HSM 2.0 Instrument

Instructions for Use of Product **A2715**

HSM 2.0 Instrument

All technical literature is available at: www.promega.com/protocols/
Visit the web site to verify that you are using the most current version of this Technical Manual.
E-mail Promega Technical Services if you have questions on use of this system: techserv@promega.com

1. Introduction

The Heater Shaker Magnet Instrument[a] (HSM 2.0) is designed to perform all the functions necessary for processing magnetic resin-based purification chemistries in large-volume formats. Paramagnetic resin chemistries typically require mixing, heating and a mechanism to efficiently capture the particles. By combining the ability to heat, shake and apply a magnetic field, the HSM 2.0 Instrument provides all-in-one processing capabilities for a variety of large-volume purification chemistries in either manual or automated formats. The instrument uses standard 50ml conical tubes and reagent-based paramagnetic particle (PMP) chemistries. Within PMP-based chemistries the PMPs provide a mobile solid phase that optimizes capture, washing and elution of biological target molecules.

Initially designed to run the Promega ReliaPrep™ Large Volume HT gDNA Isolation System (Cat.# A1751), the HSM 2.0 Instrument is supplied with software containing pre-programmed isolation methods for processing up to 32 samples of human whole blood in approximately 2–3.5 hours, depending on sample volume and number. Samples are processed in a semi-automated method with the user dispensing and aspirating reagents from the samples as directed by the software on a computer screen. The programmed methods control the shaking, heating, magnetization and timing of the steps required for the semi-automated purification. For fully automated purification, the HSM 2.0 Instrument can be integrated with a robotic liquid-handling workstation.

1.A. Intended Use of the HSM 2.0 Instrument

This product is intended for use with Promega reagent kits.

This product is intended for research use only and is not intended for use in diagnostic procedures.

1.B. HSM 2.0 Instrument Specifications

Processing Time (blood genomic DNA): 2–3.5 hours (depending on sample type and number)

Number of Samples: Up to 32

Weight:

> Main Shaker: 38.8lb (17.6kg)
> Power Supply: 4.2lb (1.9kg)

Dimensions: (W × L× H)

> Main Shaker: 8.94 × 15.08 × 6.06 inches (227 × 383 × 154mm)
> Power Supply: 4.41 × 13.78 × 2.01 inches (112 × 350 × 51mm)

Power Requirements:

> Main Shaker: 24 V DC, 25 A
> Power Supply: 100–240 VAC, 50–60 Hz

Shaking Orbit: 4mm

> Accepts tubes with an OD of no more than 29mm

Communication: RS232

Software:

> HSM 2.0 Software for manual use; integrated automation device drivers for automated use
> HSM 2.0 Software may be downloaded from:
> **www.promega.com/resources/tools/hsm-2-0-software/**

Minimum Software Requirements:

> Windows PC
> Dual-Core x86 based processor, 2 MB Memory, 100 GB HD, Video 1024 × 768
> Supported operating systems (32-bit or 64-bit):
>> Microsoft Windows® 7 Professional
>> Microsoft Windows® 7 Ultimate
>> Microsoft Windows® 10 Pro
>> Microsoft Windows® 10 Enterprise
>
> Use of up-to-date antivirus software is strongly recommended.

1.C. Product Components

PRODUCT	QUANTITY	CAT.#
HSM 2.0 Instrument	**1 each**	**A2715**

For Research Use Only. Not for use in diagnostic procedures. Includes:

- 1 HSM 2.0 Instrument
- 1 HSM Tube Rack
- 1 HSM Tube Rack Stand
- 1 Power Supply for use with HSM 2.0 Instrument
- 1 Power Cable (Blue)
- 1 RS-232 Cable
- 1 USB-to-Serial Converter
- 4 Instrument Feet
- 1 Power Cord (Black)
- 1 6mm Hex Wrench
- 1 2.5mm Hex Wrench
- 1 Spanner
- 1 Setup Guide

1.D. Inspection

Upon receiving your HSM 2.0 Instrument, please inspect the package carefully to make sure all items are present and undamaged. See Figures 1, 2 and 3 for views of the instrument and accessories.

Figure 1. Power Supply, HSM 2.0 Instrument and Tube Rack on Tube Rack Stand (from left to right).

Figure 2. HSM 2.0 Instrument Accessories. A. USB-to-serial converter (box); B. RS-232 Cable; C. Power Cord (black); D. Instrument Power Cable (blue). **Note:** The black Power Cord is shipped in a separate box.
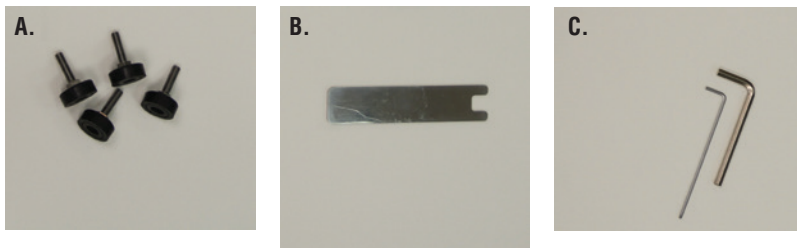

Figure 3. HSM 2.0 Instrument Accessories. A. Instrument Feet. These are screwed into the holes on the bottom of the HSM 2.0 Instrument; B. Spanner; C. 2.5mm Hex Wrench and 6mm Hex Wrench.

1.E. Precautions

Safety Symbols and Markings

⚡	Danger. Hazardous voltage. Risk of electrical shock.	Danger. Tension dangereuse. Risque de choc électrique.
⚠	Warning. Risk of personal injury to the operator or a safety hazard to the equipment or surrounding area.	Avertissement. Risque de préjudice corporel pour l'opérateur ou d'accident avec l'instrument ou l'entourage.
⚠	Warning. Pinch point hazard.	Avertissement. Risque de pincement.
⚠	Warning. Hot surface. Burn hazard.	Avertissement. Surface chaude. Risque de brûlure.
⚠	Warning. Biohazard.	Avertissement. Risque biologique.
⚠	Warning. Strong magnet. Can be harmful to pacemaker wearers.	Attention. Aimant puissant. Peut être dangereux pour des porteurs de pacemaker.
🚫	Warning. Magnet may interfere with pacemakers and other devices. Pacemaker wearers stay back 30cm (12 in).	Attention. L'aimant peut avoir des effets sur les pacemakers et autres dispositifs. Les porteurs de pacemaker doivent rester à 30 cm de l'appareil.
♻	It is important to understand and follow all laws regarding the safe and proper disposal of electrical instrumentation. Please contact your local Promega Representative for disposal of the instrument and power supply. Please follow your institutional requirements for disposal of the accessories.	Avertissement. Il est important de comprendre et de respecter toutes les lois relatives à la destruction sûre et correcte des appareils électriques. Veuillez contacter votre représentant Promega local concernant la destruction de l'appareil. Veuillez respecter les exigences de votre établissement concernant la destruction des accessoires.
REF	Catalog Number	Numéro de catalogue
SN	Serial Number	Numéro de série

	This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendement 1, or a later version of the same standard incorporating the same level of testing requirements.	Ce produit a été testé en accord avec les exigences de CAN/CSA-C22.2 No. 61010-1, 2eme Edition, ci-inclus l'amendement 1, ou un version ultérieur du même règlement incorporant les mêmes conditions d'essai.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been designed and tested to CISPR 11 Class A. In a domestic environment it may cause radio interference, in which case, you may need to take measures to mitigate the interference.

Do not use this device in proximity to sources of strong electromagnetic radiation (e.g., unshielded intentional RF sources), as these may interfere with the proper operation.

Use only the power supply provided with the instrument. There are no user-serviceable parts in the equipment. Removing the instrument or power supply casing will void the warranty.

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS.

	Safety Precautions	Mesures de Sécurité
	Do not use this equipment for anything other than its intended use.	Ne pas utiliser cet instrument à d'autres fins que celle pour laquelle il a été conçu.
	Always disconnect the power before cleaning or performing routine maintenance.	Toujours débrancher le cordon d'alimentation avant d'effectuer le nettoyage ou l'entretien de routine.
	Do not disassemble unit. There are no user-serviceable parts in the equipment.	Ne pas démonter l'appareil. Il n'existe aucune pièce pouvant être changée par l'utilisateur.
	If the equipment is used in a manner other than that specified by Promega, the protection provided by the equipment may be impaired.	Si cet appareil est utilisé à d'autres fins que celles pour lesquelles il a été conçu, la protection fournit pourrait en être diminuée.
	Keep hands clear of shaking platform.	Eloignez les mains de la plateforme agitante.
	The internal surfaces of the tube holders may become hot. Do not touch.	Les surfaces internes des portoirs de tubes peuvent être chaudes. Ne pas toucher.

1.E. Precautions (continued)

16.1 to 40kg	To avoid muscle strain or back injury, use lifting aids and proper lifting techniques when removing or replacing the instrument. The HSM 2.0 Instrument weighs 17.6kg (38.8lb) and should be handled by two people. The packaged instrument weighs 30.5kg (67.3lb).	Pour éviter des claquages musculaires ou se faire mal au dos, utiliser du matériel permettant de soulever et des techniques de soulèvement correctes lors du retrait ou du repositionnement de l'appareil. Le HSM 2.0 Instrument pèse 17,6kg and doit être manipulé par deux personnes. L'appareil emballé pèse 30.5kg.
	Equipment can be hazardous due to the use of chemical and biohazardous substances.	L'appareil peut être dangereux dû à l'utilisation de substances chimiques ou dangereuses.
	Warning. Strong magnet. Can be harmful to pacemaker wearers.	Attention. Aimant puissant. Peut être dangereux pour des porteurs de pacemaker.
	Warning. Magnet may interfere with pacemakers and other devices. Pacemaker wearers stay back 30cm (12 in).	Attention. L'aimant peut avoir des effets sur les pacemakers et autres dispositifs. Les porteurs de pacemaker doivent rester à 30cm de l'appareil.

1.F. Environmental Requirements (Operation, Shipping and Storage Conditions)

Power Requirements: 100−240VAC, 50−60Hz
Temperature: 5-40°C
Humidity: Up to 80% relative humidity
Altitude: Height above sea level to 2000m

The HSM 2.0 Instrument is intended for indoor use only. If liquid gets inside the instrument, it may damage the electronics. Install in a location that meets the following criteria:

• Install on a sturdy, dust-free, level surface.

• Choose a location that has good air circulation and is not exposed to direct sunlight.

• Avoid noisy electrical power sources (e.g., power generators).

• Do not install in a location where there is large temperature variability or high humidity.

• Position the instrument so that it is easy to unplug from the power source.

• Do not place the power supply in areas where it may come in contact with liquid.

• Do not place next to heat sources.

• Do not use near flammable gases or liquids.

• For optimal performance, equilibrate the instrument to room temperature before use.

2. Hardware Overview

Figure 4. Front of the HSM 2.0 Instrument showing LED informational lights. Green—power on/off; Yellow—user prompt; Red—error.

Figure 5. Rear of the HSM 2.0 Instrument showing connection for the blue instrument power cable and the RS-232 Cable port.

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2. Hardware Overview (continued)

Figure 6 Rear of the Power Supply showing the main power switch, fuse, and power connections.

3. Unpacking and Setting Up the HSM 2.0 Instrument

Important: Save all the packaging material (including the shipping pallet and wooden supports) in case the equipment needs to be returned for service or repair at a later date.

