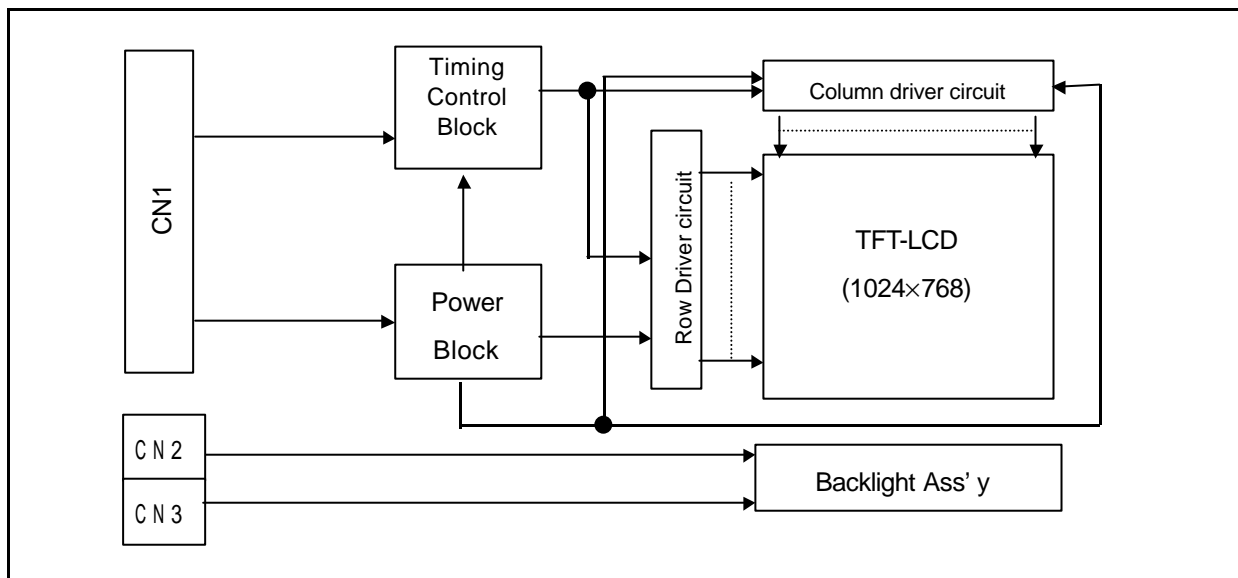


1. General Description

The LM151X4 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 a 15.1 inches diagonally measured active display area with XGA resolution(768 vertical by 1024 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 LM151X4 has been designed to apply the TTL interface method.

The LM151X4 LCD is intended to support applications where high brightness, wide viewing angle, high color saturation, and high color depth are very important. In combination with the vertical arrangement of the sub-pixels, the LM151X4 characteristics provide an excellent flat panel display for office automation products such as monitors.



General Features

Active screen size	15.1 inches(307.2 x 230.4mm) diagonal
Outline dimensions	352.0(H) × 263.5(V) × 16.0(D) mm (typ) without user connector
Pixel pitch	0.300 mm × 0.300 mm
Pixel format	1024 horiz. By 768 vert. pixels
	RGB stripe arrangement
Color depth	6-bit, 262,144 colors
Luminance,White	250 cd/m ² (typ)
Power Consumption	2.3Watts Logic / 9.7 Watts CCFL (typ. With 64 Gray pattern)
Weight	1500g (typ)
Display operating mode	transmissive mode, normally white
Surface treatments	hard coating(3H), anti-glare treatment of the front polarizer

Product General Specification

2. Electrical Specifications

2-1. Electrical Characteristics

The LM151X4 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 1 ELECTRICAL CHARACTERISTICS:

Parameter	Symbol	Values			Units	Notes
		Min.	Typ.	Max.		
MODULE:						
Power Supply Input Voltage	V_{CC}	3.0	3.3	3.6	Vdc	
Power Supply Input Current	I_{CC}	-	550	660	mA	1
Power Consumption	P_c	-	1.9	3.3	Watts	1
Input Data Logic Voltage	V_i	3.0	3.3	3.6	Vdc	
LAMP						
Operating Voltage	V_{BL}	585(9mA)	605(8mA)	720(3mA)	V_{RMS}	2
Operating Current	I_{BL}	3.0	8.0	9.0	mA	
Established Starting Voltage	V_{BS}					3
at 25		-	-	1020	V_{RMS}	
at 0		-	-	1400	V_{RMS}	
Operating Frequency	f_{BL}	30	50	60	kHz	4
Power Consumption	P_{BL}	-	9.7	10.6	Watts	5
Discharge Stabilization Time	T_s	-	-	3	Minutes	6
Life Time		30,000	-	-	Hrs	8mArms 7

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.

