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H-Scribe

DATA EXCHANGE INTERFACES

ADMINISTRATOR MANUAL

Manufactured by Mortara Instrument, Inc., Milwaukee, Wisconsin U.S.A.



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- d) Accident; a disaster affecting the Product/s;
- e) Alterations and/or modifications to the Product/s not authorized by Mortara;
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USER SAFETY INFORMATION



Warning: Means there is the possibility of personal injury to you or others.



Caution: Means there is the possibility of damage to the device.

Note: Provides information to further assist in the use of the device.



Warning(s)

- Reference H-Scribe™ user manual for warnings relating to the Holter analysis system.
- Reference H12+™ or H3+™ digital recorder user manuals for all warnings relating to the recorder.
- Possible malfunction risks could be associated when installing 3rd party software. Mortara Instrument, Inc. cannot verify the compatibility of all possible hardware/software combinations.
- Data exchange interfaces are used to exchange data with 3rd party ECG management systems. It is not possible to assure complete compatibility with all possible 3rd party ECG management systems and configurations. It is recommended to contact the 3rd party vendor to ensure device has been verified as compatible with a particular installation of their system.



Caution(s)

- Reference H-Scribe user manual for cautions relating to the Holter analysis system.
- Reference H12+ or H3+ digital recorder user manuals for all cautions relating to the recorder.



Note(s)

- Reference H-Scribe user manual for notes relating to the Holter analysis system.
- Reference H12+ or H3+ digital recorder user manuals for all notes relating to the recorder.

EQUIPMENT SYMBOLS AND MARKINGS

Symbol Delineation



Attention, consult accompanying documents



Do not dispose as unsorted municipal waste. Per European Union Directive 2002/96, requires separate handling for waste disposal according to national requirements



Indicates compliance to applicable European Union directives

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Purpose

The H-Scribe Holter analysis system offers several ways to exchange information with 3rd party ECG management systems. This manual covers the technical aspects of installing and configuring the various interface options.

- Holter report as PDF file
- Holter report statistics as XML file
- Holter report statistics sent in HL7 message
- Holter strip waveforms as XML file
- Holter strip waveforms as UNIPRO file for E-Scribe™ data management system
- Holter full disclosure waveforms as XML files
- Holter report as DICOM®-encapsulated PDF storage
- Holter report as PDF encapsulated in HL7 message
- Holter orders as DICOM Modality Worklist (MWL) request
- Holter orders received in HL7 messages
- Holter report DICOM storage commitment
- Holter study status reported as DICOM Modality Performed Procedure Step (MPPS)

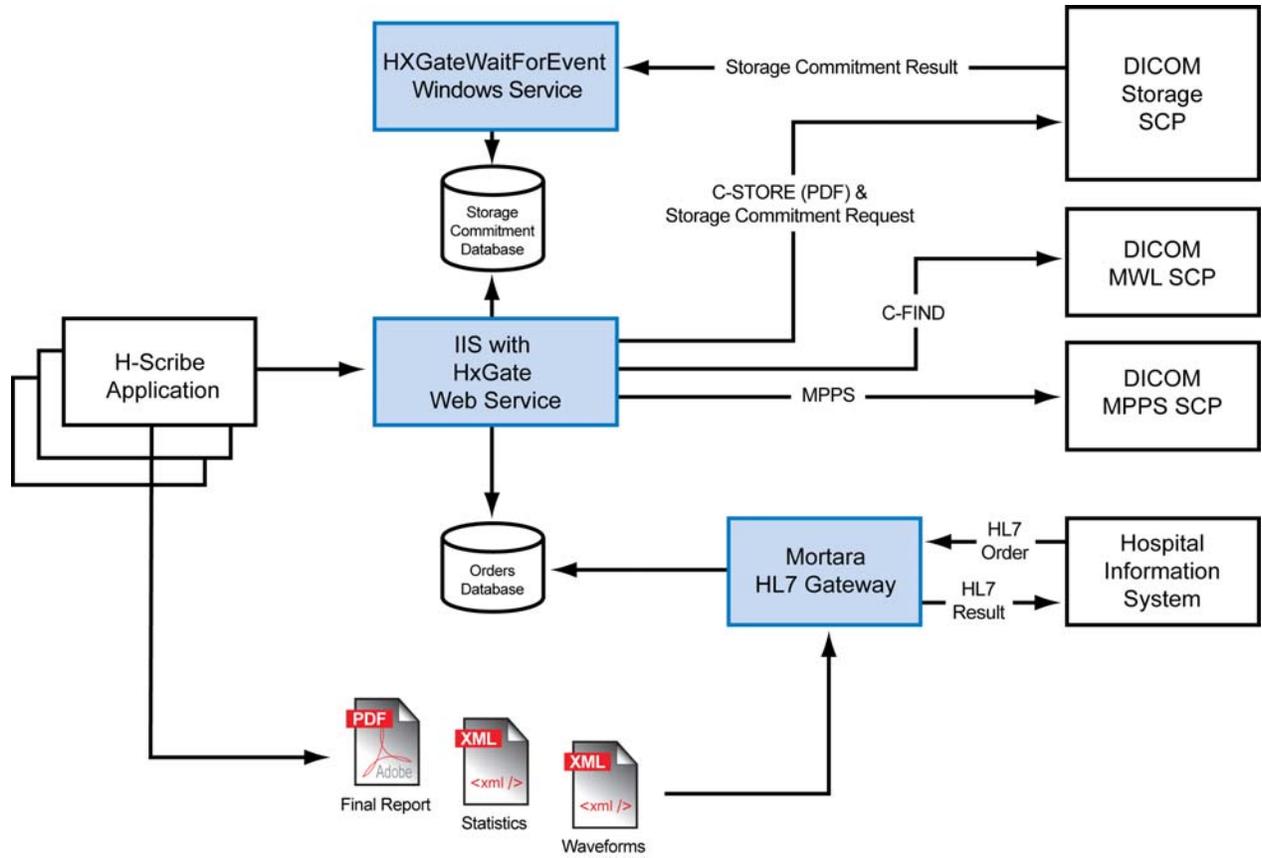
NOTE: This manual may contain screen shots. Any screen shots are provided for reference only and are not intended to convey actual operating techniques. Consult the actual screen in the host language for specific wording.

Architecture

Figure 1-1 shows the overall architecture of the H-Scribe data exchange interfaces. H-Scribe can be configured to export PDF and XML files into folders monitored by other systems for import. The exported files can also be used by Mortara's HL7 Gateway for generating HL7 results messages. The web service "HXGate for H-Scribe" is used to generate DICOM messages. The Microsoft® Windows™ service "HXGateWaitForEvent" listens for confirmations from DICOM storage commitment requests.

The interface gateways are centralized per enterprise: one HL7 Gateway, one HX-Gate for H-Scribe web service, and one HXGateWaitForEvent serves all the enterprise's H-Scribe systems. Typically, the HL7 Gateway runs on its own server; however, the web and Windows services can run on one of the H-Scribe systems if it is always available on the network.

Figure 1-1



HL7

HL7 implementations vary widely between products, versions, and installations. As such, Mortara offers its Mortara HL7 Gateway which includes a commercial HL7 messaging broker that is configured for each installation. Mortara representatives work directly with the site's IT representatives to configure and test the interface.

The HL7 Gateway uses "Interface XML/PDF Export" files to generate results messages. These messages can include discrete data found in the XML file as well as the displayable PDF report. If HL7 order messages will be received, HX-Gate must be installed. Refer to *Installation of HX-Gate* in this manual.

DICOM

HX-Gate is used to communicate with 3rd party systems that use the DICOM protocol. It supports Modality Worklist (MWL) queries, PDF storage, storage commitment, and Modality Performed Procedure Step (MPPS) status messages.

DICOM Storage Events

DICOM-encapsulated PDF messages are sent whenever a recording is closed and is "Marked as Reviewed". If Storage Commitment is enabled, a commitment request will be sent at the same time. H-Scribe will display a warning when a slot is reused before a commitment response has been received.

DICOM MPPS Events

Events in H-Scribe cause MPPS messages to be sent if MPPS is enabled in HX-Gate:

- An "In Progress" message is sent when a procedure is started. H-Scribe considers the procedure started when the following occur:
 - Demographics are either saved to the recorder before hookup, or with the data after acquisition from the recorder.
- A "Discontinued" message is sent when a started procedure is stopped before completion. H-Scribe considers the procedure discontinued when the following occur:
 - The user selects an order that replaces a previously selected order. This can occur during demographics download, acquisition, or patient information editing after acquisition.
 - When a recording is deleted before it has been scanned.
 - When a CF card with downloaded demographics is erased before the data has been recorded, or before recorded data has been acquired by H-Scribe.
- A "Completed" message is sent when a procedure is completed. H-Scribe considers a procedure completed when the following occur:
 - Recording has been "Marked as Reviewed".

CONFIGURATION OF FILE EXPORTS

H-Scribe can export several kinds of files; most are enabled with flags in the dongle.

PDF Export

Used to export a displayable report in PDF format. It is not intended to be the primary data exchange interface with other information systems. Refer to *Interface XML/PDF Export* in this manual when exchanging data with other systems. This feature can be used with Mortara's Athena product.

Dongle feature name:	Export PDF
Primary uses:	<ul style="list-style-type: none">• Send final report to Athena.• Can manually attach report to an e-mail and share it with a healthcare colleague.• Can manually attach report to the patient's electronic chart.
Export triggers:	When Export Report button is clicked when reviewing the report.
Default path configuration:	Browse.dir in the local C:\usr folder. When sending to Athena, configure path to be the same as Athena's import folder.
Example filename:	H12345 [19960619152800] First_Middle_Last.pdf Refer to <i>Filenames and Locations</i> in this section.

Interface XML/PDF Export

Primarily used to send final reports to other hospital information systems. The final report is exported as a displayable report in PDF format with the discrete data exported in XML.

Dongle feature name:	Interface XML / PDF Export
Primary uses:	<ul style="list-style-type: none">• Send final report and statistics to the HL7 Gateway causing HL7 results messages to be sent.• Send final report and statistics to 3rd party information systems that can import PDF reports and/or Mortara XML data.
Export triggers:	The Interface Export option in the User Profile controls when the files are exported. One or both of the following events can be configured to trigger the file export: <ul style="list-style-type: none">• Export Report button• Mark as Reviewed
Default path configuration:	Interface.dir in the Patient List root folder.
Example filenames:	XML: H^STAT_List1^1_12345^Last^First^M_19960619152800_20100901132254.xml PDF: H^REPORT_List1^1_123^Last^F^M_19960619152800_20100901132254.pdf Refer to <i>Filenames and Locations</i> in this section.
XML specification:	HolterStatistics_V5.dtd (see Appendix A)

Rx XML Export

Used to send discrete data from H-Scribe to clinical trial analysis and management systems. The Rx XML differs from the Interface XML in:

- Statistics XML (final report) includes additional statistics calculated between diary events.
- Waveform strips can be exported as XML files that include beat-by-beat measurements and optional waveform samples.
- Full disclosure waveforms can be exported as XML files that include beat-by-beat measurements and optional waveform samples.

Waveforms and beat measurements can be exported for selected strips and/or the entire recording. These XML files can export in either the Mortara format, or FDA-XML (HL7 v3 Annotated ECG) format. When the entire recording is exported, each hour is exported in a separate file.

Dongle feature name:	Rx XML Export
Primary uses:	<ul style="list-style-type: none"> • Send discrete data (statistics, waveforms) to a research system that performs additional analysis and management of the data.
Export triggers:	The Export XML item in the Patient menu gives a dialog for specifying what to export.
Default path configuration:	XML.dir in the Patient List root folder.
Example filenames:	<p>Rx Statistics XML: H^STAT_List1^1_12345^Last^First^M_19960619152800_20100901132254.xml</p> <p>Waveform XML: H^STRIP^M^7_List1^1_12^Last^F^M_19960619152800_20100901132254.xml H^STRIP^F^7_List1^1_12^Last^F^M_19960619152800_20100901132254.xml</p> <p>Refer to <i>Filenames and Locations</i> in this section.</p>
XML specification:	HolterStatisticsRx_V5.dtd (refer to Appendix B) HolterECG_V5.dtd (refer to Appendix C)

UNIPRO Export

Allows 10-second strips to be exported to E-Scribe so resting ECG analysis and measurements can be made. When UNIPRO files are exported, it is important to format the demographics according to the E-Scribe's Custom ID specification and to tag the ECG with the appropriate site number.

Dongle feature name:	UNIPRO Export
Primary uses:	Send 10-second strips to E-Scribe as UNIPRO files.
Export triggers:	The Export to E-Scribe item in the Patient menu gives a dialog for specifying which strips to export.
Default path configuration:	EScribeExportPath.txt in the Patient List root folder. Second line of file points to the E-Scribe's Configuration folder where Custom ID information can be found. NOTE: This file is automatically created by the Edit Patient List Location dialog that can be accessed from the Select Patient dialog. Please use Edit Patient List Location and do not edit this file manually.
Example filename:	H^UNIPRO_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.uni Refer to <i>Filenames and Locations</i> in this section.
E-Scribe Site specification:	EScribeSiteNumber.txt in Patient List root folder. NOTE: This file is automatically created by the Edit Patient List Location dialog that can be accessed from the Select Patient dialog. Please use Edit Patient List Location and do not edit this file manually.

E-Scribe Custom ID

If no Custom ID is defined, H-Scribe will use the short format:

H-Scribe Field	E-Scribe Field	Maximum Length
Last Name	Patient Last Name	20
First Name	Patient First Name	20
ID #	Patient ID Number	23
Date Of Birth	Patient Birth Date	n/a
Age	Patient Age	n/a
Sex	Patient Gender	n/a

When a Custom ID is defined, H-Scribe demographic fields are mapped to the E-Scribe Custom ID fields by:

H-Scribe Field	E-Scribe Custom ID Field	Maximum Length	Comment
Last Name	Patient Last Name	20	
ID #	Patient ID Number	23	
Age	Patient Age	n/a	
Sex	Patient Gender	n/a	
	Patient Race	-	Not supported by H-Scribe.

H-Scribe Field	E-Scribe Custom ID Field	Maximum Length	Comment
Medications	Medication 1 Medication 2	20	If Custom ID has 2 medication fields, H-Scribe will split the medications at the first comma and fill both E-Scribe fields.
First Name	Patient First Name	20	
	Lcd Request	-	Not supported by H-Scribe.
	Patient Height	-	Not supported by H-Scribe.
	Patient Weight	-	Not supported by H-Scribe.
	Soc Sec Number	-	Not supported by H-Scribe.
Second ID	Patient Second ID	23	
Middle Name	Patient Middle Name	20	
	Patient Location	-	Not supported by H-Scribe.
	Patient Room	-	Not supported by H-Scribe.
Date Of Birth	Patient Birth Date	n/a	
Strip annotation	Comment	23	
	Reason Code	-	Not supported by H-Scribe.
Referring Physician	Referring Physician	23	
	Attending Physician	-	Not supported by H-Scribe.
Reviewing Physician	Overreading Physician	23	
Analyst	Technician	23	
Indications	Diagnosis	23	
	Note 1	-	Not supported by H-Scribe.
	Note 2	-	Not supported by H-Scribe.
	Systolic Blood Pressure	n/a	Not supported by H-Scribe.
	Diastolic Blood Pressure	n/a	Not supported by H-Scribe.
Hookup Tech	(not mapped)	-	Not supported by E-Scribe.
Scan Number (numerical, 0 <= N <= 65535)	Sequence Number	n/a	
Recorder Number (numerical, 0 <= N <= 65535)	Cart Number	n/a	

Filenames and Locations

Configure filename formats and export locations in the “ExportFilenameFormats.txt” file. The file can be located in the local C:\usr folder, or, if customization must be different for each Patient List, the file can be located in each Patient List root folder.

The first six lines of the file specify the export path and filename formats for:

- 1) Audit Trail PDF and TXT beat log
- 2) Interface XML/PDF Export and HX-Gate Export
- 3) Rx XML Statistics
- 4) Rx XML Strip Waveforms
- 5) Export PDF
- 6) UNIPRO Export

The default formats for each line (used if that line is blank or if ExportFilenameFormats.txt does not exist) are:

Export PDF only:

```
<DefaultPath>\H<PatientID> [<TestDateTime>]
<PatientFirstName>_<PatientMiddleName>_<PatientLastName>
```

Example output filename:

```
H12345 [19960619152800] First_Middle_Last.pdf
```

All other exports:

```
<DefaultPath>\H^<FileType>_<PatientListName>^<SlotNumber>_<PatientID>^<
PatientLastName>^<PatientFirstName>^<PatientMiddleName>_<TestDateTime>_
<ReportDateTime>
```

Example output filenames:

```
H^REPORT_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.pdf
H^STAT_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.xml
H^STRIP^M^7_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.xml
H^STRIP^F^7_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.xml
H^UNIPRO_PatList1^1_12345^Last^First^Middle_19960619152800_20100901132254.uni
```

To modify the filename format for a particular export, the format **MUST** be put on the corresponding line. Example: to modify the Export PDF filename format, put the format on line 5 of the file. All other lines can be left blank which will leave the other exports unaffected.

Filename formats should not contain the file extension. H-Scribe automatically appends the appropriate file extension (i.e., “.pdf”, “.xml”, or “.uni”).

Format specifier names are case sensitive. Example: enter <PatientLastName> and **NOT** <PATIENTLASTNAME> nor <patientlastname>, which would be ignored.

