



*Planar Engineering Specification
023-0433-01 Rev A
8.4 Monitor for Extreme Environments; LX0850PTI
December 12, 2012*

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Display Design Summary

- Utilize proven design and supplier
- Cost optimized design
- Long product life cycle
- Designed for demanding transportation environment
- Optimized for in cab sunlight viewability
- Glass surface touchscreen for optimal performance in harsh environment
- One button Display/CPU power on/off
- Ultra wide dimming range
- Control of backlight dimming and other OSD functions through USB interface
- Wide Voltage input with transient protection
- Low EMI
- Wide operating temperature range without fans or ventilation
- Vibration and Shock tested to rugged transportation specifications
- Waterproof design
- Rugged Aluminum enclosure

Product Highlights

- 8.4 SVGA high bright display for viewability in all environments
- Infrared touchscreen with strengthened glass touch surface for the best optical clarity
- Wide dimming range controlled via USB or Hard buttons
- Wide input VGA scalar with OSD controls hidden from end user
- Fanless die cast aluminum chassis sealed to IP65 and IP67
- Mil-Std connectors for all connections

1 Proposed Product

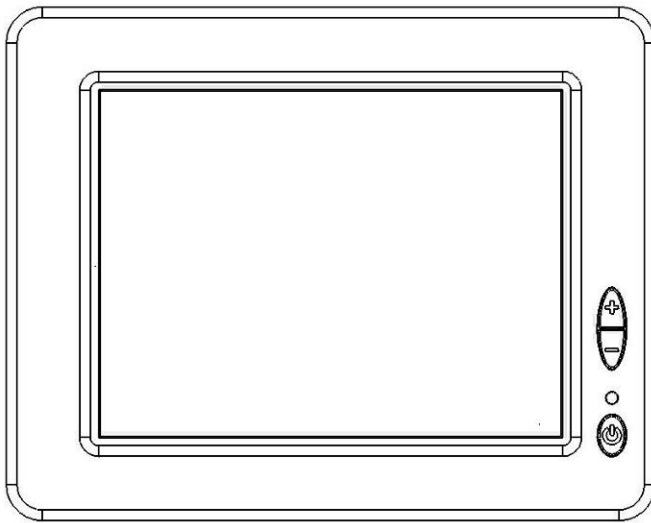
Planar will leverage past transportation and marine design and product development experience to offer a product that conforms to the following specification

1.1 Product Versions

All sellable product part numbers ending in LF will be built with RoHS complaint components

Planar Part Number	Planar Model Name	Description	UPC
997-5379-03	LX0850PTI	IR touch, 8.4 SVGA LCD	8 10689 05379 8
997-5459-02 (for Wenco)	LX0850PTI	IR touch, 8.4 SVGA LCD	8 10689 05459 7
997-5691-01 (for General Market)	LX0850PTI	IR touch, 8.4 SVGA LCD	8 10689 05691 1
997-6749-01 (for Teck Coal)	LX0850PTI	IR touch, 8.4 SVGA LCD,USB HUB Bypass	8 10689 06749 8

Figure 1 Rendering of the display



2 Product Description

The LX0850PTI is intended for use in an in transportation environment. The initial use will be a dashboard mounted, touch enabled display for a remote computer. The display will consist of an AMLCD, touchscreen, user controls, and a rugged enclosure. The LX0850PTI will be powered by 12 or 24 V DC from a vehicle.

