D-J161-01

JTC16CSX05(TENTAITIVE)

40.9cm(16.1 inch)SXGA(1,280x1,024) JTC Color TFT LCD Module

2. Contents

3. Revision History

Date of Revision	Affected Pages	Reasons of Revision
August 1, 1997	All pages.	Initial revision.
August 7, 1997	4, 6	fixed TYPO.
August 29,1997	All pages	Update timing spec with removing Preliminary note.

4. Mechanical Characteristics Data

TFT Model	ITSX81
Physical Size	400mm x 333mm x 40.7mm(Typ.)
Screen Diagonal	40.9cm(16.1")
Active Area	318.7mm(H) x 255.0mm(V)
Pixel Format	1280(x3) x 1024
Pixel Pitch	0.249(per one triad) x 0.249mm
Pixel Arrangement	R,G,B in triad arrangement
Weight	3080 grams Max.
LCD Surface Treatment	Antiglare and Hard coat 3H
Backlight	Cold Cathode Fluorescent Lamp (CCFL) with inverter

5. Absolute Maximum Ratings

Electrical Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Conditions
Supply Voltage	VDD	-0.3 to +7.0	V	
Supply Voltage	VBL	-0.3 to +21.0	V	
Input Voltage	VIN	-0.3 to +5.25	V	
Static Electricity				Operators should be grounded in handling the TFT LCD Module

5.Absolute Maximum Ratings (continued)

Environmental Absolute Maximum Ratings

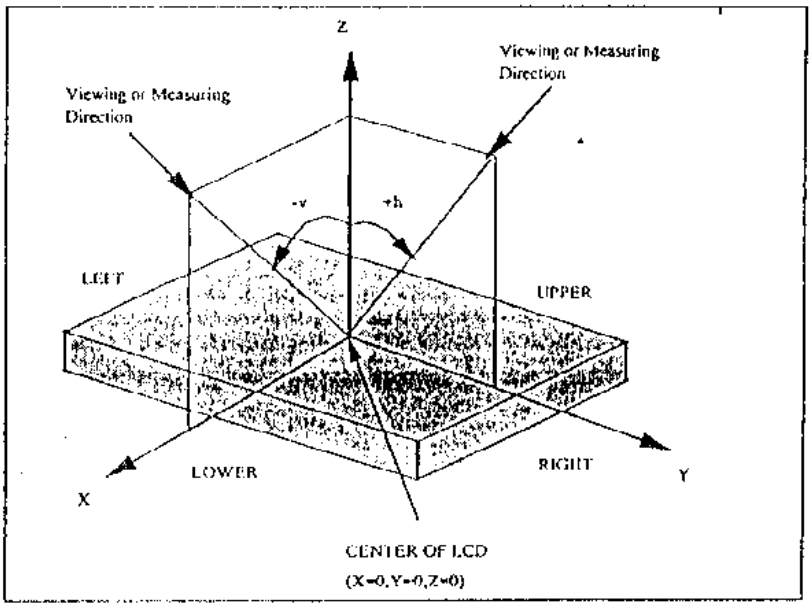
Rating	Symbol	Value	Unit	Conditions
Storage Temperature	TST	-20 to + 60	degC	At the glass surface
Operation Temperature	TOP	0 to +50	degC	At the glass surface
Operation Humidity		5 to 80	%RH	Max wet bulb temp. 29 degC No condensation
Vibration		1.5	G	10 V 200 Hz, X,Y,Z (Note1)
Trapezoidal Shock		35	G	20 msec, +/- X,Y,Z (Note1)
Corrosive Gas		Not Acceptable		

Note 1 : At testing Vibration and Shock, the fixture in holding the Module to be tested have to be hard and rigid enough so that the Module would not be twisted or bent by the fixture.

6. Optical Characteristics

Item	Conditions	Specification			Unit	Notes
		Min.	Typ.	Max.		
Viewing Angle	h = 0 ,v = + 20	5				In the unit of Contrast Ratio K
	h = 0 ,v = - 20	20				
	h = +/- 40 ,v = 0	10				
	h = +/- 20 ,v = 0	45				
Contrast	h = 0 ,v = 0	60	100			In the unit of Contrast Ratio K
Response Time	Both On/Off. From/To 10% luminance To/From 90% luminance level.		30	50	msec	Ambient Temperature 25degC. At Center of LCD. h = 0 ,v = 0
White Luminance	Gray Scale L= L255 h = 0 ,v = 0.		200		cd/m2	At Center of LCD
Luminance Uniformity	Adjacent Area	0.80				Ratio of (Ldark / Lbright) over a circular area of 10 mm diameter placed any one of 81 points of the screen.
	Screen Total	0.60				Ratio of (Ldark / Lbright) for any two of 81 measuring points of the screen
Chromaticity	Red x		0.639			+/- 0.030
	Red y		0.329			+/- 0.030
	Green x		0.301			+/- 0.030
	Green y		0.581			+/- 0.030
	Blue x		0.137			+/- 0.030
	Blue y		0.117			+/- 0.030
White Balance	x		0.310			+/- 0.030
	y		0.346			+/- 0.030

