CONTENTS

SAFETY INSTRUCTIONS

- 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 the following rules: CE, DHHS21, IEC950/ EN60950, UL1950, C-UL950

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

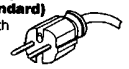
- Power requirements: connect the apparatus to an AC voltage as indicated at its back.

Using a lower voltage, the apparatus will not be able to operate. Using a higher voltage may damage the apparatus.
If you are not sure of the type of power supplied, consult the power company.

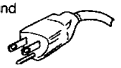
- Only use the mains lead (U.S. power cord), provided with the apparatus.
- WARNING : THIS APPARATUS MUST BE EARTHED !

The wires in the mains lead are coloured in accordance to the following code :

(CEE7 and British Standard)
Green-and-yellow: Earth (safety earth)
Blue: Neutral
Brown: Live



(ANSI 73.11)
Green-and-yellow: Ground
White: Neutral
Black: Live



- 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 monitors. 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.

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FEATURES

Synchronization and adjusted display modes

The monitor automatically synchronizes to video signals from 30 kHz to 85 kHz (horizontal frequency) and 48 Hz to 150 Hz (vertical frequency).

The monitor accepts non-interlaced as well as interlaced video signals, but for interlaced video it requires separate H & V sync.

The monitor is factory-adjusted to four display modes, according to the system used.

Apart from the factory-adjusted modes, one can adjust and store 12 display modes in the monitor's memory. This has to be done by a qualified person.

Clear-base / Blue-base selection

The monitor provides medical film simulation by means of two viewing references: Clear Base and Blue Base. The viewing references are based on scientifically determined colorimetric Lab values.

One can toggle between both by simply pushing one button on the front panel.

Clear-Base / Blue-Base viewing references have to be enabled at the time of installation.

Ambient Light Control

Ambient Light Control (ALC) can be programmed and switched on at the time of installation. An optical sensor measures the light intensity at the front of the monitor and automatically adapts the monitor contrast. If the ambient light decreases, the ALC system will accordingly decrease the contrast.

Orbiter

The orbiter is a system that unnoticeably moves the pixels of the image to prevent burn-in of static images. It can be switched on and off, depending on the installation of the monitor.

Power Management

The monitor is ready for power management according to the VESA DPMS. If DPMS is on and the computer is not active for some time, it switches the monitor power down in three steps.

After a certain period, the monitor is switched to Stand-By, where it consumes some 30% less. After a longer period, it is switched to Suspend mode, where it consumes about 30 W. In case the computer is still not being used, it switches the monitor to Power Off mode, through which the power consumption drops to less than 8 W.

If you start using the computer again, the monitor is automatically activated. This might take some time, depending on the power saving mode.

The Power save system can be switched on or off, depending on the installation of the monitor.

Note: in Power Off mode, the monitor is not disconnected from the mains voltage.

DPMS (Display Power Management System) is a Trademark of Video Electronics Standard Association (VESA).

Emission

The emission of electric and magnetic fields is strongly reduced thanks to the monitor's advanced electronic and mechanical design.

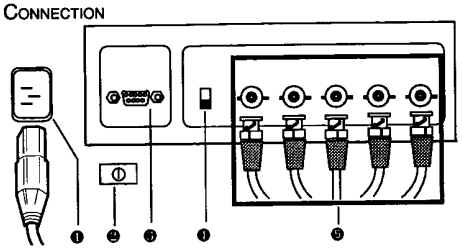
This monitor complies to: EN 55022 Limit B, FCC Class A Volume II part 15 subpart J, and MPRII.

PRECAUTIONS

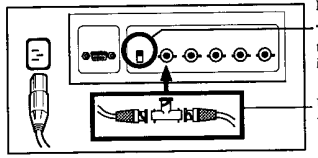
- Keep your original packaging. It is designed for this monitor and is the ideal protection during transport.
- A single person should not lift the monitor by himself to avoid injury.
- Avoid reflections in the picture tube to reduce eye strain.
- Place the monitor on a strong and stable table or desk.
- Keep the monitor away from heat sources and provide enough ventilation in case it is built in a rack or console.
- For MWD 321: keep the monitor away from strong sources of magnetic fields.
  For MWD 321 MR: the monitor is MRI-shielded and is designed to operate in strong magnetic fields.

