

# Mac-Lab/CardioLab/ Centricity Cardiology INW Service Manual

## Instructions

Version 6.5

2021423-022

Revision J



**GE Medical Systems**  
*Information Technologies*

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[gemedical.com](http://gemedical.com)

The information in this manual only applies to Mac-Lab/CardioLab/ Centricity CardiologyINW Service Manual software version 6.5. It does not apply to earlier software versions. Due to continuing product innovation, specifications in this manual are subject to change without notice.

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# 1 Introduction

# Document Information

## Revision History

A	01 October 2005	Initial release of manual.
B	01 November 2005	Added INNOVA CENTRAL/Touch Screen Information.
C	04 November 2005	Updated per SPRs MMSmk91579, MMSmk93781
D	02 February 2006	Updated per SPR's MMSmk: 93782, 93704, 93799, 93806, 93637, 93981, 94543, 95886
E	14 April 2006	Updated per SPR's MMSmk: 78357, 94852, 96437, 96450, 96587, 88710, 97368
F	19 October 2006	Updated per ECR 03162-002. Updated per SPR's: MMSmk95352, MMSmk98580, MMSmk99502 and GEHmk00131.
G	6 June 2007	Updated per SPR: GEHmk02912, GEHmk03343, GEHmk03491, GEHmk03772, GEHmk03912, GEHmk04773, GEHmk05983, GEHmk06122, GEHmk07646, GEHmk07733, GEHmk08228, GEHmk08525, GEHmk09209, GEHmk09210, GEHmk09258, GEHmk09409, GEHmk09648, GEHmk10366.
H	14 December 2007	Updated for 6.5.4 Update
J	11 September 2013	Updated to include installation and troubleshooting procedures for the Matrox Quad video board.



## Purpose

This manual contains the instructions necessary to operate and service the Mac-Lab/CardioLab system safely in accordance with its function and intended use. These instructions include but are not limited to:

- Describing fundamental controls and indicators.
- Operating procedures.
- Connecting and disconnecting detachable parts and accessories.
- Troubleshooting and service procedures.

## Intended Audience

This manual is intended for the person who maintains and troubleshoots this equipment.

## Related Manuals

Part Number	Document
2021423-015	Mac-Lab Operator's Manual
2021423-016	CardioLab Operator's Manual
2021423-017	Centricity Cardiology INW Operator's Manual
2021423-018	Mac-Lab/CardioLab Security Guide
2021423-021	Mac-Lab/CardioLab/Centricity Cardiology INW Pre-Installation Manual
2021423-023	Mac-Lab/CardioLab System Installation Manual

## Statement of Indications for Use

The Mac-Lab/CardioLab/Centricity Cardiology INW Server software applications are intended to be installed and run on an applicable ITE compliant hardware platforms (minimum Hardware Essential Performance be ITE compliant) which may not meet leakage and/or EMC requirements of patient care area equipment. This means but is not limited to the following (unless the medical electrical standard [EN60601-1-1 and EN60601-1-2] is followed)

The Mac-Lab/CardioLab/Centricity Cardiology INW Server hardware does not directly deliver energy to the Patient.

The Mac-Lab/CardioLab/Centricity Cardiology INW Server hardware does not indirectly control energy delivered to the Patient.

The Mac-Lab/CardioLab/Centricity Cardiology INW Server hardware is not directly connected to the Patient.

The Mac-Lab/CardioLab/Centricity Cardiology INW Server hardware is not installed or used in the Patient vicinity.

Patient Vicinity summarized as follows:

A space, within a location intended for the examination and treatment of patients, extending 6 ft (1.83 m) beyond the normal location of the bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically to 8 ft 2.4 in. (2.5 m) above the floor.

Areas where healthcare staff members monitor patients and perform charting and administrative tasks are not considered to be Patient Vicinity areas.

## Mac-Lab System

The Mac-Lab system is intended for use under the direct supervision of a licensed healthcare practitioner to monitor, calculate, or record cardiovascular data from patients as they undergo cardiac catheterization. Cardiovascular data may be manually entered or acquired via interfaced GE Medical Systems *Information Technologies* TRAM modules, MUSE cardiovascular system, and other interfaced information systems. Data includes: ECG waveforms, heart rate, pulse oximetry (SpO<sub>2</sub>), respiration rate, valve gradients and areas, cardiac output, hemodynamic measurements, invasive and non-invasive blood

pressure, procedural information, and optional intracardiac electrocardiogram (IECG).

This is applicable to pediatric and adult patients requiring cardiac/circulatory system catheterization. This is intended for use in catheterization and related cardiovascular specialty laboratories.

## CardioLab System

The intended use of the CardioLab system is to acquire, filter, digitize, amplify, display, and record electrical signals obtained during electrophysiological studies and related procedures conducted in an electrophysiological laboratory. Signal types acquired include ECG signals, direct cardiac signals, and pressure recordings. Physiological parameters such as diastolic, systolic, and mean blood pressure, heart rate, and cycle length may be derived from the signal data, displayed and recorded. The system allows the user to monitor the acquisition of data, review the data, store the data, perform elementary caliper-type measurements of the data, and generate reports on the data. Additionally, the system may acquire, amplify, display, and record data received from other medical devices typically used during these procedures, such as imaging devices and RF generators.

The CardioLab EP system does not control the delivery of energy, administer drugs, perform any life-supporting or life-sustaining functions, or analyze physiological data or other data acquired during an EP procedure. It does not transmit alarms or arrhythmias and does not have arrhythmia detection capabilities.

# Chapter Contents

- 1 Introduction: This chapter describes the Service manual and chapter contents. Also included are general safety requirements, service requirements, equipment symbols, and serial number identification information.
- 2 Equipment Overview: This chapter describes the equipment and its technical characteristics, connector locations, and preparation for use.
- 3 Maintenance: This chapter contains a preventive maintenance schedule and cleaning guidelines.
- 4 Troubleshooting: This chapter contains troubleshooting instructions and functional test directions.
- 5 Recovery: This chapter details procedures to restore a workstation or server in the field after failure.
- 6 Parts List: This chapter contains a list of Field Replaceable parts.
- A Abbreviations: This appendix lists all abbreviations used with the system.

## Security Information

Validated configurations consist of product scenario implementations that are test against GE product failure and sample cases run to simulate a real environment while conducting testing. GE provides service and support based on validated configurations only and bears responsibility for GE products only.

## Non-Validated Software Applications

This is to detail the policy for non-validated software applications applied to Invasive Cardiology monitoring products:

- GE Mac-Lab Hemodynamic Systems
- GE CardioLab Electrophysiology Systems
- GE ComboLab Hemo and EP Systems
- GE Centricity INW Server

Please remember that these products are a Class II device under the FDA regulations and should be treated as secondary monitoring medical devices.

## Policy

Our policy is that we do not recommend installations of any other third party software applications (i.e. not mentioned above) on the products above as they could affect performance, warranty and serviceability. Examples of such might include other Anti-Virus programs, print servers, interface engines, anti-spyware, anti-adware, viruses, malware, etc. GE does not support the use or installation of these non-validated applications or tools. If such programs are installed the customer bears the risk of the product not functioning properly and any risks that are introduced for patient safety. GE will not guarantee support for an environment that is different than a validated implementation. In cases where this is found and technical assistance is requested, GE will provide support, by first eliminating the third party software on the product and bringing it back to a known and validated configuration. If it is found that the third party software is the cause of product failure, any costs associated with this will be the responsibility of the hospital.

At GE Healthcare we understand the uniqueness of our customers and pride ourselves in the personalized solutions we provide to help you in your quest to care for patients. We hope this section will help you to better understand our policy on non-validated software applications and we hope you can work with us as we proceed in further developing our products for your future benefit.

## Validated Third Party Software

Currently validated and allowed third party software such as Enterprise Back-up, Archival, Anti-virus and other applications to run on the same computer are:

## Enterprise Backup Software

Mac-Lab/ CardioLab/ ComboLab	5.x	IT (v. 6.0 & v. 6.1)	IT (Version 6.5)
Tivoli Storage Manager	N/A	v. 5.2.2	v. 5.4
ARCserve	v. 6.5	v. 11.0	v. 11.5
Veritas	v. 8.6	v. 9.1	v. 10.0
Legato Networker	-	-	v. 7.4
Symantec	-	-	v. 11D

## Anti-Virus Software

Mac-Lab/ CardioLab/ ComboLab	5.x	IT (v. 6.0 & v. 6.1)	IT (Version 6.5)
Symantec	v. 8.0	v. 8.1	v. 10.2
McAfee	v. 4.5.1	v. 7.x	v. 8.5i with Protection Pilot 1.5
Norton Professional	v. 8.0	v. 8.1	2007
Trend Micro	-	-	Corporate v. 8.0 (English)  v.7.3 (Except English and Swedish)
eTrust	-	-	EZ Antivirus 2005 v. 7.1
CA Antivirus	-	-	r8.1

Archival: Storage Area Network (SAN) (equal to a mapped network drive)

3rd Party: PedCath

<b>Language</b>	<b>PedCath Version</b>
English	v. 7.6.5
French	v. 7.5.5
Italian	v. 7.5.5
Spanish	v. 7.5.5
Japanese	v. 7.4.3J

### NOTE

Chinese systems will use the Japanese version of PedCath. Swedish/  
German systems will use the English version of PedCath.



# Service Information

## Service Requirements

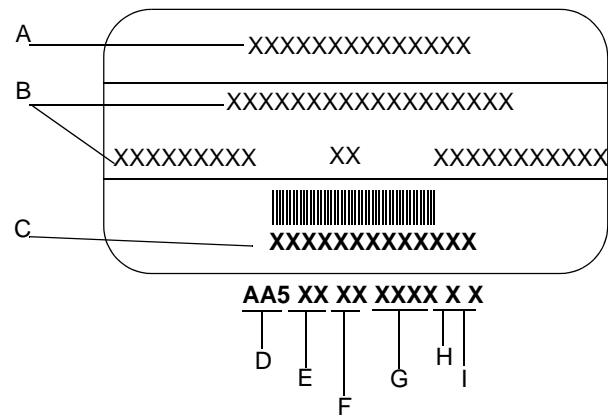
Follow the service requirements listed below:

- Equipment servicing should be performed by GE Medical Systems Information Technologies authorized service personnel only.
- Any unauthorized attempt to repair equipment under warranty voids that warranty.
- It is the user's responsibility to report the need for service to GE Medical Systems Information Technologies or one of their authorized agents.
- Failure on the part of the responsible individual, hospital, or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.
- Regular maintenance, irrespective of usage, is essential to ensure that the system is always functional when required.

# Equipment Identification

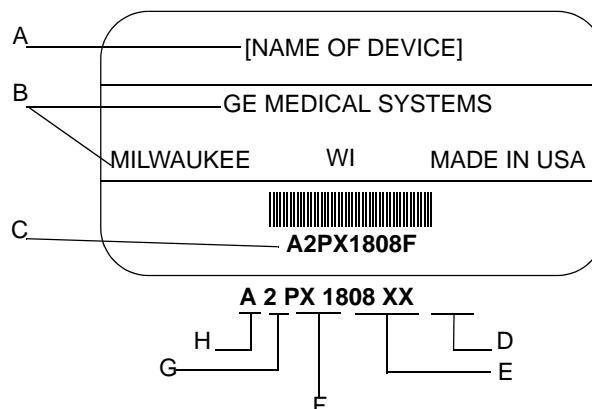
Every system has a unique serial number for identification. The serial number appears on the product labels which are located on the top of the CPU, front and back of the Integrated Electronics Box (IEB), right side of the RAC 4A, back of the TRAM and back of the Amplifier.

## Identification Tags



Identification Tags	
Item	Name
A	Name of Device
B	Manufacturer
C	Serial Number
D	3 digit product code
E	Year Manufactured
F	Fiscal Week
G	Product Sequence Number
H	Manufacturing Site
I	Misc.

## Old Identification Tags



Identification Tag		
Item	Name	Description
A	Name of Device	Cathlab Computer, CLABII Plus Amplifier or Cath Lab IEB Box
B	Manufacturer	GE Medical Systems <i>Information Technologies</i>
C	Serial Number	Unique Identifier
D	Facility Code	F or G = Milwaukee, P = Bangalore, S = Border Ops (Juarez/El Paso)
E	Product Sequence Number	Manufacturing number of total units manufactured
F	Product Code	Two character product descriptor
G	Year Manufactured	9 = 1999, 0 = 2000 (and so on)
H	Month Manufactured	A = January, B = February (and so on)

## Required Tools and Supplies

The following is a list of tools needed to service the Mac-Lab/CardioLab system:

- Adjustable wrench with a 1-inch capacity
- Phillips screwdriver
- Needle nose pliers
- Pliers
- Socket wrench (3/16 inch to 1 inch size bits)
- Phillips head screwdriver (small and large sizes)
- Flat head screwdriver (small and large sizes)
- Cutting pliers
- Power outlet ground tester
- Grounding strap
- Signal generator with ECG, pressure, cardiac output, and temperature outputs.
- Cables to connect simulator to ECG inputs of amplifier and TRAM
- Cables to connect the simulator to the catheter input modules (2 mm shielded)
- Adapter cable to connect the simulator to the amplifier and TRAM pressure inputs
- Cables to connect the simulator to the TRAM, cardiac output, and temperature inputs

## Power Input Requirements

If the equipment is installed in the USA and uses 240V rather than 120V, the source must be a center-tapped, 240V single phase circuit (120V, 20A; 240V, 10A).

# Safety Information

Follow all of the instructions and warnings marked included in this manual and save these instructions for later use. However, these instructions in no way supersede current medical practices regarding patient care and safety.

## Electromagnetic Compatibility and Interference

This catheterization system meets the requirements of the European Medical Device Directive, and by reference, the requirements for electromagnetic compatibility specified by EN 60601-1-2. This equipment is not likely to interfere with other equipment, except with certain types of rate adaptive pacemakers that rely on bioelectric impedance measurement (BIM) technology. Also, interference with the operation of this equipment is not likely to result from proximity to general equipment.

This equipment meets or exceeds Class A immunity levels. However, avoid the use of strong intentional radio transmitters in the immediate vicinity, including cellular telephones. The use of strong unintentional radiators, such as electrosurgical equipment, may cause some level of interference. GE Medical Systems Information Technologies offers optional ECG patient cables with electrosurgical noise filtering, which reduces the level of interference on ECG traces.

If using electrosurgical or RF ablation equipment in conjunction with this equipment, select an ESU filtered cable. For more information about management of the equipment in the clinical environment (from an electromagnetic compatibility perspective) consult the Association for the Advancement of Medical Instrumentation's technical information report *Guidance on Electromagnetic Compatibility of Medical Devices for Clinical/Biomedical Engineers*.

## Responsibility of the Manufacturer

GE Medical Systems Information Technologies is responsible for the effects of safety, reliability, and performance only if:

- Installation operations, extensions, readjustments, modifications, or repairs are performed by persons authorized by GE Medical Systems Information Technologies.
- The equipment is used in accordance with the instructions provided.

- The user attaches only accessory equipment recommended for interaction with the amplifier.

## General

This system is intended for use under the direct supervision of a licensed health care practitioner.

The Mac-Lab/CardioLab system maintains leakage currents below medical limits with an isolation transformer which is incorporated into the design of the integrated electronics box (IEB). The system power is supplied by a dedicated power supply on an isolated circuit for proper behavior of the system.

To ensure patient safety, use only parts and accessories manufactured or recommended by GE Medical Systems Information Technologies. Parts and accessories used must meet the requirements for the applicable EN 60601 series safety standards, and the system configuration must meet the requirements of the EN 60601-1 medical electrical systems standard. Contact GE Medical Systems Information Technologies before connecting any device to this system that is not recommended for use in this manual.

If the equipment is installed in the USA and uses 240V rather than 120V, the source must be a center-tapped, 240V single-phase circuit.

To ensure patient safety, use only parts and accessories manufactured or recommended by GE Medical Systems Information Technologies.

This equipment should only be connected as specified by GE Medical Systems Information Technologies. Installation of the equipment should only be performed by qualified GE Medical Systems Information Technologies service representatives. Connection of the system to the equipment is not recommended in this manual.

Contact GE Medical Systems Information Technologies for information before connecting any device to this equipment that is not recommended in this manual. Only cables and accessory equipment purchased from GE Medical Systems Information Technologies should be used in conjunction with the system.

It is important that all of the instructions in this manual be followed. However, these instructions in no way supersede current medical practices regarding patient care and safety.

Refer servicing of the equipment to GE Medical Systems Information Technologies authorized service personnel. Any attempt to repair equipment under warranty will void that warranty.

Failure on the part of responsible individuals or institutions to implement a satisfactory equipment maintenance schedule may lead to undue equipment failure and possible health hazards.

The use of ACCESSORY equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration relating to the choice includes:

- Use of the accessory in the Patient Vicinity.
- Evidence that the safety certification of the Accessory is performed in accordance with the appropriate EN 60601-1 and EN 60601-1 harmonized national standard.

# Equipment Symbols

Equipment Symbols

Descriptions


CE Marking



Underwriters Laboratories, Inc.

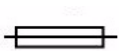
Classified by Underwriters Laboratories Inc. with respect to electric shock, fire, mechanical and other specified hazards, only in accordance with UL 2601-1, CAN/CSA C22.2 No. 601.1, IEC 60601-1, and, if required, IEC 60601-2-27, IEC 60601-2-30, IEC 60601-2-34, IEC 60601-1-1.

Power Ratings Chart:

	V~	I	
50-60 Hz	100 - 240V	0.50A - 0.25A	3A, 250V

V~ = Voltage

I = Current



Fuse =

Equipotentiality

A nonessential electrical connection which may be used to connect the chassis to other equipment to achieve the same potential.



Type CF Equipment that is Defibrillator Proof

Type CF Applied Part: Isolated (floating) applied part suitable for intentional external and internal application to the patient excluding direct cardiac application. The “paddles” outside the box indicate that the part is defibrillator proof.

(Medical Standard Definition:) F-Type applied part (floating/isolated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards provide a higher degree of protection against electric shock than that provided by Type B applied parts.



## Equipment Symbols

## Descriptions



## Type CF Equipment

Type CF Applied Part: Isolated (floating) applied part suitable for intentional external and internal application to the patient excluding direct cardiac application.

(Medical Standard Definition:) F-Type applied part (floating/isolated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards provide a higher degree of protection against electric shock than that provided by Type B applied parts.

## Attention

Pay attention to the documents delivered with the equipment.



## Input Symbol



## Compliance Information

### Mac-Lab/CardioLab System

Table 1. Declaration - Electromagnetic Emissions

The Mac-Lab / CardioLab System is intended for use in the electromagnetic environment specified below. The customer or the user of the Mac-Lab / CardioLab System should assure that it is used in such an environment.		
Emissions Tests	Compliance	Electromagnetic environment guidance
RF emissions CISPR 11	Group 1	The Mac-Lab / CardioLab System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Mac-Lab / CardioLab System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/Flicker emissions IEC 61000-3-3	Complies	

Table 2. Declaration - Electromagnetic Immunity


The Mac-Lab / CardioLab System is intended for use in the electromagnetic environment specified below. The customer or the user of the Mac-Lab / CardioLab System should assure that it is used in such an environment.			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2kV for power supply lines ± 1 kV for input/output lines	± 2kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1kV differential mode ± 2kV common mode	± 1kV differential mode ± 2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% 100-120Vac <5% 200-240Vac (>95% dip) for 0,5 cycle  40% 100-120Vac 40% 200-240Vac (>60% dip) for 5 cycles  70% 100-120Vac 70% 200-240Vac (>30% dip) for 25 cycles  <5% 100-120Vac <5% 200-240Vac (>95% dip) for 5 seconds	<5% 100-120Vac <5% 200-240Vac (>95% dip) for 0,5 cycle  40% 100-120Vac 40% 200-240Vac (>60% dip) for 5 cycles  70% 100-120Vac 70% 200-240Vac (>30% dip) for 25 cycles  <5% 100-120Vac <5% 200-240Vac (>95% dip) for 5 seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Mac-Lab / CardioLab System requires continued operation during power mains interruptions, it is recommended that the Mac-Lab / CardioLab System be powered from an Uninterruptable power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location typical commercial or hospital environment.

**Table 3. Declaration - Electromagnetic Immunity**

The Mac-Lab / CardioLab System is intended for use in the electromagnetic environment specified below. The customer or the user of the Mac-Lab / CardioLab System should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
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Table 3. Declaration - Electromagnetic Immunity

Conducted RF emissions IEC 61000-4-6	3 Vrms 105kHz to 80 MHz	3 Vrms	<p>Portable and mobile RF communications equipment should be used no closer to any part of the Mac-Lab / CardioLab System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance (d)</p> <p><math>d = 1.17 P</math></p>
Radiated RF emissions IEC 61000-4-3	3V/m 80 MHz to 2,5 GHz	3 V/m	<p><math>d = 1.17 P</math></p> <p><math>d = 2.33 P</math></p> <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters(m). Field Strengths from fixed RF transmitters, as determined by a electromagnetic site survey a, should be less than the compliance level in each frequency range b. Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div style="text-align: center;">  </div>

**Table 3. Declaration - Electromagnetic Immunity**

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflected from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Mac-Lab / CardioLab System is used exceeds the applicable RF compliance level above the Mac-Lab / CardioLab System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Mac-Lab / CardioLab System.

b Over the frequency range 150 kHz to 80 MHz. Field strengths should be less than 3 V/m.

# Centricity Cardiology INW

## File Server EMC Immunity Performance

The Centricity Cardiology INW information system file server was subjected to:

- Electrical Fast Transient (EFT) bursts applied to the AC power mains, per CISPR 24. EFT bursts on the AC power mains may temporarily reduce network performance/bandwidth. Operator intervention is not required and normal performance returns upon cessation of the EFT event.
- Users should be aware of known RF sources, such as radio or TV stations and hand-held or mobile two-way radios, and consider them when installing a device or system.

## File Server Accessory EMC Immunity Performance

The Sony CRT monitor was subjected to:

Fast Transient Surges (FTS) of 2 KV applied to the AC power lines common mode (line to earth), per CISPR24. FTSs of 2 KV or greater may cause the Sony CRT monitor to experience unrecoverable hardware failure.

### NOTE

The Sony CRT monitor meets/passes the IEC61000-4-5 ITE requirement of 1 KV.

The UPS was subjected to:

Fast Transient Surges (FTS) of 2 KV applied to the AC power lines common mode (line to earth), per CISPR24. FTSs of 2 KV or greater may cause the UPS to go into bypass mode and require a manual reset for normal operation.

# Conventions

## Safety Messages

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### DANGER

— Safety messages which indicate an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.

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### WARNING

— Safety messages which indicate a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.

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### CAUTION

— Safety messages which indicate a potentially hazardous situation which, if not avoided may result in minor or moderate injury, loss of data or system failure.

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### NOTE

Messages which provide additional user information.

## Definitions

- Items shown in Black text are keys on the keyboard, text to be entered, or hardware items such as buttons or switches on the equipment.
- Items shown in *Italicized* text are software terms which identify menu items, buttons, or options in various windows.
- To perform an operation which appears with a plus (+) sign between the names of two keys, you press and hold the first key while pressing the second key once. This is called a keystroke combination. For example, Press Ctrl+Esc means to press and hold down the Ctrl key while pressing the Esc key.
- When instructions are given for typing a precise text string with one or more spaces, the point where the spacebar must be pressed is indicated as: <Space>. The purpose of the < > brackets is to ensure you press the spacebar when required.

- Enter means to press the **Enter** or **Return** key on the keyboard. Do not type **enter**.

## Hazard Statements

### Dangers

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#### DANGER

**EXPLOSION/FIRE HAZARD** — Using this equipment in the presences of flammable gasses (including anesthetics and oxygen) may cause an explosion or fire.

Always use this equipment in a well ventilated area away from the presence of potentially flammable gasses

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### Warnings

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#### WARNING

**PATIENT SHOCK HAZARD** — Only connect UL/IEC 60601-1 certified medical equipment.

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#### WARNING

**EQUIPMENT DAMAGE** — **DO NOT** allow hydraulic fluid from any device to contact any conductive surface. Hydraulic fluid is electrically conductive.

If fluid of any kind should leak into the system, discontinue use of the equipment and contact GE Medical Systems Information Technologies immediately.

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#### WARNING

**MISINTERPRETATION OF DATA** — The system may report erroneous heart rate values when pacemaker spikes or arrhythmias are present. Reported values should be verified by a qualified physician.

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**WARNING**

**PATIENT SHOCK/EQUIPMENT DAMAGE** — Keep the conductive parts of lead electrodes and associated parts away from other conducting parts, including earth.

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**WARNING**

**PATIENT SHOCK/EQUIPMENT DAMAGE** — **DO NOT** contact the amplifier or patient during defibrillation.

Standby defibrillation equipment is required in the event that the patient needs to be cardioverted or defibrillated. Disconnect leadwires from patient before defibrillating. Otherwise, serious injury, death, or damage to the equipment could result.

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**WARNING**

**PATIENT SAFETY** — All equipment not complying with EN 60601-1 should be placed outside the patient environment.

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**WARNING**

**POWER SUPPLY SAFETY** — Total system earth leakage current must not exceed 500 microamperes.

Voltages between the three power outlet connections must be accurate **BEFORE** measuring power outlet ground-to-neutral loop resistance.

Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded when using or servicing the system.

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**WARNING**

**POWER SUPPLY/SHOCK HAZARD** — To reduce the risk of electric shock or damage to the equipment, do not disable the power cord grounding feature. This equipment is designed for connection to a grounded (earthed) power outlet.

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**WARNING**

**MISINTERPRETATION OF DATA** — A qualified physician must overread all computer-generated measurements and tracings. Computerized interpretation is only significant when used in conjunction with clinical findings.

Signal quality should be checked only by a licensed health care practitioner.

All computer assisted measurement functions must be verified by a licensed health care practitioner.

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**WARNING**

**LEAKAGE CURRENT SAFETY** — The system should be tested yearly for adequate grounding on patient leakage current.

Keep leakage current within acceptable limits when connecting auxiliary equipment to the system.

When more than two electrical devices are interconnected, the summation of leakage currents must be checked yearly.

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**WARNING**

**LOCK OUT/TAG OUT** — Use appropriate Lock Out/Tag Out procedures whenever an energy hazard exists, such as disconnecting equipment to perform maintenance.

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**WARNING**

**MAINTENANCE/SERVICE** — High voltages exist in the unit. Use insulated tools. Remove jewelry and use only one hand when possible.

Always disconnect power from the equipment before attempting service.

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**WARNING**

**PERSONAL/PATIENT SAFETY** — Keep hands, hair, jewelry and loose clothing away from moving parts. Otherwise, serious injury could result.

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**WARNING**

**REPLACEMENT PARTS** — Replace only with the same type and rating of fuse.

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**WARNING**

**POWER SUPPLY** — The supply line must be fused and capable of delivering 16A.

Route the AC power cable away from moving parts.

Connect only to a properly earth grounded outlet.

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**WARNING**

**PATIENT SAFETY** — This device is intended for use under the direct supervision of a licensed health care practitioner.

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**WARNING**

**SHOCK HAZARD** — Electrical shock hazard between chassis ground and isolated (floating) ground when power is applied. Unplug the unit from the power source before proceeding.

To reduce the risk of electric shock or damage to your equipment, do not disable the power cord grounding feature. This equipment is designed for connection to a grounded (earthed) power outlet. The grounding plug is an important safety feature.

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## Cautions

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### CAUTION

— Federal (USA) law restricts this device to sale by or on the order of a physician.

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### CAUTION

INACCURACY OF DATA — DO NOT display any channels which are based on unused catheter input modules. Otherwise, erroneous values may occur.

ECG signal quality should only be checked by qualified medical personnel.

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### CAUTION

EQUIPMENT CABLING DAMAGE — Route optical cables thorough conduit in the ceiling or floor to avoid damage to the cables of cable connectors.

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### CAUTION

EQUIPMENT USE — DO NOT reuse single use devices.

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### CAUTION

EMC — No known electromagnetic or other interference between the system exists. However, precautions should be taken to avoid the use of cellular telephones, pagers, or other transmitters.

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### CAUTION

EQUIPMENT DAMAGE — Exit the software application properly before turning off the system. Failure to do so may damage the optical disk.

Remove the optical disk before moving the system. Failure to do so may result in damage to the drive or the disk.

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**CAUTION**

**TRANSDUCER** — Remove air that is trapped in the transducer or associated tubing by flushing the system according to Cath lab procedures.

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**CAUTION**

**REMOTE MONITOR** — Always power the system through separate isolation transformers which are independently connected to a wall outlet. You can power the laser printer through the IEB/Workstation power supply. Otherwise, the printer may draw enough current away from the system and cause it to reboot.

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**CAUTION**

**SOFTWARE** — DO NOT add unauthorized software to the Mac-Lab/CardioLab system. Doing so may make the Mac-Lab/CardioLab software unstable.

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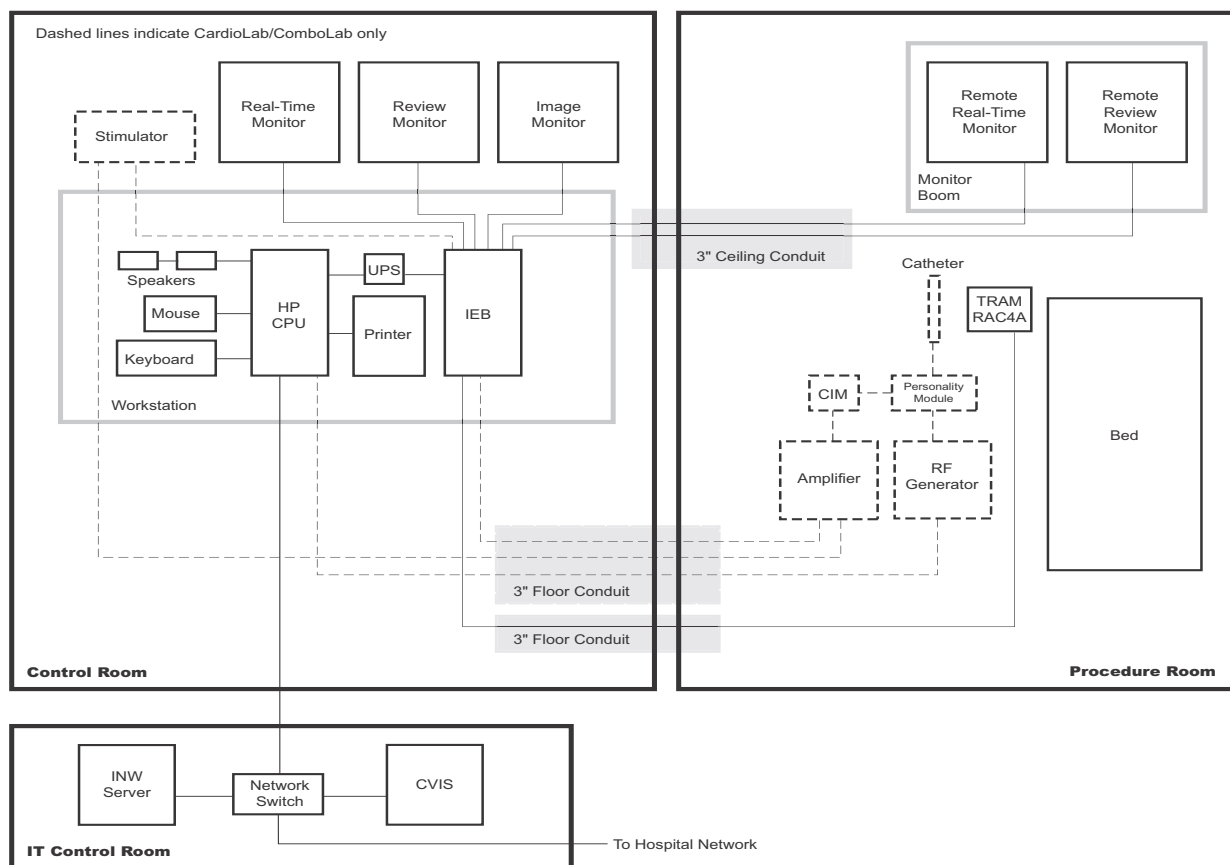
# 2 Equipment Overview

# Typical System Configuration

This system is used to assess the cardiac condition of patients and may consist of either Mac-Lab (hemodynamic), CardioLab (electrophysiologic), or ComboLab (both systems).

The system may be standalone or connected to a network. Network installations include an INW and an optional CVIS server.

The block diagram below shows a typical setup.



001



# System Hardware

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**WARNING****— LOCK OUT/TAG OUT**

Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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## Network Components

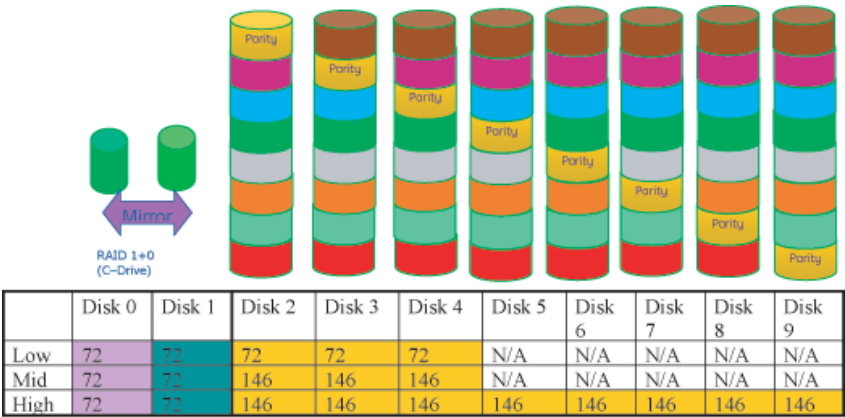
- **INW Server provides**
  - ◆ Network repository for patient studies
  - ◆ Acquisition and review workstation access to patient studies
- **CVIS Server provides**
  - ◆ Central list management for staff, supplies, etc.
  - ◆ Patient scheduling
  - ◆ Patient information
  - ◆ Inventory Management
  - ◆ Statistical Reports

Servers

INW G5 Server



The G5 server has the following specifications:

- Intel Dual-Core Xeon 5120/1.86 GHz (1066 MHz) with 4MB Level 2 cache (2MB per core)
- Three tiers:
  - ◆ Low: Three 72 GB drives
  - ◆ Mid: Three 146 GB drives
  - ◆ High: Eight 146 GB drives
- Separate C: and D: drives (see the chart below):
  - ◆ The C: drive is RAID 1 mirrored
  - ◆ The D: drive is RAID 5 mirrored





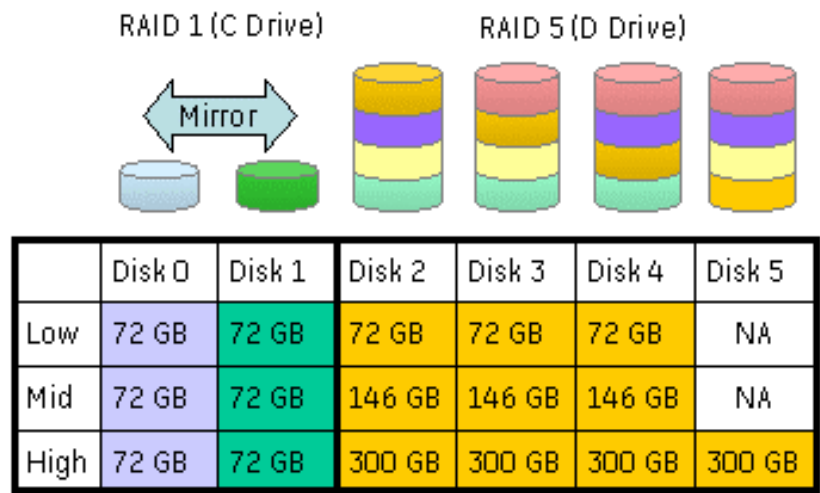
308

Picture	Name	Description
	HP SMART ARRAY P/400	<ul style="list-style-type: none"><li>■ Part Number: 2036800-038</li><li>■ Function: Hard drive RAID controller</li><li>■ Location: Slot 4, 5</li></ul>
	HP BBWC ENABLE - MEM - 1 GB DIMM	<ul style="list-style-type: none"><li>■ Part Number: 2036798-017</li><li>■ Function: Improves server performance and decreases data loss potential if power is lost</li><li>■ Location: Slots 1, 5</li></ul>

INW G4 Server

The G4 server has the following specifications:




- 3.2 GHz Xeon processor with 1 GB RAM
- Three tiers:
  - ◆ Low: Three 72 GB drives
  - ◆ Mid: Three 146 GB drives
  - ◆ High: Four 300 GB drives
- Separate C: and D: drives (see the chart below):
  - ◆ The C: drive is RAID 1 mirrored
  - ◆ The D: drive is RAID 5 mirrored



C Drive - RAID 1 mirrored drive on **ALL** configurations



402

Picture	Name	Description
	HP PCI GIGABIT NIC	<ul style="list-style-type: none"> <li>Part Number: 2026881-001</li> <li>Function: Provides reliable network connection</li> </ul> <p><b>NOTE</b> On G4 servers, connect the ethernet cable to the NIC card. Do not use the motherboard network port.</p> <ul style="list-style-type: none"> <li>Location: Slot 5</li> </ul>
	HP SMART ARRAY 641	<ul style="list-style-type: none"> <li>Part Number: 2016993-001</li> <li>Function: Hard drive RAID controller</li> <li>Location: Slot 2</li> </ul>
	HP BBWC ENABLE - MEM - 128 MB DDR	<ul style="list-style-type: none"> <li>Part Number: 2026817-001</li> <li>Function: Improves server performance and decreases data loss potential if power is lost</li> <li>Location: Connected to the SMART ARRAY card in Slot 2</li> </ul>

## INW G3 Server

The G3 server has the following specifications:

- 2.8 GHz Xeon processor with 512 MB RAM
- Three tiers:
  - ◆ Low: One 72 GB drives
  - ◆ Mid: Three 146 GB drives (RAID 5 mirrored)
  - ◆ High: Six 146 GB drives (RAID 5 mirrored)



401

# Acquisition Workstation Configuration

## Control Room Components

- **Integrated Electronics Box (IEB):** The IEB provides power to local system components, signal pass through video and communications.
- **Uninterruptible Power Supply (UPS):** The UPS provides emergency power to the HP computer.
- **HP Acquisition computer**
  - ◆ USB Mouse
  - ◆ Keyboard
- **Monitors:** Two monitors (Real-Time and Review) are standard. A third Image monitor is optional.
- **Local speakers:** Provide output for ECG QRS tone and optional audible indicators.
- **A laser printer:** Prints images or reports.
- **Barcode scanner**

## Remote Components

- **Monitors:** One remote monitor is standard (and is software switchable between Real-Time and Review windows). A second monitor is optional.
- **Remote speakers:** Provide output for ECG QRS tone and optional audible indicators in the procedure room.

## Other Related System Equipment

- **TRAMnet:** The TRAMnet gathers patient data for the Mac-Lab system. The TRAMnet consists of a Remote Acquisition Case (RAC-4A) and a Transport Remote Acquisition Module (TRAM).
- **CLab II Plus Amplifier:** The Amplifier gathers data for both the ComboLab and CardioLab systems.
- **CARTO™ XP System (Patient Interface Unit):** Provides 3D electroanatomical cardiac maps to the CardioLab.
- **Analog Output Box:** Distributes HR and BP signals from the TRAMnet and Amplifier to other equipment.
- **Review or Nurses workstation**
- **Video Printer**

## Acquisition Workstation System Components

### Integrated Electronics Box (IEB)

The IEB provides power to local system components, signal pass through video and communications. A modem for dial-up communications may be present, depending on which IEB is installed. Three versions of the IEB are available to handle different line voltages: 100, 120, and 240 VAC.

The IEB consists of the following components:

- Video Multiplexer (VID MUX) board to distribute video signals from the video cards in the HP computer to the monitors.
- I/O board to provide signal pass through for other system components.
- Isolation transformer:
  - ◆ Conforms to IEC 60601-1
  - ◆ 2.0 kVA medical grade high-isolation transformation
  - ◆ Provides either 120 VAC (for 100 and 120 VAC systems) or 240 VAC. The primary and secondary windings are wired in parallel for 120 VAC and in series for 240 VAC.

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#### CAUTION

— If the transformer must be disconnected for any reason, ensure the connections are correct.

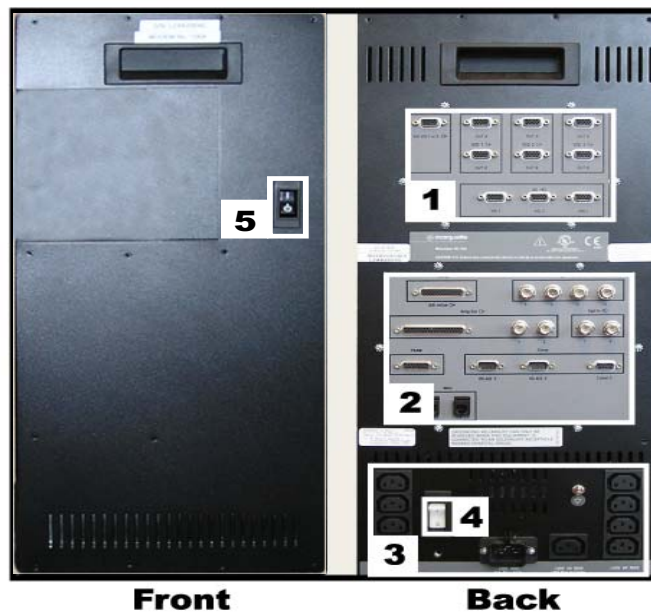
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- Power Distribution panel provides conditioned power to local system components.
- Depending on which IEB is installed, a modem and modem power supply for dial-up communication may be present. The power supply accepts any line voltage and converts it into 9 VDC.



## External Components and Connections

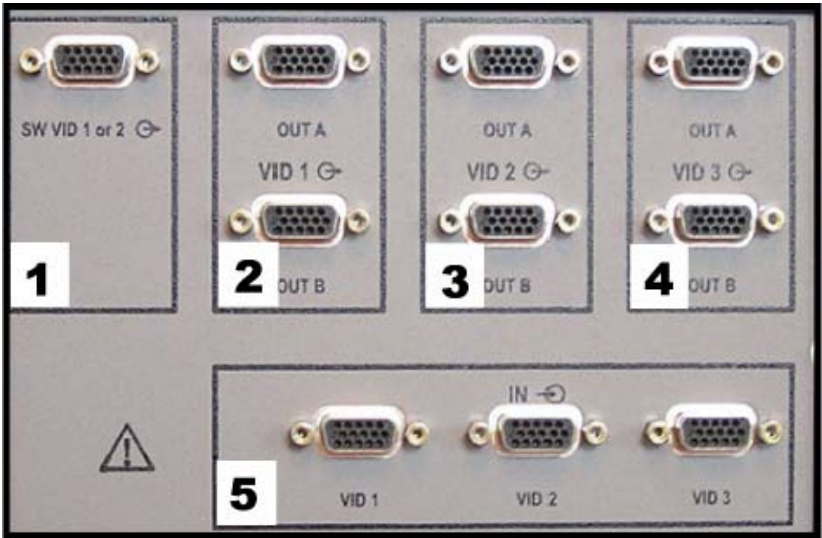


190b

Label	Part Number	Description
1	2003681-003	VID MUX board
2	2003680-001	I/O Board
3	N/A	Power Connections. The bottom right connector is for the HP computer and the four vertical connectors on the right and left are for peripheral equipment.
4	N/A	Thermal Overcurrent Circuit Breaker. This breaker protects all internal components and external devices connected to the IEB.
5	N/A	Main Power Switch. This switch controls power to all internal components and external devices except the HP computer.

Both the Main Power switch on the front of the IEB and the Thermal Overload circuit breaker on the back must be on for the system to power up.

Video Multiplexer (VID MUX) Board

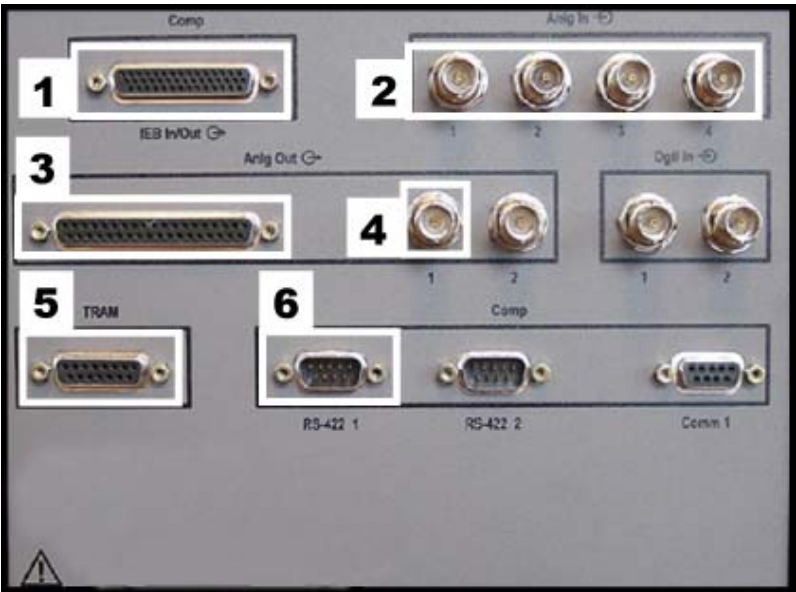


197c

Label	Description
1	Switched video out (Video 1 or 2). This is used when the facility has only one remote monitor. To switch monitors: <div>■Mac-Lab: Go to the main menu and select <i>Windows &gt; Physician Video</i> ■CardioLab: Use the dropdown box just under the main menu.</div>
2	Video 1 (Real-time) out to local monitor (bottom) and remote monitor (top)
3	Video 2 (Review) out to local monitor (bottom) and remote (top)
4	Video 3 (CardioImage) out to local monitor (bottom) and remote (top)
5	(L to R) Video 1, Video 2, Video 3 in from HP Computer Matrox AGP Video board (Vid 1 and Vid 2) and the Matrox PCI Video board (Vid 3)

The VID MUX board amplifies ( $\pm 5V$  1.25A from the internal IEB DC power supply. See “[Internal Components and Connections](#)” on page 2-17) and distributes the video signals from the HP Computer (See “[HP8400 Video Connections](#)” on page 2-61, “[HP8200 Video Connections](#)” on page 2-62 or “[HP8000 Video Connections](#)” on page 2-63).

I/O Board



196c

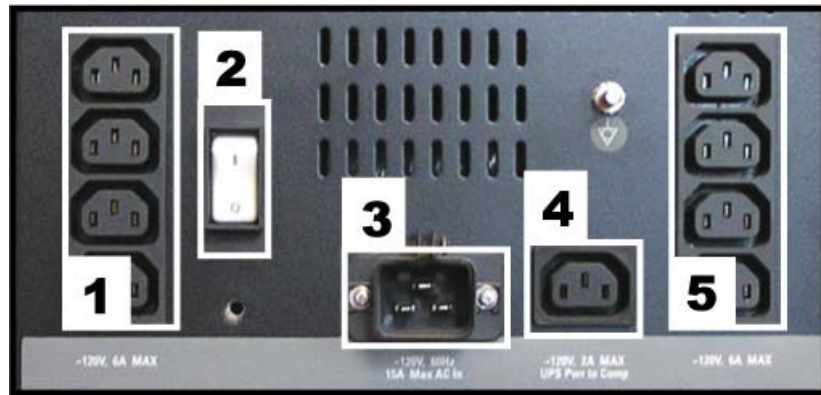
Label	Description
1	<b>Analog I/O Communications.</b> Connects to the HP Computer PCI Comms board.
2	<b>Analog in</b> from another system (Fluoro, etc.).
3	Connection to the Analog Output Box.
4	<b>Analog out</b> (Stimulator, etc.).
5	<b>I/O TRAM</b> (includes 16.5VDC power).
6	Output to HP Computer TRAMnet to Ethernet to Adapter board.

Refer to the following cabling diagrams:

- **“HP8400 Communications Connections”** on page 2-65
- **“HP8200 Communications Connections”** on page 2-66
- **“HP8000 Communications Connections”** on page 2-67
- **“HP8400 TRAM/Amplifier Connections”** on page 2-68
- **“HP8200 TRAM/Amplifier Connections”** on page 2-69

- “HP8000 TRAM/Amplifier Connections” on page 2-70

## Power Connections

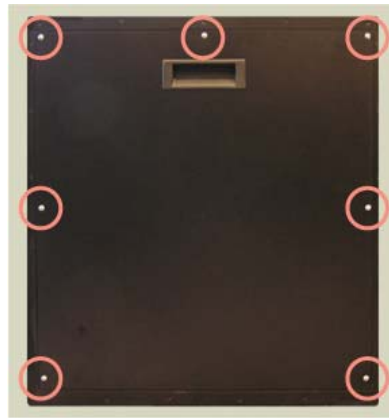


198c

Label	Description
1 & 5	AC out to local equipment (6A @ 120 VAC max.; 3A @ 240 VAC max.)
2	Thermal Overcurrent circuit breaker. Protects all internal components and external devices connected to the IEB.
3	AC main power in (15A @ 120 VAC max; 7A, @ 240 VAC max.)
4	AC power out to UPS (2A @ 120 VAC max; 1A, @ 240 VAC max.)

See the cabling diagram, “Power Connections” on page 2-60.

## Disassembly



191  
b

### Open Case

1. Remove 7 side-panel screws.
2. Lift the side panel out.



193  
a

### Remove Connection Boards

1. Open the case.
2. Remove the board screws.
3. Disconnect interior cables.

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### WARNING

— Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before opening any equipment.

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## Internal Components and Connections



195c

Label	Part Number	Description
1	2003681-003 2003680-001	Video and I/O boards (rear view)
2	2013535-001	Power Supply: Provides $\pm 5$ VDC 1.25A for the Vid MUX board and +16.5 VDC for the RAC-4A.
3	2003263-001	Terminal Strip

## Uninterruptible Power Supply (UPS)

The UPS is designed to maintain power to the computer during a power outage.

### NOTE

The UPS provides uninterrupted power to the HP computer. The monitors and other peripherals will not remain on if power is lost.



199



Part Number	Description
2034077-001	UPS Powercom, 120V, 50/60 Hz, 1500 VA, BNT
2034078-001	UPS Powercom, 230V, 50/60 Hz, 1500 VA, BNT
2034079-001	UPS Powercom, 100V, 50/60 Hz, 1500 VA, BNT

## HP Computer

The HP computer is used for either Acquisition systems or Review workstations and has the following components:

- Floppy drive (Drive A:) - **On 8000/8200 only.**
- Primary Hard Drive with two partitions
  - ◆ C: Application partition
  - ◆ D: Data partition
- Magneto-Optical drive (Drive E:)- **Optional on 8200/8400.**
- DVD-RAM drive or CD-RW drive (Drive F:).

### NOTE

The drive used to store application studies is determined by the file paths set in under *System Settings* in the main application menu.

- Secondary Hard Drive (Drive G:).
- Four standard expansion cards (plus two optional cards):
  - ◆ Video board provides video out for the Real-Time (Video 1) and Review (Video 2) monitors. (Matrox Parhelia PCI for 8400 and 8200, Matrox AGP Parhelia for 8000)
  - ◆ TRAMnet to Ethernet Adapter board for communication with the TRAM in the RAC 4A
  - ◆ PCI Communication board to provides Amplifier Communication, Analog and Digital I/O, and Switched video (video out from the IEB).
  - ◆ Dual NIC Adapter board provides Network connection.
  - ◆ (optional on 8400): Adaptec Ultra320 SCSI PCIe board for supporting MO drive.
  - ◆ (optional on 8200 and 8400): Matrox Odyssey XA board used to capture images from an X-Ray or other imaging system.
  - ◆ (optional on 8200 and 8000): Matrox Odyssey XPro board used to capture images from an X-Ray or other imaging system.
  - ◆ (optional on 8400): ATI FIREGL V5200 256MB PCI-E Video board. Provides video out for optional (video 3) monitor.
  - ◆ (optional on 8200): ATI FIREGL V5100 128MB PCI-E Video board. Provides video out for optional (video 3) monitor
  - ◆ (optional on 8000): Matrox PCI Parhelia Video board provides video out for the optional (video 3) monitor.

## External Components and Connections for the HP8400



306

Label	Part Number	Description
1	2028599-002	DVD-RAM Drive
2	N/A	Power Switch, LEDs, USB, Firewire, and Audio connections
3	N/A	AC Power
4	N/A	Backplane I/O panel
5	N/A	Board Slots
Not Shown	2003340-001	Magneto-Optical Drive (optional)
Not Shown	2026539-001	HP USB 2-Button Optical Mouse with Wheel
Not Shown	Various	Keyboard (dependent on language)

External Components and Connections for the HP8200



200a

Label	Part Number	Description
1	2028599-001	DVD-RAM Drive
2	2026804-001	Floppy Drive
3	N/A	Power Switch, LEDs, USB, Firewire, and Audio connections
4	N/A	AC Power
5	N/A	Backplane I/O panel
6	N/A	Board Slots
Not Shown	2003340-001	Magneto-Optical Drive (optional)
Not Shown	2026539-001	HP USB 2-Button Optical Mouse with Wheel
Not Shown	Various	Keyboard (dependent on language)

## External Components and Connections for the HP8000



090b

Label	Part Number	Description
1	2003340-001	Magneto-Optical Drive
2	2028599-001	DVD-RAM Drive
3	2026541-001	Floppy Drive
4	N/A	Power Switch & LEDs
5	N/A	USB, Firewire, and Audio connections
6	N/A	AC Power
7	N/A	Backplane I/O panel
8	N/A	Board Slots.
Not Shown	2026539-001	HP USB 2-Button Optical Mouse with Wheel
Not Shown	Various	Keyboard (dependent on language)

## Disassembly

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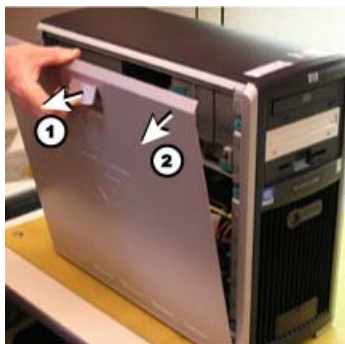
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### WARNING

— Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before opening any equipment.

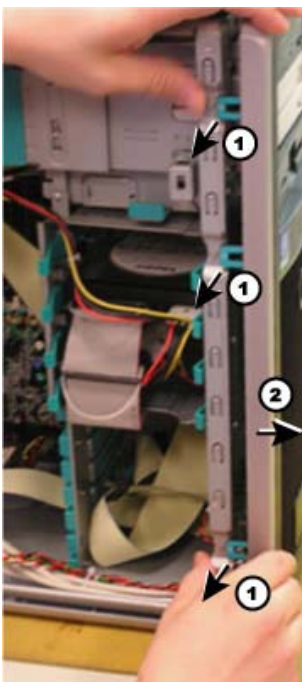
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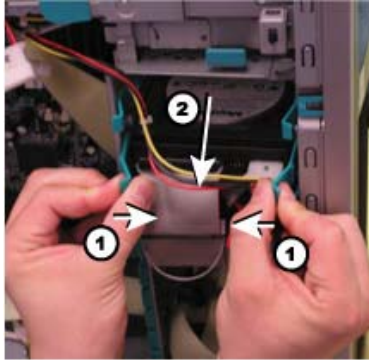
#### Remove Case Side Panel

1. Lift the tab near the top.
2. Swing the side panel out.

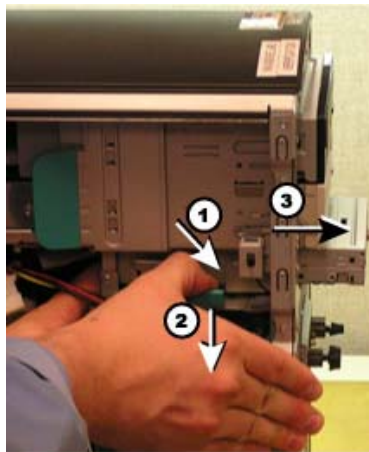


#### Remove Front Panel

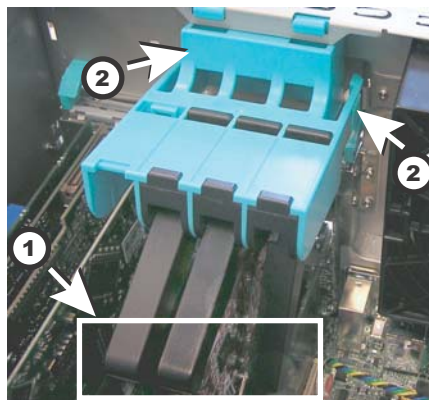
1. Lift tabs indicated.
2. Swing the front panel out.

**Remove Hard Drive**

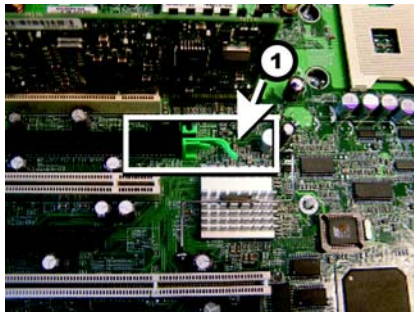
1. Press tabs as indicated.
2. Slide drive out.

**Remove Floppy Drive**

1. Remove screw.
2. Lift tab indicated.
3. Slide drive out.

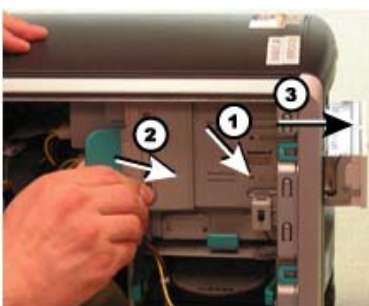
**Remove Clamps**

1. Lift the clamp fingers.
2. Squeeze down the tabs, where indicated. Gently push in, then pull out.
3. Lift off the clamp.



**Remove the ATI FIREGL  
V5100/V5200 128MB/256MB  
PCI-E Video Board (HP8200/  
8400 only)**

1. Lift up the lock arm as shown.
2. Squeeze down the tabs, where indicated. Gently push in, then pull out.
3. Lift off the clamp.



**Remove DVD-RAM Drive**

1. Remove screw.
2. Lift tab indicated.
3. Slide drive out.

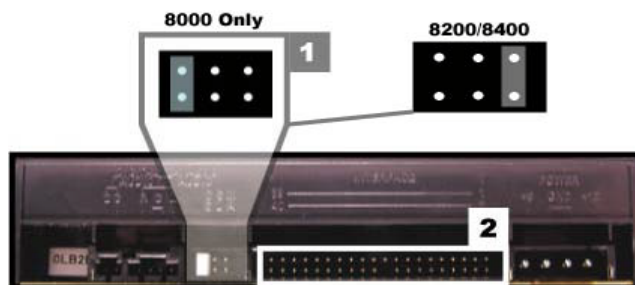


## DVD-RAM Drive

The DVD-RAM drive can also read/write to CDs. The recommended disks have a capacity of approximately 4.7 GB per side.

### NOTE

The drive used to store application studies is determined by the file paths set in under *System Settings* in the main application menu.



092b

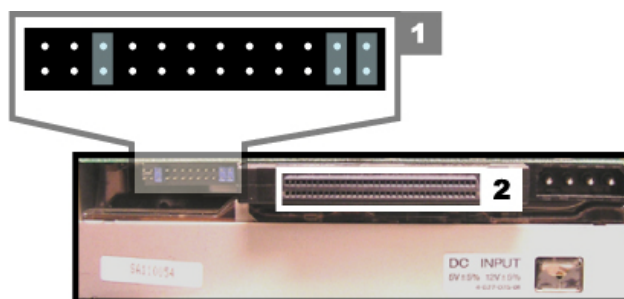
- 1: DVD-RAM Drive Jumpers
- 2: IDE Connector

## Optical Drive

The optical drive is optional upgrade to HP Computers.

### NOTE

Drive use is determined by the file paths set in under *System Settings* in the main application menu.



093b

- 1: Optical Drive Jumpers
- 2: SCSI Adapter (p/n 2012522-002)

### NOTE

Two sets of DIP switches are located on the top optical drive. These are factory preset and must not be changed.

