

# Veriti™ Thermal Cycler

## USER GUIDE

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## Introducing the Veriti™ Thermal Cycler

### About the instrument

There are four models of the Veriti™ Thermal Cycler:

- Veriti™ 96-Well *Fast* Thermal Cycler (PN 4375305), with 0.1–mL sample wells
- Veriti™ 96-Well Thermal Cycler (PN 4375786), with 0.2–mL sample wells
- Veriti™ 384-Well Thermal Cycler (PN 4388444), with 0.02–mL sample wells
- Veriti™ 60-Well Thermal Cycler (PN 4384638), with 0.5–mL sample wells

The Veriti™ Thermal Cycler is controlled using a touchscreen display with easy-to-use interface. It is also compatible with the Applied Biosystems™ Thermal Cycler Fleet Control Software. 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.

The Veriti™ Thermal Cycler has a run recovery feature. If a power failure occurs during a run, the instrument will attempt to continue the run when the power returns.

In addition, the Veriti™ 96-Well Thermal Cyclers have VeriFlex™ Blocks™. These are six independently regulated thermal blocks to aid in designing a primer set and run method for optimal PCR conditions.



**Figure 1** The Applied Biosystems™ Veriti™ thermal cycler

This user guide provides instructions for all four models of the Veriti™ Thermal Cycler. Functions which are not the same for each model are indicated by a comment such as “This function is only available for the Veriti™ 96-Well Thermal Cyclers”.

See Appendix D, “Instrument specifications” for detailed specifications of the Veriti™ Thermal Cycler.












## Using the touchscreen

You interact with the instrument using a touchscreen.

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

**Table 1** Buttons in the instrument 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.
	Creates a “shortcut” to the selected run method (or methods).
	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 2).



Figure 2 The instrument text editor

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

## Entering numerals

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

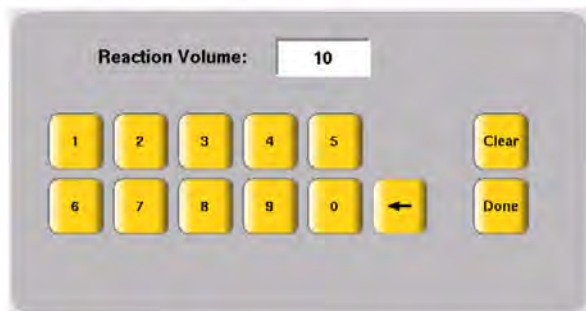





Figure 3 The instrument numeric editor

To...	Select...
Enter a number	A number button.
Delete the last number	
Remove the entire contents of the field	
Close the editor and save any changes	

# Menu overview

## Main Menu screen



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

If your system does not require login, the **My Account** button is not shown.



Figure 4 The Main Menu screen

In the **Main Menu** screen, select:

- **Browse/New Methods** to view and work with all the run methods to which you have access (see “Viewing a run method” on page 15).
- **Settings Menu** to access various instrument configuration options. If you have administrative privileges, you access the **Admin Menu** screen from this screen (see “Settings Menu screen” on page 13).
- **Tools Menu** to access instrument tests, tools such as a Tm calculator and run method conversion, as well as viewing the results of the last run and statistics about the instrument (see “Tools Menu screen” on page 14).
- **My Account** to view and edit your account information. If your system does not require login, this button is not shown.
- The **Shortcut** buttons allow you to configure instrument functions you frequently use to appear in the **Main Menu** screen (see “Configuring main menu shortcuts to functions” on page 40).
- **Log Off** to log off the instrument. You can still log off when a run is in process. If your system does not require login, the  (**Power**) button is shown instead.
-  (**Help**) to access the Help system.

## 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.

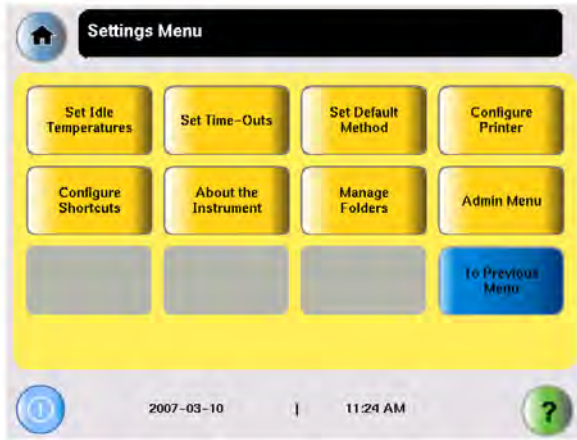


Figure 5 The Settings Menu screen, with the Admin Menu button shown

## 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.

If your system does not require login, the **Manage Users** button is not shown.

For instruments that require login, only Administrators have access to this menu.

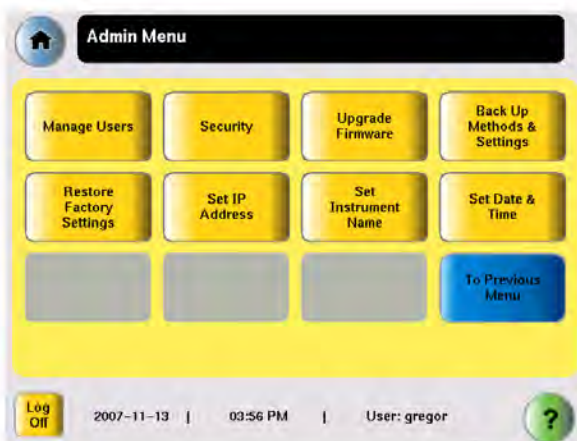


Figure 6 The Admin Menu screen, available only to users with administrative privileges

## Tools Menu screen

Use this screen to access various tools and instrument tests.

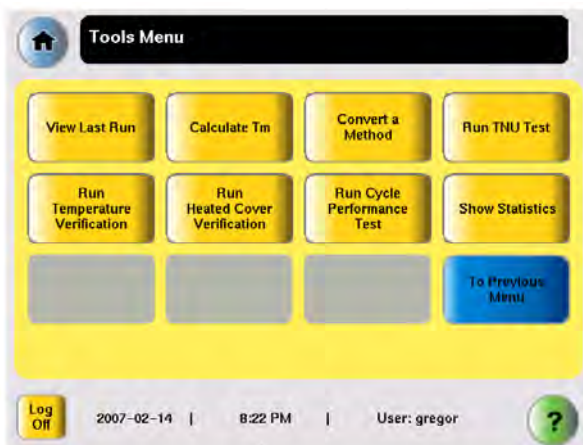


Figure 7 The Tools Menu screen, available to all users

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 instrument firmware has 10 pre-defined run methods.

---

**IMPORTANT!** The customer is responsible for validation of run methods on the instrument before use, and for compliance with regulatory requirements that pertain to their procedures and uses of the instrument.

---

- AmpliCycle™ Seq Run Method
- AmpliTaq Gold™ DNA Polymerase Run Method
- AmpliTaq Gold™ Fast PCR Run Method
- BigDye™ Kit Standard Run Method
- BigDye™ Kit 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.

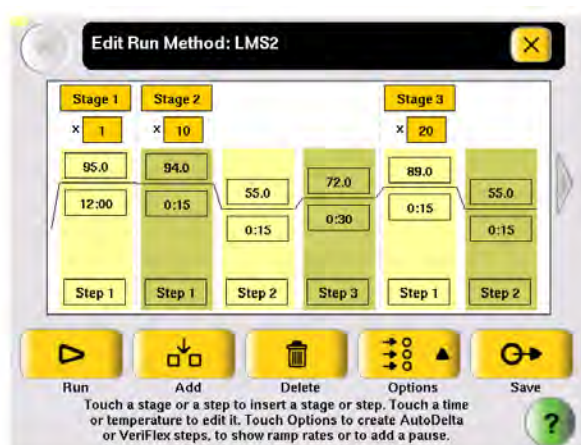
For details on these methods, see Appendix E, “Predefined run methods”

## Viewing a run method

To view a run method:

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

The run method is displayed:




---

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

---

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

## Managing run methods

1. Select **Browse/New Methods** in the **Main Menu** screen.  
The **Browse Last Accessed Run Methods** screen displays the most recently accessed run methods, and lists the total number of run methods in parentheses.



2. Select one or more rows to choose a method(s).
3. Select a highlighted row to deselect it.


## Administrative tasks for run methods

Table 2 Administrative tasks for run methods

If you want to...	Do this...
Sort run methods by different criteria	Select the title of the column with the criteria by which you want to sort the run methods.  Select the title a second time to sort in the opposite order.
View more run methods in the current folder	Select  ( <b>Page Down</b> ).
View run methods in a different folder	Select  ( <b>folders</b> ), then select the folder you want to view in the Manage Folders All screen.
Start a run	Select a run method in the list of run methods, then select <b>Start Run</b> (see page 57).
Create a new run method	Select <b>New</b> (see page 47).
View or edit a run method	Select a run method in the list of run methods, then select <b>View/Edit</b> (see page 49).
Copy one or more run methods	Select a run method in the list of run methods, then select <b>Copy</b> (see page 17).
Print a run method	Select a run method in the list of run methods, then select <b>Print</b> (see page 17).
Delete one or more run methods	Select a run method in the list of run methods, then select <b>Delete</b> (see page 18).
Designate a run method as the default	See page 18.





Table 2 Administrative tasks for run methods (continued)

If you want to...	Do this...
Create a shortcut to a run method on the Main Menu	Select a run method in the list of run methods, then select  ( <b>Create Method Shortcut.</b> ) See page 19.
Back up run methods	See page 19.
Restore run methods that you previously backed up	See page 21.

## 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. Select each run method, then select **Copy**.
4. In the **Save Run Method** screen:
  - a. If you are copying one method – select **Name**, then rename the method and/or select  (**Folder**) to save the run method to a different folder.  
or  
If you are copying more than one method – select  (**Folder**) to save the run methods to a different folder.
  - b. As needed, select **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. Select **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 28.

1. In the **Browse Run Methods** screen, locate the run method you want to print.
2. Select the run method, then select **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. Select the run method, then select **Delete**.
4. In the dialog box that opens, verify the deletion.
5. Select **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 in “General PCR Run Method” on page 95) 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, select **Settings Menu**.
3. In the **Settings Menu** screen, select **Set Default Method**.  
The **Set the Default Run Method** screen is displayed, with only the run methods in the Shared folder displayed.
4. Select the run method you wish to designate as the default in the **Set the Default Run Method** then select **Make Default**. Select **OK** in the message box that opens.  
The **Settings Menu** screen opens and the selected run method is now the default.


## Creating a shortcut to a run method

You can add buttons to the **Main Menu** screen that allow you to go directly to the **Edit Run Method** screen for a particular run method. When login is required, each user can configure his or her own shortcut buttons; otherwise the shortcut buttons are displayed for all instrument users.

---

**Note:** You can also create shortcuts to instrument functions (see “Configuring main menu shortcuts to functions” on page 40).

---

1. Select one or more methods in the **Browse Run Methods** screen, then select  (**Create Method Shortcut**).
2. In the message box that appears, select **OK**.

The selected run methods appear as buttons in the **Main Menu** screen. The name of the method is followed by the name, in parentheses, of the folder where the method is stored.

---

**Note:** Run method names longer than twelve characters will appear truncated on the shortcut button.

---

To delete a shortcut to a run method, see “Configuring main menu shortcuts to functions” on page 40.

## Backing up run methods and other settings

You can back up the instrument 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, select **Settings Menu**, then **Admin Menu**.

4. In the **Admin Menu** screen, select **Back Up Methods & Settings**.  
The **Back Up Method and Settings** screen is displayed:



5. Select **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. Select **OK**, then select **X (Close)** to return to the **Admin Menu** screen.
7. Remove the USB drive and store it in a safe place.

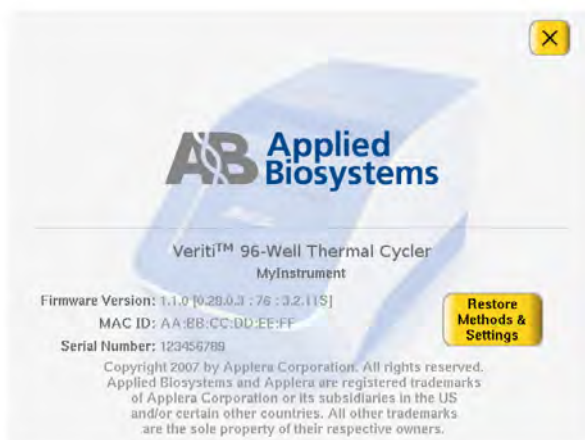
## Restoring run methods and other settings

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.