Any text included in the filename format other than the format specifiers will be included in the filename as is.

If the <DefaultPath> format specifier is not used, the output path specified in the filename format will override the output directory specified in AuditTrailPath.txt, HXGateConfig.ini, Browse.dir, XML.dir and Interface.dir.

The following variables can be used to specify filename formats:

Variable	Description
<DefaultPath>	Uses the default path for the type of file being exported as specified in AuditTrailPath.txt, Interface.dir, XML.dir, Browse.dir, or EScribeExportPath.txt.
<PatientDir>	The current patient directory (can be DAY2 subdirectory).
<PatientRootDir>	The root directory for the current patient.
<PatientListDir>	The root directory for the current Patient List (e.g. c:\usr for the local computer's Patient List).
<DefaultFilename>	The default filename (no path) for this file type.
<PatientID>	Patient's ID.
<PatientSecondID>	Patient's second ID.
<PatientFullNameLFM>	Patient's full name formatted as "Last, First Middle". The middle and first names are omitted if blank.
<PatientLastName>	Patient's last name.
<PatientFirstName>	Patient's first name.
<PatientMiddleName>	Patient's middle name.
<PatientSex>	Patient's gender: M = male F = female U = Unknown
<TestDateTime>	Start date/time of the recording (or of the strip for XML Strips) in HL7 yyyyMMddHHmmss format. For 48 hour combination report files this is the start date/time of Day 1.
<TestDate>	Start date of the recording (or of the strip for XML Strips) in HL7 yyyyMMdd format. For 48 hour combination report files this is the start date of Day 1.
<ScanDate>	The date the recording was last scanned, in HL7 yyyyMMdd format.
<ReportDateTime>	The current (local) date/time when the report is exported, in HL7 yyyyMMddHHmmss format.
<ReportDate>	The current (local) date when the report is exported, in HL7 yyyyMMdd format.
<PatientDOB>	Patient's date of birth, in HL7 yyyyMMdd format.
<PatientListName>	The name of the current Patient List.
<FileType>	The file type indicator for the file being created. PAT-STATE = audit trail files. STRIP^M^# = Mortara-format XML Strips (where # is the truncated integer duration of the strip in seconds). STRIP^F^# = FDA-format XML Strips STAT = XML Statistics (Rx, Interface Export, and HX-Gate) REPORT = PDF file (Interface Export and HX-Gate) WEB = for PDF Export to Athena UNIPRO = for UNIPRO Export to E-Scribe
<SlotNumber>	The integer value of the slot number of the patient directory.

Incompatible filename characters in patient name, ID, second ID, or Patient List are replaced with a hyphen (-). These characters include:

- * (asterisk)
- ? (question mark)
- < (greater than)
- > (less than)
- | (bar)
- “ (double-quote)
- / (forward slash)
- \ (back slash)
- : (colon)
- # (hash mark)
- . (period)
- ^ (carat)
- _ (underscore)

H-Scribe does not overwrite files. If a file with the same name already exists, H-Scribe will wait 5 seconds and try to export again (<ReportDateTime> will have incremented by 5 seconds). If the filename is still not unique, it will not export the new file. The “PDF Export” for Athena is the only exception as the default filename doesn’t include the <ReportDateTime>, so overwriting is allowed.

Example: Specifies a fixed output directory for all exports of that export type:

\\Server\ShareName\ExportDir\

Example: Changes all export filenames of that export type to be the patient full name (Last, First Middle)

<DefaultPath>\

Example: Changes all exports of that export type to go to the current patient directory, with the filenames containing first name, last name, ID and recording date/time

<PatientDir>\

Example: Changes all exports of that export type to go to a network directory, with the filename containing a fixed protocol name, the Patient List name, the file type

\\Server\ShareName\ExportDir\ProtocolXYZ_\

Example: All exports of that export type to go to a common directory specific to each Patient List

<PatientListDir>\ExportDir\

Installation of HX-Gate includes installation of the HX-Gate web service as well as the HXGateWaitForEvent Windows service. This is necessary to support the receipt of HL7 orders or to use DICOM. If PDF and XML file export is all that is required, HX-Gate is not necessary.

Identify a suitable computer to host HX-Gate. It can be one of the H-Scribe systems if it will always be running and connected to the network. Otherwise, a central server should be used. If an ideal configuration is not readily apparent, please consult with a Mortara representative.

***NOTE:** The computer must be running a 32-bit Windows operating system (Windows XP or later, 32-bit). Windows Server 2008 R2, which is 64-bit only, is not supported.*

Installation and Configuration of Internet Information Services (IIS)

When using an existing web server, carefully examine the instructions below to ensure that the required IIS features are installed.

For Windows XP and Windows Server 2003

- a. Install Microsoft .Net Framework V2.0 if it is not already installed. This can be downloaded from <http://www.microsoft.com/downloads/details.aspx?familyid=0856EACB-4362-4B0D-8EDD-AAB15C5E04F5&displaylang=en> or from Windows Update.
- b. Click on **Start ► Control Panel ► Add/Remove Programs**.
- c. Click **Add/Remove Windows Components** on the left.
- d. In Windows XP, check the box next to **Internet Information Services**. Ensure the following items are selected (included by default):
 - Common Files
 - Internet Information Services Snap-In
 - World Wide Web Service
 - World Wide Web Service
- e. In Windows Server 2003, select **Application Server** and then click on **Details**. Under **Application Server** select **ASP.Net** (which is not included by default) and select **Internet Information Services**. By default Internet Information Services includes:
 - Common Files
 - Internet Information Services Manager
 - World Wide Web Service
 - World Wide Web Service
- f. Click on **Next** and follow the rest of the prompts to complete installation of IIS. This may require inserting the Windows installation CD.
- g. Open a **Command Prompt** and go to the folder C:\WINDOWS\Microsoft.NET\Framework\v2.0.50727.
- h. Run the command:
aspnet_regiis -i
to register .NET 2.0 with IIS. This will set the Default Web Site to use ASP .Net 2.0.
- i. In Windows Server 2003:
 - Go to **Administrative Tools ► Internet Information Services Manager**.
 - Select **Internet Information Services ► Local Computer ► Web Services Extensions** in the left window. Verify that ASP .NET v2.0.50727 is listed as **Allowed**. If not, select it and click on the **Allow** button. Close IIS Manager.
- j. Perform a Windows Update and install any critical security patches that may be available.

For Windows Vista and Windows 7:

- a. Click on **Start ► Control Panel ► Programs and Features ► Turn On or Off Windows Features**.
- b. Check the checkbox next to **Internet Information Services**. Keep all the defaults and additionally select the following items that are not selected by default:
 - Internet Information Services**
 - Web Management Tools**
 - IIS 6 Management Compatibility**
 - IIS Metabase & IIS 6 Configuration Compatibility**
 - Internet Information Services**
 - World Wide Web Services**
 - Application Development Features**
 - ASP.NET**
- c. Follow the prompts to complete the installation.
- d. Perform a Windows Update and install any critical security patches that may be available.

For Windows Server 2008:

- a. Click on **Start ► Control Panel ► Administrative Tools ► Server Manager**.
- b. Right-click on **Roles** in the left window and select **Add Roles**. Click on **Next**.
- c. Select **Web Server (IIS)**. A popup will appear and require installation of the Windows Process Activation Service. Click on **Add Required Features** to return to the Server Roles window. Click on **Next**.
- d. In the Role Services window keep all the defaults; additionally select the following items that are not selected by default:
 - Web Server**
 - Application Development**
 - ASP.NET**

NOTE: When you click on ASP.Net a popup will appear and require installation of several ISAPI and .Net items. Click on Add Required Role Services.

Management Tools

- IIS 6 Management Compatibility**
 - IIS Metabase Compatibility**
- e. Click on **Next** and then click on **Install**.
 - f. Back in Server Manager, select **Roles ► Web Server** in the left window. Note that the ASP.Net State Service defaults to Stopped and Manual Start. Click on **Services**.
 - g. In the Services window double-click the ASP.NET State Service. Select a startup type of **Automatic** and click on **Start**. Close Server Manager.
 - h. Perform a Windows Update and install any critical security patches that may be available.

Configuration of Windows Firewall

1. Configure Windows Firewall (if enabled) to allow HTTP messages (on port 80 by default).

For Windows XP and Windows Server 2003

- a. Click on **Start ► Control Panel ► Windows Firewall**. Select the Advanced tab and then click on the Settings button in Network Connection Settings. Verify **Web Server (HTTP)** is checked.
- b. If necessary, check the checkbox and click OK.

For Windows Vista, Server 2008 and Windows 7:

- a. Click on **Start ► Control Panel ► Windows Firewall**. Click on **Allow A Program Through Windows Firewall**.
 - b. Verify **World Wide Web Services (HTTP)** is checked.
 - c. If necessary, check the checkbox and click OK.
2. If using DICOM Storage Commitment messages, add an Exception to Windows Firewall (if enabled) to allow the HX-Gate WaitForEvent Windows service to listen for Storage Commitment messages on port 104 (the default, configurable in HxConfig.exe below).

For Windows XP, Server 2003, Vista and Server 2008:

- a. Click on **Start ► Control Panel ► Windows Firewall**.
- b. For Windows XP and Server 2003, select the **Exceptions** tab and click on **Add Port**.
- c. For Windows Vista and Server 2008, click on **Allow A Program Through Windows Firewall** and then click on **Add Port**.
- d. Enter a helpful name such as “HX-Gate WaitForEvent Service” and a port number of 104 (the default for this service, although it can be configured as below during installation). The port type of TCP is correct. Note that the port will default to a scope that allows inbound connections from any and all computers. For Windows Vista and Server 2008, this will add a port exception to the current network profile only (i.e. domain, private, public).
- e. Click on **OK** and close the Windows Firewall configuration program.

For Windows 7:

- a. Click on **Start ► Control Panel ► Administrative Tools ► Windows Firewall With Advanced Security**.
- b. Select **Inbound Rules** and then click on **New Rule**.
- c. Select **Port** as the Rule Type and click on **Next**.
- d. Select **TCP**, and enter 104 for the **Specific Local Port**. Click on **Next**.
- e. Select **Allow** for the Action and click on **Next**.
- f. Select the correct Profiles (network types) for which you want to enable the exception (**Domain, Public, Private**). Determine which type of network your system is currently using in **Control Panel ► Network and Sharing Center**. Click on **Next**.
- g. Enter a helpful name such as “HX-Gate WaitForEvent Service” and click on **Finish**. Close **Windows Firewall With Advanced Security**.

Install HX-Gate

1. Insert the HX-Gate installation CD.
2. The setup program should automatically start. If not, open Windows Explorer and double-click on **setup.exe** in the root directory of the CD.
3. Follow the prompts to start the installation. It is recommended that you keep the default settings of
 - a. Virtual Directory = HXGate
 - b. Port = 80
4. You will be asked if you are using DICOM. If so, the HX-Gate WaitForEvent Windows Service is required and will be installed.
5. You will be prompted to restart the IIS Web Server. Type **Y** to agree.

WARNING: *If other web sites are hosted by this server, ask your server administrator to restart IIS. DO NOT attempt this yourself. If you do not restart IIS then HX-Gate will not work until you reboot.*

6. The installer will prompt to automatically create and share a local directory to which all H-Scribe systems should export files. For alternative configurations, see *File Permissions, Application Pools and Network Access* in this section.
7. When the installation is nearly complete a success message will prompt you to “Press **C** to continue with diagnostics.
8. In DICOM mode only the HXConfig program will be started to allow you to configure your DICOM access settings. Obtain the appropriate values from your DICOM Administrator. Refer also to *Configuration of DICOM* in this manual. When you are done click on **OK** to close the HXConfig window.
9. The <http://localhost/HXGate/Service1.asmx> Service Page will appear in Internet Explorer. This page allows you to test HX-Gate to make sure that it is correctly configured.
10. In DICOM mode only you can click on the **MWL_ECHO**, **MPPS_ECHO** and **C_STORE_ECHO** hyperlinks and then click on the Invoke button in the following web page to test communications with the corresponding DICOM system. You should receive a response of Echo Passed.
11. In all three modes you can click on the **GetServiceInformation** hyperlink and click on the Invoke button in the following web page to find out the HX-Gate web service software version.
12. When done, close Internet Explorer. You will be returned to the main installer program.
13. When you close the installer program you may be prompted to restart the HX-Gate computer.
14. If you are using the Mortara HL7 Gateway, you should install and configure it after installing HX-Gate.

File Permissions, Application Pools, and Network Access

By default, HX-Gate uses the default application pool user account for the version of Windows and IIS you are running to run the HX-Gate Web Service, and the local System account to run the HX-Gate WaitForEvent Windows Service (if you are using DICOM). The C:\Mortara Instrument Inc\HScribeExport directory is created and shared and these two accounts are granted the appropriate permissions to access that directory.

The only additional action you must take is to grant NTFS file and network share permissions to this export directory for the external H-Scribe user to access it externally. The permissions required on the export directory for the H-Scribe user are:

NTFS File Permissions:

Modify (which includes Write and Delete)

The installer automatically grants Modify permissions to the default application pool user account.

The local System account already has Full Control permissions.

Network Share Permissions:

Change (Full Control is not needed)

The installer automatically grants Change permissions to the default application pool user account and to the local System account.

The default application pool user accounts for each version of Windows is as follows:

Operating System	IIS Version	Default application pool user account
Windows XP	5.1	ASPNET
Windows Server 2003	6.0	NT AUTHORITY\NETWORK SERVICE (NETWORKSERVICE)
Windows Vista	7.0	NT AUTHORITY\NETWORK SERVICE (NETWORKSERVICE)
Windows Server 2008	7.0	NT AUTHORITY\NETWORK SERVICE (NETWORKSERVICE)
Windows 7	7.5	IIS APPPOOL\DefaultAppPool (DefaultAppPool)

If, however, H-Scribe is saving files to a network drive or anywhere not on the computer running HX-Gate, the default application pool user accounts do not have sufficient permissions to access network resources. In this situation it is recommended that you create a new application pool with a user account that can be granted the necessary file permissions (e.g. a domain account). At a minimum you must change the user account of the application pool used for the HX-Gate Web Service and for the WaitForEvent Windows Service.

Similarly, since the HX-Gate web application runs under ASP.Net 2.0, if you have an existing web server with web applications that must run under ASP.Net 1.1, it is recommended that you also create a separate application pool for HX-Gate to isolate the different versions of ASP.Net or unpredictable results can occur for both applications.

Creating A New Application Pool and Using A Different User Account

***NOTE:** You cannot create new application pools in Windows XP. You must use a Server version of Windows, Windows Vista, Windows 7 or later to create a new application pool. For Windows XP it is strongly recommended that you configure all H-Scribes to save exported files to a shared directory on the computer running HX-Gate.*

1. Configure the HX-Gate Web Application

For Vista, Server 2008, Windows 7 and later:

- a. Click on **Start ► Control Panel ► Administrative Tools ► Internet Information Services Manager**.
- b. Right-click on **<computer name> ► Application Pools** in the left window and select **Add Application Pool**.
- c. Enter a helpful name such as "HX-Gate App Pool". In Windows Vista, Server 2008 and later, the defaults for .Net Framework version (2.0.50727) and Managed pipeline mode (Integrated) are acceptable. Click on **OK**.
- d. Right-click on the HX-Gate App Pool and select **Advanced Settings**. Under **Process Model ► Identity** click on the button next to the default value of ApplicationPoolIdentity.
- e. Click on **Custom Account** and then click on **Set**.
- f. Enter the username and password of the account you wish to use. Click on **OK**, and on **OK**, and on **OK**.

***NOTE:** If you are using an account that is not a local account on the HX-Gate computer (e.g. a domain account), you **must** specify a fully qualified username that includes the domain, such as MYDOMAIN\UserName.*

- g. Select **<computer name> ► Web Sites ► Default Web Site ► HXGate** in the left window and click on **Advanced Settings** in the right window. You can also change the application pool of the entire web site, but this is not recommended if you are running other web applications.
- h. In the General section, click on the button next to the default value of **DefaultAppPool**.
- i. Select the **HX-Gate App Pool** application pool. Click on **OK** and then on **OK**. Close Internet Information Services Manager. You do not need to restart IIS.

For Windows Server 2003 only:

- a. Click on **Start ► Control Panel ► Administrative Tools ► Internet Information Services Manager**.
- b. Right-click on **<computer name> ► Application Pools** in the left window and select **New ► Application Pool**.
- c. Enter a helpful name such as "HX-Gate App Pool". Click on **OK**.

- d. Right-click on the HX-Gate App Pool and select **Properties**. Select the **Identity** tab and click on **Configurable**.
- e. Enter the username and password of the account you wish to use. Click on **OK**, and on **OK**, and on **OK**.

