

Instruction Manual • 05/2012



High End 19" Gray Scale Flat Panel Monitor
SMD 19102 DL

display
SOLUTIONS





LCD monitors for
medical applications
High End
19" Gray Scale Flat Panel Monitor
SMD 19102 DL


Instruction Manual


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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.

 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.

 CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the relevant information is not taken into account.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of EIZO products

Note the following:

 WARNING
EIZO products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by EIZO. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of their respective owners. Please refer to the trademarks listed in the appendix. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1.1 Contents of this document

This document explains the functionality and the approved application of the:

- SMD 19102 DL, version without protective front pane, with multi-functional stand

To ensure clarity, the documentation does not contain all detailed information available on this product.

The contents of this document are neither part of a previous or existing agreement, commitment or legal relationship, nor does it modify such.

1.2 Additional documentation

Note

Additional information

These instructions are available on the supplied CD-ROM and on the Internet page of Medical Monitor Solutions (<http://www.eizo.eu>).

Safety notes

2.1 General safety notes

Flawless, safe and reliable operation of the equipment assumes that it has been professionally transported, stored, mounted and installed as well as careful operator control and service. The units may only be used for applications for which monitors are normally used.

For safety reasons, the following precautions must be observed:

 **DANGER**

There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur. Please observe all warning information present on the display and in the instruction manual.

Do not open the display

The display may only be opened by trained and qualified personnel. There is risk of an electric shock.

Components inside the displays are at high voltage. **Touching these components is extremely dangerous!**

Servicing and maintenance must be carried out by qualified personnel only.

No liability is accepted for damage to property or injury to persons if the display is opened by non-qualified personnel.

Never use defective power cables

A damaged power cable may result in fire or electric shock. Only use power cables approved by the manufacturer.

When disconnecting the power supply cable, always do so by holding the plug. Ensure that your hands are dry.

Route the cable such that it cannot be tripped over.

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 unit

If you place objects on top of the unit, the unit may overheat.

Liquid entering the unit may result in fire or electric shock.

Connecting

There must be no contact to a patient when handling the connection cables.

Overload

Do not connect too many devices to one socket or extension cable since this could result in a fire or electric shock.

Observe the information provided by the manufacturer.

CAUTION

Improper installation may result in extensive damage to property.

Installation must be carried out by specialists.

1. To prevent injury to patients and users, connect your electrical system in accordance with the safety requirements of EN 60601-1 (IEC 60601-1) "Safety requirements for medical electrical systems".

In order to guarantee that the housing discharge current in the event of a first fault does not exceed 500 μ A, the display must be connected to an additional PE connection. The bracket of the display's support mechanism has its own grounding (PE conductor). This grounding together with the PE conductor of the display means that the housing discharge current always remains less than 500 μ A, even in the event of a first fault. The PE conductors of the display and of the separate PC are considered as a first fault event.

2. Use appropriate measures to ensure that the leakage currents in particular remain below the necessary limits:

Appropriate measures include:

- Separators for signal input or signal output unit
- Use of a safety isolating transformer
- Use of the additional protective conductor terminal

3. Device and patient must never be touched simultaneously.
4. It must be specifically mentioned that the display is only suitable for a patient environment, but not for contact with a patient.
5. Only use the video lines specified by the manufacturer for installation.
The serial interface cable must have a female Sub-D connector at the computer end.
6. Use power cables with PE contacts. Only plug the device into sockets with protective grounding.
7. For certain applications, the video ground can be connected separately to the protective ground via the additional PE connection on the plug board.
Observe EN 60601-1 (IEC 60601-1).
8. Close the connection panel using the cover provided, and secure with the screws.

9. **Note for users:**

The closed connection panel may only be opened by trained and qualified personnel.

10. **Servicing information:**

If housing parts have to be removed for servicing, this must not be carried out in the presence of the patient or user. Only connect displays with a VESA connection on the rear panel to the power supply when the VESA plate is screwed on.

11. **Important:**

Note that displays can fail and that the image properties such as brightness, contrast or color location can change with time.

Please ensure that all steps are taken to avoid injuries or incorrect diagnoses. If your application or local regulations require calibration, EIZO recommends use of QA software to facilitate quality control and document results. Observe all regulations of the country in which the device is used.

CAUTION

Failure to observe warnings may result in substantial damage to property

Ensure sufficient heat dissipation

To ensure proper air circulation, observe appropriate spacing between neighboring objects when placing or mounting the devices.

Ventilation slots are provided on the housing base, the top of the cover, the rear panel and the side panels. The permissible ambient temperature range (see instruction manual) must not be violated.

- Installation on a desk:
Place the unit on a solid and level surface. The installed stand, as well as the mounting surface, must be suitable for the weight of the unit.
- For ceiling suspension:
The wall mount must be suitable for the weight of the unit.

Avoid sources of heat

Do not install the display in the vicinity of sources of heat, e.g. radiators, heating appliances or other devices which can generate or emit heat.

Do not subject display to excessive shocks

Take care when transporting! **Use the original packaging, and transport correctly oriented!** Be sure to protect the LCD module in particular from shocks.

Care of display / Cleaning agents

- The screen surface (front panel) is extremely sensitive to mechanical damage. Absolutely avoid scratches, shocks, etc.
- Remove water drops immediately; extended contact with water discolors the surface.
- Clean the screen and the housing using only the cleaning agents referred to in the instruction manual.

CAUTION**Touching the screen surface can result in brief disturbances to the image**

Due to mechanical pressure or electrostatic discharging, touching the screen can result in brief disturbances to the image.

Only switch on cold displays following their adaptation to room temperature

If the display is brought into a room with a higher or rising temperature, condensation is formed inside and outside the unit. In such a case, do not switch on the display until the condensation has evaporated. The display will otherwise be damaged.

What to do if the display is faulty

If the following conditions exist, the display must be disconnected from the power supply and checked by qualified personnel:

- Damage to the plug or power cable.
- Following the entry of liquid into the unit.
- If the unit has been exposed to moisture.
- If the unit does not function or if you cannot eliminate a fault using the instruction manual.
- If the unit has been dropped and/or the housing damaged.
- If the unit smells of burning or produces peculiar noises.

Information for installations in the USA and Canada

Molded power supply plugs must comply with the requirements for "hospital grade attachments" CSA Std. C22.2 No. 21 and UL 498.

Note for installations in China

Only use power cables approved for China. These power cables are identified by the labels "CCC" or "CQC".

See also

- Installation site (Page 19)
- General connection information (Page 21)
- Connecting the signal cables (Page 25)
- Connecting the line cord (Page 27)
- Serial interface (Page 28)
- Cleaning (Page 81)
- Safety specifications (Page 89)

2.2 Product-specific safety notes

 **WARNING**

Adjust the monitor height carefully, otherwise danger of injury

The SMD 19102 DL is mounted on a stand:

When adjusting the height of the monitor, make sure that you do not trap your hand or any other body parts.

Description

3.1 Scope of delivery

Note

It is recommendable to keep the packaging material for subsequent transport of the monitor.

The SMD 19102 DL is delivered with the following components:

- CD with Instruction Manual
- European power cord
- DVI-D video cable

3.2 Applications

The SMD 19102 DL High End 19" (48 cm) Gray Scale Flat Panel Monitor has been specially designed for medical diagnostics according to the safety standard IEC 601 and complies with the safety standards UL 2601 and EN 60601-1:

SMD 19102 DL	Landscape, Desktop, with multifunctional stand, Last Image Hold function
---------------------	---

3.3 Important features

The flat panel monitor has the following features which permit a wide range of applications:

Compact design

Low weight and small dimensions with improved performance make the SMD 19102 DL High End Gray Scale Flat Panel Monitor preferable to conventional CRT monitors. Thanks to the equally narrow frame on each edge, the monitor fits into any environment, and is ideally suited for both desktop and ceiling installation.

3.3 Important features

Perfect picture reproduction thanks to LCD technology

The use of LCD technology eliminates picture geometry distortions and color spots.

The High End Gray Scale Flat Panel Monitor provides flicker-free pictures even at low refresh rates (60 Hz). The SMD 19102 DL High End Gray Scale Flat Panel Monitor therefore meets even the highest ergonomic requirements.

Modification of gray scale setting

In medical applications (e.g. for X-rays, computer tomography and MRI scanners), where pictures are usually displayed in shades of gray, the gray values can be adapted to the user's eye: This monitor setting, which is referred to as calibration, is performed at the factory and is therefore available on shipment (factory calibrated monitor). In addition, five different settings (Look Up Table – LUT) are saved in the monitor. In order to switch to other LUTs, please contact the service technicians, who will make the setting via the on-screen display (OSD – Servicelevel 2).

Screen resolution

The SMD 19102 DL High End Gray Scale Flat Panel Monitor is equipped with an active 19" TFT display module which provides a very wide viewing angle. The monitor offers maximum grayscale contrast (display function) across a very wide viewing angle (IPS in-plane switching technology). The optimum picture resolution is 1280 x 1024 pixels. Video signals with other resolutions, as are common in medical technology, are enlarged or reduced to fit the screen size. Alternatively, they can be displayed in their original size (1:1).

RGB input (15-pin Sub-D/DVI/BNC)

The display is connected to the computer system using either the 15-pin Sub-D input socket, the BNC sockets or the DVI input socket (digital only).

If necessary, the monitor display is adapted using an OSD menu.

Video inputs

SMD 19102 DL monitors feature two additional analog video inputs. The monitors can therefore be operated with analog standard video signals (PAL/NTSC). The RGB and video inputs can be simultaneously connected to different signal sources.

Force Mode

The Force Mode function is used to adapt the SMD 19102 DL monitors to special timing settings.

Landscape and portrait modes

The display can be used in landscape and portrait modes. The image rotation for portrait mode is made on the graphics card.

In portrait mode, the keypad is positioned at the top right and the OSD is not rotated (i.e. the OSD inscription "Dynamic help for keypad function" is still positioned above the keys).

Last Image Hold function

The SMD 19102 DL has a "Last Image Hold" function. During x-ray examination of the patient, the current image can be "frozen" on the LCD monitor. This function is triggered, for example, via a foot switch.

Via an additional switching output, other devices can be activated, such as printers or recorders, during the LIH function.

3.3 Important features

Application planning

4.1 Installation site

Provide adequate ventilation

Ventilation slots are located on the rear of the housing.

If the ventilation slots are covered or closed, the heat generated in the device cannot be dissipated sufficiently.

- Do not cover the ventilation slots.
- Do not close the ventilation slots.
- Observe the following distances:
At least 10 cm from the rear to a wall or at least 15 cm from the rear to other units.

Ensure unimpeded access to the power switch

CAUTION
Power switches and connections must be accessible at all times
When assembling or installing the device, ensure that the power switch and the connections are accessible at all times.

Observe the permissible ambient temperature range

The unit must not be operated outside the permissible ambient temperature range.

Desktop installation

The SMD 19102 DL monitor is mounted on a stand:

- You must place the monitor on a hard, horizontal surface.

Avoiding reflections on the screen

The monitor has an anti-glare surface which is only effective if the screen is clean and grease-free.

- If the screen surface is dirty, clean it using a suitable microfiber cloth.

Note the cleaning instructions (Page 81).

- Position the monitor so that it is free of reflections.

These reflections can be caused by lights, windows, furniture with shiny surfaces, or light-colored walls.

- To avoid reflections on the monitor: Only use non-dazzling reflector lights for the ceiling lighting.

Change of environment


If the unit is brought into a warm environment from a cold one, condensation may form in the unit. The device may therefore be damaged if it is switched on.

- Wait until the condensed water has evaporated, including from inside the device, before you switch it on again. The warming-up process may take several hours.

See also

Cleaning (Page 81)

5.1 General connection information

 CAUTION
All information and warnings related to this product must be observed to ensure danger-free operation.

CAUTION
Changes to device <ul style="list-style-type: none">• Device settings may only be adjusted by trained service personnel; otherwise, the warranty is void.• Do not make any changes to the device without prior approval from the manufacturer.

The display is designed for individual connection to a graphics card with a power supply of 110 or 240 V (TN-S system with PE conductor).

CAUTION
Observe shielding measures <p>Please observe all local EMC guidelines pertaining to shielding. If these requirements are not observed, interference signals could penetrate the monitor.</p> To guarantee perfect image reproduction, the following instructions should be observed: <ul style="list-style-type: none">• Only shielded cables are permitted for all signal connections.• Screw tight or lock all plug-in connections.• Signal and power cables must not be routed through the same duct.• The display must not share a power supply with motors or valves (interference peaks!).

CAUTION
Completely disconnect device from the supply mains
To completely disconnect the device from the supply mains, toggle the power switch on the rear of the monitor:
<ul style="list-style-type: none">• Move the power switch to the "OFF" position. The device is now switched off and disconnected from the supply mains.

See also

Electromagnetic compatibility (Page 89)

General safety notes (Page 9)

5.2 Connector location

The connectors are located in the connection panel under the cover on the rear of the monitor. The power switch is not covered and is freely accessible.

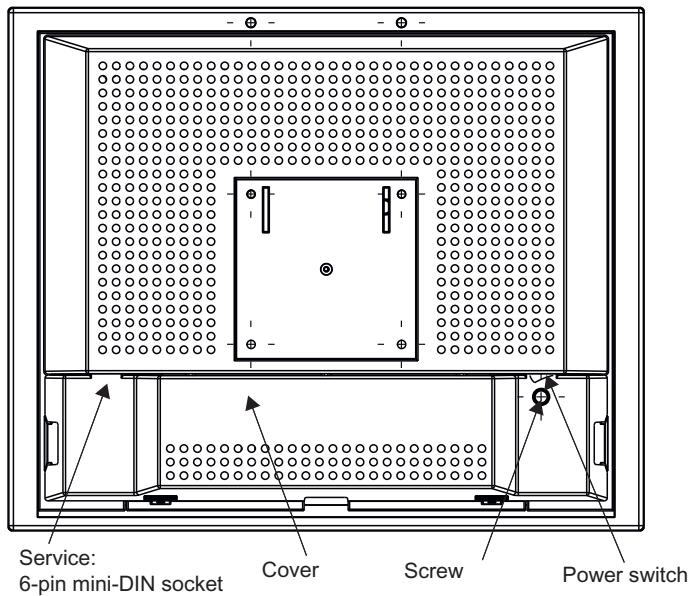
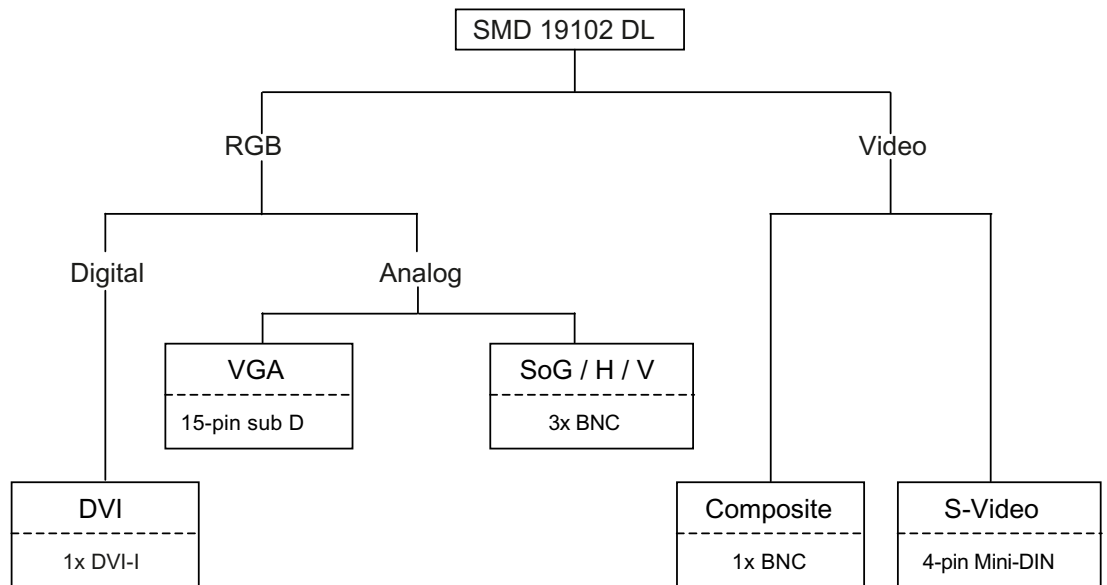


Figure 5-1 Rear view of SMD 19102 DL

See also

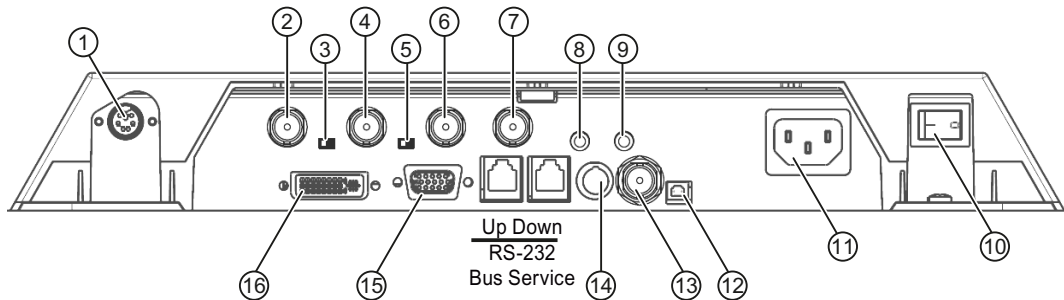
Connector panel (Page 24)

5.3 Summary of signals and connections



5.4 Connector panel

A connection panel for the signals and power supply is located at the rear of the flat panel monitor.



