



TFT-LCD MONITOR

Product Information

Preliminary

MODEL NO. : T190E1D1 v.1

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Prepared by : Nicholas Shih

Nicholas Shih, Engineer, Product Development Div.

Approved by : Jackey Chien

Jackey Chien, Director, Product Development Div.

This TFT LCD Monitor is distributed by:



Display Solution AG
Talhofstraße 32a
D-82205 Gilching
GERMANY
Fon +49 (0)8105 / 73 403 - 0
Fax +49 (0)8105 / 73 403 - 79
E-Mail: info@display-solution.com
Internet: www.display-solution.com

This product specification is subject to change without any notice.



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1.0 Handling Precaution

- 1.) Handle with care. Pay attention not to press or scratch the surface of the monitor, especially the polarizer. Do not twist or bend the monitor. It may cause un-recoverable damage.
- 2.) Do not drop or bump the monitor since this monitor contains fragile glass components. Breakage of this monitor might cause leakage of the liquid crystal sealed inside the glasses. Do not touch the liquid crystal liquid in case of leakage. **Flush with massive water immediately in case of contact with your skin by liquid crystal fluid and call for doctor for immediate medical treatment.**
- 3.) Be sure to turn off power supply while plug or un-plug the power input connector.
- 4.) Clean up the polarizer only with soft solvent if necessary. The desirable cleaners are water, IPA(Isopropyl Alcohol) or Hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, toluene, Ethyl acid or Methyl chloride. It will permanently damage the polarizer due to chemical reaction. 5.) Wipe off fluid drop immediately to prevent from possible discoloration or spots on the polarizer.
- 6.) Do not twist nor bend the monitor structure, even momentarily. Bending or twisting torque may likely damage the internal components of the monitor.
- 7.) The cold cathode fluorescent lamp in LCD contains small amount of mercury (Hg). Please refer to the design specification for application and the local regulations and environmental laws for disposal purpose.
- 8.) Protect the monitor from static environment to prevent from damage to the CMOS gate array IC.



2.0 General Description

T190E1D1 v.1 is a 19 inch (5:4 aspect ratio) color active matrix TFT LCD monitor with excellent display performance driven by a pure **DIGITAL** LVDS interface assembled in a compact and slim **LED backlight** unit. This LCD supports 1280(H) x RGB x 1024(V) stripe color pixel format and 16.7M colors (RGB 8 bits) with vivid color image. Its outstanding performances with high color saturation of 72%, ultra high brightness, **800 nits(typ.)**, super wide viewing angle(160°/160°) and ultra high contrast ratio 800:1, make this LCD module very suitable for terminal and video applications at outdoors.

2.1 General Applications

- Display terminal for applications of Video, Industrial, Medical, Gaming, Amusement, Advertisement or more.

2.2 Main Features

- 5:4 1280 x RGB x 1024 Display Aspect Ratio
- LED Backlight with Sunlight Readable Brightness of 800 nits
- Excellent Brightness at Low Temperature, 800 nits @ -20 °C
- Extremely Wide Dimming Range
- Super Wide Viewing Angle
- High Contrast Ratio
- High Color Saturation of 72%
- Pure 2ch Digital LVDS (Low Voltage Differential Signaling) Interface
- DE (Data Enable) Mode
- All-in-one Design, LED driver Enclosed
- RoHS Compliance & High Safety Product

2.3 General Information

2.3.1 Display Characteristics

Item	Specification	Unit	Note
Display Area (HxV)	376.3 x 301.1	mm	19" Diagonal
Driver Element	a-Si TFT Active Matrix	-	-
Number of Pixels (HxV)	1280 x RGB x 1024	pixel	Std. 5:4
Pixel Arrangement	R.G.B Vertical Stripe	-	-
Dot Pitch (HxV)	(0.098x3) x 0.294	mm	Dot
Viewing Angle (H/V)	160/160	degree	6 o'clock
Signal Interface	Digital RGB 24 bits (2 ch LVDS)		16.7M colors
Display Mode	Normally White	-	-



2.3.2 Mechanical Dimensions

Item		Min.	Typ.	Max.	Unit	Note
Dimension	Horizontal		396.0		mm	±0.5 mm
	Vertical		324.0			±0.5 mm
	Depth	-	17.5			+0.5 mm
Weight		-	-	2500	g	±10 g

3.0 Absolute Maximum Ratings

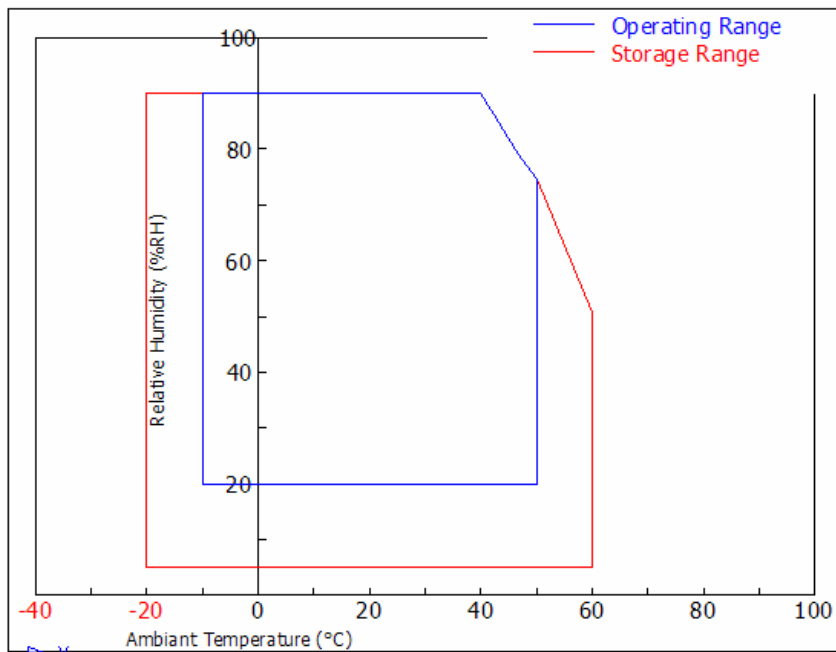
3.1 Absolute Ratings of Environment Requirement

Item	Symbol	Min.	Max.	Unit	Note
Storage Temperature	Tstg	-20	+ 60	°C	
Operation Temperature (Ambient Temperature)	Top	-10	+ 50	°C	

Note (1) Temperature and relative humidity range are shown in the figure below.

95% RH Max. ($40^{\circ}\text{C} > T_a$)

Maximum wet – bulb temperature at 39°C or less. ($T_a > 40^{\circ}\text{C}$) No condensation.