*NOTE: If you are using an account that is not a local account on the HX-Gate computer (e.g. a domain account), you **must** specify a fully qualified username that includes the domain, such as MYDOMAIN\UserName.*

- f. Right-click on <computer name> ► **Web Sites** ► **Default Web Site** ► **HXGate** in the left window and select **Properties**. You can also change the application pool of the entire web site, but this is not recommended if you are running other web applications.
 - g. Select the **Directory** tab and click on the **Application Pool** listbox. Select the HX-Gate App Pool and click on **OK**.
 - h. You will be prompted to set the Inheritance Overrides for child nodes. Click on **Select All** and then click on **OK**.
 - i. Close Internet Information Services Manager.
 - j. You must also add this user account to the local computer's IIS_WPG user group. Right-click on My Computer and select **Manage**.
 - k. Select **System Tools** ► **Local Users And Groups** ► **Groups** in the left window.
 - l. Double-click on the IIS_WPG group in the right windows and then click on **Add**.
 - m. Enter or browse for the appropriate user account and click on **OK** and then again on **OK**. Close the Computer Management program.
 - n. You must restart the IIS services for IIS to see the change in permissions. Merely stopping and restarting the web site in IIS Manager is not sufficient. You can either reboot the computer or go to a command prompt and type "IISRESET.EXE".
2. Configure the user account used for the HX-Gate WaitForEvent Windows Service (DICOM only).
 - a. Click on **Start** ► **Control Panel** ► **Administrative Tools** ► **Services**.
 - b. Double-click on the HXGate WaitForEvent service.
 - c. Select the **Logon** tab. Click on This Account and enter the username and password of the account you wish to use. If you are using an account that is not a local account on the HX-Gate computer (e.g. a domain account), you **must** specify a fully qualified username that includes the domain, such as MYDOMAIN\UserName. Click on **OK**.
 - d. You will be prompted with several notices (e.g. the account has been granted the Logon As A Service right). Click **OK**.
 - e. Right-click on the HXGate WaitForEvent service and select **Restart** to make the user account change take effect.
 - f. Close the Services window.
 3. Configure the file and folder permissions for the HX-Gate installation directory and all subdirectories.
 - a. Open Windows Explorer and navigate to the HX-Gate installation directory (typically c:\inetpub\wwwroot\HXGate). Right-click on the directory and select **Properties**.
 - b. Select the **Security** tab. In Windows Vista, Server 2008, Windows 7 and later, click on **Edit**.
 - c. Click on **Add**. Enter the appropriate user account or navigate to the list of user accounts by clicking on **Advanced**. Once you have selected a user account click on **OK**.
 - d. Back in the Permissions For HXGate window, select the newly added user account in the upper window. Click on the **Modify** checkbox in the lower window and click on **OK** and then **OK**. Close Windows Explorer.

4. Configure the network share and NTFS file permissions for the export directory.

***NOTE:** This is still required even if H-Scribe exports to a directory on the HX-Gate computer. H-Scribe will communicate file locations using UNC network paths such as \\HXGateComputer\HScribeExport, so the Web Service and Windows Service must use network share permissions to access the files.*

- a. Open Windows Explorer on the computer where H-Scribe will be saving exported files. Right-click the export directory and select **Properties**.
 - b. Select the **Security** tab. In Windows Vista, Server 2008, Windows 7 and later, click on **Edit**.
 - c. Click on **Add**. Enter the appropriate user account or navigate to the list of user accounts by clicking on **Advanced**. Once you have selected a user account click on **OK**.
 - d. Back in the Permissions window, select the newly added user account in the upper window. Click on the **Modify** checkbox in the lower window and click on **OK**.
 - e. Back in the **Properties** window, select the **Share** tab.
 - f. In Windows Vista, Server 2008, Windows 7 and later, click on **Advanced Sharing**.
 - g. Click on **Share This Folder**. Enter a **Share Name** as desired.
 - h. Click on **Permissions**. By default the Everyone group is granted Read permissions. You should strongly consider removing this group from the share permissions.
 - i. Click on **Add**.
 - j. Enter the appropriate user account or navigate to the list of user accounts by clicking on **Advanced**. Once you have selected a user account click on **OK**.
 - k. Back in the Permissions window, select the newly added user account in the upper window. Click on the **Change** checkbox in the lower window and click on **OK** and then **OK**, and then click on **Close**. Close Windows Explorer.
5. For Server 2003 ONLY: Configure the file permissions on the c:\windows\temp directory if you are using IWAM_<computername> or a domain user account.
- a. Open Windows Explorer on the HX-Gate computer. Navigate to the c:\Windows\Temp directory, right-click and select **Properties**.
 - b. Select the **Security** tab. In Windows Vista, Server 2008, Windows 7 and later, click on **Edit**.
 - c. Click on **Add**. Enter the appropriate user account or navigate to the list of user accounts by clicking on **Advanced**. Once you have selected a user account click on **OK**.
 - d. The user will be added with the correct default permissions of Read & Execute, List Folder Contents, and Read. Click on **OK** and close Windows Explorer.

Configure H-Scribe To Communicate With HX-Gate

All H-Scribe systems must be configured with the location of HX-Gate. In the systems' "C:\usr" folders, locate the file named "HxGateConfig.ini". Using a text editor like Notepad, open the file and configure the settings.

Setting	Description
URL	<p>This is the fully specified URL for the "Service1.asmx" HX-Gate web service. Examples:</p> <p>When HX-Gate is installed on the local computer using the standard port 80:</p> <pre>http://localhost/HXGate/Service1.asmx</pre> <p>When HX-Gate is installed on a central server called "server45" using the non-standard port 88:</p> <pre>http://server45:88/HXGate/Service1.asmx</pre>
HISExportPath	<p>Path where H-Scribe will put "Interface XML/PDF" files it exports for HX-Gate and the HL7 Gateway. Path must be specified in UNC format so other external computers can find it. Example:</p> <pre>\\server45\HScribeExport</pre>
StationName	<p>Name of this H-Scribe system sent to HX-Gate. This name is used in the configuration of "per station" settings, like the DICOM MWL filter settings. The special value of "UseHostName" will cause the WINS computer name to be sent. If this StationName is not explicitly listed in the DICOM MWL filter settings the default filter settings will be used. See Configuration of DICOM below.</p>
ConnectionAttemptsToTry	<p>The number of times to attempt a connection to HX-Gate before giving up. It will resume attempts to connect after waiting for "10 * RetryDelaySeconds" seconds. Suggested value: 3.</p>
RetryDelaySeconds	<p>Number of seconds to wait between HX-Gate connection attempts. Suggested value: 2.</p>

Example contents of HxGateConfig.ini:

```
[FileFormat]
Version=1

[Configuration]
URL=http://localhost/HXGate/Service1.asmx
HISExportPath=\\server45\HScribeExport
StationName=UseHostName
ConnectionAttemptsToTry=3
RetryDelaySeconds=2
```

The URL field is required for all Worklist modes of H-Scribe. If blank, it will disable the feature and hide all Worklist buttons in the program. This can be handy if you are doing preliminary testing of HX-Gate/H-Scribe integration with a hospital information system and need to be able to turn the feature quickly on and off.

The HISExportPath is required for both the DICOM and HL7 Worklist modes of H-Scribe. This too will disable the Worklist feature if blank. You should ALWAYS use a UNC export path such as \\server\sharename\subdirectory rather than a mapped network drive letter, especially if HX-Gate is not running on the same computer as H-Scribe. Network addresses are not guaranteed to be mapped to the same drive letter on all systems. Furthermore you must be careful to choose your network share and NTFS file permissions appropriately so that file export by H-Scribe and file access by HX-Gate still work even after you reboot either computer. Mapped network drive letters are less likely to solve this issue.

Independent Worklists for Multiple H-Scribe Workstations

The setting for the StationName field can be used to help HX-Gate filter the Worklist for each H-Scribe workstation in both DICOM and HL7 modes. If you only have a single H-Scribe communicating with HX-Gate the default value of "UseHostName" will work fine. This will report the H-Scribe's network computer name to HX-Gate. Any other value will be reported to HX-Gate unchanged. The HX-Gate Name/Title configuration name "default" will accept any computer name that is not explicitly listed.

If, however, you have multiple H-Scribe systems communicating with a single HX-Gate, then there are a number of scenarios that can be supported. This must be coordinated with the HX-Gate Station Settings configuration.

Worklists For Each H-Scribe	AE Titles Reported To DICOM	StationName In HXGateConfig.ini On H-Scribe	DICOM MWL Filter Name (Name/Title Under Station Settings)
Same	Same	Must be SAME for all. Must NOT use "UseHostName".	Can use 'default' filter or create filter name to match StationName
Same	Independent	Must be DIFFERENT for all. "UseHostName" is OK.	Must create one DICOM MWL filter for each StationName (or computer name if "UseHostName" is used). The filter settings should be set to be identical, but set the AE Title for each as needed.
Independent	Independent	Must be DIFFERENT for all. "UseHostName" is OK.	Must create one DICOM MWL filter for each StationName (or computer name if "UseHostName" is used). The filter settings should be set to ensure that each workstation gets its own list with no overlapping patients in both lists.

In case of multiple H-Scribe workstations requiring independent Worklists if the DICOM MWL filter settings are not sufficient to guarantee mutually exclusive lists, HX-Gate will internally mark each Worklist Item with the workstation that first requested it and only report that item to that single workstation from that time forward. This will effectively segregate the lists, but using the correct MWL filter settings is the preferred solution.

For HL7 mode this same mechanism can be used to filter Worklists provided by the Mortara HL7 Gateway. Even though DICOM is not in use you can still run HXConfig.exe in the HX-Gate install directory (typically C:\inetpub\wwwroot\HXGate\bin) and create multiple Name/Title configurations under the Station Settings section corresponding to each StationName / computer name.

CONFIGURATION OF DICOM

HX-Gate is used to communicate with 3rd party systems that use the DICOM protocol. All DICOM communications settings and Modality Worklist (MWL) filters are configured by running HXConfig.exe. If you are not using DICOM these settings are ignored and you do not need to use this program. This configuration utility is found in the HXGate\bin folder where the web service was installed, typically at:

C:\Inetpub\wwwroot\HXGate\bin\HXConfig.exe.

The left side of the configuration window shows settings for the four DICOM services: C-STORE, C-FIND/MWL, MPPS, and Storage Commitment. It is assumed the C-STORE and Storage Commitment SCPs share the same host and port. The configuration of the C-STORE and MWL services is required.

Setting	Description
C-STORE	
Host	The network name or TCP/IP address of the Storage SCP server. This is the same SCP for Storage Commitment requests.
Port	The TCP/IP port number used by the Storage SCP.
AE Title	Application Entity Title of the Storage SCP.
Retry (days)	When the Storage SCP is unavailable, the number of days to continue trying to reach the Storage SCP before giving up.
New Series Instance UID	Check if each version of a report should be stored in a new DICOM Series. If unchecked, each version is stored in the same Series.
MWL (Modality Worklist)	
Host	The network name or TCP/IP address of the MWL SCP server.
Port	The TCP/IP port number used by the MWL SCP.
AE Title	Application Entity Title of the MWL SCP.
MPPS (Modality Performed Procedure Step)	
Enable MPPS	Check to enable MPPS messages.
Host	The network name or TCP/IP address of the MPPS SCP server.
Port	The TCP/IP port number used by the MPPS SCP.
AE Title	Application Entity Title of the MPPS SCP.
Storage Commitment	
Enable Storage Commitment	Check to enable Storage Commitment messages. Messages will be sent to the C-STORE SCP after report is stored.
Receive Event Port	TCP/IP port where HXGateWaitForEvent Windows service listens for results messages. NOTE: If Windows Firewall or another firewall is enabled you MUST modify the Firewall to allow communication on this port number.
Wait For Response (days)	Number of days to wait for a result message before giving up.

The right side of the configuration window shows settings for each H-Scribe, including the AE Title that will be reported to all external DICOM SCP servers for each H-Scribe and the optional values used to filter the Modality Worklist (if any). These settings can be customized for each H-Scribe that communicates with HX-Gate. The settings listed under the Name “default” will be used for any H-Scribe system Name that is not explicitly listed here.

The H-Scribe system name is set in the StationName tag in the c:\usr\HXGateConfig.ini file on each H-Scribe computer. By default the StationName tag is set to the value "UseHostName", which causes the H-Scribe system to report its computer name to HX-Gate. Any other value for the StationName tag will be sent exactly as is to HX-Gate and must match exactly the Name value in the HXGateConfig dialog (case-sensitive).

The Storage Tag values are optional and, if present, are embedded in the DICOM object that is sent to the C-STORE SCP server.

The MWL Filter values can be used to filter the Worklist that is requested from the Modality Work List SCP server. While these values are optional, it is strongly recommended that at least a Modality value be specified. The DICOM standard requires that the Modality name be in all capital letters.

The MWL Filter values are sent as is to the MWL SCP server. Whether the filtering is done in a case-sensitive or case-insensitive manner is determined by the MWL SCP server.

In addition to filtering the Modality Work List using the DICOM tags listed in the dialog, the user can also enter an arbitrary DICOM tag on which to filter the Work List. The tag number and value will similarly be reported to the MWL SCP server to filter the list.

The Requested Procedure Description List allows the user to filter the Modality Work List based on the Requested Procedure Description DICOM tag. The user can enter multiple text values for that DICOM tag. Unlike all other filter values, this filtering is done directly by HX-Gate and is case-insensitive.

The Use Institution checkbox, when checked, indicates that the Institution Name value should additionally be used to filter the Modality Work List.

Station Settings	DICOM Tag	Description
These settings can be different for each H-Scribe system.		
Name/Title		This section is REQUIRED.
Name		Name of H-Scribe system. All station settings displayed are for the name currently displayed. Use the pull-down button to select a different H-Scribe name. The built-in name "default" contains the default settings used when an H-Scribe system Name is not explicitly listed here.
SCU AE Title		The SCU AE Title used by HX-Gate in all DICOM transactions for the specified Name. This field is REQUIRED.
Manage Names		Click this button to manage the list of H-Scribe systems served by this HX-Gate.
Storage Tags		Optional
Institution Name	(0008,0080)	This is the name of the institution and/or department where the Holter exam was performed. This will be stored in the DICOM object sent to the C-STORE SCP.
Station Name	(0008,1010)	DICOM Station Name assigned to the H-Scribe system. This will be stored in the DICOM object sent to the C-STORE SCP.

Station Settings	DICOM Tag	Description
These settings can be different for each H-Scribe system.		
MWL Filter		Optional
Modality	(0008,0060)	Typically "ECG".
Scheduled Station Name	(0040,0010)	
Scheduled Procedure Step Location	(0040,0011)	
Current Patient Location	(0038,0300)	
Requested Procedure Location	(0040,1005)	
Scheduled Procedure Step ID	(0040,0009)	
Requested Procedure ID	(0040,1001)	
Accession Number	(0008,0050)	
Scheduled Station AE Title	(0040,0002)	
User Tag		This can be used to define one additional DICOM tag for filtering the MWL.
User Tag Value		Value for the User Tag which will be accepted.
Requested Procedure Description List	(0032,1060)	List of procedure descriptions accepted. These values are not sent to the MWL SCP for filtering, but are used by HX-Gate to filter the results from the MWL SCP. This filtering is case-sensitive.
Use Institution	(0008,0080)	When checked, the Institution Name will additionally be used to filter the Modality Worklist query.

Test the HX-Gate Service Page

This should always be the first test of any HX-Gate system since it verifies that the Web Service and the IIS Web Server are up and running and visible through any firewalls. This test page can be viewed in Internet Explorer, Firefox or Google Chrome.

Open a web browser and enter the URL of `http://localhost/HXGate/Service1.asmx` (if on the HX-Gate computer) or `http://HXGateComputerName/HXGate/Service1.asmx` (from elsewhere on the network). If the HX-Gate computer is configured correctly you should see a list of operations that are supported by HX-Gate. For all HX-Gate systems you should click on the **GetServiceInformation** hyperlink and then click on the Invoke button. This will display the current software version number. If external H-Scribe systems must communicate with HX-Gate you should test this service page from an external computer.

For DICOM systems you should similarly test the **C_STORE_ECHO**, **MWL_ECHO** and **MPPS_ECHO** hyperlinks. If DICOM communication is configured correctly you should receive a response of **ECHO PASSED**. Note that the **C_STORE_ECHO** test does not verify that Storage Commitment messages will be received (see Testing DICOM Storage Commitment below).

Log Files

After the Service Page, the log files are the most helpful resource you can use when troubleshooting HX-Gate. There are log files for each of the applications involved in the communication process, and in very rare circumstances you may need to check all of them to find the cause of an error.

HX-Gate creates a log file for each day of the month. Log files are kept for one month and are overwritten on the same day of the next month. The log files are saved in the “logfiles” folder where HX-Gate is installed, typically `C:\inetpub\wwwroot\HXGate\LogFiles`. NOTE: IIS can take 3 to 5 seconds to write out the log messages.

HX-Gate uses a DICOM library from Merge which has its own log `C:\inetpub\wwwroot\HXGate\bin\merge.log`.

Some communication errors are logged by H-Scribe. H-Scribe logs are located in the `C:\usr\logfiles` folder, with a log file for each day of the month. Log files are kept for one month and are overwritten on the same day of the next month.

IIS log files are typically stored in `C:\Windows\System32\Logfiles\W3svc\exYYMMDD.log` where YYMMDD is the year/month/day for the log file. These can be helpful in a few unusual situations. NOTE: IIS can take up to 60 seconds to write out the log messages.

Testing DICOM Storage Commitment

Since HX-Gate does not have a direct user interface, verifying successful receipt of Storage Commitment messages by HX-Gate from the PACS Archive requires examining the HX-Gate Tracer log files.