- ① Service: measuring instruments
- ② SoG/G
- ③ 75 Ω/10 kΩ switch loop for H and V
- ④ H/H+V
- ⑤ 75 Ω/10 kΩ switch loop for H and V
- ⑥ V
- ⑦ SoG/G-output
- ⑧ 3.5 mm In-jack socket
- ⑨ 3.5 mm Out-jack socket
- ⑩ Power switch
- ⑪ Power supply connection
- ⑫ 5 V
- ⑬ Composite
- ⑭ S-Video
- ⑮ VGA
- ⑯ DVI

See also

Connecting the signal cables (Page 25)

Connecting the line cord (Page 27)

Serial interface (Page 28)

5.5 Connecting the signal cables

CAUTION**Observe the signal source and signal input requirements**

- At least one signal source must be connected in order to activate the OSD.
- All signal inputs can be connected simultaneously.
- If the OSD is not active, use the Up and Down keys to select which RGB or video source is to be displayed. Selection is also possible in the OSD.

CAUTION**Avoid faulty picture display: cables of equal length, signals of equal level**

- When connecting to the BNC sockets, the three cables for the R, G and B signals must be of equal length. Otherwise, color fringing, which appears similar to convergence faults, will occur due to unequal propagation times.
- The levels of the incoming analog RGB signals must be equal.
- If the same RGB signal is connected to several monitors via the BNC sockets using T-connectors:
You must set the R, G, B and H DIP switches on the monitors to 10 k Ω . These DIP switches must be set to 75 Ω on the last monitor in the sequence.

Note**Names of the image signals**

- Image signals coming from a graphics card are referred to as RGB signals.
- Image signals coming from a camera, a DVD player or a video recorder are referred to as video signals.

In the OSD menu, some of the menu displays are therefore identified by RGB or video in the header.

The signal connections are located on the rear of the flat panel monitor.

15-pin Sub-D socket

- Connect VGA cable with 15-contact Sub-D connector (male) for the analog input to the 15-contact Sub-D connector (female).

DVI socket

- DVI digital signal

BNC sockets (SoG / H / V)

- With a wire (R or **G** or B, with composite synchronization):
 - Connecting wire for BNC connection "G".
- With three wires (R or **G** or B, with separate synchronization):
 - Connecting wire for BNC connections "G", "H/H+V" and "V".

4-pin mini-DIN socket (video input)

- Connect video cable for the sync video input (Y/C signal) to the 4-pole mini-DIN socket.

BNC socket (video input)

- Connect video cable for the composite input to the BNC socket.

Socket for jack connector

- Connect 3.5 mm jack connector for the LIH function.

See also

General connection information (Page 21)

Connector panel (Page 24)

5.6 DIP switches

The SMD 19102 DL monitor has two DIP switches between the three BNC sockets.

These switches are used for changeover between high impedance (10 kΩ) and low impedance (75 Ω) for the H and V synchronization inputs.

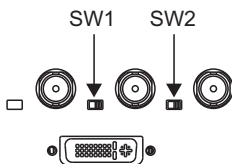


Figure 5-2 Position of the DIP switches

Delivery state

Switch	Function	Delivery state
SW1	Input resistance for H/H+V signal	75 Ω
SW2	Input resistance for V signal	75 Ω

5.7 Connecting the line cord

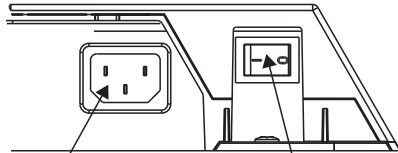
! DANGER

Only connect device to a supply mains with a PE conductor

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

The power supply socket is on the rear of the flat panel monitor (only open using appropriate tool!). The monitor's power supply is connected using an appliance plug.

- Insert the appliance plug of the supplied power cord into the mains socket.
- The power cord can be secured using a cable grip.

**! WARNING**

- Only use the supplied power cord, or a cable with PE conductor and appliance plug to DIN 49 547, IEC 320 (max. length 3 m). Furthermore, the cable must adhere to all local safety regulations applicable to the specific country in which the display is used.
- Device fuses must only be replaced by the repair centers or servicing department.
- **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.

See also

General connection information (Page 21)

Connector panel (Page 24)

5.8 Serial interface

WARNING

- Apart from Serial Spot Meters and Serial Luminance Meters, no other devices may be connected to the service socket.
- Connection and removal of a unit may only be carried out by servicing personnel or those trained by them.
- Serial Spot Meters or Serial Luminance Meters must not be connected in the presence of patients.

The monitor has three serial RS 232 interfaces:

- **Downstream RJ11 socket:**

identified in the Fig. "Possible configuration – serial bus mode" by "2". The socket is located **on the right** (landscape version) **or at the bottom** (portrait version) on the rear of the monitor.

- **Upstream RJ11 socket:**

identified in the Fig. "Possible configuration – serial bus mode" by "1". The socket is located **on the left** (landscape version) **or at the top** (portrait version) on the rear of the monitor, right next to the VGA plug.

- **6-pin mini-DIN socket (downstream):**

identified in the drawing below as "3".

This serial interface (also called the "service socket") is easily accessible on the rear of the monitor. The 6-pin mini-DIN socket is available for the connection of a Universal Serial Luminance Meter or a Serial Spot Meter.

Please note the "Service socket for measuring instruments" figure: It shows the lower left corner of the underside of the monitor (viewed from rear).

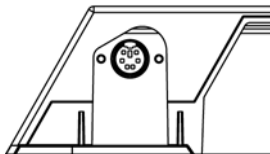


Figure 5-3 Service socket for measuring instruments

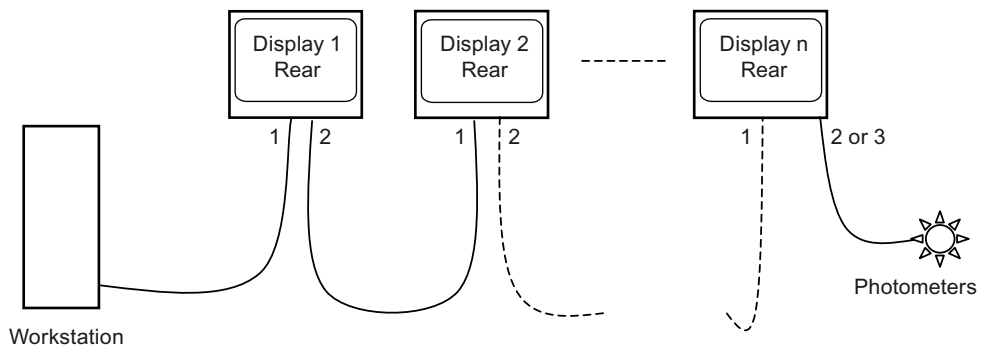


Figure 5-4 Possible configuration – serial bus mode

* Photometer is a generic term for the measuring instruments suggested by EIZO GmbH Display Technologies:

- Universal Serial Luminance Meter with adapter from 9-contact Sub-D to 6-contact mini-DIN socket **)
- Serial Spot Meter with adapter from 9-contact Sub-D to 6-contact mini-DIN socket **)

** Service mode! Not permitted in vicinity of patients.

If the monitor connection is made via the serial bus (see Fig. "Possible configuration – serial bus mode"), the setting "Serial bus" must first have been activated using "On Screen Display → Servicelevel 2 → Others". The bus address (1, 2, 3... - assignment of different numbers to the monitors connected via the same bus) must also be assigned to each device (also using "On Screen Display → Servicelevel 2 → Others").

See also

General safety notes (Page 9)

Connector panel (Page 24)

Menu functions (Page 34)

Commissioning

6.1 Switching on the monitor

- Switch on the monitor using the power switch.
The green operation LED must now light up permanently.

See also

Troubleshooting (Page 83)

6.2 Operator controls

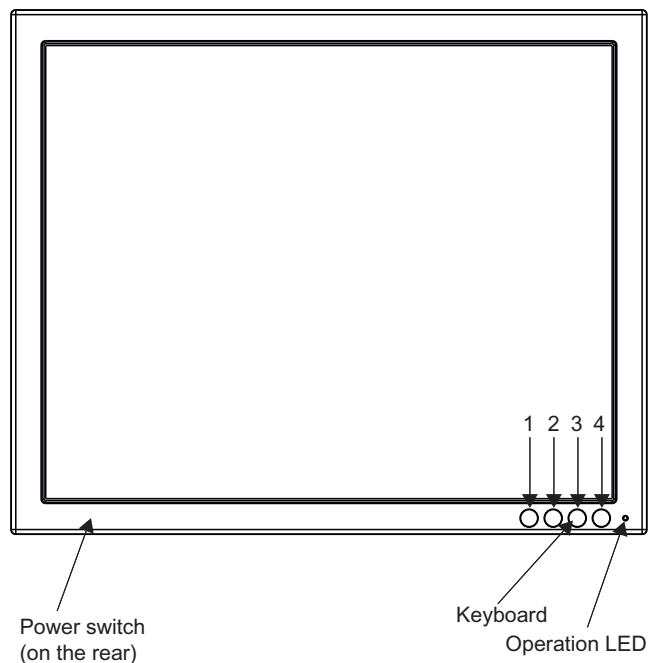


Figure 6-1 Front view: Keypad and status LED

The four buttons and the status LED are located on the front in the bottom right-hand corner of the monitor.

The status LED is lit when power is supplied to the device and the power switch is set to On.

Key functions

In the OSD menu, the keys have the following functions:

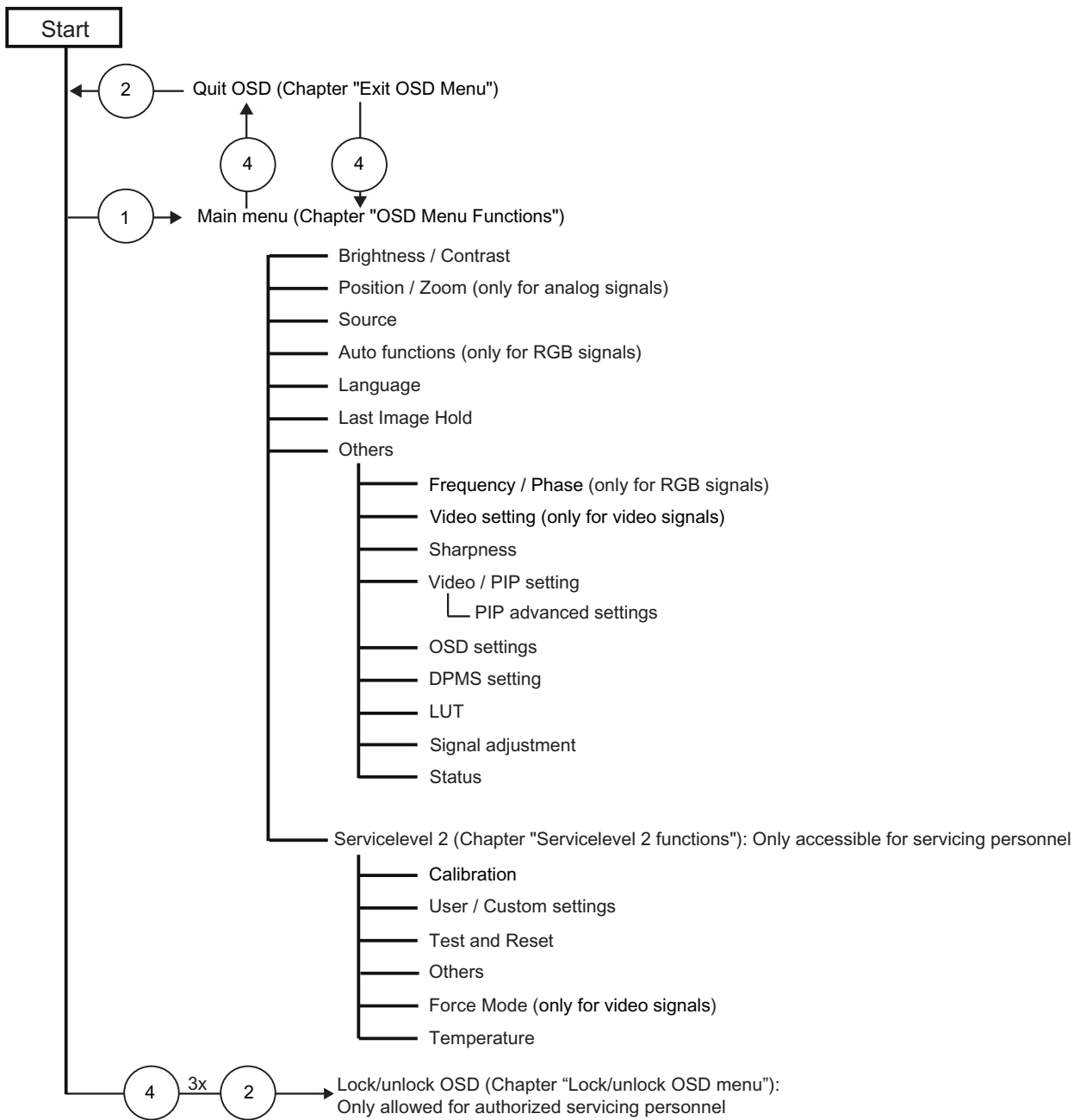
Key	Situation	Action
1	Always	Scrolling
2	Submenu is selected	Select submenu
	Function is selected	Increase/change value
3	Function is selected	Decrease/change value
4	Apart from in the "Exit OSD" menu	Return to previous menu level (settings are retained)
	In the "Exit OSD" menu	Return to main menu (settings are retained)

6.3 Description of OSD menu

6.3.1 OSD overview

The OSD menu is used to make settings for operation of the Flat Panel Monitor with a source.

The OSD can also be operated without an input signal to a limited extent.



See also

- Exit OSD (Page 47)
- Menu functions (Page 34)
- Service level 2 functions (Page 48)
- Lock/unlock OSD menu (Page 55)

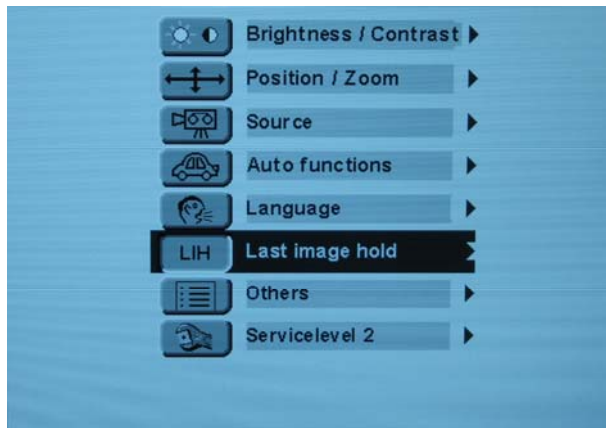
6.3.2 Menu functions

Program levels


Printed/identified in bold type



Menu title (main menu or first submenu)

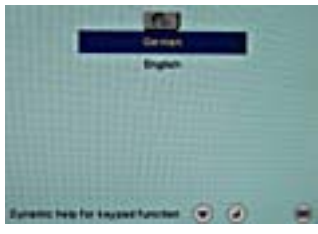
Main menu

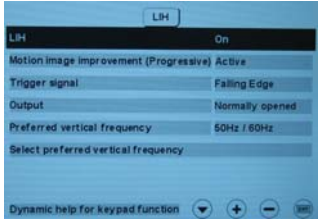



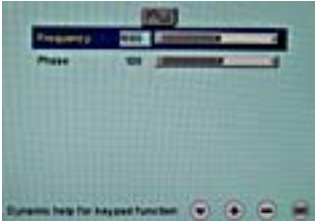
Main menu	Function	Adjustment/range	Description
Brightness/Contrast 	Brightness	0 ... 100 %	Set brightness Adapting the representation of darker picture areas. <i>Note:</i> The brightness settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).
	Contrast	0 ... 100 %	Set contrast Adapting the representation of brighter picture areas. <i>Note:</i> The contrast settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).

