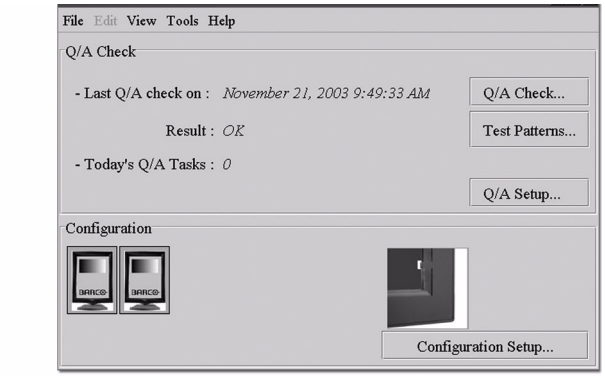
MediCal Pro



Installation & User Manual

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Contents

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1

INTRODUCTION

1 Introduction

1.1 About this manual

This manual describes how to install and use the MediCal® Pro software.

Some of the functions in MediCal Pro are accessible in Advanced user mode only. In the manual, these functions are indicated by this symbol: 

1.2 About MediCal® Pro

MediCal Pro is the complete tool for obtaining conformance (or conformity) and maintaining consistency on medical viewing stations. It is designed to set up schedules and perform automated checks for Quality Assurance (Q/A).

With MediCal Pro, you can set up and align the displays of the viewing station, including the definition of a display function and conformance calibration. You can set up a Q/A check schedule, consisting of different tasks that can be scheduled with a different frequency. You can verify the results of the Q/A tasks and get hints how to regain consistency, should a Q/A task turn out not to be OK.

Any necessary measures for regaining consistency can be taken from MediCal Pro or sometimes from MediCal Administrator, the server application to which MediCal Pro can be connected.

MediCal Pro distinguishes two user modes: The **Standard** user mode and the **Advanced** user mode.

The Standard user mode is meant for running the Q/A tasks and checking their results.

In Advanced mode, the user has full control over MediCal Pro, with the possibility to set up the system and change schedules and settings.

The Advanced user mode is secured by a password.

The Q/A check results are stored in a history log, which you can consult per task and per display.

If the viewing station is connected to a network on which the server application MediCal Administrator runs, all data from MediCal Pro is transferred to a database that can be consulted remotely by MediCal Administrator.

MediCal Pro supports BARCO displays as well as displays from other brands. It allows the connection of the following optical sensors: X-Rite DTP92 (serial or USB), Wellhofer Luxor LXPlus, Solar PMA2200, Minolta LS100 and Tektronix TJ17. Also the Coronis I-Guard sensor inside BARCO flat panel displays and the I-Guard sensor from Dicom Theater are supported.

1.3 About QA tasks

With MediCal Pro, you can set up a schedule of QA tasks that have to run at certain moments to check the conformance and consistency of the viewing station displays.

When MediCal Pro is installed, a number of standard tasks are available to be included in the QA schedule. A variety of other tasks is available as plug-ins.

The tasks can be categorized in three groups, depending on the impact they have on the user and the applications running on the viewing station.

The task categories are:

Transparent intervention-free	The task runs completely in background. It does not require any action from the user and does not change the image on the display. E.g., an Automatic I-Guard Check on a BARCO Coronis display is such a task. These tasks can run also when no user is logged in on the workstation.
Intervention-free	The task does not require any action from the user but does change the image on the display. E.g., the Measure Quality Level of a BARCO Coronis display runs completely automatic, but during the execution of the task, the current application image is replaced by test images necessary for the measurement. These tasks can run only when a user is logged in on the workstation.
Non-intervention-free	The task requires a user action. E.g., a visual check on a test pattern requires the user to confirm that the pattern was displayed correctly. These tasks can run only when a user is logged in on the workstation.

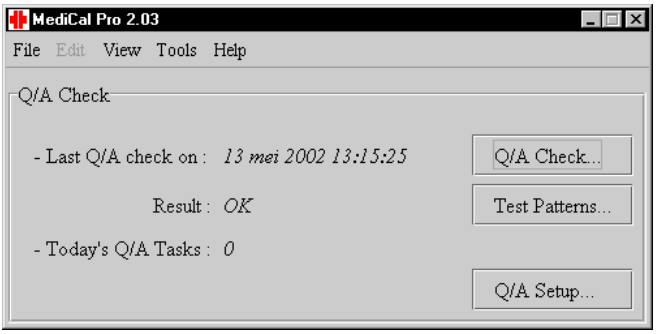
Once the QA task schedule is completed, the tasks will be executed at the scheduled moments thanks to a service, MediCal Communicator, installed together with MediCal Pro.

However, you can also run the tasks manually at any time, when this would be necessary.

1.4 The main window at start-up

MediCal Pro always starts in Standard user mode.

In Standard user mode, the main window consists of the **Q/A Check** section, allowing you to run and check Q/A tasks.



The Q/A Check section in the main window contains the following items:

- **Last Q/A check on**: Here you find the date and time the last Q/A check was run. If no Q/A check was run yet (e.g., after installation), this will be listed as Unknown.

- **Result**: Here you find the evaluated result of the last Q/A check.

  Sometimes the Info symbol  is visible next to the result. When you move the mouse pointer over the symbol, a tooltip with more information pops up.

  The following results are possible:

OK:	All Q/A tasks were OK, so the system is OK.
Not OK:	At least one of the Q/A tasks failed. To see which task(s) failed, click on the **Q/A Setup...** button.
Skipped:	The user decided not to run the Q/A check.
Unknown:	At least one of the Q/A tasks has not been run yet or the configuration has changed since the last Q/A check.

- **Today's Q/A tasks**: The number of Q/A tasks that are due for today and not have been executed yet.

- **Q/A Check...** button: Click to execute the due Q/A tasks immediately.

- **Test Patterns...** button: Click to open the Test Patterns dialog. From this dialog you can select to display test patterns.

- **Q/A Setup...** button: Click to open the Q/A Setup dialog. From this dialog you can see which tasks are scheduled. To modify the task schedule, you must log in as Advanced user.
  As Standard user, you can also check the result of the individual Q/A tasks.

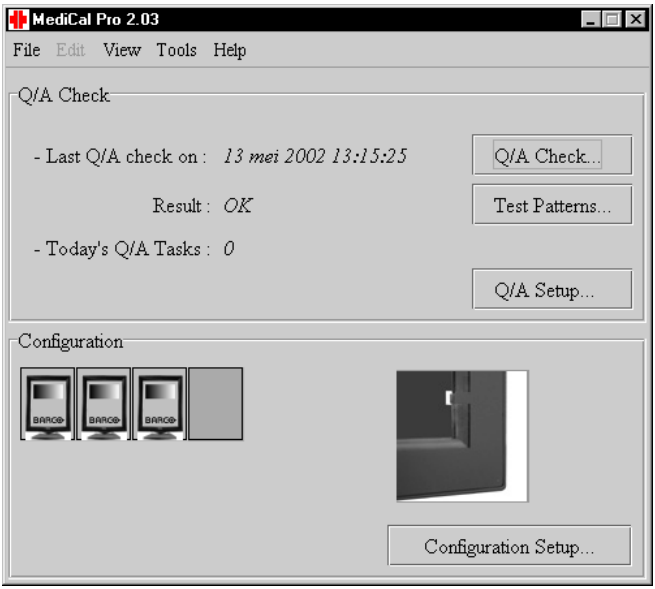
- **View** menu: Select the style you desire from the **Select Style** drop-down list. The selected style applies to the height of texts, icons and windows.
  To activate the selected style, exit MediCal Pro and open it again.

- **Tools** menu: As standard user, there is only one option:
  Options > User Login. Use this dialog to enter the Advanced user mode (see chapter Using MediCal Pro on page 66).

- **Help** menu: Via this menu, you can consult the online help pages, send a feedback e-mail and view information about the application.

1.5 The main window in Advanced user mode

In Advanced user mode, the main window consists of the **Q/A Check** section and the **Configuration** section.



The Q/A Check section is the same as described above.

The Configuration section in the main window gives an overview of the imaging boards and displays attached to the workstation. Moreover, it allows to setup or change the configuration and perform several actions to the displays in the configuration.

The Configuration section contains the following items:

- The number of rectangles in the Configuration section reflects the number of imaging board heads in the computer.
  E.g., if the computer contains one dual-head imaging board, you will notice two squares in the Configuration section: one for each head.

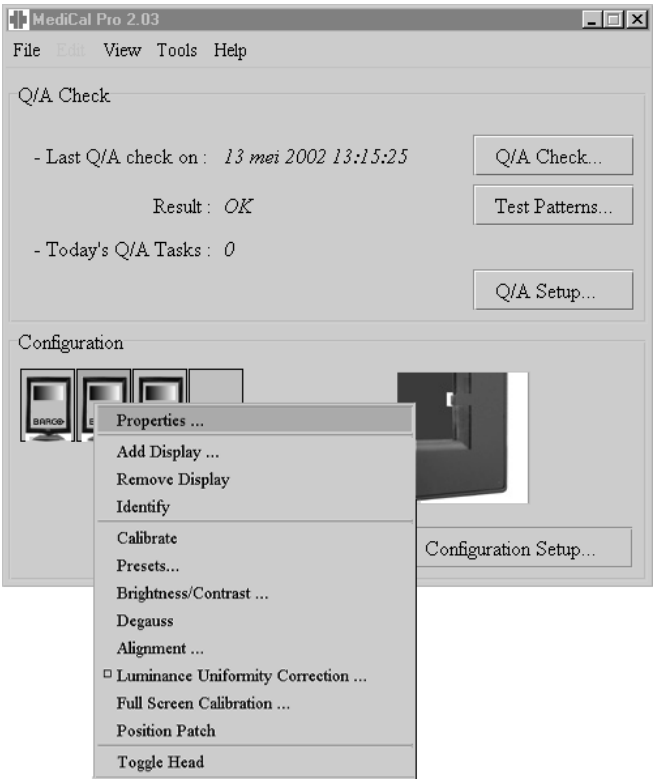
- For each display that you wish to control and check with MediCal Pro, a display icon should appear in the rectangles.
  These icons reflect the displays connected to the imaging board heads.

- In a Dicom Theater application, only one icon per imaging board is visible, even if the board contains two heads. To activate the head that is not visible, you have to right-click on the visible icon and select **Toggle Head** from the drop-down menu.
  Head A is reserved for the flat panel display and Head B is reserved for the projector.

- If one or some of the displays you wish to control does not appear as display icon, you need to run the configuration setup Wizard. This is also the case after something has changed to the viewing station (e.g., a display was removed or added).
  Running the configuration setup Wizard can be done by clicking on the **Configuration Setup...** button.

- If an optical sensor has been used for executing a certain task, the last used sensor is depicted in the Configuration section.

- You can perform a number of actions to the displays when they are listed in the Configuration section. Therefore, click with the right mouse button on the icon of the display you want to perform an action to. A menu with possible actions will pop up.



The menu contains the following items:

Properties	Show the display and imaging board head properties and activate / deactivate some of the display's features. In case of a sensor, show the sensor properties.
Add Display	Add a display icon to the configuration. This action does not use the Configuration Setup Wizard, but allows you to directly add a Barco or non-Barco display.
Remove Display	Remove a display icon from the configuration.
Identify	Check which imaging board head is connected to the selected display. The number of the head will appear on the selected display.
Presets	Define targets for white level, black level and display function, and store them in a preset.
Calibrate	Start display calibration immediately
Brightness/Contrast	Control Contrast and Brightness manually or automatically, by means of Ambient Light Compensation if present. The function is grayed if not available on the display.
Degauss	Remove remaining magnetism from the display's metal parts. Is only applicable to BARCO color CRT displays.
Alignment	Align display geometry, white uniformity, focus, etc. Is applicable to BARCO CRT displays only.
Luminance Uniformity Correction	Check this option to activate the Luminance Uniformity Correction. This system, if calibrated by means of "Full Screen Calibration" (see below), ensures a uniform luminance, even in the corners of the picture tube. This function is applicable to some BARCO displays only. This function is grayed if the function is not available on the display.

Full Screen Calibration	This function starts with a luminance measurement in the center of the screen. It proceeds with calibration in a number of zones over the picture tube, to obtain the same luminance in each of the zones. The function is applicable to some BARCO displays only. The function is grayed if not available on the display.

2

FIRST INSTALLATION

2 First Installation

2.1 Overview

If you install MediCal Pro on a medical viewing station for the first time, you should go through the steps listed below.

These steps are just listed here, as an overview of the complete installation. They are described in detail further in this chapter.

1

Install the hardware components or check the installation of the hardware:
- Video connection
- Address setting (Barco CRT displays only)
- Data connection (Barco CRT displays only)
- Optical sensor connection (if applicable)

See § Installation of the hardware : Installation of the hardware

2

Install the MediCal Pro software. On Windows 2000 and XP:

Restart the computer after installation.

See § MediCal Pro installation : MediCal Pro installation

3

Start MediCal Pro

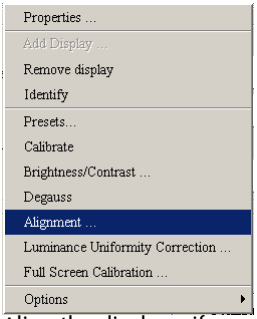
If appropriate, connect to MediCal Administrator

See § Starting up for the first time : Starting up for the first time

4

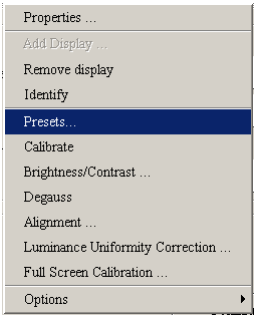
Set up the configuration
See § Setting up the configuration : Setting up the configuration

5



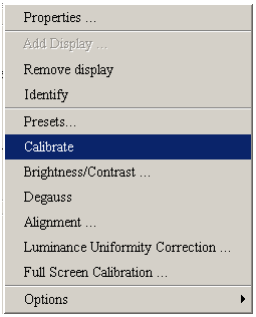
Align the displays, if necessary
See § Aligning the displays : Aligning the displays

6



Define the presets
See § Defining Presets : Defining Presets

7

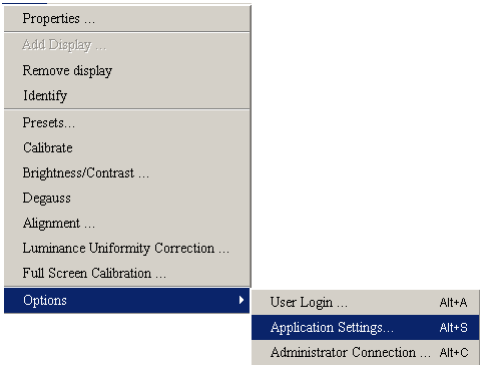


Calibrate the displays
See § Calibrating displays : Calibrating displays

8

Define the Q/A task schedule
See § Setting up the Q/A schedule : Setting up the Q/A schedule

9



Change the application settings, if necessary
See § Defining the Q/A task trigger settings : Defining the Q/A task trigger settings

10

Q/A Check...

Run the due tasks
See § Running the due tasks : Running the due tasks

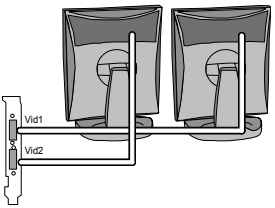
2.2 Installation of the hardware

MediCal Pro can be used on any viewing station that runs on Windows NT4, Windows 2000 or Windows XP. The viewing station can contain any number of displays, Barco and non-Barco displays.

It is impossible to describe the installation on all these systems in this manual, but we can give some important hints and rules to follow during the installation of the hardware.

Barco flat panel display installation

In case of a DVI connection:

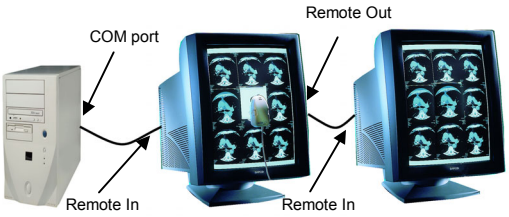


Connect the DVI cable of each display to a different imaging board head inside the viewing station's computer.
The leftmost display must be connected to head A, the second leftmost display to head B, etc.

You do not need to set the addresses of the flat panel displays.

Barco CRT display installation

1 Address setting: Each Barco display you wish to include in the configuration for Q/A checks must get a different remote address. It is logical to assign address 1 to the leftmost display, 2 to the second leftmost display, etc.



2 Video connection: Connect the video and sync inputs of each display to a different imaging board head inside the viewing station's computer. The leftmost display must be connected to head A, the second leftmost display to head B, etc.
Note: An imaging board can be a single-head or multi-head board. A multi-head board is as if several imaging boards were located on one single board, each with separate video and sync outputs. Each part of such a board is called a head.
E.g., a dual-head board contains two separate heads, and thus two separate video and sync outputs.

3 Data connection:
You can control the Barco CRT displays through the USB bus or through serial connection.
Serial connection: Connect the displays' Remote connectors in a loop-through (daisy-chain) configuration to the viewing station's computer. Connect Remote In of the leftmost display to one of the computer's COM ports. Connect Remote Out of the leftmost display to Remote In of the second leftmost display, etc.
USB connection: Connect the USB upstream connector of the first display to the USB downstream connector on the PC. Connect the second display to the USB downstream connector on the first display etc.

Dicom Theater installation

Please refer to the System Manual Dicom Theater.

Non-Barco display installation

Follow the Video connection guidelines described in the Barco display installation above. There is no Data connection nor address setting for non-Barco displays.

