For SIEMENS NIXDORF INFORMATION SYSTEMS Ltd.

14.2" XGA
(Ver. 2)

TECHNICAL SPECIFICATION

AA142XC11

MITSUBISHI / ADI

Date. May 7,'98

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1.OVER VIEW

AA142XC11 (with LVDS interface) are 14.21" color TFT- LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs, control circuit, and backlight.

By applying 6 bit digital data, 1024 X 768, 260 k -color images are displayed on the 14.21" diagonal screen. Input power voltage is single 3.3 V for LCD driving.

Inverter for backlight is not included in this module. General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	288.768 (H) X 216.576 (V) (14.21-inch diagonal)
Number of Pixels	1024 (H) X 768 (V)
Pixel Pitch (mm)	0.282 (H) X 0.282 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	normally white
Number of Colors	260 K
Optimum Viewing Angle	6 o'clock
Brightness (cd/m^2)	100
Power consumption (W)	4.9
Module Size (mm)	303.0 (W) X 230.5 (H) X 9.0 (D)
Module Weight (g)	690(TYP)
Backlight Unit	CCFL, 1-tube

The LCD products listed on this document are not suitable for use of aerospace equipment, submarine cables, nuclear reactor control system and life support systems. If customers intend to use these LCD products for above application or not listed in "Standard" as follows, please contact our sales people in advance.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tool, Industrial robot, Audio and Visual equipment, Other consumer products.

2. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage for LCD	VCC	0	4.0	V
LVDS Input Voltage	VI	-0.3	VCC+0.3	V
Operation Temperature *1)	T_{op}	0	50	°C
Storage Temperature *1)	T_{stg}	-20	60	°C

[Note]
*1) Humidity ≤ 85%RH. No condensation

3. ELECTRICAL CHARACTERISTICS

(a) TFT-LCD

Ta=25°C

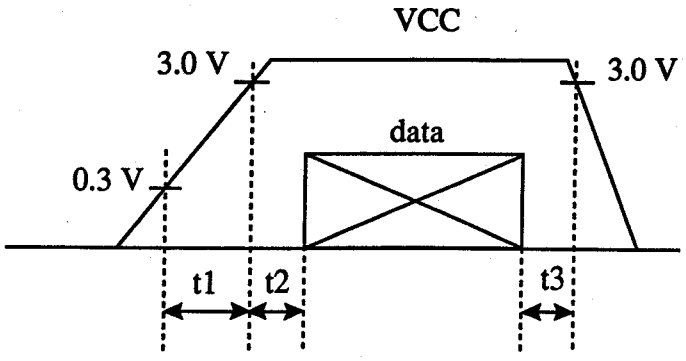
ITEM		SYMBOL	MIN	TYP	MAX	UNIT	Remark
Power Supply Voltage for LCD		VCC	3.0	3.3	3.6	V	Note 1
Power Supply Current for LCD		ICC	-	500	850	mA	Note 2
Logic Input Voltage (LVDS:IN+and IN-) Note 3	Input Voltage	VIN	0	-	VCC	V	
	Common Mode Voltage	VCM	1.125	-	1.375	V	
	Differential Input Voltage	|VID|	250	345	450	mV	
	Differential Input High Threshold of VID	VTH	-	-	100	mV	When VCM=+1.2 V
	Differential Input Low Threshold of VID	VTL	-100	-	-	mV	
Change in VID between complimentary input state		ΔVID	-	-	35	mV	
Change in VCM between complimentary input state		ΔVCM	-	-	35	mV	

[Note 1]

VCC-turn-on conditions: t1 ≤ 10ms,

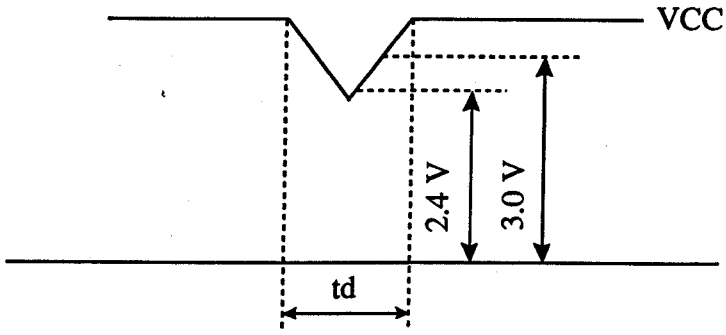
0 < t2 ≤ 50ms,

0 < t3 ≤ 50ms.



VCC-dip conditions

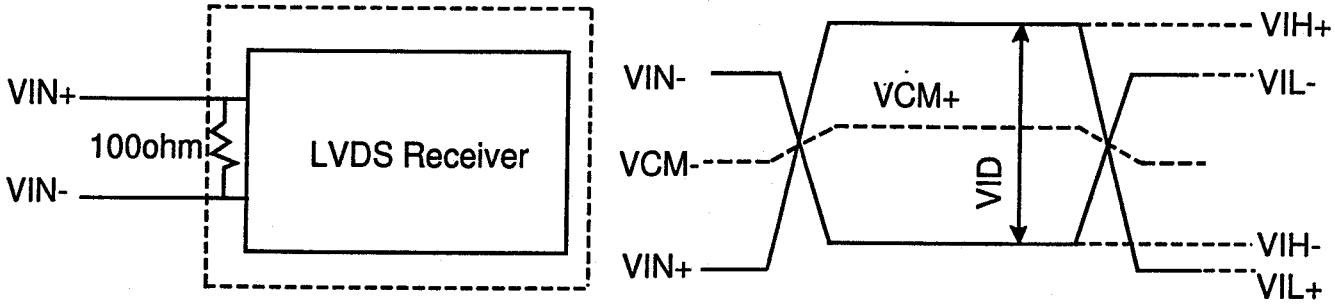
1) When 2.4 V ≤ VCC < 3.0 V
   td ≤ 20 ms
2) VCC < 2.4 V
   VCC-dip conditions should also follow the VCC-turn-on conditions.



