

# **MD-CP42AU-MED2**

USERS MANUAL

42" Medical Grade Display



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2011 Richardson Electronics GmbH

**Manufacturer**

Canvys – Visual Technology Solutions  
A Division of Richardson Electronics GmbH  
Raiffeisenstr. 5  
78166 Donaueschingen  
Germany

Tel.: +49 (0)771 / 8300-0  
Fax: +49 (0)771 / 8300-80  
Email: info-europe@canvys.com  
Internet: <http://www.canvys.com>

Specifications are subjected to change without notice.

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Thank you very much for purchasing the MD-CP42AU-MED2, a medical safety approved TFT-LCD Display. This display is for medical application approved. In order to use your display correctly, please read the users manual carefully and take notice of the danger, warning and caution notices.

## About This Manual

This user manual is intended as an aid in setting up and operating the flat-screen display. We have thoroughly verified all information and hints.

The safety information given in this manual is classified as follows:

**DANGER:**

**Indicates an imminent hazard. If not avoided, the hazard will result in death or serious injury.**

**WARNING:**

**Indicates a hazard. If not avoided, the hazard can result in death or serious injury.**

**CAUTION:**

**Indicates a potential hazard. If not avoided, this hazard may result in minor personal injury or product/property damage.**

## Application and Functional Description

### *Some Basic Facts*

The medical safety approved MD-CP42AU-MED2 is a versatile monitor designed for ergonomic and easy handling. The liquid-crystal display (LCD) monitor supports the most common resolutions from 640x480 (VGA) up to 1920x1080 (Full HD) and presents high-brightness, sharp, low-radiation images.

With the OSD wheel knob on the bottom right side of the display, the display parameters can be easily adjusted. Additionally you can control OSD by Remote Control or by serial interface RS-232 with a PC.

### *Intended Use*

The intended use of the MD-CP42AU-MED2 is to display medical imaging data and endoscopy applications.

The medical display is only to use with his internal power supply.

Only this combination of display and power supply is approved for use in the medical environment. The flat-panel display and the power supply must not be used outdoors or in areas where an explosion hazard may occur.

The user has to make sure that requirements from IEC 60601-1 are fulfilled, especially in

combination from monitor with other electrical equipment. For fulfillment of this technical requirement you can use if necessary the earthing equipment conductor, which is fixed mounted at the monitor.

The MD-CP42AU-MED2 display is a medical device as defined in the Council Directive 93/42/EEC about medical devices and is class I equipment (MDD).

### **Functional Description**

The medical flat-screen display is built into a slim and ergonomic housing. The monitor displays 16.7 Million colors with a resolution of 1920x1080 pixels.

The display is controlled either analog via a 15-pin D-sub VGA signal cable, digital via a DVI cable or video via different video cables. The signal is equivalent to the analog and digital standard signals of your PC. After connection of the signal the flat-screen display automatically adapts, as far as possible, to the VGA signal and presents a stable and centered image. Additional display parameters, such as brightness and contrast, can be adjusted via the on-screen menu.

### **Product Features MD-CP42AU-MED2**

- 42" TFT Liquid Crystal Display
- protection glass
- high brightness
- high contrast ratio
- RS-232 connector for remote control
- IR remote control
- Earthing equipment conductor
- power management
- viewing angles
  - horizontal -89° up to +89°
  - vertical -89° up to +89°
- Optimum resolution 1920 x 1080 (Full HDTV)
- 16.7 million colours
- DVI-I and DVI-D input
- S-Video, Composite Video, RGBS, YPbPr/YCbCr, HD-SDI
- user-friendly OSD-Menu with intuitive wheel-knob,  
IR remote control or  
with PC by RS-232 communication
- DDC2B Plug & Play

### Commentary of used symbols and safety instructions

The medical flat-screen display is built into a slim and ergonomic housing. The monitor displays 16.7 Million colors with a resolution of 1920x1080 pixels.

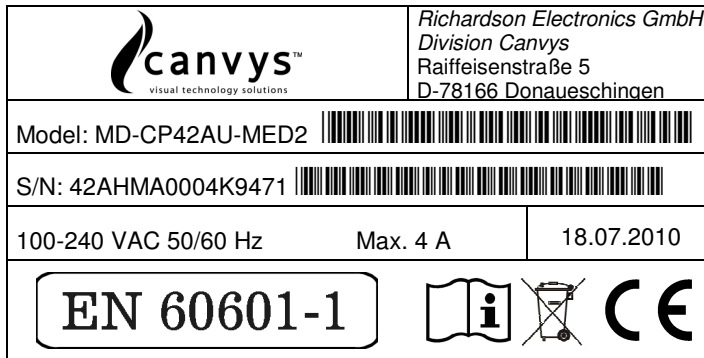





Illustration 1 – Name plate from flat-screen display (MD-CP42AU-MED)

Manufacturer:	Richardson Electronics GmbH Raiffeisenstraße 5 D-78166 Donaueschingen Tel.: +49 (0) 771 / 83 00-0 Fax: +49 (0) 771 / 83 00-80
Model: <b>MD-CP42AU-MED2</b>	Medical approved Monitor.
100-240 VAC 50/60 Hz Max. 4,0A	Use the medical flat-screen display only with his internal power supply, which allocate the needed voltages.
S/N:	Serial number
EN 60601-1	This device was accredited based on medical standard EN 60601-1.
	Confirmation over compliance with medical regulations EN 60601-1.
	WEEE-Reg.-Nr.: DE 64678500
	Manual to consider! Read the manual and consider the safety instructions and the description for correct starting up from flat-screen display.

