SAMSUNG ELECTRONICS

Approval

LEAD-FREE

TO :

DATE : June 30, 2008.

SAMSUNG TFT-LCD

MODEL NO. : LTN170CT01-L01

NOTE : Extension code [- L]
→ LTN170CT01-L
Surface type [**Glare**]

Any Modification of Spec is not allowed without SEC' permission

APPROVED BY : K. H. Shin

PREPARED BY : **Mobile Division, Application Engineering Part**

SAMSUNG ELECTRONICS CO., LTD.

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REVISION HISTORY

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Date	Revision No.	Page	Summary
Jun. 17. 2008	A00	All	LTN170CT01-L01 model spec was issued first.
June 24, 2008	A01	p. 7 P. 7	White color tolerance was revised as below. [AS-IS] +/- 0.030 for Wx/ Wy → [TO-BE] Wx +/- 0.028, Wy +/- 0.020 Viewing angle specification was changed as below. [AS-IS] Typ. 65/65/45/55 → [TO-BE] Typ. 70/70/55/60
June 27, 2008	A02	P. 21	Power sequence was revised by Lenovo's request.
June 30, 2008	A03	P. 21	'T1' power sequence was revised by Lenovo's request. [AS-IS] Min. 0.5msec → [TO-BE] Min. 0.4msec

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GENERAL DESCRIPTION

DESCRIPTION

LTN170CT01-L01 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as switching devices. This model is composed of a TFT LCD panel, a driver circuit and a backlight unit. The resolution of a 17.0" contains 1,920 x 1200 pixels and can display up to 262,144 colors. 6 O'clock direction is the optimum viewing angle.

FEATURES

- High color gamut(72%), high contrast ratio, high aperture structure
- 1920 x 1200 pixels resolution
- Low power consumption
- Fast Response
- 2 CCFL (Y-stack)
- DE (Data enable) only mode
- 3.3V LVDS Interface
- Onboard EEDID chip
- Pb free product

APPLICATIONS

- Notebook PC
- If the usage of this product is not for PC application, but for others, please contact SEC

GENERAL INFORMATION

Item	Specification	Unit	Note
Display area	367.20(H) x 229.50(V) (17.0” diagonal)	mm	
Driver element	a-Si TFT active matrix		
Display colors	262,144		
Number of pixel	1920 x 1200	pixel	16 : 10
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.19125(H) x 0.19125(V) (TYP.)	mm	
Display Mode	Normally white		
Surface treatment	Haze 34%, Hardness 3H		

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Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal (H)	381.7	382.2	382.7	mm	
	Vertical (V)	247.0	247.5	248.0	mm	
	Depth (D)	-	6.7	7.0	mm	(1)
Weight		-	740	760	g	

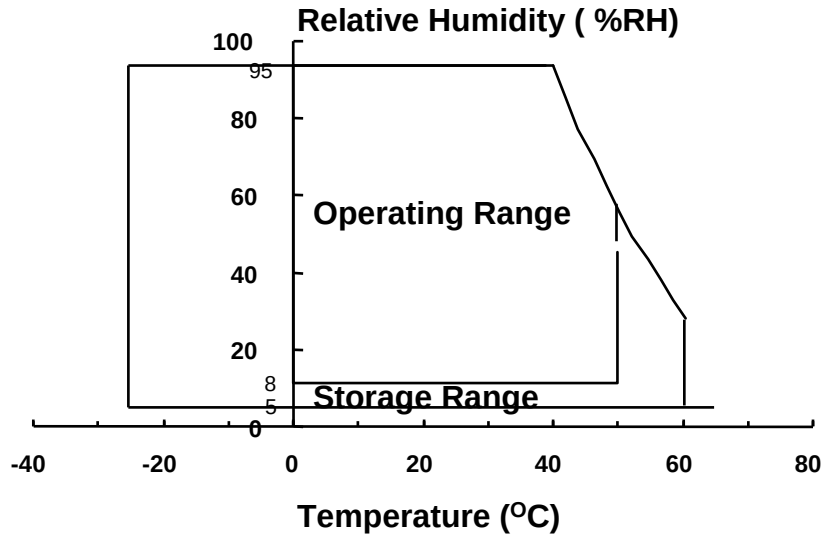
Note (1) Measurement condition of outline dimension
. Equipment : Vernier Calipers
. Push Force : 500g ·f (minimum)

1. ABSOLUTE MAXIMUM RATINGS

1.1 ENVIRONMENTAL ABSOLUTE RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Storage temperate	T_{STG}	-20	60	°C	(1)
Operating temperate (Temperature of glass surface)	T_{OPR}	0	50	°C	(1)
Shock (non-operating)	Snop	-	210	G	(2),(5)
			50		(3),(5)
Vibration (non-operating)	Vnop	-	2.41	G	(4),(5)

Note (1) Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 ^{O}C ≥ Ta)
Maximum wet - bulb temperature at 39 ^{O}C or less. (Ta > 40 ^{O}C) No condensation.
(2) 3ms, half sine wave, one time for ±X,±Y,±Z.
(3) 18ms, Trapezoidal wave, one time for ±X,±Y,±Z.
(4) 5~500 Hz, Random vibration, 30 min for X,Y,Z.
(5) At testing Vibration and Shock, the fixture in holding the Module to be tested have to be hard and rigid enough so that the Module would not be twisted or bent by the fixture.



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1.2 ELECTRICAL ABSOLUTE RATINGS

(1) TFT LCD MODULE

V_{DD} =3.3V, V_{SS} = GND = 0V

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	V_{DD} - 0.3	V_{DD} + 0.3	V	(1)
Logic Input Voltage	V_{IN}	V_{DD} - 0.3	V_{DD} + 0.3	V	(1)

Note (1) Within Ta (25 ± 2 °C)

(2) BACK-LIGHT UNIT

Ta = 25 ± 2 °C

Item	Symbol	Min.	Max.	Unit	Note
Lamp Current	I_L	3.0	7.0	mArms	(1)
Lamp frequency	F_L	40	80	kHz	(1)

Note 1) Permanent damage to the device may occur if maximum values are exceeded
Functional operation should be restricted to the conditions described under normal operating conditions.

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2. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (5). Measuring equipment : TOPCON BM-5A and PR-705

* Ta = 25 ± 2 °C, V_{DD}=3.3V, fv= 60Hz, f_{DCLK} = 81MHz, I_L = 6.0 mA

Item		Symbol	Condition	Min.	Typ.	Max	Unit	Note
Contrast Ratio (5 Points)		CR	Normal Viewing Angle $\phi = 0$ $\theta = 0$	500	600	-	-	(1), (2), (5)
Response Time at Ta (Rising + Falling)		T_{RT}		-	8	16	msec	(1), (3)
Average Luminance of White (5 Points)		$Y_{L,AVE}$		340	400	-	cd/m^2	IL=6.0mA (1), (4)
Color Chromaticity (CIE)	Red	R_X		0.615	0.645	0.675	-	(1), (5) PR-705
		R_Y		0.301	0.331	0.361		
	Green	G_X		0.262	0.292	0.322		
		G_Y		0.571	0.601	0.631		
	Blue	B_X		0.111	0.141	0.171		
		B_Y		0.041	0.071	0.101		
	White	W_X		0.285	0.313	0.341		
		W_Y		0.309	0.329	0.349		
Viewing Angle	Hor.	θ_L	CR ≥ 10	65	70	-	Degrees	(1), (5) BM-5A
		θ_H		65	70	-		
	Ver.	ϕ_H		50	55	-		
		ϕ_L		55	60	-		
13 Points White Variation		δ_L		65%	-	-	-	(6)
5 Points White Variation		δ_L		80%	-	-	-	(7)

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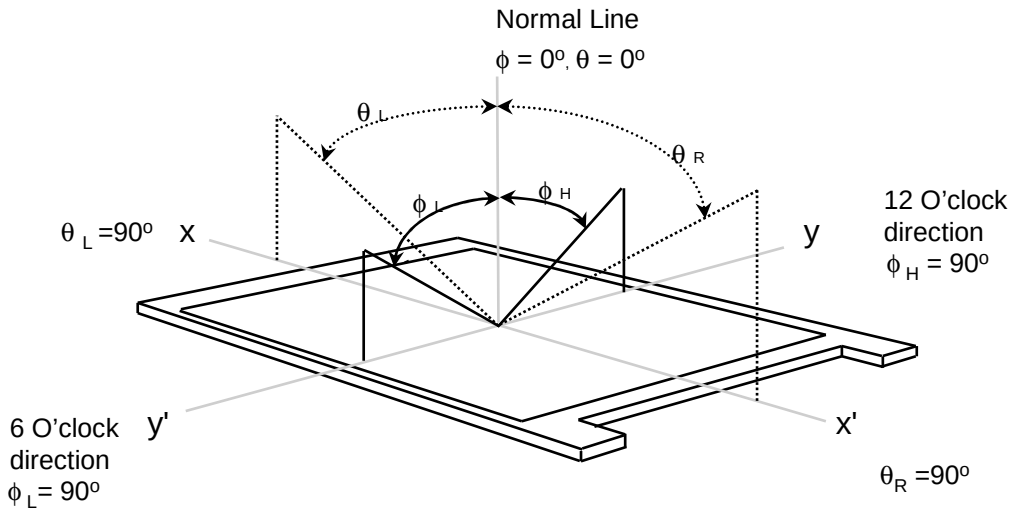
Note 1) Definition of Viewing Angle : Viewing angle range(10 ≤ C/R)

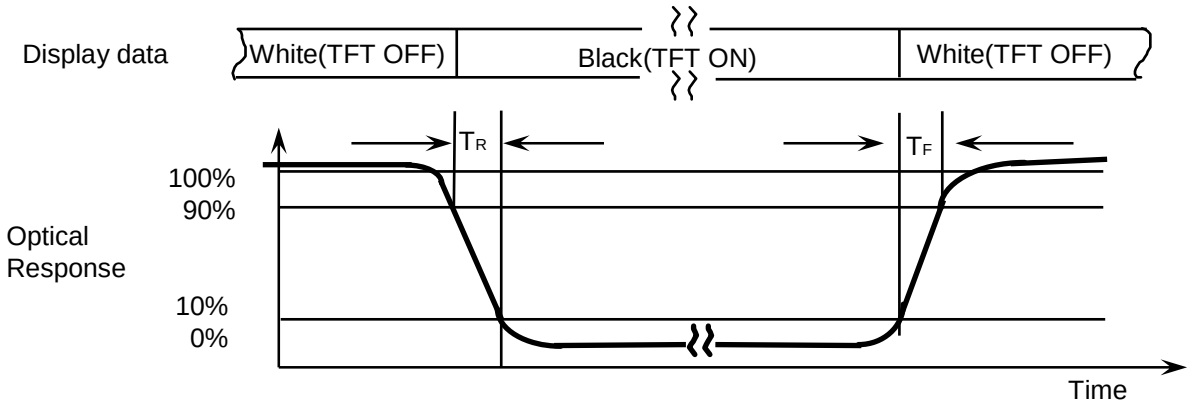


Note 2) Definition of Contrast Ratio (CR) : Ratio of gray max (Gmax) ,gray min (Gmin) at 5 points(4, 5, 7, 9, 10)

$$CR = \frac{CR(4) + CR(5) + CR(7) + CR(9) + CR(10)}{5}$$

Points : ④ , ⑤ , ⑦ , ⑨ , ⑩ at the figure of Note (6).