Optical sensor connection

Some Barco flat panel displays (e.g., Coronis®) have a built-in optical sensor (I-Guard), for which no additional connection is required. For other displays, you need to connect an external optical sensor.

The optical sensor can be connected in two ways:

- On Barco displays:
  You can connect a serial sensor to the Sensor connector (front or rear).
  A USB sensor can be connected to one of the downstream USB ports on the display. In that case however, the display must be connected to the PC USB bus as well.
  For Dicom Theater, the sensor is connected via USB.
- Non-Barco displays don't have a direct connection for the sensor. So if the viewing station contains non-Barco displays, connect the sensor to the viewing station's computer. Connect it to a free COM or USB port.

2.3 MediCal Pro installation

Minimum System requirements

- Operating system: Windows NT4/Windows 2000/Windows XP
- Memory: 128 MByte
- Free disk space: 50 MByte
- Internet Explorer 4.0

Before installing MediCal Pro

1 You must have Administrator privileges to install the software.
2 If there are older versions of MediCal Pro or MediCal Control installed on the PC, remove them. Please refer to the § "Uninstalling MediCal Pro", further in this chapter.

Installing MediCal Pro

To install MediCal Pro, enter Windows and follow these steps:

1 Exit all open programs.
2 Insert the CD-ROM containing the MediCal Pro installer program in the CD-ROM drive.
3 The CD-ROM starts automatically. After a few seconds, the MediCal Pro welcome window appears.
4 Click on **Install**. The Setup application starts.
5 Click on the **Next>** button.
6 Read the License agreement on the screen very carefully. Scroll down to read the complete text.
7 Click on **Yes** if you agree with the License agreement and wish to continue with the installation.
8 In the **Customer information** window, fill in the user name, company name, and serial number of MediCal Pro. You can find the serial number on the CD-ROM jewel case. Click on **Next>**.
9 A window appears, indicating the directory where MediCal Pro is going to be installed.

Click on the **Browse...** button if you want to change this directory. Click on the **Next>** button to continue.

10 Choose the setup type that corresponds to the viewing station on which MediCal Pro is installed: A system with CRT displays, a system with with flat panel displays or a Dicom Theater system.

11 Select the program folder where you wish to add the program icons. Click on **Next>** to continue.

12 The installer program now starts to install the files at the appropriate place.
The application **MediCal Pro Startup** is also installed. It is installed in the Startup folder. This application ensures the gamma is set properly when starting the system.

13 Please register the version of MediCal Pro. Therefore, click on **Yes** in the Register window.

If you have an Internet connection, you will be redirected automatically to a web page for registration. Please fill in the requested data and register.

14 Select **Yes, I want to restart my computer now** and click on **Finish** to complete the setup.

Uninstalling MediCal Pro

To remove MediCal Pro from your system, proceed as follows:

1 You must have Administrator privileges to uninstall the software.

2 Exit MediCal Pro.

3 From the **Start** menu, select Settings > Control Panel.

4 Double-click on the **Add/Remove Programs** icon.

5 Select **MediCal Pro** from the list box at the bottom of the Add/Remove Program Properties dialog.

6 Click on the **Change/Remove...** button.

7 Follow the instructions on the screen.

2.4 Starting up for the first time

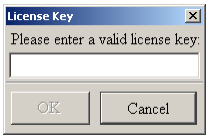
MediCal Pro start-up

To start MediCal Pro, proceed as follows:

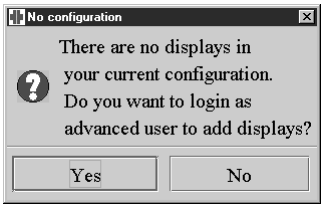
1 If the viewing station contains Barco displays, make sure there is no on-screen display (OSD) on the screen of the displays. Please refer to the display's user manual to know how to do this.

2 Start MediCal Pro from the Start > Programs > MediCal Pro menu in Windows.

3 If no license key was entered during installation, MediCal Pro prompts to enter the license key now. Enter a valid license number and click on **OK**.

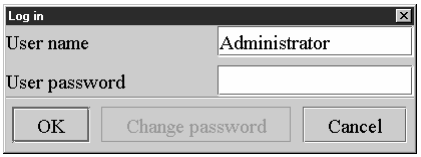


4 If the system contains no Barco flat panel displays, nor Barco CRT displays connected to the USB bus, MediCal Pro will notice that there is no configuration set up in the program yet. It will ask if you want to log in as Advanced user, to set up the configuration.



Select **Yes**.

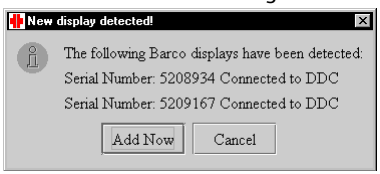
5 MediCal Pro opens the **Log in** window because you have to be advanced user to set up the configuration.



In the User Password box, enter "**advanced**".

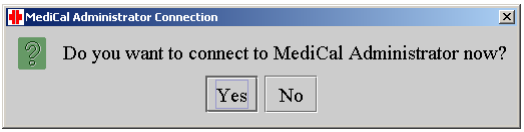
6 Select **OK**.

7 If the system contains Barco flat panel displays, the detected displays are mentioned in a message box.



Click on **Add Now** to proceed and add the displays to the configuration. Click on **Cancel** to proceed without adding the displays to the configuration.

8 MediCal Pro asks whether or not you wish to connect to MediCal Administrator on the network.



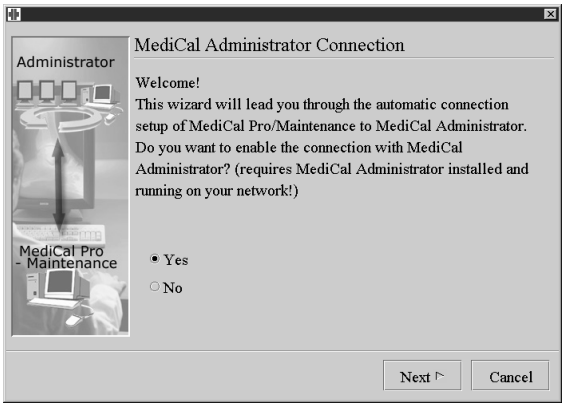
Note:
Prior to connecting the viewing station to the MediCal Administrator server, the medical facility to which the viewing station belongs, must be added already to MediCal Administrator. For more information, please consult your system administrator.

If you do not have MediCal Administrator installed on the network, select **No** and continue. Should Administrator be installed later, you can still connect to it from within MediCal Pro.
Please proceed with § Setting up the configuration , " Setting up the configuration ".

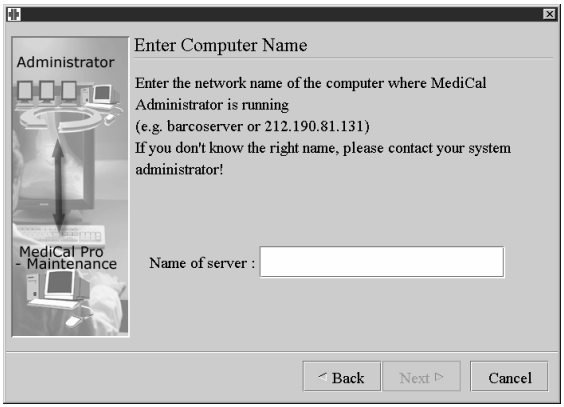
If you have MediCal Administrator installed, select **Yes** to continue. MediCal Pro will start a Wizard to set up the server.
Please proceed with § Connection to MediCal Administrator , " Connection to MediCal Administrator ".

Connection to MediCal Administrator

1 The Wizard starts with the Welcome page. To proceed with the connection, select **Yes** and click on **Next**.



2 Enter the name of the network server on which MediCal Administrator runs. Click on **Next**.

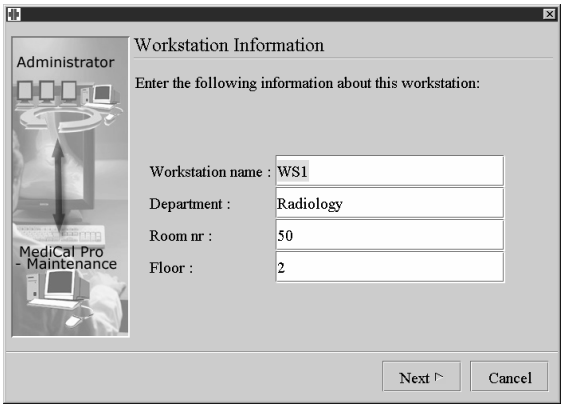


3 The Wizard will start searching for the server on the network. Click on **Next** to start the search.
If the Wizard does not find the server or if there are problems to register to the server, you will have to exit the Wizard. Contact the system administrator to solve the problem.

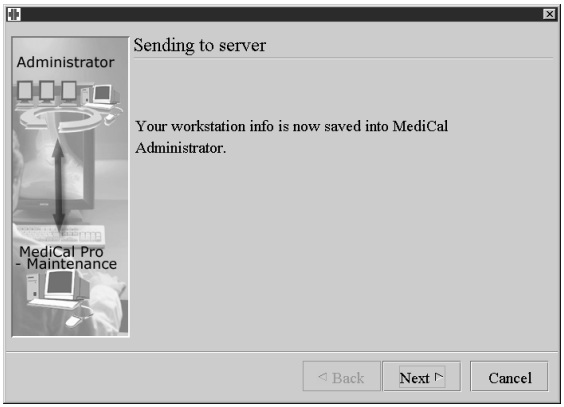
4 If the server is found, the Wizard displays the following message: Click on **Next**.

5 The drop-down list shows all medical facilities connected to MediCal Administrator on the server.
If the facility to which this viewing station belongs, is not in the list, you should exit the Wizard by clicking on **Cancel**. The medical facility should be added from within MediCal Administrator.
If the facility is in the list, select it and click on **Next**.

6 Enter the viewing station details: Workstation name, Department name, Room number and Floor.
Click on **Next**.



7 The entered information is added to MediCal Administrator. Click on **Next**.



8 Click on **Finish** to go to the MediCal Pro main window.

2.5 Setting up the configuration

Introduction

The medical viewing station consists of a computer, a number of imaging boards (containing one or more heads), an optical sensor and one or more displays. They are all connected physically, by means of cables and connectors.

An example of a medical viewing station consisting of one PC with four imaging board heads and four Barco flat panels connected. Those panels have an internal optical sensor.

The configuration is the logical representation of the viewing station's components in MediCal Pro.

A complete configuration contains the following information:

- The number of imaging board heads inside the computer
- The imaging board properties
- The number of displays connected to the heads
- The properties of connected displays
- Whether or not a sensor is connected or built-in
- The properties of the sensor, if connected

This is the MediCal Pro configuration corresponding to the medical viewing station shown above.

To run Q/A tasks on the viewing station or to perform actions on the viewing station displays, MediCal Pro must know the exact and complete configuration.

The first time MediCal Pro is run, the user must put the configuration into the program if the displays were not added to the configuration during startup.

Setting up the configuration can be done easily in two ways:

- Using the **Configuration Setup Wizard**, which will guide you through the setup process.
- Adding the displays or projector(s) directly, by right-clicking on the icons of the imaging board heads and selecting **Add Display** from the drop-down menu.

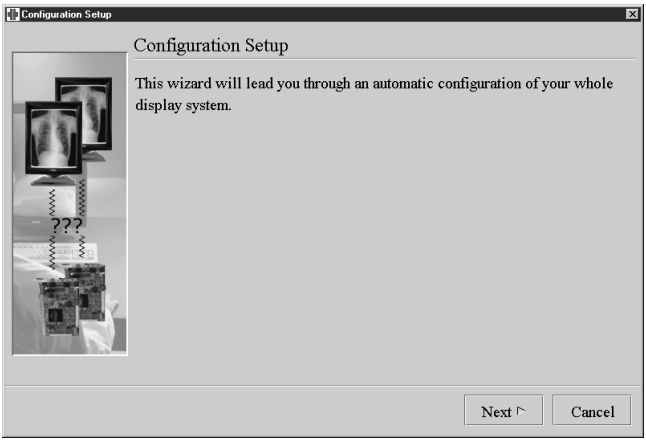
An optical sensor built in or connected to the displays or viewing station, will be added to the configuration automatically when you start a task that requires a sensor.

Setting up the configuration by running the Configuration Setup Wizard

To start the Configuration Setup Wizard, click on the **Configuration Setup...** button in the main window. As a result, the Wizard starts.

The Wizard will guide you through the following steps:

1 Configuration setup

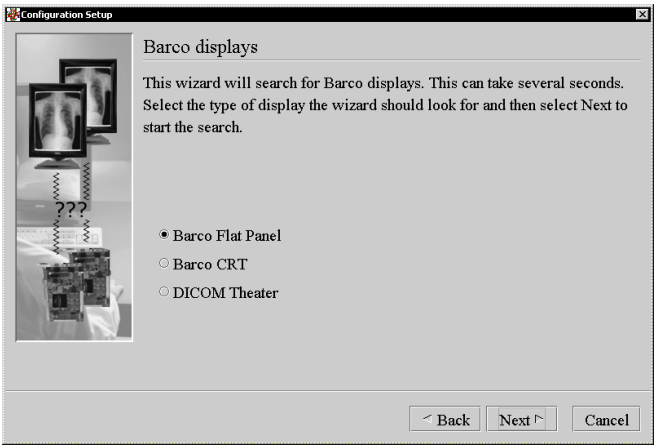


This page indicates the start of the Wizard.

At the same time, a character appears on the screen of each display. It refers to the imaging board head the display is connected to. It will be visible during the complete setup process.

Click on **Next** to continue.

2 Barco displays

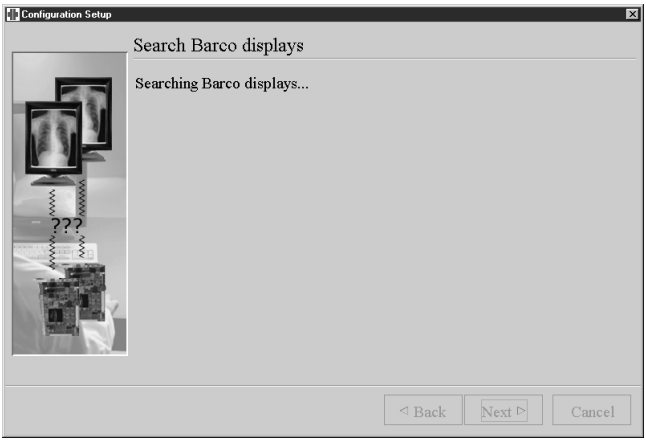


This page indicates the Wizard will start looking for connected Barco displays.

Choose the setup type that corresponds to the viewing station on which MediCal Pro is installed: A system with CRT displays, a system with with flat panel displays or a Dicom Theater system.

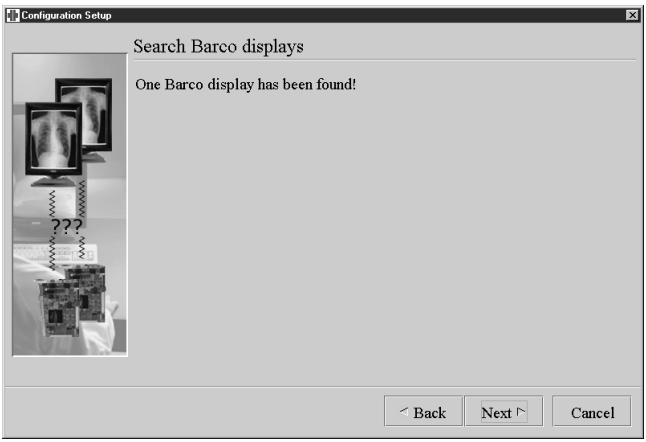
Click on the **Next** button to proceed.

3 Searching for Barco displays



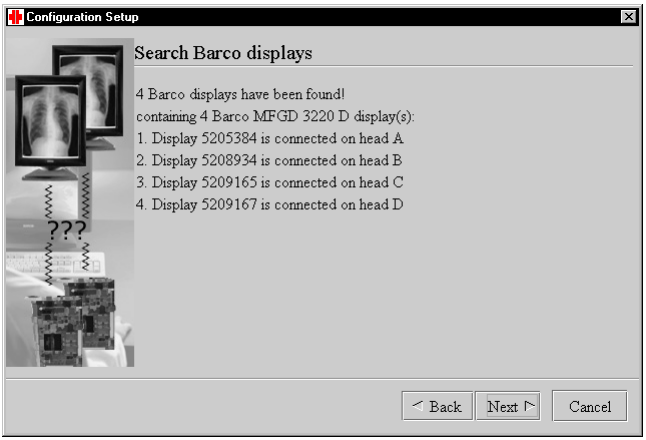
The Wizard looks if there are Barco displays or projectors connected to the workstation computer via serial data connection.

After a few seconds, it returns the number of found Barco displays.



Notes:

- In case Barco flat panel displays are connected to the workstation, the Wizard can identify the display serial numbers and the heads they are connected to.
- In case of a Dicom Theater system, the projector is also identified as a Barco display.

