

# **Applied Biosystems GeneAmp® PCR System 9700**

**Auto-Lid Dual 96 Sample Block Module and  
Dual 96 Sample Block Module**

User Guide

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The combination of the Dual 96 and Auto-Lid Dual 96 Interchangeable Sample Block Modules with a GeneAmp® PCR System 9700 Base Unit is licensed under the thermal cycler apparatus claims of U.S. Patent No. 5,333,675 and counterpart patent claims in other countries.

Patents are pending on the Auto-Lid mechanism.

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Part Number 4343363 Rev. B  
06/2003

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# Preface

## How to Use This Guide

**Purpose of This Guide** The *Applied Biosystems GeneAmp® PCR System 9700 Auto-Lid Dual 96 Sample Block Module and Dual 96 Sample Block Module User Guide* provides the information you need to operate the Dual 96 Sample Block Module with the automatic or manual lid.

**Audience** This guide is intended for novice and experienced GeneAmp® PCR System 9700 users who incorporate either the Auto-Lid Dual 96 Sample Block Module or the manual Dual 96 Sample Block module.

**Text Conventions** This guide uses the following conventions:

- **Bold** indicates user action. For example:  
Type **0**, then press **Enter** for each of the remaining fields.
- *Italic* text indicates new or important words and is also used for emphasis. For example:  
Before analyzing, *always* prepare fresh matrix.
- A right arrow bracket (>) separates successive commands you select from a drop-down or shortcut menu. For example:  
Select **File > Open > Spot Set**.  
Right-click the sample row, then select **View Filter > View All Runs**.

**User Attention Words** Two user attention words appear in Applied Biosystems user documentation. Each word implies a particular level of observation or action as described below:

**Note:** Provides information that may be of interest or help but is not critical to the use of the product.

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

Examples of the user attention words appear below:

**Note:** The size of the column affects the run time.

**Note:** The Calibrate function is also available in the Control Console.

**IMPORTANT!** To verify your client connection to the database, you need a valid Oracle user ID and password.

**IMPORTANT!** You must create a separate Sample Entry Spreadsheet for each 96-well microtiter plate.

**Safety Alert Words** Safety alert words also appear in user documentation. For more information, see “[Safety Alert Words](#)” on [page viii](#).

## How to Obtain More Information

**Related Documentation** The following related documents are shipped with the system:

- **GeneAmp® PCR System 9700 Base Module User's Manual** – Describes the GeneAmp PCR System 9700 hardware and software and provides information on preparing, maintaining, and troubleshooting the system.
- **GeneAmp® PCR System 9700 Quick Reference Guide Set** – The Quick Reference Guide provides the fundamentals of preparing and starting a run and working with methods.

Portable document format (PDF) versions of supporting documents are also available on the CD shipped with the system.

**Note:** For additional documentation, see “[How to Obtain Services and Support](#)” on [page vi](#).

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

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

## How to Obtain Services and Support

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

At the Services and Support page, you can:

- Search through frequently asked questions (FAQs)
- Submit a question directly to Technical Support
- Order Applied Biosystems user documents, MSDSs, certificates of analysis, and other related documents
- Download PDF documents
- Obtain information about customer training
- Download software updates and patches

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

# Safety and EMC Compliance Information

This section includes the following topics:


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## Safety Conventions Used in This Document


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

### Definitions

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

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

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


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


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


### Examples

The following examples show the use of safety alert words:

**IMPORTANT!** You must create a separate a Sample Entry Spreadsheet for each 96-well microtiter plate.

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

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








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



# Symbols on Instruments




## Electrical Symbols on Instruments



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

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

## Safety Symbols

The following table describes the safety symbols that may be displayed on Applied Biosystems instruments. Each symbol may appear by itself or in combination with text that explains the relevant hazard (see [“Safety Labels on Instruments”](#) on page x). 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.



Symbol	Description
	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. Read the waste profile (if any) in the site preparation guide for this instrument before handling or disposal.	<b>ATTENTION</b> Déchets dangereux. Lire les renseignements sur les déchets avant de les manipuler ou de les éliminer.
<b>CAUTION</b> Hazardous waste. Refer to MSDS(s) and local regulations for handling and disposal.	<b>ATTENTION</b> Déchets dangereux. Lire les fiches techniques de sûreté de matériels et la régulation locale associées à la manipulation et l'élimination des déchets.
<b>WARNING</b> Hot lamp.	<b>AVERTISSEMENT</b> Lampe brûlante.
<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

- Moving and Lifting the Instrument**
-  **WARNING PHYSICAL INJURY HAZARD.** Use this product only as specified in this document. Using this instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.
-  **CAUTION PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.
- Operating the Instrument**
- Ensure that anyone who operates the instrument has:
- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
  - Read and understood all applicable Material Safety Data Sheets (MSDSs). See [“About MSDSs”](#) on page xi.

## Chemical Safety

- Chemical Hazard Warning**
-  **WARNING CHEMICAL HAZARD.** Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer, and observe all relevant precautions.
-  **WARNING CHEMICAL HAZARD.** All chemicals in the instrument, including liquid in the lines, are potentially hazardous. Always determine what chemicals have been used in the instrument before changing reagents or instrument components. Wear appropriate eyewear, protective clothing, and gloves when working on the instrument.
- About MSDSs**
- Chemical manufacturers supply current Material Safety Data Sheets (MSDSs) with shipments of hazardous chemicals to *new* customers. They also provide MSDSs with the first shipment of a hazardous chemical to a customer after an MSDS has been updated. MSDSs provide the safety information you need to store, handle, transport, and dispose of the chemicals safely.
- Each time you receive a new MSDS packaged with a hazardous chemical, be sure to replace the appropriate MSDS in your files.

## Obtaining MSDSs

You can obtain from Applied Biosystems the MSDS for any chemical supplied by Applied Biosystems. This service is free and available 24 hours a day.

To obtain MSDSs:

1. Go to **<https://docs.appliedbiosystems.com/msdssearch.html>**
2. In the Search field, type in the chemical name, part number, or other information that appears in the MSDS of interest. Select the language of your choice, then click **Search**.
3. Find the document of interest, right-click the document title, then select any of the following:
  - **Open** – To view the document
  - **Print Target** – To print the document
  - **Save Target As** – To download a PDF version of the document to a destination that you choose
4. To have a copy of a document sent by fax or e-mail, select **Fax** or **Email** to the left of the document title in the Search Results page, then click **RETRIEVE DOCUMENTS** at the end of the document list.
5. After you enter the required information, click **View/Deliver Selected Documents Now**.

## Chemical Safety Guidelines

To minimize the hazards of chemicals:

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

# Chemical Waste Safety

## Chemical Waste Hazard



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

## Chemical Waste Safety Guidelines

To minimize the hazards of chemical waste:

- Read and understand the Material Safety Data Sheets (MSDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
- Provide 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.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the MSDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the MSDS.
- Handle chemical wastes in a fume hood.
- After emptying the waste container, seal it with the cap provided.
- Dispose of the contents of the waste tray and waste bottle in accordance with good laboratory practices and local, state/provincial, or national environmental and health regulations.






## Waste Disposal

If potentially hazardous waste is generated when you operate the instrument, you must:




- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure the health and safety of all personnel in your laboratory.
- Ensure that the instrument 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.

