



**LX1250TI & LX1251TI
USER MANUAL**

www.planar.com

Preface:

This manual is designed for use with the LX1250TI industrial display. Information in this document has been carefully checked for accuracy; however, no guarantee is given to the correctness of the contents. The information in this document is subject to change without notice.

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Table of Contents

USAGE NOTICE	4
PRECAUTIONS.....	4
ACCESSORY CABLES:	4
PRODUCT	5
PRODUCT HIGHLIGHTS.....	8
USING THE DISPLAY:	11
USING REMOTE OSD FEATURES:	11
2.1 DISPLAY CONTROL SERIAL COMMANDS/QUERIES.....	11
2.1.1 DEFAULT SETTINGS FOR ADJUSTABLE PARAMETERS	13
2.1.2 DETAILS OF COMMAND IMPLEMENTATION	13
PERFORMANCE CONDITIONS	25
CLEANING GUIDELINES	25
COOLING	25
FUNCTIONAL SPECIFICATIONS.....	25
MANUAL DIMMING CONTROL	25
USB DIMMING CONTROL	25
AUTO SYNC.....	25
VOLUME CONTROL.....	26
FUNCTION BUTTONS ON FRONT OF DISPLAY	26
LED STATUS LIGHT	26
MODULE SPECIFICATIONS.....	26
AMLCD.....	26
TOUCHSCREEN	26
VIDEO CONTROLLER BOARD	27
PEZIO FUNCTION – LX1250TI ONLY	27
MECHANICAL ENCLOSURE.....	27
CONNECTORS AND I/O.....	27
PHYSICAL SPECIFICATIONS	29
OPTICAL REQUIREMENTS.....	29
MECHANICAL OUTLINE	30
PRELIMINARY DIMENSIONS	30
VESA MOUNT.....	31
WEIGHT.....	31
SHIPPING BOX	31
MAINTENANCE REQUIREMENTS/SERVICE SUPPORT	31
SERVICE REQUIREMENTS	31
SERVICE BOM.....	31
ENVIRONMENTAL SPECIFICATIONS	31
TEMPERATURE	31
HUMIDITY	31
ALTITUDE.....	31
VIBRATION	31
SHOCK.....	31
REGULATORY COMPLIANCE	32
ELECTROMAGNETIC COMPATIBILITY (EMC)	32
EMISSIONS	32
IMMUNITY CHARACTERISTICS	32
SAFETY.....	32
ROHS COMPLIANCE.....	32
WEEE COMPLIANCE.....	32
RELIABILITY.....	33
INCLUDED IN THE SHIPPING BOX	33
SHIPPING CONFIGURATION (STATE OF MONITOR WHEN SHIPPED)	33
PRODUCT ACCESSORIES	33
PRODUCT SPECIFICATIONS OVERVIEW	34

USAGE Notice



WARNING – Please do not open or disassemble the product as this may cause electric shock. Doing so will void the warranty.

Precautions

To maximize the life and safe use of your unit, always be sure to follow the warnings, precautions and maintenance recommendations in this user's guide.

In a Vehicle:

The monitor should be visible to the driver only if it is used for navigation, system control or vehicle information. If the monitor will be used for other purposes, it should be installed in a way that it will only operate while the vehicle is not moving (such as when the parking brake is in use), or so that its display is not visible to the driver. Review all applicable state and local laws and regulations to make sure the monitor is used properly and safely. Avoid using the monitor for extended times while the vehicle is not running, or the monitor could drain the vehicle's battery.

Cleaning the Monitor:

Always turn off the unit before cleaning. Use a soft cloth moistened with mild detergent, isopropyl alcohol, or window cleaners to clean the display housing. Never use abrasive cleaners, waxes or solvents to clean the unit.

Accessory Cables:

The LX1250TI (PN# 997-6186-00LF) requires a special interface cable. This manual contains information to design the interface cable OR an accessory interface cable can be purchased.

- PN#. 997-5886-00LF GlenAir to VGA, Power, USB & Audio

For remote control: Download USB to RS232 Driver from Planar website at <http://www.planar.com/support/>

Introduction

About Planar's LX1250TI Rugged Touch Monitor

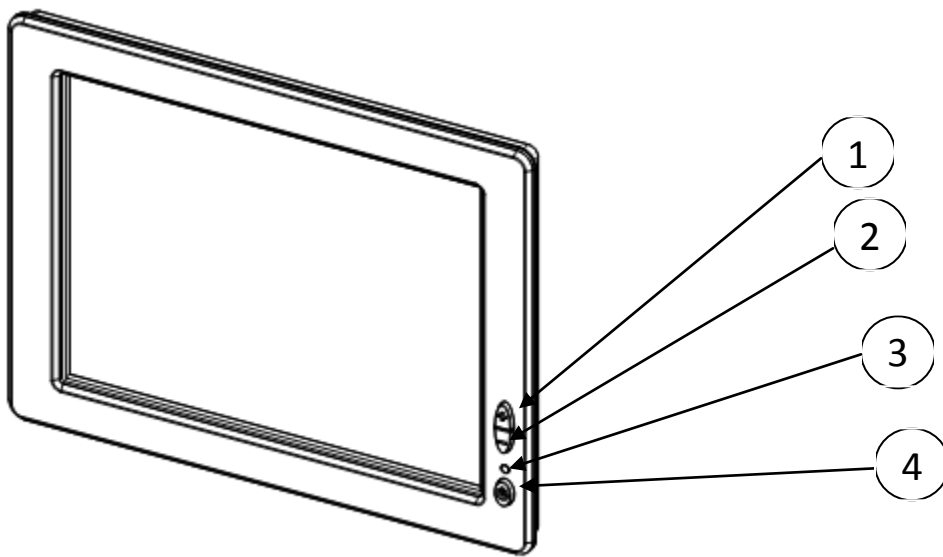
The LX1250TI is a high-performance, rugged touch monitor intended for demanding environments, such as those inside mining vehicles. The monitor features a 12.1-inch diagonal liquid crystal display with XGA resolution, bright enough to be read in full sunlight. The monitor also includes a buzzer for audio feedback and a sturdy cast aluminum enclosure that can withstand shock and vibration.

