TO　　:

Date　:　　Mar. 27,2000

HannStar Product Information

Tentative

MODEL : HSD141PX11

　　　　　-A

Note:1. The information contained herein is tentative and may be changed without prior notices.
　　　2. Please contact HannStar Display Corp. before designing your product based on this module specification.
　　　3. The information contained herein is presented merely to indicate the characteristics and perfor-mance of our products. No responsibility is assumed by HannStar for any intellectual property claims or other problems that may result from application based on the module described herein.

CONTENT

1. RECORD OF REVISIONS

ECN. No.	Date	Description of change
01	Jan. 20, 2000	● Tentative spec. for HSD141PX11-A was first issued.
02	Mar. 7, 2000	● White luminance was changed from 150 cd/m^2 to 145 cd/m^2 on page 6. ● View angle was changed from 50/50/25/45 to 45/45/20/40 ($_L$/ $_R$/ $_H$/ $_L$) on page 6. ● Outline dimension was revised on page 20. ● Label and its location drawings were added on page 22.
03	Mar 27, 2000	● Back view outline dimension was added on page 21. ● Package specification was added on page 23.

2. GENERAL DESCRIPTION

HannStar Display model HSD141PX11-A is a color active matrix thin film transistor(TFT) liquid crystal display(LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a backlight system. This TFT LCD has a 14.1 inch diagonally measured active display area with XGA resolution(768 vertical by 1024 horizontal pixel array) and can display up to 262,144 colors.

FEATURES:
- 14.1" XGA for Notebook PC.
- LVDS interface system.

APPLICATIONS:
- Notebook PC .
- OA equipment.
- Display terminals.
- Measuring Instrument.
- New media equipment.

GENERAL INFORMATION:

Item	Specification	Unit
Display area	285.7(W) × 214.3(H)	mm
Number of pixels	1024(H)*768(V)	pixels
Pixel pitch	0.279(H)*0.279(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display color	262,144	
Display mode	Normally white	
Surface treatment	Anti-glare and hard coating 3H	
Weight	520	g
Back-light	Single CCFL , Side-light type	
Input signal	1-ch LVDS	
Optimum viewing direction	6 o'clock	

MECHANICAL INFORMATION

Item		Min.	Typ.	Max.	Unit
Module size	Horizontal(H)	298.0	298.5	299.0	mm
	Vertical(V)	226.0	226.5	227.0	mm
	Depth(D)			6.0	mm
Weight (without inverter)			520	535	g

3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-20	60	ºC	
Operating temperature	T_{OPR}	0	50	ºC	
Vibration(non-operating)	V_{nop}		1.5	G	(1)
Shock(non-operating)	S_{nop}	70	--	G	(2)
Storage humidity	H_{STG}	10	90	%RH	(3)

Note: (1)10-500Hz sweep/cycle, one cycle 15min for each X,Y,Z directions

(2)2ms,± X,± Y,± Z direction, one time each

(3)Max. wet bulb temp =39ºC

3.2 ELECTRICAL ABSOLUTE RATINGS

(1) TFT LCD MODULE

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V_{DD}	-0.3	4.0	V	(1)
Logic input voltage	V_{in}	-0.3	V_{DD} +0.3	V	(1)

(2) BACK-LIGHT UNIT

Item	Symbol	Min.	Max.	Unit	Note
Lamp voltage	V_L	0	2000	V(rms)	(1)
Lamp current	I_L		6.5	mA	(1)
Lamp freqency	f_L	0	100	KHz	(1)

Note: (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under Normal Operating Conditions.

4. OPTICAL CHARACTERISTICS

| Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR			250			(1)(2)
Response time	Rising	T_R			15		msec	(1)(3)
	Falling	T_F			35			
White luminance (center of screen)		Y_L			145		cd/m^2	
Color chromaticity (CIE1931)	Red	R_x	$=0$ $=0$ Normal Viewing Angle	0.58	0.61	0.64		(1)(4)
		R_y		0.31	0.34	0.37		
	Green	G_x		0.30	0.33	0.36		
		G_y		0.53	0.56	0.59		
	Blue	B_x		0.12	0.15	0.18		
		B_y		0.10	0.13	0.16		
	White	W_x		0.30	0.33	0.36		
		W_y		0.31	0.34	0.37		
Viewing angle	Hor.	L	CR>10		40			
		R			40			
	Ver.	H			20			
		L			40			
Brightness uiformity		B_{UNI}		60			%	(5)

Measuring condition :

● Measuring surrounding : dark room

● Lamp current I_L =6mA,lamp freq. f_L =50KHz

● V_{DD}=3.3± 0.3V

● Surrounding temperature : 25ºC± 2 ºC

● 30 min. warm-up time

Measuring equipment : BM-7

Note (1) Definition of Viewing Angle :
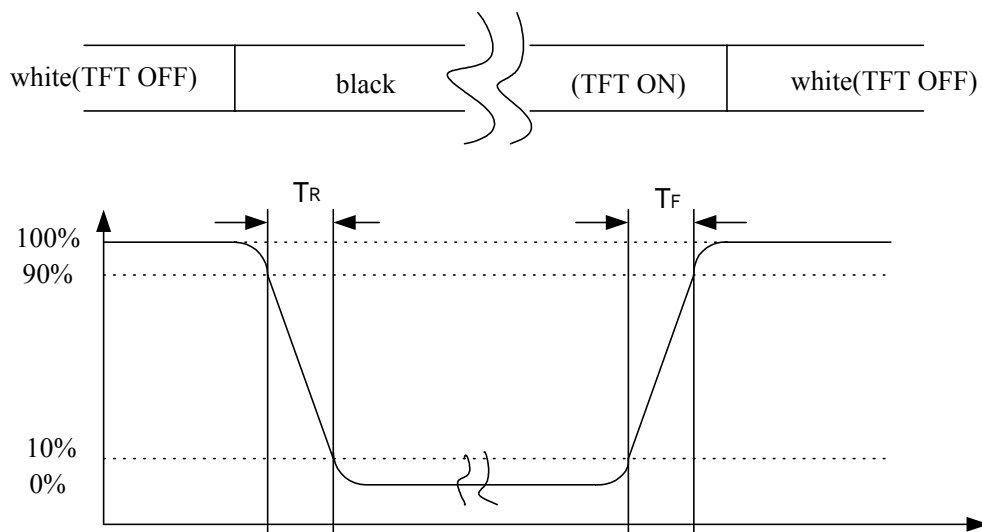
H