3.A. Setup

1. Remove the HSM 2.0 Instrument, Power Supply and accessories from the shipping containers.

2. The instrument and accessories are supplied in corrugate packaging material. Open the main box and remove the upper box, which contains the instrument accessories and power supply (as shown in Figures 3 and 6).

3. Check that all parts have been included. Refer to Section 1.C for a list of parts.

4. Remove the foam packaging material and carefully remove the box containing the HSM 2.0 Unit. Use caution when lifting the instrument. The instrument weighs approximately 38.8lb (17.6kg).

5. The HSM 2.0 unit is shipped affixed to a wooden support that needs to be removed prior to use.

6. Carefully place the unit upside down, revealing the 4 shipping screws, which can be removed with the supplied 6.0mm Hex Wrench.
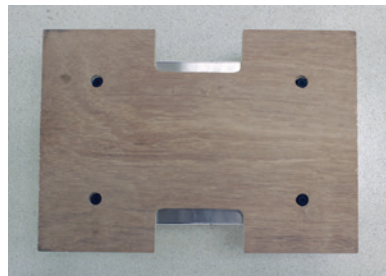
7. After removal of the wooden support, screw the four feet provided into the holes on the bottom of the instrument.
   Note: Save the wooden supports in case the instrument needs to be returned for service at a later date.

8. Set the HSM 2.0 Instrument on a flat, level surface in a dust-free location with reasonable air circulation.

9. Ensure that the power switch is in the off position. The power switch is located on the back of the Power Supply (Figure 6).

10. Connect the HSM 2.0 Instrument to the Power Supply using the blue Power Cable by plugging the cable into the back of the instrument (Figure 5) and the back of the Power Supply (Figure 6).

11. The HSM 2.0 Instrument requires an external computer for operation, either a PC with HSM 2.0 Application Software installed or a PC controlling a liquid handler that has the appropriate software drivers installed. See Section 4 for software installation instructions. Driver installation is performed during automated method installation. Using the RS232 cable and USB to Serial Converter, attach the HSM 2.0 Instrument to the computer.

3.A. Setup (continued)

⚠ **Important:** Place the power supply in a dry location away from possible liquid spills.

12. Plug the black Power Cord into the back of the Power Supply (Figure 6). Plug the Power Cord into a grounded wall outlet. See Section 1.B for power requirements.

13. Turn on the power switch located on the back of the Power Supply (Figure 6).

14. There are three LED lights on the front of the instrument. When the instrument is turned on the Green LED will light up, indicating that the power is on. The instrument will then perform a self-diagnostics test that will take about one minute. During that time you will see and hear the instrument following the diagnostics routine. If an error is detected, the red LED will light up. If there is no red light, the instrument has passed its self-diagnostic test. A yellow light indicates that user action is required. The required action will be indicated by the HSM 2.0 Software.

15. Once all diagnostic checks have been passed, the HSM 2.0 Instrument is ready for operation.

    Note: If the instrument fails any of the diagnostic checks and the red LED light is illuminated, contact Promega Technical Services or your authorized service representative for assistance.

3.B. Shutdown

Turn off the power switch on the back of the Power Supply. Unplug the Power Supply from the electrical socket. Disconnect the HSM 2.0 Instrument from the Power Supply.

4. HSM 2.0 Application Software

The Promega HSM 2.0 Application Software provides the mechanism for users to interact with the HSM 2.0 Instrument for manual demonstration and manual purification purposes. Users will need to install the software on a PC that meets the following minimum requirements:

* Windows PC

* Dual-Core x86 based processor, 2MB Memory, 100 GB HD, Video 1024 x 768

* Supported operating systems (32-bit or 64-bit):
  Microsoft Windows® 7 Professional
  Microsoft Windows® 7 Ultimate
  Microsoft Windows® 10 Pro
  Microsoft Windows® 10 Enterprise

This software enables users to process HSM 2.0-compatible chemistries, access the settings for the instrument, and export reports of service and purification activities. This document describes the features and usage of the Promega HSM 2.0 Application Software.

4.A. Software Installation

Complete the following steps to install the Promega HSM 2.0 Application Software:

1. Log on to Windows®. Administrator privileges are required to install the software.

2. Disable any automatic virus detection programs before installation. Some virus detection programs may interfere with installation.

3. Download the software installer.

4. Save the file to a local file storage location.

5. Double-click on Setup.exe to open the installer program.

6. Follow the on-screen instructions to install the Promega HSM 2.0 Application software.

7. The installer will guide you through the installation process. During installation you will be asked whether the software should be installed for a specific user or for everyone. Choose "everyone" so that all users will have access to the software.

8. Upon successful installation the screen shown in Figure 7 will be displayed. The software is now installed and ready for use.

   Note: If you are unable to install the software, contact your IT Department.
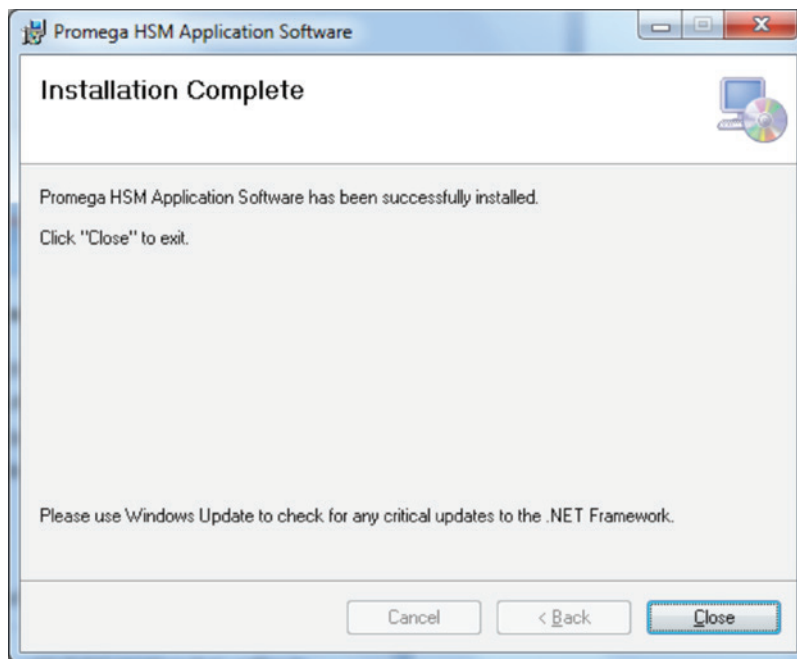
Figure 7. Successful software installation screen.

4.B. Managing User Accounts

Assigning a User Account to the PromegaHSMAppUser Group

The Promega HSM 2.0 Application Software employs a Windows® User Group for adding approved users of the software. Users will need to be added to the PromegaHSMAppUser Group. Follow the instructions below to add users. Administrator privileges are required to add users.

1. In the Microsoft Windows® 7 Operating System, from the **Start** menu, right-click on "**Computer**" and select "**Manage**". Alternatively, on the desktop, right-click the "**Computer**" icon and select "**Manage**".
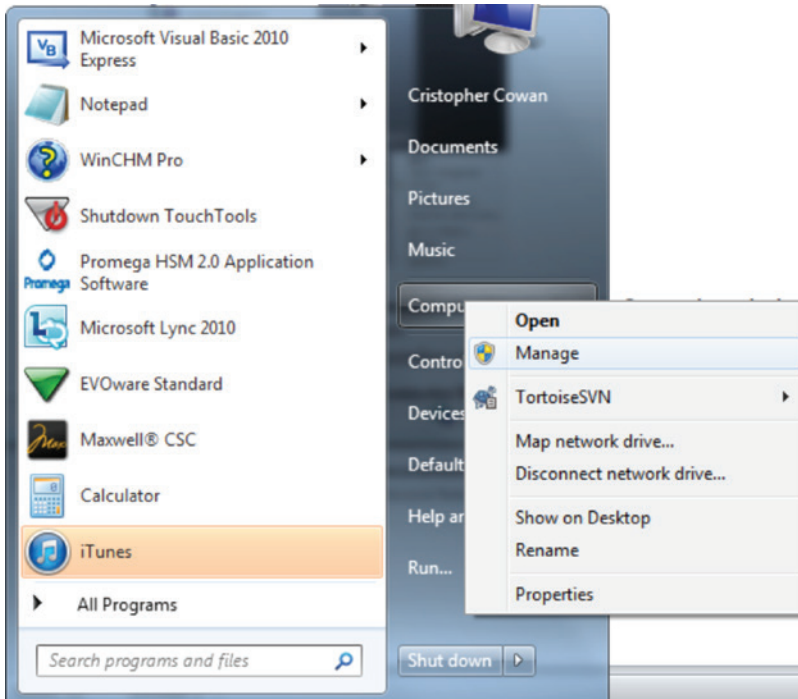
2. The **Computer Management** window will open.

3. In the left-hand panel of the **Computer Management** window, select "**Local Users and Groups**" to expand the options and then select "**Groups**".

   Note: If the Local Users and Groups menu item is not visible, select "**System Tools**" to expand that menu heading.
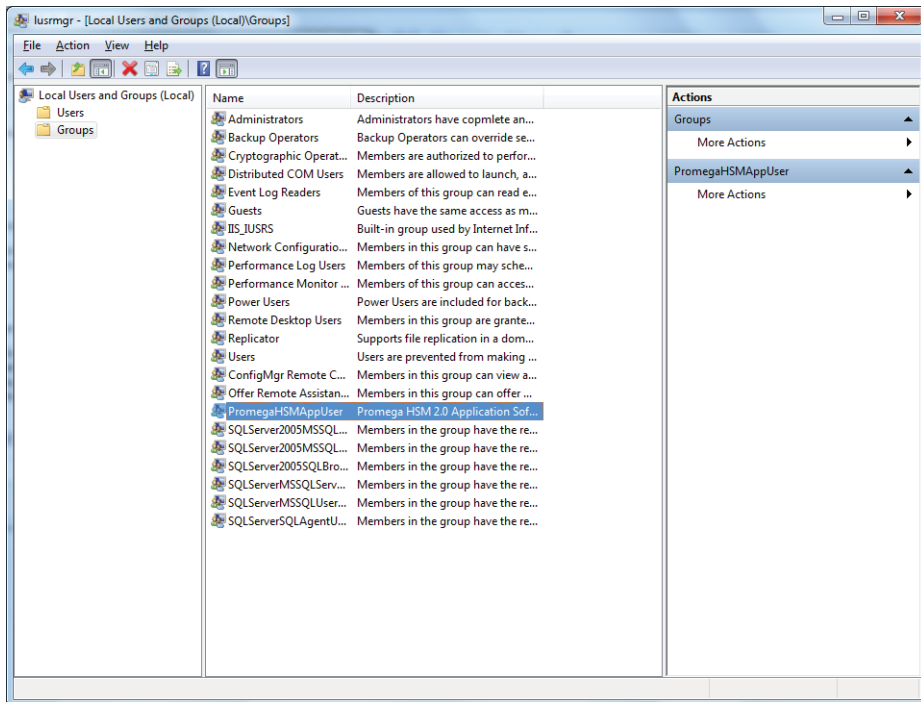
Figure 8. Selecting Groups from the Computer Management Screen.

