

GE Healthcare

MUSE™
Cardiology Information System
Version 7.1

Service Manual

2031233-210 Revision L



NOTE: The information in this manual applies only to MUSE Cardiology Information System version 7.1 . 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

For your notes

Manual Information

Revision History

The document number and revision appear at the bottom of each page. This letter identifies the document's update level. The revision history of this document is summarized in the table below.

Table 1. Revision History, PN 2031233-210		
Revision	Date	Comment
A	31 August 2007	Initial release of manual.
B	21 September 2007	<ul style="list-style-type: none">■ Revised installation requirements to include the correct Microsoft XML parser version.■ Revised the backup instructions to describe differences between the G4 and G5 platforms.
C	25 January 2008	Revised "Installing and Configuring the XML Import Option" on page 3-8
D	15 May 2008	Added rp5700 MUSE client.
E	12 September 2008	Added HP L1910 19-inch display and HP P4015n LaserJet printer.
F	5 February 2009	Added information about running modems in a virtual environment.
G	22 April 2009	Added new modem information.
H	31 January 2011	<ul style="list-style-type: none">■ Added G6 platform information.■ Revised system backup information.
J	28 February 2013	Updated for the HP rp5800 platform.
K	4 February 2014	Updated the Backup, Maintenance and System Recovery chapters.
L	19 March 2015	Updated part numbers for the RAM and Internal Hard Drive.

Manual Purpose

This manual supplies technical information for service representatives and technical personnel so they can maintain the equipment to the assembly level. Use it as a guide for maintenance and electrical repairs considered field repairable. Where necessary the manual identifies additional sources of relevant information and or technical assistance.

See the operator manual for the instructions necessary to operate the equipment safely in accordance with its function and intended use.

Manual Content

This manual is organized into the following chapters.

- Chapter 1, Introduction
Describes the service manual and chapter contents. Provides general information on safety, service requirements, equipment symbols, and serial number identification.
- Chapter 2, Equipment Overview
Describes the equipment and its characteristics, connector locations, and preparation for use.
- Chapter 3, Installation
This chapter contains a reference to the MUSE system installation and upgrade documents. Also, there is a section which describes set up the “direct to database” feature.
- Chapter 4, Database Backup
This chapter describes how to configure a GE-supplied file server for database backup and archive as well as procedures for disaster recovery.
- Chapter 5, Troubleshooting
Provides overall and specific troubleshooting help.
- Chapter 6, Maintenance
Contains a preventive maintenance schedule, instructions for opening the unit, and cleaning guidelines.
- Chapter 7, Parts Lists
Contains parts lists for reference in repairing the unit at the assembly level.
- Chapter 8, Glossary
This section contains definitions for technical words and terms used within this document.

Typographical Conventions

The following typographical conventions are used throughout this document.

Convention	Description
Bold	Indicates keys on the keyboard, text to be entered, or hardware items such as equipment buttons or switches.
<i>Italics</i>	Indicates software terms such as menu items, buttons, field names, or options.
[Key 1] + [Key 2]	Indicates a sequence of keys that must be pressed to initiate an action. While pressing and holding the first key, press and release the second key.

Convention	Description
[Space]	Indicates the spacebar must be pressed. Used in command line instructions when the command must be entered precisely.
Enter	Indicates the Enter or Return key must be pressed.

OEM Documentation and Support

The following table lists the system components provided by each original equipment manufacturer (OEM) and the URL of each component's support page. The support pages provide the most current component information, drivers, manuals, troubleshooting help, and support forum for each component. The URLs were current and active at the time this manual was released but are subject to change without notice.

Requirements for accessing and viewing these additional documents vary from manufacturer to manufacturer and sometimes from product to product. Please refer to the requirements listed on each OEM's website.

Table 2. OEM Component Support Pages		
Component Type	Component	Support Page
Servers	HP ProLiant DL370 G6	http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?lang=en&cc=us&taskId=101&prodClassId=&contentType=SupportManual&docIndexId=64255&prodTypeId=15351&prodSeriesId=3890172
	HP ProLiant DL360 G5	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=15351&prodSeriesId=1121486
	HP ProLiant ML370 G5	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=15351&prodSeriesId=1121474
	HP ProLiant ML370 G4	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=15351&prodSeriesId=397646&lang=en&cc=us
Workstations	HP rp5700	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=12454&prodSeriesId=3375897&lang=en&cc=us
	HP rp7600	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=12454&prodSeriesId=472277&lang=en&cc=us
	HP dc7100	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=12454&prodSeriesId=410112&lang=en&cc=us
Printers	HP LaserJet P4015N	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=18972&prodSeriesId=3558793&submit.y=0&submit.x=0&lang=en&cc=us
	HP LaserJet P4250	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=18972&prodSeriesId=412144&lang=en&cc=us
	HP LaserJet 4200N	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=18972&prodSeriesId=84028&lang=en&cc=us

Table 2. OEM Component Support Pages

Component Type	Component	Support Page
Monitors	HP L1910 19-inch LCD	http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&cc=us&prodTypeId=382087&prodSeriesId=3561416&submit.y=0&submit.x=0&lang=en&cc=us
	Compaq CV7500 17-inch CRT	http://h10025.www1.hp.com/ewfrf/wc/product?product=313889&lc=en&cc=us&dlc=en&submit.y=8&submit.x=7&lang=en&cc=us
	NEC 1990SXi 19-inch LCD	http://www.necdisplay.com/SupportCenter/Product/?product=bb77b527-6721-4721-b36c-f0b961836afb
Tape Drives	Sony SDX-550V AIT-2	http://sony.storagesupport.com/product/72#news
Modems	Multitech MultimodemZBA	http://multitech.com/PRODUCTS/Families/MultiModemZBA/
Barcode Readers	3800g Linear Image Scanner	http://www.handheld.com/Site.aspx/na/en/product_center/hardware/?product=136
UPS	Compaq 3000 Series	http://www3.compaq.com/support/reference_library/viewdocument.asp?countrycode=1000&prodid=121 Uninterruptible+Power+Supply&source=341251-002.xml&dt=264
Ethernet Hub	OfficeConnect	http://support.3com.com/infodeli/tools/hubs/off-con/3c16700/manual.a03/dua1670_0aaa04.pdf

Safety Information

Responsibility of the Manufacturer

GE is responsible for the effects of safety, reliability, and performance only if:

- Assembly operations, extensions, readjustments, modifications, or repairs are carried out by persons authorized by GE.
- The electrical installation of the relevant room complies with the requirements of the appropriate regulations.
- The equipment is used in accordance with the instructions for use.

General

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

The device stores ECGs generated by a computerized analysis program which can be used as a tool in ECG tracing interpretation. This computerized interpretation is only significant when used in conjunction with clinical findings. All computer-generated tracings should be overread by a qualified physician.

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

Contact GE for information before connecting any devices to this equipment that are not recommended in this manual.

If the installation of this equipment, in the USA, will use 240 V rather than 120 V, the source must be a center-tapped, 240 V, single-phase circuit.

Parts and accessories used must meet the requirements of the applicable IEC 601 series safety standards, and/or the system configuration must meet the requirements of the IEC 601-1-1 medical electrical systems standard.

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 shall include:

- use of the accessory in the PATIENT VICINITY; and
- evidence that the safety certification of the ACCESSORY has been performed in accordance to the appropriate IEC 601-1 and/or IEC 601-1-1 harmonized national standard.

Equipment Symbols

For an explanation of the symbols that appear on the equipment, refer to the *MUSE™ Cardiology Information System Operator's Manual* (PN 2031233-123).

Warnings and Cautions

DANGER

Do NOT use in the presence of flammable anesthetics.

WARNINGS

Replace only with same type and rating of fuse.

This is Class I equipment. The mains plug must be connected to an appropriate power supply.

Turn off power and disconnect power cord from AC power source before removing the cover.

Disconnect patient from unit BEFORE connecting personal computer to unit.

The file server contains an internal battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- ◆ Do not attempt to recharge the battery.
 - ◆ Do not expose to temperatures higher than 60°C.
 - ◆ Do not disassembly, crush, puncture, short external contacts, or dispose of in fire or water.
 - ◆ Replace only with the Hewlett-Packard spare parts designated for this product.
-
-

CAUTIONS

This equipment contains no user serviceable parts. Refer servicing to qualified service personnel.

U.S. Federal law restricts this device to sale by or on the order of a physician.

Data loss or system failure can result due to ingress of liquids. The system does not provide protection against ingress of liquids. Ensure installation in a cool, dry environment.

To reduce the risk of electric shock, do NOT remove cover (or back). Refer servicing to qualified personnel.

CAUTION

Users should be aware of known RF sources, such as:

- ◆ Radio and TV stations
- ◆ Portable and mobile RF communication devices
(cell phones, two-way radios)

and consider them when installing the medical device or system.

See the “Electromagnetic compatibility” section found either in this manual and/or the service manual for recommended separation distances.

Adding accessories or components, or modifying the medical device or system may degrade the EMI performance. Consult with qualified personnel regarding changes to the system configuration.

Service Information

Service Requirements

Refer equipment servicing to GE 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 or to an agent authorized by GE.

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 MUSE system will always be functional when required

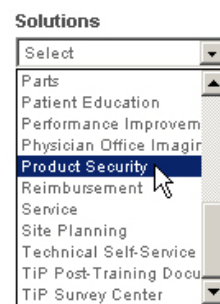
Security Updates

A list of viruses that pose a significant threat to GE customers' product security are posted on the GE Healthcare *Product Security Database* Web site. Vulnerability notification to customers will occur through the Web site. After security patches have been validated for specific GE Healthcare products, this information will be added to this database. After confirming that a particular security patch has been validated for your system configuration, you can download it directly from the Web site of the software manufacturer (Microsoft, etc.) and applied to the customer's GE product. To check on the latest information regarding validated security patches:

1. Browse to the GE Healthcare *Product Security Database* Web site:

<http://www.gehealthcare.com/usen/index.html>

2. Select *Product Security* from the *Solutions* drop-down list.



3. Select *Product Vulnerability Database*.
4. Log on with your SSO (Single Sign On) user name and password.

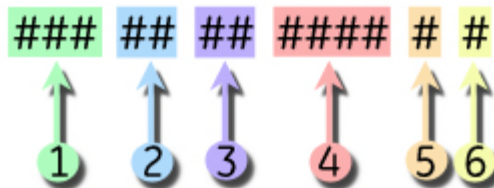
NOTE

If you do not have an SSO, click the *Sign Up* link to obtain an SSO.

5. Use the features on the GE Healthcare *Product Security Database* Web site to determine security patches that can be applied to your system.
6. Download the applicable updates per the instructions that are provided on the update site.

Equipment Identification

Serial Number Format



- 1 Product Code
- 2 Year Manufactured (00-99)
04 = 2004
05 = 2005
06 = 2006
(and so on)
- 3 Fiscal Week Manufactured
- 4 Production Sequence Number
- 5 Manufacturing Site
- 6 Miscellaneous Characteristic

Label Format



- 1 Date of manufacture in YYYY-MM format
- 2 Part number of product
- 3 Product code description
- 4 Serial number (see "Serial Number Format" on page 1-12).

FCC Requirements

Modem Requirements

The modem in your GE device is designed to comply with FCC part 68, U.S. Telecommunication Requirements. See the equipment label on the GE device for the FCC registration number and the ringer equivalence number. The device is designed to be used on standard device telephone lines. Connection to telephone company-provided coin service (central office implemented systems) is prohibited. Connection to party lines service is subject to state tariffs.

The goal of the telephone company is to provide you the best service it can. In order to do this, it may occasionally be necessary for them to make changes in their equipment, operations, or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service. If you have any questions about your telephone line, such as how many pieces of equipment you can connect to it, the telephone company will provide this information upon request.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment which you have connected to your telephone line. Upon request of the telephone company, provide the FCC registration number and the ringer equivalence number (REN) of the equipment which is connected to your line; both of these items are listed on the equipment label. The sum of all of the RENs on your telephone lines should be less than 5 in order to assure proper service from your telephone company. In some cases, a sum of 5 may not be usable on a given line.

If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you in advance of this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

An analog telephone line is required. A digital PBX line will not work.

Emissions (Interference) Requirements

This GE Medical Systems *Information Technologies* device has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Part 15 of the FCC rules. These rules are designed to provide reasonable protection against radio-frequency interference. However, there is no guarantee that interference will not occur in a particular installation.

You can tell whether this device is causing interference by turning it off. If the interference stops, it was probably caused by the device.

Compliance Information – Exceptions

The following table lists any compliance exceptions for the current GE-supplied hardware.

Hardware	Exceptions
HP DL370 G6 File Server	None
HP ML370 G5 File Server	None.
HP ML370 G4 File Server	None.
HP dc7100 Client	None.
HP dc7600 Client	None.
HP rp5700 Client	None.
HP rp5800 Client	None.
UPS	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.

For your notes

2 Equipment Overview

For your notes

System Specifications

The MUSE system is a multiple data-type system designed for managing cardiology data. It can acquire data through a variety of methods (LAN, wireless, floppy disk, SD card, direct line, or telephone transmission) from a variety of sources inside and outside the hospital, such as emergency care and outreach facilities.

After the data has been acquired, you use the MUSE application to edit and store it. The MUSE application is a modular, menu-driven program that runs within the Microsoft Windows operating system. Each module includes related operations. For example, the *System Status* module includes operations that let you display lists of errors, events, pending tasks, and print queues.

The MUSE system consists of a file server networked to one or more workstations. The system is available in a variety of configurations, from a low-cost, single data-type system to multiple data-type systems with multiple workstations and virtually unlimited ECG storage capabilities. Options can be added to the standard configuration to suit a customer's particular needs.

File Server Hardware

Turnkey MUSE systems include GE-supplied hardware, which will be configured with one of the following hardware platforms:

- HP ProLiant DL370 G6
- HP ProLiant ML370 G5
- HP ProLiant ML370 G4

The configurations of each platform are summarized in the following tables:

Table 1. DL370 G6 File Server Configurations	
Feature	Rack
CPU Slot #1	Intel 2.00 GHz Xeon E5504 Quad Core
DIMM 3A	RDIMM PC3-10600 4 GB
DIMMs 1G, 2D, 4H, 5E, 6B, 7I, 8F, 9C	Empty
CPU Slot #2	Empty
DIMMs 1G, 2D, 3A, 4H, 5E, 6B, 7I, 8F, 9C	Empty
Memory, Total	4 GB
Case/Chassis (rear-Vertical)	
Case slot #10	HP NC375i adapter
Case slots #1 - #9	Empty
External Drive Bay (Front)	
Case slot - Top	SATA half-height DVD-RW
Case slot - Bottom	Empty

Table 1. DL370 G6 File Server Configurations (Continued)	
Feature	Rack
HotPlug Drive Bay (Front)	
Bay 1	146 GB 10K 2.5 SAS
Bay 2	146 GB 10K 2.5 SAS
Bay 3	146 GB 10K 2.5 SAS
Bay 4	146 GB 10K 2.5 SAS
Bay 5	146 GB 10K 2.5 SAS
Bay 6	146 GB 10K 2.5 SAS
Bays 7-9	Empty
Power Supplies/Fans	
Power Supply 1	460W
Power Supply 2	Empty
Redundant Fans	Four (4)

Table 2. ML370 G5 File Server Configurations		
Features	Tower	Rackable
CPU Slot #1	CPU	CPU
CPU Slot #2	empty	empty
Memory, Total	2 GB	2 GB
DIMM 1A	1 GB	1 GB
DIMM 5A	1 GB	1 GB
DIMM 2B, 6B, 3G, 7C, 4D, 8D	empty	empty
Case/Chassis (rear-Vertical)		
Case slot #6 - #9	empty	empty
Case slot #5	serial / parallel board	serial / parallel board
Case slot #4	empty	empty
Case slot #3	SCSI HBA (optional)	SCSI HBA (optional)
Case slot #2	Digiboard Serial MUX (8-port)	Digiboard Serial MUX (8-port)
Case slot #1	P400 Array Controller ¹	P400 Array Controller [*]

Table 2. ML370 G5 File Server Configurations (Continued)		
Features	Tower	Rackable
External Drive Bay (Front)		
Case slot - Top	CD-ROM/16x DVD ROM	CD-ROM/16x DVD ROM
Case slot - Middle	Floppy drive	Floppy drive
Case slot - Bottom	Sony AIT-2 Turbo tape drive	Sony AIT-2 Turbo tape drive
HotPlug Drive Bay (Front)		
Bay 1	146 GB	146 GB
Bay 2	146 GB	146 GB
Bay 3	146 GB	146 GB
Bay 4	146 GB	146 GB
Bay 5	Empty	146 GB
Bay 6	Empty	146 GB
Bay 7	Empty	Empty
Bay 8	Empty	Empty
Bay 9 - Bay 16	Empty	Empty
Power Supplies/Fans		
Power Supply (Right)		
Redundant PS (Left)	Redundant PS Kit	Redundant PS Kit
Redundant Fans	Installed Internal	Installed Internal

1 Connect array controller port 1 to hard drive bays 1 – 4.
Connect array controller port 2 to hard drive bays 5 – 8.

Table 3. HP Proliant ML370 G4 File Server Configurations		
Features	Tower	Rack-ready
Processor	Single	Single
CPU Slot 1 and PPM Slot 1 Populated	CPU	CPU
Memory, Total (6,144 MB max.)	1024 MB	1024 MB
DIMM 1	512 MB	512 MB
DIMM 2	512 MB	512 MB
DIMM 3	Empty	Empty
DIMM 4 – 8	Empty	Empty

Table 3. HP Proliant ML370 G4 File Server Configurations (Continued)		
Features	Tower	Rack-ready
Case/Chassis (rear-Vertical)		
Case slot #6 (Left)	Empty	Empty
Case slot #5	Empty	Empty
Case slot #4	Empty	Empty
Case slot #3	Digiboard Serial MUX (8-port)	Digiboard Serial MUX (8-port)
Case slot #2	10/100 NIC (NC7170)	10/100 NIC (NC7170)
Case slot #1	Smart Array Controller (642)	Smart Array Controller (642)
External Drive Bay (Front-Horizontal)		
Case slot - Top	48x IDE CD-ROM/16x DVD ROM	48x IDE CD-ROM/16x DVD ROM
Case slot - Middle	AIT-2 Tape Drive	AIT-2 Tape Drive
Case slot - Bottom	Filler panel	Filler panel
HotPlug Drive Bay (Front-Horizontal)		
Ultra3 SCSI ID 5, Top	146 GB	300 GB
Ultra3 SCSI ID: 4	146 GB	300 GB
Ultra3 SCSI ID: 3	146 GB	300 GB
Ultra3 SCSI ID: 2	146 GB	300 GB
Ultra3 SCSI ID: 1	Empty	300 GB
Ultra3 SCSI ID 0. Bottom	Empty	300 GB
HotPlug - Supplies/Fans		
Power Supply	500 Watts	500 Watts
Redundant PS (Rear-Lower Left)	Redundant PS Kit	Redundant PS Kit
Redundant Fans	Yes – Installed	Yes – Installed

The G5 server must have access to an analog telephone line for communication with the host MUSE system to work properly. Newer digital telephone systems will not work with this equipment.

NOTE

HP RAID servers can be configured with a 4-port KVM (Keyboard-Video-Mouse) switch for servicing “headless” clients.

Workstation Hardware

The GE-supplied MUSE workstation is an HP model rp5700 SFF (small form factor) PC. The following table summarizes the hardware specifications of the workstation.

Table 4. HP rp5700 Small Form Factor

Processor	
Type	1 Intel® Core 2 Duo (E6400e)
Speed	2.13 GHz 2MB L2 cache
Front Side Bus (FSB)	1066-MHz front side bus
Memory	1GB PC2-5300 (DDR2-667) Expandable to 4GB
Integrated I/O	
Integrated Serial	(2) RS-232C
Integrated USB	(2) front USB 2.0 ports (4) rear USB 2.0 ports
Integrated Keyboard	PS/2 standard keyboard supported
Integrated Mouse	PS/2 2-button optical scroll mouse
Video	1280x1024 @ 75 Hz 16 or 32 bit color
Integrated Ethernet	10/100/1000 NIC RJ45 connector
Expansion Slots (PCI/ Cards)	3

Drive Bays	
Optical Drive	SATA 16X/48X DVD-ROM
Hard Drive	160GB SATA 3GB/s
Power	
Voltage	90 - 264 VAC, autoselecting
Rated Line Frequency	50/60 Hz
AC input connector	IEC60-320 male connector.
Power consumption, rated	Maximum Rated Power: 240 W

Table 4. HP rp5700 Small Form Factor (Continued)

Heat dissipation (BTU/hr)	100 VAC: 215.297 BTU/hr 115 VAC: 214.614 BTU/hr 230 VAC: 210.861 BTU/hr
Environmental	
Operating Temperature	+50° to +104° F +10° to +40°C
Operating Humidity	20% to 85%, non-condensing at ambient
Operating Altitude	10,000 feet 3,048 meters
Storage Temperature	-22° to +140°F -30° to 60° C
Storage Humidity	5% to 90%, non-condensing at ambient
Storage Altitude	30,000 feet 9,144 meters
Physical	
Size (HxWxD)	3.94 x 13.4 x 15 inches 10 x 34 x 38 cm
Weight	19.4 lbs 8.8 kg
Weight supported	77 lbs 35 kg
Operating Systems	
Operating Systems supported	Microsoft Windows XP Professional US

Table 5. HP rp5800 Small Form Factor

Processor	
Type	Intel® Core i3-2120, 2 cores/4 threads
Speed	3.30 GHz 3 MB cache
Front Side Bus (FSB)	1066-MHz front side bus
RAM	2 GB
Integrated I/O	
Serial Ports	(2) RS-232
USB Ports	Two (2) USB 2.0 ports, front, Five (5) USB 2.0 ports, rear Three (3) Powered USB ports, 12V, rear
Keyboard Type	PS/2
Mouse Type	PS/2
Video Resolution	1280 x 1024 @ 16-bit color depth
Ethernet Connection	10/100/1000 Mbps Ethernet, RJ-45 connector
Expansion Slots (PCI/ Cards)	PCI – Two (2) 4.2 inch height, 6.6 inch length, 25W PCI Express x1 — One (1) 2.5 inch low profile, 6.6 inch length, 10W PCI Express x16 — One (1) 2.5 inch low profile, 6.6 inch length, 25W
Drive Bays	
Optical Drive	DVD-R/DVD-RW capable
Hard Drive	One (1) 250 GB SATA 3.0, 3.5 inch, internal
Power	
Voltage	120 VAC 220 VAC
Rated Line Frequency	50/60 Hz
Rated Power Consumption	110 VAC: 38.55 W (Operating), 2.65 W (Sleep), 0.93 W (Off) 220 VAC: 38.62 W (Operating), 2.90 W (Sleep), 1.12 W (Off)
Heat dissipation	110 VAC: 132 BTU/hr (Operating), 9 BTU/hr (Sleep), 3 BTU/hr (Off) 220 VAC: 132 BTU/hr (Operating), 10 BTU/hr (Sleep), 4 BTU/hr (Off)
Environmental	
Operating Temperature	32° to 104° F 0° to 40° C

Table 5. HP rp5800 Small Form Factor (Continued)

Operating Humidity	10% to 90%, non-condensing
Operating Atmospheric Pressure	10,000 feet 3,048 meters
Storage Temperature	-22° to +140°F -30° to 65° C
Storage Humidity	0% to 90%, non-condensing
Storage Atmospheric Pressure	30,000 feet 9,144 meters
Physical	
Size (HxWxD)	3.95 in. x 13.30 in. x 14.90 in. 10.03 cm x 33.78 cm x 37.84 cm
Weight	15.06 lbs 6.84 kg
Operating Systems	
Operating Systems supported	Microsoft Windows XP Professional

Customer-Supplied Hardware

Customers who purchase the software-only solution must provide the hardware that meets the minimum or recommended requirements, as outlined in the following sections.

Server Hardware Requirements

Customer-supplied servers must meet or exceed the following requirements. Meeting or exceeding the recommended requirements will improve system performance.

	Requirements	
	Minimum	Recommended
CPU		
<i>Type</i>	Intel Xeon	Dual Core Intel Xeon
<i>Speed</i>	2.8 GHz	1.86 GHz
<i>L2 Cache</i>	512k	4MB
<i>Quantity</i>	1	1
RAM	1GB	2GB
Hard disk^{1,2}		
<i>C: System Partition</i>	18 GB	18 GB
<i>D: Database Partition</i>	72 GB	72 GB
Additional Drives		
<i>Diskette Drive</i>	1.44 MB	1.44 MB
<i>Optical Drive</i>	8x DVD-ROM	16x DVD-ROM
Network controller	10/100/1000 Mbps Ethernet	100/1000 Mbps Ethernet
Serial ports	1	1 ³
Graphics	1024x768 resolution	1024x768 resolution
Form factor	Tower or Rack	Tower or Rack

1 RAID Level 5 configurations are recommended for fault tolerance.

2 For exact disk needs, see "System Sizing Information" in the MUSE Pre-Installation Guide (PN 2031233-211) for system sizing guidelines.

3 See "Optional Hardware Requirements" in the MUSE Pre-Installation Guide (PN 2031233-211) for additional information.

Workstation Hardware Requirements

Customer-supplied workstations must meet the following requirements. Meeting or exceeding the recommended requirements will improve system performance.

	Requirements	
	Minimum	Recommended
CPU		
<i>Type</i>	Intel Pentium 4	Core 2 Duo
<i>Speed</i>	3 GHz	2.13 GHz
<i>Quantity</i>	1	1
RAM	512 MB SDRAM	1 GB SDRAM
Hard Disk	4 GB or more C: partition	4 GB or more C: partition
Additional Drives		
<i>Diskette Drive</i>	1.44 MB	1.44 MB
<i>Optical Drive</i>	48x CD-ROM	16x DVD-ROM
Network controller	10/100/1000 Mbps Ethernet	100/1000 Mbps Ethernet
Serial ports¹	1 or none	1 or none
Graphics	1280x1024 resolution	1280x1024 resolution
Form factor	Desktop or Mini Tower	Desktop or Mini Tower

1 Required only for modem support.

HIS Interface Hardware Requirements

Customer-supplied HIS interfaces must meet or exceed the following requirements. Meeting or exceeding the recommended requirements will improve performance.

	Requirements	
	Minimum	Recommended
CPU		
<i>Type</i>	Intel Xeon, single core	Intel Xeon, single core
<i>Speed</i>	2.8 GHz	2.8 GHz
<i>Quantity</i>	2	2
RAM	2 GB	2 GB
Hard Disk		
<i>Type</i>	SCSI	SCSI
<i>Size</i>	32 GB	32 GB

	Requirements	
	Minimum	Recommended
<i>Free Space</i>	18 GB	18 GB
<i>Quantity</i>	2	2
Additional Drives		
<i>Diskette Drive</i>	None	None
<i>Optical Drive</i>	CD-ROM	CD-ROM
Network Controller	10/100/1000 Mbps Ethernet	100/1000 Mbps Ethernet
Serial Port¹	1 or none	1 or none
Graphics	1024x768 resolution	1024x768 resolution
Form Factor	Tower or Rack	Tower or Rack

¹Required for remote modem support if network connection is unavailable.

Optional equipment

The following optional equipment may be purchased with your MUSE system.

- HP LE 1911 or HP L1910 19-inch LCD Display
- HP LaserJet P4015 Printer
- Fax Modem *

Used for faxing reports to Group 3-compatible Fax machines.

- CSI Modem *

Used for communicating with the MAC 1200, MAC 3500, MAC 5000, and MAC 5500 resting ECG analysis systems.

NOTE

The MUSE system supports a maximum of 64 modems per PC. To determine the number of required PCs, divide the number of required modem definitions by 64 and round up to the next whole number. For example, to support 84 modem definitions, you would need 2 PCs: $84 / 64 = 1.3125$, rounded to 2. Keep this in mind when designing your MUSE system.

HP LE1911 and HP L1910, 19-inch LCD Display

The following table provides the technical specifications for the HP LE1911 and HP L1910 monitors.

Table 6. HP Monitor Specifications		
Specification	HP LE1911 19-inch LCD Monitor	HP L1910 19-inch LCD Monitor
LCD Module	19-inch active matrix TFT (thin film transistor)	19-inch active matrix TFT (thin film transistor)
Viewable Image Area	19 inches (48.26 cm) diagonal	19 inches (48.26 cm) diagonal

Table 6. HP Monitor Specifications (Continued)

Active Display Area	Horizontal: 14.8 inches / 37.8 cm Vertical: 11.9 inches / 30.3 cm	Horizontal: 14.8 inches / 37.8 cm Vertical: 11.9 inches / 30.3 cm
Viewing Angle	160° horizontal 160° vertical 10:1 minimum contrast ratio	160° horizontal 160° vertical 10:1 minimum contrast ratio
Brightness	250 nits (cd.m ²)	300 nits (cd.m ²)
Contrast Ratio	1000:1	800:1
Response Rate	5 ms (rise and fall)	5 ms (rise and fall)
Pixel Pitch	0.294 mm	0.294 mm
Backlight Lamp Life	50 K hours	50 K hours
Horizontal Frequency	24 to 83 kHz	24 to 83 kHz
Vertical Frequency	50 to 70 Hz	50 to 70 Hz
Native Resolution	1280 x 1024 @ 60 Hz	1280 x 1024 @ 60 Hz
Current	< 0.50 Ampere	< 0.50 Ampere
AC input voltage/current	Universal 100 (110-240V) 50-60Hz Internal	Universal 100 (110-240V) 50-60Hz Internal
Power Consumption	Maximum: < 28 watts Typical: 24 watts Power Save Mode: <2 watts	Maximum: < 38 watts Typical: 31 watts Power Save Mode: <2 watts
Operating Temperature	+41° to +95° F (+5° to +35° C), non-condensing	+41° to +95° F (+5° to +35° C), non-condensing
Operating Humidity Range	20% to 80%, non-condensing	20% to 80%, non-condensing
Dimensions (W x H x D)	With stand: 16.4 x 16.3 x 8.1 in / 41.6 x 41.4 x 20.3cm Head only: 13.7 x 16.3 x 2.3 in / 34.7 x 41.4 x 5.8 cm	With stand: 16.4 x 16.3 x 7.6 in / 41.6 x 41.4 x 19.2 cm Head only: 13.7 x 16.3 x 2.3 in / 34.7 x 41.4 x 5.8 cm
Weight	Head only: 9.0 lbs. / 4.1 kg	Head only: 8.6 lbs. / 3.9 kg

HP LaserJet P4015 Printer

The following table provides the technical specifications for the HP LaserJet P4015 Printer.

Table 7. HP LaserJet P4015 Printer

Speed	52 ppm
Resolution	1200 x 1200 dpi
Memory, Standard	128 MB
Memory, Maximum	640 MB

Table 7. HP LaserJet P4015 Printer	
First page out	<9 sec.
Power requirements	100-127 V (50-60 Hz) 220-240 V (50-60 Hz)
Power Consumption	840 watts active 18 watts ready 12 watts sleep mode 0 watts off
Operating Temperature	50° - 90° F 10° - 32° C
Storage Temperature	32° - 95° F 0° - 35° C
Dimensions (h x w x d)	16.5 x 17.7 x 15.5 in. 41.91 x 44.95 x 39.37 cm
Weight	59.92 lbs. 27.2 kg

Software Requirements

The following table outlines the software requirements for the various components of the MUSE system.

	File Server	Workstation	HIS Interface
Operating System¹	Microsoft Windows Server 2003 SP2 .NET Framework 2.0	Microsoft Windows 2000 Professional XP Professional .NET Framework 2.0	Microsoft Windows Server 2003 SP2
SQL Server	Microsoft Server 2005 Standard or Enterprise SP2	N/A	N/A
Drivers	All required drivers provided as part of operating systems.	All required drivers provided as part of operating systems.	All required drivers provided as part of operating systems.
Configuration²	Workgroup, or Member of existing domain	Member of MUSE workgroup, or Computer on existing domain	Workstation, or Member of existing domain.

1 The customer is responsible for licensing the operating system with customer-supplied hardware.

2 The MUSE cannot operate as a domain controller.

Network Functions

Computers may be networked to each other via twisted pair ethernet. Each MUSE system is factory-equipped with the customer selected network interface.

TCP/IP is the standard networking protocol for the MUSE system.

Workstation Setup

Some of the choices when setting up workstations may be decided during installation and are as follows:

- add shortcut to launch MUSE using Windows Authentication
- add shortcut to launch MUSE using MUSE Authentication.

If these options are missed during the installation, enter the following command line entries from *\Program Files\Muse* to add the shortcuts:

- **musesHORTS -muse**
Adds MUSE Authentication icon and requires users to enter their MUSE sign-on
- **musesHORTS -win**
Adds Windows Authentication icon and does not require users to enter their MUSE sign-on.

Refer to “MUSE Cardiology Information System Advanced Security Guide” (PN 2031233-214) for information about Authentication and how it affects the level of security on your MUSE system.

Preparing for Use

The following interconnect diagrams give a general overview of how your workstation should be set up. There are too many variations to show all of them, but enough information should be provided so someone reasonably familiar with computer system installations should have no problem.

Step-by-step instructions for setting your workstation up for the first time can be found in the sections following the interconnect diagram. Use the interconnect diagram as a reference when following these instructions. Please refer to the supplied OEM manuals and the “[System Components, Controls, Indicators, and Locations](#)” on page 2-27 for more specific information.

DANGER

Do NOT use in the presence of flammable anesthetics.

WARNINGS

This is Class I equipment. The mains plug must be connected to an appropriate power supply.

Keep leakage current within acceptable limits when connecting auxiliary equipment to this device.

Disconnect patient from unit BEFORE connecting personal computer to unit.

The file server contains an internal battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- ◆ Do not attempt to recharge the battery.
 - ◆ Do not expose to temperatures higher than 60°C.
 - ◆ Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
 - ◆ Replace only with the Compaq spare parts designated for this product.
-
-

NOTE

MUSE system operation may be affected if large machines with high current draws are connected to the same electrical circuit as the MUSE system. It is recommended that the MUSE system be connected to a power source away from these machines.

Connecting the file server and clients

The following table provides information for connecting a tower file server for the MUSE clients.

Table 8. Tower File Server Interconnections		
Connect From	Connect To	Comments/Remarks
UPS		
Power Supply	Ext. AC	Ensure all devices are properly configured for the mains power (i.e. 110 or 220 VAC). Ensure all devices to be plugged into the UPS are turned 'OFF'.
Serial	Server (COM1)	See "Server" on page 2-18.
Server		
Power Supply	UPS	Via applicable AC power cord
COM1	UPS serial	Via serial: 9 pin-D to serial: 9 pin-D
COM2	Modem: RSS	Via serial: 9 pin-D to serial: 25 pin-D
Video	Display	See "Display" on page 2-19.
Keyboard	Keyboard	See "Keyboard" on page 2-19.
Mouse	Mouse or Trackball	See "Mouse/Trackball" on page 2-19.
Internal Ethernet	Ethernet Hub (#8)	Via applicable length Ethernet cable
Digi Card	Modems	Via serial: 78 pin-D to multiple 9 pin-D's [P1-8: plus 9 to 25 pin-D extension cables]
Modems (Common modem connections)		
DC Pwr	AC/DC power module	AC/DC power supplied from external power source
Line	Ext. phone jack	Via applicable length phone cord
RSS modem application		
Modem: RSS	Server (Com2)	RSS Modem (25 pin-D) to Server COM2 (9 pin-D)
CSI modem application option(s)		
Modem: CSI 1	Server via P1	Via Server serial: 78 pin-D to 9 pin-D (P1) plus 9 to 25 pin-D extension cable.
Modem: CSI 2	Server via P2	Via Server serial: 78 pin-D to 9 pin-D (P2) plus 9 to 25 pin-D extension cable.
Modem: CSI 3	Server via P3	Via Server serial: 78 pin-D to 9 pin-D (P3) plus 9 to 25 pin-D extension cable.
Modem: CSI 4	Server via P4	Via Server serial: 78 pin-D to 9 pin-D (P4) plus 9 to 25 pin-D extension cable.

Table 8. Tower File Server Interconnections (Continued)		
Connect From	Connect To	Comments/Remarks
FAX modem application option(s)		
Modem: FAX 1	Server via P5	Via Server serial: 78 pin-D to 9 pin-D (P5) plus 9 to 25 pin-D extension cable.
Modem: FAX 2	Server via P6	Via Server serial: 78 pin-D to 9 pin-D (P6) plus 9 to 25 pin-D extension cable.
Modem: FAX 3	Server via P7	Via Server serial: 78 pin-D to 9 pin-D (P7) plus 9 to 25 pin-D extension cable.
Modem: FAX 4	Server via P8	Via Server serial: 78 pin-D to 9 pin-D (P8) plus 9 to 25 pin-D extension cable.
Display		
Power Supply	UPS	Via applicable AC power cord
Video	Server	Via display video cable (hardwired into display)
Keyboard		
Keyboard	Server	Via keyboard cable (hardwired into keyboard)
Mouse/Trackball		
Mouse/Trackball	Server	Via mouse/trackball cable (hardwired in mouse/trackball)
Ethernet Hub		
Power Supply	Ext. AC	Ensure all devices with manual power selection are properly configured for the mains power (i.e. 110 or 220 Vac).
Port #8	Server Ethernet	Via applicable length Ethernet cable
Port #1-7	Clients (i.e. nodes)	Optional
Clients (MUSE or HIS), see Clients		
Power Supply	UPS if applicable	Via applicable AC power cord
NIC #2	Ethernet Hub (1-7)	Optional (see Client)

The following table provides information for connecting a rack-mounted file server for the MUSE clients.

Table 9. Rack-Mounted File Server Interconnections		
Connect From	Connect To	Comments/Remarks
UPS		
Power Supply	Ext. AC	Install "Heavy Duty" Line Cord for UPS 220V installation <ul style="list-style-type: none"> ■ Ensure all devices are properly configured for the mains power (i.e. 110 or 220 Vac). ■ Ensure all devices to be plugged into the UPS are turned "OFF."
Serial	Server (COM1)	See Server

Table 9. Rack-Mounted File Server Interconnections (Continued)		
Connect From	Connect To	Comments/Remarks
Server		
Power Supply 1	UPS	Via applicable AC power cord
Power Supply 2	UPS	Via applicable AC power cord
COM1	UPS serial	Via serial: 9 pin-D to serial: 9 pin-D
COM2	RSS Modem (Bay 12)	Via serial: 9 pin-D to serial: 25 pin-D
Video	Display	See "Display" on page 2-19.
Keyboard	Keyboard	See "Keyboard" on page 2-19.
Mouse	Mouse or Trackball	See "Mouse/Trackball" on page 2-19.
SCSI RAID Card (case slot #1)	Hot Pluggable Drive Bay	OEM installed (internal cable connection)
Digi Card (case slot #5)	Modem Rack	Via serial: 78 pin-D to multiple 9 pin-D's [P1-8: plus 9 to 25 pin-D extension cables]
Network Interface Card (case slot #7)	External Ethernet	Via applicable length Ethernet cable
Modem Rack		
Power Supply	UPS	Via applicable AC power cord
Modem Rack (Rear View) - shown with modem installed in Bay 12 <div> <div>Bay 03: not used</div> <div>Bay 06: not used</div> <div>Bay 09: not used</div> <div>Bay 12: RSS Modem</div> <div>DC Pwr</div> </div> <div> <div>Bay 02: FAX 1 (optional)</div> <div>Bay 05: FAX 2 (optional)</div> <div>Bay 08: FAX 3 (optional)</div> <div>Bay 11: FAX 4 (optional)</div> <div>(25 pin-D) [Phone]</div> </div> <div> <div>Bay 01: CSI 1 (optional)</div> <div>Bay 04: CSI 2 (optional)</div> <div>Bay 07: CSI 3 (optional)</div> <div>Bay 10: CSI 4 (optional)</div> <div>[Line]</div> </div>		
Modems in Modem Rack [reference: Modem Rack (Rear View - table above)]		
Common modem connections to Modem Rack		
Bay N DC Pwr	Modem Rack bay N DC	DC power supplied from the Modem Rack, applicable bay
Bay N [Line]	Ext. phone jack	Via applicable length phone cord
RSS modem application		
Bay 12 serial (RSS)	Server (Com2)	Modem Rack (25 pin-D) to Server COM2 (9 pin-D)
CSI modem application option(s)		
Bay 01 serial (CSI 1)	Server via P1	Via Server serial: 78 pin-D to 9 pin-D (P1) plus 9 to 25 pin-D extension cable.
Bay 04 serial (CSI 2)	Server via P2	Via Server serial: 78 pin-D to 9 pin-D (P2) plus 9 to 25 pin-D extension cable.
Bay 07 serial (CSI 3)	Server via P3	Via Server serial: 78 pin-D to 9 pin-D (P3) plus 9 to 25 pin-D extension cable.
Bay 10 serial (CSI 4)	Server via P4	Via Server serial: 78 pin-D to 9 pin-D (P4) plus 9 to 25 pin-D extension cable.

Table 9. Rack-Mounted File Server Interconnections (Continued)		
Connect From	Connect To	Comments/Remarks
FAX modem application option(s)		
Bay 02 serial (FAX 1)	Server via P5	Via Server serial: 78 pin-D to 9 pin-D (P5) plus 9 to 25 pin-D extension cable.
Bay 05 serial (FAX 2)	Server via P6	Via Server serial: 78 pin-D to 9 pin-D (P6) plus 9 to 25 pin-D extension cable.
Bay 08 serial (FAX 3)	Server via P7	Via Server serial: 78 pin-D to 9 pin-D (P7) plus 9 to 25 pin-D extension cable.
Bay 11 serial (FAX 4)	Server via P8	Via Server serial: 78 pin-D to 9 pin-D (P8) plus 9 to 25 pin-D extension cable.
Display		
Power Supply	UPS	Via applicable AC power cord
Video	Server	Via display video cable (hardwired into display)
Keyboard		
Keyboard	Server	Via keyboard cable (hardwired into keyboard)
Mouse/Trackball		
Mouse/Trackball	Server	Via mouse/trackball cable (hardwired in mouse/trackball)

The following table provides information for connecting a HIS server.

Table 10. MUSE/HIS Client Interconnections		
Connect From	Connect To	Comments/Remarks
Workstation		
Power Supply	Ext. AC	Ensure all devices are properly configured for the mains power (i.e. 110 or 220 Vac). Ensure all devices to be plugged into the UPS are turned 'OFF'.
Video	Display	See "Display"
Keyboard	Keyboard	See "Keyboard/Barcode"
Mouse	Mouse or Trackball	See "Mouse/Trackball"
COM1	Mac8 connector	Optional for MUSE Client
(PCI #4: top case slot) ¹		
Network Interface Card (PCI #3: 2nd case slot)	External Ethernet	Optional
(PCI #2: 3rd case slot) *		
Network Interface Card (PCI #1: bottom case slot)	Ethernet Hub	(Client-to-Ethernet Hub-to-Server) connection

Table 10. MUSE/HIS Client Interconnections (Continued)

Connect From	Connect To	Comments/Remarks
Display		
Power Supply	Ext. AC	Via applicable AC power cord
Video	Client	Via display video cable (hardwired into display)
Keyboard/Barcode		
Keyboard/Barcode Reader	Client	Via keyboard cable (hardwired into keyboard)
Mouse/Trackball		
Mouse/Trackball	Client	Via mouse/trackball cable (hardwired in mouse/trackball)

1Not used

Uninterruptible Power Supply (UPS)

1. Unpack the UPS and place it in a location near where you plan to set up the workstation. An area on the floor and under the desk is recommended. Keep in mind that the unit needs to be accessible.
2. Ensure that the power switch on the back of the unit is in the **OFF** position.
3. Connect the UPS power cord into a 20 amp power outlet dedicated to the workstation.