### 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. Open the **About the Instrument** screen in one of the following ways:
  - Select **Log Off** to return to the **Login Options** screen, then select **About the Instrument**.
  - In the **Main Menu** screen, select **Settings Menu**, then **About the Instrument**.

The **About the Instrument** screen is displayed:



3. In the **About the Instrument** screen, select **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.

4. Remove the USB drive and store it in a safe place.
5. Toggle the switch on the back of the instrument to power off.
6. Toggle the switch again to 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 32.

---

## 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 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 **Manage 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 49) or you can create one by selecting **New** in the **Manage Folders** screen.

## Deleting custom folders


You can delete any custom folder. When you delete a custom folder, all run methods in that folder are also deleted.

1. In the **Main Menu** screen, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Manage Folders**.
3. In the **Manage Folders** screen, select the button for the folder you want to delete, then select **Delete**.
4. Select **Yes** in the dialog box that opens, then **OK**. The folder is deleted.
5. Repeat steps 3 on page 22 and 4 on page 22 to delete other folders.
6. When you are done making changes to folders, select **✕ (Close)** to return to the **Settings Menu** screen.

## Renaming custom folders

You can rename any custom folder.

1. In the **Main Menu** screen, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Manage Folders**.
3. In the **Manage Folders** screen, select the button for the folder you want to rename, then select **Rename**.
4. Enter up to 12 characters for the folder's new name, then select **Done** to return to the **Manage Folders** screen.

5. Repeat steps 3 on page 22 and 4 on page 22 to rename any other folders.
6. When you are done making changes to folders, select  **(Close)** to return to the **Settings Menu** screen.



## Installing the Veriti™ Thermal Cycler

### Before you start

#### Site requirements

The instrument is intended for indoor use. Ensure that the installation site:

- Meets the spatial and weight requirements (see page 24)
- Meets environmental requirements (see page 25)
- Is within 1m (3 ft.) of a 800 VA power receptacle
- Is away from water

#### System specifications

Table 3 Physical dimensions, weight, and power consumption

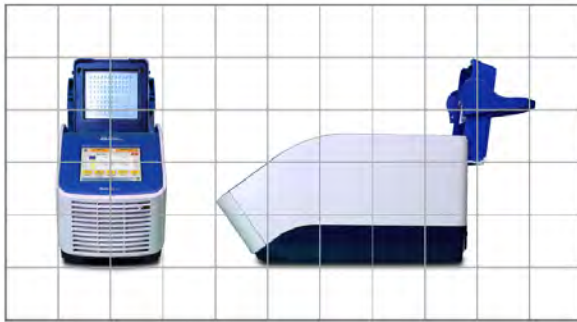
Parameter	Instrument Footprint	Recommended Clearance	Total
Length	48.5 cm (19.1 in)	15.5 cm (6.1 in) <sup>[1]</sup>	64 cm (15.2 in)
Width	23.7 cm (9.3 in)	0 cm (0 in)	23.7 cm (9.3 in)
Height <sup>[2]</sup>	40.0 cm (15.7 in)	15.5 cm (6.1 in) <sup>[3]</sup>	55.5 cm (21.8 in)
Weight	10.6 kg (22.6 lbs)		
Power Consumption	800 VA – Maximum consumption		
	~260 VA – Average during thermal cycling		
	~10 VA – During sleep/standby		

<sup>[1]</sup> At the rear of the instrument to ensure adequate airflow and cooling.

<sup>[2]</sup> With the heated cover open

<sup>[3]</sup> 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 2 rating are laboratories and sales and commercial areas.

### Altitude

The safety of Veriti™ Thermal Cycler use was tested for altitudes up to 2,000 ft.

## Materials

### Required materials

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

## Optional protective hardware

The following devices are supported to protect the Veriti™ Thermal Cycler 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 instrument

---

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

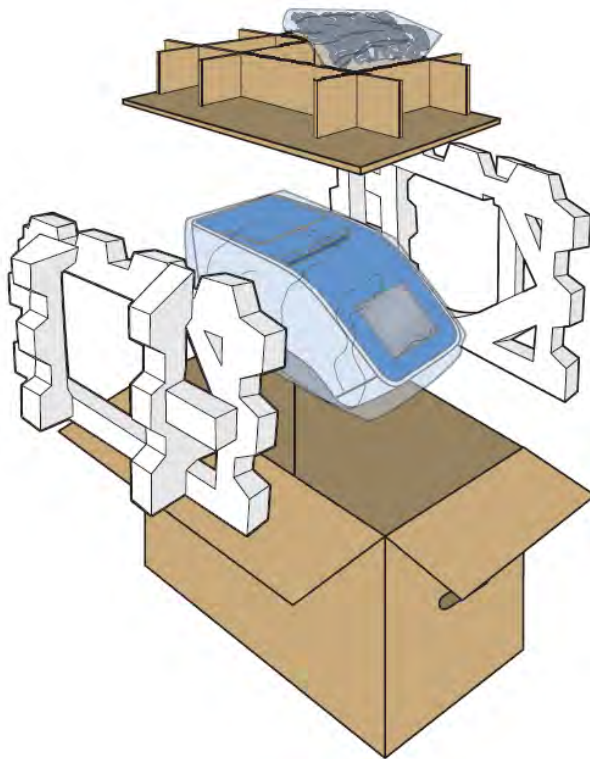
---

1. To unpack the instrument:
  - 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 instrument 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 instrument, then inspect the instrument for shipping damage.

---

**IMPORTANT!** If the instrument is damaged, note the location and appearance of the damage, then contact Technical Support or your service representative (see Appendix G, “Documentation and support”).

---



2. Move the instrument 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 instrument accessories, then verify that it contains:
  - *Applied Biosystems™ Veriti™ Thermal Cycler User Guide CD*
  - Cable, Power 13A/125V North America (PN 4382067)
  - Cable, Power 10A/220V Europe (PN 4382068)
  - Veriti™ Thermal Cycler Starter Kit

## Setting up the instrument

1. Remove the packing material:
  - a. Open the instrument heated cover.
  - b. Remove the packing material from the sample block(s).
  - c. Using a can of compressed air, deliver a blast of air into each well of the sample block(s) to remove any particles that may have collected during transportation.
  - d. Close the heated cover.
2. Connect the power cable to the instrument.
3. (Optional) Install any of the recommended protective devices (see “Optional protective hardware” on page 26).
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 32).

## Connecting multiple instruments

### Required parts for connection

Connecting your thermal cycler to other thermal cyclers allows you to use one instrument to control others. You can connect up to 12 instruments.

To connect together multiple instruments, you need:

- An Ethernet cable for each instrument
- A network switch
- A TCP/IP printer, if you want to print

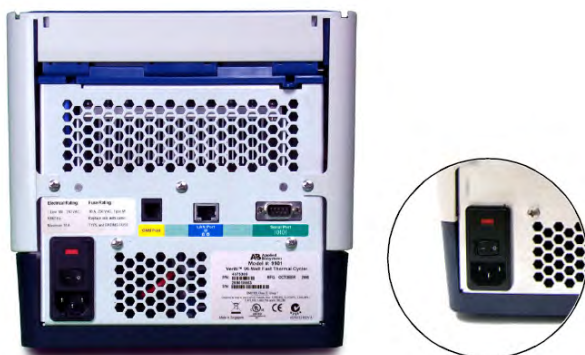
For best results, do not connect the network switch to your laboratory's network. Communication between instruments works best on an isolated system, free from interference from other network traffic.

### Making the connections

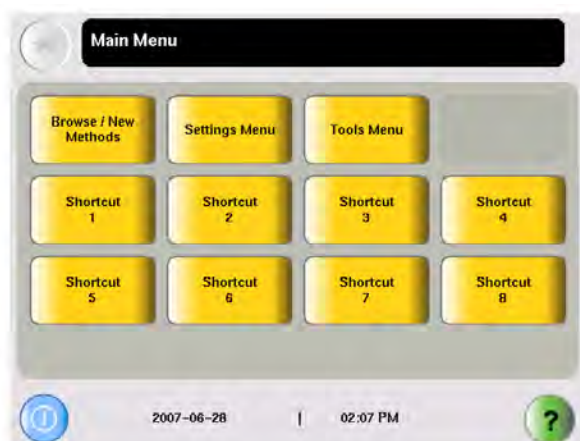
1. Connect the Ethernet cable to the back of the thermal cycler and connect the other end of the cable to the network switch.
2. Repeat step 1 on page 29 for each thermal cycler.
3. Connect the printer to the network switch.
4. Power on the network switch.
5. For each thermal cycler, follow the instructions in “Setting the IP address” on page 31 and “Setting the instrument name” on page 32.
  - When you set the instruments 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 32.
7. Continue with “Powering on” on page 30, and “Setting up the Veriti™ Thermal Cycler” on page 30.

## 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 Main Menu screen is displayed:



## Setting up the Veriti™ Thermal Cycler

### Recommended instrument settings

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

- Instrument IP address (“Setting the IP address” on page 31)
- Instrument name (“Setting the instrument name” on page 32)
- Current date and time (“Setting the date and time” on page 32)
- Printer information, if you want to print run methods or the run report (“Configuring the instrument for a printer” on page 32)

Optionally, you can also change the settings for:

- User accounts and security (“Setting up instrument security and user accounts” on page 33)
- Idle state temperatures for the cover and the sample block(s) (“Setting idle temperatures for the block(s) and cover” on page 39)
- Durations for pauses and stand-by (“Setting time-outs” on page 39)
- “Shortcuts” to instrument functions (to be displayed on the Main Menu) (“Configuring main menu shortcuts to functions” on page 40)

## 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 Settings** 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, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Admin Menu**.
3. In the **Admin Menu** screen, select **Set IP Address**.



4. In the **IP Settings** screen, set the IP address:
  - Dynamically – Select **Assign IP address dynamically (using DHCP)**. A check mark appears when DHCP is selected.

or

  - Manually – Select **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. Select **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. You can change the name to something more descriptive. The instrument name appears in the **About the Instrument** and **Run Report** screens and, if you connect together multiple instruments, in the **Select Instruments** screen.

1. In the **Main Menu** screen, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Admin Menu**.
3. In the **Admin Menu** screen, select **Set Instrument Name**.
4. Select 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. Select **Yes** next to **Allow Remote Runs** to make the instrument available for remote runs (a run on this instrument can be started from another instrument); otherwise select **No**.
6. Select **Done**, then **OK** to save your changes and return to the **Admin Menu** screen.

---

**Note:** If you edit the **Instrument Name** field, you can still view the serial number in the **About the Instrument** screen. You can access the **About the Instrument** screen from either the **Login** screen or the **Settings Menu** screen.

---

## Configuring the instrument for a printer

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

1. In the **Main Menu** screen, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Configure Printer**.
3. Select the fields to set the printer's name and IP address.
4. Select **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, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Admin Menu**.
3. In the **Admin Menu** screen, select **Set Date & Time**.
4. To set the date, select **Date**, then enter today's date, using the format YYYY-MM-DD. The instrument automatically enters the "-".



5. To set the time, select **Time**, enter the current time using the format HH:MM, then select **AM** or **PM**. The instrument automatically enters the ":".
6. Select **Done**, then **OK** to save your changes and return to the **Admin Menu** screen.

## Setting up instrument security and user accounts

By default, the instrument 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. Log in as a user with Administrator access.
2. In the **Main Menu** screen, select **Settings Menu**.
3. In the **Settings Menu** screen, select **Admin Menu**.
4. In the **Admin Menu** screen, select **Security**.



5. To allow VeritiLink™ Remote Management Software to control this instrument, select **Yes** next to **Allow VeritiLink™ Software Control**.
6. To require each user to log in when using the instrument, select **Yes** next to **Require Login**.
7. To allow anyone to log in as a guest, select **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.
8. To allow users to log in without entering a password, select **Yes** next to **Require Password**.

