

# **User Manual**

32 inch LCD Monitor

Model: HL3116ST

Rev.: 0.0

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# 1. Application

This high-resolution color display is specifically designed to meet the rigorous performance standards needed for diagnostic, with Touch screen interventional radiology, and other medical applications. To guarantee image integrity, features include accurate signal conversion and a wide range of interfacing options.

**Compact design** - Low weight and small size with improved performance make the color flat panel display HL3116ST preferable to conventional CRT monitors.

## **Grayscale display and calibration**

The monitor features smoother and more accurate grayscale gradations with 1024 (10-bit) shades of gray from a palette of 4096(12-bit LUT). At least five different LUT are built into the monitor, and the monitor is factory calibrated to achieve DICOM 3.0 Part 14 and other calibrated Gamma value at the factory set point.

**Screen resolution** – HL3116ST is equipped with a panel with Super PLS technology. The optimal picture resolution is 3840 x 2160 pixels. Video signals with other resolutions typical to medical engineering are optimally zoomed in or out to the screen size.

**Fast backlight stability** - The luminance stabilization circuit employs a built in photo sensor to keep the back-light lamps at a constant luminance for consistent calibration over the life of the display and can control the back light system automatically to extend the life of the monitor and achieve very short warming up time.

## **Perfect picture reproduction technology**

The physical resolution is 3840 x 2160 pixels. Video pictures of other resolutions are optimally scaled to the screen size in proportion.

## **High brightness**

## **VESA Hole**

The monitor supports 100X100mm , 100X200mm VESA arm mounting.

**Multi-interface for video inputs** - Support DVI-D(dual), Display Port.

**Touch panel**-The monitor has protective glass bonding to panel and has infrared touch screen in the front.

**PIP picture**- The PIP can be supported .

## **2. Declarations**

### **Safety precautions**

Medical Equipment

With respect to electric shock, Fire and mechanical hazards only in accordance with ANSI/AAMI ES60601-1: 2005 + A2(R2012) + A1

&CAN/CSA-C22.2 NO. 60601-1:14

#### **Regular maintenance and calibration are recommended**

Please note that liquid crystal displays such as the HL3116ST do not have a zero failure rate and image parameters may change over time (e.g. luminance or discoloration). Please ensure that all measures are taken to prevent injuries or incorrect diagnoses. Regular maintenance and calibration are recommended.

Correct and safe operation of the flat panel displays is dependent on proper transport, storage, installation and assembly, as well as careful operation and maintenance. The units must only be used for applications for which monitors are normally used. The information in the Section "Technical data" must be observed exactly.

**For the sake of safety, the following precautions must be observed:**



**Danger: There is a danger to life if the warning information is observed. Severe personal injury or damage to property may occur.**

**Do not open the unit yourself**

Certain components inside the units are at high-voltage, i.e. touching these components presents a danger to life!

## **Do not insert any objects into the housing**

Objects inserted into the housing may result in damage to the unit or personal injury.

## **Do not place any objects on top of the units**

Penetrating liquids may result in a fire or electric shock.

## **Caution**

Incorrect installation may result in extensive damage to property. Installation should be carried out by trained personnel. In order to prevent injury to patients and users of your systems, when installing your medical electrical system with our products in an environment with patients, please observe the safety requirements of EN 60601-1-1 (IEC 60601-1-1) in "Specifications for the safety of medical electrical systems".

## **Take appropriate measures to particularly ensure that discharge currents remain below the required limits: Appropriate measures:**

- Disconnecting devices for signal input or output unit
- Use of a safety transformer

-Close the plug panel using the provided cover, and secure using the screws.

-Turn the switch off and then remove power cord.

## **Notice for users**

The plug panel is closed by the cover, must not be opened by users.

## **Servicing information**

If housing components have to be removed for servicing, this must not be carried out in the presence of patients, the user, or other persons not involved

with servicing. The following applies to installations in the USA and Canada: Molded power supply plugs must comply with the requirements for "Hospital Grade Attachments" UL 498.

