Model Name: T195XVN01.0 (open cell)

Issue Date : 2014/12/04

( ) Preliminary Specifications
(∗) Final Specifications

Customer Signature	Date	AUO	Date
Approved By _____		Approval By PM Director Kuei Sheng Tseng _____	
Note		Reviewed By RD Director John Lee _____ Reviewed By Project Leader Edward Hu _____	
		Prepared By PM Johnny Chen _____	

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RECORD OF REVISION

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1.0	2014/11/26		First release
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		16	Power Sequence (t8 & t9)

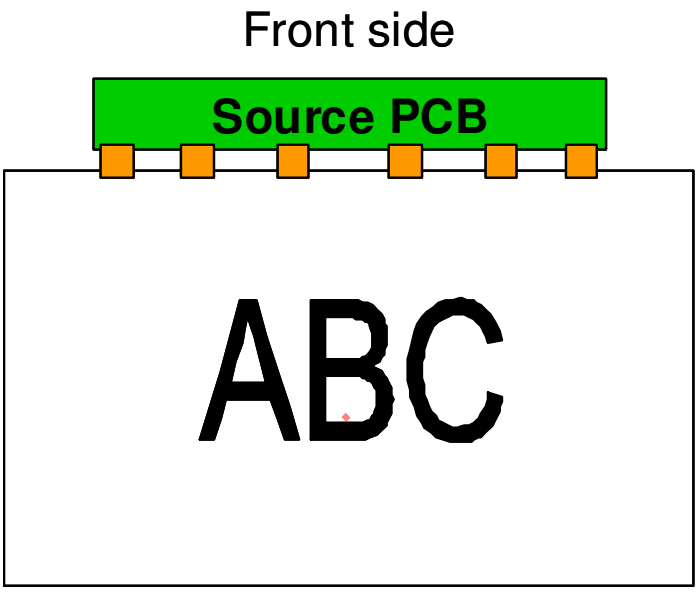
1. General Description

This specification applies to the 19.5 inch Color TFT-LCD SKD model T195XVN01.0. This Open Cell Unit has a TFT active matrix type liquid crystal panel 1,366x768 pixels, and diagonal size of 19.5 inch. This Open Cell Unit supports 1,366x768 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 6-bit+Hi-FRC gray scale signal for each dot.

*** General Information**

Items	Specification	Unit	Note
Active Screen Size	19.5	Inch	
Display Area	433.98 (H) x 235.78 (V)	Mm	
Outline Dimension	440.38 (H) x 244.5 (V)	Mm	
Cell Dimension	440.38 (H) × 291.12 (V) ×1.27 (D)	Mm	D: cell thickness
Driver Element	a-Si TFT active matrix		
Display Colors	6 bit + Hi-FRC, 16.7M	Colors	
Number of Pixels	1,366x768	Pixel	
Pixel Pitch	317.7 (H) x 307 (W)	μm	
Pixel Arrangement	RGB vertical stripe		
Display Operation Mode	Normally Black		
Surface Treatment	Anti-Glare, 3H		Haze=2%
Transmittance (with Polarizer)	4.45	%	Typical value
Weight	335	g	Typical value
Display Orientation	Signal input with “ABC”		Note 1

Note 1: LCD display as below illustrated when signal input with “ABC”.



2. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	V_{DD}	-0.3	6	[Volt] $_{DC}$	Note 1
Input Voltage of Signal	Vin	-0.3	4	[Volt]$_{DC}$	Note 1
Operating Temperature	TOP	0	+50	[°C]	Note 2
Operating Humidity	HOP	10	90	[%RH]	Note 2
Storage Temperature	TST	-20	+60	[°C]	Note 2
Storage Humidity	HST	10	90	[%RH]	Note 2
Panel Surface Temperature	PST		65	[°C]	Note 3
Electro Statistic Voltage	ESD		±2	[KV]	Note 4

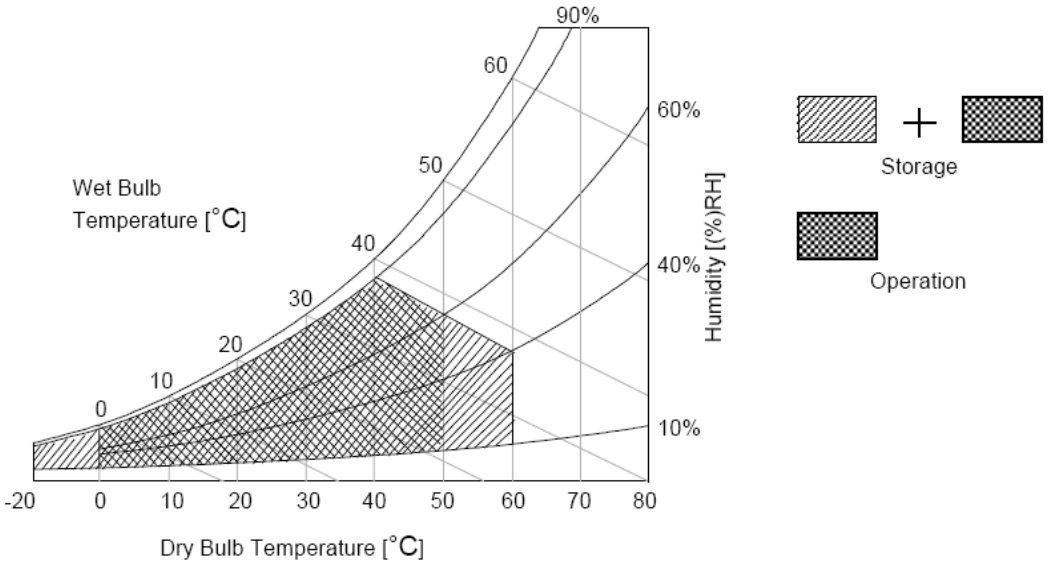
Note 1: Duration:50 msec.

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.

The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3: Surface temperature is measured at 50℃ Dry condition

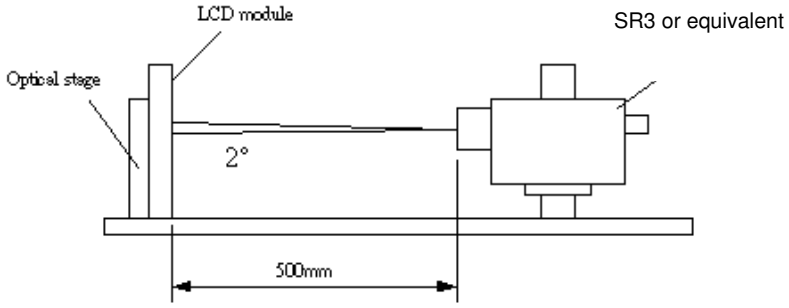
Note 4: ESD protection procedure must be applied during production process; especially polarizer protection films remove process. Please directly contact AUO if module process advice is required.



3. Optical Specification

Optical characteristics are determined after the open cell unit and light source has been 'ON' and stable for approximately 45 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of φ and θ equal to 0°.

FIG.1 presents additional information concerning the measurement equipment and method.