9. Select **Done**, then select either:

- **Yes**, to restart the instrument and have the changes take effect immediately. Toggle the switch on the back of the instrument to power off then toggle the switch again to power on the instrument. After you restart, follow the instructions in “Adding yourself as a user” on page 34.

or

- **No** to have the changes take effect the next time the instrument is restarted with 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:

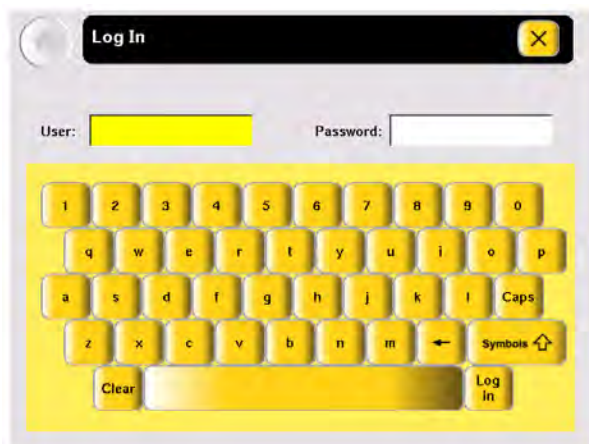
- **Limited User** – Can perform runs, view and print run methods, and run tests. Cannot edit or create run methods, manage users, or set instrument preferences.
- **User** – Can perform runs, create, view, edit, delete, save and print run methods, and run tests. Cannot manage users or set instrument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

**To add yourself as a user:**

1. In the opening screen, select **On ▶ Log In**.



2. In the **Log In** screen, select:
  - a. The **User** field, then enter **admin**.
  - b. The **Password** field, then enter **password**.

**c. Log In.**

3. In the **Main Menu** screen, select **Settings Menu**.
4. In the **Settings Menu** screen, select **Admin Menu**.
5. Follow the instructions in “Adding users” on page 35 to add yourself as a user. Make sure you make yourself an Administrator.

**Adding users****To add a user:**

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

The **Manage Users** screen is displayed:



5. Select **Add User**.

The **Create New User Account** screen is displayed:

The screenshot shows a 'Create New User Account' dialog box. It contains the following fields and controls:

- User Name:\***: Text input field
- Password:\***: Text input field
- Re-enter Password:\***: Text input field
- Phone:**: Text input field
- Email:**: Text input field
- Permission Level:\***: Dropdown menu
- Last Update:**: Text input field
- Set Access**: Yellow button
- Done**: Yellow button
- Footer text: "All information with \* is compulsory. Please fill in the information accordingly."
- Green question mark icon in the bottom right corner.

6. Enter information for the new user. The required fields are **User Name**, **Password**, **Re-enter Password**, and **Permission Level**.
  - a. User Name must be between 5 and 15 characters, with no spaces.
  - b. Password must be at least 1 character.
  - c. Select **Set Access**, then select one of the following:
    - **Limited User**
    - **User**
    - **Administrator**
  - d. Select **Done** to close the **Permission** screen.
7. Select **Done** ► **OK** to add the user account to the instrument. The new user appears in the **Manage Accounts** screen.
8. When you finish, select **X (Close)** to return to the **Admin Menu** screen.

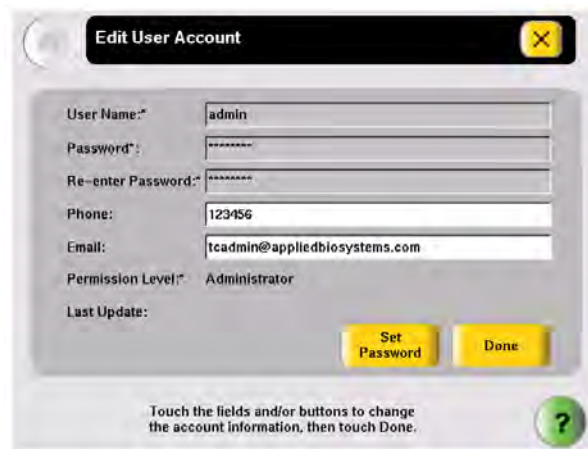
## Changing a user

### To edit a user:

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



- In the list, select the user in the list, then select **Edit User**. The **Edit User Account** screen is displayed:



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

## Deleting a user

### To delete a user:

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

- In the **Admin Menu** screen, select **Manage Users**.

The **Manage Users** screen is displayed:



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

## Setting other options

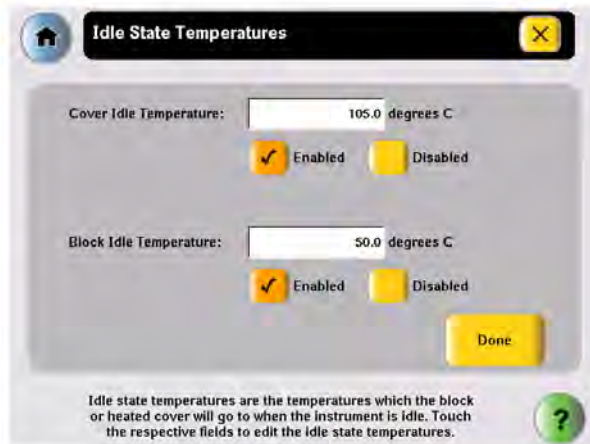
Table 4 lists additional options that can be adjusted or activated. These settings apply to all users.

**Table 4** Additional options (and their default values) for the instrument

Option	Default Value	See Page
Idle temperatures for the cover and the sample block(s)	Cover: 105°C Sample block(s): 25°C	“Setting idle temperatures for the block(s) and cover” on page 39
Durations for pause and standby time-outs	Pause: 10 sec. Standby: 1 min. 30 sec.	“Setting time-outs” on page 39
Shortcuts to appear on the <b>Main Menu</b> screen	None	“Configuring main menu shortcuts to functions” on page 40

## Setting idle temperatures for the block(s) and cover

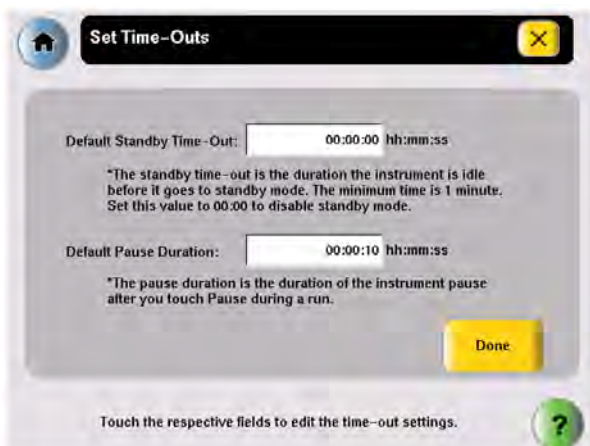
1. In the **Main Menu** screen, select **Settings Menu**.
2. In the **Settings Menu** screen, select **Set Idle Temperatures**.



3. In the **Idle State Temperatures** screen, to set the temperatures for the sample block(s) and the cover, select:
  - a. **Enabled** to turn the option on. If this is disabled, the temperature for the cover and/or block(s) is not maintained by the instrument and will 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. Select **Done** to save your changes and return to the **Settings Menu** screen.

## Setting time-outs

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



3. In the **Set Time-Outs** screen, select **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 select **Pause** during a run.
4. Select **Done** ▶ **OK** to save your changes and return to the **Settings Menu** screen.

## Configuring main menu shortcuts to functions

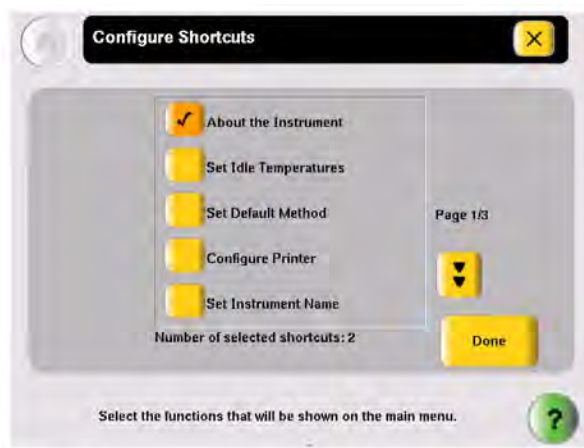
You can add buttons to the **Main Menu** screen that allow you to go directly to various instrument functions. When login is required, each user can configure his or her own shortcut buttons; otherwise the shortcut buttons are displayed for all instrument users.

You can also create shortcuts to run methods (see “Creating a shortcut to a run method” on page 19).

1. In the **Main Menu** screen, select:
  - Any button labeled **Shortcut X** (where X is a number).

or

  - **Settings Menu** ▶ **Configure Shortcuts**.
2. In the list of functions available as shortcuts in the **Configure Shortcuts** screen, select the functions to select them. Select **▲ (Page Up)** and **▼ (Page Down)** to scroll through the list.



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

## Deleting shortcuts

To delete a shortcut, follow the steps above, but uncheck the function to remove it from the Main Menu. Any run methods for which there is a shortcut are shown at the bottom of the list and can also be deleted.



## About the Thermal Cycler Fleet Control Software

The Applied Biosystems™ Thermal Cycler Fleet Control Software (Cat. No. A40070) is used to manage users, methods, run reports, and multiple PCR instruments through a single user interface. The software is compatible with all Applied Biosystems™ Thermal Cyclers. The Thermal Cycler Fleet Control Software can be purchased separately, and is not included with the Veriti™ Thermal Cycler. For more information visit [thermofisher.com](http://thermofisher.com).

### Connect the thermal cycler to the network

1. Connect the thermal cycler to your network using an Ethernet cable.
2. Go to **Settings Menu Admin Menu Set IP Address** to set up your thermal cycler network configuration.

## Selecting disposables

Use this section to determine the tube, sample tray, and plate configurations appropriate for your thermal cycler and application.

- “Disposables for 96-well instruments” on page 42
- “Disposables for the 384-well instrument” on page 44
- “Disposables for the 60-well Veriti™ Thermal Cycler” on page 44

See Appendix C, “Disposables” for part numbers for these items.

## Disposables for 96-well instruments

### 96-well tube configurations

---

**IMPORTANT!** The tray or the tray/retainer is required for the operation of the instrument.

---

You can use three different types of tube configurations to hold your samples, as shown in Figure 8.

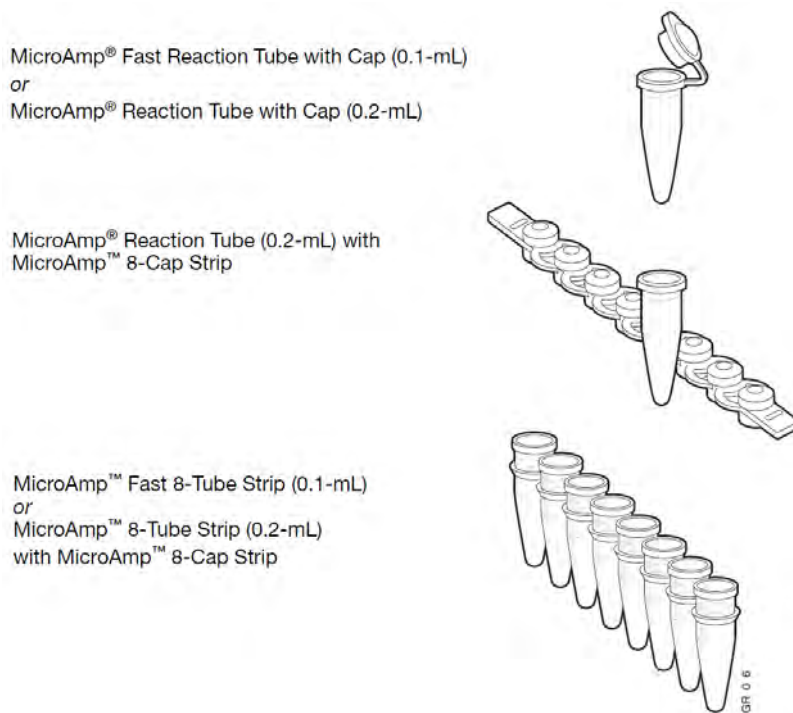
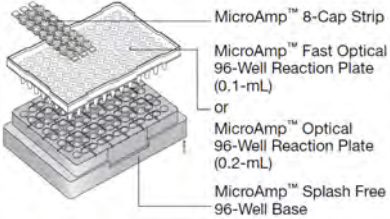
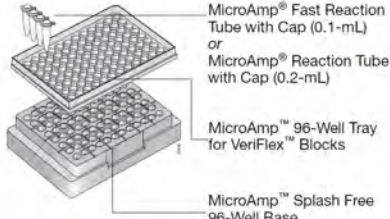
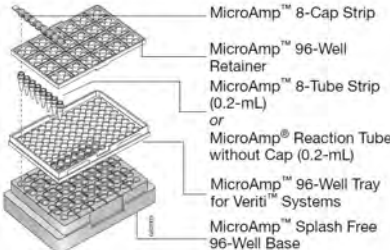