## **Caution**

**Failure to observe the warnings may result in substantial damage to property.**

## **Provide sufficient heat dissipation**

Slots are provided at the rear of the housing. The display must be placed or secured on a hard, level surface at least 10cm from the wall and 15cm away from other devices. Several displays can be butt-mounted horizontally and vertically.

The following must be observed when mounting (VESA connection):

Mounting screws	
Number	4
Thread	M6
Immersion depth	Max. 15 mm
Torque	Max. 12Nm
Mounting screws#	

The permissible ambient temperature range (10 °C ... 35 °C) must not be violated. Do not subject device to unnecessary shocks. Take care when transporting! Use the original packaging! The panel in particular should be protected against shocks.

When touching the panel surface, the mechanical contact or an electrical discharge may cause a brief disturbance in the picture quality.

## **Care of unit / cleaning agents**

- The front panel is extremely sensitive to mechanical damage. Avoid all scratches, knocks etc.!
- Remove water drops immediately which will discolor the surface. Clean the front panel when dirty, using a micro fiber cloth and, if necessary, a glass cleaning agent. Only clean housing parts using a cleaning agent for plastics.

### **Note:**

**Do not use cleaning agents containing solvent, e.g. petroleum**

## **Explanation of the symbols**



Direct current (DC)



China RoHS symbol



EC WEEE symbol



European conformity



TUV approval mark



Attention: Consult the accompanying documents

## **3. Installation**

### **Provide adequate ventilation**

Ventilation slots are located on the rear of the housing.

### **Ambient temperature**

The permissible ambient temperature range must not be violated.

### **Minimize reflections**

The display should be positioned so that reflections of lights, windows, furniture with shiny surfaces or light-colored walls do not appear on the screen.

### **Minimize mirroring**

In order to reduce mirroring on the unit, ceiling lighting or reflected light (no dazzling) should be used. Mirroring can only be eliminated if the screen is clean and free of grease. Clean the display using a suitable micro fiber cloth.

### **Change of environment**

If the unit is brought into a warm environment from a cold one, water may condense upon it. The unit should not be switched on until all the condensed water has evaporated, including that inside the unit. This may take several hours, depending on the conditions.

## **4. Start-up**



### **Caution**

In order to ensure safe operation of the equipment, close attention must be paid to the information contained in this Instruction Manual as well as the warnings in Section 2 "Safety precautions".

### **Caution Information for end customer**

None of the settings must be changed on site by the user, otherwise the guarantee is canceled. This also applies to settings made using the HL3116ST keys. These are therefore locked for certain applications. If settings have to be changed, please contact the responsible servicing department.

The display is designed for individual connection to a graphics card with a power supply of 100 or 240 Volt (TN-S system with PE conductor). If the display is to be used in a sequence of several displays, or if it is not exactly

known whether the graphics card standard can be output by the display, refer to Section 5.1 "Connection of the flat panel display".

In order to start the unit properly, the following steps should be carried out in the given sequence.

## **4.1 Connecting the power and signal cables**



### **Warning**

The display can be tilted backwards and forwards. Please pay attention not to hurt yourself, when moving the display. Fingers or small objects may get stuck at the bottom of the display.

### **Caution**

Use a power cable with PE conductor corresponding to the safety requirements of the respective country of use. Note for North America: Molded power supply plugs must comply with the requirements for hospitals with respect to CSA Std. C22.2 No. 21 and UL 498. The power supply and signal connections are located on the rear of the color flat panel display.

### **Note**

Note that the cables are already positioned when you receive the display (power cable and DVI-D cable). The following steps are only necessary if you need to connect/ disconnect the cables of the scope of supply.

#### **4.1.1 Cable (attaching)**

Connect the cables to the display.

**Power cable:** The Power cable connection is used for display power supply.

**DVI-D connection:** The connection to the computer can be made via the digital single link. The picture quality, noise immunity and radiated interference of the complete system depend on the cable quality and length.

**DP connection:** The connection to the computer can also be made via the Display Port connection. The picture quality, noise immunity and radiated interference of the complete system depend on the cable quality and length.

## **4.2 Power up the display**

Use the power switch to power up the flat panel display. The operation LED lights up (color: green)

## **4.3 Screen saver**

A screen saver function should be used in order to reduce "image sticking" which can occur in TFT displays.