Parameter		Symbol	Condition	Values			Unit	Notes
				Min.	Typ.	Max		
Contrast Ratio		CR	SR3, TRD-100	2400	3000	--		1, 2
Response Time		$T_{\gamma}+T_F$		--	12	16	ms	3
Center Transmittance		T%			4.45		%	1
Color Chromaticity			With SR3 Standard light source "C"					4
	Red	R_X		Typ.-0.03	0.660	Typ.+0.03		
		R_Y			0.323			
	Green	G_X			0.273			
		G_Y			0.593			
	Blue	B_X			0.139			
		B_Y			0.098			
	White	W_X			0.293			
		W_Y			0.337			
Viewing Angle			SR3					1, 5
	x axis, right(φ=0°)	θ_r		--	89	--	degree	
	x axis, left(φ=180°)	θ_l		--	89	--	degree	
	y axis, up(φ=90°)	θ_u		--	89	--	degree	
	y axis, down (φ=270°)	θ_d		--	89	--	degree	

Note :

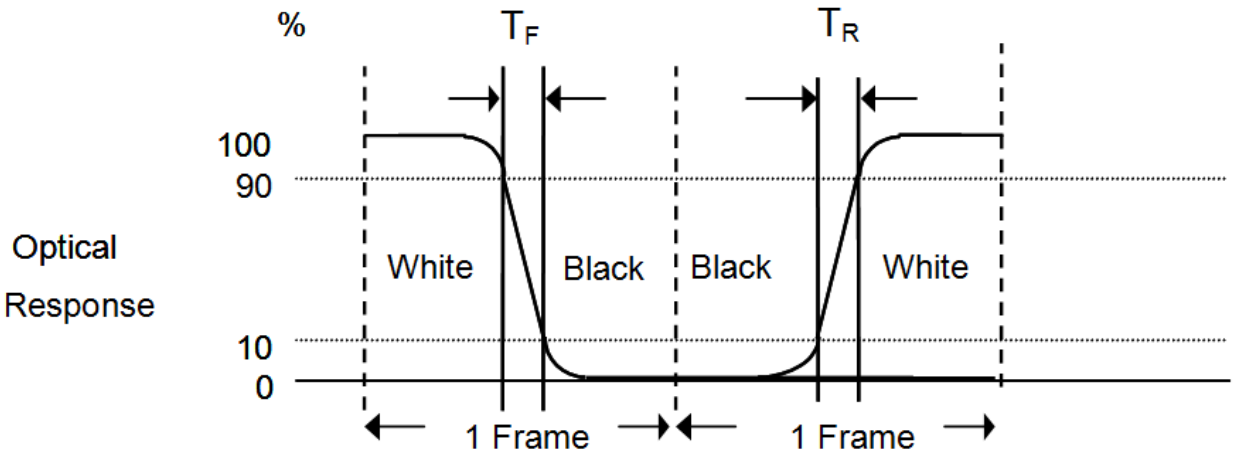
1. Light source here is the BLU of AUO T195XVN01.0 module.
2. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance of } L_{on5}}{\text{Surface Luminance of } L_{off5}}$$

3. Response time measurement

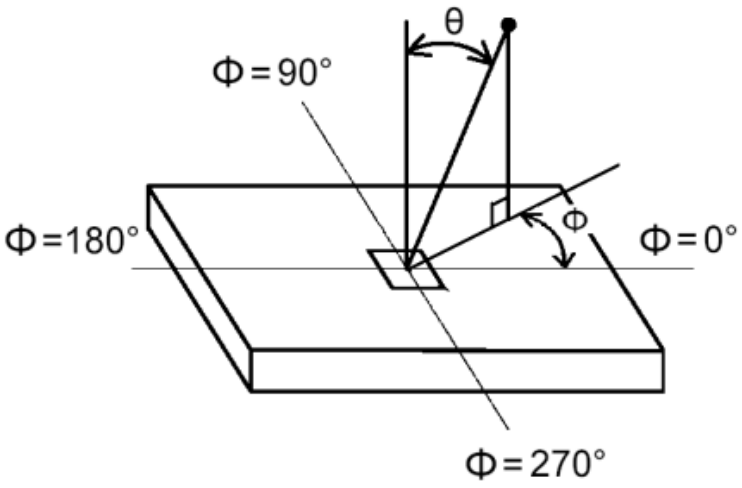
The output signals of photo detector are measured when the input signals are changed from "Black" to "White" (rising time, TR), and from "White" to "Black" (falling time, TF), respectively. The response time is interval between the 10% and 90% of optical response. (Black & White color definition: Please refer section 4.4)

FIG.3 Response Time



4. Light source here is the standard light source “C” which is defined by CIE and driving voltages are based on suitable gamma voltages. The calculating method is as following：
   A. Measure the “Module” and “BLU” optical spectrums (W, R, G, B).
   B. Calculate cell spectrum from “Module” and “BLU” spectrums.
   C. Calculate color chromaticity by using cell spectrum and the spectrum of standard light source “C”.
5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG4.

FIG.4 Viewing Angle



4. Interface Specification

4.1 Input power

The T195XVN01.0 Open Cell Unit requires power input which is employed to power the LCD electronics and to drive the TFT array and liquid crystal.

Item		Symbol	Min.	Typ.	Max	Unit	Note
Power Supply Input Voltage		V_{DD}	4.5	5	5.5	V	1
Power Supply Input Current	Black pattern	I_{DD}	-	0.4	0.5	A	2
	White pattern		-	0.5	0.6	A	
	H-strip pattern		-	0.5	0.6	A	
Power Consumption	Black pattern	P_C	-	2	2.5	Watt	
	White pattern		-	2.5	3	Watt	
	H-strip pattern		-	2.5	3	Watt	
Inrush Current		I_{RUSH}	--	--	3	A	3

Note1. The ripple voltage should be fewer than 5% of VDD.

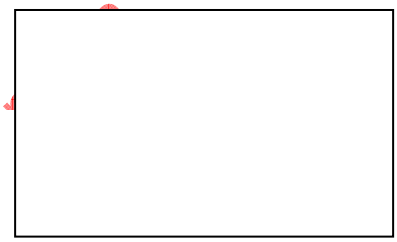
Note2. Test Condition:

(1) V_{DD} = 5.0V, (2) Fv = 60Hz, (3) Fclk= 77.9MHz, (4) Temperature = 25 ℃

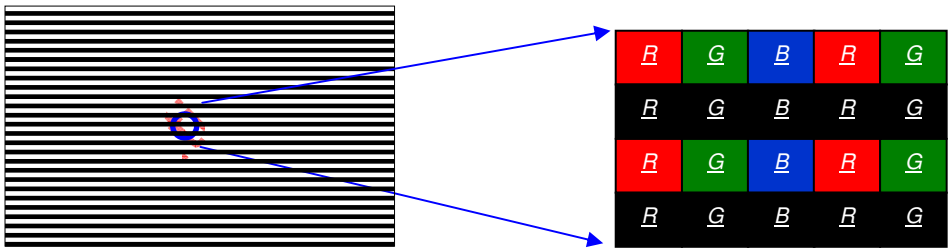
(5) Power dissipation check pattern. (Only for power design)

