Mac-Lab

Cardiac Cath Lab Physiological Recording System

Performance. Integration. Synchronization.

The Mac-Lab™ Hemodynamic Recording System is part of a comprehensive cath lab workflow infrastructure designed to help make you more efficient, more productive and able to focus more on your patients.

Through intelligent design everything works as one. The result: information is available where you think it should be, when you think it should be there, regardless of where it's coming from. With an intuitive Windows® graphical user interface and menus only one or two levels deep, Mac-Lab operation is designed to be quick, easy to use and reliable. User-defined procedural lists and macros can help streamline case flow, speed and overall ease of use, while reporting based on Microsoft® Word simplifies and enables efficient report generation. For enhanced productivity, the Mac-Lab adds the dependability of our multi-parameter TRAM™ and PDM modules for dedicated real-time data acquisition. Industry-standard hardware, on-line help, and the ability to save full-disclosure data to the network Drive and backup to SD card further help enable confident operation. Built-in interactive reporting enables point-and-click data manipulation.

Excellent network capabilities designed to facilitate department productivity

By networking remote workstations, the Mac-Lab creates a seamless data management system throughout the cath lab and allows near-real-time case review outside the department. Integrated documentation and waveform data capabilities help streamline reporting. Networking and connectivity functions include:

- CardioICE™ Synchronized Ultrasound (optional on XT systems) brings together the Mac-Lab and Vivid™ i/q ultrasound systems to provide an integrated workflow solution with exceptional control and access to information. Synchronized Ultrasound begins by bringing the Vivid i/q with ICE into the lab with an innovative bedside mount and takes information integration to the next level. By reproducing the display of the Vivid i/q on the Mac-Lab window, CardioICE allows continuous visualization of the devices inside the cardiac anatomy in real-time, with waveforms. Images captured during the procedure are time-aligned with the waveforms and information, creating a synchronized case report with images, waveforms and information.

- True FFR integration, including direct input of both PressureWire™ Aeris™ wireless technology and SmartMap® pressure instrument and auto-calculation of the FFR value, eliminating the need for a separate FFR analyzer and set-up.

- Invasive Workbench: Integrated research tool helps unlock the potential value of your data, empowering you to explore innovative ways to treat patient populations and perform research[1].

- Multi-Path documentation: Streamlined documentation and reporting workflow helps you document your case with fewer[2] interruptions and still meet your documentation requirements. With the flexibility to start a report anywhere on the network, and the ability to document on multiple stations simultaneously, you are now empowered to focus more on the patient and less on the process.

- Esignature: Integrated electronic signature capabilities give you the ability to sign and lock reports from within Mac-Lab using your system logon and password.

- Automated user tracking: Electronic tagging of each user created medical record with author and location. Facilitate retrospective audit of tasks and help eliminate the need for manual event log signatures.

Flexible system configurations offer high functionality and value

GE Healthcare offers Mac-Lab systems in configurations tailored to help address the demands of your clinical caseload:

- Mac-Lab IT for essential functionality and exceptional performance.
- Mac-Lab XT for efficient information integration of high volume labs.

System Features and Options

GE Innova™ X-ray bi-directional interface	
Innova Central tableside touch screen interface	
Mainstream/ Sidestream End-Tidal CO_2[1]	
Dual or triple monitor system configuration	
CardioImage Fluoroscopy Image Management System	
Integrated Vitals and Audible Indicators to facilitate data recording[1]	
Coronary diagramming module[1]	
Continuous ST Segment analysis window	
Cath Measurement Display: real-time display of patient hemodynamic status	
Networking solutions	• INW Central Server for networked data storage • Nursing Workstation for simultaneous data entry • Holding area Client Workstation with connectivity to GE CARESCAPE™ B450 and B650, Dash™ 3000/4000/5000 and GE Solar™ 8000M/i (with TRAM or PDM) bedside monitors
CVIS Applications (via Centricity™ CVIS)	• Administrative and Clinical Statistics • Inventory • Electronic white board scheduling module • ADT, Orders, Billing, Results Interface(s)

Specifications

Technical specifications

Processor/Data Storage	• Intel® Xeon® 3.5 GHz Quad-core or greater processor • 16 GB of RAM • 2 x 500 GB in RAID 1 hard drives • DVD RW drive • SDHC Card • MS SQL Server® 2008 Standard Edition • Optical Scroll Mouse • Microsoft Windows 7 Ultimate for Embedded Systems (32-bit) • Microsoft Office Professional Plus 2010
Networking	100/1000 Mbps Base-T Ethernet, TCP/IP
Monitors	• 20" or larger flat panel • 1600 × 1200 resolution
Printer option	• Black & White HP M401n[1] • Color HP M451nw[1]

Environmental, electrical specifications

Operating temperature	+15°C to +30°C
Storage temperature	-10°C to +50°C
Storage humidity	10% to 85% non-condensing
Maximum current draw	15A/ 120V

[1] Not available in all markets

[2] As compared to previous releases of Mac-Lab

CardioImage Fluoroscopy Image Management system option

- Acquire analog monochrome video with 1280 × 1024 resolution at 72 frames/second, with a maximum input frequency of 135MHz, or acquire analog RGB color video from 1 input with resolution up to 1920 × 1200 at 60 frames/second, or acquire digital video (DVI-D) from 1 input with resolution up to 1920 × 1200 at 60 frames/second.

