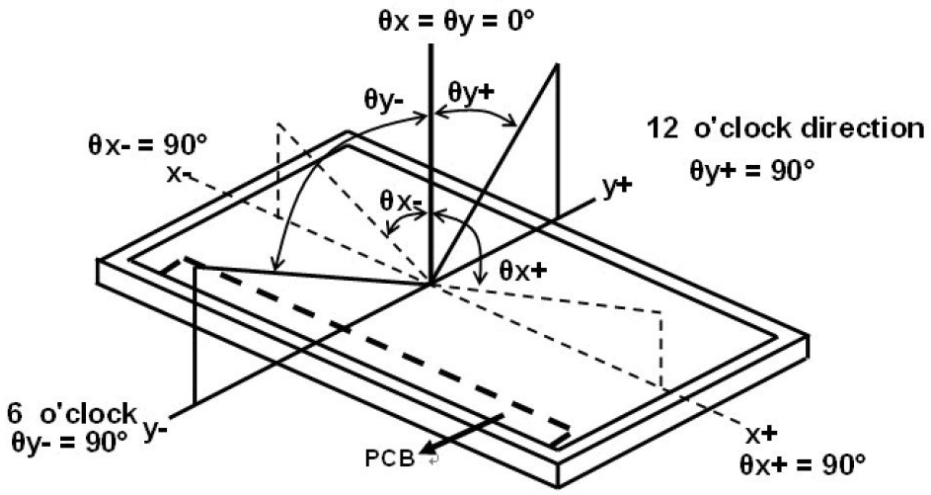
Note1! *Measurement Setup:*

The LCD module should be stabilized at given temperature(25℃) for 15 minutes to Avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.



Note2! *The LED input parameter setting as: PWM: duty 100 %*

Note3! *Definition of viewing angle:*



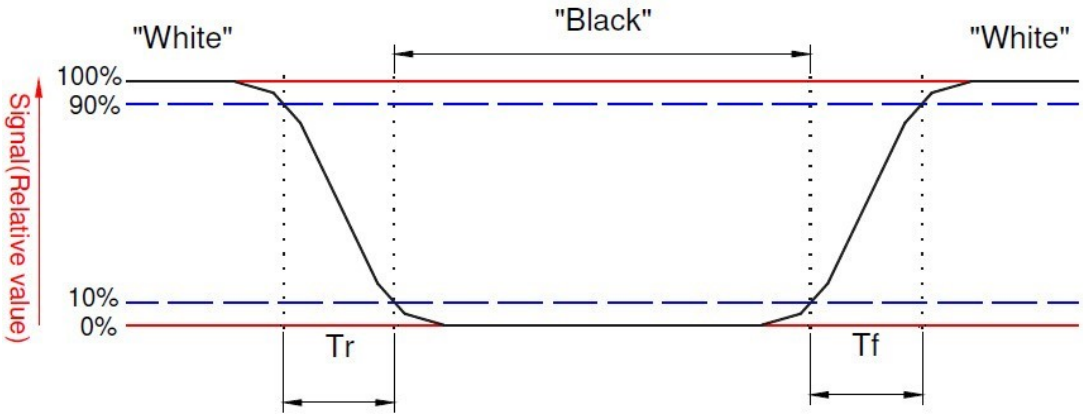
Note4! *Definition of Contrast Ratio (CR)*

Measured at the center point of panel

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note5! *Definition of Response Time (Tr, Tf)*

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (Tr) is the time between photo detector output intensity changed from 90% to 10%. And fall time (Tf) is the time between photo detector output intensity changed from 10% to 90%.

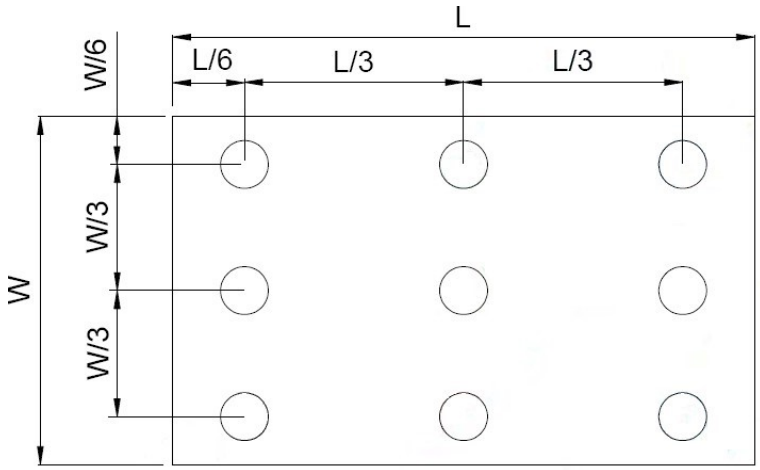


Note6! Definition of Brightness Uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure). Every measuring point is placed at the center of each measuring area.

L ----- Active area lengthWActive area width

$$\text{Luminance Uniformity}(Y_u) = \frac{B_{min}}{B_{max}}$$



Bmax: The measured maximum luminance of all measurement position.
Bmin: The measured minimum luminance of all measurement position.

2.3 Electrical Characteristics

2.3.1 Power Specification

Table 2.3: Power Specification

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Logic / LCD Drive Voltage	VCC	3.0	3.3	3.6	V	
VCC Current	ICC		180.		mA	(1)

