

Interfață intuitivă cu utilizatorul

Vision 2 poate fi controlat direct pe stația de lucru AW sau de la masă cu ajutorul Ecranului Tactil Central (Fig. 1).

Utilizatorul poate:

- să lanseze și să închidă aplicația
- să folosească modul de înregistrare bi-vizualizare
- să selecteze obiectul 3D care trebuie afișat
- să optimizeze afișarea suprapunerii 3D
- să analizeze și să înregistreze secvențele cu suprapunerea lor 3D
- să folosească Stereo 3D (opțiune)

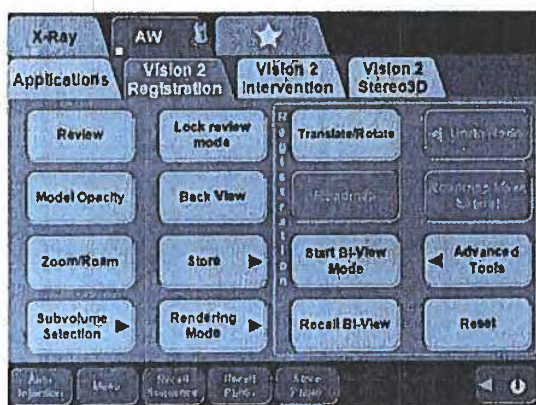


Fig. 1

Înregistrarea bi-vizualizare

- Modul de înregistrare bi-vizualizare permite să se realizeze o înregistrare 3D corespunzătoare între anatomia văzută în fluoroscopie și modelul 3D.
- Acesta ajută utilizatorul să lucreze cu două imagini (Fig. 2) obținute sub unghiuri diferite și apoi să optimizeze înregistrarea 3D în translație și rotație. Se prezintă un punctaj de precizie (Fig. 3) care ajută la siguranța înregistrării. Mișcarea pacientului se corectează de la masă sau din sala de comandă.

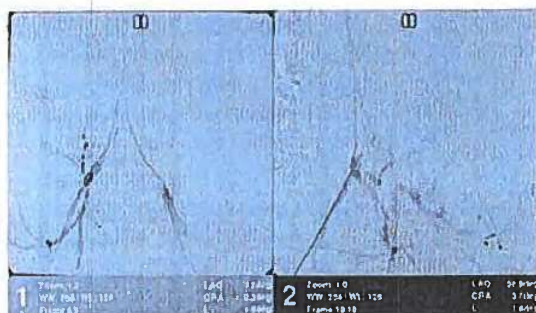


Fig. 2



Fig. 3

Comenzile de afișare

Se optimizează afișarea obiectelor suprapuse:

- Opacitatea suprapunerii 3D
- 3 moduri de redare (Fig. 4): Radiografie Reconstruită Digital, Redare în volum sau Contururi 2D
- Controlul culorilor
- Vedere față/spate
- Afișarea pragului unităților Hounsfield
- Arată/ascunde reperele și liniile de planificare
- Arată/ascunde liniile centrale ale vaselor
- Mărire-micșorare/deplasare imagini afișate



Fig. 4

Comenzi de analizare

Comenzile de analizare permit utilizatorului:

- să analizeze secvențele Vision stocate
- să analizeze una din ultimele zece secvențe obținute
- să creeze filme
- să stocheze fotografiile ale secvențelor utilizate.

Filmele și fotografiile sunt stocate pe stația de lucru AW ca și obiecte DICOM.

Funcțiunea Auto Store (Stocare automată) permite memorarea automată a oricărei secvențe de imagini fuzionate obținute.

Stereo 3D (opțiune)

Stereo 3D reconstruiește obiectele în 3D prin intermediul unui flux de lucru ghidat intuitiv.

Utilizatorul identifică obiectele pe 2 imagini obținute din diferite unghiuri.

Apoi Stereo 3D permite să se evalueze poziția obiectelor reconstruite pe anatomia 3D în Volume Viewer.

Biplan

Pe sistemele biplan, Vision 2 permite utilizatorului să treacă în mod automat afișarea modelului 3D în vedere frontală sau laterală, pe baza apăsării pe pedală. Apăsarea pedalei frontale or biplane activează suprapunerea 3D pe vederea frontală. Apăsarea pedalei laterale activează suprapunerea 3D pe vederea laterală.

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Destinație

Aplicația software Vision 2 este destinată să permită utilizatorilor să încarce seturi de date 3D și să suprapună și să înregistreze în timp real aceste seturi de date 3D cu imagini radioscopice sau radiografice ale aceleiași anatomii în scopul de a sprijini ghidarea cateterului/dispozitivului pe timpul procedurilor intervenționale.

Respectarea reglementărilor

În țările cu marca CE, Vision 2 nu se poate introduce pe piață sau da în exploatare înainte de a fi realizat astfel încât să respecte cerințele Directivei privind Dispozitivele Medicale pentru marcarea CE. În țările fără marca CE, Vision 2 nu se poate introduce pe piață sau da în exploatare înainte de a se obține toate autorizațiile regulamentare necesare. Opțiunea Stereo 3D nu este autorizată or aprobată de Administrația SUA pentru Alimente și Medicamente pentru disponibilitate comercială în SUA și nu este autorizată or aprobată pentru disponibilitate comercială în restul lumii.

Cerințe de sistem

- Stația de lucru Advantage (AW) la nivelul AW 4.7 (VolumeShare 7) sau superior și produse Volume Viewer dedicate.
- Unul din următoarele sisteme cu raze X: Innova™ IGS 520, Innova IGS 530, Innova IGS 540, Innova IGS 620, Innova IGS 630, Discovery™ IGS

730 sau Discovery IGS 740

De asemenea, vor fi activate următoarele opțiuni:

- Video AW se va afișa în sala de examinare cu un monitor AW dedicat sau folosindu-se monitorul mare de afișare al sistemului cu raze X.
- Este necesară o conexiune Ethernet punct-la-punct între sistemul intervențional vascular cu raze X și stația de lucru Advantage.
- Ecranul Tactil Central va fi instalat cu sistemul IGS cu raze X.

Neasumarea răspunderii

- (1) Pentru sistemele cu masa Innova-IQ sau masa Omega V, fantoma rigidă geometrică, planul frontal, brațul L 0°, mișcarea mesei inferioară la 80 mm între achiziția 3D și fluoroscopia live, precizia obținută pentru cel puțin 90% din imaginile obținute pe fiecare sistem.
- (2) Pentru sistemele cu masa Innova-IQ sau masa Omega V, fantoma rigidă geometrică, date CBCT, planul frontal, brațul L 0°, regiunea de interes de 10 cm.
- (3) Pentru sistemele cu masa Innova-IQ sau masa Omega V și cu calibrare sporită, fantoma rigidă geometrică, volum 3D cu mărimea voxelului de 0,95 mm, planul frontal,

fără mișcarea brațului L sau a mesei după înregistrare, Regiunea de interes de 10 cm.

