TITLE : B3 HN133WU3-100 Open Cell

Product Specification

Rev.1

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

REVISION HISTORY

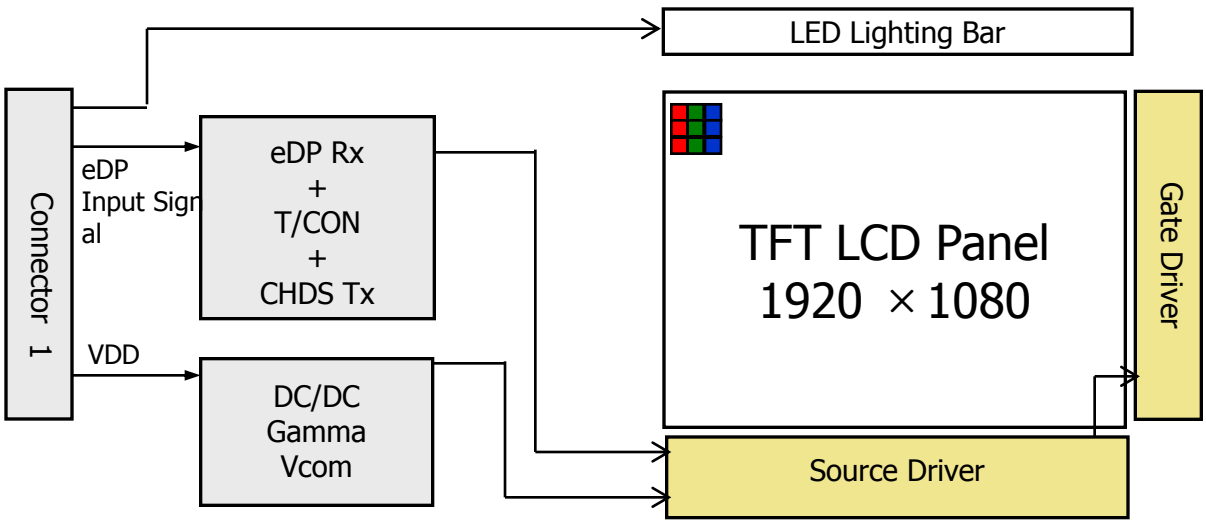
REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
O		Initial Release	2012.08.07	胡 明
1	Revision	-	2012.11.20	胡 明

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

HN133WU3-100 is a color active matrix TFT LCD open cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This open cell has a 13.3 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this open cell can display 16.7M colors. The TFT-LCD panel used for this open cell is adapted for a low reflection and higher color type.



1.2 Features

- 2 lane eDP Interface with 2.7Gbps Link Rates
- High-speed response
- 8-bit color depth, display 16. 7M colors
- Low reflection and wide viewing angle
- RoHS /TCO 5.0 Compliant
- Gamma Correction

1.3 Application

- NB Display

1.4 General Specification

The followings are general specifications at the open cell HN133WU3-100.

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	293.76(H) × 165.24 (V)	mm	
Number of pixels	1920(H) ×1080(V)	pixels	
Pixel pitch	0.153(H) ×0.153(V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M	colors	
Display mode	Normally Black		
Weight	97 (Type.)	g	
Surface Treatment	Non-Glare		

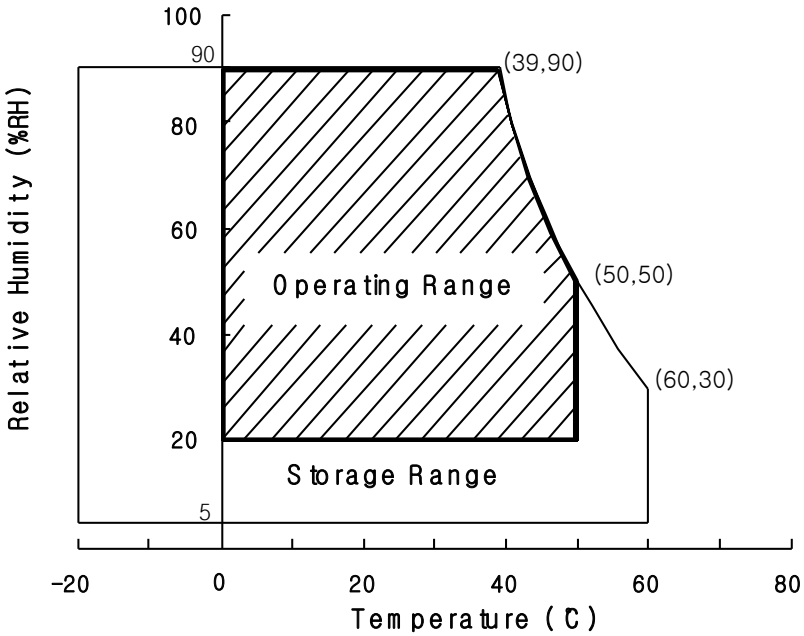
2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings> [VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.5	4.0	V	Ta = 25 ℃
Logic Supply Voltage	V_{IN}	VSS-0.3	V_{DD}+0.3	V	
Operating Temperature	T_{OP}	0	+50	℃	1)
Storage Temperature	T_{ST}	-20	+60	℃	1)

Note : 1) Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 ^{O}C max. and no condensation of water.



3.0 ELECTRICAL SPECIFICATIONS

3.1Electrical Specifications

< Table 3. Electrical specifications >

[Ta =25±2 ℃]

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	Note1
Power Supply Current	I_{DD}	-	300	-	mA	
In-Rush Current	I_{RUSH}	-	2.0	3.0	A	Note 2
Permissible Input Ripple Voltage	V_{RF}	-	-	100	mV	V_{DD} = 3.3V
Differential input voltage	Vdiff	120	-	1320	mV	Peak to Peak
Differential input common mode voltage	Vcm	1.0	1.2	1.5		V_{IH}=100mV, V_{IL}=-100mV
Power Consumption	P_D	-	1	-	W	

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCONE BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to $\theta_{Ø=0}$ (=θ_3) as the 3 o'clock direction (the "right"), $\theta_{Ø=90}$ (= θ_{12}) as the 12 o'clock direction ("upward"), $\theta_{Ø=180}$ (= θ_9) as the 9 o'clock direction ("left") and $\theta_{Ø=270}$(= θ_6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 3.3V +/-10% at 25°C. Optimum viewing angle direction is 6 'clock.