Note! *fV =60Hz, Ta=25°C, Display pattern: All Black*

2.3.2 LVDS Electrical Specification

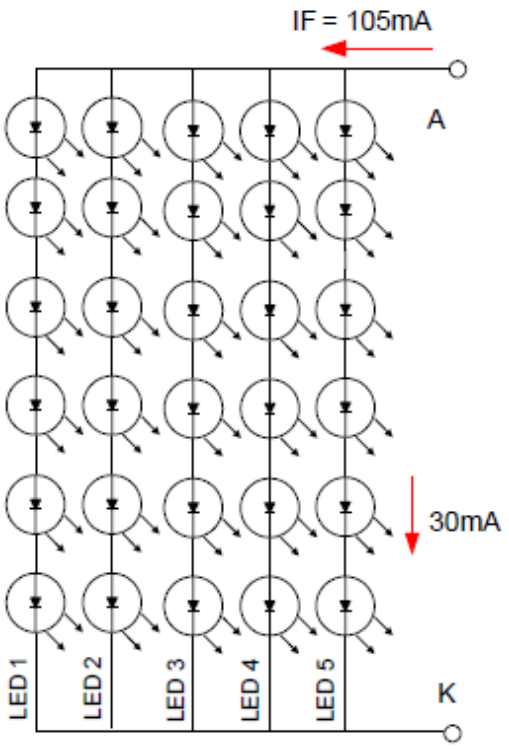
Table 2.4: LVDS Electrical Specification						
V_{CC}=3.0-3.6V, Ta=-10-+70°C						
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
CMOSITTL DC SPecifications						
V_{IH}	High Level Input Voltage		2.0		Vcc	V
V_{IL}	Low Level Input Voltage		GND		0.8	V
V_{OH}	High Level output Voltage	I_{OH}=4mA	2.4			V
V_{OL}	Low Level Output Voltage	I_{OL}=4mA			0.4	V
I_{IN}	Input Current	0V ≤ V_{IN} ≤ Vcc			±10	ųA
I_{PD}	Pull Down Current	RF pin, V_{IH}=Vcc			100	ųA
I_{OS}	Output Short Circuit Current	V_{OUT}=0V			-50	ųA
LVDS Driver DC Specifications						
V_{OD}	Differential Output Voltage	RL=100Ω	250	350	450	mV
ΔV_{OD}	Change in VOD between Complimentary Output States				35	V
V_{OC}	Common Mode Voltage		1.25	1.25	1.375	V
ΔV_{OC}	Change in VOC between Complimentary Output States				35	V
I_{OS}	Output Short Cireuit Current	V_{OUT}=0V, RL=100Ω			-24	mA
I_{OZ}	Output TRI-STATE Curent	/PDWN=0V, V_{OUT}=0V to Vcc			±10	ųA
LVDS Receiver DC Specifications						
V_{TH}	Differential Input High Threshold	V_{OC}=1.2V	250	350	450	mV
ΔV_{TL}	Differential Input low Thresh-old				35	V
I_{IN}	Input Current	VIN=+2.4V/0V Vcc=3.6V	1.25	1.25	1.375	V

2.4 Backlight Unit

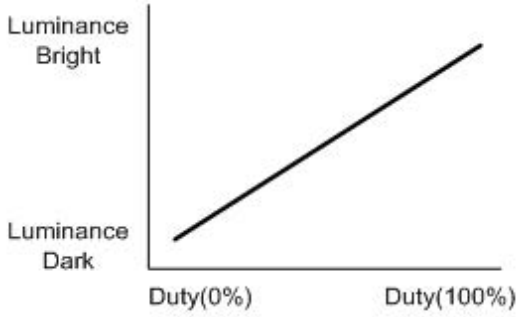
Table 2.5: Backlight Unit						
Item	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Input Voltage	V_{LED}	10.8	12.0	12.6	V	
Input Current	I_{LED}	--	220	--	mA	100% PWM duty
Dimming Frequency	Fpwm	200		30K	Hz	
Dimming Voltage High		2	--	5.0	V	
Dimming Voltage Low		0	--	0.8	V	
LED Forward Current	IF	--	105		mA	Ta=25°C
LED Forward Voltage	VF	16.2	18.0	19.8	V	IF=105mA, Ta=25°C
LED life time			50,000	-	Hr	IF=105mA, Ta=25°C

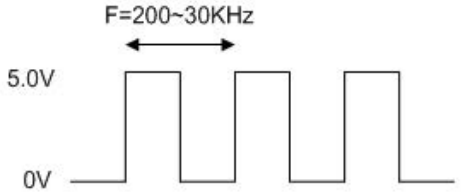
Note!

1. *Ta means ambient temperature of TFT-LCD module.*
2. *VLED, ILED are defined for LED B/L. (100% duty of PWM dimming)*
3. *IF, VF, Fpwm are defined for LED Driver.*
4. *If the module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.*
5. *Operating life means brightness goes down to 50% minimum brightness. LED life time is estimated data.*
6. *The structure of LED B/L shows as below.*



2.4.1 PWM Dimming Control





2.5 Interface

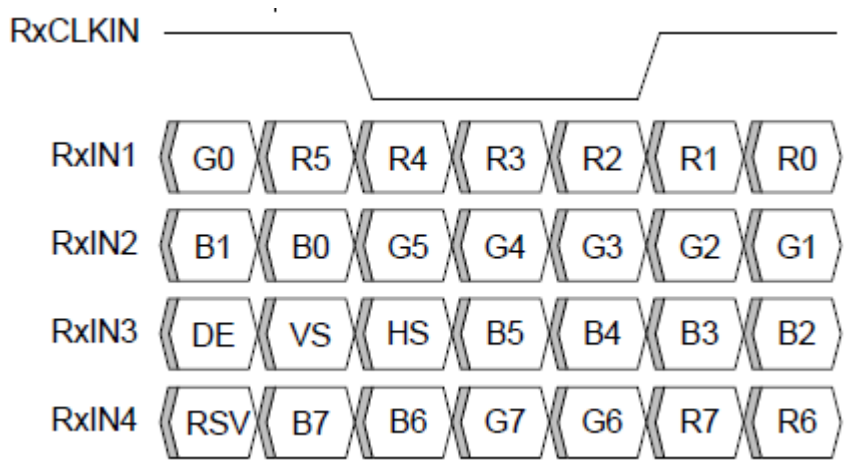
2.5.1 Interface Definition

2.5.1.1 CN1: LVDS Connector

Table 2.6: CN1: LVDS Connector

Pin no	Symbol	Function
1	VCC	POWER SUPPLY:3.3V
2	VCC	POWER SUPPLY:3.3V
3	UD	Vertical Reverse Scan Control.
4	LR	Horizontal Reverse Scan Control.
5	RXIN1-	Transmission Data of Pixels 1
6	RXIN1+	Transmission Data of Pixels 1
7	GND	Power Ground
8	RXIN2-	Transmission Data of Pixels 2
9	RXIN2+	Transmission Data of Pixels 2
10	GND	Power Ground
11	RXIN3-	Transmission Data of Pixels 3
12	RXIN3+	Transmission Data of Pixels 3
13	GND	Power Ground
14	RXCKIN-	Sampling Clock
15	RXCKIN+	Sampling Clock
16	GND	Power Ground
17	NC	No connection
18	NC	No connection
19	NC	**LVDS 6 bits mode: No connection (default)** LVDS 8 bit mode: (RXIN4-) Transmission Data of Pixels 4
20	NC	**LVDS 6 bits mode: No connection (default)** LVDS 8 bit mode: (RXIN4+) Transmission Data of Pixels 4

