



# Applied Biosystems Veriti™ Thermal Cycler

User Guide

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# Preface

## How to Use This Guide

<b>Purpose of This Guide</b>	The <i>Applied Biosystems Veriti™ User Guide</i> provides information about installing, using and maintaining the Applied Biosystems Veriti™ Thermal Cycler.
<b>Audience</b>	This guide is intended for novice and experienced Veriti™ Thermal Cycler users who use the instrument to perform PCR.
<b>Assumptions</b>	This guide assumes you have knowledge of basic laboratory procedures and PCR chemistry.
<b>Text Conventions</b>	<p>This guide uses the following conventions:</p> <ul style="list-style-type: none"><li>• <b>Bold</b> text indicates user action. For example: Type <b>0</b>, then press <b>Enter</b> for each of the remaining fields.</li><li>• <i>Italic</i> text indicates new or important words and is also used for emphasis. For example: Before analyzing, <i>always</i> prepare fresh matrix.</li><li>• A right arrow symbol ( ▶ ) separates successive commands you select from a drop-down or shortcut menu. For example: Select <b>File ▶ Open ▶ Spot Set</b>. Right-click the sample row, then select <b>View Filter ▶ View All Runs</b>.</li></ul>
<b>User Attention Words</b>	<p>Two user attention words appear in Applied Biosystems user documentation. Each word implies a particular level of observation or action as described below:</p> <p><b>Note:</b> – Provides information that may be of interest or help but is not critical to the use of the product.</p> <p><b>IMPORTANT!</b> – Provides information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.</p> <p>Examples of the user attention words appear below:</p> <p><b>Note:</b> The Calibrate function is also available in the Control Console.</p> <p><b>IMPORTANT!</b> If your instrument is so configured, you need a valid user ID and password to log in.</p>
<b>Safety Alert Words</b>	Safety alert words also appear in user documentation. For more information, see “ <a href="#">Safety Alert Words</a> ” on <a href="#">page xii</a> .

## How to Obtain More Information

### Related Documentation

The following document is shipped with the system:


*Applied Biosystems Veriti™ Thermal Cycler Quick Reference Card* – Provides a summary of information about the thermal cycler, its installation, and accessories. It is designed to help you quickly learn to use the Veriti™ Thermal Cycler.

A portable document format (PDF) version of this guide is available on the *Veriti™ Thermal Cycler Documentation CD*.

**Note:** To open the user documentation on the *Veriti™ Thermal Cycler Documentation CD*, use the Adobe® Reader® software available from [www.adobe.com](http://www.adobe.com).

**Note:** For additional documentation, see “How to Obtain Support” on page viii.

### Obtaining Information from the Help System

The Veriti™ Thermal Cycler has a Help system that describes how to use each feature of the user interface. Access the Help system by touching  (Help) at the bottom right corner of the instrument touchscreen.

### Send Us Your Comments

Applied Biosystems welcomes your comments and suggestions for improving its user documents. You can e-mail your comments to:

[techpubs@appliedbiosystems.com](mailto:techpubs@appliedbiosystems.com)

**IMPORTANT!** The e-mail address above is for submitting comments and suggestions relating only to documentation. To order documents, download PDF files, or for help with a technical question, go to <http://www.appliedbiosystems.com>, then click the link for **Support**. (See “How to Obtain Support” below).

## How to Obtain Support

### Support Information

For the latest services and support information for all locations, go to <http://www.appliedbiosystems.com>, then click the link for **Support**.

At the Support page, you can:

- Search through frequently asked questions (FAQs)
- Submit a question directly to Technical Support
- Order Applied Biosystems user documents, MSDSs, certificates of analysis, and other related documents
- Download PDF documents
- Obtain information about customer training
- Download software updates and patches
- Contact technical services by clicking the **Care Center** link.

In addition, the Support page provides access to worldwide telephone and fax numbers to contact Applied Biosystems Technical Support and Sales facilities.



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**TVK Support** To send the temperature verification kit equipment for recalibration:

1. Use the address or Fax information below to request a quote from Alpha Technics for a recalibration order:
    - Mail: Alpha Technics  
17151 Gillette Avenue  
Irvine, Ca. 92614-5602
    - Fax: (949)-271-2300
  2. Ensure that the probe assembly has been decontaminated (see [“Decontaminating the Probe Assembly” on page 4-11](#)).
  3. Pack the digital thermometer and the probe assembly in the black case.
  4. Create a shipping package with:
    - Black case containing the digital thermometer and probe assembly
    - Decontamination certificate (see [Appendix D](#))
    - Payment for shipping/handling in one of the following forms:
      - Purchase order
      - Company letterhead with the words “verbal purchase order,”
      - Visa/MasterCard credit card information
    - Your address and contact information:
      - Billing address
      - Return shipping address
      - Name and phone number of a contact (person most familiar with the thermometer)
- Note:** If payment is not included with the package, Alpha Technics bills you for \$150.00 plus a 10% administrative fee. The total for the purchase order is then \$165.00.
5. Send the package freight prepaid to Alpha Technics at the address in [step 1](#).



# Safety and EMC Compliance Information

This section covers:


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## Safety Conventions Used in This Document


**Safety Alert Words** Four safety alert words appear in Applied Biosystems user documentation at points in the document where you need to be aware of relevant hazards. Each alert word—**IMPORTANT**, **CAUTION**, **WARNING**, **DANGER**—implies a particular level of observation or action, as defined below.

### Definitions

**IMPORTANT!** – Indicates information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.

 **CAUTION** – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

 **WARNING** – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.


 **DANGER** – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.


Except for **IMPORTANT**s, each safety alert word in an Applied Biosystems document appears with an open triangle figure that contains a hazard symbol. *These hazard symbols are identical to the hazard symbols that are affixed to Applied Biosystems instruments* (see “[Safety Symbols](#)” on [page xiii](#)).

### Examples

The following examples show the use of safety alert words:

**IMPORTANT!** You must create a separate sample entry spreadsheet for each 96-well plate.

 **CAUTION** The lamp is extremely hot. Do not touch the lamp until it has cooled to room temperature.









 **WARNING** **CHEMICAL HAZARD. Formamide.** Exposure causes eye, skin, and respiratory tract irritation. It is a possible developmental and birth defect hazard. Read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

 **DANGER** **ELECTRICAL HAZARD.** Failure to ground the instrument properly can lead to an electrical shock. Ground the instrument according to the provided instructions.

## Symbols on Instruments



### Electrical Symbols on Instruments




The following table describes the electrical symbols that may be displayed on Applied Biosystems instruments.

Symbol	Description
	Indicates the <b>On</b> position of the main power switch.
	Indicates the <b>Off</b> position of the main power switch.
	Indicates a standby switch by which the instrument is switched on to the <b>Standby</b> condition. Hazardous voltage may be present if this switch is on standby.
	Indicates the <b>On/Off</b> position of a push-push main power switch.
	Indicates a terminal that may be connected to the signal ground reference of another instrument. This is not a protected ground terminal.
	Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	Indicates a terminal that can receive or supply alternating current or voltage.
	Indicates a terminal that can receive or supply alternating or direct current or voltage.

### Safety Symbols

The following table describes the safety symbols that may be displayed on Applied Biosystems instruments. Each symbol may appear by itself or with text that explains the relevant hazard (see “[Safety Labels on Instruments](#)” on [page xiv](#)). These safety symbols may also appear next to DANGERS, WARNINGS, and CAUTIONS that occur in the text of this and other product-support documents.

Symbol	Description
	Indicates that you should consult the manual for further information and to proceed with appropriate caution.
	Indicates the presence of an electrical shock hazard and to proceed with appropriate caution.

Symbol	Description
	Indicates the presence of a hot surface or other high-temperature hazard and to proceed with appropriate caution.
	Indicates the presence of a laser inside the instrument and to proceed with appropriate caution.
	Indicates the presence of moving parts and to proceed with appropriate caution.

### Environmental Symbols on Instruments

The following symbol applies to all Applied Biosystems electrical and electronic products placed on the European market after August 13, 2005.

Symbol	Description
	<p><b>Do not dispose of this product as unsorted municipal waste.</b> Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE).</p> <p><b>European Union customers:</b> Call your local Applied Biosystems Customer Service office for equipment pick-up and recycling. See <a href="http://www.appliedbiosystems.com">http://www.appliedbiosystems.com</a> for a list of customer service offices in the European Union.</p>


## Safety Labels on Instruments

The following CAUTION, WARNING, and DANGER statements may be displayed on Applied Biosystems instruments in combination with the safety symbols described in the preceding section.


English	Francais
<b>CAUTION</b> Hazardous chemicals. Read the Material Safety Data Sheets (MSDSs) before handling.	<b>ATTENTION</b> Produits chimiques dangereux. Lire les fiches techniques de sûreté de matériels avant la manipulation des produits.
<b>CAUTION</b> Hazardous waste. Refer to MSDS(s) and local regulations for handling and disposal.	<b>ATTENTION</b> Déchets dangereux. Lire les fiches techniques de sûreté de matériels et la régulation locale associées à la manipulation et l'élimination des déchets.
<b>WARNING</b> Hot lamp.	<b>AVERTISSEMENT</b> Lampe brûlante.

English	Francais
<b>WARNING</b> Hot. Replace lamp with an Applied Biosystems lamp.	<b>AVERTISSEMENT</b> Composants brûlants. Remplacer la lampe par une lampe Applied Biosystems.
<b>CAUTION</b> Hot surface.	<b>ATTENTION</b> Surface brûlante.
<b>DANGER</b> High voltage.	<b>DANGER</b> Haute tension.
<b>WARNING</b> To reduce the chance of electrical shock, do not remove covers that require tool access. No user-serviceable parts are inside. Refer servicing to Applied Biosystems qualified service personnel.	<b>AVERTISSEMENT</b> Pour éviter les risques d'électrocution, ne pas retirer les capots dont l'ouverture nécessite l'utilisation d'outils. L'instrument ne contient aucune pièce réparable par l'utilisateur. Toute intervention doit être effectuée par le personnel de service qualifié de Applied Biosystems.
<b>CAUTION</b> Moving parts.	<b>ATTENTION</b> Parties mobiles.

## General Instrument Safety

 **WARNING PHYSICAL INJURY HAZARD.** Using the instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.

### Moving and Lifting the Instrument


 **CAUTION PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

### Operating the Instrument

Ensure that anyone who operates the instrument has:


- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
- Read and understood all applicable Material Safety Data Sheets (MSDSs). See “About MSDSs” on [page xvi](#).

### Cleaning or Decontaminating the Instrument

 **CAUTION** Before using a cleaning or decontamination method other than those recommended by the manufacturer, verify with the manufacturer that the proposed method will not damage the equipment.

## Chemical Safety

### Chemical Hazard Warning

 **WARNING CHEMICAL HAZARD.** Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer, and observe all relevant precautions.

### About MSDSs

Chemical manufacturers supply current Material Safety Data Sheets (MSDSs) with shipments of hazardous chemicals to *new* customers. They also provide MSDSs with the first shipment of a hazardous chemical to a customer after an MSDS has been updated. MSDSs provide the safety information you need to store, handle, transport, and dispose of the chemicals safely.

Each time you receive a new MSDS packaged with a hazardous chemical, be sure to replace the appropriate MSDS in your files.



**Obtaining MSDSs** The MSDS for any chemical supplied by Applied Biosystems is available to you free 24 hours a day. To obtain MSDSs:

1. Go to <https://docs.appliedbiosystems.com/msdssearch.html>
2. In the Search field of the MSDS Search page:
  - a. Type in the chemical name, part number, or other information that you expect to appear in the MSDS of interest.
  - b. Select the language of your choice.
  - c. Click **Search**.
3. To view, download, or print the document of interest:
  - a. Right-click the document title.
  - b. Select:
    - **Open** – To view the document
    - **Save Target As** – To download a PDF version of the document to a destination that you choose
    - **Print Target** – To print the document
4. To have a copy of an MSDS sent by fax or e-mail, in the Search Results page:
  - a. Select **Fax** or **Email** below the document title.
  - b. Click **RETRIEVE DOCUMENTS** at the end of the document list.
  - c. Enter the required information.
  - d. Click **View/Deliver Selected Documents Now**.

**Note:** For the MSDSs of chemicals not distributed by Applied Biosystems, contact the chemical manufacturer.

## Chemical Safety Guidelines

To minimize the hazards of chemicals:

- Read and understand the Material Safety Data Sheets (MSDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. (See “About MSDSs” on page xvi.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the MSDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the MSDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer’s cleanup procedures as recommended in the MSDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

## Chemical Waste Safety


Chemical Waste Hazard





**CAUTION**


**HAZARDOUS WASTE.** Refer to Material Safety Data Sheets and local regulations for handling and disposal.

## Electrical Safety

 **DANGER ELECTRICAL SHOCK HAZARD.** Severe electrical shock can result from operating the Veriti™ Thermal Cycler without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.


Fuses  **WARNING FIRE HAZARD.** Improper fuses or high-voltage supply can damage the instrument wiring system and cause a fire. Before turning on the instrument, verify that the fuses are properly installed and that the instrument voltage matches the power supply in your laboratory.

 **WARNING FIRE HAZARD.** For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.

Power  **DANGER ELECTRICAL HAZARD.** Grounding circuit continuity is vital for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected. Use properly configured and approved line cords for the voltage supply in your facility. Plug the system into a properly grounded receptacle with adequate current capacity.

Overvoltage Rating The Veriti™ Thermal Cycler has an installation (overvoltage) category of II, and is classified as portable equipment

## Physical Hazard Safety

Moving Parts  **WARNING PHYSICAL INJURY HAZARD.** Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.

## Safety and Electromagnetic Compatibility (EMC) Standards

This section provides information on:

- [U.S. and Canadian Safety Standards](#)
- [Canadian EMC Standard](#)
- [European Safety and EMC Standards](#)
- [Australian EMC Standards](#)

U.S. and  
Canadian Safety  
Standards



The Veriti™ Thermal Cycler has been tested to and complies with standard:  
UL 61010A-1/CAN/CSA C22.2 No. 1010.1-92, “Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.”

UL 61010A-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”

**Canadian EMC Standard**

This instrument has been tested to and complies with ICES-001, Issue 3: “Industrial, Scientific, and Medical Radio Frequency Generators.”

**European Safety and EMC Standards**



**Safety**

This instrument meets European requirements for safety (Low Voltage Directive 73/23/EEC). This instrument has been tested to and complies with standards EN 61010-1:2001, “Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements.”

EN 61010-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”

EN 61010-2-081, “Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and Other Purposes.”

**EMC**

This instrument meets European requirements for emission and immunity (EMC Directive 89/336/EEC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class B), “Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements.”

**Australian EMC Standards**



This instrument has been tested to and complies with standard AS/NZS 2064, “Limits and Methods Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio-frequency Equipment.”



# System Overview

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# 1

This chapter covers:

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# Introducing the Veriti™ Thermal Cycler

## About the Instrument

There are two models of the Veriti™ Thermal Cycler:

- Veriti™ *Fast* 96-Well Thermal Cycler (PN 4375593), with 0.1-mL sample wells
- Veriti™ 96-Well Thermal Cycler (PN 4375785), with 0.2-mL sample wells

The Veriti™ Thermal Cycler features the VeriFlex™ Sample Block, with six independently regulated thermal areas to aid in designing a primer set and run method for optimal PCR conditions. You control the Veriti™ Thermal Cycler using the touchscreen display and easy-to-use interface.

Up to twelve Veriti™ Thermal Cyclers can be connected in a satellite-like format through a network switch. With this connection, you can transmit run methods from one Veriti thermal cycler to another and start multiple thermal cyclers at once.

This user guide provides information on how to maximize the capabilities of your new Veriti™ Thermal Cycler.



Figure 1-1 The Applied Biosystems Veriti™ Thermal Cycler









Detailed specifications for the Veriti™ Thermal Cycler are found in [Appendix A, “Instrument Specifications.”](#)

## Using the Touchscreen

You interact with the Veriti™ Thermal Cycler using a touchscreen.

**Table 1** describes several buttons common to many of the touchscreens.






**Table 1** Buttons in the Veriti™ Thermal Cycler touchscreen

Button	Function
	Returns to the Main Menu screen.
	Returns to the previous screen.
	When a run is in progress, displays the Status Report to view any errors that occurred during the run.
	When a run is in progress, displays the Run Monitor screen to view the run.
	Scrolls up and down through a list of items.
	Displays the run method folders.
	Indicates that a USB drive is connected to the instrument's USB port.
	Opens the Help system.

**Entering Text** When you touch a field that requires the input of text, the text editor opens (Figure 1-2).



Figure 1-2 The Veriti™ Thermal Cycler text editor

To...	Touch...
Enter a lowercase letter	A letter button.
Enter an uppercase letter	 <b>Caps</b> , then the letter(s). When you are done, touch <b>Caps</b> again.
Enter punctuation or other symbols	 <b>Symbols</b> , then the symbol(s). When you are done, touch <b>Symbols</b> again.
Remove the contents of the entire field	
Delete the last letter	
Close the editor	



**Entering Numerals** When you touch a field that requires only numerical input, the numeric editor opens (Figure 1-3).

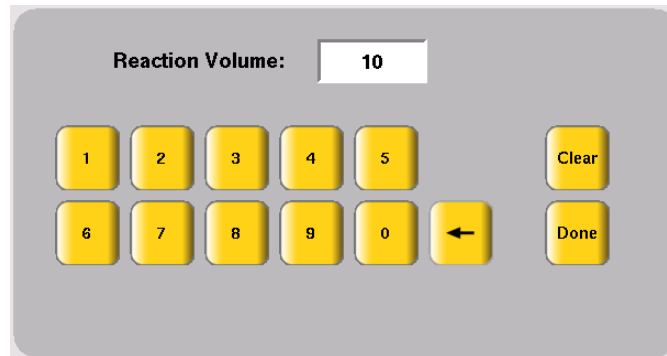





Figure 1-3 The Veriti™ Thermal Cycler numeric editor

To...	Touch...
Enter a number	A number button. The instrument automatically adds the decimal point for those fields that include a decimal point, such as a temperature value. Colons (for entering times) and dashes (for entering dates) are also automatically added.
Delete the last number	
Remove the entire contents of the field	
Close the editor and save any changes.	

## Menu Overview

**The Main Menu Screen** After you log in to the system, the Main Menu screen opens. This screen is the starting point for operating the Veriti™ Thermal Cycler. The date, current time, and current user are shown at the bottom of the screen.

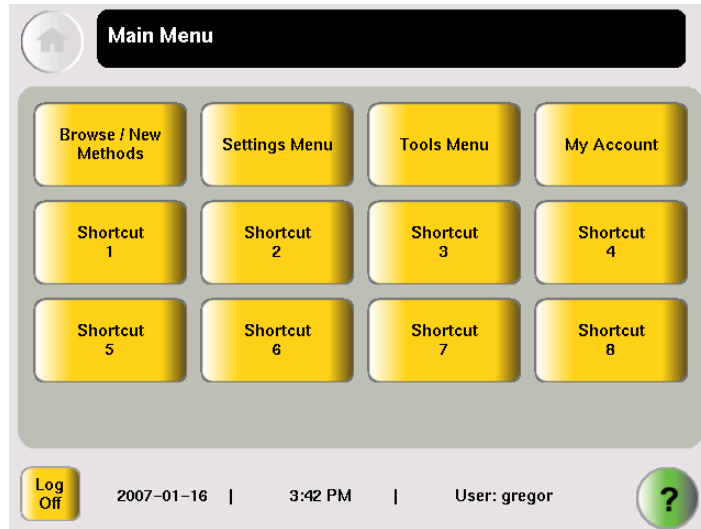



Figure 1-4 The Veriti™ Thermal Cycler Main Menu screen

In the Main Menu screen, touch:

- **Browse/New Methods** to view and work with all the run methods to which you have access (see [“Viewing a Run Method” on page 1-9](#)).
- **Settings Menu** to access various instrument configuration options. If you have administrative privileges, you access the Admin Menu screen from this screen (see [“The Settings Menu Screen” on page 1-7](#)).
- **Tools Menu** to access instrument tests and tools such as a Tm calculator, run method conversion, and touchscreen calibration (see [“The Tools Menu Screen” on page 1-8](#)).
- **My Account** to view and edit your account information. This button is not displayed if your system does not require login.
- The **Shortcut** buttons allow you to configure options you frequently use to appear in the Main Menu screen (see [“Configuring Main Menu Shortcuts” on page 2-15](#)).
- **Log Off** to log off the instrument. You can still log off when a run is in process.
- , (Help) to access the Help system.

## The Settings Menu Screen

Use this screen to set various instrument configuration options. For instruments that require login, only Users and Administrators have access to this menu.

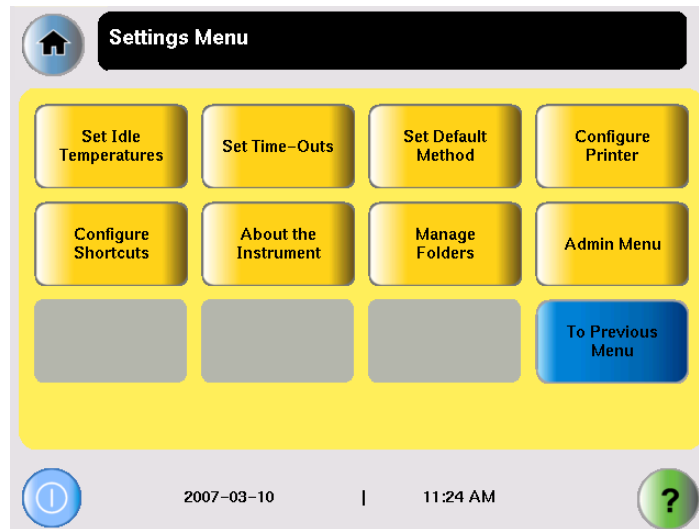


Figure 1-5 The Settings Menu screen, with the Admin Menu button shown

## The Admin Menu Screen

Use this screen to manage user accounts, set instrument security, back up run methods and settings, upgrade the firmware, and perform other functions. For instruments that require login, only Administrators have access to this menu.

