

User Manual

19 inch Color LCD Display

Model: HL1916S SERIAL

Rev.: A0



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1. Application

This high-resolution color display with touch screen use is specifically designed to meet the rigorous performance standards needed for diagnostic, 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 HL1916S SERIAL preferable to conventional CRT monitors.

Embedded LUT(Look Up Table)-This monitor is factory calibrated to achieve Gamma2.2 compliance and Linear gray level reproduction at the factory set point. Six different settings are stored within the display.

Screen resolution- HL1916S SERIAL is equipped with a panel with Twisted Nematic technology. The optimal picture resolution is 1280 x 1024 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

Multi-interface for video inputs- Support DVI-D, VGA, DisplayPort.

Embedded full functional stand base - The stand base is embedded inside the monitor and can be easily removed. The stand base is up/down and tilt adjustable.

2. Declarations

Safety precautions

Medical Equipment

With respect to electric shock, Fire and mechanical hazards only in accordance with ANSI/AAMI ES60601-1:2005 & CSA C22.2 No.60601-1:2008

WARNING:

To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

Appliance coupler or separable plug of is used as isolation means to isolate the equipment from mains supply.

Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN950 for data processing equipment and IEC/EN 60601-1 for medical equipment).

Furthermore all configurations shall comply with the valid version of the System standard IEC/EN 60601-1-1. Everybody who connects additional equipment to the signal input connector or signal output connector Configures a medical system, and therefore responsible that the system Complies with the requirements of the valid version of the system standard IEC/EN 60601-1-1. If in doubt, consult our technical service department or your local distributor.

Regular maintenance and calibration are recommended

Please note that liquid crystal displays such as the HL1916S SERIAL do not have a failure rate of zero 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:

Only use a perfect power supply cable

A damaged power supply cable may result in a fire or electric shock. When disconnecting the power supply cable, always do so by holding the plug.

Only use the same type of fuse

T2A/250V

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.

Connection

No contact to a patient must occur when handling the cables.

Do not hurt yourself, when moving the display

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.

When moving the display up and down (height adjustment), make sure you do not squeeze your hand or any other object. The minimum distance between the display edge and the bottom is only 59 mm.

Caution

Incorrect installation may result in extensive damage to property. Installation should be carried out by trained personnel

When installing your medical electrical system with our products in an environment with patients, please observe the safety requirements of EN 60601-1 (IEC 60601-1) for "Specifications for the safety of medical electrical systems" in order to prevent injury to patients and users of your 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
- Use of additional PE conductor

Only use the signal cables and interface cables specified by the manufacturer for the installation.

Use power cables with a PE contact. Only insert into sockets with a PE contact.

For certain applications, the video earth can be separately connected to the PE via the additional PE connection in the plug panel (observe IEC 60601-1).

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

Turn switch off and then remove power cord.

Mounting information: The stability of the display must be guaranteed following mounting of the foot/holder. The immersion depth of the mounting screws has to be 10 to 12 mm including a 3 mm VESA mounting plate. (See also table "Mounting screws" on the following). All these requirements are satisfied when using the original foot. All requirements must be observed when using customer-specific mounting solutions.

Notice for users: The plug panel 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

Holes 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 | M4 |
| Strength | 12 |
| Immersion depth | Min. 10 mm; Max. 12 mm |
| Torque | Max. 3 Nm |

Please see 4.1.4 for details.

The permissible ambient temperature range (5 °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; extended contact with water discolors 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 spirit!

Explanation of the symbols



Alternation current (AC)



Protective earth



China Rohs symbol



EC WEEE symbol



European conformity



China Compulsory Certification



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 HL1916S SERIAL 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 Little cover (removing)

Remove the one screws with a **M4 Slot** screwdriver (one turn suffices). Pull down the little cover and then open the little cover and remove it.



4.1.2 Cable (attaching)

Connect the cables to the display.



VGA connector: the flat panel display can be connected to the computer system using a VGA Cable on D-sub connection for analog signal. The display is adapted using an OSD menu.