When H-Scribe Marks a patient as Reviewed and calls SendResults to send the PDF to HX-Gate, you will see the following in the HX-Gate Tracer log. The important message is STORE_PDF_DLL() returned MC_NORMAL_COMPLETION, which indicates the PDF was successfully sent to the PACS Archive.

```
10/5/2009 10:25:05 AM SendResults (10.30.65.137,
1.2.40.0.13.0.10.30.65.156.1947116.1248203845593.32768,
\\VMWin7Pro\c\TempExports\HXGate\H^REPORT_Local
Computer^8_37368468^Visnapuu^Herkemer^J_19990703153700_20091005102515.pdf)
10/5/2009 10:25:07 AM C STORE_PDF_DLL() returned MC_NORMAL_COMPLETION
```

When the HxGate WaitForEvent Windows service gets the response from the PACS Archive, you will see the following in the Tracer log. The important messages are MC_Wait_For_Connection success and N_EVENT_SUCCESS.

```
10/5/2009 10:25:07 AM MC Wait For Connection success
10/5/2009 10:25:08 AM SOP Class UID = 1.2.840.10008.5.1.4.1.1.104.1 in ProcessNEventMessage()
10/5/2009 10:25:08 AM SOP Instance UID = 1.3.6.1.4.1.20029.60.20091005102505469 in
ProcessNEventMessage()
10/5/2009 10:25:08 AM ExecuteDBCommand (UPDATE StorageCommitmentStatus SET Status = '2' WHERE
(UID = '1.3.6.1.4.1.20029.60.20091005102507046'))
10/5/2009 10:25:08 AM 20091005102508 N_EVENT SUCCESS
10/5/2009 10:25:08 AM MC_Read_Message() Association Closed. In HandleNEventAssociation() with status
MC_ASSOCIATION_CLOSED
```

Note that H-Scribe also sends the Interface XML Statistics file to HX-Gate, but this is immediately deleted and ignored by HX-Gate.

Troubleshooting the HX-Gate Service Page

1. Service Page displays “Internet Explorer Cannot Display The Web Page” when clicking on Invoke buttons in the Service Page because of incorrect permissions.

Cause: The user account for the IIS application pool that is running HX-Gate does not have the correct permissions to access the HX-Gate install directory.

Solution: See *Creating A New Application Pool and Using A Different User Account* in this manual.

2. When you click on a hyperlink in the Service Page, the following page has no Invoke button because HX-Gate is running in .Net 1.1.

Cause: The HX-Gate Web Service is running under .Net 1.1 rather than 2.0.

Solution: This is allowed, but to see the Invoke buttons you need to edit the file C:\inetpub\wwwroot\HXGate\Web.config and add the following to the <system.web> section of the file:

```
<webServices>
<protocols>
<add name="HttpGet"/>
<add name="HttpPost"/>
</protocols>
</webServices>
```

When you save the web.config file IIS automatically tells the web service to reload the config file settings so it will take effect immediately without restarting IIS. Adding this section will make the button available to remote systems as well. If the web service is running under .Net 2.0 you should always see the Invoke button locally, and the <webServices> section will only enable the Invoke button for remote systems.

3. Service Page displays “Internet Explorer Cannot Display The Web Page” because Windows Firewall blocks HTTP traffic.

Cause: Windows Firewall on the HX-Gate computer is blocking HTTP traffic.

Solution: See *Configuration of Windows Firewall* in this manual.

4. Service Page displays <% WebService Language="c#" Codebehind="Service1.aspx.cs" ... %> because ASP .Net is not registered with IIS.

Cause: ASP.Net is not correctly registered with IIS.

Solution: Open a command prompt in the C:\Windows\Microsoft.Net\Framework\v2.0.50727 directory and run the following command:

```
Aspnet_regiis -i           ("i" for Install)
```

5. Service Page displays “Server Error in ‘HXGate’ Application” and “An attempt was made to load a program with an incorrect format”.

If you try to run HX-Gate on Windows Server 2008 R2 (which is 64-bit only) or any 64-bit version of Windows you will get error messages when trying to display the Service Page of “Server Error in ‘HXGate’ Application” and “An attempt was made to load a program with an incorrect format”.

Cause: HX-Gate is incompatible with 64-bit versions of Windows.

Solution: Install HX-Gate on a 32-bit version of Windows.

6. Service Page displays “Server Error in ‘HXGate’ Application” and “Failed to access IIS metabase”.

Cause: ASP.Net is not correctly registered with IIS.

Solution: Open a command prompt in the C:\Windows\Microsoft.Net\Framework\v2.0.50727 directory and run the following command:

```
Aspnet_regiis -i           ("i" for Install)
```

7. Service Page displays “Service Unavailable” (Windows Server 2003 only).

Cause: The user account running the HX-Gate Web Service (the application pool identity) has not been added to the IIS_WPG local user group on the HX-Gate computer.

Solution: Use the Computer Management Console to add the user to the IIS_WPG user group. You must run IISReset.exe from an elevated command prompt after you do so (and restart the HX-Gate WaitForEvent Windows Service if you are using DICOM).

8. Service Page displays “The page cannot be found” with “HTTP Error 404 – File or directory not found” (Windows Server 2003 only).

This same problem prevents any ASPX or ASMX pages from displaying correctly. Verify this situation by opening an IIS log file in C:\Windows\System32\Logfiles\W3svc\exYYMMDD.log where YYMMDD is the year/month/day for the log file. There should be an entry for the requested page such as the entry below. The 404 error code (File not found) and the 2 sub-error code (Web service extension lockdown policy prevents this request).

```
2007-05-11 15:43:31 W3SVC1 127.0.0.1 GET /hxgate/service1.asmx - 80 - 127.0.0.1
Mozilla/4.0+(compatible;+MSIE+6.0;+Windows+NT+5.2;+SV1;+.NET+CLR+1.1.4322;+.NET+CLR
+2.0.50727;+.NET+CLR+3.0.04506.30;+.NET+CLR+3.5.20404) 404 2 1260
```

```
2007-05-11 15:43:31 W3SVC1 10.30.65.137 GET /WhoAmI.aspx - 80 - 10.30.65.139
Mozilla/4.0+(compatible;+MSIE+7.0;+Windows+NT+5.1;+.NET+CLR+1.1.4322;+.NET+CLR+2.0.5
0727) 404 2 1260
```

Cause: ASP.Net Server Extensions are not enabled in IIS.

Solution:

- a. Navigate to **Start ► Programs ► Administrative Tools ► Internet Information Services Manager**.
 - b. Navigate to the **Web Services Extension folder**.
 - c. Select each ASP.Net version and click on Allow.
9. When you click on any of the Invoke buttons you get an error message of “System.InvalidOperationException: Unable to generate a temporary class” because of incorrect permissions on C:\Windows\Temp (Windows Server 2003 only).

You can also receive this same message in the H-Scribe log file:

```
[debug] 9/15 10:45:37 GetWebServiceVersion: CService1::GetServiceInformation failed
[debug] 9/15 10:45:37 HXGateWebService hResult = 0x80004005 (Unspecified error - DICOM MWL
or Archive might not be running)
[debug] 9/15 10:45:38 HXGateWebService.GetClientError = 7 (The server returned a SOAP
fault.)
[debug] 9/15 10:45:38 Error code 400
FaultCode: Server
FaultString: System.Web.Services.Protocols.SoapException: Server was unable to process request. ---
> System.InvalidOperationException: Unable to generate a temporary class (result=1).
error CS2001: Source file 'C:\WINDOWS\TEMP\edtrbm98.0.cs' could not be found
error CS2008: No inputs specified
```

Cause: The HX-Gate Web Service is running under an application pool identity that does not have sufficient permissions to the c:\windows\temp directory to allow the Merge toolkit to create temporary files. This includes the IWAM_<ComputerName> local user account on Windows Server 2003. You will see NOTHING in the tracer log.

Solution: Change the permissions on the C:\windows\temp directory to grant the user account List Folders/Read Data and Delete permissions. See *Creating A New Application Pool and Using A Different User Account* in this manual.

10. Service Page displays “Internet Explorer Cannot Display The Web Page” and “Failed to load application /LM/W3SVC” because IIS installation is corrupt.

If you attempt to open the HX-Gate Service Page and get the following error in the Event Log

The server failed to load application '/LM/W3SVC'. The error was 'the specified metadata was not found'.

Or

The server failed to load application '/LM/W3SVC/1/ROOT'. The error was 'Class not registered'.

Cause: IIS installation is corrupt.

Solution: Uninstalling IIS and reinstalling will not fix this. You must do the following 3 steps in order from an administrative command prompt in the %windir%\system32\inetsrv directory:

1. rundll32 wamreg.dll, CreateIISPackage
2. regsvr32 asptxn.dll (note you might get a cryptic warning message if this DLL is already correctly registered)
3. iisreset /restart

If you get the “Class not registered” error,

<http://msmvps.com/blogs/bernard/archive/2005/03/22/39216.aspx> recommends deleting the three IIS packages in **Start ► Control Panel ► Administrative Tools ► Component Services ► Computers ► My Computer ► COM+ Applications.**

- IIS In-Process Applications
- IIS Out-of-Process Pooled Applications
- IIS Utilities

and THEN following the 3 steps above.

See also the *Last Resort* section of <http://support.microsoft.com/kb/309051>.

Troubleshooting the HX-Gate/H-Scribe Communications

1. H-Scribe log contains error message “Failed to send the message” and “GetServiceInformation failed” because HX-Gate Web Service is unavailable.

If the log file on the H-Scribe computer contains the following:

```
[debug] 10/24 13:07:25 GetWebServiceVersion: CService1::GetServiceInformation failed
[debug] 10/24 13:07:25 HXGateWebService.GetClientError = 5 (Failed to send the message.)
[debug] 10/24 13:07:25 Error code 0
FaultCode:
FaultString:
```

Cause: The HX-Gate Web Service is unavailable.

Solutions:

1. Verify that the URL in the H-Scribe’s c:\usr\HXGateConfig.ini file is correct. The URL MUST contain “Service1.asmx” even if the HX-Gate web site has the default page set to Service1.asmx.
2. Verify that the network connection is functional.
3. Verify that the HX-Gate computer is turned on.

4. Often when you connect to the HX-Gate Web Service for the first time since booting the HX-Gate computer, the IIS Web Server takes a while to wake up. Try closing H-Scribe and trying again, or adjusting the ConnectionAttemptsToTry or RetryDelaySeconds settings in HXGateConfig.ini file.
 5. The directory permissions on the c:\inetpub\wwwroot\HXGate install directory do not grant Modify permissions to the user account running the web service. If this is true, then you won't see any tracer log at all since that user account could not create the log file. If you recently CHANGED the user account, the tracer log might exist from the old user account writing to it but it will not be updated by the new user account. Run IISReset.exe from an elevated command prompt and to restart the HXGate WaitForEvent Windows service after you change the permissions or user account. See *Creating A New Application Pool and Using A Different User Account* in this manual.
 6. In Windows Server 2003, verify that the user account running the web service is a member of the local IIS_WPG user group. Run IISReset.exe from an elevated command prompt after you add them to the group.
 7. Verify that you installed HX-Gate.
2. H-Scribe displays error "Failed to transmit results for the selected Worklist Item" and "message will be re-sent automatically" when Marking as Reviewed because HX-Gate is inaccessible.

If you close a patient record, Mark As Reviewed, and then see the following error message:

Failed to transmit results for the selected Worklist Item because communication with HX-Gate <http://vmwin2k3/hxgate/service1.asmx> failed.
This message will be re-sent to HX-Gate automatically.

The H-Scribe log file will contain the following:

```
[debug] 9/21 9:07:26 Export Mortara XML Statistics SUCCESS:
  Patient name <Patient, Name Middle>
  ID <64117599>
  Record date <06/19/1996 15:28:00>
[debug] 9/21 9:07:27 SendResults failed: OrderID
  1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769
[debug] 9/21 9:07:27 filename <\\VMwin2k3\temp\H^REPORT_Local
  Computer^4_64117599^Patient^Name^Middle_19960619152800_20100921090722.pdf>
[debug] 9/21 9:07:27 SendResults failed
[debug] 9/21 9:07:27 HXGateWebService hResult = 0x80004005 (Unspecified error - DICOM
  MWL or Archive might not be running)
[debug] 9/21 9:07:28 HXGateWebService.GetClientError = 5 (Failed to send the message.)
[debug] 9/21 9:07:28 Error code 0
FaultCode:
FaultString:
[debug] 9/21 9:07:51 Failed to transmit results for the selected Worklist Item because communication
  with HX-Gate <http://vmwin2k3/hxgate/service1.asmx> failed.
```

This message will be re-sent to HX-Gate automatically.

Cause: The HX-Gate Web Service is unavailable. This is not an error. HX-Gate may be offline or inaccessible. Each time you display the Worklist H-Scribe will attempt to re-send the results to HX-Gate.

Solution: Verify connectivity to HX-Gate by displaying the HX-Gate Service Page (<http://HXGateComputerName/HXGate/Service1.asmx>) from the H-Scribe computer. When HX-Gate is accessible, display the Worklist and the results will be re-sent.

3. H-Scribe log contains error message “Failed to send the message” and “GetHolterOrders failed” because DICOM system(s) are unavailable.

If the log file on the H-Scribe computer contains the following:

```
[debug] 9/21 11:15:23 HX-Gate V1.0.3639 successfully contacted
[debug] 9/21 11:15:23 Local IPv6 address: fe80::1d9b:6a19:35c8:235e
[debug] 9/21 11:15:23 Requesting Work List - this can take a few seconds
  Name:
  ID:
  Second ID:
  Date range: 2000-01-01T00:00:00 - 2059-12-31T23:59:59
[debug] 9/21 11:15:33 CService1::GetHolterOrders failed
[debug] 9/21 11:15:33 HXGateWebService hResult = 0x80004005 (Unspecified error - DICOM MWL
  or Archive might not be running)
[debug] 9/21 11:15:33 HXGateWebService.GetClientError = 5 (Failed to send the message.)
[debug] 9/21 11:15:33 Error code 0
  FaultCode:
  FaultString:
```

In this case the Web Service computer IS available because you couldn't get here if the call to GetServiceInformation failed (see above). But you can still get this in DICOM mode if HX-Gate is configured incorrectly and is not successfully contacting the DICOM system or if the DICOM system(s) are offline. You can tell if this is the case by opening the Tracer log for HX-Gate for the current day (e.g. c:\inetpub\wwwroot\HXGate\bin\Log Files\TracerXX.log) and you'll see something like the following:

```
7/8/2009 1:40:27 PM GetHolterOrders() Id: 10.30.65.137 ModelName: H-Scribe Name: MrBill
  SerialNumber: 1430362054 Version: 4.32.09
7/8/2009 1:40:43 PM MC_Open_Association(failed in C_FIND_main() with status
  MC CONNECTION FAILED
```

Cause: DICOM system is unavailable.

Solution: Verify DICOM connectivity. Use the echo commands on the Service Page.

4. H-Scribe log contains error messages “GetClientError = 7” and “Server was unable to process request – could not find file” when Mark As Reviewed / Send Results fails because of invalid H-Scribe export path.

If the log file on the H-Scribe computer contains the following:

```
[debug] 11/1 11:25:11 CService1::SendResults failed
[debug] 11/1 11:25:11 HXGateWebService.GetClientError = 7 (The server returned a SOAP fault.)
[debug] 11/1 11:25:11 Error code 400
  FaultCode: Server
  FaultString: Server was unable to process request. --> Could not find file
  &quot;c:\temp\HXGateExport\H^REPORT_Local Computer^3_243243^Gingold^Harvard
  James_20030711091108_20061101112433.pdf&quot;;
[debug] 11/1 11:25:26 Failed to transmit results for the selected Work List Item because
  communication with HX-Gate <http://lhscribexp/HXGate/service1.asmx> failed.
```

Cause: The HISExportPath specified in the c:\usr\HXGateConfig.ini file on H-Scribe is a path that HX-Gate cannot access.

Solution:

1. Always use a UNC network path when specifying HISExportPath, such as \\ComputerName\ShareName\Subdirectory. Never use drive letters such as C:\ExportDirectory or H:\NetworkDirectory, since it is unlikely that HX-Gate will interpret C: or H: as the same location (ESPECIALLY C: !!).
 2. Check network connectivity from the HX-Gate computer and verify that the specified network path is indeed accessible and that the user account running HX-Gate has sufficient permissions to access it (NTFS Modify permissions, network share Change permissions). Note that the default installation uses local system user accounts which do NOT have permissions to access network resources.
5. H-Scribe displays error message “Failed to create the specified network path” at startup because HX-Gate export path is inaccessible / offline.

When H-Scribe starts you will see a delay and then the error message

Failed to create the specified network path:

\\HXGateComputerName\HScribeExportPath

Check to make sure this is a valid path.

Cause: The network path used for HX-Gate exports is not accessible.

Solution: Verify network connectivity and verify that the computer hosting the shared directory is online.

6. H-Scribe log contains error message “Operation must use an updateable query” because app pool identity does not have write permissions to database file.

If the log file on the H-Scribe computer contains the following:

[debug] 10/24 13:12:48 MGateWebService.**GetClientError = 7** (The server returned a SOAP fault.)

[debug] 10/24 13:12:48 Error code 400

FaultCode: Server

FaultString: Server was unable to process request. --> ERROR [HY000] [Microsoft][**ODBC**

Microsoft Access Driver] Operation must use an updateable query.

Cause: The user account for the IIS application pool identity does not have write permissions to the directory containing the MDB database file on the Web Service computer (typically the c:\inetpub\wwwroot\HXGate\bin\database directory).