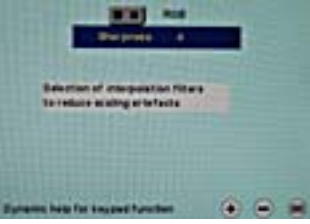
Main menu	Function	Adjustment/range	Description
	Backlighting	0 ... 100 % Recommended setting: Max. 80 %	Adjusting the monitor backlighting brightness Adjustment of overall brightness to ambient lighting. <i>Note:</i> If the function "Backlight Command" is activated in the "Others → LUT" menu, the backlight setting cannot be changed.
Position / zoom (not for analog picture signal) 	H position	0 ... 100 %	Shift picture in horizontal direction With identical monitor and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
	V position	0 ... 100 %	Shift picture in vertical direction With identical monitor and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
	Zoom	1 to 1 Fill all Fill ratio Square <i>Default: Fill all</i>	Selection between different picture size settings: <ul style="list-style-type: none"> • <i>1 to 1:</i> The picture is displayed on screen with its original resolution. • <i>Fill all:</i> The picture is displayed to fill the complete screen (1280 x 1024 pixels). • <i>Fill ratio:</i> The picture is zoomed to the maximum screen area with retention of the aspect ratio. • <i>Square:</i> The picture is zoomed to square format.

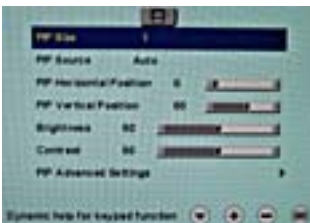
Main menu	Function	Adjustment/range	Description
<p>Source</p> 		<p>VGA DVI Digital Composite S-Video SoG / H / V</p>	<p>Select source for main display</p> <p>Selection of picture source for full format image.</p> <p>If you call this OSD menu, the current source is displayed.</p> <p>After switching the monitor off and on again, the sources are queried in sequence.</p> <p><i>Note</i></p> <p>Alternatively, the source can be selected through a hot key function (see the OSD menu → Others → OSD setting).</p>
<p>Auto functions (only for analog signal)</p> 	<p>The auto functions support automatic adjustment of the parameters. The quality of the settings depends on the picture contents and the type of synchronization.</p> <p>All settings can of course also be optimized manually using the corresponding items in the OSD menu.</p> <p><i>Note:</i> We recommend that an SMPTE test picture is displayed</p>		
	<p>Auto brightness/contrast</p>	<p>On/Off <i>Default: On</i></p>	<p>This parameter can be selected for the auto function</p> <p>With "On", the brightness and contrast are adjusted when the "Auto functions" are executed.</p> <p>With "Off", the brightness and contrast are not adjusted when the "Auto functions" are executed.</p> <p><i>Note</i></p> <p>This function is not available for "Sync on green signals".</p>
	<p>Auto position/phase/frequency</p>	<p>On/Off <i>Default: On</i></p>	<p>This parameter can be selected for the auto function</p> <p>With "On", the position, phase and frequency are adjusted when the "Auto functions" are executed.</p> <p>With "Off", the position, phase and frequency are not adjusted when the "Auto functions" are executed.</p>

Main menu	Function	Adjustment/range	Description
	Execute selected autofunctions	Execute	<p>The selected autofunctions are executed</p> <p>This sets brightness, contrast, position, frequency and phase to their optimum values. The quality of the function depends on the applied image contents.</p>
<p>Language</p> 		<p>German, English <i>Default: English</i></p>	<p>Use the "Language" menu to select the language of the OSD menu</p> <p>German or English can be selected. English is the delivery default setting.</p>

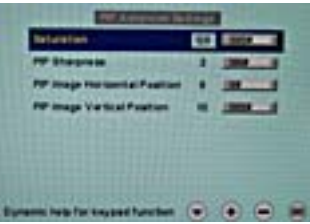

Main menu	Function	Adjustment/range	Description
	<p>By activating the trigger signal, the current picture is displayed on the monitor until the trigger signal is reset.</p>		
	LIH	On/Off <i>Default: Off</i>	If you select "On" the Last Image Hold function is activated.
	Motion image improvement (Progressive / Interlaced)	Active / Inactive <i>Default: Active</i>	In the case of motion images, you must set this function to "Active". This is how you ensure that a complete image is always "frozen".
	Trigger signal	Rising edge / Falling edge <i>Default: Falling edge</i>	You must set the trigger signal correctly according to the system configuration.
	Output	Normally opened / Normally closed <i>Default: Normally opened</i>	A floating contact for the connection of external devices is output.
Preferred vertical frequency	50 Hz / 60 Hz 72 Hz / 75 Hz <i>Default: 50 Hz / 60 Hz</i>	<p>If the vertical frequency of the input signal is 72 Hz / 75 Hz:</p> <ol style="list-style-type: none"> You must select the preferred vertical frequency "72 Hz / 75 Hz" according to the vertical frequency of the input signal. You must confirm the modified vertical frequency by clicking on "Select preferred vertical frequency". <p>This means that the vertical frequency will be recognized correctly in the Last Image Hold function.</p> <p><i>Note</i> You can view the vertical frequency of the input signal in the OSD menu under "Others" → "Status".</p>	
	Select preferred vertical frequency	<p>If you change the vertical frequency to "72 Hz / 75 Hz", the frequency change must be loaded:</p> <ul style="list-style-type: none"> To do this, click "Select preferred vertical frequency". <p>This means that the vertical frequency will be recognized correctly in the Last Image Hold function.</p>	

Main menu	Function	Adjustment/range	Description
<p>Others</p> 			
	Frequency / phase(only for analog signal)		
	Frequency (only for RGB signals)	1638 ... 1738	Setting the frequency and phase of the input signal If the vertical lines are still slightly fuzzy, adjust the "Frequency/Phase" setting. <i>Note</i> We recommend that a vertical line from the "Pixel On/Off" test pattern is displayed.
Phase (only for RGB signals)	0 ... 255		

Main menu	Function	Adjustment/range	Description
	Sharpness		
	Interpolation filters	1 ... 5	<p>One of 5 filters can be selected for setting the sharpness, in order to reduce scaling artefacts.</p> <p>You must visually determine which sharpness setting is best.</p> <p>Common filters are available for the RGB picture sources (VGA, DVI).</p> <p>The interpolation filters depend on the input resolution. A filter is not normally used with 1280 x 1024 since each physical pixel can be controlled individually by its own pulse.</p> <p>At lower resolutions, the filter calculates the value for the non-controlled pixels.</p> <p>The larger the filter number (No. 1, 2, ...5), the finer/deeper the calculation, i.e. the picture appears smoother and more details are lost.</p> <p>Users should individually set the filter depending on the application:</p> <p>Filter No. 1 produces the "sharpest" picture, as it does the least filtering.</p> <p>Filter No. 5 filters the most; the greatest danger exists with this filter that details can no longer be recognized.</p>



Main menu	Function	Adjustment/range	Description
	Video/PIP setting		
	PIP size	Off 1 2 3 <i>Default: Off</i>	Activating and deactivating the PIP window and setting the PIP window size
	PIP source	Auto VGA DVI Digital Composite S-Video SoG / H / V <i>Default: Auto</i>	Selection of source to be shown in the PIP window. "VGA" and "DVI" or "SoG / H / V" cannot be displayed simultaneously. <i>Note</i> When an RGB signal is displayed in the PIP window, resolutions of up to 1280 x 1024 can be displayed in PIP size 3 and 800 x 600 in PIP size 2. The PIP window remains black if the signal cannot be displayed. To display the signal: <ul style="list-style-type: none"> • Reduce the resolution of the signal or • Change the window size under "PIP size"
	PIP horizontal position	Slider	Shift the PIP window in the horizontal direction
	PIP vertical position	Slider	Shift the PIP window in the vertical direction
Brightness	0 ... 100 %	Adjust the brightness of the PIP window Adapting the representation of darker picture areas. <i>Note:</i> The brightness settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).	

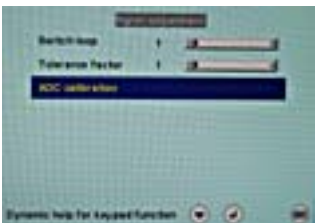
6.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
	Contrast	0 ... 100 %	<p>Adjust the contrast of the PIP window</p> <p>Adapting the representation of brighter picture areas.</p> <p><i>Note:</i></p> <p>The contrast settings are already optimized for digital DVI signals. Manual changes to these values are not recommended, as this can result in an impairment of picture quality (loss of gray scales).</p>
	PIP advanced settings		
	PIP sharpness (only for analog signal)	1 ... 5	<p>One of 5 filters can be selected for setting the sharpness of the PIP image in order to reduce scaling artefacts.</p> <p>You must visually determine which sharpness setting is best.</p> <p>See "Sharpness" in the "Others" menu: Description of details via the filters.</p>
	PIP image horizontal position (only for analog signal)	Slider	Shift the image in the horizontal direction in the PIP window
	PIP image vertical position (only for analog signal)	Slider	Shift the image in the vertical direction in the PIP window
	OSD settings		
	Horizontal position	Slider <i>Default: Right</i>	Setting of horizontal position of OSD menu
	Vertical position	Slider <i>Default: Down</i>	Setting of vertical position of OSD menu
	Background	Opaque Transparent <i>Default: Opaque</i>	Selection of OSD background (Opaque or Transparent).
	LED	Dimmed Lit <i>Default: Dimmed</i>	Adjust the brightness of the status LED.


Main menu	Function	Adjustment/range	Description
	OSD lock/hotkey	Hotkey brightness / contrast Hotkey backlight Hotkey select source <i>Default: OSD available</i>	<p>Selection of different OSD lock/hotkey settings:</p> <ul style="list-style-type: none"> • <i>Hotkey brightness / contrast:</i> The OSD menu is locked and can only be unlocked using a specific key combination. Only the brightness and contrast can be changed by any user with the OSD keys without the need for a key combination. • <i>Hotkey backlight:</i> The OSD menu is locked and can only be unlocked using a specific key combination. Only the backlight can be changed by any user with the OSD keys without the need for a key combination. • <i>Hotkey select source:</i> The OSD menu is locked and can only be unlocked using a specific key combination. Only the source can be changed by any user with the OSD keys without the need for a key combination. <p><i>Note:</i> See "Lock OSD menu" (Page 55)</p>
	Hotkey for PIP activation	Active Inactive <i>Default: Inactive</i>	<p>Activating and deactivating the PIP window with button 4 on the front</p> <p>If "Active" is selected, the PIP window can be opened or closed with the saved settings using button 4 on the front without opening the OSD menu.</p>

6.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
	DPMS setting		
	DPMS	On Off <i>Default: On</i>	The DPMS (Display Power Management Signaling) can be switched on/off. If the DPMS is activated and there is no input signal, the backlight is switched off or darkened (depending on the parameter for the "DPMS Off mode": see below). This saves power, and increases the service life of the backlight.
	DPMS Off mode (backlight)	Dimmed Off <i>Default: Dimmed</i>	"DPMS Off mode" can be set to "Dimmed" or "Off". The backlight is then either dimmed or switched off when the DPMS mode is active.
	LUT choice		
	LUT backlight command	On/Off <i>Default: On</i>	Permits access to the backlight <ul style="list-style-type: none"> When "On" is selected, the backlight cannot be changed in the "Brightness/contrast" menu. When "Off" is selected, the backlight can be changed in the "Brightness/contrast" menu.
	Select display function	1 ... 5 <i>Default: 1</i>	Selection of display function: information on the selected curve For further details on LUT settings, see "Monitor adjustment – LUT" (Page 58). The LUTs that can be selected are displayed in the table in the OSD menu.

Main menu	Function	Adjustment/range	Description
	Signal adjustment		
	Switch loop	1 ... 255 <i>Default: 1</i>	<p>The following four parameters are of relevance for this tool:</p> <ul style="list-style-type: none"> • H-frequency • V-frequency • V-total • Interlaced/non Interlaced <p>If one of these parameters changes, the monitor treats it as a timing change and initiates resynchronization via an "Auto in progress". To prevent this from happening as a result of each and every minor signal disturbance, the value representing the permissible number of faulty or changed frames must be increased in the case of unstable signal sources.</p> <p><i>Disadvantage:</i> The higher the tab setting, the longer it will take for a desired timing change to occur (delayed by a number of milliseconds).</p>
	Tolerance factor	1 ... 10 <i>Default: 1</i>	<p>This tool only considers the H and V frequencies.</p> <p>An increase in the tab value results in a larger tolerance band being defined. Minor frequency fluctuations within this range will not result in resynchronization ("Auto in progress").</p>
Signal (only for analog signal)	RGB Monochrome <i>Default: Monochrome</i>	<p>Switch over signal between b/w and color operation</p> <ul style="list-style-type: none"> • If a monochrome signal arrives, it appears green on the color monitor. • To obtain correct b/w images, set the "Signal" parameter to monochrome. 	


Main menu	Function	Adjustment/range	Description
	ADC calibration	Execute	<p>Automatically calibrate A/D converter for the applied video level</p> <p>The video level range of the system is checked, and the monitor set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source.</p> <p>The calibration results in a larger and more flexible video level range (e.g., the full brightness is also achieved at 700 mV if the video level is limited at this value).</p> <p><i>Note</i></p> <p>A specific test pattern and timing are prerequisites!</p> <p>The A/D converters have already been factory-set and need not be readjusted.</p>

Main menu	Function	Adjustment/range	Description
	Status	Information	<p>Current monitor settings in the respective picture mode can be called here.</p> <ul style="list-style-type: none"> • Operating hours of the monitor • Temperature in the housing (actual and maximum temperature over the complete service life of the monitor) • Firmware type and version • OSD version • Configuration version • Current timing • Current source • Screen resolution • Frequency of the input signal (line frequency and refresh rate)
Servicelevel 2	Settings in this menu must only be carried out by servicing personnel! For further information, see "Service level 2 functions" (Page 48).		

See also

Monitor adjustment - Last Image Hold (LIH) (Page 59)

6.3.3 Exit OSD

<p>Exit OSD menu</p> 	<p>Accept changes Reject changes</p>	<p>You exit the OSD and can save or reject any changes.</p> <p>Press button 2 if you unintentionally entered this menu and want to return to the main menu.</p> <p><i>Note:</i></p> <p>If the OSD menu is exited by changing the timing or switching off the monitor, the changes made are saved.</p>
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See also

Service level 2 functions (Page 48)

6.3.4 Servicelevel 2 functions

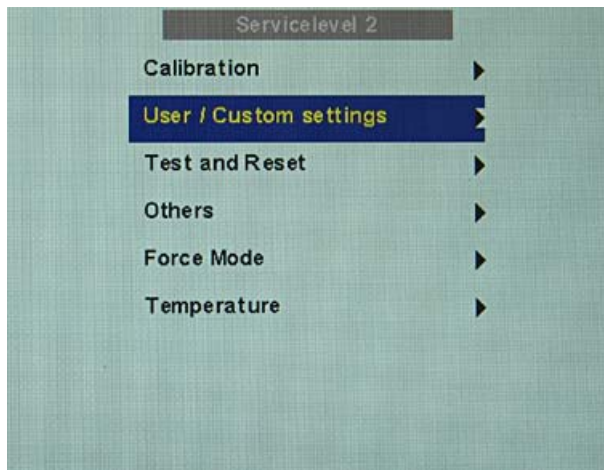
CAUTION
Only servicing personnel trained by EIZO GmbH Display Technologies have access to "Servicelevel 2."


The "Servicelevel 2" menu can be accessed from the OSD main menu.

Key combination for opening "Servicelevel 2"

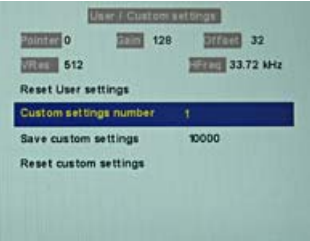
- Briefly press the Up key and immediately keep the Down key pressed.


