Hillrom™

Welch Allyn® HScribe™ Holter Analysis System

User Manual

Manufactured by Welch Allyn, Inc. Skaneateles Falls, NY U.S.A.

CE 0459

CAUTION: Federal law restricts this device to sale by or on the order of a physician

Not Available in the U.S.

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901143 HOLTER ANALYSIS SOFTWARE

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1. NOTICES

Manufacturer's Responsibility

Welch Allyn, Inc. is responsible for the effects on safety and performance only if:

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

Responsibility of the Customer

The user of this device is responsible for ensuring the implementation of a satisfactory maintenance schedule. Failure to do so may cause undue failure and possible health hazards.

Equipment Identification

Welch Allyn, Inc. equipment is identified by a serial and reference number. Care should be taken so that these numbers are not defaced.
The HScribe product label shows the unique identification numbers along with other important information printed on the label.

The serial number format is as follows:
YYYWWSSSSSSS
YYY = First Y is always 1 followed by two-digit Year of manufacture
WW = Week of manufacture
SSSSSSS = Sequence number of manufacture

The Hscribe label and UDI label (when applicable) are applied to the product identification card delivered with the software.

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Notice to EU Users and/or Patients

Any serious incident that has occurred in relation to the device, should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

2. WARRANTY INFORMATION

Your Welch Allyn Warranty

WELCH ALLYN, INC. (hereafter referred to as "Welch Allyn") warrants that components within Welch Allyn products (hereafter referred to as "Product/s") will be free from defects in workmanship and materials for the number of years specified on documentation accompanying the product, or previously agreed to by the purchaser and Welch Allyn, or if not otherwise noted, for a period of twelve (12) months from the date of shipment.

Consumable, disposable or single use products such as, but not limited to, PAPER or ELECTRODES are warranted to be free from defects in workmanship and materials for a period of 90 days from the date of shipment or the date of first use, whichever is sooner.

Reusable product such as, but not limited to, BATTERIES, BLOOD PRESSURE CUFFS, BLOOD PRESSURE HOSES, TRANSDUCER CABLES, Y-CABLES, PATIENT CABLES, LEAD WIRES, MAGNETIC STORAGE MEDIUMS, CARRY CASES or MOUNTS, are warranted to be free from defects in workmanship and materials for a period of 90 days. This warranty does not apply to damage to the Product/s caused by any or all of the following circumstances or conditions:

a) Freight damage;

b) Parts and/or accessories of the Product/s not obtained from or approved by Welch Allyn;

c) Misapplication, misuse, abuse, and/or failure to follow the Product/s instruction sheets and/or information guides;

d) Accident; a disaster affecting the Product/s;

e) Alterations and/or modifications to the Product/s not authorized by Welch Allyn;

f) Other events outside of Welch Allyn's reasonable control or not arising under normal operating conditions.

THE REMEDY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT WITHOUT CHARGE FOR LABOR OR MATERIALS, OR ANY PRODUCT/S FOUND UPON EXAMINATION BY WELCH ALLYN TO HAVE BEEN DEFECTIVE. This remedy shall be conditioned upon receipt of notice by Welch Allyn of any alleged defects promptly after discovery thereof within the warranty period. Welch Allyn's obligations under the foregoing warranty will further be conditioned upon the assumption by the purchaser of the Product/s (i) of all carrier charges with respect to any Product/s returned to Welch Allyn's principal place or any other place as specifically designated by Welch Allyn or an authorized distributor or representative of Welch Allyn, and (ii) all risk of loss in transit. It is expressly agreed that the liability of Welch Allyn is limited and that Welch Allyn does not function as an insurer. A purchaser of a Product/s, by its acceptance and purchase thereof, acknowledges and agrees that Welch Allyn is not liable for loss, harm, or damage due directly or indirectly to an occurrence or consequence therefrom relating to the Product/s. If Welch Allyn should be found liable to anyone under any theory (except the expressed warranty set forth herein) for loss, harm, or damage, the liability of Welch Allyn shall be limited to the lesser of the actual loss, harm, or damage, or the original purchase price of the Product/s when sold.

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3. 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.

***NOTE**: This manual may contain screen shots and pictures. Any screen shots and pictures 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.*

WARNINGS

1. This manual gives important information about the use and safety of this device. Deviating from operating procedures, misuse or misapplication of the device, or ignoring specifications and recommendations could result in increased risk of harm to users, patients and bystanders, or damage to the device.

2. The various manufacturers of accessories provide separate user manuals and/or instructions (e.g., display, laser printer, patient cables, and electrodes). Read these instructions well and refer to them for specific functions. It is recommended to keep all instructions together. Refer to these instructions for a list of approved accessories. When in doubt, contact Welch Allyn.

3. Device (Holter analysis system) captures and presents data reflecting a patient's physiological condition that when reviewed by a trained physician or clinician can be useful in determining a diagnosis; however, the data should not be used as a sole means for determining a patient's diagnosis.

4. Users are expected to be licensed clinical professionals knowledgeable about medical procedures and patient care, and adequately trained in the use of this device. Before attempting to use this device for clinical applications, the operator must read and understand the contents of the user manual and other accompanying documents. Inadequate knowledge or training could result in increased risk of harm to users, patients and bystanders, or damage to the device. Contact Welch Allyn service for additional training options.

5. To ensure that electrical safety is maintained during operation from AC (~) power, the device must be plugged into a hospital-grade outlet.

6. To maintain designed operator and patient safety, peripheral equipment and accessories used that can come in direct patient contact must be in compliance with UL 2601-1, IEC 60601-1, and IEC 60601-2-25. Only use parts and accessories supplied with the device and available through Welch Allyn, Inc.

7. All signal input and output (I/O) connectors are intended for connection of only those devices complying with IEC 60601-1, or other IEC standards (e.g., IEC 60950), as appropriate to the device. Connecting additional devices to the device may increase chassis and/or patient leakage currents. To maintain operator and patient safety, consideration should be given to the requirements of IEC 60601-1, and leakage currents should be measured to confirm no electric shock hazard exists.

8. To avoid potential for electric shock, ensure that approved equipment and accessories are connected to the appropriate ports and that no incompatible equipment has been connected.

9. The personal computer and all peripheral equipment used should be approved to the appropriate safety standard for nonmedical electrical equipment per IEC 60950, or its national variants.
10. A possible explosion hazard exists. Do not use the device in the presence of a flammable anesthetic mixture.

11. Test all HScribe functions after each Microsoft critical and security update.

12. ECG electrodes used with the Holter recorders could cause skin irritation; patients should be examined for signs of irritation or inflammation. Electrode materials and ingredients are specified on the packaging or are available from the vendor upon request.

13. Do not attempt to clean the device or patient cables by submersing into a liquid, autoclaving, or steam cleaning as this may damage equipment or reduce its usable life. Wipe the exterior surfaces with a warm water and mild detergent solution and then dry with a clean cloth. Use of unspecified cleaning/disinfecting agents, failure to follow recommended procedures, or contact with unspecified materials could result in increased risk of harm to users, patients and bystanders, or damage to the device.

14. Damaged or suspected inoperative equipment must be immediately removed from use and must be checked/repaired by qualified service personnel prior to continued use.

15. To prevent emission of substances that may damage the environment, dispose of the device, its components and accessories (e.g., batteries, cables, electrodes), and/or packing materials that are past the shelf life in accordance with local regulations.

16. When necessary, dispose of the device, its components and accessories (e.g., batteries, cables, electrodes), and/or packing materials in accordance with local regulations.

17. Proper functioning backup items such as a spare patient cable, display monitor, and other equipment are recommended on hand to prevent delayed treatment due to an inoperable device.

18. The device and IT Network the device is connected to should be securely configured and maintained per the IEC 80001 standard, or an equivalent network security standard or practice.

19. This product complies with relevant electro-magnetic interference, mechanical safety, performance, and biocompatibility standards. However, the product cannot completely eliminate potential patient or user harm from the following:
    - Harm or device damage associated with electro-magnetic hazards,
    - Harm from mechanical hazards,
    - Harm from device, function, or parameter unavailability,
    - Harm from misuse error, such as inadequate cleaning, and/or
    - Harm from device exposure to biological triggers that may result in a severe systemic allergic reaction

20. Evaluation of ECGs from infants is limited to QRS detection and heart rate reporting, including infants weighing less than 10 kg (22 lbs) if supported by the Holter recorder device, see specific Holter recorder User Manual.

CAUTIONS

1. Do not use the device as a method for loading or operating commercially available software. Doing so might affect the performance of the device.

2. Do not pull or stretch patient cables as this could result in mechanical and/or electrical failures. Patient cables should be stored after forming them into a loose loop.

3. Microsoft Windows compatibility, updates and anti-virus policy: The HScribe software has been fully tested with Windows 7 Professional Service Pack 1, Windows 7 Enterprise Service Pack 1, Windows 8.1 Professional 64-bit, Windows 8.1 Enterprise 64-bit, Windows 10 Professional 64-bit and Windows 10 Enterprise 64-bit operating systems. The server (modality manager) software has also been tested with Windows Server 2008 R2 Service Pack 1 and Windows Server 2012 R2. Although it is unlikely that Windows updates and security patches affect HScribe functionality, Welch Allyn recommends turning automatic Windows update off, and

periodically running it manually. A functional test should be executed after update, which includes acquiring a recording, editing and printing a report, as well as importing an order and exporting results, if activated Compatibility of HScribe with corporate anti-virus software packages has been evaluated. Welch Allyn recommends excluding the HScribe database folder (Normally C:\ProgramData\MiPgSqlData on a stand-alone system or the server) from the folders to be scanned. In addition, anti-virus patch updates and system scans should be scheduled for time periods when the system is not actively in use or performed manually.

4. All H3+ recorders and H12+ media cards must remain unencrypted for software to work properly (e.g. technologies such as BitLocker should not be used). Furthermore, software users must have read and write permissions for the appropriate H3+ recorders and media card readers, whether connected to their local machine or over the network.

5. No other non-recommended PC application software should run while the HScribe application is being used.

6. It is recommended that all Holter workstations be periodically updated with Microsoft critical and security updates to protect from malware attacks and to fix critical Microsoft software issues.

7. To prevent delivery of malware into the system Welch Allyn recommends that institution operating procedures are written to prevent malware to be transmitted into the system from removable media.

8. Exams that are saved to the local or server database on the hard drive will cause the device to fill over a period of time. These exams must be removed from the database by deleting or archiving prior to causing the device to cease to operate. Periodic checks of the device's capacity are recommended; a safe minimum capacity is 10 GB. See *Exam Search* for ways to select exams for deletion or archiving.

9. The HScribe application will display a warning prompting the user to delete exams when the database reaches a threshold at 11 GB of available space. Each 24-hour Holter exam is approximately 300 MB in size and only 30 more exams can be imported. When the available storage is at 2 GB, no new Holter exams can be imported.

10. To avoid risk of unintentionally booting into a USB device, ensure that the Boot Order in BIOS is set with the SATA hard drive listed first in the boot order. Refer to computer manufacturer's instruction for entering BIOS on startup and configuring Boot Order.

11. When using H12+ media cards (either a secure digital [SD] or compact flash [CF] card) in the card reader, ensure that the media card is removed before powering the system on. If the card is not removed, the PC may attempt to boot from the media card and report an error.

Note(s)

1. Local Administrator permissions are required for software installation, application configuration, and software activation. Local User privileges are required for application users. Roaming and temporary accounts are not supported.

2. 8-hour timeout expiration is automatically controlled by the system. Each operation that occurs (e.g. Exam Search, Patient Search, editing exams, importing an exam, etc.) will reset the timeout start time. When there is no interaction with the system for the timeout duration, the user is prompted to enter login information.

3. When the server is unavailable in a distributed configuration, the client workstation will notify the user with a prompt to proceed in Offline Mode or cancel. Scheduled orders are not available. An exam can be conducted with manually entered demographics and will be stored locally. When the server comes available, the user is prompted with a list of unsent exams and a selection to send exams to the modality manager database.

4. Poor patient preparation prior to electrode attachment may affect the Holter recording and could interfere with the operation of the device.

5. Patient movements may generate excessive noise that may affect the quality of the Holter ECG traces and the proper analysis performed by the device.

6. ECG waveform displays square waves during periods of lead fail. Waveform returns when correction is made.

7. An ambulatory 12-lead ECG obtained with torso-located limb electrodes is not equivalent to a conventional diagnostic ECG.

8. Always ensure that the Recorder Duration is set appropriately when preparing H3+ digital Holter recorders.

9. Holter recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected by the Holter analysis system.

10. Error codes along with descriptive message text are displayed to notify the user. Contact Welch Allyn Service with any questions.

11. When updating the H3+ recorder time fails during preparation, the user is notified with the following message:

    The internal clock on this recorder is not functioning. Consult Welch Allyn Service before using this recorder.

12. When an H3+ recorder has no data due to absent internal battery power, the following message is displayed to notify the user:

    The internal clock on this recorder has been reset since its last usage, possibly from not being used for some time. Consult the recorder user manual or Welch Allyn Service for instructions on how to charge the internal clock battery before use.

.

4. EQUIPMENT SYMBOLS AND MARKINGS

Device Symbol Delineation

	WARNING The warning statements in this manual identify conditions or practices that could lead to illness, injury, or death. In addition, when used on a patient applied part, this symbol indicates defibrillation protection is in the cables. Warning symbols will appear with a grey background in a black and white document.
	CAUTION The caution statements in this manual identify conditions or practices that could result in damage to the equipment or other property, or loss of data.
7d hillrom.com	Follow instructions/directions for use (DFU) – mandatory action. A copy of the DFU is available on this website. A printed copy of the DFU can be ordered from Hillrom for delivery within 7 calendar days.
	USB connection
PC	USB connection to PC
CE 0459	Indicates compliance to applicable European Union directives
MD	Medical Device
#	Model Identifier
REF	Reorder Number
SN	Serial Number
	Manufacturer
EC REP	Authorized representative in the European Community
	Do not dispose as unsorted municipal waste. Requires separate handling for waste disposal according to local requirements per European Union Directive 2012/19/EU requiring separate handling for waste disposal

NOTE: *Refer to the manual(s) accompanying the device that pertain to the computer hardware for additional definitions of symbols that may be present.*

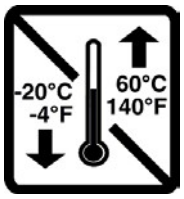
Package Symbol Delineation

This side up

Fragile

Keep Dry

Keep Away from Heat



Acceptable Temperature Range

5. GENERAL CARE

Precautions

- Turn off the device before inspecting or cleaning.
- Do not use organic solvents, ammonia based solutions, or abrasive cleaning agents which may damage equipment surfaces.

Inspection

Inspect your equipment daily prior to operation. If you notice anything that requires repair, contact an authorized service person to make the repairs.

- Verify that all cords and connectors are securely seated.
- Check the case and chassis for any visible damage.
- Inspect cords and connectors for any visible damage.
- Inspect keys and controls for proper function and appearance.

Cleaning Exterior Surfaces

1. Use caution with excess liquid as contact with metal parts may cause corrosion.
2. Do not use excessive drying techniques such as forced heat.
3. Refer to cleaning instructions that are included with the computer, display, and printer.

***WARNING**: Do not attempt to clean/disinfect the recording device or patient cables by submerging into a liquid, autoclaving, or steam cleaning.*

Cleaning the Device

Disconnect the power source. Clean the exterior surface of the device with a damp, soft, lint-free cloth using a solution of mild detergent diluted in water. After washing, thoroughly dry off the device with a clean, soft cloth or paper towel.

Cautions

Improper cleaning products and processes can damage the device, corrode the metal, and void the warranty. Use care and proper procedure whenever cleaning or maintaining the device.

Disposal

Disposal must be in accordance with the following steps:

1. Follow cleaning and disinfection instructions per instructions in this user manual section.
2. Delete all existing data related to patients/hospital/clinic/doctor. Data backup may be performed prior to deletion.
3. Segregate material in preparation for the recycling process
    - Components are to be disassembled and recycled based on type of material
        - Plastic to be recycled as plastic waste
        - Metal to be recycled as Metals
            - Includes loose components containing more than 90% metal by weight
            - Includes screws and fasteners

- Electronic components, including the power cord, to be disassembled and recycled as Waste of Electrical and Electronic Equipment (WEEE)
- Batteries to be dismantled from the device and recycled as per WEEE

Users must adhere to all federal, state, regional, and/or local laws and regulations as it pertains to the safe disposal of medical devices and accessories. If in doubt, the user of the device shall first contact Hillrom Technical Support for guidance on safe disposal protocols.

Waste of Electrical and
Electronic Equipment (WEEE)

6. INTRODUCTION

Manual Purpose

This manual is intended to provide the user with information about:

- Holter recorder preparation
- Import of recorded Holter ECG data
- Patient Information entry, modification, and deletion
- Review and editing of recorded Holter ECG data
- Final report preparation and generation
- Exporting results to external destinations
- Recording archive and restoration
- Modifying scanning criteria and other system settings
- Management of stored Holter ECG data

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

Audience

This manual is written for clinical professionals. They are expected to have working knowledge of medical procedures and terminology as required for monitoring cardiac patients.

Indications For Use

The HScribe Holter analysis system is intended to acquire, automatically analyze, edit review, report and store prerecorded electrocardiographic data of patients that have been connected to compatible ambulatory Holter recorders. The Holter analysis system is intended for use in adult and pediatric patient populations. Evaluation of ECGs from infants is limited to QRS detection and heart rate reporting.

The Holter analysis system is indicated for use in a clinical setting, only by qualified medical professionals. The system is intended to be used for the diagnosis of cardiac arrhythmia and repolarization disturbances.

The Holter analysis system acquires data which may be used for the following indications:

- Evaluation of symptoms related to rhythm disturbances and/or arrhythmia
- Reporting of heart rate variability
- Evaluation of therapeutic interventions
- Evaluation of atrial fibrillation burden
- Identification of ST segment changes
- Evaluation of QT/QTc intervals
- Assessment of pacemaker function
- Use in research studies and clinical trials

System Description

HScribe is a high-speed, PC-based Holter system with tools to analyze, review, edit, and generate results for Holter ECG data. Used in conjunction with Welch Allyn's H3+™ and H12+™ digital Holter recorders, HScribe provides full-disclosure data for arrhythmia analysis and incorporates Welch Allyn's exclusive VERITAS™ ECG algorithms for superior beat detection, atrial fibrillation detection, ST segment analysis on all recorded leads, and global QT interval computation from acquired Holter ECG data. ECG data from an H3+ or a H12+ media card (based on recorder either secure digital (SD) or compact flash (CF)) is downloaded for analysis to the HScribe. After acquisition, the recorder or media card is erased and prepared for the next recording session using the HScribe application software.

The HScribe system is available as a single workstation system with a centralized exam database that can support networked HScribe Review and HScribe Download workstations; or in a distributed configuration where the database resides on server hardware supporting a number of networked HScribe workstations.

The HScribe review station offers review, editing and reporting capabilities equivalent to the HScribe with the exclusion of the data acquisition feature. Holter ECG recordings are acquired at the HScribe or a networked download station. The HScribe review station can be set up as a Citrix® Application Server for remote access from client computers with Citrix XenApp™ installed.

The HScribe download station supports either recorder or media card data acquisition and erasure, entry of patient information, automatic scanning, and archive to external or network drive. It does not review Holter ECG data. Recordings must be reviewed and edited at any networked HScribe or review station where the final report is also generated.

The Surveyor™ Central system (software versions 3.00 and later) receives 12-lead ECG data from a Welch Allyn digital transmitter. Full-disclosure patient monitoring data can be imported into the HScribe for Holter analysis through the use of the HScribe Surveyor Import application.

H3+ and H12+ Holter recordings can be acquired from a web server when they have been uploaded from a remote location with the Welch Allyn Web Upload option.

Report formats include scan criteria, tabular and narrative report summaries, rhythm profiles, trends of all arrhythmias, QT/QTc and ST segment values, template pages, automatic and operator-selected strips with one, two, three, or twelve-lead ECG, and full disclosure for selected channels. HScribe supports a paperless workflow with user verification and an option for authorized electronic signature.

Multiple recordings with analyses are stored in the HScribe database. Users with the appropriate permissions can import a new recording and review existing analyses.

Long-term storage of full-disclosure patient recordings is accomplished by the archive feature. Archived Holter recordings can be restored to the HScribe database for further analysis, review, report export, and printing.

For security purposes, user access to HScribe is defined by the system administrator allowing the ability to modify patient demographics, report conclusions, diary events and perform Holter ECG data editing. HScribe access is controlled by each user's role (e.g. IT administrator, Clinical Administrator, Physician Reviewer, Holter analyst, etc.) and associated permissions. The HScribe database may also be configured for Windows Encrypted File System (EFS) for protection of patient data security.

An audit trail allowing administrative personnel to query details for user actions and operations is maintained by HScribe.

The HScribe system layouts and contents are customizable for both display and final reporting.

Contact Welch Allyn Technical Support for more information.

Interacting with Windows Environment

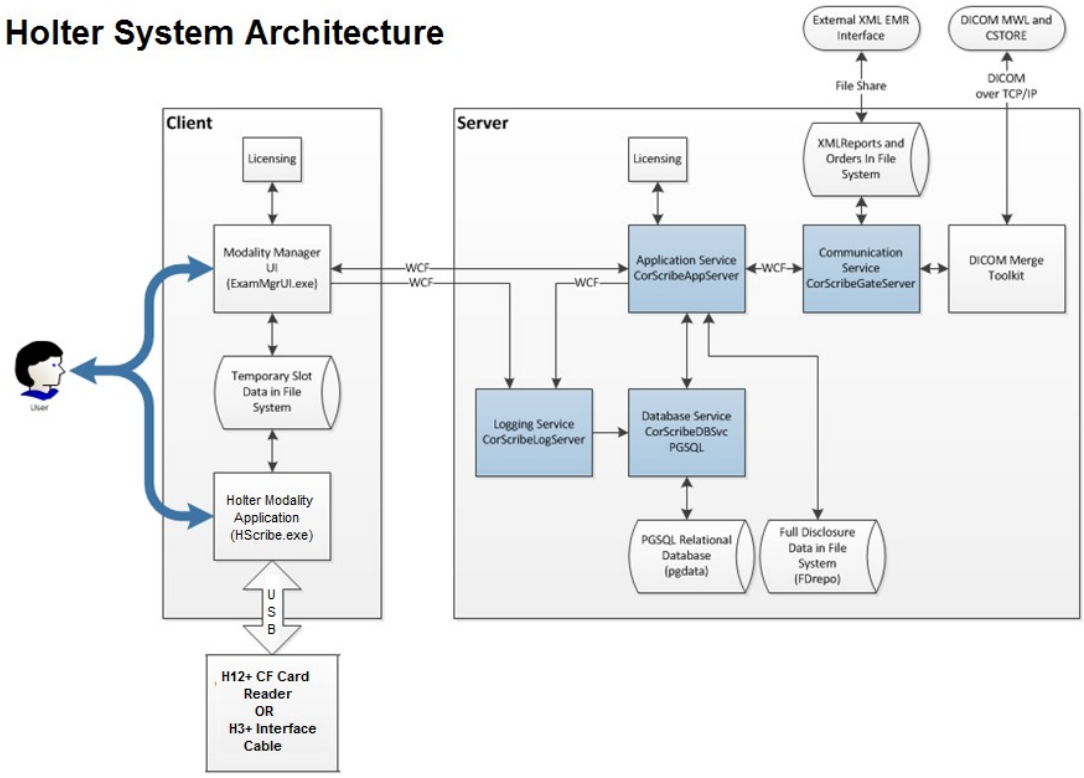
HScribe is based on a Microsoft® Windows® operating system and runs on an industry-standard platform. Conforming to Windows' intuitive "graphical user interface," the HScribe uses the mouse to point, click, and drag data that is displayed on the display. Keyboard entries, called shortcut keys, can also be used in conjunction with the mouse.

Miscellaneous System Information

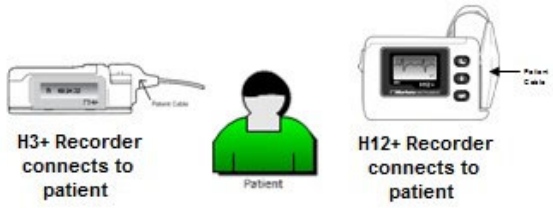
- HScribe is capable of supporting the following video resolutions: 1920 x 1080 and 1920 x 1200.
- HScribe is capable of supporting HP LaserJet printers with 600 dpi and PCL5 capabilities.

***NOTE**: No user-serviceable parts are inside. Any modification to any part of device is to be performed by qualified service personnel only.*

HScribe System Architecture



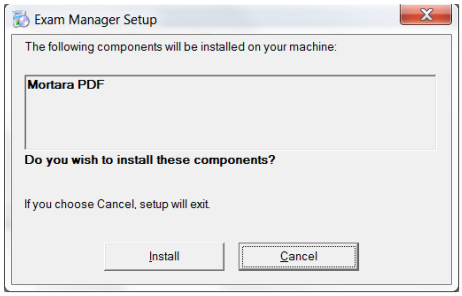
***NOTE**: Holter recorders are applied to the patient in another location. The H3+ Holter recorder is disconnected from the patient cable and attached to the H3+ USB interface cable for data import and recorder preparation. The H12+ recorder media card (based on recorder either secure digital (SD) or compact flash (CF)) is removed from the recorder and then inserted into the media card reader at the system for data import and preparation for the next recording.*



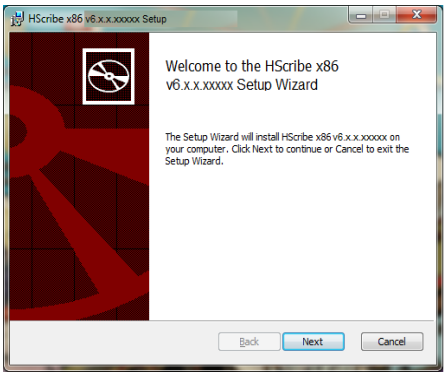
HScribe Software Installation Process

Log in to Windows with an account having Local Administrator privileges. Navigate to the location of the software to be installed and double click on the "Setup" application file. If asked to allow the program to make changes to the computer, click **Yes.**

The Exam Manager Setup window will appear prompting you to install Mortara PDF; click **Install**.

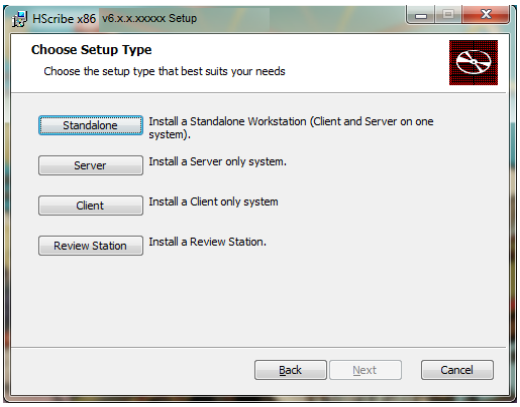


The HScribe x86 Setup window will appear; click **Next** to continue.



***NOTE**: If you are upgrading the system from a previous version, the next step will be omitted.*

Choose the setup type from 4 possible types

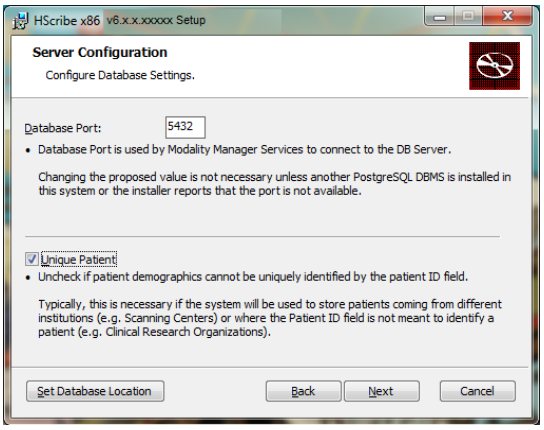


Standalone: Choose the standalone option if you are loading a single HScribe application with the Database Server functionality included on a single computer.

Server: This option allows for installations using multiple networked computers with the Database Server functionality loaded onto a separate computer or a Server hardware platform.

Client: Choose this option if you are loading the HScribe application on a computer that will be networked to the Database Server functionality on a different computer.

Review Station: Choose this option when loading the ability to review exams that are acquired on a networked computer, with the Database Server functionality already loaded onto a separate networked computer.

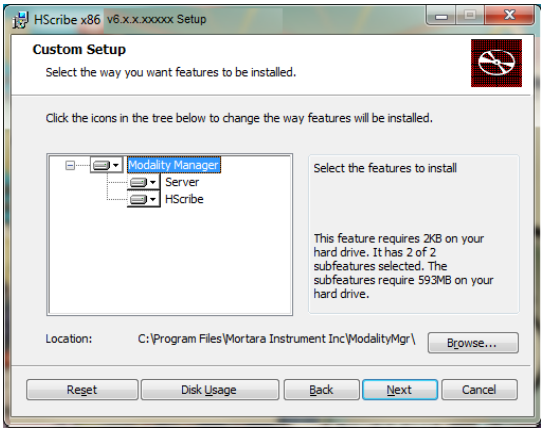


Once **Standalone** is selected, the Server Configuration dialog is displayed.

DB Port: It is recommended that you use the default port number for the installation. If the port is already being used, the installation tool will alert you that the port is already taken and a new port number will need to be entered to continue with the installation.

Unique Patient ID: This option defaults to a YES (checked) condition to configure the system to utilize the Patient ID field as a unique identifier for patient demographic information, which is the most typically used system configuration.

- The option box can be UNCHECKED if the system is to be configured without using the Patient ID field as a unique identifier for patient demographics. This type of configuration is used when patients may be entered from different institutions (such as scanning centers) that use different ID schemes; or instances where the Patient ID field is not used to identify a patient (such as clinical research studies).



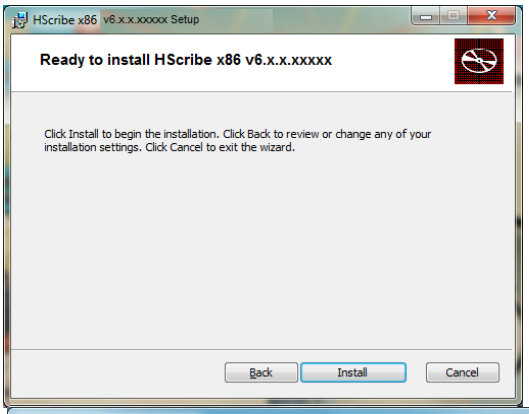
Set Database Location: Selection of this button allows you to Browse to a location for the HScribe application and database other than the local default (C:) directory, beneficial when it is necessary to define the application and database locations on a different data drive.

- This selection allows a preview of Disk Usage to ensure requirements are met.
- The Reset selection will return all changes to default settings.
- Select Next to return to the Server Configuration window to continue the installation steps.
- Select Cancel to exit the installation process.

Click **Next** to continue and then **Install** to begin the installation.

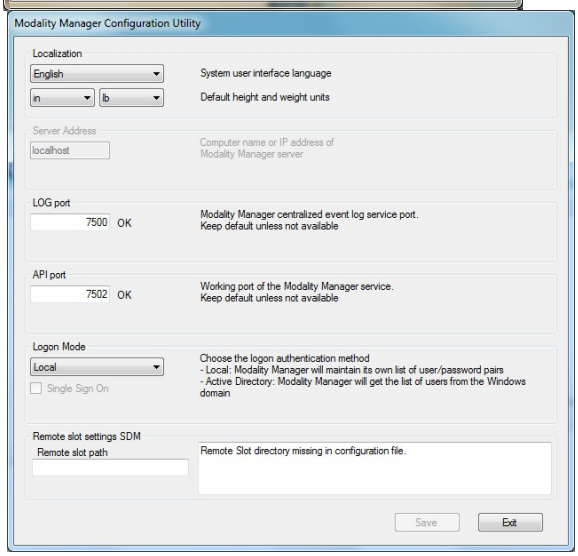
The wizard will now load the software files to the defined location.

Please wait while the setup wizard installs HScribe software.



The Modality Manager Configuration Utility window is presented.

***NOTE**: If any changes are needed, the Modality Manager Configuration Utility can also be accessed after the installation process is completed by selecting the Modality Configuration settings from the Windows START menu → All Programs → Mortara Modality Manager.*



Language: This setting is always available to select the desired language.

Default height and weight units: Choose the desired units from the drop-down menus.

Server Address: This setting is grayed out when the Database Server functionality will be installed on the local PC, but will become an active selection when the modality will be accessing a remote Database Server.

Log Port: This setting is always available to select the port to be used for the event log service. Leave as default if the port is not occupied for other purposes.

API Port: This setting is always available to select the port to be used for Modality Manager Service.

Logon Mode: This setting can be set to either Local or Active Directory depending on the user preference. If Local is selected, the Modality Manager Service will maintain its own local listing of user/password pairs for logging onto the system. If Active Directory is selected, the Modality Manager service will access the list of users from the Windows domain.

The Single Sign On box is grayed out unless the installation is for a "Server Only" installation using Active Directory logon authentication.

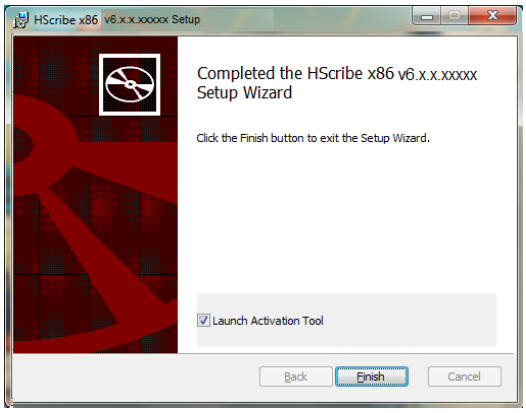
Remote slot settings SDM (Single Directory Management): This setting is only intended for distributed system configurations. Normally, when an exam is active (selected), all data will be copied from the system database to the local client workstation. This method is not typically used but may be desirable for users that will review only.

Once the settings are correct, select **Save** (if you changed anything), then select **Exit** to continue.

If you exit without saving modified settings, a warning message will appear.

Click **Finish** to complete the installation process.