(4) Datorită înregistrării 2D/3D, în locul tehnicii de înregistrare 3D/3D.

Pe baza datelor kerma de aer din manualul de exploatare al Discovery IGS 740, Discovery IGS 730, Innova IGS 540, Innova IGS 530: 1 flux de lucru tipic Vision cu suprapunere CT pre-operatorie include achiziția fluoroscopică 2x2s. Suprapunerea CT pre-operatorie cu utilizarea înregistrării 3D/3D ar necesita achiziția fluoroscopică 2x2s pentru a centra anatomia și achiziția CT Cone Beam (Fascicul conic).

În practica clinică, utilizarea Vision 2 poate reduce doza de radiații a pacientului în funcție de sarcina clinică, mărimea pacientului, locația anatomică și practica clinică.

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AngioViz

Visualize Vascular Flow

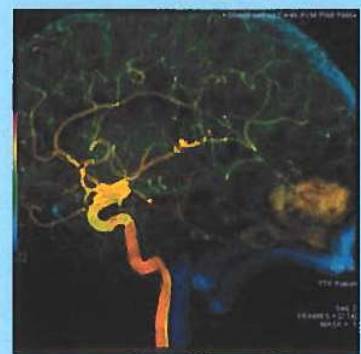
A Digital Subtraction Angiography (DSA) generates an array of vascular flow data. Comparing and synthesizing information contained from different sequences to arrive at a confident diagnosis may be difficult and time consuming.

What's new

- Displays a DSA series in one color image.
- Automatically synchronizes different DSA series for flow comparison
- Helps you analyze complex flow pattern of several anatomical regions

Overview

AngioViz summarizes in a single image critical information contained in a DSA time series facilitating understanding of vascular flow. With AngioViz, you can easily compare different DSA series with just a glance.



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AngioViz DSA Parametric Viewer

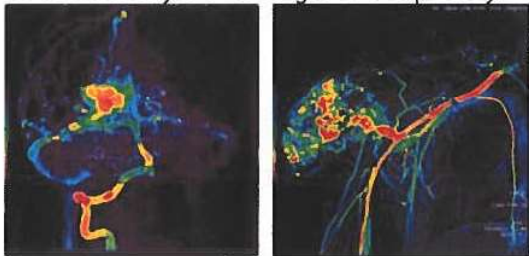
AngioViz is an optional program that operates with the AW 2D viewer software to enable the user to more easily visualize characteristics of vascular flow while viewing either single plane or biplane DSA image sequences.

Using a simple user interface which allows the user to select appropriate time portions of a DSA sequence AngioViz produces images which reflect peak opacification, time to peak, and combinations of these parameters to represent contrast flow in black and white and color parametric images. AngioViz includes a comparative feature called synchronized series which propagates the same time scale across different DSA series to allow comparison of the different series, for example pre and post intervention DSA runs.

Features

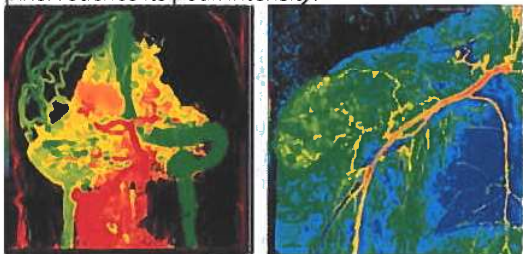
AngioViz facilitates understanding of vascular flow by displaying a DSA series in a single color-coded image of:

- **Peak opacification:** Shows the peak intensity reached by each pixel over time. Shows arterial and venous anatomy and flow together or separately.



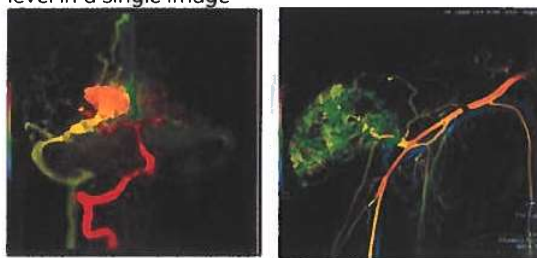
Cerebral AVM (left), Shoulder AVM (right).

- **Time to peak:** Displays the time at which each pixel reaches its peak intensity.



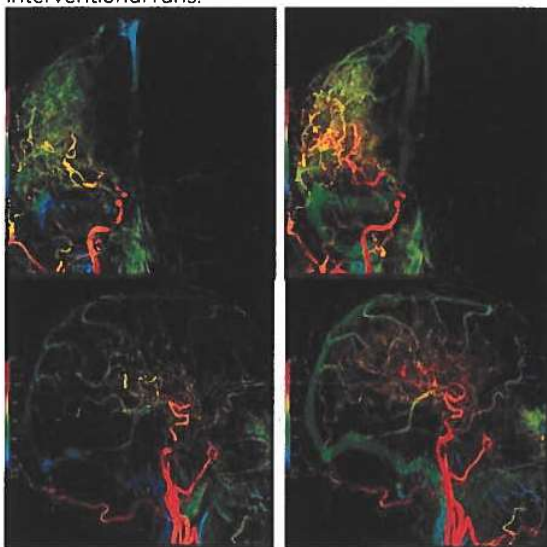
Cerebral AVM (left), Shoulder AVM (right).

- **Time to peak fusion:** Combines time to peak and peak opacification parameters. Colors indicate time to peak; intensity indicates peak opacification. Demonstrates both vascular flow and opacification level in a single image



Cerebral AVM (left), Shoulder AVM (right).

AngioViz automatically synchronizes different DSA series for flow comparison of pre- and post-interventional runs.



Pre-stent images (left). Post-stent images (right).

AngioViz's intuitive interface lets you analyze complex flow patterns of several anatomical regions in a single click.

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Indication for use

AngioViz is an application which produces from a DSA series parametric images representing maximum opacification, time to peak and combinations of those, to enable the user to more easily visualize characteristics related to vascular flow.

The AngioViz application can be used to process DSA image data from any location in the human body for which DSA imaging is used.

Regulatory Compliance

This product complies with the European Council Directive 93/42/EEC Medical Device Directive as amended by European Council Directive 2007/47/EC.