4.2 Optical Specifications

[VDD = 3.3V, Frame rate = 60Hz,Ta =25±2 ℃]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	70	85	-	Deg.	Note 2
		Θ_9		70	85	-	Deg.	
	Vertical	Θ_{12}		70	85	-	Deg.	
		Θ_6		70	85	-	Deg.	
Viewing Angle range	Horizontal	Θ_3	CR > 5	85	-	-	Deg.	
		Θ_9		85	-	-	Deg.	
	Vertical	Θ_{12}		85	-	-	Deg.	
		Θ_6		85	-	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0° (Center) Normal Viewing Angle	600	800			Note 3
Cell Transmittance		Tr		3.8	4.3	-	%	Note 4
White luminance uniformity		ΔY		75	80		%	Note 5
Reproduction of color	White	W_x		0.284	0.314	0.344		Note 6 Base on C light
		W_y		0.310	0.340	0.374		
	Red	R_x		0.634	0.664	0.694		
		R_y		0.295	0.325	0.355		
	Green	G_x		0.258	0.288	0.318		
		G_y		0.576	0.606	0.636		
	Blue	B_x		0.105	0.135	0.165		
		B_y		0.068	0.098	0.128		
Response Time	Rising	T_r		-	13.5	-	ms	Note 7
	Falling	T_f		-	16.5	-	ms	
Cross Talk		CT		-	-	2.0	%	Note 8

Note :

1. The value in upper table are based on BLU provided by BOEHF.
2. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
3. Contrast measurements shall be made at viewing angle of θ= 0° and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

4. Luminance of LCD module shall be made without signal input. Cell transmittance is defined mathematically, BLU provided by BOEHF.

$$\text{Transmittance} = \frac{\text{Luminance of LCD Module}}{\text{Luminance of BLU}}$$

5. The White luminance uniformity on LCD surface is then expressed as :
   ΔY = (Minimum Luminance of 9points / Maximum Luminance of 9points) * 100
   (See FIGURE 2 shown in Appendix).
6. The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel with BLU provided by BOEHF.
7. The electro-optical response time measurements shall be made as FIGURE 3 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Td, and 90% to 10% is Tr.
8. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (Y_A) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (Y_B) of that same area when any adjacent area is driven dark. (See FIGURE 4 shown in Appendix).

5.0 INTERFACE CONNECTION.

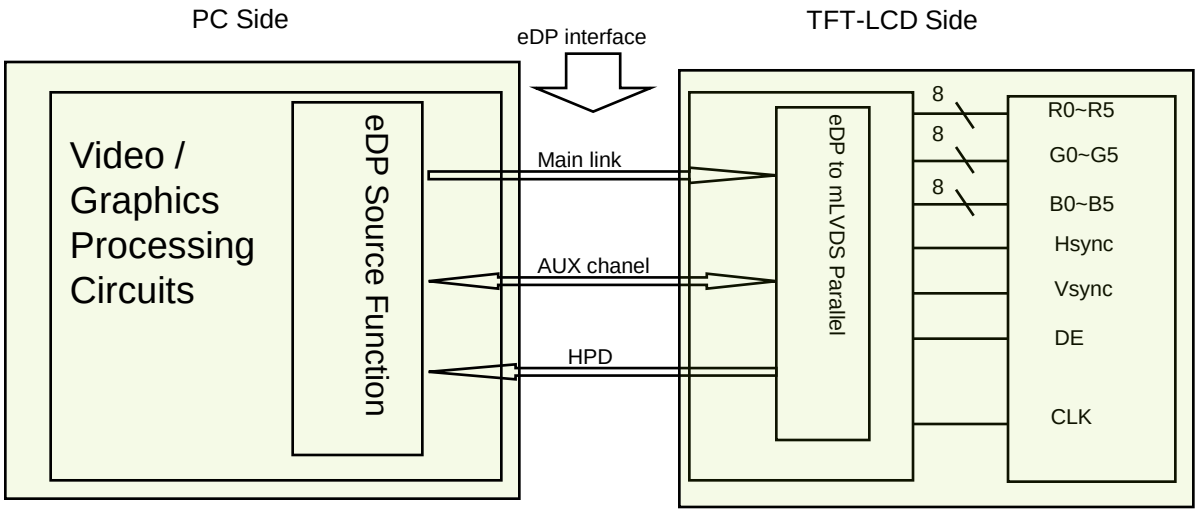
5.1 Electrical Interface Connection

● The electronics interface connector is STM or Compatible or equivalent. The mating connector part number is I-PEX 20455-040T-11 or Compatible. The connector interface pin assignments are listed in Table 6.

Pin No	Symbol	Function	Remark
1	VCC	Power Supply, 3.3V (typ.)	
2	VCC	Power Supply, 3.3V (typ.)	
3	VCC	Power Supply, 3.3V (typ.)	
4	VCC	Power Supply, 3.3V (typ.)	
5	NC	No Connection	
6	GND	Ground	
7	GND	Ground	
8	WPN	Write Protect	
9	SCL	DVR的Clock	
10	SDA	DVR的data	
11	NC	No Connection	
12	Rx0N	Complement Signal Link _Lane0	Negative
13	Rx0P	True Signal Link _Lane0	Positive
14	GND	High Speed Ground	
15	Rx1N	Complement Signal Link _Lane1	Negative
16	Rx1P	True Signal Link _Lane1	Positive
17	GND	High Speed Ground	
18	DAUXN	Complement Signal Link _Auxiliry Channel	
19	DAUXP	True Signal Link _Auxiliry Channel	
20	GND	High Speed Ground	
21	GND	High Speed Ground	
22	NC	No Connection	
23	HPD	HPD(Hot Plug Detect) Signal Pin	
24	NC	No Connection	
25	GND	Ground	
26	GND	Ground	
27	NC	No Connection	
28	FB6	LED Driver Feedback Channel 6	
29	FB5	LED Driver Feedback Channel 5	
30	FB4	LED Driver Feedback Channel 4	