When enabled, the Modality Manager Activation Tool dialog window will be launched for entry of the feature activation code obtained from Welch Allyn. Refer to instructions on the next page.



Feature Activation

An activation code is required to permanently operate full HScribe software functions such as import a recording, access stored exams, schedule patients, review exams, store exams, archive exams, export results and other tasks. Without activation, the system will function for a period of fourteen days and will then become invalid.

To prepare for activation, run the Modality Manager Activation Tool accessed from the following menus:

- Start menu
- All Programs
- Mortara Instrument
- Modality Manager Activation Tool (click **Yes** when prompted to allow changes to the computer)

Once your system serial number is entered, this utility generates the site code that is needed for activation by Welch Allyn Technical Support personnel. You can click on the Copy to Desktop or the Copy to Clipboard button to generate information to be e-mailed to mor_tech.support@hillrom.com.

Welch Allyn Technical Support will return an activation code that can be typed or copied and pasted into the white space above the "Activate License" button. Select the Activate License button to activate the software. You can activate the software at any time after installation with the Modality Manager Activation Tool. Contact Welch Allyn Technical Support personnel for further information.

Starting the HScribe Workstation

The ON/OFF switch is located on the front side of the CPU. When the switch is depressed, the workstation will power on. To turn on the LCD screen, locate the display main switch.

HScribe Login and Main Display

Log in to Windows with an appropriate Local User account.

Note: Roaming or Temporary user accounts are not supported.

If Single Sign On has been configured, log into Windows using a domain account that has been granted permission to use HScribe.

Launch HScribe with a double-click on the HScribe icon.

The HScribe application requires user credentials on startup when the program has not been set up with a single sign on. The default factory Username and Password is admin. The password is case sensitive.

The HScribe Username and Password are entered then the **OK** button is selected to open the application main menu. Some of the icons may be grayed or absent depending on the user permissions and system configuration.

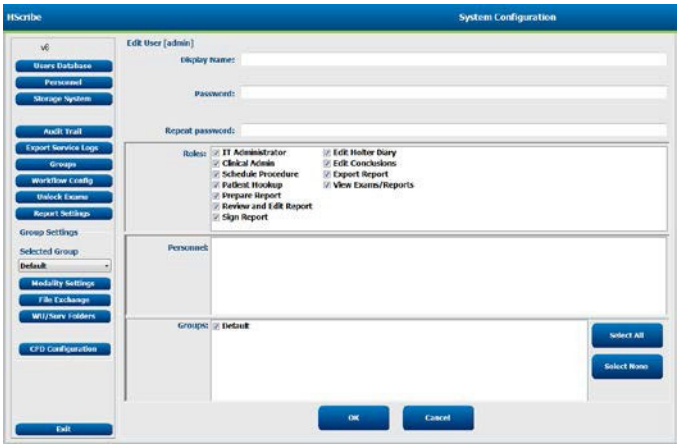
Upon successful login, the application will present a screen similar to the one shown at the right. The user name and software version is shown in the bottom left corner. Click on any of the icons representing workflow to perform a specific task.

Hovering over an icon will display a textual message showing its function. Icons that are not permitted for the logged in user are grayed and unavailable.

The first time you login, you will need to select the **System Configuration** icon to setup your access to all functions.

1. Select the **User's Database** button and you will see the" IT Admin" user. Double-click on the name to open the role privileges and check desired functions.

2. Click **OK** → **Exit** → **Exit** and start up HScribe again. If you don't do this, most all icons are grayed and unavailable.



HScribe Icon Descriptions

Icon and Hover Text	Description
	HScribe desktop shortcut icon to launch the Holter modality application.
MWL/Patients	Opens a window with two selectable tabs. A MWL (Modality Work List) tab allows exam scheduling (when no orders interface exists) and schedule review. A Patients tab allows addition of new patient information and editing of existing patient information.
Prepare Recorder/Card	Use for H3+ recorder or H12+ media card (secure digital (SD) or compact flash (CF)) erasure and preparation for the next exam.
Import Recordings	Opens a window presenting connected devices allowing association of patient demographic data, acquisition of recordings, and recorder/card erasure.
Exam Search	Opens a window allowing users to search for Holter exams or patients in the database using filters.
User Preferences	Opens a window for configuring the user preferences for the Worklist default filters, List Customization, and changing the password.
System Configuration	Opens a window for administrative users to configure the system settings such as creating/modifying users, changing the HScribe default modality settings and defining archive directories, and other tasks.
Exit	Closes the HScribe application and returns the user to the desktop.
	Allows users to Minimize or Exit the application and return to the desktop.

User Roles and Permissions

HScribe supports a workflow oriented setup for defining user roles and controlling user access to the various operations. Role assignments are comprised of a set of permissions for each user type (e.g., IT administrator, clinical administrator, Hookup Tech, and so on).

Each user can be assigned a single role or a combination of roles. Some roles include permissions assigned to other roles where applicable. After installation, a single user is created, with the role of "IT Administrator". Before using HScribe, this user must log in and create other required user assignments.

Roles	Permission Assignment
IT Administrator	Manage user permissions; manage personnel lists; export settings; archive settings; workflow configuration; storage system configuration; unlock exams; view audit trail reports; export service logs; create and modify groups.
Clinical Administrator	Manage database exams (delete, archive, and restore); copy exams offline to share with Welch Allyn personnel or other sites; view audit trail reports; modify modality settings (profiles, protocols, and other Holter specific settings); reconcile; export service logs.
Schedule Procedure	Create new patient orders; associate an order with an existing patient; modify demographics of an existing patient; export service logs. *Scheduling and order entry is only available when HScribe is not linked to an external scheduling system.*
Patient Hookup (Prepare/Import)	Ability to import new recordings using the Import Recordings icon. Includes the ability to create a new patient; associate an order with an existing patient; export service logs.
Edit Holter Diary	Create and modify diary events; export service logs. Must be assigned in conjunction with another role (e.g. Review Report).
View Exams/Reports	Review exams and final reports only. Includes the ability to search exams, view and print reports; export service logs.
Prepare Report	Review and edit exams to move them from an acquired state to the edited state. Includes ability to search exams and view and print reports; export service logs.
Review and Edit Report	Review and edit exams to move them to the reviewed state. Includes ability to search exams and view and print reports; modify and create conclusions; export service logs.
Edit Conclusions	Create and modify conclusions. Includes ability to review exams and final reports only; search exams and view and print reports; export service logs.
Sign Report	Ability to move exams to a signed state. Includes ability to review exams and final reports; search exams and view and print reports; export service logs. May require user authentication.
Export Report	Ability to export a PDF and XML file when features are enabled. Must be assigned in conjunction with another role (e.g. Review, View, or Conclusions).

Refer to *User Role* assignment details.

HScribe Network Operation in a Distributed Configuration

The HScribe network capabilities leverage a common database across multiple networked HScribe workstations where exams will be conducted, HScribe Review stations where acquired exams can be reviewed and edited, and HScribe Download stations where recorders can be prepared and exams acquired.

A distributed configuration is comprised of a dedicated server and a number of networked client HScribe workstations, Download stations, and Review Stations sharing the same database.

A distributed configuration supports efficient operation for a busy Holter scanning department to:

- Create logins for all users at a single location who can log into any networked station.
- Define clinical and system settings at a single location for all networked workstations.
- Manually schedule exam orders, when no orders interface exists, that are available to all Holter workstations regardless of the lab location.
- Access and update Patient Information, Holter exam data, and final reports from multiple locations.
- Start Holter exams utilizing scheduled orders received from the institution information system with a single DICOM or HL7 interface to the shared database. Refer to the Data Exchange section in this user manual for network interface configuration instructions.
- Selectively search the database to review any completed exam's full disclosure data. This includes the ability to edit, sign, print, and export the final report from multiple HScribe client workstations on the network, dependent on the user permissions.
- Manage the stored data for all exams with ability to view audit trails, create groups, configure workflow, troubleshoot issues, and archive/restore/delete exams at a single location according to user permissions.

Microsoft Updates

Welch Allyn recommends that all HScribe workstations and review stations be periodically updated with Microsoft critical and security updates to protect from malware attacks and to fix critical Microsoft software issues. The following guidelines apply for Microsoft updates:

- Customer is responsible for applying Microsoft updates.
- Configure Microsoft updates to be manually applied.
    - Turn automatic Windows update off and run it periodically as a manual action.
- Do not install Microsoft updates during active use of the product.
- Run a functional test after any update which includes conducting a test exam as well as importing an order and exporting results (if activated) before running patient exams.

Each HScribe product release is tested against the cumulative Microsoft updates at the time of product release. There are no known Microsoft update conflicts with the HScribe application. Please contact Welch Allyn Technical support if conflicts are identified.

Anti-Virus Software

Welch Allyn recommends the use of anti-virus (AV) software on computers hosting the HScribe application. The following guidelines apply in the use of AV software:

- Customer is responsible for installation and maintenance of AV software.
- AV software updates (software and definition files) should not be applied during active use of the HScribe application.
    - AV patch updates and system scans should be scheduled for time periods when the system is not actively in use or should be performed manually.
- AV software must be configured to exclude files/folders as defined in *Cautions* in User Safety Information and below:
    - Welch Allyn recommends excluding the HScribe database folder (normally *C:\ProgramData\MiPgSqlData*) from the folders to be scanned.

If a technical support issue is reported, you may be asked to remove the virus scanning software to allow investigation of the issue.

Encrypt Protected Health Information (PHI) Stored in HScribe

The HScribe database may be configured for Windows Encrypted File System (EFS) for protection of patient data security. EFS encrypts individual files with a key stored with the Windows user account. Only the Windows user that encrypts or creates new files in an EFS-enabled folder can decrypt the files. Additional users can be granted access to individual files by the original account that encrypted the files.

> ***NOTE:*** *The HScribe system database must be unencrypted prior to performance of any software upgrades.*

Contact Welch Allyn technical support if your facility requires this security feature.

HScribe Specifications

Feature	Workstation Minimum Specification*
Processor	Performance equivalent to an Intel Core i3-4330
Graphics	1280 x 1024 (1920 x 1080 recommended)
RAM	8 GB
Operating System	Microsoft® Windows® 7 Professional 32-bit or 64-bit; Windows 7 Enterprise 32-bit or 64-bit, Windows 8.1 Professional 64-bit, Windows 8.1 Enterprise 64-bit, Windows 10 Professional 64-bit, Windows 10 Enterprise 64-bit or Windows 10 Enterprise LTSC 64-bit Operating System
Hard Drive Capacity	160 GB
Archive	Network or external USB drive
Input Devices	USB Standard keyboard and 2-button scroll mouse
Software Installation	CD-ROM
Network	100 Mbps connection or better
Printing Devices	HP M604n Laser printer (tested) HP PCL5-compatible printer series (recommended)
USB Ports	2 free USB 2.0 ports

* *Specifications subject to change without notice.*

Feature	Server Minimum Specification*
Processor	Performance equivalent to an Intel Xeon class, Quad-core with hyperthreading
Graphics	1024 x 768
RAM	4 GB
Operating System	Microsoft Windows 2008 or 2012 server R2, 64-bit
System Disk	100 GB for OS and product installation (RAID recommended for data redundancy)
Data Disks	550 GB hard drive space available HD controller with 128 MB read/write cache (RAID recommended for data redundancy)
Archive	Network or external USB drive
Software Installation	CD-ROM
Network	100 Mbps connection or better
Input Devices	Standard keyboard and mouse

* *Specifications subject to change without notice.*

Requirements for HScribe Review Station as a Citrix XenApp

	Requirements*
Client Machines that will run Citrix XenApp	Microsoft® Windows® 7 Professional 64-bit, Windows 7 Enterprise 64-bit, Windows 10 Professional 64-bit, Windows 10 Enterprise 64-bit or Windows 10 Enterprise LTSC 64-bit Operating System Citrix Receiver
	Internet Browser – any that is supported by Citrix
	• Internet Explorer 11 and 10 (HTTP connections only) • Safari 7 • Google Chrome 43 and 42 • Mozilla Firefox 38 and 37
Citrix Domain Controller Server	Citrix XenDesktop Enterprise Edition 7.9
	Any operating system supported by Citrix
Citrix App Servers	Microsoft® Windows® 7 Professional 64-bit, Microsoft Windows 7 Enterprise 64-bit, Windows 10 Professional 64-bit, Windows 10 Enterprise 64-bit or Windows 10 Enterprise LTSC 64-bit Operating System
	Citrix Virtual Delivery Agent 7.9
	HScribe software version 6.2.0 and later

**Requirements subject to change without notice.*

Parts and Accessories

For more information on parts/accessories or to place an order, contact Welch Allyn.

Part Number*	Description
25019-006-60	USB Download Cable for H3+ recordings
9903-013	Media Card Reader (including secure digital (SD) compact flash (CF)) with USB interface for H12+ recordings
H3PLUS-XXX-XXXXX	H3+ Digital Holter Recorder (various configurations)
H12PLUS-XXX-XXXXX	H12+ Digital Holter Recorder (various configurations)
749566	DELL CPU WINDOWS 10 64-BIT
036872-001	External Hard Drive for Archive storage
9900-014	24” Widescreen LCD Display
9907-016	HP LaserJet Network Windows Printer (110V)
6400-012	Cable USB Type A to B Full Speed (for Windows printer connection)
88188-001-50	Welch Allyn Web Upload Software Kit
11054-012-50	Surveyor Import Application for Surveyor Central data import

** Subject to change without notice.*

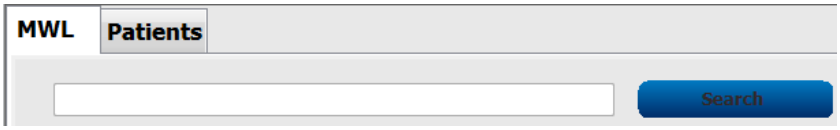
7. MWL/PATIENTS

The MWL/Patients icon allows you to schedule Holter exams and enter patient demographic information.

When the modality is linked to an external scheduling system, this information arrives from institution entered orders.

When the icon is selected, a split window appears with two selectable tabs (MWL and Patients) on the left and Patient or Order Information fields on the right, dependent on the selected tab.

A Search field and button are present below the tab selections.



MWL

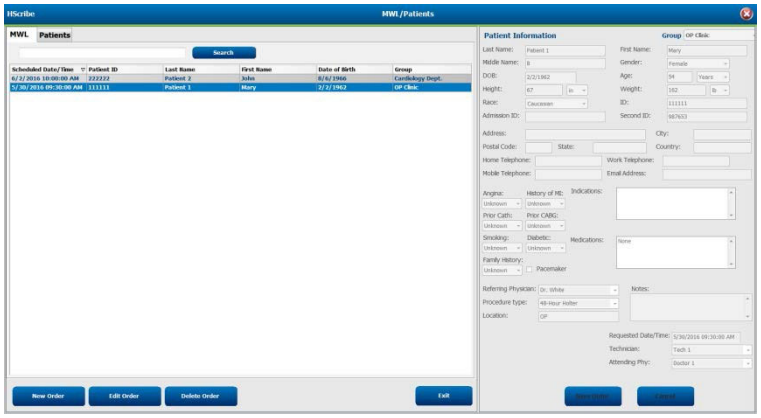
Text that is entered in the search field will be used to search through the Modality Worklist (MWL) to display orders that start with matching text in the Last Name, First Name, or Patient ID. A blank search field will list all orders.

MWL columns include Scheduled Date/Time, Patient ID, Last Name, First Name, Date of Birth, and Group. The list can be sorted by selecting the column headers. A second selection on the same header will reverse the column order.

Edit Order

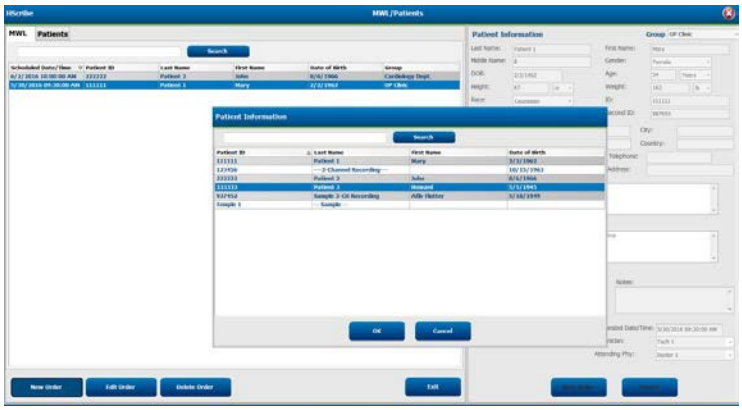
Selection of an entry in the list will display the Order Information as read-only. Select the **Edit** buttons to modify the order. Select the **Save Order** button to save changes or **Cancel** to cancel all changes.

NOTE: *This function is not available when the DICOM feature is enabled. All orders will arrive from the institution information system.*



New Order

A **New Order** button allows a Patient ID or name search of patient information in the database allowing addition of a new order in the MWL list. A blank search field will list all patients in the database.



The list can be sorted by selection of the column header

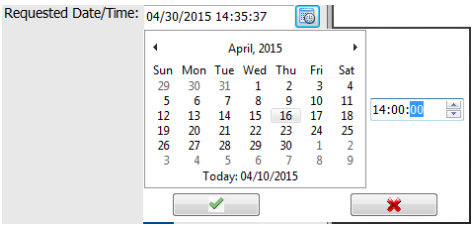
NOTE: *This function is not available when the DICOM feature is enabled. All orders will arrive from the institution information system.*

When the patient does not already exist in the database, **Cancel** the Patient Information search and select the **Patients** tab to enter a new patient. Instructions are on the following page.

The patient information populates the Order Information at the right of the display. Additional order information can be entered and the order saved. The **Cancel** button will close the order without saving.

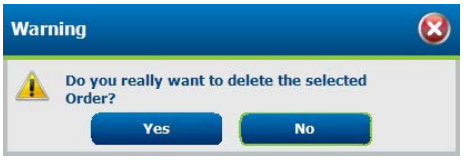
When entering an order, use the **Group** drop-down list to assign the order to a specific group that has been configured in the system settings.

Select the calendar icon in the bottom right corner of the **Order Information** section to open a calendar for selection of the scheduled order date and time. Date and time may also be entered by typing in the **Requested Date/Time** field.



Delete an Existing Order

Select an existing patient order by highlighting the line and then select **Delete Order**.



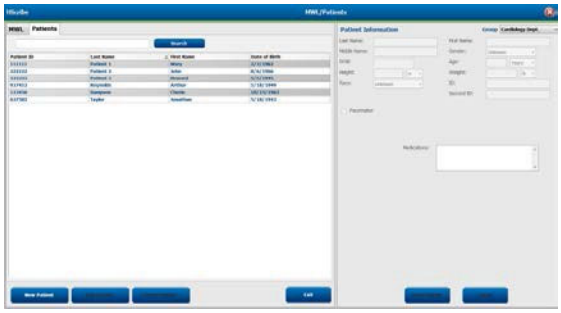
A warning message prompting delete confirmation will appear. Select **Yes** to delete the order or **No** to cancel and return to the MWL listing.

Exit MWL/Patients

Select the **Exit** button when finished to return to the main menu.

Patients

Text that is entered in the search field will be used to search through the patient demographics in the database to display any patients that start with matching text in the Last Name, First Name, or Patient ID.



Patients' columns include Patient ID, Last Name, First Name, and Date of Birth. The list can be sorted by selecting the column headers. A second selection on the same header will reverse the column order.

Edit Patient

Selection of an entry in the list will display the Patient Information as read-only. Select the **Edit** button to enable and modify the patient demographics fields. Enabling the Pacemaker checkbox will turn on pacemaker detection when the recording is imported and analyzed.

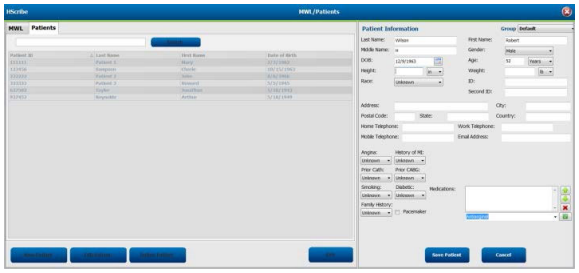
> ***NOTE**: Recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected.*

Select the **Save Patient** button when finished to save changes or the **Cancel** button to return to read-only demographics without saving changes.

New Patient

A **New Patient** button clears any selected patient information allowing addition of a new patient in the list. The new patient information can be entered in the demographic fields and the **Save Patient** button selected to save it to the database. The **Cancel** button will close the patient information without saving.

***NOTE:** Available demographic fields are dependent on the CFD Configuration (Long, Intermediate, or Short) selection in Modality Settings.*

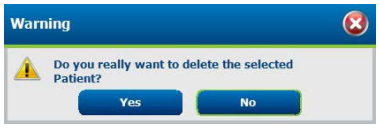


Delete Patient

Select the **Delete** button to remove patient demographics from the database.

> ***NOTE**: The Delete button is disabled when the patient demographics are associated with an existing order or exam. All orders and exams for that patient must first be deleted before the patient demographics can be deleted.*

A warning message prompting delete confirmation will appear. Select **Yes** to delete the patient demographics or **No** to cancel and return to the Patients listing.



Exit MWL/Patients

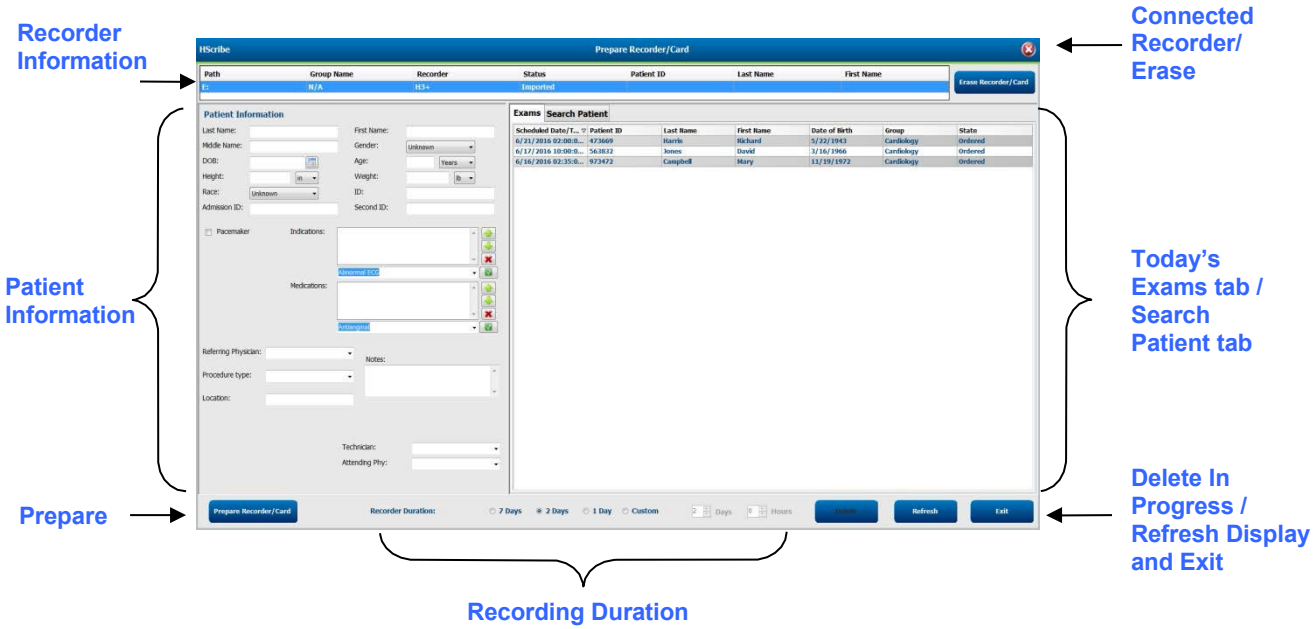
Select the **Exit** button when finished to return to the main menu.

8. HOLTER RECORDER PREPARATION

Prepare Recorder/Card

Select the **Prepare Recorder/Card** icon to open the window. The window is divided into five portions.

1. Connected recorder information with the status and the **Erase Recorder/Card** selection in the top portion
    - Path represents the drive connection
    - Group Name represents the group selected with the patient demographics
    - Recorder type
    - Status
        - Erased = no data exists on recorder/card
        - Prepared = patient demographics have been written to recorder/card
        - Completed = recording is complete but not imported
        - Imported = recording has been imported
    - Patient ID
    - Last Name
    - First Name
2. **Patient Information** in the left-middle portion
3. **Exams** tab and **Search Patient** tab in the right-middle portion
4. **Prepare Recorder/Card** selection with customizable **Recorder Duration** in the lower-left portion
5. **Erase Recorder/Card** selection and **Exit** in the lower-right portion



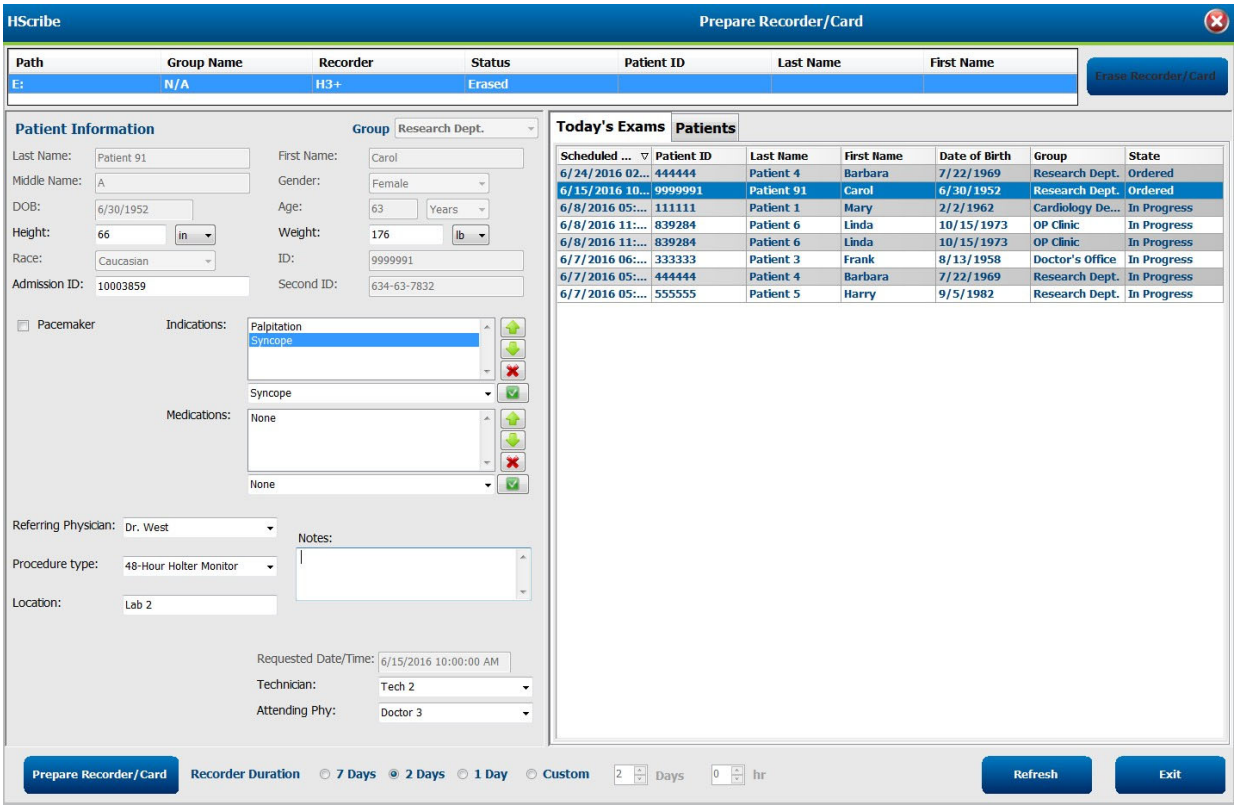
The **Recording Duration** selection represents the H3+ recorder set duration. It also allows you to define the number of days and hours that will be recorded prior to an automatic stop when preparing the H3+ Holter recorder. The Recording Duration selections are not available when preparing an H12+ media card.

The **Delete** button in the bottom right area of this window allows you to delete an Exam with an "In Progress" status when the exam has been cancelled after preparing the recorder.

Existing Order

To complete an order for the selected recorder/card, click on **Prepare Recorder/Card**. If the recording has not been erased, a warning prompt will ask if you want to proceed. Select **Yes** to erase the recorder and proceed, or **No** to cancel.

When the recorder/card status is Erased, select an order from the Exams list and the Patient Information fields will be populated with available information. Additional information may be added in the available Patient Information fields. Unavailable fields with patient information can only be updated in the MWL/Patients dialog.



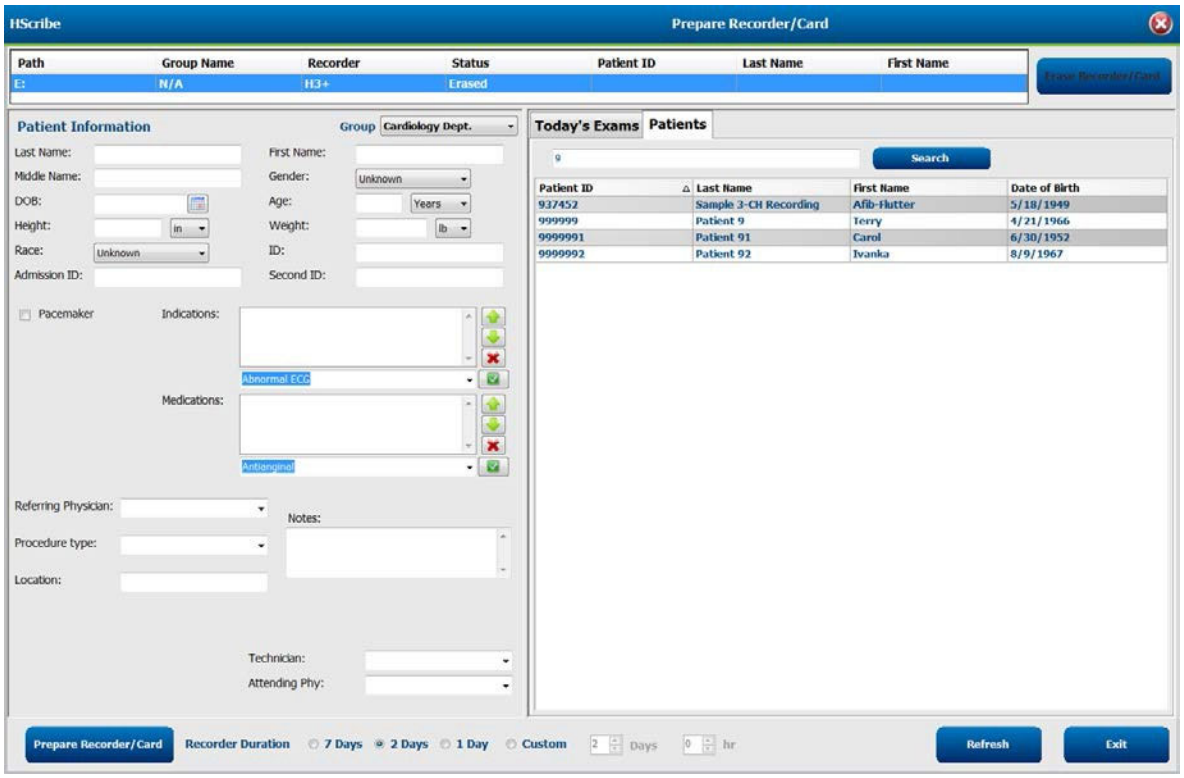
When preparing an H3+ v3.0.0 or later H3+ Holter recorder, you may set the recording duration to 7 Days, 2 Days, 1 Day, or any Custom number of days and hours up to 7 days. Once the H3+ recorder duration is set, it will remain programmed to this set duration until changed in the lower left portion of this window.

> ***NOTE**: Always ensure that the Recorder Duration is set appropriately when preparing the recorder/card.*

When finished, click on **Prepare Recorder/Card** and the recorder status will show Prepared. Disconnect the recorder or media card from HScribe, as it is now ready for patient preparation and hookup.

No Existing Order

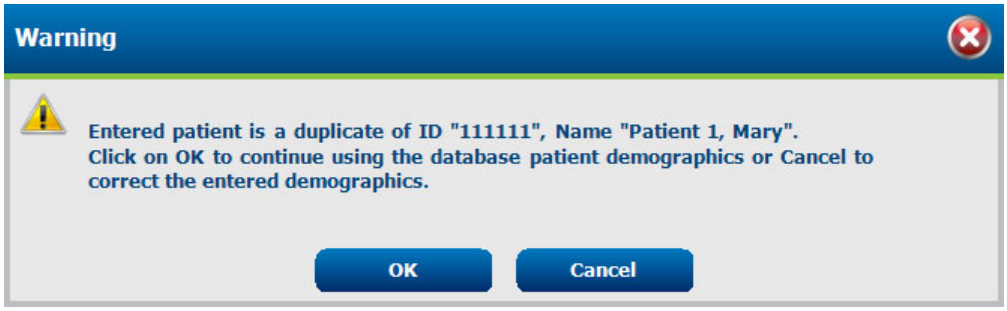
When no scheduled order exists, the Patients tab is automatically selected.



1. Search for existing patients in the database by entering a name or ID number, and then select the **Search** button. When the patient is found, click on it and information is populated in the left panel.

2. When the patient is not found, enter any desired patient and exam information on the left panel.

***WARNING**: If the entered patient ID matches an existing patient ID in the patient database, a warning message prompts you to click on **OK** to continue using the existing database patient demographics or **Cancel** to correct the entered demographics.*



Enter date of birth by typing MM/DD/YY or DD-MM-YY according to the computer regional settings, or by clicking on the calendar icon. Select the decade and the year; use the left/right arrows to scroll the year, the month, and the day to populate the field. Age will be automatically calculated.

3. Additional information may be added in the available Patient Information fields.

   HScribe will remember list items such as Indications, Medications, Procedure Type, and Referring Physician as they are entered. The added items will be available for future selection. Enter text or choose items from the drop-down menu and then click on the green checkmark to enter. Use the red **X** to delete a selected item. When there are multiple entries, items can be moved up or down by using the green arrow keys.