[Note 2]

Typical value is measured when displaying gray shade gradient(64 gray pattern)
768 line mode
VCC = + 3.3 V

[Note 3] Definition of LVDS signals



$VID = VIN_+ - VIN_-$,
$\Delta VCM = |VCM_+ - VCM_-|$,
$\Delta VID = |VID_+ - VID_-|$
$VID+ = |VIH_+ - VIH_-|$
$VID- = |VIL_+ - VIL_-|$
$VCM = (VIN_+ - VIN_-)/2$
$VCM+ = (VIH_+ - VIH_-)/2$
$VCM- = (VIL_+ - VIL_-)/2$

VIN_+ : Positive differential DATA & CLK Input
VIN_- : Negative differential DATA & CLK Input

(b) Backlight

Ta=25°C

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Lamp Voltage	VL	-	640	-	V
Lamp Current	IL	-	5.0*1)	5.5	mA
Starting Lamp Voltage	Vs	1,200*2)	-	-	V

[Note]

*1) For typical luminance of 100cd/m^2

*2) Vs=1700V, Ta=0 °C

4.INTERFACE PIN CONNECTION

CN 1 (INTERFACE SIGNAL)

Used connector: FI-SEB20P-HF (JAE)

Corresponding connector: FI-S20S, FI-SE20M (JAE)

pin	Symbol	Function
1	VCC	3.3V power supply
2	VCC	3.3V power supply
3	VCC	3.3V power supply
4	GND	
5	GND	
6	Link 0-	R0, R1, R2, R3, R4, R5, G0 *)
7	Link 0+	R0, R1, R2, R3, R4, R5, G0 *)
8	GND	
9	Link 1-	G1, G2, G3, G4, G5, B0, B1 *)
10	Link 1+	G1, G2, G3, G4, G5, B0, B1 *)
11	GND	
12	Link 2-	B2, B3, B4, B5, DENA, HD, VD *)
13	Link 2+	B2, B3, B4, B5, DENA, HD, VD *)
14	GND	
15	CLKIN-	Clock -
16	CLKIN+	Clock +
17	GND	
18	TEST	Should be open during operation
19	TEST	Should be open during operation
20	TEST	Should be open during operation

*) See page 8,11 for Data Mapping

CN 2 (BACKLIGHT)

Backlight-side connector: BHSR-02VS-1 (JST)

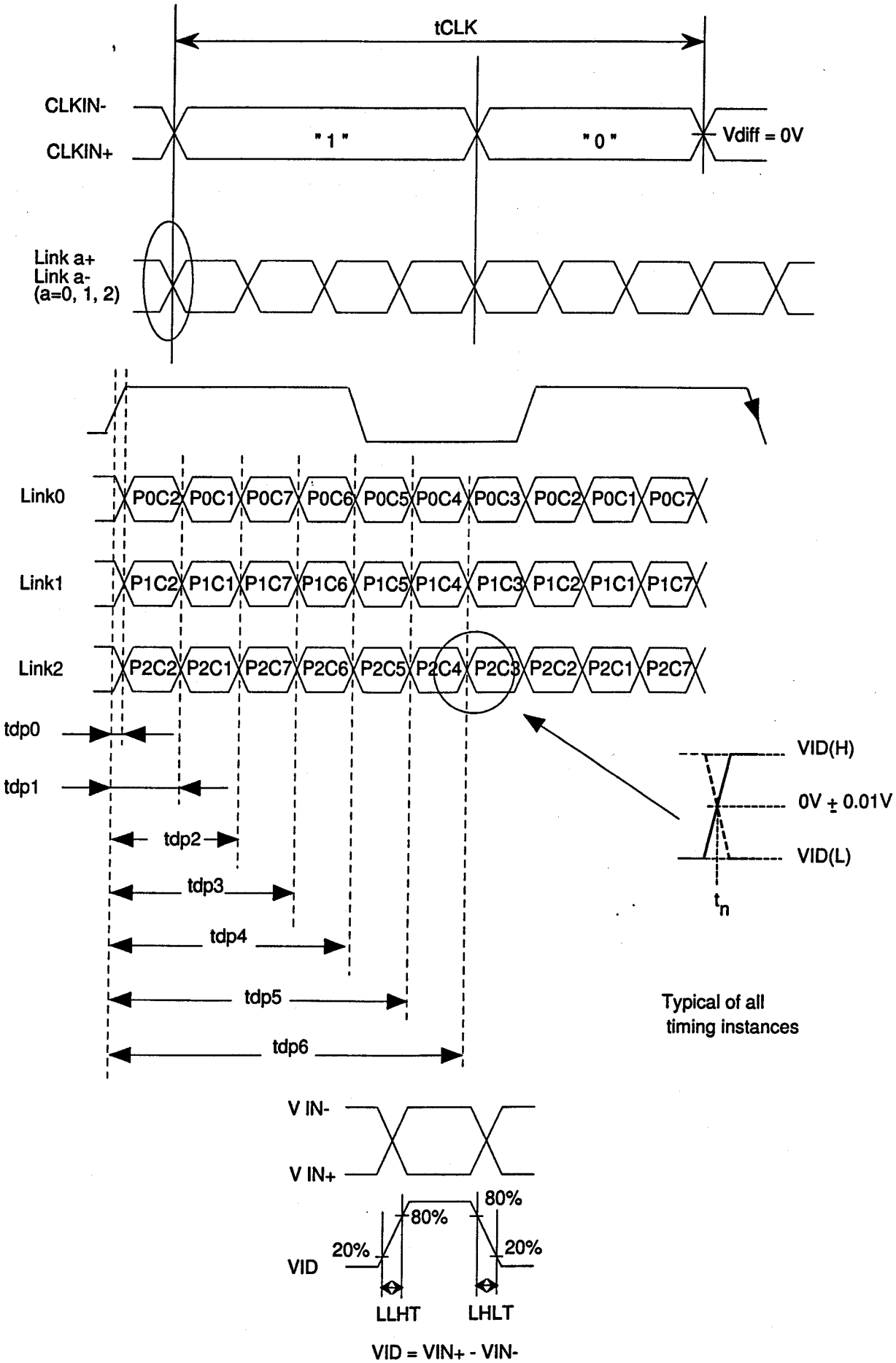
Inverter-side connector: SM02B-BHSS-1 (JST)