Menu structure

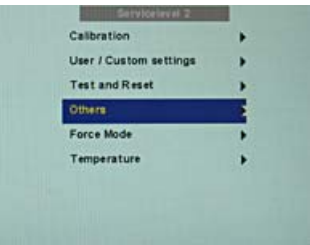


Servicelevel 2	Function	Adjustment/range	Description
	Temperature	Information	Specified as info in °C
	Backlight command	Information	Facility for reading out the current tab value of the backlight
	Backlight sensor info	Information	<ul style="list-style-type: none"> • Backlight sensor regulation • Minimum and maximum regulation
	When backlight regulation is set to "On": Backlight (regulated)	0 ... 100 %	<p>Adjustment of brightness of monitor backlight</p> <p>Adjustment of overall brightness to ambient lighting.</p>



Servicelevel 2	Function	Adjustment/range	Description
	When backlight regulation is set to "Off": Backlight (controlled)	0 ... 3360	Backlight inverter value
	Backlight regulation	On Off <i>Default: On</i>	The backlight regulation (backlight sensor) is switched on or off
	ADC calibration	Execute	<p>Automatically calibrate A/D converter for the applied video level</p> <p>The video level range of the system is checked, and the monitor set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source.</p> <p>The calibration results in a larger and more flexible video level range (e.g., the full brightness is also achieved at 700 mV if the video level is limited at this value).</p> <p><i>Note</i></p> <p>A specific test pattern and timing are prerequisites!</p> <p>The A/D converters have already been factory-set and need not be readjusted.</p>
	Backlight margin	Information	<p>Remaining margin of backlight that can be used for regulation</p> <p><i>Note</i></p> <p>The data is only displayed when the panel has warmed up (after approx. 20 min). The display value only serves for information purposes.</p>

Servicelevel 2	Function	Adjustment/range	Description
	Reset User settings	Execute	All automatically stored timing data are deleted
	Custom settings number	1 ... 5	<p>Custom settings can be saved here</p> <p>A total of 5 custom settings can be generated. The digit is the code number for the memory location.</p>
	Save custom settings		<p>Press the "Up" key to save the current picture settings and timing data to the memory addresses specified via the "Custom settings number".</p> <p>The 5-digit combination indicates which individual memory addresses have been allocated.</p> <p><i>Example:</i> 10010 → Addresses 1 and 4 have been allocated.</p>
	Reset custom settings	Execute	Clears the content of the five memory locations

Servicelevel 2	Function	Adjustment/range	Description
<p data-bbox="161 285 328 310">Test and Reset</p> 	<p data-bbox="491 285 627 310">Test pattern</p>	<p data-bbox="823 285 863 310">Off</p> <p data-bbox="823 325 935 351">Gray bars</p> <p data-bbox="823 366 1023 391">Calibration picture</p> <p data-bbox="823 406 954 431"><i>Default: Off</i></p>	<p data-bbox="1155 285 1406 342">Fixed test patterns are available</p> <p data-bbox="1155 357 1474 619">The test patterns are generated directly in the monitor's processor. The test patterns can be used to analyze whether a fault is present in the control electronics or has to be searched for in the plugs/cables or video source.</p> <ol style="list-style-type: none"> <li data-bbox="1155 634 1474 774">3. If the test pattern is displayed without faults, one should first check the connections and video sources. <li data-bbox="1155 789 1474 987">4. If the video source and the connections are OK, and if the test pattern is displayed perfectly, the fault must be searched for in the video input range of the monitor. <p data-bbox="1155 1002 1474 1081">The test patterns can also be used to check the panel quality:</p> <ul style="list-style-type: none"> <li data-bbox="1155 1095 1474 1293">• Proof of the contrast with gray scales and color channels (independent of picture, picture program, graphics card and connectors). <li data-bbox="1155 1308 1474 1513">• All the pixels on the display area are activated (exception: The first column on the left of the panel remains black). Test of columns or line driver

Servicelevel 2	Function	Adjustment/range	Description
	Reset to factory defaults	Execute	<p>All parameters are reset</p> <p>The following are deleted:</p> <ul style="list-style-type: none"> • User settings • Custom settings <p>The following are reset:</p> <ul style="list-style-type: none"> • Backlight • Sharpness • User color location • Signal settings • Black level settings • RGB relation • DPMS settings • Language • OSD setting • Gamma curve • Standard group • Info window settings • Serial interface settings • H-Scaler clip
	Restart	Execute	<p>The processor is reset</p> <p>The power supply unit is not switched off. The monitor restarts.</p>
<p>Others</p> 	Info	<p>On Off <i>Default: Off</i></p>	<p>To display an info window</p> <p>The info window is displayed on the bottom right of the screen if the source changes. It provides more detailed information about the set timing.</p>
	Serial interface	<p>On Off <i>Default: On</i></p>	<p>The serial interface can be activated or deactivated.</p> <p>If the serial interface is deactivated ("Off"), it is possible to suppress e.g. the downloading of firmware.</p>

Servicelevel 2	Function	Adjustment/range	Description
	Serial bus	Enable Disabled <i>Default: Disabled</i>	To configure a network of several monitors This function is used to interconnect several monitors so that they can all be calibrated using a single computer (connected to the first monitor). <i>Note:</i> See the section "Serial interface" (Page 28)
	Bus address	Slider from 0 ... 10 <i>Default: 1</i>	Definition of bus address for monitor.
	H-Scaler clip	Slider from 0 ... 100	Supports adjustment to the aspect ratio The picture can be expanded or compressed in the horizontal direction.
	Motion image improvement	Active Inactive <i>Default:</i> <i>Interlaced signals: Active</i> <i>Progressive signals: Inactive</i>	Activation of motion image improvement <ul style="list-style-type: none"> Undesirable comb effects can be reduced in the case of interlaced signals with PAL and NTSC resolutions connected to the "VGA" and "DVI Analog" signal inputs. Undesirable staircase signals can be reduced in the case of non-interlaced signals (progressive) of up to 60 Hz connected to the "VGA" and "DVI Analog" signal inputs. <i>Note:</i> See Chapter "Motion image improvement" (Page 77)

Servicelevel 2	Function	Adjustment/range	Description
Force Mode 	Blind mode	Execute	<p>Force Mode is a tool for setting unknown timings that are not displayed via exact modes that have already been stored.</p> <p>Suitable for the direct input of previously determined Force Mode data.</p> <p><i>Note:</i> See section "Monitor adjustment - Force Mode" (Page 60)</p>
	Live mode	Execute	<p>Force Mode is a tool for setting unknown timings that are not displayed via Exact Modes that have already been stored.</p> <p>Suitable for step-by-step setting of an unknown timing or for fine adjustment of a timing whose data have been entered using "Blind mode".</p> <p><i>Note:</i> See section "Monitor adjustment - Force Mode" (Page 60)</p>
	Help	Execute	Brief description of the Force Mode functions
Temperature 	Temperature limit	25 °C ... 90 °C <i>Default: 60 °C</i>	Here you can select the temperature above which the monitor is dimmed
	Shutdown temperature	25 °C ... 90 °C <i>Default: 70 °C</i>	Here you can select the temperature above which the monitor is switched off

6.3.5 Lock/unlock OSD menu

CAUTION
Locking/unlocking only by authorized service personnel
Only authorized service personnel may lock or unlock the OSD menu. If the user can affect the intended use of the monitor through inappropriate settings, the OSD menu should be locked.

Lock

You can lock the call from the OSD if the OSD is not active.

To lock, enter the following key combination without interruption:

- Press button "4" and then button "2" three times.

The OSD menu is locked.

Cancel locking

- Press button "4" once and then button "2" three times (if the OSD is not active).

Locking of the OSD menu has been canceled.

Delivery state

The OSD is unlocked.

See also

Menu functions (Page 34)

6.4 System settings

Optimum picture quality

CAUTION
Optimum picture quality only with a graphics resolution of 1280 x 1024 pixels
To achieve optimum picture quality, the monitor must be operated with a graphics resolution of 1280 x 1024 pixels. The corresponding setting for the graphics card must be made in the operating system.

6.4.1 Avoiding image sticking

So-called image sticking may occur with TFT monitors. Image sticking is an effect whereby a faint image of the previous screen contents can be seen after the display contents have changed. The following measures can reduce or prevent image sticking:

- Use a screen saver with regularly changing images
- Switch off the monitor when it is no longer needed.
- The monitor has a power saving mode:
Activate the power saving mode if one is supported by the application being used.

6.4.2 Adjusting the image geometry

The display automatically recognizes the used standard, and has preprogrammed set-up values for each standard. However, depending on the graphics card used, it may still be necessary to align and size the picture for the selected standard.

6.4.3 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.

CAUTION
Brightness and contrast can only be set accurately using a photometer (Serial Spot Meter, Serial Luminance Meter, Universal Serial Luminance Meter, Advanced Serial Luminance Meter).

CAUTION
Fine adjustment of analog inputs: Only via 15-pin Sub-D and DVI-I connector Fine adjustment of digital input: not necessary
<ul style="list-style-type: none">• Fine adjustment of the Flat Panel Monitor should only be carried out via the two analog ports (15-pin Sub-D and DVI-I).• The digital input (DVI-D) does not require a fine adjustment since the signal display is always optimum. With a fine adjustment, it is possible that gray scales are not displayed.

Note on adjustment

- Use the SMPTE test pattern.
- Adjust the brightness so that image sections with 5 % and 0 % gray value still visibly contrast.
- Adjust the contrast so that image sections with 95 % and 100 % gray value still visibly contrast. To adapt the luminosity to the ambient lighting, adjust the backlight brightness (caution: factory-set brightness is no longer observed).

See also

Menu functions (Page 34)

6.4.4 Monitor adjustment – video source/graphics card

As with all monitors, the flat panel monitor also has certain limits, e.g. maximum resolution and refresh rate.

- The graphics card must be set when using the monitor such that these limits are observed.

CAUTION
Fine adjustment of monitor only via the analog port
Fine adjustment of the Flat Panel Monitor can only be carried out via the analog port (15-pin Sub-D). The digital input (DVI-D) does not require a fine adjustment since the signal display is always optimum.

RGB sources (via 15-pin Sub-D or DVI-I 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 into digital signals for the Flat Panel Monitor by a video digitizer. Depending on the 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 Monitor.

A manual fine adjustment is therefore necessary during which the Flat Panel Monitor (or, more precisely, the video digitizer) is matched to the respective video source.

The fine adjustment includes, for example, setting the horizontal/vertical picture position and the picture sharpness. This can be done via the OSD menu.

In order to optimize the monitor settings for the installed graphics card and guarantee that all greyscales can be distinguished, we recommend that brightness and contrast are adjusted only for the analog inputs.

Please note that the calibration (in the look up table) is not affected by these settings (EIZO GmbH Display Technologies monitors are factory-calibrated and retain these settings):

- Use a picture with 0% gray value (black) and a suitable measuring instrument (a spot meter is recommended) in order to reduce the brightness with the aid of the OSD control elements until the measuring instrument displays constant values (i.e. the measured value no longer changes). Then increase the brightness slightly until the monitor is just above the lowest black level (one step is generally sufficient).
- The white value can be set in the same way. Again, use a test pattern with 100% gray value (white) and the measuring instrument. Only the contrast should be adjusted, to ensure that the black value remains unchanged.
- Increase the contrast until the measuring instrument no longer registers an increase in light density. Then reduce the contrast to slightly below the maximum value (one or two steps are usually sufficient).
- Make sure once again that the black value has not changed. If it should have changed, repeat the two steps described above until the value no longer changes (cause: black value reduction).

The monitor is now configured for optimum performance with the installed graphics card. If you are still not satisfied with the light density, you can increase the black and white values further by adjusting the backlighting in the OSD menu.

CAUTION

A permanently higher setting for the backlighting may reduce the brightness performance
Please note that a permanently higher setting for the backlighting results in a more rapid reduction in the brightness performance toward the end of the service life.

See also

Menu functions (Page 34)

6.4.5 Monitor adjustment – LUT

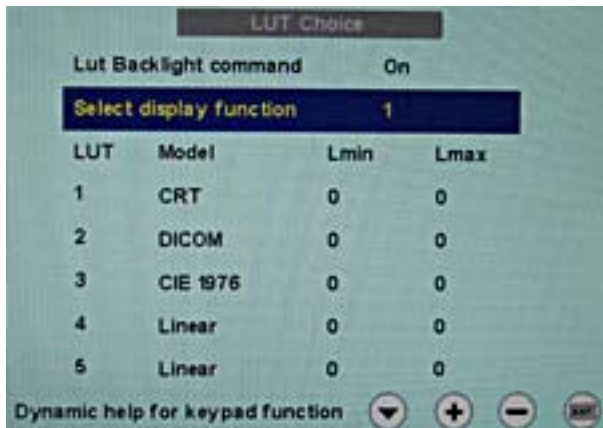


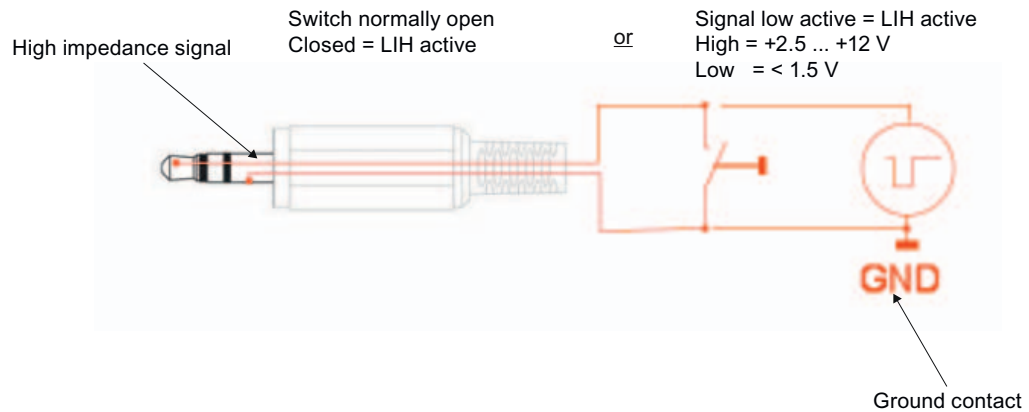
Figure 6-2 LUT

You can choose between five different LUT values in this menu. The values saved in the monitor are shown in a table in the OSD window.

See also

Menu functions (Page 34)

6.4.6 Monitor adjustment - Last Image Hold (LIH)



When the trigger signal is activated with the Last Image Hold function, the currently displayed image is stored in the image memory of the monitor and displayed until the trigger signal is reset. You can either use a switch (close/open) as a trigger signal or an active low/high signal.

Last Image Hold function: Make settings

To use the LIH function, in the OSD menu under "Last Image Hold", you must set several parameters (Page 34).

CAUTION

Default settings for "Last Image Hold" in the OSD menu

- "LIH" not switched on.
- "Motion image improvement (Progressive / Interlaced)" is activated.
- "Falling edge" is set for the trigger signal.
- V frequency is set to "50 Hz / 60 Hz".

1. LIH must be switched on, otherwise the trigger signal is not detected.
2. Activated "Motion image improvement (Progressive / Interlaced)":
During x-ray examination, if motion images are generated, this ensures that always a complete image is "frozen".
3. You must set the trigger signal correctly according to the system configuration:
If you do not adjust the trigger signal, you cannot use the LIH function.
4. The vertical frequency must be adapted to the input signal.
If you change the vertical frequency to "72 Hz / 75 Hz", the frequency change must be loaded into the OSD menu under the LIH function:
 - To do this, click "Select preferred vertical frequency".

6.4.7 Monitor adjustment - Force Mode

6.4.7.1 Introduction

"Force Mode" is an engineering tool

Force Mode is only used to determine exotic and unknown timings. Using these data, an unknown timing can be implemented in the monitor.