![Promega logo]

4.B. Managing User Accounts (continued)

4. To add a user to the PromegaHSMAppUser Group, double-click on the PromegaHSMAppUser group in the Computer Management Groups list (Figure 9). Adding users should be done according to the IT rules and IT procedures pertinent to your site. Click the "**Add**..." button to add users to the PromegaHSMAppUser group. In the "**Enter the object names to select"** area of the window, enter the username for the user you wish to add. Click "**OK**" in this window and in the PromegaHSMAppUser window to add users to the PromegaHSMAppUser group. Close the Computer Management window.
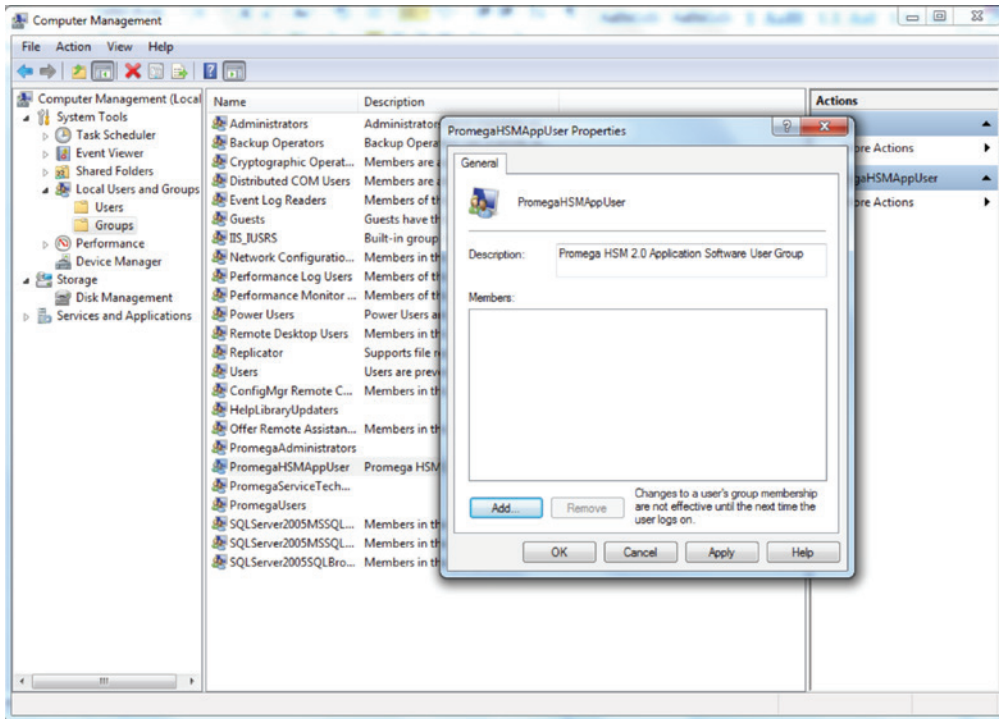
Figure 9. Adding users to the PromegaHSMAppUser group.

Removing User Accounts

The Promega HSM 2.0 Application Software employs a Windows® Group for adding approved users. Administrator privileges are required to remove user accounts.

1.   In the Microsoft Windows® 7 Operating System, from the **Start** menu, right-click **Computer** and select "**Manage**". Alternatively, on the desktop, right-click the "**Computer**" icon and select "**Manage**".
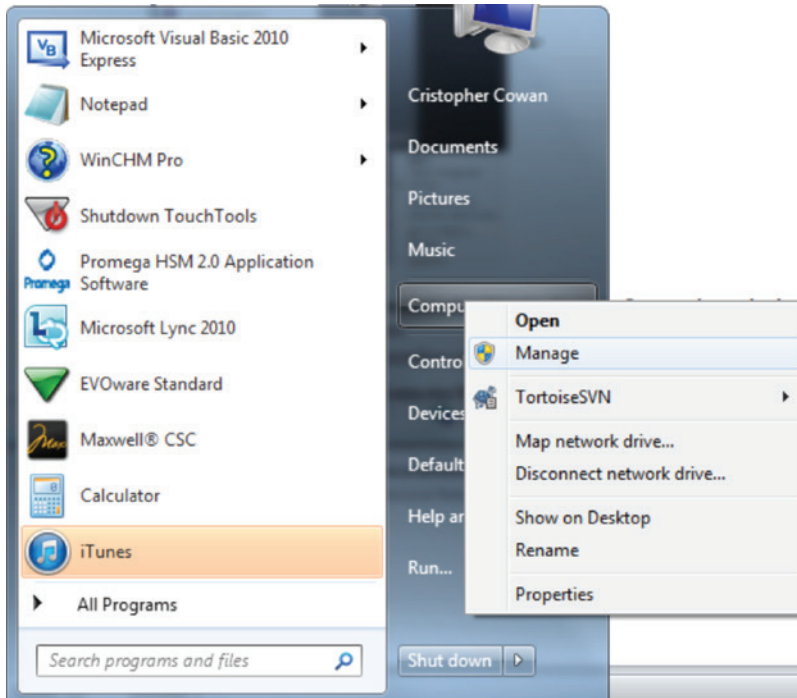
2.   The **Computer Management** window will open.

3.   In the left-hand panel of the **Computer Management** window, select "**Local Users and Groups**" to expand the options and then select "**Groups**".

4.B. Managing User Accounts (continued)
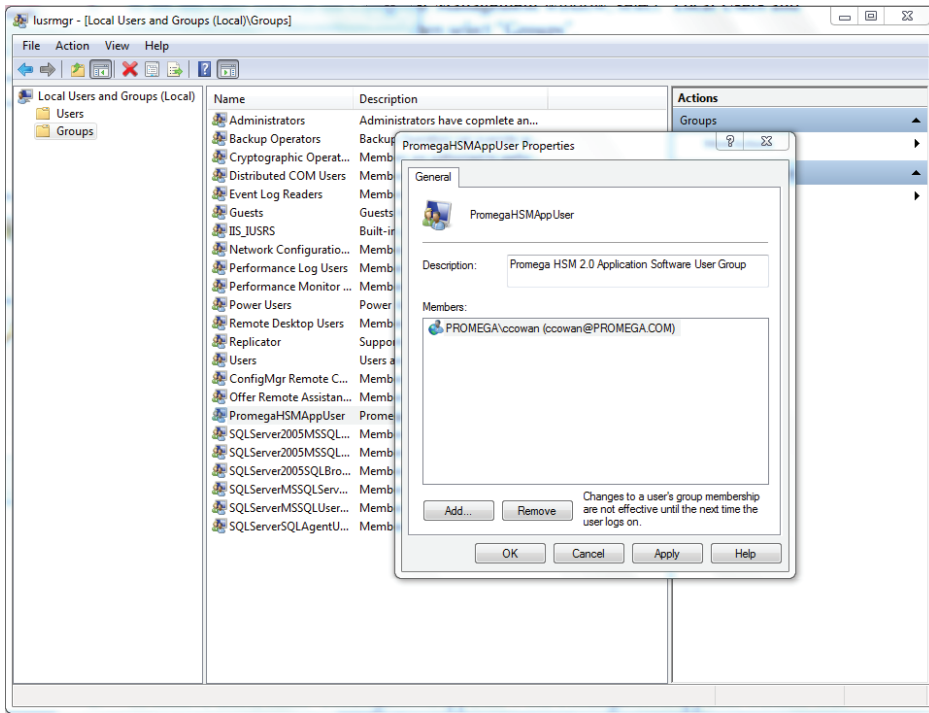
Figure 10. Removing Groups from the Computer Management Screen.

4. To remove users, select "**PromegaHSMAppUser**". The **PromegaHSMAppUser** window will open.

5. Select the user you want to remove and select "**Remove**". Select "**OK**" to remove users from the PromegaHSMAppUser group. Removing users should be done according to the IT rules and procedures pertinent to your site.

4.C Access Levels, Login and Main Menu Screens

The Promega HSM 2.0 Application software allows access to certain functions within the software by a login mechanism with user and administrator access levels. There are three levels of access: User, Administrator, and Promega Service. The Main Menu will differ based on the access level of the currently logged in user (Figure 12).

1. Login

Users must login to the software to run protocols.

The login window will pop up automatically when you start the application. If you have previously logged out, Select "Logon" on the upper right of the Main Menu screen to open the login window.

Enter your username and password. The password is case sensitive.
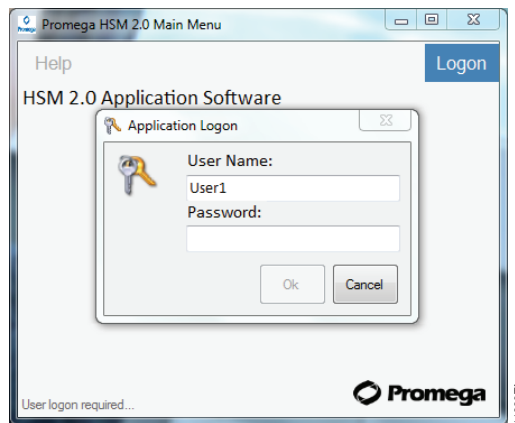
Figure 11. The Main Menu Window.

Contact Promega Technical services for login information to an administrator account and assistance (techserv@promega.com). If you have forgotten your password, a user with administrative rights can reset your password. If you have forgotten your administrative password, contact Promega Technical Services for assistance.

2. Main Menu

The main menu is the launching pad for interaction with the functionalities built into the Promega HSM 2.0 Application Software.
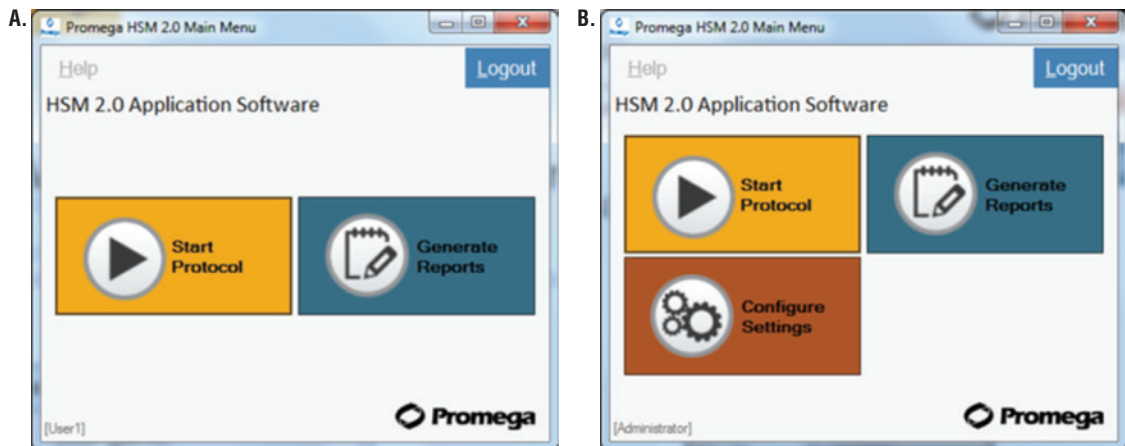
Figure 12. Main menu screens for different access levels. Panel A. User access level menu displays the Start Protocol and Generate Reports options. Panel B. Administrator access level menu displays Start Protocol, Generate Reports, and Configure Settings options.

Main Menu Screen Navigation and Function Buttons:

Navigation Buttons (Displayed across the top of the user interface window)

- **Logout:** Logs the user out and locks the software.