DVI-D connection: The connection to the computer can also 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 DisplayPort connection. The picture quality, noise immunity and radiated interference of the complete system depend on the cable quality and length.

Serial connection: you can connect the display via the RJ11 connector to the computer for firmware updating.

4.1.3 Stand base (attaching)

Put the stand base near VESA holes of the monitor. Fasten the stand base with four M4x12 screws.



Move the button of stand base towards the right, and lift the monitor, and then turn the monitor by 90 degrees.



Note: the stand base is optional.

4.1.4 Mounting Use

Remove the stand base according to the contrary way in 4.1.3. Fix the

mount by mounting screws (see page 6 table Mounting Screws for details).



4.2 Switching on the display

Switch on the flat panel display using the power switch. The operation LED lights up (color: green, provided the timing has been recognized – please refer to section 7 "Fault diagnostics").

4.3 Adjusting the image geometry

The display automatically recognizes the used standard, and set-up values for each standard are preprogrammed. However, depending on the graphics card used, it may still be necessary to align and size the picture for the selected standard (see Section 6.1 "Picture adjustment"). Normally auto adjust will work.

4.4 Adjusting the brightness and contrast

The brightness and contrast must be adjusted for the respective graphics card (different output levels) in the system on site.

Note on adjustment

- Use the SMPTE test pattern.

- Adjust the brightness so that image sections with 5% and 0% blackness still visibly contrast from one another.
- Adjust the contrast so that image sections with 95% and 100% whiteness still visibly contrast from one another. To adapt the luminosity to the ambient lighting, adjust the backlight brightness (note: 180 cd/m² factory setting is then modified).

4.5 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. Connections

5.1 Connecting the flat panel display

Note

All screening precautions contained in the corresponding EMC guidelines must be observed. If these guidelines are not observed, interference signals could penetrate the monitor.

Information on cable installation

Only screened cables are permitted for the signal connections.

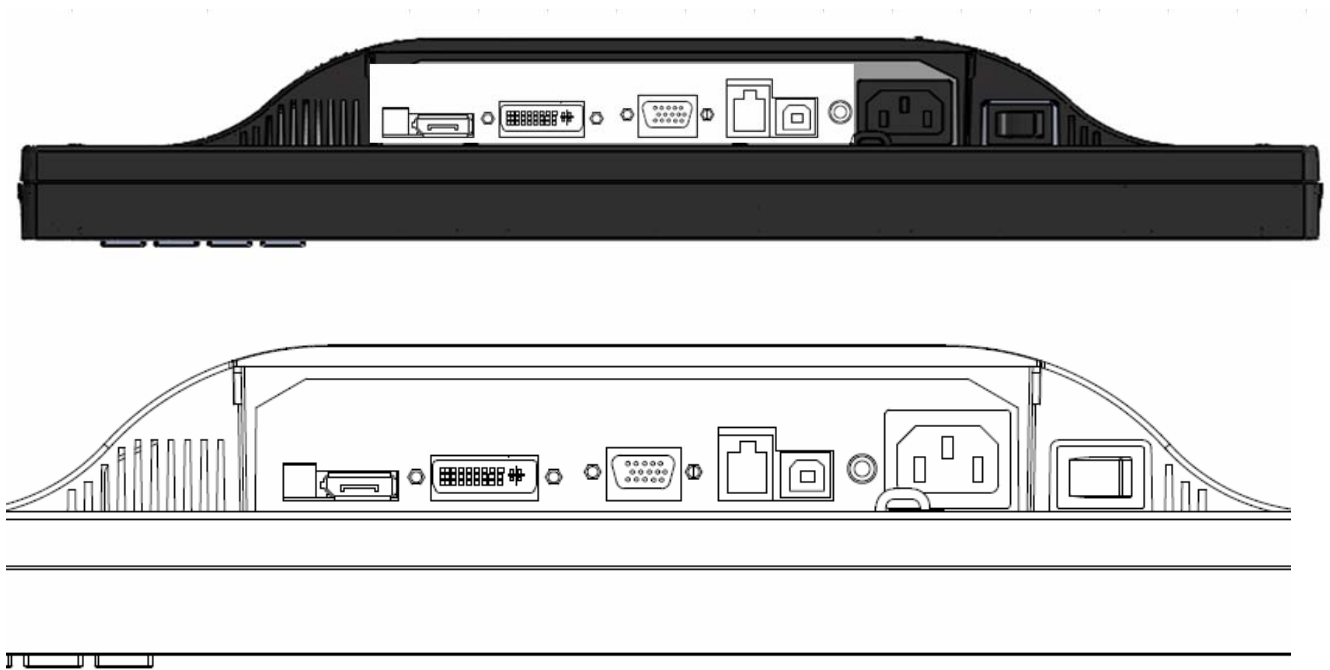
All connectors should be of screw or locking types (as far as possible).