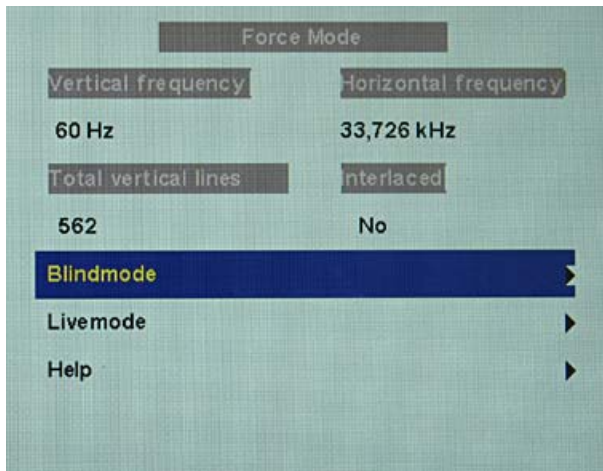


Figure 6-3 Force Mode

6.4.7.2 Foreword (a number of useful points to facilitate understanding of timing and the various types of timing)

Scanning in the interlaced and non-interlaced procedures

There are two different scanning systems. They differ in the technology used to display the image on the screen TV signals and monitors which are compatible with them are normally set to the interlaced procedure; computer signals and monitors compatible with them are normally set to the non-interlaced procedure. These two formats are not compatible; one of them must first be converted before the signals can be processed together. In the case of interlaced scanning, each image is divided into two separate fields. An image therefore comprises two fields. An interlaced image is output on the screen in two scans. The horizontal lines of the first field are scanned first, and then, again starting at the top of the image, the horizontal lines of the second field are scanned between the first set of lines. Field 1 consists of the lines 1 to 262 1/2, and field 2 of the lines 262 1/2 to 525. Only a few lines are displayed at the top and bottom of each field.

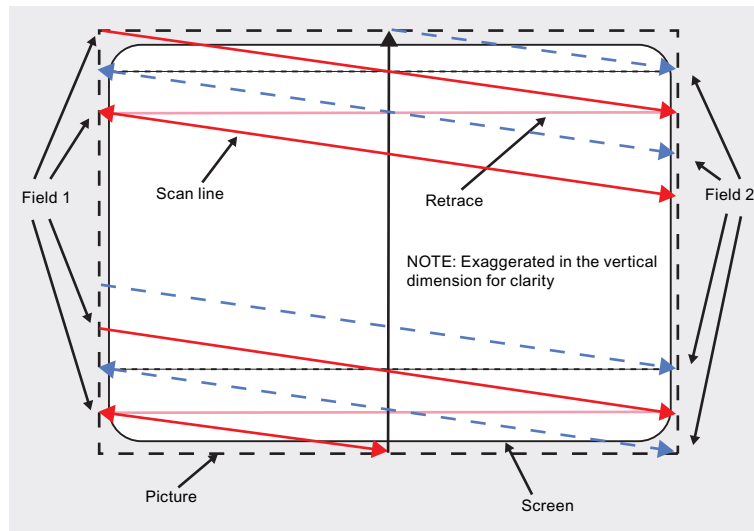


Figure 6-4 Interlaced scanning system

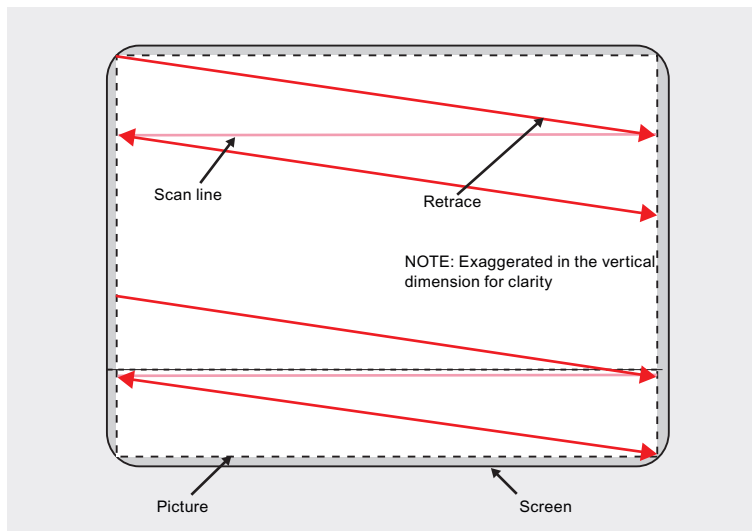


Figure 6-5 Non-interlaced scanning system

A non-interlaced image is output on the screen in that all horizontal lines are scanned from top to bottom in one scan.

Horizontal timing diagram (the vertical timing diagram is identical)

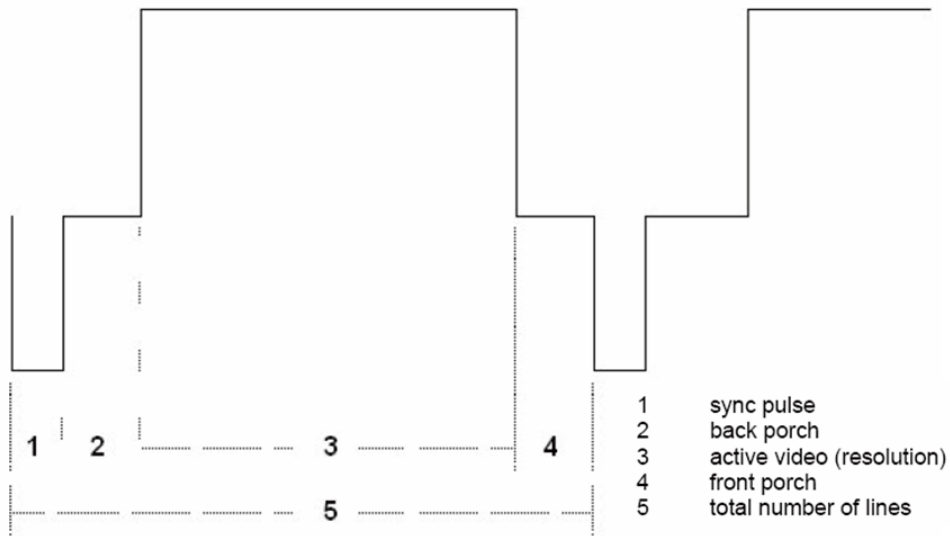


Figure 6-6 Timing diagram

Force Mode menu	Timing diagram
Horizontal resolution	3 - Active Video (resolution horizontal)
Vertical resolution	3 - Active Video (resolution vertical)
Total horizontal lines	5 - Total number of lines (horizontal)
Horizontal blank pixels	4 - Front Porch (horizontal)
Vertical blank pixels	4 - Front Porch (vertical)

6.4.7.3 Name equivalence for the Force Mode menu

Blind mode

The setting values must be known in Blind mode, and these can then be entered. See "Blind mode" (Page 64).

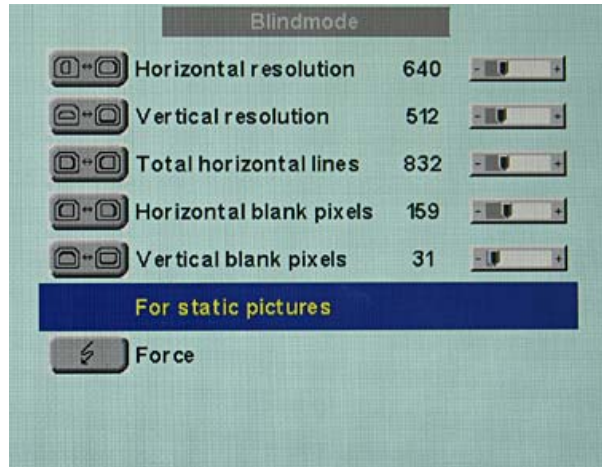


Figure 6-7 Blind mode menu

Live mode

Timings whose setting values are unknown can be set step-by-step in Live mode using test patterns. The changes in the test pattern are output live on the monitor. See "Live mode" (Page 67).

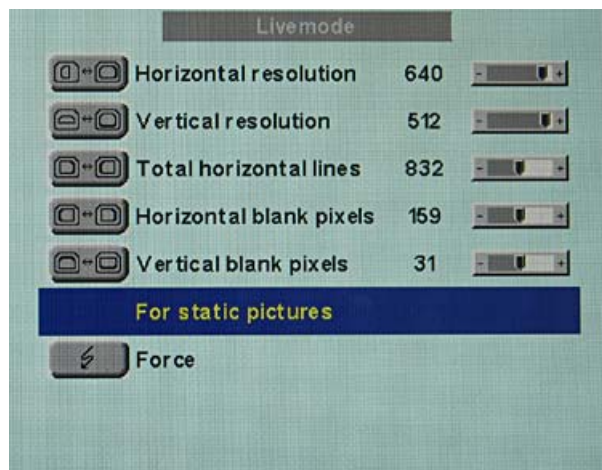


Figure 6-8 Live mode menu

Note

Various factory-set timings are saved in the monitor. As soon as a video signal is connected, an appropriate timing is searched for. During this phase, "Auto In Process" is displayed. These timings are compatible with the standard video signals provided by current graphics cards.

If no image or only an unclear image is displayed on the monitor, the signal is outside the standard ranges. Such signals frequently occur with older medical equipment. Such a timing can be set using the Force Mode functions.

In many cases, the unknown timing will be correctly displayed without having to use Force Mode. This is possible because a large number of known timings are saved in the monitor.

Force Mode timings can also be saved in the Custom settings. Thus up to five further Force Mode timings are available.

Only one timing can be saved in Force Mode itself.

6.4.7.4 Blind mode

CAUTION
Saving of data always with "Force"
The timing data are only entered into memory by the "Force" command, and the image is then displayed with the new parameters.

Note

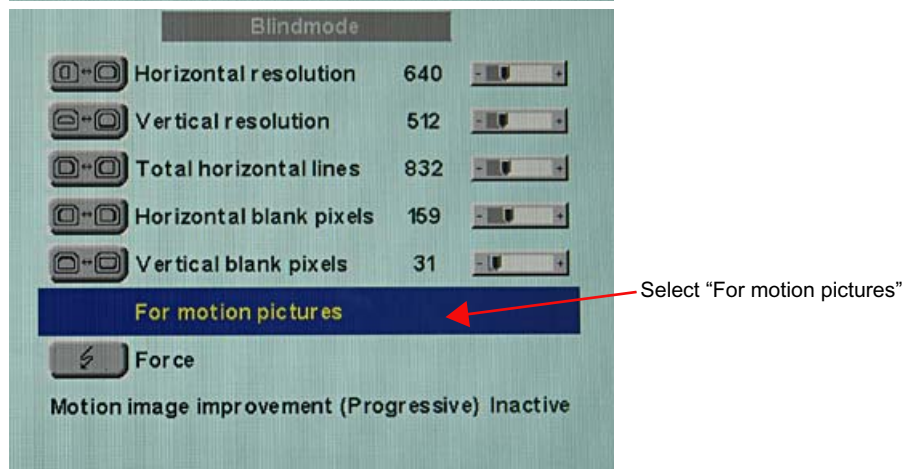
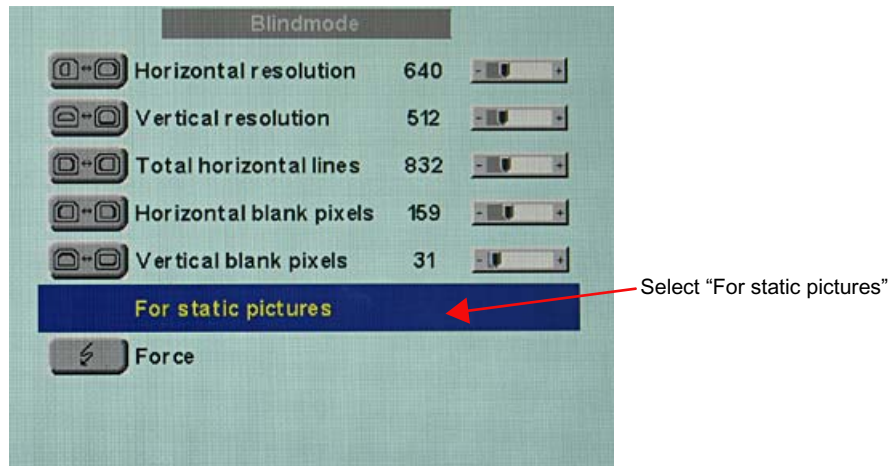
Input of known or already determined timing data only

"Blind mode" is used to enter known or already determined timing data.

"Live mode" should be used to set unknown timing data step-by-step.

Enter known timing data and fine adjustment

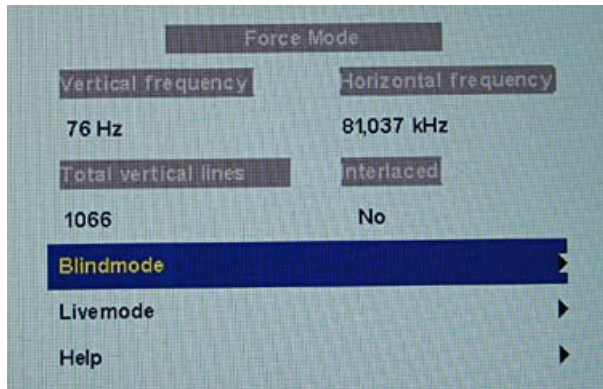
1. Open a test pattern with a clearly defined frame (e.g. SMPTE image).
2. Open the "Blind mode" menu: Main menu → Servicelevel 2 → Force Mode → Blind mode.
3. Enter the timing data into the individual input fields using the Menu, Up and Down buttons.
4. Select either **"For static pictures"** or **"For motion pictures"** in line 6 in the "Blind mode" menu using key 2.



5. Execute "Force"  Force command using key 2.

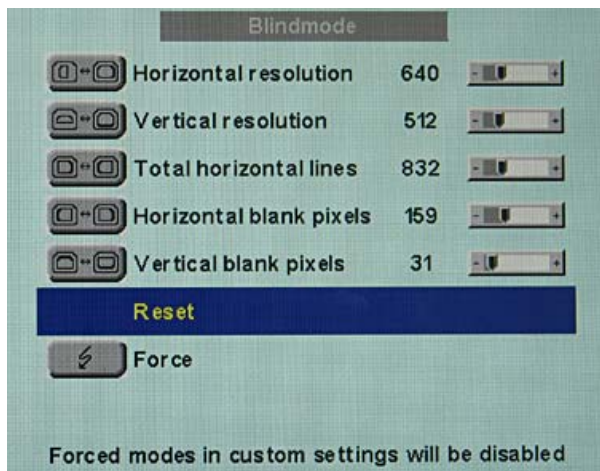
Note

For progressive timings with an image refresh rate greater than 60 Hz, only the item "For static pictures" or "Reset" can be selected in line 6 in the "Blind mode" menu.



CAUTION

If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



6.4.7.5 Live mode

Moderate picture quality, timing not detected?

If a timing is not detected by the monitor or if the image is not satisfactory, a fine adjustment can be carried out using "Live mode" or "Position/Zoom" and "Frequency/Phase".

"Live mode" is used for step-by-step approximation of an unknown timing.

All settings to be carried out in this chapter are executed in "Live mode".

CAUTION

Enter known values

- If some of the timing data are already known, for example the resolution, these should first be entered in "Blind mode" in order to simplify the next steps.
- If the resolution is known, it can be used for the approximation of "Horizontal lines (total)". The following applies: "Horizontal lines (total)" > "Horizontal resolution". If, when setting "Horizontal lines (total)", the "Horizontal resolution" is larger, the latter must be reduced. A larger "Horizontal resolution" can result in the image being split vertically.

CAUTION

Saving of data always with "Force"

The timing data are only entered into memory by the "Force" command, and the image is then displayed with the new parameters.

CAUTION

Execute all settings in "Live mode" with zoom factor "1 to 1"

All settings in "Live mode" must be carried out with the zoom factor "1 to 1" ("Position/Zoom" menu).

