TOSHIBA

Technical Information

15cm FULL-COLOR
TFT-LCD MONITOR MODULE
TFD60W11-MM

1. FEATURE

(1) NTSC Composite video and Analog RGB Interface
(2) +9.5V Single Power Supply
(3) Built-in Backlight and Inverter Unit
(4) High Luminance (250 cd/m2)

2. MECHANICAL SPECIFICATIONS

ITEM		SPECIFICATION	UNIT
DISPLAY SIZE		15 cm diagonal (6 inch)	—
CONTENTS		TFT cell, Drivers, Timing controller Video interface, Backlight, Inverter, Power supply	—
DISPLAY MODE		TN Full-color, Normally-white	—
INPUT SIGNALS	Comp.	NTSC Composite video signal (1.0Vp-p 75Ω)	—
	RGB	NTSC Analog RGB video signal (0.7Vp-p 75Ω) + Composite sync. signal (1.0Vp-p Negative, 75Ω)	—
PIXEL NUMBER		234(V) × 320(H)	—
DOT NUMBER		234(V) × 960(H) RGB stripe	—
OUTLINE DIMENSIONS		109.4(H) × 144.0(W) × 20.0(D)	mm
ACTIVE AREA		89.2(H) × 121.9(W)	mm
PIXEL PITCH		0.318(H) × 0.318(W)	mm
BACKLIGHT		L-shape edge light, Dimming ratio 3 -100 %	—
WEIGHT		300	g
VIEWING ANGLE		Maximum contrast at 6 o'clock	—

Fig.1 : Dot color configration

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◆This product is under development, any information contained are subject to change. Please contact TOSHIBA for up-dated information.