Product

This manual applies to product

Planar Part Number	Planar Model Name	Description	UPC
997-6186-00LF	LX1250TI	IR touch 12.1" XGA LCD General Market	8 10689 06186 1
997-6192-00LF	LX1251TI	IR Touch 12.1" XGA LCD General Market –VGA IF	8 10689 06192 2

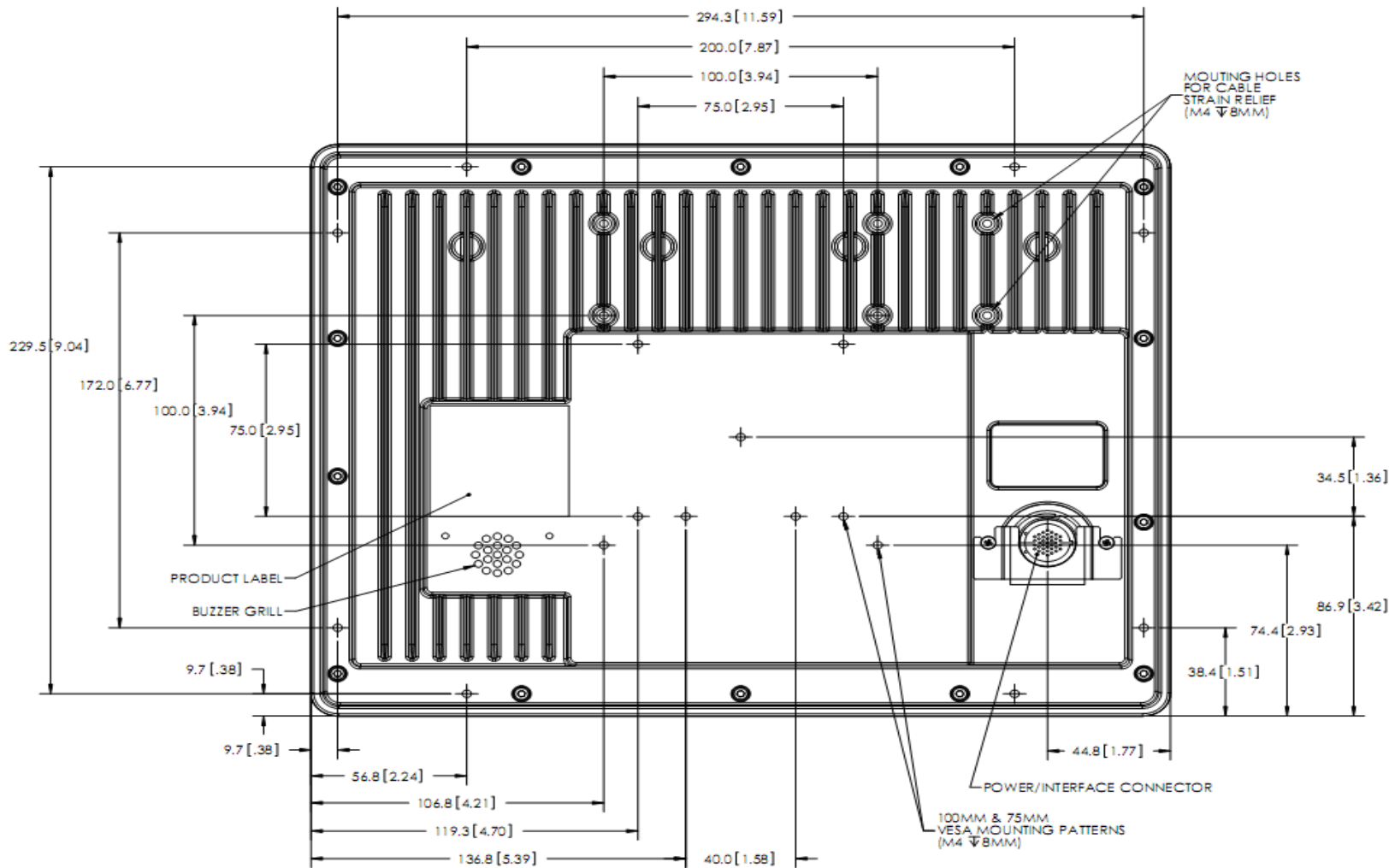
Figure 1 Rendering of the display



Reference Document # 076-0672-00 for detailed drawings.

Front View (Descriptions):

1. Backlight control +
2. Backlight Control –
3. LED:
 - Green When video present;
 - Amber when there is no video signal present and the monitor will go into standby mode. LED remains Amber in Standby Mode
 - Off – no power to display.
4. Power Switch Pass through for remote PC shutdown. N.O. SPST switches (not Monitor Power) an external device.