12' o'clock

$_H$=90°

L

R

$_L$=90°

$_R$=90°

L

6' o'clock

$_L$=90°
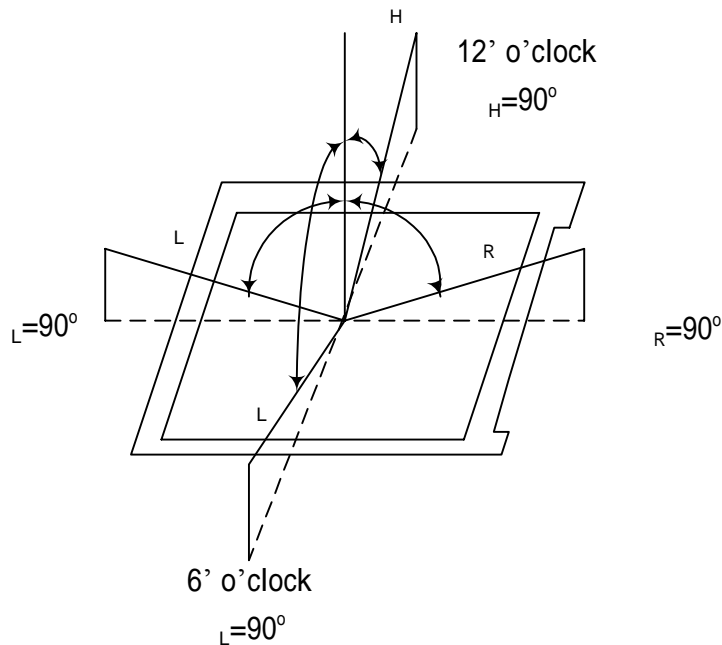
Note (2) Definition of Contrast Ratio (CR) :
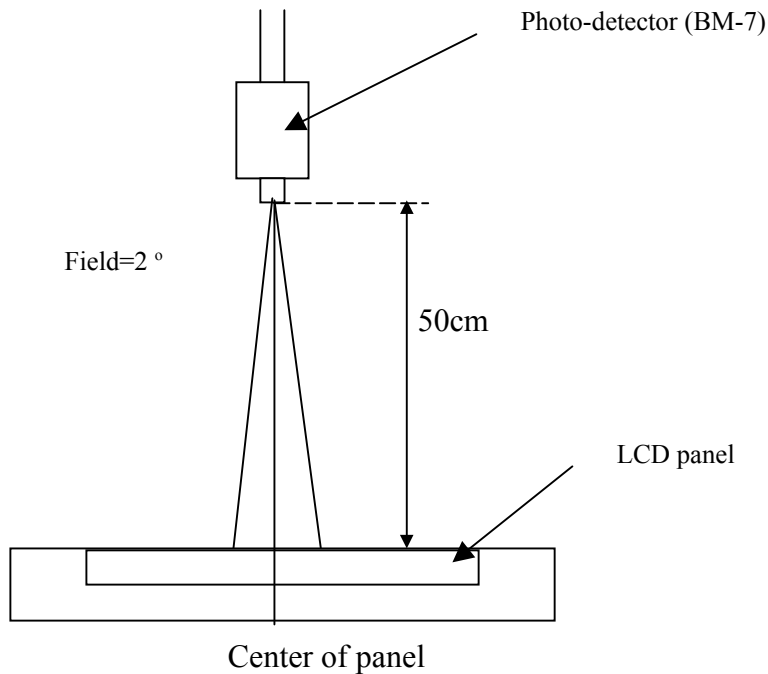
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white (L63)}}{\text{Luminance with all pixels black (L0)}}$$

Note (3) Definition of Response Time : Sum of T_R and T_F

white(TFT OFF)   black   (TFT ON)   white(TFT OFF)

T_R T_F

100%
90%

10%
0%

Note (4) Optical characteristics measurement setup

Photo-detector (BM-7)

Field=2 º

50cm

LCD panel

Center of panel

Note (5) Definition of brightness uniformity

Luminance uniformity=(Min Luminance)/(Max Luminance)x100%
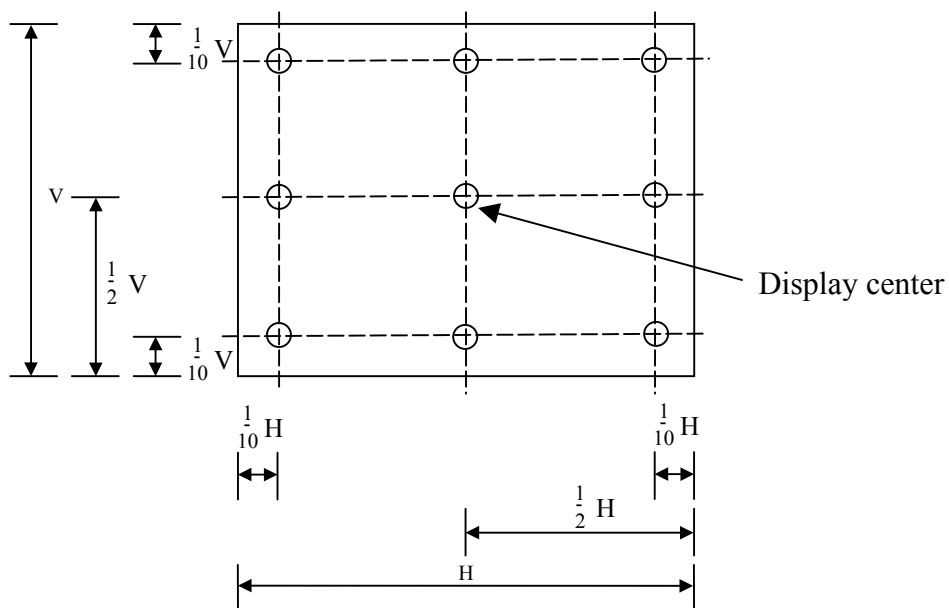
$\frac{1}{10}$ V

V

$\frac{1}{2}$ V

$\frac{1}{10}$ V

Display center

$\frac{1}{10}$ H

$\frac{1}{10}$ H

$\frac{1}{2}$ H

H

5. ELECTRICAL CHARACTERISTICS

5.1 TFT LCD MODULE

| Item		Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of power supply		V_{DD}	3.0	3.3	3.6	V	
Differential input threshold voltage	High	V_{IH}			100	mV	V_{CM}=1.2V
	Low	V_{IL}	-100			mV	
Current of power supply	Mosaic	I_{DD}		TBD		mA	(1)
Vsync frequency		f_V		60		Hz	(2)
Hsync frequency		f_H		48.35		kHz	
Main frequency		f_{DCLK}		65.00		MHz	

(1)Mosaic: Dot checker image

Grey scale: L0   L63.

L0: Luminance with all pixels black.

L63: Luminance with all pixels white.
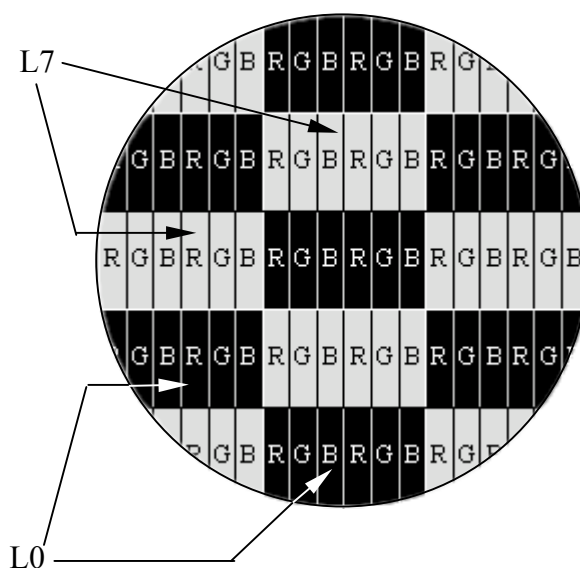
(2)When f_v is too low, a flicker may be occurred on the display.

5.2 BACK-LIGHT UNIT

The back-light system is an edge-lighting type with 1 CCFL(Cold Cathod Fluorescent Lamp).

The characteristics of the lamp is shown in the following tables.