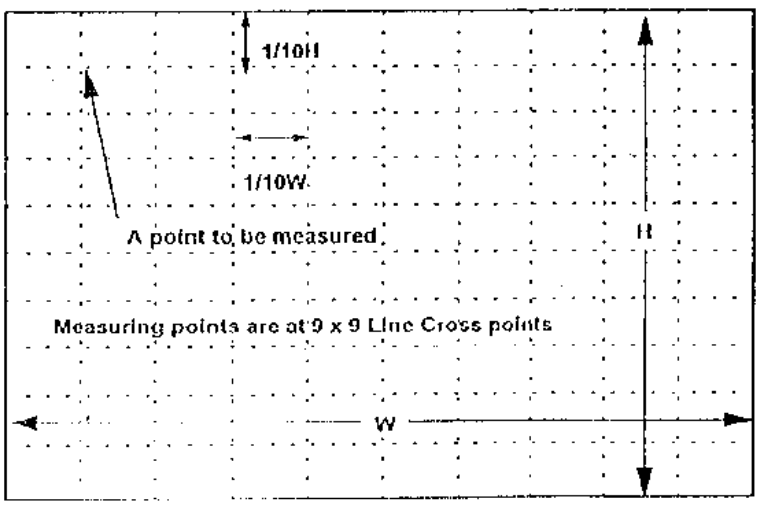
Notes for the Optical Characteristics :



- Gray Scale Level is denoted by Lxx. (ex. L00 means all Pels are in the selected state)

(Uniformity Measurement)

- 'Lbright' represents the Luminance of the point that is brighter than the other point to be compared.
- 'Ldark' represents the Luminance of the point that is darker than the other point to be compared.
- Measuring points are at the following.



- Chromaticity and White Balance are defined as the C.I.E. 1931 x,y coordinates at the center of LCD.
- The Measurement Equipment are as shown below table.

Item	Measuring Equipment
Viewing Angle	Pritchard 1980A by Photo Research Corp.
Contrast	Pritchard 1980A by Photo Research Corp.
Response Time	LCD-5000 by Ohtsuka Elec
White Luminance	Pritchard 1980A by Photo Research Corp.
Luminance Uniformity	Pritchard 1980A by Photo Research Corp.
Chromaticity	LCD-5000 by Ohtsuka Elec
White Balance	LCD-5000 by Ohtsuka Elec

The measurement is to be done after 30 minutes of Power-on of BackLight.

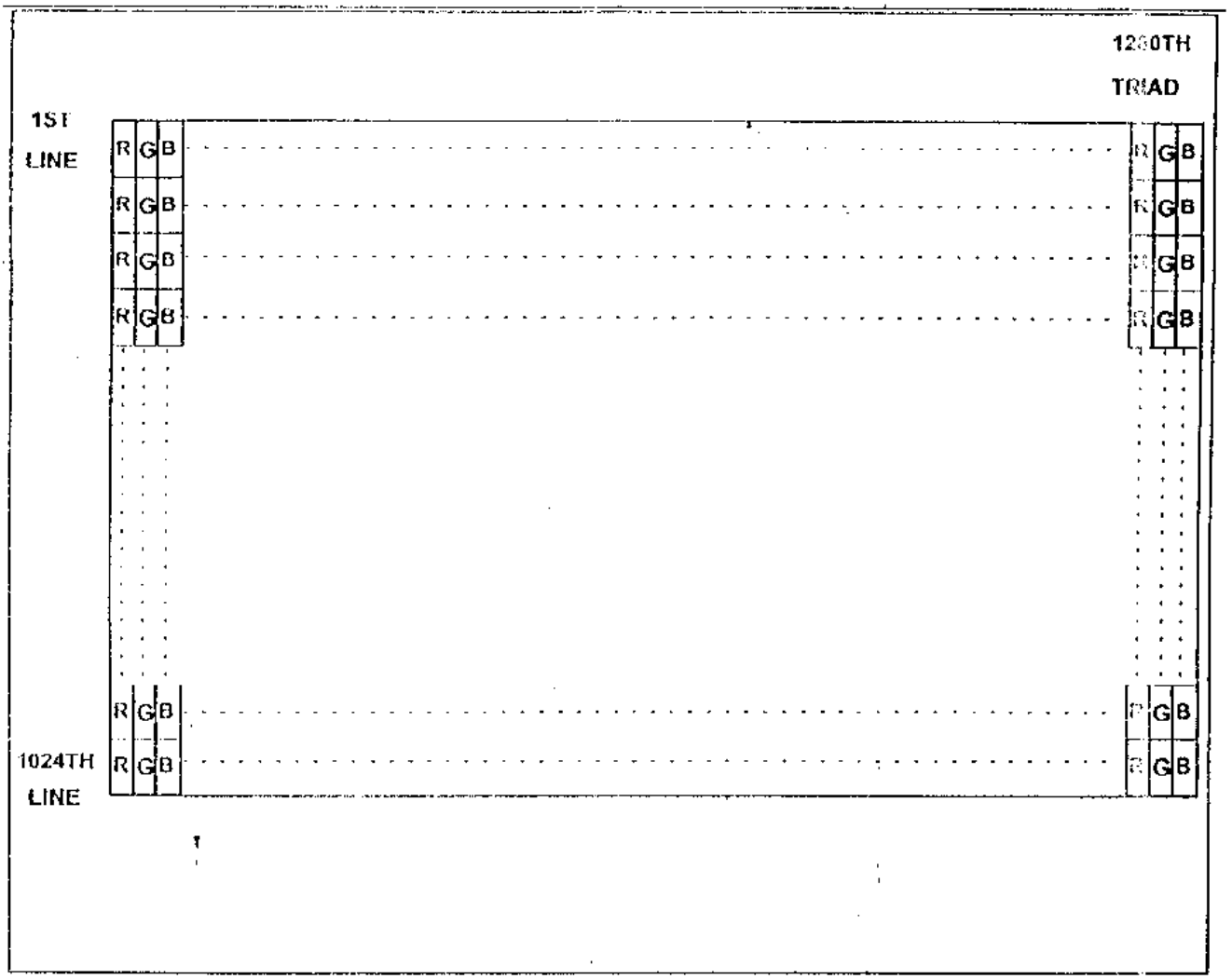
- Unless otherwise specified, the ambient conditions are as following.