   Some fields are not available (grayed) when patient demographics are attached to existing exams in the database. Unavailable fields with patient information can only be updated in the MWL/Patients dialog

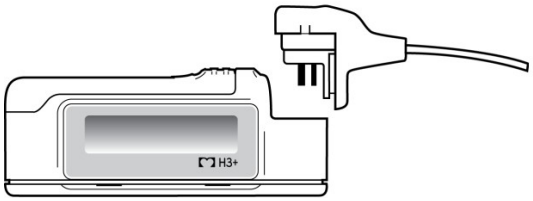
4. When finished, click on **Prepare Recorder/Card** and the recorder status will show Prepared. Disconnect the H3+ recorder from the USB interface cable or H12+ media card from the media card reader and proceed with patient hookup and recording.

   ***NOTE**: Always ensure that the Recorder Duration is set appropriately when preparing the recorder/card.*

The following Recording Duration sections are not available when preparing an H12+ media card.

H3+ Digital Holter Recorder Preparation

The H3+ records three channels of continuous ECG data over a period of one or more days. Refer to the device user manual, part number 9515-165-50-XXX, for detailed instructions about recorder operation.



Erasing H3+ Recorder Patient Data

Before a new patient recording can begin, previous data must be erased from the H3+. Remove the AAA battery from the H3+. Remove the patient cable and insert the USB interface cable connector into the recorder's input connector. A tone sounds indicating that the HScribe has detected the recorder. The recorder LCD will show "USB" indicating a powered connection.

The button at the top right of the Prepare Recorder/Card window allows you to **Erase Recorder/Card**. A warning will appear when attempting to erase a recording to ensure recordings are not prematurely erased.

H3+ Recorder Preparation

Select the patient name from the Exams list to enter the patient information prior to starting a new patient recording, or select the Patients window to search for existing patient demographics, or enter the demographics directly into Patient Information fields in the left portion of the display.

The time and date are set according to the HScribe computer regional settings when the data is written to the recorder.

If an H3+ recording has not been erased, a warning prompt will ask if you want to proceed. Select **Yes** to erase the recording and proceed, or **No** to cancel.

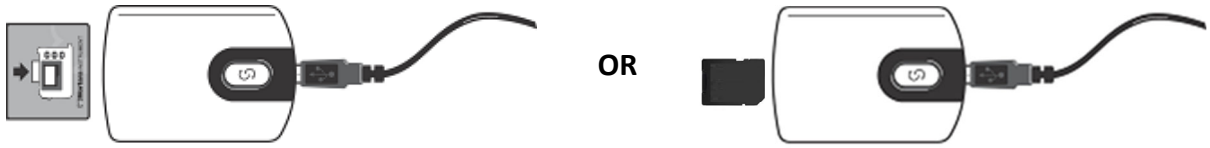
Select **Prepare Recorder/Card** to write the demographics to the recorder or **Cancel** to exit this window without saving changes.

> ***NOTE***: *Always ensure that the Recorder Duration is set appropriately when preparing the recorder/card.*

The H3+ recorder status will change to Prepared and the Exams list will show an In Progress status. Disconnect the H3+ recorder from the USB interface cable and proceed with patient hookup and recording.

Media Card (for the H12+ Digital Holter Recorder) Preparation

The H12+ records 12-lead ECG data continuously for up to 48 hours onto a H12+ media card (based on recorder either secure digital (SD) or compact flash (CF)). The H12+ is capable of acquiring digital waveforms at 180 or 1,000 samples per second per channel depending on the type of media card used. Refer to the H12+ Holter recorder device user manual for detailed instructions about recorder operation.



Erasing H12+ Media Card Patient Data

Before a new patient recording can begin, previous data must be erased from the media card. Insert the H12+ media card into the HScribe media card reader.

The button at the top right of the Prepare Recorder/Card window allows you to **Erase Recorder/Card**. A warning will appear when attempting to erase a recording to ensure recordings are not prematurely erased.

H12+ Media Card Preparation

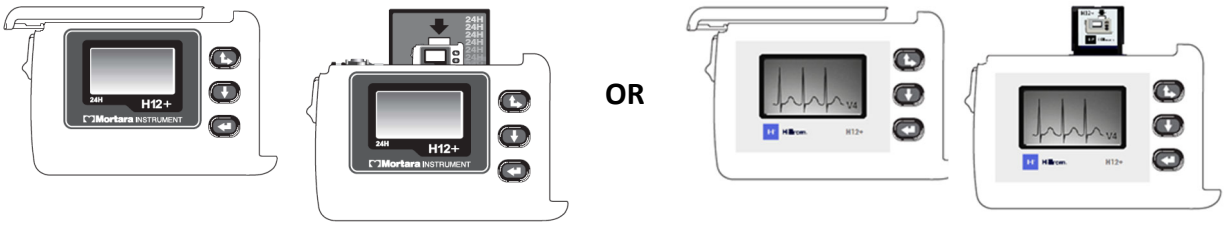
Select the patient name from the Exams list to enter the patient information prior to starting a new patient recording, or select the Patients window to search for existing patient demographics, or enter the demographics directly into Patient Information fields in the left portion of the display.

If an H12+ recording has not been erased, a warning prompt will ask if you want to proceed. Select **Yes** to erase the recording and proceed, or **No** to cancel.

Select **Prepare Recorder/Card** to write the demographics to the media card or **Cancel** to exit this window without saving changes.

The H12+ recorder status will change to Prepared and the exam listing will show an In Progress status.

Disconnect the H12+ media card from the media card reader and proceed with patient hookup and recording.



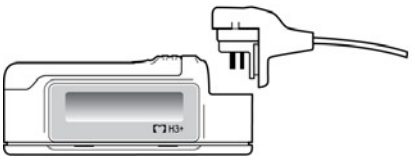
9. HOLTER DATA IMPORT

Import H3+ and H12+ Media Card Recordings

Import H3+ Recordings

The H3+ records three channels of continuous ECG data over a period of one or more days.

Remove the AAA battery from the H3+. Remove the patient cable and insert the USB interface cable connector into the recorder's input connector. A tone sounds indicating that the HScribe has detected the recorder. The recorder LCD will show "USB" indicating a powered connection.



Import H12+ Media Card Recordings

The H12+ records 12-lead ECG data continuously for up to 48 hours onto a media card (based on recorder either secure digital (SD) or compact flash (CF)). The H12+ is capable of acquiring digital waveforms at 180 or 1,000 samples per second per channel depending on the type of media card used.

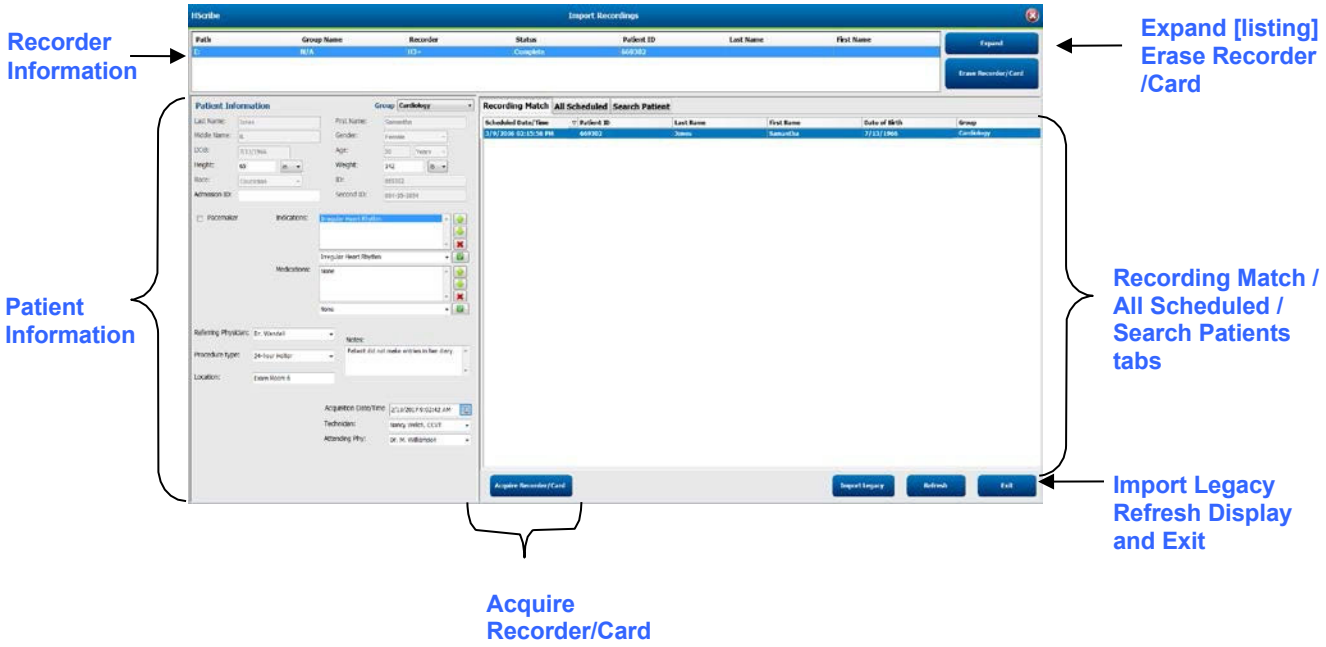
Remove the media card from the H12+ recorder and insert it into the HScribe media card reader.

OR

Import Recordings

Select the **Import Recordings** icon to open the window. The window is divided into four portions.

1. Available recorder information with the recording status and two button selections in the top portion
2. Patient Information in the left-lower portion of the window with ability to change acquisition date/time
3. Recording Match, All Scheduled, and Search Patient tabs in the right portion of the window
4. Button selections to Acquire recordings, Import Legacy (H-Scribe version 4.xx data) recordings, Refresh the display, and Exit



Recorder Information

- Path represents the drive connection
- Group Name represents the group selected with the patient demographics
- Recorder type
- Status
  - Erased = no data exists on recorder/card
  - Prepared = patient demographics have been written to recorder/card
  - Completed = recording is complete but not imported
  - Imported = recording has been imported
- Patient ID
- Last Name
- First Name

Expand button

This selection is useful when importing recordings from multiple sources such as recordings residing at the institution web server obtained from the Welch Allyn Web Upload option or Surveyor Central patient monitoring data with the Surveyor Import option, all ready for import at HScribe.

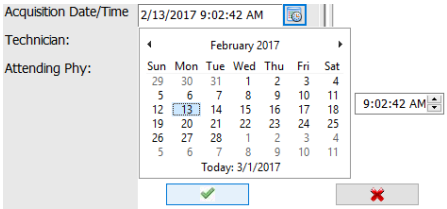
1. Select the Expand button
2. Click to highlight the desired recording for import
3. Select Collapse to return to the Import Recordings window with the desired recording selected

Erase Recorder/Card button

This selection is used to erase the connected H3+ Holter recorder or H12+ media card.

Patient Information

Fields can be manually populated for the selected recorder or automatically populated when there is a Recording Match, by selecting a scheduled order, or through selection of an existing searched patient. When importing a recording where date/time needs change, enter the correct time/date or use the calendar tool to modify. Update will occur when Acquire Recorder/Card button is selected.



Tab Selections

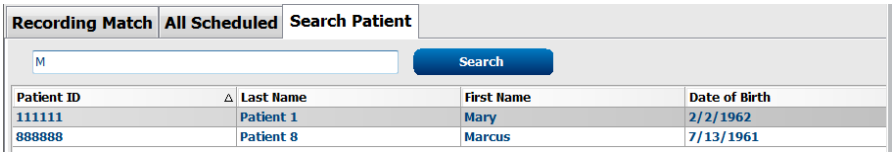
- **Recording Match** tab is automatically selected upon entry when the recorder has been prepared prior to starting the recording session
- **All Scheduled** tab is automatically selected upon entry when no match exists and there are available scheduled orders
- **Search Patient** tab is automatically selected when no recording match or scheduled orders exist.

Recording Match

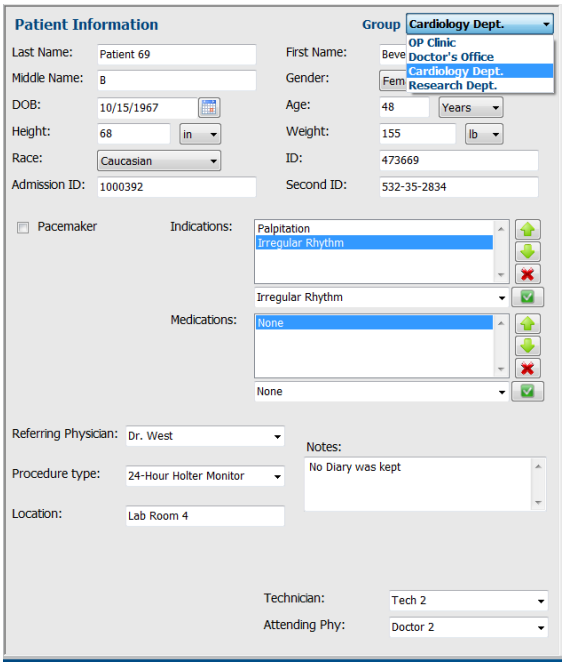
When there is a match with the selected recording, click on the **Acquire Recorder/Card** button. A warning prompt will ask if you want to associate the exam with the selected patient. Select **Yes** to proceed, or **No** to cancel.

No Matched Order

When no recording match or scheduled order exists, the Search Patient tab automatically opens. Search for existing patients in the database by entering a name or ID number, and then select the Search button. When the patient is found, click on it and information is populated in the left panel.



If no match is found, enter patient information into the left portion of the display. A single group may be used for all recordings. In that case, the Group selection is not present. When more than one Group has been configured by the administrator, use the Group drop-down menu to choose the desired group name.

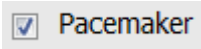


Enter date of birth by typing MM/DD/YY or DD-MM-YY according to the computer regional settings, or by clicking on the calendar icon. Select the decade and the year; use the left/right arrows to scroll the year, the month, and the day to populate the field. Age will be automatically calculated.

List items such as Indications, Medications, Procedure Type, Referring Physician, Technician, and Analyst will be available for future selection after they are entered the first time.

Enter text or choose items from the drop-down menu and then click on the green checkmark to enter. Use the red X to delete the selected item. When there are multiple entries, items can be moved up or down by using the green arrow keys.

Enabling the Pacemaker checkbox will cause HScribe to perform pacemaker analysis through pace spike detection.



***NOTE**: Recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected.*

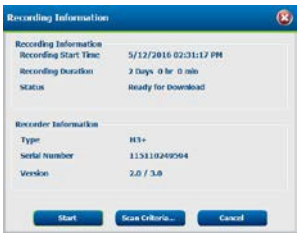
Some fields are not available (grayed) when patient demographics are attached to existing exams in the database or are ordered by an external system.

Acquisition Date/Time, Date Processed, Recording Duration, Recorder [serial] Number, and Recorder (type) are automatically populated when the recording is imported.

Click on the **Acquire Recorder/Card** button. A warning prompt will ask if you want to associate the exam with the selected patient. Select **Yes** to proceed and the Recording Information window is then displayed.

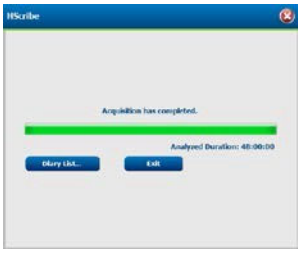
Start Import

There are three button selections on the Recording Information screen.



1. **Start** begins Holter data acquisition and processing.

   - *Acquiring Recording* initially displays, followed by *Preparing Recording*, followed by *Acquisition has completed.* There are two button selections in this window.
     - Diary List… allows you to add a new diary event, edit a diary event time and description, and delete a diary event. Select **OK** to save or **Cancel** to exit this window without saving changes.



   - Exit will close the window and open the HScribe analyzed results if the user has appropriate permissions. An Acquiring Recording… message is displayed prior to opening the results.

2. **Scan Criteria** opens the settings window and adjusts thresholds for this recording only. Default settings defined by the System Administrator will apply to all other recordings unless changed on an individual basis.

Analysis Duration From Recording Start allows the recording duration to be set in days, hours, and minutes for less than the full recording duration.

When the analysis duration is changed, a warning message appears prompting you Continue or Cancel.

- SVPB Prematurity %
  - Pause in msec
- ST Segment Depression in µV
- ST Segment Elevation in µV
  - Tachycardia BPM
  - Bradycardia BPM
- Minimum Tachy/Brady duration in hours, minutes, and seconds
- Ventricular Tachycardia BPM and number of consecutive beats
- Supraventricular Tachycardia BPM and number of consecutive beats
- Pause
  - All Beats
  - Normal to Normal Only
- Automatically Detect Atrial Fibrillation
- Store Raw ECG Samples (disable for research purposes only)
- Enable Supraventricular Template Group
- Exclude Pause from HR
- Heart Rate Variability
  - Normal (only)
  - Normal and Supraventricular
- HR
  - All Beats

- Normal Only
- Exclude Pause from HR

o Pacemaker

- Pacemaker Analysis (enable/disable)
- Pacemaker Minimal Rate

3. **Cancel** closes the Recording Information window and cancels acquisition and processing.

Import Web Upload Recordings

Click on the desired patient data in the Recording List.

Click to highlight the desired recording in the recording list and the existing demographics attached to the recording will appear in the Patient Information section. The Expand button can be used to view a long list of recordings.

Click **Acquire Recorder/Card** when demographic information is complete and follow the *Start Import* instructions in this section. Once imported, the recording is automatically removed from the web server.

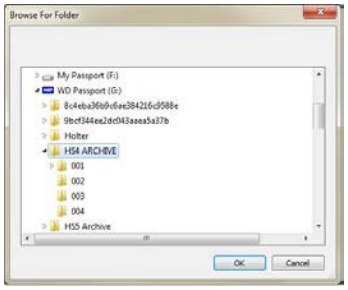
Import Surveyor Central Recordings

Click on the desired patient data in the Recording List.

Click to highlight the desired recording in the recording list and the existing demographics attached to the recording will appear in the Patient Information section. The Expand button can be used to see a long list of recordings.

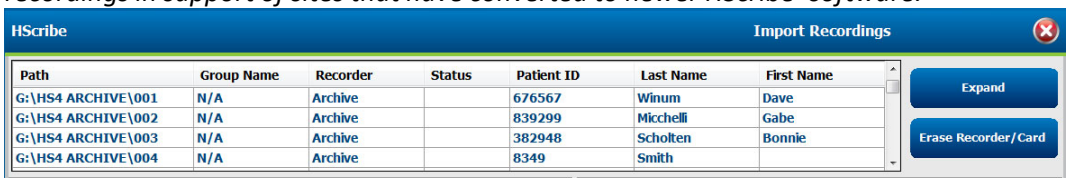
Click **Acquire Recorder/Card** when demographic information is complete and follow the *Start Import* instructions in this section. Once imported, the recording is automatically removed from the Surveyor data directory unless it is from write-protected media.

Import Legacy Recordings



Click on **Import Legacy** and browse to the directory where the legacy recordings are stored. Once the main directory is selected, all recordings at that location are shown in the Recording List.

***NOTE**: This feature is only available for legacy H-Scribe version 4.xx recordings in support of sites that have converted to newer HScribe software.*



Click to highlight the desired recording in the recording list and the existing demographics attached to the recording will appear in the Patient Information section.

Click **Acquire Recorder/Card** when demographic information is complete and follow the *Start Import* instructions in this section.

10. HOLTER ANALYSIS

Reviewing Holter Recordings

HScribe supports both retrospective and prospective review modes, as well as automatic strip generation for a quick review of significant Holter ECG events.

The workflow for the three modes is different, but important similarities exist. The difference is evident where ECG events are reviewed, edited, and selected for inclusion in a system-generated final report.

Typical Workflow			
1. Prepare recorder			
2. Patient preparation and hookup			
3. Holter recording period			
4. Import of data at HScribe			
5. Pre-analysis scan			
6. **Analyst review & editing**	**Rapid Review with Automatic Strips**	**Retrospective Review & Editing**	**Prospective Scan Review & Editing**
	• Generate Automatic Strips • ECG review and editing as needed • Final report preparation	• Templates • ECG strip selection using review of ▪ Profile ▪ Histogram ▪ Trends ▪ Superimposition • Generate manual or automatic strips • Strips review during final report preparation	• Prospective (tab) review • Set stop-event criteria • ECG review and strip selection during superimposition/page mode scanning • ECG strip selection using ▪ Profile review ▪ Histogram review ▪ Trend review • Generate manual or automatic strips • Strip review during final report preparation
7. Physician summary review and sign off			
8. Report generation and export			

During review, the user must make certain that specific criteria such as Pause-Length, ST Segment Elevation and Depression, Tachycardia/Bradycardia thresholds, and Supraventricular Prematurity Percent (%) are appropriate for the individual recording. During the review steps, decisions made by HScribe are verified.

Refer to the last section in this manual named Basic Steps as a quick reference to guide you through each review mode.

Scan Criteria

The following criteria are defined by default. Thresholds can be changed as needed on a per-recording basis. Select **Scan Criteria** in the Recording Information screen when preparing to scan a recording, or select **Edit** from the tool bar menu and then select Scan Criteria to open the settings window.

- SVPB Prematurity %
- Pause duration in milliseconds
- ST segment depression in microvolts
- ST segment elevation in microvolts
- Tachycardia beats per minute
- Bradycardia beats per minute
- Minimum Tachycardia/Bradycardia duration in hours, minutes and seconds
- Ventricular tachycardia beats per minute and number of consecutive beats
- Supraventricular tachycardia beats per minute and number of consecutive beats
- Pause duration threshold used for all beats or only normal to normal beats
- Automatically detect atrial fibrillation
- Store Raw ECG Samples (enabled as default; only disabled for specific research purposes)
- Enable Supraventricular Template Group
- Heart Rate Variability computation to use only normal beats or normal and supraventricular beats
- Heart Rate calculated on all beats or only normal beats
- Heart Rate calculation to include or exclude pauses
- Pacemaker analysis enabled or disabled and the pacemaker rate in beats per minute

  ***NOTE**: Recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected.*

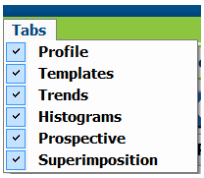
After verifying the correct patient information is attached to the recording and appropriate scan criteria are set, proceed with review and editing to prepare the Holter results.

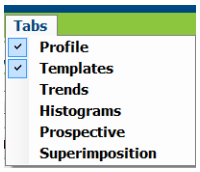
Review and Edit Recording

Upon completion of Holter data import and processing, or when an already acquired recording is opened, the Profile initially displays. Review and editing of the recording can now proceed according to user preference. Each display type is selected by clicking on its respective tab.

The Profile, Templates, Trends, Superimposition and Histogram tabs can display in a split view with the ECG tab and context view. The Prospective tab always displays in a split view and the context view can be enabled or disabled. Each tab is detailed on the following pages, though not necessarily in the order they are used.

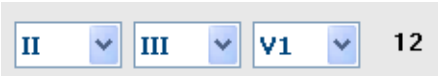
Tabs can be hidden through selection of Tabs in the tool bar by removing the checks with the exclusion of Strips, ECG, and Summary. The set selections are saved with the current exam.

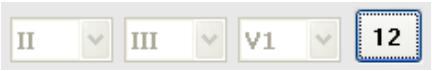




ECG Tab

The ECG tab displays the ECG waveform and events. 1, 2, 3, or 12-leads are selectable and can display depending on recorder type. Select leads by using the **Leads** selections on the toolbar.





NOTE: Lead selections are dependent on the recorder type. The 12-lead icon selection is not available when an H3+ digital Holter recorder was used.

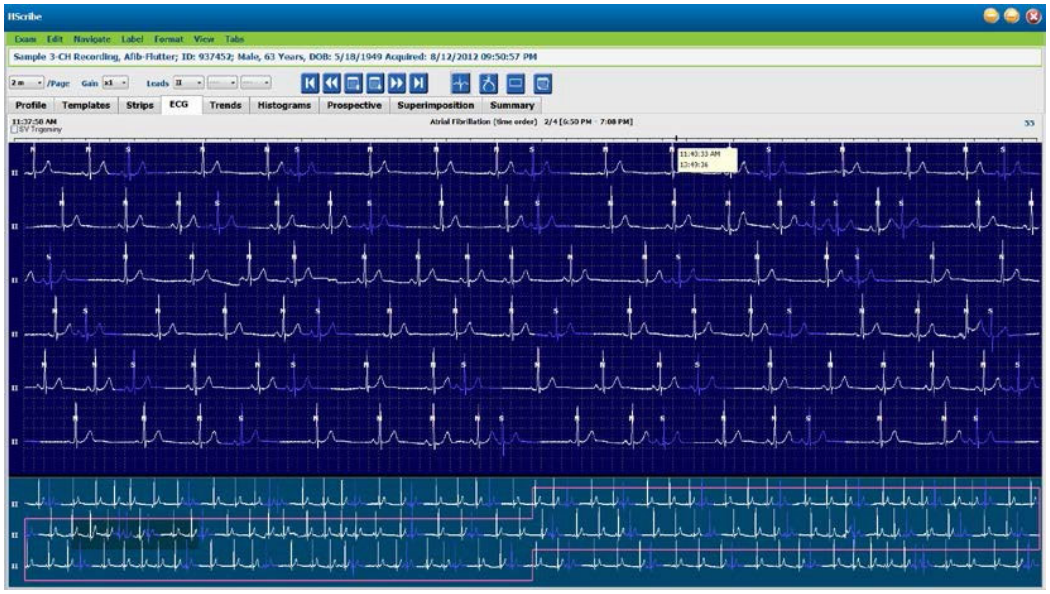
Other menu items are available from the tool bar, pull-down menus, or shortcut keys as shown below:

Menu Item	Settings	Menu Select Location	Shortcut Keys
Grid	Enable or disable; display depends on duration displayed	Format pull down	Ctrl+G
Text Beat Labels	Enable or disable; display depends on duration displayed	Format pull down	Ctrl+T
Dark Background	Enable or white background when disabled	Format pull down	Ctrl+D
Split Window (Right)	Enable or disable	View pull down	Ctrl+S
Split Window (Bottom)	Enable or disable	View pull down	Ctrl+Shift+S
Context	Enable or disable	View pull down	Alt+C
Select Context Lead	When Context is enabled, allows selection of any recorded lead	View pull down	
Duration/Page	5-seconds to 30-minutes depending on number of displayed leads	Toolbar, Format pull-down Zoom In/Out, or mouse wheel	NumLock+ NumLock-
Gain	x½, x1, x2, x4	Toolbar	
Enhance Pacemaker Spike	Enable or disable	Format pull down	Ctrl+E

Each beat is color coded to assist with a quick review.

ECG Color	ECG Color Name	Label	Text Beat Label
	Black/White	Normal	N
	Bright Blue	Supraventricular	S
	Turquoise	Bundle Branch Block	B
	Aqua	Aberrant	T
	Bright Red	Ventricular	V
	Salmon	R on T	R
	Tangerine	Interpolated	I
	Bright Orange	Ventricular Escape	E
	Bright Pink	Atrial Paced	C
	Chartreuse	Ventricular Paced	P
	Golden Yellow	Dual Paced	D
	Brown	Fusion	F
	Dark Orange	Unknown	U

An ECG time bar with 15-minute interval tick marks is proportional to the recording duration and indicates the current time of the ECG view. Hovering will show the time and date. Left click anywhere in the time bar to navigate to that time point.



Context View

The Context view provides a single-lead detailed view of the beats surrounding the ECG display focal point. A pink rectangle indicates the time range of the data in the ECG view. A right click in the Context view will center that point in the ECG view. Each waveform row is 60 seconds in duration.

Strips that have been added to the final report will appear shaded in the Context view.

Split Screen View

The Split Screen view provides simultaneous viewing of ECG display together with Profile, Trends, Superimposition, Templates, and Histograms. Split Screen is always active within the Prospective tab.

Print Screen

To print the displayed ECG data, click on **Print Screen** in the Exam pull-down menu, or press **CTRL+P** on the keyboard. The displayed ECG leads will print with the time, patient name, ID#, and heart rate at the top of the printed page.

Beat Tool

Use the Beat tool to select a single beat or a group of beats. Select multiple beats by dragging the cursor across the beats to be selected. Consecutive beats can also be selected by clicking on the first beat and then Shift+clicking on the last beat. Select multiple, non-consecutive beats by pressing Ctrl+click.

Double click on a beat to display the template it belongs to.

Re-label selected beats by right clicking and selecting a new label from the context menu or with their shortcut keys.

Delete selected beats by right clicking and selecting **Delete Beat(s)** from the Context menu or by using the Delete key.

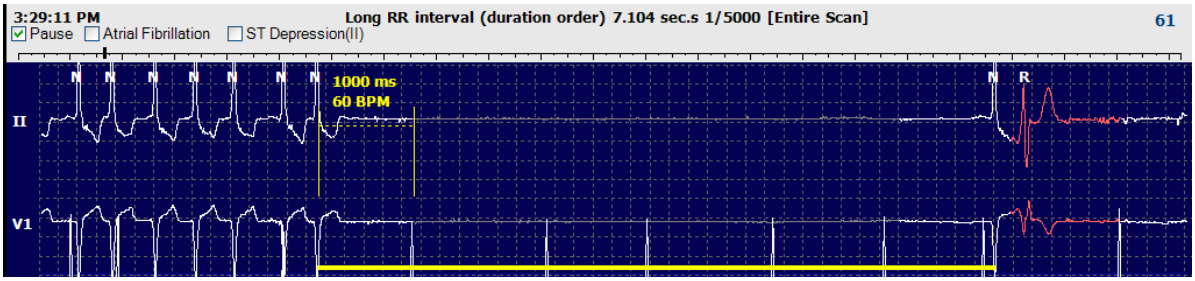
Insert new beat labels by positioning the cursor at the insertion point in the ECG. Right click and select Insert Beat from the Context menu. A prompt appears for the new beat label. The cursor must be more than 100 ms from a beat label or the Insert Beat selection does not appear in the Context menu.

A left click on **Move to Center** in the Context menu redraws the display with the time point of the current mouse position at the center of the display.

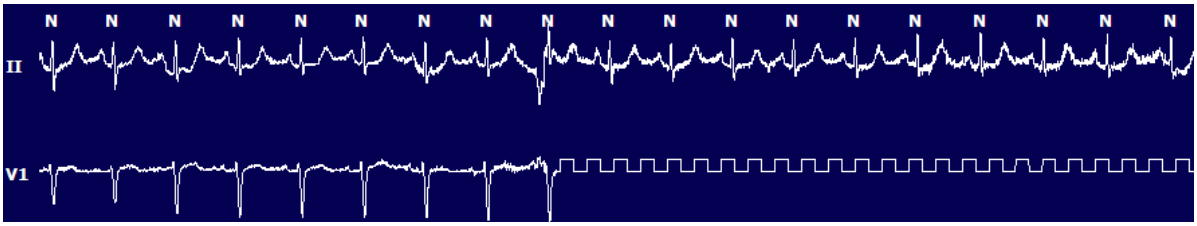
A beat manually labeled as Artifact can be reverted back and forth to its original label by alternately applying the Artifact label.

BEAT LABEL CONTEXT MENU				
ECG Color	ECG Color Name	Label	Shortcut key	Insert shortcut keys
	Black/White background dependent	Normal	N	Shift+N
	Bright Blue	Supraventricular	S	Shift+S
	Turquoise	Bundle Branch Block	B	Shift+B
	Aqua	Aberrant	T	Shift+T
	Bright Red	Ventricular	V	Shift+V
	Salmon	R on T	R	Shift+R
	Tangerine	Interpolated	I	Shift+I
	Bright Orange	Ventricular Escape	E	Shift+E
	Bright Pink	Atrial Paced	C	Shift+C
	Chartreuse	Ventricular Paced	P	Shift+P
	Golden Yellow	Dual Paced	D	Shift+D
	Brown	Fusion	F	Shift+F
	Dark Orange	Unknown	U	Shift+U
		Delete Beat(s)	Delete	
		Insert Beat		
		Artifact	A	
		Move to Center	Alt+Click	

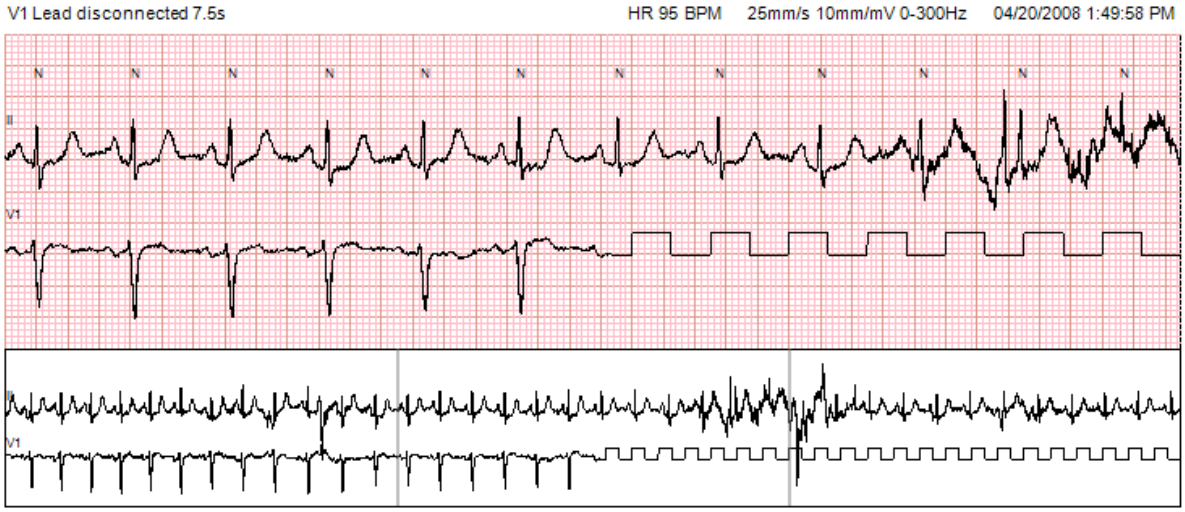
NOTE: *ECG beat coloring extends 1 second before or after the beat. A pause that is greater than 2-seconds will have gray waveform between the beat colors. An example is shown below.*



***NOTE**: Displayed ECG waveform will show square waves during periods of lead fail. HScribe will not use the lead fail periods for beat detection, HR, or RR interval but will use other channels when available.*



***NOTE**: Saved ECG strips with lead fail will show square waves in the final report printout and PDF as shown below.*



Events

Whenever events are present in the current ECG view, event checkboxes are presented above the waveform display where the colored event bar can be disabled or enabled. ST event checkbox text will also display the primary lead in parenthesis.