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp current	I_L	3.0	6.0	6.5	mA(rms)	(1)
Lamp voltage	V_L	575	625	675	V(rms)	I_L=6.0mA
Frequency	f_L	30	50	100	KHz	(2)
Operating life time	Hr	10,000			Hour	(3)
Startup voltage	Vs			1040	V(rms)	at 25ºC
				1250		at 0ºC

Note :

(1) Lamp current is measured with current meter for high frequency as shown below. Specified values are for a lamp.
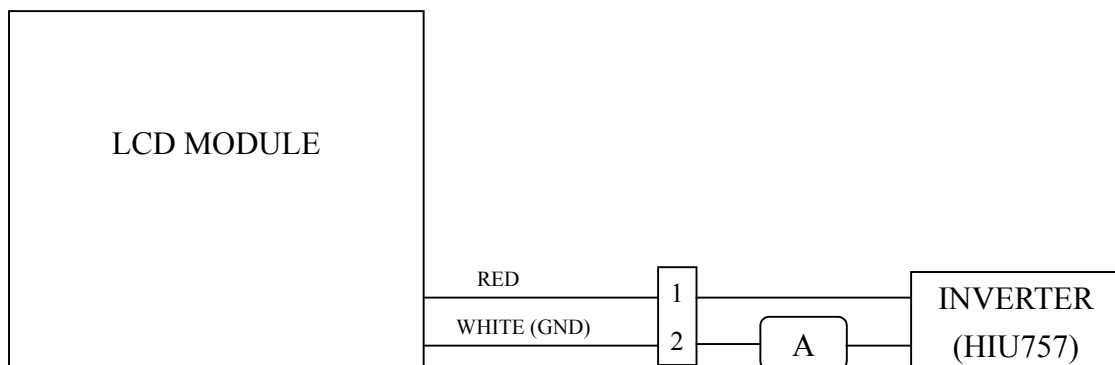
(2) Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency shall be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.
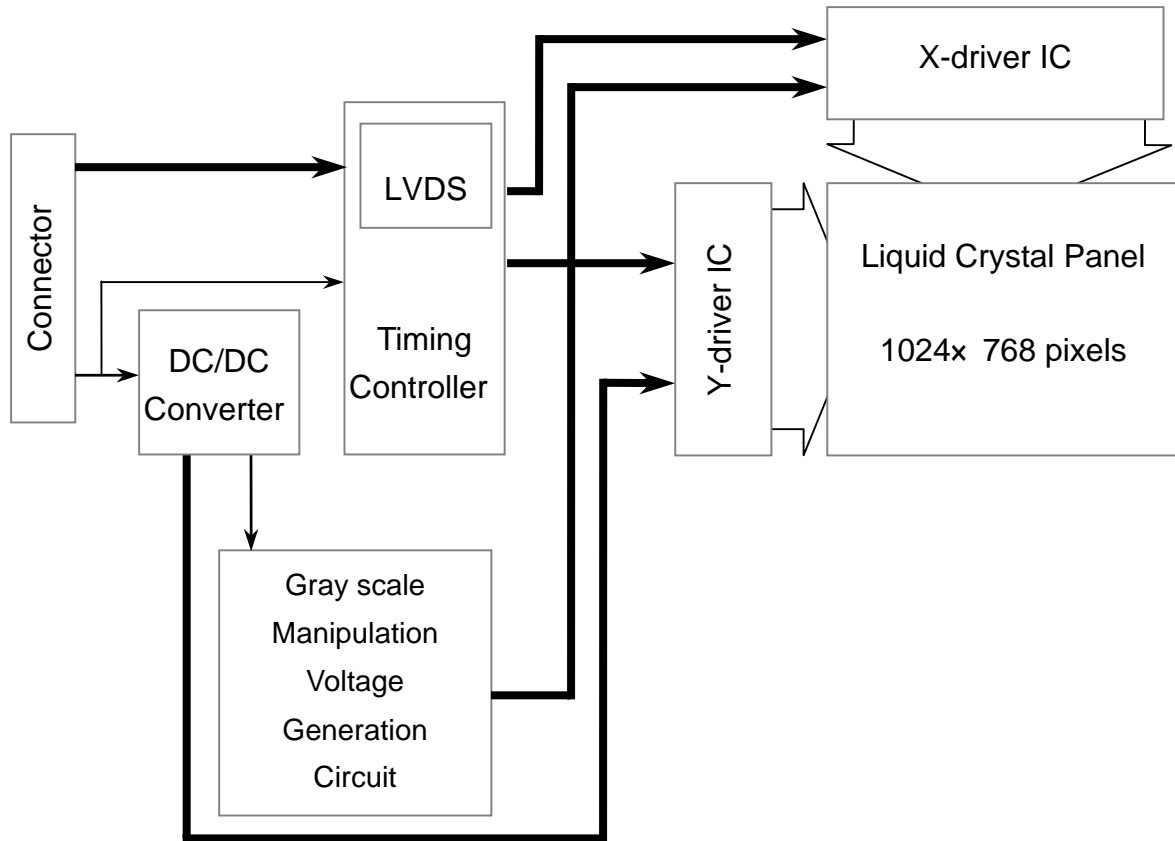
(3) Life time (Hr) of a lamp is defined as the time in which it continues to operate under the condition of Ta=25~35°C and I_L=6 mA(max) until one of the following event occurs:

　1.When the brightness becomes 50% .
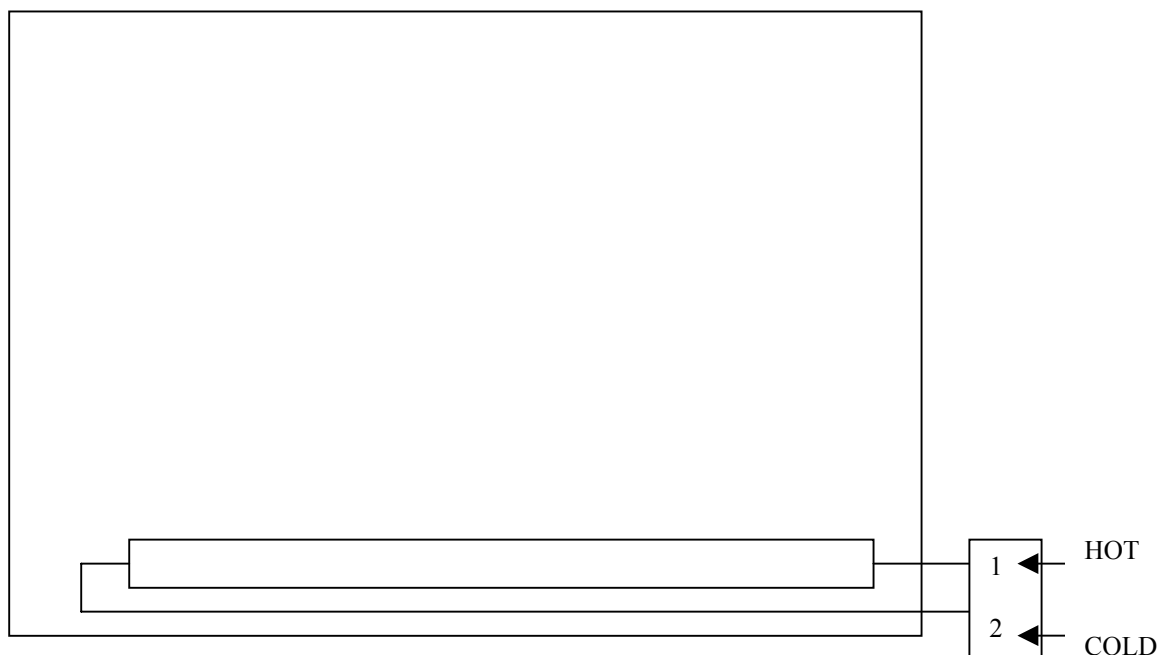
　2.When the effective ignition length becomes 90% .

