

GE Healthcare

MUSE™  
Cardiology Information System

Service Manual

2002783-027    Revision Z



This document applies to MUSE version 5E.14. It does not apply to earlier versions. Due to continuing product innovation, specifications in this manual are subject to change without notice.

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# 1 Introduction

# Manual information

## Revision history

The document part number and revision appear at the bottom of each page. The following table summarizes this document's revision history .

Table 1. Revision History, PN 2002783-027		
Revision	Date	Comment
A	10 July 2000	Initial release of manual.
B	4 December 2000	Added SMM information. Updated manual to version 005C.04 software. Added section for Tram-MUSE gateway setup to "Installation" chapter. Changed company name.
C	4 March 2001	Updated manual to include new client hardware SFF (small form factor).
D	1 June 2001	Updated manual to include new ML370 file server.
E	1 May 2002	Updated manual to include G2 server, Evo workstation, and flat panel monitor.
F	1 October 2002	Edited IMS chapter for 5C.10 software changes.
G	22 November 2002	Edited manual for Evo D510 SFF client.
H	1 May 2003	Edited manual for G3 server.
J	22 September 2003	Edited manual for Evo D530 client. and the HIS ProLiant DL360 1U G3 client.
K	15 April 2004	Edited manual for version 5E software.
L	21 July 2004	Document edited per feedback from 5E pilot installations.
M	20 April 2005	Updated hardware information for ML370 G4, new monitors, and HP4250N printer
N	17 June 2005	Updated hardware information for dc7100 client. Added pointer to security information.
P	17 February 2006	Updated hardware for dc7600 MUSE client and 1U HIS client.
R	1 May 2006	Updated document for 2MB L2 memory processor.
S	20 October 2006	Added software version 5E.12
T	18 June 2007	Added DL360 IU G5 HIS server.
U	12 October 2007	Added ML370 G5 MUSE file server hardware.
V	23 May 2008	Added rp5700 client. Added "Installing and Configuring the I2 Option".
W	4 September 2008	Modified "Installing and Configuring the I2 Option" on page 3-5.
Y	12 September 2008	Added information on the HP5700 hardware, HP L1910 19 inch display, and HP 4015N LaserJet printer.
Z	23 April 2009	Updated with new modem part number information.

## 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  
References installation/upgrade documents for the 005E MUSE system.  
  
Describes how to use the Format Settings Manager to customize the format of printed reports.
- Chapter 4, Integrated Maintenance Suite  
Describes how to use the Integrated Maintenance Suite (IMS) to back up and archive data on the MUSE system as well as procedures for disaster recovery.
- Chapter 5, HIS Disaster Recovery  
Provides information for rebuilding the DL310 1U G4 HIS hardware.
- Chapter 6, Troubleshooting  
Provides overall and specific troubleshooting help.
- Chapter 7, Maintenance  
Contains a preventive maintenance schedule, instructions for opening the unit, and cleaning guidelines.
- Chapter 8, Parts Lists  
Contains parts lists for reference in repairing the unit at the assembly level.
- Chapter 9, Glossary  
Defines technical words and terms used in this document.

## Typographical Conventions

The following typographical conventions are used throughout this document.

Convention	Description
<b>Bold</b>	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.
<b>[Key 1] + [Key 2]</b>	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.
<b>[Space]</b>	Indicates the spacebar must be pressed. Used in command line instructions when the command must be entered precisely.
<b>Enter</b>	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 ML370 G4	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=397646&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=397646&amp;lang=en&amp;cc=us</a>
	HP ProLiant ML370 G5	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=1121474">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=1121474</a>
	HP ProLiant DL360 G5	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=1121486">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=15351&amp;prodSeriesId=1121486</a>

Table 2. OEM Component Support Pages

Component Type	Component	Support Page
Workstations	HP rp5700	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=3375897&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=3375897&amp;lang=en&amp;cc=us</a>
	HP rp7600	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=472277&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=472277&amp;lang=en&amp;cc=us</a>
	HP dc7100	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=410112&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=12454&amp;prodSeriesId=410112&amp;lang=en&amp;cc=us</a>
Printers	HP LaserJet P4015N	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=3558793&amp;submit.y=0&amp;submit.x=0&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=3558793&amp;submit.y=0&amp;submit.x=0&amp;lang=en&amp;cc=us</a>
	HP LaserJet P4250	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=412144&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=412144&amp;lang=en&amp;cc=us</a>
	HP LaserJet 4200N	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=84028&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=18972&amp;prodSeriesId=84028&amp;lang=en&amp;cc=us</a>
Monitors	HP L1910 19-inch LCD	<a href="http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=382087&amp;prodSeriesId=3561416&amp;submit.y=0&amp;submit.x=0&amp;lang=en&amp;cc=us">http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp?lang=en&amp;cc=us&amp;prodTypeId=382087&amp;prodSeriesId=3561416&amp;submit.y=0&amp;submit.x=0&amp;lang=en&amp;cc=us</a>
	Compaq CV7500 17-inch CRT	<a href="http://h10025.www1.hp.com/ewfrf/wc/product?product=313889&amp;lc=en&amp;cc=us&amp;dlc=en&amp;submit.y=8&amp;submit.x=7&amp;lang=en&amp;cc=us">http://h10025.www1.hp.com/ewfrf/wc/product?product=313889&amp;lc=en&amp;cc=us&amp;dlc=en&amp;submit.y=8&amp;submit.x=7&amp;lang=en&amp;cc=us</a>
	NEC 1990SXi 19-inch LCD	<a href="http://www.necdisplay.com/SupportCenter/Product/?product=bb77b527-6721-4721-b36c-f0b961836afb">http://www.necdisplay.com/SupportCenter/Product/?product=bb77b527-6721-4721-b36c-f0b961836afb</a>
Tape Drives	Sony SDX-550V AIT-2	<a href="http://sony.storagesupport.com/product/72#news">http://sony.storagesupport.com/product/72#news</a>
Modems	Multitech MultimodemZBA	<a href="http://multitech.com/PRODUCTS/Families/MultiModemZBA/">http://multitech.com/PRODUCTS/Families/MultiModemZBA/</a>
Barcode Readers	3800g Linear Image Scanner	<a href="http://www.handheld.com/Site.aspx/na/en/product_center/hardware/?product=136">http://www.handheld.com/Site.aspx/na/en/product_center/hardware/?product=136</a>
UPS	Compaq 3000 Series	<a href="http://www3.compaq.com/support/reference_library/viewdocument.asp?countrycode=1000&amp;prodid=121 Uninterruptible+Power+Supply&amp;source=341251-002.xml&amp;dt=264">http://www3.compaq.com/support/reference_library/viewdocument.asp?countrycode=1000&amp;prodid=121 Uninterruptible+Power+Supply&amp;source=341251-002.xml&amp;dt=264</a>
Ethernet Hub	OfficeConnect	<a href="http://support.3com.com/infodeli/tools/hubs/off-con/3c16700/manual.a03/dua1670_0aaa04.pdf">http://support.3com.com/infodeli/tools/hubs/off-con/3c16700/manual.a03/dua1670_0aaa04.pdf</a>

# Safety information

## Responsibility of the manufacturer

GE Medical Systems *Information Technologies* 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 Medical Systems *Information Technologies*.
- 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 Medical Systems *Information Technologies*.

Contact GE Medical Systems *Information Technologies* 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 with 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 2020285-021).

## Warnings and cautions

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### **DANGER**

Do NOT use in the presence of flammable anesthetics.

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### **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.
- 
- 

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### **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.

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# Service information

## Service requirements

Refer equipment servicing to GE Medical Systems *Information Technologies*' authorized service personnel only. Any unauthorized attempt to repair equipment under warranty voids that warranty.

It is the user's responsibility to report the need for service to GE Medical Systems *Information Technologies* or to one of their authorized agents.

Failure on the part of the responsible individual, hospital, or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

Regular maintenance, irrespective of usage, is essential to ensure that the MUSE cardiology information system will always be functional when required.

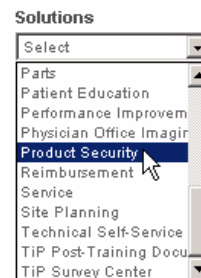
## Security updates

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) username and password.

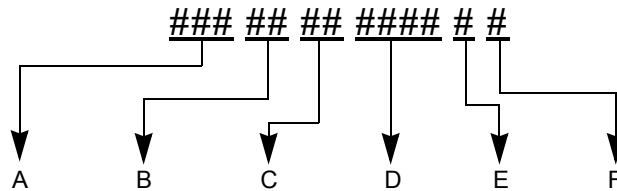
### NOTE

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.

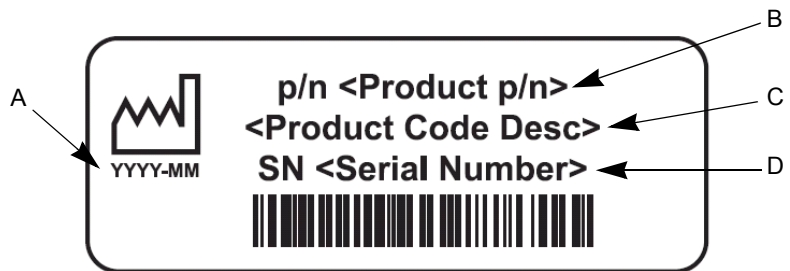
## Equipment identification

### Serial number format



A	Product Code
B	Year Manufactured (00-99) 04 = 2004 05 = 2005 06 = 2006 (and so on)
C	Fiscal Week Manufactured
D	Production Sequence Number
E	Manufacturing Site
F	Miscellaneous Characteristic

### Label format



A	Date of manufacture in YYYY-MM format
B	Part number of product
C	Product code description
D	Serial number (see "Serial number format" on page 1-9).

## FCC requirements

### Modem requirements

The modem in your GE Medical Systems *Information Technologies* device is designed to comply with FCC part 68, U.S. Telecommunication Requirements. See the equipment label on the GE Medical Systems *Information Technologies* 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 you will be 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.

# 2 Equipment Overview

# System characteristics

## General description

The MUSE system is a multiple data-type system designed for managing cardiology data. It allows you to edit and store data acquired from many different areas. Data may be acquired from areas within the hospital, as well as from areas not directly connected to the hospital such as emergency care and outreach facilities.

The version 5E MUSE system has a file server running Windows Server 2003 which is networked to one or more workstations. The products range from a low-cost, single data-type system to multiple data-type systems with many 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 either an HP ProLiant ML370 G4 or G5 server.

The following table describes the available configurations for the HP ProLiant ML370 G4 server.

Table 1. ML370 G4 File Server Configurations		
Features	Tower	Rackable
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
<b>Case/Chassis (rear-Vertical)</b>		
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)

Table 1. ML370 G4 File Server Configurations (Continued)		
Features	Tower	Rackable
Case slot #1	Smart Array Controller (642)	Smart Array Controller (642)
<b>External Drive Bay (Front-Horizontal)</b>		
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
<b>HotPlug Drive Bay (Front-Horizontal)</b>		
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
<b>HotPlug - Supplies/Fans</b>		
Power Supply	500 Watts	500 Watts
Redundant PS (Rear-Lower Left)	Redundant PS Kit	Redundant PS Kit
Redundant Fans	Yes – Installed	Yes – Installed

The following table describes the available configurations for the HP ProLiant ML370 G5 server.

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
<b>Case/Chassis (rear-Vertical)</b>		
Case slot #6 - #9	empty	empty

Table 2. ML370 G5 File Server Configurations (Continued)		
Features	Tower	Rackable
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*	P400 Array Controller*
<b>External Drive Bay (Front)</b>		
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
<b>HotPlug Drive Bay (Front)</b>		
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
<b>Power Supplies/Fans</b>		
Power Supply (Right)		
Redundant PS (Left)	Redundant PS Kit	Redundant PS Kit
Redundant Fans	Installed Internal	Installed Internal

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



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 3. HP rp5700 Small Form Factor**

<b>Processor</b>	
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
<b>Integrated I/O</b>	
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
<b>Drive Bays</b>	
Optical Drive	SATA 16X/48X DVD-ROM
Hard Drive	160GB SATA 3Gb/s
<b>Power</b>	
Voltage	90 - 264 VAC, autoselecting
Rated Line Frequency	50/60 Hz
AC input connector	IEC60-320 male connector.

Table 3. HP rp5700 Small Form Factor (Continued)

Power consumption, rated	Maximum Rated Power: 240 W
Heat dissipation (BTU/hr)	100 VAC: 215.297 BTU/hr 115 VAC: 214.614 BTU/hr 230 VAC: 210.861 BTU/hr
<b>Environmental</b>	
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
<b>Physical</b>	
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
<b>Operating Systems</b>	
Operating Systems supported	Microsoft Windows XP Professional US

## Optional equipment

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

- 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.

### HP L1910 19-inch LCD Display

The following table provides the technical specifications for the HP L1910 monitor.

Table 4. HP L1910 19-inch LCD Monitor	
LCD Module	19-inch active matrix TFT (thin film transistor (TFT))
Viewable Image Area	19 inches (48.26 cm) diagonal
Active Display Area	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
Brightness	300 nits (cd.m <sup>2</sup> )
Contrast Ratio	800:1
Response Rate	5 ms (rise and fall)
Pixel Pitch	0.294 mm
Backlight Lamp Life	50 K hours
Horizontal Frequency	24 to 83 kHz
Vertical Frequency	50 to 70 Hz
Native Resolution	1280 x 1024 @ 60 Hz
Current	< 0.50 Ampere
AC input voltage/current	Universal 100 (110-240V) 50-60Hz Internal
Power Consumption	Maximum: < 38 watts Typical: 31 watts Power Save Mode: <2 watts
Operating Temperature	+41° to +95° F (+5° to +35° C), non-condensing
Operating Humidity Range	20% to 80%, non-condensing

Table 4. HP L1910 19-inch LCD Monitor (Continued)	
Dimensions (W x H x D)	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: 8.6 lbs. / 3.9 kg

## HP LaserJet P4015 Printer

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

Table 5. HP LaserJet P4015 Printer	
Speed	52 ppm
Resolution	1200 x 1200 dpi
Memory, Standard	128 MB
Memory, Maximum	640 MB
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

The MUSE system is capable of acquiring data from a variety of sources, both within and outside the hospital. Data is acquired via a network, floppy diskette, direct line, or telephone transmission. Users may view and measure ECG waveforms, edit and confirm the acquired data, and create an assortment of configurable data reports.

The MUSE system software is a menu-driven program that operates in Microsoft Windows. The overall program is divided into “applications.” Each application includes many related operations. For example, the *System Status* Application includes operations that let you display lists of errors, events, pending tasks, and print queues.

## Network functions

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

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

## Workstation setup

### NOTE

Some of the choices you will be asked to make when setting up workstations must be decided when they are installed. Based on the following information, decide if the workstation will be a “Turnkey” or “Multi-Use” workstation. Then, decide if it will be set up for MUSE authentication or Windows authentication. Refer to “MUSE Information Advanced Security Guide” for information about Authentication and how it affects the level of security on your version 005E MUSE system.

### Turnkey workstation

- Dedicated to the operation of the MUSE system
- Only MUSE system software is installed
- MUSE system software starts automatically when the workstation starts
- Typically, additional MUSE tasks are running

### Multi-use workstation

- Additional third-party applications may be installed.
- The MUSE system software does not start automatically.
- Typically, does not have additional MUSE tasks running. (The user is not always running the MUSE system software.)

## MUSE authentication

- MUSE Login (**ICIS0250.exe**) provides authentication.
- Must have a Domain User Account with which to log in to the computer. This is typically MUSEXXX (where XXX is the node ID).

## Windows authentication

- Provides a one-time login to all MUSE and third-party resources.
- Must have a Domain User Account for the user.
- Must have a MUSE User account (**USERS.BTR**)
- Must have an entry in the MUSE NT Users database (**NTUSERS.BTR**) that maps the Windows domain account to the corresponding MUSE User account.

# Preparation 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 up your workstation 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” on page 2-22 for more specific information.

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**DANGER**

Do NOT use in the presence of flammable anesthetics.

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**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 HP 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 6. Tower File Server Interconnections		
Connect From	Connect To	Comments/Remarks
<b>UPS</b>		
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 <a href="#">"Server"</a> on page 2-12.
<b>Server</b>		
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 <a href="#">"Display"</a> on page 2-13.
Keyboard	Keyboard	See <a href="#">"Keyboard"</a> on page 2-13.
Mouse	Mouse or Trackball	See <a href="#">"Mouse/Trackball"</a> on page 2-13.
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]
<b>Modems</b> (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
<b>RSS modem application</b>		
Modem: RSS	Server (Com2)	RSS Modem (25 pin-D) to Server COM2 (9 pin-D)
<b>CSI modem application option(s)</b>		
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 6. Tower File Server Interconnections (Continued)		
Connect From	Connect To	Comments/Remarks
<b>FAX modem application option(s)</b>		
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.
<b>Display</b>		
Power Supply	UPS	Via applicable AC power cord
Video	Server	Via display video cable (hardwired into display)
<b>Keyboard</b>		
Keyboard	Server	Via keyboard cable (hardwired into keyboard)
<b>Mouse/Trackball</b>		
Mouse/Trackball	Server	Via mouse/trackball cable (hardwired in mouse/trackball)
<b>Ethernet Hub</b>		
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
<b>Clients (MUSE or HIS), see Clients</b>		
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 7. Rack-Mounted File Server Interconnections		
Connect From	Connect To	Comments/Remarks
<b>UPS</b>		
Power Supply	Ext. AC	Install "Heavy Duty" Line Cord for UPS 220V installation <ul style="list-style-type: none"> <li>■ Ensure all devices are properly configured for the mains power (i.e. 110 or 220 Vac).</li> <li>■ Ensure all devices to be plugged into the UPS are turned "OFF."</li> </ul>
Serial	Server (COM1)	See Server

Table 7. Rack-Mounted File Server Interconnections (Continued)		
Connect From	Connect To	Comments/Remarks
<b>Server</b>		
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 2-13.
Keyboard	Keyboard	See "Keyboard" on page 2-13.
Mouse	Mouse or Trackball	See "Mouse/Trackball" on page 2-13.
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
<b>Modem Rack</b>		
Power Supply	UPS	Via applicable AC power cord
<b>Modem Rack (Rear View) - shown with modem installed in Bay 12</b> Bay 03: not usedBay 02: FAX 1 (optional)Bay 01: CSI 1 (optional) Bay 06: not usedBay 05: FAX 2 (optional)Bay 04: CSI 2 (optional) Bay 09: not usedBay 08: FAX 3 (optional)Bay 07: CSI 3 (optional) Bay 12: RSS ModemBay 11: FAX 4 (optional)Bay 10: CSI 4 (optional) DC Pwr(25 pin-D) [Phone] [Line]		
Modems in Modem Rack [reference: Modem Rack (Rear View - table above)]		
<b>Common modem connections to Modem Rack</b>		
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
<b>RSS modem application</b>		
Bay 12 serial (RSS)	Server (Com2)	Modem Rack (25 pin-D) to Server COM2 (9 pin-D)
<b>CSI modem application option(s)</b>		
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 7. 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 8. 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) *		
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 8. MUSE/HIS Client Interconnections (Continued)

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

\*Not 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.
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” on page 2-22. 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 8, “**MUSE/HIS Client Interconnections**,” on page 2-15 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.

## RSS multitech modem

1. Unpack the modem and place it in a location near the file server.
2. Ensure that the power switch located on the side of the modem is in the off position.
3. Attach the AC power cord to the modem and to the UPS.
4. Connect one end of the RS232 cable to the **COM2** port on the back of the file server. Connect the other end to the **RS232** port on the back of the modem. Use Table 6, “**Tower File Server Interconnections**,” on page 2-12 or Table 7, “**Rack-Mounted File Server Interconnections**,” on page 2-13 as a reference.
5. Connect one end of the phone wire to the **LINE** jack on the back of the modem and connect the other end to the appropriate phone jack in the wall.

## Fax/asynch CSI multitech modem

Refer to 2002783-012 “MUSE System Standard Fax/Asynch CSI Modem Upgrade” 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.

## Printers

### **NOTE**

Do NOT plug your laser printer into the UPS.

### HP LaserJet

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
- Exiting from MUSE system software to Windows desktop

## 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, “[Integrated Maintenance Suite](#)”.



# Checkout the workstation

## Final checkout

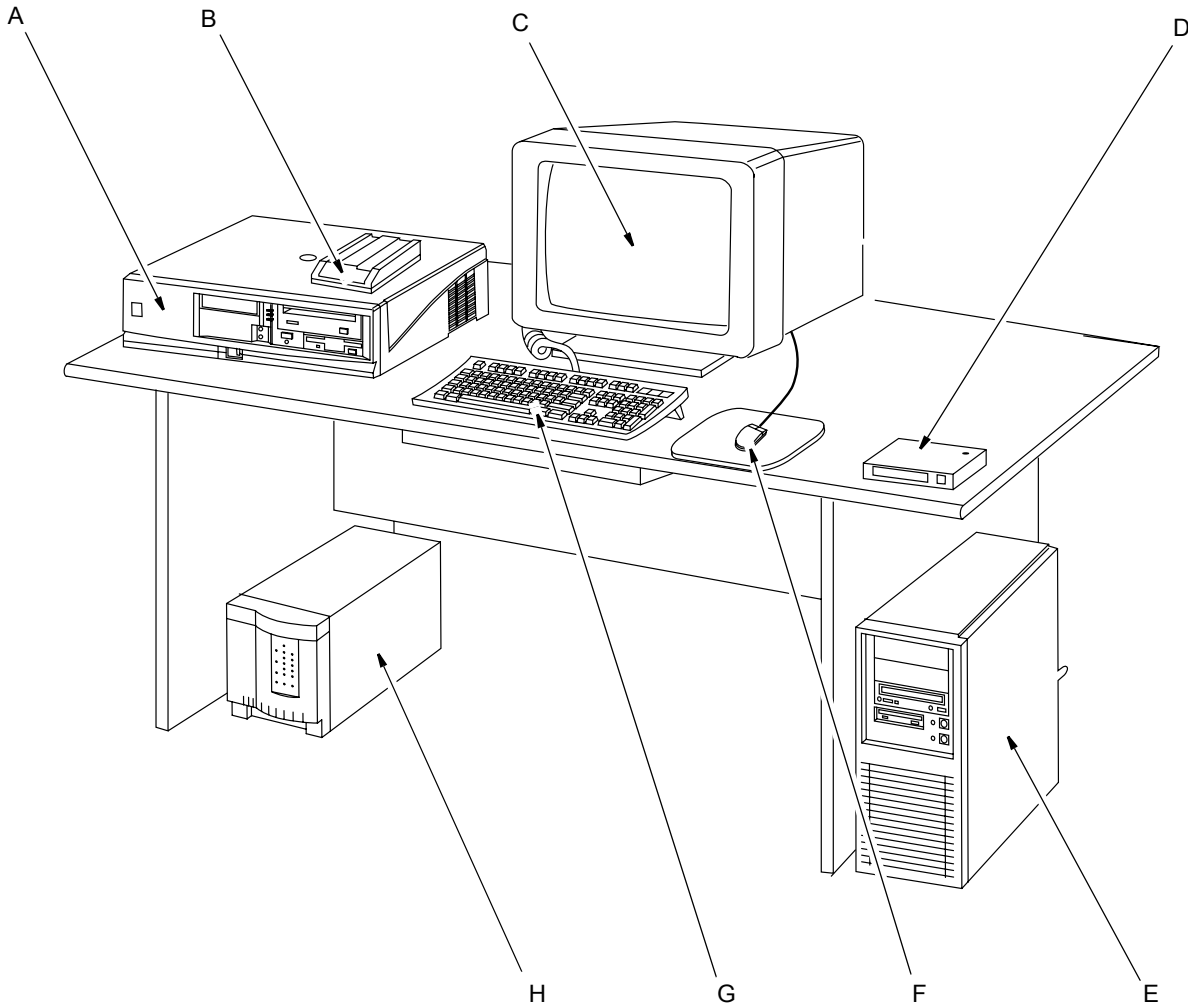
Perform the following for all applicable options. Use this manual and the MUSE system operator's manual for reference.

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. Local Acquisition – Acquire test ECGs via the MAC 8 acquisition cable and ensure they plot according to report distribution.
5. Holter – Locally transmit data from the Holter to the MUSE system.
6. TRAM Module – Test that data is successfully flowing from the TRAM to the MUSE system.
7. MAC LAB – Test that data can be sent from the MAC LAB to the MUSE system.
8. SDLC – Acquire test ECGs via remote SDLC modems.
9. CSI – Acquire test ECGs via remote CSI modems.
10. RSS – Contact Tech Support to ensure remote logon is possible.
11. Remote Query – Test CSI modem connections if system has Remote Query.
12. Edit – View and edit an ECG from the *Edit List*.
13. Writer/Printers – Test writers to ensure they plot. Check for burned out dots, especially in the bar code region.
14. Fax – Fax a record to test fax modems.
15. On-line Archives – If the system has on-line archive drives, ensure that backup tapes are up to date.
16. Backups – Perform a non-scheduled backup. See Chapter 4, “**Integrated Maintenance Suite**” for details. Check that all tapes are being successfully used. Replace tapes that are past their intended life span. The Customer should store old tapes for safe keeping.