System Requirements

- Advantage workstation (AW) at the AW 4.6 or higher version.
- One of the following X-ray system: Innova™ IGS 520, Innova IGS 530, Innova IGS 540, Innova IGS 620, Innova IGS 630, Discovery™ IGS 730 or Discovery IGS 740

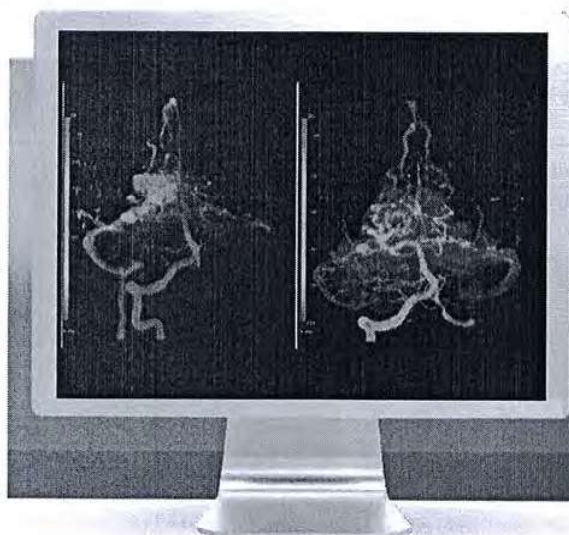
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AngioViz

Vizualizarea fluxului

O angiografie prin subtracție digitală (DSA) generează o serie de date privind fluxul vascular. Compararea și sintetizarea informațiilor conținute de diferite secvențe pentru a ajunge la un diagnostic sigur poate fi dificilă și necesită mult timp.

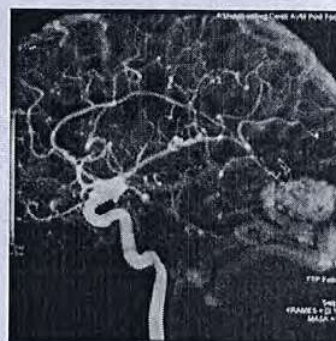
Descriere generală

AngioViz rezumă într-o singură imagine informațiile critice conținute într-o serie cronologică DSA, facilitând înțelegerea fluxului vascular.

Cu AngioViz, puteți compara cu ușurință diferite serii DSA cu o singură privire.

Ce este nou

- Aceasta afișează o serie DSA într-o singură imagine color.
- Sincronizează automat diferite serii DSA pentru compararea debitului
- Vă ajută să analizați modelul complex de flux al mai multor regiuni anatomice



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Vizualizator parametric AngioViz DSA

AngioViz este un program opțional care funcționează cu software-ul AW 2D viewer pentru a permite utilizatorului să vizualizeze mai ușor caracteristicile fluxului vascular în timp ce vizualizează secvențe de imagini DSA pe un singur plan sau pe două planuri.

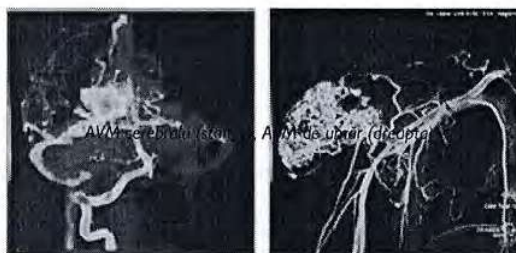
Utilizând o interfață de utilizator simplă care permite utilizatorului să selecteze porțiuni de timp adecvate dintr-o secvență DSA, AngioViz produce imagini care reflectă opacifierea de vârf, timpul până la vârf și combinații ale acestor parametri pentru a reprezenta fluxul de contrast în imagini parametrice alb-negru și color.

AngioViz include o caracteristică comparativă numită serie sincronizată care propagă aceeași scală de timp în diferite serii DSA pentru a permite compararea diferitelor serii, de exemplu seriile DSA înainte și după intervenție.

Caracteristici

AngioViz facilitează înțelegerea fluxului vascular prin afișarea unei serii DSA într-o singură imagine cu cod de culoare a:

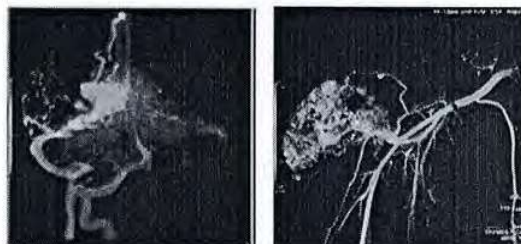
- **Opacifierii de vârf:** Afișează intensitatea maximă atinsă de fiecare pixel în timp. Arată anatomia arterială și venoasă și fluxul împreună sau separat.



AVM cerebrală (stânga), AVM de umăr (dreapta).

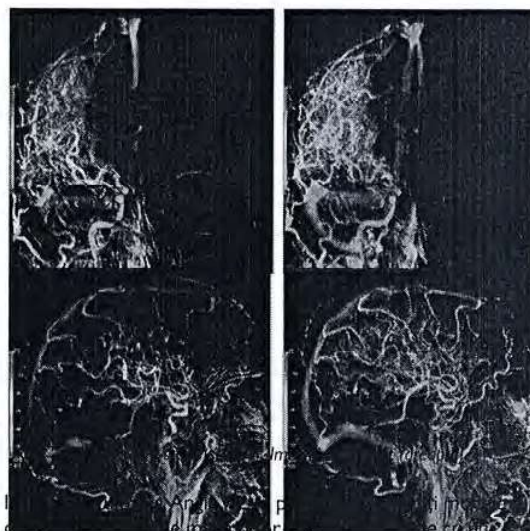
- **Timpului până la fuziunea maximă:** Combină parametrii timp până la vârf și opacifierea de vârf. Culoarele indică timpul până la vârf; intensitatea indică opacifierea de vârf.

Demonstrează atât fluxul vascular, cât și nivelul opacifierii într-o singură imagine



AVM cerebrală (stânga), AVM de umăr (dreapta).

AngioViz sincronizează automat diferite serii DSA pentru compararea fluxului de pre și post intervențional.



singur clic.



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AngioViz

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Indicații de utilizare

AngioViz este o aplicație care produce dintr-o serie DSA imagini parametrice reprezentând opacifierea maximă, timpul până la vârf și combinații ale acestora, pentru

a permite utilizatorului să vizualizeze mai ușor caracteristicile legate de fluxul vascular.

Aplicația AngioViz poate fi utilizată pentru a procesa datele imaginilor DSA din orice locație a corpului uman pentru care se utilizează imagistica DSA.

Conformitate normativă

Acest produs este în conformitate cu Directiva 93/42/CEE a Consiliului European privind dispozitivele medicale, astfel cum a fost modificată prin Directiva 2007/47/CE a Consiliului European.