a. Black pattern

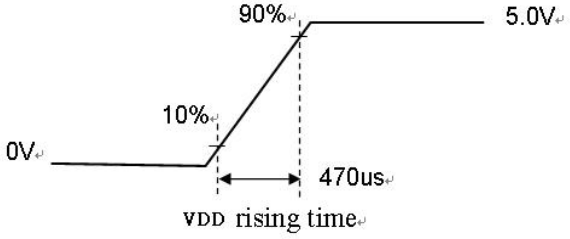
b. White pattern



c. H-Strip pattern



Note3. Measurement condition : Rising time = 470us

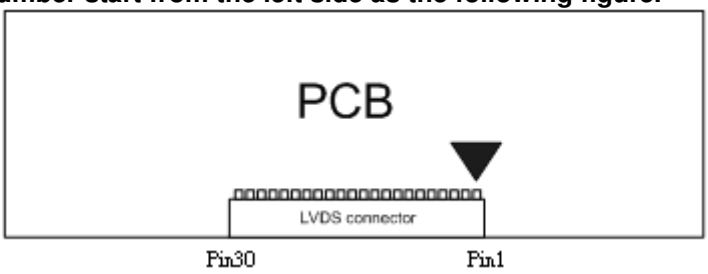


4.2 Input Connection

TFT-LCD Connector	Manufacturer	P-TWO	STM
	Part Number	AL230F-A0G1D-P	MSCKT2407P30HB
Mating Connector	Manufacturer	JAE or Compatible	
	Part Number	FI-X30HL (Locked Type) or Compatible	

PIN #	Symbol	Description	Remark
1	NC	No connection	
2	NC	No connection	
3	NC	No connection	
4	NC	No connection	
5	NC	No connection	
6	NC	No connection	
7	GND	Ground	
8	NC	No connection	
9	NC	No connection	
10	NC	No connection	
11	NC	No connection	
12	RxIN0-	Negative LVDS differential data input	
13	RxIN0+	Positive LVDS differential data input	
14	GND	Ground	
15	RxIN1-	Negative LVDS differential data input	
16	RxIN1+	Positive LVDS differential data input	
17	GND	Ground	
18	RxIN2-	Negative LVDS differential data input	
19	RxIN2+	Positive LVDS differential data input	
20	RxCLKIN-	Negative LVDS differential clock input	
21	RxCLKIN+	Positive LVDS differential clock input	
22	RxIN3-	Negative LVDS differential data input	
23	RxIN3+	Positive LVDS differential data input	
24	DG_WP	WP(DVCOM)	Note5: WP
25	NC	No connection (For AUO use only. Do not connect)	Note2
26	SCL_VCOM	SCL_VCOM	Note4 : SCL/SDA
27	SDA_VCOM	SDA_VCOM	Note4 : SCL/SDA
28	VDD	Power Supply Input Voltage	
29	VDD	Power Supply Input Voltage	
30	VDD	Power Supply Input Voltage	

Note1. Pin number start from the left side as the following figure.



Note2. Please leave this pin unoccupied. It can not be connected by any signal (Low/GND/High).

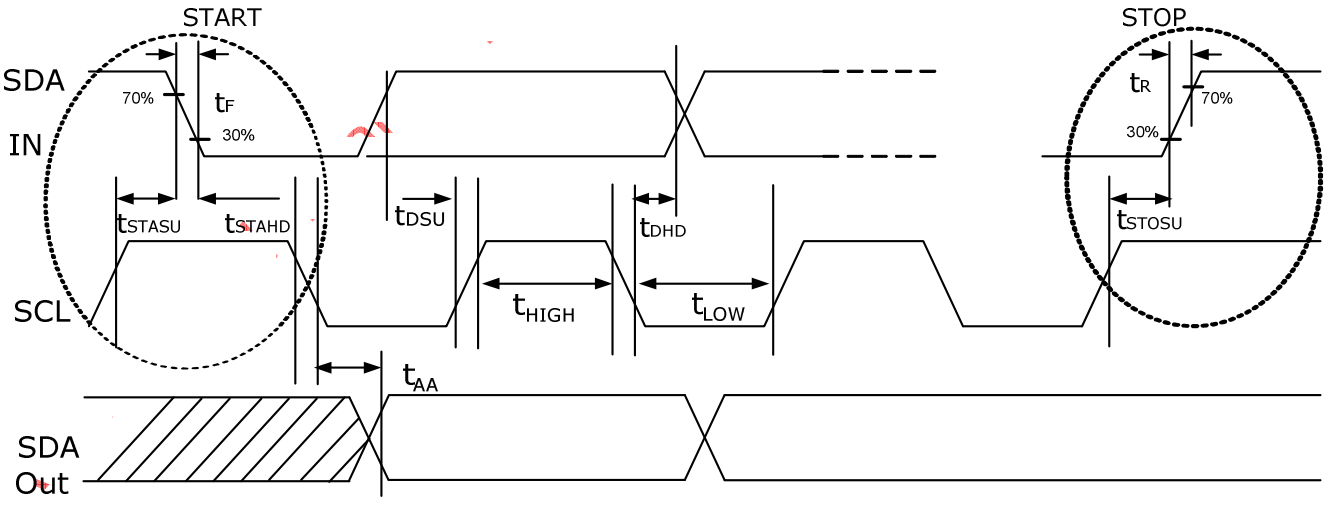
Note3. Input control signal threshold voltage definition

Item	Symbol	Min.	Typ.	Max.	Unit
Input High Threshold Voltage	VIH	3.0	-	3.3	V
Input Low Threshold Voltage	VIL	0	-	0.8	V

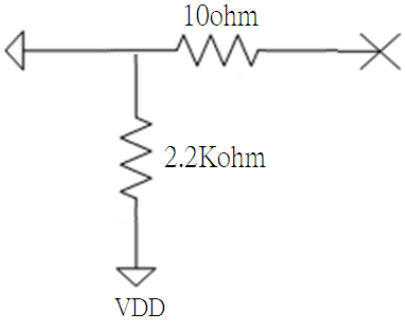
Note4. I2C Data and Clock

I2C Data and Clock timing

Parameter		Symbol	Min.	Typ.	Max	Unit
I2C	SCL clock frequency	fSCL		-	400	kHz
	Clock Pulse Width Low	tLOW	1.3	-	-	us
	Clock Pulse Width High	tHIGH	0.6	-	-	us
	Clock Low to Data Output Valid	tAA	0	-	0.9	us
	Start Setup Time	tSTASU	0.6	-	-	us
	Start Hold Time	tSTAHD	0.6	-	-	us
	Stop Setup Time	tSTOSU	0.6	-	-	us
	Data In Setup Time	tDSU	0.1	-	-	us
	Data In Hold Time	tDHD	0	-	0.9	us
	SCL/SDA Rise Time	tR	-	-	0.3	us
	SCL/SDA Fall Time	tF	-	-	0.3	us



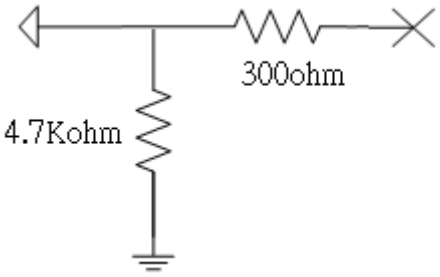
Input equivalent impedance of SDA/SCL pin