# System components, controls, indicators

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



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### 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 9. Tower File Server System Description**

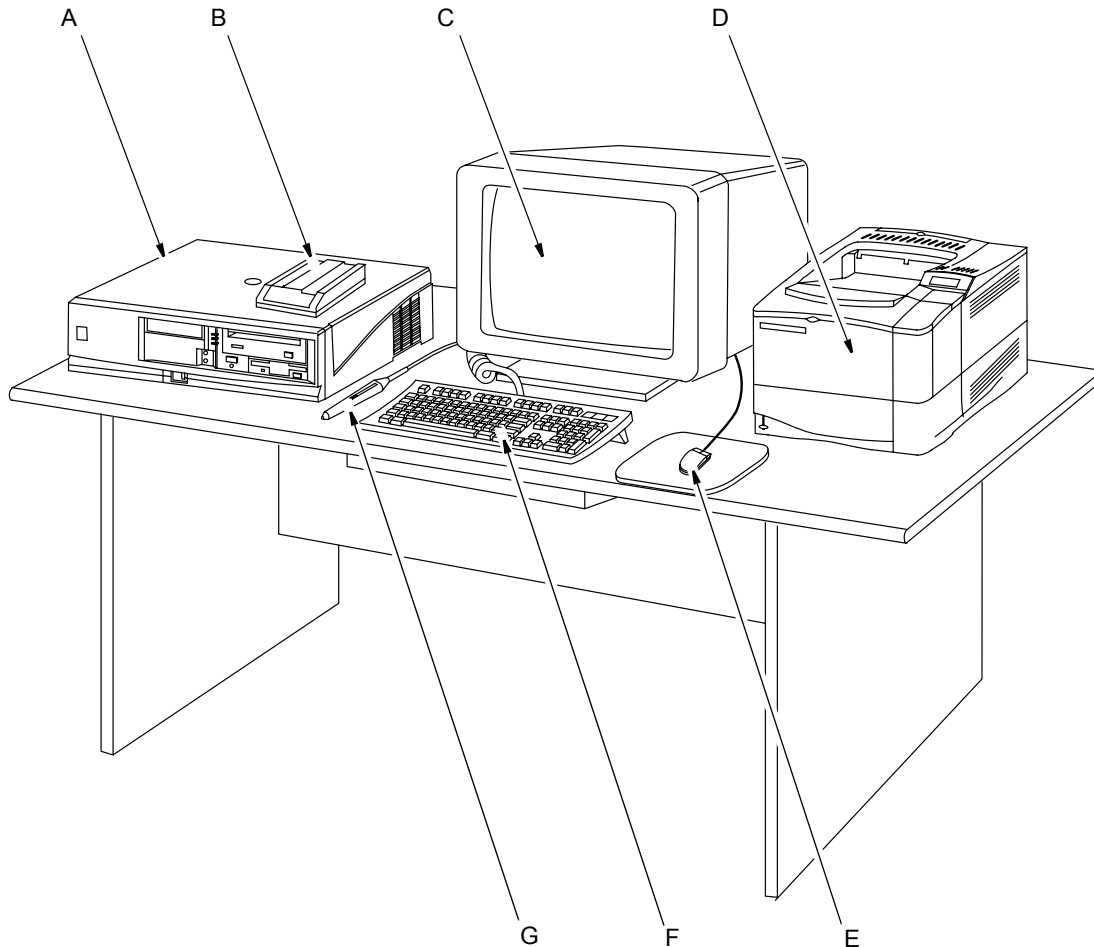
Item	Name	Description
A	Modem module	Stores system's modems.
B	RSS modem	Used by service to provide remote system support.
C	Monitor	Displays information, messages, etc.

**Table 9. Tower File Server System Description (Continued)**

<b>Item</b>	<b>Name</b>	<b>Description</b>
D	Hub	Hub used in twisted pair networks. This item is optional.
E	File server	System box. Contains the power supply, hard disk drive, RAM, central processing unit, etc.
F	Mouse	An input device used to move the cursor and select items on the display. The mouse is standard on the system.
G	Keyboard	The keyboard is an input device. Use the keyboard to type information when required by the system.
H	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 10. Workstation Client System Description**

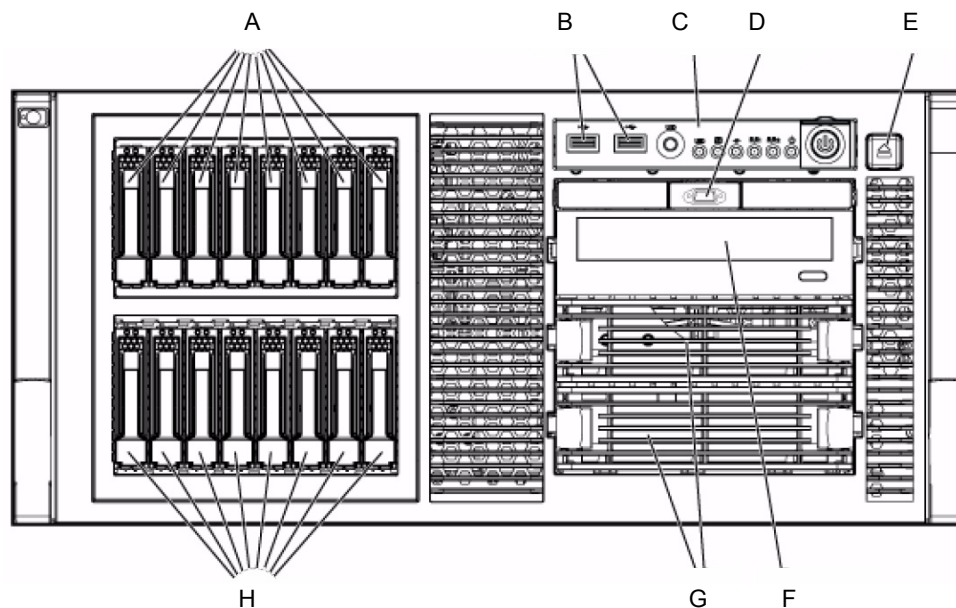
Item	Name	Description
A	Client	The system box which contains the power supply, hard disk drive, RAM, central processing unit, etc.
B	CSI modem	Used to communicate with MAC VU, MAC 8, MAC 1200, and MAC 5000 resting ECG analysis systems.
C	Monitor	Displays information, messages, reports, ECGs, etc.
D	HP LaserJet printer	Optional laser printer used to print various reports on standard paper.

<b>Table 10. Workstation Client System Description (Continued)</b>		
<b>Item</b>	<b>Name</b>	<b>Description</b>
E	Mouse	Input device used to move the mouse cursor and select items on the display.
F	Keyboard	The keyboard is an input device. Use the keyboard to type information when required by the system.
G	Barcode reader	Used to select and edit ECGs. Makes the system easier to use for those not used to working with computers.

# Component Descriptions

## ML 370 G5 File Server, CPU

### ML 370 Rack, Front



**Table 11. CPU Front, HP ProLiant ML370 G5, Rack Model**

Item	Description
A	Hard drive bays 9 – 16 (not used)
B	USB connectors
C	Front Panel LEDs and buttons (See “ <a href="#">ML 370 LEDs, Front Panel</a> ” on page 2-28 for more information.)
D	Video Connector (rack model only)
E	HP Systems Insight Display ejector button
F	DVD/CD-ROM drive
G	Removable media bays
H	Hard drive bays 1-8*

\* Only bays 1-6 are used.

## ML 370 Tower, Front

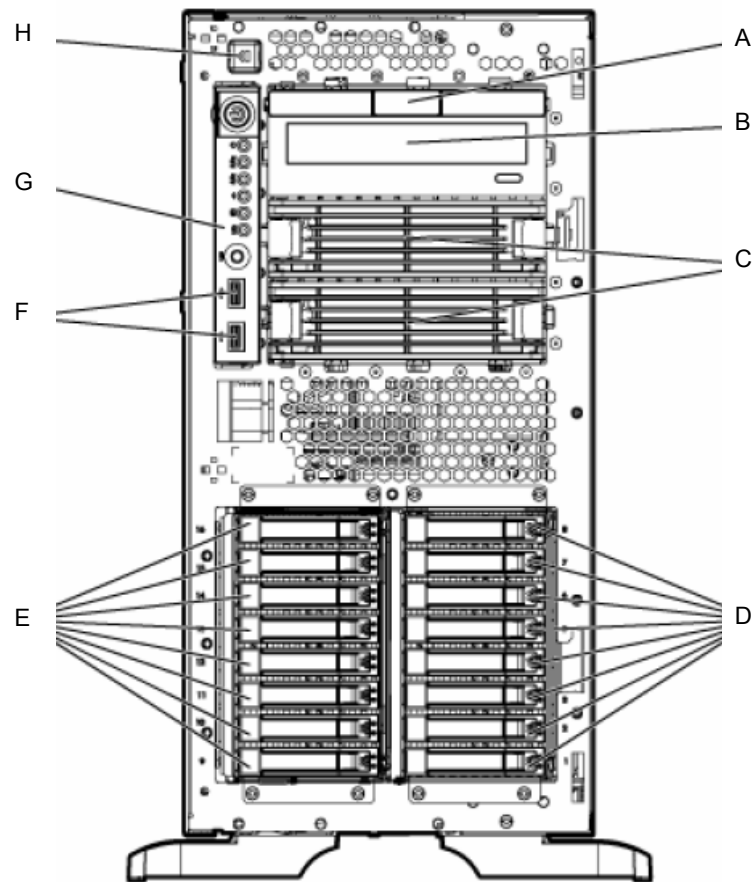


Table 12. CPU Front, HP ProLiant ML370 G5, Tower Model

Item	Description
A	Media bay spacer
B	DVD/CD-ROM drive
C	Removable media bays
D	Hard drive bays 1-8 (only bays 1-4 are used)
E	Hard drive bays 9-16 (not used)
F	USB connectors
G	Front Panel LEDs and buttons (See "ML 370 LEDs, Front Panel" on page 2-28 for more information.)
H	HP Systems Insight Display ejector button

## ML 370 LEDs, Front Panel

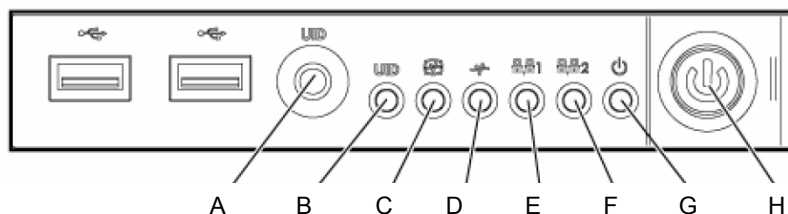


Table 13. CPU Front Panel LEDs and Buttons HP ProLiant ML370 G5		
Item	Description	Status
A	UID button	–
B	UID LED	Blue = Activated Flashing blue = System is being managed remotely Off = Deactivated
C	Internal system health LED	Green = Normal (system on) Amber = System health is degraded Red = System health is critical Off = Normal (system off)
D	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)
E	NIC 1 link/activity LED (embedded NIC)	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
F	NIC 2 link/activity LED (embedded NIC)	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
G	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
H	Power On/Standby button	–



## ML 370 Connectors, Rear Panel

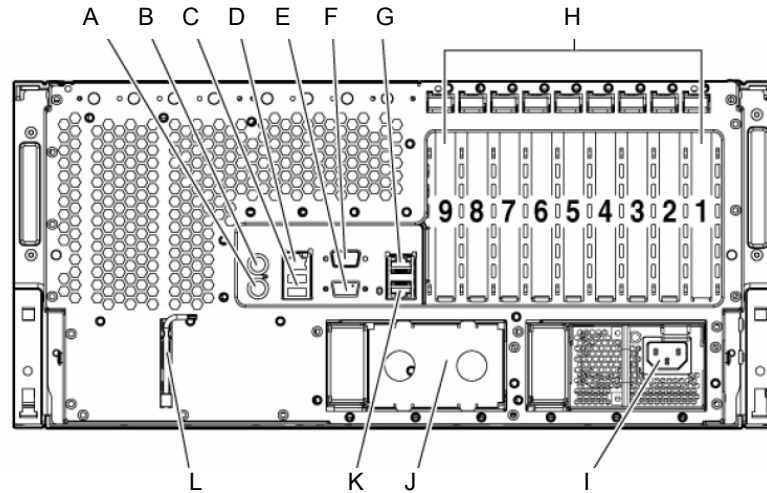


Table 14. CPU Back HP ProLiant ML370 G5

Item	Description
A	Keyboard connector
B	Mouse connector
C	USB connectors
D	iLO 2 management connector
E	Video connector
F	Serial connector
G	NIC 2 connector
H	PCI expansion slots
I	Hot-plug power supply (primary bay)
J	Hot-plug power supply blank (redundant bay)
K	NIC 1 connector
L	T-15 Torx screwdriver

## ML 370 LEDs and Buttons, Rear Panel

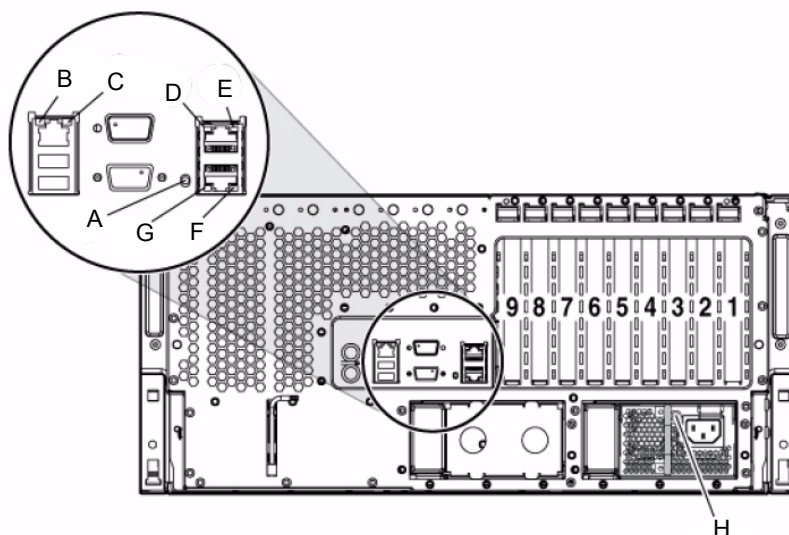


Table 15. Rear Panel LEDs and Buttons

Item	Description	Status
A	UID LED	Blue = Activated Flashing blue = system is being remotely managed Off = Deactivated
B	iLO 2 activity LED	Green or flashing green = Network activity Off = No network activity
C	iLO 2 link LED	Green = Linked to network Off = No network connection
D	NIC 2 activity LED	Green or flashing green = Network activity Off = No network activity
E	NIC 2 link LED	Green = Linked to network Off = No network connection
F	NIC 1 link LED	Green = Linked to network Off = No network connection
G	NIC 1 activity LED	Green or flashing green = Network activity Off = No network activity
H	Power supply LED	Green = System has AC power and is powered up Off = System has no AC power

## ML 370 G5 File Server, Accessories

### HP Insight 2 Display

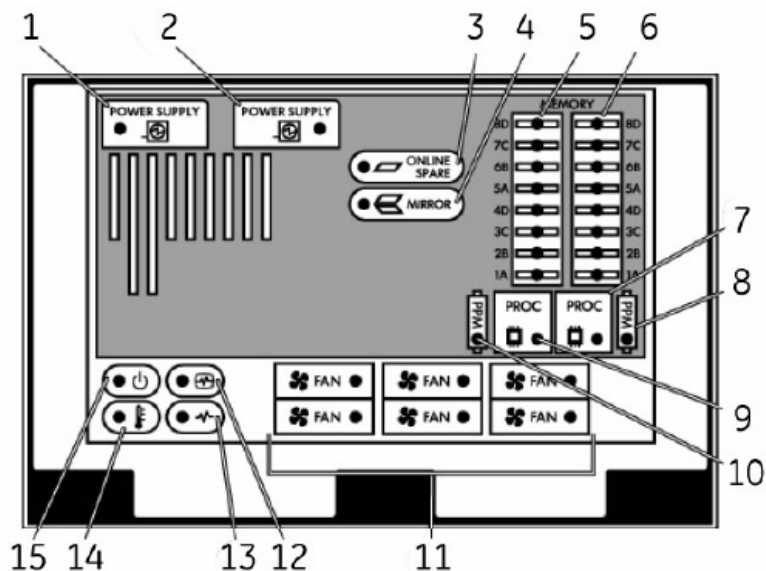


Table 16. Insight 2 Display

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	F8DIMM LEDs (Mem board 1)*	Amber	Failure
		Off	Normal
6	F8DIMM LEDs (Mem board 2)*	Amber	Failure
		Off	Normal

Table 16. Insight 2 Display (Continued)			
Item	Description	Indicator	Description
7	Processor 1	Amber	Failure
		Off	Normal
8	PPM 1	Amber	Failure
		Off	Normal
9	Processor 2	Amber	Failure
		Off	Normal
10	PPM2	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 of
		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

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

## Sony AIT Tape Drive LEDs

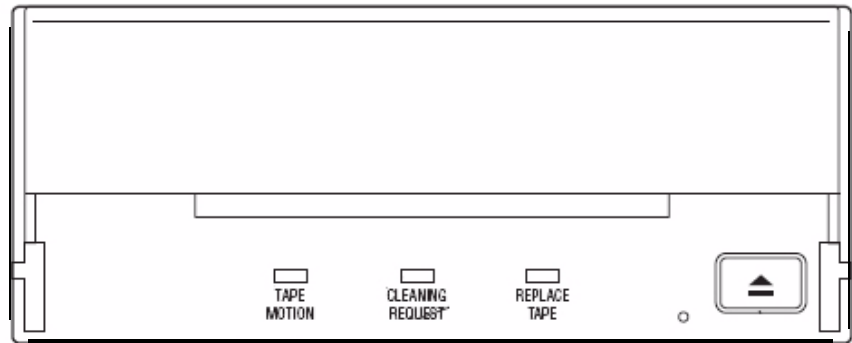











Table 17. Sony AIT tape drive LEDs

LED			Sense
TAPE MOTION	CLEANING REQUEST	REPLACE TAPE	
	Independent	Independent	Tape loaded
	Independent	Independent	Tape access in progress (write/read)
	Independent	Independent	Tape access in progress (others)
Independent		Independent	Cleaning is requested
Independent		Independent	Cleaning is not completed
Independent	Independent		Media error occurred
			H/W Error Occurred

## LED Legend (Sony AIT Tape Drive)



on



Slow

1 pulse (0.9 sec on/0.3 sec off)



Fast

1 pulse (0.3 sec on/0.3 sec off)

## UPS, Front Panel

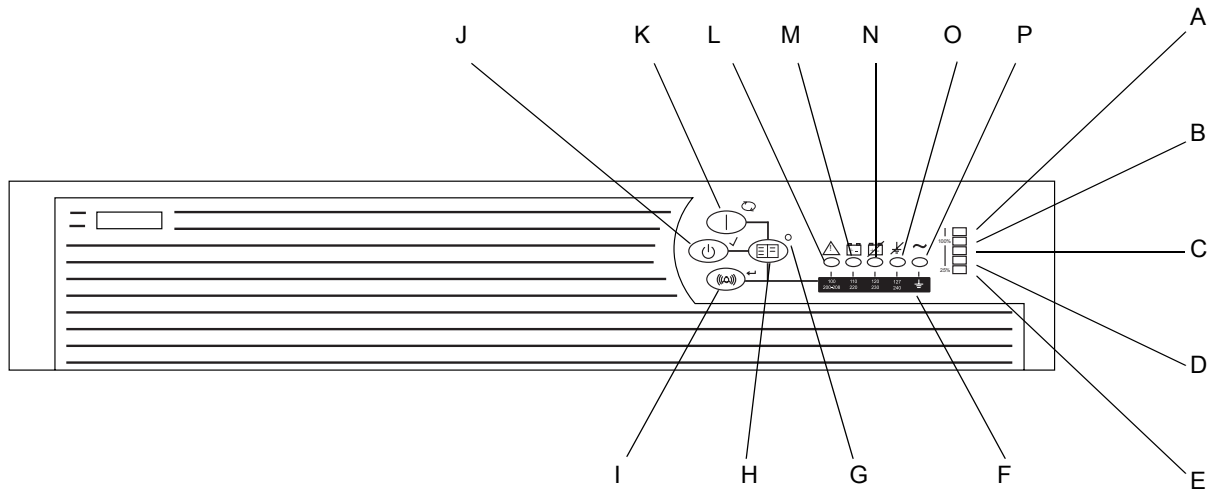
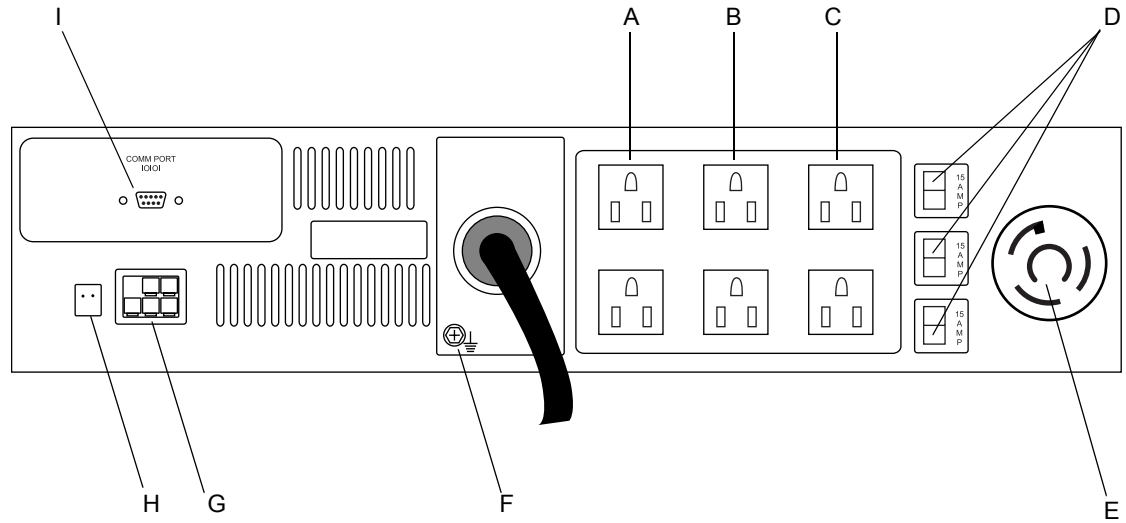


Table 18. UPS for HP File Server (Front)

Item	Name
A	LED indicating overload capacity
B	LED indicating 76% to 100% load capacity
C	LED indicating 51% to 75% load capacity
D	LED indicating 26% to 50% load capacity
E	LED indicating 0% to 25% load capacity
F	Voltage Configuration Panel *
G	Configure mode on LED *
H	Configure button *
I	TEST/ALARM RESET Button
J	STANDBY Button
K	ON Button
L	General Alarm
M	On Battery
N	Bad Battery / Low Battery
O	Site Wiring Fault Indicator
P	Utility LED

\* Accessible only when the front bezel is removed.