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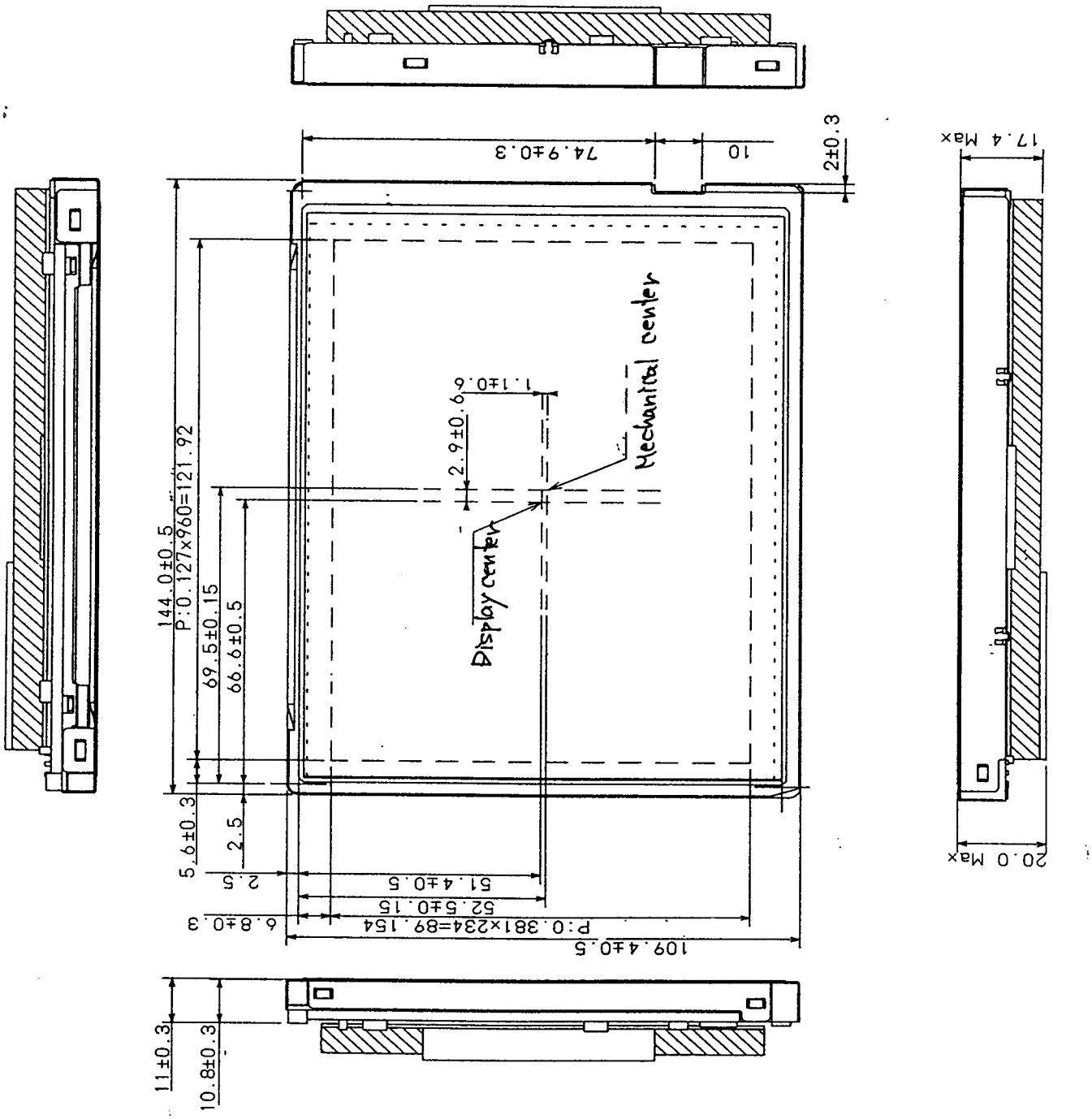