6. BLOCK DIAGRAM

6.1 TFT LCD MODULE

6.2 BACK-LIGHT UNIT

7. INTERFACE PIN CONNECTION

7.1 TFT LCD MODULE

Connector : HIROSE DF19KR-14P-1H

Matching Socket : HIROSE DF19G-14S-1C

Pin No.	Symbol	Function	Polarity
1	VDD	Power Supply : +3.3V	
2	VDD	Power Supply : +3.3V	
3	GND	Ground	
4	GND	Ground	
5	IN0-	Transmission Data of Pixels 0	Negative
6	IN0+	Transmission Data of Pixels 0	Positive
7	IN1-	Transmission Data of Pixels 1	Negative
8	IN1+	Transmission Data of Pixels 1	Positive
9	IN2-	Transmission Data of Pixels 2	Negative
10	IN2+	Transmission Data of Pixels 2	Positive
11	CLK-	Sampling Clock	Negative
12	CLK+	Sampling Clock	Positive
13	GND	Ground	
14	GND	Ground	

7.2 BACK-LIGHT UNIT

Connector : BHSR-02VS-1/ JAPAN SOLDERLESS TERMINAL MFG CO., LTD.

Mating Connector : SM02B-BHSS-1

Pin No	Input	Symbol	Function
1	HOT	VL	CCFL power supply (high voltage)
2	COLD	GL	CCFL power supply (low voltage)

7.3 RELATIONSHIP BETWEEN DISPLAYED COLOR AND INPUT DATA

		Display	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0	Gray scale level
Basic color		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
		Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	-
		Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	-
		Light Blue	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	-
		Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	-
		Purple	H	H	H	H	H	H	L	L	L	L	L	L	H	H	H	H	H	H	-
		Yellow	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	-
		White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
Gray scale of Red		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark		L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L1
			L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
			:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3~L60
	Light		H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L61
			H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L62
		Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	Red L63
Gray scale of Green		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark		L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L1
			L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L2
			:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3~L60
	Light		L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L	L61
			L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L62
		Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	Green L63
Gray scale of Blue		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L1
			L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
			:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3~L60
	Light		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H	L61
			L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L62
		Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	Blue L63
Gray scale of White & Black		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark		L	L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L1
			L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L	L2
			:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3~L60
	Light		H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	L61
			H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	L62
		White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L63

7.4 PIXEL FORMAT
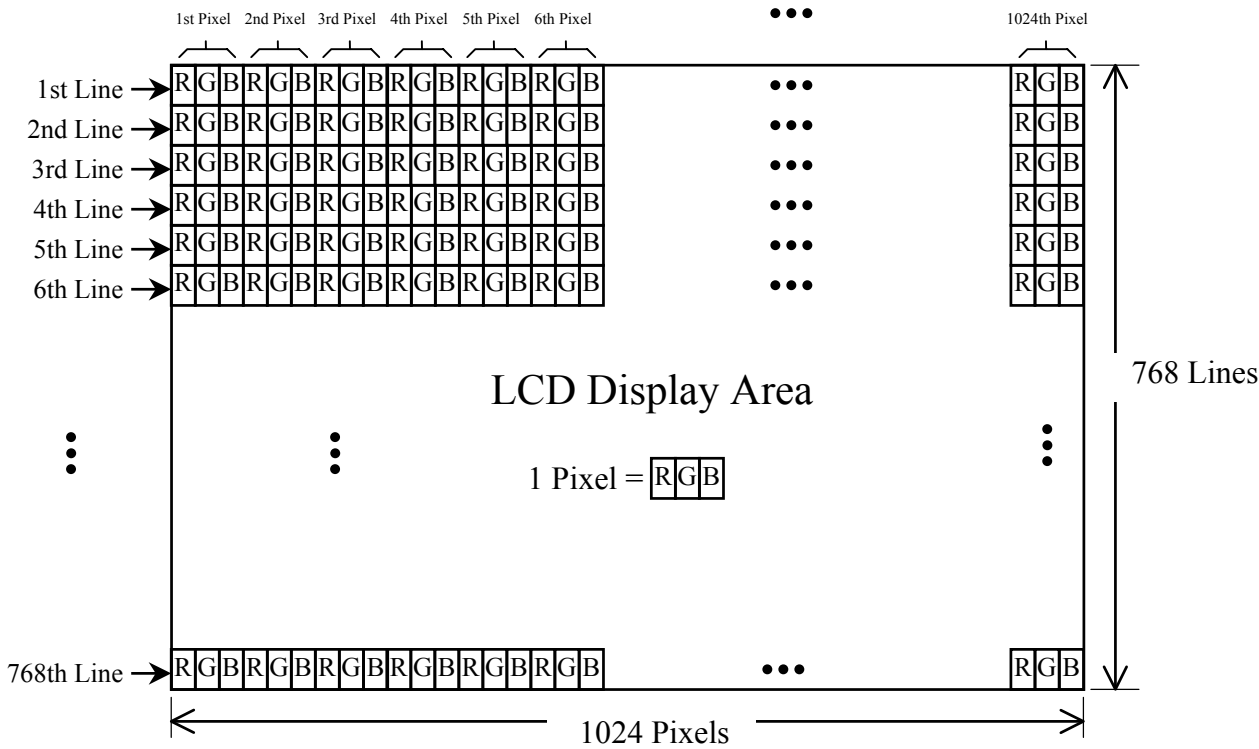
7.5 RECOMMENDED TRANSMITTER TO HSD141PX11-A INTERFACE ASSIGNMENT

Case1: 6bit transmitter

DS90CF363						HSD141PX11-A interface(CN1)	
Input terminal no.		Input signal (Graphics controller output signal)			Output signal		
Symbol	Terminal	Symbol	Function		Symbol	Terminal	Symbol
TIN0	44	R0	RED Pixels Display Data (LSB)				
TIN1	45	R1	RED Pixels Display Data				
TIN2	47	R2	RED Pixels Display Data		TOUT0-	No. 5 No. 6	IN0- IN0+
TIN3	48	R3	RED Pixels Display Data				
TIN4	1	R4	RED Pixels Display Data		TOUT0+		
TIN5	3	R5	RED Pixels Display Data (MSB)				
TIN6	4	G0	RED Pixels Display Data (LSB)				
TIN7	6	G1	GREEN Pixels Display Data				
TIN8	7	G2	GREEN Pixels Display Data				
TIN9	9	G3	GREEN Pixels Display Data		TOUT1-	No. 7 No. 8	IN1- IN1+
TIN10	10	G4	GREEN Pixels Display Data				
TIN11	12	G5	GREEN Pixels Display Data (MSB)		TOUT1+		
TIN12	13	B0	BLUE Pixels Display Data (LSB)				
TIN13	15	B1	BLUE Pixels Display Data				
TIN14	16	B2	BLUE Pixels Display Data				
TIN15	18	B3	BLUE Pixels Display Data				
TIN16	19	B4	BLUE Pixels Display Data		TOUT2-	No. 9 No. 10	IN2- IN2+
TIN17	20	B5	BLUE Pixels Display Data (MSB)				
TIN18	22	NC	Non Connection (open)		TOUT2+		
TIN19	23	NC	Non Connection (open)				
TIN20	25	ENAB	Compound Synchronization Signal				
CLK IN	26	NCLK	Data Sampling Clock		TCLK OUT- TCLK OUT+	No. 11 No. 12	CLK IN- CLK IN+

Note : Please connect NC pin to nothing. Don't connect it to ground nor to other signal input.