## **General Notes on Electrical Safety**

Connecting medical electrical equipment to other medical electrical devices and/or other non medical electrical devices, be it for diagnostic or therapeutic purposes or for monitoring, creates a medical electrical system. The standard EN 60601-1-1 and cUL 60601 describes the requirements for these systems.

These systems must be composed of devices that comply either with the standard EN 60601-1 and or cUL 60601 or with the applicable IEC / ISO standard (PCs, for instance, must meet the requirements of the standard IEC 60950) or that are equipped with additional safety features, such as a protective earth conductor, isolating transformer or electrically isolated interface (e.g. optocoupler). This applies to devices of protection class I or II. It is not permitted to integrate protection class 0 devices in medical electrical systems.

In the patient environment, the following maximum enclosure leakage currents (current flowing between two device enclosures or between the enclosure of a device and the protective earth conductor) are permitted for medical devices:

normal condition: 0.1 mA

single fault condition: 0.5 mA (e.g. protective earth conductor interrupted)

Before putting the system into service for the first time, a specialist is required to check that these values are not exceeded.

If the enclosure leakage current of a device or of the system exceeds the limit values stated above, additional protective measures, such as connection to protective earth conductor, isolating transformers or conductive castors, must be implemented to correct this problem.

## **Safety Information**

### **DANGER:**

**Explosion Hazard – The display including the power supply is not designed for use in areas of medical locations where an explosion hazard may occur.**

**In appropriate usage of flammable anesthetics, skin cleansing agents and disinfectants the medical Displays can be used risk less in surgical rooms and intensive care units.**

**It is not permitted to operate the devices in the presence of flammable substances (e.g. gas).**

### **WARNING:**

**Shock Hazard — Use only integrated medical power supply:**

**Alternation current input: 100 - 240V~, 50 - 60Hz, Current: 4A**

**WARNING:**

**Personal Injury** — Medical electrical devices may be connected to other devices or to parts of systems only when it has been made certain that there is no danger to the patient, the user, or the environment as a result.

In those instances where there is any element of doubt concerning the safety of connected devices, the user must contact the manufacturers concerned or other informed experts as to whether there is any possible danger to the patient, the operator, or the environment as a result of the proposed combination of devices.

Connecting medical electrical devices to other medical electrical devices and/or other non-medical electrical devices creates a medical system which must comply with the system standard

**EN 60601-1-1 / cUL 60601.** Before putting the system into service, a specialist is required to ascertain its conformity with the system standard.

**WARNING:**

**Personal Injury** — Before putting the device into service, check all cables for signs of damage. Damaged cables must be replaced immediately with the original manufacturer's cables. The safety information and certificates do not apply when cables from other manufacturers are used.

Do not open the flat-screen display or perform any service interventions. This may render your warranty claims null and void. Only authorized technicians are permitted to service the flat-screen display.

Do not put the flat-screen display into service

- when liquids have entered the device,
- when it was dropped and the housing is damaged.

Do not immerse the devices into liquids.

- Disconnect the power supply from the power line before cleaning. Use a moist cloth.

**WARNING:**

**Equipment Failure** — Magnetic and electrical fields are capable of interfering with the proper performance of the devices. For this reason make sure that all devices operated in the vicinity comply with the relevant EMC requirements. X-ray equipment, MRI devices, radio systems, and cellular telephones are possible sources of interference as they may emit higher levels of electromagnetic radiation.

Keep the system away from these devices and verify its performance before use.



**WARNING:**

**Risk of Suffocation — Dispose of the packaging material, observing the applicable waste-control regulations and keeping it out of children's reach.**

**CAUTION:**

**Personal Injury — All devices used must comply with the applicable IEC/EN or ISO standard (PCs, for instance, must comply with IEC 60950). This applies to custom designs in particular.**

**During operation from flat-screen display (contact to monitor) do not simultaneously touch patient.**

**CAUTION:**

**Personal Injury, Equipment Damage — Check that the ambient conditions specified by the manufacturers of the different devices are ensured.**

**Before cleaning the flat-screen display, turn it off and remove power cord from power supply. Do not spray liquid cleaning agents directly onto the display. Spray the cleaning agent onto a cloth and wipe the display clean without exerting any pressure.**

**Do not place any objects on the signal cables. Route the signal cables and the power cable to the flat-screen display such that they do not present a stumbling hazard.**

**CAUTION:**

**Equipment Damage — Do not set up the flat-screen display in the immediate vicinity of a window. Rain, water, humidity and sunlight may damage the flat-screen display.**

**Do not exert pressure on the LCD. Excessive pressure may permanently damage the display.**

**For safe storage of the flat-screen display, a temperature between -20°C and +60°C must be ensured. Temperatures above or below this range may permanently damage the flat-screen display. Always store your flat-screen display in its original shipping box.**

**WARNING:**

**Personal Injury — During intracardiac application, it is recommended to connect the individual devices to the room's potential equalization system via separate potential equalization cables.**

**For intracardiac application, the application guidelines for medical electrical devices set forth in the German standard VDE 0753, part 2, must be observed.**

## Manufacturer's declaration of compliance with standards and directives



### EG Declaration of Conformity

Manufacturer Richardson Electronics GmbH  
Division Canvys  
Raiffeisenstraße 5  
D-78166 Donaueschingen

Tel.: +49 (0) 771 / 8300-0  
Fax: +49 (0) 771 / 8300-80

Product: Medical Monitor (product group 1)  
**MD-CP42AU-MED2**  
**MD-CP42AUPC-MED** (chassis without front bezel)

Classification: **I**  
(Directive 93/42/EWG)

We declare in own responsibility, that the above named products correspond to relevant regulations according to the following EG guidelines and standards.