## UPS, Rear Panel



**Table 19. UPS for HP File Server (Back)**

Item	Name
A	Load Segment 1
B	Load Segment 2
C	Load Segment 3
D	Load Segment Circuit Protectors
E	PDU (Power Distribution Unit) output receptacle
F	Ground bonding screw
G	ERM (Extended Runtime Modules) connector
H	REPO (Remote Emergency Power Off) port
I	Communications Port / Option Slot

## HP DL 360 G5 HIS server

### HP DL360, Front Panel

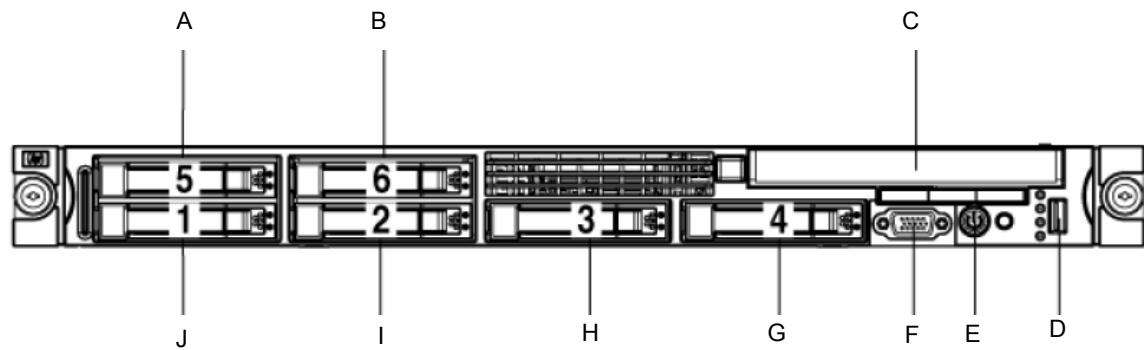


Table 20. HP DL360 G5 Server

Item	Name
A	Hard drive bay 5 (not used on GE-supplied hardware)
B	Hard drive bay 6 (not used on GE-supplied hardware)
C	Multibay drive bay
D	USB connector
E	HP Systems Insight Display
F	Video connector
G	Hard drive bay 4 (not used on GE-supplied hardware)
H	Hard drive bay 3 (not used on GE-supplied hardware)
I	Hard drive bay 2
J	Hard drive bay



## HP DL360 LEDs and Buttons, Front Panel

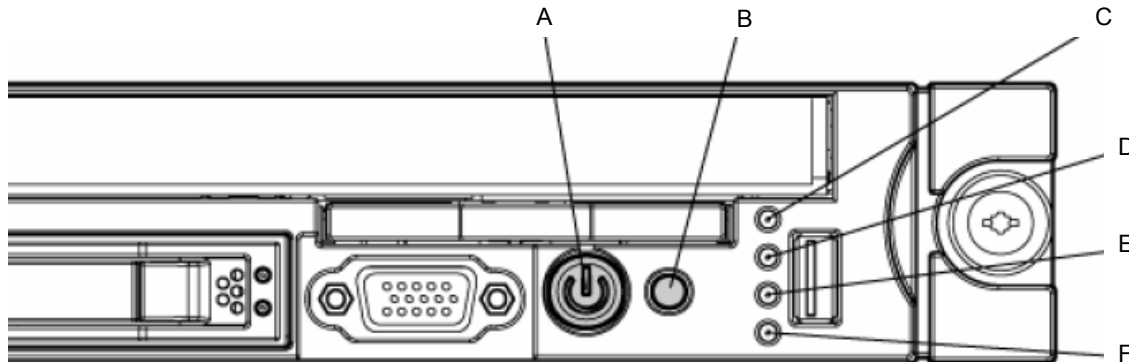


Table 21. HP DL360 G5 Server, Front Panel LEDs and Buttons

Item	Description	Status
A	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.
B	UID button/LED	Blue = Identification is activated. Flashing blue = System is being remotely managed. Off = Identification is deactivated.
C	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).
D	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 21. HP DL360 G5 Server, Front Panel LEDs and Buttons (Continued)		
Item	Description	Status
E	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).
F	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, Rear Panel

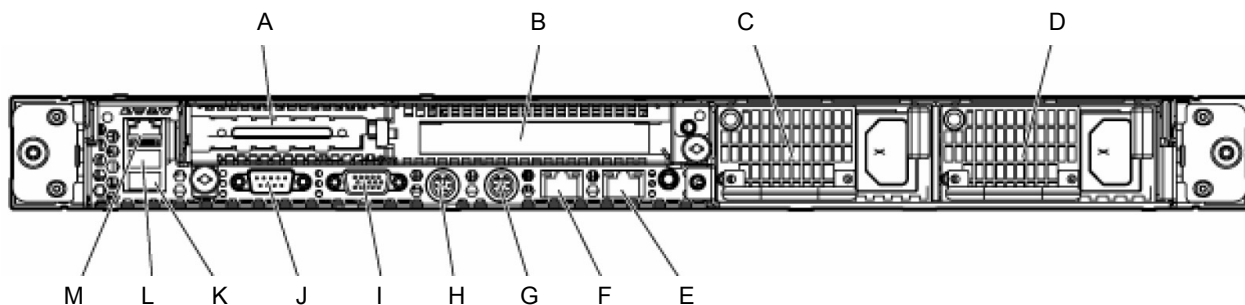


Table 22. DL360 G5, Rear Panel	
Item	Description
A	PCI Express expansion slot 1, low-profile, half-length
B	PCI Express expansion slot 2
C	Power supply bay 2
D	Power supply bay 1
E	NIC 2 connector
F	NIC 1 connector
G	Keyboard connector
H	Mouse connector
I	Video connector
J	Serial connector

Table 22. DL360 G5, Rear Panel (Continued)

Item	Description
K	USB connector
L	USB connector
M	iLO 2 NIC connector

## HP DL360 LEDs and Buttons, Rear Panel

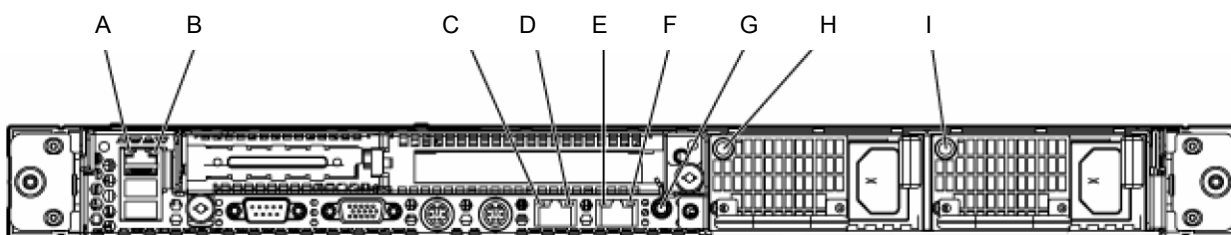
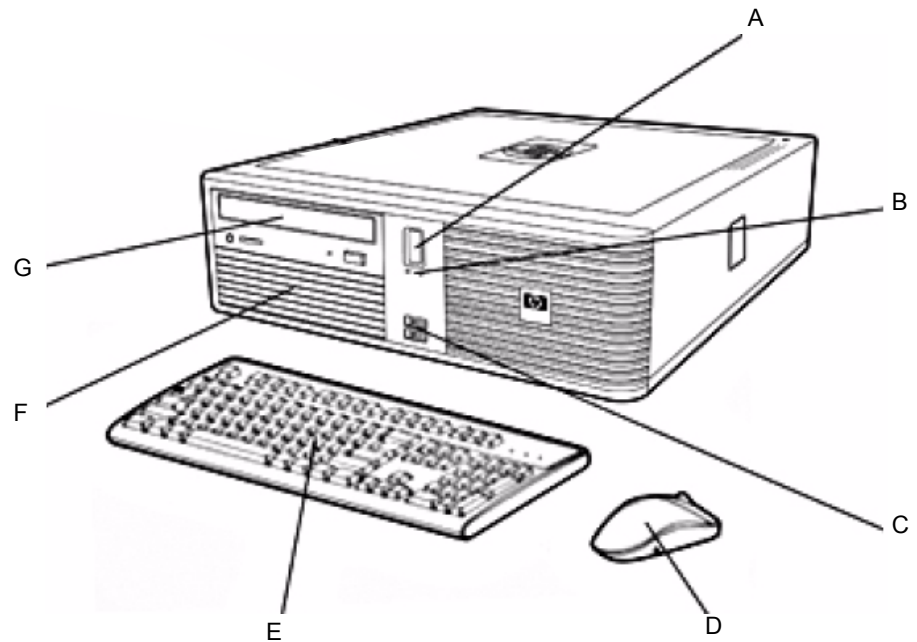


Table 23. DL360 G5, Rear Panel LEDs and Buttons

Item	Description	Status
A	iLO 2 NIC activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
B	iLO 2 NIC link LED	Green = Link exists. Off = No link exists.
C	10/100/1000 NIC 1 activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
D	10/100/1000 NIC 1 link LED	Green = Link exists. Off = No link exists.
E	10/100/1000 NIC 2 activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
D	10/100/1000 NIC 2 link LED	Green = Link exists. Off = No link exists.
E	UID button/LED	Blue = Identification is activated. Flashing blue = System is being managed remotely. Off = Identification is deactivated.
F	Power supply 2 LED	Green = Normal Off = System is off or power supply has failed
G	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 24. 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

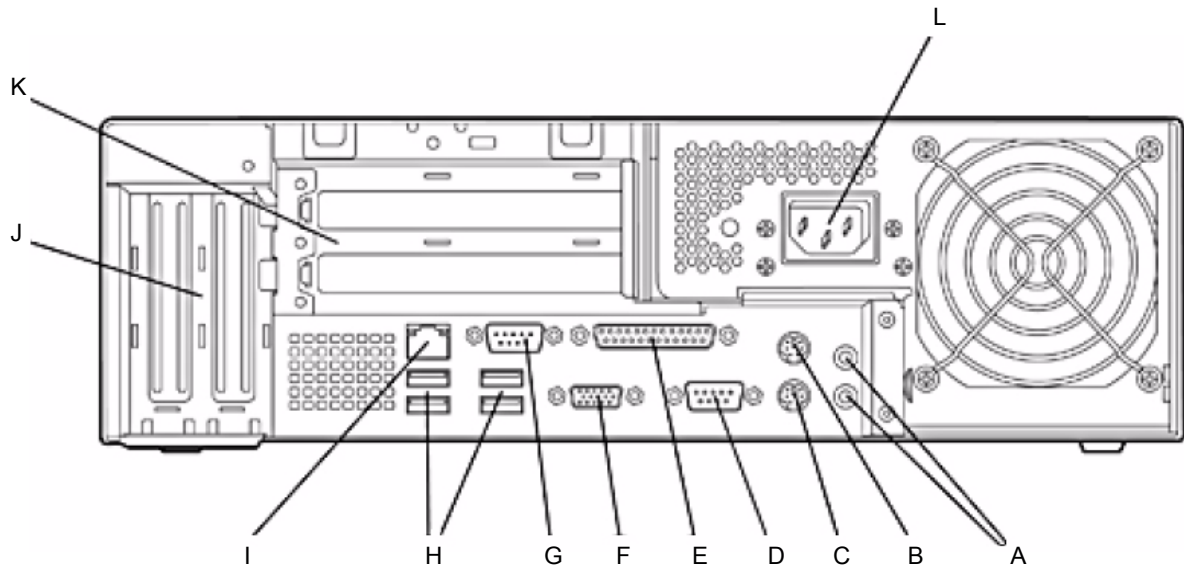
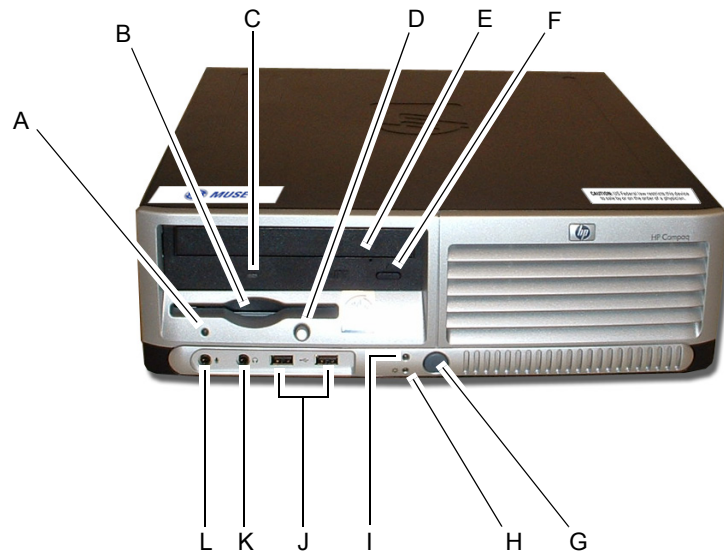


Table 25. rp5700 client, rear panel connectors

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 dc7600 Client

### DC7600 Controls and Indicators, Front Panel



**Table 26. MUSE dc7600 Client, Front Panel Controls and LEDs**

Item	Description	Item	Descriptions
A	Diskette drive activity light	G	Dual-state power button
B	Diskette drive	H	Power-on light
C	Optical drive activity light	I	Hard drive activity light
D	Diskette eject button	J	USB ports
E	Optical drive (xx)	K	Headphone connector
F	Optical drive eject button	L	Microphone connector

## DC7600 Connectors, Rear Panel

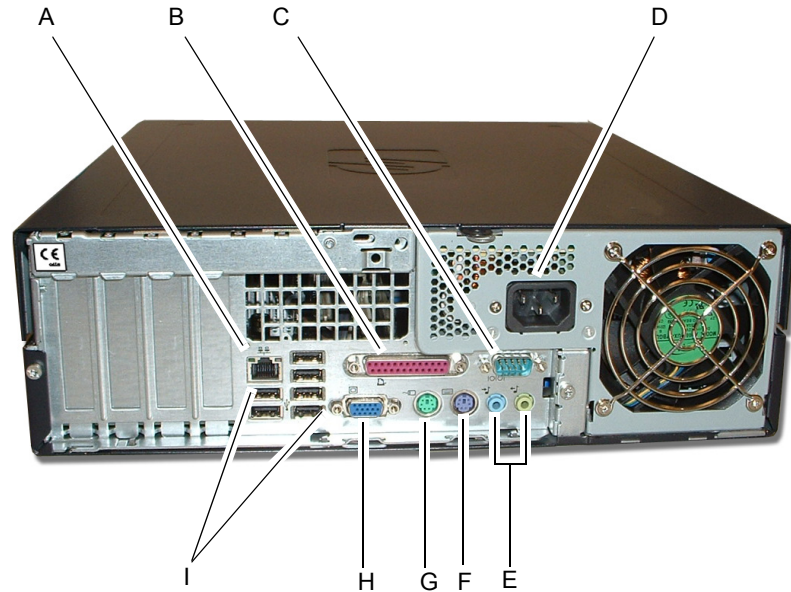
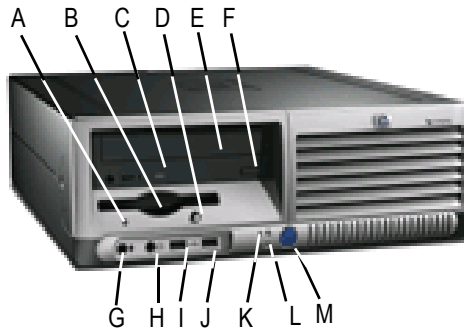


Table 27. MUSE dc7600 Client – Rear Panel Connectors

Item	Name
A	RJ-45 network connector
B	Parallel connector
C	O   O   Serial connector
D	Power cord connector
E	Line-in audio connectors
F	PS/2 keyboard connector (purple)
G	PS/2 mouse connector (green)
H	Monitor connector
I	USB Ports

## MUSE dc7100 Client

### DC7100 Controls and Indicators, Front Panel

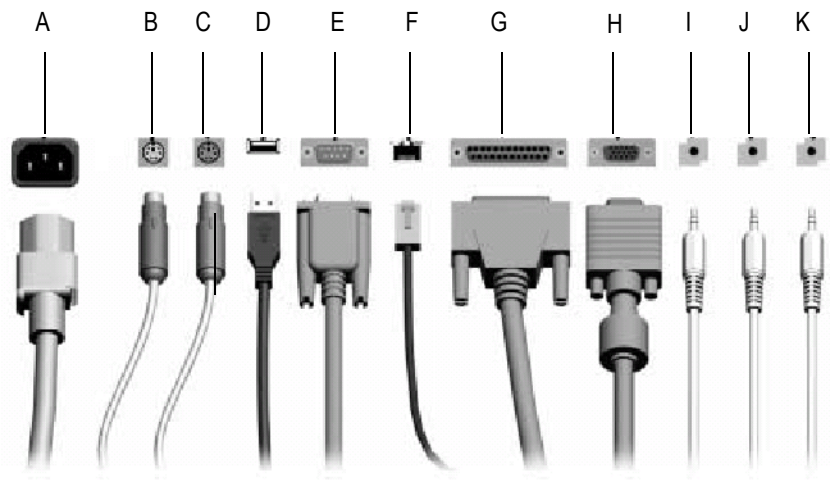


**Table 28. MUSE dc7100 Client, Front Panel Controls and LEDs**

Item	Description	Item	Descriptions
A	Diskette Drive Activity Light	G	Microphone Connector
B	Diskette Drive	H	Headphone Jack
C	Optical Drive Activity Light	I	USB (Universal Serial Bus) Ports (2)
D	Diskette Eject Button	J	Hard Drive Activity Light
E	Optical Drive (CD-ROM CD-R/RW, DVD-ROM, DVD+R/RW, or CD-RW/DVD Combo Drive)	K	Power On Light
F	Optical Drive Eject Button	L	Power Button



## DC7100 Connectors, Rear Panel



MD1350-175A

Table 29. MUSE dc7100 Client – Rear Panel Connectors	
Item	Name
A	Power Connector
B	PS/2 Mouse Connector
C	PS/2 Keyboard Connector
D	Universal Serial Bus (USB)
E	Serial Connector
F	RJ-45 Network Connector
G	Parallel Connector
H	Monitor Connector
I	Headphone/Line-Out Connector
J	Line-In Audio Connector
K	Microphone Connector

**NOTE**

Arrangement and number of connectors may vary by model.

## HP L1910 LCD Monitor



Table 30. HP L1210 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 31. 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

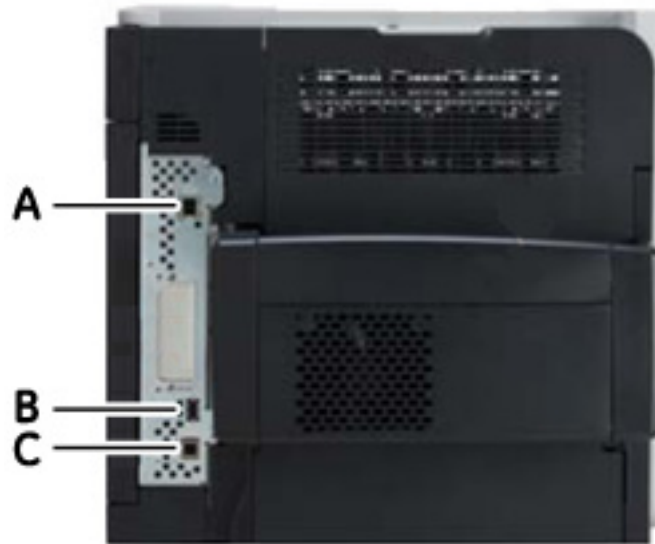
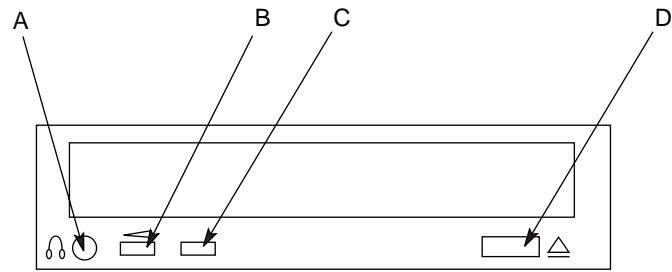


Table 32. HP P4015N LaserJet Printer

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

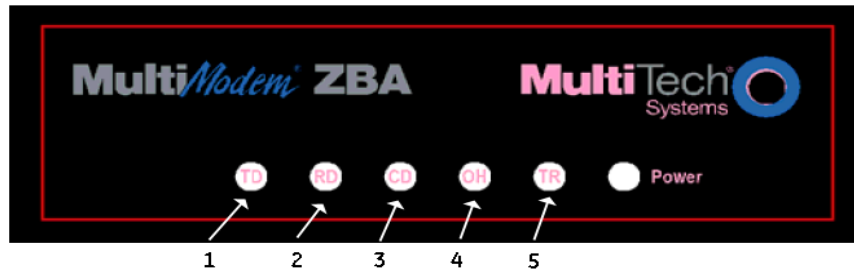
## CD-ROM drive



**Table 33. CD-ROM Drive**

Item	Name	Description
A	Headphone connector	Connect headphones here.
B	Variable control dial	Use to vary CD volume.
C	LED	Light indicates CD-ROM drive activity.
D	Eject button	Press to remove CD-ROM.

## Universal modem



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Item	Name	Description
1	<b>TD</b> (Transmit Data)	The TD LED flashes when the modem is transmitting data to another modem.
2	<b>RD</b> (Receive Data)	The RD LED flashes when the modem is receiving data from another modem.
3	<b>CD</b> (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	<b>OH</b> (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	<b>TR</b> (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

# Installation documents

The following table summarizes installation/upgrade documents that have been written for the MUSE system at version 005E software.

Part Number	Title
2002783-012	MUSE Standard Fax/Asynch CSI Modem Upgrade
2002783-039	MUSE Messaging Configuration and Setup Guide
2002783-040	MUSE/LifePak 12 Data Interface Configuration and Setup Guide
2020285-024	File Server Installation
2006660-016	Network Printer Installation
2006660-022	Client Software Installation
2020285-104	Monitoring Gateway Installation
2020285-097	Install MUSE 5E Software on Customer-Supplied Hardware
2020285-092	HIS Software-Only Installation Instructions
2020285-023	Advanced Security Guide
2020285-025	MUSE Pre-Installation Manual
2020285-022	G4 File Server Software Upgrade
408287-080	MARS-to-MUSE
2000656-010	CASE-to-MUSE
419931-003	CV Web Installation
419931-040	Data Transfer
2020285-192	MUSE Client Build Instructions
2027237-019	SD Card Reader Installation Instructions (English)
2027237-021	SD Card Reader Installation Instructions (French)
2027237-022	SD Card Reader Installation Instructions (Italian)
2027237-023	SD Card Reader Installation Instructions (German)
2027237-024	SD Card Reader Installation Instructions (Swedish)
2027237-025	SD Card Reader Installation Instructions (Danish)
2027237-026	SD Card Reader Installation Instructions (Norwegian)
2027237-034	SD Card Reader Installation Instructions (Simplified Chinese)



## How to set up the direct to database feature

If the customer wants to send reports directly to the database (rather than the *Edit List*), perform the steps below.

1. Log in to the system with the Service password.
2. Select *System* → *System Setup*.

The *Location* window for Location 0 is displayed.

Location

Location Name: PSYCHIATRIC WARD

Location Name Abbreviation: PSYCH Location Number: 0

Lab System IP Address: 255 255 255 0

Serial Comparison Setup

Serial Comparison? ☒ Patient ID Mask: NO PID

Use Edited Rhythm Stmt's? ☒ State Unconfirmed? ☒

No Unconfirmed ECG's? ☐ Only State Existence? ☐

No PID/Name Mismatch? ☒ Summary Diagnosis Only? ☐

Data Reduction Setup

Normal ECG's? ☐

Abnormal ECG's? ☐

Incoming report routing >>

OK Prev Next Last Select Delete Modified: ☐

3. Click the *Incoming report routing*>> button.

The *Incoming report routing* window appears.

Report Type	Edit list	Database	In-basket
Resting ECG	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pacemaker ECG	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
HiResolution ECG	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise testing	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Holter	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cath Lab	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Echo	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Defib	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discharge Summary	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
History and Physical	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Event Recorder	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nuclear	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surgery	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrophysiology	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chest Pain Assessment	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

In-basket:

OK Cancel

- For each data type, select the desired routing of incoming reports.

**NOTE**

If *In-basket* is selected, click the *In-basket* button to select the desired in-basket.

- Click *OK*.
- Repeat for each *Location*.
- Inform the customer of the modifications you made to their incoming report routing. If necessary, they may need to find reports using the *Retrieval* command.

# Installing and Configuring the I2 Option

The I2 (Information Interchange) 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)
- DatamedFT (Format Translator) provided by Engineering Solutions.

The Information Interchange option is listed in the *Installed Option* list as I2.

## Requirements

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

1. The I2 option must be installed.  
This is installed by GE Service using the *MUSE Options* utility.
2. The following line must be added to *d:\vol000\system\sysinf\xmlacq.asc*:  
**\\servername\vol000\tmp\xml\\*.xml;**

Where **servername** is the name of the MUSE file server.

The semi-colon at the end of the command must be included.

3. The CVIS0553 service must be installed and running.  
Add CVIS0553 to *backtask.asc* and install it as a service using the following command:

**CVADDSVC [Space] Domain\MuseBkgnd [Space] Password [Space] CVIS0553**

Where:

- ◆ **Domain** is the domain where the *MuseBkgnd* account exists. If *Musebkgnd* is a local account then **Domain** is the name of the MUSE file server
- ◆ **Password** is the password of the *MuseBkgnd* service account

Start the CVIS0553 service after it has been added.

4. The Microsoft XML Parser must be installed.  
Refer to “[Installing the MSXML Parser](#)” on page 3-6 for details.

## Installing the MSXML Parser

In order to install Microsoft XML Parser (Microsoft Core Services) the system needs Windows Installer version 2. The procedure in this section provides the steps to install the XML Parser and to update the version of the Windows Installer if necessary.