When enabled, a colored event bar under the ECG lead(s) indicates the start and end points of the event. When events occur simultaneously, the event with the highest priority will display the color bar.

Event Bar Color	Event Bar Color Name	Event Type	Priority Highest = 1 Lowest = 16
	Fuchsia	Artifact	1
	Aquamarine	Atrial Fibrillation	2
	Bright Yellow	Pause	3
	Olive Green	Supraventricular Trigeminy	4
	Turquoise	Supraventricular Bigeminy	5
	Green	Supraventricular Tachycardia	6
	Peach	Ventricular Trigeminy	7
	Rose-Brown	Ventricular Bigeminy	8
	Lavender	Ventricular Tachycardia	9
	Coral	User Defined 3	10
	Dark Orange	User Defined 2	11
	Tan	User Defined 1	12
	Light Brown	Tachycardia	13
	Light Green	Bradycardia	14
	Blue-Green	ST Depression (Lead)	15
	Crimson Red	ST Elevation (Lead)	16

User Defined Events

Optional event labels may be user defined for the current exam. Beat counts will be listed for these user-defined events in the Profile and in the exam results. Click on the Edit pull down menu and select **Edit Event Labels…** to open the dialog window. One, two, or three event labels with up to sixteen characters will become available once the text is entered and the OK button is selected. Any existing default event labels can be overwritten in this window. All existing events for an event label must be deleted before the label can be deleted.

Editing Events

Artifact, Atrial Fibrillation, User defined, ST Elevation and ST Depression events are editable events.
With the **Event Tool** selected, right click on an event bar to open the Context menu.

- To delete an editable event, right click on the event, move the mouse over **Delete Event**, and click on the displayed event name.
- To add an editable event, left click on the ECG at the start of the event and drag the cursor to the end of the event, then right click to choose the event label. When the event continues over multiple ECG pages, left click and drag over at least one beat and click Set Start of Event, then navigate to the end of the event, left click and select **Set End of Event**. Left click to select the event label. You may also navigate to the end and press Shift+left click.
- To **Edit Event Times**, select this item from the menu and extend the end event times. Left click and **Save Editing Changes** or **Cancel Event Editing.**

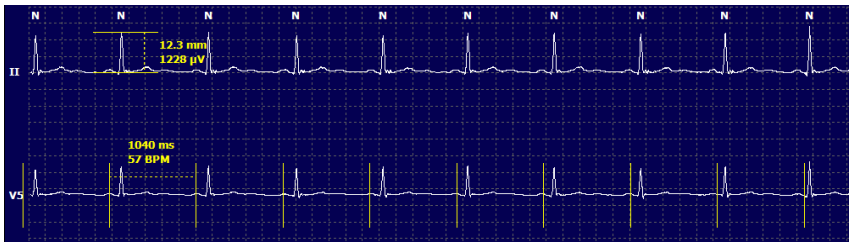
ST Event Details

ST Elevation and ST Depression events offer an additional selection to Edit Event Details when an ST elevation or depression event bar is right clicked with the **Event tool** selected. Right click on the event text to open a dialog window where average and max ST values, channels, and time can be edited. If entered values are out of range, the user will be prompted. When finished, left-click **OK** to save changes or **Cancel** to exit this window without saving changes.

Caliper Tool

Selection of the Caliper Tool is used to display ECG measurements of time and amplitude. Heart rate is also calculated along with time in milliseconds. When active, two calipers will be in the ECG view: one is for time and the other for amplitude measurement. Left click and drag the caliper at the dashed line to the desired position and then left click and drag the solid line end points of each separately.

A right click on the time caliper allows a **March Out** selection to add equally spaced time markers to one ECG line. When one-time marker is moved, all time markers will move and are spaced equally.



Caliper shortcut keys are shown below.

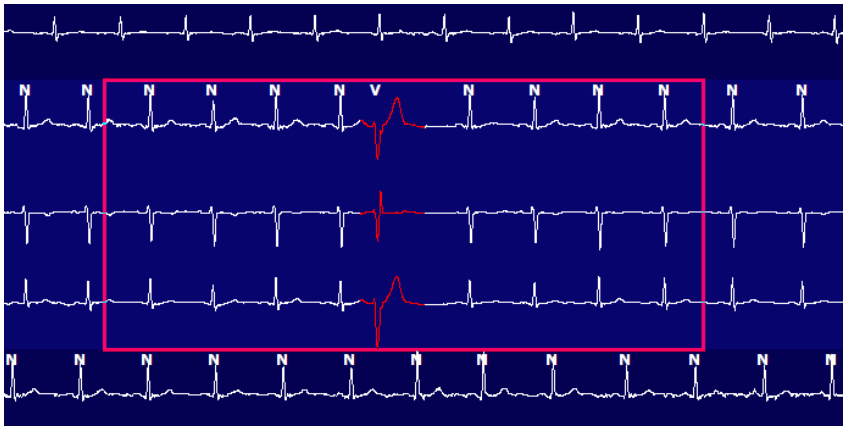
Keys	Description
Control-Left Arrow	Move active caliper 1 pixel to left
Shift-Left Arrow	Move active caliper 10 pixels to left
Control-Right Arrow	Move active caliper 1 pixel to right
Shift-Right Arrow	Move active caliper 10 pixels to right
Control-Up Arrow	Move active caliper 1 pixel up
Shift-Up Arrow	Move active caliper 10 pixels up
Control-Down Arrow	Move active caliper 1 pixel down
Shift-Down Arrow	Move active caliper 10 pixels down
Control-Add (+ numeric keypad)	Increase active caliper distance by 1 pixel
Control-Subtract (- numeric keypad)	Decrease active caliper distance by 1 pixel

Strip Tool

Use the **Strip Tool** to select ECG strips for the final report. A red frame is superimposed on the ECG display that follows the mouse cursor when moved.

A left click will open a Context menu to add the 7.5-second strip with the strip start time and annotation shown in the window. The selected leads can be changed prior to adding the strip. The annotation can be changed using free text or with a selection from the drop-down menu.

A right click will open a Context window allowing the strip duration to be stretched in 7.5-second increments. Once the strip tool size has been stretched, click on **Shrink-7.5** sec to shrink the strip tool selection in increments. A single lead page strip can be added from within this window anywhere from 5 minutes to 60 minutes per page by choosing a duration item from the drop-down menu or by entering a value from 5 to 60. Select **Move to Center** to center the ECG at the point of the mouse cursor position.



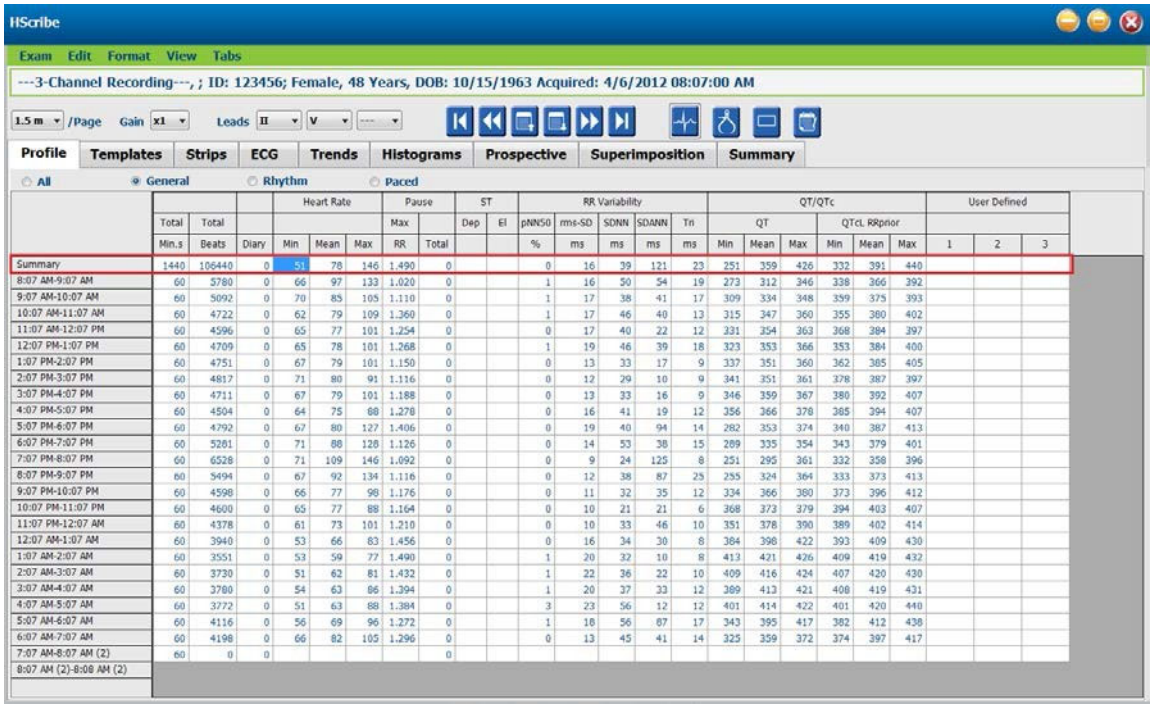
When the Context view is enabled, added strips will appear shaded indicating they have been added to the final report.

Profile Tab

The Profile display offers a complete tabular summary of all events in an hour-by-hour format for recordings with a duration up to 48-hours. Four-hour summary periods are displayed for extended recordings. The top row summarizes the most extreme values or total counts within the entire recording.

Diary events can be accessed by selecting **Edit** from the menu bar followed by **Diary List…** New diary entries can be added and existing entries can be edited or deleted.

Left click on a cell in a particular hour or in the top summary row to display ECG for the column labeled event. The following are not navigable: Total Min., Total Beats, Mean Heart Rate, pNN50%, SDANN, Triangular Index, QT/QTc Min, Mean, and Max, Supraventricular Tachycardia, and Ventricular Tachycardia.



	Total Min.s	Total Beats	Diary	Heart Rate Min	Heart Rate Mean	Heart Rate Max	Pause Max RR	Pause Total	ST Dep	ST El	RR Variability pNN50 %	RR Variability rms-SD ms	RR Variability SDNN ms	RR Variability SDANN ms	RR Variability Tri ms	QT/QTc QT Min	QT/QTc QT Mean	QT/QTc QT Max	QT/QTc QTcL RRprior Min	QT/QTc QTcL RRprior Mean	QT/QTc QTcL RRprior Max	User Defined 1	User Defined 2	User Defined 3
Summary	1440	106440	0	51	78	146	1.490	0			0	16	39	121	23	251	359	426	332	391	440			
8:07 AM-9:07 AM	60	5780	0	66	97	133	1.020	0			1	16	50	54	19	273	312	346	338	366	392			
9:07 AM-10:07 AM	60	5092	0	70	85	105	1.110	0			1	17	38	41	17	309	334	348	359	375	393			
10:07 AM-11:07 AM	60	4722	0	62	79	109	1.360	0			1	17	46	40	13	315	347	360	355	380	402			
11:07 AM-12:07 PM	60	4596	0	65	77	101	1.254	0			0	17	40	22	12	331	354	363	368	384	397			
12:07 PM-1:07 PM	60	4709	0	65	78	101	1.268	0			1	19	46	39	18	323	353	366	353	384	400			
1:07 PM-2:07 PM	60	4751	0	67	79	101	1.150	0			0	13	33	17	9	337	351	360	362	385	405			
2:07 PM-3:07 PM	60	4817	0	71	80	91	1.116	0			0	12	29	10	9	341	351	361	378	387	397			
3:07 PM-4:07 PM	60	4711	0	67	79	101	1.188	0			0	13	33	16	9	346	359	367	380	392	407			
4:07 PM-5:07 PM	60	4504	0	64	75	88	1.278	0			0	16	41	19	12	356	366	378	385	394	407			
5:07 PM-6:07 PM	60	4792	0	67	80	127	1.406	0			0	19	40	94	14	282	353	374	340	387	413			
6:07 PM-7:07 PM	60	5281	0	71	88	128	1.126	0			0	14	53	38	15	289	335	354	343	379	401			
7:07 PM-8:07 PM	60	6528	0	71	109	146	1.092	0			0	9	24	125	8	251	295	361	332	358	396			
8:07 PM-9:07 PM	60	5494	0	67	92	134	1.116	0			0	12	38	87	25	255	324	364	333	373	413			
9:07 PM-10:07 PM	60	4598	0	66	77	98	1.176	0			0	11	32	35	12	334	366	380	373	396	412			
10:07 PM-11:07 PM	60	4600	0	65	77	88	1.164	0			0	10	21	21	6	368	373	379	394	403	407			
11:07 PM-12:07 AM	60	4378	0	61	73	101	1.210	0			0	10	33	46	10	351	378	390	389	402	414			
12:07 AM-1:07 AM	60	3940	0	53	66	83	1.456	0			0	16	34	30	8	384	398	422	393	409	430			
1:07 AM-2:07 AM	60	3551	0	53	59	77	1.490	0			1	20	32	10	8	413	421	426	409	419	432			
2:07 AM-3:07 AM	60	3730	0	51	62	81	1.432	0			1	22	36	22	10	409	416	424	407	420	430			
3:07 AM-4:07 AM	60	3780	0	54	63	86	1.394	0			1	20	37	33	12	389	413	421	408	419	431			
4:07 AM-5:07 AM	60	3772	0	51	63	88	1.384	0			3	23	56	12	12	401	414	422	401	420	440			
5:07 AM-6:07 AM	60	4116	0	56	69	96	1.272	0			1	18	56	87	17	343	395	417	382	412	438			
6:07 AM-7:07 AM	60	4198	0	66	82	105	1.296	0			0	13	45	41	14	325	359	372	374	397	417			
7:07 AM-8:07 AM (2)	60	0	0					0																
8:07 AM (2)-8:08 AM (2)																								

Radio buttons allow for all events to display in a single window or in a grouping of event types organized as listed below. Some event columns are repeated in the groups for easy reference.

General

- Total Minutes
- Total Beats
- Diary Events
- Heart Rate Minimum, Mean, Maximum
- Maximum RR interval
- Pause Total
- ST Depression and Elevation
- RR Variability Calculations: pNN50, rms-SD, SDNN, SDANN, and Triangular Index
- QT/QTc calculation using Linear, Bazett or Fridericia and RRprior, RRc, or RR16 formulas
- User Defined Events

Rhythm

- Diary Events
- Heart Rate Minimum, Mean, Maximum
- Supraventricular Ectopy 1 (isolated), 2 (pairs), 3+ (runs of 3 or more) and total
- Supraventricular Rhythms: Tachycardia, Bigeminy, Trigeminy, Aberrant, BBB beats, and Atrial Fib
- Ventricular Ectopy 1 (isolated), 2 (couplets), 3+ (runs of 3 or more) and total
- Ventricular Rhythms: Tachycardia, Bigeminy, Trigeminy, R on T, Fusion, Interpolated, Escape and Unknown
- User Defined Events

Paced

- Diary Events
- Heart Rate Minimum, Mean, Maximum
- Paced Beats: Atrial, Ventricular, and Dual Paced total
  - Pacemaker Failure to Capture
  - Pacemaker Under Sense
  - Pacemaker Over Sense
- User Defined Events

Vertical and horizontal scroll bars are present when necessary with fixed column headers and time labels.

Right clicking on an individual column value will display a Context menu that allows for clearing and restoring all values. Right clicking on a cell will display a Context menu that provides additional items for navigation and ability to the value (excluding ST events).

Left clicking on a navigable column value will display the start time of the ECG view with the first selected event centered in the display. Pressing the Tab key will move the ECG display to the next event. Pressing the Shift+Tab key will move the ECG display to the previous event. The name and the sequence number of the event are displayed at the top of the ECG view.

When the events listed below are present in the ECG view, a checkbox with the event name displays. Enable or disable to show the color bar indicating event beginning to end. Color-bar events are prioritized for display when simultaneously occurring.

- ST Elevation
- ST Depression
- Bradycardia
- Tachycardia
- Ventricular Tachycardia
- Ventricular Bigeminy
- Ventricular Trigeminy
- Supraventricular Tachycardia
- Supraventricular Bigeminy
- Supraventricular Trigeminy
- Pause
- Atrial Fibrillation
- Artifact
- User Defined 1
- User Defined 2
- User Defined 3

When clear or restore is applied to some profile column headings, the corresponding fields in the Summary tab will also be cleared or restored. Following is a table of the profile sections for which this is enabled and the summary fields that are updated when clear or restore is applied.

Profile Section	Summary Section
Supraventricular Ectopy	- Supraventricular Ectopy (all fields except Aberrant Beats) - Supraventricular Beats field in All Beats
Supraventricular Rhythms	- SV Rhythm Episodes - BBB Beats field in All Beats - Aberrant Beats field in Supraventricular Ectopy
Ventricular Ectopy	- Ventricular Ectopy (all fields except R on T Beats, Interpolated Beats, and Escape Beats)
Ventricular Rhythms	- VE Rhythm Episodes - Unknown Beats and Fusion Beats fields in All Beats - R on T Beats, Interpolated Beats, and Escape Beats fields in Ventricular Ectopy
AFib	- Atrial Fib Percent in SV Rhythm Episodes - Atrial Fib Peak Rate in SV Rhythm Episodes

Prospective Tab

The Prospective display allows review of the ECG in chronological order as you verify beat labels and events in a split screen. ECG strips with annotation can be added and beat labels edited as the scan progresses. Superimposition view is optional and can be enabled or disabled during a stop. One, two, three, or 12-leads can be selected for prospective scanning. To view all 12-leads in the superimposition and page display, simultaneously press the shift key and left click the **12** button.

Checkboxes determine events the system will automatically stop on during a prospective scan.

- Stop Event criteria can be enabled or disabled before starting the scan and changed during a stop.
- Select **None** to disable all selections and then choose a subset of desired stop criteria.
- You can select **All** to enable all checkboxes.

An ECG time bar with 15-minute interval tick marks is proportional to and indicates the current time of the ECG view. Left click anywhere in the time bar to navigate to that time point.

To display the previous or following pages of the ECG, use **Page Up** and **Page Down** or the menu buttons.

Move to Start

Move Back One Hour

Page Up

Page Down

Move Forward One Hour

Move to End

To select an event from the Context view, click on the desired event and it is centered in the ECG view. To move in one-second intervals, select a beat in the ECG display and use the ⬅ and ➡ arrow keys.

The Scan Speed can be modified from slow to fast using one of five button settings, or **InstaPage**. InstaPage will only stop on pages with stop events.

To start or continue a review, click on **Start** or press **F7** on the keyboard. To stop scanning, click on **Stop** or press **F7/F8** keys.

When another tab is selected to exit the Prospective display, the scan will resume at the point it was exited upon return.

The start button will not be visible when the end of the recording has been reached. Press **Reset Prospective Scan to the Beginning** to make the start button reappear and to also begin the scan again from any point within the scan.

When the criterion is set to stop on a New Morphology, it is possible to relabel all beats matching the new morphology using the Learn label with a right click on the beat in the ECG view.

Learn affects all beats matching the same morphology. When more than one beat is selected, Learn options are disabled. The following Context menu items appear in addition to the single-beat labels with a right click on the beat in the ECG view. Label allows for a single-beat label change only.

PROSPECTIVE CONTEXT MENU					
ECG Color	ECG Color Name	Learn	Label	Shortcut key	Insert beat shortcut keys
	Black/White	Learn Normal	Normal	N	Shift+N
	Bright Blue	Learn Supraventricular	Supraventricular	S	Shift+S
	Turquoise	Learn Bundle Branch Block	Bundle Branch Block	B	Shift+B
	Aqua	Learn Aberrant	Aberrant	T	Shift+T
	Bright Red	Learn Ventricular	Ventricular	V	Shift+V
	Salmon	Learn R on T	R on T	R	Shift+R
	Tangerine	Learn Interpolated	Interpolated	I	Shift+I
	Bright Orange	Learn Ventricular Escape	Ventricular Escape	E	Shift+E
	Bright Pink	Learn Atrial Paced	Atrial Paced	C	Shift+C
	Chartreuse	Learn Ventricular Paced	Ventricular Paced	P	Shift+P
	Golden Yellow	Learn Dual Paced	Dual Paced	D	Shift+D
	Brown	Learn Fusion	Fusion	F	Shift+F
	Dark Orange		Unknown	U	Shift+U
			Delete All Beats in Template		
			Insert Beat		
			Artifact	A	
			Move to Center	Alt+Click	

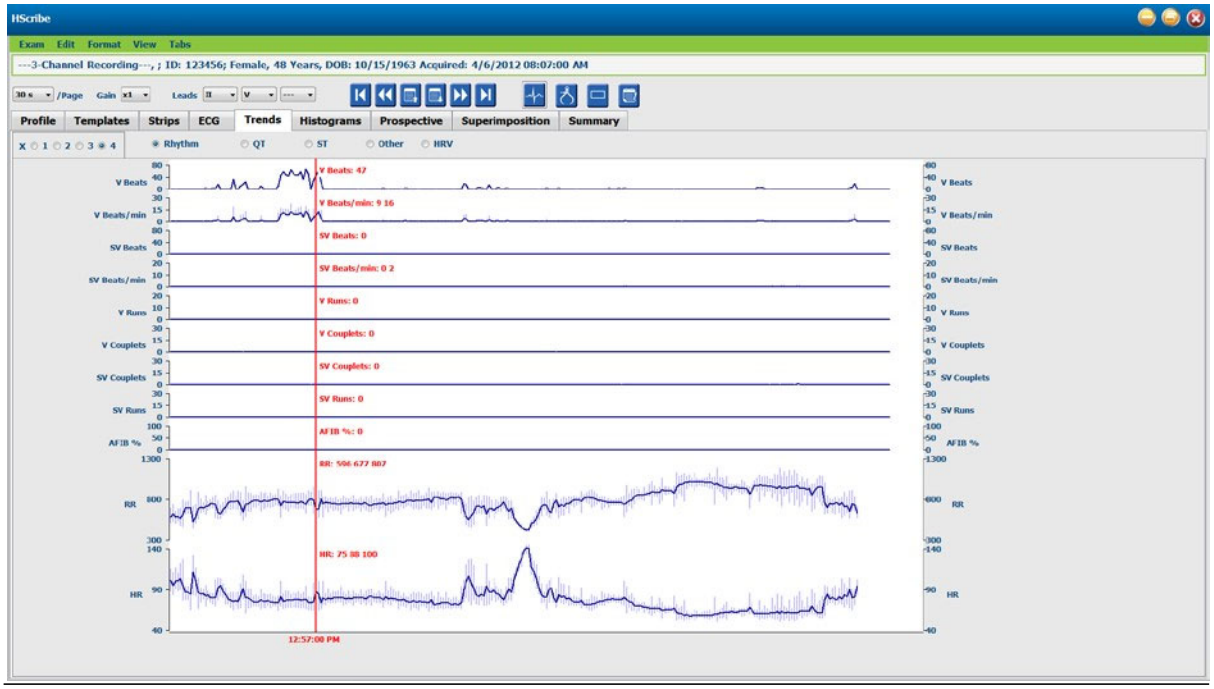
Insert new beat labels by positioning the cursor at the insertion point in the ECG. Right click and select **Insert Beat** from the Context menu. A prompt appears for the new beat label. The cursor must be more than 100 ms from a beat label or the Insert Beat selection does not appear in the Context menu.

A left click on **Move to Center** in the Context menu redraws the display with the time point of the current mouse position at the center of the display.

Trends Tab

The Trends display provides a graphical overview of 5-minute measurements for most events over the entire recording period. Drag the mouse or click anywhere in the trend to position the red trend-line cursor at a desired time point. The numbers on the right represent measurements computed for that 5-minute period.

When in a split view, the ECG view will reflect the same time as the trend cursor. Navigation within the ECG view will also move the trend cursor.



A selection for time resolution of 1, 2, 3, or 4 times allows you to zoom in/out. Radio buttons allow for a grouping of trend types organized as follows.

Rhythm

- Ventricular Beats, count and per minute
- Supraventricular Beats, count and per minute
- Ventricular Couplets
- Ventricular Runs
- Supraventricular Couplets
- Supraventricular Runs
- Atrial Fibrillation Percent
- RR Interval
- Heart Rate

QT

- QT Interval
- QTc Interval
- Heart Rate
- RR Interval

ST

- ST Level for all recorded leads
- Heart Rate
- RR Interval

Other

- Bradycardia Beats
- Tachycardia Beats
- Ventricular Bigeminy Beats
- Ventricular Trigeminy Beats
- Supraventricular Bigeminy Beats
- Supraventricular Trigeminy Beats
- User Defined 1 Beats
- User Defined 2 Beats
- User Defined 3 Beats
- Heart Rate
- RR Interval

HRV

- RMSSD
- SDNN
- Heart Rate
- RR Interval

Superimposition Tab

Superimposition display is useful for identifying ECG component (e.g. PR interval, QRS duration, ST-T, etc.) changes as they occur. Beats are displayed superimposed onto each other while accumulating brightness as each beat is processed. Ventricular beats are displayed separately from normal beats on the right. Click on the Forward button or the **F7** key to start superimposition. The F7 key or the stop button will stop superimposition. The time displayed at the top of the ECG view is the last superimposed beat. You can also scan backwards using the button on the left.

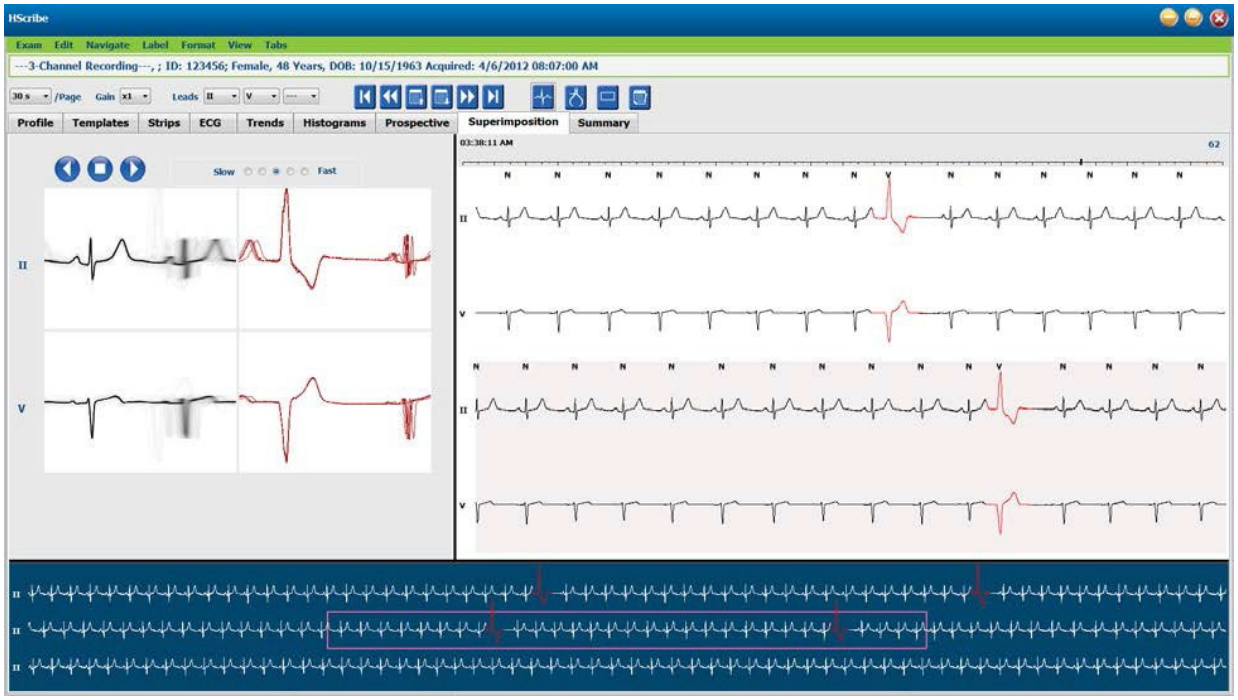
ECG strips with annotation can be added and beat labels edited as the scan progresses. 1, 2, 3, or 12-leads can be selected for prospective scanning. To view all 12-leads in the superimposition and page display, simultaneously press the Shift key and left click the **12** button.

An ECG time bar with 15-minute interval tick marks is proportional to and indicates the current time of the ECG view and shows progression through the recording. Left click anywhere in the time bar to navigate to that time point.

To move backward and/or forward in time, use the **Page Up** and **Page Down** keys or menu buttons to display the previous or following pages of the ECG. To select an event from the Context view, click on the desired event and it is centered in the ECG view. To move in one-second intervals, select a beat in the ECG display and use the ⬅ and ➡ arrow keys.

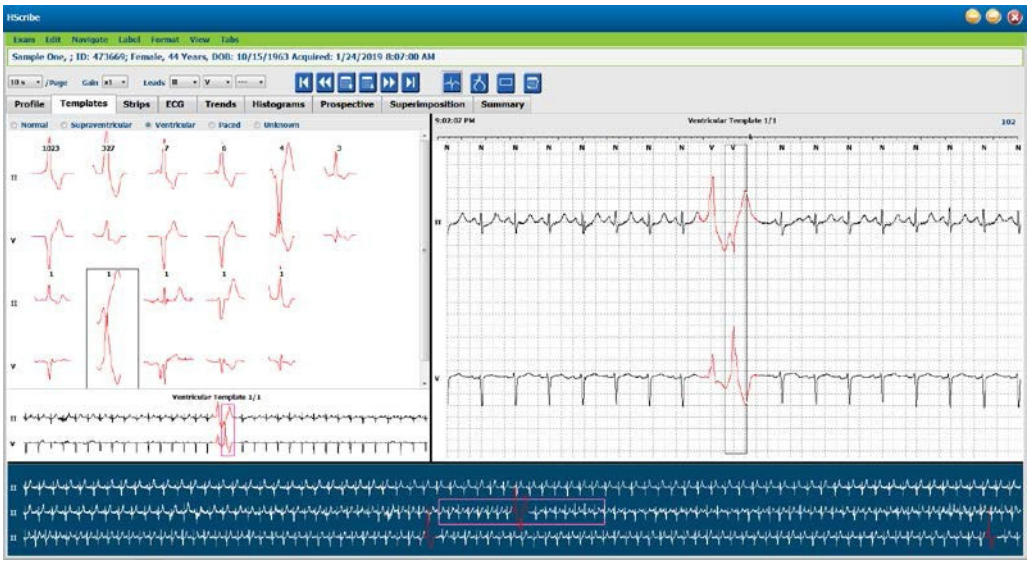
There are five settings for speed control from slow to fast.

When the ECG split view or Context view is enabled, the view will be updated when the scan is stopped.



Templates Tab

A template is a group of beats matching the same shape, or morphology, presented in descending order by beat count in each template. The Templates display is grouped into four or five different template types that are selected with radio buttons: Normal, Ventricular, Paced and Unknown with a fifth group as Supraventricular when enabled. Selecting a template displays the surrounding ECG waveform in a Context view below the templates.



The following table lists templates and their associated beat types:

Template	Beat Types Contained Within The Template Group
Normal	Normal, Bundle Branch Block, Supraventricular*, Aberrant*
Supraventricular*	Supraventricular, Aberrant
Ventricular	Premature Ventricular Contraction, Interpolated Ventricular, Ventricular Escape, R on T, and Fusion
Paced	Atrial Paced, Ventricular Paced, Dual Paced
Unknown	Unknown

* When **Enable Supraventricular Template Group** has been selected in the Scan Criteria window, all normal beats that meet the SVPB prematurity defined percent and manually labeled aberrant beats will be in the Supraventricular template group and not included in the Normal template group.

A left click on a template will display the first beat of the selected template in the Context view with the beat number and total beat count in the template. Pressing the tab key will display the next beat of the selected template. Pressing the Shift+Tab keys will display the previous beat of the selected template.

When the ECG split view is enabled, a left click on a template will move the start time of the ECG view to center the first beat of the selected template. Pressing the tab key will adjust the start time of the ECG view to center the next beat of the selected template. Pressing the Shift+Tab keys will adjust the start time of the ECG view to center the previous beat of the selected template.

To change any template label, right click on a template to open the Context menu and left click the new label. Shortcut keys may also be used. When a template is relabeled, all the beats in the template are relabeled at once and the template will move to the appropriate group when the function is exited.

To change several templates at one time:

- Left-click and drag the mouse over the templates to relabel consecutive templates
- Press and hold the Ctrl key and left-click on the non-consecutive templates
- Left-click on the first template, press and hold the Shift key, and left-click on the last consecutive template

To finish, right-click to open the context menu to change all selected templates. Alternatively, you may use a shortcut key.

When Delete All Beats in Template is selected from the context menu, beat labels for all beats within the template and the template itself are removed. There is no shortcut key for this action.

When Artifact All Beats in Template is selected from the context menu, the template and beat label(s) is removed and the ECG is excluded from being used for any calculation (e.g. heart rate calculation, RR interval analysis, etc.).