Cerințe de sistem

- Stația de lucru Advantage (AW) la versiunea AW 4.6 sau superioară.
- Unul dintre următoarele sisteme de raze X: Innova™ IGS 520, Innova IGS 530, Innova IGS 540, Innova IGS 620, Innova IGS 630, Discovery™ IGS 730 or Discovery IGS 740

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Mac-Lab User Manual

Altix BT22 Edition



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5222001-1EN
Revision 2.0
US English
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- The system administrator is also responsible for monitoring and reporting system hardware and software problems using the procedures described in [Chapter 18 System Administration on page 231](#).
- The Mac-Lab/CardioLab system administrator should be familiar with the Windows desktop and be fully trained on the Mac-Lab/CardioLab features and configuration settings.

NOTE

A system administrator password is required.

- It is recommended that Mac-Lab/CardioLab system administrators be trained to become familiar with the capabilities and operations of the Mac-Lab/CardioLab system. The following training options are available:
 - Classroom training
 - On-site customer training
 - Remote training



1.1.4.3 Field service engineer

This manual does not address system problems. Only trained GE field service engineers may diagnose and correct system problems. Refer system problems to GE product support.

1.1.5 Indications for use

Mac-Lab

The Mac-Lab system is indicated for use on patients of all ages when a physician determines that a patient would benefit from a hemodynamic procedure. The Mac-Lab can be used in a variety of hospital and clinical settings to record hemodynamic data and measurements, which can then be displayed, filtered, digitized, amplified, measured, calculated, and/or transmitted for storage, analysis, and viewing at distributed locations.

CardioLab

The CardioLab system is indicated for use on patients of all ages when a physician determines that a patient would benefit from an electrophysiology procedure. The CardioLab can be used in a variety of hospital and clinical settings to record electrophysiology data and measurements, which can then be displayed, filtered, digitized, amplified, measured, calculated, and/or transmitted for storage, analysis, and viewing at distributed locations.

ComboLab

The ComboLab system is indicated for use on patients of all ages when a physician determines that a patient would benefit from either a hemodynamic or electrophysiology procedure. The ComboLab can be used in a variety of hospital and clinical settings to record hemodynamic and electrophysiology data and measurements, which can then be displayed, filtered, digitized, amplified, measured, calculated, and/or transmitted for storage, analysis, and viewing at distributed locations.

MLCL Client Software

The MLCL Client Software is indicated for use on patients of all ages when a physician determines that a patient would benefit from either a hemodynamic or electrophysiology procedure. MLCL Client Software can be used in a variety of hospital and clinical settings to record, document, and/or review hemodynamic and electrophysiology data and measurements, which can then be displayed, filtered, digitized, amplified, measured, calculated, and/or transmitted for storage, analysis, and viewing at distributed locations.

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1.1.6 Clinical benefits

Mac-Lab™ displays and records clinical data (ECG waveforms, heart rate, pulse oximetry, respiration rate, CO₂, temperature, and hemodynamic measurements) and provides the clinical tools needed to help physicians deliver patient diagnoses.

CardioLab™ displays and records clinical data (ECG waveforms, intracardiac signals, stimulus data, ablation data, pulse oximetry, respiration rate, CO₂, temperature, invasive and noninvasive blood pressures) and provides the clinical tools needed to help physicians deliver patient diagnoses.

ComboLab displays and records clinical data (ECG waveforms, heart rate, intracardiac signals, stimulus data, ablation data, pulse oximetry, respiration rate, CO₂, temperature, hemodynamic measurements, invasive and noninvasive blood pressures) and provides the clinical tools needed to help physicians deliver patient diagnoses.

The MLCL Client Software displays clinical data (ECG waveforms, heart rate, intracardiac signals, stimulus data, ablation data, pulse oximetry, respiration rate, CO₂, temperature, hemodynamic measurements, invasive and noninvasive blood pressures) and provides the clinical tools needed to help physicians deliver patient diagnoses.

1.1.7 Patient benefit

The Mac-Lab, CardioLab, and ComboLab recording systems maintain a comprehensive archive for performed procedures that may include waveform data, reports, and a time-based procedure log. The hemodynamic or electrophysiology study information is archived and available to provide continuity in patient care should additional treatments be necessary if indicated by a healthcare professional. The study information may also be transmitted to an Electronic Medical Records system. All study data stored or transmitted by the Mac-Lab, CardioLab, or ComboLab is encrypted to maintain the security of patient medical records and to ensure private health information is protected.

1.1.8 Intended Use/Intended Purpose

1.1.8.1 Types of systems

The following system names are used:

- **Mac-Lab:** A hemodynamic recording system typically used in catheterization laboratories.
- **CardioLab:** An electrophysiology recording system built on a common platform with Mac-Lab.
- **ComboLab:** A single system that contains the features of both the Mac-Lab and the CardioLab systems.
- **MLCL Client Software:** The Mac-Lab and CardioLab acquisition software that is made available for installation on stand-alone systems to operate as a review workstation.

1.1.8.2 Mac-Lab system

The Mac-Lab system is intended for recording hemodynamic clinical data, which can then be displayed, filtered, digitized, amplified, measured, calculated, and/or transmitted for storage, analysis, and viewing at distributed locations.

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3.2.1 Control room components

Acquisition computer

The acquisition computer provides the ability to record the patient's real time waveform data. It uses the Microsoft Windows operating system and has the following drives:

- DVD drive: used for installation and service of the computer.
- SD drive: used to store backup copies of patient procedure data.

The required media for the SD card drive is an SDHC or SDXC card with capacity of at least 16GB, and speed of at least Class 6 (Class 10 and higher is also acceptable).

Desk (optional)

Provides a workspace for control room components.

HD Hub

A small enclosure that houses the required components for HD video (three HD video distribution amplifiers and one HD switcher). The HD Hub distributes video and communication signals to the control and procedure rooms.

Isolation transformer

Provides isolated power for components.

Monitors

For Mac-Lab systems, two monitors are standard to display *Real-Time* and *Review* windows. For CardioLab and ComboLab systems, an optional third monitor displays images acquired from the X-ray and ultrasound systems or can be used as a workspace integrator display.

Printer (optional)

Used to print snapshots, images, and reports after a procedure.

NOTE

Connect the printer only to the hospital network, not to the acquisition computer.

Uninterruptible power supply (UPS)

The UPS provides emergency power to the acquisition computer in the event of a power outage. It will sustain power to the computer for a minimum of 20 seconds. When the UPS battery is low, it will beep. If this happens, do not attempt to replace the battery. Contact a GE representative.

NOTE

The UPS provides uninterrupted power to the acquisition computer. Only the first monitor will be powered during a power outage.

NOTE

When loss of power occurs, close the study, exit the Mac-Lab/CardioLab software, and shut down the acquisition computer. When power is restored, turn on the acquisition computer, start the Mac-Lab/CardioLab software, and continue the study

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Figure 3-9 PDM dock and PDM on bedrail**WARNING****TRIPPING HAZARD**

Keep cables away from accessible walkways. Failure to do so may present a tripping hazard and could result in cable damage.