Figure 8 Different tube configurations for use in 96-well instruments

## 96-well 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(s).

Run Vessel	Compatible Component	Illustration
MicroAmp™ Fast Optical 96-Well Reaction Plate, 0.1 mL	MicroAmp™ Caps, 8-Cap Strip <i>or</i> MicroAmp™ Clear Adhesive Film (not shown)	 <ul style="list-style-type: none"> <li>MicroAmp™ 8-Cap Strip</li> <li>MicroAmp™ Fast Optical 96-Well Reaction Plate (0.1-mL)</li> <li><i>or</i></li> <li>MicroAmp™ Optical 96-Well Reaction Plate (0.2-mL)</li> <li>MicroAmp™ Splash Free 96-Well Base</li> </ul>
MicroAmp™ Optical 96-Well Reaction Plate, 0.2-mL		
MicroAmp™ Fast Reaction Tube with Cap, 0.1 mL	MicroAmp™ 96-Well Tray for VeriFlex™ Block	 <ul style="list-style-type: none"> <li>MicroAmp™ Fast Reaction Tube with Cap (0.1-mL)</li> <li><i>or</i></li> <li>MicroAmp™ Reaction Tube with Cap (0.2-mL)</li> <li>MicroAmp™ 96-Well Tray for VeriFlex™ Blocks</li> <li>MicroAmp™ Splash Free 96-Well Base</li> </ul>
MicroAmp™ Reaction Tube with Cap, 0.2 mL		
MicroAmp™ 8-Tube Strip, 0.2 mL <i>or</i> MicroAmp™ Reaction Tube without Cap, 0.2 mL	MicroAmp™ 8-Cap Strip <i>and</i> MicroAmp™ 96-Well Tray/Retainer Set for Veriti™ Systems	 <ul style="list-style-type: none"> <li>MicroAmp™ 8-Cap Strip</li> <li>MicroAmp™ 96-Well Retainer</li> <li>MicroAmp™ 8-Tube Strip (0.2-mL)</li> <li><i>or</i></li> <li>MicroAmp™ Reaction Tube without Cap (0.2-mL)</li> <li>MicroAmp™ 96-Well Tray for Veriti™ Systems</li> <li>MicroAmp™ Splash Free 96-Well Base</li> </ul>

## Disposables for the 384-well instrument

There is one plate configuration for the 384-well instrument, shown in Figure 9. This uses the MicroAmp™ Optical 384-Well Reaction Plate.

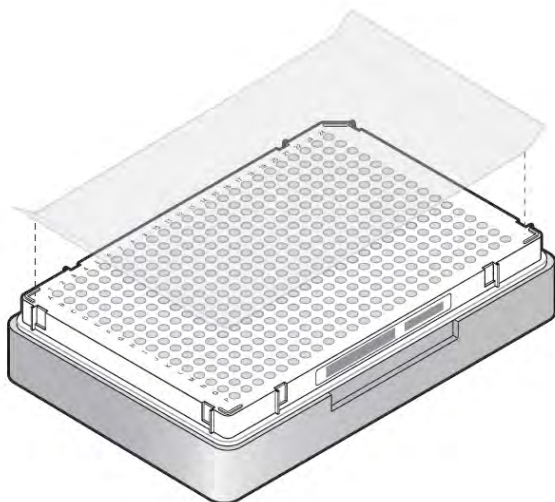


Figure 9 MicroAmp™ Optical 384-Well Reaction Plate with MicroAmp™ Clear Adhesive Film cover

## Disposables for the 60-well Veriti™ Thermal Cycler

You can use three types of tubes to hold your samples, as shown in Figure 10.

GeneAmp® Thin-Walled Reaction Tube with Flat Cap (0.5-mL)



GeneAmp® Thin-Walled Reaction Tube with Domed Cap, Autoclaved (0.5-mL)



Figure 10 Different tubes for use in the Veriti™ 384-well Thermal Cycler

## Loading samples into the instrument

See the appropriate section for your instrument:

- “Loading Samples in 96-well instruments” on page 45
- “Loading samples in the 384-well instrument” on page 46
- “Loading samples in the Veriti™ 60-well Thermal Cycler” on page 47

## Loading Samples in 96-well instruments

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 wells or as a vapor barrier over the PCR reaction mixture in the tubes. The MicroAmp™ 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 MicroAmp™ 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(s)” on page 46.

### Loading the reaction plate

1. Place the reaction plate on a MicroAmp™ Splash-Free 96-Well Base.
2. Pipette the samples into the sample wells.
3. Cap the plates using the MicroAmp™ 8-Cap Strips, or cover the plates with MicroAmp™ Clear Adhesive Film.
4. See “Placing the sample tray or plate onto the sample block(s)” on page 46.

### Loading tubes without caps

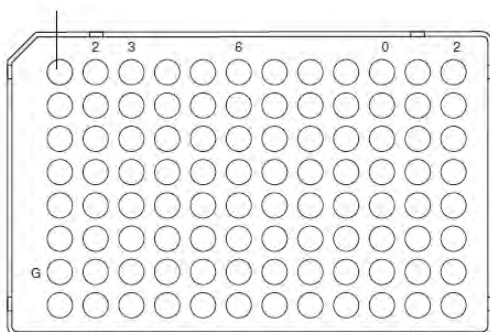
**To load the 96-well tray/retainer:**

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™ 8-Cap Strip.
6. See “Placing the sample tray or plate onto the sample block(s)” on page 46.

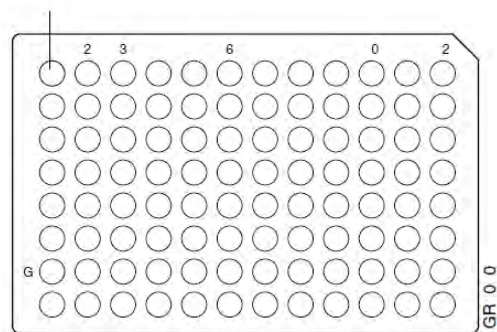
## Placing the sample tray or plate onto the sample block(s)

The steps for placing the sample tray in the sample block(s) 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 MicroAmp™ Splash-Free 96-Well Base and place it in the sample block(s).
  2. Place the MicroAmp™ Tray or Plate onto the sample block(s) 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)

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

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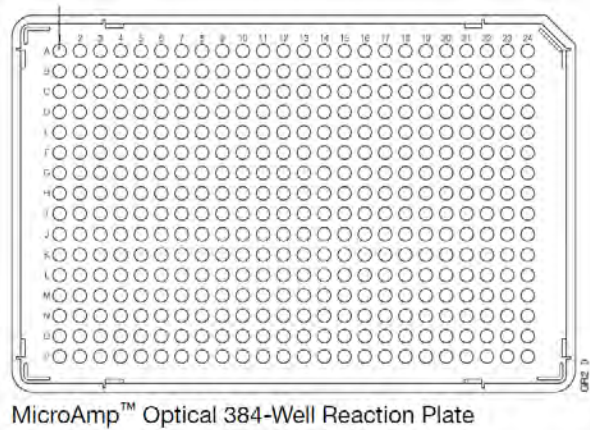
3. Close the heated cover.

## Loading samples in the 384-well instrument

This section describes how to load samples in 384-well reaction plates.

1. Pipette the samples into the sample wells.
2. Cover the plates with MicroAmp™ Clear Adhesive Film.

3. Place the MicroAmp™ Optical 384-Well Reaction Plate onto the sample block(s) so that well A1 is at the upper left corner of the tray, as shown below:



4. Close the heated cover.

## Loading samples in the Veriti™ 60-well Thermal Cycler

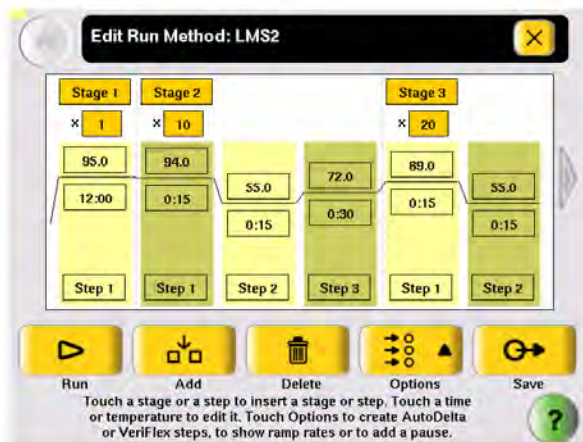
There is no need to use mineral oil or glycerine in the sample wells or as a vapor barrier over the PCR reaction mixture in the tubes. The GeneAmp™ Thin-Walled Reaction Tubes fit tightly in the wells, and the heated cover exerts an even pressure on all tubes, eliminating condensation on the tubes.

1. Pipette the samples into the reaction tubes.
2. Cap the tubes.
3. Place the GeneAmp™ Thin-Walled Reaction Tubes with Flat or Domed Caps (0.5 mL) onto the sample block(s).
4. Place the GeneAmp™ Thermal Isolation Frame around the sample block(s).
5. Close the heated cover.

## Creating a new run method

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

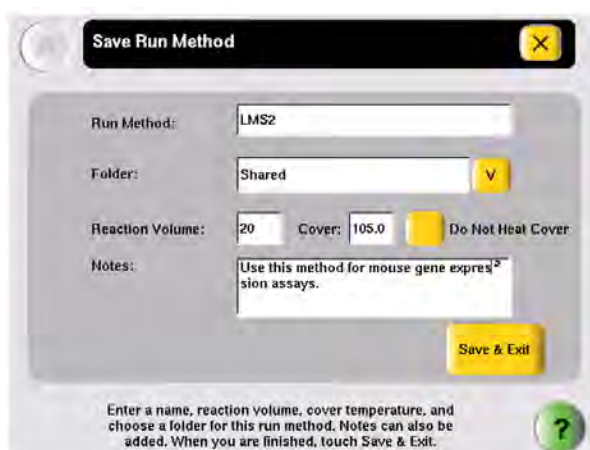
The default run method is displayed in the **Edit Run Method** screen. (For instructions on setting the default run method, see “Designating a run method as the default” on page 18.)



3. Edit the default run method as needed:

- Insert a stage (see “Adding a stage” on page 49).
- Insert a step (see “Adding a step” on page 50).
- Add an AutoDelta step (see “Creating an AutoDelta step” on page 52).
- Add a pause (see “Adding a pause” on page 54).
- Delete a step or stage (see “Deleting a stage or step” on page 55).
- For 96-well instruments, you can add a step to program different temperatures on the VeriFlex™ Blocks™ (see “Creating a VeriFlex™ step” on page 55).

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



5. Select **Run Method** to enter the name of the run method. Names can be up to 48 characters. Names may not contain any of the following characters: %\*?|;:,!@#\$.()<>^””~{}[]=+&^ (tab). Spaces, underscores, and dashes are allowed.



6. Select **v** (**Folder**) to choose a folder in which to save the run method.
  - To save the run method so that all users have access to it, select **Shared**.
  - To create a new folder for the run method, select **New Folder** at the bottom of the list, enter a name of up to 12 characters (no spaces), for the new folder, then select **Done**.
  - To save the run method to the USB drive, select **USB** (available only when a USB drive is inserted in the instrument).
7. Select **Reaction Volume** to enter the reaction volume. (You can change this volume when you perform a run with this run method.)
8. Set the cover temperature, if any:
  - **Cover Temperature** to enter the temperature for the heated cover.  
*or*
  - **Do Not Heat Cover**.

You can change this temperature when you perform a run with this run method.
9. Select **Notes**, then enter any notes for the method.
10. Select **Save & Exit** when you are done.  
The **Browse Run Methods** screen is displayed.

## Editing details

- This section describes how to edit a run method by:
- Adding a stage (“Adding a stage” on page 49)
- Adding a step (“Adding a step” on page 50)
- Editing a temperature or a time (“Editing temperature and time” on page 51)
- Editing a ramp rate (“Editing ramp rates” on page 52)
- Creating an AutoDelta step (“Creating an AutoDelta step” on page 52)
- Adding a pause (“Adding a pause” on page 54)
- Creating a step to program different temperatures on the VeriFlex™ Blocks (“Creating a VeriFlex™ step” on page 55) (Available only on 96-well instruments.)