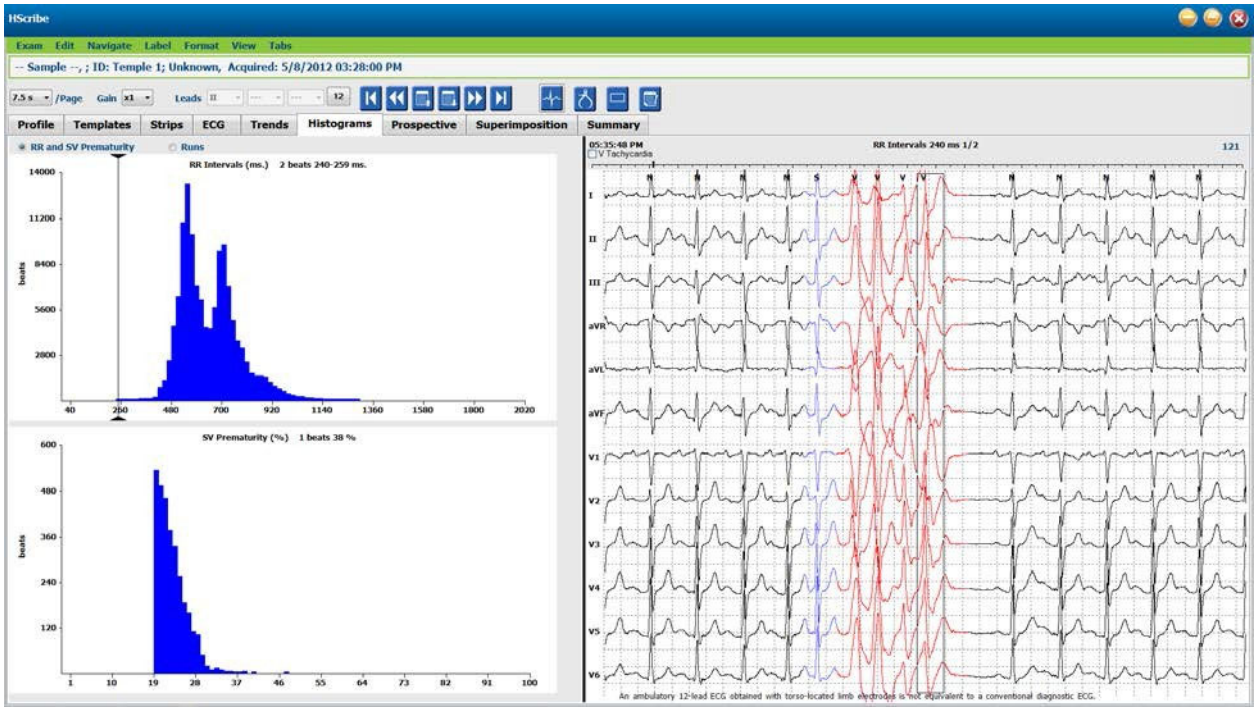
TEMPLATE CONTEXT MENU			
ECG Color	ECG Color Name	Label	Shortcut key
	Black/White background dependent	Normal	N
	Bright Blue	Supraventricular	S
	Turquoise	Bundle Branch Block	B
	Aqua	Aberrant	T
	Bright Red	Ventricular	V
	Salmon	R on T	R
	Tangerine	Interpolated	I
	Bright Orange	Ventricular Escape	E
	Bright Pink	Atrial Paced	C
	Chartreuse	Ventricular Paced	P
	Golden Yellow	Dual Paced	D
	Brown	Fusion	F
	Dark Orange	Unknown	U
		Delete All Beats In Template	
		Artifact	A
		Relabel All Following As Artifact	
		Merge Templates	

To merge templates of similar shape into a single template, press and hold the **Ctrl** key as you select templates, right click and select **Merge Template** from the Context menu.

As a quick way to exclude a high quantity of noise with a single key stroke, **Relabel All Following As Artifact** will remove beat labels in the selected template and in all templates after the selected template.

Histograms Tab

Histograms provide a graphical representation for distribution of beats allowing quick navigation to the most extreme events and a quick determination of frequency and density of Holter data.



The Histogram tab is broken into three radio button selections that show types and units as listed below:

- RR and SV Prematurity
  - RR intervals in milliseconds
  - Supraventricular prematurity percent
- Runs
  - Ventricular run lengths
  - Supraventricular run lengths
- Paced (not present when pacemaker has not been indicated for this patient)
  - Pacemaker spike to QRS
  - QRS to pacemaker spike

Left click on a histogram column to display the event centered in the ECG view with textual information displayed above the ECG. Press the Tab key to navigate to the next event in the selected column. Press the Shift+Tab keys to move to the previous event. Out-of-range events are indicated with a red bar and are navigable.

To quickly move from a single Histogram column to the next, use the ⬅ and ➡ arrow keys and then tab to the next event.

Strips Tab

The Strips tab displays the strip list with the following information about each strip.

- Time (with day 2, 3, 4, 5, 6, or 7 enclosed in parenthesis)
- Annotation
- Automatic indication
    - Y = automatic strip
    - Blank = manually added strip
- Strip duration in seconds
- Leads

Click on any column header to sort the strip list based on the column. The resulting list order will be used for printing the final report strips.

A single-click on any strip will display the strip to the right of the display. A double click on any strip will display the ECG view at the time of the strip.

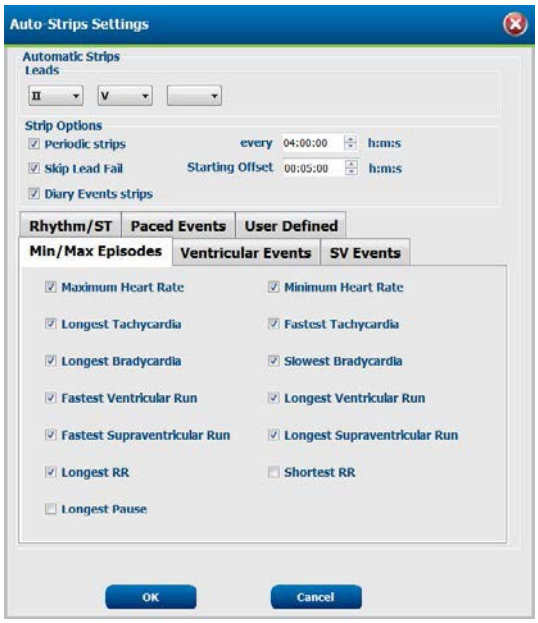
Buttons at the bottom of the strip list allow the strips to be edited, deleted, moved up/down, marked as artifact, and automatic strips to be added.

Automatic strips will be replaced with the next event when the Artifact button is used for all enabled events under Min/Max Episodes (e.g. Maximum Heart Rate, Minimum Heart Rate, Longest RR, Longest Pause, and so on). All other automatic strips are not replaced automatically; however, selection of the Add Auto button a second time will remove and replace all automatic strips. A Rescan will also remove all automatic strips. Manually added strips are not affected.

Automatic Strips

Select **Add Auto** to open a window allowing selection of leads, ECG events, diary events, and periodic strips with a specified starting offset and strip addition intervals every so many hours, minutes, and seconds.

When **Skip Lead Fail** is selected, any periodic strip that has lead fail will be excluded. Select **Diary Event strips** to include them automatically. Toggle **Periodic Auto-Strips** on or off with a checkbox. The first strip Offset from Start time is set with HH:MM:SS for each following strip.



Min/Max Episodes are selected by enabling the checkbox to include the most extreme ECG event that meets the criteria with the start centered in the 7.5 second strip.

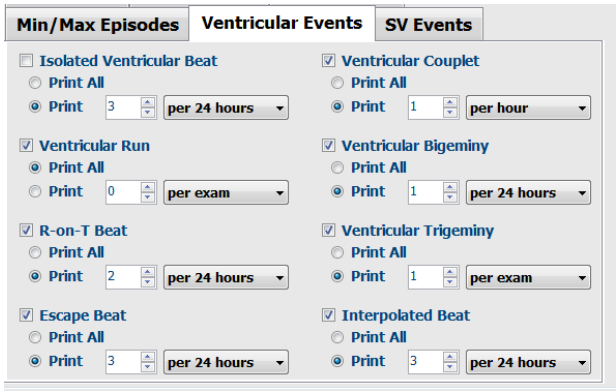
- Maximum heart rate strip
- Minimum heart rate strip
- Longest Tachycardia Episode start
- Fastest Tachycardia Episode start
- Longest Bradycardia Episode start
- Slowest Bradycardia Episode start
- Longest Ventricular Run start
- Fastest Ventricular Run start
- Longest Supraventricular Run start
- Fastest Supraventricular Run start
- Longest RR interval
- Longest Pause interval
- Shortest RR interval

NOTE: *Tachycardia and Bradycardia strips report the average BPM over the duration of the episode.*

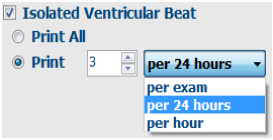
All other automatic strip selections are grouped according to rhythm and event type. Event types allow selections to enable/disable inclusion by checkbox, print all or print a designated number from 1 to 100 per the entire exam, per each 24-hour period, or per each recorded hour.

Ventricular Events, as an example at the right, include:

- Isolated Ventricular Beat
- Ventricular Couplets
- Ventricular Run
- Ventricular Bigeminy
- R-on-T Beat
- Ventricular Trigeminy
- Escape Beat
- Interpolated Beat



Drop down lists for each event type include a choice of per exam, per 24 hours, or per hour.



Supraventricular (SV) Events include:

- Isolated SV Beat
- SV Pair
- SV Run
- SV Bigeminy
- AFib
- SV Trigeminy
- Aberrant Beat

Rhythm/ST Events include:

- ST Depression
- ST Elevation
- Bradycardia
- Tachycardia
- Fusion Beat
- Bundle Branch Block (BBB) Beat
- Unknown Beat
- Pause

Paced Events include:

- Atrial Paced Beat
- Ventricular Paced Beat
- Dual Paced Beat
- Failure to Capture
- Failure to Sense
- Oversense

***NOTE**: Recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected.*

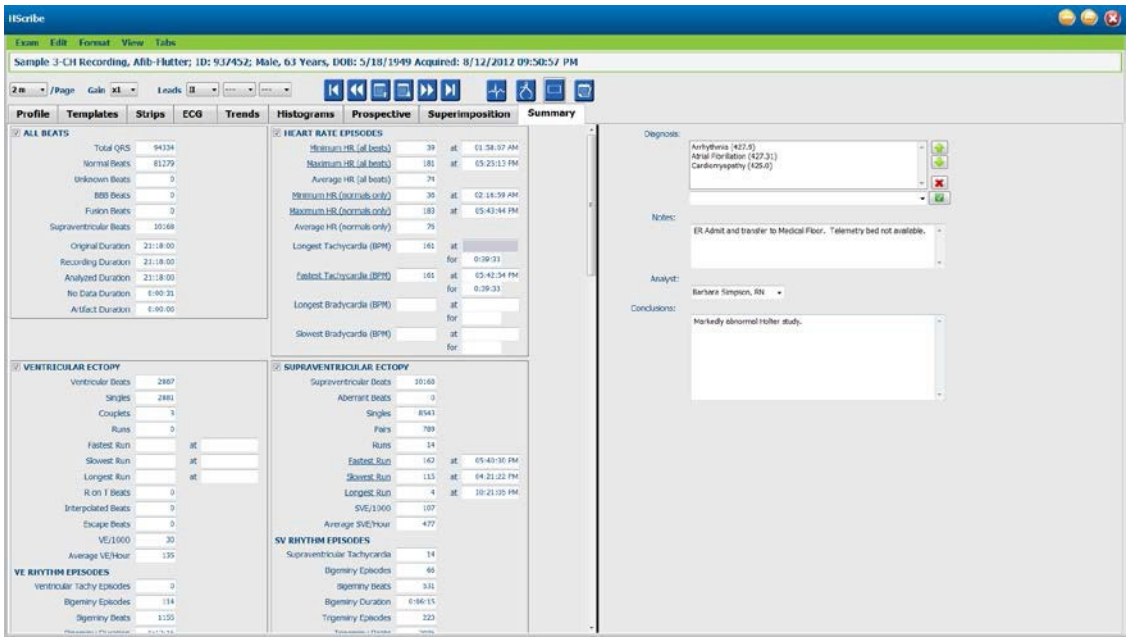
User Defined includes:

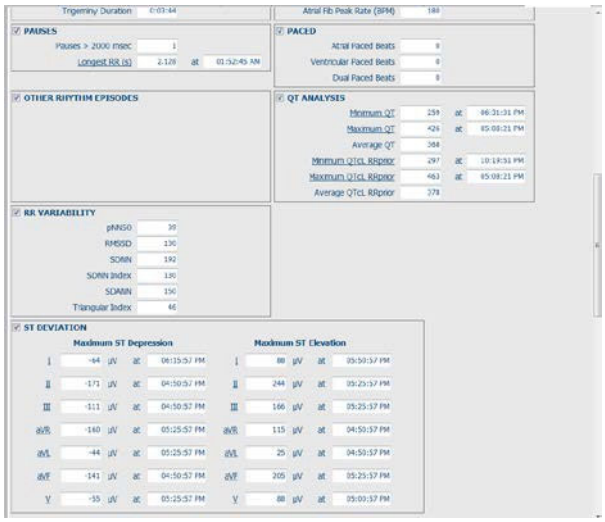
- User Defined 1 Event
- User Defined 2 Event
- User Defined 3 Event

Default settings for Auto Strips are defined by the System Administrator and will apply to all other recordings unless changed on an individual basis per exam.

Summary Tab

The Summary tab displays summary values at the left of the display and the conclusions field at the right of the display. Measurements that have durations are reported with HH:MM:SS. Use the scroll bar to view more summary information.





All of the summary values can be overridden with a user-entered value. The overridden cell will be shaded indicating the value was changed. The original value can be restored with a right click on the summary item label and then a left click on Restore.

Summary measurements that contain both a value and time appear as hyperlinks. Click the hyperlink to navigate to the ECG view at the time of the measurement.

Checkboxes at the left of each summary group title will enable/disable contents for inclusion/exclusion in the final report.

Rescan

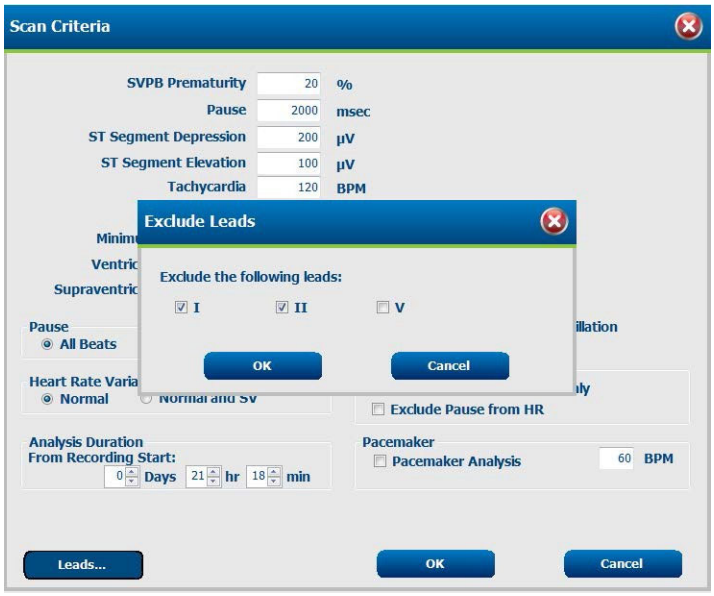
You can choose to rescan the recording to cancel all editing changes and return the recording to its original unedited state. If leads are interfering with proper beat identification, you can exclude them from being used for the analysis as well as shorten the analysis duration when the leads have been disconnected before recording end.

Reanalyze Recording

To reanalyze the recording, select **Rescan…** from the Exam pull-down menu. You are prompted that all editing changes will be lost if this recording is rescanned. Select Continue or Cancel. Continue will allow you to select **Start**. A progress window will display a notification when the rescanning is complete.

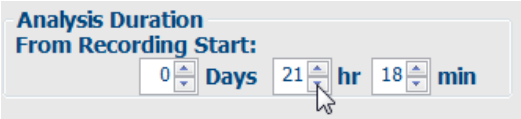
Reanalyze Recording with Leads Excluded

To reanalyze the recording and exclude specific leads, select **Rescan…** from the Exam pull-down menu and then select the **Scan Criteria…** button. Select **Leads…** to open a window where you can choose the lead(s) to exclude and then click **OK**. Click **OK** to close the Scan Criteria window and then click **Start** to reanalyze the recording. A progress window will display a notification when the rescanning is complete.



Reanalyze Recording with a Shortened Recording Duration

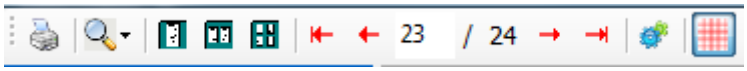
To reanalyze the recording and shorten the duration, select **Rescan…** from the Exam pull-down menu and then select the **Scan Criteria…** button. Change the **Days, hours, and minutes** values to a shorter duration for analysis and then click **OK**. A warning appears to notify that it is not possible to retrieve the excluded data. Click **Continue** or **Cancel** and then click **OK** to close the Scan Criteria window. Click **Start** to reanalyze the recording. A progress window will display a notification when the rescanning is complete



Final Report Print Preview

To open a preview of the final report, select **Print Report…** from the Exam pull-down menu or use the shortcut keys Ctrl + P. A preview is generated and the first report page is displayed.

Icon Tool Bar



Use the printer icon to open a Windows' printer dialog and choose defined printers with properties, print range, and number of copies. To print the final report, select **OK**.

Use the magnifying glass icon to choose Auto to fit the window or a percentage size for display.

Use the page icons to select a single-page, two-page, or four-page preview.

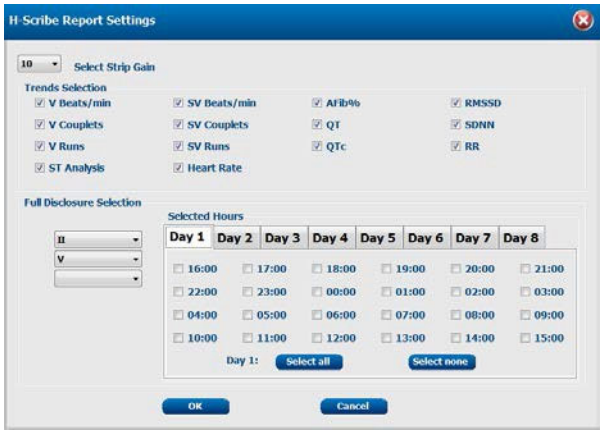
The number of report pages is shown as xx / xx (displayed page number per total pages). The red arrow keys allow you to preview the next page or the previous page, as well as move to the last page or the first page.

Use the settings icon to change the 7.5-second Strip Gain setting to 5, 10, 20, or 40.

Trend selections may be included or excluded.

Full disclosure selection allows a choice of up to three leads in the drop-down menus and checkboxes for the hours to include. The **Select All** and **Select None** buttons allow for a quick change. Select **OK** to save your changes and update the displayed report.

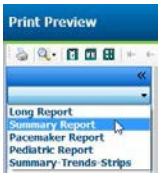
The Full Disclosure section presents a tab for each individual day of recording.



Use the pink grid icon to toggle the ECG grid background on or off. An X appears when the background is off.

Final Report Templates

Click on the Report drop down list in the upper left area of the display to choose any of the user defined report types for this report.



Sections

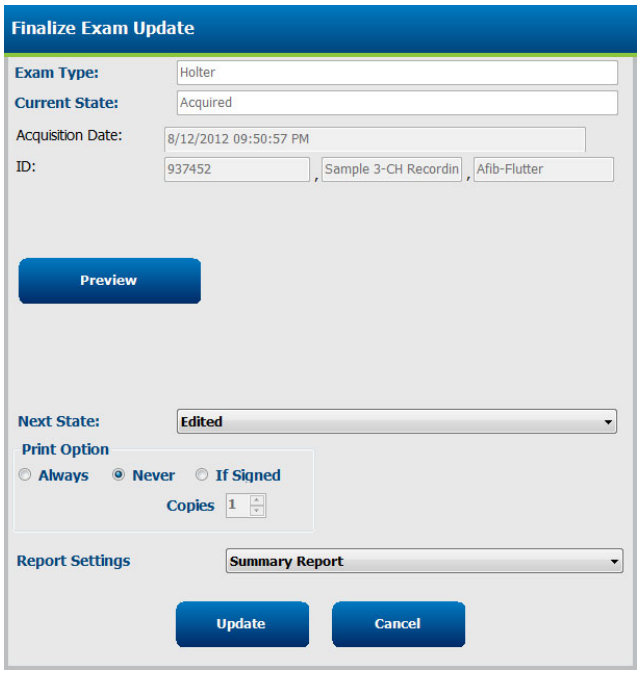
Use the checkboxes at the left of the display to choose sections for inclusion or exclusion in the final report. Select the arrows in the bottom left corner of the display to refresh the displayed report after a change is made.

Exit the Print Preview

Click on the red **X** to close the report preview and return to the recording review display.

Closing the Patient Recording

Select **Exit…** from the Exam pull-down menu to close the recording results display. A window opens to display the exam information and prompts for selection of the status to **Finalize Exam Update**. The next logical status is displayed and can be changed using the drop-down menu.



There are four possible states, dependent on how the system settings are defined.

1. Acquired indicates that the recording has been imported and is waiting for the analyst to confirm or modify results.
2. Edited indicates the analyst has examined the results and prepared the recording for review.
3. Reviewed indicates that an authorized user has confirmed the results are correct.
    - When selected, a Reviewed By field will open for reviewer's name entry.
4. Signed indicates that the exam results are correct and no further processing is necessary.
    - When selected, both a Username and Password field must be completed by a user with signing privileges (if Legal Signatures has been defined by the administrator in system settings).

Preview opens the final report display that contains the same selections explained on the previous page.

Selecting **Always** or **If Signed** from the Print Option selections will automatically generate a printout of the final report. The report will print to the default Windows printer when the selected state is updated.

Choose the appropriate **Report Settings** template type for this exam.

Select **Update** to save the next state selection or **Cancel** to exit the window without saving any changes. The Cancel selection is only available when reviewing a searched exam.

Pull-Down Menus

Pull-down menus are located at the top of the screen. The availability of some menus will vary according to the displayed screen.

Exam Pull-Down Menu

COMMAND	FUNCTION	TABS
Patient Information	Opens a window for editing patient demographics.	All
Rescan	Reanalyze current recording. All beat editing changes, profile overrides, summary overrides and automatic strips are discarded.	All
Print Report	Opens a preview and allows a printout of the final report. Keyboard shortcut is Ctrl+P.	All
Print Screen	Print current screen with time, patient name, ID and heart rate at the top of the page. Choose number of copies, pages to be printed, and destination printer.	ECG and all ECG split views
Exit	Saves changes and exits the application.	All

Edit Pull-Down Menu

COMMAND	FUNCTION	TABS
Settings	12-Lead ECG strip with 12x1 format duration choices for 7.5-second portrait or 10-second landscape.	All
Diary List	Opens a window that allows addition, editing, or deletion of diary entries. When adding diary event times beyond the first 24-hour period, enter parenthesis for the desired period after the HH:MM:SS such as 08:24:36 (2).	All
Scan Criteria	View or change Scan Criteria. These settings are used in conjunction with the HScribe analysis program to customize event detection for a particular patient. Once changed, settings remain in effect for this patient until modified. Most changes take effect immediately. When enabling the Supraventricular Template Group during exam review, a rescan or change in SVPB prematurity % is required to populate templates.	All
Edit Event Labels	Opens a window that allows up to three user-defined event labels.	All
QTc Settings	Opens a window that allows a QTc formula for linear, Bazett, or Fridericia to be set by the user. The QTc RR for single, average of the last 16, or RRc is also set by the user in this window.	All
Undo Artifact…	Opens a window that allows removal of artifact periods in the recording. The Remove All button will remove all artifact labeling in the recording. A prompt to confirm removal of all artifacts displays when the Removal All button is selected. The Undo button will remove the previous artifact labeling and can be selected to undo each previous artifact edit.	All

Navigate Pull-Down Menu

COMMAND	FUNCTION	TABS
Next Page	Move to next page.	ECG and all ECG split views
Previous Page	Move to previous page.	ECG and all ECG split views
COMMAND	**FUNCTION**	**TABS**
Next Line	Move to next line.	ECG and all ECG split views
Previous Line	Move to previous line.	ECG and all ECG split views
Next Second	Move to next second.	ECG and all ECG split views
Previous Second	Move to previous second.	ECG and all ECG split views
First Page	Move to start of the recording.	ECG and all ECG split views
Last Page	Move to end of the recording.	ECG and all ECG split views
Select Time	Navigate to an exact time in the recording. Time is presented in a 24-hour format and is selectable to a given second. To navigate beyond the first 24-hour period, enter parenthesis for the desired period after the HH:MM:SS such as 08:24:36 (2).	ECG and all ECG split views

Label Pull-Down Menu

COMMAND	FUNCTION	TABS
Normal	Label selected beat Normal. (**N** key on keyboard.)	ECG and all ECG split views
Supraventricular	Label selected beat Supraventricular. (**S** key on keyboard.)	ECG and all ECG split views
Bundle Branch Block	Label selected beat Bundle Branch Block. (**B** key on keyboard.)	ECG and all ECG split views
Aberrant	Label selected beat Aberrant. (**T** key on keyboard.)	ECG and all ECG split views
Ventricular	Label selected beat Ventricular. (**V** key on keyboard.)	ECG and all ECG split views
R on T	Label selected beat R on T. (**R** key on keyboard.)	ECG and all ECG split views
Interpolated	Label selected beat Interpolated. (**I** key on keyboard.)	ECG and all ECG split views
Ventricular Escape	Label selected beat Escape. (**E** key on keyboard.)	ECG and all ECG split views
Atrial Paced	Label selected beat Atrial Paced. (**C** key on keyboard.)	ECG and all ECG split views
Ventricular Paced	Label selected beat Ventricular Paced. (**P** key on keyboard.)	ECG and all ECG split views
Dual Paced	Label selected beat Dual Paced. (**D** key on keyboard.)	ECG and all ECG split views
Fusion	Label selected beat Fusion. (**F** key on keyboard.)	ECG and all ECG split views
Unknown	Label selected beat Unknown. (**U** key on keyboard.)	ECG and all ECG split views

Format Pull-Down Menu

COMMAND	FUNCTION	TABS
Gain	Increase or decrease the amplitude of displayed ECG complexes. The available options are ½, 1, 2, or 4 times the original size.	Prospective, ECG and all ECG split views
Zoom	Increase or decrease time span on the display based on number of leads selected. Available options are: **–Single Lead:** 5,10,15 or 30 seconds; 1,2,3,5,10,20 or 30 minutes **–Two leads:** 5,7.5,10,15 or 30 seconds; 1,1.5,2,5,10 or 15 minutes **–Three leads:** 5,7.5,10,15 or 30 seconds; 1,1.5,2,5 or 10 minutes **–Twelve leads:** 5,7.5,10,15,20 or 30 seconds; 1,1.5,2 or 4 minutes Use the center wheel on mouse for zooming in and out.	Prospective, ECG and all ECG split views
Grid	Select to turn grid on in ECG display; deselect to turn grid off. Use **Ctrl+G** keys to toggle grid on and off. The grid will be displayed when the zoom size is adequate.	Prospective, ECG and all ECG split views
Text Beat Labels	Enables or disables text beat labels displayed above each beat. Use **Ctrl+T** keys to toggle beat labels on and off. Beat labels will be displayed when the zoom size is adequate.	Prospective, ECG and all ECG split views
Dark Background	Enables or disables dark background mode. Keyboard shortcut is **Ctrl+D**.	All
Enhanced Pacemaker Spike	Enables or disables enhanced pacemaker spike. Keyboard shortcut is **Ctrl+E**.	Prospective, ECG and all ECG split views

View Pull-Down Menu

COMMAND	FUNCTION	TABS
Profile	Selects Profile display. Keyboard shortcut is **Alt+1**.	All
Prospective	Selects Prospective display. Keyboard shortcut is **Alt+2**.	All
Trends	Selects Trend display. Keyboard shortcut is **Alt+3**.	All
Superimposition	Selects Superimposition display. Keyboard shortcut is **Alt+4**.	All
Templates	Selects Template display. Keyboard shortcut is **Alt+5**.	All
ECG	Selects ECG display. Keyboard shortcut is **Alt+6**.	All
Histograms	Selects Histogram display. Keyboard shortcut is **Alt+7**.	All
Strips	Selects Strips display. Keyboard shortcut is **Alt+8**.	All
Summary	Selects Summary display. Keyboard shortcut is **Alt+9**.	All
Split Window (Right)	In the Split view, used in conjunction with ECG display, you view onscreen a split format with ECG displayed on the right side of the display. Keyboard shortcut is **Ctrl+S**.	All except ECG, Strips and Summary
Split Window (Bottom)	In the Split view, used in conjunction with ECG display, you view onscreen a split format with ECG displayed on the lower portion of the display. Keyboard shortcut is **Ctrl+Shift+S**.	All except ECG, Strips and Summary
Context	In Context view, used in conjunction with ECG display, you view the ECG onscreen in the context of the surrounding beats. Initially, window includes 3 minutes of ECG but may be sized larger. Keyboard shortcut is **Alt+C**.	All except Strips and Summary
Select Context Lead	Select Context Lead to choose a different lead for the Context view.	When context view is active

Tabs Pull-Down Menu

COMMAND	FUNCTION	TABS
Profile	Hides tab when unchecked. Shows tab when checked.	All
Templates	Hides tab when unchecked. Shows tab when checked.	All
Trends	Hides tab when unchecked. Shows tab when checked.	All
Histograms	Hides tab when unchecked. Shows tab when checked.	All
Prospective	Hides tab when unchecked. Shows tab when checked.	All
Superimposition	Hides tab when unchecked. Shows tab when checked.	All

Icons and Drop-down Lists

Glossary of Icons

ICON or Drop-down list	FUNCTION
15 s /Page	Change Timespan or Zoom of the ECG for display.
Gain x1	Increase or decrease amplitude of ECG for display and printing.
Leads II V --- (---, I, II, III, aVR, aVL, aVF, V)	Lead selections for H3+ 3-channel recordings.
Leads c1 c2 ---	Lead selections for H3+ 2-channel recordings.
Leads II V1 V5	Lead selections for 12-lead recordings. (I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6)
12 or 12	12-lead ECG display; toggle on or off.
	Move to the start of the recording.
	Move back one hour.
	Move to the previous page.
	Move to the next page.
	Move forward one hour.
	Move to the end of the recording.
	Select Label Beats as current tool.
	Select Caliper as current tool.
	Select Strip as current tool.
	Select Event as current tool.

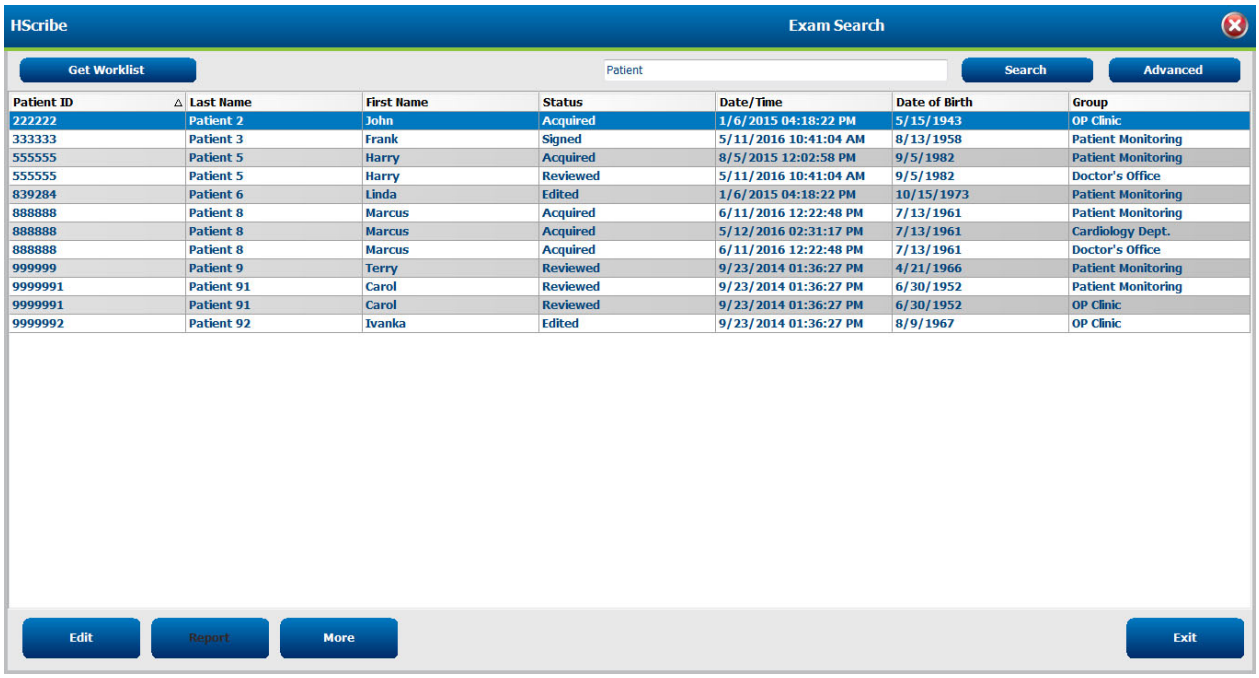
11. EXAM SEARCH

Exam Search is available for users that will edit, review, print or export reports, archive, delete, copy offline, open offline, and sign Holter exams. Click on the icon to open a window allowing you to view a list of the exams according to the filter and your assigned permissions.

The **Get Worklist** button will filter the list of exams according to the User Preferences for the logged in user.

A search field is available for entry of a patient name or ID number. When you enter one or more alphanumeric characters, all exams that start with those characters are displayed in a list when the **Search** button is clicked. Listed exams can be sorted by clicking any of the column headers.

When a complete last name, first name, or patient ID is entered in the search field and the **Search** button is clicked, all matching exams will appear in the list.



Patient ID	Last Name	First Name	Status	Date/Time	Date of Birth	Group
222222	Patient 2	John	Acquired	1/6/2015 04:18:22 PM	5/15/1943	OP Clinic
333333	Patient 3	Frank	Signed	5/11/2016 10:41:04 AM	8/13/1958	Patient Monitoring
555555	Patient 5	Harry	Acquired	8/5/2015 12:02:58 PM	9/5/1982	Patient Monitoring
555555	Patient 5	Harry	Reviewed	5/11/2016 10:41:04 AM	9/5/1982	Doctor's Office
839284	Patient 6	Linda	Edited	1/6/2015 04:18:22 PM	10/15/1973	Patient Monitoring
888888	Patient 8	Marcus	Acquired	6/11/2016 12:22:48 PM	7/13/1961	Patient Monitoring
888888	Patient 8	Marcus	Acquired	5/12/2016 02:31:17 PM	7/13/1961	Cardiology Dept.
888888	Patient 8	Marcus	Acquired	6/11/2016 12:22:48 PM	7/13/1961	Doctor's Office
999999	Patient 9	Terry	Reviewed	9/23/2014 01:36:27 PM	4/21/1966	Patient Monitoring
9999991	Patient 91	Carol	Reviewed	9/23/2014 01:36:27 PM	6/30/1952	Patient Monitoring
9999991	Patient 91	Carol	Reviewed	9/23/2014 01:36:27 PM	6/30/1952	OP Clinic
9999992	Patient 92	Ivanka	Edited	9/23/2014 01:36:27 PM	8/9/1967	OP Clinic

Highlight an exam in the list and then click the

- **Edit** button to open the exam for review and editing, or
- **Report** button to open the final report for review and printing, or
- **More** button to display more advanced selections explained below.