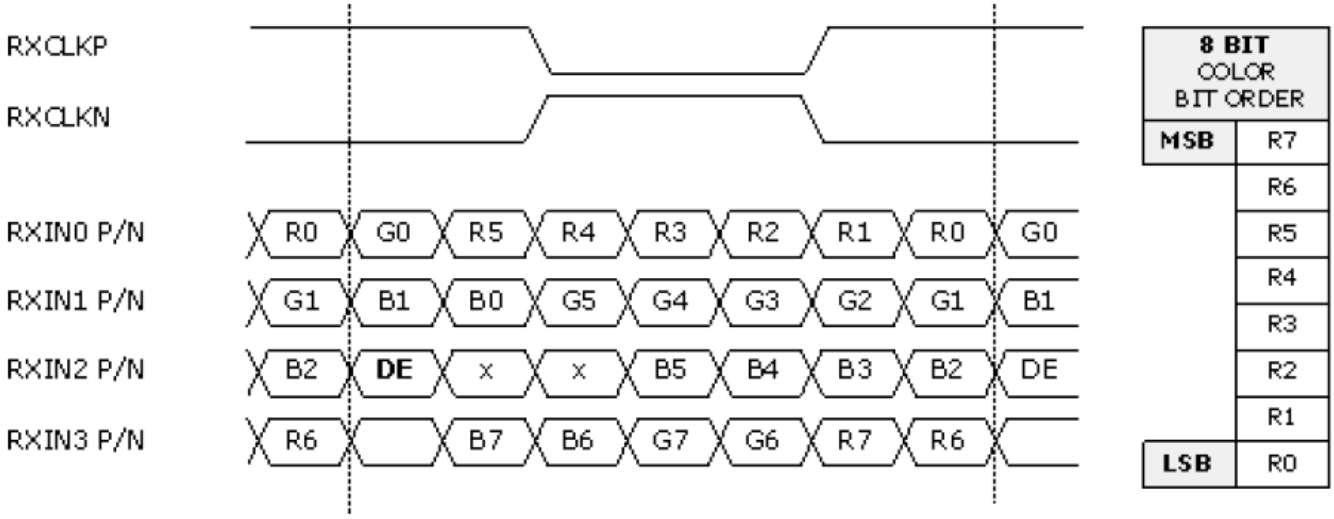
Note5. Write Protection
Mode selection

WP	Note
L or OPEN	Protection
H	Writable

Input equivalent impedance of WP pin



4.3 Input Data Format



LVDS Data Mapping of NS Format

4.4 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 6-bit + Hi-FRC gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR DATA REFERENCE

Color		Input Color Data																							
		RED								GREEN								BLUE							
		MSB							LSB	MSB							LSB	MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
R	RED(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0			1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
B	BLUE(000)	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(001)	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	BLUE(254)	0	0	0	0			0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0			0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

5. Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

Timing Table (DE only Mode)

Signal	Item	Symbol	Min.	Typ.	Max	Unit
Vertical Section	Period	Tv	782	808	1364	Th
	Active	Tdisp (v)		768		Th
	Blanking	Tblk (v)	14	40	596	Th
Horizontal Section	Period	Th	1406	1606	2047	Tclk
	Active	Tdisp (h)		1366		Tclk
	Blanking	Tblk (h)	40	240	681	Tclk
Clock	Frequency	Fclk=1/Tclk	53.9	77.9	94	MHz
Vertical Frequency	Frequency	Fv	49	60	76	Hz
Horizontal Frequency	Frequency	Fh	38	49	67	KHz

Notes:

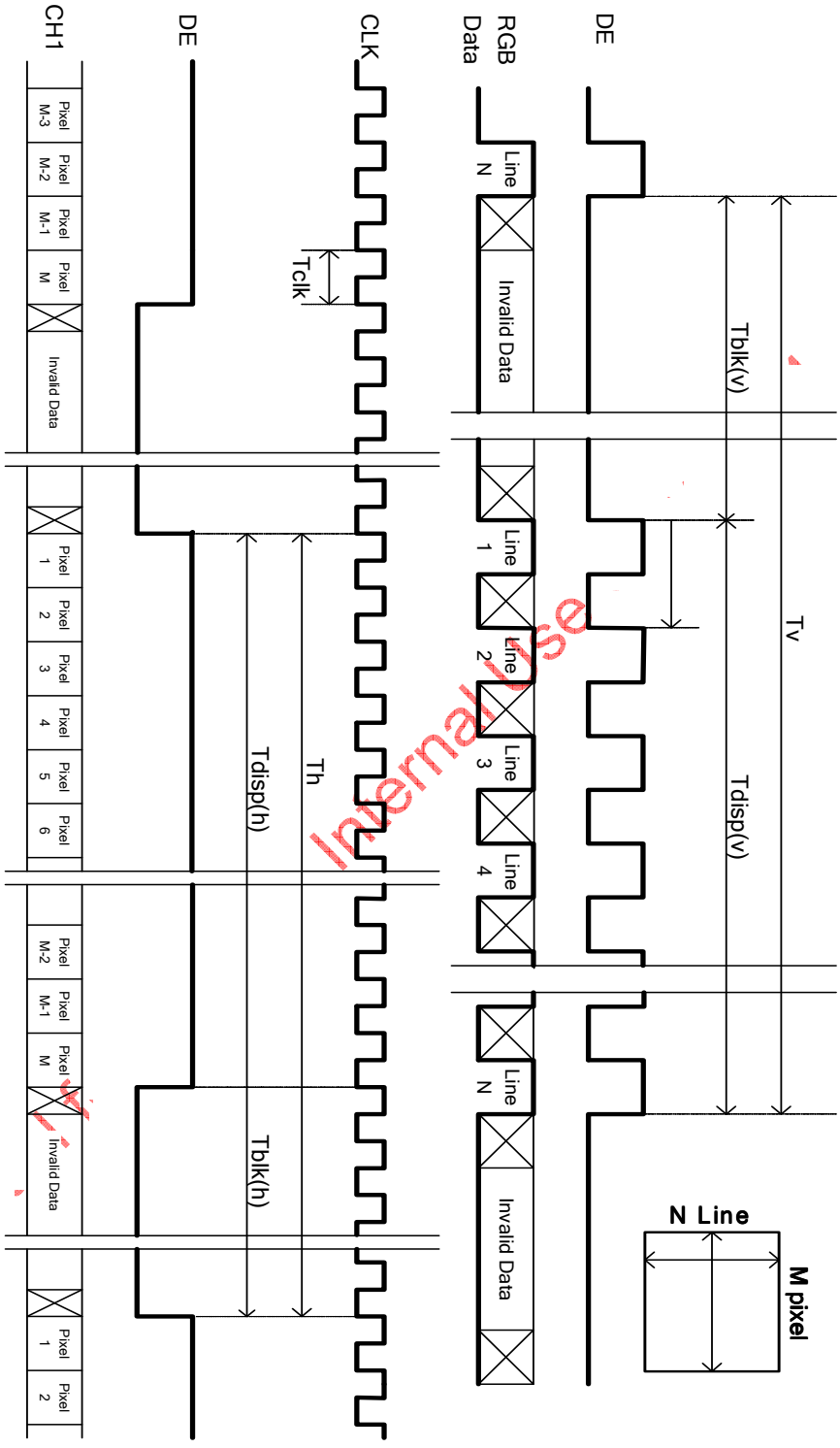
(1) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.