2.5.1.2 8 bits LVDS input

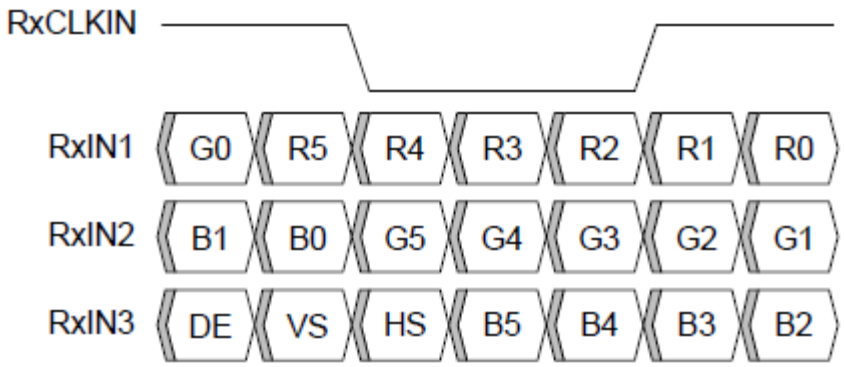


Note! *R/G/B data 7: MSB, R/G/B data 0: LSB*

Table 2.7: 8 bits LVDS input

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 Date 7 (MSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
G6	Green Date 6	
G5	Green Date 5	
G4	Green Date 4	
G3	Green Date 3	
G2	Green Date 2	
G1	Green Date 1	
G0	Green Date 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	

2.5.1.3 6 bits LVDS input

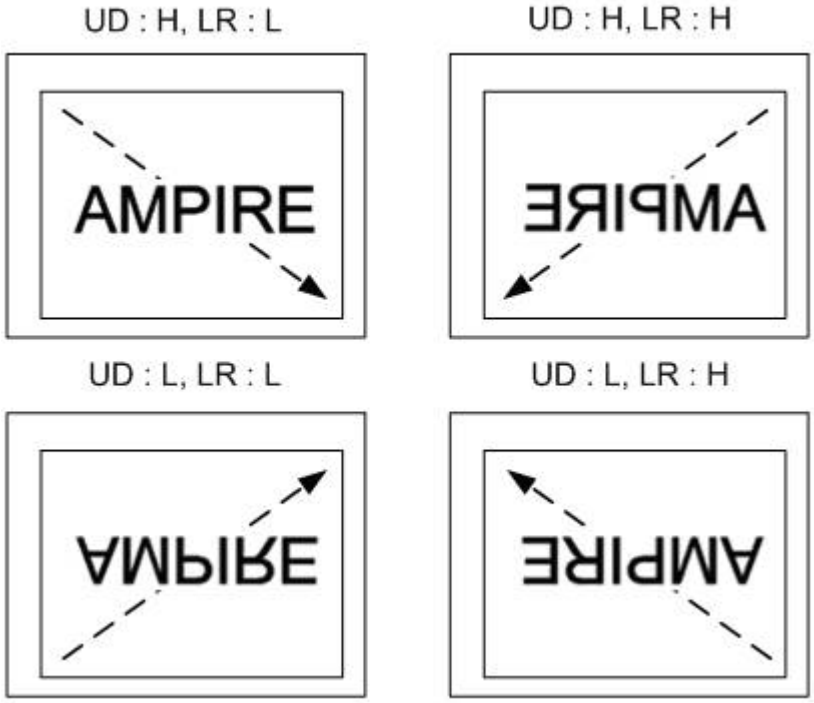


Note! *R/G/B data 5: MSB, R/G/B data 0: LSB*

Table 2.8: 6 bits LVDS input

Signal Name	Description	Remark
R5 R4 R3 R2 R1 R0	Red Data 5 (MSB) Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB)	Red-pixel Data Each red pixel's brightness data consists of these 6 bits pixel data.
G5 G4 G3 G2 G1 G0	Green Date 5 (MSB) Green Date 4 Green Date 3 Green Date 2 Green Date 1 Green Date 0 (LSB)	Green-pixel Data Each green pixel's brightness data consists of these 6 bits pixel data.
B5 B4 B3 B2 B1 B0	Blue Data 5 (MSB) Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 6 bits pixel data.
RxCLKIN+ RxCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

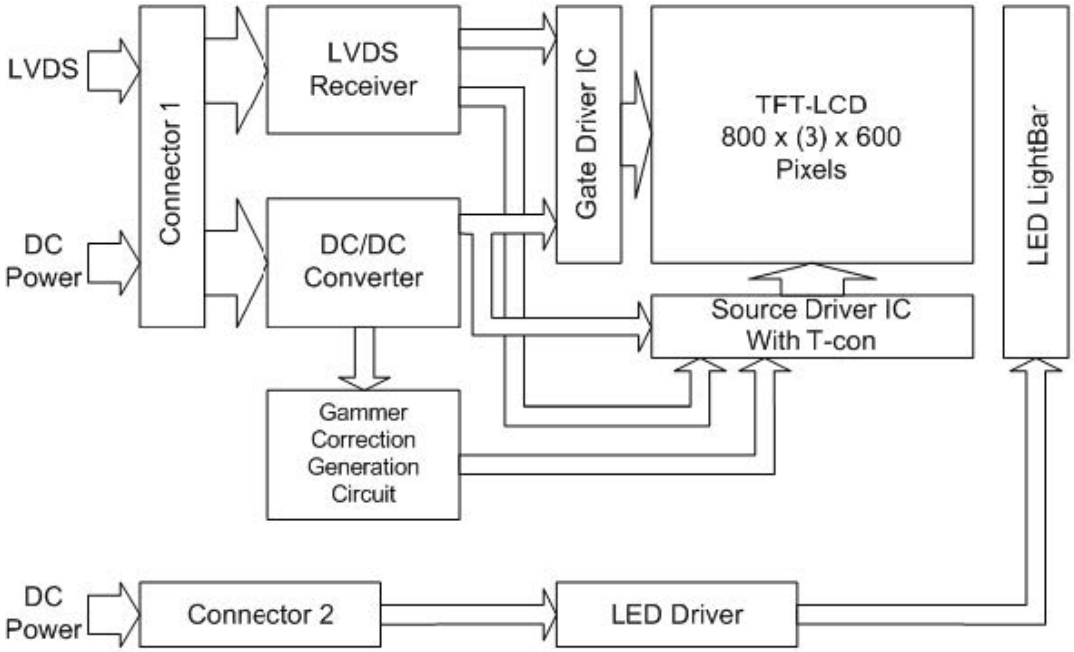
Table 2.9:		
Setting of scan control input		**Scanning direction**
UD	LR	
VCC	GND	Up to Down, Left to Right
GND	VCC	Down to Up, Right to Left
VCC	VCC	Up to Down, Right to Left
GND	GND	Down to Up, Left to Right