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To reduce the risk of ingress of water into the equipment, do not mount the PDM in a vertical position with the patient cables facing up or down.

**WARNING****SHOCK HAZARD**

To reduce the risk of ingress of water into the equipment, do not mount the PDM Slim Connect or PDM Base Station Plus in a vertical position with the patient cables facing up or down.

**CAUTION****FALLING EQUIPMENT**

Do not place the PDM more than 147 cm (58 in) from the floor when mounting on an IV pole with a base less than 58 cm (23 in) in diameter. This may cause the IV pole to tip over.

3.3 Review workstations

Mac-Lab software runs on hardware provided by GE (GE Client Workstation).

PDM Base Station Plus or PDM Slim Connect

Provides power and communication to the PDM and CO₂ modules.

Remote operators terminal (RMOT) (optional)

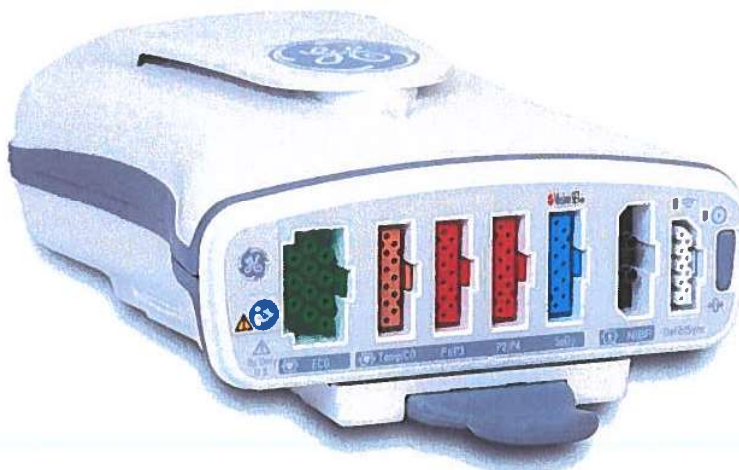
The RMOT consists of three monitors, a keyboard and a mouse remotely connected to the acquisition system to provide remote control of the acquisition computer from the procedure room.

Remote speakers

Provide output for ECG QRS tone and optional audible indicators in the procedure room.

3.2.3 Patient data module (PDM)

The PDM acts as an amplifier for the Mac-Lab system and is responsible for patient data acquisition. It receives power from the PDM Base Station Plus or PDM Slim Connect unit and is placed in the procedure room near the patient table. The PDM rests in a dock that can be mounted to a bed rail, a pole, or a stand that also holds the PDM Base Station Plus or PDM Slim Connect.



PDM has the following patient data input features:

- Electrocardiogram (ECG): green connector (5 or 10 leads)
- Thermolulution cardiac output (TDCO) or temperature: brown connector
- Invasive blood pressure (IBP): red connectors
- Pulse oximetry (SpO₂): blue connector
- Non-invasive blood pressure (NIBP): black connector

When using PDM with the PDM Base Station Plus or PDM Slim Connect, an optional CO₂ module can acquire end-tidal CO₂ data.

The PDM can monitor up to four invasive blood pressures when two Y-adaptor cables are used. Plugging one Y-adaptor cable into the P1/P3 connector on the PDM allows two separate invasive blood pressures to be monitored from that connector, for a total of three pressures. Plugging a second Y-adaptor cable into the P2/P4 connector on the PDM allows two separate invasive blood pressures to be monitored from that connector, for a total of four pressures.

Pulse oximetry

1. Select **Minimum** in the **Pulse oximetry** section.
2. Type the desired value to set the minimum range.

NOTE

When the pulse oximetry value drops below the specified minimum value, the SpO₂ reading is displayed with a yellow background .

3. If the SpO₂ cable is connected to the PDM, but a cabling or signal or device error occurs, the SpO₂ display in the **Patient Status** area shows asterisks (** %) and the indicators turn on (if enabled).

Temperature

1. Select **Enable Continuous Temperature Display** to display patient temperature in the **Patient Status** area.
2. To set upper or lower boundary temperature limits, select the **Maximum** and/or **Minimum** check boxes and enter the limits. The limits must be between 0.0°C and 45.2°C.
 - If the temperature exceeds the upper limit or falls below the lower limit, the audible indicator turns on (if enabled) and the temperature display changes from green numbers on a gray background to black numbers on a yellow background.
 - If continuous temperature is enabled and the cable is not connected, the temperature display in the **Patient Status area** remains blank.
 - If continuous temperature is enabled with the cable connected, but a cabling or device error occurs, the temperature display in the **Patient Status** area shows asterisks (** °C) and audible indicators turn on (if enabled).

Vital log

1. Select the **Auto vital log** check box to enable the system to log vitals. This setting acquires an invasive blood pressure from the vital logging pressure source chosen from the **Blood Pressure > Vital logging pressure source** drop-down list.
2. Enter the desired minutes in the **Vital log time interval** field. Vitals events appear in the **Log** window at the selected time intervals.

NOTE

Activating this area does not take a new NBP. It logs a vitals event with asterisks (***/**/***).

Heart rate

1. Select the desired channel used for the heart rate display in the **Patient Status** area from the **Heart rate channel** drop-down list.
2. To set upper or lower boundary heart rate limits, select the **Maximum** and/or **Minimum** check boxes and enter the limits. The limits must be between 0 and 400 BPM.

If the heart rate exceeds the upper limit or falls below the lower limit, the audible indicator turns on (if enabled) and the heart rate display changes from green numbers on a gray background to black numbers on a yellow background.
3. Select **ECG Tone** to activate the ECG tone feature. The system sounds a tone on every detected heartbeat.

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Chapter 8 X-Ray Image Capture

Systems with the Matrox OrionHD board installed can capture video output from an X-ray fluoroscopy system for display inside the Mac-Lab/CardioLab application. Users can capture and store single-frame images in the study as part of case documentation along with the corresponding cardiac signal waveforms.

8.1 Configurations

Systems may be in one of the following configurations:

- Non-imaging systems: Review workstations and base acquisition systems do not have image capture capability. These systems support review of images and image loops captured on another system.
- Image capture systems: These systems allow the capture of static images and the display of live images from X-ray and ultrasound systems. The X-ray and ultrasound images can be displayed live, simultaneously, in separate windows.

8.2 X-ray image capture

X-ray image capture is connected to a laboratory's fluoroscopy system, integrating fluoroscopy image data with a patient's electrograms for better case documentation. Captured images are also saved as part of the patient's study, along with the corresponding cardiac signals. Both live and stored images can be viewed simultaneously.