Signal and power cables must not be routed in the same duct.

The display must not share a power supply with motors or valves (glitches!).

5.2 Connection panel

A connection panel for the signals and power supply is located at the rear of the flat panel display underneath the little cover.



5.3 Information on additional serial interface (Service Only)

Serial connection: you can connect the display via the RJ11 connector to the computer for firmware updating and monitor test.

5.4 Analog and digital inputs (DVI,VGA,DP)

DVI socket

With DVI digital signal through DVI cable.

VGA socket

Use VGA cable for VGA input.

DP socket

With DP digital signal through DP cable.

5.5 Power supply connection

Note

Device fuses can not be exchanged outside of the repair centers.
The display power supply is connected using an appliance plug. Only use the power cable supplied in the delivery, or a cable with PE conductor and appliance socket to DIN 49 547, IEC 320.

Caution

A power cable with PE conductor must be used which corresponds to the safety requirements of the respective country of use.

5.6 Serial interface

Caution

No other units may be connected to the service socket. Connection or disconnection of a unit may only be carried out by servicing personnel or those trained by them. A Serial Spot Meter or Universal Serial Luminance Meter must not be connected in the presence of patients.

The display has a serial RS 232 4 pins RJ11 interface sockets to update the SW.

6. Adjustments

6.1 Picture adjustment

This section describes the settings for operation of the flat panel display with a video source. The most important settings are:

Adjusting the graphics memory of the video source

As with all monitors, the flat panel display also has certain limits, e.g. maximum resolution and vertical frequency. The graphics adapter must be set when using the flat panel display such that the limits are observed.

Fine adjustment of the flat panel display

Note

Fine adjustment of the flat panel display can only be carried out via the analog port. The digital input (DVI-D, DP) does not require a fine adjustment since the display signal is always optimum.

RGB picture sources via VGA connector supply analog signals which are basically intended for conventional CRT monitors and which are processed directly by them.

In contrast, the analog signals must be converted for a flat panel display into digital signals by a video digitizer. Depending on the picture source, cable length and video mode (e.g. VGA, SVGA, XGA) this conversion may cause certain deviations which cannot be corrected fully automatically by the flat panel display. A manual fine adjustment is therefore necessary during which the flat panel display (or, more precisely, the video digitizer) is matched to the respective video source. The fine adjustment comprises e.g. setting the horizontal/vertical picture position and the picture sharpness. This can be carried out for the color flat panel display HL1916S SERIAL using an OSD menu.

To optimize the display settings for the installed graphic board, and to ensure all gray levels are distinguishable, we recommend to adjust the

brightness and contrast levels for and only for analog inputs. Note that the calibration (in the Look Up Table) is not changed by these adjustments (All the monitors are and remain factory calibrated):

Using a 100% black picture and an appropriate measurement device (a spot meter recommended), decrease the brightness level using the OSD controls until the measurement device displays a constant level (i.e. the measured value no longer changes). Once this is achieved, increase the brightness level slightly until the display is just above the absolute lowest black level (one step is generally sufficient).

Similarly, set the white level using a 100%-white test pattern and the measurement device. Only the contrast level should be adjusted to ensure that the black level remains unchanged.

- Control again the black value did not change. In case it did you need to duplicate the two previous steps until it does not change anymore (cause: pedestal).