BACK VIEW
 MOUNTING DIMENSIONS

All mounting & strain relief holes M4 x 8 mm

Product highlights

- Designed for demanding transportation environment
- Optimized for in cab sunlight viewability
- One button Display/CPU power on/off
- 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 enclosure design
- Rugged Aluminum enclosure
- 12.1" XGA 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 Bezel buttons
- Fanless die cast aluminum chassis with an IP65 design
- Single integrated Mil-Std connector for all connections
- Also available with separate VGA, Power, and USB connectors
- LED backlight for increased ruggedness, lower power, better EMI performance, better environmental impact (no mercury) and to minimize overall monitor depth and weight
- Hazardous materials compliant for international deployment

Features:

- **Brightness control** allows you to easily adjust the display to match ambient light, from full sunlight to night. Even while wearing gloves. The convenient buttons enable quick adjustments.
- The monitor's **optically bonded** display reduces the effects of reflected light on the display, increasing contrast ratio and read-ability in high ambient lighting conditions.
- The monitor's **autosync function** eliminates the need for adjusting the monitor for best image. The monitor automatically adjusts to the input signal.
- HID Compliant **IR Touch** screen provides a durable touch environment that allows for operation in all conditions including with gloved hands. HID compliance means no touch drivers required.
- The monitor supports **standard VGA input signals** – native 1024 x 768 (XGA) as well as 800 x 600 (SVGA) and 640x480 VGA.
- The **aluminum enclosure** has a waterproof front and is designed to withstand substantial shock and vibration.

Package Overview

The following items are shipped with the display:

- Monitor
- Quick Start Guide

NOTE: No cables ship with the monitor. Cables are purchased separately.

Installation

Before Installing

Keep the following in mind while installing the monitor.

- The monitor should be visible to the driver only if it is used for navigation, system control or vehicle information. If the monitor will be used for other purposes, it should be installed in such a way that it will only operate while the vehicle is not moving (such as when the parking brake is in use). Review all applicable state and local laws and regulations to make sure the monitor is used properly and safely.
- The installed monitor must not interfere with the driver's vision.

Installing the LX1250TI monitor consists of three steps:

1. Testing Touch Screen functionality with application software - see page 26.
2. Securely routing the interface cable
3. Mounting the monitor using one of the mounting options available on the back of the display enclosure. - see page 31.
4. Connecting the monitor to the computer and power source - see page 17

Note: The touch sensor is factory tested & calibrated, however different computing environments may require the touch screen to be recalibrated. Windows & Linux tools can be downloaded at:

For Windows Support: <http://www.irtouch.com/shtml/20091124180041.shtml>

For Linux Support: <http://www.irtouch.com/shtml/2009129110904.shtml>

No standard On Screen Display (OSD) buttons are available to the user: All 'standard' OSD functionality can be controlled via the remote interface.

The user controls are limited to Backlight +/- & Remote Power buttons.

The 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 a remote computer. It functions very similar to a laptop computer docking station power button. The button is a Normally Open, Single Pull Single Throw Switch. It is not designed for current carrying switching.

When there is no video detected, the monitor will go into standby mode. The LED will remain in Amber state in 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.

Electrical & SW Installation:

Prior to end unit installation verify display works with computing system.

1. Power up display:
 - a. Display requires 9-32V DC with a maximum of 1.88A
 2. Test touch functionality. Connect cable to display and apply power.
 3. Connect Display to a computer.
 4. Display should auto sync to source signal. Ensure source meets supported display resolutions (XGA, SVGA, VGA).
 5. Connect USB touch screen to display.
 - a. If Windows PC, PC should auto detect and configure touch sensor as HID compliant device.
 6. Verify touch response and accuracy.
 - a. If Touch alignment is reversed install Touch calibration tools
- NOTE: Touch screen is calibrated at factory. Some computer interfaces may require recalibration at installation. Regular Calibration is not required.
7. Once monitor is verified working with PC proceed to mechanical installation.

Mechanical Installation:

Display may be mounted in several configurations.

- a) Panel mounting
- b) VESA 100 or 75mm
- c) RAM 34.5mm x 40mm Triangle mount.

If Vibration is a concern, consider mounting display using vibration dampening mount.

- 1 Choose mounting option & Location
- 2 Refer to dimensions figure for mounting holes and locations.
- 3 Attach display to mounting hardware.
- 4 Rout cable.

NOTE: GlenAir cable should be mounted with strain relief to avoid excessive loading or torquing of the cable connectors. Improper cable installation will void warranty.

Using the display:

1. Once installed and cabled. The display is ready to use.
2. Apply system power.
3. Display & Touch screen are active

Using the Touchscreen

1. The LX1200TI touchscreen allows you to operate the computer by touching the screen with a finger or stylus, rather than using a mouse or keyboard.
2. Navigating the Touchscreen
 - To click an item, tap the item once.
 - To double-click an item, tap the item twice rapidly.
 - To drag an item, touch the item, and then drag it along the screen to the new location.
3. To move the cursor, touch the screen and move the cursor as needed.

Using Remote OSD features:

This is an advanced feature and should only be attempted by qualified individuals.

The display allows for remote PC management. The display is controlled via the USB interface. The controlling PC requires a virtual COM port to operate the display. Drivers for the Display Virtual comport can be found here:

<http://www.ftdichip.com/Drivers/VCP.htm>

<http://www.ftdichip.com/Drivers/D2XX.htm>

Commands for control are as follows:

2.1 Display Control Serial Commands/Queries

The display must support the following commands and queries using a protocol compatible with the Pixel works PW Host protocol.

Support required for Phase II and beyond.