Case2 : 8bit transmitter

			DS90CF383			
Input terminal no.		Input signal (Graphics control output signal)		Output signal	To HSD141PX11-A interface(CN1)	
Symbol	Terminal	Symbol	Function	Symbol	Terminal	Symbol
TIN0	51	R0	RED Pixels Display Data (LSB)	TOUT0- TOUT0+	No. 5 No. 6	IN0- IN0+
TIN1	52	R1	RED Pixels Display Data			
TIN2	54	R2	RED Pixels Display Data			
TIN3	55	R3	RED Pixels Display Data			
TIN4	56	R4	RED Pixels Display Data			
TIN6	3	R5	RED Pixels Display Data (MSB)			
TIN7	4	G0	GREEN Pixels Display Data (LSB)			
TIN8	6	G1	GREEN Pixels Display Data	TOUT1- TOUT1+	NO.7 NO.8	IN1- IN1+
TIN9	7	G2	GREEN Pixels Display Data			
TIN12	11	G3	GREEN Pixels Display Data			
TIN13	12	G4	GREEN Pixels Display Data			
TIN14	14	G5	GREEN Pixels Display Data (MSB)			
TIN15	15	B0	BLUE Pixels Display Data (LSB)			
TIN18	19	B1	BLUE Pixels Display Data			
TIN19	20	B2	BLUE Pixels Display Data	TOUT2- TOUT2+	NO.9 NO.10	IN2- IN2+
TIN20	22	B3	BLUE Pixels Display Data			
TIN21	23	B4	BLUE Pixels Display Data			
TIN22	24	B5	BLUE Pixels Display Data (MSB)			
TIN24	27	NC	Non Connection (open)			
TIN25	28	NC	Non Connection (open)			
TIN26	30	ENAB	Compound Synchronization Signal			
TIN27	50	NC	Non Connection (open)	TOUT3- TOUT3+		
TIN5	2	NC	Non Connection (open)			
TIN10	8	NC	Non Connection (open)			
TIN11	10	NC	Non Connection (open)			
TIN16	16	NC	Non Connection (open)			
TIN17	18	NC	Non Connection (open)			
TIN23	25	NC	Non Connection (open)			
CLK IN	31	NCLK	DATA SAMPLING CLOCK	TCLK OUT- TCLK OUT+	NO. 11 NO. 12	CLK IN- CLK IN+

Note : Please connect NC pin to nothing. Don't connect it to ground nor to other signal input.

IN0	TIN7	TIN6	TIN4	TIN3	TIN2	TIN1	TIN0
	G0	R5	R4	R3	R2	R1	R0
IN1	TIN18	TIN15	TIN14	TIN13	TIN12	TIN9	TIN8
	B1	B0	G5	G4	G3	G2	G1
IN2	TIN26	TIN25	TIN24	TIN22	TIN21	TIN20	TIN19
	ENAB	NC	NC	B5	B4	B3	B2
IN3	TIN23	TIN17	TIN16	TIN11	TIN10	TIN5	TIN27
	NC	NC	NC	NC	NC	NC	NC

8. INTERFACE TIMING

8.1 Timing Parameters (DE Mode)

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Frame period	t1	778×t3	806×t3 16.67	860×t3	ms	1) 5)
Vertical display term[1]	t2	768×t3	768×t3 15.8	768×t3	ms	1)
One line scanning time	t3	1100×t5	1344×t5 20.68		μs	1) 5)
Horizontal display term	t4	1024×t5	1024×t5 15.76	1024×t5	μs	1)
Clock period	t5	15	15.38		ns	5)

Note 1) Refer to TIMING CHART at page18 and LVDS specification (DS90CF364MTD) by National Semiconductor Corporation.

Note 2) When ENAB is fixed to "H" level or "L" level after NCLK is supplied, the panel displays black with some flicker.

Note 3) If NCLK is fixed to "H" level or "L" level, for certain period while ENAB is supplied, the panel may be damaged.

Note 4) Do not make t1 and t3's fluctuate . If t1 or t3 is fluctuate, the panel displays black.

Note 5) Please adjust LCD operating signal timing and FL driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and FL driving condition (especially driving frequency).

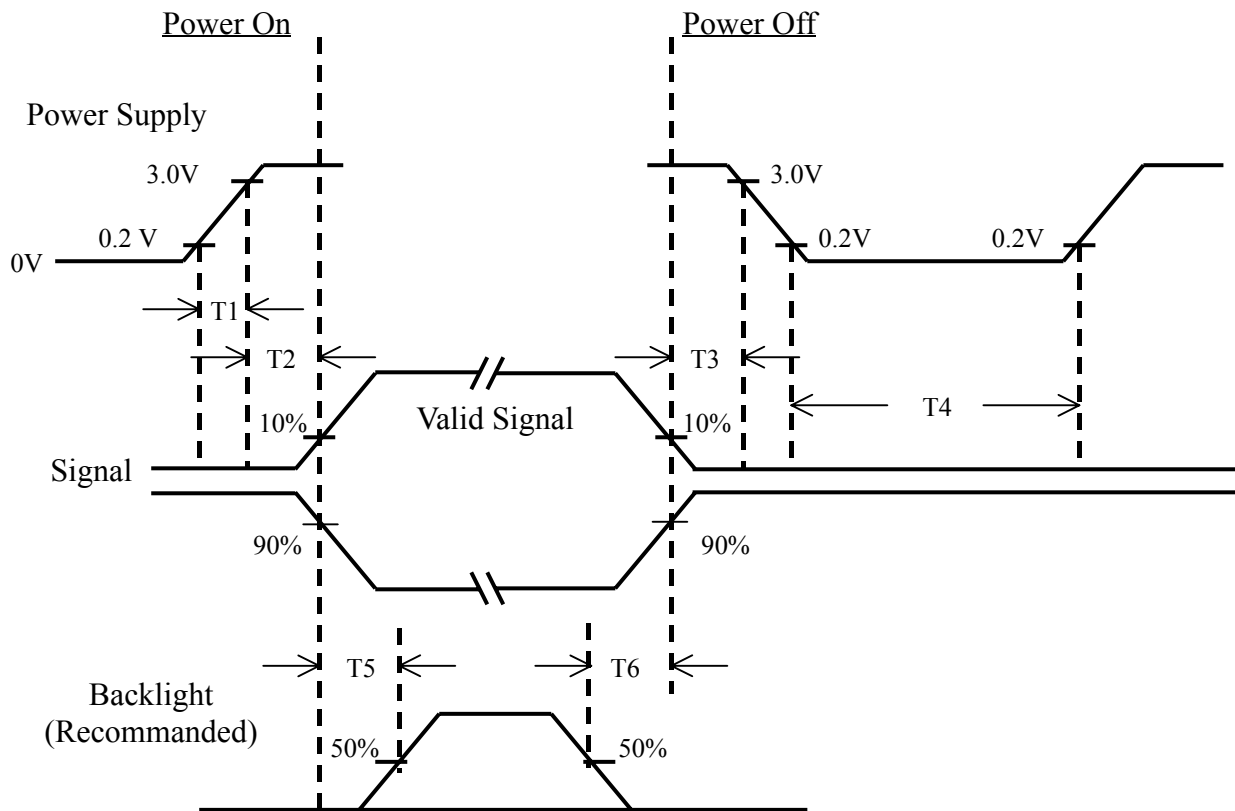Note 6) All input condition(level&timing) refers to LVDS DS90CF364MTD specification.