Increase the contrast level until the measurement device no longer detects an increase in luminance. Once this is achieved, decrease the contrast level slightly (1 or 2 steps is generally sufficient).

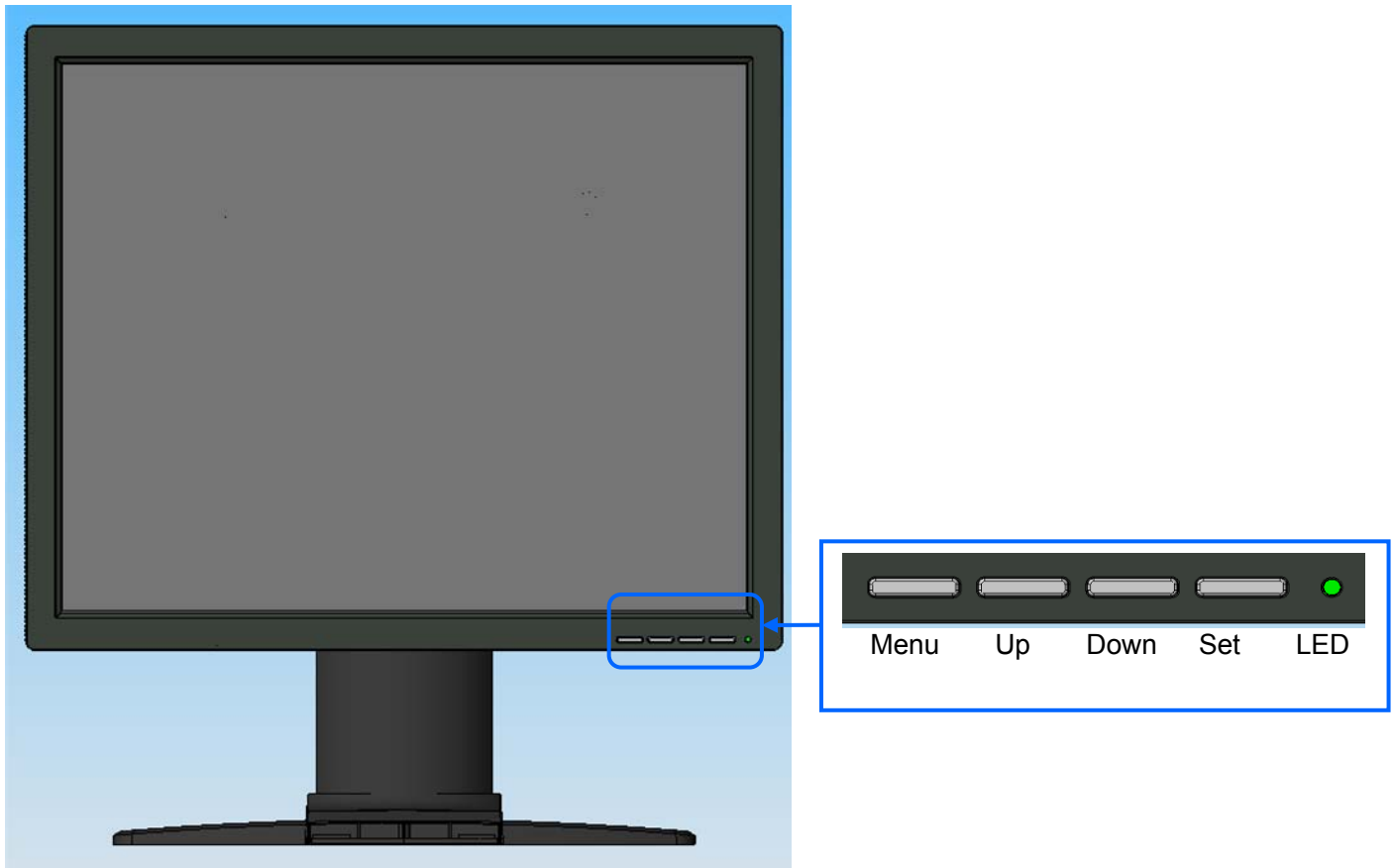
At this point, the display is configured for optimal performance with the installed graphic board. If one is not yet satisfied with the luminance level, the black and white levels can be further increased by adjusting the backlight level in the OSD menu. Please note that higher backlight level settings tend to reduce the stability of luminance over time.