2.5.1.4 CN2: LED Driver Connector

Table 2.10: CN2: LED Driver Connector		
Pin no	**Symbol**	**Function**
1	VLED	12V input
2	GND	GND
3	Display_ON/OFF	+3.3V:ON, 0V:OFF
4	Dimming	PWM

2.5.2 Block Diagram

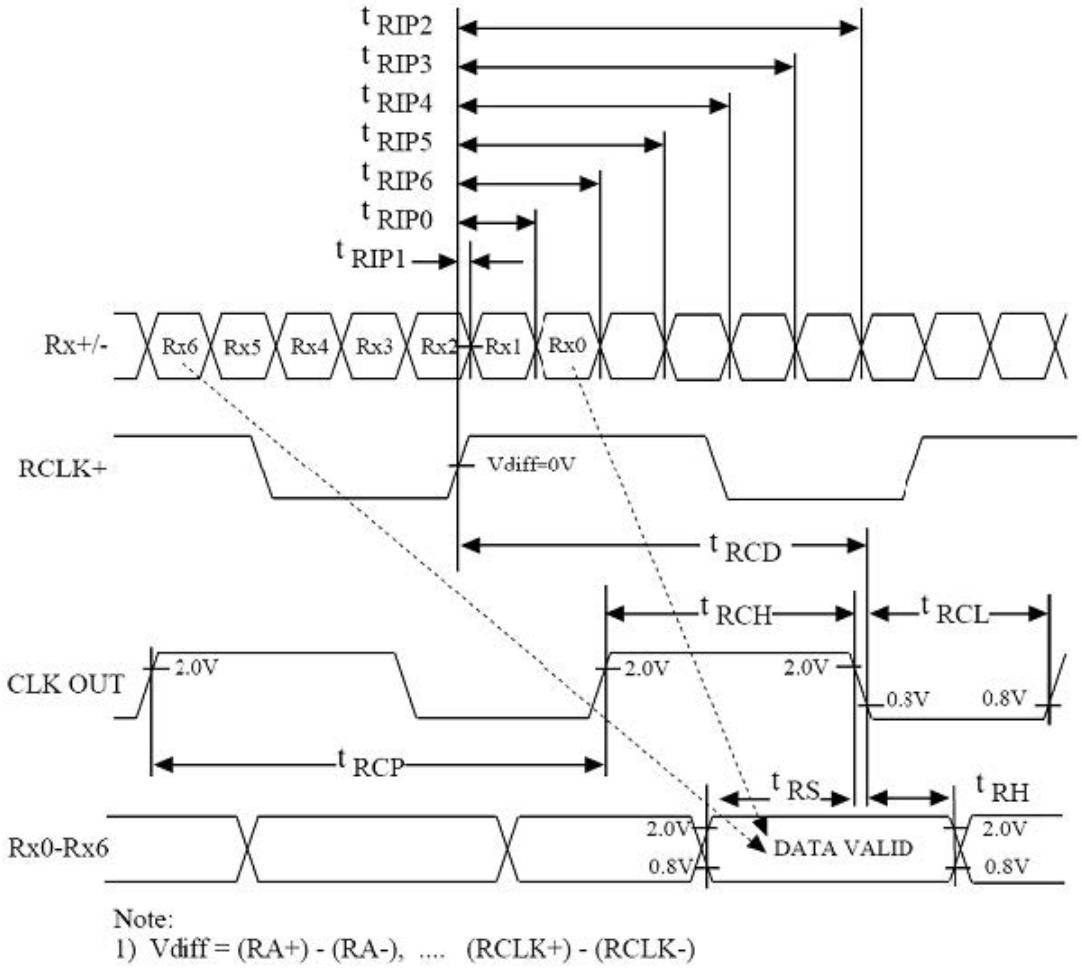


2.6 AC Timing Characteristic

2.6.1 AC Timing Characteristic of LVDS

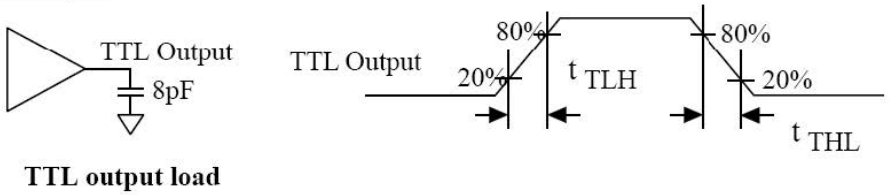
Table 2.11: AC Timing Characteristic of LVDS					
Switching Characteristics					
Vcc=3.0-3.6V, Ta=-10-+70°C					
RECEIVER					
t_{RCP}	CLK OUT Period	11.76	T	50.0	ns
t_{RCH}	CLK OUT High Time		4T/7		ns
t_{RCL}	CLK OUT Low Time		3T/7		ns
t_{RCD}	RCLK+/- to CLK OUT Delay		5T/7		ns
t_{RS}	TTL Data Setup to CLK OUT	3T/7-2.5			ns
t_{RH}	TTL Data Hold from CLK OUT	4T/7-3.5			ns
t_{TLH}	TTL Low to High Transition Time		3.0	5.0	ns
t_{THL}	TTL High to Low Transition Time		3.0	5.0	ns
t_{RIP1}	Input Data Position 0(T=11.76ns)	-0.4	0.0	0.4	ns
t_{IPO}	Input Data Position 1(T=11.76ns)	T/7-0.4	T/7	T/7+0.4	ns
t_{RIP6}	Input Data Position 2(T=11.76ns)	2T/7-0.4	2T/7	2T/7+0.4	ns
t_{RIP5}	Input Data Position 3(T=11.76ns)	3T/7-0.4	3T/7	3T/7+0.4	ns
t_{RIP4}	Input Data Position 4 (T=11.76ns)	4T/7-0.4	4T/7	4T/7+0.4	ns
t_{RIP3}	Input Data Position 5(T=11.76ns)	5T/7-0.4	5T/7	5T/7+0.4	ns
t_{RIP2}	Input Data Position 6(T=11.76ns)	6T/7-0.4	6T/7	6T/7+0.4	ns
t_{RPLL}	Phase Lock Loop Set			10.0	ms