1. Insert the MUSE Support CD #1 into the CD-ROM drive.
2. Type or browse to **z:\XML\Parser\msxml.msi** (where **z** indicates the drive letter of the CD-ROM drive) and click *OK*.
3. If you get a message that you need a newer version of the Windows Installer service, complete the following steps.
  - a. Press **Ctrl + Esc** and then press **R**.
  - b. Browse to **z:\XML\Installer\instmsiw.exe** (where **z** indicates the drive letter of the CD-ROM drive) and click *OK*.
  - c. When you get the *Windows Installer Setup Completed Successfully* message, click *OK*.
  - d. Return to step 1 to install the parser.
4. Click *Next* at the *Welcome to the Microsoft XML Parser and SDK Setup Wizard* window.
5. At the *End-User License Agreement* screen click the radio button for *I accept the terms in the License Agreement* and select *Next*.
6. At the *Customer Information* screen, accept the defaults for *User Name* and *Organization* and click *Next*.
7. At the *Choose Setup Type* select *Customize*.
8. Accept the default selection at *Microsoft XML Parser* and select *Install Now*.
9. At the *Completing the Microsoft XML Parser and SDK Setup Wizard* screen click *Finish* to complete the install.

## Enabling the I2 Option

This XMLCONFIG.EXE utility, located on MUSE Support CD #1, is used to insert entries into \sysinf\xmlmap.btr. Before running the utility, launch the MUSE application on the file server so the H: drive is mapped.

1. Run the utility and log in with the service username and password.
2. Click *Add New*.
3. For LifePak 12 enter the following and then refer to the MUSE CV Information System/LIFEPAK 12 Data Interface Configuration and Setup Guide (PN 2002783-040):

The screenshot shows the 'Add A New XML Device' dialog box. The 'XML Device Text' field contains 'LP12'. The 'Configuration Parameters' section includes the following settings:

- Manufacturer's ID: Okin (selected), Physio (available)
- Analysis Function: XML\_AddRawChannel (selected), XML\_AnalyzeWaveform (available)
- Image Type: Text Data Only (selected), Waveforms As Data Points (available)
- Device ID: ECG Cart (MAC VU) (selected), Holter (available)

Buttons at the bottom: Add Device, Cancel.

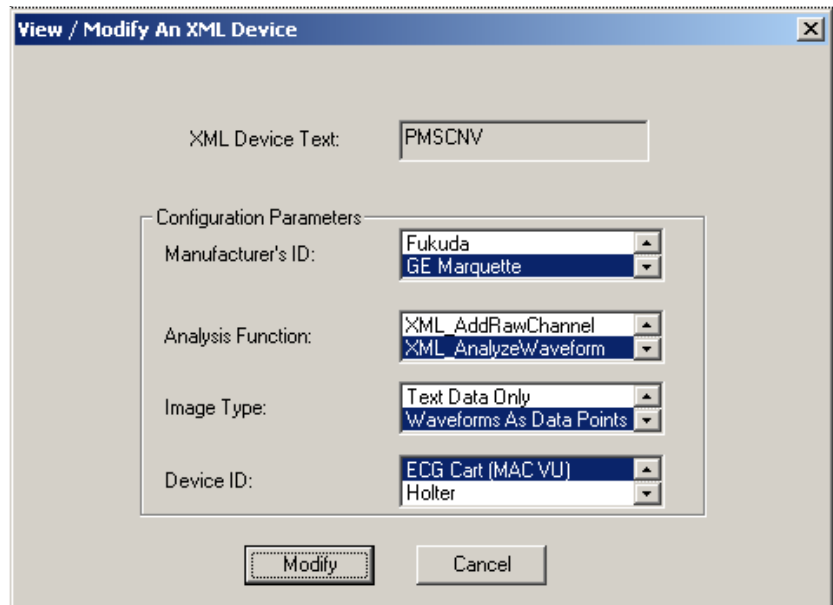
Or, for a DatamedFT, enter the following:

The screenshot shows the 'Add A New XML Device' dialog box. The 'XML Device Text' field contains 'DatamedFT'. The 'Configuration Parameters' section includes the following settings:

- Manufacturer's ID: DataMed (selected), Fukuda (available)
- Analysis Function: XML\_AnalyzeWaveform (selected), XML\_Cleanup (available)
- Image Type: Waveforms As Data Points (selected), Waveforms As Images (available)
- Device ID: ECG Cart (MAC VU) (selected), Holter (available)

Buttons at the bottom: Add Device, Cancel.

Or, for a Phillips-to-MUSE db conversion, enter the following:



4. Click *Add Device* (LifePak 12 or DatamedFT) or *Modify* (Phillips-to-MUSE db conversion)
5. Select *OK* to exit the utility.

**NOTE**

If you get an error creating the device, run the utility again, delete the device that you just created, and run through steps 2-5 again to recreate the device.

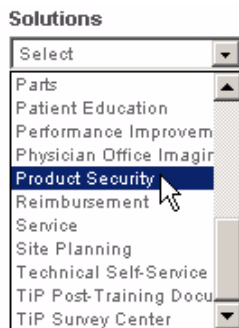
# Adjust daylight savings time to comply with the Energy Policy Act of 2005

If the MUSE 5E system is to be installed in the United States or Canada, you need to ensure that the appropriate Microsoft patches for changing the Daylight Savings Time start and end dates have been applied to the system. This will facilitate an accurate Daylight Savings time change in the MUSE system.

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

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

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



3. Click *Daylight Saving Time Change*.
4. Click the *CLICK HERE to learn how to keep your system right on time!* link.
5. Select the following from the three lists that appear next.

*Vendor:* GE Healthcare  
*Modality/Category:* Cardiology  
*Product:* MUSE

**Select a vendor, then modality (or category) and product:**

A screenshot of three stacked dropdown menus. The top menu is labeled 'GE Healthcare' and has a small downward arrow on the right. The middle menu is labeled 'Cardiology' and also has a small downward arrow on the right. The bottom menu is labeled 'MUSE' and has a small downward arrow on the right.

6. Click the *Click Here* link provided for the *DST Procedure* as shown in the following figure.

Check back regularly if your product is not listed yet.

Vendor	GE Healthcare
Modality	Cardiology
Product	MUSE
Software Version	
Remediation	Manual Only
Other Remediation	
DST Procedure	<a href="#">Click Here</a>
DST Patch	
Date Solution Will Be Available	
Additional Notes To Customer	<a href="#">Click Here</a>
Link for Additional Documentation	
Link To Additional Documentation 2	

7. If you need additional information on Daylight Savings Time, open the PDF file.
  - a. Click *Open* in the *File Download* window to read or print the bulletin.
  - b. After reading or printing the information, select *File > Close* to close the bulletin.

The bulletin describes the process required, specific to each of the GE Healthcare Diagnostic Cardiology products, to account for the United States and Canada DST change. It also provides detailed instructions for downloading and applying the appropriate Microsoft patches required.

8. Use the information in the file to determine if any Microsoft patches need to be applied to the MUSE 5E system.

If any patches need to be applied, use the information in the bulletin to download and apply the appropriate patches.



# 4 Integrated Maintenance Suite

# Introduction

The Integrated Maintenance Suite (IMS) application is provided with the MUSE CV information system for database backup and archive, as well as integrity checking, queue rebuilding, and system shutdown and restart. The system uses a third-party package to allow the file server to remain online during backup and therefore all workstations will also remain active during backup.

The MUSE CV information system has been set up to automatically run the IMS application every night at 3:00 am. When the IMS application runs, it does the following tasks:

- Integrity checking,
- Database analysis.
- Archive checking. Before doing a backup, the IMS applications checks if an archive should occur, and warns the user when an archive is near.
- Disk space checking. The IMS application begins checking for low disk space 180 days prior to an archive (when additional disk space is required).
- Automatic database archive. Automatic archive of database is triggered by any one of the following conditions:
  - ◆ if the highest numbered database file approaches “255”
  - ◆ if the total amount of data on the C: drive + Vol000 + the highest volume number approaches the capacity of the backup tape, or
  - ◆ there is a scheduled archive date, or
  - ◆ the disk space on the active volume is running low.
- Database backup.

**NOTE**

Database backup does not occur for systems that have been set up for network backup.

- Detailed logging of messages.
- Optional notification of significant events via email.
- Optional notification of significant events via MUSE editor.

## Database backup

Under normal circumstances, the IMS application does a FULL BACKUP EVERY DAY to the tape inserted at the file server.

A set of seven tapes is required for the 7-day backup rotation used by the IMS application. The IMS application requires that you sequence through the set of seven tapes, maintaining the same order every week. If the tapes are used out of sequence, the full backup is performed and a warning is entered in the *MUSE Event Log* (and the optional email notification message).

## Technical support for IMS

There are many references within this chapter to contacting the Jupiter On-Line Center for technical support for systems in the United States. The phone number for the Jupiter On-Line Center is 1-800-558-7044. If you need technical support for a system and you are not in the US, see “How to Reach Us” at the front of this manual to determine whom to contact for technical support.

## Network backup

If the user has agreed to use their own network backup, they assume full responsibility for all data residing on the file server. IMS will not perform any data backup, however IMS must continue to run to perform integrity checking and database analysis. If you want your system configured for network backup, contact the Jupiter On-Line Center.

# Configuration

There are two features of IMS that may be configured. Generally, the default parameters initially configured with the system should suffice, and no reconfiguration is necessary. These default parameters include the following:

- Automatic Daily Backup occurs at 3:00 am
- Users with *System Owner* privilege are notified of IMS-related events/conditions

These items can be reconfigured if the default settings are not suitable for your system.

## IMS notifications

The *Notifications* window in *System Setup* serves two purposes. It allows the *System Owner* to set up notification of IMS events and conditions to editors and site managers. The *Notifications* window also indicates that IMS events and conditions have occurred and provides a checkbox to acknowledge the event/condition. To view the *Notifications* window, follow the steps below:

1. Log in to the MUSE CV system as the *System Owner*.
2. Select *System* → *System Setup* → *System* → *IMS Notifications*.

The *Notifications* window appears.

Events		Occurred	Acknowledged
Backup failed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Archive occurred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Archive backup 1 occurred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Archive backup 2 occurred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Conditions		Occurred	Acknowledged
No recent backup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Archive pending	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disk space low (VolUUU)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disk space low (active volume)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disk space low (large volume)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Backup media not changed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notify these user groups:  
☐ Editors    ☐ Site Managers    ☒ System Owners

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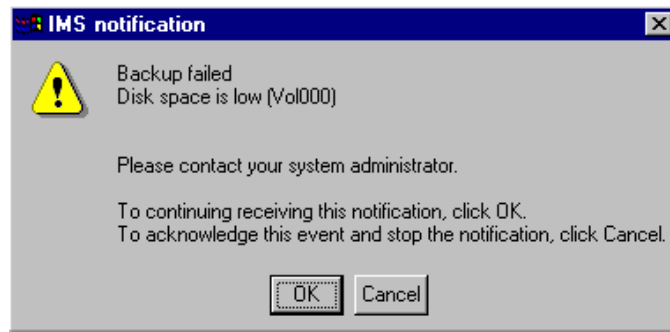
### NOTE

There are three groups of users who can be configured for notification of IMS events and conditions – *Editors*, *Site Managers*, and *System Owners*. Notification to *System Owners* only is the default setting.

3. To configure the other user groups for notification, select the check box next to the name of the group in the *Notifications* window and click the *Save* button.

When an IMS event or condition occurs, the users who have been configured for notification will see a window similar to the following when they start the

Editor application.



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- ◆ If the user clicks *OK* in the *IMS notification* window, the window will continue to appear until the event or condition is fixed.
- ◆ If the user clicks *Cancel* in the *IMS notification* window, the window will no longer be displayed. However, the window will continue to appear for users of a higher privilege level. For example, if a user with *Edit* privileges acknowledges the event/condition by clicking *Cancel*, the window will continue to appear for *Site Managers* and *System Owners* when they log into the system. When a user acknowledges an *IMS* event/condition, it will be logged to the *Event Log*.

For each *Event* and *Condition*, there is a check box labeled *Occurred* and a check box labeled *Acknowledged*. When an event or condition occurs, a check mark is added to the *Occurred* check box. The check mark is cleared when the event/condition is fixed.

#### NOTE

The three archive-related events can only be cleared by clicking the *Acknowledged* check box in the *Notifications* window. Only the *System Owner* can clear these events.

## Events

- *Backup failed*. There was a failure during the Backup operation. This is generally caused by a missing tape, a physically bad tape (due to wear, overuse or contamination), or incorrect tape label.

#### NOTE

If the tape inserted in the drive is labeled with any one of the 7 days of the week (Sunday, Monday, etc.), the backup will occur even if the tape label does not match the current day of the week.

The daily backup will fail if the tape inserted in the drive is not one of the 7 tapes labeled with days of the week. For example, if an archive tape is in the drive when the system attempts to perform a daily backup, the backup will fail. *IMS* will not overwrite archive backup tapes, monthly backup tapes or service backup tapes during a regular daily backup.

In the event of a failed backup, the user can perform a manual backup or wait for *IMS* to attempt a backup the following night.

- *Archive occurred*. The system archived successfully. This should generally be accompanied by an “Archive backup 1 occurred” message.

- *Archive backup 1 occurred.* The current tape now contains a backup (1st of 2) of the archived volume. This tape should be labeled and removed from rotation. The archive backup tapes should be stored in a safe place. If they are needed in the future for disaster recovery, they may be the only source that contains a copy of this portion of the database.
- *Archive backup 2 occurred.* The current tape now contains a backup (2nd of 2) of the archived volume. This tape should be labeled and removed from rotation. The archive backup tapes should be stored in a safe place. If they are needed in the future for disaster recovery, they may be the only source that contains a copy of this portion of the database.

## Conditions

- *No recent backup.* Indicates that at least one week has passed since the last successful daily backup. This is a serious problem that requires investigation. Check the *Error Log* and *Event Log* for information as to why the backups are failing or not being performed at all.
- *Backup media not changed.* It has been one week since the tape was rotated. The same tape (e.g. the “Friday” tape) is being used each night. Using the same tape over and over will not only wear out the tape and eventually cause backup to fail, but also restricts disaster recovery options to a single tape.
- *Archive pending.* Indicates that an archive will occur soon (generally within two to three weeks).
- *Disk space low (vol000).* Indicates that the disk space available for the D drive is low. A larger drive will need to be installed, or if the active volume is currently on the D drive, it may make sense to move it to another drive. Contact the Jupiter On-Line Center for assistance.
- *Disk space low (active volume).* Indicates that the disk space available for the drive containing the active volume is low. An archive will occur prematurely unless some space is made available on the drive, or it is replaced with a larger disk drive. Contact the Jupiter On-Line Center for assistance.
- *Disk space low (target volume).* Indicates that there is not enough disk space available for a new archive volume. It is necessary to increase the storage capacity of the system. Contact the Jupiter On-Line Center for assistance.

## Email notification

IMS may be configured to email a report to one or more selected users. See “[Email notification of IMS events](#)” on page 4-21 for details on how to configure email notification of IMS events. When configured to receive email notification, a user will receive a daily email from IMS. This email can be configured to contain IMS warnings, IMS error information, and/or all status information.

The messages contained in the email notification are the same as those displayed in the *Details* section of the *IMS Status* window. (Refer to “[IMS status window](#)” on pages 4-10 through 4-13 for further information.)

## Daily responsibilities

The following daily responsibilities are required in order to use the IMS application responsibly.

- Rotate backup tapes. Insert the correct backup tape every day.

### NOTE

For systems using the network backup option, tape rotation is not required.

- Review the *IMS Status* window.
- Review the *Notifications* window.

## Rotate backup tapes (not required for network backup)

A set of 11 tapes ships with the system. Seven tapes are required for the complete backup cycle required by the IMS application. One tape is to be used for the monthly backup and one tape is to be used for the monthly service backup. The remaining tapes are to be stored in reserve for when the first database archive occurs. Label the tapes as follows:

Sunday  
Monday  
Tuesday  
Wednesday  
Thursday  
Friday  
Saturday  
Monthly Backup  
Monthly Service Backup

Leave the two remaining tapes unlabeled. They will be used to replace the day of the week tapes that become archive backup tapes after an archive takes place. (Refer to “[Check for archive \(not required for network backup\)](#)” on page 4-12.)

### NOTE

In order to improve tape reliability, record the date each tape is used. This includes each time a tape may be re-used over a weekend (for users that are unable to rotate tapes on weekends).



The MUSE CV information system has been set up to automatically run the IMS application every night at 3:00 am. Therefore, every day before the 3:00 am automatic backup, you must remove the previous backup tape and insert the next one.

1. Press the eject button on the tape drive to eject the current tape.
2. Wait for the tape to rewind and eject.

**NOTE**

If the tape was ejected by IMS, review the *Details* section of the *IMS Status* window to determine why. (Refer to “*IMS status window*” on pages 4-10 through 4-13.) There are 4 possible reasons why the tape was automatically ejected from the drive:

- ◆ Archive has taken place
- ◆ Archive backup has taken place
- ◆ Monthly backup has taken place
- ◆ Service backup has taken place

Tapes containing archive backups should not be reused. They should be labeled and put in storage.

3. Record the date(s) the tape was used on the usage grid, which is located on the tape label.
4. Put the tape back into its jacket.
5. Find and insert the next day's tape.

## IMS status window

IMS backup and archive information is available in *System Status*. To view the IMS status window select *System* → *System Status* → *System* → *IMS Status*.

A typical *IMS status* window is shown below.

The screenshot shows the 'IMS status' window with the following sections:

- Last IMS operation:**
  - Type: BACKUP
  - Status: Successful
  - Date: Sun Jul 14 12:41:32
  - Duration: 00:05:11
  - Details:
    - {REPORT } Successful backup
    - {WARNING} The backup media has not been changed in the last week
    - {REPORT } Backup/Archive: media label Friday, 0 errors.
- Last backups:**
  - Last successful backup: Sun Jul 14 12:41:32
  - Monthly backup: ^^^
  - Last backup media label: Sunday
  - Service backup: xxx
- Backup status:**
  - This week:**

Sun Jul 14	OK
------------	----
  - Last week:**

> Sunday	NO BACKUP
> Mon Jul 08	Label Saturday
> Tue Jul 09	Label Saturday
> Wednesday	NO BACKUP
> Thu Jul 11	Label Saturday
> Fri Jul 12	Label Saturday
> Saturday	NO BACKUP
- Disks and backup media:**
  - Disk drives (fileserver):**

C:	1.4 of 3.9Gb used, 64% free
D:	9.3 of 13.0Gb used, 29% free
  - Backup media:**

3.5 of 11.2Gb used, 69% free
------------------------------
- Archive status:**
  - Projected automatic archive: 46 days (Tuesday 03-Sep-2002)
  - User-scheduled archive: [empty field]
  - Table:
 

Volume	Archive date	Backup 1 date	Backup 2 date
vol001	ACTIVE		

An 'OK' button is located at the bottom right of the window.

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## Verify the IMS application ran

Review the *Last IMS operation* section of the *IMS Status* window. Use the information displayed in this window to verify that IMS ran the previous night. Typically, *BACKUP* will appear in the *LAST IMS operating Type* field. Call Jupiter On-Line Center if IMS did not run within the last 24 hours.

## Check the backup

Verify that a successful nightly backup occurred. The date should reflect the previous night's backup schedule time. Also verify that the correct tape was used. The tape label is shown in "Last backup media label." If the tape label does not match the current day of the week, verify you have the correct tape inserted for the next backup.

### NOTE

If the line {WARNING} current media label is (?), expected (??) appears in the *Details* section (where ? and ?? are replaced by the label rotation found and expected), this indicates that the tape was not rotated prior to the backup operation. This Warning line does not indicate a failed backup. Users who are unable to rotate tapes on the weekends will always see this warning on Monday morning.

If the backup has failed, a manual backup may be required. See "Manual backup" on page 4-16 for detailed procedures.

## Check the last IMS operation

The last IMS operation will indicate what type of operation occurred. The possible messages which may appear in the *Type* field include:

<i>BACKUP</i>	for an automatic nightly backup
<i>MANUAL BACKUP</i>	for a manual backup
<i>MONTHLY</i>	for a monthly backup (manual backup)
<i>SERVICE</i>	for a monthly service backup (manual backup)
<i>ARCHIVE</i>	for an archive
<i>ARCHIVE/BACKUP</i>	for an backup of an archive volume

There are two possible messages which may appear in the *Status* field. They include:

<i>Successful</i>	The operation succeeded
<i>Failed</i>	The operation failed.

If the operation failed, refer to the *Details* section and scroll through the list, looking for any messages labeled {ERROR}. A failed backup may result from:

- There was no tape in the drive.
- A tape was inserted however it had a smaller capacity than required.
- A tape with an incorrect label. Tapes which are labeled as archive backup tapes, monthly backup tapes and monthly service tapes may not be used for daily backups. Daily backups will not overwrite tapes with these labels. A message will indicate this in the details section.

## Check for archive (not required for network backup)

If an automatic archive has taken place, the last operation will show BACKUP/ARCHIVE. Also, the daily tape, which now contains the archive, will be ejected from the tape drive in the file server if the backup of the archive succeeded. If the operation was successful:

1. Remove the archive backup tape from the tape drive. Label it as noted in the *Details* section. Write protect the tape and store in a safe place.
2. Label a new blank tape (PN 2291440) to replace the daily tape removed from the rotation in step 1. (Label tape with the same “day of the week” label as the tape you removed.)
3. Insert the next day’s tape. The IMS application will make another archive backup copy the following night.
4. The next morning, after the IMS application has made the second archive backup tape, remove the tape and label it as noted in the *Details* section. Write protect the tape and store it with the first archive backup tape.
5. Label another new tape to replace the daily tape removed from the rotation in step 4. (Again, use the same “day of the week” as the tape you removed.)

### NOTE

Expect to see *New or unrecognized backup media, will be labeled as (?)* where ? is the current weekday.

### NOTE

If an archive fails contact the Jupiter On-Line Center to correct the archive.

## Review the details section of the IMS status window

Significant IMS messages are noted in the *Details* section.

- ERROR: Unable to access the tape. Check to be sure a tape was inserted.
- Disk full warning messages. When the volume of data on the hard disk is reaching capacity, the IMS application begins logging messages to the *Details* section and MUSE *Event Log*. This message should first appear approximately 180 days before the hard drive is filled. When this message first appears in the *Details* section, contact the Jupiter On-Line Center. It is necessary to increase the storage capacity of your system.
- Archive prediction. As the system approaches automatic archive conditions, the IMS application logs appropriate messages to the *Details* section and MUSE Event Log. IMS includes the predicted number of days until archive (based on daily use) in the *Details* section.

- **WARNING:** Backup/Archive: sequence (?), (#) files skipped (where ? is replaced by the rotation and # is replaced by a number). These indicate files which were not backed up. It is important to review which files are skipped to determine whether the backup is OK. Contact the Jupiter On-Line Center.

**NOTE**

The MUSE CV information system uses a third party package to allow the file server to remain online during backup. During periods of heavy MUSE CV information system traffic (for example, more than normal acquiring, editing, printing, and HIS link traffic), backup may skip some files, and this will be logged as a warning message. If this occurs frequently, see “[Re-schedule automatic backup](#)” on page 4-16 for details on how to re-schedule the time at which the IMS application runs or contact the Jupiter On-Line Center for assistance.

- **ERROR:** Integrity Failed. Integrity Errors. If this message appears in the *Details* section, call the Jupiter On-Line Center.

## Review notifications window (System Owner)

IMS is configured to provide notification of significant events and conditions to MUSE users. Initially only the system owner is configured to receive these notifications when logging into the MUSE CV system. These notifications may be disabled, and the system owner may elect not to log in to the MUSE. If this is the case, the System Owner should view the *Notifications* window daily to check for and acknowledge messages. Refer to “[IMS notifications](#)” on pages 4-4 through 4-6 for more information.

# Responsibilities (monthly)

## NOTE

The following monthly responsibilities are required if the systems are using database backup and are recommended if the systems are using network backup.

## Update the monthly backup tape

1. Insert the Monthly Backup tape.
2. Select *Start → Programs → MUSE CV Information System → Integrated Maintenance Suite → Manual Backup*.
3. Select the *Monthly Backup* button.
4. Wait for the progress bar to disappear.
5. Wait for the tape to be ejected.
6. Eject the Monthly Backup tape.
7. Continue with “[Manual backup](#)” on page 4-16.