6.2 Optimum picture quality

In order to achieve an optimum picture quality, the color flat panel display HL1916S SERIAL should be operated with a graphics resolution of 1280 x 1024 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 that it is not offset by even one pixel. For example, if the horizontal position is offset by one step to the right, the right-hand edge of the picture will disappear, and a black pixel column will appear at the left-hand edge. And similarly for an offset to the left, top or bottom. If the vertical lines are still slightly fuzzy, adjust the setting "Frequency/phase" (see Section 6.4 "Description of the menus").

6.3 OSD menu

6.3.1 Keys assignment and operation LED



A “dynamic help for keypad function” is available for each menu: it explains the role of each key depending on the OSD menu window, which is currently active.

6.3.2 Key functions without active OSD menu

| Key | Action |
|------|------------------------------------|
| Menu | Activate OSD |
| Up | Define VGA port |
| Down | Select DVI-D, DP, VGA input source |

Note:

While there is no sync in VGA input, there is instruction on the OSD to indicate that how to define the analog input as VGA input. Press and hold the 'UP' key for about 2 seconds, the monitor will change the analog input between VGA.

The 'Down' key function is used to select input source and is enabled only when OSD menu is locked. This function can be enabled or disabled through OSD selection. This choice is in case all the signal sources are available. If not, the monitor will auto search DVI-D, DP and VGA.

6.3.3 Key functions in the OSD menu

| Key(s) | Situation | Action |
|-------------|------------------|-------------------------|
| Menu | Always | Jump to next line |
| Up | Slide controller | Increase value |
| | Command | "Enter key" |
| Down | Slide controller | Decrease value |
| Set | Sub-menu | Return to previous menu |

6.3.4 Menu calls

Press the “Menu” key while the OSD is active, the function icon will jump to next line. Pressing the “Up” key, the coordinate submenu will be selected. Press “Set” key to return to the main menu while in the submenu state.

6.3.5 Locking of OSD menu

| Keys | Action |
|-------------------------------|--------------------|
| 1x Set key, then 3x Up key | Lock or unlock OSD |

6.3.6 Description of the menus

| Main Menu | Function | Adjustment range | Description |
|-------------|------------|------------------|--|
| Performance | Brightness | 0...100 | Set brightness. Adapting the image quality of darker picture areas. The center point is in 50 position. Note: The brightness settings are already optimized for digital signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of grayscales). |

| | | | |
|------------------|---------------------------|--|--|
| | Contrast | 0...100 | Adjustment of contrast. This allows the brighter area to be seen more distinctly. The center point is in 50 position. Note: for DVI-D signals the Contrast setting is optimized. Manual changes are not recommended. |
| | Backlight | 0...100 | It is used to adjust the Brightness of the monitor. |
| | Color | Color1 Color2 Color3 User R G B Gain R G B Bias | Color 1, Color 2, Color 3 are three fixed color temperature and can not be changed. User temperature can be adjustable and saved. |
| Display Settings | H Position (Analog only) | 0...255 | Shift picture in horizontal direction |
| | V Position (Analog only) | 0...255 | Shift picture in vertical direction |
| | Frequency (Analog only) | 0...100 | Adjust the frequency and phase of the input signal. |
| | Hsync Phase (Analog only) | 0...63 | Source clock phase |
| | PhaseR (Analog only) | R ADC clock phase 0...7 | For compensate R,G,B phase for analog long cable use. |
| | PhaseG (Analog only) | G ADC clock phase 0...7 | |
| | PhaseB (Analog only) | B ADC clock phase 0...7 | |
| | Sharpness | Interpolation filter -5 to 5 | One of the 11 filters can be selected for the sharpness setting to reduce scaling artifacts. Interpolation filters depend on the input resolution. Digital signals which is used with 1280X1024 resolution can not be adjusted since each pixel is controlled by its own pulse. Other digital signals which is lower than 1280 x 1024 can be adjusted. Analog signals can be adjusted in all supported resolution. Negative figure is adjusted to get softer image and positive figure is adjusted to get sharper image. The user should individually adjust the filter depending on the application. |
| Input Source | | DVI-D DP VGA | Select the active input source priority. If you call this OSD menu, the current source is displayed. If current source is inactive (NO sync) and, it will auto search other port. |
| Auto Adjust | Auto-Color | ON / OFF | Automatically get input signal match |