## HP8400 Installed Boards

### 8400 PCI Communication Board



309

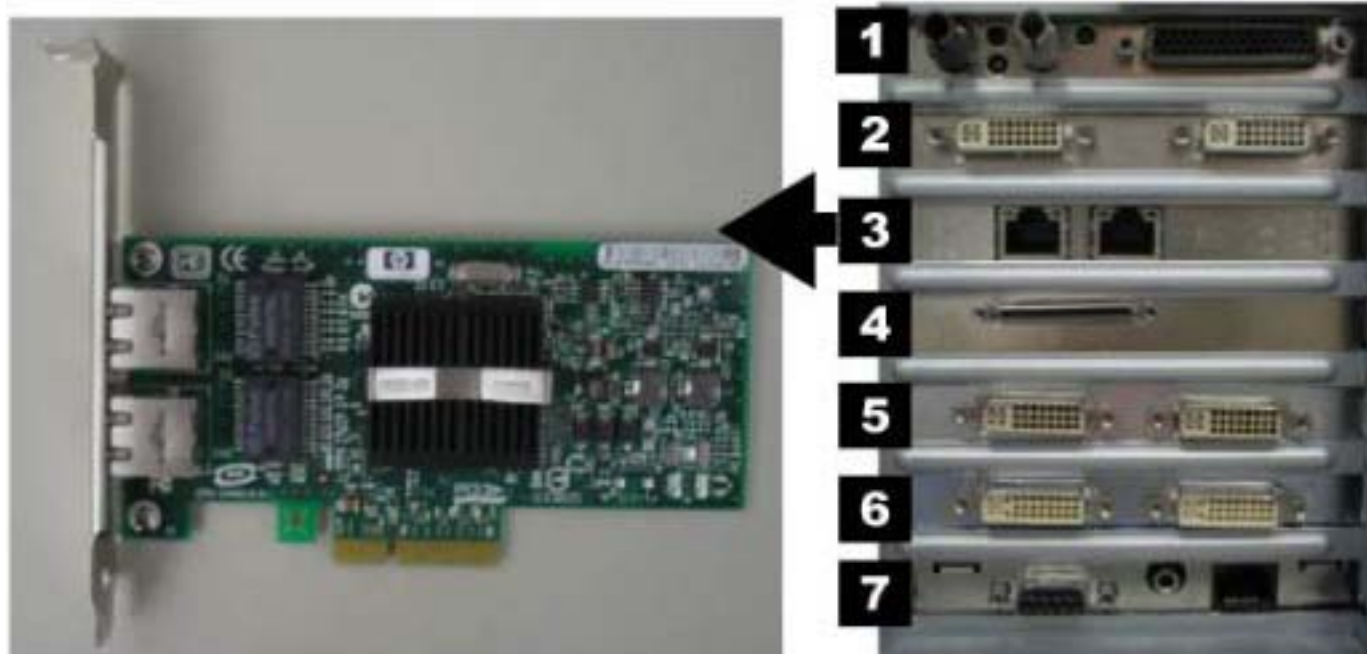
- Part Number: 2014935-002
- Location: Slot 1
- Functions:
  - ◆ Communicates with the C-Lab II Plus Amplifier via the fiber optic connectors
  - ◆ Analog and Digital communication with the IEB via the D-Connector
  - ◆ Provides the video switching signal for the Switched Video output on the IEB via the D-Connector
- I/O: D-Connector to IEB, Fiber Optic Jacks to the Amplifier

**8400 ATI FIREGL V5200 256MB PCI-E Video Board (Optional)**

304

- Part Number: 2026189-002
- Location: Slot 2
- Function: Video out for optional (video 3) monitor
- I/O: Two DVI connectors (only the left one is used)

### 8400 Dual NIC Adapter Board



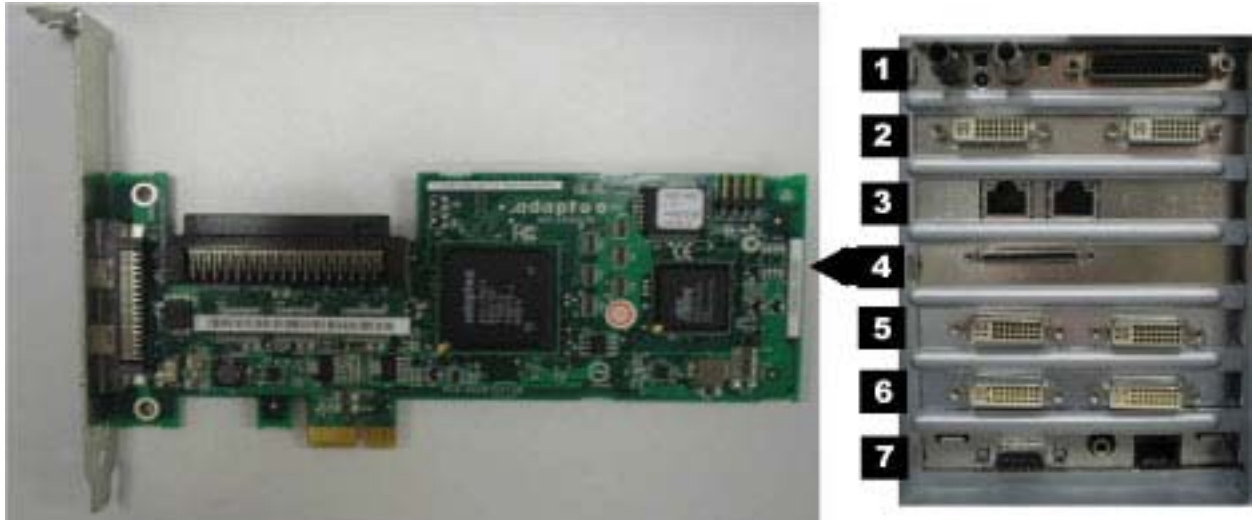
307

- Part Number: 2017795-002
- Location: Slot 3
- Function: Network connection card
- I/O: Two network connection jacks

### 8400 PCIX 2 SCSI Card

#### NOTE

This board is optional with the MO upgrade kit.



- Part Number: 2038632-001
- Location: Slot 4
- Function: Provides SCSI cable connection internally to an optional MO Drive.
- I/O: Two SCSI connectors (only internal SCSI is used)

310

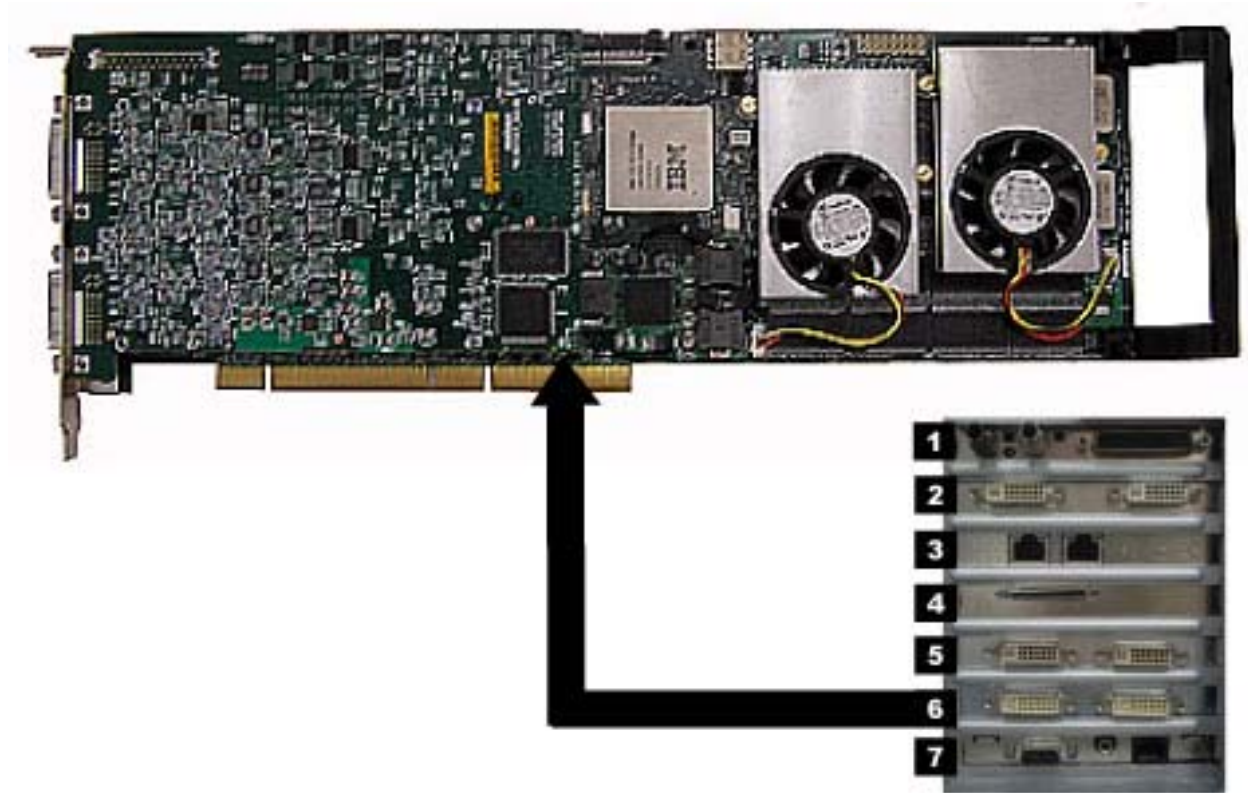
### 8400 MATROX PARHELIA PCI 256 MB Video Card



305

- Part Number: 2026188-001
- Location: Slot 5 (PCI slot)
- Function: Provides video out for the Real-Time (Video 1) and Review (Video 2) monitors. This board supports resolutions of 1280x1024 for Mac-Lab, 1600x1200 for CardioLab.
- I/O: Two DVI connectors
- Included adaptors: DVI to HD15 Video Adapter (2021697-001).

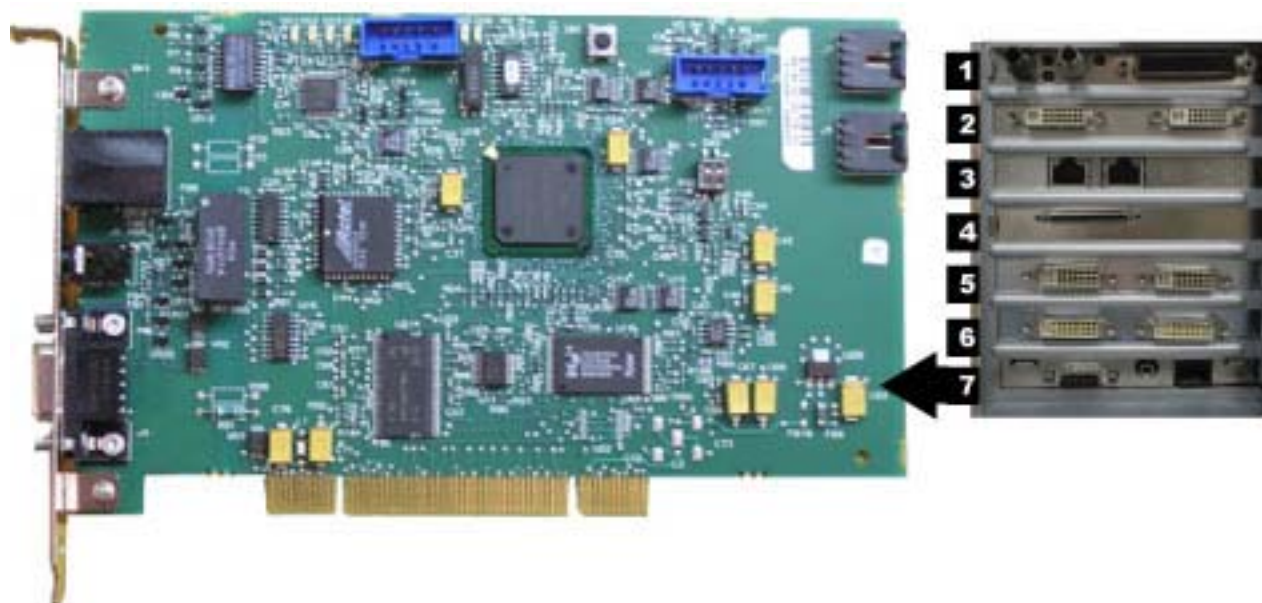


**8400Matrox Odyssey XA Board (Optional)**

- Part Number: 2030688-001
- Location: Slot 6
- Function: Image capture for X-Ray or other imaging systems
- I/O: Two DVI connectors

311

### 8400 TRAMnet to Ethernet Adapter board



- Part Number: 2009937-002
- Location: Slot 7
- Function: Provides communication with the TRAM in the RAC 4A, and converts signals from the TRAM to the ethernet.
- I/O: Network Interface Port and 9-Pin D connector

312

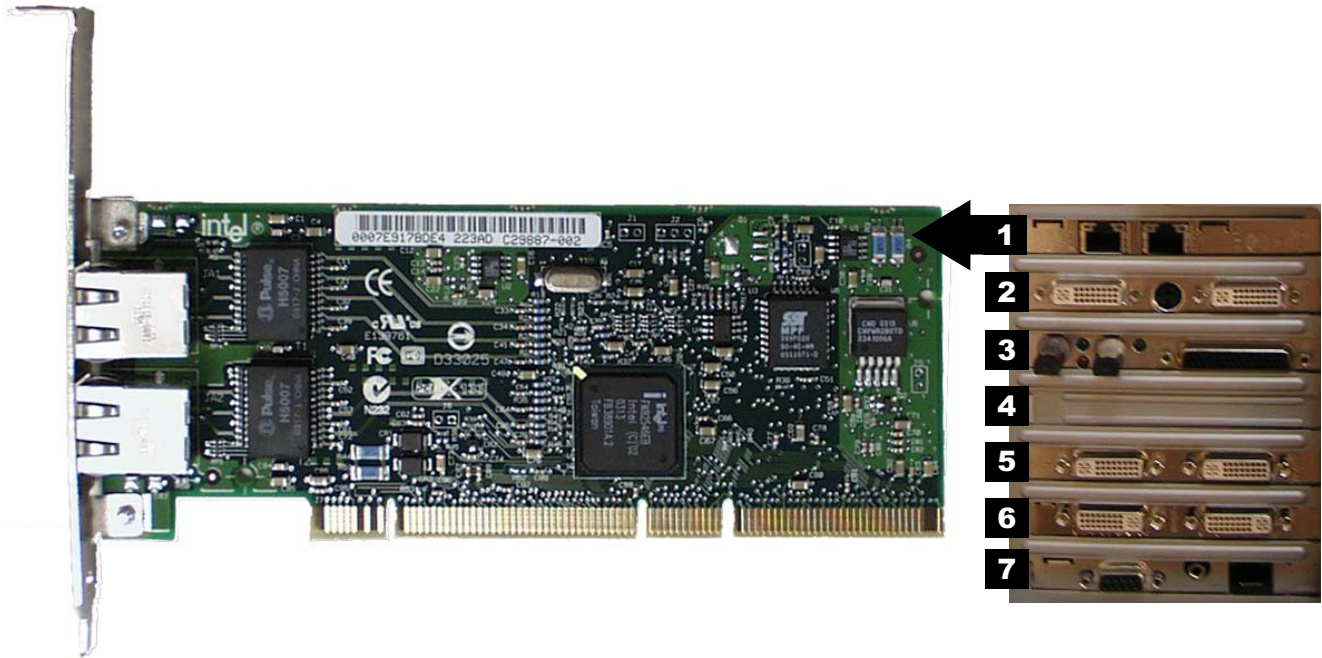


## HP8200 Installed Boards

### NOTE

Slot 4 is not used.

### 8200 Dual NIC Adapter Board



- Part Number: 2017795-001
- Location: Slot 1
- Function: Network connection card
- I/O: Two network connection jacks

201a

### 8200 ATI FIREGL V5100 128MB PCI-E Video Board (Optional)



- Part Number: 2026189-001
- Location: Slot 2
- Function: Video out for optional (video 3) monitor
- I/O: Two DVI connectors (only the left one is used)

202a

### 8200 PCI Communication Board



203a

- Part Number: 2014935-002
- Location: Slot 3
- Functions:
  - ◆ Communicates with the C-Lab II Plus Amplifier via the fiber optic connectors.
  - ◆ Analog and Digital communication with the IEB via the D-Connector.
  - ◆ Provides the video switching signal for the Switched Video output on the IEB via the D-Connector.
- I/O: D-Connector to IEB, Fiber Optic Jacks to the Amplifier

## 8200 MATROX PARHELIA PCI 256 MB Video Card

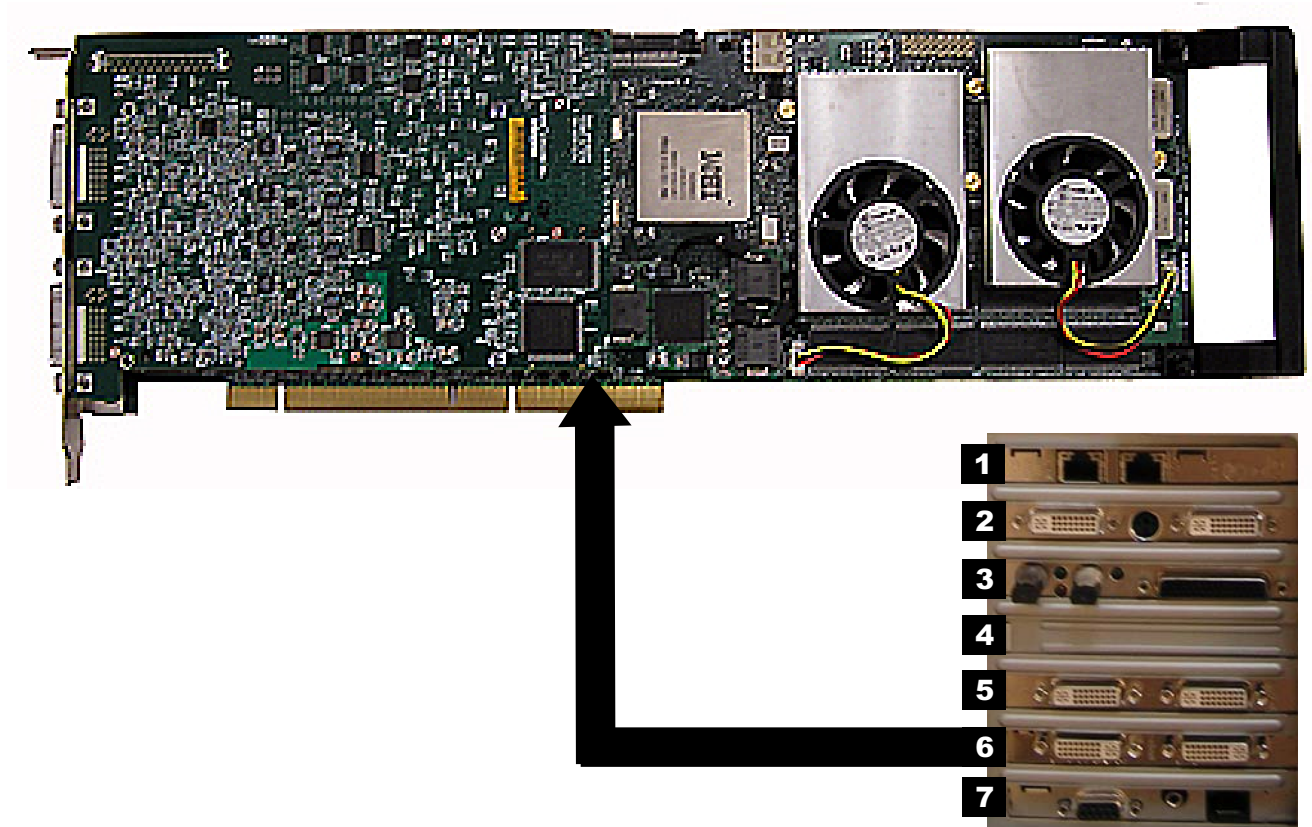


205a

- Part Number: 2026188-001
- Location: Slot 5 (PCI slot)
- Function: Provides video out for the Real-Time (Video 1) and Review (Video 2) monitors. This board supports resolutions of 1280x1024 for Mac-Lab, 1600x1200 for CardioLab.
- I/O: Two DVI connectors
- Included adaptor: DVI to HD15 Video Adapter (2021697-001).



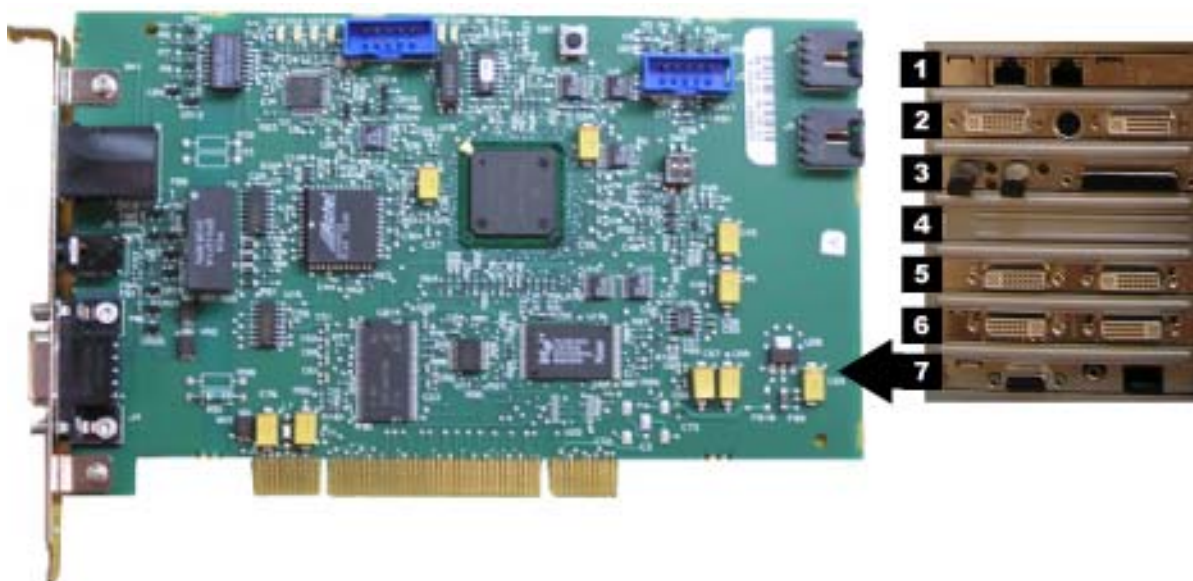
### 8200 Matrox Odyssey XA Board (Optional)



- Part Number: 2030688-001 (replaces initially released part number 2017708-001, Matrox Odyssey XPro board, which is obsolete)
- Location: Slot 6
- Function: Image capture for X-Ray or other imaging systems
- I/O: Two DVI connectors

206a

### 8200 TRAMnet to Ethernet Adapter board



207a

- Part Number: 2009937-002
- Location: Slot 7
- Function: Provides communication with the TRAM in the RAC 4A, and converts signals from the TRAM to the ethernet.
- I/O: Network Interface Port and 9-Pin D connector

## HP8000 Installed Boards

### NOTE

Slot 1 is not used.

### 8000 Matrox AGP Parhelia Video board



- Part Number: 2017707-001
- Location: Slot 2 (AGP slot)
- Function: Provides video out for the Real-Time (Video 1) and Review (Video 2) monitors. This board supports resolutions of 1280x1024 for Mac-Lab, 1600x1200 for CardioLab.
- I/O: Two DVI connectors
- Included adaptor: DVI to HD15 Video Adapter (2021697-001).

102a

## 8000 TRAMnet to Ethernet Adapter board



- Part Number: 2009937-002
- Location: Slot 3
- Function: Provides communication with the TRAM in the RAC 4A, and converts signals from the TRAM to the ethernet.
- I/O: Network Interface Port and 9-Pin D connector

103a

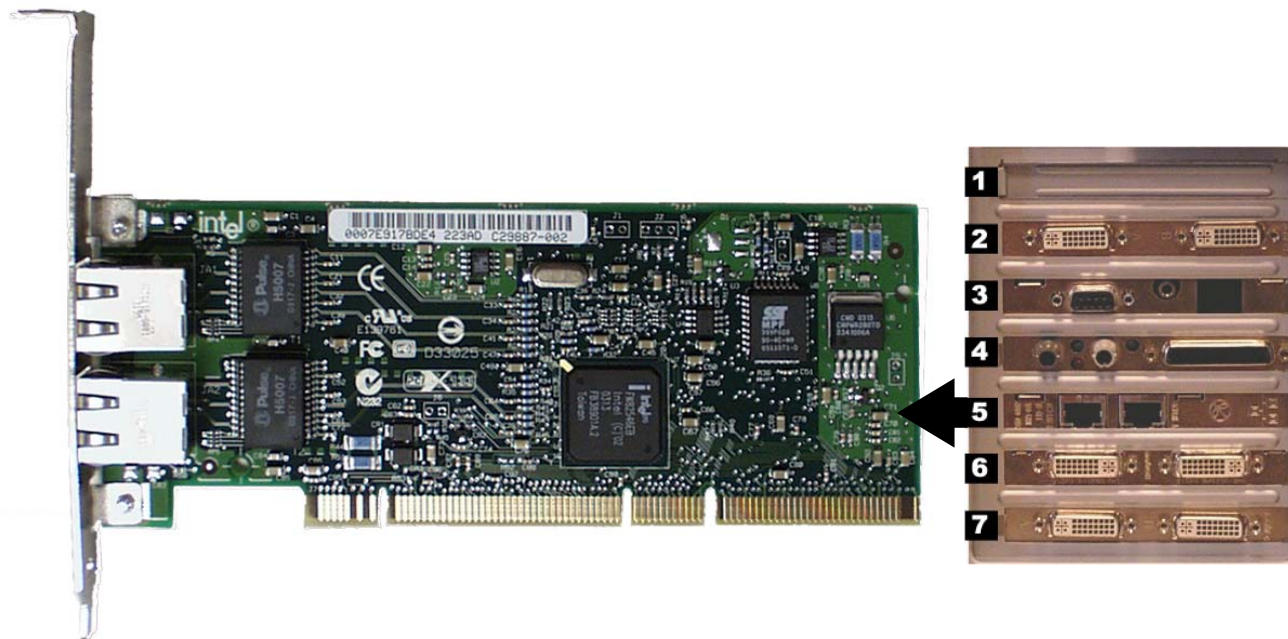


**8000 PCI Communication board**

- Part Number: 2014935-002
- Location: Slot 4
- Functions:
  - ◆ Communicates with the C-Lab II Plus Amplifier via the fiber optic connectors.
  - ◆ Analog and Digital communication with the IEB via the D-Connector.
  - ◆ Provides the video switching signal for the Switched Video output on the IEB via the D-Connector.
- I/O: D-Connector to IEB, Fiber Optic Jacks to the Amplifier

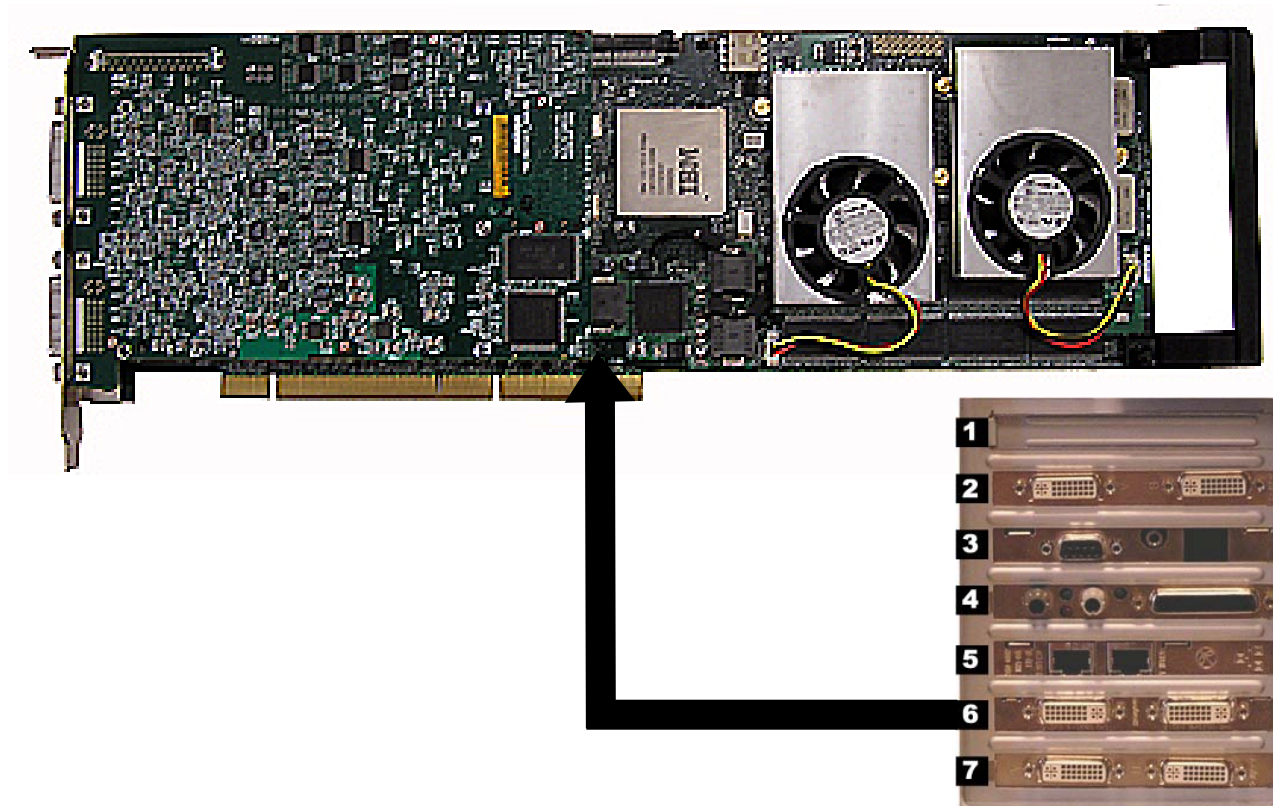
104a

### 8000 Dual NIC Adapter Board



- Part Number: 2017795-001
- Location: Slot 5
- Function: Network connection card
- I/O: Two network connection jacks

105a

**8000 Matrox Odyssey XPro Board (Optional)**

106a

- Part Number: 2017708-001
- Location: Slot 6
- Function: Image capture for X-Ray or other imaging systems
- I/O: Two DVI connectors

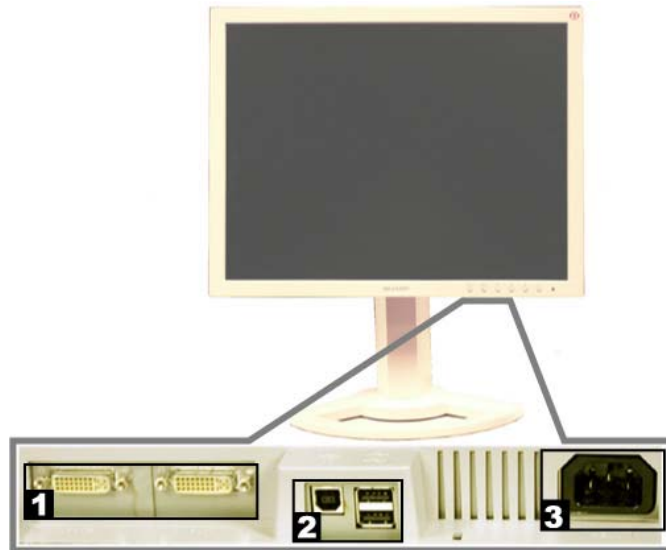
### 8000 Matrox PCI Parhelia Video Board (Optional)



- Part Number: 2017709-001
- Location: Slot 7
- Function: Video out for optional (video 3) monitor
- I/O: Two DVI connectors (only the left one is used)

107a

## Monitors



120b

Label	Description
1	DVI Jacks. Note: the video cable may be plugged into either jack--the monitor automatically switches to the correct jack.
2	USB and Firewire ports. (Not Used)
3	AC power connection

The standard workstation comes with two monitors and may have a third optional monitor. The monitors include:

- A Real-Time monitor to display current patient information. It is usually located on the left.
- A Review monitor to display past patient information.
- An optional Image monitor (used with the CardioImage option) displays live or frozen video images.

A single remote monitor is standard and receives input from the switched video out (Video 1 or 2) jack on the IEB (see “[External Components and Connections](#)” on page 2-11).

- To switch video for the Mac-Lab go to the main menu and select *Windows > Physician Video*.
- To switch video for the CardioLab use the dropdown box just under the main menu.



## Other Related Equipment

### TRAMnet



029b

Label	Description
1	TRAM Module
2	To Analog Out Connector
3	To IEB TRAM Connector

The TRAMnet consists of a Remote Acquisition Case (RAC-4A) and one or more TRAM modules. The TRAMnet is located in the procedure room near the procedure table.

The TRAMnet receives power (+16.4 VDC) from the IEB DC power supply via the serial cable.

The TRAM module receives patient inputs and then transmits signal data to the IEB and other equipment through the Analog Output Box (refer to the cabling diagrams on page [“HP8400 TRAM/Amplifier”](#))

[Connections](#)” on page 2-68, [“HP8200 TRAM/Amplifier Connections](#)” on page 2-69 and [“HP8000 TRAM/Amplifier Connections](#)” on page 2-70).

#### TRAM Module Inputs

- Electrocardiogram (ECG) - green connector (5 or 10 leads)
- Thermal Dilution Cardiac Output (TDCO) - brown connector
- Invasive Blood Pressure (IBP) - 3 red connectors
- Non-Invasive Blood Pressure (NIBP) - black connector
- Pulse Oximetry (SpO2) - blue connector

Outputs: Analog output connector.

The following TRAM modules are supported by the Mac-Lab system:

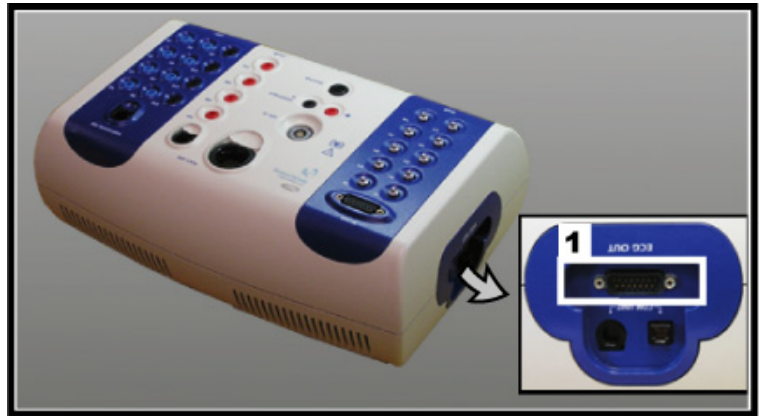
- 200SL
- 400/450SL (Ohmeda, Nellcor)
- 451/451N/451M (Ohmeda, Nellcor, Massimo)
- 600/650SL (Ohmeda, Nellcor)

The following software versions are supported by the Mac-Lab system:

- 7A, 7B, 7C, 7D, 7E, 7F, 7H
- 8A, 8B, 8C, 8D
- 9A, 9B
- 10A, 10B
- 11A, 11B, 11C



## CARTO™ XP System (Patient Interface Unit)



160c

Label	Description
1	Output to Amplifier

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**CAUTION**

**EXCESSIVE SIGNAL NOISE** — Using a PIU earlier than version 10 with a crossover cable may cause excessive signal noise.

If this excessive signal noise occurs, then discontinue using the crossover cable until the PIU is replaced with a later version. (The new PIU must be purchased from Biosense Webster).

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**NOTE**

For specific information related to the operation, troubleshooting, or repair of the CARTO™ XP System, refer to the OEM documentation. For information about the CardioLab/CARTO™ XP System interface, refer to the CardioLab Operator manual.

The CARTO™ XP System acquires and displays electroanatomical 3D images of heart chambers. This information is displayed on the CARTO™ XP System and can be exported into the CardioLab application.

Two connections are required: one from the CARTO™ XP System Patient Interface Unit to the Clab II Plus Amplifier and another from the CARTO™ XP System computer to the HP computer. Refer to the cabling diagram on page “[HP8400 CARTO™XP System Connections](#)” on page 2-73, “[HP8200 CARTO™XP System Connections](#)” on page 2-74 and “[HP8000 CARTO™ XP System Connections](#)” on page 2-75 for specific information.

To quickly view the status of the interface, check the CARTO™ XP System icon at the bottom-right of the Real-Time window (a heart against a grid). The color changes, depending on the system state:

- Gray: Disconnected
- Blue: Standby
- Green: Passive Interface
- Yellow: Active Interface

## Analog Output Box



050b

Label	Description
1	Input from TRAMnet
2	Input from Amplifier through the IEB

The analog output box distributes HR and BP signals to multiple outputs (refer to the connection diagram on page “[HP8400 TRAM/Amplifier Connections](#)” on page 2-68, “[HP8200 TRAM/Amplifier Connections](#)” on page 2-69 and “[HP8000 TRAM/Amplifier Connections](#)” on page 2-70). This may be done to synch auxiliary equipment or display the information on a scope or other device.

Patient information comes from either the TRAMnet or the Amplifier (through the IEB) and is output through the output jacks on the top of the box:

- Channels 2-4 and 13-16 are switchable between the TRAMnet (Mac-Lab) and Clab 2 Plus Amplifier (CardioLab).
- The remaining channels are used exclusively by CardioLab.
- Channels 1-12 may be distributed to up to 4 other devices using the selector switch.

## Cabling and Connections

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### WARNING

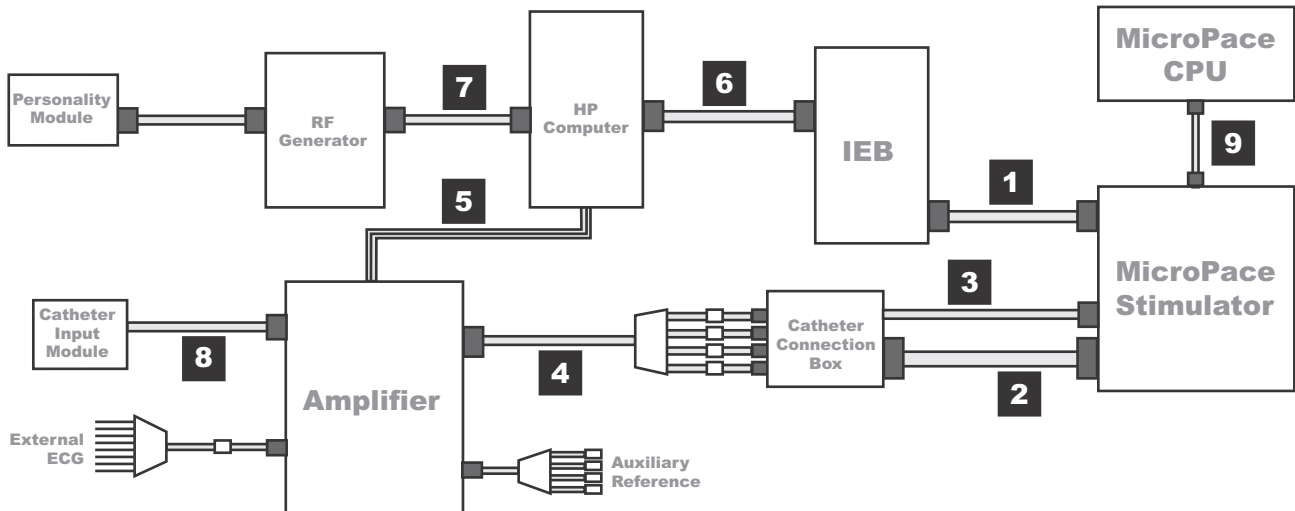
LOCK OUT/TAG OUT — Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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## Amplifier/Stimulator Connections

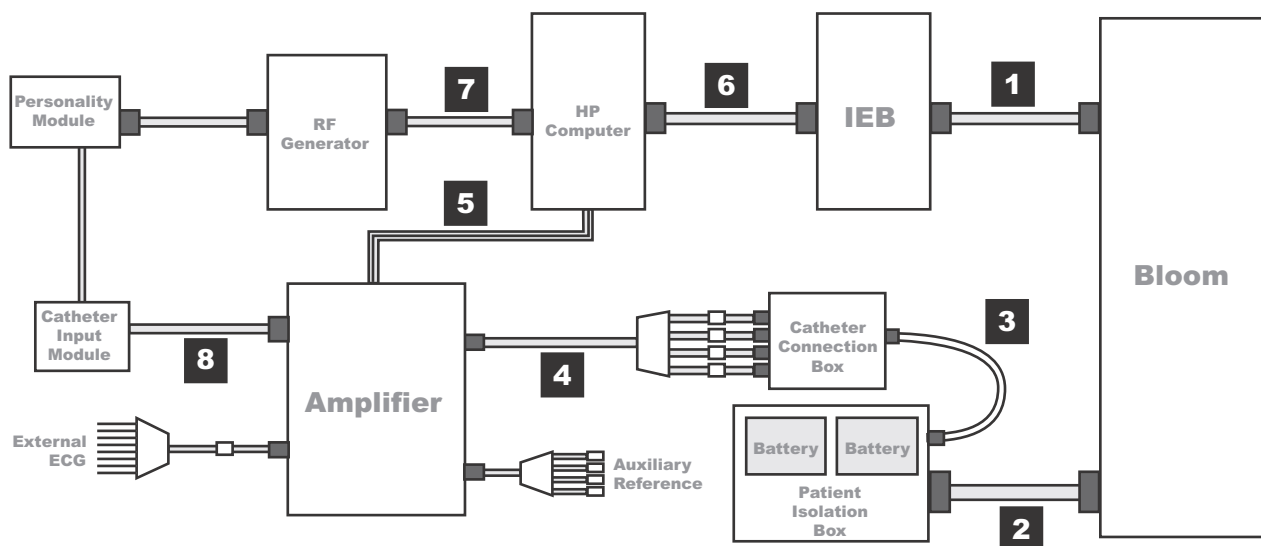
### Typical Setup (with MicroPace)



004

Label	Part Number	Description
1	2003411-001	<b>BNC Cable (50').</b> Connects back of MicroPace (ECG 1 Input) to back of IEB (Analog Out 1).
2	N/A	<b>Large Cable with D-Connectors.</b> Connects back of MicroPace (Auxiliary Port) to side of Catheter Connection Box.
3	N/A	<b>Small Cable.</b> Connects front of MicroPace (Green Connection Port or in emergencies Red Connection Port) to side of Catheter Connection Box.
4	301-00204-03	Red or Black leads connect to front of Catheter Connection Box to Amplifier Stimulator Input.
5	2003434-001	Fiber Optic Cable (75')
6	2003587-001	DB44 Connect Cable
7	2003408-002	50' Serial Cable
8	301-00202-08	Catheter Input Module

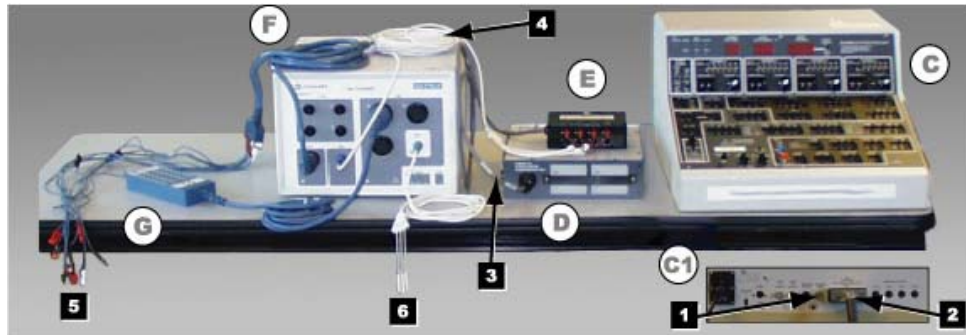
## Typical Setup (with Bloom)



003

Label	Part Number	Description
1	2003410-001	<b>BNC Cable (30')</b> . Connects Bloom and IEB.
2	N/A	<b>Large Cable with Square Connectors</b> . Connects back of Bloom to back of Patient Isolation Box.
3	N/A	<b>Small Cable</b> . Connects front of Patient Isolation Box to side of Catheter Connection Box.
4	301-00204-03	Red or Black leads connect to front of Catheter Connection Box to Amplifier Stimulator Input.
5	2003434-001	Fiber Optic Cable (75')
6	2003587-001	DB44 Connect Cable
7	2003408-002	50' Serial Cable
8	301-00202-08	Catheter Input Module

## Equipment Setup

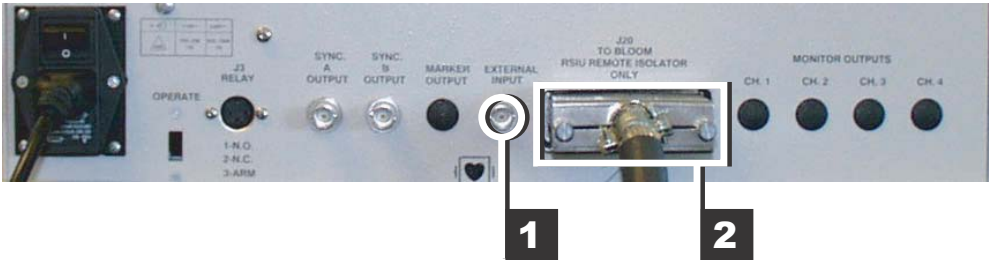


002a

Label	Part Number	Description
C and C1	N/A	<b>Bloom</b> (This is a typical example. Specific equipment may vary by location). Connects to the IEB (not shown) via the External Input BNC jack on the back (C1) and the Patient Isolation Box (D) via a large cable with square connectors. (See next section for detail.)
D	N/A	<b>Patient Isolation Box</b> Rear connection to Bloom (C1) via large cable with square connectors. Front connection to Catheter Connection Box (E). Front panel provides access to internal batteries.
E	N/A	<b>Catheter Connection Box</b> Side connection to the Patient Isolation Box (D) front connector. Red and Black leads connect from the front to the Amplifier (F) Stim Input.
F	301-00088-10	<b>Amplifier</b> Connected to: <ul style="list-style-type: none"> <li>■ (1) External ECG connection</li> <li>■ (2) Catheter Input Module</li> <li>■ (3) Auxiliary Reference Cable</li> <li>■ (6) Catheter Connection Box</li> </ul>
G	301-00202-08	<b>Catheter Input Module</b> Catheter leads (not shown) plug into the block end. Connector on other end plugs into the Amplifier (4) Cardiac Input (Labeled A, B, C, etc.)
1	N/A	Bloom connection to IEB (BNC cable not shown).
2	N/A	Bloom connection to Patient Isolation Box.
3	N/A	Patient Isolation box to Catheter Input Module cable.

Label	Part Number	Description
4	301-00204-03	Catheter Connection Box to Amplifier cable.
5	301-00038-00	<b>External ECG Connections.</b> Colored leads connect to patient. Connector on other end connects into the Amplifier(4) ECG Input.
6	301-00205-08	<b>Auxiliary Reference Cable.</b> Plugs into the Amplifier (4) Auxiliary Input.

Bloom (Connection Detail)



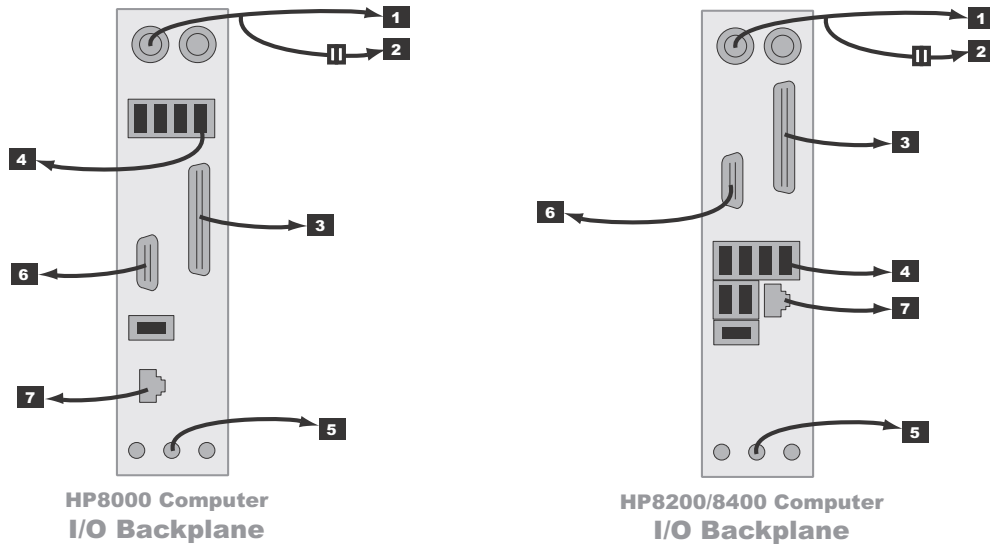
001

Connector	Description
1	<b>External Input.</b> BNC connection to the IEB (cable not shown).
2	<b>J20.</b> Connection to Patient Isolation Box (large square connector)



## HP/IEB Connections

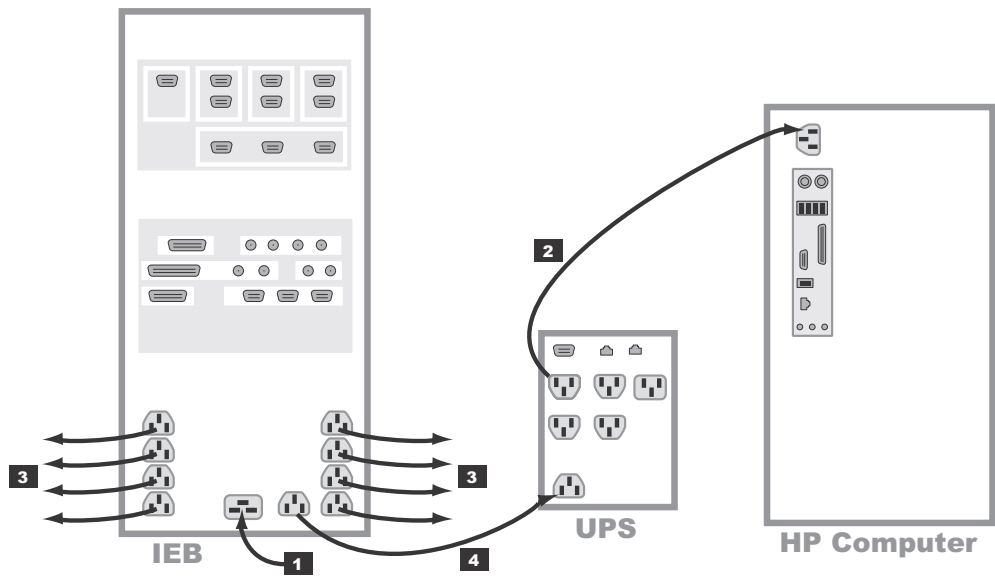
### HP Computer I/O Backplane Connections



025

Label	Part Number	Description
1	N/A	PS2 Connection for Y-cable to keyboard (if connecting with PS2 version Barcode Scanner)
2	2020280-001 (Note: This number is for the cable only)	PS2 connection for Y-Cable to PS2 version Barcode Scanner
3	6119-101 2031697-001	To Local Printer (cable to use depends on printer)
4	N/A	USB Ports for Mouse (Must use right-most port), and for USB version Barcode Scanner
5	N/A	To Speakers
6	N/A	To Ablation Interface
7	N/A	To Network

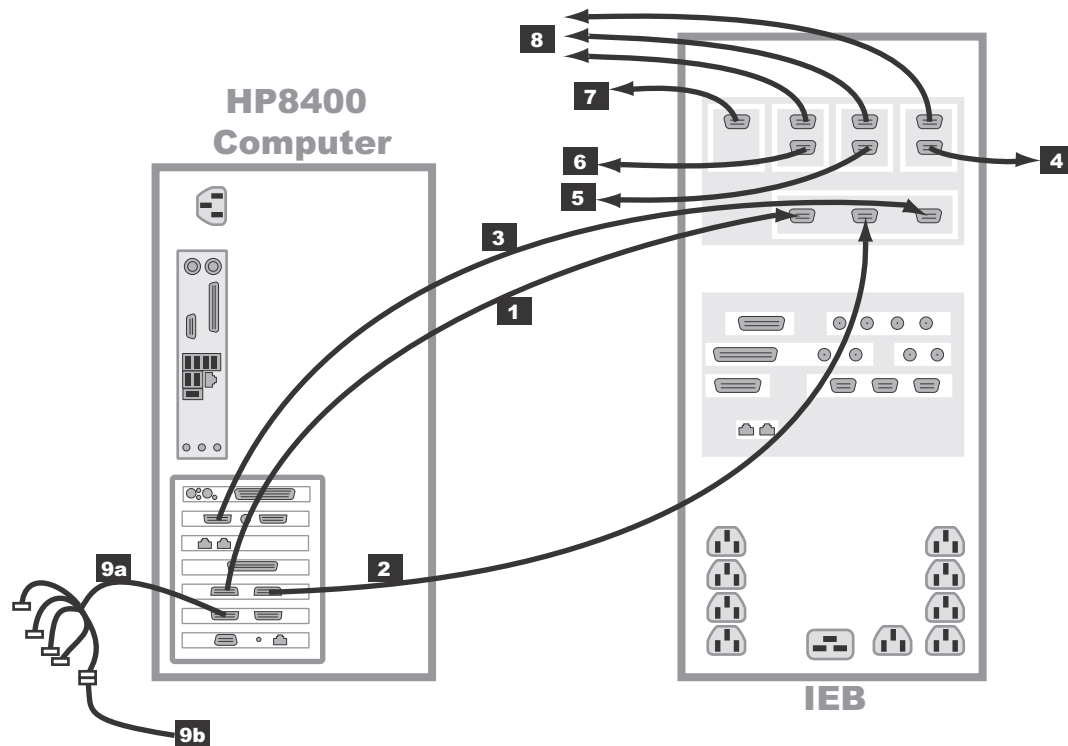
Power Connections



018

Label	Part Number	Description	Length
1	700775-001 700774-001	120 VAC main power in 250 VAC main power in	8'
2	405535-013 80274-006 2003927-001	AC power to HP CPU (100V) AC power to HP CPU (120V) AC power to HP CPU (230V)	8'
3	2003927-001 403689-010	AC to Local Equipment--Monitors, Printers, etc. AC to Remote Monitors	8' 100'
4	2003927-001	AC power to UPS	8'

## HP8400 Video Connections

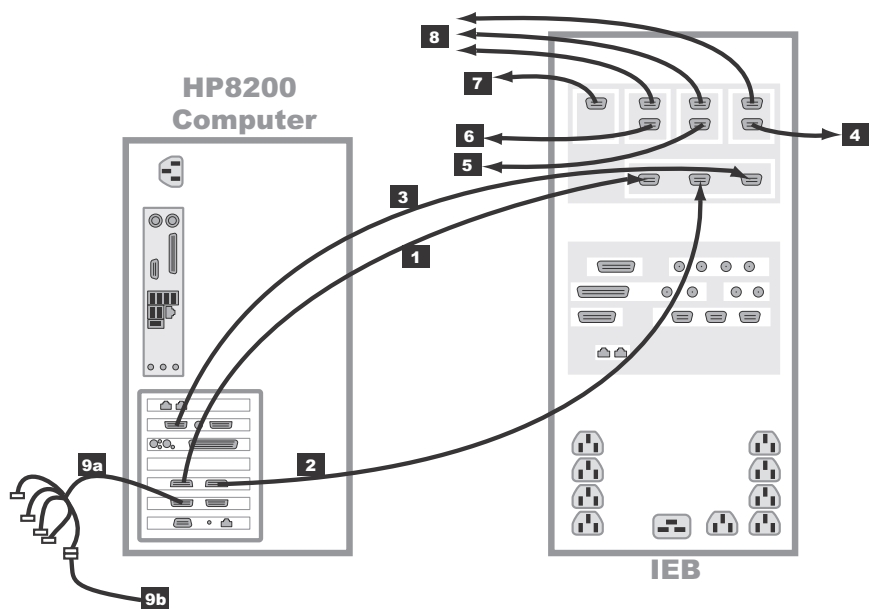


421

Label	Part Number	Description	Length
1	2003928-001	Real-time display (Video 1) in to IEB	5'
2	2003928-001	Review display (Video 2) in to IEB	5'
3	2003928-001	Cardio Image display (Video 3) in to IEB	5'
4	2003928-001	Out to Local Cardio Image Monitor (Video 3)	5'
5	2003928-001	Out to Local Review Monitor (Video 2)	5'
6	2003928-001	Out to local Real-time monitor (Video 1)	5'
7	2003442-001	Out to remote monitor (switched Video 1 or Video 2)	100'
8	2003442-001	Out to optional remote monitors (Video 1, 2, or 3)	100'

Label	Part Number	Description	Length
9a	2018060-001	Image capture. DVI to 5-BNC female connector cable plugs into either DVI plug. Only one BNC connection is used to connect to the image input from another system (9b)	
9b	2003411-001	BNC Cable to optional imaging system	50'

HP8200 Video Connections

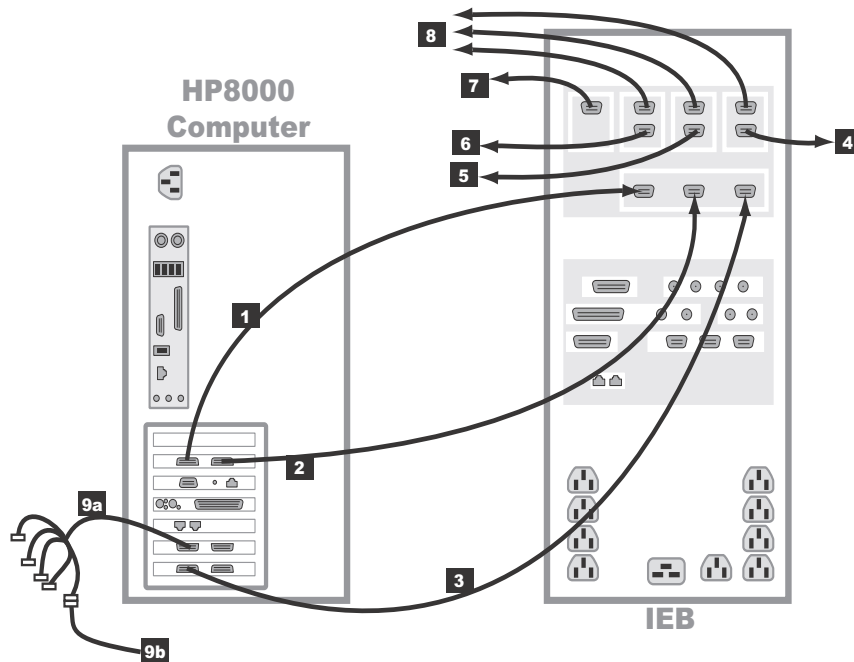


419

Label	Part Number	Description	Length
1	2003928-001	Real-time display (Video 1) in to IEB	5'
2	2003928-001	Review display (Video 2) in to IEB	5'
3	2003928-001	Cardio Image display (Video 3) in to IEB	5'
4	2003928-001	Out to Local Cardio Image Monitor (Video 3)	5'

Label	Part Number	Description	Length
5	2003928-001	Out to Local Review Monitor (Video 2)	5'
6	2003928-001	Out to local Real-time monitor (Video 1)	5'
7	2003442-001	Out to remote monitor (switched Video 1 or Video 2)	100'
8	2003442-001	Out to optional remote monitors (Video 1, 2, or 3)	100'
9a	2018060-001	Image capture. DVI to 5-BNC female connector cable plugs into either DVI plug. Only one BNC connection is used to connect to the image input from another system (9b)	
9b	2003411-001	BNC Cable to optional imaging system	50'

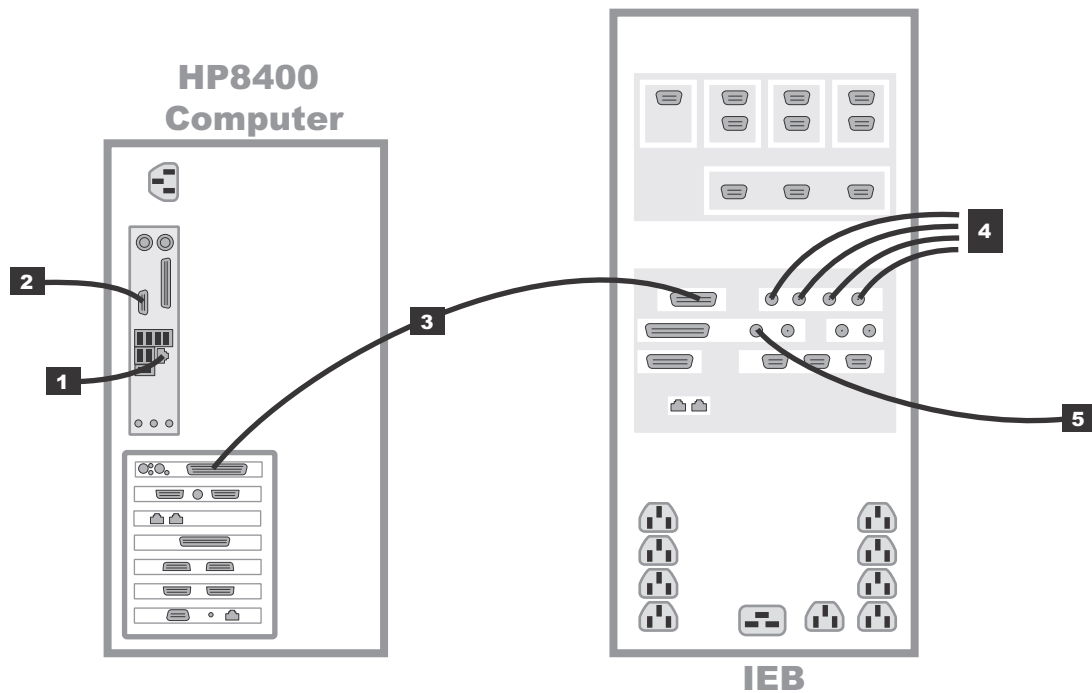
## HP8000 Video Connections



019

Label	Part Number	Description	Length
1	2003928-001	Real-time display (Video 1) in to IEB	5'
2	2003928-001	Review display (Video 2) in to IEB	5'
3	2003928-001	Cardio Image display (Video 3) in to IEB	5'
4	2003928-001	Out to Local Cardio Image Monitor (Video 3)	5'
5	2003928-001	Out to Local Review Monitor (Video 2)	5'
6	2003928-001	Out to local Real-time monitor (Video 1)	5'
7	2003442-001	Out to remote monitor (switched Video 1 or Video 2)	100'
8	2003442-001	Out to optional remote monitors (Video 1, 2, or 3)	100'
9a	2018060-001	Image capture. DVI to 5-BNC female connector cable plugs into either DVI plug. Only one BNC connection is used to connect to the image input from another system (9b)	
9b	2003411-001	BNC Cable to optional imaging system	50'