3.2 Electrical Absolute Ratings

3.2.1 TFT-LCD Module

(Ta=25±2°C), GND=0V)

Item	SYMBOL	Min.	Max.	UNIT	NOTE
Power Supply Voltage	V _{CC-in}	-0.3	5.5	V	(1),(2)

3.2.2 Backlight Module(LED Driver)

Item	SYMBOL	MIN	MAX	UNIT	NOTE
Input DC Voltage	V _{BL}		15	V	(1),(2)

Note (1) Within operating temperature

Note (2) 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.



4.0 Optical Characteristics

The following items are measured under stable conditions in a dark room or equivalent state.

* Measuring Equipment: BM-5A, PR-650

($V_{cc-in}=5V$, $f_v=60Hz$, $T_a=25\pm 2^\circ C$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio	CR	At optimized Viewing Angle	600	800	-	-	(1)(2) (4)	
Response Time at 25°C	Rising	$\theta=0^\circ$	-	15	-	ms	(3)	
	Falling		-	5	-			
Luminance(center)	Y_L	$V_{DIM=max}$	700	800	-	cd/m ²	(1)(2) (6)	
Color Chromaticity (CIE 1931)	White	W_X	$\theta=0^\circ$	-	TBD	-	(2)(6)	
		W_Y	$\theta=0^\circ$	-	TBD	-		
Viewing Angle	Hor.	θ_L	CR \geq 10 at center point	-	80	-	Degree	(2)(5)
		θ_R		-	80	-		
	Ver.	θ_H		-	80	-		
		θ_L		-	80	-		

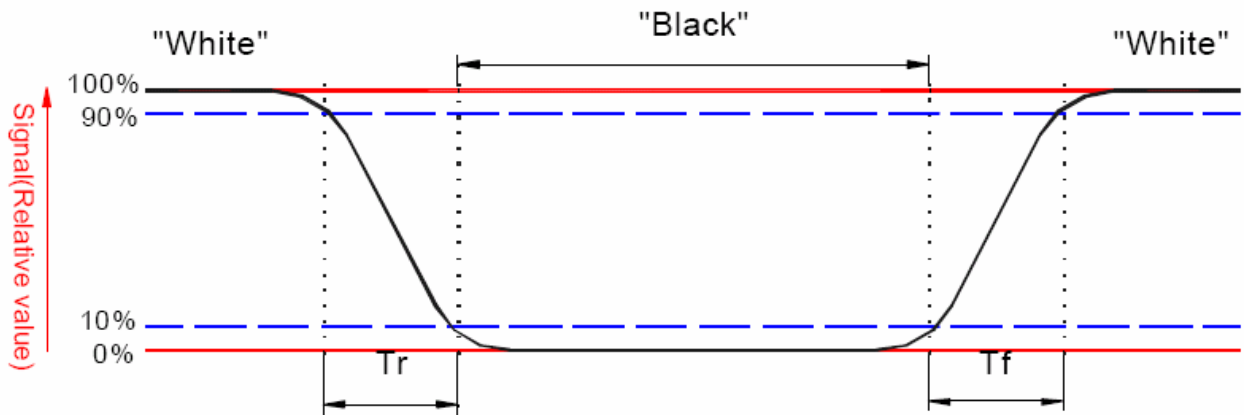
Note (1) : Ambient temperature =25°C , and , using the Mode 2 of LED control scheme and $V_{DIM}=0V$ to get the maximum brightness. To be measured in the dark room.

Note (2) : To be measured on the center area of panel with a viewing cone of 1° by Topcon Luminance Meter BM-5, after 10 minutes operation.

Note (3) : Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively.

The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.

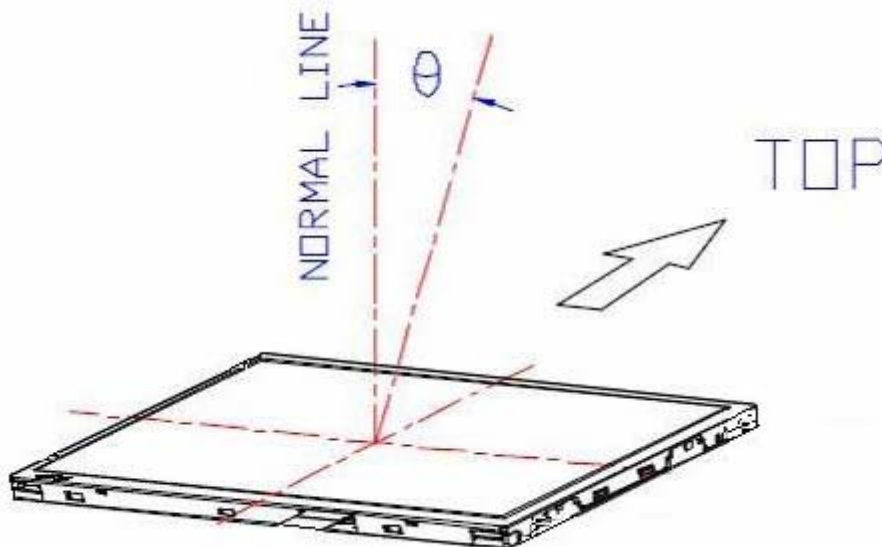


Note (4) : Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note (5) : Definition of viewing angle, Refer to figure as below.



Note (6) : Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.



5.0 Electrical Characteristics

5.1 AC Timing Characteristics

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	Fc	45	54	68	MHz	-
	Period	Tc	14.71	18.52	22.22	ns	
Vertical Active Display Term	Frame Rate	Fr	56	60	75	Hz	Tv=Tvd+Tvb
	Total	Tv	1044	1066	1300	Th	-
	Display	Tvd	1024	1024	1024	Th	-
	Blank	Tvb	20	42	Tv-Tvd	Th	-
Horizontal Active Display Term	Total	Th	710	844	980	Tc	Th=Thd+Thb
	Display	Thd	640	640	640	Tc	-
	Blank	Thb	70	204	Th-Thd	Tc	-

Note : (1) Hsync and Vsync input signals should be set to low logic level or ground because this LCD module is operated by "DE only" mode. Otherwise, this module would operate abnormally.