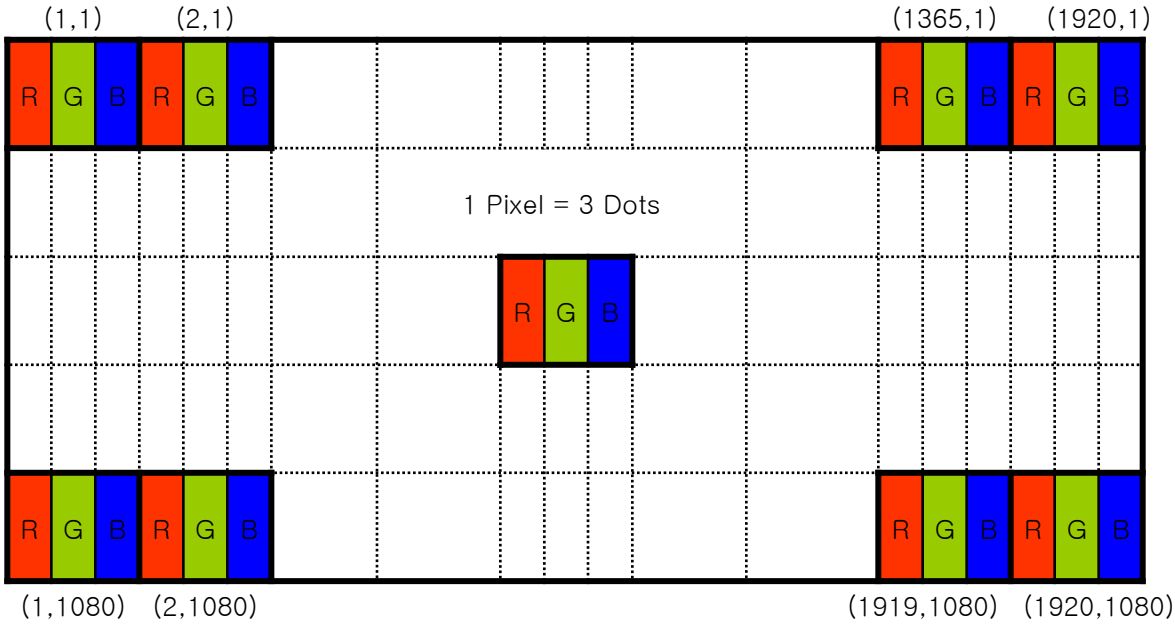
Pin No.	Symbol	Function	Remark
31	FB3	LED Driver Feedback Channel 3	
32	FB2	LED Driver Feedback Channel 2	
33	FB1	LED Driver Feedback Channel 1	
34	NC	No Connection	
35	GND	Ground	
36	NC	No Connection	
37	VLED _35V	LED Power Supply 35V	
38	VLED _35V	LED Power Supply 35V	
39	VLED _35V	LED Power Supply 35V	
40	VLED _35V	LED Power Supply 35V	

5.2. eDP Interface



Note. Transmitter : Parade DP501 or equivalent.
Transmitter is not contained in Module.

5.3 Data Input Format



Display Position of Input Data (V-H)

6.0 SIGNAL TIMING SPECIFICATION

6.1 Basically, interface timings should match the 1920x1080 /60Hz manufacturing guide line timing.

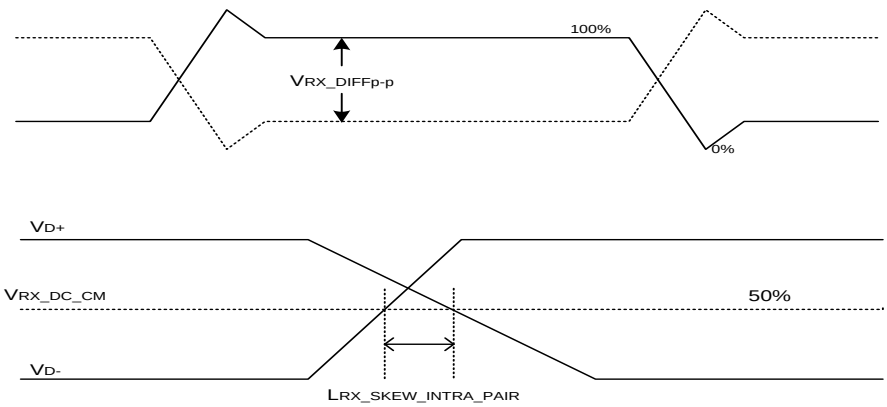
Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	100	148.5	160	MHz
Frame Period		Tv	1112	1125	1238	lines
			40	60	66	Hz
			25	16.67	15.15	ms
Vertical Display Period		Tvd	-	1080	-	lines
One line Scanning Period		Th	2080	2200	2400	clocks
Horizontal Display Period		Thd	-	1920	-	clocks

6.2 eDP Rx Interface Timing Parameter

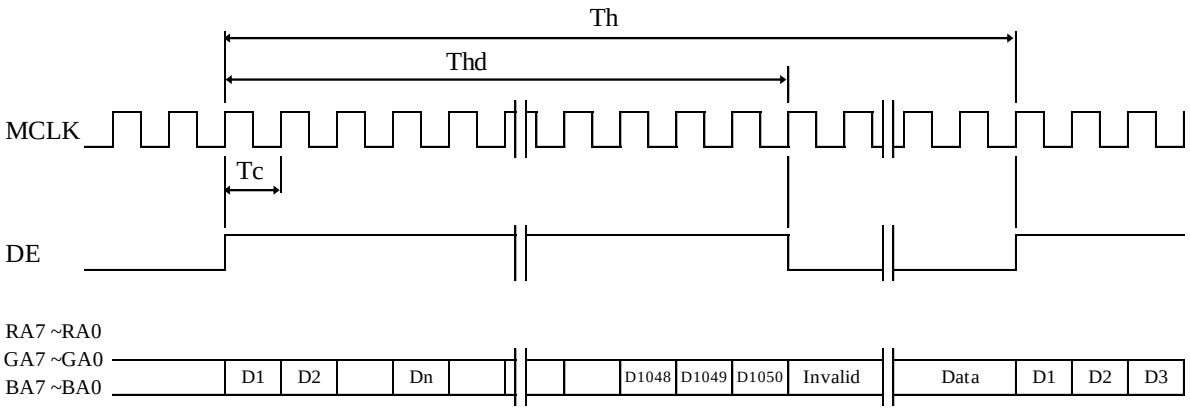
The specification of the eDP Rx interface timing parameter is shown in Table 8.