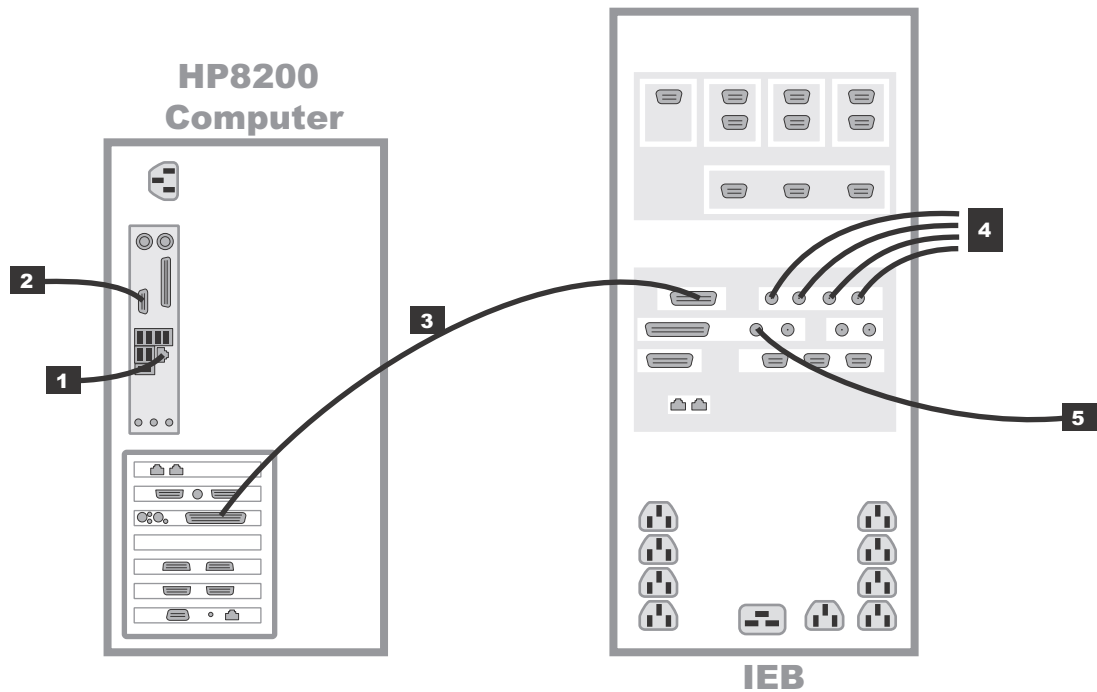
## HP8400 Communications Connections



422

Label	Part Number	Description	Length
1	N/A	Network connection	N/A
2	2018835-001 2003408-002 2042981-001 2035570-001 2042214-001	<b>RF Ablation Device Interface</b> 50' Serial Cable Optical Isolator Serial Cable for CryoCath Interface Serial Cable for RF Ablation Interface	50' 2 m 6'
3	2003587-001	PCI Communications (DB-44)	2.5'
4	2003410-001	BNC coax. analog in (from Fluoro, etc.)	30'
5	2003410-001	Analog out (typically to Stimulator)	30'

# HP8200 Communications Connections

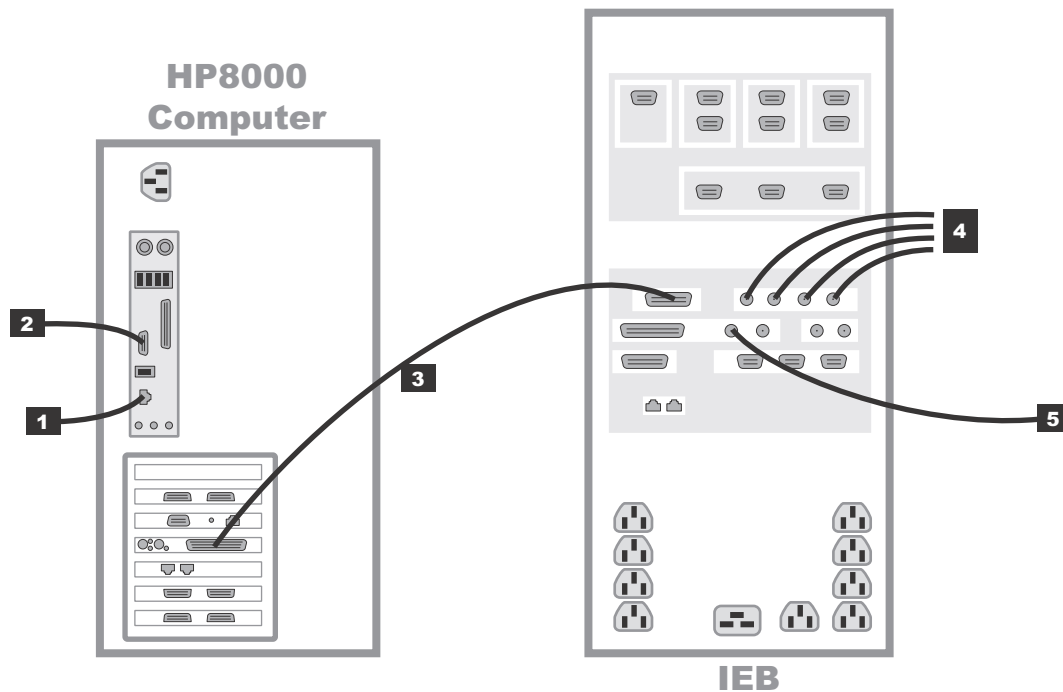


420

Label	Part Number	Description	Length
1	N/A	Network connection	N/A
2	2018835-001 2003408-002 2042981-001 2035570-001 2042214-001	<b>RF Ablation Device Interface</b> 50' Serial Cable Optical Isolator Serial Cable for CryoCath Interface Serial Cable for RF Ablation Interface	50'  2 m 6'
3	2003587-001	PCI Communications (DB-44)	2.5'
4	2003410-001	BNC coax. analog in (from Fluoro, etc.)	30'
5	2003410-001	Analog out (typically to Stimulator)	30'



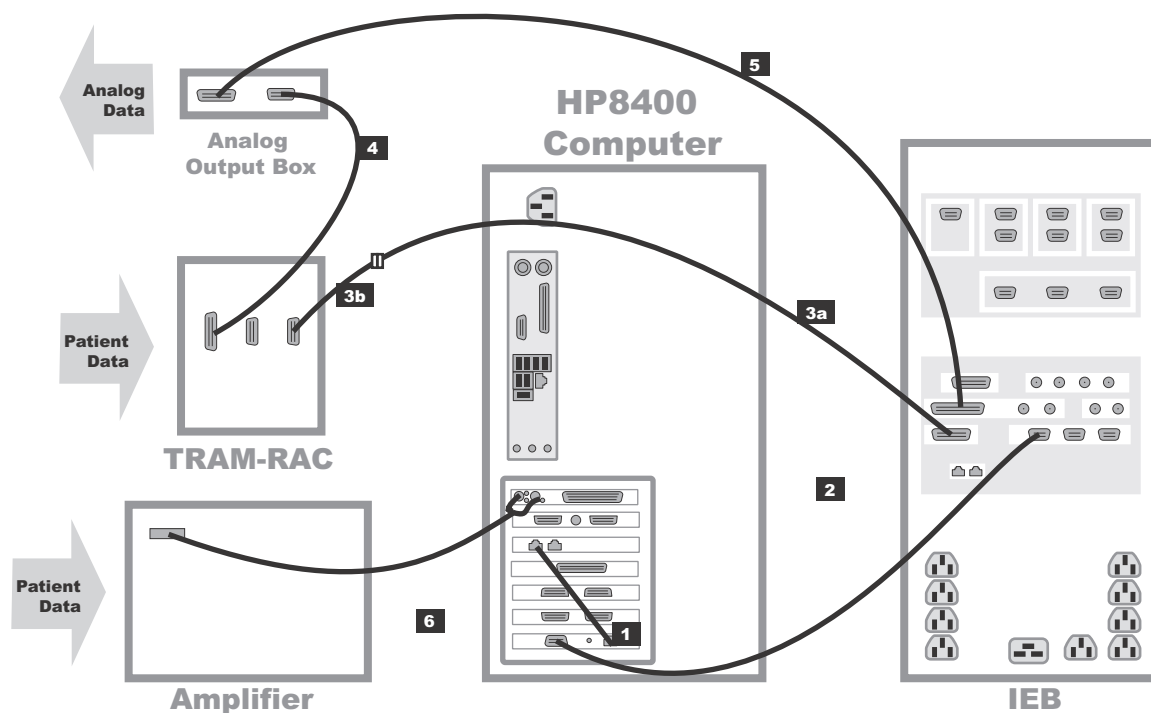
## HP8000 Communications Connections



020

Label	Part Number	Description	Length
1	N/A	Network connection	N/A
2	2018835-001 2003408-002 2042981-001 2035570-001 2042214-001	<b>RF Ablation Device Interface</b> 50' Serial Cable Optical Isolator Serial Cable for CryoCath Interface Serial Cable for RF Ablation Interface	50' 2 m 6'
3	2003587-001	PCI Communications (DB-44)	2.5'
4	2003410-001	BNC coax. analog in (from Fluoro, etc.)	30'
5	2003410-001	Analog out (typically to Stimulator)	30'

## HP8400 TRAM/Amplifier Connections

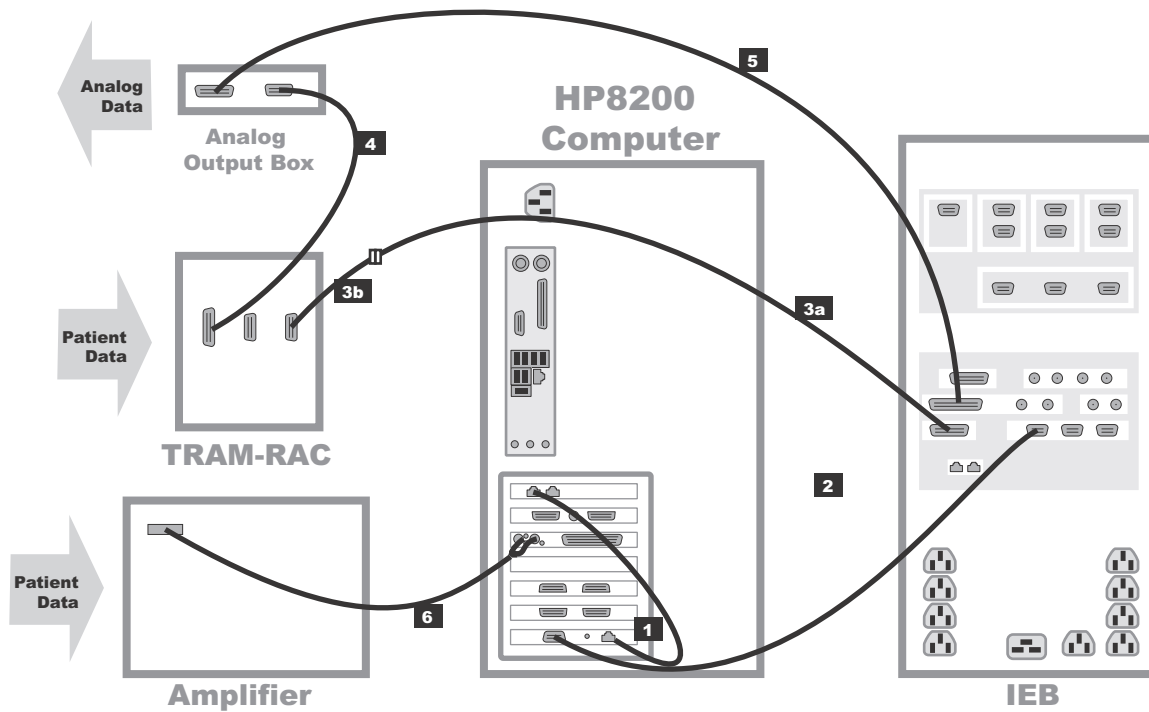


425

Label	Part Number	Description	Length
1*	2011129-001	TRAMnet to ethernet cable	1'
2*	2016133-001	HP Computer/IEB TRAMnet cable	9'
3a	417335-xxx	Adapter cable to TRAM. Part number varies by length ordered (-001 to -007).	Varies
3b*	2016134-001	15-pin to 9-pin adapter cable	1'
4	417335-002	TRAM-RAC to Analog Output Box cable	51'
4	417335-003	TRAM-RAC to Analog Output Box cable	70'
5	2007579-001	IEB to Analog Output Box cable	15'

Label	Part Number	Description	Length
6	2003434-001	Amplifier to HP fiber optic cable	75'
* These cables are contained in TRAMnet Cabling Kit (p/n 2018683-001)			

## HP8200 TRAM/Amplifier Connections

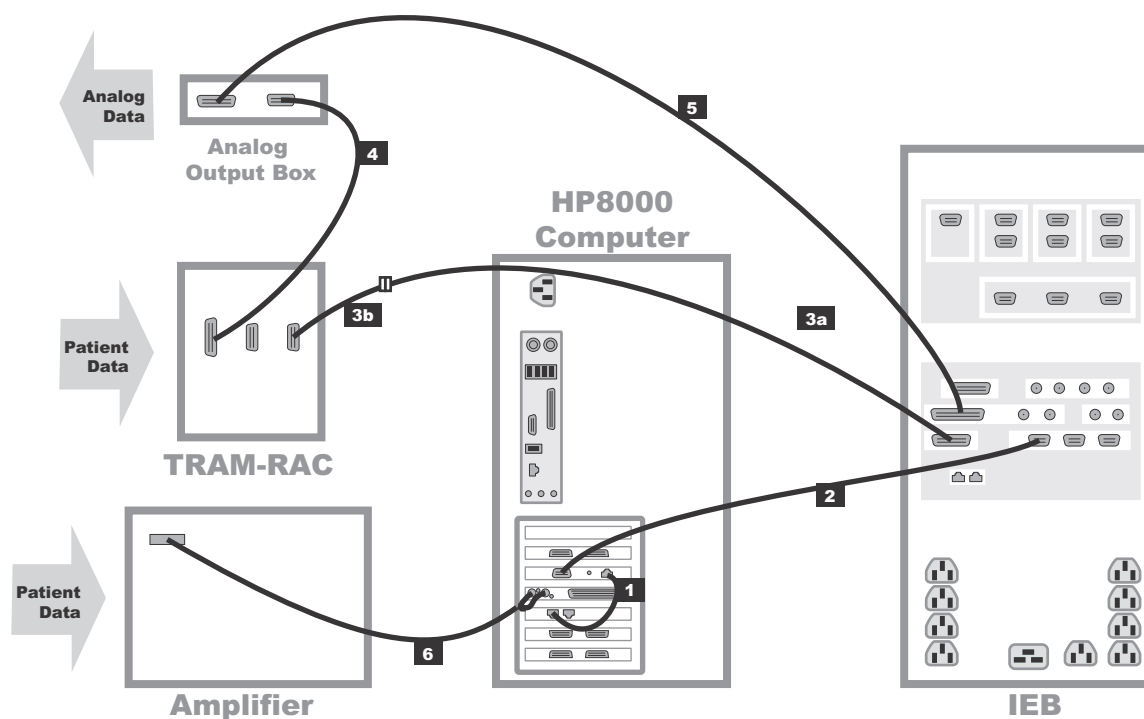


424

Label	Part Number	Description	Length
1*	2011129-001	TRAMnet to ethernet cable	1'
2*	2016133-001	HP Computer/IEB TRAMnet cable	9'
3a	417335-xxx	Adapter cable to TRAM. Part number varies by length ordered (-001 to -007).	Varies
3b*	2016134-001	15-pin to 9-pin adapter cable	1'

Label	Part Number	Description	Length
4	417335-002	TRAM-RAC to Analog Output Box cable	51'
4	417335-003	TRAM-RAC to Analog Output Box cable	70'
5	2007579-001	IEB to Analog Output Box cable	15'
6	2003434-001	Amplifier to HP fiber optic cable	75'
* These cables are contained in TRAMnet Cabling Kit (p/n 2018683-001)			

## HP8000 TRAM/Amplifier Connections

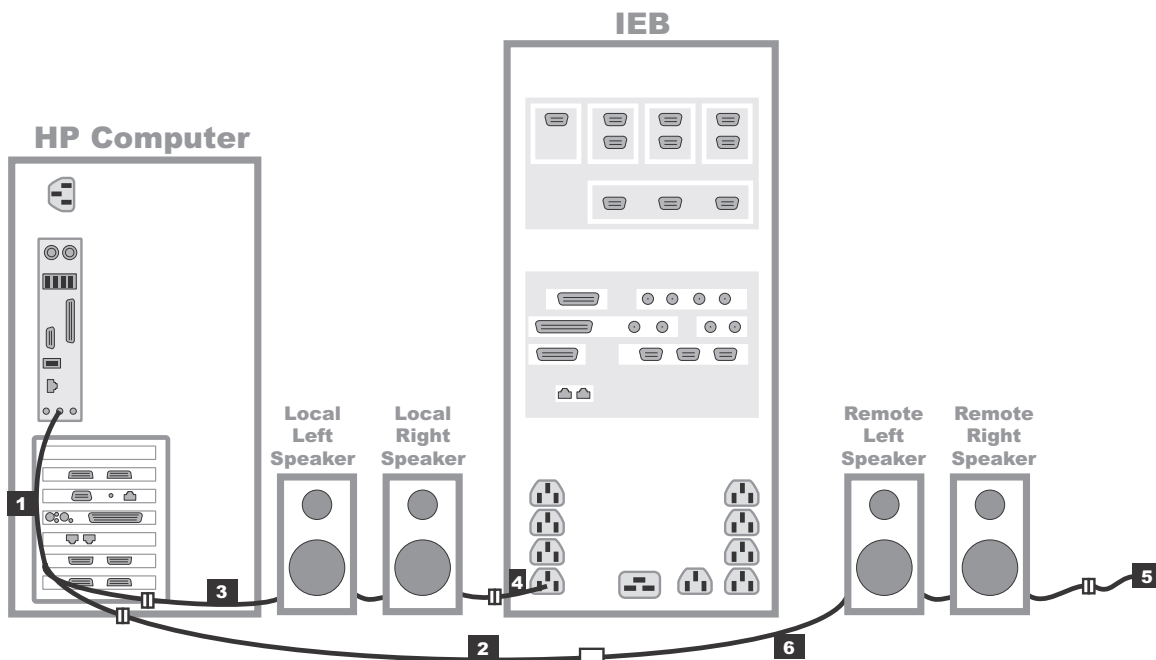


024

Label	Part Number	Description	Length
1*	2011129-001	TRAMnet to ethernet cable	1'
2*	2016133-001	HP Computer/IEB TRAMnet cable	9'

Label	Part Number	Description	Length
3a	417335-xxx	Adapter cable to TRAM. Part number varies by length ordered (-001 to -007).	Varies
3b*	2016134-001	15-pin to 9-pin adapter cable	1'
4	417335-002	TRAM-RAC to Analog Output Box cable	51'
4	417335-003	TRAM-RAC to Analog Output Box cable	70'
5	2007579-001	IEB to Analog Output Box cable	15'
6	2003434-001	Amplifier to HP fiber optic cable	75'
* These cables are contained in TRAMnet Cabling Kit (p/n 2018683-001)			

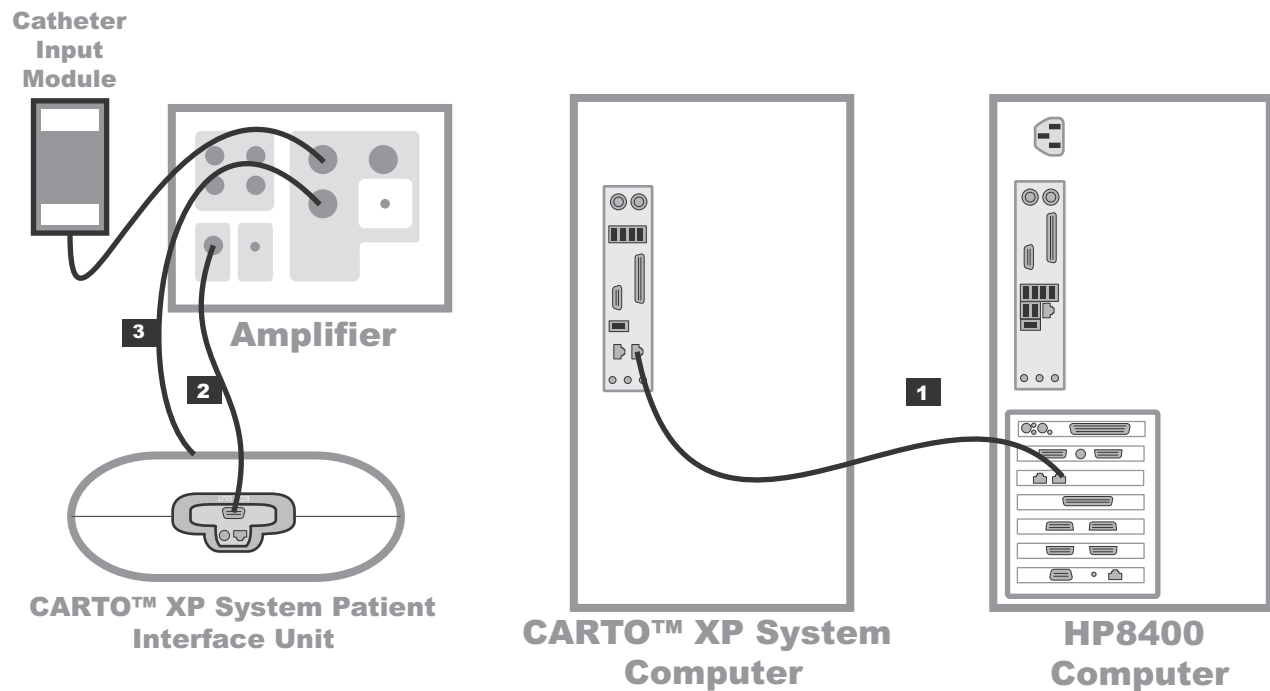
## Audio



022

Label	Part Number	Description
1	2018218-001	Y-connector (Connects to green jack on HP. One side to local speakers, the other to remote speakers.)
2	2018219-001	Audio Isolator.
3	2039003-001 2039004-001	Local speakers (120 VAC) - replaces 2036113-001 Local speakers (240 VAC) - replaces 2036113-002
4	2003625-001 415359-001	Power cable 120 VAC 240 VAC
5	2003625-001 415359-001	Remote speakers require power cable adapter to wall outlet (Must be isolated if in patient area.)  Power cable 120 VAC 240 VAC
6	2011108-002	Speaker cable (50')

## HP8400 CARTO™XP System Connections



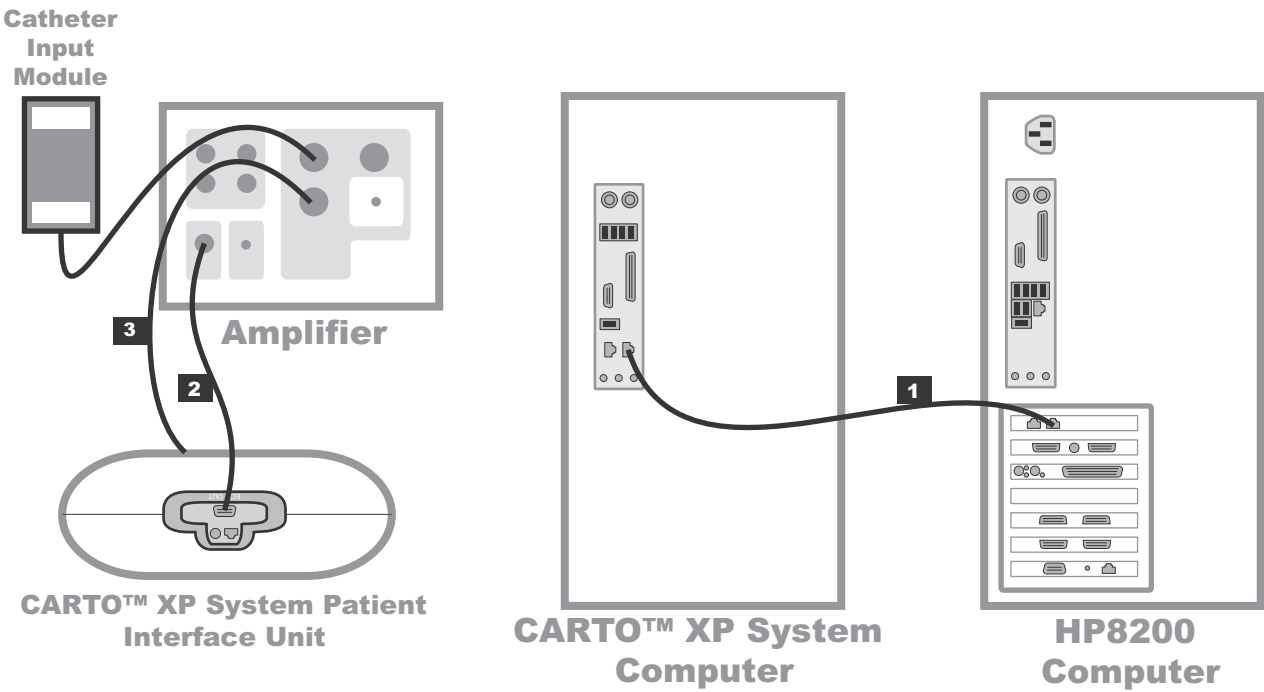
426

Label	Part Number	Description
1	2018217-001	CARTO™ XP System Crossover Network Cable (25')
2	2015944-001	ECG Quick Connect Cable (ECG OUT connector on the PIU to the ECG connector on the Amplifier)
3	2024507-001	Clab II to Carto™ IC/Stim Cable

### NOTE

Not all CARTO™ XP System equipment or connections are shown. Refer to the CARTO™ XP System Installation Manual for additional information.

# HP8200 CARTO™XP System Connections



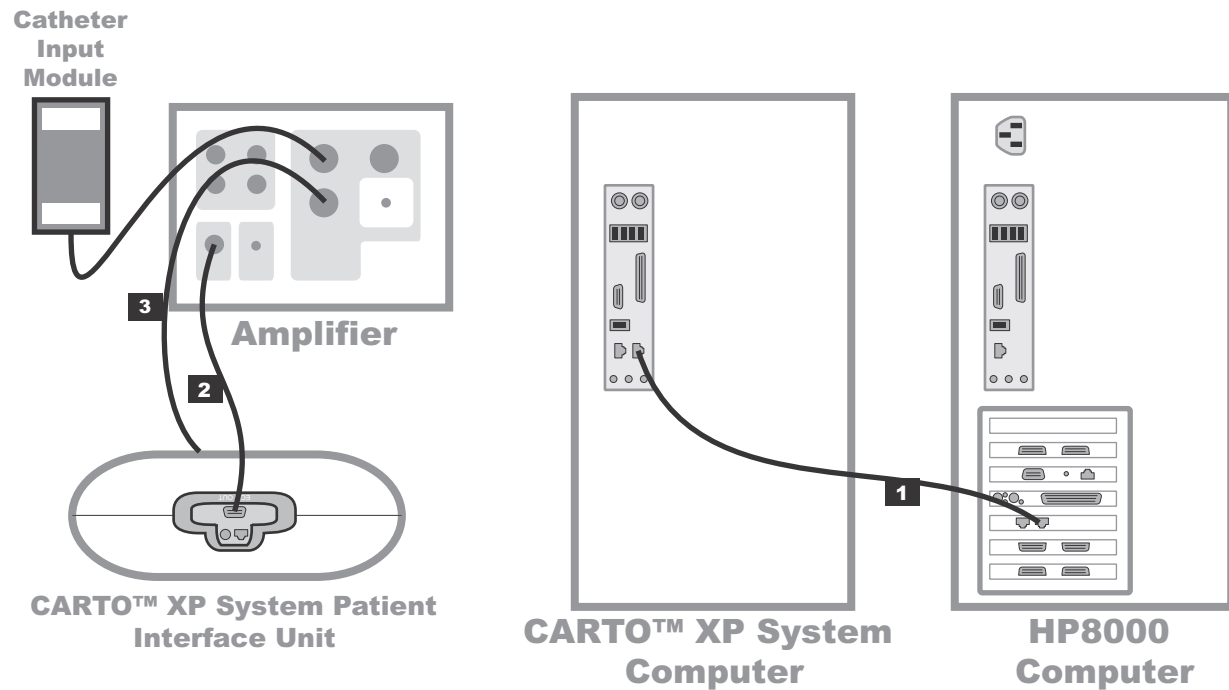
423

Label	Part Number	Description
1	2018217-001	CARTO™ XP System Crossover Network Cable (25')
2	2015944-001	ECG Quick Connect Cable (ECG OUT connector on the PIU to the ECG connector on the Amplifier)
3	2024507-001	Clab II to Carto™ IC/Stim Cable

NOTE  
Not all CARTO™ XP System equipment or connections are shown. Refer to the CARTO™ XP System Installation Manual for additional information.



## HP8000 CARTO™ XP System Connections



028

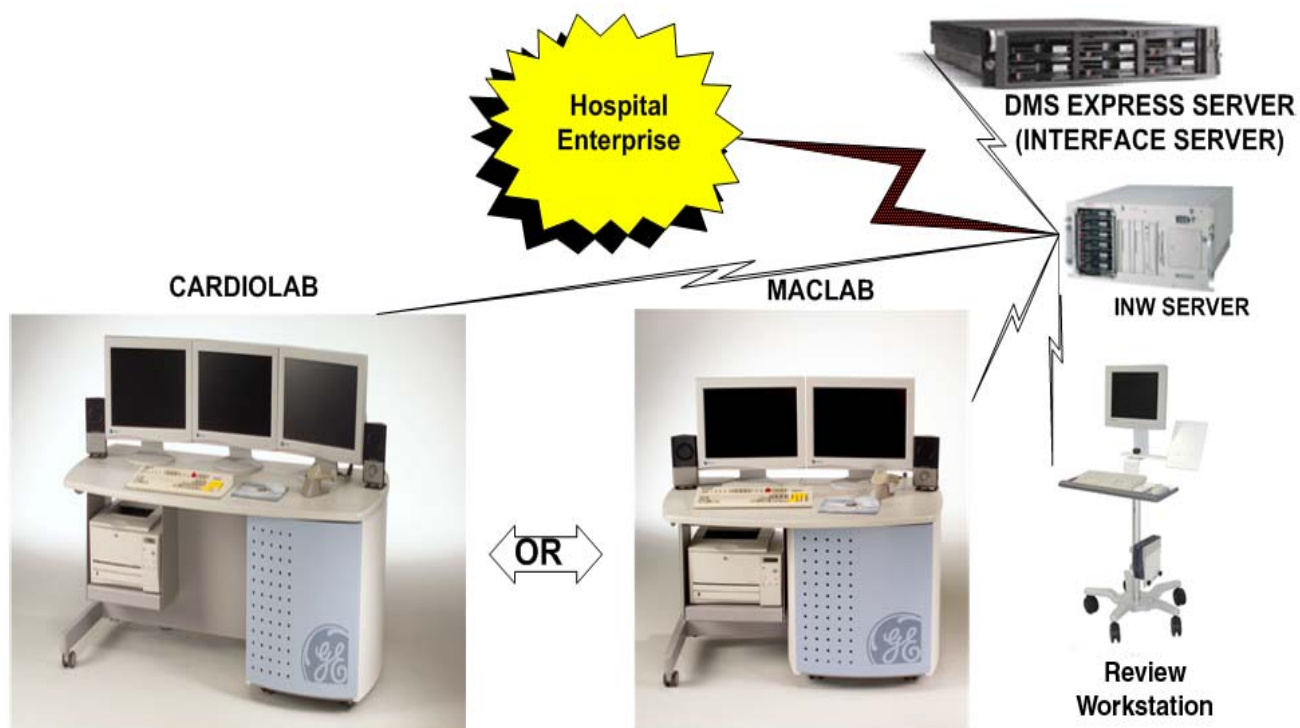
Label	Part Number	Description
1	2018217-001	CARTO™ XP System Crossover Network Cable (25')
2	2015944-001	ECG Quick Connect Cable (ECG OUT connector on the PIU to the ECG connector on the Amplifier)
3	2024507-001	Clab II to Carto™ IC/Stim Cable

### NOTE

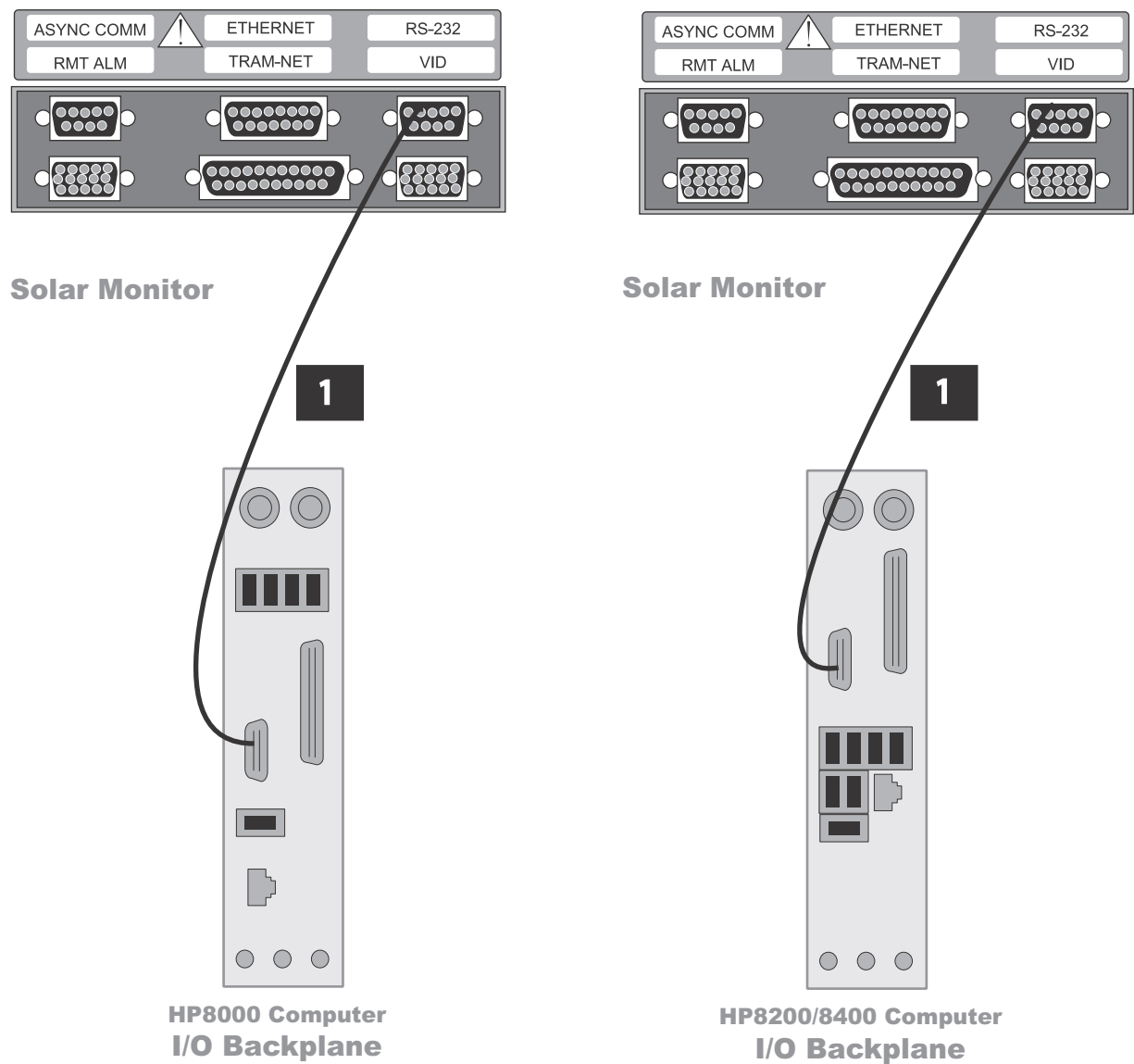
Not all CARTO™ XP System equipment or connections are shown. Refer to the CARTO™ XP System Installation Manual for additional information.

## Review Workstations

### Network Connections



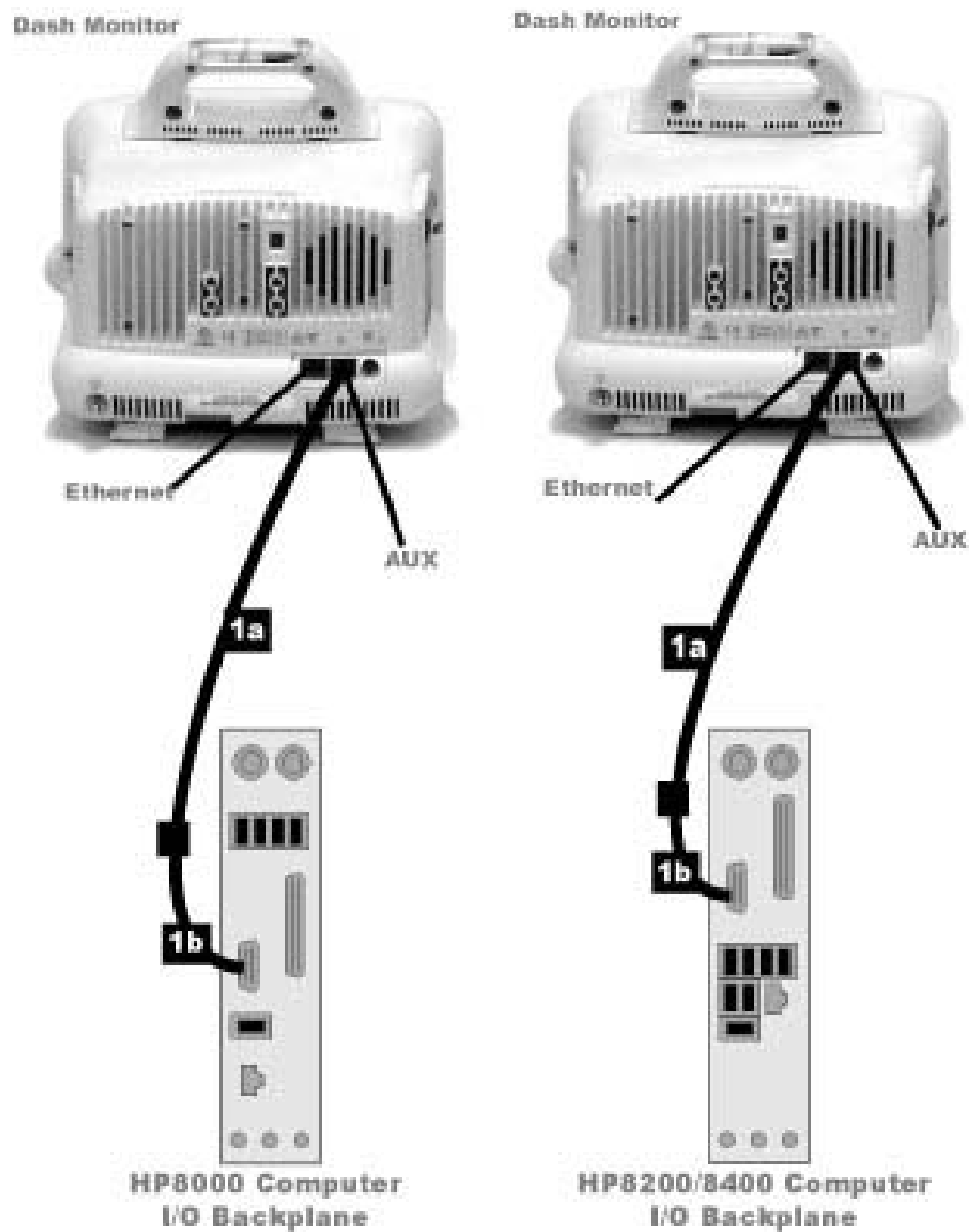
## Solar Connection



501

Label	Part Number	Description
1	2003408-001	DB9M TO DB9F, 50FT, STRAIGHT THRU

## Dash Connection



502

Label	Part Number	Description
1a	418335-002	OCTACOMM, SERIAL PORT CABLE
1b	420915-013	DIDCA ASM PC INTERFACE AUTOPORT

## Software

### Operating System

**INW Server:** Windows Server 2003 Standard Edition

**Acquisition/Review Workstations:** Windows XP Professional

**Software Only Workstation:** Windows 2000 or XP Professional

### Database

**INW Server:** Microsoft SQL 2000 Server Standard Edition

**Acquisition/Review Workstations:** Microsoft SQL 2000 Desktop Edition

### Application Software

**Acquisition/Review Workstations:** Microsoft Office XP or Office 2007 Professional.



# 3 Maintenance

# Functional Checkout Procedure

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**WARNING**

LOCK OUT/TAG OUT — Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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## Introduction

As part of the system checkout procedure, hook up a simulator to the TRAM module in the RAC or the CardioLab II Plus Amplifier located in the procedure area.

1. If a GE or Bio-Tek simulator is being used, connect the P1 output to the P1 input of the TRAM module in the slot A position.
2. Connect the P2 output to the P2 input of the same TRAM module.
3. Define the pressures to be Arterial and Venous. These two pressure simulations provide a realistic representation of pressure monitoring waveforms.
4. Also connect the ECG leadwires.

**NOTE**

See the “TRAM 100-600 A and SL Modules Service Manual” for additional information.

## System Initialization

After you are sure that the system is properly connected, the peripherals are turned on, and there is no disk in the floppy disk drive, you can Power On the system.

1. Turn on the IEB, UPS and CPU power switches.
2. Verify that the image fills the entire window and that the colors are correct.



## Front End Data Acquisition

1. Adjust the simulator so that the BP waveforms are zero.
2. Re-adjust the simulator so that it is simulating BP waveforms. If you have hooked up the simulator as recommended, you should see pressures in the window.
3. Verify that the correct ECG waveforms are present at the top of the window.
4. Verify that intracardiac inputs are present. Hook simulator ECG outputs to catheter input modules.

## Planned Maintenance

### Planned Maintenance Form

Print the form below.



GE Healthcare

### Mac-Lab/CardioLab IT Planned Maintenance Checklist

Customer			
System Type	Mac-Lab/Cardiolab ▼	Software Version	▼
Serial #		SR#	
FE signature			
PM Date		Next PM Due	

#### Preliminary Checklist

- Copy of this form left with customer
- Contacted customer to determine /discuss any Issues
- Documented performance issues on Service report
- Recorded Hardware Information
- Inspected all power cords for damage
- Inspected all cables for Stress-Cuts- Tears
- Verified Grounds
- Checked mounting hardware on Remote monitor and tightened as needed
- Checked mounting hardware on Tram and tightened as needed.
- Checked that all cables are neatly managed and don't create any hazards
- Checked for loose cables and tightened as needed
- Cleaned and checked fiber optic cables

☐ **Performed all checks listed above**

#### Functional Checklist

- Created New Study
- Hooked up simulator and verified operational function of Tram Module
- ECG traces checked
- Pressures checked
- SpO2 checked
- Cardiac output checked
- Check with customer that all Macro's operate properly
- Check with customer that all Lists are correct
- Turned on Optical/DVD and verified recording of signals on the media
- Created a report and verified printer operation
- Closed study and verified study in System, Optical and Network Catalog if networked
- Verified the study transferred to DMS by checking logs in DMS
- Verified the operation of Archive Generator
- Continued study from the network for networked systems
- Verified correct operation of Clab amplifier if Cardiolab or Combolab
- Verified operation of stimulator if Cardiolab/Combolab

☐ **All functions defined above checked properly**

#### Hardware Checklist

- Removed front cover of computer and removed dust
- Removed dust and checked operation of system fan on computer
- Removed dust from power supply and checked power supply fan
- Checked operation of UPS
- Removed dust and checked operation of IEB fan
- Verified operation of computer displays
- Cleaned and checked floppy and CD drives
- Cleaned and checked keyboard
- Shutdown and verified correct boot operation of computer
- Checked event logs for error's
- Ran virus scan and checked for viruses if Anti Virus software is installed

☐ **All hardware checks performed**

#### Hardware and System Configuration Information

Description	Model#	S/N #	MLCL name
Acquisition	▼		CLWS
Review	▼		Ip address
IEB			D.G.
Tram 451	2006171-002		Subnet
Tram Rac	900031-006		255.255.240.0 ▼
ClabII amp	2003232-001 ▼		Wins
Printer	▼		AE Tilt
INW	▼		INW name
DMS	P0001MC ▼		CLSV
Stimulator	Micro Pace ▼		Ip address
			D.G.
			Subnet
			255.255.240.0 ▼
			DMS
			INT IP
			DB IP

GEHC schedules and conducts Planned Maintenance on equipment that is under contract. For equipment not under contract, the customer can schedule Planned Maintenance and will be charged a standard service rate. All Planned Maintenance service will be conducted between 8-5, M-F only unless Service contract purchased for extended coverage hours. This is not a contract amendment.

# 4 Troubleshooting

# Initial Inspection

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## WARNING

**SHOCK HAZARD** — Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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## CAUTION

**EQUIPMENT DAMAGE** — Do not disconnect or reconnect cables while the system is under power (especially the barcode scanner).

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Always use the following username for troubleshooting the system:

**mlcltechuser** (Contact GE Medical Technical Support or the system administrator for current password information).

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## CAUTION

**SECURITY BREACH** — Never leave a system logged in as **mlcltechuser**. When done, always log out and leave the system at the custom shell.

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Before performing any troubleshooting procedure, check the following:

- The IEB is plugged in and power and ground are available at the wall outlet (also check the outlet circuit breaker).
- The IEB, HP computer, monitors, keyboard, and any optional equipment are properly connected and all connections are tight. Be sure to check for:
  - ◆ Frayed cables
  - ◆ Exposed conductors
  - ◆ Bent prongs or pins
  - ◆ Damaged cable housings
  - ◆ Loose plug screws
- Both IEB power switches (one in front and one in back) are on.
- HP computer power switch is on.
- The floppy drive is empty.
- All monitors are turned on and set to the appropriate brightness and contrast.
- Equipment housing for cracks, overheating, or other damage.

# Hardware

## Initial Check

1. Right click *My Computer* icon and select *Explore*.
2. Navigate to *C:\Windows\cpqdiag\cpqdiag.exe*.
3. Run a complete hardware diagnostic test on the system.

### NOTE

The tests also include an internal serial loopback test.

## Troubleshooting

*Problem: Unable to communicate with the TRAM*

- **The system cannot have an IP address in the range of 192.168.0.xxx.**

**Verify the IP address for the system network connection (in network properties) is not 192.168.0.xxx.** For example, if one of the other adapters on the Acquisition system has the IP configured for 192.168.0.20, the TRAM net TRAM net connection will fail and TRAM communication will fail.

The IP address of the TRAMnet is 192.168.0.100 and can not be changed.

- **Verify the TRAMnet jumper cable (1 foot yellow Ethernet cable) is connected into the left network port.**

Review Installation manual and Service Manual for proper cable connections.

*Problem: System locks up after first scan (with the barcode scanner) or the barcode scanner does not work properly.*

- **Ensure the barcode scanner is connected to the keyboard input, not the mouse input. (For PS/2 Connection style)**

- **The barcode scanner cable must not be connected to the keyboard PS/2 connector when system power is on.** This causes the system to lock up after the first scan.

If this happens, the barcode scanner cable must be replaced. Insert a paperclip into the small hole at the base of the scanner to release the cable.

- **Ensure the barcode scanner has the correct cable.** It must be a straight PS/2 connection, not the old DIN to PS/2 converter.

*Problem: No video display on the review stations with the 18" LCD monitor.*

- **Check the video cable.** The computer and monitors both have DVI connectors.
  - ◆ Use the DVI-VGA adapter with the DB15-HD15 cable.
  - ◆ Try the supplied DVI-HD15 cable.
  - ◆ Try a different cable with the monitor or test the monitor on a different station.

*Problem: Scrambled video display after 6.5.4 upgrade.*

- **Incompatible refresh rate between the video card and the supported ranges on the monitor (if the monitor is older).** The new Parhelia video board supports a high range of refresh rates, and may power up with a random rate.
- **Scan for hardware problems using the built-in HP diagnostic tool (on acquisition systems and HP review stations).**

*Problem: Amplifier communication (choppy signals in CardioLab).*

- **Verify the PCI Comms board has the proper version number.** Use the PCI Comms Tool (*Start > Programs > PCI Comms Tool*) to verify it is version 2.

*Problem: Amplifier signals are incomplete, intermittent, and/or noisy.*

- **Clean the fiber optic cable.** Clean the pin ends of the fiber optic cable with a soft, dry clean cloth to remove any dust or debris that may be present. Do this at each end of the cable connecting to the amplifier and to the HP computer. Also remove any dust build up at the connector on the amplifier (use a can of compressed air).

## Replace Primary Video Board with Matrox M9140 Quad Video Board

This section gives the procedures to replace the primary video board with the Matrox M9140.

### Uninstall Unused Display Drivers

Uninstall unused display drivers before installing the Matrox M9140 Quad video board drivers.

1. Log on to Windows and the Custom Shell as **mlcltechuser**.
2. Ignore any New Hardware found messages.

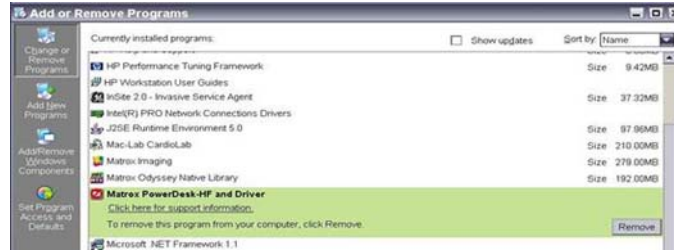
3. If an error message about stopping ONL display appears, click *OK*.



4. Click *Start > Settings > Control Panel > Add or Remove Programs*.
5. Uninstall the *ATI – Software Uninstall Utility*.



6. Ignore any New Hardware found messages.
7. Restart the system.
8. Log on to Windows and the Custom Shell as **mlcltechuser**.
9. Ignore any New Hardware found messages.
10. If an error message about stopping ONL display appears, click *OK*.
11. Click *Start > Settings > Control Panel > Add or Remove Programs*.
12. Uninstall *Powerdesk-HF and Driver*.



13. Select *No* to restart in the *Matrox Uninstaller for PowerDesk* window.

## Shut Down the System

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### WARNING

**SHOCK HAZARD** — To reduce the risk of shock and equipment damage, use safe working practices before servicing electrical equipment.

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1. Close all open windows.
2. Select **Start > Shutdown**.
3. Click *Shutdown*.
4. Power off the computer and all peripheral devices.
5. Disconnect the AC main power cords from the computer and from all peripheral devices.

## Remove and Install the Board

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### WARNING

**SHOCK HAZARD** — To reduce the risk of shock and equipment damage, use safe working practices before servicing electrical equipment.

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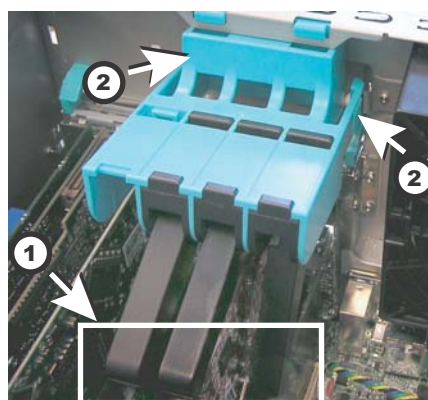
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1. Lift up on the tab near the top of the side panel.





2. Swing out the side panel and remove from the computer.
3. Disconnect all video cables (including adaptors) from the computer.
4. Place computer on side (open side up).
5. Squeeze in two tabs, gently push in, then pull, and lift off the clamp.



Item	Description	Quantity
1	Tabs	1
2	Clamp	1

6. Gently pull the board from slot 5 of the computer.

7. Gently pull the video board from slot 2 of the computer (if present).
8. Slide the new M9140 video board into the computer slot 2.
9. Follow the instructions included with the Matrox Quad Graphics card for securing the bracket to the card. After the bracket is installed, test to ensure the mating quad video cable can plug into the graphics card without any interference from the bracket.
10. Install the blank panel for the unused PCI slot 5.
11. Connect the new proprietary connector cable to the board.
12. Slide the clamp into the computer, swing the clamp toward the board end plates. Make sure the clamp is properly secured when the tabs “click” into their locked position.
13. Connect three video cables (including adaptors) to the proprietary connector cable on the board.
  - Video 1 cable to connector labeled 1/5
  - Video 2 cable to connector labeled 2/6
  - Video 3 cable to connector labeled 4/8
  - Connector labeled 3/7 not used
14. Re-install the side panel on the computer.

## Power On the System

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### WARNING

**SHOCK HAZARD** — To reduce the risk of shock and equipment damage, use safe working practices before servicing electrical equipment.

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1. Connect the AC main power cords to the computer and all peripheral devices.
2. Power on all peripheral devices.
3. Power on the Acquisition computer.

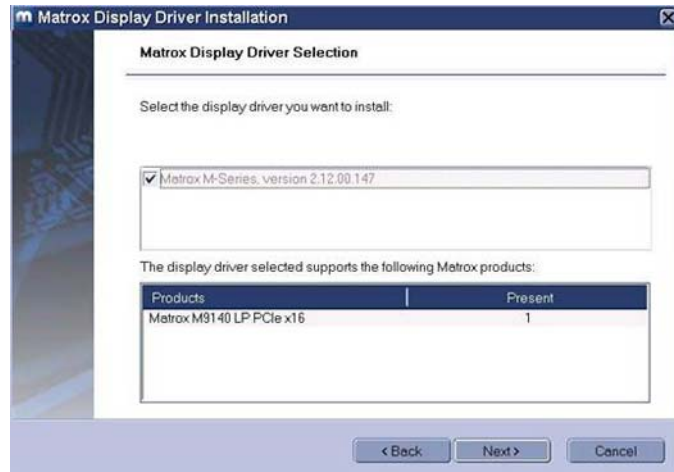
## Install Matrox M9140 Quad Video Board Drivers V2.12.00.147

Install the Matrox M9140 Quad video board drivers using CD-R MATROX M9140 QUAD VIDEO CARD DRIVER, V2.12.00.147 (P/N 2074635-001).

1. Log on to Windows and the Custom Shell as **mlcltechuser**.
2. Ignore any New Hardware found messages.
3. If an error message about stopping ONL display appears, click *OK*.



4. Insert CD-R MATROX M9140 QUAD VIDEO CARD DRIVER, V2.12.00.147 (P/N 2074635-001) into the drive.
5. Browse to the CD drive and double-click *Setup.exe*.
6. At the *Matrox Display Driver Installation - Matrox PowerDesk* window, click *Next*.
7. At the *Matrox Display Driver Selection* window, click *Next*.



8. At the *Ready to Install* window, click *Next*.
9. At the *Installation Completed Successfully* window, click *Next*.
10. At the *Installation Completed* window, click the *Restart Computer* checkbox and click *Finish*.



## Post Installation Steps for Matrox M9140 Quad Video Board Drivers V2.12.00.147

After installing drivers for the Matrox M9140, the logon fields might not display properly when the computer first restarts. Restarting the computer again resolves the issue.

1. Log on as **mlcltechuser**.



#### NOTE

The logon fields are present, but might not display properly.

2. Shut down and restart the system again to resolve the issue.
3. Log on to Windows and the Custom Shell as **mlcltechuser**.
4. Reconfigure the monitor settings using “[Set Display Configurations](#)” on page 4-11.

## Set Display Configurations

### Two Monitor Systems

1. Right-click the Desktop and select *Properties*.
2. Select the *Settings* tab.
3. Click the icon for the second monitor (labeled “2”).
4. Select *Extend the Windows desktop onto this monitor* check box.
5. Click *Apply*.
6. Close all open windows.

### Three Monitor Systems

1. Right-click the Desktop and select *Properties*.
2. Select the *Settings* tab.
3. Click the second monitor icon (labeled 2).

4. Select *Extend the Windows desktop to this monitor* check box.
5. Re-order the monitor icons so they appear in the following order:  
*1-2-4*.

NOTE

For HP z600 and HP xw8400 systems, the order of monitors should be *1-2-4*, the second monitor (“2”) and fourth monitor (“4”) need to be extended and the third monitor (“3”) should not be extended.

NOTE

To re-order the icons, drag the monitor icons and drop them in the correct position.

6. Click *Apply*.
7. Click the third monitor icon (labeled *4*).
8. Select *Extend the Windows desktop to this monitor* check box.
9. Click *Apply*.
10. Click *Identify*.
11. Verify the monitors are identified as *1-2-4* from left to right.

## Set Display Resolution

1. Verify you are logged on as **mlcltechuser** (password: **mlcl!techuser**).
2. Right-click the Desktop and select *Properties*.
3. Select the *Settings* tab.
4. In the *Screen Resolution* section, select *1600x1200*.

NOTE

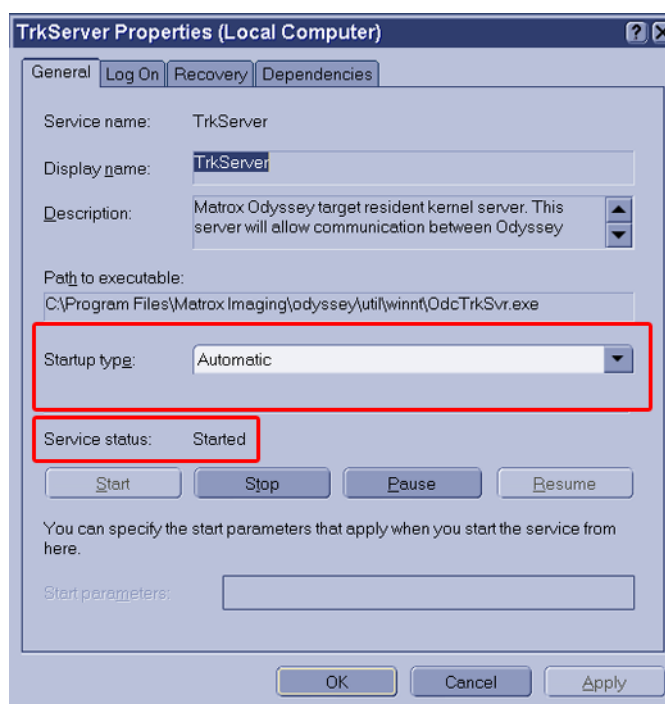
This is the only supported resolution for new systems. If existing monitors do not support this resolution, *1280x1024* may be used for Mac-Lab systems. All monitors must be set to the same resolution.

5. Verify the color for all monitors is set to *Highest (32-bit)*.
6. Click *OK*.

# Prevent Failure of the Matrox Odyssey Driver Service

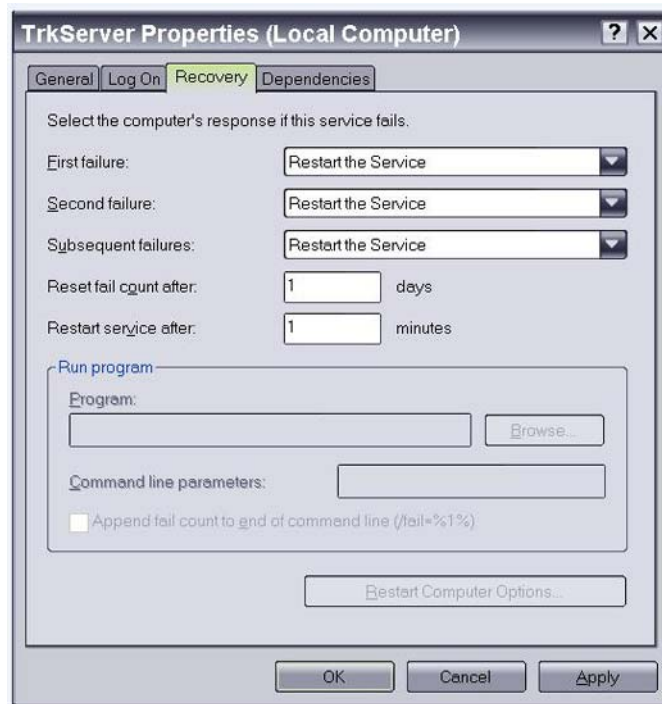
If the Image icon in the Image window appears grayed-out and disabled, the Matrox Odyssey driver service might have failed to start. The following procedure ensures that if the display driver service fails, it is automatically restarted.

1. Log on to Windows and the Custom Shell as **mlcltechuser**.
2. Click *Control Panel > Administrative tools > Services*.
3. In the *Services* panel, right-click *TrkServer* and select *Properties*.
4. Select the *General* tab and verify the following:
  - The *Startup type* is set to *Automatic*
  - The *Service Status* is *Started*



5. If the service is not started, click *Start* in the *Service Status* section to start it manually.

6. Select the *Recovery* tab and change the recovery actions as shown below:



7. Click *OK*.
8. Log off and auto-logon to Windows.

## ImageCapture/CardioImage

### Normal Operation

Ensure all cables and connectors are tight and correctly connected. Refer to the connection diagrams in “[Cabling and Connections](#)” on page 2-54.

### Troubleshooting

#### Problem: Unable to capture image

The image grabber window is blank or displays an error (no video found).



1. Check the cables.
  - Red and blue cables are input 1 and input 2 (respectively).
  - Left DVI port on the Odyssey board is channels 1 and 2, right DVI port is channels 3 and 4.
2. Verify Odyssey Firmware Version:
  - a. Right-click *My Computer* icon and select *Explore*.
  - b. Navigate to *C:\Program Files\Matrox Imaging\Odyssey\Util\Winnt* and run *MTXEDIT.exe*.
  - c. Click *OK* at the *Select Board* window.
  - d. The title of the MTXEDIT application window displays the current firmware information. The format of the information displayed is: *Grab:0x###A/B AN:1480.0*, for example, this may look like: *Grab:0x460A AN:1480.0*. Please ensure that *1480.0* is the last part of this string.
  - e. If the firmware revision is not 1480 (or the information is not displayed), then you have not successfully upgraded. Do not continue, return to the Odyssey Board Setup section.
3. Verify Odyssey Driver:
  - a. Verify that you are logged into Windows as local **mlclctechuser**.
  - b. Right-click the *My Computer* icon and select *Manage*.
  - c. Browse to *Device Manager*, and expand *Matrox Imaging Adapter*.
  - d. Verify that two Odyssey devices are listed under Matrox Imaging Adapter.
  - e. If these devices are not listed, do the following:
    - i. Expand and check the *Other Devices* folder.
    - ii. Right-click the devices listed and select *Update driver*.
    - iii. Click *Next* to install the default driver.
    - iv. Once the installation is complete, the devices should be listed under *Matrox Imaging Adapter* as listed above.
4. Browse to *C:\Program Files\Matrox Imaging\Intellicam* and double-click *Intelcam.exe* to run the IntelliCam utility.
  - The Odyssey system should be selected for ImageCapture (select *Odyssey 0* or *Odyssey/Analog 0* from *Options > System Selection*).

- Connect a test video source (X-Ray video signal or DVD player), then try to grab an image.
- Select *File > Open* and browse to *D:\gemms\prucka\system\image\dcf* to select the DCF file corresponding to the video source. All technical information about the format is contained in the DCF file.
- From the IntelliCam menu, select *Digitizer > Single Safe Grab* or *Continuous Safe Grab*.
- If IntelliCam can't capture the image, then the application will not be able to either.