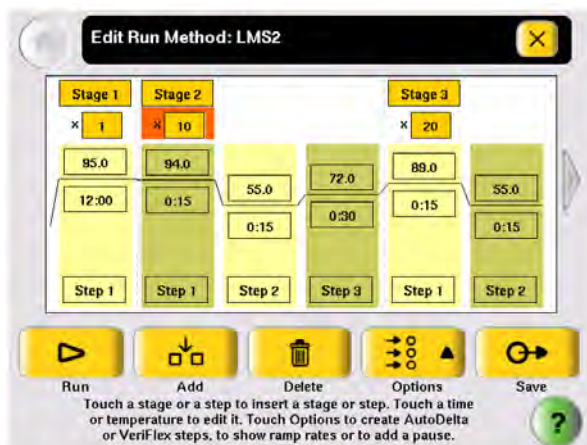
## Adding a stage

The two types of run method stages are:

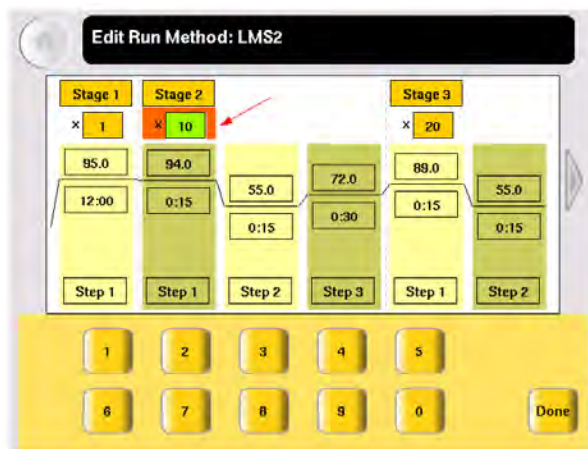
- **Cycling** – The steps in a cycling stage are repeated a specified number of times. In general, the steps in a cycling stage are template denaturation, primer annealing, and primer extension.
- **Holding** – The steps in a holding stage are not repeated.

**To add a stage:**

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



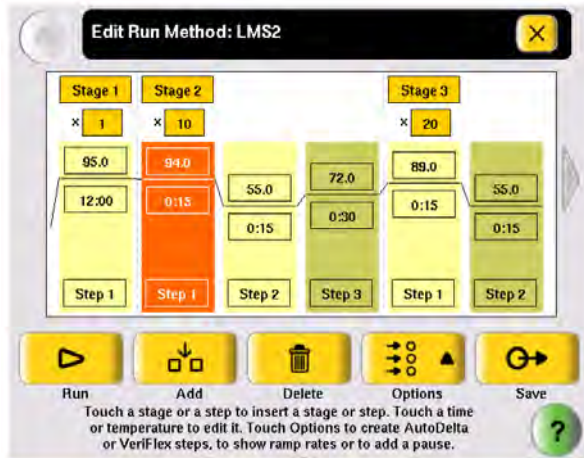
2. Touch **Add**.  
A copy of the selected stage is added to the run method.
3. For a cycling stage, edit the number of cycles as needed.
  - a. Select the stage.
  - b. Select the cycles field (the box below the Stage Name):



- c. Enter the number of cycles, then select **Done**.
4. To change the temperature and/or time for any step in the stage, see “Editing temperature and time” on page 51.

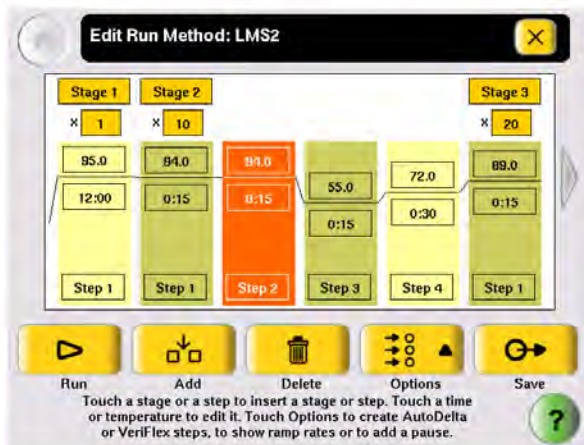
## Adding a step

1. In the **Edit Run Method** screen, touch anywhere in the step column 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 51.

## Editing temperature and time

1. Select any temperature field, then edit the temperature as desired.  
or  
Select any time field, 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. Select the field.
  - b. Select the keys in the editor.

- c. Repeat for any other field.
3. Select **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%.

---

**Note:** You cannot edit ramp rates for methods created using the Convert Method wizard (see “Using GeneAmp™ PCR System 9700 run methods” on page 65).

---

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

## 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.

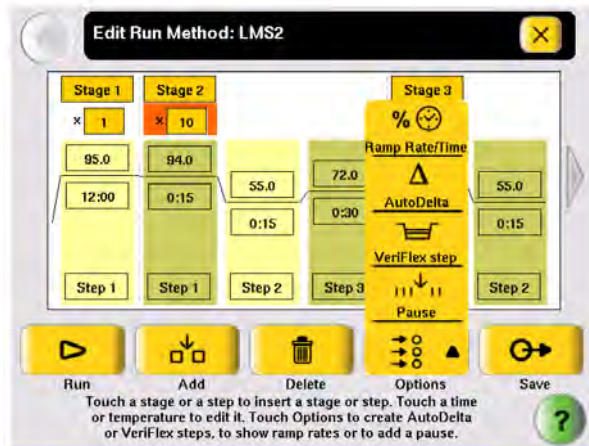
---

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

---

### To create an AutoDelta step:

1. Select a step, then **Options**.  
The options menu appears:



- In the options menu, select **AutoDelta**.

The **Create an AutoDelta Step** screen is displayed:



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

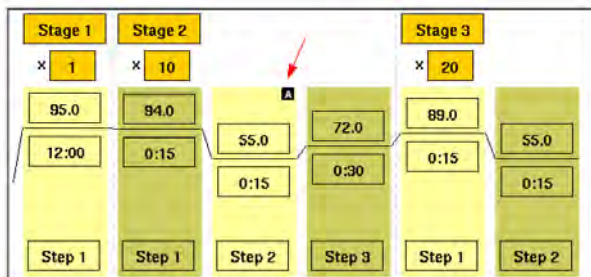
---

**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.

---

- Select **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 on page 53 in Stage 2 is an AutoDelta step:



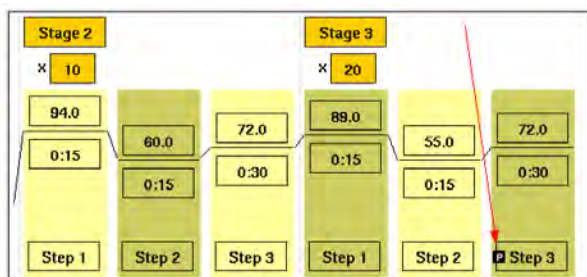
## Adding a pause

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

1. In the **Edit Run Method** screen, select a step in a cycling stage, then touch **Options**.
2. In the options menu, select **Pause** to display the **Add a Pause Before a Step** dialog box:



3. Enter:
  - The first cycle in which the run will pause.
  - The frequency of the pause.
  - The duration of the pause, in mm:ss.
4. Select **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):



## Deleting a stage or step

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

## Creating a VeriFlex™ step

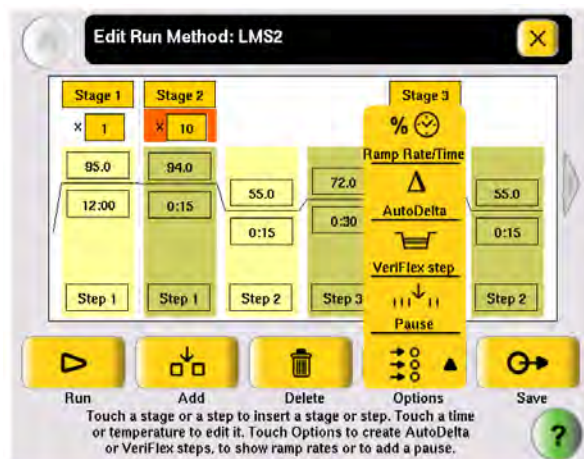
**Note:** This function is only available for the 96-well versions of the instrument.

The 96-well instruments have six VeriFlex™ Blocks. You can specify temperatures for each VeriFlex™ Block, or treat each VeriFlex™ Block the same (the default). The VeriFlex™ Blocks can be used to provide up to six different temperature zones for the 96 wells. A step that has different temperatures for different VeriFlex™ Blocks 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™ Blocks:**

1. Select a step, then touch **Options**.

The options menu appears:



2. In the options menu, select **VeriFlex™ step**.  
The **Create a VeriFlex™ Step** screen is displayed:



3. Select a temperature field, then enter the desired temperature. Temperatures for neighboring VeriFlex™ Blocks 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.
4. Repeat step 3 on page 56 for each of the six VeriFlex™ Blocks, then select **Done**.

---

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

---

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

The VeriFlex™ Step appears in the **Edit Run Method** screen, with the text “Zones” in the temperature field.



# Performing a run

## Before you begin

Prepare your samples and load the sample block(s) as described in “Loading samples into the instrument” on page 44.

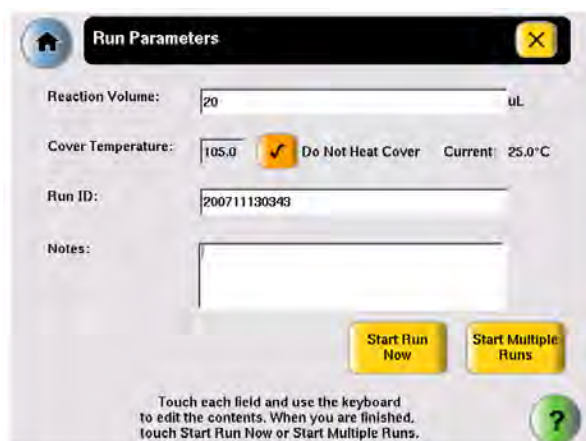
---

**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. Select **Browse/New Methods**.
3. Locate the run method you want to use (see “Viewing a run method” on page 15), then select the run method.
4. Select **Start Run**. The **Run Parameters** screen is displayed:



5. Select **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 40  $\mu$ L
- Veriti™ 96-Well Thermal Cycler: 10 to 100  $\mu$ L
- Veriti™ 384-Well Thermal Cycler: 5 to 30  $\mu$ L
- Veriti™ 60-Well Thermal Cycler: 10 to 100  $\mu$ L

6. Set the cover temperature:
  - **Cover Temperature** to enter the temperature for the heated cover.
  - or
  - **Do Not Heat Cover**.

7. Select **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.

8. If you are making runs on:

- **Only this instrument** – Select **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** – Select **Start Multiple Runs**. The **Select Instruments** screen is displayed:



9. In the **Select Instruments** screen:

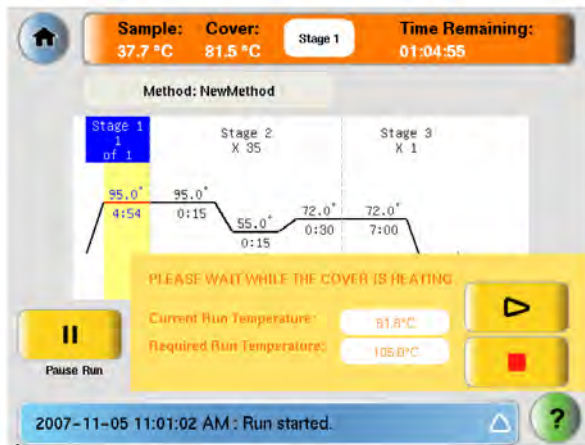
- a. Select the check box corresponding to each instrument on which you want to perform the run. Only instruments that are compatible with the run method are available. Incompatible instruments are indicated by .

If you want to perform the run on this instrument, be sure to select the check box in the upper left corner of the screen.



- b. Select **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 on each instrument.

10. While the cover heats, the **Cover Heating** dialog box appears in the **Run Monitor** screen:



If you want to:

- Start the run immediately, before the cover reaches the specified temperature – Select  (**Skip**).
- Stop the run – Select  (**Stop**).

## Monitoring a run

### Run Monitor screen

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



Table 5 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 temperature of the heated cover, the estimated time remaining in the run, and 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 instrument 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 instrument is performing.
G	Status report	Displays the run status and any errors that occur during the run. Select the triangle to view the entire report.
H	Arrow button	Select this to see the additional steps in the run method.

