### Instruction Manual • 07/2013

### Analog DVI converter PDC0100 for analog video signals

# solutions display



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### Analog DVI converter PDC0100 for analog video signals

**Instruction Manual** 

### 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.

#### 

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

#### 

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

#### 

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 <sup>®</sup> 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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Table of contents

### Introduction

### 1.1 Contents of this documentation

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

• PDC0100 analog DVI converter

To ensure clarity, it does not contain all detailed information 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

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

Introduction

1.2 Additional documentation

### 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.

2.1 General safety notes

For safety reasons, the following precautions must be observed:

### 

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.

 To avoid danger for patients and users, connect your electrical system in accordance with the safety requirements of EN 60601-1-1 (IEC 60601-1-1) "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  $\mu$ 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  $\mu$ 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.
- For certain applications, the video ground can be connected separately to the protective ground via the additional PE connection in the plug panel.
  Observe EN 60601-1-1 (IEC 60601-1-1).
- 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. Observe all regulations of the country in which the device is used.

2.1 General safety notes

### 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.

### NOTICE

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

### See also

Connecting the signal cables (Page 23) Connecting the power supply (Page 24) Serial interface (Page 25) Cleaning (Page 69) Safety regulations (Page 76) General connection information (Page 21) Site (Page 17) Safety notes

2.1 General safety notes

### Description

### 3.1 Scope of delivery

PDC0100 analog DVI converter	Order no.: 6GF6010-0BA02
with power supply unit and keypad (control unit), together with connection cable, DVI cable, VGA cable	
PDC0100-SP analog DVI converter	
without power supply unit or keypad	

### Accessories

Power supply unit for 1x PDC0100	Order no.: 6GF6010-0BA03-0AA0
SINPRO power supply; model: MPU15A-105, EU power cable	
Power supply unit for 1-4x PDC0100	Order no.: 6GF6010-0BA03-0AA1
SL POWER™ and AULT®; model: MW153KB1203F01, EU power cable	
Power supply unit for 1x PDC0100	Order no.: 6GF6010-0BA03-1AA0
SINPRO power supply; model: MPU15A-105, US power cable	
Power supply unit for 1-4x PDC0100	Order no.: 6GF6010-0BA03-1AA1
SL POWER™ and AULT®; model: MW153KB1203F01, US power cable	
Keypad with cable	Order no.: 6GF6010-0BA00-0AB0

### 3.2 Area of application

The analog DVI converter is used to convert analog signals into a digital video signal.

3.3 Essential characteristics

### 3.3 Essential characteristics

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

The analog DVI converter is connected to the computer system via the 15-pin sub-D input socket.

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

### Video inputs

The analog DVI converter features two additional analog video inputs. The displays 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 PDC0100 analog DVI converter to special timing settings.

### Specially for use on the LMM56800 large monitor manager

The analog DVI converter is specially designed for use on the LMM56800 large monitor manager from EIZO. It is used to increase the number of analog inputs.

### Application planning

4.1 Site

### Provide adequate ventilation

Ventilation slots are located on the top of the housing. Do not cover the vent slots. A distance of 2 cm must be observed between the vent slots and other devices or covers.

### Observe the permissible ambient temperature range

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

### Change of environment

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

### See also

General safety notes (Page 9)

Application planning

4.1 Site

### Assembly

### 5.1 Mounting the display

### Installation

M3 press-in nuts are provided on both sides of the analog DVI converter for installation.



Assembly

5.1 Mounting the display

## 6

### Connecting

### 6.1 General connection information

### 

All information and warnings related to this product must be observed to ensure dangerfree operation.

### CAUTION

### Changes to device

- 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

Please observe all local EMC guidelines pertaining to shielding. Ignoring such requirements could allow signals to interfere with the proper operation of the display.

To guarantee perfect image reproduction, please observe the following:

- 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 analog DVI converter must not share a power supply with motors or valves (interference!).

### Note

All input signals and voltages must be in accordance with the SELV protection class.

### See also

General safety notes (Page 9) Electromagnetic compatibility (Page 77) 6.2 Connector locations

### 6.2 Connector locations

### Inputs of the analog DVI converter



### Output of the analog DVI converter and power supply



### Summary of signals and connections

See also

Connecting the signal cables (Page 23) Connecting the power supply (Page 24) Serial interface (Page 25)

6.3 Connecting the signal cables

### 6.3 Connecting the signal cables

### Note

- The video signals coming from a graphics card are referred to below as RGB signals, and those coming from a camera, DVD player, video recorder etc. as video signals. In the OSD menu, some of the menu displays are also appropriately identified by RGB or video in the header.
- At least one signal source must be connected in order to activate the OSD.
- All signal inputs may be connected simultaneously.
- The Up and Down keys can be used to select which RGB or video source is to be displayed when the OSD is not active. Selection is also possible in the OSD.