#### Directive:

Directive 93/42/EWG of the Council of 14. Jun. 1993

#### Standards:

DIN EN 13485: 2003 + AC2007

Medical Products-Quality management system

IEC 60601-1 3<sup>rd</sup> Edition: 2005 = EN 60601-1:2007

General Requirements Of Basic Safety and Essential Performance

EN 60601-1-2: 2007

EMC-Directive

EMC - Emission

EMC - Immunity

EMC-Tests have been carried out using standard cables with cables length of up to 2,5 meters. If longer cables are used, additional tests might be necessary to prove compliance with the EMC-directive.



#### Konformitätsbewertungsverfahren:

Anhang VII

Name: Bernhard Zimmermann  
Position: Director of European Sales

## **Your Medical Display MD-CP42AU-MED2**

Before you start to install your medical display, make sure the carton box is not damaged and that all equipment is delivered completely.

### ***Transport Damage***

If the equipment has obviously been damaged in transit, make a written report immediately upon arrival of the goods and notify the shipping agent. The shipping agent must be informed of hidden damage in transit in writing within 2 work days.

### ***Unpacking***

Before unpacking the flat-screen display, prepare a suitable area for its set-up. Choose a location where the display will not be frequently exposed to direct sunlight or other strong sources of light. The light reflects on the display, dazzling you, and you will have problems seeing the displayed information.

After unpacking the display, check whether the shipment is complete and all items are intact:

### ***MD-CP42AU-MED2***

- User's Manual (CD)
- 75Ω Termination at HD-SDI OUT
- DVI cable
- 2 x Power cord (UK & EU)
- Remote Control

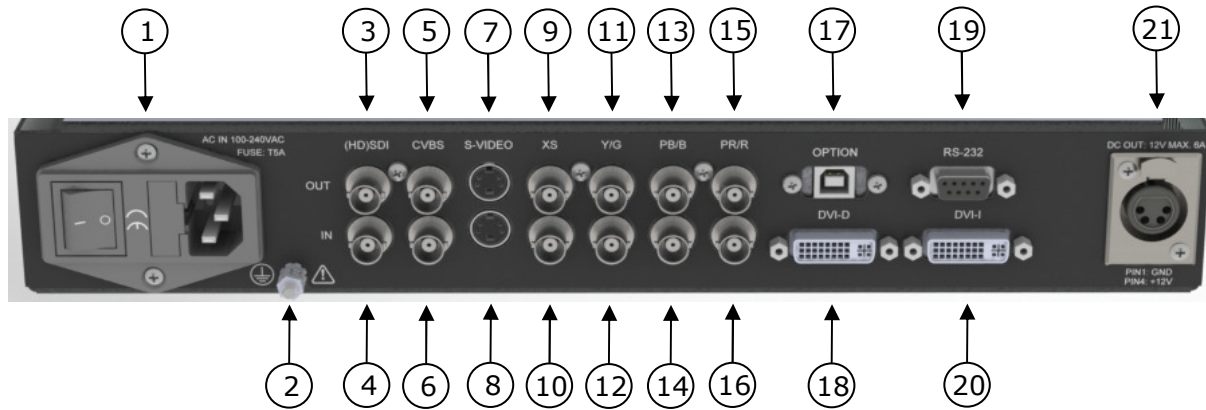
If items are missing or damaged, contact your dealer immediately. Keep the packaging material and the shipping carton for storage or shipment of the flat-screen display.

### ***Setup and positioning***

If you use our wall mount system (Option VESA 200) to mount the MD-CP42AU-MED2 monitor to a wall with its VESA 200 adaptor, please make sure, that all data links and plug connections are easily reachable.

Please refer to the references from next pages. Circuit points for signal cables and power cord are located on back of the flat-screen display. There is in illustration 2 a detailed identification and description.

Choose a location where sunlight or other bright light does not directly fall on the display. The flat-screen display should not be exposed to excessive heat, humidity or direct sunlight, because this could cause damage to the device.



**Illustration 2 – Connectors and cabling of MD-CP42AU-MED2**

To connect the cables

1. AC power input unit  
The connection for energy supply is identified with "POWER". Connect AC power cord with this input. Plug into a power socket other side of power cord. The AC power input unit contained a ON/OFF switch, two fuses and the mains connection.
2. Earth conductor  
Connect the Earth Conductor with little resistance with protective earth. After installation examine carefully the efficiency from this protective conductor connection before starting up.
3. HD-SDI-Output Connector
4. HD-SDI-Input Connector  
Connect SDI video connector and a SDI video output device with a 75-Ohm coaxial cable (e.g. Camcorder)
5. CVBS/Composite Video output connector
6. CVBS/Composite Video input connector  
Connect a composite video cable to this connector and a video output device.
7. S-Video output connector
8. S-Video input connector  
Connect a S-Video signal cable to this connector and a S-Video output video device.
9. XS-Output (synchronization) Connector
10. XS-Input (synchronization) Connector  
For Pr,Pb,Y and Xs-Input (Component) signal or alternative RGBS-Input signal  
No. 10,12,14 and 16 Connect a component video cable to this connector and a component video output device (e.g. DVD, High Definition (HD), RGBS video image)
11. Y/G-Output Connector
12. Y/G-Input Connector  
For Pr,Pb,Y and Xs-Input (Component) signal or alternative RGBS-Input signal  
No. 10,12,14 and 16 Connect a component video cable to this connector and a component video output device (e.g. DVD, High Definition (HD), RGBS video image).