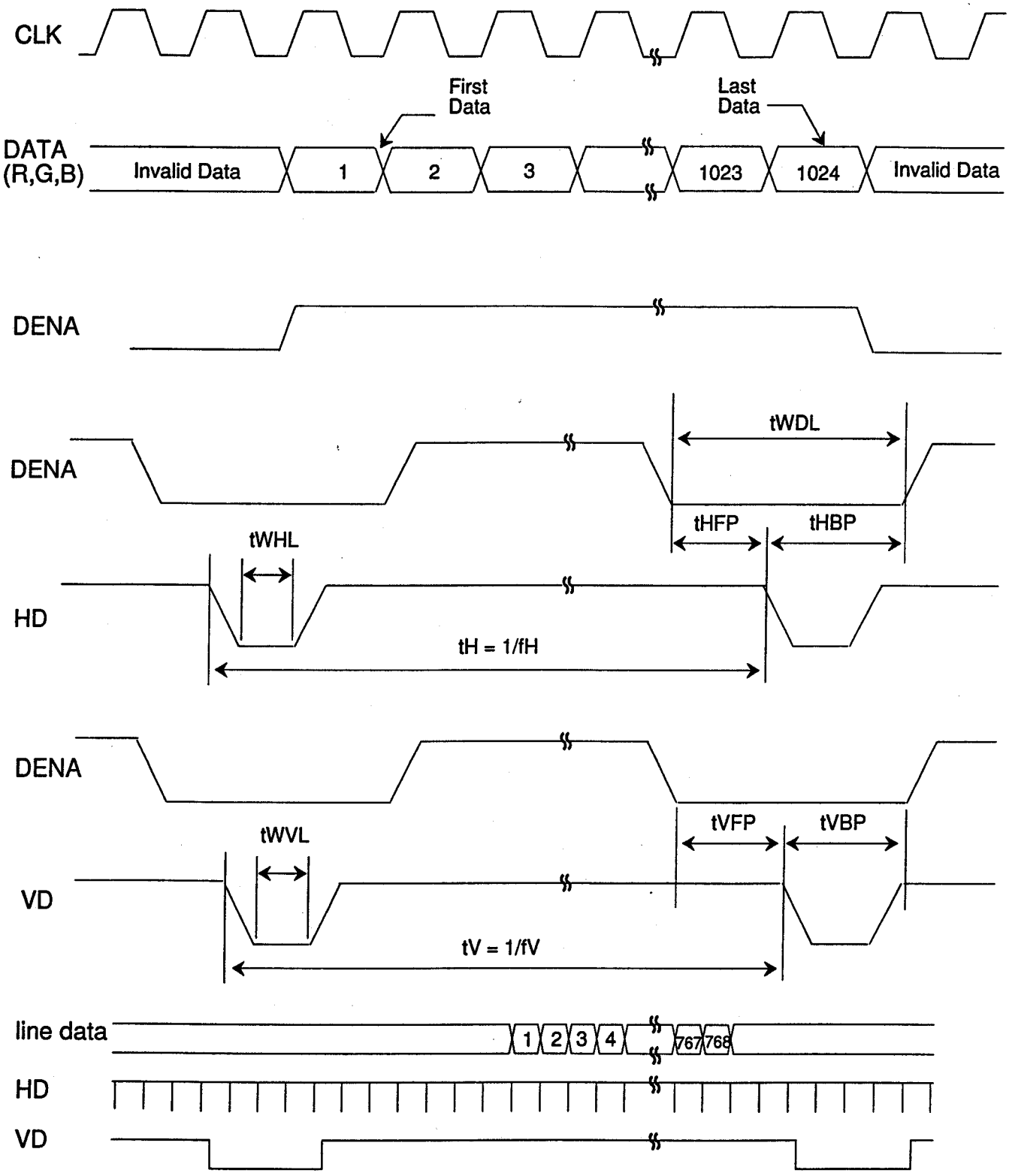
Pin No.	Symbol	Function
1	CTH	VLH (High voltage)
2	CTL	VLL (Low voltage)

[Note]
VLH - VLL = VL

5.INTERFACE TIMING

(a) LVDS & LCD Input Timing Chart




CLK
First Data
Last Data
DATA (R,G,B)
Invalid Data
1
2
3
1023
1024
Invalid Data
DENA
DENA
tWDL
tHFP
tHBP
tWHL
HD
tH = 1/fH
DENA
tVFP
tVBP
tWVL
VD
tV = 1/fV
line data
1
2
3
4
767
768
HD
VD

(b) Timing Specifications

ITEM			SYMBOL	MIN	TYP	MAX	UNIT
LVDS input Timing	CLK frequency		fCLKIN	--	65	66.6	MHz
	CLK period		tCLKIN	15	15.4	--	ns
	LVDS Low to High transition time		LLHT	--	0.75	1.5	ns
	LVDS High to Low transition time		LHLT	-	0.75	1.5	ns
	Receiver Input Strobe position for Bit 0		t_0	0.7	1.1	1.4	ns
	Receiver Input Strobe position for Bit 1		t_1	2.9	3.3	3.6	ns
	Receiver Input Strobe position for Bit 2		t_2	5.1	5.5	5.8	ns
	Receiver Input Strobe position for Bit 3		t_3	7.3	7.7	8.0	ns
	Receiver Input Strobe position for Bit 4		t_4	9.5	9.9	10.2	ns
	Receiver Input Strobe position for Bit 5		t_5	11.7	12.1	12.4	ns
	Receiver Input Strobe position for Bit 6		t_6	13.9	14.3	14.6	ns
LCD Timing LVDS Transmitter Input	DENA	Low width	tWDL	100	--	--	tCLK
		Horizontal Front Porch	tHFP	0	--	--	tCLK
		Horizontal Back Porch	tHBP	5	--	--	tCLK
		Vertical Front Porch	tVFP	0	--	--	tH
		Vertical Back Porch	tVBP	4	--	--	tH
	HD	Frequency	fH	--	48.5	55.9	kHz
		Period	tH	1100	1340	--	tCLK
		Low width	tWHL	1	--	--	tCLK
	VD	Frequency	fV	--	--	62	Hz
		Period	tV	772	809	--	tH
		Low width	tWVL	0.5	--	--	tH

[Note]

1) Polarities of HD and VD are negative in this specification.
2) DENA (Data Enable) should always be positive polarity as shown in the timing specification.
3) CLKIN should appear during all invalid period, and HD should appear during invalid period of frame cycle.
4) Used LVDS Receiver is DS90C384(NS).

