Model Name: T195XVN01.0

Issue Date : 2014/11/21

(＊)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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0.1	2014/10/01		First release
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		9	Note2 (Fclk)
		10	Pin Note

1. General Description

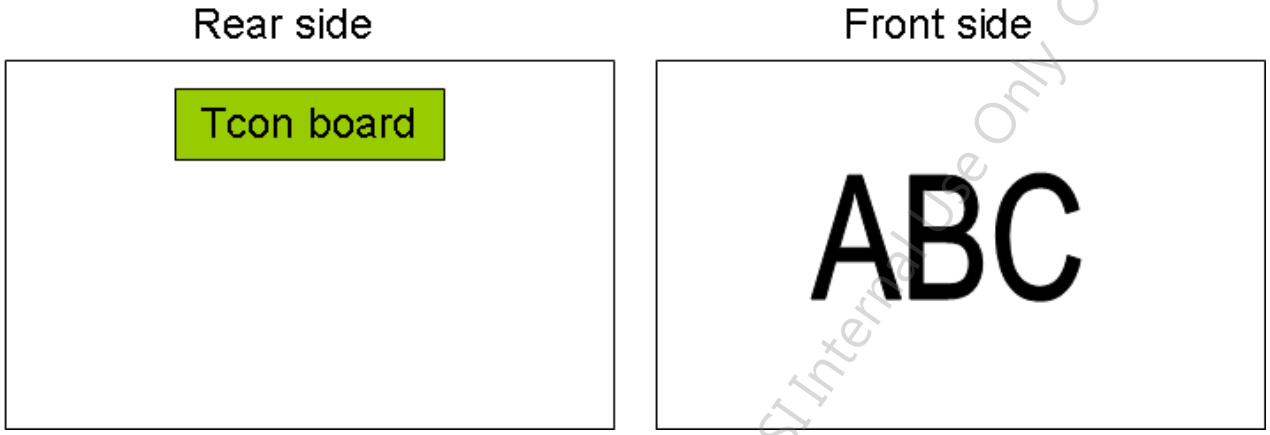
This specification applies to the 19.5 inch Color TFT-LCD Module T195XVN01.0. This LCD module has a TFT active matrix type liquid crystal panel 1,366x768 pixels, and diagonal size of 19.5 inch. This module supports 1,366x768 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which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

The T195XVN01.0 has been designed to apply the 1 channel LVDS interface method and doesn't contain a driver board for backlight.

*** General Information**

Items	Specification	Unit	Note
Active Screen Size	19.5	Inch	
Display Area	433.98 (H) x 235.78 (V)	Mm	
Outline Dimension	452 (H) x 263 (V) x 10.5 (D)	Mm	D: front bezel to T-con cover
Driver Element	a-Si TFT active matrix		
Bezel Opening	437.2X 239.6	mm	
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%
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

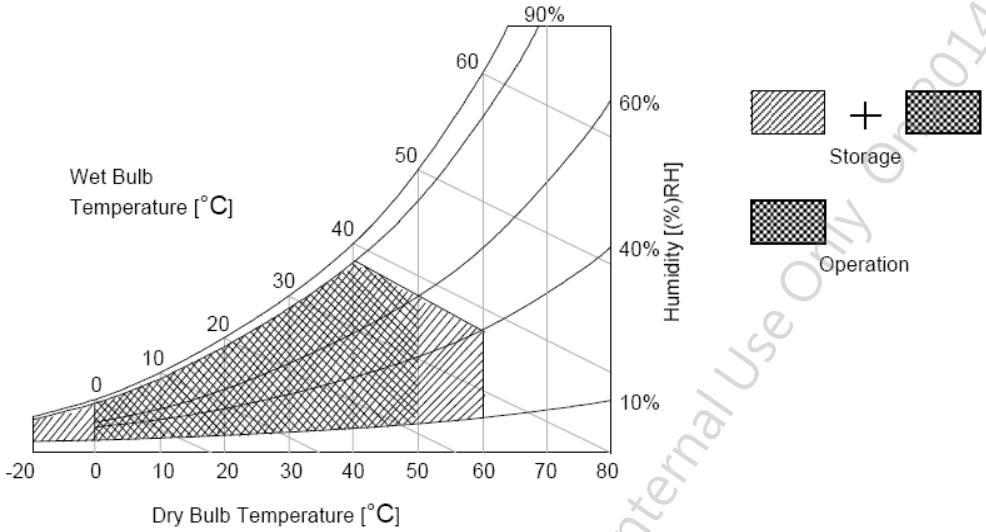
Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	V_{DD}	-0.3	6	[Volt] $_{DC}$	Note 1
Input Voltage of Signal	Vin	-0.3	4	[Volt]$_{DC}$	Note 1
Operating Temperature	TOP	0	+50	[°C]	Note 2
Operating Humidity	HOP	10	90	[%RH]	Note 2
Storage Temperature	TST	-20	+60	[°C]	Note 2
Storage Humidity	HST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

Note 1: Duration:50 msec.

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

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

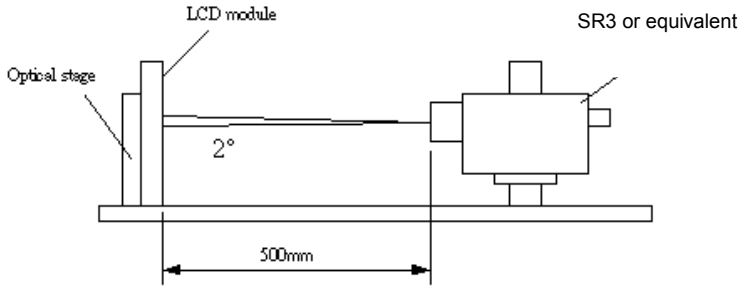
Note 3: Surface temperature is measured at 50°C Dry condition



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°C. 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	Values			Unit	Notes
			Min.	Typ.	Max		
Contrast Ratio		CR	2400	3000	--		1
Surface Luminance (White)		L_{WH}	200	250	--	cd/m^2	2
Luminance Variation		$\delta_{WHITE(9P)}$	--	--	1.33		3
Response Time (on+off)		$T_{Y+} T_F$	--	12 (TBD)	16 (TBD)	ms	4
Color Gamut		NTSC		72		%	
Color Coordinates							
	Red	R_X	Typ.-0.03	0.648	Typ.+0.03		
		R_Y		0.333			
	Green	G_X		0.323			
		G_Y		0.626			
	Blue	B_X		0.156			
		B_Y		0.054			
	White	W_X		0.313			
		W_Y		0.329			
Viewing Angle							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	