NOTE

Do not connect your laser printer to the UPS. The large periodic current draw of the printer will trigger the low voltage alarm on the UPS.

4. Connect the UPS serial cable from the UPS serial port to **COM1** on the file server.

Client

1. Unpack the system box and place it in a location near the UPS.
2. Note the location of the items on the back of the system box. You need to know where each of the controllers or connectors are to properly set up your system.

Detailed descriptions of these items are in the original equipment manufacturer (OEM) manual you received with your system, and further defined in the [“System Components, Controls, Indicators, and Locations”](#) on page 2-27. You can also use the interconnect diagrams for locating the proper connectors.
3. Verify that the input power selection switch on the back of your system box is set correctly for your environment. The voltage visible on the switch is the voltage at which the system is set to operate.
4. Ensure the power control button, located on the front of the client hardware, is off. Also ensure that the system power enable switch on the back of the desktop server is in the off position by pressing the end marked **0**.
5. Connect the AC power cord to the AC power receptacle on the back of the system box and to one of the power outlets on the back of the UPS.

Monitor

1. Unpack the monitor and place it on the desktop. The monitor may also be placed on top of the client.
2. Verify that the power switch is in the off position.
3. Connect the AC power cord to the power receptacle on the back of the monitor and to one of the power outlets on the back of the UPS.
4. Connect one end of the video cable to the back of the monitor and connect the other end to the appropriate port on the back of the system box. Use the interconnect diagrams as a reference.

NOTE

Be sure to connect the monitor to the file server and not the modem module.

Modem Module

1. If a modem module was ordered, unpack it and place it in a location near the UPS.
2. Note the location of the items on the back of the system box. You need to know where each of the controllers or connectors are to properly set up your system.

Detailed descriptions of these items are in the original equipment manufacturer (OEM) manual you received with your system, and further defined in the “System Components, Controls, Indicators, and Locations” section in this chapter. See Table 10, “[MUSE/HIS Client Interconnections](#),” on page 2-21 for locating the proper connectors.

NOTE

The modem module does not use a keyboard or a monitor.

3. Ensure the power switch on the back of the unit is in the off position by pressing the end marked 0.
4. Connect the AC power cord into the AC receptacle on the back of the system box and to one of the power outlets on the back of the UPS.

Fax/Asynch CSI Multitech Modem

Refer to “[Setting Up Modems](#)” on page 3-4 for specific instructions regarding how to add either the STANDARD FAX modem or the ASYNCH CSI modem as Windows Services on a MUSE File Server or client running Windows.

Keyboard and Mouse

1. Ensure the system power is off.

NOTE

Power should always be OFF when connecting or disconnecting the keyboard or mouse.

2. Connect the keyboard/bar code wand cable to the 6-pin keyboard port on the back of the system box and to the port on the back of the keyboard. Use the interconnect diagrams as a guide.
3. Connect the mouse cable to the 6 pin mouse port on the back of the system box. See the interconnect diagram for the exact location.

Network Connection

Twisted Pair

1. If your network is twisted pair, unpack the 3Com Linkbuilder hub and place it near your system box or in the location designated by your customer's IS department.
2. Connect each system box to the network by running your twisted pair wire from the twisted pair network port on the back of the system box to a port on the hub.

If necessary, multiple hubs may be linked together to accommodate a large number of workstations.

Enterprise Network

If you are connecting to the customer's enterprise network, your system contains a "special". An RSA should be involved in the installation.

HP Laser Jet Printer

NOTE

Do NOT plug your laser printer into the UPS.

1. If you are connecting the HP laser printer to your system, unpack the HP LaserJet and place it in the desired location.
2. Follow the installation instructions provided in the HP manuals which accompanied your shipment of equipment.

JAM RECOVER Setting

After connecting your printer, ensure that the *JAM RECOVER* setting is turned on.

Powering On and System Shutdown

Introduction

The section includes the following procedures:

- Powering on the workstation
- Powering off the workstation

Powering On the Workstation

Power on your client as specified below. Additional information can be found in your file server's OEM manual.

1. Verify that all system components such as the monitor, keyboard, etc. are connected. All connections should be made while the system is off.

NOTE

If a laser printer is part of the system, do not plug it into the uninterruptible power supply (UPS). In some environments, the cycling of power in the laser printer will cause the UPS alarm to sound (approximately every minute).

2. Turn on the UPS power switch.
3. Turn on peripheral devices, monitors, and printers.
4. Turn on the power enable switch on the back of your desktop and communication servers.
5. Press the power control button on the front of your system to turn it on. The system will power up and immediately begin the power-on self test (POST).
6. Make sure the *Authorization* window appears.

NOTE

System shutdown procedures are described in Chapter 4, “[Backup and Recovery](#)”.

Workstation Checkout Procedure

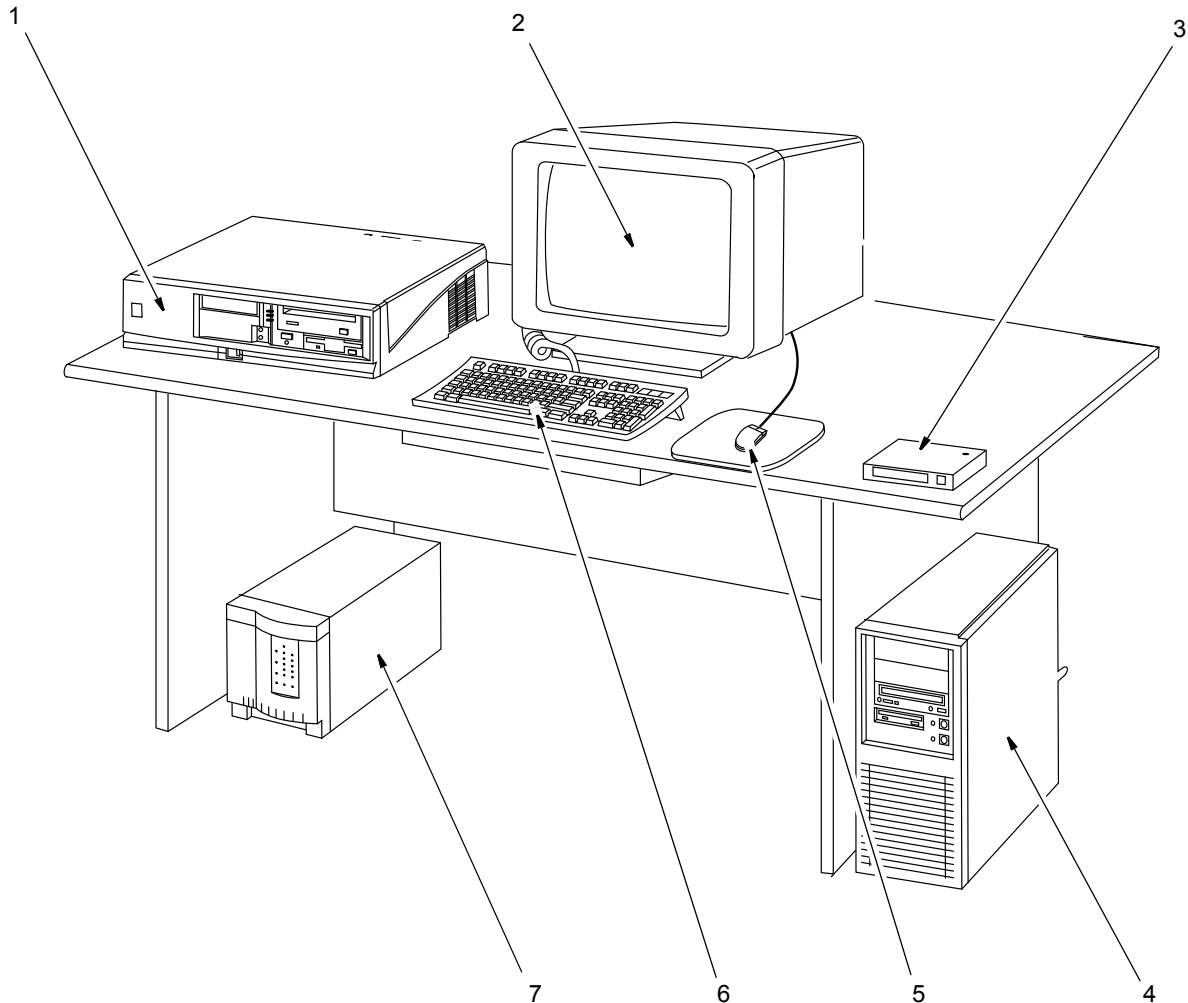
Perform the following for all applicable options. Use this manual and the MUSE system operator's manual for reference.

1. Client Initialization – Power up all clients and ensure each initializes, error free, and you can log in.
2. Diskette Acquisition – Acquire test ECGs via electrocardiograph diskettes and ensure they plot according to report distribution.
3. Phone Acquisition – Acquire test ECGs via remote electrocardiograph modems and ensure they plot according to report distribution.
4. Holter – Locally transmit data from the Holter to the MUSE system.
5. TRAM Module – Test that data is successfully flowing from the TRAM to the MUSE system.
6. CSI – Acquire test ECGs via remote CSI modems.
7. Remote Query – Test CSI modem connections if system has Remote Query.
8. Edit – View and edit an ECG from the *Edit List*.
9. Writer/Printers – Test writers to ensure they plot. Check for burned out dots, especially in the bar code region.
10. Fax – Fax a record to test fax modems.
11. Backups – Perform a non-scheduled backup. See Chapter 4, “**Backup and Recovery**” for details. Check that all tapes are being successfully used. Replace tapes that are past their intended life span (customer should store old tapes for safe keeping).

System Components, Controls, Indicators, and Locations

This section provides a description of the MUSE system hardware. The first diagram is a typical setup containing a tower file server and modem module. The second diagram shows a typical setup using a client.

Tower File Server System



20A

NOTE

The components shown in the figure above are representative of a typical MUSE system with a tower file server. They may not appear identical to the components of your system.

Table 11. Tower File Server System Description

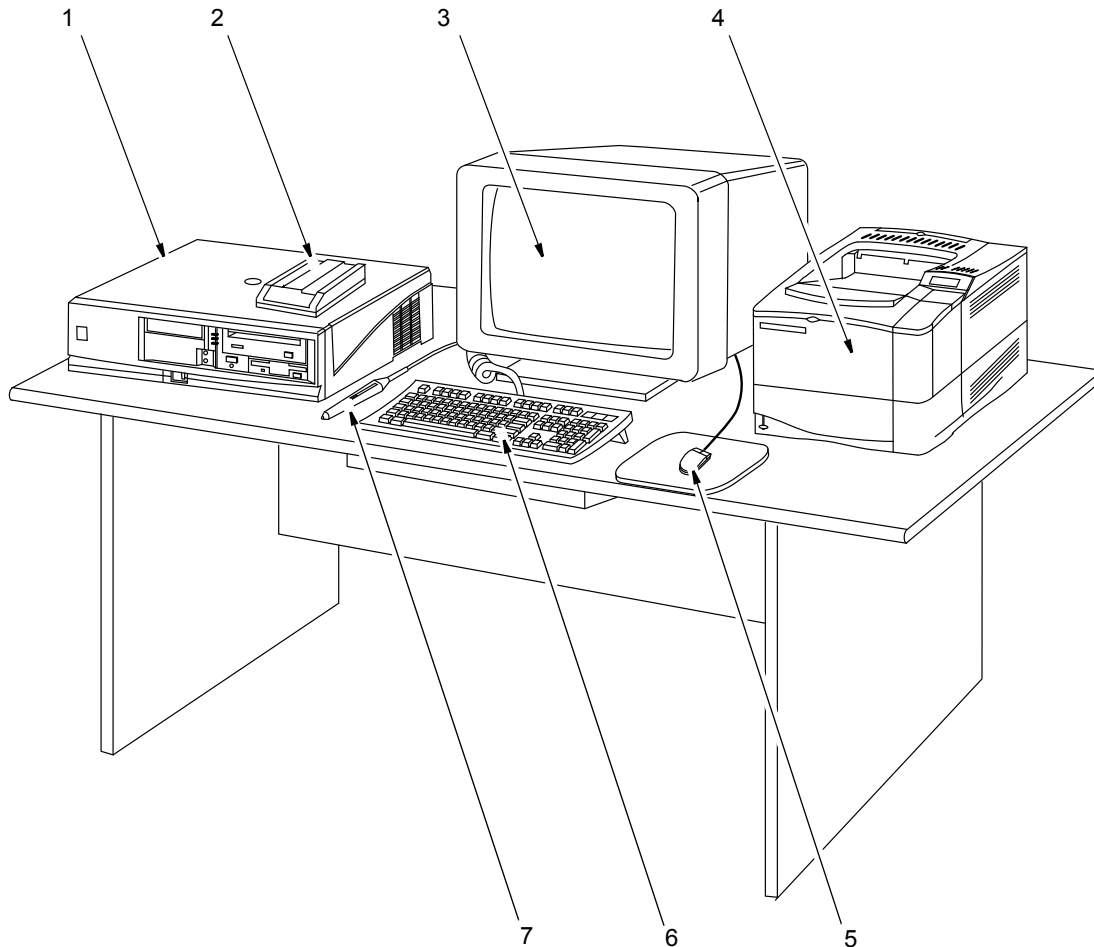
Item	Name	Description
1	modem module	Stores system's modems.
2	monitor	Displays information, messages, etc.

Table 11. Tower File Server System Description (Continued)

Item	Name	Description
3	Hub	Hub used in twisted pair networks. This item is optional.
4	file server	System box. Contains the power supply, hard disk drive, RAM, central processing unit, etc.
5	mouse	An input device used to move the cursor and select items on the display. The mouse is standard on the system.
6	keyboard	The keyboard is an input device. Use the keyboard to type information when required by the system.
7	UPS	The UPS automatically provides temporary power to the MUSE system in the event of a power interruption.

Workstation Client System

This section provides a description of the MUSE system hardware. The hardware associated with a typical workstation client configuration is shown.



21A

Table 12. Workstation Client System Description

Item	Name	Description
1	client	The system box which contains the power supply, hard disk drive, RAM, central processing unit, etc.
2	CSI modem	Used to communicate with MAC 1200, MAC 3500, MAC 5000, and MAC 5500 resting ECG analysis systems.
3	monitor	Displays information, messages, reports, ECGs, etc.
4	Laser printer	Optional Laser printer used to print various reports on standard paper.

Table 12. Workstation Client System Description (Continued)		
Item	Name	Description
5	mouse	Input device used to move the mouse cursor and select items on the display.
6	keyboard	The keyboard is an input device. Use the keyboard to type information when required by the system.
7	bar code reader	Used to select and edit ECGs. Makes the system easier to use for those not used to working with computers.

Component Descriptions

This section identifies the components of the various MUSE servers and workstations supported by MUSE version 7.1.1.

MUSE File Server, ML370 G6

This section identifies the components of the HP ML370 G6 file server. The HP ML370 G6 server is available only in a rack configuration.

HP ProLiant DL370 G6 Server, Front

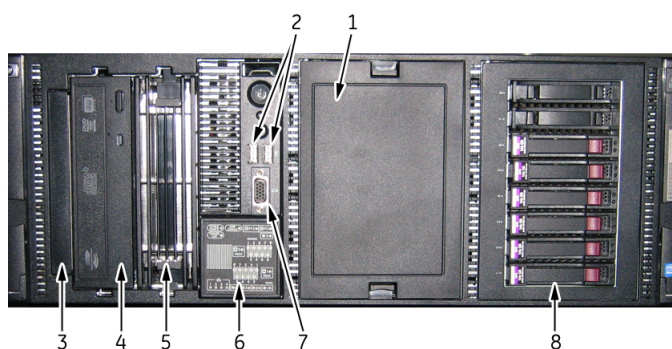


Table 13. ML370 G6 Server, Front (Rack Mount)

Item	Name	Description
1	Drive Cage Blank	Reserved area for additional drives
2	USB Ports (2)	USB devices can connect to these ports
3	Optical Drive Blank	Reserved for additional optical drive
4	DVD-ROM Drive	Reads and writes to DVD-RW
5	Removable Media Bay	Not used
6	Systems Insight Display	LEDs represent the system board layout
7	Front Video Connector	Connects to the monitor
8	SATA 146 GB Drives (6)	Hard drive storage

HP ProLiant DL370 G6 Server, Front Panel LEDs and Buttons

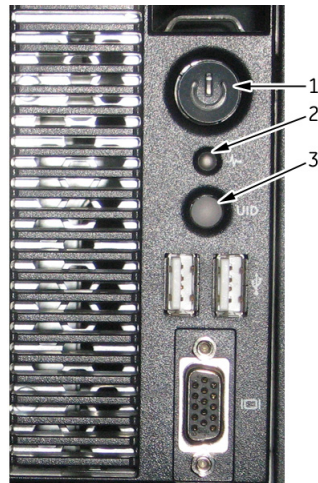


Table 14. ML370 G6 Server, Front Panel LEDs and Buttons (Rack Mount)		
Item	Name	Description
1	Power On/Standby Button and System Power LED	Green = Normal (system on) Amber = System in standby; power still applied Off = System off, power cord detached, or power supply failure
2	Health LED	Green = Normal (system on) Amber = System health is degraded Red = System health is critical Off = Normal (system off)
3	UID LED	Blue, Solid = System is activated Blue, Flashing = System is managed remotely Off = System is deactivated

HP ProLiant DL370 G6 Server, Back

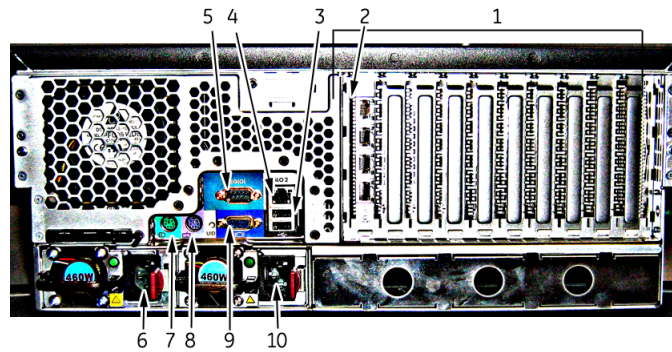


Table 15. ML370 G6 Server, Back (Rack Mount)

Item	Name	Description
1	PCI Expansion Slots	Not used
2	NIC Connectors (4)	Connects to network cables
3	USB Ports (2)	Connects to USB devices
4	iLO 2 Port	Remote management port
5	Serial Port	Connect optional modem
6	Power Supply Bay 1	Location of power supply
7	Mouse Port	Connect PS/2 mouse
8	Keyboard Port	Connect PS/2 keyboard
9	Video Connector	Connect to the monitor
10	Power Supply Bay 2	Location of power supply

HP ProLiant DL370 G6 Server, Back Panel LEDs



Table 16. ML370 G6 Server, Front (Rack Mount)		
Item	Name	Description
1	iLO 2 Link LED	Green = Linked to network Off = No network connection
2	iLO 2 Activity LED	Green (Solid or Flashing) = Network activity Off = No network activity
3	UID LED	Blue, Solid = System is active Blue, Flashing = System managed remotely Off = System is deactivated
4	Power Supply LED	Green = System has AC power and is powered up. Off = System off, power cord detached, or power supply failure
5	NIC Link LED	Green = Linked to network Off = No network connection
6	NIC Activity LED	Green (Solid or Flashing) = Network activity Off = No network activity

MUSE File Server, ML370 G5

This section identifies the components of the HP ML370 G5 file server. The HP ML370 G5 server is available in both rack and tower configurations.

HP ML370 G5 Server, Front (Rack Mount)

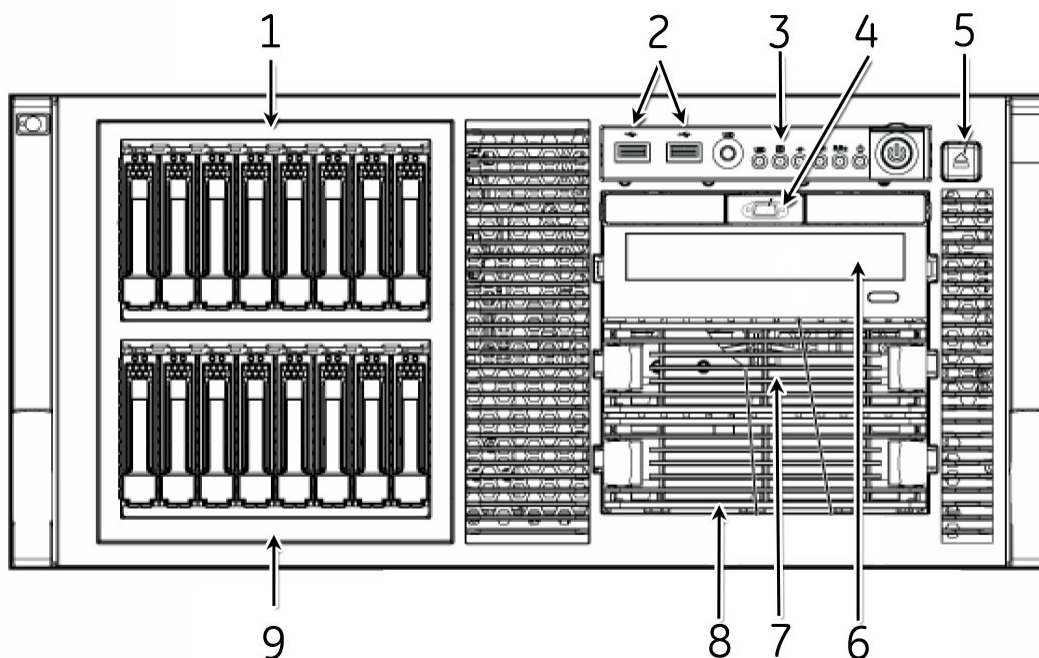


Table 17. ML370 G5 Server, Front (Rack Mount)

Item	Description
1	Hard drive bays 9-16 (not used)
2	USB connectors
3	HP Systems Insight Display (see "HP ML370 G5 Server, LEDs and Buttons (Both)" on page 37)
4	Video connector (rack-mounted model only)
5	HP Systems Insight Display ejector button
6	Optical drive
7	Floppy drive
8	Optional Tape Drive
9	Hard drive bays 1-8 ¹

¹ Only bays 1-6 are used.

HP ML370 G5 Server, Front (Tower)

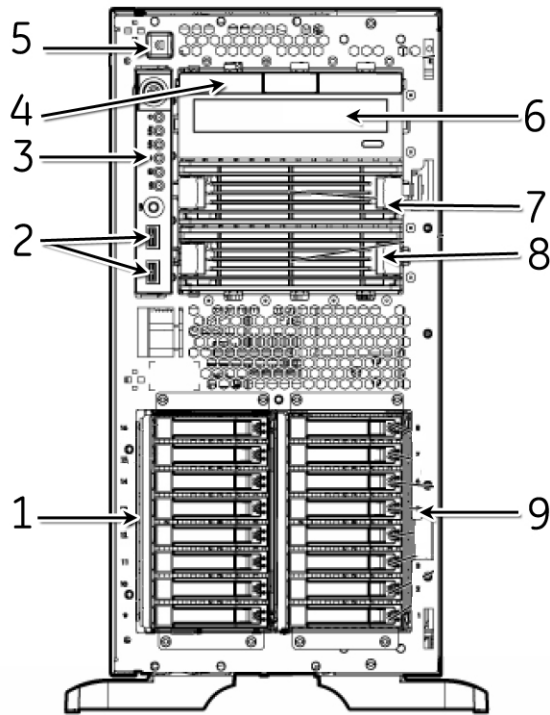


Table 18. ML370 G5 Server, Front (Tower)	
Item	Description
1	Hard drive bays 9-16 (not used)
2	USB connectors
3	HP Systems Insight Display (see "HP ML370 G5 Server, LEDs and Buttons (Both)" on page 37)
4	Media bay spacer (tower model only)
5	HP Systems Insight Display ejector button
6	Optical drive
7	Floppy drive
8	Optional Tape Drive
	Hard drive bays 1-8 ¹

¹ Only bays 1-6 are used.

HP ML370 G5 Server, LEDs and Buttons (Both)

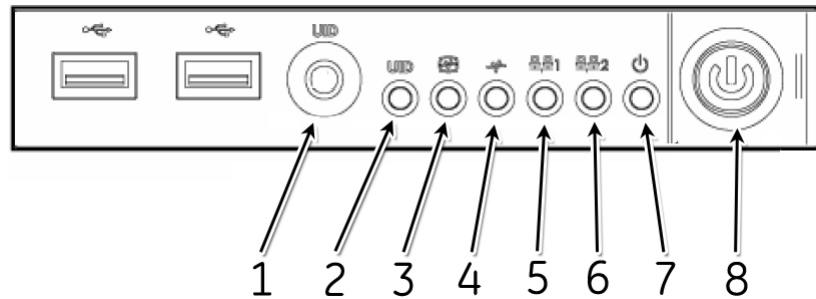


Table 19. ML37 G5 Server, LEDs and Buttons (Insight Display)

Item	Description	Status	
		Indicator	Description
1	UID button	–	–
2	UID LED	Solid blue	Activated
		Flashing blue	System managed remotely
		Off	Deactivated
3	Internal system health LED	Green	Normal, system on
		Amber	System health is degraded
		Red	System health is critical
		Off	Normal, system off
4	External system health LED (power supply)	Green	Normal, system on
		Amber	Redundant power supply failure
		Red	Power supply failure. No operational power supplies.
		Off	Normal, system off
5	NIC 1 link/activity LED (embedded NIC)	Green	Linked to network
		Flashing green	Linked with network activity
		Off	No network connectivity
6	NIC 2 link/activity LED (embedded NIC)	Green	Linked to network
		Flashing green	Linked with network activity
		Off	No network connectivity

Table 19. ML37 G5 Server, LEDs and Buttons (Insight Display)			
Item	Description	Status	
		Indicator	Description
7	System power LED	Green	System has AC power and is powered up
		Amber	System has AC power and is in standby mode
		Off	System has no AC power
8	Power On/Standby button	–	–

HP ML370 G5 Server, Back Panel (Both)

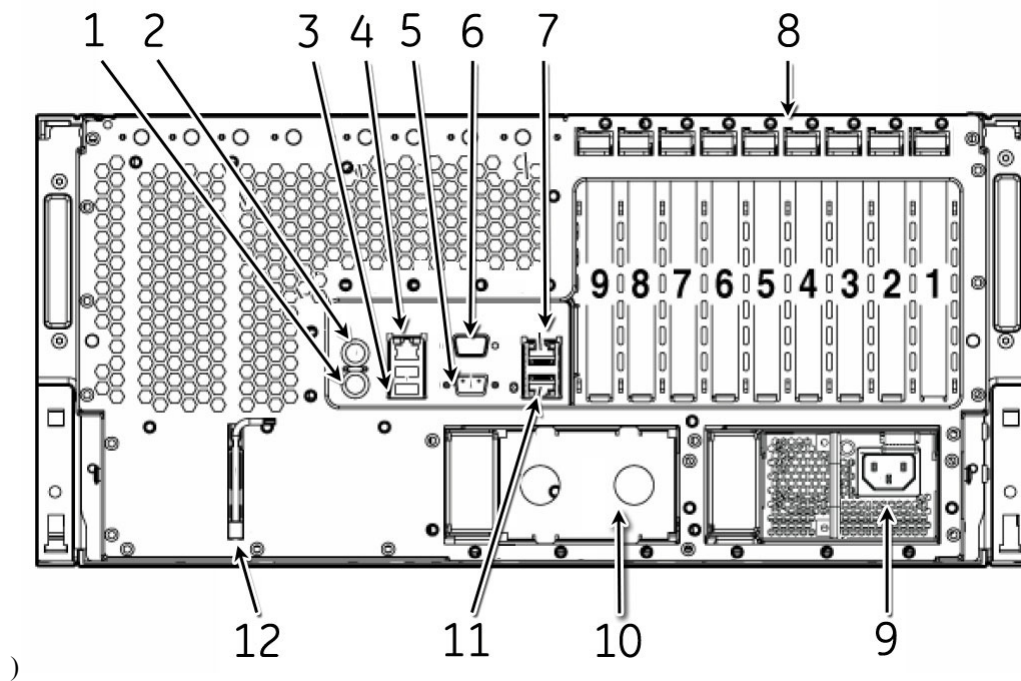


Table 20. ML370 G5 Server, Back Panel	
Item	Description
1	Keyboard connector
2	Mouse connector
3	USB connectors
4	iLO 2 management connector
5	Video connector
6	Serial connector

Table 20. ML370 G5 Server, Back Panel

Item	Description
7	NIC 2 connector
8	PCI expansion slots
9	Hot-plug power supply (primary bay)
10	Hot plug power supply blank (redundant bay)
11	NIC 1 connector
12	T-10/T-15 Torx screwdriver

MUSE File Server, ML 370 G4

This section identifies the components of the HP ML370 G4 file server. The HP ML370 G4 server is available in both rack and tower configurations. Only the rack model is shown here; the orientation for the tower is on a 90-degree angle.

ML 370 G4, Front

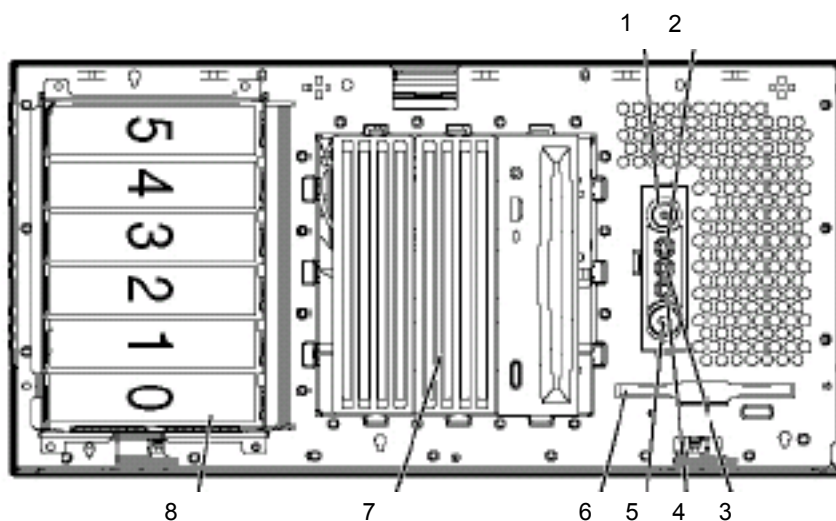


Table 21. CPU Front, Compaq ProLiant ML370 G4

Item	Description
1	UID switch and LED
2	Internal system health LED
3	External system health LED
4	NIC link/activity LED
5	Power On/Standby button/LED assembly

Table 21. CPU Front, Compaq ProLiant ML370 G4	
Item	Description
6	Diskette drive
7	Removable media bays
8	Hot-plug SCSI hard drive bays (SCSI IDs 0 through 5)

ML370 G4 LEDs and Buttons Front Panel

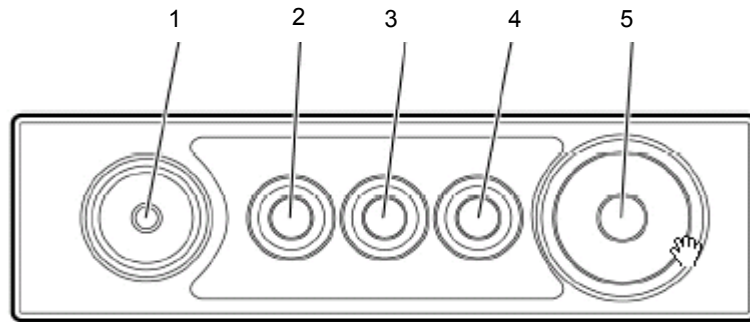


Table 22. CPU Front Panel LEDs and Buttons Compaq ProLiant ML370 G4		
Item	Description	Status
1	UID switch and LED	Blue = Activated Flashing blue=System being managed remotely
2	Internal system health LED	Green =Normal (system on) Amber = System health is degraded Red = System health is critical Off = Normal (system off)
3	External system health (power supply) LED	Green = Normal (system on) Amber = Redundant power supply failure Red = Power supply failure. No operational power supplies Off = Normal (system off)
4	NIC link/activity LED (embedded NIC only)	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
5	Power on/Standby button and LED	Amber = System has AC power and is in standby mode Green = System has AC power and is turned on Off = System has no AC power

ML370 G4, Rear Panel

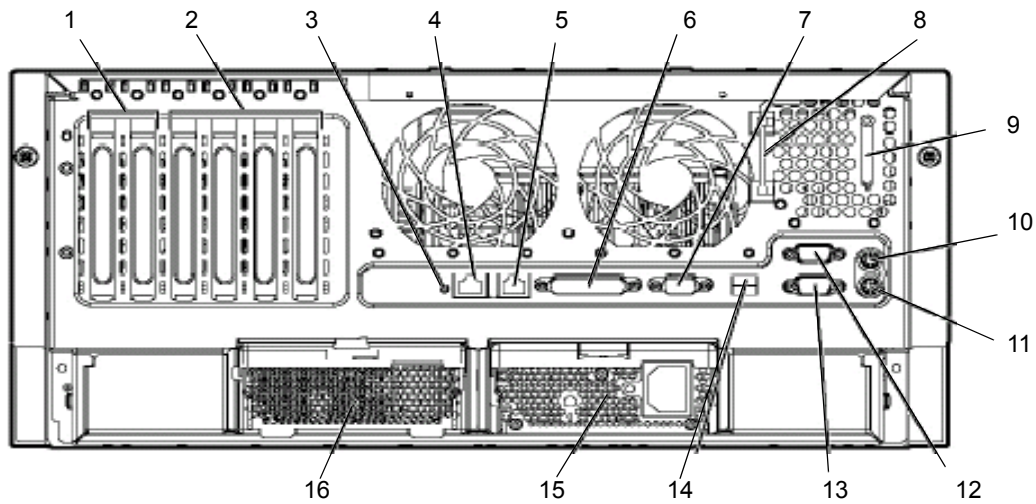


Table 23. CPU Back Compaq ProLiant ML370 G4

Item	Description
1	x PCI Express expansion slots
2	100-Mhz PCI-X expansion slots
3	Unit ID LD
4	Ethernet 10/100/1000 port
5	iLO management port
6	Parallel connector
7	Video connector
8	T-15 Torx screwdriver
9	Auxiliary VHDCI SCSI blank
10	Mouse connector
11	Keyboard connector
12	Serial connector B
13	Serial connector A
14	USB connectors
15	Power supply
	Power supply

ML370 G4 LEDs and Buttons, Rear Panel

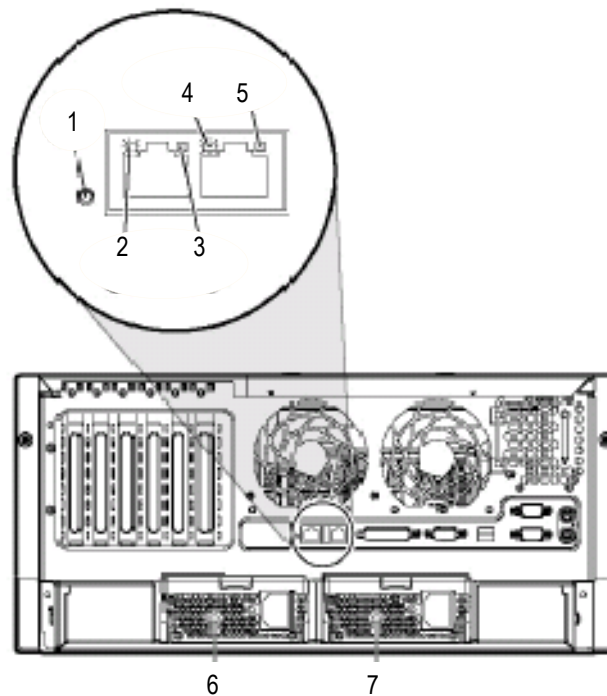


Table 24. Rear Panel LEDs and Buttons – Compaq ProLiant ML370 G4

Item	Name	Color	Description
1	Unit ID LED	Blue	On = Activated Flashing = System remotely managed Off = Deactivated
2	NIC Activity LED (Integrated NC7781)	Green	On or flashing = Linked to network Off = Not linked to network
3	NIC Link LED (Integrated NC7781)	Green	On = Network activity Off = No network activity
4	iLO NIC Activity LED	Green	On or flashing = Network activity Off = No network activity
5	iLO NIC Link LED	Green	On = Linked to network Off = Not linked to network

Table 24. Rear Panel LEDs and Buttons – Compaq ProLiant ML370 G4			
Item	Name	Color	Description
6	Power supply LED (redundant)	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: <ul style="list-style-type: none">■ AC power unavailable■ Power supply failed■ Power supply in standby mode■ Power supply exceeded current limit
7	Power Supply LED (primary)	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: <ul style="list-style-type: none">■ AC power available■ Power supply failed■ Power supply in standby mode■ Power supply exceeded current limit

MUSE File Server, Accessories

HP Insight 2 Display

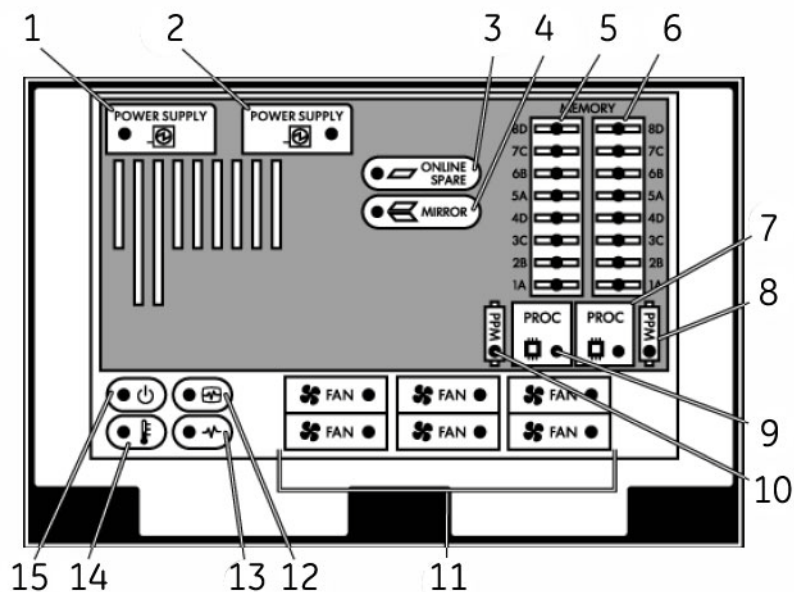


Table 25. Insight 2 Display)

Item	Description	Indicator	Description
1	Primary power supply	Amber	Failure
		Off	Normal
2	Redundant power supply	Amber	Failure
		Off	Normal
3	Online spare memory	Green	Protection enabled
		Amber	Memory failure occurred
		Flashing Amber	Memory configuration error
		Off	No protection
4	Mirrored memory	Green	Protection enabled
		Amber	Memory failure occurred
		Flashing Amber	Memory configuration error
		Off	No protection
5	FBDIMM LEDs (Mem board 1) ¹	Amber	Failure
		Off	Normal

Table 25. Insight 2 Display			
Item	Description	Indicator	Description
6	FBDIMM LEDs (Mem board 2) ¹	Amber	Failure
		Off	Normal
7	Processor 1	Amber	Failure
		Off	Normal
8	PPM 1	Amber	Failure
		Off	Normal
9	Processor 2	Amber	Failure
		Off	Normal
10	PPM 2	Amber	Failure
		Off	Normal
11	Hot-plug fan	Amber	Failure, or fan not installed
		Off	Normal
12	Internal system health	Green	Normal, system on
		Amber	Degraded health
		Red	Critical health
		Off	System off
13	External system health (power supply)	Green	Normal, system on
		Amber	Redundant power failure
		Red	Power supply failure, no operational power
		Off	System off
14	Over temperature	Red	Critical overheating
		Off	Normal
15	System power	Green	AC power on.
		Amber	System in standby mode
		Off	No AC power

¹ If all LEDs for a memory board are flashing, it indicates the memory board is unseated.

AIT Drive

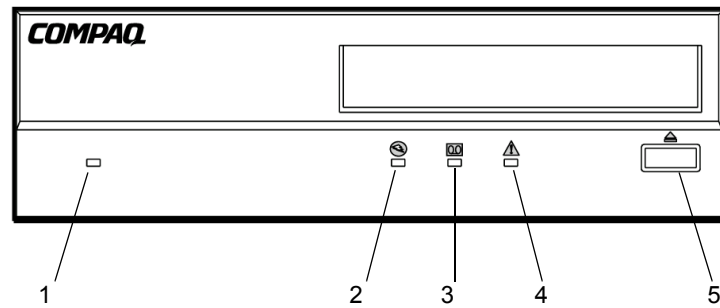


Table 26. AIT Drive





Item	Icon	Description
1	None	Power LED
2		Busy LED
3		Tape LED
4		Status LED
5		Eject Button

Table 27. Legend




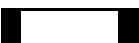


LED Flash Symbol	LED Display
	Off
	On
	Quick flashes
	Quick flash with a long pause in between

Table 27. Legend (Continued)	
LED Flash Symbol	LED Display
	Long flash with a short pause in between
	Two quick flashes with a long pause in between.

