

DoseAware

Base Station Package

Instructions for Use



PHILIPS

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1 Introduction

1.1 Intended Use of the DoseAware System

The DoseAware System is an electronic X-ray dose monitoring system. The intended use is to improve the awareness of people, who work with or are in the presence of X-Ray imaging equipment, about their occupational dose (also known as staff dose).

The awareness focuses on:

- a graphical visualization of the real-time staff dose rate while working with X-Ray equipment in examination rooms during medical procedures;
- instant access to historical staff dose for reporting and analysis purposes.

The benefits of the DoseAware System are to:

- make people aware of their received staff dose during clinical work with X-ray imaging equipment;
- instantly visualize the result of reducing measures of occupational dose by, for example, changing a person's position in the examination room.

The DoseAware System may not be used as a legal staff dose recording solution. The DoseAware System is not intended for patient use.

NOTE: Do not expose the PDMs in direct X-ray beam. They are designed to be exposed to scattered radiation only.

NOTE: The Dose Manager, DoseView, Cradle and PDM Rack are not intended to be used inside examination rooms.

NOTE: The DoseAware product is not a replacement for a TLD (ThermoLuminescent Dosimeter) or similar product.

The components of the Base Station Package are intended to be used in combination with a number of PDMs. In this configuration, the Base Station Package is designed as a monitoring aid for hospital staff.

1.2 About the DoseAware System

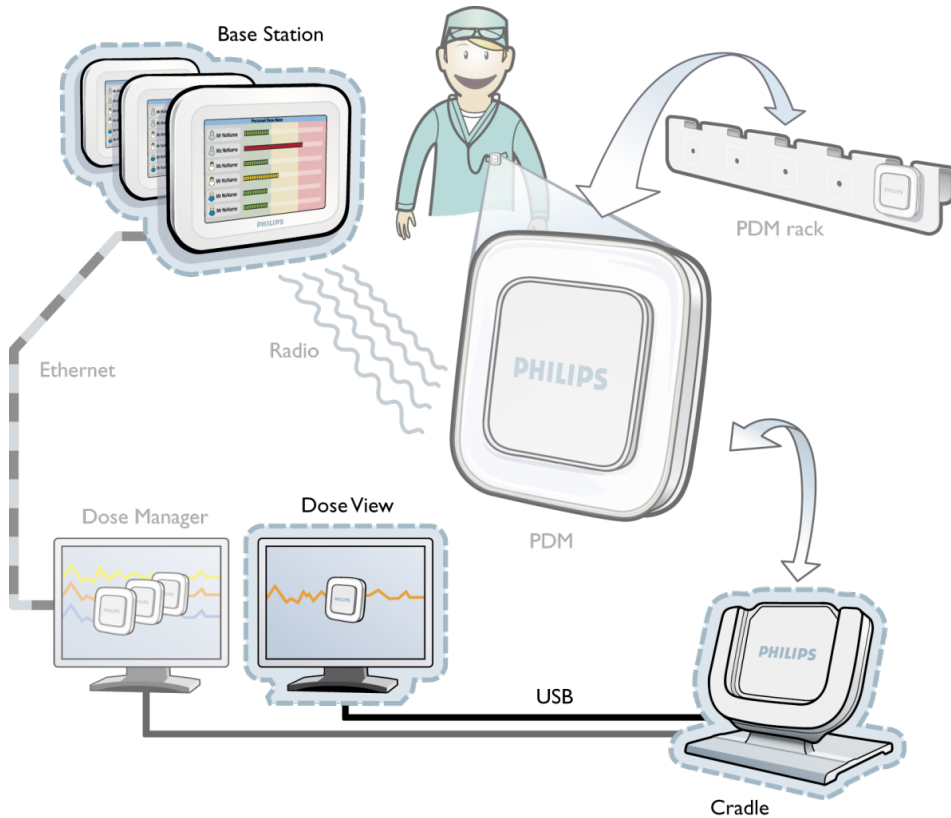


Figure 1 DoseAware System overview with Base Station Package components highlighted

The DoseAware System consists of:

- Personal Dose Meter (PDM)
- Base Stations (display unit)
- DoseView (computer software)
- Dose Manager (computer software)
- Cradle (dock station used to connect PDMs and computer)
- PDM Rack (PDM storage)

The components of the system are delivered in two main configurations and as separate PDMs:

- Base Station Package, which consists of:
 - Base Station, power adaptor, MCS bracket and wall mount kit
 - DoseView (CD)
 - User manual (CD)
 - Cradle, USB cable

- Dose Manager Package (optional), which consists of:
 - Dose Manager licensed software (CD)
 - User Manual (CD)
 - Cradle, USB cable
- PDMs in packages of one, three or ten units
- PDM Rack, optional

1.3 About this User Manual

This user manual describes the Base Station Package. In order to get an immediate hands-on experience of the Base Station Package, we recommended that you interact with the Base Station, DoseView and Cradle in parallel to reading this user manual.

1.4 Other User Manuals

- Dose Manager is described in a separate user manual, which can be found on the CD delivered in the box together with the Dose Manager package.
- The PDMs are described in the PDM Quick Guide, a leaflet that is delivered in the box together with the PDM.

1.5 System Requirements

DoseView has the following system requirements:

- Operating systems: Windows Vista or Windows XP
- .NET 3.0
- At least one USB port available
- At least 1 GB of system memory available
- At least 40 GB hard drive with at least 15 GB of memory available
- Recommended screen resolution at least 1024 x 768

2 Base Station Package Installation

The Base Station Package is installed and configured by a Philips service engineer and a local application specialist as part of delivery and hand-over. During its use or due to changes in the place of installation, modification to the Base Station Package or its configuration may be necessary. A trained Philips service engineer will carry this out.

NOTE: Installation of third-party software in the Base Station is prohibited. Installation of such software may cause the Base Station to malfunction.

3 Use the Base Station

3.1 Introduction

The Base Station is the display unit for the DoseAware System. It communicates wireless with PDMs within radio range in order to collect, present and store PDM dose data.



3.2 Getting Started

3.2.1 Wall Mounted Base Station

1. Connect the output connector of the AC-DC adaptor to the back of the Base Station, if needed.
2. Connect the input connector to an AC electrical outlet socket. This will switch on the Base Station. A Philips start up screen will be displayed for a few seconds. The Online View will be displayed and within 30 seconds a maximum of 8 PDMs (at a time) within range of the Base Station will appear.

NOTE: The Base Station screen is a touch screen. Operate the Base Station by tapping buttons and graphs on the screen.

WARNING: Do not cover the Base Station to prevent excessive temperatures.

WARNING: Be careful when moving other equipment in the vicinity of the Base Station.

3.2.2 MCS Mounted Base Station

1. Switch on the X-ray system and the Base Station will automatically switch on. A Philips start up screen will be displayed for a few seconds. The Online View will be displayed and within 30 seconds a maximum of 8 PDMs (at a time) within range of the Base Station will appear.

NOTE: The Base Station screen is a touch screen. Operate the Base Station by tapping buttons and graphs on the screen.

2. Position the Base Station similar to the other monitors in the MCS as much as possible.

WARNING: Do not cover the Base Station to prevent excessive temperatures.

WARNING: Be careful when moving the MCS or other equipment because the Base Station may stick out and can be hit.

3.2.3 Troubleshooting

If a PDM does not appear in the Online View, use DoseView or Dose Manager to check that the PDM's:

- battery Status is OK (see chapter 4.4.4).
- power Mode is set to 'On' (see chapter 4.4.4).
- Base Station Mode is set to 'Show' (see chapter 4.4.4).

3.3 Base Station Features

The Base Station offers:

- An Online View (see chapter 3.3.1) where you can:
 - view current Personal Dose Rate information for several PDMs at a time.
 - access the Walk-Up View by tapping the Displayed Name tag button of that PDM in the Online View.
- A Walk-Up View (see chapter 3.3.2) where you can view historical dose data for a PDM chosen from the OnLine View.
- A Base Station Settings View (see chapter 3.3.3) for administrator settings.

See chapter 9 for technical details about how the Base Station displays dose data. In addition, the Base Station:

- Serves as an interim storage for the PDMs' dose data to be further analyzed in the Dose Manager application.
- Is provided with a USB port for dose data download to USB memory (see the Dose Manager Package user manual).

NOTE: When the Base Station memory is full, the oldest data will be overwritten with newer data. For storage capacity examples, see chapter 9.3.