X-ray image capture features include:

- Display real-time and saved fluoroscopic images on a dedicated monitor.
- Capture images at any time and correlate each image with patient electrograms.
- Special support for capturing images from biplane X-ray systems.
- Print acquired images on the system printer.
- Store saved images with the study. The size of the image depends on the resolution of the fluoro video output from the X-ray system.
- Automated image storage, for example, with ablations and/or mapping events. Image storage can be automated with macros.
- Fluoroscopic image management feature that builds a library of images as they are acquired. Clicking an image in the *Image Library* window causes the associated fluoroscopic image and electrograms to be recalled for review.
- Save and review images during mapping cases, providing guidance in procedures such as ablation.

8.3 Image 1 and Image 2 windows

Use the *Image 1* and *Image 2* windows to view live images from the X-ray system and to capture and save X-ray images as part of study documentation. You can also use these windows to review stored images and image loops in a study.

You can open these windows during a study. This is useful for viewing live and stored images side by side.

Normally, the system is configured to capture images from a single input channel (for example, the video output from the X-ray system). When used with a biplane X-ray system, two input channels can be configured to correspond to the two video outputs from the X-ray system. These windows can then be set to different input channels, for viewing images from the two channels on separate windows. Only one *Image* window shows a live image at any time.

8.4 Image 1 and Image 2 window toolbar

8.4.1 Live Image

When you select the **Live Image** icon on either the *Image 1* or *Image 2* windows, that window displays a live image from the specified input channel. The window title indicates that the image is live.

NOTE

If the input video is stopped or disconnected during live capture, the image window displays a blank image. The window automatically displays the live capture when the input signal is available.

8.4.2 Freeze

When you select the **Freeze** icon, the system captures an image from the input channel and displays it in the active *Image* window. If a live capture was previously in progress in the same window, it will be stopped.

NOTE

- The **Freeze** operation causes signal data to be saved if the **Save signal data with images** option is enabled and the system is not already saving signal data. The system saves at least 10 seconds of signal data.

The keyboard shortcut **Action + ~** captures an image from the currently active *Image* window.

NOTE

This shortcut is not supported on Japanese language systems.

8.4.3 Active

When the *Image 1* and *Image 2* windows are open, the active window indicator determines which image window is used for reviewing images and image loops. Use this icon to toggle the active status of the *Image* windows.

8.4.4 Settings

To configure the *Image 1* and *Image 2* windows, select the **Settings** icon. The *Image Window Settings* dialog appears.

Configure the *Image Window Settings* dialog settings upon installation. Do not modify these settings after they are established. If the image quality changes, call technical support for assistance in modifying these settings.

Setting	Description
Image Channel	A maximum of two individual channels may be used. Select the box to enable a channel. Only enabled channels will be listed in the input selectors for the <i>Image</i> windows.
Video Format	Select from the list of supported formats on the drop-down menu. This can be changed only for the first channel. The video format for the second channel, if enabled, will be the same as that of the first channel.
Save signal data with images	Allows signal and waveform data to be saved any time an image is saved. This applies if manual (continuous) save is not selected throughout the case. If manual (continuous) save is on throughout the case, the corresponding signal and waveform data are saved automatically.
Enable gating on trigger (CardioLab only)	If this setting is enabled, the image is captured only after the specified trigger level is reached for the trigger signal in the <i>Real-Time</i> window.
Capture color image	Enable this setting if a color video output is available from the X-ray system and it is connected to the acquisition computer using appropriate cabling. If this setting is enabled, only one image channel is available, and biplane mode is not available.
Enable biplane mode	Enable this setting when connecting to a biplane system. If biplane mode is enabled, note the following considerations: <ul style="list-style-type: none"> • If an image is captured from either the <i>Image 1</i> or <i>Image 2</i> windows, the system captures two images from the two biplane channels. If the image is saved, both images are saved. • If both image windows are open and are set to different channels, upon capturing an image in one window, both windows will be updated to show the images captured from the respective channels.
Save images on ablation (CardioLab only)	This setting automatically saves an image at the start of each ablation.
Save images on activation alignment (CardioLab only)	This setting automatically saves an image with each activation alignment window grab.
Save images on Mapping System event (CardioLab only)	This setting automatically saves an image when a mapping system event occurs. This setting applies only if interfacing with a CARTO® 3 System.
Save images on FFR measurement	If the optional FFR feature is enabled for Mac-Lab, enable this setting to save an image automatically with each FFR measurement.

8.4.5 Save

Click the **Save** icon to save an image displayed on an *Image* window in the following cases:

- After a freeze operation is performed or when a live image is being displayed
- When an image loop is paused

When captured images are saved, the title of the image indicates the name of the channel and the time at which the image was captured.

The macro step **Display > Image > Save** from the *Macro* window can also be used to capture and save an image automatically.

8.4.6 Print

Click the **Print** icon on either of the *Image* windows to print an image while reviewing single-frame images.

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NOTE

- The images print to the default Windows printer.
- Images may be printed in color if a supported color printer is installed on the system.

8.4.7 Annotate

1. Click the **Annotate** icon to annotate a stored image displayed in the window. The *Image Viewer* window appears.
2. The tools supplied in the application can be used to annotate the image. After annotating, the image can be saved to the hard drive, copied to the clipboard or printed.

See [7.4 Image Viewer on page 128](#) for more information.

8.4.8 Play

Click the **Play** icon to play an image loop repeatedly.

8.4.9 Pause

Click the **Pause** icon to pause a playing image loop.

8.4.10 Stop

Click the **Stop** icon when playing an image loop to stop playing and return to the first frame of the image loop.

8.4.11 Previous Frame

Click the **Previous Frame** icon when the image loop is paused to go back one frame in an image loop.

8.4.12 Next Frame

Click the **Next Frame** icon when the image loop is paused to go forward one frame in an image loop.

8.4.13 Input

If more than one input channel is configured, use this drop-down menu to select the input channel for either the *Image 1* or *Image 2* windows. The selected input channel is used when the freeze or live operations are performed in the selected window. The channel associated with the selected image window is automatically saved.

NOTE

The names of the input channels are configured on the *Image Window Settings* dialog (see [8.4.4 Settings on page 136](#)).

8.4.14 Zoom

To zoom in or zoom out of the image, select the appropriate setting from the drop-down menu:

Setting	Description
Auto	Resize the image to fit the size of the window while keeping the original aspect ratio.
X 1	Display the image at original size.
X 2	Resize the image by a factor of 2 (not available for image loops).
X 3	Resize the image by a factor of 3 (not available for image loops).

The image will be centered if it is smaller than the window and will have horizontal or vertical scrollbars if it is larger than the window.

Zoom settings are not persistent. The selection will be reset if the window is reopened.

8.4.15 Contrast and brightness

To adjust the brightness and contrast of live and saved images:

- Move the markers on the **Contrast** and **Brightness** bars in the *Image 1* window or *Image 2* window toolbar to the left or right.
- The **Brightness** bar lightens and darkens the image. The **Contrast** bar widens and narrows the range of black and white used to display the image.