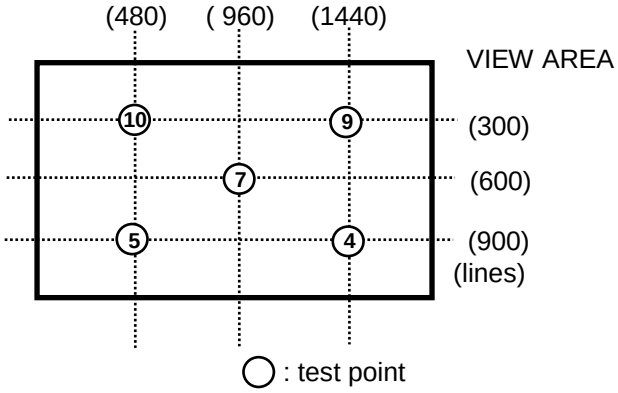
Note 3) Definition of Response time :



Note 4) Definition of Average Luminance of White : measure the luminance of white at 5 points.

Average Luminance of White ($Y_{L,AVE}$)

$$Y_{L,AVE} = \frac{Y_{L4} + Y_{L5} + Y_{L7} + Y_{L9} + Y_{L10}}{5}$$



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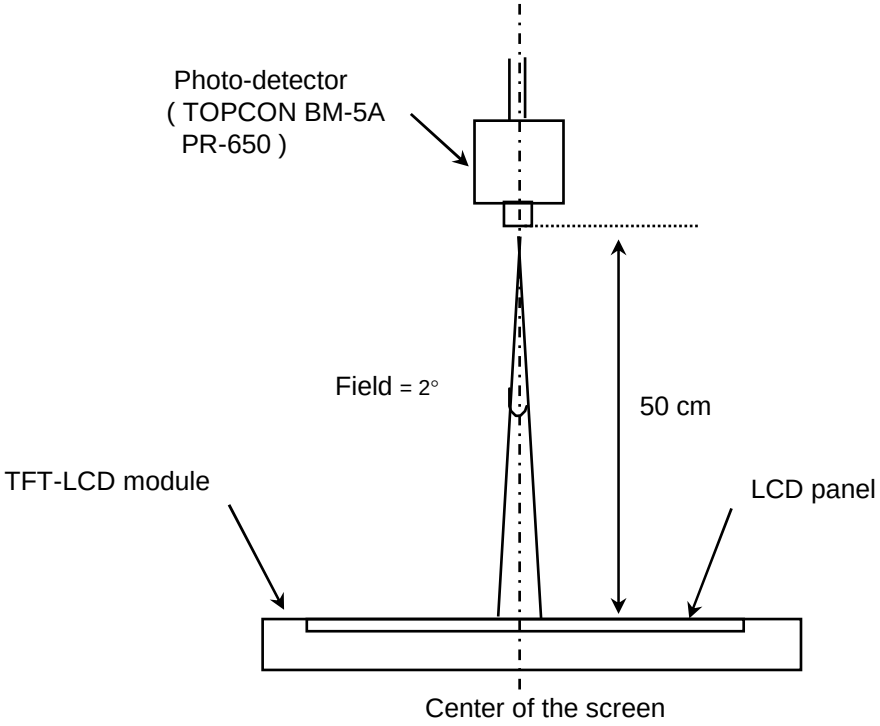
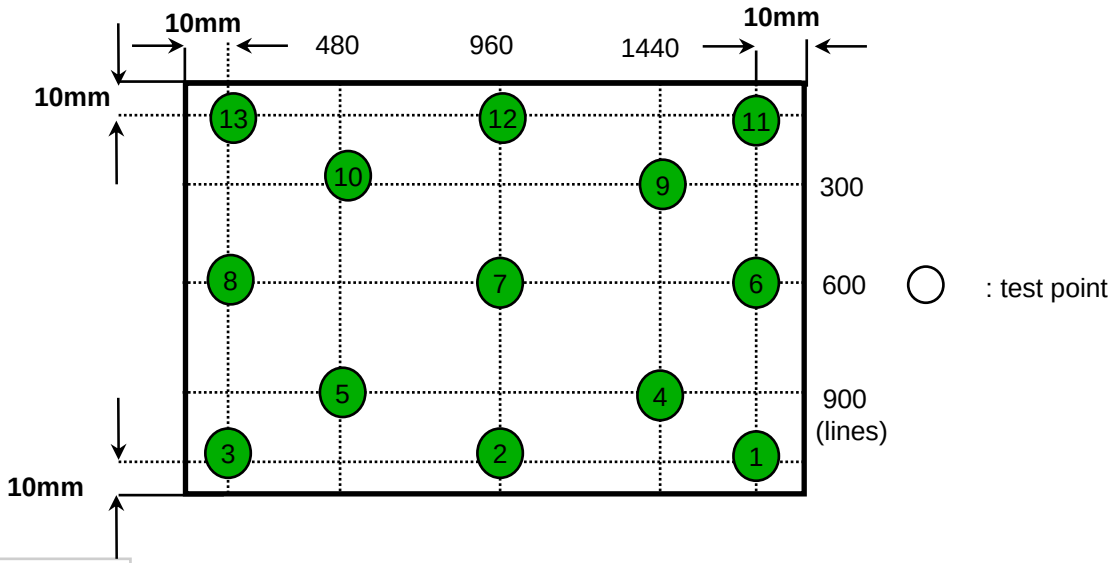
Note 5) After stabilizing and leaving the panel alone at a given temperature for 30 min , the measurement should be executed. Measurement should be executed in a stable, windless,and dark room.
30 min after lighting the backlight. This should be measured in the center of screen.
Lamp current : 6.5mA (Inverter : SIC-130T)
Environment condition : Ta = 25 ± 2 °C



[Optical characteristics measurement setup]

Note 6) Definition of 13 points white variation (δ_L), CR variation(C_{VER}) [① ~ ⑬]

$$\delta_L = \frac{\text{Maximum luminance of 13 points}}{\text{Minimum luminance of 13 points}}$$



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3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

Ta= 25 ± 2°C

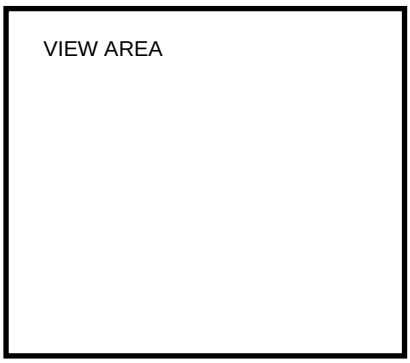
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply		V_{DD}	3.0	3.3	3.6	V	
Differential Input Voltage for LVDS Receiver Threshold	High	V_{IH}	-	-	+100	mV	V_{CM} = +1.2V
	Low	V_{IL}	-100	-	-	mV	
Vsync Frequency		fv	-	60	-	Hz	
Hsync Frequency		f_H	-	75	-	KHz	
Main Frequency		f_{DCLK}	-	81	-	MHz	
Rush Current		I_{RUSH}	-	-	1.5	A	(4)
Current of Power Supply	White	I_{DD}	-	600	-	mA	(2),(3)*a
	Mosaic		-	600	-	mA	(2),(3)*b
	WinXP Pattern		-	600	-	mA	(2),(3)*c
	V. stripe		-	820	970	mA	(2),(3)*d

Note (1) Display data pins and timing signal pins should be connected.(GND = 0V)

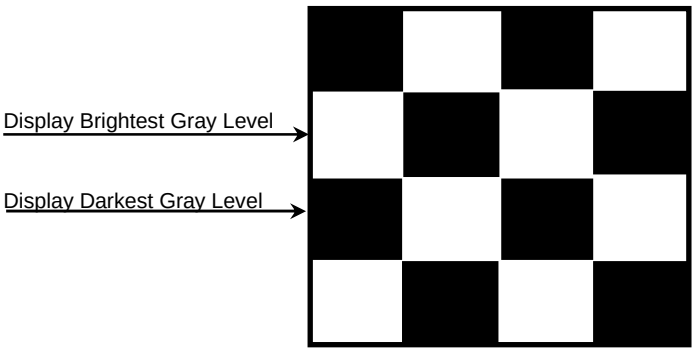
(2) f_V = 60Hz, f_{DCLK} = 81MHZ, V_{DD} = 3.3V , DC Current.