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**CAUTION**

**LOSS OF FUNCTION** — Do not edit or change the original dcf files. They may be needed in the future.

Always create a copy of the original dcf file to work on.

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5. Contact technical support if an X-Ray image is not properly displayed using any of the supplied.dcf files.
  - Provide all image source specifications (resolution size, video timing, frequency, etc.). Contact the X-Ray OEM if necessary.
  - Technical support may be able to create a custom dcf file based on the specifications.

### Problem: Image Distorted

Use this procedure if you are able to capture images using one of the provided DCF files but the image is distorted or partially cut off.

1. Ensure you are logged on to Windows as **mlcltechuser**.
2. Attempt to capture using all provided DCF files. Identify the DCF file that gives the best image.
3. Browse to *C:\Program Files\Matrox Imaging\Intellicam* and double-click *Intelcam.exe* to run the IntelliCam utility.
4. Select the *Options* menu and choose *System Selection*. Choose *Odyssey 0 Device* and make it active.
5. Select the *Open* menu and browse to *D:\Gemms\Prucka\System\Image\Dcf*.
6. Choose the DCF file that gave the best image.
7. Save the DCF file as a different name to prevent the original file from being modified.

8. Select the *Digitizer* menu and select *Continuous Safe Grab*.

You should see an image at this time. If you do not see any image, check your connections and make sure the imaging system is sending out a signal.

9. Click the *Pixel Clock* tab in the configuration box.
  - If the image is a vertically elongated, increase the pixel clock value. This will make the image wider and shorter.
  - If the image is a horizontally elongated, decrease the pixel clock. This makes the image taller and narrower.

10. Click the *Video Timing* tab of the *Configuration* window.

#### NOTE

As you change the settings and modify the image, it may be necessary to close the grab window from time to time and open a new one for the changes to take effect. Most changes will take effect in real-time during the grab.

It may also be necessary to turn off the pixel clock Auto-adjust so you do not lose the pixel clock setting you just set.

- To decrease the amount of blank space to the left of the image, click on the lock active and total box in the horizontal section.
- To move the image to the left, increase the back porch value.
- To move it to the right, decrease it.

With the lock active and total box checked, the software automatically computes the front porch value.

- To decrease the amount of blank space above the image, click on the Lock Active and Total box in the vertical section.
- To move the image up, increase the back porch value.

With the lock active and total box checked, the software automatically calculates the back porch value.

11. Save changes made to the camera format once the image is set up correctly.
12. Return to the Mac-Lab/CardioLab software and start a study. Open the *Study Configuration* window, and select the *Imaging* tab. In the camera type field for image input 1, select the DCF file you created in *Intellicam* utility.

13. Test the camera format by acquiring an image. If the image is not acceptable, you may need to go back to Intellicam to adjust the image.

NOTE

The brightness and contrast of the image can be adjusted by changing the controls in the image window.

14. If it is not possible to correct the image using manual adjustments, you need to contact the vendor of the imaging system. You will need the following details that can be directly entered in Intellicam to create a new DCF file:
  - Whether video is interlaced or non-interlaced
  - Pixel clock (dot clock) in MHz
  - Horizontal frequency (line rate) in kHz
  - Vertical frequency (frame rate) in Hz
  - Image width (both active and total) in pixels
  - Image height (both active and total) in lines
  - Horizontal sync, front porch and back porch duration, in pixels or microseconds
  - Vertical sync, front porch and back porch duration, in lines or microseconds

## Problem: Image Buttons Are Grayed Out

The *Live* and *Freeze* buttons on the Image window toolbar are grayed out.

1. Check the Software options installed on the system. The CardioImage option should be enabled for Live capture support. The Image capture option must be enabled for single-image capture (Freeze).

### NOTE

Live capture is supported only when the Image window is opened on the third monitor.

2. Check that the Imaging driver is installed correctly and the Odyssey board firmware is up-to-date. Refer to the steps “Verify Odyssey Firmware Version” and Verify Odyssey Driver” in the troubleshooting section “[Problem: Unable to capture image](#)” on page 4-14.
3. Use the Intellicam utility to capture some images. Details about using Intellicam are given in the troubleshooting section “[Problem: Unable to capture image](#)” on page 4-14.
4. If the Intellicam utility does not list the "Odyssey 0" device, do the following:
  - a. Ensure that you are logged in locally as mcltechuser.
  - b. Run the *OdcMon.exe* tool from *C:\Program files\Matrox imaging\odyssey\util\winnt*. The tool will get minimized to the system tray. Double-click on the *OdcMonitor* icon in the system tray to open the tool.
  - c. If the tool shows a smaller window inside, with "Node 0" shown inside, do nothing -- this is the expected result.
  - d. If no window is shown inside, and a green Arrow icon is shown in the toolbar, it indicates that a required system service is not running. Click on the green arrow to start the service. This should open a window inside the tool, showing the status of the node.
  - e. Close the *OdcMon* tool and try running Intellicam again.

## Cannot Print To The Image Printer After Changing Printers

The Image Printer must first be configured by following these steps:

1. Configure the new printer in Windows.
2. Launch the Mac-Lab/CardioLab application.

3. Start a Mac-Lab or CardioLab study.
4. From the *Real-Time* window click the *Study Configuration* icon.
5. Browse to *Imaging* and select the *Software Settings* tab.
6. Click the *Printer Setup* button.

### NOTE

An error will be displayed if a Windows printer is not configured.

7. Select the desired printer from the list.
8. Close the *Study Configuration* window.
9. Exit the study.

## Switching Ablation Devices

When switching ablation devices from the CryoCath to any other, the cable should be switched first followed by the ablation device driver. When switching from any RF ablation device to the CryoCath, the ablation device driver should be switched first followed by the cable. If an ablation device appears to not be receiving data, clicking on the ablation device driver in the ablation setup screen will reset the com port. They may resolve the ablation data transmission issue.

## Replication

### Normal Operation

- All clients must be in the domain before starting replication
- All clients must be in the correct Organization Unit and have the correct policies applied.

### Troubleshooting

#### *Problem: Replication Errors*

- The replication tool must be able to see and connect with the clab database on the acquisition system.
- Verify the acquisition system's SQLServerAgent service has logon rights as INW\mlcsqluser.

#### *Problem: SQL not running on clients (or fails)*

**Changing the SQL user password requires a replication update on all systems.** If the update is not done, the SQL agent will not be run on the clients (and if you try to start it, the service will fail).

# Windows XP/2003

## Normal Operation

Windows XP/2003 are extremely stable (if you delete system files, it puts them back.

- Three tools to use on 2003 are (refer to Installation manual):
  - ◆ Active Directory users and computers
  - ◆ Active Directory domains and trusts
  - ◆ DNS configuration.
- OEM images randomly generated name based on CLWS or CLSV and 4 digits – if a duplicate name on the network is found, there is a utility built in to change the name automatically (*C:\windows\special\rename.wsf*).
- Files may be dragged to the CD to write to re-writable media.

## Troubleshooting

### No login through the custom shell.

1. Log off and during log on, hold the Shift key to break the auto-logon sequence.
2. *Logon through the windows logon dialog as **MLCLTechUser** from **INW** domain (the following steps require administrative privileges).*
3. *Log into the Custom Shell as **MLCLTechUser** from **INW** domain*
4. *Open a Command Prompt.*

#### NOTE

If Explorer or the command prompt icon are not available in the Start Menu, open explorer by right-clicking on the Start button and selecting Explore. Then go to *C:\Windows\System32\Cmd.exe*.

5. *Type **net time /set /domain:INW** Select **Y** for yes when prompted.*
6. *On the command prompt type **gpupdate /force** at the command prompt. This command will take about 15-20 seconds to finish.*
7. *Reboot the computer.*



**Problem: How can you tell if the computer has the correct policies applied?**

1. Open Help (*Start > Help*) from the Start menu.
2. Select *Pick a Task > Use tools* to view your computer information and diagnose problems.
3. Select *Tools > Advanced System Information*.
4. Select *View Group Policy settings applied* in the right window (may take up to 2 minutes to display).
5. *Default\_MLCL Computers\_Policy* must be listed under *Applied Group Policy Objects*.
6. If not, perform the following procedure:
  - a. Ensure the system is properly entered into the domain.
  - b. Reboot and allow computer to come to custom shell.
  - c. Press **Ctrl+Alt+Delete** and logoff while holding down **Shift** key.
  - d. Log back in as local mcltechuser to Windows XP.
  - e. Logon to the custom shell as local mcltechuser.
  - f. Log off and allow the system to auto-logon. The correct policies should now be applied.

**Problem: Error message (User Does Not Have Appropriate Rights) while logged in the domain as MLCLTechUser.**

1. Make sure you are in the OU.
2. If so, log out and log in to the systems as a local mcltechuser.

**Problem: Can not obtain proper policies on acquisition or review system.**

1. Verify the DNS entry for the workstation is directed to the IP of the INW server.
2. Verify the INW server can be pinged by both name and IP address.

## GEMS\_TaskMonitor Service

### NOTE

To start or stop the service, select *Control Panel > Administrative Tools > GEMS\_TaskMonitor*.

GEMS\_TaskMonitor service monitors configured services. Based on configuration, this service could be used to start or stop any windows services.

On INW server, GEMS\_TaskMonitor will be configured to monitor the CentralList Service. CentralList service will be used for communicating with CVIS server.

The GEMS\_TaskMonitor service must be stopped for:

- CentralList Service configuration or maintenance:  
GEMS\_TaskMonitor service will try to start CentralList Service at every 15 minutes, the CentralList Service may be started while configuring by GEMS\_TaskMonitor service if we didn't stop GEMS\_TaskMonitor before configuration.
- If the INW server is not configured to communicate with CVIS: We don't need the monitoring service, as CentralList Service won't be running on INW server. In this case you need to stop and then disable the GEMS\_TaskMonitor service. Be sure to start GEMS\_TaskMonitor service when you configure INW server to communicate with CVIS.

# Networking

## Normal Operation

It is very important to understand the facilities IP Addressing scheme before equipment setup. If any IP setting is mistyped the system may not be able to communicate on the network.

## Troubleshooting

### IP Troubleshooting

- Ping 127.0.0.1 to ensure the TCP/IP is installed properly.
- Ping the IP of the Local Computer to ensure the IP was entered correctly.
- If applicable, ping the IP Address of the Default Gateway. If this ping fails then you may not be able to communicate with other devices on the network.
- If applicable, ping the IP Address of a device located beyond the Default Gateway. This will ensure the Default Gateway is properly routing packets outside of your current network segment.
- Attempt to ping a remote device by name. If the system can ping by IP, but not by name, there is probably an issue with the DNS configuration.

### Slow Transfer/Ping Speeds

- If the system is experiencing slow transfer speeds ensure the NIC is communicating at least 100mb/s at Full Duplex. If the link is not at least 100mb/s then there may be a conflict between the NIC adapter and the network switch.
- To ensure transfer speeds of at least 100mb/s Full Duplex the NIC and the Switch port must BOTH be configured for either: Auto Detect or forced to at least 100/Full Duplex.

### DNS Troubleshooting (Client Side)

- If unable to ping a system by name it may be the local DNS cache is out of date. To resolve this open a command prompt and type the following:

- ◆ *Ipconfig /flushdns* **Enter**
- ◆ *Nbtstat -R* **Enter**
- If the problem persists after flushing the local DNS records the problem may reside on the server side.

## DNS Troubleshooting (Server Side)

- Correct DNS Entry:
  1. *Launch Administrative Tools > DNS*
  2. Navigate to *[Server Name] > Forward Lookup Zone > [Domain Name]*
  3. Ensure all records in the DNS table are accurate. If there is an IP / Name mismatch the record can be updated by double-clicking it.
- Clearing DNS Cache
  1. *Launch Administrative Tools > DNS* and right-click the server name and select *Clear the DNS Cache*.
  2. If the problem persists after flushing the local DNS records the problem may reside on the server side

## Operating System Troubleshooting

- Group Policy at Local Computer: If policy is not correctly applied to the local computer some or all of the following symptoms may occur:
  - ◆ Custom Shell is not displayed
  - ◆ Domain **mlcltechuser** does not have Administrative Rights
  - ◆ SQL Replication failures
  - ◆ Auto OS login failure
- Verify the computer is the proper OU.
- Verify all network settings are correct. If DNS, IP, Subnet or Gateway settings are not correct the policy may not push to the local computer.
- Ensure the time of the local machine is synchronized with the time of the Domain Controller. To set the time open a command prompt and type *net time /set /domain:[DOMAIN NAME]*.
- If you are unsure if the policy has been applied perform the following:
  1. Select *Start > Help*.
  2. Select *Pick a Task > Use Tools*
  3. Select *Tools > Advanced System Information*

4. Select *View Group Policy Settings Applied* (may take up to 2 minutes to display).
  5. Ensure the *Default\_MLCL Computers\_Policy* is listed under *Applied Group Policy Objects*.
- Unable to logon to the Custom Shell with a Hospital User: This is commonly caused by *Default\_MLCL Computers\_Policy* not containing the proper trusted user group information. To verify and correct policy edits perform the following:
    1. Launch *Administrative Tools > Group Policy Management Console*.
    2. Open the *Group Policy Objects* container.
    3. View the *Settings* for the *Default\_MLCL Computers\_Policy*
    4. Ensure the *MLCLAdmGrp*, *MLCLUsrGrp* and *MLCLSystemGrp* contain their respective hospital group names (e.g. *Hospital\MLCLAdmGrp*)
    5. Ensure the *Users* group contains all hospital MLCL groups. This setting determines if the user has rights to interactively logon to the operating system. If this setting is incorrect the user will be unable to logon with their hospital account information.

## INW Server

Refer to the Centricity Cardiology INW Operator's Manual, 2021423-017, Chapter 4 for additional Troubleshooting information specific to INW servers.

## InSite 2.0

### Normal Operation

Once the agents are configured and started after initial setup, any configuration problems will cause the agents to attempt to connect three times at two minute intervals before shutting down.

Once the agents are successfully configured and started:

- If the system is restarted, the agents attempt to start three times and then shut down (as above) until manually restarted.
- In the event of a failure (e.g., the network or enterprise is server down), the service agent polls every 10 minutes until it can connect.

# Option Codes

## Normal Operation

- **IMPORTANT:** Always make a backup options CD or USB disk after system setup. Refer to the **Installation manual** for detailed procedures.
- *Invalid key* message indicates key was entered incorrectly.
- Functions are enabled only when checkboxes are checked.
- If Option codes are changed while in the applications: Close the application and re-open to see the changes.

## Troubleshooting

### Fix Corrupt Option Codes

If options somehow become corrupted, then the following procedure can be used to reset the Mac-Lab CardioLab/Options.

1. Login as *mlcltechuser* (to OS and custom shall)
2. Open a command prompt and type: *regedit.exe [enter]*
3. Navigate to  
*HKEY\_LOCAL\_MACHINE\Software\GEMS\CardioLab\Options.*
4. Delete Option List.
5. Launch the Service Console from the desktop and select the Options Manager.
6. Read the Software Options from the CD or from the USB disk and apply the changes.

### If Serial Numbered Entered Incorrectly

1. Open command prompt
2. Navigate to *D:\Gemms\Prucka\bin*
3. Type: *GEMS\_ChangeSerialNum [SERIAL NUMBER]*

# CARTO™ XP System

## NOTE

Error messages on the CARTO™ System itself (such as a magnet positioning error) are the responsibility of the manufacturer-- either refer to the documentation or call CARTO™ XP System technical support.

## Normal Operation

The CARTO™ XP System has four states:

- Gray and unclickable: Software option must be enabled.
- Gray and clickable: Disconnected--No physical connection between the CARTO™ XP System and Mac-Lab/CardioLab systems.
- Blue: Connected. If the icon does not turn blue automatically, check the connections.
- Green: Passive interface. Must be activated from the Acquisition.
- Yellow: Active interface. Must be activated from the CARTO™ XP System. Refer to OEM documentation for specific information.

In active mode, a point selected on the Acquisition system is also selected on the CARTO™ XP System (however, a point selected at the Review system is not select at the CARTO™ XP System).

One CARTO™ XP System study may only be synched to one Mac-Lab/CardioLab study (a 1 to 1 relationship). The same two studies may be independently stopped and restarted, but a new CARTO™ XP System study can not be added to an existing Mac-Lab/CardioLab study.

*Netmsgsender* is used to communicate between Acquisition and Review systems. Check the connection between Acquisition and Review systems before targeting problem as CARTO™ XP System issues (e.g., log entries not being added).

A quick-connect cable is required to show ECG information.

CARTO™ XP System files are always less than 1MB.

## Troubleshooting

*Problem: CARTO™ XP System button inactive.*

Verify normal operation.

- Ensure the CARTO™ XP System interface is enabled on the Mac-Lab/CardioLab system.
- The interface is only available in the CardioLab application (make sure you're not in Mac-Lab).
- The interface is only accessible from the Real-Time window.
- The CARTO™ XP System must be version 7.0 or greater to be able to use this interface.
- Patient demographics may be edited on the CARTO™ XP System.
- CARTO™ XP System does not support import of foreign language demographics from Mac-Lab/CardioLab system (ENGLISH ONLY). Foreign languages are displayed as unrecognizable characters.

*Problem: CARTO™ XP System connection failure.*

Check cabling.

- The CARTO™ XP System option requires a crossover cable connected from the acquisition system computer to the CARTO™ XP System computer. Ensure cable and connectors are good.
- Verify the Ethernet lights are on

*Problem: CARTO™ XP System IP address conflict.*

- Use ping to test communication between the two systems.
- The CARTO™ XP System interface uses hardcoded IP address on our system.
  - ◆ The IP of the CARTO™ XP System is 192.168.5.1
  - ◆ The IP of the Mac-Lab/CardioLab CARTO™ XP System adapter is 192.168.5.2

*Problem: Cannot print from the Mac-Lab/CardioLab system to the CARTO™ XP System color printer.*

This functionality is not supported. The Mac-Lab/CardioLab and CARTO™ XP System are completely independent and only send messages for points and waveform data.



*Problem: Mapping points are unsynchronized or missing*

At the Review system double-click on points to see the data.

- Regular CARTO™ XP System mapping points are not editable on Mac-Lab/CardioLab system.
- Resynch at the CARTO™ XP System.
- Check the CARTO™ XP System point filter on the log. Missing points may be filtered out.
- Points missing from a report may have been manually deselected (the default is to include all points in a report).
- During normal operation waveform point synchronization may be off by up to  $\pm 50$ ms.
- If it is off by more than  $\pm 50$ ms, select a different channel (channel registered is the channel measured in CardioLab)

*Problem: Signal Noise*

The following steps should be tried when troubleshooting noise associated with connectivity of the CARTO XP system. Each of these steps have proven to reduce or eliminate noise.

NOTE

If the 10-foot 2015944-001 ECG cable is used, the total ECG signal path will be lengthened significantly and in some clinical settings increased noise may appear on the ECG readout.

1. Make sure you are using Rev 10 or newer of the CARTO PIU. Earlier revisions of the PIU can make the overall system more susceptible to ECG noise. Revision 10 introduced an improved grounding scheme.
2. If you are not using the CARTO IC cable (i.e. if you are currently providing IC signals to the CARTO PIU by connecting the CARTO IC input leads to the CLAB CIM terminals), try routing all catheter leads to the CARTO PIU IC inputs, then connect the CLAB to the CARTO PIU using the blue CARTO-to-CLAB cable (2015944-001). This is the recommended system configuration.
3. In some clinical settings, the use of the ECG cable that connects the CARTO PIU and the CLAB amp (2015944-001) can be a source of noise. In this case, noise may be reduced by removing this cable and instead connecting the CLAB to the ECG terminals on the top of the CARTO PIU via the ECG cable assembly (2003419-001) along with the ECG lead set (2003421-001). This is a cleaner alternative to "double patching" the patient (10 electrodes for the CLAB, 10 electrodes for the CARTO).

4. If noise is present during ablation, try using the RF Filter Box (2004965-001).

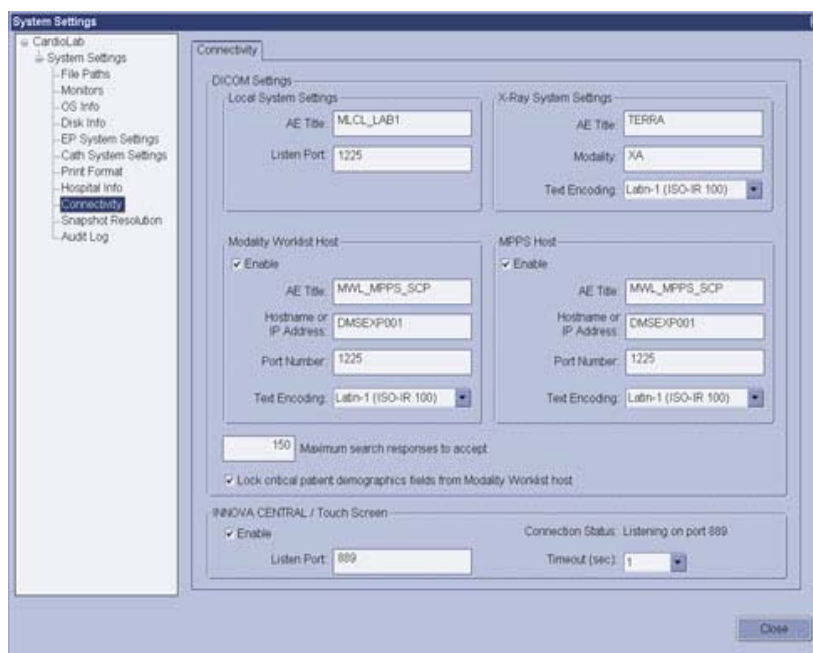
*Problem: Data import does not work on non-English systems*

- This is expected behavior. Patient demographics are shared only between English CardioLab systems and CARTO™ XP Systems.
- For non-English CardioLab systems, the demographic data must be entered manually.

## CVIS to Mac-Lab/CardioLab Interface

### NOTE

For Acquisition and Review system, the *Local System Setting* and *Modality, Host Worklist* sections must be completed to perform patient search and schedule searches.



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The screen above shows the DICOM configuration settings with some default settings. Enter each field as described below:

**Local System Settings:** These settings are for this Mac-Lab/CardioLab system. You must fill in this section.

- **AE Title:** The DICOM name for the Mac-Lab/CardioLab system. An AE Title may only contain letters, numbers, and the underscore character, and must be 16 characters or less.

**NOTE**

AE Titles are case sensitive, e.g., *Lab1* is not the same as *LAB1*.

- **Listen Port:** Port number on which Mac-Lab/CardioLab listens for connections from the X-ray system. Use the default of *1225*.

**X-Ray System Settings:** Fill in this section only if the X-ray system DICOM interface will be used. (Typically only GE Innova or DLX system).

- **AE Title:** The DICOM name for the X-ray system. This is found in the X-ray system's configuration settings. (Default is "dlx\_root" for the "TERRA" or DLX for Innova, but these values are typically changed).
- **Modality:** Imaging system's modality. Leave at default of *XA*.
- **Text Encoding:** How text sent to the X-ray system is coded. Leave at default of *Latin-1*.

**Modality Worklist Host:** CVIS settings. You must fill in this section.

- **AE Title:** DICOM name for the CVIS. Default is *MWL\_MPPS\_SCP*. Check CVIS configuration to verify the name.
- **Hostname or IP Address:** CVIS hostname or IP address.
- **Port Number:** Port number on which CVIS listens for connections from the Mac-Lab/CardioLab. Default values are:
  - ◆ Domestic CVIS is *1225*
  - ◆ Non-Domestic CVIS is *104*.

Check the CVIS configuration to verify the value.
- **Text Encoding:** How text sent to the CVIS is coded. Leave at default of *Latin-1* (exception: CVIS in China and Japan should be *Unicode (UTF-8)*).

**MPPS Host:** CVIS settings. You must fill in this section. Use exactly the same values you used to fill in the **Modality Worklist Host** section.

**Maximum search responses to accept:** Defines the maximum number of DICOM search results displayed. Use the default value of 150.

**Lock critical patient demographics fields from Modality Worklist host:** Leave checked to prevent the operator from changing Patient Name, MRN, and Date of Birth when these values are provided by the CVIS.

## Problem Scenarios

*My supplies or other list items I add to the CVIS system are not showing up on my Mac-Lab*

- INW service that processes lists not configured or started
- CVIS List Sharing Delta export not configured for the given location
- Corrupt XML export from the CVIS system
- CVIS List Sharing services on CVIS server not started
- Replication errors/issues with INW Server and Mac-Labs
- Network connection between CVIS and INW server lost (INW service can't find files even though they're getting created appropriately)

*Problem: Cases I do on Mac-Lab are not showing up in the CVIS system.*

- Interfaces on CVIS server not running or configured improperly
- Data Export Utility on Mac-Lab not configured correctly
- Data Export not turned on Mac-Lab in Sys Admin File Path setup
- Network connection between Mac-Lab and CVIS Server not up

*Problem: I scheduled the patient on the CVIS system, but I can't find them in the Schedule search*

- DICOM settings not configured correctly on Mac-Lab
- DICOM services not running on CVIS Server
- Network connection lost between Mac-Lab and CVIS

*Problem: I can't find a patient with the Patient search, but I know they are admitted...the Patient search isn't working*

- DICOM settings on Mac-Lab not configured correctly
- Network connection lost between Mac-Lab and CVIS
- Patient Interface service not running
- HIS feed to ADT Interface is down on CVIS

## Test DICOM Connectivity (CVIS)

Steps 1 and 2 are only valid for US CVIS.

1. Open the *Study > Patient Search* at the Navigator.
2. Enter a *Patient Last Name* of *Smith* (or other common name) and press *Start Search*. One of the following outcomes will occur:

- One or more patient records are returned and shown in the list. (If too many matches are found the list will be truncated.) The DICOM configuration settings are correct.
- An error message is displayed indicating no matching patients were found. The DICOM configuration settings may be correct, but another name should be tried.
- Some other error message is displayed.
  - ◆ Either the DICOM configuration settings are incorrect.
  - ◆ The CVIS system configuration settings are incorrect.
  - ◆ The CVIS system is not actively listening for connections.

Begin troubleshooting with the next step.

3. These substeps are valid for both US and non-US CVIS.
  - a. Log in as *MLCLTechUser* (to OS).
  - b. Open command prompt.
  - c. Type *dicomdiag* and press *Enter*. The diagnostic tool will attempt to connect to CVIS. Failures and recommended solutions will be reported.
  - d. The diagnostic tool will tell you what to do next.
4. Check the DICOM server settings on the CVIS systems. Log in to the US CVIS system using *MuseAdmin* (Contact GE Medical Technical Support or the system administrator for current password information). *MuseAdmin* is only valid for US CVIS.
  - a. Open the *Interface Management Console* tool (if it is not already running, look for it on the system tray).
  - b. Select the *DICOM MWL SCP* on the left side (it may be called something else).
  - c. Verify the DICOM server is running (it is shown on the right side). If it is not, click the + button on the toolbar.
  - d. Verify the AE Title and Network Port values match the Mac-Lab/ CardioLab configuration.
  - e. Verify the CVIS application is running. If it is not, open the *Centricity Cardiology DMS* application on the desktop.
  - f. Go to *Administrative > System Management > DICOM Maintenance*.

- g. Check near the bottom of the *DICOM Network* section. The Mac-Lab/CardioLab system must have the same *AE Title* configured earlier in CVIS (*MLCL\_LAB1* in the previous example).
- h. If it does not, click the *Add Net Device* button and enter the following information:
- i. **AE Title** column: Enter the *AE Title* of Mac-Lab/CardioLab system.
- j. **AE Alias** column: Enter a user-friendly name for the system (e.g., Lab #1 or Mac-Lab 3).
- k. **Modality** column: *HD* for Mac-Lab; *EPS* for CardioLab systems, or both for ComboLab systems.
- l. Repeat the patient search. If all settings are correct, it should return a valid result. If the search still does not work, go to the next step.

**NOTE**

By default, only errors from the DICOM interface are logged. To see additional error messages, you must edit the registry.

5. Add event log for DICOM traffic.

- a. At the command prompt, run *regedit*.
- b. Go to the following key:

HKEY\_LOCAL\_MACHINE\SOFTWARE\GEMS\DICOM\MWL\_MPPS

- c. Open *Logging Filter*. (It should have a default value of "08".)
- d. Change the value to "0F" (number zero, letter "F") to enable logging of all events.

**NOTE**

Only change this value for troubleshooting because debug messages are also logged and the log will quickly fill up with unneeded information.

- e. Restore the value to "08" when finished troubleshooting.

## Test DICOM Connectivity (X-Ray)

**Mac-Lab/CardioLab:** After you configure (or re-configure) either the “Local System Settings” or the “X-ray System Settings” within the Mac-Lab/CardioLab application, you must either reboot the Acquisition system or manually restart the service called “MWL MPPS Service”. Note that you must be logged in as MLCLTechUser to manually start this service. MLCLLogonUser does not have the privilege to do this.

**X-ray:** You must configure the X-ray system to use the Mac-Lab/CardioLab Acquisition system as its destination for both MWL and MPPS transactions. The X-ray system must not get this information from the CVIS system.

1. PING (at the command prompt) the X-ray system using the same hostname or IP address previously configured.

- PING fails: Networking problem.
- PING successful: Go to the next step.

### NOTE

The dcmecho command (see above for CVIS) will not work for to test the X-ray system interface. This is because the command tests connecting from Mac-Lab/CardioLab to X-ray systems, but the connections only go the other way. Therefore, the connection test must be done from the X-ray side.

2. Use the DICOM Echo interface (if supported by the X-ray system) to verify the connection with the Mac-Lab/CardioLab system can be established. If that works, the Mac-Lab/CardioLab system is configured correctly and is listening for and responding to connections.
3. Use the MWL interface on the X-ray system to request patient and study data from the Mac-Lab/CardioLab system.
  - a. Start a new study on the Mac-Lab/CardioLab system. If you don't do that, the MWL request from the X-ray system will fail because there is no patient and study data to report.
  - b. Make the MWL request from the X-ray system. Key patient attributes such as Name, MRN, Date of Birth, Height, and Weight should transfer from the Mac-Lab/CardioLab and should be displayed on the X-ray system.
4. If this doesn't work, make sure the *MWL MPPS Service* is running on the Mac-Lab/CardioLab system.

5. Check the error log and look for errors reported by the DICOM layer.
6. Recheck the configuration on both systems (the values should match):
  - **Mac-Lab/CardioLab:** Local *AE Title* and *Listen Port*, the X-ray system's *AE Title* and *Modality*.
  - **X-ray System:** *AE Title* values, MWL/MPPS destination *Hostname/IP Address*, *Port Number*.

## HL7 Export to CVIS

- Check the Mac-Lab/CardioLab logs to verify successful HL7 export.
- Check the CVIS Interface Console audit logs to see if the HL7 message was received.
- Check the CVIS archive logs to see if the HL7 message was processed.

## Log File Locations for ML-CL System

The following log files may exist on workstations and INW servers:

- D:\GEMMS\Prucka\Setup\GEMS\_CLAB\_INSTALL.log
- D:\GEMMS\Prucka\Setup\GEMS\_DROP\_DATABASE.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_DBMAINT\_PROCS.log
- D:\GEMMS\Prucka\Bin\TramNetErr.log
- D:\GEMMS\Prucka\Bin\Gems\_backupclab.log
- D:\GEMMS\Prucka\Bin\Gems\_restoreclab.log
- D:\GEMMS\Prucka\Bin\Audit.log
- C:\DFCtest\merge.log
- D:\GEMMS\Prucka\Setup\changepassword.log
- C:\clabdbsizecheck.log
- D:\GEMMS\Prucka\Bin\CMD\_RESULT.log
- D:\GEMMS\Prucka\setup\GEMS\_Droplinkedserver.log
- D:\GEMMS\Prucka\setup\GEMS\_Dropreplblaster.log
- D:\GEMMS\Prucka\setup\GEMS\_Replcheck.log
- D:\GEMMS\Prucka\SETUP\GEMS\_CLAB\_Export.Log
- D:\GEMMS\Prucka\Setup\GEMS\_CLAB\_INSTALL.Log
- D:\GEMMS\Prucka\Setup\GEMS\_archiveuser.log



- D:\GEMMS\Prucka\Bin\DATABASE\MAINTENANCE\LOG\GEMS\_BKP.Log
- D:\GEMMS\Prucka\Bin\DATABASE\MAINTENANCE\LOG\GEMS\_TAPEBKP.Log
- D:\GEMMS\Prucka\Bin\build.log
- D:\GEMMS\Prucka\Bin\DashErr.log
- D:\GEMMS\Prucka\Bin\TramErr.log
- C:\STATS.LOG
- C:\QUERY.LOG
- C:\SQL.LOG
- D:\GEMMS\Prucka\2GBUtility\Log\2GBLimit.log
- D:\GEMMS\Pruckaa\Bin\GEMMS\_tmparchive.log
- D:\GEMMS\Prucka\Bin\GEMMS\_tmppurge.log
- D:\GEMMS\Prucka\Bin\log\gems\_ws\_dbmaint.log
- D:\GEMMS\Prucka\Bin\log\GEMS\_DBMAINT\_PROCS.log
- D:\GEMMS\Prucka\Bin\log\GEMS\_WS\_DBMAINT.log
- D:\GEMMS\Prucka\Bin\log\GEMS\_db\_maint\_checks.log
- GEMS\_db\_maint\_backup.log
- GEMS\_db\_maint\_REINDEX.log
- GEMS\_db\_maint\_updatestats.log
- D:\GEMMS\Prucka\log\GEMS\_db\_maint\_recompile.log
- D:\GEMMS\Prucka\DICOM\merge.log
- D:\GEMMS\Prucka\Ntos\logs\GEMS\_Policy.log
- D:\Upgrade65\capture\_settings.log
- D:\GEMMS\Prucka\Database\maintenance\log>Listjobs.log
- D:\GEMMS\Prucka\Database\maintenance\log\sp\_detach\_5x.log
- D:\Upgrade60\migrate\_acq.log
- D:\Upgrade60\migrate\_rev.log
- D:\Upgrade60\migrate\_srv.log
- D:\GEMMS\Prucka\Database\maintenance\log\sp\_attach\_cb.log
- D:\GEMMS\Prucka\Bin\log\sp\_attach\_5x.log
- C:\windows\security\logs\resetup.log
- C:\windows\special\cardiosec.log
- D:\GEMMS\Prucka\setup\LMT\_Update.log
- D:\GEMMS\Prucka\Setup\MLCL\_Set\_Language.log
- D:\GEMMS\Prucka\Setup\history.log
- D:\GEMMS\Prucka\Bin\GEMS\_SWInstall.log

- D:\GEMMS\Prucka\Bin\GEMS\_SW\_D.log
- D:\GEMMS\Prucka\Setup\GEMS\_clabsys.log
- D:\GEMMS\Prucka\Setup\GEMS\_clabuser.log
- D:\GEMMS\Prucka\Setup\GEMS\_CmdExecNT.log
- D:\GEMMS\Prucka\Setup\GEMS\_StartServices.log
- D:\GEMMS\Prucka\Setup\GEMS\_CmdExecNT.log
- D:\GEMMS\Prucka\Setup\GEMS\_CmdExecSQLAcq.log
- D:\GEMMS\Prucka\Setup\GEMS\_CmdExecSQLRev.log
- D:\GEMMS\Prucka\Setup\GEMS\_netshare.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\DatabaseMaintenance.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_sqljobs.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_backup\_clabdb.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_backup\_masterdb.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_db\_maint\_reindexdb\_clab.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_db\_maint\_recompile\_clab.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_db\_maint\_checks\_master.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_SrvNameChanger.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_SrvNameChanger.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\NameChanger.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_Acq\_ReplRemove.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_ReplicationCheck.log
- D:\GEMMS\Prucka\Database\Maintenance\Log\GEMS\_Server\_ReplRemove.log
- D:\GEMMS\Prucka\Setup\MLCLInstallerDbg.log
- D:\GEMMS\Prucka\Bin\ArchiveUtility\Log\GEMS\_Archive.log

# INNOVA CENTRAL/Touch screen

## Check connection status

1. Open the Mac-Lab/CardioLab application.
2. Select *Administration > System Settings*.
3. Select the *Connectivity* screen.
4. Check the *Connection Status* in the *Touchscreen* section.
  - *Connected* is displayed if the INNOVA CENTRAL/Touch screen is connected  
If the connection status is *disabled*, ensure the INNOVA CENTRAL/Touch screen enable checkbox is checked. If the checkbox is grayed out, the software option is disabled. Any changes to items on this dialog require an application restart to update.
  - *Listening on port nnn* (where nnn is the port setting) is displayed if the INNOVA CENTRAL/Touch screen is not connected.  
If the INNOVA CENTRAL/Touch screen is connected and this message is displayed, ensure the port listed is 889. This is the INNOVA CENTRAL/Touch screen connection port.

## Determine IP addresses

1. Press the **Service** button on the bottom of the INNOVA CENTRAL/Touch screen.  
  
The INNOVA CENTRAL/Touch screen local service main page is displayed. Note the INNOVA CENTRAL/Touch screen IP address.
2. Determine Mac-Lab IP address
  - a. Open a browser and type the following URL:  
  
*http://TouchScreenIPAddress*
  - b. Log onto the web application with the user id: **service** (password: **service**).
  - c. Touch the *Configuration* button.
  - d. Touch the *Modalities IP configuration* button.  
  
Verify the Mac-Lab IP address is set correctly. Update if necessary.

- e. Press the reset button on the bottom of the unit to reset the INNOVA CENTRAL/Touch screen.

# 5 Recovery Procedures

# Acquisition System Disaster Recovery

The decision to perform an Acquisition system recovery should only be made after consultation with GE Technical Support by the on-site Field Engineer. The high-level steps for a complete 6.5 Acquisition system recovery are listed below. Detailed instructions for each step follow.

## How to log on to the Acquisition System

When starting up an Acquisition system, an auto-logout sequence starts and you are automatically logged on to Windows XP. To install this update you must stop the auto-logout so you can log on to Windows XP as **mlcltechuser**.

1. Power on the Acquisition system.

The system boots up to the *Mac-Lab / CardioLab Custom Shell* screen.

2. Press **Ctrl + Action + Delete**.
3. Click *Logoff* and select *Logoff*.
4. Immediately hold down the **Shift** key.
5. Log on to Windows OS as **local mlcltechuser** (contact GE Technical Support or the system administrator for current password information).

To log on locally, select the computer name in the *Domain* field.

6. Log on to the Mac-Lab/CardioLab Custom Shell locally as **mlcltechuser** (contact GE Technical Support or the system administrator for current password information).

## Save Acquisition System Information

If the system will not boot up or drives C: or D: are unavailable:

- For INW networked systems, go to “[Obtain System Information at the Server](#)” on page 5-7.
- For standalone systems, go to “[Reimage the Acquisition System](#)” on page 5-10.

If the system boots up and the C: and D: drives are available, use the following procedures to back up system information.

## Export Custom Data

Use this procedure to save custom data to the G: (backup) drive.

### NOTE

If prompted for an administrative logon, enter **mlcladmuser** (password: **mlcl!admuser**).

### Export Custom Lists

1. Double-click the *GE Medical Systems* icon to start the *Mac-Lab/ CardioLab* application.
2. In the Navigator window, select *Utilities > Export Lists*.  
The *Data Export Wizard* is displayed.
3. Select the G: drive and click the *New Folder* icon.
4. Enter **List\_ Backup** for the folder name and click *Ok*.
5. Click *OK* when the *Success* message is displayed.

### Export Custom Forms

1. In the Navigator window, select *Utilities > Export Custom Form Layouts*.  
The *Data Export Wizard* is displayed.
2. Select the G: drive and click the *New Folder* icon.
3. Enter **Forms\_ Backup** for the folder name and click *Ok*.
4. Confirm that the custom forms to be exported are selected and click *Export*.

5. Click *OK*.
6. Click *OK* when the *Success* message is displayed.

### Export Custom Report Formats

1. In the Navigator window, select *Utilities > Export Report Formats*.  
The *Data Export* wizard is displayed.
2. Select the *G:* drive and click the *New Folder* icon.
3. Enter **Report\_Backup** for the folder name and click *Ok*.
4. Click *OK* when the *Success* message is displayed.
5. Close the application.

## Back Up System Information Manually

A manual backup must be created for the following information:

- Third Party Software
- Software Options
- Desktop Files

### Back up Third-Party Software

1. Check for the PedCath database:
  - a. Open the *PedCath* application and select *File > Show Data Folder Path* from the main menu.  
  
If the data folder path is on the local C: or D: drive, then perform the next steps:
  - b. Right-click *My Computer* icon and select *Explore*.
  - c. Navigate to the PedCath database folder location.
  - d. Drag and drop the PedCath Data folder into the G: drive.
2. Check for the ACCAccess database:
  - a. Right-click *My Computer* icon and select *Search*.
  - b. Search the C: and D: drives for the file *acc.mdb*.
  - c. If the ACCAccess database is found, drag and drop the file into the G: drive.



3. Backup any other third-party software to the G: drive.

**NOTE**

This disaster recovery procedure will only save Mac-Lab/ CardioLab files. Any other files must be backed up manually to the G: drive and restored later.

**Back Up Software Options**

1. Double-click *Service Console* icon on the *Desktop*.
2. Navigate to *Software Options Manager > Software Options*.
3. Click *Create Backup*.
4. In the *Save In* drop-down box navigate to *G: drive*.
5. In the *File Name* field type in *Software\_Options* and click *Save*.
6. Close the *Service Console*.

**Back Up Desktop Files**

1. Right-click *My Computer* icon on the Desktop and select *Explore*.
2. Navigate to *G: drive* and click the *New Folder* button.
3. Enter the folder name as *Desktop\_Items*.
4. Copy any customer created documents or folders from the desktop to the *Desktop\_Items* folder.
5. Repeat this procedure logged in as any other applicable user (local mlcllogonuser, INW mlcllogonuser, and INW mlcltechuser).

**Record Network Settings**

1. Verify that you are logged in to both the Windows OS and the Custom Shell as **local mlcltechuser**.
2. From the *Desktop*, right-click *My Computer* icon.
3. Choose *Properties*.
4. Click the *Computer Name* tab.
5. Record the computer name in the table below.
6. Record the *Domain/Workgroup* information and click *Ok*.
7. From the Desktop, right-click on the *My Network Places* icon.

8. Choose *Properties*.
9. Right-click on *Local Area Connection*.
10. Choose *Properties*.
11. Highlight the *Internet Protocol (TCP/IP)* and click *Properties*.
12. Record the *IP Address*, *Subnet Mask*, *Default Gateway*, and *DNS Server* information.

Network Settings	
Computer name	
Domain\Workgroup	
IP Address	_____ - _____ - _____ - _____
Subnet Mask	_____ - _____ - _____ - _____
Default Gateway	_____ - _____ - _____ - _____
DNS Server	_____ - _____ - _____ - _____ _____ - _____ - _____ - _____ _____ - _____ - _____ - _____

## Record Mapped Drives

1. Press **Ctrl + Action + Delete**.
2. Click *Logoff* and select *Logoff*.
3. Allow the system to auto-logon to Windows.
4. Log on to the Mac-Lab/CardioLab Custom Shell as a local user.
5. Double-click on *My Computer* icon.
6. Go to *Network Drives*. All mapped drives will be listed.
7. Record all mapped drives.
  - Drive letter
  - Share name
  - Hostname of the computer that owns the share

## INW Networked Acquisition Systems Only

Use these procedures only if the Acquisition system is part of an INW network.

You must log on to the server as the INW Domain **Administrator** to perform this procedure (contact GE Technical Support or the system administrator for current password information).

### Obtain System Information at the Server

Use this procedure to obtain network settings if the Acquisition system will not boot or the C: or D: drives are unavailable.

1. Select *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
2. Open *Microsoft SQL Servers > SQL Server Group*.
3. Highlight the server name.
4. Expand *Replication Monitor > Agents > Merge Agents*.

The failed Acquisition has a red X displayed next to system's *Merge Agent*.

5. Record the system name in one of the *Merge Agents* with the red X under the *Subscription* tab.

- 
6. Close the *Enterprise Manager*.
  7. Open a command prompt (*Start > Programs > Accessories > Command Prompt*).
  8. Type:

*Ping [System Name]*

recorded in step 5.

9. Record the Acquisition system IP address.

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#### NOTE

Ignore the request timeout.

10. Close all open windows.

11. Go to another Acquisition or Review system on the network within the same subnet, and use the procedure “**Record Network Settings**” on page 5-5 to obtain and record DNS, Default Gateway, and Subnet information.

**NOTE**

A system on the network within the same subnet will have the same network information as the system being recovered.

### **Remove the Acquisition System from Replication**

1. Select *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
2. Open *Microsoft SQL Servers > SQL Server Group*.
3. Highlight the server name.
4. From the menu Select *Tools/Replication/Configure Publishing, Subscribers, and Distribution*.
5. Select the *Subscribers* tab.
6. Deselect the checkbox next to the Acquisition system name.
7. Click *Yes*.
8. Click *OK*.
9. In the *Enterprise Manager*, right-click the Acquisition system in the left pane.
10. Select *Delete SQL server registration*.
11. Select *Yes*.
12. Close the *Enterprise Manager*.

### **Remove the Acquisition System from the GE MLCL Organizational Unit**

1. At the server Desktop, go to *Start > Control Panel*.
2. Double-click the *Administrative tools* icon.
3. Double-click *Active Directory Users and Computers*.
4. Expand *inw.local*.
5. Expand the *GE Medical Systems (MLCL)* organizational unit.
6. Expand the *MLCL Computers*.

7. Expand the *MLCL Workstations*
8. Expand the *MLCL Acquisition Workstations*
9. Delete the Acquisition system name from the *MLCL Acquisition Workstations* folder.
10. Click *Yes* to confirm.
11. Close all open windows.

## Restore System Software

### Reimage the Acquisition System

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**CAUTION**

**SHOCK HAZARD** — Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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**CAUTION**

**EQUIPMENT DAMAGE** — Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before opening any equipment.

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**CAUTION**

**LOSS OF DATA** — If drive G:, the second hard drive, is physically connected during reimaging, all data contained on it will be lost.

You must physically disconnect the second hard drive before reimaging.

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For the reimaging process you'll need the following media depending on system type (HP8000, HP8200, HP8400) and configuration (-001, -002, -003, -004).

Media	-001	-002	-003	-004
2024573-015CD-R - HPX8000 ACQ/REV IMAGE 6.5 #1	Required	Required	N/A	N/A
2024573-016CD-R - HPX8000 ACQ/REV IMAGE 6.5 #2	Required	Required	N/A	N/A
2024573-017CD-R - HPX8000 ACQ/REV IMAGE 6.5 #3	Required	Required	N/A	N/A
2024573-018CD-R - HPX8000 ACQ/REV IMAGE 6.5 #4	Required	Required	N/A	N/A
2024573-019CD-R - HPX8000 ACQ/REV IMAGE 6.5 #5	Required	Required	N/A	N/A
2024573-020CD-R - HPX8000 ACQ/REV IMAGE 6.5 #6	Required	Required	N/A	N/A
2024575-014CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #1	N/A	N/A	Required	Required
2024575-015CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #2	N/A	N/A	Required	Required
2024575-016CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #3	N/A	N/A	Required	Required
2024575-017CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #4	N/A	N/A	Required	Required
2024575-018CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #5	N/A	N/A	Required	Required
2024575-019CD-R - HPX8000 ACQ W/MIL IMAGE 6.5 #6	N/A	N/A	Required	Required
2026363-005DVD MLAB/CLAB HPXW8200 ACQ/REV IMAGE 6.5	Required	Required	N/A	N/A
2026363-006 DVD MLAB/CLAB HPXW8200 ACQ W/MIL IMG 6.5	N/A	N/A	Required	Required
2037988-001DVD MLAB/CLAB HPXW8400 IMG 6.5.4 #1	Required	Required	Required	Required
2037988-002 DVD MLAB/CLAB HPXW8400 IMG 6.5.4 #2	Required	Required	Required	Required
2036182-001CD Mac-Lab/CardioLab Application/Upgrade vers. 6.5.4	Required	Required	Required	Required
2037996-001CD-R MLAB/CLAB OS UPDATE v. 6.5.4	Required	Required	Required	Required
2034817-001CD-R Mac-Lab/CardioLab v6.5.3 Update	Required	Required	Required	Required
2035828-001CD-R ML/CL VIDEO SUPPORT	Required	Required	Required	Required

1. Shut down the system, if necessary.
2. Open the computer case and disconnect the second hard drive (drive G:) before reimaging.

The second hard drive is physically located below the primary hard drive.

3. Restart the system.

NOTE

Press **F1 (Help)** at the *Intel Boot Agent* screen, if displayed.

4. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell locally as **mlcltechuser** (contact GE Technical Support or the system administrator for current password information).

NOTE

If the *Systems Settings Change* window is displayed, click *Yes* to restart. Log on again as **mlcltechuser**.

5. Right-click *My Computer* icon and select *Explore* and verify the G: drive is no longer available.
6. Insert the appropriate Image CD/DVD.
7. Shut down the system and replace the faulty hard drive, if necessary.

NOTE

**For the HP8000 only:** Ensure the jumpers are set to cable select.

8. Restart the system.
9. Press **Enter** to continue at the *Warning* screen.

The *Symantec Ghost* screen is displayed monitoring the progress of the image process. If necessary, insert the remaining image CDs/ DVDs as prompted. When the installation is complete perform the following step depending on the type of media:

- For CD, the system will automatically restart. Remove the CD after the restart.
- For DVD, a command prompt is displayed. Remove the DVD and manually restart the computer.

NOTE

During the setup process a blank Windows DOS-Prompt window is displayed. Do not close this window as setup is being performed.

## Configure Microsoft Windows XP

After reimaging, *Welcome to Windows XP Setup* wizard is displayed. Perform the following procedure to setup and activate Windows XP.

For CardioImage systems, ensure that all three video outputs are connected to monitors.



## Set Up Windows XP

1. Click *Next* at the *Setup Wizard* screen.

The *License Agreement* screen is displayed.

2. Read the agreement and click *Accept*, and then click *Next*.

The *Enter the XP Product Code* screen is displayed.

3. Enter the license code (printed on a sticker on the side of the computer box), and then click *Next*. The system will complete the configuration setup and automatically restart.

### NOTE

The following step may take up to 10 minutes. Do not manually restart or interrupt the setup process.

4. After restart, allow the system to complete all setup tasks and automatically restart when necessary.
5. When the system restarts to the Mac-Lab/CardioLab Custom Shell, press **Ctrl + Action + Delete** and click *Shutdown*.
6. Select *Shutdown* and click *OK*.

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### CAUTION

EQUIPMENT DAMAGE — Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before opening any equipment.

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7. Reconnect the second hard drive.
8. Power up the Acquisition system.

### NOTE

Press **F1 (Help)** at the Intel Boot Agent screen, if displayed.

9. Press **Ctrl + Action + Delete** and click *Logoff*.
10. Click *Logoff* and immediately hold down the **Shift** key.
11. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell locally as **mlcltechuser** (contact GE Technical Support or the system administrator for current password information).
12. If any devices were not automatically installed during re-imaging, a *New Hardware Found* message may be displayed at restart. If this happens, use the following procedure for each wizard:

- a. If prompted to connect to Windows update to search for software, select *No, not at this time*, and click *Next*.
- b. Select the *Install the software automatically*, and click *Next*.
- c. If a choice of drivers is presented, pick the default selection, and click *Next*.
- d. If prompted about Windows Logo testing or driver signing, select *Continue anyway*.
- e. If prompted by *Matrox Powerdesk Installation* about enabling independent mode for Matrox graphics hardware, select *Yes*.
- f. Click *Finish* when installation is complete.
- g. Restart the computer if prompted and log on again as **local mcltechuser**.

Click *Cancel* if the *Matrox Multi-Display Setup* wizard is displayed.

**NOTE**

If any new devices were installed, they may not be available until the system is restarted.

### **Activate Windows XP**

1. Select *Start > Activate Windows*.
  2. At the *Let's Activate Windows* screen, select the *Yes, I want to telephone a customer service representative to activate Windows* radio button and click *Next*.
  3. From the dropdown box, select the appropriate location.
  4. Call the number listed on the screen.
  5. Follow the prompts over the phone and when asked give the Installation ID listed on the screen.
  6. Record the confirmation ID given by the Microsoft Customer Service Agent:
- 
7. Type in the Confirmation ID (boxes *A* through *G*) and click *Next*.
  8. At the *Thank You* window, click *Finish*.

## Activate Microsoft Office

1. Select *Start > Programs > Microsoft Office Tools > Activate Product*. The *Microsoft Office XP Setup* screen is displayed.

### NOTE

For Microsoft Office 2007 Professional, select *Start > Programs > Microsoft Office Word 2007*. The *Microsoft Office 2007 Setup* screen is displayed.

2. Enter appropriate information (if not applicable, delete any default entries).
3. Enter the Microsoft Office product key (located on a sticker on the side of the computer box).
4. Click either *OK* or *Continue*, as applicable.
5. Perform these steps only when activating Microsoft Word 2007:
  - a. Click *Install Now*.
  - b. Click *Close*.
  - c. Uncheck *Get Online Help* in *Privacy Options* and click *OK*.
  - d. Close *Microsoft Word 2007*.
  - e. Open *Microsoft Word 2007*.
6. Read the agreement and click *Accept*. The *Microsoft Office Activation Wizard* is displayed.
7. Select *Activate by using Telephone* and click *Next*. The *Privacy Policy* window is displayed.
8. Click *Next*.
9. Select the appropriate location from the dropdown menu and call the number listed on the screen.
10. Follow the phone prompts and provide the Installation ID when requested.
11. Record the confirmation ID given by the Microsoft Customer Service Agent:  

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12. Enter the Confirmation ID (boxes *A* through *G*) and click *Next*.
13. At the *Thank You* window, click *Next*.

14. Close the *Microsoft Office Activation Wizard* window.

## Verify Drive Order

1. Right-click *My Computer* icon and select *Manage*.
2. Select *Storage > Disk Management* in the left pane.
3. In the right pane verify each drive is assigned the correct drive letter:
  - C: Primary Hard Drive
  - D: Data Hard Drive
  - E: MO Drive (if installed)
  - F: DVD-RAM Drive (if installed)
  - G: Second Hard Drive

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### CAUTION

PROCEDURE FAILURE — If the C: or D: drive letters are not correctly set, security settings were not properly applied. Do not change the drive letter. The system must be reimaged

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4. If a drive does not have the correct letter perform the following steps for each drive not assigned the correct letter:
  - a. Right-click the drive in the right pane and select *Change drive letter and paths*.
  - b. Click *Change*.
  - c. Select the new drive letter in the dropdown menu and click *OK*.
  - d. Click *Yes* to the confirmation message.
5. Close the Computer Management window.

## Required Updates for Systems Using the Matrox M9140 Quad Video Board

This section gives the installation procedures for systems using the Matrox M9140 Quad video board. If the system is not using the Matrox M9140 Quad video board, ignore this section and go to “[Verify Video Driver Installation](#)” on page 5-23.

## Uninstall Unused Display Drivers

Uninstall unused display drivers before installing the Matrox M9140 Quad video board drivers.

1. Log on to Windows and the Custom Shell as **mlcltechuser**.
2. Ignore any New Hardware found messages.
3. If an error message about stopping ONL display appears, click *OK*.



4. Click *Start > Settings > Control Panel > Add or Remove Programs*.
5. Uninstall the *ATI – Software Uninstall Utility*.



6. Ignore any New Hardware found messages.
7. Restart the system.
8. Log on to Windows and the Custom Shell as **mlcltechuser**.
9. Ignore any New Hardware found messages.
10. If an error message about stopping ONL display appears, click *OK*.
11. Click *Start > Settings > Control Panel > Add or Remove Programs*.
12. Uninstall *Powerdesk-HF and Driver*.



13. Select *No* to restart in the *Matrox Uninstaller for PowerDesk* window.
14. Shutdown the system.

### Install Matrox M9140 Quad Video Board Drivers V2.12.00.147

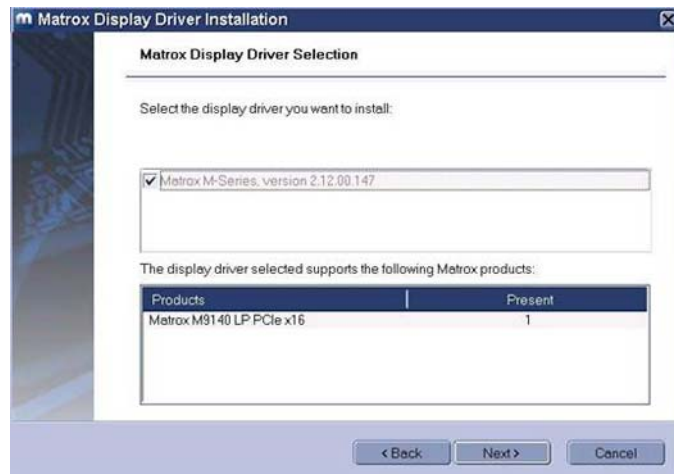
Install the Matrox M9140 Quad video board drivers using CD-R MATROX M9140 QUAD VIDEO CARD DRIVER, V2.12.00.147 (P/N 2074635-001).

1. Power on the system.
2. Log on to Windows and the Custom Shell as **mlcltechuser**.
3. Ignore any New Hardware found messages.
4. If an error message about stopping ONL display appears, click *OK*.



5. Insert CD-R MATROX M9140 QUAD VIDEO CARD DRIVER, V2.12.00.147 (P/N 2074635-001) into the drive.
6. Browse to the CD drive and double-click **Setup.exe**.
7. At the *Matrox Display Driver Installation - Matrox PowerDesk* window, click *Next*.

8. At the *Matrox Display Driver Selection* window, click *Next*.



9. At the *Ready to Install* window, click *Next*.
10. At the *Installation Completed Successfully* window, click *Next*.
11. At the *Installation Completed* window, click the *Restart Computer* checkbox and click *Finish*.



## Post Installation Steps for Matrox M9140 Quad Video Board Drivers V2.12.00.147

After installing drivers for the Matrox M9140, the logon fields might not display properly when the computer first restarts. Restarting the computer again resolves the issue.

1. Log on as **mlcltechuser**.



### NOTE

The logon fields are present, but might not display properly.

2. Shut down and restart the system again to resolve the issue.
3. Log on to Windows and the Custom Shell as **mlcltechuser**.

## Set Display Configurations

### Two Monitor Systems

1. Right-click the Desktop and select *Properties*.
2. Select the *Settings* tab.
3. Click the icon for the second monitor (labeled “2”).
4. Select *Extend the Windows desktop onto this monitor* check box.
5. Click *Apply*.
6. Close all open windows.

### Three Monitor Systems

1. Right-click the Desktop and select *Properties*.



2. Select the *Settings* tab.
3. Click the second monitor icon (labeled 2).
4. Select *Extend the Windows desktop to this monitor* check box.
5. Re-order the monitor icons so they appear in the following order:  
*1-2-4*.

**NOTE**

For HP z600 and HP xw8400 systems, the order of monitors should be *1-2-4*, the second monitor (“2”) and fourth monitor (“4”) need to be extended and the third monitor (“3”) should not be extended.

**NOTE**

To re-order the icons, drag the monitor icons and drop them in the correct position.

6. Click *Apply*.
7. Click the third monitor icon (labeled 4).
8. Select *Extend the Windows desktop to this monitor* check box.
9. Click *Apply*.
10. Click *Identify*.
11. Verify the monitors are identified as *1-2-4* from left to right.

**Set Display Resolution**

1. Verify you are logged on as **mlcltechuser** (password: **mlcl!techuser**).
2. Right-click the Desktop and select *Properties*.
3. Select the *Settings* tab.
4. In the *Screen Resolution* section, select *1600x1200*.

**NOTE**

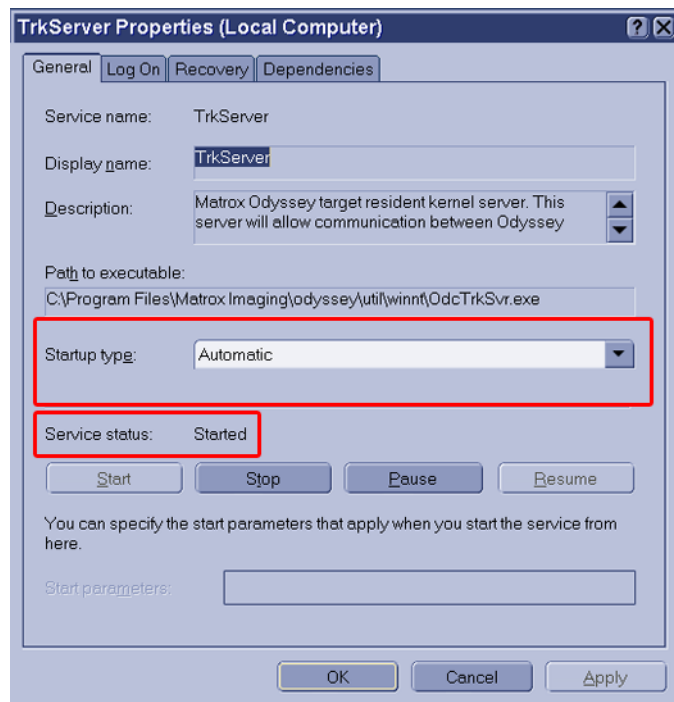
This is the only supported resolution for new systems. If existing monitors do not support this resolution, *1280x1024* may be used for Mac-Lab systems. All monitors must be set to the same resolution.