## Electrical Safety

- Fuses**  **DANGER ELECTRICAL SHOCK HAZARD.** Improper fuses or high-voltage supply can damage the instrument wiring system and cause a fire. Before turning on the instrument, verify that the fuses are properly installed and that the instrument voltage matches the power supply in your laboratory.
-  **WARNING FIRE HAZARD.** For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.
- Power**  **DANGER ELECTRICAL HAZARD.** Grounding circuit continuity is vital for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected.
-  **DANGER ELECTRICAL HAZARD.** Use properly configured and approved line cords for the voltage supply in your facility.
-  **DANGER ELECTRICAL HAZARD.** Plug the system into a properly grounded receptacle with adequate current capacity.
- Overvoltage Rating** The GeneAmp PCR System<sup>®</sup> 9700 system has an installation (overvoltage) category of II, and is classified as portable equipment

## Physical Hazard Safety

- Moving Parts**  **WARNING PHYSICAL INJURY HAZARD.** Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.
-  **DANGER PHYSICAL INJURY HAZARD.** Do not operate the instrument without the arm shield in place. Keep hands out of the deck area when the instrument is spotting.
- Hot Surface**  **WARNING PHYSICAL INJURY HAZARD.** During instrument operation, the temperature of the heated cover can be as high as 108 °C, and the temperature of the sample block can be as high as 100 °C. Before performing the procedure, keep hands away until the heated cover and sample block reach room temperature.

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## Workstation Safety

Correct ergonomic configuration of your workstation can reduce or prevent effects such as fatigue, pain, and strain. Minimize or eliminate these effects by configuring your workstation to promote neutral or relaxed working positions.

**CAUTION MUSCULOSKELETAL AND REPETITIVE MOTION**

**HAZARD.** These hazards are caused by potential risk factors that include but are not limited to repetitive motion, awkward posture, forceful exertion, holding static unhealthy positions, contact pressure, and other workstation environmental factors.

To minimize musculoskeletal and repetitive motion risks:

- Use equipment that comfortably supports you in neutral working positions and allows adequate accessibility to the keyboard, monitor, and mouse.
- Position the keyboard, mouse, and monitor to promote relaxed body and head postures.

# Safety and Electromagnetic Compatibility (EMC) Standards

This section provides information on:

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

## U.S. and Canadian Safety Standards



This instrument has been tested to and complies with standard UL 3101-1, “Safety Requirements for Electrical Equipment for Laboratory Use, Part 1: General Requirements.”

This instrument has been tested to and complies with standard CSA 1010.1, “Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.”

## Canadian EMC Standard

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

## European Safety and EMC Standards



### Safety

This instrument meets European requirements for safety (Low Voltage Directive 73/23/EEC). This instrument has been tested to and complies with standards EN 61010-1:2001, “Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements” and EN 61010-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”

### EMC

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

## Australian EMC Standards



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



# Dual 96 Sample Block Module Overview

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# 1

This chapter covers:

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## About the Dual 96 Sample Block Module

**What It Does** The GeneAmp® PCR System 9700 amplifies nucleic acids using the polymerase chain reaction (PCR) process.

Sample block modules are interchangeable. You can, for example, remove the Auto-Lid Sample Block Module and replace it with the manual lid Dual 96 Sample Block Module. This interchangeable module design allows you to change sample well formats as well as throughput capacity.

**Compatible Software** Interchanging sample block modules may require a firmware change. If the sample block module is placed on a base module running an earlier software version, the instrument will not operate correctly. To upgrade the base module software, use the floppy disk that is shipped with the Dual 96 Sample Block Module. For instructions on upgrading the software, see the *GeneAmp PCR System 9700 Base Module User's Manual* (P/N 4303481) or see “[How to Obtain Services and Support](#)” on [page vi](#).

**Lid Choices** The Dual 96 Sample Block Module comes with one of the following:

- An automatic lid
- A manual lid

The major difference between the two lids is that with the manual lid, you must physically slide the lid back and forth into position; with the Auto-Lid, you simply press the red button to move the lid.

Both lids are heated.

**Heated Cover** The heated cover slides over the sample blocks and performs two functions:

- It raises the temperature of the upper part of the tube (the part above the sample blocks) above the temperature of the reaction mixture. This reduces condensation, which may have a negative effect on your chemistry.
- It puts pressure on the reaction plates to seat them firmly and precisely in the sample blocks. This enhances heat transfer.

**Auto-Lid** The heated Auto-Lid automatically moves over to cover the reaction plates at the start of a PCR run, and then moves to the back of the module and opens when the run is complete.

**IMPORTANT!** If you do not want the lid to open after a run, you need to apply a 4 °C hold at the end of the program.

The Auto-Lid Sample Block Module (Figure 1-1) attaches to the top of the GeneAmp® PCR System 9700 Base Module and allows you to perform up to 192 reactions, 0.2 mL each. The Auto-Lid Sample Block Module also adds automation to the System 9700, which can increase throughput.

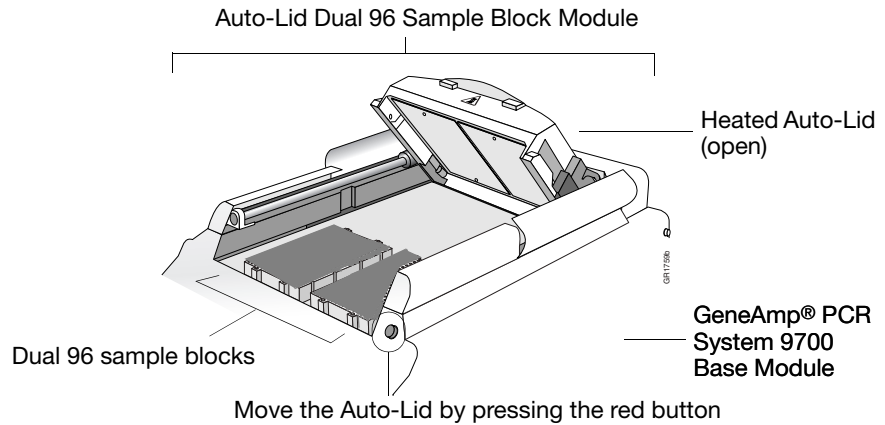


Figure 1-1 Auto-Lid Dual 96 Sample Block Module on the GeneAmp® PCR System 9700 Base Module

**Manual Lid** The manual lid Dual 96 Sample Block Module (Figure 1-2) is used throughout this manual as the primary example.