Ambient Temperature : 25 ± 2 (degreeC)

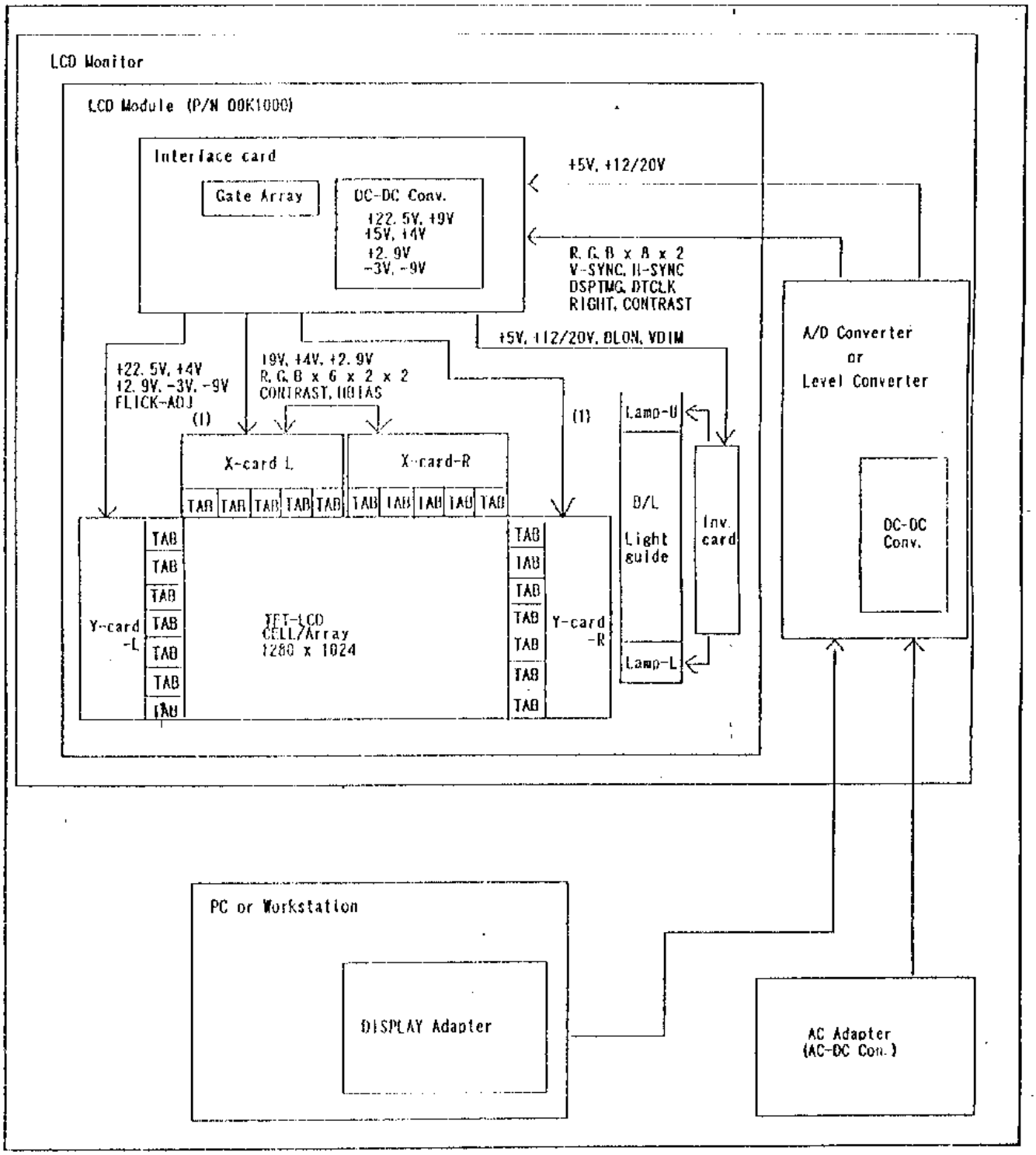
Ambient Humidity : 25 - 85 (%)