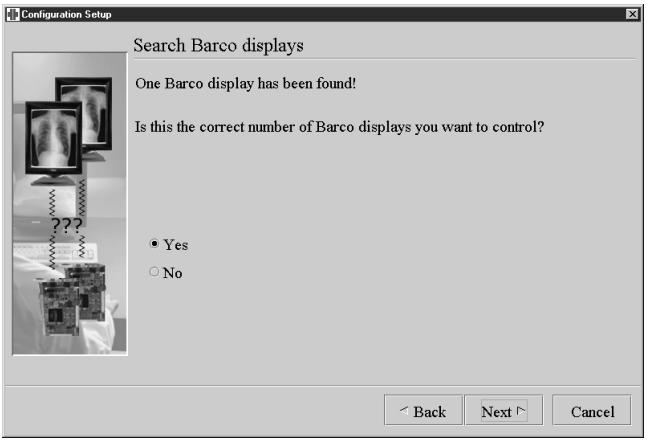


There are two possibilities:

4a The number of found Barco displays equals the number of imaging board heads in the viewing station

Click on **Next** to continue. Please continue with step 5.

4b The number of found Barco displays does not equal the number of imaging board heads in the viewing station



The Wizard asks if the number of found Barco displays really equals the number of Barco displays you want to add to the configuration.

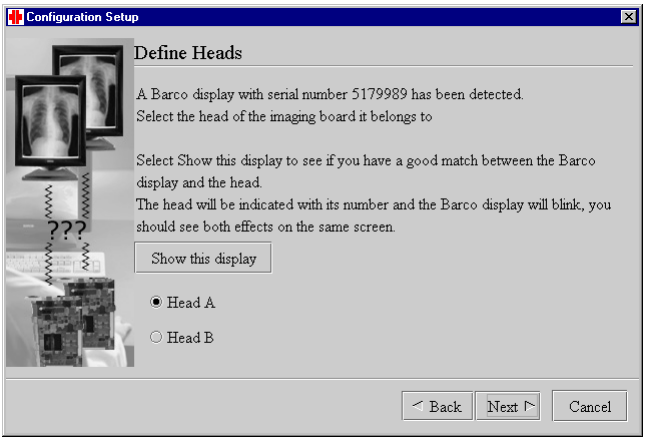
Yes You can proceed with the Wizard, adding Barco- and / or non-Barco displays. Continue with step 5.

No The Wizard gives a search error.
Refer to § Solving Configuration Setup Wizard search errors , " Solving Configuration Setup Wizard search errors " for more information about what to do in case of a search error.

Click on **Next** to continue.

5 Define Heads

Note: This step is skipped if only Barco flat panel displays have been found.



If the Wizard has found one or more Barco displays, it identifies the first one by communicating its serial number and by dimming the display's screen a few times.

Add the display to the configuration by selecting the imaging board head it is connected to. This is the character in the white square in the lower right corner.

If you are not sure which head to select, click on **Show this display**. As a result, the display screen will be dimmed again. Select the head of which the character appears on the dimmed display.

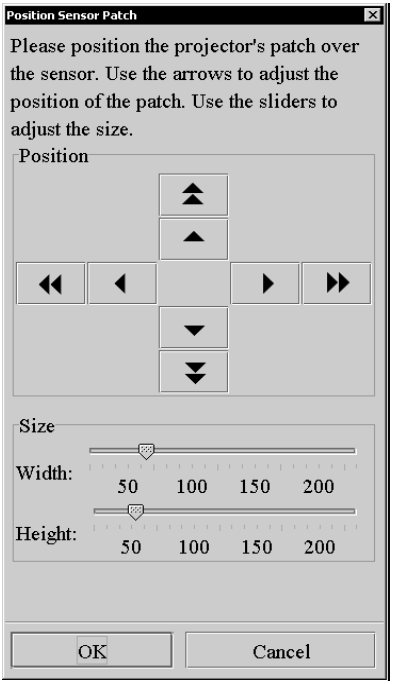
Click on the **Next** button to add the next display. Repeat this until all Barco displays are added.

If you add Barco displays only, please continue with step 9.

If you are adding non-Barco displays as well, please continue with the following step.

6 Position sensor patch

This screen appears only in case of a Dicom Theater application.



After a projector is found to add to the configuration, the projector projects a black square. This is the patch for the optical sensor (the patch will turn white afterwards). It appears default in the upper right corner of the projected image.

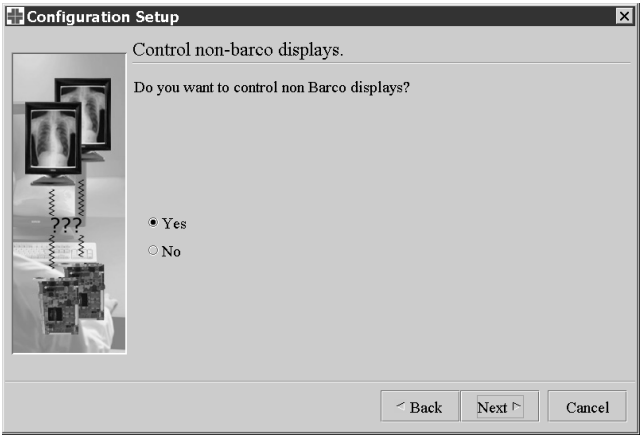
You will have to attach the optical sensor on the place where the patch is projected (see the Dicom Theater System Manual).

If necessary you can adjust the patch position and size. Use the arrows to adjust the patch position. Use the sliders to adjust the size of the patch.

When done, click **OK**.

Note: When you plug in the optical sensor to the PC USB bus for the first time, you will be asked to install a driver. You can find the driver on the Dicom Theater application CD-ROM, in the folder Drivers > IGuard.

7 Control non-Barco displays

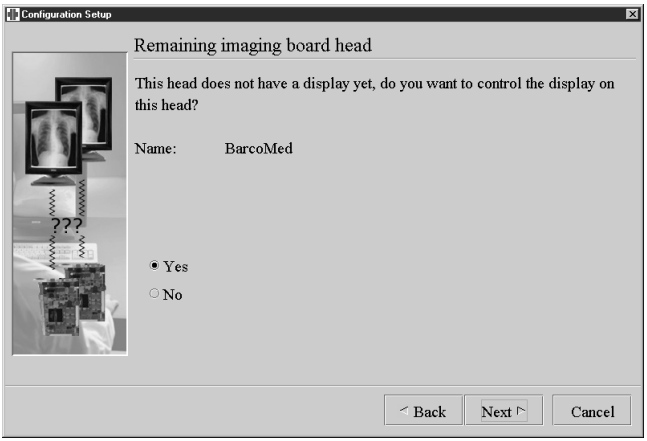


If there are more heads in the computer than found Barco displays or if no Barco displays were found at all, the Wizard asks if you want to add non-Barco displays to the configuration.

Yes You can proceed with the Wizard, defining the non-Barco displays. Continue with step 8.

No The Wizard continues with only the Barco display(s) added. In case no Barco displays were added at all, the Wizard exits. Continue with step 10.

8 Remaining imaging board head



The Wizard allows to logically link a non-Barco display to each remaining imaging board head.

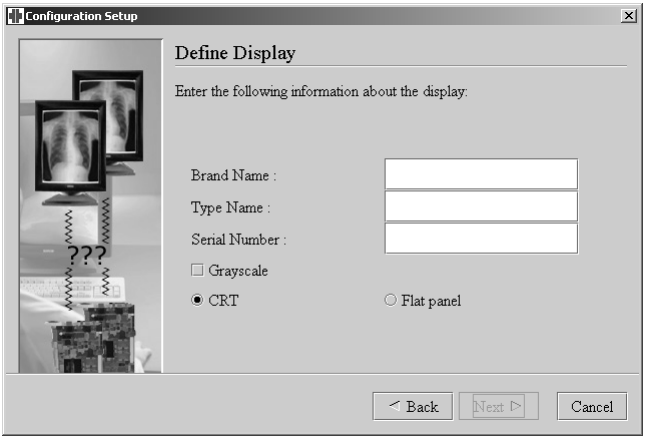
The Wizard makes a suggestion of the head to link the display to by inverting the colors of the character in the display's lower right corner.

Select **Yes** if the display is really connected to this head (with video cables). Click on **Next**. The Wizard proceeds.

Select **No** if you do not want to add the display to that head.

Click on **Next**. The Wizard continues with only the Barco display(s) added. In case no Barco displays were added at all, the Wizard exits.

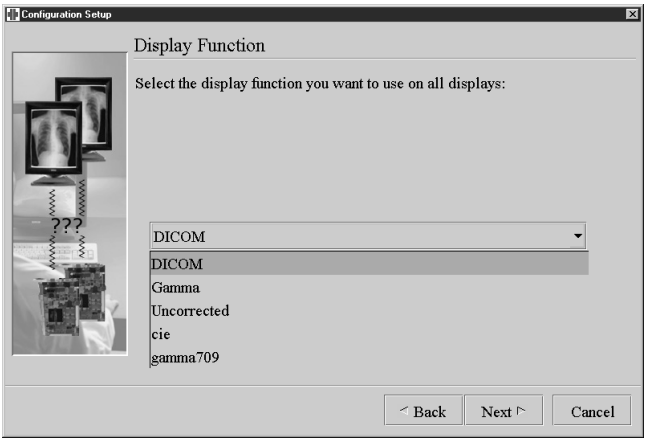
9 Define display



Enter the brand name, type and serial number. Indicate if the display is a flat panel or CRT display. Also, you have to indicate whether the display is a grayscale display or not.
Note: It is important to enter the correct data here, so that the display can be found quickly should a task on this display generate an error in MediCal Administrator.

Click on **Next** to continue.

10 Display function



Select the display function you want to use for all the displays. This screen does not appear for Dicom Theater applications.

Display function

Select the required display function from the drop-down list. For most medical viewing applications, we recommend you select the **DICOM** display function, as this function results in the most visible grayscales.

If you select **Gamma**, you can enter a display gamma value if the imaging board head, to which the display is connected, has an editable gamma table.
If you select **Uncorrected**, the program fills the imaging board gamma table with a linear function.

Ambient light compensation

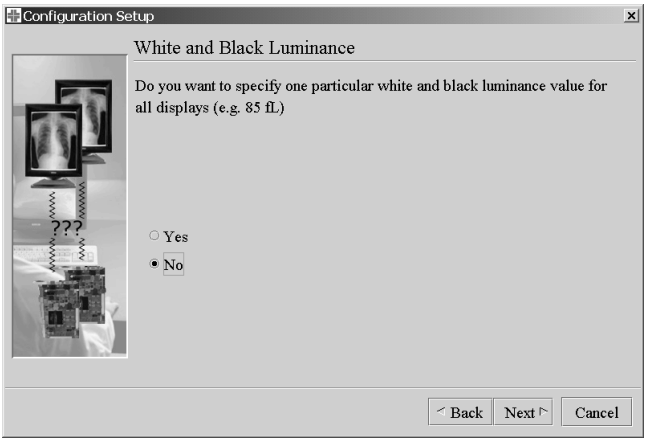
Check this option if you want to compensate for the influence of the ambient light on the image. Especially when you have selected a DICOM or CIE display function, we advise to switch on this compensation to obtain a better display performance.

Glare compensation

Check Glare Compensation if you want to compensate for the influence of the bright parts on the dark parts of the image.
This option is always on (and grayed) if a DICOM display function is selected.

When finished, click on **Next**.

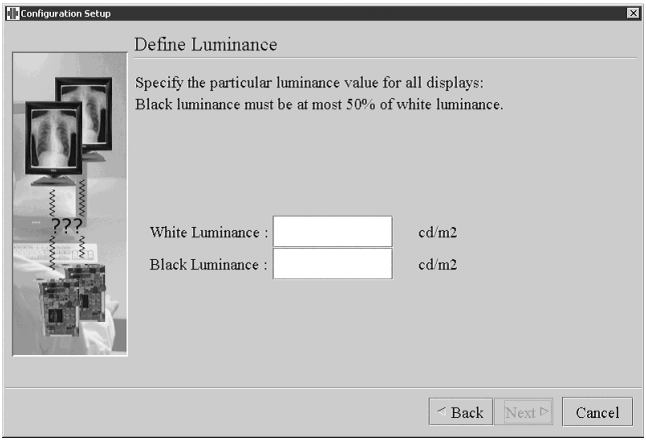
11 White and black luminance



You can choose to specify one particular white luminance and black luminance value for all the displays. This screen does not appear for Dicom Theater applications.

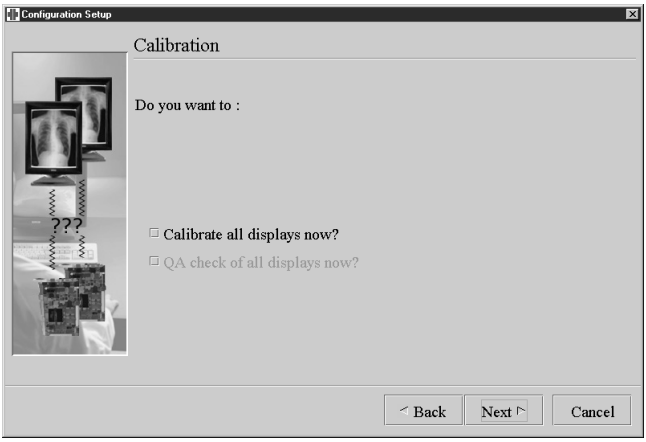
Select **Yes** only if all displays are the same type and if you are sure about the value to specify.

If you proceed in that case, the Define Luminance page appears.



Enter the desired white and black luminance, expressed in Cd/m² or fl, depending on the application settings.

12 Calibration



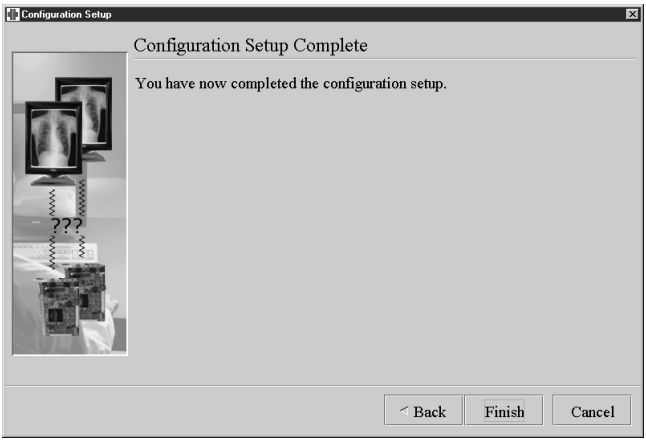
You can choose to calibrate the displays and possibly run a QA check on the displays after finishing the Wizard.

The Q/A check option can be checked only if the Calibrate option is checked.

We advise not to check either of these options at this time, because the displays have to be aligned (CRT displays only) after the configuration setup, and the presets still have to be defined or edited.

If you check one or both options, they will be executed after completion of the Wizard.

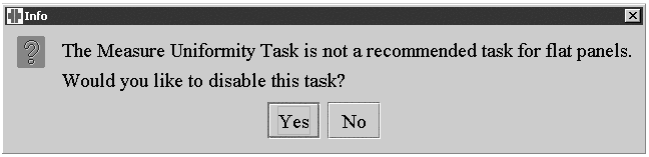
13 Configuration setup complete



The Wizard is completed. Select **Finish** to return to the main window. The display icons are now filled in in the main window's Configuration section.

Note: If MediCal Pro was installed for CRT displays and the Wizard has now detected only Barco flat panel displays, a message appears, asking you to disable the Uniformity task for the flat panel displays. We advise to select **Yes** because the uniformity task is not needed for flat panels.

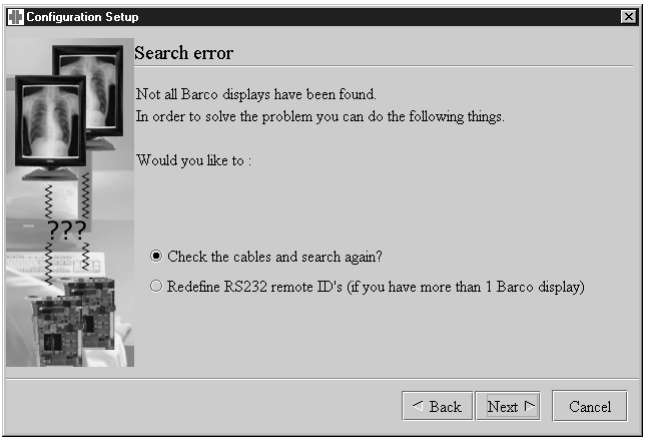
This message appears only if the Measure Uniformity task is loaded into the QA check schedule.



Now the Barco CRT displays must be aligned (if necessary), the presets must be defined, and the displays must be calibrated. Please proceed with the next chapter, "Aligning the displays".

Solving Configuration Setup Wizard search errors

The Wizard returns a search error in case you make clear that the Wizard has not found all Barco displays that should be connected.



The most common causes of failures in finding Barco displays are:

- Data cables not or wrongly connected

- Some of the displays have equal remote addresses.
  The remote addresses can be set by means of the display's OSD menus.

The Wizard provides two ways to solve a search problem, taking the above-mentioned possible causes into account.

Note:

The search error solving methods can work only for Barco CRT displays connected through a serial connection. For flat panel or non-Barco displays these methods are not applicable.

To solve a search error, proceed as follows:

a) The problem is probably caused by the data cables

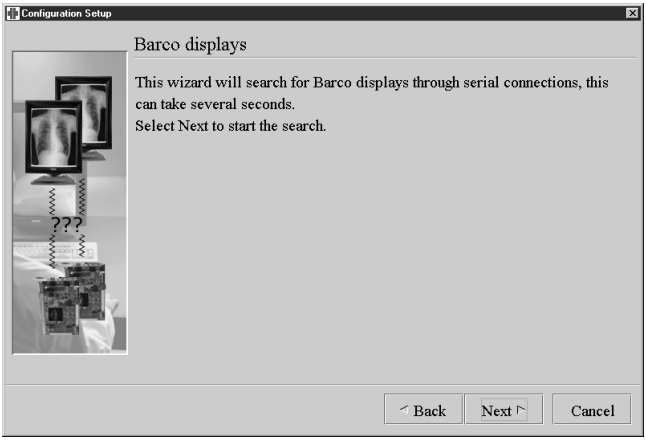
This is the most common cause and the easiest one to examine. Therefore, we suggest you consider this option first.