Receiver Device

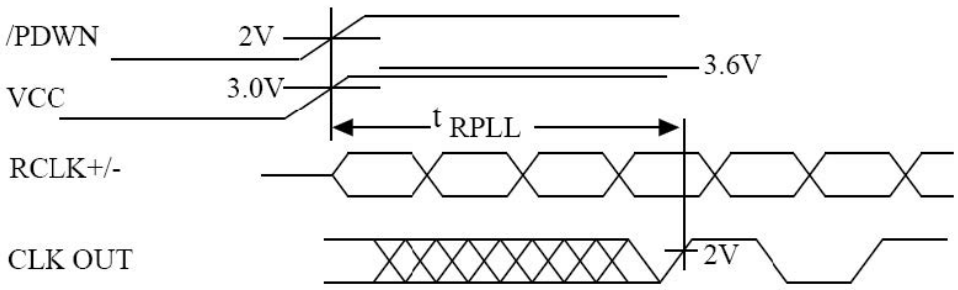


Receiver Device Transmission Times

TTL Output



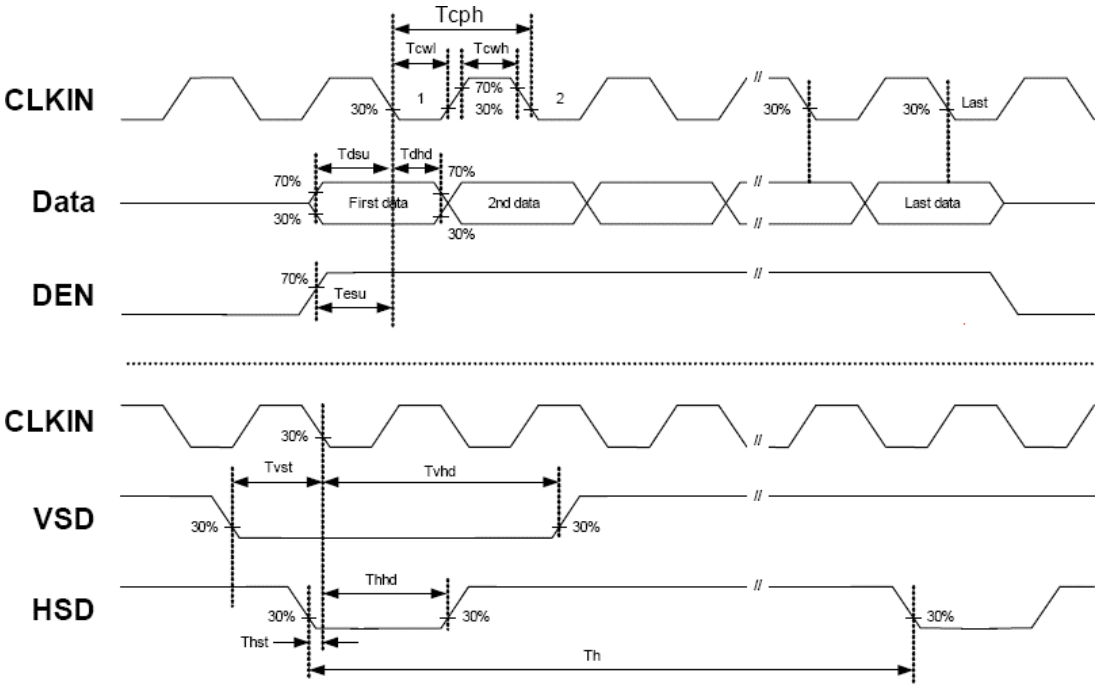
Phase Clock Loop Set Time



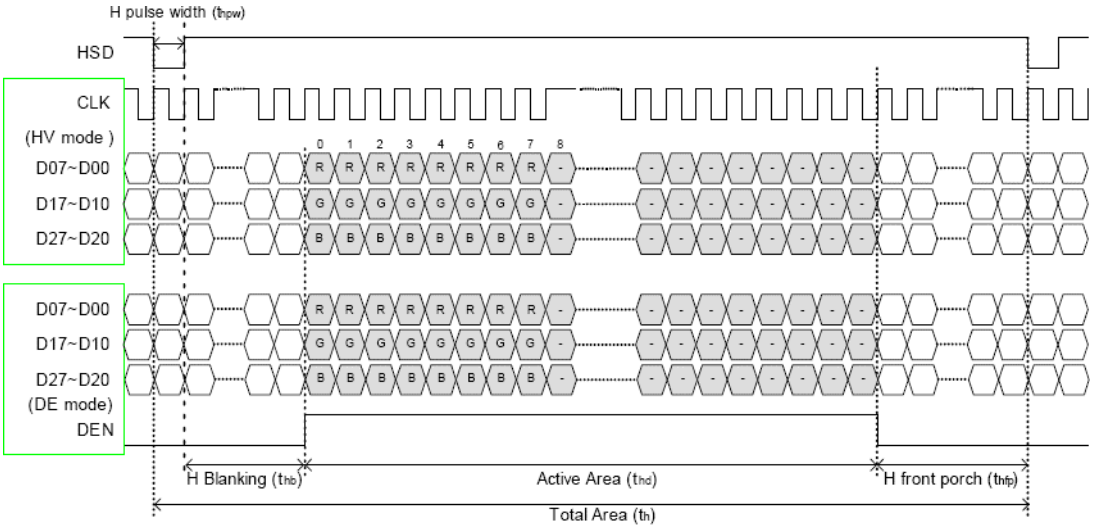
2.6.2 AC Timing Characteristic of Panel

Table 2.12: AC Timing Characteristic of Panel				
Item	**Symbol**	**Min.**	**Typ.**	**Max.**
DCLK cycle time	Tcph	20		
DCLK frequency	fclk		40	50
DCLK pulse duty	Tcwh	40	50	60
VSD setup time	Tvst	8		
VSD hold time	Tvhd	8		
HSD setup time	Thst	8		
HSD hold time	Thhd	8		
Data setup time	Tdsu	8		
Data hold time	Tdhd	8		
DE setup time	Tesu	8		
DE hold time	Tehd	8		
Horizontal display area	thd		800	
HSD period time	th		1000	
HSD pulse width	thpw	1	48	
HSD back porch	thb		40	
HSD front porch	thfp		112	
Vertical display area	tvd		600	
VsD period time	tv		660	
vsD pulse width	tvpw		3	
VsD back porch	tvb		39	
VsD front porch	tvfp		18	

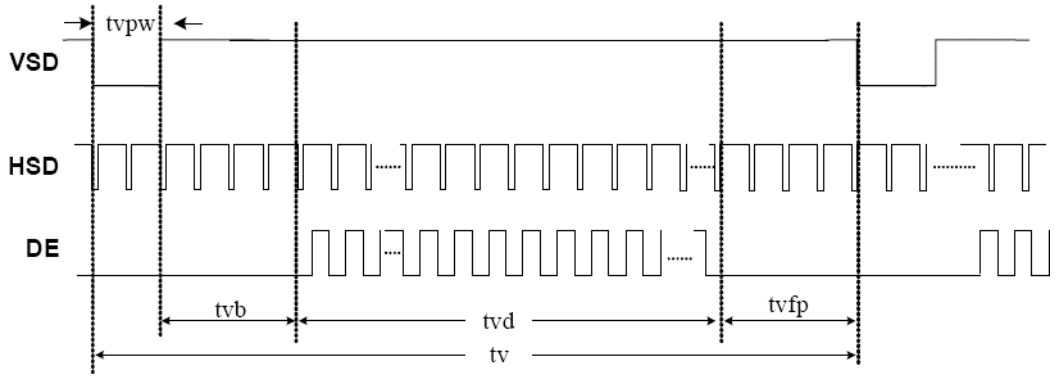
Sample Clock Timing



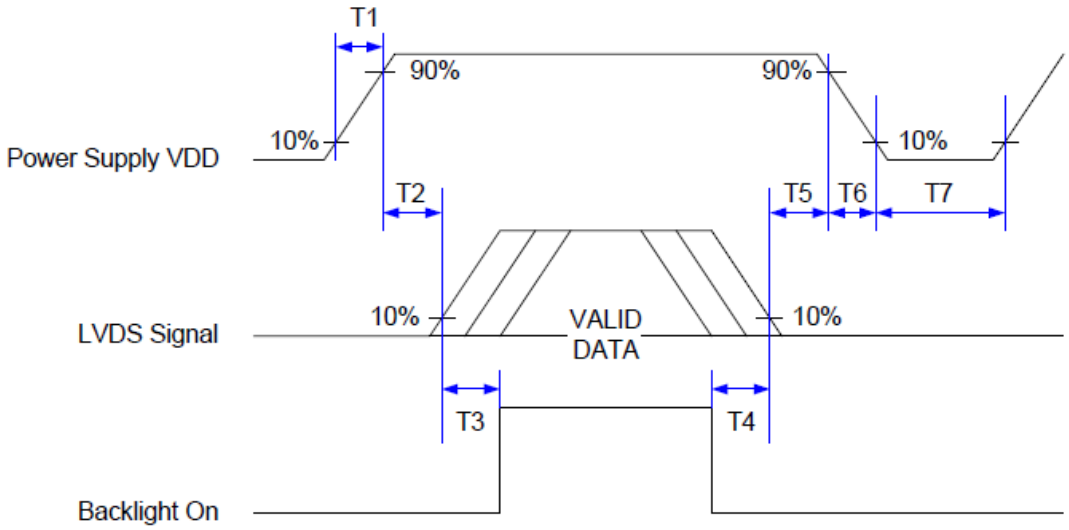
Horizontal Display Timing Range



Vertical Timing