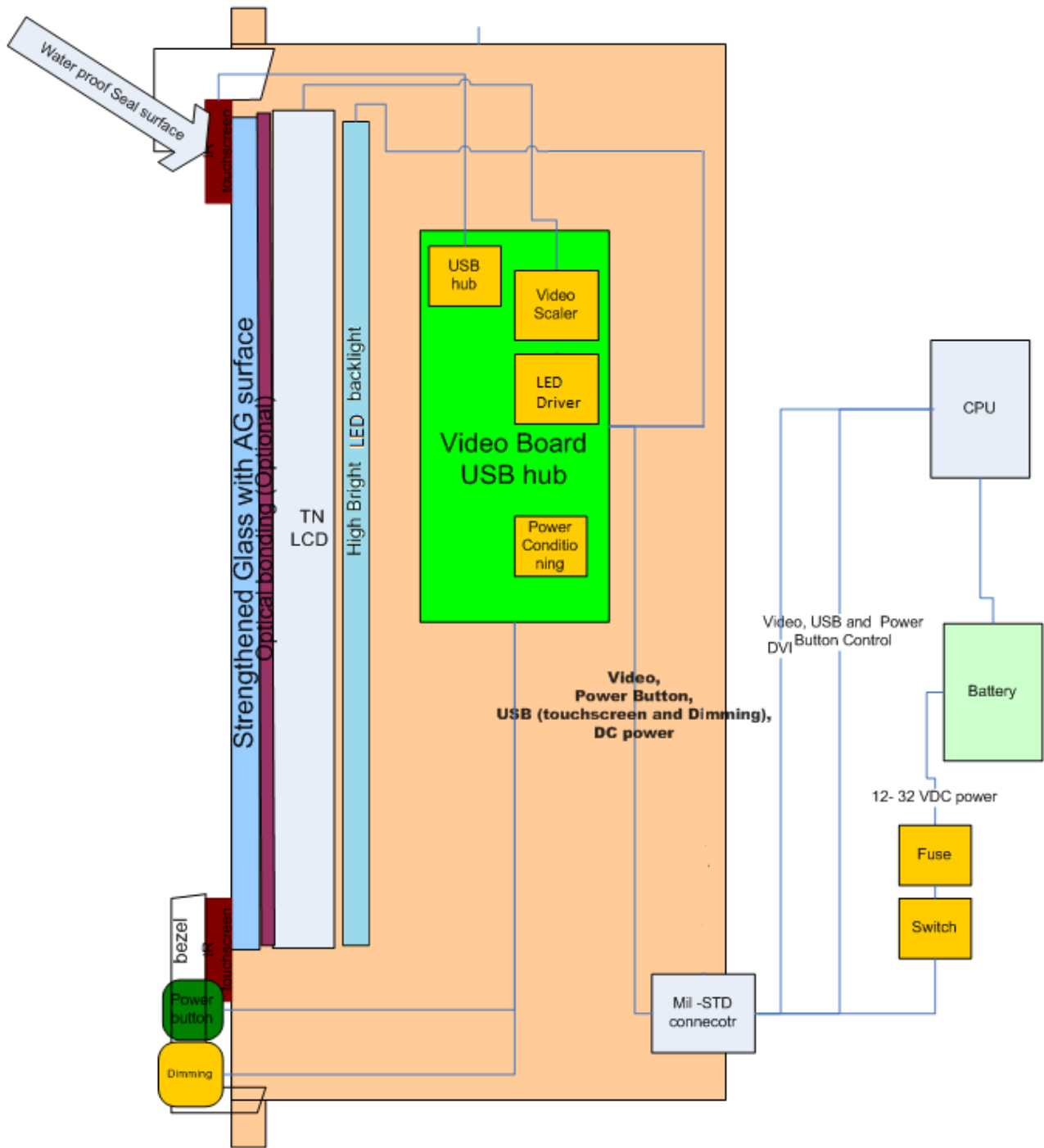
The primary application for this product requires a touch enabled display that is plug_and_play, and requires little training to use by the end user.

There are a few unique features to this product that are not on standard desktop monitors (DTM):

- No standard OSD buttons are open to the user: All 'standard' DTM OSD functionality will work as a hard button or be hidden to the user.
- All-in-One power button: A power button located on the front of the display functions as a pass through to turn on and off the remote computer. It functions very similar to a laptop computer docking station power button. When there is no video detected, the monitor will go into standby mode.
- No Base, mounting brackets, or stand is shipped with this device. It is a monitor head only.
- No cables or power supply are shipped with this monitor, they are available as accessories for order separately.

Refer to the following block diagram for a general description of the product components:

LX0850PTI Concept



3 Performance Conditions

Performance characteristics are guaranteed over the environmental specification range.

This product will be in used in the following conditions:

- Dusty or damp environments
- High ambient lighting conditions, outdoors and in cab vehicles
- Very high vibration and shock environments
- Areas prone to vandalism and tampering:
 - *This monitor can be driven as configured by remote computer at a maximum distance of 15 foot separation.
 - *For distances ≥ 15 feet, USB cables require a customer provided hub or booster per the USB industry standard. Video cable lengths ≥ 15 feet may require customer provided amplification.
-

3.1 Cleaning guidelines

The LX0850PTI will continue to operate normally while being cleaned in a fashion normal for a transportation environment. This includes cleaning with a damp (wrung out), mild soapy cloth.