### 15-pin Sub-D female connector

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

### **DVI socket (input)**

• With DVI analog signal

### DVI socket (output)

- With DVI digital signal
- The analog pins of the DVI plug are not connected internally.

### 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.

6.4 Connecting the power supply

### BNC socket (video input)

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



### See also

General safety notes (Page 9) Connector locations (Page 22)

### 6.4 Connecting the power supply



Power supply connection (12 VDC)

The connection for the power supply is located on the front of the analog DVI converter. This is a 12 VDC connection. The device does not have an on/off switch.

• Secure the power supply cable to the metal lug using a cable tie.

### See also

General safety notes (Page 9) Connector locations (Page 22)

### 6.5 Serial interface

### 

- Apart from the serial spot meter and the advanced serial luminance meter, no other devices are permitted to 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 analog DVI converter has two serial RS232 interfaces:

• Upstream RJ11 socket:

The socket is located directly next to the VGA socket (labeled "UP").

#### • Downstream RJ11 socket:

The socket is located directly next to the first RJ11 socket (labeled "Down").

The socket allows serial bus mode for integration of the analog DVI converter into existing systems (bus connections). In addition, users are able to change the display settings through remote access.



#### See also

General safety notes (Page 9) Connector locations (Page 22) Connecting

6.5 Serial interface

### 7.1 Switch on the device

The device does not have a power switch, and is switched on and off using the power supply unit.

If the device is supplied with current, the green operation LED "Power" lights up.

### See also

Troubleshooting (Page 71)

### 7.2 Keypad

### The analog DVI converter is set using a keypad

The analog DVI converter is set using a keypad.

• Only connect the keypad using the supplied cable.



### CAUTION

### The analog DVI converter must not be connected to a network!

The RJ45 socket on the analog DVI converter and the keypad are used exclusively to connect these together using the network cable supplied with the keypad.

The operation LED is located directly on the analog DVI converter. The 4-key keypad is connected to the analog DVI converter via a network cable.

7.3 Description of OSD menu

### Key functions

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

Кеу	Situation	Action
1 (≙ Menu)	Always	Scrolling
2 (≙ +)	Submenu is selected	Select submenu
	Function is selected	Increase/change value
3 (≙ -)	Function is selected	Decrease/change value
4 (≙ Set)	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)

### 7.3 Description of OSD menu

### 7.3.1 OSD overview

The OSD menu is used to make settings for operation of the flat panel display with a source. The OSD can also be operated without an input signal to a limited extent.

7.3 Description of OSD menu



See also

Exit OSD (Page 40) Servicelevel 2 functions (Page 41) Lock/unlock OSD menu (Page 46) Menu functions (Page 30)

PDC0100 for analog video signals Instruction Manual, 07/2013, 1012298-004 7.3 Description of OSD menu

### 7.3.2 Menu functions

### **Program levels**

Printed/identified in bold type

Menu title (main menu or first submenu)

Main menu

Ŧ	Position / Zoom	,
1000	Source	
<u>e</u>	Auto functions	
0	Language	
	Others	
3	Servicelevel 2	

Main menu	Function	Adjustment/range	Description
Brightness/contrast	Brightness	0 100 %	Set brightness
Brightness 0			Adapting the representation of darker picture areas.
Contrast 100			Note:
Set user color (key "+") 1 \$300 K 2 7300 K 3 6500 K User User Color Dynamic help for keypad function • + • •			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.
			Note:
			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
	Color	1, 2, 3, User 1: 9300°K 2: 7300°K 3: 6500°K (native) User factory setting: "6500 °K (native)". This color can be set by the user. <i>Default: 1 (6500°K)</i>	Set the desired color temperature or hue Three fixed color temperatures and one adjustable color temperature can be selected. Color locations 1 and 3 cannot be saved. They only remain active while the timing is applied. <i>Note:</i> The user color setting can be changed when "User" is selected.
The second s	User color	Define user color temperature	
Ped Long Angle		The color setting defined here using the color function (selec <i>Note</i> If the color location setting is c	can be subsequently selected tion "User"). corrected with "User color",
Oynems hels for Leyped Furscher 💌 🔹 👄 📾	Red color temp	-32 +32	Select red component of
			display
	→Green color temp.	-32 +32	Select green component of display
	→ Blue color temp.	-32 +32	Select blue component of display
Position / zoom (not for analog picture signal)	H position	0 100 %	Shift picture in horizontal direction
H-Partier B			With identical display and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.
Denne and to the sector to the S	V position	0 100 %	Shift picture in vertical direction
			With identical display and graphics card settings, the complete picture to be displayed fills the display area of the monitor with the exact number of pixels.