- **Exit:** Exits the Promega HSM 2.0 Application software and returns users to the Windows Operating System

- **Help:** Displays the Help menu. Select "Quick Help" to display help for the current page of the Promega HSM 2.0 Application Software. Select "About" to access version information for the software.

Function Buttons (Displayed in the center of the user interface window)

- **Start Protocol:** Selecting the Start button will begin the process of selecting a protocol and processing a chemistry on the HSM 2.0

- **Generate Reports:** The Reports button takes users to the Reports Screen where it is possible to export any of the run reports from previous purification runs and service processes.

- **Configure Settings:** Accesses the Settings window, which includes functions to view and adjust Instrument Info, perform instrument diagnostics, specify software settings, and change instrument settings (Configure Settings is only available to users with Administrator level access).

4.D. Running a Protocol

Turn the HSM 2.0 Instrument Power On
The instrument power switch is located on the back of the power supply (Figure 6).

Start a protocol by selecting the Start Protocol button on the Main Menu.

Pre-programmed Methods

The pre-programmed methods supplied with the HSM 2.0 Instrument can be used to purify nucleic acids from defined sample types. Sample preparation and handling is described in the relevant reagent kit manual.

Step 1: Selecting a Method

Select "**Start Protocol**". The **Protocol Selection** window (Figure 13) will open if: (1) multiple processing methods are available or (2) the administrator has required that users always select processing methods. Processing methods are presented as .nsp files. Select the .nsp file you wish to run. Double-click to open, or select the file and click "**Open**" to initiate the processing method. If neither (1) nor (2) apply, the "Select Available HSM 2.0 Instrument" window will open (Figure 14) immediately.
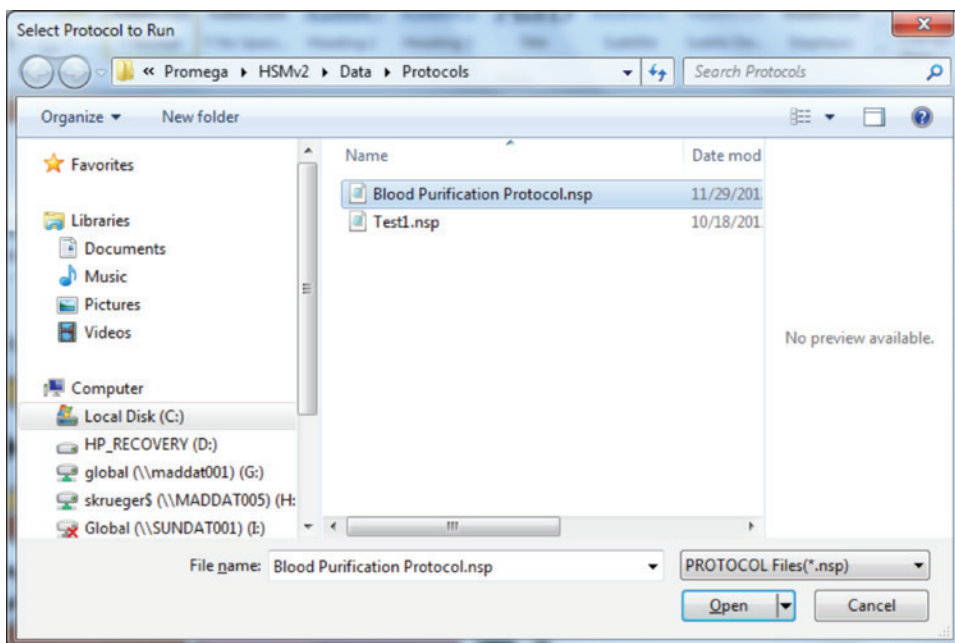

Figure 13. Protocol Selection window. To select a method, browse to the appropriate file location and select a method file (.nsp extension).

4.D. Running a Protocol (continued)

Step 2: Selecting an HSM 2.0 Unit

Once a method file has been selected, the user will be presented with the **Select Available HSM 2.0 Instrument** window (Figure 14). The Promega HSM 2.0 Application Software allows simultaneous processing of purification chemistries on up to three HSM 2.0 units. After a method is selected, the software will query the communication ports on the PC to determine all the active HSM 2.0 connections. A dropdown menu will open in the **Select Available HSM 2.0 Instrument** window, allowing the user to select an HSM 2.0 unit to run the selected method (Figure 14, Panel A). This menu will display the Com port to which the HSM 2.0 is connected, the serial number, and the firmware installed on the HSM 2.0. Below the dropdown menu, the window will display the number of available HSM 2.0 instruments. If a connected HSM 2.0 is not found by the software, check the connection and verify that the HSM 2.0 is turned on, and then select "**Search**" to test for connected HSM 2.0 instruments again. Checking the "**Allow Demo Mode**" checkbox (Figure 14, Panel B) will enable the software to run a selected method in simulation mode instead of using an active HSM 2.0 instrument.

Once you have selected the HSM 2.0 instrument to use for your processing method, click "**OK**" to proceed. If you wish to return to the file selection window, select "**Cancel**" in the **Select Available HSM Instrument window**. If this is the first time that an HSM 2.0 Instrument has been connected, you will be given the option to assign a name, background color and foreground color to the instrument for identification purposes.
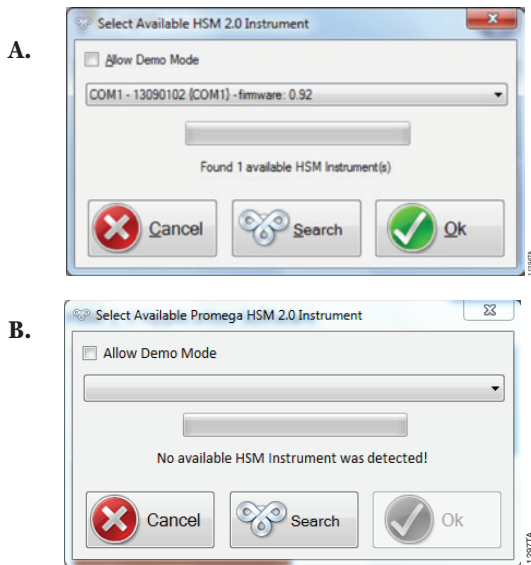

Figure 14. Select Available HSM 2.0 Instrument window. From this window the user can choose which available HSM 2.0 instrument to use for the selected method processing run. Panel A. Available HSM 2.0 instruments listed. Panel B. No available HSM 2.0 instrument detected.

Step 3: Promega Protocol Run Window

Upon selection of an HSM 2.0 instrument or demo mode, the method steps will be displayed in the **Promega Protocol Run** window (Figure 15). Each step to be performed is shown as a gray line. Clicking the gray "+" symbol on the left side of any of these lines will expand the step to display the settings for that step (Figure 16).

The **Promega Protocol Run** window displays the connection state of the selected HSM 2.0 Instrument in two places: (1) On the upper left of the window a box above the Start icon displays the serial number or name of a connected HSM 2.0 Instrument (Figure 15); and (2) On the lower right of the window the connection status of the HSM 2.0 Instrument is directly displayed as either "**Offline**" (Figure 15) or "**Connected**". Before starting a run, the method steps will all be shaded blue and the protocol status displayed in the lower left corner of the window will indicate "**Protocol Ready**".

Please ensure that you have sufficient reagents available for the entire run.

The HSM 2.0 Instrument is designed for use with potentially infectious materials. Use appropriate protection (i.e., gloves, goggles, etc.) when handling potentially infections substances. Users should adhere to their institutional guidelines for the handling and disposal of all infectious materials. If you are processing less than 32 samples, we recommend placing empty 50ml tubes in unused positions to reduce the chance of instrument contamination.
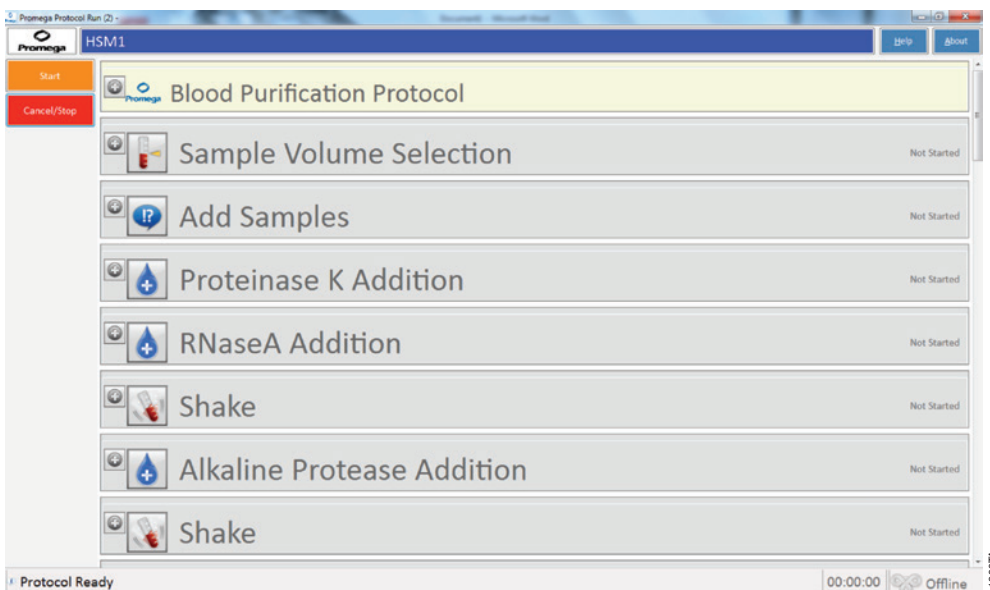
Figure 15. Promega Protocol Run Window. After choosing an available HSM 2.0 Instrument for processing with the selected method, the Promega Protocol Run Window is displayed. The individual steps of the selected method are displayed in this window.
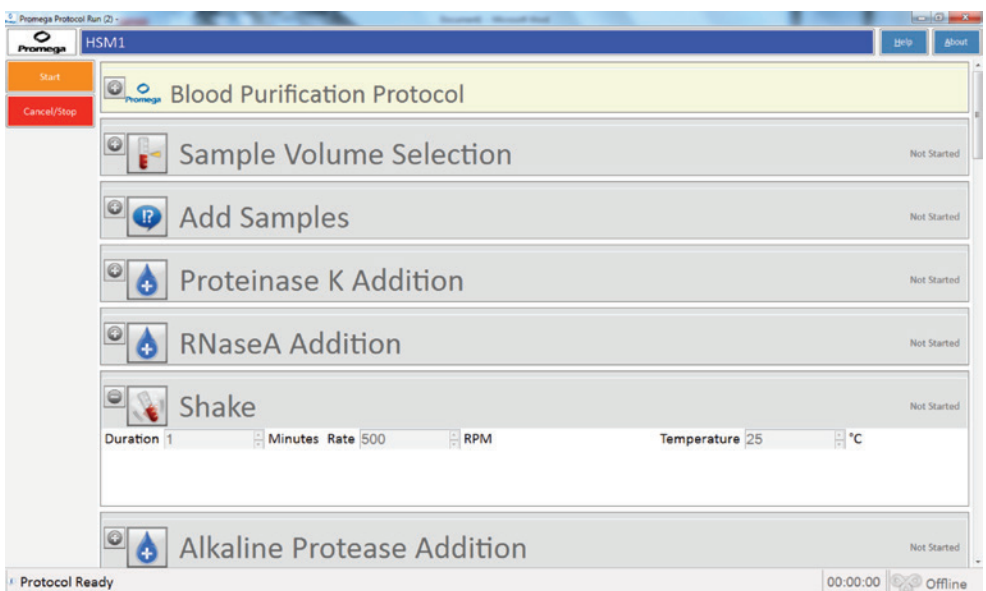
Figure 16. Individual Step Settings. Clicking the gray "+" symbol on the left side of any protocol step will expand the line to display the settings for that processing step.