Proceed as follows:

1 Check the hardware connection of data cables. Please refer to the Installation chapter to find out how the data cables should be connected.

2 Select **Check the cables and search again**.
Click on **Next** to continue.

3 The Wizard displays the Barco Displays page again.
Click on **Next** to start a new search for Barco displays.



The Wizard now continues with step 3 of the normal, previously described sequence.

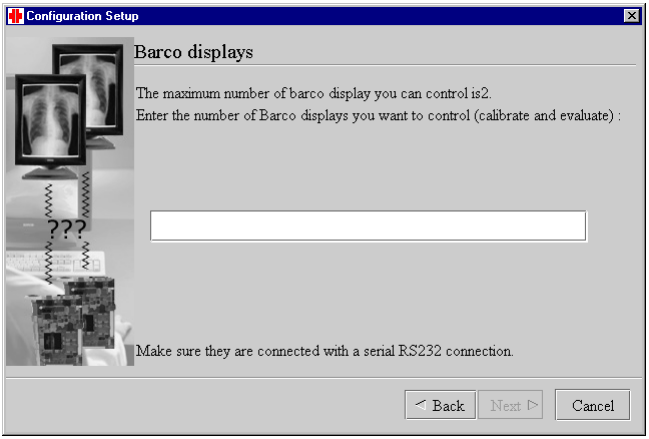
If the connection problem persists, the Wizard will arrive at the search error page again. If this is the case, the problem may be caused by overlapping remote addresses (ID's).

b) The problem is probably caused by the remote ID's

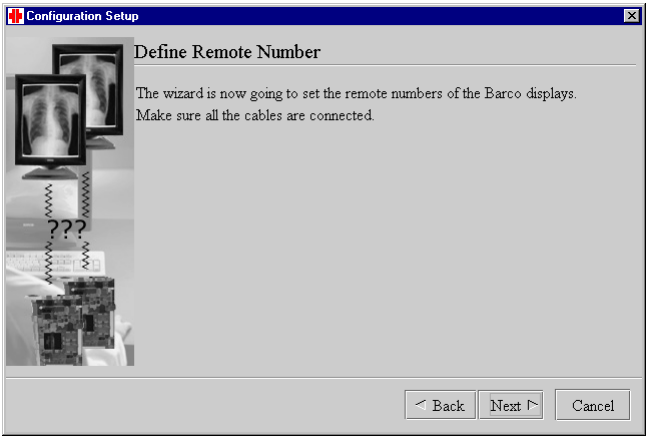
Proceed as follows:

1 In the Search error page, select **Redefine the remote ID's**.
Click on **Next** to continue.

2 The Wizard indicates the maximum number of Barco displays you can add. This is the number of imaging board heads in the computer.
In the field, enter the total number of Barco displays you want to add. This number should not exceed the number given by the Wizard.



3 The Wizard indicates it will start an interactive procedure to set the remote addresses correctly.

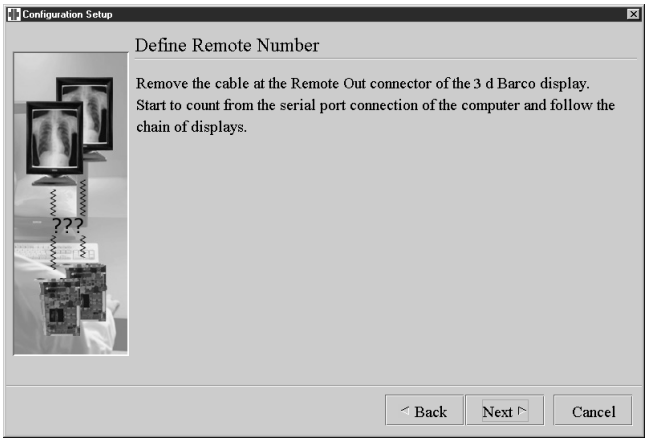


First, check if the data cables between the computer and all Barco displays are connected correctly.
When ready, click on **Next** to continue.

4 Unplug the Remote Out connection of the first display. When ready, click on **Next**.

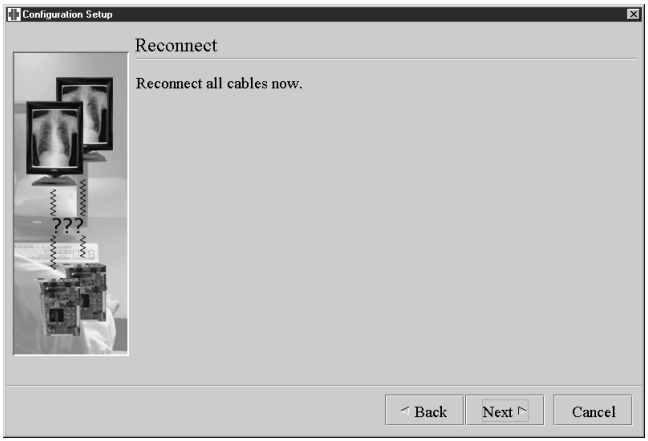
5 Plug in the remote cable into the Remote Out connector of the first display again.

6 Unplug the Remote Out connection of the second last Barco display. E.g., if 4 Barco displays are connected, you need to unplug the Remote Out connection of the 3rd one.
When ready, click on **Next**.



7 You have to repeat the previous step on the other Barco displays, in descending order towards the computer.
Read and follow the instructions of the Wizard carefully.

8 After having disconnected each display one by one, reconnect all data cables.
Make sure they are connected properly!
Click on **Next**.



9 The Wizard makes a new search for Barco displays and continues with the normal configuration setup procedure as described above.

Setting up the configuration directly by using the drop-down menus

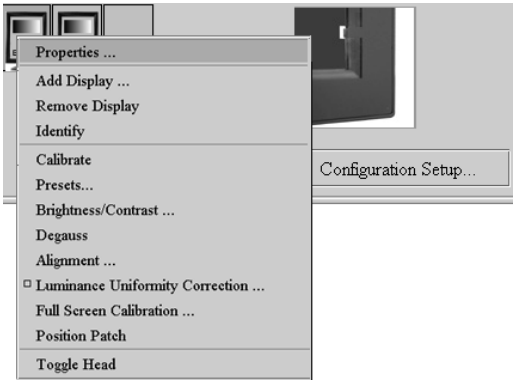
There is also a shorter, not guided way to add the configuration to MediCal Pro. You can do this by means of the context-sensitive drop-down menu.

In case you feel a bit unsure about the way to add a complete configuration, you better use the Cofiguration Setup Wizard (see previous sections).

To add displays:

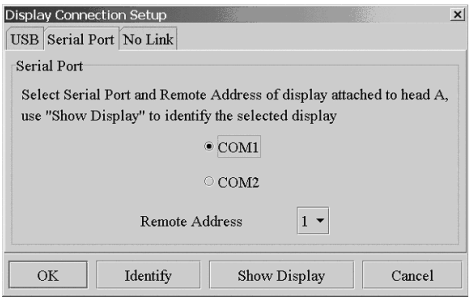
1 Right-click on the imaging board head icon and select **Add Display...** from the drop-down menu.

In case of a Dicom Theater application, both head icons are positioned on top of each other, so that only one icon per board is visible at the time. To activate the head that is hidden, select **Toggle head** from the drop-down menu. Head A is reserved for the flat panel display and Head B is reserved for the projector.



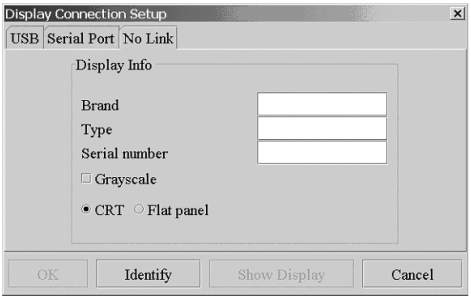
2 Barco flat panel displays are added immediately. For all other display types, the Display Connection Setup dialog appears.

a) Select the **Serial port** tab if you want to add a Barco projector connected to the serial (Remote) bus.



- Check the communication port to which the display is connected.
- Click on **Identify** to see which display is connected to which head. For a few seconds, you will see the letter of the heads on the displays. They automatically disappear after a few seconds. In case of a projector, the projector's shutter closes a few times.
- Click on **Show display** to see which display corresponds to the *Remote Address* chosen from the drop-down list.
  The image of the selected display will blink for a few times.

b) Select the **No Link** tab if you want to add a non-Barco display.



Enter the brand name, type and serial number. Also, you have to indicate whether the display is a grayscale display or not, and a CRT or flat panel display.

Note: It is important to enter the correct data here, so that the display can be found quickly should a task on this display generate an error in MediCal Administrator.

2.6 Aligning the displays

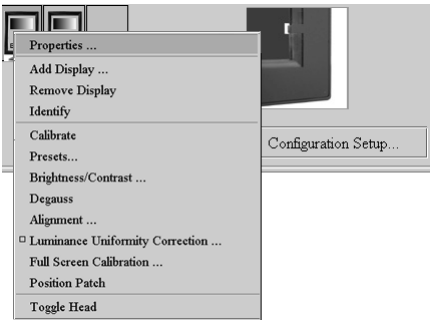
When the complete configuration is entered in MediCal Pro, you can align the displays, if necessary.

Barco CRT displays can be aligned from within MediCal Pro. You can align image geometry and (only for color displays) white uniformity.

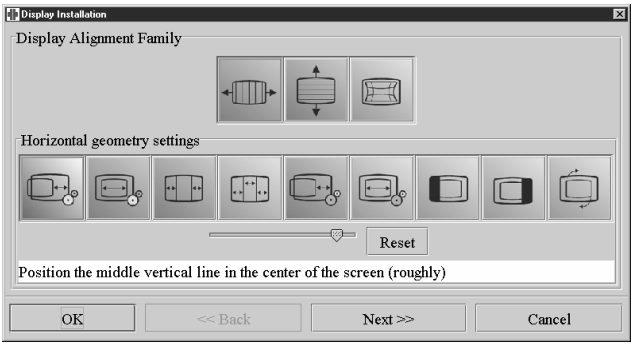
Barco flat panel displays do not require any image alignment.

Non-Barco displays must be aligned using their own controls. Please refer to that display's user documentation.

To start display alignment for Barco displays, right-click on the icon of the display you want to align. Select **Alignment...** from the drop-down menu.



After a few seconds, the selected display shows a test pattern. At the same time, the display alignment dialog appears.



The adjustments in the **Alignment** window are combined in a number of groups (display alignment families).

Note:

The number of alignment families and alignments depends on the type of display you are about to install. On some display types, some of the above described alignments will not be present.

The possible display alignment families are:

 Horizontal geometry settings

 Vertical geometry settings

 East-West geometry settings

 White uniformity settings (on color displays only)

The Alignment dialog contains the following elements:

- The icons at the top of the dialog indicate the different alignment families (e.g., horizontal geometry, vertical geometry etc.).
- The second row of icons represents the different alignments that belong to the selected alignment family.
- The names of alignment families and alignments appear as screen tips when you move the mouse pointer over their icons.
- The slider under the icons allows you to perform the alignment. Drag the slider or click inside the slider bar. Click on the **Reset** button to undo the alignment.
- The text box under the slider indicates how to perform the alignment properly. Follow the instructions in this text box carefully.
- The **Next>>** button selects the following alignment. If you are not experienced in aligning the display, it is best to follow the sequence of alignments by using the **Next>>** button until you have performed all the alignments.
- The **<<Back** button selects the previous alignment.
- By clicking on the **OK** button, you exit the alignments. All changes are saved.
- By clicking on the **Cancel** button, you exit the alignments without saving any changes.

Horizontal geometry settings

Horizontal position (course)

Position the middle vertical line of the test image approximately in the center. This is a course adjustment. You will get the opportunity to fine-tune later in the procedure.

Screen width

Adjust the width of the white frame on the test image following the display's specifications. You will get the opportunity to fine-tune later in the procedure. Tip: It is a good idea to use a flexible plastic or paper ruler to measure the size.

Horizontal linearity

Adjust until the distance between the vertical lines on the left side of the test image is the same as between those at the right. These lines are marked by arrows.

Horizontal S-correction

Adjust until the distance between the vertical lines in the center of the test image is the same as between those at the left and the right.

Horizontal blanking left

The background of the test image is highlighted (gray) and a white frame appears around the test image. When you drag the slider in the adjustment dialog to the right, a black vertical border appears at the left side of the test image. This is the blanking. Adjust now until this blanking stops at 0.5 cm (0.2 inch) before the left edge of the white frame. The frame must be completely visible.

Horizontal blanking right

Now do the same at the right side of the test image. Adjust until the blanking starts at 0.5 cm (0.2 inch) after the right edge of the white frame . The frame must be completely visible.

Rotation

Adjust until the white frame on the test image is perfectly upright.

Vertical geometry settings

Vertical position (course)

Position the middle horizontal line of the test image approximately in the center. This is a course adjustment. You will get the opportunity to fine-tune later in the procedure.

Screen height

Adjust the height of the white frame on the test image following the display's specifications. Tip: It is a good idea to use a flexible plastic or paper ruler to measure the size.

Vertical linearity

Adjust until the distance between the horizontal lines on the top of the test image is the same as between those at the bottom. These lines are marked by arrows.

Vertical S-correction

Adjust until the distance between the horizontal lines in the center of the test image is the same as between those at the top and the bottom.

Top blanking, AKB shift and AKB removal

Proceed as follows:

1. Select the **Top blanking** adjustment. Adjust until the blanking (on the top of the test image) ends just above the top line of the white frame. This line must be completely visible.
2. Select the **AKB removal** adjustment. Drag the slider in the adjustment dialog completely to the left (0 adjustment).
3. Select the **AKB shift** adjustment. Drag the slider completely to the right (maximum adjustment).
4. On the test image, you can now see the so-called AKB and AWS lines. These are test lines for the internal circuits that guarantee the stability of the display's white and black point. You should be able to see a

bright ascending line (joined by two parts of gray lines) and two dim ascending lines, at a distance of a few cm. The bright line is the AWS line and the dim lines are AKB lines.

5. Step by step, decrease the **AKB shift** adjustment. As a result, the AWS and AKB lines in the test image move up. Adjust until the lowest AKB line has completely disappeared under the bezel and a bright horizontal line appears under the bezel. This is the AWS line that is coming down again.

   Note: If you are unable to shift the AKB lines high enough until they have completely disappeared, repeat the adjustment with a somewhat higher **AKB removal** value.

6. Select the **AKB removal** adjustment. Increase the adjustment until the line on top of the test image has completely disappeared.

East-West geometry settings

Skewing

Adjust until the vertical lines in the middle of the test image are perfectly upright.

Trapezoid deformation

Adjust until the vertical lines at the sides of the test image are upright as well.

Parabola deformation

Adjust until the vertical lines at the sides of the test image are as straight as possible.

Corner deformation

Adjust until the vertical lines in the corners of the test image are straight. As a result, the corners of the test image should be 90 degrees exactly.

Bowing deformation

Adjust until the vertical lines in the middle and at the sides of the test image are straight.

Note: You might have to repeat the east-west settings a couple of times to obtain a perfect result.

White uniformity settings (on color displays only)

The white uniformity adjustments compensate for the effect of disturbing magnetic fields on color displays. These magnetic fields cause color purity or white uniformity errors. The most common is distortion due to the earth magnetic field.

Vertical uniformity

This adjustment is especially necessary when the display is operating in the southern hemisphere or near the equator. Adjust to remove purity or uniformity errors, especially in the center of the image.

Note: After each change of vertical uniformity, you might notice the image gets a slight “shiver”. This is due to the degauss, which is done after each change in this setting.

Axial uniformity

This adjustment compensates mostly around the edges of the image. As a side effect, the image rotates because of the adjustment. You can compensate this by means of the Rotation deviation adjustment (Horizontal geometry).

2.7 Defining Presets

Introduction

For each display in the configuration, you must define a Preset.
The Preset is very important in the Q/A concept. In a preset you define the display’s reference for visual behavior. With this reference, we want the display to be conform.

The Q/A tasks will use this reference to determine whether or not the displays are still performing OK.

A preset completely defines the display’s required visual behavior, based on essential parameters (see below). For each parameter you can enter a target value and 2 levels of tolerance.

These parameters are:

- White luminance:
  The required luminance for a white image.
- Black luminance:
  The required luminance for a black image.

- Display function:
  The function that defines how the luminance evolves when the video signal goes from black to white.

For a **color display**, you must additionally define:

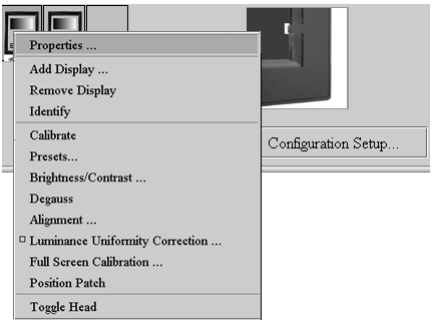
- White chroma:
  The chroma or color temperature for a white image.
- Black chroma:
  The chroma or color temperature for a black image.

Moreover you can define in the Preset if glare compensation and ambient light compensation must be taken into account during calibration.