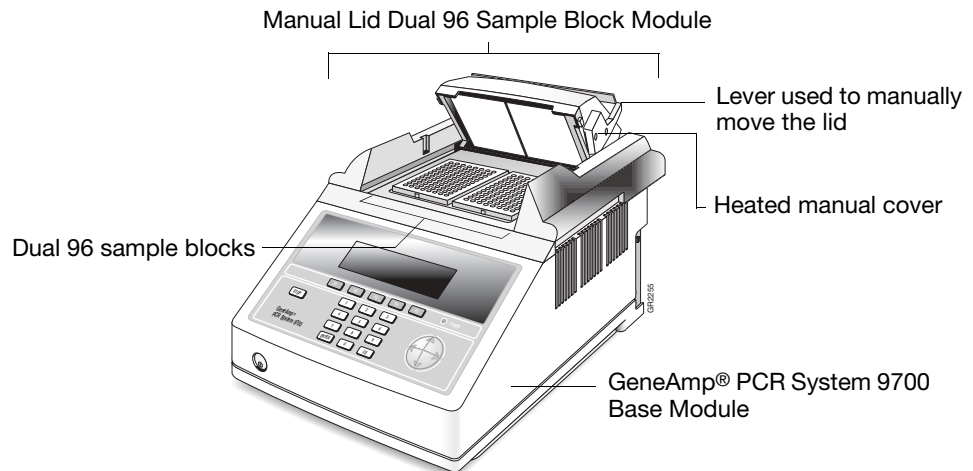
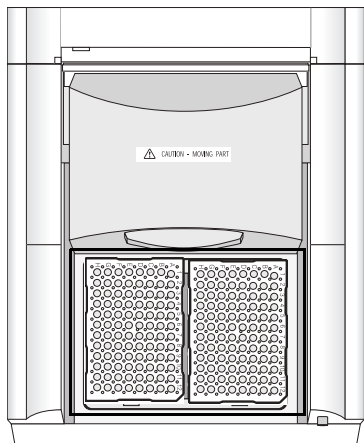


Figure 1-2 Manual Lid Dual 96 Sample Block Module on the GeneAmp® PCR System 9700 Base Module

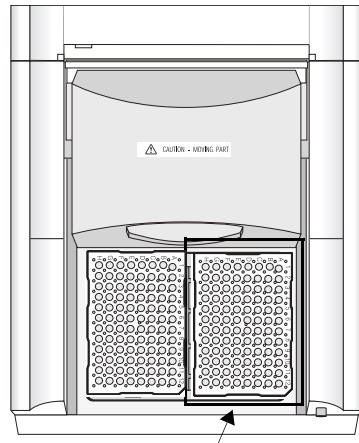
**Sample Blocks** There are two sample blocks in the Dual 96 Sample Block Module. Each holds one 96-well reaction plate.

**IMPORTANT!** The right sample block is the primary control block. If you are using only one reaction plate:

- Place the reaction plate you are using in the **right** sample block.
- Place an empty reaction plate in the **left** sample block.



Using reaction plates on both sides

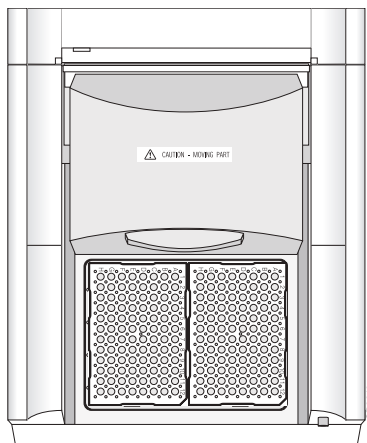


If you use just one reaction plate, place it on the right. Place an empty plate on the left.

## Placing the Reaction Plates

To place the reaction plates in the sample blocks:

1. Place a 96-well reaction plate into the **right** sample block.



2. Place a second reaction plate in the **left** sample block.

**IMPORTANT!** You must insert two plates into the sample block for the instrument to run properly.

3. Close the heated lid:
  - For an Auto-Lid, press the red button located near the right sample block.
  - For a manual lid, use the handle on top of the lid.
4. Process the samples.

## Peltier Heating/Cooling Unit

The internal Peltier heating/cooling unit is housed in the sample block module. The sample block module is made of aluminum to provide the optimal thermal transfer rate.

- Platinum sensors in the sample block module provide:
- Wide temperature range: 4 to 99.9 °C
- Accuracy:  $\pm 0.25$  °C from 35 to 100 °C
- Uniformity of each sample block:  $\pm 0.5$  °C (measured after 30 sec at 95 °C)
- Uniformity of combined sample blocks:  $\pm 0.75$  °C (measured after 30 sec at 95 °C)
- Long-term stability and high reliability

## Modules, Accessories, and Disposables

The modules listed below are available for the GeneAmp PCR System 9700 Base Module. The accessories and disposables are for use with the Dual 96 Sample Block Module.

**Ordering** Order modules, accessories, and disposables from Applied Biosystems by part number. See [Tables 1-1 through 1-3](#).

**Table 1-1 Modules for the 9700 Base Module**

Modules	Part Number
96-Well Sample Block Module	N805-0251
96-Well Gold Sample Block Module	4314443
96-Well Aluminum Sample Block Module	4314445
0.5-mL 60-Well Sample Block Module	4309131
Auto-Lid Dual 384-Well Sample Block Module	4312904
Dual 96-Well GeneAmp PCR System 9700	4343176
Auto-Lid Dual 96-Well GeneAmp PCR System 9700	4343178
Dual 384-Well Sample Block Module	N805-0400

**Table 1-2 Accessories for the 9700 Base Module**

Accessories	Part Number
Dual 96-Well Sample Block Module Temperature Verification Kit.	4317939
Dual 384-Well Sample Block Module Temperature Verification Kit <b>Note:</b> This kit is also used for the Auto-Lid Sample Block Module.	4308354
Tool, 384-Well Plate Extraction	T-6273

**Table 1-3 Disposables for the 9700 Base Module**

Disposable	Part Number
ABI PRISM® 96-Well Optical Reaction Plate	4329989
Adhesive Covers	4311971
MicroAmp® Clear Adhesive Covers	4306311
MicroAmp® Optical 96-Well Reaction Plate	N801-0560
MicroAmp® Full Plate Cover	N8010550
MicroAmp® Cap Installing Tool	N801-0438
MicroAmp® 96-Well Tray/Retainer Sets	403081
MicroAmp® Cap Installing Tool	N801-0438
MicroAmp® 96-Well Support Base	4312063
MicroAmp® Reaction Tubes	N801-0533

Table 1-3 Disposables for the 9700 Base Module (*continued*)

<b>Disposable</b>	<b>Part Number</b>
MicroAmp® Caps, Twelve Caps/Strip	N801-0534
MicroAmp® Caps, Eight Caps/Strip	N801-0535
MicroAmp® Reaction Tubes with Caps	N801-0540
MicroAmp® 96-Well Tray for Tubes with Caps	N801-0541
MicroAmp® Centrifuge Adapter	N801-3822

## Installing the Dual 96 Sample Block Module

**Release Lever** A lever behind the sample block module releases it from the GeneAmp® PCR System 9700 Base Module. The top and bottom of the Dual 96 Sample Block Module are shown below.