3.3.1 Online View – View Current Dose Rates

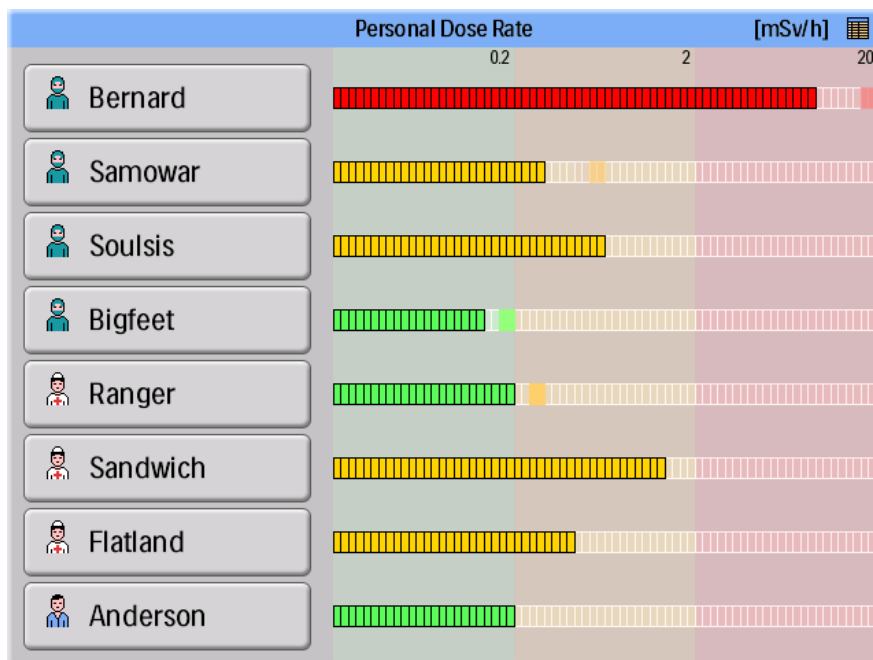


Figure 2 The Online View

The Online View displays the current personal dose rates and peak dose rate indicators, for up to 8 PDMs within range of the Base Station.

The icon in the upper right corner gives you access to the Base Station settings view (see chapter 3.3.3).

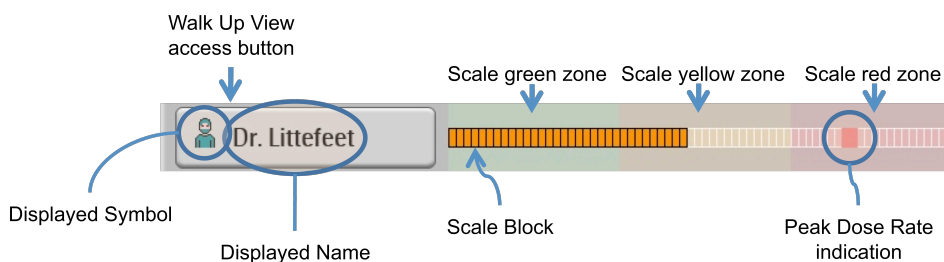


Figure 3 The Online View elements

The Displayed Name button identifies the PDMs. By tapping the Displayed Name button of a PDM, you will enter the Walk-Up View of that PDM.

The dose rate scale is divided in three zones:

- Green zone indicates good working habits. Proper actions have been taken to avoid exposure for unnecessary radiation.
- Yellow zone indicates higher doses, which can be acceptable for shorter periods of time, for example if you need to stand closer to the patient during a procedure. If you are exposed to radiation in the yellow zone frequently, you need to take actions to minimize the dose exposure.

- Red zone dose indications should not occur during normal procedures. If you are exposed to radiation in the red zone, you need to take actions to minimize the dose exposure.

When a PDM moves out of range of the Base Station, its button will remain visible in the Online View for two minutes. The button will then remain grayed out for another eight minutes before it disappears. This feature allows people to temporarily leave the room without losing their position in the list. When a button is grayed out, it is not possible to access the Walk-Up View.

If no PDM has been within range of the Base Station for 30 minutes, the Online View will enter screen saver mode. In screen saver mode the Base Station displays a black screen. The Base Station screen starts up when a PDM connects to the Base Station or when the user taps the screen.

3.3.2 Walk-Up View – View Detailed Dose Data

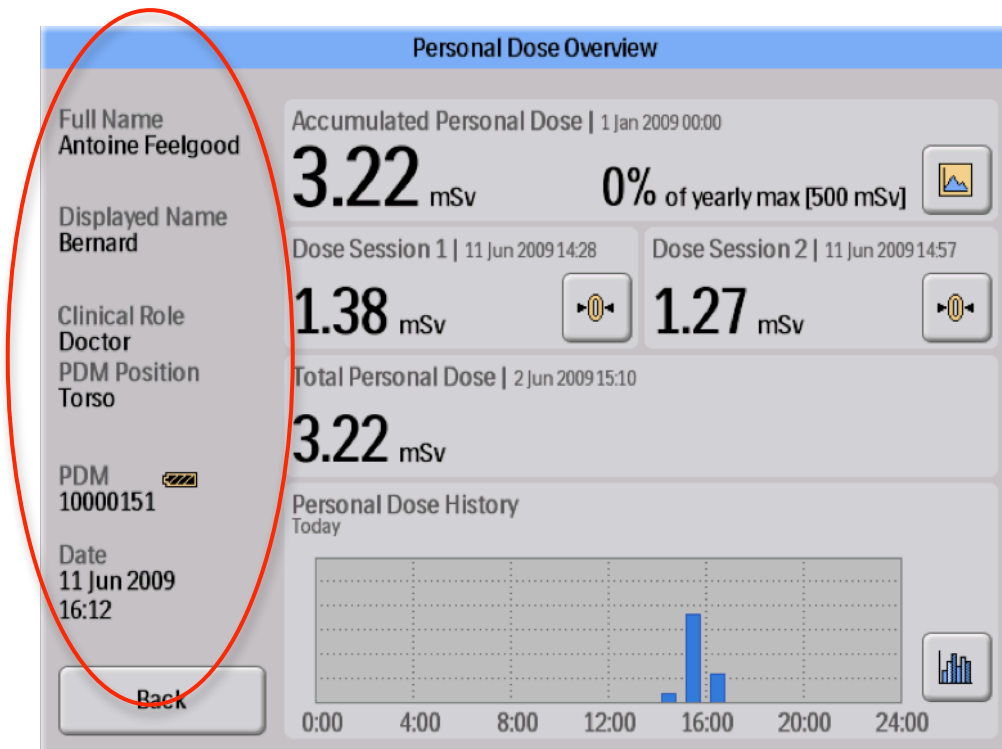


Figure 4 Personal Dose Meter Information panel

Enter the Walk-Up View of a PDM by tapping the Displayed Name button of that PDM in the Online View. On the left hand side of the Walk-Up View a Personal Dose Meter Info panel is displayed (see Figure 4). It displays:

- **Full Name**
- **Displayed Name** - the name that is displayed in the Base Station Online View
- **Clinical Role** - Doctor, Nurse, Technician or Other
- **PDM Position** - Head, Torso, Hand, Belly, Leg or Other
- **PDM ID** - a unique ID per PDM
- **Battery status**
 - 2-4 blocks indicate normal use.
 - 1 block indicates that you need to change the battery.
- **The PDM's date and time**

The Walk-Up View also consists of the Personal Dose Overview (see chapter 3.3.2.1), which is the default Walk-Up view. It has two sub views:

- the Annual Personal Dose view (see chapter 3.3.2.2)
- the Personal Dose History view (see chapter 3.3.2.3)