(c) LVDS Data Mapping

Cell	IN *)	DATA
P0C1	TxIN0	R0
P0C2	TxIN1	R1
P0C3	TxIN2	R2
P0C4	TxIN3	R3
P0C5	TxIN4	R4
P0C6	TxIN6	R5
P0C7	TxIN7	G0
P1C1	TxIN8	G1
P1C2	TxIN9	G2
P1C3	TxIN12	G3
P1C4	TxIN13	G4
P1C5	TxIN14	G5
P1C6	TxIN15	B0
P1C7	TxIN18	B1
P2C1	TxIN19	B2
P2C2	TxIN20	B3
P2C3	TxIN21	B4
P2C4	TxIN22	B5
P2C5	TxIN24	HD
P2C6	TxIN25	VD
P2C7	TxIN26	DENA
Ref-CLK1	TxCLKIN	CLK

*) DS90C383(NS) Pin name.

(d) Color Data Assignment

COLOR	INPUT DATA	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB					LSB	MSB					LSB	MSB					LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	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
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

[Note]

1) Definition of gray scale

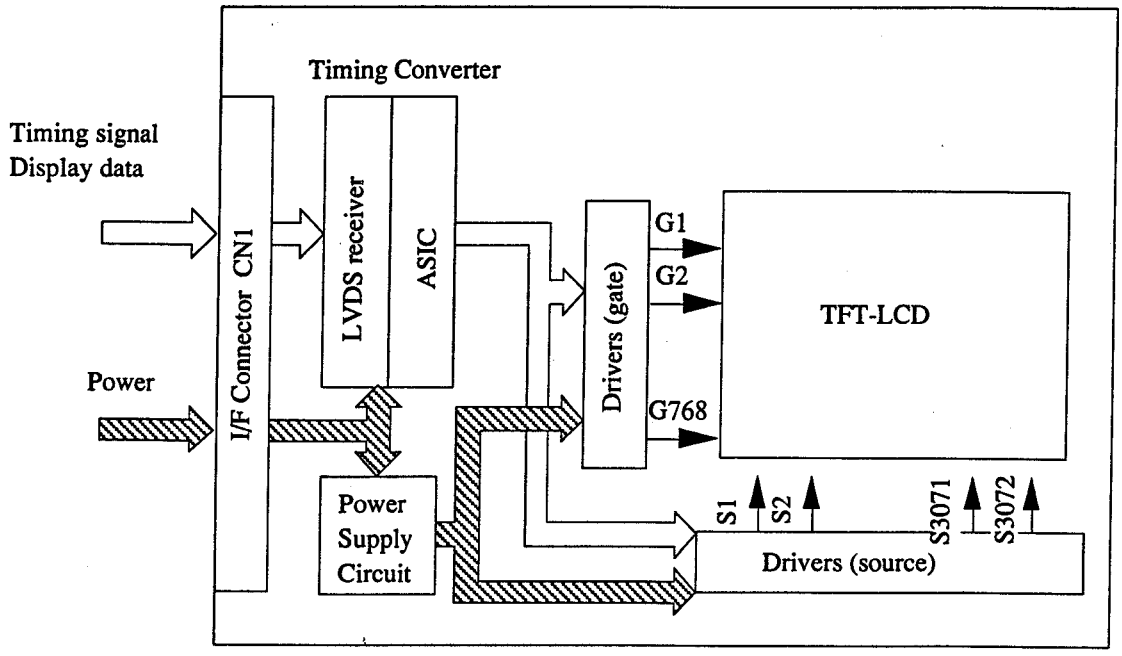
Color (n)--- n Indicates gray scale level.

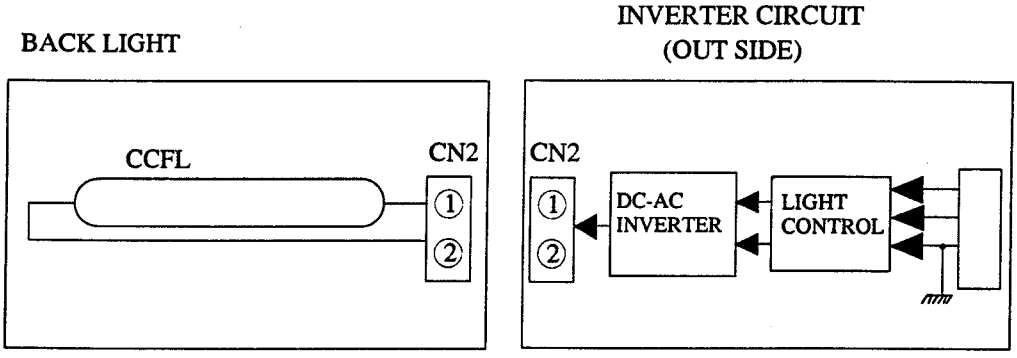
Higher n means brighter level.