See “Actions in the Run Monitor screen during a run” on page 60 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 6 Actions in the Run Monitor screen allowed during a run

To...	Do This
View other stages	 Use the scroll right and scroll left buttons.
Pause the run	 Select <b>Pause Run</b> (see page 61).
View run method information	 Select <b>View Method Information</b> . The information you entered in the <b>Run Parameters</b> dialog box is shown.
Display the time for the run	 Select <b>Display Method Time</b> . The elapsed time and time remaining for the run are shown.

**Table 6** Actions in the Run Monitor screen allowed during a run *(continued)*

To...	Do This
Skip to the next step	 Select <b>SKIP</b> . Skip works only when the instrument is holding.
Stop the run	 Select <b>STOP</b> (see page 62).
Change the number of cycles for a cycling stage	Select the <b>Cycle</b> field then change the number of cycles (see page 61).
Go to the Main Menu screen	 Select (Home). From the <b>Main Menu</b> Screen, you can access most of the instrument functions while the run continues.
View the Status Report	Select  ( <b>Status</b> ).

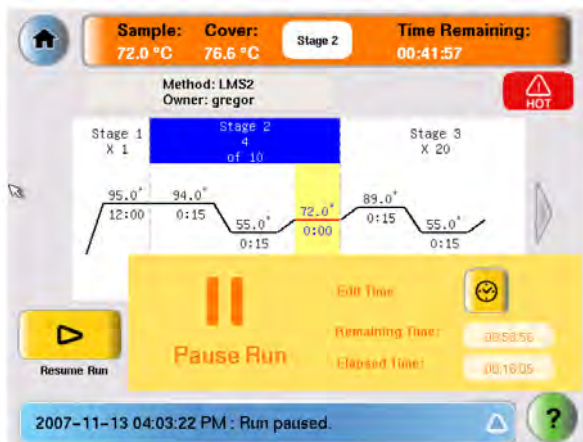
## Changing the number of cycles

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. Select 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. Select **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, select **Pause Run**.  
The **Pause Run** dialog box is displayed:



The run pauses for the duration set in the **Set Time-Outs** screen (see “Setting time-outs” on page 39). 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 in process.

2. If you want to:

- Pause until the default pause has elapsed – Do nothing.
- Pause for a specific amount of time – Select **Edit Time**, enter the duration of the pause, then select **Done**. The run resumes when the pause is complete.
- Resume the run immediately – Select **Resume Run** (to the left of the dialog box).

## Stopping a run

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

The run stops and the **Run Report** opens.

## Using the Run Monitor button

The **Run Monitor** button (Figure 11) 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.

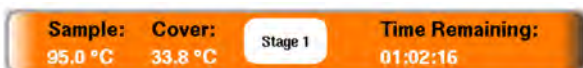


Figure 11 The Run Monitor button

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

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:



Figure 12 Alert icon, shown in the Run Monitor button when an error occurs

## If the power fails

If a power failure occurs during a run, the instrument attempts to continue the run when the power returns. The run begins at the first step of the stage where the power failed.

For example, the power fails during step 2 of the tenth cycle for a stage with three steps and 20 cycles. After the power returns, the run starts at step 1 of the tenth cycle and continues for 11 more cycles.

---

**Note:** If the time between the initial power failure and the time the power returns is more than 18 hours, the run is not continued.

---

## 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 select **Stop**, then **OK** in the message box before the **Run Report** is displayed.

You can also see the **Run Report** by selecting **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, select **Print**.  
If any errors occurred during the run, the error information is also printed.
- To save the run report to the USB drive, select **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(s) temperature is above 27°C.



## Using GeneAmp™ PCR System 9700 run methods

**Note:** This function is only available on Veriti™ 96-Well Thermal Cyclers.

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.

The available conversions are specific to the type of instrument:

- Veriti™ 96-Well *Fast* Thermal Cycler – Only 9700 Max™ Mode run methods can be converted.
- Veriti™ 96-Well Thermal Cycler – Run methods in 9600 Emulation Mode or 9700 Max™ Mode can be converted.

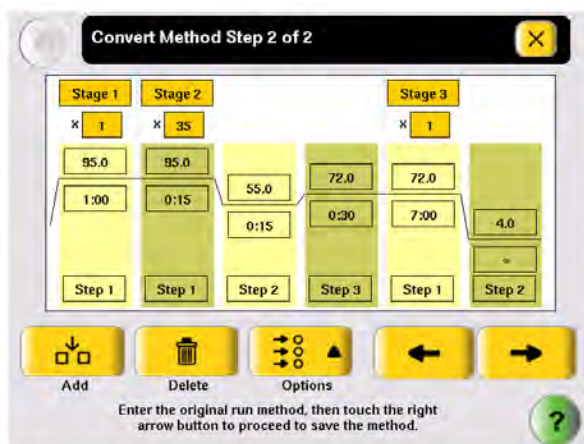
**Note:** Only users who can save run methods (all users except Limited Users) have access to this function.

**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, select **Tools Menu**.
3. In the Tools Menu screen, select **Convert a Method** to open the Convert Method wizard:



4. Select the check box next to the run method's original format (**9700 Max™ Mode** or **9600 Emulation Mode**) then select **→** (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:



Select **→** (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. By default, the name begins with “9700-Max™ -Mode-” or “9600-Mode-”, depending on the format selected in step 4 on page 66.

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



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

The Tools Menu is displayed.

---

**Note:** You cannot edit the ramp rates in the method created by the Convert Method wizard. This is indicated by “9600” or “9700M” in the Time field, when you choose to view ramp rates rather than time (see Figure 13).

---

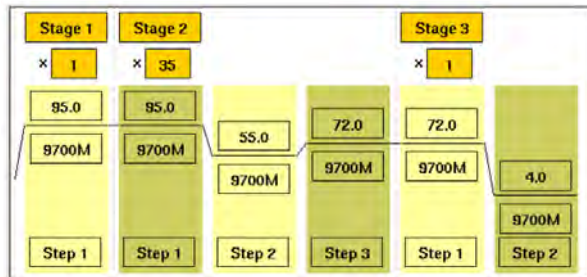


Figure 13 Converted run method, showing “9700M” as the ramp rate

## Upgrading system firmware

### About the upgrade

If a new version of the firmware is available for the instrument, 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.

---

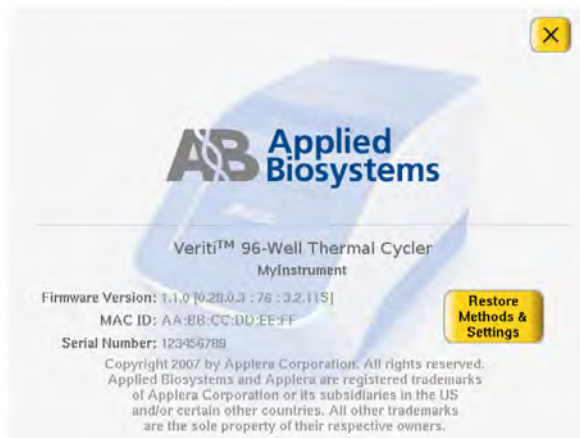
**IMPORTANT!** You cannot upgrade the firmware while a run is in progress.

---

### Upgrading the instrument firmware

1. Determine the version number of the existing firmware from the **About the Instrument** screen.
  - a. Open the **About the Instrument** screen:
    - Select **Log Off** to return to the **Login Options** screen, then select **About the Instrument**.
    - or
    - In the **Main Menu** screen, select **Settings Menu**, then **About the Instrument**.

The **About the Instrument** screen opens:

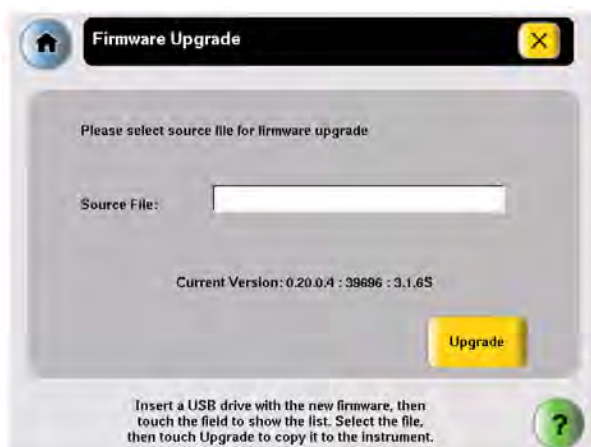


- b. Record the version number of the firmware, then select **Done**.
  2. Determine the version number of the new firmware.
    - a. On a computer connected to the Internet, go to [www.appliedbiosystems.com](http://www.appliedbiosystems.com).
    - b. Click **Support**, then **Software Downloads**.
    - c. Select your instrument from 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 on page 68), you do not need to upgrade the firmware.
      - Different from the current version (from step 1 on page 68), 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 19 to save your run methods and settings from the instrument.
2. Insert the USB drive with the new firmware in the USB port on the front of the instrument.
3. Log in as a user with Administrator access.
4. In the **Main Menu** screen, select **Settings Menu**.
5. In the **Settings Menu** screen, select **Admin Menu**.
6. In the **Admin Menu** screen, select **Upgrade Firmware**.

The **Firmware Upgrade** screen opens:

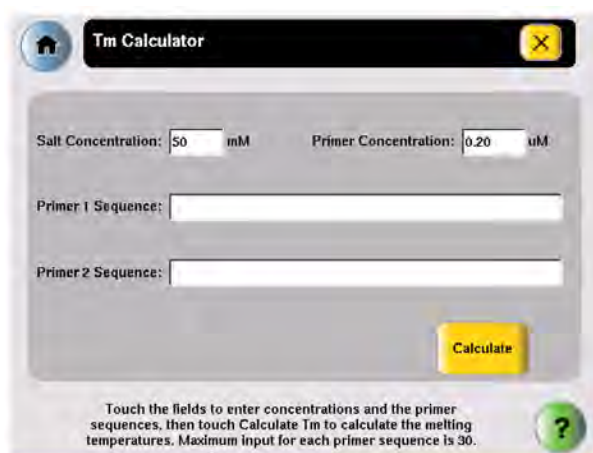


7. Select **Source File** to display a list of the files on the USB drive. The instrument firmware files end with “.update”.
8. Select the name of the file with the new firmware, then touch **Select**.
9. Select **Upgrade**, then **Yes**.  
When the upgrade process is complete, a message box opens.
10. Restart the instrument.

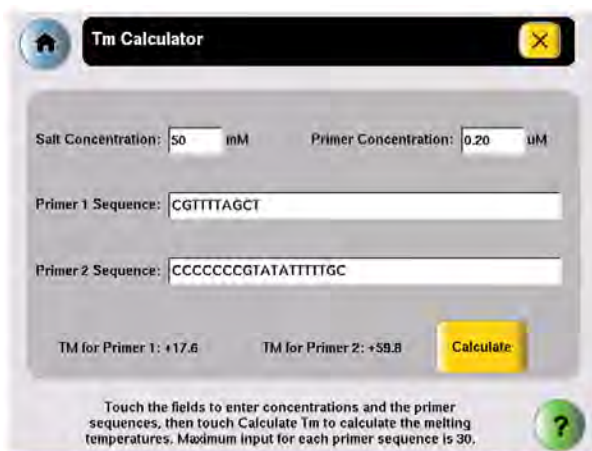
## Calculating melting temperatures

To calculate the melting temperatures for a DNA primer pair:

1. In the **Main Menu** screen, select **Tools Menu**.
2. In the **Tools Menu** screen, select **Calculate Tm** to open the **Tm Calculator** screen:



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



## Viewing instrument statistics

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

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

The following statistics are shown:

- **Total Cycles for Block(s)** – The total number of cycles the instrument has performed over its lifetime.
- **Total Degrees for Block(s)** – The total degrees the blocks) have climbed over their lifetime. For example, if the sample block(s) were 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, select **Done** to return to the **Tools Menu** screen.

## Restoring the factory settings

You can reset the instrument to the default values for all instrument settings. When you do this, the following are lost:

- All run methods except the predefined methods listed in Appendix E, “Predefined run methods”
- Any users and their custom folders
- The instrument name and IP address
- Any changes to time-outs, block idle temperatures, security settings, printer settings, and any shortcuts to methods or functions

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

4. In the **Admin Menu** screen, select **Restore Factory Settings** to open the **Restore Factory Settings** screen:



5. In the **Restore Factory Settings** screen, select **Restore**. The **Restore Factory Settings** dialog box is displayed.