Sequence for setting a timing

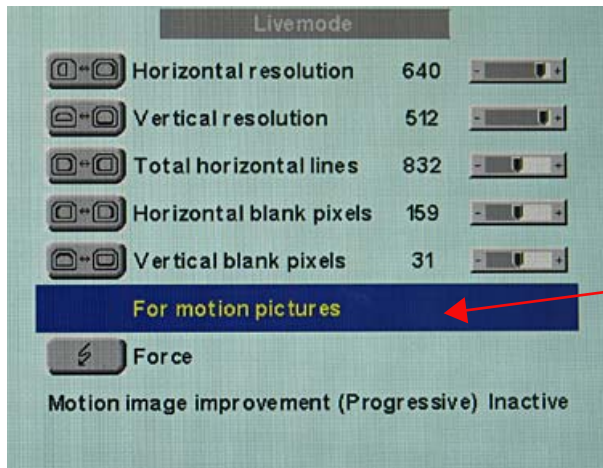
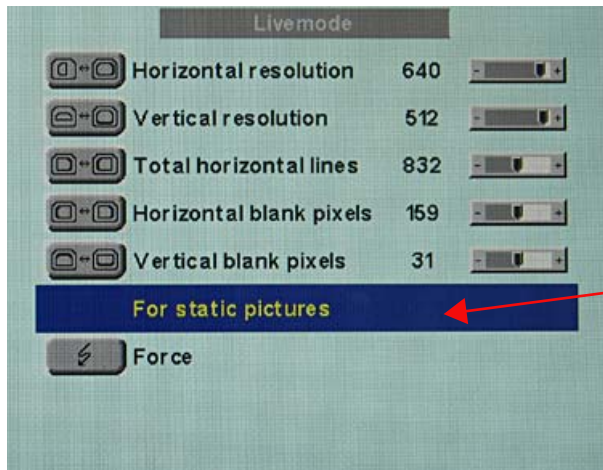
1. Determine start values using autofunction
2. Optimize scanning frequency
3. Optimize geometry and resolution

Step-by-step instructions for setting a timing can be found in the next three sections.

Determine start values using autofunction

The following commands can be used to trigger automatic determination of the timing data, and provides rough approximation of the applied timing.

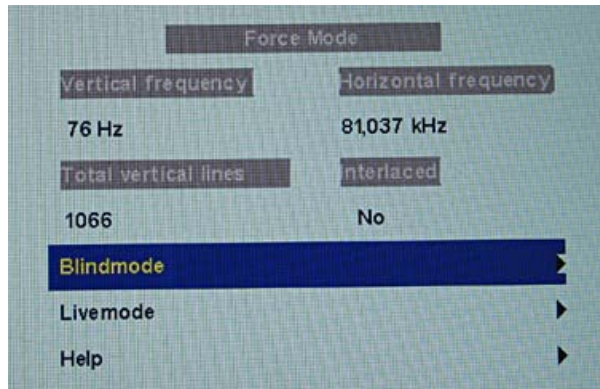
1. Open a test pattern with a clearly defined frame (e.g. SMPTE image).
2. Open the Live mode" menu: Main menu → Servicelevel 2 → Force Mode → Live mode.
3. Select either "For static pictures" or "For motion pictures" in line 6 in the "Live mode" menu using key 2.



4. Execute "Force"  Force command using key 2.

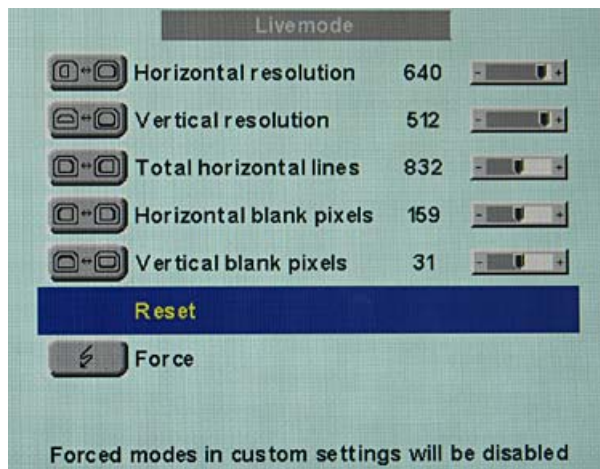
Note

For progressive timings with an image refresh rate greater than 60 Hz, only the items "For static pictures" or "Reset" can be selected in line 6 in the "Live mode" menu.



CAUTION

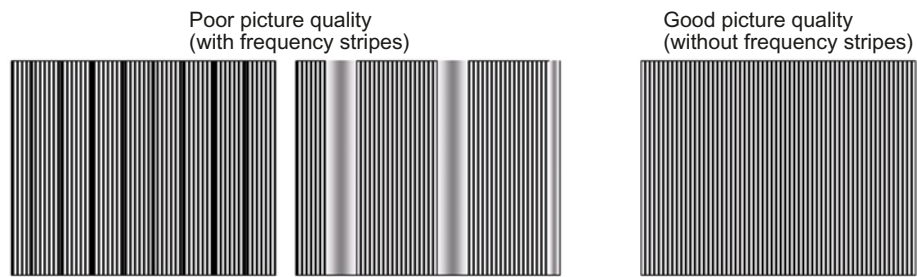
If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



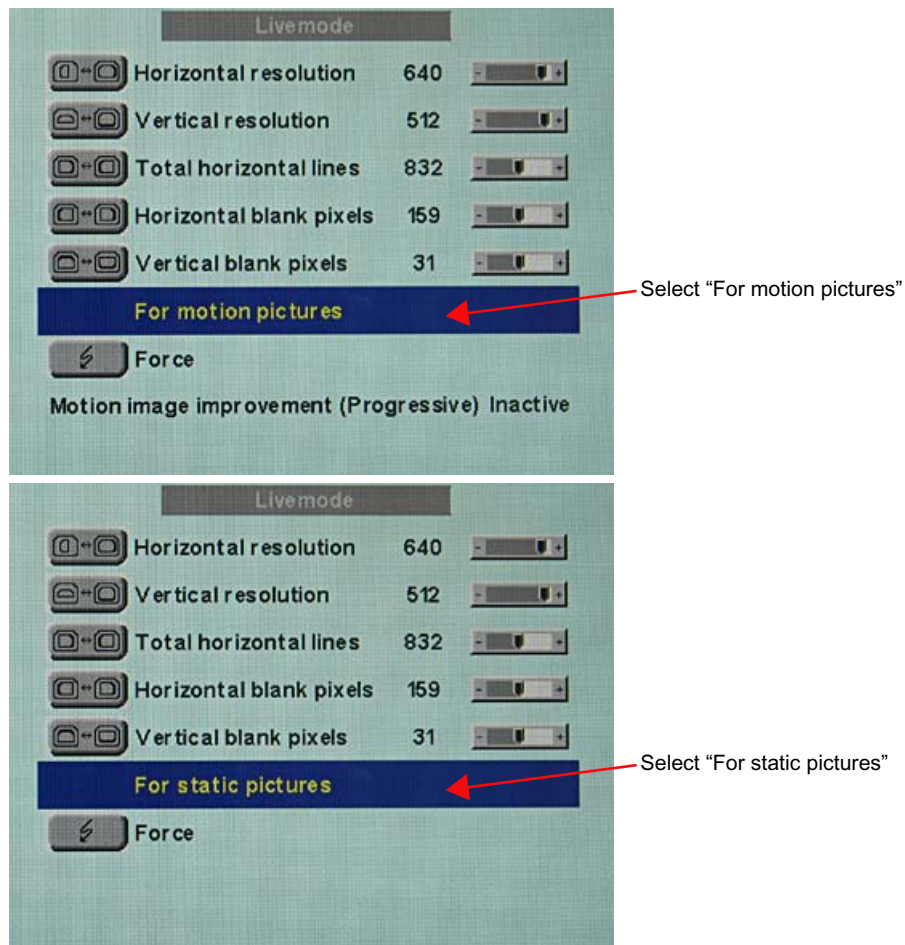
Optimize scanning frequency

The correct signal frequency must now be set ("Horizontal lines. (total)").

1. In order to set "Horizontal lines (total)" correctly, it is best to use an SMPTE and a pixel on/pixel off test pattern. If the test patterns are not available, you can use an image with clearly defined frame and a line written "IIIIII" for the setting. Optimize the signal frequency such that no interferences are present in the picture. If the interval between the interferences becomes larger, and these therefore also become fewer, you are moving the slider in the correct direction.



2. If you reach the limit of the control range with the slider, you must carry out the "Force" command with the selection "**For static pictures**" or "**For motion pictures**". The current setting is then saved, and the slider set to the center of the control range. Once you have set the signal frequency optimally, you can continue with the description.



CAUTION

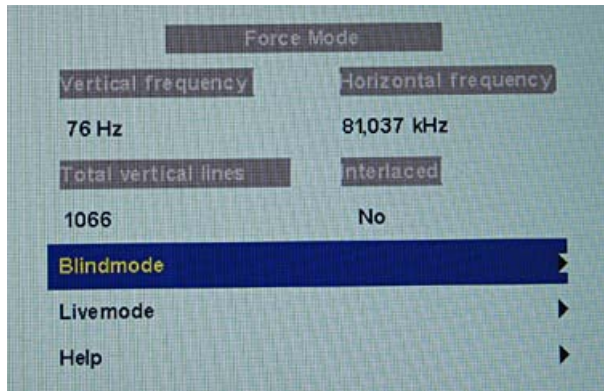
Setting limit reached for all settings: Execute "Force"

- Since the resolution and scanning frequency can only be set within limits, the "Force" function must be carried out when the setting limit is reached in order to continue with the setting process. In this manner, the slider for the setting range is again set in the center.

It may be necessary to repeat this process several times!

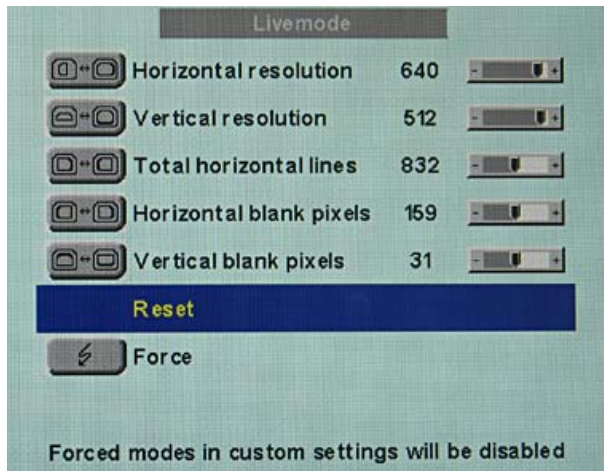
Note

For progressive timings with an image refresh rate greater than 60 Hz, only the items "For static pictures" or "Reset" can be selected in line 6 in the "Live mode" menu.



CAUTION

If the "Reset" setting is selected, all learned values are deactivated in the current Force Mode window.



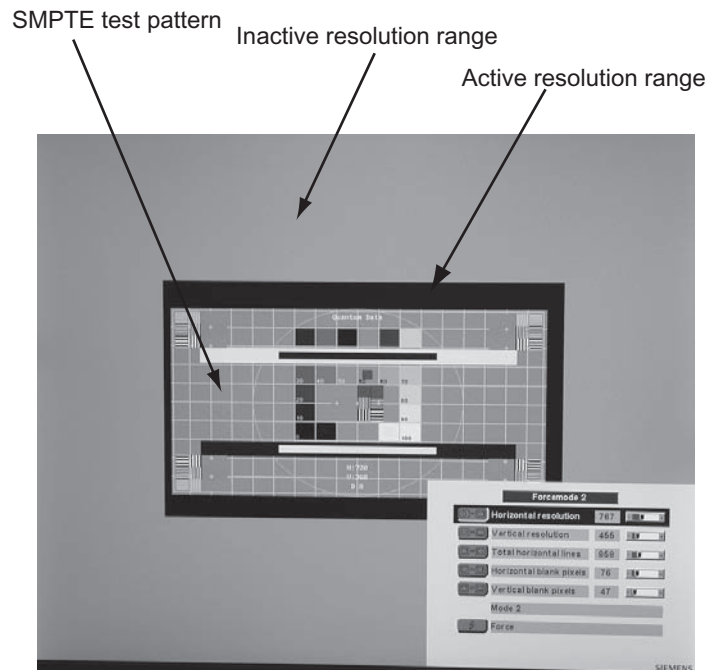
Optimize geometry/resolution

Note

Active and inactive resolution range

The active resolution range is defined by the values of the "Horizontal resolution" and "Vertical resolution" input fields. This range is displayed centrally on the monitor in black.

The inactive resolution range is the unused range between the active resolution and the maximum monitor resolution of 1280 x 1024. This range is displayed in Force Mode in gray (with monochrome monitors) or blue (with color monitors).



To match the active resolution range to the actual video signal resolution, you must carry out the following steps:


1. Open a test pattern with a clearly defined frame (e.g. SMPTE image).
2. Open the "Live mode" menu: Main menu → Servicelevel 2 → Force Mode → Live mode.
3. Select either **"For static pictures"** or **"For motion pictures"** in line 6 in the "Live mode" menu using key 2.

4. Use the "Horizontal blank pixels" input field to shift the left edge of the SMPTE image pixel-exact to the left internal border of the gray/blue area.

CAUTION
Gray/blue area not visible: Reduce "Horizontal resolution"
If no gray/blue area is visible on the left and right sides of the image, reduce the "Horizontal resolution" until the gray/blue area becomes visible.

5. Correct the values in the "Horizontal resolution" input field until the right internal border of the gray/blue area is pixel-exact at the right edge of the SMPTE image.
6. Use the "Vertical blank pixels" input field to shift the top edge of the SMPTE image pixel-exact to the top internal border of the gray/blue area.

CAUTION
Gray/blue area not visible: Reduce "Vertical resolution"
If no gray/blue area is visible on the top and bottom sides of the image, reduce the "Vertical resolution" until the gray/blue area becomes visible.

7. Correct the values in the "Vertical resolution" input field until the bottom internal border of the gray/blue area is pixel-exact at the bottom edge of the SMPTE image.
8. Execute the "Force"  Force command using key 2.

Timing successfully set

CAUTION
Desired zoom factor selectable in "Live mode" following completion of all settings
Once all settings have been carried out in Force Mode, the desired zoom factor can be selected from the "Position/Zoom" menu.

Note**Only teach and save new timings once**

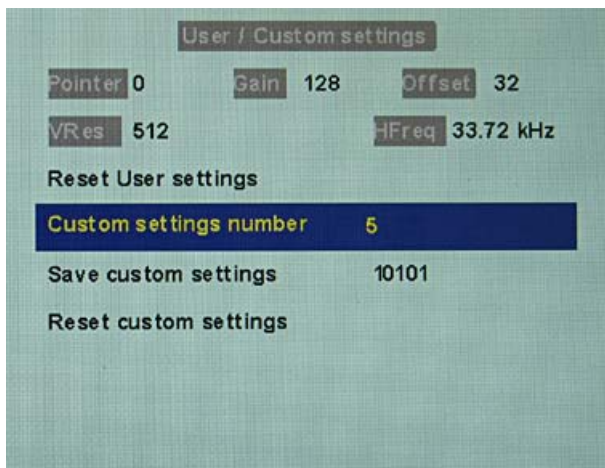
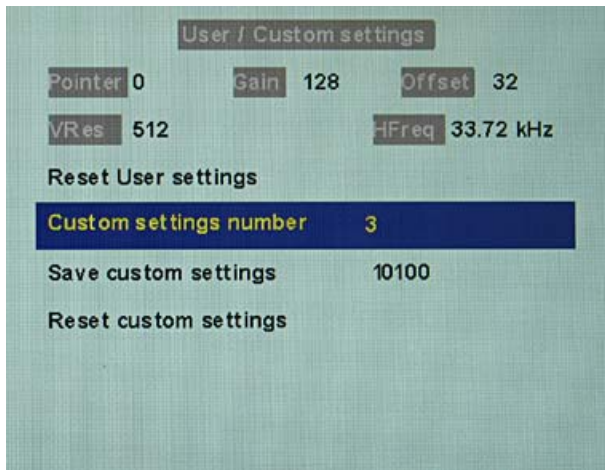
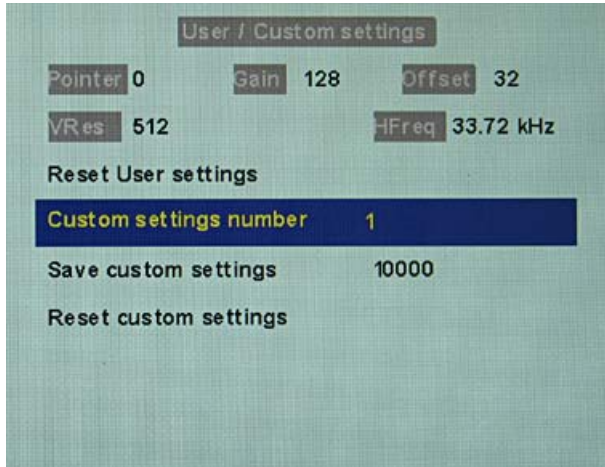
New timings need only be learned and saved once. The monitor subsequently recognizes the timings automatically.

The unknown timing has been successfully set, you can now exit the OSD menu. The monitor will recognize the newly set timing and set it as saved whenever connected in the future.