| | | | |
|-----------------|---|-----------|---|
| (Analog only) | | | with the monitor |
| | Auto-Configure | ON / OFF | Automatically adjust the image display settings. |
| | Execute | | The selected auto functions are executed. Note: The quality of the function depends on the applied picture contents. To get better effect it is recommended to apply full screen picture and including white and dark contents. |
| OSD Settings | Horizontal position | 0 ... 255 | Adjustment of OSD horizontal position |
| | Vertical position | 0 ... 255 | Adjustment of OSD vertical position |
| | Background | 0 ... 12 | Select the OSD background transparency |
| | LED | ON/OFF | Setting the status of the operation LED. |
| | Language | English | Use the "Language" menu to select the language of the OSD menu. English is the default. While in the English menu state the "中文" font means to select to Chinese menu. And while in Chinese menu state the "English" font means to select to English. |
| | | 中文 | |
| Information | Firmware version OSD version Config version Power saving Input Source LUT Working hours | | Current display status can be informed. |
| Service Level 2 | Settings in this menu must only be carried out by service person* | | |
| Exit | Reject changes Accept changes Quit OSD | | Check box for save or reject the changes when Quit OSD menu . |

7. 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 |
| Fuzzy picture, interference in vertical lines | Scanning frequency or phase incorrectly set | Adjust frequency and phase |
| Other faults –LED orange blinking | Loose plugs | Plug cables in properly and secure them |
| | Faulty cable | Replace cable |
| Other faults: “Temp. High” on screen | Temperature shutdown value has been reached | Display will be automatically shut down after a certain time (and turn on again when the temperature decreases enough again) |

Other information available from the 2-colors LED

| LED | Display status |
|---------------------|--|
| LED orange blinking | No error, stand-by has been activated |
| LED green | Video signal has been recognized, no error |

8. Technical data

All technical data are valid after a warming-up period of 2 hours.

8.1 Display

| | |
|--------------------------|---|
| Type | TFT, color active matrix |
| Display area | 376.32mm x 301.06 mm |
| Picture diagonal | 19" or 48 cm |
| Native resolution | 1280 x 1024 (full-screen format) |
| Pixel organization | 3 vertical sub pixels |
| Pixel pitch | 0.294 mm x 0.294 mm |
| Contrast ratio | Typically 900:1 |
| Horizontal viewing angle | Typically $\pm 85^\circ$ (CR \geq 10) |
| Vertical viewing angle | Typically $\pm 80^\circ$ (CR \geq 10) |
| Backlight | LED |
| Brightness | Max backlight: brightness MIN 260 cd/m ² . Factory setting: 200 cd/m ² (with touch screen) |
| Lifetime of backlight | 50,000 hours typically for LED (applies to an ambient temperature for the backlight of 25°C) |

8.2 Power supply

| | | | |
|--------------|-------------------|------------------|--|
| Power Supply | Input Voltage | | AC100-240V \pm 20%, 50 / 60Hz; <0.9A |
| | Power Consumption | Normal operation | <50W |
| | | Power saving | <5W |
| | Input Connector | | 3P IEC Type |

8.3 Electronics

| | |
|---------------------------|---|
| Multi-standard technology | <p>Video modes with resolutions less than 1280 x 1024 can be expanded to the TFT resolution, and thus utilize the full display area (like multi-sync CRTs).</p> <p>In the same way, resolutions higher than 1280 x 1024 can be reduced and then displayed. (Caution: depending if the timing is frame buffered or frame sync, image information might get lost; the gray levels - the</p> |
|---------------------------|---|

| | |
|--------------------|---|
| | color depth for color images - will also be reduced and might be visible) |
| Timing recognition | H frequency, V frequency |