- **Copy Offline** button that allows an existing exam to be copied to an external drive using a browser for review at any HScribe v6.x system.
- **Open Offline** button that allows a HScribe v6.x system user to open an exam from another HScribe v6.x system by browsing to the location of the copied exam.
- **Export** button allows the exam results in PDF, XML, and DICOM format to be sent to a destination defined in the system configuration settings. This is an optional feature and may not be available. This selection is only enabled when the selected exam has the associated export status enabled in the Workflow Config settings.

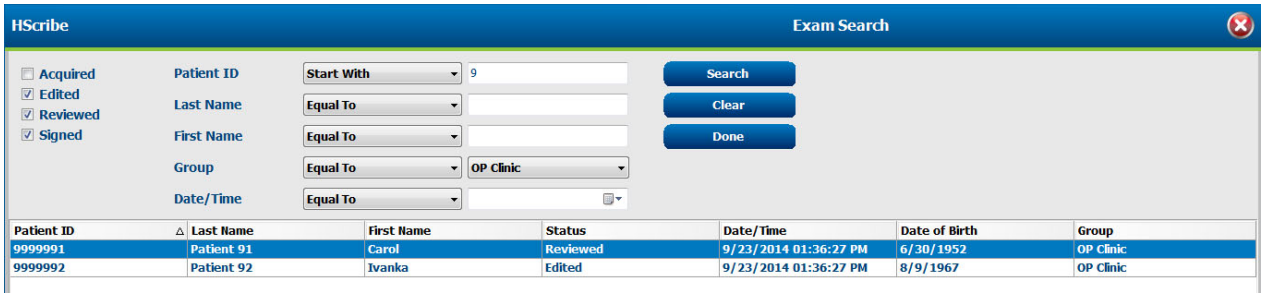
- **Reconcile** button is typically used to update patient demographics from an order in MWL or a Patient already in the database to an exam that was performed before the order was available.
- **Archive** button is used to move the exam from the database to an external drive for long-term storage purposes. Archive may not be available when DICOM settings are set to prevent it.
- **Delete** button is used to permanently remove an exam or an order from the system database. The exam is not recoverable after performing this action.
- **Open Legacy** feature allows archived HScribe v4.xx exams to be imported into the database and rescanned.

Advanced Search

For more sophisticated exam list filtering, click on the **Advanced** button. The identifier selections are relational to the selected filter and are dependent on your system configuration.

The exam state(s) are selected by checkbox as identifiers. Click the **Search** button after your filter and identifiers are selected. Click the **Clear** button to cancel and remove your entries from the search fields.

When finished, click the **Done** button to exit the advanced search selections and return to the main Exam Search window.



Exam State Identifiers

- Acquired
  - Checked if equal to
- Edited
  - Checked if equal to
- Reviewed
  - Checked if equal to
- Signed
  - Checked if equal to

Exam Criteria Identifiers

- Patient ID
  - Equal To
  - Start With
- Last Name
  - Equal To
  - Start With
- First Name
  - Equal To
  - Start With
- Group
  - Equal To
  - Blank (All)
  - Any defined Group this user can access
- Date/Time
  - Equal To
  - Prior To
  - Later Than

12. FINAL REPORTS

The final report can be previewed and printed during Holter review. Any of the following sections can be excluded by the user with appropriate permissions. This section explains the information contained in each final report page.

Condensed Report Patient Information with Summary Statistics

The Patient Information page consists of a report header with institution contact information; a report footer with manufacturer name (Welch Allyn, Inc.) and the HScribe software version included on every page; and scan criteria in a text box above the footer. The patient name, recording start date and time section; a patient ID, secondary ID, admission ID, date of birth, age, gender and race section; an indication and medications section; a referring physician, procedure type, date processed, technician, analyst, and recorder number section; a conclusions section; and fields for the reviewer name and the signing physician name with signing date. This page may also include an institution logo in the header.

Summary statistics are shown in the middle of this page that include results for beat totals and recording duration, heart rate episodes, ventricular ectopy, supraventricular ectopy, pauses, paced beats, and atrial fibrillation percent with peak rate.

The Conclusions field allows up to nine lines of text or approximately 850 alphanumeric characters.

Standard Report Patient Information

The Patient Information page consists of a report header with institution contact information; a report footer with manufacturer name (Welch Allyn, Inc.) and the HScribe software version included on every page; a patient name, recording start date and time section; a patient ID, secondary ID, admission ID, date of birth, age, gender and race section; a patient address, telephone and e-mail section; an indication and medications section; a referring physician, procedure type and location section; a date processed, technician, analyst, recording duration, recorder type, and recorder number section; a diagnosis, notes and conclusions section; and fields for the reviewer name and the signing physician name with signing date. This page may also include an institution logo in the header. Areas within this page can be customized through use of the Report Configuration Tool.

The Diagnosis field allows up to four lines of text or approximately 100 alphanumeric characters. A flashing exclamation will appear upon exit if too many items have been selected. The Notes field allows up to three lines of text or approximately 100 alphanumeric characters.

The Conclusions field allows up to eight lines of text or approximately 700 alphanumeric characters.

Standard Report Summary Statistics

The summary statistics page consists of scan criteria and summary statistics section at the top of the page. The patient ID, name, gender, age and date of birth, start time and date, and page number and page type are printed on this and every following page.

The scan criteria section includes settings utilized for the analysis of this recording. The summary statistics section includes results for totals, heart rate episodes, ventricular ectopy, supraventricular ectopy, pauses, paced, other rhythm episodes that are user defined, RR variability, QT analysis with QTc calculations, ST elevation, and ST depression.

The HScribe Holter analysis system methods for analysis and various aspects of the Welch Allyn VERITAS algorithm for Holter analysis are explained in the Clinician's Guide to HScribe Holter Analysis (P/N: 9515-184-51-ENG). Refer to this guide for details about the summary statistics results.

Narrative Summary

If Narrative Summary is selected as an enabled section, a narrative report is included. This can be used in addition to the tabular statistics summary or as a substitute. The filled in narrative summary includes statements with the appropriate entries from the summary statistics results as shown below. This page can be customized through use of the Report Configuration Tool explained in the System and User Configuration section of this manual.

Narrative Text

The monitoring started at [%StartTime_NS%] and was continued for [%Duration_NS%]. The total number of beats was [%NumberOfBeats%] with total analysis duration of [%MinutesAnalyzed_HHMM%]. The average heart rate was [%MeanHR_NS%] BPM, with the minimum rate , [%MinHR_NS%] BPM, occurring at [%MinHRTime_NS%], and the maximum rate, [%MaxHR_NS%] BPM, occurring at [%MaxHRTime_NS%].

The longest episode of bradycardia was detected with an onset at [%LongBradyTime_HHMMSST%], duration of [%LongBradyDur_HHMMSSD%] and a heart rate of [%LongBradyRate%] BPM. The slowest episode of bradycardia was detected with an onset at [%SlowBradyTime_HHMMSST%], duration of [%SlowBradyDur_HHMMSSD%] and a heart rate of [%SlowBradyRate%] BPM.

The longest episode of tachycardia was detected with an onset at [%LongTachyTime_HHMMSST%], duration of [%LongTachyDur_HHMMSSD%] and a heart rate of [%LongTachyRate%] BPM. The fastest episode of tachycardia was detected with an onset at [%FastTachyTime_HHMMSST%], duration of [%FastTachyDur_HHMMSSD%] and a heart rate of [%FastTachyRate%] BPM.

Atrial fibrillation was detected for [%AFibTime_NS%] of the monitoring period with a total of [%AFibPercent%]%. The peak average heart rate during atrial fibrillation was [%AFibPeakRate%] BPM.

Supraventricular ectopic activity consisted of [%SupraBeatCount%] beats, which included [%SupraSingles%] single beats, [%SupraPairCount%] pairs, and [%SupraRunCount%] runs of 3 beats or longer. There were [%SupraBigCount%] supraventricular bigeminy episodes and [%SupraTrigCount%] supraventricular trigeminy episodes. The SVE/hour was [%SupraPerHour%] and SVE/1000 was [%SupraPer1000%].

The fastest supraventricular run had a rate of [%SRFastRate%] BPM and occurred at [%SRFastTime_HHMMSST%]. The longest run was [%SRLongCount%] beats long and occurred at [%SRLongTime_HHMMSST%]. There were [%SupraTachyCount%] episodes of supraventricular tachycardia.

Ventricular pacing was detected for [%VPaceBeatCount%] beats, which is [%VPaceBeatPercent_NS%]% of the total; atrial pacing was detected for [%APaceBeatCount%] beats, which is [%APaceBeatPercent_NS%]% of the total; dual pacing was detected for [%DPaceBeatCount%] beats, which is [%DPaceBeatPercent_NS%]% of the total.

Ventricular ectopic activity consisted of [%VentBeatCount%] beats, which included [%VentSingles%] single beats, [%VentCoupCount%] couplets, [%RonTBeatCount%] R on T events, and [%VentRunCount%] runs of 3 beats or longer. There were [%VentBigCount%] ventricular bigeminy episodes and [%VentTrigCount%] ventricular trigeminy episodes. The VE/hour was [%VentPerHour%] and VE/1000 was [%VentPer1000%].

The fastest ventricular run had a rate of [%VRFastRate%] BPM and occurred at [%VRFastTime_HHMMSST%]. The slowest ventricular run had a rate of [%VRSlowRate%] BPM and occurred at [%VRSlowTime_HHMMSST%]. The longest run was [%VRLongCount%] beats long and

occurred at [%VRLongTime_HHMMSST%]. There were [%VentTachyCount%] episodes of ventricular tachycardia.

The longest R-R interval was [%LongestRR%] milliseconds at [%LongestRRTime_HHMMSST%], with [%PauseCount%] R-R intervals longer than [%PauseRR_NS%] milliseconds.

The R-R variability measures were: pNN50 of [%pNN50%], RMSSD of [%RMSSD%], SDNN Index of [%SDNNindex%], SDNN of [%SDNN%], and Triangular Index of [%HRVTrianIndex%].

The maximum ST Depression of [%MaxSTDep_1_NS%] uV was detected in lead [%MaxSTDep_Lead_1_NS%] at [%MaxSTDepTime_1_NS%], and the maximum ST elevation of [%MaxSTElev_1_NS%] uV was detected in lead [%MaxSTElev_Lead_1_NS%] at [%MaxSTElevTime_1_NS%].

The average QT was [%MeanQT%] ms, with a maximum QT of [%MaxQT%] ms occurring at [%MaxQTTime_HHMMSST%] and a minimum QT of [%MinQT%] ms occurring at [%MinQTTime_HHMMSST%]. The average QTc ([%QTcFormula_NS%], using [%QTcRR_NS%]) was [%MeanQTc%] ms, with a maximum QTc of [%MaxQTc%] ms occurring at [%MaxQTcTime_HHMMSST%] and a minimum QTc of [%MinQTc%] ms occurring at [%MinQTcTime_HHMMSST%].

[%UsrDefLabel1_NS%] was identified for [%UsrDef1Percent%]% of the recording with a total number of [%UsrDef1BeatCount%] beats. [%UsrDefLabel2_NS%] was identified for [%UsrDef2Percent%]% of the recording with a total number of [%UsrDef2BeatCount%] beats. [%UsrDefLabel3_NS%] was identified for [%UsrDef3Percent%]% of the recording with a total number of [%UsrDef3BeatCount%] beats.

Profiles

The Profile pages provide hour-by-hour statistics and a summary of the entire recording in four profile tables for recording durations up to 48-hours. When the recording duration exceeds 48-hours, the statistics are reported in four-hour increments.

1. General Rhythm Profile including a summary of total beats, diary events, heart rate, pauses, ST and user-defined events.
2. Supraventricular Rhythm Profile including a summary of diary events, heart rate, supraventricular ectopy, and supraventricular rhythm.
3. Ventricular Rhythm Profile including a summary of diary events, heart rate, ventricular ectopy, and ventricular rhythm.
4. RR and QT Profile including diary events, heart rate, RR variability values, and QT/QTc values.

Profile values are reported hourly and for the entire recording in the bottom summary row in each profile column. The period start time, diary event, and heart rate columns are repeated in each profile for correlation purposes.

Trends

The trends pages consist of 5-minute rhythm trends, QT and RR variability trends and ST trends.

Heart rate, QT/QTc, and RR variability trends include tick marks that present the minimum value at the bottom and the maximum value at the top with each 5-minute average represented by a horizontal line. The time of day is shown at the bottom of each trend in two-hour increments.

Rhythm trends show vertical marks when events are present. The amplitude of each mark represents the total number in a 5-minute period that can be correlated to the time below each trend and the numeric value shown horizontally at the left of each trend.

RR variability and ST segment trends include a single value for each 5-minute period. All recorded leads are trended and included in the ST trends. When ST elevation and depression episodes are present, the onset, duration, maximum µV, average µV, primary channel, secondary channels, and mean heart rate are reported in a table on the ST trend page.

For recording durations up to 48-hours, the heart rate trend is repeated in each trend for correlation purposes with 24-hours of data per page. Hourly trend periods are consecutively reported for each 24-hour period.

For recording durations greater than 48-hours, all trends with the exception of ST are wrapped to include up to 7-days of data per page. Two-hour trend periods are consecutively reported for the recording duration.

Templates

The templates pages consist of one page for each template type that is present in the recording: Normal, Supraventricular (when Supraventricular Template Group is enabled), Ventricular, Paced, and Unknown. Three leads are included for 12-lead and 3-channel recordings.

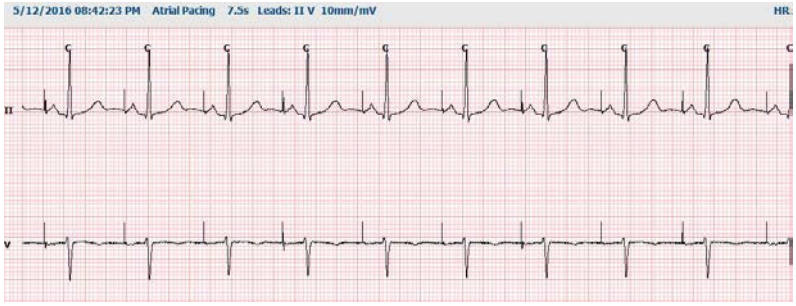
ECG Strips

The ECG strips pages are preceded by an index listing start time of the ECG strip, duration of the ECG strip, included leads or 12-lead strip, ECG strip annotation, and final report page number where the strip can be located.

The strips themselves are included with strip annotation, beat labels, timestamp, and reference grid. Full size 7.5-second ECG strips include a context of 22.5 seconds below each 1, 2 or 3-channel ECG strip. A 12-lead ECG strip includes the statement “An ambulatory 12-lead ECG obtained with torso-located limb electrodes is not equivalent to a conventional diagnostic ECG.”

Recordings with pacemaker detection enabled will include a spike marker at 500 µV amplitude where pacing has been detected by the Holter analysis system

.



A Page strip can also be included in the final report. The Page strip is similar to full disclosure, but can be set to include user-defined intervals of time (from 5 to 60 minutes of a single lead per page) when using the Strip Selection tool.

Time and amplitude scale are indicated in the upper left-hand corner and average HR for each line of waveform displays in the left margin of page strips and full disclosure pages.

Up to 100 strip pages may be included per each final report. Strip pages exceeding the maximum will not be included.

Full Disclosure

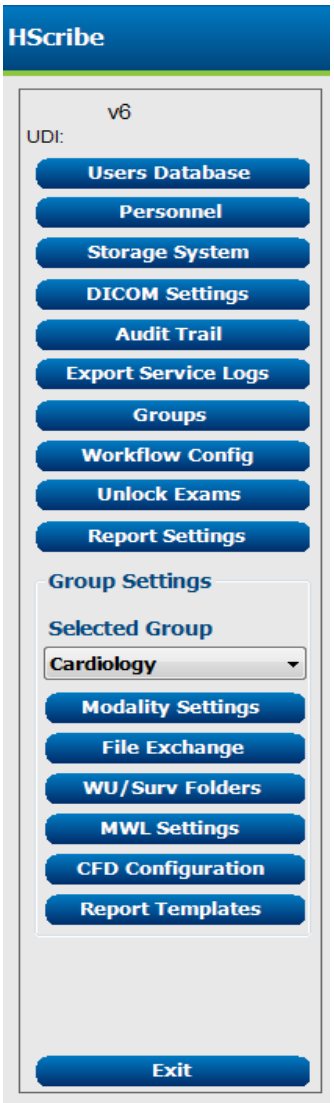
Full disclosure pages may be included if selected. Each page contains 60 minutes of miniature ECG at 2.5 mm/mV. Each line is 1 minute in duration with a minutes designation (:MM) every 5 minutes of the hour shown above the ECG and the BPM for each minute in the left border. Any of the recorded leads, with a choice of up to three, can be included in the full disclosure section of the final report.

Up to fifty full disclosure pages may be included per each final report. When selections exceed the maximum, a message prompt will request modification.

13. SYSTEM AND USER CONFIGURATION

Administration Tasks

The IT and Clinical Administrator user will select the **System Configuration** icon to enter the HScribe administrative functions. All other users can enter this menu to access the Export Service Log task only.



A list of administrative task buttons is presented to:

- Manage user accounts
- Manage personnel lists
- Manage Groups
- Manage archived exams*
- View audit trail logs
- Export service logs for troubleshooting purposes
- Configure system-wide modality settings
- Configure DICOM data exchange**
- Configure (DICOM) MWL Settings**
- Configure XML and PDF file exchange
- Configure demographics format (CFD)
- Configure report settings
- Configure workflow
- Unlock exams
- Configure Web Upload file location for import
- Configure surveyor Data file location for import
- Configure Final Report Templates

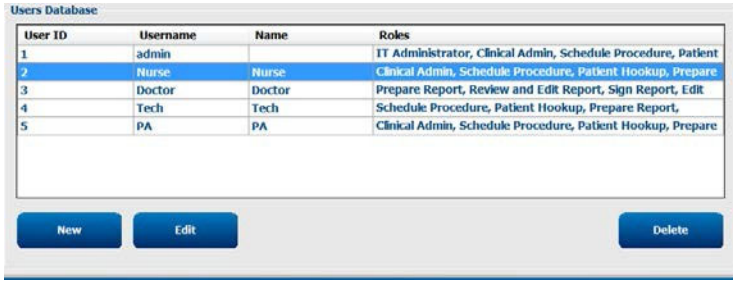
** Task may not be available when operating with DICOM*
*** Only present when DICOM feature is enabled*

Select the **Exit** button to close the System Configuration menu and return the user to the main display.

Manage User Accounts and Personnel

User's Database

The IT administrator will select **Users Database** to create new or delete user accounts, reset user passwords, assign roles (permissions) and groups for each user, and assign personnel entries for that user's selection. When a single sign-on is used, no user account and password creation is needed.



Personnel

Personnel is selected to add personnel that will be available in the Patient Information, Summary, and the Finalize Exam Update windows. Listed personnel can be assigned to each user account and will appear as selections for the logged-in user and in the appropriate final report fields.

New User

Selection of the **New** button within the Users Database window will open the New User dialog, similar to the window to the right.

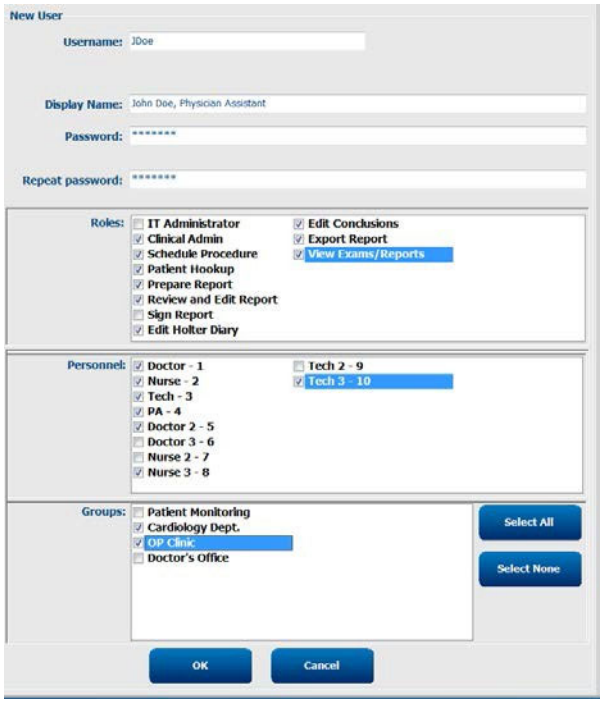
> ***Tip:*** *It is best to complete the Personnel list before adding Users so they can be selected here.*

The name entered in the Display Name field will appear on the HScribe display when that user logs in.

The login password is entered and repeated.

Roles for this user, Personnel that will populate drop-down lists for this user, and Groups that this user will have access to are checked.

> ***Tip:*** *Refer to* [User Role Assignment Table](#).

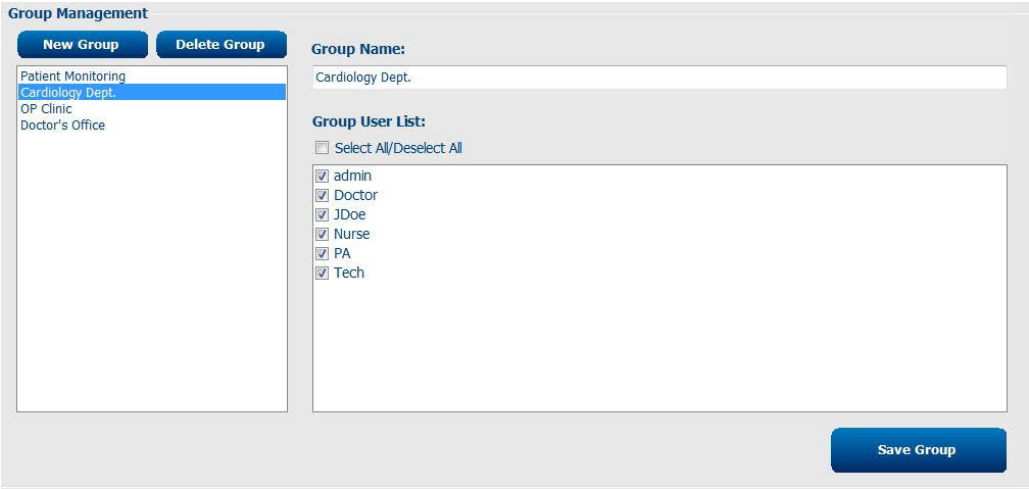


Manage/Create Groups

Groups allow the IT administrator to group exams according to user access, reporting preferences (modality settings) and file exchange preferences. Any user can be assigned to multiple groups. A group definition can be copied and saved with a new name to create a second group, copying all settings and preferences of the existing group.

- Select the **Groups** button to make changes. Any created group can be copied, renamed and modified.
- To create a new group, highlight the group you would like to copy, select **New Group**, and enter the new **Group Name**. A new group will be created with the settings of the highlighted group.
- Select the users under the **Group User List** that may have access to the highlighted group. The Select All and Deselect All selection can be used to enable or disable all users.
- If you want to rename a group without creating a new one, highlight the group, and enter a Group Name
- Select **Save Group** to save your changes.

The Default group (first in the list) can only be renamed. A number of new groups can be created and modified.



HScribe Modality Settings, DICOM Modality Worklist (MWL), File Exchange paths, Filename customization, and a long, medium, or short format for displayed items and report contents can be uniquely defined for each individual group.

Groups, with exception of the Default group, can be deleted. All existing exams present in the deleted group will be automatically assigned to the default group.

Modality Settings

HScribe modality settings are defined, as default, by the Clinical Administrator user and are available for the user with editing permissions. A user with editing privileges is able to modify these settings on a per exam basis. Select the tab you wish to modify and click on **Save Changes** or **Discard Changes** to cancel changes before exiting.

ECG Strip Annotations

ECG strip annotations available for selection when adding a strip to the final report can be added, removed, and moved up or down in the list.

Automatic Strip Leads

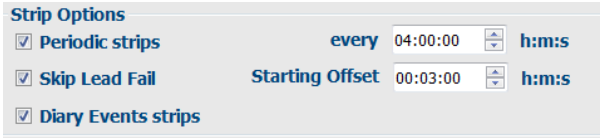
One, two, three, or 12 leads can be selected as a default for auto-strips settings selection for the final report.

Automatic Periodic Strips and Diary Event Strip Options

Strip Options include the ability to include periodic strips that can be set every HH:MM:SS as well as setting the offset time for the first strip.

ECG strips with lead failure can be excluded by checking the **Skip Lead Fail** checkbox.

Diary Events strips are included when enabled.

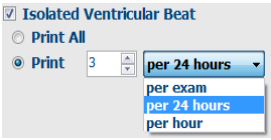


Automatic Strip Episodes and Events

Min/Max Episodes are selected by enabling the checkbox to include the most extreme ECG event that meets the criteria with the start centered in the 7.5 second strip.

Ventricular Events, **SV Events**, **Rhythm/ST**, **Paced Events**, and **User Defined** automatic strip selections are grouped according to rhythm and event type.

Event types allow selections to enable/disable inclusion by checkbox, print all or print a designated number of automatic strips from 1 to 100 per the entire exam, per each 24-hour period, or per each recorded hour.



Scan Criteria

Scan Criteria settings define default analysis thresholds for all Holter recordings. Default values defined in this window will apply to all recordings unless changed on an individual basis by users with editing permissions on a per recording basis.

Analysis Duration From Recording Start allows the recording duration to be set in days, hours, and minutes for less than the full recording duration. Change is not available in this mode.

Pacemaker Analysis checkbox is not available in this mode.

Diary

Use **Add** or **Remove** to modify the Diary Annotations list.

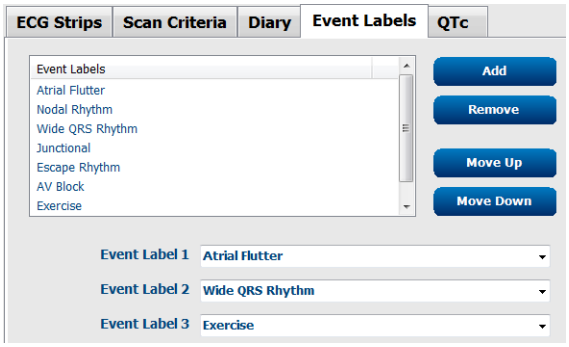
Items added in this window will be available when Diary Events are added or edited.

Items can be moved up or moved down within this list.

Event Labels

Event labels available for selection when identifying an ECG event in the recording can be added, removed, and moved up or down in the list.

A maximum of three event labels selected from the Event Labels listing can be identified as default in this window.



QTc

The default formula choice for QTc Linear, Bazett, or Fridericia is chosen in this window with selection of a radio button.

Three user-selectable choices for RR intervals to be used for QTc calculation are selectable by radio button. Choices are RRprior (previous RR interval in milliseconds), RR16 (sum of the previous 16 RR intervals), and RRc (weighted average of the past 256 RR intervals).

File Exchange

HScribe supports the ability to import orders from XML files and export PDF, XML, or both results to an external system dependent on the HScribe system activated features. Import/Export directories for the selected group are defined in the File Exchange Configuration window under the File Export Settings tab.

Enter information into the File Information fields to include institution and department information in the exported results.

The Site Number field is applicable to E-Scribe imported UNIPRO files from 10-second 12-lead Holter ECG data.

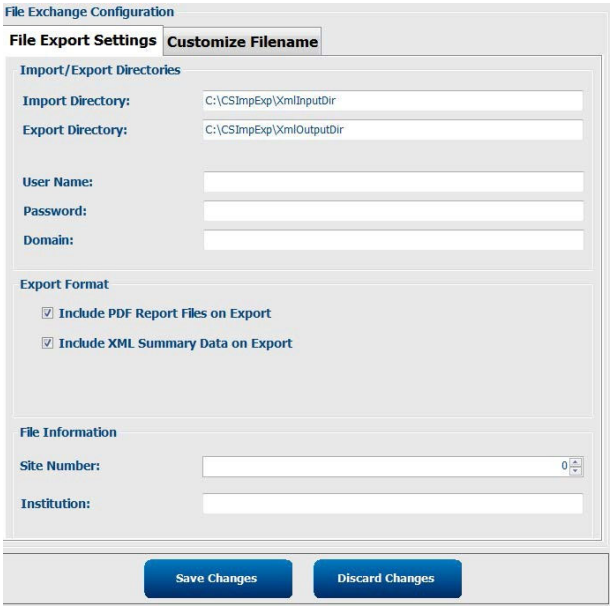
The file name configuration for XML and PDF results may be customized under the Customize Filename tab. To customize, select the **Clear Filename** button, select the tags in the order you wish them to appear in the name, and then **Save Changes**.

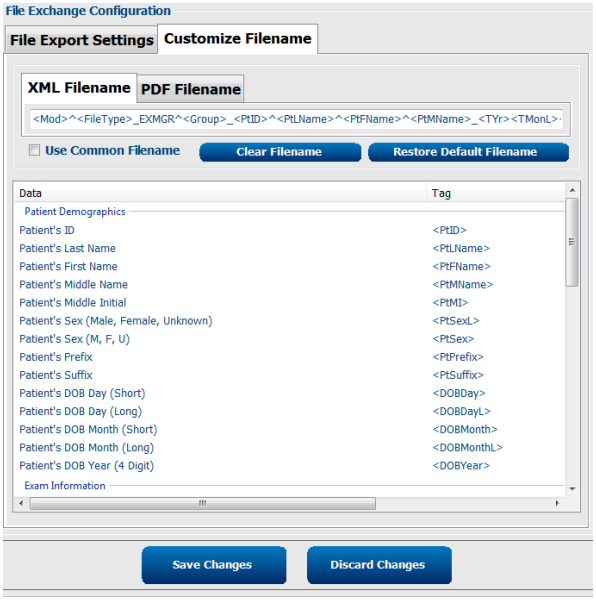
To use a common filename for both PDF and XML files, select the **Use Common Filename** checkbox.

> ***NOTE:*** *Default Import/Export paths are defined during software installation. PDF files will be exported to C:\CSImpExp\XmlOutputDir until modified by the administrative user. Access to PDF files are based on user account settings. Permission changes to the file or folder may be required.*

> ***NOTE:*** *When DICOM communication is enabled, XML (orders) import selection is grayed to indicate it is unavailable.*

File Export Settings	Customize Filename





Refer to *HScribe Data Exchange Configuration*.

Standard File Export

Systems configured with standard export options includes the ability export XML V6 Holter Statistics and a PDF copy of the final report to the defined destination.

RX File Export

Systems configured with RX export options includes the ability to export an XML V6 Rx Holter Statistics file, Holter ECG strips with waveform in Mortara XML format, UNIPRO32 12-lead ECG strips, and a PDF of the final report to the defined destination. The Rx XML Statistics file will include Diary Period summaries, when diary event strips are included, in addition to hourly summaries.

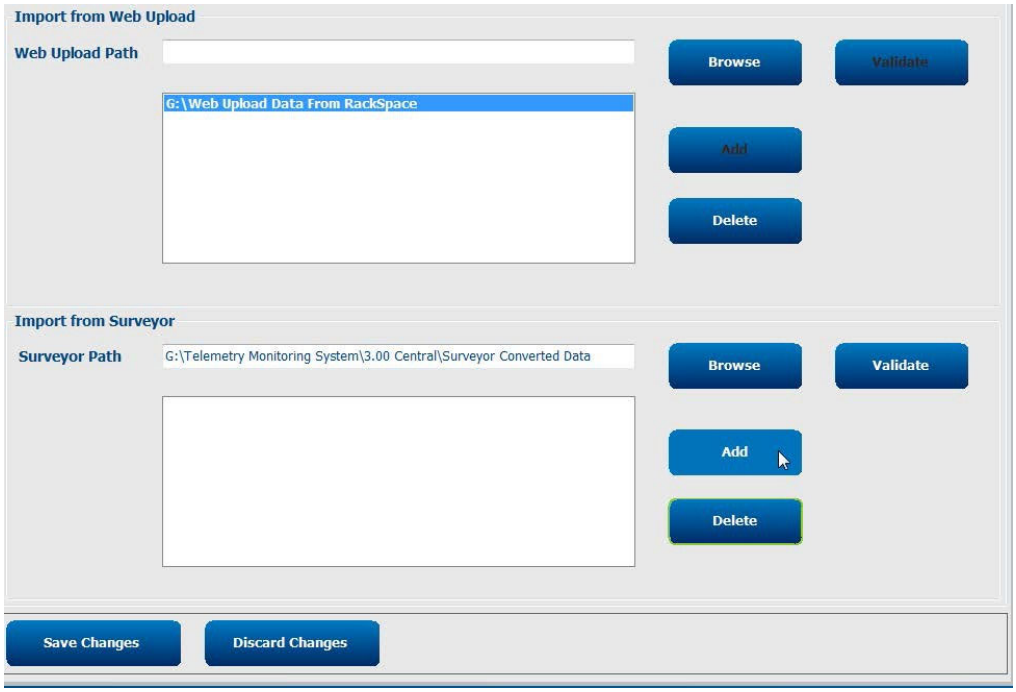
Web Upload/Surveyor Folders (WU/Surv)

HScribe supports the ability to import Web Upload server recordings and Surveyor Central system monitoring data dependent on the system activated features. The Web upload and Surveyor import paths are defined within this selection.

The Windows user running HScribe must have read/write access to the directories. Select the Path field and select Browse to navigate to the appropriate directory, or enter the path manually. Click **Add** to include the path for the selected group.