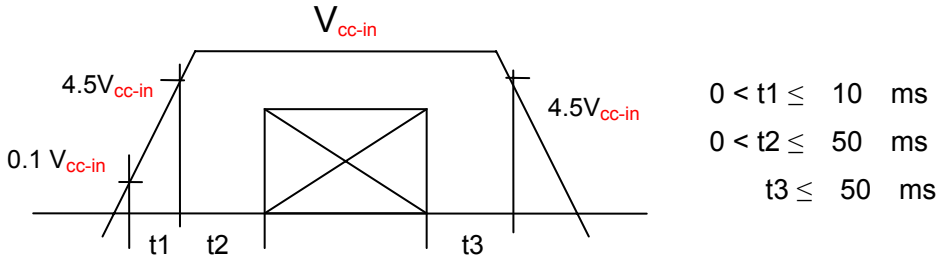
5.2 DC Characteristics

5.2.1 TFT-LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply	V _{cc-in}	4.5	5.0	5.5	V	(1)
	I _{cc-in}	-	1.5	1.7	A	V _{cc-in} =+5V
Permissive Input Ripple Voltage	V _{RF}	100	-	-	mV _{P-P}	V _{cc-in} =+5V
Differential Impedance	Z _m	90	100	110	ohm	
LVDS Differential Input Voltage	V _{id}	-100	-	100	mV	
LVDS Common Input Voltage	V _{ic}	1.125	1.25	1.375	V	



Note (1) V_{cc-in} Power-On Condition :



5.2.2 Backlight Unit & LED Driver

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply	V_{BL}	10.8	12	13.2	V	
	I_{BL}	-	3.5	-	Amp	Note1

Note (1) : $V_{BL} = 12V$, using the Mode 2 of LED control scheme and $V_{DIM} = 0V$ to get the maximum brightness.

Note (2) : Since LED is consumables, the backlight life time stated in the above list is referential value and is not guaranteed by PowerView. The LED life time is defined as when brightness becomes 50% of the original value that is applied under continuous turning on at the typical value of the power supplied into the backlight, as defined above, at $+25^{\circ}C$ in a stable environment.



5.3 Input Terminal Pin Assignment

5.3.1 Signal Input Interface

JAE Connector: 30 pin/1 mm pitch JAE-FI-X30SSL-HF

Mating Connector : JAE FI-XB30SSL-HF15 or equivalent

Pin No	Symbol	Description	Remark
1	RxO0-	LVDS receiver signal channel 0 (Odd ch)	
2	RxO0+		
3	RxO1-	LVDS receiver signal channel 1 (Odd ch)	
4	RxO1+		
5	RxO2-	LVDS receiver signal channel 2 (Odd ch)	
6	RxO2+		
7	GND	Ground	
8	RxOC-	LVDS receiver signal clock (Odd ch)	
9	RxOC+		
10	RxO3-	LVDS receiver signal channel 3 (Odd ch)	
11	RxO3+		
12	RxE0-	LVDS receiver signal channel 0 (Even ch)	
13	RxE0+		
14	GND	Ground	
15	RxE1-	LVDS receiver signal channel 1 (Even ch)	
16	RxE1+		
17	GND	Ground	
18	RxE2-	LVDS receiver signal channel 2 (Even ch)	
19	RxE2+		
20	RxEC-	LVDS receiver signal clock (Even ch)	
21	RxEC+		
22	RxE3-	LVDS receiver signal channel 3 (Even ch)	
23	RxE3+		
24	GND	Ground	
25	GND	Ground	
26	NC	No Connection	
27	GND	Ground	
28	V _{cc_IN}	Power supply (+5V)	
29	V _{cc_IN}	Power Supply (+5V)	
30	V _{cc_IN}	Power Supply (+5V)	



5.3.2 LED Driver Unit

Connector : ACES 88290-0601 pitch 2.0mm 6 pins CN

Mode 1 :

Matching Connector : ACES 86809-0600 CN

Pin No.	Symbol	Description	Remark
1	V _{BL}	Power Supply for LED Driver	
2	V _{BL}	Power Supply for LED Driver	
3	EN	LED Enable & Dimming Control Input	Note 1
4	DIM	Connect this pin to GND at this mode	Note 2
5	GND	Ground Pin for LED Driver	
6	GND	Ground Pin for LED Driver	

Note 1 : The “Enable & Dimming Control” of the LED driver shares the same pinning.

The LED backlight will turn on when the input voltage of this pin exceeds +0.6V.

The LED current/brightness will be adjustable by applying an analog voltage between +0.8 ~ +1.4V(Max. Brightness).

Note 2: The “DIM” pin should be connected to GND in order to get the full brightness.

Mode 2:

Pin No.	Symbol	Description	Remark
1	V _{BL}	Power Supply for LED Driver	
2	V _{BL}	Power Supply for LED Driver	
3	EN	LED Enable Control Input	Note 1
4	DIM	Dimming Control Input	Note 2
5	GND	Ground Pin for LED Driver	
6	GND	Ground Pin for LED Driver	

Note 1 : Disable V_{EN}<0.6 V, Enable V_{EN}>1.8 V

Note 2 : Max Brightness V_{DIM} : 0V, Min Brightness V_{DIM} : 2.2V (≈ 0 Nit)

Mode 3:

Pin No.	Symbol	Description	Remark
1	V _{BL}	Power Supply for LED Driver	
2	V _{BL}	Power Supply for LED Driver	
3	EN	PWM Control Pulse Input	Note 1, 2
4	DIM	Connect this pin to GND at this mode	Note 3
5	GND	Ground Pin for LED Driver	
6	GND	Ground Pin for LED Driver	

Note 1: Valley of PWM Pulse V_{PWM}<0.6 V, Peak of PWM Pulse V_{PWM} >1.8 V

Note 2: The frequency of each completed PWM cycle: 100~300 Hz

Note 3: The “DIM” pin should be connected to GND in order to get the full brightness.



5.3.3 Color Data Reference

The below table is about input signal, Basic display colors and gray scale of each color.

0 : Low Level Voltage 1 : High Level Voltage

Each basic color can be displayed in 256 gray scales from 8 bit data signals. With the combination of total 24 bit data signals, the 16,777,216 color display can be achieved on the screen.