8.4 Inputs/outputs

8.4.1 Analog signal input

| | |
|-----------|-----------------------------|
| VGA input | Via VGA socket, single link |
|-----------|-----------------------------|

8.4.2 Digital signal input

| | |
|-------------|------------------------------|
| DVI-D input | Via DVI socket , single link |
| DP input | Via DP socket |
| DDC | Via DVI |

8.4.3 Serial interface

| | |
|-------|--------------------|
| RS232 | Via RJ11 connector |
|-------|--------------------|

8.4.4 Timing Input

| Item | | SPEC |
|---------------|---------------------------------------|---|
| Analog VGA | Frequency | Horizontal: 31 ~ 82kHz Vertical: 56 ~ 75Hz |
| | Pixel clock | 25—140 MHz |
| | Video Bandwidth | ≥ 165M Hz |
| | Video Input | Analog 0.7Vpp Input Impedance: 75 Ohm |
| | Sync Signal Input | Separate Sync, Composite Sync on Hs, TTL/LVTTL (N or P) |
| | VGA EDID datum | EDID via VGA I ² C bus |
| SOG | Via VGA connector | Analog R,G, B: 0.7Vpp Input Impedance: 75 Ohm Sync on Green: 0.2-0.3V |
| CVS Signal | Via VGA connector (monochrome use) | Video Level: 0.6---0.9V Input Impedance: 75 Ohm |

| | | |
|--------------|---|--|
| | | Sync level: 0.2---0.3V |
| DVI Digital | DVI-Digital Single link | TMDS: 600mV for each differential line Input Impedance: 50 ohm |
| | DVI EDID datum | EDID via DVI I2C bus |
| Display Port | Display Port 1.1 Receiver 4 main Lanes | Display Port: 600mV for each differential line Impedance: 100 ohm per differential pair |
| | DP EDID datum | EDID via AUX channel |

8.5 Controls and connection elements

| | |
|------------|--|
| Front Side | Four keys for OSD menu, operation-LED |
| Rear | <ul style="list-style-type: none"> • Power switch • Power supply connection • DVI socket • DP socket • VGA socket • RS 232 sockets 4 pins RJ11 |

8.6 Mechanical design

| Item | Set | |
|------------------------|---------------------------------|----------|
| | Width | 416.5mm |
| | Depth | 179mm |
| | Height | 386.7 mm |
| Tilt | Up & Down -5—88 degrees | |
| Housing components | Plastic | |
| Visible screen surface | Approx. 376mm×301mm | |
| Ventilation slots | In rear panel | |
| Degree of protection | IPX0 to DIN40050 | |
| Cover color | Black/white(Optional) | |
| Mounting | At rear VESA 100 x 100 mm | |
| Net weight | Approximate 5.5 kg (With stand) | |

8.7 Climatic conditions

Operation

| | |
|---------------------------|------------------------------|
| Ambient temperature range | +5 -- +35°C |
| Temperature gradient | Max. 7°C/h , no condensation |
| Relative Humidity | 15%-85% |
| Atmospheric pressure | 70 – 106 kPa |

Transport and storage (packed)

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

8.8 Mechanical requirements

Operation

| | |
|-----------|--|
| Vibration | According to EN 60068-2-6 10 ... 58 Hz with ± 0.075 mm deflection 58 ... 500 Hz at 10 m/s ² |
| Shock | According to EN 60068-2-27 (single shock) 150 m/s ² , 6 ms No permanent shock allowed in operating conditions |