Solution: Fix the directory permissions on the C:\inetpub\wwwroot\HXGate directory and all subdirectories. See *Creating A New Application Pool and Using A Different User Account* in this manual.

7. H-Scribe log contains error message “Access to the path ...HXGate\LogFiles\TracerXX.log is denied” because app pool identity does not have correct permissions for install directory.

If the log file on the H-Scribe computer contains the following:

[debug] 6/3 11:28:04 GetWebServiceVersion: CService1::GetServiceInformation failed

[debug] 6/3 11:28:04 HXGateWebService.**GetClientError = 7** (The server returned a SOAP fault.)

[debug] 6/3 11:28:04 Error code 400

FaultCode: Server

FaultString: Server was unable to process request. --> Access to the path
 "c:\inetpub\wwwroot\HXGate\bin\LogFiles\Tracer3.log&
 quot; is denied.

Cause: The user account for the IIS application pool that is running HX-Gate does not have the correct permissions to access the HX-Gate install directory and to write log files.

Solution: Grant the user account for the application pool identity the correct permissions. See *Creating A New Application Pool and Using A Different User Account* in this manual.

8. H-Scribe Marks as Reviewed and exports results to HX-Gate successfully, but the results never show up at the DICOM PACS server because the HX-Gate application pool user account cannot access the network location where H-Scribe exported the files.

This is a bit more challenging to track down because H-Scribe tells you everything is OK. If you look in the HX-Gate tracer log, you'll see the error messages "MC Send Request Message() failed in C STORE PDF DLL() with status 4086" and "SendResults1() failed - Access to the path xxx denied."

In this particular case HX-Gate was running in Server 2003 under the DefaultAppPool which uses the NETWORKSERVICE account. This account cannot access network resources (despite its name). There is no way to grant access permission on the remote network share to this account that is local to the HX-Gate computer.

```
09/10/2010 16:29:50 SendResults (MRBILL4, fe80::1d9b:6a19:35c8:235e%11,
  1.240.0.13.0.10.30.65.169.26357574.1247682327328.32768,
  \\mrbill4\TempExports\HXGate\H^REPORT_Local
  Computer^4_33026518^Patient^Name^Middle_19960619152800_20100910162945.pdf)
09/10/2010 16:29:55, MC Send Request Message() failed in C STORE PDF DLL() with status
  4086
09/10/2010 16:29:55 C_STORE_PDF_DLL() returned MC_NORMAL_COMPLETION
09/10/2010 16:29:56 MC_Wait_For_Connection success
09/10/2010 16:29:56 ProcessNEventMessage() N-EVENT Transaction UID:
  1.3.6.1.4.1.20029.60.20100910162955618 returned eventType 2
09/10/2010 16:29:56 ProcessNEventMessage() SOP Instance UID
  1.3.6.1.4.1.20029.60.20100910162950385 failed
09/10/2010 16:29:56 20100910162956 N_EVENT_SUCCESS
09/10/2010 16:29:56 MC_Read_Message() Association Closed. In HandleNEventAssociation() with
  status MC_ASSOCIATION_CLOSED
09/10/2010 16:29:57 SendResults (MRBILL4, fe80::1d9b:6a19:35c8:235e%11,
  1.240.0.13.0.10.30.65.169.26357574.1247682327328.32768,
  \\mrbill4\TempExports\HXGate\H^STAT_Local
  Computer^4_33026518^Patient^Name^Middle_19960619152800_20100910162948.xml)
09/10/2010 16:29:57 SendResults1() failed - Access to the path
  '\\mrbill4\TempExports\HXGate\H^STAT_Local
  Computer^4_33026518^Patient^Name^Middle_19960619152800_20100910162948.xml' is
  denied.
```

Cause: The user account for the IIS application pool that is running HX-Gate does not have the correct permissions to access the H-Scribe export directory.

Solution: Grant the user account for the application pool identity the correct permissions. See *Creating A New Application Pool and Using A Different User Account* in this manual.

9. HX-Gate fails to delete the XML and/or PDF files periodically in DICOM mode due to “Access to path xxx is denied” errors.

When running in DICOM mode the HX-Gate Web Service automatically deletes the Interface Export XML Statistics files immediately after H-Scribe exports them, and the PDF files are deleted within 5 minutes or so of when the HX-Gate WaitForEvent Windows Service receives Storage Commitment results (or about 7 days later if Storage Commitment is disabled). The user account(s) running the Web Service and Windows Service must have Modify NTFS file permissions to the export directory and Change network share permissions to the export directory, EVEN IF it is a local directory on the HX-Gate computer. This is because H-Scribe exports the file path as a UNC path such as \\HXGateComputer\HScribeExportShare\Filename.pdf, which invokes the network share permissions.

Note that the PDF and XML files do NOT get automatically deleted in HL7 mode.

The HX-Gate tracer log will contain something similar to the following:

```
09/15/2010 11:20:23 SendResults (MRBILL4, fe80::1d9b:6a19:35c8:235e%11,
  1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769, \\VMwin2k3\Temp\H^STAT_Local
  Computer^4_64117599^Patient^Name^Middle_19960619152800_20100915112014.xml)
09/15/2010 11:20:23 SendResults1() failed - Access to the path "\\VMwin2k3\Temp\H^STAT_Local
  Computer^4_64117599^Patient^Name^Middle_19960619152800_20100915112014.xml' is
  denied.
09/15/2010 11:20:25 UpdateOrderStatus(MRBILL4,
  1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769, 2010-09-15T11:20:23,
  APPROVED_REPORT)
09/15/2010 11:20:25 SendNSETRQ() sent COMPLETED for UID =
  1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769
09/15/2010 11:20:25 ExecuteDBCommand (DELETE FROM HolterOrders WHERE (UID =
  '1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769' AND ComputerName <> 'default'))
09/15/2010 11:20:25 ExecuteDBCommand (UPDATE HolterOrders SET Status = 6 WHERE (UID =
  '1.2.40.0.13.0.10.30.65.169.26357574.1247682327328.32769' AND ComputerName = 'default'))
09/15/2010 11:21:23 WaitForEvent failed to read committed or expired records - Access to the
  path "\\VMwin2k3\Temp\H^REPORT_Local
  Computer^4_64117599^Patient^Name^Middle_19960619152800_20100915112011.pdf' is
  denied.
```

Cause: The user account for the IIS application pool that is running HX-Gate or the user account running the HX-Gate WaitForEvent Windows Service (DICOM only) does not have the correct permissions to access the H-Scribe export directory.

Solution: Grant the user accounts for the Web Service (and Windows Service if DICOM mode) the correct permissions. See *Creating A New Application Pool and Using A Different User Account* in this manual.

10. H-Scribe gets 0 orders in its Worklist because DICOM servers are using a NULL Study Instance UID.

If H-Scribe gets 0 orders in its Worklist when in DICOM mode and you see the combination of the following messages in the respective log files:

Tracer Log shows:

2010-04-27 17:04:01 **MC Free Message(failed in ProcessWorklistReplyMsg() with status MC_INVALID_MESSAGE_ID**

H-Scribe Log shows:

4/27 17:04:02 **GetHolterOrders: 0 orders returned**

Merge.log shows:

(424) 0020,000D UI <null> **(0)Study Instance UID**

Cause: DICOM Modality Worklist server allows NULL Study Instance UID values.

Solution: Change the DICOM Modality Worklist server configuration to prohibit NULL Study Instance UID values.

11. DICOM returns zero orders because environment variable not found.

When first installed, HX-Gate creates an environment variable MERGE_INI for use by the Merge Toolkit that manages DICOM communication. If you failed to restart IIS when installing HX-Gate and have not yet rebooted, then the Merge Toolkit will not find the environment variable and it cannot initialize. In this case the Tracer log for the current day will show the following:

7/21/2009 10:30:16 AM MC_Library_Initialization()failed in C_FIND_main() with status **MC_NO_MERGE_INI**

Cause: Merge Toolkit did not detect the MERGE_INI environment variable.

Solution: Verify that the MERGE_INI environment variable exists and that it points to the location of the merge.ini file (typically c:\inetpub\wwwroot\HXGate\bin\merge.ini). If this is correct, try running IISReset.exe from an elevated command prompt and restart the HXGate WaitForEvent Windows service.

12. H-Scribe log contains error message “GetClientError = 8 (Failed to parse a SOAP fault)” because HX-Gate is installed on an incompatible 64-bit operating system.

If the log file on the H-Scribe computer contains the following:

```
[debug] 9/21 11:05:06 GetWebServiceVersion: CService1::GetServiceInformation failed
[debug] 9/21 11:05:06 HXGateWebService hResult = 0x80004005 (Unspecified error - DICOM
MWL or Archive might not be running)
[debug] 9/21 11:05:06 HXGateWebService.GetClientError = 8 (Failed to parse a SOAP fault.)
[debug] 9/21 11:05:06 Error code 0
FaultCode:
FaultString:
[debug] 9/21 11:05:09 Communication with HX-Gate <http://vmsvr2008r2x64/hxgate/service1.asmx>
failed.
```

Cause: HX-Gate is incompatible with 64-bit versions of Windows.

Solution: You must install HX-Gate on a 32-bit version of Windows.

13. H-Scribe log contains error message “Could not find file '(unknown)’ ” because the HXGate.mdb file was deleted.

If the log file on the H-Scribe computer contains the following:

```
[debug] 11/1 8:37:02 CService1::GetHolterOrders failed
[debug] 11/1 8:37:02 HXGateWebService.GetClientError = 7 (The server returned a SOAP fault.)
[debug] 11/1 8:37:02 Error code 400
FaultCode: Server
FaultString: Server was unable to process request. --> ERROR [HY000] [Microsoft][ODBC
Microsoft Access Driver] Could not find file '(unknown)'.
ERROR [IM006] [Microsoft][ODBC Driver Manager] Driver's SQLSetConnectAttr failed
ERROR [HY000] [Microsoft][ODBC Microsoft Access Driver] Could not find file '(unknown)'.
```

Cause: An unwise person deleted the HXGate.mdb database file from the install directory (typically c:\inetpub\wwwroot\HXGate\bin\database).

Solution: Restore the database file from backups (if any), or get an empty database file from Tech Support.

14. H-Scribe log contains error message “The Microsoft Jet database engine cannot find the input table or query 'HolterOrders’ ” because a table was deleted from the HXGate.mdb database file.

If the log file on the H-Scribe computer contains the following:

```
[debug] 11/1 8:44:03 CService1::GetHolterOrders failed
[debug] 11/1 8:44:03 HXGateWebService.GetClientError = 7 (The server returned a SOAP fault.)
[debug] 11/1 8:44:03 Error code 400
FaultCode: Server
FaultString: Server was unable to process request. --> ERROR [42S02] [Microsoft][ODBC Microsoft
Access Driver] The Microsoft Jet database engine cannot find the input table or query
'HolterOrders'. Make sure it exists and that its name is spelled correctly.
```

Cause: An unwise person was editing the HXGate.mdb database file and inadvertently deleted one of the tables in the file.

Solution: Restore the database file from backups (if any), or get an empty database file from Tech Support.

15. H-Scribe log contains error message “Microsoft Jet Database Engine cannot open the file – it is already opened exclusively by another user”.

If the log file on the H-Scribe computer contains the following:

```
[debug] 2/20 12:46:15 CService1::GetHolterOrders failed
[debug] 2/20 12:46:15 HXGateWebService.GetClientError = 7 (The server returned a SOAP fault.)
[debug] 2/20 12:46:15 Error code 400
FaultCode: Server
FaultString: Server was unable to process request. --> ERROR [HY000] [Microsoft] [ODBC Microsoft
Access Driver] The Microsoft Jet database engine cannot open the file '(unknown)'. It is
already opened exclusively by another user, or you need permission to view its data.
ERROR [IM006] [Microsoft][ODBC Driver Manager] Driver's SQLSetConnectAttr failed
```

Cause: An unwise person is editing the HXGate.mdb database file.

Solution: Shame on you. Cut that out.

File name: **HolterStatistics_V5.dtd**

File location: automatically copied into folder where XML files are exported.

XML Description

XML Tag	Description
/HOLTER_STATISTICS	
@RECORDER_TYPE	Type of recorder used. E.g. "H12.Cont.3.12"
@SCAN_NUMBER	Number assigned by H-Scribe when data is downloaded from device. Can be overridden by user.
@DATE_RECORDED	The date and time when the ECG recording was started. In the format yyyyMMddHHmmss.
@DATE_PROCESSED	Date when data was downloaded from device in yyyyMMdd format.
@RECORDER_NUMBER	Holter recorder number as entered by the H-Scribe user.
@HOOKUP_TECH	Name of the hookup technician.
@ANALYST	Name of the Holter analyst.
@REFERRING_PHYSICIAN	Name of the referring physician.
@REVIEWING_PHYSICIAN	Name of the physician reviewing/confirming the Holter report.
@WORKSTATION	Name of the patient list where the recording is stored.
@REPORT_FILENAME	Full path to PDF file.
/HOLTER_STATISTICS/PATIENT	
@NAME	Full name of the patient as entered in the Name field.
@LAST_NAME	Last name of the patient if a comma was used to separate the last name from the first.
@FIRST_NAME	First name of the patient if a comma was used to separate the last name from the first.
@MIDDLE_NAME	Middle name of the patient if it can be parsed.
@ID	Patient's primary medical record number.
@SECOND_ID	Patient's secondary ID (i.e., admission ID).
@AGE	Patient's age in years.
@SEX	Unknown Male Female
@INDICATIONS	Indications for the Holter test, separated by commas.
@MEDICATIONS	Name of medications, separated by commas.
@DOB	Patient's date of birth formatted according to the local regional settings.
@DOB_EX	Patient's date for birth formatted as yyyyMMdd.
/HOLTER_STATISTICS/SOURCE	
@TYPE	HOLTER
@MANUFACTURER	Mortara Instrument, Inc.
@MANUFACTURER_ID	8 = Mortara
@MODEL	Type and version of the recorder. E.g. "H12.Cont.3.12"
@ID	Recorder number entered by the user.
@RECORDER_SERIAL_NUMBER	Recorder serial number, if available.

XML Tag	Description
/HOLTER_STATISTICS/DEMOGRAPHIC_FIEL ELD_LIST	Complete list of all demographics fields. Useful when field labels have been customized.
/HOLTER_STATISTICS/DEMOGRAPHIC_FIEL ELD_LIST/DEMOGRAPHIC_FIELD	
@NAME	Name of the field. FULL_NAME LAST_NAME FIRST_NAME MIDDLE_NAME ID SECOND_ID AGE SEX REFERRING_PHYSICIAN REVIEWING_PHYSICIAN INDICATIONS MEDICATIONS RECORDER_TYPE RECORDER_NUMBER HOOKUP_TECH ANALYST SCAN_NUMBER RECORD_DATE RECORD_START_TIME SCAN_DATE DOB COMMENT
@LABEL	Label of the field displayed to the H-Scribe user.
@VALUE	Value of the field.
/HOLTER_STATISTICS/SCAN_CRITERIA	
@SVPB_PREMATURITY_PERCENTAGE	Criteria for supraventricular prematurity as a percentage of the current RR.
@PAUSE_MSEC	Number of milliseconds to be considered a pause.
@ST_DEPRESSION_UV	Minimum ST depression in microvolts.
@ST_ELEVATION_UV	Minimum ST elevation in microvolts.
@LONG_RR_PAUSE	All Beats = Any pause between any beats. N-N Only = Only count as a pause if long RR was between normal beats.
@PAUSE_EXCLUDED_FROM_HR	TRUE FALSE
@TACHYCARDIA_LIMIT_BPM	Minimum HR for tachycardia episodes.
@BRADYCARDIA_LIMIT_BPM	Maximum HR for bradycardia episodes.
@MIN_TACHY_BRADY_EPISODE_SECONDS	Minimum number of seconds of tachy or brady to be considered an episode.
/HOLTER_STATISTICS/RATE_STATISTICS	
@MIN_RATE	Minimum HR (BPM) recorded over a 5-second interval at MIN_RATE_TIME.
@MIN_RATE_TIME	Time of min rate in yyyyMMddHHmmss format.
@MAX_RATE	Maximum HR (BPM) including Ventricular beats recorded over a 5-second interval at MAX_RATE_TIME.