7.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
	Zoom	1 to 1	Selection between different
		Fill all	picture size settings:
		Fill ratio	• 1 to 1: The nicture is displayed
		Square	on screen with its original
		Default: Fill all	resolution.
			• <i>Fill alt.</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.
Source	Select source for main display	,	
	Selection of source for full forr	nat image.	
Dri Digiter Composite	If you call this OSD menu, the	current source is displayed.	
B-Volue Divi Analog		VGA	After switching the display off
In Americans for man dealery and		DVI Digital	are gueried in sequence.
System his for System for the Cart		Composite	Note
		S-Video	Alternatively, the source can
		DVI Analog	be selected through a hot key function (see the OSD menu → Others → OSD setting).
Auto functions (only for	The auto functions support au	tomatic adjustment of the parar	neters.
analog signal)	The quality of the settings dep	ends on the picture contents ar	nd the type of synchronization.
Auto Sciptores Cartast Dos a Cit Auto Fastian Plans Transmis	All settings can of course also OSD menu.	be optimized manually using th	e corresponding items in the
Theory sended and fundamental services	<i>Note:</i> We recommend that an	SMPTE test picture is displayed	
	Auto brightness/contrast	On / Off	selected for the auto function
Bywanie fung fan kragtwei functions 💿 🍙 📾			With "On", the brightness and contrast are adjusted when the "Auto functions" are executed. With "Off", the brightness and contrast are not adjusted when the "Auto functions" are executed. <i>Note</i>
			This function is not available for "Sync on green signals".

7.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
	Auto position/phase/frequency	On / Off <i>Default: On</i>	This parameter can be selected for the auto function With "On", the position, phase and frequency are adjusted when the "Auto functions" are executed. With "Off", the position, phase and frequency are not adjusted when the "Auto functions" are executed.
	Execute selected auto functions	Execute	The selected auto functions are executed This sets brightness, contrast, position, frequency and phase to their optimum values. The quality of the function depends on the applied image contents.
Language		English, German <i>Default: English:</i>	Use the "Language" menu to select the language of the OSD menu German or English can be selected. English is the delivery default setting.
Others RGB Frequency / Phase Frequency / Phase Frequency / Phase Sharpness OSD setting DPMS betting Signal adjustment Status Dynamic help for keypad function		Frequency / Phase Sharpness	
	Frequency / phase(only for an	alog signal)	
Deremi kep for ingent fan ber	Frequency(only for RGB signals) Phase(only for RGB signals)	1638 1770 0 255	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.

### 7.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
Reference for Languest function	Sharpness		
	Interpolation filters	1 5	One of 5 filters can be selected for setting the sharpness, in order to reduce scaling artefacts.
			You must visually determine which sharpness setting is best.
			Common filters are available for the RGB sources (VGA, DVI).
			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.
			At lower resolutions, the filter calculates the value for the non-controlled pixels.
			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.
			Users should individually set the filter depending on the application:
			Filter No. 1 produces the "sharpest" picture, as it does the least filtering.
			Filter No. 5 filters the most; the greatest danger exists with this filter that details can no longer be recognized.
Commissioning

Main menu	Function	Adjustment/range	Description
	Video/PIP setting		
PETER Ante PETerrente Ante PETerrente Parties 5 (kmm) PETerrente Parties 0 (kmm)	PIP size	Off 1 2	Activating and deactivating the PIP window and setting the PIP window size
Connad Bill and a second billings		3 Default: Off	
Represent these first coupled franciscos	PIP source	Auto VGA DVI Digital Composite S-Video DVI Analog SoG / H / V <i>Default: Auto</i>	<ul> <li>The source is selected that is to be shown in the PIP window.</li> <li>"VGA" and "DVI" or</li> <li>"SoG / H / V" cannot be displayed simultaneously.</li> <li><i>Note</i></li> <li>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.</li> <li>The PIP window remains black if the signal cannot be displayed.</li> <li>To display the signal:</li> <li>Reduce the resolution of the signal or</li> <li>Change the window size under "PIP size"</li> </ul>
	PIP horizontal position	Slider	Shift the PIP window in the
	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).