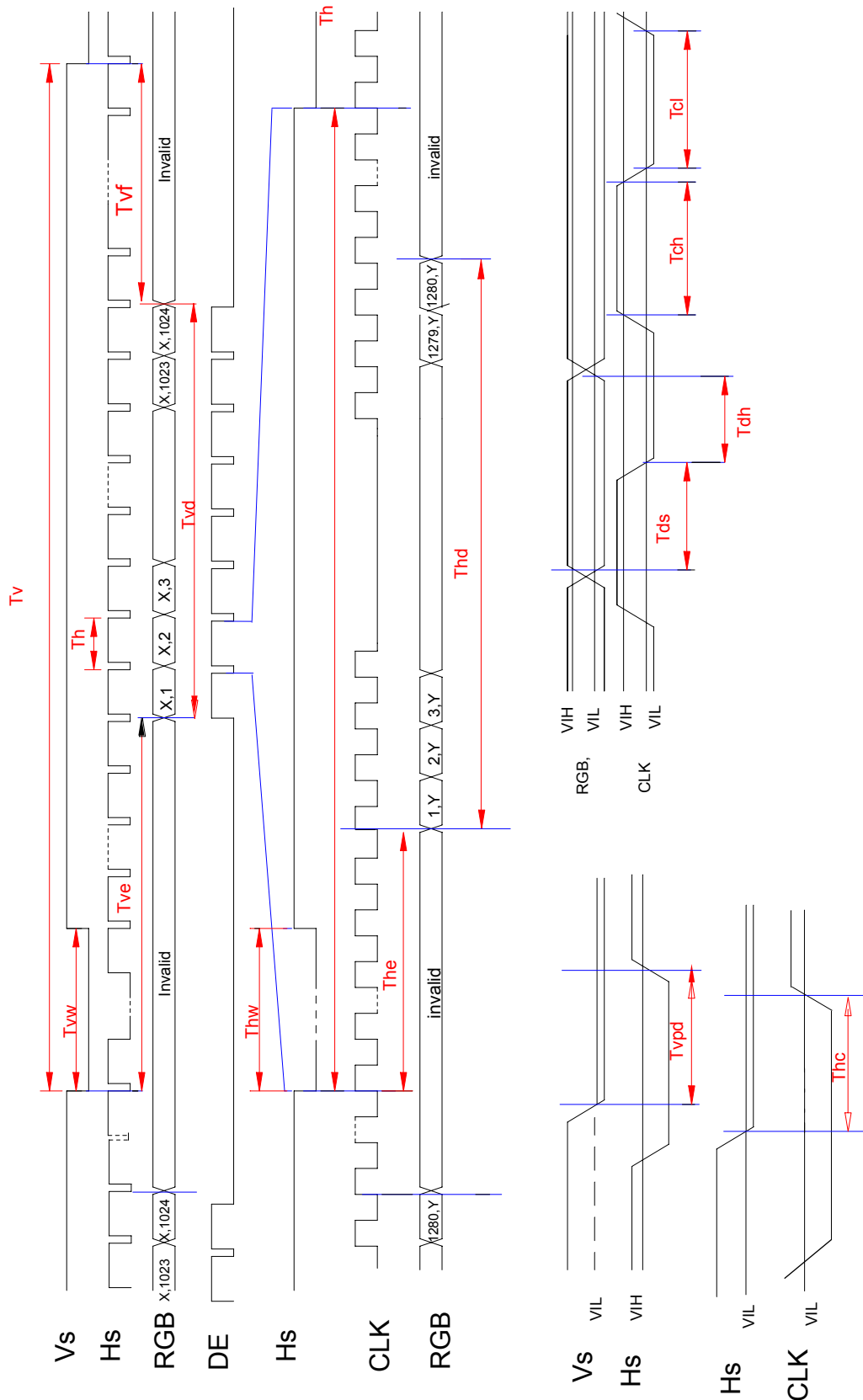
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	Colors & Gray Scale	Data Signal																							
		Gray Scale	R0 R1 R2 R3 R4 R5 R6 R7	G0 G1 G2 G3 G4 G5 G6 G7	B0 B1 B2 B3 B4 B5 B6 B7																				
Basic Color	Black	-	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	Blue	-	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1																				
	Green	-	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0																				
	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																				
	Red	-	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	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																				
Gray Scale of Red	Black	GS0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↑	GS1	1 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	Darker	GS2	0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↑	↓																							
	↓	↓																							
	Brighter	GS253	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↓	GS254	0 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	Red	GS255	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
Gray Scale of Green	Black	GS0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↑	GS1	0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	Darker	GS2	0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↑	↓																							
	↓	↓																							
	Brighter	GS253	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0																				
	↓	GS254	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0																				
	Green	GS255	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0																				
Gray Scale of Blue	Black	GS0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																				
	↑	GS1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0																				
	Darker	GS2	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 1 0 0 0 0 0 0																				
	↑	↓																							
	↓	↓																							
	Brighter	GS253	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1																				
	↓	GS254	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1																				
	Blue	GS255	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1																				

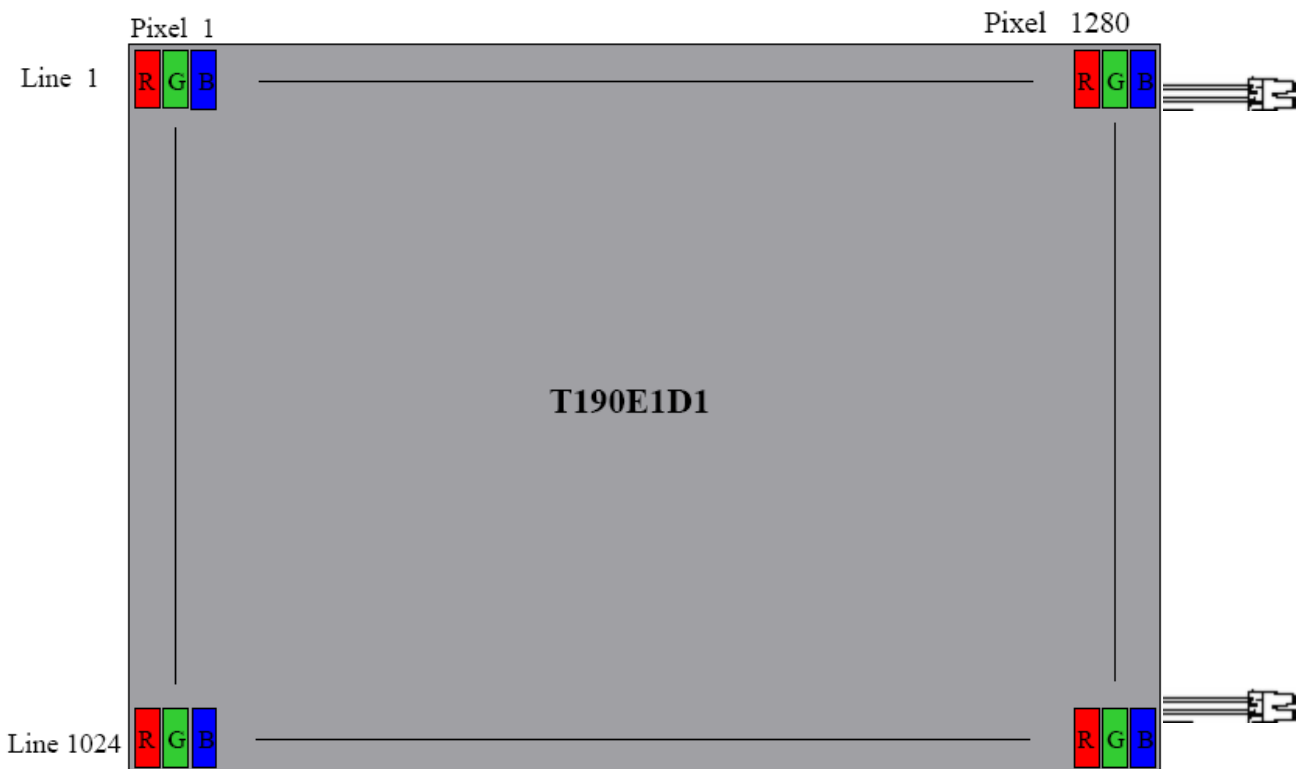
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5.4 Input Timing Chart