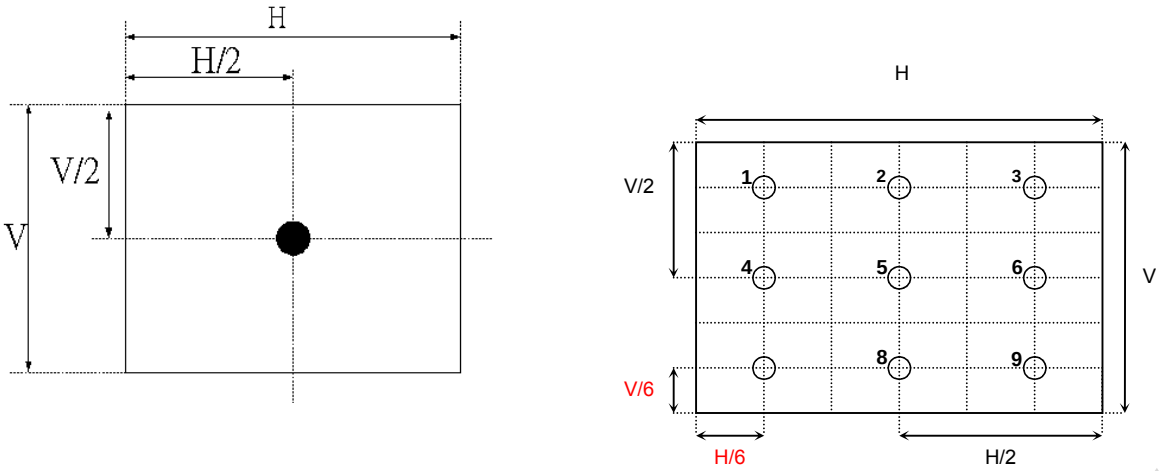
Note:

1. Contrast Ratio (CR) is defined mathematically as:

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

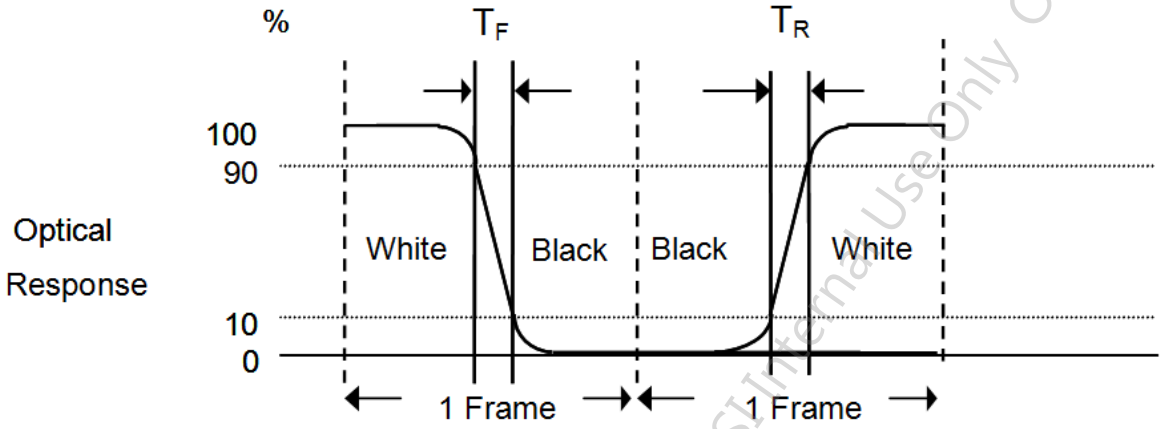
2. Surface luminance is luminance value at point 5 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see FIG 2. When LED current I_F = typical value (without driver board), LED input VDDB =24V, I_{DDB}. = Typical value (with driver board), L_{WH}=Lon5 where Lon5 is the luminance with all pixels displaying white at center 5 location.

FIG. 2 Luminance



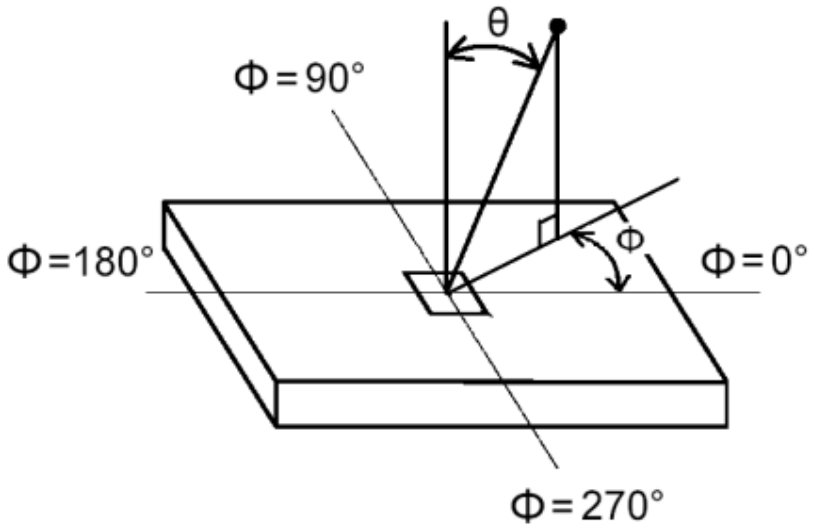
3. The variation in surface luminance, δWHITE is defined (center of Screen) as:
   $\delta_{WHITE(9P)}$= Maximum(L_{on1}, L_{on2},…,L_{on9})/ Minimum(L_{on1}, L_{on2},…L_{on9})
4. Response time measurement

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)



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 FIG3.

FIG.3 Viewing Angle



4. Electrical 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:

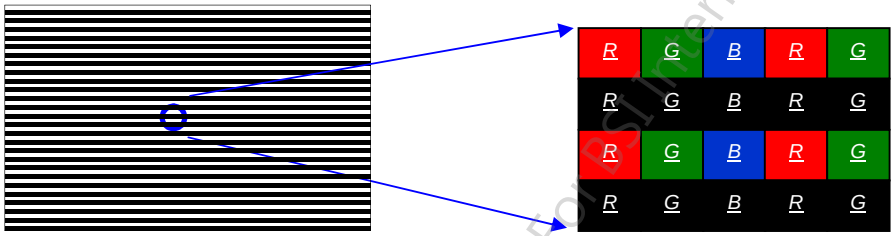
(1) V_{DD} = 5.0V, (2) Fv = 60Hz, (3) Fclk= 77.9MHz, (4) Temperature = 25 °C