UPS, Front

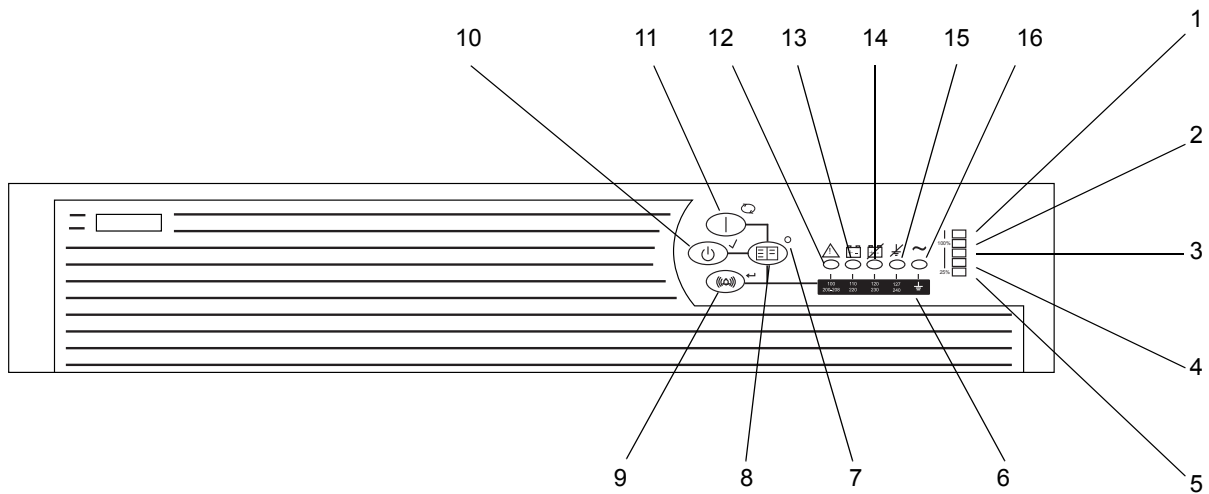


Table 28. UPS for Compaq File Server (Front)	
Item	Name
1	LED indicating overload capacity
2	LED indicating 76% to 100% load capacity
3	LED indicating 51% to 75% load capacity
4	LED indicating 26% to 50% load capacity
5	LED indicating 0% to 25% load capacity
6	Voltage Configuration Panel ¹
7	Configure mode on LED *
8	Configure button *
9	TEST/ALARM RESET Button
10	STANDBY Button
11	ON Button
12	General Alarm
13	On Battery

Table 28. UPS for Compaq File Server (Front)

Item	Name
14	Bad Battery / Low Battery
15	Site Wiring Fault Indicator
16	Utility LED

1 Accessible only when the front bezel is removed.

UPS, Back

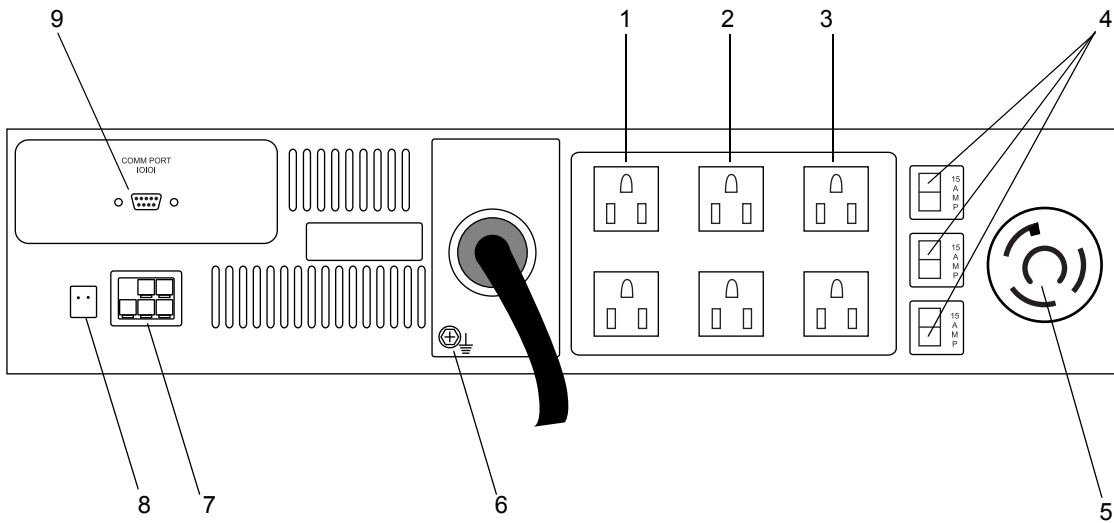


Table 29. UPS for Compaq File Server (Back)

Item	Name
1	Load Segment 1
2	Load Segment 2
3	Load Segment 3
4	Load Segment Circuit Protectors
5	PDU (Power Distribution Unit) output receptacle
6	Ground bonding screw
7	ERM (Extended Runtime Modules) connector
8	REPO (Remote Emergency Power Off) port
9	Communications Port / Option Slot

MUSE EveryWARE File Server

HP DL360 G5, Front Panel

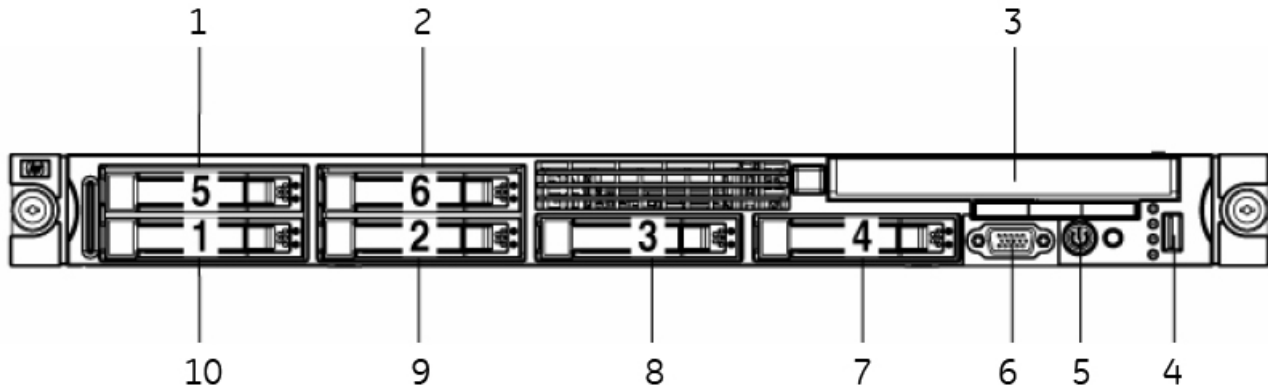


Table 30. DL360 G5 MUSE EveryWARE File Server

Item	Name
1	Hard drive bay 5 (not used)
2	Hard drive bay 6 (not used)
3	CD/DVD Drive
4	USB connector
5	HP Systems Insight Display
6	Video connector
7	Hard drive bay 4 (not used)
8	Hard drive bay 3 (not used)
9	Hard drive bay 2
10	Hard drive bay 1

HP DL360 G5 LEDs and Buttons, Front Pane

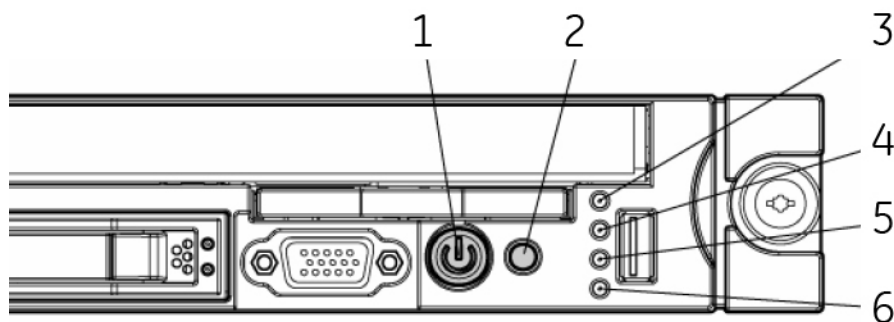


Table 31. DL360 G5, Front Panel LEDs and Buttons		
Item	Description	Status
1	Power On/Standby button and system power LED	Green = System is on. Amber = System is shut down, but power is still applied. Off = Power cord is not attached, power supply failure has occurred, no power supplies are installed, facility power is not available, or disconnected power button cable.
2	UID button/LED	Blue = Identification is activated. Flashing blue = System is being remotely managed. Off = Identification is deactivated.
3	Internal health LED	Green = System health is normal. Amber = System health is degraded. To identify the component in a degraded state, refer to "HP Systems Insight Display and LEDs" ("HP Systems Insight Display and LEDs" on page 77). Red = System health is critical. To identify the component in a critical state, refer to "HP Systems Insight Display and LEDs" ("HP Systems Insight Display and LEDs" on page 77). Off = System health is normal (when in standby mode).
4	External health LED (power supply)	Green = Power supply health is normal. Amber = Power redundancy failure occurred. Off = Power supply health is normal when in standby mode.

Table 31. DL360 G5, Front Panel LEDs and Buttons (Continued)

Item	Description	Status
5	NIC 1 link/activity LED	Green = Network link exists. Flashing green = Network link and activity exist. Off = No link to network exists. If power is off, the front panel LED is not active. View the LEDs on the RJ-45 connector for status by referring to the rear panel LEDs ("Rear panel LEDs and buttons" on page 74).
6	NIC 2 link/activity LED	Green = Network link exists. Flashing green = Network link and activity exist. Off = No link to network exists. If power is off, the front panel LED is not active. View the LEDs on the RJ-45 connector for status by referring to the rear panel LEDs ("Rear panel LEDs and buttons" on page 74).

HP DL360 G5, Rear Panel

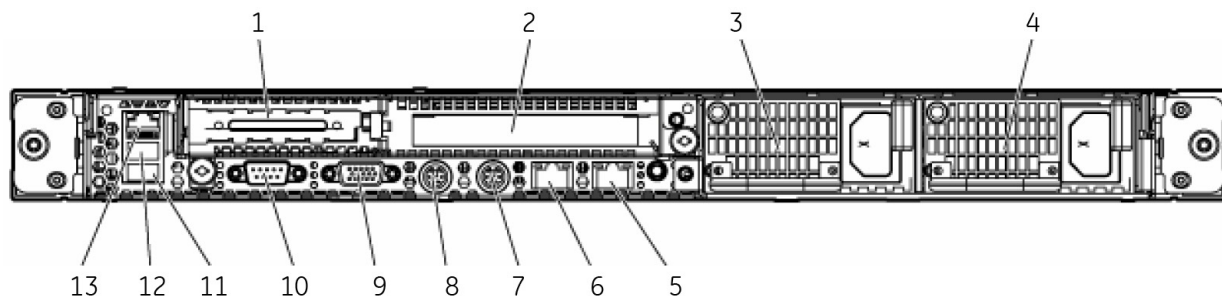


Table 32. DL360 G5, Rear Panel

Item	Description
1	PCI Express expansion slot 1, low-profile, half-length
2	PCI Express expansion slot 2
3	Power supply bay 2
4	Power supply bay 1
5	NIC 2 connector
6	NIC 1 connector
7	Keyboard connector
8	Mouse connector
9	Video connector
10	Serial connector

Table 32. DL360 G5, Rear Panel (Continued)

Item	Description
11	USB connector
12	USB connector
13	iLO 2 NIC connector

HP DL360 G5 LEDs and Buttons, Rear Panel

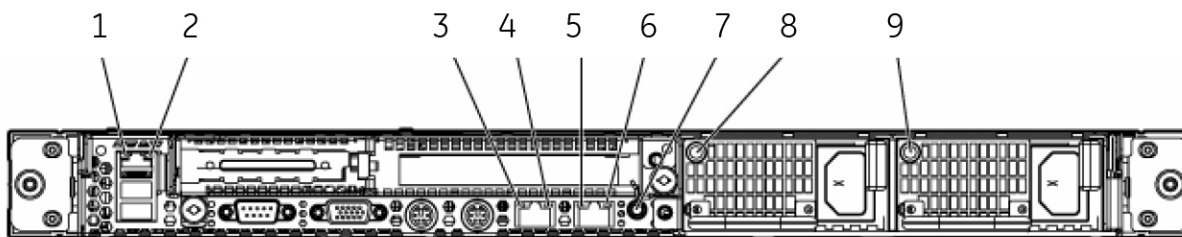


Table 33. DL360 G5, Rear Panel LEDs and Buttons

Item	Description	Status
1	iLO 2 NIC activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
2	iLO 2 NIC link LED	Green = Link exists. Off = No link exists.
3	10/100/1000 NIC 1 activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
4	10/100/1000 NIC 1 link LED	Green = Link exists. Off = No link exists.
5	10/100/1000 NIC 2 activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
6	10/100/1000 NIC 2 link LED	Green = Link exists. Off = No link exists.
7	UID button/LED	Blue = Identification is activated. Flashing blue = System is being managed remotely. Off = Identification is deactivated.
8	Power supply 2 LED	Green = Normal Off = System is off or power supply has failed
9	Power supply 1 LED	Green = Normal Off = System is off or power supply has failed

MUSE rp5700 Client

RP5700 Controls and Indicators, Front Panel

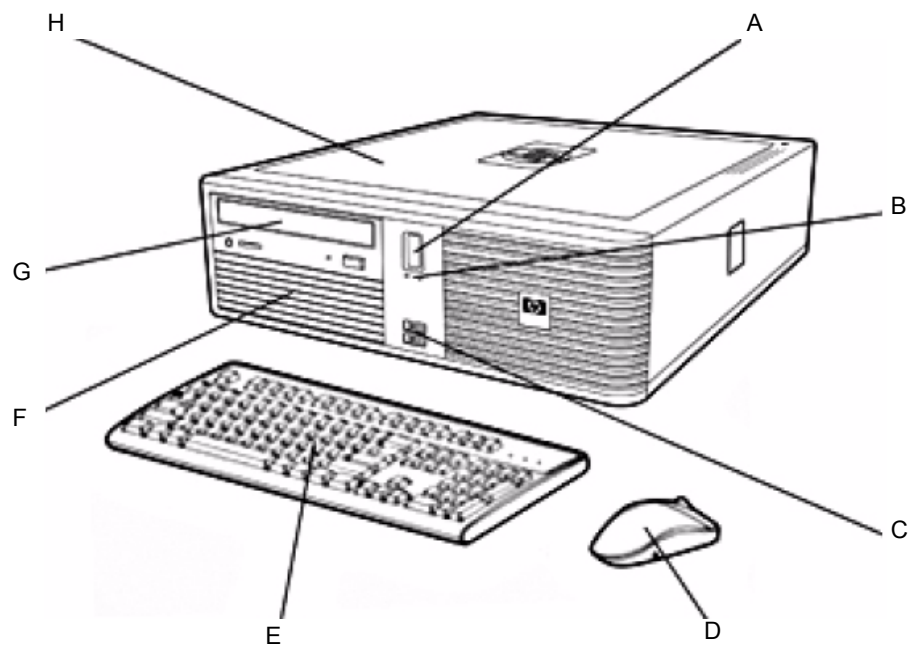


Table 34. rp5700 client, front panel controls and indicators

Item	Description
A	Recessed power button
B	LEDs
C	2 USB 2.0 ports with rubber cover
D	2-button optical scroll mouse
E	Keyboard
F	Internal hard drive
G	CD/DVD drive

RP5700 Connectors, Rear Panel

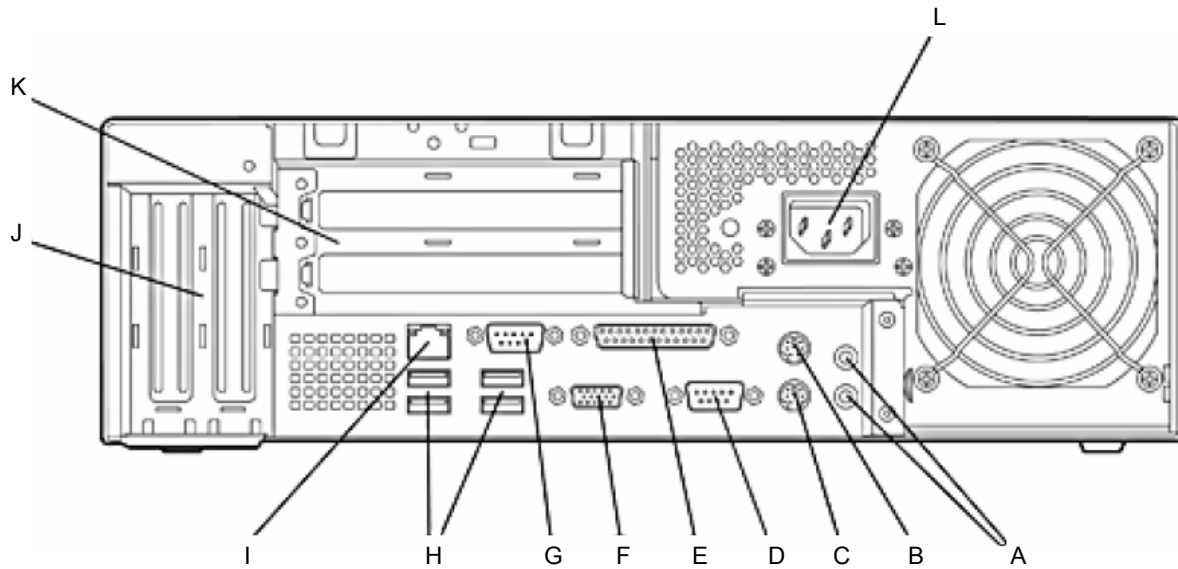


Table 35. rp5700 client, rear panel connectors

Item	Description
A	Line in and line out audio jacks
B	PS/2 mouse port
C	PS/2 keyboard port
D	RS232 serial COM1 port
E	Parallel port
F	VGA port
G	RS232 serial COM2 port
H	4 USB 2.0 ports
I	RJ-45 LAN jack
J	2 low-profile slots: left ADD2/SDVO slot, right PCI3-x1
K	2 full-height PCI slots
L	240W 80 PLUS® – Active PFC power supply (no line switching required)

MUSE rp5800 Client

RP5800 Controls and Indicators, Front Panel

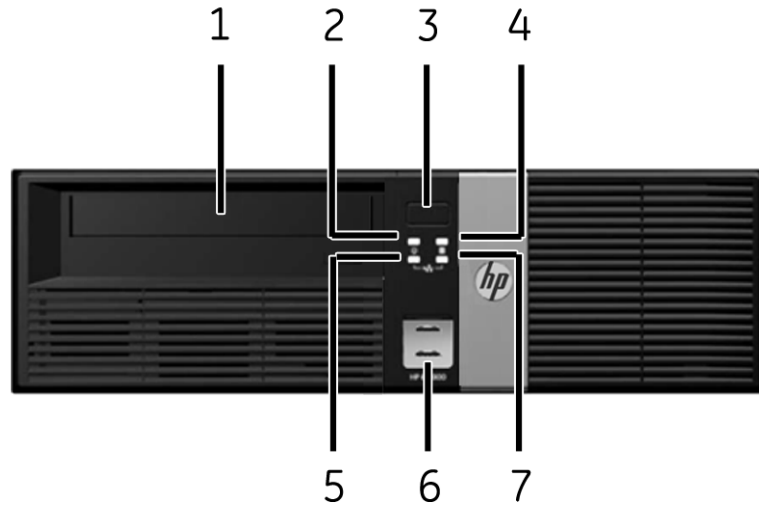


Table 36. HP rp5800, front view

Item	Name	Description
1	Optical Drive	5.25-inch DVD-R/DVD-RW capable drive
2	Power Light	A steady green light indicates the system is powered on. A flashing red light indicates there is a problem with the system and displays a diagnostic code. Refer to the OEM's Maintenance and Service Guide to interpret the code.
3	Power Button	Dual state power button
4	Hard Drive Light	LED flashes when internal hard drive is being accessed
5	NIC Link Light	LED lights up to indicate a network connection.
6	USB Ports	2 USB 2.0 ports behind a sliding cover
7	NIC Activity Light	LED flashes to indicate network activity.

RP5800 Connectors, Rear Panel

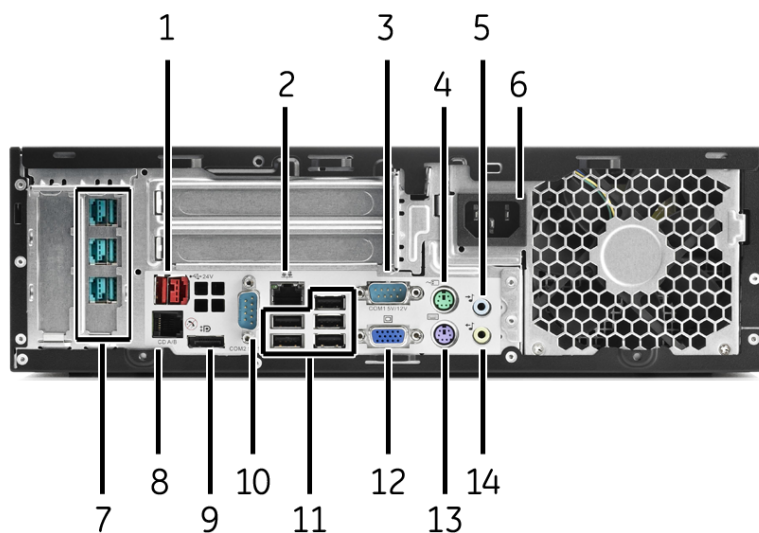


Table 37. rp5800 client, rear panel connectors

Item	Name	Description
1	Powered USB	Powered USB port, 24V
2	LAN Port	RJ-45 network connector
3	Serial Connector	COM1 serial port
4	Mouse Connector	PS/2 mouse connector (green)
5	Audio Connector	Line-in audio connector (blue)
6	Mains	Mains power cord connector
7	Powered USB	Powered USB ports, 12V
8	Cash Drawer Connector	Similar in size and shape to standard modem jack. To avoid damaging the computer, DO NOT attempt plug a network or phone cable into the connector.
9	Display/Port	DVI display connector
10	Serial Connector	COM2 serial port
11	USB	Un-powered USB ports
12	VGA Connector	VGA display connector
13	Keyboard Connector	PS/2 keyboard connector (purple)
14	Speaker connector	Line-out speaker connector (green)

MUSE dc7600 Client

DC7600 Controls and Indicators, Front Panel

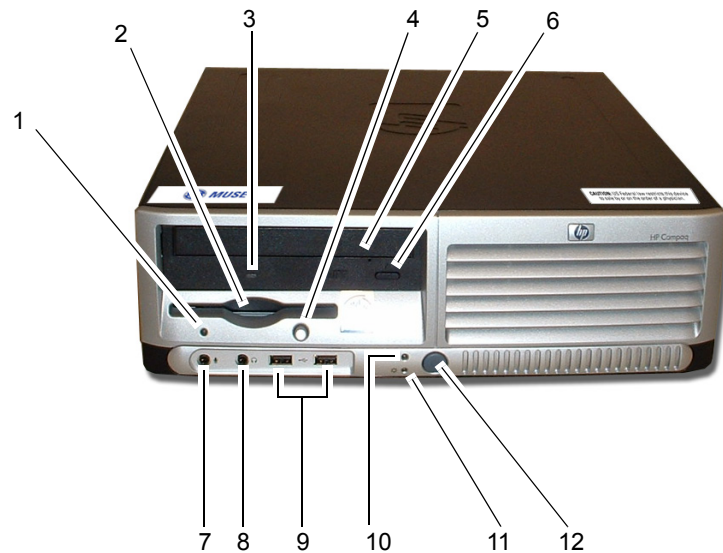


Table 38. MUSE dc7600 Client, Front Panel Controls and LEDs

Item	Description	Item	Descriptions
1	Diskette drive activity light	7	Dual-state power button
2	Diskette drive	8	Power-on light
3	Optical drive activity light	9	Hard drive activity light
4	Diskette eject button	10	USB ports
5	Optical drive	11	Headphone connector
6	Optical drive eject button	12	Microphone connector

DC7600 Connectors, Rear Panel

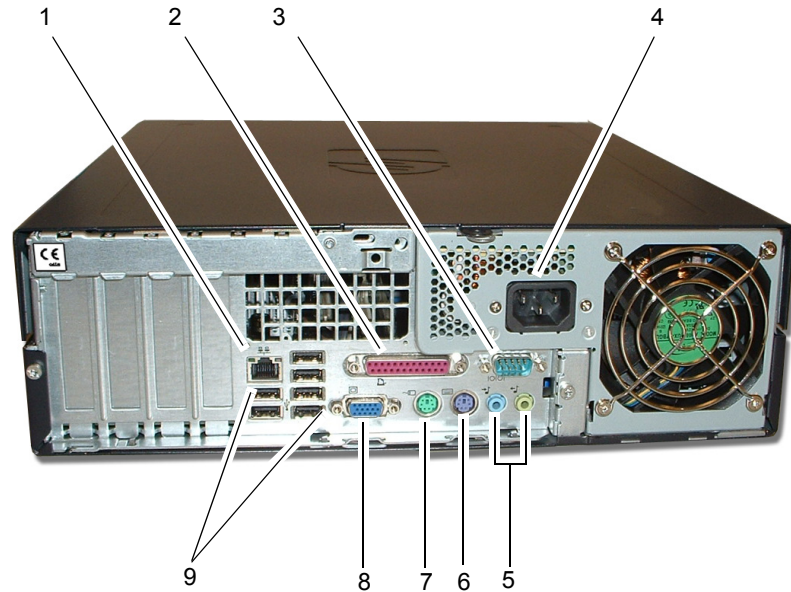


Table 39. MUSE dc7600 Client – Rear Panel Connectors

Item	Name
1	RJ-45 network connector
2	Parallel connector
3	O O Serial connector
4	Power cord connector
5	Line-in audio connectors
6	PS/2 keyboard connector (purple)
7	PS/2 mouse connector (green)
8	Monitor connector
9	USB Ports

MUSE dc7100 Client

DC7100 Controls and Indicators, Front Panel

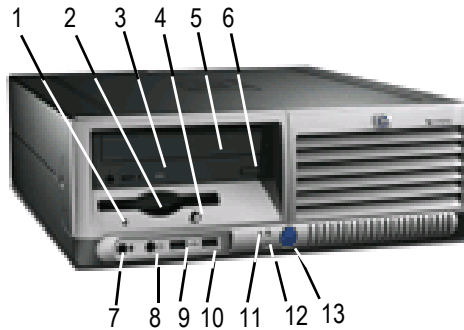
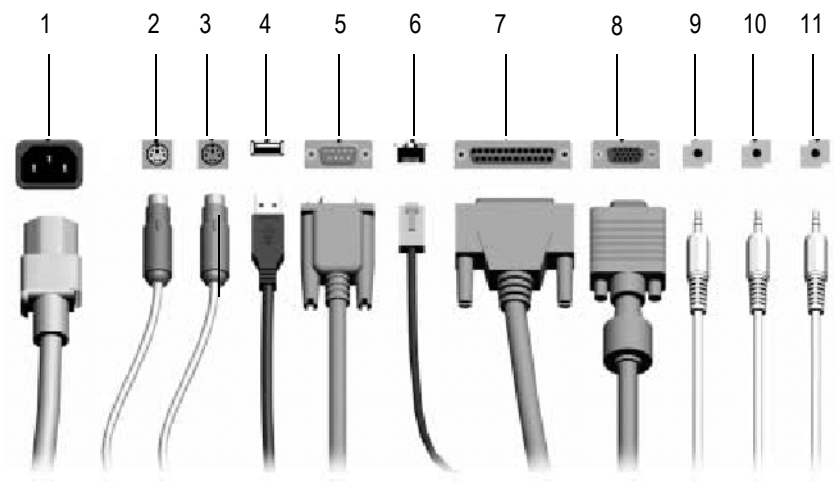


Table 40. MUSE dc7100 Client, Front Panel Controls and LEDs

Item	Description	Item	Descriptions
1	Diskette Drive Activity Light	7	Microphone Connector
2	Diskette Drive	8	Headphone Jack
3	Optical Drive Activity Light	9	USB (Universal Serial Bus) Ports (2)
4	Diskette Eject Button	10	Hard Drive Activity Light
5	Optical Drive (CD-ROM CD-R/RW, DVD-ROM, DVD+R/RW, or CD-RW/DVD Combo Drive)	11	Power On Light
6	Optical Drive Eject Button	12	Power Button

Connectors, Rear Panel



MD1350-175A

Table 41. MUSE dc7100 Client – Rear Panel Connectors

Item	Name
1	Power Connector
2	PS/2 Mouse Connector
3	PS/2 Keyboard Connector
4	Universal Serial Bus (USB)
5	Serial Connector
6	RJ-45 Network Connector
7	Parallel Connector
8	Monitor Connector
9	Headphone/Line-Out Connector
10	Line-In Audio Connector
11	Microphone Connector

NOTE

Arrangement and number of connectors may vary by model.

HP LE1911 and HP L1910 LCD Monitor



Table 42. HP LE1911 and HP L1910 LCD Monitor Controls

Item	Name
A	Menu Selection
B	Menu “-” Selector
C	Menu “+” Selector
D	Power LED
E	Power Button

HP P4015N LaserJet Printer

HP P4015N Features, Front



Table 43. HP P4015N LaserJet Printer

Item	Name
A	500 Sheet Tray 2
B	100 Sheet Multi-Purpose Input Tray
C	Control Panel Display
D	Control Panel

HP P4015N Connectors, Rear Panel

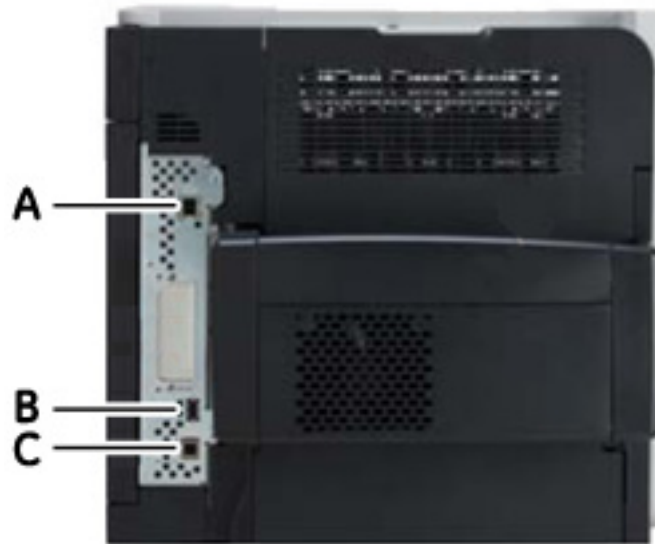


Table 44. HP P4015N LaserJet Printer	
Item	Name
A	HP Jetdirect Gigabit Ethernet embedded print server with IPsec
B	One external and two internal Host USB 2.0-like ports for third-party connections
C	Hi-Speed USB 2.0 port for direct connection to printer

CD-ROM Drive

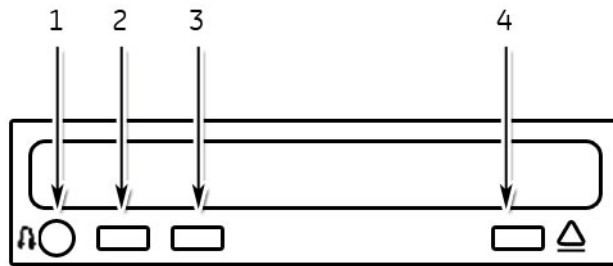
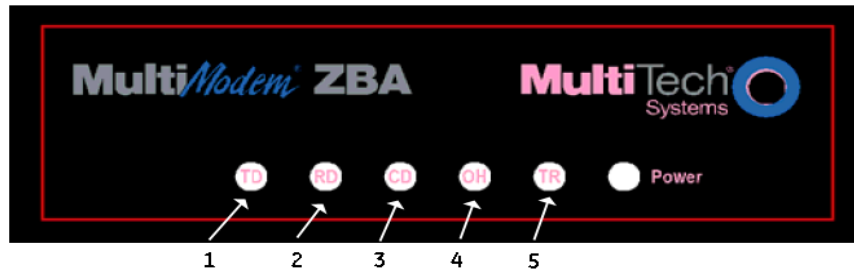


Table 45. CD-ROM Drive

Item	Name	Description
1	Headphone connector	Connect headphones here.
2	Variable control dial	Use to vary CD volume.
3	LED	Light indicates CD-ROM drive activity.
4	Eject button	Press to remove CD-ROM.

Universal Modem



486

Item	Name	Description
1	TD (Transmit Data)	The TD LED flashes when the modem is transmitting data to another modem.
2	RD (Receive Data)	The RD LED flashes when the modem is receiving data from another modem.
3	CD (Carrier Detect)	The CD LED lights when the modem detects a valid carrier signal from another modem. It is on when the modem is communicating with the other modem and off when the link is broken.
4	OH (Off-Hook)	The OH LED lights when the modem is off-hook, which occurs when the modem is dialing, online, or answering a call. The LED flashes when the modem pulse-dials.
5	TR (Terminal Ready)	The TR LED lights when a communication program is using the modem. It means the modem is ready for an outgoing or incoming call. It goes off when the communication program disconnects the serial port. When it goes off, a connected modem will also disconnect.

3 Installation

For your notes

Installation Documents

The following table lists the current MUSE system installation and upgrade documents.

PN	Title
2014300-082	Information Interchange Developer's Manual
2014300-156	HL7 Reference Manual
2020299-021	MobileLink Setup & Installation Instructions
2020299-015	MAC 3500/5500 LAN Installation Instructions
2021233-221	MUSE Web (Enterprise Integration) Installation Instructions
2031233-214	Advanced Security Guide
2031233-231	MUSE System Installation Instructions
2031233-218	CASE to MUSE Installation Instructions
2031233-211	MUSE Pre-Installation Manual
2031233-212	MUSE v5x to 7.1 System Upgrade Instructions
2031233-213	MUSE V7.0.x to V7.1 Update Instructions
2031233-219	MARS PC to MUSE Installation Instructions
2031233-220	MARS Unix to MUSE Installation Instructions
2031233-222	InSite 2 Installation Instructions
2031233-216	MUSE Client Installation Instructions
2031233-242	MUSE API Installation
2031233-224	CCG Upgrade Instructions
2031233-226	Monitoring Gateway Installation Instructions
2037606-040	MUSE on VMware Pre-Installation Manual

Setting Up Modems

The MUSE system uses the following modems to send and receive data.

FAX Modem	Faxes reports from the MUSE system.
CSI Modem	Transfers cart data via the modem.
CSI Wireless Modem	Wirelessly transfers cart data via LAN or client bridge.
CSI Direct	Transfers cart data through a direct connection between the MUSE system and the cart.

Each modem can be configured to service a defined set up devices using the following instructions.

NOTE

Modems cannot be connected directly to a virtual machine. If the MUSE server is installed on a virtual machine and data acquisition via modem is required, connect the modem to a MUSE workstation or to a dedicated system with the MUSE client software installed. In either case, use the following procedures, configuring each modem in the MUSE application and install a modem service on the machine where the modem(s) physically reside(s). Refer to the *MUSE Cardiology Information System on VMware Pre-Installation Manual* (PN 2037606-040) for more information.

Setting Up Modems in MUSE Setup

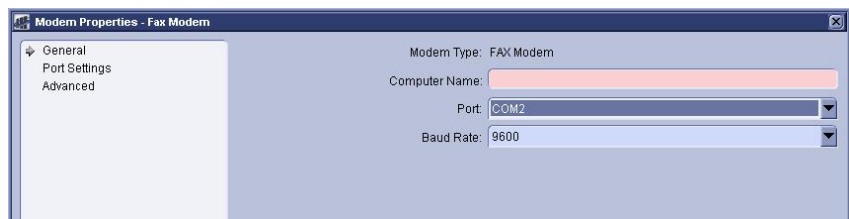
Repeat the following for each modem that needs to be configured.

1. Log in as a user with privileges to change *Modem Setup*.
2. At the *Modem* window open a *Modem Properties* window using one of the following methods:

select *Action > New*, or
click the *New* icon, or
right-click in the empty space and select *New*.

3. Select *the appropriate modem type*.

The *Modem Properties...* window opens.



4. Enter the appropriate values in the following fields.

Field	Description
<i>Computer Name:</i>	Name of the computer where the modem is physically installed. Typically, this is the MUSE file server.
<i>Port:</i>	Port Number
<i>Baud Rate:</i>	115.2K Baud (CSI Wireless, CSI Direct) 9600 Baud (CSI, Fax ¹)

1. If the Fax modem encounters problems at 9600 baud, use 4800 baud.

5. Select *OK* to save your changes.

The *Modem Properties* window closes.

Adding Service for Each Modem

Add a modem service on each computer where a modem was physically installed. For example, if you installed a modem on a client, add a service to the client; if you installed a modem on the server, add a service to the server.

1. Open the *Modem Setup* window to use as a reference for modem IDs while adding modem services.
2. Open a *Command Prompt*.
3. Change to the directory where MUSE was installed.

By default, this would be **Program Files\muse**.

4. Type the following command in the Command Prompt window.

```
musesvc [space] -<modem> [space] <domain> \musebkgnd [space]
<password> [space] <modemID> [space] -cmdline:-db: <sql server name>
```

Where:

domain = the domain or local computer name where the MuseBkgnd account was created

password = password for MuseBkgnd account

modem ID = the modem ID assigned in MUSE Modem Setup

sql server name = name of sql server where the MUSE database resides.

For a typical installation, this is the same as the MUSE server name.

NOTE

To see the usage for the musescv command, type **musesvc [space] ?** in the *Command Prompt* and press **Enter**

For example, to install a CSI modem with an ID of *1* on a MUSE server named *muse7server* in the *memorialhc* domain, the command would like this:

```
musesvc [space] -csi [space] memorialhc\musebkgnd [space]
Muse!Bkgnd007 [space] 1 [space] -cmdline:-db:muse7server
```

5. Press **Enter** to run the command.

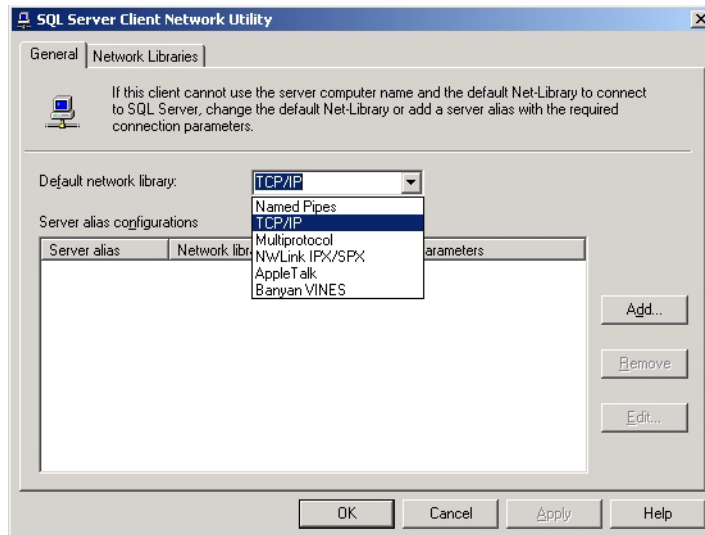
Configuring SQL Server Client Network

Unlike Windows XP or Windows Server 2003, which allow an ordered protocol list, Windows 2000 has only one SQL protocol, set to *Named Pipes* by default. When the MUSE CSI FAX or Modem service runs on a Windows 2000 client, it must be configured to use TCP/IP instead. This change is only needed when the Windows 2000 hosts the MUSE services. It is not needed to run the MUSE application.

Use the following instructions to configure the SQL protocol on the MUSE client.

1. Open a *Command Prompt* window.
2. Type **cliconfg**.

The *SQL Server Client Network Utility* window opens.



3. Select *TCP/IP* from the *Default network library* drop-down list.

This sets TCP/IP as the default protocol. There is no need to add anything to the *Server alias configurations* list.

4. Click **OK** to save the setting.
5. Start the CSI FAX or Modem service.

NOTE

If a hospital reconfigures a Windows XP/2003 box to exclude the 'TCP/IP' protocol in the SQL Server Client Network Utility, an error will occur. For more information, refer to Technical Bulletin 2026938-606.

Setting Up Carts

The MUSE system can acquire ECGs from a cart through a direct serial connection between the MUSE server and the cart device.

To set up the MUSE system to accommodate this communication, the connection with the cart must be set up just as you would a CSI Direct modem in the MUSE application. For details, refer to “Setting Up Modems in MUSE Setup” on page 4 and “Adding Service for Each Modem” on page 5 for details.

Installing and Configuring the XML Import Option

The XMLImport option is required for systems that are acquiring data in XML format. The MUSE system can acquire data in XML format from the following devices:

- LifePak 12 through the LIFENET Receiving Station (reference document 2002783-040).
- From a Datamed FT (Format Translator) provided by Engineering Solutions, Inc.

This option is listed as **XMLImport**, and it is option number 20.

Requirements

The following requirements must be met on the MUSE file server:

- The **XMLImport** option is installed.
Installed by GE Service using the **changeopts** utility.
- The MUSE XML Parser Service is installed and running.
Installed with this command:

`musesvc [space] -xml [space] <domain>\MUSEBkgnd [space]
<MUSEBkgnd Password> [space] -cmdline:"-db:[SQLServer]"`
- An **xml** folder under the **muse** folder, for example **d:\muse\xml**.
 - ◆ This folder is created when the database is installed.
 - ◆ Share the folder as **xml\$** so that it is hidden.
 - ◆ Configure permissions as required.
 - ◆ The DTD files are copied to the **xml** folder when the database is installed.
- The default location for the Parser Service to look for files is: **d:\muse\xml**. You can change the location by altering the **cfgServiceXML** table in the MUSE_System database.
- The sending system needs to be configured to send to the shared **xml** folder.

Use the following instructions to install the Microsoft XML parser.

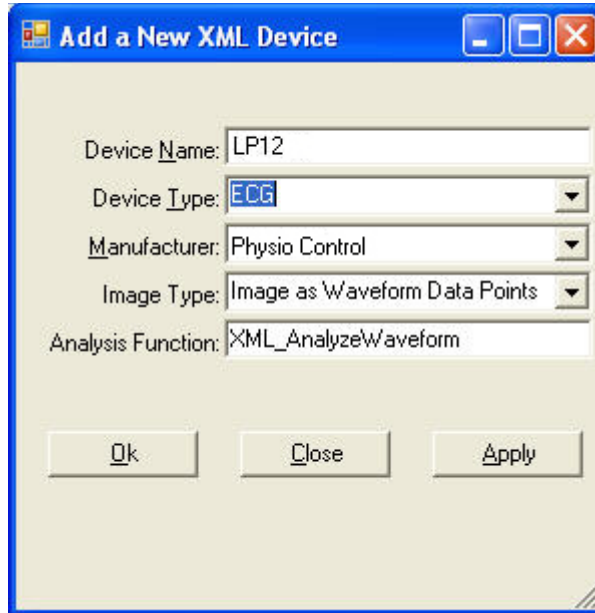
1. Run `\\MSXML 6.0\msxml6.msi` from the MUSE Support CD.
2. Click *Next*, accept the license agreement and click *Next*.
3. Click *Next* to accept the default customer information.
4. Click the *Install Now* button.
5. Click *Finish*.

Using XMLCONFIG.EXE to Configure the Option on MUSE

This utility is used to insert entries into the **cfgXmlInput** table in the **MUSE_System** database.

1. Copy the **xmlconfig** utility to the folder where MUSE is installed and launch it.
2. Click *New Device*.
3. Set the correct options for the appropriate device.

For LifePak 12 enter/select the following:



The screenshot shows the 'Add a New XML Device' dialog box with the following settings:

- Device Name: LP12
- Device Type: ECG
- Manufacturer: Physio Control
- Image Type: Image as Waveform Data Points
- Analysis Function: XML_AnalyzeWaveform

Buttons at the bottom: Ok, Close, Apply.

For a DatamedFT, enter/select the following:



The screenshot shows the 'Add a New XML Device' dialog box with the following settings:

- Device Name: DataMedFT
- Device Type: ECG
- Manufacturer: DataMed
- Image Type: Image as Waveform Data Points
- Analysis Function: XML_AnalyzeWaveform

Buttons at the bottom: Ok, Close, Apply.