(3) Power dissipation pattern

*a) White Pattern



*b) Mosaic Pattern



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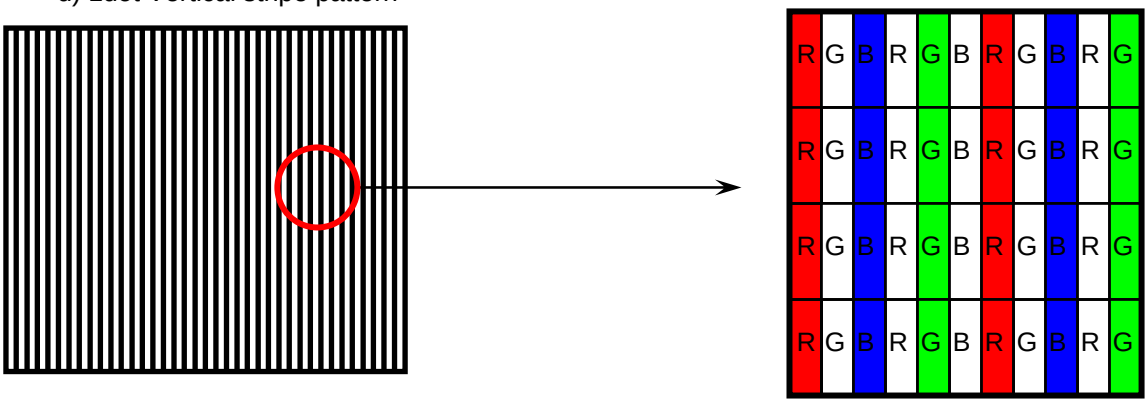
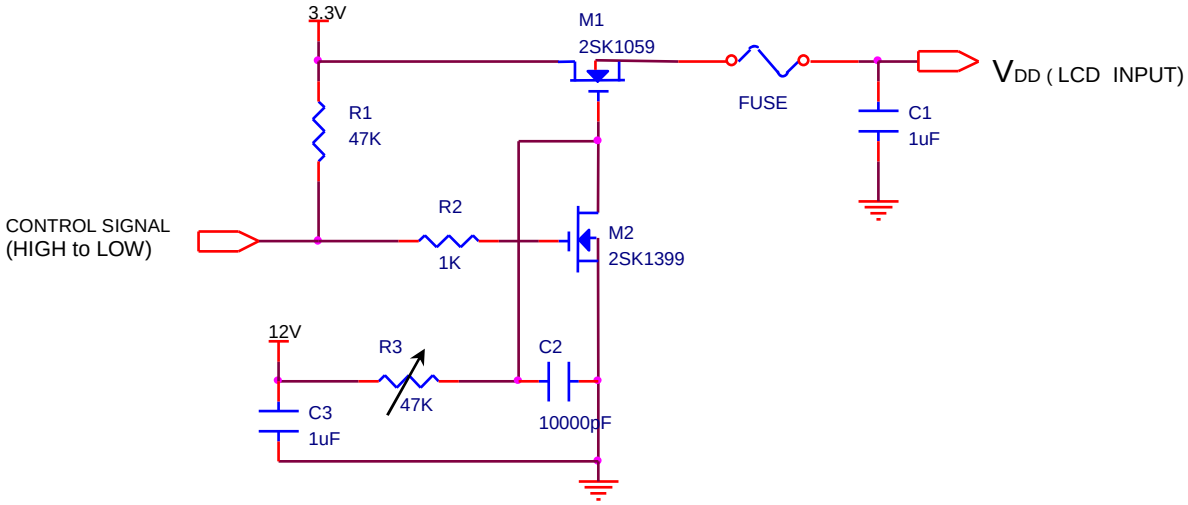
*c) WinXP Pattern

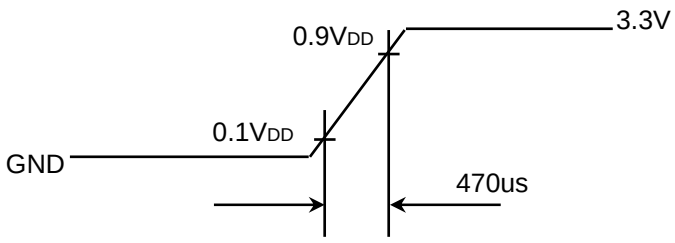
*d) 1dot Vertical stripe pattern



4) Rush current measurement condition



VDD rising time is 470us



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3.2 BACK-LIGHT UNIT

The backlight system is an edge-lighting type with dual CCFT (Cold Cathode Fluorescent Tube). The characteristics of a single lamp are shown in the following table.

- INVERTER : SEM SIC 1801

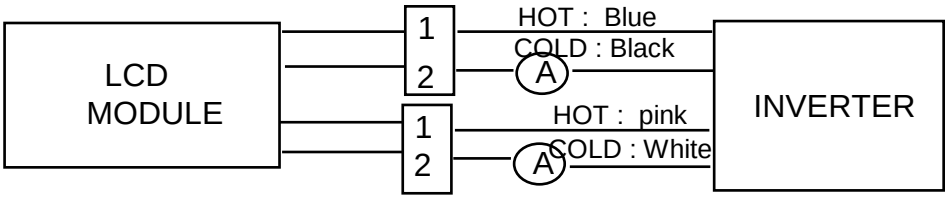
Ta= 25 ± 2 °C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp Current	I_L	3.0	6.0	7.0	mArms	(1)
Lamp Voltage	V_L	-	720/CCFL	-	Vrms	I_L = 6.0mA
Frequency	f_L	50	60	68	KHz	(2)
Power Consumption	P_L	-	4.32/CCFL		W	(3) I_L = 6.0mA
Operating Life Time	Hr	12,000	-	-	Hour	(4)
Startup Voltage	V_S	-	-	1280	Vrms	25°C, (5)
				1400	Vrms	0°C, (5)

Note) The waveform of the inverter output voltage must be area symmetric and the design of the inverter must have specifications for the modularized lamp.

The performance of the backlight, for example life time or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the backlight and the inverter(miss lighting, flicker, etc.) never occur. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

Note (1) Lamp current is measured with a high frequency current meter as shown below.



(2) Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

(3) Refer to $I_L \times V_L$ to calculate.

(4) Life time (Hr) of a lamp can be defined as the time in which it continues to operate under the condition Ta= 25 ± 2 °C and I_L = 6.0 mArms until one of the following event occurs.

1. When the brightness becomes 50% or lower than the original.
2. When the Effective ignition length becomes 80% or lower than the original value.
   (Effective ignition length is defined as an area that has less than 70% brightness compared to the brightness in the center point.)

(5) The inverter open voltage - this voltage should be measured after ballast capacitor- have to be larger than the lamp startup voltage, otherwise backlight may has blinking for a moment after turns on or not be turned on.
If an inverter has shutdown function it should keep its open voltage for longer than 1 second even if lamp connector open.

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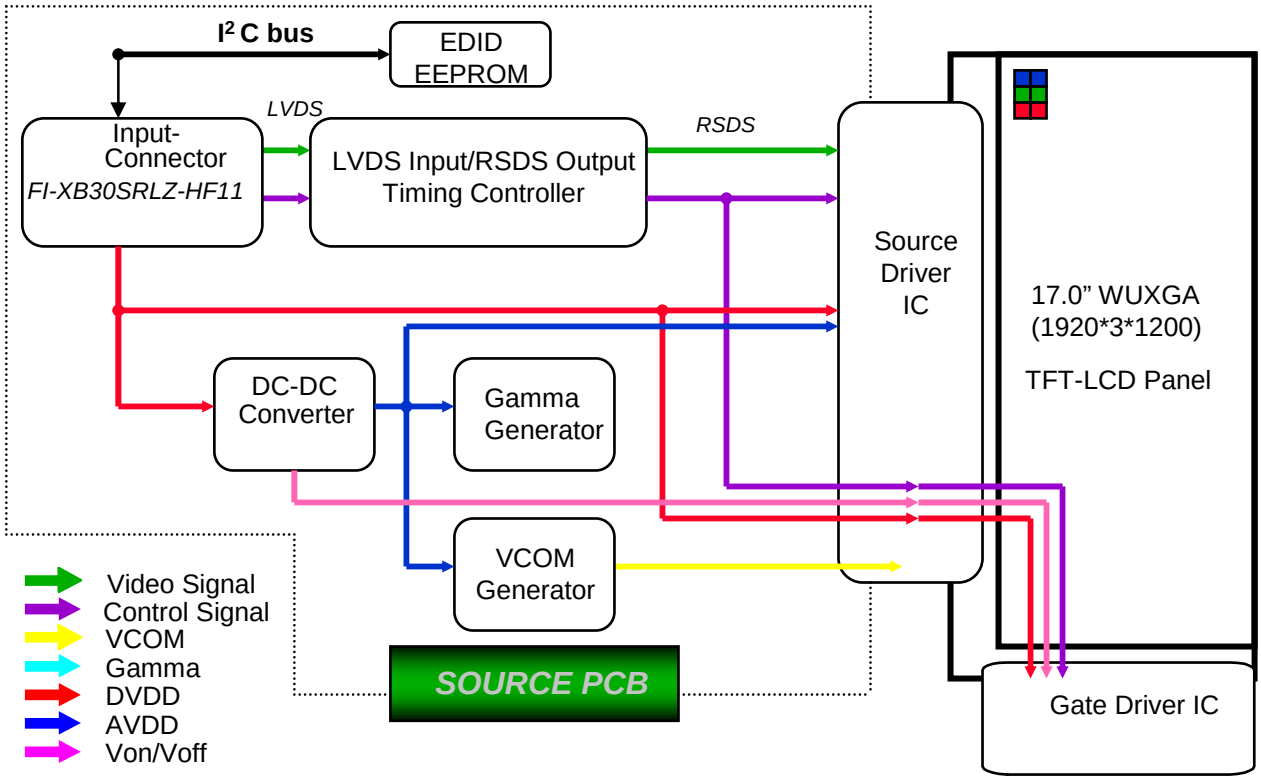
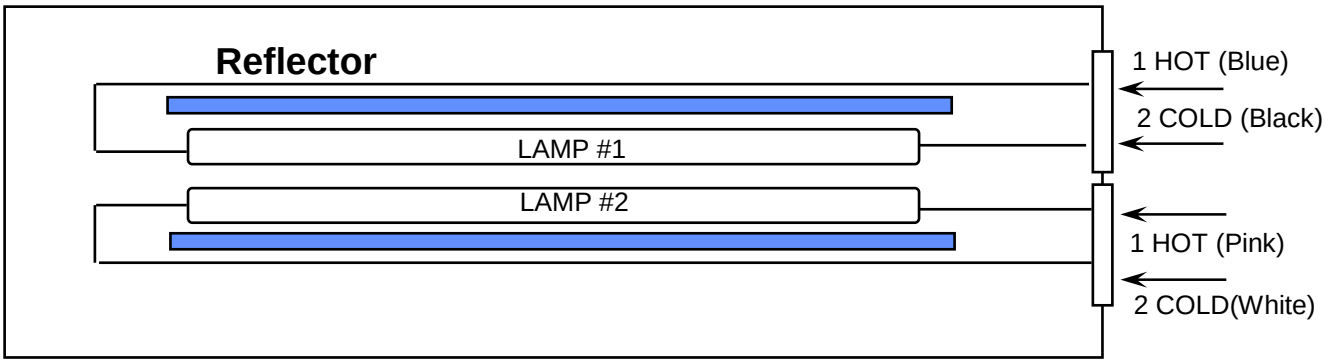
4. BLOCK DIAGRAM