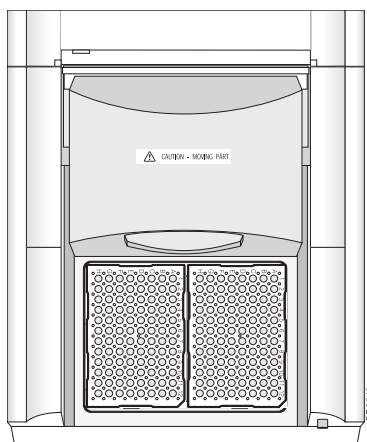


Figure 1-3 Top view, Auto-Lid Dual 96 Sample Block Module

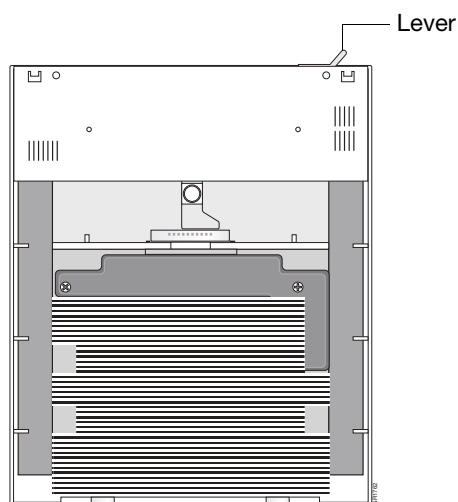


Figure 1-4 Bottom view, Auto-Lid Dual 96 Sample Block Module



### Installing the Sample Block Module

To install the sample block module (Auto-Lid and manual lid) into the GeneAmp PCR System 9700 Base Module:

1. Pull out the lever from the sample block module.
2. Place the sample block module onto the base module, then push the sample block module back to seat the electrical connections.
3. Push the lever into the base module to secure the sample block module.

**Note:** If the sample block module is not seated correctly, the instrument cannot be turned on.

### Installing the Auto-Lid Module Communication Card and Cable

To install the communication card and cable into the GeneAmp PCR System 9700 Base Module:

1. Insert the communication card into the slot at the rear of the right side of the instrument (the label on the card face should be facing you).
2. Insert the connector end of the communication cable (very short cable) into the communication card.
3. Insert the other end of the cable (plug type) into the receptacle on the sample block module labeled "I/O Port."

### Installing the Auto-Lid Module Power Line Cords and Powering Up

To install the power line cords into the sample block module and the GeneAmp PCR System 9700 Base Module:

1. Plug one end of the power line cord into the sample block module receptacle and the other end into an outlet.
2. Plug the very short jumper cable into the sample block module and the other into the base module.
3. Flip the power switch located on the sample block module near the plug receptacle and press the power button located on the front of the instrument.

# Sample Tray and Plate Configurations

The following section describes the possible sample tray and plate configurations.

**IMPORTANT!** The Tray or the Tray Retainer Set are essential for the operation of the GeneAmp PCR System 9700. Sample Tray and Plate Configurations

Table 1-4 illustrates the possible sample tray and plate configurations.

Table 1-4 Sample tray and plate configurations

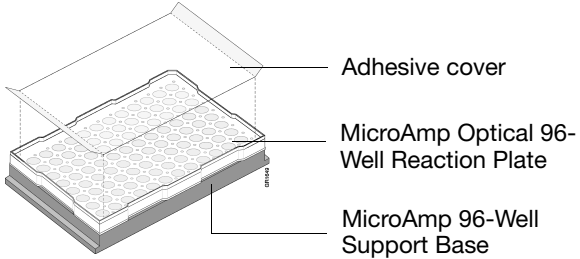

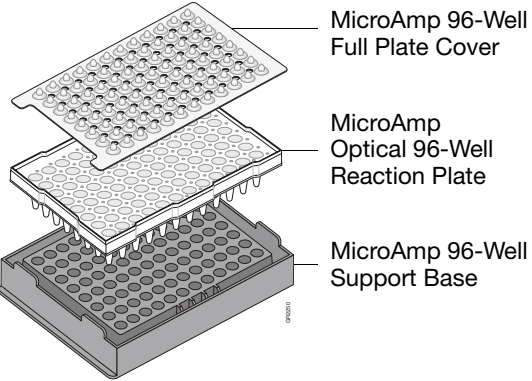
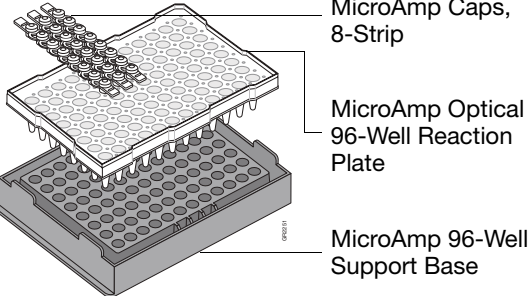

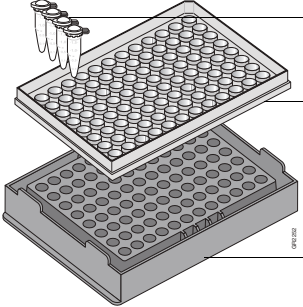
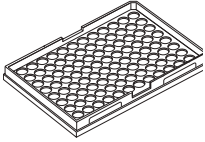
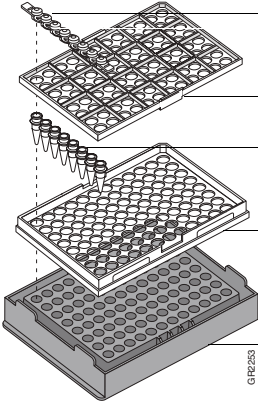
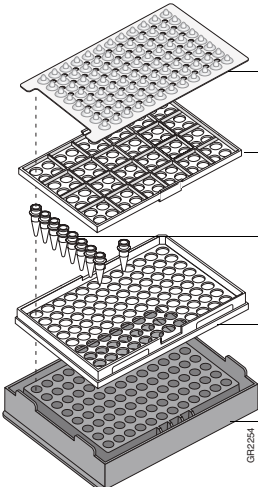
With this vessel...	Use...	As Shown
MicroAmp Optical 96-Well Reaction Plate	Adhesive cover	 <p>Adhesive cover MicroAmp Optical 96-Well Reaction Plate MicroAmp 96-Well Support Base</p>
	MicroAmp 96-Well Full Plate Cover 	 <p>MicroAmp 96-Well Full Plate Cover MicroAmp Optical 96-Well Reaction Plate MicroAmp 96-Well Support Base</p>
	MicroAmp 8-Strip Caps	 <p>MicroAmp Caps, 8-Strip MicroAmp Optical 96-Well Reaction Plate MicroAmp 96-Well Support Base</p>

Table 1-4 Sample tray and plate configurations (continued)

With this vessel...	Use...		As Shown
<p>MicroAmp Reaction Tubes with Caps</p>	<p>MicroAmp 96-Well Tray for Tubes with Caps</p> 		 <ul style="list-style-type: none"> <li>MicroAmp Reaction Tubes with Caps</li> <li>MicroAmp 96-Well Tray for Tubes with Caps</li> <li>MicroAmp 96-Well Support Base</li> </ul>
<p>MicroAmp 8-Strip Tubes or Single Tubes</p>	<p>MicroAmp 96-Well Tray Retainer Set</p> 	<p>MicroAmp 8-Strip Caps</p>	 <ul style="list-style-type: none"> <li>MicroAmp Caps, 8-Strip</li> <li>MicroAmp 96-Well Retainer</li> <li>MicroAmp 8-Strip Tubes or Single Tubes</li> <li>MicroAmp 96-Well Tray</li> <li>MicroAmp 96-Well Support Base</li> </ul>
	<p>MicroAmp 96-Well Full Plate Cover</p>		 <ul style="list-style-type: none"> <li>MicroAmp 96-Well Full Plate Cover</li> <li>MicroAmp 96-Well Retainer</li> <li>MicroAmp 8-Strip Tubes or Single Tubes</li> <li>MicroAmp 96-Well Tray</li> <li>MicroAmp 96-Well Support Base</li> </ul>

## Loading Samples

The following procedures describe how to load samples for:

- Tubes with attached caps
- 96-Well reaction plate
- 96-Well Tray Retainer Assembly
- Sample volume range: 5 to 100  $\mu$ L in “D96” mode

**IMPORTANT!** Do not use mineral oil or glycerine in the sample block or as a vapor barrier over the PCR reaction mixture in the tubes. The MicroAmp Reaction Tubes fit tightly in the wells and a heated cover exerts even pressure on all tubes, reducing condensation on the tubes when you are using a tray or tray/retainer set.