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

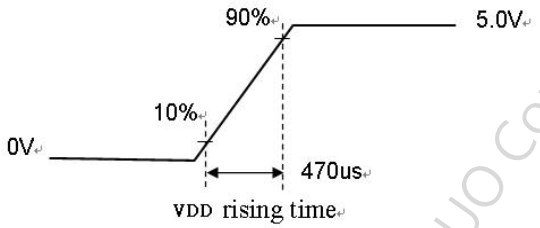
a. Black pattern

b. White pattern

c. H-Strip pattern



Note3. Measurement condition : Rising time = 470us

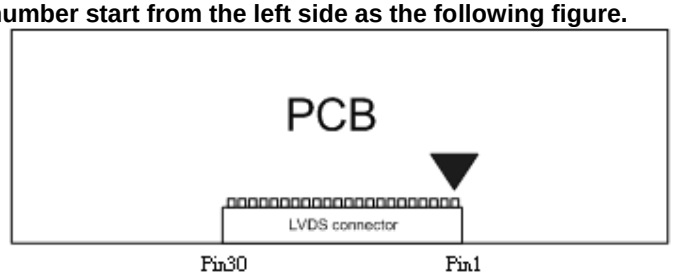


4.2 Input Connection

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	

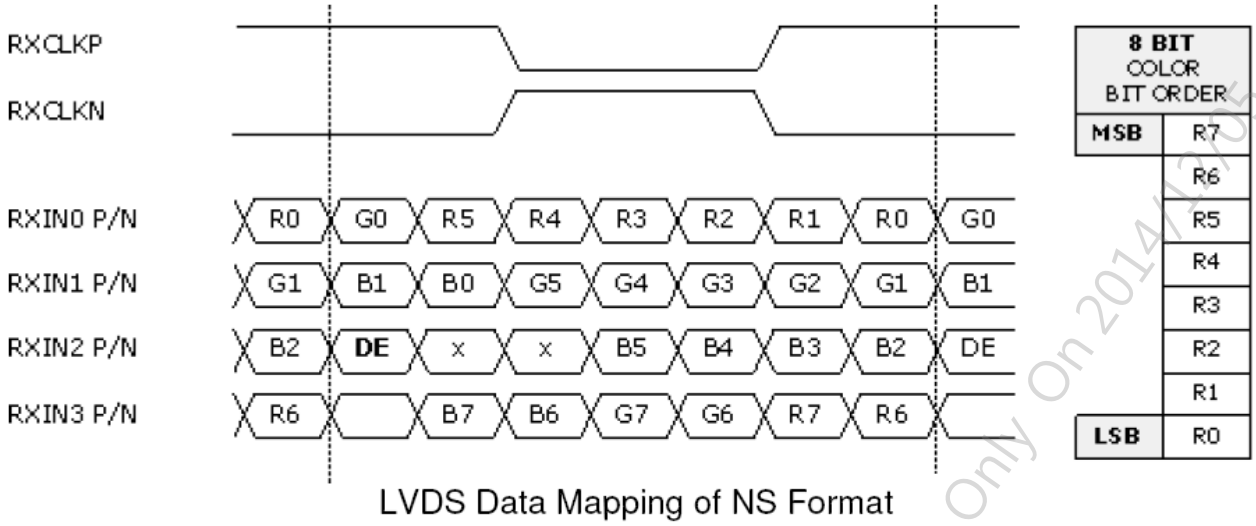
PIN #	Symbol	Description	Remark
1	NC	No connection	
2	NC	No connection	
3	NC	No connection	
4	NC	No connection	
5	NC	No connection	
6	NC	No connection	
7	GND	Ground	
8	NC	No connection	
9	NC	No connection	
10	NC	No connection	
11	NC	No connection	
12	RxIN0-	Negative LVDS differential data input	
13	RxIN0+	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	NC	No connection (For AUO use only. Do not connect)	Note2
25	NC	No connection (For AUO use only. Do not connect)	Note2
26	NC	No connection (For AUO use only. Do not connect)	Note2
27	NC	No connection (For AUO use only. Do not connect)	Note2
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).

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	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	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	0	0	1

	BLUE(254)	0	0	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	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:

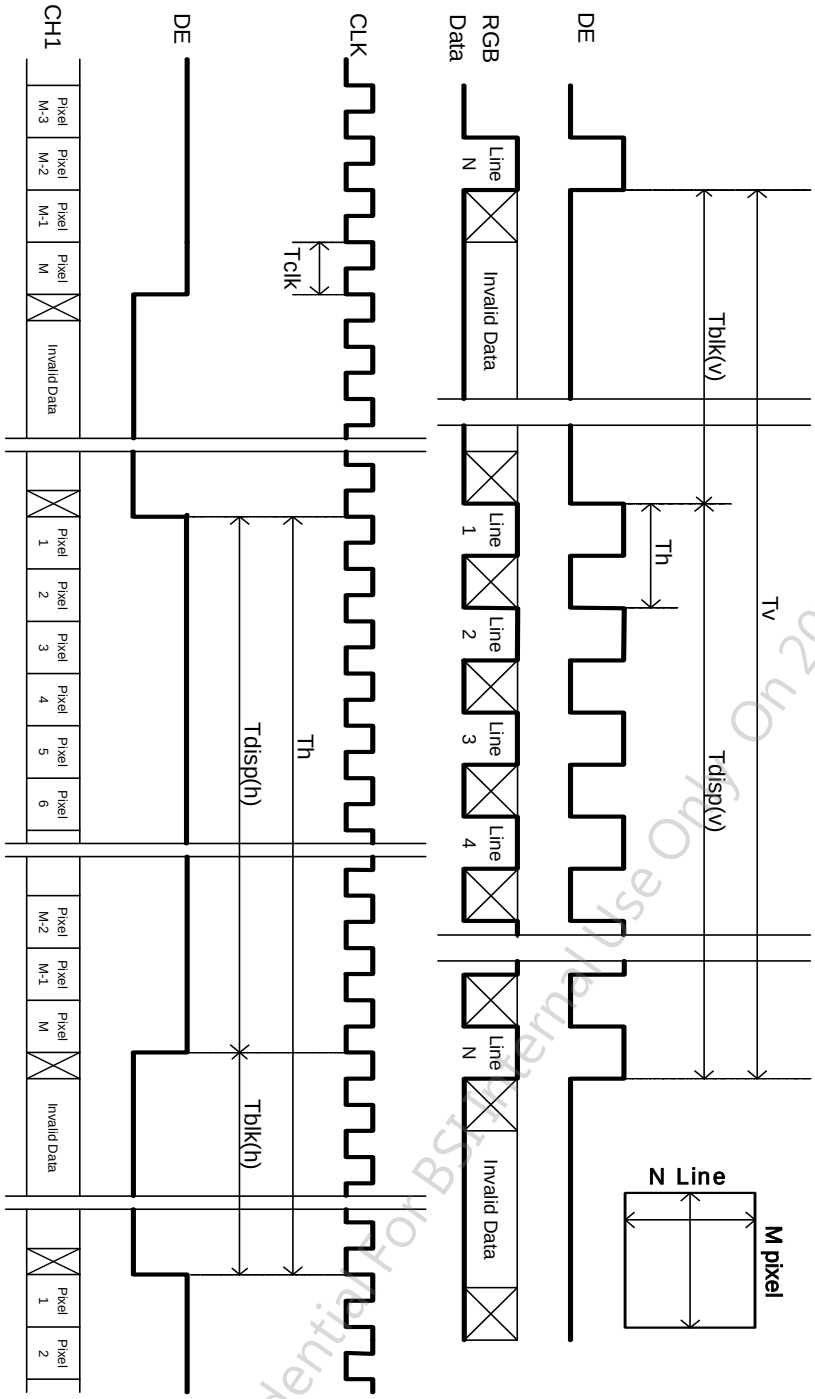
(1) Display position is specific by the rise of DE signal only.
Horizontal display position is specified by the rising edge of 1st DCLK after the rise of 1st DE, is displayed on the left edge of the screen.