(2)Vertical display position is specified by the rise of DE after a “Low” level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise of 1st DE is displayed at the top line of screen.

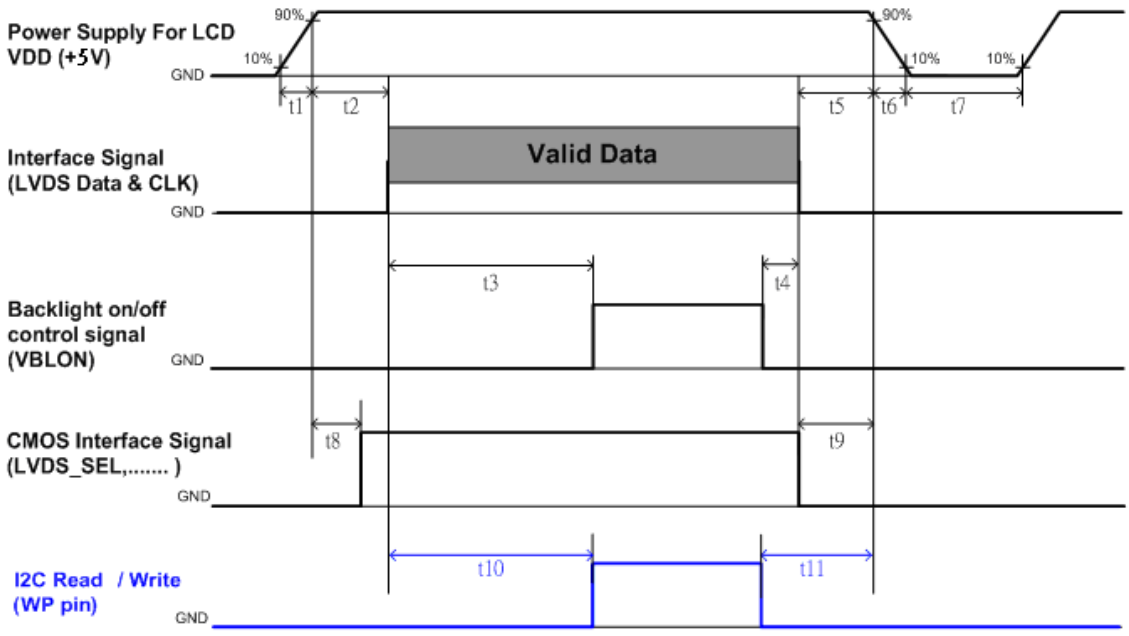
(3)If a period of DE “High” is less than 1366 DCLK or less than 768 lines, the rest of the screen displays black.

(4)The display position does not fit to the screen if a period of DE “High” and the effective data period do not synchronize with each other.

5.1 Signal Timing Waveforms



5.2 Power Sequence for LCD



Parameter	Values			Unit
	Min.	Type.	Max.	
t1	0.5	-	10	ms
t2	0	-	50	ms
t3	500	-	-	ms
t4	100	-	-	ms
t5	0		50	ms
t6	-	-	-	ms
t7	1000	-	-	ms
t8	10	-	50	ms
t9	0	-	-	ms
t10	1000	-	-	ms
t11	500	-	-	ms

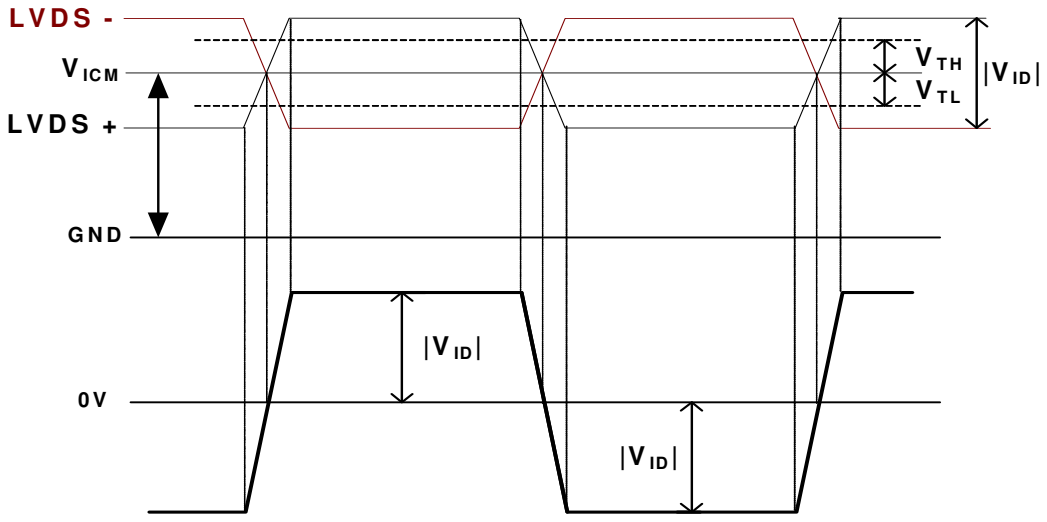
Note:
(1) Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.
(2) During T5 and T6 period, please keep the level of input LVDS signals with Hi-Z state.

5.3 Input interface characteristics

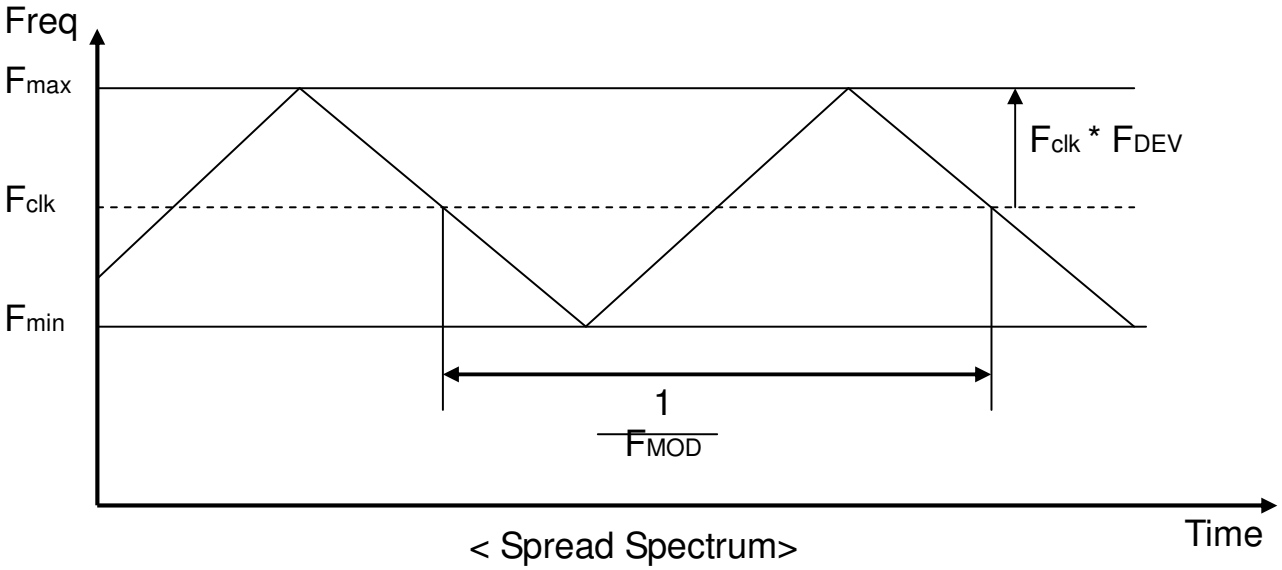
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
LVDS Interface	Input Differential Voltage	$\lvert V_{ID} \rvert$	100	-	600	mV_{DC}	1
	Differential Input High Threshold Voltage	V_{TH}	-	-	+100	mV_{DC}	1
	Differential Input Low Threshold Voltage	V_{TL}	-100	-	-	mV_{DC}	1
	Input Common Mode Voltage	V_{ICM}	+1.0	+1.2	+1.5	V_{DC}	1
	Receiver Clock : Spread Spectrum Modulation range	F_{DEV}	Fclk -3%	--	Fclk +3%	MHz	2
	Receiver Clock : Spread Spectrum Modulation frequency	F_{MOD}	--	--	200	KHz	2
	Receiver Data Input Margin Fclk =94 MHz Fclk = 77.9 MHz	tRMG	 -0.4 -0.5	 -- --	 0.4 0.5	ns	3
CMOS Interface	Input High Threshold Voltage	V_{IH} (High)	3.0	--	3.3	V_{DC}	4
	Input Low Threshold Voltage	V_{IL} (Low)	0	--	0.8	V_{DC}	4