13. PB/B-Output Connector
14. PB/B-Input Connector  
For Pr,Pb,Y and Xs-Input (Component) signal or alternative RGBS-Input signal  
No. 10,12,14 and 16 Connect a component video cable to this connector and a component video output device (e.g. DVD, High Definition (HD), RGBS video image).
15. PR/R-Output Connector
16. PR/R-Input Connector  
For Pr,Pb,Y and Xs-Input (Component) signal or alternative RGBS-Input signal  
No. 10,12,14 and 16 Connect a component video cable to this connector and a component video output device (e.g. DVD, High Definition (HD), RGBS video image).
17. OPTION Connector  
Optional In-/Output for additional functions.
18. DVI-D Digital Input Connector  
Connect the DVI cable to this connector and to your graphic adapter
19. Remote Control RS-232 Connector  
Connect this input with a RS-232 cable and with corresponding PC interface.
20. DVI-D Analog-digital input Connector  
Here at this input you have two possibilities. You can use it in analog (VGA) or digital (DVI) mode. Connect the suitable VGA-/DVI-cable to this connector and to your graphic adapter.
21. 12V DC Output Connector  
You can connect a Media player or a Mini-PC with a 12V DC Input voltage up to a maximum power consumption from 6A (max. power consumption 72W).  
The user has take care for acceptability within a medical system.

**CAUTION:**

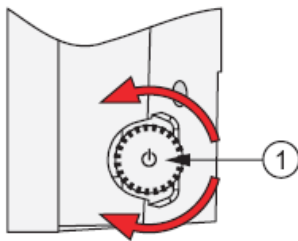
**When you disconnect the cord/cables, be sure to hold the connector and not the cable itself.**

## Controls & Functions

### ***The OSD Wheel Knob***

(On Screen Menu) The OSD Wheel Knob is a multi-functional device located on the right side of the front bezel. It has three movements - rotate upward, rotate downward and press inward as a button.

- Rotate Downward : Move Up/Right, Increase
- Rotate Upward : Move Downward/Left, Decrease
- Button Press : Execute, Do, Save



**Illustration 3 – OSD Wheel Knob**

Switch ON/OFF the flat-screen monitor with his power switch. In normal mode is a green LED illuminated. If there is no input signal (VGA-DVI- or Video) or in standby the LED is illuminated orange. This LED is located at left rear side frame (considered from front view).

1. Switch-ON/OFF  
If LED is not illuminated, switch-on the flat-screen display by pressing the OSD Wheel knob.  
To switch-off the monitor press the OSD wheel knob two seconds until the LED illumination appears.
2. Status-LED  
If power cord is connected correct and power supply is switch-on the status-LED illuminates green. When monitor goes into energy saving mode (STANDBY) the status-LED illuminates orange instead of green. In chapter Power Management you will find additional descriptions.

#### Handling of OSD-Menu

Press the OSD wheel knob, by switched-on flat-screen display (Status-LED illuminates green and picture at the display), to overlay the OSD-Menu. With the three functions from OSD wheel know you can make your adjustments within the OSD-Menu.

- Rotate upward: moving upwards, move to right side, increase value.
- Rotate downward: moving downwards, move to left side, decrease value.
- Press button: Activate function, activate, store.

Mode	Power consumption (only flat screen)	Status-LED
ON	Approx. 250W	Illuminate green
STANDBY	Approx 25W	Illuminate orange
OFF		OFF

### On-Screen Display

The OSD menu is activated by pressing the OSD wheel knob inward and you can select and adjust the function of your choice by rotating and clicking the OSD wheel knob. The main menu displays a list of submenu icons and the current video input mode. Rotate the OSD wheel knob to move the highlights to the control you would like to adjust, then press the OSD wheel knob inward to select that control or to activate that function. Depending on the OSD wheel knob selected, a submenu of the control with a status bar will appear. Rotate the OSD wheel knob to adjust the control. When you have finished making the adjustments, the setting is saved automatically by exiting the control function. If you do not touch the OSD wheel knob for 3 seconds, the OSD is automatically exited saving your current settings.

### OSD – Main Menu Display

The OSD menu is displayed with icons, adjustment items, and setting values as shown below. The charts below display the function tree and brief explanations of the functions.