6.0 Pixel Format Image

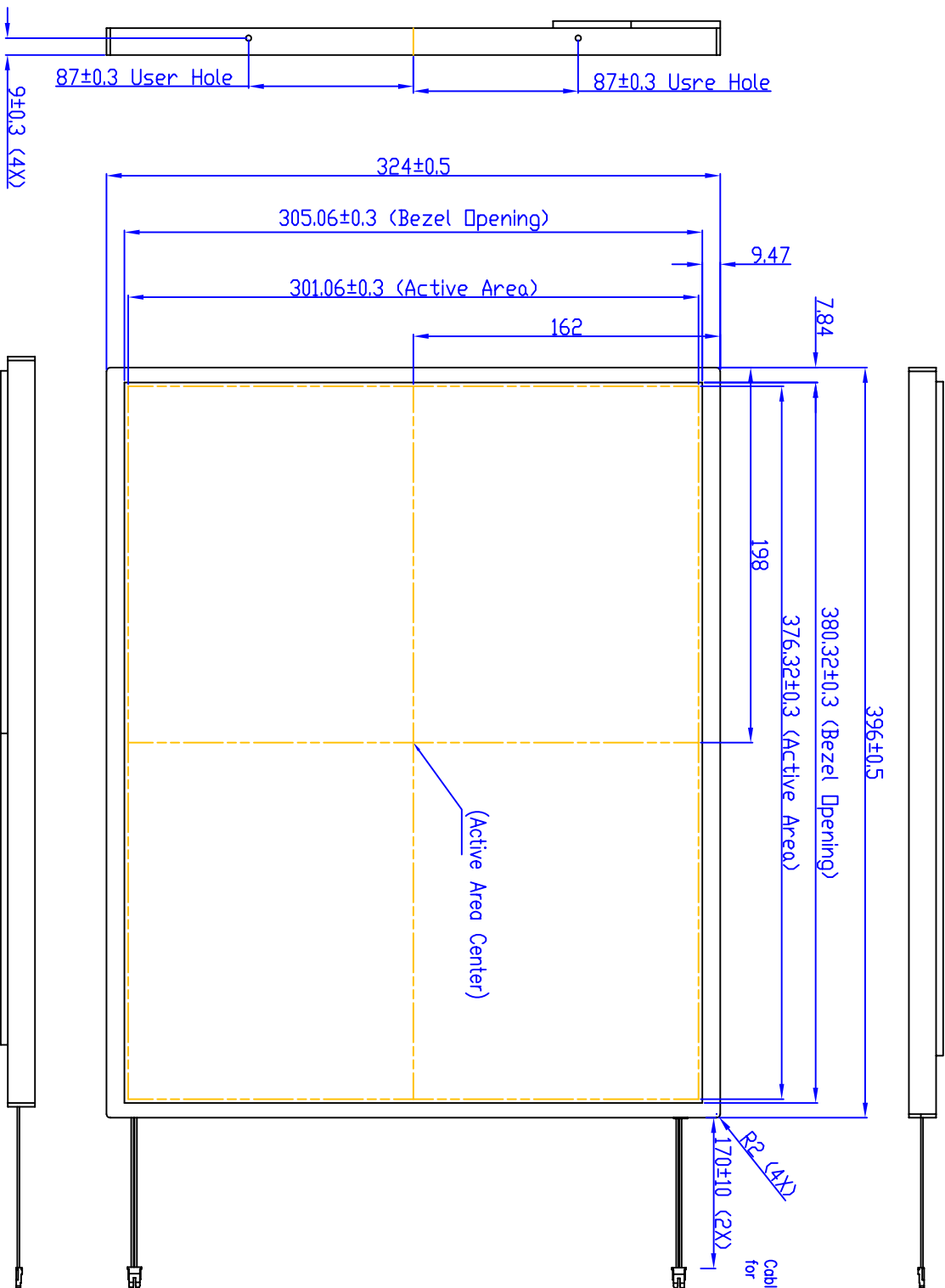


7.0 Display Outline Dimensions

7.1 Monitor Outline Dimensions

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REV	EQ. NUMBER	DESCRIPTION	DATE
1	APPROVED	APPROVED	

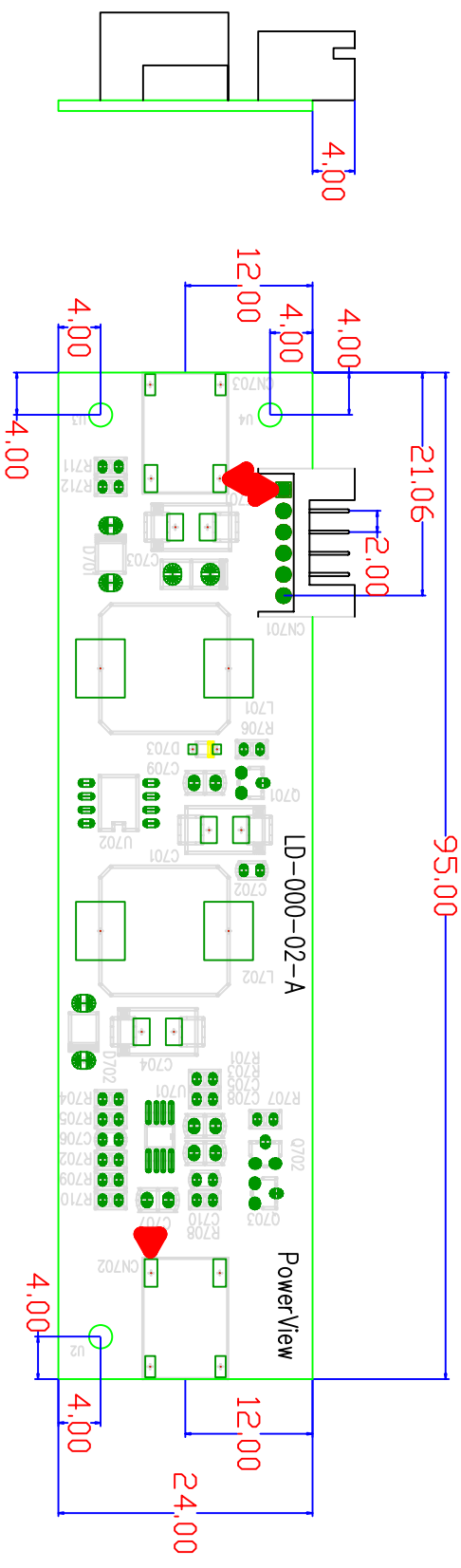


Cables must be left the frame hook for length measurement

SIZE	QTY	DESCRIPTION
8.2 x 4.0	1	FRONT BEZEL
14.2 x 16.0	1	FRONT BEZEL
16.2 x 18.0	1	FRONT BEZEL
18.2 x 20.0	1	FRONT BEZEL
20.2 x 22.0	1	FRONT BEZEL
22.2 x 24.0	1	FRONT BEZEL
24.2 x 26.0	1	FRONT BEZEL
26.2 x 28.0	1	FRONT BEZEL
28.2 x 30.0	1	FRONT BEZEL
30.2 x 32.0	1	FRONT BEZEL
32.2 x 34.0	1	FRONT BEZEL
34.2 x 36.0	1	FRONT BEZEL
36.2 x 38.0	1	FRONT BEZEL
38.2 x 40.0	1	FRONT BEZEL
40.2 x 42.0	1	FRONT BEZEL
42.2 x 44.0	1	FRONT BEZEL
44.2 x 46.0	1	FRONT BEZEL
46.2 x 48.0	1	FRONT BEZEL
48.2 x 50.0	1	FRONT BEZEL
50.2 x 52.0	1	FRONT BEZEL
52.2 x 54.0	1	FRONT BEZEL
54.2 x 56.0	1	FRONT BEZEL
56.2 x 58.0	1	FRONT BEZEL
58.2 x 60.0	1	FRONT BEZEL
60.2 x 62.0	1	FRONT BEZEL
62.2 x 64.0	1	FRONT BEZEL
64.2 x 66.0	1	FRONT BEZEL
66.2 x 68.0	1	FRONT BEZEL
68.2 x 70.0	1	FRONT BEZEL
70.2 x 72.0	1	FRONT BEZEL
72.2 x 74.0	1	FRONT BEZEL
74.2 x 76.0	1	FRONT BEZEL
76.2 x 78.0	1	FRONT BEZEL
78.2 x 80.0	1	FRONT BEZEL
80.2 x 82.0	1	FRONT BEZEL
82.2 x 84.0	1	FRONT BEZEL
84.2 x 86.0	1	FRONT BEZEL
86.2 x 88.0	1	FRONT BEZEL
88.2 x 90.0	1	FRONT BEZEL
90.2 x 92.0	1	FRONT BEZEL
92.2 x 94.0	1	FRONT BEZEL
94.2 x 96.0	1	FRONT BEZEL
96.2 x 98.0	1	FRONT BEZEL
98.2 x 100.0	1	FRONT BEZEL
100.2 x 102.0	1	FRONT BEZEL
102.2 x 104.0	1	FRONT BEZEL
104.2 x 106.0	1	FRONT BEZEL
106.2 x 108.0	1	FRONT BEZEL
108.2 x 110.0	1	FRONT BEZEL
110.2 x 112.0	1	FRONT BEZEL
112.2 x 114.0	1	FRONT BEZEL
114.2 x 116.0	1	FRONT BEZEL
116.2 x 118.0	1	FRONT BEZEL
118.2 x 120.0	1	FRONT BEZEL
120.2 x 122.0	1	FRONT BEZEL
122.2 x 124.0	1	FRONT BEZEL
124.2 x 126.0	1	FRONT BEZEL
126.2 x 128.0	1	FRONT BEZEL
128.2 x 130.0	1	FRONT BEZEL
130.2 x 132.0	1	FRONT BEZEL
132.2 x 134.0	1	FRONT BEZEL
134.2 x 136.0	1	FRONT BEZEL
136.2 x 138.0	1	FRONT BEZEL
138.2 x 140.0	1	FRONT BEZEL
140.2 x 142.0	1	FRONT BEZEL
142.2 x 144.0	1	FRONT BEZEL
144.2 x 146.0	1	FRONT BEZEL
146.2 x 148.0	1	FRONT BEZEL
148.2 x 150.0	1	FRONT BEZEL
150.2 x 152.0	1	FRONT BEZEL
152.2 x 154.0	1	FRONT BEZEL
154.2 x 156.0	1	FRONT BEZEL
156.2 x 158.0	1	FRONT BEZEL
158.2 x 160.0	1	FRONT BEZEL