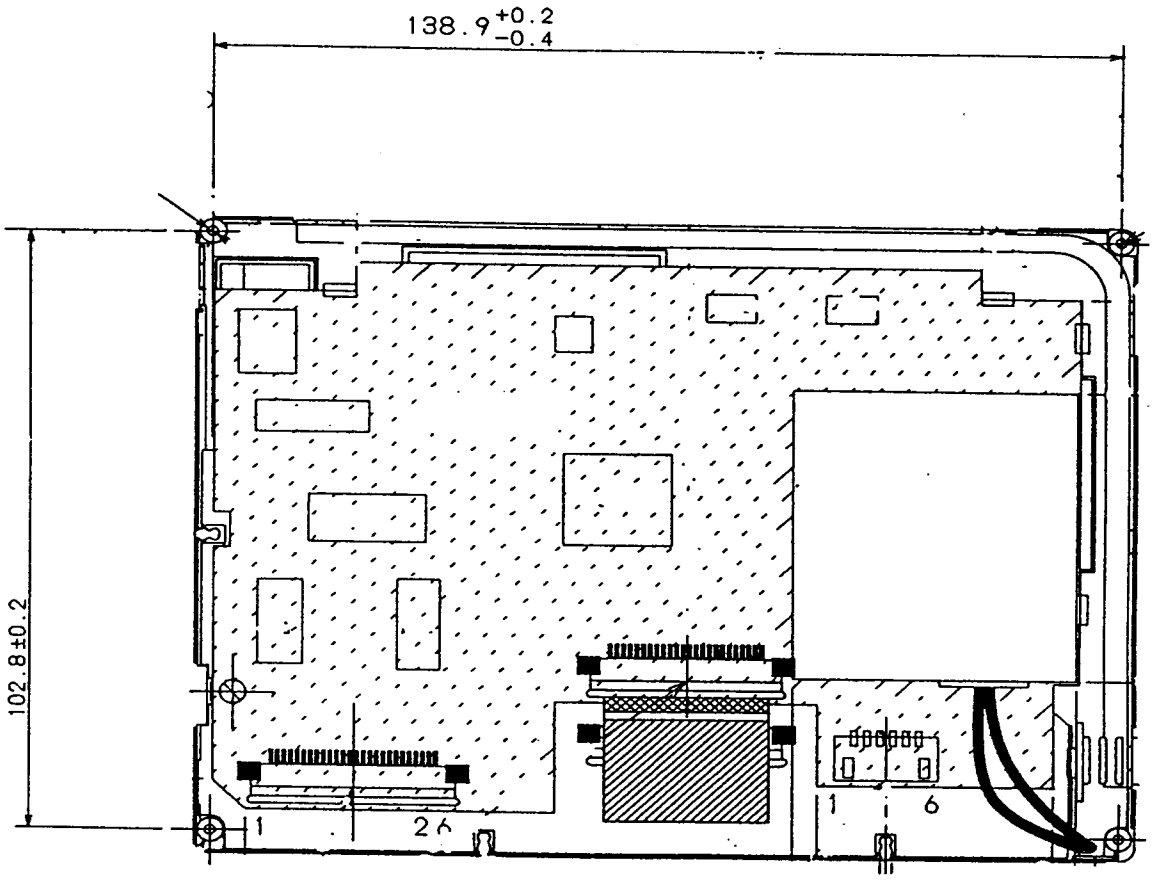
No. KD96004