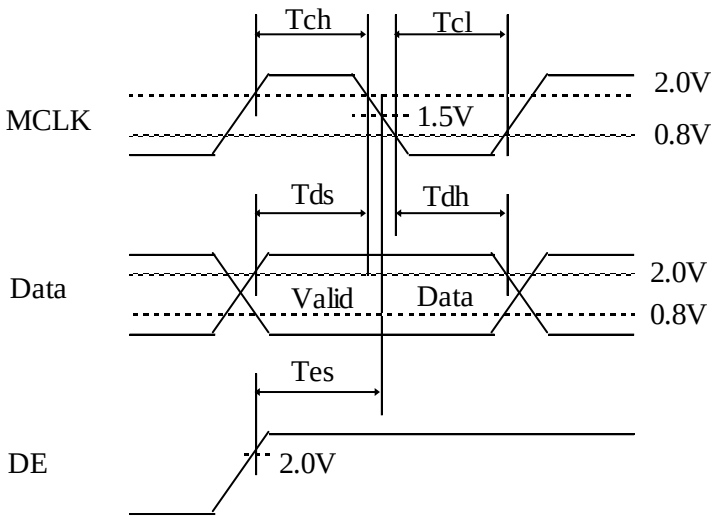
<Table 8. eDP Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
Spread spectrum clock	ssc		-		%	
Differential peak-to-peak input voltage at package pins	$V_{RX-DIFFp-p}$	500	0	1000	mV	
Rx input DC common mode voltage	$V_{RX\_DC\_CM}$	-	GND	-	V	
Differential termination resistance	$R_{RX-DIFF}$	80	-	100	Ω	
Single-ended termination resistance	R_{RX-SE}	40	-	60	Ω	
Rx short circuit current limit	I_{RX_SHORT}	-	-	20	mA	
Intra-pair skew at Rx package pins (HBR) RX intra-pair skew tolerance at HBR	$L_{RX\_SKEW\_INTRA\_PAIR}$	-	-	150	ps	



7.0 Horizontal Timing Waveforms



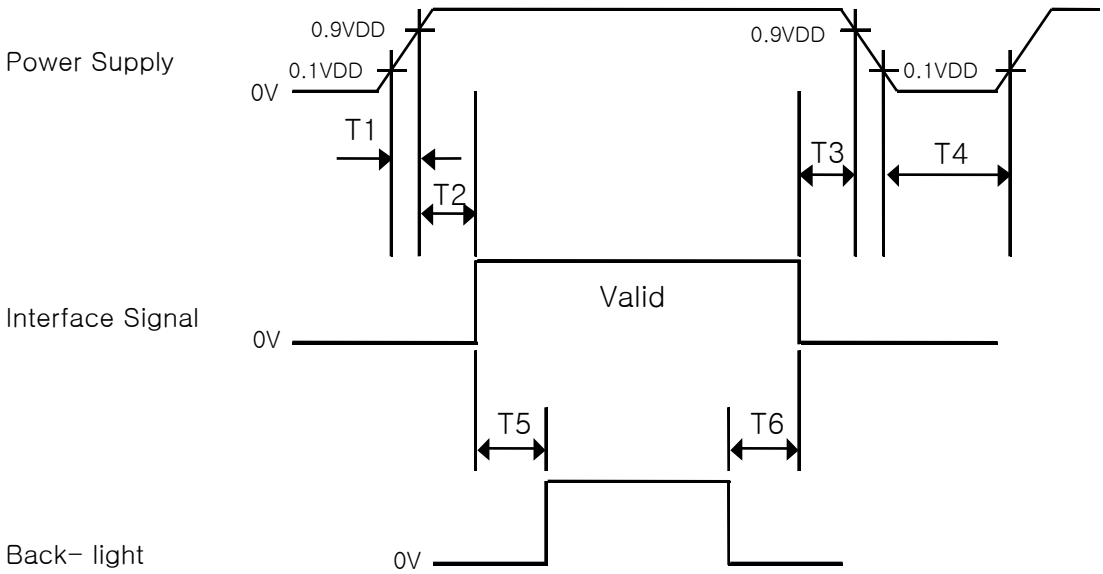


8.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

Color & Gray Scale		RED DATA								GREEN DATA								BLUE DATA							
		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 Colors	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of WHITE	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the Open Cell, the power on/off sequence shall be as shown in below



- 0.5 ms ≤ T1 ≤ 10 ms
- 0 ≤ T2 ≤ 50 ms
- 0 ≤ T3 ≤ 50 ms
- 1 sec ≤ T4
- 200 ms ≤ T5
- 200 ms ≤ T6

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.

10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

FIGURE 6 (located in Appendix) shows mechanical outlines for the open cell HN133WU3-100. Other parameters are shown in Table 5.

<Table 5. Dimensional Parameters>

Parameter	Specification	Unit
Weight	97 (Type.)	gram
Active area	293.76(H) × 165.24 (V)	mm
Pixel pitch	0.153(H) ×0.153(V)	mm
Number of pixels	1920(H)×1080(V) (1 pixel = R + G + B dots)	pixels

10.2 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

11.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in below.

