Landmark Technology

LT201-420WX5 - a 42", 870 nits LCD Module for Digital Signage

Introduction

LT201-420WX5 is a 42" high brightness LCD module for Digital Signage applications. At the full brightness setting, the screen luminance is 870 nits, which is about 75% brighter than regular 42" LCD TVs.

The LT201-420WX5 has 1366 x 768 native resolution. At 870 nits brightness, the image displayed on the screen matches the surperb quality of traditional advertising signs using light boxes behind color transparencies. This makes the LT201-420WX5 specifically suitable as a digital sign in areas with bright amabient lighting such as at the front windows of a store where the display will attract a customer's attention.

A number of accessories are available for this 42" LCD module. For example, the PS200 photosensor can be used to automatically adjust the screen brightness down at night.

Characteristics (Note 1, 2)

Parameters	Typical Value	Units	Conditions
LCD Screen Luminance	870	Cd/m^2	LCD displays the brightest white
Typical LCD Contrast Ratio	800:1		White vs. Black (measured in the dark at the normal direction)
Typical Viewing Angles			
3:00 to 9:00 direction	± 89	Degrees	Contrast ratio ≥ 10
6:00 to 12:00 direction	± 89	Degrees	Contrast ratio ≥ 10
LCD Screen Chromaticity (x, y)			
White	(0.271, 0.290)		Measured at the normal direction
Red	(0.626, 0.353)		Measured at the normal direction
Green	(0.266, 0.617)		Measured at the normal direction
Blue	(0.141, 0.052)		Measured at the normal direction
Display Resolution	1,366 x 768		
Inverter Power Requirement	24V at 7.1 A		At full brightness of 870 nits
LCD Power Requirement	12V at 0.6 A		With the max. current pattern
LCD Module Weight	1,200	Grams	Storage Temp: -20 to 50 C
Mechanical Dimensions	983 (H) x 576 (V) x 51 (D) mm		Operating Temp: 0 to 50 C
Active Screen Size	42.02 inches (1067.308 mm) diagonal		
Color Depth	8-bit R, G, B. 16.7 million colors		
Screen Surface Treatment	Hard coating (3H), anti-glare treatment		

Note 1: Please refer to the LG LC420WX5-SLB1 data sheet for detailed LCD electrical specifications and general precautions.
Note 2: All data are measured at 25^{o} C ± 2^{o}C ambient temperature.

Landmark Technology 172 Component Drive San Jose, CA 95131 (408) 434-9302 Fax: (408) 434-0954 06/2008
www.landmarktek.com

LCD Module Optical Performances

Luminance & Contrast Ratio

The LT201-420WX5 is a normally black, wide viewing LCD module. The screen luminance (brightness) is measured with the LCD displaying the white color. However, the "white" color displayed on the screen may depend on the video signal, the setting of the LCD controller, etc., which may cause a lower brightness reading. When the LCD is properly driven, the measured luminance of the "white" color displayed on the screen should be within 5% of the specified brightness.

The LT201-420WX5 LCD module has a very high contrast ratio (CR) over 800:1 along the normal direction. This is the inherent CR which is the luminance ratio between the "White" state and the "Black" state measured in a totally dark room. Under ambient lighting, particularly in bright outdoor environments, the CR value of the display drops significantly due to the reflection and glare caused by the ambient illumination.

Chromaticity

The 1931 CIE chromaticity coordinates of the R, G, B primary colors are presented in the table on page 1. These numbers are measured from a viewing direction normal to the LCD screen.

The LT201-420WX5 LCD module has a very wide viewing angle with virtually no color shifts. As the view direction moves toward off-axis angles, there are no color shifts upto ±60 degrees.

Backlight Electrical Characteristics (Note 1)

Parameters		Typical Values	Units	Remarks
Inverter Input Voltage		24	Vdc	22.8 V min, 25.2V max.
Inverter Input Current		7.1	A	At max. screen brightness 870 nits
Power Consumption		170	Watts	At max. screen brightness 870 nits
Power Supply In-rush Current		8.6	A	Maximum value
Backlight Control Voltage				
Brightness Adjust		0 to 3.3	Vdc	3.3V for max. brightness
Backlight On/Off	On	5	Vdc	2.5V min., 5.25V max.
	Off	0	Vdc	-0.3V min., 0.8V max.
Brightness Control Range (with V_{BR-B})				
	3.3V	100%		870 nits at inverter current 7.1A.
	0V	20%		170 nits at inverter current 1.5A.
Lamp Half Brightness Lifetime		50,000	Hours	

Note 1: All data are measured at 25^{o} C ± 2^{o}C ambient temperature.

Backlight Life

The lifetime of a backlight is mainly determined by the lamp life. The lamp life is specified as "half brightness lifetime". This is the cumulative operating time when the surface brightness of the lamp drops to 50% of its original value.

The CCFL lamp used in the LT201-420WX5 backlight is rated at 50,000 hours half brightness life. However, the brightness of the backlight (and thus the LCD screen brightness) decays slightly faster than that of a CCFL due to the aging of other materials in the backlight.

However, lamp life depends strongly on the lamp current. So, when the LCD is dimmed down, the lamp current is adjusted down and its half brightness lifetime increases significantly. Therefore, the actual operating lifetime of the backlight is expected to reach the specified 50,000 hours, in particular if the LCD screen brightness is adjusted down at night. For more information, please refer to our Technical Note TK801.