Notes: 1. The current draw and power consumption specified is for 3.3 Vdc at 25 and fv at 60Hz.

(at chess 8X6 pattern)

2. The variance of the voltage is $\pm 10\%$.
3. The output voltage at the transformer in the inverter must be high considering to the loss of the ballast capacitor in the inverter.
4. The output of the inverter must have symmetrical(negative and positive) voltage waveform and symmetrical current waveform.(Unsymmetrical ratio is less than 10%) Please do not use the inverter which has unsymmetrical voltage and unsymmetrical current and spike wave.
Lamp frequency may produce interference with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away as possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.
5. The lamp power consumption shown above does not include loss of external inverter.
6. Let's define the brightness of the lamp after being lighted for 5 minutes as 100%.
 T_s is the time required for the brightness of the center of the lamp to be not less than 95%.
7. The life time is determined as the time at which brightness of lamp is 50% compare to that of initial value at the typical lamp current on condition of continuous operating at 25 ± 2 .

Product General Specification

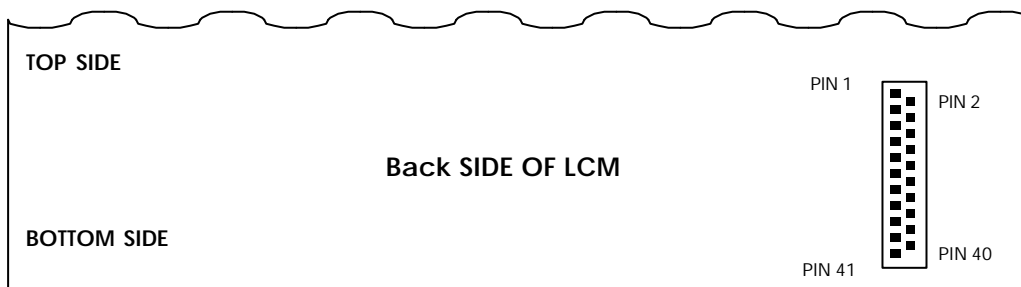
2-2. Interface Connections

This LCD employs three interface connections, a 41 pin connector is used for the module electronics and two connectors, a three pin connector, are used for the integral backlight system. The electronics interface connector is a model DF9B-41P-1V manufactured by Hirose. The pin configuration for the connector is shown in the table below

Table 2 MODULE CONNECTOR PIN CONFIGURATION

Pin	Symbol	Description	Pin	Symbol	Description
1	GND	System Ground. Note 1	2	DCLK	Data Input Clock
3	GND	System Ground	4	H _{sync}	H _{sync} - Horizontal Sync Signal
5	V _{sync}	V _{sync} - Vertical Sync Signal	6	GND	System Ground
7	GND	System Ground	8	GND	System Ground
9	R0	Red data 0 (LSB)	10	R1	Red data 1
11	R2	Red data 2	12	GND	System Ground
13	R3	Red data 3	14	R4	Red data 4
15	R5	Red data 5 (MSB)	16	GND	System Ground
17	GND	System Ground	18	GND	System Ground
19	G0	Green data 0 (LSB)	20	G1	Green data 1
21	G2	Green data 2	22	GND	System Ground
23	G3	Green data 3	24	G4	Green data 4
25	G5	Green data 5 (MSB)	26	GND	System Ground
27	GND	System Ground	28	GND	System Ground
29	B0	Blue data 0 (LSB)	30	B1	Blue data 1
31	B2	Blue data 2	32	GND	System Ground
33	B3	Blue data 3	34	B4	Blue data 4
35	B5	Blue data 5 (MSB)	36	GND	System Ground
37	DE	Data Enable Signal	38	V _{DD}	Power Supply for LCD Module
39	V _{DD}	Power Supply for LCD Module	40	V _{DD}	Power Supply for LCD Module
41	V _{DD}	Power Supply for LCD Module			

- Notes:
1. All GND(ground) pins should be connected together and to V_{SS} which should also be connected to the LCD's metal frame.
 2. All V_{CC}(power input) pins should be connected together.