2) Data

1: High, 0:Low

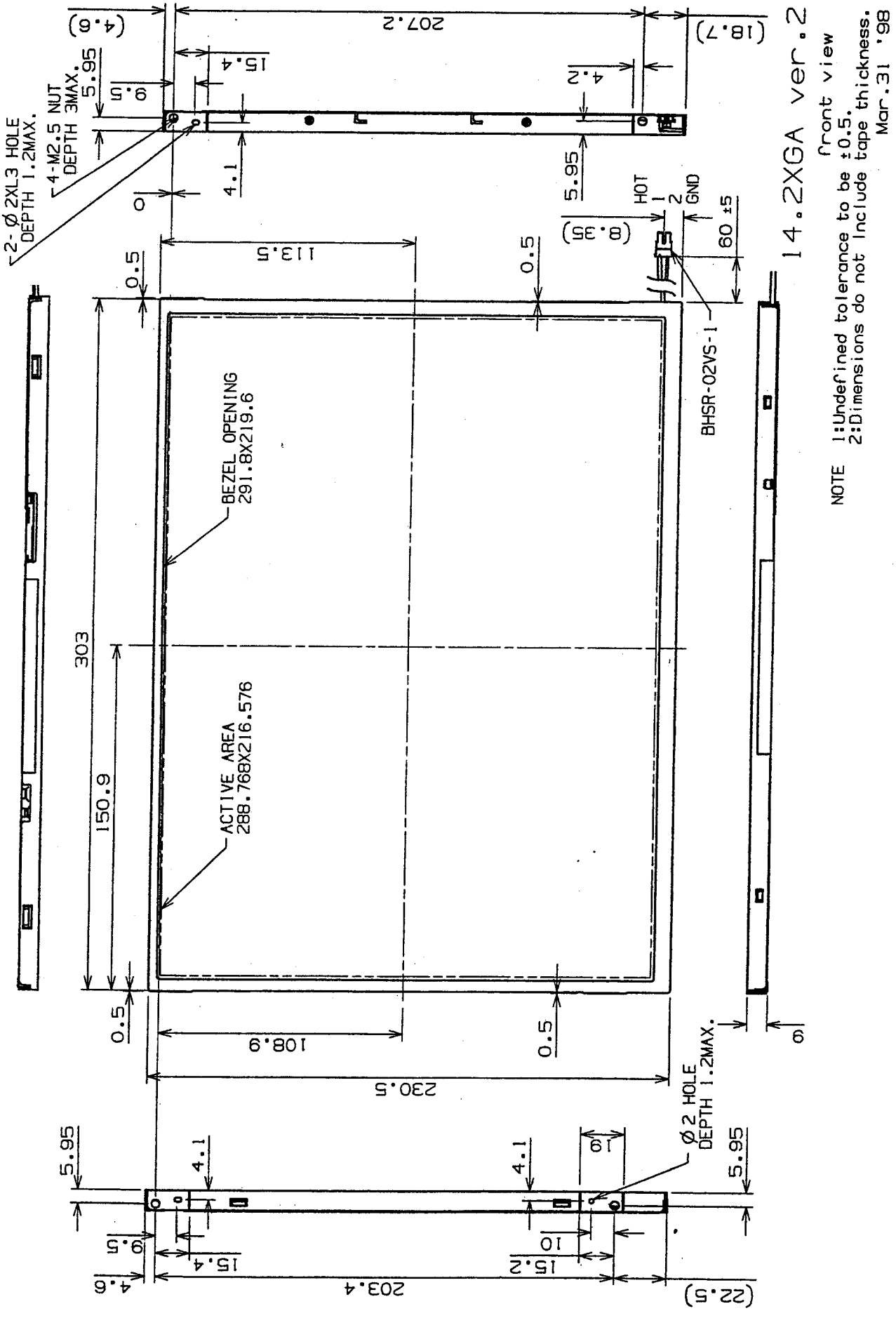
6.BLOCK DIAGRAM



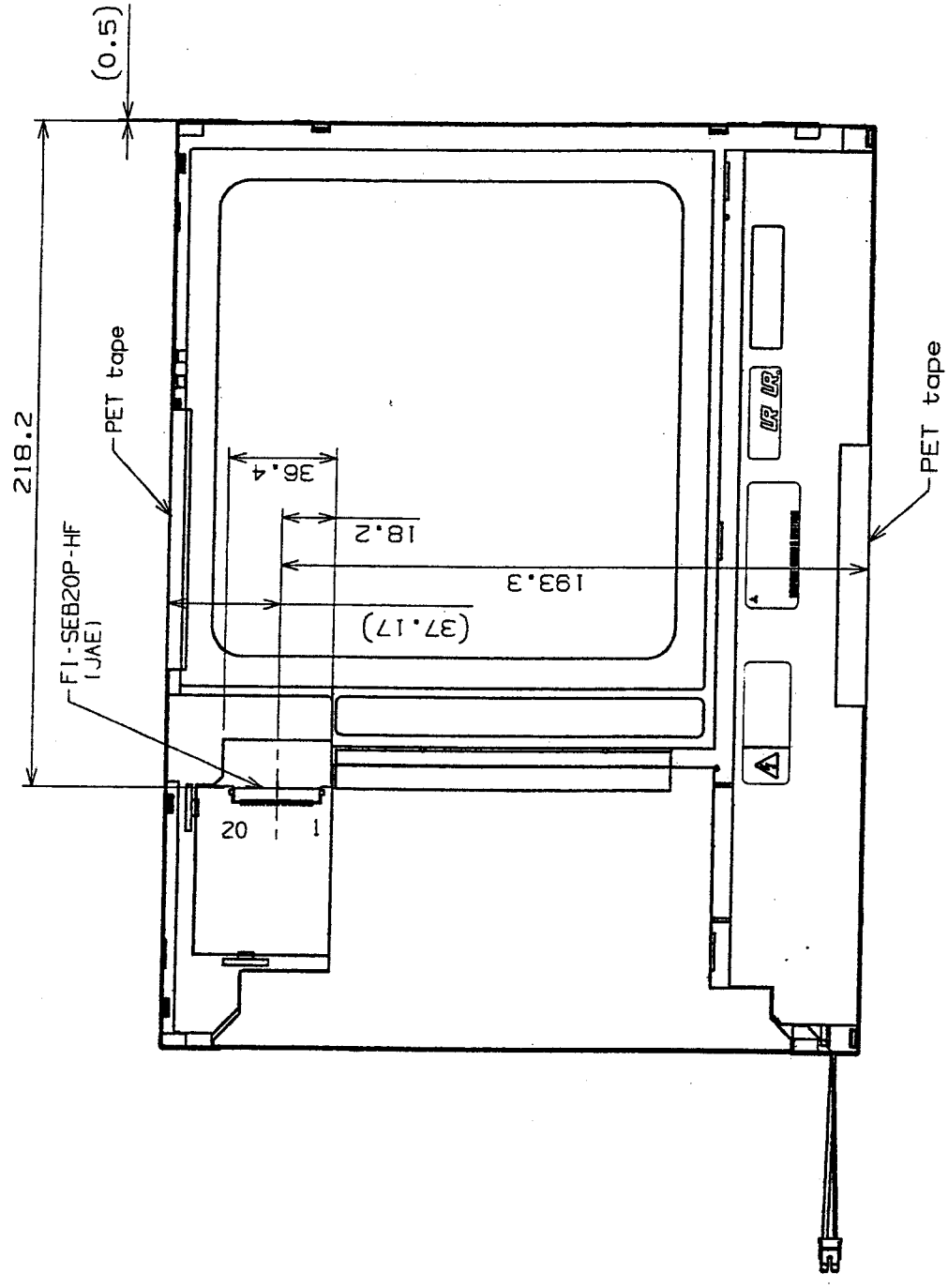


7.MECHANICAL SPECIFICATION

(a) Front side



(b) Rear side



14.2XGA ver.2
rear view

NOTE 1:Undefined tolerance to be ±0.5.
2:Dimensions do not include tape thickness.

Mar.31 '98

8.OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Contrast Ratio		CR	θ = ϕ = 0°	--	150	--	--
Luminance*1)		L	θ = ϕ = 0°	70*2)	100*2)	--	cd/m^2
Response Time		tr	θ = ϕ = 0°	--	20	--	ms
		tf	θ = ϕ = 0°	--	30	--	ms
Viewing Angle	Horizontal	ϕ	CR ≥ 10	--	-45 ~45	--	°
	Vertical	θ		--	-30 ~10	--	°
Color Coordinates	Red	x	θ = ϕ = 0°	0.572	0.602	0.632	--
		y		0.325	0.355	0.385	