Function	Function Type	Description
Power On	Command	Turn on backlight and AMLCD (assuming video is present)
Power Off	Command	Turn off backlight and AMLCD
Set Image Scale	Command	Display changes to the desired image scale setting: One to One, Fill All, Fill to aspect Ratio, Fill to 16:9 Linear
Set Contrast	Command	Adjusts the contrast of the display
Set Brightness	Command	Adjusts the color brightness of the display (note: not an adjustment of the backlight brightness)
Set Color Temperature	Command	Display changes to the desired color temp setting: 5000C, 6500C, 7300C, or 9300C
Set Gamma	Command	Display changes to the desired gamma setting (adjusts gray scale separation): Linear or CRT
Restore Default Settings	Command	Display restores all adjustable parameters back to the factory settings (see table below for default values)
Get Power Status	Query	Display response indicates whether display is on, off, or on with no video present
Read ID	Query	Display responds by sending: Display model Serial number Date of manufacture (year, month, day) Firmware version
Get Image Scale	Query	Display sends the current image scale setting
Get Contrast Setting	Query	Display sends the current contrast setting
Get Brightness Setting	Query	Display sends the current color brightness setting
Get Color Temp Setting	Query	Display sends the current color temp setting
Get Gamma Setting	Query	Display sends the current gamma setting
Set Display ID	Command	Sets ID of display for use in multi-display installations.
Get Display ID	Command	Gets ID of display being communicated with
Set Backlight Brightness	Command	Sets backlight brightness (value 0-100, 25 Nit to Max LCD brightness)
Get Backlight Brightness	Query	Display Sends the current backlight brightness setting

2.1.1 Default Settings for Adjustable Parameters

- The following table defines the factory set values for the adjustable parameters.

Parameter	Default Setting
Power	On
Image Scale	Fill All
Contrast	150 (Range 0 -255)
Brightness	150 (Range 0 -255)
Color Temperature	7300C
Gamma	Linear
Backlight brightness*	255

*Backlight retains previous brightness settings.

Auto Power On

The display automatically turns on when power is restored after a power failure and maintains all operational settings. Note: “on/off” refers to the LCD panel and the backlight inverter.

Standby Mode

If no video is present, after 10 seconds, the display powers off (will power back on once video is detected.)

No Burn-in during Signal Loss

The AMLCD will not maintain any static self-generated images (such as a “no video” text box when video is not present), thus avoiding image burn in.

2.1.2 Details of Command Implementation

All serial commands must be compatible with the Pixel works PW Host protocol defined in the Pixel works application note AN#77. Refer to AN #77 for protocol details.

The physical layer used for data exchange is RS232. No handshaking is used. Pin 3 of the DB-9 connector on the display is data transmitted from the host (Tx); pin 2 is data transmitted from the display and received by the host (Rx).

An explanation of the content transmitted to the display...

Tx: [line 1] BE EF 03 19 00 HH HH II JJ JJ CC CC FF FF FF FF

Tx: [line 2] KK 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

BE EF – signifies the beginning of the transmission (always BE EF)
03 – indicates the packet type (typically 03 in this application)
19 00 – indicates the packet length (typically 19 00 in this application)
HH HH – gives the calculated CRC checksum for the transmission
II – gives the operation type
JJ JJ – gives the operation name (least significant byte is on the left)
KK – gives the operation value
All CC, FF, or 00 – not applicable... always CC, FF or 00 as indicated

An explanation of the content received from the display...

Rx: [line 1] 1E BE EF 03 19 00 00 00 XX XX XX XX 00 FF FF FF

Rx: [line 2] FF KK 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [line 3] CC

1E -- is the acknowledgement indicating that the transmission has been successfully received
KK – gives the return value, if any, called for by the previous transmission
Everything else – “don’t care”

In the examples of data transmitted to the display and the responses from the display:

Operation names are shown in blue

Operation types are shown in green

Operation values, either transmitted or received, are shown in red

A. Power Command

Operation name: op_FORCE_DPMS_STATE

Operation types: SET or GET

Values:

dsON = LCD and inverter are powered on (inverter will power off if no video present)
 dsSTANDBY = LCD and inverter off (state entered when no video Hsync is present)
 dsSUSPEND = LCD and inverter off (state entered when no video Vsync is present)
 dsOFF = if no video, LCD and inverter are powered off (will turn on when video returns)
 dsSOFTPOWER = LCD and inverter are powered off regardless of video status

Factory default value: dsON

Typical uses:

Use dsON and dsSOFTPOWER to turn the display on and off, respectively.

-----Typical header file-----

```
op_FORCE_DPMS_STATE = 5125 // 5125 = x1405
```

```
typedef enum {
    dsON           = 0,
    dsSTANDBY     = 1,
    dsSUSPEND     = 2,
    dsOFF         = 3,
    dsSOFTPOWER   = 4,
} eDPMSSTATE;
```

-----Examples of data streams-----

op_Force_DPMS_State: turn on display

Tx: [0x000] BE EF 03 19 00 DD 91 01 05 14 CC CC FF FF FF FF

Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 01 05 14 01 00 FF FF FF

Rx: [0x010] FF 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

op_Force_DPMS_State: place display into Suspend state

Tx: [0x000] BE EF 03 19 00 4D 50 01 05 14 CC CC FF FF FF FF

Tx: [0x010] 01 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 01 05 14 01 00 FF FF FF

Rx: [0x010] FF 01 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

op_Force_DPMS_State: place display into Softpower state

Tx: [0x000] BE EF 03 19 00 1E 93 01 05 14 CC CC FF FF FF FF

Tx: [0x010] 04 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 01 05 14 01 00 FF FF FF

Rx: [0x010] FF 04 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

query op_Force_DPMS_State: result = display is in On state

Tx: [0x000] BE EF 03 19 00 96 6E 02 05 14 CC CC FF FF FF FF

Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 02 05 14 01 00 FF FF FF

Rx: [0x010] FF 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

B. DPMS Enable Command

Operation name: op_DPMS_ENABLE

Operation types: SET

Values: enabled or not enabled

Factory default: enabled

Typical use: Typically not used; set to "not enabled" to force the display to stay powered on when video is not detected

-----Typical header file-----

```
op_DPMS_ENABLE          = 5126,
```

```
typedef enum {  
    enNotEnabled    = 0,  
    enEnable        = 1,  
} eENABLE;
```


-----Examples of data streams-----

op_DPMS_ENABLE: Enabled

Tx: [0x000] BE EF 03 19 00 B2 B4 01 06 14 CC CC FF FF FF FF

Tx: [0x010] 01 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 01 06 14 01 00 FF FF FF

