

MFGD 3220 D

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User Manual

SAFETY INSTRUCTIONS



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER TO QUALIFIED SERVICE PERSONNEL**

- Read the safety and operating instructions before operating the apparatus.
- Retain safety and operating instructions for future reference.
- Adhere to all warnings on the apparatus and in the operating instructions manual.
- Follow all instructions for operation and use.
- This apparatus conforms to: CE, IEC 60950, UL 60950, CAN/CSA C22.2 No. 60950 (cUL)

• FCC notice

This equipment has been tested and found to comply with the limits of a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Power connection

- **Warning:** This apparatus must be earthed!
- **Power requirements:** The apparatus must be powered using the 12 VDC power supply that is supplied with the apparatus. The 12 VDC power supply must be powered by the AC mains voltage.
- Do not overload wall outlets and extension cords as this may result in fire or electric shock.
- **Mains lead protection (U.S.:** Power cord): Supply cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs and receptacles.

Water and moisture

- Never expose the apparatus to rain or moisture.
- Never use the apparatus near water - e.g. near a bathtub, washbasin, swimming pool, kitchen sink, laundry tub or in a wet basement.

Ventilation

- Do not cover or block the ventilation openings in the cover of the set. When installing the apparatus in a cupboard or another closed location, heed the necessary space between the set and the sides of the cupboard.

Installation

- Place the apparatus on a flat, solid and stable surface that can bear the weight of at least 3 displays. If you use an unstable cart or stand, the set may fall, causing serious injury to a child or adult, and serious damage to the equipment.

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1. OVERVIEW

1.1 Introduction

The MFGD 3220D, BARCO's 21" 3 megapixel greyscale LCD display, guarantees perfect image quality in medical imaging applications.

The display combines a TFT (thin film transistor) liquid crystal display panel structure and a built-in backlight with inverter for a better picture quality. It is designed to meet the users' needs for performance, consistency, and outstanding image quality through a streamlined development process.

The display can be used in portrait or landscape version, simply by turning the panel. The tilt & swivel foot allows ideal positioning of the panel, in height and viewing angle.

The image brightness can be adjusted by means of a control wheel on the display. Other image parameters can be adjusted by means of external software, like MediCal® Pro.

I-Guard

I-GUARD® is Barco's patent-pending, built-in calibration device, continuously maintaining image quality. With I-GUARD®, QA checks no longer need to disturb normal radiology activities, as they can be performed while applications are running.

I-GUARD® allows radiologists or QA administrators to calibrate their viewing stations or adjust the panel's curve to DICOM standards without administrator intervention.

MediCal Pro

In combination with Barco's MediCal® Pro management and calibration software package, Coronis offers a truly intervention-free display system, making it possible to perform QA checks from one central server at any time, thereby reducing lifecycle cost.

Multi-scan capabilities

The optimum and recommended resolution is **2048 x 1536** or **1536 x 2048 at 60 Hz**.

The MFGD 3220D display will also display most of the computer boot modes.

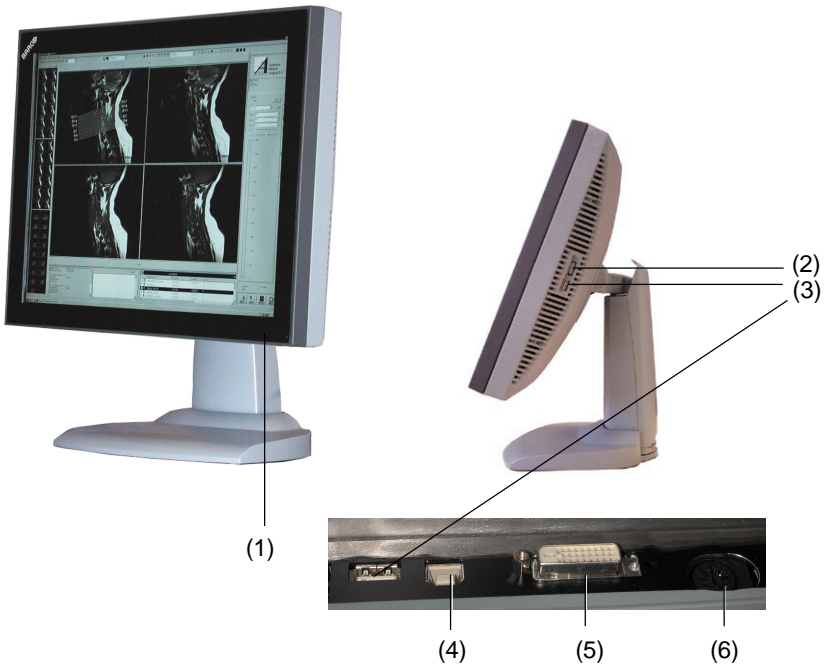
BARCO's BarcoMed 3MP2FH imaging board is the best choice to drive the MFGD 3220D display.