For a Getemed C3012, enter or select the following:

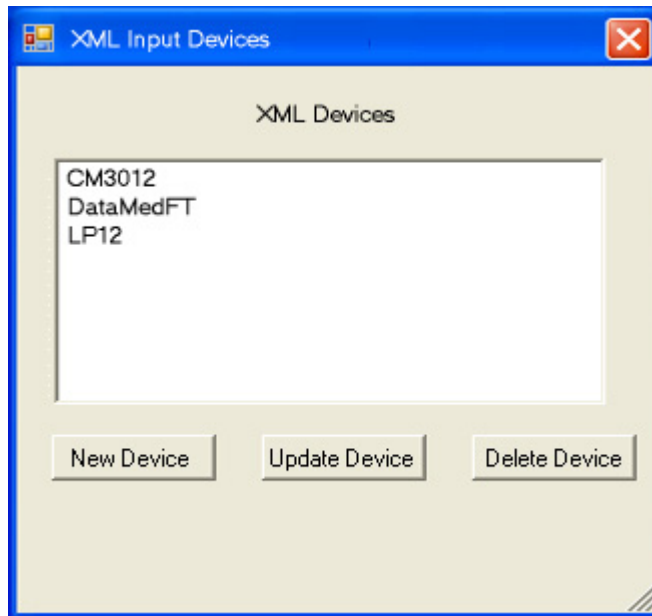


The "Add a New XML Device" dialog box contains the following fields and options:

- Device Name: CM3012
- Device Type: ECG (selected from a dropdown menu)
- Manufacturer: Getemed (selected from a dropdown menu)
- Image Type: Image as Waveform Data Points (selected from a dropdown menu)
- Analysis Function: XML_AnalyzeWaveform

Buttons at the bottom: Ok, Close, Apply.

4. Click *Ok*.
5. Create other devices, update an existing device, or delete a device as required



The "XML Input Devices" dialog box displays a list of XML Devices:

- CM3012
- DataMedFT
- LP12

Buttons at the bottom: New Device, Update Device, Delete Device.

6. Click the **X** to exit the utility when you are finished.

How to Configure Windows High Contrast Color Scheme on MUSE Client

For each workstation which may be used by one or more individuals with color vision deficiency (color blind), you can enable the Windows *High Contrast Color Scheme* for MUSE as follows:

1. From the Windows Desktop of the client which will be used by a color blind individual, select *Start* → *Control Panel*.
2. Double-click *Display* to open the *Display Properties* window.
3. Select the *Appearance* tab.
4. Select *Windows Classic style* in the *Windows and buttons* list.
5. Select one of the *High Contrast* options in the *Color scheme* list.
 - ◆ *High Contrast #1*
 - ◆ *High Contrast #2*
 - ◆ *High Contrast Black*
 - ◆ *High Contrast White*
6. Click *Apply*.
7. From the Windows Desktop, copy and paste a MUSE shortcut icon which was created during installation and paste the copy to the Windows Desktop.
8. Rename the new shortcut by adding **Windows Default Colors** to the end of the name.
9. Right-click on the new shortcut and select *Properties*.
10. Add the following to the end of the string in the *Target* field:
[space] **-nocui**
11. Click *OK* to save your changes.
12. Repeat steps 7-11 for each of the MUSE shortcut icons.

NOTE

Inform color blind system users to use the shortcuts with **Windows Default Colors** appended to the end of the name.

Also, inform system users who are not color blind to use the original shortcuts.

Changing the Port Number of the File Server

If you need to change the port number of the file server:

- Manually edit the **server.remoting.config** file on the file server
- Run the **remotingcfg.bat** at the file server and at each client.

1. Shut down MUSE service at the file server.
2. At the file server, manually modify the **c:\program files\muse\server.remoting.config** file.
3. Scroll to <channels> section and modify port="nnnn" to the appropriate port.

```

type="MUSE.MiddleTier.Server.Config.StatementManager, ML
objectUri="StatementManager" />

<wellknown mode="singleCall"
type="MUSE.MiddleTier.Server.Config.HISLocationManager,
objectUri="HISLocationManager" />

<wellknown mode="singleCall"
type="MUSE.MiddleTier.Server.DBSearch.DBManager, MUSE.M
objectUri="DBManager" />
</service>

<channels>
  <channel ref="tcp" port="8001">
    <serverProviders>
      <provider type="MUSE.Security.SecurityServerChannelsir
      <formatter ref="binary" />
    </serverProviders>
  </channel>
</channels>

</application>
<customErrors mode="off"/>
</system.runtime.remoting>
</configuration>

```

4. Save the changes made to the **server.remoting.config** file.
5. From the **c:\program files\muse>** prompt, run **remotingcfg.bat** at the server and each client.
arguments **-server** (name of MUSE file server) and **-port** (port number you want to change to)

EXAMPLE:

To change the port number of **muse7server** to **8002**, type the following in a *Command Prompt* window.

```
remotingcfg [space] -server:muse7server [space] -port:8002
```

NOTE

If the MUSE server is part of a domain, be sure to include the domain name as part of the server name.

This batch file will change the port numbers listed in the **muse.remoting.config** file.

Set Up MUSE File Server for File Copy

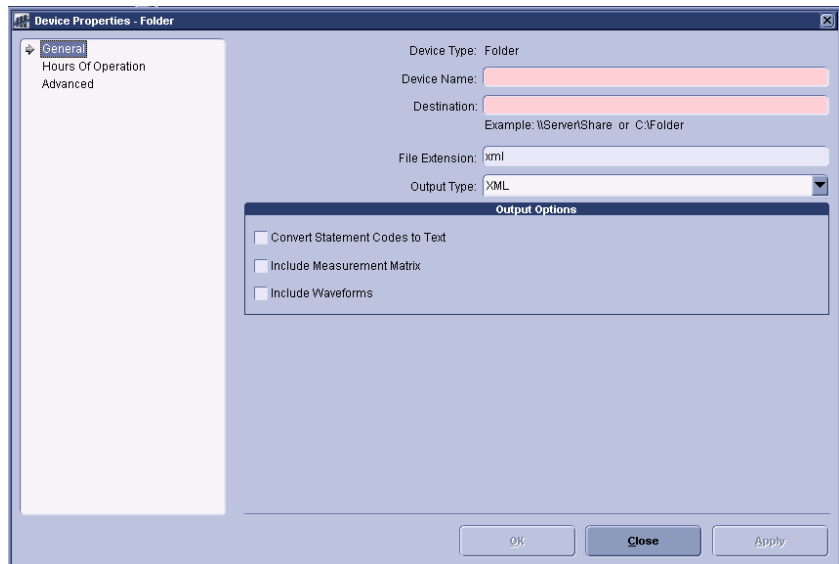
This section describes how to set up a File Copy Device. Use this if you want to copy to a folder on the MUSE file server or to a network share.

Change the Log On Service

If sending files to another computer on domain, you will need to use a **MuseBkgnd** Windows domain account as the logon for the MUSE file copy service. This requires that the hospital network administrator, create a domain **MuseBkgnd** user account. That account must then be used as the logon credentials for the MUSE File Copy Service on the MUSE file server.

Setting up a Folder

1. At the *Devices* window, select *Action* → *New* → *Folder*. The *Device Properties - Folder* window appears.



2. Type the device name and folder destination in the appropriate fields.
3. Select appropriate file type from the *Output Type* drop-down list.
4. Ensure that the appropriate file extension appears in the *File Extension* field.
5. Select the appropriate *Output Options*.
6. At the *Hours of Operation* tab, set up the hours of operation. Click *OK*.
7. At the *Advanced* tab, set up the format settings. Click *OK*.

Installation Checkout Procedure

NOTE

Use the checkout steps below as a guideline. Some of these steps can be verified by looking at the system or through discussions with the customer.

Use the Service and Operator's manual where necessary for reference. Perform the following for all applicable options.

REQUIREMENTS

To perform this system checkout procedure you will need one or more output devices, such as a network laser printer and a Fax machine. Make sure that you configure and test at least one for each output type that will be used.

- ☐ Verify that all MUSE client computers are able to connect to the MUSE system and run the application. Verify that end users are able to log into MUSE with their user account.
- ☐ Verify that the clients generate the proper login and logout messages in the MUSE Process Log when they launch and then exit the MUSE application.
- ☐ Verify that records can be acquired via diskette, serial cable, modem and wireless connections, and that they route properly based on Report Distribution settings.
- ☐ Verify that data can be acquired from the MARS system(s), and that the data can be printed.
- ☐ Verify that data can be acquired from the Stress system(s), and that the data can be printed.
- ☐ Verify that reports are being successfully transmitted to the Monitoring Gateway, that MUSE is picking them up and processing them, and that the reports can be printed.
- ☐ Verify that the system can successfully send reports to laser printers and Fax machines.
- ☐ Verify that users can successfully edit and confirm reports from the Edit List.
- ☐ Test MUSE Web functionality to ensure that users can view and print records pulled up with their browser.

- ☐ Verify locally that the remote access connection is working. If possible, contact the Tech Support group in your country or region to verify that they can remotely access the system file server. If there is a CCG for HL7 interfaces, verify that they can also access that computer so that the HIS Implementation team will be able to work on the system.
- ☐ For customers that are using the local tape backup solution, verify that they understand the backup process, and how to rotate the tapes.
- ☐ Verify that the email notifications for backups are working, if configured, and that the nightly backup job is functioning properly.
- ☐ For customers that are doing network backups, verify that they understand what needs to be backed up on the system. Also verify that they understand they are responsible for the backup and disaster recovery procedures.
- ☐ For GE-supplied hardware, verify that you have created at least one ASR tape/diskette set for disaster recovery, and that the set is stored in a safe location.

Name of Installer: _____

Date: _____

MUSE Authentication – Enable or Disable

Having MUSE Authentication enabled is the default setting for the MUSE v7 system. The steps below describe how to disable MUSE Authentication (or, how to re-enable this setting if it has been disabled).

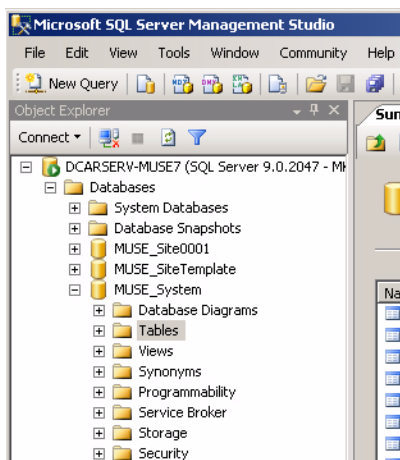
NOTE

When MUSE Authentication is disabled, users are forced to log into Windows in order to gain access to the MUSE system.

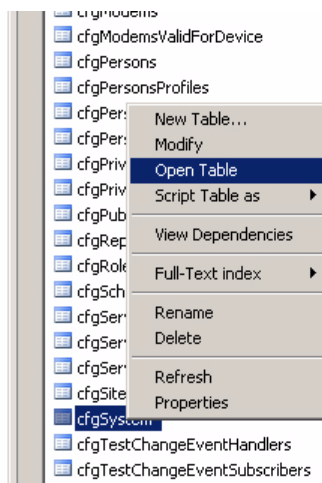
1. Log into the MUSE file server with a local administrator account.
2. Stop the MUSE Services.
3. From the Windows desktop select *Start → All Programs → Microsoft SQL Server 2005 → SQL Server Management Studio*.

The *SQL Server Management Studio* window is displayed.

4. In the left pane, browse to *Databases → MUSE_System → Tables*.



5. With *Tables* highlighted in the left pane, find *cfgSystem* in the main window.
6. Right-click *cfgSystem* and select *Open Table* from the menu.



The *cfgSystem* table is displayed.

Table - dbo.cfgSystem					
Summary					
	OnlyOneRow	ProductVersion	ProductName	DBLanguageID	Cus
▶	1	7.0.2	MUSE« Cardiol...	en	0
*	NULL	NULL	NULL	NULL	NULL

7. Scroll to the *AllowMuseAuthentication* column in the table.

FreeFeatures	AllowMuseAuth...	KanjiNameEnab...
<Binary data>	True	False
NULL	NULL	NULL

8. Click in the cell and type the desired setting for MUSE Authentication.

- ◆ Type **False** to disable MUSE Authentication.
- ◆ Type **True** to enable MUSE Authentication.

NOTE

DO NOT change any other settings in the table.

9. Close *SQL Server Management Studio*.

NOTE

All changes made to the table are immediately saved. There is no need to select a *Save* or *Save As* command.

10. Re-start the MUSE services.

NOTE

If MUSE Authentication has been disabled, all MUSE users who need to log into the system should be set up with their *Windows User Name* in their *User Properties* setup window in the MUSE interface.

MUSE Install Statement of Work

Date: _____

Hardware Installed

<input type="checkbox"/> MUSE Server	<input type="checkbox"/> MUSE EveryWare	<input type="checkbox"/> Printers
<input type="checkbox"/> CCG Server	<input type="checkbox"/> Client	<input type="checkbox"/> Client (Upgrades)

Applications Installed

<input type="checkbox"/> MUSE Application	<input type="checkbox"/> MUSE Web	<input type="checkbox"/> MUSE EveryWare (Citrix 4.0)
<input type="checkbox"/> CCG	<input type="checkbox"/> CV-Web	<input type="checkbox"/> Serial IP 4.0
<input type="checkbox"/> ADT		<input type="checkbox"/> MobileLink
<input type="checkbox"/> Orders		<input type="checkbox"/> LAN
<input type="checkbox"/> Out Bound		
<input type="checkbox"/> File Transfer		
<input type="checkbox"/> InSite 2.0		

Conversions

☐ to MUSE version ☐

Backup Solution

<input type="checkbox"/> Local Tape	<input type="checkbox"/> Network
-------------------------------------	----------------------------------

O/S Users Added

<input type="checkbox"/> MuseAdmin	<input type="checkbox"/> MuseBkgnd
------------------------------------	------------------------------------

Options

<input type="checkbox"/> SerialComparison (0)	<input type="checkbox"/> Database Search (1)	<input type="checkbox"/> HIS_ADT_Interface (4)
<input type="checkbox"/> HIS_Orders_Interface (5)	<input type="checkbox"/> HIS_Results_Interface (6)	<input type="checkbox"/> HIS_Billing_Interface (9)
<input type="checkbox"/> HIS_Waveform_Interface (12)	<input type="checkbox"/> HISOrderDownload_Interface (17)	<input type="checkbox"/> XML Import (20)
<input type="checkbox"/> ACI_TIPI (21)	<input type="checkbox"/> WirelessCommunication (23)	<input type="checkbox"/> Email (24)
<input type="checkbox"/> 21CFRPart11 (26)	<input type="checkbox"/> XMLExport (28)	<input type="checkbox"/> USEAPI_And_Web_Interface (30)
<input type="checkbox"/> OREO (Enhanced Editor) (31)	<input type="checkbox"/> Testtype_RestingECG (50)	<input type="checkbox"/> Testtype_HiresolutionECG (51)
<input type="checkbox"/> TestType_HiresolutionPWave (52)	<input type="checkbox"/> TestType_ExerciseTesting (53)	<input type="checkbox"/> TestType_HolterTesting (54)

MUSE Application Users Added

Devices Added

Holter

MARS System Name

IP Address

Physical Modems

ID:	Function (CSI, FAX)	Phone Number	Location (Server, Workstation)

[illegible]

CASE

Location:

[illegible]

Location:

[illegible]

For your notes

4 Backup and Recovery

For your notes

Introduction

A backup and recovery plan is crucial to prevent data loss and to minimize service interruption in the event of system failure or disaster. This chapter describes the backup and recovery options provided by GE Healthcare. These options are available only to users running the MUSE system on GE-supplied hardware. Users running the software-only version of the MUSE system, or who choose not to use the GE-supplied options, are responsible for implementing and maintaining their own backup and recovery plans.

GE Healthcare provides two backup options. A network backup option is available for users running MUSE system on GE-supplied G5 or G6 platforms. A tape backup option is available for users running the MUSE system on GE-supplied G4 or G5 platforms equipped with the AIT Tape Drive. Refer to “[Backup Options](#)” on page 4-4 for more information.

After determining which backup option you will use, refer to “[Setting Up Automatic Backups](#)” on page 4-8 for instructions on how to create the backup jobs, how to configure the backup jobs, how to change the backup schedules, how to create automatic notifications, and how to test the backup jobs.

In addition to running automatic backup jobs at regularly scheduled times, you can manually initiate the backup jobs to run outside of their normal schedules. Use this feature if you need to generate a special backup, for example, before upgrading or performing service on the system. Refer to “[Backing up the Database Manually](#)” on page 4-20 for more information.

In the event that the database becomes corrupted, or if you want to return the database to a previous state for any reason, you can restore just the MUSE database. For details, refer to “[Database Recovery](#)” on page 4-21.

NOTE

In the event of a system-wide failure or natural disaster, or if you want to return the system to a previous state for any reason, you can restore the entire MUSE system. For details, refer to Appendix A, “[System Recovery](#)”.

During the backup and recovery process, it may be necessary to shut down or restart the MUSE system or to initialize a new backup tape. For details, refer to “[Additional Information](#)” on page 4-27.

Backup Options

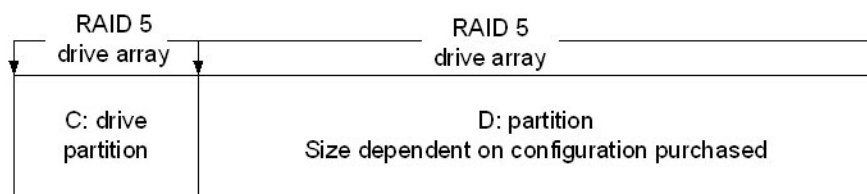
This section provides the following information about the MUSE backup options:

- Overview of the MUSE disk and data structures
- Overview of the network and tape backup options

Overview of the MUSE Disk and Data Structures

Knowledge of the MUSE disk and data structures helps you understand the backup options provided by GE Healthcare. If you purchased a software-only system, or if you opt not to use the GE-supplied backup options, this information will be useful in planning and implementing your own backup/recovery plan.

MUSE servers running on GE-supplied hardware are configured with two partitions, as shown in the following diagram:



The **C:** drive is fairly static and typically needs to be backed up only for operating system updates, software upgrades, or configuration changes. It contains the following components:

- The Windows operating system
- SQL Server software - including the master and msdb system databases
- The MUSE client application
- GE Remote Access Files (InSite 2)

The **D:** drive is dynamic and typically needs to be backed up on a regular basis. It contains the following components:

- The MUSE user databases (**d:\muse\db**)
- The backup report and supporting files (**d:\muse\backup**)
- The temporary files being sent to the MARS formatter when Holter reports are printed (**d:\muse\mars**).
- The XML input files (**d:\muse\xml**).
- The acquisition data sent via a network share (**d:\muse\acq**).

The MUSE system, version 7.0.2 and above, uses the SQL Server 2005 database management system (DBMS) and includes the following default user databases:

- **MUSE_Site0001**
- **MUSE_SiteTemplate**
- **MUSE_System**

If additional sites have been set up on the system, additional site databases will exist; for example, **MUSE_Site0002**, **MUSE_Site0003**, and so on.

Overview of the Network and Tape Backup Options

For customers running on GE-supplied hardware, GE Healthcare provides a network option and a tape option for backing up the MUSE system and databases. Your hardware platform determines which options are available, as shown in the following table.

Platform	Tape Backup	Network Backup
HP ML370 G4	X	
HP ML370 G5	X	X
HP DL370 G6		X

WARNING

The backup procedures in this chapter have been tested only on the GE-supplied hardware outlined in the previous table. GE Healthcare cannot guarantee database or system recovery following these procedures on customer-supplied hardware. Customers implementing the network backup model described in this document on their own hardware are responsible for testing, verifying, and maintaining the procedure.

GE Service supports both the tape and network backup options, as covered by any applicable warranties or service agreements. GE Service will also assist with the initial setup and configuration of the selected option.

The MUSE backup options are set for the Simple Recovery Model. Customers who require a Full Recovery Model (so that they have transaction logs that provide the ability to recover to a specific point in time) will need to implement their own backup and recovery plans. Customer-implemented backup plans are not covered by applicable warranties or service agreements; however, GE Service can still assist in these cases on a time-and-material basis.

NOTE

Even though GE Service will install and configure the backup options, the customer is responsible for verifying that each backup completed successfully. You cannot use the success or failure status of the SQL backup job itself as proof of the job's success; in some circumstances, the SQL job can indicate a false success.

You have two methods for verifying the success of a backup job:

- ◆ Review the backup log file generated at the completion of each backup. The log file can be emailed to a selected user for review. Refer to [“Creating Notifications”](#) on page 4-13 for details.
- ◆ Verify the database backup files and their dates. Refer to [“Network Backup Option”](#) on page 4-6 for a list of the backup files created on the network drive.

Network Backup Option

The network backup option is available to users running MUSE v7.1.1 or higher on GE-supplied G5 or G6 platforms. It provides both nightly and weekly backup jobs.

Nightly Backup

The nightly backup job, **7Nightly_Backups**, does the following:

- **Creates a daily backup file for each database.**

The files are named by combining the day of the week with the name of the database, as seen in the following examples:

- ◆ MondayMaster.bak
- ◆ Mondaymsdb.bak
- ◆ MondayMUSE_Site0001.bak
- ◆ MondaySiteTemplate.bak
- ◆ MondaySystem.bak

This results in seven sets of backup files. Each file overwrites the corresponding file from the previous week.

- **Performs a full backup of all the MUSE databases.**

The advantage of a full backup is that you can restore the databases using a single backup instead of a series of differential or incremental backups.

The disadvantage of a full backup is that it requires more storage space than a differential or incremental backup. Because the backup job creates seven sets of backups (one for each day of the week), the destination drive for the backups must be at least seven times greater than the combined size of the databases. For example, if the MUSE databases totalled 20 GB, the destination drive would need to be at least 140 GB (7 x 20 GB) to hold a full seven-day backup cycle.

- **Saves the backup to a local folder and then copies it to a network share.**

You can edit the script file, **7Nightly_Backups_NetCopyScript.bat**, to customize this behavior in two ways:

First, you can modify the way in which the backup files are copied to the network drive by setting the **COPYOPTION** parameter to one of the following values:

- ◆ **MIRROR** - Copies the nightly database backups from the local drive to the network share, leaving the originals on the local drive. This provides a full set of backups on both the local drive and the network share.
- ◆ **MIRRORSOME** - Copies a defined number of backup sets from the local drive to the network share, leaving the defined number of originals on the local drive and removing the remainder. This provides a partial set of backups on the local drive and a full set of backups on the network share.
To define the number of records to retain on the local drive, set the **LOCALDAYSTOMAINAIN** parameter with a number from 1 to 7. For example, setting **LOCALDAYSTOMAINAIN=3** would retain the three most recent nightly backups on the local drive.
- ◆ **MOVE** - Copies the nightly database backups from the local drive to the network share and removes the originals from the local drive. This provides only one set of backups on the network share.

Second, you can change the location of the network share where the backups will be copied.

■ **Attempts to reconnect if the network connection is interrupted.**

The backup job uses the robocopy command to copy or move the backup files from the local directory to the network share. If the network connection is interrupted during the transfer, robocopy notes where the copy stopped, attempts to reconnect to the network, and resumes the transfer.

Weekly Backup

The weekly backup job, **WeeklyCDriveNetworkBackup**, backs up the complete C: drive, including the system state, to a shared network drive. The weekly backup job saves the files directly to the network drive; unlike the nightly backup job, it does not first save the files locally and then copy them to the network drive.

By default, the weekly backup job saves the backup file, **CDrivebackup.bkf**, to the local **d:\muse\backup** folder. To change the destination to a network share, edit the location in the weekly backup batch file, **Cbackup_NO_TAPE.bat**. For instructions, refer to “[Configuring the Network Backup Jobs](#)” on page 4-10. The backup file is overwritten each time the weekly backup runs.

Unlike the weekly tape backup (see “[Local Tape Backup Option](#)” on page 4-7), the weekly network backup is not intended to be used as part of an Automated System Recovery (ASR). Instead, when the weekly network backup is used, recovery involves the use of the server image CD and weekly backup file. For details, refer to Appendix A, “[System Recovery](#)”.

Local Tape Backup Option

The local tape backup option is available only on GE-supplied G4 servers, for which a tape drive was supplied as standard equipment, and G5 servers, for which a tape drive was available as optional equipment. The tape drive is no longer available for purchase. Any G5 server that does not already have a tape drive must use the network backup option (“[Network Backup Option](#)” on page 4-6).

The local tape backup option includes nine AIT tapes and provides a nightly backup, a weekly backup, and a monthly backup.

Nightly Backup

The nightly backup copies each of the MUSE user databases to an AIT tape. This backup job requires seven of the nine AIT tapes, each labeled with a day of the week from **Sunday Backup** through **Saturday Backup**.

Weekly Backup

The weekly backup copies the entire C: drive to an AIT tape. This backup job requires one of the nine AIT tapes, labeled **Weekly C: Backup**.

Monthly Backup

The monthly backup copies the entire MUSE system to an AIT tape. This backup job requires one of the nine AIT tapes, labeled **Monthly System Backup**.

Setting Up Automatic Backups

This section provides the following information for creating and configuring automatic backups:

- Creating the backup jobs
- Configuring the backup jobs
- Changing the backup schedules
- Creating notifications
- Testing the backup jobs

Creating Backup Jobs

The procedure for installing the network backup jobs and the procedure for installing the tape backup jobs are nearly identical. The only difference between them is the name and location of the files to be installed. That difference is noted where applicable.

NOTE

If creating backup jobs on an existing system, do the following before proceeding:

- ◆ Delete any backup files located in the **d:\muse\backup** folder.
- ◆ Delete any SQL backup jobs in SQL Server Management Studio.

To create the backup jobs, do the following:

1. Create the **d:\muse\backup** folder if it does not already exist.
2. Insert the MUSE support CD into the CD-ROM drive.
3. Copy all the files from **\Local Tape Backup** on the support CD to **d:\muse\backup** on the MUSE server.

The SQL backup jobs utilize batch files stored in the **d:\muse\backup** folder. If the backup folder is created on a different drive partition or uses a different name, the backup jobs and email notifications will fail.

4. Verify that the *SQL Server Agent* service is running using the MUSEBknd account.

The *SQL Server Agent* service runs SQL jobs, such as the backup jobs. It is also required for database searches and the log and queue maintenance jobs. Use the following procedure to verify the service is running:

- a. Select *Start > Administrative Tools > Services* to display the *Services* list.
- b. Right-click *SQL Server Agent* and select *Properties*.
- c. Verify that the startup type is set to *Automatic* and change it if necessary.
- d. Start the *SQL Server Agent* service if it is not already running.
- e. Close the *Services* window.

5. Do one of the following to build the appropriate backup jobs.

◆ **To build the network backup jobs:**

- a. Open a command prompt.
- b. Run **d:\muse\backup\build_7Day_job.bat**.

This creates the following backup jobs and schedules:

Job Name	Scheduled Run Time
7Nightly_Backups	Daily starting at midnight.
WeeklyCDriveNetworkBackup	Every Friday starting at 3:00 PM

You will receive the message *Warning: Non-existent step referenced by @on_fail_step_id*. This warning is normal and can be ignored.

- c. In the SQL Server Management Studio, expand *SQL Server Agent > Jobs* and verify the two backup jobs were created.

◆ **To build the local tape backup jobs:**

- a. Open a command prompt.
- b. Run **d:\muse\backup\buildjobs.bat**.

This creates the following backup jobs and schedules:

Job Name	Scheduled Run Time
NightlyMUSEDDBBackup	Daily at 2:00 a.m.
MonthlyMUSEDDBBackup	First Monday of the Month at 9:00 a.m.
WeeklyCDriveBackup	Each Friday at 3:00 p.m.
NightlyBackupReminder	Daily at 3:00 p.m.
MonthlyBackupReminder	First Monday of the Month at 6:00 a.m.
WeeklyBackupReminder	Each Friday at 1:00 p.m.

It also adds a backup device under *Server Objects > Backup Devices*. If the device already exists, you will receive an error message that the device already exists. This error can be ignored.

- c. In the SQL Server Management Studio, expand *SQL Server Agent > Jobs* and verify the backup jobs were created.

NOTE

If the backup jobs already exist, the batch files will not overwrite them. This prevents you from accidentally removing any custom configurations. To replace the existing jobs with the defaults, run *SQL Server Management Studio*, open *SQL Server Agent > Jobs*, and delete the existing jobs before you run the batch files.

Configuring the Backup Jobs

After the backup jobs have been installed (“[Setting Up Automatic Backups](#)” on page 4-8), configure them to run at a time and in a manner that meets your operational needs.

Configuring the Network Backup Jobs

Before configuring the network backup jobs, gather the following information:

- The **COPYOPTION** parameter to use.
Refer to “[Nightly Backup](#)” on page 4-6 for details.
- The sizes of the MUSE database and C: drive.
The size of the MUSE database and C: drive determine the required amount of free space on the destination drive. For example:

Target	Size	Number	Space Needed
MUSE Databases	20 GB	7	140 GB
C: Drive	10 GB	1	10 GB
Space needed on the destination drive			150 GB

Allow additional space to accommodate anticipated growth.

NOTE

Because the backup first backs up to the local drive and then moves the backup to the network share, the local drive needs enough free space to accommodate at least one backup. For example, if the MUSE databases total 20 GB, the local drive must have at least 20 GB of free space or the backup will fail.

- The location of the destination network share.
You need this information to edit the **7Nightly_Backups_NetCopyScript.bat** and **Cbackup_NO_TAPE.bat** files. The path to the network share cannot contain spaces; if it contains spaces, the backup will fail.

NOTE

After you have identified the location of the destination network share, do the following:

- a. Create a folder called *MUSEbackups* on the share.
- b. Share it on the network.
- c. Grant *Full Control* to the *MUSEBkgnd* account.

This should be the same account used as the *SQL Server Agent* service account logon on the MUSE server.

Configuring the Nightly Network Backup

1. Create the folder **d:\muse\musedbbackups**.
2. Using an ASCII editor, such as *Notepad*, open **d:\MUSE\Backup\7Nightly_Backups_NetCopyScript.bat**.

3. Set **COPYOPTION** to **MIRROR**, **MIRRORSOME**, or **MOVE**.
For example: **SET COPYOPTION=MOVE**. Refer to “Nightly Backup” on page 4-6 for details.
4. If you set the **COPYOPTION** to **MIRRORSOME**, set the **LOCALDAYSTOMAIN** parameter to the number of backups to keep on the local drive.
For example: **SET LOCALDAYSTOMAIN=3** retains the three most recent backups on the local drive.
5. Set the **NETWORKBACKUPDIR** to the UNC path of the network share where the backups will be copied.
For example: **SET NETWORKBACKUPDIR=\\metropolis\musebackups**.
6. Set the **MUSEBACKUPDIR** to the UNC path of the local drive where the backups will be saved.
For example: **SET MUSEBACKUPDIR=d:\muse\musedbbackups**.
7. Save the file.

Configuring the Weekly Network Backup

1. Browse to **d:\muse\backup**.
2. Using an ASCII editor, such as *Notepad*, open **Cbackup_NO_TAPE.bat**.
3. Change the location to the network share where the backup will be saved.

Look for the following string:

```
C:\WINDOWS\system32\ntbackup.exe backup
C:\ systemstate /v:no /j
"CDriveBackup" /m normal /l:s /f
"D:\muse\backup\CDrivebackup.bkf"
```

Change "D:\muse\backup\CDrivebackup.bkf" to the correct path.
For example: "\\MUSEBkupSvr\MUSEBackup\CDrivebackup.bkf"

4. Change the parameters for the email notification as appropriate.

Look for the following string:

```
d:\muse\backup\blat.exe
d:\muse\backup\weeklybackupstatus.txt
-subject "MUSE System Backup Status"
-to recipient@email.com
-server server.mail.com
-i "MUSESystem@muse.com"
-f sender@email.com
```

Change the following parameters as appropriate:

-subject	Enter the subject line for the notification email
-to	Enter the email address of the notification recipient
-server	Enter the name of the email server
-f	Enter the email address of the notification sender

5. Save the file.

Configuring the Weekly Tape Backup

1. Change the destination drive if necessary.

By default, the backup job is set up to write to a Sony AIT tape drive. If using the ML370 G3 platform, use the following procedure to configure the job for a Compaq AIT tape drive:

- a. Open **d:\muse\backup\CBackup.bat** in *Notepad*.
 - b. In the *Eject the tape* section, comment out the *rsm* line for the Sony tape drive and uncomment the *rsm* line for the Compaq tape drive.
2. Change the tape reminder as necessary.
 - a. If not open from step 1, open **d:\muse\backup\CBackup.bat** in an ASCII editor, such as *Notepad*.
 - b. Edit the following parameters as appropriate:

-to	Enter the email address of the notification recipient
-from	Enter the email address of the notification sender

3. Save the file.

Changing the Backup Schedule

After configuring the backup jobs (“[Configuring the Backup Jobs](#)” on page 4-10) you can modify their scheduled start times to better suit your needs. For example, you could change the start time of the nightly backup or remove Saturday and Sunday from the backup schedule.

For a description of the default schedules, refer to “[Setting Up Automatic Backups](#)” on page 4-8.

Use the following procedure to change the schedule for any of the jobs.

1. Open SQL Server Management Studio and expand *SQL Server Agent > Jobs*.
2. Right-click on the job you want to modify and select *Properties*.
3. Select the *Schedules* in the left pane and click the *Edit* button.

The following window opens.

4. In the Daily Frequency section, enter the time at which to run the job.
To run the job once, select the *Occurs once at* field and enter the starting time.
To run the job repeatedly, select the *Occurs every* field and enter the *Starting at* and *Ending at* times.
5. In the *Duration* section, enter the *Start date* and *End date* for the job.
By default, the *No end date* button is selected. It is recommended that you keep that setting for all backup jobs.
6. Click *OK* on all the opened windows to save your changes.

Creating Notifications

Both network and tape backup options provide three ways to keep you informed of their status:

- **Log File**
The MUSE backup jobs generate a log file at *d:\muse\backup\MUSEBackup*. The log file retains information only from the most recent backup: every time a backup job runs, it overwrites the previous log. Use an ASCII editor, such as Notepad, to review the log file.
- **Email Notifications**
You can configure the MUSE backup jobs to send an email with the back up log file when the backup jobs complete. In addition, if you are using the tape backup option, you can set up the system to send an email reminder to insert the backup tape.

- Net Send Notifications

You can configure the MUSE backup jobs to use the Windows *Net Send* command to alert you on their status. Typically this option is used to send a message when the backup job fails. It is not as reliable as email notifications; if the computer to which you are sending the message is not online, the message will not be received. This procedure is only documented here for cases where the customer wants this type of notification.

This section documents how to set up and configure the email and net send notifications.

Email Notifications

Setting up the email notifications consists of three tasks:

- Configuring the email utility
- Configuring the status notification
- Configuring the tape reminder notification

These tasks only need to be performed once.

Configuring the Email Utility

The backup jobs use the open source *Blat* utility to send email notifications. To configure the *Blat* utility, use the following procedure:

1. Open a *Command Prompt* window and change to the **d:\muse\backup** directory.
2. Type the following command:

```
Blat [space] -install [space] <email server address> [space]  
<sender address>
```

For example:

```
Blat [space] -install [space] mail.someplace.com [space]  
someone@someplace.com
```

NOTE

The sender email address may be any valid email account, but customers may want to set up a special account so the MUSE backup administrator can easily identify it.

3. Press **Enter**.

A message is returned stating that the SMTP server has been set to the email server address on port 25, with the user/sender address you provided, and that it is set to retry 1 time.

NOTE

When running the *Blat* utility for the first time, you will get an error message because *Blat* needs to create registry entries. You can ignore this error.

If you need to alter the *Blat* installation settings, they can be found in the following registry key - **HKLM\Software\Public Domain\Blat**.

You are now ready to configure the email notifications.

Configuring the Status Notification

The method for configuring the status notifications depends on the backup job.

Configuring the Nightly and Monthly Notifications – The nightly and monthly backup status notifications use two files: a batch file that contains the instructions for sending the email and a text file that contains the body of the email message. Edit the files using a standard ASCII editor, such as *Notepad*.

NOTE

The monthly backup files are available only if you are using the tape backup option.

1. Open the appropriate batch file.

For the nightly backup, select **d:\muse\backup\nightlybackupstatus.bat**.

For the monthly backup, select **d:\muse\backup\monthlybackupstatus.bat**.

2. Modify the following parameters as appropriate.

-subject	Edit this text to change the email subject
-attach	Leave this value at the default
-to	Enter an individual or group email address
-server	Enter the address of the email server that will route the message

3. Save the batch file.

4. Open the appropriate text file.

For the nightly backup, select **d:\muse\backup\nightlybackupstatus.txt**.

For the monthly backup, select **d:\muse\backup\monthlybackupstatus.txt**.

5. Modify the .body of the email message as appropriate.

6. Save the file.

Configuring the Weekly Notification – The weekly backup status notification is configured as part of the backup job itself. Refer to “[Configuring the Backup Jobs](#)” on page 4-10 for details.

Configuring the Tape Reminder Notification

The reminder to switch the backup tape is available only if you are using the tape backup option. If you are using the network backup option, skip this section.

The method for configuring the reminder depends on the backup job.

Configuring the Weekly and Monthly Reminder – The weekly and monthly reminder use two files: a batch file that contains the instructions for sending the email and a text file that contains the body of the email message. Edit the files using a standard ASCII editor, such as *Notepad*.

1. Open the appropriate batch file.

For the nightly backup, select **d:\muse\backup\nightlybackupreminder.bat**.

For the monthly backup, select **d:\muse\backup\monthlybackupreminder.bat**.

2. Modify the following parameters as appropriate.

-subject	Edit this text to change the email subject
-to	Enter an individual or group email address
-server	Enter the address of the email server that will route the message
3. Save the batch file.
4. Open the appropriate text file.
 For the nightly backup, select **d:\muse\backup\nightlybackupreminder.txt**.
 For the monthly backup, select **d:\muse\backup\monthlybackupreminder.txt**.
5. Modify the body of the email message as appropriate.
6. Save the file.

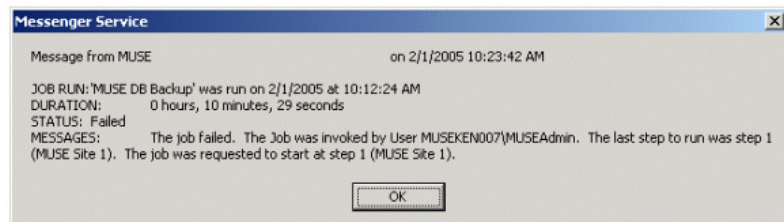
Configuring the Weekly Reminder – The weekly backup status notification is configured as part of the backup job itself. Refer to “[Configuring the Backup Jobs](#)” on page 4-10 for details.

Net Send Notifications

Configuring the Net Send notifications consists of two tasks:

- Creating and configuring the *Operator* that will receive the message
- Configuring the backup job to send the message

After the notification is configured, the *Messenger Service* must be started on both the sending and receiving computers. Once set up, the backup will send standard Windows notifications, as seen in the following illustration.

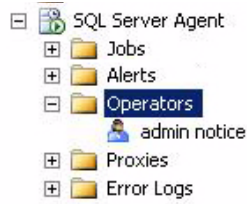


Creating and Configuring the Operator

1. Log into the MUSE file server with a local administrator account.
2. From the Windows desktop select *Start > All Programs > Microsoft SQL Server 2005 > SQL Server Management Studio*.

The *SQL Server Management Studio* window opens.

3. In the left pane, browse to *SQL Server Agent > Operators*.



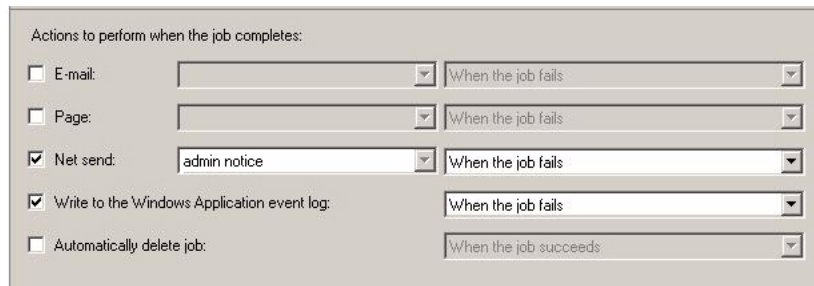
4. Right-click on *Operators* and select *New Operator...* from the menu.

The *New Operator* window opens.

5. Enter the name you would like to use for the *Operator* and the address of the computer you want to receive the Net Send message.
6. Click *OK* to save your changes.

Configuring a Backup Job to Send Message

1. In the left pane of the *SQL Server Management Studio* window, browse to *SQL Server Agent > Jobs*.
2. Right-click on the backup job you want to send a Net Send message and select *Properties* from the menu.
3. Click on *Notifications* in the left pane of the *Job Properties* window.
4. In the *Actions to perform when the job completes* section of the window, check the *Net send* check box, select the appropriate operator from the first drop-down list, and select an event from the second drop-down list.



5. Click *OK* to save your changes.
6. Exit *SQL Server Management Studio*.

Testing the Backup Jobs

After the backup jobs have been set up and configured, run the jobs manually to ensure that they back up the data to the correct location and email the correct notifications to the correct recipient.

Testing the Network Backup Jobs

1. Open SQL Server Management Studio and select *SQL Server Agent > Jobs*.
2. Right-click on the job to test, select *Start Job at Step...*, and select step 1.
 - ◆ To test the nightly backup, select the *7Nightly_Backups* job.
 - ◆ To test the weekly backup, select the *WeeklyCDriveNetworkBackup* job.
3. After the job completes, verify that the correct files were written to the network share.
 - ◆ For the nightly backup, verify the following files were written to the network drive:
[weekday]Master.bak
[weekday]MSDB.bak
[weekday]MUSE_Site000x.bak
[weekday]SiteTemplate.bak
[weekday]System.bak

Note that *[weekday]* will be the day on which you ran the backup and that there will be one *MUSE_Site000x.bak* file for each site added to the MUSE system.
 - ◆ For the weekly backup, verify *CDriveBackup.bkf* was written to the network share.
4. If you are testing the nightly backup whose **COPYOPTION** parameter was set to **MIRROR** or **MIRROR SOME** (see “**Nightly Backup**” on page 4-6), verify that the backups also exists on the drive (**d:\muse\musedbbackup**).
5. Verify that the email notification was sent to the appropriate recipient and that the **musebackup.log** file was attached.
6. Verify that the attached log file is complete and accurate.
7. Refer to “**Database Recovery**” on page 4-21 and verify that the backup just created can be used to restore the database.

Testing the Tape Backup Jobs

1. Open *SQL Server Management Studio* and select *SQL Server Agent > Jobs*.
2. Right-click on the tape reminder job to be tested, select *Start Job at Step...*, and select step 1.
 - ◆ To test the nightly reminder, select the *NightlyBackupReminder* job.
 - ◆ To test the weekly reminder, select the *WeeklyBackupReminder* job.
 - ◆ To test the monthly reminder, select the *MonthlyBackupReminder* job.
3. Verify the email reminder to insert the backup tape was sent to the correct recipient and that it contained the correct information.
4. Insert a tape into the AIT tape drive.

Initialize the tape if necessary. Refer to “**Initializing a New Tape**” on page 4-27 for instructions.