Rx: [0x010] FF 01 00 00 00 CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

op_DPMS_ENABLE: NotEnabled

Tx: [0x000] BE EF 03 19 00 22 75 01 06 14 CC CC FF FF FF FF

Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC

Rx: [0x000] 1E BE EF 03 19 00 00 00 01 06 14 01 00 FF FF FF

Rx: [0x010] FF 00 00 00 00 CC CC CC CC CC CC CC CC CC CC

Rx: [0x020] CC

C. Contrast Command

Operation name: op_CONTRAST
Operation types: SET, GET, INCREMENT, or DECREMENT
eTarget: always = 0 (wnWIN_MAIN)
Values: 64 to 192 (0x40 to 0xC0)
Factory default: 128

-----Typical header file-----

op_CONTRAST = 16388 // 16388 = x4004

```
typedef enum {  
    wnWIN_MAIN          = 0,  
    wnWIN_PIP           = 1,  
    wnWINDOW_COUNT     = 2,  
    wnCURRENT_WINDOW   = 3,  
    wnINVALID_WINDOW   = 4,  
} eWINDOW;
```

-----Examples of data streams-----

set op_CONTRAST to 0x6F

Tx: [0x000] BE EF 03 19 00 A7 3F 01 04 40 CC CC 00 00 00 00
Tx: [0x010] 6F 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 01 04 40 01 00 00 00 00
Rx: [0x010] 00 6F 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

decrement op_CONTRAST

Tx: [0x000] BE EF 03 19 00 A6 16 04 04 40 CC CC 00 00 00 00
Tx: [0x010] CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 04 04 40 01 00 00 00 00
Rx: [0x010] 00 CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

query op_CONTRAST: result = 0x6E

Tx: [0x000] BE EF 03 19 00 30 AD 02 04 40 CC CC 00 00 00 00
Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 02 04 40 01 00 00 00 00
Rx: [0x010] 00 6E 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

D. Brightness Command (controls color intensity; not a backlight control)

Operation name: op_BRIGHTNESS
Operation types: SET, GET, INCREMENT, or DECREMENT
eTarget: always = 0 (wnWIN_MAIN)
Values: 0 to 255 valid
Factory default: 128

-----Typical header file-----

op_BRIGHTNESS = 16387

```
typedef enum {  
    wnWIN_MAIN = 0,
```

```

wnWIN_PIP           = 1,
wnWINDOW_COUNT     = 2,
wnCURRENT_WINDOW   = 3,
wnINVALID_WINDOW   = 4,
} eWINDOW;

```

-----Examples of data streams-----

set op_BRIGHTNESS to 0xC8

```

Tx: [0x000] BE EF 03 19 00 C7 93 01 03 40 CC CC 00 00 00 00
Tx: [0x010] C8 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 01 03 40 01 00 00 00 00
Rx: [0x010] 00 C8 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

```

increment op_BRIGHTNESS

```

Tx: [0x000] BE EF 03 19 00 E2 2A 03 03 40 CC CC 00 00 00 00
Tx: [0x010] CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 03 03 40 01 00 00 00 00
Rx: [0x010] 00 CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

```

query op_BRIGHTNESS: result = 0xC9

```

Tx: [0x000] BE EF 03 19 00 1A 3B 02 03 40 CC CC 00 00 00 00
Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x000] 1E BE EF 03 19 00 00 00 02 03 40 01 00 00 00 00
Rx: [0x010] 00 C9 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
Rx: [0x020] CC

```

E. Color Temperature Command

Operation name: op_COLOR_TEMP
Operation types: SET or GET
Values: ct9300K, ct7300K, ct6500K, ct5000K
Factory default: ct7300K

-----Typical header file-----

```
op_COLOR_TEMP = 17415
```

```
typedef enum {  
    ct9300K = 0,  
    ct7300K = 1,  
    ct6500K = 2,  
    ct5000K = 3,  
    ctUSER1 = 4,  
    ctLASTCOLORTEMP = 5,  
} eCOLORTEMPLIST;
```

-----Examples of data streams-----

```
set op_COLOR_TEMP = ct5000K
```

```
Tx: [0x000] BE EF 03 19 00 79 91 01 07 44 CC CC FF FF FF FF
```

```
Tx: [0x010] 03 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC
```

```
Rx: [0x000] 1E BE EF 03 19 00 00 00 01 07 44 01 00 FF FF FF
```

```
Rx: [0x010] FF 03 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
```

```
Rx: [0x020] CC
```

```
query op_COLOR_TEMP: result = ct5000K
```

```
Tx: [0x000] BE EF 03 19 00 C3 2E 02 07 44 CC CC FF FF FF FF
```

```
Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC CC
```

```
Rx: [0x000] 1E BE EF 03 19 00 00 00 02 07 44 01 00 FF FF FF
```

```
Rx: [0x010] FF 03 00 00 00 CC CC CC CC CC CC CC CC CC CC CC
```

```
Rx: [0x020] CC
```

F. Gamma Command

Operation name: op_GAMMA_DISCRETE
Operation types: SET or GET
Values: gtLINEAR, gtCRT
Factory default: gtLINEAR

-----Typical header file-----

```
op_GAMMA_DISCRETE = 17416
```

```
typedef enum {  
    gtLINEAR = 0,  
    gtCRT = 1,  
} eGAMMATABLELIST;
```