1.2 Package contents

The package should include the following items, please check. If some of the items are missing, please contact the reseller you have purchased the unit from.

- The MFGD 3220D display
- 12V DC power supply
- European power cord
- American power cord
- Video cable
- This user manual

1.3 Controls and connectors



- (1) Power LED
 - The LED is off when the display is off.
 - The LED is green when the display is on.
Note: This function can be switched off by software.
 - The LED is blinking green when the display is in Suspend power-saving mode.
 - The LED is orange when the display is in Stand-by power-saving mode.
- (2) Control wheel for stand-by switching and luminance control
- (3) USB-downstream connector
- (4) USB-upstream connector
- (5) DVI (video and data) input
- (6) 12V DC power input

2. INSTALLATION

2.1 Precautions

- Keep your original packaging. It is designed for this display and is the ideal protection during transport.
- Avoid reflections in the flat panel to reduce eye strain.
- Place the display on a strong and stable table or desk.
- Keep the display away from heat sources and provide enough ventilation in case it is built in a rack or console.
- Make sure the computer is switched off before connecting the signals.
- Do not block or cover the openings in the external power supply block. Also, do not turn the power supply upside down or at its side. Doing so would cause overheating of the power supply.

2.2. Before installing the display

Important:

In the factory, the height-positioning system in the display foot is blocked with a strap to prevent damage during transportation.

Before installing the display, you must remove this strap.

To remove the strap:

- 1 Position the display with its rear side facing you.
- 2 If the foot cover is mounted on the foot, lift up the 2 clips of the foot cover to release the cover from the foot.
- 3 Pull the lower side of the cover towards you and simultaneously slide the cover downward.



- 4 Pull the red strap out of the fixation holes in the foot.

You can better leave the cover off the foot while connecting the signal cables to the display.

2.3 Portrait or landscape position

You can change the orientation of the panel at any time, but it is more convenient to select landscape or portrait orientation before connecting the cables.

To change the panel orientation:

- 1 Stand at the front side of the panel and take the panel at both sides.
- 2 **Very important:** Tilt the panel before changing the orientation.
Should you change the panel orientation without tilting it first, you might irreversibly damage the tilt & swivel mechanism.



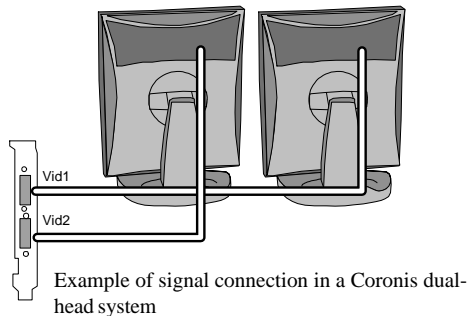
- 3 To change from portrait to landscape, turn the panel **counterclockwise** while lifting it up slightly.
To change from landscape to portrait, turn **clockwise**.

2.4 Connecting the signals

To get access to the connectors, open the cover of the connector compartment by pulling down the 2 clips of the cover.

To connect the video & sync signals:

- 1 Connect one end of the video cable to the DVI input (5) of the display.
- 2 Connect the other end of the video cable to the video output of your video source (Computer graphics board with digital video output).
- 3 Route the cable so that it enters the connector compartment at the place where the cover is bulged.



To connect the power:

- 1 Connect the output of the 12V DC power supply to the DC input (6) of the display.
- 2 Connect one end of the proper power cable to the AC input of the 12V DC power supply.

- 3 Connect the other end of the power cord to a grounded power outlet.

2.5. Routing the signal cables

After connecting all cables, fix them in the cable tie at the rear of the connector compartment. You can also bind the cables together by means of the 2 velcro strips included in the package.

After fixing the cables, put the connector compartment cover back in place. Pay attention that the signal cables are positioned under the bulge in the cover.

Next, fix the cables in the plastic clamps on the foot. At last, put the foot cover back in place.

To put the foot cover in place:

- 1 Push the upper side of the cover onto the foot, so that the hooks on the cover are positioned right under the holes in the foot.
- 2 Slide the cover upward while moving the lower side of the cover towards the foot.
- 3 Press the cover to the foot so that both clips make a clicking sound.



Push the upper side of the cover onto the foot

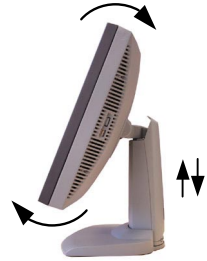


Signal cables routed under foot cover and bound by velcro strips

2.6 Tilt and swivel positioning

Adjust the position of the panel for best viewing conditions.