5. In *SQL Server Management Studio*, right-click on the backup job to be tested, select *Start Job at Step...*, and select step 1.
 - ◆ To test the nightly backup, select the *NightlyMUSEDDBBackup* job.
 - ◆ To test the weekly backup, select the *WeeklyMUSEDDBBackup* job.
 - ◆ To test the monthly backup, select the *MonthlyMUSEDDBBackup* job.
6. As the job runs, verify that the backup is being written to the AIT tape drive. Make sure the read/write light is flashing.
7. Verify that the email notification was sent to the appropriate recipient and that the *musebackup.log* file was attached.
8. Verify that the attached log file is complete and accurate.
9. Refer to “**Database Recovery**” on page 4-21 and verify that the backup just created can be used to restore the database.

Backing up the Database Manually

If you need to perform a database backup between scheduled backup jobs, use the following procedure.

1. If using the tape backup option, insert the appropriate backup tape in the file server's tape drive.
2. Log into the MUSE file server with the user name and password of a user with administrative privileges.
3. Open SQL Server Management Studio.
The *Connect to Server* window opens.
4. Select the server you wish to connect to in the *Server Name* list.
5. Click the *Connect* button.
6. In the left pane of the SQL Server Management Studio window, browse to *SQL Server Agent > Jobs*.
7. Right-click the backup job you want to run and select *Start Job at Step...*
 - ◆ To run the nightly network backup, select *7Nightly_Backups*.
 - ◆ To run the weekly network backup, select *WeeklyCDriveNetworkBackup*.
 - ◆ To run the nightly tape backup, select *NightlyMUSEDDBBackup*.
 - ◆ To run the weekly tape backup, select *WeeklyCDriveBackup*.
 - ◆ To run the monthly tape backup, select *MonthlyMUSEDDBBackup*.
8. With *Step 1* highlighted, click *Start*.
9. Verify each step completes successfully.
For network backups verify that the backup files were created on the local and/or network drive and are time stamped with the date the backup ran.
10. Exit SQL Server Management Studio when the backup is complete.

Database Recovery

The database recovery process is intended to restore the MUSE databases without affecting the Windows operating system, MUSE application, or the rest of the MUSE system. If the entire MUSE system becomes corrupt or unstable, use the system recovery process as described in Appendix A, “[System Recovery](#)”.

The process to restore the database consists of the following basic tasks:

1. Copying the current databases.
2. Restoring the most recent database backup.
3. Reverting to the current database, if necessary.

Each task is described in more detail in the following sections.

Copying the Current Database

GE Healthcare recommends that you copy the current database before restoring a backup. This allows you to back out of the restore process, if necessary, and revert to the current database.

1. Shut down all MUSE, MACCRA, and SQL services.
2. Navigate to *d:\muse*.
3. Right-click the *\muse\db* folder and select *Copy*.
4. Right-click in a blank area in the *\muse* folder and select *Paste*.

This creates a *\muse\Copy of db* folder.

Recovering the MUSE Database

The process for restoring the MUSE database differs depending on whether you are using the network backup option or the tape backup option. Both processes are described in the following sections.

NOTE

If either restore fails or you decide to cancel in the middle of the restore process, refer to “[Reverting to the Current Database](#)” on page 4-26 for instructions on how to return the database to its pre-restore state.

Recovering the MUSE Database From the Network

After creating a copy of the current database, use the following procedure to restore a backup of the database from the network backup.

1. Logon to the MUSE server using an administrator account that has permissions to the network share where the database backups are saved.
2. Verify that all MUSE services and MACCRA are off.
3. Start the SQL Server and SQL Server Agent services.
4. Open SQL Server Management Studio and right-click on *Databases*.

5. Select *Restore Database*.

The *Restore Database* dialog box opens.

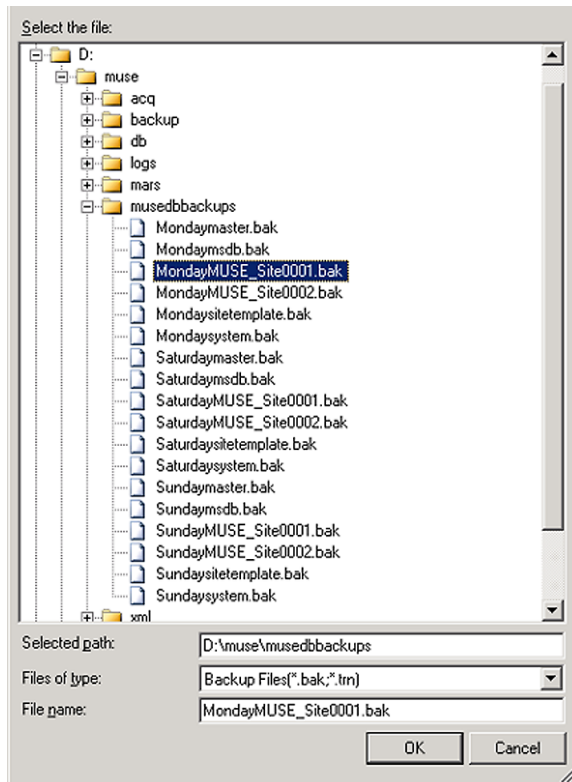
6. Under *Source for restore*, click the *From device* radio button.

7. Select the ... button.

The *Specify Backup* dialog box opens.

8. From the *Backup Media* dropdown list, select *File* and click *Add*.

The *Locate Backup File* dialog box opens.



9. Select the database to restore.

- a. If you are restoring from the local D drive, simply expand the selections to *d:\muse\musedbbackup* and select the database to restore.
- b. If you are restoring from the network share, enter the UNC path to the network share in *Selected path*.

If you receive a message indicating the database engine server cannot resolve the file location and is unable to resolve the permission issue, copy the MUSE database backups from the network server to the MUSE server's D: drive and restore from there.

- c. In *File name* enter the name of the database being restored.

For example if you are restoring the Monday Site 1 backup you would enter *MondayMUSE_Site0001.bak*.

10. Click **OK**.

You are returned to the *Specify Backup* dialog box with the backup location now displayed.

NOTE

If you are unable to save a UNC path, it is generally due to a permissions error. You must be logged onto the MUSE server using an account with permissions to the network share and the MUSE database on the server. The MUSEBkgnd account can be used for this. You may need to change the SQLSERVER service logon to MUSEBkgnd as well. If you change the logon permission for the SQLSERVER service, be sure to change it back to Local System after you are done restoring the databases, the Local System account is more secure. Only the SQLServerAgent logon account should use MUSEBkgnd.

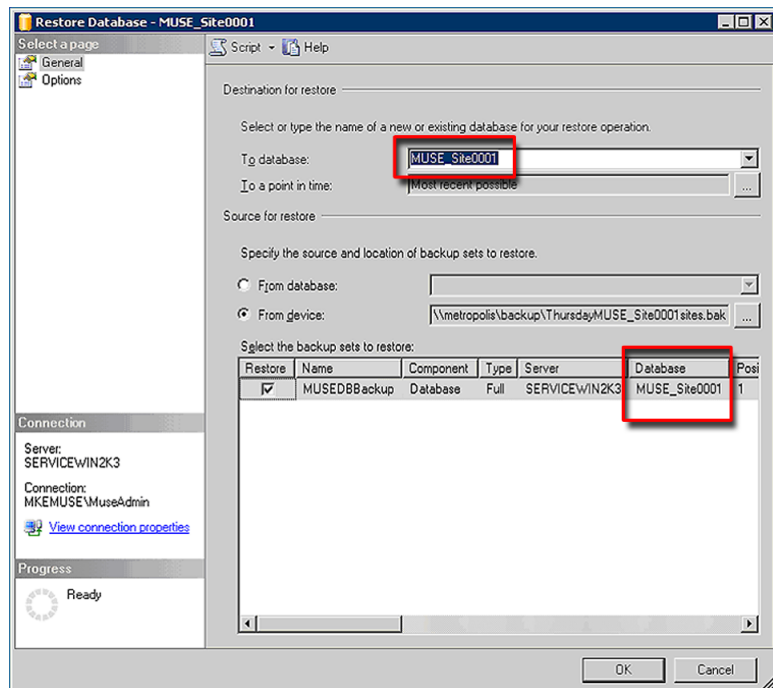
11. Click **OK**.

The *Restore Database* screen opens.

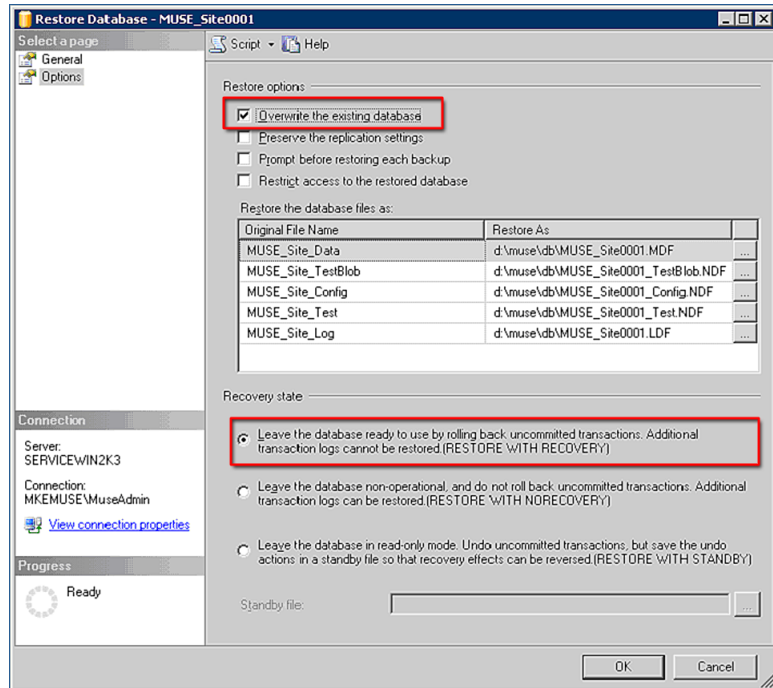
12. Restore the database using the following procedure.

Note that you would be restoring the MUSE_Site_000x databases first, followed by MUSE_SiteTemplate, and the MUSE_System database last.

- a. Under *Select the backup sets to restore*, check the database being restored.
- b. Under *Destination for restore*, select the MUSE database being restored from the dropdown list next to *To Database*.

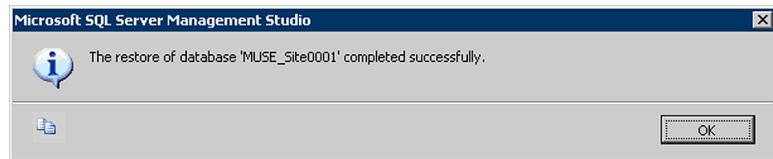


- c. Click *Options* in the left navigation pane.
- d. Check *Overwrite the existing database* in the *Restore options* section and verify that *Leave the database ready for use by rolling back uncommitted transactions...* is selected in the *Restore state* section.



- e. Click **OK**.

When the database is restored, the following dialog box opens.



- f. Repeat this process for each remaining databases in the order indicated at the beginning of step 12.
13. After all the databases have been restored, reboot the server.

If the databases did not restore correctly, refer to “**Reverting to the Current Database**” on page 4-26 for instructions on how to backup out the restored data and to revert the databases to their pre-restored state.

Recovering the MUSE Database From Tape

After creating a copy of the current database, use the following instructions to restore a backup of the database from a tape backup.

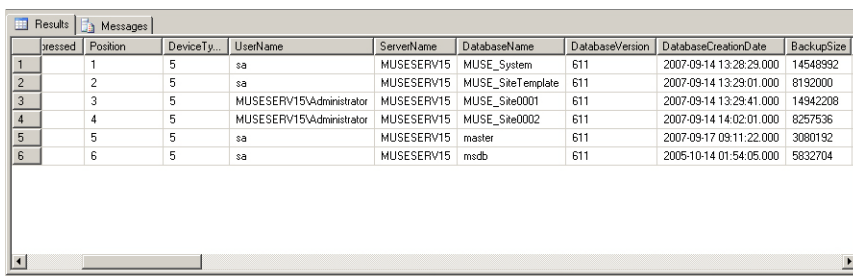
1. Start the SQL Server and SQL Server Agent services.
2. Delete the current databases using the following procedure:
 - a. Run *SQL Server 2005 Management Studio*.
 - b. Right-click on each MUSE database and select *Delete*.
 - c. On the *Delete Object* window, set the *Delete backup and restore history information for databases* check box and click *OK*.
 - d. Repeat step b through step c for each MUSE database.

3. After the databases have been deleted, insert the most recent backup tape.
4. Click the *New Query* button.
5. In the query window, type the following command:

**restore [space] headeronly [space] from [space] tape = [space]
'\.\tape0' [space] with [space] noload**

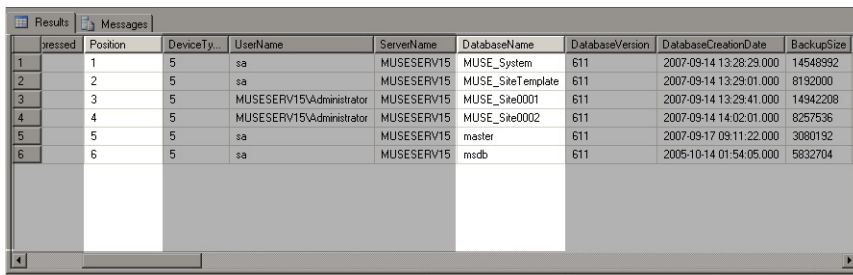
6. Execute the command.

A directory of the tape's contents opens, as seen in the following illustration.



	pressed	Position	DeviceTy...	UserName	ServerName	DatabaseName	DatabaseVersion	DatabaseCreationDate	BackupSize
1		1	5	sa	MUSESERV15	MUSE_System	611	2007-09-14 13:28:29.000	14548992
2		2	5	sa	MUSESERV15	MUSE_SiteTemplate	611	2007-09-14 13:29:01.000	8192000
3		3	5	MUSESERV15\Administrator	MUSESERV15	MUSE_Site0001	611	2007-09-14 13:29:41.000	14942208
4		4	5	MUSESERV15\Administrator	MUSESERV15	MUSE_Site0002	611	2007-09-14 14:02:01.000	8257536
5		5	5	sa	MUSESERV15	master	611	2007-09-17 09:11:22.000	3080192
6		6	5	sa	MUSESERV15	msdb	611	2005-10-14 01:54:05.000	5832704

7. Note the names and positions of the MUSE databases on the tape, as highlighted in the following illustration.



	pressed	Position	DeviceTy...	UserName	ServerName	DatabaseName	DatabaseVersion	DatabaseCreationDate	BackupSize
1		1	5	sa	MUSESERV15	MUSE_System	611	2007-09-14 13:28:29.000	14548992
2		2	5	sa	MUSESERV15	MUSE_SiteTemplate	611	2007-09-14 13:29:01.000	8192000
3		3	5	MUSESERV15\Administrator	MUSESERV15	MUSE_Site0001	611	2007-09-14 13:29:41.000	14942208
4		4	5	MUSESERV15\Administrator	MUSESERV15	MUSE_Site0002	611	2007-09-14 14:02:01.000	8257536
5		5	5	sa	MUSESERV15	master	611	2007-09-17 09:11:22.000	3080192
6		6	5	sa	MUSESERV15	msdb	611	2005-10-14 01:54:05.000	5832704

8. In the query window, type the following restore command for each database:
restore [space] database [space] db_name [space] from [space] tape [space] = [space] '\.\tape0' [space] with [space] file [space] = [space] [position]

The database names and positions MUST MATCH EXACTLY what appears in the tape directory. For example, the restore commands for the databases in the previous illustrations would look like this:

restore database MUSE_System from tape = '\.\tape0' with file = 1
restore database MUSE_SiteTemplate from tape = '\.\tape0' with file = 2
restore database MUSE_Site0001 from tape = '\.\tape0' with file = 3
restore database MUSE_Site0002 from tape = '\.\tape0' with file = 4

The listed sites and the positions of each database may differ with each system.

9. Execute the restore commands.
10. When the restore is complete, close *SQL Server 2005 Management Studio*.
11. Restart the MUSE, MACCRA, and SQL services.

12. Verify the restore was successful and the database is operational and accessible and do one of the following:
 - ◆ If the databases restored correctly, delete the *d:\muse\copy of db* folder.
 - ◆ If the databases did not restore correctly, refer to “[Reverting to the Current Database](#)” on page 4-26 for instructions on how to back out the restored data and revert the databases to their pre-restored state.

Reverting to the Current Database

If the restore fails, if you cancel in the middle of the restore process, or if you simply decide to back out the restored data, use the following instructions to revert the databases to their condition before you started the restore process.

1. Shut down all MUSE and MACCRA services.
2. Use the following procedure to delete the restored databases:
 - a. Run *SQL Server 2005 Management Studio*.
 - b. Right-click on each MUSE database and select *Delete*.
 - c. On the *Delete Object* window, set the *Delete backup and restore history information for databases* check box and click *OK*.
 - d. Repeat step b through step c for each MUSE database.
3. Copy the contents of the *d:\muse\copy of db* folder to the *d:\muse\db* folder.
4. Open a *Command Prompt* window.
5. Navigate to *c:\Program Files\muse*.
6. Type **attachmusedb** and press **Enter**.
7. Close the *Command Prompt* window.
8. Verify the MUSE databases were attached in *SQL Server 2005 Management Studio*.
9. Restart the MUSE and MACCRA services.
10. Verify the MUSE application opens and the database is present.
11. Delete the *d:\muse\copy of db* folder.

Additional Information

When configuring or performing the system backups, you may need to shutdown the system, restart the system, or initialize a new backup tape. The instructions for performing these additional tasks are provided in the following sections.

System Shutdown and Restart Procedure

During the MUSE backup and recovery process, it may become necessary to shut down and restart the system. This section provides instructions for safely shutting down and restarting the system: shutting down or starting the system any other way could result in data loss or corruption.

1. Notify users that you are about to shut down the MUSE system so they can save their changes before the system is shut down.

This prevents any changes being made to open tests from being lost when the system is shut down. Records that are open when the user is disconnected will remain locked but can be unlocked by a user with the proper permissions under *Status > Locked Data List*.

2. From the *Windows* desktop on the MUSE server, select *Start > Shut Down*.
3. Select either of the following options:

- ◆ *Restart*

This option powers down and immediately reboots the computer.

- ◆ *Shut down*

This option powers down the computer until you manually reboot it.

The MUSE services will launch automatically when the server reboots and will be available immediately to MUSE clients. If the system has an HL7 interface, the inbound messages will queue on the HL7 server until the MUSE is restarted.

4. After the file server has been restarted, verify that all of the MUSE-related services have started and that you can run the MUSE application on the server.
5. Verify that clients are able to attach when running the MUSE application.

Initializing a New Tape

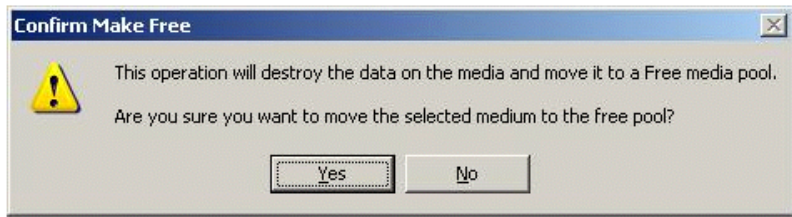
When using an AIT tape for the first time, it must be initialized to receive data. Use the following procedure to initialize a new tape:

1. Insert a new tape into the tape drive.
2. Right-click on *My Computer* and select *Manage*.
3. Expand *Removable Storage* and select *Media*.

The tape should be listed on the right. If it is new, it will show as **\Unrecognized\8mm AIT 1** under the *Media Pool* column.

4. Highlight the new tape in the list.
5. Click on *Action > Free* from the menu.

The following message opens:



6. Click *Yes*.

Another message opens asking you to confirm that you want to make it free.

7. Click *Yes*.
8. Label the tape externally. For a nightly tape, label it **Day Backup**, where Day is replaced by the appropriate day of the week. For the weekly tape, label it **Weekly C: Backup**. For the monthly tape, label it **Monthly Backup**.

5 Troubleshooting

For your notes

Assembly Descriptions

Introduction

If you encounter a problem that is not addressed in the OEM manuals or if you would like further assistance, please call Technical Support at 1-800-558-7044.

File Server

Assembly and disassembly instructions can be found in the OEM manuals that accompanied your system.

Desktop Client

Assembly and disassembly instructions as well as basic troubleshooting procedures can be found in the OEM manuals that accompanied your system.

Monitors

Basic troubleshooting procedures for the monitors can be found in the Operating Instruction manual that accompanied your monitor. The monitor is a field replaceable unit and should not be disassembled in the field.

UPS

Basic troubleshooting procedures for the UPS can be found in the OEM manual that accompanied your UPS. The UPS is a field replaceable unit and should not be disassembled in the field.

HP LaserJet 4015N Printer

Basic troubleshooting procedures for the printer can be found in the Operating Instruction manual that accompanied it. The printer is a field replaceable unit and should not be disassembled in the field.

High Level System Description

Introduction

The MUSE system consists of a file server that stores the system configuration and patient records, and client computers that run the MUSE application. The MUSE application allows the users of the system to access the file server to perform system functions, such as: editing, test retrieval, system setup, running database searches, and checking system status.

Each MUSE system is configured, as required, to support the different devices that are sending data into the system, and to support the different ways that MUSE needs to send data from the system, for example: to laser printers, fax machines, or to an HL7 (Health Level 7) interface. Several different data types are supported by the MUSE system, but the most common ones are ECG, Stress and Holter. These different data types come from devices or systems such as ECG Electrocardiograph Carts, CASE Stress systems, or MARS Holter systems.

This document provides detailed information about the hardware and software requirements of the MUSE system. It also provides information on topics such as the flow of data through the system, networking requirements, system sizing guidelines, and the remote access methods that are used by service to support the system.

Theory of Operation

Some of the information described in this section is dependant on the options that are purchased for use with the system.

The MUSE system consists of computers connected together via a network. The file server stores patient tests (ECG, Stress, Holter, HiRes) in a relational database. The tests are acquired from the associated devices for a particular type of study. Depending on the device and the system configuration, tests can be acquired over the wired network, over a combination wireless and wired network, from a floppy diskette or secure digital card, over a modem, or via a serial download cable. The “Data Flow Diagram” on page 5-7 illustrates the flow of data through the system.

The system includes applications for performing different tasks like configuring the system, running database searches, and checking system status. It also includes an editor application for tasks like overreading, retrieving and confirming tests. The tests can be either manually or automatically routed to output devices such as laser printers and fax machines, or they can be routed to destinations such as email addresses and shared folders.

Client workstations are connected to the file server over the network, and are used to perform the above-mentioned tasks. Workstations are identified in the system by their computer name.

Operating System & Database Description

The MUSE System is built on the following architecture:

File Servers:

- Microsoft Windows Server 2003
- Microsoft SQL Server 2005

Client workstations:

- Windows 2000 Professional or Windows XP Professional
- .NET Framework 2.0 (MUSE 7.1 and later)
- .NET Framework 1.1 with SP1 (MUSE 7.0.2 and earlier)

System and Device Interfaces

MARS (Unix and PC)

MARS Holter systems can be configured to store saved reports to the MUSE system for long-term storage. Full Disclosure is not part of what gets sent to MUSE. The data transfer mechanism involves the MUSE system connecting to a network share on the MARS system over the network and copying the files back to the MUSE file server for processing. The Holter Data Type option is required on the MUSE system. Unix-based MARS systems require the enterprise network card option.

MAC Carts

ECG data that is acquired at the MAC carts can be sent into the MUSE system for long-term storage. Depending on the type of cart and the options installed, data can be sent one of several ways:

- Removing the diskette or secure digital card from the cart and downloading it into a MUSE client
- CSI modem
- CSI wireless
- CSI direct (serial)

CASE/CardioSoft Stress Systems

CASE/CardioSoft Stress systems can be configured to store saved reports to the MUSE system for long-term storage. CASE/CardioSoft systems require a network option to send data to the MUSE. The data transfer method involves the CASE/CardioSoft system copying the files to a shared folder on the MUSE system, and then the MUSE system will pick up the files locally for processing.

HL7 (Health Level 7)

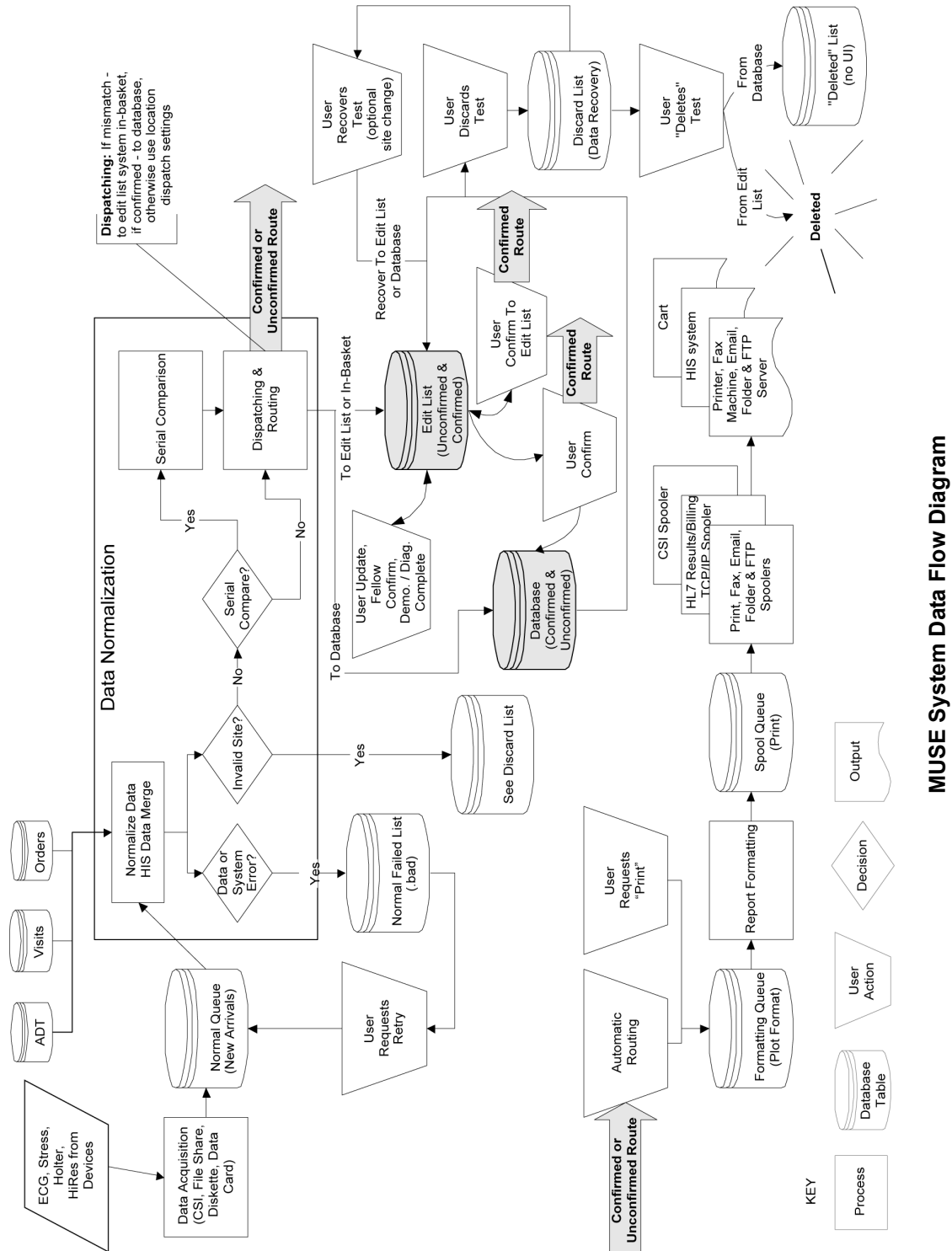
The MUSE system supports HL7 interfaces for ADT, Orders, Results and Billing. The MUSE system, version 7.0 and later, uses the CCG (Centricity Cardiology Gateway) v5.1 as the interface with the HIS.

Interface to Monitoring Systems

Bedside monitors can be configured to send ECG data to the MUSE system for long term storage. This is accomplished through the use of a monitoring gateway, which is a computer that has two network interfaces - one on the monitoring network, and one on the hospital network on which the MUSE file server is located. When a test is sent to MUSE from a bedside monitor, it is received by the monitoring gateway and stored locally in a shared folder. The MUSE file server is configured to look for data on that network share, and when it finds new data it will be moved to the MUSE file server and processed into the system.

Data Flow Diagram

This figure shows data flow from acquisition to confirmation into the database.



MUSE System Data Flow Diagram

General Fault Isolation

First Things to Ask

If the unit is not working properly, save yourself some time troubleshooting by asking yourself these basic questions.

- Is the unit turned on?
- Have there been any changes in the use, location, or environment of the equipment that could cause the failure?
- Has the unit been modified in any way, either in software or hardware?
- Is operator error the cause of the problem? Try to repeat the user's scenario exactly and compare that to the proper operation of the equipment. Check the operator's manual as necessary.

Visual Inspection

A thorough visual inspection of the equipment can save time. Small things—disconnected cables, foreign debris on circuit boards, missing hardware, loose components—can frequently cause symptoms and equipment failures that may appear to be unrelated and difficult to track.

Read the disassembly guidelines in the products OEM manual before you perform an internal visual inspection of the components.

Take the time to make all the recommended visual checks (refer to the following visual inspection chart) before starting any detailed troubleshooting procedures.

Table 1. Visual Inspection List	
Area	Look for the following problems
I/O Connectors and Cables	<ul style="list-style-type: none"> ■ Fraying or other damage ■ Bent prongs or pins ■ Cracked housing ■ Loose screws in plugs
Fuses	<ul style="list-style-type: none"> ■ Type and rating, replace as necessary
Interface Cables	<ul style="list-style-type: none"> ■ Excessive tension or wear ■ Loose connection ■ Strain reliefs out of place
Circuit Boards	<ul style="list-style-type: none"> ■ Moisture, dust, or debris (top and bottom) ■ Loose or missing components ■ Burn damage or smell of over-heated components ■ Socketed components not firmly seated ■ PCB not seated properly in edge connectors ■ Solder problems: cracks, splashes on board, incomplete feedthrough, prior modifications or repairs
Ground Wires/Wiring	<ul style="list-style-type: none"> ■ Loose wires or ground strap connections ■ Faulty wiring ■ Wires pinched or in vulnerable position

Table 1. Visual Inspection List (Continued)	
Area	Look for the following problems
Mounting Hardware	<ul style="list-style-type: none">■ Loose or missing screws or other hardware, especially fasteners used as connections to ground planes on PCBs
Power Source	<ul style="list-style-type: none">■ Faulty wiring, especially AC outlet■ Circuit not dedicated to system■ (Power source problems can cause static discharge, resetting problems, and noise.)

For your notes

6 Maintenance

For your notes

Introduction

A regular equipment maintenance program helps prevent unnecessary equipment and power failures. A regular maintenance routine should include the following tasks, which are described in more detail later in the chapter:

- Visual inspection
- Cleaning the equipment's exterior
- Cleaning the equipment's interior
- Cleaning the equipment's accessories
- Maintaining the UPS
- Conducting equipment safety tests

GE recommends that these maintenance tasks be performed annually. To help establish a regular maintenance program, use the “[MUSE™ 7 System Preventive Maintenance Inspection Report](#)” provided at the end of this chapter.

NOTE

Except in the case of equipment maintenance contracts, the institution or individual using the equipment is responsible for maintenance. GE assumes no responsibility for performing the recommended maintenance procedures; however, GE service personnel may, at their discretion, follow any or all of the procedures as a guide during visits to the equipment site.

In addition to the regular maintenance tasks, this chapter also describes additional service tasks that may be performed as part of or outside the maintenance schedule. These tasks, described in more detail later in the chapter, include:

- Disassembling the hardware
- Conducting an anti-virus scan
- Renaming the file servers
- Changing Windows accounts and passwords
- Changing MUSE account passwords
- Upgrading the BIOS firmware
- Creating the Automated System Recovery Media
- Conducting service checkouts

Required Tools and Supplies

The following equipment is required to maintain or repair the MUSE system.

- Standard set of hand tools
- Multimeter
- Leakage Current Tester
 - ◆ 120 V (or equivalent)
 - ◆ 240 V (or equivalent)
- Tape Head Demagnetizer
- Cleaning kits for the following components:
 - ◆ DAT drive
 - ◆ Tape drive
 - ◆ Optical drive
 - ◆ Floppy drive
- Vacuum
- Isopropyl alcohol
- Can of compressed air
- Tie wraps for securing cables

Inspection and Cleaning

Before pilfering any of the following inspection or cleaning tasks, shut down the system and disconnect it from its power source using the appropriate instructions:

- For instructions on shutting down the MUSE system, refer to “Powering On and System Shutdown” in Chapter 2.
- For instructions on shutting down individual components and devices, refer to the OEM manuals.

Precautions

Observe the following precautions while inspecting or cleaning the equipment:

- Do not immerse any part of the equipment in water.
- Do not use organic solvents, ammonia-based solutions, or abrasive cleaning agents, which may damage equipment surfaces.
- Do not use a cleaning solution or solvent on the cassette tapes. Doing so can cause loss of data or damage to the tape drive.
- Do not use metal articles, such as a screwdriver, to clean the tape heads.
- Do not bring any magnetic material near the head assembly.

Visual Inspection

Perform the following tasks daily before using the unit.

- Check the case and screen for cracks or other damage.
- Inspect all cords and cables for fraying or other damage.
- Inspect all plugs, cables, and connectors for bent prongs or pins.
- Verify all cords, socketed components, and connectors are securely seated.
- Verify that all keys function properly and do not stick in one position.
- Verify that all knobs function properly and rotate fully in both directions.

If the inspection fails, do not use the unit until the failed condition is corrected.

Exterior Cleaning

Perform the following task monthly or more frequently, as needed.

1. Dip a clean, soft cloth in a mild dishwashing detergent diluted with water.
2. Wring the excess water from the cloth.
3. Wipe the system surfaces with the damp cloth.

CAUTION

Do not drip water or any liquid on the writer assembly, and avoid contact with open vents, plugs, or connectors.

4. Dry the surfaces with a clean cloth or paper towel.

Cleaning the Monitor Screen

Clean the monitor's screen as needed for unobstructed viewing. Refer to the OEM manual for instructions.

Interior Cleaning

WARNING

Shut down the system and disconnect from the AC power source before performing the following procedures.

CAUTION

Only qualified personnel should perform the following procedures.

Cleaning the System Box Interior

The equipment is sealed before it leaves the factory. There should be no dust buildup on the surfaces of the interior PCB assemblies and components when you receive it.

However, if dust is an environmental problem, use a commercially available dust remover (compressed air) to clean the following internal components:

- PCB assemblies
- Cooling fans
- Expansion cards
- Vents

Follow the manufacturer's directions for use.

Refer to the OEM manual for your specific system for instructions on opening and closing the system case.

Cleaning the Floppy Diskette Drive

To clean the MUSE system's floppy drive, follow the instructions provided with the floppy disk drive cleaning kit.

Cleaning the Tape Drive

Refer to the OEM manual for instructions on cleaning the tape drive heads.

Cleaning the CD-ROM Drive

Use a commercially available CD-ROM cleaning kit to clean the optical drive. Follow the manufacturer's directions for use.

Accessory Cleaning

Clean the accessories as needed to ensure trouble-free use.

Cleaning the Printer

Refer to the OEM manual for instructions on cleaning and adjusting the printer.

Cleaning the Mouse

For laser and optical mice, wipe the mouse with a damp cloth and dry thoroughly.

For ball mice, use the following instructions.

1. Shut down the MUSE system.
2. Disconnect the mouse from the computer.
3. Turn the mouse upside down and rotate the retainer ring, turn it in the direction indicated by the arrows.
4. Carefully turn the mouse right-side up so that the retainer ring and ball drop out.
5. Wash the ball in warm, soapy water and dry it with a clean cloth.
6. Blow air carefully into the ball-cage to dislodge dust and lint.
7. Look for a build-up of dirt on the plastic rollers inside the ball-cage.
This usually appears as a stripe around the middle of the rollers.
8. If the rollers are dirty, clean them with a cotton swab soaked in isopropyl (rubbing) alcohol. Turn the rollers with your finger and repeat until all deposits are removed. After cleaning, make sure the rollers are still centered in their channels.
9. Ensure that fluff from the swab is not left on the rollers.
10. Replace the ball and retainer ring and turn the retainer ring to lock it into place.
11. Connect the mouse cable to the computer.
12. Boot the MUSE system.

UPS Maintenance

All UPS sub-systems used in MUSE systems use sealed lead acid batteries and do not require any specific preventive maintenance other than testing for functionality.

UPS Battery Care

Keep the area around the unit clean and relatively dust free. If the atmosphere is very dusty, clean the outside of the system periodically with a vacuum cleaner.

Battery Life

Battery life varies based on ambient temperature and amount of duration of use. Maintaining an ambient temperature of 25°C (77°F) will help attain maximum battery life. Typical battery life is approximately 2 – 4 years. It is recommended that floor mounted UPS systems be returned for battery replacement and testing every 3 years or sooner if the preventive maintenance tests described below fail.

The rack mounted UPS systems are designed to allow on site replacement of batteries. Contact your authorized service provider or follow the recommended procedures in the Rack Mount UPS manual.

UPS Testing

The UPS has a built-in self test. It can be run from the unit's front panel by pressing and holding the **Test/Alarm Reset** button for 3 seconds. The unit will do an internal self-test. If a problem is found the unit will sound an alarm and an LED will turn on to indicate the nature of the problem.

The self test should not be run on systems in operation. It should be done only during scheduled down time. The test disconnects the power from the line and attempts to supply the load from batteries. If the batteries cannot hold the load the system attached to the UPS will experience a power failure.

The test can be run from the Fail Safe III software.

1. At the file server select *Start > Programs > FailSafe III > FailSafe III console*.
2. From the console window select *Maintenance > Test Hardware*.
3. At the test hardware window press the **Test** button.
4. The system will respond with *maintenance is running*. After about 42 seconds the system will respond with a *maintenance completed OK* message.
5. Close the *FailSafe III* window.

It is possible that if the system has gone for a long period of time without loss of input power the batteries could be in an unrecognized failed condition. It is also possible that the built in test may pass. During scheduled down time, the most thorough test is to disconnect the input power from the UPS with the full load applied to the system. The unit should maintain power to the system for the recommended amount of backup time based on the equipment load. Typically better than 5 minutes.

Disassembly Guidelines

PCB Assemblies

Observe the following guidelines when working on all PCB assemblies:

- Take precautions against electrostatic discharge damage.
- Handle all PCB assemblies by their edges.

Hardware

- Before disassembly, note the positions of any wires or looms (cables), marking them if necessary to ensure that they are replaced correctly.
- Save and set aside all hardware for re-assembly.

Opening the File Server

See the OEM manual for your specific system for the steps to open, disassemble, and reassemble your system.

WARNING

Turn off power and disconnect power cord from AC power source before removing the cover.

Opening the HP LaserJet 4015N Printer

Instructions on opening the HP printer, adding RAM, and other maintenance procedures can be found in the OEM manual.

Equipment Safety Tests

Introduction

This section contains equipment safety tests to ensure that the MUSE system poses no electrical health hazards. These tests should be performed annually and any time the AC ground is disturbed, for example, when replacing the main system board or power supply.

To perform these tests, you need a multimeter and either a 110-volt or 220-volt leakage current tester,.

NOTE

Failure to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards. Unless an Equipment Maintenance Contract exists, GE does not in any manner assume the responsibility for performing the recommended maintenance procedures. The sole responsibility rests with the individual or institution using the equipment. GE service personnel may, at their discretion, use this procedure as a helpful guide during visits to the equipment site.

Preparation for Tests

NOTE

The following procedure checks for proper wiring of the power receptacle. If the proper indications of step A (normal polarity and ground) are not obtained, the following procedures will be ambiguous. Do not proceed until a properly wired outlet is found.

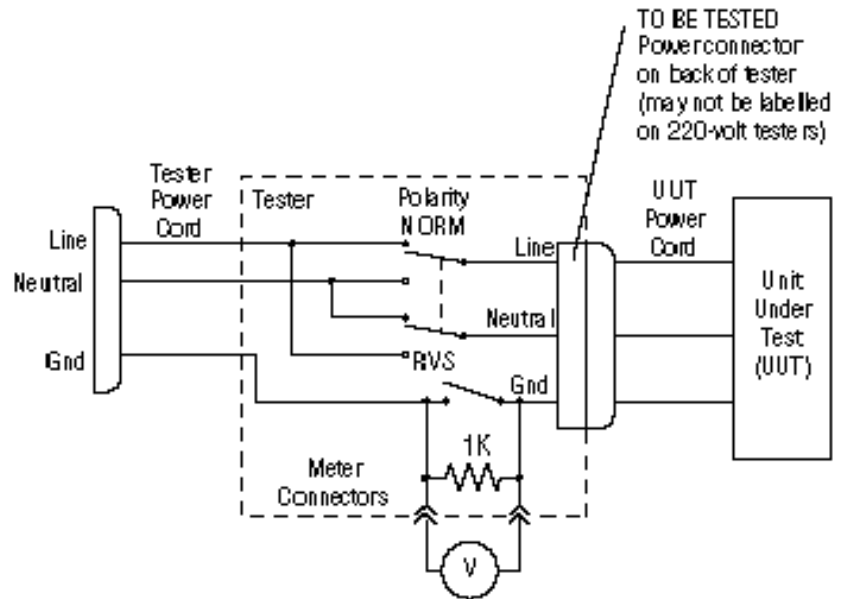
This procedure verifies that a properly wired outlet is used to furnish power to the MUSE system. Note also that Chapter 6, “Troubleshooting” contains an additional and important power source verification procedure that should also be done.

- Connect the appropriate leakage tester to the power outlet.
- Insure that the GND switch on the leakage tester is in the down (closed) position.
- Refer to “**ELECTRICAL SAFETY CHECKS**” on page 6-35 for a description of the tests to perform.

Test #1 – Ground-Wire-Leakage-to-Ground Test

NOTE

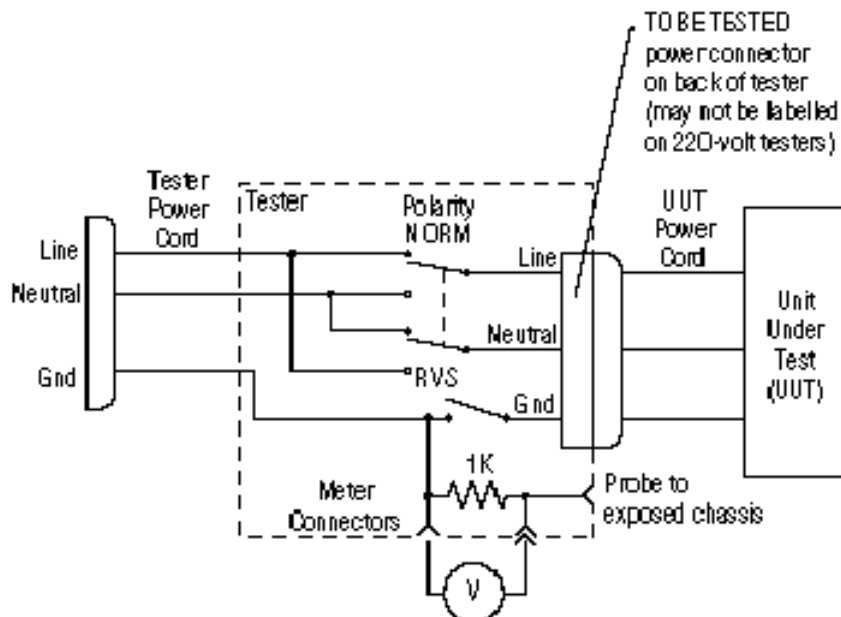
This diagram shows only a representation of how a typical leakage current tester functions. Follow the instructions provided with your leakage tester.