Step 4: Running a Method

To run the displayed method, click the **Start** icon (orange box) in the upper left corner of the **Promega Protocol Run** window. After starting a run the following changes will occur:

* The **Start** icon will change to a **Pause** icon (orange box).

* The current processing step will be highlighted in yellow.

* Current temperature, speed and magnet state of the HSM 2.0 will be displayed in the lower right corner of the window (next to the connection status).

* Total elapsed time of the run will be displayed in the lower right corner of the window (next to the current HSM 2.0 status) The time remaining for the currently active step will be indicated on the left, under the Cancel/Stop button.

* Protocol status in the lower left corner of the window will change from "Protocol Ready" to "Running".

For detailed information on the purification reagents and protocol, please refer to the appropriate technical manual such as the *ReliaPrep™ Large Volume HT gDNA Isolation System Technical Manual* #TM341 available at **www.promega.com/protocols/**

Users can pause a run using the **Pause** icon (orange box) in the upper left corner of the screen. When a run is paused, the current step will be completed and then the protocol will stop. The **Pause** icon will change to a **Resume** icon that can be selected to resume the protocol. To abort a processing run, the user can select the **Cancel/Stop** button (red box) bellow the **Pause** button.
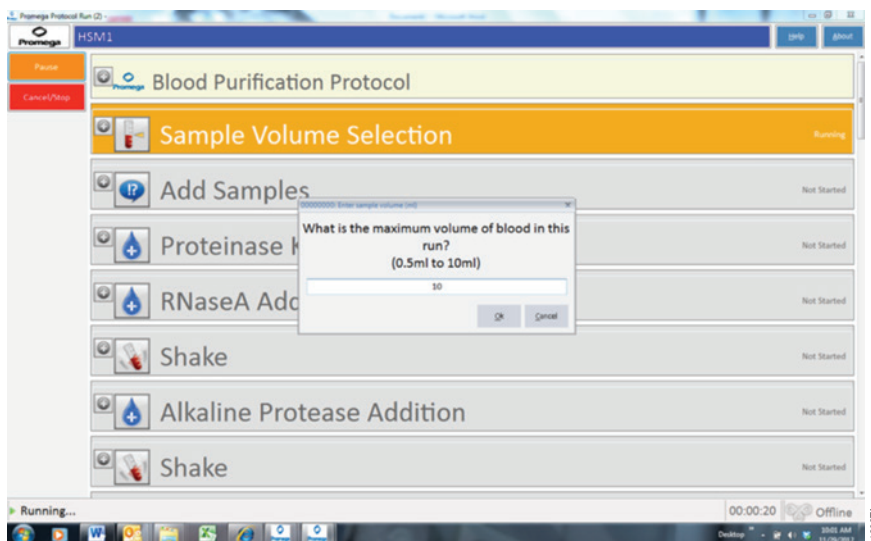
Figure 17. Protocol Running. The appearance of the Promega Protocol Run window when a processing run is started.

As a run progresses, the user will be presented with various prompts that request information (Figure 17) or specify manual steps that need to be performed (Figure 18). User prompts are displayed with **OK** and/or **Cancel** buttons. Clicking **OK** will advance the method to the next step; clicking **Cancel** will abort the current protocol.
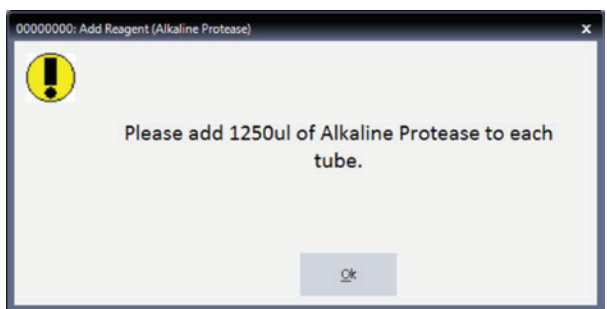
Figure 18. User prompt to perform a manual step. During protocol processing the user may be prompted to perform certain actions. These will be displayed as user prompts. Reagent additions will be scaled according to the sample volume entered by the operator.

4.D. Running a Protocol (continued)

The yellow highlighted line in the method will progress through each step as the method proceeds. Each successfully completed step will be presented in gray with a "**Complete**" indicator to the right of the line (Figure 19). The current step being performed is highlighted in yellow with a "**Running**" indicator on the right. Steps yet to be completed are shown in light gray with a "**Not Started**" indicator on the right.
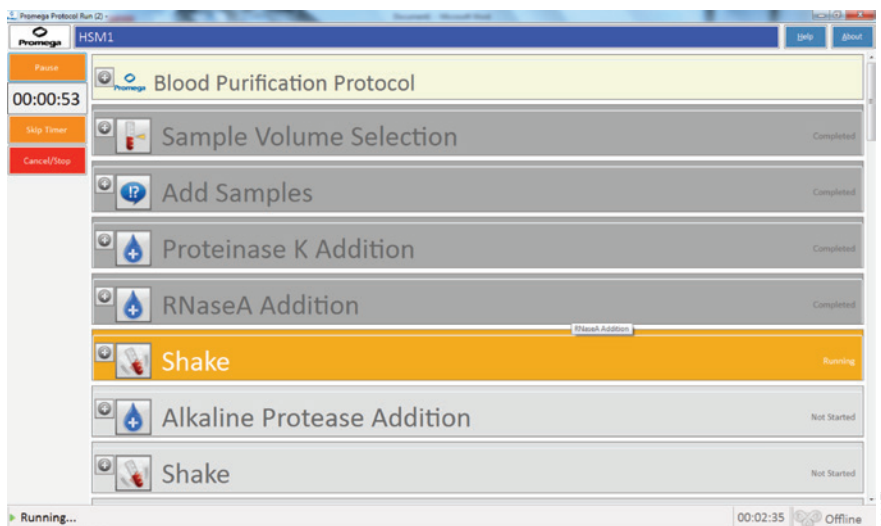
Figure 19. Display of method progress. Completed steps in the method are shown in dark gray with a "**Completed**" indicator on the right. The currently active step is highlighted in yellow with a "**Running**" indicator to the right. Steps yet to be completed are shown in light gray with a "**Not Started**" indicator on the right.

Step 5: Run Completion

Upon completion of a chemistry run, either by successful completion or because the run was aborted, the **Promega Protocol Run** window will indicate the status of the run as follows:

Successful Run Completion: When a chemistry run is completed successfully all lines of the method will be dark gray with a "**Completed**" indicator on the right side. A message will be displayed to indicate that the method was completed successfully.

Aborted Run: If a chemistry run is aborted by the user or because of instrument error, the line at which failure occurred will be highlighted in red with a "**Cancelled**" indicator to the right of the step. The protocol status displayed in the lower left corner of the window will change to "**Error: User Cancelled**" (Figure 20).

Note: If there is a **power failure** during a run, the method will be aborted. If the computer remains on during the power failure the Promega HSM 2.0 Application Software will log the communication failure with the HSM 2.0 and the abort of the method. The Protocol Run screen will highlight the line at which the abort occurred in red (Figure 20). If the computer shuts down as a result of the power failure, the Promega HSM 2.0 Application Software will not restart, indicating that the run was aborted.
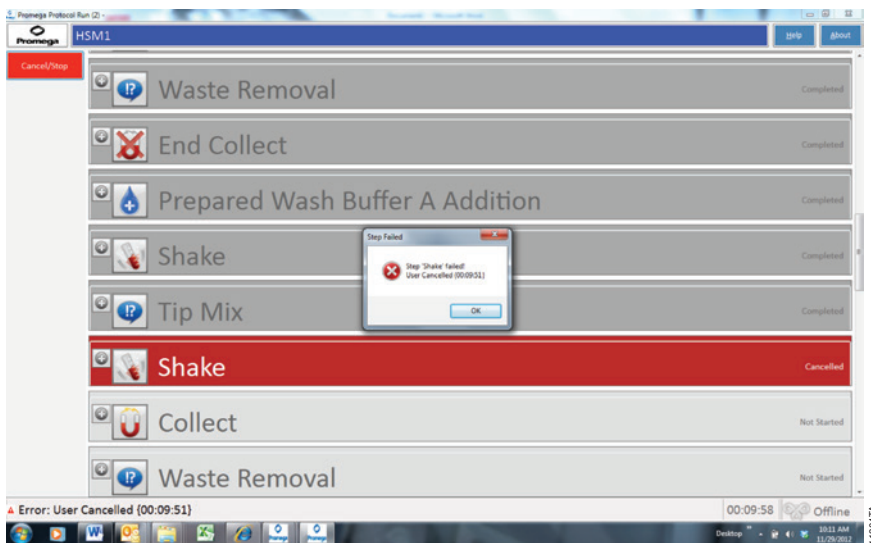
Figure 20. Protocol Run window after a run has been aborted. The step at which the method was aborted is highlighted in red with a "**Cancelled**" indicator on the right. The run status displayed in the lower left corner of the window changes to "Error: User Cancelled".

After a run is completed, remove all tubes and dispose of their contents in accordance with your site guidelines for potentially biohazardous materials.

The HSM 2.0 Instrument is designed for use with potentially infectious materials. Use appropriate protection (i.e., gloves, goggles, etc.) when handling potentially infections substances. Users should adhere to their institutional guidelines for the handling and disposal of all infectious materials. If you are processing less than 32 samples, we recommend placing empty 50ml tubes in unused positions to reduce the chance of instrument contamination.

4.E. Run Reports

A run report is generated for each protocol initiated. The report is displayed after a protocol run and is archived in the software. Archived reports can be accessed via the **Generate Reports** function in the main menu.
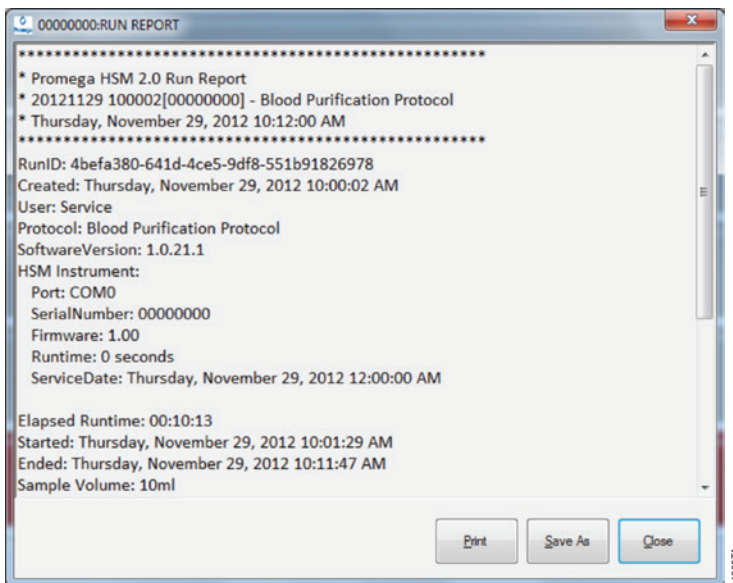
Figure 21. An example run report generated at the completion of a sample processing run. Reports can be viewed, printed or saved.