3. OUTLINE DIMENSIONS

Front View



Rear View



4. MAXIMUM ABSOLUTE RATING

ITEM		SYMBOL	CONDITONS	MAXIMUM ABSOLUTE RATINGS		UNIT
				MIN.	MAX.	
SUPPLY POWER VOLTAGE		VCC	Ta=25℃	VSS-0.2	+13.0	V
		VBL	VSS=0V	VSS-0.2	+11.0	V
INPUT SIGNAL VOLTAGE	Video	VIDEO	Ta=25℃	—	1.5	Vp-p
	RGB	R, G, B	75Ω	—	1.5	Vp-p
	Sync.	SYNC	VCC=9.5V	—	1.5	Vp-p
	Bright Control	BRT, TINT COLOR DIM	VCC=9.5V VBL=9.5V	VSS-0.2	VDD+0.2	V
	Switch	SYNC SW VIDEO SW L/R, U/D	VCC=9.5V	VSS-0.2	VDD+0.2	V
OPERATING TEMP. RANGE		Top	Note 1	0	+ 50	℃
STORAGE TEMP. RANGE		Tstg	—	- 40	+ 85	℃

Note 1: Operating temperature range of the surface of TFT-LCD module is ranges from -30 to +85 ℃, however, because of the heatness of backlight the operating temperature range of TFT-LCD monitor is narrow.

5. RECOMMENDED OPERATING CONDITIONS

(Ta=RT, VSS=0V)

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT
				MIN.	TYP.	MAX.	
SUPPLY POWER VOLTAGE		VCC	—	+ 8.5	+ 9.5	+10.5	V
		VBL	—	+ 9.0	+ 9.5	+10.0	V
INPUT SIGNAL VOLTAGE		VIDEO	75Ω	—	1.0	—	Vp-p
		RGB	75Ω	—	0.7	—	Vp-p
		SYNC	75Ω, Nega	—	1.0	—	Vp-p
		BRT	—	—	3.0	—	V
		TINT	—	—	2.5	—	V
		COLOR	—	—	2.5	—	V
		DIM	—	+1.35	—	+3.9	V
SYNC FREQUENCY	NTSC	fVDN	〃	58	59.94	62	Hz
		fHDN	〃	15.2	15.73	16.2	kHz

6. ELECTRICAL SPECIFICATIONS

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT
				MIN.	TYP.	MAX.	
CURRENT CONSUMPTION		ICL	VCC=+9.5V	—	0.21	0.26	A
		IBL	VBL=+9.5V	—	0.3	0.4	A
OUTPUT VOLTAGE (HSY, VSY)		VOH	VDD=5V	4.6	—	VDD	V
		VOL		VSS	—	0.4	V
VERTICAL DISPLAY START	NTSC	Vpos	—	—	21	—	H
VERTICAL DISPLAY PERIOD	NTSC	Vdis	—	—	234	—	H
HORIZONTAL DISPLAY START	NTSC	Hpos	fHDN =15.73kHz	—	9.85	—	μs
HORIZONTAL DISPLAY PERIOD	NTSC	Hdis	fHDN =15.73kHz	—	50.84	—	μs

7. OPTICAL SPECIFICATIONS

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT
			MIN.	TYP.	MAX.	
LUMINANCE	LUM	DIM=3.90V RGB=0.7V	200	250	—	cd/m2
CONTRAST RATIO	CR	RGB=0/0.7V	20	50	—	—
SPECULAR REFLECTANCE	RS		—	1	3	%
VIEWING ANGLE	θL/θR	RGB=0/0.7V	TBD/TBD	45/45	—	deg
	ϕU/ϕD		TBD/TBD	15/30	—	deg