Note :

1. V_{ICM} = 1.2V



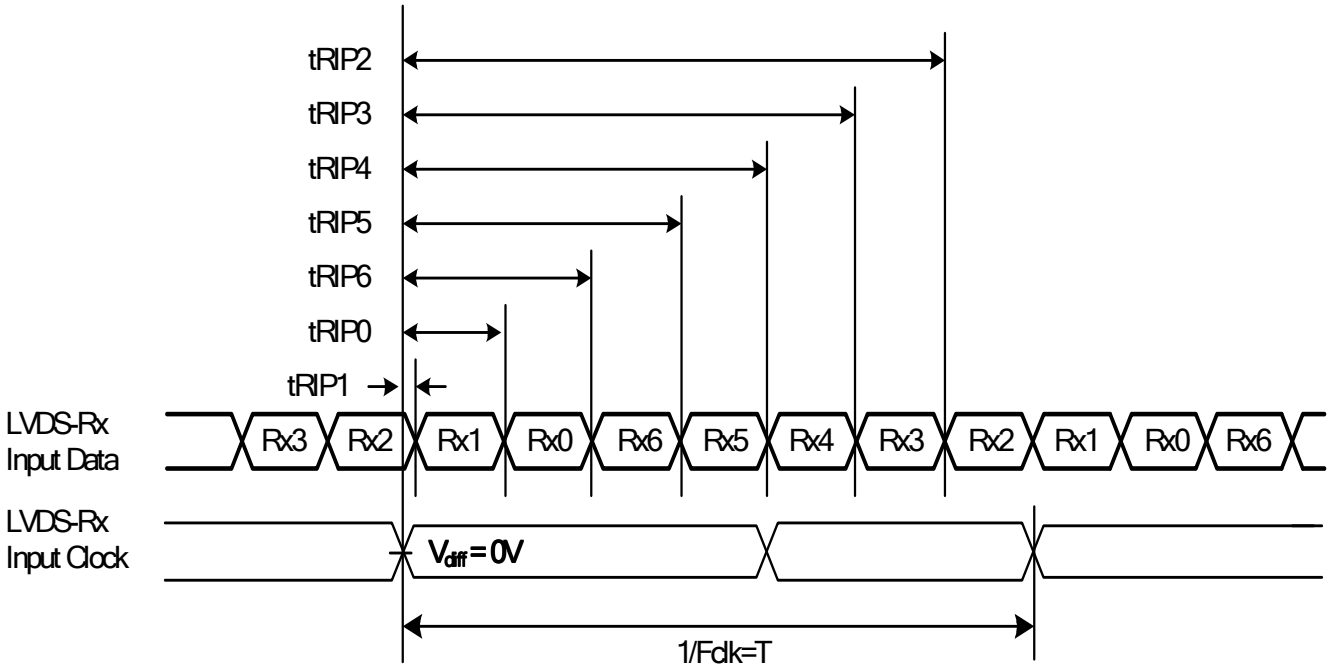
2. LVDS Receiver Clock SSCG (Spread spectrum clock generator) is defined as below figures.



< Spread Spectrum>

3. Receiver Data Input Margin

Parameter	Symbol	Rating			Unit	Note
		Min	Type	Max		
Input Clock Frequency	Fclk	Fclk (min)	--	Fclk (max)	MHz	**T=1/Fclk**
Input Data Position0	tRIP1	-|tRMG|	0	|tRMG|	ns	
Input Data Position1	tRIP0	T/7-|tRMG|	T/7	T/7+|tRMG|	ns	
Input Data Position2	tRIP6	2T/7-|tRMG|	2T/7	2T/7+|tRMG|	ns	
Input Data Position3	tRIP5	3T/7-|tRMG|	3T/7	3T/7+|tRMG|	ns	
Input Data Position4	tRIP4	4T/7-|tRMG|	4T/7	4T/7+|tRMG|	ns	
Input Data Position5	tRIP3	5T/7-|tRMG|	5T/7	5T/7+|tRMG|	ns	
Input Data Position6	tRIP2	6T/7-|tRMG|	6T/7	6T/7+|tRMG|	ns	

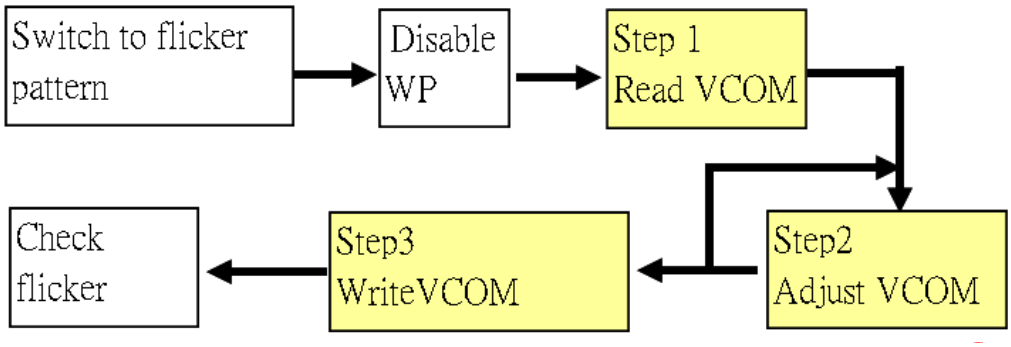


4. The measure points of V_{IH} and V are in LCM side after connecting the System Board and LCM.

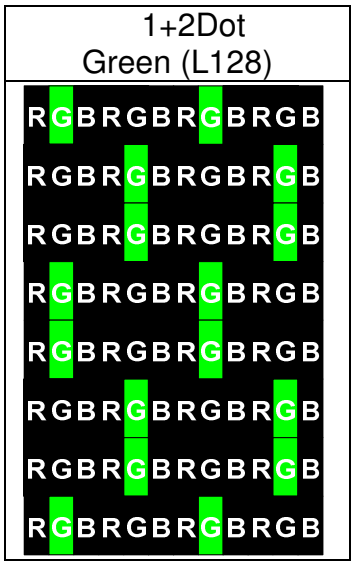
5.4 VCOM Adjust SOP

If you need below pattern or more detail information, please directly contact AUO for engineer service.