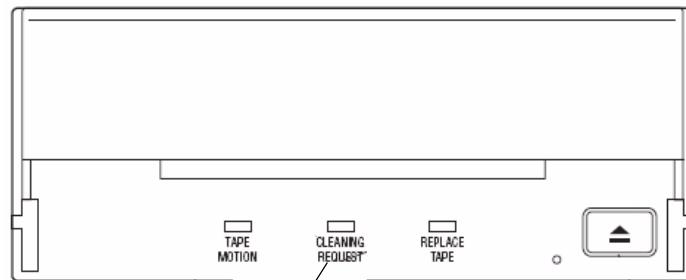
## Update the monthly service tape

1. Find and insert the Monthly Service tape.
2. Select *Start → Programs → MUSE CV Information System → Integrated Maintenance Suite → Manual Backup*.
3. Select the *Monthly Service* button.
4. Wait for the progress bar to disappear.
5. Wait for the tape to be ejected.
6. Remove the Monthly Service tape.
7. Insert the next backup tape from the front of the rotation stack.

# Responsibilities (every 3 months or 100 hours)

## Run the cleaning cartridge

The tape drive manufacturer recommends cleaning the tape drive when the **CLEANING REQUEST** LED is on to keep the tape drive in good working order.



**CLEANING REQUEST LED**

Clean tape drive when CLEANING REQUEST LED is on.

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### CAUTION

Regular cleaning is vital to trouble-free operation of any tape device. Failure to follow recommended cleaning procedures could result in serious damage to the tape drive.

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GE recommends cleaning the drive once every 3 months or every 100 hours of use, whichever comes first.

When a drive is cleaned according to a regular schedule, one cleaning cycle typically removes accumulated dirt and particle deposits. However, in a dusty environment, one cleaning cycle may not fully clean the drive read/write heads. Up to four cleaning cycles may be necessary to fully clean the drive.

### NOTE

For systems using the network backup option, cleaning is required only once a year.

## Cleaning procedure

For specific tape drive cleaning procedures, refer to the OEM manual that shipped with the system.

# Miscellaneous

## Manual backup

1. For software v005E.12 or higher systems, before running IMS for the first time, run the *c:\mei\evnttrig.bat* batch file.
  - a. From the Windows desktop, select *Start → Run....*
  - b. Click *Browse...* button and browse to the **c:\mei\evnttrig.bat** file.
  - c. Click *Open*.
  - d. Click *OK*.

The batch file will prompt for password for three times.
  - e. Enter **Muse!Admin** (the current user login password) at each password prompt.
2. Select *Start → Programs → MUSE CV Information System → Integrated Maintenance Suite → Manual*.
3. Make sure that the correct tape is in the tape drive.
4. Select the *Normal Daily* button.
5. Wait for the progress bar to disappear.
6. Review the *IMS Status* window. (Refer to the “**IMS status window**” on pages 4-10 through 4-13 for more information.)

### NOTE

Be sure you scroll through the entire *Details* list in the *IMS Status* window.

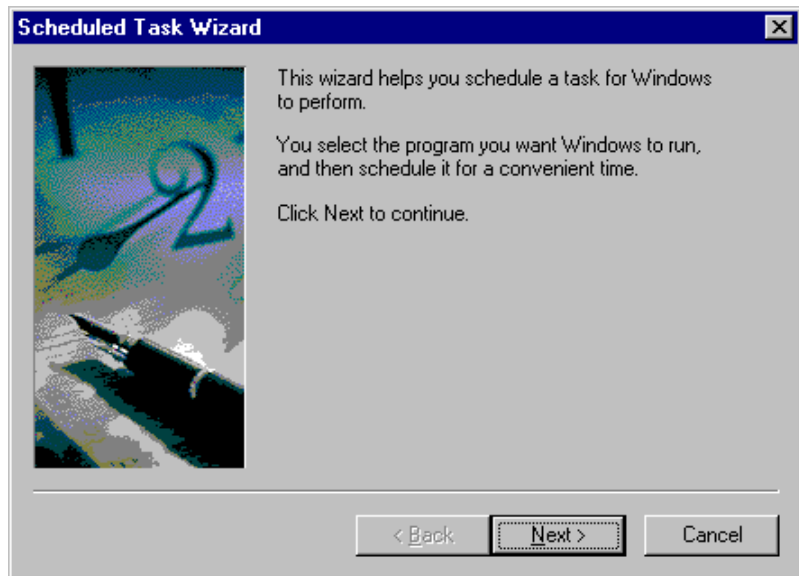
7. Eject the tape.

## Re-schedule automatic backup

The default time for automatic daily backup is 3:00am. If this backup time is not the time you wish to run automatic backup, change the backup time as described in this section:



1. From the desktop of the file server double-click *My Computer*, and then double-click *Scheduled Tasks*.
2. Double-click *Add Scheduled Task*. This will launch the *Scheduled Task Wizard*.

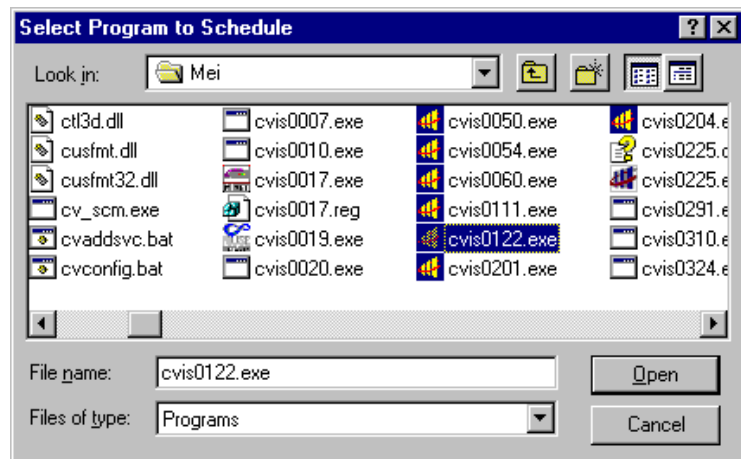


3. Click *Next*.



4. Click *Browse*.

5. Browse to **c:\mei**. Click **cvis0122.exe** and click *Open*.



A window appears prompting you to select when to perform the **cvis0122** task.



6. Select *Daily* and click *Next>*.

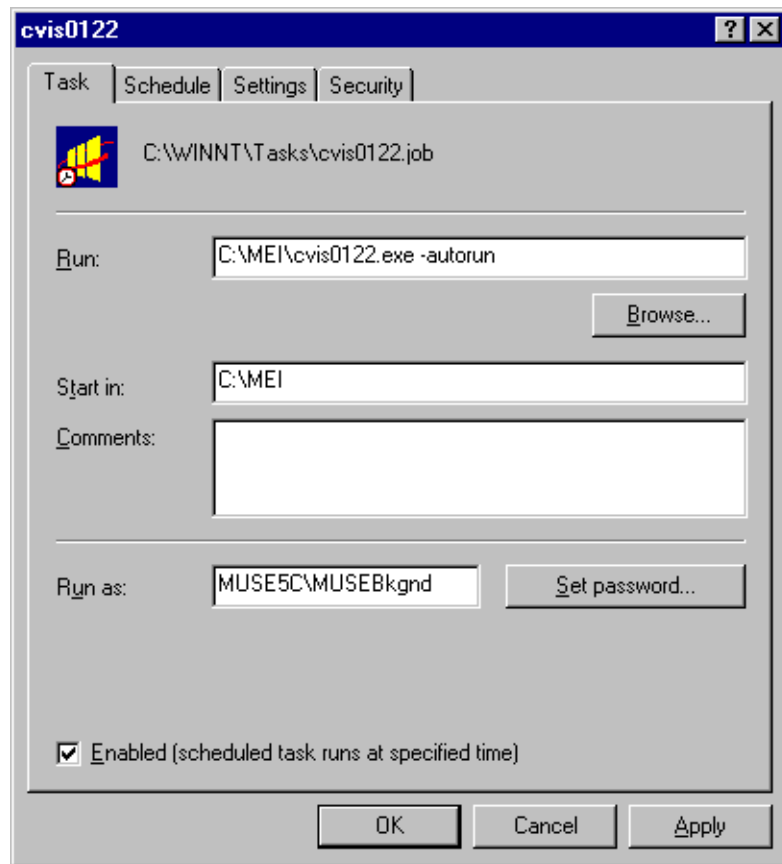


7. Change the *Start time* to the desired time and click *Next>*.

8. Enter the MUSEBkgnd account information and click *Next>*.

9. Click the *Open advanced properties for this task when I click Finish* box.

10. Click *Finish*.



11. Add the **-autorun** switch to the *Run* line and click *OK*.

## Email notification of IMS events

The steps below describe how to set up the system for email notification of IMS events.

1. At the file server open Windows Explorer.
2. Browse to the following file:  
**vol000\system\templt\imsnote.bat**
3. Copy the imsnote.bat file to:  
vol000\sysinf
4. Right-click the vol000\sysinf\ims.bat file and select Open to launch Notepad.
5. Edit the file per the instructions contained in the file comments.
6. Save the ims.bat file.

## Log files

The IMS application writes information to several log files. Daily log files for the previous seven days are stored on the D-drive in *Vol000 → System → Errlog*. A partial list includes:

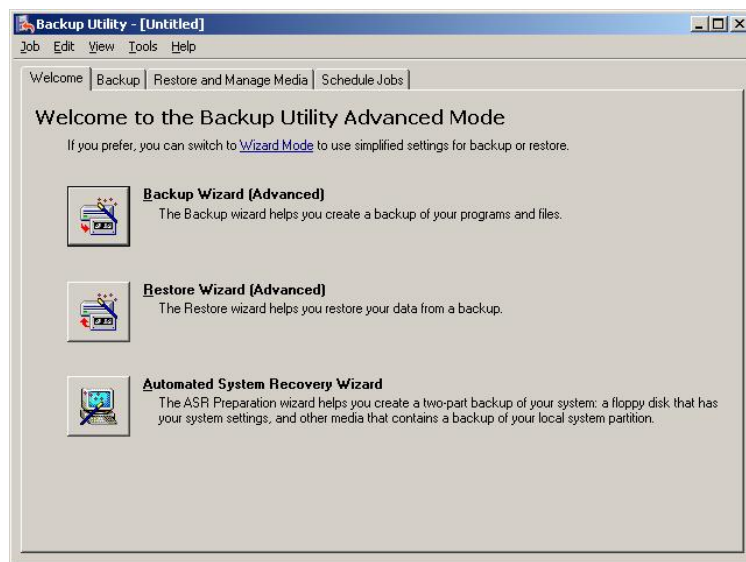
- IMS\_?.LOG
- CHKPTRS.LOG
- DBANAL.LOG
- BACK\_?.LOG
- ARC\_#\_#.LOG

# Disaster recovery – MUSE file server

## 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.

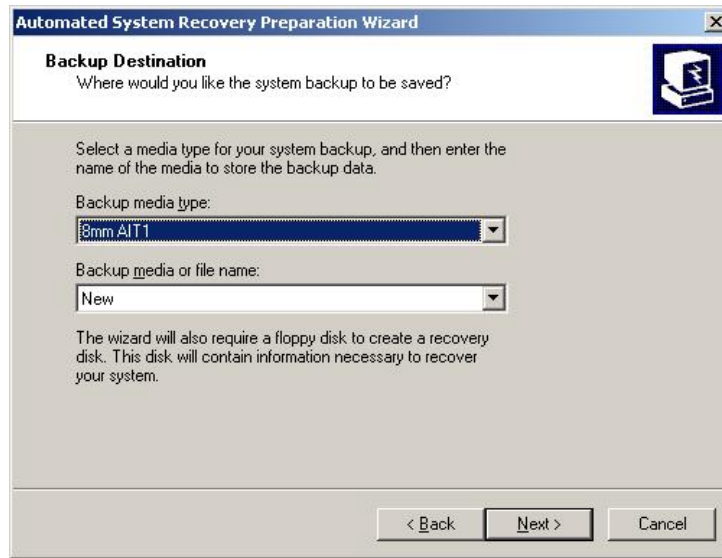
1. Log in to the file server as a local administrator.
2. To create an AIT tape/Diskette ASR set, click on *Start* → *Run...*
3. Type **ntbackup** and press **Enter**. If backup is already configured for advanced mode, the following screen will be displayed. If not, click on the advanced mode link.



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



5. 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.

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

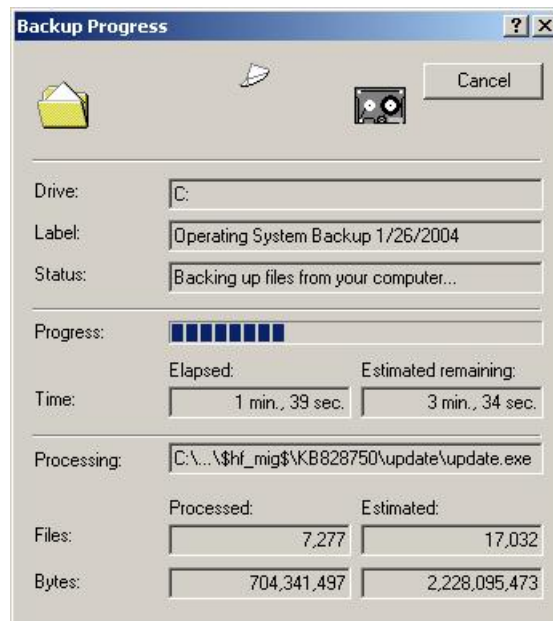


7. Make sure you have a new blank AIT tape in the tape drive (or an existing one that is being replaced) and that you have a blank formatted diskette ready. Click *Finish*.

You will see windows like the ones below that show the progress of the backup.



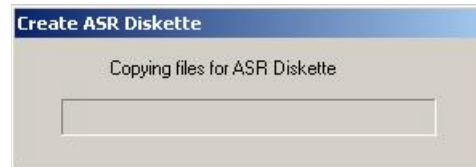




8. When the backup finishes, you will be prompted for the diskette. Insert the blank formatted diskette and click *OK*.



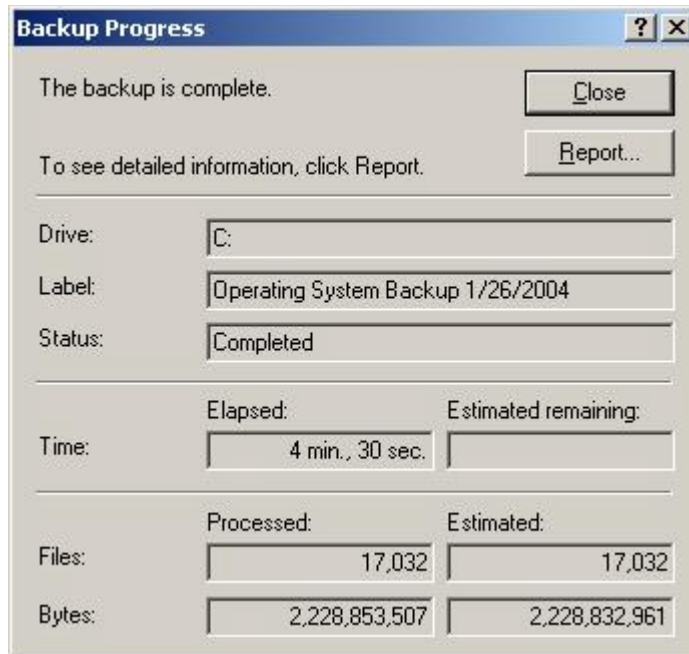
Files will be copied to the diskette.



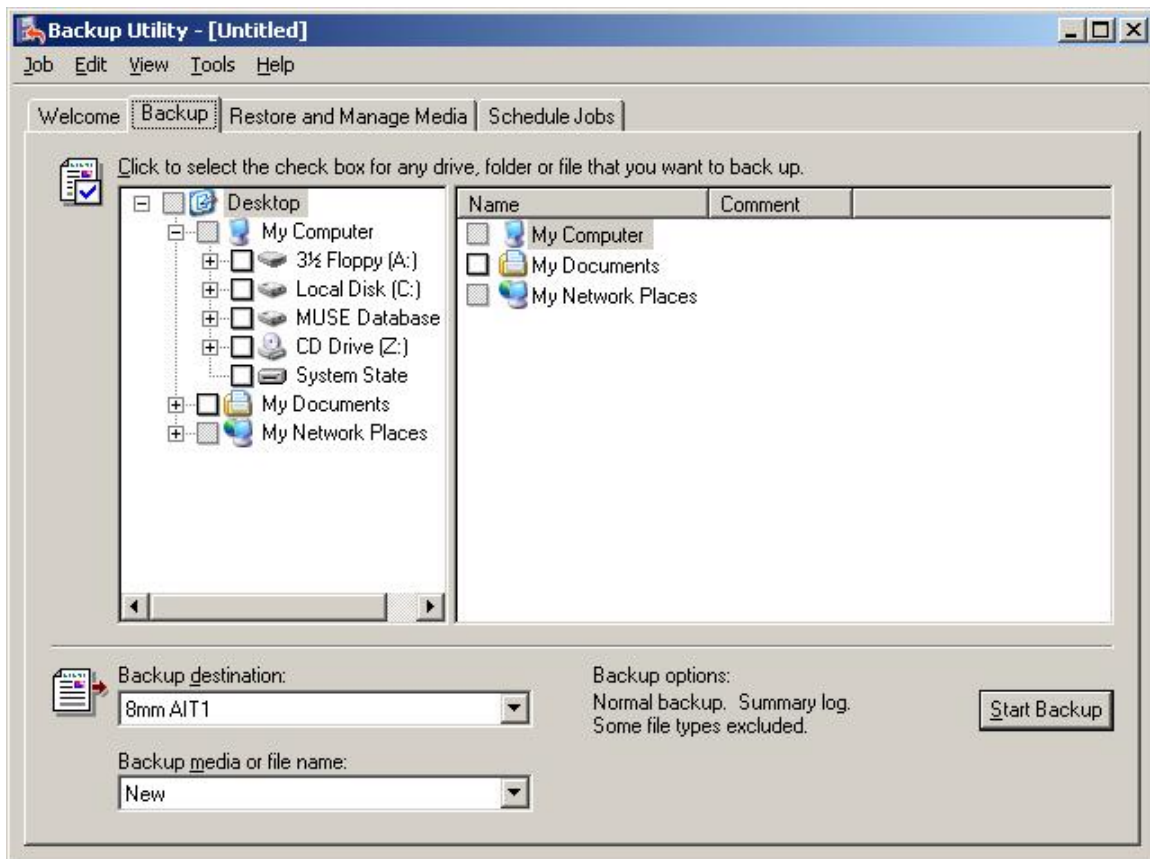
9. After the diskette is created, you will be prompted to remove the diskette and tape and to label them appropriately.



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



11. Click the **X** to close the *Backup Utility* window.



12. If the MUSE file server is a G5 server, 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 [http://sony.storagesupport.com/ait/ait\\_asr.htm](http://sony.storagesupport.com/ait/ait_asr.htm).

13. If the MUSE file server is a G5 server, verify the floppy drive contains the following files and directory structure:

Directory	Files	Comments
A:\ (root)		
	asr.sif asrnp.sif 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

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

**NOTE**

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.

**NOTE**

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.

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

## Recovering from system failures

There are two possible routes to take when you need to recover from a system failure.

- Recovery Console (used to repair minor problems)
- Automated System Recovery (used to completely restore the system partition)

### Using recovery console to recover from system failure

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 to use 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. Watch closely for the Windows Setup window to display the F6 prompt at the bottom of the screen. Press the **F6** key immediately after the prompt appears.
3. Insert the ASR floppy disk when prompted and press any key to continue.
4. Press the **F2** key when you are prompted to run the Automated System Recovery (ASR).
5. When the screen asks for floppy to install the tape driver, press the **S** key.
6. Select the correct operating system tape driver.  
(Sony AIT SAIT 32 bit tape driver for Windows Server 2003).
7. When the text-based part of Setup begins, follow the prompts; choose the repair or recover option by pressing **R**.
8. When prompted, type the password for the local administrator account.
9. At the system prompt, type the relevant Recovery Console commands; type `help` for a list of commands or `help commandname` for help about a specific command.
10. To exit the *Recovery Console* and restart the computer, type **exit**.

## Using automated system recovery to recover from system failure

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 just like it was 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 use the Automated System Recovery (ASR) backup media for recovery, you must have the floppy disk that you created with that set of media. You cannot use a floppy disk created at a different time or with a different set of media.

Make sure you have the following available before you begin the recovery procedure:

- Your previously created ASR floppy disk.
- Your previously created ASR backup media.
- The Windows Server 2003 installation CD.
- The ML370 G5 Pre-Install CD (for G5 servers only)
- The most recent MUSE backup tape, to recover **D:\vol000** and the highest **\volxxx** folder.
- Any MUSE Archive backup tapes, to recover any **D:\volxxx** archive folders.

### Configuring the file server RAID array (G3 and G4 servers)

1. Power-up the system.
2. Watch closely during system boot and when *Press <F8> to run the Option ROM Configuration for Arrays Utility* is displayed press **F8**.
3. Highlight *Delete Logical Drive* and press **Enter**.
4. If the *There are no available logical drives* screen appears, press **Esc** and go to step 7 below (Highlight *Create Logical Drive...*)
5. If logical drives exist, press **F8** to delete them, and press **F3** in the warning window.
6. Press **Enter** at the configuration saved screen.
7. Highlight *Create Logical Drive* and press **Enter**.
8. In the *Available Physical Drives* box, cursor down to the last drive and press the Spacebar to remove the drive from the array.
9. Verify *RAID 5* is selected.
10. Press the **Tab** key twice to select *Use one drive as spare* pressing the Spacebar. Verify that the letter **S** appears in the checkbox.
11. Press **Enter** to create the drive.
12. Press **F8** to save the configuration.
13. Press **Enter** on *Configuration Saved* screen.
14. On *Main Menu* screen press **Esc** to exit and resume the boot process.

## NOTE

Steps 15 through 26 below would not normally need to be done if the system was already 5E, but they might be necessary, depending on what hardware was replaced on the file server.

15. Press **F9** when the message *Press “F9” key for ROM-Based Setup utility* is displayed.
16. Select *System Options*. Press **Enter**.
17. Select *OS selection*. Press **Enter**.
18. Select or verify *Microsoft Windows 2000/Windows Server 2003* as the OS to be installed. This may show as *Microsoft Windows 2000/Windows.NET*. Press **Enter**. Press **Esc**.
19. Select *Boot controller Order*. Press **Enter**.
20. Select or verify *Compaq Smart Array 532 (or 641) controller*, press **Enter**.
21. Select *Controller Order 1*. Press **Enter**. Press **Esc**.
22. Select *Date and time*. Press **Enter**; enter the current date and time and press **Enter**.
23. Select *Advanced Options*. Press **Enter**.
24. Select *Post F1 Prompt*. Press **Enter**. Select *Disabled*. Press **Enter**.
25. Press **Esc** twice.
26. Press **F10** to Confirm Current boot controller is *Compaq Smart Array 532 (or 641) Controller*.  
The system will reboot.
27. Go to “[Recovering the system partition \(G3 and G4 servers\)](#)” on page 4-31.

## Configuring the file server RAID array (G5 servers)

1. Power up the system.
2. Watch closely during system boot and when *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 \(G5 servers\)](#)” on page 4-32.

## Recovering the system partition (G3 and G4 servers)

1. Insert the Windows Server 2003 Standard Edition installation 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, you may need to check the boot order in the BIOS setup.
3. Press **F2** when prompted at the beginning of the text-only mode section of Setup. You will be prompted to insert the ASR floppy disk you had previously created.
4. You will be prompted to delete and recreate the disk partitions. Press **C** to continue.
5. The drive will be formatted, and then setup files will be copied to the Windows installation folders.
6. The system will reboot. Remove the floppy diskette as requested.
7. After reboot, a normal Windows installation will begin. Windows will install drivers and the network, and then go into the *Automated System Recovery*.
8. Follow the prompts to allow the system to restore from the ASR tape. The system will reboot.
9. At this point you will have your original C: drive (from the time the ASR tape was created), and you will have an empty D: drive.

### NOTE

Automated System Recovery will not restore your data files. The MUSE database will need to be restored separately from the most recent backup and archive backup tapes.

## Recovering the system partition (G5 servers)

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. Press the **F6** key when the **F6** prompt appears at the bottom of the *Windows Setup* window.
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” on page 4-xx.



## Formatting the D partition (G3, G4, and G5 servers)

Verify that the D-drive is empty. If it is not, perform the steps to re-format the D: drive.

1. Right-click on *My Computer* and select *Manage*.
2. On the *Computer Management* window, select *Storage > Disk Management*.
3. Right-click on drive **D:** and select *Format...*
4. On the *Format* window, verify the *File System* is set to *NTFS* and the *Perform a Quick Format* check box is set.
5. Click *OK*.
6. 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 next section.