(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.

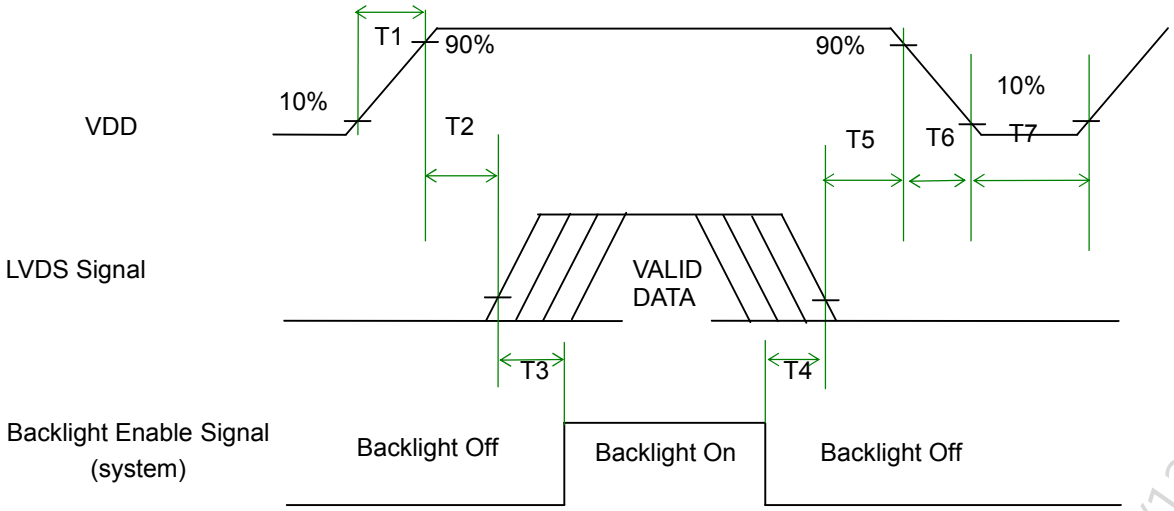
(3) If a period of DE “High” is less than 1366 DCLK or less than 768 lines, the rest of the screen displays black.

(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

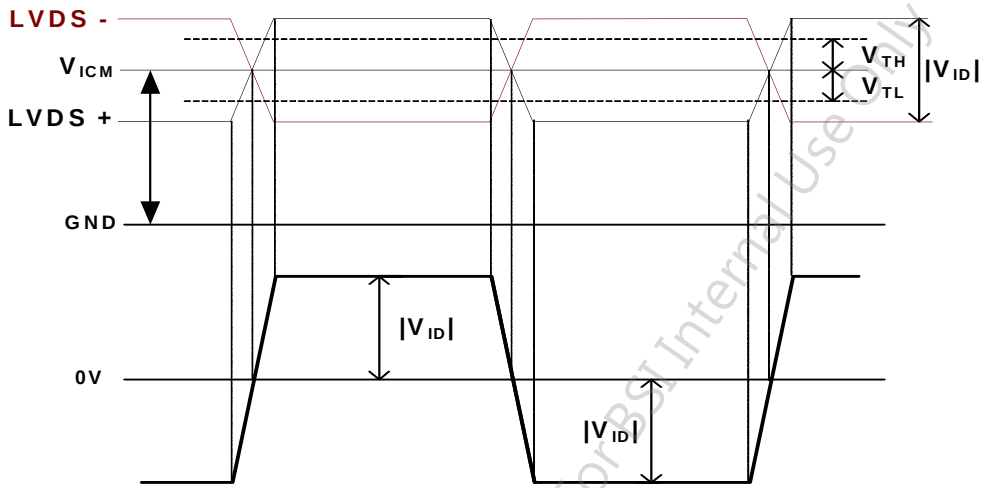
Note:
(1) Recommend setting T5 = 0ms to avoid electronic noise when VDD is off.
(2) During T5 and T6 period, please keep the level of input LVDS signals with Hi-Z state.

5.3 Input interface characteristics

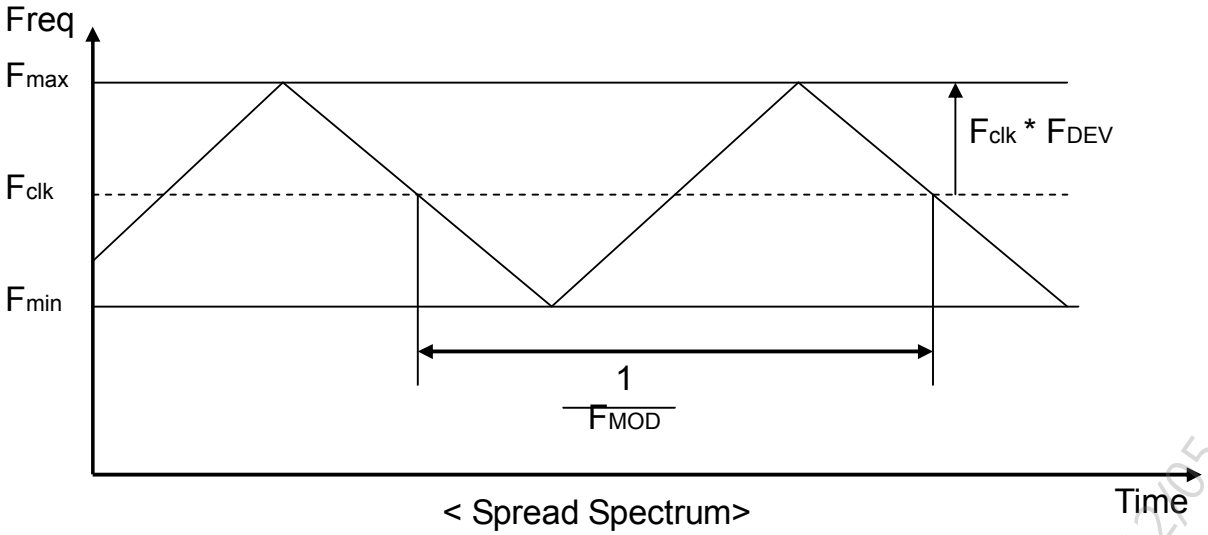
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
LVDS Interface	Input Differential Voltage	$\lvert V_{ID} \rvert$	100	-	600	mV_{DC}	1
	Differential Input High Threshold Voltage	V_{TH}	-	-	+100	mV_{DC}	1
	Differential Input Low Threshold Voltage	V_{TL}	-100	-	-	mV_{DC}	1
	Input Common Mode Voltage	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