4.1 TFT LCD Module



4.2 BACK-LIGHT UNIT



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5. INPUT TERMINAL PIN ASSIGNMENT

5.1. Input Signal & Power (LVDS, Connector : JAE FI-XB30SRLZ-HF11)
Mating Connector : JAE FI-X30M or compatible)

No.	Symbol	Function	Polarity	Remarks
1	VSS	Ground		
2	VDD	POWER SUPPLY +3.3V		
3	VDD	POWER SUPPLY +3.3V		
4	VEEDID	DDC 3.3V Power		
5	NC	No Connection		
6	CLKEDID	DDC Clock		
7	DATAEDID	DDC data		
8	O_RxIN0-	LVDS Differential Data INPUT (Odd R0-R5,G0)	Negative	
9	O_RxIN0+	LVDS Differential Data INPUT (Odd R0-R5,G0)	Positive	
10	GND	Ground		
11	O_RxIN1-	LVDS Differential Data INPUT (Odd G1-G5,B0-B1)	Negative	
12	O_RxIN1+	LVDS Differential Data INPUT (Odd G1-G5,B0-B1)	Positive	
13	GND	Ground		
14	O_RxIN2-	LVDS Differential Data INPUT (Odd B2-B5,Sync,DE)	Negative	
15	O_RxIN2+	LVDS Differential Data INPUT (Odd B2-B5,Sync,DE)	Positive	
16	GND	Ground		
17	O_RxCLK-	LVDS Differential Data INPUT (Odd Clock)	Negative	
18	O_RxCLK+	LVDS Differential Data INPUT (Odd Clock)	Positive	
19	GND	Ground		
20	E_RxIN0-	LVDS Differential Data INPUT (Even R0-R5,G0	Negative	
21	E_RxIN0+	LVDS Differential Data INPUT (Even R0-R5,G0)	Positive	
22	GND	Ground		
23	E_RxIN1-	LVDS Differential Data INPUT (Even G1-G5,B0-B1)	Negative	
24	E_RxIN1+	LVDS Differential Data INPUT (Even G1-G5,B0-B1)	Positive	
25	GND	Ground		
26	E_RxIN2-	LVDS Differential Data INPUT (Even B2-B5,Sync,DE)	Negative	
27	E_RxIN2+	LVDS Differential Data INPUT (Even B2-B5,Sync,DE)	Positive	
28	GND	Ground		
29	E_RxCLK-	LVDS Differential Data INPUT (Even Clock)	Negative	
30	E_RxCLK+	LVDS Differential Data INPUT (Even Clock)	Positive	

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5.2 LVDS Interface : Transmitter DS90CF363 or Compatible

LVDS for Odd pixel

Pin No.	Name	RGB Signal	Pin No.	Name	RGB Signal
44	TxIN0	RO0	12	TxIN11	GO5
45	TxIN1	RO1	13	TxIN12	BO0
47	TxIN2	RO2	15	TxIN13	BO1
48	TxIN3	RO3	16	TxIN14	BO2
1	TxIN4	RO4	18	TxIN15	BO3
3	TxIN5	RO5	19	TxIN16	BO4
4	TxIN6	GO0	20	TxIN17	BO5
6	TxIN7	GO1	22	TxIN18	Hsync
7	TxIN8	GO2	23	TxIN19	Vsync
9	TxIN9	GO3	25	TxIN20	DE
10	TxIN10	GO4	26	TxCLK IN	Clock

LVDS for Even pixel

Pin No.	Name	RGB Signal	Pin No.	Name	RGB Signal
44	TxIN0	RE0	12	TxIN11	GE5
45	TxIN1	RE1	13	TxIN12	BE0
47	TxIN2	RE2	15	TxIN13	BE1
48	TxIN3	RE3	16	TxIN14	BE2
1	TxIN4	RE4	18	TxIN15	BE3
3	TxIN5	RE5	19	TxIN16	BE4
4	TxIN6	GE0	20	TxIN17	BE5
6	TxIN7	GE1	22	TxIN18	N/C
7	TxIN8	GE2	23	TxIN19	N/C
9	TxIN9	GE3	25	TxIN20	N/C
10	TxIN10	GE4	26	TxCLK IN	Clock

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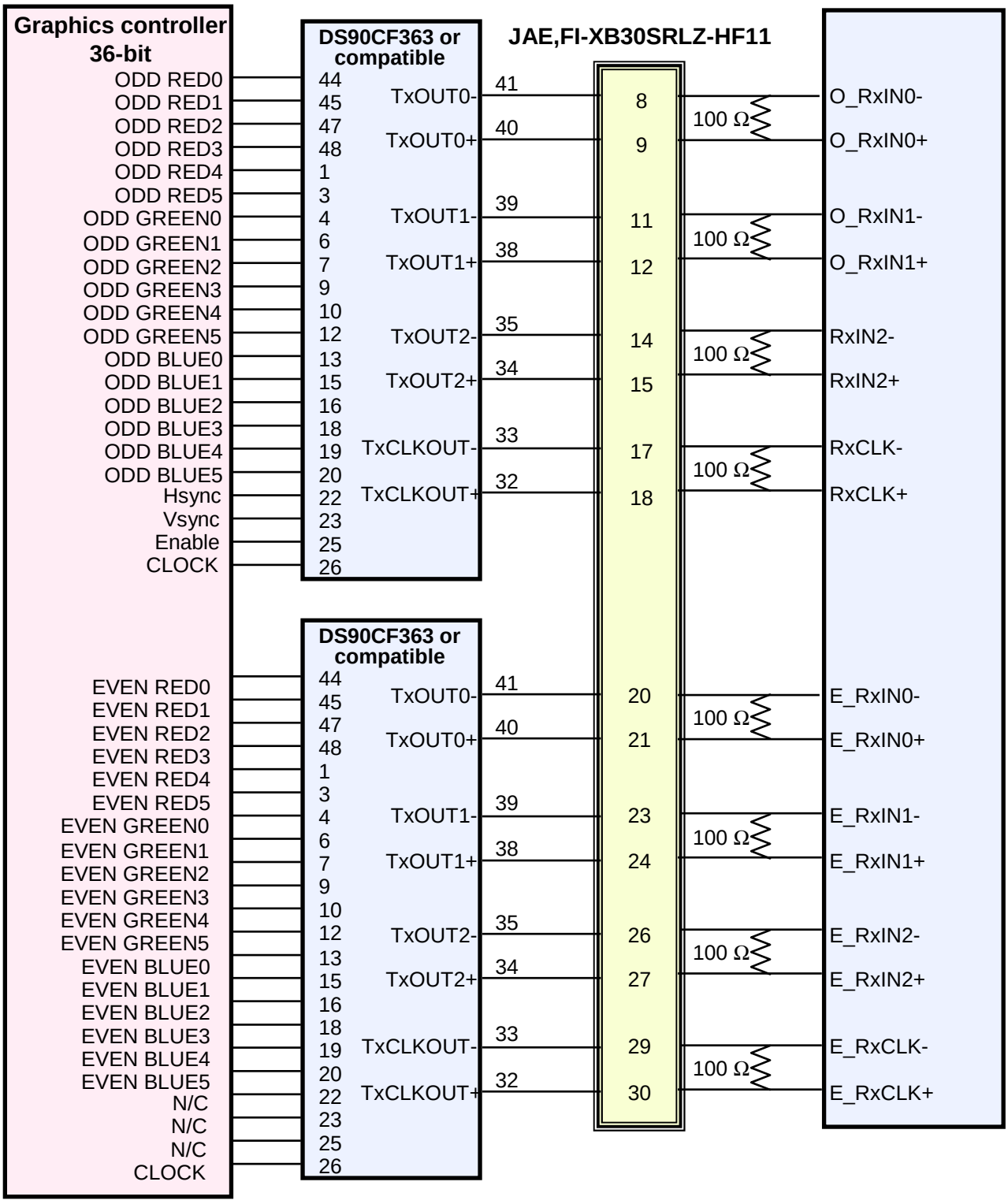
LVDS Interface



Note : The LCD Module uses a 100ohm resistor between positive and negative lines of each receiver input.