5. Verify the color for all monitors is set to *Highest (32-bit)*.
6. Click *OK*.

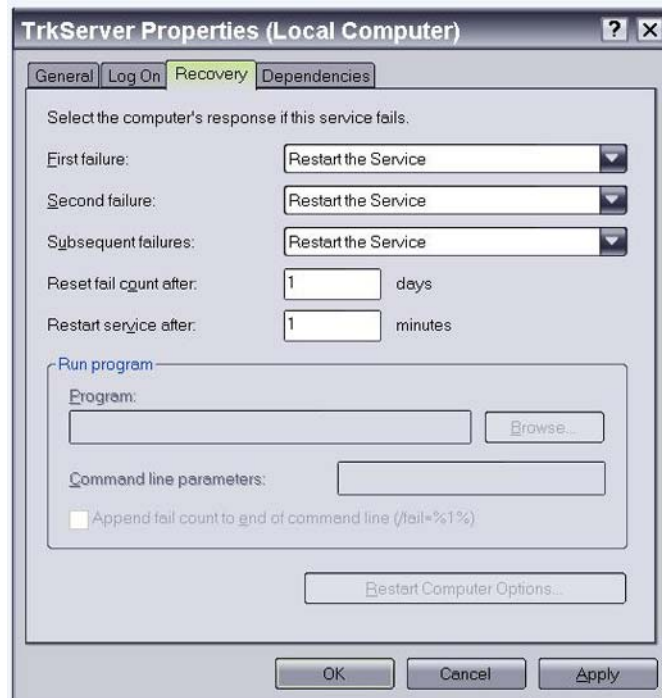
## Configure the Matrox Odyssey Driver Service

The following procedure ensures that if the display driver service fails, it is automatically restarted.

1. Log on to Windows and the Custom Shell as mcltechuser.
2. Click *Control Panel > Administrative tools > Services*.
3. In the *Services* panel, right-click *TrkServer* and select *Properties*.
4. Select the *General* tab and verify the following:
  - The *Startup type* is set to *Automatic*
  - The *Service Status* is *Started*



5. If the service is not started, click *Start* in the *Service Status* section to start it manually.
6. Select the *Recovery* tab and change the recovery actions as shown below:



7. Click *OK*.

## Verify Video Driver Installation

Perform the following procedures to verify that the required video and image capture drivers are installed correctly.

### Delete the MTXOGL Key

Perform these steps on HP8000 computers only.

1. Select *Start > Programs > Accessories > Command Prompt*.
2. Type *regedit* and press **Enter**.
3. Navigate to:

*HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\OpenGLDrivers*

## NOTE

The *HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\OpenGLDrivers* folder may not exist on your system. In that case, the *MTXOGL* key will not be present.

4. If the *MTXOGL* key is present, delete the entire key, including sub-keys.

**Verify Matrox Imaging Drivers (For 8400 only)**

Perform these steps on all Image Capture and CardioImage systems only.

1. Right click *My Computer* icon and select *Manage*.
2. Select *Device Manager* and expand the *Matrox Imaging Adapter* folder.
3. Verify that the following two entries are present:

- Odyssey PMC analog acquisition device
- Odyssey Vision Processor (PROTO)

## NOTE

The entries may be present, but with a warning icon (yellow exclamation point). In this case, right-click the entry and select *Update Driver* and then follow on-screen instructions

4. If one or both of the above entries are missing, check the *Other Devices* folder in Device Manager. If there is a yellow *PCI Data Acquisition and Signal Processing* entry under *Other Devices*, perform the following steps:
  - a. Right-click *PCI Data Acquisition and Signal Processing* under *Other Devices* and select *Update Driver*.
  - b. Click *Next* then click *Finish*.
  - c. In *Device Manager*, verify that the two Odyssey devices listed above are listed under *Matrox Imaging Adapter*

## NOTE

If the ODCCFG application is displayed, uncheck the checkbox to run ODCCFG automatically at startup, and click *Exit*.

**Set CardioImage Display**

Perform these steps on an HP8200/8400 CardioImage computers only.

1. Right-click *My Computer* icon and select *Manage*.
2. Select *Device Manager* and expand the *Display adapters* folder.
3. Check the status of the *ATI FireGL V5100/V5200 Secondary* entry:
  - If it is disabled (shown with a red X), no further action is required. Skip to the next section.
  - If it is not disabled, right-click on the entry and select *Disable*.
4. Click *Yes* to confirm the selection.
5. Select *Yes* at the *System Settings Change* prompt to restart the computer.
6. Log on to Windows OS as **local mlcltechuser**.

## Change the Workstation Computer Name

Use this procedure to change the computer name to the name recorded earlier.

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### CAUTION

PROCEDURE FAILURE — Follow the computer naming requirements:

- The new computer name must begin with a letter (numbers or other characters are not allowed).
  - The name cannot contain a hyphen or underscore.
  - If required, the computer must be renamed now. To rename it later, it must be reimaged and data may be lost.
- 
- 

1. Verify you are logged on to Windows and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. Right-click *My Computer* icon and select *Explore*.
3. Navigate to *C:\Windows\Special*.
4. Double-click *ManualRename.wsf*.
5. Enter the old Acquisition system name recorded earlier.
6. Click *OK* at the confirmation messages.

The system automatically restarts.

7. At the Mac-Lab/CardioLab Custom Shell screen, press **Ctrl + Action + Delete**.
8. Click *Logoff*.
9. Click *Logoff*.
10. Immediately hold down the **Shift** key.
11. Log on to Windows OS as **local mcltechuser**.
12. Log on to the Mac-Lab/CardioLab Custom Shell as local **mcltechuser**.

## Version Update Installation for 8000/8200 Acquisition Systems only

### NOTE

For 8400 systems, skip this section and proceed to “[Install Microsoft Operating System Updates](#)” on page 5-34.

### 6.5.3 Release Windows Update

It installs the needed Microsoft Security Patches that were available at the time of the 6.5.3 release, including MS06-035, MS06-036, and MS06-040.

1. Verify that you are logged in to both the OS and custom shell as local **mcltechuser**.
2. Insert the **Mac-Lab/CardioLab 6.5.3 Update CD** (p/n: 2034817-001) into the CD/DVD drive.
3. Right-click on the *My Computer* icon on the Desktop and select *Explore*.
4. Navigate to *[CD DRIVE]:\Windows Updates\Windows XP*.
5. The Updates should be installed in the following order:
  - a. *WindowsXP-KB914388-x86-ENU.exe*
  - b. *WindowsXP-KB917159-x86-ENU.exe*
  - c. *WindowsXP-KB921883-x86-ENU.exe*
  - d. *WindowsXP-KB928388-x86-ENU.exe*

### NOTE

An error message may be displayed if the Daylight Savings Patch has already been applied. Click *OK* to this message.

6. To install each update, perform the following steps:
  - a. Double-click on the *Windows Update* file
  - b. Click *Next* at the *Software Update* welcome screen.
  - c. Click *I Agree* at the *License Agreement* screen and then click *Next*.
  - d. Check the *Do Not Restart Now* checkbox if displayed. Restart is not required until after the Matrox Library is uninstalled.
  - e. Click *Finish*.
7. Remove the **Mac-Lab/CardioLab 6.5.3 Update CD** (p/n: 2034817-001) from the CD/DVD drive.

## Uninstall Matrox Library

1. From Windows start menu, run *Settings > Control Panel*. In the Control Panel, double-click on *Add or Remove Programs*.
2. From the currently installed programs list, select *Matrox Imaging*, and click *Change/Remove*.
3. At the *Matrox Imaging Uninstall* screen, select *OK*.
4. The InstallShield wizard will now run and uninstall the old version of the Matrox library. If any informational messages are displayed, click *OK*.
5. If the *Uninstallation Complete* screen is displayed, click *Finish*.
6. At the *InstallShield Wizard Complete* screen, select *Yes, I want to restart my computer now*, and click *Finish* to restart the system.

## Install New Matrox Library

### All Workstations

1. Log in to both the OS and custom shell as local **mlcltechuser**.
2. Insert the **Mac-Lab/CardioLab Video Support CD** (p/n 2035828-001) into the CD or DVD drive.
3. Browse to the *MIL 8.0* folder on the CD drive and double-click *setup.exe*. This will start the *Matrox Imaging Setup Wizard*.
4. Based on the type of system, use one of the following procedures (“Image Capture or CardioImage Acquisitions Only” below or “Non-

**Imaging Acquisitions Workstations**” on page 5-29) to install the new Matrox Library.

### Image Capture or CardiolImage Acquisition Only

On Image capture or CardiolImage Acquisitions only, select the following options during installation. For all other systems, proceed to “**Non-Imaging Acquisitions Workstations**” on page 5-29.

1. At the Select the features you want to install prompt, select *MIL Runtime, Intellicam and Odyssey Native Library*. Leave the other options unchecked. Click *Next*.
2. At the *Select the board drivers you want to install* prompt, select *Odyssey only*. Click *Next*.
3. At the next screen, select 32 MB for MIL non-paged memory size (change the default 16 to 32). Leave all other settings at the default selections. Click *Next*.
4. If asked whether to install MGA driver, select *No*.
5. Click *I Agree* twice for the license screens.
6. The *Matrox Imaging Setup* will now start copy installation files to the system.
7. If the *Setup has completed configuring the Windows Installer on your system* message is shown, do the following:
  - a. Click *Restart*.
  - b. Select *Yes, I want to restart my computer now* and click *Finish* to restart the system.
  - c. Hold down the **shift** key as the Windows XP boot screen appears, and log on to Windows and Custom shell as local **mlcltechuser**.
  - d. The *Matrox Odyssey Native Library* installation wizard will appear.

#### NOTE

This may take between 10 - 40 seconds or longer to appear after logging in and the desktop is visible.

8. At the *Matrox Odyssey Native Library* installation screen, click *Next*
9. At the *Ramdrive settings* screen, select *Do not use a ramdrive*. Click *Next*. Click *OK* when a warning is reported about the imcc tool.
10. At the *Installing Files* screen, click *Next* to continue.



11. If asked *Do you want to select a default DCF?*, select *No*.
12. If the *InstallShield Wizard Complete* screen is displayed, click *Finish*.
13. Remove the **Mac-Lab/CardioLab Video Support CD** (p/n 2035828-001) from the CD or DVD drive.
14. Restart the system if prompted; otherwise proceed to “**Configure Imaging System**” on page 29.

## Non-Imaging Acquisitions Workstations

On all non-Imaging Acquisitions workstations, select the following options during installation.

1. At the *Select the features you want to install* prompt, select only *MIL Runtime*. All other options should be unchecked. Click *Next*.
2. At the *Select the board drivers you want to install* prompt, do not select any board drivers. Click *Next*.
3. At the *Matrox Imaging Default Settings* screen, click *Next*.
4. If asked whether to install MGA driver, select *No*.
5. Click *I Agree* on the license screen.
6. The Matrox Imaging Setup will now start copying installation files to the system.
7. If a message is displayed about driver signing, click *Continue anyway*.
8. At the *InstallShield Wizard Complete* screen, select *Yes, I want to restart my computer now*, and click *Finish* to restart the system.
9. Log in to both the OS and custom shell as local **mlcltechuser**.
10. Remove the **Mac-Lab/CardioLab Video Support CD** (p/n 2035828-001) from the CD or DVD drive.

## Configure Imaging System

The steps in this section are required only on Image capture or CardioImage Acquisitions.

### Odyssey Board Setup

1. Verify that you are logged into Windows as local **mlcltechuser**.

2. If a prompt about updating the Odyssey Acquisition module is displayed upon logging into the system, perform the following steps:
  - a. Click *Yes* at the prompt, and *Yes* again to confirm.
  - b. Wait while the grab module on the Odyssey board is updated. Several progress indicators may be displayed during this process.
  - c. After updating the grab module, if the *OdcCfg* tool is displayed, click *Exit*.
  - d. Shut down and power off the system completely.
  - e. Power on the system again.
  - f. Hold down the **shift** key as the Windows XP boot screen appears, and log on to Windows and Custom shell as local **mlcltechuser**.
3. Navigate to *C:\Program Files\Matrox Imaging\Odyssey\Util\Winnt* and run the *odccfg.exe* program again. You may now be prompted for a board firmware update. If prompted, follow the steps above to update and restart the system.
4. Repeat the previous step until the *OdcCfg* program starts up without any messages about required firmware upgrades. Click *Exit* to exit the program.

### Verify Odyssey Firmware Version

1. Right-click *My Computer* icon and select *Explore*.
2. Navigate to *C:\Program Files\Matrox Imaging\Odyssey\Util\Winnt* and run *MTXEDIT.exe*.
3. Click *OK* at the *Select Board* window.
4. The title of the MTXEDIT application window displays the current firmware information. The format of the information displayed is: *Grab:0x###A/B AN:1480.0*, for example, this may look like: *Grab:0x460A AN:1480.0*. Please ensure that *1480.0* is the last part of this string.
5. If the firmware revision is not 1480 (or the information is not displayed), then you have not successfully upgraded. Do not continue, return to the Odyssey Board Setup section.
6. Close all open windows.

### Verify Odyssey Driver

1. Verify that you are logged into Windows as local **mlcltechuser**.

2. Right-click the *My Computer* icon and select *Manage*.
3. Browse to *Device Manager*, and expand *Matrox Imaging Adapter*.
4. Verify that two Odyssey devices are listed under Matrox Imaging Adapter:
  - Odyssey Vision Processor (XA)
  - Odyssey XA Analog Acquisition Device
5. If these devices are not listed, do the following:
  - a. Expand and check the *Other Devices* folder.
  - b. Right-click the devices listed and select *Update driver*.
  - c. Click *Next* to install the default driver.
  - d. Once the installation is complete, the devices should be listed under *Matrox Imaging Adapter* as listed above.

### Configure Imaging Software

1. Double-click on the OdcMonitor icon in the system tray. (If it is not present, run *OdcMon.exe* from *C:\Program Files\Matrox Imaging\Odyssey\Util\Winnt*)
2. The OdcMonitor tool should open up. If the tool fails to open, reboot the system and try again.
3. Select Tools > Options.
4. Check the Don't start OdcMonitor option. Leave all others at the default settings.
5. Click *Apply* and then *OK*.
6. Close the *OdcMonitor* tool.

## Install the Mac-Lab/CardioLab 6.5.3 Updates

1. Verify that you are logged into the Windows OS as local **mlcltechuser**.
2. Insert the **Mac-Lab/CardioLab v6.5.3 Update CD** (p/n 2034817-001) into the CD or DVD drive.
3. Right-click *My Computer* and select *Explore*.
4. Navigate to the *Mac-Lab/CardioLab v6.5.3 Update CD*.

5. Double-click the *GEMS\_Update.bat* file.
6. Press **Enter** at the command window to install the updates.

The installer checks the system for previous installations and installation requirements. A confirmation message indicates whether each update is installed, not needed, or already installed.

**NOTE**

Detailed installation information is saved in  
*D:\GEMMS\Prucka\Setup\GEMS\_Update.log* and  
*D:\GEMMS\Prucka\Setup\History*.

7. Press **Enter** to close the command window.
8. Close all open windows.
9. Remove the **Mac-Lab/CardioLab v6.5.3 Update CD** (p/n 2034817-001) from the CD or DVD drive.
10. Restart the system.
11. Log in to both the OS and custom shell as local **mlcltechuser**.
12. Verify the software has been loaded:
  - Verify the line *GEMS\_SUCCESS\_6\_5\_3\_1740 - Installed all required updates*. appears in the file  
*D:\GEMMS\Prucka\Setup\GEMS\_Update.log*
  - Start the ML/CL application and select *Help > About*. It should display “6.5.3.1740 (xxxx)” where xxxx will always be either 1626 or 1715

## Install 6.5.4 OS Updates

This section includes Operating System updates and .NET Framework 2.0 installation.

1. Verify that you are are logged on as **mlcltechuser**.
2. Insert the **MLAB/CLAB OS UPDATE V6.5.4 CD** (p/n2037996-001) into the CD drive.
3. Right-click *My Computer* and select *Explore*.
4. Navigate to the *OS Update V6.5.4 CD*.
5. Double-click the *InstallWindowsUpdates.wsf* file.
6. Click *Yes* at the prompt *System will now install Windows OS updates. Click 'Yes' to install, 'No' to quit*.

7. After the installation is complete the script will prompt *"Windows OS Update completed successfully. System needs to be rebooted. Would you like to reboot now? Click 'Yes' to reboot now, 'No' to reboot manually later."* Select *Yes* to reboot.
8. Remove the **MLAB/CLAB OS UPDATE V6.5.4 CD**.

## Install The 6.5.4 Update on the Acquisition System

Please note the following:

- All other applications must be closed before installing the upgrade.

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### CAUTION

LOSS OF DATA — If the installer indicates an error, attempt to fix the problem and click *Retry*.

Clicking *Cancel* may create data loss and require system re-image.

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1. Log on to both the Windows and Mac-Lab/CardioLab Custom Shell as local **mlcltechuser**.
2. Insert the **MAC-LAB/CARDIOLAB V6.5.4 UPDATE CD** (p/n 2036182-001) into the CD drive.
3. Right-click *My Computer* and select *Explore*.
4. Navigate to the *Mac-Lab/CardioLab v6.5.4 Application CD*.
5. Double-click the *setup.exe* file.

### NOTE

All other applications must be closed before installing the upgrade.

6. Click *OK* at the *Setup* window.
7. A *Setup Is Working Screen* is displayed. When prompted to reboot, click *Yes*.
8. Press **Ctrl + Action + Delete** at the Mac-Lab/CardioLab Custom Shell screen.
9. Click *Logoff*.
10. Select *Logoff* and click *OK*.
11. Immediately hold down the *Shift* key.

12. Log in to the Windows XP OS locally as **mlcltechuser** (password **mlcl!techuser**).
  13. Log in to the ML/CL Custom shell locally as **mlcltechuser** (password **mlcl!techuser**).
  14. At the *Setup* window, click *OK* to continue the setup.
  15. Repeat step 7 through step 14 until you arrive at the *Welcome* window.
  16. Click *Next* at the *Welcome* window.
  17. Verify the correct system type is listed at the *Setup Type* window. (Mac-Lab/ CardioLab Workstation should be displayed for Acquisition systems). If it is not, contact GE Technical support.
  18. Click *Next* in the *Setup Type* window.
  19. Enter the SQL server **sa** password: **gemssqladmin** and click *Next*.
  20. Click *Install* at the *Ready To Install* window.
  21. The install may take several minutes. The *Installshield Wizard Completed* window is displayed when the installation is complete.
- NOTE
- If a Word license agreement screen is displayed, accept the agreement and continue with the install.
- If the *Accept* button is not clicked for several minutes, the window may lose focus and the clicking with the mouse may not work. If this happens, use the **Tab** key to select the *Accept* button and then press **Enter**.
- If any applications are running, a window is displayed listing the open applications. Close all open applications and click *Retry*.
22. Click *Finish*.
  23. When prompted to reboot, click *Yes*.
  24. Remove the **MAC-LAB/CARDIOLAB V6.5.4 UPDATE CD** (p/n 2036182-001) from the CD drive.

## Install Microsoft Operating System Updates

Instructions for downloading and installing Microsoft security patches and service packs are listed by product type on Support Central. Download and install all applicable patches and service packs.

## Verify Computer BIOS Settings

Perform the following steps only if performing a recovery on a HP8000 computer with Imaging. Verify the BIOS has been updated.

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### CAUTION

SYSTEM CONFIGURATION FAILURE — This procedure updates the BIOS settings to change memory allocation for the graphics cards.

Do not change any other BIOS settings. The system may become unstable or not function as designed if other settings are changed.

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1. Restart the system and press the **F2** key when the *HP BIOS* screen is displayed.

The screen is only displayed briefly, so it's easy to miss. Also the F-keys on the top row of the keyboard are not labeled **F1**, **F2**, etc. Refer to the chart below:



After about 30 seconds, the *Phoenix BIOS Setup* screen is displayed. The mouse is inactive on this screen--you must use the arrow keys.

2. Use the **Right Arrow** key to select the *Advanced* tab.
3. **Arrow down** to the *AGP Slot (Graphics)* line and press **Enter**.
4. Check the *Graphics Aperture* line.  
32 MB should be displayed. If it is, go to Step 7.
5. If it is not, **arrow down** to the *Graphics Aperture* line and press **Enter**.
6. **Arrow down** to the 32 MB line and press **Enter** to select.
7. Press **F10** to exit the *BIOS Settings* page.



8. Select *Yes* to save the settings at the confirmation page.

The system automatically restarts.

## Switch Language

Use these steps to change the language on the Acquisition system. If the system will stay as an English system go to “[Restore Data to the Acquisition System](#)” on page 5-40.

### Restart the system

This restart must be done to ensure the switch language process runs correctly.

1. Restart the system.
2. Hold down the **Shift** key.
3. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.

### Delete user profiles

1. Select *Start > Settings > Control Panel*.
2. Double-click the *System* icon.
3. Click the *Advanced* tab.
4. In the *User Profiles* section, click *Settings*.
5. Select each profile in the list, and click the *Delete* button if it is enabled to delete the profile.

#### NOTE

The **mlcltechuser** profile will not be able to be deleted.

6. Click *OK* to close the *User Profiles* dialog.
7. Click *OK* to close the *System Properties* dialog.

### Set operating system language

#### NOTE

The following language settings must be applied for the application to function properly:

- English: United States/United Kingdom
- French: France



- German: Germany
- Italian: Italy
- Spanish: Spain
- Swedish: Sweden
- Chinese: China (PRC)
- Japanese: Japan

1. Double-click the *Regional and Language Options* icon.
2. Select the *Regional Options* tab.
3. In the *Standards and formats* section, select the correct language and locale (e.g., *French (France)*) from the dropdown list.
4. In the *Location* section, select the correct locale (e.g., *France*).
5. Select the *Languages* tab.
6. Click *Details* button.
7. For Chinese systems only:

If the use of the IME is required, the following steps must be taken to set it up in a manner which is compatible with the operation of the ML/CL software:

- a. Click the *Add* button.
- b. Change the Input Language to *Chinese (PRC)*.
- c. Click the *Keyboard Layout/IME* checkbox.
- d. Select *Chinese (Simplified) - Enhanced Unicode IME* from the drop down box.
- e. Click *OK*.
- f. Click the *Add* button.
- g. Click the *Keyboard Layout/IME* checkbox.
- h. Select *Chinese (Simplified) - US Keyboard* checkbox.
- i. Click *OK*.
- j. In the *Default input language* dropdown, select *Chinese (PRC) - Chinese (Simplified) - US Keyboard*.

If the use of the IME is not required, select the desired keyboard layout as appropriate.

8. For all other languages:

In the *Default input language* section, determine if the desired language and locale is listed. If it is not:

- a. Click the *Add* button.
  - b. In the *Input language* list, select the appropriate language and locale. If necessary, configure other settings (e.g., *Keyboard layout/IME*) as appropriate.
  - c. Click *OK* to close this dialog.
9. In the *Default input language* section, select the language and locale.
  10. Press *OK* to close this dialog.
  11. In the *Languages used in menus and dialogs* section, select the correct language (e.g., *Francais*).
  12. Select the *Advanced* tab.
  13. In the *Language for non-Unicode programs* section, select the correct language (e.g., *French (France)*).
  14. In the *Default user account settings* section, check the *Apply all settings...* checkbox.
  15. If prompted after doing this, click *OK*.
  16. Click *OK* to close the *Regional and Language Options* window.
  17. At the prompt that *the changes will not take effect until you reboot*, click *OK*.
  18. If prompted about copying required files; click *Yes* to use the files that are already on the system.
  19. When prompted to restart, click *Yes*.

### **Set Mac-Lab/CardioLab application language**

1. At the Mac-Lab/CardioLab Custom Shell screen, press **Ctrl + Action + Delete**.
2. Click *Logoff*.
3. Click *Logoff*.
4. Immediately hold down the **Shift** key.

5. Log on to Windows OS as **local mlcltechuser** (password: **mlcl!techuser**).
6. Log on to the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser** (password: **mlcl!techuser**).
7. Right-click *My Computer* icon and select *Explore*.
8. Browse to the *D:\GEMMS\Prucka\Setup\Language* directory.
9. Double-click on the batch file *MLCL\_Set\_Language.bat* to start the process of setting the Mac-Lab/CardioLab application language.
10. Verify that the language listed is correct (e.g, *French*). If so, press any key to begin the process of setting the application language.

#### NOTE

The process will take a few minutes to complete.

11. At the *Language Switch Completed Successfully* message, click *OK*.
12. Both the Operating System language and the Mac-Lab/CardioLab application language should now be set correctly.

### Install International Ablation files

The following steps must be performed on systems outside of the United States and English Canada using ablation.

1. Right-click *My Computer* icon and select *Explore*.
2. Navigate to *D:\GEMMS\Prucka\Bin\Ablation\International*.
3. Double-click the *InstallAblation.bat* file.
4. Verify no errors occurred.

### Adjust Japanese Ablation file

This procedure must be performed on Japanese systems.

1. Navigate to *D:\GEMMS\Prucka\Bin\Ablation*.
2. Right-click the *PEIATAKR.DLL* and select *Copy*.
3. Right-click in the white space on the right side of the window and select *Paste*.
4. Right-click the *Copy Of PEIATAKR.DLL* file and select *Rename*.
5. Type *JLLCABL-IT.DLL* and press **Enter**.

### Verify Ablation Files

1. Navigate to *D:\GEMMS\Prucka\Bin\Ablation*.
2. Verify the following files are in the directory:

Ablation File	Locale = US	Locale = Japan	Locale = Other
CryoCath.dll	Yes	Yes	Yes
PEIAtakr.dll	Yes, as PEIAtakr.dll	Yes, as JLLCABL-IT.dll	Yes, as PEIAtakr.dll
PEIEpt1000.dll	Yes	Yes	Yes
PEIStockert.dll	Yes	Yes	Yes
PEIHat200.dll	No	Yes	Yes
PEIHat300S.dll	No	Yes	Yes
PEIbi1500T.dll	No	Yes	Yes

3. Close the *Windows Explorer* window.

## Restore Data to the Acquisition System

### Restore Clab database, Registry, and Patient Folders

1. Verify you are logged on as **local mlcltechuser** (password **mlcl!techuser**).
2. Right click *My Computer* icon and select *Explore*.
3. Using *Windows Explorer*, move the contents of the following folders:  
**G:\gemms\prucka\database\maintenance\backup** folder  
to the  
**D:\gemms\prucka\database\maintenance\backup** folder.
4. Move the contents of the following folders:  
**G:\gemms\prucka\database\maintenance\log** folder  
to the  
**D:\gemms\prucka\database\maintenance\log** folder.

**NOTE**

If a confirmation message is displayed, click *Yes* and continue.

5. Move the contents of the following folders:

**G:\gemms\prucka\studies** folder

to the

**D:\gemms\prucka\studies** folder.

6. Restore the clab database by executing the

**D:\gemms\prucka\bin\gems\_restoreclab.bat** file.

A command prompt window opens.

7. Press **Enter** at the prompt. When the process is complete a confirmation screen is displayed.
8. Press **Enter** to close the command prompt window.
9. In the Explorer window navigate to:

**D:\gemms\prucka\database\maintenance\backup**

10. Double-click *gemsback.reg* to restore the registry.

A confirmation message is displayed.

11. Click *Yes*. A completion message is displayed.
12. Click *OK* and close any open windows.
13. On networked Acquisition systems only:
  - a. Navigate to *D:\GEMMS\Prucka\network*.
  - b. Double-click *stoprepl.bat*.

**NOTE**

Ignore any reported errors. The file will run successfully even if errors are reported.

**Restore Clink database**

Use the following steps to restore the Clink database if *clinkbackup.bak* is present in the backup folder.

1. Select *Start > Programs > Accessories > Command Prompt*.
2. Type (case sensitive):

*OSQL -S -Usa -Pgemssqladmin*

and press **Enter**.

3. Type:

*Restore database Clink from Disk =*

*'D:\gemms\prucka\database\maintenance\backup\Clinkbackup.bak'*

and press **Enter**.

4. Type:

*Go*

and press **Enter**.

Wait for the database to restore.

5. Type:

*Exit*

and press **Enter**.

6. Type:

*Exit*

and press **Enter**.

## Set Default Baseline Phase

This section has to be executed only if GEMS registry key (*gemsback.reg*) was not restored in “[Restore Data to the Acquisition System](#)” on page 5-40.

1. Open the Mac-Lab/CardioLab application and select the Mac-Lab Module.
2. Select *Administration > Lists > Phases*.
3. Click *Edit*.
4. If prompted for an administrator login, use **mlcladmuser** (password **mlcl!admuser**).
5. Select *Baseline* in the Default drop-down box.

6. Close all open windows.

## Install/Enable Software Options

This section has to be executed only if GEMS registry key (gemsback.reg) was not restored in “[Restore Data to the Acquisition System](#)” on page 5-40.

### NOTE

The software options backup that was made when the system was installed can be used in this section.

1. Double-click the *Service Console* icon from the Desktop.
2. Browse to *Software Options Manager > Software Options*.

### NOTE

If prompted for the GEMS Serial Number, enter the serial number and click *OK*. The serial number can be found on a label on the top of the computer.

3. In the *Software Options* form, click on *Read License File*.
4. Insert the **Software Options CD** into the F: drive.
5. In the *Look In* dropdown box, select the F:\ drive.
6. Double-click the *Options.txt* file.
7. Ensure the correct options are enabled.

### NOTE

Ensure the DVD-RAM drive option is checked (if it is a valid key).

8. Click *Update and Save changes to Software options* to save the options.
9. At the *Save changes?* message, click *Yes*.

## Configure the Acquisition System

### Configure Display Settings

#### Configure number of monitors

Skip this section if the Acquisition system has only one monitor and proceed to “[Verify display resolution](#)” on page 5-44.

1. Ensure you are logged on to Windows and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. If the Acquisition system has two monitors:
  - a. Right-click on the Desktop and select *Properties*.
  - b. Select the *Settings* tab.
  - c. Click on the icon for the second monitor (labeled 2),
  - d. Check *Extend the Windows Desktop to this monitor* checkbox.
  - e. Click *Apply*.
3. If the Acquisition system has three monitors:
  - a. Right-click on the Desktop and select *Properties*.
  - b. Select the *Settings* tab.
  - c. Click on the icon for the third monitor (labeled 3),
  - d. Check *Extend the Windows Desktop to this monitor* checkbox.
  - e. Re-order the monitor icons so that they appear in the following order: 1-3-2.

NOTE

To re-order the icons, drag the monitor icons and drop them in the correct position

- f. Click *Apply*.
- g. Click the *Identify* button
- h. Verify that the monitors are identified as 1-3-2 from left to right.

### Verify display resolution

1. Ensure the following resolutions are selected in the *Screen Resolution* section:
  - 1280x1024 for Hemo/ 19" LCD Monitors
  - 1600x1200 for EP/ 20" LCD Monitors
  - 1600x1200 for Combolab LCD Monitors

NOTE

These are the only supported resolutions. All monitors must be set to the same resolution.

2. Verify that the color for all monitors is set to: *Highest (32-bit)*.



3. Click *OK*.

## Check/Set Time

### NOTE

You must be logged on to Windows as **mlcltechuser** for the changes to take effect.

1. Select *Start > Settings > Control Panel > Date and Time*.
2. Select the *Date & Time* tab.
3. Set the time and date.
4. Click *Apply*.
5. Select the *Time Zone* tab.
6. Select the correct time zone and daylight savings setting.
7. Click *Apply*.
8. Select the *Internet Time* tab.
9. Uncheck *Automatically synchronize with an Internet Time Server*.
10. Click *OK*.
11. Reboot the system.

## Configure Network Settings on the Acquisition System

A Standalone Acquisition system is NOT a member of the hospital Domain. It is a member of the CARDIOLAN workgroup. Do not add the Acquisition system to the hospital Domain.

1. Right-click *My Computer* icon on the Desktop and select *Properties*.
2. Select the *Computer Name* tab, and check the computer name.
3. Record the name of the Acquisition system and the workgroup.

Computer Name: \_\_\_\_\_

Workgroup: \_\_\_\_\_

4. In *Computer Description* textbox, type an easily identifiable name for the system.
5. Click *OK* to close the *Properties* window.
6. Select *Start > Settings > Network Connections*.
7. Verify that *Local area connection* is enabled.
8. If the network connections for TRAMNET or CARTO™ XP System are required, connect the necessary network cables and verify that the corresponding items are enabled as well.
9. Right-click *Local Area Connection* and select *Properties*.
10. Select *Internet Protocol (TCP/IP)*, and click *Properties*.
11. Select the *Use the following IP Address* radio button.
12. If system is to be attached to a network, enter the following information from the “[Record Network Settings](#)” on page 5-5, or “[Obtain System Information at the Server](#)” on page 5-7, as appropriate:
  - a. Static IP address
  - b. Subnet mask
  - c. Default gateway
  - d. DNS server
13. In the *Internet Protocol (TCP/IP) Properties* window, click *OK*.
14. In the *Local Area Connection Properties* window, click *Close*.

The following steps must ALWAYS be performed regardless if the CARTO™ XP System or TRAMnet connections are being used.

15. Right-click on the *TRAMNET connection* and select *Properties*.
16. Uncheck all components except *Internet Protocol (TCP/IP)*.
17. Select *Internet Protocol (TCP/IP)* and click *Properties*.
18. Click the *Advanced* button.
19. Click the *WINS* tab.
20. Uncheck *Enable LMHOSTS Lookup*.
21. In the *NetBIOS* setting, select the *Disable NetBIOS over TCP/IP* radio button.
22. Click *OK* in the *Advanced TCP/IP Settings* window.
23. Click *OK* in the *Internet Protocol (TCP/IP) Properties* window.
24. Click *Close*.
25. If the TRAMNET option is not being used, right-click the *TRAMNET connection* and select *Disable*.
26. Right-click the *CARTO™ XP System* connection and select *Properties*.
27. Uncheck all components except *Internet Protocol (TCP/IP)*.
28. Select *Internet Protocol (TCP/IP)* and click *Properties*.
29. Click the *Advanced* button.
30. Click the *WINS* tab.
31. Uncheck *Enable LMHOSTS Lookup*.
32. In the *NetBIOS* setting, select the *Disable NetBIOS over TCP/IP* radio button.
33. Click *OK* in the *Advanced TCP/IP Settings* window.
34. Click *OK* in the *Internet Protocol (TCP/IP) Properties* window.
35. Click *Close*.
36. If the CARTO™ XP System option was not purchased, right-click the *CARTO™ XP System* connection and select *Disable*.

## Verify NIC Connection Speed

1. Right-click on *Local Area Connections* and select *Status*.
2. Verify the connection speed is at least 100Mbps.

### NOTE

If it is not set to at least 100Mbps, then there is an issue at the network switch auto-negotiating the proper speed settings. Verify with the hospital IT department that the switch is configured correctly for Auto Negotiate.

3. Click *Close*.
4. Close the *Network Connections* window.
5. Restart the Acquisition system.

### NOTE

The restart is required for the previous settings to take effect.

6. At the *Mac-Lab/CardioLab* Custom Shell screen, press **Ctrl + Action + Delete**.
7. Click *Logoff*.
8. Select *Logoff...* and click *OK*.
9. Immediately hold down the **Shift** key.
10. Log on to Windows OS as **local mcltechuser**.
11. Log on to the Mac-Lab/CardioLab Custom Shell as **local mcltechuser**.

## Configure Database Maintenance

For networked or standalone Acquisition systems

1. Select *Start > Settings > Control Panel*.
2. Double-click *Scheduled Tasks*.
3. Double-click *Add Scheduled Task*.
4. At the *Scheduled Task Wizard* window, click *Next*.
5. Click *Browse*.
6. Browse to the file that needs to be scheduled. To schedule database maintenance on the system browse to:  
  
*D:\GEMMS\Prucka\Database\Maintenance\GEMS\_WS\_DBMAIN  
TJOB*
7. Click *Open*.
8. In the textbox, type **Database Maintenance** to name the job.
9. Select the radio button *Weekly* to perform this task on a weekly basis. Click *Next*.
10. Select the time and day to begin the task. Click *Next*.

### NOTE

The recommended time is 10:00 pm and the day is Saturday. Acquisitions that will be networked should be scheduled to run database maintenance one-half hour apart (Lab 1: 10:00 p.m., Lab 2: 10:30 p.m., Lab 3: 11:00 p.m.). Ensure the schedule does not overlap with the following jobs:

- Archive Generator on all Acquisition systems
  - Archive Utility on the server
  - DB Maintenance on the server
  - Backups on the server
11. Enter the **local mlcltechuser** information for the **Administrator** user name and password and click *Next*.
  12. Click *Finish* to successfully schedule the Database Maintenance job. It will appear in the *Scheduled Tasks* folder.

## Setup Purge on Standalone Acquisition systems

The next steps are for standalone Acquisition systems only. Skip these steps if the system will be connected to a Centricity Cardiology INW server later in the installation, close all open windows, and proceed to “[InSite 2.0 Setup](#)” on page 5-51. Perform the following steps to update the job to purge studies on a regular basis.

The task below will purge studies on a only after clab database reaches 1,350 MB.

1. Right-click on *Database Maintenance* and select *Properties*.
2. The Database Maintenance window appears. In the *Run:* field, add **<space> purge** to the end of the existing command.
3. Click *OK*.
4. The *Set Account Information* window appears. Enter the **local mcltechuser** information as the Administrator user name and password and select *OK* to save the modified job.
5. Close all open windows.

## InSite 2.0 Setup

Verify with the customer that InSite 2.0 is to be used as the Remote Support Service. If no remote service support is needed, proceed to the next section.

1. Verify you are logged on to Windows and Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. From the Desktop, double-click on the *Service Console* icon.
3. At the *Service Console* screen, in the left pane, expand the *InSite 2.0* folder and select the *Device Manager* folder.
4. In the *Device Information* screen click *Generate Device Information*.
5. Verify the correct information is present in the *Serial Number*, *Name*, and *Type* fields.
6. From the left pane under *InSite 2.0* select the *Configuration Utility* folder.
7. If the hospital uses a proxy server perform the next step, otherwise skip to step 12.
8. Click on the *Proxy Configuration* tab. Check *Use a Proxy Server to connect to the Enterprise* and enter the appropriate proxy server information.

### NOTE

Contact the Hospital IT Department for the appropriate information regarding the proxy address, proxy port, and authentication information if required by the proxy server.

9. After entering the proxy server information, click *Update Proxy*.
10. At the *InSite 2.0 Message* screen, click *OK*.
11. While in the *Configuration Utility*, select the *Service Controller* tab and click *Stop Service* and wait for the service to stop.
12. In the *Service Controller* tab, click *Start Service*.
13. Close the *Service Console*.

### NOTE

Perform the following steps only if the customer requests InSite 2.0 access control.

14. Right-click the VNC icon in the System Tray and select *Options*.

15. Select the *Authentication* tab and check *Prompt local user to accept incoming connections*.
16. Select *Initiate Remote Service* and verify that it connects and a *Request submitted successfully message* is displayed.
17. Click *OK*.

## Configure Data Export

Refer to the appropriate subsection below to reconfigure Data Export of either a standalone Acquisition system or a networked Acquisition system.

### Create active translation on standalone Acquisition workstation

If the Acquisition system was a standalone system and connected to the CVIS server, the following must be reconfigured (refer to the appropriate CVIS installation/configuration documentation for specific information/procedures):

- Re-establish CVIS connectivity.
- Reconfigure shares. Ensure the share permissions are correct. On the CVIS server the following must be reconfigured with proper permissions:
  - ◆ List Sharing share
  - ◆ Export share

Perform the following steps on the standalone Mac-Lab/CardioLab systems.

1. Map a drive to the English (and US Canada) CVIS Full Interface or English (and US Canada) CVIS Express server Import Share, which was configured in the interfaces console.
2. Right click *My Computer* icon and select *Explore*.
3. Click *Tools*.
4. Click *Map Network Drive > Browse*.
5. In the Network, locate the English (and US Canada) CVIS server.
6. Double-click the English (and US Canada) CVIS server name (you may enter the unc path to the share as well, i.e., `\\dmsint001\import` or `\\dmsexp001\import`).
7. Highlight the import directory.



8. Click *OK*.
9. Select drive letter *S* from the drive letter dropdown list.
10. Verify that the *Reconnect at Login* checkbox is checked.
11. Select the *Connect using a different user name*.
12. In the *Connect As...* window enter the user: **[DMS Server Name (i.e. DMSINT001 or DMSEXP001)]\mlcllogonuser** in the *User Name* field and the password in the *Password* field.
13. Click *OK*.
14. Click *Finish*.
15. Close any mapped drive windows that may automatically opens.
16. Navigate to *D:\GEMS\Prucka\Bin* in *Windows Explorer*.
17. Double click on *DataExportConfig.exe*.
18. Click the *Active Translations* tab.
19. Click the *HL7 EP* radio button.
20. Browse to the drive letter for the mapped drive created above followed by:\ (i.e., *S:\*).
21. Check the following check boxes: *Study Reports (R)*, *Images (I)* and *Snapshots (S)*.
22. Click the *Add translation* button.
23. Click the *HL7 Cath* radio button.
24. Browse to the drive letter for the mapped drive created above followed by:\ (i.e., *S:\*).
25. Check the following check boxes: *Study Reports (R)*, *Images (I)* and *Snapshots (S)*.
26. Click the *Add translation* button.
27. Click *Done*.

### Create active translation on networked Acquisition system

#### NOTE

Perform the following steps on each of the networked Mac-Lab/ CardioLab Acquisition systems.

1. Open *Windows Explorer*.

2. Navigate to *D:\GEMS\Prucka\Bin*.
3. Double click on *DataExportConfig.exe*.
4. Click the *Active Translations* tab.
5. Click the *HL7 EP* radio button.
6. Enter the UNC Path or browse to the shared drive on the English (and US Canada) CVIS server (i.e., *\\DMSEXP001\Import or \\DMSINT001\Import*) for the directory path.
7. Check the following check boxes: *Study Reports (R)*, *Images (I)* and *Snapshots (S)*.
8. Click the *Add translation* button.
9. Click the *HL7 Cath* radio button.
10. Enter the UNC Path to the Shared drive on the English (and US Canada) CVIS server (i.e., *\\DMSEX001\Import or \\DMSINT001\Import*) for the directory path.
11. Check the following check boxes: *Study Reports (R)*, *Images (I)* and *Snapshots (S)*.
12. Click the *Add translation* button.
13. Click *Done*.

## Import Report Formats

Perform these steps to import report formats on recovered network or standalone Acquisition systems. Report Formats are not replicated in the INW networked environment. Obtain the backups from one of the following sources:

- Use the backup saved to the G: drive
  - Check with the Lab administrator to see if a backup they made earlier is available.
  - Make a copy from a Review workstation in the same lab
  - For English systems: If any other backups are unavailable, report formats must be imported from the **6.5.4 Clinical Applications Defaults CD** (p/n 2036180-001).
1. Double-click the GE Medical systems icon to open the application.
  2. Select *Utilities > Import Report Formats* in the *Navigator* window.

3. At the *Report Wizard* window, click *Next*.
4. Click *Change Folder*.
5. Select the drive G (or the appropriate folder location).
6. Navigate to the *Report\_Backup* folder (or other location).
7. Click *OK*.
8. Select *No* when asked whether to merge with existing data.
9. Click *OK* at success message.
10. Close the application.

## Configure Central List Management

Perform this procedure only on standalone Acquisition systems.

1. At the Acquisition system, double-click the *Service Console* icon on the Desktop.
2. Navigate to *GEMS Central List Management > Central List Setup*
3. In the *CVIS Server Export Directory* click the... button to browse.
4. Browse to the path on the CVIS server.

NOTE

This may be a mapped drive or the UNC name (e.g.,  
\\DMSexp001\ListSharing

5. In the *Location* dropdown box, select the appropriate location for the hospital.
6. Click *Update Lists*.

NOTE

The *Update Lists* button must be clicked on the Mac-Lab/  
CardioLab system each time the lists are updated on the English  
(and US Canada) CVIS server. Ensure this is done while the  
application is running.

7. Close the *Service Console* window.

## Configure the Acquisition System on the INW Network

If the Acquisition system is part of an INW network, use these procedures to configure the system. If configuring Standalone Acquisition systems, go to “[Initialize Applications](#)” on page 5-64.

### Add the System to the Domain

1. Verify that you are logged on to Windows and Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. Right-click *My Computer* icon on the Desktop and select *Properties*.
3. Select the *Computer Name* tab.
4. Click the *Change* button.
5. In the *Member of* section, select the *Domain* radio button, enter the name of the INW Domain to join and click *OK*.

#### NOTE

The default Domain is *inw.local*.

6. When prompted, type the username **mlcltechuser** and password.
7. At the *Welcome to inw* message, click *OK*.
8. At the restart message click *OK*.
9. At the *System Properties* window, click *OK*.
10. At the *Do you want to restart now?* message click *Yes*.
11. After the system restarts, at the Mac-Lab/CardioLab Custom Shell window, press **Ctrl + Action + Del** and click *Logoff*.
12. Click *Logoff* and immediately hold the **Shift** key to stop the auto-logon sequence.
13. Logon to Windows and the Mac-Lab/CardioLab Custom Shell as the INW **domain mlcltechuser**.

### Synchronize Time

1. Select *Start > Programs > Accessories > Command Prompt*.
2. Type **net time /set** and press **Enter**.
3. When asked to sync with the server, type **y** and press **Enter**.

NOTE

This step may take up to 2 minutes to complete.

4. Close the *Command Prompt* window.

## Add Acquisition System to GE MLCL Organizational Unit

1. Log on to the server as the INW **domain Administrator** (contact GE Technical Support or the system administrator for current password information).
2. Select *Start > Settings > Control Panel*.
3. Double-click the *Administrative tools* icon.
4. Double-click *Active Directory Users and Computers*.
5. Expand *inw.local*
6. Click the *Computers* folder and locate the Acquisition system to add.
7. Expand the *GE Medical Systems (MLCL)* organizational unit.
8. Expand the *MLCL Computers*.
9. Expand the *MLCL Workstations*.
10. Drag and drop the computer name from the *Computers* folder to the *MLCL Acquisition workstations*.
11. Close all open windows.
12. Restart the Acquisition system added to the organizational unit in the previous step.
13. After restart, press **Ctrl + Action + Del**, logoff as **mlcllogonuser**.
14. Click *Logoff*.
15. Immediately hold down the **Shift** key.
16. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell locally as **mlcltechuser**.

## Confirm Domain Security Policy

### **At the Acquisition system, verify the security policy:**

1. Right click *My Computer* icon on the Desktop and select *Manage*.
2. Select *System Tools > Local Users and Groups > Groups*.

3. Right-click on *Administrators* and select *Properties*.
4. Verify that the following members are shown in the list:
  - INW\Domain Admins
  - INW\mlcltechuser
  - INW\mlclsqluser

**NOTE**

If the members are not shown, follow the troubleshooting steps below.

**Troubleshooting**

1. Verify that the Acquisition system is in the correct Domain:
  - a. Right click *My Computer* icon on the Desktop and select *Properties*.
  - b. Verify that on the *Computer Name* tab the INW Domain is present.
2. Verify that the Acquisition system shows up in the *GE Medical Systems (MLCL)* Organizational Unit on the server.
3. On the server, open a command prompt window and type **gpupdate /force** and press **Enter**.
4. Restart the Acquisition systems, wait approximately 7 minutes and check the policy again as described in “**Confirm Domain Security Policy**” on page 5-58. If the policy is still not correct proceed to the next step.
5. Verify that the TCP/IP properties on the server are set correctly
  - a. The INW server IP must be configured as the preferred DNS server.
  - b. The subnet mask must be correct as defined by the hospital IT staff.
6. Verify that the TCP/IP properties on the Acquisition are set correctly
  - a. The IP subnet mask of the Acquisition system **MUST** match exactly the subnet mask of the server.
  - b. The IP address of the Acquisition system must be manually configured and must fall within the subnet of the server as defined by the subnet mask.

- c. The gateway of the Acquisition system must be set to the IP address of the server or another machine on the hospital network.
  - d. The DNS of the Acquisition system must be set to the IP address of the INW server.
  - e. In the CARTO™ XP System and TRAMNet IP settings, make sure that the *Internet Protocol (TCP/IP)* checkbox is the **ONLY** item selected in the *This connection uses the following items:* list.
- 7. Verify that the server and Acquisition system can communicate.
  - 8. Open a command window on the Acquisition system and type **ping <servername>** and press **Enter**.
    - a. A *Request timed out* message indicates failure, a *Reply from* message indicates success.

**NOTE**

If successful, verify that the reply from IP address shown matches the server's IP address and if correct skip the reset of the sub-steps below

- b. If step a failed, repeat with the servername replaced with the correct IP address of the server **ping <###.###.###.###>** and press **Enter**.
  - c. If step a and step b both failed, there is a problem with the IP address or the physical network. Repeat the above steps to verify the TCP/IP properties of the server and Acquisition system
  - d. If step a fails and step b succeeds, there is a problem with DNS setup. Repeat the TCP/IP properties steps above paying careful attention to the DNS setup.
- 9. Verify that the time on the server and the Acquisition system match
    - a. If they do not match, open a command prompt on the Acquisition system and type **net time /set** and press **Enter**.
    - b. Restart the Acquisition system, wait 7 minutes and check the policy again in “**Confirm Domain Security Policy**” on page 5-58- if the policy is still not correct proceed to the next step
  - 10. If the policy is still not correct after all above steps:
    - a. Remove the Acquisition system from the Domain and add it back to the *CARDIOLAN* workgroup.
    - b. Restart the Acquisition system



- c. Delete the Acquisition system name for the OU on the server
- d. Repeat the instructions for adding the Acquisition system to the Domain.

## Register the Acquisition System and Update Acquisition Database on the Server

Use this procedure to register the recovered Acquisition system and update the Acquisition database at the server.

1. At the server go to *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
  2. Open *Microsoft SQL Servers* and right-click on *SQL Server Group*
  3. Select *New SQL Server Registration*.
  4. Click *Next*.
  5. Select the Acquisition system name and click *Add*.
  6. Click *Next*.
  7. Select *SQL Server Login*.
  8. Click *Next*.
  9. Type **sa** as the account name and enter the password (contact GE Technical Support or the system administrator for current password information).
  10. Follow onscreen confirmation messages. When complete the Acquisition system is displayed in the machine list in the left pane.
  11. Expand *SQL Server Group*.
  12. Open *[Acquisition computer name] > Databases > Clab > Tables*.
  13. Right-click on *Detail Version* and select *Open Table > Return All Rows*.
  14. Set the following fields:
    - *NetVersion* = **0**
    - *MachineDBVersion* = **00**
- NOTE
- MachineDBVersion* must be **00** (two zeros) or the restore will fail.
15. Close the *Table* window.
  16. Close *Enterprise Manager*.

## Add Acquisition System to Replication on the INW Server

Perform the rest of these steps only if you are adding the Acquisition to the INW network.

1. Double-click the *Service Console* icon on the Desktop.
2. Navigate to *Console Root > Create Replica > Replication Setup* in the left hand frame.
3. The right frame should show the *Replication utility* with the top *Service User Login* section active.
4. In the password box enter the password and click *Login*.
5. The top *Login* section should now be inactive and the bottom section will be active with a *password validated* message.
6. Click *Add*.
7. Browse to *My Network Places > Entire Network > Microsoft Windows Network > <current domain>* and select an Acquisition system and click *OK*.
8. When prompted for consolidation, click *Yes* to move all studies on the currently selected Acquisition system up to the server.
9. The selected machine should now appear in the *Add to replication* list box.
10. Click *Apply*.
11. Click *Yes* to confirm replication.
12. Wait while the progress bar and text indicate the operations performed.

### NOTE

This may take 5 minutes to complete.

13. When complete, a *Replication setup complete* message will be displayed above the progress bar and the server and all Acquisition systems will appear in the *Currently replicating* list.
14. Close out of the *Service Console* window.

## Configure Archive Generator

Perform the following steps to configure the archiving of studies to the INW server.

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**WARNING**

**ARCHIVE GENERATOR FAILURE** — If the time for the archive generator process is set at the same time on more than one Acquisition system, the studies will not be moved properly because different systems will be attempting to move studies simultaneously.

---

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**NOTE**

If the archive generator process is started while a study is in progress, that specific study will not be archived to the server until the next archive generator process is run.

1. On the server, select *Start > Programs > Microsoft SQL Server> Enterprise Manager*.
2. Expand the *SQL Server group*, click to expand the Acquisition system that is scheduling the archive generator task.
3. Expand the *Management* folder.
4. Expand the *SQL Server Agent*.
5. Click *Jobs*.
6. Right-click *Run Archive Generator*.
7. Choose *Properties*.
8. Select the *Schedule* tab.
9. Click *Edit*.
10. Click *Change*.
11. In the *Edit Recurring Job Schedule* window, enter the following information:
  - a. In the *Occurs:* section, select the *Daily* radio button.
  - b. In the *Daily:* section, type **1**.
  - c. In the *Daily Frequency:* section, enter a time.

**NOTE**

The time must be set to at least 5 to 10 minutes after the hour (e.g., 1:05 am, 1:35 am). Ensure the job schedule does not overlap other scheduled jobs. Do not schedule any jobs at 12:05 am as other system jobs are scheduled at this time.

12. Click *OK*.

13. At the *Run Archive Generator Properties* window, click *OK*.

## Initialize Applications

Adobe Reader, Microsoft Word, and Microsoft Word Reports must be initialized under both **mlcllogonuser** and **mlcltechuser** logons.

### Adobe Reader

1. Press **Ctrl + Action + Delete**.
2. Click *Logoff*.
3. Click *Logoff*.

Allow the system to auto-log on to Windows OS as **mlcllogonuser**.

4. Log on to the Mac-Lab/CardioLab Custom Shell:
  - For standalone Acquisition systems: **local mlcllogonuser** (password **mlcllogonuser**).
  - For networked Acquisition systems: **domain mlcllogonuser** (password **mlcllogonuser**).

5. Select *Start > Programs* and select *Adobe Reader 6.0*.
6. Accept the *End User License Agreement* if displayed.

After *Adobe Reader* opens, wait one minute to ensure a *Check for Update* dialog box is not displayed. If the dialog box is displayed, click *Cancel*.

7. Select *Edit > Preferences* from the main menu.
8. Click *Internet*.
9. Uncheck *Allow Speculative downloading in the background*.
10. Ensure *Check browsers settings when starting Reader* is checked.
11. Click *Startup*.
12. Ensure *Show Messages and automatically update* is checked.
13. Click *OK*.
14. Close *Adobe Reader*.

### Microsoft Word

1. Select *Start > Programs* and select *Microsoft Word*.

**NOTE**

For Microsoft Office 2007 Professional, select *Start > Programs > Microsoft Office > Microsoft Office Word 2007*.

2. Accept the *End User License Agreement* if displayed.
3. Click *OK* if the *User Initial* dialog box is displayed.
4. Close *Microsoft Word*.

## Microsoft Word Reports

1. Double-click the *GE Medical systems* icon on the desktop.
2. Select *Administration > Reports > Templates*.  
If prompted for an administrator password enter **mlcladmuser**.
3. If a server busy message is displayed. Click *Retry*. Microsoft Word will open.
4. Move the Microsoft Word window to the review monitor (on multiple monitor systems only):
  - a. Right-click the Microsoft Word title bar and select *Restore*.
  - b. Move the Microsoft Word window to the next monitor (from the real-time monitor to the review monitor).
  - c. Right-click the Microsoft Word title bar and select *Maximize*.
5. Close Microsoft Word.
6. When prompted to save the report, click *No*.
7. Close the ML-CL application.

## Adobe Reader

1. Press **Ctrl + Action + Delete**.
2. Click *Logoff*.
3. Click *Logoff*.
4. Immediately hold down the **Shift** key.
5. Log on to Windows OS:
  - For standalone Acquisition systems: **local mlcltechuser** (password **mlcltechuser**).

- For networked Acquisition systems: **domain mlcltechuser** (password **mlcl!techuser**).
6. Log on to the Mac-Lab/CardioLab Custom Shell:
    - For standalone Acquisition systems: **local mlcltechuser** (password **mlcl!techuser**).
    - For networked Acquisition systems: **domain mlcltechuser** (password **mlcl!techuser**).
  7. Select *Start > Programs* and select *Adobe Reader 6.0*.
  8. Accept the *End User License Agreement* if displayed.

After *Adobe Reader* opens, wait one minute to ensure a *Check for Update* dialog box is not displayed. If the dialog box is displayed, click *Cancel*.
  9. Select *Edit > Preferences* from the main menu.
  10. Click *Updates*.
  11. Ensure *Check for Updates* is set to *Manually*.
  12. Uncheck *Display notification dialog at startup*.
  13. Click *OK*.
  14. Close *Adobe Reader*.

## Microsoft Word

1. Select *Start > Programs* and select *Microsoft Word*.

### NOTE

For Microsoft Office 2007 Professional, select *Start > Programs > Microsoft Office > Microsoft Office Word 2007*.

2. Accept the *End User License Agreement* if displayed.
3. Click *OK* if the *User Initial* dialog box is displayed.
4. Close *Microsoft Word*.

## Microsoft Word Reports

1. Double-click the *GE Medical systems* icon on the desktop.
2. Select *Administration > Reports > Templates*.

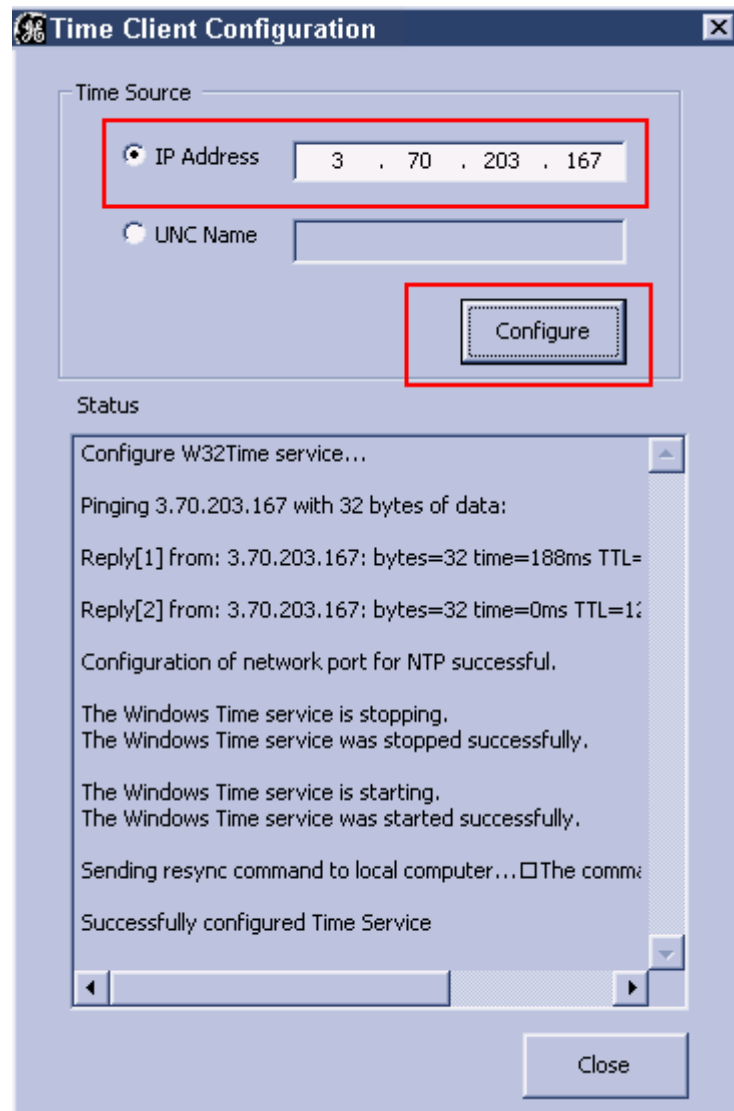
If prompted for an administrator password enter **mlcladmuser**.

3. If a server busy message is displayed. Click *Retry*. Microsoft Word will open.
4. Move the Microsoft Word window to the review monitor (on multiple monitor systems only):
  - a. Right-click the Microsoft Word title bar and select *Restore*.
  - b. Move the Microsoft Word window to the next monitor (from the real-time monitor to the review monitor).
  - c. Right-click the Microsoft Word title bar and select *Maximize*.
5. Close Microsoft Word.
6. When prompted to save the report, click *No*.
7. Close the ML-CL application.

## Synchronize Time

Perform this procedure at networked Acquisition systems.

1. Right-click the *My Computer* icon and select *Explore*.
2. Navigate to *D:\GEMMS\Prucka\Utilities*.
3. Double-click on the file *TimeClientConfig.exe*. This tool will perform the following:
  - Checks for Administrator logon.
  - Does a backup of the existing registry entries pertaining to Windows Time Service.
  - Updates the required registry entries to configure Windows Time Service.
  - Verifies one of the registry keys to ensure the registry update was successful.
  - Enables/Configures UPD port 123 in the **Windows Firewall** on Windows XP SP2 system.
  - Stops and Starts the W32Time service.
  - Runs the w32tm command to update the Windows Time Service to look at the update configuration, re synchronize, and rediscover the time source.



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4. In a fixed-IP network, select the radio button for IP Address, and enter the IP address of the INW server. For a DHCP network, select the radio button for the UNC name and enter the name of the INW server.

**NOTE**

In a DHCP environment, the UNC name must be used since it is likely that the IP address will change.

5. Click on the *Configure* button.



6. When the configuration completes, the status will indicate that the time settings were updated successfully.
7. Close all open windows.
8. Time Sync Configuration is now complete. Proceed to the next section.

## Confirm File Paths and Network Storage Settings

Perform this procedure at the Acquisition system.

1. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell as INW **domain mcltechuser**.
2. Double-click the *GE Medical Systems* icon on the Desktop to start the Mac-Lab/CardioLab application.
3. Select *Administration > System Settings*.
4. Browse to the *File Paths* section.
5. Set the *Local Storage Optical Study Path*.
6. Check the *Enable Acquisition* checkbox, if unchecked.
7. Check the *Enable Network Storage* checkbox.
8. Click *Browse*.
9. Browse to the INW server and select the *PruckaStudies* share as the network storage path.
10. Click *OK*.
11. Select the *Audit Log* section.
12. Move all items in the list to the right *Events selected for audit* by clicking the >> button.
13. Close the application.