Test #2 – Chassis-Leakage-to-Ground (Exposed Chassis) Test

NOTE

This diagram shows only a representation of how a typical leakage current tester functions. Follow the instructions provided with your leakage tester.



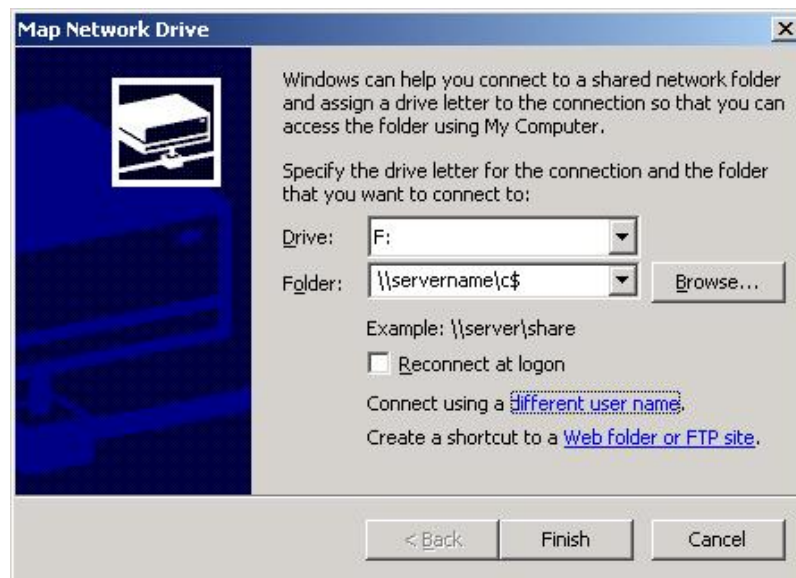
Performing Antivirus Scan From an FE Notebook Computer

Introduction

This procedure describes how to scan the MUSE file server for viruses, over the network, by using the Symantec AntiVirus Corporate Edition software that is installed on an FE notebook computer.

Mapping Drives to the MUSE File Server

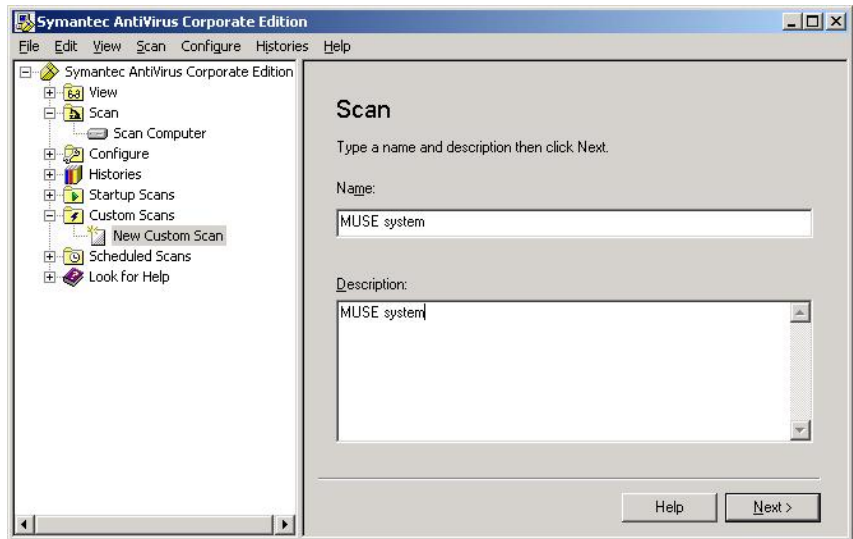
The first step is to map drives to the MUSE file server so that they can be selected within the antivirus software for scanning. You can use Windows Explorer to map to the `\\servername\c$` and `\\servername\d$` administrative shares.



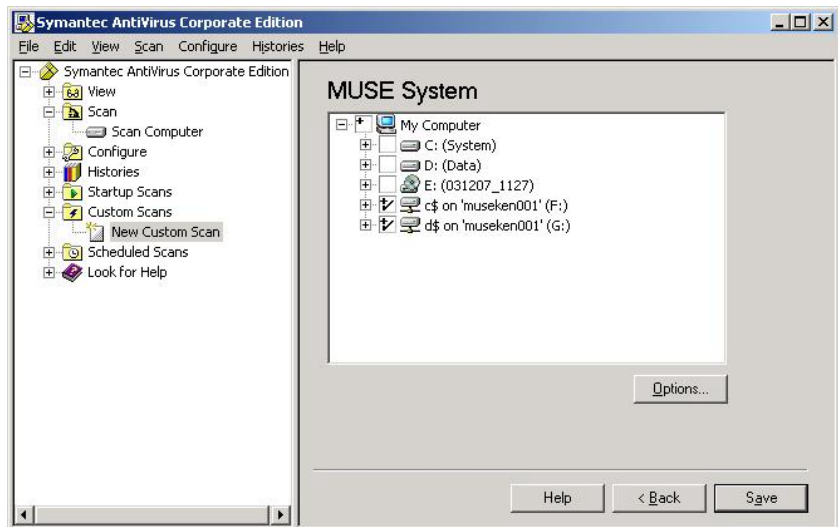
Use the *Connect using a different user name* feature to provide a username and password that has administrator rights on the MUSE file server. On MUSE systems you should be able to use the local administrator account and the corresponding password. For example, in the *Connect As* dialog box you would enter **administrator** for the *User name* and **password** for the *Password*. The real password is not supplied here for obvious reasons.

Configuring a Custom Scan

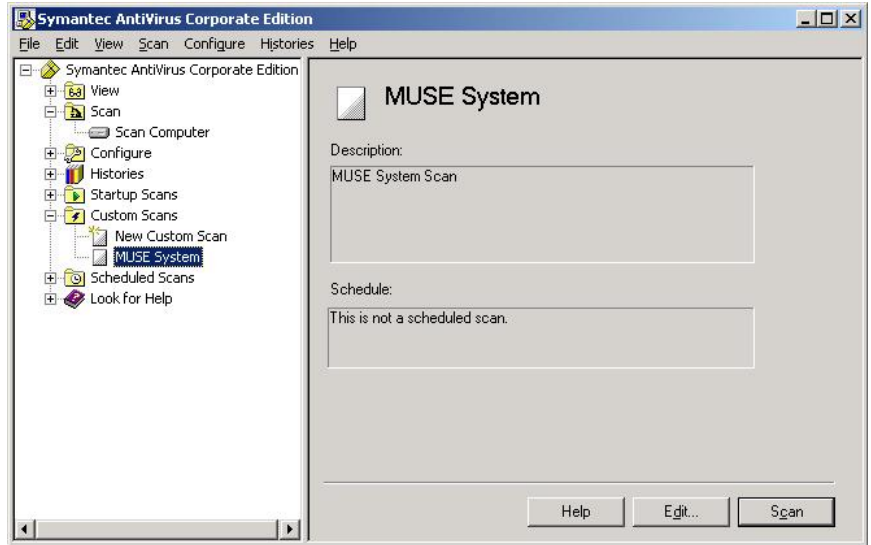
1. Open Symantec AntiVirus and select *New Custom Scan* as shown below.



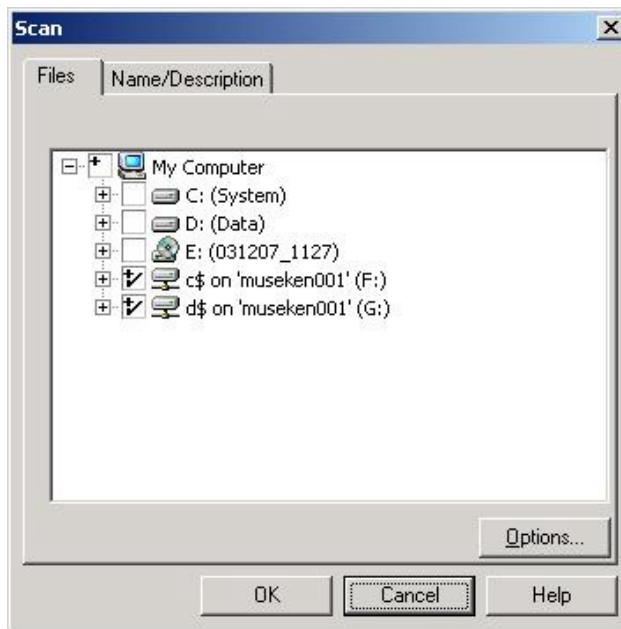
2. Enter a descriptive *Name* and *Description* so that you will recognize it when you want to run it.
3. Click the *Next>* button.
4. Select the **c\$** and **d\$** drives that you mapped previously.



5. Click on *Save* to save this custom scan. Now you can highlight the custom scan you created and click on *Scan* to run it.



Or, if you need to make changes to the configuration for the scan, you can click on *Edit* as shown below.



6. Click on *Options* to bring up the *Scan Option* dialog where you can configure different options such as the files to include or exclude.

NOTE

You wouldn't normally want to exclude any files for a one time scan, but keep in mind that for a large system the scan could take quite a long time.

Renaming File Servers

To rename the file server after the MUSE application and SQL server have been installed, you must rename the Windows server and the SQL server. Both tasks are described in the following topics.

Renaming the Windows Server

NOTE

You must be logged in as **MuseAdmin** account in order to change the name of the file server.

1. Right-click my computer. Click on *Properties*; click on *Computer Name* tab; click on *Change...* and record the computer name, as you will need it later.
Original Computer Name: _____
2. Enter the new computer name and record it. Click on *OK* for the name change window and then computer properties to close the Properties window.
New Computer Name: _____
3. When the window appears asking if you want to restart the computer now, select *Yes*.
4. When the system restarts, log back using the **MuseAdmin** account and verify the computer name has changed.

Renaming the SQL Server

1. From the MUSE file server Windows desktop, select *Start → All Programs → Microsoft SQL Server 2005 → SQL Server Management Studio*.
The *Connect to Server* window is displayed.
2. Select/verify the name of the server you wish to connect to is displayed in the *Server Name* list.
3. Click the *Connect* button.
4. Click the *New Query* button.
5. Type the following command in the query window:
exec sp_dropserver 'oldname' substituting 'oldname' with the name you had written down earlier. And press **Enter**. Type **go** and press **Enter**.
6. Next, type the following command in the query window:
exec sp_addserver 'newname', 'local' substituting 'newname' with the new server name you had written down earlier and hit enter. Type **go** and press **Enter**.
7. Verify the syntax before executing the query.

NOTE

Below is an example of what you should have entered in the query analyzer text box before executing:

```
exec sp_dropserver 'MUSE001'  
go
```

```
exec sp_addserver 'HospName', 'local'  
go
```

8. Click the *Execute* button in the menu bar (or press **F5**) to execute the query.

The *Message* window will display a message indicating the query was successfully executed.

9. Now you can check your work.

- a. Erase the text in the *Query* window and type the command:
exec sp_helpserver and press **Enter**.

- b. Type **go** and press **Enter**.

- c. Click on the *Execute* button in the menu bar (or press **F5**).

The command will return a row with a 'name' column that says the new name of the server, 'HospName' in our example.

10. Restart the MUSE file server.

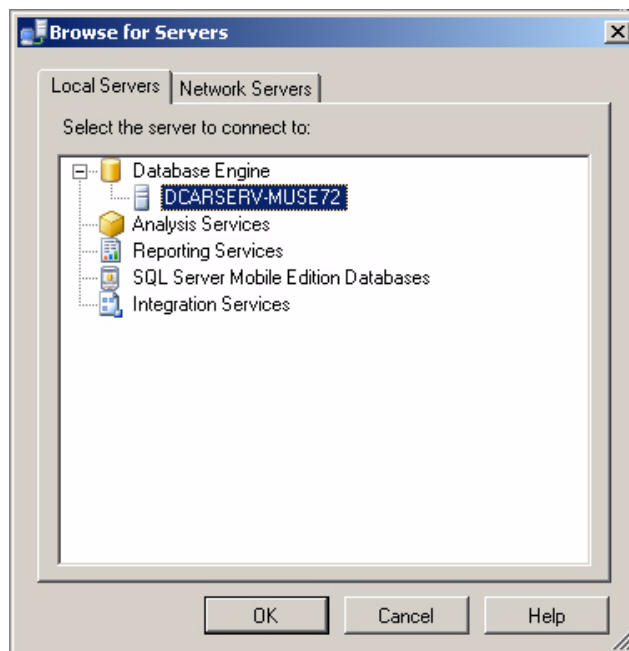
11. After the file server reboots, verify you can connect the file server using the new name.

- a. Open *SQL Server 2005 Management Studio*.

The *Connect to Server* window is displayed. The old server name will be displayed in the *Server Name* field.

- b. Click the arrow to open the *Server Name* drop-down list and select *<Browse for more...>*.

The *Browse for Servers* window is displayed.



- c. Select the new file server name from the list of *Database Engines*.

- d. Click *OK*.

- e. Click the *Connect* button.

Setting up the MUSE Server and Client Software

If the name of the MUSE file server changes after the initial MUSE installation, perform the following step:

1. Run **remotingcfg.bat** on the server and each client to point the clients to the new server name in **muse.remoting.config**:

remotingcfg [space] **-server:**<newname>

Changing MUSE Service Accounts

The MUSE service accounts are integral to the correct operation of the MUSE system. The following table identifies the default accounts:

Default Account	Description
MUSEAdmin	MUSE administrator account. Used by the MUSE application to perform functions critical to the system operation. Also used by MUSE Tech Support to help troubleshoot and maintain the system.
MUSEBkgnd	MUSE background account. Used to run the MUSE services.


To be able to log on to both MUSE and Windows, the accounts must be set up with the following user accounts.

■ MUSE User

The default MUSEAdmin and MUSEBkgnd accounts both exist as Users within the MUSE application. The account names are listed in the *MUSE User Name* field. See (1) in the following illustration. They are critical to the internal working of the MUSE system and cannot be changed. However, to provide added security, their passwords may be modified. Changing the passwords have little effect on the system's operation.

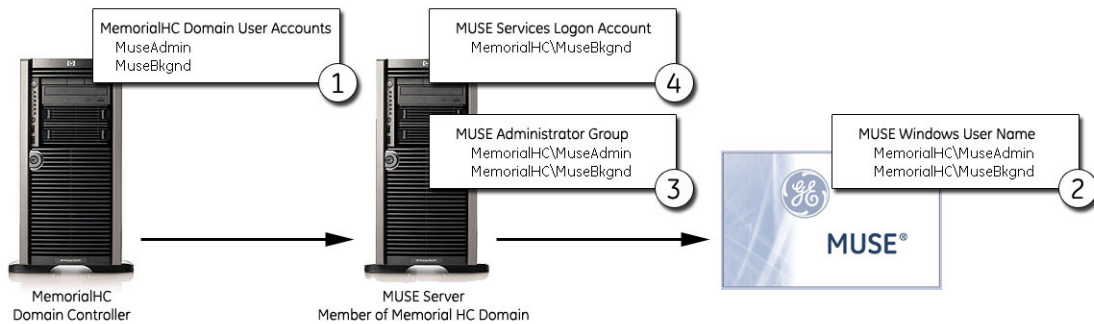
■ Windows User

The Windows user accounts provide access to the MUSE application, MUSE services, and SQL database. They are linked to the MUSE user accounts within the MUSE application via the user's *Windows User Name* field. See (2) in the following illustration. Unlike the MUSE user accounts, however, these account names may be changed. If these account names are changed, the services and operations dependent on these accounts must be changed accordingly.



Last Name ^	First Name	MUSE User Name	Windows User Name	User Enabled	System User ID
MuseAdmin	MuseAdmin	MuseAdmin	mkemuse\MUSEAdmin	Yes	20001
MuseBkgnd	MuseBkgnd	MuseBkgnd	mkemuse\MUSEBkgnd	Yes	20002

The following diagram illustrates the dependencies between the MUSE and Windows accounts.



The following rules must be observed when changing the MUSE service accounts. Refer to the corresponding numbers in the previous illustration.

1. The MUSEAdmin and MUSEBkgnd accounts must be set up as users in the domain.
2. The accounts must be configured as users in the MUSE application with the users' Windows User Name field pointing to the domain accounts.
3. The domain\MuseAdmin and domain\MuseBkgnd accounts must be added to the local Administrators group on the MUSE file server.
4. The logon accounts for MUSE services and other services used by the MUSE application must point to the domain\MuseBkgnd account.

Changing the MUSE Account Passwords

To change the password for the *MUSEAdmin* or *MUSEBkgnd* account, modify the user's password in the MUSE application using the following instructions.

1. Log on to the MUSE application.
2. Go to *Setup > Users*.
3. Right-click on the account and select *Properties*.
4. From the *User Properties* window, enter a new MUSE password.
5. Select *Apply* to save your changes.

For more information, refer to the *MUSE™ Cardiology Information System Operator's Manual*.

Changing the Windows Accounts

The process to override the default MuseAdmin and MuseBkgnd Windows accounts consists of the following steps:

1. Shutting down the MUSE system.
2. Changing or creating the domain accounts.
3. Changing the Windows User Name in MUSE.

4. Re-installing the MUSE services.
5. Changing the SQL Service Agent Service Logon.
6. Changing the DCOM Configuration.
7. Changing the MACCRA Service.
8. Changing the MUSE Web Application Pool Identity.

Shutting Down the MUSE System

The MUSE system must be shut down before you begin this process. For information on shutting down the MUSE system, refer to the *MUSE™ Cardiology Information System Operator's Manual*.

Changing or Creating the Domain Accounts

The MUSE service accounts must be set up properly on the domain before making any changes to the MUSE system. Contact the hospital IT department and verify the accounts and passwords are set up on the domain before proceeding with the next step.

Changing the Windows User Name in MUSE

Use the following procedure to change to the name and/or domain of the Windows administrative and service accounts.

1. Shutdown all MUSE services.
2. From the server desktop, open a Command Prompt window and navigate to your MUSE installation directory.
3. Type the following command:

```
museusers {domain | -admin:<username> -bkgnd:<username>  
[-server:<server>] [-prefix:<prefix>]}
```

Refer to the following table for a description of each switch.

Switch	Description
<i>domain</i> ¹	Domain of the MUSEAdmin and MUSEBkgnd accounts. If you use the domain switch, the account names of MUSEAdmin and MUSEBkgnd are assumed. Use this switch if you are changing the account domains but not account names.
<i>-admin</i>	The name of the MUSE administrator account. This switch allows you to change the name and domain of the administrative account.
<i>-bkgnd</i>	The name of the MUSE background account. This switch allows you to change the name and domain of the service account.
<i>-server</i>	The name and instance of the SQL server and instance. If left blank, defaults to the name of the MUSE server.
<i>-prefix</i>	The prefix appended to the MUSE database. Defaults to MUSE.

1. Use either the *domain* switch or the *-admin* and/or *-bkgnd* switches. Do not use both.

For example, if you are using the default MUSEAdmin and MUSEBkgnd accounts, enter the following command to change to domain without changing the accounts:

museusers museprod

If you are not using the default accounts, or if you wish to change the default accounts along with the domain, enter the following command:

museusers -admin:museprod\musesvc -bkgnd:museprod\svcbkgnd

4. Press **Enter**.

The batch file does the following:

- ◆ Adds the admin and background accounts to the local administrators group.
- ◆ Changes the Windows User Name for MUSE account names accordingly.
- ◆ Assigns “Logon as service” rights to the *-bkgnd* account.

5. Notify GE Technical Support of the new account names.

This ensures that GE service personnel are equipped to respond to service needs.

6. What you do next depends on which passwords you changed:

- ◆ If you changed the password for the administrative account, you are done.
- ◆ If you changed the password for the background account, you need to re-install the MUSE services.

Continue to “[Re-Installing the MUSE Services](#)”.

Re-Installing the MUSE Services

Windows stores the account name and password of the MUSE background account with any service registration associated with that account. Therefore, if you change the account name or password, you also need to re-install the MUSE services so they can be reregistered with the new Windows account and password.

1. Open a *Command Prompt* window on the MUSE server.
2. Navigate to your MUSE Installation directory.
3. Type the following command and press **Enter**.

musesvc -server account password -cmdline:-db:sqlservername

Refer to the following table for a description of each switch element.

Switch	Description
<i>-server</i>	Installs the MUSE services. It must be followed by the log on and password for the MUSE background account.
<i>account</i>	Identifies the Windows domain and name of the account used to log on to the services. This will be MUSE background account. If the MUSE background account was changed from the default, use the new account name. It must be presented in this format: <i>domain\account name</i> . For example: <i>mkemuse\svcbkgnd</i>
<i>password</i>	Identifies the password of the MUSE background account. If the password for the account was changed, use the new password.
<i>-cmdline:-db:sqlservername</i>	Identifies the name of the SQL server where the MUSE database is installed. For a standard installation, this will be the same as the MUSE server name. If this switch is not included, it will default to the MUSE server name.

4. When you receive a message stating that the services have been re-installed, close the *Command Prompt* window and restart the MUSE services, if they did not start automatically.

To make sure the MUSE background account is recognized by the MUSE database, you need to change the SQL Server Agent log on information. Continue to [“Changing the SQL Server Agent Service”](#).

Changing the SQL Server Agent Service

Use the following instructions to modify the log on information of the SQL Server Agent to ensure that the MUSE background account can access the MUSE database:

NOTE

Failure to update the SQL Service Agent logon account will result in the failure of scheduled jobs, such as database search, local tape backup, and log and queue maintenance.

1. On the MUSE server, open the *Computer Management* window and select *Services*.
2. Locate the *SQL Server Agent (MSSQLSERVER)* service and open its *Properties*.
3. On the *SQL Server Agent (MSSQLSERVER) Properties* window, select the *Log On* tab.
4. Make sure the *This account* option is selected.

5. Enter the Windows domain and account name of the MUSE background account in the *This account* field.
6. Enter the account's password in both the *Password* and *Confirm Password* fields.
7. Click *OK*.
8. Restart the service for the changes to take effect.
9. Determine whether the MACCRA service is installed and running.

NOTE

The MACCRA service is used by several MUSE options, such as MUSE Web and CV-Web. If you change the MUSE background account name or password, you will need to update the MACCRA and MUSE Web App Pool accounts.

10. Do one of the following.
 - ◆ If the MACCRA service is not installed, you are done changing the MUSE account password.
 - ◆ If the MACCRA service is installed, continue to “[Changing the MACCRA Service](#)”.

NOTE

The MACCRA service is installed for MUSE Web and MUSE CV Web.

Changing MACCRA and MUSE Web App Pool Accounts

To change the MACCRA and MUSE Web App Pool accounts, you will need to:

- change the DCOM configuration,
- change the MACCRA service, and
- change the MUSE Web application pool identity.

Changing the DCOM Configuration

Use the following instructions to change the DCOM properties to the new MUSE background service account and password. You must have administrator privileges to perform this procedure.

1. From the MUSE server desktop, select *Start > Run*.
2. Type **DCOMCNFG** and press **Enter**.
3. On the *Component Services* window, select *Component Service > Computers > My Computer > DCOM Config*.
4. Right-click on *MACCRA* and select *Properties*.
5. On the properties window, select the *Identity* tab.
6. Change the User Account to the new account name and password.

Changing the MACCRA Service

Use the following procedure to modify the MACCRA service.

NOTE

Failure to update the MACCRA logon account will result in the failure of the MUSE Web and MUSE CV-Web options.

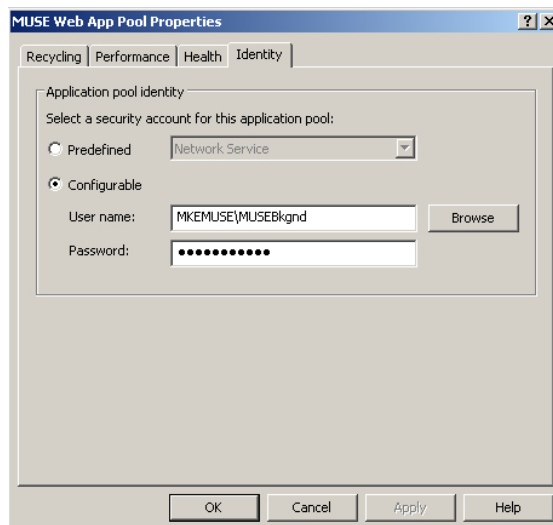
1. In the services list, locate the *MACCRA* service and open its *Properties*.
2. On the *MACCRA Properties* window, select the *Log On* tab.
3. Make sure the *This account* option is selected.
4. Enter the domain and account name of the MUSE background account in the *This account* field.
5. Enter the account's password in both the *Password* and *Confirm Password* fields.
6. Click *OK*.
7. Restart the service for the changes to take effect.

You are done changing the Windows MUSE Service account and password.

Changing MUSE Web Application Pool Identity

If you change the MUSE Background Service Account or its password, you must make the corresponding changes to the MUSE Web Application Pool. Use the following instructions to make the necessary changes.

1. On the MUSE server desktop, select Start > Administrative Tools > Internet Information Services (IIS) Management.
2. On the Internet Information Services (IIS) Management window, right-click on *Muse Web App Pool* and select *Properties*.
3. On the *MUSE Web App Pool Properties* window, select the *Identity* tab.
4. Change the *User name* and *Password* to match the new MUSE background service account, as seen in the following figure.



Upgrading the BIOS Firmware of a G4 Server

If the 1MB processor that originally shipped with a G4 file server needs to be replaced, you may need to replace it with a 2MB processor. After replacing a 1MB processor with a 2MB processor, you may need to upgrade the BIOS firmware.

NOTE

The BIOS firmware upgrade procedure described below is needed if the BIOS firmware date displayed when the file server boots is dated earlier than 11/09/2005 (November, 2005). If the BIOS firmware date displayed on reboot is 11/09/2005 or later, the BIOS firmware upgrade is not necessary.

1. Create a BIOS upgrade floppy diskette by inserting a blank diskette into the floppy drive and the MUSE Support CD in the CD drive.
2. Select *Start* → *Run*....
3. Click *Browse...* and browse to:
[CD drive letter]:\BIOS\ML370G4\SP31871.exe
4. Follow the on-screen prompts to create the BIOS upgrade floppy.
5. When the process is done, reboot the system with the floppy diskette in the drive.

The system should automatically boot from the floppy disk and display *ROMPAQ Firmware Upgrade Utility V4.20M*.

NOTE

If the system does not boot from the floppy, you may need to reboot the system and press **F9** during the boot process and then select the floppy as the boot device.

6. At *Select a Device* window, select *Compaq ML370G4* and press **Enter**.
7. At the *Select an Image* window, select **11/09/2005**, and press **Enter**.
8. At the *Caution* window, read and follow the warning,...*Do not reboot or turn off your machine while programming is in process*. Press **Enter**.
9. Wait for the upgrade process to complete (2-3 minutes) and display *Flash Programming Completed Successfully*. Press **Enter**.
10. At *Do you want to reprogram another ROM?*, press the **Esc** key.
11. Remove the floppy and power cycle the system.

Creating the Automated System Recovery Media

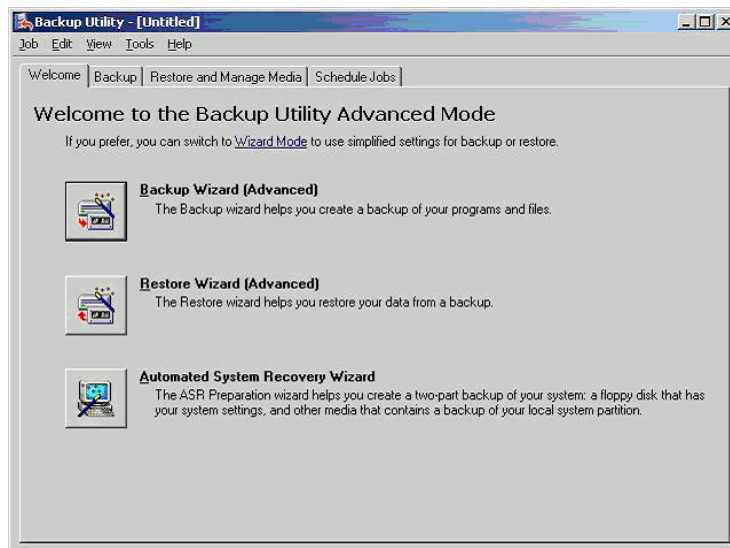
This procedure takes advantage of the Automated System Recovery (ASR) feature that is part of Windows Server 2003. You will need a new blank AIT tape and a blank formatted diskette to create the ASR media set.

NOTE

Before performing this procedure, inform the customer that the system will be shutdown for approximately 30 minutes. This will allow you enough time to make two ASR sets.

1. Log into the file server as a local administrator.
2. Open a *Command Prompt* and change to the folder where MUSE is installed. This is typically **c:\program files\muse**.
3. Type **asrprep** and press **Enter**.

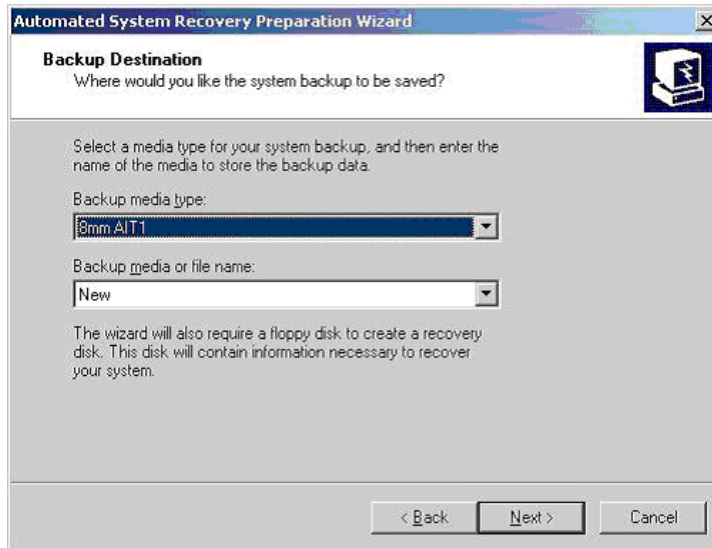
This will shutdown some of the Services so that they won't interfere with the ASR tape creation.
4. To create an AIT tape/Diskette ASR set, click on *Start* → *Run...*.
5. Type **ntbackup** and press **Enter**. If backup is already configured for advanced mode, the following screen will be displayed. If not, click on the advanced mode link to go into advanced mode.



6. Click on the *Automated System Recovery Wizard* button to launch the wizard. The following screen will be displayed.



7. Click on *Next>*. The following screen will be displayed.



NOTE

If you are reusing an existing ASR tape, you will need to select it from the *Backup media or file name* drop-down list.

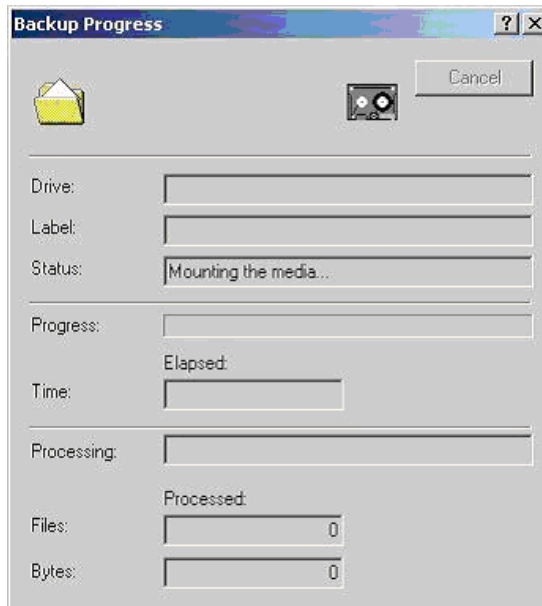
If you are reusing an existing ASR tape, you will either need to select it from the *Backup media or file name* drop-down list, or select to overwrite it when the backup starts.

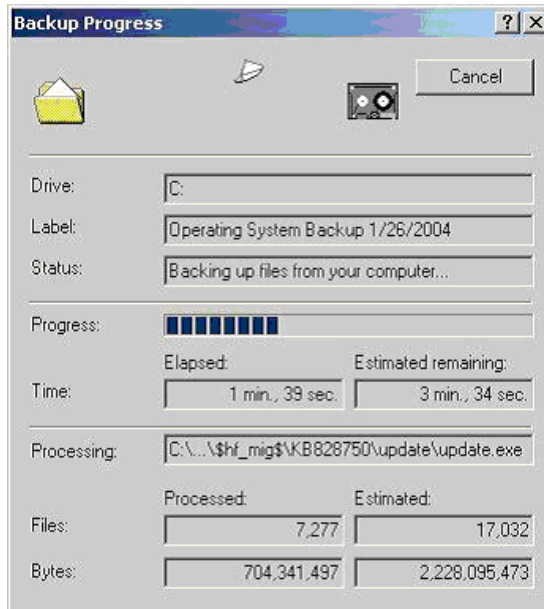
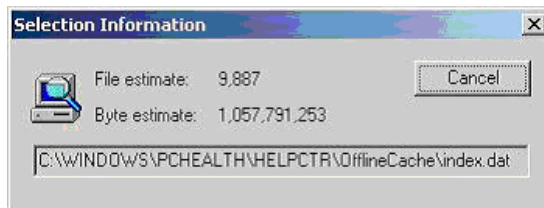
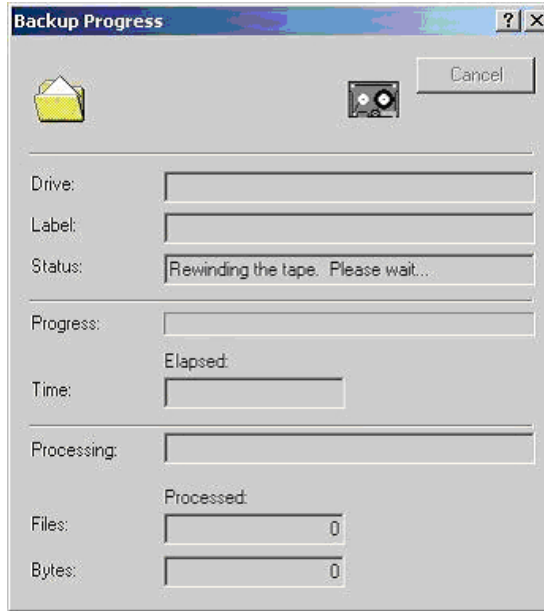
8. Verify that the information matches and then click *Next>*. The following screen will be displayed.



9. Make sure you have a new blank AIT tape in the tape drive (or an existing one that is being replaced) and that you have a blank formatted diskette ready. Click *Finish*.

A series of windows similar to the following figures will be displayed to indicate the progress of the backup.

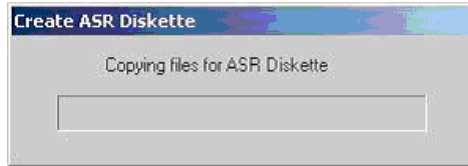




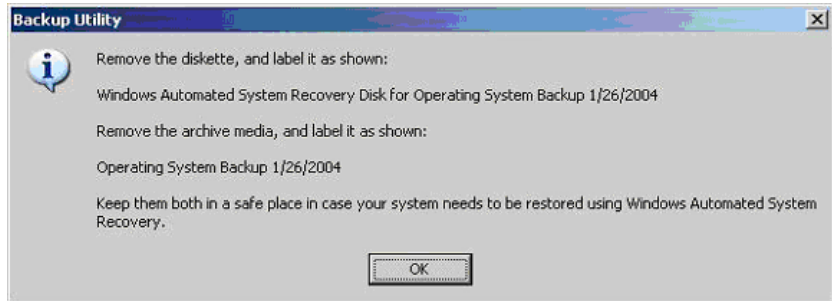
10. When the backup finishes, you will be prompted for the diskette. Insert the blank formatted diskette and click *OK*.



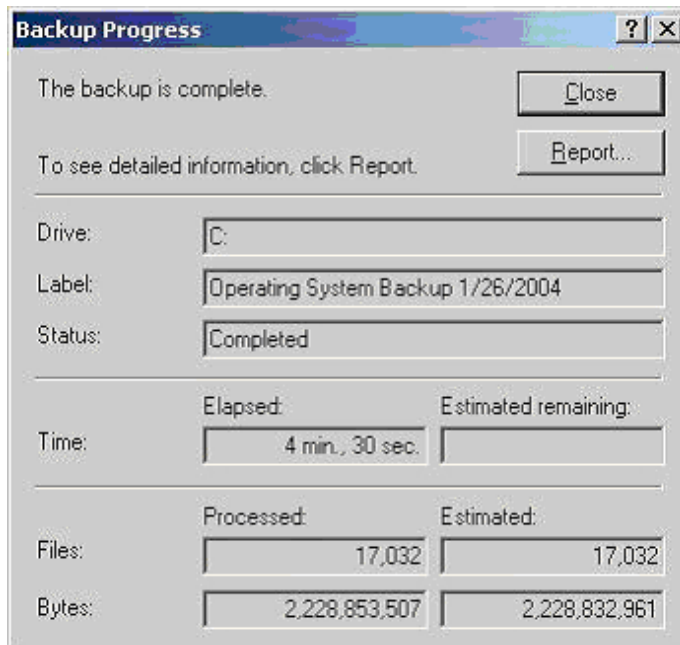
Files will be copied to the diskette.



11. After the diskette is created, you will be prompted to remove the diskette and tape and to label them appropriately.



12. Click *OK*. Click *Close* to close the *Backup Progress* window.



13. Close the *Backup Utility* window.
14. Use the following steps to copy the drivers needed for the Sony SDX-550V tape drive from the MUSE Support CD to the ASR floppy disk.
 - a. Insert the MUSE Support CD into the CD-ROM drive.

- b. Navigate to *x:\SDX-550V*, where *x*: is the CD-ROM driver letter.
- c. Copy the entire contents of the SDX-550V folder to the root directory of the ASR floppy disk.

NOTE

If you cannot locate the MUSE Support CD, you can download the necessary files from the Sony web site (<http://sony.storagesupport.com/product/72#drivers>). Once on the site, click the *Windows XP Pro/Server 2003 Automatic System Recovery Tape Driver* link and download the two attachments.

15. Verify the floppy drive contains the following files and directory structure:

Directory	Files	Comments
A:\ (root)		
	asr.sif asrnp.sif backup.bkf setup.log	ASR Files
	sonlyait.txt txtsetup.oem	Tape Drivers
W2k3		
32	s32ait.cat s32ait.inf s32ait.sys	Tape Drivers
64	sx64ait.cat sx64ait.inf sx64ait.sys	Tape Drivers

16. Store the tape and diskette in a safe place.

NOTES

It is recommended that two separate ASR Tape/Diskette sets be created and stored in separate locations. One should be easily retrievable to minimize delay when it is needed. To create the second set, simply go through this procedure again.

New ASR Tape/Diskettes should be created whenever the system partition changes, such as after a MUSE software update, or when new Windows Users, printers, or security patches are added. Creating new ASR sets is recommended during any preventive maintenance work.

17. Restart the MUSE file server when you are finished making ASR media.

Conducting Service Checkouts

Whenever a MUSE system is serviced, checkout procedures must be performed to comply with FDA guidelines and to ensure that the system is safe and functioning properly. The specific procedures depend on the service performed.

The following sections:

- identify the required tools,
- describe the checkout procedures for FRU repairs, and
- describe the checkout procedures for non-FRU repairs.

Required Tools

The following list identifies all the tools that may be required to perform a specific checkout procedure. When a specific tool is required by a procedure, it will be identified by number.

1. Standard hand tools, including a #10 Torx Driver
2. Anti-static wrist strap
3. Applicable service and/or operator manual as needed
Use OEM manuals for reference as needed.
4. Floppy Diskette
5. SD Card
6. Tape
7. CD or DVD
8. Leakage tester
9. Multimeter

Visual Checkout and Cleaning

All service repairs should include a visual inspection of the product before service begins. For information on what to inspect, refer to “[Visual Inspection](#)” on page 6-5.

If the system box is opened, also inspect for dust. If necessary, clean the dust from the interior as described in “[Interior Cleaning](#)” on page 6-6.

Checking Out FRU Repairs

FRU replacement should be made following the appropriate repair procedures outlined in the manufacturer's manual for the system. For systems under the manufacturer's warranty, the repair may be performed by the OEM service representative. However, final functional checkout of the system is the responsibility of the GE service representative onsite at the time.

NOTE

The FRU checkout procedure for any listed FRU also applies to its internal PCBs and components

Locate the repaired FRU in the following table to identify tools and checkout procedures to use. The tools are described in “Required Tools” on page 6-32. The checkout procedures follow the table.

FRU Description	Tools	Visual Inspection?	Checkout Procedures
Hard Drive	1, 2, 3	Y	1, 2
Disk Array Controller	1, 2, 3	Y	1, 2, 3
Power Supply	1, 2, 3, 8, 9	Y	1, 2, 10
Fan	1, 2, 3	Y	1, 2
Mother Board	1, 2, 3	Y	1, 2
Battery	1, 2, 3	Y	1, 2
Network Card (NIC)	1, 2, 3	Y	1, 2
Memory	1, 2, 3	Y	1, 2
Floppy Drive	1, 2, 3, 4	Y	1, 2, 6
CD/DVD Drive	1, 2, 3, 7	Y	1, 2, 7
Multimedia Card Reader (External)	1, 2, 3, 5	Y	1, 2, 8
Tape Drive	1, 2, 3, 6	Y	1, 2, 5
Tape Drive Controller	1, 2, 3, 6	Y	1, 2, 5
Modem	1, 2, 3	Y	1, 2, 9
Mouse	1, 2, 3	Y	1, 2
Keyboard	1, 2, 3	Y	1, 2
Display	1, 2, 3	Y	1, 2, 4

1. SERVER**NOTE**

Verify that rack-mounted systems have been fully seated and fastened to rack before proceeding.

- a. Reboot the server.
- b. Confirm that system boots normally (that is, no errors occur).
- c. Confirm you can successfully log on to the MUSE system from the server.
- d. Confirm that users can successfully log on to the MUSE system from a client workstation.
- e. Confirm that users can open the edit list and access a patient record from a client workstation

2. CLIENT

- a. Reboot the client.
- b. Confirm that the system boots normally (that is, no errors occur).
- c. Confirm that users can successfully log on to the client.
- d. Confirm that users can open the edit list and access a patient record.

3. DISK ARRAY CONTROLLER

- a. Confirm that C and D drive partitions have been created correctly.
- b. Verify that the disaster recovery procedure restored the MUSE database.
For more information, refer to Appendix A, “[System Recovery](#)”.

4. DISPLAY

- a. Confirm the display resolution is set to customer preference.
- b. Open the MUSE application and confirm the application displays correctly.