### Loading Tubes with Attached Caps

To load tubes with attached caps:

1. Set the 96-well tray on a 96-well support base.
2. Place the reaction tubes in the tray.
3. Pipette the samples into the reaction tubes.
4. Cap the tubes.

### Loading the 96-Well Reaction Plate

To load the 96-well reaction plate:

1. Place the reaction plate on the 96-well support base.
2. Pipette the samples into the sample wells.
3. Apply the adhesive cover with a compression pad or cap the tubes using either the MicroAmp 96-Well Full Plate Cover or the MicroAmp 8-Strip Caps.

### Loading the 96-Well Tray Retainer Assembly

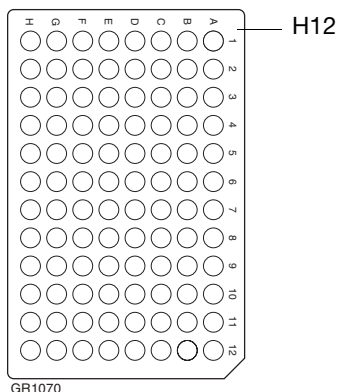
To load the 96-Well Tray Retainer Assembly:

1. Place the tray on the 96-well support base.
2. Load tubes onto the tray, either using single tubes or using the 8-well tubes.
3. Place retainer over the tubes.
4. Pipette the samples into the tubes.
5. Cap the tubes using either the MicroAmp 96-Well Full Plate Cover or the MicroAmp 8-Strip Caps.

## Placing the Sample Tray or Plate onto the Block

To place a sample tray or plate onto the block:

1. Lift the sample tray from the 96-well base and place it in the sample block.  
Place the MicroAmp tray or plate so that well H12 is located at the upper right corner of the tray.



**Figure 1-5** Align well H12 with upper right corner of the tray

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

2. Slide the heated cover forward (press the red button for an Auto-Lid).  
**Note:** Ensure that the cover is pulled completely forward for a proper seal.
3. Pull the heated cover lever down to engage the heated cover with the reaction plate.
4. Process the samples

**IMPORTANT!** Do *not* open the cover when the block temperature is above 27 °C because sample caps may pop off or jam.



# Maintaining the Sample Block Module

---

# 2

This chapter covers:

Cleaning the Sample Block Module .....	2-2
Fixing an Auto-Lid Jam .....	2-4

## Cleaning the Sample Block Module

**Overview** The following procedures describe how to:

- Put the heated cover into the cleaning position
- Clean the heated cover
- Clean the sample block wells



**CAUTION** Before using any cleaning or decontamination method, except those recommended in this manual, check with Applied Biosystems to ensure that the proposed method will not damage the equipment.

**Required Materials** To clean the system, you need:

- Bleach, 10%
- Isopropanol, pure
- Cotton swabs
- Clean cloth



**WARNING CHEMICAL HAZARD. Sodium hypochlorite (bleach)** is a liquid disinfectant that can be corrosive to the skin and can cause skin depigmentation. Please read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.



**WARNING CHEMICAL HAZARD. Isopropanol** is a flammable liquid and vapor. It may cause eye, skin, and upper respiratory tract irritation. Prolonged or repeated contact may dry skin and cause irritation. It may cause central nervous system effects such as drowsiness, dizziness, and headache, etc. Please read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

### Cleaning the Heated Cover

Clean the heated cover at least once a month or more frequently, if needed.



**WARNING** During instrument operation, the temperature of the heated cover can be as high as 108 °C, and the temperature of the sample block module can be as high as 100 °C. Before performing this procedure, wait until the heated cover and sample block module reach room temperature.

**To clean the heated cover:**

1. Power off the instrument.
2. Unplug the instrument.
3. Wait 20–30 minutes for the heated cover to cool down.
4. Put the cover into the cleaning position by raising the front of the lid through the slots on each side of the module as shown in [Figure 2-1](#).



Raise front of the lid up through the slots



Figure 2-1 Heated cover in cleaning position (manual lid shown)

5. Soak a cotton swab or clean cloth with pure isopropanol and gently wipe the bottom of the heated cover.



**WARNING CHEMICAL HAZARD.** Isopropanol is a flammable liquid and vapor. It may cause eye, skin, and upper respiratory tract irritation. Prolonged or repeated contact may dry skin and cause irritation. It may cause central nervous system effects such as drowsiness, dizziness, and headache, etc. Please read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

6. If the heated cover becomes contaminated with amplified DNA:
  - a. Wipe the heated cover with a clean cloth or cotton swab soaked in 10% bleach.
  - b. Wipe with a clean, damp cloth.
7. Remove any remaining isopropanol from the heated cover with a clean cloth and return the cover to its normal position.

### Cleaning the Sample Block Wells

Clean the sample block wells once a month or more frequently, if needed.

#### To clean the sample block wells:

1. Let the system 9700 cool to the idle setpoint (25 °C).
2. Put the heated cover into the cleaning position. See [step 4 on page 2-2](#) and [Figure 2-1](#) above.
3. Power off the instrument.
4. Unplug the instrument.
5. Remove the reaction plates from the sample block module and set them aside.

6. Soak a cotton swab in pure isopropanol and clean the sample block wells thoroughly.
7. Remove any remaining isopropanol from the sample block before reloading the reaction plates.
8. If the sample block wells become contaminated with amplified DNA:
  - a. Clean the wells thoroughly with a cotton swab soaked in 10% bleach.
  - b. Wipe with a clean, damp cloth.



**WARNING**

**CHEMICAL HAZARD. Sodium hypochlorite (bleach)** is a liquid disinfectant that can be corrosive to the skin and can cause skin depigmentation. Please read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

## Fixing an Auto-Lid Jam

The following table describes how to fix a jam that is causing the Auto-Lid to stop.

If the Auto-Lid jams while ...	Then...
Closing	The Auto-Lid automatically retracts to the open position. <ul style="list-style-type: none"> <li>• Find the jam and clear it.</li> <li>• Press the red button and hold for 1 sec. The heated cover returns to the open position and the instrument is reset.</li> </ul>
Opening	The Auto-Lid stops moving and remains in place. <ul style="list-style-type: none"> <li>• Try to find the jam and clear it.</li> <li>• Press the red button and hold for 1 sec. The heated cover returns to the open position and the instrument is reset.</li> </ul>

# Testing the Dual 96 Sample Block Module

---

# 3

This chapter covers:

Performing the Calibration Verification Test .....	3-2
Performing the Temperature Non-Uniformity Test .....	3-8
Performing System Performance Diagnostics .....	3-15

## Performing the Calibration Verification Test

**Overview** Use this test to verify the temperature calibration of the GeneAmp® PCR System 9700 Dual 96 Sample Block Module.