8.2 Timing Diagram of Interface Signal (DE mode)
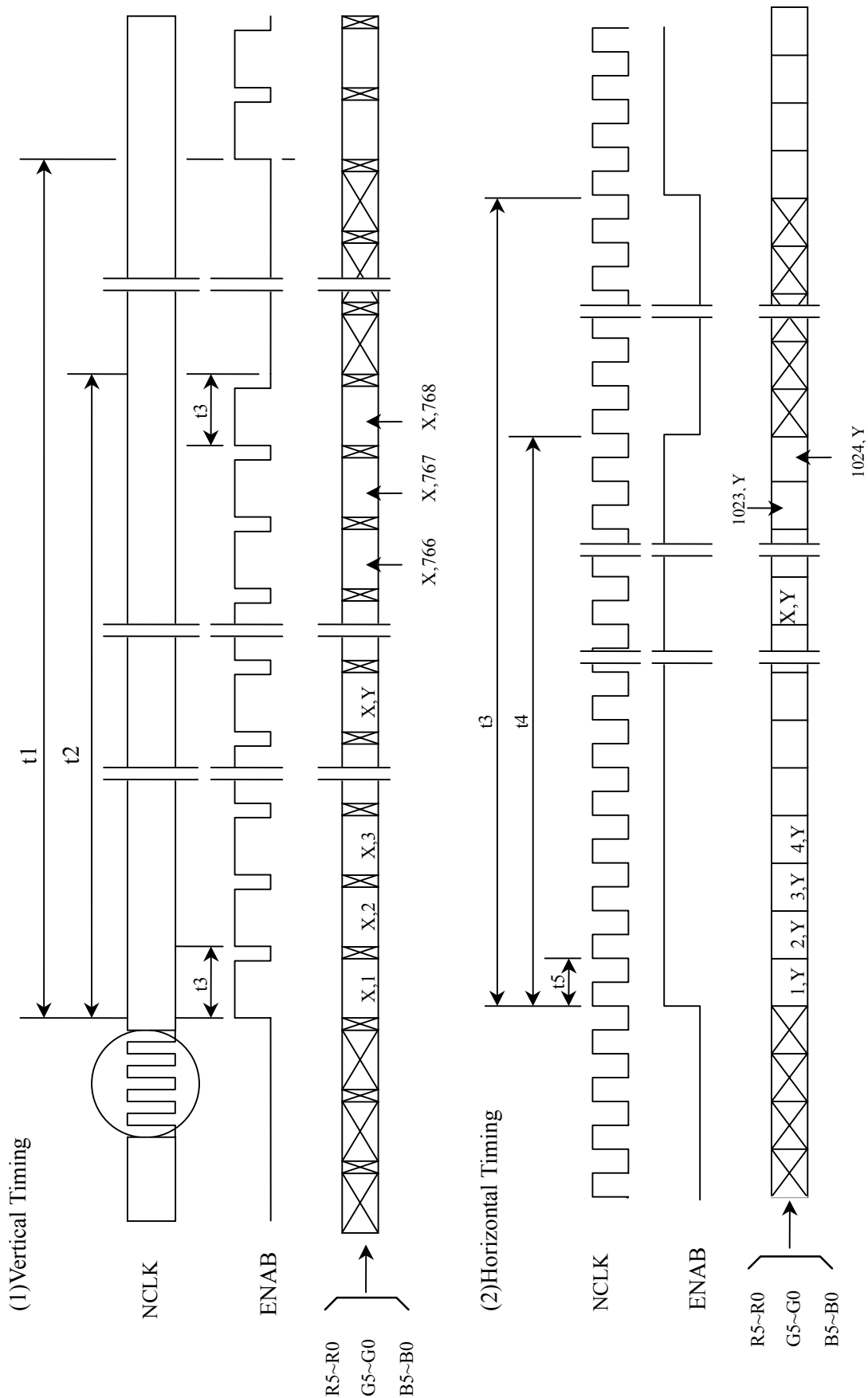
8.3 Power ON/OFF Sequence

Power ON/OFF Sequence

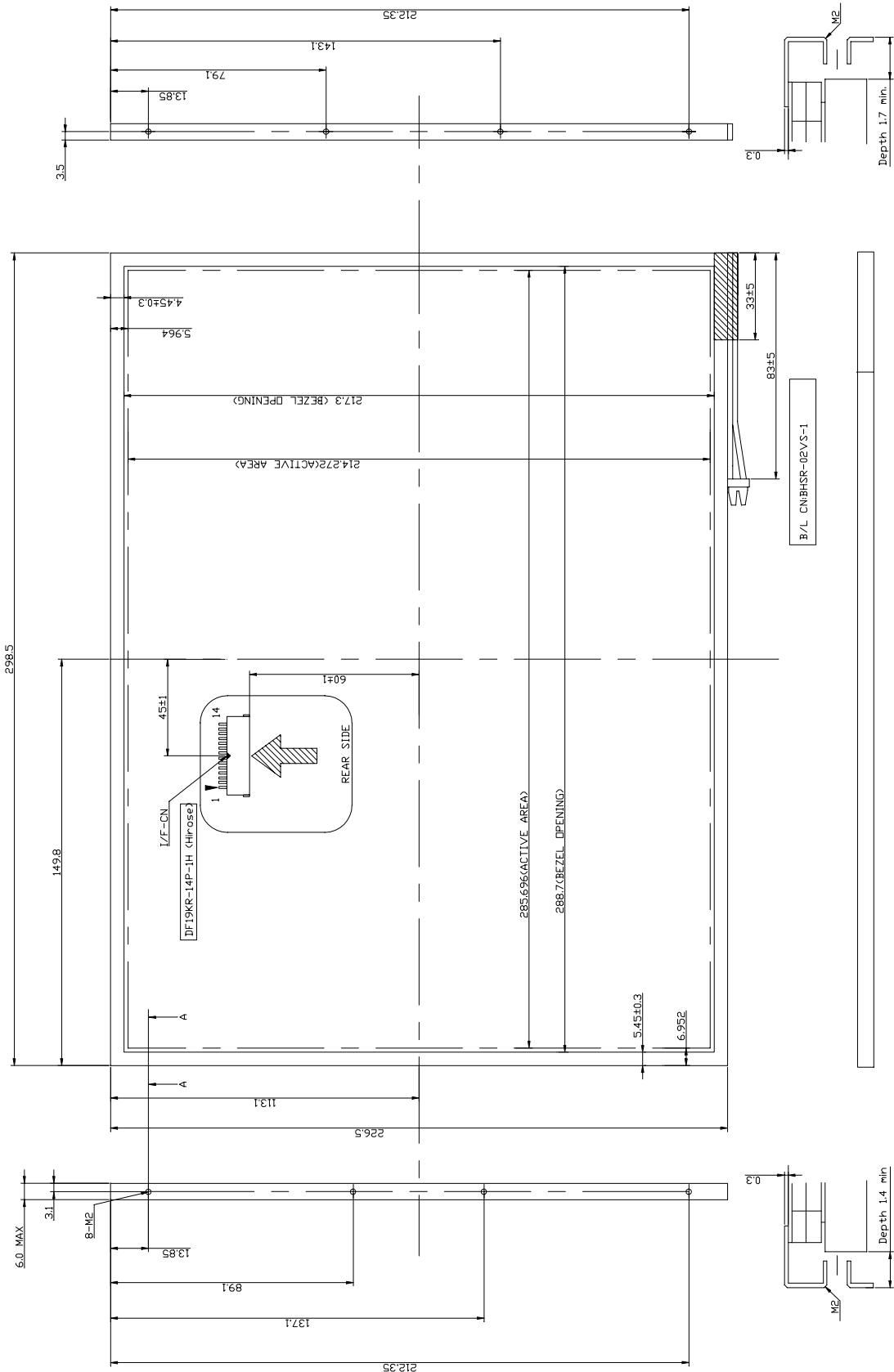| Item	Min.	Typ.	Max.	Unit	Remark
T1	0		10	msec	
T2	50		55	msec	
T3	0		40	msec	
T4	500			msec	
T5	200			msec	
T6	200			msec	

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 volatge 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 signal 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.