	Green	x		0.277	0.307	0.337	
		y		0.537	0.567	0.597	
	Blue	x		0.111	0.141	0.171	
		y		0.081	0.111	0.141	
	White	x		0.292	0.322	0.352	
		y		0.306	0.336	0.366	

These items are measured using BM-5A (TOPCON) or LCD-7000 (Otsuka Electronic) under the dark room condition (no ambient light).

*1) Average luminance on the 5 points. See 4): Definition of Luminance.

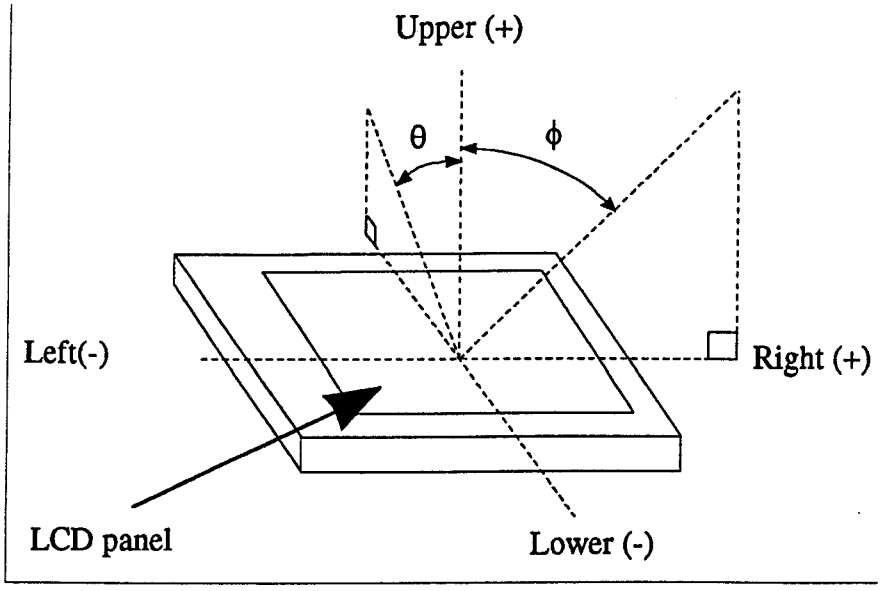
*2) IL=5.0mA, Inverter: IM8806, MINEBEA CO.,LTD.

Definition of these measurement items are as follows:

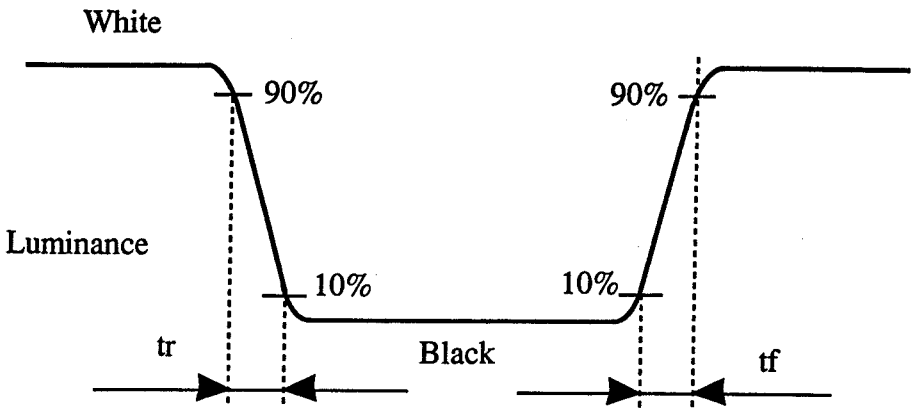
1) Definition of Contrast Ratio

CR=ON (White) Luminance / OFF(Black) Luminance

2) Definition of Viewing Angle (θ , ϕ)