Procedure

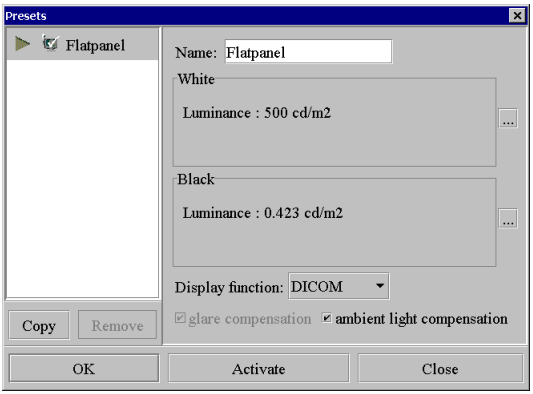
To define the preset, right-click on the icon of the display of which you want to define the Preset.

For Dicom Theater, the icons of both heads of the imaging board can be positioned on top of each other, so that only one icon per board is visible. To activate the hidden icon, select **Toggle Head** from the drop-down menu.



Select **Presets...** from the drop-down menu.

The **Presets** dialog appears.



The left column shows the installed presets. The right window pane shows the properties of the preset selected in the left column.

You can select an installed preset and, if necessary, modify its properties.

Alternatively, you can first copy an installed preset by clicking on the **Copy** button, and then modify its properties to create a brand new preset without overwriting one of the others.

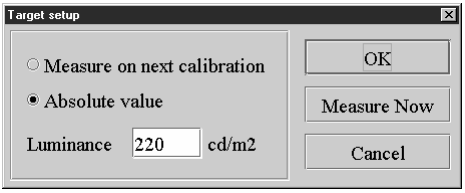
Preset parameters

Name

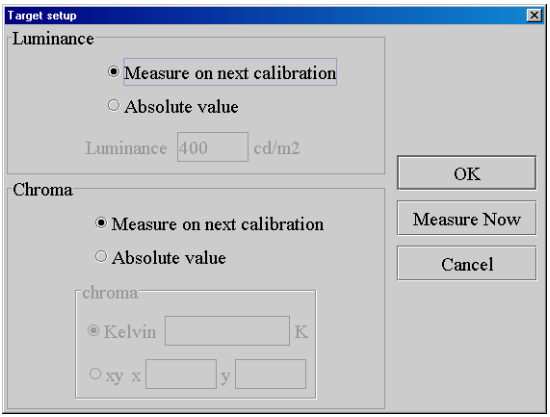
Enter or edit the name of the preset selected from the left column.

White Luminance /Black Luminance

Click the **...** button to edit the target value. You have the following options:



On grayscale displays



On color displays and projectors

Measure on next calibration:

Select this option if you do not wish to enter a target value now. Instead, the target value will be determined by measuring during the next calibration.

Absolute value

Select this option if you wish to enter a numeric target value.
This option is preferred for Barco displays.

Luminance

In this field, enter the required target value, expressed in Cd/m².
The field will be grayed if the "Measure on next calibration" option is selected.

Chroma (color displays only)

Note: This item is grayed for predefined Presets for Barco projectors (in Dicom Theater). If you create a new Preset, you will be able to define a chroma.

In this field, enter the required color temperature or chroma value, expressed in Kelvin or CIE (x,y) units.

In the Black luminance option window, you can check the option **Same as white chroma** in case you wish the black and white chroma values to be the same.

Measure Now

Click on this button if you wish to measure the actual luminance value. You will be asked to calibrate the sensor (if necessary) and apply it to the screen.

Display function

Note: This item is grayed for predefined Presets for Barco projectors (in Dicom Theater). If you create a new Preset, you will be able to define a display function.

Select the required display function from the drop-down list.

Select the required display function from the drop-down list. For most medical viewing applications, we recommend you select the DICOM display function, as this function results in the most visible grayscales.**DICOM** display function, as this function results in the most visible grayscales.

If you select **Gamma**, you can enter a display gamma value if the imaging board head, to which the display is connected, has an editable gamma table.

If you select **Uncorrected**, the program fills the imaging board gamma table with a linear function.

Ambient light compensation

Check this option if you want to compensate for the influence of the ambient light on the image. Especially when you have selected a DICOM or CIE display function, we advise to switch on this compensation to obtain a better display performance.

Glare compensation

Check Glare Compensation if you want to compensate for the influence of the bright parts on the dark parts of the image.
This option is always on (and grayed) if a DICOM display function is selected.

2.8 Calibrating displays

After defining the display's Preset, the display is calibrated. This is described in detail in § "Calibrating displays" on page 59.

2.9 Setting up the Q/A schedule

When every display in the configuration has the correct Preset values and is calibrated successfully, you need to set up the schedule of Q/A tasks that is appropriate for this viewing station.

To access MediCal Pro's default Q/A schedule, click on the **Q/A Setup...** button in the main window. For more information, please refer to § "Setting up a Q/A task schedule" on page 75.

2.10 Defining the Q/A task trigger settings

The tasks can be categorized in three groups, depending on the impact they have on the user and the applications running on the viewing station.

The task categories are:

Transparent intervention-free	The task runs completely in background. It does not require any action from the user and does not change the image on the display. E.g., an Automatic I-Guard Check on a BARCO Coronis display is such a task. These tasks can run also when no user is logged in on the workstation.
Intervention-free	The task does not require any action from the user but does change the image on the display. E.g., the Measure Quality Level of a BARCO Coronis display runs completely automatic, but during the execution of the task, the current application image is replaced by test images necessary for the measurement. These tasks can run only when a user is logged in on the workstation.
Non-intervention-free	The task requires a user action. E.g., a visual check on a test pattern requires the user to confirm that the pattern was displayed correctly. These tasks can run only when a user is logged in on the workstation.

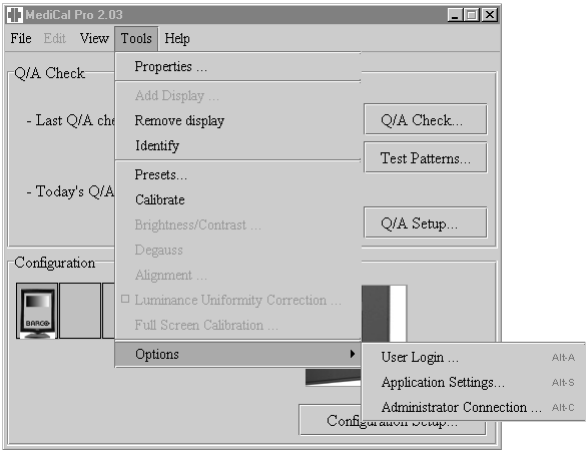
The trigger settings determine when the tasks will be executed after they have become due.

You can define trigger settings for intervention-free and non-intervention-free tasks.

It is not necessary to define trigger settings for transparent intervention-free tasks, because they do not hinder the user when they are executed. So, these tasks can always start when they become due. They will start even when no user is logged in.

To define the task trigger settings:

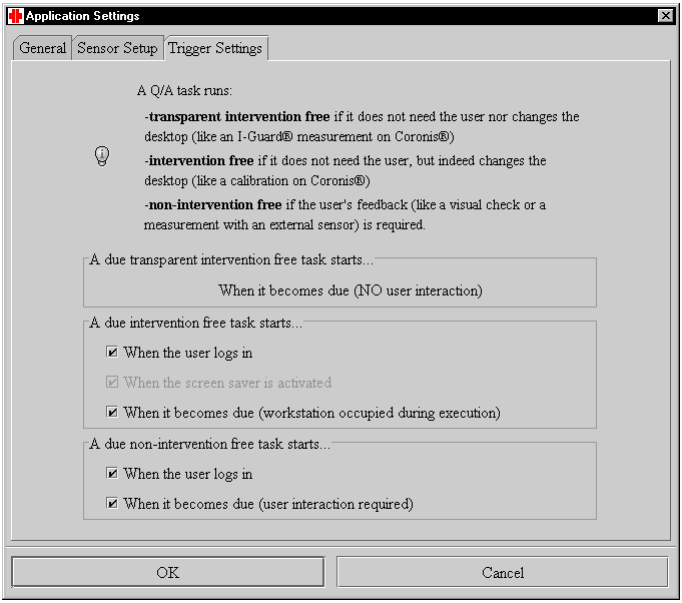
1 From the Tools menu, select **Options** > Application Settings.



2 Select the Trigger Settings tab.

3 Set the trigger settings.

The possible trigger settings are:



When the user logs in

Tasks that have become due, will be executed at the moment a user logs in on the workstation.

This is a good setting for tasks that require a user interaction (non-intervention-free). The tasks are executed after they have become due and at the moment someone logs in on the workstation. In that way you are sure a user is present to respond to the task's interactions.

When the screen saver is activated

Tasks that have become due, will be executed at the moment the screen saver is activated.

This is a good setting for tasks that can run automatically, but are not allowed to run while the workstation is occupied by a user (intervention-free). The tasks are executed after they have become due and at the moment the screensaver pops up on the workstation. In that way you are sure no user is busy on the workstation when the task starts.

When the task becomes due

The tasks will be executed at the time they become due. This is the time entered in the Q/A Setup schedule.

However, intervention-free and non-intervention-free tasks cannot run when no user is logged in. So, when no user is logged in at that moment, the task will not start. It will start the first moment someone logs in after the task has become due.

When you wish the tasks to start at the moment they become due, you have to select this trigger setting only.

Multiple trigger settings

When you check more than one trigger setting, the trigger conditions are handled in an OR-function.

Example:

Let us suppose you have checked the settings "When the user logs in" and "When the screen saver is activated" for the category of intervention-free tasks.

In that situation, the intervention-free tasks that have become due, will be executed at the moment someone logs in on the workstation or at the moment the screen saver pops up on that workstation, whichever occurs first.

No trigger settings defined

If you do not check any of the trigger settings, the task will not start automatically, even when it has become due. The task can be run manually only.

2.11 When will a task start?

First condition: Task is due

The first condition for a task to start, is that it is or becomes due. In other words, a task will never start as long as it is not due.

The time that the task becomes due, is determined by defining the Q/A schedule.

Therefore, in the Q/A Setup, select frequency, time and (if appropriate) date you wish the task to become due.

Example:

Let us suppose today is Wednesday, and the Automatic I-Guard Check task is scheduled weekly, on Thursday at 10 PM.

This means that tomorrow at 10 PM, the task will become due.

Will it also be executed at that time? That depends on the trigger settings.

Second condition: Trigger settings

Once a task is due, its execution depends on the Trigger settings.

In that way you can prevent that certain tasks would be executed while the workstation is occupied by a user.

Some tasks require a user interaction or temporarily replace the image by a test pattern. E.g., while the Measure Quality Level task is executed, the displays on which the task runs, are completely dimmed, apart from a white text being displayed.

In most cases, when you set up the task schedule, you cannot predict that the workstation will always be free when the task becomes due. Suppose that the Measure Quality Level task starts to run while a doctor is examining medical images. In that case, the doctor would not be able to continue viewing the images as long as the task is running.

To prevent situations like described above, you can set trigger settings. By setting trigger settings, you can prevent tasks to be executed at the time that they become due. They will be executed when they are due AND a certain condition (trigger setting) is true.

Example:

Let us again suppose that the Measure Quality Level task is scheduled weekly, on Thursday at 10 PM.

Let us also suppose the trigger settings for this task are set to: "When the screen saver is activated".

On Thursday at 10.00 PM, a doctor is working on the workstation, viewing medical images. The task becomes due, because it was scheduled that way. However, the task does not start to run yet, because the screen saver is not activated.

At 10.45, the doctor stops, does not log off, and leaves the workstation. The workstation' s screen saver is set to wait 15 minutes. So, at 11.00 PM, the screen saver is activated. At that time, the task will start.

You cannot set trigger settings per task, but per category of tasks.

Third condition: If a user is logged in

Intervention-free tasks and non-intervention-free tasks (see task categories) will not start when no user is logged in, even if they are due and the trigger settings are true.

2.12 Running the due tasks

To complete the installation, it is important to run the due Q/A tasks for the first time. Therefore, click on the **Q/A Check...** button in the main window.

For more information, please refer to §“Description of the tasks” on page 79.

3

USING MEDICAL PRO

3 Using MediCal Pro

3.1 Starting up

To start MediCal Pro, proceed as follows:

1 If the viewing station contains Barco displays, make sure there is no on-screen display (OSD) on the screen of the displays. Please refer to the display's user manual to know how to do this.

2 Start MediCal Pro from the Start > Programs > MediCal menu in Windows.

3 During start-up, the MediCal Pro Startup application may display the following message:

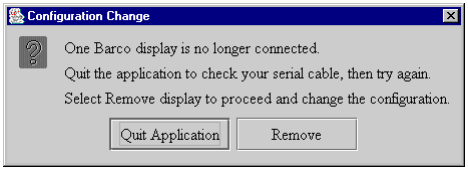
This means that another application has changed an imaging board's Look-Up Tables since you have last used MediCal Pro.
Select **Yes** if you want to restore the gamma to the value defined in MediCal Pro. This is the preferred choice if you were satisfied with the appearance of the images on the displays when you last closed MediCal Pro.
Select **No** if you do not want to restore the gamma defined in MediCal Pro. In that case, however, your display system will be no longer calibrated, because it was calibrated according to the gamma defined in MediCal Pro.

4 During start-up, MediCal Pro may notice a change in the configuration (e.g., it cannot establish communication with one of the Barco displays in the configuration).

Here is an example of a message that may appear when MediCal Pro has detected additional displays in the system:

Select **Cancel** to stop MediCal Pro.
Select **Add now** to continue with the start-up.

Here is an example of a message that may appear when MediCal Pro has detected a display has been removed from the system:



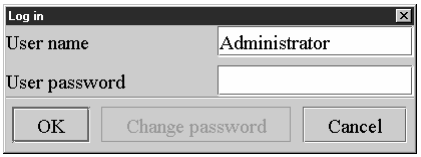
Select **Quit application** to stop MediCal Pro. Then you can try to restore the hardware connection to the display that was missing, and restart MediCal Pro.
Select **Remove** to continue with the start-up.

5 The MediCal Pro main window appears.

3.2 Entering Advanced user mode

To log in as advanced user

1 Press Alt-A on the keyboard or select **Tools** – **Options** – **User Login...** from the menus.
The **User Login** dialog appears.



2 In field **User name**, fill in your user name (maximum 20 characters).
3 In field **User password**, fill in advanced. This is the default password.
4 Click on **OK**.

To log out as advanced user and log in as standard user

1 In the Login dialog, fill in a user name different from the advanced user account (maximum 20 characters).
2 Do not fill in any user password.
3 Click on **OK**.

3.3 Changing passwords

When you have logged in as advanced user, you can change the advanced user password.

To change the advanced user password:

1 From the main window, press **Alt-A** on the keyboard or select **Tools** – **Options** – **User Login...** from the menus. Your user name is still filled out in the **User name** field.

2 Click on **Change Password.**

3 In field **Old password**, fill in the current password.

4 In fields **New password** and **Re-enter new password**, fill in the new password.

5 Click on **OK**. The password is changed.

6 The Login dialog appears again. Click on **Cancel** to continue as advanced user, or log in as standard user.

3.4 Calibrating displays

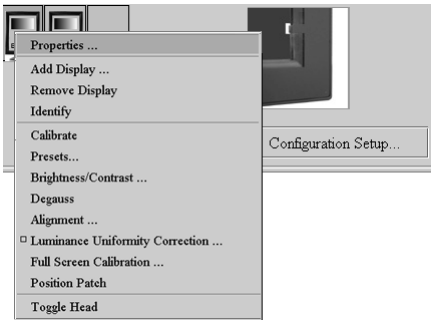
The calibration of the displays is a very important issue. Calibration is necessary to obtain conformance and to maintain consistency. It is inevitable during Configuration setup and may be necessary as intervention when a Q/A check turns out to be Not OK.

You can calibrate Barco displays and non-Barco displays, but the procedure for both categories is different.

MediCal Pro supports the following sensors for calibration: X-Rite DTP92 (serial or USB), Wellhofer Luxor LXPlus, Solar PMA2200, Minolta LS100 and Tektronix TJ17. Also the Coronis I-Guard sensor inside BARCO flat panel displays and the I-Guard sensor from Dicom Theater are supported.

To start calibration:

- Calibration starts automatically after defining a new, uncalibrated Preset or after modifying a Preset.
- You can also calibrate a display by right-clicking on its icon in the main window, and selecting **Calibrate...** from the drop-down menu.

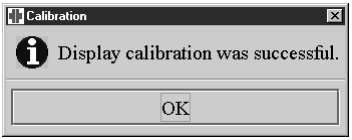


Calibrating Barco flat panel displays

Barco flat panel displays, like the Coronis displays, have a built-in optical sensor that communicates with MediCal Pro.

The calibration runs completely automatically.

When the calibration is finished successfully, it displays the following message.



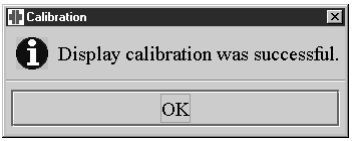
Click on **OK** to close the window.

Calibrating Barco projectors

Barco projectors are calibrated by means of the I-Guard external sensor, connected to the USB bus. The sensor is included in the Dicom Theater package.

The calibration runs completely automatically. During calibration, the same image appears on the flat panel display, but only the projector is calibrated at that moment.

When the calibration is finished successfully, it displays the following message.