<Table 6. Reliability Test Parameters >

No	Test Items	Conditions		
1	High temperature storage test	Ta = 60 ℃, 240 hrs		Note 1
2	Low temperature storage test	Ta = -20 ℃, 240 hrs		
3	High temperature & high humidity (operation test)	Ta = 50 ℃, 80%RH, 240hrs		
4	High temperature operation test	Ta = 50 ℃, 240hrs		
5	Low temperature operation test	Ta = 0 ℃, 240hrs		
6	Thermal shock	Ta = -20 ℃ ↔ 60 ℃ (0.5 hr), 100 cycle		
7	Electro-static discharge test (non-operating)	Air: 150 pF, 330Ω, 15 KV		
		Contact: 150 pF, 330Ω, 8 KV		
8	Vibration test (non-operating)	Frequency	10 ~ 300 Hz, Sweep rate 30 min	
		Gravity / AMP	1.5 G	
		Period	+X, +Y, +Z 30 min	
9	Packing Vibration Test	1.47Grms, 1~200Hz, Random		Note 2
		±X, ±Y, ±Z per 1hr		
10	Drop Test	1Angle,3Edge,6Face		
		Height: JIS-Z-0200 Level 1		

Notes:

1. The tests are done with LCD modules. (Use BOEHF BLU)
2. The test is done with a package (TBD) shown in section 14.

12.0 HANDLING & CAUTIONS

(1) Cautions when taking out the open cell
- Pick the pouch only, when taking out open cell from a shipping package.

(2) Cautions for handling the open cell
- As the electrostatic discharges may break the LCD open cell, handle the LCD open cell with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel is made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD open cell is operating.
- Handle connectors and cables with care.

(3) Cautions for the operation
- When the open cell is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the open cell would be damaged.

(4) Cautions for the atmosphere
- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD open cell in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the open cell characteristics
- Do not apply fixed pattern data signal to the LCD open cell at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions
- Do not re-adjust variable resistor or switch etc.
- When returning the open cell for repair or etc., Please pack the open cell not to be broken. We recommend to use the original shipping packages.

13.0 PRODUCT SERIAL NUMBER

Remark：Module ID(Product ID) 编码规则

序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	4	F	P	3	1	2	7	3	8	3	0	0	0	1	E	E	J
描述	GBN代码		等级	B3	年份		月	FG Code后四位				序列号					

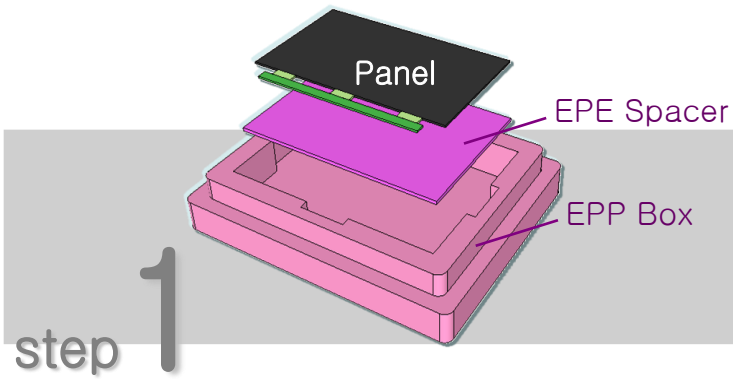
Code	Description
L	LCM
H	HYDIS
A	BOEOT
B	BOEOT
C	BOEOT
3	BOEHF

Code	Description
1	1月
2	2月
…	…
X	10月
Y	11月
Z	12月

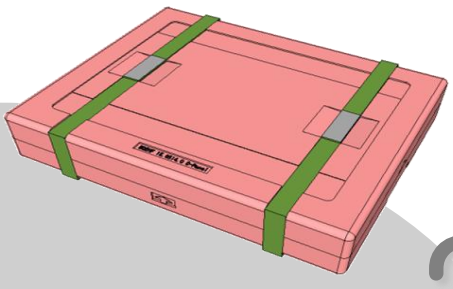
14.0 Packing

14.1 Packing Order

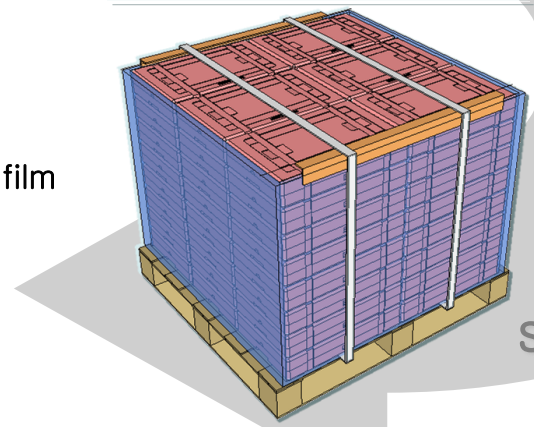
-. Put 15ea Panel and 16pcs Spacer into the box;



-.EPP Box fixed by straps



-. 48ea PP Box/Pallet
-. Pallet Packing by Stretch film
-. 720pcs Panel /Pallet



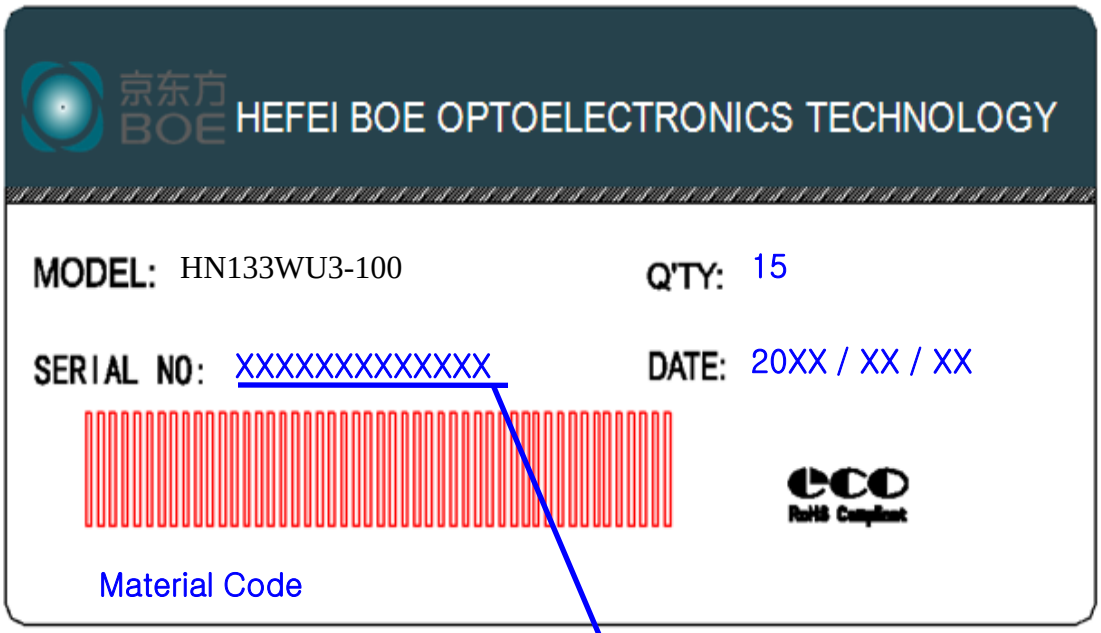
14.2 Packing Note

- Box Dimension : 500mm(W) x 400mm(D) x 117mm(H)
- Package Quantity in one Box : 15pcs