-----Examples of data streams-----

```
set op_GAMMA_DISCRETE = gtLINEAR
```

```
Tx: [0x000] BE EF 03 19 00 48 A0 01 08 44 CC CC FF FF FF FF  
Tx: [0x010] 00 00 00 00 CC CC CC CC CC CC CC CC CC CC CC  
Rx: [0x000] 1E BE EF 03 19 00 00 00 01 08 44 01 00 FF FF FF  
Rx: [0x010] FF 00 00 00 00 CC CC CC CC CC CC CC CC CC CC  
Rx: [0x020] CC
```

```
set op_GAMMA_DISCRETE = gtCRT
```

```
Tx: [0x000] BE EF 03 19 00 D8 61 01 08 44 CC CC FF FF FF FF  
Tx: [0x010] 01 00 00 00 CC CC CC CC CC CC CC CC CC CC CC  
Rx: [0x000] 1E BE EF 03 19 00 00 00 01 08 44 01 00 FF FF FF  
Rx: [0x010] FF 01 00 00 00 CC CC CC CC CC CC CC CC CC CC  
Rx: [0x020] CC
```

G. Image Scale Command

Operation name: op_Scaler_mode

Operation types: SET or GET

Values:

smONE_TO_ONE = data is shown as received; if smaller than screen, image will be centered; if larger than screen, the image will be upper left justified and truncated as required

smFILL_ALL = data will be stretched/compressed as required to fill the entire screen

smFILL_TO_ASPECT_RATIO = data will be stretched/compressed as needed to fill as much of the screen as possible while maintaining original image aspect ratio; so a 16:9 input on a 4:3 screen would result in black bars at the top and bottom of the screen

smFILL_TO_16X9_LINEAR = stretch content to fill as much screen as possible while maintaining a 16x9 aspect ratio

Factory default: smFILL_ALL

-----Typical header file-----

op_SCALER_MODE = 17430

```
typedef enum {
    smONE_TO_ONE           = 0,
    smFILL_ALL             = 1,
    smFILL_TO_ASPECT_RATIO = 2,
    smFILL_TO_16X9_LINEAR  = 3,
    smFILL_NL_LETTERBOXED  = 4,
    sm4X3LB_TO_4X3        = 5,
    sm4X3LBST_TO_4X3      = 6,
    sm4X3A_TO_4X3         = 7,
    sm4X3_TO_16X9        = 8,
    sm4X3LB_TO_16X9       = 9,
    sm4X3LBST_TO_16X9     = 10,
    smNORMAL              = 11,
    smWIDE                = 12,
    smZOOM                = 13,
    smANAMORPHIC         = 14,
    smZOOM2               = 15,
}; eSCALEMODE;
```

H. Display ID Commands

For the date of manufacture...

<u>Op name:</u> op_MFGYEAR	<u>Op name:</u> op_MFGMONTH	<u>Op name:</u> op_MFGDAY
<u>Op types:</u> SET or GET	<u>Op types:</u> SET or GET	<u>Op types:</u> SET or GET
<u>Values:</u> 0 to 4000	<u>Values:</u> 1 to 12	<u>Values:</u> 1 to 31

For the Manufacturing Serial number...

Operation name: op_MFGSERIALNUMBER
Operation types: SET or GET
Values: 0 to 65535

For the Manufacturing Model number...

Operation name: op_MFGMODEL
Operation types: SET or GET
Values: 0 to 65535

Note: the initial model number is "8650" decimal, which is based on the "865" and last digit of the product part number 997-3865-00

Manufacturing Firmware Version number...

Operation name: op_MFGSWVERSION
Operation types: GET
Values: 0 to 65535

Note: the initial firmware version is "0001" and will be increased by 1 with each change

-----Typical header file-----

```
typedef enum
{
    op_MFGMONTH      = 642, // Mfg Month
    op_MFGYEAR       = 643, // Mfg Year
    op_MFGDAY        = 644, // Mfg Day
    op_MFGSERIALNUMBER = 645, // Mfg Serial Number
    op_MFGMODEL      = 646, // Mfg Model
    op_MFGSWVERSION  = 647, // Mfg SW Version
} eOPERATIONS;
```

Troubleshooting the Monitor

If you are experiencing trouble with the LX1200TI monitor, refer to the following. If the problem persists, please contact your local dealer or our service center.

Problem: No image appears on screen

- Make sure the brightness is not turned all the way down.
- Make sure all data and power cables are properly connected to the monitor and to the computer and power supply - see page 17 for details.
- Make sure the pins on the cables and connectors are not crooked or broken.
- Make sure the computer is functioning properly, and has not entered power-saving mode. (You may also want to disable the computer's power-saving feature.)

Problem: Partial image or incorrectly displayed image

- Make sure the computer's image resolution is set to one of these resolutions: 1024 x 768 (XGA), 800 x 600 (SVGA) or 640 x 480 (VGA).

Problem: Image is scrolling

- Check and make sure the VGA signal cable (or adapter) is securely connected at both ends.

Problem: No sound

- Make sure the volume is not turned completely down.
- Make sure the audio cable is securely connected at both ends.
- Make sure the computer's audio is not muted.

Problem: The monitor does not appear to respond to the touchscreen

- Make sure the USB cable to the computer is securely connected at both ends.

Performance Conditions

Performance characteristics are guaranteed over the environmental specification range.

This product will be in used in the following conditions:

- Dusty environments
- High ambient lighting, outdoors and in a vehicles
- Scratched and banged with other equipment in the vehicle
- Very high vibration and shock environment
- Vandalism and tamper proofing: This product may be in environments that are unattended and used by people that are hard on their equipment
- This product will be driven by remote computers that can be far away. Product testing and verification was done with cables of at least 15ft. USB cables require a hub or booster for testing at lengths over 15 ft.

Cleaning guidelines

The LX1250TI 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 LX1250TI will withstand cleaning solutions used in transportation. Possible chemicals include:

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

Cooling

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

Functional Specifications

All specifications apply to both LX1250TI & LX1251TI Unless specifically noted.

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.

USB dimming control

It is possible to access OSD functions via USB interface. To control display remotely, install Virtual COM Port drivers.