The backlight interface connector is a model BHR-03VS-1, manufactured by JST. The mating connector part number is SMO2(8.0)B-BHS-1-TB or equivalent. The pin configuration for the connector is shown in the table below.

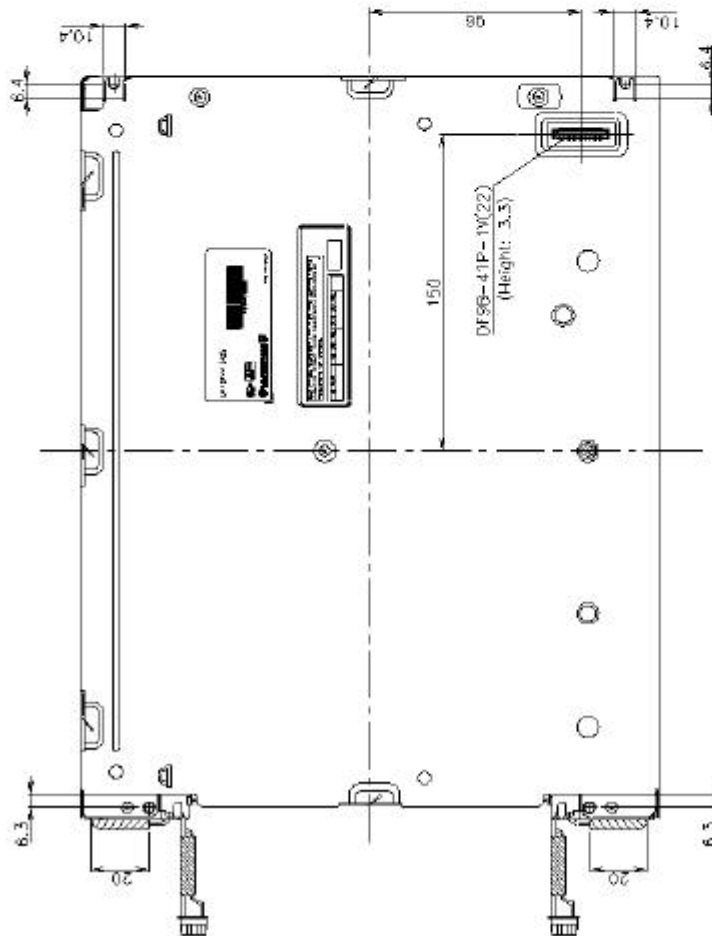
Table 3 BACKLIGHT CONNECTOR PIN CONFIGURATION

Pin	Symbol	Description	Notes
1	HV	Lamp power input(High)	1
2	NC	No connect	
3	LV	Lamp power input(Low)	

- Notes: 1. The input power terminal(High) is colored pink.

Product General Specification

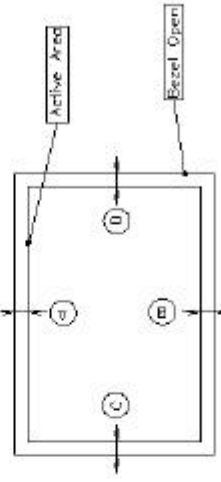
<REAR VIEW>



NOTES

1. Unspecified tolerances to be ± 0.5
2. This drawing is only preliminary data and can be changed without previous notice
3. Gap between Top case and Glass is $0.2(+0.5/-0.2)$
4. Tilt and partial disposition tolerance of display area are as follow

- 1) Y-Direction : $IK-BI \leq 1.0$
- 2) X-Direction : $IC-DI \leq 1.0$



5. The same shape is same dimension.

3.PRECAUTIONS

The LCD Products listed on this documents are not suitable for use of Military,Industry,Medical etc. system.

If customers intend to use these LCD products for above application, Please contact ours sales people in advance.