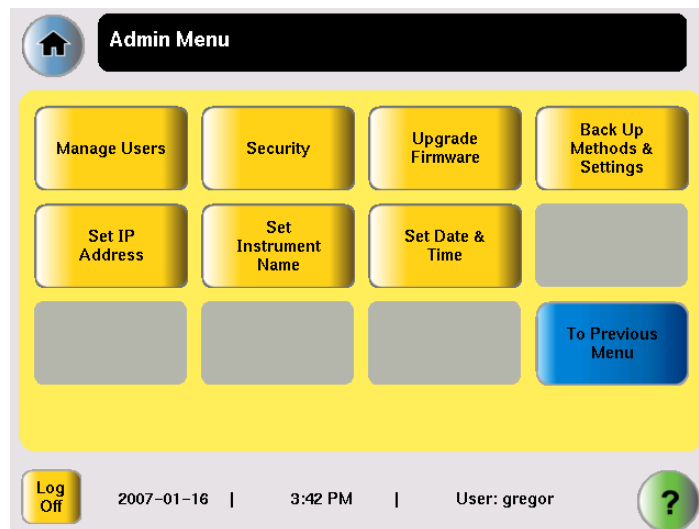


Figure 1-6 The Admin Menu screen, (available only to users with administrative privileges)

## The Tools Menu Screen

Use this screen to access various tools and instrument tests.

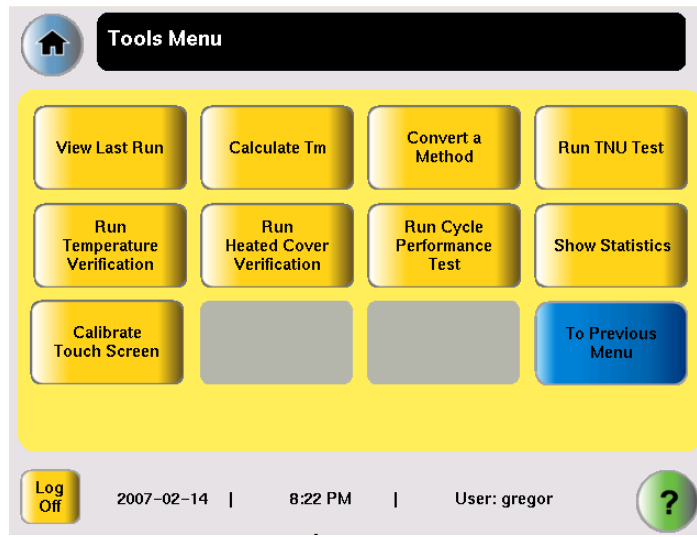


Figure 1-7 The Tools Menu screen, available to all users

For more information about the functions on the Tools Menu, see [Chapter 4, “Utilities.”](#)

## About Run Methods

### What Is a Run Method?

A run method is a set of instructions that specifies how the instrument should heat and cool your samples. Run methods are stored in the instrument firmware.

### Predefined Methods

The Veriti™ Thermal Cycler firmware has ten predefined run methods:

- AmpliCycle® Seq Run Method
- AmpliTaq Gold® DNA Polymerase Run Method
- BigDye® Standard Run Method
- BigDye® Fast Run Method
- Fast PCR Run Method
- General PCR Run Method
- LMS2 Run Method
- Time Release Run Method
- Touchdown PCR Run Method
- XL PCR Run Method

Each method is stored in the Shared folder. You can edit, copy, and run these predefined methods as you would any other run method, but you cannot delete them.

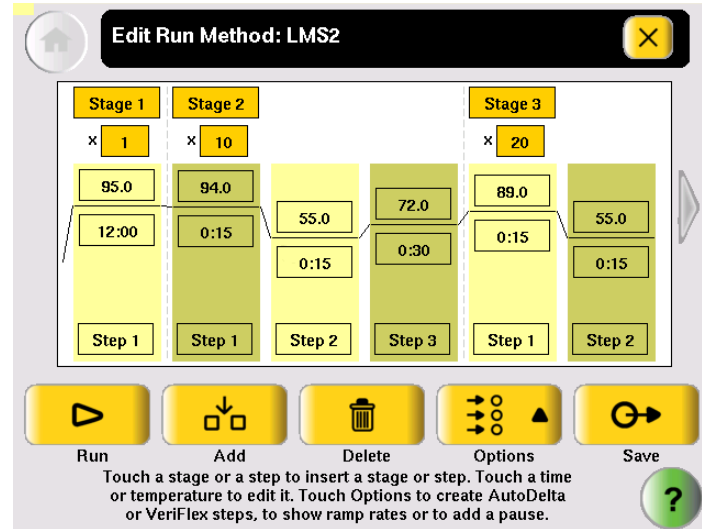
For details on these methods, see [Appendix C, “Predefined Run Methods.”](#)

## Viewing a Run Method

To view a run method:

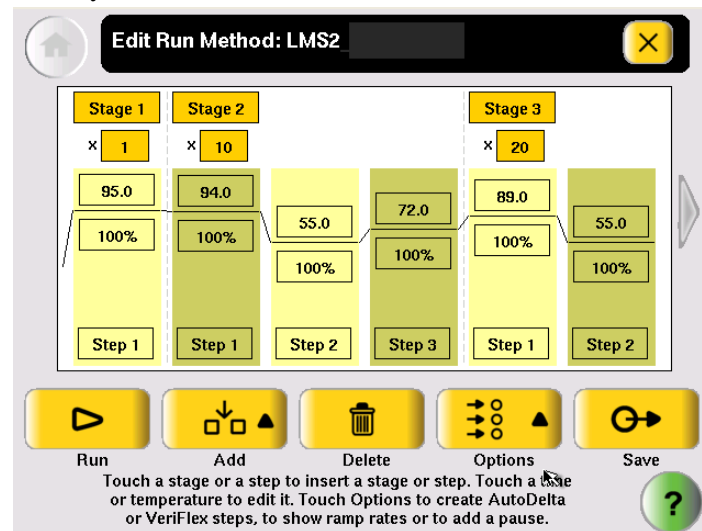
1. In the Browse Run Methods screen, touch a run method to select it, then touch **View/Edit**.

The run method is displayed.



**IMPORTANT!** If you are logged on as a Limited User or a Guest, you can make changes to the run method, but you cannot save them.

2. To view:
  - Other steps in the run method – Touch the arrow buttons at the end of the run method.
  - View steps with ramp rates – Touch **Options**, then **Ramp Rate**. The fields showing times update to show the corresponding ramp rates.
3. When you are done, touch **X** to return to the Browse Run Methods screen.



## Managing Run Methods

To see the run methods in the current folder:

- In the Main Menu screen, touch **Browse/New Methods**.

The Browse Run Methods screen opens. The title includes the number of run methods in parentheses.

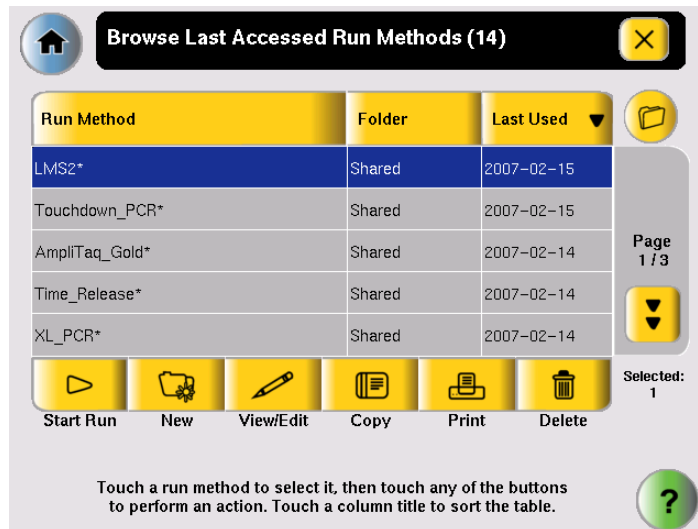


Figure 1-8 The Browse Run Methods screen, showing the most recently accessed run methods

To select a run method:

1. If a run method is already selected in the Browse Run Methods screen:
  - a. Touch the row for the selected method to deselect it.
  - b. Touch the row for the method of interest.
2. To select more than one method, touch each method.

[Table 2](#) lists the administrative tasks you can perform for run methods.

Table 2 Managing run methods



If you want to...	Do this...
Sort run methods by different criteria	Touch the title of the column with the criteria by which you want to sort the run methods. Touch the title a second time to sort in the opposite order.
View more run methods in the current folder	Touch  (Page Down).
View run methods in a different folder	Touch  (folders). In the Browse All Folder screen that opens, touch the folder you want to view.
Start a run	In the list of run methods, touch a run method to select it, then touch <b>Start Run</b> (see <a href="#">“Performing a Run”</a> on page 3-15).

Table 2 Managing run methods (continued)

If you want to...	Do this...
Create a new run method	Touch <b>New</b> (see “Creating a New Run Method” on page 3-6).
View or edit a run method	In the list of run methods, touch the run method to select it, then touch <b>View/Edit</b> (see “Editing Details” on page 3-8).
Copy one or more run methods	In the list of run methods, touch each run method to select it, then touch <b>Copy</b> (see “Copying a Run Method” on page 1-11).
Print a run method	In the list of run methods, touch a run method to select it, then touch <b>Print</b> (see “Printing a Run Method” on page 1-12).
Delete one or more run methods	In the list of methods, touch each run method to select it, then touch <b>Delete</b> (see “Deleting a Run Method” on page 1-12).
Designate a run method as the default	See “Designating a Run Method as the Default” on page 1-12
Back up run methods	See “Backing Up Run Methods and Other Settings” on page 1-13
Restore run methods that you previously backed up	See “Restoring Run Methods and Other Settings” on page 1-14

## Copying a Run Method

**Note:** If your instrument requires login, you must have User or Administrator level permissions to copy a run method.

To copy a run method:

1. Log in as a user with User or Administrator access.
2. In the Browse Run Methods screen, find the run method or methods you want to copy.
3. Touch each run method to select it, then touch **Copy**.
4. In the Save Method screen:
  - a. If you are copying one method – touch **Name**, then rename the method, and/or touch **Folder** to save the run method to a different folder.  
*or*  
If you are copying more than one method – touch **Folder** to save the run methods to a different folder.
  - b. As needed, touch **Reaction Volume**, **Cover Temperature** and **Notes** to edit the values. You can change any of these values when you perform a run with this run method.
  - c. Touch **Save & Exit**, then **OK**.

### Printing a Run Method

Note: Before you print a run method, be sure your instrument is connected to a printer. See [“Connecting to a Network Printer” on page 2-5](#).

1. In the Browse Run Methods screen, locate the run method you want to print.
2. Touch the run method to select it, then touch **Print**.

### Deleting a Run Method

Note: If your instrument requires log in, you must have User or Administrator level permissions to delete a run method.

To delete a run method:

1. Log in as a user with User or Administrator access.
2. In the Browse Run Methods screen, find the run method you want to delete.
3. Touch the run method to select it, then touch **Delete**.
4. In the dialog box that opens, verify the deletion.
5. Touch **Yes** in the message box.

The run method is deleted.

### Designating a Run Method as the Default

The run method that is designated as the default method is used as the starting point for all new methods. The Veriti™ Thermal Cycler uses the General PCR run method (shown on [page C-5](#)) as the default, unless you change to another method.

**IMPORTANT!** If your instrument requires login, you must have User or Administrator level permissions to set the default run method. Only a run method in the Shared folder can be set as the default method.

To designate a run method as the default:

1. Log in as a user with User or Administrator access.
2. In the Main Menu screen, touch **Settings Menu**.
3. In the Settings Menu screen, touch **Set Default Method**.

The Set the Default Run Method screen opens, with only the run methods in the Shared folder displayed.

4. In the Set the Default Run Method, touch the run method you wish to designate as the default, then touch **Make Default**. In the message box that opens, touch **OK**.

The Settings Menu screen is displayed and the selected run method is now the default.



## Backing Up Run Methods and Other Settings

You can back up the instrument's run methods and other settings to a USB drive. All run methods, folders, user information, and other instrument settings are saved.

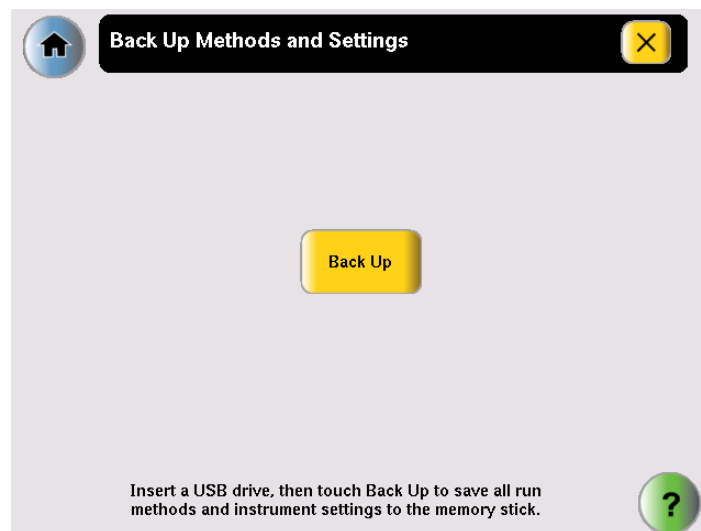
**Note:** If your instrument requires login, you must have Administrator level permissions to back up run methods and instrument settings.

1. Insert the USB drive into the USB port on the front of the instrument.



USB Port

2. Log in as a user with Administrator access.
3. In the Main Menu screen, touch **Settings Menu**, then **Admin Menu**.
4. In the Admin Menu screen, touch **Back Up Methods & Settings**.  
The Back Up Method and Settings screen opens.



5. Touch **Back Up**.  
If a back up file already exists, you are prompted to overwrite it.  
The instrument copies all run methods, folders, user information, and other instrument settings to the USB drive, then displays a message box when the backup is complete.
6. Touch **OK**, then touch (Close) to return to the Admin Menu screen.

7. Remove the USB drive and store it in a safe place.

## Restoring Run Methods and Other Settings

You can restore run methods and other settings from a USB drive to an instrument. The restore feature can also be used to load run methods onto another instrument in your lab.

**Note:** If your system requires login, you must have User or Administrator level permissions to restore saved run methods and settings to your instrument.

To restore run methods and instrument settings:

1. Insert the USB drive containing the saved run methods and settings into the USB port on the front of the instrument.
2. Log in as a user with User or Administrator access.
3. In the Main Menu screen, touch **Settings Menu**, then **About the Instrument**.



4. In the About the Veriti™ Thermal Cycler screen, touch **Restore Methods & Settings**, then **Yes** in the message box.

The instrument copies all run methods, folders, user information, and other instrument settings from the USB drive to the instrument, then displays a message box when the restore is complete.

5. Remove the USB drive and store it in a safe place.
6. Power off the instrument using the switch on the back.
7. Power on the instrument.

**IMPORTANT!** If you restore information to an instrument that is different from the instrument that provided the backup data and your instruments are on a network, you should change the instrument's name. See [“Setting the Instrument Name” on page 2-8](#).

## About Folders

Each run method is saved in a folder. There are three folders available by default:


- **Default** – Run methods are stored here if you do not select another folder. Run methods stored in this folder, run methods can be accessed, edited, run, and deleted only by the user who created them. The Default folder has a blue button.
- **Shared** – Run methods can be accessed, edited, run, and deleted by any user. In the Browse Folders screen, the Shared folder has a blue button.
- **USB** – This folder shows all run methods on the USB drive. If a USB drive is present in the instrument, this button is blue, otherwise it is grey.

In addition, you may create up to nine custom folders. In a custom folder, run methods can be accessed, edited, run, and deleted only by the user who created them. In the Browse folders screen, custom folders have a yellow button.

You can create a new folder when you save a run method (see [step 6 on page 3-7](#)).


### Deleting Custom Folders

You can delete any custom folder. All run methods a custom folder that is deleted are also deleted.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Manage Folders**.
3. In the Manage Folders screen, touch the check box next to the folder you want to delete, then touch **Delete**.
4. Touch **Yes** in the dialog box that opens, then **OK**.  
The folder is deleted.
5. Repeat [steps 3](#) and [4](#) to delete other folders.
6. When you are done making changes to folders, touch  (Close) to return to the Settings Menu screen.

### Renaming Custom Folders

You can rename any custom folder.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Manage Folders**.
3. In the Manage Folders screen, touch the check box next to the folder you want to rename, then touch **Rename**.
4. Enter up to 12 characters for the folder's new name, then touch **Done** to return to the Manage Folders screen.
5. Repeat [steps 3](#) and [4](#) to rename any other folders.
6. When you are done making changes to folders, touch  (Close) to return to the Settings Menu screen.



This chapter covers:

Installing the Veriti™ Thermal Cycler .....	2-2
Setting Up the Veriti™ Thermal Cycler .....	2-7

# Installing the Veriti™ Thermal Cycler

## Before You Start

### Site Requirements

The Veriti™ Thermal Cycler is for indoor use. Ensure that the installation site:

- Meets the spatial and weight requirements for the Veriti™ System (see “[System Specifications](#),” below)
- Meets environmental requirements (see “[Environmental Requirements](#),” below)
- Is within 1 m (3 ft.) of a 800 VA power receptacle
- Is away from water

### System Specifications

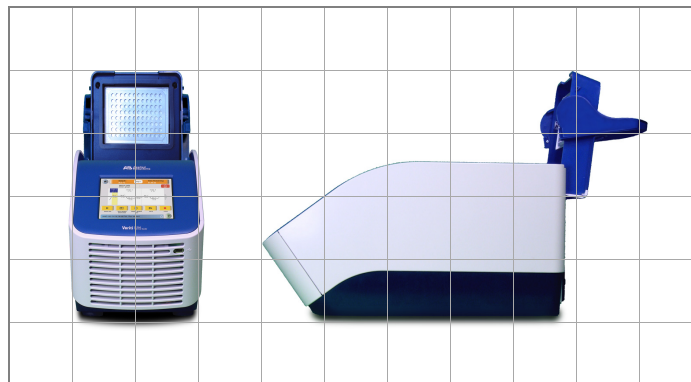
Table 1 Physical dimensions, weight, and power consumption

Parameter	Instrument Footprint	Recommended Clearance	Total
Length	48.5 cm (19.1 in)	15.5 cm (6.1 in) <sup>‡</sup>	64 cm (15.2 in)
Width	23.7 cm (9.3 in)	0 cm (0 in)	23.7 cm (9.3 in)
Height <sup>§</sup>	40.0 cm (15.7 in)	15.5 cm (6.1 in) <sup>#</sup>	55.5 cm (21.8 in)
Weight	10.6 kg (22.6 lbs)		
Power Consumption	800 VA – Maximum consumption		
	~260 VA – Average during thermal cycling		
	~10 VA – During sleep/standby		

‡ At the rear of the instrument to ensure adequate airflow and cooling.

§ With the heated cover open

# Above the instrument to provide adequate space for opening the heated cover, as shown below.



1 square. = 10 cm<sup>2</sup> (3.94 in<sup>2</sup>)

## Environmental Requirements

**Temperature and Humidity Requirements** Ensure that the installation site is maintained under the following conditions:

Condition	Acceptable Range
Temperature	15 to 30 °C (59 to 86 °F)
Humidity	20 to 80% relative humidity, noncondensing

Avoid placing the instrument adjacent to heaters, cooling ducts, or in direct sunlight. Fluctuations between day and night temperatures can cause system instability. Place away from any equipment that vibrates, such as a refrigerator or centrifuge.

**Pollution** The Veriti™ Thermal Cycler has a Pollution Degree rating of 2. It may be installed in an environment that has nonconductive pollutants only, such as dust particles or wood chips. Typical environments with a Pollution Degree II rating are laboratories and sales and commercial areas.

**Altitude** The safety of Veriti™ Thermal Cycler use was tested for altitudes up to 2000 ft.

## Materials

**Required Materials**

- Scissors, pocket knife, or box cutter
- Compressed air
- Protective hardware, as appropriate (see below)

**Optional Protective Hardware** Applied Biosystems supports the use of the following devices to protect the Veriti™ System from damage resulting from electrical hazards and the resultant loss of data. Before installing the system, decide what additional hardware (if any) you want to install.

- Power line regulator (1.5-kVA)
- Surge protector/line conditioner (10-kVA)
- Uninterruptible power supply (1.5-kVA)

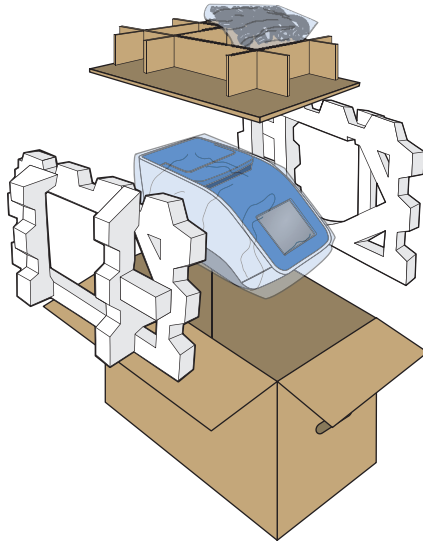
## Unpacking the Veriti™ System

**IMPORTANT!** Save the packing materials and box in case you need to ship the instrument to Applied Biosystems for service.