The display foot allows adjusting the panel height, horizontal viewing angle and vertical viewing angle.



2.7 Starting up

Proceed as follows:

- 1 Switch on the computer.
- 2 If necessary, select a suitable resolution in the computer operating system. You will have to select a resolution that corresponds to the panel orientation (landscape or portrait).

Please refer to the possible resolutions in the Technical specifications.

Note: The recommended resolution for best image quality is **2048 x 1536** or **1536 x 2048**.

3. CONTROLS

The control wheel (2) at the bottom (landscape orientation) or at the side (portrait orientation) allows you to perform some controls. You can switch the display in stand-by and control the brightness.

3.1 Stand-by switching

When the display is on, depress the control wheel slightly to switch the display in stand-by.

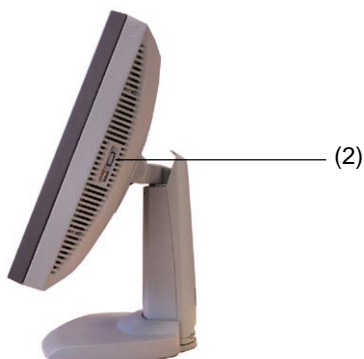
When the display is in stand-by, depress the control wheel slightly to turn it back on.

3.2 Brightness control

Turn the control wheel (2) clockwise to increase the brightness.

Turn the control wheel (2) counterclockwise to decrease the brightness.

The Brightness control can be disabled using the MediCal Pro software.



4. MAINTENANCE

Panel

Take care not to damage or scratch the panel. Clean with a soft woolen or cotton towel. Use a watery solution or a mild commercial glass cleaning product.

Cabinet

Do not use chemical cleaning products, benzene, toluene, xylene or other solvents. Clean with a soft cloth dampened with mild detergent and water. Repeat with water only and wipe dry with a dry cloth.

Removing dust from the rear of the glass panel

It may be possible that dust particles have entered the display and are stuck to the rear of the glass.

We recommend to let this cleaning procedure be done in a BARCO service center.

However, when really necessary, you can perform the cleaning on site **if you can work in conditions that are as clean and dust-free as possible.** This is to avoid more dust entering the display when opening it.



Tilt the panel



Remove the sunken screws

To remove the glass panel:

- 1 Switch off the display.
- 2 Tilt the panel.
- 3 Unscrew the 4 sunken screws at the rear, fixing the glass panel and bezel.
- 4 Remove the bezel with glass panel.

Cleaning instructions:

- Dust, fingerprints, grease etc. can be removed by using a soft damp cloth (a small amount of mild detergent can be used on the cloth, NOT solvent).

- Do not apply liquid directly to the LCD surface as excess liquid may cause damage to internal electronics.

- Take care not to touch the *l-guard* light sensor on the LCD panel.

5. TROUBLESHOOTING

Pixel Faults

Permanently dark or bright pixels can happen to TFT displays. 20 or less permanently dead pixels do not make out a good case for exchanging the unit.

Please contact our Customer Service Department if the number of pixel faults exceeds the above-mentioned figure.

6. TECHNICAL SPECIFICATIONS

Picture panel

20.8-inch diagonal viewable screen TFT (thin film transistor) active matrix, greyscale liquid crystal display

Resolution

Native: 2048 x 1536

Display area (H x V)

423.7 x 318 (mm)

Viewing angle (@ 10/1 contrast)

Vertical: 170°

Horizontal: 170°

Input signals

Possible resolutions:

- 640 x 350 @ 85 Hz
- 720 x 400 @ 75 Hz
- 1536 x 2048 @ 60 Hz
- 2048 x 1536 @ 60 Hz

Video: Complying to DVI Rev 1.0 specifications

Sync: Complying to DVI Rev 1.0 specifications

Native color resolution

8 bits / sub-pixel

Signal system

DVI Digital

Luminance

500 cd/m² (calibrated)

700 cd/m² (maximum)

Contrast ratio

600/1 (in dark environment)

Response time

25 ms (@ 25° C after 30 min warmup)

Controls

Push / turn control wheel for stand-by switching and brightness control

Pixel Pitch

0.207 mm (H) x 0.207 mm (V)

Input connectors

DVI dual channel

Power source

Input for 12 VDC power supply unit: 90 ~ 264 VAC

Input for display: 12 VDC. (The supplied 12VDC power supply must be used)

Power consumption

100 watts (max.)

Safety standards

CE, IEC 60950, UL 60950, CAN/CSA C22.2 No. 950-95 (cUL)

Dimensions (W x H x D)

In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°:

385 x 590 x 240 mm

Net weight

13 kg

Operating Temperature

0°C to 40°C

Storage Temperature

-20°C to 60°C

NOTICE:

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