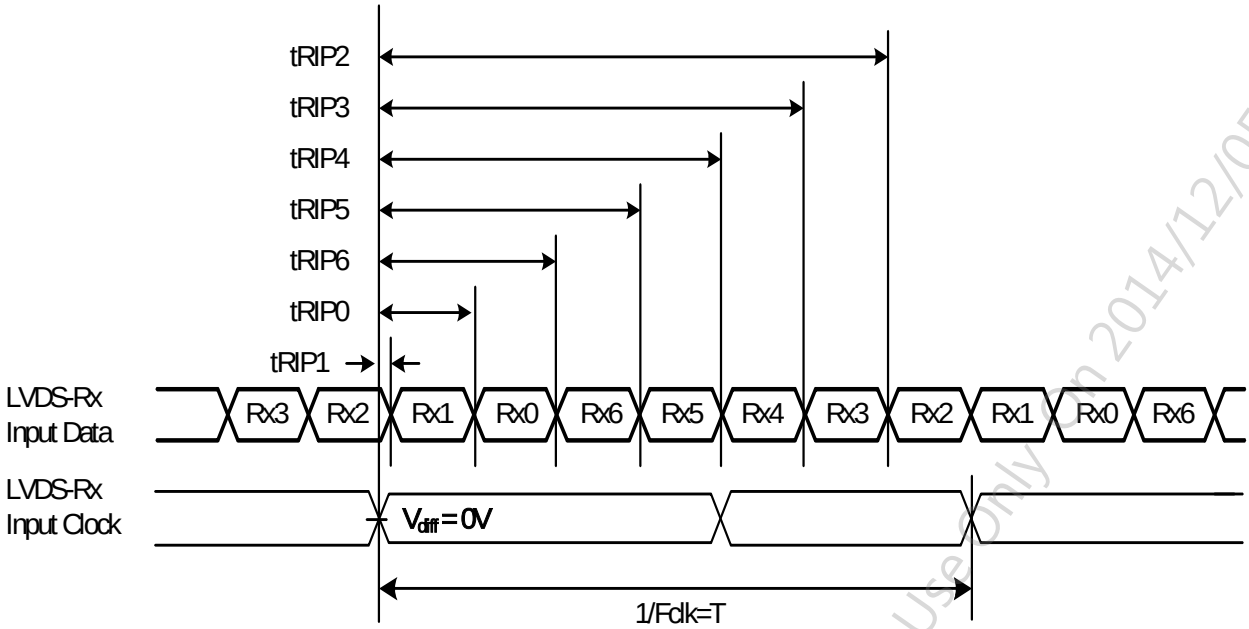
2. LVDS Receiver Clock SSCG (Spread spectrum clock generator) is defined as below figures.



< 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	

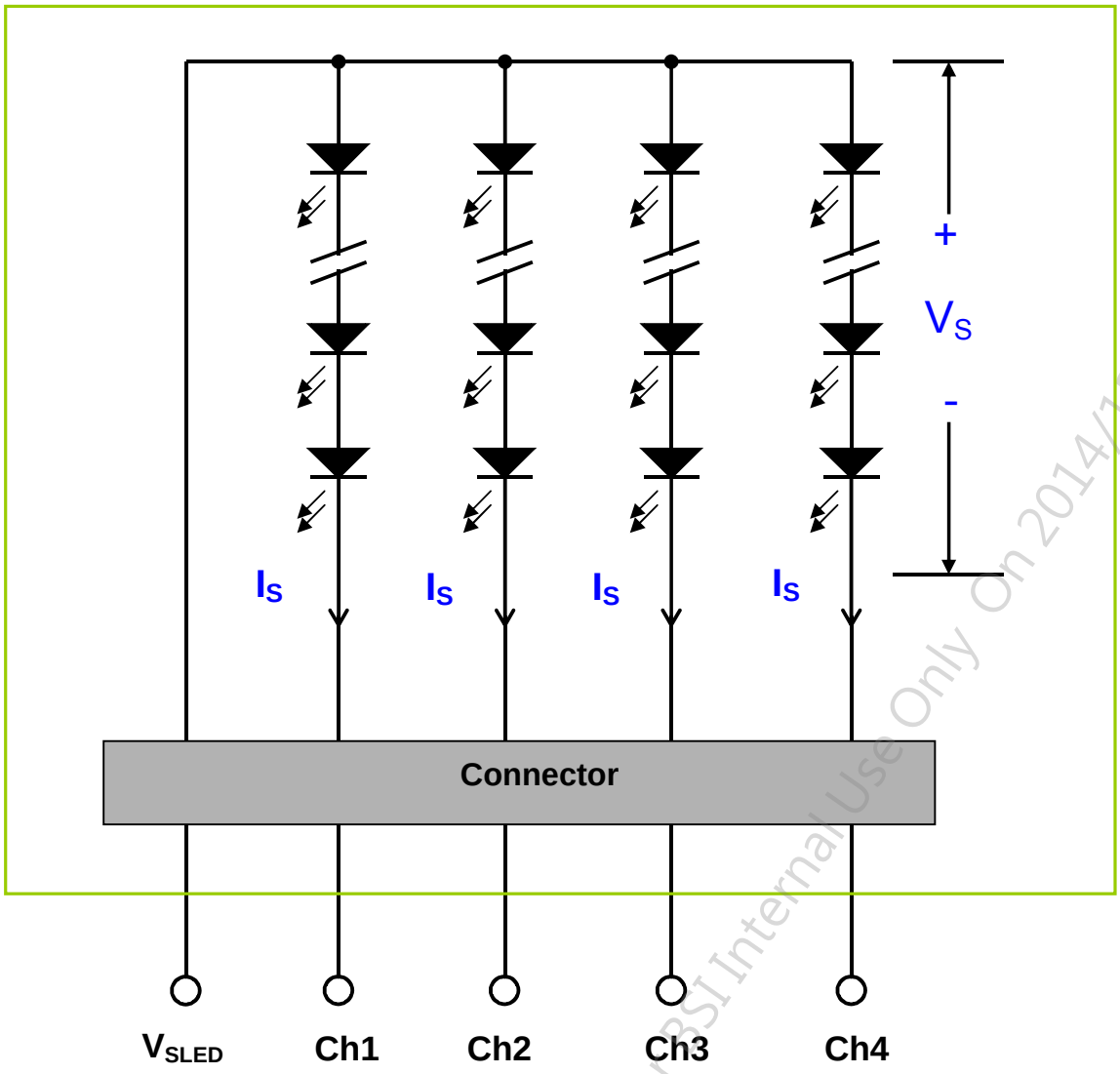


4. The measure points of V_{IH} and V_{IL} are in LCM side after connecting the System Board and LCM.

6. Backlight Specification

6.1 Block Diagram

The following shows the block diagram of the 19.5 inch Backlight Unit. And it includes 36 pcs LED in the LED light bar. (4 strings and 9 pcs LED of one string).