Web upload and Surveyor data paths can be removed by highlighting the path and selecting **Delete**.

Web upload and Surveyor paths can be authenticated using **Validate**. When the path is not valid a red exclamation mark (!) is displayed next to the path field.



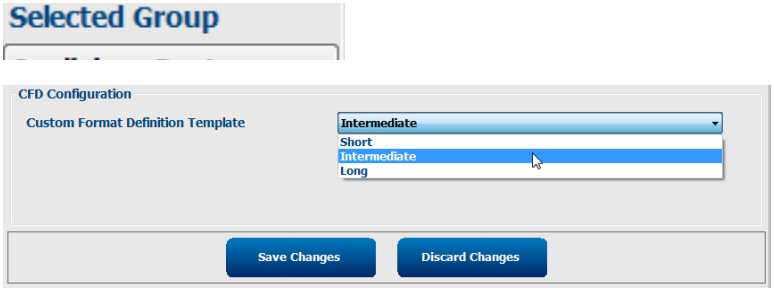
When finished, select **Save Changes** to save, or **Discard Changes** to cancel.

CFD Configuration

A long, medium, or short format for displayed items and report contents can be uniquely defined per Group. Select the **CFD Configuration** button to display the Custom Format Definition Template drop-down list. Choose the Long, Intermediate, or Short template for the selected group and then click the **Save** button, or the **Cancel** button to discard your changes.

The **Long** format contains all demographics.
The **Intermediate** format excludes the patient contact information.

The **Short** format excludes the patient history and contact information in the report summary.



Long CFD	Intermediate CFD	Short CFD

NOTE: *When only one Group exists, the Group selection will not be included in the Patient Information dialog.*

DICOM and MWL Settings

HScribe supports the ability to exchange information with DICOM systems dependent on the system activated features. A DICOM Modality Worklist (MWL) will be received from the DICOM server. A DICOM encapsulated PDF will be exported to the defined destination. Refer to *HScribe Data Exchange Configuration*.

Unlock Exams

HScribe internally tracks transitioning exams preventing the same exam to be processed by two or more users. When a second user attempts to access an exam in use, a message displays with notification that the exam is not currently available.

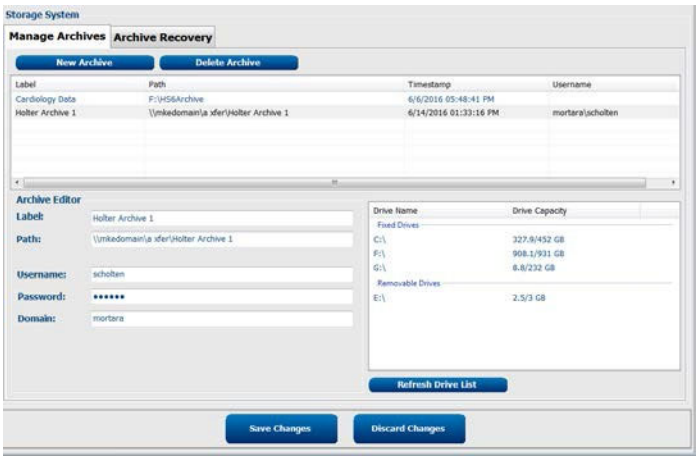
As a measure for recovering locked exams, administrative users can unlock an exam that resides on the same workstation by selecting **Unlock Exams**. Highlight the listed exam(s) and click on **Unlock**.

Manage Archive Storage

The HScribe administrative user will manage storage system disks through selection of Storage System.

Add Archive Location

Select **New Archive** button to begin definition of a path to the archive directory destination.



- Any external disk (e.g. NAS, USB, etc.) accessible from the HScribe central database is a candidate for becoming an archive volume.
- The archive path should be defined as a UNC path such as \\ServerName\ShareName\Directory\
- A Username, Password and Domain may be entered as needed to add the new storage disk to the Archive drive listing.

Select **Save Changes** button to create the archive location or **Discard Changes** button to exit this window without saving changes.

The **Refresh Drive List** button is available to update the list of available drives.

An archive path may also be deleted by highlighting the desired label and selecting the **Delete Archive** button. When selected, a prompt asking if you are sure you want to delete the selected archive is presented. Select **Yes** or **No**. Archived exams will remain at the destination until they are manually deleted.

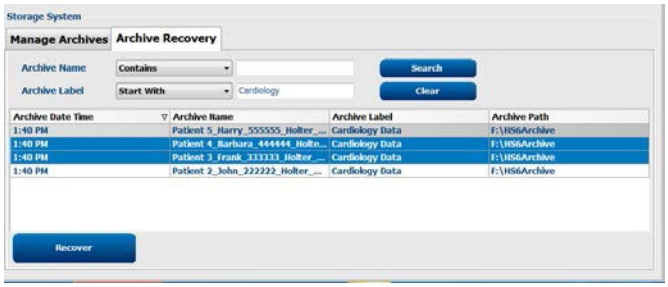
Recover Archived Exams

Administrative users can restore exams from the archive location to the HScribe database through selection of the **Archive Recovery** tab. Once selected, a window will open allowing a search of the Archive Name or the Archive Label.

To search by Archive Name, a letter or number combination may be entered to show exams that contain the characters. To search by Archive Label, the first letter of the label can be entered with the Start With description, or the entire Archive Label can be entered with the Equal To description. Select the **Search** button when ready. The **Clear** button can be selected to clear all search fields. Column headers can be selected to sort listed exams by that item.

To restore exams, highlight the desired exam(s) in the list and click on **Recover**.

Multiple exams can be restored by highlighting them followed by a single **Recover** button click.

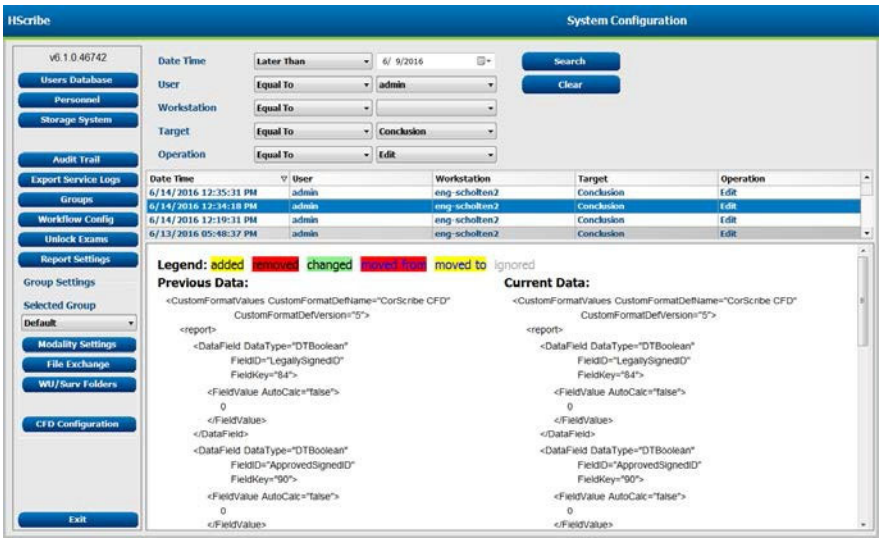


Audit Trail Logs

The HScribe administrative user will select **Audit Trail** to view the audit trail history. A selection of filter criteria is available to sort the listing by date, user, workstation, operation, or target (e.g. User, Patient, Exam, Conclusion, Locked Exams, User and System Settings). One or more filter criteria can be used to find audit trails.

Selection of results will display differences by comparing the XML statistics data before and after changes. A legend with colored highlighting will point to added, removed, changed, and moved information.

All configuration information, user information, patient demographic information, exam demographic information, textual conclusions, archive operations, and exam download requests are tracked by the audit trail with a date and time.



Service Logs

All HScribe users have access to **Export Service Logs**. Selection of the button creates a Win-7 zipped file that can be sent to the desktop containing a copy of the system logged events.

The file named EMSysLog.xml.gz can be e-mailed to a Welch Allyn service representative for troubleshooting purposes.

Configure Workflow

The HScribe exam states are designed to follow typical user workflow. There are six possibilities with meanings defined below each state:

1. ORDERED
   The Holter exam is either scheduled by a user or an external scheduling system has sent an order.

2. IN PROGRESS
   The Holter recorder or media card has been prepared and is in process of recording patient data.

3. ACQUIRED
   The Holter recording has completed data collection and the recording has been imported at the Hscribe system, ready for review and editing.

4. EDITED
   The Holter recording has been analyzed with or without changes and is ready for review by a physician. Conclusions may be entered at this state.

5. REVIEWED
   The Holter recording has been reviewed and confirmed to be accurate by an authorized user (e.g. physician, fellow, clinician, etc.). Conclusions may be entered at this state.

6. SIGNED
   The exam is reviewed and electronically signed by an authorized user. No further workflow processing is required. Conclusions may be entered at this state.

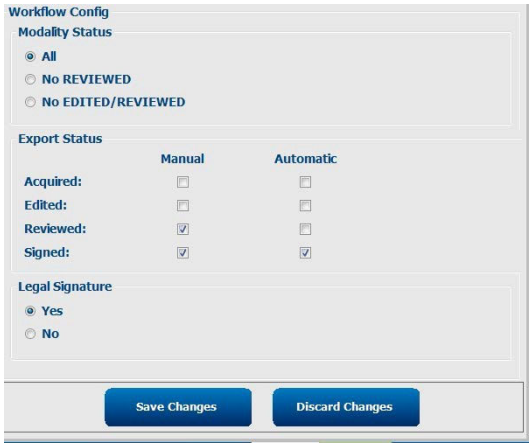
The user with appropriate permissions is prompted with a Final Exam Update dialog to confirm or Update the next logical state when exiting a Holter exam. A drop-down menu allows selection of a state in respect to the exam's current state.

Workflow Config

Administrative users can configure the workflow to include all, or exclude some states through selection of **Workflow Config**.

Modality Status

- Select **All** under Modality Status to enable all five states.
- Select **No REVIEWED** under Modality Status to move the state from EDITED to SIGNED.
- Select **No EDITED/REVIEWED** under Modality Status to move the state from ACQUIRED to SIGNED.



Export Status

Checkboxes allow choices for Manual or Automatic export of the results when the state is updated to Acquired, Edited, Reviewed or Signed. Any combination may be selected.

Legal Signature

A Legal Signature can be enabled by selecting **Yes** or disabled by selecting **No**.

No Legal Signature

When updating the exam to the signed state, the signature area will show the approver's name with a label of **Approved by:** in the final report.

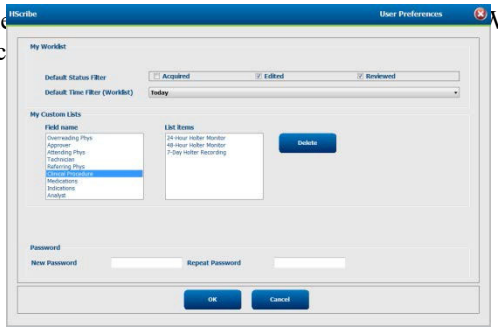
About the Legal Signature

The legal signature requires the user credentials prior to updating a Holter exam when changing to a signed state. When enabled, the user is prompted to authenticate with a user name and password when transitioning to the signed state. Authentication can be entered when a different user is currently logged in. When incorrect or no credentials are entered, the user will be notified with a message that the "Credentials supplied are not valid."

When the signing physician has been set up as an Attending Physician under Personnel, the printed name will appear in the HScribe final report on the signature line following the **Electronically Signed by:** field label with the date signed.

User Preferences

Select the User Preferences icon to open the window. Set sel Worklist in the Search feature when the particular user is logged into HSc



Set selections can be changed when the user selects the Advanced search selections.

The user can also change the password in this window when the system is not set up with a single sign-on.

All users have access to the User Preferences settings but may not have the Search feature available. Those users will only enter this window to change their own password.

There are three possible choices for the Worklist Holter exam states that can be enabled or disabled by checkboxes. The choices are dependent on the workflow configuration modality status setting in that Edited or Review may not appear as selections.

1. Acquired
2. Edited
3. Reviewed

There are three choices for the default time filter for worklists.

1. All
2. Today
3. Last week

The user's custom lists can also be modified on this page. Some demographic data entry lists also accept free text which will be automatically added to the list for future use. "My Custom Lists" allows deletion of any list items the current user does not wish to use in the future.

The user can change his password on this page, only if "Single Sign On" is not used

When finished, select **OK** to save changes or **Cancel** to exit the window without saving changes.
HScribe will present the default settings on any of the workstations that this user logs into.

Report Settings

Multiple HScribe final reports can be created and saved with user-defined names. These final report choices will be available in a drop-down list when finalizing exams.

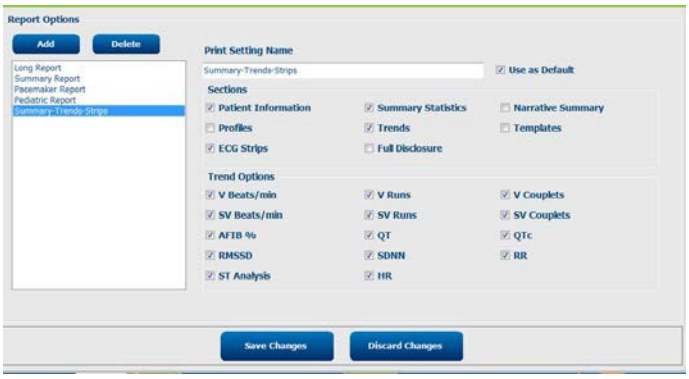
Click on the **Report Settings** button. Click the **Add** button to create a new report type.

- Choose the report sections to include using the checkboxes
- Choose individual trends to include or exclude when the Trends section is enabled

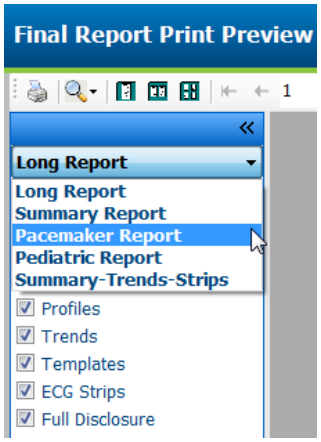
Enter the name of the report in the Print Setting Name field. The Use as Default check-box may also be selected.

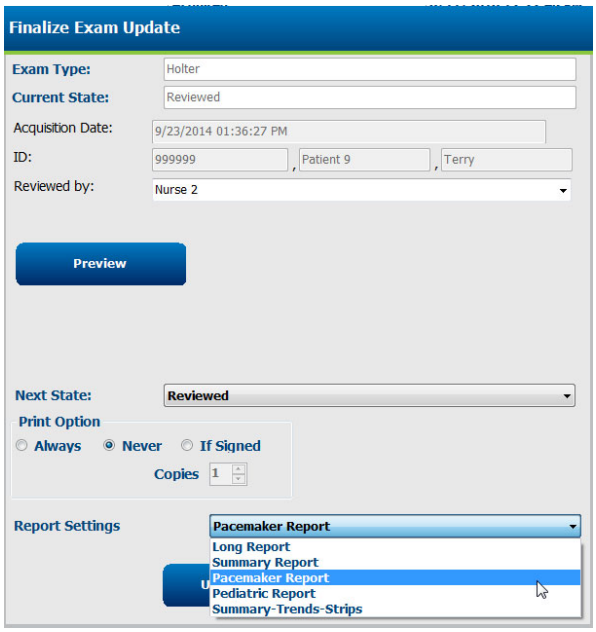
Click on the **Save Changes** button when finished, or **Discard Changes** to cancel without saving.

Click the **Delete** button to remove a report type from the Print Setting drop down list when it is no longer needed.



Once created and saved, the Report Settings list will be available in the Finalize Exam Update dialog when exiting an exam and in the Final Report Print Preview display when the **Preview** button has been selected.





Report Templates

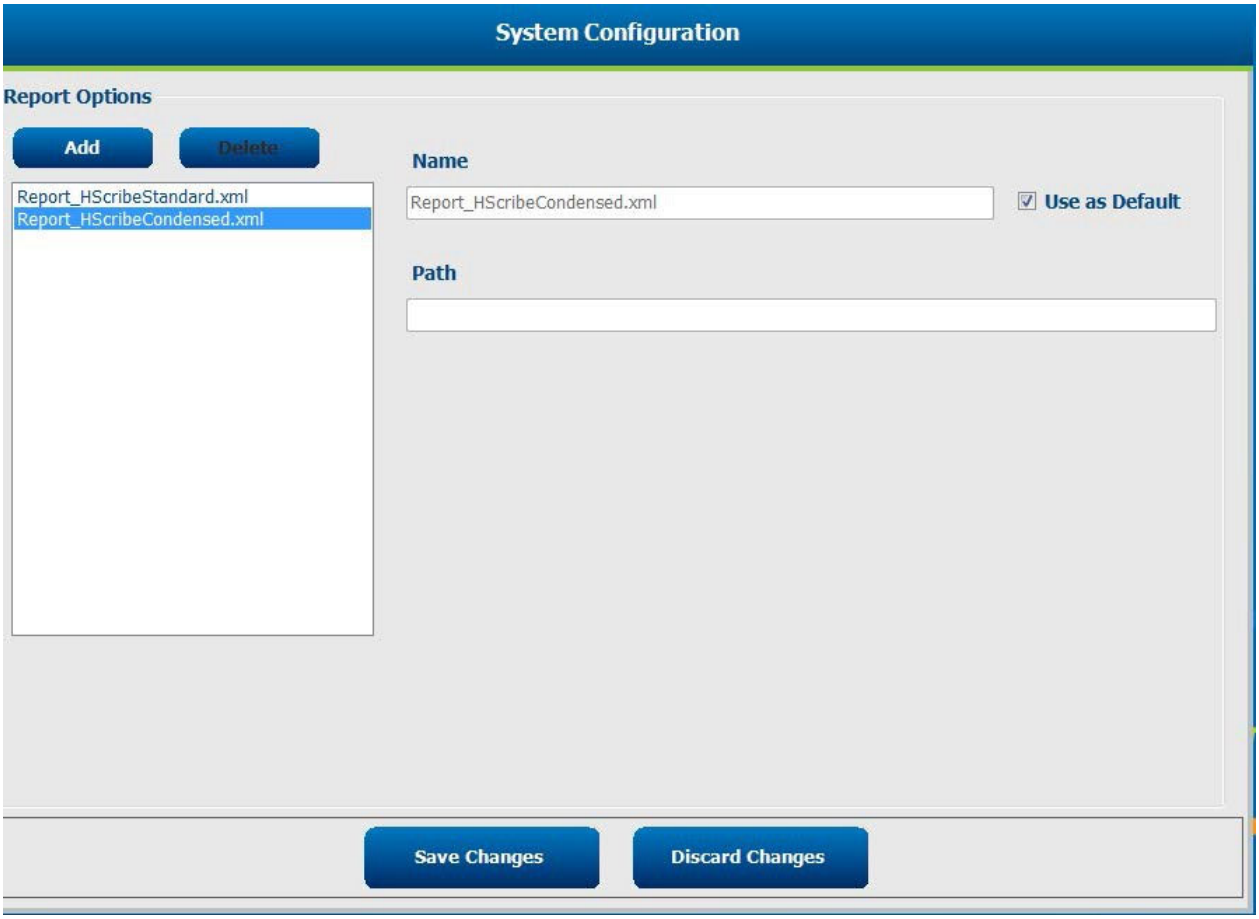
Report Options list two choices for the Final Report template.

1. Standard report presents a comprehensive report with advanced summary statistics
2. Condensed report presents a subset of the summary statistics on the first page of the final report

Click on the **Report Templates** button and then highlight Report_HScribeStandard.xml for the Standard report or highlight the Report_HScribeCondensed.xml for the Condensed report.

Enable the Use as Default checkbox to use the highlighted selection as default for the Selected Group.

Click on the **Save Changes** button when finished, or **Discard Changes** to cancel without saving.

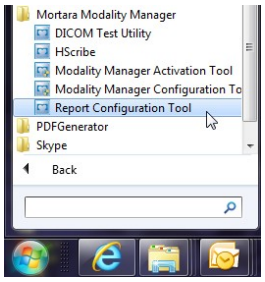


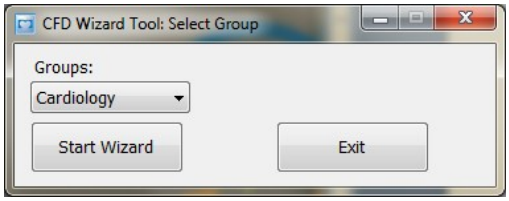
NOTE: *The Add and Delete buttons and Path field are not currently functional or supported.*

Report Configuration Tool

HScribe final reports should be configured with the practice name prior to using the system. The default sections for final report inclusion are also customizable within this tool.

Click on the HScribe workstation **Start** menu. Choose **All Programs, Mortara Modality Manager** followed by **Report Configuration Tool** to open a dialog window prompting a **Group** choice from a drop-down list. Each group that has been defined will have its own report configuration.

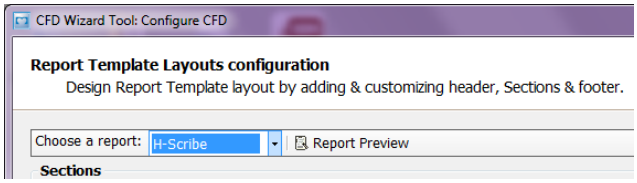




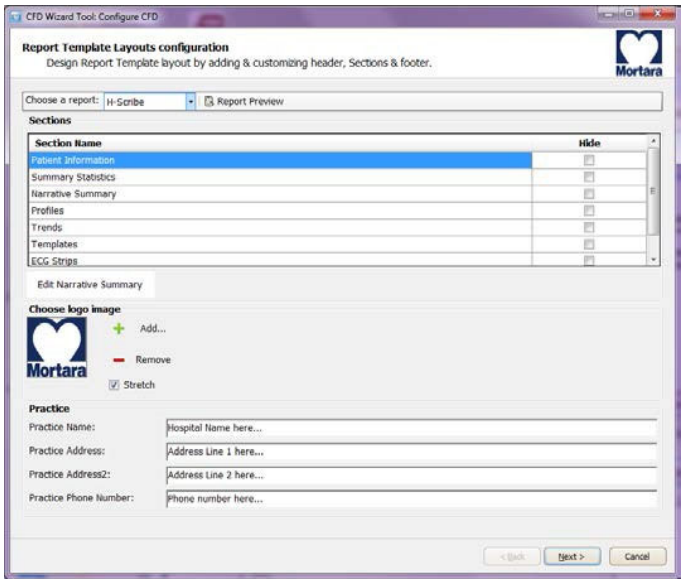
Click on the **Start Wizard** button to open the tool. The **Exit** button will close the tool.

Configuring the Final Report

Choose the HScribe report using the **Choose a Report** drop-down list, if necessary.



The Report Template Layout configuration will open for the selected Group.



Configuring the Final Report

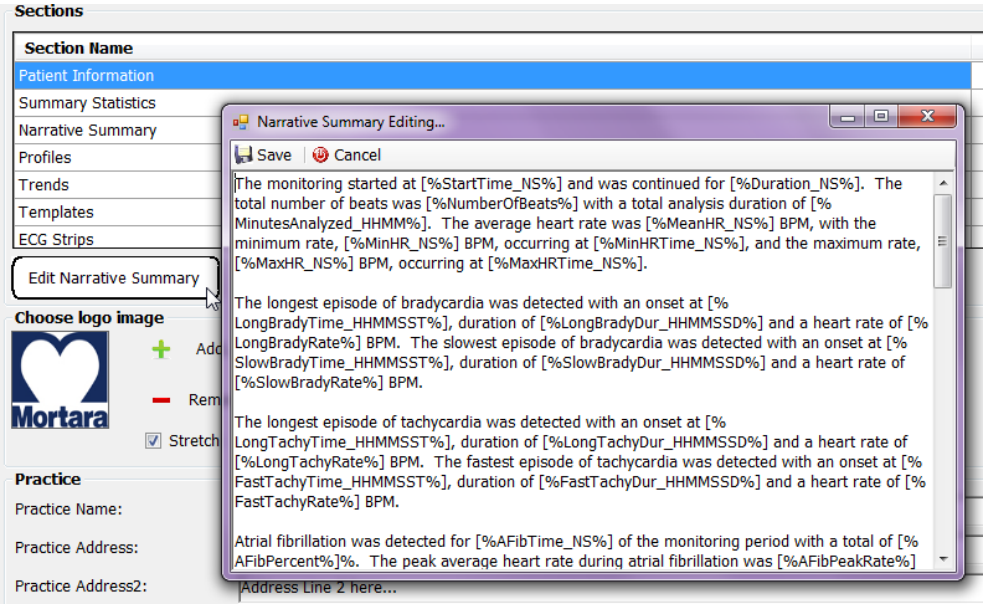
Once the tool is opened, the following can be performed:

1. Hide final report sections by checkbox selection in the Report Configuration Tool. When the box is checked, the section is disabled as a default; however, the section can be enabled for printing and export when previewing the final report for each individual patient.

2. **Add** or **Remove** a logo image for the HScribe final report header. The **Stretch** checkbox causes the logo to fit into the header area appropriately.

3. Enter institution contact information under the **Practice** section.

4. Customize the narrative summary by clicking on the **Edit Narrative Summary** button. Text that is not enclosed in brackets [xxx] can be customized as desired. Text and bracketed data can be removed as desired. Select Save when finished to save your changes and close the text file. Select Cancel to exit without saving your changes.



When finished, click on **Next >** and then **Finish**. **<Back** allows you to return to the previous screen; **Cancel** prompts you with an "Are You Sure" message. Select **Yes** to cancel the changes.

Once finished, the Group selection is still available for you to choose the next group to repeat the steps listed above. When done defining all groups, select the **Exit** button.

14. TROUBLESHOOTING

Troubleshooting Chart

This chart is intended to assist with some common conditions to save time and expense. When issues are not resolved by troubleshooting, contact Welch Allyn Customer Support (refer to page 1).

Condition or Issue	Possible Cause	Solution
Poor waveform quality	Poor skin-to-electrode contact. Moist skin (oils and lotions). Excessive chest hair. Insufficient or dried electrode gel. Faulty patient cable.	Re-prep, clean, gently abrade and dry skin. Shave to remove hair from electrode sites. Replace electrode(s). Replace patient cable.
Failure to detect H3+ recorder when connected to interface cable.	Battery is not removed when connected to USB interface cable. Faulty recorder. Faulty interface cable. Ability to import is not activated in the Holter application.	Remove battery and reconnect. Ensure that interface cable is connected to CPU properly and recorder is firmly connected. Check your system activation (Start menu → Modality Manager → Modality Manager Activation Tool).
Failure to detect H12+ media card in media card reader.	Media card reader is not detected by computer. Faulty media card. Faulty media card reader. Ability to import is not activated in the Holter application.	Ensure that media card reader is connected to CPU properly and media card is firmly inserted. Check your system activation (Start menu → Modality Manager → Modality Manager Activation Tool).
Intermittent muscle tremor artifact during activities.	Electrodes positioned in muscular locations.	Refer to lead placement recommendations in device user manual to avoid muscular areas.
Square waves displayed on the multi-lead rhythm display screen	Lead fail caused by poor skin-to-electrode contact. Broken lead wire/cable.	Perform good skin prep prior to recording start. Replace patient cable.
Incorrect Heart Rate	Excessive noise causing beat labels on artifact areas. Very low amplitude causing missed beat detection.	Perform good skin prep prior to recording start. Insert and delete beat labels to correct classification.

Condition or Issue	Possible Cause	Solution
Pause or long RR interval errors	Low amplitude signal. Artifact preventing accurate beat detection.	Check signal amplitude at the recorder prior to starting the recording. Insert beat labels or mark regions of artifact during editing.
Ventricular errors	Excessive noise causing wide appearing beats.	Perform good skin prep prior to recording start. Relabel beats or regions as artifact during editing.
Supraventricular errors	Excessive noise causing beat labels on artifact areas. Prematurity % in Scan Criteria is set too low for this exam.	Perform good skin prep prior to recording start. Relabel beats or regions as artifact during editing. Select Edit→ Scan Criteria to adjust prematurity threshold. Use Supraventricular Prematurity Histogram to review ECG when adjusting prematurity percent.
Pacemaker spike errors	Excessive noise causing pacemaker spikes to be inserted in artifact areas.	Perform good skin prep prior to recording start. Relabel beats or regions as artifact during editing. Perform a Rescan and disable pacemaker spike detection in the Scan Criteria window.
Excessive mislabeling with inaccurate automatic strips	Low QRS amplitude with large T-waves. High degree of noise in one or two channels. Patient removed ECG leads prior to Holter recording end time.	Perform good skin prep prior to recording start. Relabel beats or regions as artifact during editing. Perform a Rescan to exclude leads causing issues. Perform a Rescan to shorten the recording analysis duration.

15. SYSTEM INFORMATION LOG

The following system information log is provided for your convenience. You will need this information if the system needs servicing. Update the log when you add options or your system has been serviced.

> ***NOTE:*** *It is strongly recommended that you make a copy of this log and file it after you enter the information.*

Record the model and serial number of all components, dates of removal, and/or replacement of components, and the name of the vendor from whom the component was purchased and/or installed.

In addition to having records of this information, the system information provides a record of when your system was placed in service.

Manufacturer:

Welch Allyn, Inc.
4341 State Street Road
Skaneateles Falls, NY 13153

Telephone Numbers:

Domestic: 800-231-7437
European: +39-051-298-7811

Sales Department: 800-231-7437
Service Department: 888-667-8272

Product Information:

Name of Unit/Product: HScribe

Date of Purchase:_____/_____/_____

Purchased Unit From: _____

_____

_____

_____

Serial Number _____

Software Version: _____

For questions or service information when calling into Welch Allyn Technical Support, have the system serial number and the reference number available. The serial number and part number (REF) are printed on the Product Identification Card (9517-006-01-ENG) delivered with the system software.

16. USER ROLE ASSIGNMENT TABLE

	IT Admin	**Clinical Admin**	**Schedule Procedure**	**Patient Hookup**	**Prepare Report**
Main Screen					
MWL / Patients	No	Yes	Yes	No	No
Prepare Recorder / Card	No	No	No	No	No
Import Recordings	No	No	No	Yes	No
Exam Search	No	Yes	No	No	Yes
User Preferences	Yes - No Status Filter	Yes - No Status Filter	Yes - No Status Filter	Yes - Filter Acquired only	Yes - Filter Acquired and Edited only
System Configuration	Yes - No Modality Settings, CFD or Report Settings	Yes - Audit Trail, Service Logs, Report Settings, Modality Settings and CFD	Yes - Service Logs only	Yes - Service Logs only	Yes - Service Logs only
Exam Search					
Edit	No	No	No	No	Yes - Acquired and Edited Exams only
Report	No	No	No	No	No
Copy Offline	No	Yes	No	No	No
Open Offline	No	No	No	No	Yes
Export	No	No	No	No	No
Reconcile	No	Yes (Signed only)	No	No	No
Archive	No	Yes	No	No	No
Delete	No	Yes	No	No	No

	IT Admin	Clinical Admin	Schedule Procedure	Patient Hookup	Prepare Report
Editing Permissions					
Summary Tables	No	No	No	No	Yes
Conclusions Section	No	No	No	No	Diagnosis, Reason For End and Technician
Patient Data	No	No	No	Patient and Contact Fields - only after Acquisition	Admission ID, Indications, Referring Physician, Procedure type, Location, Notes, and Technician
Page Review	No	No	No	No	Yes - View/Add/Edit Events and Print
Update Exam State	No	No	No	Acquired only	Edited only

	Review and Edit Report	Sign Report	Edit Conclusions	Export Report	View Exams/Reports
Main Screen					
MWL / Patients	No	No	No	No	No
Prepare Recorder / Card	No	No	No	No	No
Import Recordings	No	No	No	No	No
Exam Search	Yes	Yes	Yes	Yes	Yes
User Preferences	Yes	Yes	Yes - Filter Acquired and Edited only	Yes - No Status Filter	Yes - No Status Filter
System Configuration	Yes - Service Logs only	Yes - Service Logs only	Yes - Service Logs only	Yes - Service Logs only	Yes - Service Logs only

	Review and Edit Report	Sign Report	Edit Conclusions	Export Report	View Exams/Reports
Exam Search					
Edit	Yes - Acquired, Edited, Reviewed Exams only	Yes	Yes - Acquired and Edited Exams only	No	Yes
Report	No	No	No	No	Yes - Reviewed and Signed Exams only
Copy Offline	No	No	No	No	No
Open Offline	Yes	Yes	Yes	No	Yes
Export	No	No	No	Yes - Reviewed and Signed Exams only	No
Reconcile	Yes (Not Signed)	Yes (Not Signed)	No	No	No
Archive	No	No	No	No	No
Delete	No	No	No	No	No
Editing Permissions					
Summary Tables	No	No	No	No	No
Conclusions Section	Symptoms and Conclusions	Symptoms and Conclusions	Symptoms and Conclusions	No	No
Patient Data	No	No	No	No	No
Page Review	Yes - View and Print only	View and Print only	Yes - View and Print only	No	Yes - View and Print only
Update Exam State	Reviewed only	Signed only	Edited only	No	No - Screen is not shown

17. HSCRIBE DATA EXCHANGE CONFIGURATION

Data Exchange Interfaces

The HScribe can exchange data with other information systems using file exchange and/or DICOM®. HL7 is also possible by adding Welch Allyn's HL7 Gateway to the solution.

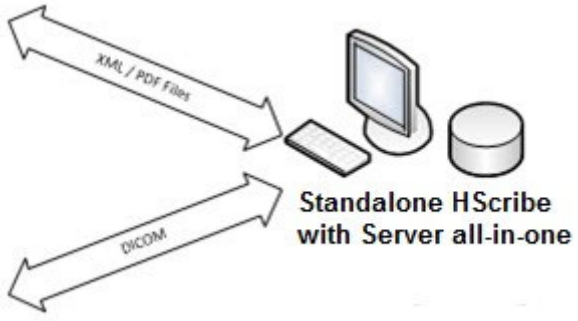
All data exchange is performed by the central HScribe Server (aka Modality Manager); all HScribe workstations connected to the dedicated HScribe Server share the same data exchange settings.