To view archived reports, select **Generate Reports** from the main menu (Figure 12). The Promega HSM 2.0 Report viewer will open (Figure 22).

The **Generate Reports** function on the main menu allows viewing, printing and export of run reports generated during sample processing.

Reports Check Box:

Selecting the **Reports** check box (Figure 22) displays formatted reports that open using the Notepad utility found on Windows computers. Reports can be sorted by date ranges as defined by buttons on the left hand margin of the report screen.

To open a report, double-click on the date of the report.

To export reports, select "**Save As**" in Notepad and save the file to your desired location.

Data Check Box:

Selecting the data check box (Figure 22) displays run report data in delimited text file format. Reports can be sorted by date range as defined by buttons in the left hand panel of the report screen.

The file is opened in Notepad. To save the file, select the "**Save As**" option in Notepad and save the file to your desired location.
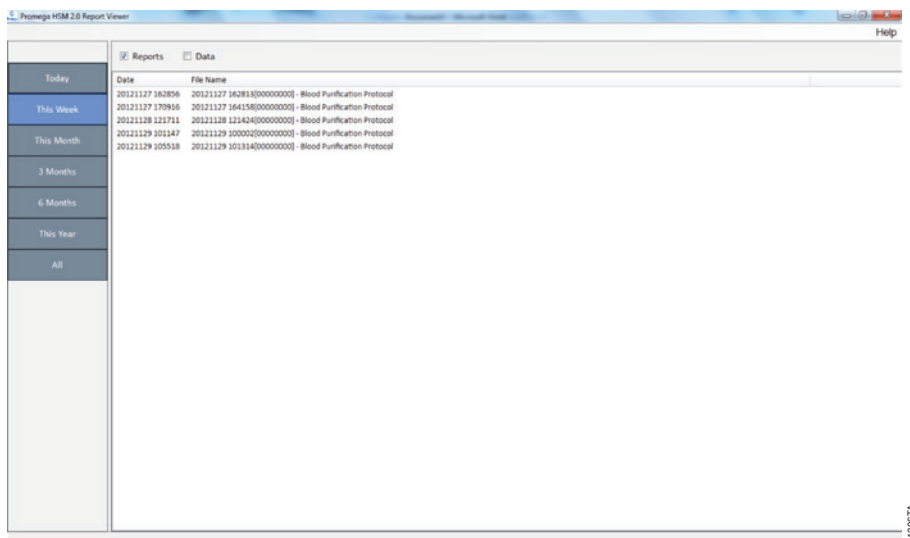
Figure 22. The Report Viewer window. In this example, reports from the current week are selected, as evidenced by the "**This Week**" icon selection on the left hand side of the screen. To open a report, select **Report** or **Data** and then double-click on the report date.

4.F.   Software Administration

Administrators can view and access the **Configure Settings** option from the main menu (Figure 12). Selecting Configure Settings opens the **Configuration Settings Menu** (Figure 23), which allows administrators to view and modify advanced configuration information. Select "**Help**" in the upper right corner of the **Configure Settings Menu** window for more information on the accessible functions.
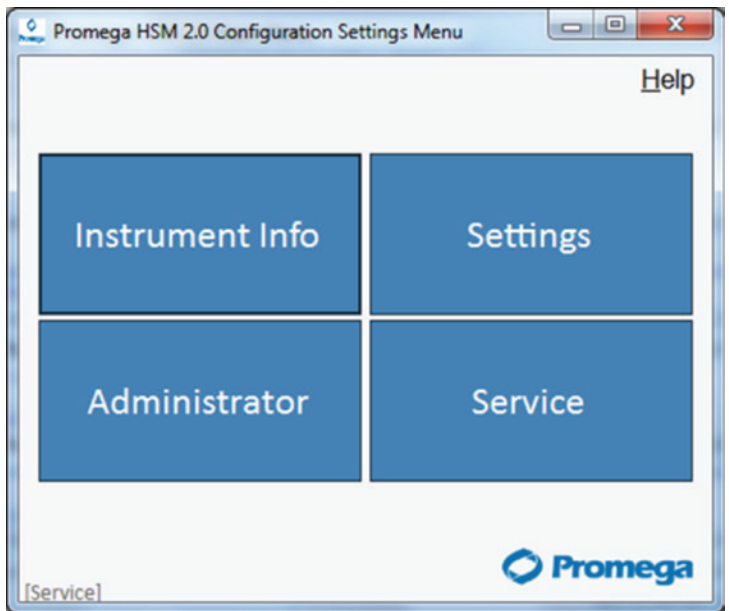
Figure 23. The Configuration Settings Menu.

Instrument Info Button

Selecting **Instrument Info** displays information on the HSM 2.0 Instruments that is currently communicating with the software (Figure 24). It displays the instrument serial number and allows the administrator to change the name and the color associated with each instrument. Select "**Save**" to accept changes.
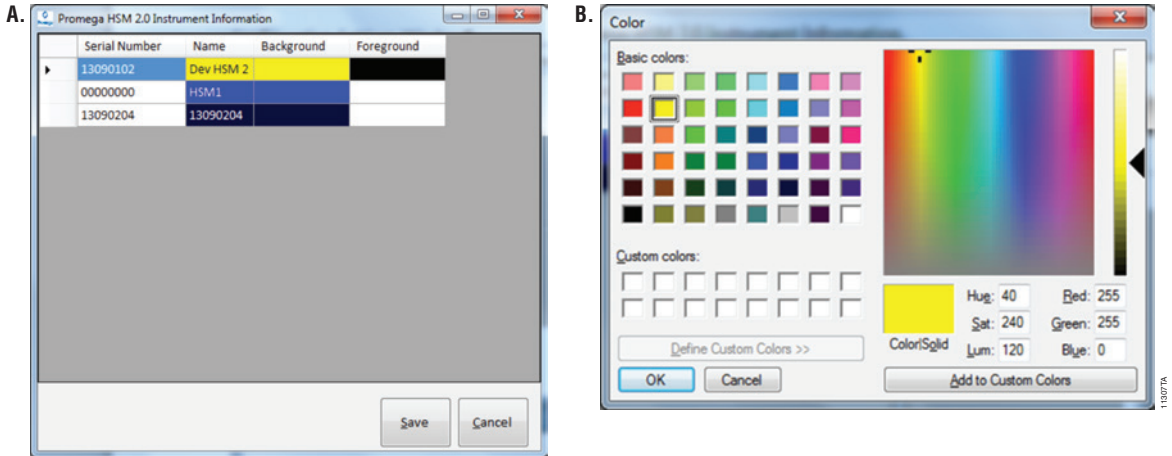
Figure 24. Instrument information screen. Panel A. A listing of instruments discovered by the HSM 2.0 Software. Panel B. The color palette selector.

To change a parameter, double-click on the box of interest.

For **color changes**, select the desired color in the color palette and click "**OK**" in the color selector

For **name changes** a cursor will appear in the text box, highlight the text to make edits and click "**Save**" to accept changes.

To delete an HSM 2.0 Instrument from the list, click the arrow on the right-hand side of the row and press the **Delete** key on the keyboard.

To **exit the Configuration Settings** menu and return to the main screen, select the **Close** icon in the upper right of the window.

Settings Button

The settings button allows administrators to select custom locations to store and locate various files generated by the software (Figure 25).
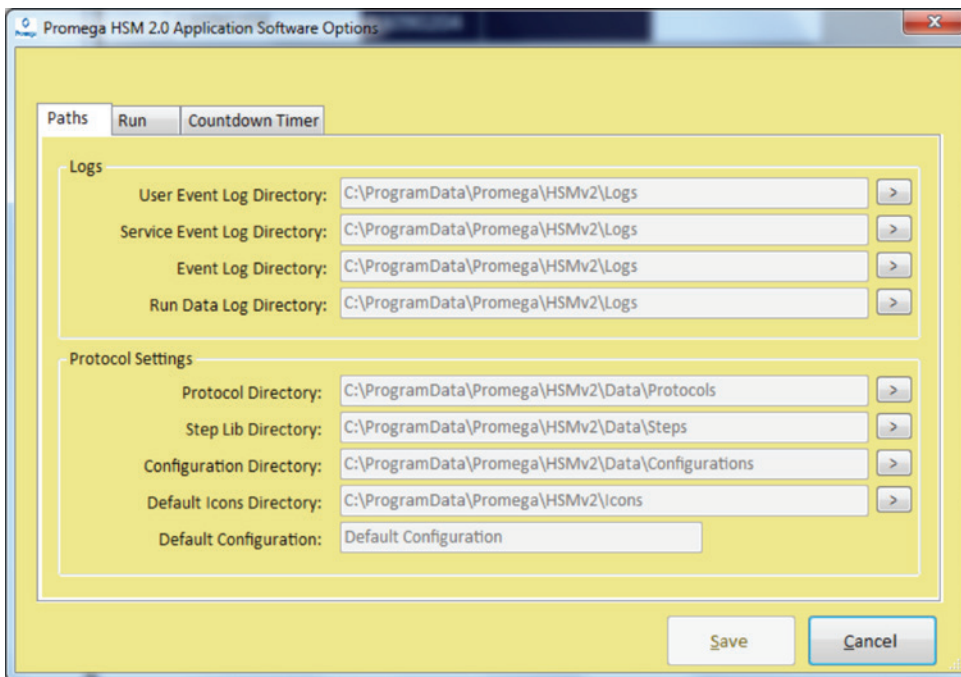
Figure 25. Software Options screen. Three tabs allow administrators to select file locations (Paths tab), options for Running protocol (Run tab) and countdown timer and sound options (Countdown Timer tab).

The Paths Tab

Logs: There are 4 log file types generated by the software. These are stored in the default location **C:\ProgramData\ Promega\HSMv2\Logs**. The administrator can select a different storage location for log files, if desired:

• **Service Event Log:** Contains a summary of service events and diagnostics

• **Event Log:** Contains the run reports outlining the protocols run on the instrument

• **Run Data Log:** Contains run reports in delimited format

Protocol Settings: The administrator can change the default locations for the various support files for the software. However, we recommend that they be left in their default locations.