1. To unpack the Veriti™ System:
  - a. Cut the straps securing the instrument box.
  - b. Cut the tape securing the top flaps of the instrument crate, then open the flaps.
  - c. Remove the Veriti™ System Accessories from the instrument and set them aside.
  - d. Lift and remove the cover from the instrument crate.

- e. Remove the packing material from the Veriti™ System, then inspect the instrument for shipping damage.

**IMPORTANT!** If the Veriti™ System is damaged, note the location and appearance of the damage, then contact Applied Biosystems Technical Support or your service representative (see “[How to Obtain Support](#)” on [page viii](#)).



2. Move the Veriti™ System to the desired installation site. Follow these guidelines for lifting and moving:
  - Make sure that you have a secure, comfortable grip.
  - Keep your spine in a neutral position.
  - Bend at the knees and lift with your legs.
  - Do not lift and twist your torso at the same time.
3. Open the bag containing the Veriti™ System Accessories, then verify that it contains:
  - *Applied Biosystems Veriti™ Thermal Cycler User Guide CD* (PN 4376993)
  - Cable, Power 13A/125V North America (PN 4382067)
  - Cable, Power 10A/220V Europe (PN 4382068)
  - Veriti™ System Starter Kit (PN 4376634)

## Setting Up the Veriti™ System

1. Remove the packing material:
  - a. Open the Veriti™ System heated cover.
  - b. Remove the packing material from the sample block.
  - c. Using a can of compressed air, deliver a blast of air into each well of the sample block to remove any particles that may have collected during transportation.
  - d. Close the heated cover.



2. Connect the power cable to the Veriti™ System.
3. (Optional) Install any of the recommended protective devices (see [“Optional Protective Hardware”](#) on page 2-3).
4. Connect the power cable to the 800 VA power source receptacle.

## Connecting to a Network Printer

**Requirements** The Veriti™ Thermal Cycler requires a printer that:

- Has an Ethernet port
  - Supports the LPD/LPR protocol (often called a “TCP/IP printer”)
1. Plug the Ethernet cable into the Ethernet port on the back of the instrument.
  2. Plug the other end of the cable into a network port.

You must also configure the instrument firmware with printer information before you can print (see [“Configuring the Instrument for a Printer”](#) on page 2-8).

## Connecting Together Multiple Instruments

**You Will Need** Connecting your Veriti™ Thermal Cycler to other Veriti™ Thermal Cyclers allows you to use one instrument to control others. You can connect together up to 12 instruments.

To connect together multiple Veriti™ instruments, you need:

- An Ethernet cable for each Veriti™ Thermal Cycler
- A network switch
- A TCP/IP printer, if you want to print

For best results, do not connect the network switch to your laboratory’s network. Communication between Veriti™ Thermal Cyclers works best on an isolated system, free from interference by other network traffic.

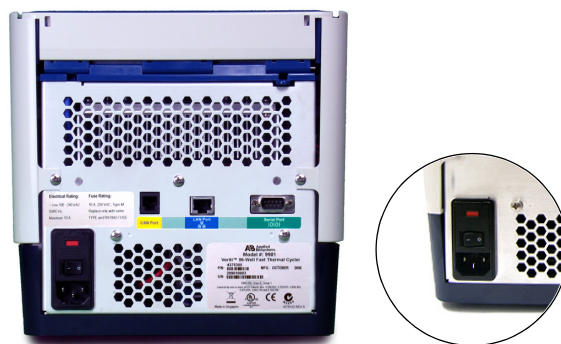
### Making the Connections

1. Connect the Ethernet cable to the back of the thermal cycler and connect the other end of the cable to the network switch.
2. Repeat [step 1](#) for each thermal cycler.
3. Connect the printer to the network switch.
4. Power on the network switch.
5. For each thermal cycler, follow the instructions in [“Setting the IP Address”](#) on page 2-7 and [“Setting the Instrument Name”](#) on page 2-8.
  - When you set the instrument’s IP address, select **Assign IP address dynamically (using DHCP)**.
  - Make sure each instrument name is unique.
6. Follow the instructions in [“Configuring the Instrument for a Printer”](#) on page 2-8.

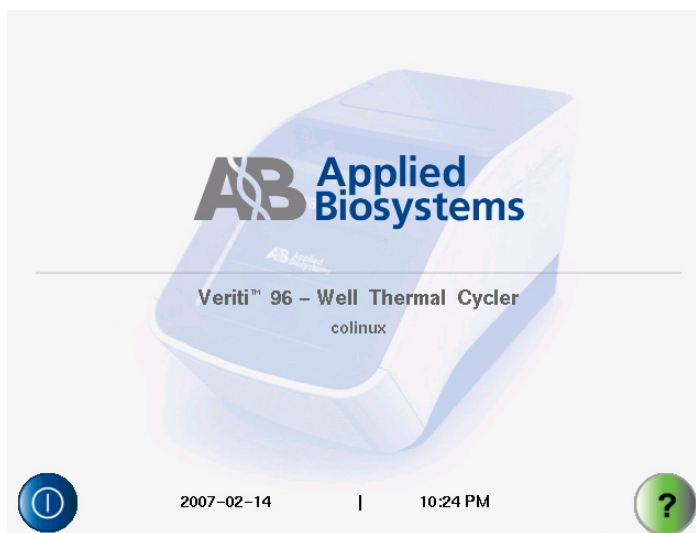
7. Continue with “Powering On” on page 2-6 and “Setting Up the Veriti™ Thermal Cycler” on page 2-7.


## Powering On

1. Verify that the heated cover is closed.
2. Press the power button on the back left side of the instrument.



The instrument powers on and the opening screen is displayed.



1. Touch  (Power) in the lower left corner of the screen to display the Main Menu screen.

# Setting Up the Veriti™ Thermal Cycler

## Recommended Instrument Settings

Before performing a run, be sure to set the following instrument settings:

- Instrument IP address (page 2-7)
- Instrument name (page 2-8)
- Current date and time (page 2-8)
- Printer information, if you want to print run methods or the run report (page 2-8)

Optionally, you can also change the settings for:

- User accounts and security (page 2-9)
- Idle state temperatures for the cover and the sample block (page 2-14)
- Durations for pauses and stand-by (page 2-15)
- “Shortcuts” to other options (displayed on the Main Menu) (page 2-15)

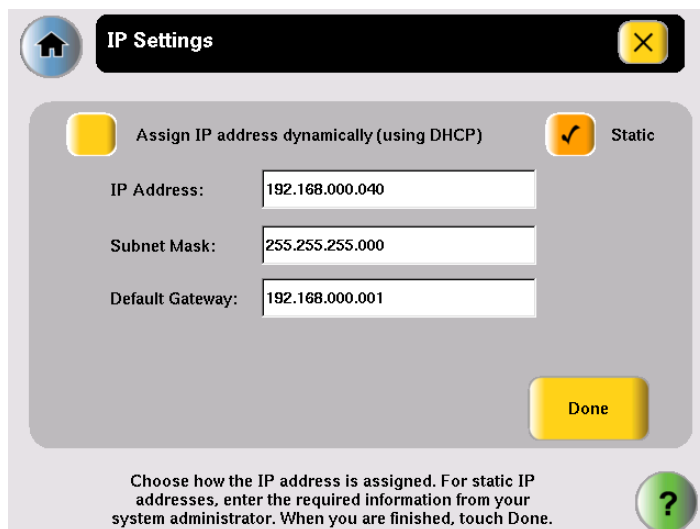
### Setting the IP Address

Note: If your instrument is not on a network, you do not need to set the IP address.

The IP address can be assigned dynamically by a computer on the network (using DHCP) or set manually by entering a number in the IP Address screen.

Note: Ask your system administrator if the IP address is assigned statically or dynamically. For static addresses, you need to know the IP address for the instrument, the subnet mask, and the default gateway.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Admin Menu**.
3. In the Admin Menu screen, touch **Set IP Address**.



4. In the IP Settings screen, set the IP address:

- Dynamically – Touch **Assign IP address dynamically (using DHCP)**. A check mark appears when DHCP is selected.  
*or*
  - Manually – Touch **Static**, then enter the appropriate IP addresses for the instrument, the subnet mask, and, optionally, the default gateway using the numeric editor. Addresses are in the form of X.X.X.X, where each X is a 3-digit number, from 001 to 255.
5. Touch **Done**, then **OK** to save your changes and return to the Admin Menu screen.

## Setting the Instrument Name

By default the instrument name is set to the instrument serial number. The instrument name appears in the Run Report screen and, if you connect together multiple instruments, in the Select Instruments screen. You can change the name to something more descriptive.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Admin Menu**.
3. In the Admin Menu screen, touch **Set Instrument Name**.
4. Touch the field to enter the new name.

Names cannot contain spaces and cannot be more than 24 alphanumeric characters or, for numeric-only names, 10 characters.

5. Touch **Yes** to make the instrument available for remote runs (a run on this instrument can be started from another instrument); otherwise touch **No**.
6. Touch **Done**, then **OK** to save your changes and return to the Admin Menu screen.

## Configuring the Instrument for a Printer

If you want to print the run report and/or a run method, you must configure the instrument with information about the printer.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Configure Printer**.
3. Touch the fields to set the printer's name and IP address.
4. Touch **Done** to save your changes and return to the Settings Menu screen.

## Setting the Date and Time

The date and time appear in the run report and at the bottom of many of the screens on the instrument.

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Admin Menu**.
3. In the Admin Menu screen, touch **Set Date & Time**.
4. To set the date, touch **Date**, then enter today's date, using the format YYYY-MM-DD. The instrument automatically enters the “-”.
5. To set the time, touch **Time**, enter the current time using the format HH:MM:SS, then touch **AM** or **PM**.  
The instrument automatically enters the “:”.

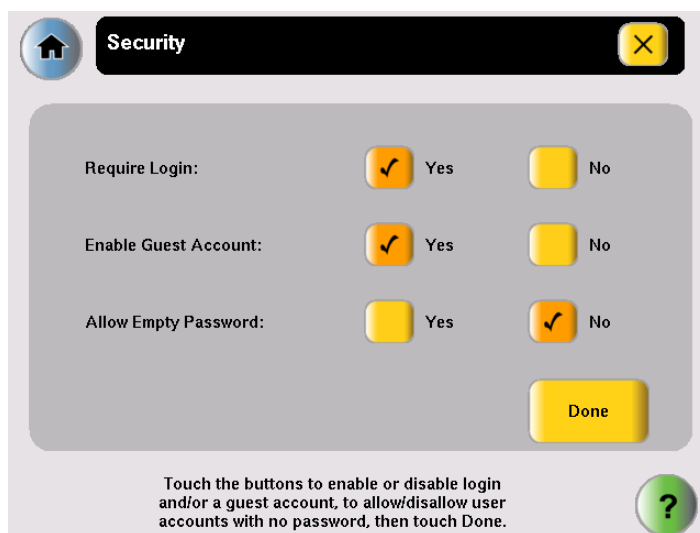
6. Touch **Done**, then **OK** to save your changes and return to the Admin Menu screen.

## Setting Up Instrument Security and User Accounts

By default, the Veriti™ Thermal Cycler has all security settings disabled, allowing anyone to use the instrument and/or change instrument settings.

To change the security settings for the instrument:

1. If login is required, log in as a user with Administrator access.
2. In the Main Menu screen, touch **Settings Menu**.
3. In the Settings Menu screen, touch **Admin Menu**.
4. In the Admin Menu screen, touch **Security**.



5. In the Security screen, to require each user to log in when using the instrument, touch **Yes** next to Require Login.
6. To allow anyone to log in as a guest, touch **Yes** next to Enable Guest Account.  
A guest user can perform runs, view and print run methods, and run tests. Also, for run methods stored on a USB drive, a guest can create, view, edit, delete, save, and print run methods.  
A guest user cannot manage users or set instrument preferences.
7. To allow new user accounts with empty passwords, touch **Yes** next to **Allow Empty Password**.

**Note:** If existing user accounts have passwords, those passwords are required to log in when this option is Yes.

8. Touch **Done**, then:

- **Yes**, to restart the instrument so the changes take effect immediately. (You cannot restart the instrument if a run is in progress) Follow the instructions in “Adding Yourself, as a User” on page 2-10 after you restart.  
*or*
- **No** to have the changes take effect the next time the instrument is restarted using the power switch on the back of the instrument.

## Adding Users

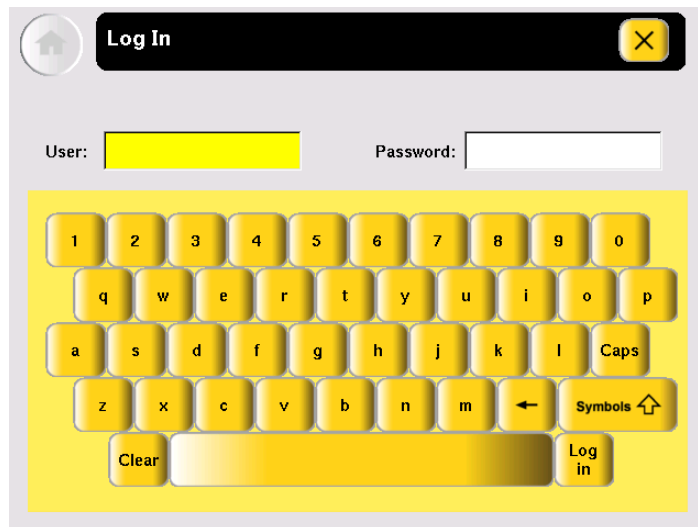
**Access Levels** Each user is assigned an access level that determines how he or she can interact with the instrument. There are three access levels:

- **Limited User** – Can perform runs, view and print run methods, and run tests. Cannot edit or create run methods, manage users, or set instrument preferences.
- **User** – Can perform runs, create, view, edit, delete, save and print run methods, and run tests. Cannot manage users or set instrument preferences.
- **Administrator** – Can access all instrument functions, including setting security, managing users and settings instrument preferences.

**Adding Yourself, as a User** If you set the instrument to require login, you need to use the default administrator user name and password until you create your own user.

To add yourself as a user:

1. In the opening screen, touch **On**, then **Log In**.



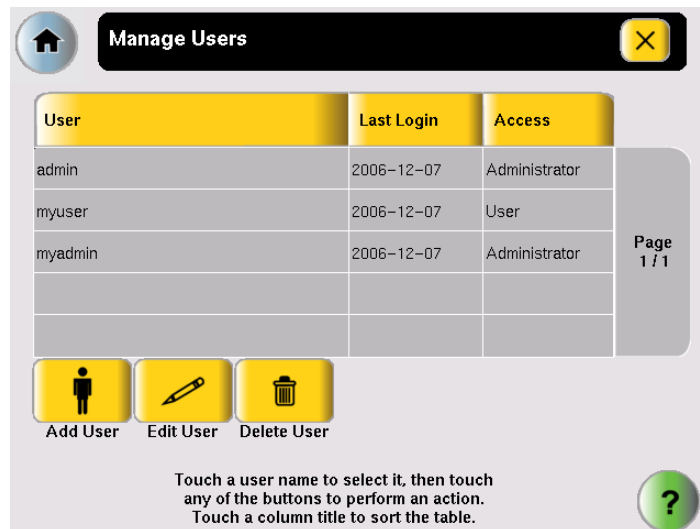
2. In the Log In screen, touch:
  - a. The **User** field, then enter **admin**.
  - b. The **Password** field, then enter **password**.
  - c. **Log In**.
3. In the Main Menu screen, touch **Settings Menu**.
4. In the Settings Menu screen, touch **Admin Menu**.

- Follow the instructions in “Adding Users” to add yourself as a user. Make sure you make yourself an Administrator.

### Adding Users To add a user:

- Log in as a user with Administrator access.
- In the Main Menu screen, touch **Settings Menu**.
- In the Settings Menu screen, touch **Admin Menu**.
- In the Admin Menu screen, touch **Manage Users**.


The Manage Users screen opens.



- Touch **Add User**.

The Create New User Account screen opens.

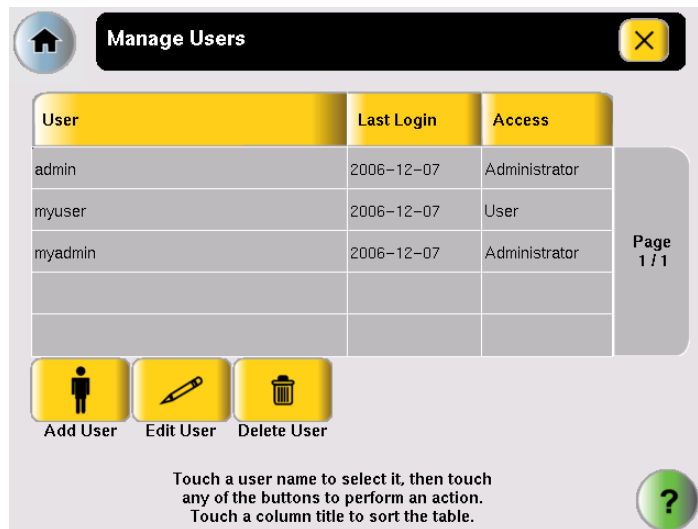
- Enter information for the new user. The required fields are User Name, Password, Re-enter Password, and Permission Level.
  - User Name must be between 5 and 15 characters, with no spaces.

- b. Password must be at least 1 character, with no spaces *unless* you have selected “Allow Empty Password” in the Security screen, in which case, you can leave the password empty.
  - c. Touch **Set Access**, then touch one of the following:
    - **Limited User**
    - **User**
    - **Administrator**
  - d. Touch **Done** to close the Permission screen.
7. Touch **Done**, then **OK** to add the user account to the instrument.  
The new user appears in the Manage Accounts screen.
  8. When you finish, touch  (Close) to return to the Admin Menu screen.

### Changing a User To edit a user:

1. Log in as a user with Administrator access.
2. In the Main Menu screen, touch **Settings Menu**.
3. In the Settings Menu screen, touch **Admin Menu**.
4. In the Admin Menu screen, touch **Manage Users**.


The Manage Users screen opens.



In the list, touch the user in the list, then touch **Edit User**.



The Edit User screen opens.


5. In the Edit User Account screen, make the required changes:
  - Touch **Phone** and/or **Email** to edit the contents.
  - Touch **Set Access** to change the access level for the user.
  - Touch **Set Password** to change the password for the user.
6. Touch **Done**, then **OK** to return to the Manage Users screen.
7. When you finish, touch  (Close) to return to the Admin Menu.

### Deleting a User To delete a user:

1. Log in as a user with Administrator access.
2. In the Main Menu screen, touch **Settings Menu**.
3. In the Settings Menu screen, touch **Admin Menu**.
4. In the Admin Menu screen, touch **Manage Users**.

The Manage Accounts screen opens.

User	Last Login	Access
admin	2006-12-07	Administrator
myuser	2006-12-07	User
myadmin	2006-12-07	Administrator

5. In the list, touch the user name for the account you want to delete, then touch **Delete User**.  
A confirmation message appears.
6. Touch **OK** to delete the user and any run methods or folders for that user, then **OK**.
7. When you finish, touch  (Close) to return to the Admin Menu.

## Setting Other Options

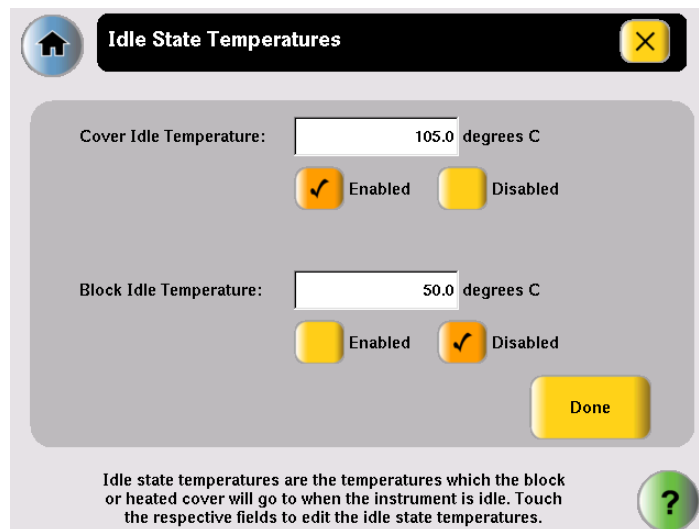
[Table 2](#) lists additional options that can be adjusted or activated. These settings apply to all users.

Table 2 Additional options (and their default values) for the Veriti™ Thermal Cycler

Option	Default Value	See Page
Idle temperatures for the cover and the sample block	Cover: 105 °C Sample block: 25 °C	<a href="#">2-14</a>
Durations for pause and standby time-outs	Pause: 10 sec. Standby: 1 min. 30 sec.	<a href="#">2-15</a>
Shortcuts to appear on the Main Menu screen	None	<a href="#">2-15</a>

### Setting Idle Temperatures for the Block and Cover

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Set Idle Temperatures**.