3.3.2.1 Personal Dose Overview

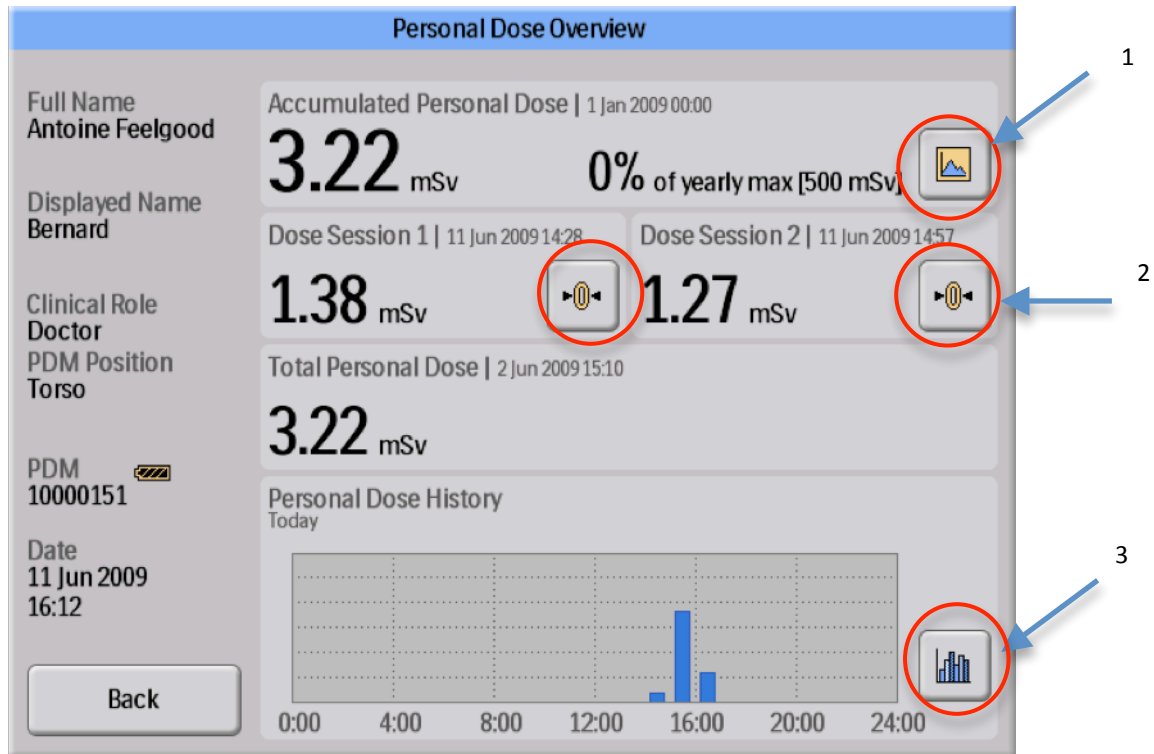


Figure 5 The Personal Dose Overview view

When you enter the Walk-Up View you will see the following information (see Figure 5):

- The Accumulated Personal Dose since January 1st of the current year, or since last reset. This value is also shown as a percentage of the yearly max dose.
- Access to the Annual Personal Dose sub view (1), see chapter 3.3.2.2.
- Dose Session 1 and 2 values. Use the Dose Sessions to measure dose for specific time spans, for example a specific procedure or a working day. The value shows the accumulated dose for a session since last Dose Session reset, measured in Sv. Use the reset buttons (2) to reset a Dose Session to zero. Information about dose session reset will appear as an event in Dose Manager.
- Total Personal Dose since the last Dose History reset.
- The current day's Personal Dose History graph. You can also access the Personal Dose History sub view (3), see chapter 3.3.2.3.

3.3.2.2 Annual Personal Dose

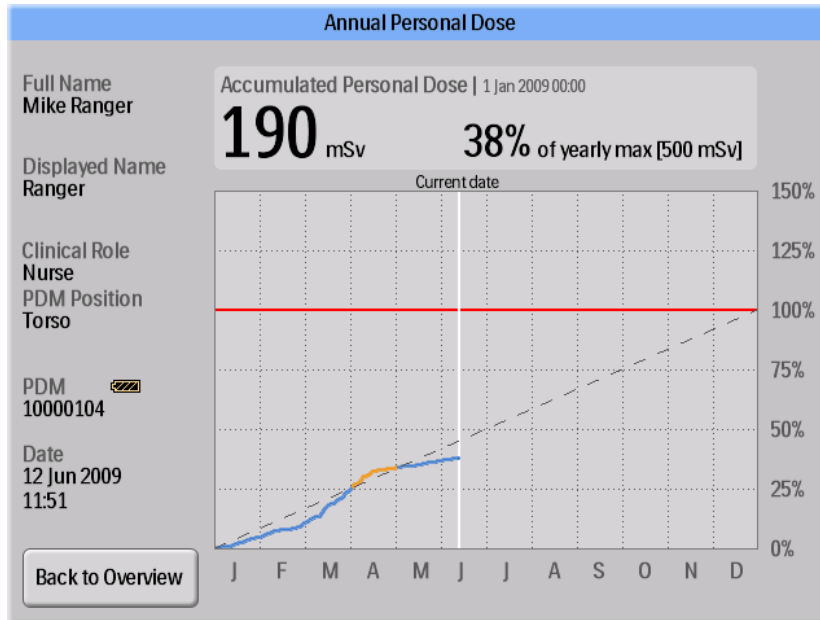


Figure 6 The Annual Personal Dose view

In this screen you can find the following information:

- Today's date (white line).
- Annual dose limit (red line). Set this value in DoseView or Dose Manager.
- The annual dose limit distributed over the full year (dashed line). As long as the accumulated dose stays below this value, the annual dose limit will not be exceeded for the full year.
- Accumulated dose in relation to the annual dose limit for the current year (blue/orange line). When the accumulated dose exceeds the distributed annual dose limit, the color will change from blue to orange in order to alert the user to take actions.

3.3.2.3 Personal Dose History

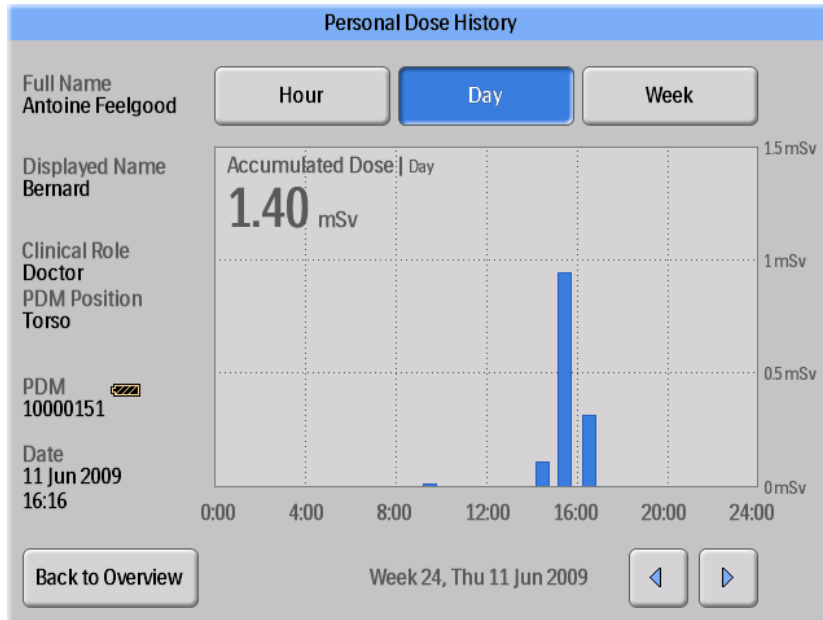


Figure 7 The Personal Dose History view, with Day selected

In this view, you can view Hour, Day and Week overviews by tapping the respective buttons on top of the screen.

The view lets you:

- For the Hour time span:
view a Dose Rate graph spanning ½ hours. Each data point in the graph represents the maximum dose rate during the surrounding 15 seconds.
- For the Day/Week time spans:
view accumulated dose value bars. Each bar represents the accumulated dose during one/four hours, respectively.
Within the Day and Week time spans, tapping a dose bar in the diagram will zoom into the larger underlying time scale (that is Week -> Day and Day -> Hour).

Within each time span (Hour/Day/Week) you can step forward and backward in time with the arrow buttons on the bottom of the screen. By pressing and holding the arrow buttons you will scroll along the time axis within the chosen zoom level.

- in the upper left corner of the chart, view the value of the Accumulated Dose during the chosen time span

3.3.3 Base Station Settings View

The Base Station Settings View is where administrators configure the Base Station. Follow the instructions below to enter the Base Station Settings View:

1. Tap the settings menu symbol in the upper right corner of the Online View.
2. Enter configuration values by tapping the buttons in the respective menus.

In the lower part of Base Station Settings, the Base Station ID/serial number and the software version is displayed. This information can be used as assistance for support issues.