Main menu	Function	Adjustment/range	Description
	Contrast	0 100 %	Adjust the contrast of the PIP window
			Adapting the representation of brighter picture areas.
			Note:
			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).
EGACITERISTICS	PIP advanced settings		
Martine Constant	Saturation	1 255 <i>Default: 128</i>	Adjusting the saturation for video signals displayed in PIP
Baranan hapi ta tayan tara kar	PIP sharpness (only for analog signal)	1 5	One of 5 filters can be selected for setting the sharpness of the PIP image in order to reduce scaling artefacts.
			You must visually determine which sharpness setting is best.
			See "Sharpness" in the "Others" menu: Description of details via the filters.
	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

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Main menu	Function	Adjustment/range	Description
560	OSD setting		
Decised Particles (2000)	Horizontal Position	Slider Default: Right	Setting of horizontal position of OSD menu
LED Desense ORD Lock/Heckay ORD Analative Heckay For PP Activative Institute	Vertical Position	Slider Default: Down	Setting of vertical position of OSD menu
Benne har for legan for the 💿 💿 🗮	Background	Opaque Transparent <i>Default: Opaque</i>	Selection of OSD background (Opaque or Transparent).
	OSD Lock/Hotkey	Hotkey brightness / contrast	Selection of different OSD lock/hotkey settings:
		Default: OSD available	<ul> <li>Hotkey brightness / contrast: The OSD menu is locked and can only be unlocked using a specific key combination.</li> <li>Only the brightness and contrast can be changed by any user with the OSD keys without the need for a key combination.</li> </ul>
			<ul> <li>Hotkey select source: 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.</li> <li>Note: See "Locking/unlocking OSD menu (Page 46)"</li> </ul>
	Hotkey for PIP activation	Active Inactive <i>Default: Inactive</i>	Activating and deactivating the PIP window with button 4 on the front 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.

Main menu	Function	Adjustment/range	Description
	DPMS setting		
	DPMS	On Off	The DPMS (Display Power Management System) can be switched on/off
Bureaun into for Inggest forminen 💿 🌒 🗩 📾		Default: On	When 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.
20mil adjustment	Signal adjustment		
Normgroup PAL Video Switch loop 1 1	Normgroup: PAL Video/PAL R	GB/VRC VIDEO/VCR RGB	I
Tolerance Factor 1 II III III Signal RGB ADC calibration Correction of Yill all'Smings Active	Switch loop	1 200 <i>Default: 1</i>	The following four parameters are of relevance for this tool:
			H frequency
Dynamic help for keypad function			V frequency
			V-total
			• Interlaced/non Interlaced If one of these parameters changes, the display 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. <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).
	Tolerance factor	1 10 <i>Default: 1</i>	This tool only considers the H and V frequencies.
			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").

Main menu	Function	Adjustment/range	Description
	Signal (only for analog signal)	RGB Monochrome	Switch over signal between b/w and color operation
		Default: RGB	<ul> <li>If a monochrome signal arrives, it is green on the color display.</li> </ul>
			<ul> <li>To obtain correct b/w images, set the "Signal" parameter to monochrome.</li> </ul>
	ADC calibration	Execute	Automatically calibrate A/D converter for the applied video level
			The video level range of the system is checked, and the display set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source.
			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).
			Note
			A specific test pattern and timing are prerequisites!
			The A/D converters have already been factory-set and need not be readjusted.
	Correction of "Fill all" timings	Active Inactive	Enhances the DVI-D signal quality over long distances, even when standard cable is used

## 7.3 Description of OSD menu

Main menu	Function	Adjustment/range	Description
Status Strill Vice 000000000 Working Hours 127-26	Status	Information	Current display settings in the respective picture mode can be called here.
Hortzontal Vertical Resolution 5000 1200 Frequency 74.906 kHz 60 Hz Framware Typ: 0.0 350 Version: 1.00			<ul> <li>Operating hours of the display</li> </ul>
SOK 22 SPE Release: Nov 24 2008 1114.41			OSD version
Dynamic help for keypad function			Configuration version
			Current timing
			Current source
			Screen resolution
			<ul> <li>Frequency of the input signal (line frequency and refresh rate)</li> </ul>
Servicelevel 2	Settings in this menu must onl	y be carried out by servicing pe	rsonnel!
	For further information, see "S	ervicelevel 2 functions" (Page 4	41).

## 7.3.3 Exit OSD

Exit OSD menu	Accept change	You exit the OSD and can save or
America Annual	Reject change	reject any changes. Press button 2 if you unintentionally entered this menu and want to return to the main menu.
		Note:
Dynami, help for key and function		If the OSD menu is exited by changing the timing or switching off the monitor, the changes made are saved.