XML Tag	Description
@MAX_RATE_TIME	Time of max rate in yyyyMMddHHmmss format.
@MEAN_RATE	Mean HR (BPM) computed over the entire monitoring period.
@TOTAL_QRS	Total number of detected QRS complexes including both normal and Ventricular beats.
@MONITORING_PERIOD	"HH hr, mm min" total time monitored.
@ANALYZED_DATA	"HH hr, mm min" total time analyzed.
@LONGEST_TACHY_DURATION	Longest tachycardia episode duration in HH:mm:ss format.
@LONGEST_TACHY_ONSET	Onset of longest tachycardia episode in HH:mm:ss format.
@LONGEST_TACHY_OFFSET	End of longest tachycardia episode in HH:mm:ss format.
@LONGEST_TACHY_MAX_HR	Maximum HR (BPM) during longest tachycardia episode.
@LONGEST_TACHY_AVG_HR	Average HR (BPM) during longest tachycardia episode.
@LONGEST_TACHY_TOTAL_BEATS	Number of beats in longest tachycardia episode.
@FASTEST_TACHY_DURATION	Fastest tachycardia episode duration in HH:mm:ss format.
@FASTEST_TACHY_ONSET	Onset of fastest tachycardia episode in HH:mm:ss format.
@FASTEST_TACHY_OFFSET	End of fastest tachycardia episode in HH:mm:ss format.
@FASTEST_TACHY_MAX_HR	Maximum HR (BPM) during fastest tachycardia episode.
@FASTEST_TACHY_AVG_HR	Average HR (BPM) during fastest tachycardia episode.
@FASTEST_TACHY_TOTAL_BEATS	Number of beats in fastest tachycardia episode.
@LONGEST_BRADY_DURATION	Longest bradycardia episode duration in HH:mm:ss format.
@LONGEST_BRADY_ONSET	Onset of longest bradycardia episode in HH:mm:ss format.
@LONGEST_BRADY_OFFSET	End of longest bradycardia episode in HH:mm:ss format.
@LONGEST_BRADY_MIN_HR	Maximum HR (BPM) during longest bradycardia episode.
@LONGEST_BRADY_AVG_HR	Average HR (BPM) during longest bradycardia episode.
@LONGEST_BRADY_TOTAL_BEATS	Number of beats in longest bradycardia episode.
@SLOWEST_BRADY_DURATION	Slowest bradycardia episode duration in HH:mm:ss format.
@SLOWEST_BRADY_ONSET	Onset of slowest bradycardia episode in HH:mm:ss format.
@SLOWEST_BRADY_OFFSET	End of slowest bradycardia episode in HH:mm:ss format.
@SLOWEST_BRADY_MIN_HR	Maximum HR (BPM) during slowest bradycardia episode.
@SLOWEST_BRADY_AVG_HR	Average HR (BPM) during slowest bradycardia hycardia episode.
@SLOWEST_BRADY_TOTAL_BEATS	Number of beats in slowest bradycardia episode.
/HOLTER_STATISTICS/SUPRVENTRICULAR_ECTOPY	
@AFIB_TIME_PERCENTAGE	When detected, % of time that Atrial Fibrillation was present during monitoring period.
@AFIB_PEAK_AVERAGE_RATE	When detected, peak average rate during Atrial Fibrillation (BPM).
@SINGLES	Number of occurrences of a single Supraventricular Ectopic beat during monitoring period.
@COUPLETS	Number of occurrences of two consecutive Supraventricular Ectopic beats during monitoring period.
@RUNS	Number of occurrences of three or more consecutive Supraventricular Ectopic beats during monitoring period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Supraventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.

XML Tag	Description
@LONGEST_RUN_RATE	Longest Supraventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@TOTAL	Total number of Supraventricular Ectopic beats during monitoring period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/VENTRICULAR_ECTOPY	
@VENT_PACED_TIME_PERCENTAGE	When pacemaker present, % of time Ventricular Pacing was active during monitoring period.
@VENT_PACED_BEATS	When pacemaker present, how many beats were paced.
@SINGLES	Number of occurrences of a single Ventricular Ectopic beat during monitoring period.
@COUPLETS	Number of occurrences of two consecutive Ventricular Ectopic beats during monitoring period.
@RUNS	Number of occurrences of three or more consecutive Ventricular Ectopic beats during monitoring period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Ventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Ventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@NUMBER_R_ON_T	Number of occurrences of an R wave detected on the T wave of preceding beat.
@TOTAL	Total number of Ventricular Ectopic beats during monitoring period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/RR_VARIABILITY	
@PERCENT_RR_GREATER_50	Percentage of successive RR intervals with greater than 50 ms difference between normal beats. If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@RMS_SD	Root-mean-square of successive differences of the RR intervals (ms) between normal beats. If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@MAGID_SD	Magid standard deviation of the RR intervals (ms). If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@KLEIGER_SD	Kleiger standard deviation of the RR intervals (ms). If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
/HOLTER_STATISTICS/ST_DEVIATION	
@MAX_DEPRESSION_V1_UV	Maximum ST segment depression in microvolts (1 mm = 100 microvolts) on V1/I/C1 at MAX_DEPRESSION_V1_TIME.
@MAX_DEPRESSION_V1_TIME	Time of max depression in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.

XML Tag	Description
@MAX_DEPRESSION_V5_UV	Maximum ST segment depression in microvolts (1 mm = 100 microvolts) on V5/V/C2 at MAX_DEPRESSION_V5_TIME.
@MAX_DEPRESSION_V5_TIME	Time of max depression in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
@MAX_ELEVATION_V1_UV	Maximum ST segment elevation measured in microvolts (1 mm = 100 microvolts) on V1/I/C1 at MAX_ELEVATION_V1_TIME.
@MAX_ELEVATION_V1_TIME	Time of max elevation in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
@MAX_ELEVATION_V5_UV	Maximum ST segment elevation measured in microvolts (1 mm = 100 microvolts) on V5/V/C2 at MAX_ELEVATION_V5_TIME.
@MAX_ELEVATION_V5_TIME	Time of max elevation in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
/HOLTER_STATISTICS/PAUSES	
@LONGEST_RR_SEC	Longest RR interval (seconds) observed at LONGEST_RR_TIME. Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
@LONGEST_RR_TIME	Time of max elevation in yyyyMMddHHmmss format.
@NUM_RR_GREATER_2_SEC	Number of RR intervals with duration greater than pause threshold set in Scan Criteria (2.0 second as a default). Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
/HOLTER_STATISTICS/SUMMARY_NARRATIVE	Narrative summary.
/HOLTER_STATISTICS/COMMENTS	Physician comments.
/HOLTER_STATISTICS/DIARY	List of diary entries.
/HOLTER_STATISTICS/DIARY/DIARY_ENTRY	
@TIME	Time of diary entry in yyyyMMddHHmmss format.
@LABEL	Diary event label, e.g. "Event Button Pressed".
/HOLTER_STATISTICS/RHYTHM_PROFILE	Hour-by-hour rhythm statistics.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD	One hour's rhythm statistics.
@TIME_RANGE	Time range of period in "yyyyMMddHHmmss – yyyyMMddHHmmss" format.
@START_TIME	Start of time range in yyyyMMddHHmmss format.
@END_TIME	End of time range in yyyyMMddHHmmss format.
@LABELS	
@START_LABEL	
@END_LABEL	
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/HEART_RATE	
@MIN_RATE	Minimum HR (BPM) in the period.
@MEAN_RATE	Mean HR (BPM) over the entire period.
@MAX_RATE	Maximum HR (BPM) including Ventricular beats in the period.

XML Tag	Description
@TACHY_BEATS	Number of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.
@TACHY_PERCENT	Percentage of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.
@BRADY_BEATS	Number of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
@BRADY_PERCENT	Percentage of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/SUPRAVENTRICULAR_ECTOPY	
@AFIB_TIME_PERCENTAGE	When detected, % of time that Atrial Fibrillation was present during profile period.
@AFIB_PEAK_AVERAGE_RATE	When detected, peak average rate during Atrial Fibrillation (BPM).
@SINGLES	Number of occurrences of a single Supraventricular Ectopic beat during profile period.
@COUPLETS	Number of occurrences of two consecutive Supraventricular Ectopic beats during profile period.
@RUNS	Number of occurrences of three or more consecutive Supraventricular Ectopic beat runs during profile period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Supraventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Supraventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@TOTAL	Total number of Supraventricular Ectopic beats during profile period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/VENTRICULAR_ECTOPY	
@VENT_PACED_TIME_PERCENTAGE	When pacemaker present, % of time Ventricular Pacing was active during profile period.
@VENT_PACED_BEATS	When pacemaker present, how many beats were paced.
@SINGLES	Number of occurrences of a single Ventricular Ectopic beat during profile period.
@COUPLETS	Number of occurrences of two consecutive Ventricular Ectopic beats during profile period.
@RUNS	Number of occurrences of three or more consecutive Ventricular Ectopic beat runs during profile period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Ventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Ventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@NUMBER_R_ON_T	Number of occurrences of an R wave detected on the T wave of preceding beat.

XML Tag	Description
@TOTAL	Total number of Ventricular Ectopic beats during profile period.
@MAX_RUN	Number of beats in the longest run.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/PAUSES	
@LONGEST_RR_SEC	Longest RR interval (seconds) observed at LONGEST_RR_TIME. Can include or exclude RR intervals between Ectopic and normal beats according to the Scan Criteria.
@LONGEST_RR_TIME	Time of max elevation in yyyyMMddHHmmss format.
@NUM_RR_GREATER_2_SEC	Number of RR intervals with duration greater than pause threshold set in scan criteria (2.0 second as a default). Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/RR_VARIABILITY	
@PERCENT_RR_GREATER_50	Percentage of successive RR intervals with greater than 50 ms difference between normal beats.
@RMS_SD	Root-mean-square of successive differences of the RR intervals (ms) between normal beats.
@MAGID_SD	Magid standard deviation of the RR intervals (ms).
@KLEIGER_SD	Kleiger standard deviation of the RR intervals (ms).
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/PACED_BEATS	
@ATRIAL	Number of atrial paced beats in profile period.
@VENTRICULAR	Number of ventricular paced beats in profile period.
@CAPTURE_FAILURE	Number of detected pacer spikes without a QRS in profile period.
@UNDER_SENSE	Number of times pacer spike detected too early (didn't sense rhythm) in profile period.
@OVER_SENSE	Number of times pacer spike was not detected when it was expected (sensed a rhythm when there wasn't one) in profile period.
/HOLTER_STATISTICS/ST_DEPRESSION_EPISODES	
/HOLTER_STATISTICS/ST_DEPRESSION_EPISODES/EPISODE	An episode of ST depression meeting the @ST_DEPRESSION_UV Scan Criteria.
@ONSET	The onset of the ST depression episode in yyyyMMddHHmmss format.
@END	The end of the ST depression episode in yyyyMMddHHmmss format.
@DURATION	The duration of the ST depression episode in HH:mm:ss format.
@MAX_UV	The maximum ST depression in the episode, in microvolts.
@AVERAGE_UV	The average ST depression in the episode, in microvolts.
@PRIMARY_CHANNEL	The channel with the most ST depression. I II III aVR aVL aVF V1

XML Tag	Description
	V2 V3 V4 V5 V6
@SECONDARY_CHANNEL	Other channels also meeting the ST depression criteria, separated by commas. I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
@MEAN_RATE	The mean HR (BPM) during the episode.
/HOLTER_STATISTICS/ST_ELEVATION_EPISODES	
/HOLTER_STATISTICS/ST_ELEVATION_EPISODES/EPISODE	An episode of ST elevation meeting the @ST_ELEVATION_UV scan criteria.
@ONSET	The onset of the ST elevation episode in yyyyMMddHHmmss format.
@END	The end of the ST elevation episode in yyyyMMddHHmmss format.
@DURATION	The duration of the ST elevation episode in HH:mm:ss format.
@MAX_UV	The maximum ST elevation in the episode, in microvolts.
@AVERAGE_UV	The average ST elevation in the episode, in microvolts.
@PRIMARY_CHANNEL	The channel with the most ST elevation. I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
@SECONDARY_CHANNEL	Other channels also meeting the ST elevation criteria, separated by commas. I II III aVR aVL aVF V1

XML Tag	Description
	V2 V3 V4 V5 V6
@MEAN_RATE	The mean HR (BPM) during the episode.
/HOLTER_STATISTICS/TACHYCARDIA_EPISODES	
/HOLTER_STATISTICS/TACHYCARDIA_EPISODES/TB_EPISODE	An episode of tachycardia as defined by @TACHYCARDIA_LIMIT_BPM scan criteria.
@ONSET	The onset of the episode in yyyyMMddHHmmss format.
@END	The end of the episode in yyyyMMddHHmmss format.
@DURATION	The duration of the episode in HH:mm:ss format.
@EXTREME_RATE_BPM	The maximum HR (in BPM) occurring in the episode.
@MEAN_RATE_BPM	The mean HR (in BPM) for the episode.
@TOTAL_BEATS	Total number of beats in the episode.
/HOLTER_STATISTICS/BRADYCARDIA_EPISODES	
/HOLTER_STATISTICS/BRADYCARDIA_EPISODES/TB_EPISODE	An episode of bradycardia as defined by @BRADYCARDIA_LIMIT_BPM scan criteria.
@ONSET	The onset of the episode in yyyyMMddHHmmss format.
@END	The end of the episode in yyyyMMddHHmmss format.
@DURATION	The duration of the episode in HH:mm:ss format.
@EXTREME_RATE_BPM	The minimum HR (in BPM) occurring in the episode.
@MEAN_RATE_BPM	The mean HR (in BPM) for the episode.
@TOTAL_BEATS	Total number of beats in the episode.
/HOLTER_STATISTICS/TRENDS	
/HOLTER_STATISTICS/TRENDS/TEND	
@TREND_TYPE	TREND_ST_LEAD_I = ST level in lead I TREND_ST_LEAD_II TREND_ST_LEAD_III TREND_ST_LEAD_AVR TREND_ST_LEAD_AVL TREND_ST_LEAD_AVF TREND_ST_LEAD_V1 TREND_ST_LEAD_V2 TREND_ST_LEAD_V3 TREND_ST_LEAD_V4 TREND_ST_LEAD_V5 TREND_ST_LEAD_V6 TREND_SVPB = Supraventricular rate TREND_VPB = Ventricular rate TREND_VPB2 = Couplets per 5min period TREND_VPB3PLUS = Runs per 5min period TREND_HR = Heart rate TREND_RR = RR intervals TREND_STD_DEV_RR = RR standard deviation
@TREND_LABEL	Label of the trend.
@TREND_VALID	TRUE = trend has valid information.

XML Tag	Description
	FALSE = no trend.
@MAX_VALID	TRUE = has valid max values. FALSE = max values should be ignored.
@MIN_VALID	TRUE = has valid min values. FALSE = min values should be ignored.
@AVG_DURATION_SEC	Average number of seconds represented by each trend value. E.g. 5, 300.
@MAX_MIN_DURATION_SEC	
@UNITS	Units the values are expressed in. UV (for ST trends) BPM (for SVPB, VPB, HR trends) VPB_COUPLETS_PER_5MIN (for VPB2 trends) VPB_RUNS_PER_5MIN (for VPB3PLUS trends) MSEC (for RR, STD_DEV_RR trends)
/HOLTER_STATISTICS/TRENDS/TEND/TREND_VALUE	
@DATE_TIME_HL7	Time of trend value in yyyyMMddHHmmss format.
@MIN_VALUE	Minimum value in the trend value period. Ignore if @MIN_VALUE_VALID=FALSE.
@AVG_VALUE	Average value in the trend value period.
@MAX_VALUE	Maximum value in the trend value period. Ignore if @MAX_VALID=FALSE.
@VALID	TRUE = trend value has valid values. FALSE = trend value should be ignored.

RX STATISTICS XML

File name: **HolterStatisticsRx_V5.dtd**

File location: automatically copied into folder where XML files are exported.

Rx XML Description

XML Tag	Description
/HOLTER_STATISTICS	
@RECORDER_TYPE	Type of recorder used. E.g. "H12.Cont.3.12"
@SCAN_NUMBER	Number assigned by H-Scribe when data is downloaded from device. Can be overridden by user.
@DATE_RECORDED	The date and time when the ECG recording was started. In the format yyyyMMddHHmmss.
@DATE_PROCESSED	Date when data was downloaded from device in yyyyMMdd format.
@RECORDER_NUMBER	Holter recorder number as entered by the H-Scribe user.
@HOOKUP_TECH	Name of the hookup technician.
@ANALYST	Name of the Holter analyst.
@REFERRING_PHYSICIAN	Name of the referring physician.
@REVIEWING_PHYSICIAN	Name of the physician reviewing/confirming the Holter report.
@WORKSTATION	Name of the patient list where the recording is stored.
@REPORT_FILENAME	Full path to PDF file.
/HOLTER_STATISTICS/PATIENT	
@NAME	Full name of the patient as entered in the Name field.
@LAST_NAME	Last name of the patient if a comma was used to separate the last name from the first.
@FIRST_NAME	First name of the patient if a comma was used to separate the last name from the first.
@MIDDLE_NAME	Middle name of the patient if it can be parsed.
@ID	Patient's primary medical record number.
@SECOND_ID	Patient's secondary ID (i.e., admission ID).
@AGE	Patient's age in years.
@SEX	Unknown Male Female
@INDICATIONS	Indications for the Holter test, separated by commas.
@MEDICATIONS	Name of medications, separated by commas.
@DOB	Patient's date of birth formatted according to the local regional settings.
@DOB_EX	Patient's date for birth formatted as yyyyMMdd.
/HOLTER_STATISTICS/SOURCE	
@TYPE	HOLTER
@MANUFACTURER	Mortara Instrument, Inc.
@MANUFACTURER_ID	8 = Mortara
@MODEL	Type and version of the recorder. E.g. "H12.Cont.3.12"
@ID	Recorder number entered by the user.
@RECORDER_SERIAL_NUMBER	Recorder serial number, if available.