3.3.3.1 User Settings Menu

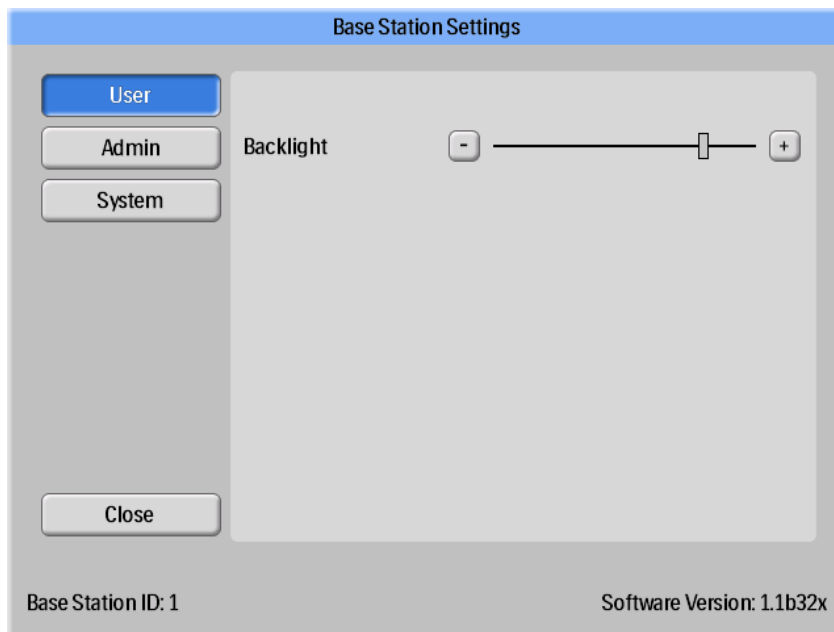


Figure 8 The User Settings menu

The User Settings menu consists of one screen.

Adjust the backlight level of the screen by moving the bar horizontally. This change will take effect immediately.

3.3.3.2 Admin Settings Menu

The screenshot shows a software interface titled "Base Station Settings". On the left side, there is a vertical menu with three buttons: "User", "Admin" (which is highlighted in blue), and "System". Below these buttons is a "Close" button. The main area of the screen contains two labels: "Base Station Name" and "Base Station Location". To the right of "Base Station Name" is a text input field containing the text "My BS". To the right of "Base Station Location" is a text input field containing the text "Mydesk". In the bottom right corner of the main area, there is a small blue arrow button pointing to the right. At the very bottom of the screen, there are two pieces of information: "Base Station ID: 1" on the left and "Software Version: 1.1b32x" on the right.

Figure 9 The Base Station Name and Base Station Location menu.

The Admin Settings menu consists of four screens. Access these screens by tapping the arrow buttons in the lower right corner of each screen.

Base Station Name and Base Station Location Menu

Enter name and location of the Base Station (see Figure 9). This information is used to identify the Base Station so that it can be detected in Dose Manager.

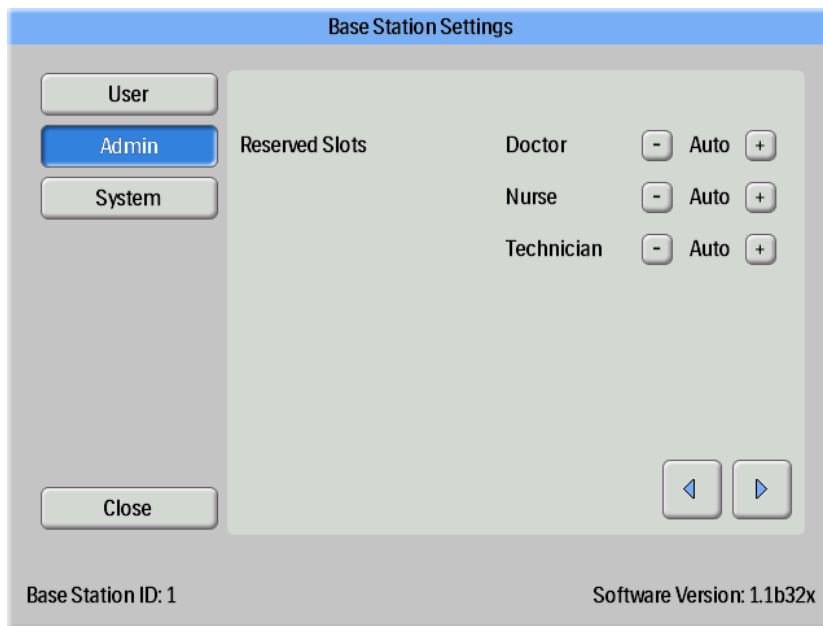


Figure 10 The Reserved Slots menu.

Reserved Slots Menu

This is an optional setting, which you can use to reserve a number of slots in the Online View for the clinical roles Doctor, Nurse and Technician (see Figure 10).

If you, for example, have reserved three slots for Doctors but the Base Station detects only one, there will be two empty slots before the first Nurse appears.

If you want to reserve slots for Nurses, you also have to reserve slots for Doctors. If you want to reserve slots for Technicians, you also have to reserve slots for Doctors and Nurses.

The default behavior “Auto” is first-come, first-served, which means that PDMs will appear on the screen in the order the Base Station detects them, sorted after their clinical role.

The image shows a 'Base Station Settings' dialog box. On the left, there are three tabs: 'User', 'Admin' (which is selected and highlighted in blue), and 'System'. Below these tabs is a 'Close' button. The main area of the dialog contains the following settings:

- 'Use DHCP' with an unchecked checkbox.
- 'IP Address' with a text field containing '172.28.20.65'.
- 'Subnet Mask' with a text field containing '255.255.255.0'.
- 'Default Gateway' with a text field containing '0.0.0.0'.
- 'Host Name' with a text field containing 'BS1'.

At the bottom of the settings area, there is a message 'Changing information requires restart' followed by two arrow buttons (left and right). At the very bottom of the dialog, it says 'Base Station ID: 1' on the left and 'Software Version: 1.1b32x' on the right.

Figure 11 The Network setup menu.

Network Setup Menu

Configure the network connection between the Base Station and the Dose Manager (see Figure 11). If you change this information, the Base Station requires a restart.

NOTE: Network setup is only applicable if you are using Dose Manager.

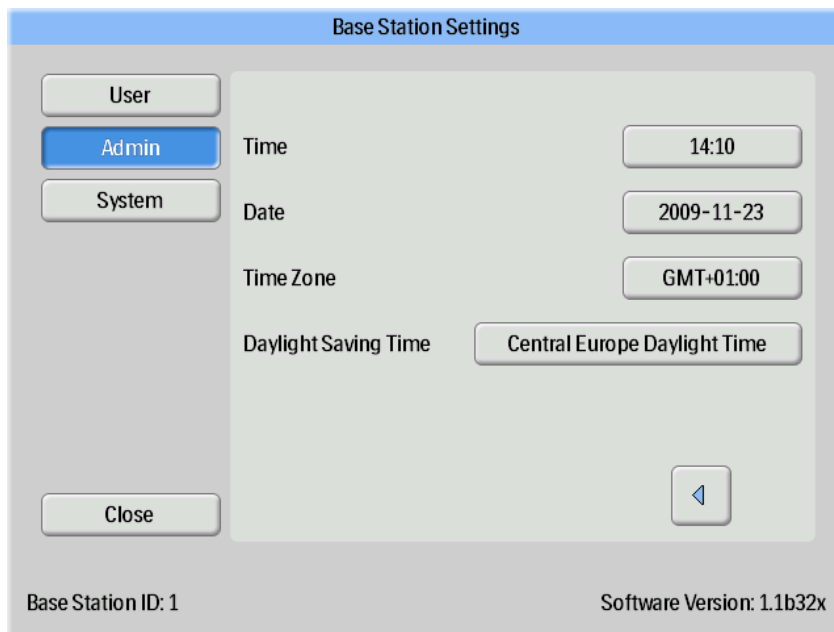


Figure 12 The Time and Date menu.

Time and Date Menu

Set time, date, time zone and manage daylight saving time for the Base Station (see Figure 12).

For daylight saving time, you can select to manage it manually or by selecting a daylight settings region for your time zone. The possible regions available for daylight saving time are different depending on your current time zone.

If you choose to manage daylight saving time manually, you can choose to set it to wintertime (+0 hours) or summer time (+1 hours). If a region is selected, the change between winter/summer time will be done automatically.