Note**Further use of determined values**

The values determined step-by-step using "Live mode" can now be copied and entered directly in further monitors using "Blind mode".

Saving of several timings which have been successfully forced



1. Up to five timings can be saved in "User / Custom settings".
Save the timings in the OSD menu "Servicelevel 2 → User / Custom settings".
2. Select memory location using "Custom settings number".

3. Save timing by selecting "Save custom settings" and confirming with key 2.
4. The saved timing is now identified by a "1" in "Save custom settings".

If a "3" has been selected in "Custom settings number", the third digit of "Save custom settings" is set to "1".

Saved timings can be overwritten at any time.

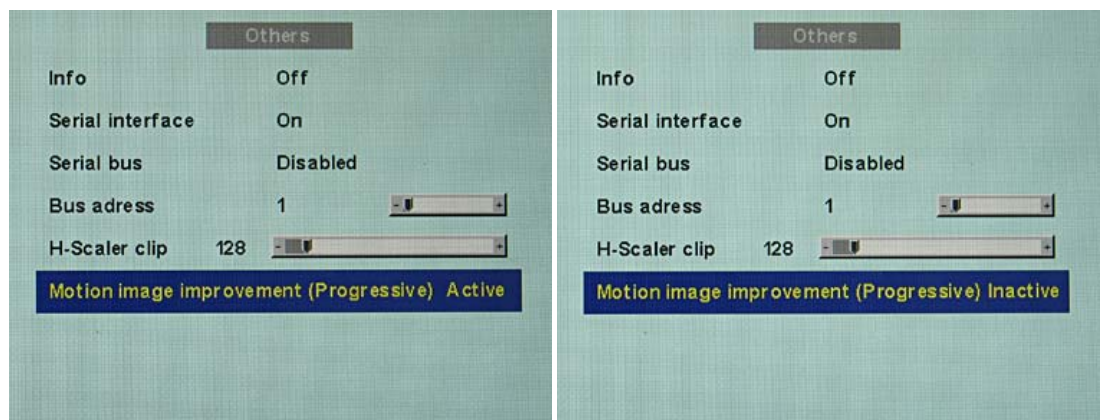
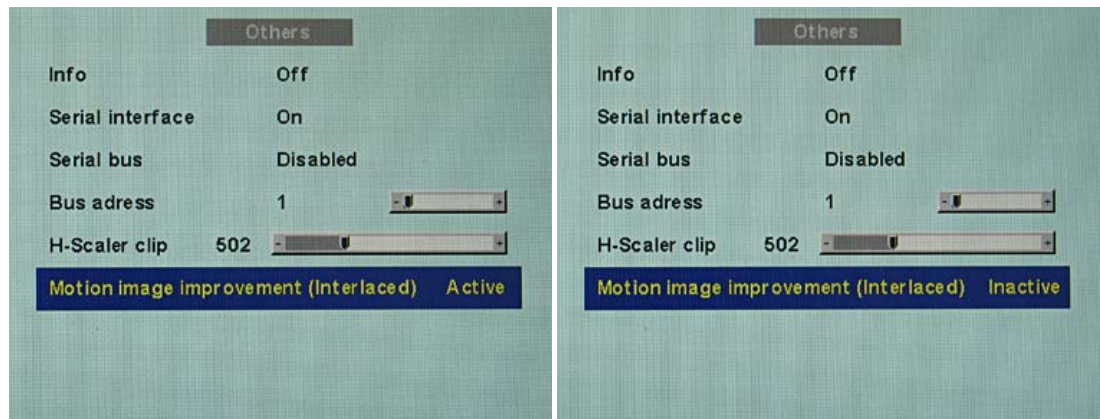
Note

Up to five timings can be saved in the menu line "Save custom settings".

6.4.7.6 Motion image improvement with interlaced and non-interlaced (progressive)

If the setting "For motion pictures" is selected and "Force" is carried out in the Force-Mode menu "Blind mode" or "Live mode", the menu line "Motion image improvement" is displayed with the setting "Inactive".

- If the motion image improvement is to be activated, the setting for this must be changed from "Inactive" to "Active" either in the "Servicelevel 2" → "Others" menu or in the Force Mode menu "Blind mode" or "Live mode".



Advantages of motion image improvement with interlaced signals

CAUTION

With the setting "Motion image improvement" for interlaced signals, the sharpness settings cannot be changed in the "Others" menu. The motion image improvement would then be lost.

Using the motion image improvement, it is possible to reduce undesirable comb effects in the case of motion images of interlaced signals with PAL and NTSC resolutions connected to the "VGA" and "DVI Analog" signal inputs.

Advantages of motion image improvement with non-interlaced (progressive) signals

Using the motion image improvement, it is possible to reduce undesirable staircase signals in the case of all non-interlaced signals of up to 60 Hz connected to the "VGA" and "DVI Analog" signal inputs.

CAUTION

Despite motion image improvement, staircase signals can occur with PIP images of the signal sources "S-Video" and "Composite Video". The staircase signals can occur if a signal source with motion image improvement is active in the main picture.
--

See also

Service level 2 functions (Page 48)

Blind mode (Page 64)

Live mode (Page 67)

Operation

7.1 Note for users

CAUTION
Settings must not be changed by users
None of the settings may be changed on site by the user. This also applies to settings made using the monitor keys. These are therefore locked for certain applications. If settings have to be changed, please contact the responsible service department.

CAUTION
If the keypad is locked, contact the service department
If the keypad is locked, contact the service department in order to unlock it. If you unlock it yourself, the warranty will no longer be valid!

7.2 Switching on the monitor

Following commissioning, operation is limited to switching on and off.

- Switch on the device using the power switch.

The green operation LED now lights up permanently.

See also

Troubleshooting (Page 83)

Service and maintenance

8.1 Cleaning

CAUTION
<p>Device maintenance, cleaning and disinfecting</p> <ul style="list-style-type: none"> • 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 microfiber cloth and, if necessary, a cleaning agent. Only clean housing parts using the recommended cleaning agents. • The entire monitor may only be disinfected using the tested disinfecting agents.

CAUTION
<p>Remove all residual cleaning agents immediately</p> <ul style="list-style-type: none"> • Some cleaning agents leave residue (streaks) on the surface which can easily be removed by wiping with a damp cloth. • Remove residues of alcohol, "Cidex", "Taski DS 5001" and "Surfanios Fraicheur Citron" from the surface immediately. Residue of these cleaning agents on the surface often causes permanent streaks.

Recommended cleaning agents and disinfectants

Agent class	Tested cleaning agents and disinfectants:	Further examples
Alcohol	<ul style="list-style-type: none"> • Ethyl alcohol (96%) • Isopropyl alcohol (70%) • 0.5% chlorhexidine in isopropyl alcohol (70%) 	<ul style="list-style-type: none"> • Hospiset cloth • Mikrozyd liquid
Aldehyde	<ul style="list-style-type: none"> • Melsitt • Cidex • Cidex (2.4% glutaraldehyde solution) 	<ul style="list-style-type: none"> • Aldasan 2000 • Kohsolin • Gigasept FF
Chlorine derivatives	<ul style="list-style-type: none"> • Terralin • Sodium hypochlorite (10%) 	Quartamon Med

8.1 Cleaning

Agent class	Tested cleaning agents and disinfectants:	Further examples
Disinfectants	<ul style="list-style-type: none"> • TaskiDS5001 (Diverseylever Labs) • Morning Mist • Surfanios Fraicheur Citron (Anios Labs) • Misty Multi-Purpose Disinfectant Cleaner I and II • Misty Disinfectant and Deodorant RTU (Amrep labs) • Virex II 256 • Precise Hospital Foam Cleaner Disinfectant • "Green Soap" USP • Ovation • Formula 409 • Fantastik • WexCide 	
Guanidine derivatives	Lysoformin	
Quaternary compounds	Incidur spray, undiluted	
Standard household washing-up liquid	Tempo	Fairy Ultra, Pril, Palmolive
Pyridine derivatives	Activ spray, undiluted	
Water	<ul style="list-style-type: none"> • Tap water • Distilled water • 1.6 % water-based ammonia solution 	

Impermissible cleaning agents and disinfectants

Agent class	Tested cleaning agents and disinfectants:
Peroxide compounds	Perform Dismozon pur

These cleaning agents and disinfectants can bleach the paint after a longer period of application.

Troubleshooting

Fault	Cause	Remedy
No picture appears on the monitor, operation LED off	Fuse is defective	Inform service personnel
	Power cable is not inserted or incorrectly inserted.	Connect power cord
No picture appears on the monitor, operation LED flashes green	No video signal	Check video cable
	Video source is not outputting a video signal	Check video source
Fuzzy picture, interference in vertical lines	Scanning frequency or phase incorrectly set	Adjust frequency and phase
DPMS ON mode: LED flashes green, then orange	Loose connections	Plug in cables properly and secure them
DPMS OFF mode: LED flashes green	Faulty cable	Replace cable
Status LED flashes orange, temperature warning appears on the screen	Overtemperature threshold: The temperature limit has been exceeded	Check the following: <ul style="list-style-type: none"> • The temperature limit is not set correctly: <ul style="list-style-type: none"> – Check the setting in the OSD menu (Servicelevel 2). • Room temperature is too high • The cooling fins on the housing are covered. • Non-compliance with the spacing requirements on installing the monitor. • The monitor is close to a heat source.
Status LED flashes red, no image appears on the monitor	Overtemperature threshold: Temperature for automatic shutdown has been reached. <ul style="list-style-type: none"> • The monitor will shut down automatically after 30 minutes. • The monitor will switch on again as soon as the temperature falls sufficiently. 	
Image has no contrast	The video source is only transmitting a green signal	In the OSD menu, switch over from "RGB" to "MONO"
The image cannot be shifted horizontally with reference to the panel	Synchronization not OK	Set maximum window size and perform "Auto adjust"

Other information output via two-color LEDs

LED	Monitor status
LED orange	No fault; "Power down" was switched on and activated
LED green	Video signal recognized, no fault

Technical specifications

Applicability of technical specifications

All technical specifications are valid after a warming-up period of 30 minutes.

10.1 Monitor characteristics

Type	Monochrome, IPS, TFT panel
Screen size	376 mm x 301 mm
Screen diagonal	19" (48 cm)
Native resolution	1280 x 1024 (full-screen format)
Pixel arrangement	3 subpixels
Pixel spacing	0.294 mm x 0.294 mm
Contrast ratio	<ul style="list-style-type: none"> Typically 900:1 At least 600:1
Brightness	<ul style="list-style-type: none"> Typically 1000 cd/m² Min. 800 cd/m²
Horizontal viewing angle	At least $\pm 85^\circ$
Vertical viewing angle	At least $\pm 85^\circ$
Backlight	6 CCFT (cold cathode fluorescent tubes)
Lifetime of backlight	Typically 45 000 hours for CCFT Applies to an ambient temperature for the backlight of 25 °C

10.2 Voltage supply

Mains connection	Non-heating appliance socket
Line supply voltage	100 V ... 240 V AC
Miniature fuse	2 x 3.5 A, quick-blow
Line frequency	50 ... 60 Hz ($\pm 5\%$)
Power consumption	< 58 W

10.3 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>Likewise, resolutions above 1280 x 1024 can be reduced and then displayed.</p> <p>Interpolation artifacts must be expected when displaying images with a resolution other than 1280 x 1024.</p> <p>(Caution: If the timing is frame-buffered or frame-synchronized, the picture information may be lost; the grayscales - the color hues for color images - are also reduced and may be visible).</p>
Timing recognition	H frequency, V frequency, interlaced, number of horizontal lines

10.4 Inputs/Outputs

Analog signal input

RGB input, H/C-Sync input and V-Sync input	<ul style="list-style-type: none"> via 15-pin Sub-D connector (female), any polarity via 3 BNC sockets (green, horizontal sync, vertical sync)
DVI input	via DVI-I socket
RGB signal	<ul style="list-style-type: none"> Video level: 0,5 ... 1.0 V_{pp} Sync level: TTL-compatible
SoG signal	<ul style="list-style-type: none"> Video level: 0,5 ... 1.0 V_{pp} Sync level: 0,2 ... 0.3 V_{pp}

Digital signal input

DVI input	Over DVI-I socket, single link
DDC	via DVI

Video input

S-Video	Via 4-pin mini-DIN socket
Composite	Over 1x BNC socket
Composite & S-Video	<ul style="list-style-type: none"> • Video level: 0,5 ... 1.4 V_{pp} • Sync level: 0,2 ... 0.3 V_{pp}
Standards	PAL (625 Z / 50 Hz) NTSC (525 Z / 60 Hz)

Analog signal output

SoG signal	<ul style="list-style-type: none"> • Video level: 0,5 ... 1.0 V_{pp} • Sync level: 0,2 ... 0.3 V_{pp}
------------	---

Serial interface

RS 232	via RJ 11 socket (female) or 6-pin mini-DIN socket
--------	--

10.5 Control and connection elements

Front	<ul style="list-style-type: none"> • Four buttons for OSD menu • Operation LED
Rear side	<ul style="list-style-type: none"> • 1x power connection socket • 1x DVI socket • 1x 15-pin 3-row Sub-D socket • 3x BNC sockets • 1x BNC socket • 1x 4-pin mini-DIN socket • 2x RS 232 sockets (RJ11) • Voltage source for connection of external devices (5 V/1 A) • 2x 75 Ω/10 kΩ switch loop for H and V
Rear panel (accessible without detaching connector panel cover)	<ul style="list-style-type: none"> • 1x power switch • 1x RS 232 socket (6-pin mini-DIN socket)

10.6 Mechanical design

Housing components	ABS
Visible screen area	Approx. 376 mm x 301 mm
Ventilation openings	In rear panel
Degree of protection	IP20 in accordance with DIN 40050
Connector panel	On rear panel, under cover
Weight in kg	9.4 kg
Dimensions (W x H x D) in mm	423 x 446.5 ... 528.5 x 230*

* Corresponds to a possible height adjustment of 82 mm.

10.7 Climatic conditions

Operation

Temperature range	5 °C ... 40 °C ambient temperature
Temperature gradient	Max. 5 °C/h, without condensation
Air pressure	1053 ... 540 hPa

Transport and storage (packed)

Temperature range	-20 °C ... +60 °C ambient temperature
Temperature gradient	Max. 5 °C/h, without condensation
Air pressure	1053 ... 540 hPa

10.8 Mechanical requirements

Operation

Vibration	To EN 60068-2-6 10 ... 58 Hz at ± 0.075 mm deflection 58 ... 500 Hz at 10 m/s ²
Shock	To EN 60068-2-27 (single impact) 150 m/s ² , 6 ms Under operating conditions, the device must not be exposed to continuous or repeated shocks.