9. OUTLINE DIMENSION

(1)Front view outline

(2)Back view outline dimension
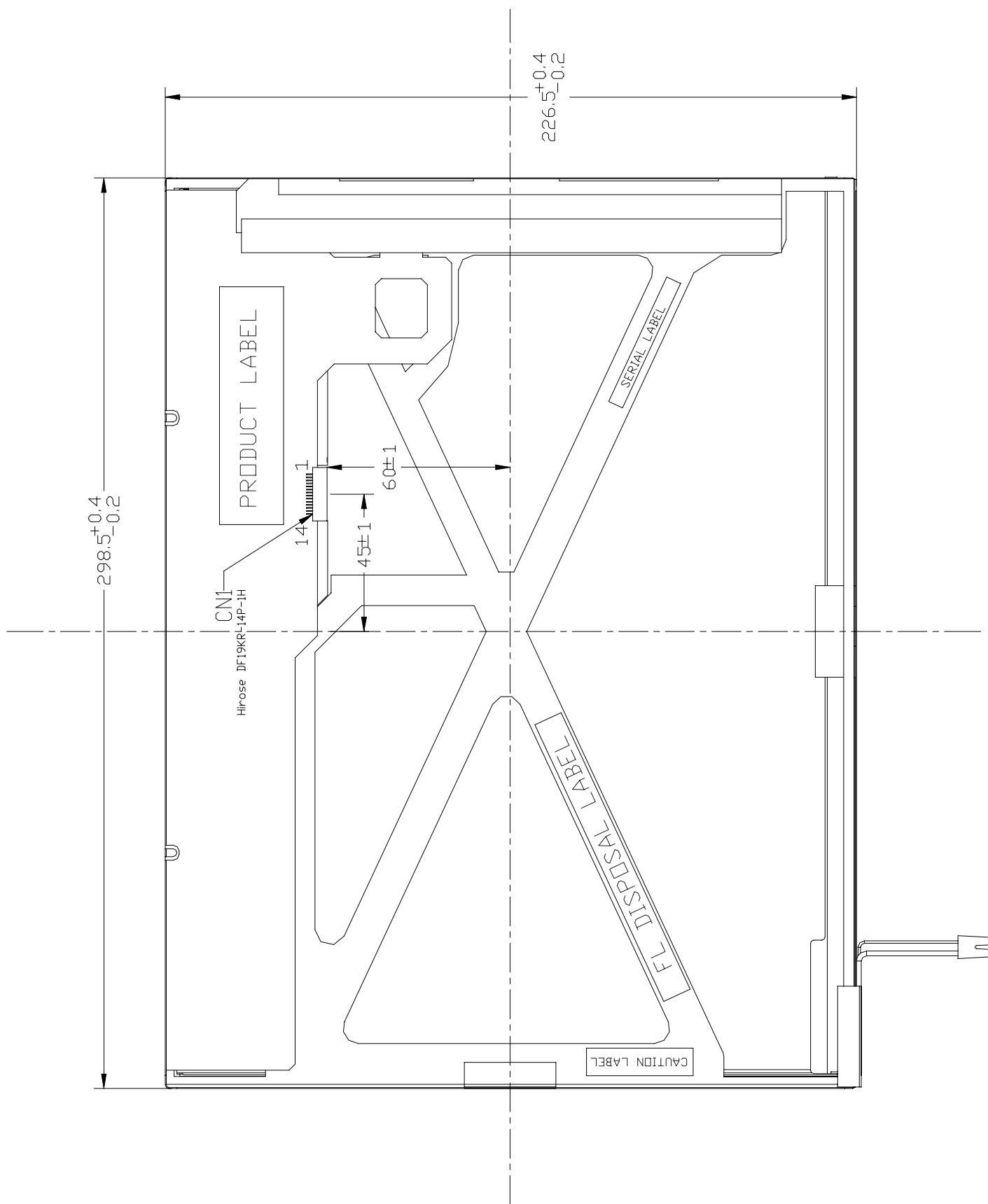
10. LOT MARK

10.1 lot mark

								10	11	12	13	14	15

code 1,2,3,4,5,6: HannStar internal flow control code.

code 7: production location.

code 8: production year.

code 9: production month.

code 10,11,12,13,14,15: serial number.

Note(1) production year

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mark	9	0	1	2	3	4	5	6	7	8

Note(2) production month

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

10.2 location of lot mark

(1) The label is attached to the backside of the LCD module.
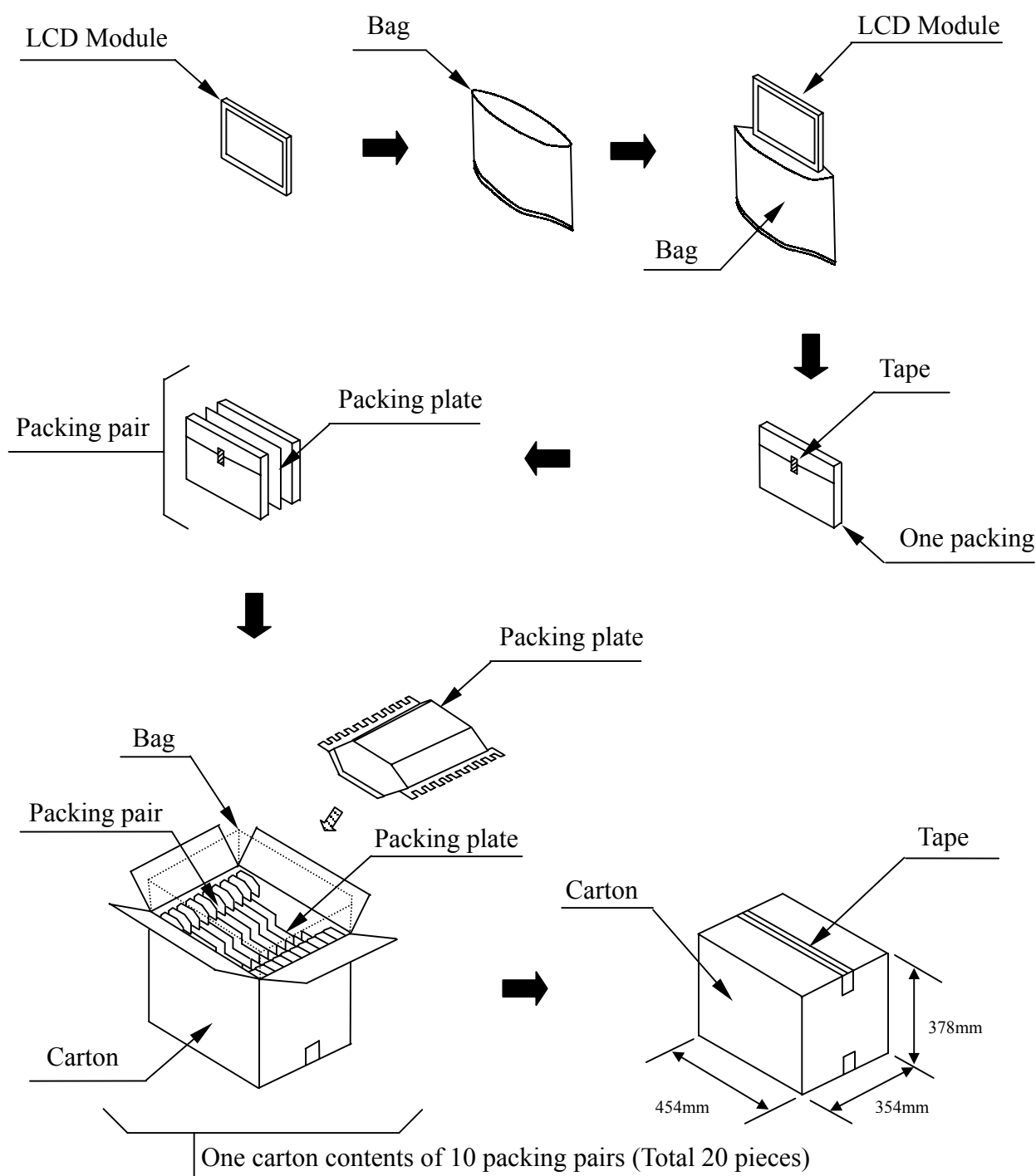
(2) This is subject to change without prior notice.
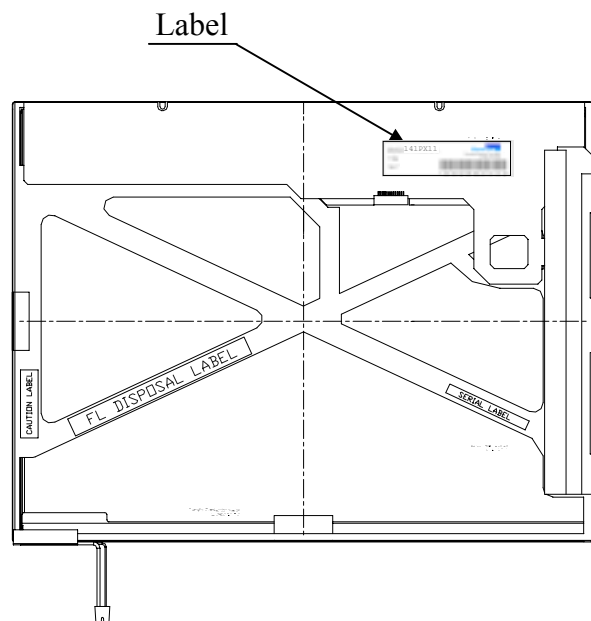
Label