3.4 Shut Down the Base Station

For a wall mounted Base Station:

1. Unplug the AC-DC adaptor.

For an MCS mounted Base Station:

2. Switch off the X-ray system and the Base Station will be switched off.

4 Use DoseView

4.1 Introduction to DoseView

The DoseView application lets you, for one PDM at a time:

- view the PDM's dose history
- change the PDM options, for example full name and displayed name

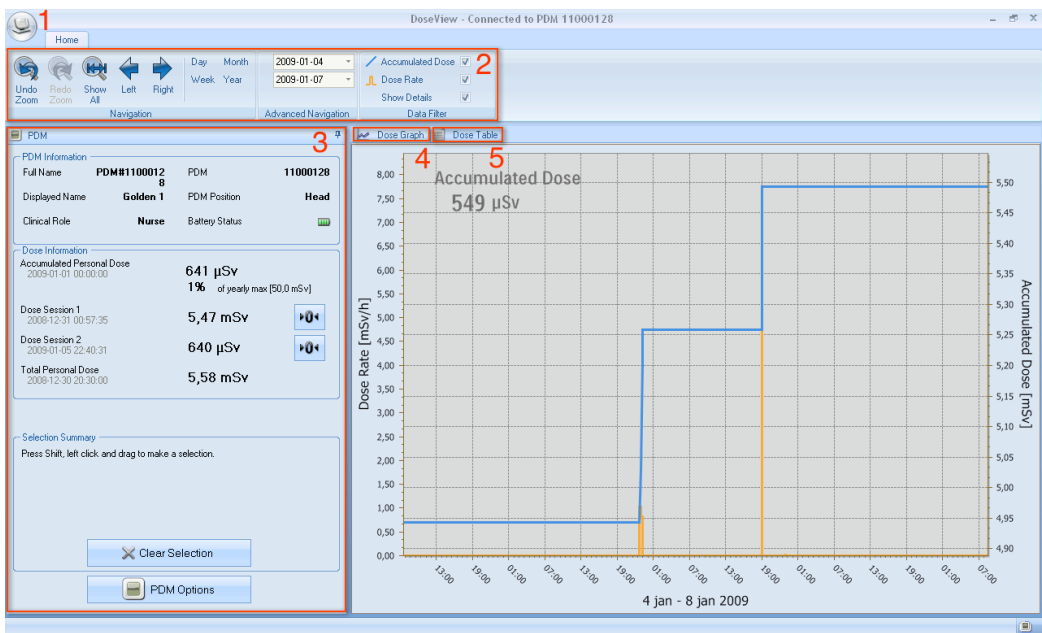


Figure 13 DoseView overview

The following items are available when you start DoseView:

Item	Description
1 Application menu	Access the DoseView options dialog, see chapter 4.7.
2 Home toolbar	Access tools to navigate in dose graphs and dose tables, see chapter 4.3.
3 PDM panel	Show and manage options for a PDM that is placed in a Cradle. You can only access and change PDM options when the PDM is in a Cradle, see chapter 4.4.
4 Dose graph	View the dose history as a graph, see chapter 4.5.
5 Dose table	View the dose history as a table, see chapter 4.6.

4.2 Getting Started with DoseView

NOTE: Do not connect the Cradle to the computer unless DoseView and the Cradle driver are installed on the computer.

Follow the steps below to get started with DoseView:

1. Start the DoseView application.
2. Connect a Cradle to your computer's USB port.
3. Put a PDM in the Cradle. Within a few seconds, DoseView will detect the PDM. This is indicated at the top of the DoseView window by a note "Connected to PDM 100001158", where PDM 100001158 is an example of a PDM ID. DoseView will start loading the PDM dose history. This may take up to a few minutes. You can follow the progress on the progress bar at the bottom of the DoseView window.

4.2.1 Troubleshooting

If the PDM does not appear:

- Check that the PDM is correctly fitted into the Cradle.

If the Cradle is not detected:

- Check the USB connection between the Cradle and the computer.
- Install the Cradle driver manually. All the driver files are located on the installation CD in the folder "CradleDriver". These files are also copied to the application installation folder when DoseView is installed. When Windows detect a connected Cradle and the dialog about driver installation is displayed, select to use the driver files located on the CD or in the application installation folder.

If you have forgotten your password:

- Contact your local administrator, who will have to re-install the software.

4.3 Home Toolbar Overview



Figure 14 Home toolbar

The home toolbar is where you find tools to navigate in dose graphs and dose tables. The following items are available in the home toolbar:

Function	Description
Navigation group	Access tools for dose history navigation.
Undo zoom button	Move one step back in a sequence of zoom actions, showing the last selected time range.
Redo zoom button	Move one step forward in a sequence of zoom actions, showing the time range that was selected before the last undo zoom action.
Show all button	Show all available data for the selected PDM. The time range will start the first date any PDM begun to measure dose and stop the last date any PDM was synchronized.
Left button	Shift the time range one step backward. If you have selected year/month/week/day, the time range will move one year/month/week/day backward. If you have selected another time range, the time range will move approximately 10% backward.
Right button	Shift the time range one step forward. If you have selected year/month/week/day, the time range will move one year/month/week/day forward. If you have selected another time range, the time range will move approximately 10% forward.
Day button	View dose history for the current day.
Week button	View dose history for the current week.
Month button	View dose history for the current month.
Year button	View dose history for the current year.
Advanced navigation group	
Start time button	The viewed time range start day.
End time button	The viewed time range end day.
Data filter group	Select which information to be visible in the graph.
Accumulated dose check box	Show/hide the accumulated dose in the graph.
Dose rate check box	Show/hide the dose rate in the dose graph.
Show details check box	Checked: The graphs will display dose rate samples for every second, where such data is available. Unchecked: the graphs will display mean dose rate values per hour.

4.4 PDM Panel

The screenshot shows a software window titled 'PDM'. It contains three main sections:

- PDM Information:** A table with fields for Full Name (PDM#11000128), Displayed Name (Golden 1), Clinical Role (Nurse), PDM (11000128), PDM Position (Head), and Battery Status (indicated by a green bar icon).
- Dose Information:** A table showing dose sessions and totals.

Session	Dose	Actions
Accumulated Personal Dose 2008-01-01 00:00:00	641 μ Sv 1% of yearly max [50.0 mSv]	
Dose Session 1 2008-12-31 00:57:35	5,47 mSv	[Reset]
Dose Session 2 2009-01-05 22:40:31	640 μ Sv	[Reset]
Total Personal Dose 2008-12-30 20:30:00	5,58 mSv	
- Selection Summary:** A section with instructions 'Press Shift, left click and drag to make a selection.' and two buttons: 'Clear Selection' and 'PDM Options'.

Figure 15 PDM Panel

4.4.1 PDM Information

The following information is visible when a PDM is placed in the Cradle:

Item	Description
Full name	Full name of the person using the PDM.
Displayed name	The name that is displayed in the Base Station Online View.
Clinical role	One of Doctor, Nurse, Technician or Other.
PDM ID	A unique PDM serial number.
PDM position	One of Head, Torso, Hand, Belly, Leg or Other.
Battery status	The PDM's battery status: <ul style="list-style-type: none"> Green: normal use. Yellow: normal use. Red: the PDM need to be replaced in 4-6 months. Crossed battery: there is no battery left. The PDM does not measure radiation and will not communicate with Base Stations.

4.4.2 Dose Information

Accumulated personal dose	The PDM's total dose measured this year or since last reset, measured in Sv.
Percentage of annual dose	The PDM's accumulated annual dose measured this year or since last manual reset, measured in Sv.
Dose Session 1 and 2	Trip meter for dose values. The accumulated dose for a session since last Dose Session reset, measured in Sv. You can also reset these values. NOTE: Dose session reset done in DoseView will not appear as an event in Dose Manager.
Total personal dose	The total dose exposure for a PDM since last dose history reset.

4.4.3 Selection Summary

View a summary of the dose data selection you might have done either in the dose table or in the dose graph (see chapters 4.5 and 4.6). You can also clear the contents of the selection summary field by tapping clear selection.

4.4.4 Change PDM Options

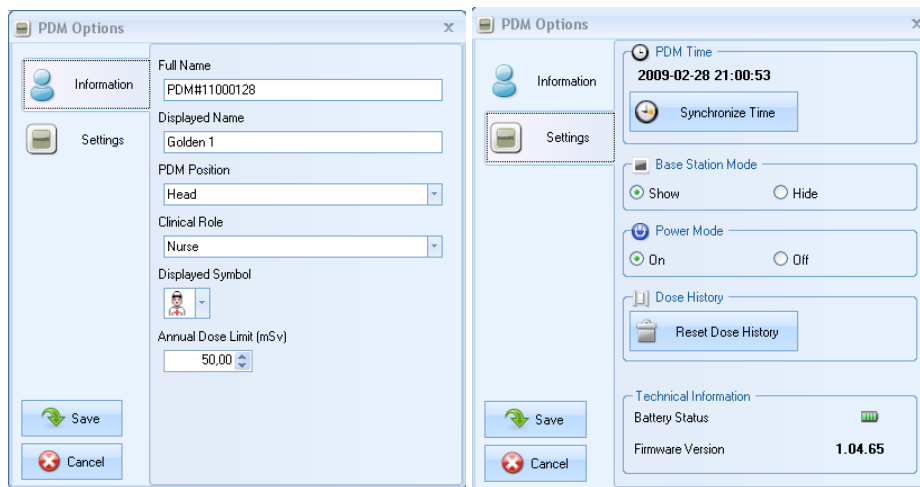


Figure 16 PDM Options dialog box

Follow the instructions below to change PDM options:

1. Make sure that a Cradle is connected to your computer's USB slot.
2. Insert a PDM in the Cradle. The computer will detect the PDM automatically and the PDM information will appear in DoseView.
3. Access the PDM options dialog by clicking the PDM options (see Figure 16). The PDM options dialog consists of two tabs, see below.
NOTE: If a password has been set (see chapter 4.7), access to the PDM options dialog box will be password protected.