For all changes, select "**Save**" to save settings or "**Cancel**" to exit the screen without saving changes.
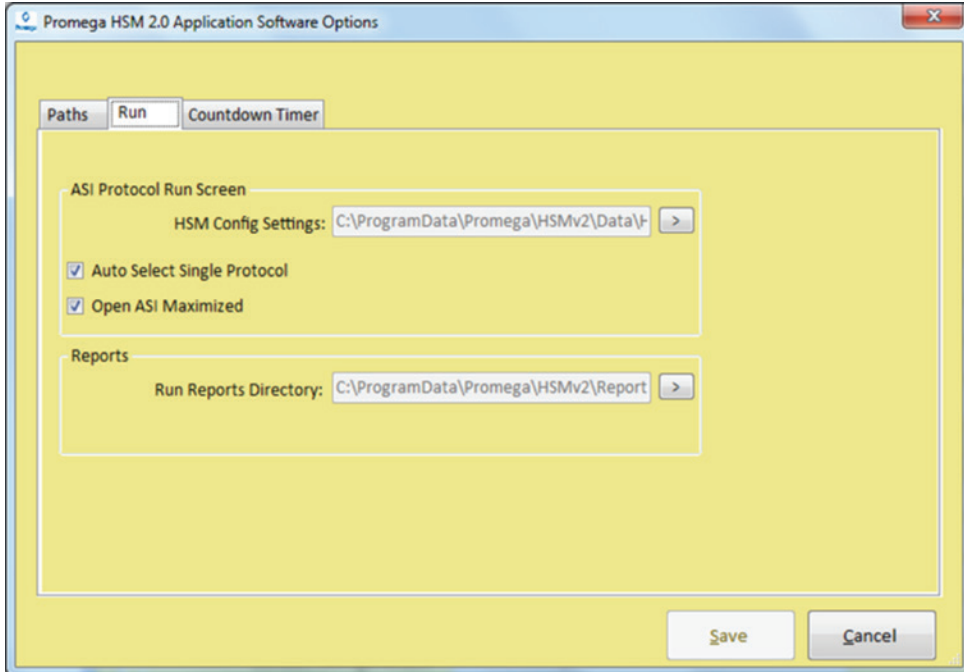
Figure 26. Software Options Screen showing the Run Tab.

The Run Tab

ASI Protocol Run Screen

HSM Config Settings: Allows the administrator to select location for configuration settings.

*   **Auto Select Single Protocol**: Checking this box allows the software to select and run the processing program if there is only one available.

*   **Open ASI Maximized**: Checking this box causes window pop ups to be maximized.

4.F. Software Administration (continued)
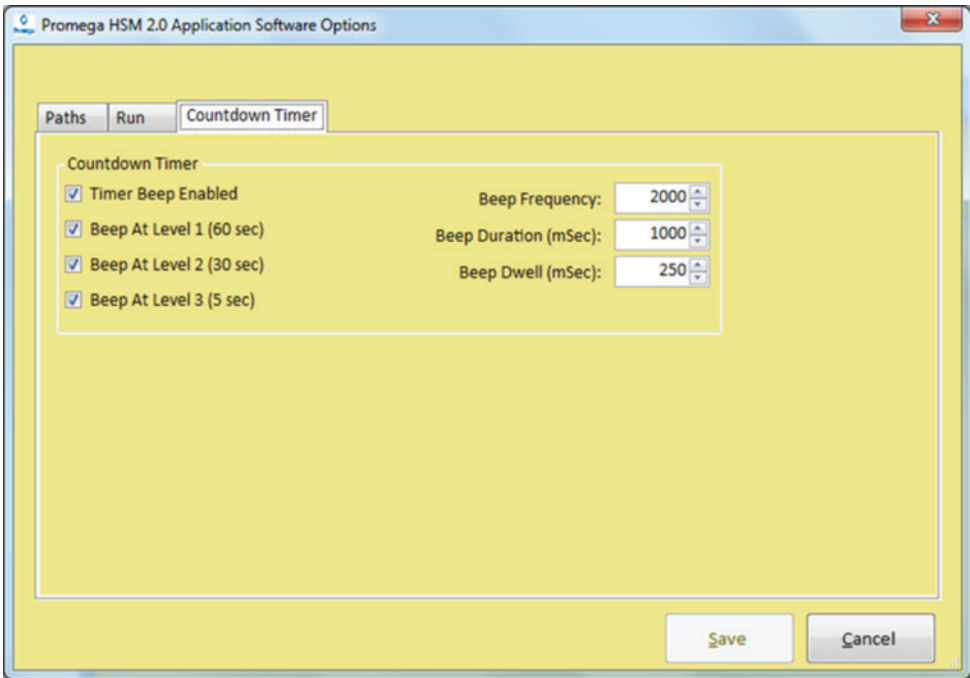
Figure 27. Software Options Screen showing the Countdown Timer Tab.

The Countdown Timer Tab

• Allows administrator to adjust countdown timer settings.

• Timer Beep Enabled Check box turns on and off the beeps.

• Beep frequency can be adjusted from 37 Hz up to 10,000 Hz.

• Warning beeps can be selected or turned off by selecting the different check boxes.

• Beep duration and dwell times can be adjusted from the default settings.
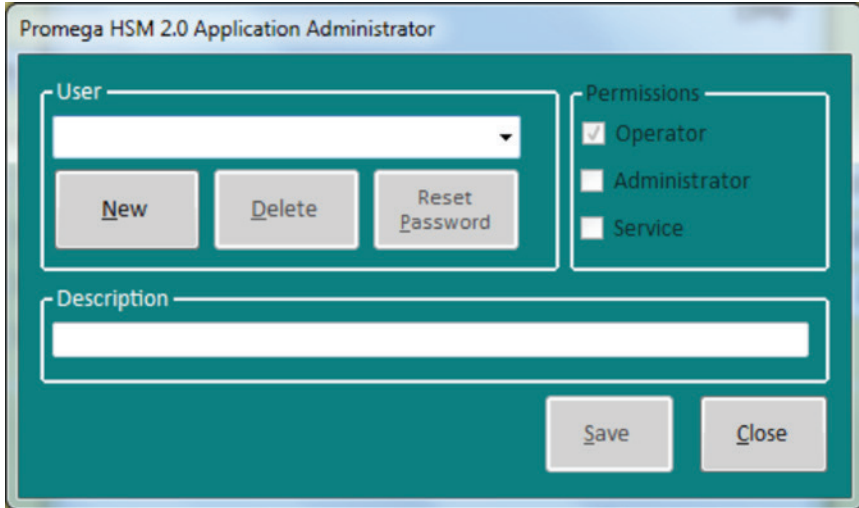
Figure 28. Administrator screen.

Administrator Button

- Allows administrator to add users, delete users, set permissions and reset passwords for users.

- Contains a dropdown menu of all users in the software as well as their permissions level

To **Add a New User**, select the **New** button and enter the username and a description. Permissions can be checked after clicking in the Description field. Before saving settings, text must be typed into the Description field. Select "**Save**" to save the new user. The default password generated will be identical to the username.

Permissions can be selected for each user. Administrators can assign Administrator or Operator permissions.

- Operators can start protocols and generate reports

- Administrators can start protocols, generate reports, add users and configure the system

- Service permissions cannot be assigned by administrators.

To **Delete a User** from the system, select the username from the dropdown menu. Select the **Delete** button. A confirmation screen appears asking if you are sure you want to delete the named user. Select "**Yes**" and the user will be deleted.

To Reset a Password for a user, select the username from the drop-down menu and select the **Reset Password** icon. The administrator must enter their password in the **Existing Password** field before they can change the user password (Figure 29). Passwords are case-sensitive and must be at least eight characters long.

4.F. Software Administration (continued)
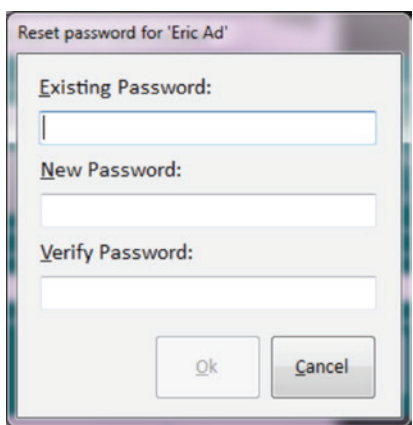
Figure 29. Password reset screen. Enter the administrator password and then the new password for the user. Passwords are case sensitive and new passwords must be at least eight characters long.

5. HSM 2.0 Instrument Cleaning and Maintenance

The HSM 2.0 Instrument requires minimal maintenance. However, it is important to clean the instrument at regular intervals. Spilled samples or reagents should be cleaned up immediately. Most parts of the instrument have an anodized coating, which forms a durable, easily cleaned barrier. However, if liquid gets inside the instrument, it may damage the electronics.

Always turn off and unplug the HSM 2.0 Instrument or the Power Supply before cleaning.

No additional maintenance is required for the HSM 2.0 Instrument, Power Supply or accessories. The Instrument and Power Supply do not contain any user-serviceable parts. Removing the Instrument or Power Supply casing will void the warranty.

General Care

Wipe up any spills immediately.

After each use, clean the instrument by wiping off the top and sides of the HSM 2.0 Instrument and the Tube Rack using a cloth or paper towel dampened with CaviCide® (Fisher Scientific Cat. No. 22998800; VWR Scientific Products Cat. No. 89132-864; or similar approved disinfectant) followed by 70% ethanol. Do not use other solvents or abrasive cleaners because they can damage the instrument's anodized coating.

Note: Wear gloves. If the instrument is used with biohazardous materials, dispose of any cleaning materials in accordance with your institutional guidelines.

If liquid enters the tube wells, carefully remove with a paper towel or similar. Decontaminate if necessary with CaviCide® (Fisher Scientific Cat. No. 22998800; VWR Scientific Products Cat. No. 89132-864; or similar disinfectant) followed by 70% ethanol as described above.

Repeat the procedure as many times as required to effectively disinfect and decontaminate the instrument.

- Keep the cooling vents in the back of the instrument and top of the Power Supply clear of dust.
- Do not remove the HSM 2.0 Instrument case for cleaning. This will void the warranty.
- Never allow liquids to sit on equipment surfaces for extended periods of time.

6. Troubleshooting

If you have questions that are not covered in this troubleshooting section, contact Promega Technical Services. Visit **www.promega.com** to find your nearest Promega branch or distributor.

Symptoms	Causes and Comments
The instrument is making an unusual, rapid clicking noise when it is turned on.	One of the machine sensors might have dust interfering with it. Contact Promega or your local Promega representative for assistance with sensor cleaning.
Green LED does not light up.	Check the Power Supply. If the Power Supply switch is turned on, the switch does not glow green, and you cannot hear the Power Supply fans running: • Check that the black Power Cord is securely connected to the back of the Power Supply. • Check that the black Power Cord is securely plugged in to a working electrical outlet. • An 8-amp fuse is located next to the power switch on the back of the Power Supply. Check the fuse. If the fuse is blown, replace the fuse. If you can hear the Power Supply fans running: • Check that the blue Power Cable is connected between the back of the Instrument and the Power Supply. • Listen for the fans and motors in the instrument. If they are running, it is most likely that the LED cable has become disconnected. Contact Promega or your local Promega representative for service.
Red LED lights up.	Instrument error. Turn the HSM 2.0 Instrument off and then on again. If the red LED is still on, contact Promega Technical Services.

6. Troubleshooting (continued)

Symptoms	Causes and Comments
Power failure occurs during an instrument run.	If power failure occurred during a prompt, be sure that power has been restored and the unit has completed its diagnostics test before acknowledging the prompt. There should be no effect. If the power failure occurred during an action step, restart the run on the software, and bypass steps until arriving at the step during which the power failure occurred. Complete this step, and proceed with the run.
Poor-quality, low-yield or low-purity DNA obtained.	See the ReliaPrep™ Large Volume Blood Genomic DNA Isolation System Technical Manual (#TM341) for more information.
Magnetic particles are washed off or not captured.	The HSM 2.0 Instrument is intended for use only with Promega ReliaPrep™ paramagnetic particles.
	Check to make sure that the magnets are rotating 90 degrees during collection. You can remove the black top plate to observe the magnets. Replace the cover before running again. **Do not remove the case** as this will void the instrument warranty. If the magnets are not rotating fully, contact Promega or your authorized Promega representative for service.
Inconsistent results.	Instrument run without the tube rack or the black top plate. The HSM 2.0 is designed to be used with the black top plate and tube rack in place; operation without these pieces may alter heating of the samples and adversely affect performance.
Communication error displayed.	• Check that all the power and communication cables are connected securely. • Check that the instrument is on. • Check that the driver for the USB to serial converter is installed properly.
Forgotten User Password.	An Administrator can reset user passwords.
Forgotten Administrator Password.	Contact Promega Technical Services for assistance: **techserv@promega.com**

7. Appendix

7.A. Instrument Startup, Diagnostics and Errors

When instrument is powered on:

Each time the instrument is turned on it will automatically perform a self-diagnostic test during which the platform, heating elements, and magnetic assemblies are initialized to check that the instrument is functioning.