To complete the Calibration Verification Test, you perform the following tasks, in order:

Tasks	See Page
<a href="#">Setting Up the 0.2-mL Probe Assembly</a>	3-3
<a href="#">Configuring the System 9700</a>	3-3
<a href="#">Performing the Calibration Verification Test</a>	3-4
<a href="#">Evaluating the Results</a>	3-6
<a href="#">Ending the Test</a>	3-6

In this procedure, you use the digital thermometer to take temperature readings of one sample well connected to the 0.2-mL Probe Assembly. You take a reading at two setpoint temperatures, 85 °C and 45 °C.



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

**Note:** To exit the test at any time, press **F5** (Cancel).

**Required Materials** This test requires the Temperature Verification System, Dual 0.2 mL (P/N 4346117), which includes:

- Light mineral oil
- Cotton swabs
- Temperature Verification Plates
- 0.2-mL Probe Assembly
- Digital thermometer with 9 V battery installed

**Note:** This system is also used for the Auto-Lid Sample Block Module.

## Setting Up the 0.2-mL Probe Assembly

### To set up the 0.2-mL Probe Assembly:

1. If the heated cover is in the forward position, lift the lever, then slide the heated cover back.
2. Position the 9700 Temperature Verification Plates on the appropriate sample blocks:
  - **Right sample block** – Plate labeled with R1 to R6
  - **Left sample block** – Plate labeled with L1 to L6

Position the plate with the notch facing the back of the instrument.

**Note:** The plates are used as a guide to help you locate the probes within the sample blocks.

3. Using a cotton swab, coat well R3 with mineral oil.
4. Place the 0.2-mL Probe Assembly into well R3.
5. Thread the probe wire through the channel in the Temperature Verification Plate to prevent damage to the probe and lead wires.
6. Make sure the probe is connected to the digital thermometer.
7. Slide the heated cover forward and pull the lever down.

**IMPORTANT!** Seat the probe properly and close the heated cover carefully. If the probe wire is crushed when the heated cover is closed, the probe may be damaged.

8. Power on the digital thermometer.

**Note:** Refer to the instructions included with the Temperature Verification System for a detailed description on operating the digital thermometer.

9. Continue with [“Configuring the System 9700” on page 3-3](#).

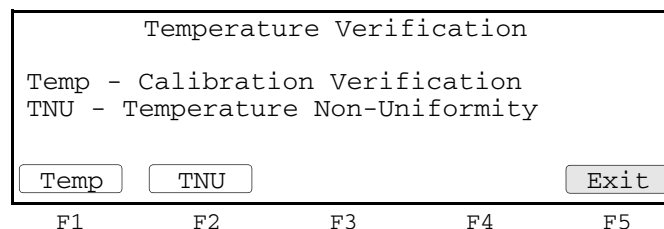
## Configuring the System 9700

Before you begin configuring the System 9700, perform the procedure described in [“Setting Up the 0.2-mL Probe Assembly” on page 3-3](#).

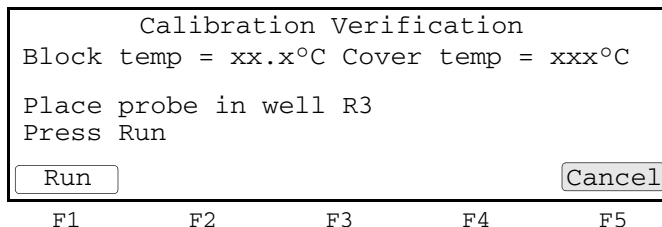
### To configure the System 9700 for the Calibration Verification Test:

1. Power on the System 9700. The Main menu is displayed.
2. Press **F4** (Util). The Utilities screen is displayed.
3. Press **F1** (Diag). The Diagnostics screen is displayed.
4. Press **F3** (TmpVer).

The Temperature Verification screen is displayed.



- Press **F1** (Temp). The Calibration Verification screen is displayed and the System 9700 is automatically configured for the Calibration Verification Test.



- Continue with [“Performing the Calibration Verification Test”](#) on page 3-4.

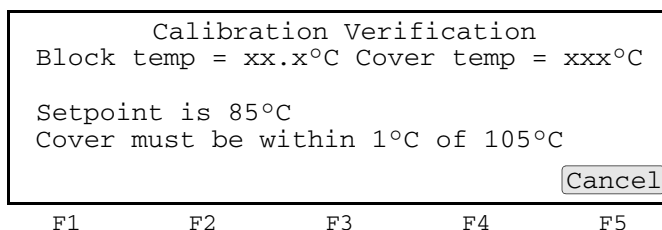
### Performing the Calibration Verification Test

Before you begin calibrating the System 9700,

- Perform the procedures in:
  - [“Setting Up the 0.2-mL Probe Assembly”](#) on page 3-3
  - [“Configuring the System 9700”](#) on page 3-3
- Obtain the current Calibration Verification Data Sheet for your system, or copy the form on [page 3-7](#).

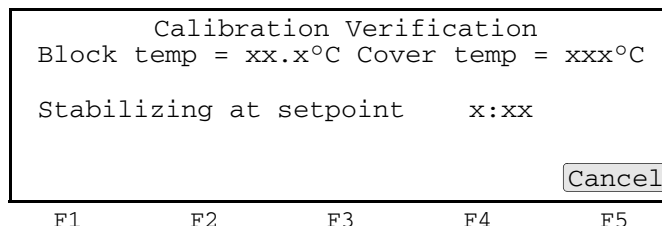
#### To perform the Calibration Verification Test:

- Press **F1** (Run). The Calibration Verification screen is displayed for the first setpoint, 85 °C.



The System 9700 ramps up the lid temperature (cover temp) to 105 °C (±1 °C). It may take several minutes for the System 9700 to ramp up.

When the lid temperature is reached, the “Stabilizing at setpoint” screen is displayed. The “Stabilizing at setpoint” value begins to count down.



- When the “Stabilizing at setpoint” value decrements to zero, read the digital thermometer.

Refer to the instructions included with the Temperature Verification System for a detailed description on operating the digital thermometer.

- Using the numeric keys, type the value displayed on the digital thermometer in the “Enter actual block temperature” field.

Calibration Verification

Block temp = xx.x°C Cover temp = xxx°C

Enter actual block temperature

F1      F2      F3      F4      F5

**Note:** The digital thermometer displays a four-digit value; round off the value to three digits before typing it in the Calibration Verification screen.

Record the value on the Calibration Verification Test Data Sheet ([page 3-7](#)).

- Press **Enter**.

The System 9700 automatically begins the second reading. The Calibration Verification screen is displayed for the second setpoint, 45 °C. If necessary, the System 9700 ramps up the lid temperature (cover temp) to 105 °C ( $\pm 1$  °C) before initiating the “Stabilizing at setpoint” value countdown.

Calibration Verification

Block temp = xx.x°C Cover temp = xxx°C

Setpoint is 45°C

Cover must be within 1°C of 105°C

F1      F2      F3      F4      F5

- When the “Stabilizing at setpoint” value decrements to zero, read the digital thermometer and enter the value for the second reading as described in [steps 2](#) and [3](#). Record the value.