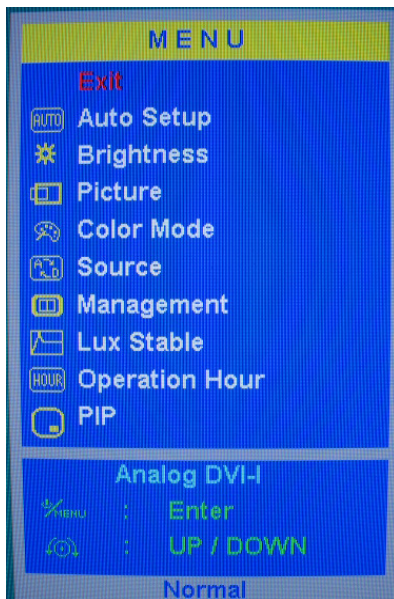


Illustration 4 – OSD Main Menu

The Main Menu consists of followings menu points:

<b>Exit</b>	Close the OSD screen
<b>Auto Setup</b>	Automatically adjusts the display according horizontal and vertical adjustments, position, frequency and phase. It takes only a couple of seconds. After that you have a perfect image. For the digital input DVI, this function is not available.
<b>Brightness</b>	Adjusts the brightness of the full screen at the range from 0 to 100. Rotating the control dial up/down to adjust the brightness any time while the OSD is off
<b>Picture</b>	The picture menu allows to make changes of the picture
<b>Color Mode</b>	Allows to select color mode or color temperature
<b>Source</b>	Allows to select the input signals of the display: VGA, DVI, S-Video, Composite, Component, RGBS and SDI
<b>Management</b>	Contains several adjustments in order to change miscellaneous properties of your display, e.g. language, OSD position etc.
<b>Lux Stable</b>	Stabilize the brightness. Switch-On/Off this function.
<b>Operation Hour</b>	Operation hour meter
<b>PIP</b>	Picture in picture shows two pictures from two different input sources.

### Menu Picture (VGA or DVI)

The picture menu allows making changes of the picture. Following sub menus are available:

<b>Exit</b>	Returns to Main Menu
<b>Contrast</b>	Adjusts the contrast of the full screen at the range from 0 to 100.
<b>Black Level</b>	Adjust black level of the screen. The larger the value is, the brighter the brightness of the background contrast is, and vice versa. Adjustable at the range from 0 to 100.
<b>Display</b>	Adjust the horizontal position of the display. When rotating Control dial clockwise, the display moves to the left, and vice versa. For the digital input DVI, this function is not available. Adjust the vertical position of the display. When rotating Control dial clockwise, the display moves upward, and vice versa. For the digital input DVI, this function is not available.
<b>Clock/Phase</b>	Make "Phase" and "Clock" adjustments, if any flickers, blurs, or horizontal stripes on screen. Adjustable at the range from 0 to 100. For the digital input DVI, this function is not available.



## Menu Picture (Video)

The picture menu allows to makes changes of the picture. Following sub menus are available:

<b>Exit</b>	Returns to Main Menu
<b>Contrast</b>	Adjusts the contrast of the full screen at the range from 0 to 100.
<b>Black Level</b>	Adjust black level of the screen. The larger the value is, the brighter the brightness of the background contrast is, and vice versa. Adjustable at the range from 0 to 100.
<b>Saturation</b>	Adjust saturation of the screen. The larger the value is, the more intensive is the specific hue. Adjustable at the range from 0 to 100.
<b>Hue</b>	Adjust gradation of colour. Adjustable at the range from 0 to 100.
<b>Sharpness</b>	Adjust sharpness of the screen. The larger the value is, the outline gets sharper. To make characters look sharper, set a large value. To make pictures and images look finer, set a small value. Adjustable at the range from 0 to 10.

## Menu Colour Mode

Selects the colour mode or colour temperature.

<b>Exit</b>	Returns to Main Menu
<b>Normal</b>	Adjust preset colour temperature of Cool, Neutral, Warm or User for customized red, green and blue levels: The user can adjust and set tones. - R Adjust red and equivalent colours at the range from 0 to 100. The greater the value is, the deeper the colour is, and vice versa. - G Adjust green and equivalent colours at the range from 0 to 100. The greater the value is, the deeper the colour is, and vice versa. - B Adjust blue and equivalent colours at the range from 0 to 100. The greater the value is, the deeper the colour is, and vice versa.
<b>Gamma 1.8</b>	Presetting for Gamma value 1.8
<b>Gamma 2.0</b>	Presetting for Gamma value 2.0
<b>Gamma 2.2</b>	Presetting for Gamma value 2.2
<b>DICOM</b>	Presetting for Gamma value DICOM
<b>Calibration</b>	No function

## Menu Source

Select the Input signal of your display. The signal is not auto detected, so you have to choose the input signal manually between DVI-I, DVI-D, S-Video, Composite Video, Component (YPbPr/YCbCr), RGBS or HD-SDI.

<b>Exit</b>	Returns to Main Menu
<b>Analog DVI-I</b>	Select DVI 24-pin input signal (analog)
<b>Digital DVI-I</b>	Select DVI 24-pin input signal (digital)
<b>Digital DVI-D</b>	Select DVI 24-pin input signal (digital)
<b>S-Video</b>	Select S-Video input signal (Video)
<b>Composite</b>	Select Composite (CVBS) input signal (Video)
<b>YPbPr/YCbCr</b>	Select Component input signal (Video)
<b>RGBS</b>	Select RGBS input signal (Video)
<b>HD/SD-SDI</b>	Select HD-SDI input signal (Video)

## Menu Management

Utility contains several adjustments in order to change miscellaneous properties of your display, e.g. language, OSD position etc.