8. INTERFACE PIN ASSIGNMENT

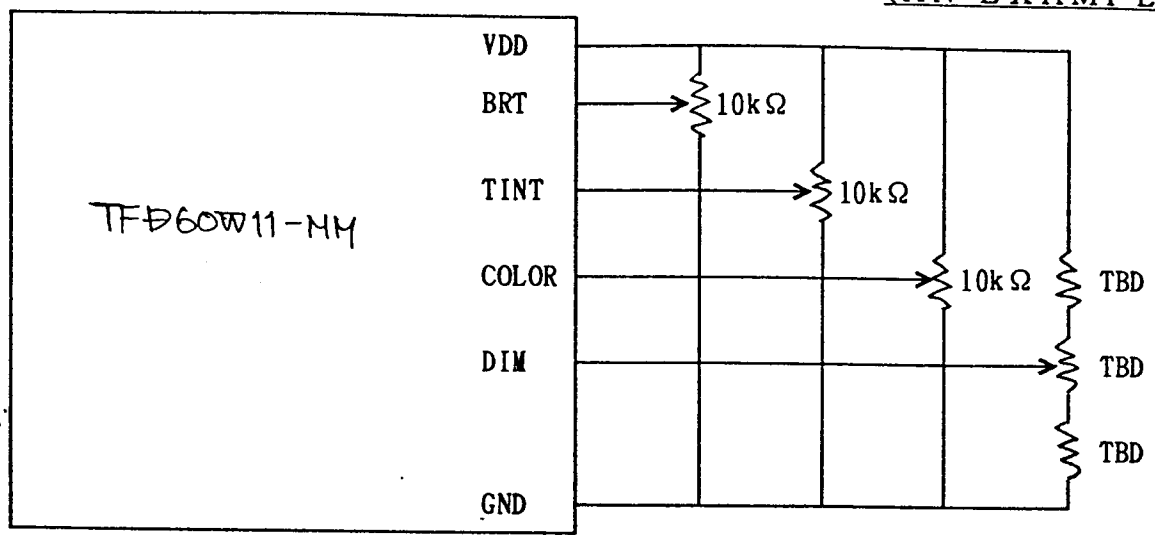
CONNECTOR 1 : Connector S06B-PH-SM3B-TB (NICHIATSU)

No.	SYMBOL	I/O	FUNCTIONS
1	VBL	I	Power Supply for Backlight Unit +9.5V
2	NC	-	No-connection
3	GND(B/L)	-	Ground for Backlight Unit
4	GND(VCC)	-	Ground for Video Interface Unit
5	NC	-	Np-connection
6	VCC	-	Power Supply for Video Interface Unit +9.5V