INSTALLATION

SIGNAL CONNECTION



❶ Mains input. Automatic voltage selection from 90 V to 135 V and from 195 V to 265 V.
❷ Mains switch.
❸ Service connector.
❹ Termination switch. Is in the lower position when the monitor is not connected in loop-through or is the last monitor in the loop.
❺ Video signal connection (from computer).



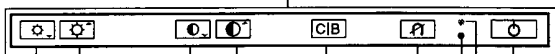
Loop-through connection:

Termination switch is in the upper position when the monitor is connected in loop-through, unless it is the last one in the loop.

Use T-connectors or Y-connectors to connect the video signals.

OPERATION

FUNCTION OF INDICATORS AND BUTTONS IN NORMAL MODE



Manual power-off button.

Green indicator. Is on when the monitor is active.

Red indicator. Is on when the monitor is in a power saving mode.

Degauss (demagnetization) button.

Switch between Clear-base and Blue-base.

Contrast Up button. Push and hold down to increase contrast.

Contrast Down button. Push and hold down to decrease contrast.

Push [◐↓] and [◐↑] simultaneously to set to calibrated position.

Push [◐↓] and [⌂] to select minimum, [◐↑] and [⌂] to select maximum position.

Brightness Up button. Push and hold down to increase brightness.

Brightness Down button. Push and hold down to decrease brightness.

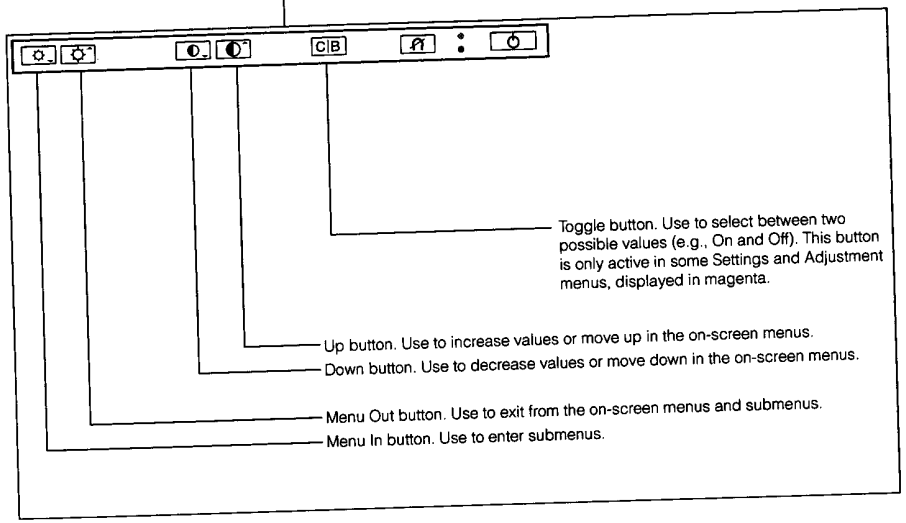
Push [☼↓] and [☼↑] simultaneously to set to calibrated position.

Push [☼↓] and [⌂] to select minimum, [☼↑] and [⌂] to select maximum position.

Remark: the [☼↓], [☼↑], [◐↓], [◐↑] and [⏻] buttons can be disabled in the Controls menu on the OSD.

Function of indicators and buttons in OSD mode

Remark: push [☼] and [◐] simultaneously to display the On-Screen Display.



OSD menus and functions

Note: This section is reserved for authorised service staff.

Main Menu

Status menu: allows you to view the current monitor settings.

Settings menu: allows you to change the monitor settings.

Adjustments menu: allows you to adjust the selected display mode.

Controls menu: allows you to choose between user colors and standard colors, and to switch user controls on or off.

Information menu: allows you to view general information about the monitor.

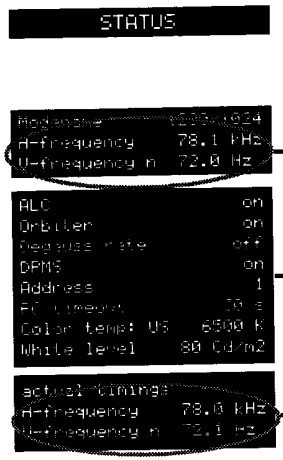
To display the Main menu:

1 In normal mode (OSD is not visible), push the [☼] and [◐] buttons simultaneously.

To enter one of the submenus:

1 Push the [◐] or [◐] button to highlight the submenu you want to select.
2 Push the [☼] button to enter the menu.

Note: this menu automatically disappears after 30 seconds.