<b>Exit</b>	Returns to Main Menu
<b>Scaling</b>	Select one scale from the followings to display images: Full, 1:1, 4:3. When using scaling function in expanding direction other than 1:1, image will be expanded and thus blur.
<b>OSD Display</b>	Adjust the OSD position on the screen. OSD H. Position: When rotating OSD wheel knob clockwise, OSD moves to the right, and vice versa. OSD V. Position: When rotating OSD wheel knob clockwise, OSD moves downward, and vice versa.
<b>Language</b>	Selecting this control, then rotate the Control Dial to select the language you want: English, French, German, Italian, Spanish, Japanese. Press the OSD wheel knob to execute when selected
<b>Recall</b>	Initialize the data such as display position and automatic adjustment data to factory default

### ***The OSD Remote Control***

With the OSD Remote Control is it very comfortable to make your display settings.



**Illustration 5 – OSD Remote Control**

<b>Power symbol</b>	Switch-ON /-OFF the monitor.
<b>Volume +</b>	Hotkey for Brightness menu In brightness menu it increase brightness value.
<b>Volume -</b>	Hotkey for Brightness menu In brightness menu it decrease brightness value.
<b>Speaker symbol</b>	Overlay the OSD menu. Together with Channel +, Channel - and speaker symbol you can make your adjustments. The functions are Overlay OSD, Execute, Do and Save.
<b>Channel +</b>	Rotate upwards, increase selected value.
<b>Channel -</b>	Rotate downwards, decrease selected value.
<b>MISC</b>	No function.

## Cleaning and Disinfection

### Equipment Surface

**WARNING:**

**Shock Hazard — Disconnect the AC power cord from the power input connector from flat-screen display before cleaning or disinfection from monitor surface.**

**Do not reconnect the devices to the power line before all cleaned parts are completely dry.**

- Wipe the equipment surface down with a moist cloth; do not allow liquid to enter the equipment. All cleaning agents and disinfectants commonly used in hospitals are suitable. Do not use abrasive products.

**CAUTION:**

**Personal Injury, Equipment Damage — Strictly observe the instructions for use of the cleaning agents and disinfectants supplied by the manufacturers.**

### Connection Cables

- Disconnect the cables from the device and remove the AC power connector before cleaning or disinfection. When disconnecting the cable, be sure to pull on the connector, not on the cable.
- **Clean** the cable by rubbing it down with a cloth moistened with soap water. Use a **disinfectant** for disinfection. Do not immerse the cable in liquid.

## Appendix

### **Technical Information\***

(\* Applicable after a minimum warm-up time of 30 minutes)

#### Specification of the medical flat screen displays MD-CP42AU-MED2

Module	42 Inch Full HDTV-TFT-LCD, diagonal 106,9cm
Active Area	930,2mm horizontal x 523,3mm vertical
Resolution	max. 1920 x 1080, max. 85Hz
Pixel pitch	0,484 mm
Colors	16.7 Million
Contrast ratio	3500:1 typical
Brightness	700cd/m <sup>2</sup> typical (without protection glass/without touch screen)
Backlight	16 CCFL lamps
Response Time	6,5ms
Viewing angle	+89° / -89° horizontal / +89° / -89° vertical
Input Signal	RGB-Video analog 0.7Vpp TTL pos./pos. Separate Sync, Composite Sync, Sync on Green Vertical sync signal: TTL level 2.5~5.5V DVI-D
Video Input Signal	NTSC, PAL, SECAM, SVHS & FBAS S-Video BNC connector: Composite signal BNC connector: Component signal / RGBS signal HD-/SD-SDI connector: Compliant to SMPTE-292M
Power management	according to VESA® DPMS
Internal power supply	Alternation current input: 100 - 240VAC, 50 - 60Hz
Power consumption	max. 250W
Dimensions	(1002 x 595 x 118.5)mm (W x H x D)
Weight	approx. 36 kg with front bezel & protection glass, without VESA adaptation
Temperature Range	Operation: 0°C to ~ 35°C Storage: -20°C ~ +60°C
Humidity:	Operation: 20% ~ 80%, (no condensation) Storage: 10% ~ 90%, (no condensation)
Plug & Play	VESA® DDC2B
Approvals	EN60601-1, CE

Despite high quality controls of the panel manufacturer sometimes defect pixels can not be avoided. Compare with specification of panel manufacturer.

## Timings

VGA / DVI / RGBS	Up to WUXGA 1920 x 1080@ 60Hz. VESA 1280 X 1024@75/60Hz, VESA 1024 X 768@85/75/70/60Hz, VESA 800 X 600@85/75/72/60/56Hz, VESA 640 X 480@85/75/72/60Hz, Super VGA, VGA, Mac 832 x 624@75Hz, Power Mac and more.
YPbPR	1920 x 1080I, 720 x 480P, 720 x 480I 1280 x 720P, 720 x 576P, 720 x 576I
Composite	NTSC/PAL
S Video	NTSC/PAL
SDI	Complied with SMPTE 292M, SDI-HD & SMPTE 259M, SDI-SD.

### Illustration 6 – Timings

## Completion technical data

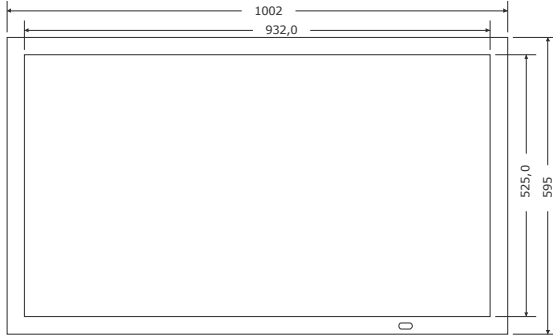
Reference to maximum cable lengths for the different input signal sources.