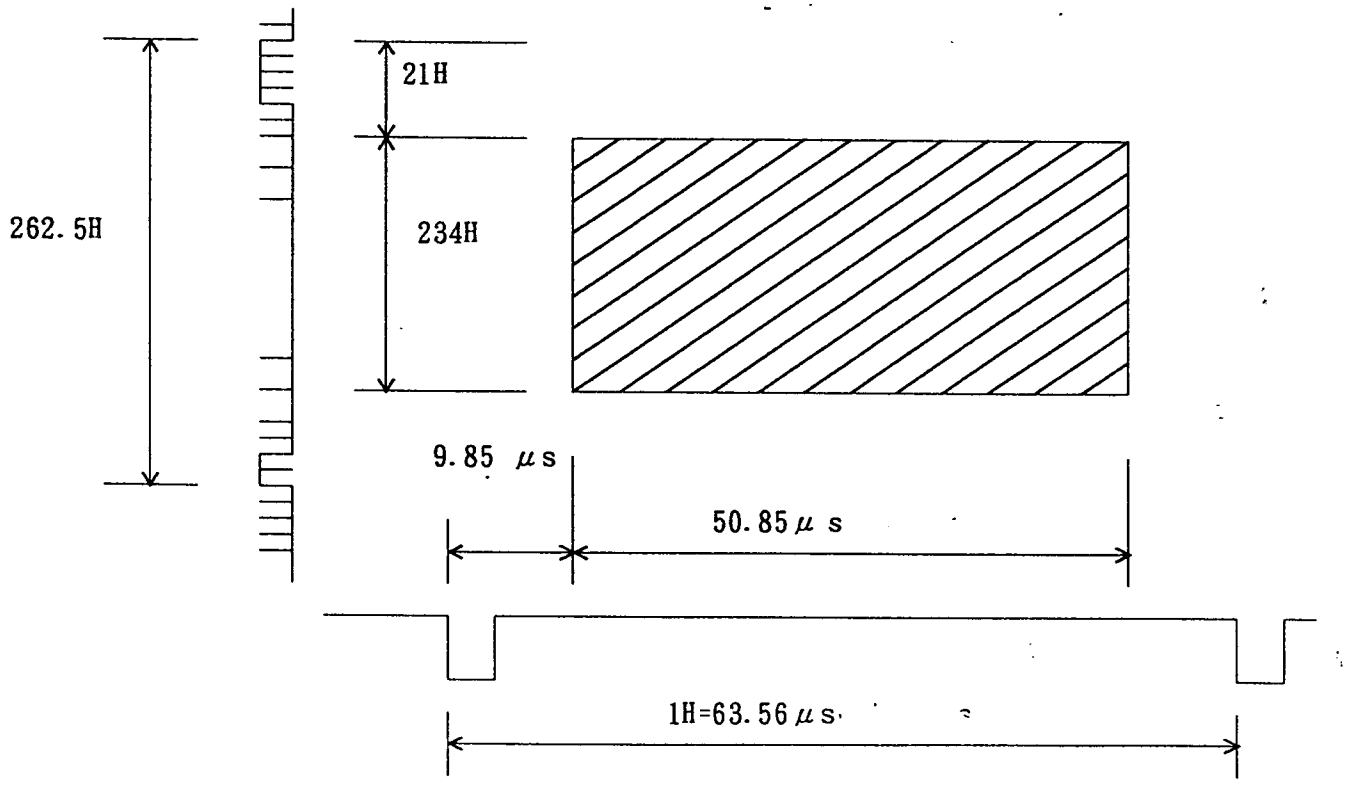
CONNECTOR 2 : Connector 52207-2690 (MOLEX)

No.	SYMBOL	I/O	FUNCTIONS	
1	VIDEO	I	Composite Video Input	1.0Vp-p, 75Ω
2	GND	-	Ground	
3	SYNC1	I	Composite Sync. Input 1	1.0V, Negative, 75Ω
4	VR1	I	Video Input R1	0.7Vp-p, 75Ω
5	VG1	I	Video Input G1	0.7Vp-p, 75Ω
6	VB1	I	Video Input B1	0.7Vp-p, 75Ω
7	GND	-	Ground	
8	HSY	O	Horizontal Sync. Output	5V, Negative, C-MOS
9	VSY	O	Vertical Sync. Output	5V, Negative, C-MOS
10	SYNC2	I	Composite Sync. Input 2	1.0V, Negative, 75Ω
11	VR2	I	Video Input R2	0.7Vp-p, 75Ω
12	VG2	I	Video Input G2	0.7Vp-p, 75Ω
13	VB2	I	Video Input B2	0.7Vp-p, 75Ω
14	GND	-	Ground	
15	SYNC SW	I	Sync. Signal Selection	0V:Composite, 5V:RGB
16	RGB SW	I	RGB Input Channel Selection	0V:RGB1, 5V:RGB2
17	GND	-	Ground	
18	VDD	O	+5V Output for Control Signal	
19	L/R	I	Horizontal Scan Direction	0V:Normal, 5V:Reverse
20	U/D	I	Vertical Scan Direction	0V:Normal, 5V:Reverse
21	GND	-	Ground	
22	BRT	I	Brightness Control	0 to 5V
23	DIM	I	Dimmer(Backlight) Control	1.35 to 3.9V
24	COLOR	I	Color Purity Control	0 to 5V
25	TINT	I	Tint(Hue) Control	0 to 5V
26	VIDEO SW	I	Video Signal Input Selectio	0V:Composite, 5V:RGB