5.4.1 VCOM I2C Tuning Step



5.4.2 Flicker Pattern



5.4.3 WP (Write Protect) Disable

Disable	Enable	Default (NC)
L	H	L

5.4.4 Adjust SOP

For DVCOM

Step1 Read VCOM

Start	Slave Address							W R	ACK	DVCOM								ACK	Stop
	1	0	0	1	1	1	1	1		X	X	X	X	X	X	X	NA		
	0x9F									0~127									
	Device Address + R									VCOM Value									

Step2 Adjust VCOM

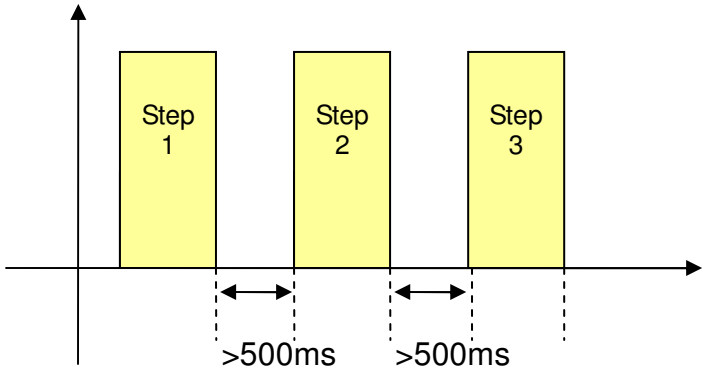
Start	Slave Address							W R	ACK	DVCOM								ACK	Stop
	1	0	0	1	1	1	1	0		X	X	X	X	X	X	X	1		
	0x9E									0~127									
	Device Address + W									VCOM Value									

Step3 Write VCOM

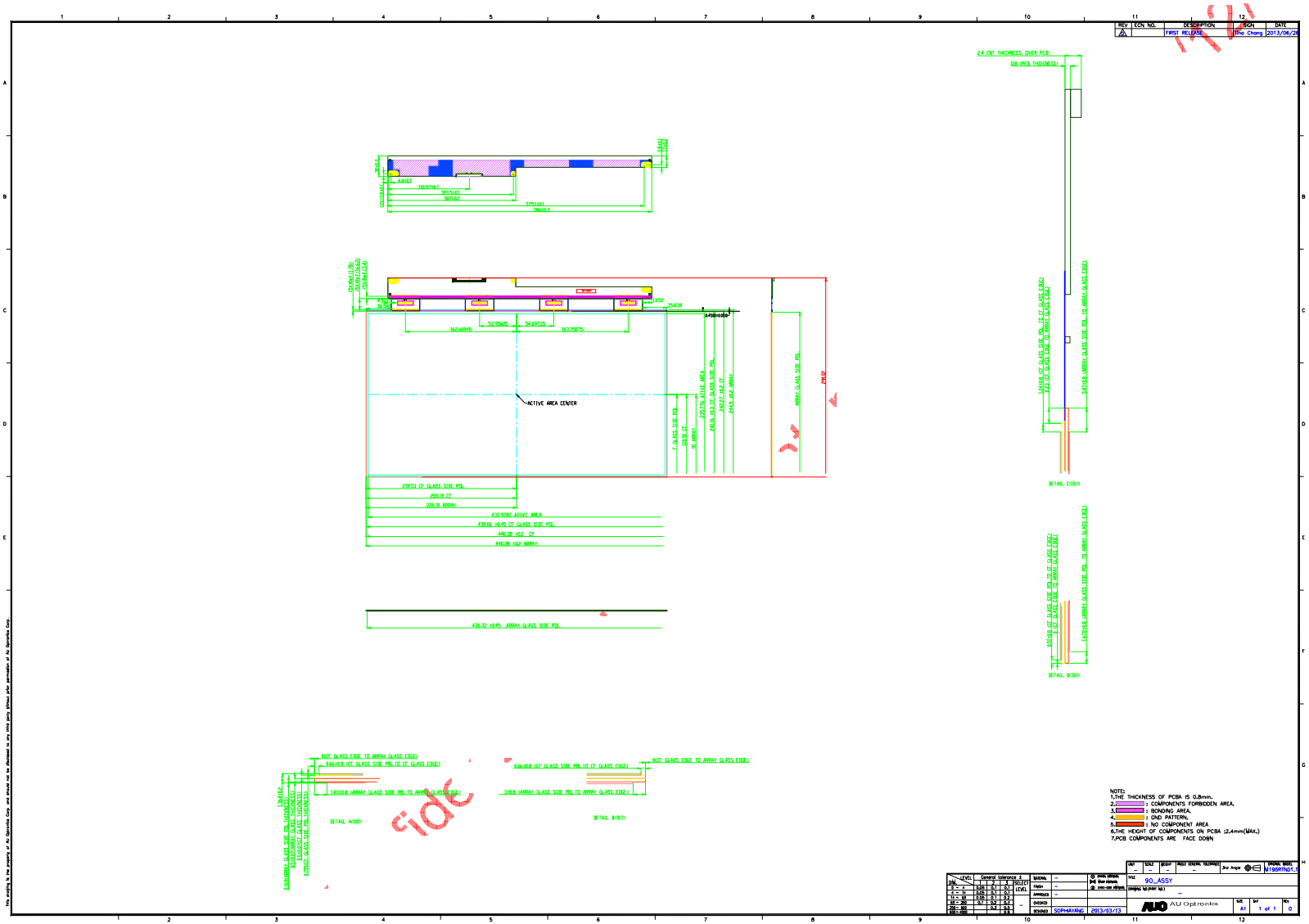
Start	Slave Address							W R	ACK	DVCOM								ACK	Stop
	1	0	0	1	1	1	1	0		X	X	X	X	X	X	X	0		
	0x9E									0~127									
	Device Address + W									VCOM Value									

5.4.5 Interval of Step to Step

Step to step interval must follow below figure



6. Mechanical Characteristics



7. Packing

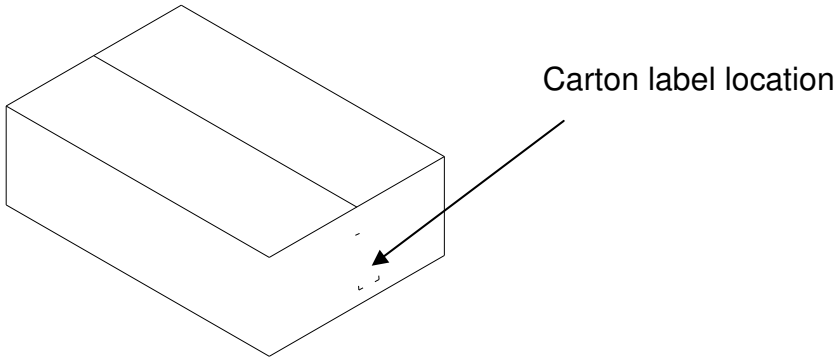
Open cell shipping label (35*7mm)

XXXXXXXXXXXX – XXXXXX – XXXX – XXXXXXXXXXX

1 2 3 4

1. S/N Number
2. AUO internal use
3. Manufactured week
4. Model name

Carton Label:



8. Precautions

Please pay attention to the followings when you use this TFT LCD Open Cell unit and strongly recommended to contact AUO if module process advice is required.