Packed unit

Vibration	To EN 60068-2-6 5 ... 9 Hz at ± 3.5 mm deflection 9 ... 500 Hz at 10 m/s ²
Shock	To EN 60068-2-27 (single impact) 250 m/s ² , 6 ms (in storage packaging) to EN 60068-2-29 (continuous shocks)

10.9 Safety specifications

Safety standards	<ul style="list-style-type: none"> • IEC/EN 60601-1 (Second Edition) • IEC/EN 60601-1 (Third Edition) • CAN/CSA C22.2 No. 601.1-M90 • CAN/CSA C22.2 No. 60601-1-08
Protection class	Protection class I
Degree of protection according to DIN 40050	IP20
Conformity	CE in accordance with MDD 93/42/EEC (Class I)

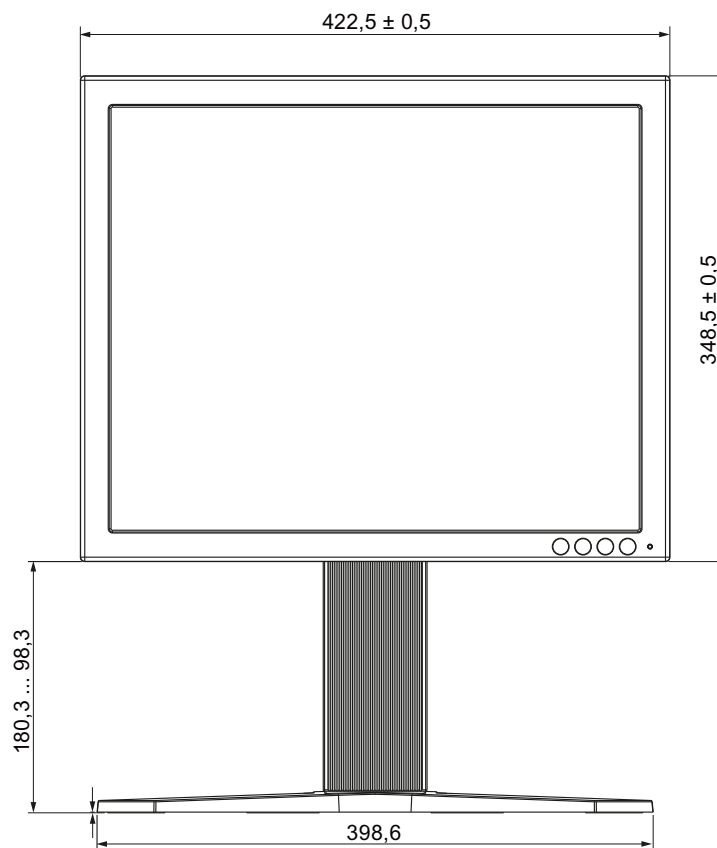
10.10 Electromagnetic compatibility

Interference voltage/interference noise	EN 60601-1-2
Voltage fluctuations	EN 610004-11
Burst on power cables	EN 61000-4-4 1 kV
Surge on power cables	EN 61000-4-5 1 kV symmetrical, 2 kV unsymmetrical
Static discharge on casing parts (ESD)	EN 61000-4-2 8 kV air, 4 kV contact
RFI	EN 61000-4-3 80 MHz ... 2.5 GHz, 3 V/m 80 % AM 1 kHz
Noise immunity	EN 61000-4-6 150 kHz ... 80 MHz 3 V/m 80 % AM 1 kHz
Magnetic constant fields	EN 61000-4-8 Max. 4000 A/m
Magnetic alternating fields	EN 61000-4-8 Max. 10 A/m

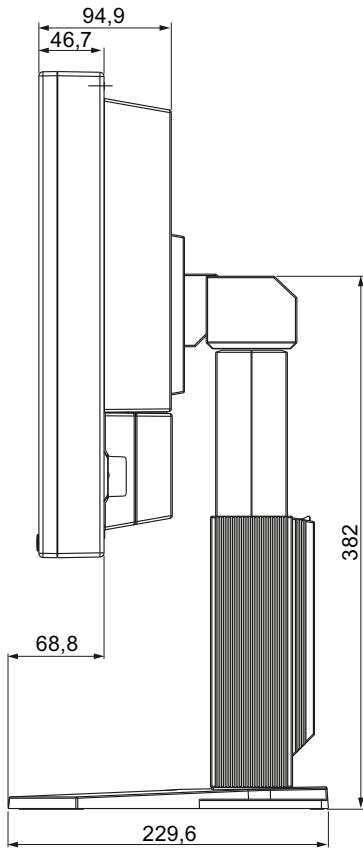
Dimensional drawings

All dimensions in mm

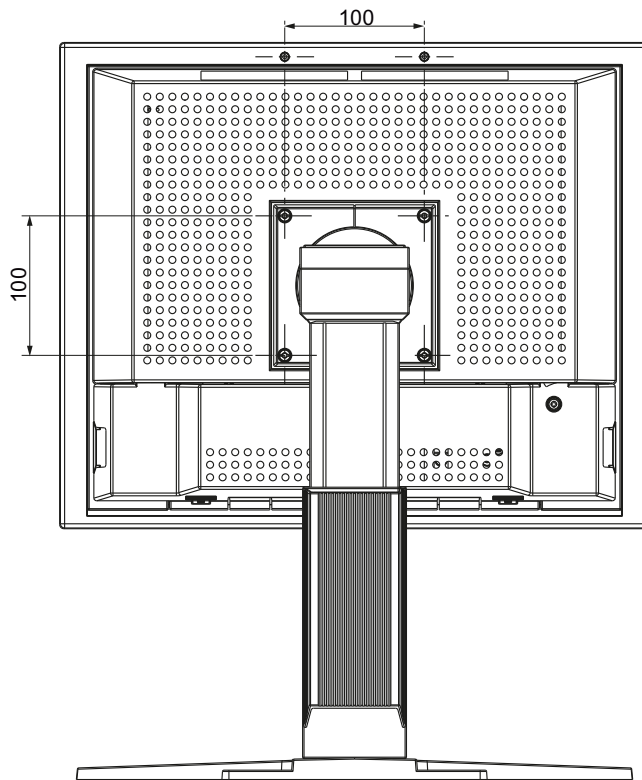
11.1 Front view



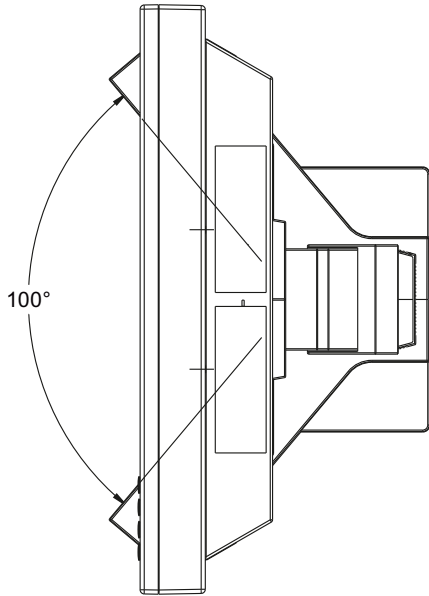
11.2 View from left



11.3 Rear view



11.4 View from above



Accessories

12.1 DVI transmission path and cable

TDL3600-SL / TDL2300-SL DVI transmission path

CAUTION

If the monitor is not designed for a 5 V/1 A power supply, a power supply unit is required for the DVI transmission path.

Digital graphics connection supports the transmission of high-quality video data. Using the TDL3600-SL DVI cable set from EIZO, this data can be transmitted over a distance of up to 36 m without any reduction in quality.

The transmission set comprises a receiver and a transmitter that are connected over the CAT cable. This medium is widely implemented, rugged in use and the cables are easy to connect. The plugs at each end are small enough to pass through narrow tubing.

Product	Order No.
TDL3600-SL DVI transmission path • 36 m without power supply unit	6GF6010-0DA36
TDL3600-SL DVI transmission path • 36 m with power supply unit	6GF6010-1DA36
TDL2300-SL DVI transmission path • 23 m with power supply unit	6GF6010-1DA23

Cables and adapters







A variety of cables and adapters allows problem-free integration of our monitors, even in extremely complex systems.





Product	Order No.
PS2 adapter for luminance meter	6GF6980-1TB03
DVI cable, single link, 3 m	6GF6980-1TA07
BNC to VGA cable	6GF6980-1TB04
UMC-201, USB serial converter	6GF6980-8WG15

Appendix

A.1 Markings and symbols on the monitor

Meaning of markings and symbols on the SMD 19102 DL

Marking/symbol	Description
	Symbol for "Caution, observe accompanying documents". Appears on the name plate.
	CE marking (EU conformity mark). Appears on the name plate.
	CSA marking, accounting for U.S. and Canadian national regulations. Appears on the name plate.
	CCC marking, accounting for Chinese national regulations. Appears on the name plate.
	Symbol for date of production for medical products. Appears on the name plate.
	WEEE Product must be disposed of separately; materials may be recycled. Appears on the name plate.

Marking/symbol	Description
	Marking in accordance with ACPEIP (China-RoHS). Appears on the name plate.
	Symbol for "On" (voltage). Present on the power switch.
○	Symbol for "Off" (voltage). Present on the power switch.
	Input for servicing. Present on the additional plate below the PS2 socket.
	Symbol for "Observe instruction manual". Present on the device.
	Symbol for "Only for authorized service". Present on the device.

A.2 Warranty

Opening of the housing, or electrical or mechanical changes on or in the device, result in cancellation of the warranty. For warranty details, please contact the sales partner from whom you purchased the product. These warranty conditions are neither extended nor limited by the contents of this instruction manual.

A.3 Repairs

Please contact the sales partner from whom you purchased the product.

A.4 Environmental protection

Please observe all local requirements and laws pertaining to the disposal of displays.

A.5 Accessory devices

Devices connected to the monitor (e.g. PC) must also comply with the relevant safety specifications.

A.6 Contact

Support during installation and for technical questions

Medical Monitor Solutions (<http://www.eizo.eu>)

EIZO global (www.eizo.com)

A.7 Trademarks

The EIZO Logo is a registered trademark of EIZO NANA O CORPORATION in Japan and other countries.

EIZO is a registered trademark of EIZO NANA O CORPORATION in Japan and other countries.

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ScreenManager is a registered trademark of EIZO NANA O CORPORATION in Japan and other countries.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Apple is a registered trademark of Apple Inc.

Macintosh is a registered trademark of Apple Inc.

Mac is a registered trademark of Apple Inc.

VESA is a registered trademark or a trademark of Video Electronics Standards Association in the United States and other countries.

All other trademarks are the properties of their respective owners.

A.8 China RoHS (Restriction of Hazardous Substances)

LCD Monitor 液晶显示器

型号 Model: 6GF621#-2E\$## (#=0..1 ; \$=A..Z ; ##=00..99)

根据SJ/T11364-

2006《电子信息产品污染控制标识要求》特提供如下有关污染控制方面的信息。

The following product pollution control information is provided according to SJ/T11364-2006 Marking for Control of Pollution caused by Electronic Information Products.

电子信息产品污染控制标志说明 Explanation of Pollution Control Label



该标志表明本产品含有超过中国标准SJ/T11363-

2006《电子信息产品中有毒有害物质的限量要求》中限量的有毒有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

为保证所声明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所声明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 *Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products*. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

有毒有害物质或元素的名称及含量 Name and Concentration of Hazardous Substances

部件名称 Component Name	有毒有害物质或元素 Hazardous substances' name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
液晶纯平屏幕 LCD Flat Screen	X	X	O	O	O	O
背光逆变器 Backlight Inverter	O	O	O	O	O	O
控制板 Controller Board	O	O	O	O	O	O
电源 Power Supply	O	O	O	O	O	O
其他 电路板 Other Circuit Boards	O	O	O	O	O	O
其他 (电缆等) Others (cables, etc.)	O	O	O	O	O	O
机架、底盘 Housing, Chassis	O	O	O	O	O	O
附件 (信号电缆、输电线等) Accessories (signal cable, power line, etc.)	O	O	O	O	O	O
<p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求</p> <ul style="list-style-type: none"> 此表所列数据为发布时所能获得的最佳信息. 由于缺少经济上或技术上合理可行的替代物质或方案, 此医疗设备运用以上一些有毒有害物质来实现设备的预期临床功能, 或给人员或环境提供更好的保护效果. <p>O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006</p> <ul style="list-style-type: none"> Data listed in the table represents best information available at the time of publication. Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes. 						

产品中有毒有害物质或元素的名称及含量 Table of hazardous substances' name and concentration.

The flat lamps of the LCD Flat screen for medical backlights use a lead-containing solder glas. There is no risk, because the substance is integrated in the glass of the flat lamp. The flat lamps of the LCD Flat screen for medical backlights contain Mercury. The Mercury is inside the CCFL tubes.

A.9 Disposal of materials containing mercury

 **WARNING**

Disposal of product components that contain mercury must be in accordance with the applicable regional or national legislation.

This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor contain mercury)

Ce produit comporte des composants susceptibles de contenir du mercure devant être recyclé ou éliminé conformément aux lois locales, régionales ou nationales en vigueur. (dans le présent système, les lampes de rétro-éclairage de l'écran contiennent du mercure)

Dieses Produkt enthält quecksilberhaltige Schaltungen, die gemäß den regionalen oder nationalen gesetzlichen Bestimmungen zu recyceln oder zu entsorgen sind. (In diesem System ist Quecksilber in den zur Hinterleuchtung des Monitors verwendeten Lampen enthalten)

该产品中涉及使用含汞类设备，这些设备的回收、处理必须符合当地、该国家与地区的法律要求。（该系统中，显示器的背光灯含汞。）

Tento výrobek je složen ze zařízení, která mohou obsahovat rtuť, jejíž recyklace nebo likvidace musí proběhnout v souladu s místními a státními zákony. (V tomto systému je rtuť obsažena v zadních lampách kontrolního displeje.)

Dette product består af enheder, der kan indeholde kviksølv, som skal genbruges eller bortskaffes i henhold til locale eller nationale love. (I dette system indeholder bagbelysningslamperne i skærmen kviksølv.)

Dit product bestaat uit apparatuur die kwikzilver kan bevatten dat moet worden gerecycleerd of moet worden verwijderd volgens de plaatselijke of nationale wetten of de wetten van de staat. (Binnen dit systeem, bevatten de lampen voor de achtergrondverlichting in de monitordisplay kwikzilver.)

Ez a termék részét olyan berendezések képezhetik, amelyek higanyt tartalmaznak, ezt újra kell hasznosítani, vagy a helyi vagy országos rendelkezéseknek megfelelően kell likvidálni. (E rendszerben a monitor képernyőjének a hátsó megvilágítását biztosító lámpák tartalmazzak higanyt.)

Questo prodotto consiste di dispositivi che possono contenere mercurio, da riciclare o smaltire in accordo con le leggi locali, regionali o nazionali. (In questo sistema, le lampade di retroilluminazione nel display del monitor contengono mercurio.)

本製品は有害な水銀を含有している可能性がある機器で構成されているため、国内および地域の関連法規に基づいてリサイクルまたは廃棄処分してください。（このシステムでは、モニターディスプレイのバックライトランプに水銀が含まれています。）

Dette produktet består av utstyr som kan inneholde kvikksølv, som må resirkuleres eller deponeres i samsvar med lokale eller nasjonale lover. (Innenfor dette systemet inneholder baklyslampene i monitordisplayet kvikksølv.)

Ten produkt składa się z urządzeń mogących zawierać rtęć, która musi być poddawana recyklingowi lub składowana zgodnie miejscowym lub krajowym prawem. (Lampy podświetlające w wyświetlaczu monitora zawierają rtęć.)

Este produto incorpora dispositivos que poderão conter mercúrio, devendo ser reciclado ou eliminado de acordo com as leis locais, estaduais ou nacionais. (Dentro deste sistema, as lâmpadas de fundo no écran do monitor podem conter mercúrio.)

Данное изделие состоит из устройств, которые могут содержать ртуть, требующую соблюдения соответствующих местных и федеральных законов при повторном использовании и утилизации. (В данной системе ртуть содержится в лампах подсветки монитора.)

Este producto consta de elementos que pueden contener mercurio, los cuales deben reciclarse o gestionarse de acuerdo a las Leyes locales, regionales o estatales (dentro de este sistema, la lámparas de retroiluminación del display del monitor contienen mercurio)

Denna produkt består av komponenter som kan innehålla kvicksilver, vilket måste återvinnas eller bortskaffas i enlighet med lokala eller nationella lagar. (I systemet innehåller lamporna för bakgrundsbelysningen i skärmen kvicksilver.)

Το συγκεκριμένο προϊόν περιλαμβάνει συσκευές που ενδέχεται να περιέχουν υδράργυρο, η ανακύκλωση ή απόρριψη του οποίου πρέπει να πραγματοποιείται σύμφωνα με τον τοπική, πολιτειακή ή εθνική νομοθεσία. (Στο συγκεκριμένο σύστημα, οι λυχνίες οπίσθιου φωτισμού στην οθόνη του μόνιτορ περιέχουν υδράργυρο)

List of abbreviations/acronyms

C	
CRT	Cathode Ray Tube
D	
DDC	Display Data Channel
DIN	German Institute for Standardization
DPMS	Display Power Management Signaling
DVI	Digital Visual Interface
DVI-A	Digital Visual Interface - Analog
DVI-D	Digital Visual Interface - Digital
DVI-I	Digital Visual Interface - Integrated
I	
ESD	Electrostatic Discharge
EMC	Electromagnetic compatibility
EN	European standard
F	
FCC	Federal Communications Commission
H	
HF	High Frequency
L	
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LUT	Look Up Table
M	
MDD	Medical Device Directive
O	
OSD	On-Screen Display
P	
PE	Protective Earth
S	
SMPTE	Society for Motion Picture and Television Engineers
SVGA	Super Video Graphics Array
T	
TN-S mains	Terre Neutre-Separé
TFT	Thin Film Transistor
V	
VGA	Video Graphics Array
VESA	Video Electronics Standards Association

X	
XGA	Xtended Graphics Array
Units of measurement:	
Cd/m ²	Candela/m ² (photometric measurement for brightness)
ftL	3.426 cd/m ²

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Order No.: 1028221-002

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