The default settings for contrast and brightness will show the original image without any adjustments to contrast or brightness. Changes made to contrast or brightness settings for live images are automatically saved and are associated with the input channel used. These settings are used only for live and freeze operations.

NOTE

For live color images, brightness and contrast cannot be changed in the image windows. Adjust these on the X-ray system.

Changes made to contrast or brightness settings while viewing saved images are temporary and will not be saved.

8.5 How to view images

8.5.1 Image Library window

The system generates a thumbnail image and adds it to the *Image Library* window when any of the following are acquired:

- Images captured from the *Image 1*, *Image 2*, or *Image 3* windows
- Images or image loops received from the CARTO® 3 System

8.5.2 Display images

Select a thumbnail in the *Image Library* window to load the associated image or image loop on the active image window.

If the image has associated signal data, the *Review* window updates to show the signal waveforms that correspond to the timestamp of the image.

NOTE

If the image has no associated signal data, the *Review* window may update with the signals nearest in time to the acquired image.

8.5.3 Delete images

Images can be deleted from the *Image Library* window or from the *Log* window.

1. Right-click the thumbnail image and select **Delete**.
2. Confirm the deletion. When confirmed, the image event is deleted.

Once deleted, the image cannot be recovered.

8.5.4 Rename images

Images can be renamed from the *Image Library* window or from the *Log* window. To rename an image, right-click the thumbnail image and select **Rename**.

8.5.5 Images in the report

All saved images can be included in generated reports. Select the **Image Capture X-Ray**, **Image Capture Ultrasound**, or **Imported images** sections as part of the report format, depending on the desired content. See [Chapter 16 Reports on page 199](#) for details on including these sections in reports.

8.6 Log window

When the system acquires an image, it generates a corresponding entry in the log and stores it as part of the study.

The *Log* window documents the time an image was saved and the title of the image. The *Log* window, the *Image 1* window, and the *Image 2* window are integrated dynamically. This section covers the *Log* window as it relates to images.

8.6.1 Log window columns

For image events in the *Log* window, the display includes the following:

- **R (report)** column check box: If selected, the image or image loop will be included in report sections. For image loops, this will be unchecked by default. For single-frame images, this will be checked by default. This can be checked manually for image loops, but only the first frame of the image loop is included in the report.
- **Time**: Time at which image or image loop was acquired.
- **Summary**: This column contains the image title. The image title may be edited by the operator. The default titles for the different image types are:
 - For images captured from the *Image 1*, *Image 2*, and *Image 3* windows, the title includes the channel name and the time at which the image was captured.
 - For images and image loops received or imported from external systems, the title includes a number that indicates the order in which it was received.
- **Comment**: Editable text field.

8.6.2 Display images

Select the **Time** column for an image event in the *Log* window to load the associated image or image loop on the active *Image* window.

If the image has associated signal data, the *Review* window updates to show the signal waveforms that correspond to the timestamp of the image.

NOTE

If the image has no associated signal data, the *Review* window may update with the signals nearest in time to the acquired image.

8.6.3 Delete images

Right-click the **Time**, **Summary**, or **Comment** fields of an image event in the *Log* window and select the **Delete Event** option to delete an image. This action displays a message prompting the operator to confirm the operation. When confirmed, the image event is deleted. Once deleted, the image cannot be recovered.

8.6.4 Rename an image

To rename the title of the image from the *Log* window:

1. Double-click the **Summary** column to display the image title.
2. Type the new **Title** and select **OK**.

8.6.5 Log window toolbar

The user may select an **Image** filter from the dropdown menu. When selected, this filter displays only image events.

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Abbreviation	Data Name	Units
CVP	Central venous pressure	mmHg (or kPa), BPM
GRAD	Gradient - no valve	mmHg (or kPa)
LA	Left atrial pressure	mmHg (or kPa), BPM
LV	Left ventricular pressure	mmHg (or kPa), BPM
LVET	Left ventricular ejection time	msec/beat
LVFT	Left ventricular filling time	msec/beat
MVG	Mitral valve gradient	mmHg (or kPa)
PA	Pulmonary artery pressure	mmHg (or kPa), BPM
PCW	Pulmonary capillary wedge pressure	mmHg (or kPa), BPM
PV	Pulmonary vein pressure	mmHg (or kPa), BPM
PVG	Pulmonary valve gradient	mmHg (or kPa)
RA	Right atrial pressure	mmHg (or kPa), BPM
RV	Right ventricular pressure	mmHg (or kPa), BPM
RVET	Right ventricular ejection time	msec/beat
RVFT	Right ventricular filling time	msec/beat
SP	Special pressure	mmHg (or kPa), BPM
TIME	Flow time - no valve	msec
TVG	Tricuspid valve gradient	mmHg (or kPa)
VC	Vena cava pressure	mmHg (or kPa), BPM
VEN	Venous pressure	mmHg (or kPa), BPM

A.3 Automatically measured data—pediatric sites

This section lists the pediatric site groups. These groups are used for valve identification, determination of whether systolic or diastolic phase analysis is performed in manual gradient calculations, in the determination of the “to” site in pullback measurements and defining what data is obtained during a single pressure measurement (as shown in the last column in the tables). Mac-Lab windows that display pediatric sites may show additional site labels.

Venous group

Site Label	Description	Measurement
ACV	Antecubital Vein	Mean, HR
AXV	Auxillary Vein	Mean, HR
AZV	Azygos Vein	Mean, HR
BV	Brachial Vein	Mean, HR
FV	Femoral Vein	Mean, HR
HAZ	Hemiazygos Vein	Mean, HR
HEPV	Hepatic Vein	Mean, HR
INN	Innominate Vein	Mean, HR
SCLV	Subclavian Vein	Mean, HR