The LX0850PTI will withstand cleaning solutions used in transportation. Possible chemicals include:

- 70% isopropyl alcohol
- 1.6% aqueous ammonia
- Formula 409®
- Fantastic®

3.2 Cooling

Cooling will be provided solely by convection cooling (no fan).

4 Functional Specifications

4.1 Manual Dimming Control

Dimming control shall be two buttons that are easy to access and use with gloved hands. Dimming range shall be from max bright to minimum brightness.

4.2 USB dimming control

It is possible to access OSD functions on the Pixelworks scaler via USB

4.3 Auto Sync

The display will Autosync to video if both '+' and '-' are pushed at the same time

4.4 Volume Control

None: through OS control only

4.5 Function Buttons on Front of display

The LX0850PTI will have buttons and LEDs on the front of the display for user interaction. All buttons are silicon with positive feedback and backlight with white LEDs

4.5.1 Power interrupt button (All-in-one power button)

This button is not connected to the monitor power. The power interrupt button passes through to connector TBD. It shall be a SPST,N.O. momentary push button.

4.5.2 (+) Button

This button increases brightness of the backlight

4.5.3 (-) Button

This button decreases the brightness of the backlight

4.6 Standard DTM OSD Buttons

No OSD buttons or OSD are required on this product.

4.7 LED status light

The Monitor shall have a single LED for video status.

4.7.1 LED green

The LED Shall be green with there is video present

4.7.2 LED amber

The LED shall be amber when there is no video signal present and the monitor will go into standby mode.

5 Module Specifications

This section describes the internal components of this monitor.
(Refer to Block Diagram in the Product Description Section 2)

5.1 AMLCD

Industrial grade with high bright backlight

5.2 Touchscreen

Infrared type: sensors and controller located in bezel

5.2.1 Touch surface

3mm solid glass, chemically strengthened, Anti glare coating AG level 110.
The touchscreen will function even if the surface is scratched or broken.

5.2.2 Touchscreen interface

USB

5.2.3 Touchscreen resolution

4096 X 4096

5.2.4 Touchscreen driver

Windows XP, Linux kernel () support

5.2.5 Touchscreen controller

Built into frame

5.3 Video Controller board

- Requires standard VGA (DVI input TBV)
- Auto sync on power up and any video mode change.
- Video Modes supported

Resolution	Vertical refresh rate
1024*768	60 Hz
800*600	60 Hz
640*480	60Hz
	More available

- When the is no VGA signal present, it will show "No Signal message" within 1 second and the LED over the power button (B1) will go amber.
- Integrated LED Driver provides 50ma backlight LED current with wide dimming range (Dim to off).

5.4 Piezo function

Function: provides audio for PC applications

Specification:

Frequency range: 700Hz – 20kHz

Max SPL@1m: 81dB Typical (1 Vpp, 1kHz sine wave input @ 25C)

Input 0-1VPP, Caution: Operating the speaker outside of 1VPP input spec can damage the speaker and will void the warranty. If speaker is used for steady tones, limit the duration to 1Second pulses or less.

Location: Rear of display.

5.5 Mechanical enclosure

Function: provides support for internal components and EMI cage

- Must be rugged.
- Material: Aluminum
- Designed to pass IP67
- The enclosure will be powder coated

5.5.1 Front Bezel

Material Aluminum

Color: Black

5.6 Connectors and I/O

Connector Location: To be located on the back of the monitor facing the rear unless otherwise noted.

5.6.1 I/O connector

Manufacture: Glenair; Mighty Mouse

Part number: 801-011-07M13-37PA

Description 37 pin, round

Recommended Mating connector: 801-007-16M13-37SA

Pin	Description	Pin	Description	Pin	Description
4	Audio in	23	RX2-	17	Gnd Logic 4
3	Audio gnd	16	RX2+	20	H plug detect
2	H- sync VGA	25	DVI VGA SCL	19	+5 V DVI
1	V- sync VGA	24	DVI VGA SDA	34	12 V power Backlight
30	All-in-one	11	RX1-	35	12 V power Logic
31	All-in-one	10	RX1 +	36	GND Logic
26	USB - downstream	12	RX0+	29	GND Backlight
27	USB + downstream	13	RX0-	33	USB -
28	USB power downstream	9	RXC-	32	USB +
21	USB gnd downstream	15	RXC+	22	USB power
18	VGA blue	7	Gnd Logic 1	37	USB GND
6	VGA Green	5	Gnd Logic 2		
8	VGA red	14	Gnd Logic 3		

6 Physical Specifications

6.1 Optical requirements

6.1.1 Maximum luminance through touchscreen:

750 cd/m² (nits) typical

6.1.2 Maximum luminance at full dimming

Less than 5 nits. There is no uniformity spec when the unit is at full dimming

6.1.3 Uniformity

Per LCD spec at full brightness.