## Recovering the MUSE database

1. Insert the latest MUSE backup tape into the tape drive.
2. Click *Start* → *Run...* and type in **ntbackup** and press **Enter**.
3. Click on the *Restore Wizard (Advanced)* button.
4. Click *Next>* on the *Welcome to the Restore Wizard* screen.
5. Expand *8mm AIT1* under *Items to restore*.
6. If necessary, double-click on the backup tape to load a set list from the media.
7. If necessary, double-click the **D:** drive to load the list for that set.
8. Verify that you have **vol000** and **volxxx** (where xxx = the other volume that would be part of the current nightly backups) selected for restore.
9. Click *Next*.
10. Click *Finish* to restore the **D:\vol000** and **D:\volxxx** folders to their original locations.
11. Click *Close* when the restore is complete.
12. Follow a similar procedure to restore any archive volumes from the archive backup tapes.
13. When you are done with recovering the MUSE database, you should have **D:\vol000** through **D:\volxxx** (where xxx = the other volume that was restored from the nightly backup tape). If any volumes are missing, you have not restored all of the archive volumes. Contact MUSE Tech Support if you are unable to find all of the required backups to recover this data.
14. When you are finished with restoring data, close the *Backup Utility* window.

## Sharing the volumes

After restoring the volumes on the D: drive, you will need to share them for the MUSE Users group.

1. For each volume, right-click on the folder in *Windows Explorer* and go into *Sharing and Security*.
2. Select *Share this folder*, and click on the *Permissions* button.
3. Remove the *Everyone* group, and add the local *MUSE Users* group. Give the MUSE Users group Change permissions.

## Recreating and restoring the format settings database

The Format Settings database is stored under **D:\mssql\data**. Since that folder is not part of a normal MUSE backup, a SQL backup is run nightly at 10:00pm that stores the database backup in **D:\vol000\mssql**. The file that contains the SQL backup is **sqlbackup.dmp**. You can use the following procedure to recreate and restore the Format Settings database.

If not already present, copy the **buildsql5e.exe** and **restsql.exe** files to the **C:\service** folder. These files can be found on the MUSE 5E Service Diskette. Contact Technical Support if you do not have this diskette.

Execute the two files to create the **C:\service\buildsql** and **C:\service\restsql** folders.

### NOTE

If the system is running MUSE English software, continue with the next steps. Otherwise, do the following:

French – In the **c:\service\buildsql** folder, copy **\*.sfr** to **\*.sql**  
German – In the **c:\service\buildsql** folder, copy **\*.sgr** to **\*.sql**  
Italian – In the **c:\service\buildsql** folder, copy **\*.sit** to **\*.sql**  
Swedish – In the **c:\service\buildsql** folder, copy **\*.ssw** to **\*.sql**

4. Double-click on **C:\service\buildsql\buildsql.bat**. This will create the **D:\mssql7\data** folder with the default Format Settings database.
5. Double-click on **C:\service\restsql\restsql.bat**. This will restore the backed up Format Settings database from the **D:\vol000\mssql\sqlbackup.dmp** file.

## Reconfiguring services

The services will be reset to a default configuration as part of this procedure. In order to restore the proper settings for MUSE, perform the following step.

1. Click on *Start* → *Run...*
2. Type or browse to **C:\Install\regtweak.reg**.
3. Click *OK*.

# System Shutdown & Restart Procedures

## Shut Down the MUSE System

Shut down all workstations attached to the file server by initiating a MUSE shutdown on the file server. To initiate a system shutdown:

1. Log in to the file server as MUSE Administrator.
2. Select *Start* → *Programs* → *MUSE CV Information System* → *Integrated Maintenance Suite* → *Advanced* to launch the *MUSE CV- IMS Advanced* window.
3. Select *System* → *Shutdown/Restart* to display all the *Shutdown/ Restart* options.

The options in the *Shutdown/Restart* menu initiate the MUSE CV information system shutdown process whereby all MUSE services running on the file server and all MUSE clients attached to the server are shut down. The shutdown is a four-minute process, allowing users of client workstations sufficient notification in order to exit their current application and log out.

The differences between the three options are as follows:

- ◆ The *Shutdown* option will result in a system shutdown. Select this option when shutting down the system for maintenance or software upgrades.
- ◆ The *Rebuild Queues* option, in addition to shutting down the system, selecting this command copies over new template versions of the queues as selected by the user from an additional dialog display. When the system is restarted, those queues are then rebuilt from scratch (not just validated) by the MUSE Service Control Manager task (CV\_SCM).
- ◆ The *Restart* option is available for a single-step shutdown/restart process for cases such as the need to activate MUSE CV information system device configuration changes. The Restart option results in the automatic restart of the MUSE CV information system.

4. Select the appropriate *Shutdown/Restart* option.
5. After selecting the shutdown option, select *OK* from the warning dialog to begin operation.

For all options the *Shutdown Pending...* text appears in the IMS dialog context and a small blue flashing indicator appears in the lower right corner of the screen. When the operation has completed, *Shutdown OK*. Code (0) is displayed in the IMS dialog context. (Note that the IMS dialog box will remain displayed until it is manually closed out.)

6. Select *System* → *Exit* to close the MUSE CV-IMS Advanced window.
7. If you selected *Rebuild Queues* or *Restart* in step 4, go to “[Start-Up Verification](#)” on page 4-37.
8. If you selected *Shutdown* in step 4, go to “[Start-Up Verification](#)” on page 4-37.

## Shutdown the File Server

1. After shutting down the MUSE CV system as described in the previous section, shut down the file server by selecting *Start* → *Shutdown...* from the Windows desktop.
2. Select *Shut down the computer?* and click the *Yes* button.
3. After Windows has completed its shutdown process, a message box will appear stating that It is now safe to turn off your computer, followed by a *Restart* button. At this time, you may turn off the monitor and power down the file server.
4. At this time, you may also power down the workstation nodes and attached monitors if so desired.

## Power Up Procedure

1. Power up the file server and attached monitor.
2. Restart clients. Wait until the *NT Begin Logon* window appears and then power on the clients.

### NOTE

Clients that were not powered off will restart automatically.

## Start-Up Verification

1. Log into the MUSE CV information system.
2. Verify that all nodes had shutdown and initialized. Look for the following line in the *Event Log*:

<<<<Station Shutdown>>>> <<<<Station initialization>>>>

### NOTE

If a node has not initialized, press its **Reset** button to manually reboot.

# Troubleshooting (IMS)

The frequently asked questions and solutions provided in this section apply to MUSE software v5E.12 with Windows Server 2003 operating system.

## Storage media not detected

### Problem

Removable storage media is not getting detected (the window shown below is displayed).



### Solution

The situation occurs randomly. The cause is still unknown. The solution for this is to restart the Removable Storage Service. After re-starting the service, the cross will get removed. After this if you try to look for the pool list in the RSM, you will find only three pools: *Free*, *Import*, and *Unrecognized*. The *Backup* pool is not listed. The inserted media will be listed under the *Import* pool. Next time IMS runs, the tape will be re-prepared by the IMS and the *Backup* pool will be created automatically.

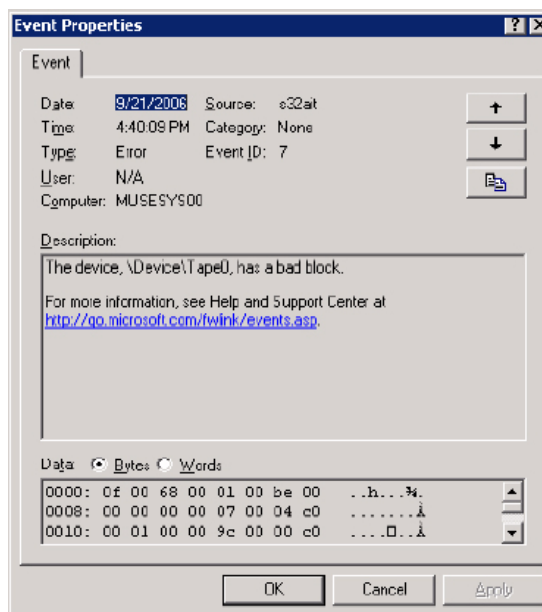
## Error 20531 – ntbackup fails

### Problem

NT Backup fails and error 20531 is logged by the IMSSclient debug messages.

### Solution

This is a tape drive related issue. The tape driver used by MUSE is version 1.0.0.4 which gives this error if it is not able to read some memory location on the tape. When this error occurs an event is logged in the windows system log with an ID of 7. The only solution is to manually restart the backup.



In the MUSE 5E.12 application, the IMS looks for such an event, detects it and stops the backup. The following message will also be logged in:

**d:\vol000\system\errlog\ims\_.log** and  
**d:\vol000\system\errlog\backarc\_.log** files

*A message fatal error has occurred... Now killing imsserver and imssclient.*

### NOTE

Upgrading the driver to the latest release v2.0.0.7 will remove this error but may introduce other problems that will stop NTbackup from working properly and is not recommended.

## Tape in use

### Problem

When a prepared tape is inserted and IMS is started, IMS is not able to read from the tape and displays the following message:

*Tape in use. Sleeping and retrying*

### Solution

IMS makes use of Removable Storage Manager to read from the tape. The RSM maintains a cache of the information about the inserted media. The cache needs to be updated when new media is inserted. This is done automatically once the new tape is inserted but this process takes some time (5-10 seconds). If you start the IMS backup while the RSM is still updating its database about the media, you will get message *Tape in use, Sleeping and retrying*. If this happens, wait for 10-15 seconds after replacing the media and then start the IMS backup.

## Tape drive not recognized by removable storage media

### Problem

Removable storage media is not recognizing the tape drive. I am getting a cross against the tape drive name.



### Solution

Restarting the Removable Storage Service will solve this problem. IMS code proactively takes care of this situation and restarts the Removable Storage Service. But sometimes this problem occurs once the backup has already started. In that case IMS cannot automatically restart the Removable Storage Service. Whenever such a problem occurs an event **id 168** is logged in the system event log file. IMS detects this and just stops the backup and logs the error message: *fatal error has occured...Now killing imsserver and imscient!!*.



## Backup stops suddenly

### Problem

The IMS backup stops suddenly. The **ims\_.log** file contains the following entry:  
*fatal error has occurred... Now killing imsserver and imscient!!*

### Solution

A new IMS feature (introduced with v5E.12) deals with the exceptional situation which may occur due to one of the following:

1. System event 168 occurred. This event occurs when the removable storage media stops recognizing the tape drive.
2. System event 85 occurred. This event occurs when the removable storage media stops working probably because its database gets corrupted.
3. System event 7 occurred. This event occurs when the tape driver is not able to read properly from the tape. Previously when windows logged any of these events, the backup used to hang since the application was not able to read the tape. In the latest version of IMS any such occurrence of events is considered fatal and the backup is simply stopped.

#### **NOTE**

Also refer to “**Error 20531 – ntbackup fails**” on page 4-39 and “**Tape drive not recognized by removable storage media**” on page 4-40.

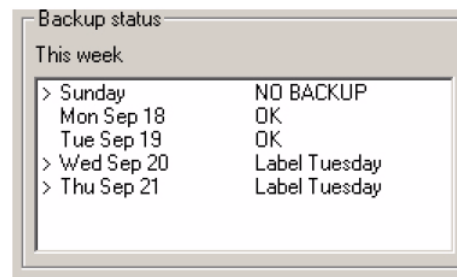
## Sequence of backup tape usage

### Problem

I was told to always use a GE-supplied tape and in a particular order (on Monday use the tape labeled **Monday**, on Tuesday use the tape labeled **Tuesday** tape, etc.). But even if I use the tapes in random order the backup is done successfully.

### Solution

In earlier versions of MUSE software, the IMS had some problems with the order of the tapes. With v5E.12 this problem has been addressed. The only issue is that in the IMSstatus in the *This week* column it will display the status as *Label Tuesday* (day as per the label of the tape) instead of *OK*.



The screenshot shows a window titled "Backup status" with a sub-header "This week". Below this is a table with two columns: the first column lists days of the week with a greater-than sign (>) at the start of each line, and the second column shows the backup status for each day.

This week	
> Sunday	NO BACKUP
Mon Sep 18	OK
Tue Sep 19	OK
> Wed Sep 20	Label Tuesday
> Thu Sep 21	Label Tuesday

Even if you insert a brand new tape (that has not been provided by GE) the backup will be done successfully. This is because the latest IMS will automatically format the new tape according to the IMS format.

# 5 HIS Disaster Recovery

# Introduction

The procedures in this section are intended to be performed in order to restore the OS image installation performed by HP and before the installation of the application software.

This disaster recovery procedure applies to MUSE HIS systems running on a GE-supplied HP DL360 Server (G4 or G5) and running Windows 2003 operating system. To identify the server, check the label imprint on the left or right tab on the front of the server where it fastens to the rack. It should indicate G4 or G5. To verify the operating system right-click on *My Computer* and select *Properties*. On the *General* tab verify the Windows version running.

## NOTES

The system will reboot several times during this procedure.

Some information in this procedure is case-sensitive. Observe case, as noted.

Before starting you should have the following:

Hardware Platform	Software Required	
	GE Part Number	Description
DL360 G5	2002801-012	HP SmartStart CD version 7.6
	2030821-001	MUSE HIS HP#325367-004 CD (GE-supplied Windows 2003 OS)
DL360 G4	2002801-012 *	HP SmartStart CD version 7.6
	2030821-001	MUSE HIS HP#325367-004 CD (GE-supplied Windows 2003 OS)

\* For G4 server, HP SmartStart v7.4 (PN 2002801-011) will also work.

## Configure the HP server

1. Boot the system using the SmartStart CD version 7.60.  
(This will take approximately three minutes.)
2. Press **F1** to continue, if applicable.
3. At the *Language* selection screen, select the *English* radio button.
4. In the *Select the keyboard to be used with the system* drop-down list select *English*.
5. Click *Continue*.
6. Click the *Agree* button.
7. Select the *Maintain Server* button.
8. Select *Erase System* button.
9. Confirm all boxes are checked and click the *Continue* button.
10. Click *OK* when the *Are you sure...?* window is displayed.

11. System will power down and then reboot.  
(This will take approximately three minutes.)
12. During boot up, press the **F9** key for ROM-based *Setup Utility* when prompted.
13. Select *Boot Controller Order* and move *PCI slot 1 HP Smart Array Controller* to **CTLR:1** position. Depending on the server being restored, the controllers will be identified as follows:

G5 E200i

G4 6i

14. Press **Enter**.

**NOTE**

If necessary, press the **Esc** key to return to the selection menu.

15. Select *Date and Time* and press **Enter**. Enter current date and time info.  
Press **Enter**.
16. Select *Server Availability* and press **Enter**.
17. Select *POST F1 Prompt* and press **Enter**.
18. Select *Disabled* and press **Enter**.
19. Press **Esc** to exit the window.
20. Press **Esc** to exit the utility.
21. Press **F10** to *Confirm Exit Utility*.

## Configure the disk system RAID

1. Reboot the system with HP SmartStart CD version 7.60 in the CD-ROM drive.
2. At the *Language* selection screen select the *English* radio button.
3. In the *Select the keyboard to be used with system* drop-down list select *English*.
4. Click *Continue*.
5. Click the *Agree* button and click *OK*.
6. Select the *Maintain Server* button to begin configuration of the array controllers.
7. Click *Configure Array* button.
8. Select *Clear Configurations* under *Common Tasks*.
9. The message ... *Any data on these logical drives will be lost!* appears.  
Select *OK*.
10. Select *Create Array* under *Common Tasks*.
11. Check the *Select All* checkbox and select *OK*.
12. Select *Create Logical Drive*.
13. In the *Create Logical Drive* window, select *OK* (to use the default settings).
14. Confirm the SCSI controller has one logical drive configured to *RAID 1+0* in the *Configuration View* panel.

15. Click *Exit ACU*.
16. Click *Smartstart Home*.
17. Click *Deploy Server*.
18. Click *Continue*.
19. Click on *Microsoft Windows 2003* folder.
20. Select *Microsoft Windows Server 2003, Standard Edition (HP-branded)*.
21. Select *Continue*.
22. In the *Operating system media source* select the following radio buttons:  
*CD-ROM* and *Flat Files*.
23. Select *Continue*.

**NOTE**

It will take several minutes while Smart Start prepares the system for installation of the operating system.

24. In the file system drop-down box, select *NTFS*.
25. Click the *Minimum Recommended* partition size.
  - ◆ Select 10420 MB if this is a G5 server.
  - ◆ Select 10842 MB if this is a G4 server.
26. Click *Continue*.
27. In *User Name* field type **Hospital Name**.
28. In *Organization* field type **Hospital Name**.
29. In *License Type* field, select *Per Seat*.
30. Click *Continue*.
31. Accept default entries in *SNMP Configuration* screen and click *Continue*.
32. *Pressing Continue will erase all drives, resulting in the loss of all data* is displayed. Click *Continue*.

**NOTE**

It will take several minutes while SmartStart prepares the system for installation of the operating system.

33. When the SmartStart CD is ejected from the drive and you are prompted to insert the operating system media, proceed with “**Install the operating systems (Windows Server 2003)**” on page 5-5.

# Install the operating systems (Windows Server 2003)

1. At the *Please insert the Operating System media and click Continue* window, remove the Smart Start CD and insert the Windows 2003 Server CD (GE PN 2030821-001; HP PN 325367-004).
2. Click *Continue*. The system will reboot after 3-5 minutes.
3. When the CD drawer opens, remove the Windows 2003 Server CD.
4. System will reboot several times over 3-5 minutes.
5. If the *Welcome to Windows Setup Wizard* screen, click *Next*.  
The *Installing Devices* window is displayed for several minutes.
6. At the *Regional and Language Options* window, click *Next*.
7. At the *Computer Name and Administrator Password* window, use the following information where applicable (follow screen instructions). Case sensitive inputs are required:

Computer Name:	Revise per customer or accept default
Administrator Account Password:	Enter GE-recommended Administrator password (or, enter customer-provided Administrator password)
Confirm Password:	Enter same password entered in previous field

## NOTE

If you do not know the GE-recommended Administrator password, contact the Jupiter, Florida On-Line Center (MUSE Tech Support) at 1-800-558-7044. If the customer is using a password other than the one recommended by GE, be sure that MUSE Tech Support personnel are aware of this password.

8. Click *Next*.
9. Set *Date & Time* and *Time Zone* to appropriate values. Select *Next*.
10. System displays *Installing Network* for 30 seconds.
11. Select *No, this computer...* radio button (or *Yes, make this computer...* per customer's network environment).
12. In the text box, type **HIS\_WG** (or enter domain or workgroup name per customer order).
13. Click *Next*.
14. System installs drivers and programs for approximately 20 minutes and then reboots.
15. At the *Welcome to Windows* window, press **Ctrl + Alt + Delete** and enter password.
16. System installs HP drivers and programs for several minutes and then reboots.
17. At the *Welcome to Windows* window, press **Ctrl + Alt + Delete** and enter password.

18. At the *Windows Server Post-Setup Security Updates* window, select *Finish*.
19. At *When you close this page...* window, select *Yes*.
20. At the *Manage Your Server* window, check the *Don't display this page at logon* check box.
21. Exit the *Manage your server* window.

## Configure the display settings

1. Click *Start* → *Control Panel* → *Display*.
2. Click on the settings tab and configure the *Settings* in *Display Properties* as follows:
  - a. Set *Screen Resolution* to *1024 by 768 pixels*.
  - b. Set *Color Palette* to *Highest 32 bit*.
  - c. Click on *Advanced* and select *Monitor* tab.  
Set *Screen refresh rate* to *75 Hertz*.
  - d. Click *OK* to exit the *Advanced* window.
  - e. Click *Apply*.
  - f. At the testing mode dialog box, click *Yes*.
  - g. Click *OK*. To exit the *Display Properties* window.

## Configure SNMP

1. Select *Start* → *All Programs* → *Administrative Tools* → *Services*.
2. In the right pane, open *SNMP Service*.
3. Select the *General* tab.
4. At *Startup type*, click *Disabled*.
5. At *Service status*, click *Stop*, if it is not grayed out.
6. In the *Stop Other Services* window, click *Yes*.
7. After the *stopping services* window closes, click *OK* to close the *SNMP Service Properties* window.
8. Close the *Services* window.

### NOTE

SNMP is disabled here in order to reduce security risks in the system.



## Change the CD drive letter to Z:

1. Select *Start* → *All Programs* → *Administrative Tools* → *Computer Management*.
2. Select *Disk Management*.
3. Right-click on the CDROM 0 device, then select *Change Drive Letter...*
4. Select *Change*. Open the drive letter drop-down box and select **Z**. Select *OK*.
5. At the confirm window, select *Yes*.

## Create the D-drive

1. Right-click in the *Disk 0 Unallocated space* and select *New Partition*.
2. At the *Welcome to the New Partition Wizard* window, click *Next*.
3. At the *Select Partition Type* window, select the *Primary* partition radio button and click *Next*.
4. At the *Specify Partition Size* window, set the partition size to the maximum and press *Next*.
5. At the *Assign Drive Letter or Path* window, select drive letter D and click *Next*.
6. At the *Format partition* window, in the *Volume label* field enter *Data*. Check the *Perform a Quick format* check box. Click *Next*.
7. At the *Completing the New Partition Wizard* window, click *Finish*.
8. Wait for the formatting to complete, then close the *Computer Management* window.

## Install security updates

1. Insert the MUSE 5E Support CD #2.
2. With *Windows Explorer*, browse to the CD ROM drive and open \Win2K3SR.
3. Double-click on **ServerUpdates.cmd**.
4. After the updates install and the DOS window closes (2-3 minutes), close *Windows Explorer*.

## Set up the Windows environment

1. From the *Control Panel*, click the *System* icon.
2. Click the *Advanced* tab.
3. Click the *Startup and Recovery Settings* button.
4. In the *Time to display list of operating systems* text box, enter **5** seconds.
5. In the *Write debugging information* drop-down box, select **(none)**.
6. Click *OK* to exit the *Startup and Recovery* window.
7. Click *OK* to exit the *Systems Properties* window.

## Install HIS software

See “HIS Software-Only Installation Instructions” (pn 2020285-092) for HIS software installation procedures.

# 6 Troubleshooting

# 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 1-800-558-7070.

## File server

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

## Desktop client

Assembly and disassembly instructions as well as basic troubleshooting procedures can be found in the HP 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

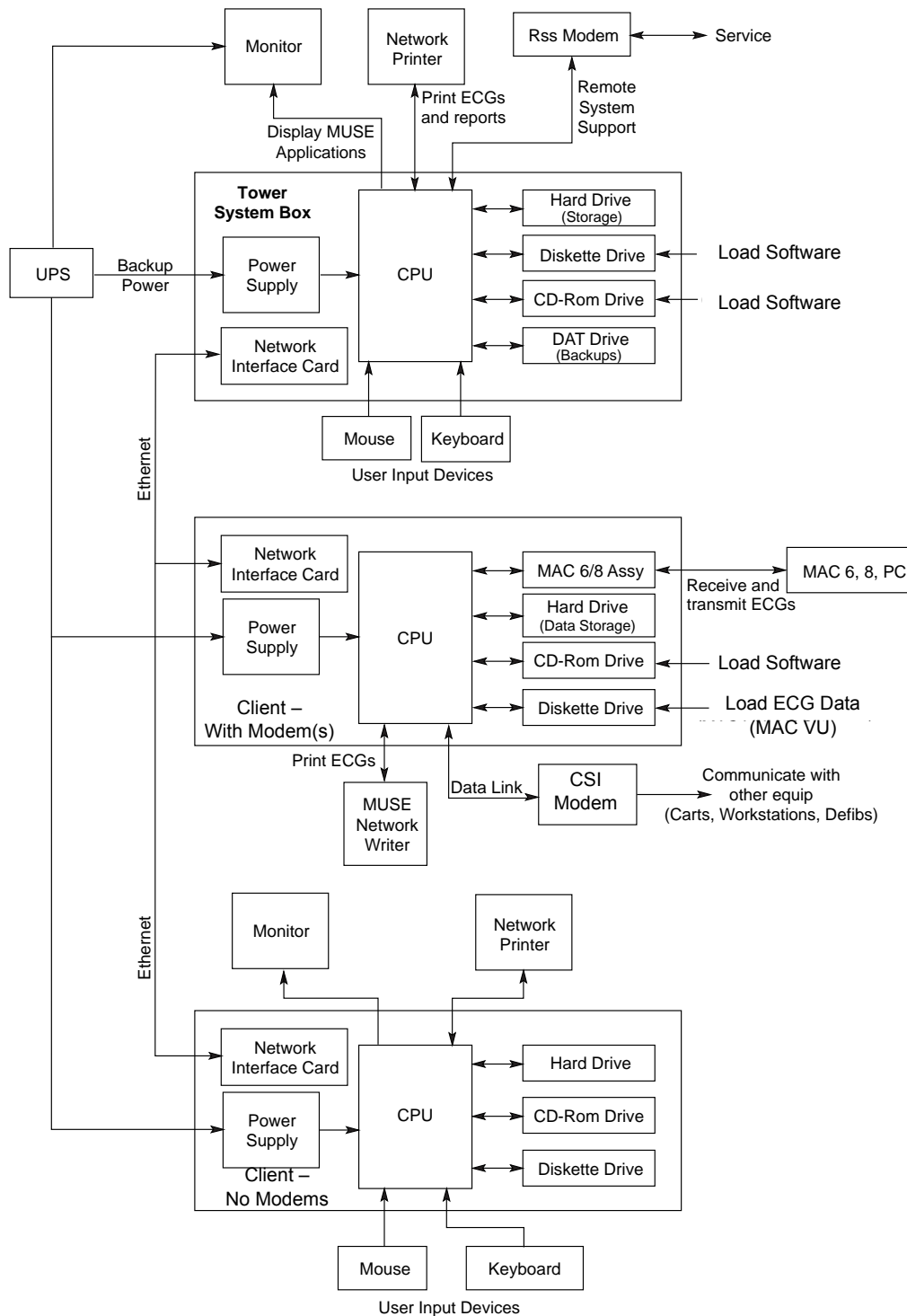
Basic troubleshooting procedures for the UPS can be found in the PowerVAR or HP manual that accompanied your UPS. The UPS is a field replaceable unit and should not be disassembled in the field.