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5.3 BACK LIGHT UNIT

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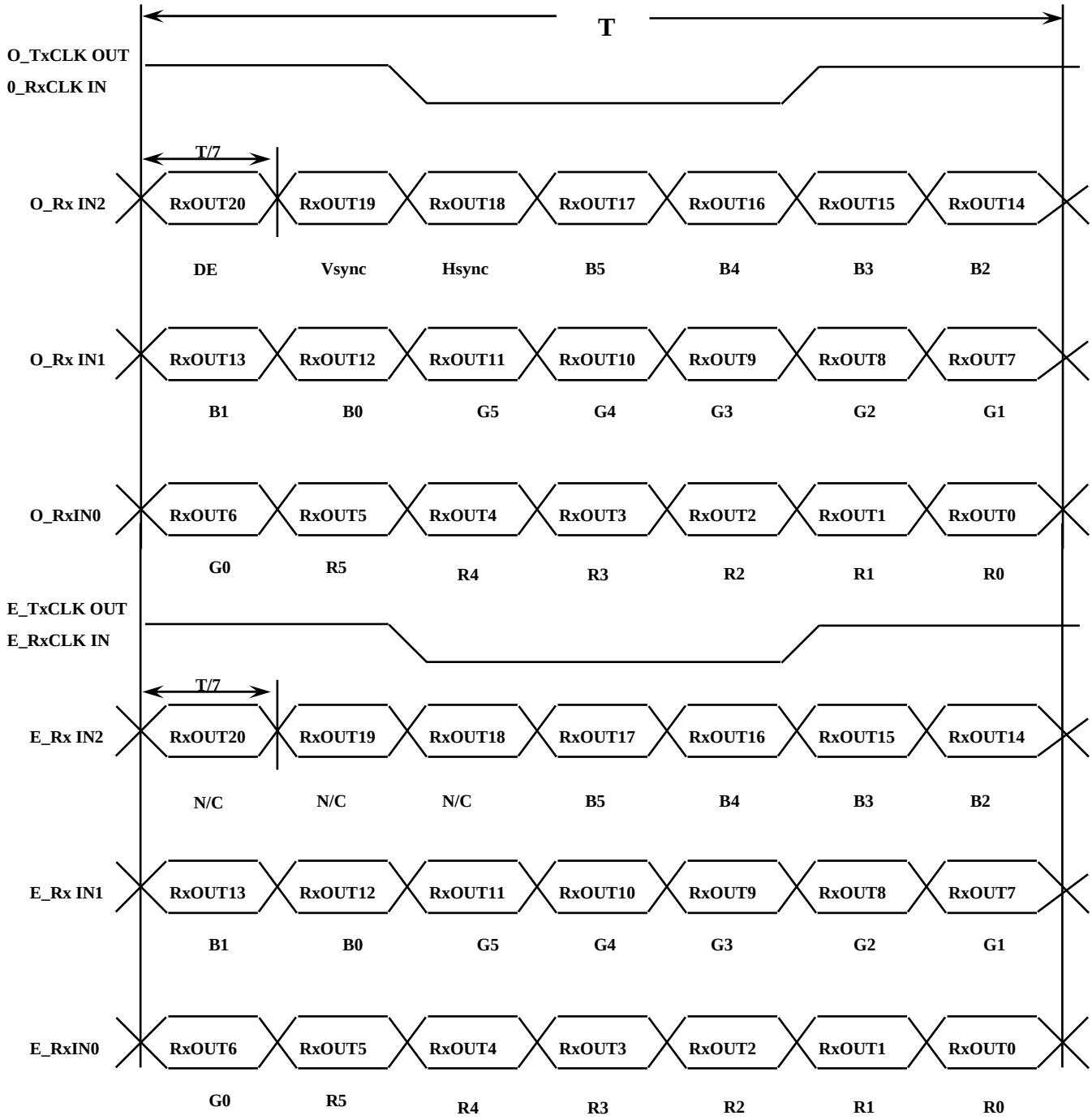
Connector : JST BHSR - 02VS -1
Mating Connector : SM02B-BHSS-1(JST)

Pin NO.	Symbol	Color	Function
1	HOT	Pink/Blue	High Voltage
2	COLD	White/Black	Low Voltage

5.4 Timing Diagrams of LVDS For Transmission

LVDS Receiver : Integrated T-CON



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5.5 Input Signals, Basic Display Colors and Gray Scale of Each Color

Color	Display	Data Signal																		Gray Scale Level
		Red						Green						Blue						
		R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	45	B5	
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	-
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	-
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	-
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	-
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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	-
Gray Scale Of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0
	Dark	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
	↑	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R60
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	↓	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	R61
	Light	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	R62
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	R63
Gray Scale Of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0
	Dark	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	G1
	↑	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	G2
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G60
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	↓	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	G61
	Light	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	G62
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	G63
Gray Scale Of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0
	Dark	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	B1
	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	B2
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B60
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	↓	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	B61
	Light	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	B62
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	B63

Note 1) Definition of gray :
Rn: Red gray, Gn: Green gray, Bn: Blue gray (n=gray level)
Note 2)Input signal: 0 =Low level voltage, 1=High level voltage

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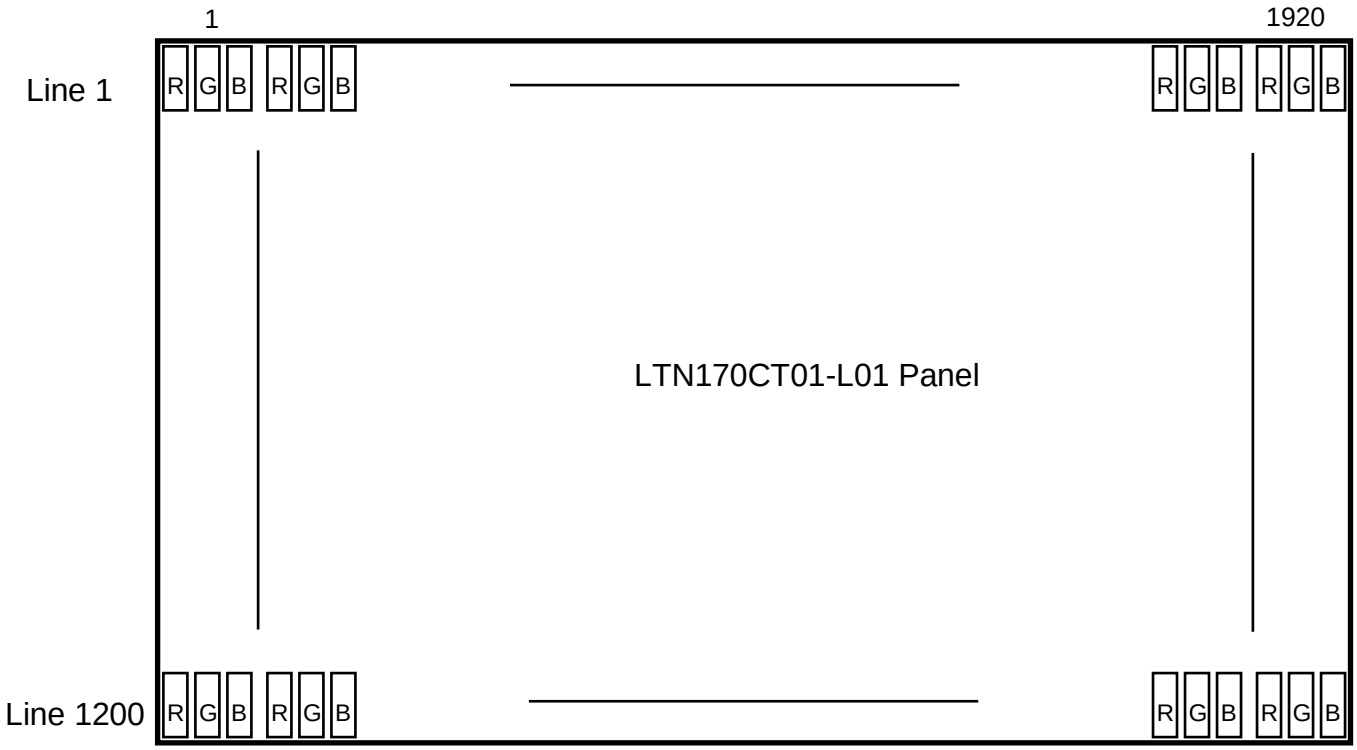
5.6 Pixel Format in the display



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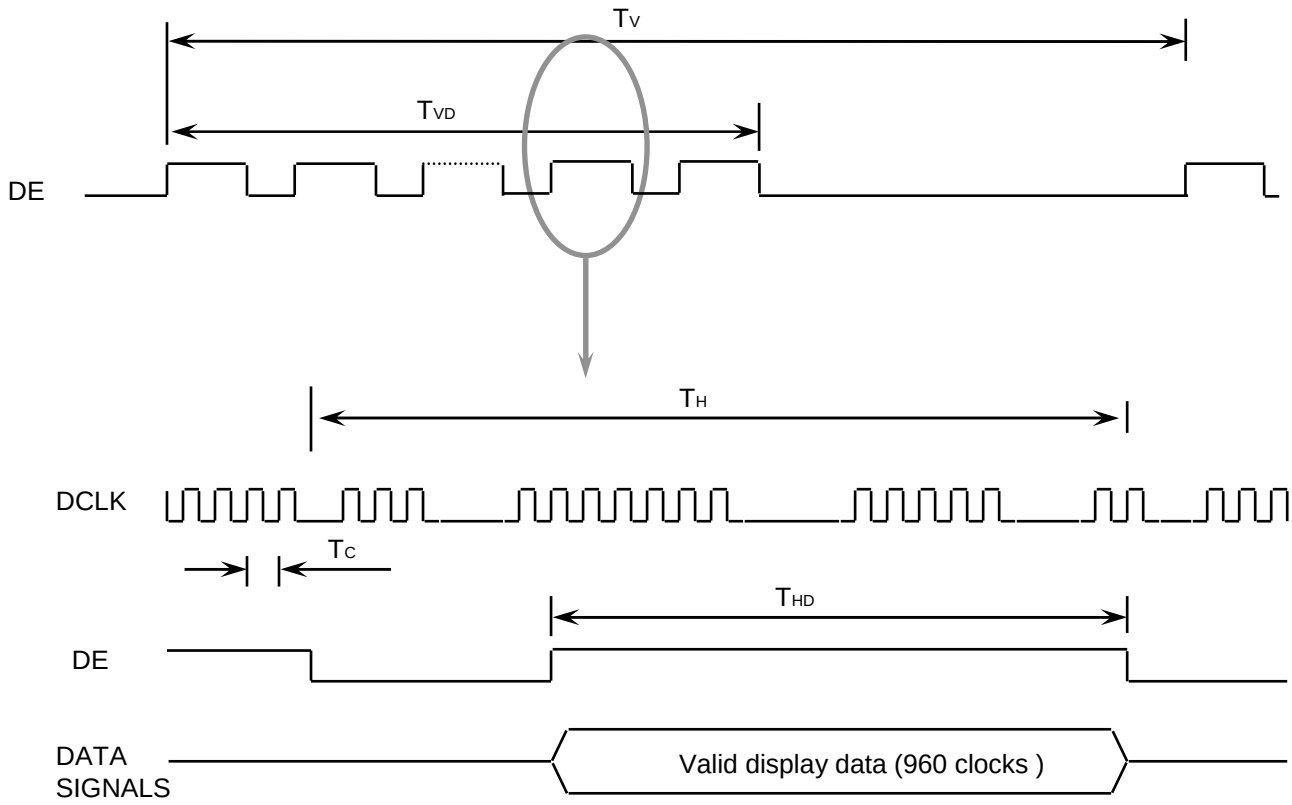
6. INTERFACE TIMING