Status Menu

You can view the status and actual settings of the monitor. You cannot change them in the **Status** Menu.

For more information and to know how to change them, please refer to the chapter about the **Settings** menu.

These are the horizontal and vertical sync frequencies, and vertical polarity of the currently selected display mode. These are the figures stored in the memory. In case of a new mode, these figures are empty.

When the resolution of the connected signal is low, this field is split in two alternating fields.

These are the actual horizontal and vertical sync frequencies, and vertical polarity of the connected video signal. They are measured constantly by the monitor.

Note: this menu automatically disappears after 30 seconds.

Settings Menu

The settings include all the monitor's display mode-independent controls.

To change the settings:

1 Push the ◐+ or ◐- button to highlight the setting's name.

2 For **Modename**, **Degauss rate**, **Address**, **PC timeout**, **Color temp**, **White level**, or **Change password**:
- push the ☼ button to select the setting.
- push the ◐+ or ◐- button to change the setting.
- push the ☼ button to return to the Settings menu.

3 For **ALC**, **Orbiter**, or **DPMS**:
- just push the CIB button to change the setting.

This is the name of the currently selected display mode. The name is max. 10 characters long, including uppercase and lowercase letters, digits, periods, blanks and dashes.

Pushing the ◐+ or ◐- button changes the characters.

Pushing the CIB button highlights the next character to change.

You can switch the Ambient Light Control system on or off (CIB).

You can switch the Orbiter on or off (CIB).

You can make the monitor degauss periodically by entering the time between two successive degauss actions. When set to 0, Degauss rate is **Off** and degaussing is done only when you push the ⏎ button or when the monitor starts up.

You can switch the Power save system on or off ([C|B]).

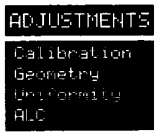
You can set the monitor address from 1 to 16. In case one computer controls several monitors in loop-through, you should assign a different address to each monitor. The first monitor, connected to the computer, must have address no. 1.

When the monitor communicates with a computer through the Service connector, and the computer doesn't respond anymore, the monitor will break the communication after the time you enter here. You can enter a value from 10 to 655 seconds.

You can set the monitor's user color temperature (**US**), Clear-base (**CB**) or Blue-base (**BB**) from 5000 K to 25000 K in steps of 100 K. This value is used in the automatic color adjustment.
Select between User and CB/BB in the Controls menu. Select between CB and BB by means of the [C|B] button.

You can set the monitor's white level or light output from 60 to 80 Cd/m². You cannot set this value when ALC is on. This value is used in the automatic color adjustment.

This function has no effect, since the password system is not installed from the factory. It can only be installed by means of dedicated remote control software.
If the password is installed, it protects the Settings and Adjustments menus: you need to enter the password before you can access these menus.



The MWD321 Display modes

The MWD 321 can store up to 16 different display modes in memory. Four of them are factory-adjusted and fixed, the remaining 12 can be filled up by the user.
In case you connect a new display mode, you will have to adjust and store the Geometry. If necessary you will also have to adjust Uniformity and ALC, and change the display's Settings. In the end, you will have to calibrate the color temperature you have entered in the Settings.
When you store the parameters of a new display mode, the MWD 321 automatically stores them in a free memory location. When the memory was completely full however, the display first shows the list of 16 display modes from its memory. You can pick one of them to be replaced by the new display mode.
In case you don't want any of the display modes in memory to be replaced by the new one, press the [☼] button to exit. In that case however, the adjustments of the new display mode will be lost.

Adjustment Menus

The adjustments contain all the monitor's display mode-dependent controls. They are grouped into four menus: calibration, geometry, uniformity and ALC.
To perform the adjustments:

1 Push the [◐] or [◐] button to highlight the name of the menu.
2 Push the [☼] button to enter the menu.
3 Perform the adjustments (see the related chapters).
4 Push the [☼] button to return.
5 The monitor asks to save the changes. The default answer is **No**.
Push the [☼] button to return without the changes saved.
Push the [C|B] button, followed by the [☼] button to return and save the changes.