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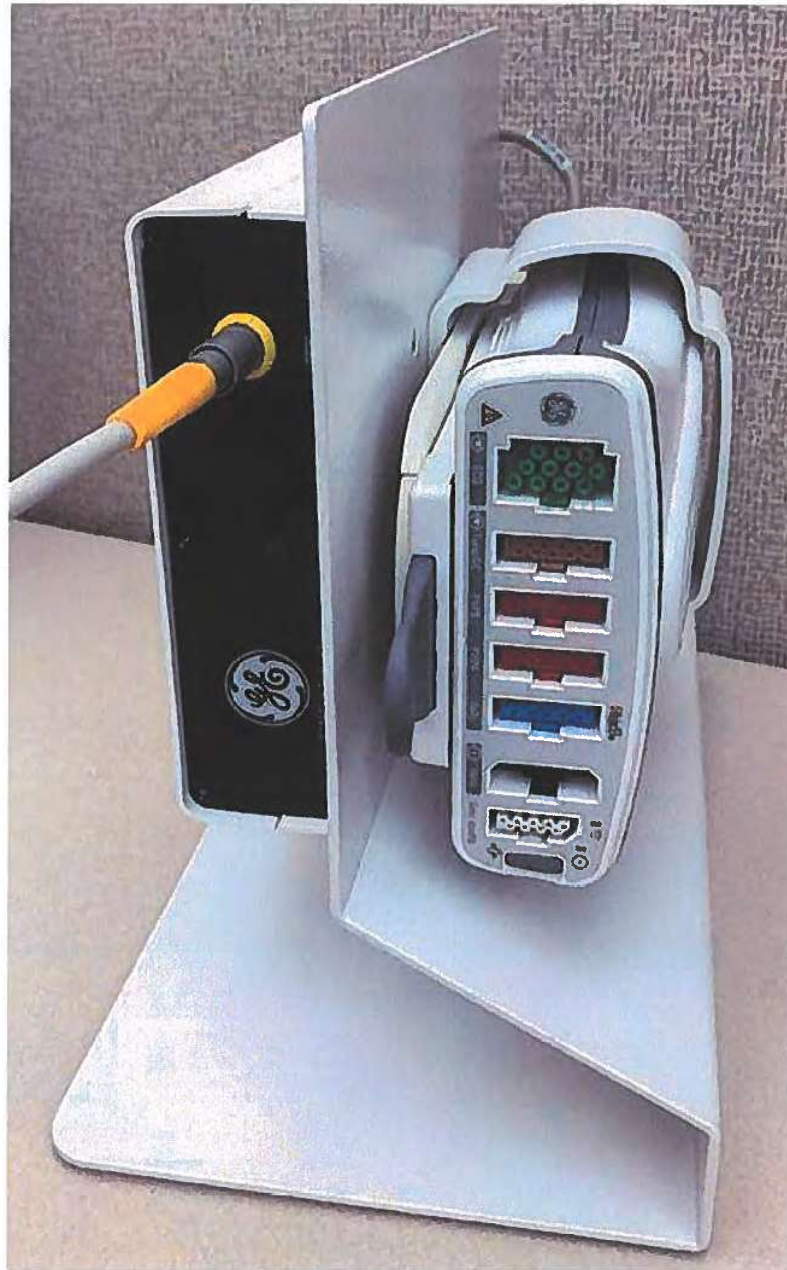
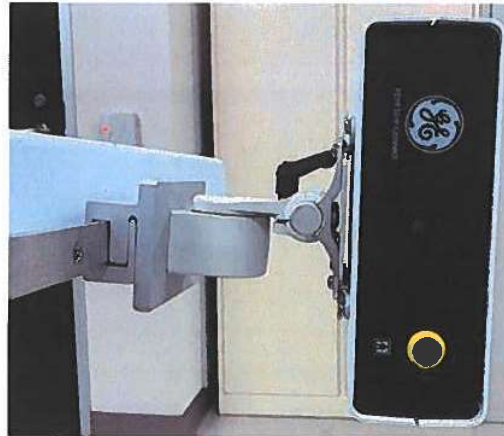
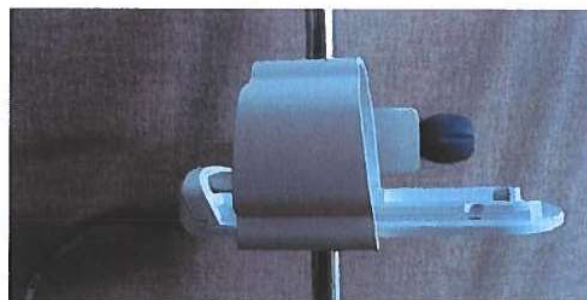
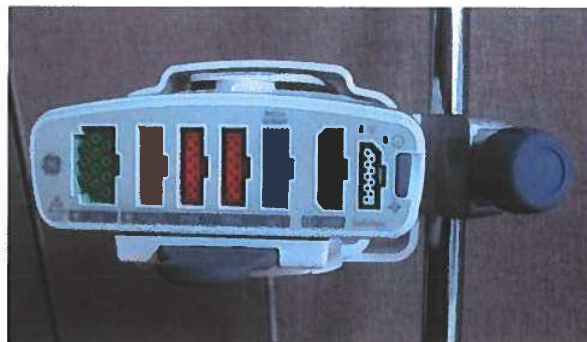
Figure 3-5 PDM Slim Connect and PDM in floor stand**CONFIDENTIAL****SECRET DE
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Figure 3-6 PDM Slim Connect on bedrail**NOTE**

- Ensure the knob is fully tightened when you clamp the PDM to bedrails or poles.
- The distance between the PDM Base Station Plus or PDM Slim Connect and the PDM is greater than the distance of the other mounting configurations. Use a cable of the appropriate length.

Figure 3-7 PDM dock on pole**Figure 3-8 PDM dock and PDM on pole****CONFIDENTIAL****SECRET DE
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Chapter 14 Macros

Macros consolidate routine actions into a single command and build automation into the case. Macros can change a pressure label, change the pressure scale and make a measurement all in a single command. Macros are also helpful for entering notes into the *Log* window. This chapter describes executing, building, adding, editing and exporting/importing macros.

NOTE

Building or editing a macro requires the administrator sign in. Make sure to sign out as administrator after building or editing the macro.

Macros can only be created while in a study.

NOTE

Macros should not be edited while studies are in progress anywhere on the Centricity Cardiology INW network. Editing macros while live studies are in progress elsewhere on the network may cause permanent loss of macro folders and/or commands.

14.1 Macro window

To open the *Macro* window:

1. Select the **Windows** menu in the *Real-Time* or *Review* window.
2. Select the **Macro** option, position the cursor where the user would like the *Macro* window to appear and left-click. The *Macro* window will open. The *Macro* window can be resized or removed.
- The *Macro* window title bar indicates which macro folder is being displayed. To navigate to the parent folder, select the **Folder Up** icon, or put the cursor on the last line (with the up arrow) and double-click or select **Enter**.

14.2 Execute macros

1. Select the folder that contains the macro to execute.
2. Select the macro and press **Enter**.

You can also double-click the macro to execute it and the steps.

NOTE

Ensure that the **Edit** icon is not active.

The text of the macro changes color when the macro is executed. The color change appears on all workstations that are joined to the study. The color change persists when the study is continued or reviewed.

NOTE

When a macro is executed, the color change is visible for all the macros that have the same macro name.

When an executed macro entry is deleted from the *Log* window, the macro is unhighlighted in the *Macro* window, and, the color change is visible on all the workstations that are joined to the study.

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