6.1 Timing Parameters

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Frame Frequency	Cycle	TV	1205	1220	1400	Lines	
Vertical Active Display Term	Display Period	TVD	-	1200	-	Lines	
One Line Scanning Time	Cycle	TH	1102	1104	1460	Clocks	
Horizontal Active Display Term	Display Period	THD	-	960	-	Clocks	

6.2 Timing diagrams of interface signal



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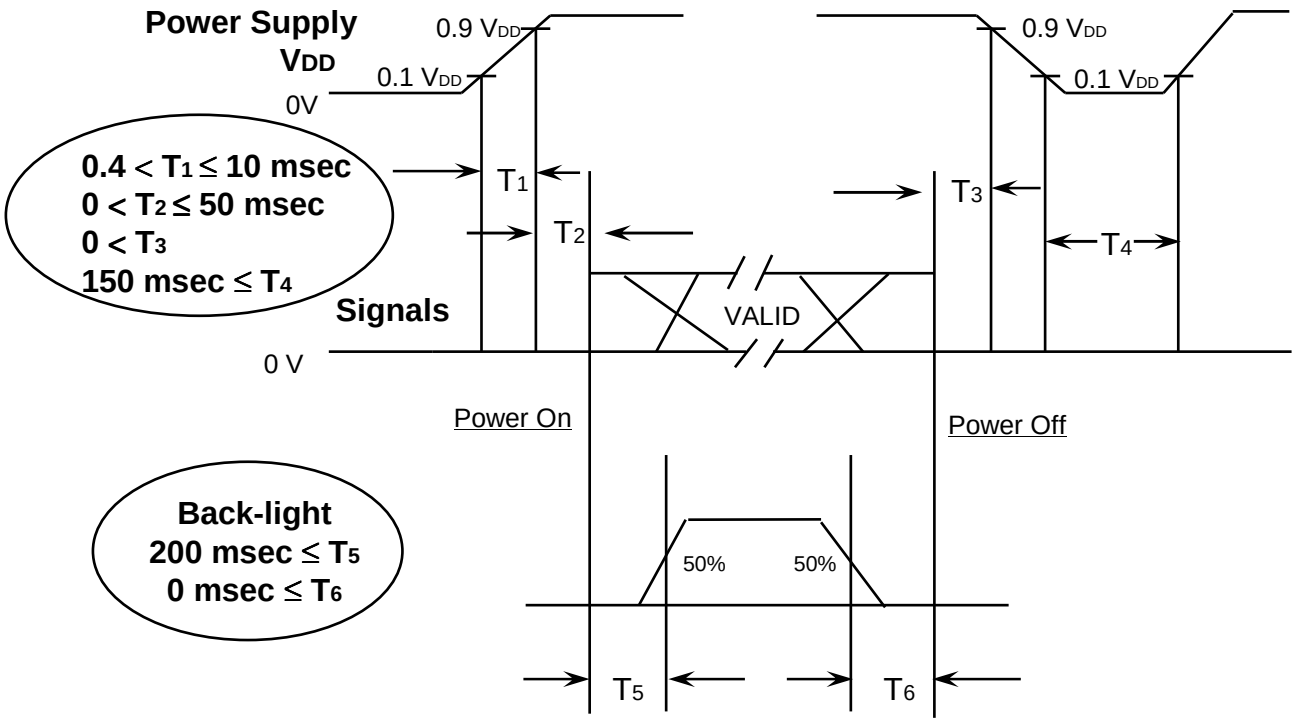
6.3 Power ON/OFF Sequence

: To prevent a latch-up or DC operation of the LCD module, the power on/off sequence should be as the diagram below.



Power ON/OFF Sequence

T1 : Vdd rising time from 10% to 90%
T2 : The time from Vdd to valid data at power ON.
T3 : The time from valid data off to Vdd off at power Off.
T4 : Vdd off time for Windows restart
T5 : The time from valid data to B/L enable at power ON.
T6 : The time from valid data off to B/L disable at power Off.

NOTE.

(1) The supply voltage of the external system for the module input should be the same as the definition of V_{DD}.

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

(3) In case of V_{DD} = off level, please keep the level of input signals on the low or keep a high impedance.

(4) T4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

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7. Mechanical Outline Dimension

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[Refer to the next page]

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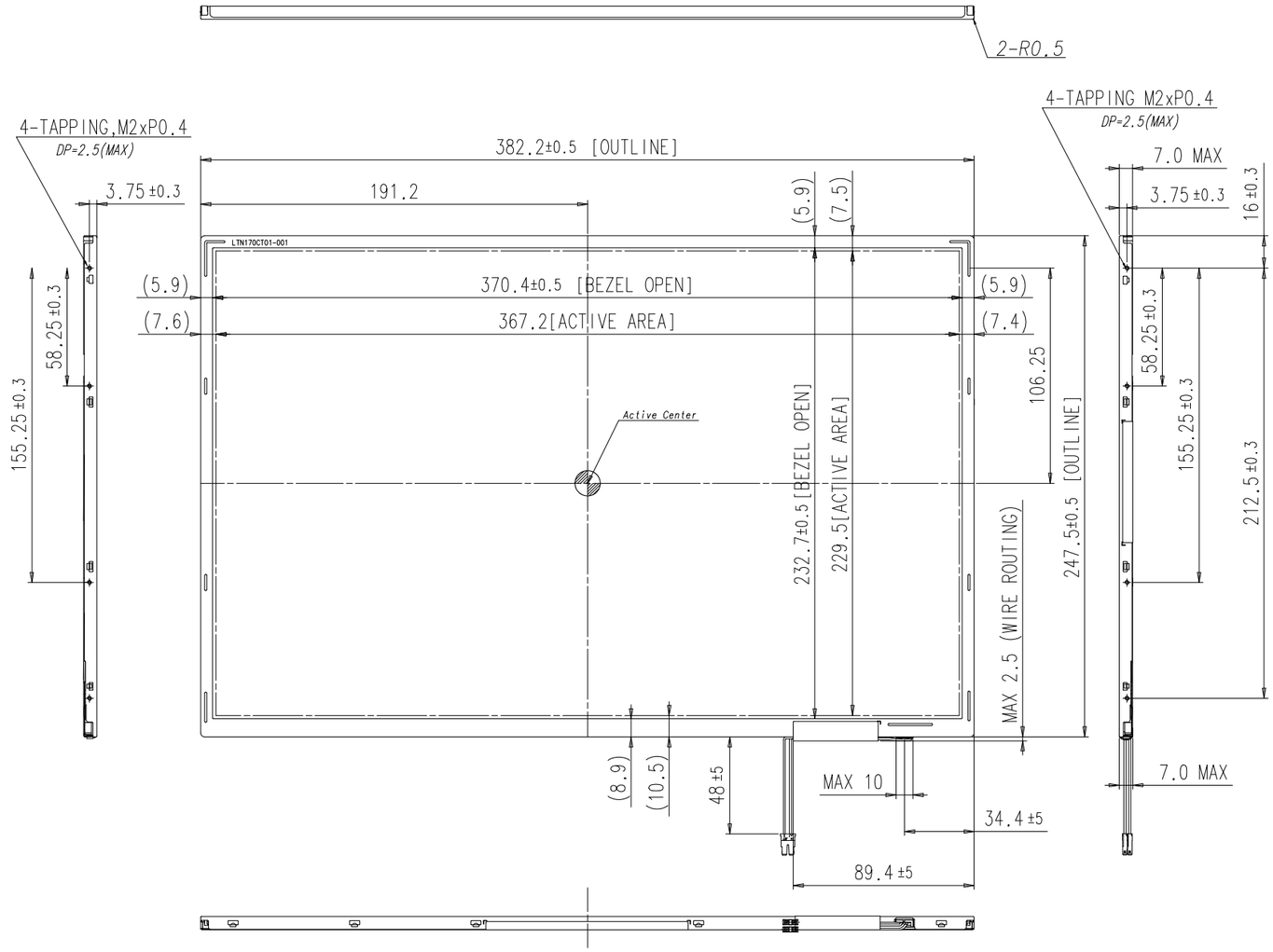
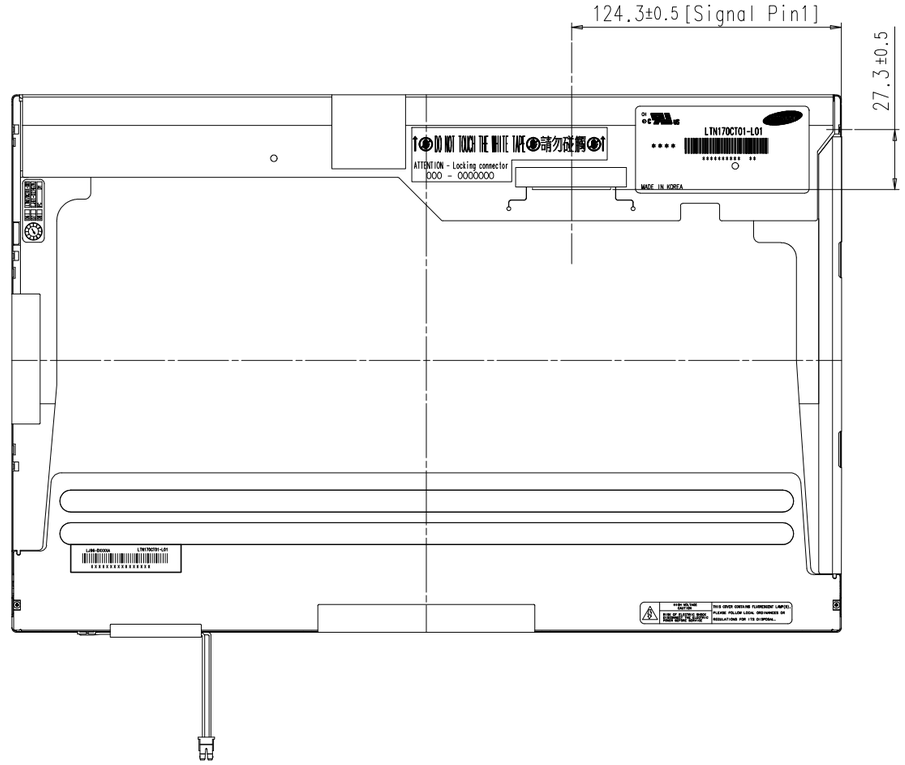
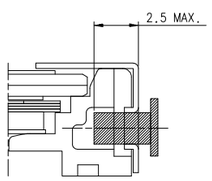
NO	PART NAME	CODE NO	SPECIFICATION	Q'TY	SPEC NO.	REMARK
1	OUTLINE	LTN170CT01-L01				