14.3 Box label

- Label Size : 115mm × 55mm
- Contents

  Open cell : HN133WU3-100
  Q`ty : 15pcs/Box
  Serial No. : Box Serial No. See following picture for detail description.
  Date : Packing Date
  FG Code : FG Code of Product



Digit / Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	3	0	9	3	D	0	0	0	6	8
Description	Products GBN		Grade	Line	Year		Month	Revision Code					

15.0 APPENDIX

Figure 1. Measurement Set Up

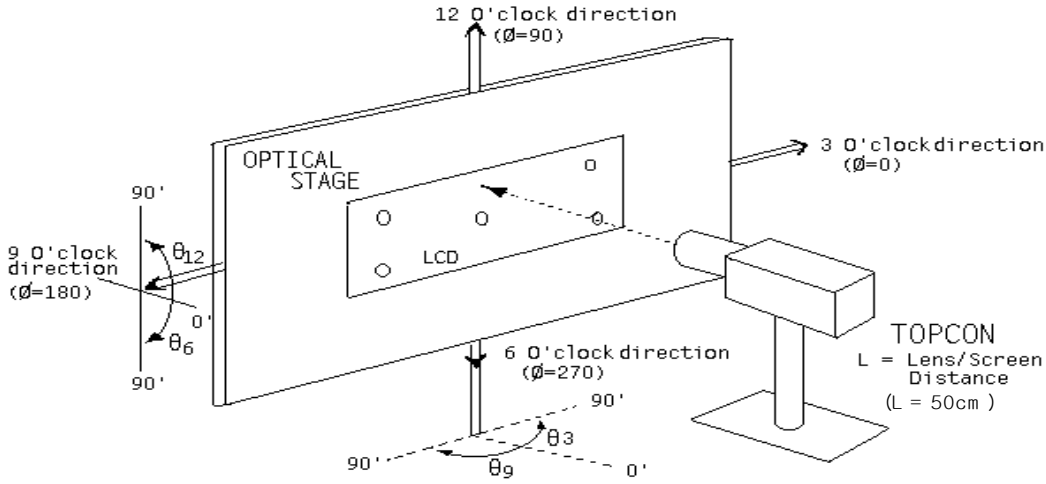


Figure 2. White Luminance and Uniformity Measurement Locations (9 points)

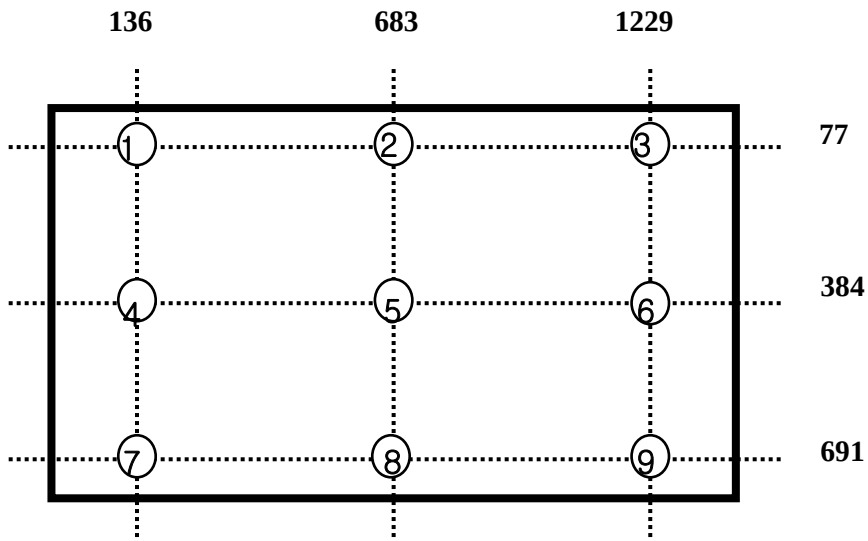


Figure 3. Response Time Testing

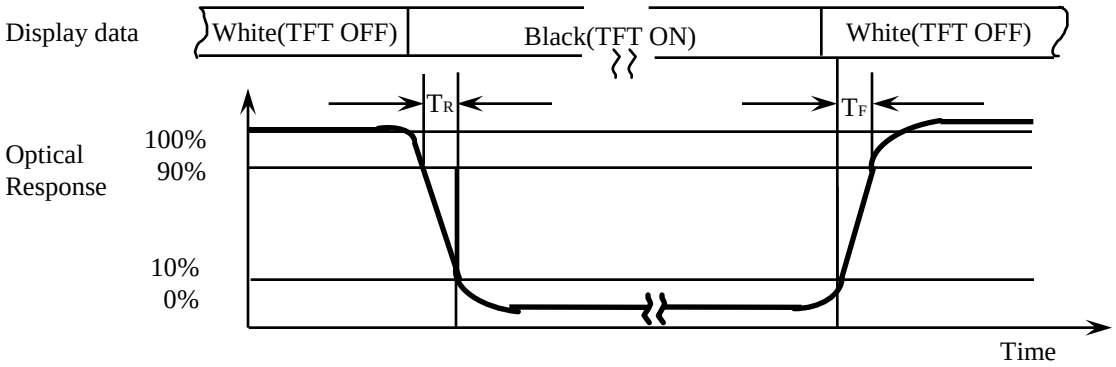
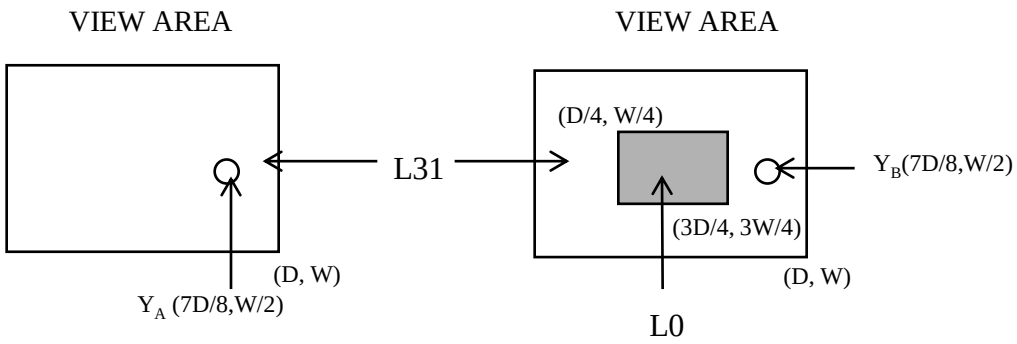