2.6.3 Power ON/OFF Sequence



2.6.3.1 Power ON/OFF Sequence Timing

Table 2.13: Power ON/OFF Sequence Timing				
Symbol	**Value**			**Unit**
	Min.	Typ.	Max.	
T1	0.5	--	20	ms
T2	0	40	50	ms
T3	200	--	--	ms
T4	200	--	--	ms
T5	0	40	50	ms
T6	0	--	20	ms
T7	1000	--	--	ms

Chapter 3

Touch Screen

3.1 Touch Panel Electrical Specification

Table 3.1: Touch Panel Electrical Specification

Parameter	Condition	Standard Value
Terminal Resistance	X Axis	200 ~ 1000
	Y Axis	100 ~ 800
Insulating Resistance	DC 25 V	More than 10M
Linearity	--	1.5%
Notes life by Pen	Note a	100,000 times (min)
Input life by finger	Note b	1,000,000 times (min)

Note! *Notes area for pen notes life test is 10 x 9 mm.*
Size of word is 7.5 x 6.75
Shape of pen end: R0.8
Load: 250 g

Note! *By Silicon rubber tapping at same point*
Shape of rubber end: R8
Load: 200g
Frequency: 5 Hz

Table 3.2: Interface

No.	Symbol	Function
1	Y1	Touch Panel Bottom Signal in Y Axis
2	X1	Touch Panel Left Signal in X Axis
3	Y2	Touch Panel Top Signal in Y Axis
4	X2	Touch Panel Right Signal in X Axis