8.1 Storage

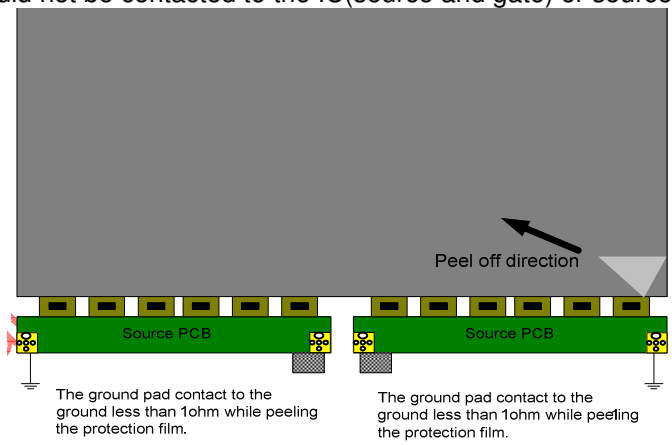
When storing open cell units, the following precautions are necessary.

(a) Store them in a dark place. Do not expose the open cell unit to sunlight or fluorescent light.
(b) Store them at the advised storage temperature between 5 ℃ and 35 ℃ at normal humidity(35%rH~75%rH).
(c) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.
(d) Be careful of condensation. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

8.2 Module Assembly

8.2.1 Protection film peeling

(a) The protection films of polarizer had attached on the both sides of open cell polarizer surfaces. Handlers should peel them off with care. While the protection film is being peeled off, static electricity is easily generated on the polarizer surface. Please follow the instructions listed below to reduce ESD failure risk.
(b) People who handle the unit should wear antistatic wristbands on hands. The band should be connected to the common ground with a current limiting resistor which is most commonly one megohm, rated at least 1/4 watt with a working voltage rating of 250 volts.
(c) Connect the grounded pads on source PCB to ground with less than 1 ohm resistance as below figure.
(d) The peeling direction is recommended in below figure.
(e) During peeling off process, ionized air should continuously & stably be blown on the surfaces of protection film and polarizer. The flow rate of ionized air should be monitored periodically.
(f) It is recommended to peel protection films off as slowly as possible. (constant speed more than 8 seconds per film.)
(g) The protection film should not be contacted to the IC(source and gate) or source PCB.



8.2.2 Assembly Precautions

(a) Remove the stains with finger-stalls wearing soft gloves in order to keep the display clean in the process of the incoming inspection and the assembly process. When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(b) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer with bare hands or greasy clothes. (Some cosmetics are detrimental to the polarizer.)
(c) Use the tray to transport open cell can prevent open cell broken and electrical components damage.
(d) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the cell. And the frame on which a cell is mounted should have sufficient strength so that external force is not transmitted directly to the cell
(e) Be careful not to give any extra mechanical stress to the panel when designing the set, and BLU kit.
(f) Do not use cover case which made of acetic acid type and chlorine type materials because acetic acid type materials generates corrosive gas which will damage the polarizer at high temperature and chlorine type materials causes circuit break by electro-chemical reaction.

(g) When the panel kit and BLU kit are assembled, the panel kit and BLU kit should be attached to the set system firmly by combining each mounted holes. Be careful not to give the mechanical stress. Electrostatic discharge may easily damage the electronic circuits on the open cell unit. Make certain that treatment persons are grounded, (ex: anti-static wristband or etc) and don't touch interface pin directly.

8.2.3 FFC & PCB Precautions

(a) Refrain from applying any forces to the source PCB and the drive IC in the process of the handling or installing to the set. If any forces are applied to the product, it may cause damage or a malfunction in the panel kit.
(b) Do not pull, fold or bend the source COF and the gate COF in any processes.
(c) This panel has its circuitry of PCB's on the rear side, so it should be handled carefully in order for a force not to be applied.
(d) Do not touch the pins of the interface connector directly with bare hands.
(e) The connector is a precision device to connect PCB and transmit electrical signals. Operators should plug/un-plug the connector in parallel way during module assembly.
(f) The cables between TV SET connector and Control PCB interface cable should be connected directly to have a minimized length. A longer cable between TV SET connector and Control PCB interface cable maybe operate abnormal display.

8.2.4 Flicker adjust

In order to prevent potential problems, flicker should be adjusted by optimizing the Vcom value in customer LCM Line through the I2C Interface. Detail settings please refer to appendix section.

8.3 Aging

Be sure to age for over 1 hour at least, which the product is driving initially to stabilize TFT Characteristic.

8.4 Operating Precautions

(a) Be cautious not to give any strong mechanical shock or any forces to the panel kit. Applying any forces to the panel may cause the abnormal operation or the damage to the panel kit and the back light unit kit.
(b) Avoid the condensation of water which may result in the improper operation of product or the disconnection of electrode.
(c) It is recommended to operate the LCD product under the normal conditions as below:
- VDD=5V
- Temperature=25±10℃
- Display pattern : continually changing pattern
(d) Response time depends on the temperature. (In lower temperature, it becomes longer)
(e) If the product will be used under extreme conditions such as under high temperature, humidity, display patterns or the operation time etc.., it is strongly recommended to contact AUO for the advice about the application of engineering. Otherwise, its reliability and the function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, banks, stock markets, and controlling systems.

8.5 Others

(a) Module designer should apply adequate thermal solutions to keep the electrical components surface temperature under control limit (ex: Source Driver IC 85℃, Components on T-con PCB 75℃) Operations over the temperature can cause damages or decrease of lifetime.
(b) Protect the TFT LCD open cell unit out of the static electricity in all process. Otherwise the circuit IC could be damaged.

Reference: The environment ESD control standard of AUO

Item	Control standard
ESD	All environment ESD controlled under 200V
Ground resistance	All equipment ground should be less than 1ohm.

(c) Note that polarizer could be damaged easily. Do not press or scratch the bare surface with the material which is harder than a HB pencil lead.
(d) Wipe off water droplets or oil immediately. If you leave the droplets for a long time on the product, the stain or the discoloration may occur.
(e) If the surface of the polarizer is dirty, clean it using the absorbent cotton or the soft cloth.
(f) If the liquid crystal material leaks from the panel, this should be kept away from the eyes or mouth. If this

contacts to hands, legs, or clothes, you must washed it away with soap thoroughly and see a doctor for the medical examination.

(g) The module has high frequency circuits. The sufficient suppression to the electromagnetic interference should be done by the system manufacturers. The grounding and shielding methods is important to minimize the interference. The sufficient suppression to the EMI should be done by the set manufacturers.