Glossary

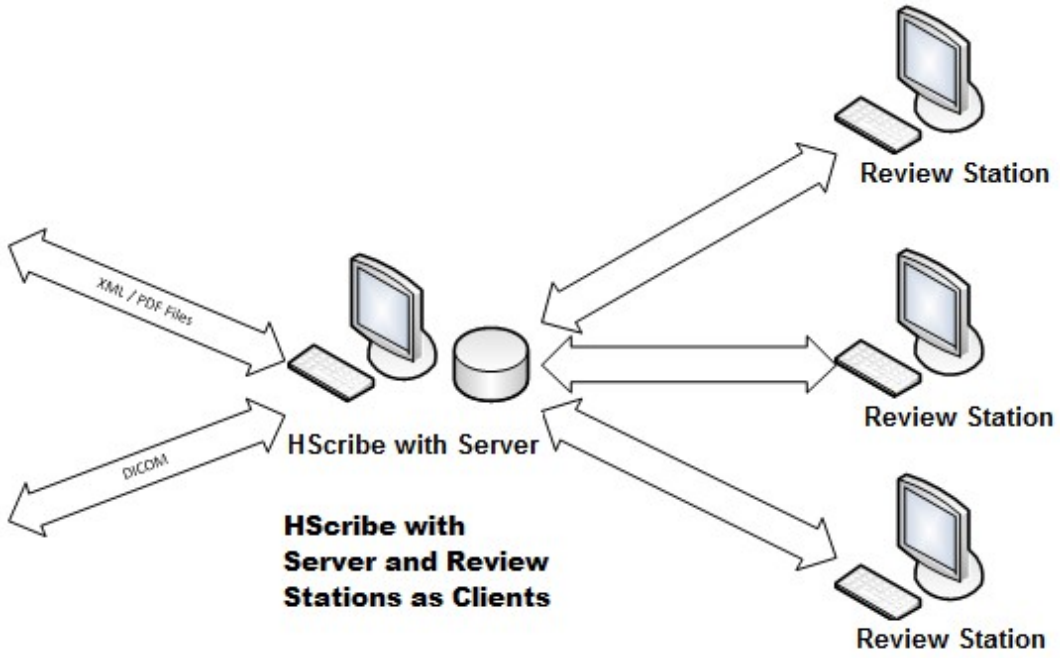
Term	Definition
Ordered Test	A diagnostic test that has been electronically ordered by an authorized caregiver. Scheduling may be a separate step, or "now" may be implied by the ordering system.
Scheduled Test	An ordered test that has also been scheduled to be performed at a specific time. It could be scheduled for now, any time today, a specific date, and/or a specific time.
HScribe Server or Modality Manager	The database used to organize and store patient and test data. It may reside on the local HScribe computer, a remote HScribe computer, or on a central server. An HScribe is associated with one and only one HScribe Server (Modality Manager).
Ad Hoc Test	A test that is performed without an electronic order.
HScribe Desktop	The application desktop that displays the icons for such tasks as performing a test, editing a test, finding a test, finding a patient, etc.
SCP	Service Class Provider. In DICOM, this is the "server" that listens for connections from clients.
SCU	Service Class User. In DICOM, this is the "client" that initiates the connection to the SCP.
MWL	DICOM Modality Worklist.

Network Topologies

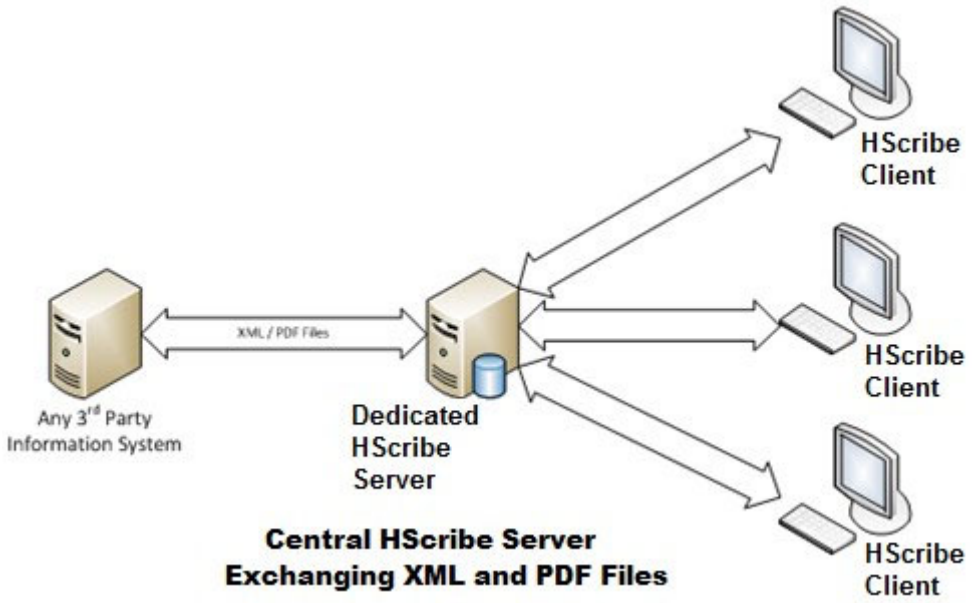
The simplest installation is a standalone HScribe with a local Server.



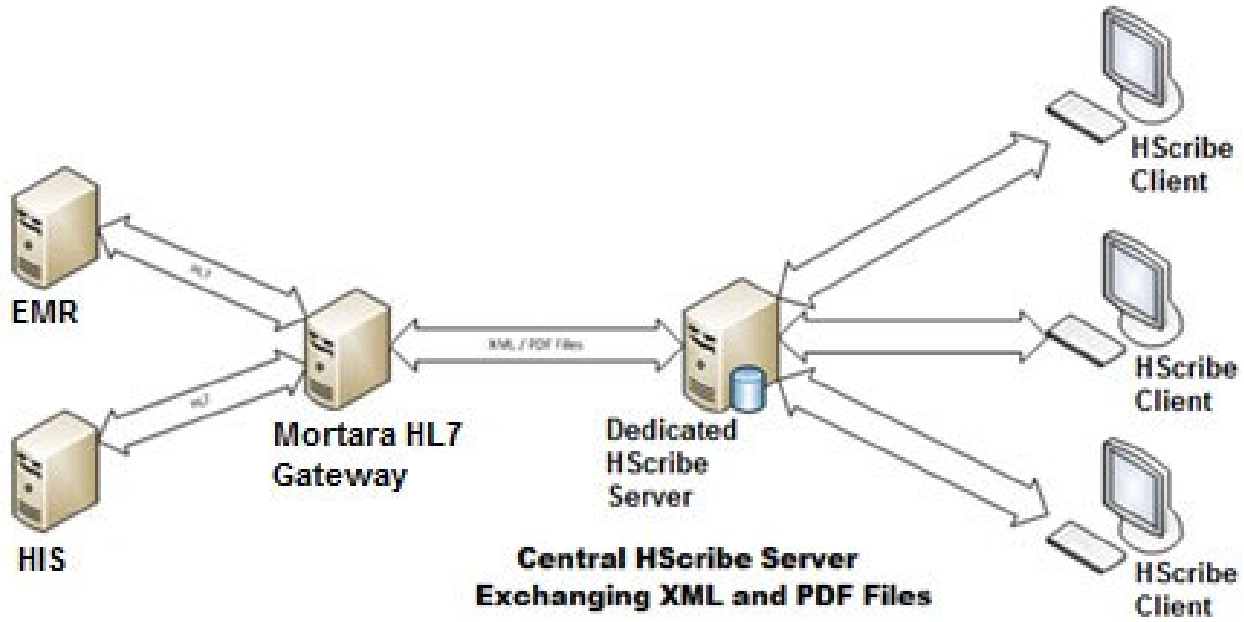
A small number of Review Stations can be networked to a HScribe that hosts the central server (Modality Manager).



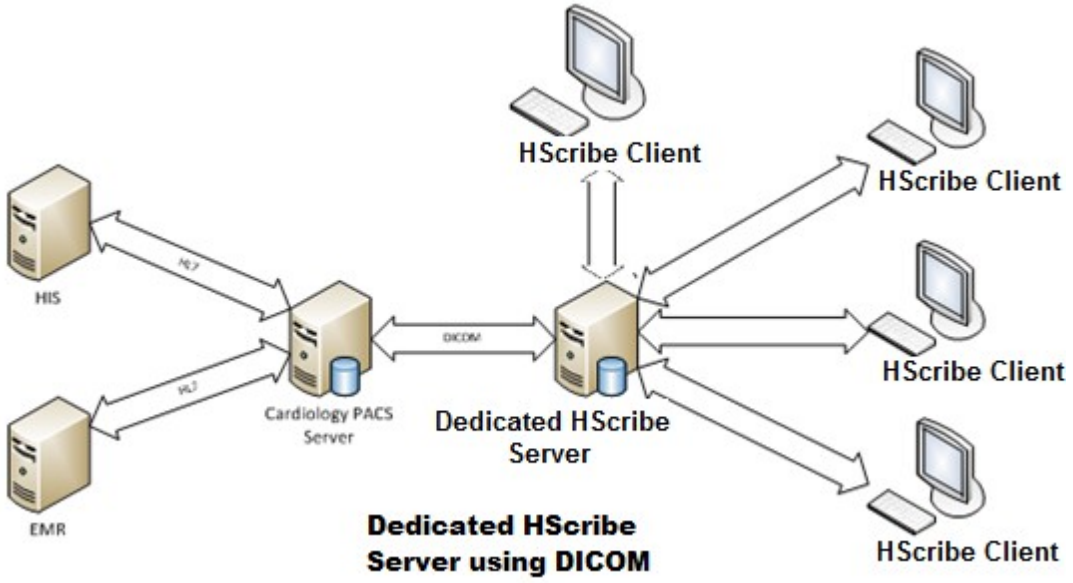
A central dedicated HScribe Server can be hosted on server hardware with a number of HScribe workstations as clients. Any 3rd party information system can exchange XML and PDF files with the HScribe Server.



A Welch Allyn HL7 Gateway can be added to the solution to enable exchange of HL7 messages between HIS and EMR systems and the central HScribe Server.



The central Modality Manager can exchange DICOM messages with a cardiology PACS system.



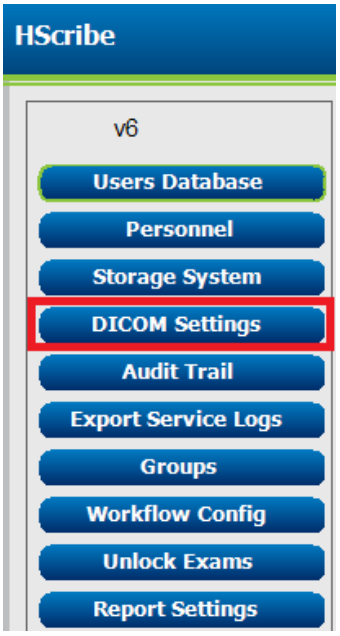
DICOM

When the HScribe Server is configured for DICOM, all ordered/scheduled test information comes from the MWL SCP. If an ad hoc test needs to be performed, just start the test and enter new demographics at that time.

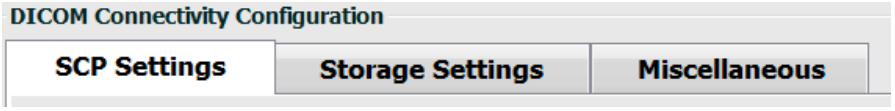
Configuring DICOM

HScribe users with "IT Administrator" permission can configure the HScribe Server DICOM settings. Log into any HScribe computer associated with the HScribe Server to be configured. Launch any of the HScribe Stations to start an HScribe Desktop. Click on **System Configuration**.

Then select **DICOM Settings**.

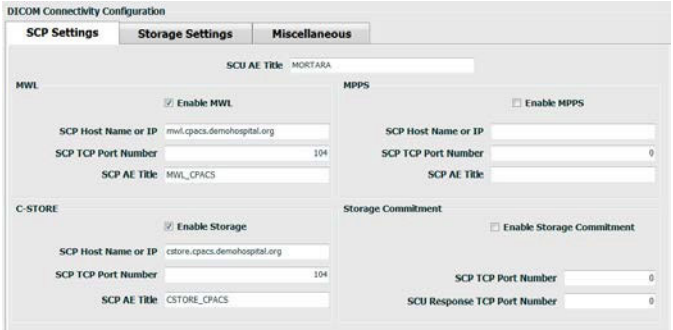


The DICOM settings are organized on 3 tabs: SCP Settings, Storage Settings, and Miscellaneous.



SCP Settings

Service Class Provider (SCP) settings contain the communication settings used for Modality Worklist (MWL), C-STORE, Modality Performed Procedure Step (MPPS), and Storage Commitment.

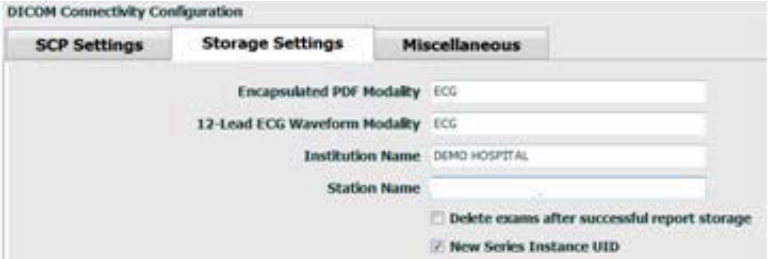


SCP	Setting	Description
Modality Worklist (MWL)	Enable MWL	Check to enable MWL.
	SCP Host Name or IP	DNS hostname or IP address of the SCP.
	SCP TCP Port Number	TCP/IP port number of the MWL service.
	SCP AE Title	Application Entity (AE) Title of the SCP.
C-STORE	Enable Storage	Check to enable storage of results (Encapsulated-PDF for Holter reports). This checkbox enables storage for all HScribe workstations connected to the central Modality Manager.
	SCP Host Name or IP	DNS hostname or IP address of the SCP. If Storage Commitment is also enabled, it will communicate with this same SCP host.
	SCP TCP Port Number	TCP/IP port number of the storage service.
	SCP AE Title	Application Entity (AE) Title of the SCP. If Storage Commitment is also enabled, it will communicate with this same AE Title.
Modality Performed Procedure Step (MPPS)	Enable MPPS	Check to enable MPPS status messages.
	SCP Host Name or IP	DNS hostname or IP address of the SCP.
	SCP TCP Port Number	TCP/IP port number of the MPPS service.
	SCP AE Title	Application Entity (AE) Title of the SCP.
Storage Commitment	Enable Storage Commitment	Check to enable Storage Commitment.
	SCP TCP Port Number	TCP/IP port number of the Storage Commitment service.
	SCU Response TCP Port Number	TCP/IP port the HScribe Server will use to listen for Storage Commitment responses.

SCP	Setting	Description
	SCP TCP Port Number	TCP/IP port number of the Storage Commitment service.
	SCU Response TCP Port Number	TCP/IP port the HScribe Server will use to listen for Storage Commitment responses.

Storage Settings

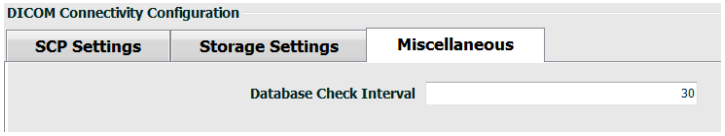
These settings specify how to store the results of the tests.



Setting	DICOM Tag	Description
Encapsulated PDF Modality	(0008,0060)	Modality value stored in the encapsulated-PDF objects from Holter tests. Normally set to “ECG”.
12-Lead ECG Waveform Modality	(0008,0060)	Modality value stored in the 12-Lead ECG Waveform objects from resting ECG tests. Normally set to “ECG”.
Institution Name	(0008,0080)	Name of institution or department that performed the test.
Station Name	(0008,1010)	Station Name that performed the test. Station name will use the computer name by default.
Delete exams after successful report storage		Check if the exam data should automatically be deleted after the DICOM PDF or waveform has been stored. Only use this option if you’re sure you’ll never need to amend the test results later. This option is only active when Storage Commitment is used.
New Series Instance UID		When checked, and the test results are amended and signed again, the DICOM PDF or waveform will be given a different Series Instance UID from the previous ones used for this test.

Miscellaneous Settings

This tab contains other settings.

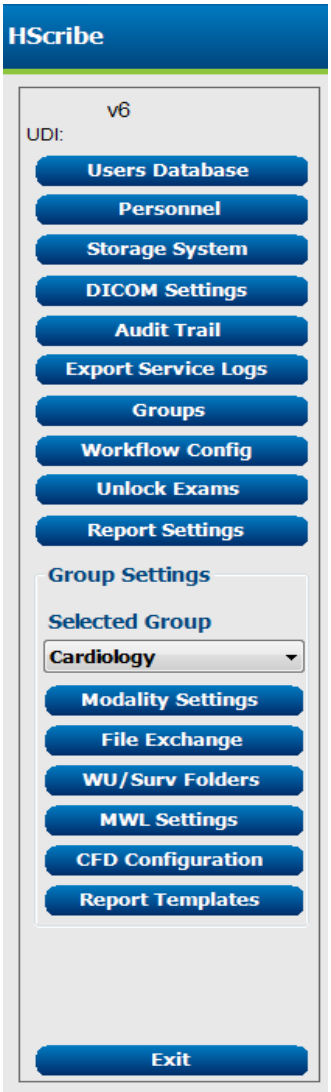


Setting	Description
Database Check Interval	Specifies the number of seconds between each MWL query. ***Note**: when an HScribe workstation displays the MWL, it does not display the list it just retrieved from the MWL SCP. Instead, it displays the MWL most recently retrieved by the HScribe Server. If the interval is set to 30 seconds, the MWL displayed by the HScribe is at most 30 seconds old. If set to 600 seconds, then it could be up to 10 minutes old. Using a small number ensures the list is up-to-date. However, a small number could overload the MWL SCP with frequent queries.*

MWL Settings

HScribe users with "IT Administrator" permission can configure the HScribe Server DICOM settings. Log into any HScribe computer associated with the server to be configured. Launch any of the HScribe workstations to start an HScribe Desktop. Click on **System Configuration**.

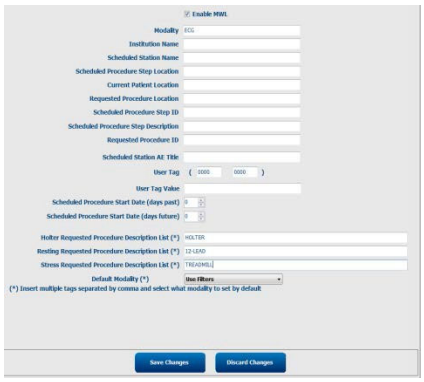
MWL Settings are per Group, so first select the appropriate Group, and then select **MWL Settings**.



The MWL settings are for filtering the MWL items HScribe Server seeks from the MWL SCP.

Since these are global settings for all MWL items for all the HScribe associated with this HScribe Server, the query needs to be fairly broad.

The only settings that specify which MWL items go to the individual HScribe workstations are the Requested Procedure Description Lists. There you will list the procedure descriptions for the procedures those particular workstations support.



Setting	DICOM Tag	Description
Modality	(0008,0060)	Usually set to “ECG”.
Institution Name	(0008,0080)	Name of institution or department where the order was placed, or where it should be performed.
Scheduled Station Name	(0040,0010)	DICOM Station Name scheduled to perform the test.
Scheduled Procedure Step Location	(0040,0011)	Location where the test is scheduled to be performed.
Current Patient Location	(0038,0300)	Patient’s current location, e.g. a room number for an inpatient.
Requested Procedure Location	(0040,1005)	Location where the test was requested to be performed.
Scheduled Procedure Step ID	(0040,0009)	The procedure step ID of the scheduled procedure.
Scheduled Procedure Step Description	(0040,0007)	The text description of the scheduled procedure step.
Requested Procedure ID	(0040,1001)	The ID of the requested procedure.
Scheduled Station AE Title	(0040,0001)	AE Title of the system scheduled to perform the test.
User Tag, Value		Any tag and value not already supported in the other settings can be configured here.
Scheduled Procedure Start Date (days past)	(0040,0002)	Days prior to today. 0 = all dates, 1 = minimum days past.
Scheduled Procedure Start Date (days future)	(0040,0002)	Days in the future. 0 = all dates, 1 = minimum days future.
Holter Requested Procedure Description List	(0032,1060)	List of requested Holter procedure descriptions, separated by commas.
Resting Requested Procedure Description List	(0032,1060)	List of requested resting ECG procedure descriptions, separated by commas.
Stress Requested Procedure Description List	(0032,1060)	List of requested stress procedure descriptions, separated by commas.
Default Modality		The modality to assume when a MWL item does not have a Requested Procedure Description.

DICOM Events

The table below shows when DICOM transactions are performed.

DICOM Transaction	HScribe
Modality Worklist C-FIND	Query made periodically according to “Database Check Interval”
PDF or Waveform C-STORE Storage Commitment	When the State is changed to **Signed** with automatic export in the “Finalize Exam Update” dialog.
MPPS IN PROGRESS	Not supported.
MPPS DISCONTINUED	Not supported.
MPPS COMPLETED	After performing a new test and changing the State with the “Finalize Exam Update” dialog.

DICOM Echo

The DICOM communications configuration can be verified with the **DICOM Test Utility** found under **Mortara Modality Manager** menu in the Windows Start menu. To perform a DICOM Echo test, click the "Run Test" button. It will display the status of DICOM Echo tests to the Storage SCP, MWL SCP, and MPPS SCP. Click the "Exit" button when done viewing the results.

File Exchange

When the Modality Manager is configured for XML Connectivity, scheduled test information can be received in XML files, or the user can schedule tests using the MWL/Patients icon on the HScribe Desktop. Files are automatically exported when they meet the defined criteria for the Workflow Config Export Status settings.

Files can be manually exported anytime from the "Exam Search" dialog. Search for the test to be exported, highlight it, and click **Export**. This Manual Export is only available for tests that meet the defined criteria for the Workflow Config Export Status settings and by the users with appropriate permissions.

Setting	Description
Import directory	If orders will be sent to Modality Manager as XML files, this is the full path to the folder where the XML files will be placed.
Export directory	Specify the full path to the folder where the XML, UNIPRO and PDF files should be placed as each test report is signed.
User Name	This is the name of the Windows domain account to use for writing files into the export folder. If left blank, the default service account will be used to write the files.
Password	The account password that goes with the User Name.
Domain	The name of the domain for the User Name account.
Site Number	This is the UNIPRO "Site Number".

HScribe Statistics XML Export

XML Schema File: **HolterStatistics_V5.xsd**

***NOTE**: when Modality Manager is activated for **Holter Rx** XML, the following XML elements will be included. If it is not activated for Holter Rx, these elements will not contain any child elements.*

- /HOLTER_STATISTICS/DIARY_PERIODS
- /HOLTER_STATISTICS/STRIP_LIST

XML Tag	Description
/HOLTER_STATISTICS	
@RECORDER_TYPE	Type of recorder used. E.g. “H12.Cont.3.12” or “H3+”
@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.
@ORDER_NUMBER	
@ACCESSION_NUMBER	
@ADMISSION_ID	
/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	Welch Allyn, Inc.
@MANUFACTURER_ID	8 = Welch Allyn
@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_FIELD_LIST	Complete list of all demographics fields. Useful when field labels have been customized.
/HOLTER_STATISTICS/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 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.

XML Tag	Description
@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.
@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.

XML Tag	Description
@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.
@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	
/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.

XML Tag	Description
@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.
@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.

XML Tag	Description
@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.
@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.

XML Tag	Description
@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_PROFIL E/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.
@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/P ERIOD/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_PROFIL E/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.

XML Tag	Description
@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.
/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.

XML Tag	Description
/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 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.

XML Tag	Description
@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 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.

XML Tag	Description
@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_IIII 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. 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.

XML Tag	Description
@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.

HScribe Strip Mortara XML

XML Schema File: **HolterECG_V5.xsd**

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.
@ORDER_NUMBER	
@ACCESSION_NUMBER	DICOM Accession Number.
@ADMISSION_ID	DICOM Admission ID.
/HOLTDER_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.

XML Tag	Description
/HOLTER_ECG/SOURCE	
@TYPE	HOLTER
@MANUFACTURER	Welch Allyn, Inc.
@MANUFACTURER_ID	8 = Welch Allyn
@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.
/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 COMMENT
@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 4 = Ventricular Paced 5 = Ventricular Escape 7 = R on T 8 = Artificial 9 = Unknown 10 = Bundle Branch Block 11 = Aberrant 12 = Interpolated 13 = Atrial Paced 14 = Dual Paced
@TYPE_EX	This attribute is maintained for backward compatibility but doesn’t offer any more information than the TYPE attribute. Use the TYPE attribute when possible. 0 = Normal

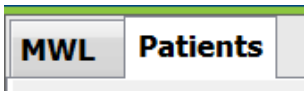
XML Tag	Description
	1 = Supraventricular Premature Beat 3 = Fusion 4 = Paced 7 = Unknown 10 = Ventricular Premature Beat (including Interpolated) 13 = Ventricular Escape 40 = R on T
@QON	QRS onset in milliseconds from the beginning of the strip.
@RR	RR interval in milliseconds from the preceding R-peak 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 Welch Allyn 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 uV.
@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.

18. BASIC STEPS

This section is provided as a guide to assist new users with basic operation of the HScribe system when performing routine procedures and results review. Refer to appropriate sections in this user manual for more detail as needed.

Schedule Holter Exam (Optional)

1. **MWL/Patients** icon
2. **Patients** tab → **New Patient** button → Enter information → **Save Patient**
3. **MWL** tab → **New Order** button → Search and Select Patient → Enter Order Information Save Order → Exit

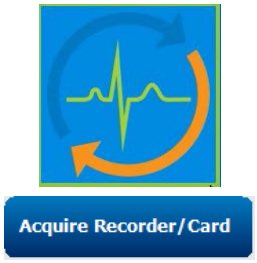


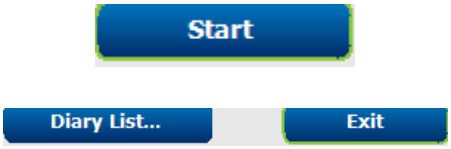
Prepare Recorder

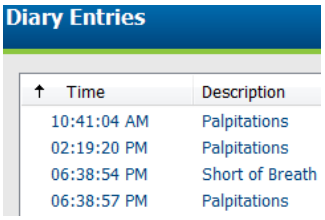
1. Connect H3+ recorder to system interface cable or H12+ media card to media Card reader
2. **Prepare Recorder/Card** icon; Erase previous data if present
3. Select **Order** OR **Patients** tab to search OR enter Patient Information
4. **Prepare Recorder/Card** button → disconnect
5. **Exit** → hookup patient

Import Recording

1. Connect H3+ recorder/H12+ media card to system interface cable/media card reader
2. **Import Recording** icon → Recording Match OR enter Patient Information
3. Acquire Recorder/Card **button**
4. **Start** button → Acquisition complete → **Diary List** → **Exit**
   - Acquiring Recording
5. Holter Data is ready to review/edit
   - Choose your review mode
6. **Erase Recorder/Card** and disconnect



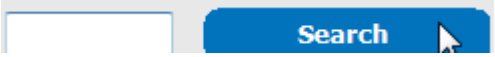




Exam Search to Review and Finalize Holter Results

1. **Exam Search** icon

2. **Search** button → List of exams
   - Blank search field lists all Holter exams or enter name or ID for a match
   - Sort the list by column header



Patient ID	Last Name
123456	---3-Channel Recordin...
473669	Harris
937452	Sample 3-CH Recording
Temple 1	-- Sample --

3. Highlight the desired exam → **Edit** button
   - Acquiring Recording

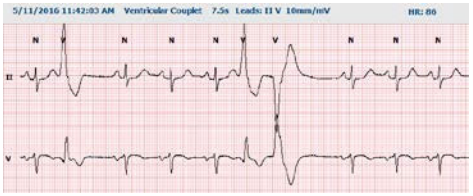
4. Holter Data is ready to review/edit
   - Choose your review mode

Rapid Review with Automatic Strips

1. **Strips** tab → **Add Auto…** → **OK**

2. Click on 1st strip in the list to review
   a. Down arrow to move to next strip, or
   b. **Artifact** button/A key to exclude ECG
   c. **Delete** button/Delete key to delete strip

Time	Annotation	Automatic Strips	Duration (s)	Leads
10:41:04 AM	Diary Event: Palpitations	Y	7.5 s	II V
10:42:23 AM	Isolated Ventricular Beat	Y	7.5 s	II V
10:57:20 AM	R-on-T Beat	Y	7.5 s	II V
11:27:55 AM	Isolated SV Beat	Y	7.5 s	II V
11:42:03 AM	Ventricular Couplet	Y	7.5 s	II V
01:29:01 PM	Maximum Heart Rate 117 BPM	Y	7.5 s	II V

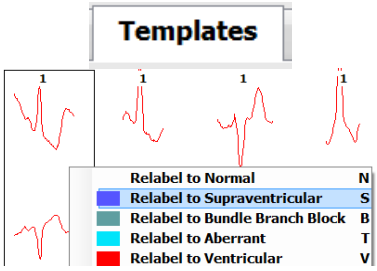


3. **ECG** tab → review full disclosure ECG as needed
4. **Summary** tab → review statistics and enter comments as desired
5. **Exam** → **Exit** → Finalize Exam → **Preview** button
   a. Final Report is opened for review/report template/printing

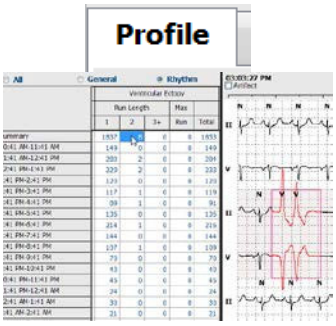
6. **Exit** to close Final Report
7. Choose appropriate state (e.g. Edited)
8. **Update** button to save recording and exit

Retrospective Scan with Profile and Template Review

1. **ECG** tab → Zoom to 30-minutes/page → Page Down for a quick review of ECG quality and rhythm
   a. **Beat Tool** → click & drag over regions of artifact → A (Artifact)
   b. **Rescan** needed for lead fail or poor quality lead(s)?
   c. **Scan Criteria** adjustment needed?



2. **Templates** tab → relabel as needed
   a. Groups: Normal / Supraventricular / Ventricular / Paced / Unknown
   b. Left-click template →Right-click for labels or use shortcut keys



3. **Profile** tab → Navigate to the most extreme ECG events for review and editing
   a. **Split Screen** to view ECG
   b. **Strip tool** to add ECG strips
   c. Edit / Relabel Beats / Add Events as needed

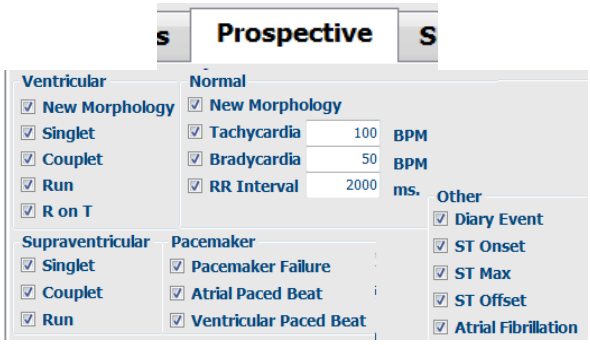
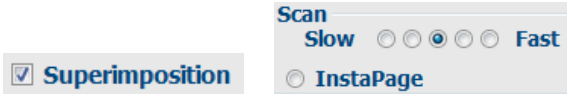
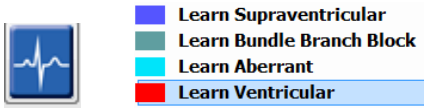
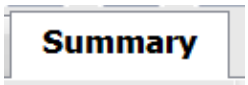
4. View **Trends** / **Histograms** / **Superimposition** tabs as needed and according to patient status
5. Select available tools as needed for review
   a. Beat Tool
   b. Caliper Tool
   c. Strip Tool
   d. Event Tool

6. **Strips** tab → **Add Auto**... → **OK**
7. Click on 1st strip in the list to review
   a. Down arrow to move to next strip, or
   b. **Artifact** button/A key to exclude ECG
   c. **Delete** button/Delete key to delete strip

8. **Summary** tab → review statistics and enter comments

9. **Exam** → **Exit** → Finalize Exam → **Preview** button
   d. Final Report is opened for review/printing

10. **Exit** to close Final Report
11. Choose appropriate state (e.g. Edited)
12. **Update** button to save recording and exit

Prospective Scan with Paging and/or Superimposition

1. **Prospective** tab → split-screen view
2. Enable/Disable Stop settings per category
   a. Check or uncheck Ventricular / Normal / Supraventricular / Pacemaker / Other
   b. Can select All or None as a quick change
   c. Set threshold values for Tachy, Brady, and RR intervals
   d. Toggle **Superimposition** on/off
3. Choose **Leads** to view using drop-down lists
4. Choose **Scan** speed: Slow – Fast - InstaPage
5. **Start (F7)** scanning / **Stop (F8)** as desired
6. Add **Strips** using the tool as desired
7. Select **Beat tool** and right-click beats to
   a. **Relabel / Insert / Delete** beats as needed
   b. **Learn** to relabel all beats of a certain shape
8. Select available tools as needed to end of ECG
   a. Beat Tool
   b. Caliper Tool
   c. Event Tool
   d. Page Up/Down or Arrow Right/Left through continuous ECG
   e. Adjust Scan Criteria as needed
   f. Click on the ECG time bar
   g. Reset to start at beginning of ECGs
9. **Strips** tab → **Add Auto...** → **OK**
10. Click on 1st strip in the list to review
    a. Down arrow to move to next strip, or
    b. **Artifact** button/A key to exclude ECG
    c. **Delete** button/Delete key to delete strip
11. **Summary** tab → review statistics and enter comments
12. **Exam** → **Exit** → Finalize Exam → **Preview** button
    a. Final Report is opened for review/printing
13. **Exit** to close Final Report
14. Choose appropriate state (e.g. Edited)
15. **Update** button to save recording and exit