Chapter 4

Touch Controller

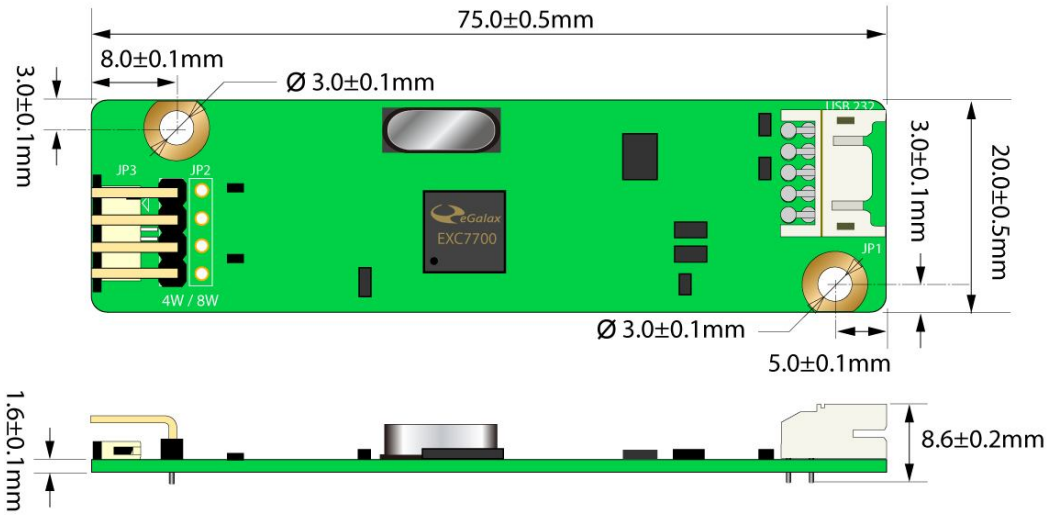
4.1 4-Wire USB & RS232 Touch Panel Controller

eGalax_eMPIA launched touch control board to meet latest Restriction of Hazardous Substances (RoHS) Directive. This touch panel controller provides the optimistic performance of your analog resistive touch panels for 4 wire models. It communicates with PC system directly through USB and RS232 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 function and supports operation systems as following.

Table 4.1: Supported OS

OS	Version	Interfaces
Windows	Windows 7, Vista, XP, 2000, ME, 98 Windows CE (up to 7.0) Windows Embedded Windows XP Tablet PC edition	RS232/USB
Windows	Windows NT4, 95	RS232
Linux	Supports Kernel 2.4.x / 2.6.x / 3.x with XFree86 4.x / xorg (up to X server 1.11.x). Supports most of the Linux distribution 32/64 bit versions, Including:CentOS, Debian, Fedora, Gentoo, Mandrake(Mandriva), Moblin(Meego), Red Hat, Ubuntu, Slackware, SuSE(openSuSE) etc.	RS232/USB
	Android (up to 4.x)	RS232/USB
DOS	DOS 6.22	RS232
Mac	Mac OS9, Mac OS (Power PC, Intel CPU)	USB
QNX	QNX RTOS v6.3	RS232/USB