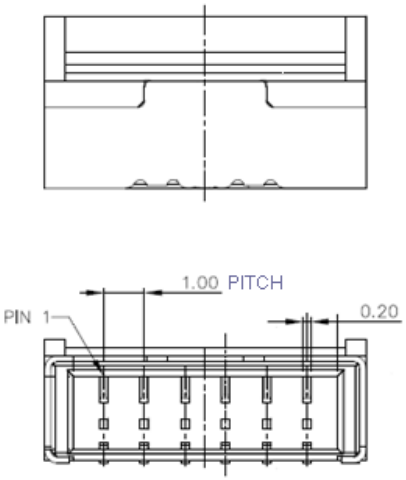
6.2 Interface Connection

Connector Type

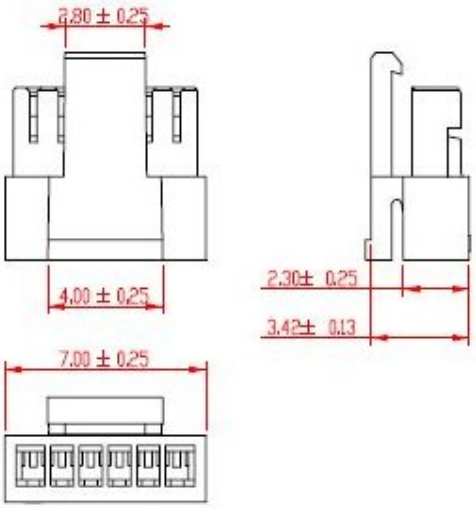
Backlight Connector	Manufacturer	ENTERY
	Part Number	3707K-S06N-21R
Mating Connector	Manufacturer	ENTERY
	Part Number	H112K-P06N-13B (Locking type)

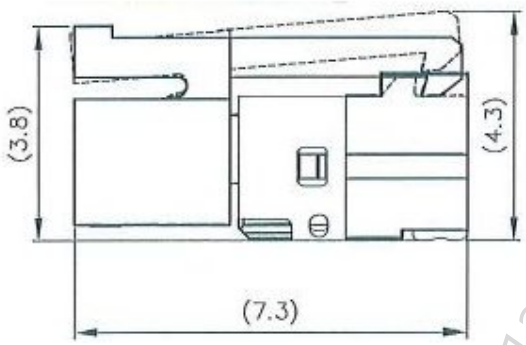
Backlight Connector dimension

$H \times V \times D = 13.9 \times 3.00 \times 4.25, Pitch = 1.0(unit = mm)$



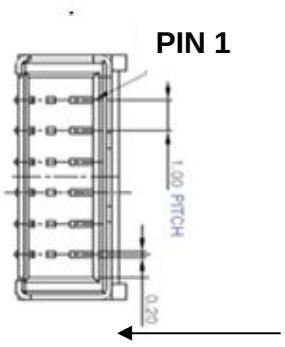
6.3 Mating Connector dimension





6.4 Connector Pin Assignment

Pin#	Symbol	Description	Remark
1	Ch1	LED Current Feedback Terminal (Channel 1)	
2	Ch2	LED Current Feedback Terminal (Channel 2)	
3	V_{SLED}	LED Power Supply Voltage Input Terminal	
4	V_{SLED}	LED Power Supply Voltage Input Terminal	
5	Ch3	LED Current Feedback Terminal (Channel 3)	
6	Ch4	LED Current Feedback Terminal (Channel 4)	



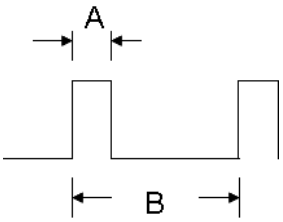
6.5 Electrical Characteristics

Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

(Ta=25°C)

Symbol	Description	Min	Max	Unit	Remark
Is	LED String Current	0	90	[mA]	100% duty ratio
			150	[mA]	*Duty ratio≦ 10%* *Pulse time=10 ms*



Duty ratio= (A / B) X 100% ; (A: Pulse time, B: Period)

Recommended Operating Condition

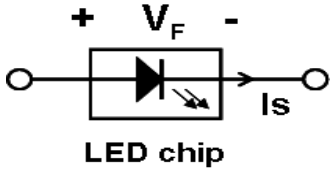
(Ta=25°C)

Symbol	Description	Min.	Typ.	Max.	Unit	Remark
Is	LED String Current	-	65	71.5	[mA]	100% duty ratio of LED chip
Vs	LED String Voltage	25.2	27.9	30.6	[Volt]	Is=65mA @ 100% duty ratio; ***Note 1, Note 5***
ΔVs	Maximum Vs Voltage Deviation of light bar	-	-	1.8	[Volt]	Is=65mA @ 100% duty ratio; ***Note 2***
P_{BLU}	LED Light Bar Power Consumption	-	7.3	8.0	[Watt]	***Note 3***
LT_{LED}	LED Life Time	30,000	-	-	[Hour]	***Note 4***
OVP	Over Voltage Protection in system board	110% Vsmax	-	-	[Volt]	***Note 5***

Note 1: Vs (Typ.) = V_F (Typ.) X LED No. (one string);

a. V_F: LED chip forward voltage, V_F (Min.)=2.8V, V_F(Typ.)=3.1V, V_F(Max.)=3.4V

b. The same euqation to calculate Vs(Min.) & Vs (Max.) for respective V_F (Min.) & V_F(Max.);



Note 2: ΔVs (Max.) = ΔV_F X LED No. (one string);

a. ΔV_F: LED chip forward voltage deviation; (0.2 V , each Bin of LED V_F)

Note 3: P_{BLU} (Typ.) = Vs (Typ.) X Is (Typ.) X 4 ; (4 is total String No. of LED Light bar)

P_{BLU} (Max.) = Vs (Max.) X Is (Typ.) X 4 ;

Note 4: Definition of life time:

a. Brightness of LED becomes to 50% of its original value

b. Test condition: Is = 65mA and 25°C (Room Temperature)

Note 5: Recommendation for LED driver power design:

Due to there are electrical property deviation in LED & monitor set system component after long time operation. AUO strongly recommend the design value of LED driver board OVP (over voltage protection) should be 10% higher than max. value of LED string voltage (Vs) at least.