It is high risk to display a static graphic over half an hour.

Image sticking is the effect where a faint image of the previous screen contents can still be seen after the display contents have changed. By using a screen saver with permanently changing screen contents, unnecessary effects of the same image are avoided.

If the keyboard is locked, contact the servicing department in order to unlock it. The guarantee is cancelled if you unlock it yourself!

# **5. Adjustments**

## **5.1 Picture adjustment**

This section describes the settings for operation of the flat panel display with a video source.

### **Fine adjustment of the flat panel display**

Fine adjustment of the flat panel display can only be carried out via the analog port. The digital inputs (DVI-D,DP) do not require a fine adjustment since the display signal is always optimum. At this point, the display is configured for optimal performance with the installed graphic board. If one is not yet satisfied with the luminance level, the black and white levels can be further increased by adjusting the backlight level in the OSD menu. Please note that higher backlight level settings tend to reduce the stability of luminance over time.

## 5.2 Optimum picture quality

In order to achieve an optimum picture quality, the color flat panel display HL3116ST should be operated with a graphics resolution of 3840 x 2160 pixels (settings for graphics card in the PC). When adjusting the picture position and size, ensure that the picture appears exactly on the active surface of the display and it is not offset by even one pixel.

# 6. Fault diagnostics

Fault	Cause	Remedy
No picture appears on the display, operation LED off	Broken fuse	Inform servicing department
	Power cable not inserted or incorrectly inserted	Insert power cable
No picture appears on the display, operation LED green blinking	No video signal	Check video cable
	Video source not supplying a signal	Check video source
Other faults: LED orange blinking	Loose plugs	Plug cables in properly and secure them
	Faulty cable	Replace cable

## 7. Technical data

All technical data are valid after a warming-up period of half an hour.

### 7.1 Display

Item	Specification		
LCD	Panel Module	NC	
	Size	31.5" (80 cm diagonal)	
	Active Display Area	698.4 (H) x 392.85 (V) mm	
	Resolution	3840 x 2160 pixel (UHD)	
	Pixel Pitch	0.181(H) x 0.181(V) mm	
	Luminance	650cd/m <sup>2</sup> (Panel min.)	
	Viewing Angle (H VType.)	178°, CR>10	
	Color imaging	Yes	
	Color support	10 bit	
	Contrast Ratio	1700:1 (panel typical)	
	Response time	9.5ms(typical), gray to gray.	
	Back Light	LED	
Preset Timings		Refer to "Video specification"	
PIP		DVI input, 1920x1920 pixel	
Environment Condition	Temperature		
	Humidity		
Power Supply	Input Voltage		
	Power Consumption	Normal operation	
		Power saving	
VESA compatible arm mounting interface		100mm x 100mm and 100mm x 200mm	
Structure Dimension		750mm*444mm*60mm	

### 7.2 Screen Performance

- Warm up time	$\geq 20$ minutes.
- DC supply voltage	20-24V
- Ambient temperature	$25\pm 2^\circ\text{C}$
- Relative Humidity	30% --80%
- Video signal	3840 x 2160 @ 60Hz; DP
- Ambient Environment	Dark
- Setting	Set to Default DICOM LUT
- Luminance meter	Minolta CA-310 or equivalent

### 7.3 Operation Temperature

Ambient temperature range	+10 -- +35°C
Ambient humidity	20%-85%
Temperature gradient	Max. 7°C/h, no condensation
Atmospheric pressure	70-106 kPa

### 7.4 Transport and storage (Packed)

Ambient temperature range	-20 -- +60°C
Ambient humidity	10%-90%, no condensation.
Temperature gradient	Max. 10°C/h, no condensation.
Atmospheric pressure	70-106 kPa

## 7.5 Mechanical requirements Operation

Vibration	Random vibration, 1 G rms 5-200Hz for 2 hours duration, in the vertical direction. Random vibration, 0.5 G rms 5-200Hz for 1hour duration, in the horizontal plane, in a direction perpendicular to the front face of monitor. Random vibration 0.5 G rms 5-200Hz for 1 hour duration, in a horizontal plane, in a direction parallel to the front face of the monitor.
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### Packed unit