5. TAPE DRIVE/TAPE DRIVE CONTROLLER

- a. Using the Enterprise Manager or SQL Server Management Studio, run a manual MUSE backup.
- b. Confirm the backup was successful.
- c. Verify that all tapes are being successfully used in per backup schedule.
- d. Replace tapes that are past their intended life span.

6. FLOPPY DRIVE

- a. Access the floppy using My Computer or Windows Explorer.
- b. Confirm that the contents of the floppy are displayed.
- c. Confirm that you can open and save files to the floppy.
- d. Confirm that you can acquire data into the MUSE system from the floppy.

7. CD/DVD DRIVE

- a. Access the CD or DVD drive using My Computer or Windows Explorer.
- b. Confirm that the contents of the media are displayed.
- c. Confirm that you can open files from the media.

8. MULTIMEDIA CARD READER

- a. Access the card reader using My Computer or Windows Explorer.
- b. Confirm that the contents of card are displayed.
- c. Confirm that you can open and save files to the card.
- d. Confirm you can acquire data into MUSE from the card.

9. MODEM

- a. Transmit an ECG from a cart to the modem.
- b. In the MUSE application, select *System Status*.
- c. Select *Newly Acquired* or *Acquisition Log*.
- d. Verify the *PID/Name* of the ECG transmitted from the cart has been acquired.

10. ELECTRICAL SAFETY CHECKS

Perform electrical safety checks when indicated. Record measurement values in your debrief.

NOTE

The following values apply to 120/240 VAC for personal computers.

Step	Description	Condition ²	UUT-ON ³	Results
A	Earth Leakage Current		in uA	
1	Forward Polarity	NC		Pass/Fail
2	Neutral Open, Forward Polarity	SFC		Pass/Fail
3	Neutral Open, Reverse Polarity	SFC		Pass/Fail
4	Reverse Polarity	NC		Pass/Fail
B	Enclosure Leakage Current		in uA	
1	Forward Polarity	NC		Pass/Fail
2	Neutral Open, Forward Polarity	SFC		Pass/Fail
3	Ground Open, Forward Polarity	SFC		Pass/Fail
4	Ground Open, Reverse Polarity	SFC		Pass/Fail
5	Neutral Open, Reverse Polarity	SFC		Pass/Fail
6	Reverse Polarity	NC		Pass/Fail
C	Ground Continuity		in ohms	
1	AC mains power cord ground prong to exposed metal surface (e.g., ground lug)	N/A		Pass/Fail

60950-1 Leakage Current Limits in microamps (uA) ¹	
IEC 60601-1	UL 60601-1
Type ITE	
3500	3500
3500	3500
3500	3500
3500	3500
Type ITE	
3500	3500
3500	3500
3500	3500
3500	3500
3500	3500
3500	3500
Resistance in ohms	
< 200	< 200

1. Countries recognizing IEC standards use the IEC values; countries recognizing UL standards use the UL values.

2. Condition Abbreviations: NC – Normal Conditions, SFC – Single Fault Condition, N/A – Not Applicable

3. Record your readings in this column.

Checking Out Non-FRU Repairs

System functional checks are required for non-FRU repairs and typically involve MUSE setup and configurations that can be performed remotely or onsite. If performed remotely, visual inspections or confirmation should be completed by a customer contact or FE on-site.

Checkout	Tools	Visual Inspection	Checkout Procedure
Printing			
Manual printing	NR	Y	1a
Automatic printing	NR	Y	1b
Format setting change	NR	Y	1c
Faxing			
Manual faxing	NR	Y	2a
Automatic faxing	NR	Y	2b
Editing/Confirming			
Edit record checkout	NR	Y	3a
Confirm record	NR	Y	3b
Report Distribution			
	NR	Y	4
Device Setup			
Output device (printer, fax, HL7 results)	NR	Y	5a
Inbound devices (modem, share)	NR	Y	5b
User Setup			
	NR	Y	6
Carts Transmission			
Modem transmission	NR	Y	7a
Wireless transmission	NR	Y	7b
LAN transmission	NR	Y	7c
MARS Transmission			
New MARS to MUSE setup	NR	Y	8a
MARS formatted report print	NR	Y	8b
CASE/Cardiosoft Transmission			
CASE/Cardiosoft to MUSE	NR	Y	9
Monitoring Transmission			
Manual transmission from bedside monitor	NR	Y	10
Database Search			
Manual report	NR	Y	11a
Automatic report	NR	Y	11b
MUSE Web			
MUSE Web data retrieval	NR	Y	12

Checkout	Tools	Visual Inspection	Checkout Procedure
CV-Web			
CV Seb data retrieval	NR	Y	13
Remote Support			
	NR	Y	14
HIS/CCG			
HIS ADT/Orders inbound checkout	NR	Y	15a
HIS Realtime results/billing outbound checkout	NR	Y	15b
Order download from MAC Cart checkout	NR	Y	15c
XML Import	NR	Y	

1. PRINTING

- a. Manual Print Checkout
 - i Highlight a record on the MUSE edit list and click the print button
 - ii Select the printer you want to test, from the drop-down menu and click 'OK'
 - iii Verify that the record printed out correctly at the printer selected
- b. Automatic Print Checkout
 - i Acquire data from a cart/stress device with the location number you are testing
 - ii Verify that the record prints out correctly at the printer setup for automatic distribution
- c. Format Setting change checkout
 - i Highlight the record on the MUSE edit list and click the print button
 - ii Select the printer you want to test from the drop-down menu and click 'OK'
 - iii Compare the new printout to a previous printout to verify format changes took effect

2. FAXING

- a. Manual Fax to temp or defined device checkout
 - i Highlight record on the MUSE edit list and click the print button
 - ii Send to a temporary fax machine
 - iii Check that the fax printed correctly at the receiving fax machine
- b. Automatic Fax to existing fax device checkout
 - i Acquire data from an ECG cart with the location setup for the correct report distribution, or confirm data with correct physician mapping for auto-fax.
 - ii Check that the fax printed correctly at the receiving fax machine

3. EDITING/CONFIRMING

- a. Edit record checkout

- i Have customer open a record on the MUSE edit list and edit as normal
 - ii Update in edit list
 - iii Re-open record to verify the changes have been saved
 - b. Confirm Record Checkout
 - iv Have customer edit a record on the edit list
 - v Have customer confirm the record
 - vi Do a retrieval of the record and verify it is now in the database
- 4. REPORT DISTRIBUTION CHECKOUT**
- a. Acquire or confirm data for the location of new report distribution setup
 - b. Check the output device setup in the report distribution for the report
- 5. DEVICE SETUP**
- a. Output Device (Printer, Fax, HL7 Results)
 - i Highlight a record on the MUSE edit list and click on the print button
 - ii Select newly created device from the drop-down menu and click 'OK'
 - iii Check device for report
 - b. Inbound Device (Modem, Share)
 - i Transmit record from source device
 - ii Verify record appears in MUSE
- 6. USER SETUP**
- a. Have newly created user start the MUSE application
 - b. Have user logon and confirm MUSE access based on roles/privileges given during setup
- 7. CARTS TRANSMISSION**
- a. Modem transmission checkout
 - i Transmit ECG from cart to modem
 - ii In MUSE select System Status
 - iii Select “Newly Acquired” or “Acquisition Log”
 - iv Check that PID/Name of ECG transmitted from cart has been acquired in MUSE
 - b. Wireless transmission checkout
 - i Transmit ECG from cart while in range of wireless antennae
 - ii In MUSE select System Status
 - iii Select “Newly Acquired” or “Acquisition Log”
 - iv Check that PID/Name of ECG transmitted from cart has been acquired in MUSE
 - c. LAN transmission checkout
 - i Transmit ECG from cart via LAN
 - ii In MUSE select System Status
 - iii Select “Newly Acquired” or “Acquisition Log”

- iv Check that PID/Name of ECG transmitted from cart has been acquired in MUSE

8. MARS TRANSMISSION

- a. New MARS to MUSE setup checkout
 - i From a MARS workstation send a Holter report to MUSE
 - ii In MUSE select System Status
 - iii Select “Newly Acquired” or “Acquisition Log”
 - iv Check that PID/Name of ECG transmitted from MARS has been acquired in MUSE
- b. MARS formatted report print checkout
 - i In MUSE highlight a Holter report on the Edit list or retrieve from database
 - ii Click the print button
 - iii Compare the newly printed Holter report to printout prior to MARS formatter installation to and check that the Holter format change

9. CASE/CARDIOSOFT TRANSMISSION

- a. Send Stress report to MUSE
- b. In MUSE select System Status
- c. Select “Newly Acquired” or “Acquisition Log”
- d. Check that PID/Name of ECG transmitted from cart has been acquired in MUSE

10. MONITORING TRANSMISSION

- a. From Bedside/Dash monitor, transmit 12SL to MUSE
- b. In MUSE select System Status
- c. Select “Newly Acquired” or “Acquisition Log”
- d. Check that PID/Name of ECG transmitted from cart has been acquired in MUSE

11. DATABASE SEARCH

- a. Manual Search checkout
 - i Go to Database Search function of MUSE.
 - ii Create a search.
 - iii Choose criteria and run the search.
 - iv Verify search results match criteria selected
- b. Automatic Search checkout:
 - i Go to Database Search function of MUSE.
 - ii Create a search.
 - iii Save the criteria.
 - iv Schedule the search.
 - v Verify search runs when scheduled and expected results are generated. MUSE v7.x runs all scheduled searches only once per day (2:00 AM).

12. MUSE WEB DATA RETREIVAL CHECKOUT

- a. Start Internet Explorer.
- b. Type the MUSE server name into the URL field, i.e. <http://museserver>
- c. If prompted, login as a user who has access to MUSE Web.
- d. Choose Frames or No Frames
- e. Type patient ID into PID field, or patient name into Last Name field
- f. Find record for verification that MUSE Web is working properly

13. CV-Web DATA RETRIEVAL CHECKOUT

- a. Start Internet Explorer.
- b. Type the CV-Web server name into the URL field, i.e. <http://cvweb>.
- c. If prompted, login as a user who has access to MUSE Web.
- d. Type patient ID into PID field, or patient name into Last Name field.
- e. Verify appropriate MUSE server/site is selected.
- f. Find record for verification that CV-Web is working properly.

14. REMOTE SUPPORT

- a. Log into customer's system using the remote connection configured for that system. (PC anywhere or Insite 2)
- b. Confirm that you can access customer's desktop via remote connection.
- c. Confirm you can upload and download files to customer system.

15. HIS/CCG

- a. HIS ADT/Orders Inbound Checkout:
 - i From MUSE go to HIS Event Viewer.
 - ii Verify inbound ADT and order events exist.
 - iii Have customer verify data being sent from their interface is flowing into MUSE.
- b. HIS Realtime Results/Billing Outbound Checkout:
 - i From MUSE go to HIS Event Viewer.
 - ii Verify outbound results/billing events exist.
 - iii Verify outbound data is leaving the MUSE result/billing queue.
- c. Order Download from MAC Cart Checkout:
 - i From a MAC cart use the order download function.
 - ii Verify that the MAC cart is able to successfully download orders from MUSE.

16. XML Import

- a. Copy XML data files from the manufacturer's device into the XML folder setup on the MUSE server.
- b. In the MUSE application, select *System Status*.
- c. Select *New Acquired* or *Acquisition Log*.
- d. Verify the XML data has been acquired into the MUSE system.

Miscellaneous Maintenance Form

GE recommends that you perform the annual maintenance checks and test procedures on the “MUSE™ 7 System Preventive Maintenance Inspection Report” beginning on page 6-42. These maintenance procedures can be performed more often if indicated.

MUSE™ 7 System Preventive Maintenance Inspection Report

Customer _____ Customer # _____ Date _____

Field Engineer _____ Case # _____

Equipment Serial # _____ MUSE Software Version _____

Required Tools

1. Standard hand tools
2. Compressed air
3. Multimeter (Not always required)
4. AIT cleaning tape (GE-supplied hardware)
5. Floppy Drive cleaning kit
6. Field Service manual - reference only
7. Operator's manual - reference only

Visual Inspection

Inspect the following for visual wear and/or for proper functionality

1. _____ Network cabling (broken insulation)
2. _____ Network cabling (proper stress relief)
3. _____ AC power cord(s)
4. _____ Fans
5. _____ Internal and external system cables and connectors

Cleaning

1. _____ Clean all internals of dust (may not be necessary in raised floor computer rooms)
2. _____ Clean all keyboards
3. _____ Clean mouse contacts (only necessary on roller ball style)
4. _____ Clean all fans and air intakes
5. _____ Clean floppy drives
6. _____ Clean CD-ROM drives (use canned air to carefully blow out any dirt or debris)
7. _____ Clean the AIT backup tape drive
8. _____ Clean external surfaces and monitor screens

Calibration

There is no calibration required on the MUSE system.

Miscellaneous System Checks

1. _____ Verify that the MUSE software version is up to date, based on customer entitlement. Inform the customer if their file server or client hardware does not meet the specifications for the latest update.
2. _____ Check the free space on the system and database partitions on the file server. Inform the customer if available hard drive free space is low.
3. _____ Verify that all of the latest validated Microsoft service packs and security patches have been installed.
4. _____ On GE-supplied hardware, where the customer is using the local tape backup option, verify that backups are working properly by checking the Job History for the backup jobs in *Microsoft SQL Server Management Studio*. Make sure the email notifications are working if they have been configured, and that the email messages are being sent to the correct person.
5. _____ Update the Automated System Recovery (ASR) media sets for GE-supplied hardware.
6. _____ Check the hardware if GE-supplied (fans, hard drives, etc.) to make sure nothing has failed.
7. _____ Verify that the floppy and CD-ROM drives are working properly.
8. _____ Placeholder for any required SQL database maintenance.

Checkout Procedure

NOTE

Use the checkout steps below as a guideline. Some of these steps can be verified by looking at the system logs or through discussions with the customer. Use the Service and Operator Manuals where necessary for reference. Perform the following for all applicable options.

1. Verify that all clients can connect to the file server and run the MUSE application.
2. Verify that tests can be acquired via diskette, serial cable, modem, wireless and LAN connections, and that they route properly based on report distribution settings.
3. Verify that tests can be acquired from the MARS system(s).
4. Verify that tests can be acquired from the CASE system(s).
5. Verify that tests are being successfully transmitted through the Monitoring Gateway.
6. Verify that the system can successfully send reports to laser printers and fax machines.
7. Verify that users can successfully edit and confirm reports from the *Edit List*.
8. Contact the Jupiter Online Center and verify that they can remotely access the system. (See “Remote Checkout Procedure” on the following page.)
9. Check the backup tapes to ensure they have not exceeded their expected lifespan. (Customers should store old tapes for safekeeping).

Remote Checkout Procedure

This section should be performed by Jupiter Online Center while connected to test remote access.

1. Check the MUSE *Application Log* and the Windows *Event Viewer* for any obvious problems.
2. Verify that the Queue and Log Maintenance job is running properly.
3. Delete any old files that may have been left on the system for troubleshooting purposes.

Reference

This section has been maintained from previous versions for reference. You are not expected to shutdown the system to perform these tests.

AC Line Voltage Checkout

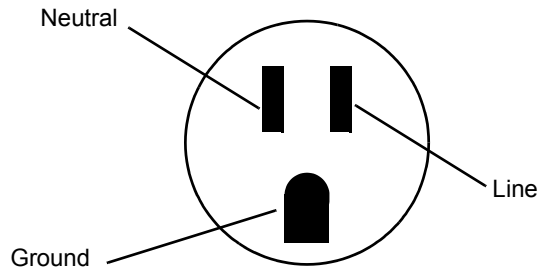
Line to neutral = 120V

Line to ground = 120V

Neutral to ground < 3V

Neutral-ground loop resistance test

Neutral to ground < 2Ω



This report is to be filed at customer site.

Briefly describe all repairs/adjustments made and list any parts replaced:

Additional Comments:

Customer Signature: _____ Date: _____

FE Signature: _____ Date: _____

10/01/2005

7 Parts Lists

For your notes

Ordering Parts

Introduction

The parts lists and assembly drawings in this chapter supply enough detail for you to order parts for the assemblies considered field serviceable.

If you require additional information, schematic diagrams, or troubleshooting assistance, contact Technical Support.

To order parts, contact Service Parts at the address or telephone number on the, “How to Reach Us...,” page provided at the beginning of this manual.

Field Replaceable Units

The following items may not be assigned separate manufacturing part numbers because they are normally part of a larger assembly. Since they are considered FRUs (field replaceable units), they have specific service part numbers so they can be ordered and replaced by service technicians. Contact Tech Support for FRU information for assemblies used on previous configurations.

NOTE

Verify part numbers before ordering service parts (FRUs). See the tech memo series for this product for changes or additions to these lists.

FRUs HP DL370 G6 File Server

Table 1. FRUs, HP DL370 G6 File Server		
Description	GE Part Number	OEM Part Number
Access Panel	2051430-002	519557-001
Rack Bezel	2051430.003	519563.001
Miscellaneous Hardware Kit: Fan Blank Power Supply Blank Hard Drive Cage Blank Media Bay Blank	2051430.004	519560.001
Air Baffle	2051430.005	519558.001
Power Supply, 460W	2051430.006	511777.001
Fan	2051430.007	519559.001
Battery	2051430.008	153009.001
Processor, Intel 2.13 GHz Xeon E5506, Quad Core	2022774-001	495942-L21
Heatsink	2051430.010	508996.001
NC375i Adapter NIC	2051430.011	491838.001
I/O Bezel	2051430.012	519562.001
Systems Insite Display	2051430.013	511786.001
System Board	2051430-014	491835-002
Power Supply Backplane w/cables	2051430.015	491836.001
8.Bay Backplane LFF	2051430.016	511785.001
DVD-ROM Drive	2051430.017	447464.001
Rack Mounting Kit	2051430.018	381679.001
DIMM 2 GB	2054841-001	500656-B21

Table 1. FRUs, HP DL370 G6 File Server (Continued)		
Description	GE Part Number	OEM Part Number
Miscellaneous Cable Kit: SAS Drive Cable 2 Bay LFF LED Cable I/O Bezel Cable Power On Button Cable SID Sideband Cable	2051430.020	519565.001
Mini-SAS cable	2051430.021	489426.001
SFF Hard Drive SAS 300 GB	2049045-001	507127-B21
Smart Array P410i Ctlr	2051430.023	412799.001
Smart Array Ctlr Cache Mod (256 MB)	2051430.024	405836.001
Smart Array Ctlr Battery Cbl 11.5 in.	2051430.025	409124.001
Smart Array Ctlr Battery Cbl 24 in.	2051430.026	409125.001
TPM	2051430.027	505836.001
Battery Cable 24 in.	2051430.028	488138.001
Digi AccelePort® 8 Port Serial Adapter (DIGI International, Inc.)	2054076-001	77000889

FRUs HP ML370 G5 File Server

Table 2. FRUs, HP ML370 G5 File Server		
Description	GE Part Number	OEM Part Number
FRU HP ML370 ACCESS PANEL (TOP COVER)	2036800-001	409410-001
FRU HP ML370 FRONT BEZEL (TOWER ONLY)	2036800-002	409411-001
FRU HP ML370 RACK BEZEL (RACK ONLY)	2036800-003	409412-001
FRU HP ML370 TOWER CONFIGURATION PANEL	2036800-004	409413-001
FRU HP ML370 CENTER WALL	2036800-005	409433-001
FRU HP ML370 REMOVABLE MEDIA BLANK	2036800-006	409414-001
FRU HP ML370 MEDIA BAY SPACER	2036800-007	409415-001
FRU HP ML370 SAS DRIVE CAGE BLANK	2036800-008	409416-001
FRU HP ML370 POWER SUPPLY BLANK	2036800-010	409417-001
FRU HP ML370 PROCESSOR AIR BAFFLE	2036800-011	409419-001
FRU T-10/T-15 TORX SCREWDRIVER L-HEAD	2036800-012	413965-001
FRU SYSTEM DISPLAY TRAY W/EJECT BUTTON	2036800-013	409420-001
FRU ML370 HOT-PLUG POWER SUPPLY 1000-W	2036800-014	403781-001

Table 2. FRUs, HP ML370 G5 File Server (Continued)		
Description	GE Part Number	OEM Part Number
FRU HP ML370 HOT-PLUG FAN, 120-MM	2036800-015	409421-001
FRU HP ML370 3.3-V LITHIUM BATTERY	2036800-016	153099-001
FRU ML370 DUAL-CORE XEON PROCESSOR 5120	2036800-017	416794-001
FRU HP ML370 HEATSINK GREASE/ALCOHOL PAD	2036800-018	409426-001
FRU ML370 DSPLY PANEL W/BRD, LBL, BEZEL	2036800-019	409427-001
FRU ML370 SYS BOARD W/PROCEESSOR CAGE	2036800-020	409428-001
FRU HP ML370 PPM	2036800-021	407748-001
FRU HP ML370 POWER SUPPLY BACKPLANE	2036800-022	399787-001
FRU SAS BACKPLANE DUPLEX BRD W/DRV CAGE	2036800-023	409429-001
FRU HP ML370 MEMORY BOARD	2036800-024	409430-001
FRU HP ML370 DVD-RW	2036800-025	384069-001
FRU HP ML370 DISKETTE DRIVE	2036800-026	399397-001
FRU HP ML370 PLASTICS KIT	2036800-027	409431-001
FRU HP ML370 HARDWARE KIT	2036800-028	409432-001
FRU HP ML370 RACK-MOUNTING KIT	2036800-029	377839-001
FRU RETURN KIT PACKING BOX AND CUSHIONS	2036800-030	409434-001
FRU ML370 MISCELLANEOUS CABLE KIT	2036800-031	409436-001
FRU ML370 SAS OPTION CABLE	2036800-032	389952-001
FRU ML370 DISKETTE DRIVE CABLE	2036800-033	431243-001
FRU ML370 2ND PARALLEL/SERIAL PORT CABLE	2036800-034	418300-001
FRU ML370 SFF HARD DRIVE 146 GB NOTE: Quantity required for rack-mounted server = 6 Quantity required for tower server = 4	2036800-036	432320-001
FRU HP SMARTARRAY P400 CNTRLR CACHE MOD	2036800-038	405832-001
FRU HP DL360 HARD DRIVE BLANK LFF	2036798-003	392613-001
FRU HP DL360 AC POWER CORD	2036798-021	187335-001
FRU HP FBDIMM PC2-5300F FULLY-BUFFERED	2036798-017	416471-001
Digi Board (DIGI International, Inc.)	412946-006	77000707

FRUs HP ML370 G4 File Server

Table 3. FRUs, HP ML370 G4 File Server		
Description	GE Part Number	OEM Part Number
Access Panel Top Cover	2026980-001	359233-001
Front Bezel – Tower Model Only	2026981-001	359234-001
Rack Bezel – Rack Model Only	2026982-001	359235-001
Hood Cover – Tower Model Only	2026983-001	359236-001
Power Supply, 800 W	2026984-001	347883-001
Fans, 92 MM	2026985-001	231213-001
Power Button/Switch with Cable	2026987-001	359714-001
Intel Xeon 3.4-GHZ 1-MB L2 Cache	2026988-001	364757-001
Intel Xeon 3.4-GHZ 2-MB L2 Cache	2031370-001	379429-001
System Board with Processor Cage	2026989-001	347882-001
PPM	2026990-001	347884-001
Power Supply Backplane	2026991-001	347886-001
SCSI Backplane Simplex W/6X1-IN Drive Cage	2026992-001	359719-001
SCSI Backplane Duplex Board	2026993-001	371722-001
Diskette Drive, 3-Mode 1.44 MB	2026994-001	233409-001
DVD-ROM Drive, IDE, 12X	2026995-001	217801-001
Plastics Kit	2026996-001	365962-001
Hardware Kit	2026997-001	365963-001
Wall, Center	2026998-001	359238-001
Round Hole Rack Mounting Kit	2026999-001	373115-001
Country Kit	2027000-001	359712-001
Return Kit Packing Box/Cushions – Tower	2027001-001	359713-001
Processor Air Baffle	2027002-001	359240-001
Miscellaneous Data Cable Kit	2027003-001	365964-001
Miscellaneous Power Cable Kit	2027004-001	365967-001
Cable Management Arm	2027005-001	367831-001
512-MB PC2-3200-R DIMM	2027006-001	359241-001
Rear Fan Cage	2027007-001	230984-001

Table 3. FRUs, HP ML370 G4 File Server (Continued)		
Description	GE Part Number	OEM Part Number
146.8-GB 10K rpm SCSI Ultra320 hot-plug hard drive	2027078-001	289044-001
300-GB 10K rpm SCSI Ultra320 hot-plug hard drive	2027079-001	351126-001
Digi Board - DIGI International, Inc.	412946-006	77000707
Digi Cable - DIGI International, Inc.	414961-003	76000529
Tape Drive SONY AIT-2 SDX-500V/RB Int	2024244-001	SDX-500V/RB
Digi Board (DIGI International, Inc)	412946-006	77000707
Digi Board (DIGI International, Inc)	414961-003	76000529

Table 4. G4 Configurations	
Configurations	Qty
Computer Server Rackable ML370 G4 MUSE	
HP ProLiant ML370 G4 - Rack 0 MB - HD: none - LAN EN, Fast EN, Gigabit EN - Monitor: none 5U - CTO	1
Processor upgrade - 1 x Intel Xeon 3.4 GHz (800 MHz) - Socket 604 - L2 2MB	1
HP - Memory - 512 MB x 2 - DIMM 240-pin - DDR 11 - 400 MHz/PC2-3200	1
HP Standard FIO Memory ALL	
HP Universal Hard Drive - Hard drive - 300 GB - hot-swap - 3.5" - Ultra320 SCSI	6
HP Smart Array 642 Controller - Storage controller (RAID) - Ultra320 SCSI - 320	1
HP - Power supply - hot-plug/redundant (plug-in module) - ACC 100-240 V 77	1
HP - System fan kit	1
HP NC7170 - Network adapter - PCI-X - EN, Fast EN, Gigabit EN - 10Base-T, 10	1
HP - DVD-ROM drive - plug-in module - 12x - 5.25" - IDE	1
Ultra-3, twisted wrapped, 4 connector, terminated SCSI cable (40")	
Microsoft Windows Server 2003 Standard Edition License - 1 server - Standard	1
Computer Tower ML370 G4 MUSE	
HP ML370G4 TWR CTO Chassis	1
Processor upgrade - 1 x Intel Xeon 3.4 GHz (800 MHz) - Socket 604 - L2 2MB	1
HP - Memory - 12 MB x 2 DIMM 240-pin - DDR II - 400 MHz/PC2-3200HP	1
Standard FIO Memory ALL	1
HP Universal Hard Drive - Hard drive - 146.8 GB - hot-swap - 3.5" - Ultra320 SC	4
HP Smart Array 642 Controller - Storage controller (RAID) - Ultra320 SCSI - 320	1

Table 4. G4 Configurations (Continued)	
HP - Power supply - hot-plug/redundant (plug-in module) - AC 100-240 V - 77	1
HP - System fan kit	1
100Base-TX, 1000Base-T - 2 ports	1
HP - DVD-ROM drive - plug-in module - 12x - 5.25" - IDE	1
Ultra-3, twisted wrapped, 4 connector, terminated SCSI cable (40")	1
Microsoft Windows Server 2003 Standard Edition - License - 1 server - STD	1
Computer Server ML370 G4 MUSE with Rack	
Rack MUSE Integrated Kit Graphite	1
Computer Server Rackable ML370 G4 MUSE	1
Tape Drive SONY AIT-2 SDX-500V/RB INT	1
Adapter PCI Digi AccelePort 8P Serial MLTPLR	1
Cable 8 Port HD68 TO DB9M Serial/Digi 8P	1
Label Prescription Device	1
Label MUSE CV Info System	1
Computer Server ML370 G4 MUSE + Rack 220V	1
Rack MUSE Integrated Kit - 220V	
Computer Server Rackable ML370 G4 MUSE	1
Tape Drive Sony AIT-2 SDX-500V/RB INT	1
Adapter PCI Digi AccelePort 8P Serial MLTPLR	1
Cable 8 Port HD68 to DB9M Serial/Digi 8P	1
Label MUSE CV Info System	1
Label Prescription Device	1

MUSE EveryWare Server – HP Model DL360 1U G5

Table 5. FRUs, HP DL360 1U G5		
Description	GE Part Number	HP Part Number
Access panel	2036798-001	412209-001
Plastics kit: a) Optical drive ejector assembly b) Front bezel c) Optical device blank d) Expansion slot covers (2) e) Screws, M3×0.5×4 in, T-10 (4) f) Bezel screw, T-10, flathead, 1/4-in g) Power supply air baffle h) Processor air baffle i) HP Smart Array E200i Controller battery tray j) HP Smart Array P400i Controller battery tray k) Hard drive bezel blank SFF l) Power supply blank	2036798-002	412208-001
Hard drive blank LFF	2036798-003	392613-001
Rack mounting hardware kit	2036798-004	360104-001
Cable management arm	2036798-005	360105-001
System fan module	2036798-006	412212-001
Hot-plug power supply, 700 W	2036798-007	412211-001
PCI riser board assembly	2036798-008	412200-001
Dual-Core, Intel® Xeon™ Processor 5110 (1.6-GHz, 1066- MHz FSB, 2x2-MB L2 cache)	2036798-009	416795-001
Heatsink with grease and alcohol swab	2036798-010	412210-001
HP Smart Array E200i Controller, integrated SAS	2036798-011	412205-001
System board with processor cage supporting Intel® Xeon™ 50xx and 51xx processors	2036798-012	412199-001
SAS backplane	2036798-013	412201-001
Multibay media backplane	2036798-014	412202-001
HP Systems Insight Display, LEDs, and power button assembly, with cable	2036798-015	412204-001
CD-ROM Slimline Drive	2036798-016	228508-001
FBDIMM, PC2-5300F, Fully-Buffered DIMM (Qty 2)	2036798-017	416471-001
SAS hard drives 72-GB, 10,000-rpm (Qty 2)	2036798-018	376597-001
HP Smart Array E200i Controller memory module, 64-MB	2036798-019	412800-001
SAS cable	2036798-020	408763-001

Table 5. FRUs, HP DL360 1U G5 (Continued)		
Description	GE Part Number	HP Part Number
AC power cord	2036798-021	187335-001
Battery, 3.3-V, lithium	2036798-022	234556-001

CCG Computer – HP Model DL360 G4

Table 6. FRUs, HP DL360 1U G4		
Description	GE Part Number	HP Part Number
Access Panel DL360 G4	2030506-001	361400-001
Intel® 3.60-GHZ Xeon 1-MB L2 Cache G4	2030506-005	361382-001
3.6 Volt, 500 MAH NIMH Battery DL360 G4	2030506-006	307132-001
Sys Board w/Processor SCSI Model	2030506-008	361384-001
SCSI Backplane DL360 G4	2030506-010	305443-001
Optical Device/Disk Drive Interface G4	2030506-011	361395-001
2 GB DL360 G4	2030506-016	367553-001
SCSI Ultra320 72.8-GB 15K RPM DL360 G4	2030506-018	289243-001
Diskette Drive/Optical Drive Cable G4	2030506-019	361391-001
AC Power Cord DL360 G4	2030506-020	187335-001
Optical Drive Ejector Assembly DL360 G4	2030506-022	30545-001
Hardware Kit DL360 G4	2030506-023	361397-001

FRUs HP rp5700 SFF client

Table 7. FRUs, HP rp5700 SFF Client		
Description	GE Part Number	HP Part Number
CMPTR HP RP5700 SFF E6400 1MB 160GB	2040611-001	445766-001
FRU FRO RP5700 HOOD ASSY W FRT BEZEL	2040746-001	445766-001
FRU RP5700 POWER SUPPLY	2040746-002	445771-001
FRU RP5700 POWER SWITCH W LED AND CABLE	2040746-003	445759-001
FRU RP5700 SERIAL PORT W CABLE	2040746-004	445768-001
FRU RP5700 HD DRIVE 160GB 7200 RPM SATA	2040746-005	440499-001
FRU RP5700 SYSTEM BOARD	2040746-006	445757-001

Table 7. FRUs, HP rp5700 SFF Client (Continued)		
Description	GE Part Number	HP Part Number
FRU RP5700 CPU 2GB E6400 2.13GHZ	2040746-007	450470-001
FRU DC5750 1 GB, PC2-5300, CL5	2036936-022	398038-001
FRU RP5700 MEMORY RISER CARD	2040746-008	445758-001
FRU RP5700 USB EXPANSION CARD W CBL	2040746-009	445775-001
FRU RP5700 FAN	2040746-010	445761-001
FRU RP5700 HEATSINK	2040746-011	445774-001
FRU RP5700 MOUSE PS2 OPTICAL	2040746-012	417966-001
FRU HP ML370 3.3-V LITHIUM BATTERY	2036800-016	153099-001
FRU RP5700 FRONT BEZEL	2040746-013	445766-001
FRU RP5700 SPEAKER INTERNAL	2040746-014	445762-001
FRU RP5700 FAN DUCT	2040746-015	445767-001
FRU RP5700 TOWER STAND	2040746-016	445770-001
SATA 16X SUPERMULTI LIGHTSCRIBE ALL	2040746-017	RV629AV
DISK DRIVE FLOPPY USB 2.0 EXT BLACK	2034800-002	DC361B
SD Card Reader Memory Card 18 in 1	2027495-004	N/A

FRUs HP rp5800 SFF client

Table 8. HP rp5800 Computer		
Description	GE Part Number	HP Part Number
Access panel	2066875-002	653026-001
Front Bezel	2066875-003	653025-001
System Board, Trusted Platform Module (TPM)	2066875-004	628930-001
System Board, non-TPM	2066875-005	655580-001
Power Supply	2066875-006	659246-001
RAM, 4-GB, HP	2089411-001	671613-001
Intel Core i3 2120 (3.3-GHz, 3-MB L3 cache, 65W)	2066875-021	638629-001
Front USB and power switch assembly	2066875-008	655579-001
Powered serial cable	2066875-009	653023-001
SATA cable, 19.5 inch, 2 straight ends	2066875-013	638813-001
SATA cable, 25.2 inch, 1 straight end, 1 angled end	2066875-016	638814-001
Adapter, Display Port to VGA	2066875-017	603250-001
Adapter, Display Port to DVI	2066875-020	484156-001
Adapter, Display Port to HDMI	2066875-030	617450-001
Display Port cable	2066875-031	487562-001
Cable cover	2066875-032	653028-001
Heat sink and replacement thermal material	2066875-033	645326-001
Chassis fan	2066875-034	653024-001
Speaker	2066875-035	636925-001
Printer port, PCI card	2066875-036	638817-001
Fan duct	2066875-037	636921-001
Serial port (COMB) card	2066875-038	638946-001
Modem, LSI, v.92	2066875-039	490689-001
eSATA port assembly, PCI card	2066875-012	645558-001
PS/2, basic for use in the United States	2066875-040	537745-001
PS/2, basic	2066875-041	609250-001
Internal Hard Drive, 500-GB, 7200-rpm	2089413-001	636929-001
16X SATA DVD-ROM drive	2066875-022	419496-001
2-port powered serial card	2066875-042	638947-001

Table 8. HP rp5800 Computer		
Description	GE Part Number	HP Part Number
PCIe to PCIe riser – 24V	2066875-011	638944-001
Powered USB card – 12V	2066875-043	638945-001
HP FireWire / IEEE 1394a PCIe x1 card	2066875-010	637591-001
Intel PRO/1000CT NIC, includes bracket	2066875-014	635523-001

FRUs HP dc7100 SFF Client

Table 9. FRUs, HP dc7100 SFF Client		
Description	GE Part Number	HP Part Number
Computer HP dc7100 P4 2.8GHZ 512MB SFF	2027481-001	PP458US#ABA
40GB Serial ATA hard drive	2027481-002	365555-001
16X/40X DVD-ROM	2027481-003	325313-005
512MB 400MHz DDR-DIMM	2027481-004	325313-005
System Board	2027481-005	361682-001
Intel Pentium 4 processor - 2.80GHz, 800MHz FSB	2027481-006	367594-001
Power supply,240 watts	2027481-007	350030-001
Keyboard	2027481-008	355630-005
Mouse	2027481-009	323614-005
SD Card Reader Memory Card 18 in 1	2027495-004	N/A

FRUs HP dc7600 SFF Client

Table 10. FRUs, HP dc7600 SFF Client		
Description	GE Part Number	HP Part Number
dc7600 HP Client	2030496-001	ES329UC#ABA
Computer Cover Assembly Front Bezel w/o Inserts	2030505-018	393599-001
Power Supply 5 Output 240W DC7600	2030505-019	381024-001
40 GB\7200 RPM SATA Hard Drive DC7600	2030505-020	365555-001
48X CDROM Drive w/Mounting Screws DC7600	2030505-021	326773-005
SATA Hard Drive Cable 19.5" DC7600	2030505-022	391739-001
Power Switch/LED Cable USE W/370857-001	2030505-023	392410-001
Front I/O Device w/Cable USB+Audio 7600	2030505-024	393606-001
CD Drive Bezel w/Disk Drive Slot DC7600	2030505-025	370501-001
Speaker HP DC7600 SFF	2030505-026	394778-001
Heatsink w/Thermal Grease & Alcohol Pad	2030505-027	382024-001
Chassis Fan HP DC7600 SFF	2030505-028	392412-001
Heatsink Duct Baffle DC7600 SFF	2030505-029	375514-001
Foot Kit Oval and Round (4 each) 7600 SFF	2030505-030	370708-001
Sys Board w/Alcohol Pad & Thermal Grease	2030505-032	381028-001
SD Card Reader Memory Card 18 in 1	2027495-004	N/A

Multitech Modem

Table 11. FRUs, Multitech Modem	
Description	GE Part Number
MultiTech Modem MT9234ZBA Replacement Kit	2046544-001

A System Recovery

For your notes

Introduction

The system recovery process is intended to restore the entire MUSE system (Windows operating system, MUSE application, MUSE databases, and supporting software) in the event it becomes corrupted or unstable. If you need to restore only the MUSE databases and not the entire system, use the database recovery process described in [“Database Recovery”](#) on page 4-21.

The MUSE system may need to be recovered for any number of reasons. The most extreme case would be the loss of your disk array caused by the failure of multiple hard drives. In this case you would need to replace the hard drives, reinstall the MUSE system, configure the server as if it were new, and restore the databases.

The process for restoring the MUSE system varies depending on which backup method was used:

- If you use the network backup option, refer to [“System Recovery Using a Network Backup”](#) on page A-5.
- If you use the tape backup option, refer to [“System Recovery Using a Tape Backup”](#) on page A-13.

NOTE

Each recovery situation is different. Before performing a full system recovery try other options to identify and resolve system failure or instability, such as booting into Windows Safe Mode or using the Windows Recovery Console (refer to [“Using Recovery Console”](#) on page A-4 for details). Performing a full system recovery should be the final resort after all other corrective options have been exhausted.

Using Recovery Console

If Safe Mode and other startup options do not work, consider using the *Recovery Console*. This method is recommended only if you are an advanced user who can use basic commands to identify and locate problem drivers and files. In addition, you will need the password for the built-in administrator account to use the *Recovery Console*.

Using the *Recovery Console*, you can enable and disable services, format drives, read and write data on a local drive (including drives formatted as NTFS), and perform many other administrative tasks. The *Recovery Console* is particularly useful if you need to repair your system by copying a file from a floppy disk or CD-ROM to your hard drive, or if you need to reconfigure a service that is preventing your computer from starting properly.

If you are unable to start your computer, you can run the Recovery Console from your Setup CD.

To start the computer and use the *Recovery Console*.

1. Insert the Setup CD and restart the computer from the CD drive.
2. When the text-based part of Setup begins, follow the prompts; choose the repair or recover option by pressing **R**.
3. When prompted, type the password for the local administrator account.
4. At the system prompt, type the relevant *Recovery Console* commands; type **help** for a list of commands or **help [space] <commandname>** for help about a specific command.
5. To exit the *Recovery Console* and restart the computer, type **exit**.

System Recovery Using a Network Backup

This system recovery procedure applies for both the HP Proliant ML370 G5 and HP Proliant DL370 G6 platforms using the network backup procedure (refer to “[Network Backup Option](#)” on page 4-6).

NOTE

The HP Proliant ML370 G4 platform can only be recovered using ASR recovery. Refer to “[System Recovery Using a Tape Backup](#)” on page -13.

This procedure consists of the following steps:

1. Reimaging the MUSE server.

To reimage an HP ML370 G5 platform, refer to “[Reimaging an HP ML370 G5 Server](#)” on page A-5.

To reimage an HP DL370 G6 platform, refer to “[Reimaging the HP DL370 G6 Server](#)” on page A-6.

2. Recovering the system partition (C: drive).
3. Adding the server to the domain.
4. Recovering the data partition (D: drive)
5. Restoring the MUSE databases.
6. Verifying the MUSE communications.
7. Restoring other functionality.

Reimaging an HP ML370 G5 Server

Use the following procedure to reimage your MUSE server on an HP ML370 G5 platform. If you are recovering an HP DL370 G6 server, refer to “[Reimaging the HP DL370 G6 Server](#)” on page A-6.

To configure the drive array and return the server to its base OS configuration, you need the Pre-Install and Image CDs that shipped with the hardware.

CAUTION

Reimaging deletes all the data on the server. Reimage the server **ONLY** if you plan to perform a complete system recovery and reinstallation of the MUSE system. If you need to restore only the MUSE database, turn to “[Database Recovery](#)” on page 4-21.

1. Insert the MUSE Pre-Install CD into the server’s optical drive.
2. Reboot the server from the CD.
3. When prompted, type **R** for a rack configuration or **T** for a tower configuration and press **Enter** to configure the drive array.
The server reboots.
4. Remove the MUSE Pre-Install CD and insert the MUSE Image CD.

5. When prompted, press **Y** to continue.

This will reimage the system with Windows 2003 SP2 and SQL 2005 SP1. During the recovery of the system partition (“**Recovering the System Partition (C: Drive)**” on page A-9), any service packs that were installed on the system will be restored.

When the reimage is complete, the messages *Cloning Success* and *CRC Check: Success* will display.

6. Remove the MUSE Image CD.

7. Reboot the server.

The server will reboot and configure the operating system and disk partitions. The server will reboot several times during this process. When it is complete, the Windows logon screen will open.

8. Log on to the server as an administrator.

If you do not know the administrator’s user name or password, contact Tech Support.

9. Change the system date and time as needed.

10. Change the computer name to match the original name of the server.

11. Reboot the server.

Do not join the computer to the domain at this time. This step will be performed after the system partition has been recovered.

12. Proceed to “**Recovering the System Partition (C: Drive)**” on page A-9.

Reimaging the HP DL370 G6 Server

Use the following procedure to reimage your MUSE server on an HP DL370 G6 platform. If you are recovering an HP ML370 G5 server, refer to “**Reimaging an HP ML370 G5 Server**” on page A-5.

You will need the Image CD that shipped with the hardware to configure the drive array and return the server to its base OS configuration.

CAUTION

Reimaging deletes all the data on the server. Reimage the server **ONLY** if you plan to perform a complete system recovery and reinstallation of the MUSE system. If you need to restore only the MUSE database, turn to “**Database Recovery**” on page 4-21.