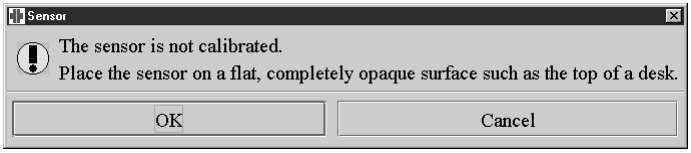


Click on **OK** to close the window.

Note: During calibration, be sure no persons or objects come between the projected sensor patch and the projection screen.

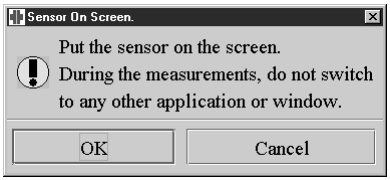
Calibrating Barco CRT displays

1 If you use an X-Rite DTP92 sensor, you may be asked to calibrate the sensor first.



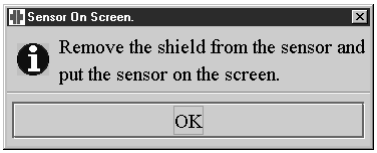
Make sure the sensor is completely covered (so that no light can enter the sensor) and click on **OK**.

2 Put the sensor, with Ambient Light Shield if appropriate, on the image on the screen.
Important:
Make sure there are no application windows or other items (e.g., the cursor) displayed under the sensor. They would cause the calibration to fail.



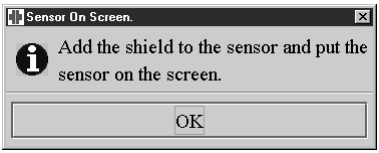
When ready, click on **OK**.

3 For sensors that have an ambient light shielding only: If the **Ambient Light Compensation** option in the Preset is checked, the software asks you to remove the sensor from the screen and put it back without Ambient Light Shield.



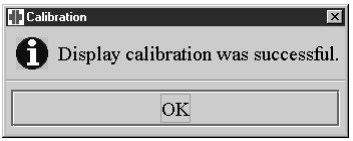
When ready, click on **OK**.

After a few measurements, the software asks to remove the sensor once more, and put it back with the Ambient Light Shield.



When ready, click on **OK**.

5 When the calibration is finished successfully, it displays the following message.



Click on **OK** to close the window.

Full screen calibration

Full screen calibration is possible on Barco CRT displays only. The optical sensor must be connected to the display to be able to perform full screen calibration.

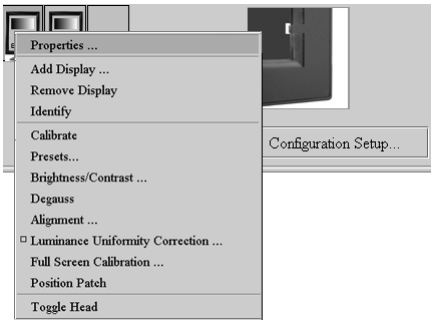
The function is grayed if not available on the display.

The purpose of full screen calibration is to obtain a uniform luminance all over the screen. When full screen calibration is done, AND the option **Luminance Uniformity Correction** (see Luminance Uniformity Correction on/off Luminance Uniformity Correction on/off) is switched ON, the luminance will be uniform all over the screen.

If the option **Luminance Uniformity Correc**tion is off, the result of the full screen calibration will not be visible on the screen.

To perform a full screen calibration:

1 In the Configuration section in the main window, right-click on the icon of the display on which you wish to perform full screen calibration. From the drop-down menu, select **Full Screen Calibration...**

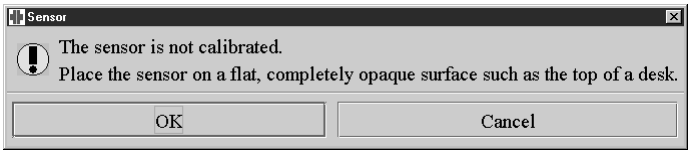


2 Put the sensor without Ambient Light Shield (for convenience) on the image and follow the instructions on the screen.

The full screen calibration starts with a measurement of luminance in the center of the screen. It proceeds with calibration in a number of zones over the picture tube so that the luminance in all of the zones equals the center luminance.
The zone where you have to put the sensor, is indicated by a white, blinking square.

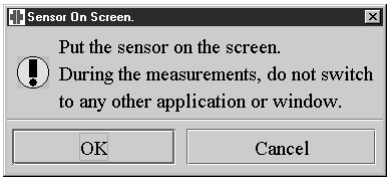
Calibrating non-Barco displays

1 If you use an X-Rite DTP92 sensor, you may be asked to calibrate the sensor first.



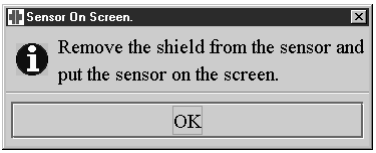
Make sure the sensor is completely covered (so that no light can enter the sensor) and click on **OK**.

2 Put the sensor, with Ambient Light Shield if appropriate, on the image on the screen.
Important:
Make sure there are no application windows or other items (e.g., the cursor) displayed under the sensor. They would cause the calibration to fail.



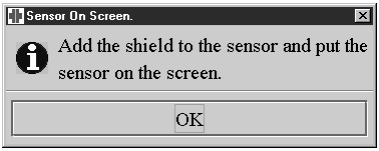
When ready, click on **OK**.

3 For sensors that have an ambient light shielding only: If you have specified an **absolute value** for black and white luminance in the Preset, and the **Ambient Light Compensation** option is checked, the software asks you to remove the sensor from the screen and put it back without Ambient Light Shield.



When ready, click on **OK**.

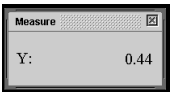
After a few measurements, the software asks to remove the sensor once more, and put it back with the Ambient Light Shield.



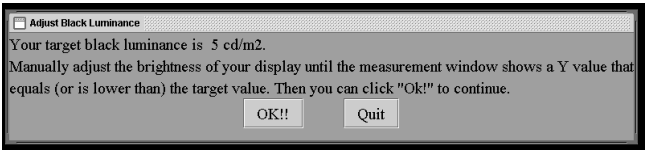
When ready, click on **OK**.

4 The black luminance target value is determined now.

The sensor measures a black patch. The result of the measurement is shown in a small **Measure** window in the corner.



a) If you have specified an absolute value for black luminance in the Preset, MediCal Pro displays this value in the message.
You must control the display brightness manually until the measured value is equal or lower than the target value.



When this is the case, the OK button becomes active so that you can continue.

b) If you selected **Measure on next calibration** in the Preset, you must adjust display brightness manually, until a desired level of black luminance is attained.
When you click on **OK**, the measured value will be taken as black luminance target.

5 The white luminance target value is determined now.

The sensor measures a white patch. The result of the measurement is shown in the **Measure** window.

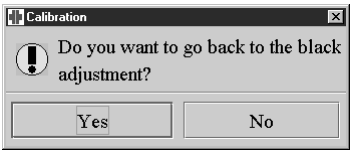
a) If you have specified an absolute value for white luminance in the Preset, MediCal Pro displays this value in the message.

You must control the display contrast manually until the measured value is equal or higher than the target value.

When this is the case, the **OK** button becomes active so that you can continue.

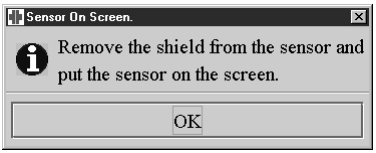
b) If you selected **Measure on next calibration** in the Preset, you must adjust display contrast manually, until a desired level of white luminance is attained.
When you click on **OK**, the measured value will be taken as white luminance target.

7 The black luminance and white luminance measurements may influence each other, so that the value of the first step changes when the second step is done. Therefore, you have to repeat both steps (steps 3 and 4) until both values remain stable.



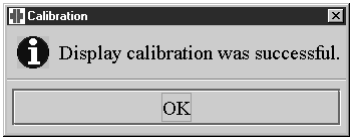
Click on **Yes** to repeat the measurements. Click on **No** if the values remain stable and you wish to proceed with the calibration.

8 For sensors that have an ambient light shielding only: If you selected **Measure on next calibration** in the Preset and the **Ambient Light Compensation** option is checked, the software asks you now to remove the sensor from the screen and put it back without Ambient Light Shield.
When ready, click on **OK**.



After a few measurements, the software asks to remove the sensor once more, and put it back with the Ambient Light Shield.
When ready, click on **OK**.

9 When the calibration is finished successfully, it displays the following message:



Click on **OK** to close the window.

3.5 Setting up a Q/A task schedule

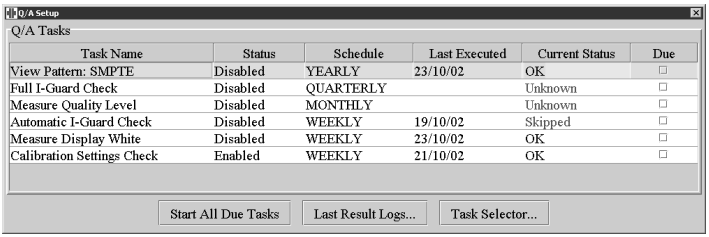
The tasks can be categorized in three groups, depending on the impact they have on the user and the applications running on the viewing station.

The task categories are:

Transparent intervention-free	The task runs completely in background. It does not require any action from the user and does not change the image on the display. E.g., an Automatic I-Guard Check on a BARCO Coronis display is such a task. These tasks can run also when no user is logged in on the workstation.
Intervention-free	The task does not require any action from the user but does change the image on the display. E.g., the Measure Quality Level of a BARCO Coronis display runs completely automatic, but during the execution of the task, the current application image is replaced by test images necessary for the measurement. These tasks can run only when a user is logged in on the workstation.
Non-intervention-free	The task requires a user action. E.g., a visual check on a test pattern requires the user to confirm that the pattern was displayed correctly. These tasks can run only when a user is logged in on the workstation.

To open the Q/A task setup window:

In the main window, click on the **Q/A Setup...** button. The Q/A Setup window appears.



When MediCal Pro is installed, a default task schedule is filled in.

The **Q/A Setup** window gives the following information:

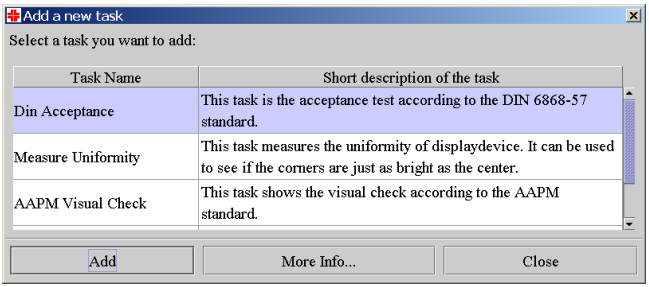
Task Name	The task's name or description
Status	Whether the task is enabled or disabled
Schedule	The frequency with which you wish the task to be executed
Last Executed	The date (in MM/DD/YY format) the task is last executed
Current status	The result of the task's last execution
Due	Whether the task is due or not. This is determined by the task's schedule and the moment it last has been executed. E.g., a task that is scheduled daily, and that has been executed today already, will not be due until the next day. When you move the mouse cursor over the schedule, screen tips pop up to give you some detailed information about the schedule.

When you move the mouse cursor over the schedule, screen tips pop up to give you some detailed information about the schedule.

Adding tasks

By default, the task schedule contains a number of tasks. Other tasks are installed as plug-in. You can add them to the schedule in the following way:

1 From the Q/A task setup window, click on the **Task Selector...** button. The Add New Task window appears.



2 To get more information about a specific task, click on the name of the task and then click on the **More Info** button.

3 To add a task, click on the name of the task you wish to add and then click on the **Add** button.

4 When finished, click on the **Close** button.

Notes:

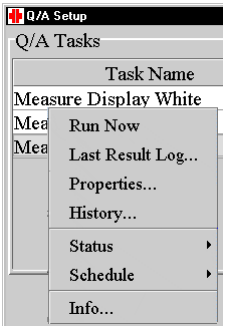
There is no way to remove the tasks from the schedule. If you do not want a task to be executed, you have to disable it (see below).

To see which plug-ins are installed, you can open the Help menu of MediCal Pro.

Enabling or disabling tasks

To enable or disable a task:

1 In the **Q/A setup** window, right-click on the name of the task you wish to enable or disable. A drop-down menu appears.



2 Select **Status > Disabled** to disable the task. As a result, the task will not be executed until it is manually enabled again.
Select **Status > Enabled** to enable the task to be executed. The task will be executed according to the entered schedule. This is indicated by the check mark in the Due column.

Scheduling a task

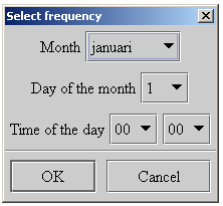
To schedule a task:

1 In the **Q/A setup** window, right-click on the name of the task you wish to schedule. A drop-down menu appears (see above).

2 Select the desired frequency from the **Schedule >** menu:

Daily	The task becomes due every day at the scheduled time.
Weekly	The task becomes due every week at the scheduled time.
Monthly	The task becomes due every month at the scheduled time.
Quarterly	The task becomes due every 3 months starting with the scheduled time.
Twice a Year	The task becomes due every 6 months starting with the scheduled time.
Yearly	The task becomes due every year at the scheduled time.

3 In the **Select frequency** window, select the time and, when appropriate, day and month you wish the task to be executed.



Notes:

- After enabling and scheduling a task, it may still not appear as a due task. The cause of this may be that the display(s) in the configuration are not calibrated. Some tasks can be executed on calibrated displays only.
- The moment that the task will be executed automatically, depends on:
  - the moment it becomes due
  - the trigger settings for this category of tasks
  - if a user is logged in on the workstation

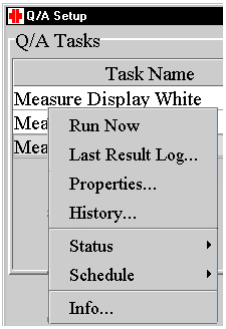
Checking and changing task properties

You can display the task properties and change some of them.

There is a difference in properties between some of the tasks. Some of them even have no properties.

To display the task properties

1 In the **Q/A setup** window, right-click on the name of the task of which you wish to view the properties. A drop-down menu appears.



2 Select **Properties...** The task properties appear. The fields displayed in white can be edited by double-clicking on them.

Description of the tasks

To display a task description

1 In the **Q/A setup** window, right-click on the name of the task of which you wish to view the description. A drop-down menu appears (see above).

2 Select **Info...** The task description appears.

3.6 Performing Q/A checks

Running Q/A tasks

MediCal Communicator service

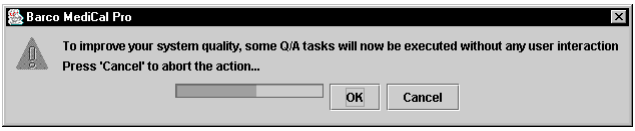
During installation of MediCal Pro, a Windows service is installed as well. This service, called MediCal Communicator, will run the due tasks, taking the Q/A task time schedule and the task trigger settings into account.

The time schedule can be entered in the Q/A Setup window. See §"Setting up a Q/A task schedule" on page 75.

The task trigger settings can be entered in the Application Settings menu. See "Defining the Q/A task trigger settings" on page 60.

Before the tasks can be executed, MediCal Pro must be closed.

When an intervention-free or a non-intervention-free task starts, MediCal Communicator will display a message saying a task is ready to be executed.



When you wish the task(s) to be executed, click on **OK**.

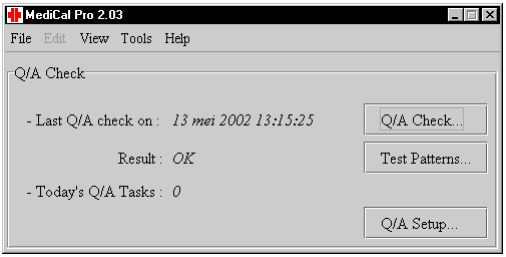
When you do not wish the task(s) to be executed, click on **Cancel**.

When the user does not respond to the message, after some time the task will be executed automatically.

Running tasks from within MediCal Pro

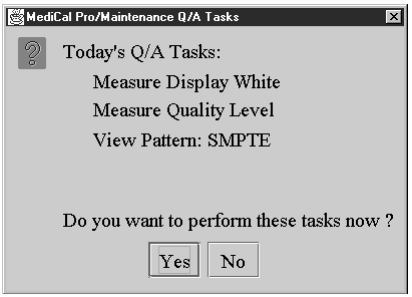
Running all due tasks

To run all today's due tasks from within MediCal Pro, first start up MediCal Pro (see "Starting up for the first time" on page 26).



To run the due tasks, click on the **Q/A Check...** button in the main window.

A window appears, displaying the due tasks for today.



Click on **Yes** to run the tasks immediately.

All due tasks will be executed in the order they appear in MediCal Pro's **Q/A Setup** window.

Click on **No** to skip the execution of the tasks. The tasks' result will be indicated as Skipped but the tasks remain due. They will be run the next time you perform a Q/A Check.

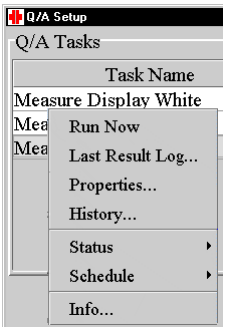
Running a single task

At any time, you can run any task, even if it is disabled or not due.