In the Info tab you can:

- Edit PDM information (full name, displayed name, PDM position, clinical role, and annual dose limit value, see chapter 3.3.2) and select a displayed symbol,

which is displayed in the Base Station interface.

The displayed name is used to identify a PDM in the Base Station. The name is limited to 16 characters. However, in the Base Station's online view, the displayed name may be truncated.

NOTE: The dose measurement for a PDM depends on factors such as where on the body the PDM is positioned and if x-ray protection devices (for example a lead apron) that shield the PDM measurements are used. These factors need to be considered for the annual dose limit.

In the Settings tab you can:

- View and synchronize the PDM's clock with the computer's clock.
WARNING: Make sure that the computer's clock is correct, otherwise the dose history data will be shifted in time and therefore not accurate anymore.
NOTE: If you need to change hour-portion of time, the dose history will have to be reset. This is done automatically; you just need to confirm the action.
When you synchronize PDM's time the internal clock will be synchronized to the same time as the host PC, including the Windows time zone settings. If you are using multiple PDMs, it is important to synchronize time for the PDMs with the same PC, because they will have the same time reference.

NOTE: If you need to change the time backwards to where there is dose history stored, the dose history will have to be reset. This is done automatically; you just need to confirm the action.
NOTE: The synchronization takes immediate effect and you do not need to press the Save button.
- Set Base Station Mode to Show/Hide, which makes the PDM to be shown/not shown on a Base Station.
- Turn Power Mode On/Off, which puts the PDM in operating or power saving mode. In operating mode, communication with Base Stations will take place and registration of dose data will occur. In power saving mode no communication with Base Stations will take place and no registration of dose data will occur.
- Reset the PDM's Dose History.
NOTE: This will permanently delete the PDM's entire dose data
- View Battery Status and Firmware Version.

4.5 View Dose Graph

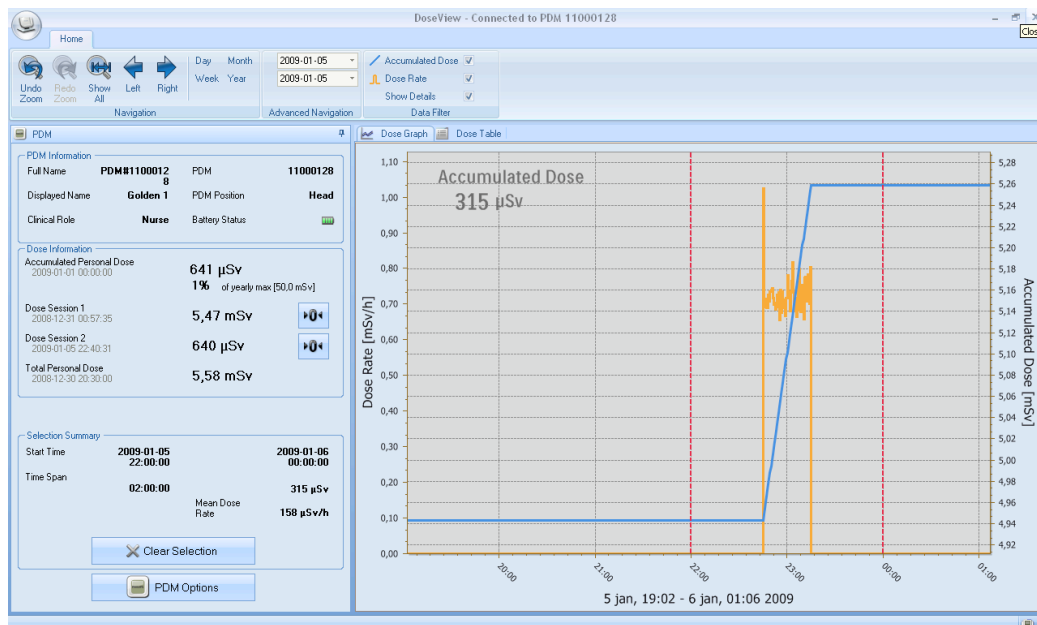


Figure 17 Dose Graph with selection (vertical red dotted lines)

Use the data filter panel in the home menu toolbar to select which information to be visible in the graph:

- Accumulated Dose graph – blue graph
- Dose Rate graph – orange graph, displays dose rate samples for every second, where such data is available
- Show details
Checked: The graphs will display dose rate samples for every second, where such data is available.
Unchecked: the graphs will display mean dose rate values per hour.

The graphs are covering a time span that you choose, either:

- from the Advanced Navigation panel,
- from the Navigation panel,
- or by left-clicking and dragging in the graph (zooming).

You can also select a time span to be summarized in the Selection Summary field of the Personal Dose Meter panel. You do the selection by shift-left-clicking and dragging in the graph. Two red, dotted vertical lines in the graph will indicate the selected time span.

4.6 View Dose Table

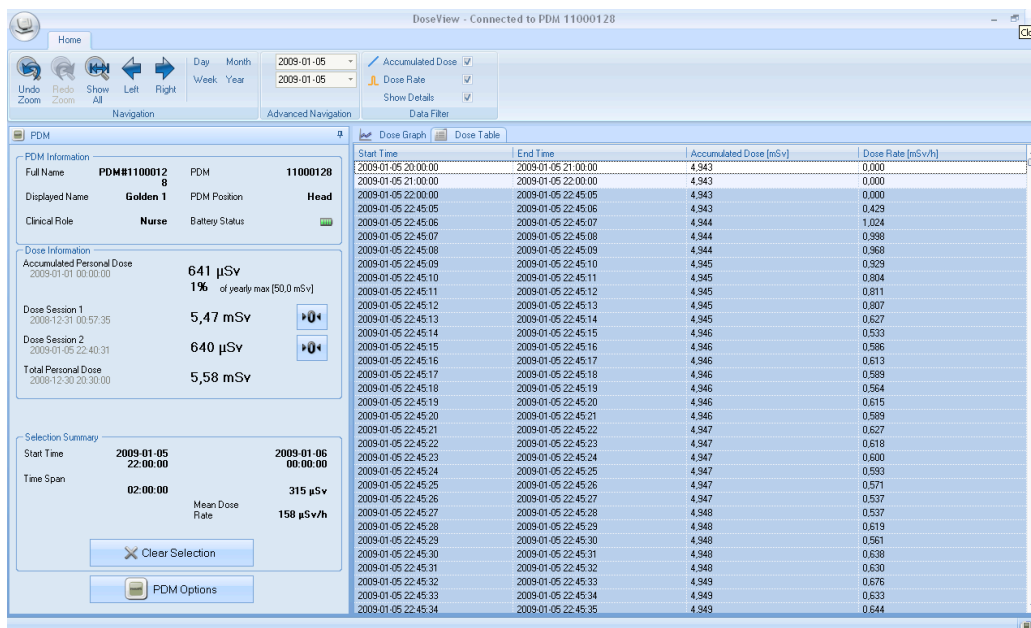


Figure 18 Dose Table with selection

In the Dose Table tab (see Figure 18) you can view a table of

- Accumulated Dose values
- Dose Rate values

The tables are covering a time span that you choose either from the:

- Navigation panel,
- or the Advanced Navigation panel.

You can also select one or several rows to be summarized in the Selection Summary field of the Personal Dose Meter panel.

With the Show details check box checked, the table will list second data, where such data is available.