3) Definition of Response Time

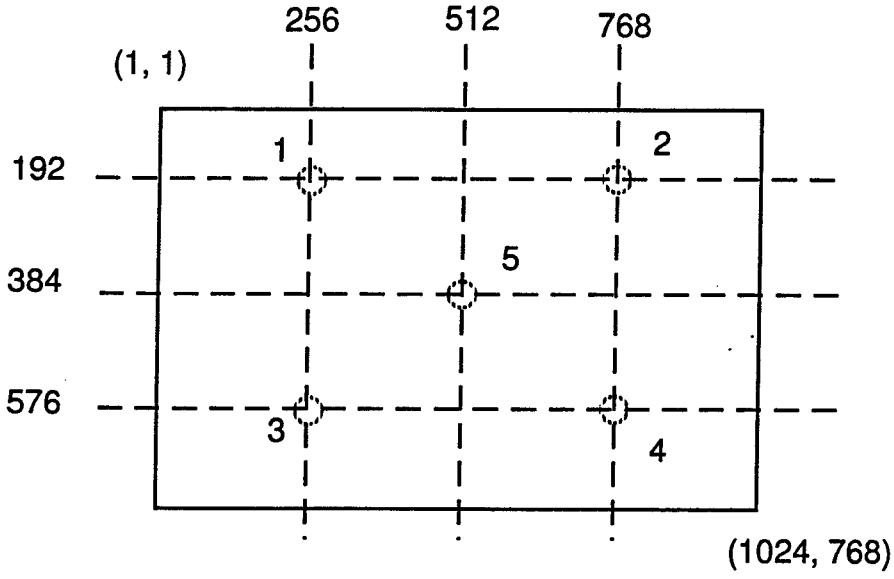


4) Definition of Luminance

Measure White Luminance on the below 5 points.

L is defined by the average of five points.

MEASUREMENT POINTS



9. LIFE TIME OF THE BACKLIGHT

The definition of life time is as follows:

The luminance becomes half of the initial value or

The lamp does not turn on under 1200V (Ta =25°C, IL(MAX) =5.5mA).

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	Remark
Life Time	TL	10000			Hour	note 1

note 1: The conditions are following

Ta =25(°C)

IL(MAX) =5.5(mA)

10. RELIABILITY TEST CONDITIONS

(1) Temperature and Humidity

TEST ITEMS	CONDITIONS
HIGH TEMPERATURE HIGH HUMIDITY OPERATION	40°C, 90%RH, 500 h
HIGH TEMPERATURE HIGH HUMIDITY STORAGE	60°C, 90%RH, 96 h
LOW TEMPERATURE STORAGE	-20°C, 96 h
THERMAL SHOCK	BETWEEN -20°C (1h) AND 60°C(1h), 5 CYCLES

(2) Shock & Vibration

ITEMS	CONDITIONS
SHOCK *) (NON-OPERATION)	Shock level: 980m/s^2 (100G), Waveform: half sinusoidal wave, 2 ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs
	Shock level: 490m/s^2 (50G), Waveform: half sinusoidal wave, 7 ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs
VIBRATION (NON-OPERATION)	Vibration level: 9.8m/s^2 (1.0G) zero to peak Waveform: sinusoidal Frequency range: 5 to 500 Hz Frequency sweep rate: 0.5 octave /min Duration: one sweep from 5 to 500 to 5 Hz in each of three mutually perpendicular axis (each x,y,z axis: 1 hour, total 3 hours)

*): Shock test should be done under one of these conditions.

(3) Judgment standard

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect.
Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

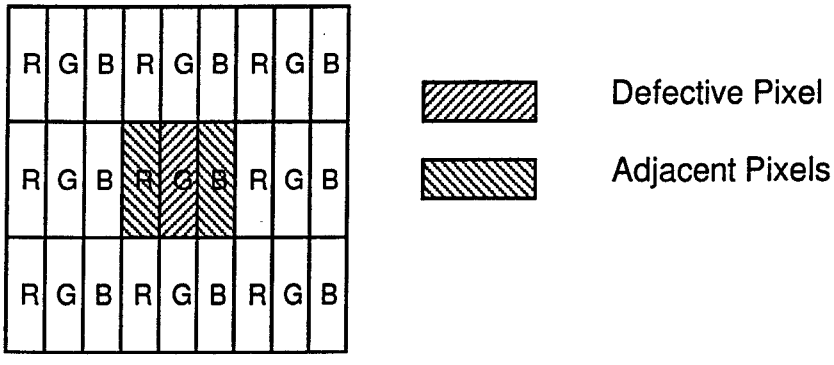
11. INSPECTION STANDARDS

Inspection condition is as follows:
Viewing distance is approximately 35cm
Viewing angle is normal to the LCD panel.
Ambient temperature is approximately 25°C
Ambient light is from 300 to 500 lux.

Bright Dot is defined as follows:
Visible thorough 5% transmission ND filter

DEFECT TYPE		LIMIT	
VISUAL DEFECT	Bright / Dark Spots (Foreign Material)	0.1mm < D ≤ 0.7mm	N ≤ 4
	Bright or dark line or filament (Foreign Material)	0.01mm < W ≤ 0.07mm 0.3mm < L ≤ 1.0 mm	N ≤ 4
	Polarizer / Linear Scratch	0.01mm < W ≤ 0.1mm 0.3 mm < L ≤ 5.0 mm	N ≤ 4
	Polarizer / Dent or Bubble	0.1mm ≤ Average D ≤ 0.4mm	N ≤ 4
	Maximum Allowable Defect Count		N ≤ 7
DOT DEFECT	Bright Dots	N ≤ 8 (G ≤ 5)	
	Dark Dots	N ≤ 8	
	Total Dots	N ≤ 10	
	Two adjacent Bright Dots Dark Dots	 N ≤ 2 pairs N ≤ 2 pairs	
	Three or more adjacent	Not allowed	
	Distance Between Defects Bright Dots Dark Dots	 ≥ 15mm ≥ 15mm	
LINE DEFECTS		Not allowed	

*1) W: width, L: length, D: diameter, N: Number
*2) DEFINITION OF ADJACENT



*3)Two adjacent dots in the vertical direction and the diagonal direction are not allowed due to the limitation of "Distance Between Defect."

12. HANDLING PRECAUTIONS FOR TFT-LCD MODULE

Please pay attention to the followings in handling TFT-LCD products;

1 ASSEMBLY PRECAUTION

(1)Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.

(2)Please take care so as not to screw up the LCD module too tightly in installing.
(We recommend 0.294N·m (3kgfcm) tightening torque.)

(3)Please design display housing in accordance with the following guide lines.

(3 - 1)Housing case must be designed carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.