## 7.3.4 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
Calibration	ADC calibration	Execute	Automatically calibrate A/D converter for the applied video level
			The video level range of the system is checked, and the display set accordingly. This results in optimum adjustment of the individual RGB A/D converters to the video source.
			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).
			Note
			A specific test pattern and timing are prerequisites!
			The A/D converters have already been factory-set and need not be readjusted.
User settings	Reset User settings	Execute	All automatically stored timing data are deleted
	Custom settings number	1 5	Custom settings can be saved here
Custon of Bugs number 1 New summer of English 00000 Result summer antitrigs			A total of 5 custom settings can be generated. The digit is the code number for the memory location.
	Save custom settings		Press the "Up" key to save the current picture settings and timing data to the memory addresses specified via the "Custom settings number".
			The 5-digit combination indicates which individual memory addresses have been allocated.
			<i>Example:</i> 10010 ⇒ Addresses 1 and 4 have been allocated.
	Reset custom settings	Execute	Clears the content of the five memory locations

Servicelevel 2	Function	Adjustment/range	Description
Test and Reset	Test pattern	Off Color bars	Fixed test patterns are available
Teat PANAN Rever La Factory antiana Restart		Gray bars Calibration picture <i>Default: Off</i>	The test patterns are generated directly in the display'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.
			<ol> <li>If the test pattern is displayed without faults, one should first check the connections and video sources.</li> </ol>
			2. 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.
			The test patterns can also be used to check the panel quality:
			<ul> <li>Proof of the contrast with grayscales and color channels (independent of picture, picture program, graphics card and connectors).</li> </ul>
			<ul> <li>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.</li> </ul>

Servicelevel 2	Function	Adjustment/range	Description
	Reset to factory defaults	Execute	All parameters are reset The following are deleted: User settings Custom settings The following are reset: Backlight Sharpness User color location Signal adjustments Black level settings RGB relation DPMS settings Language OSD setting Gamma curve Normgroup Info window settings Serial interface settings H-Scaler clip
	Restart	Execute	The processor is reset The power supply unit is not switched off. The monitor restarts.
Others	Info	On Off <i>Default: Off</i>	To display an info window 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.
	Serial interface	On Off <i>Default: On</i>	The serial interface can be activated or deactivated. If the serial interface is deactivated ("Off"), it is possible to suppress e.g. the downloading of firmware.

Servicelevel 2	Function	Adjustment/range	Description
	Serial bus Bus address	Enable Disabled <i>Default: Disabled</i> Slider from 0 10 <i>Default: 1</i>	To configure a network of several displays This function is used to interconnect several displays so that they can all be calibrated using a single computer (connected to the first display). <i>Note:</i> See the section "Serial interface" (Page 25) Definition of bus address for display.
	H-Scaler clip	Slider from 0 1984	Supports adjustment to the aspect ratio The picture can be expanded or compressed in the horizontal direction.
Force Mode	Blind mode	Execute	Force Mode is a tool for setting unknown timings that are not displayed via exact modes that have already been stored. Suitable for the direct input of previously determined Force Mode data. <i>Note:</i> See the section "Display
	Live mode	Execute	(Page 49) Force Mode is a tool for setting unknown timings that are not displayed via Exact Modes that have already been stored.
			setting of an unknown timing or for fine adjustment of a timing whose data have been entered using "Blind mode". <i>Note:</i> See the section "Display adjustment - Force Mode"

## 7.3.5 Lock/unlock OSD menu

#### CAUTION

Locking/unlocking of the OSD is only permissible for authorized servicing personnel. The OSD must be locked if a faulty operation on the part of the user could have a detrimental effect on the approved application of the display.

### Disable

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" once 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 30)

## 7.4 System settings

### 7.4.1 Implementing settings

The analog DVI converter automatically recognizes many different timings. However, it may be necessary to adjust the detected timing in certain cases. The required operations are explained here.

## 7.4.2 Adjusting the image geometry

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

## 7.4.3 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, or advanced serial luminance meter).

#### CAUTION

Fine adjustment of analog input: Only via 15-pin Sub-D connector Fine adjustment of digital input: Not necessary

- Fine adjustment of the Flat Panel Display should only be carried out via the analog port (15-pin Sub-D connector).
- 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 30)

## 7.4.4 Adaptation of display – video source / graphics card

As with all monitors, the Flat Panel Display also has certain limits, e.g. maximum resolution and refresh rate.

• The graphics card must be set when using the display such that the limits are observed.

#### NOTICE

Fine adjustment of the Flat Panel Display can 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.

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 for the Flat Panel Display into digital signals 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 Display.

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

The fine adjustment 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 display settings for the installed graphics card and guarantee that all grayscales can be distinguished, we recommend that brightness and contrast are adjusted only for the analog inputs.

- 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 display 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 display 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.