<http://www.ftdichip.com/Drivers/VCP.htm>

<http://www.ftdichip.com/Drivers/D2XX.htm>

Auto Sync

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

Volume Control

None: through OS control only. Only available on LX1250TI, LX1251, does not have Audio.

Function Buttons on Front of display

The LX1250TI 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

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

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

(+) Button

This button increases brightness of the backlight

(-) Button

This button decreases the brightness of the backlight

LED status light

The Monitor shall have a single LED for video status.

LED green

The LED Shall be green with there is video present

LED amber

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

Module Specifications

This section describes the internal components of this monitor.

(Refer to Block Diagram in the Product Description Section 1.4)

AMLCD

Industrial grade with high bright LED backlight

Touchscreen

Infrared type: sensors and controller located in bezel

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.

Touchscreen interface

USB - HID

Touchscreen resolution

4096 X 4096

Touchscreen driver

Windows XP, Linux kernel (Fedore Code 4) support

Touchscreen controller

Built into touch screen frame

Externally accessible for firmware updates

Video Controller board

Requires standard VGA

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 there 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.

Pezio function – LX1250TI only

Function: provides audio warning signals

Location: Rear of display.

To use Buzzer:

Apply a 500hz-1khz, 500mv-1V sign wave to the Audio Input signals. Duration of the signal controls perceived volume (1ms minimum @1khz,2ms minimum @500hz).

Mechanical enclosure

Function: provides support for internal components and EMI cage

- Rugged.
- Material: Aluminum
- Designed for IP67
- Powder coated enclosure

Front Bezel

Material Aluminum

Color: Black

Connectors and I/O

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

I/O connector – LX1250TI

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 out	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		

5.7.1 I/O Connectors –LX1251TI

Power

Manufacture: LTW

Part number: LTWCD-07MMS-LC7001 and mating LTWCD-07BFFA-LL7001

Description: 7 pin IP-68 rated, locking

Reference Planar mating cable PN#:

Or LTW Mating cable PN#

VGA

Manufacture: LTW

Part number: LTWHDB-15PFFP-SA8001 and mating LTWHDB-15MMA-SL7001

Description: HD-SUB 15 pin, IT-68 rated

Pin	Description	Pin	Description	Pin	Description
	Power	5	GND		USB
1	Blue-8-30VDC To Inverter	6	Red GND	5	Shield
2	Orange-Ground To Inverter	7	Green GND	4	Black
3	Yellow-8-30VDC To Inverter	8	Blue GND	3	Green
4	Red-Bezel Switch Connector	9	+5 VDC	2	White
5	Brown-Bezel Switch Connection No 2	10	S GND	1	Red
6	Green-8-30VDC To Video Board	11	IDO		
7	White-Ground to Video Board VGA	12	SDA DDC		
	VGA	13	H Sync		
1	Red Video	14	V Sync		
2	Green Video	15	SCL DDC		
3	Blue Video				
4	RES				

USB

Manufacture: LTW

Part number: LTWUB-20PMFP-SC8002

Description: USB, B TYPE, Female, IP-68 rated

Physical Specifications

Optical requirements

Maximum luminance through touchscreen:

650 cd/m² (nits) typical

Maximum luminance at full dimming

Less than 5 nits.

Uniformity

Per LCD spec at full brightness. Maximum/Minimum 1.25 T typical

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

Contrast

Per LCD Spec and standard indoor brightness

Measured: 600 typical, min = 300

High ambient contrast

Per Mil-Std-85762A Greater than 7:1 at 8000 fc

Measured: CR = or > 11:1 with daylight (diffused) at 8,000 fC. CR = or > 3.5 for glare source of 2000 fL. (measured at 30° to normal)

Voltage Range

8 to 32 V, 12 V nominal.

Voltage Transients

Protected against voltage transients above +/-30V for 100ms

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

Maximum Power Consumption

Maximum: <10 W @ 12 or 24V

Typical power consumption: 7.7W @ 12 or 24V

Power consumption in standby Power (LED amber)