XML Tag	Description
/HOLTER_STATISTICS/DEMOGRAPHIC_FIEL ELD_LIST	Complete list of all demographics fields. Useful when field labels have been customized.
/HOLTER_STATISTICS/DEMOGRAPHIC_FIEL ELD_LIST/DEMOGRAPHIC_FIELD	
@NAME	Name of the field. FULL_NAME LAST_NAME FIRST_NAME MIDDLE_NAME ID SECOND_ID AGE SEX REFERRING_PHYSICIAN REVIEWING_PHYSICIAN INDICATIONS MEDICATIONS RECORDER_TYPE RECORDER_NUMBER HOOKUP_TECH ANALYST SCAN_NUMBER RECORD_DATE RECORD_START_TIME SCAN_DATE DOB COMMENT
@LABEL	Label of the field displayed to the H-Scribe user.
@VALUE	Value of the field.
/HOLTER_STATISTICS/SCAN_CRITERIA	
@SVPB_PREMATURITY_PERCENTAGE	Criteria for supraventricular prematurity as a percentage of the current RR.
@PAUSE_MSEC	Number of milliseconds to be considered a pause.
@ST_DEPRESSION_UV	Minimum ST depression in microvolts.
@ST_ELEVATION_UV	Minimum ST elevation in microvolts.
@LONG_RR_PAUSE	All Beats = Any pause between any beats. N-N Only = Only count as a pause if long RR was between normal beats.
@PAUSE_EXCLUDED_FROM_HR	TRUE FALSE
@TACHYCARDIA_LIMIT_BPM	Minimum HR for tachycardia episodes.
@BRADYCARDIA_LIMIT_BPM	Maximum HR for bradycardia episodes.
@MIN_TACHY_BRADY_EPISODE_SECONDS	Minimum number of seconds of tachy or brady to be considered an episode.
/HOLTER_STATISTICS/RATE_STATISTICS	
@MIN_RATE	Minimum HR (BPM) recorded over a 5-second interval at MIN_RATE_TIME.
@MIN_RATE_TIME	Time of min rate in yyyyMMddHHmmss format.
@MAX_RATE	Maximum HR (BPM) including Ventricular beats recorded over a 5-second interval at MAX_RATE_TIME.

XML Tag	Description
@MAX_RATE_TIME	Time of max rate in yyyyMMddHHmmss format.
@MEAN_RATE	Mean HR (BPM) computed over the entire monitoring period.
@TOTAL_QRS	Total number of detected QRS complexes including both normal and Ventricular beats.
@MONITORING_PERIOD	"HH hr, mm min" total time monitored.
@ANALYZED_DATA	"HH hr, mm min" total time analyzed.
@LONGEST_TACHY_DURATION	Longest tachycardia episode duration in HH:mm:ss format.
@LONGEST_TACHY_ONSET	Onset of longest tachycardia episode in HH:mm:ss format.
@LONGEST_TACHY_OFFSET	End of longest tachycardia episode in HH:mm:ss format.
@LONGEST_TACHY_MAX_HR	Maximum HR (BPM) during longest tachycardia episode.
@LONGEST_TACHY_AVG_HR	Average HR (BPM) during longest tachycardia episode.
@LONGEST_TACHY_TOTAL_BEATS	Number of beats in longest tachycardia episode.
@FASTEST_TACHY_DURATION	Fastest tachycardia episode duration in HH:mm:ss format.
@FASTEST_TACHY_ONSET	Onset of fastest tachycardia episode in HH:mm:ss format.
@FASTEST_TACHY_OFFSET	End of fastest tachycardia episode in HH:mm:ss format.
@FASTEST_TACHY_MAX_HR	Maximum HR (BPM) during fastest tachycardia episode.
@FASTEST_TACHY_AVG_HR	Average HR (BPM) during fastest tachycardia episode.
@FASTEST_TACHY_TOTAL_BEATS	Number of beats in fastest tachycardia episode.
@LONGEST_BRADY_DURATION	Longest bradycardia episode duration in HH:mm:ss format.
@LONGEST_BRADY_ONSET	Onset of longest bradycardia episode in HH:mm:ss format.
@LONGEST_BRADY_OFFSET	End of longest bradycardia episode in HH:mm:ss format.
@LONGEST_BRADY_MIN_HR	Maximum HR (BPM) during longest bradycardia episode.
@LONGEST_BRADY_AVG_HR	Average HR (BPM) during longest bradycardia episode.
@LONGEST_BRADY_TOTAL_BEATS	Number of beats in longest bradycardia episode.
@SLOWEST_BRADY_DURATION	Slowest bradycardia episode duration in HH:mm:ss format.
@SLOWEST_BRADY_ONSET	Onset of slowest bradycardia episode in HH:mm:ss format.
@SLOWEST_BRADY_OFFSET	End of slowest bradycardia episode in HH:mm:ss format.
@SLOWEST_BRADY_MIN_HR	Maximum HR (BPM) during slowest bradycardia episode.
@SLOWEST_BRADY_AVG_HR	Average HR (BPM) during slowest bradycardia hycardia episode.
@SLOWEST_BRADY_TOTAL_BEATS	Number of beats in slowest bradycardia episode.
/HOLTER_STATISTICS/SUPRVENTRICULAR_ECTOPY	
@AFIB_TIME_PERCENTAGE	When detected, % of time that Atrial Fibrillation was present during monitoring period.
@AFIB_PEAK_AVERAGE_RATE	When detected, peak average rate during Atrial Fibrillation (BPM).
@SINGLES	Number of occurrences of a single Supraventricular Ectopic beat during monitoring period.
@COUPLETS	Number of occurrences of two consecutive Supraventricular Ectopic beats during monitoring period.
@RUNS	Number of occurrences of three or more consecutive Supraventricular Ectopic beats during monitoring period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Supraventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.

XML Tag	Description
@LONGEST_RUN_RATE	Longest Supraventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@TOTAL	Total number of Supraventricular Ectopic beats during monitoring period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/VENTRICULAR_ECTOPY	
@VENT_PACED_TIME_PERCENTAGE	When pacemaker present, % of time Ventricular Pacing was active during monitoring period.
@VENT_PACED_BEATS	When pacemaker present, how many beats were paced.
@SINGLES	Number of occurrences of a single Ventricular Ectopic beat during monitoring period.
@COUPLETS	Number of occurrences of two consecutive Ventricular Ectopic beats during monitoring period.
@RUNS	Number of occurrences of three or more consecutive Ventricular Ectopic beats during monitoring period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Ventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Ventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@NUMBER_R_ON_T	Number of occurrences of an R wave detected on the T wave of preceding beat.
@TOTAL	Total number of Ventricular Ectopic beats during monitoring period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/RR_VARIABILITY	
@PERCENT_RR_GREATER_50	Percentage of successive RR intervals with greater than 50 ms difference between normal beats. If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@RMS_SD	Root-mean-square of successive differences of the RR intervals (ms) between normal beats. If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@MAGID_SD	Magid standard deviation of the RR intervals (ms). If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
@KLEIGER_SD	Kleiger standard deviation of the RR intervals (ms). If more than 24 hours was analyzed, a value for each 24-hour period is reported, separated by commas.
/HOLTER_STATISTICS/ST_DEVIATION	
@MAX_DEPRESSION_V1_UV	Maximum ST segment depression in microvolts (1 mm = 100 microvolts) on V1/I/C1 at MAX_DEPRESSION_V1_TIME.
@MAX_DEPRESSION_V1_TIME	Time of max depression in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.

XML Tag	Description
@MAX_DEPRESSION_V5_UV	Maximum ST segment depression in microvolts (1 mm = 100 microvolts) on V5/V/C2 at MAX_DEPRESSION_V5_TIME.
@MAX_DEPRESSION_V5_TIME	Time of max depression in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
@MAX_ELEVATION_V1_UV	Maximum ST segment elevation measured in microvolts (1 mm = 100 microvolts) on V1/I/C1 at MAX_ELEVATION_V1_TIME.
@MAX_ELEVATION_V1_TIME	Time of max elevation in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
@MAX_ELEVATION_V5_UV	Maximum ST segment elevation measured in microvolts (1 mm = 100 microvolts) on V5/V/C2 at MAX_ELEVATION_V5_TIME.
@MAX_ELEVATION_V5_TIME	Time of max elevation in yyyyMMddHHmmss format. If the recording is longer than 24 hours, a "/1" or "/2" will follow the time indicating which day it occurred in.
/HOLTER_STATISTICS/PAUSES	
@LONGEST_RR_SEC	Longest RR interval (seconds) observed at LONGEST_RR_TIME. Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
@LONGEST_RR_TIME	Time of max elevation in yyyyMMddHHmmss format.
@NUM_RR_GREATER_2_SEC	Number of RR intervals with duration greater than pause threshold set in scan criteria (2.0 second as a default). Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
/HOLTER_STATISTICS/SUMMARY_NARRATIVE	Narrative summary.
/HOLTER_STATISTICS/COMMENTS	Physician comments.
/HOLTER_STATISTICS/DIARY	List of diary entries.
/HOLTER_STATISTICS/DIARY/DIARY_ENTRY	
@TIME	Time of diary entry in yyyyMMddHHmmss format.
@LABEL	Diary event label, e.g. "Event Button Pressed".
/HOLTER_STATISTICS/DIARY_PERIODS	
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD	Statistics for each period between diary events.
@TIME_RANGE	Time range of period in "yyyyMMddHHmmss – yyyyMMddHHmmss" format.
@START_TIME	Start of time range in yyyyMMddHHmmss format.
@END_TIME	End of time range in yyyyMMddHHmmss format.
@LABELS	
@START_LABEL	Diary label that starts the diary period.
@END_LABEL	Diary label that ends the diary period.
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/HEART_RATE	
@MIN_RATE	Minimum HR (BPM) in the period.
@MEAN_RATE	Mean HR (BPM) over the entire period.

XML Tag	Description
@MAX_RATE	Maximum HR (BPM) including Ventricular beats in the period.
@TACHY_BEATS	Number of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.
@TACHY_PERCENT	Percentage of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.
@BRADY_BEATS	Number of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
@BRADY_PERCENT	Percentage of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/SUPRAVENTRICULAR_ECTOPY	
@AFIB_TIME_PERCENTAGE	When detected, % of time that Atrial Fibrillation was present during period.
@AFIB_PEAK_AVERAGE_RATE	When detected, peak average rate during Atrial Fibrillation (BPM).
@SINGLES	Number of occurrences of a single Supraventricular Ectopic beat during period.
@COUPLETS	Number of occurrences of two consecutive Supraventricular Ectopic beats during period.
@RUNS	Number of occurrences of three or more consecutive Supraventricular Ectopic beat runs during period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Supraventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Supraventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@TOTAL	Total number of Supraventricular Ectopic beats during period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/VENTRICULAR_ECTOPY	
@VENT_PACED_TIME_PERCENTAGE	When pacemaker present, % of time Ventricular Pacing was active during period.
@VENT_PACED_BEATS	When pacemaker present, how many beats were paced.
@SINGLES	Number of occurrences of a single Ventricular Ectopic beat during period.
@COUPLETS	Number of occurrences of two consecutive Ventricular Ectopic beats during period.
@RUNS	Number of occurrences of three or more consecutive Ventricular Ectopic beat runs during period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Ventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Ventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@NUMBER_R_ON_T	Number of occurrences of an R wave detected on the T wave of preceding beat.

XML Tag	Description
@TOTAL	Total number of Ventricular Ectopic beats during period.
@MAX_RUN	Number of beats in the longest run.
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/PAUSES	
@LONGEST_RR_SEC	Longest RR interval (seconds) observed at LONGEST_RR_TIME. Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
@LONGEST_RR_TIME	Time of max elevation in yyyyMMddHHmmss format.
@NUM_RR_GREATER_2_SEC	Number of RR intervals with duration greater than pause threshold set in scan criteria (2.0 second as a default). Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/RR_VARIABILITY	
@PERCENT_RR_GREATER_50	Percentage of successive RR intervals with greater than 50 ms difference between normal beats.
@RMS_SD	Root-mean-square of successive differences of the RR intervals (ms) between normal beats.
@MAGID_SD	Magid standard deviation of the RR intervals (ms).
@KLEIGER_SD	Kleiger standard deviation of the RR intervals (ms).
/HOLTER_STATISTICS/DIARY_PERIODS/PERIOD/PACED_BEATS	
@ATRIAL	Number of atrial paced beats in period.
@VENTRICULAR	Number of ventricular paced beats in period.
@CAPTURE_FAILURE	Number of detected pacer spikes without a QRS in period.
@UNDER_SENSE	Number of times pacer spike detected too early (didn't sense rhythm) in period.
@OVER_SENSE	Number of times pacer spike was not detected when it was expected (sensed a rhythm when there wasn't one) in period.
/HOLTER_STATISTICS/RHYTHM_PROFILE	Hour-by-hour rhythm statistics.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD	One hour's rhythm statistics.
@TIME_RANGE	Time range of period in "yyyyMMddHHmmss – yyyyMMddHHmmss" format.
@START_TIME	Start of time range in yyyyMMddHHmmss format.
@END_TIME	End of time range in yyyyMMddHHmmss format.
@LABELS	
@START_LABEL	
@END_LABEL	
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/HEART_RATE	
@MIN_RATE	Minimum HR (BPM) in the period.
@MEAN_RATE	Mean HR (BPM) over the entire period.
@MAX_RATE	Maximum HR (BPM) including Ventricular beats in the period.
@TACHY_BEATS	Number of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.

XML Tag	Description
@TACHY_PERCENT	Percentage of beats in period with HR greater than TACHYCARDIA_LIMIT_BPM.
@BRADY_BEATS	Number of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
@BRADY_PERCENT	Percentage of beats in period with HR less than BRADYCARDIA_LIMIT_BPM.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/SUPRAVENTRICULAR_ECTOPY	
@AFIB_TIME_PERCENTAGE	When detected, % of time that Atrial Fibrillation was present during profile period.
@AFIB_PEAK_AVERAGE_RATE	When detected, peak average rate during Atrial Fibrillation (BPM).
@SINGLES	Number of occurrences of a single Supraventricular Ectopic beat during profile period.
@COUPLETS	Number of occurrences of two consecutive Supraventricular Ectopic beats during profile period.
@RUNS	Number of occurrences of three or more consecutive Supraventricular Ectopic beat runs during profile period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Supraventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Supraventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@TOTAL	Total number of Supraventricular Ectopic beats during profile period.
@MAX_RUN	Number of beats in longest run.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/VENTRICULAR_ECTOPY	
@VENT_PACED_TIME_PERCENTAGE	When pacemaker present, % of time Ventricular Pacing was active during profile period.
@VENT_PACED_BEATS	When pacemaker present, how many beats were paced.
@SINGLES	Number of occurrences of a single Ventricular Ectopic beat during profile period.
@COUPLETS	Number of occurrences of two consecutive Ventricular Ectopic beats during profile period.
@RUNS	Number of occurrences of three or more consecutive Ventricular Ectopic beat runs during profile period.
@FASTEST_RUN_RATE	Fastest HR (BPM) measured over Ventricular Runs at FASTEST_RUN_TIME.
@FASTEST_RUN_TIME	Time of fastest run in yyyyMMddHHmmss format.
@LONGEST_RUN_RATE	Longest Ventricular Run (number of beats) measured at LONGEST_RUN_TIME.
@LONGEST_RUN_TIME	Time of longest run in yyyyMMddHHmmss format.
@NUMBER_R_ON_T	Number of occurrences of an R wave detected on the T wave of preceding beat.
@TOTAL	Total number of Ventricular Ectopic beats during profile period.
@MAX_RUN	Number of beats in the longest run.