See also

Menu functions (Page 30)

## 7.4.5 Display adjustment – Force mode

## 7.4.5.1 Introduction





#### NOTICE

#### "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.

# 7.4.5.2 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 displays which are compatible with them are normally set to the interlaced procedure, computer signals and displays 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 7-2 Interlaced scanning system



Figure 7-3 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 7-4 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)

#### 7.4.5.3 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 53).



Figure 7-5 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 display. See "Live mode" (Page 56).



Figure 7-6 Live mode menu

#### Note

Various factory-set timings are saved in the display. 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 screen, 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 display.

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.

#### 7.4.5.4 Blind mode

#### Note

"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.

#### NOTICE

#### Saving of data always with "Force"

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

## 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  $\rightarrow$  Servicelevel 2  $\rightarrow$  Force Mode  $\rightarrow$  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.

Blindmoza				
Or Horizontal resolution	640	BU		
O-O Vertical resolution	512			
D-C Total horizontal lines	832		1	
Horizontal blank pixels	169			
Vertical blank pixels	31	-		Colori (Escatorio aleta
For static pictures		•		Select "For static pictu
Force				
Horizontal resolution	640	100	9	
Or O Vertical resolution	512	<u></u>		
Total horizontal lines	832	<u></u>		
Horizontal blank pixels	169		1	
Vertical blank pixels	31			0.1.1.F
For motion pictures		<b>4</b>		Select "For motion pict
Force				

5. Execute "Force" **EXECUTE** 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.

Vertical frequency	Horizontal frequency
76 Hz	81,037 kHz
Total vertical lines	Interlaced
1066	No
Blindmode	
Livemode	
Help	

#### NOTICE

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

Horizontal resolution	640		+
G-O Vertical resolution	512	ERF	ŀ
D+D Total horizontal lines	832	-	F
Horizontal blank pixels	159	-	Ŧ
O-O Vertical blank pixels	31	-10	•
Reset			
Force			

#### 7.4.5.5 Live mode

#### Moderate picture quality, timing not detected?

If a timing is not detected by the display 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.

#### Note

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

#### Note

#### 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.

#### NOTICE

#### Saving of data always with "Force"

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

#### 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  $\rightarrow$  Servicelevel 2  $\rightarrow$  Force Mode  $\rightarrow$  Live mode.
- 3. Select either "For static pictures" or "For motion pictures" in line 6 in the "Live mode" menu using key 2.

Livemote			
Horizontal resolution	640	STREET, S	
Vertical resolution	512		
DelQ Total horizontal lines	832		
Horizontal blank pixels	159	PILIT A	
Vertical blank pixels	31		
For static pictures		<b></b>	Select "For static pictur
Force			
0 + 23 Herizontal resolution	640	S INIINI 3	
Horizontal resolution	640	A BRIDDA S	
Vertical resolution	512	A	
Total horizontal lines	832	2000 F	
Horizontal blank pixels	159	ENNIR H	
Vertical blank pixels	31		Colort (Fee motion sint
For motion pictures			Select "For motion pict
Force			

4. Execute "Force" *second* 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.

Poret	
Vertical frequency	Horizontal frequency
76 Hz	81,037 kHz
Total vertical lines	Interlaced
1066	No
Blindmode	
Livemode	
Help	

#### NOTICE

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

	lorizontal resolution	640	-	
9-0)	ertical resolution	512	-	U.
	Fotal horizontal lines	832	-	
0-0H	Horizontal blank pixels	159	-	
0-0	vertical blank pixels	31	-	
F	Reset			
E F	Force			

## 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 "IIIIIII" 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.

Horizontal resolution	640		1	
P-D Vertical resolution	512		J	
Total horizontal lines	832		1	
DelD Horizontal blank pixels	159	THE R	1	
Vertical blank pixels	31		J	
For motion pictures		4	- 54	slect "Farr
	11.		and the second se	
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Motion image improvement (Pro	gressiv 640 512 832	e) Inactiv	• 1 1	
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Wotion image improvement (Pro	gressiv 640 512 832 159 31	e) Inactiv	• 1 1 1	elect "Fors

#### Note

#### Setting limit reached (applies to all settings in Force Mode!)

• 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.

Vertical frequency	Horizontal frequency
76 Hz	81,037 kHz
Fotal vertical lines	Interlaced
1066	No
Blindmode	
Livemode	

#### NOTICE

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 in black and centric on the display.

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



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  $\rightarrow$  Servicelevel 2  $\rightarrow$  Force Mode  $\rightarrow$  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.

#### Note

#### Gray/blue area not visible

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.
- Use the "Vertical blank pixels" input field to shift the top edge of the SMPTE image pixelexact to the top internal border of the gray/blue area.

#### Note

#### Gray/blue area not visible

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" *server* command using key 2.