## Update HL7 Export and MWL/MPPS SCU Configuration

Each Mac-Lab/CardioLab Acquisition and Review system can be configured to export HL7 results to CVIS server and to use the CVIS server as a DICOM Modality Worklist and MPPS Host. If the CVIS server name or IP address has changed, this configuration may also need to change. To do this, perform the following steps on each Mac-Lab/CardioLab Acquisition and Review system:

## Update the DICOM MWL/MPPS Host Configuration

1. Open the Mac-Lab/CardioLab application.
2. In the *Administration* menu, select the *System Settings*. (username: **mlcladmuser**, obtain current password information from Hospital Administrator).
3. Select *Connectivity*.
4. If the *Enable* option is not checked in both the *Modality Worklist Host* and *MPPS Host* sections, nothing more needs to be done. Skip to step 7.
5. If the *Hostname* or *IP Address* entry for both the MWL Host and MPPS Host already uses the correct hostname or IP address for the CVIS server, nothing more needs to be done. Skip to step 7.
6. Under the *Modality Worklist Host* and *MPPS Host* sections, enter the correct hostname or IP address for the DMS in the *Hostname* or *IP Address* field.
7. Click the *Close* button.
8. Close the application.

## Update the HL7 Export Configuration

1. Right-click *My computer* icon and select *Explore*.
2. Navigate to *D:\GEMMS\Prucka\Bin*.
3. Double-click on the *DataExportConfig.exe*.
4. Click the *Active Translations* tab.
5. If the existing active translations that refer to the CVIS server already use the correct hostname or IP address, nothing more needs to be done. Skip to step 15.
6. For each existing active translation that refers to the CVIS server, select the translation and press *Delete Translation*.
7. Click the *HL7 EP* radio button.
8. Enter the UNC Path or browse to the shared drive on the CVIS server (e.g., *\\DMSEXP001\Import* or *\\DMSINT001\Import*) for the directory path.
9. Check the following check boxes:
  - *Study Reports (R)*

- *Images (I)*
  - *Snapshots (S)*
10. Click the *Add Translation* button.
  11. Click the *HL7 Cath* radio button.
  12. Enter the UNC Path or browse to the shared drive on the CVIS server (e.g., \\DMSEXP001\Import or \\DMSINT001\Import) for the directory path.
  13. Check the following check boxes:
    - *Study Reports (R)*
    - *Images (I)*
    - *Snapshots (S)*
  14. Click the *Add Translation* button.
  15. Click *Done*.

## Reconfigure Printer

Refer to the setup instructions included with the printer to install the appropriate printer driver.

### NOTE

If using an HP Laserjet printer, ensure that the HP Laserjet 2100 driver is selected.

1. Set up the default printer settings for a network printer (if applicable):
  - a. Double-click the *My Network Places* icon on the Desktop.
  - b. Double-click *Entire Network*
  - c. Double-click *Microsoft Windows Network*
  - d. Double-click the domain
  - e. Double-click *Printers and Faxes*.
  - f. Right-click the default printer and select *Connect*.
2. Select *Start > Settings > Printers*
3. Right-click the default printer and select *Properties*
4. Click *Print Test Page*.
5. Verify the page prints correctly and click *OK*.

6. Close the *Properties* window.

## Reconfigure Mapped Drives

If any mapped drives were recorded in “Record Mapped Drives” on page 5-6, perform this procedure.

1. Log off the system and allow the auto-logon run and log on to the Mac-Lab/CardioLab Custom Shell as a local user.
2. Verify any mapped drives still exist.

If they do not, perform the steps in this procedure.

3. Right-click *My Computer* icon on the Desktop and select *Map Network Drive*.
4. In the *Drive* section, select the drive letter.
5. In the *Folder* section, enter the path.
6. Click *Finish*.
7. Close all open windows.
8. Log off the system and allow the auto-logon run.

# INW Server Disaster Recovery

The decision to perform server recovery should only be made after consultation with GE Technical Support by the on-site Field Engineer. The high-level steps for a complete 6.5 INW server recovery are listed below. Detailed instructions for each step follow.

## High-Level Overview

### Required Parts

Verify the appropriate media is available. Double-check part numbers before you begin.

- 6.5 MLAB/CLAB G3 SERVER IMAGE CD: 2027422-007/-008/-009
- 6.5 MLAB/CLAB G4 SERVER IMAGE DVD: 2027420-003
- Mega Server Partition Upgr. Tool 6.0 CD: 2024535-001
- 6.5 backup tapes (Full and Incremental, if applicable)
- MLAB/CLAB G5 Server Image DVD version 6.5.4: 2037990-001
- Mac-Lab/CardioLab Application/Update CD version 6.5.4: 2036182-001
- MLAB/CLAB OS UPDATE V.6.5.4 CD: 2037996-001
- I386 for MS Srv 2003 SP2 CD: 2037992-001
- Mac-Lab/CardioLab 6.5.3 Update CD: 2034817-001
- SQL Server Configuration Utility CD: 2030710-002
- CD-R MLAB/CLAB G5 REGISTRY PATCH: 2039607-001

Depending on the site configuration server failure will fall into one of two scenarios:

### Scenario 1

Failure of a single drive in a disk array on a G3 mid- or high-end server or a G4/G5 low- mid- or high-end server.

Replace the drive (See [“Replace the Server Hard Drive”](#) on page 5-82); the RAID automatically rebuilds the replacement drive. No further action is required.

## Scenario 2

Perform the steps listed below if the failure is:

- A single drive on a G3 low-end server
- Multiple drives in a disk array on a G3 mid- or high-end server.
- Multiple drives in a disk array on a G4/G5 server.

**Step 1: Record Server Information.** Go to [“Record Server Information”](#) on page 5-76.

**Step 2: Take the Acquisition systems out of replication and set systems to standalone**

Perform the following steps to take the Acquisitions systems out of replication:

- If the server is still running (e.g., the hard drive is corrupt, rather than completely failed), remove all Acquisition systems from replication (See [“Take All Acquisition Systems out of Replication at the Server”](#) on page 5-77) and then continue with the [“Set All Acquisition Systems to Standalone”](#) on page 5-78.
- If the server is not running, go to each Acquisition system and remove the system from replication (See [“Set All Acquisition Systems to Standalone”](#) on page 5-78).

**Step 3: See procedures: “Backup Custom Lists, Custom Reports, and Custom Forms”** on page 5-81 **for detailed steps.**

**Step 4: Replace the hard drive** (See [“Replace the Server Hard Drive”](#) on page 5-82)

**Step 5: Reimage the hard drive.** Depending on the type of server, perform the associated steps.

Compaq ML370 G3 Servers

- [“Load G3 Server Image”](#) on page 5-83
- [“Repartition the Hard Drive”](#) on page 5-85
- [“Activate Microsoft Windows”](#) on page 5-92

Compaq ML370 G4 Servers

- [“Load G4 Server Image”](#) on page 5-84
- [“Activate Microsoft Windows”](#) on page 5-92

## HP ProLiant ML370 G5 Servers

- “Load G5 Server Image” on page 5-85
- “Activate Microsoft Windows” on page 5-92

**Step 6:** Perform all the procedures in “G3/G4/G5 Server Setup and Data Restore” on page 5-93.

**Step 7:** Perform all the procedures in “Re-Configure Centricity Cardiology INW Network” on page 5-124.

**Step 8:** Perform all the procedures in “Post Configuration Procedures” on page 5-133.

## Record Server Information

If the server and acquisition/review systems are on different subnet's, then you may need to contact the Hospital's IT department for the gateway, WINS and additional DNS information.

### Record the server IP information

The Server IP information is required for the “G3/G4/G5 Server Setup and Data Restore” on page 5-93 procedure. The Server IP can be found on any Acquisition system or Review workstation connected to the network. Use the following procedure to find and record the information:

1. Log on to Windows OS and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. Right-click on *My Network Places* and select *Properties*.
3. Right-click on *Local Area Connection* and select *Properties*.
4. Highlight *TCP/IP* and select *Properties*.
5. Record the following information:
  - *Preferred DNS Server:* \_\_\_\_\_  
(This is the server IP)
  - *IP Subnet Mask:* \_\_\_\_\_

### Record the server and domain names

Record the server name for the “G3/G4/G5 Server Setup and Data Restore” on page 5-93.

1. Go to any Acquisition system or Review workstation.
2. Launch the *Mac-Lab/CardioLab* application and go to *Administration > System Settings*.
3. Select *File Paths* and look at the *Network Study Path* field.

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#### CAUTION

PROCEDURE FAILURE — The entire server disaster recovery procedure will fail if you record the wrong server name below. Be sure to double-check the name you recorded.

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4. Record the server name. It has this format:



\\CLSV[**four digit number**]\Prucka\Studies

CLSVxxxx is the server name:\_\_\_\_\_

5. Right-click the *My Computer* icon from the Desktop and navigate to *Properties* and select the *Computer Name* tab.
6. Record the domain name. It has this format:

**CLWSxxxx.<Domain name>.**

Domain name:\_\_\_\_\_

## Reimaging Procedures

### Take All Acquisition Systems out of Replication at the Server

If the server is available (i.e., can be booted and the service console can be run), use this procedure to take the all Acquisitions out of replication at the server, and then continue with to “[Set All Acquisition Systems to Standalone](#)” on page 5-78.

If the server is not available, skip this procedure and continue with “[Set All Acquisition Systems to Standalone](#)” on page 5-78.

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#### CAUTION

PROCEDURE FAILURE — If either this procedure or “[Stop Replication](#)” on page 5-79 is not performed to stop replication on the Acquisition system, the Acquisition systems cannot be added back into replication later.

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Adding or removing a system from replication requires administrative privileges. Contact the facility IT department for current logons if necessary.

1. At the server, double-click the *Service Console* icon from the Desktop and navigate to *Create Replica > Replication Setup*.
2. Log on to the *Service Console* as **mlclsquser** (contact GE Technical Support or the system administrator for current password information).
3. Highlight all Acquisition systems (e.g., CLWS0001, etc.) in the list of *currently replicating systems*.
4. Click the *Remove* button.

5. Click *Yes* at the confirmation window.

NOTE

Stopping replication could take several minutes to complete.

6. Once all Acquisitions have been taken out of replication, the message *Replication Removal Complete* will appear and all Acquisitions are no longer listed as being replicated.
7. Refresh the window (click another folder in the tree and then click Replication Setup again) to verify all Acquisition systems have been taken out replication.
8. Close the *Service Console*.
9. Go to the *Enterprise Manager* and stop server replication.
  - a. Select *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
  - b. Expand *Microsoft SQL Servers > SQL Server Group*. Highlight the INW Server (in the left window).
  - c. Select *Tools > Replication > Disable Publishing*.
  - d. Click *Next*.
  - e. Select *Yes, disable publishing on [Server name]* and click *Next*.
  - f. Click *Next* in the *Confirm Dropping of Publications* window.
  - g. Click *Finish* in the *Completing the Disable Publishing and Distribution Wizard* window.
  - h. Click *OK* to the *Successfully Disabled* window.
  - i. Right-click the server name and select *Refresh*.

## Set All Acquisition Systems to Standalone

While the server is down communicate the following to the users and lab administrator:

- Review workstations will also be down while the server down.
- Acquisitions systems will function normally (but will have no access to the network catalog).
- Switching users or logging on using some usernames may fail. If this happens users should either use the emergency logon or the temporary logon set up in this step (username: Tempuser, Password:

password).

To set the Acquisition systems to standalone while the server is down perform the following procedures at each Acquisition system:

- “**Stop Replication**” on page 5-79 (This step is not required if the Acquisition systems were taken out of replication at the server in the previous procedure).
- “**Set up a temporary user on each Acquisition system**” on page 5-79
- “**Disable Networking**” on page 5-80
- “**Backup LMT Custom Reports**” on page 5-80

At the Acquisition system log on Windows and the custom shell as **local mlcltechuser** (contact GE Technical Support or the system administrator for current password information).

## Stop Replication

This procedure is not required if the Acquisition systems were taken out of replication at the server in the procedure “**Take All Acquisition Systems out of Replication at the Server**” on page 5-77.

1. Verify you are logged in as **local mlcltechuser**.
2. Right-click *My Computer* icon and select *Explore*.
3. Navigate to *D:\GEMMS\Prucka\Network*.
4. Double-click *StopRepl.bat*.
5. A Command Prompt window opens and the file runs.
6. Press the **Enter** key when prompted to press any key.

## Set up a temporary user on each Acquisition system

1. Right-click *My Computer* icon and select *Manage*.
2. Expand *Local Users and Groups*.
3. Highlight *Users*.
4. Right-click on *Users* and select *New User*.
5. Enter the following information in the New User window:
  - User ID: **Tempuser**
  - Password: **password**

- Uncheck the option to require the user to change the password at the first logon.
- 6. Click *Create*.
- 7. Click *Close*.
- 8. Double-click on the user you just created and go to *Member of* tab.
- 9. Click *Add*.
- 10. Click *Advanced*.
- 11. Verify the *Location* field displays the local computer name.
- 12. Click *Find Now*.
- 13. Multi-Select the following groups:
  - Administrator
  - MLCLAdmgrp
- 14. Click *Ok three times*.
- 15. Double-Click on the user, go to the *Member of tab* and ensure the following groups are listed:
  - Administrator
  - MLCLAdmgrp
  - Users
- 16. Close all open windows.

### **Disable Networking**

1. Open the Mac-Lab/CardioLab application.
2. Select *Administration > System Settings*.
3. When prompted, log on as Tempuser (Password: password) to the local computer.
4. Select *File Paths*.
5. Uncheck the *Enable Network Storage* option and click close.

### **Backup LMT Custom Reports**

Skip this procedure if the customer is not using LMT Custom reports or the customer has previously backed up the clink\_drk.mdb file. The customer is responsible for backing up the clink\_drk.mdb file because the is not backed up as part of the INW backup procedure or the optical backup performed earlier.

1. Insert an optical disk into the optical drive.
2. Double-click *My Computer* icon and select *Explore*.
3. Navigate to D:\Program Files\GEMS\LMT\Client\Resource Kit.
4. Right-click *clink\_drk.mdb* and select *Copy*.
5. Navigate to the *Optical Drive (E:)*.
6. Right-click on the drive and select *Paste*.
7. Remove the optical disk from the drive.

## Backup Custom Lists, Custom Reports, and Custom Forms

This procedure is done in case the custom lists, custom reports, and custom forms are lost during the recovery. It may be completed at any one of the Acquisition systems.

### NOTE

If prompted for an administrator password enter **domain mlcladmuser**. If **mlcladmuser** does not work, login as **Tempuser**.

### Backup Custom Lists

1. Double-click the *GE Medical Systems* icon to start the Mac-Lab/CardioLab application.
2. In the *Navigator* window, select *Utilities > Export Lists*.
3. Click *Next* in the *Data Export* wizard window.
4. Select the *G:* drive and click *New Folder*.
5. Enter *List\_Backup* for the folder name and click *OK*.
6. Click *OK* at the *Data Export* wizard window.
7. Click *OK* when the Success message is displayed.

### Backup Custom Reports

1. In the *Navigator* window, select *Utilities > Export Report Formats*.
2. Click *OK* in the *Data Export* wizard window.
3. Select the *G:* drive and click the *New Folder*.
4. Enter *Reports\_Backup* for the folder name and click *OK*.

5. Click *OK* at the *Data Export* wizard window.
6. Click *OK* when the Success message is displayed.

### Backup Custom Forms

1. In the *Navigator* window, select *Utilities > Export Custom Form Layouts*.
2. Click *Next* in the *Data Export* wizard window.
3. Select the *G:* drive and click *New Folder*.
4. Enter *Forms\_Backup* for the folder name and click *OK*.
5. Click *OK* at the *Data Export* wizard window.
6. Click *OK* when the Success message is displayed.
7. Press **Ctrl + Action + Delete**.
8. Click *Logoff*.
9. Click *Logoff*.
10. Let the system autologon as **mlcllogonuser**.

## Replace the Server Hard Drive

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#### WARNING

LOCK OUT/TAG OUT — Use appropriate Lock Out/Tag Out procedures before performing any service on potentially energized equipment.

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#### WARNING

EQUIPMENT DAMAGE — Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before opening any equipment.

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Ensure the new hard drive is exactly the same as the old one (type, size, etc.). Consult GE Technical support with any drive replacement questions.

## Reimage G3/G4/G5 Server

The following media is needed to reimage the G3/G4/G5 server:

- **MLAB/CLAB G3 SERVER IMAGE CD** (p/n: 2027422-007/-008/-009)
- **MLAB/CLAB G4 SERVER IMAGE DVD** (p/n: 2027420-003)
- **MLAB/CLAB G5 SERVER IMAGE DVD** (p/n: 2037990-001)

### Load G3 Server Image

Use these steps to reimage a G3 server. If reimaging a G4 server, use “[Load G4 Server Image](#)” on page 5-84. If reimaging a G5 server, use “[Load G5 Server Image](#)” on page 5-85.

1. Restart or power on the server, as necessary.
2. Insert the first **MLAB/CLAB G3 SERVER IMAGE CD** (p/n 2027422-007) during the restart or power on. The *Ghost 7.5 Boot CD* prompt is displayed.
3. Select *Erase System Data...* and press **Enter** to begin reimaging. When required, a prompt for the second CD is displayed.
4. Insert the second **MLAB/CLAB G3 SERVER IMAGE CD** (p/n 2027422-008) and press *Ok*.
5. When prompted, remove the second Image CD and insert the third **MLAB/CLAB G3 SERVER IMAGE CD** (p/n 2027422-009).

#### NOTE

The imaging process is complete when the INW server automatically restarts and the *Welcome to Windows Setup Wizard* screen is displayed.

6. Remove the third **G3 Image CD** from the drive.
7. Click *Next*, the *License Agreement* screen is displayed.
8. Accept the agreement and click *Next*.
9. When prompted, enter the Windows 2003 License key (the key is printed on a sticker on the side of the server) and click *Next*.
10. At the *License* screen click *Next*. The system will perform the final installation steps and restart.

The auto-logon screen is displayed.

11. Log on as **Administrator**.

## Load G4 Server Image

If reimaging a G3 server, skip these steps and go to “[Repartition the Hard Drive](#)” on page 5-85. If reimaging a G5 server, skip these steps and proceed to “[Load G5 Server Image](#)” on page 5-85.

1. Restart or power on the server, as necessary.
2. Insert the **G4 Server Image DVD** (p/n 2027420-003) during the restart or power on. The *Ghost 8.0 Boot CD 2.0* prompt is displayed.
3. Select *Erase System Data...* and press **Enter** to begin reimaging.

A command prompt is displayed when reimaging is complete.

4. Remove the **G4 Image DVD** from the drive.
5. Manually restart the computer.
6. Click *Next*, the *License Agreement* screen is displayed.
7. Accept the agreement and click *Next*.
8. When prompted, enter the Windows 2003 License key (the key is printed on a sticker on the side of the server) and click *Next*.
9. At the *Licensing Modes* screen click *Next*. The system will perform the final installation steps and restart.

The auto-logon screen is displayed.

10. Log on as **Administrator** if necessary



## Load G5 Server Image

If reimaging a G3/G4 server, skip these steps and go to “[Repartition the Hard Drive](#)” on page 5-85.

1. Restart or power on the server, as necessary.
2. Insert the **G5 Server Image DVD** (p/n 2037990-001) during the restart or power on. The *Ghost 8.0 Boot CD 2.0* prompt is displayed.
3. Select *Erase System Data...* and press **Enter** to begin reimaging.

A command prompt is displayed when reimaging is complete.

4. Remove the **G5 Image DVD** from the drive.
5. Manually restart the computer.
6. Click *Next*, the *License Agreement* screen is displayed.
7. Accept the agreement and click *Next*.
8. When prompted, enter the Windows 2003 License key (the key is printed on a sticker on the side of the server) and click *Next*.
9. At the *Date and Time* screen click *Next*. The system will perform the final installation steps and restart.

The auto-logon screen is displayed.

10. Log on as **Administrator** if necessary

## Repartition the Hard Drive

This procedure is only performed after reimaging a G3 server with a hard drive capacity of more than 500 GB. If reimaging a G4/G5 server or the server hard drive capacity is less than 500 GB, skip this procedure and proceed to “[Activate Microsoft Windows](#)” on page 5-92.

### NOTE

To find the approximate hard drive capacity of the server, open the server and add together the drive sizes listed on each drive label. Then subtract one drive.

For example, the capacity of a G3 server with six 146 GB drives

$$6 \times 146 \text{ GB} = 876 \text{ GB}$$

$$876 \text{ GB} - 146 \text{ GB} = 730 \text{ GB (approximate capacity)}$$

1. Log on as **Administrator** (contact GE Technical Support or the system administrator for password information).
2. Insert **Mega Server Partition Upgr. Tool 6.0 CD** (p/n 2024535-001) into the drive.
3. Double-click *My Computer* icon and select *Explore*.
4. Navigate to the CD and double-click *preupgrade.bat*.

A command window opens with a prompt to press any key to continue.

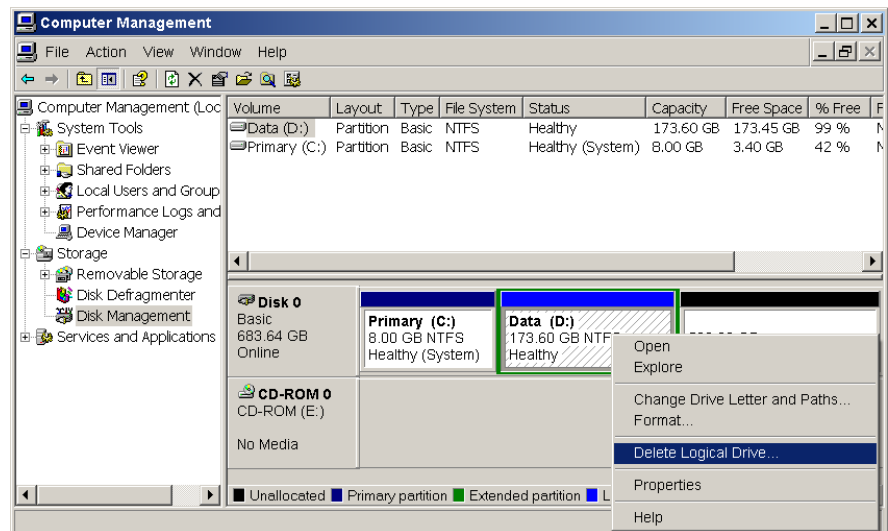
5. Press **Enter**.

The pre-upgrade scripts run. When complete, a prompt to press any key is displayed.

6. Press **Enter**.

The command prompt window closes.

7. Select *Start > Programs > Administrative Tools > Computer Management*
8. Select *Disk Management* in the left column
9. Right click on the *D:* drive and select *Delete Logical Drive...*(See Figure below).



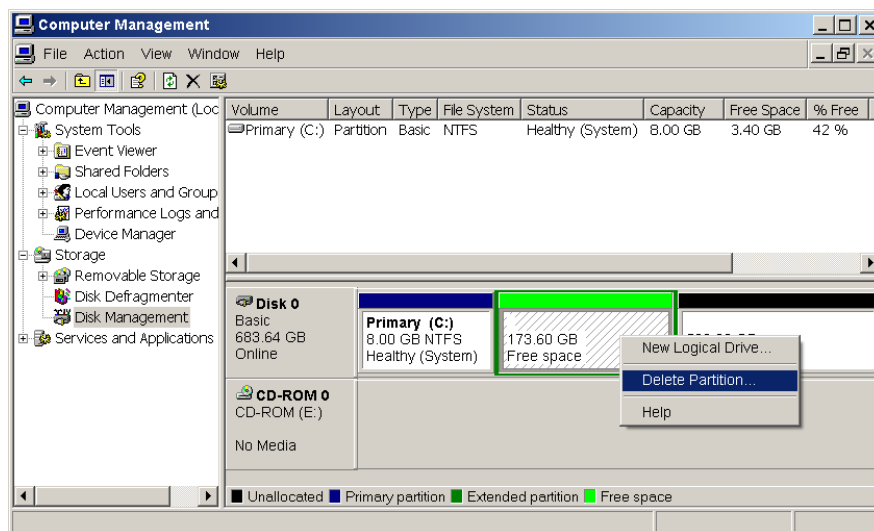
001

10. Click *Yes* to the *All data will be lost. Do you want to continue?* message.

11. Click *Yes*.

The partition name changes from *Data (D:)* to *Free Space*.

12. Right click on the *Free Space* partition and select *Delete Partition* (See Figure below).

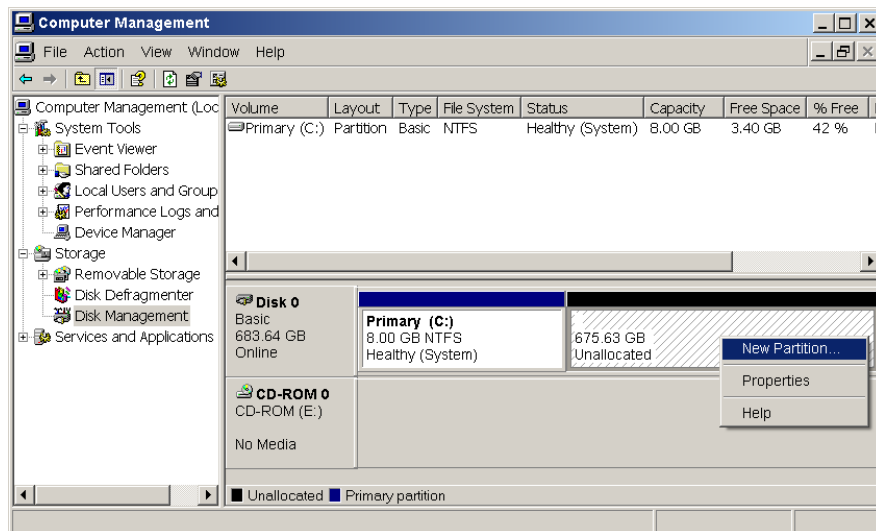


002

A *Delete free space* confirmation message is displayed.

13. Click *Yes*.

14. Right-click on the *Unallocated* space and select *New Partition...*(see Figure 003).

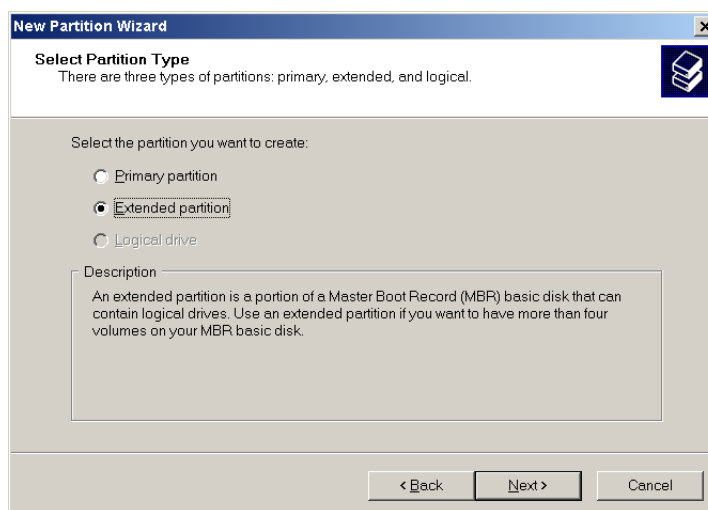


003

The *New Partition* Wizard is displayed.

15. Click *Next*.

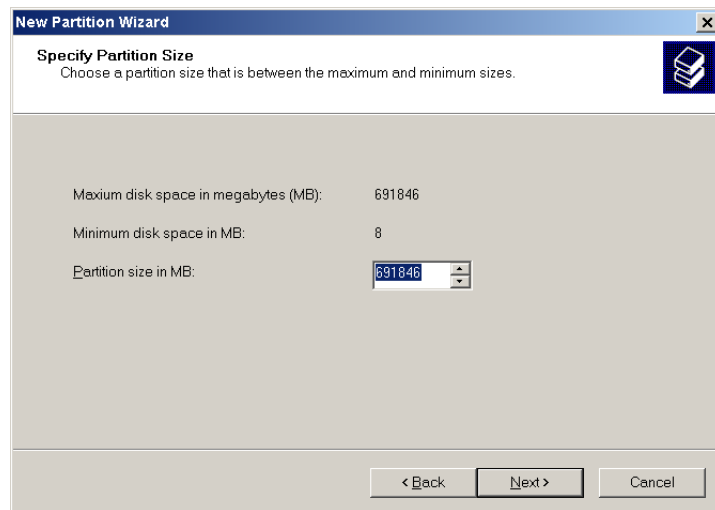
The *Partition Type* window is displayed.



004

16. Select *Extended Partition* and click *Next* (see Figure 004).

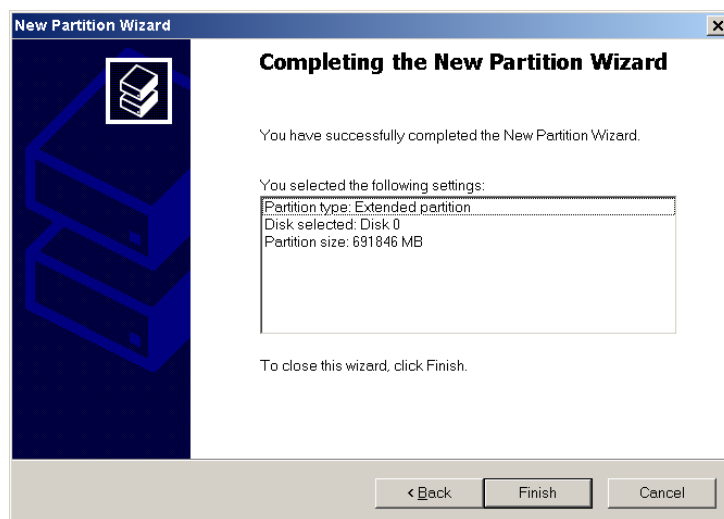
The *Specify Partition Size* window is displayed.



005

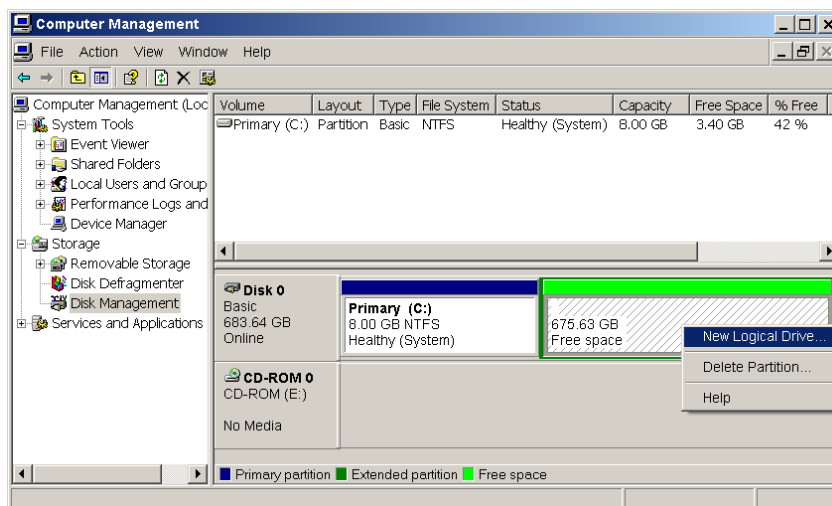
17. Ensure that the *Partition size in MB:* is set to the maximum. See Figure 005 (for example, 691846MB) and click *Next*.

The *Completing the New Partition Wizard* is displayed



006

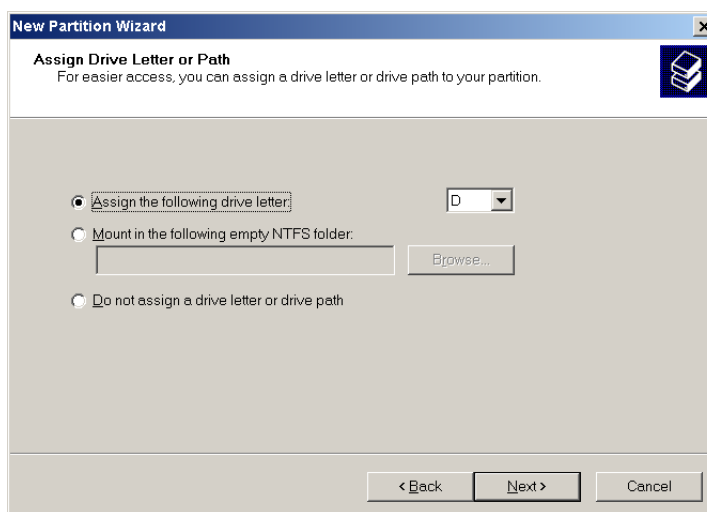
18. Verify that all the information on the *Completing the New Partition Wizard* matches the screen above (Figure 006) and click *Finish*.
19. Right click on *Free Space* and select *New Logical Drive...*(see Figure 007).



007

20. Click *Next* on the *New Partition Wizard* screen
21. Select *Logical drive*. This should be the only option.
22. On the Specify Partition Size screen, ensure that the *Partition size in MB*: is set to the maximum. (In the example shown, 691846MB) and click *Next*.

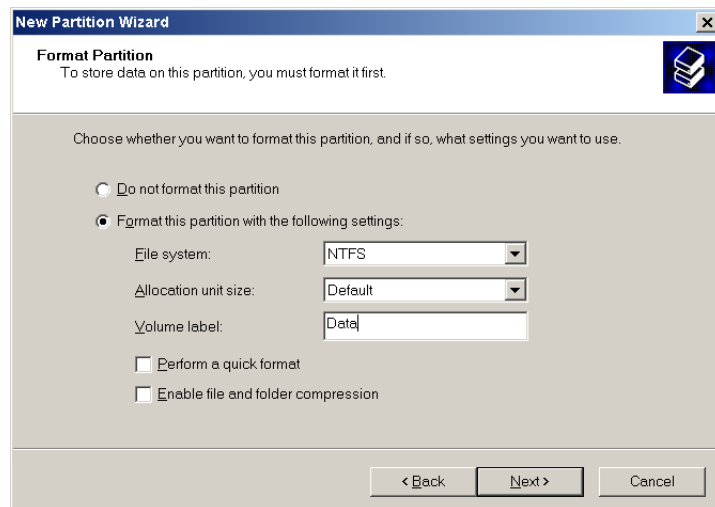
The *Assign Drive Letter or Path* screen is displayed.



008

23. Verify *D* is selected for *Assign the following drive letter*: (see Figure 008) and click *Next*.

The *Format Partition* screen is displayed.



24. Change the *Volume Label* to *Data* and use the defaults for the rest of the fields (see Figure 009) and click *Next*.

The *Completing the new partition* screen is displayed.

25. Click *Finish*.

The partitioning/formatting takes several minutes. Wait until the partition label changes to *Healthy*.

26. Close the *Computer Management* window.

27. Right-click *My Computer* icon and select *Explore*.

28. Navigate to the CD and double-click *postupgrade.bat*.

A command window opens with a prompt to press any key to continue.

29. Press **Enter**.

The post-upgrade scripts run. When complete, a prompt to press any key is displayed.

30. Press **Enter**.

The command prompt window closes.

009

31. Remove the CD from the drive.

### **Activate Microsoft Windows**

1. Log on to Windows as **Administrator** (contact GE Technical Support or the system administrator for current password information).
2. Select *Start > Activate Windows*.
3. At the *Let's Activate Windows* screen, select the *Yes, I want to telephone a customer service representative to activate Windows* radio button and click *Next*.
4. From the dropdown box, select the appropriate location.
5. Call the number listed on the screen.
6. Follow the prompts over the phone and when asked give the Installation ID listed on the screen.
7. Record the Confirmation ID given by the Microsoft Customer Service Agent:  

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8. Type in the Confirmation ID (boxes *A* through *G*) and click *Next*.
9. At the *Thank You* window, click *Finish*.



## G3/G4/G5 Server Setup and Data Restore

### Verify time zone

Verify the time zone on the server is set correctly.

1. Double-click on the time in the system tray.
2. Select the *Time Zone* tab.
3. Verify the time zone is correct for the location of the server.
4. Make sure *Automatically sync time with Internet time* is unchecked.
5. Set the correct time on the server.

### Configure NIC Connections

These steps apply only to G5 servers. Skip these steps if you have a G3 or G4 server.

1. Verify you are logged on to the server as local **administrator** (password: **MLCL8273!admin**).
2. Select *Start > Settings > Network Connections*.
3. Verify that *Local Area Connection* is enabled.
4. Right-click *Local Area Connection 2* and select *Disable*.

### Rename Server

The server is automatically named during the imaging procedure. The name must be changed back to the old name. Use the server name recorded earlier.

#### Rename the server to the old name

1. Right-click *My Computer* icon and select *Explore*.
2. Navigate to *C:\Windows\Special*.
3. Double-click *manualRename.wsf*.
4. Enter the old server name and click *OK*.

#### NOTE

The old server name was recorded in the section “Record the server and domain names” on page 5-76.

5. The system will reboot when the script completes.

## Configure Static IP

1. At the server, Select *Start > Settings > Network Connections*.
2. Right-click *Local Area Connection* and select *Properties*.
3. Highlight *Internet Protocol (TCP/IP)*, and click *Properties*.
4. Select the *Use the following IP Address* radio button.
5. Enter the IP Address, subnet mask, default gateway, and preferred DNS server as recorded in “Record the server IP information” on page 5-76.

### NOTE

The IP addresses for the primary DNS server should be set to be the same as the Centricity Cardiology INW server’s IP address. The secondary DNS server should be set to the Hospital DNS server if applicable.

6. Click *Advanced*.
7. Select the *DNS* tab.
8. Add any additional DNS servers previously recorded.
9. Select the *WINS* tab.
10. Add any WINS servers previously recorded.
11. Click *OK*.
12. Close the *Properties* windows.
13. Select *Start > Programs > Accessories > Command Prompt*.
14. Verify that you can ping (by IP address) all of the following:
  - a. Hospital Domain Controller (required if using a trust).
  - b. Hospital DNS Server (required if using DNS forwarding).

### NOTE

To do this type **ping <IP Address>** in the *Command Prompt* window and press **Enter**.

## Verify NIC Connection Speed

1. Right-click on *Local Area Connections* and select *Status*.

2. Verify that the connection speed is at least *100Mbps*.

## NOTE

If it is not set to at least *100Mbps*, then there is an issue at the network switch auto-negotiating the proper speed settings. Verify with the hospital IT department that the switch is configured correctly for *Auto Negotiate*.

3. Click *OK*.
4. Close the *Network Connections* window.

## NOTE

Perform the next procedures only if you are restoring data to the server. If you are going to perform a new install refer to the *Mac-Lab/CardioLab/Centricity Cardiology INW* system installation manual for setup instructions.

## Version Update Installation for G3/G4 Servers only

## NOTE

For G5 servers, skip this section and proceed to “[Promote Server to Domain Controller](#)” on page 5-99.

### Install the Mac-Lab/CardioLab 6.5.3 Updates

1. Insert the **Mac-Lab/CardioLab v6.5.3 Update CD** (p/n 2034817-001) into the CD or DVD drive.
2. Right-click *My Computer* and select *Explore*.
3. Navigate to the *Mac-Lab/CardioLab v6.5.3 Update CD*.
4. Double-click the *GEMS\_Update.bat* file.
5. Press **Enter** at the command window to install the updates.

The installer checks the system for previous installations and installation requirements. A confirmation message indicates whether each update is installed, not needed, or already installed.

## NOTE

Detailed installation information is saved in  
*D:\GEMMS\Prucka\Setup\GEMS\_Update.log* and  
*D:\GEMMS\Prucka\Setup\History*.

6. Press **Enter** to close the command window.
7. Close all open windows.

8. Remove the **Mac-Lab/CardioLab v6.5.3 Update CD** (p/n 2034817-001) from the CD or DVD drive.
9. Restart the INW server.
10. Login to the server as **Administrator** (password: **MLCL8273!admin**).
11. Verify the software has been loaded. For INW servers, verify the line *GEMS\_SUCCESS\_6\_5\_3\_1740 - Installed all required updates.* appears in the file *D:\GEMMS\Prucka\Setup\GEMS\_Update.log*

### Install 6.5.4 OS Updates

This section includes Operating System updates, .NET Framework 2.0 installation, and SQL Server 2000 SP4 installation

1. Logon to Windows as **Administrator**.
2. Insert the **MLAB/CLAB OS UPDATE V6.5.4 CD** (p/n2037996-001) into the CD drive.
3. Right-click *My Computer* and select *Explore*.
4. Navigate to the *OS Update V6.5.4 CD*.
5. Double-click the *InstallWindowsUpdates.wsf* file.
6. Click *Yes* at the prompt *System will now install Windows OS updates. Click 'Yes' to install, 'No' to quit.*
7. After the OS update and .NET Framework 2.0 installation is complete the script will prompt *"Windows OS Update completed successfully. The setup needs to reboot to install SQL Server 2000 SP4.Click 'OK' to reboot now.."* Select *OK* to reboot. Do not remove the CD.
8. After the reboot log on to Windows as **Administrator**.
9. Click *Yes* at the prompt *"System will now install Windows OS updates. Click 'Yes' to install, 'No' to quit.."*
10. After the installation is complete the script will prompt *"Windows OS Update completed successfully. System needs to be rebooted. Would you like to reboot now?Click 'Yes' to reboot now, 'No' to reboot manually later."* Select *Yes* to reboot.
11. Remove the **MLAB/CLAB OS UPDATE V6.5.4 CD**.

## Install The 6.5.4 Update on an INW Server

Please note the following:

- On the INW Server you must be logged in as local **Administrator** to perform this upgrade.
- The server must be have the OS Updates v6.5.4 installed to perform the upgrade.
- All other applications must be closed before installing the upgrade.

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**CAUTION**

LOSS OF DATA — If the installer indicates an error, attempt to fix the problem and click *Retry*.

Clicking *Cancel* may create data loss and require system re-image.

---

1. Insert the **MAC-LAB/CARDIOLAB V6.5.4 UPDATE CD** (p/n 2036182-001) into the CD drive.
2. Right-click *My Computer* and select *Explore*.
3. Navigate to the *Mac-Lab/CardioLab v6.5.4 Application CD*.
4. Double-click the *setup.exe* file.

**NOTE**

All other applications must be closed before installing the upgrade.

5. Click *OK* at the *Setup* window.
6. A *Setup Is Working Screen* is displayed. When prompted to reboot, click *Yes*.
7. Log on as **Administrator**.
8. At the *Setup* window, click *OK* to continue the setup.
9. Repeat step 6 through step 8 until you arrive at the *Welcome* window.
10. Click *Next* at the *Welcome* window.
11. Verify the correct system type is listed at the *Setup Type* window. (INW Server should be displayed for Servers). If it is not, contact GE Technical support.
12. Click *Next* in the *Setup Type* window.
13. Enter the SQL server **sa** password: **gemssqladmin** and click *Next*.

14. Click *Install* at the *Ready To Install* window.
15. The install may take several minutes. The *Installshield Wizard Completed* window is displayed when the installation is complete.
16. Click *Finish*.
17. When prompted to reboot, click *Yes*.
18. Remove the CD from the CD drive.

## Install Microsoft Operating System Updates

Instructions for downloading and installing Microsoft security patches and service packs are listed by product type on Support Central. Download and install all applicable patches and service packs.

## Specify AIT Drive

Perform this procedure only for a G3 server with hard drives of 72 or 146 GB (check the label on the drive). If the server is a G4/G5 or has larger hard drives, skip these steps and proceed to [“Promote Server to Domain Controller”](#) on page 5-99.

1. Right-click *My Computer* icon and select *Manage*.
2. Select *Device Manager* under *System Tools*.
3. Under *Other Devices*, right-click on *Sony 5-500V...* device and select *Properties*.
4. Select the *Driver* tab.
5. Click *Update Driver*.
6. The *Hardware Update Wizard* starts.
7. Select the *Install from a list or specific location* radio button and click *Next*.
8. Select the *Don't search* radio button and click *Next*.
9. Select the *Tape drives* and click *Next*.
10. Select the *Sony* and click *Next*.
11. Click *Yes* to the *Update driver* warning message.
12. Click *Finish*.

13. Close all open windows.

## Promote Server to Domain Controller

1. Insert the **I386 for MS Srv 2003 SP2 CD** (p/n 2037992-001) into the CD drive.
2. If the content of the CD in *E:\* drive is displayed, close the window.
3. Select *Start > Programs > Accessories > Command Prompt*
4. Type *dcpromo* and press **Enter**.
5. At the *Welcome To Active Directory Installation Wizard* window, click *Next*.
6. At the *Operating System Compatibility* window, click *Next*.
7. At the *Domain Controller Type* window, select the *Domain controller for a new domain* radio button and click *Next*.
8. At the *Create New Domain* window, select the *Domain in a new forest* radio button and click *Next*.
9. Enter the domain as recorded in “**Record Server Information**” on page 5-76 and click *Next* at the *New Domain Name* window is displayed.
10. At the *NetBIOS Domain name* window, click *Next*
11. At the *Database and Log folders* window, click *Next*.
12. At the *Shared System Volume* window, click *Next*.
13. At the *DNS Registration Diagnostics* window, select *Install and configure the DNS server on this computer, and set this computer to use this DNS server as the preferred DNS server* and click *Next*.
14. At the *Permissions* window, click *Next*.
15. At the *Directory Services Restore Mode Administrator Password* window, click *Next*.
16. At the *Summary* window, click *Next*.

The *Active Directory Installation Wizard* is displayed while the installation runs for several minutes.

NOTE

If prompted for the *I386* folder, browse to the *I386* folder on the CD. It may appear to be selected, but you must select the CD drive, then select the *I386* folder, and then click *OK*. (This prompt may occur more than once.)

17. At the *Completing the Active Directory Installation Wizard* window, click *Finish*.
18. At the *Active Directory Installation Wizard* window, click *Restart now*.
19. Remove the **I386 for MS Srv 2003 SP2 CD** (p/n 2037992-001) from the CD drive.

## Update Policies

1. Log on to the server as **Administrator**.
2. Right-click *My Computer* icon on the Desktop and select *Explore*.
3. Browse to the *C:\Windows\special* folder.
4. Double-click on the *ADConfig.wsf* script to create the Active Directory users, groups and policies.
5. At the *AD Creation Script* window, click *OK* to run the script.

NOTE

The script will take about a minute to run. A progress bar will NOT be shown...wait for the success message before continuing.

6. At the message, *The script completed successfully*, click *OK*.  
This message may appear behind the *Windows Explorer* window.
7. Close the *Windows Explorer* window.
8. Select *Start > Settings > Control Panel*.
9. Double-click the *Administrative Tools* icon.
10. Double-click *Active Directory Users and Computers*
11. Verify that the new *inw.local* Domain is listed
12. Expand the *inw.local* Domain and verify the *GE Medical Systems (MLCL)* organizational unit is listed.
13. Browse to *inw.local > GE Medical Systems (MLCL) > MLCL Users* and verify that the following MLCL users are present:



- MLCLAdmUser
  - MLCLEmergency
  - MLCLLogonUser
  - MLCLSqlUser
  - MLCLTechUser
  - MLCLUser
14. Browse to *inw.local > GE Medical Systems (MLCL) > MLCL Software Groups* and verify that the following MLCL groups are present.
    - MLCLAdmGrp
    - MLCLEmergencyGrp
    - MLCLSystemGrp
    - MLCLUsrGrp
  15. Close all open windows.
  16. Restart the system to allow policies to take effect.
  17. Log on as **Administrator**.

## Confirm Time Service

1. Open a command prompt by selecting *Start > Programs > Accessories > Command Prompt*.
2. Type **net stop w32time** and press **Enter**.
3. Type **regedit** and press **Enter**.
4. Navigate to  
*HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NTPServer*.
5. Double-click on *ENABLED*.
6. Change the value to *1*, if necessary.
7. Navigate to  
*HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\Parameters*.
8. Double-click on *TYPE*.
9. Change the value to *NT5DS*, if necessary.
10. Close the Registry Editor.
11. At the command prompt, type **net start w32time** and press **Enter**.

12. Close the command prompt.

## Switch Language

Perform this procedure to switch the operating system language if necessary.

All of the following steps to set the Operating System and ML/CL language and locale must not be done until the server has been promoted to an Active Directory Domain Controller and the ADConfig tool has been run to configure security and policy settings on the system. Only when this is complete should you follow the steps listed here.

### Delete User Profiles

1. Log on to the server as **mlcltechuser**.
2. Select *Start > Settings > Control Panel*.
3. Select *Switch to Classic View*, if not in *Classic* view.
4. Double-click the *System* icon.
5. Click the *Advanced* tab.
6. In the *User Profiles* section, click *Settings*.
7. Select each profile in the list, and click the *Delete* button if it is enabled to delete the profile.

#### NOTE

The **mlcltechuser** profile cannot be deleted.

8. Click *OK* to close the *User Profiles* dialog.
9. Click *OK* to close the *System Properties* dialog.

## Set operating system language

### NOTE

The following language settings must be applied for the application to function properly:

- English: United States/United Kingdom
- French: France
- German: Germany
- Italian: Italy
- Spanish: Spain
- Swedish: Sweden
- Chinese: China (PRC)
- Japanese: Japan

1. Double-click the *Regional and Language Options* icon.
2. Select the *Regional Options* tab.
3. In the *Standards and formats* section, select the correct language and locale (e.g., *French (France)*) from the dropdown list.
4. In the *Location* section, select the correct locale (e.g., *France*).
5. Select the *Languages* tab.
6. Click *Details* button.
7. For Chinese systems only:

If the use of the IME is required, the following steps must be taken to set it up in a manner which is compatible with the operation of the ML/CL software:

- a. Click the *Add* button.
- b. Change the Input Language to *Chinese (PRC)*.
- c. Click the *Keyboard Layout/IME* checkbox.
- d. Select *Chinese (Simplified) - Enhanced Unicode IME* from the drop down box.
- e. Click *OK*.
- f. Click the *Add* button.
- g. Click the *Keyboard Layout/IME* checkbox.

- h. Select *Chinese (Simplified) - US Keyboard* checkbox.
- i. Click *OK*.
- j. In the *Default input language* dropdown, select *Chinese (PRC) - Chinese (Simplified) - US Keyboard*.

If the use of the IME is not required, select the desired keyboard layout as appropriate.

- 8. For all other languages:

In the *Default input language* section, determine if the desired language and locale is listed. If it is not:

- a. Click the *Add* button.
  - b. In the *Input language* list, select the appropriate language and locale. If necessary, configure other settings (e.g., *Keyboard layout / IME*) as appropriate.
  - c. Click *OK* to close this dialog.
- 9. In the *Default input language* section, select the language and locale.
  - 10. Press *OK* to close this dialog.
  - 11. In the *Languages used in menus and dialogs* section, select the correct language (e.g., *Francais*).
  - 12. Select the *Advanced* tab.
  - 13. In the *Language for non-Unicode programs* section, select the correct language (e.g., *French (France)*).
  - 14. In the *Default user account settings* section, check the *Apply all settings...* checkbox.
  - 15. If prompted after doing this, click *OK*.
  - 16. Click *OK* to close the *Regional and Language Options* window.
  - 17. If the prompt that *the changes will not take effect until you reboot*, click *OK*.
  - 18. If prompted about copying required files; click *Yes* to use the files that are already on the system.
  - 19. When prompted to restart, click *Yes*.

### **Set Mac-Lab/CardioLab database language.**

1. Log on to the server as **mlcltechuser**.
2. Right-click *My Computer* icon and select *Explore*.
3. Browse to the *D:\GEMMS\Prucka\Setup\Language* directory.
4. Double-click on the batch file *MLCL\_Set\_Language.bat* to start the process of setting the Mac-Lab/CardioLab application language.
5. Verify that the language listed is correct (e.g, *French*). If so, press any key to begin the process of setting the application language.

NOTE

The process takes several minutes to complete.

6. At the *Language Switch Completed Successfully* message, click *OK*.
7. Log on as **Administrator**. Both the Operating System language and the Mac-Lab/CardioLab application language should now be set correctly.

## InSite 2.0 Setup

Verify with the customer that InSite 2.0 is to be used as the Remote Support Service. If no remote service support is needed, proceed to the next section.

1. From the Desktop, double-click on the *Service Console* icon.
2. At the *Service Console* screen, in the left pane, expand the *InSite 2.0* folder and select the *Device Manager* folder.
3. In the *Device Information* screen, enter the serial number of the INW server and click *Update Serial Number*.
4. Verify the correct information is present in the *Serial Number*, *Name*, and *Type* fields.
5. From the left pane under *InSite 2.0* select the *Configuration Utility* folder.
6. If the hospital uses a proxy server perform the next steps, otherwise skip to step 11.
7. Click on the *Proxy Configuration* tab. Check *Use a Proxy Server to connect to the Enterprise* and enter the appropriate proxy server information.

### NOTE

Contact the Hospital IT Department for the appropriate information regarding the proxy address, proxy port, and authentication information if required by the proxy server.

8. After entering the proxy server information, click *Update Proxy*.
9. At the *InSite 2.0 Message* screen, click *OK*.
10. While in the *Configuration Utility*, select the *Service Controller* tab and click *Stop Service* and wait for the service to stop.
11. In the *Service Controller* tab, click *Start Service*.
12. Close the *Service Console*.

## Add CALS to Server (if needed)

1. Right-click *My Computer* icon and select *Manage*.
2. Expand *Services and Applications* and select *Services*.
3. Double-click *License Logging* service on the right to view properties.

4. Set the *Startup Type* to *Automatic*.
5. Click *OK*.
6. Double-click *License Logging* service on the right to view properties.
7. Click *Start*.
8. Click *OK* to close the License Logging Properties window.
9. Select *Start > Settings > Control Panel*.
10. Double-click the *Licensing* icon.

The *Licensing* window is displayed.

11. Set *Product* to *Windows Server*.
12. The default number of *concurrent connections per server* is 5.  
This number indicates the number of current licenses for this server.
13. Click *Add Licenses* to add licenses.
14. Enter the number of licenses needed in addition to the 5 already listed and click *OK*.  
A *Per Server Licensing* window is displayed.
15. Select the *I agree* radio button and click *OK*.
16. Close all open windows.

## Add SQL Licenses (if needed)

1. Select *Start > Settings > Control Panel*
2. Double-click the *SQL Server 2000 Licensing Setup* icon.
3. Choose *Licensing Mode*.
4. In the *Licensing Mode* section increase *Per Seat for* number (default is 5) to the total number of licenses needed.
5. Click *Continue*.
6. Once finished, close all open windows.

## Restore Data to the Server

A backup may be restored locally from AIT or from an enterprise backup agent.

The high-level steps for restoring from the backup tapes are:

- Step 1: Restore the last full backup first.
- Step 2: Then restore the oldest incremental backup made after the full backup.
- Step 3: Finally, restore each succeeding incremental backup up to the previous night.
- Step 4: Verify the restore is successful. If it is not, restore the full backup from the previous week.

### **Restore tape backup from INW server**

1. For a single-tape backup, insert the Full Backup tape. If your system requires a multiple-tape backup, insert the first tape.
2. Open the *Backup Utility* from the *Start > Programs > Accessories > System Tools*. This opens the *Backup and Restore* wizard. After a few minutes while at the Backup and Restore wizard, the *Recognizable Media Found* screen is displayed.
3. Select *Allow Backup Utility to use all recognized media* and click OK.
4. Click the *Next* button in the *Backup and Restore* wizard to start the restore process.
5. Select *Restore files and settings* and click *Next*.
6. Expand the 8mm AIT (for AIT-2 TURBO tapes) or 8mm AIT1 (for all other AIT tapes) to list the tape names under items to restore.
7. Double-click on the tape name to catalog the tape.
8. Double-click on *D: Data* to catalog the *GEMMS* directory.
9. Select the following folders to restore:
  - *D:\GEMMS\Prucka\Database\Maintenance\Backup*
  - *D:\GEMMS\Prucka\Database\Maintenance\Log*
  - *D:\GEMMS\Prucka\Studies*and click *Next*.
10. Click *Advanced*.
11. Select *Original location* and click *Next*.
12. Select *Replace existing files* and click *Next*.
13. Ensure the following are selected:
  - Restore security settings



- Restore junction points, but not the folders and file data they reference
- *Preserve existing volume mount points*  
and click *Next, Finish*. The restore begins and the *Restore Progress* screen is displayed.  
If the backup spans multiple tapes, insert each tape as requested.

**NOTE**

Ignore the Mount Waiting message--just insert the next tape.  
The window closes automatically.

14. Click *close* when the restore is complete.
15. Eject the tape.
16. Repeat steps 1-14 for each incremental backup tape to restore the data on the incremental backup tapes. Start with the oldest incremental backup tape that was done after the full backup that has just been restored. Then restore each succeeding incremental backup tape up to the previous night.

## Restore Enterprise backup agents

All procedures regarding enterprise backup are the responsibility of the facility Enterprise Backup Manager.

1. Ensure the Enterprise backup folders are restored from previous full, differential, or incremental backups to ensure all data has been recovered to the server.
2. These folders are:
  - D:\GEMMS\Prucka\Database\Maintenance\Backup
  - D:\GEMMS\Prucka\Database\Maintenance\Log
  - D:\GEMMS\Prucka\Studies

## Restore Backed-up Files

Once all previously backed-up files are restored to the server, the database and registry must be restored for the INW server to become fully functional.

### Restore the Database Files

1. Right-click *My Computer* icon and select *Explore*.
2. Go to the *D:\gemms\prucka\netconfig* folder.
3. Run the *gems\_restoreclab.bat*. A command prompt screen is displayed.
4. Press **Enter** to continue.

When the restore is complete a confirmation message is displayed

5. Press **Enter** to continue and close the window.
6. Go to *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
7. Go to *Microsoft SQL Servers > SQL Server Group*
8. Expand *SQL Server Group*.
9. Expand the local server.
10. Expand *Databases > Clab* and highlight *Tables*.
11. Right-click on the *Detail Version* table and select:

*Open Table > Return All Rows*

12. Set the following fields:

*NetVersion* = **0**

*MachineDBVersion* = **00**

#### NOTE

*MachineDBVersion* must be “00” (two zeros) or the restore will fail.

13. Close all open windows.
14. Run the stop replication batch file on the server:

*D:\gemms\prucka\network\stoprepl.bat*

**NOTE**

This file must be run on the server to complete this procedure.  
Ignore any error messages displayed.

There will be no indication the batch file ran successfully.

**Restore the GEMs Registry Key**

1. Double-click on the *gems.reg* file located in:

*D:\gemms\prucka\database\maintenance\backup*

2. Follow on-screen prompts and confirmation messages.

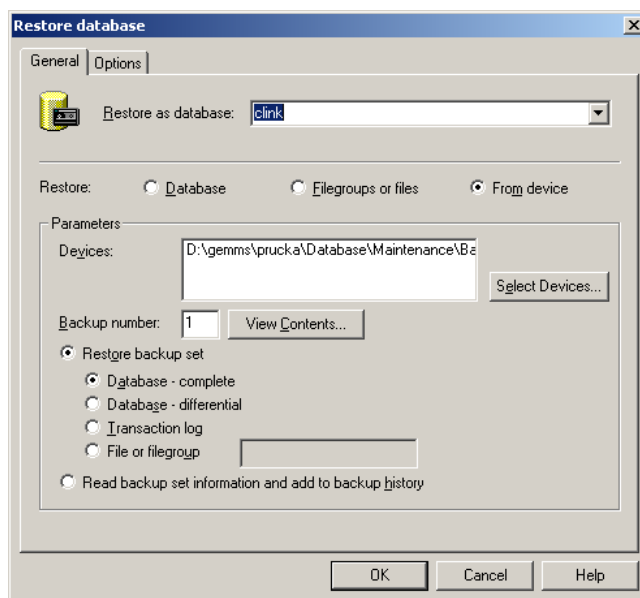
**Restore clink database**

If the file *clinkbackup.bak* exists in

D:\GEMMS\Prucka\Database\Maintenance\Backup, then perform this procedure. If it does not go to the next procedure: “**Restore LMT Custom Reports**” on page 5-113

1. Select *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
2. In *Enterprise Manager*, navigate to: *Microsoft SQL Servers > SQL Server Group > [Server Name] (local)*.
3. Right-click *Databases* and select *All Tasks > Restore Databases*.

The *Restore Databases* window is displayed.



4. Type *clink* in the *Restore as database* field.
5. Select the *Restore from device* radio button.
6. If necessary, select and delete any entries in the *Devices* field.
7. Click *Select Device*.
8. Click *Add*.
9. Browse to the *clinkbackup.bak* file under  
*D:\GEMMS\Prucka\Database\Maintenance\Backup*.

Before continuing, check the window selections with the screenshot above.

10. Click *OK*.
11. Click *OK*.

A status display indicates restore progress. A confirmation window is displayed when complete.

12. Click *OK*.
13. Right-click *Databases* and select *Refresh*.
14. Expand *Databases* and verify *clink* is shown.

## Restore LMT Custom Reports

Skip this procedure if the customer is not using LMT Custom reports. If the customer is using LMT Custom Reports, restore the customer backup of the *clink\_drk.mdb* file (or the file backed up earlier in “Backup LMT Custom Reports” on page 5-80) as indicated below.

1. Right-click *My Computer* icon and select *Explore*.
2. Navigate to *D:\Program Files\GEMS\LMT\Client\Resource Kit*.  
Create this directory if it does not exist.
3. Paste *clink\_drk.mdb* into the *Resource Kit* folder.

## Update Server Registry

This section has to be executed only if a G5 server is being recovered and GEMS registry key was not restored in “Restore Backed-up Files” on page 5-110.

1. Insert the **2039607-001 CD-R MLAB/CLAB G5 REGISTRY PATCH** in to the CD/DVD drive.
2. Open the Windows explorer and browse to the CD/DVD drive.
3. Double-click on *Server\_update.reg*.
4. Select *Yes* to the question.
5. Verify that the confirmation message *Information in <CD Drive>\Server\_update.reg has been successfully entered into the registry* is displayed.
6. Select *OK*.
7. Close Windows explorer and remove the CD.

## Set Software Options

This section has to be executed only if GEMS registry key was not restored in “Restore Backed-up Files” on page 5-110.

1. Right-click the *My Computer* icon and select *Explore*.
2. Navigate to *D:\GEMMS\Prucka\bin*.
3. Double-click on *GEMS\_SetServerOptions.exe*.