4.7 Specify Password and Language

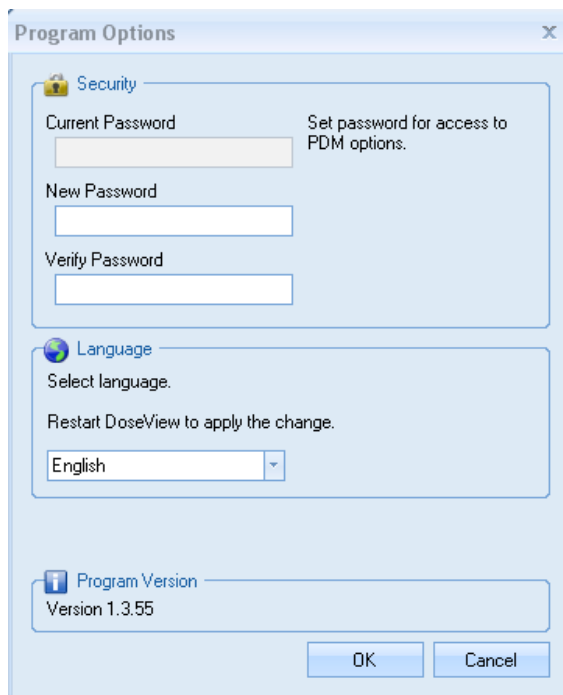


Figure 19 Program Options dialog box

In the Application Menu -> Program Options dialog box (see Figure 19) you can:

- specify a password to protect the access to the PDM options dialog. The password is only used when you are making PDM options changes. Others can still view the PDM data.
NOTE: Contact your local administrator for password guidelines.
NOTE: if you have lost your password, contact your local administrator, who will have to re-install the software.
- change application language.
- view the DoseView program version.

5 PDM

5.1 Introduction

The PDM is an active dose meter designed for maintenance-free usage throughout its lifetime.

You can personalize the PDM's appearance by attaching one of the 8 inlays of different color, which are delivered together with the PDM (see the PDM Quick Guide).

The intended PDM position is outside the lead apron. If it is used under the lead apron the recorded dose will have to be adjusted.



Figure 20 The PDM

5.2 Getting Started

Follow the instructions below to start using your PDM:

1. Make sure that the PDM's power mode is set to "on", see chapter 4.4.4.
2. Attach the PDM on your clothes, using the metallic clip, which is located on the back of the PDM. The PDM now records dose values and transmits them to Base Stations within range. You can also read out the recorded dose values by using DoseView via the Cradle (see chapter 4.2).

See chapter 9 to learn more about PDM memory and data transfer between PDM and Base Stations.

6 Cradle

6.1 Introduction

The Cradle is a dock station that lets you connect a PDM to a computer for data read out as well as PDM Options writing into the PDM. Use the Cradle in combination with the DoseView and/or Dose Manager applications.



Figure 21 The Cradle

6.2 Getting Started

NOTE: Do not connect the Cradle to the computer unless DoseView and the Cradle driver are installed on the computer.

1. Start the DoseView application.
2. Connect a Cradle to your computer's USB port.
3. Put a PDM in the Cradle. Within a few seconds, DoseView will detect the PDM. This is indicated at the top of the DoseView window by a note "Connected to PDM 100001158", where PDM 100001158 is an example of a PDM ID. DoseView will start loading the PDM dose history. This may take up to a few minutes. You can follow the progress on the progress bar at the bottom of the DoseView window.

6.3 Troubleshooting

If the PDM does not appear:

- Check that the PDM is correctly fitted into the Cradle.

If the Cradle is not detected:

- Check the USB connection between the Cradle and the computer.
- Install the Cradle driver manually. All the driver files are located on the installation CD in the folder "CradleDriver". These files are also copied to the application installation folder when DoseView is installed. When Windows detect a connected Cradle and the dialog about driver installation is displayed, select to use the driver files located on the CD or in the application installation folder.

7 Maintenance

7.1 Calibrating the Base Station Screen

If the touch screen does not respond correctly to user interaction, a touch screen re-calibration may be needed. Follow the instructions below to perform a re-calibration:

1. Tap and hold on the Philips start up screen that appears during Base Station startup until the Setup view appears.
2. Follow the instruction on the bottom of the screen and the subsequent instructions in the next views.

7.2 Cleaning the Base Station Package Components

Clean the components of the Base Station Package when necessary.

WARNING: Always isolate the components from the mains electrical supply before cleaning to prevent electric shocks.

WARNING: Never allow water or other liquids to enter the components, since these may cause electrical short-circuits or metal corrosion.

Clean the Base Station, Cradle, PDMs, PDM Rack and connecting cables in the following way:

1. Wipe enameled parts and aluminum surfaces clean with a damp cloth and mild detergent.
2. Rub down with a dry woolen cloth.

7.3 Disinfection

Disinfect the components of the Base Station Package when necessary. Disinfect the Base Stations, Cradle, PDMs, PDM Rack and connection cables in the following way:

1. Switch off the equipment and allow it to cool. This prevents convection currents drawing disinfectant mist into the equipment (this concerns only the Base Station).
2. Wipe the component with a cloth dampened with disinfectant.

8 Product Disposal

Final disposal is when the user disposes of the DoseAware products in such a way that it can no longer be used for its intended purpose(s).

In the European Union (the WEEE directive), this label



indicates that the product should not be disposed of together with household waste. It should be disposed of at an appropriate facility to enable recovery and recycling.

WARNING Do not dispose of any parts of this product with industrial or domestic waste. Incorrect disposal of DoseAware products may lead to serious environmental pollution.

NOTE: Make sure that the power mode is set to “off” when returning a PDM.

NOTE: PDMs and Base Stations contain personal data. Remove or disable this data for third parties to read before removal of the part when it is no longer used (end-of-life or broken).

Philips supports users in:

- Recovering reusable parts
- Recycling of useful materials by competent disposal companies
- Safe and effective disposal of product

For advice and information, contact your Philips Service Organization.

9 Technical Data

9.1 PDM Radiology

Characteristic	Measure
Operational Quantity*	Hp(10)
Reproducibility	5% or 1 μSv
Dose Rate Range	40 $\mu\text{Sv/h}$ – 500 mSv/h
Energy dependence X-/g-rays	+/- 30% within N40 – N120
Angular dependence	+/- 5% within +/- 5° +/- 30% within +/- 50° +200%/-100% within +/- 180°
Temperature dependence	+/- 5% within 20-26°C +/- 25% within 15-35°C
Battery voltage dependence	+/- 1% from fully charged until low battery shutdown
Response time	Less than 1s above 100 $\mu\text{Sv/h}$, less than 4s otherwise
Position on body**	On torso outside lead apron

*) Hp(10): Personal dose equivalent at a depth of 10 mm according to ISO 4037.

**) Position on body: The Hp(10) measurement is only valid for a position on the torso outside any lead apron or other protection. (To estimate effective dose to a user, one must use other means to estimate things like the environmental radiation situation and the effectiveness of protection.)

9.2 PDM Memory

The PDM has two dose data memories:

- The accumulated dose memory, where the PDM stores *accumulated dose values* every hour for the entire lifetime of the PDM.
- The dose rate memory, where the PDM stores *dose rate samples*. When the radiation exceeds 40 $\mu\text{Sv/h}$, the PDM stores one sample per second. This memory is limited to 3600 second-samples.
NOTE: When the dose rate memory is full, the oldest data will be overwritten with newer data.

9.3 Base Station Memory

The Base Station stores dose information and PDM Info for PDMs that have been connected to it.

As the Base Station does not have a limitation of 3600 s for the dose rate memory, the information transmitted from the PDM will be more detailed. When a PDM is connected to a Base Station, it continuously transmits its measured dose exposures.

NOTE: When the Base Station memory is full, the oldest data will be overwritten.

The capacity of the Base Station depends on the number of PDMs that have been On-Line and the number of dose rate samples. Storage capacity example:

- 290 hours of dose exposure for 50 PDMs each

9.4 Dose Data Transfer from PDM to Base Station

When a PDM gets within range of a Base Station, it will transfer data to the Base Station (the *accumulated dose values* the PDM has collected since last time it was within range. If a PDM is within range of a Base Station when it is exposed to radiation, the PDM will also start sending *dose rate samples* to the Base Station each second.

9.5 PDM and Base Station/DoseView Memories

Dose rate samples that have been overwritten in the PDM's dose rate memory may still be available in the Base Station.

If there are no dose rate samples neither in the Base Station, nor in the PDM dose rate memory, the Base Station and DoseView will instead display mean dose rate values based on accumulated dose values (see Figure 22).

Lack of dose rate samples in the Base Station and/or DoseView memories occurs when the:

- PDM is not within range of the Base Station when it is exposed to radiation.
- dose rate samples in the PDM dose rate memory are overwritten.