Measured: Non-uniformity for white screen is 26% defined as = $(1 - \min / \max)$

6.1.4 Contrast

Per LEC Spec and standard indoor brightness

Measured: 500 typical, max = 570, min = 400

6.1.5 High ambient contrast

Per Mil-Std-85762A Greater than 7:1 at 5000 lux

7:1 is required for Color graphics.

Measured: CR = 11:1 with daylight (diffused) at 10,000 f.c. CR = 3.5 for glare source of 2000 fL.

6.2 Power requirements

The LX0850 will be powered from a vehicle 12 or 24 volt system with wide voltage ranges and transient conditions. .

6.2.1 Voltage Range

8 to 32 V, 12 V nominal.

6.2.2 Voltage Transients

Voltage transients up to 60V for 100ms

Voltage transients below -40V for 100ms

6.2.3 Reverse polarity protection

The display shall have reverse polarity protection as long as there is a slow blow fuse for power

12 V use fuse 2A

24 V use fuse 1A

6.2.4 Maximum Power Consumption

Maximum: 12 W @ 12 or 24V

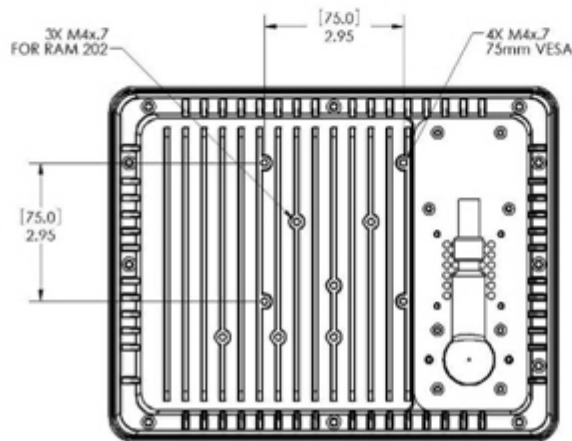
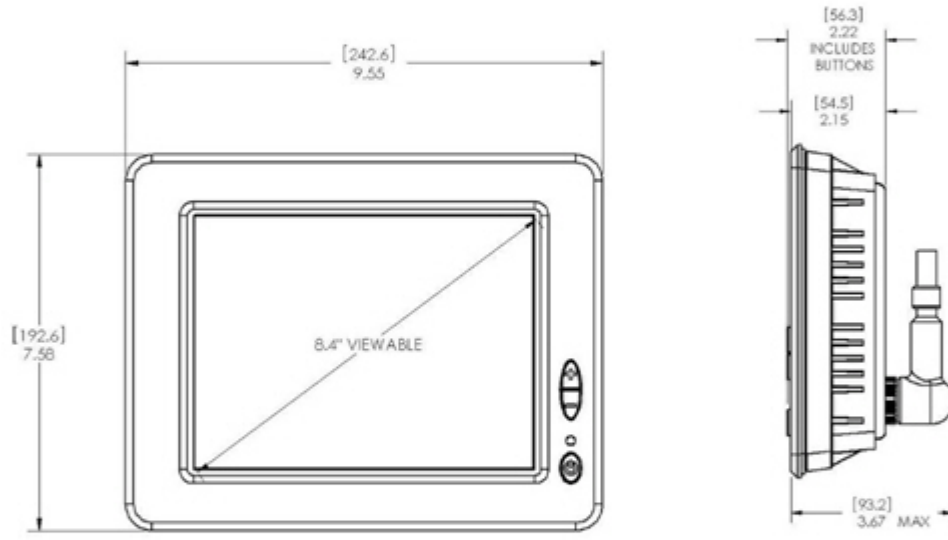
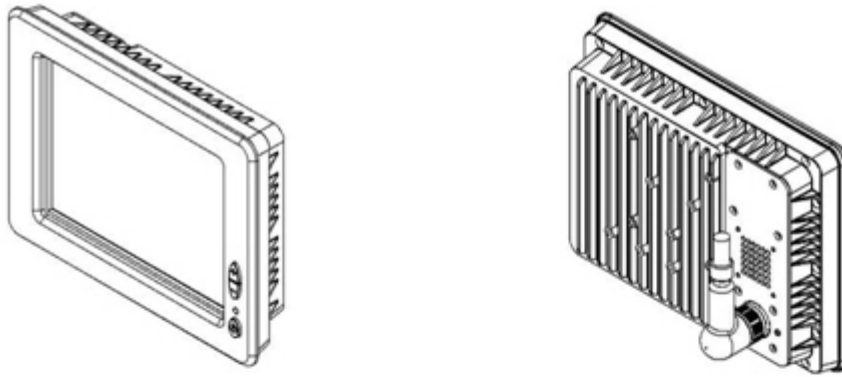
Typical power consumption: 12W @ 12 or 24V