Note: the 50,000 hours half brightness life is when the lamps are aligned horizontally. When operating the LCD in vertical portrait mode, the lamps are aligned vertically and their life may decrease significantly.

Thermal Management

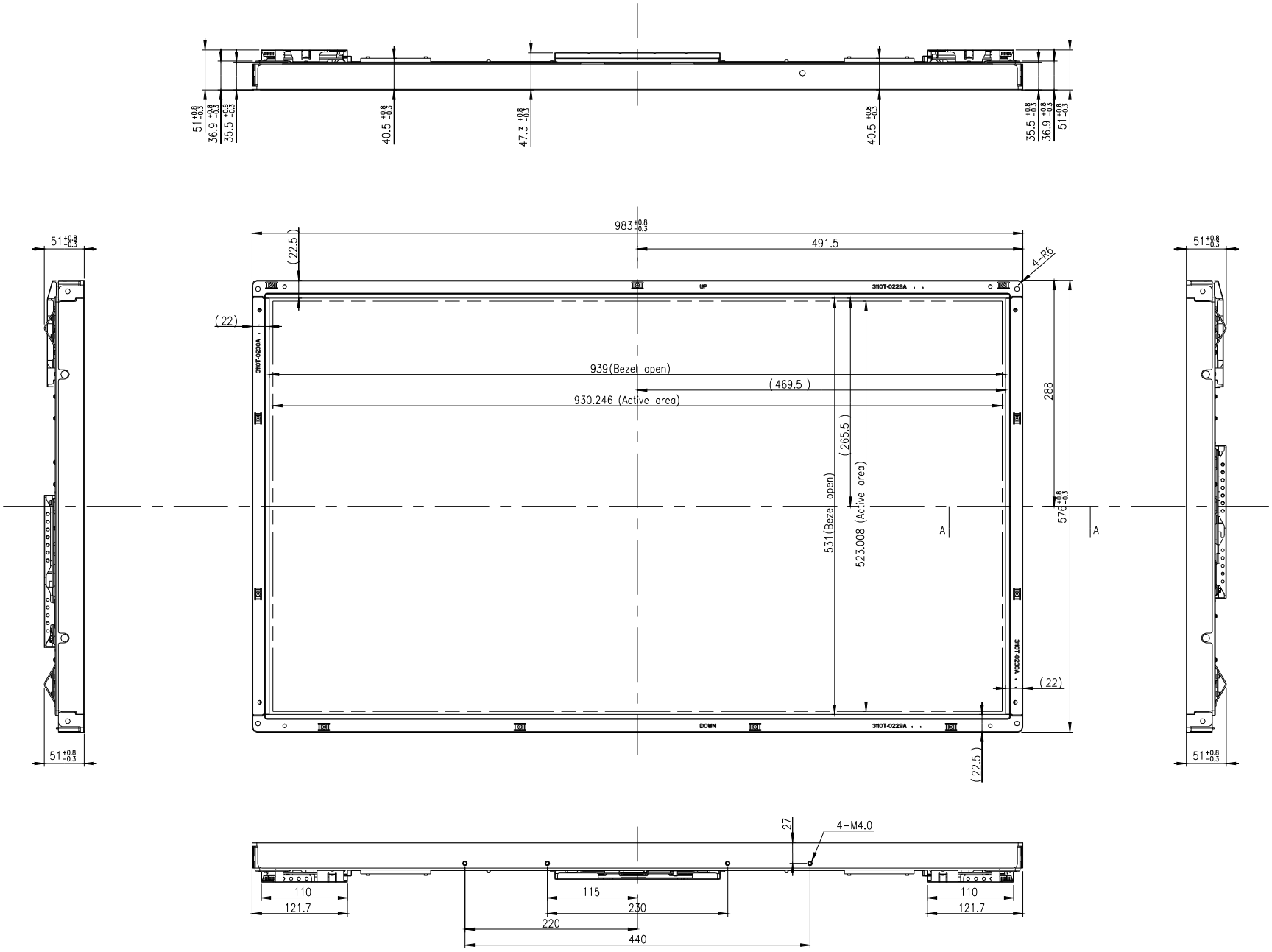
The backlight power consumption of the LT201-420WX5 LCD module at full brightness is about 170 Watts, which is about the same as a standard 42" LCD at 500 nits brightness. Therefore, thermal management issues are comparable to that of a 500 nits 42" LCD.

With poor thermal management, however, the backlight can still get warmer than usual. Consequently, the LCD screen brightness drops below the specified 870 nits. In general, with some simple cooling measures such as a fan, the screen brightness can be maintained at above 800 nits.

In outdoor applications where the display may subject to direct sunlight exposure, the LCD screen can absorb a large amount of sunlight power and heat up very quickly. At worst, the heating power generated from the sunlight exposure can be about three time more than that generated by the backlight.

For outdoor applications with direct sunlight exposure, the combined heating power from the sunlight and the backlight can raise the LCD temperature beyond 70^{o}C. In cold winter weather, the ambient temperature may drop to well below 0^{o}C. Therefore, it is necessary to design the thermal management (cooling and heating) system according to the worst case conditions experienced by the LCD, making sure that the LCD temperature stays within the specified operating temperature range.

Mechanical Dimensions (Front View)



Mechanical Dimensions (Back View)