(3 - 2)Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. Approximately 1.0mm of the clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.

(3 - 3)When some parts, such as, FPC cable and ferrite plate, are installed underneath the LCD module, still sufficient clearance is required, such as 0.5mm. This clearance is, especially, to be reconsidered when the additional parts are implemented for EMI countermeasure.

(3 - 4)Design the inverter location and connector position carefully so as not to give stress to lamp cable, or not to interface the LCD module by the lamp cable.

(3 - 5)Keep sufficient clearance between LCD module and the others parts, such as inverter and speaker so as not to interface the LCD module. Approximately 1.0mm of the clearance in the design is recommended.

(4) Please do not push or scratch LCD panel surface with anything hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)

(5) Please do not press any parts on the rear side such as source TCP, gate TCP, control circuit board and FPCs during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.

(6) Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.

(7) Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.

(8) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

(9) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.

(10)Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2 OPERATING PRECAUTIONS

(1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.

(2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification.

(3) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

(4) A condensation might happen on the surface and inside of LCD module in case of sudden change of ambient temperature.

(5) Please pay attention to displaying the same pattern for very long time. Image might stick on LCD. If then, time going on can make LCD work well.

(6) Please obey the same caution descriptions as ones that need to pay attention to ordinary electronic parts.

3 PRECAUTIONS WITH ELECTROSTATICS

(1) This LCD module use CMOS-IC on circuit board and TFT-LCD panel, and so it is easy to be affected by electrostatics. Please be careful with electrostatics by the way of your body connecting to the ground and so on.

(2) Please remove protection film very slowly on the surface of LCD module to prevent from electrostatics occurrence.

4 STORAGE PRECAUTIONS

(1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C~40°C without the exposure of sunlight and to keep the humidity less than 90%RH.

(2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C90%RH.

(3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

5 SAFETY PRECAUTIONS

(1) When you waste LCDs, it is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

6 OTHERS

(1) A strong incident light into LCD panel might cause display characteristics changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays.

(2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.

(3) For the packaging box, please pay attention to the followings;

(3 - 1) Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.

(3 - 2) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.

(3 - 3) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

(3 - 4) Packaging box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

13. REVISION STATUS

Revision Notice	Description	Rev. Date	Prepared	Checked Approved
First	First Revision is in according to AA142XE01_B	Jan.20,'98	T.Hatashita	K. Niki K.Kusunoki
A	1.OVER VIEW Delete" Contrast ratio:150" Brightness: 70 → 100, Power consumption:4.8 → 4.9 Module weight: (740) → 690(TYP), P3 3. ELECTRICAL CHARACTERISTICS (a) TFT-LCD ICC: 800 → (800)(MAX) |VID|: 290 → 345(TYP) Vcc dip conditions: 0.3 → 2.4(miss typing correct), P4 (b) Backlight IL: 2.0 → --(MIN), 4.5 → 5.0(TYP), 5.0 → (5.5)(MAX) Vs: 1870 → 1200(MIN), Delete "Frequency Note: *1) For typical luminance of 70cd/m^2 → 100cd/m^2 Add *2) Vs=1700V, Ta=0°C, P6 4.INTERFACE PIN CONNECTION CN 1(INTERFACE SIGNAL) Used connector: FI-SE20P-HF → FI-SEB20P-HF Pin.No15: Data Clock- → CLKIN- Pin.No16: Data Clock+ → CLKIN+ Pin No.18,19,20: NC → TEST, P7 5. INTERFACE TIMING (a) LVDS & LCD Input Timing Chart New drawing, P8, 9 (b) Timing specifications New table, P10 6.BLOCK DIAGRAM Miss-typing correct: CN1 → CN2, P13 7. MECHANICAL SPECIFICATION (a)Front side, (b) Rear side: New drawing, P14, 15 8. OPTICAL CHARACTERISTICS L: 50 → 70 (MIN), 70 → 100(TYP), P16 Color coordinate xRed: 0.557 → 0.572(MIN), 0.587 → 0.602(TYP) 0.617 → 0.632(MAX) yRed: 0.329 → 0.325(MIN), 0.359 → 0.355(TYP), 0.389 → 0.385(MAX) xGreen: 0.271 → 0.277(MIN), 0.301 → 0.307(TYP), 0.331 → 0.337(MAX) xBlue: 0.117 → 0.111(MIN) , 0.147 → 0.141(TYP), 0.177 → 0.171(MAX) yBule: 0.070 → 0.081(MIN) , 0.100 → 0.111(TYP) 0.130 → 0.141(MAX) xWhite: 0.275 → 0.292(MIN), 0.305 → 0.322(TYP), 0.335 → 0.352(MAX) yWhite: 0.296 → 0.306(MIN), 0.326 → 0.336(TYP) 0.356 → 0.366(MAX) Add note "*1) Average luminance on the 5 points (See.....), 2) IL=5.0mA, Inverter:INVHA01.....", P16 Add "4) Definition of luminance and luminance variation", P17 Add 9. LIFE TIME OF THE BACKLIGHT 10. RELIABILITY TEST CONDITIONS (b) Shock & Vibration Shock level: T.B.D. → 980m/s^2(100G) Vibration level: T.B.D. 9.8m/s^2(1.0G), P18 11.INSPECATION STANDARDS Revise New table Add Note"*3) Two adjacent dots .....Defect.", P20 Revise 12. HANDLING PRECAUTIONS FOR TFT-LCD MODULE, P21, 22, 23	Mar.30, '98	Y.Ohno	K.Niki K.Kusunoki

Revision Notice	Description	Rev. Date	Prepared	Checked / Approved
B	3. ELECTRICAL CHARACTERISTICS (a) TFT-LCD ICC: (800) → 850(MAX), P4 10. RELIABILITY TEST CONDITIONS (2) Shock & Vibration Add "Shock level: 490m/s^2(50G), Waveform: add 7ms" Add note ":) Shock test should be done under one of these conditions.", P19 11.INSPECTION STANDARDS Add Bright Dots: N ≤ 8 → N ≤ 8 (G ≤ 5) , P20	May.7,'98	T.Hatashita	I.Ogo K.Niki