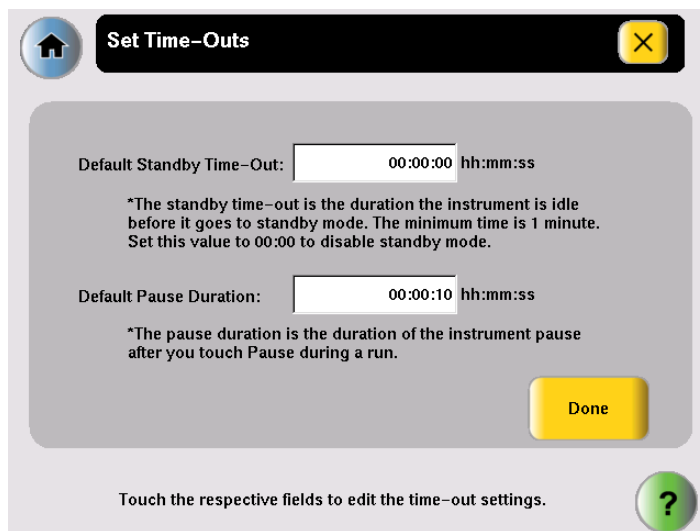


3. In the Idle State Temperatures screen, to set the temperatures for the sample block and the cover, touch:

- a. **Enabled** to turn the option on. If this is disabled, the temperature for the cover and/or block are not maintained by the instrument and eventually come to room temperature.
  - b. The **Temperature** field, then enter the temperature. The temperature for the cover must be between 4 and 99 °C.
4. Touch **Done** to save your changes and return to the Settings Menu screen.

## Setting Time-Outs

1. In the Main Menu screen, touch **Settings Menu**.
2. In the Settings Menu screen, touch **Set Time-outs**.





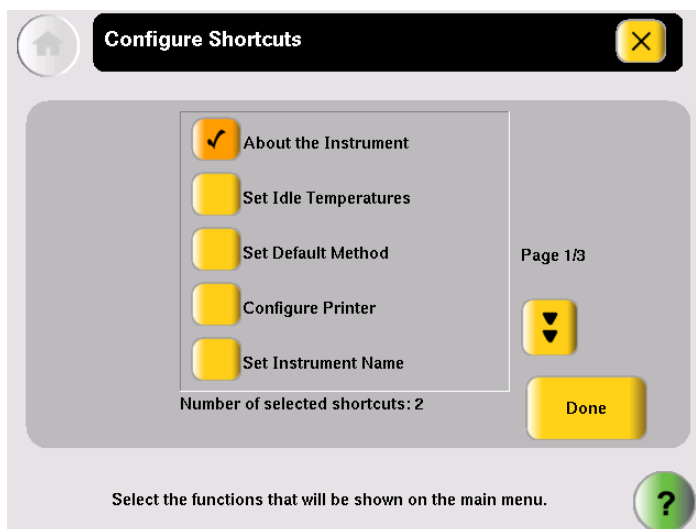
3. In the Set Time-Outs screen, touch **Time-out**, then enter the duration.
  - Default Standby Time-Out sets the duration that the instrument is idle before the touchscreen is turned off. Enter a duration of **00:00** if you do not want the instrument to turn off the touchscreen.
  - Default Pause Duration sets the duration the instrument pauses, after you touch Pause during a run.
4. Touch **Done**, then **OK** to save your changes and return to the Settings Menu screen.

## Configuring Main Menu Shortcuts

You can add buttons to the Main Menu screen that allow you to go directly to various instrument functions. When login is required, each user can configure his or her own shortcut buttons; otherwise the shortcut buttons are displayed for all instrument users.

1. In the Main Menu screen, touch:
  - Any button labeled **Shortcut X** (where X is a number).
  - or*
  - **Settings Menu**, then **Configure Shortcuts**.

2. In the list of functions available as shortcuts in the Configure Shortcuts screen, touch the functions to select them. Touch  (Page Up) and  (Page Down) to scroll through the list.



3. Touch **Done** to return to the Settings Menu screen.  
The selected shortcut(s) appear in the Main Menu screen.

This chapter covers:

Selecting Disposables .....	3-2
Loading Samples into the Instrument .....	3-4
Creating a New Run Method.....	3-6
Editing Details.....	3-8
Performing a Run .....	3-15
Monitoring a Run .....	3-18
Viewing and Printing the Run Report .....	3-20
Removing the Samples from the Instrument.....	3-21

## Selecting Disposables

Use this section to determine the tube, sample tray, and plate configurations appropriate for your application. See [Appendix B, “Disposables,”](#) for part numbers for these items.

**IMPORTANT!** The tray or the tray/retainer is required for the operation of the Veriti™ Thermal Cycler.

### Selecting Tube Configurations

You can use three different types of tube configurations to hold your samples, as shown in [Figure 3-1](#).

MicroAmp® Fast Reaction Tube with Cap (0.1-mL)  
*or*  
MicroAmp® Reaction Tube with Cap (0.2-mL)

MicroAmp® Reaction Tube (0.2-mL) with  
MicroAmp™ 8-Cap Strip

MicroAmp™ Fast 8-Tube Strip (0.1-mL)  
*or*  
MicroAmp™ 8-Tube Strip (0.2-mL)  
with MicroAmp™ 8-Cap Strip

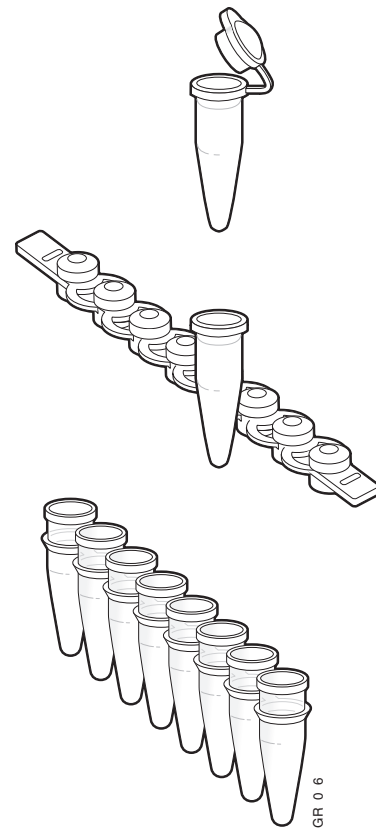
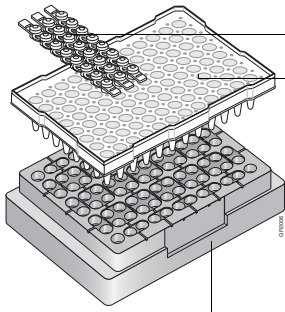
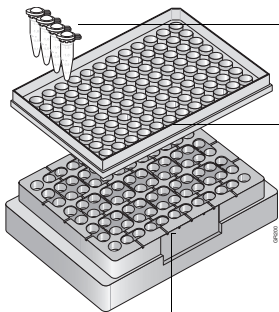
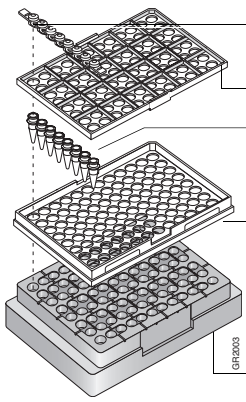


Figure 3-1 Different tube configurations for use in the Veriti™ Thermal Cycler

## Selecting Sample Tray and Plate Configurations

The following table lists the possible sample tray and plate configurations.

**IMPORTANT!** The MicroAmp™ Splash Free 96-Well Base shown below is used only when pipetting samples into tubes or trays. Do not place it in the sample block.

Run Vessel	Compatible Component	Illustration
MicroAmp™ Fast Optical 96-Well Reaction Plate (0.1-mL) or MicroAmp™ Optical 96-Well Reaction Plate (0.2-mL)	MicroAmp™ Caps, 8-Cap Strip or MicroAmp™ Clear Adhesive Film (not shown)	 <p>MicroAmp™ 8-Cap Strip</p> <p>MicroAmp™ Fast Optical 96-Well Reaction Plate (0.1-mL) or MicroAmp™ Optical 96-Well Reaction Plate (0.2-mL)</p> <p>MicroAmp™ Splash Free 96-Well Base</p>
MicroAmp® Fast Reaction Tube with Cap (0.1-mL) or MicroAmp® Reaction Tube with Cap (0.2-mL)	96-Well Tray for VeriFlex™ Blocks	 <p>MicroAmp® Fast Reaction Tube with Cap (0.1-mL) or MicroAmp® Reaction Tube with Cap (0.2-mL)</p> <p>MicroAmp™ 96-Well Tray for VeriFlex™ Blocks</p> <p>MicroAmp™ Splash Free 96-Well Base</p>
MicroAmp™ 8-Tube Strip (0.2-mL) or MicroAmp® Reaction Tube without Cap (0.2-mL)	MicroAmp™ 8-Cap Strip and MicroAmp™ 96-Well Tray/Retainer Set for Veriti™ Systems	 <p>MicroAmp™ 8-Cap Strip</p> <p>MicroAmp™ 96-Well Retainer</p> <p>MicroAmp™ 8-Tube Strip (0.2-mL) or MicroAmp® Reaction Tube without Cap (0.2-mL)</p> <p>MicroAmp™ 96-Well Tray for Veriti™ Systems</p> <p>MicroAmp™ Splash Free 96-Well Base</p>

## Loading Samples into the Instrument

This section describes how to load samples in:

- Tubes with attached caps
- 96-well reaction plates
- 96-well tray/retainer assemblies

### Loading Tubes with Attached Caps

There is no need to use mineral oil or glycerine in the sample block wells or as a vapor barrier over the PCR reaction mixture in the tubes. The MicroAmp<sup>®</sup> Reaction Tubes fit tightly in the wells, and the heated cover exerts an even pressure on all tubes, eliminating condensation on the tubes.

1. Set the 96-well tray on a splash-free 96-well base.
2. Place the reaction tubes in the tray.
3. Pipette the samples into the reaction tubes.
4. Cap the tubes.
5. See [“Placing the Sample Tray or Plate onto the Sample Block” on page 3-4.](#)

### Loading the Reaction Plate

1. Place the reaction plate on a splash-free 96-well base.
2. Pipette the samples into the sample wells.
3. Cap the plates using the MicroAmp<sup>™</sup> 8-Cap Strips, or cover the plates the with MicroAmp<sup>™</sup> Clear Adhesive Film.
4. See [“Placing the Sample Tray or Plate onto the Sample Block” on page 3-4.](#)

### Loading Tubes Without Caps

To load the 96-well tray/retainer:

1. Place the tray on the splash-free 96-well base.
2. Load tubes onto the tray using either single tubes or the 8-tube strips.
3. Place the retainer over the tubes.
4. Pipette the sample into the tubes.
5. Cap the tubes using a MicroAmp<sup>™</sup> 8-Cap Strip.
6. See [“Placing the Sample Tray or Plate onto the Sample Block” on page 3-4.](#)

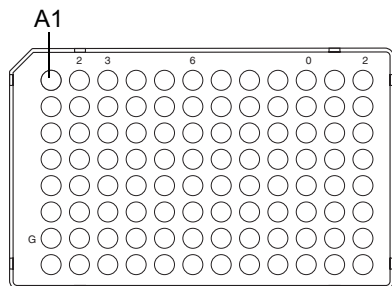
### Placing the Sample Tray or Plate onto the Sample Block

The steps for placing the sample tray in the sample block are the same for:

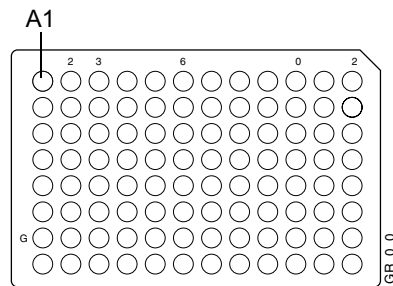
- A sample tray/retainer
- A sample tray without a retainer
- A 96-well plate.

1. Lift the sample tray from the splash-free 96-well base and place it in the sample block.
2. Place the MicroAmp<sup>™</sup> Tray or Plate onto the sample block so that well A1 is at the upper left corner of the tray, as shown below.





MicroAmp™ Fast Optical 96-Well Reaction Plate (0.1-mL)



MicroAmp™ Optical 96-Well Reaction Plate (0.2-mL)

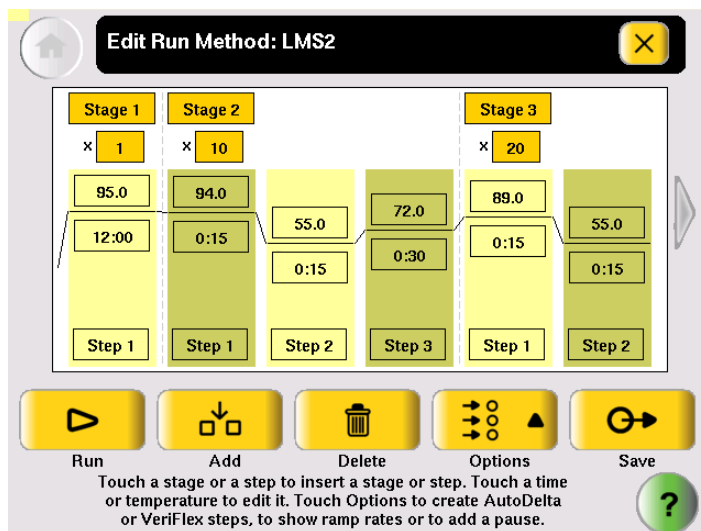
**IMPORTANT!** Do not place the base in the sample block.

3. Close the heated cover.

## Creating a New Run Method

1. In the Main Menu screen, touch **Browse/New Methods**.
2. In the Browse Run Methods screen, touch **New**.

The default run method is displayed in the Edit Run Method screen. (For instructions on setting the default run method, see [“Designating a Run Method as the Default”](#) on page 1-12.)



3. Edit the default run method as needed:
  - Insert a stage (see [“Adding a Stage”](#) on page 3-8).
  - Insert a step (see [“Adding a Step”](#) on page 3-9).
  - Add a step to program different temperatures on the VeriFlex™ Block (see [“Creating a Step for the VeriFlex™ Block”](#) on page 3-11).
  - Add an AutoDelta step (see [“Creating an AutoDelta Step”](#) on page 3-12).
  - Add a pause (see [“Adding a Pause”](#) on page 3-14).
  - Delete a step or stage (see [“Deleting a Stage or Step”](#) on page 3-14).

4. Touch **Save & Exit** to display the Save Run Method screen.

Save Run Method

Run Method: LMS2

Folder: Shared

Reaction Volume: 10 Cover Temperature: 105.0

Notes: This method used for gene expression assay.

Save & Exit

Enter a name, reaction volume, and choose a folder for this run method. Notes can also be added. When you are finished, touch 'Save & Exit'.

5. Touch **Run Method** to enter the name of the run method. Names can be up to 48 characters, with no spaces.
6. Touch **Folder** to select a folder in which to save the run method.
  - To save the run method so that all users have access to it, touch **Shared**.
  - To create a new folder for the run method, touch **New Folder** at the bottom of the list, enter a name of up to 12 characters (no spaces), for the new folder, then touch **Done**.
  - To save the run method to the USB drive, touch **USB** (available only when a USB drive is inserted in the instrument).
7. Touch **Reaction Volume** to enter the reaction volume. (You can change this volume when you perform a run with this run method.)
8. Touch **Cover Temperature** to enter the cover temperature. (You can change this temperature when you perform a run with this run method.)
9. Touch **Notes**, then enter any notes for the method.
10. Touch **Save & Exit** when you are done.  
The Browse Methods screen is displayed.

## Editing Details

This section describes how to edit a run method by:

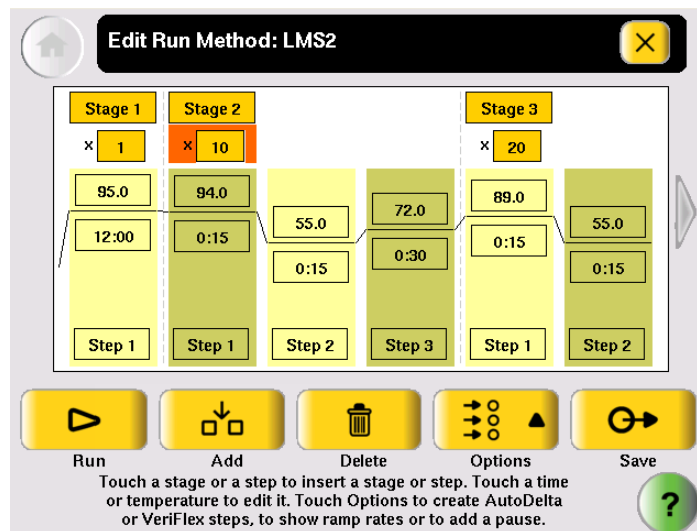
- Adding a stage (page 3-8)
- Adding a step (page 3-9)
- Editing a temperature or a time (page 3-10)
- Editing a ramp rate (page 3-10)
- Creating a step to program different temperatures on the VeriFlex™ Block (page 3-11)
- Creating an AutoDelta step (page 3-12)
- Adding a pause (page 3-14)

**Adding a Stage** The two types of run method stages are:

- **Cycling** – The steps in a cycling stage are repeated a specified number of times. In general, the steps in a cycling stage are template denaturation, primer annealing, and primer extension.
- **Holding** – The steps in a holding stage are not repeated.

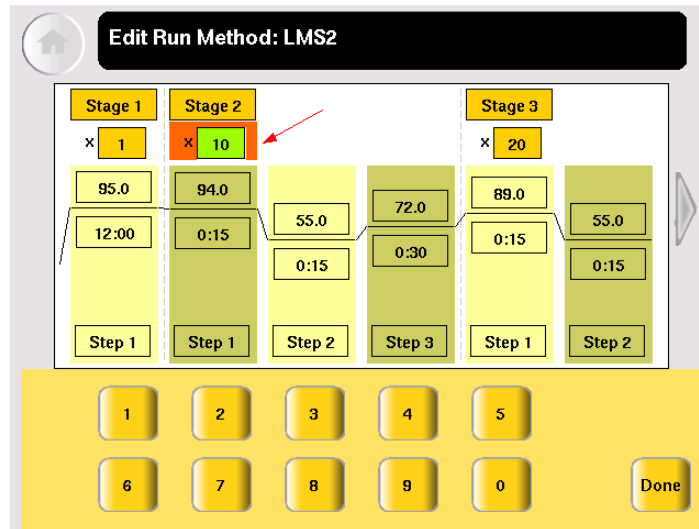
To add a stage:

1. In the Edit Run Method screen, touch the stage name (at the top of the stage) to select it. When a stage is selected, the area around the name is red.



2. Touch **Add**.  
A copy of the selected stage is added to the run method.

3. For a cycling stage, edit the number of cycles as needed.
  - a. Touch the stage to select it.
  - b. Touch the cycles field (the box below the Stage Name) to select it.

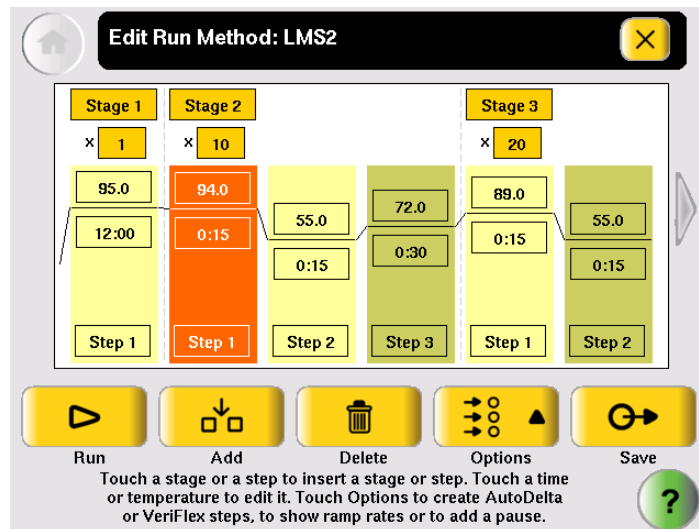


- c. Enter the number of cycles, then touch **Done**.
4. To change the temperature and/or time for any step in the stage, see [“Editing Temperature and Time”](#) on page 3-10.

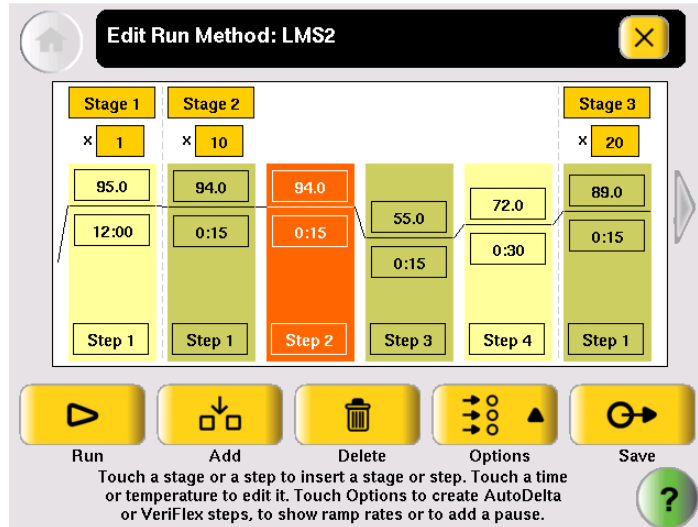
### Adding a Step

1. In the Edit Run Method screen, touch anywhere in the column for a step to select it.

When the step is selected, the column turns red.