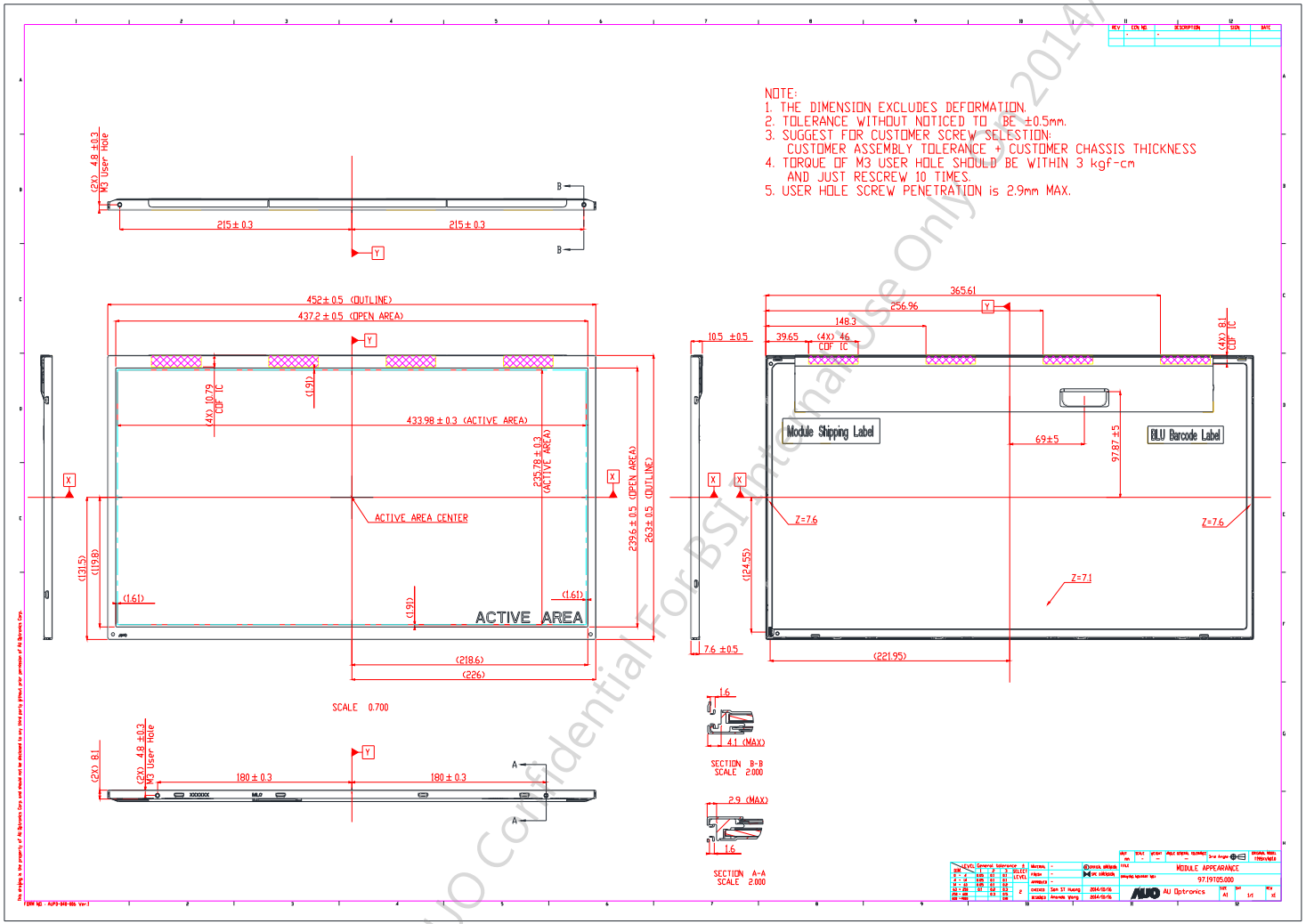
Note 6: AUO strongly recommend “Analog Dimming” method for backlight brightness control for Wavy Noise Free. Otherwise, recommend that Dimming Control Signal (PWM Signal) should be synchronized with Frame Frequency.

7. Mechanical Characteristics

The contents provide general mechanical characteristics for the model T195XVN01.0. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Item		Dimension	Unit	Note
Outline Dimension	Horizontal	452	mm	
	Vertical	263	mm	
	Depth	10.5	mm	to rear
Weight	1380		g	

Front & Back View



8. Reliability Test Items

	Test Item	Q'ty	Condition
1	High temperature storage test	3	60°C, 300hrs
2	Low temperature storage test	3	-20°C, 300hrs
3	High temperature operation test	3	50°C, 300hrs
4	Low temperature operation test	3	-5°C, 300hrs
5	Vibration test (non-operation)	3	Wave form: random Vibration level : 1.0G RMS Bandwidth : 10-300Hz Duration : X,Y,Z 10min per axes X,Y,Z: Vertical
6	Shock test (non-operation)	3	Shock level 50G ,20ms ±X,Y,Z axis Waveform: half sine wave Direction: One time each direction
7	Vibration test (With carton)	3	Random wave (1.05Grms 10~200Hz) Duration : X,Y,Z 10min per axes
8	Drop test (With carton)	3	Height: 46.0 cm (ASTMD4169-I) 1 corner, 3 edges, 6 surfaces (refer ASTM D 5276)

9. International Standard

9.1 Safety

(1) UL 60950-1, UL 60065; Standard for Safety of Information Technology Equipment Including electrical Business Equipment.
(2) IEC 60950-1, IEC 60065; Standard for Safety of International Electrotechnical Commission
(3) EN 60950-1, EN 60065; European Committee for Electrotechnical Standardization (CENELEC), EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

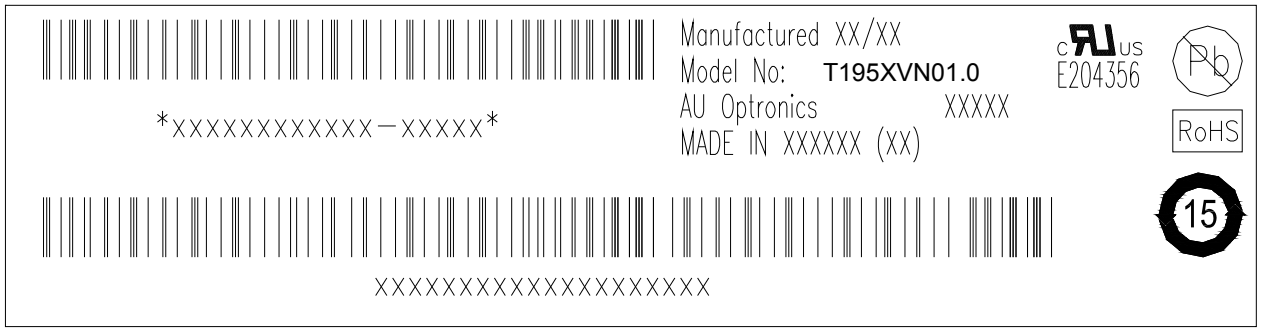
9.2 EMC

(1) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992
(2) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.
(3) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electrotechnical Standardization. (CENELEC), 1998

10. Packing

10.1 Definition of Label

The label is on the panel as shown below.