To run a single task:

1 In the main window, click on **Q/A Setup...**

2 In the **Q/A setup** window, right-click on the name of the task you wish to run. A drop-down menu appears.



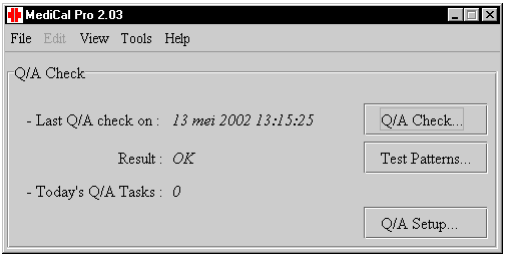
3 Select **Run Now**. The task will start immediately.

Checking task results

Checking the results of executed tasks can be done with the MediCal Administrator application, if installed.

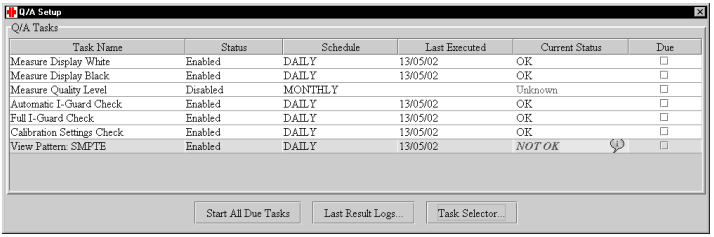
However, also in MediCal Pro you can check the task results.

To check the task results, click on the **Q/A Setup...** button in the main window.

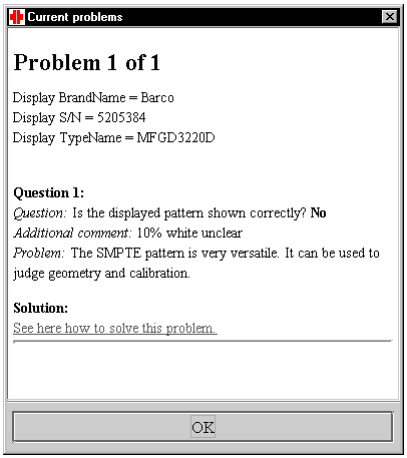


To troubleshoot tasks that are Not OK

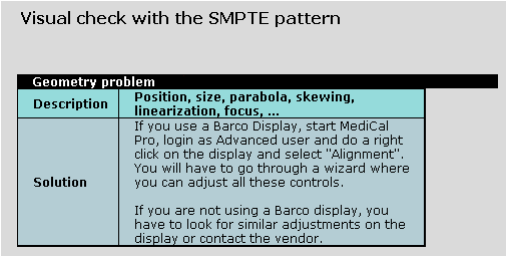
Tasks that were Not OK the last time they were executed, are indicated with a question mark  in the Current Status field in the Q/A Setup window.



- To see a description of the problem(s), click on the question mark. The problem description appears.



- To get hints for a possible solution, click on the sentence **See here how to solve this problem**. As a result, an html page with problem solving hints appears.



To display all tasks' last results

To display all tasks' last results, click on the **Last Result Logs...** in the **Q/A Setup** window.

The overview of all tasks' last results appears.

- To see the history log of a task, click the task name in the All Results window.
- For tasks that were Not OK: To see a problem description and a hint to solve the problem, click on the question mark next to the task in the All Results window.

To display a particular task's last result

To display a particular task's last result, right-click on the task name and select **Last Result Log...** from the drop-down menu.

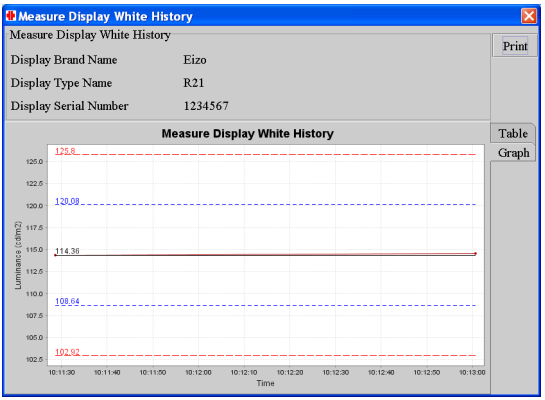
The tasks' last result appears.

- To see the history log of a task, click the task name in the Last Result window.
- For tasks that were Not OK: To see a problem description and a hint to solve the problem, click on the question mark next to the task in the Last Result window.

To display a particular task's history of results:

In the **Last Result** window (see above), click on the underlined name of the task.

The history is displayed in table or graph form, and can be printed out.
Exception: For Test pattern tasks, graph form nor printing can be selected.



Graph form

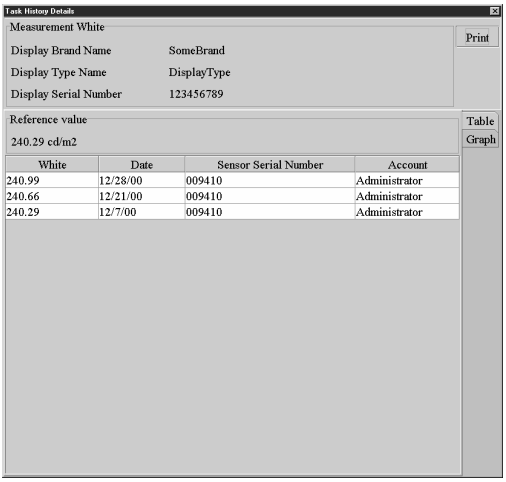
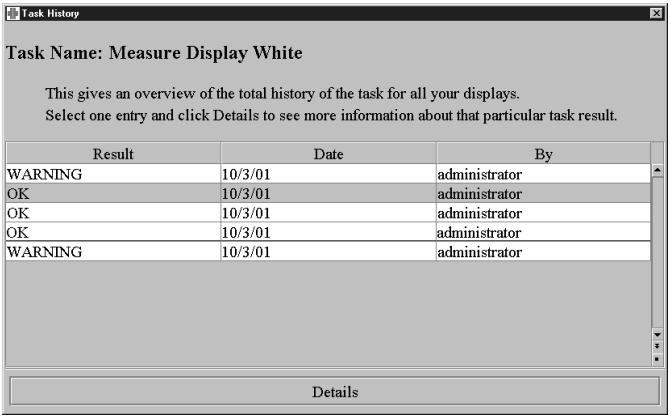


Table form

Alternatively, in the **Q/A Setup** window, right-click on the task name and select **History...** from the drop-down menu. The history is shown as table only, and cannot be printed.



To see more (older) results in the history list, click on the double arrow under the scroll bar at the right of the list.

To define the number of results you want to see in the history list, click on the small square under the scroll bar at the right of the list, and select the number of results by moving the slider in the **Select number of results** dialog box.

To display details about one of the results

To display details about one of the results, select a result in the **Task History** window (see above) and click on the **Details** button.

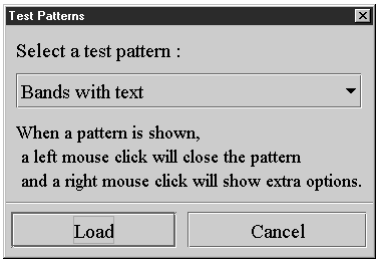
Using test patterns for a quick Q/A check

You can perform a quick Q/A check by displaying a test pattern on the viewing station displays and checking the picture quality.

To display a test pattern:

1 In the Configuration section in the main window, select the display on which you wish to see the test pattern. You can do this by clicking on its icon.
If you have logged on as Guest user, you cannot select a display. The test pattern will be shown on the first display.

2 Click on the **Test Patterns...** button. The Test Patterns dialog appears.



3 Select a pattern from the drop-down list.
If you select **Select Image**, a dialog box will appear when the pattern is loaded, allowing you to select any jpg, bmp or gif image file on the computer.

4 Click on the **Load** button.
After a few seconds, the test pattern will appear.

5 The following patterns provide a **Measure** window, allowing you to measure certain areas from the test pattern with the optical sensor:
   - Centered square
   - Select Image
   - Uniformity

6 Right-click on the test pattern to display a menu with the following options (depending on the configuration and pattern, some of them may not be available):

Invert LUT:	Invert the values in the imaging board's LUTs (white becomes black, black becomes white, etc.)
Linearize LUT:	The LUT entries are filled with a linear function (a gamma of 1).
Full Screen:	Expand the test pattern over the connected displays, covering the full virtual desktop.
Every Screen:	Repeat the test pattern on every connected display.
Quit:	Close the test pattern.

Test pattern description

The default test patterns are:

Pattern name	Description
Astigmatism	This pattern can be used to check the astigmatism and overall focus of the display. Check that the pattern is displayed sharp all over the screen.

Bands with text	This pattern can be used to check if the display function is perceptually linear (calibrated according to the DICOM display curve). This is the case if the text in all of the bands is legible.
Briggs	This pattern can be used to check if the display function is perceptually linear (calibrated according to the DICOM display curve). The pattern consists of rectangles including small squares that are 5% darker. The small squares in each of the rectangles should be visible if the system is calibrated according to the DICOM display function.
Centered Square	This pattern can be used to check the white luminance. Put the optical sensor on the white square and check the measured luminance displayed in the measurement window
Characters	This pattern can be used to check the image focus. Check that the characters are sharp.
Contrast & noise	This pattern can be used to check the video signal. Check that there is no ghosting or smearing near the white squares.
Focus	Just like the Characters pattern, this pattern can be used to check the image focus. Check that the characters are sharp.
Grid	This pattern can be used to check the image geometry (size, position, linearity) and focus. Check if the lines of the pattern are: - straight - at an equal distance apart - sharp
Horizontal gradient	This pattern displays a horizontal gradient from black to white. You can use this pattern to check the grayscale performance.
SMPTE	The SMPTE pattern is a universal pattern with which you can check geometry, focus, white luminance, bandwidth and display curve. We suggest to check on display curve. Therefore, check the patches with the 5% gray square on black and the 95% white square on white. The gray squares should be visible if the system is calibrated according to the DICOM display function.

Select image	Browse and select your own test pattern. MediCal LE supports bmp, tif, jpg and gif files.
TG18QC	This pattern is a universal pattern with which you can check geometry, focus, white luminance, bandwidth and display curve, according to the AAPM qualifications.
Uniformity	This pattern can be used to check if the white and black levels are uniform all over the screen. Therefore, put the sensor on the different patches on the screen, and check the Measure window to see if the measured value is approximately the same all over the screen.
Wedge	This pattern shows three different white-to-black gradients. You can use it to check the grayscale performance and bandwidth.

3.7 Changing an existing configuration

When a configuration is set up, you can add or remove displays without running the Configuration Setup Wizard.

Note:
After changing anything to the configuration, you need to run the Q/A tasks again. If not, the task results will appear Unknown.

Adding a display

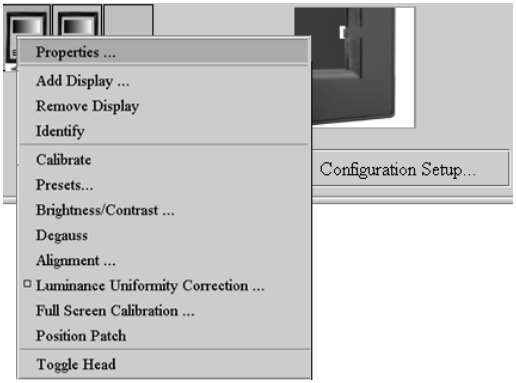
If the main window displays an imaging board head without an added display (represented by a square without display icon), you can add a display to the head.

To add displays:

1 Right-click on the imaging board head icon and select **Add Display...** from the drop-down menu.

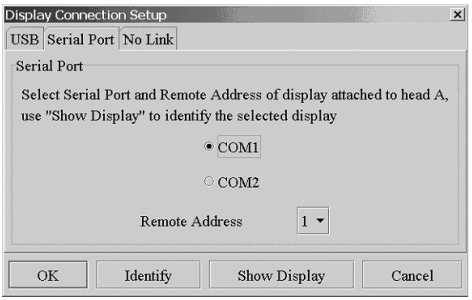
In case of a Dicom Theater application, both head icons are positioned on top of each other, so that only one icon per board is visible at the time. To activate the head that is hidden, select **Toggle head** from the

drop-down menu. Head A is reserved for the flat panel display and Head B is reserved for the projector.



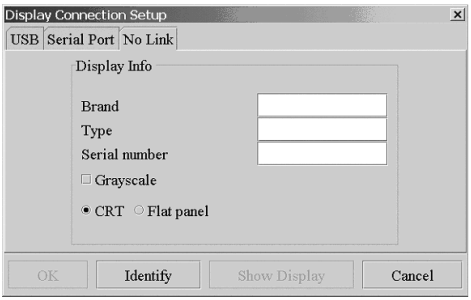
2 Barco flat panel displays are added immediately. For all other display types, the Display Connection Setup dialog appears.

a) Select the **Serial port** tab if you want to add a Barco projector connected to the serial (Remote) bus.



- Check the communication port to which the display is connected.
- Click on **Identify** to see which display is connected to which head. For a few seconds, you will see the letter of the heads on the displays. They automatically disappear after a few seconds. In case of a projector, the projector's shutter closes a few times.
- Click on **Show display** to see which display corresponds to the *Remote Address* chosen from the drop-down list. The image of the selected display will blink for a few times.

b) Select the **No Link** tab if you want to add a non-Barco display.



Enter the brand name, type and serial number. Also, you have to indicate whether the display is a grayscale display or not, and a CRT or flat panel display.

Note: It is important to enter the correct data here, so that the display can be found quickly should a task on this display generate an error in MediCal Administrator.

Removing a display

To remove a display, right-click on the display icon and select **Remove Display...** from the drop-down menu.

The display is removed immediately.

Note:

When a display is removed from the configuration, the task histories related to that display will no longer be visible in MediCal Pro.

However, the histories are not deleted. When you connect the same display again, the histories will be visible as well.

3.8 Connecting to MediCal Administrator

When MediCal Pro starts up for the very first time, it provides the opportunity to connect to a server on which MediCal Administrator is installed. If MediCal Pro is not yet connected to a MediCal Administrator server, it is still possible to do this in the program.

Note:

Prior to connecting the viewing station to the MediCal Administrator server, the medical facility to which the viewing station belongs, must be added already to MediCal Administrator. For more information, please consult your system administrator.

To connect to MediCal Administrator:

1 From the Tools menu, select **Administrator Connection**.

2 The MediCal Administrator Connection Wizard starts. Please refer to the chapter “First Installation” for a detailed description of this Wizard.

3.9 Registering the operations in a log file

MediCal Pro stores the results of the Q/A checks in a log file, and if it is connected to a MediCal Administrator server, it sends the result data to MediCal Administrator.

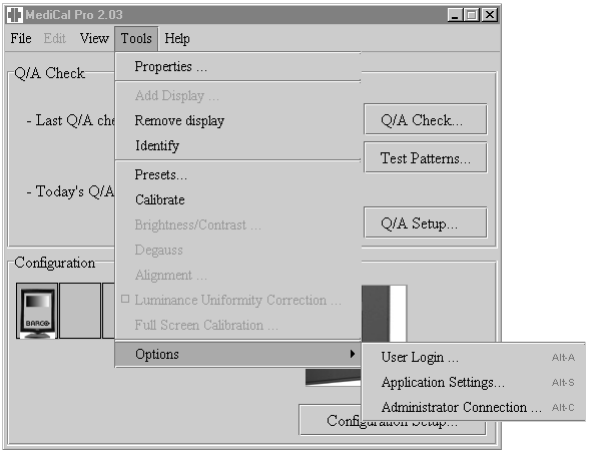
Apart from these methods of logging, MediCal Pro can keep track of all the operations the users perform in the program.

This file, called **log**, is stored on the hard disk in the MediCal Pro program folder. It can be opened with any text editor.

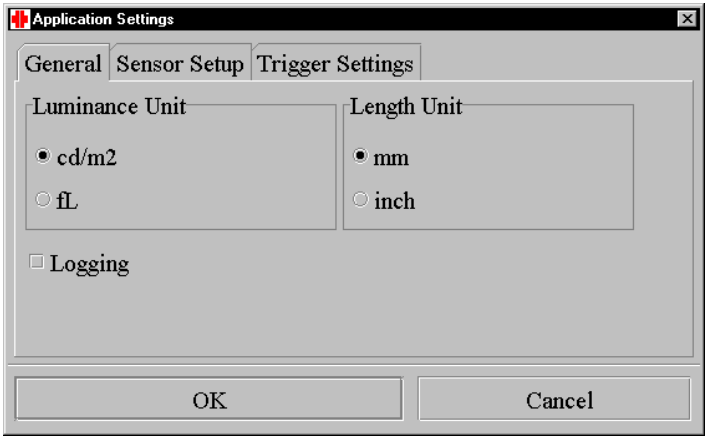
This registration can be switched on or off.

To select / deselect logging:

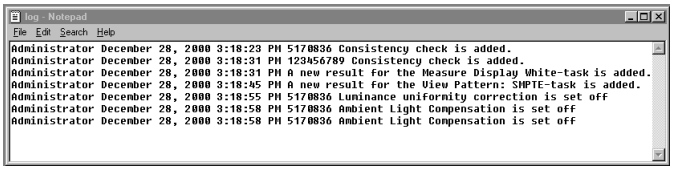
1 From the Tools menu, select **Options > Application Settings**.



2 Select the **General** tab.



3 If **Logging** is checked, the manipulations are registered in the log file. If **Logging** is not checked, the manipulations are not registered in the log file.



Example of a Log file

3.10 Selecting Luminance units

The results and values of luminance measurements can be expressed in Candela per square meter (Cd/m²) or Footlambert (fL).

To select the luminance units:

1 From the Tools menu, select **Options** > **Application Settings** (see above).
2 Select the **General** tab (see above).
3 Select the desired luminance unit.