#### Timing successfully set

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

#### Note

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

The desired zoom factor can be selected in "Live mode" when all settings have been completed.

Once all settings have been carried out in Force Mode, the desired zoom factor can be selected from the "Position/Zoom" menu.

#### Further use of determined values

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

```
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```

Saving	of several	timinas	which	have been	successfull	v forced
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User / Custom set Pointer 0 Sain 128 VRes 512 Reset User settings Custom settings number Save custom settings Reset custom settings	attings Offset 32 HFreq 33.72 kHz 1 10000
User / Custom so Pointer 0 Sain 128 VRes 512 Reset User settings Custom settings number Save custom settings Reset custom settings	ettings Offset 32 IFreq 33.72 kHz 3 10100
User / Custom so Pointer 0 Sain 128 VRes 512 Reset User settings Custom settings number Save custom settings Reset custom settings	ettings Dffset 32 HFreq 33.72 kHz 5 10101

- 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".

7.4 System settings

## Operation

## 8.1 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 display keys. These are therefore locked for certain applications. If settings have to be changed, please contact the responsible service department.

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!

## 8.2 Switch on the device

The analog DVI converter does not have an on/off switch. If the device is connected via the power supply unit, the operation LED on the power supply unit lights up green permanently.

#### See also

Troubleshooting (Page 71)

Operation

8.2 Switch on the device

## Service and maintenance

## 9.1 Cleaning

С	AUTION
Ρ	lease note with device maintenance, cleaning and disinfecting
•	Remove dust from the device using a dry cloth.
	Liquid must not penetrate the device.

## See also

General safety notes (Page 9)

Service and maintenance

9.1 Cleaning
# 10

# Troubleshooting

Fault	Cause	Remedy
Power LED off (power supply unit)	Power cable is not inserted or incorrectly inserted.	Connect power cord
Monitor displays no picture,	No video signal	Check video cable
Power LED flashes green	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
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 LED states

LED	Display status
Both LEDs light up	No fault; "Power down" was switched on and is active
LED green	Video signal recognized, no fault

Troubleshooting

#### Applicability of technical specifications

All technical specifications are valid after a warming-up period of 10 minutes.

# 11.1 Power supply

Mains connection	External 12 VDC power supply unit
Line voltage	100 V 240 V AC
Line frequency	50 60 Hz (± 5 %)
Power consumption	< 10 W

## 11.2 Electronics

Timing recognition	H frequency, V frequency, interlaced, number of
	horizontal lines

# 11.3 Inputs/outputs

#### Analog signal input

RGB input, H/C-Sync input and V-Sync input	via 15-pin Sub-D connector (female), any polarity
DVI input	Via DVI-I socket (analog pins are used)
RGB signal	• Video level: 0,5 1.0 V <sub>pp</sub>
	Sync level: TTL-compatible
SoG signal	• Video level: 0,5 1.0 V <sub>pp</sub>
	• Sync level: 0,2 0.3 V <sub>pp</sub>

11.3 Inputs/outputs

#### Video input

S-Video	Via 4-pin mini-DIN socket
Composite	Over 1x BNC socket
Composite & S-Video	• Video level: 0,5 1.4 V <sub>pp</sub>
	• Sync level: 0,2 0.3 V <sub>pp</sub>
Standards	PAL (625 Z / 50 Hz)
	NTSC (525 Z / 60 Hz)

#### **Digital output**

DVI output

DVI – socket (digital), single link

#### Keypad connection

Remote control cable

RJ45 socket on analog DVI converter and keypad to connect these together. Optional settings on the analog DVI converter can be made via this socket.

#### Serial interface

RS 232 Via RJ 11 socket

11.4 Controls and connectors

# 11.4 Controls and connectors

Front	12 V connection
	Operation LED
	<ul> <li>1x RJ45 socket for connection of keypad</li> </ul>
	1x DVI socket (only digital)
Rear	1x DVI socket
	• 1x 15-pin 3-row Sub-D socket
	1x BNC socket
	1x 4-pin mini-DIN socket
	• 2x RS 232 sockets (RJ11)
	<ul> <li>Voltage source for connection of external devices (5 V/1 A)</li> </ul>
Keypad	1x RJ45 socket for connection of keypad

# 11.5 Mechanical design

Housing components	Powder-coated metal parts
Ventilation openings	In rear panel
Degree of protection	IP20 in accordance with DIN 40050
Connector panel	At front and rear
Weight	Analog DVI converter: 850 g
	• Keypad: 90 g
Dimensions (W x H x D) in mm	Analog DVI converter: 220 x 43 x 170
	• Keypad: 100 x 24.5 x 43

# 11.6 Climatic conditions

#### Operation

Temperature range	5 °C 40 °C ambient temperature