Packed unit

According to 2M2 EN60721-3-2

8.9 Safety specifications

| | |
|-----------------------------------|---|
| Safety standards | EN60601-1、IEC60601-1、ANSI/AAMI ES60601-1:2005 & CSA C22.2 No.60601-1:2008 |
| Approvals | cTUVus、CCC、CB (NCB Lab.) |
| Protection class | Protection class I |
| Degree of protection to DIN 40050 | IP X0 |
| Type B/BF/CF applied part | No Applied Part |
| Category AP/APG equipment | No AP/APG |

| | |
|------------|----------|
| Conformity | GAMMA2.2 |
|------------|----------|

8.10 Electromagnetic compatibility

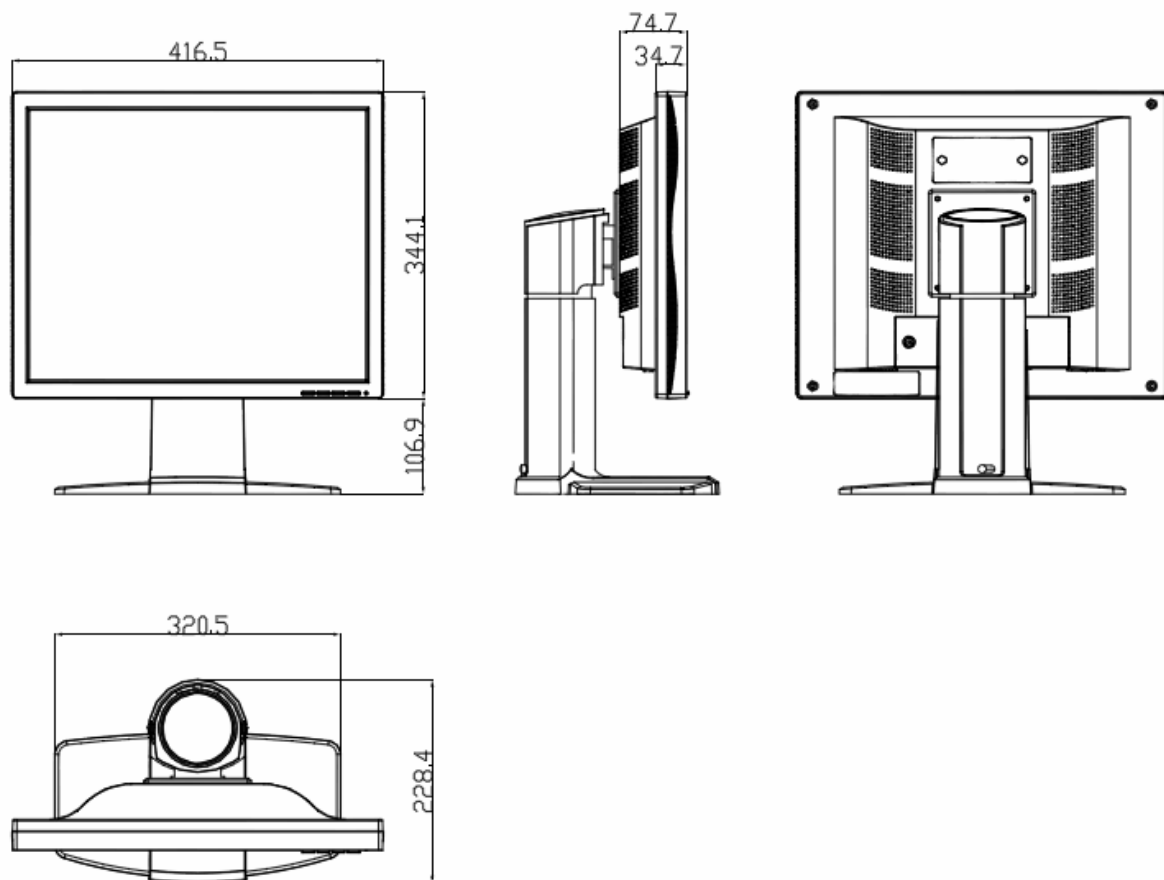
IEC60601-1-2 Class B

FCC Part15 class B

9. Dimensional drawings

All dimensions in mm.

9.1 Front, Platform and Side view



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 Torch-Bigtide 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.

Contact Information

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.

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.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance

could void the user's authority to operate the equipment.