2. Touch **Add**.  
A copy of the selected step is added to the run method.



3. To change the temperature and/or time for the step, see [“Editing Temperature and Time”](#) on page 3-10.

### Editing Temperature and Time

1. Touch any temperature field to select it, then edit the temperature as desired.  
*or*  
Touch any time field to select it, then edit the time as desired.
2. You can edit any other times, temperatures, (or the number of cycles for a stage) without closing the editor.
  - a. Touch the field.
  - b. Touch the keys in the editor.
  - c. Repeat for any other field.
3. Touch **Done** to close the editor.

### Editing Ramp Rates

You can edit the rate at which the instrument ramps to the temperature for the step. The default ramp rate is 100%.

1. Touch a step to select it.
2. Touch **Options**, then **Ramp Rate**.  
The field displaying time changes to display the ramp rate.
3. Touch the ramp field, then enter the desired ramp rate. Ramp rates from 0.1 to 100% are valid.
4. Touch **Done** to close the editor.

The ramp rate symbol **R** appears next to any step with a ramp rate less than 100%.

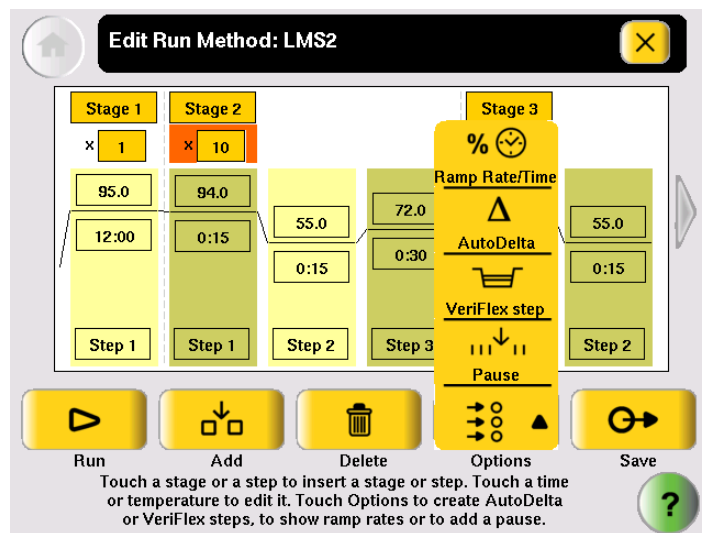
## Creating a Step for the VeriFlex™ Block

The sample block of the Veriti™ Thermal Cycler has six temperature zones. You can specify temperatures for each zone, or treat the entire sample block as one zone (the default). A step that has different temperatures for areas in the VeriFlex™ Block is called a “VeriFlex™ step.” This feature is useful for quickly optimizing new run methods.

To create a step with different temperatures for the VeriFlex™ block:

1. Touch a step, then **Options**.

The options menu appears.



2. In the Options menu, touch **VeriFlex step**.

The Create a VeriFlex Step screen opens.



3. Touch a temperature field, then enter the desired temperature. Temperatures for neighboring zones can be the same, but if they are not the same, they must be *at least* 0.1 °C apart but *no more* than 5.0 °C apart. The maximum temperature is 99.9 °C.

- Repeat [step 3](#) for each of the six zones, then touch **Done**.

**Note:** To set each field to the same temperature, touch the desired temperature field, then touch **Apply Selected to All**.

- Depending on your instrument configuration, enter either a duration or a ramp rate.
  - Touch **Time**, enter the duration (in minutes and seconds), then touch **Done**.  
*or*
  - Touch **Ramp Rate**, enter the ramp rate (as a percentage value), then touch **Done**.

### Creating an AutoDelta Step

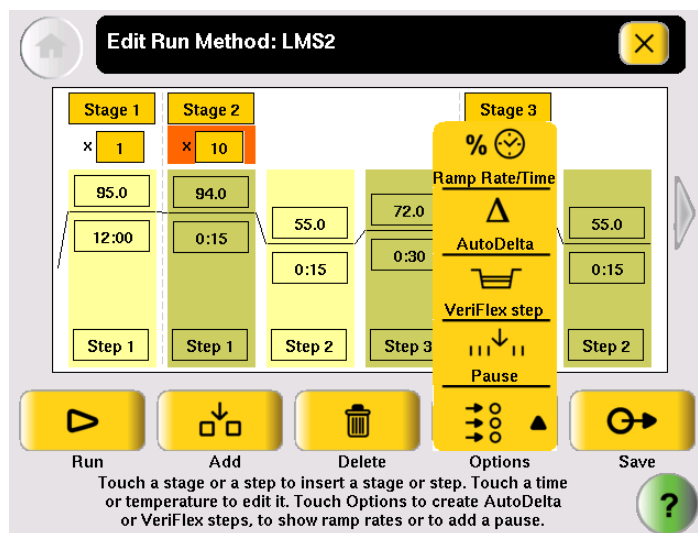
An AutoDelta step allows you to increase or decrease the temperature and/or change the duration of the cycle during a cycling stage.

One use for an AutoDelta step is for touchdown PCR, a method in which the earliest cycles have a high annealing temperature, followed by cycles where the annealing temperature decreases slightly for each cycle. Touchdown PCR increases the specificity of the PCR products. The high initial temperature favors more specific annealing between the primer and the template. Because these fragments are further amplified during subsequent cycles at lower temperatures, they outcompete the nonspecific sequences to which the primers bind at lower temperatures.

**Note:** AutoDelta steps are allowed only in cycling stages.

To create an AutoDelta step:

- Touch a step, then **Options**.





- In the Options menu, touch **AutoDelta**. The Create an AutoDelta Step screen opens.



- Touch **Starting Cycle**, then enter the cycle at which the AutoDelta step begins.
- Select the parameter(s) to increment:
  - Touch **Delta Temperature**, then enter the number of degrees that the temperature changes for each cycle. To enter a temperature that decreases with every cycle, touch + to change it to -. To enter a temperature that increases, the button should show +.

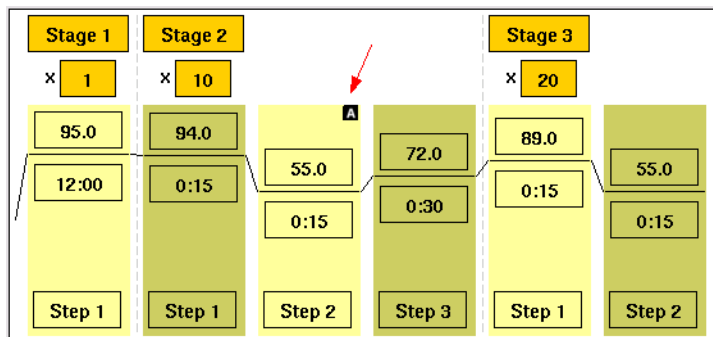
*and/or*

- Touch **Delta Time**, then enter the minutes and seconds that the step duration should change with each cycle. To enter a time that decreases with each cycle, touch + to change it to -. To enter a time that increases, the button should show +.

**Note:** Make sure the parameters you enter result in a final temperature *greater* than 4.0 °C and *less* than 99.9 °C. Also, the Delta Time must be less than the total time for the stage.

- Touch **OK** to save the step and return to the screen that displays the run method.

The AutoDelta symbol **A** appears on the step with the AutoDelta step. In this example, Step 2 in Stage 2 is an AutoDelta step.

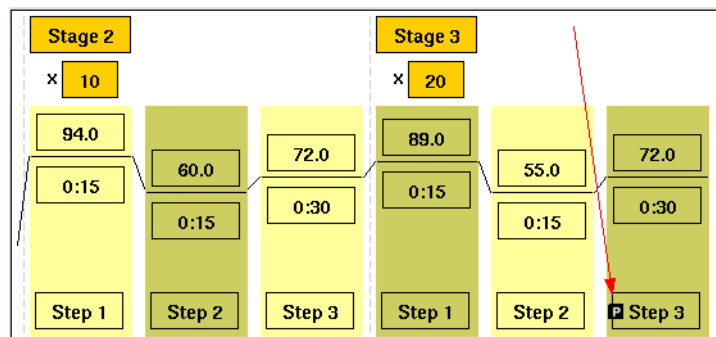


**Adding a Pause** You can add a pause before any step in any cycling stage.

1. In the Edit Run Method screen, touch a step in a cycling stage, then touch **Options**.
2. In the Options Menu, touch **Pause**.



4. Enter:
  - The first cycle in which the run will pause.
  - The frequency of the pause.
  - The duration of the pause, in mm:ss.
5. Touch **Done** to save the pause and return to editing the method.  
 The step preceded by the pause is indicated by the **P** (see Step 3 in Stage 3, below).



**Deleting a Stage or Step**

1. In the Edit Run Method screen, touch the stage or step to select it.
2. Touch **Delete**, then **OK**.  
 The stage or step is deleted from the run method.

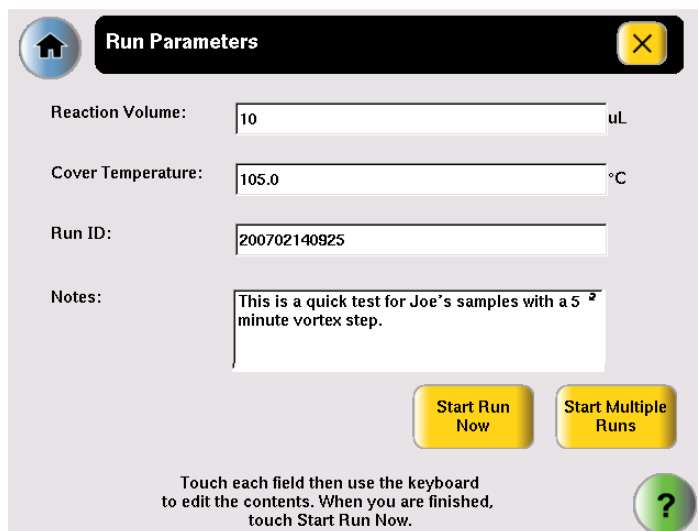
## Performing a Run

**Before You Begin** Prepare your samples and load the sample block as described in [“Loading Samples into the Instrument”](#) on page 3-4. Y

**IMPORTANT!** You can start a run on multiple instruments at the same time if your instruments are on a network.

To start a run from the Main Menu screen:

1. Close the cover.
2. Touch **Browse/New Methods**.
3. Locate the run method you want to use (see [“Viewing a Run Method”](#) on page 1-9), then touch the run method to select it.
4. Touch **Start Run**. The Run Parameters screen opens.



The screenshot shows the 'Run Parameters' screen with the following fields and values:

- Reaction Volume: 10 uL
- Cover Temperature: 105.0 °C
- Run ID: 200702140925
- Notes: This is a quick test for Joe's samples with a 5 minute vortex step.

Buttons at the bottom: Start Run Now, Start Multiple Runs.

Footer text: Touch each field then use the keyboard to edit the contents. When you are finished, touch Start Run Now.

5. Touch **Reaction Volume** to edit the reaction volume. By default, the reaction volume you entered when you saved the method is displayed.

Reaction volumes are specific to the type of instrument:

- Veriti 96-Well *Fast* Thermal Cycler: 5 to 50 µL
- Veriti 96-Well Thermal Cycler: 10 to 100 µL

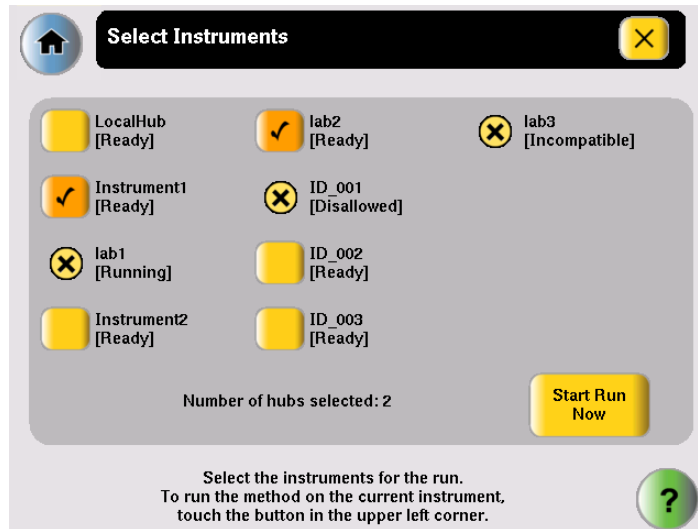
6. Touch **Cover Temperature**, **Run ID**, and/or **Notes**, then enter the applicable information.


The default Run ID is YYYYMMDDHHMM, where “YYYYMMDD” is the date and “HHMM” is the current time.

7. If you are making runs on:
  - **Only this instrument** – Touch **Start Run Now**, then **OK**. The cover is heated to the required temperature, then the run begins. When the run is complete, the Run Report is displayed.

*or*

- **Multiple instruments** – Touch **Start Multiple Runs**. The Select Instrument screen is displayed.



8. In the Select Instrument screen:
  - a. Touch the check box corresponding to each instrument on which you want to perform the run. Only instruments that are compatible with the run method are available. Incompatible instruments are indicated by . If you want to perform the run on this instrument, be sure to touch the check box in the upper left corner of the screen.
  - b. Touch **Start Run Now**, then **OK**. The run method is sent to each selected instrument, and, if no problems are encountered, the run begins. After the run begins, you must interact with any remote instruments directly if you want to make changes to the run method, pause, or stop the run. When the runs are complete, the Run Reports are displayed.

## Monitoring a Run

### The Run Monitor Screen

You can follow the status of a run using the Run Monitor screen (below).

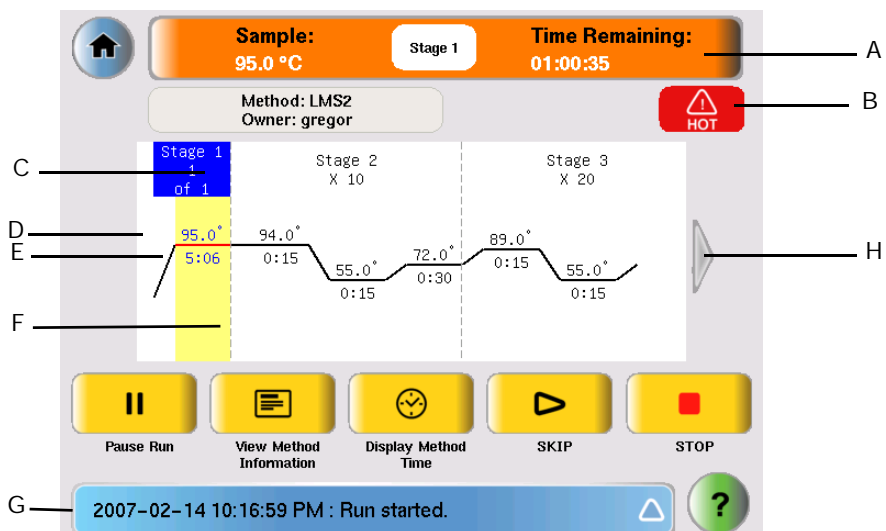


Table 4 Elements of the Run Monitor screen









Location in Figure	Element	Description
A	Run Monitor Button and Status Bar	Displays the estimated temperature of the sample, the estimated time remaining in the run, and the name of the current stage.
B	Hot Icon	Indicates that the heated cover has achieved a temperature sufficient to burn skin.
C	Stage Indicator	Indicates the stage that the Veriti™ System is performing and the current cycle in that stage.
D	Step Temperature	Indicates the temperature for the step.
E	Hold Time	Indicates the time for the step. When this is the current step, this field counts down.
F	Step Indicator	Indicates the step that the Veriti™ System is performing.
G	Status Report	Displays the run status and any errors that occur during the run. Touch the triangle to view the entire report.
H	Arrow Button	Touch this to see the additional steps in the run method.

See [“Actions in the Run Monitor Screen During a Run”](#) on page 3-18 for information about what you can do during a run.

## Actions in the Run Monitor Screen During a Run

During a run, the touchscreen is active, allowing you to perform the actions indicated in the table.

Table 1 Actions in the Run Monitor Screen Allowed During a Run

To...	Do This
View other stages	 Touch the scroll right and scroll left buttons.
Pause the run	 Touch <b>Pause Run</b> (see “Pausing a Run” on page 3-19).
View run method information	 Touch <b>View Method Information</b> . The information you entered in the Run Parameters dialog box is shown.
Display the time for the run	 Touch <b>Display Method Time</b> . The elapsed time and time remaining for the run are shown.
Skip to the next step	 Touch <b>SKIP</b> . Skip works only when the instrument is holding.
Stop the run	 Touch <b>STOP</b> (see “Stopping a Run” on page 3-19).
Change the number of cycles for a cycling stage	Touch the Cycle field then change the number of cycles (see “Changing the Number of Cycles” on page 3-18).
Go to the Main Menu screen	 Touch (Home). From the Main Menu Screen, you can access most of the Veriti™ Thermal Cycler functions while the run continues.
View the Status Report	Touch  (Status).

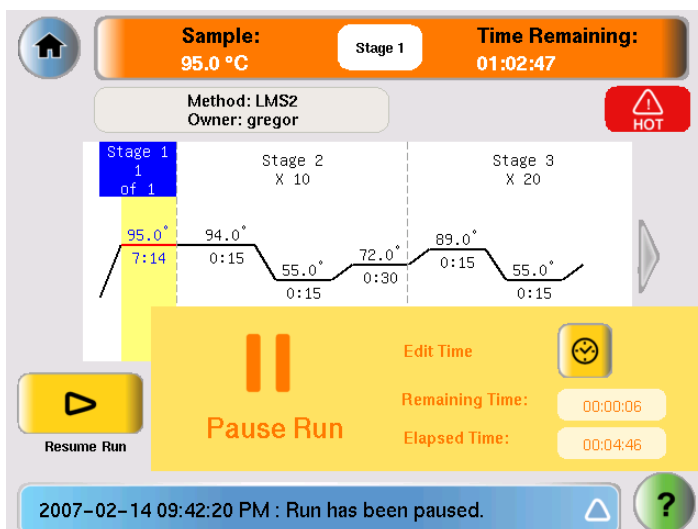
## Changing the Number of Cycles

You can change the number of cycles for a cycling stage while a run is in progress.

1. If needed, click the orange run monitor button to return to the run monitor screen.
2. Touch the cycles field (below the Stage Name) for a cycling stage, then enter the new value. You cannot:
  - Edit a stage that is already complete.
  - Enter a number that is smaller than the number of cycles that have already been completed.
3. Touch **Send** to return to the Run Monitor screen.  
The run continues, using the new number of cycles.

## Pausing a Run

1. In the Run Monitor screen, touch **Pause Run**.



The run pauses for the duration set in the Time Settings screen (see [page 2-15](#)).

In the Pause Run dialog box:

- Remaining Time shows the remaining time for the pause.
  - Elapsed Time is continually updated to show the time the run has been paused.
2. If you want to:
    - Pause until the default pause has elapsed – Do nothing.
    - Pause for a specific amount of time – Touch **Edit Time**, enter the duration of the pause, then touch **Done**. The run resumes when the pause is complete.
    - Resume the run immediately – Touch **Resume Run** (to the left of the dialog box).

## Stopping a Run

In the Run Monitor screen, touch **Stop**, then **OK**.

The run stops and the Run Report opens.

## Using the Run Monitor Button

The Run Monitor button is displayed at the top of the Run Monitor screen. If you leave the Run Monitor screen during a run, this button also appears at the top of all menu screens.

You can touch the Run Monitor button to return to the Run Monitor screen at any time.



Figure 3-1 The Run Monitor button

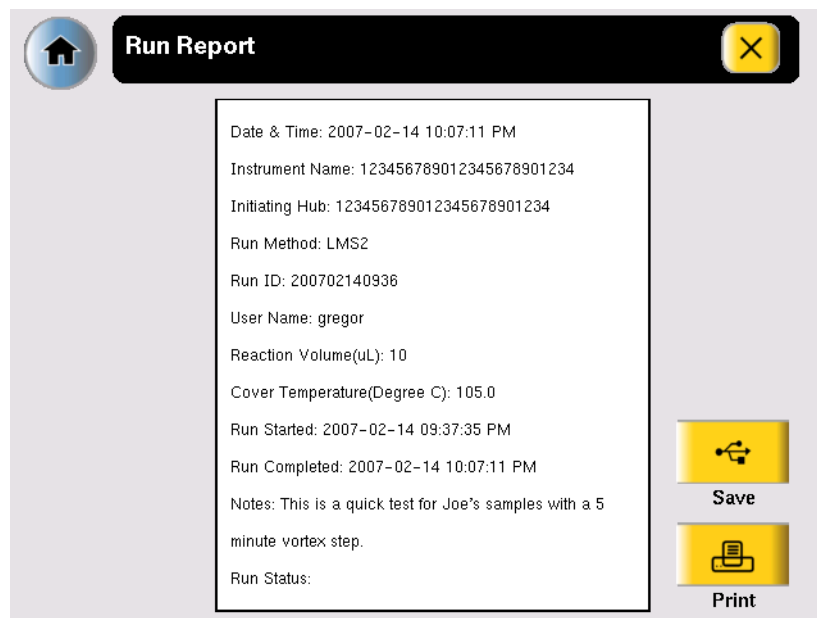
If an error occurs during the run, the area showing the current stage, in the middle of the button, is replaced by an alert icon.



## Viewing and Printing the Run Report

At the end of a run, the Run Report screen is displayed (below). If the last stage of the run method is an infinite hold, you must touch **Stop**, then **OK** in the message box before the Run Report is displayed.

You can also see the Run Report by touching **View Last Run** in the Tools Menu.