Atmospheric Pressure : 86 - 106 (kPa)

7. Color Arrangement



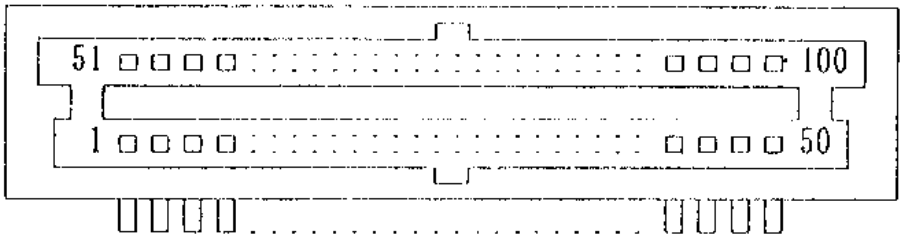
9. Block Diagram



10. Signal Interface

(1) Signal connector

J1: PHEC100R-R21I (BURNDY, mate with PHEC100P-R21I)



Front View

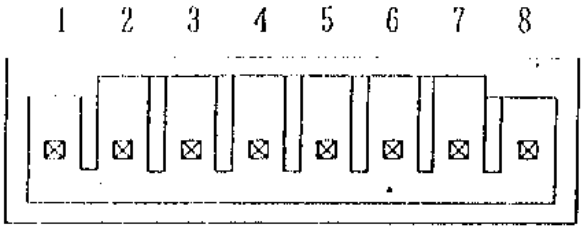
PIN#	Signal name	PIN#	Signal name	PIN#	Signal name	PIN#	Signal name
1	VSYNC	26	GND	51	GND	76	OG5
2	GND	27	OG6	52	DOTCLK	77	GND
3	HSYNC	28	GND	53	GND	78	OG7
4	GND	29	EB2	54	DISP TIMING	79	GND
5	ER2	30	EB0	55	GND	80	EB3
6	ER0	31	EB4	56	ER3	81	EB1
7	ER4	32	GND	57	ER1	82	EB5
8	GND	33	EB6	58	ER5	83	GND
9	ER6	34	GND	59	GND	84	EB7
10	GND	35	OB2	60	ER7	85	GND
11	OR2	36	OB0	61	GND	86	OB3
12	OR0	37	OB4	62	OR3	87	OB1
13	OR4	38	GND	63	OR1	88	OB5
14	GND	39	OB6	64	OR5	89	GND
15	OR6	40	GND	65	GND	90	OB7
16	GND	41	RESERVE	66	OR7	91	GND
17	EG2	42	GND	67	GND	92	RESERVE
18	EG0	43	RESERVE	68	EG3	93	GND
19	EG4	44	DPOL	69	EG1	94	PPOL
20	GND	45	N.C.	70	EG5	95	N.C.
21	EG6	46	BRIGHTNESS	71	GND	96	CONTRAST
22	GND	47	FRCEN	72	EG7	97	DTREN
23	OG2	48	RESERVE	73	GND	98	-BL-OFF
24	OG0	49	GND	74	OG3	99	GND
25	OG4	50	+5V	75	OG1	100	+5V

INTERFACE SIGNAL DESCRIPTION

SIGNAL NAME	DESCRIPTION
RE(7:0),RO(7:0)	Red data 7(MSB) to 0(LSB)
GE(70),GO(7:0)	Green data 7(MSB) to 0(LSB)
BE(7:0),BO(7:0)	Blue data 7(MSB) to 0(LSB)
DOTCLK	Dot Clock Input - The falling edge should be used to sample the other LCD signal.
DISP TIMING	LCD Display Timing signal
VSYNC	Vertical Synchronization
HSYNC	Horizontal Synchronization
DPOL (Note.1)	Display Timing Signal Polarity Control - This signal controls the polarity of 'DISP TIMING'. The 'DISP TIMING' signal is high active when 'DPOL' is high, low active when 'DPOL' is low. This signal is pulled-up internally by 10k ohm.
PPOL (Note.1)	Pixel Data Polarity Control - This signal is used to indicate the digital video data polarity. This signal is pulled-up internally by 10k ohm.
BRIGHTNESS	Shall be connected with variable volume(Max=0 ohm, Min=10k ohm) between this signal line and GND.
CONTRAST	Shall be connected with variable volume(Max=0 ohm, Min=10k ohm) between this signal line and GND.
FRCEN (Note.1)	Frame Rate Control Enable - When this signal is high, the Frame Rate Control function is enabled. This signal is pulled-up internally by 10k ohm.
DTREN (Note.1)	Dithering Enable - When this signal is high, the Dithering function is enabled. This signal is pulled-up internally by 10k ohm.
-BL-OFF (Note.1)	Back Light Off input - This signal is used to control the back light by external input. When this signal is low, back light is off(pre-heating) and DC/DC converter on the IF card is disabled. This signal is pulled-up internally by 10k ohm.
+5V	+5V output for test use.
GND	Signal GND.

(Note.1) If this signal is not used, the signal should be open.

(2) Power connector



Front View

Compatible with ITSX80

J10: S8B-PH-SM3 (JST, mate with PHR-8)

PIN #	Signal name
8	+5V
7	+5V
6	GND
5	GND
4	+12/20V
3	+12/20V
2	AGND
1	AGND

11. Color Code

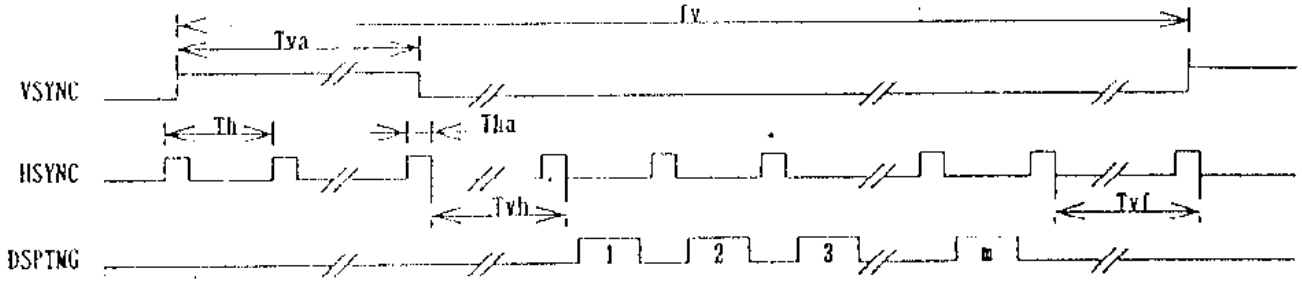
BIT7 (MSB)	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0 (LSB)	Color code
ER7	ER6	ER5	ER4	ER3	ER2	ER1	ER0	Red of even column pixels.
OR7	OR6	OR5	OR4	OR3	OR2	OR1	OR0	Red of odd column pixels.
EG7	EG6	EG5	EG4	EG3	EG2	EG1	EG0	Green of even column pixels.
OG7	OG6	OG5	OG4	OG3	OG2	OG1	OG0	Green of odd column pixels.
EB7	EB6	EB5	EB4	EB3	EB2	EB1	EB0	Blue of even column pixels.
OB7	OB6	OB5	OB4	OB3	OB2	OB1	OB0	Blue of odd column pixels.
H	H	H	H	H	H	H	H	255 (brightest)
H	H	H	H	H	H	H	L	254
H	H	H	H	H	H	L	H	253
H	H	H	H	H	H	L	L	252
L	L	L	L	L	L	H	H	3
L	L	L	L	L	L	H	L	2
L	L	L	L	L	L	L	H	1
L	L	L	L	L	L	L	L	0(darkest)

12. Signal Specification

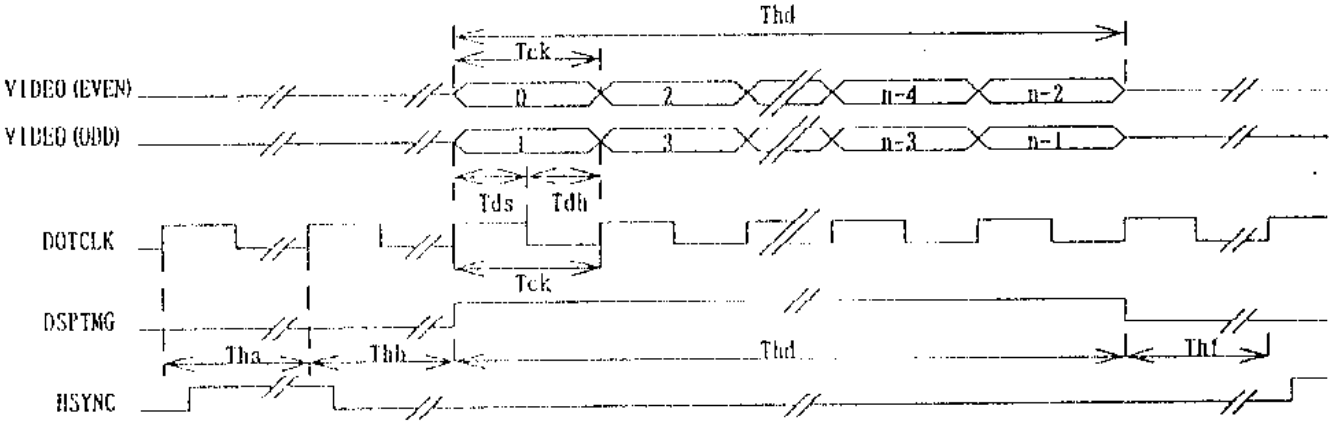
R/G/B,DTCLK,DSPTMG,H/VSYNC signal specification

Parameter	Condition	Min.	Max.	Unit
Vih	High level input voltage	2.0	VDD+0.3	V
Vil	Low level input voltage	0	0.8	V
Iih	High level input current	—	50	uA
Iil	Low level input current	—	-50	uA

13. Interface Timing



Vsync, Hsync and Display Timing



Video signal and Dot clock

- 1280 x 1024 / 60 Hz , Dot Clock 55.76 MHz

Signal	Item	Symbol	MIN.	TYP.	MAX.	Unit
DTCLK	Freq.	Fdck		55.76	57	MHz
DTCLK	Freq.	Tck	17.5	17.9		ns
DTCLKWH	Clock high width	Twch	4			ns
DTCLKWL	Clock low width	Twcl	4			ns
+V-Sync	Frame Rate	1/Tv	56.25	60	61	Hz
+V-Sync	Cycle	Tv	16.39	16.67	17.78	ms
+V-Sync	Cycle	Tv	1020	1056		lines
+V-Sync	active level	Tva	15.78	47.3		us
+V-Sync	active level	Tva	1	3		lines
+V-Sync	V-back porch	Tvb	7	26	63	lines
+V-Sync	V-front porch	Tvf	1	3		lines
+DSPTMG	V-Line	n		1024		lines
+H-Sync	Scan Rate	1/Th		63.36		KHz
+H-Sync	Cycle	Th		15.78		usec
+H-Sync	Cycle	Th	820	880		Tck
+H-Sync	active level	Tha		1.79		usec
+H-Sync	active level	Tha	10	100		Tck
+H-Sync	Back porch	Thb	8	127		Tck
+H-Sync	Front porch	Thf	8	13		Tck
+DSPTMG	Display	Thd		11.48		usec
+VIDEO	V-ODD/EVEN	n		640		Tck
+VIDEO	Data setup	Tds	3			ns
+VIDEO	Data hold	Tdh	5			ns

- 1280 x 1024 / 60 Hz , Dot Clock 50 MHz

Signal	Item	Symbol	MIN.	TYP.	MAX.	Unit
DTCLK	Freq.	Fdck		50		MHz
DTCLK	Freq.	Tck		20		ns
DTCLKWH	Clock high width	Twch	4			ns
DTCLKWL	Clock low width	Twcl	4			ns
+V-Sync	Frame Rate	1/Tv		57.74		Hz
+V-Sync	Cycle	Tv		17.32		ms
+V-Sync	Cycle	Tv		1056		lines
+V-Sync	active level	Tva		49.6		us
+V-Sync	active level	Tva		3		lines
+V-Sync	V-back porch	Tvb		26		lines
+V-Sync	V-front porch	Tvf		3		lines
+DSPTMG	V-Line	m		1024		lines
+H-Sync	Scan Rate	1/Th		60.98		KHz
+H-Sync	Cycle	Th		16.4		usec
+H-Sync	Cycle	Th		820		Tck
+H-Sync	active level	Tha		2		usec
+H-Sync	active level	Tha		100		Tck
+H-Sync	Back porch	Thb		67		Tck
+H-Sync	Front porch	Thf		13		Tck
+DSPTMG	Display	Thd		12.8		usec
+VIDEO	V-ODD/EVEN	n		640		Tck
+VIDEO	Data setup	Tds	3			ns
+VIDEO	Data hold	Tdh	5			ns

14. Power Requirement

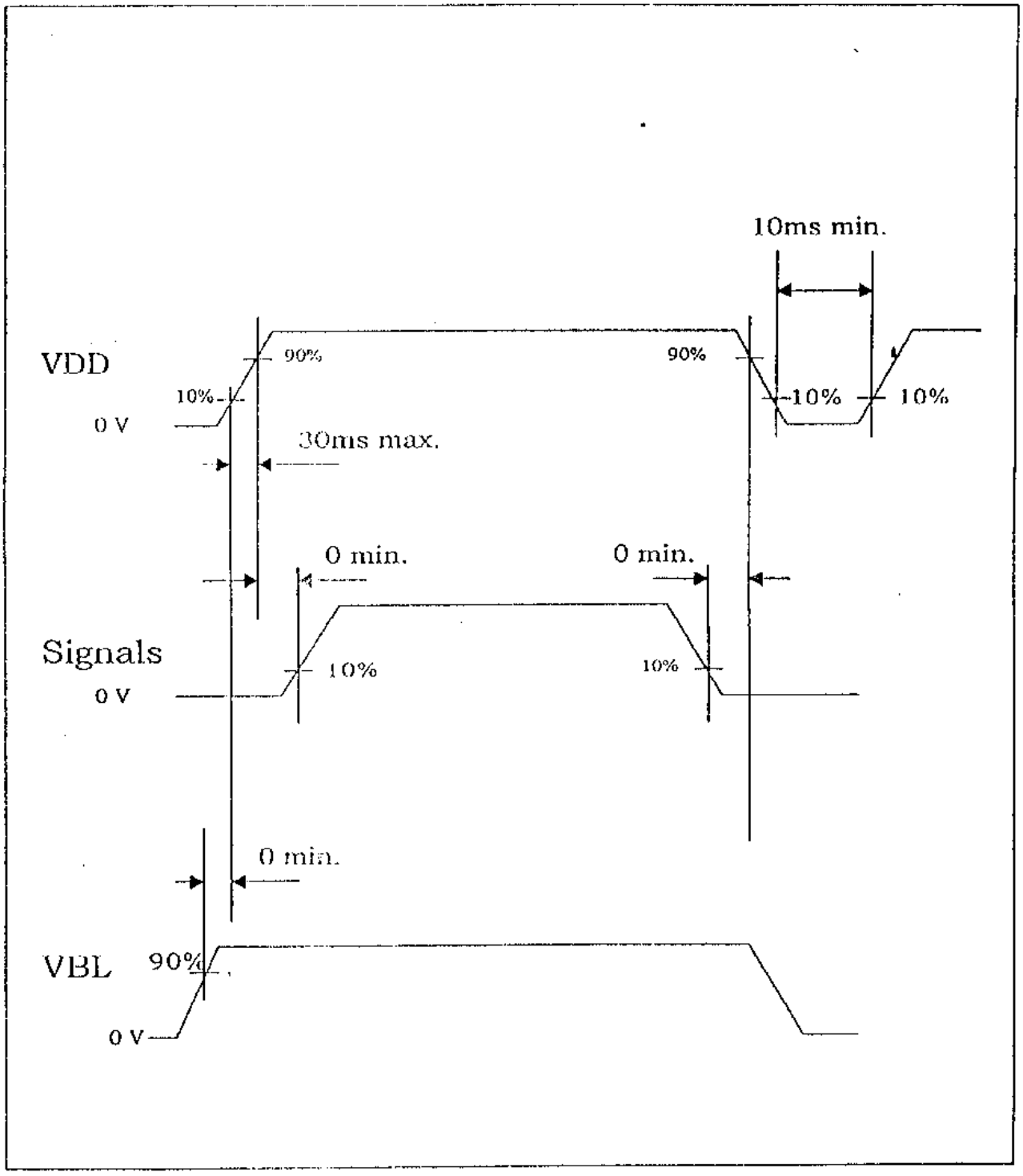
SYMBOL	PARAMETER	Min.	Typ.	Max.	Unit	CONDITION
VDD	Logic/LCD Drive Voltage	4.75	+5.0	5.25	V	
IDD	Logic Control Current			0.6	A	
VBL	Backlight Voltage	10.8		21	V	
IBL	Backlight Current			2.5 1.5	A	12 V 20 V
PDD+PBL	Total Power		30	33	W	
VDDrp, VBLrp	Allowable Logic/LCD Drive Ripple Voltage			100	mVp-p	
VDDns, VBLns	Allowable Logic/LCD Drive Ripple Noise			150	mVp-p	

Note: 1. This requirements shall be met with 'All black pattern'.

2. Maximum current does not include noise nor ripple current.

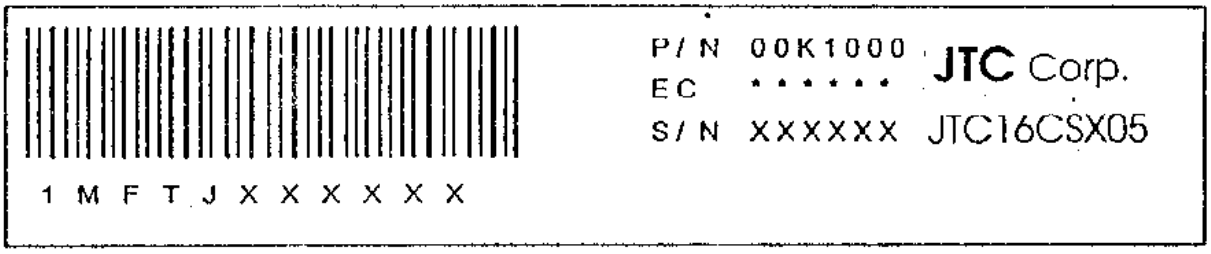
3. Voltage variation includes the ripple voltage.

15. Power ON/OFF sequence

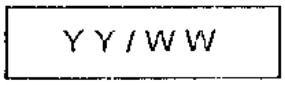


16. Product Label

Serial Number Label



Week Code Label



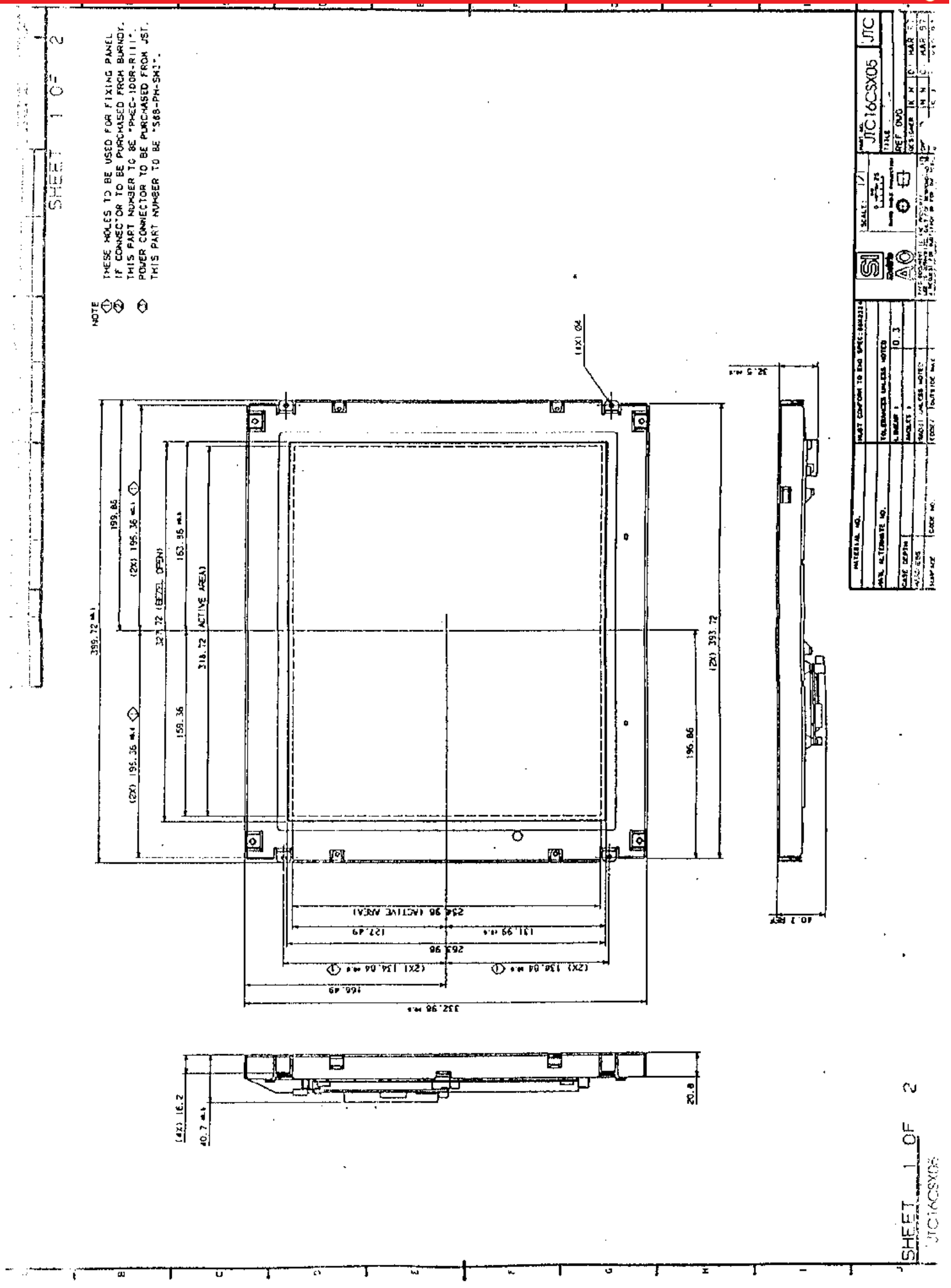
There are two labels at the front limb of the Module Frame.

One is the Serial Number Label and the other is the Week Code Label.

The first 4 digits of the Bar code shows the Module Type JTC10CV001

The fifth digit is for the manufacturing location code.

YY and WW of the Week Code stand for the Year and the Week of the Year of manufacturing of the Module respectively.



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