The System 9700 evaluates the calibration of the sample block temperature for the setpoint values you entered and displays the results. A summary screen is displayed at the conclusion of the test.

Calibration Verification

Actual temperature at 85°C

Actual temperature at 45°C

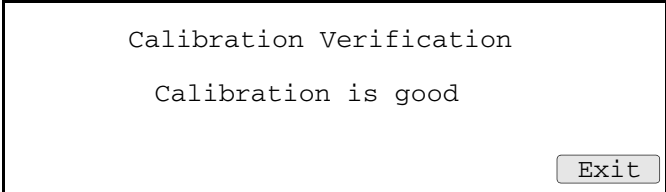
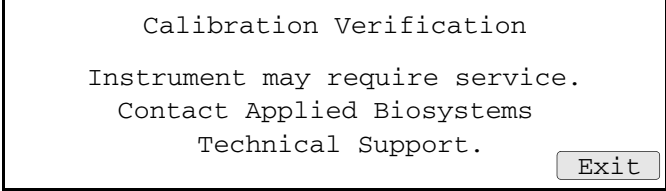
F1      F2      F3      F4      F5

Compare the values displayed with the actual test results you recorded. If the values differ, repeat the procedure to make sure you entered the values accurately.

- If the values agree, press F1 (Accept).
- Continue with [“Evaluating the Results”](#) on [page 3-6](#) and [“Ending the Test”](#) on [page 3-6](#).

**Evaluating the Results** When the System 9700 completes the Calibration Verification Test, one of two screens is displayed (Table 3-1) to evaluate the results.

**Table 3-1 Calibration Verification Test Results**

If the screen displays...	Then the sample block module...
 <p>Calibration Verification Calibration is good Exit</p> <p>F1 F2 F3 F4 F5</p>	<p>Is properly calibrated</p>
 <p>Calibration Verification Instrument may require service. Contact Applied Biosystems Technical Support. Exit</p> <p>F1 F2 F3 F4 F5</p>	<p>Failed the Calibration Verification Test</p> <ul style="list-style-type: none"> <li>Repeat the procedure to make sure you accurately read and entered the temperature readings.</li> <li>If the test fails again, contact Applied Biosystems Technical Support. For information, see <a href="#">“How to Obtain Services and Support”</a> on page vi.</li> </ul>

**Ending the Test To end the test:**

1. Press **F5** (Exit). Continue to press **F5** (Exit) until the Main Menu screen is displayed.
2. Remove the 0.2-mL Probe Assembly from the sample block.
3. Power off the digital thermometer and clean off the oil.
4. Wait for the sample block to reach room temperature (~25 °C), then remove the 96-Well Temperature Verification Plates from the sample blocks.
5. Clean the oil from the sample block.





## Performing the Temperature Non-Uniformity Test

**Overview** Use this test to find wells within the GeneAmp PCR System 9700 Dual 96-Well Sample Block Module that exhibit unacceptable temperature variation.

To complete the Temperature Non-Uniformity Test, you perform the following tasks, in order:

Tasks	See Page
<a href="#">Setting Up the 0.2-mL Probe Assembly</a>	<a href="#">3-8</a>
<a href="#">Configuring the System 9700</a>	<a href="#">3-9</a>
<a href="#">Performing the Temperature Non-Uniformity Test</a>	<a href="#">3-9</a>
<a href="#">Evaluating the Results</a>	<a href="#">3-13</a>
<a href="#">Ending the Test</a>	<a href="#">3-13</a>

The Temperature Non-Uniformity Test uses the 0.2-mL Probe Assembly to test the temperature uniformity of all six wells in the left and right sample blocks. You test each well at two setpoints, 95 °C and 55 °C.



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

**Note:** To exit the test at any time, press **F5** (Cancel).

**Required Materials** See [“Required Materials” on page 3-2](#) for information.

### Setting Up the 0.2-mL Probe Assembly

To set up the 0.2-mL Probe Assembly:

1. If the heated cover is in the forward position, lift the lever, then slide the heated cover back.
2. Position the Temperature Verification Plates on the appropriate sample blocks:
  - **Right sample block** – Plate labeled with R1 to R6
  - **Left sample block** – Plate labeled with L1 to L6

Position the plate with the notch facing the back of the instrument.

**Note:** The plates are used as a guide to help you locate the probes within the sample blocks.

3. Using a cotton swab, coat wells R1 to R6 and L1 to L6 with mineral oil.
4. Place the 0.2-mL Probe Assembly into the well to be tested. Begin testing with well L1.
5. Thread the probe wire through the channel in the Temperature Verification Plate to prevent damage to the probe and lead wires.
6. Make sure the probe is connected to the digital thermometer.

- Slide the heated cover forward and pull the lever down.

**IMPORTANT!** Seat the probe properly and close the heated cover carefully. If the probe wire is crushed when the heated cover is closed, the probe may be damaged.

- Power on the digital thermometer.

**Note:** Refer to the instructions included with the Temperature Verification System for a detailed description on operating the digital thermometer.

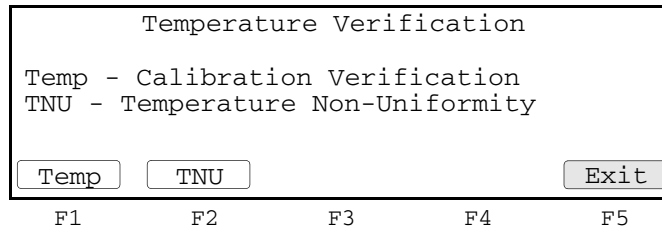
- Continue with [“Configuring the System 9700” on page 3-9](#).

## Configuring the System 9700

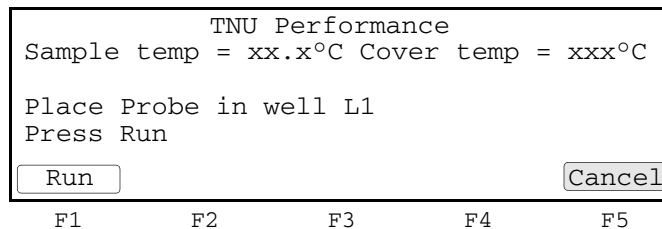
Before you begin configuring the System 9700, perform the procedures described in [“Setting Up the 0.2-mL Probe Assembly” on page 3-8](#).

**To configure the System 9700 for the Calibration Verification Test:**

- Power on the System 9700. The Main menu is displayed.
- Press **F4** (Util). The Utilities screen is displayed.
- Press **F1** (Diag). The Diagnostics screen is displayed.
- Press **F3** (TmpVer). The Temperature Verification screen is displayed.



- Press **F2** (TNU). The TNU Performance setpoint screen is displayed and the system is automatically configured for the Temperature Non-Uniformity Test. When the configuration is complete, the TNU Performance probe position screen is displayed.



- Continue with [“Performing the Temperature Non-Uniformity Test” on page 3-9](#).

## Performing the Temperature Non-Uniformity Test

Before you begin the Temperature Non-Uniformity Test:

- Perform the procedures in:
  - [“Setting Up the 0.2-mL Probe Assembly” on page 3-8](#)
  - [“Configuring the System 9700” on page 3-9](#)
- Obtain the current Temperature Uniformity Data Sheet for your system, or copy the form on [page 3-14](#).