Input Signal Source	Maximum cable length	Remark
VGA	5m	
DVI	5m	
RGB	5m	
YPbPr	5m	
S-Video	5m	
CVBS	5m	
HD-SDI	25m 35m	Without signal termination with signal termination 75 Ohm
RS-232	100m	9600 Baud

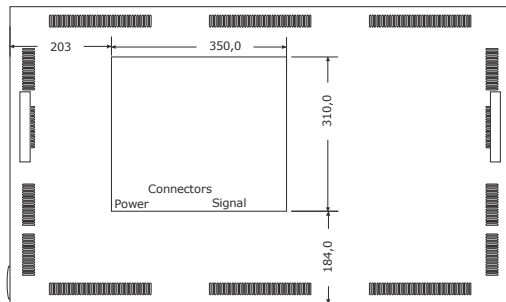
Corresponding to table above we grant correct function in combination with suitable signal cables and signal sources. Longer cable lengths are maybe possible with special signal cables, for this is the user responsible.

## External Dimensions

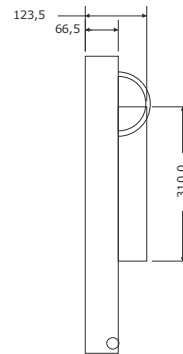
### Frontview / Vorderansicht



### Rearview / Rückansicht



### Sideview / Seitenansicht



## Illustration 7 – External Dimensions

Dimensions in mm, Tolerance: DIN 2768-1 mittel  
*Abmessungen in mm, Toleranz nach DIN 2768-1 mittel*

## Instruction set for serial communication with RS-232

Baud rate: 9600 (bps)  
Data bit: 8 bit  
Parity: none  
Stop bit: 1 bit

Note: All commandos are made by combination of numeric value which is expressed by hexadecimal format. Like as "0A", "FF".

Note: All communication needs a handshake replay.

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### 1.0 Control Read command:

command format: 04 03 ID CK1

reply command format: 04 ID DD CK2

CK1:checksum for checking command weather valid. CK1=100-04-03-ID

CK2:checksum for checking command weather valid. CK2=100-04-ID-DD

#### 1.1 Color Mode status (ID=0x01)

command 04 03 01 CK1

reply: 04 01 00 CK2 - Gamma OFF mode.

reply: 04 01 01 CK2 - Gamma2.0 Mode.

reply: 04 01 02 CK2 - Gamma2.2 Mode.

reply: 04 01 03 CK2 - Gamma1.8 Mode.

reply: 04 01 04 CK2 - DICOM Mode.

reply: 04 01 05 CK2 - Calibration Mode.

#### 1.2 Color temperature status. (ID=0x03)

command 04 03 03 CK1

reply: 04 03 00 CK2 - Cool

reply: 04 03 01 CK2 - Neutral

reply: 04 03 02 CK2 - Warm

reply: 04 03 03 CK2 - User

#### 1.3 Source input status.(ID=0x04)

command 04 03 04 CK1

reply: 04 04 00 CK2 - DVI-I Analog Input.

reply: 04 04 01 CK2 - DVI-I Digital Input.

reply: 04 04 02 CK2 - DVI-D Digital Input.

reply: 04 04 03 CK2 - S-Video Input.

reply: 04 04 04 CK2 - Composite Input.

reply: 04 04 05 CK2 - YPbPr Input.

reply: 04 04 06 CK2 - RGBS Input.

reply: 04 04 07 CK2 - SDI Input.

#### 1.4 Brightness status (ID=0x10)

command 04 03 10 CK1

reply: 04 10 DD CK2 - Brightness value(from 0x00-0x64)

#### 1.5 Contrast status. (ID=0x11)

command 04 03 11 CK1

reply: 04 11 DD CK2 - Contrast value(from 0x00-0x64)

1.6 ALSON/OFF.(ID=0x0C)

command 04 03 0C CK1  
reply: 04 0C 00 CK2 - ALS OFF.  
reply: 04 0C 01 CK2 - ALS ON.

1.7 Scaling Control(ID=0x09)

command 04 03 09 CK1  
reply: 04 09 00 CK2 - 1:1.  
reply: 04 09 01 CK2 - Aspect.  
reply: 04 09 02 CK2 - FULL.

1.8 PIP/SWAP Control(ID=0x08)

command 04 03 08 CK1  
reply: 04 08 00 CK2 - PIP OFF.  
reply: 04 08 01 CK2 - PIP ON.  
reply: 04 08 02 CK2 - SWAP.

1.9 Power On/OFF Control(ID=0x07)

command 04 03 07 CK1  
reply: 04 07 00 CK2 - Power OFF.  
reply: 04 07 01 CK2 - Power ON.

1.10 Lamp Status(ID=0x25)

command 04 03 25 CK1  
reply 04 25 DD CK2 - Lamp sensor Data

1.11 Temp Status(ID=0x26)

command 04 03 26 CK1  
reply 04 26 DD CK2 - Temperature sensor Data

---

**2.0 Control Write command:**

command format: 05 04 ID DD CK  
reply command format: 03 0C F1  
DD:control data value  
CK:checksum for checking command weather valid.  $CK = \sim(05+04+ID+DD)+1$

2.1 Color Mode status (ID=0x01)

command 05 04 01 00 CK -set to Gamma OFF Mode  
command 05 04 01 01 CK -set to Gamma2.0 Mode  
command 05 04 01 02 CK -set to Gamma2.2 Mode  
command 05 04 01 03 CK -set to Gamma1.8 Mode  
command 05 04 01 04 CK -set to DICOM Mode  
command 05 04 01 05 CK -set to Calibration Mode  
reply: 03 0C F1 - ack.