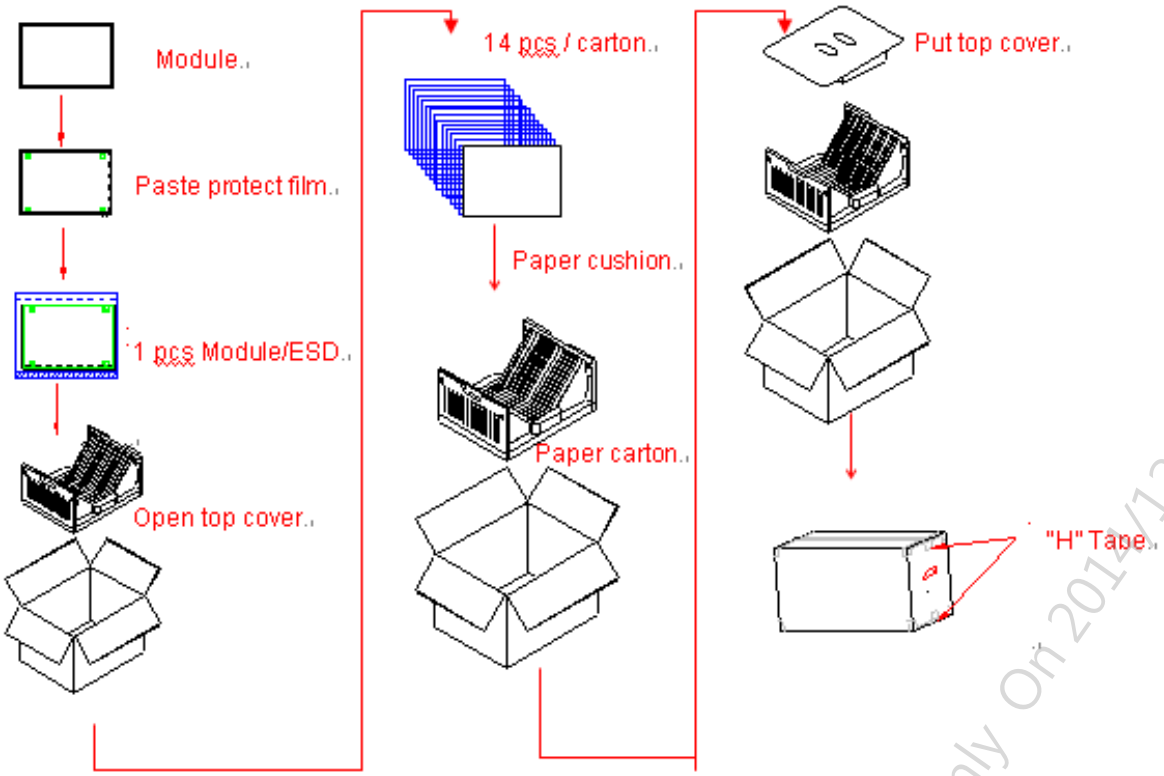
Note 1: For Pb Free products, AUO will add for identification.

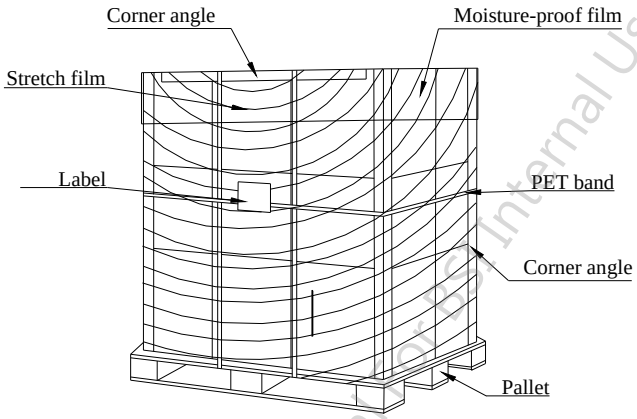
Note 2: For RoHS compatible products, AUO will add for identification.

Note 3: For China RoHS compatible products, AUO will add for identification.

Note 4: The Green Mark will be presented only when the green documents have been ready by AUO Internal Green Team.

10.2 Packing Flow





10.3 Pallet and shipment information

Item	Specification			Remark
	Q'ty	Dimension	Weight(kg)	
Panel	1	452.0(H)mmx263(V)mmx10.5(D)mm	1.38 Kg	
Cushion	1	-	1.7 Kg	
Box	1	526(L)mm x 299(W)mm x 335(H)mm	0.9 Kg	without Panel & cushion
Packing Box	14 pcs/Box	526(L)mm x 299(W)mm x 335(H)mm	21.92 Kg	with panel & cushion
Pallet	1	1150(L)mm x 910(W)mm x 138(H)mm	15 Kg	
Pallet after Packing	18boxes/ pallet	1150(L)mm x 910(W)mm x 1143(H)mm	409.56 Kg	

11. Precautions

Please pay attention to the followings when you use this TFT LCD module.

11.1 Mounting Precautions

(1) You must mount a module using holes arranged in four corners or four sides.

(2) You should consider the mounting structure so that uneven force (ex. twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter cause circuit broken by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizer 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 for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(7) 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 polarizer. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

11.2 Operating Precautions

(1) The device listed in the product specification sheets was designed and manufactured for TV application under normal conditions. Normal condition is defined as below:
   A. Temperature 5~40°C.
   B. Display pattern: continuously changing pattern (Not stationary).
   If product will be used in extreme conditions such as high temperature/humidity, display stationary patterns or long operation time etc.., It is strongly recommended to contact AUO for Field Application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at Airports, Transit Stations, Banks, Stock Market, and Controlling systems.

(2) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)

(3) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(4) Brightness depends on the temperature. (In lower temperature, it may become lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(6) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(7) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

11.3 Electrostatic Discharge Control

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

11.4 Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

11.5 Storage

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

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
(2) 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.

11.6 Handling Precautions for Protection Film

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.
(3) You can remove the glue easily. When the glue remains on the bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane

