SPECIFICATION
FOR
APPROVAL

(V) **Preliminary Specification**
( ) **Final Specification**

Title	10.4” VGA TFT LCD

BUYER	
MODEL	

SUPPLIER	LG.Philips LCD Co., Ltd.
*MODEL	LB104V03
Suffix	A1

*When you obtain standard approval,
please use the above model name without suffix

SIGNATURE	DATE
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Please return 1 copy for your confirmation with your signature and comments.

SIGNATURE	DATE
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RECORD OF REVISIONS

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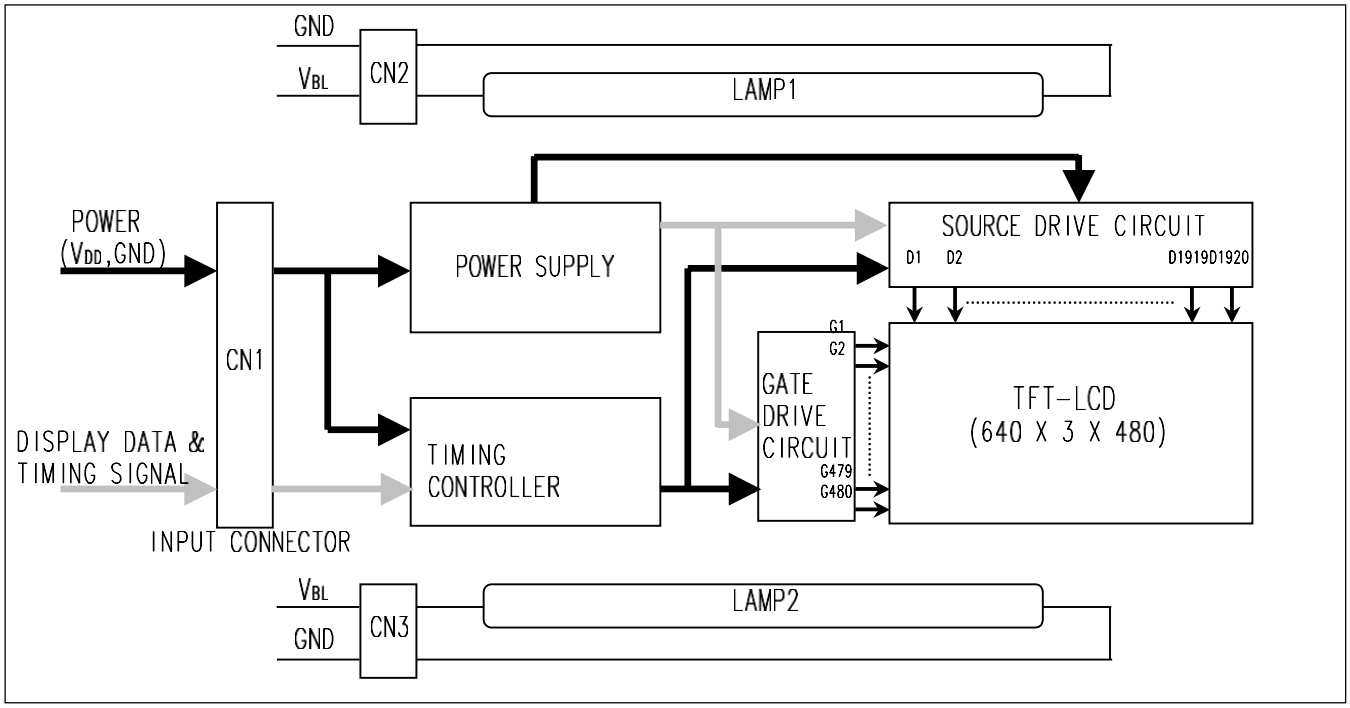
0.0	Mar. 14. 2003	-	First Draft (Preliminary)	

1. General Description

The LB104V03-A1 is a Color Active Matrix Liquid Crystal Display with an integral Cold Cathode Fluorescent Lamp (CCFL) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally white mode. This TFT-LCD has 10.4 inches diagonally measured active display area with VGA resolution(480 vertical by 640 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 6-bit gray scale signal for each dot, thus, presenting a palette of more than 262,144 colors.

The LB104V03-A1 has been designed to apply the interface method that enables low power, high speed, low EMI.

The LB104V03-A1 is intended to support applications where thin thickness, low power are critical factors and graphic displays are important. In combination with the vertical arrangement of the sub-pixels, the LB104V03-A1 characteristics provide an excellent flat display for office automation products such as Notebook PC.



General Features

Active Screen Size	10.4 inches(26.42cm) diagonal
Outline Dimension	236(H) × 180(V) × 10(D) mm
Pixel Pitch	0.33 mm × 0.33 mm
Pixel Format	640 horiz. By 480 vert. Pixels RGB strip arrangement
Color Depth	6-bit, 262,144 colors
Luminance, White	400 cd/m^2(Typ.) Lamp Ass'y replaceable
Power Consumption	TBD Watt(Typ.)
Weight	500 g (Max.)
Display Operating Mode	Transmissive mode, normally white
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer

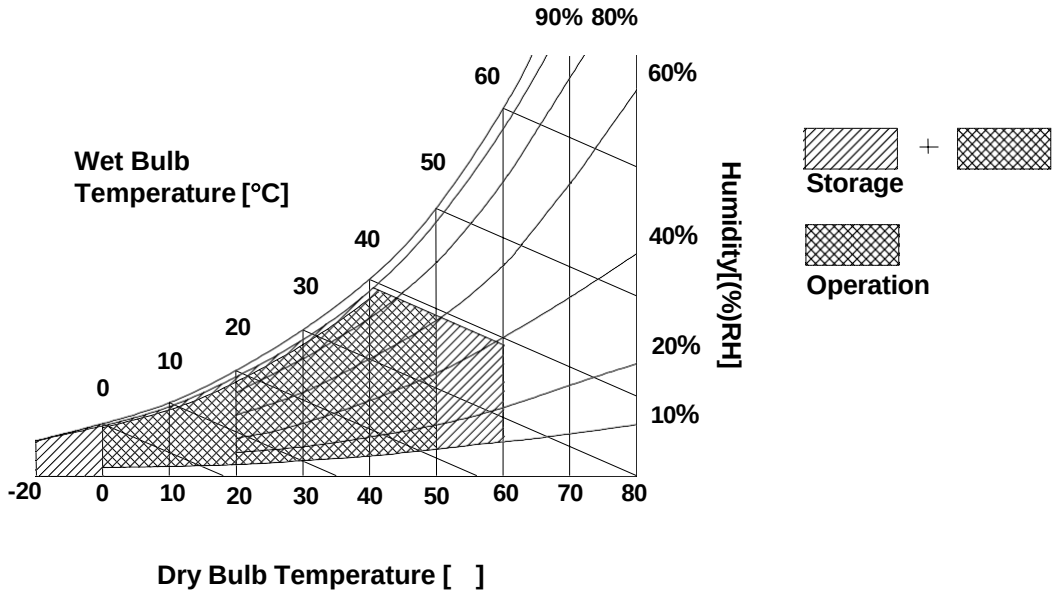
2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values		Units	Notes
		Min	Max		
Power Input Voltage	VCC	-0.3	4.0	Vdc	at 25 ± 5°C
Operating Temperature	TOP	0	50	°C	1
Storage Temperature	TST	-20	60	°C	1
Operating Ambient Humidity	HOP	10	90	%RH	1
Storage Humidity	HST	10	90	%RH	1

Note : 1. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39°C Max, and no condensation of water.



3. Electrical Specifications

3-1. Electrical Characteristics

The LB104V03-A1 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input which powers the CCFL, is typically generated by an inverter. The inverter is an external unit to the LCD.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
MODULE :						
Power Supply Input Voltage	VCC	3.0	3.3	3.6	Vdc	
Power Supply Input Current	I_{CC}	-	TBD	TBD	mA	1
Power Consumption	Pc	-	TBD	TBD	Watt	1
LAMP :						
Operating Voltage	V_{BL}		485	625	V_{RMS}	2
Operating Current	I_{BL}	2.0	6.0	7.0	mA_{RMS}	3
Established Starting Voltage	Vs					4
at 25 °C		-	-	750	V_{RMS}	
at 0 °C		-	-	940	V_{RMS}	
Operating Frequency	f_{BL}	40	55	80	kHz	5
Discharge Stabilization Time	Ts	-	-	3	Min	6
Power Consumption	P_{BL}	-	5.8	6.4	Watt	7
Life Time		40,000	-	-	Hrs	8

Note)

The design of the inverter must have specifications for the lamp in LCD Assembly. The performance of the Lamp in LCM, for example life time or brightness, is extremely influenced by the characteristics of the DC-AC inverter. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter(no lighting, flicker, etc) never occurs. When you confirm it, the LCD Assembly should be operated in the same condition as installed in your instrument.

1. VCC=3.3V, 25°C, f_V (frame frequency) = 60Hz condition, whereas Mosaic pattern(Typ).,full black pattern(Max) is displayed.
2. The variance of the voltage is ± 10%.
3. The typical operating current is for the typical surface luminance (L_{WH}) in optical characteristics.
4. The voltage above VS should be applied to the lamps for more than 1 second for start-up. Otherwise, the lamps may not be turned on. The used lamp current is the lamp typical current.