2.2 Color temperature (ID=0x03)

command 05 04 03 00 CK - Cool  
command 05 04 03 01 CK - Neutural  
command 05 04 03 02 CK - warm  
command 05 04 03 03 CK - User.  
reply: 03 0C F1 -ack.



### 2.3 Source switching (ID=0x04)

command 05 04 04 00 CK - select DVI-I Analog Input.  
command 05 04 04 01 CK - select DVI-I Digital Input.  
command 05 04 04 02 CK - select DVI-D Digital Input.  
command 05 04 04 03 CK - select S-Video Input.  
command 05 04 04 04 CK - select Composite Input.  
command 05 04 04 05 CK - select YPbPr/YCbCr Input.  
command 05 04 04 06 CK - select RGBS Input.  
command 05 04 04 07 CK - select SDI Input.  
reply: 03 0C F1 -ack.

### 2.4 Brightness control (ID=0x10)

command 05 04 10 DD CK -control Brightness value(from 0x00-0x64) if color mode  
!= DICOM Mode  
reply: 03 0C F1

### 2.5 Contrast control. (ID=0x11)

command 05 04 11 DD CK -control Contrast value(from 0x00-0x64) if Color mode is  
normal mode  
reply: 03 0C F1

### 2.6 ALS ON/OFF(ID=0x0C)

command 05 04 0C 01 CK - ALS ON  
command 05 04 0C 00 CK - ALS OFF  
reply: 03 0C F1  
PS:if Color Mode=DICOM Mode or if Color mode=Calibration mode ALS always ON

### 2.7 Scaling Control(ID=0x09)

command 05 04 09 00 CK - set to 1:1.  
command 05 04 09 01 CK - set to Aspect.  
command 05 04 09 02 CK - set to FULL.  
reply: 03 0C F1

### 2.8 PIP/SWAP Control(ID=0x08)

command 05 04 08 00 CK - set to PIP\_OFF.  
command 05 04 08 01 CK - set to PIP\_ON.  
command 05 04 08 02 CK - set to SWAP.  
reply: 03 0C F1

### 2.9 POWER ON/OFF Control(ID=0x07)

command 05 04 07 00 CK - set to Power\_OFF.  
command 05 04 07 01 CK - set to Power\_ON.  
reply: 03 0C F1

## Support and Service

Canvys a Division of Richardson Electronics GmbH, from Donaueschingen/Germany is active in national and international markets. Full application support and service is available. For technical support or service problems, please contact our service team at:

Canvys – Visual Technology Solutions  
A Division of Richardson Electronics GmbH  
Raiffeisenstr. 5  
78166 Donaueschingen  
Germany

Tel.: +49 (0)771 / 8300-0  
Fax: +49 (0)771 / 8300-80  
Email: info-europe@canvys.com  
Internet: <http://www.canvys.com>

### ***Repairs:***

Equipment for repair must be returned in the original shipping carton (postage prepaid) to the above service address. RMA number and error description must be included.

Please request the RMA number under the following link:  
<http://teklink.rell.com/MRcgi/MRentrancePage.pl>

After receipt of the equipment for repair we will send you an order confirmation and a cost estimate (for repairs after the warranty period).  
For questions about servicing and repairs, please call your contact in our Sales team. There, you will receive more detailed information about handling service and repair cases.

## Product Warranty

In case of defects, please advise Richardson Electronics GmbH according to the aforementioned RMA Handling Procedures promptly, but no later than 8 days after receipt of goods, or in case of hidden defects no later than 3 days after discovery. The customer has no right to return the goods without prior approval from Richardson Electronics GmbH.

If there has been no prior agreement, the warranty-period is 24 months commencing from the invoice date by Richardson Electronics GmbH.

Richardson Electronics GmbH will not bear costs resulting from re-performance, particularly infrastructure and transport costs, if the goods have been placed to another location than the place of delivery. The customer shall choose the lowest-price form of transportation or our pickup service through Richardson Electronics GmbH.

Claims for warranty defects shall not exist in cases of:

- improper usage
- modification of the goods by the customer
- using the goods outside its field of application or its electrical specifications
- neglect or misuse of the goods by the customer
- natural wear and tear and damages, defects, reduced output, and changes of conditions or operation of our goods due to extraneous causes ( e.g. impact, blows, agitation, water, fire), improper storage, treatment or installation, unusual climatic conditions, special conditions at receipt or operational conditions at the location of use, or force majeure
- defects due to construction and material deficiencies, when the customer has specified the construction or the material
- image retention on the LCD-Panel, which is caused by permanent pictures as well as Gap Mura on the LCD-Panel

If there are any other issues which have not been stated, the current version of the General Terms and Conditions of Delivery and Payment issued by Richardson Electronics GmbH should apply.

## **Disposal**

For the disposal of your flat-screen display, please observe the applicable local regulations.



**Notes**





Canvys – Visual Technology Solutions  
A Division of Richardson Electronics GmbH  
Raiffeisenstr. 5  
78166 Donaueschingen

Tel.: +49 (0)771 / 8300-0  
Fax: +49 (0)771 / 8300-80  
Email: [info-europe@canvys.com](mailto:info-europe@canvys.com)  
Internet: <http://www.canvys.com>