6.2.5 Power consumption in standby Power (LED amber)

2.5 W @ 12 or 24V typical.

3.5 W @ 12 or 24V with USB

6.3 Mechanical Outline



6.4 VESA Mount

A VESA mount feature must be included on the LX0850PTI, located on the back cover. Standard 75 mm VESA mount M4 x .7 threaded hole pattern. The holes shall be blind. Additional M4 threaded mounting or cable management locations on rear of display also included.

6.5 Weight

~ 5lbs, 2.3kg

6.6 Color

6.6.1 Monitor Bezel and Back Chassis

Powder coated Black

6.6.2 Button color

Background BLACK Pantone 426C

6.7 Product Graphics

6.7.1 Product Branding Graphics

Location: Customer defined

Size: Customer defined

6.7.2 Product Model Name

Location: Customer defined

Size: Customer defined

6.7.3 Button Graphics

Power Button



Brightness Up

"+"

Brightness Down

"-"



6.7.4 Product Label Requirements

Location: Rear

Rating Label: Content (minimum):

Model Number: LX0850PTI

Serial Number TBD

Barcode of Serial Number

Power Requirements

Regulatory Marks: CE, FCC, UL file number for LX0850PTI

Country of Origin: "Made in USA"

Manufacturing date code

Planar Part Number and Revision level (e.g., XXX-XXXX-XXLF)

HG Logo

WEEE Trash bin

Color: Silver lettering on black label

Size: 14 point

Durability: Label will be tamper resistant. Must prevent easy removal by user.

7 Cosmetic Defects, Viewing Area of Display Screen

The Cosmetic specification for the LX0850PTI will follow the Touchscreen glass and AMLCD cosmetic specifications. No foreign articles are allowed within the optical bond.

See Appendix A

8 Cosmetic Defects, External Surfaces

The monitor chassis shall follow Planar document 002-0112-00.

All labels must be attached squarely in their designated locations.

9 Shipping Box

- Must limit contents to shock and vibration levels given in this specification when 50G shock and 3G (zero to peak) vibration levels are applied to a fully loaded shipping box
- Conform to ISTA-2A (32 inch drop)
- Planar labeling on box
- Package will be designed to fit maximum units per container.

10 Shipping box label

- UPC
- Hg information must be on the outside of the box.
- Planar part number
- Planar model number

11 Maintenance Requirements/Service Support

11.1 Service Requirements

The LX0850PTI requires no routine maintenance.

11.2 Service BOM

Service BOM provided on request.

12 Environmental Specifications

12.1.1 Temperature

Operating Temperature

-20° C to + 60° C (-4° to 140° F)

Storage Temperature

-40° C to + 70° C (-40° to 158° F)

*Operating Survival Temp Range

-40° C to + 70° C (-40° to 158° F)

* Product will be fully functional over this extended survival temperature range. Full specification performance attained at "Operating Temperature" range.

12.2 Humidity

Operating:

MIL-STD-810F (95% RH with 20° C to 60° C temperature cycle for 11 days)

12.3 Altitude

Non-operating:

30K ft (IEC 60068 PT2-13, 4 hr)

12.4 Vibration

Note: Tests performed with assemblies mounted in a rigid retaining fixture.