Figure 4. Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$$

Where: Y_A = Initial luminance of measured area (cd/m^2)
Y_B = Subsequent luminance of measured area (cd/m^2)
The location measured will be exactly the same in both patterns

EDID Table

Address (HEX)	Function	Hex	Dec	crc	Input values.	Notes
00	Header	00	0		0	EDID Header
01		FF	255		255	
02		FF	255		255	
03		FF	255		255	
04		FF	255		255	
05		FF	255		255	
06		FF	255		255	
07		00	0		0	
08	ID Manufacturer Name	09	9		BOE	ID = BOE
09		E5	229			
0A	ID Product Code	D7	215		1495	ID = 1495
0B		05	5			
0C	32-bit serial No.	00	0			
0D		00	0			
0E		00	0			
0F		00	0			
10	Week of manufacture	01	1		1	
11	Year of Manufacture	16	22		2012	Manufactured in 2012
12	EDID Structure Ver.	01	1		1	EDID Ver 1.0
13	EDID revision #	03	3		3	EDID Rev. 0.3
14	Video input definition	80	128		-	
15	Max H image size	1D	29		29	29 cm (Approx)
16	Max V image size	11	17		17	17 cm (Approx)
17	Display Gamma	78	120		2.2	Gamma curve = 2.2
18	Feature support	0A	10			RGB display, Preferred Timming mode
19	Red/Green low bits	92	146		-	Red / Green Low Bits
1A	Blue/White low bits	9E	158		-	Blue / White Low Bits
1B	Red x high bits	A9	169	678	0.663	Red (x) = 10101001 (0.663)
1C	Red y high bits	53	83	333	0.326	Red (y) = 01010011 (0.326)
1D	Green x high bits	4A	74	296	0.290	Green (x) = 01001010 (0.29)
1E	Green y high bits	9A	154	618	0.604	Green (y) = 10011010 (0.604)
1F	Blue x high bits	22	34	138	0.135	Blue (x) = 00100010 (0.135)
20	BLue y high bits	19	25	101	0.099	Blue (y) = 00011001 (0.099)
21	White x high bits	4F	79	319	0.312	White (x) = 01001111 (0.312)
22	White y high bits	55	85	342	0.334	White (y) = 01010101 (0.334)

Address (HEX)	Function	Hex	Dec	crc	Input values.	Notes
23	Established timing 1	00	0		-	
24	Established timing 2	00	0		-	
25	Established timing 3	00	0		-	
26	Standard timing #1	01	1			Not Used
27		01	1			
28	Standard timing #2	01	1			Not Used
29		01	1			
2A	Standard timing #3	01	1			Not Used
2B		01	1			
2C	Standard timing #4	01	1			Not Used
2D		01	1			
2E	Standard timing #5	01	1			Not Used
2F		01	1			
30	Standard timing #6	01	1			Not Used
31		01	1			
32	Standard timing #7	01	1			Not Used
33		01	1			
34	Standard timing #8	01	1			Not Used
35		01	1			
36	Detailed timing/monitor descriptor #1	36	54		138.8	138.78MHz Main clock
37		36	54			
38		80	128		1920	Hor Active = 1920
39		A0	160		160	Hor Blanking = 160
3A		70	112		-	4 bits of Hor. Active + 4 bits of Hor. Blanking
3B		38	56		1080	Ver Active = 1080
3C		20	32		32	Ver Blanking = 32
3D		40	64		-	4 bits of Ver. Active + 4 bits of Ver. Blanking
3E		30	48		48	Hor Sync Offset = 48
3F		20	32		32	H Sync Pulse Width = 32
40		35	53		3	V sync Offset = 3 line
41		00	0		5	V Sync Pulse width : 5 line
42		26	38		294	Horizontal Image Size = 294 mm (Low 8 bits)
43		A5	165		165	Vertical Image Size = 165 mm (Low 8 bits)
44		10	16		-	4 bits of Hor Image Size + 4 bits of Ver Image Size
45		00	0		0	Hor Border (pixels)
46		00	0		0	Vertical Border (Lines)
47		1A	26			Refer to right table

Address (HEX)	Function	Hex	Dec	crc	Input values.	Notes
48	Detailed timing/monitor descriptor #2	24	36		92.5	92.52MHz Main clock
49		24	36			
4A		80	128		1920	Hor Active = 1920
4B		A0	160		160	Hor Blanking = 160
4C		70	112		-	4 bits of Hor. Active + 4 bits of Hor. Blanking
4D		38	56		1080	Ver Active = 1080
4E		20	32		32	Ver Blanking = 32
4F		40	64		-	4 bits of Ver. Active + 4 bits of Ver. Blanking
50		30	48		48	Hor Sync Offset = 48
51		20	32		32	H Sync Pulse Width = 32
52		35	53		3	V sync Offset = 3 line
53		00	0		5	V Sync Pulse width : 5 line
54		26	38		294	Horizontal Image Size = 294 mm (Low 8 bits)
55		A5	165		165	Vertical Image Size = 165 mm (Low 8 bits)
56		10	16		-	4 bits of Hor Image Size + 4 bits of Ver Image Size
57		00	0		0	Hor Border (pixels)
58		00	0		0	Vertical Border (Lines)
59		1A	26			
5A	Detailed timing/monitor descriptor #3	00	0			ASCII Data Sting Tag
5B		00	0			
5C		00	0			
5D		FE	254			
5E		00	0			
5F		42	66		B	Manufacture name : BOEHF
60		4F	79		O	
61		45	69		E	
62		20	32			
63		48	72		H	
64		46	70		F	
65		0A	10			
66		20	32			
67		20	32			
68		20	32			
69		20	32			
6A		20	32			
6B		20	32			