9. BRIGHTNESS/TINT/COLOR/DIMMER CONTROL (AN EXAMPLE)

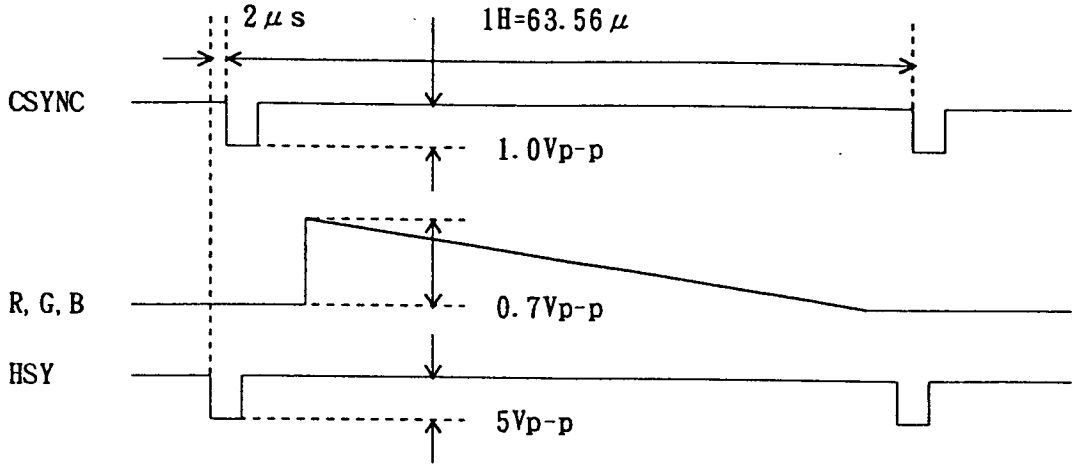


10. DISPLAY AREA

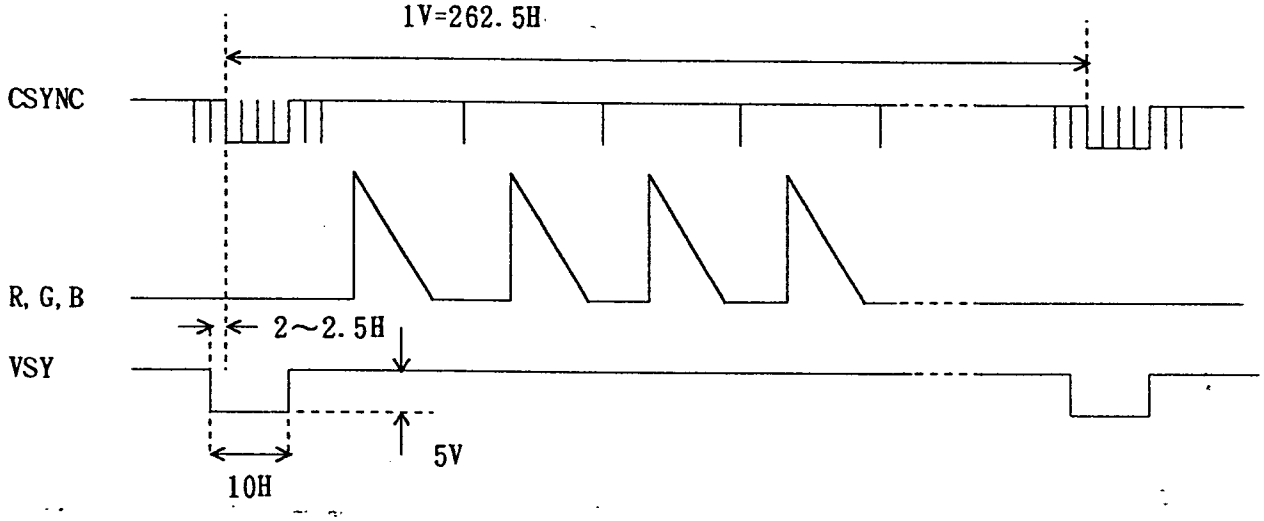


11. TIMING DIAGRAM

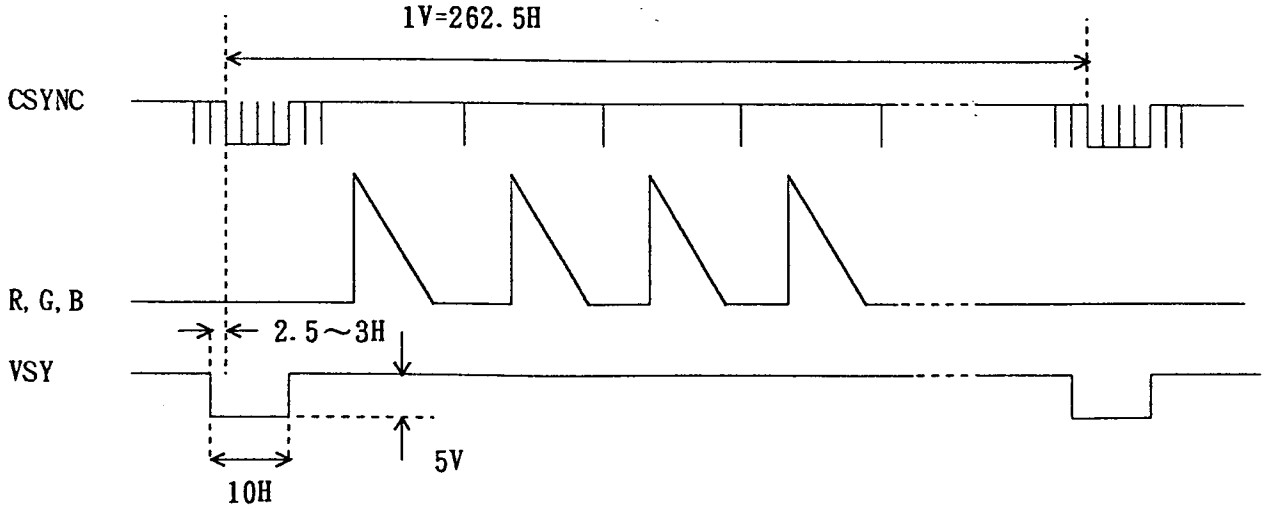
(1)Horizontal Timing (Analog RGB)