4. Enter the system HP Proliant Server Serial Number and click *Generate Options*.
5. At completed message, click *OK*.
6. Close the *GEMS\_SetServerOptions* program.
7. This utility installed and enabled the CVIS Integration software option. If the hospital is not using CVIS, Launch the *Service Console >GEMS Software Options Management Console* to disable CVIS Integration.
8. Close all open windows.

## Install the SQL Server Configuration Update (For G3/G4 Servers only)

1. Insert the **SQL Server Configuration Utility CD** (2030710-002) into the CD Drive.
2. Right-click on *My Computer* and select *Explore*.
3. Navigate to the CD Drive (E).
4. Double-click on the file *GEMS\_UpdateSQLReg.exe*.
5. A console window will be displayed for a few seconds.
6. Click *OK* to the message box indicating that the server must be restarted.
7. Navigate to *D:\Gemms\Prucka\Setup*.
8. Double-click *SQLBACKLOG.log* and verify that no errors occurred.
9. Remove the **SQL Server Configuration Utility CD** (2030710-002) from the CD Drive.
10. Restart the INW server so that the SQL update takes effect.

## Configure INW DNS Server with a forwarder to the Hospital DNS Server IP address (if applicable)

The trust must be removed from the hospital Domain controller before re-establishing the trust between the INW server and the hospital Domain controller. The trust must be set up on the INW server before re-establishing the trust on the Hospital Domain Controller (contact the hospital system administrator).

The DNS Server IP address is provided by the Hospital Administrator.

1. Log onto the INW server as **Administrator**.
2. Select *Start > Settings > Control Panel > Administrative Tools > DNS*.
3. Right-click on the *INW Domain Name Server* (i.e. *CLSV####*), and select *Properties*.
4. In the *Properties* window, select the *Forwarders* tab.
5. Enter the IP address of the Hospital DNS Server in the forwarders *IP Address List* and click the *Add* button.
6. Click *OK*.
7. Close the *DNS Management* window
8. Close the *Administrative Tools* window.
9. Select *Start > Programs > Accessories > Command Prompt*.
10. Verify that from a command prompt you can ping the following by name:
  - a. Hospital Domain Controller (supplied by hospital).
  - b. Hospital DNS Server (supplied by hospital).

NOTE

To do this type **ping <name>** and press **Enter**.

## Create Two-Way Trust with Hospital Domain

Before setting up the trust, note the following:

- If setting up trust in a Windows NT 4.0 environment, the trust must be set from the INW server FIRST or the trust will not function properly.
  - The INW server must have the hospital server configured as a DNS forwarder as well as the hospital server must have the INW server configured as a DNS forwarder.
  - If configuring a trust to a Windows NT Domain, the INW server may need to be configured for the hospital WINS server if the hospital Domain name cannot be resolved.
1. Select *Start > Settings > Control Panel*.
  2. Double-click the *Administrative Tools* icon.
  3. Double-click *Active Directory Domains and Trusts*.
  4. Right-click on the Domain name (i.e. *inw.local*), and select *Properties*.
  5. In the *Domain Properties* window, select the *Trusts* tab.
  6. From the Open window, click the *New Trust* button to start the *New Trust Wizard*.
  7. At the *Welcome to the New Trust Wizard* window, click *Next*.
  8. In the *Trust Name* window, enter the NETBIOS name of the Hospital Domain Controller (if trusting to a Windows NT 4.0 server) or enter the DNS name of the Hospital Domain Controller (if trusting to a Windows 2000/2003 server) and click *Next*.
  9. In the *Direction of Trust* window, leave the default setting *Two-Way* selected and click *Next*.
  10. In the *Outgoing Trust Authentication* window, ensure *Domain Wide Authentication* is selected and click *Next*.
  11. At the *Trust Password* window, enter the password (contact GE Technical Support or the system administrator for current password information) and click *Next*.
  12. At the *Trust Selection Complete* window, click *Next*.
  13. At the *Trust Creation Complete* window, click *Next*.
  14. At the *Confirm Outgoing Trust* window, select *Yes* and click *Next*.
  15. At the *Confirm Incoming Trust* window, select *Yes* and click *Next*.



## NOTE

The hospital admin will need to provide the password for the site.  
This may not be needed for a trust to an NT Domain.

16. At the *Completing The New Trust Wizard* window, click *Finish* to complete.

## Create One-Way Trust with Hospital Domain

Before setting up the trust, note the following:

- If setting up trust in a Windows NT 4.0 environment, the trust must be set from the INW server FIRST or the trust will not function properly.
  - The INW server must have the hospital server configured as a DNS forwarder as well as the hospital server must have the INW server configured as a DNS forwarder.
  - If configuring a trust to a Windows NT Domain, the INW server may need to be configured for the hospital WINS server if the hospital Domain name cannot be resolved.
1. Select *Start > Settings > Control Panel*. Double-click the *Administrative Tools* icon.
  2. Double-click *Active Directory Domains and Trusts*.
  3. Right-click on the Domain name (i.e. *inw.local*), and select *Properties*.
  4. In the *Domain Properties* window, select the *Trusts* tab.
  5. From the Open window, click the *New Trust* button to start the *New Trust Wizard*.
  6. At the *Welcome to the New Trust Wizard* window, click *Next*.
  7. In the *Trust Name* window, enter the NETBIOS name of the Hospital Domain Controller (if trusting to a Windows NT 4.0 server) or enter the DNS name of the Hospital Domain Controller (if trusting to a Windows 2000/2003 server) and click *Next*.
  8. In the *Direction of Trust* window, select *One-Way (outgoing)* and click *Next*.
  9. If the *Sides of Trust* window appears, ensure that *This Domain Only* is selected and click *Next*.
  10. In the *Outgoing Trust Authentication Level* window, select *domain-wide authentication* and click *Next*.
  11. At the *Trust Password* window, enter the password and click *Next*.
  12. At the *Trust Selections Complete* window, click *Next*.
  13. At the *Trust Creation Complete* window, click *Next*.
  14. At the *Confirm Outgoing Trust* window, select *Yes* and click *Next*.

**NOTE**

The hospital admin will need to provide the password for the site.  
This may not be needed for a trust to an NT Domain.

15. At the *Completing The New Trust Wizard* window, click *Finish* to complete.

## Hospital IT Department Setup

Have the Domain Administrator from the Hospital Domain Complete the Domain Trust on the Hospital Domain using the same password that was used on the INW side.

## Modify Default\_MLCL Computer\_Policy

1. Select *Start > Settings > Control Panel*.
2. *Double-click Administrative Tools*.
3. *Double-click Active Directory Users and Computers*.
4. Right-click the INW Domain server and select *Properties*.
5. Select the *Group Policy* tab.
6. Click *Open*.
7. In the *GPMC Interface* window, expand the server Domain tree and locate the *Group Policy Objects* folder.
8. Expand all *Group Policy Objects*.
9. Right-click on the *Default\_MLCL Computer\_Policy* and select *Edit*.
10. In the *Group Policy Object Editor* window, navigate to *Computer Configuration > Windows Settings > Security Settings > Restricted Groups*.
11. Double-click on *MLCLAdmGrp*.
12. In the *MLCLAdmGrp Properties* window, under members of this group section, click *Add*.
13. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

### NOTE

For example: *HOSPITALDOMAIN\MLCLAdmGrp*

14. Click *OK* to the *MLCLAdmGrp Properties* window.
15. Double-click on *MLCLEmergencyGrp*.
16. In the *MLCLEmergencyGrp Properties* window, under members of this group section, click *Add*.
17. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

### NOTE

For example: *HOSPITALDOMAIN\MLCLEmergencyGrp*

18. Click *OK* to the *MLCLEmergencyGrp Properties* window.

19. Double-click on *MLCLUsrGrp*.
20. In the *MLCLUsrGrp Properties* window, under members of this group section, click *Add*.
21. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

NOTE

For example: *HOSPITALDOMAIN\MLCLUsrGrp*

22. Click *OK* to the *MLCLUsrGrp Properties* window.
23. Double-click *Users*.
24. In the *Users Properties* window, under members of this group section, click *Add*.
25. In the *Add Member* window, type in the name of the Hospital Administrators group previously entered (e.g., *HOSPITALDOMAIN\MLCLAdmGrp*) and click *OK*.
26. In the *Add Member* window, type in the name of the Hospital Emergency group previously entered (e.g., *HOSPITALDOMAIN\MLCLEmergencyGrp*) and click *OK*.
27. In the *Add Member* window, type in the name of the Hospital Users group previously entered (e.g., *HOSPITALDOMAIN\MLCLUsrGrp*) and click *OK*.
28. Click *OK* to the *Users Properties* window.
29. Close all open windows.
30. Select *Start > Programs > Accessories > Command Prompt*.
31. Type **gpupdate /force** and press **Enter**.
32. Close the *Command Prompt*.

## Modify Default\_MLCL SoftwareOnly\_Policy

1. Select *Start > Settings > Control Panel*.
2. *Double-click Administrative Tools*.
3. *Double-click Active Directory Users and Computers*.
4. Right-click the INW Domain server and select *Properties*.
5. Select the *Group Policy* tab.
6. Click *Open*.
7. In the *GPMC Interface* window, expand the server Domain tree and locate the *Group Policy Objects* folder.
8. Expand all *Group Policy Objects*.
9. Right-click on the *Default\_MLCL SoftwareOnly\_Policy* and select *Edit*.
10. In the *Group Policy Editor* window, navigate to *Computer Configuration > Windows Settings > Security Settings > Restricted Groups*.
11. Double-click on *MLCLAdmGrp*.
12. In the *MLCLAdmGrp Properties* window, under members of this group section, click *Add*.
13. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

### NOTE

For example: *HOSPITALDOMAIN\MLCLAdmGrp*

14. Click *OK* to the *MLCLAdmGrp Properties* window.
15. Double-click on *MLCLEmergencyGrp*.
16. In the *MLCLEmergencyGrp Properties* window, under members of this group section, click *Add*.
17. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

### NOTE

For example: *HOSPITALDOMAIN\MLCLEmergencyGrp*

18. Click *OK* to the *MLCLEmergencyGrp Properties* window.
19. Double-click on *MLCLUsrGrp*.
20. In the *MLCLUsrGrp Properties* window, under members of this group section, click *Add*.
21. In the *Add Member* window, type in the name of the Hospital Users Groups that was created for you in the Hospital Domain by the Hospital Administrator and click *OK*.

NOTE

For example: *HOSPITALDOMAIN\MLCLUsrGrp*

22. Click *OK* to the *MLCLUsrGrp Properties* window.
23. Double-click *Users*.
24. In the *Users Properties* window, under members of this group section, click *Add*.
25. In the *Add Member* window, type in the name of the Hospital Administrators group previously entered (e.g., *HOSPITALDOMAIN\MLCLAdmGrp*) and click *OK*.
26. In the *Add Member* window, type in the name of the Hospital Emergency group previously entered (e.g., *HOSPITALDOMAIN\MLCLEmergencyGrp*) and click *OK*.
27. In the *Add Member* window, type in the name of the Hospital Users group previously entered (e.g., *HOSPITALDOMAIN\MLCLUsrGrp*) and click *OK*.
28. Click *OK* to the *Users Properties* window.
29. Close all open windows.
30. Select *Start > Programs > Accessories > Command Prompt*.
31. Type **gpupdate /force** and press **Enter**.
32. Close the Command Prompt.

## Re-Configure Centricity Cardiology INW Network

### Remove each Acquisition system and Review workstation from the Domain

Each Acquisition system and Review workstation must be removed from the Domain, and then added back to the Domain.

#### Change the system from a Domain to Workgroup

1. At the Acquisition system or Review workstation, log on to Windows and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.
2. Right-click *My Computer* icon and select *Properties*.
3. Select the *Computer Name* tab.

#### NOTE

Do not change the computer name in the next step.

4. Click the *Change* button.

The *Computer Name Changes* window is displayed.

5. In the *Member of* section, select the *Workgroup* radio button, enter *MLCL* as the workgroup name and click *OK*.

Enter the log on as **mlcltechuser** when prompted.

6. Click *OK*.
7. Click *OK* at the confirmation message to restart the computer.
8. Click *OK*.

The member change takes about 1 minute. A *Welcome to the workgroup* window is displayed when complete.

9. Click *OK* at the *System Properties* window to close.
10. Click *Yes* to restart the system.

Windows will attempt to auto-logon, but the logon will fail.

11. Click *OK* to the message and log on to Windows and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.

#### Delete unrecognizable user names

1. Right-click *My Computer* icon and select *Manage*.
2. Expand *Local Users and Groups* and select *Groups*.



3. Open the first group and delete any member names that begin with??
4. Repeat for all other groups.
5. Close the *Computer Management* window.

## Reset SQLSERVERAGENT Service (Acquisition Systems Only)

1. Verify you are logged on as **mlcltechuser**.
2. Select *Start > Settings > Control Panel*.
3. Double-click *Administrative Tools*.
4. Double-click *Services*.
5. Right-click *SQLSERVERAGENT* and select *Properties*.
6. Select the *Log On* tab.
7. Select the *Local System Account* radio button and click *Apply*.
8. Select the *General* tab and click *Start* to start the *SQLSERVERAGENT* service.
9. Click *OK* to close the dialog.

## Configure DNS Entry on each Acquisition system and Review workstation

1. Select *Start > Settings > Network Connections*.
2. Right click on the *Local Area Connection* icon and select *Properties*.
3. Highlight *Internet Protocol (TCP/IP)* and click *Properties*.
4. Verify that the entry for the preferred DNS server is the IP address of the Centricity Cardiology INW Server.
5. Click *OK*.
6. Click *OK* to close the *Local Area Connections Properties* window.
7. Close the *Network Connections* window.

## Add each Acquisition system and Review workstation back to the Domain

1. Verify that you are logged on to Windows as **mlcltechuser**.

NOTE

This should be the **local mlcltechuser** account (i.e. log on to the computer not the Domain.)

2. Right-click *My Computer* icon on the Desktop and select *Properties*.
3. Select the *Computer Name* tab.
4. Click the *Change* button.
5. In the *Member of* section, select the *Domain* radio button, enter the name of the INW Domain to join and click *OK*.

NOTE

The default Domain is *inw.local*

6. When prompted, type the username **mlcltechuser** and password.
7. At the *Welcome to inw* message, click *OK*.
8. At the restart message click *OK*.
9. At the *System Properties* window, click *OK*.
10. At the *Do you want to restart now?* message click *Yes*.
11. After the system restarts, at the Mac-Lab/CardioLab Custom Shell window, press **Ctrl + Action + Del** and click *Logoff*.
12. Click *Logoff*.
13. Immediately hold the **Shift** key to stop the auto-logon sequence.
14. Log on to Windows and the Mac-Lab/CardioLab Custom Shell as the **local mlcltechuser**.

## Run scripts

The next steps are required to reset internal settings changed by previously run scripts.

1. Ensure you are logged on as **local mlcltechuser**.
2. Open a command prompt.
3. Type:

```
secedit[sp]/configure[sp]/  
db[sp]"C:\Windows\Special\secedit.sdb"[sp]/  
cfg[sp]"C:\Windows\Security\Templates\cardiosecc.inf"[sp]/  
overwrite[sp]/quiet
```

and press **Enter** (Note: [sp] = one space).

This command takes about 5 minutes to run. The scripts are complete when the *C:* prompt returns.

4. Restart the system.

Windows will attempt to auto-logon, but the logon may fail.

5. If necessary, click *OK* to the message.
6. Log on to Windows and the Mac-Lab/CardioLab Custom Shell as **domain mcltechuser**.

## Synchronize Time

1. Select *Start > Programs > Accessories > Command Prompt*.
2. Type **net time /set** and press **Enter**.
3. When asked to sync with the server, type **y** and press **Enter**.

### NOTE

This step may take up to 2 minutes to complete.

4. Close the *Command Prompt* window.

## Add Acquisition system and Review workstations to GE MLCL Organizational Unit

1. At the server, log on as **Administrator**.
2. Select *Start > Settings > Control Panel*.
3. Double-click the *Administrative tools* icon.
4. Double-click *Active Directory Users and Computers*.
5. Expand *inw.local*
6. Click the *Computers* folder and locate the Acquisition system/Review workstations to add.
7. Expand the *GE Medical Systems (MLCL)* organizational unit.
8. Expand the *MLCL Computers*.
9. Expand the *MLCL Workstations*

10. Drag and drop the computer names from the *Computers* folder to the *MLCL Acquisition workstations* or *MLCL Review workstations* folder as appropriate.
11. Close all open windows.
12. Restart each Acquisition system and Review workstation that was added to the organizational unit in the previous step.
13. After restart on each system, press **Ctrl + Action + Del**, logoff as *mlcllogonuser*.
14. Click *Logoff*.
15. Immediately hold down the **Shift** key.
16. Log on to Windows and the Mac-Lab/CardioLab Custom Shell as **local mlcltechuser**.

## Confirm Domain Security Policy

On the Acquisition systems, perform the following steps:

1. Right click *My Computer* icon on the Desktop and select *Manage*.
2. Select *System Tools > Local Users and Groups > Groups*.
3. Right-click on *Administrators* and select *Properties*.
4. Verify that the following members are shown in the list:
  - INW\Domain Admins
  - INW\MLCLSqlUser
  - INW\MLCLTechUser
5. If the members are not shown, go to the “[Domain Troubleshooting](#)” on page 5-129.
6. If the members were displayed correctly, log on to the Domain using the steps below and skip “[Domain Troubleshooting](#)” on page 5-129. Go to “[Start Replication](#)” on page 5-130
  - a. Press **Ctrl + Action + Del** and click *Logoff*.
  - b. Click *Logoff*.
  - c. Immediately hold the **Shift** key to stop the auto-logon sequence.
  - d. Log on to Windows and the Mac-Lab/CardioLab Custom Shell as **domain mlcltechuser**.

## Domain Troubleshooting

1. Verify that the Acquisition system is in the correct Domain:
  - a. Right click *My Computer* icon on the Desktop and select *Properties*.
  - b. Verify that on the *Computer Name* tab the *INW Domain* is present.
2. Verify that the Acquisition system shows up in the *GE Medical Systems (MLCL)* Organizational Unit on the server.
3. On the server, open a command prompt window and type **gpupdate /force** and press **Enter**.
4. Restart the Acquisition systems, wait 7 minutes and check the policy again as described in “**Confirm Domain Security Policy**” on page 5-128. If the policy is still not correct proceed to the next step
5. Verify that the TCP/IP properties on the server are set correctly
  - a. The INW server IP must be configured as the preferred DNS server.
  - b. The subnet mask must be correct as defined by the hospital IT staff
6. Verify that the TCP/IP properties on the Acquisition are set correctly
  - a. The IP subnet mask of the Acquisition system **MUST** match exactly the subnet mask of the server.
  - b. The IP address of the Acquisition system must be manually configured and must fall within the subnet of the server as defined by the subnet mask
  - c. The gateway of the Acquisition system must be set to the IP address of the server or another machine on the hospital network.
  - d. The DNS of the Acquisition system must be set to the IP address of the INW server.
  - e. In the CARTO™ XP System and TRAMnet IP settings, make sure that the *Internet Protocol (TCP/IP)* checkbox is the **ONLY** item selected in the *This connection uses the following items:* list
7. Verify that the INW server and Acquisition system can communicate

8. Open a command window on the Acquisition system and type **ping <servername>** and press **Enter**.

- a. A *Request timed out* message indicates failure, a *Reply from* message indicates success.

**NOTE**

If success, verify that the reply from IP address shown matches the server's IP address and if correct skip the reset of the sub steps below

- b. If step a failed repeat with the servername replaced with the correct IP address of the server **ping <###.###.###.###>** and press **Enter**.
    - c. If steps a and b both failed there is a problem with the IP address or the physical network. Repeat the above steps to verify the TCP/IP properties of the server and Acquisition system
    - d. If step a fails and step b succeeds there is a problem with DNS setup. Repeat the TCP/IP properties steps above paying careful attention to the DNS setup.
9. Verify that the time on the server and the Acquisition system match
  - a. If they do not match, open a command prompt on the Acquisition system and type *net time /set* and press **Enter**.
  - b. Restart the Acquisition system, wait 7 minutes and check the policy again in “**Confirm Domain Security Policy**” on page 5-128- if the policy is still not correct proceed to the next step
10. If the policy is still not correct after all above steps:
  - a. Remove the Acquisition system from the Domain and back to workgroup *CARDIOLAN*
  - b. Restart the Acquisition system
  - c. Delete the Acquisition system name for the OU on the server
  - d. Repeat the instructions for adding the Acquisition system to the Domain.

## Start Replication

Verify you are logged on to each Acquisition system as **domain mcltechuser** before adding the system to replication.

### Register SQL Server

1. At the Server, select *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
2. Navigate to *Microsoft SQL Servers > SQL Server Group*
3. Right-click the *default (LOCAL) server* entry if present and select *Delete SQL Server Registration*.
4. At the confirmation window, click *Yes*.
5. Right-click on *SQL Server Group* and select *New SQL Server Registration*.
6. At the *Welcome* screen, click *Next*.
7. Click *Add* to select the server.  
Server name should show up automatically in the textbox.
8. In the *Select SQL Server* window, select the Acquisition system and click *Add*.  
  
If the Acquisition system name does not appear in the list, type the name in the textbox and click *Add*.
9. Once all systems are added, click *Next*.
10. At the *Select an Authentication mode* window, select *SQL Server login information* option radio button and click *Next*.
11. At the *Select Connection Option* window, select the *Logon automatically* radio button.
12. Type **sa** as the account and enter the password (contact GE Technical Support or the system administrator for current password information) and click *Next*.
13. At the *Select SQL Server Group* window, click *Next*.
14. At the *Completing the Register SQL Server Wizard* window, click *Finish*.
15. Close the *Register SQL Server Messages* window.
16. Close *Enterprise Manager*.

### **Add each Acquisition System to Replication on the INW server**

1. Double-click the *Service Console* icon on the Desktop.

2. Navigate to *Console Root > Create Replica > Replication Setup* in the left frame.

The right frame should show the *Replication utility* with the top *Service User Login* section active.

3. Log on as **mlcsqluser** (Contact GE Technical Support or the system administrator for current password information) and click the *Login* button.

The top *Login* section should now be inactive and the bottom section will be active with a *password validated* message.

4. Click *Add*.
5. Browse to *My Network Places > Entire Network > Microsoft Windows Network > [current Domain]* and select an Acquisition system to add to replication and click *OK*.
6. When prompted for consolidation, click *Yes* to move all studies on the currently selected Acquisition system up to the server.
7. The selected machine is now shown in the *Add to replication* list box.
8. Repeat the steps above for each additional Acquisition system to add to replication.
9. Click *Apply*.
10. Click *Yes* to confirm replication.

The process may take up to 5 minutes per Acquisition system. A progress bar indicates replication status.

When complete, a *Replication setup complete* message will be displayed above the progress bar and the server and all Acquisition systems will appear in the *Currently replicating list*.

11. Close the *Service Console* window.
12. Restart all Acquisition systems after replication has been started.
13. Wait for the Acquisition systems to finish restarting before continuing with the procedure.



## Post Configuration Procedures

### Reconfigure Hospital Mapped Drives on the Server (If Applicable)

1. At the server, right-click *My Computer* icon and select *Map Network Drive*.
2. In the *Drive* section, select an available drive letter.
3. In the *Folder* section, enter the path to the folder set up on the foreign server.
4. Click *Finish*.

### Configure Archive Utility User

1. Select *Start > Settings > Control Panel*.
2. Double-click the *Administrative Tools* icon.
3. Double-click the *Services* icon.
4. Double-click the *GEMS Task Scheduler* service.
5. Set the *Startup Type* to *Automatic*.
6. Select the *Log On* tab.
7. Click the *This account* radio button.
8. In the *UNDER THIS ACCOUNT TYPE* box, enter *<Domain>\MLCLSQLUSER*.
9. Type the password: *sql8273user*.
10. Click *OK*.
11. Right-click on *GEMS Task Scheduler* service and click *Start*.
12. Close all open windows.

### Configure Database Maintenance on the Server

1. At the server Desktop, go to *Start > Programs > Microsoft SQL Server > Enterprise Manager*.
2. Expand the INW server.
3. Expand *Management*.

4. Expand *SQL Server Agent*.
5. Select *Jobs*.
6. Right-click *Database Maintenance Job* and select *Properties*.
7. Select the *Schedules* tab.
8. Click *New Schedule*.
9. In the *Name:* textbox, type *Database Maintenance*.
10. Click the *Change* button.
11. In the *Occurs:* section, select the *Weekly* radio button.
12. In the *Weekly:* section, select only the *Sat* checkbox.
13. In the *Daily Frequency:* section, select a time at least 30 minutes after the last archive generator is run.
14. Click *OK*.
15. At the *New Job Schedule* window, verify *Enable* is checked and click *OK*.
16. Select the *General* tab, and verify *Enable* is checked.
17. At the *Database Maintenance Properties* window, click *OK*.

NOTE

Ensure the schedule does not overlap with the following jobs:

- Archive Generator on all Acquisition systems
- Archive Utility on the server
- Backups on the server

## Configure Database Backup Job

1. Right-click *Backup clab, clink databases and GEMS registry job* and select *Properties*.
2. Select the *Schedules* tab.
3. Click *New Schedule*.
4. In the *Name:* textbox, type *Database Backup*.
5. Click *Change*.
6. In the *Occurs:* section, select the *Daily* radio button.
7. In the *Daily Frequency:* section, select a time at least 30 minutes after the last Archive Generator is run and must not overlap with the server Database Maintenance schedule.
8. Click *OK*.
9. At the *New Job Schedule* window, verify *Enabled* is checked and click *OK*.
10. Select the *General* tab, and verify *Enable* is checked
11. In the *Backup clab, clink databases and GEMS registry job* window click *OK*.
12. Right-click *Backup Master and MSDB Databases job* and select *Properties*.
13. Select the *Schedules* tab.
14. Click *New Schedule*.
15. In the *Name:* textbox, type *Backup Master and MSDB Databases*.
16. Click *Change*.
17. In the *Occurs:* section, select the *Monthly* radio button.
18. In the *Monthly Frequency:* Last Sunday of the Month.
19. In the *Daily Frequency:* section, set the time to 3:10 pm.
20. Click *OK*.
21. At the *New Job Schedule* window, verify *Enabled* is checked and click *OK*.
22. Select the *General* tab, and verify *Enable* is checked.

23. Click *OK*.

24. Close *Enterprise Manager*.

## Recommended Backup Schedule

GE Medical Systems *Information Technologies* recommends the following schedule for a facility with a server and four Acquisition systems based on a 5-day, single-shift work-week.

### NOTE

The following schedules are staggered because the Archive Generator must not be scheduled to start within 5 minutes of the clock hour and at 12:05 am. Also, more than one Archive Generator must not run at the same time.

1. Daily (Monday Night-Tuesday Morning through Thursday Night-Friday Morning):
  - 11:10 pm: Archive Generator on AC1 (the archive generator schedule was set when the Acquisition computer was installed or upgraded).
  - 11:40 pm: Archive Generator on AC2
  - 12:10 am: Archive Generator on AC3
  - 12:40 am: Archive Generator on AC4
  - 2:10 am: Run the *Backup clab, clink databases and GEMS registry job*.
  - 3:10 am: Incremental Backup on the Server.
2. Weekly (Friday Night-Saturday Morning)
  - 11:10 pm: Archive Generator on AC1
  - 11:40 pm: Archive Generator on AC2
  - 12:10 am: Archive Generator on AC3
  - 12:40 am: Archive Generator on AC4
  - 1:10 am: Run the *Database Maintenance* job.
  - 2:10 am: Run the *Backup clab, clink databases and GEMS registry job*.
  - 3:10 am: Full Backup on the Server. 50 GB of data takes approximately 2 hours.
3. Monthly (Last Sunday of the Month)
  - 3:10 pm: Run the *Backup Master and MSDB databases* job.

- This job may be run concurrently with other jobs.

## Create Backup Tapes and Schedule Backups

These instructions show how to configure a full tape backup using single or multiple tapes as well as the incremental tape backups.

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### CAUTION

PROCEDURE FAILURE — Please be advised that tape backup requires human intervention.

- For full backups that use single tape and incremental backups the user has to insert appropriate tapes on daily basis for backups to run successfully.
  - For full backups that use multiple tapes, in addition to inserting the appropriate tapes the user has to manually prepare the additional tapes. Refer to section "Free additional tape" for details on how to prepare additional tapes.
- 
- 

### 1. Determine Number of Tapes Needed for Full Backup

1. Login on to the server as **Administrator**
2. Right click on *My Computer* and select *Explore*.
3. Browse to
  - a. *D:\GEMMS\Prucka\Studies*
  - b. *D:\GEMMS\Prucka\Database\Maintenace\Backup*
  - c. *D:\GEMMS\Prucka\Database\Maintenace\Log*

For each of these folders right-click on the folder and choose *Properties* to view the size of the folder.
4. If the total size of the *Studies*, *Backup* and *Log* folders from the above step is greater than the tape size, then multiple tapes will be needed for full backups.

### 2. Physically Label the Backup Tapes

Place a sticker on each tape with the labels listed below, then perform the procedures below for each tape.

- Tuesday Incremental. Backups normally run in the early morning, so the tape is actually put in the drive at the end of the previous day (in this case, Monday evening.)
- Wednesday Incremental
- Thursday Incremental
- Friday Incremental
- Full Backup 1 (Full Backup 1 - 2, Full Backup 1 - 3, etc. for additional tapes in case of multiple tape backups)
- Full Backup 2 (Full Backup 2 - 2, Full Backup 2 - 3, etc. for additional tapes in case of multiple tape backups)
- On Demand Backup (On Demand Backup - 2, On Demand Backup - 3, etc. for additional tapes in case of multiple tape backups)

**NOTE**

When labeling the tapes, it is important to use a consistent naming convention. If consistent names are not used, the procedures below will fail.

### 3. Catalog Backup Tapes

This procedure runs a dummy backup to label (name) the tape and create an initial catalog. This backup will be overwritten when the actual backup is run.

**NOTE**

The tapes are automatically formatted during this procedure.

1. Open the *Backup Utility* by selecting *Start > Programs > Accessories > System Tools > Backup*.
2. If the Backup application opens in Wizard mode, click *Advanced Mode*.
3. Insert the first tape (for example the one labeled Full Backup 1) into the tape drive. Wait for a message to be displayed.
4. If the message *Unrecognized Media Found* is displayed, accept any confirmation messages and check the *Restore and Manage Media* tab and confirm the tape is listed under Free Media. Skip the next step.
5. If the message *Recognizable Media Found* is displayed:
  - a. Select *Allow Backup Utility to Use this Media*
  - b. Click *OK*. The media is displayed under 8mm AIT (for AIT-2 TURBO tapes) or 8mm AIT1 (for all other AIT tapes).
  - c. Right-click the media and select *Mark as Free* and click *Yes* to confirm.

6. Go to the *Backup Utility Welcome* tab.
7. Click on *Backup Wizard*.
8. Click *Next*.
9. Select *Backup selected files, drives, or network data* and click *Next*.
10. In the *Items to Back Up* window expand the *My Computer* icon and select a sample folder to backup (this is done just to assign a name to the tape. The actual backup is performed below. Use the *D:/Gemms/Prucka/Database/Maintenance/Log* folder for example). Click *Next*.
11. Select *8mm AIT (for AIT-2 TURBO tapes)* or *8mm AIT1 (for all other AIT tapes)* for the backup type and *New* for the tape to use. Then click *Next*.
12. Click *Advanced*.
13. Click *Next* for the next three screens (accept the defaults).

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**CAUTION**

**BACKUP FAILURE** — All label names must be written exactly the same or the backup will fail.

Ensure the name written on the outside of the tape, the backup label, the media label, and the job name all match exactly.

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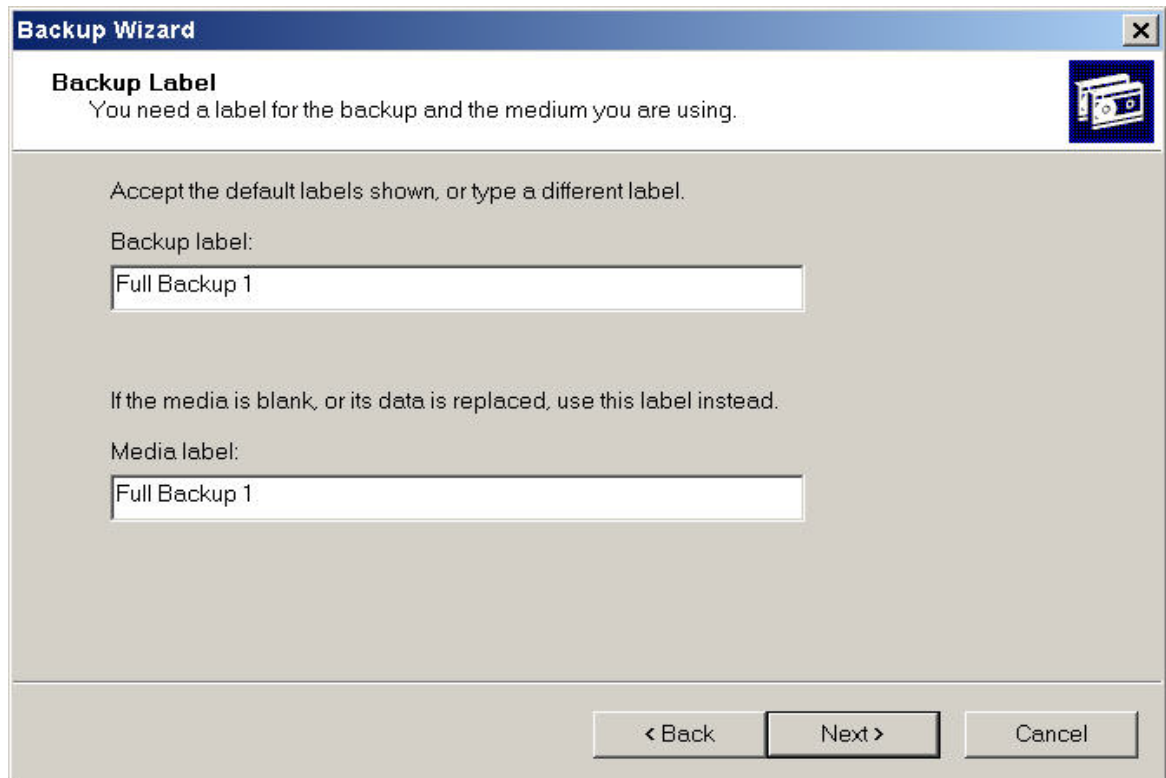
---

14. Change the backup label and media label to the name written on the label on the outside of the tape (In this case Full Backup 1). Click *Next*.

**NOTE**

For multiple tape backups, name the first tape as Full Backup 1 or Full Backup 2 or On Demand Backup as the case might be. Then for additional tapes:

- For Full Backup -1 as Full Backup 1 - 2, Full Backup 1 - 3, etc
- For Full Backup -2 as Full Backup 2 - 2, Full Backup 2 - 3, etc.
- For On Demand Backup as On Demand Backup - 2 , On Demand Backup - 3, etc.



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15. At the *When To Backup* dialog box, click *Now*.
16. Click *Finish*. When the backup is complete, click *Close*.
17. Eject the tape.
18. Repeat this procedure for each remaining tape so that all tapes labeled earlier in “3. Physically Label the Backup Tapes” are cataloged (including the additional tapes that will be used in multiple tape backups).

#### **4. Configure storage to automatically return backup media to the free media pool**

1. Right-click *My Computer* and select *Manage*.
2. Double-click *Removable Storage*.
3. Double-click *Media Pools*.
4. Double-click *Backup*.



5. Right-click the media pool *8mm AIT (for AIT-2 TURBO tapes) or 8mm AIT1 (for all other AIT tapes)* and choose *Properties*.
6. In the *General* tab check the *Return media to Free media pool* check box.
7. Press *Apply* and choose *OK*.
8. Close the *Computer Management* dialog box.

## 5. Schedule Backups

This procedure sets the schedule for the backups to run. When performing this procedure for each tape note the following:

- Ensure the tape labels are typed in accurately. If the tape name is different the backups won't run.
- Be sure to set the start time for Full Backup 2 to one week after Full Backup 1, otherwise both backups will try to run on the same day.
- Check all backup options carefully. When performing this procedure for each tape, the defaults may reset.

### NOTE

If the full backup for this server is a single tape backup you can start with an incremental backup -- a full backup is not necessary to start the backups. All selected files and folders are backed up, so an initial full backup is not required. But if you expect to use multiple tapes for full backup then a full backup should be executed first, as incremental backups are not configured to span multiple tapes. Based on this suggested schedule the "On Demand Backup" (a full backup) is executed after scheduling the jobs, and will serve as the first full backup.

1. Go to the *Backup Utility Welcome* tab.
2. Click *Backup Wizard*.
3. Click *Next*.
4. Select *Backup selected files, drives, or network data* and click *Next*.
5. In the *Items to Back Up* window click on *My Computer icon* and select the following folders:
  - *D:\Gemms\Prucka\Database\Maintenance\Backup*
  - *D:\Gemms\Prucka\Database\Maintenance\Log*
  - *D:\Gemms\Prucka\Studies*
6. Click *Next*.

7. Select *8mm AIT (for AIT-2 TURBO tapes)* or *8mm AIT1 (for all other AIT tapes)* and select the name of the backup tape (for example, Full Backup 1) from the dropdown list. For multiple tape full backups pick the first tape. For example for Full Backup 1 pick the tape that is labeled as Full Backup 1. Then click *Next*.

NOTE

It is very easy in this step to forget to select the tape name and leave the default 'New' in.

8. Click the *Advanced* button.
9. Select the type of backup:
  - Normal for Full Backup 1, Full Backup 2, and On Demand Backup.
  - Incremental for daily Incremental backups.and click *Next*.
10. Select *Verify Data after Backup* and *Use Hardware Compression* (if available) and click *Next*.
11. Select *Replace Existing Backups* and click *Next*.

---

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CAUTION

BACKUP FAILURE — All label names must be written exactly the same or the backup will fail.

Ensure the name written on the outside of the tape, the backup label, the media label, and the job name all match exactly.

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12. Change both the backup label and media label to the tape name used when labeling the tape (for example, Full Backup 1) and click *Next*.
13. Select *Later* and enter the job name (for example, Full Backup 1 or Tuesday Incremental) for the backup name. Then click *Set Schedule*.
14. Schedule the task:

For Full Backup 1 select:

  - Weekly
  - Every 2 Weeks
  - Saturday (ensure no other days are checked)
  - Appropriate Start Time

For Full Backup 2 select:

- Weekly
- Every 2 Weeks
- Saturday (ensure no other days are checked)
- Appropriate Start Time
- Click the *Advanced* button and change the start day to the Friday following the first Full Backup 1. For example, if Full Backup 1 runs Saturday, May 1, then the start day for Full Backup 2 must be Friday May 7 (the start day should be the day before the backup is scheduled to run).

For each incremental backup, select:

- Weekly
- Every 1 Week
- The appropriate day (Tuesday-Friday)
- Appropriate Start Time

For On Demand Backup select:

- Once
- Tonight
- Appropriate Start Time

15. Click *OK*.

16. Enter the **administrator** password (**MLCL8273!admin**) and click *Next* (the password will be requested again) and click *OK*.

17. Click *Finish*.

18. Repeat the above steps for the remaining tapes. DO NOT repeat for all tapes in multiple tape full backups. Create only one job for a set of full backup tapes.

19. When all jobs are created continue with the next procedure below.

## 6. Multiple Tape Preparation

Execute these instructions for multiple tape full backup scenarios. It prepares the additional tapes for first time use. Not preparing the tape will cause failure of the full tape backup that uses multiple tapes.

NOTE

Nothing has to be changed for the first tape that will be used for full backup and for the tapes that will be used in incremental backups.

1. Ensure all tapes of a multi-tape backup are the same model.
2. Verify that you are logged on to the server as *Administrator*.
3. Prepare the additional tapes in the order they will be used, First prepare additional tapes for On Demand Backup (On Demand Backup - 2, On Demand Backup - 3, etc) then additional tapes for full backup 1 (Full Backup 1 - 2, Full Backup 1 - 3, etc) and then for Full Backup 2 (Full Backup 2- 2, Full Backup 2- 3, etc).

NOTE

It is important that the additional tapes are prepared in the order they will be used by the backup jobs otherwise the backup job will prompt for a wrong tape.

- a. Insert the tape.
- b. Right click *My Computer* and select *Manage*.
- c. Drop-down the *Removable Storage* under *Storage*
- d. Click on *Media*

NOTE

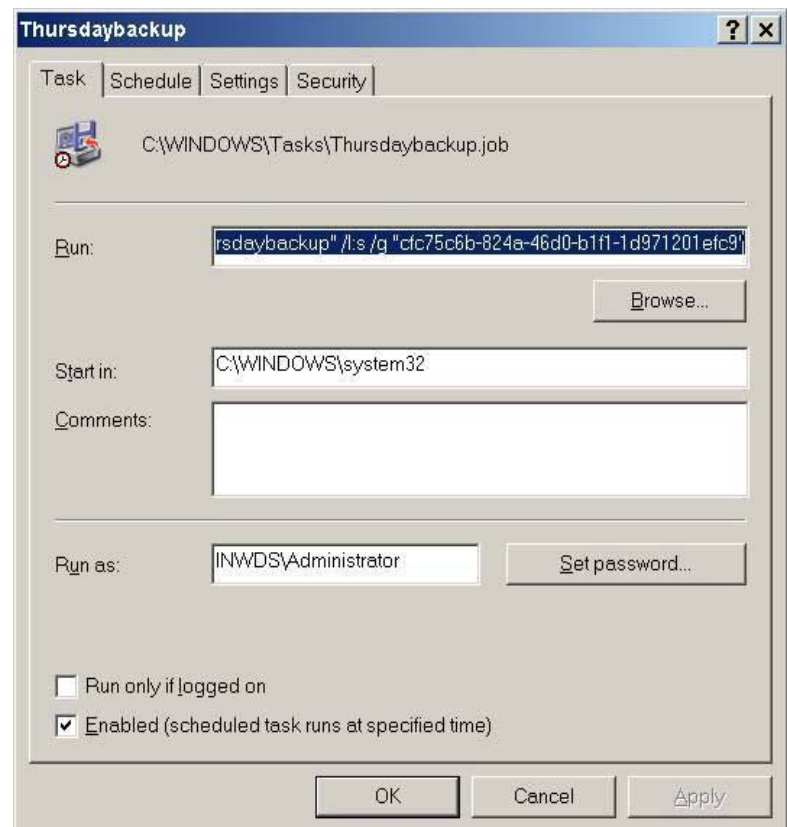
It may take up to 1 minute for the system to recognize the tape.

- e. Right click on the *Media* (tape) that was just inserted and select *Properties*.
- f. Ensure *Enable Media* is checked.
- g. Click *OK* and close the *Properties* dialog.
- h. Right click the tape being prepared and select *All Tasks > Deallocate*. Select *Yes* to the confirmation dialogs.
- i. Verify that the tape just de-allocated is listed under *Free \ 8mm AIT/AIT1 Media* pool.
- j. Eject the tape.
- k. Repeat these steps for each additional tape (2nd and 3rd tape) that will be part of the full backups.

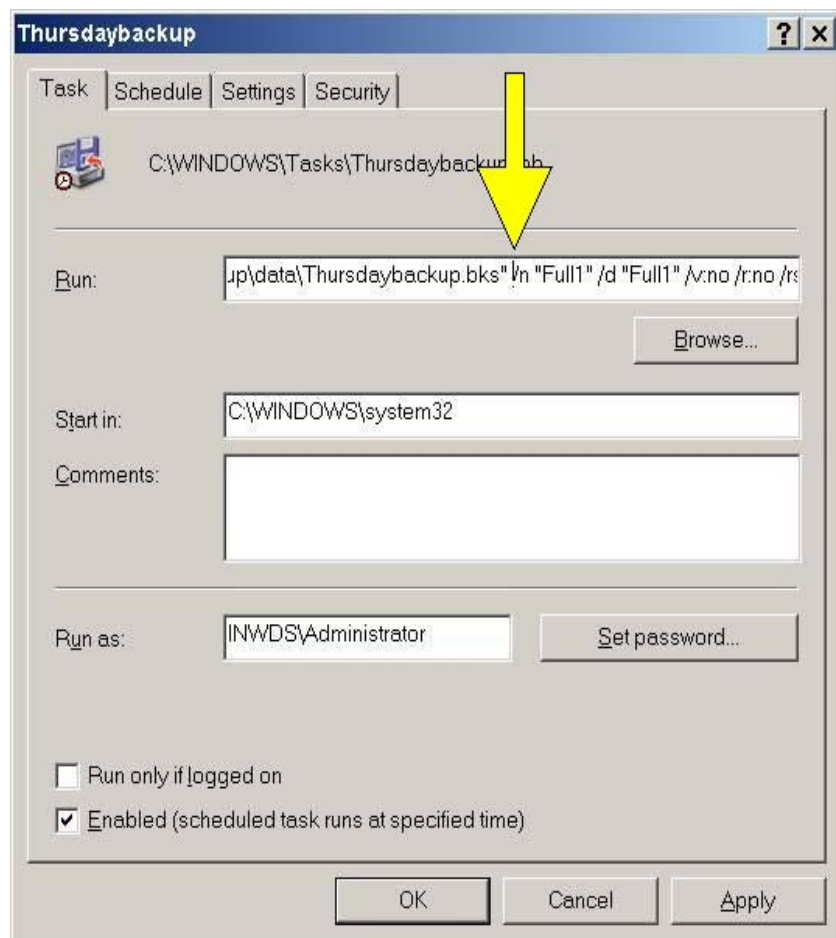
## 7. Add the /UP Switch

1. In the Control Panel, under *Scheduled Tasks* right click a scheduled full backup task and select *Properties* (since Incremental backups do not exceed one tape in length, those tasks will not be altered. Even if the current full backup doesn't exceed one tape add the /UP switch, this will prompt for additional tape when the size of backup grows in future and exceeds the size of a single tape).

The following dialog box appears (the values within quotes on the command line in the run text box will be different between all systems).



2. In the *Run* text box, locate the /n switch right after the path for the \*.bks file.

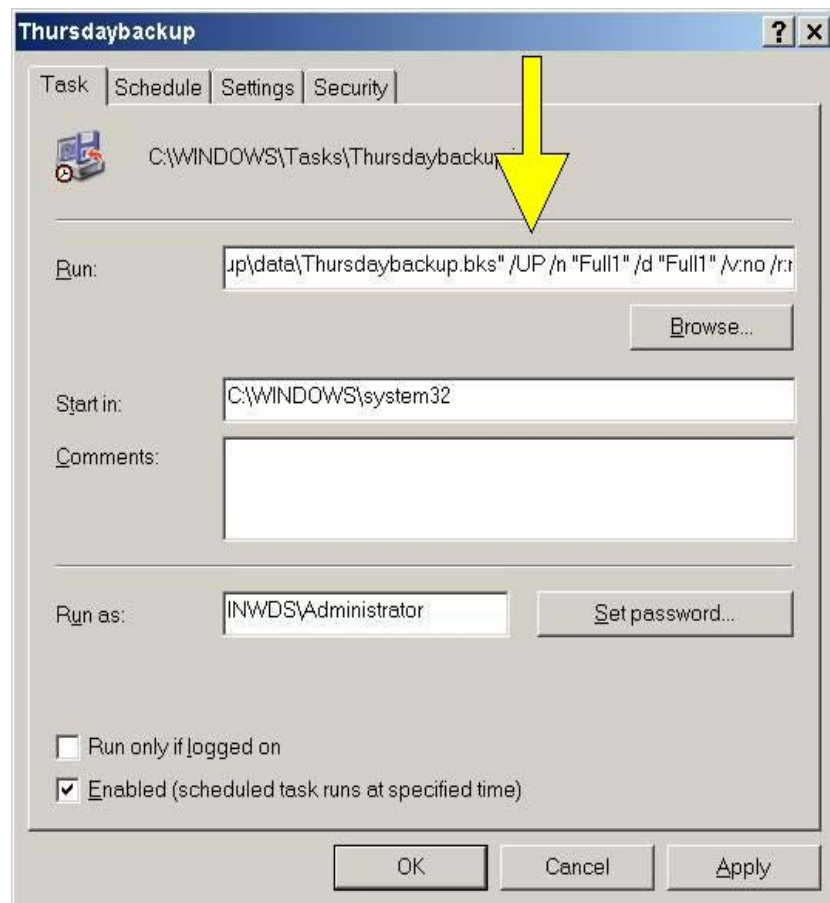


3. After the .bks" and before the /n place the /UP (case-sensitive) switch.

**NOTE**

Make sure there is a space before and after the /UP switch.

Example: .bks"<space>/UP<space>/n



4. Click *Apply*. Enter the Administrator password when prompted for it and close out of the dialog box.
5. Repeat these steps to set the /UP switch for each full backup task (including the On Demand Backup).

## 8. Verify Backup Schedule

### NOTE

The Schedule Jobs tab may not always refresh automatically. If the jobs are not displayed correctly, close the Backup Utility and then reopen it.

Click the *Schedule Jobs* tab. The schedule should look like this:



The schedule can be verified or modified in the following ways:

- The blue “N” indicates a Normal (i.e., Full) backup. The green “I” indicates an Incremental backup.
- Roll the cursor over each backup event. The name of the backup schedule is displayed. Ensure each incremental backup takes place on the appropriate day and Full Backup 1 and Full Backup 2 occur on alternate Saturdays.
- Click on one instance of each event to view the details. Go to the Schedule tab to ensure the schedule is correct.
- At the schedule tab, the schedule may be adjusted, if necessary. An incorrect schedule name (typo, etc.) can not be changed. The backup must be deleted and recreated.

## Run the Backup Job at the Server

This procedure creates database and registry backup files.

1. Select *Start>Programs>Microsoft SQL Server>Enterprise Manager*.



2. Expand *Microsoft SQL Servers* and the *SQL Server Group*. Highlight *INW Server* in the left pane.
3. Under the server, navigate to *Management>SQL Server Agent>Jobs*.
4. Right-click the *Backup clab*, *clink databases*, and *GEMS registry* job and select *Start Job*.
5. Click *Start* at the confirmation window.
6. Wait for the *Backup* job to complete before continuing with the next step.

**NOTE**

This job can take up to 20 minutes to run. The status will not automatically update. To view the status, right-click the job and select *Refresh Job*. When the job is completed *Succeeded* is displayed in the *Last Run Status* column.

7. Minimize the *Enterprise Manager*.
8. Verify the following files with the timestamp from today are in the backup directory:  
*D:\GEMMS\Prucka\Database\Maintenance\Backup*.
  - clabbackup.bak
  - clinkbackup.bak (if the LMT database is installed)
  - Gems.reg
9. Close all open windows.

## Perform On Demand Backup

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**CAUTION**

**SYSTEM PERFORMANCE DEGRADATION** — A full backup takes several hours (depending on the amount of data to backup. Running a full backup while procedures are being performed may cause the system to slow unacceptably.

Always perform a full backup at a time when no procedures will be performed for several hours.

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1. For single tape On Demand Backup insert the On Demand Backup tape and for multiple tape On Demand Backup insert the first tape.
2. Open the Control Panel by browsing to *Start>Settings> Control Panel*.

3. In the Control Panel double-click *Scheduled Tasks*.
4. To start the backup job:
  - a. Right-click the *On Demand Backup* task.
  - b. Select *Properties*.
  - c. Select the *Schedule* tab.
  - d. Assign a schedule to start the job in 3 to 5 minutes.
  - e. When prompted for the **Administrator** password, enter the password.
  - f. Select *Apply*.
  - g. Click *OK* to close the dialog.
5. For multiple tape On Demand Backup: When prompted for the additional tape, insert the additional tape.
6. For multiple tape On Demand Backup: When the multiple tape backup finishes the backup tape must be verified. To verify the backup, insert the tapes as prompted.
7. For single and multiple tape On Demand Backup: Check the On Demand Backup job log to verify that it completed successfully. To view the log file:
  - a. Launch backup from *Start>Programs>Accessories>System Tools>Backup*.
  - b. In the backup utility drop down Tools menu click on *Reports*. This will list the reports for each backup job.
  - c. Open the log file for the On Demand Backup job.

## Verify Backups Ran Successfully

After each backup tape runs for the first time, check the following the next day to ensure the backup ran successfully:

1. View the tape backup log file. To view the log file:
  - a. Launch backup from *Start>Programs>Accessories>System Tools>Backup*.
  - b. In the backup utility drop down Tools menu click on *Reports*. This will list the reports for each backup job.

- c. Review the log file for the tape backup job to verify that the backup was performed successfully.
2. For Full Backups: Restore several files from the tape to an alternate location (such as *D:\Temp*). Only restore the Backup folder and the 20 most recent patient folders.

**NOTE**

Do not restore the whole backup as the server hard drive may run out of space. Make sure you delete the files after verification.

3. Verify the following files are in the backup directory:  
*D:\GEMMS\Prucka\Database\Maintenance\Backup*.

- *clabbackup.bak*

**NOTE**

Check the timestamp and the size of the *clabbackup.bak* file after every backup to ensure the database was backed up successfully.

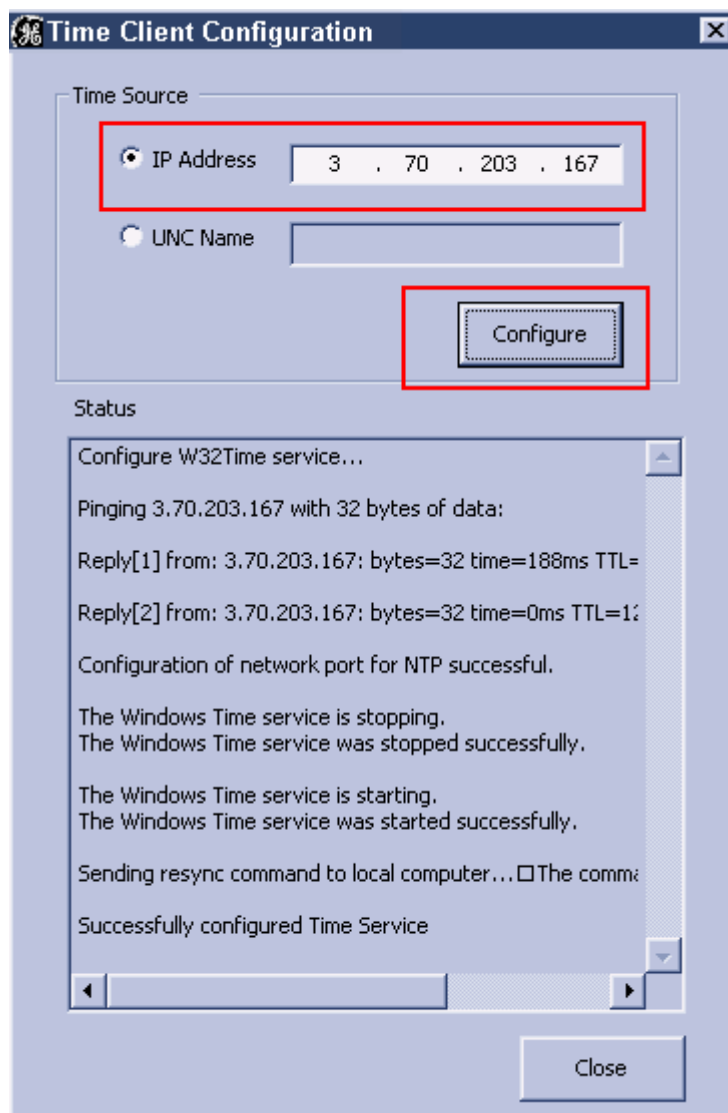
- *clinkbackup.bak* (if the LMT database is installed)
- *Gems.reg*

## For Each Acquisition System and Review System (Including Software Only)

The time has to be re-synchronized using this section only if the environment uses static IP and the server IP was changed during disaster recovery.

1. Log in to both the OS and custom shell as domain **mlcltechuser**. Ensure the ML-CL application is not running.
2. Right-click the *My Computer* icon and select *Explore*.
3. Navigate to *D:\GEMMS\Prucka\Utilities*.
4. Double-click on the file *TimeClientConfig.exe*. This tool will perform the following:
  - Checks for Administrator logon.
  - Does a backup of the existing registry entries pertaining to Windows Time Service.
  - Updates the required registry entries to configure Windows Time Service.
  - Verifies one of the registry keys to ensure the registry update was successful.

- Enables/Configures UDP port 123 in the **Windows Firewall** on Windows XP SP2 system.
- Stops and Starts the W32Time service.
- Runs the w32tm command to update the Windows Time Service to look at the update configuration, re synchronize, and rediscover the time source.



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5. In a fixed-IP network, select the radio button for IP Address, and enter the IP address of the INW server. For a DHCP network, select

the radio button for the UNC name and enter the name of the INW server.

**NOTE**

In a DHCP environment, the UNC name must be used since it is likely that the IP address will change.

6. Click on the *Configure* button.
7. When the configuration completes, the status will indicate that the time settings were updated successfully.
8. Close all open windows.
9. Time Sync Configuration is now complete. Proceed to the next section.

## Initialize Applications

Adobe Reader, Microsoft Word, and Microsoft Word Reports must be initialized under both **mlcllogonuser** and **mlcltechuser** logons.

### Adobe Reader

1. Press **Ctrl + Action + Delete**.
2. Click *Logoff*.
3. Click *Logoff*.

Allow the system to auto-log on to Windows OS as **mlcllogonuser**.

4. Log on to the Mac-Lab/CardioLab Custom Shell as **domain mlcllogonuser** (password **mlcl!logonuser**).
5. Select *Start > Programs* and select *Adobe Reader 6.0*.
6. Accept the *End User License Agreement* if displayed.

After *Adobe Reader* opens, wait one minute to ensure a *Check for Update* dialog box is not displayed. If the dialog box is displayed, click *Cancel*.

7. Select *Edit > Preferences* from the main menu.
8. Click *Internet*.
9. Uncheck *Allow Speculative downloading in the background*.
10. Ensure *Check browsers settings when starting Reader* is checked.

11. Click *Startup*.
12. Ensure *Show Messages and automatically update* is checked.
13. Click *OK*.
14. Close *Adobe Reader*.

### Microsoft Word

1. Select *Start > Programs* and select *Microsoft Word*.

#### NOTE

For Microsoft Office 2007 Professional, select *Start > Programs > Microsoft Office > Microsoft Office Word 2007*.

2. Accept the *End User License Agreement* if displayed.
3. Click *OK* if the *User Initial* dialog box is displayed.
4. Close *Microsoft Word*.

### Microsoft Word Reports

1. Double-click the *GE Medical Systems* icon on the desktop.
2. Select *Administration > Reports > Templates*.  
If prompted for an administrator password enter **mlcladmuser**.
3. If a server busy message is displayed. Click *Retry*. Microsoft Word will open.
4. Move the Microsoft Word window to the review monitor (on multiple monitor systems only):
  - a. Right-click the Microsoft Word title bar and select *Restore*.
  - b. Move the Microsoft Word window to the next monitor (from the real-time monitor to the review monitor).
  - c. Right-click the Microsoft Word title bar and select *Maximize*.
5. Close Microsoft Word.
6. When prompted to save the report, click *No*.
7. Close the ML-CL application.

### Adobe Reader

1. Press **Ctrl + Action + Delete**.

2. Click *Logoff*.
3. Click *Logoff*.
4. Immediately hold down the **Shift** key.
5. Log on to Windows OS as **domain mlcltechuser** (password **mlcl!techuser**).
6. Log on to the Mac-Lab/CardioLab Custom Shell as **domain mlcltechuser** (password **mlcl!techuser**).
7. Select *Start > Programs* and select *Adobe Reader 6.0*.
8. Accept the *End User License Agreement* if displayed.

After *Adobe Reader* opens, wait one minute to ensure a *Check for Update* dialog box is not displayed. If the dialog box is displayed, click *Cancel*.

9. Select *Edit > Preferences* from the main menu.
10. Click *Updates*.
11. Ensure *Check for Updates* is set to *Manually*.
12. Uncheck *Display notification dialog at startup*.
13. Click *OK*.
14. Close *Adobe Reader*.

## Microsoft Word

1. Select *Start > Programs* and select *Microsoft Word*.

### NOTE

For Microsoft Office 2007 Professional, select *Start > Programs > Microsoft Office > Microsoft Office Word 2007*.

2. Accept the *End User License Agreement* if displayed.
3. Click *OK* if the *User Initial* dialog box is displayed.
4. Close *Microsoft Word*.

## Microsoft Word Reports

1. Double-click the *GE Medical Systems* icon on the desktop.
2. Select *Administration > Reports > Templates*.

If prompted for an administrator password enter **mlcladmuser**.

3. If a server busy message is displayed. Click *Retry*. Microsoft Word will open.
4. Move the Microsoft Word window to the review monitor (on multiple monitor systems only):
  - a. Right-click the Microsoft Word title bar and select *Restore*.
  - b. Move the Microsoft Word window to the next monitor (from the real-time monitor to the review monitor).
  - c. Right-click the Microsoft Word title bar and select *Maximize*.
5. Close Microsoft Word.
6. When prompted to save the report, click *No*.
7. Close the ML-CL application.

## Enable the Network Path on each Acquisition system or Review workstation

1. Go to each Acquisition system or Review workstation and log on to Windows and the Mac-Lab/CardioLab Custom Shell as INW Domain **mlcltechuser**.
2. Open the Mac-Lab/CardioLab application.
3. Go to *Administration > System Settings*.
4. Select *File Paths*.
5. Select *Enable Network Storage* checkbox.
6. Close the *System Settings* window.
7. Switch the *Catalog View* from *System* to *Network* to verify the network catalog is displayed.

## Review Studies on Acquisition Systems

All studies performed on the Acquisition system since the last successful server backup (full or incremental) must be reviewed from optical or DVD. These are the studies performed since the last backup and not restored as part of the backup. This procedure must be performed on each Acquisition system.

### NOTE

This procedure must also be performed for studies performed while the server was being recovered.