3.11 Selecting units of length

In the Display properties, you can enter the screen size of the displays. You can do this in inches or millimeters. You can select this unit of length in the Application Settings dialog.

To select the units of length:

1 From the Tools menu, select **Options** > **Application Settings** (see above).
2 Select the **General** tab (see above).
3 Select the desired unit of length.

3.12 Setting up optical sensor list and priority

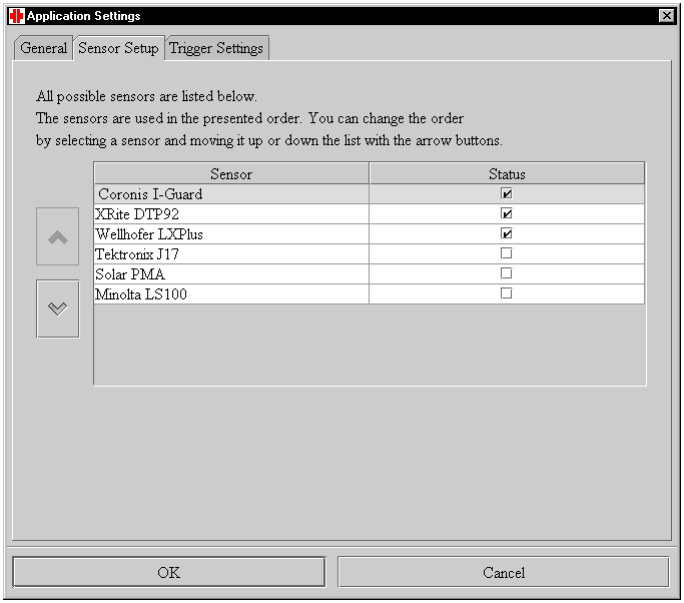
MediCal Pro supports a list of possible optical sensors. To speed up the search for connected optical sensors, it is best to indicate which sensor types are used and which ones are not used.

Moreover, you can set up a priority of sensors. This may be necessary when using Barco flat panel displays with built-in I-Guard sensor. When you wish to use an external sensor for measurements on the flat panel, you should assign it a higher priority than the I-Guard sensor. In that case, MediCal Pro will automatically select the external sensor for the measurements.

To set up the list and priority of used sensors:

1 From the Tools menu, select **Options** > **Application Settings** (see above).

2 Select the **Sensor Setup** tab.



3 Check the types of sensors used on the viewing station. Do not check the types that are not used.

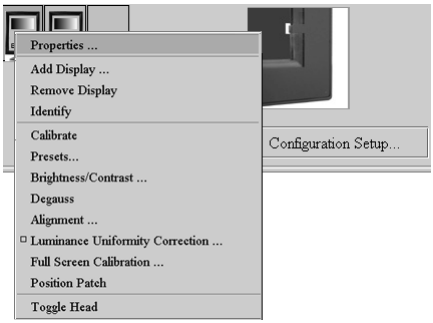
4 Select a sensor type and use the  and  buttons left of the sensor list to change the priority of sensors.

3.13 Additional display functions

Viewing display and imaging board properties

 In the Configuration section in the main window, right-click on the icon of the display you wish to view the properties of.

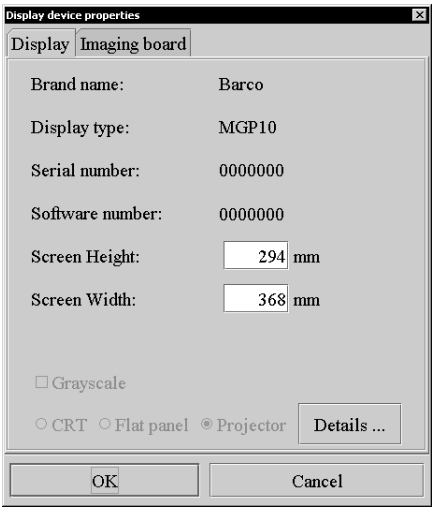
From the drop-down menu that appears, select **Properties...**



The display device properties dialog appears.

Display Properties

Select the **Display** tab in the display device properties dialog.



Brand name:	The display brand name.
Display type:	The display type or description.
Serial number:	The display's serial number.
Software number:	The order number of the display's internal software (BARCO displays only).
Screen height	The height of the visible display screen. The unit of length can be selected in the Application Settings dialog.

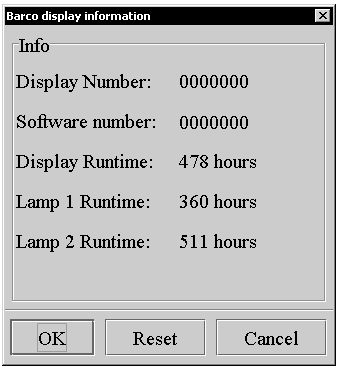
Screen width	The width of the visible display screen. The unit of length can be selected in the Application Settings dialog.
Gray scale:	This option is checked if the software has detected the display is a grayscale display (BARCO displays only) or if the user has defined the display as a grayscale display during the configuration setup.
CRT/Flat panel:	Whether the display is a CRT or flat panel type.
Details:	(BARCO displays only) Click to get additional information about the display and activate / deactivate some additional features (see below).

Display Details: Flat panel displays

Display Number	The order number of the display
Software Number	The order number of the display's internal software (BARCO displays only)
Lifetime	The time (in hours) the display has been operating so far, including the time the display was switched in power-saving mode (BARCO displays only)
Runtime	The time (in hours) the display has been operating so far, excluding the time the display was switched in power-saving mode (BARCO displays only)
Stabilizer	Check this option to switch on the backlight stabilizer. The option is grayed if not applicable to the selected display.

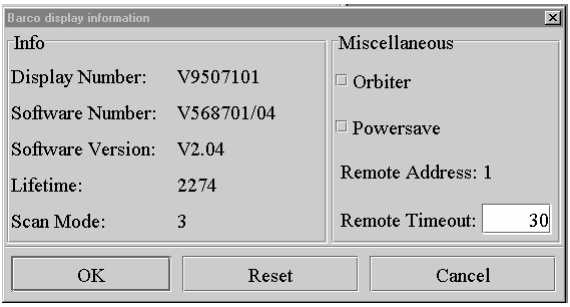
DPMS	Check this option to switch on the Power Saving utility (DPMS). The option is grayed if not applicable to the selected display.
Power LED	Check this option to switch on or off the functionality of the power LED.

Display Details: Projectors



Display Number	The order number of the projector
Software Number	The order number of the projector's internal software
Display Runtime	The time (in hours) the projector has been operating so far, excluding the time the projector was switched in power-saving mode
Lamp 1 Runtime	The time (in hours) lamp 1 in the projector has been on so far
Lamp 2 Runtime	The time (in hours) lamp 2 in the projector has been on so far

Display Details: CRT displays



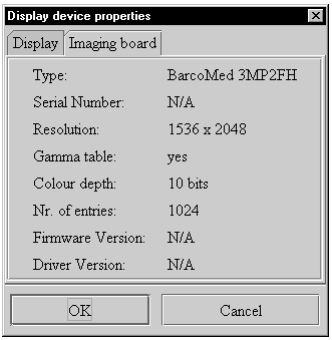
Info

Display Number	The order number of the display
Software Number	The order number of the display's internal software (BARCO displays only)
Software version	The version of the display's internal software (BARCO displays only)
Lifetime	The time (in hours) the display has been operating so far (BARCO displays only)
Scan Mode	The scan mode, internally selected from the display's memory (BARCO displays only)

Miscellaneous

Orbiter	Check this option to switch on the Orbiter. The option is grayed if not applicable to the selected display.
Powersave	Check this option to switch on the Power Saving utility (DPMS). The option is grayed if not applicable to the selected display.
Remote Address	The internal address of the selected display (BARCO displays only). Each display connected to the same computer must have a different address. The addresses must be set with the display's internal controls.
Remote Timeout	The time after which the display interrupts communication with the computer should the computer not respond anymore (e.g., is "crashed"). Applicable to BARCO displays only.

Imaging board properties



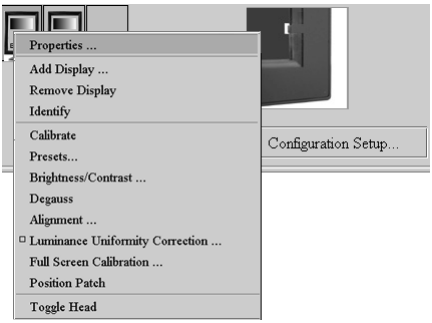
Select the **Imaging board** tab in the display device properties dialog.

Type	The type or brand of the board
Serial number	The imaging board serial number
Resolution	The resolution of the imaging board head
Gamma table	Whether the board contains an editable gamma table or not
Color depth	The gamma table's color depth. This number determines the number of grayscales or colors that can be reproduced
No. of entries	The number of entries in the gamma table
Firmware version	The on-board firmware version
Driver version	The driver version controlling the board

Controlling Contrast & Brightness

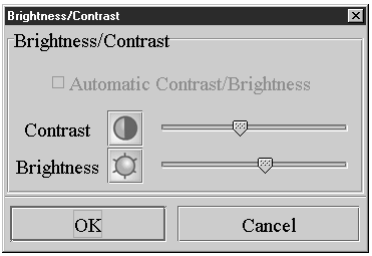
This function is available for BARCO CRT displays only.

In the Configuration section in the main window, right-click on the icon of the display you wish to control contrast or brightness of.



From the drop-down menu that appears, select **Brightness/Contrast...**

The Brightness/Contrast control panel appears.



Automatic Contrast / Brightness

If checked, this function uses the **Ambient Light Compensation** option to control Contrast and Brightness automatically.

In that case, the Contrast and Brightness will be set depending on the ambient light around the display.

This function is grayed if the **Ambient Light Compensation** option is not installed in the display.

Contrast & Brightness sliders

If Automatic Contrast / Brightness is not checked, you can control Contrast & Brightness manually by moving the sliders.

Brightness control affects all the luminance levels of the image, from the dark background to the peak white parts of the image.

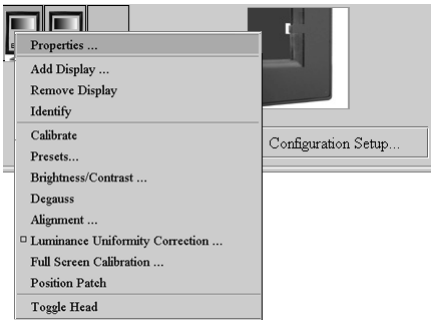
Contrast control does not change the background and darkest parts. It changes the difference in luminance between the background and the lighter parts of the image.

Clicking on the Contrast (Brightness) icon left of the sliders, puts the Contrast (Brightness) control in calibrated position. This is the preferred position.

Luminance Uniformity Correction on/off

This function is available for BARCO displays only.

In the Configuration section in the main window, right-click on the icon of the display of which you wish to switch LUC on or off.



From the drop-down menu that appears, select **Luminance Uniformity Correction...**

The Luminance Uniformity Correction system, if calibrated by means of "Full Screen Calibration" (see below), ensures a uniform luminance, even in the corners of the picture tube.

This function is grayed if the function is not available on the display.

Full Screen Calibration

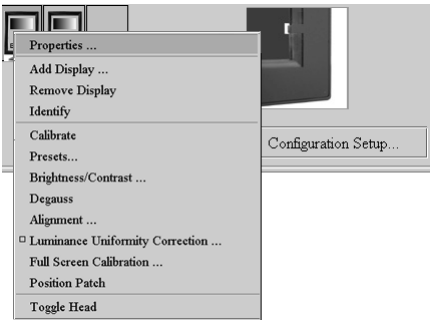
This function starts with a normal calibration in the center of the screen. It proceeds with calibration in a number of zones over the picture tube.

Please refer to § Full screen calibration : " Full screen calibration " for more information.
The function is grayed if not available on the display.

Degaussing displays

This function is available for color BARCO displays only.

In the Configuration section in the main window, right-click on the icon of the display you wish to degauss.

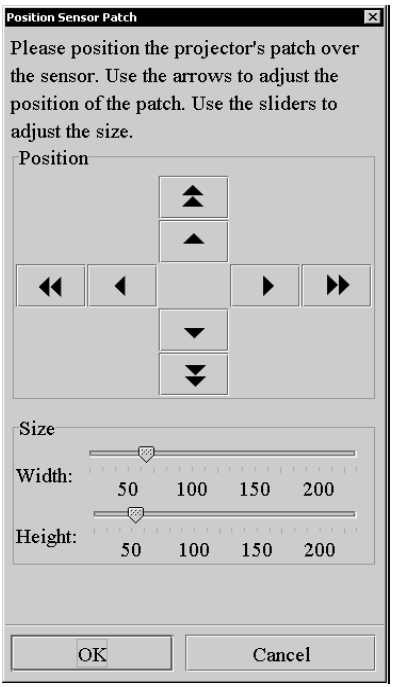


From the drop-down menu that appears, select **Degauss**.

As a result, possible purity errors in the image (so-called hot spots) are removed. The display automatically degausses at switch-on.

Sensor patch position

This function is available only for Dicom Theater applications.



With this dialog box you can adjust the projector sensor patch position and size. Use the arrows to adjust the patch position. Use the sliders to adjust the size of the patch.

When done, click **OK**.

3.14 Changing the program's appearance

It is possible to change the appearance of MediCal Pro somehow. The change in appearance affects the size of characters and icons used in the program.

Changing the appearance might be necessary to improve the legibility when the displays are switched to a different resolution.

To change the appearance:

1 From the View menu, select **Select Style**.

2 Select the desired style, from "Smallest" to "Extra Large".

The change in appearance is activated after restarting MediCal Pro.

3.15 Getting help

Context-sensitive help

MediCal Pro contains context-sensitive help. To get help about a particular view or window, press **F1** on the computer keyboard. As a result, the online help pages will open at the desired help page.

Help menu

The Help menu contains the following items:

Help:

Open the online help pages

Send Feedback:After selecting this option, you can enter your e-mail address and mail server name, if you have not entered them before. MediCal Pro now creates the file MedicalLogs.zip in the application directory and attaches it to the e-mail.

If the automatic e-mail creation fails, please try sending the MedicalLogs.zip file, together with a detailed problem description, to mis.support@barco.com , using your standard mail application.

Note: If you don't know the exact data to fill out the Send Feedback dialog, you can always look for the MedicalLogs.zip file in the MediCal application directory, and just mail them to mis.support@barco.com without using the Send Feedback function.

About:
Displays the details of this version of MediCal Pro.

4

GLOSSARY

4 Glossary

4.1 Q/A check

In softcopy diagnostic systems, displays are used to judge medical images and to take conclusions about patients' physical condition.

It is obvious that the image quality is of the utmost importance. Therefore it is necessary to check the quality of the system, and especially the displays' image quality, on a regular basis.

A Q/A check tests the image quality of all the displays on a medical viewing station. It consists of a number of Q/A tasks.

Some Q/A tasks have target values and tolerances that can be set to generate a warning or an error. For other tasks, the user must judge if the result is OK or not.

When an error occurs, measures must be taken immediately to restore the image quality.

In the intervention-free concept of MediCal, tasks can be scheduled to start automatically, running in background. Some of the tasks do not require any user interaction at all. The tasks are executed and the results are immediately sent to MediCal Administrator, if installed.

4.2 Conformance (conformity)

When the system is installed, a Preset is defined for each display in the viewing station. This Preset is the reference for the display's visual behavior. When the display image quality is good, the display is *conform* to the defined Preset.

4.3 Consistency

Due to aging and other external conditions, the display image quality is not constant. If the change in image quality is still within the tolerances defined in the task properties, the display is still *consistent*.

4.4 Calibration

In many cases, calibration is the remedy for a display that is no longer conform to its Preset.

The calibration routine restores the black luminance, the white luminance and the display function.

4.5 Viewing station

The medical viewing station consists of a computer, a number of imaging boards (containing one or more heads), an optical sensor and one or more displays. They are all connected physically, by means of cables and connectors.

4.6 Configuration

The configuration in MediCal Pro is the software representation of the viewing station's hardware components.

A complete configuration contains the following information:

- The number of imaging board heads inside the computer
- The imaging board properties
- The number of displays connected to the heads
- The properties of connected displays
- Whether or not a sensor is connected or built-in
- The properties of the sensor, if present

4.7 Display Function

A Display Function describes how a display device converts the voltages at the inputs into light.

In the context of a medical viewing station, a *display device* is the combination of imaging board and display.

The display function is a graph that shows how the light from the picture tube evolves from minimum to maximum luminance while the data levels at the input of the imaging board go from 0 to maximum.

4.8 Gamma

The Gamma function is a kind of display function, characterizing an apparatus that converts voltages into light or ink or vice versa.

Displays, printers, scanners, ... all have their own, unique Gamma function.

In a display, this function is exponential. The Gamma value is the exponent that determines the shape of the function.

4.9 Imaging board head

An imaging board or graphics board converts the digital data from the computer into analog video voltages.

Most of the common imaging boards contain just one set of video and sync outputs. However, some high-end boards, like some of the BarcoMed boards, contain *two* sets of video and sync outputs.

This is called a *dual head* imaging board. It is like two complete imaging boards implemented on one single unit.

A dual head board in the computer behaves exactly as if two separate boards were installed.

4.10 DICOM

DICOM stands for **Digital Imaging and Communications in Medicine**. It is a standard developed by the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA).

The standard specifies how digital image data can be moved from system to system.

In addition, Supplement 28 Part 14 specifies a function that relates pixel values to displayed Luminance levels and is called Grayscale Display Function Standard.

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