## 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.

# Assembly block diagram

The system level overview on the following page describes the function of each of the major assemblies in a typical MUSE system configuration. Please keep in mind that the diagram is only a representative sample, there are too many possible configurations to show them all.



## Theory of operation

The theory of operation gives you a very broad overview of the various functional units. Refer to the OEM manuals for additional information and troubleshooting procedures.

The MUSE system consists of computers connected together via a local area network (LAN). There are several different computers and each is used in a different way. File servers store large numbers of ECGs and “serve” requests from other computers on the network for files. Communication servers acquire ECGs from diskette, via modem, or through a local direct connection to a resting ECG analysis system. They then process the ECG and send it to the file server.

Workstation clients allow reports to be edited and printed. Physician stations allow a physician to change reports right in the computer, or dictate the changes for a technician to incorporate at a later time. Telephone retrieval stations allow a physician to call in to the system from a telephone and hear the diagnosis for a particular patient.

Most often an ethernet local area network (LAN) system interconnects the MUSE system file servers, synchronous modem modules, and workstation clients together. Regardless of network technology, each computer on the network is called a “node” and has a “node ID” or “station ID” number that identifies it.

## File server

The HP file server contains the motherboard, processor (CPU), hard drives, RAM, internal DVD-ROM drive, 3.5" diskette drive, AIT tape drive and a redundant power supply. The hard drive stores the Windows operating system, MUSE system software, and patient data. The diskette drive is used for updating software and running system diagnostics, and the AIT drive is used for system backups and data archive. The CD-ROM drive is used for software upgrades.

The hard drive stores the MS-DOS operating system, MUSE system software, and patient data. The diskette drive is used for updating software and running system diagnostics, and the AIT drive is used for system backups. The CD-ROM drive is used for software upgrades.

The default configuration shipped in all ML370 G4 or G5 servers from the manufacturer includes a 10/100 MB card in each slot.

### **Network Fault Tolerance (NFT)**

Network Fault Tolerance allows two NIC cards to be configured to have one ethernet and one IP address with one card on and one card in backup mode. The backup NIC card will become active using the same ethernet and IP address, should the primary active card, its cable, or the switch it is attached to fail.

The default configuration shipped in all ML370 G4 servers from the manufacturer includes a 10/100 MB card in each slot.

## Workstation client

The workstation client contains a motherboard, a 2.13 GHz Pentium 4 processor (CPU), one 160 GB hard drive, 1 GB of RAM, an internal 48x CD-ROM drive, and a power supply.

The hard drive stores the Windows operating system, MUSE system software, and patient data. The CD-ROM drive is used for software upgrades.

## Network interface

Twisted pair ethernet network is supported.

## Displays

Display options include an HP L1910 19-inch LCD monitor. Additional information on the display can be found in the OEM manual.

## Printers

Printer options include an HP LaserJet 4015N printer. Additional information on the HP printer can be found in the OEM manual.

## Uninterruptible power supply

The UPS provides battery backup for a limited time after power has gone out. It also provides power conditioning. The MUSE system should be systematically shut down in the event of a power outage. Do not rely on long-term use of the UPS's battery backup.

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



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

**For your notes**

# 7 Maintenance

# Introduction

## Recommended maintenance

A regular equipment maintenance program helps prevent unnecessary equipment and power failures and also reduces possible health hazards. This chapter contains instructions for the following recommended maintenance:

- Inspecting and cleaning the unit
- System Checkout

## Inspection report

To help you establish a systematic maintenance routine, GE Medical Systems *Information Technologies* recommends that every six months you perform the maintenance checks and test procedures on the “Preventive Maintenance Inspection Report,” included at the end of this chapter.

### **NOTE**

Unless you have an Equipment Maintenance Contract, 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, follow the procedures provided in this manual as a guide during visits to the equipment site.

## 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

# Pre-service procedures

## System shutdown

Before opening the unit for maintenance or service, be sure to shut the system down and remove power. Instructions for shutting the system down can be found in “Powering On and System Shutdown” in Chapter 2.

In addition, the OEM manuals provide information regarding the proper shutdown of individual systems and devices.

# Inspection and cleaning

## Visual inspection

Perform a visual inspection daily. Turn off the unit and remove power before making an inspection or cleaning the unit.

- Check the case and display screen for cracks or other damage.
- Regularly inspect all cords and cables for fraying or other damage.
- Inspect all plugs, cables, and connectors for bent prongs or pins.
- Verify that all cords, socketed components, and connectors are securely seated.
- Inspect keys and controls for proper operation.
  - ◆ Toggle keys should not stick in one position.
  - ◆ Knobs should rotate fully in both directions.

## Precautions

Turn off the unit and remove all power before inspecting or cleaning.

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, or bring any magnetic material near the head assembly.

## Exterior cleaning

Clean the exterior surfaces once per month, and more frequently if needed, with a clean, soft cloth and a mild dishwashing detergent diluted in water.

- Wring the excess water from the cloth. Do not drip water or any liquid on the writer assembly, and avoid contact with open vents, plugs, or connectors.
- Dry the surfaces with a clean cloth or paper towel.

## Cleaning the monitor screen

Clean the LCD monitor surface with a lint-free, non-abrasive cloth. Avoid using any cleaning solution or glass cleaner.

## Interior cleaning

Complete any pre-service procedures prior to opening the unit or performing any interior cleaning. Clean the unit as needed, but at least once per month.

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). Follow the manufacturer's directions for use.

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**WARNING**

Only qualified personnel should perform the following procedure.

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**WARNING**

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

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## Cleaning the system box interior

Follow these steps to clean the system box interior.

1. Power off the workstation. See "Powering Off the Workstation" in Chapter 2, "Equipment Overview," for steps to power off the workstation.
2. Detach the AC power cord before cleaning the interior of the system box.
3. Remove the system box top cover. See the OEM manual for your specific system for detailed information.
4. Clean the interior. See the "Preventive Maintenance Inspection Report" for more detail.
5. Replace the system box cover. Refer to the OEM manual for your specific system for detailed information.

## Cleaning the tape drive

See the OEM manual for the steps required to clean the tape drive heads on the file server.



## Cleaning the CD-ROM drive

Follow these steps to clean the CD-ROM drive.

1. Open the CD-ROM drive.
2. Insert the cleaning CD-ROM, brushes down, into the drive.
3. Close the CD-ROM drive. The activity led blinks for about 10 seconds.
4. Open the CD-ROM drive.
5. Remove the cleaning CD-ROM and place it in its case.
6. Close the CD-ROM drive.

## Cleaning the printer

See the OEM manual for cleaning and adjusting instructions for the HP LaserJet 4015N printer.

## Cleaning the mouse

1. Make sure the computer is turned off.
2. Disconnect the mouse cable from the computer.
3. Turn the mouse over and look carefully at the bottom. To remove the retainer ring, turn it in the direction indicated by the diagram on the bottom of the mouse.
4. Turn the mouse over, top side up, so that the retainer ring and ball drop out.
5. Wash the ball in warm, soapy water; then dry it with a clean cloth. Blow air carefully into the ball-cage to dislodge dust and lint.
6. Look for a build-up of dirt on the plastic rollers inside the ball-cage. This build-up usually appears as a stripe running around the middle of the rollers.
7. If dirty, clean the rollers by using a cotton swab soaked in isopropyl (rubbing) alcohol. Turn the rollers with your finger and repeat the process until all deposits are removed. After cleaning, make sure the rollers are still centered in their channels.
8. Make sure that fluff from the swab is not left on the rollers.
9. Replace the ball and retainer ring. Turn the retainer ring to lock it into place.
10. Connect the mouse cable to the computer. Turn your computer back on.

## UPS maintenance

All UPS sub-systems used in MUSE systems use sealed lead acid batteries. These batteries 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 will vary based on ambient temperature and amount of time that the batteries are used. 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 mount 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

### NOTE

The following test should not be run on system that is in operation. It should only be done during scheduled down time for preventive maintenance. The following 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.

There is a self-test built into the UPS. This can be run from the front panel of the unit by depressing 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 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, which is 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.
- Use a heatsink when soldering any phototransistors, photodiodes, or optical isolators.
- After soldering, clean excess flux from the PCB assembly.

## 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.

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**WARNING**

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

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## 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

The following paragraphs contain equipment safety tests to ensure that the MUSE system poses no electrical health hazards. It is suggested that the equipment safety tests be performed every 6 months and every time a circuit board/assembly is removed and replaced. The following table lists the tests.

Equipment necessary to perform these equipment safety tests includes a 110-volt leakage current tester, pn MT-1216-01AAMI, (referred to as tester) and a digital multimeter. Note that for 220-volt, use tester, pn MT-1216-02AAMI.

### NOTE

Failure to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards. Unless an Equipment Maintenance Contract exists, GE Medical Systems *Information Technologies* 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 Medical Systems *Information Technologies* service personnel may, at their discretion, use this procedure as a helpful guide during visits to the equipment site.

Table 2. Equipment Safety Tests		
Test #	Applies to	Tools Required
1	File servers, acquisition servers/processing stations, and workstation computers that have the MAC 6/MAC PC Local Acquisition Port	110V ac MT-1216-01AAM 220 V ac MT-1216-02AAMI (or equivalent) and DVOM
2	Same as above.	Same as above.

# 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.

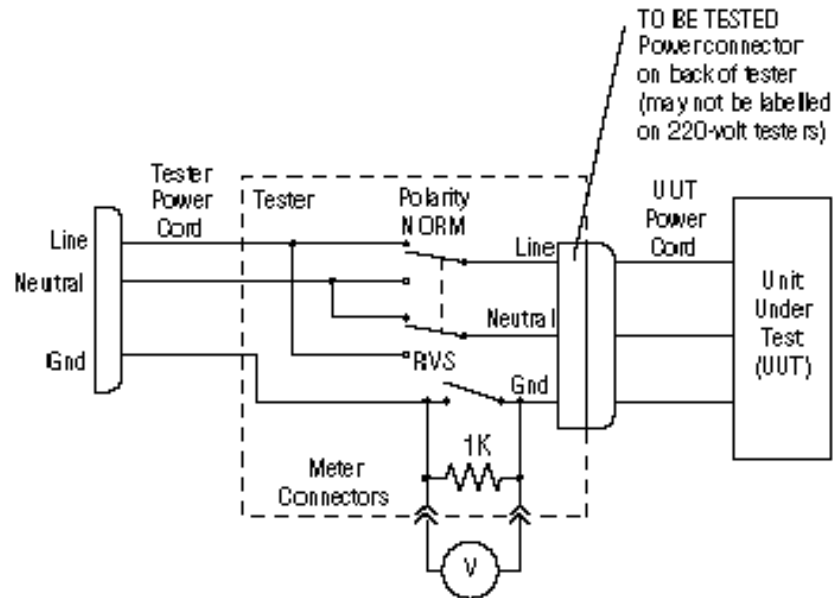
- Connect the appropriate leakage tester to the power outlet.
- Insure that the GND switch on the leakage tester is in the down (closed) position.
- Check the O, K, and R indicators for the condition according to the table below. Normal polarity and ground is the desired and safe condition.

Table 3. Power Receptacle Wiring Check				
Step	Indicator			Condition
	O	K	R	
A	On	On	Off	Normal polarity and ground
B	Off	On	On	Reverse polarity
C	Off	On	Off	No ground
D	On	Off	On	No neutral
E	Off	Off	On	No neutral/reverse polarity
F	Off	Off	Off	No power

## Test #1: ground-wire-leakage-to-ground test

### NOTE

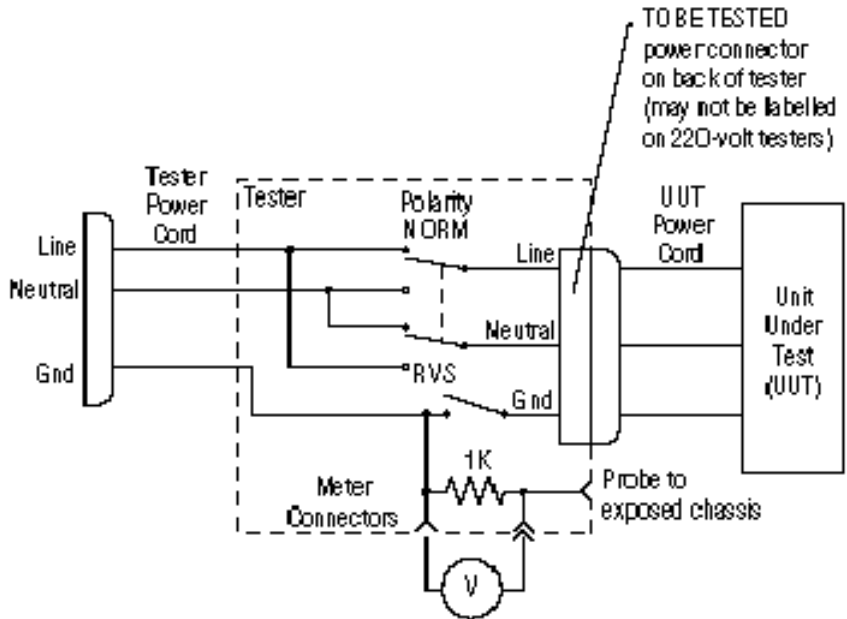
This diagram shows only a representation of how a typical leakage current tester functions. Follow the instructions provided with your leakage tester.



## 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.



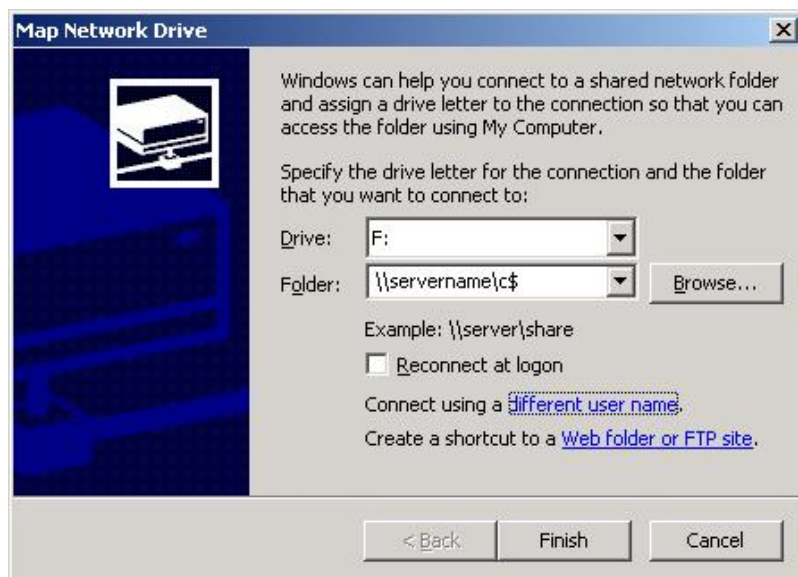
# Performing anti-virus scanning from an FE notebook computer

## 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.

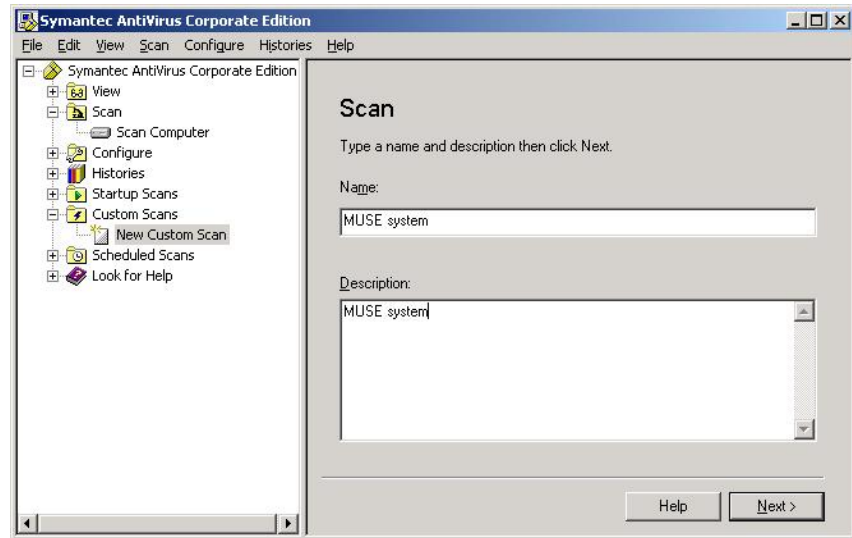


Use the *Connect using a different user name* feature to provide a username and password that has administrator rights on the MUSE file server. On MUSE systems you should be able to use the local administrator account and the corresponding password. For example, in the *Connect As* dialog box you would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

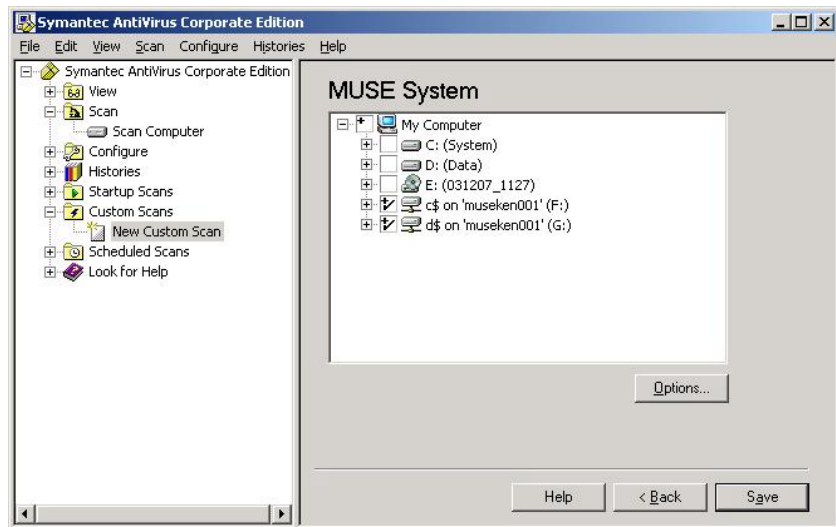


## Configuring a custom scan

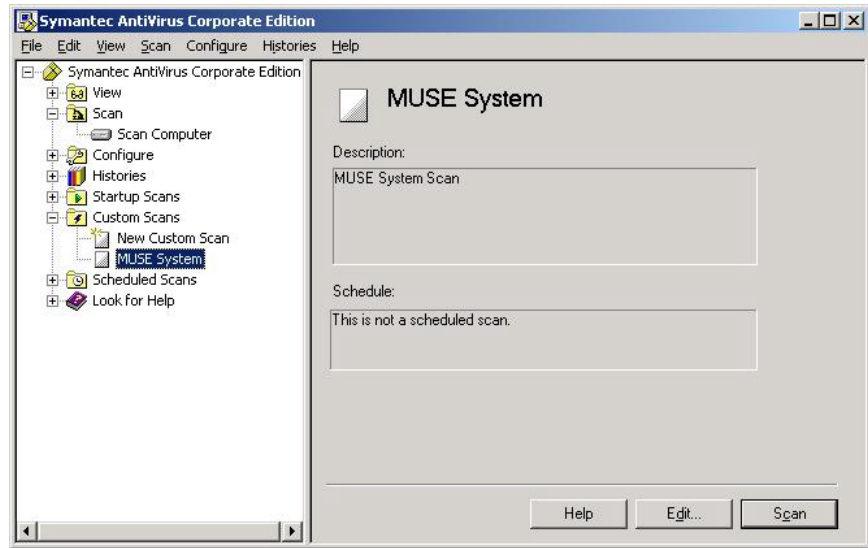
Open Symantec AntiVirus and select *New Custom Scan* as shown below. Provide a descriptive name and description so that you will recognize it when you want to run it.



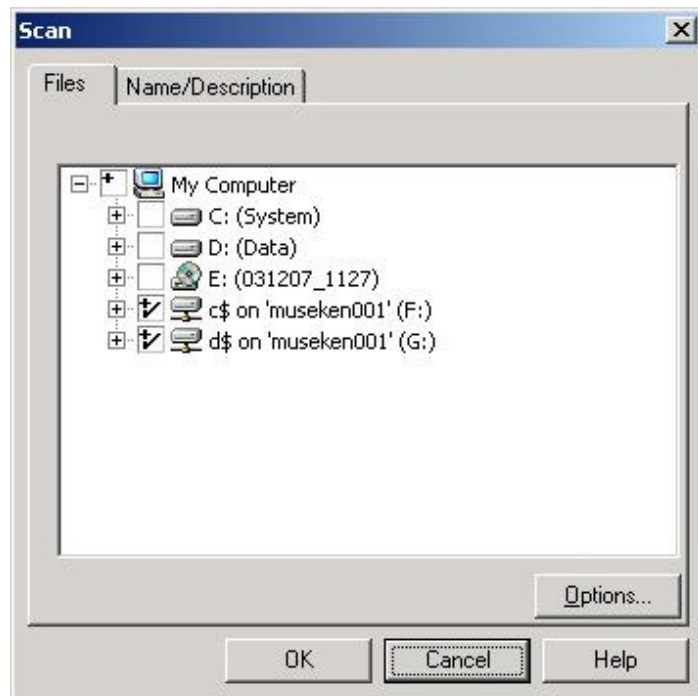
After clicking *Next>*, select the **c\$** and **d\$** drives that you mapped previously.



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.



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

# How to change the name of the file server

1. Shutdown the MUSE system from IMS, or stop the **CV\_SCM** service if there are no users on the system.
2. Edit **d:\vol000\system\sysinf\backtask.asc**, **generacq.asc**, **resource.asc**, and **xmlacq.asc** to have the correct computer name.
3. Edit **MainServerName=** in the [MUSE] section of **c:\windows\win.ini** to have the correct computer name. This needs to be done on the file server and on each client workstation.
4. Right-click on *My Computer* and select *Properties*.
5. Click on the *Computer Name* tab.
6. Click on the *Change* button.
7. Enter the correct computer name in the *Computer name* field.
8. Click *OK*.
9. Click *OK* to the message that you will need to restart the computer.
10. Click *OK* to close the *System Properties* window.
11. Click *Yes* to the question about restarting the computer now.
12. After the system reboots, verify that the services start correctly and that the MUSE system is functioning properly.

## Upgrading the BIOS firmware

If the 1MB processor which was originally shipped with a G4 file server needs to be replaced, you may need to replace it with a 2MB processor (pn 2031370-001). 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 5E Support CD #2 (pn 2021275-002) 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.

# Changing MUSE Service Accounts

The following MUSE service accounts are integral to the correct operation of the MUSE system:

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.

The process of changing the passwords for these accounts consists of the following procedures.

1. Changing the MUSE account passwords.  
See [“Changing Service Accounts Passwords”](#) on page 7-19 for details.
2. Changing the password on scheduled IMS tasks.  
See [“Changing Passwords for Windows Scheduled Task\(s\) for IMS”](#) on page 7-20 for details.
3. Reinstalling the MUSE services.  
See [“Re-Installing the MUSE Core Services”](#) on page 7-21 for details.
4. Changing the MACCRA service password.  
See [“Changing the MACCRA Service Password”](#) on page 7-22 for details.
5. Changing the password on any interconnected systems.  
See [“Changing Passwords on Interconnected Systems”](#) on page 7-22 for details.
6. Verifying the system functions with the new passwords.  
See [“Verifying the Changes”](#) on page 7-22 for details.

If you are using domain accounts and do not have the appropriate permissions to change them, contact the IT domain system administrator and request that the passwords be changed.