Temperature gradient	5°C/h max., no condensation
Air pressure	700 1060 hPa

11.7 Mechanical requirements

#### Transport and storage (packed)

Temperature range	-20°C +70°C ambient temperature
Temperature gradient	5°C/h max., no condensation
Air pressure	500 1060 hPa

# 11.7 Mechanical requirements

#### Operation

Vibrations	To EN 60068-2-6
	To EN 60721-3-2
Shock	To EN 60068-2-27 (single impact)
	To EN 60721-3-3 Class 3M2 (single impact)
	To EN 60068-2-29 (permanent impact)
	To EN 60721-3-3 Class 3M2 (permanent impact)

#### Packed unit

Vibrations	To EN 60068-2-6
	To EN 60721-3-2 Class 2M2
Shock	To EN 60068-2-27 (single impact)
	300 m/s <sup>2</sup> , 6 ms (in storage packaging)
	To EN 60068-2-29 (continuous shocks)

# 11.8 Safety regulations

Safety standards	EN 60950, UL 60950
Approval	CAN/CSA - C 22.2 No. 950, CSA/us mark
Protection class	Degree of protection II
Degree of protection according to DIN 40050	IP20
Conformity	CE in accordance with guideline 2004/108/EC

11.9 Electromagnetic compatibility

# 11.9 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

11.9 Electromagnetic compatibility

# **Dimensional drawings**

All dimensions in mm

# 12.1 Front view



# 12.2 View from right



12.3 Rear view

# 12.3 Rear view



# 12.4 View from above



12.5 View of keypad

# 12.5 View of keypad







Dimensional drawings

12.5 View of keypad

# 13

# Accessories

## 13.1 Analog DVI converter

#### Accessories for analog DVI converter

Product	Order no.:
Power supply unit for 1x PDC0100	6GF6010-0BA03-0AA0
Power supply unit for 1 to 4 PDC0100	6GF6010-0BA03-0AA1
Keypad with cable	6GF6010-0BA03-0AB0

#### Note

You will find updates regarding products and accessories on our homepage: Medical Monitor Solutions (http://www.eizo.eu)

# 13.2 DVI transmission path and cable

#### Accessory: DVI transmission links TDL3600 and TDL2300

#### NOTICE

If the display 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 TDL 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 pipes.

13.2 DVI transmission path and cable

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

#### Accessories: cables and adapters

Different cables and adapters allow problem-free integration of our displays, even in extremely complex systems.

Product	Order No.
DVI-HDMI cable, 5 m	6GF6980-1HA00
BNC to VGA cable	6GF6980-1TB04
UMC-201, USB serial converter	6GF6980-8WG15

# Appendix



#### A.1 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 user manual.

#### A.2 Repairs

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

#### A.3 Environmental protection

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

#### A.4 Accessory devices

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

#### A.5 Contact

#### Support during installation and for technical questions

Medical Monitor Solutions (http://www.eizo.com)

A.6 Trademarks

#### A.6 Trademarks

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Appendix

A.7 China RoHS (Restriction of Hazardous Substances)

# A.7 China RoHS (Restriction of Hazardous Substances)

#### PDC0100

型号 Model: 6GF6010-0BA0# (#=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。 为保证所申明的环保使用期限,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,以保证所申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.

A.7 China RoHS (Restriction of Hazardous Substances)

#### 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	有毒有害物质或元素 Hazardous substances' name					
Component Name	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
控制板 Controller Board	0	0	0	0	0	0
电源 Power Supply	0	0	0	0	0	0
其他 电路板 Other Circuit Boards	0	0	0	0	0	0
其他(电缆等) Others (cables, etc.)	0	0	0	0	0	0
机架、底盘 Housing, Chassis	0	0	0	0	0	0
附件(信号电缆 、输电线等) Acessories (signal cable, power line, etc.)	0	0	0	0	0	0

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

• 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。

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

- 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.

# B

# List of abbreviations/acronyms

С	
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
1	
ESD	Electrostatic Discharge
EMC	Electromagnetic compatibility
EN	European standard
F	
FCC	Federal Communications Commission
н	
HF	High Frequency
L	
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LUT	Look Up Table
м	
MDD	Medical Device Directive
0	
OSD	On-screen display
Р	
PE	Protective Earth
S	
SMPTE	Society for Motion Picture and Television Engineers
SVGA	Super Video Graphics Array
т	
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 <sup>2</sup>	Candela/m <sup>2</sup> (photometric measurement for brightness)
ftL	3.426 cd/m <sup>2</sup>

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Order Number: 1912298-004

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