If an error is detected, the red LED on the front of the instrument will light up. If this happens, turn the instrument off and on again. If the red light persists, contact Promega for service.

During operation, the instrument will automatically perform periodic self-diagnostic tests to verify that the platform, heating elements and magnetic assemblies are within calibration. If the instrument detects an error contact Promega Technical Services.

7.B. Updating Firmware and Software

As new purification kits and applications become available, new versions of the HSM 2.0 Software and or Firmware may be required.

The firmware version installed on your instrument can be verified either by accessing the Firmware Version option from the Service Menu (see Section 4.F) or by turning the machine off and then on again.

Firmware is updated using the Service Manager in the Promega HSM 2.0 Application Software program and the RS-232 port on the back of the instrument. Alternatively, the instrument can be connected to a USB port on the computer using the included USB-to-serial converter cable. Firmware can be updated from any computer running supported versions of Microsoft Windows® 7 (32-Bit or 64-Bit) or Microsoft Windows® 10 (32-Bit or 64-Bit) with an available serial port or by using the included USB-to-Serial converter cable.

1. Plug the provided RS-232 Cable into the back of the instrument and into a serial port on your computer. Note the address of the COM port that is being used.

2. Access the Configure Settings > Service > Update Firmware function in the software.

Save the file to your hard drive. Within the HSM 2.0 Application Software, first select the Com port to which the shaker is connected, and then select **"Connect"**. Select **"Upgrade firmware"** to start the firmware upgrade process. As part of this process you will browse to the saved location of the firmware upgrade that you have downloaded. Once you have selected the firmware upgrade program to be used for the upgrade, select **"Upgrade"**. Upgrading the firmware may take a few minutes. After completing the upgrade process, a message will be displayed indicating that the firmware has been upgraded successfully. At this point you can quit the **Reliaprep.exe** program.

Please contact Promega or your local Promega representative for assistance if you encounter any problems during the firmware upgrade process.

7.C. Information on Shake Speeds and Volumes

The HSM 2.0 Instrument is used to shake uncapped tubes. Please follow the protocol instructions provided in the software when processing samples. If tubes contain too much liquid, there is a risk that the liquid may be thrown from the tubes during shaking. See Table 1 for recommend maximum shaking speed and volume combinations. When testing a new liquid/RPM combination, never exceed the recommended settings, and observe the liquid shaking in the tube to verify that the liquid/RPM combination does not result in spillage. Never exceed 35ml solution in a processing tube.

Table 1. Maxiumum Recommended Shaking Speeds for Different Amounts of Liquid.

Volume	Water	50% Ethanol
35ml	550rpm	450rpm
30ml	620rpm	550rpm
25ml	680rpm	650rpm
20ml	700rpm	680rpm
15ml	700rpm	700rpm
10ml	700rpm	700rpm

7.D. Instrument Disposal

Contact your local Promega Representative for disposal of the instrument. Please follow your institutional guidelines to handle the disposal of accessories.

7.E. Returning the Instrument and Accessories

The HSM 2.0 Instrument is designed to provide years of consistent performance with little maintenance. If a problem arises with your instrument, please contact Promega or your local Promega representative for support. If further action is required, repair options will be presented and a return authorization assigned if necessary. Promega is not responsible for instrumentation returned without an authorization number. When you ship the instrument for service, please remember to:

1. Obtain a return authorization from Promega.

2. Decontaminate the instrument (see Section 7.F for Decontamination Instructions).

3. Affix a signed and dated Certificate of Decontamination to the outside of the package in which the instrument is returned. Failure to complete and attach the Certificate of Decontamination will result in a decontamination charge.

4. Use the original packaging to ensure that no damage will occur to the equipment during shipping. Any damage will incur additional charges.

   Note: If any of the original packaging is lost or damaged, contact Promega or your local Promega representative for replacement packaging.

5. Repack the equipment as follows:

Preparing the HSM 2.0 Instrument and Power Supply for Repacking

1. Ensure that the tubes are removed from the instrument platform.

2. Ensure that the Power Supply is turned off and not plugged in.

3. Ensure that the HSM 2.0 Instrument is turned off.

4. Make sure that the instrument is disconnected from the Power Supply.

5. Remove the feet from the bottom of the instrument and replace the wooden packaging support.

Repacking the Instrument

1. Place the instrument back into the plastic bag.

2. Place the protective cardboard pieces over the HSM 2.0 instrument and power supply.

3. Repack the HSM 2.0 Instrument accessories:

   Rewrap the Tube Rack, Tube Rack Stand and Power Supply in bubble wrap and place in the appropriate location in the shipping container.

   Place the RS-232 Cable, the Power Cable and the Power Cord into resealable bags, and place the bags into the accessories box. Place the accessories box into the shipping container.

5. Affix the Certificate of Decontamination on the outside of the shipping box. Write the return authorization number provided to you by Promega or your local Promega representative on the outside of the shipping box. Seal the box securely and send back on the original pallet provided.

Please contact Promega technical services for additional assistance if required.

7.F. Certificate of Decontamination

Disinfection and decontamination are required prior to shipping the instrument and instrument accessories for repair. Instruments returned must be accompanied by a signed and dated Certificate of Decontamination attached to the outside packaging of the instrument.

To disinfect and decontaminate: Wipe off the outside surfaces using a cloth dampened with 70% ethanol followed by CaviCide® (Fisher Scientific Cat. No. 22998800; VWR Scientific Products Cat. No. 89132-86) following the manufactures instructions. Follow immediately with a cloth dampened with deionized water to remove any disinfectant from the instrument surfaces. Remove the Tube Rack (Figure 1) and the cover (Figure 5) to expose the Magnet Bar and the Tube Holders. Wipe off the Magnet Bar and the Tube Holders using a cloth and foam- or cotton-tipped swabs dampened with 70% ethanol followed by a cloth and foam- or cotton-tipped swabs dampened with CaviCide® (Fisher Scientific Cat. No. 22998800; VWR Scientific Products Cat. No. 89132-864) following the manufactures instructions. Follow immediately with a cloth and foam- or cotton-tipped swabs dampened with deionized water to remove any residual bleach from the instrument surfaces. Repeat the procedure as many times as required to effectively disinfect and decontaminate the instrument.

Failure to confirm disinfection and decontamination will result in decontamination charges before the instrument will be serviced.

Select either (A) or (B):

A.   I confirm that the returned items have not been contaminated by body fluids or by toxic, carcinogenic, radioactive, or other hazardous materials.

B.   I confirm that the returned items have been decontaminated and can be handled without exposing personnel to health hazards.

Circle the type of material used in the instrument: Chemical   Biological   Radioactive**

Briefly describe the decontamination procedure performed:

Date: _____

Place: _____

Signature: _____

Name (block capital letters): _____

** The signature of a Radiation Safety Officer is also required if the instrument was used with radioactive materials.

This instrument is certified by the undersigned to be free of radioactive contamination.

Date: _____

Place: _____

Signature: _____

Name (block capital letters): _____

7.G. Warranty Information

Limited Warranty and Service Guidelines (Pending Warranty and Service Contract Information)

Promega warrants to the original purchaser that the HSM 2.0 Instrument will be free from defects in materials and workmanship for a period of one year from the date of delivery. Promega agrees, as its sole responsibility under this limited warranty and upon prompt notice of a defect, to repair or replace (at Promega's discretion) any instrument discovered to be defective within the warranty period. Expendable items are not covered by this warranty. This warranty does not include repair or replacement necessitated by accident, neglect, misuse, unauthorized repair or modification of the instrument. The instrument may not be returned without a proper Return Authorization Number from Promega, as described below.

This warranty and the remedies set forth herein are exclusive and in lieu of all other express or implied warranties (including implied warranties of merchantability, fitness for a particular purpose and noninfringement), and no other warranties shall be binding upon Promega. In no event shall Promega be liable for any special, incidental or consequential damages resulting from the use or malfunction of this instrument or the system with which it is used.

To obtain service during the warranty period, please take the following steps:

1. Write or call the company that sold you the instrument and describe as precisely as possible the nature of the problem.

2. Carry out minor adjustments or tests as suggested by your technical contact.

3. If the instrument is still not functioning properly and needs to be returned to Promega for service, YOU MUST OBTAIN A PROMEGA RETURN AUTHORIZATION NUMBER prior to shipping the instrument back.

4. Before returning the equipment, you will be responsible for cleaning it and providing a Certificate of Decontamination to Promega in accordance with instructions.

5. After obtaining a Return Authorization Number and signing the Certificate of Decontamination, pack the instrument carefully (damage incurred in shipping due to improper packaging is not Promega's responsibility), write the Return Authorization Number on the outside of the package and ship it to the address provided by your technical contact.

6. Shipping to and from Promega will be paid by Promega pursuant to directions to be provided. The instrument will be repaired free of charge for all customers within their warranty period.

7. Under no circumstance can equipment be returned without proper authorization. This authorization is needed to ensure that the problem is not a minor problem that can be easily handled in your laboratory and to determine the nature of the problem so that repairs can be handled appropriately.

Out of Warranty Service

Contact Promega or your local Promega representative. We will be happy to assist you by telephone at no charge. Repair service, if needed, will be billed at a flat rate to be agreed upon in advance. Your invoice will include shipping.

7.H. Related Products, Warranties and Service Agreements

DNA Purification Kits

Product	Quantity	Cat.#
ReliaPrep™ Large Volume HT gDNA Isolation System	96 × 10ml to 960 × 1ml preps	A1751

Replacement Components

Product	Quantity	Cat.#
HSM 2.0 Tube Rack	1 each	A2713
HSM 2.0 Tube Rack Stand	1 each	A2714
HSM 2.0 Cover	1 each	A2712

Warranties

The Standard Warranty, included in the system price, covers all parts, labor and shipping to and from our service facility as well as a temporary replacement upon request. The temporary replacement will be shipped via standard ground shipment and will arrive in 5 to 7 working days. If you no longer have your instrument shipping carton, we will provide you with a box for shipment of the instrument back to our service technicians. We will repair it and return it to you performing to original factory specifications.

Service Agreement Options

After the warranty period is over, you can continue to receive the same comprehensive service and support from Promega you did when your system was under warranty. The Standard Service Agreement covers all parts, labor and shipping to and from our depot repair location as well as a loaner instrument upon request. If your instrument needs repair, we will provide a box for shipment of the instrument back to our service facility. We will repair it and return it performing to original factory specifications. The term is one year, and it is renewable.

Product	Quantity	Cat.#
HSM 2.0 Instrument Standard Service Agreement	1 each	SA1330

7.I. Summary of Changes

The following change was made to the 3/19 version of this document: The operating system requirements were updated.