Physiologic recordings

Amplifiers	Modular transport design
ECG	12-lead with ST segment analysis
Respiration	Impedance method (0-200 breaths per min range)
Cardiac Output	Thermodilution, calculated and estimated Fick
Invasive pressure	4 channels with means (-25 to 249mmHg range)
Non-invasive pressure	Automatic and manual modes (oscillometric)
Pulse Oximetry	Saturation range 1-100% (accuracy 70-100% +/- 3)

Physical specifications

	Width (in/cm)	Depth (in/cm)	Height (in/cm)	Weight (lbs/kg)
Computer – HP z440	6.7/16.9	17.5/44.5	17.0/43	30.3/13.8
Workstation Desk – 65"	65/165	30/76	29.5/74.9	340/154
Workstation Desk – 47"	47/119	30/76	29.5/74.9	265/120
Accessory Cart -27"	27/68.5	28/71	30/76.2	300/136
PDM Base Station Plus	11.3/28.6	13.0/33.1	3.3/8.4	5.5/2.5
PDM	5.8/14.77	10.1/25.7	3.1/7.9	2.4/1.1
Flat Panel Monitor (20")	17.7/45	9/22.8	17.2/43.68	22/10
Flat Panel Monitor (21")	18.3/46.5	8.2/20.9	17.8/45.3	19/8.6
Integrated Electronics Box (IEB)	11/28	21/53	24.5/62	75/34

Centricity Cardiology INW Server Specifications - GE Supplied Hardware

HP ML350p Gen9	INW Server
Processor	2.4 GHz 6-core Intel Xeon® or greater processor
Memory	32 GB/PC3L-10600R
Storage	C: RAID 1 – two 300 GB Hot Pluggable SAS D: RAID 6 – 6 1.2 TB Hot Pluggable SAS
DVD-ROM	SATA
Case	Rack Mount
Number of Studies[3]	4.5 TB for on-line studies; storage for Approximately 240,000 Cath Studies Approximately 24,000 EP studies
Software Configurations	• Centricity INW Server Application • MS Windows Server 2008 R2 for Embedded Systems, MS SQL Server 2008 Standard Edition

Client Workstation Specifications - GE Supplied Hardware

	Client Workstation
Processor	Intel® Xeon® 3.5 GHz Quad-core or greater
Memory	16 GB of RAM
Storage	2 x 500 GB in RAID 1 hard drives
Monitor Resolution	1600 × 1200 resolution
Network Interface	One IEEE 802.3 100/1000 BASE-T compatible network interface. TCP/IP to the Centricity Cardiology INW Server.
Media & Accessories	DVD Drive, SDHC card drive, keyboard, mouse, required cables and accessories
Monitor	20" or larger flat panel
Included Software	Microsoft Windows 7 Ultimate for Embedded Systems (32-bit), Microsoft Office Professional Plus 2010, MS SQL Server® 2008 Express Edition

Virtual Client Minimum Specifications - Customer supplied Hardware

When purchasing the software-only version of INW Client software the following requirements must be met.
Even when these minimum requirements are met, GE does not guarantee successful installation of SW-only client.

CPU	Intel Quad-Core processor with Virtual Technology. Minimum of i5-4570 or equivalent Xeon processor.
Memory	Host system requires at least 8GB of RAM 2GB of which is allocated to Virtual Review Client
USB	Host system requires at least 1 USB port
Hard Drive	Host system requires 50 GB of free hard drive space for each Virtual Review Client
Mouse/Keyboard/DVD drive	System requires standard keyboard, USB mouse and a DVD-R drive
Network Interface	IEEE 802.3 100 or 1000 BASE-T compatible network interface card for connectivity to the Centricity Cardiology INW Server
Video Display	Host system must provide minimum resolution of 1600 × 1200 set to True Color (32-bit) with a refresh rate of at least 60Hz.
Customer-supplied software requirements	• Operating System: Windows 7 64-bit, Windows 8 64-bit or Windows 10 64-bit with VMware Workstation Player • VMware Player: VMware Workstation Player 12.5.0 (recommended) • VMware Tools: Tools v10.0.10.4301679 • NOTE: The Virtual Review is not compatible with the VMware Player's Unity Mode
Safety Protocol	When used in a patient care area, the hardware must meet IEC60601-1

Virtual Client Software not available in all markets.

[3] Assumes 20 MB per Cath Study and 200 MB per EP Study (average case size can vary depending on usage preferences).

GE imagination at work

About GE Healthcare

GE Healthcare provides transformational medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world. GE works on things that matter - great people and technologies taking on tough challenges. From medical imaging, software & IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improvement solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

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