**Note:** The run report is saved only until the next run is finished.



- To print the run report, in the Run Report screen, touch **Print**.  
If any errors occurred during the run, the error information is also printed.
- To save the run report to the USB drive, touch **Save**.

## Removing the Samples from the Instrument

Grasp the sample tray/retainer assembly or reaction plate firmly with both hands and gently rock it back and forth until the tubes (or plate) are free.



**CAUTION** Sample caps may pop off if the cover is opened when the sample block temperature is above 27 °C.



This chapter covers:

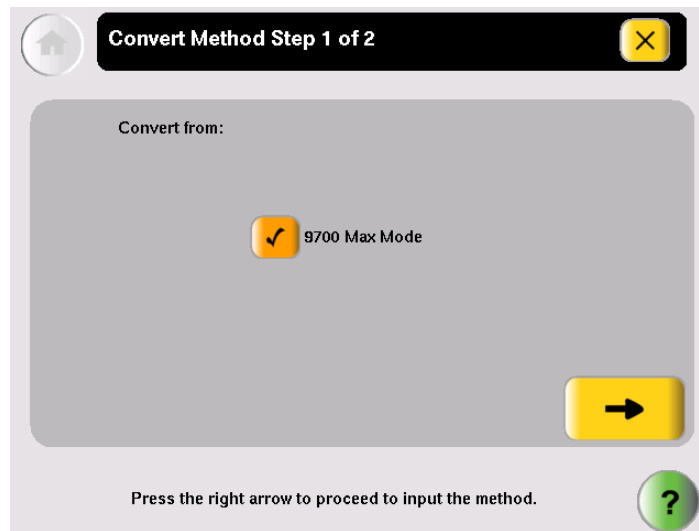
Using GeneAmp® PCR System 9700 Run Methods . . . . .	4-2
Upgrading System Firmware . . . . .	4-4
Calculating Melting Temperatures . . . . .	4-6
Viewing Instrument Statistics . . . . .	4-7
Calibrating the Touchscreen . . . . .	4-7
Running the Cycle Performance Test . . . . .	4-8
Tests Using the Temperature Verification Kit . . . . .	4-9

## Using GeneAmp® PCR System 9700 Run Methods


The Veriti™ Thermal Cycler has a Convert Method tool to guide you through importing existing run methods from a GeneAmp® PCR System 9700 thermal cycler. The tool is designed to create a method for the Veriti™ Thermal Cycler with ramp rates that simulate those on the 9700 thermal cycler. Although the ramp rates may be similar in the two methods, the results on the Veriti™ Thermal Cycler may differ from those from the GeneAmp® PCR System 9700 and, therefore, additional optimization may be needed.

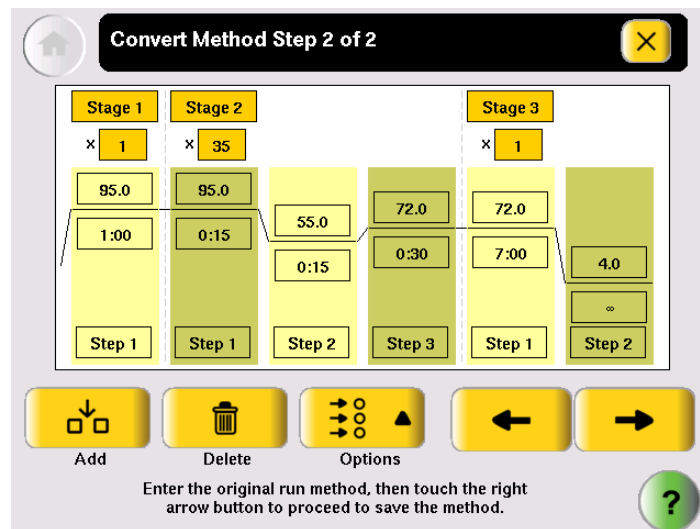
To use a run method from a GeneAmp® PCR System 9700 thermal cycler:

1. Obtain a copy of the original method you want to convert, either by printing it from the instrument or copying it manually to a piece of paper.
2. In the Main Menu screen, touch **Tools Menu**.
3. In the Tools Menu screen, touch **Convert a Method** to open the Convert Method wizard.



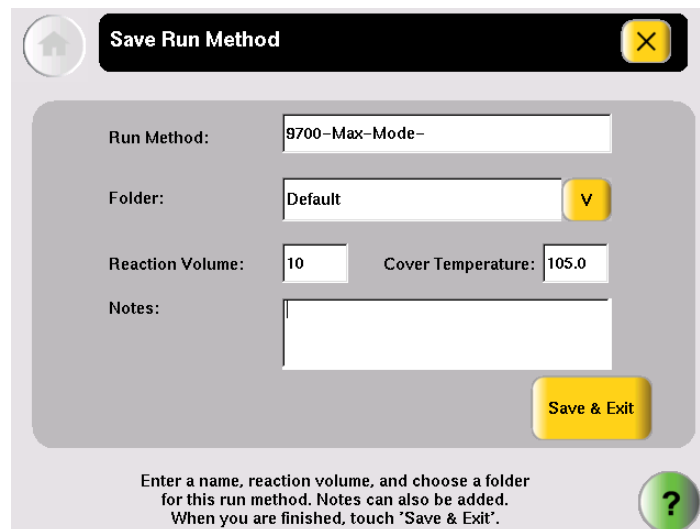
4. Touch  (Next).

5. In the second page, enter the original run method. You can include AutoDelta steps, pauses, and VeriFlex™ steps, and you can edit the ramp rates. Touch  (Next), when you are done.



6. In the Save Run Method page (below), enter a name and select a folder for the run method. Names are limited to 16 characters with no spaces. By default, the name begins with “9700-Max-Mode-”.

Also enter the reaction volume, the temperature for the heated cover, and any notes for this method.



When you finish, touch **Save & Exit**.

The Tools Menu is displayed.

Note: You cannot edit the ramp rates in the method created by the Convert Method tool. This is indicated by “9700M” in the Time field for each step (see [Figure 4-1](#)).

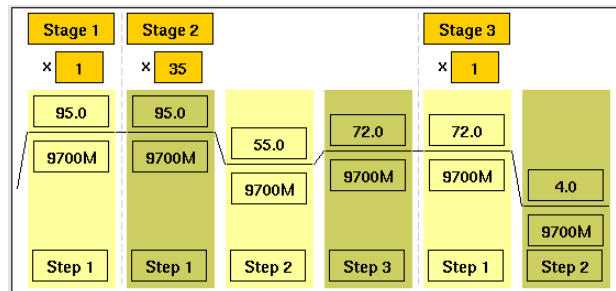


Figure 4-1 Converted run method, showing “9700M” for the ramp rate.

## Upgrading System Firmware

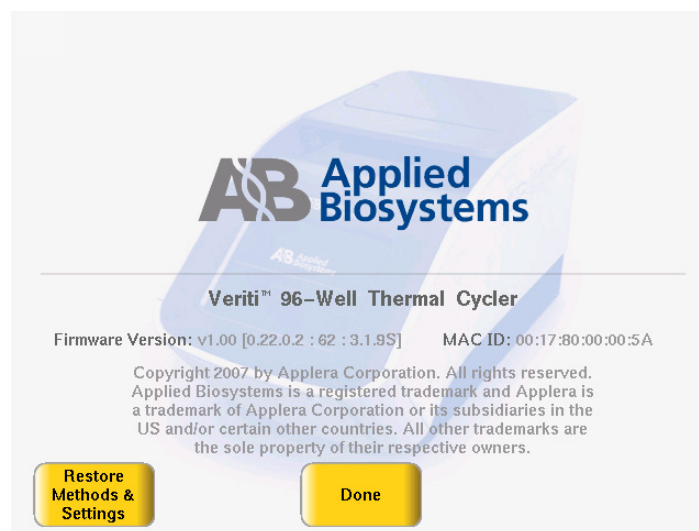
**About the Upgrade** If Applied Biosystems provides a new version of the firmware for the Veriti™ Thermal Cycler, you may be required to load the new firmware on the instrument.

You will need a USB drive and, if your instrument requires login, Administrator access to upgrade the firmware.

**IMPORTANT!** You cannot upgrade the firmware while a run is in progress.

### Upgrading the Veriti™ Thermal Cycler Firmware

- Determine the version number of the existing firmware:
  - In the Main Menu screen, touch **Settings Menu**.
  - In the Settings Menu screen, touch **About the Instrument**, record the version number of the firmware, then touch **Done** to return to the Settings Menu.



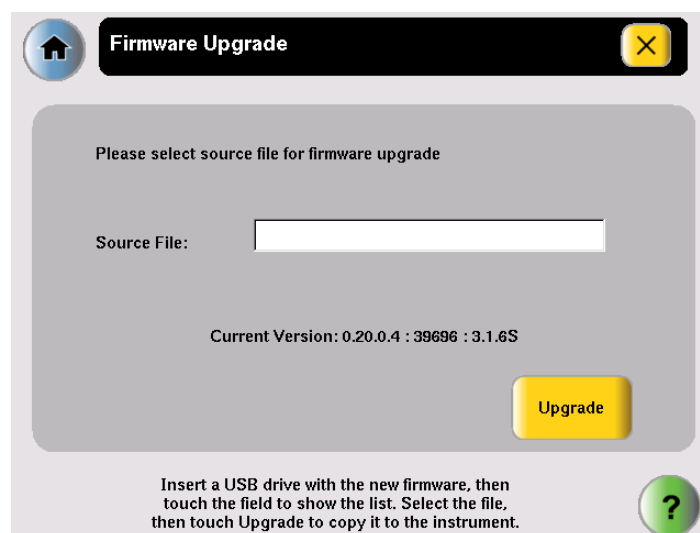
- Determine the version number of the new firmware.

- a. On a computer connected to the Internet, go to [www.appliedbiosystems.com](http://www.appliedbiosystems.com).
  - b. Click **Support**, then **Software Downloads**.
  - c. Select **Veriti™ Thermal Cyclers** in the list, then click **Updates & Patches**.
  - d. Find the appropriate file. If the version number is:
    - The same as the current version (from [step 1](#)), you do not need to upgrade the firmware.
    - Different from the current version (from [step 1](#)), follow the steps below to download and upgrade the firmware.
3. Download the new firmware to a USB drive:
    - a. Insert the USB drive into the USB port on the computer.
    - b. Click the link in the Software column to download the file. Select the USB drive as the location for the saved file.
    - c. Remove the USB drive from the computer when the download is complete.

To upgrade the instrument with the new firmware.

1. Follow the instructions in “[Backing Up Run Methods and Other Settings](#)” on [page 1-13](#) to save your run methods and settings from the Veriti™ Thermal Cyclers.
2. Insert the USB drive with the new firmware in the USB port on the front of the Veriti™ Thermal Cyclers,
3. Log in as a user with Administrator access.
4. In the Main Menu screen, touch **Settings Menu**.
5. In the Settings Menu screen, touch **Admin Menu**.
6. In the Admin Menu screen, touch **Upgrade Firmware**.

The Firmware Upgrade screen opens.



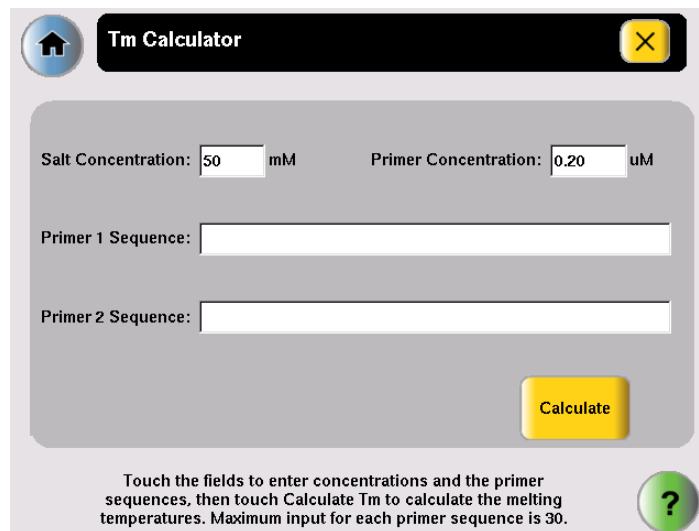
7. Touch **Source File** to display a list of the files on the USB drive. Veriti™ system firmware files end with “.update”.

8. Touch the name of the file with the new firmware, then touch **Select**.
9. Touch **Upgrade**, then **Yes**.  
When the upgrade process is complete, a message box opens.
10. Restart the instrument and follow the prompts to calibrate the touchscreen.
  - a. Remove the USB drive, then power off the instrument using the switch on the back.
  - b. Power on the instrument. It takes a few minutes for the firmware upgrade to complete. Do not power off the instrument again until the entire upgrade process is complete and the opening screen is displayed.
  - c. Follow the instructions on the screen to calibrate the touchscreen.
 After you complete the touchscreen calibration, the firmware is upgraded and the instrument is ready.

## Calculating Melting Temperatures

To calculate the melting temperatures for a DNA primer pair:

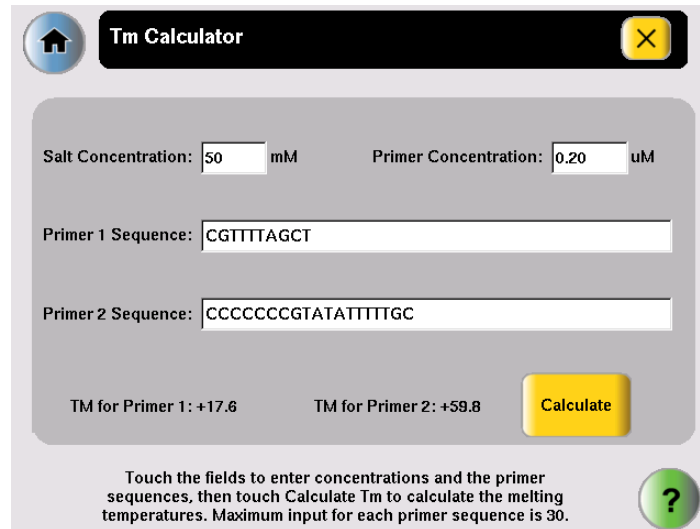
1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Calculate T<sub>m</sub>** to open the T<sub>m</sub> Calculator screen.



The screenshot shows the T<sub>m</sub> Calculator interface. At the top, there is a title bar with a home icon on the left, the text "Tm Calculator" in the center, and a close icon (an 'X' in a yellow square) on the right. Below the title bar, there are two input fields: "Salt Concentration: 50 mM" and "Primer Concentration: 0.20 uM". Below these are two text input fields for "Primer 1 Sequence:" and "Primer 2 Sequence:". A yellow "Calculate" button is located at the bottom right of the main input area. At the bottom of the screen, there is a green circular icon with a white question mark. Below this icon, there is a text box that reads: "Touch the fields to enter concentrations and the primer sequences, then touch Calculate T<sub>m</sub> to calculate the melting temperatures. Maximum input for each primer sequence is 30."

3. Enter the required information.
  - a. Touch **Salt Concentration**, then enter the salt concentration in mM.
  - b. Touch **Primer Concentration**, then enter the DNA concentration in  $\mu\text{M}$ .
  - c. Enter each primer sequence.
4. Touch **Calculate**.  
The melting temperature for each primer is displayed.





**Tm Calculator**

Salt Concentration: 50 mM      Primer Concentration: 0.20 uM

Primer 1 Sequence: CGTTTAGCT

Primer 2 Sequence: CCCCCGTATATTTTGC

TM for Primer 1: +17.6      TM for Primer 2: +59.8      **Calculate**

Touch the fields to enter concentrations and the primer sequences, then touch Calculate Tm to calculate the melting temperatures. Maximum input for each primer sequence is 30.

## Viewing Instrument Statistics

The instrument records information about how it has been used. You can view this information.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Show Statistics**.

The following statistics are shown:

- **Total Cycles for Block** – The total number of cycles the sample block has performed over its lifetime.
- **Total Degrees for Block** – The total degrees the sample block has climbed over its lifetime. For example, if the sample block was heated from 10 degrees to 30 degrees, for 3 cycles, the total degrees would be 60. [ $3 \times (30 - 10) = 60$ ].

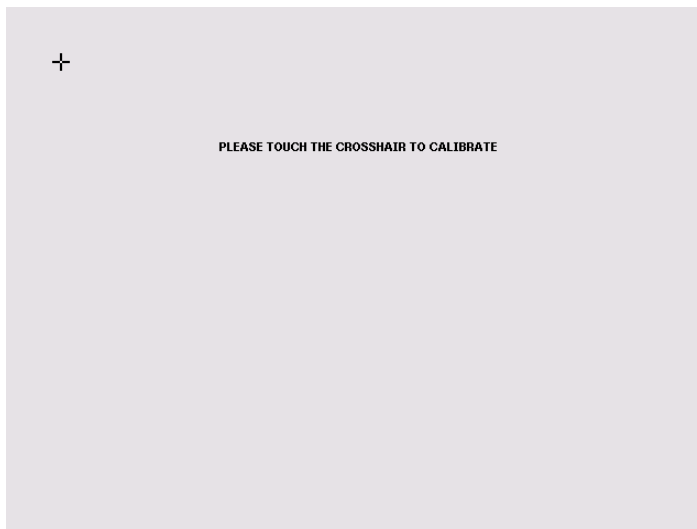
3. When you finish, touch **Done** to return to the Tools Menu screen.

## Calibrating the Touchscreen

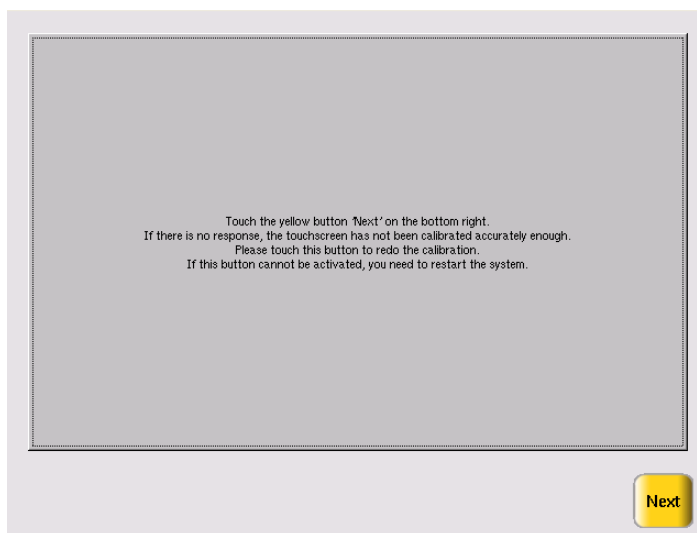
Use this test to verify that all pixels on the touchscreen are visible and respond to touch.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Calibrate Touch Screen**.

3. Follow the instructions on the screen, touching the center of the + sign at each location where it appears on the screen.



4. At the end of the test, the following screen appears. Touch **Next** to complete the calibration and view the Tools Menu screen.



## Running the Cycle Performance Test

Use this test to verify that the sample block is heating and cooling properly and that the PCR cycling function operates properly.

### Required Materials

The appropriate sample plate for your instrument:

- Veriti 96-Well *Fast* Thermal Cycler: MicroAmp™ *Fast* Optical 96-Well Reaction Plate with Barcode (PN 4346906)

- Veriti 96-Well Thermal Cycler: MicroAmp™ Optical 96-Well Reaction Plate (PN N8010560)

**Procedure** This test takes 10 minutes to complete.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Run Cycle Performance Test**.
3. To save the test results to the USB drive, insert the drive now. Otherwise, the test results are not saved, but are displayed when the test is complete.
4. Follow the instructions on the screen to perform the test.  
The results are saved to the file CyclePEvents.txt if the USB drive is present.
5. If the test fails, repeat the procedure. Make sure that the heated cover is closed.
6. If the test fails again, contact Applied Biosystems Technical Support.

## Tests Using the Temperature Verification Kit

You need the Temperature Verification Kit to perform the:

- Heated Cover Verification
- Temperature Verification
- Temperature Nonuniformity Test

### About the Temperature Verification Kit

The Temperature Verification Kit consists of:

- A probe – Either a 0.1-mL or 0.2-mL probe assembly, ordered separately or as part of the kit
- Digital thermometer – Model 4690 Digital thermometer with 9 V battery
- Light mineral oil
- Cotton swabs

You need the appropriate model of the Temperature Verification Kit for your Veriti™ Thermal Cycler, as shown below.

Veriti™ Thermal Cycler Model	Temperature Verification Kit	Part Number
Veriti™ Fast 96-Well Thermal Cycler (PN 4375593), with 0.1-mL sample wells	0.1-mL Temperature Verification Kit	4373997
Veriti™ 96-Well Thermal Cycler (PN 4375785), with 0.2-mL sample wells	0.2-mL Temperature Verification Kit	4377669

### For More Information

See the *Temperature Verification Kit 0.1-mL and 0.2-mL VeriFlex™ 96-Well Sample Blocks User Guide* (PN 4376864).

## Running the Heated Cover Verification

Use this test to verify that the heated cover is within  $\pm 3$  °C of the 105 °C set point.

**Required Materials** The appropriate Temperature Verification Kit for your Veriti™ Thermal Cycler model (see table above).

**Procedure** This test takes 10 to 15 minutes to complete.



**WARNING PHYSICAL INJURY HAZARD.** Hot Surface. Use care when working around the heated cover and sample block to avoid being burned.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Run Heated Cover Verification**.
3. To save the test results to the USB drive, insert the drive now. Otherwise, the test results are not saved, but are displayed when the test is complete.
4. Follow the instructions on the screen to perform the test.