Color calibration can be performed by means of the proper tools only.

Geometry adjustments allow you to optimize the shape of the picture.

Uniformity adjustments allow you to optimize the picture performance: moire, focus (sharpness) and uniformity of the color all over the screen. The different adjustments are explained in the chapter "Uniformity Adjustment Menu".

ALC adjustments allow you to optimize the ALC's control function.

Calibration Menu

- The monitor should be warmed up for at least 30 minutes before calibrating !
- Dim the light in the room or cover the calibration device with a cloth, to avoid ambient light influencing the adjustment.

Manual calibration

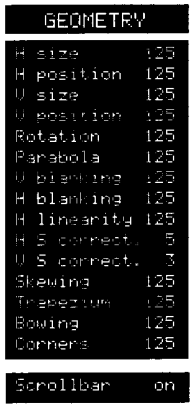
Do not use manual calibration, but use automatic calibration (next §). Manual calibration will not be stored in the memory !

Automatic calibration

You can calibrate the monitor automatically by means of one of the following devices: Thoma TMF 3 or TMF 6, or X-Rite DTP92.

To calibrate the currently entered color temperature automatically:

1 Let the system display a 100% white box in the center of the screen.
2 Connect the color calibration device to the monitor's Service connector at the rear. For the DTP92, use an interface connector.
3 Put the calibration device's measuring head on the screen, on top of the white box.
4 Select **Automatic**.

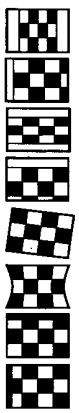


When the resolution of the connected signal is low, only half of the menu is displayed. This is indicated by small arrows in the corners. You can still scroll through the menu by means of the ◐ or ◐ buttons.

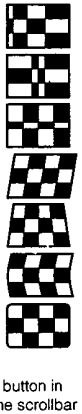
Geometry Adjustment Menu

To adjust the following controls:

1 Push the ◐ or ◐ button to highlight the name of the control.
2 Push the ⊙ button to select the control.
3 Push the ◐ or ◐ button to change the setting.
4 Push the ⊙ button to return to the menu.



Horizontal size
Horizontal position
Vertical size
Vertical position
Picture rotation
Parabola
Vertical blanking
Horizontal blanking



Horizontal linearity
Horizontal S-correction
Vertical S-correction
Skewing
Trapezium
Bowing
Corners

Scrollbar: push the CLR button in case you want to hide the scrollbar during the adjustments.

Uniformity Adjustment Menu

To adjust the following controls:

1 Push the ◐+ or ◐- button to highlight the name of the control.
2 Push the ☼ button to select the control.
3 Push the ◐+ or ◐- button to change the setting.
4 Push the ☼ button to return to the menu.

Adjust in case you notice a disturbing pattern, caused by the superimposition of the image pattern and the raster pattern of the picture tube.

Adjust in case picture elements, such as lines and characters, are unsharp.

Adjust in case you notice 'hot spots', colored stains in the center of the screen.

Adjust in case you notice darker or colored spots in the picture, especially situated at the edges of the screen.

Adjust in case the monitor has to operate near sources of strong magnetism, causing severe color errors. Please refer to the following page for the MRI correction procedure.

Push the CIB button in case you want to hide the scrollbar during the adjustments.

MRI correction (only for MWD 321 MR)

Strong magnetic fields cause the image on a picture tube to have distorted colors and geometry. The monitor has 4 tools to eliminate the influence of magnetic fields: the Mumetal *tubus* and the adjustments Axial uniformity, Vertical uniformity and MRI correction. Additionally there is the Rotation adjustment to compensate for the rotation of the image, caused by the magnetic adjustments.

The tubus is a kind of shield around the bezel. It is made of Mumetal, which guides magnetic fields around the picture tube. You can extract the tubus to obtain a higher degree of protection.

The procedure to eliminate the influence of magnetic fields is a try-and-error procedure. Start with the tubus in zero-position (not extracted).