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162.2 x 164.0	1	FRONT BEZEL
164.2 x 166.0	1	FRONT BEZEL
166.2 x 168.0	1	FRONT BEZEL
168.2 x 170.0	1	FRONT BEZEL
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174.2 x 176.0	1	FRONT BEZEL
176.2 x 178.0	1	FRONT BEZEL
178.2 x 180.0	1	FRONT BEZEL
180.2 x 182.0	1	FRONT BEZEL
182.2 x 184.0	1	FRONT BEZEL
184.2 x 186.0	1	FRONT BEZEL
186.2 x 188.0	1	FRONT BEZEL
188.2 x 190.0	1	FRONT BEZEL
190.2 x 192.0	1	FRONT BEZEL
192.2 x 194.0	1	FRONT BEZEL
194.2 x 196.0	1	FRONT BEZEL
196.2 x 198.0	1	FRONT BEZEL
198.2 x 200.0	1	FRONT BEZEL
200.2 x 202.0	1	FRONT BEZEL
202.2 x 204.0	1	FRONT BEZEL
204.2 x 206.0	1	FRONT BEZEL
206.2 x 208.0	1	FRONT BEZEL
208.2 x 210.0	1	FRONT BEZEL
210.2 x 212.0	1	FRONT BEZEL
212.2 x 214.0	1	FRONT BEZEL
214.2 x 216.0	1	FRONT BEZEL
216.2 x 218.0	1	FRONT BEZEL
218.2 x 220.0	1	FRONT BEZEL
220.2 x 222.0	1	FRONT BEZEL
222.2 x 224.0	1	FRONT BEZEL
224.2 x 226.0	1	FRONT BEZEL
226.2 x 228.0	1	FRONT BEZEL
228.2 x 230.0	1	FRONT BEZEL
230.2 x 232.0	1	FRONT BEZEL
232.2 x 234.0	1	FRONT BEZEL
234.2 x 236.0	1	FRONT BEZEL
236.2 x 238.0	1	FRONT BEZEL
238.2 x 240.0	1	FRONT BEZEL
240.2 x 242.0	1	FRONT BEZEL
242.2 x 244.0	1	FRONT BEZEL
244.2 x 246.0	1	FRONT BEZEL
246.2 x 248.0	1	FRONT BEZEL
248.2 x 250.0	1	FRONT BEZEL
250.2 x 252.0	1	FRONT BEZEL
252.2 x 254.0	1	FRONT BEZEL
254.2 x 256.0	1	FRONT BEZEL
256.2 x 258.0	1	FRONT BEZEL
258.2 x 260.0	1	FRONT BEZEL
260.2 x 262.0	1	FRONT BEZEL
262.2 x 264.0	1	FRONT BEZEL
264.2 x 266.0	1	FRONT BEZEL
266.2 x 268.0	1	FRONT BEZEL
268.2 x 270.0	1	FRONT BEZEL
270.2 x 272.0	1	FRONT BEZEL
272.2 x 274.0	1	FRONT BEZEL
274.2 x 276.0	1	FRONT BEZEL
276.2 x 278.0	1	FRONT BEZEL
278.2 x 280.0	1	FRONT BEZEL
280.2 x 282.0	1	FRONT BEZEL
282.2 x 284.0	1	FRONT BEZEL
284.2 x 286.0	1	FRONT BEZEL
286.2 x 288.0	1	FRONT BEZEL
288.2 x 290.0	1	FRONT BEZEL
290.2 x 292.0	1	FRONT BEZEL
292.2 x 294.0	1	FRONT BEZEL
294.2 x 296.0	1	FRONT BEZEL
296.2 x 298.0	1	FRONT BEZEL
298.2 x 300.0	1	FRONT BEZEL
300.2 x 302.0	1	FRONT BEZEL
302.2 x 304.0	1	FRONT BEZEL
304.2 x 306.0	1	FRONT BEZEL
306.2 x 308.0	1	FRONT BEZEL
308.2 x 310.0	1	FRONT BEZEL
310.2 x 312.0	1	FRONT BEZEL
312.2 x 314.0	1	FRONT BEZEL
314.2 x 316.0	1	FRONT BEZEL
316.2 x 318.0	1	FRONT BEZEL
318.2 x 320.0	1	FRONT BEZEL
320.2 x 322.0	1	FRONT BEZEL
322.2 x 324.0	1	FRONT BEZEL
324.2 x 326.0	1	FRONT BEZEL
326.2 x 328.0	1	FRONT BEZEL
328.2 x 330.0	1	FRONT BEZEL