The results are saved to the file heatedCover.txt if the USB drive is present.

5. If the test fails, repeat the procedure. Make sure that:
  - The probe plate is in the correct location. Probe 1 should be in well A5 during this test.
  - Cables are securely seated in the digital thermometer and in the instrument.
  - The heated cover is closed.
6. If the test fails again, contact Applied Biosystems Technical Support.

## Running the Temperature Verification

Use this test to verify that the average temperature for the sample block is within  $\pm 0.25$  °C of the set point temperature.

**Required Materials** The appropriate Temperature Verification Kit for your Veriti™ Thermal Cycler model (see table above).

**Procedure** This test takes 25 to 30 minutes to complete, but you can cancel before it is complete.



**WARNING PHYSICAL INJURY HAZARD.** Hot Surface. Use care when working around the heated cover and sample block to avoid being burned.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Run Temperature Verification**.
3. To save the test results to the USB drive, insert the drive now. Otherwise, the test results are not saved, but are displayed when the test is complete.
4. Follow the instructions on the screen to perform the test.

The results are saved to the file bcAlevents.txt if the USB drive is present.

5. If the test fails, repeat the procedure. Make sure that:

- The probe is placed in the correct wells during the test.
  - A drop of mineral oil is in each of the test wells.
  - You save or print the results.
6. If the test fails again, contact Applied Biosystems Technical Support.

## Running the Temperature Nonuniformity Test

Use this test to verify that the sample well temperatures are within the threshold temperature range.

**Required Materials** The appropriate Temperature Verification Kit for your Veriti™ Thermal Cycler model (see table above).

**Procedure** This test takes 10 to 15 minutes to complete, but you can cancel before it is complete.



**WARNING PHYSICAL INJURY HAZARD.** Hot Surface. Use care when working around the heated cover and sample block to avoid being burned.

1. In the Main Menu screen, touch **Tools Menu**.
2. In the Tools Menu screen, touch **Run TNU Test**.
3. To save the test results to the USB drive, insert the drive now. Otherwise, the test results are not saved, but are displayed when the test is complete.
4. Follow the instructions on the screen to perform the test.  
The results are saved to the file tnuEvents.txt if the USB drive is present.
5. If the test fails, repeat the procedure. Make sure that the:
  - Cables are securely seated in the digital thermometer and in the instrument.
  - Heated cover is closed.
6. If the test fails again, contact Applied Biosystems Technical Support.

## TVK Recalibration

Applied Biosystems recommends that your Temperature Verification Kit be recalibrated once a year.

Calibrating the thermometer and probe of the Temperature Verification Kit requires that you:

- Decontaminate the probe assembly as described below.
- Send the equipment to the manufacturer. See [TVK Support](#) on [page ix](#).

### Decontaminating the Probe Assembly

1. Gently wipe the probe cones with a cotton swab that has been moistened with with a 1:10 v/v solution of 5.25% sodium hypochlorite (Chlorox bleach).  
**IMPORTANT!** Do not submerge the probe in bleach solution. Do not disassemble the probe assembly.
2. Complete a copy of the Certificate of Decontamination ([Appendix D](#)).



This chapter covers:

Troubleshooting . . . . .	5-2
Returning an Instrument for Service . . . . .	5-2

## Troubleshooting

Use the following table to help troubleshoot problems with your Veriti™ Thermal Cycler.

Problem	Possible Causes	Check and/or Remedy
Cooling rate too slow	<ul style="list-style-type: none"> <li>Peltier assembly failure.</li> </ul>	<ul style="list-style-type: none"> <li>Run the Cycle Performance Test.</li> </ul>
Temperature does not match specified temperature	<ul style="list-style-type: none"> <li>Instrument may require calibration</li> </ul>	<ul style="list-style-type: none"> <li>Run the Temperature Verification Test.</li> </ul>
Heating rate too slow	<ul style="list-style-type: none"> <li>Peltier failure</li> </ul>	<ul style="list-style-type: none"> <li>Run the Cycle Performance Test.</li> </ul>
Printing fails	<ul style="list-style-type: none"> <li>Printer incorrectly configured on instrument</li> <li>Printer not connected to network</li> <li>Instrument not connected to network</li> <li>Ethernet cable bad</li> </ul>	<ul style="list-style-type: none"> <li>Make sure the printer IP address on the instrument matches the IP address from the system administrator.</li> <li>Is Ethernet cable connected to the printer?</li> <li>Is Ethernet cable connected to the instrument?</li> <li>Is network functioning?</li> <li>Try a different Ethernet cable.</li> </ul>
Cycling time too long	<ul style="list-style-type: none"> <li>Peltier failure</li> </ul>	<ul style="list-style-type: none"> <li>Run the Cycle Performance Test.</li> </ul>
When running on multiple instruments, cannot see instruments in "Select Instruments" screen	<ul style="list-style-type: none"> <li>Instrument(s) not connected to network.</li> <li>Switch powered off.</li> <li>Ethernet cable bad.</li> <li>IP address conflict.</li> </ul>	<ul style="list-style-type: none"> <li>Are all Ethernet cables connected to the instruments?</li> <li>Are all Ethernet cables connected to the router?</li> <li>Try a different Ethernet cable.</li> <li>Change the IP addresses on the instruments.</li> </ul>
No screen display No response when you power on the instrument	<ul style="list-style-type: none"> <li>Blown fuse</li> <li>Not connected to power source</li> </ul>	<ul style="list-style-type: none"> <li>Is power switch on?</li> <li>Is power cord connected?</li> <li>Check fuses.</li> </ul>
Heated cover not responsive	<ul style="list-style-type: none"> <li>Heated cover failure.</li> </ul>	<ul style="list-style-type: none"> <li>Run the Heated Cover Verification Test.</li> </ul>

## Returning an Instrument for Service

Before returning an instrument for service, back up the run methods and instrument settings, as described in ["Backing Up Run Methods and Other Settings" on page 1-13](#). This practice ensures that if the service center sends you a replacement instrument, you can restore the run methods and other settings.

To return an instrument for service:

1. Contact your local customer care center or technical support group to obtain a service notification, a service call number, and, if required, packaging.



2. Decontaminate the instrument.

**IMPORTANT!** If the sample block becomes contaminated with radioactivity, use a commercially available decontaminant to remove the contamination. If the block cannot be decontaminated, the instrument cannot be returned to Applied Biosystems for service.

3. Complete and sign a copy of the Certificate of Instrument Decontamination (see [Appendix D](#)).
4. Fax the Certificate of Instrument Decontamination to the customer care center.
5. Pack the instrument in the provided packaging, without any accessories or power cords. Include a hard copy of the Certificate of Instrument Decontamination in the box.

**Note:** Repairs for instruments without the Certificate of Instrument Decontamination are delayed.

6. Affix the provided postage to the box, then ship the instrument to the designated facility.

The repair process requires 2 to 3 weeks.



This chapter covers:

Scheduled Maintenance .....	6-2
As-Needed Maintenance .....	6-2
Parts List .....	6-6

## Scheduled Maintenance

Run the following tests annually:

- Heated Cover Verification – [page 4-10](#)
- Temperature Verification – [page 4-10](#)
- Cycle Performance Test – [page 4-11](#)

## As-Needed Maintenance

**Tests** Run the Temperature Nonuniformity Test (see [page 4-11](#)).


## Cleaning the Instrument


**Preparation** Before cleaning the instrument:

1. Power off the Veriti™ Thermal Cycler, then remove the power cord.
2. Allow the instrument to cool until the heated cover and sample block reach room temperature.

**Cleaning the Touchscreen** Clean the touchscreen with any commercially available LCD cleaning product. Be careful not to scratch the screen.

**Cleaning the Sample Wells** If you use any cleaning or decontamination method, except those recommended in the manual, you risk damaging the equipment. Clean the sample wells once a month or as needed.

 **WARNING** Always wear protective glasses and gloves when servicing the instrument. Also, make sure you disconnect the instrument from AC line power before you begin any service procedure.

 **CAUTION** During instrument operation, the temperature of the heated cover can be as high as 108 °C, and the temperature of the sample block can be as high as 100 °C. Before performing the procedure, keep hands away until the heated cover and sample block reach room temperature

To clean the sample wells:

1. Follow the steps in [Preparation](#), above.
2. Open the heated cover.
3. Remove the sample tray from the sample block and set it aside.
4. Use a cotton swab soaked in pure isopropanol to clean the sample wells thoroughly. Make certain that the isopropanol has evaporated completely before reloading a sample tray.

## Decontaminating the Sample Wells

If the sample wells become contaminated with any biological agents, clean the wells thoroughly with a cotton swab soaked in 1:10 v/v dilution of 5.25% sodium hypochlorite (Chlorox bleach).

**Use bleach solution in moderation.** Applied Biosystems recommends the use of 10% bleach solution for removing contamination from the Veriti™ instrument sample block; excessive use of the solution, however, can corrode the sample block material. To prevent damage to the sample block:

- Avoid applying excessive amounts of bleach solution. If possible, instead of using a squeeze bottle or soaked cloth, use an atomizer to deliver the solution to the wells of the block.
- After treating with bleach solution, rinse the sample block thoroughly using deionized water.

**Note:** Removing residual bleach from the surfaces of the Veriti™ instrument using water minimizes the long-term effects of bleach treatments.

If the sample block becomes contaminated with radioactivity, use a commercially available decontaminant to remove the contamination. If the block cannot be decontaminated, the instrument cannot be returned to Applied Biosystems for service.

## Cleaning the Heated Cover

Clean the heated cover once a month or as needed.



### CAUTION

During instrument operation, the temperature of the heated cover can be as high as 108 °C, and the temperature of the sample block can be as high as 100 °C. Before performing the procedure, keep hands away until the heated cover and sample block reach room temperature.

To clean the heated cover:

1. Follow the steps in [“Preparation” on page 6-2](#).
2. Open the heated cover.
3. Soak a cotton swab or piece of clean cloth with pure isopropanol and gently wipe the heated platen.



### WARNING

**CHEMICAL HAZARD.** Isopropanol is a flammable liquid and vapor. Exposure may cause eye, skin, and upper respiratory tract irritation. Prolonged or repeated contact may dry skin and cause irritation. Exposure may cause central nervous system effects such as drowsiness, dizziness, and headache. Read the MSDS, and follow the handling instructions.

4. Remove any remaining isopropanol from the cover.

**Note:** If the platen becomes contaminated with amplified DNA, then raise the heated cover to the cleaning position, wipe the platen with a cloth or cotton swab soaked in bleach, then rinse with water.

Clean the heated platen once a month or as needed.

## Decontaminating the Heated Cover

If the heated cover become contaminated with amplified DNA, raise the heated cover to the cleaning position and wipe the cover with a cloth or cotton swab soaked in 1:10 v/v dilution of 5.25% sodium hypochlorite (Chlorox bleach), then wipe the cover with a damp cloth.

## Replacing Fuses

### Fuse Overview

The instrument has two 10 A Type M 250 V 5 × 20 mm fuses (PN 4377690).



**WARNING FIRE HAZARD.** For continued protection against the risk of fire, replace fuses only with Listed and Certified fuses of the same type and rating as those currently in the instrument.



**DANGER ELECTRICAL HAZARD.** To protect yourself against shock hazards, use a properly wired three-terminal outlet. Do not use an adapter to a two-terminal outlet since this does not provide positive ground protection.

Instrument Configuration*	Main Fuse Rating	Part Number
All configurations	10 A	4377690

Acceptable AC line voltage tolerances: 100, 120, 220, 230 ±10%; 240 VAC  
+6%/–10%, 50/60 Hz ± 1%

### Required Materials

- Two 10 A Type M 250 V 5 × 20 mm fuses
- Fine flat-tip screwdriver

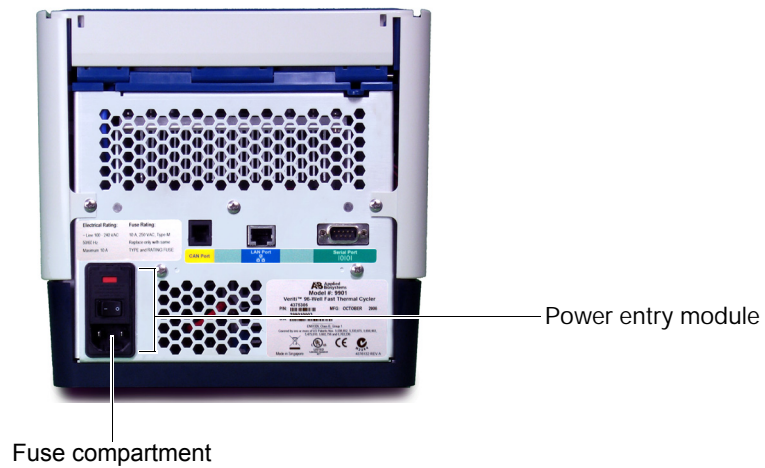
### Procedure

1. Turn off the instrument and disconnect the power cord from the back of the instrument.

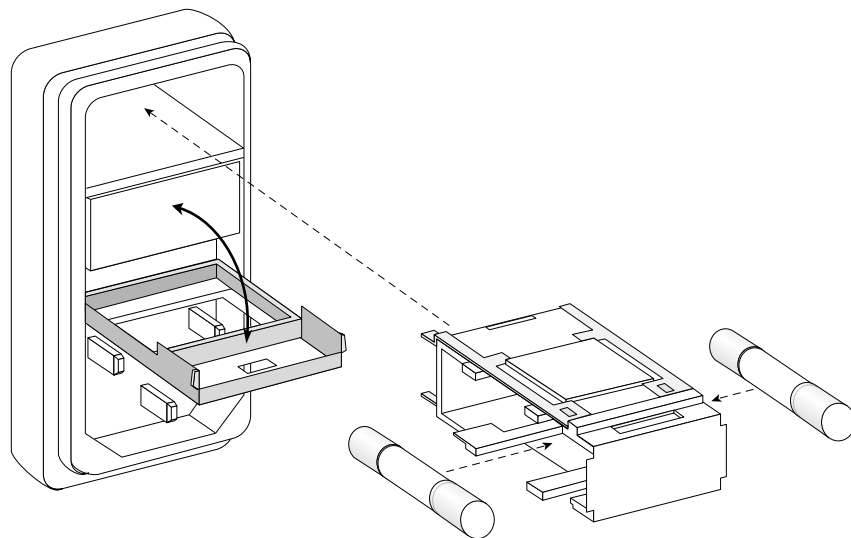


**DANGER ELECTRICAL SHOCK HAZARD.** Severe electrical shock, which could cause physical injury or death, can result from working on an instrument when the high voltage power supply is operating. To avoid electrical shock, disconnect the power supply to the instrument, unplug the power cord, and wait at least 1 minute before working on the instrument.

The fuses are in the power entry module.



2. Insert a small flat-tip screwdriver into the slot in the upper portion of the power entry module, and open the door.
3. Pull out the fuse compartment to inspect the two fuses in the fuse compartment.



GR0 6

4. Pull out the blown fuse(s) from the fuse compartment and replace with new 10 A Type M 250 V 5 × 20 mm fuses.
5. Place the fuse compartment back into the power entry module (there is only one orientation) and close the door.
6. Press the door until it locks in place.
7. Connect the instrument power cord.

## Parts List

Table 6-1 Kits and Spares

Part	PN
<b>Kits</b>	
Temperature Verification Kit (0.1-mL)	4373997
Temperature Verification (0.2-mL)	4377669
Veriti™ System Starter Kit	4376634
<b>Spares</b>	
Cable, AC Power Supply	4374647
Cam, Left Side	4374274
Cam, Right Side	4374275
Foot, Rubber (Package of 4)	4375246
Fuse 10A Slo-Blo	4377690
Grill, Plastic Mold	4374178
Handle, Plastic	4374277
Handle, Rubber Grip	4374181
Heated Cover	4374276
Panel, Left	4374176
Panel, Rear (Heated Cover)	4374280
Panel, Right	4374175
Probe, Temperature Verification Kit (0.1-mL)	4375938
Probe, Temperature Verification Kit (0.2-mL)	4377670



# Instrument Specifications

---

# A

This appendix covers:

System Specifications .....	A-2
Printer Specifications .....	A-3

# System Specifications

## Physical Dimensions and Electrical Specifications

Physical Dimensions	
Width	23.7 cm (9.3 in)
Height	24.5 cm (9.6 in)
Depth	48.5 cm (19.1 in)
Weight	10.2 kg (22.5 lbs)
Electrical	
Input Voltage	100 to 240 VAC 50/60 Hz
Max Power	10 A
AC Line Voltage Tolerances	100, 120, 220, 230 $\pm 10\%$ 240 VAC +6%/-10%, 50/60 Hz $\pm 1\%$

## Power and Communication Connections

Table 1 Power and Communication




Port	Description
	800 VA power cable
	10/100 fast Ethernet port for a network connection
	USB v1.0 port for a connection to an external USB drive
IOIOI	RS232 serial communication port for connecting the probe for the Temperature Verification Kit

Figure A-1 Connections for power and communications on the Veriti™ Thermal Cycler



**Sample Temperature Range**

- Sample temperature range: +4 to +99.9 °C
- Temperature calibration accuracy: Traceable to National Institute of Standards and Technology (NIST)

**Touchscreen Specifications**

640 × 480 pixel LCD color display with full VGA resolution.

**Sample Block Dimensions**

Instrument Model	No. of Wells	Volume/Well
Veriti™ <i>Fast</i> 96-Well Thermal Cycler (PN 4375593)	96	0.1 mL
Veriti™ 96-Well Thermal Cycler (PN 4375785)	96	0.2 mL

## Printer Specifications

The Veriti™ Thermal Cycler requires a printer that:

- Has an Ethernet port
- Supports the LPD/LPR protocol (often called a “TCP/IP printer”)



# Disposables

---

# B

This appendix covers:

Disposables .....B-2  
Other Supplies for Sample Handling .....B-4

# Disposables

Table B-1 Disposables for the Veriti™ Thermal Cycler

Part Description	96-Well (0.1-mL)	96-Well (0.2-mL)	Part Number
<b>96-Well Plates</b>			
MicroAmp™ <i>Fast</i> 96-Well Reaction Plate (0.1 mL)	x		4346907
MicroAmp™ <i>Fast</i> Optical 96-Well Reaction Plate with Barcode (0.1 mL)	x		4346906
	x		4366932
MicroAmp™ Optical 96-Well Reaction Plate		x	N8010560
		x	4316813
MicroAmp™ Optical 96-Well Reaction Plate with Barcode		x	4306737
		x	4326659
MicroAmp™ Optical 96-Well Reaction Plate with Barcode and Optical Caps		x	403012
MicroAmp™ Optical 96-Well Reaction Plate with Barcode and Optical Adhesive Films		x	4314320
<b>12-Well Strips</b>			
MicroAmp™ 12-Cap Strip	x	x	N8010534
	x	x	N8011534
MicroAmp™ 12-Cap Strip, Assorted Colors	x	x	N8010834
<b>8-Well Strips</b>			
MicroAmp™ <i>Fast</i> 8-Tube Strip (0.1 mL)	x		4358293
MicroAmp™ 8-Tube Strip (0.2 mL)		x	N8010580
MicroAmp™ 8-Tube Strip, Assorted Colors (0.2 mL)		x	N8010838
MicroAmp™ Optical 8-Tube Strip (0.2 mL)		x	4316567
MicroAmp™ 8-Cap Strip	x	x	N8010535
	x	x	N8011535
MicroAmp™ 8-Cap Strip, Assorted Colors	x	x	N8010835
MicroAmp™ Optical 8-Cap Strip	x	x	4323032
<b>Single Tubes</b>			
MicroAmp® <i>Fast</i> Reaction Tube with Cap (0.1 mL)	x		4358297

Table B-1 Disposables for the Veriti™ Thermal Cycler (continued)

Part Description	96-Well (0.1-mL)	96-Well (0.2-mL)	Part Number
MicroAmp® Reaction Tube with Cap (0.2 mL)		x	N8010540
		x	N8011540
MicroAmp® Reaction Tube with Cap, Assorted Colors (0.2 mL)		x	N8010840
MicroAmp® Reaction Tube with Cap, Autoclaved (0.2 mL)		x	N8010612
MicroAmp® Reaction Tube without Cap (0.2 mL)		x	N8010533
		x	N8011533
MicroAmp® Reaction Tube without Cap, Assorted Colors (0.2 mL)		x	N8010833
MicroAmp® Optical Tube without Cap (0.2 mL)		x	N8010933
<b>Seals &amp; Covers</b>			
MicroAmp™ Clear Adhesive Film	x	x	4306311
MicroAmp™ Optical Adhesive Film	x	x	4360954
	x	x	4311971
MicroAmp™ Optical Adhesive Film Kit	x	x	4313663
<b>Reaction Trays</b>			
MicroAmp™ 96-Well Tray for VeriFlex™ Blocks	x	x	4379983
MicroAmp™ 96-Well Tray/Retainer Set for Veriti™ Systems		x	4381850

## Other Supplies for Sample Handling

The following parts can simplify working with your samples and the Veriti™ Thermal Cycler.