Address (HEX)	Function	Hex	Dec	crc	Input values.	Notes
6C	Detailed timing/monitor descriptor #4	00	0			Product Name Tag (ASCII)
6D		00	0			
6E		00	0			
6F		FE	254			
70		00	0			
71		48	72		H	Model name : HN133WU3-100
72		4E	78		N	
73		31	49		1	
74		33	51		3	
75		33	51		3	
76		57	87		W	
77		55	85		U	
78		33	51		3	
79		2D	45		-	
7A		31	49		1	
7B		30	48		0	
7C		30	48		0	
7D		0A	10			
7E	Extension flag	00	0			
7F	Checksum	DC	220	220	-	

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00h	00	FF	FF	FF	FF	FF	FF	00	09	E5	D7	05	00	00	00	00
10h	01	16	01	03	80	1D	11	78	0A	92	9E	A9	53	4A	9A	22
20h	19	4F	55	00	00	00	01	01	01	01	01	01	01	01	01	01
30h	01	01	01	01	01	01	36	36	80	A0	70	38	20	40	30	20
40h	35	00	26	A5	10	00	00	1A	24	24	80	A0	70	38	20	40
50h	30	20	35	00	26	A5	10	00	00	1A	00	00	00	FE	00	42
60h	4F	45	20	48	46	0A	20	20	20	20	20	20	00	00	00	FE
70h	00	48	4E	31	33	33	57	55	33	2D	31	30	30	0A	00	DC

16.0 MECHANICAL OUTLINE DIMENSION

Figure 1. FOB Outline Dimension (Front View)

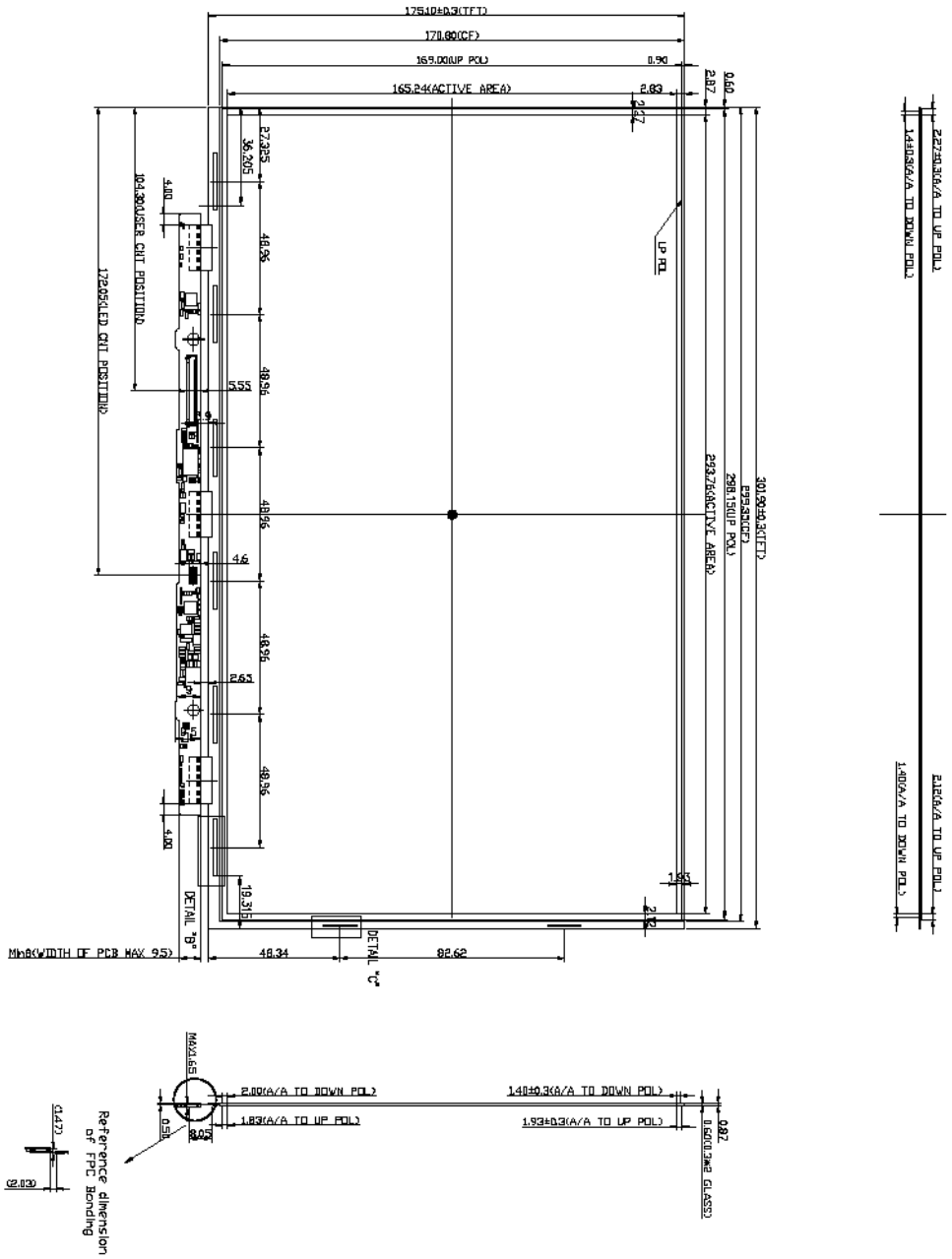


Figure 2. TFT-LCD Panel Outline Dimensions (Rear view)