Operating (Random):

10-500 Hz, 3.0G rms acceleration, 3 hours per axis

Vibration, Endurance Sine Sweep

100-1100 Hz, 5 Gs rms, 1hr/axis

12.5 Shock

Note: Tests performed with monitor mounded in a rigid retaining assembly.

Operating/Non-operating:

50 g, 11 ms duration, ½ sine, 3 shocks per axis (IEC 60068 PT2-27)

13 Regulatory Compliance

13.1 Electromagnetic Compatibility (EMC)

Must be verified to comply with the following:

- ESD, 6kV contact and 8 kV air discharge

13.2 Emissions

- 47 CFR, Part 15, Subpart B, Class B
- CE EMC Directive 2004/108/EC
- EN55022: 2010, Class B
- EN610003-3-3: 2008 Conducted Emissions, Voltage Flicker

13.3 Immunity Characteristics

- EN55024: 2010
- IEC 61000-4-2:2008 Electrostatic Discharge test
- IEC 61000-4-3:2006+A1:2007+A2:2010 Radiated Radio-Frequency Electromagnetic Field Immunity Test
- IEC 61000-4-4:2004+A1:2010 Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical Fast Transient/Burst Immunity Test
- IEC 61000-4-5:2005 Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
- IEC 61000-4-6:2008 Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
- IEC 61000-4-8:2009 Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
- IEC 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

13.4 Safety

Must be certified to comply with the following:

- UL/CSA 60950-1
- Designed to Class 1 Div 2 certification optional TBV
- Designed and tested to IP67

13.5 RoHS Compliance

Planar guarantees RoHS compliance with on all part numbers ending in LF.

13.6 WEEE compliance

Will comply

13.7 Reliability

The MTBF of the LX0850PTI shall be 30,000 hours at 25°C with a 90% confidence level, excluding brightness degradation.

14 Included in the Shipping Box

- LX0850PTI touch monitor
- Plastic bag

15 Shipping Configuration (State of monitor when shipped)

The unit will be shipped in the 'ON' state

Brightness Control: Set to Maximum

16 Product accessories

- Upon customer request

17 Product Specifications Overview

1

Display Type	LCD Active Matrix Flat Panel Display (TFT)
Viewable Size	8.4 inch
Display Viewing Area	304 (W) x 228 (H) mm
Display Color	262 K (6 bit/color)
Touchscreen Type	IR touch
Touchscreen Interface	USB
Touchscreen surface	strengthened glass with AntiGlare
Contrast Ratio (Typical)	650:1
Viewing Angle (Typical)	160 ° H / -60 ° 80° V
Response Time (Typical)	25 ms
Brightness (Typical)	750 cd/m ² Min
Display Resolution	SVGA
Refresh Rate	56 to 60 Hz
Dimensions	9.55" W x 7.58" T x 2.22" D (no connectors)
Display Weight	5lbs, 2.3kg
Audio input	Mono 0-1VPP
External Connections	37 pin Military connector
Power Supply	None provided
Power Requirements	8-32 V DC
Power Consumption	12W typ @ 12V
VESA Compatible/Location	Built-in 75 mm VESA on monitor back

18 Revision History

REV	ECO	DATE	SECTIONS	DESCRIPTION OF CHANGE
A	ECO-1004164	12-10-2012		INITIAL RELEASE, LED Version

19 Appendix A

19.1 AMLCD cosmetic specification

- Planar part number 933-0952-00 references NEC supplied specification.

19.2 Optical bonding cosmetic specification

Planar defined.

Panel size	< 9"	10" to 13"	14" to 18"	19" to 24"	25" to 29"	30" to 36"	> 37"
Opaque Defect							
< .020"	0	0	1	1	2	2	3
.020" - .030"	0	0	0	0	1	1	1
> .030"	0	0	0	0	0	0	0
Lint							
<.002" x .1"	0	1	2	3	Disregard	Disregard	Disregard
.002"-.003" x .15"	0	0	1	1	2	2	3
.003"-.004" x .1"	0	0	0	1	1	2	3
> .004" x > .04"	0	0	0	0	0	0	0
Bubble/Translucent							
< .020"	1	2	3	3	Disregard	Disregard	Disregard
.020" - .035"	0	0	1	2	2	3	3
.035" - .050"	0	0	0	0	0	1	1
> .050"	0	0	0	0	0	0	0

19.3 Protective cover glass

Meets 80-50 (scratch – dig) per MIL-O-13830B.