## Changing Service Accounts Passwords

Use the following procedure to change service account passwords. The same procedure can be used for both local accounts and domain accounts; however, to change the passwords for domain accounts, you must have the appropriate permissions. If you do not have the appropriate permissions, contact the system administrator to change the passwords for you.

If the MUSE File Server, HIS Server, and MUSE Clients all use the same domain *MUSEBkgnd* account and password, you need to perform this procedure only once: the change will be applied globally. If they use local accounts, you must perform the procedure on each computer where the account exists.

1. Log on to the server as the user whose password is to be changed.  
The user will be either *MUSEAdmin* or *MUSEBkgnd*.
2. Press **Ctrl+Alt+Delete**.  
The *Windows Security* dialog box opens.
3. Click the *Change Password...* button.  
The *Change Password* dialog box opens.
4. Type the current password into the *Old Password* field.
5. Type the new password into the *New Password* and *Confirm New Password* fields.
6. Click *OK*.  
If the new password meets the system restrictions, the password is changed and a confirmation message is displayed.
7. Click *OK*.  
The confirmation message closes and you return to the *Windows Security* dialog box.
8. Do one of the following:
  - ◆ If you changed the MUSEAdmin password, continue to “[Changing Passwords for Windows Scheduled Task\(s\) for IMS](#)” on page 7-20.
  - ◆ If you changed the MUSEBkgnd password, skip to “[Re-Installing the MUSE Core Services](#)” on page 7-21.

## Changing Passwords for Windows Scheduled Task(s) for IMS

The MUSE v5E system uses a Windows scheduled task to run the daily IMS job. By default, this job is configured to use the MUSEAdmin account and password. If you change the MUSEAdmin password, use the following procedure to modify the password of the scheduled tasks to the new MUSEAdmin password.

1. Select *Start > Programs > Accessories > System Tools > Scheduled Tasks*.  
The *Scheduled Tasks* window opens.
2. Right-click on a scheduled task and choose *Properties*.  
The task's *Properties* window opens.
3. Enter the appropriate domain or local MUSEAdmin account in the *Run as* field.
4. Click *Set Password*.  
The *Set Password* window opens.
5. Type the new MUSEAdmin password in both the *Password* and *Confirm Password* fields.
6. Click *OK* to close the *Set Password* window.
7. Click *OK* to close the task's properties window.
8. Verify the job runs successfully.
9. Repeat step 2 through step 8 for each scheduled task.

Systems running v5E.12 or higher will have the following scheduled tasks:

- ◆ IMS-rs
- ◆ IMS-rsm
- ◆ IMS-system

10. Do one of the following:

- ◆ If you changed the MUSEBkgnd password, continue with “**Re-Installing the MUSE Core Services**” on page 7-21.
- ◆ If you changed the MUSEAdmin password, skip to “**Verifying the Changes**” on page 7-22.

## Re-Installing the MUSE Core Services

Windows stores the MUSE background account’s name and password with any service registration associated with that account. If you change the Windows account name or password, you must re-install the MUSE services so they can be re-registered with the new account name and password.

1. Perform an IMS shutdown on the MUSE server.
2. Stop the CV\_SCM service and verify that all MUSE services have stopped.
3. Open a *Command Prompt* window on the MUSE file server.
4. Change to the *c:\mei* directory.
5. Type the following command and press **Enter**.

```
cvsinst [space] domain\MUSEBkgnd [space] password [space]  
d:\vol000\system\sysinf\services.asc
```

Where:

- ◆ **domain** is the name of the domain where the account resides. For local accounts, it will be the name of the MUSE file server.
  - ◆ **password** is the password assigned to the MUSEBkgnd account.
6. When you receive a message stating that the services have been re-installed, close the *Command Prompt* window and restart the CV\_SCM service.
  7. If there is a HIS Interface, repeat step 1 through step 6 on the HIS Interface.
  8. If the MUSE server or clients have defined modems, the modem services must be reinstalled. Refer to “MUSE™ Cardiology Information System Standard Fax/Asynch CSI Modem Upgrade” (2002783-012) for instructions on installing modem services.
  9. Determine whether the MACCRA service is installed and do one of the following.
    - ◆ If the MACCRA service is installed, continue to “**Changing the MACCRA Service Password**” on page 7-22.
    - ◆ If the MACCRA service is not installed, determine whether the MUSE system is connected to a MARS system or Monitoring Gateway. If it is, skip to “**Changing Passwords on Interconnected Systems**” on page 7-22. If it is not, skip to “**Verifying the Changes**” on page 7-22.

## Changing the MACCRA Service Password

The MACCRA service is used by several MUSE options, such as CV Web, and is run using the MUSE Background account name and password. Therefore, if you changed the MUSE background account name or password, use the following procedure to update the MACCRA service.

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. Enter the Windows domain and account name of the MUSE background account in the *This account* field.
4. Enter the account's password in both the *Password* and *Confirm Password* fields.
5. Click *OK*.
6. Restart the service for the changes to take effect.
7. Proceed to “[Changing Passwords on Interconnected Systems](#)” on page 7-22.

## Changing Passwords on Interconnected Systems

The MUSE system can interact with the following external systems:

- **MARS PC**  
Using its default configuration, the MUSE system pulls holter data from the MARS PC using the MUSEBkgnd account.
- **Monitoring Gateway**  
Using its default configuration, the MUSE system pulls 12-lead ECG data from the Monitoring Gateway using the MUSEBkgnd account.

If the MUSE, MARS PC, and Monitoring Gateway systems all use the same MUSEBkgnd domain account and password, no changes are required on the MARS PC or Monitoring Gateway: the changes you made to the MUSE system will be applied globally on both systems. However, if the MUSE system uses local accounts, you must change the MUSEBkgnd password on MARS PC and Monitoring Gateway to match the change on the MUSE server.

## Verifying the Changes

After changing the service password(s) on the MUSE system and all interconnected systems, verify that the system functions correctly as described in “Installation Checkout Procedures” in *MUSE™ Cardiology Information System File Server Installation* (PN 2020285-024)



# 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 7-5.

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 7-6.

## 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 7-23. 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 the 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 “[Disaster recovery – MUSE file server](#)” on page 4-22.

**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 per the 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.

					60950-1 Leakage Current Limits in microamps (uA) <sup>1</sup>	
					IEC 60601-1	UL 60601-1
Step	Description	Condition <sup>2</sup>	UUT-ON <sup>3</sup>	Results	Type ITE	
<b>A</b>	<b>Earth Leakage Current</b>		<b>in uA</b>			
1	Forward Polarity	NC		Pass/Fail	3500	3500
2	Neutral Open, Forward Polarity	SFC		Pass/Fail	3500	3500
3	Neutral Open, Reverse Polarity	SFC		Pass/Fail	3500	3500
4	Reverse Polarity	NC		Pass/Fail	3500	3500
<b>B</b>	<b>Enclosure Leakage Current</b>		<b>in uA</b>		Type ITE	
1	Forward Polarity	NC		Pass/Fail	3500	3500
2	Neutral Open, Forward Polarity	SFC		Pass/Fail	3500	3500
3	Ground Open, Forward Polarity	SFC		Pass/Fail	3500	3500
4	Ground Open, Reverse Polarity	SFC		Pass/Fail	3500	3500
5	Neutral Open, Reverse Polarity	SFC		Pass/Fail	3500	3500
6	Reverse Polarity	NC		Pass/Fail	3500	3500
<b>C</b>	<b>Ground Continuity</b>		<b>in ohms</b>		Resistance in ohms	
1	AC mains power cord ground prong to exposed metal surface (e.g., ground lug)	N/A		Pass/Fail	< 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
<b>Printing</b>			
Manual printing	NR	Y	1a
Automatic printing	NR	Y	1b
Format setting change	NR	Y	1c
<b>Faxing</b>			
Manual faxing	NR	Y	2a
Automatic faxing	NR	Y	2a
<b>Editing/Confirming</b>			
Edit record checkout	NR	Y	3a
Confirm record	NR	Y	3b
<b>Report Distribution</b>			
	NR	Y	4
<b>Device Setup</b>			
Output device (printer, fax, HL7 results)	NR	Y	5a
Inbound devices (modem, share)	NR	Y	5b
<b>User Setup</b>			
	NR	Y	6
<b>Carts Transmission</b>			
Modem transmission	NR	Y	7a
Wireless transmission	NR	Y	7b
LAN transmission	NR	Y	7c
<b>MARS Transmission</b>			
New MARS to MUSE setup	NR	Y	8a
MARS formatted report print	NR	Y	8b
<b>CASE/Cardiosoft Transmission</b>			
CASE/Cardiosoft to MUSE	NR	Y	9
<b>Monitoring Transmission</b>			
Manual transmission from bedside monitor	NR	Y	10
<b>Database Search</b>			
Manual report	NR	Y	11a
Automatic report	NR	Y	11b
<b>MUSE Web</b>			
MUSE Web data retrieval	NR	Y	12

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

### 6. USER SETUP

- a. Have newly created user start the MUSE application.
- b. Have user log on 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 the MUSE system select *System Status*.
  - iii Select *Newly Acquired* or *Acquisition Log*.
  - iv Check that PID/Name of ECG transmitted from cart has been acquired by the MUSE system.
- b. Wireless transmission checkout
  - i Transmit ECG from cart while in range of wireless antennae.
  - ii In the MUSE system select *System Status*.
  - iii Select *Newly Acquired* or *Acquisition Log*.
  - iv Check that PID/Name of ECG transmitted from cart has been acquired in the MUSE system.

- c. LAN transmission checkout
  - i. Transmit ECG from cart via LAN.
  - ii. In the MUSE system 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 the MUSE system.
  - ii. In the MUSE system select *System Status*.
  - iii. Select *Newly Acquired* or *Acquisition Log*.
  - iv. Check that PID/Name of ECG transmitted from MARS has been acquired by the MUSE system.
- 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 the report printed prior to the installation of the MARS formatter and verify the format changes.

## 9. CASE/CARDIOSOFT TRANSMISSION

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

## 10. MONITORING TRANSMISSION

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

## 11. DATABASE SEARCH

- a. Manual Search checkout
  - i. Go to *Database Search* function on the MUSE system.
  - 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 on the MUSE system.
  - ii. Create a search.



- iii Save the criteria.
- iv Schedule the search.
- v Verify search runs when scheduled and expected results are generated. The MUSE system 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, log on as a user who has access to MUSE Web.
- d. Choose *Frames* or *No Frames* option.
- 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, log on 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 (PCAnywhere 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 the MUSE system 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 Real-time Results/Billing Outbound Checkout:
  - i From the MUSE system 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*.
- b. Verify the XML data has been acquired into the MUSE system.

# TheMUSE™ system preventive maintenance inspection report

Customer \_\_\_\_\_ Customer # \_\_\_\_\_ Date \_\_\_\_\_

Field Engineer \_\_\_\_\_ Case # \_\_\_\_\_

Equipment Serial # \_\_\_\_\_ MUSE Software Version \_\_\_\_\_

## Required tools

1. Standard hand tools (p/n NA)
2. Multimeter (p/n NA) (Not always required)
3. DAT cleaning tape (p/n 409669-001) (Not required on all systems)
4. AIT cleaning tape (p/n 2291441) (Not required on all systems)
5. Vacuum cleaner (p/n VACUUM)
6. Floppy Drive cleaning kit (p/n 407546-001)
7. Field Service manual - reference only
8. 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
6. \_\_\_\_ Laser printer toner cartridge

## 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 DAT or AIT backup tape drive - older systems use the DAT tape drive
8. \_\_\_\_ Clean external surfaces and monitor screens

## Calibration

There is no calibration required on the MUSE system.

## Diagnostic tests

1. Verify that there is a recent backup before doing other diagnostic tests.
2. Shut down MUSE from IMS before running Diskeeper and scheduling CHKDSK and rebooting.
3. Verify that Defrag is running regularly by checking the Diskeeper schedule. If it is not running regularly, run it on both drive C: and D:. Wait until the remote checkout procedure below has been completed to run Diskeeper.
4. Schedule CHKDSK to run on the next reboot for both drive C: and D:
  - a. From Windows Explorer, under the properties for the drive, on the Tools tab.
  - b. Select only the bottom check box - Scan for and attempt recovery of bad sectors.
  - c. Reboot the system and note any errors during the boot up process, especially when CHKDSK runs.

## AntiVirus procedure

Check with the customer, or on the system, to see if they are running an antivirus program on the MUSE. If they are, and if they are keeping the virus definition files up to date, you do not need to do anything more. You may need to remind them to keep the definition files up to date. If they are not running antivirus software, and if in the process of doing this PM or in discussions with the customer you suspect that the system may have a virus, you can follow the procedure outlined in [“Performing anti-virus scanning from an FE notebook computer”](#) on page 7-14 to run an anti-virus check over the network from your notebook computer. Please keep in mind that the procedure is just a guideline, and that running the antivirus check could take a long time on some systems.

## PM checkout procedures

### 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.

1. Power up all nodes and ensure that each one initializes and that you can log into MUSE.
2. Verify that records can be acquired via diskette, serial cable, modem (CSI and SDLC), and wireless connections, and that they route properly based on report distribution settings.
3. Verify that data can be acquired from the MARS system(s).
4. Verify that data can be acquired from the CASE system(s).
5. Verify that data can be acquired from the Mac-Lab system(s).
6. Verify that reports are being successfully transmitted through the Monitoring/MUSE gateway.
7. Verify that the system can successfully send reports to laser printers and fax machines.
8. Verify that users can successfully edit and confirm reports from the *Edit List*.
9. Verify that the system is running the latest point release for the current version of software (i.e. version 5C.10). If necessary, update the system to the latest version. This update will need to be coordinated with the site.
10. Contact the Jupiter Online Center and verify that they can remotely access the system. \*See remote checkout procedure below.
11. Check the backup tapes to ensure they have not exceeded their expected lifespan. (Customers should store old tapes for safekeeping).
12. Verify that Archive backup tapes exist for all Archive Volumes on the system.
13. Verify that there is enough free space on the system to provide for continued growth.
14. Perform a service tape backup of the system.

# Remote checkout procedure

This section should be performed by technical support while connected to test remote access.

1. Check that backups are functioning and that tapes are being rotated. (Does not apply to sites that are doing network backups).
2. Check the MUSE *Event Log* and *Error Log*, and the *NT Event Viewer* for any obvious problems.
3. Verify that \*.bak files are not collecting in the **d:\vol000\tmp\acq** folder. There should only be files that have collected since the last backup.
4. Perform a cleanup of the working directories - \tmp and its subfolders, and copy in new Btrieve queues where appropriate.
5. Delete any old files that may have been left on the system for troubleshooting purposes.
6. Delete or move any unnecessary files or folders from under **d:\vol000**.

## 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

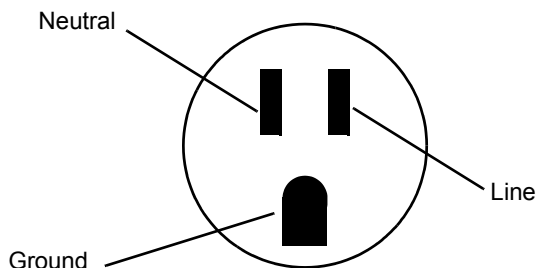
Line to neutral = 120V

Line to ground = 120V

Neutral to ground < 3V

### Neutral-ground loop resistance test

Neutral to ground <  $2\Omega$



**This report is to be filed at customer site.**

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

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Additional Comments:

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Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

FE Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# 8 Parts Lists

# 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 GE Healthcare Service Parts.



## 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.

## HP ML370 G5 file server

Table 1. FRUs, HP ML370 G5 File Server		
Description	GE Part Number	HP 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
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

Table 1. FRUs, HP ML370 G5 File Server (Continued)		
Description	GE Part Number	HP Part Number
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 <b>NOTE:</b> 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

## HP ML370 G4 file server

Table 2. FRUs, HP ML370 G4 File Server		
Description	GE Part Number	HP 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 Xenon 3.4-GHZ 1-MB L2 Cache	2026988-001	364757-001

Table 2. FRUs, HP ML370 G4 File Server (Continued)		
Description	GE Part Number	HP Part Number
Intel Xenon 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
146.8-GB 10K rpm SCSI Ultra320 hot-plug hard drive <b>NOTE:</b> Quantity required for rack-mounted server = 6 Quantity required for tower server = 4	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

## HP rp5700 SFF client

Table 3. FRUs, HP rp5700 SFF Client		
Description	GE Part Number	HP Part Number
CMPTR HP RP5700 SFF E6400 1MB 160GB	2040611-001	KW399UP#ABA
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
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
DISK DRIVE FLOPPY USB 2.0 EXT BLACK	2034800-002	DC361B
SATA 16X SUPERMULTI LIGHTSCRIBE ALL	2040746-017	RV629AV
SD Card Reader Memory Card 18 in 1	2027495-004	*

\* SD Card Reader is not an HP part.

## HP dc7600 SFF client

Table 4. FRUs, HP dc7600 SFF Client		
Description	GE Part Number	HP Part Number
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	*

\* SD Card Reader is not an HP part.

## HP dc7100 SFF client

Table 5. 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

## HIS DL360 1U G5 server

Table 6. 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 6. 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

## HIS DL360 1U G4 server

Table 7. 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

## Multitech Modem

Table 8. FRUs, Multitech Modem	
Description	GE Part Number
MultiTech Modem MT9234ZBA Replacement Kit	2046544-001

**For your notes**



# 9 Glossary

archive	Permanent storage of data.
ACC	<b>American College of Cardiology.</b> A professional society whose membership comprises more than 24,000 cardiovascular physicians and scientists from around the world.
AIT	<b>Advanced Intelligent Tape.</b> 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	<b>American National Standards Institute.</b> The United States government body responsible for approving US standards in many areas, including computers and communications. ANSI is a member of ISO.
API	<b>Application Program Interface.</b> 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	<b>American Standard Code for Information Interchange.</b> 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	<b>AT Attachment Packet Interface.</b> 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	<b>Basic Input/Output System.</b> 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	<b>Bayonet Navy Connector.</b> 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	<b>Complementary Metal Oxide Semiconductor.</b> 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	<b>Central Processing Unit.</b> The part of a computer which controls all the other parts.
DICOM	<b>Digital Imaging and Communications in Medicine.</b> 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	<b>Dual In-line Memory Module.</b> Small circuit boards carrying memory integrated circuits, with signal and power pins on both sides of the board.
DLL	<b>Dynamically Linked Library.</b> 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	<b>Direct Memory Access.</b> 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	<b>Dynamic Random Access Memory.</b> 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	<b>Dual Tone Multi Frequency.</b> ("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	<b>Error Detection and Correction.</b> 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	<b>Electrostatic Discharge.</b> 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	<b>Facsimile.</b> 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	<b>File Allocation Table.</b> 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	<b>File Transfer Protocol.</b> The method of moving files from system to system using TCP/IP.
gateway	A term for a device that enables data to flow between different networks (forming an internet).
HIS	<b>Hospital Information System.</b> 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	<b>Health Level 7.</b> 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	<b>Integrated Drive Electronics.</b> A disk drive interface standard based on the IBM PC ISA 16-bit bus but also used on other personal computers.
IEC	<b>International Electrotechnical Commission.</b> The international standards and conformity assessment body for all fields of electrotechnology.
IEEE	<b>Institute of Electrical and Electronics Engineers, Inc.</b> 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	<b>Internet Information Server.</b> 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	<b>Input/Output.</b> 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	<b>Infrared Data Association.</b> 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	<b>Internet Protocol.</b> 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	<b>Interrupt Request.</b> 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	<b>Industry Standard Architecture.</b> A bus standard for IBM compatibles that extends the XT bus architecture to 16 bits.
ISO	<b>International Organization for Standardization.</b> 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	<b>Keyboard Video Mouse switch.</b> 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	<b>Local Area Network.</b> 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	<b>Liquid Crystal Display.</b> An electro-optical device used to display digits, characters or images, commonly used in digital watches, calculators, and portable computers.
LED	<b>Light-Emitting Diode.</b> A type of diode that emits light when current passes through it.
MIME	<b>Multipurpose Internet Mail Extensions.</b> 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	<b>Moving Picture Experts Group.</b> An ISO committee that generates standards for digital video compression and audio. Also the name of their algorithms.
NEMA	<b>National Electrical Manufacturers Association.</b>
NetBIOS	<b>Network Basic Input/Output System.</b> 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	<b>NetBIOS Extended User Interface.</b> The network transport protocol used by all of Microsoft's network systems and IBM's LAN Server based systems.
NIC	<b>Network Interface Card.</b> An adapter circuit board installed in a computer to provide a physical connection to a network.
ns	<b>nanosecond.</b> $10^{-9}$ seconds (one thousand millionth part of a second)
OEM	<b>Original Equipment Manufacturer.</b> A company which makes equipment (e.g. computers) as opposed to one which sells equipment made by other companies.
OS	<b>Operating System.</b> The program that allows you to access the basic functions of your computer. It is the minimum software required to run a program.

PBX	<b>Private Branch Exchange.</b> 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	<b>Printed Circuit Board.</b> 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	<b>Peripheral Component Interconnect.</b> A standard for connecting peripherals to a personal computer.
PCL	<b>Printer Control Language.</b> A Document description language used by Hewlett-Packard LaserJet printers.
PDC	<b>Primary Domain Controller.</b> 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	<b>Portable Document Format.</b> 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	<b>Packet Internet Groper.</b> 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	<b>Partial Response Maximum Likelihood.</b> 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	<b>Redundant Array of Inexpensive Disks/Drives.</b> A unit with several magnetic disks which protects against data loss in the event of the failure of any one disk.
RAM	<b>Random Access Memory.</b> A data storage device for which the order of access to different locations does not affect the speed of access.
RFI	<b>Radio Frequency Interference.</b> 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	<b>Reduced Instruction Set Computer.</b> 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	<b>Read-Only Memory.</b> 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	<b>Small Computer System Interface.</b> 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.
SDLC	<b>Synchronous Data Link Control.</b> An IBM protocol. A discipline conforming to subsets of the ADCCP of ANSI and the HDLC of the International Organization for Standardization. SDLC manages synchronous, code-transparent, bit-serial communication which can be duplex or half-duplex; switched or non-switched; point-to-point, multipoint, or loop.
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.
SFF	<b>Small Form Factor.</b> A term used to describe computers that are housed in smaller cases than typical desktop computers.
SIMM	<b>Single In-line Memory Module.</b> 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	<b>Simple Mail Transfer Protocol.</b> 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	<b>Society for Thoracic Surgeons.</b>
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	<b>Transmission Control Protocol over Internet Protocol.</b> 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.
token ring	A computer local area network arbitration scheme in which conflicts in the transmission of messages are avoided by the granting of "tokens" which give permission to send. A station keeps the token while transmitting a message, if it has a message to transmit, and then passes it on to the next station.
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	<b>Ultra Direct Memory Access.</b> 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	<b>Underwriters Laboratories Inc.</b> 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 server\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.
- 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.



# A Electromagnetic Compatibility

# Introduction

Changes or modification to the MUSE system server or client not expressly approved by GE could cause electromagnetic compatibility (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.

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**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.

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**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.

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## Guidance and manufacturer's declaration – electromagnetic emissions

Emissions test	Compliance	Electromagnetic environment-guidance
RF emissions EN 55022	Group 1	The MUSE server and client use RF energy for their internal functions. 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)	The MUSE server and client are 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.
	Class A (Client)	
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 ± 500V for input/output lines	± 2 kV for power supply lines ±1 kV 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 file server or client requires continued operation during power mains interruptions, it is recommended that the MUSE file server or client 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 EN 61000-4-6</p> <p>Radiated RF EN 61000-4-3</p>	<p>3 Vrms 150 KHz to 80 MHz</p> <p>3V/m 80 MHz to 2.5 GHz</p>	<p>3 Vrms</p> <p>3V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the MAC 400, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance</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 where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer, and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by 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><b>Note:</b> At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p><b>Note:</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by reflection from structures, objects, and people.</p>			
<p><sup>a</sup> 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><sup>b</sup> 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 MAC 400 system. The MAC 400 system is intended for use in the electromagnetic environment on which radiated RF disturbances are controlled. The customer or the user of the MAC 400 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MAC 400 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	Model	Type (i.e. ESD)	Exception(s)	EMC Environment Guidance
Server	HP ML370G5	N/A	None	N/A
	HP ML370G4	N/A	None	N/A
	HP DL360G5	N/A	None	N/A
Client	HP dc7600	N/A	None	N/A
	HP dc7100	N/A	None	N/A
	HP rp5700	N/A	None	N/A
Accessories	LCD (HP Model L1910)	N/A	None	N/A
	UPS 120V Powerware PW5115 1400	—	—	—
	UPS 230V Powerware PW5115 1400i	—	—	—

**For your notes**



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**For your notes**

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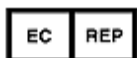
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