To eliminate magnetic field influence:

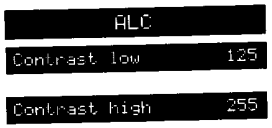
1 First, adjust **Rotation** (Geometry menu) until the image is approximately horizontal. You might have to fine-tune the rotation after the other adjustments.
2 Adjust **MRI correction** up or down in steps of 10 units. Observe if the image is becoming better or worse. After every change, the monitor will degauss automatically. The complete effect of the change is only visible in the image after the degauss. There must be a delay of 10 seconds at least between 2 successive changes. This is the time it takes between 2 degauss actions.
3 If the image is becoming better, continue in the same sense (up or down) until the image is getting worse again. That means the adjustment has reached its optimum, and will only get worse if you continue in the same sense.
4 If after optimizing the MRI correction, the picture still has distorted colors, you will have to adjust the tubus. See the next §.

Adjusting the tubus:

1 The Mumetal tubus is covered with a plastic *tubus cover*. Remove the tubus cover by carefully pulling it to the front.
2 The tubus is fixed by 8 screws: 2 on top, 2 underneath, and 2 at both sides. The screws don't have to be removed. Loosen them until you can move the tubus.
3 Extract the tubus for about 4 cm. and repeat the MRI correction described above.
4 In case the image is still not good enough, proceed by extracting the tubus and adjusting the MRI correction until the image is free from color distortions.
5 If necessary, adjust **Rotation** (Geometry menu) to obtain a horizontal image.
6 Tighten the 8 screws of the tubus and slide the plastic tubus cover back over the tubus.

If the image is still not good after extracting the tubus completely:

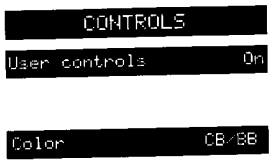
1 Adjust **Axial** uniformity. If necessary, also adjust **Rotation** to obtain a horizontal image.
2 If the adjustments are insufficient, try to place the monitor further away from the source of magnetic fields.

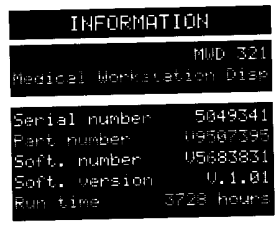


ALC Adjustment menu

Dim the light in the room. Adjust until you are satisfied with the contrast of the picture.

Create normal ambient light in the room. Adjust until you are satisfied with the contrast of the picture.





Controls Menu

Switch the user controls off or on ([C|B]).
When switched **Off**, buttons [☼], [☼°], [◐], [◐°] and [⏻] are disabled in normal mode (so when the OSD is not visible). However you can still use them in OSD mode.

Switch between user colors and standard colors ([C|B]). If **User** is selected, the [C|B] button is disabled.
In case **CB/BB** is selected, you can use the [C|B] button to select between Clear Base and Blue Base.

Information Menu

This is the monitor's serial number.
This is the order no. of the monitor.
This is the order number of the monitor's internal software.
This is the version of the monitor's internal software.
This is the time the monitor has been operating since it was manufactured.

Note: this menu automatically disappears after 30 seconds.

MAINTENANCE

Picture tube

The picture tube is handled with a special coating. Take care not to damage or scratch the coating. Clean with a soft woolen or cotton towel. Use a watery solution or a mild commercial glass cleaning solution.

Cabinet

Clean with a soft cloth dampened with mild detergent and water. Repeat this with water only and wipe dry with a dry cloth.

The following products will not damage the cabinet: Alcohol (Ethyl and Isopropyl), Aquasonic Gel, Betadine, Cidex and other, ammonia-based cleaners (Windex).

TROUBLESHOOTING

The monitor displays "Function disabled"

- Contact the system supplier's Technical Service.

Picture is blank, and the indicators on the front are not illuminated

- Check if power plug is connected and the mains switch is on.

Picture is blank, and the green indicator is illuminated

- Check if contrast and brightness aren't set to 0.
- Check the source of the video signals.
- Check the video cable and connections.

Picture is blank, and the red indicator is illuminated

- The monitor is in a power saving mode. Push the Power off button or hit a key on your computer's keyboard to make the monitor 'alive'.

The red indicator flashes and the green one is illuminated

- The vertical sync frequency is too high. Probably the horizontal and vertical sync signals are switched.

Picture is not stable

- Contact the system supplier's Technical Service.

Picture has color stains ('hot spots')

- Degauss.
- There may be a source of magnetic fields close to the monitor (e.g., a loudspeaker). Remove this source, if possible.
- Contact the system supplier's Technical Service.