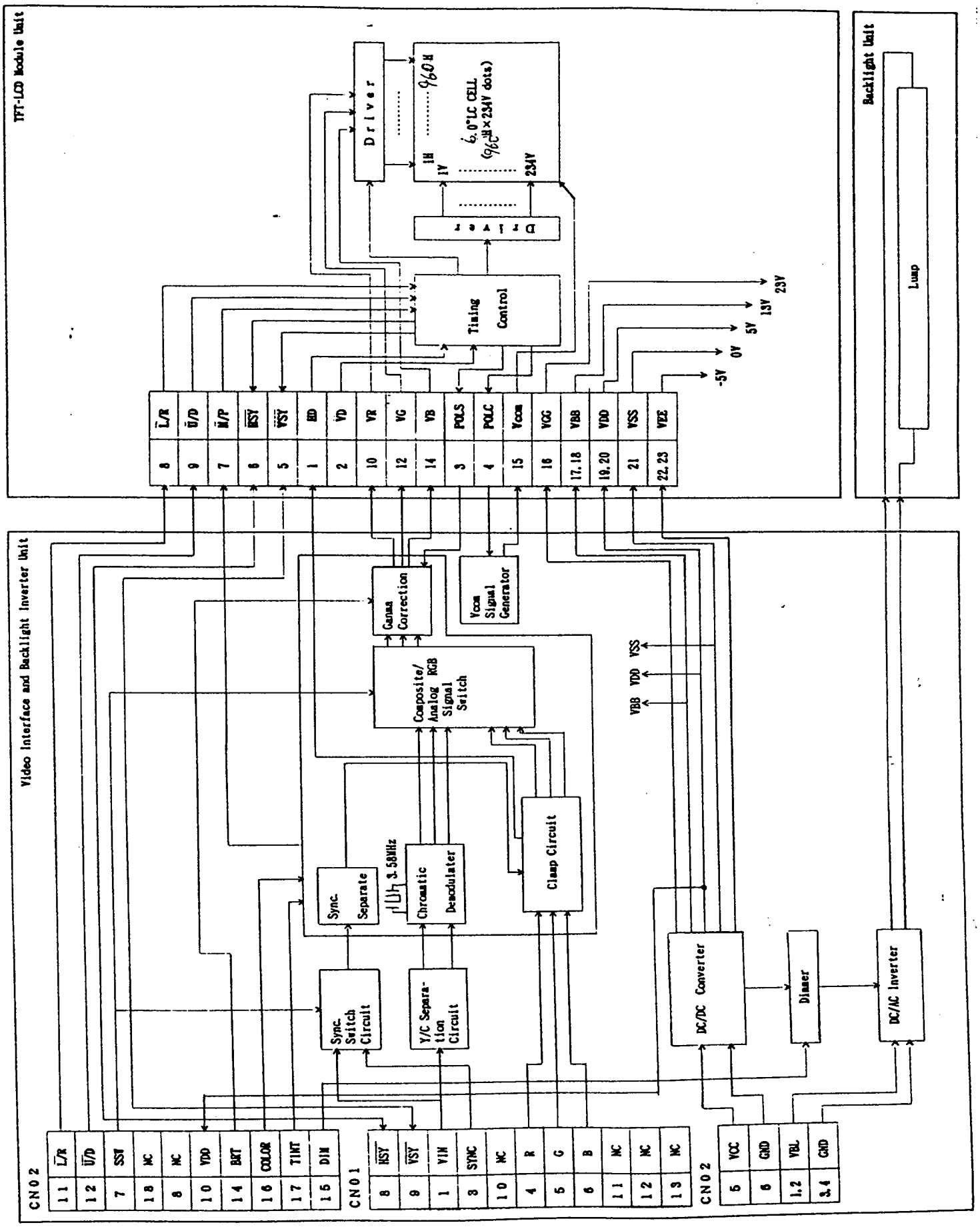
(2)Vertical(Even Field) Timing (Analog RGB)



(3)Vertical(Odd Field) Timing (Anarog RGB)



12. BLOCK DIAGRAM



13. Cautions

FOR SAFETY

LCD module is generally designed with precise parts to achieve light weight and thin mechanical dimensions.

In using our Modules, make certain that you fully understand and put into practice the warnings and safety precautions detailed in Engineering Information No. EE-N001, "CAUTIONS AND INSTRUCTIONS FOR TOSHIBA LCD MODULE".

Refer to individual speifications and TECHNICAL DATA sheets for more detailed technical information.

1) SPECIAL PURPOSES

Please inform and contact Toshiba when LCD monitor module is used for the equipment that relates to the safety of human body or human life.

2) DISASSEMBLING OR MODIFICATION

DO NOT DISASSEMBLE OR MODIFY the monitor module. It may damage sensitive parts inside LCD monitor module, and may cause scratches or dust on the display.

Toshiba dose not warrant the monitor module, if customer disassembled or modified it.

3) BREAKAGE OF LCD PANEL

DO NOT INGEST liquid crystal material, DO NOT INHALE this material, and DO NOT CONTACT the material with skin, if LCD panel is broken and liquid crystal material spills out.

If liquid crystal material comes into mouth or eyes, rinse mouth or eyes out with water immediately.

If this material contact with skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

4) GLASS OF LCD PANEL

BE CAREFUL WITH CHIPS OF GLASS that may cause injuring fingers or skin, when the glass is broken.

5) ELECTRIC SHOCK

DISCONNECT POWER SUPPLY before handling LCD monitor module.

6) ABSOLUTE MAXIMUM RATINGS AND POWER PROTECTION CIRCUIT

DO NOT EXCEED the absolute maximum rating values under the worst probable conditions caused by the supply voltage variation, input voltage variation, variation in parts constants, environmental temperature, etc., otherwise LCD monitor module may be damaged.

Employ protection circuit for power supply, whenever the specification or TD specifies it.

Suitable protection circuit should be applied for each system design.

7) DISPOSAL

When dispose LCD monitor module, obey to the applicable environmental regulations.