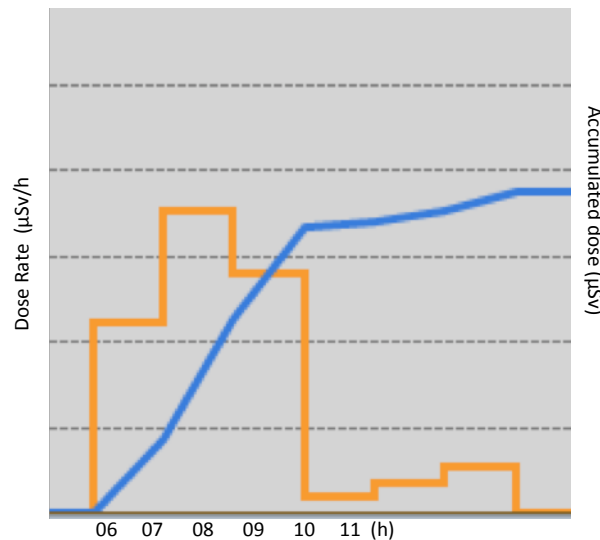


Figure 22 DoseView chart. In lack of dose rate samples, the yellow curve displays mean dose rate values per hour calculated from the accumulated dose (blue curve).

NOTE: The same effect as illustrated in Figure 22 is also obtained by un-checking the Show details check box in the Data filter panel (see chapter 4.5).

9.6 Time Management

The PDM logs dose history in local time with no daylight saving time adjustments. Daylight saving time adjustment is done in the Base Station, DoseView or Dose Manager when the dose history is presented.

The following happens when the daylight saving time is changed:

- When going to summertime, one extra hour with no dose data will be added to the dose log.
- When going to wintertime, two hours of dose data will be merged into one hour. This hour contains no dose rate details. When changing from summertime to wintertime, dose data details in the two merged hours will not be displayed.

9.7 Technical Specifications

9.7.1 Radio Communication

- The communication range between a PDM facing a Base Station and the Base Station is at least 10 meters in open air inside an operating room.
- Communication radio, Europe, complies with 1995/5/EC Radio and Telecommunications Terminal Equipment (R & TTE)
- Communication radio, US, complies with FCC Declaration of Conformity

9.7.2 Base Station

Characteristic	Measure
Weight	1.45 kg (3,2 lb)
Dimensions	297x243x51 mm (WxHxD)
Display	10.4" touch screen, 640x480 pixels, 65 000 colors
Power supply	12 V, 2 A
Memory	512 Mb
Storage	Approximately 290 hours of dose history for each of 50 PDMs
Backlight life time	Approximately 50000 hours
Maximum heat dissipation	25 W
Network	Ethernet 10/100
USB	1.1 host for USB Mass Storage Device

9.7.3 PDM

Characteristic	Measure
Weight	30 g (1 oz)
Dimensions	44x45x10 mm (WxHxD)
Fastening	Metallic clip and lanyard holder

Log memory 1	5 years Accumulated Dose with 1 hour resolution, cyclically overridden
Log memory 2	3600 Dose Rate samples with one-second resolution, cyclically overridden. Dose Rate is only measured above a 40µSv/h threshold limit
Time resolution	1 second
Time accuracy	Maximum error 2 seconds/24 hrs
Power supply	via the Cradle when connected to a computer via USB
Expected battery life	At least 4 years based on “normal use”, which is defined as the operating conditions under normal use are 8 hours per day, 5 days a week and 52 weeks per year at an ambient temperature of 20°C.

9.7.4 Cradle

Characteristic	Measure
Weight	50 g
Dimensions	64x61x59 mm (WxHxD)
Cable length	1,5 M
Power	via USB
Communication with computer	USB 2.0

10 Safety

10.1 Warnings

If the DoseAware system is not functioning correct or damage is visible, inform a Philips service engineer, which will take appropriate actions in order not to harm personnel or patients.

Handle the hardware and software with care. Make sure that the hardware and software is used and stored in a secured environment to prevent unauthorized access.

10.1.1 Maintenance and Faults

Do not use the product for any application until you are sure that the user routine-checks have been satisfactorily completed, and that the periodic maintenance of the product is up to date. If any part of the product is known (or suspected) to be defective or wrongly adjusted, DO NOT USE the product until a repair has been made. Operation of the product with defective or wrongly adjusted components could expose the user or the patient to safety hazards. This could lead to fatal or other serious personal injury.

10.1.2 Safety Awareness

Do not use the product for any application until you have read, understood and know all the safety information, safety procedures and emergency procedures contained in this safety section. Operation of the product without a proper awareness of how to use it safely could lead to fatal or other serious personal injury.

WARNING: During communication between the Base Station and PDMs, personal data is transmitted in open air.

10.1.3 Adequate Training

Do not use the product for any application until you have received adequate and proper training in its safe and effective operation. If you are unsure of your ability to operate this product safely and effectively DO NOT USE IT. Operation of this product without proper and adequate training could lead to fatal or other serious personal injury.

Do not operate the product with patients unless you have an adequate understanding of its capabilities and functions. Using this product without such an understanding may compromise its effectiveness and/or reduce the safety of the patient, you and others.

10.1.4 Safety Devices

Never attempt to remove, modify, or over-ride or frustrate any safety device on the product. Interfering with safety devices could lead to fatal or other serious personal injury.

Changes or modifications on the equipment, not expressly approved by the party responsible for compliance, could void the user's authority to operate the equipment.

10.1.5 Intended Use and Compatibility

Do not use the product for any purpose other than those for which it is intended. Do not use the product with any product other than that which Philips Healthcare recognizes as compatible. Operation of the product for unintended purposes, or with incompatible product, could lead to fatal or other serious injury.

Do not move a PDM to an unknown environment (for example another hospital). If you are visiting unknown environments, there is a risk that personal data is registered there. For correct registration of staff dose data, only use the PDM within designated environment.

10.2 Electrical Safety

WARNING: Do not remove covers or cables from this product. Dangerous electrical voltages are present within this product. Removing covers or cables could lead to serious or fatal personal injury.

Covers or cables should only be removed by qualified and authorized service personnel. Use this product in rooms or areas that comply with all applicable law (or regulations having the force of law) concerning electrical safety for this type of product.

Electrically isolate this product from the mains electrical supply before cleaning or disinfecting it.

10.3 Mechanical Safety

WARNING: Do not remove covers from this product. Removing covers could lead to serious or fatal personal injury.

Covers should only be removed by qualified and authorized service personnel. In this context, qualified means those legally permitted to work on this type of medical electrical product in the jurisdiction(s) in which the product is being used, and authorized means those authorized by the user of the product.

10.4 Fire Safety

Use of electrical product in an environment for which it was not designed can lead to fire or explosion.

Fire regulations for the type of medical area being used should be fully applied, observed and enforced. Fire extinguishers should be available for both electrical and non-electrical fires.

WARNING: Only use extinguishers on electrical or chemical fires, which are specifically labeled for those purposes. Using water or other liquids on an electrical fire can lead to fatal or other serious personal injury.

If it is safe to do so, attempt to isolate the product from electrical and other supplies before attempting to fight a fire. This will reduce the risk of electric shocks.

10.5 Electrostatic Discharge (ESD)

CAUTION: Always wait at least ten seconds after the product is switched OFF before switching the product back to ON.

CAUTION: Always use proper static procedures, protection, and product prior to opening and during handling of this product. This product contains components that are electrostatic sensitive. Failure to use ESD procedures may cause damage to these components. Such damage to components is not covered by Philips warranties.



Connections to sensitive parts are identified by the ESD warning symbol as shown.

Electrostatic discharge (ESD) can amount to a significant voltage, which may cause damage to PCBs or other system components.

ESD damage is cumulative and may not be apparent at first, as indicated by a hard failure, but can cause degraded performance. Therefore, always use proper ESD handling procedures. ESD can result from low humidity conditions, use of electrical equipment on carpeting, linens, and clothing.

10.6 Electromagnetic Compatibility (EMC)

This Philips product complies with relevant international and national law and standards on EMC (electro-magnetic compatibility) for this type of product when used as intended. Such laws and standards define both the permissible electromagnetic emission levels from product and its required immunity to electromagnetic interference from external sources.

Other electronic products exceeding the limits defined in such EMC standards could, under unusual circumstances, affect the operation of the product.

Medical electrical products needs special precautions regarding EMC, and needs to be installed and put into service according to EMC information provided in the accompanying documents.

The use of accessories and cables other than those specified, may result in increased emission or decreased immunity levels.

The product should not be used adjacent to or stacked with other products and that if adjacent or stacked use is necessary, it should be observed to verify normal operation.

The Base Station and PDM comply with part 15 of the FCC Rules. Operation is subject to the following conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

10.6.1 Portable and Mobile Phones

CAUTION: Portable and mobile RF communications can affect electrical equipment. Use caution when using such communication devices within the specified range of electrical devices.

WARNING: Non-radiation sources, for example a mobile phone, may influence the measurement of data.

10.7 Modality Specific Safety

Be careful when using a PDM while being near a patient and make sure that the PDM does not fall or comes in contact with other equipment (such as a catheter) to endanger the procedure.