XML Tag	Description
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/PAUSES	
@LONGEST_RR_SEC	Longest RR interval (seconds) observed at LONGEST_RR_TIME. Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
@LONGEST_RR_TIME	Time of max elevation in yyyyMMddHHmmss format.
@NUM_RR_GREATER_2_SEC	Number of RR intervals with duration greater than pause threshold set in scan criteria (2.0 second as a default). Can include or exclude RR intervals between Ectopic and normal beats according to the scan criteria.
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/RR_VARIABILITY	
@PERCENT_RR_GREATER_50	Percentage of successive RR intervals with greater than 50 ms difference between normal beats.
@RMS_SD	Root-mean-square of successive differences of the RR intervals (ms) between normal beats.
@MAGID_SD	Magid standard deviation of the RR intervals (ms).
@KLEIGER_SD	Kleiger standard deviation of the RR intervals (ms).
/HOLTER_STATISTICS/RHYTHM_PROFILE/PERIOD/PACED_BEATS	
@ATRIAL	Number of atrial paced beats in profile period.
@VENTRICULAR	Number of ventricular paced beats in profile period.
@CAPTURE_FAILURE	Number of detected pacemaker spikes without a QRS in profile period.
@UNDER_SENSE	Number of times pacemaker spike detected too early (didn't sense rhythm) in profile period.
@OVER_SENSE	Number of times pacemaker spike was not detected when it was expected (sensed a rhythm when there wasn't one) in profile period.
/HOLTER_STATISTICS/ST_DEPRESSION_EPISODES	
/HOLTER_STATISTICS/ST_DEPRESSION_EPISODES/EPISODE	An episode of ST depression meeting the @ST_DEPRESSION_UV Scan Criteria.
@ONSET	The onset of the ST depression episode in yyyyMMddHHmmss format.
@END	The end of the ST depression episode in yyyyMMddHHmmss format.
@DURATION	The duration of the ST depression episode in HH:mm:ss format.
@MAX_UV	The maximum ST depression in the episode, in microvolts.
@AVERAGE_UV	The average ST depression in the episode, in microvolts.
@PRIMARY_CHANNEL	The channel with the most ST depression. I II III aVR aVL aVF V1 V2 V3

XML Tag	Description
	V4 V5 V6
@SECONDARY_CHANNEL	Other channels also meeting the ST depression criteria, separated by commas. I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
@MEAN_RATE	The mean HR (BPM) during the episode.
/HOLTER_STATISTICS/ST_ELEVATION_EPISODES	
/HOLTER_STATISTICS/ST_ELEVATION_EPISODES/EPISODE	An episode of ST elevation meeting the @ST_ELEVATION_UV scan criteria.
@ONSET	The onset of the ST elevation episode in yyyyMMddHHmmss format.
@END	The end of the ST elevation episode in yyyyMMddHHmmss format.
@DURATION	The duration of the ST elevation episode in HH:mm:ss format.
@MAX_UV	The maximum ST elevation in the episode, in microvolts.
@AVERAGE_UV	The average ST elevation in the episode, in microvolts.
@PRIMARY_CHANNEL	The channel with the most ST elevation. I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
@SECONDARY_CHANNEL	Other channels also meeting the ST elevation criteria, separated by commas. I II III aVR aVL aVF V1 V2 V3

XML Tag	Description
	V4 V5 V6
@MEAN_RATE	The mean HR (BPM) during the episode.
/HOLTER_STATISTICS/TACHYCARDIA_E PISODES	
/HOLTER_STATISTICS/TACHYCARDIA_E PISODES/TB_EPISODE	An episode of tachycardia as defined by @TACHYCARDIA_LIMIT_BPM Scan Criteria.
@ONSET	The onset of the episode in yyyyMMddHHmmss format.
@END	The end of the episode in yyyyMMddHHmmss format.
@DURATION	The duration of the episode in HH:mm:ss format.
@EXTREME_RATE_BPM	The maximum HR (in BPM) occurring in the episode.
@MEAN_RATE_BPM	The mean HR (in BPM) for the episode.
@TOTAL_BEATS	Total number of beats in the episode.
/HOLTER_STATISTICS/BRADYCARDIA_E PISODES	
/HOLTER_STATISTICS/BRADYCARDIA_E PISODES/TB_EPISODE	An episode of bradycardia as defined by @BRADYCARDIA_LIMIT_BPM Scan Criteria.
@ONSET	The onset of the episode in yyyyMMddHHmmss format.
@END	The end of the episode in yyyyMMddHHmmss format.
@DURATION	The duration of the episode in HH:mm:ss format.
@EXTREME_RATE_BPM	The minimum HR (in BPM) occurring in the episode.
@MEAN_RATE_BPM	The mean HR (in BPM) for the episode.
@TOTAL_BEATS	Total number of beats in the episode.
/HOLTER_STATISTICS/STRIP_LIST	
/HOLTER_STATISTICS/STRIP_LIST/STRIP	
@ANNOTATION	The strip annotation.
@TIME	The time of the first sample in the strip, in yyyyMMddHHmmss format.
/HOLTER_STATISTICS/TRENDS	
/HOLTER_STATISTICS/TRENDS/TEND	
@TREND_TYPE	TREND_ST_LEAD_I = ST level in lead I TREND_ST_LEAD_II TREND_ST_LEAD_III TREND_ST_LEAD_AVR TREND_ST_LEAD_AVL TREND_ST_LEAD_AVF TREND_ST_LEAD_V1 TREND_ST_LEAD_V2 TREND_ST_LEAD_V3 TREND_ST_LEAD_V4 TREND_ST_LEAD_V5 TREND_ST_LEAD_V6 TREND_SVPB = Supraventricular rate TREND_VPB = Ventricular rate TREND_VPB2 = Couplets per 5min period TREND_VPB3PLUS = Runs per 5min period TREND_HR = Heart rate TREND_RR = RR intervals

XML Tag	Description
	TREND_STD_DEV_RR = RR standard deviation
@TREND_LABEL	Label of the trend.
@TREND_VALID	TRUE = trend has valid information. FALSE = no trend.
@MAX_VALID	TRUE = has valid max values. FALSE = max values should be ignored.
@MIN_VALID	TRUE = has valid min values. FALSE = min values should be ignored.
@AVG_DURATION_SEC	Average number of seconds represented by each trend value. E.g. 5, 300.
@MAX_MIN_DURATION_SEC	
@UNITS	Units the values are expressed in. UV (for ST trends) BPM (for SVPB, VPB, HR trends) VPB_COUPLETS_PER_5MIN (for VPB2 trends) VPB_RUNS_PER_5MIN (for VPB3PLUS trends) MSEC (for RR, STD_DEV_RR trends)
/HOLTER_STATISTICS/TRENDS/TEND/TR END_VALUE	
@DATE_TIME_HL7	Time of trend value in yyyyMMddHHmmss format.
@MIN_VALUE	Minimum value in the trend value period. Ignore if @MIN_VALUE_VALID=FALSE.
@AVG_VALUE	Average value in the trend value period.
@MAX_VALUE	Maximum value in the trend value period. Ignore if @MAX_VALID=FALSE.
@VALID	TRUE = trend value has valid values. FALSE = trend value should be ignored.

RX WAVEFORM XML

File name: **HolterECG_V5.dtd**

File location: Automatically copied into folder where XML files are exported.

Rx XML Description

XML Tag	Description
/HOLTER_ECG	
@RECORDER_TYPE	Type and version of the recorder. E.g. "H12.Cont.3.12"
@SCAN_NUMBER	Number assigned by H-Scribe when data is downloaded from device. Can be overridden by user.
@DATE_RECORDED	The date and time when the ECG recording was started. In the format yyyyMMddHHmmss.
@DATE_PROCESSED	Date when data was downloaded from device in yyyyMMdd format.
@RECORDER_NUMBER	Holter recorder number as entered by the H-Scribe user.
@HOOKUP_TECH	Name of the hookup technician.
@ANALYST	Name of the Holter analyst.
@REFERRING_PHYSICIAN	Name of the referring physician.
@REVIEWING_PHYSICIAN	Name of the physician reviewing/confirming the Holter report.
@ACQUISITION_TIME	The date and time of the first sample of this waveform strip. In the format yyyyMMddHHmmss.
@ANNOTATION	The strip annotation.
@WORKSTATION	Name of the patient list where the recording is stored.
/HOLTER_ECG/PATIENT	
@NAME	Full name of the patient as entered in the Name field.
@LAST_NAME	Last name of the patient if a comma was used to separate the last name from the first.
@FIRST_NAME	First name of the patient if a comma was used to separate the last name from the first.
@MIDDLE_NAME	Middle name of the patient if it can be parsed.
@ID	Patient's primary medical record number.
@SECOND_ID	Patient's secondary ID, like an admission ID.
@AGE	Patient's age in years.
@SEX	Unknown Male Female
@INDICATIONS	Indications for the Holter test, separated by commas.
@MEDICATIONS	Name of medications, separated by commas.
@DOB	Patient's date of birth formatted according to the local regional settings.
@DOB_EX	Patient's date for birth formatted as yyyyMMdd.
/HOLTER_ECG/SOURCE	
@TYPE	HOLTER
@MANUFACTURER	Mortara Instrument, Inc.
@MANUFACTURER_ID	8 = Mortara
@MODEL	Type and version of the recorder. E.g. "H12.Cont.3.12"

XML Tag	Description
@ID	Recorder number entered by the user.
@RECORDER_SERIAL_NUMBER	Recorder serial number, if available.
/HOLTER_ECG/DEMOGRAPHIC_FIELD_LIST	Complete list of all demographics fields. Useful when field labels have been customized.
/HOLTER_ECG/DEMOGRAPHIC_FIELD_LIST/DEMOGRAPHIC_FIELD	
@NAME	Name of the field. FULL_NAME LAST_NAME FIRST_NAME MIDDLE_NAME ID SECOND_ID AGE SEX REFERRING_PHYSICIAN REVIEWING_PHYSICIAN INDICATIONS MEDICATIONS RECORDER_TYPE RECORDER_NUMBER HOOKUP_TECH ANALYST SCAN_NUMBER RECORD_DATE RECORD_START_TIME SCAN_DATE DOB
@LABEL	Label of the field displayed to the H-Scribe user.
@VALUE	Value of the field.
/HOLTER_ECG/BEAT_LIST/BEAT	
@TYPE	0 = Normal 1 = Supraventricular Premature Beat 2 = Ventricular Premature Beat 3 = Fusion (deprecated, now labeled "Unknown") 4 = Paced 5 = Ventricular Escape 6 = Atrial Fibrillation 7 = R on T 8 = Artificial 9 = Unknown 10 = Pseudo Beat
@TYPE_EX	Beat type in H-Scribe internal format. Values and bit fields are defined below: 0x00 = Normal 0x01 = Supraventricular Premature Beat 0x02 = Ventricular Premature Beat 0x03 = Fusion 0x04 = Paced 0x05 = Ventricular Escape 0x06 = Atrial Fibrillation 0x20 = R on T 0x08 = flag means beat is ventricular, like VPB or V Escape, but not all Fusion

XML Tag	Description
	0x10 = flag means artifact is present
@QON	QRS onset in milliseconds from the beginning of the strip.
@RR	RR interval in milliseconds from the preceding R-peak to the R-peak of this beat.
@FILTERED_RR	Average of this RR interval, the prior 32 RR intervals, and the following 32 RR intervals (i.e. a 65-beat sliding window, centered on this beat). Expressed in milliseconds.
@QT	Average of this QT interval, the prior 32 QT intervals, and the following 32 QT intervals (i.e. a 65-beat sliding window, centered on this beat). Expressed in milliseconds.
/HOLTER_ECG/CHANNEL	
@OFFSET	This channel's offset, milliseconds, from the beginning of the strip. Always 0 because Mortara recorders capture all leads simultaneously.
@BITS	16
@FORMAT	SIGNED
@UNITS_PER_MV	The value of 1 mV. E.g. 160 means each unit represents 1000 / 160 = 6.25 μ V.
@DURATION	The duration of the channel in milliseconds.
@SAMPLE_FREQ	The sampling frequency in Hertz.
@AC_FILTER_HZ	DISABLED ENABLED 50 60
@HIGH_PASS_FILTER	DISABLED ENABLED
@HIGH_PASS_FILTER_CUTOFF_FREQ_HZ	Typically "0.05" Hz.
@NAME	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
@ENCODING	BASE64
@DATA	The Base64-encoded waveform samples.

Below lists possible error codes returned from the DICOM library used by HX-Gate.

DICOM Error Codes

- 1. MC_NORMAL_COMPLETION
- 4000. MC_ALREADY_REGISTERED
- 4001. MC_ASSOCIATION_ABORTED
- 4002. MC_ASSOCIATION_CLOSED
- 4003. MC_ASSOCIATION_REJECTED
- 4004. MC_ATTRIBUTE_HAS_VALUES
- 4005. MC_BUFFER_TOO_SMALL
- 4006. MC_CALLBACK_CANNOT_COMPLY
- 4007. MC_CALLBACK_DATA_SIZE_NEGATIVE
- 4008. MC_CALLBACK_DATA_SIZE_UNEVEN
- 4009. MC_CALLBACK_PARM_ERROR
- 4010. MC_CALLBACK_REGISTERED
- 4011. MC_CANNOT_COMPLY
- 4012. MC_CANT_ACCESS_PROFILE
- 4013. MC_CONFIG_INFO_ERROR
- 4014. MC_CONFIG_INFO_MISSING
- 4015. MC_DDFILE_ERROR
- 4016. MC_DOES_NOT_VALIDATE
- 4017. MC_EMPTY_VALUE
- 4018. MC_END_OF_DATA
- 4019. MC_EXT_INFO_UNAVAILABLE
- 4020. MC_FOUND
- 4021. MC_FUNCTION_UNAVAILABLE
- 4022. MC_INCOMPATIBLE_VR
- 4023. MC_INCOMPATIBLE_VALUE
- 4024. MC_INVALID_APPLICATION_ID
- 4025. MC_INVALID_APPLICATION_TITLE
- 4026. MC_INVALID_ASSOC_ID
- 4027. MC_INVALID_CHARS_IN_VALUE
- 4028. MC_INVALID_COMMAND
- 4029. MC_INVALID_DATA_TYPE
- 4030. MC_END_OF_LIST
- 4031. MC_INVALID_GROUP
- 4032. MC_INVALID_HOST_NAME
- 4033. MC_INVALID_ITEM_ID
- 4034. MC_INVALID_LENGTH_FOR_TITLE
- 4035. MC_INVALID_LENGTH_FOR_VR
- 4036. MC_INVALID_LICENSE
- 4037. MC_INVALID_MESSAG_ID
- 4038. MC_INVALID_MESSAGE_RECEIVED
- 4039. MC_INVALID_PARAMETER_NAME
- 4040. MC_INVALID_PORT_NUMBER
- 4041. MC_INVALID_PRIVATE_CODE
- 4042. MC_INVALID_SERVICE_LIST_NAME
- 4043. MC_INVALID_TAG
- 4044. MC_INVALID_TRANSFER_SYNTAX
- 4045. MC_INVALID_VALUE_FOR_VR
- 4046. MC_INVALID_VALUE_NUMBER
- 4047. MC_INVALID_VR_CODE

4048. MC_LOG_EMPTY
4049. MC_MESSAGE_EMPTY
4050. MC_MESSAGE_VALIDATES
4051. MC_MISSING_CONFIG_PARM
4052. MC_MSGFILE_ERROR
4053. MC_MUST_BE_POSITIVE
4054. MC_NETWORK_SHUT_DOWN
4055. MC_NO_APPLICATIONS_REGISTERED
4056. MC_NO_CALLBACK
4057. MC_NO_CONDITION_FUNCTION
4058. MC_NO_FILE_SYSTEM
4059. MC_NO_INFO_REGISTERED
4060. MC_NO_LICENSE
4061. MC_NO_MERGE_INI
4062. MC_NO_MORE_ATTRIBUTES
4063. MC_NO_MORE_VALUES
4064. MC_NO_PROFILE
4065. MC_NO_REQUEST_PENDING
4066. MC_NON_SERVICE_ATTRIBUTE
4067. MC_NOT_FOUND
4068. MC_NOT_ONE_OF_ENUMERATED_VALUES
4069. MC_NOT_ONE_OF_DEFINED_TERMS
4070. MC_NULL_POINTER_PARM
4071. MC_NULL_VALUE
4072. MC_PROTOCOL_ERROR
4073. MC_REQUIRED_ATTRIBUTE_MISSING
4074. MC_REQUIRED_DATASET_MISSING
4075. MC_REQUIRED_VALUE_MISSING
4076. MC_STATE_VIOLATION
4077. MC_SYSTEM_CALL_INTERRUPTED
4078. MC_SYSTEM_ERROR
4079. MC_TAG_ALREADY_EXISTS
4080. MC_TEMP_FILE_ERROR
4081. MC_TIMEOUT
4082. MC_TOO_FEW_VALUES
4083. MC_TOO_MANY_BLOCKS
4084. MC_TOO_MANY_VALUES
4085. MC_UNABLE_TO_CHECK_CONDITION
4086. MC_UNACCEPTABLE_SERVICE
4087. MC_UNEXPECTED_EOD
4088. MC_UNKNOWN_ITEM
4089. MC_UNKNOWN_SERVICE
4090. MC_VALUE_MAY_NOT_BE_NULL
4091. MC_VALUE_NOT_ALLOWED
4092. MC_VALUE_OUT_OF_RANGE
4093. MC_VALUE_TOO_LARGE
4094. MC_VR_ALREADY_VALID
4095. MC_LIBRARY_ALREADY_INITIALIZED
4096. MC_LIBRARY_NOT_INITIALIZED
4097. MC_INVALID_DIRECTORY_RECORD_OFFSET
4098. MC_INVALID_FILE_ID
4099. MC_INVALID_DICOMDIR_ID

4100. MC_INVALID_ENTITY_ID
4101. MC_INVALID_MRDR_ID
4102. MC_UNABLE_TO_GET_ITEM_ID
4103. MC_INVALID_PAD
4104. MC_ENTITY_ALREADY_EXISTS
4105. MC_INVALID_LOWER_DIR_RECORD
4106. MC_BAD_DIR_RECORD_TYPE
4107. MC_UNKNOWN_HOST_CONNECTED
4108. MC_INACTIVITY_TIMEOUT
4109. MC_INVALID_SOP_CLASS_UID
4110. MC_INVALID_VERSION
4111. MC_OUT_OF_ORDER_TAG
4112. MC_CONNECTION_FAILED
4113. MC_UNKNOWN_HOST_NAME
4114. MC_INVALID_FILE
4115. MC_NEGOTIATION_ABORTED
4116. MC_INVALID_SR_ID
4117. MC_UNABLE_TO_GET_SR_ID
4118. MC_DUPLICATE_NAME
4119. MC_DUPLICATE_SYNTAX
4120. MC_EMPTY_LIST
4121. MC_MISSING_NAME
4122. MC_INVALID_SERVICE_NAME
4123. MC_SERVICE_IN_USE
4124. MC_INVALID_SYNTAX_NAME
4125. MC_SYNTAX_IN_USE
4126. MC_NO_CONTEXT
4127. MC_OFFSET_TABLE_TOO_SHORT
4128. MC_MISSING_DELIMITER
4129. MC_COMPRESSION_FAILURE
4130. MC_END_OF_FRAME
4131. MC_MUST_CONTINUE_BEFORE_READING
4132. MC_COMPRESSOR_REQUIRED
4133. MC_DECOMPRESSOR_REQUIRED
4134. MC_DATA_AVAILABLE
4135. MC_ZLIB_ERROR
4136. MC_NOT_META_SOP
4137. MC_INVALID_ITEM_TRANSFER_SYNTAX
4138. MC_LICENSE_ERROR