6. In the dialog box, select:

- **Yes** to back up run methods and other settings before restoring the default settings to the instrument. Insert a USB drive for the backup.
- **No** to restore the default settings, without first performing a back up. Before the restore operation begins, you are prompted to confirm the restore with a second dialog box.

---

**IMPORTANT!** Selecting **No** erases all run methods, user accounts and other settings from the instrument.

---

- **Cancel** to cancel the restore operation.

When the restore process is complete, a message box stating “Factory settings have been restored.” opens.

7. Remove the USB drive, if present, then toggle the switch on the back of the instrument to power off.
8. Toggle the switch again to power on the instrument and restart with the factory default settings.

## Running the cycle performance test

Use this test to verify that the sample block(s) are heating and cooling properly and that the PCR cycling function operates properly.

## Required materials

The appropriate equipment 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)
- Veriti™ 384-Well Thermal Cycler: MicroAmp™ Optical 384-Well Reaction Plate (PN 4309849)
- Veriti™ 60-Well Thermal Cycler: GeneAmp™ Thermal Isolation Frame (PN 4308927)

## Procedure

This test takes 10 minutes to complete.

1. Place the reaction plate or thermal isolation frame in the instrument.
2. In the **Main Menu** screen, select **Tools Menu**.
3. In the **Tools Menu** screen, select **Run Cycle Performance Test**.
4. Follow the instructions on the screen to perform the test. The results are displayed at the end of the test.
5. At the end of the test, select:
  - **Print** to print the results.
  - **Save** to save the results to the USB drive.

The results are saved to the file CyclePEvents.txt.

6. If the test fails, repeat the procedure. Ensure that the heated cover is closed.
7. If the test fails again, contact 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 – The appropriate size for the sample wells in your instrument. The probe can be ordered separately or a part of a kit. (See “Parts list” on page 81 for part numbers for the probes.)
- 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™ 96-Well <i>Fast</i> Thermal Cycler (PN 4375305), with 0.1-mL sample wells	0.1-mL Temperature Verification Kit	4373997
Veriti™ 96-Well Thermal Cycler (PN 4375786), with 0.2-mL sample wells	0.2-mL Temperature Verification Kit	4377669
Veriti™ 384-Well Thermal Cycler (PN 4388444), with 0.02-mL sample wells	0.02-mL Temperature Verification Kit	4385338
Veriti™ 60-Well Thermal Cycler (PN 4384638), with 0.5-mL sample wells	0.5-mL Temperature Verification Kit	4309924

## For more information

See the *Multiprobe Temperature Verification Kit User Guide* (PN 4376864).

## Running the heated cover verification

Use this test to verify that the heated cover is within  $\pm 3^{\circ}\text{C}$  of the  $105^{\circ}\text{C}$  set point.

Perform this test annually.

### Required materials

The appropriate Temperature Verification Kit for your Veriti™ Thermal Cycler model (see Table 7).

## 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(s) to avoid being burned.

1. In the **Main Menu** screen, select **Tools Menu**.
2. In the **Tools Menu** screen, select **Run Heated Cover Verification**.
3. Follow the instructions on the screen to perform the test.
4. At the end of the test, select:
  - **Print** to print the results.
  - **Save** to save the results to the USB drive.  
The results are saved to the file heatedCover.txt.
5. If the test fails, repeat the procedure. Ensure the:
  - Probe plate is in the correct location. Probe 1 should be in well A5 during this test.
  - Cables are not damaged (no nicks, cuts or crimps) and are securely seated in the digital thermometer and in the instrument.
  - Heated cover is closed.
  - Results are saved or printed.
6. If the test fails again, contact Technical Support.

## Running the temperature verification

Use this test to verify that the average temperature for the sample block(s) is within  $+0.25^{\circ}\text{C}$  of the set point temperature.

### Required materials

The appropriate Temperature Verification Kit for your Veriti™ Thermal Cycler model (see Table 7).

## 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(s) to avoid being burned.

1. In the **Main Menu** screen, select **Tools Menu**.
2. In the **Tools Menu** screen, select **Run Temperature Verification**.
3. Follow the instructions on the screen to perform the test.
4. At the end of the test, select:
  - **Print** to print the results.
  - **Save** to save the results to the USB drive.  
The results are saved to the file bcalevents.txt.
5. If the test fails, repeat the procedure. Ensure the:
  - Probe is placed in the correct wells during the test.
  - A drop of mineral oil is in each of the test wells.
  - Cables are not damaged (no nicks, cuts or crimps) and are securely seated in the digital thermometer and in the instrument.
  - Results are saved or printed.
6. If the test fails again, contact 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).

## 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(s) to avoid being burned.

1. In the **Main Menu** screen, select **Tools Menu**.
2. In the **Tools Menu** screen, select **Run TNU Test**.
3. Follow the instructions on the screen to perform the test.

4. At the end of the test, select:
  - **Print** to print the results.
  - **Save** to save the results to the USB drive.  
The results are saved to the file `tnuEvents.txt`.
5. If the test fails, repeat the procedure. Ensure the:
  - Cables are not damaged (no nicks, cuts or crimps) and are securely seated in the digital thermometer and in the instrument.
  - Heated cover is closed.
  - Results are saved or printed.
6. If the test fails again, contact Technical Support.

## TVK recalibration

It is recommended to recalibrate your Temperature Verification Kit 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 and the completed Certificate of Instrument Decontamination to the manufacturer. See Appendix G, “Documentation and support”.

### Decontaminating the probe assembly

1. Contact your local customer care center or technical support group to obtain a copy of the Certificate of Instrument Decontamination.
2. Gently wipe the probe cones with a cotton swab that has been moistened with a 1:10 v/v solution of 5.25% sodium hypochlorite (Clorox bleach).

---

**IMPORTANT!** Do not submerge the probe in bleach solution. Do not disassemble the probe assembly.

---

3. Complete the Certificate of Instrument Decontamination.



## Scheduled maintenance

Run the following tests annually:

- **Cycle performance test**—See “Running the cycle performance test” on page 71.
- **Heated cover verification**—See “Running the heated cover verification” on page 73.
- **Temperature verification**—See “Running the temperature verification” on page 74.
- **Temperature nonuniformity test**—See “Running the temperature nonuniformity test” on page 75.

## As-Needed maintenance

### Tests

Run the Temperature Nonuniformity Test (see “Running the temperature nonuniformity test” on page 75).

## Cleaning the instrument

### Preparation

#### Before cleaning the instrument:

1. Power off the instrument, then remove the power cord.
2. Allow the instrument to cool until the heated cover and sample block(s) 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(s) can be as high as 100°C. Before performing the procedure, keep hands away until the heated cover and sample block(s) reach room temperature

### To clean the sample wells:

1. Follow the steps in “Cleaning the instrument” on page 77.
2. Open the heated cover.
3. Remove the sample tray from the sample block(s) 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 (Clorox bleach).

**Use bleach solution in moderation.** We recommend the use of 10% bleach solution for removing contamination from the instrument sample block(s); excessive use of the solution, however, can corrode the sample block(s) material. To prevent damage to the sample block(s):

- 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(s).
- After treating with bleach solution, rinse the sample block(s) thoroughly using deionized water.

---

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

---

If the sample block(s) become contaminated with radioactivity, use a commercially available decontaminant to remove the contamination. If the block(s) cannot be decontaminated, the instrument cannot be returned 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(s) can be as high as 100°C. Before performing the procedure, keep hands away until the heated cover and sample block(s) reach room temperature.

### To clean the heated cover:

1. Follow the steps in “Preparation” on page 77.
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 becomes 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 (Clorox 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 (Cat. No. 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

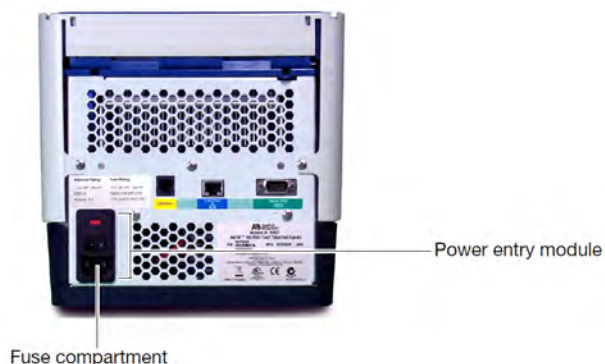
### Procedure

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



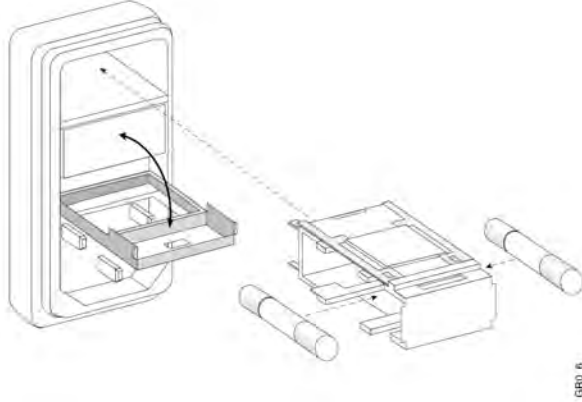
**DANGER! ELECTRICAL SHOCK HAZARD.** Severe electrical shock, which could cause physical injury or death, can result from working on an instrument when the high voltage power supply is operating. To avoid electrical shock, disconnect the power supply to the instrument, unplug the power cord, and wait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



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 7 Kits and spares

Part	PN
<b>Kits</b>	
Temperature Verification Kit (0.1-mL)	4373997
Temperature Verification Kit (0.2-mL)	4377669
Temperature Verification Kit (0.02-mL)	4385338
Temperature Verification Kit (0.5-mL)	4309924
<b>Spares</b>	
Cable, AC Power Supply	4374647
Cam, Left Side	4374274
Cam, Right Side	4374275

**Table 7 Kits and spares** (continued)

Part	PN
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
Probe, Temperature Verification Kit (0.02-mL)	4308757
Probe, Temperature Verification Kit (0.5-mL)	4309925



# Troubleshooting

Observation	Possible cause	Recommended action
Cooling rate too slow.	Peltier assembly failed.	Run the Cycle Performance Test.
Temperature does not match specified temperature.	Instrument may require calibration.	Run the Temperature Verification Test.
Heating rate too slow.	Peltier failed.	Run the Cycle Performance Test.
Printing fails.	Printer was incorrectly configured on instrument.	Make sure the printer IP address on the instrument matches the IP address from the system administrator.
	Printer was not connected to network.	Make sure the Ethernet cable is connected to the printer.
	Instrument was not connected to network.	Make sure the Ethernet cable is connected to the instrument.
	Ethernet cable was faulty.	Use a new/different Ethernet cable.
Cycling time too long.	Peltier assembly failed.	Run the Cycle Performance Test.
When running on multiple instruments, cannot see instruments in the <b>Select Instruments</b> screen.	Instrument(s) not connected to network.	Make sure Ethernet cables are connected to the instruments.
	Switch powered off.	Make sure Ethernet cables are connected to the network switch.
	Ethernet cable was faulty.	Use a new/different Ethernet cable.
	IP address conflicts.	Change the IP addresses on the instruments.
	<b>Allow Remote Runs</b> setting in <b>Instrument Name</b> screen set to <b>No</b> .	In <b>Instrument Name</b> screen, change <b>Allow Remote Runs</b> to <b>Yes</b> .
No screen display.	Blown fuse.	Check fuses.
	Not connected to power source.	Make sure power cord is connected and power switch is on.
Screen display is missing characters or illegible.	LCD screen failed.	Request service.
Sample tubes melt during run.	Incompatible consumables used.	Use recommended consumables (see "Disposables" on page 86).
	Heated cover was too hot.	Run the Heated Cover Verification Test.
	Sample block(s) was too hot.	Run the Heated Cover Verification Test.
Heated cover stuck.	Cam, platen, or cover assembly malfunctioning.	Request service.
Heated cover not responsive.	Heated cover failed.	Run the Heated Cover Verification Test.



Observation	Possible cause	Recommended action
Cannot see <b>Manage Users</b> button in <b>Admin Menu</b> screen.	<b>Manage Users</b> button is not shown when instrument is monitored by VeritiLink™ Remote Management Software.	Use VeritiLink™ Software to manage user accounts.
		Change <b>Allow VeritiLink™ Software Control</b> to NO in the <b>Security</b> screen on the instrument.



# 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 19. 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 copy of the Certificate of Instrument Decontamination, a service notification, a service call number, and, if required, packaging.
2. Decontaminate the instrument.