4.1.1 Controller

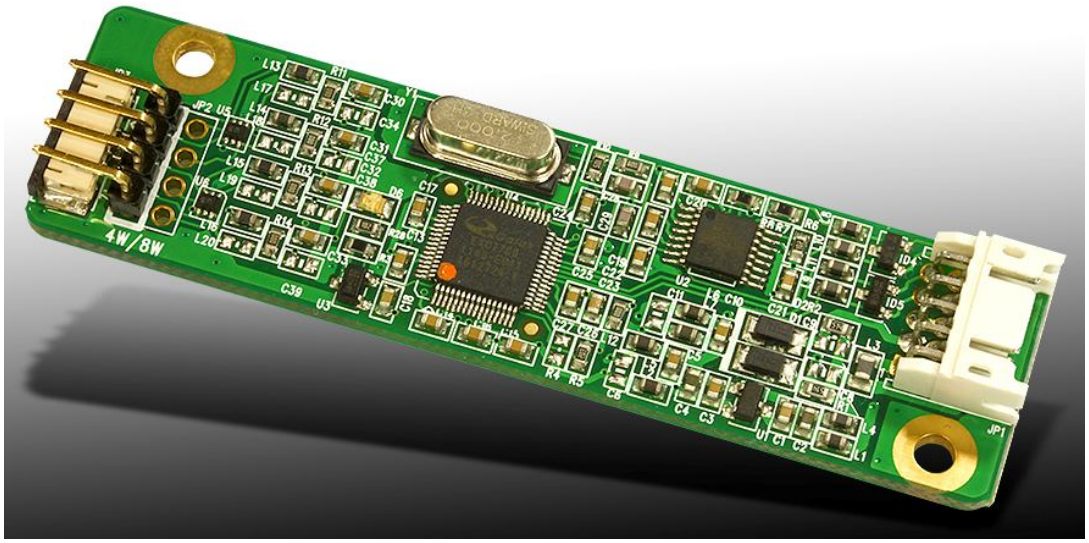


4.1.2 Specifications

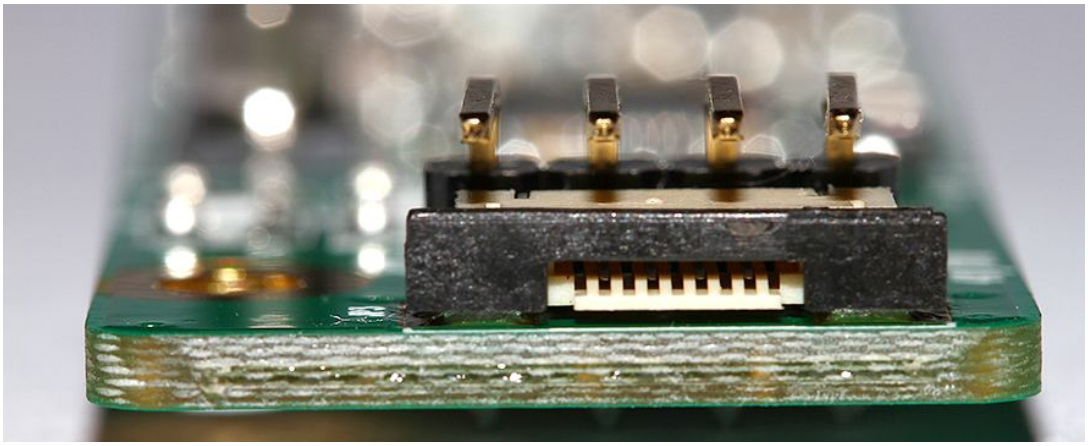
Table 4.2: 4wire Type Controller	
Circuit Board	20mm x 75mm (0.79 inches x 2.95 inches)
Power Requirements	D.C.+5V (100mA typical, 50mV peak to peak maximum ripple and noise)
Operating	-25 to 85°C
Storage Temperature	-25 to 85°C
Relative Humidity	95% at 60°C, RH Non-condensing
Interface	Bi-directional RS-232 serial communication USB: 1.1 Full Speed
Protocol	No parity, 8 data bits, 1 stop bit,9600 baud (N,8,1,9600)
Resolution	2048 2048 resolution
Report rate	RS232: Max. 180 points/sec USB: Max. 200 points/sec
Response time	Max. 20 ms
Attached Cable	RS232: 180cm shielded cable with 9-pin D-sub connector USB: 180cm shielded cable with USB-A connector
Regulatory Approvals	FCC-B, CE
EMI	Unaffected by environmental EMI
Panel resistance	4 wire resistive model: 200 ~ 900 ohm (Pin to pin on same layer, Touch Resistance under 3k ohm)
Green Product	RoHS Compliant
MTBF	200,000 hrs

4.1.3 Product Package

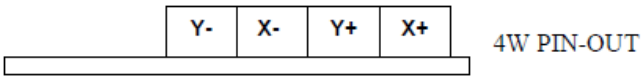
ETP-MB-MER4040CFBG-ADV (4 wire control board)



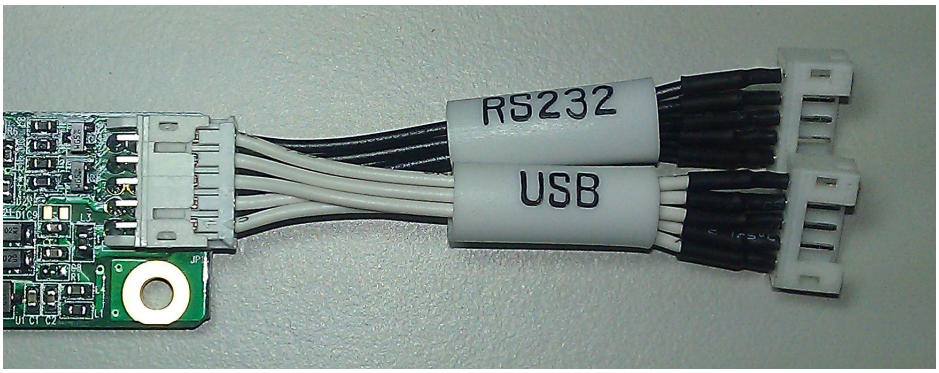
4.1.3.1 Controller Panel Pin Assignment

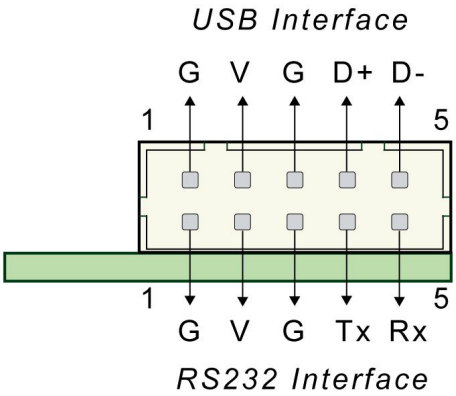


For 4-Wire Resistive Touch Panel

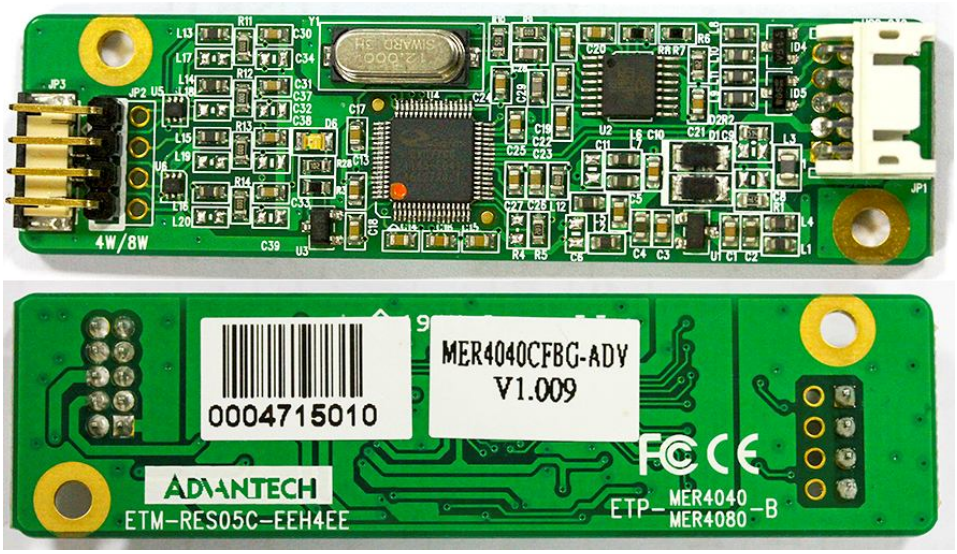


4.1.3.2 Controller Wafer Pin Assignment





4.1.3.3 Advantech logo and shipping label



Appendix A

Safety Precautions

A.1 Handling Precautions

1. The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
2. Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
3. 3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
4. 4) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

A.2 Installing Precautions

1. The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
2. When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
3. To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
4. Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off.

A.3 Storage Precautions

1. Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
2. Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
3. Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

A.4 Operating Precautions

1. Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
2. The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
3. The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.
4. When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
5. Make certain that each signal noise level is within the standard (L level: 0.2Vdd or less and H level: 0.8Vdd or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
6. The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.
7. The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.
8. Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

A.5 Others

1. Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
2. Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.
3. AMIPRE will provide one year warranty for all products and three months warrantee for all repairing products.

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