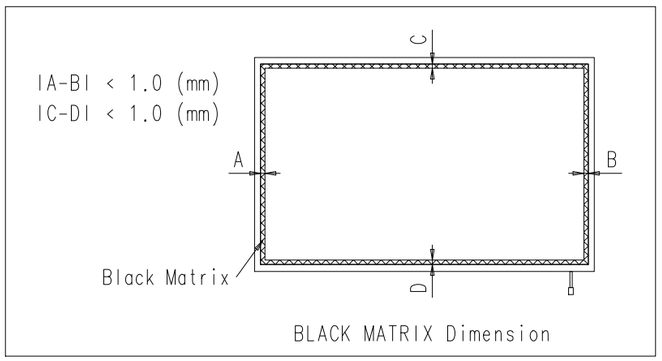
PRELIMINARY







USERHOLE SCREW PENETRATION DEPTH SPEC.



BLACK MATRIX Dimension

*NOTE

1. SIGNAL INTERFACE CONNECTOR TO BE SPECIFIED AS BELOW.
   - MAKER : JAE
   - PART NO : FI-XB30SRLZ-HF11
2. CCFT CONNECTOR FOR BACKLIGHT TO BE SPECIFIED AS BELOW.
   - MAKER : JST
   - PART NO : BHSR-02VS-1
   - LAMP DIAMETER : ø2.0
3. CALIFERS MEASURING FORCE :750 ± 250 gf
4. USER HOLE TORQUE SPEC : 2.3kgfcm MIN./ 3.0kgfcm MAX. (5TIMES)
5. WEIGHT SPEC : 780g MAX.

GENERAL TOLERANCE			
STEP	LEVEL 1	LEVEL 2	LEVEL 3
0 < X ≤ 4	±0.05	±0.1	±0.2
4 < X ≤ 16	±0.08	±0.15	±0.3
16 < X ≤ 64	±0.12	±0.25	±0.5
64 < X ≤ 256	±0.25	±0.4	±0.8

REV	DATE	DESCRIPTION OF REVISION	DRA'N BY	DES'D BY	CHK'D BY	APP'D BY
		08.02.11 update (userhole screw spec., BM width etc.)				
UNIT	mm		JUNU.YOU			D.C.YANG
SCALE	1/1					2008.02.11
GENERAL TOLERANCE	±0.5		2008.02.11			SPEC. NO
SAMSUNG ELECTRONICS						00507282-000

CUSTOMER REQUEST			
REASON			CHK'D BY
MODEL NAME	LTN170CT01-L01		
PART/SHEET NAME	OUTLINE DIMENSION	SHEET	1/1
CODE NO.	-	VER.	000

REVISION 0

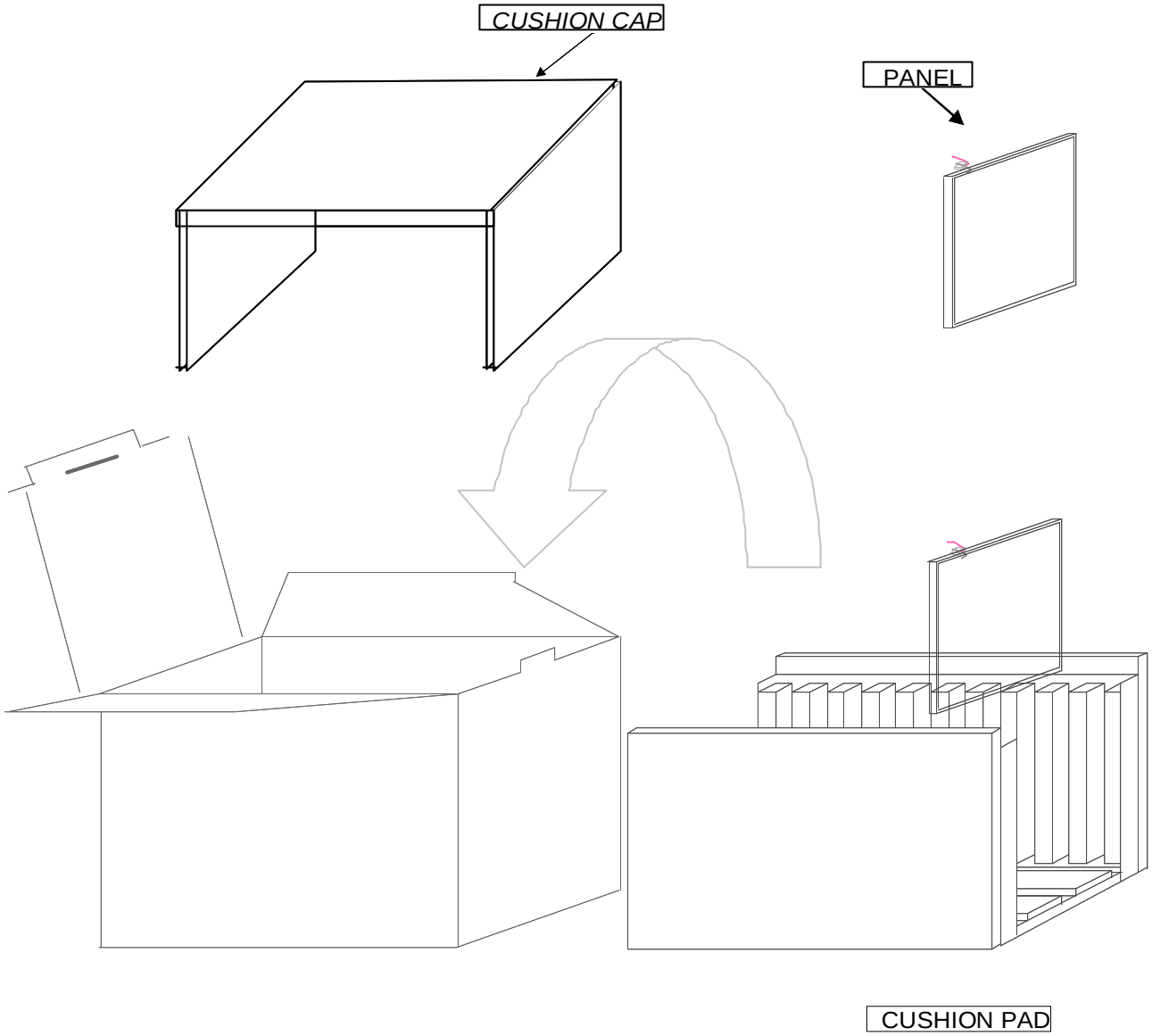
8. PACKING

1. CARTON(Internal Package)

(1) Packing Form

Corrugated Cardboard box and Corrupad form as shock absorber

(2) Packing Method



Note 1)Total Weight : Approximately 10 kg

2) Acceptance number of piling : 10 sets

3) Carton size : 376(W)×326(D)×404(H)

PACKING CASE

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No	Part name	Quantity
1	Static electric protective sack	10
2	Packing case (Inner box) included shock absorber	1 set
3	Pictorial marking	2 pcs
4	Carton	1 set

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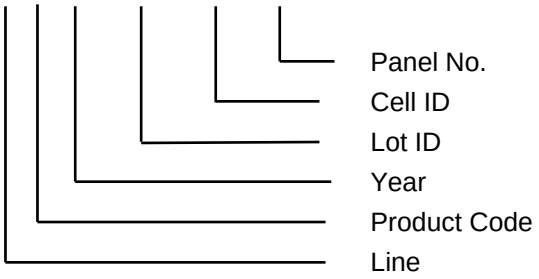
9. Product Markings and Others

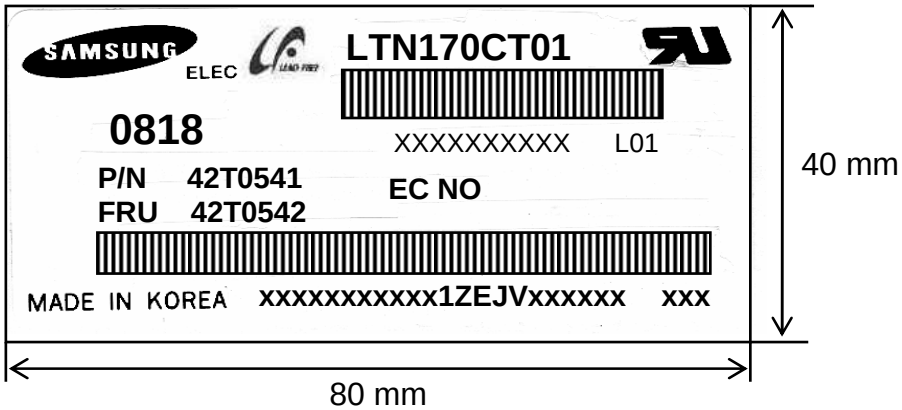
A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

(1)Parts number : LTN170CT01
(2)Revision : Three letter
(3)Control code : One letter
(4)Lot number : X X X X X X X X X X

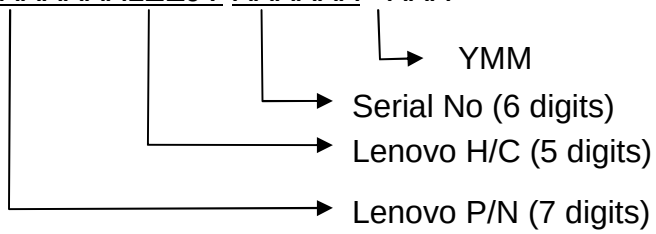


NOTE 1). This code indicating year is omitted in the products of Cheon-an site.