Product	Part Number
MicroAmp™ 96-Well Base	N8010531
MicroAmp™ Splash Free 96-Well Base	4312063
MicroAmp™ Cap Installing Tool (Handle)	4330015
MicroAmp™ Multi-Removal Tool	4313950
MicroAmp™ Adhesive Film Applicator	4333183
MicroAmp™ Centrifuge Adapter	N8013822



# Predefined Run Methods

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# C

This appendix covers:

[Predefined Run Methods](#) .....C-2

## Predefined Run Methods

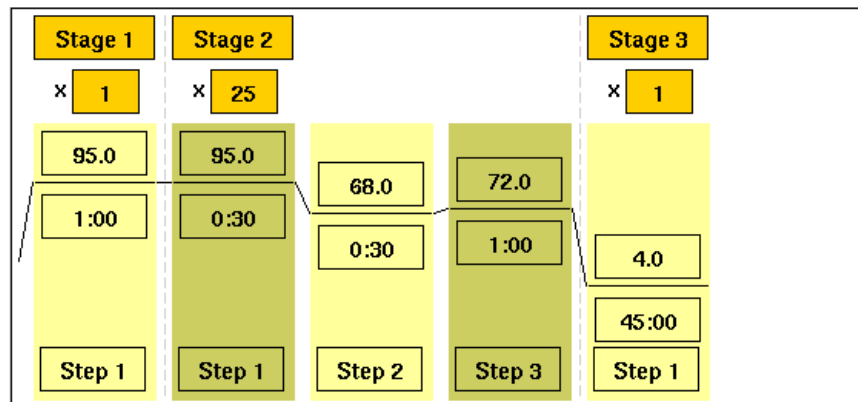
The following run methods are supplied with the Veriti™ Thermal Cycler and are stored in the Shared folder. These run methods are based on recommended protocols from Applied Biosystems and should be considered as starting points for the different applications. Your results may vary between instrument models, so some optimization may be needed. Please note that the ramp rates of these methods are 100%.

- [AmpliCycle® Seq Run Method](#)
- [AmpliTaq Gold® DNA Polymerase Run Method](#)
- [BigDye® Fast Run Method](#)
- [BigDye® Standard Run Method](#)
- [Fast PCR Run Method](#)
- [General PCR Run Method](#)
- [LMS2 Run Method](#)
- [Time Release Run Method](#)
- [Touchdown PCR Run Method](#)
- [XL PCR Run Method](#)

These run methods may be edited and/or deleted. If you need to re-create a run method, the details are shown below.

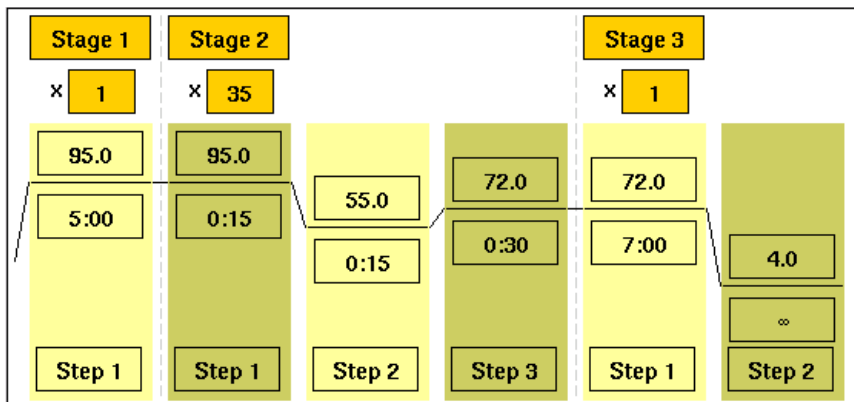
### AmpliCycle® Seq Run Method

Use this run method to achieve clean sequence ladders from femtomole quantities of template. The cycle sequencing process and the benefits of AmpliTaq® DNA Polymerase, CS, are described in the product insert for the AmpliCycle® Sequencing Kit (PN N8080175).



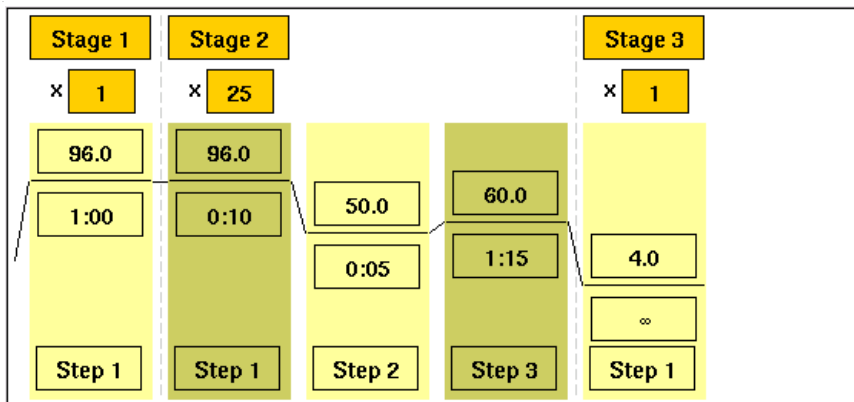
## AmpliTaq Gold® DNA Polymerase Run Method

Use this run method for hot-start PCR in place of labor-intensive methods such as manual hot-start or wax-bead-mediated hot-start techniques. The hot-start technique helps to minimize the formation of primer-dimers or nonspecific products, thereby increasing specificity and sensitivity of PCR. This run method specifies a pre-PCR heat step for activation of AmpliTaq Gold® DNA Polymerase.



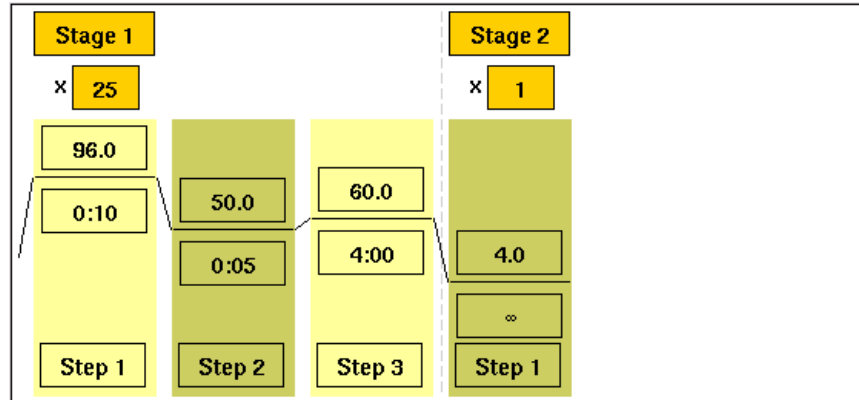
## BigDye® Fast Run Method

Use this run method for cycle sequencing of dideoxy (Sanger) terminator sequencing using ABI PRISM® BigDye® Terminator Cycle Sequence Ready Reaction Kits.



## BigDye® Standard Run Method

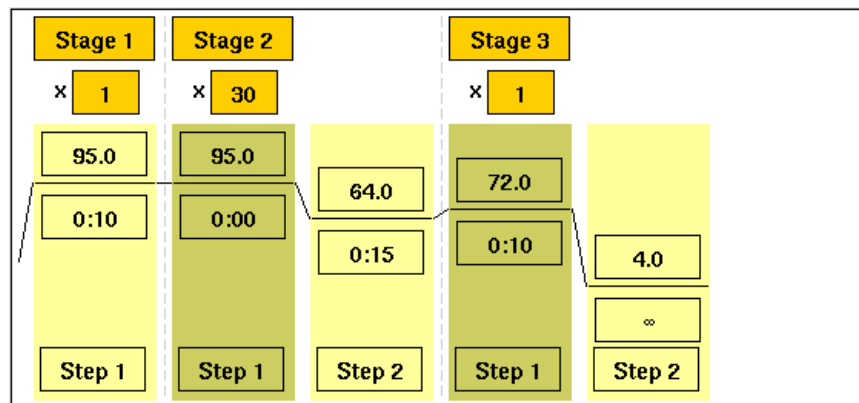
Use this run method, which consists of cycle-sequencing parameters for dideoxy (Sanger) terminator sequencing, with ABI PRISM® BigDye® Terminator Cycle Sequencing Ready Reaction Kits.



The pre-coded conditions in the BigDye method are optimized for AmpliTaq® DNA Polymerase, FS and the cycle sequencing reagents supplied with the BigDye® Terminator kits.

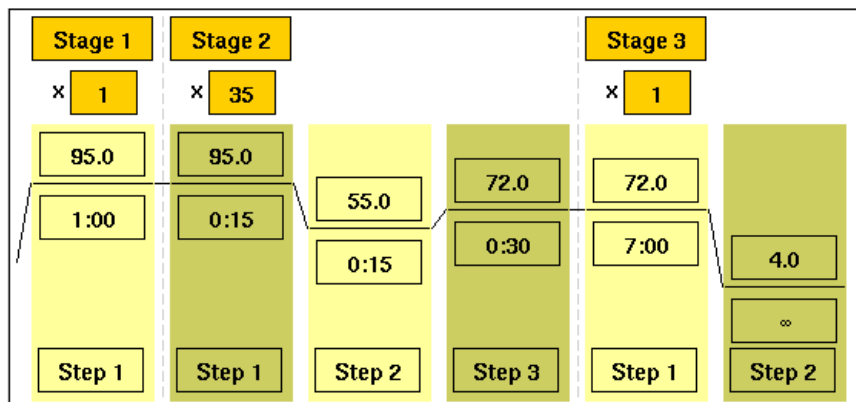
## Fast PCR Run Method

Use this run method for use with the GeneAmp® Fast PCR Master Mix. For more information on how to convert your standard methods to Fast methods, refer to the product literature for Fast PCR Master Mix available from [www.appliedbiosystems.com](http://www.appliedbiosystems.com).



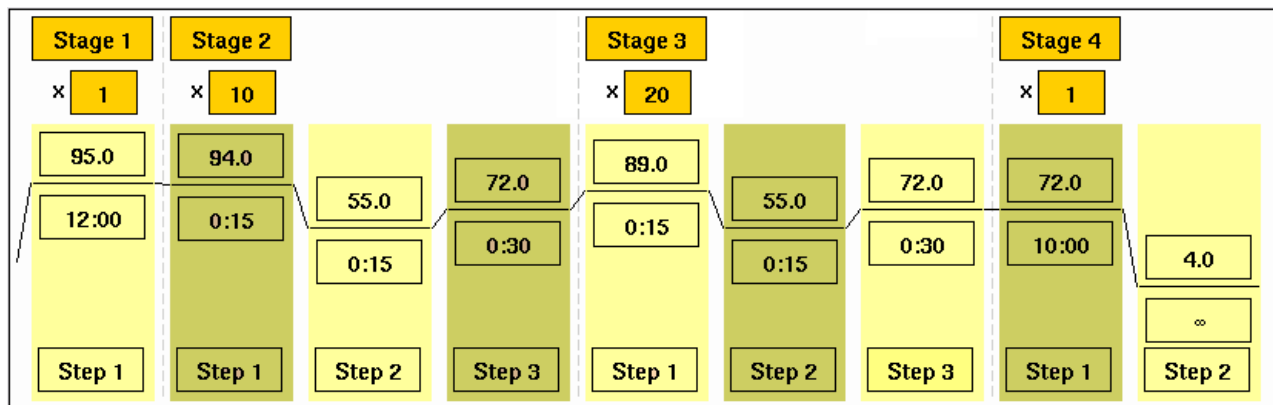
## General PCR Run Method

Use this run method for standard PCR use. This method is set as the default run method for the Veriti™ Thermal Cycler.



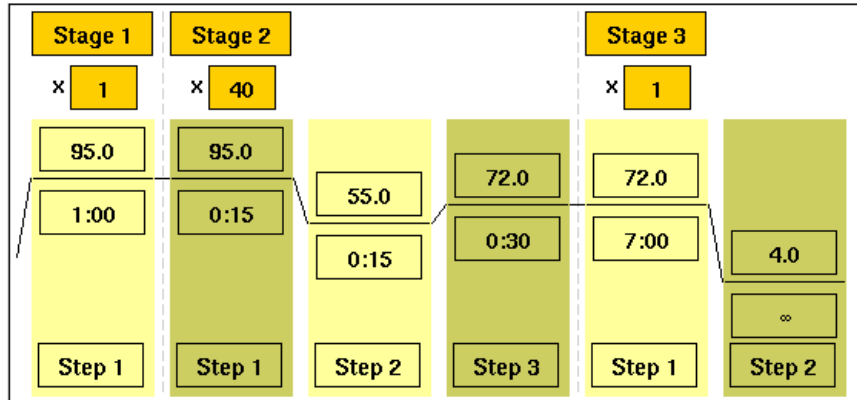
## LMS2 Run Method

Use this run method for ABI PRISM® Linkage Mapping Set Version 2.5 (LMS2) thermal cycling. Linkage Mapping Set Version 2 uses over 400 fluorescently labeled PCR primer pairs for analysis of select microsatellite loci from the Génethon human linkage map.



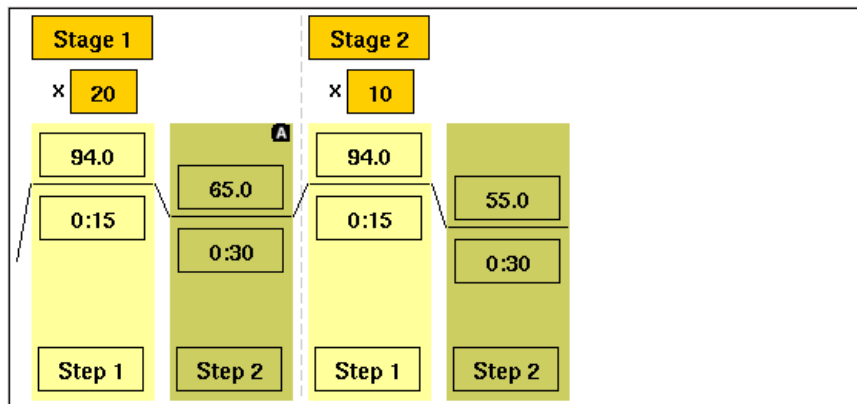
## Time Release Run Method

Use this run method for use with AmpliTaq Gold® DNA Polymerase. This method minimizes the pre-PCR activation step and adds a minimum of 10 additional cycles, allowing for slow activation of the enzyme during cycling. This provides a simple method where polymerase activity increases more slowly as product accumulates, improving specificity.



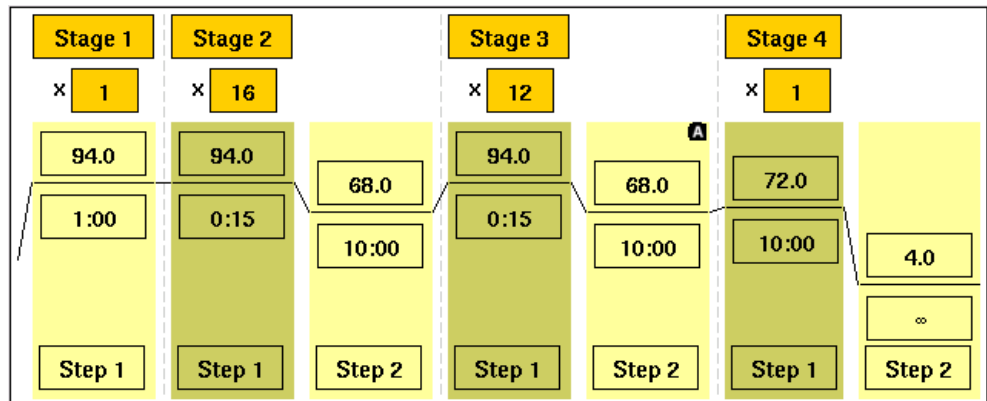
## Touchdown PCR Run Method

Use this run method if the optimal annealing temperature is not known. This method incrementally decreases the annealing temperature in early cycles to maximize the yield of specific products.



## XL PCR Run Method

Use this run method for amplification of 5 to 40 kb PCR products using *rTth* DNA Polymerase, XL and unique reaction conditions. By providing longer templates, XL PCR complements technologies for rapid, long-range PCR. More complete genes can be amplified in one reaction from known expressed sequences, allowing more introns to be spanned. You can use XL PCR to amplify the control target (a 20.8-kb product from Lambda DNA) supplied in the kit.







# Certificate of Decontamination

---

# D

This appendix contains the certificate of instrument decontamination required when returning either the Veriti™ Thermal Cycler or the 0.1-mL or 0.2-mL Temperature Verification Kit for service.



**Certificate of Instrument Decontamination**

This document must be completed in full and signed by the Customer (a) before returning an instrument or part (hereinafter referred to as instrument) to an Applied Biosystems Repair Center, and (b) prior to any on-site service to be performed by Applied Biosystems.

- 1. Refer to page 2 for special instructions concerning Mass Spectrometers.
- 2. The form must be attached to the outside of transport packaging prior to returning the instrument to an Applied Biosystems Repair Center for repair, maintenance, trade-in or loan. European customers of Thermal Cyclers should fax the form to Applied Biosystems Customer Services and enclose a copy in the shipping container.
- 3. The form must be given to the Applied Biosystems Engineer prior to any service of an instrument that has been located within a laboratory in which biological agents, hazardous chemicals or radioactive materials have been used.

**Please note that Applied Biosystems cannot accept any instruments that may be contaminated with viable biological agents, harmful quantities of hazardous chemicals, or radioactive materials.**

**AB Instrument Number:** \_\_\_\_\_ **Serial Number:** \_\_\_\_\_  
**AB Instrument Description:** \_\_\_\_\_  
**Reason for return/service:** \_\_\_\_\_  
**RMA or RA Number (if required):** \_\_\_\_\_

**Decontamination Information and Procedures**

**1. Biological Agents**

Has this instrument been exposed to viable biological agents? YES  NO

If YES, please state the viable biological agent(s), their Hazard Group(s) and Biosafety Level/Category of

Containment: \_\_\_\_\_

If YES, please describe the procedures used to decontaminate the instrument:

\_\_\_\_\_

**2. Radioactive Materials**

Has this instrument been exposed to radioactive materials? YES  NO

If YES, please identify the radioactive isotopes: \_\_\_\_\_

If YES, please describe the procedures used to decontaminate the instrument:

\_\_\_\_\_

If YES, are the radioactivity survey results at or below local background level\*? YES  NO   
(Attach the results to this form)

\*Or in the US only, for service work excluding any transportation, at levels designated to be clean or safe as stated in the Customer's regulatory approved Site Radioactive Materials License.

**3. Hazardous Chemicals**

Has this instrument been exposed to chemicals that are very toxic, (in quantities harmful to human contact), carcinogenic, mutagenic, toxic for reproduction, sensitizing, and/or which have not yet been fully tested? YES  NO

If YES, please identify the hazardous chemicals:

\_\_\_\_\_

If YES, please describe the procedures used to decontaminate the instrument:

\_\_\_\_\_



## Examples of Instrument Decontamination Procedures

### 1. Biological Agents

The following procedures are based on widely used industry standards for instrument or part (hereinafter referred to as instrument) decontamination, but the Customer must assess the suitability of these methods for the biological agents concerned.

Some instruments may require decontamination by an outside service - refer to your User Manual or Applied Biosystems Representative for further information.

#### Hazard Group 1 or 2

Instruments exposed to biological agents in Hazard Group 1 or 2, situated in a Biosafety Level/Containment Level 1 or 2 laboratory, or exposed to any human source material or cell culture including clinical samples:

- a) Follow Universal Precautions and wear all applicable personal protective equipment. Place the instrument in a well-ventilated area.
- b) Apply a freshly made solution of 1:10 v/v dilution of 5.25% sodium hypochlorite (e.g. Clorox bleach) with water to accessible product surfaces. A spray dispenser may help to ensure complete coverage.
- c) Keep surfaces wet for at least 15 minutes, then wipe dry.
- d) Repeat steps (b) and (c).
- e) Clean all decontaminated surfaces with water to remove residual bleach, and wipe dry.

If an alternative to 1:10 v/v dilution of bleach is used for instrument decontamination, please provide details in written form and attached to the Certificate of Instrument Decontamination.

#### Hazard Group 3 or 4

Instruments situated in Biosafety Level/Containment Level 3 or 4 laboratories must be decontaminated, by the customer, using an internationally approved sterilization procedure. The customer must then move the instrument to either a Containment Level 1 or 2 laboratory for service.

Applied Biosystems employees are not permitted to enter Biosafety Level/Containment Level 3 or 4 laboratories.

It may not be possible for Applied Biosystems to service or transport these instruments.

### 2. Radioactive Materials

Apply an industry standard radioactivity decontaminant (e.g. Radiacwash®, Rad-Con® or equivalent) to the instrument, and wipe surfaces as directed by the decontaminant manufacturer.

Survey the instrument with an appropriate radioactivity-measuring instrument (e.g. Geiger Counter or scintillation counter).

Satisfactory decontamination is defined as survey results at or below background level or **in the US only, for service work excluding transportation, levels designated to be clean or safe as stated in the Customer's regulatory approved Site Radioactive Materials License.**

Repeat steps (a) and (b) until satisfactory survey results are achieved, and attach the results to this form.

### 3. Hazardous Chemicals

- (a) Areas exposed to hazardous chemicals should be washed with an acceptable solvent such as ethyl alcohol or isopropyl alcohol.
- (b) Rinse with detergent and water.

#### Mass Spectrometer

Mass Spectrometers cannot be decontaminated at the customer's site. Complete disassembly is required.



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#### **Worldwide Sales and Support**

Applied Biosystems vast distribution and service network, composed of highly trained support and applications personnel, reaches 150 countries on six continents. For sales office locations and technical support, please call our local office or refer to our Web site at [www.appliedbiosystems.com](http://www.appliedbiosystems.com).

Applera is committed to providing the world's leading technology and information for life scientists. Applera Corporation consists of the Applied Biosystems and Celera Genomics businesses.

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03/2007