Vibration	Vibration : Random vibration, 1 G rms 5-200Hz for 2 hours duration, in the vertical direction. Random vibration, 0.5 G rms 5-200Hz for 1hour duration, in the horizontal plane, in a direction perpendicular to the front face of monitor. Random vibration 0.5 G rms 5-200Hz for 1 hour duration, in a horizontal plane, in a direction parallel to the front face of the monitor.
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## 7.6 Safety specifications

Safety standards	IEC/EN/UL60601-1,ANSI/AAMI ES60601-1 & CSA C22.2 No.601.1-M90
Approvals	c TUV us, FCC, CB
Protection class	Protection class 1
Conformity	CE

## 7.7 Electromagnetic compatibility

Comply with IEC/EN60601-1-2(Class B), FCC Part15, CISPR11(EN55011).

## 7.8 Environmental information

### RoHS

EU Directive 2011/65/EU

China SJ/T11364-2006

### WEEE

Waste Electrical and Electronic Equipment



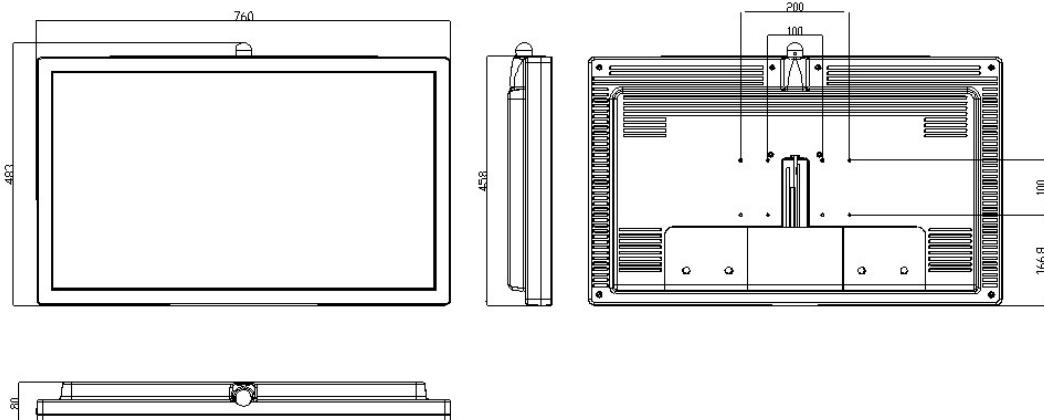
This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

## 7.9 MTBF

Flat screen without Backlight: 50,000 operation hours.

Flat screen with Backlight: 30,000 operation hours.

## 8. Dimensional drawings



## 9. Cleaning

please use IPA (Isopropyl Alcohol) or Hexane with a Non-Woven Cloth to clean the screen surface.

**Do not use any acids or cleaning alkali liquids as this may cause cosmetic damage to clean this display**

## 10. Remarks and contact address

### Invalidity of guarantee

All unauthorized electrical or mechanical alterations on or in the unit result in loss of the guarantee.

### Information on the Instruction Manual

For clarity reasons, this Instruction Manual does not contain all detailed information on this product. Your attention is additionally drawn to the fact that the contents of this Instruction Manual are not part of a previous or existing agreement, commitment or statutory right and do not change the latter.

### Guarantee

All commitments on the part of Beacon are contained in the respective sales contract which also contains the complete and solely applicable warranty

conditions. These warranty conditions in the contract are neither extended nor limited by the contents of this Instruction Manual.

## **Repairs**

Please contact your distributor from whom you originally purchased the product.

## **Environmental protection**

When disposing of the device, the requirements and laws in the respective country must be observed.

## **Others**

Service personnel and Installation personnel need receive related training about this display. Name of Manufacture: Shenyang Torch-Bigtide Digital Technology Co., Ltd. Address: No.18-6B, Yaoyang Road, Huishan Economic Development Area, Shenbei New District, Shenyang, China. 110164 Tel: 86-24-88087621

FCC Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: --Reorient or relocate the receiving antenna. --Increase the separation between the equipment and receiver. --Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. --Consult the dealer or an experienced radio/TV technician for help.