1. At the Acquisition system double-click on the *GE Medical Systems* icon to open the Mac-Lab/CardioLab application.
2. Switch the catalog to optical.
3. Select the first patient on the list and verify the proper module is selected (Mac-Lab or CardioLab).
4. Click *Review Study*.
5. After the study loads, select *Study > Close Study*.
6. Select *Yes* at the confirmation window.
7. Repeat this procedure for the remainder of the studies listed.

## Delete Temporary Users from each Acquisition System

1. Log on to Windows and the Mac-Lab/CardioLab Custom Shell as INW **domain mcltechuser**.
2. Right-click *My Computer* icon and select *Manage*.
3. Choose *Local Users and Groups*.
4. Choose *Users*.
5. Highlight *Tempuser*.
6. Right-click on *Tempuser* and delete. A confirmation message is displayed.
7. Click *Yes* to delete.

## Cardiovascular Information System (CVIS) Configuration

If configuring a CVIS system outside of the US or English Canada, use the “[Non-US \(or English Canada\) CVIS Configuration](#)” on page 5-164.

Use this procedure to re-configure CVIS systems in the US and English Canada. If no configuration is required, go to “[Review Studies on Acquisition Systems](#)” on page 5-156.

### US (or English Canada) CVIS Re-Configuration

If the system included a CVIS server it must be reconfigured. Determine the CVIS Network configuration. Possible configurations include:

- The CVIS server is part of the INW domain. On the CVIS server, right-click *My Computer* icon and go to *Properties* > Network Identification tab and check to see if the CVIS server was part of the INW domain.
- The CVIS Server was part of a two-way trust relationship with the facility and the INW server.

#### Remove INW Users/Groups from the DMS Shared Directories

1. Logon to the DMS server as **local MuseAdmin** (password **Muse!Admin**).
2. Open *Windows Explorer* in the DMS Express server.
3. Navigate to *D:\Mac-Lab\Import*.
4. Right-click on the *Import* folder.
5. Select *Sharing*.
6. Select the *Permissions* button.
7. Highlight all INW Users and Groups and click *Remove*.
8. Click *OK*.
9. Select the *Security* tab.
10. Highlight all INW Users and Groups and click *Remove*.
11. Click *OK*.
12. Navigate to *D:\Program Files\GE Medical Systems\Report\_Router\Bin\List Sharing*.

13. Right-click on the *List Sharing* folder.
14. Select *Sharing*.
15. Select the *Permissions* button.
16. Highlight all INW Users and Groups and click *Remove*.
17. Click *OK*.
18. Select the *Security* tab.
19. Highlight all INW Users and Groups and click *Remove*.
20. Click *OK*.
21. Close all open windows.

### **Remove the CVIS Server from the INW Domain**

If the CVIS is in the INW Active Directory Domain, it must be removed from the Domain, and then added back to the Domain.

1. Log on as **local MuseAdmin** (password: **Muse!Admin**).
2. Right-click *My Computer* icon and select *Properties*.
3. Select the *Computer Name* tab.
4. Click the *Change* button.

The *Computer Name Changes* window is displayed.

5. In the *Member of* section, select the *Workgroup* radio button, enter **CARDIOLAN** as the workgroup name and click *OK*.

Enter the log on as **MuseAdmin** (password **Muse!Admin**) if prompted.

6. Click *OK*.

The member change takes about 1 minute. A *Welcome to the workgroup* window is displayed when complete.

7. Click *OK*.
8. Click *OK* at the confirmation message to restart the computer.
9. Click *OK*.
10. Click *OK* at the *System Properties* window to close.
11. Click *Yes* to restart the system.

12. Log on as **local MuseAdmin** (password: **Muse!Admin**).

### **Delete unrecognizable user names**

1. Right-click *My Computer* icon and select *Manage*.
2. Expand *Local Users and Groups* and select *Groups*.
3. Open the first group and delete any member names that begin with a question mark “?”.
4. Repeat for all other groups.
5. Close the *Computer Management* window.

### **Add CVIS Server to the INW Domain**

1. Right-click *My Computer* icon and select *Properties*.
2. Select the *Computer Name* tab.
3. Click the *Change* button.

The *Computer Name Changes* window is displayed.

4. In the *Member of* section, select the *Domain* radio button, enter the INW Domain name and click *OK*.
5. Click *OK*.

The member change takes about 1 minute. A *Welcome to the Domain* window is displayed when complete.

6. Click *OK*.
7. Click *OK* at the confirmation message to restart the computer.
8. Click *OK*.
9. Click *OK* at the *System Properties* window to close.
10. Click *Yes* to restart the system.

### **Configure the import share on the CVIS Server**

The following users or groups are from the INW domain:

- MLCLTechUser
- MLCLUsrGrp
- MLCLAdmGrp
- MLCLSystemGrp

1. Log onto as local MuseAdmin to the English US (and English Canada) CVIS server (Contact GE Technical Support or the system administrator for current password information).
2. Open *Windows Explorer* on the US (and English Canada) CVIS server Interface or Express Server.
3. Navigate to *D:\Mac-Lab\Import*.
4. Right-click the *Import* folder.
5. Select *Sharing*.
6. Remove all existing entries.
7. Click the *Permissions* button.
8. Click the *Add* button.
9. Select the INW domain from the dropdown.
10. Multi-select the following users/groups:
  - MLCLTechUser
  - MLCLUsrGrp
  - MLCLAdmGrp
  - MLCLSystemGrp
11. Click the *Add* button.
12. Click the *OK* button.
13. Highlight each added user and check the *Full Control* checkbox.
14. Remove the *Everyone* group if listed under the Share.
15. Click *OK*.
16. Select the *Security* tab.
17. Remove all existing entries.
18. Click *Add*.
19. Select the INW domain from the dropdown.
20. Multi-select the following users/groups:
  - MLCLTechUser
  - MLCLUsrGrp
  - MLCLAdmGrp
  - MLCLSystemGrp

21. Click *Add*.
22. Click *OK*.
23. Highlight each added user and check the *Full Control* checkbox.
24. Click *OK*.
25. Click *OK*.

## Configure the US (and English Canada) CVIS List Sharing Share

The following users or groups are from the INW domain:

- MLCLTechUser
  - Administrator
  - MLCLSqlUser
1. Log onto as **local MuseAdmin** to the US (and English Canada) CVIS server.
  2. Open *Windows Explorer* on the US (and English Canada) CVIS server Interface or Express Server.
  3. Navigate to *D:\Program Files\GE Medical Systems\Report\_Router\Bin\List Sharing*.
  4. Right-click the *List Sharing* folder.
  5. Select *Sharing*.
  6. Select the *Permissions* button.
  7. Remove all existing entries.
  8. Click *Add*.
  9. Select the INW domain from the dropdown.
  10. Multi-select the following users/groups:
    - MLCLTechUser
    - Administrator
    - MLCLSqlUser
  11. Click *Add*.
  12. Click *OK*.
  13. Highlight each added user and check *Full Control* checkbox.
  14. Remove the *Everyone* group if listed under the Share.

15. Click *OK*.
16. Select the *Security* tab.
17. Remove all existing entries.
18. Click *Add*.
19. Select the INW domain from the dropdown.
20. Multi-select the following users/groups:
  - MLCLTechUser
  - Administrator
  - MLCLSqlUser
21. Click *Add*.
22. Click *Close*.
23. Highlight each added user and check *Full Control* checkbox.
24. Click *OK*.
25. Click *OK*.

### **Configure CVIS Central List Management on the INW server**

1. At the INW server, double-click the *Service Console* icon on the Desktop.
2. Navigate to *GEMS Central List Management > Central List Setup*
3. In the *CVIS Server Export Directory* click the... button to browse.
4. Browse to the path on the US (and English Canada) CVIS server.  
This may be a mapped drive or the UNC name.
5. In the *Location* dropdown box, select the appropriate location for the hospital.
6. Click *Update Lists*.
7. Close the *Service Console* window.

### **Check List Management Service status**

1. Go to *Control Panel > Administrative Tools > Services*.
2. Verify the Gems Task Scheduler is running.
3. Verify the Central List Management Service is running.

## Non-US (or English Canada) CVIS Configuration

Refer to Non-US (or English Canada) CVIS Installation manual for steps to install the Server and its clients.

Record the following information for the Non-US (or English Canada) CVIS Server:

Perform the following steps to configure Central List Management:

1. Double-click the *Service Console* icon on the Desktop.
2. Navigate to *GEMS Central List Management > Central List Setup*
3. In the *CVIS Server Export Directory* click the... button to browse.
4. Browse to the path on the non-US (or English Canada) CVIS server.

This may be a mapped drive or the UNC name

5. In the *Location* dropdown box, select the appropriate location for the hospital.
6. Click *Update Lists*.

The *Update Lists* button must be clicked on the Mac-Lab/CardioLab system each time the lists are updated on the US (or English Canada) CVIS server. Ensure this is done while the application is not running.

7. Close the *Service Console* window.

### **Check List Management Service status**

1. Go to *Control Panel > Administrative Tools > Services*.
2. Verify the Gems Task Scheduler is running.
3. Verify the Central List Management Service is running.



# 6 Parts List

# Centricity Cardiology INW G3 Server

Part Number	Description
2020321-004	CMPTR SVR RACK MNT CLINK WVFM ARCH HIGH (M4)
2020321-005	CMPTR SVR RACK MNT CLINK WVFM ARCH MID (M4)
2020321-006	CMPTR SVR RACK MNT CLINK WVFM ARCH LOW (M4)
2015258-001	CMPTR SERVER RM CPQ ML370G3 2.8G 512MB - Base
2015265-001	MEMORY CPQ 512MB PC2100 2X256
2016993-001	ADPTR DISK RAID HP SMART ARRAY 641
2015268-001	DISK DRIVE CPQ HOT SWAP 36.4GB 10K U320
2015268-002	DISK DRIVE CPQ HOT SWAP 72.8GB 10K U320
2015268-003	DISK DRIVE CPQ HOT SWAP 146.8GB 10K U320
2018036-001	TAPE DRIVE AIT-3 100GB INTERNAL
2005996-001	TAPE DRIVE AIT-2 50GB INTERNAL
2006397-001	PWR CONDTNR CPQ UPS 3KVA RACK MNT 2U
2006397-002	PWR CONDTNR CPQ UPS 220V INTL 3KVA 2U
2006397-003	PWR CONDTNR CPQ UPS 100V JP 3KVA 2U
414582-222	POWER ADAPTER 230VAC/DC ME (FOR EUROPE)
414582-223	POWER ADAPTER 100VAC/DC JAP (FOR JAPAN)
414582-224	POWER ADAPTER 240VAC/DC AA (FOR ASIA/AUSTRALIA)
414582-225	POWER ADAPTER 240VAC/DC UK (FOR UNITED KINGDOM)
2000594-019	DSPL CRT 17" COMPAQ V7550 CARBON
2019000-001	KYBD TRACKBALL INTEGRATED 1U HP
2019028-001	CARDIOLINK SERVER RACK
421572-028	CABLE ETHERNET
2018135-004	AIT-2 TAPE CARTRIDGES - Single
2018135-003	AIT-3 TAPE CARTRIDGES - Single
2025078-001	INTERFACE ADAPTORS
2025079-001	CAT5 ETHERNET PATCH CABLE 10FT.

Part Number	Description
2025080-001	Keyboard, Mouse, and Video Zip Cable
2019300-001	CMPTR 1GB PC2100 DDR (2X512MB)

## Centricity Cardiology INW G4 Server

Part Number	Description
2026341-001	CMPTR SVR RACK MNT CLINK WVFM ARCH HIGH (M4)
2026341-002	CMPTR SVR RACK MNT CLINK WVFM ARCH MID (M4)
2026341-003	CMPTR SVR RACK MNT CLINK WVFM ARCH LOW (M4)
2026366-001	CMPTR SERVER ML/CL INW G4 BASE
2015268-002	DISK DRIVE CPQ HOT SWAP 72.8GB 10K U320
2015268-003	DISK DRIVE CPQ HOT SWAP 146.8GB 10K U320
2015268-004	DISK DRIVE CPQ HOT SWAP 300 GB 10K U320
2024244-002	TAPE DRIVE SONY AIT-3 SDX-700V/RB INTERNAL
2005996-001	TAPE DRIVE AIT-2 SDX-500V/RB INTERNAL
2026819-001	MEMORY HP 512MBX DDR2-400MHZ PC2-3200
2016993-001	ADPTR DISK RAID HP SMART ARRAY 641
2026817-001	CARD HP BBWC ENABLER - MEM -128 MB DDR
2025649-001	HP CD-RW/DV ROM 48X COMBO DRIVE
2026881-001	CARD HP NC320T PCI GIGABIT NIC
2006397-001	PWR CONDTNR CPQ UPS 3KVA RACK MNT 2U
2006397-002	PWR CONDTNR CPQ UPS 220V INTL 3KVA 2U
2006397-003	PWR CONDTNR CPQ UPS 100V JP 3KVA 2U
414582-222	POWER ADAPTER 230VAC/DC ME (FOR EUROPE)
414582-223	POWER ADAPTER 100VAC/DC JAP (FOR JAPAN)
414582-224	POWER ADAPTER 240VAC/DC AA (FOR ASIA/AUSTRALIA)
414582-225	POWER ADAPTER 240VAC/DC UK (FOR UNITED KINGDOM)
421572-028	CABLE ETHERNET

Part Number	Description
2018135-004	AIT-2 TAPE CARTRIDGES - Single
2018135-003	AIT-3 TAPE CARTRIDGES - Single
2025078-001	INTERFACE ADAPTORS
2025079-001	CAT5 ETHERNET PATCH CABLE 10FT.
2025080-001	Keyboard, Mouse, and Video Zip Cable

## Centricity Cardiology INW G5 Server

Part Number	Description
2038168-001	CMPTR SERVER CL/ML INW G5 HI
2038168-002	CMPTR SERVER CL/ML INW G5 MID
2038168-003	CMPTR SERVER CL/ML INW G5 LO
2038630-001	CMPTR SERVER ML/CL INW G5 BASE
2036800-038	HP SMARTARRAY P400 CNTRLR CACHE MOD
2034798-001	HP 72GB 10K SAS 2.5 HOT PLUG HARDDRIVE
2034806-001	HP 146GB 10K SAS 2.5 HOT PLUG HARDDRIVE
2024244-002	TAPE DRIVE SONY AIT-3 SDX-700V/RB INTERNAL
2024244-003	TAPE DRIVE AIT-2 turbo SDX-550V INTERNAL
2036798-017	MEMORY HP 2GB Fully Buffered DIMM PC2-5300F (2x1GB Memory)
2036800-025	HP ML370 DVD-RW DRIVE
414582-222	POWER ADAPTER 230VAC/DC ME (FOR EUROPE)
414582-223	POWER ADAPTER 100VAC/DC JAP (FOR JAPAN)
414582-224	POWER ADAPTER 240VAC/DC AA (FOR ASIA/AUSTRALIA)
414582-225	POWER ADAPTER 240VAC/DC UK (FOR UNITED KINGDOM)
421572-028	CABLE ETHERNET
2018135-005	TAPE CARTRIDGE AIT-2 TURBO 80GB
2018135-003	AIT-3 TAPE CARTRIDGES - Single

Part Number	Description
2025078-001	INTERFACE ADAPTORS
2025079-001	CAT5 ETHERNET PATCH CABLE 10FT.
2025080-001	Keyboard, Mouse, and Video Zip Cable
2036800-014	HP ML370 1000-W HOT-PLUG POWER SUPPLY
2036800-015	HP ML370 HOT-PLUG FAN, 120-MM

# HP8400 Computer

Part Number	Description
2037934-001	ASSY CMPTR CLAB/MLAB REVIEW (DVD-RAM drive)
2037934-002	ASSY CMPTR CLAB/MLAB ACQUISITION (DVD-RAM drive)
2037934-003	ASSY CMPTR CLAB/MLAB ACQUISITION W/ IMAGE IN (DVD-RAM drive)
2037934-004	ASSY CMPTR CLAB/MLAB ACQ. W/ IMAGE IN/OUT (DVD-RAM drive)
Base Computer - 2037935-001	
2032742-001	80GB SATA/7200 ALL (Hard Drive)
2028599-002	DISK DRIVE PANASONIC SW-9576 DVD-RAM
2021462-001	DVD Disk Cartridge. 9.4 GB, Formatted
2038813-001	MEMORY INVASIVE HPXW8400 2GB FRU KIT
2026539-001	OPTICAL USB SCROLL MOUSE ALL
2038827-001	FAN HPXW8400 FAN KIT
2026188-001	CARD, VIDEO, MATROX PCI PARHELIA
MAC-LAB/CARDIOLAB Computers	
422310-001	MOUSEPAD GE
2038834-001	EQPMT, BARCODE SCANNER 3800G USB (replaces 2003417-001 EQPMT, BARCODE SCANNER)
2021697-001	DVI TO DB15 VIDEO ADAPTER
2014935-002	PCB COMM PCI
2009937-002	PCB TRAMNET TO ETHERNET ADAPTER
2003587-001	CABLE, MULTICONDUCTOR, DB-44, M-M, 2.5 FT.
2017795-002	CARD DUAL NIC ADAPTER PCI-E GIGABIT
IMAGE CAPTURE/CARDIOIMAGE Computers	
2030688-001	CARD, VIDEO, MATROX ODYSSEY XA
2026189-002	CARD VIDEO,ATI FIREGL V5200 256MB PCI-E

Part Number	Description
2017899-001	KIT, IMAGE CABLING ACCESSORIES CABLE DVI-I MALE TO 5 BNC FEMALES CABLE BNCM TO BNCM, MIN RG-59 COAX, 50FT
UPGRADES	
2022686-001	IMAGE CAPTURE UPGRADE KIT
2022687-003	KIT CARDIOIMAGE UPGRADE XW8400
2022688-003	KIT CARDIOIMAGE UPG IMAGE CAPTURE XW8400
2021561-001	UPGRADE KIT: MO DRIVE Kit is used to add MO drive to computers (for backward compatibility)
2003888-001	DISK OPTICAL FAT 16 FMT DRV4 MLAB 2.6 GB VIA
2012522-002	ADPTR, INTERNAL SCSI3 TO SCSI2
2003340-001	DISK DRIVE OPT 5 1/4 SONY SMO-F551SD (Black bezel)
2038632-001	CARD SCSI PCI-E
<b>CARDIOLAB Keyboards from Language Kits</b>	
2003809-002	CARDIOLAB KEYBOARD
2003810-009	GERMAN CARDIOLAB KEYBOARD
2003810-008	FRENCH CARDIOLAB KEYBOARD
2003810-011	ITALIAN CARDIOLAB KEYBOARD
2003810-010	SPANISH CARDIOLAB KEYBOARD
2003810-019	CHINESE CARDIOLAB KEYBOARD
2003810-016	SWEDISH CARDIOLAB KEYBOARD
<b>COMBOLAB Keyboards from Language Kits</b>	
2003809-003	COMBOLAB KEYBOARD
2003810-005	GERMAN COMBOLAB KEYBOARD
2003810-004	FRENCH COMBOLAB KEYBOARD
2003810-007	ITALIAN COMBOLAB KEYBOARD
2003810-006	SPANISH COMBOLAB KEYBOARD

Part Number	Description
2003810-021	CHINESE COMBOLAB KEYBOARD
2003810-018	SWEDISH COMBOLAB KEYBOARD
<b>MACLAB Keyboards from Language Kits</b>	
2003809-001	MACLAB KEYBOARD
2003810-013	GERMAN MACLAB KEYBOARD
2003810-012	FRENCH MACLAB KEYBOARD
2003810-015	ITALIAN MACLAB KEYBOARD
2003810-014	SPANISH MACLAB KEYBOARD
2003810-020	CHINESE MACLAB KEYBOARD
2003810-017	SWEDISH MACLAB KEYBOARD

## HP8200 Computer

Part Number	Description
2026192-001	ASSY CMPTR CLAB/MLAB REVIEW (DVD-RAM drive)
2026192-002	ASSY CMPTR CLAB/MLAB ACQUISITION (DVD-RAM drive)
2026192-003	ASSY CMPTR CLAB/MLAB ACQUISITION W/ IMAGE IN (DVD-RAM drive)
2026192-004	ASSY CMPTR CLAB/MLAB ACQ. W/ IMAGE IN/OUT (DVD-RAM drive)
Base Computer - 2026354-001	
2032742-001	80GB SATA/7200 ALL (Hard Drive) (replaces 2026822-001 40GB ATA/7200 Hard Drive)
2028599-001	DVD Drive (replaces 2026193-001 DVD Drive)
2021462-001	DVD Disk Cartridge. 9.4 GB, Formatted
2032582-001	INVASIVE HPXW8200 512-MB MEMORY FRU KIT
2026539-001	OPTICAL USB SCROLL MOUSE ALL
2026824-001	Rear fan



Part Number	Description
2026804-001	3.5 IN FLOPPY DRIVE (HP#312506-001)
2026188-001	CARD, VIDEO, MATROX PCI PARHELIA
MAC-LAB/CARDIOLAB Computers	
422310-001	MOUSEPAD GE
2003417-001	EQPMT, BARCODE SCANNER
2021697-001	DVI TO DB15 VIDEO ADAPTER
2014935-002	PCB COMM PCI
2009937-002	PCB TRAMNET TO ETHERNET ADAPTER
2003587-001	CABLE, MULTICONDUCTOR, DB-44, M-M, 2.5 FT.
2017795-001	CARD DUAL NIC ADAPTER PCI GIGABIT
IMAGE CAPTURE/CARDIOIMAGE Computers	
2030688-001	CARD, VIDEO, MATROX ODYSSEY XA (replaces 2017708-001 MATROX ODYSSEY XPRO)
2026189-001	CARD, VIDEO,ATI FIREGL V5100 128 MB PCI-E
2017899-001	KIT, IMAGE CABLING ACCESSORIES CABLE DVI-I MALE TO 5 BNC FEMALES CABLE BNCM TO BNCM, MIN RG-59 COAX, 50FT
UPGRADES	
2022686-001	IMAGE CAPTURE UPGRADE KIT
2022687-002	CARDIOIMAGE UPGRADE KIT
2022688-002	CARDIOIMAGE UPGRADE FROM IMAGE CAPTURE
2021561-001	UPGRADE KIT: MO DRIVE Kit is used to add MO drive to computers (for backward compatibility)
2003888-001	DISK OPTICAL FAT 16 FMT DRV4 MLAB 2.6 GB VIA
2012522-002	ADPTR, INTERNAL SCSI3 TO SCSI2
2003340-001	DISK DRIVE OPT 5 1/4 SONY SMO-F551SD (Black bezel)
CARDIOLAB Keyboards from Language Kits	

Part Number	Description
2003809-002	CARDIOLAB KEYBOARD
2003810-009	GERMAN CARDIOLAB KEYBOARD
2003810-008	FRENCH CARDIOLAB KEYBOARD
2003810-011	ITALIAN CARDIOLAB KEYBOARD
2003810-010	SPANISH CARDIOLAB KEYBOARD
2003810-019	CHINESE CARDIOLAB KEYBOARD
2003810-016	SWEDISH CARDIOLAB KEYBOARD
<b>COMBOLAB Keyboards from Language Kits</b>	
2003809-003	COMBOLAB KEYBOARD
2003810-005	GERMAN COMBOLAB KEYBOARD
2003810-004	FRENCH COMBOLAB KEYBOARD
2003810-007	ITALIAN COMBOLAB KEYBOARD
2003810-006	SPANISH COMBOLAB KEYBOARD
2003810-021	CHINESE COMBOLAB KEYBOARD
2003810-018	SWEDISH COMBOLAB KEYBOARD
<b>MACLAB Keyboards from Language Kits</b>	
2003809-001	MACLAB KEYBOARD
2003810-013	GERMAN MACLAB KEYBOARD
2003810-012	FRENCH MACLAB KEYBOARD
2003810-015	ITALIAN MACLAB KEYBOARD
2003810-014	SPANISH MACLAB KEYBOARD
2003810-020	CHINESE MACLAB KEYBOARD
2003810-017	SWEDISH MACLAB KEYBOARD

## HP8000 Computer

Part Number	Description
2017588-001 Rev A 2017588-001 Rev B 2021331-001	ASSY CMPTR CLAB/MLAB REVIEW (CD-RW and MO Drives) ASSY CMPTR CLAB/MLAB REVIEW (DVD-RAM and MO Drives) ASSY CMPTR CLAB/MLAB REVIEW (DVD-RAM drive)  (2021331-001 replaces all previous computers)
2017588-002 Rev A 2017588-002 Rev B 2021331-002	ASSY CMPTR CLAB/MLAB ACQUISITION (CD-RW and MO Drives) ASSY CMPTR CLAB/MLAB ACQUISITION (DVD-RAM and MO Drives) ASSY CMPTR CLAB/MLAB ACQUISITION (DVD-RAM drive and MO Drives)  (2021331-002 replaces all previous computers):
2017588-003 Rev A 2017588-003 Rev B 2021331-003	ASSY CMPTR CLAB/MLAB ACQUISITION W/ IMAGE IN (CD-RW and MO Drives) ASSY CMPTR CLAB/MLAB ACQUISITION W/ IMAGE IN (DVD-RAM and MO Drives) ASSY CMPTR CLAB/MLAB ACQUISITION W/ IMAGE IN (DVD-RAM drive and MO Drives)  (2021331-003 replaces all previous computers)
2017588-004 Rev A 2017588-004 Rev B 2021331-004	ASSY CMPTR CLAB/MLAB ACQ. W/ IMAGE IN/OUT (CD-RW and MO Drives) ASSY CMPTR CLAB/MLAB ACQ. W/ IMAGE IN/OUT (DVD-RAM and MO Drives) ASSY CMPTR CLAB/MLAB ACQ. W/ IMAGE IN/OUT (DVD-RAM drive and MO Drives)
Base Computer - 2021948-001	
2026525-001	40GB ATA/7200 ALL (Hard Drive) (HP# 308559-001)
2028599-001	DVD Drive
2021462-001	DVD Disk Cartridge. 9.4 GB, Formatted
2026538-001	512M/266 DD E (2X256) ALL (Memory) (Kingston# KTH-ZX2000/512)
2026539-001	OPTICAL USB SCROLL MOUSE ALL (HP#323617-005)
2026540-001	REAR FAN (HP# 312507-001)
2026541-001	3.5 IN FLOPPY DRIVE (HP#312506-001)
2026542-001	FLOPPY DRIVE CABLE (HP#312513-001)
MAC-LAB/CARDIOLAB Computers	
422310-001	MOUSEPAD GE
2003417-001	EQPMT, BARCODE SCANNER
2017707-001	CARD, VIDEO, MATROX, AGP PARHELIA

Part Number	Description
2021697-001	DVI TO DB15 VIDEO ADAPTER
2014935-002	PCB COMM PCI
2009937-002	PCB TRAMNET TO ETHERNET ADAPTER
2003587-001	CABLE, MULTICONDUCTOR, DB-44, M-M, 2.5 FT.
2017795-001	CARD DUAL NIC ADAPTER PCI GIGABIT
IMAGE CAPTURE/CARDIOIMAGE Computers	
2017708-001	CARD, VIDEO, MATROX ODYSSEY XPRO
2017709-001	CARD, VIDEO, MATROX PCI PARHELIA
2017899-001	KIT, IMAGE CABLING ACCESSORIES CABLE DVI-I MALE TO 5 BNC FEMALES CABLE BNCM TO BNCM, MIN RG-59 COAX, 50FT
UPGRADES	
2022686-001	IMAGE CAPTURE UPGRADE KIT
2022687-001	CARDIOIMAGE UPGRADE KIT
2022688-001	CARDIOIMAGE UPGRADE FROM IMAGE CAPTURE
2021738-001	UPGRADE KIT FOR CL/CO/ML
2021561-001	UPGRADE KIT: MO DRIVE Kit is used to add MO drive to computers (for backward compatibility)
2003888-001	DISK OPTICAL FAT 16 FMT DRV4 MLAB 2.6 GB VIA
2012522-002	ADPTR, INTERNAL SCSI3 TO SCSI2
2003340-001	DISK DRIVE OPT 5 1/4 SONY SMO-F551SD (Black bezel)
2021562-001	UPGRADE KIT: DVD-RAM DRIVE Kit is used to add DVD-RAM drive to 2017588-00x Rev A computers (for forward compatibility)
CARDIOLAB Keyboards from Language Kits	
2003809-002	CARDIOLAB KEYBOARD
2003810-009	GERMAN CARDIOLAB KEYBOARD

Part Number	Description
2003810-008	FRENCH CARDIOLAB KEYBOARD
2003810-011	ITALIAN CARDIOLAB KEYBOARD
2003810-010	SPANISH CARDIOLAB KEYBOARD
2003810-019	CHINESE CARDIOLAB KEYBOARD
2003810-016	SWEDISH CARDIOLAB KEYBOARD
<b>COMBOLAB Keyboards from Language Kits</b>	
2003809-003	COMBOLAB KEYBOARD
2003810-005	GERMAN COMBOLAB KEYBOARD
2003810-004	FRENCH COMBOLAB KEYBOARD
2003810-007	ITALIAN COMBOLAB KEYBOARD
2003810-006	SPANISH COMBIOLAB KEYBOARD
2003810-021	CHINESE COMBOLAB KEYBOARD
2003810-018	SWEDISH COMBOLAB KEYBOARD
<b>MACLAB Keyboards from Language Kits</b>	
2003809-001	MACLAB KEYBOARD
2003810-013	GERMAN MACLAB KEYBOARD
2003810-012	FRENCH MACLAB KEYBOARD
2003810-015	ITALIAN MACLAB KEYBOARD
2003810-014	SPANISH MACLAB KEYBOARD
2003810-020	CHINESE MACLAB KEYBOARD
2003810-017	SWEDISH MACLAB KEYBOARD

## Integrated Electronics Box (IEB)

Part Number	Description
2033852-001	<b>PWR BOX IEB, W/VIDEO, ANALOG I/O 100V (replaces 2010698-001 IEB)</b> Includes parts listed under 120V IEB, except the following parts are changed:
2006323-001	CABLE POWER, IEC C19 TO UNTERMINATED
2033852-002	<b>PWR BOX IEB, W/VIDEO, ANALOG I/O 120V (replaces 2010698-002 IEB)</b>
2003253-002	XFMR, ISO, 100-240VAC, 50/60HZ, 2.0KVA
2003680-001	ASSY DB CONNECT FOR IEB
2003681-003	ASSY VID/MUX FOR IEB
2013535-001	PWR SPLY SW 90-265VAC 50-60HZ 16.5/-5/5V
700775-001	PWR CORD 125V 15A 2.5M
2003410-001	CABLE BNCM TO BNCM, MIN RG-59 COAX, 30FT
2003927-001	POWER CORD IEC (M)-IEC(F) 8FOOT
2003928-001	CABLE, VIDEO, DB15MHD-DB15MHD; 5FT
2033852-003	<b>PWR BOX IEB, W/VIDEO, ANALOG I/O 240V (replaces 2010698-003 IEB)</b> Includes parts listed under 120V IEB, except the following parts are changed:
2006323-001	CABLE POWER, IEC C19 TO UNTERMINATED
700774-001	PWR CORD 250V 13A 2.5M EURO
2011055-001	IEB SHELF ASSY 100V & 120V Use this replacement part for repair of an RAU power supply (2003264-001) and/or Vid/mux power supply (2003266-001)
2011055-002	IEB SHELF ASSY 240V Use this replacement part for repair of an RAU power supply and/or Vid/mux power supply.
2033852-004	<b>IEB, MAC-LAB, NO MDM, 240V CHINESE</b> Includes parts listed under 120V IEB, except the following parts are changed:

## Uninterruptible Power Supply (UPS)

Part Number	Description
2034077-001	UPS POWERCOM, 120V, 50/60 Hz, 1500VA, BNT (replaces: 2033849-001 UPS POWERCOM, 120V, 1000VA 2031037-001 UPS POWERCOM, 115V, 800VA 2023532-001 BTRY UPS, 115V, MI800)
2034078-001	UPS POWERCOM, 230V, 50/60 Hz, 1500VA, BNT (replaces: 2033850-001 UPS POWERCOM, 240V, 1000VA 2031038-001 UPS POWERCOM, 230V, 800VA 2023533-001 BTRY UPS, 230V, MI800)
2034079-001	UPS POWERCOM, 100V, 50/60 Hz, 1500VA, BNT (replaces: 2033851-001 UPS POWERCOM, 100V, 1000VA 2031039-001 UPS POWERCOM, 100V, 800VA 2023534-001 BTRY UPS, 100V, MI800)

## Monitors and Printers

Part Number	Description
2030979-001	MONITOR NEC 19" LCD 1990SXI BLACK - MOD (replaces 1980 SXI 19" LCD - p/n 2024188-002)
2027200-001	MONITOR NEC 19" CRT FE 992 (Used for real-time scrolling)
2030604-002	DSPL LCD 20 INCH NEC LCD 2090UX+ (replaces 2080UX 20" LCD - p/n 2020737-002)
2004036-001	POWER CABLE
6119-101	CABLE PARALLEL PRNTR 8-12 FT
2031697-001	CABLE EPP DB25M/MDR36M 10 FT

Part Number	Description
9242-101	PAPER 20LB BOND WHITE 8 1/2x11
2037296-001	PRINTER LASER RICOH 4100N - US (replaces 2026916-001 RICOH AP410N)
2037296-002	PRINTER LASER RICOH 4100N - 220V (replaces 2026916-002 RICOH AP410N)
2026916-001	PRINTER LASER RICOH AP410N - US (replaces 2016771-001 HP LJ2300)
2026916-002	PRINTER LASER RICOH AP410N - 220V
2030606-001	PRINTER LASER COLOR RICOH CL3500 (replaces CL3000 printer - p/n 2023223-001)
2030606-002	PRINTER LASER COLOR RICOH CL3000 220V (replaces CL3000 220V printer - p/n 2023223-002)



# TRAMnet

Part Number	Description
2018683-001 2011129-001 2016133-001 2016134-001	<b>Kit MLCL TRAMnet Cabling Accessories</b> CABLE ETHERNET PATCH - 1FT ASSY CABLE TNET TO IEB D 9M/9F ASSY CABLE IEB TO RAC 4A ADAPTOR
2019445-001	TRAM 451 CABLE KIT (AHA): includes ACQ CABLE, TRAMNET CABLES, AND MOUNTING KIT
2019446-001	TRAM 451N CABLE KIT (AHA): includes ACQ CABLE, TRAMNET CABLES, AND MOUNTING KIT
2019447-001	TRAM 451M CABLE KIT (AHA): includes ACQ CABLE, TRAMNET CABLES, AND MOUNTING KIT
2021597-001	TRAM 451N CABLE KIT (IEC): includes ACQ CABLE AND MOUNTING KIT
2021598-001	TRAM 451M CABLE KIT (IEC): includes ACQ CABLE AND MOUNTING KIT
2021599-001	TRAM 451N CABLE KIT (IEC)
2021600-001	TRAM 451M CABLE KIT (IEC)
417335-003	ASM, ACQUISITION CABLE 70'
2007759-002	MOUNTING KIT
900031-006	ASSY TRAM RAC 4A W/PWR SPLY
2000633-001	CABLE ASSY CINCH MDC-7P15
412931-005	MAC-LAB 5LD STRTR KIT, RADIOTRANSLUCENT
416035-003	MAC-LAB 12LD STARTER KIT AHA
2025248-002	CABLE ASSY CARDIAC OUTPUT 2.7M (replaces 2002973-004 CABLE ASSY PATIENT CARDIAC OUTPUT 9FT)
9446-909	BATH PROBE TR INJ TEMP 6FT MEI
9446-910	CA TRAM INLINE INJ EDW 3FT MEI
415265-003	KIT NBP ADULT STARTER
900079-006	SYNC CBL, TRAM 3 'Y' ADAPTER

Part Number	Description
2008991-001	ADPTR MINI DIN TO CONN RCPT 6P PHG 1B
2006644-001	CABLE ASSY PATIENT ADAPTER NELLCOR SPO2
407705-006	DURASENSOR ADULT DS-100A INDV
2017002-001	CABLE ASSY SPO2 MASIMO 3.6M (replaces 2016041-001 CABLE ASSY PATIENT ADPT MASIMO SPO2 12FT)
2017002-003	CABLE ASSY SPO2 MASIMO (replaces 2016041-002 CABLE ASSY PATIENT ADPTR MASIMO SPO2 8FT)
2002800-001	MASIMO REUSABLE FINGER SENSOR ADULT
2002799-001	MASIMO REUSABLE FINGER SENSOR PED
2017006-003	CABLE ASSY ECG MLT-LNK 10 LEAD 3.6M IEC (replaces 416035-002 PATIENT CABLE 12SL IEC)
403751-026	LD RT GRB/MNK IEC 60L 10/SET
414873-001	TUBE NBP CUFF
9461-601	BP CUFF DL TUBE ADULT - DURA-CUF
9446-911	CA TR INLINE INJ GOULD 3FT MEI

## Amplifier

Part Number	Description
2003232-001	ASSY CLAB II PLUS 32 AMP 110-240V 50/60HZ
2003232-002	ASSY CLAB II PLUS 64 AMP 110-240V 50/60HZ
2003232-003	ASSY CLAB II PLUS AMPLIFIER 96 CHANNEL
2003232-004	ASSY CLAB II PLUS AMPLIFIER 128 CHANNEL
2003419-001	CABLE, ECG, 10LEAD, SHIELDED 10FT
2003421-001	CABLE LEAD SET, ECG, SHIELDED, 36" WIRES
2003434-001	CABLE FIBER, ST TO FDDI, DUPLEX, 75FT
2007857-001	PRUCKA CATHETER INPUT MODULE LABELS
301-00202-08	CABLE CATHTR INPT MOD3 TPRF 8FT M CLBII+
301-00204-03	CABLE STIM INPT TCHPRF 3FT CLBII+
301-00205-08	CABLE AUX INPT RF RCRD UNIPLR CLBII+

## Speakers & Misc.

Part Number	Description
2018835-001	RF ABLATION DEVICE INTERFACE
<b>2018971-001</b>	<b>16CH ANALOG OUTPUT CPU INTERFACE OPTION</b>
2007557-002	KIT ANALOG OUTPUT BOX W/CABLES
2010476-001	BOX CARDIOLAB/MACLAB ANALOG OUTPUT
2007579-001	CABLE DB 37 MALE/FEMALE 15 FT
417335-002	ASM, ACQUISITION CABLE 51'
2011355-001	CABLE PHONE-BNC M 10FT RG-174 COAX 20 PC
2003410-001	CABLE BNCM TO BNCM, MIN RG-59 COAX, 30FT
<b>2018216-001</b>	<b>KIT, CARTO™ XP System CABLES</b>
2015944-001	AMPLIFIER TO PIU QUICK CONNECT 10 FT
2018217-001	CABLE RJ45 CROSSOVER CAT5 25FT
2024507-001	IC TO PIU QUICK CONNECT 10FT
<b>2018856-001</b>	<b>AUDIBLE INDICATORS 120V</b>
2017900-001	KIT, AUDIO CABLING ACCESSORIES
2011108-002	CABLE AUDIO 50 FT.
2018218-001	STEREO AUDIO SPLITTER 1M-2F
2018219-001	MONO AUDIO ISOLATOR
2039003-001	POWERED SPEAKERS, 120V (replaces 2036113-001, 2029281-001 and 2026555-001)
<b>2018857-001</b>	<b>AUDIBLE INDICATORS 240V</b>
2039004-001	POWERED SPEAKERS, 240V (replaces 2036113-002, 2029281-002 and 2026555-002)
415359-004	PWR CRD ADAPTER 1FT UK
2003625-001	CABLE, NEMA 5-15R to IEC320P, 1FT

Part Number	Description
2003625-001	CABLE, NEMA 5-15R TO IEC320P, 1FT
412340-002	SNSR CBL CO2 CAPNOSTAT 3 W/AGND
412554-003	LABEL MODULE CO2 CAPNOSTAT
412832-001	ASSEMBLY MODULE CO2 CAPNOSTAT
418747-001	STARTER KIT EAGLE 3X00 CO2
<b>2008203-001</b>	<b>MOBILE WORKSTAND CART</b>
2018892-003	65 IN WORKSTATION DESK
2018892-002	47 IN WORKSTATION DESK
2018892-001	MOBILE CABINET

## Dash Connection

Part Number	Description
2000453-001	KIT DOWNLOAD DASH
418335-002	OCTACOMM, SERIAL PORT CABLE
420915-013	DIDCA ASM PC INTERFACE AUTOPORT

## Solar Connection

Part Number	Description
2003408-001	DB9M TO DB9F, 50FT, STRAIGHT THRU

# A Abbreviations

## Electrical & IT Abbreviations

Abbreviation	Description
AD	Active Directory
AC	Alternating Current
AE	Application Entity
AIT	Advanced Intelligent Tape
Com	Communication
CMC	Crystal Management Console
CNDT	Conduit
CPU	Central Processing Unit
DAT	Digital Audio Tape
DC	Direct Current
DICOM	Digital Imaging and Communication in Medicine
DMS	Data Management System
DOS	Disk Operating System
D-Sub	hardware connector
dV/dT	change in Voltage over Time
EMC	Electromagnetic Compatibility
EMI	ElectroMagnetic Interference
ESD	Electrostatic Discharge
GB	gigabytes
HW/SW	Hardware/Software
Hz	Hertz
IEB	Integrated Electronics Box
IEC	International Electrotechnical Commission
INW	Invasive Net Work formerly known as CardioLink



Abbreviation	Description
IT	Information Technology
KB	Kilobytes
kOhm	kilo-ohms
KV	Kilovolts
LCD	Liquid Crystal Display
LMT	Lab Management Tools
MB	Megabytes
MHz	Mega Hertz
ML/CL	Mac-Lab/CardioLab
MWL	Modality Work List
MPPS	Modality Performed Procedure Step
ms	milliseconds
MSDE	MicroSoft Data Engine
mV	millivolts
OD	Optical Disk
OS	Operating System
OU	Organizational Unit
PC	Personal Computer
pcb	Printed Circuit Board
PDF	Portable Document Format
RAC-4A	Remote Acquisition Case
RAU	Remote Acquisition Unit
RF	Radio frequency
TCP/IP	Internet Protocol
UI	User Interface
UPS	Uninterruptible Power Supply

Abbreviation	Description
VIDMUX	Video Multiplexer
V	Volts
VPN	Virtual Private Network

## Hospital Staff

Abbreviation	Description
RN	registered nurse
LPN	licensed practical nurse
LVN	licensed vocational nurse
RT	radiology technologist
RRT	registered respiratory therapist
CVT	cardiovascular technologist
RCIS	registered cardiac interventional specialist
RTRCV	radiologic technologist registered cardiovascular
RCPT	registered cardiopulmonary technologist
MD	doctor of medicine
DO	doctor of osteopathic medicine
PA	physician's assistant
RTR	radiologic technologist registered cardiovascular
NP	nurse practitioner
PhD	doctor of philosophy
RCVT	registered cardiovascular technologist
NA	nurse's assistant
MD/PhD	Physician/Doctor
RCS	registered cardiac sonographer

Abbreviation	Description
CNS	cardiac nurse specialist
DR	doctor
CVVT	certified cardiovascular technologist
CRNA	certified registered nurse anesthetist

## Medical Abbreviations

Abbreviation	Description
OCOf	Cardiac Output by Fick
ABAO	Abdominal Aorta
ACC	American College of Cardiology
ACV	Antecubital Vein
ADT	Admission Discharge Transfer
AIR	Room Oxygen Temperature
Ao	Aorta or Aortic Pressure
APV	Anamalous Pulmonary Vein
ARCH	Transverse Aortic Arch
AREA	Area - No Valve
ARP	Antegrade Refractory Period
ART	Arterial
ARTSAT	Arterial Saturation
ASAO	Ascending Aorta
ATM	Atmospheres
ATPS	Ambient Temperature and Pressure where Gas is Saturated with Water Vapor
AVA	Aortic Valve Area

Abbreviation	Description
Vaudeville	Arteriovenous Oxygen Difference
aVF	left foot augmented lead
AVF	Aortic Valve Flow
AVG	Aortic Valve Gradient
AVI	Aortic Index or Aortic Valve Area Index
aVL	left arm augmented lead
AVN ERP	Atrio-Ventricular Node Effective Refractory Period
A-VO <sub>2</sub> diff	Arterial - Venous Oxygen difference
aVR	right arm augmented lead
AXA	Axillary Artery
AXV	Axillary Vein
AZV	Azygos Vein
BA	Brachial Artery
BIM	bioelectric impedance measurement
BP	Blood Pressure
BPM	Beats Per Minute
BSA	Body Surface Area
BV	Brachial Vein
C.I.	Cardiac Index
C.O.	Cardiac Output
CA	Common Atrium
CARA	Carotid Artery
cath	catheterization
CCU	Coronary Care Unit
CI	Cardiac Index
CIM	Catheter Input Modules

Abbreviation	Description
Clin Proc	Clinical Procedures
CO	Cardiac Output
COL	Systemic Collateral Artery to Lungs
Comp	Complications
Cond Intvls	Conduction Intervals
Cons Sed	Conscious Sedation
COR	Coronary Artery
COTd	Cardiac Output obtained by Thermodilution
COUT	Cardiac Output
COUTI	Cardiac Index
CPT	Current Procedural Terminology
CS	Coronary Sinus
CSNRT	Corrected Sinus Node Recovery Time
CV	Common Ventricle
CVIS	Cardiovascular Information System
CVP	Central Venous Pressure
DCS	Distal Coronary Sinus
DFP	Diastolic Filling Period
DFPm	Mitral Diastolic Filling Period
DFPt	Tricuspid Diastolic Filling Period
DFT	Diastolic Filling Time
Dias	Diastolic
dp/dt	change in pressure per unit in time
DSAO	Descending Aorta
ECG	ElectroCardioGram
EDP	End Diastolic Point

Abbreviation	Description
Emerg	Emergency
EP	electrophysiology
ER	Emergency Room
ERP	Effective Refractory Period
ESU	Electrosurgical Unit
ETCO <sub>2</sub>	End Tidal CO <sub>2</sub>
EXP CO <sub>2</sub>	Expired CO <sub>2</sub>
FA	Femoral Artery
FCa	Arterial Content
FCI	Fick Cardiac Index
FCLA	Fistula Coronary to the Left Atrium
FCLV	Fistula Coronary to the Left Ventricle
FCpa	Pulmonary Artery Content
FCpv	Pulmonary Venous Content
FCRA	Fistula Coronary to the Right Atrium
FCRV	Fistula Coronary to the Right Ventricle
FCv	Venous Content
FEO <sub>2</sub>	Oxygen of Expired Air
FIO <sub>2</sub>	Oxygen of Inspired Air
FIS	Arterial Fistula
FLOW	Flow - No Gradient
FRZ	Freeze
FV	Femoral Vein
Gcm <sup>2</sup>	Gray-centimeter squared
HABAO	High Abdominal Aorta
HAO	High Aorta

Abbreviation	Description
HARCH	High Transverse Aortic Arch
HASAO	High Ascending Aorta
HAZ	Hemiazygos Vein
Hb	Hemoglobin
HDSAO	High Descending Aorta
HEPA	Hepatic Artery
HEPV	Hepatic Vein
HIPAA	Health Insurance Portability and Accountability Act
HIS	Hospital Information System
HIVC	High Inferior Vena Cava
HLA	High Left Atrium
HLV	High Left Ventricle
HLVA	High Left Ventricular Apex
HLVIN	High Left Ventricle Inflow
HLVOC	High Left Ventricle Outflow
HNAO	High Neo-Aorta
HR	Heart Rate
HRA	High Right Atrium
HRAO	Heart Rate
HRf	Fick Heart Rate
HRU	Hybrid Resistance Units
HRV	High Right Ventricle
HRVA	High Right Ventricular Apex
HRVIN	High Right Ventricular Inflow
HRVIN	High Right Ventricle Inflow
HRVOT	High Right Ventricular Outflow

Abbreviation	Description
HSVC	High Superior Vena Cava
HUA	High Umbilical Artery
HUV	High Umbilical Vein
HVC	High Vena Cava
I/O	Intake/output
IABP	Intra-Aortic Balloon Pump
IB	Inferior Baffle
IC	Intra-cardiacs
ICU	Intensive Care Unit
IM	Internal Mammary
IMA	Internal Mammary Artery
INDEX	Valve Index or Area Index - No Valve
INNA	Innominate Artery
INNV	Innominate Vein
INSP CO <sub>2</sub>	Inspired CO <sub>2</sub>
IVC	Inferior Vena Cava
JX	Juxtaposed Appendage
LA	Left Atrium
LACV	Left Antecubital Vein
LaM	Mean Left Atrial Pressure
LAO	Low Aorta
LAPV	Left Anomalous Pulmonary Vein
LARCH	Low Transverse Aortic Arch
LART	Left Arterial
LASAO	Low Ascending Aorta
LAXA	Left Auxiliary Artery



Abbreviation	Description
LAXV	Left Auxiliary Vein
LAZV	Left Azygos Vein
LBA	Left Brachial Artery
LBAO	Low Abdominal Aorta
LBV	Left Brachial Vein
LCA	Left Common Atrium or Left Coronary Artery
LCARA	Left Carotid Artery
LCNDT	Left Conduit
LCOR	Left Coronary Artery
LCV	Left Common Ventricle
LDSAO	Low Descending Aorta
LED	Light Emitting Diode
LFCLV	Left Fistula Coronary to Left Ventricle
LFCRA	Left Fistula Coronary to Right Atrium
LFCRV	Left Fistula Coronary to Right Ventricle
LFIS	Left Arterial Fistula
LFV	Left Femoral Vein
LHAZ	Left Hemiazygos Vein
LHEPA	Left Hepatic Artery
LHEPV	Left Hepatic Vein
LIB	Left Inferior Baffle
LIMA	Left Internal Mammary Artery
LINNA	Left Innominate Artery
LINNV	Left Innominate Vein
LIVC	Low Inferior Vena Cava
LJX	Left Juxtaposed Appendage

Abbreviation	Description
LLA	Low Left Atrium
LLV	Low Left Ventricle
LLVA	Low Left Ventricular Apex
LLVIN	Low Left Ventricle Inflow
LLVOT	Low Left Ventricle Outflow
LNAO	Left Neo-Aorta
LNPA	Left Neo Pulmonary Artery
LOC	Level of Consciousness
LPA	Left Pulmonary Artery
LPAB	Left Pulmonary Artery Branch
LPACN	Left Pulmonary Artery Conduit
LPAVF	Left Pulmonary Artery Venous Fistula
LPAW	Left Pulmonary Artery Wedge
LPDA	Left Patent Ductus Arteriosus
LPV	Left Pulmonary Vein
LPVAT	Left Pulmonary Venous Atrium
LPVC	Left Pulmonary Vein chamber in Cor Triatriatum
LPVCN	Left Pulmonary Vein Confluence
LPVW	Left Pulmonary Vein Wedge
LRA	Low Right Atrium
LRADA	Left Radial Artery
LRENV	Left Renal Vein
LRFLOW	Left to Right Flow
LRFLOWI	Left To Right Shunt Flow Index
LRV	Low Right Ventricle
LRVA	Low Right Ventricular Apex

Abbreviation	Description
LRVIN	Low Right Ventricular Inflow
LRVOT	Low Right Ventricular Outflow
LSBCA	Left Subclavian Artery
LSCLV	Left Subclavian Vein
LSHNT	Left Systemic Pulmonary Shunt
LSP	Left Special
LSPHV	Left Saphenous Vein
LSVC	Low Superior Vena Cava
LTAC	Left Truncus Arteriosus Communis
LUA	Low Umbilical Artery
LUV	Low Umbilical Vein
LV	Left Ventricle
LVA	Left Ventricle Apex
LVC	Low Vena Cava
LVEDP	Left Ventricular End Diastolic Period
LVEN	Left Venous
LVET	Left Ventricle Ejection Time
LVFT	Left Ventricle Filling Time
LVIN	Left Ventricle Inflow
LVOC	Left Ventricle Outflow Chamber
LVOT	Left Ventricle Outflow
LVRTA	Left Vertebral Artery
LVSW	Left Ventricular Stroke Work
LVSWI	Left Ventricle Stroke Work Index
MAP	Mean Arterial Pressure
Meds	Medications

Abbreviation	Description
MMF	Mean Maximum Flow
MRN	Medical Record Number
MV	Mixed Venous
MVA	Mitral Valve Area
MVF	Mitral Valve Flow
MVG	Mitral Valve Gradient
MVGpcws	Mitral Valve Splice Pulmonary Capillary Wedge
MVI	Mitral Index or Mitral Valve Area Index
NAO	Neo Aortic Arch
NIBP	Non-Invasive Blood Pressure
NICU	Neuro Intensive Care Unit
NPA	Neo Pulmonary Artery
O2	Oxygen
Op	Operative
PA	Pulmonary Artery
PAB	Pulmonary Artery Branch
PACN	Pulmonary Artery Conduit
PAFV	Pulmonary Arteovenous Fistula
PAm	Mean Pulmonary Arterial Pressure
PAO2	Mixed Venous Oxygen Saturation a/k/a Pulmonary Artery Saturation
PAW	Pulmonary Artery Wedge
Pb	Barometric Pressure
PCI	Percutaneous Coronary Intervention
PCS	Proximal Coronary Sinus
PCW	Pulmonary Capillary Wedge Pressure
PDA	Patent Ductus Arteriosus

Abbreviation	Description
PER	Period - No Value
PID	Patient Identification
PO2	Dissolved Oxygen Tension a/k/a Partial Pressure of Oxygen
PV	Pulmonary Vein
PVA	Pulmonary Valve Area
PVAT	Pulmonary Venous Atrium
PVCH	Pulmonary Vein Chamber in Cor Triatriatum
PVCN	Pulmonary Vein Confluence
PVF	Pulmonary Valve Flow
PVG	Pulmonary Valve Gradient
PVGs	Pulmonary Valve Splice
PVI	Pulmonary Index or Pulmonary Valve Area Index
PVO2	Pulmonary Vein Saturation
PVR	Peripheral Vascular Resistance
PVR_SVR ratio	Pulmonary Vascular Resistance, Systemic Vascular Ratio
PVR_W	Pulmonary Vascular Resistance in Wood Units
PVRI	Pulmonary Vascular Resistance Index
PVRI_W	Pulmonary Vascular Resistance in Wood Units
PVW	Pulmonary Vein Wedge
Q <sub>eff</sub>	Effective Pulmonary Flow
Q <sub>p</sub>	Pulmonary Flow
Q <sub>p</sub> /Q <sub>s</sub>	Flow Ratio
QPEFFI	Effective Pulmonary Flow Index
Q <sub>pl</sub>	Pulmonary Flow Index
Q <sub>s</sub>	Systemic Flow

Abbreviation	Description
QSI	Systemic Flow Index
R	Report
RA	Right Atrium
RACV	Right Antecubital Vein
Rad	Radiology
RADA	Radial Artery
RaM	Mean Right Atrial Pressure
RAPV	Right Anomalous Pulmonary Vein
RART	Right Arterial
RAVZ	Right Azygos Vein
RAXA	Right Auxiliary Artery
RAXV	Right Auxiliary Vein
RBA	Right Brachial Artery
RCA	Right Common Atrium or Right Coronary Artery
RCARA	Right Carotid Artery
RCNDT	Right Conduit
RCOR	Right Coronary Artery
RCV	Right Common Ventricle
RENA	Renal Artery
RENV	Renal Vein
RFA	Right Femoral Artery
RFCLA	Right Fistula Coronary to Left Atrium
RFCLV	Right Fistula Coronary to Left Ventricle
RFCRA	Right Fistula Coronary to Right Atrium
RFV	Right Femoral Vein
RHAZ	Right Hemiazygos Vein

Abbreviation	Description
RHEPA	Right Hepatic Artery
RHEPV	Right Hepatic Vein
RIB	Right Inferior Baffle
RIMA	Right Internal Mammary Artery
RINNA	Right Innominate Artery
RINNV	Right Innominate Vein
RJX	Right Juxtaposed Appendage
RLFLOW	Right to Left Flow
RLFLOWI	Right to Left Shunt Flow Index
RMOT	Remote Operators Terminal
RNPA	Right Neo Pulmonary Artery
ROI	Region of Interest
RPA	Right Pulmonary Artery
RPAB	Right Pulmonary Artery Branch
RPACN	Right Pulmonary Artery Conduit
RPAVF	Right Pulmonary Artery Venous Fistula
RPAW	Right Pulmonary Artery Wedge
RPDA	Right Patent Ductus Arteriosus
RPV	Right Pulmonary Vein
RPVAT	Right Pulmonary Venous Atrium
RPVC	Right Pulmonary Vein chamber in Cor Triatriatum
RPVCN	Right Pulmonary Vein Confluence
RPVW	Right Pulmonary Vein Wedge
RR	Respiratory Rate
RRADA	Right Radial Artery
RRENV	Right Renal Vein

Abbreviation	Description
RRP	Retrograde Refractory Period
RSCLV	Right Subclavian Vein
RSHNT	Right Systemic Pulmonary Shunt
RSP	Right Special
RSPHV	Right Saphenous Vein
RT	Room Temperature
RTAC	Right Truncus Arteriosus Communis
RVA	Right Ventricle Apex
RVEN	Right Venous
RVET	Right Ventricle Ejection Time
RVFT	Right Ventricle Filling Time
RVIN	Right Ventricle Inflow
RVOT	Right Ventricle Outflow
RVSW	Right Ventricular Stroke Work
RVSWI	Right Ventricle Stroke Work Index
RVTRA	Right Vertebral Artery
SA	Systemic Artery
SAm	Mean Systemic Arterial Pressure
Sat	Saturation
SB	Superior Baffle
SBCA	Subclavian Artery
SCL	Sinus Cycle Length
SCLV	Subclavian Vein
SCV	Superior Vena Cava
SEP	Systolic Ejection Period
Sep/Dfp	Systolic Ejection Period divided by Diastolic Filling Period



Abbreviation	Description
SEPa	Aortic Systolic Ejection Period
SEPP	Systolic Ejection Period
SHNT	Systemic Pulmonary Shunt
SNRT	Sinus Node Recovery Time
SP	Special Pressure
SPHV	Saphenous Vein
SpO2	Peripheral Oxygen Saturation
Stat	statim (Latin for immediately)
Stim	Stimulus
STPD	Standard Temperature and Pressure of Dry Gas
STS	Society of Thoracic Surgeons
SV	Stroke Volume
SVA	Systemic Venous Atrium
SVI	Stroke Index
SVR	Systemic Vascular Resistance
SVR_W	Systemic Vascular Resistance in Wood Units
SVRI	Systemic Vascular Resistance Index
SVRI_W	Systemic Vascular Index in Wood Units
sync	synchronis
Sys	Systolic
T	Room Temperature
TAC	Truncus Arteriosus Communis
TDCI	Thermodilution Cardiac Index
TDCO	Thermodilution Cardiac Output
TPR	Total Peripheral Resistance
TPR_TVR ratio	Total Pulmonary Resistance, Total Vascular Resistance Ratio

Abbreviation	Description
TPR_W	Total Pulmonary Resistance, Wood Units
TPRI	Total Pulmonary Resistance Index
TPRI_W	Total Pulmonary Index, Wood Units
TPVR_W	Total Pulmonary Vascular Resistance in Wood Units
TPVRI_W	Total Pulmonary Vascular Resistance Index in Wood Units
TRAM	Transport Remote Acquisition Monitor
Trig	Trigger
TSVR	Total System Vascular Resistance
TSVR_W	Total Systemic Vascular Resistance in Wood Units
TVA	Tricuspid Valve Area
TVF	Tricuspid Valve Area
TVG	Tricuspid Valve Gradient
TVGs	Tricuspid Valve Splice
TVI	Tricuspid Index or Tricuspid Valve Area Index
TVR	Total Vascular Resistance
TVRI	Total Vascular Resistance Index
TVRI_W	Total Vascular Resistance Index in Wood Units
UA	Umbilical Artery
UV	Umbilical Vein
VA	Valve Area
VC	Vena Cava
VeATPS	Minute volume at ATPS
VEN	Venous
VENSAT	Venous Saturation

Abbreviation	Description
VeSTPD	Minute volume
VeSTPD	Volume of Gas (Corrected)
VF	Valve Flow or Ventricular Fibrillation
VGs	Valve Splice
VI	Valve Index
VO <sub>2</sub>	Oxygen Consumption
VRTA	Vertebral Artery
WCT	Wilson Central Terminal
WU	Wood Units

## Miscellaneous Abbreviations

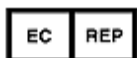
Abbreviation	Description
3-D	Three Dimensional
Accts	Accounts
C	Centigrade
Cal	Calibration
cm	centimeters
cm <sup>2</sup>	centimeters squared
CO <sub>2</sub>	Carbon Dioxide
etc.	etcetera
FAQ	Frequently Asked Questions
gm/dl	grams per deciliter
Grad	Gradient
HT	Height
HH:MM:SS	Hours:Minutes:Seconds

Abbreviation	Description
ID	Identity
IMG	Image
Info	Information
Kgs	kilograms
kPa	Kilopascal
KT	Water Vapor Pressure
lb	pounds
l/min	liters per minute
l/min/m <sup>2</sup>	liters per minute per milliliter squared
mcg	micrograms
ml/dl	milliliters per deciliter
ml/min	milliliters/minute
ml/s	milliliters per second
mm/hg	millimeters of mercury
mm/sec	millimeters per second
UL	Underwriter's Laboratory





GE Medical Systems  
*Information Technologies, Inc.*  
8200 West Tower Avenue  
Milwaukee, WI 53223 USA  
Tel: + 1 414 355 5000  
1 800 558 7044 (US Only)  
Fax: + 1 414 355 3790



GE Medical Systems  
*Information Technologies GmbH*  
Munzinger Straße 5  
D-79111 Freiburg  
Germany  
Tel: + 49 761 45 43 - 0  
Fax: + 49 761 45 43 - 233

#### **Asia Headquarters**

GE Medical Systems  
*Information Technologies Asia; GE (China) Co., Ltd.*  
No. 1 Huatuo Road,  
Zhangjiang Hi-tech Park Pudong  
Shanghai, People's Republic of China 201203  
Tel: + 86 21 3877 7888  
Fax: + 86 21 3877 7402

[www.gehealthcare.com](http://www.gehealthcare.com)