2.5 W @ 12 or 24V typical.

Mechanical Outline

Preliminary dimensions

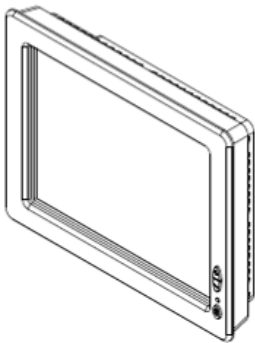
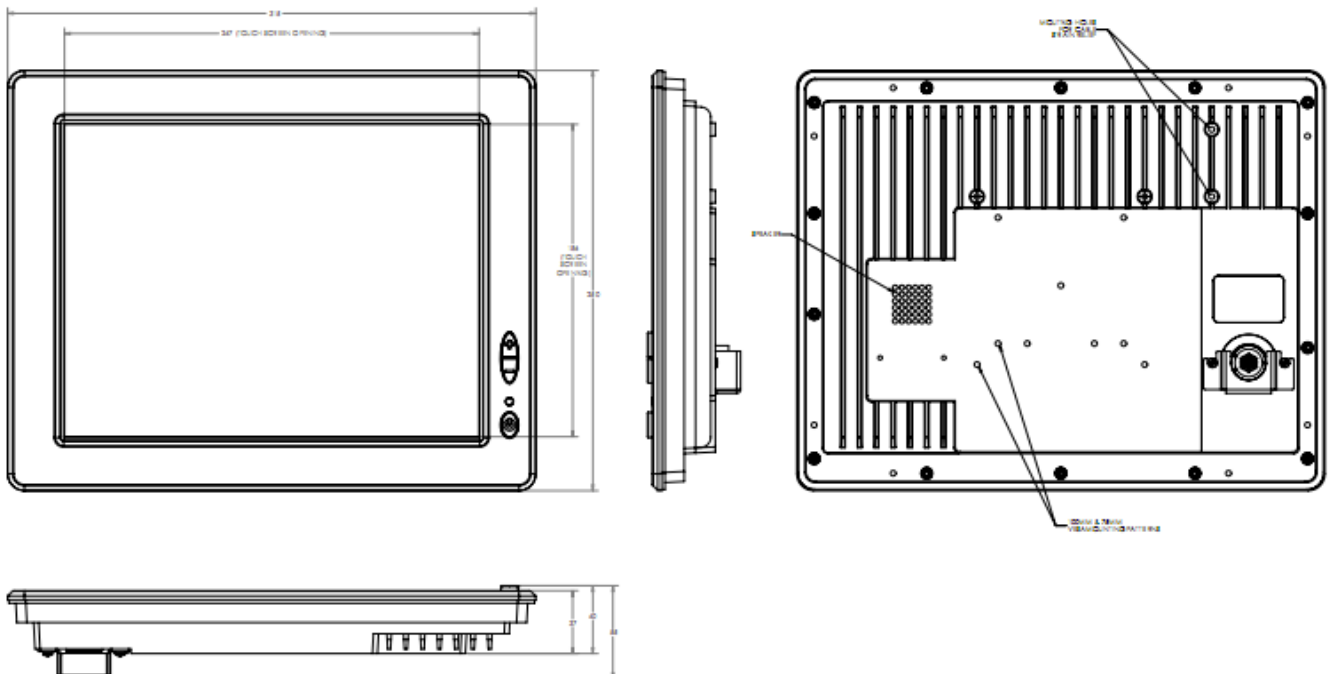


Figure 2: Outline Drawing



VESA Mount

A VESA mount feature must be included on the LX1250TI, located on the back cover.

Standard 100 and 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 to support vertical cable routing.

See Figure 2: Outline Drawing.

Weight

Weight <5.5lbs.

Shipping Box

- Conforms to ISTA-2A (32 inch drop)

Maintenance Requirements/Service Support

Service Requirements

The LX1250TI requires no routine maintenance.

Service BOM

Service BOM provided on request.

Environmental Specifications

Temperature

Operating Temperature	-20° C to + 60° C (-4° to 140° F)
Storage Temperature	-20° C to + 85° C (-4° to 185° F)
Operating Survival Temp Range	-40° C to + 70° C

Humidity

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

Altitude

Operating:	15K ft (IEC 60068 PT2-13, 4hr)
Non-operating:	30K ft (IEC 60068 PT2-13, 4 hr)

Vibration

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

Operating (Random): per axis	10-500 Hz, 3.0G rms acceleration, 3 hours
Vibration, Endurance Sine Sweep	100-1100 Hz, 4 Gs rms, 1hr/axis

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)

Regulatory Compliance

Electromagnetic Compatibility (EMC)

Must be verified to comply with the following:

Emissions

- 47 CFR. Part 15, Subpart B, Class A
- CE EMC Directive [2004/108/EC](#)
- [EN55022:2006](#), A1:2000, Class A
- EN61000-3-2:2006 Harmonic Current Emissions
- EN61000-3-3: 1995+ A1:2001 Voltage Flicker
- EN61000-3-3:1995+A1:2001+A2:2005

Immunity Characteristics

- EN55024: 1998 + A1:2001 + A2:2003
- [IEC 61000-4-2: 2008 ESD](#) , 6kV contact and 8 kV air discharge
- IEC 61000-4-3: 2006+A1:2007 Radiated Field Immunity
- [IEC 61000-4-4: 2004](#) - Electrical Fast Transient/Burst Immunity Test
- [IEC 61000-4-5: 2005](#) - Surge immunity test
- IEC 61000-4-6:2008 - Immunity to conducted disturbances, induced by radio-frequency fields
- IEC 61000-4-8:2001 - Power frequency magnetic field immunity test
- IEC 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

Safety

Must be certified to comply with the following:

- IEC/EN 60950-1:2005 Second Edition with country deviations for the US (UL60950-1) and Canada (CAN/CSA-C22.2 No. 60950-1)
- Designed to but not certified for Class 1 Div 2
- Designed and tested to IP67

RoHS Compliance

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

WEEE compliance

Will comply

Reliability

The MTBF of the LX1250TI shall be 30,000 hours at 25°C demonstrated by test or calculation, excluding brightness degradation.

Included in the Shipping Box

- LX01250TI touch monitor

Shipping Configuration (State of monitor when shipped)

The unit will be shipped in the 'ON' state

Brightness Control: Set to Maximum

Product accessories

- Upon customer request

Product Specifications Overview

5

Display Type	LCD Active Matrix Flat Panel Display (TFT)
Viewable Size	12.1 inch
Display Viewing Area	246 (W) x 184 (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)	600:1
Viewing Angle (Typical) @contrast ratio >10:1	70° -70 ° H /60 ° -60° V
Response Time (Typical)	25 ms
Brightness (Typical)	650 cd/m ² Min
Display Resolution	XGA
Refresh Rate	60 to 68 Hz
Preliminary Dimensions	12.5" W x 10" H x 2.3" D (no connectors)
Preliminary Display Weight	<5.5lbs, 2.5kg
Audio input	Mono 0-1VPP (LX1250TI only)
External Connections	37 pin Military connector
Power Supply	None provided
Power Requirements	8-32 V DC
Power Consumption	<8W typ @ 12V
VESA Compatible/Location	Built-in 75 and 100 mm VESA on monitor back
Protective cover glass	Meets 80-50 (scratch – dig) per MIL-PRF-13830B.

Revision Control	
DATE:	DESCRIPTION:
May 2011	Document number 020-1121-00 A

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