HSD141PX11
-A
Rev:

HannStar Display Corporation
MADE IN TAIWAN

* A 0 K 9 C 0 0 0 A 0 0 0 0 0 3 *
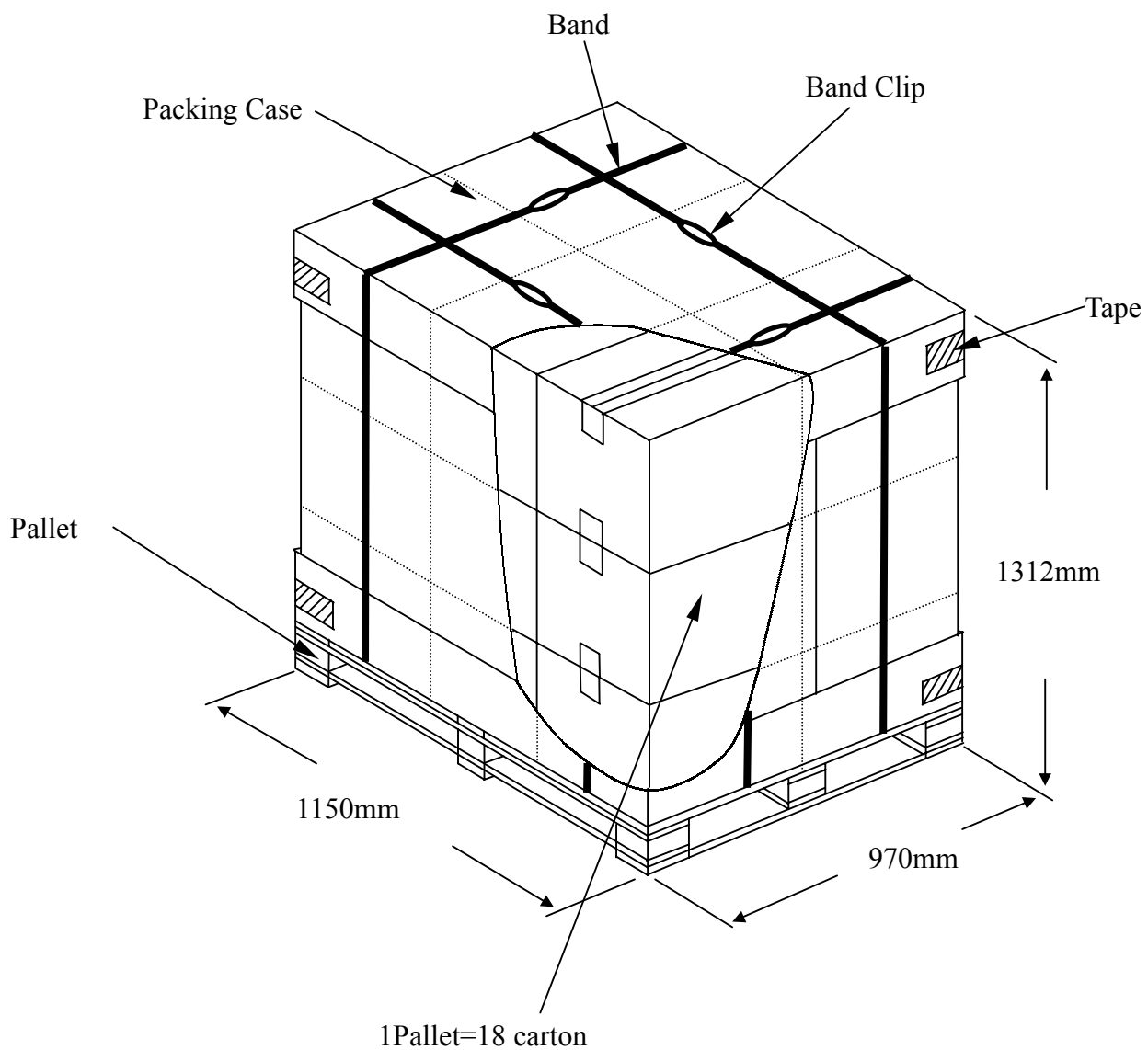
Lot mark

11. PACKAGE SPECIFICATION

11.1 packing form

(1) package quantity in one carton: 20 pieces.

(2) carton size: 454± 3mm× 354± 3mm× 378± 3mm.

(3) for domestic transportation only.

11.2 packing assembly drawings

One carton contents of 10 packing pairs (Total 20 pieces)

11.3 Pallet transportation specification

Band

Band Clip

Packing Case

Tape

Pallet

1312mm

1150mm

970mm

1Pallet=18 carton

12. GENERAL PRECAUTION

(1) USE RESTRICTION

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

(2) DISASSEMBLING OR MODIFICATION

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

(3) BREAKAGE OF LCD PANEL

    (3.1) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

    (3.2) If liquid crystal contacts mouth or eyes, rinse out with water immediately.

    (3.3) If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

    (3.4) Handle carefully with chips of glass that may cause injury , when the glass is broken.

(4) ELECTRIC SHOCK

    (4.1) Disconnect power supply before handling LCD module.

    (4.2) Do not pull or fold the CCFL cable.

    (4.3) Do not touch the parts inside LCD modules and the fluorescent lamp's connector or cables in order to prevent electric shock.

(5) ABSOLUTE MAXIMUM RATINGS AND POWER PROTECTION CIRCUIT

    (5.1) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

    (5.2) Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

    (5.3) It's recommended to employ protection circuit for power supply.

(6) OPERATION

    (6.1) Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

    (6.2) Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

(6.3) When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

(6.4) Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

(6.5) When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

(7) Mechanism

Please mount LCD module by using mouting holes arranged in four corners tightly.

(8) STATIC ELECTRICITY

(8.1) Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

(8.2) Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

(9) STRONG LIGHT EXPOSURE

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

(10) DISPOSAL

When disposing LCD module, obey the local environmental regulations.