330.2 x 332.0	1	FRONT BEZEL
332.2 x 334.0	1	FRONT BEZEL
334.2 x 336.0	1	FRONT BEZEL
336.2 x 338.0	1	FRONT BEZEL
338.2 x 340.0	1	FRONT BEZEL
340.2 x 342.0	1	FRONT BEZEL
342.2 x 344.0	1	FRONT BEZEL
344.2 x 346.0	1	FRONT BEZEL
346.2 x 348.0	1	FRONT BEZEL
348.2 x 350.0	1	FRONT BEZEL
350.2 x 352.0	1	FRONT BEZEL
352.2 x 354.0	1	FRONT BEZEL
354.2 x 356.0	1	FRONT BEZEL
356.2 x 358.0	1	FRONT BEZEL
358.2 x 360.0	1	FRONT BEZEL
360.2 x 362.0	1	FRONT BEZEL
362.2 x 364.0	1	FRONT BEZEL
364.2 x 366.0	1	FRONT BEZEL
366.2 x 368.0	1	FRONT BEZEL
368.2 x 370.0	1	FRONT BEZEL
370.2 x 372.0	1	FRONT BEZEL
372.2 x 374.0	1	FRONT BEZEL
374.2 x 376.0	1	FRONT BEZEL
376.2 x 378.0	1	FRONT BEZEL
378.2 x 380.0	1	FRONT BEZEL
380.2 x 382.0	1	FRONT BEZEL
382.2 x 384.0	1	FRONT BEZEL
384.2 x 386.0	1	FRONT BEZEL
386.2 x 388.0	1	FRONT BEZEL
388.2 x 390.0	1	FRONT BEZEL
390.2 x 392.0	1	FRONT BEZEL
392.2 x 394.0	1	FRONT BEZEL
394.2 x 396.0	1	FRONT BEZEL
396.2 x 398.0	1	FRONT BEZEL
398.2 x 400.0	1	FRONT BEZEL
400.2 x 402.0	1	FRONT BEZEL
402.2 x 404.0	1	FRONT BEZEL
404.2 x 406.0	1	FRONT BEZEL
406.2 x 408.0	1	FRONT BEZEL
408.2 x 410.0	1	FRONT BEZEL
410.2 x 412.0	1	FRONT BEZEL
412.2 x 414.0	1	FRONT BEZEL
414.2 x 416.0	1	FRONT BEZEL
416.2 x 418.0	1	FRONT BEZEL
418.2 x 420.0	1	FRONT BEZEL
420.2 x 422.0	1	FRONT BEZEL
422.2 x 424.0	1	FRONT BEZEL
424.2 x 426.0	1	FRONT BEZEL
426.2 x 428.0	1	FRONT BEZEL
428.2 x 430.0	1	FRONT BEZEL
430.2 x 432.0	1	FRONT BEZEL
432.2 x 434.0	1	FRONT BEZEL
434.2 x 436.0	1	FRONT BEZEL
436.2 x 438.0	1	FRONT BEZEL
438.2 x 440.0	1	FRONT BEZEL
440.2 x 442.0	1	FRONT BEZEL
442.2 x 444.0	1	FRONT BEZEL
444.2 x 446.0	1	FRONT BEZEL
446.2 x 448.0	1	FRONT BEZEL
448.2 x 450.0	1	FRONT BEZEL
450.2 x 452.0	1	FRONT BEZEL
452.2 x 454.0	1	FRONT BEZEL
454.2 x 456.0	1	FRONT BEZEL
456.2 x 458.0	1	FRONT BEZEL
458.2 x 460.0	1	FRONT BEZEL
460.2 x 462.0	1	FRONT BEZEL
462.2 x 464.0	1	FRONT BEZEL
464.2 x 466.0	1	FRONT BEZEL
466.2 x 468.0	1	FRONT BEZEL
468.2 x 470.0	1	FRONT BEZEL
470.2 x 472.0	1	FRONT BEZEL
472.2 x 474.0	1	FRONT BEZEL
474.2 x 476.0	1	FRONT BEZEL
476.2 x 478.0	1	FRONT BEZEL
478.2 x 480.0	1	FRONT BEZEL
480.2 x 482.0	1	FRONT BEZEL
482.2 x 484.0	1	FRONT BEZEL
484.2 x 486.0	1	FRONT BEZEL
486.2 x 488.0	1	FRONT BEZEL
488.2 x 490.0	1	FRONT BEZEL
490.2 x 492.0	1	FRONT BEZEL
492.2 x 494.0	1	FRONT BEZEL
494.2 x 496.0	1	FRONT BEZEL
496.2 x 498.0	1	FRONT BEZEL
498.2 x 500.0	1	FRONT BEZEL