---

**IMPORTANT!** If the sample block(s) become contaminated with radioactivity, use a commercially available decontaminant to remove the contamination. If the block(s) cannot be decontaminated, the instrument cannot be returned for service.

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3. Complete and sign a copy of the Certificate of Instrument Decontamination.
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.

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

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6. Affix the provided postage to the box, then ship the instrument to the designated facility.  
The repair process requires 2 to 3 weeks.



# Disposables

## Disposables

Table 8 Disposables for the Veriti™ thermal cycler

Part Description	96-Well (0.1-mL)	96-Well (0.2-mL)	384-Well (0.02-mL)	60-Well (0.5-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
MicroAmp™ Optical 384-Well Reaction Plate			x		4309849
MicroAmp™ Optical 384-Well Reaction Plate with Barcode			x		4309849
			x		4326270
			x		4343814
<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



**Table 8 Disposables for the Veriti thermal cycler (continued)**

Part Description	96-Well (0.1-mL)	96-Well (0.2-mL)	384-Well (0.02-mL)	60-Well (0.5-mL)	Part Number
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™ Fast Reaction Tube with Cap (0.1 mL)	x				4358297
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
GeneAmp™ Thin-Walled Reaction Tube with Flat Cap (0.5 mL)				x	N8010737
GeneAmp™ Thin-Walled Reaction Tube with Domed Cap, Autoclaved (0.5 mL)				x	N8010611
<b>Seals &amp; Covers</b>					
MicroAmp™ Clear Adhesive Film	x	x	x		4306311
MicroAmp™ Optical Adhesive Film	x	x	x		4360954
	x	x	x		4311971
MicroAmp™ Optical Adhesive Film Kit	x	x			4313663



**Table 8 Disposables for the Veriti thermal cycler** *(continued)*

Part Description	96-Well (0.1-mL)	96-Well (0.2-mL)	384-Well (0.02-mL)	60-Well (0.5-mL)	Part Number
<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
GeneAmp™ Thermal Isolation Frame	4308927
MicroAmp™ Cap Installing Tool	4330015
MicroAmp™ Multi Removal Tool	4313950
MicroAmp™ Adhesive Film Applicator	4333183
MicroAmp™ Centrifuge Adapter	N8013822





# Instrument specifications

## 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 +10% 240 VAC +6%/-10%, 50/60 Hz + 1%

### Power and communication connections

Table 9 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
	RS232 serial communication port for connecting the probe for the Temperature Verification Kit



Figure 14 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 well specifications

Instrument Model	No. of Wells	Volume/Well
Veriti™ 96-Well <i>Fast</i> Thermal Cycler (PN 4375305)	96	0.1 mL
Veriti™ 96-Well Thermal Cycler (PN 4375786)	96	0.2 mL
Veriti™ 384-Well Thermal Cycler (PN 4388444)	384	0.02 mL
Veriti™ 60-Well Thermal Cycler (PN 4384638)	60	0.5 mL

## Printer specifications

The instrument requires a printer that:

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



# Predefined run methods

## 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 recommended protocols 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%.

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**IMPORTANT!** The customer is responsible for validation of run methods on the instrument before use, and for compliance with regulatory requirements that pertain to their procedures and uses of the instrument.

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- “AmpliCycle™ Seq Run Method” on page 93
- “AmpliTaq Gold™ DNA Polymerase Run Method” on page 93
- “AmpliTaq Gold™ Fast PCR Run Method” on page 93
- “BigDye™ Kit Fast Run Method” on page 94
- “BigDye™ Kit Standard Run Method” on page 94
- “Fast PCR Run Method” on page 94
- “General PCR Run Method” on page 95
- “LMS2 Run Method” on page 95
- “Time Release Run Method” on page 95
- “Touchdown PCR Run Method” on page 96
- “XL PCR Run Method” on page 96

These run methods cannot be edited or deleted, but if you save them with a different name or to a different folder, you can edit them.

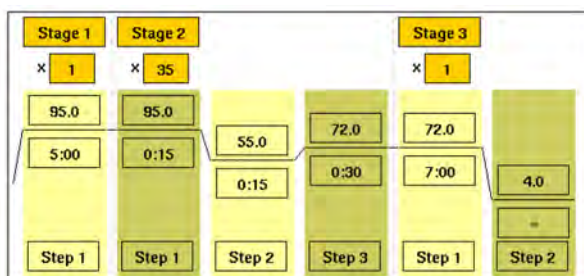
## AmpliCycle™ Seq Run Method

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).



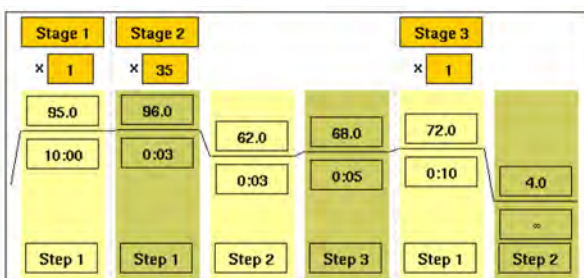
## AmpliTaq Gold™ DNA Polymerase Run Method

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.



## AmpliTaq Gold™ Fast PCR Run Method

Use this run method for PCR with AmpliTaq Gold™ Fast PCR Master Mix, UP to produce optimal yield and specificity for a 500 bp amplicon. This run method is optimized to generate template for DNA sequencing reactions and is only available on 96-well instruments.



**Note:** By default, the annealing temperature is set at 62°C. Replace this temperature with the melting temperature of the primer (see “Calculating melting temperatures” on page 69).

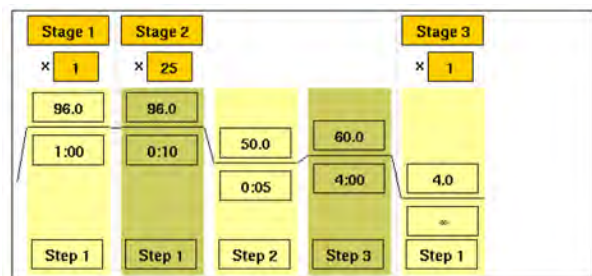
## BigDye™ Kit Fast Run Method

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



## BigDye™ Kit Standard Run Method

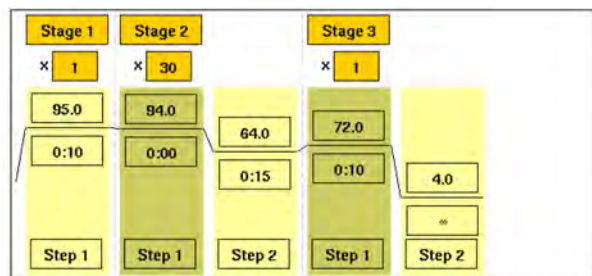
Use this run method, which consists of cycle-sequencing parameters for dideoxy (Sanger) terminator sequencing, with ABI PRISM™ BigDye™ Terminator Cycle Sequencing Ready Reaction Kits .



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

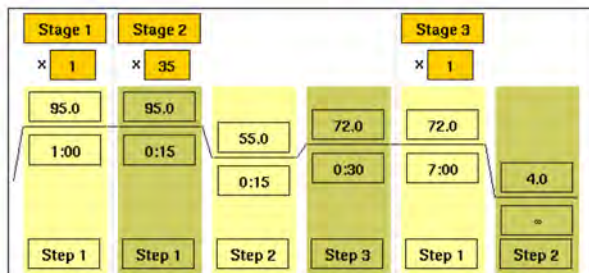
## Fast PCR Run Method

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.thermofisher.com](http://www.thermofisher.com).



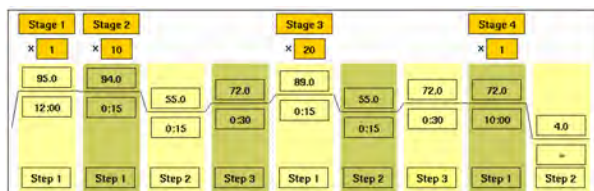
## General PCR Run Method

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



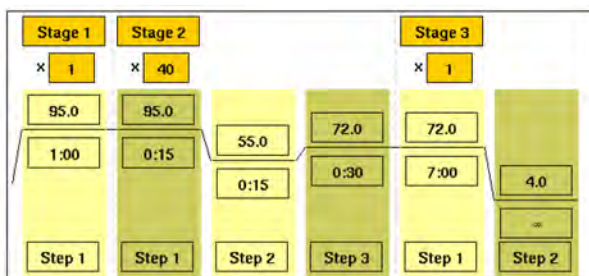
## LMS2 Run Method

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 Généthon human linkage map.



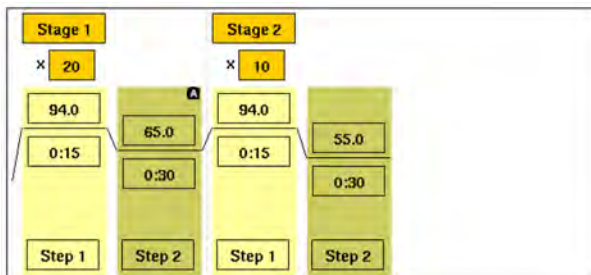
## Time Release Run Method

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.



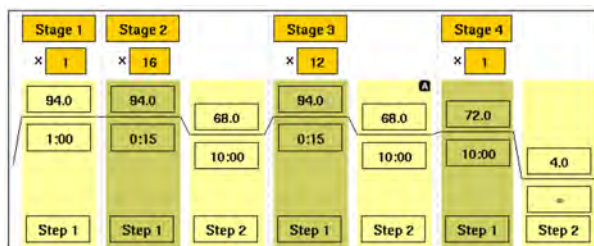
## Touchdown PCR Run Method

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.



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# Safety and EMC compliance information



**WARNING! GENERAL SAFETY.** Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, see the “Documentation and Support” section in this document.

## 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

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

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**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 IMPORTANTs, 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 99).


## 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.

### Environmental symbols on instruments

Symbol	Description
	<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).



## 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 99). 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.
	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.

## 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 réglementation locale associées à la manipulation et l'élimination des déchets.

(continued)

English	Francais
 <b>WARNING!</b> Hot lamp.	<b>AVERTISSEMENT</b> Lampe brûlante.
 <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).

## 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.

## 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



**CAUTION! 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.



**CAUTION! 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

## Safety and electromagnetic compatibility (EMC) standards

Symbol	Description
	<p><b>U.S. and Canadian safety standards.</b></p> <p>The Veriti™ Thermal Cycler has been tested to and complies with standard:</p> <p>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.”</p> <p>UL 61010A-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”</p> <p><b>Canadian EMC standard</b></p> <p>This instrument has been tested to and complies with ICES-001, Issue 3: “Industrial, Scientific, and Medical Radio Frequency Generators.”</p>
	<p><b>European safety and EMC standards.</b></p> <p><b>Safety</b></p> <p>The protection provided by the instrument may be impaired if the instrument is used in a manner not specified by Thermo Fisher Scientific. This instrument meets European requirements for safety (Low Voltage Directive 2006/95/EC). 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.”</p> <p>EN 61010-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”</p> <p>EN 61010-2-081, “Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and Other Purposes.”</p> <p><b>EMC</b></p> <p>This instrument meets European requirements for emission and immunity (EMC Directive 2004/108/EC). 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.”</p>
	<p><b>Australian EMC standards</b></p> <p>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.”</p>

## 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.

## Chemical safety



**WARNING! GENERAL CHEMICAL HANDLING.** To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the "Documentation and Support" section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with sufficient ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if needed) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.



**WARNING! HAZARDOUS WASTE (from instruments).** Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.



**WARNING! 4L Reagent and Waste Bottle Safety.** Four-liter reagent and waste bottles can crack and leak. Each 4-liter bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position.

## Biological hazard safety



**WARNING! Potential Biohazard.** Depending on the samples used on this instrument, the surface may be considered a biohazard. Use appropriate decontamination methods when working with biohazards.



**WARNING! BIOHAZARD.** Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/ institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, 5th Edition, HHS Publication No. (CDC) 21-1112, Revised December 2009; found at:  
<https://www.cdc.gov/labs/pdf/CDC-BiosafetymicrobiologicalBiomedicalLaboratories-2009-P.pdf>
- World Health Organization, *Laboratory Biosafety Manual*, 3rd Edition, WHO/CDS/CSR/LYO/2004.11; found at:  
[www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf](http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf)





# Documentation and support

## Customer and technical support

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- Worldwide contact telephone numbers
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  - Training for many applications and instruments
- Order and web support
- Product documentation
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

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**Note:** For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

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