(5) Product Label Definition



TFT-LCD Product name	: LTN170CT01
Lot number	: XXXXXXXXXX
Revision Code	: L01
Inspected work week	: 0818(2008 Year, 18th week)
P/N	: Lenovo Part Number (42T0541)
EC NO	: Engineering Change Number (Blank)
FRU	: Field Replaceable Unit Part Number(42T0542)
Header Code	: 1ZEJV
Lenovo Barcode	: XXXXXXXXXXX1ZEJV XXXXXX XXX



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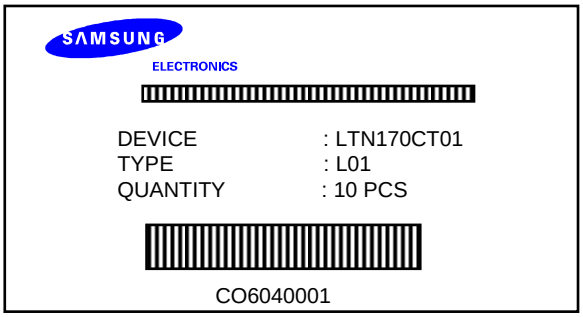
This HIGH VOLTAGE CAUTION is carved in mold frame

(6) Packing small box attach



(7) Packing box Marking : Samsung TFT-LCD Brand Name

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10. GENERAL PRECAUTIONS

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1. Handling

(a) When the module is assembled, It should be attached to the system firmly using every mounting holes. Be careful not to twist and bend the modules.

(b) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module and CCFT back-light.

(c) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a HB pencil lead.

(d) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, Staining and discoloration may occur.

(e) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(f) The desirable cleaners are water, IPA (Isoprophyl Alcohol) or Hexane.
Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(g) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

(h) Protect the module from static , it may cause damage to the C-MOS Gate Array IC.

(i) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(j) Do not disassemble the module.

(k) Do not pull or fold the lamp wire.

(l) Do not adjust the variable resistor which is located on the back side.

(m) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(n) Pins of I/F connector shall not be touched directly with bare hands.

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2. STORAGE

(a) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%.

(b) Do not store the TFT-LCD module in direct sunlight.

(c) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

3. OPERATION

(a) Do not connect,disconnect the module in the " Power On" condition.

(b) Power supply should always be turned on/off by following item 6.3 " Power on/off sequence ".

(c) 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 interference.

(d) The cable between the back-light connector and its inverter power supply shall be a minimized length and be connected directly . The longer cable between the back-light and the inverter may cause lower luminance of lamp(CCFT) and may require higher startup voltage (Vs).

(e) The standard limited warranty is only applicable when the module is used for general notebook applications. If used for purposes other than as specified, SEC is not to be held reliable for the defective operations. It is strongly recommended to contact SEC to find out fitness for a particular purpose.

4. OTHERS

(a) Ultra-violet ray filter is necessary for outdoor operation.

(b) Avoid condensation of water. It may result in improper operation or disconnection of electrode.

(c) Do not exceed the absolute maximum rating value. (the supply voltage variation, input voltage variation, variation in part contents and environmental temperature, so on) Otherwise the module may be damaged.

(d) If the module displays the same pattern continuously for a long period of time,it can be the situation when the image "sticks" to the screen.

(e) This module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

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11. EDID

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Address (HEX)	FUNCTION	Value HEX	BIN	DEC	ASCII or Data	Notes
00	Header	00	00000000	0		EDID Header
01		FF	11111111	255		
02		FF	11111111	255		
03		FF	11111111	255		
04		FF	11111111	255		
05		FF	11111111	255		
06		FF	11111111	255		
07		00	00000000	0		
08	ID Manufacturer Name	30	00110000	48	L	3 character ID
					E	
09		AE	10101110	174	N	"IBM" as an end-customer
0A	ID Product Code	67	01100111	103		#WUXGA (4067, High Brt)
0B		40	01000000	64		
0C	32-bit serial no.	00	00000000	0		
0D		00	00000000	0		
0E		00	00000000	0		
0F		00	00000000	0		
10	Week of manufacture	00	00000000	0		
11	Year of manufacture	12	00010010	18	2008	2007
12	EDID Structure Ver.	01	00000001	1	1	EDID Ver. 1.0
13	EDID revision #	03	00000011	3	3	EDID Rev. 3
14	Video input definition	80	10000000	128		
15	Max H image size	25	00100101	37	37	37 cm(approx)
16	Max V image size	17	00010111	23	23	23 cm(approx)
17	Display Gamma	78	01111000	120	2.2	Gamma 2.2
18	Feature support	EA	11101010	234		
19	Red/green low bits	87	10000111	135		10000111
1A	Blue/white low bits	F5	11110101	245		11111110
1B	Red x/ high bits	94	10010100	148	0.580	Red x 0.569=
						1001010010
1C	Red y	57	01010111	87	0.340	Red y 0.332=
						0101011100
1D	Green x	4F	01001111	79	0.310	Green x 0.312=
						0100111101
1E	Green y	8C	10001100	140	0.550	Green y 0.544=
						1000110011
1F	Blue x	27	00100111	39	0.155	Blue x 0.149=
						001001111
20	Blue y	27	00100111	39	0.155	Blue y 0.132=
						001001111
21	White x	50	01010000	80	0.313	White x 0.313=
						0101000001
22	White y	54	01010100	84	0.329	White y 0.329=
						0101010001
23	Established timing 1	00	00000000	0		
24	Established timing 2	00	00000000	0		
25	Established timing 3	00	00000000	0		

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26	Standard timing #1	01	00000001	1		not used
27		01	00000001	1		
28	Standard timing #2	01	00000001	1		not used
29		01	00000001	1		
2A	Standard timing #3	01	00000001	1		not used
2B		01	00000001	1		
2C	Standard timing #4	01	00000001	1		not used
2D		01	00000001	1		
2E	Standard timing #5	01	00000001	1		not used
2F		01	00000001	1		
30	Standard timing #6	01	00000001	1		not used
31		01	00000001	1		
32	Standard timing #7	01	00000001	1		not used
33		01	00000001	1		
34	Standard timing #8	01	00000001	1		not used
35		01	00000001	1		
36	Detailed timing/monitor descriptor #1	23	00100011	35	161.63	Main clock= 161.63 MHz
37		3F	00111111	63		
38		80	10000000	128	1920	Hor active=960*2 pixels
39		20	00100000	32	288	Hor blanking=288 pixels
3A		71	01110001	113		4bit : 4bit
3B		B0	10110000	176	1200	Vertcal active=1200 lines
3C		14	00010100	20	20	Vertical blanking=20 lines
3D		40	01000000	64		4bit : 4bit
3E		30	00110000	48	48	Hor sync. Offset=64 pixels
3F		20	00100000	32	32	H sync. Width=32 pixels
40		26	00100110	38	2 6	V sync. Offset=2 lines V sync. Width=6 lines
41		00	00000000	0		2bit : 2bit :2bit :2bit
42		6F	01101111	111	367	H image size= 367 mm(approx)
43		E6	11100110	230	230	V image size = 230 mm(approx)
44		10	00010000	16		
45		00	00000000	0		No Horizontal Border
46		00	00000000	0		No Vertical Border
47		19	00011001	25		
48	Detailed timing/monitor descriptor #2	9C	10011100	156	134.68	Main clock= 134.68 MHz (@50Hz)
49		34	00110100	52		
4A		80	10000000	128	1920	Hor active=960*2 pixels
4B		20	00100000	32	288	Hor blanking=288 pixels
4C		71	01110001	113		4bit : 4bit
4D		B0	10110000	176	1200	Vertcal active=1200 lines
4E		14	00010100	20	20	Vertical blanking=20 lines
4F		40	01000000	64		4bit : 4bit
50		30	00110000	48	48	Hor sync. Offset=48 pixels
51		20	00100000	32	32	H sync. Width=32 pixels
52		26	00100110	38	2 6	V sync. Offset=2 lines V sync. Width=6 lines
53		00	00000000	0		2bit : 2bit :2bit :2bit
54		6F	01101111	111	367	H image size= 367 mm(approx)
55		E6	11100110	230	230	V image size = 230 mm(approx)
56		10	00010000	16		
57		00	00000000	0		No Horizontal Border
58		00	00000000	0		No Vertical Border
59		19	00011001	25		

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5A	descriptor #3	00	00000000	0		Manufacturer Specified (Timing)
5B		00	00000000	0		
5C		00	00000000	0		
5D		0F	00001111	15		
5E		00	00000000	0		
5F		D1	11010001	209	209	**(Horizontal active pixel /8)-31**
60		0A	00001010	10	10	**Image Aspect Ratio(16:10)**
61		32	00110010	50	50	**Low Refresh Rate #1(50Hz)**
62		D1	11010001	209	209	**(Horizontal active pixel /8)-31**
63		0A	00001010	10	10	**Image Aspect Ratio(16:10)**
64		28	00101000	40	40	**Low Refresh Rate #1(40Hz)**
65		28	00101000	40	40	**Brightness(1/10nit)**
66		01	00000001	1		**Feature flag(TN mode)**
67		00	00000000	0		
68		4C	01001100	76		**supplier ID "SEC"**
69		A3	10100011	163		
6A		43	01000011	67	[C]	**Product code "CT"**
6B		54	01010100	84	[T]	**(Hex, LSB first)**
6C	Detailed timing/monitor descriptor #4	00	00000000	0		Monitor Name Tag (ASCII)
6D		00	00000000	0		
6E		00	00000000	0		
6F		FE	11111110	254		
70		00	00000000	0		
71		4C	01001100	76	[L]	
72		54	01010100	84	[T]	
73		4E	01001110	78	[N]	
74		31	00110001	49	[1]	
75		37	00110111	55	[7]	
76		30	00110000	48	[0]	
77		43	01000011	67	[C]	
78		54	01010100	84	[T]	
79		30	00110000	48	[0]	
7A		31	00110001	49	[1]	
7B		4C	01001100	76	[L]	
7C		30	00110000	48	[0]	
7D		31	00110001	49	[1]	
7E	Extension Flag	00	00000000	0		
7F	Checksum	**CE**	11001110	**206**		

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