POVERVIEW DISPLAY CORPORATION		All Rights Reserved	
MATERIAL	See notes	DATE	3-4-2010
FINISH	FR-1414	FORM	T:11/W:1
APPROVED		REV	1:1
CHECKED		DESCRIPTION	T190E1D1
DESIGNED	Tim	DATE	2007/08/06
		REV	43
		DATE	1-1
		REV	A

REV	IS NUMBER	DESCRIPTION	DATE
1	APPROVED	APPROVED	



CN701	
SYMBOL	DESCRIPTION
Pin 1	Vin Power Supply +12V
Pin 2	Vin Power Supply +12V
Pin 3	ENA On/Off control (On>+1.8V, Off<+0.8V)
Pin 4	DIM Linear Dim, 0V(Max.) ~ +1.4V(min.)
Pin 5	GND Ground
Pin 6	GND Ground

CN702 / CN703	
SYMBOL	DESCRIPTION
Pin 1	Anode Anode DC Power Supply for Backlight Unit
Pin 2	Cathod Cathod DC Power Supply for Backlight Unit

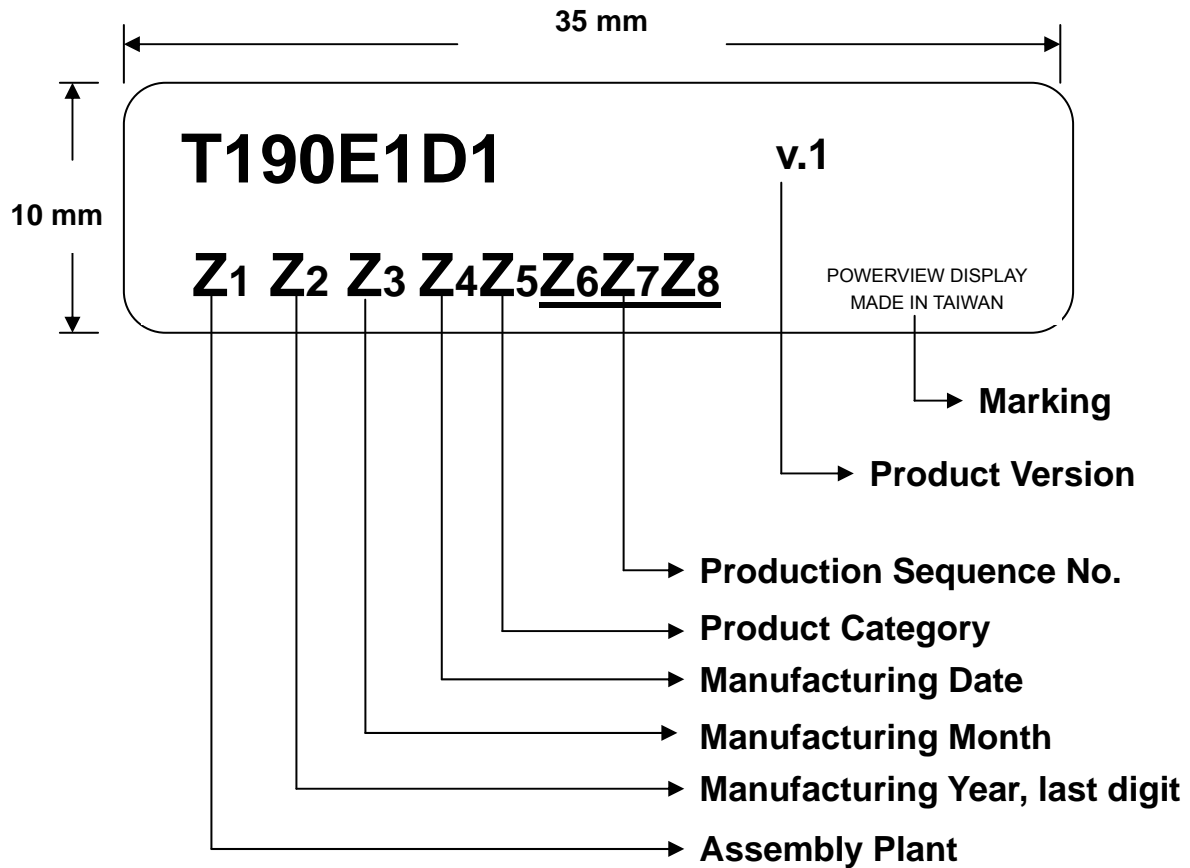
SIZE	3	4	5	6	7	8	9	10	11	12
1.4 - 1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.6 - 1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.8 - 2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

POVERVIEW DISPLAY CORPORATION		All Rights Reserved	
MATERIAL	See notes	DATE	3rd ANGLE
FINISH	Plating	FORM	1:1 (N/A)
APPROVED		REF. DESCRIPTION	LD006S1D1
CHECKED			LED Driver for TORNS101
REVISIONS	Tim	8/27/12	1-2
			3



8.0 Labeling, Packaging & Others

* Labeling



* Packaging

- TBD



9.0 General Notice

9.1 Reliability Test Items (Note 2)

No.	Test Items	Conditions	Remark
1	High Temperature Storage	Ta= + 60°C 240 Hrs	
2	Low Temperature Storage	Ta= - 20°C 240 Hrs	
3	High Temperature Operation	Ta= + 50°C 240 Hrs	
4	Low Temperature Operation	Ta= -10°C 240 Hrs	
5	High Temperature and High Humidity	Tp= 40°C, 90%RH 240 Hrs	operation
6	Heat Shock	-25~60°C/200 cycles 1Hr/cycle	Non-operation
7	Electrostatic discharge	10KV, 150pF(330Ω), 1 second, 9 positions on the panel, 10 times each place.	Non-operation
8	Vibration	Frequency range : 10~500~10Hz Stoke : 1.3mm Sweep : 1G Cycle : 30 minutes 1 hours for each direction of X,Y,Z	
9	Mechanical Shock	50G, 11ms, ±X±Y±Z once for each direction	
10	Vibration (with carton)	Random vibration : 0.015G ² /Hz from 5~200Hz -6dB/octave from 200~500Hz	IEC 68-34
11	Drop (with carton)	Height : 60 cm 1 corner, 3 edges, 6 surfaces	JIS Z0202

Note1: Ta: Ambient temperature.

Note 2: In the standard conditions, there is not display function NG issue occurred. All the cosmetic specification is judged before the reliability stress.



9.2 Storage, Operation & Others

- (a) Do not leave the panel 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.
- (d) Do not connect, disconnect the module in the "Power On" condition.
- (e) Power supply should always be turned on/off by the item 3.2 "Electrical Absolute Ratings"
- (f) The liquid-crystal is deteriorated by ultraviolet rays. Do not leave it in direct sunlight and strong ultraviolet rays for many hours.
- (g) Avoid condensation of water. It may result in improper operation or disconnection of electrode.
- (h) Do not exceed the absolute maximum rating value. (the supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on)
Otherwise the panel may be damaged.
- (i) If the panel displays the same pattern continuously for a long period of time, it can be the situation when the image "Sticks" to the screen.
- (j) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.