1. Reboot the server.
2. During the reboot, press **F9** when prompted for the *ROM-based Setup Utility*.
The **ROM-based Setup Utility** opens.
3. Select the *Standard Boot Order (IPL)* option and press **Enter**.
The *Standard Boot Order (IPL)* window opens.
4. Verify that CD-ROM is listed as the first boot sequence.

This is necessary to ensure that the system can boot from the MUSE Image CD. If CD-ROM is not listed as the first boot sequence, do the following:

- a. Use the arrow keys to select *CD-ROM* and press **Enter**.
- b. Select *Set the IPI Device Boot Order to 1* and press **Enter**.

The CD-ROM moves to the first position in the boot sequence.

5. Press **Esc** twice to close the menu and the *ROM-based Setup Utility*.
6. When prompted, press **F10** to confirm that you want to exit the utility.

The system reboots and displays the following message:

*Press <F8> to run option ROM Configuration for Arrays Utility.
Press <ESC> to skip configuration and continue.*

7. Press **F8** to run the *ROM Configuration for Arrays Utility*.
8. On the *Main Menu*, select *Delete Logical Drive* and press **Enter**.

The *Delete Logical Drive* window opens.

9. In the *Available Logical Drive* section, select **F8** to delete.

The following warning is displayed:

*This will result in complete data loss for this logical drive. You have selected to delete logical drive #1, RAID 50, 1117.5 GB with 6 physical drive(s).
Press <F3> to delete the logical drive.
Press <ESC> to cancel.*

10. Press **F3**.

A message opens when the configuration is saved.

11. Press **Enter** to close the message window and continue.

You return to the *Main Menu*.

12. Select *Create Logical Drive* and press **Enter**.
13. Follow the on-screen navigation instructions and verify the following settings are selected:

Field	Setting
<i>Available Physical Drives</i>	All six drives
<i>RAID Configurations</i>	RAID 50
<i>Parity Group Count</i>	2
<i>Spare</i>	Unchecked
<i>Maximum Boot Partition</i>	Disabled

14. When the settings are correct, press **Enter**.

The following message displays:

You have selected a logical drive with a total data size of 1117.5 GB and RAID 50 fault tolerance.

Press <F8> to save the configuration.

Press <ESC> to cancel.

15. Press **F8**.

The message *Saving Configuration* flashes briefly. When the configuration is saved, the message *Configuration Saved* opens.

16. Press **Enter** to close the message and continue.

You return to the *Main Menu*.

17. Select the *View Logical Drive* option and press **Enter**.

The *View Logical Drive* window opens.

18. Verify that the window displays *Logical Drive #1, RAID 50, 1117.5 GB*, and do one of the following:

- ◆ If everything is not correct, repeat from step 13 to make the necessary changes.
- ◆ If everything is correct, press **Esc** to return to the *Main Menu*.

19. Insert the MUSE Image CD into the server's optical disk drive.

20. Press **Esc** to exit the *ROM Configuration for Arrays Utility*.

The server reboots and the *MARS DL370 G6 Server Image* window opens with the following message:

This utility will image your hard drive as a MARS Server.

!!WARNING!! You are about to permanently overwrite the contents of your hard drive array. Do you wish to continue?

21. Press **Y** to continue.

The system loads the ghost image and displays the message *Loading Ghost*. This process reimages the system with Windows 2003 SP2 and SQL 2005 SP3 and can take from 20 to 30 minutes to complete.

When the reimage is complete, the following message is displayed:

Imaging Results

Cloning: Success

CRC Check: Success

22. Remove the MUSE Image CD and reboot the system.

23. When the system reboots, accept the License Agreement and click *Next* on the remaining screens.

The system reboots and the *HP Network Configuration Utility* opens.

24. Click *Cancel*.

The *HP Network Configuration Utility* closes and the system continues to boot to Windows.

25. Log on to the server as Administrator.

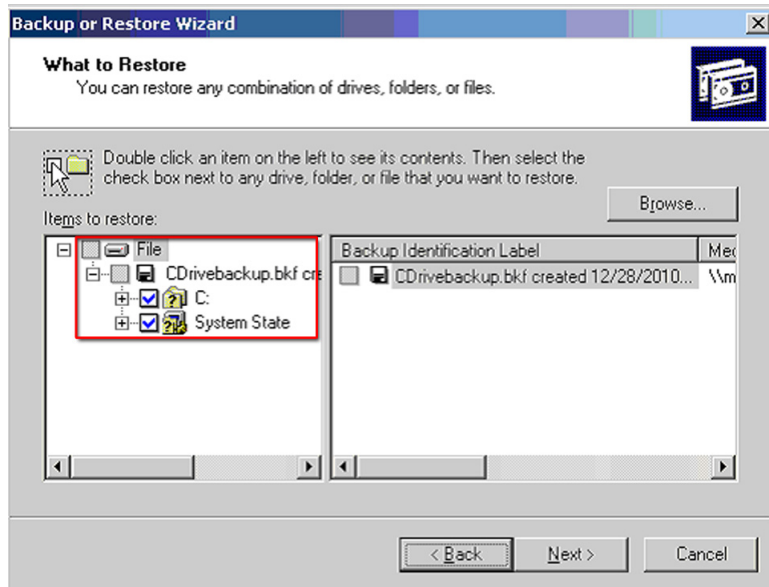
26. Adjust the date and time settings.

27. From the desktop, select *Start > Control Panel > Add or Remove Programs*.
The *Add or Remove Programs* window opens.
28. Select the *Add/Remove Windows Components* option.
The *Windows Components* window opens.
29. Uncheck *Internet Explorer Enhanced Security Configuration*.
30. Click *Next* to save the settings.
31. Proceed to “**Recovering the System Partition (C: Drive)**”.

Recovering the System Partition (C: Drive)

After reimaging the server (“**Reimaging an HP ML370 G5 Server**” on page A-5 or “**Reimaging the HP DL370 G6 Server**” on page A-6), use the following procedure to restore the system partition.

1. Log on to the MUSE server as Administrator, if necessary.
2. Create an account with read/write permissions to the network share where the weekly C: drive backup is stored and add it to the *Administrators* users group.
3. Log off the MUSE server and log back on using the account you just created.
4. On the MUSE desktop, select *Start > Run* to open the *Run* dialog box.
5. Type **ntbackup** and click *OK*.
The *Backup or Restore Wizard* window opens.
6. Click *Next*.
The *Backup or Restore* dialog box opens.
7. Select *Restore Files and Settings*.
8. Click *Next*.
The *What to Restore* dialog box opens.
9. Click the *Browse* button.
The *Open Backup File* dialog box opens.
10. Enter the network path and name of the C: drive backup file.
For example: \\servername\share\cDriveBackup.bkf.
11. Click *OK*.
The *Open Backup File* dialog box closes and you return to the *What to Restore* dialog box.
12. Under the *Items to Restore*, expand the *File* and *cDriveBackup* selections and verify the backup file date being restored is correct.
13. Check the *C:* and *System State* check boxes.



14. Click *Next*.

The *Completing the Restore Wizard* dialog box opens.

15. Click *Advanced* and do the following:
- Under *Restore files to*, check *Original Location* and click *Next*.
 - Click **OK** at the warning.
 - Under *How to restore*, check *Replace existing files* and click *Next*.
 - Under *Advanced Restore Option*, do the following:
 - Check *Restore security settings*
 - Check *Preserve existing volume mount points*
 - Clear the remaining check boxes
 - Click *Next*.

16. Review your settings on the *Completing the Restore Wizard* dialog box and click *Finish*.

The *Restore Progress* window opens.

17. When the *Complete* status displays, close the window and reboot the computer.
18. Proceed to “**Adding the Server to the Domain**”

Adding the Server to the Domain

After the system is rebooted it may already belong to a domain; however, the domain user accounts may display the Security Identifier (SID) instead of the domain\user name. To check, open a Windows group that has domain user accounts, such as the Administrator or MUSE Web Users Group. If the SID is displayed instead of the user names, try generating new SIDs, by removing the computer from the domain and adding it again by using the following the procedure.

1. Add the computer to a workgroup and reboot the system to save the changes.
2. Add the computer to the domain and reboot the system to save the changes.

3. Verify that any domain accounts under Windows groups are now recognized.
Examples may include domain\MUSEAdmin and domain\MUSEBkgnd accounts under the Administrators group and domain\user accounts under the MARS Web Users group. If the domain\users are still not displaying properly, it may be necessary to add them again manually.
4. Proceed to “[Recovering the Data Partition \(D: Drive\)](#)”.

Recovering the Data Partition (D: Drive)

After the computer has been added to the domain (“[Adding the Server to the Domain](#)” on page A-10), use the following procedure to restore the data partition.

1. Log on to the server using the *Administrator* account.
2. Create the following file structure on the D: drive:

```
D:\
  muse\
    acq\
    backup\
    db\
    logs\
    mars\
    xml\
```
3. If XML Import is being used, copy the *.dtd files from the *musedb\dtd* folder on the *MUSE Application CD* to *d:\muse\xml* on the server.
4. Copy the files from the *Local Tape Backup* folder on the *MUSE Application CD* to *d:\muse\backup* on the MUSE server.

This allows you to reconfigure the backup files again after the database has been restored.
5. Use the following procedure to share the *acq* folder.
 - a. Right-click on the *acq* folder and select *Properties*.
 - b. Click the *Sharing* tab.
 - c. Type **acq\$** as the share name.
 - d. If CASE to MUSE communications is being used, click *New Share*, enter *case8000* in the *Share Name* field, and click *OK*.
 - e. Click *Permissions*, add the *MUSE Acq Users* group, grant it *Change and Read* permissions, and click *OK*.
6. Proceed to “[Restoring the MUSE Databases](#)”.

Restoring the MUSE Databases

The process for restoring the MUSE databases during a system recovery is identical to the database recovery process. See “[Recovering the MUSE Database From the Network](#)” on page 4-21 for details.

Verifying the MUSE Communications

After the MUSE databases have been restored, verify the following actions can be performed as required by the original system configuration.

- MUSE can be launched from the server.
- MUSE can be accessed from a client and a patient test can be acquired.
- MUSE can receive an ECG from a cart via wireless or LAN (Serial IP).
- MARS to MUSE communication works.
- CASE\Cardiodoft to MUSE communication works.
- Tech Support can remotely access the system using the InSite 2 services.
- MUSE can communicate to CCG server, if the system has HL7 interface.
- Web client can access the web server, if the system has MUSE Web.
- Web client can access the web server, if system has CV Web.

Restoring Other Functionality

If any of the communication checks (“[Verifying the MUSE Communications](#)”) fail, it may be necessary to reinstall and reconfigure device communications and perform basic MUSE troubleshooting.

If the the customer is using the XML import option, share *d:\muse\xml* as described in “[Installing and Configuring the XML Import Option](#)” on page 3-8.

Recreate and configure the backup jobs as described in “[Setting Up Automatic Backups](#)” on page 4-8.

System Recovery Using a Tape Backup

This system recovery procedure applies for both the HP Proliant ML370 G4 and HP Proliant ML370 G5 platforms using the local tape backup procedure (refer to “[Local Tape Backup Option](#)” on page 4-7).

This procedure consists of the following steps:

1. Using Automated System Recovery
2. Configuring the file server RAID array.
3. Recovering the system partition (C: drive).
4. Recovering the MUSE databases.
5. Performing other system tasks.

Using Automated System Recovery

There are several reasons why you might need to perform a disaster recovery. This procedure describes a situation where you have replaced multiple failed hard drives and would need to start by configuring the server as if it were new.

Another disaster recovery situation may be different, so you should use this information as a guide to helping you recover a system. For example, you may not need to reconfigure the RAID 5 drive array.

NOTE

To perform an Automated System Recovery (ASR), you need the automated system recovery media, typically created by GE Healthcare service personnel during installation or system maintenance, and the floppy disk created with that media. You cannot use a floppy disk created at a different time or with a different set of media. Refer to “[Creating the Automated System Recovery Media](#)” on page 6-26 for more information.

Make sure you have the following before you begin the recovery procedure:

- Your most recent ASR media set (floppy disk and AIT tape).
- A Windows Server 2003 CD.
- The most recent MUSE database backup tape.
- *370G5 MUSE Pre-Install CD* (G5 platforms only)

Configuring the File Server RAID Array

The process for configuring the file server’s RAID array differs depending on whether your system is running on a G4 platform or a G5 platform. If necessary, refer to Chapter 2, “[Equipment Overview](#)” for guidance in identifying which platform the MUSE server is on. After identifying the platform, refer to the appropriate instructions for your platform.

Configuring the FILE Server RAID Array on a G4 Platform

1. Power-up the system.
2. When the prompt *Press <F8> to run the Option ROM Configuration for Arrays Utility* is displayed, press **F8**.
3. Highlight *Delete Logical Drive* and press **Enter**.
4. Do one of the following:
 - ◆ If the *There are no available logical drives* screen opens, press **Esc** and skip to step 5.
 - ◆ If logical drives exist, do the following:
 - a. Press **F8** to delete them.
 - b. On the warning window, press **F3**.
 - c. On the configuration saved screen, press **Enter**.
5. Highlight *Create Logical Drive* and press **Enter**.
6. In the *Available Physical Drives* box, select the last drive and press the **spacebar** to remove the drive from the array.
7. Verify RAID 5 is selected.
8. Press the **Tab** key twice to select *Use one drive as spare* and press the **spacebar**. Verify that the letter *S* appears in the check box.
9. Press **Enter** to create the drive.
10. Press **F8** to save the configuration.
11. Press **Enter** on *Configuration Saved* screen.
12. From the *Main Menu* screen, press **Esc** to exit and resume the boot process.

NOTE

This next section of steps would not normally need to be done if the system was already running MUSE v7, but they might be necessary, depending on what hardware was replaced on the file server.

13. Press **F9** when the message *Press "F9" key for ROM-Based Setup utility* opens.
14. Select *System Options* and press **Enter**.
15. If *OS selection* is present, perform the following steps.
 - a. Select *OS selection* and press **Enter**.
 - b. Select or verify *Microsoft Windows 2000/Windows Server 2003* as the O/S to be installed. (This may show as *Microsoft Windows 2000/Windows .NET*.)
 - c. Press **Enter**.
 - d. Press **Esc**.
16. Select *Boot controller Order* and press **Enter**.
17. Select or verify *Smart Array controller* and press **Enter**.

Depending on the server, the array could be labeled 400, 641, or 643.
18. Select *Controller Order 1* and press **Enter**.

19. Press **Esc**.
20. Select *Date and Time* and press **Enter**.
21. Enter the current date and time and press **Enter**.
22. Select *Advanced Options* and press **Enter**.
23. If *Post F1 Prompt* is present, perform the following steps.
 - a. Select *Post F1 Prompt* and press **Enter**.
 - b. Select *Disabled* and press **Enter**.
 - c. Press **Esc** twice.
24. Press **F10** to confirm current boot controller is *Compaq Smart Array (641 or 642) Controller*.

The system will reboot.
25. When the system reboots, proceed to “[Recovering the System Partition](#)” on page A-16.

Configuring the FILE Server RAID Array on a G5 Platform

1. Power-up the system.
2. When the prompt *Press <F8> to run the Option ROM Configuration for Arrays Utility* is displayed, press **F8**.
3. Highlight *Delete Logical Drive* and press **Enter**.
4. Do one of the following:
 - ◆ If the *There are no available logical drives* screen opens, press **Esc** and skip to step 5.
 - ◆ If logical drives exist, do the following:
 - a. Select the drive with the highest number.

For example, if the logical drives are Drive 0 and Drive 1, delete Drive 1 before deleting Drive 0.
 - b. Press **F8** to delete the selected drive.
 - c. On the warning window, press **F3**.
 - d. On the *Configuration Saved* screen, press **Enter**.
 - e. Repeat step a through step d for each logical drive.
5. Insert the *370G5 MUSE Pre-Install CD* into the CD-ROM drive.
6. On the *Option ROM Configuration for Arrays Utility* main menu, press the **Esc** key to reboot the server.

The system will reboot from the CD.
7. When prompted, press **R** for Rack or **T** for Tower, whichever is appropriate for the platform, and press **Enter**.

The drive array will be configured. When it is done, the system will automatically reboot.
8. Remove the CD.

9. Proceed to “[Recovering the System Partition](#)”.

Recovering the System Partition

1. Insert the Windows Server 2003 Recovery CD into your CD drive and the ASR AIT Tape into the tape drive.
2. Restart your computer.
The computer should boot from the CD. If it does not, check the boot order in the BIOS setup.
3. When the F6 prompt appears at the bottom of the Windows Setup window, press the **F6** key.
4. When you are prompted to run the Automated System Recovery (ASR), press the **F2** key.
5. When prompted, insert the ASR floppy disk and press **Enter**.
6. When the system prompts you for the floppy drive with the tape driver, press the **S** key.

NOTE

If the SDX-550V tape driver was not added to the ASR floppy when it was originally created, you will need to copy it onto a floppy disk from the hardware Support CD that shipped with the system before pressing the **S** key.

7. When you are prompted to select the driver to install, select *Sony AIT - SAIT 32 Bit Tape Driver for Windows Server 2003* and press **Enter**.
8. When Windows Setup prompts you for additional device drivers, press **Enter** to continue.
9. When prompted to delete and recreate the disk partitions, press **C** to continue.
The drive will be formatted and setup files will be copied to the Windows installation folders. When it is done, the system will reboot and the normal Windows installation will continue. When Windows is installed, the *Automated System Recovery* process will start.
10. Follow the prompts to allow the system to restore from the ASR tape.
When the process is complete, the system will reboot. At this point, the original **C:** drive will be restored from the ASR tape. This process does not restore the MUSE database. You must restore the databases separately. Proceed to “[Recovering the MUSE Databases](#)”.

Recovering the MUSE Databases

The process of recovering the MUSE database consists of three basic steps:

1. Formatting the D: partition.
2. Installing the default MUSE databases.
3. Restoring data from the most recent backup tape.

Each step is described in more detail in the following topics.

Formatting the D: Partition

1. Sign on to the server as an administrator.
2. Shut down all MUSE and MACCRA services.
3. Run the *Microsoft SQL Management Studio*.
4. Right-click on each MUSE database and select *Delete*.
5. On the *Delete Object* window, set the *Delete backup and restore history information for databases* check box and click *OK*.
6. Repeat step 4 through step 5 for each MUSE database.
7. Close the *Microsoft SQL Management Studio*.
8. Right-click on *My Computer* and select *Manage*.
9. On the *Computer Management* window, select *Storage > Disk Management*.
10. Right-click on drive D: and select *Format....*
11. On the *Format* window, verify the *File System* is set to NTFS and the *Perform a Quick Format* check box is set.
12. Click *OK*.
13. When the warning message appears, click *OK*.

The system will begin formatting the D: partition. When it is done, you will have a clean D: drive and its status will be changed to *Healthy*. Continue to “[Installing the Default MUSE Databases](#)”.

Installing the Default MUSE Databases

1. Login using the **MUSEAdmin** account.
2. Insert the MUSE Application CD.
3. Open a *Command Prompt* and change to the x:\musedb directory, where x: is the CD-ROM drive letter.
4. Type **install** and press **Enter**.
5. Respond to the License Agreement prompt.

The system will install the default databases and any ancillary files. When it is done, proceed to “[Restoring From the Most Recent Backup Tape](#)”.

Restoring From the Most Recent Backup Tape

The process for restoring the MUSE databases during a system recovery is identical to the database recovery process. See “[Recovering the MUSE Database From Tape](#)” on page 4-24 for details.

Other Tasks to Perform After System Restore

1. If acquiring CASE data over the network, you will need to perform the following steps.
 - a. Right-click on the folder in *Windows Explorer* and select *Sharing and*

Security....

- b. Select *Share this folder*.
 - c. Change the share name to **acq\$** and click on the *Permissions* button.
 - d. Remove the *Everyone* group, and add the local **case8000** user.
 - e. Give the **case8000** user *Change and Read* permissions.
 - f. If Stress systems were already copying data to this folder, you may also need to share the folder as “case8000” if that is how the Stress systems are configured.
2. If the customer is using the XML import option, share the **d:\muse\xml** folder as described in “**Installing and Configuring the XML Import Option**” on page 3-8.
 3. If the system had been configured with the MUSE Web option, verify and, if necessary, reinstall MUSE Web. See *MUSE Web Installation Instructions* (PN 2031233-221) for detailed procedures.
 4. Recreate any backup jobs as described in “**Setting Up Automatic Backups**” on page 4-8.

B Electromagnetic compatibility

For your notes

Changes or modification to the MUSE 7.1 system (server or client) not expressly approved by GE could cause EMC issues. This system is designed and tested to comply with applicable regulation regarding EMC and needs to be installed and used according to the EMC information stated as follows.

CAUTION**RADIO FREQUENCY INTERFERENCE**

Use of portable phones or other radio frequency (RF) emitting equipment near the system may cause unexpected or adverse operation.

Do not use RF emitting equipment near the device.

CAUTION**EQUIPMENT INTERFERENCE**

If adjacent or stacked use is necessary, the equipment or system should be tested to verify normal operation in that configuration.


The equipment or system should not be used adjacent to, or stacked with, other equipment.

Guidance and manufacturer's declaration- electromagnetic emissions

Emissions test	Compliance	Electromagnetic environment-guidance
RF emissions EN 55022	Group 1	The MUSE 7.1 system uses RF energy 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 EN 55022	Class A (Server) Class A (Client)	The MUSE 7.1 server 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. The MUSE 7.1 client 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 EN 61000-3-2	Class A	
Voltage fluctuations/Flicker emissions EN 61000-3-3	Complies	

Guidance and manufacturer's declaration-electromagnetic immunity

Immunity test	EN55024 test level	Compliance level	Electromagnetic environment-guidance
Electrostatic discharge (ESD) EN 61000-4-2	± 4 kV contact ± 8 kV air	± 4 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 EN 61000-4-4	± 1 kV for power supply lines ±500 V for input/output lines	± 1 kV for power supply lines ±500 V for input/output lines	Mains power should be that of a typical commercial or hospital environment.
Surge EN 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines EN 61000-4-11	<5% Ut (>95% dip in Ut) for 0.5 cycles 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	<5% Ut (>95% dip in Ut) for 0.5 cycles 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	Mains power should be that of a typical commercial or hospital environment. If the user of the MUSE 7.1 system requires continued operation during power mains interruptions, it is recommended that the MUSE 7.1 system be powered from an uninterruptible power supply or a battery.
Power frequency(50/60 Hz) magnetic field EN 61000-4-8	N/A	N/A	Power frequency magnetic fields should be at levels characteristics of a typical location in a typical commercial or hospital environment.

Immunity test	EN55024 test level	Compliance level	Electromagnetic environment-guidance
<p>Conducted RF</p> <p>EN 61000-4-6</p>	<p>3 Vrms</p> <p>150 KHz to 80 MHz</p>	<p>3 Vrms</p> <p>150 KHz to 80 MHz</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the MUSE 7.1 system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P}$ <p>80 MHz to 800 MHz</p> $d = 2.3 \sqrt{P}$ <p>800 MHz to 2.5 GHz</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).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Radiated RF</p> <p>EN 61000-4-3</p>	<p>3V/m</p> <p>80 MHz to 2.5 GHz</p>	<p>3V/m</p> <p>80 MHz to 2.5 GHz</p>	
<p>Note: At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>Note: These guidelines may not apply in all situations. Electromagnetic propagation is affected by reflection from structures, objects and people.</p> <p>^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile 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 equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment.</p> <p>^b Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

Recommended separation distance

The following table provides the recommended separation distances (in meters) between portable and mobile RF communication equipment and the MUSE 7.1 system. The MUSE 7.1 system is intended for use in the electromagnetic environment on which radiated RF disturbances are controlled. The customer or the user of the MUSE 7.1 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MUSE 7.1 system as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter in watts	Separation distance in meters (m) according to frequency of transmitter			
	150KHz to 80MHz outside ISM bands $d = 1.2\sqrt{P}$	150KHz to 80MHz outside ISM bands $d = 1.2\sqrt{P}$	80MHz to 800MHz $d = 1.2\sqrt{P}$	800MHz to 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.12	0.23
0.1	0.38	0.38	0.38	0.73
1	1.2	1.2	1.2	2.3
10	3.8	3.8	3.8	7.3
100	12	12	12	23
At 80MHz and 800MHz the separation distance of high frequency range applies.				

For transmitters rated at a maximum output power not listed above, the recommended separation distance [d] in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

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

Exceptions

	Component	Type (i.e., ESD)	Exceptions(s)	EMC Environment Guidance
Servers	ML370 G5	N/A	None	N/A
	ML370 G4	N/A	None	N/A
	DL360 G5	N/A	None	N/A
Clients	dc7600	N/A	None	N/A
	dc7100	N/A	None	N/A
	rp5700	N/A	None	None

C Glossary

For your notes

archive	Permanent storage of data.
ACC	American College of Cardiology. A professional society whose membership comprises more than 24,000 cardiovascular physicians and scientists from around the world.
AIT	Advanced Intelligent Tape. A form of magnetic tape and drive using AME developed by Sony for storing large amounts of data. AIT features high speed file access, long head and media life, the ALDC compression algorithm, and a MIC chip.
ANSI	American National Standards Institute. The United States government body responsible for approving US standards in many areas, including computers and communications. ANSI is a member of ISO.
API	Application Program Interface. The interface (calling conventions) by which an application program accesses operating system and other services. An API is defined at source code level and provides a level of abstraction between the application and the kernel (or other privileged utilities) to ensure the portability of the code.
ASCII	American Standard Code for Information Interchange. This is a standard means of representing characters, consisting of 256 characters. The first 128 characters are standardized, and the first 32 of those are control codes, which don't really represent visible characters but rather codes that can be used for text formatting or actions, such as making the computer beep. After the 32 control codes, the next 96 standardized characters represent numbers, letters (both uppercase and lowercase), and standard punctuation marks. The last 128 characters represent different things on different platforms.
ATAPI	AT Attachment Packet Interface. Part of the EIDE interface that provides additional commands to control a CD-ROM drive or magnetic tape.
backup	A spare copy of a file, file system or other resource for use in the event of failure or loss of the original.
BIOS	Basic Input/Output System. The part of the system software of the IBM PC and compatibles that provides the lowest level interface to peripheral devices and controls the first stage of the bootstrap process, including installing the operating system. The BIOS is stored in ROM, or equivalent, in every PC. Its main task is to load and execute the operating system which is usually stored on the computer's hard disk, but may be loaded from CD-ROM or floppy disk at install time.
BNC	Bayonet Navy Connector. A connector for coaxial cable such as that used for some video connections and RG58 "cheapernet" connections. A BNC connector has a bayonet-type shell with two small knobs on the female connector which lock into spiral slots in the male connector when it is twisted on.
cache	A small fast memory holding recently accessed data, designed to speed up subsequent access to the same data. Most often applied to processor-memory access but also used for a local copy of data accessible over a network etc.
CE Marking	<p>The European Commission refers to the CE Marking of products as a "passport" which can allow a manufacturer to freely circulate their products within the European marketplace. The marking applies only to products regulated by European health, safety and environmental protection legislation (product directives) but this is estimated to include more than 50% of the goods currently exported from the U.S. to Europe.</p> <p>The letters "CE" are an abbreviation of a French phrase "Conformite Europeene". The marking indicates that the manufacturer has conformed with all the obligations required by the legislation.</p>
client/server	A network system where a dedicated computer (server) handles some of the processing tasks while multiple smaller computers (clients) complete other processes by tapping into the server's shared files and programs.
CMOS	Complementary Metal Oxide Semiconductor. A semiconductor fabrication technology using a combination of n- and p-doped semiconductor material to achieve low power dissipation. Any path through a gate through which current can flow includes both n and p type transistors. Only one type is turned on in any stable state so there is no static power dissipation and current only flows when a gate switches in order to charge the parasitic capacitance.

CPU	Central Processing Unit. The part of a computer which controls all the other parts.
DICOM	Digital Imaging and Communications in Medicine. An industry standard to define connectivity and communication protocols of medical imaging devices. It conforms to the ISO reference model for network communications and incorporates object-oriented design concepts.
DIMM	Dual In-line Memory Module. Small circuit boards carrying memory integrated circuits, with signal and power pins on both sides of the board.
DLL	Dynamically Linked Library. A library which is linked to application programs when they are loaded or run rather than as the final phase of compilation. This means that the same block of library code can be shared between several tasks rather than each task containing copies of the routines it uses. The executable is compiled with a library of "stubs" which allow link errors to be detected at compile-time. Then, at run-time, either the system loader or the task's entry code must arrange for library calls to be patched with the addresses of the real shared library routines, possibly via a jump table. The alternative is to make library calls part of the operating system kernel and enter them via some kind of trap instruction. This is generally less efficient than an ordinary subroutine call. It is important to ensure that the version of a dynamically linked library is compatible with what the executable expects.
DMA	Direct Memory Access. A facility of some architectures which allows a peripheral to read and write memory without intervention by the CPU. DMA is a limited form of bus mastering.
DRAM	Dynamic Random Access Memory. A type of semiconductor memory in which the information is stored in capacitors on a MOS integrated circuit. Typically each bit is stored as an amount of electrical charge in a storage cell consisting of a capacitor and a transistor. Due to leakage the capacitor discharges gradually and the memory cell loses the information. Therefore, to preserve the information, the memory has to be refreshed periodically. Despite this inconvenience, the DRAM is a very popular memory technology because of its high density and consequent low price.
DTMF	Dual Tone Multi Frequency. ("Touch-Tone") A method used by the telephone system to communicate the keys pressed when dialling. Pressing a key on the phone's keypad generates two simultaneous tones, one for the row and one for the column. These are decoded by the exchange to determine which key was pressed.
ECC	Error Detection and Correction. A collection of methods to detect errors in transmitted or stored data and to correct them. This is done in many ways, all of them involving some form of coding. The simplest form of error detection is a single added parity bit or a cyclic redundancy check. Multiple parity bits can not only detect that an error has occurred, but also which bits have been inverted, and should therefore be re-inverted to restore the original data. The more extra bits are added, the greater the chance that multiple errors will be detectable and correctable.
ESD	Electrostatic Discharge. One kind of test that hardware usually has to pass to prove it is suitable for sale and use. The hardware must still work after it has been subjected to some level of electrostatic discharge. Some organizations have their own ESD requirements which hardware must meet before it will be considered for purchase. Different countries have different legal regulations about levels of ESD.
Ethernet	A popular method for sending data through a local area network using single channel cable and a special data collision protocol to detect network availability.
expansion slot	A connector in a computer into which an expansion card can be plugged. The connector supplies power to the card and connects it to the data bus, address bus and control signals of the motherboard.
fax	Facsimile. A process by which fixed graphic material including pictures, text, or images is scanned and the information converted into electrical signals which are transmitted via telephone to produce a paper copy of the graphics on the receiving fax machine.

FAT	File Allocation Table. The component of an MS-DOS or Windows 95 file system which describes the files, directories and free space on a hard disk or floppy disk.
file server	A computer dedicated to managing the flow of information among networked computers and used as a storage location for programs and files shared by network users.
firmware	Refers to the software that is embedded onto a piece of hardware to control that hardware. Generally, firmware can be upgraded and is placed on an EEPROM. Sometimes, if a new driver for a piece of hardware is released, new firmware will also be released that is required to get the full functionality or performance of the driver. In other cases, firmware will have some bugs or undesirable features, and can be upgraded to work out the problems. Of course, the rest of the hardware cannot be upgraded without replacing pieces of it, so manufacturers try to store as many critical function controls as they can in the firmware, in case they need to change them. For them, it is the difference between recalling a product and simply telling their customers to upgrade the firmware.
FTP	File Transfer Protocol. The method of moving files from system to system using TCP/IP.
FTS	Fast Transient Surge.
gateway	A term for a device that enables data to flow between different networks (forming an internet).
HIS	Hospital Information System. A system that provides the information management features hospitals need for daily business. Typically includes patient tracking, billing and administrative programs. May also include clinical features.
HL7	Health Level 7. A standard interface for exchanging and translating data between computer systems.
Hot-pluggable	This type of mechanism implies that you can remove or add things while the system is running. For example, hard drives and power supplies are often candidates for this term. Normally, they come in special proprietary form factors in server machines and RAID boxes. If you've got mission-critical applications you want your servers to have as many hot swappable components as possible. Recently, servers have been introduced with hot-swappable PCI cards and buses.
IDE	Integrated Drive Electronics. A disk drive interface standard based on the IBM PC ISA 16-bit bus but also used on other personal computers.
IEC	International Electrotechnical Commission. The international standards and conformity assessment body for all fields of electrotechnology.
IEEE	Institute of Electrical and Electronics Engineers, Inc. The world's largest technical professional society, based in the USA. Founded in 1884 by a handful of practitioners of the new electrical engineering discipline, today's Institute has more than 320,000 members who participate in its activities in 147 countries. The IEEE sponsors technical conferences, symposia and local meetings worldwide, publishes nearly 25% of the world's technical papers in electrical, electronics and computer engineering and computer science, provides educational programs for its members and promotes standardization. Areas covered include aerospace, computers and communications, biomedical technology, electric power and consumer electronics.
IIS	Internet Information Server. The name for Microsoft's webserver. It works with server versions of Microsoft's operations systems and was first developed for Windows NT Server.
I/O	Input/Output. Communication between a computer and its users, its storage devices, other computers (via a network) or the outside world. The devices the computer uses to do this are called "peripherals".
IrDA	Infrared Data Association. A non-profit trade association providing standards to ensure the quality and interoperability of infrared (IR) hardware. The association currently has a membership of over 160 companies from around the world, representing computer and telecommunications hardware, software, components and adapters.

IP	Internet Protocol. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.
IRQ	Interrupt Request. The name of an input found on many processors which causes the processor to suspend normal instruction execution temporarily and to start executing an interrupt handler routine.
ISA	Industry Standard Architecture. A bus standard for IBM compatibles that extends the XT bus architecture to 16 bits.
ISO	International Organization for Standardization. A voluntary, nontreaty organization founded in 1946, responsible for creating international standards in many areas, including computers and communications. Its members are the national standards organizations of 89 countries, including the American National Standards Institute.
KVM Switch	Keyboard Video Mouse switch. This is a switch that connects 2 or more computers to the same keyboard, mouse, and monitor. The KVM switch fools each computer into thinking that they are actively connected to a separate keyboard, mouse and monitor. There is always some mechanism (a button and or keyboard command) on a KVM switch to switch between which computer accepts the input of the keyboard and mouse, and displays output to the monitor. Thus, when you move the mouse connected to the switch, your mouse movement is only echoed to the active computer at the time.
LAN	Local Area Network. A data communications network which is geographically limited (typically to a 1 km radius) allowing easy interconnection of terminals, microprocessors and computers within adjacent buildings.
LCD	Liquid Crystal Display. An electro-optical device used to display digits, characters or images, commonly used in digital watches, calculators, and portable computers.
LED	Light-Emitting Diode. A type of diode that emits light when current passes through it.
MIME	Multipurpose Internet Mail Extensions. Refers to functions used for the attachment of binary files to an e-mail message. MIME is the most common group of functions used to make this translation, and allows us to tack on graphics, sound, and executable files to our e-mail messages.
motherboard	The main printed circuit board in an electronic device, particularly a computer, which may contain sockets that accept additional boards ("daughter-boards"). In a personal computer, the motherboard contains the bus, the microprocessor, and integrated circuits used for controlling any built-in peripherals such as the keyboard, text and graphics display, serial ports and parallel ports, and mouse interfaces.
MPEG	Moving Picture Experts Group. An ISO committee that generates standards for digital video compression and audio. Also the name of their algorithms.
NEMA	National Electrical Manufacturers Association.
NetBIOS	Network Basic Input/Output System. An applications programming interface (API) which activates network operations on IBM PC compatibles running under Microsoft's DOS. It is a set of network commands that the application program issues in order to transmit and receive data to another host on the network. The commands are interpreted by a network control program or network operating system that is NetBIOS compatible.
NetBEUI	NetBIOS Extended User Interface. The network transport protocol used by all of Microsoft's network systems and IBM's LAN Server based systems.
NIC	Network Interface Card. An adapter circuit board installed in a computer to provide a physical connection to a network.
ns	nanosecond. 10^{-9} seconds (one thousand millionth part of a second)
OEM	Original Equipment Manufacturer. A company which makes equipment (e.g. computers) as opposed to one which sells equipment made by other companies.

- OS **Operating System.** The program that allows you to access the basic functions of your computer. It is the minimum software required to run a program.
- PBX **Private Branch Exchange.** A telephone exchange local to a particular organization who use, rather than provide, telephone services. The earliest PBXs were manual (Private Manual Branch EXchange, PMBX) but are now more likely to be automatic (Private Automatic Branch eXchange).
- PCB **Printed Circuit Board.** A thin board to which electronic components are fixed by solder. Component leads and integrated circuit pins may pass through holes ("vias") in the board or they may be surface mounted, in which case no holes are required (though they may still be used to connect different layers).
- PCI **Peripheral Component Interconnect.** A standard for connecting peripherals to a personal computer.
- PCL **Printer Control Language.** A Document description language used by Hewlett-Packard LaserJet printers.
- PDC **Primary Domain Controller.** In Windows NT, this machine is the main machine that responds to security authentication requests, such as logging in, within its domain. The PDC may be backed by one or more backup domain controllers that can also handle security authentication.
- PDF **Portable Document Format.** The native file format for Adobe Systems' Acrobat. PDF is the file format for representing documents in a manner that is independent of the original application software, hardware, and operating system used to create those documents.
- PING **Packet Internet Groper.** A program used to test reachability of destinations by sending them one, or repeated, ICMP echo requests and waiting for replies.
- PostScript A Page Description Language based on work originally done by John Gaffney at Evans and Sutherland in 1976, evolving through "JaM" ("John and Martin", Martin Newell) at XEROX PARC, and finally implemented in its current form by John Warnock et al. after he and Chuck Geschke founded Adobe Systems, Inc. in 1982. Its primary application is to describe the appearance of text, graphical shapes and sampled images on printed or displayed pages.
- PRML **Partial Response Maximum Likelihood.** A method for converting the weak analog signal from the head of a magnetic disk drive into a digital signal. PRML attempts to correctly interpret even small changes in the analog signal, whereas peak detection relies on fixed thresholds. Because PRML can correctly decode a weaker signal it allows higher density recording.
- PS/2 IBM's second generation of personal computers. The PS/2 series introduced three advances over the PC series: 3.5" 1.44 megabyte microfloppy disks, VGA and 8514 graphics display standards, and the Micro Channel bus architecture. The 3.5" disks and VGA can be easily installed on other PCs and will become the standard for new compatible computers.
- RAID **Redundant Array of Inexpensive Disks/Drives.** A unit with several magnetic disks which protects against data loss in the event of the failure of any one disk.
- RAM **Random Access Memory.** A data storage device for which the order of access to different locations does not affect the speed of access.
- RFI **Radio Frequency Interference.** Electromagnetic radiation which is emitted by electrical circuits carrying rapidly changing signals, as a by-product of their normal operation, and which causes unwanted signals (interference or noise) to be induced in other circuits.
- RISC **Reduced Instruction Set Computer.** A processor whose design is based on the rapid execution of a sequence of simple instructions rather than on the provision of a large variety of complex instructions.
- RJ-45 A serial connector which looks very much like a standard telephone connector, except it houses eight wires instead of four.

ROM	Read-Only Memory. A type of data storage device which is manufactured with fixed contents. In its most general sense, the term might be used for any storage system whose contents cannot be altered. The term is most often applied to semiconductor integrated circuit memories, of which there are several types, and CD-ROM.
RS-232	The most common asynchronous serial line standard.
SCSI	Small Computer System Interface. A processor-independent standard for system-level interfacing between a computer and intelligent devices including hard disks, floppy disks, CD- ROM, printers, scanners, and many more.
seek time	The time it takes for a disk drive to move its head(s) from one track to another. The seek time depends on the power of the servo, the mass of the heads, the number of tracks traversed and the time taken to position the heads over the target track accurately enough to start data transfer.
SIMM	Single In-line Memory Module. A small circuit board or substrate, typically about 10cm x 2cm, with RAM integrated circuits or die on one or both sides and a single row of pins along one long edge. Several SIMMs are mounted with their substrates at right-angles to the main circuit board (the motherboard). This configuration allows greater packing density than direct mounting of, e.g. DIL (dual in-line) RAM packages on the motherboard. In 1993 one SIMM typically held one or four megabytes, by early 1997 one could hold 8, 16, or 32 MB.
SMTP	Simple Mail Transfer Protocol. A protocol defined in STD 10, RFC 821, used to transfer electronic mail between computers, usually over Ethernet. It is a server to server protocol, so other protocols are used to access the messages.
STS	Society for Thoracic Surgeons.
Subnet Mask	This is a TCP/IP number used to determine which TCP/IP subnet a device belongs to. Devices in the same subnet can be communicated with locally without going through a router. When a TCP/IP device tries to communicate with another device, the bits of the TCP/IP destination address are "ANDed" with the subnet mask to determine whether the address is a local address (broadcastable) or must be reached through a router.
TCP/IP	Transmission Control Protocol over Internet Protocol. The de facto standard Ethernet protocols incorporated into 4.2BSD Unix. TCP/IP was developed for internetworking and encompasses both network layer and transport layer protocols.
track ball	A pointing device consisting of a ball housed in a socket containing sensors to detect rotation of the ball about two axes - like an upside-down mouse. The user rolls the ball with his thumb or the palm of his hand to move a cursor. Track balls are common on modern portable computers, where there may be no desk space on which to use a mouse. Some clip onto the side of the keyboard and have integral buttons which have the same function as mouse buttons.
twisted pair	A type of cable in which pairs of conductors are twisted together to randomize possible cross-talk from nearby wiring. Inadequate twisting is detectable using modern cable testing instruments.
UDMA	Ultra Direct Memory Access. A development of the Advanced Technology Attachment specifications which gives nearly twice the maximum transfer speed of the ATA-3 standard (PIO Mode 4).
UL	Underwriters Laboratories Inc. is an independent, not-for-profit product safety testing and certification organization.
UNC	Universal Naming Convention. The name given for the naming used when one specifies: \\the sever\\the volume\\the path\\then the file name of a file. An example of a UNC is: \\Myserver\\Docdrive\\Magazine\\glossary.doc
UPS	Uninterruptible Power Supply. Unit which supplies ten minutes of battery backup power to the file server in the event of main power source failure.

Glossary:

- USB **Universal Serial Bus.** A technology in the works that will replace the current way that some peripheral devices connect to your computer. It is much faster than serial and parallel communications. It is also much more flexible: it will be able to connect to possibly hundreds of devices simultaneously.
- VESA **Video Electronics Standards Association.** An industry standards organization created in 1989/1990 primarily concerned with IBM compatible personal computers. The first standard it created was the 800 x 600 pixel Super VGA (SVGA) display and its software interface. It also defined the VESA Local Bus (VLB).
- VGA **Video Graphics Array.** A display standard for IBM PCs, with 640 x 480 pixels in 16 colors and a 4:3 aspect ratio. There is also a text mode with 720 x 400 pixels.

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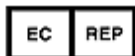
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