**To perform the Temperature Non-Uniformity Test:**

1. Press **F1** (Run).

This starts the Temperature Non-Uniformity Test. The TNU Performance screen is displayed with the first setpoint value, 95 °C.

```
TNU Performance
Sample temp = xx.x°C Cover temp = xxx°C
Setpoint is 95°C
Sample must be within 1.0°C of setpoint
Cancel
```

F1 F2 F3 F4 F5

If necessary, the System 9700 ramps up the sample block (sample temp) and lid (cover temp) temperatures to the specified values. It may take several minutes for the System 9700 to stabilize at these temperature.

When the sample block and lid temperatures are reached, the “Stabilizing at setpoint” screen is displayed. The TNU Performance screen counts down the time until the setpoint is stabilized.

```
TNU Performance
Sample temp = xx.x°C Cover temp = xxx°C
Stabilizing at setpoint x:xx
Cancel
```

F1 F2 F3 F4 F5

2. When the “Stabilizing at setpoint” value decrements to zero, read the digital thermometer.

Refer to the instructions included with the Temperature Verification System for a detailed description on operating the digital thermometer.

- Using the numeric keys, type the value displayed on the digital thermometer in the “Enter actual block temperature” field.

TNU Performance

Sample temp = xx.x°C Cover temp = xxx°C

Enter actual block temperature

F1      F2      F3      F4      F5

**Note:** The digital thermometer displays a four-digit value; round off the value to three digits before typing it in the Calibration Verification screen.

Record the value and well number on the Temperature Non-Uniformity Test Data Sheet ([page 3-14](#)).

- Press **Enter**.

The System 9700 automatically begins the second reading. The TNU Performance screen is displayed for the second setpoint, 55 °C. If necessary, the System 9700 ramps up the sample and lid (cover temp) temperatures to the specified values before initiating the “Stabilizing at setpoint” value countdown.

TNU Performance

Sample temp = xx.x°C Cover temp = xxx°C

Setpoint is 55°C

Sample must be within 1.0°C of setpoint

F1      F2      F3      F4      F5

- When the “Stabilizing at setpoint” value decrements to zero, read the digital thermometer and enter the value for the second reading as described in [steps 2](#) and [3](#). Record the value.

- Press **Enter**.

The TNU Performance screen is displayed with the following message:

TNU Performance

Sample temp = xx.x°C Cover temp = xxx°C

Place probe in well xx

Press Run

F1      F2      F3      F4      F5

7. Test the next well:
  - a. **Move the probe assembly to the next well** – Slide the heated lid back. Move the probe. Make sure the probe is connected to the digital thermometer. Seat the probe and close the cover. See [“Setting Up the 0.2-mL Probe Assembly”](#) on page 3-8, steps 4 through 6.
  - b. **Initiate and enter the first setpoint reading** – Press **F1 (Run)**. Repeat steps 2 and 3 of this procedure.
  - c. **Initiate and enter the second setpoint reading** – Press **Enter**. Repeat steps 2 and 3 of this procedure.
8. To initiate testing of the next well, press **Enter**.
9. Repeat steps 7 and 8 of this procedure until you test all 12 wells (L1 to L6 and R1 to R6).
10. After the last well is tested, the System 9700 displays the values you entered.

Well	95°C	55°C	Well	95°C	55°C
L1	xx.x	xx.x	L5	xx.x	xx.x
L2	xx.x	xx.x	L6	xx.x	xx.x
L3	xx.x	xx.x	R1	xx.x	xx.x
L4	xx.x	xx.x	R2	xx.x	xx.x

Accept
More
Cancel

F1
F2
F3
F4
F5

Compare the values displayed with the actual test results you recorded on the Temperature Non-Uniformity Test Data Sheet. If the values differ, repeat the procedure to make sure the values were accurately entered.

11. If the values agree, press **F1 (Accept)**.
12. Continue with [“Evaluating the Results”](#) on page 3-13 and [“Ending the Test”](#) on page 3-13.

**Evaluating the Results** When the System 9700 completes the Temperature Non-Uniformity Test, the TNU Performance screen is displayed. See the table below to evaluate the results.

If the performance result displays...	Then...
Pass after both setpoint temperatures	The temperature of the sample block wells is uniform.
"Fail" after one or both setpoints	<p>The temperature variation of the sample block wells is unacceptable.</p> <ul style="list-style-type: none"> <li>• Repeat the procedure to make sure you accurately read and entered the temperature readings.</li> <li>• If the test fails again, contact Applied Biosystems Technical Support. See <a href="#">"How to Obtain Services and Support"</a> on page vi.</li> </ul>

**Ending the Test** To end the test, follow the procedures in ["Ending the Test"](#) on page 3-6.

**Data Sheet:  
Temperature  
Non-Uniformity  
Test**

When you run the Temperature Non-Uniformity Test, record the setpoint values for wells L1–L6 and R1–R6 on a copy of this data sheet. At the end of the Temperature Non-Uniformity Test, check the values displayed on the System 9700 against the values recorded to ensure accurate test records.

**IMPORTANT!** Use a photocopy of this page to record values, and keep the original intact.

<b>Date</b>		
<b>Tested By</b>		
<b>Probe Serial No.</b>		
<b>Meter Serial No.</b>		
<b>Setpoint Value</b>	<b>95 °C</b>	<b>55 °C</b>
<b>L1</b>		
<b>L2</b>		
<b>L3</b>		
<b>L4</b>		
<b>L5</b>		
<b>L6</b>		
<b>R1</b>		
<b>R2</b>		
<b>R3</b>		
<b>R4</b>		
<b>R5</b>		
<b>R6</b>		



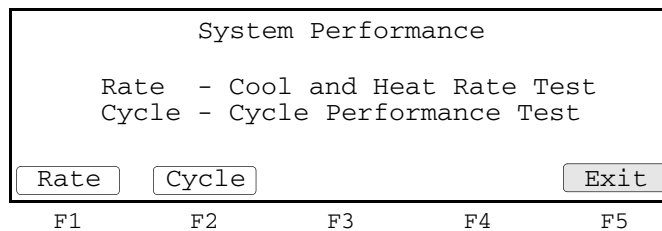
## Performing System Performance Diagnostics

After you have configured the GeneAmp PCR System 9700, conduct the system Rate and Cycle performance tests to verify the integrity of the cooling and heating system.

**IMPORTANT!** Before you begin these tests, make sure that you place an empty 96-well plate with full plate lid on the sample block (or use an empty tray and lid the wells with caps or the full plate cover). Slide the heated lid forward, and pull the lever down.

### Accessing the Tests

To access the tests, press **System** from the Diagnostics screen. The System Performance screen is displayed.

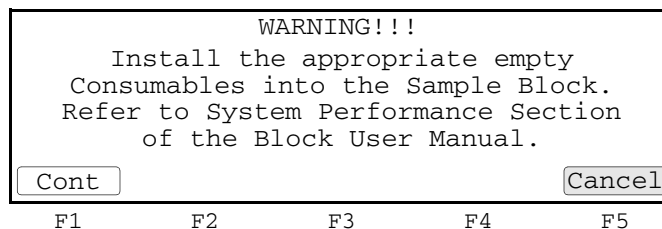


### Performing the Rate Test

Use the Rate Test to verify that the Peltier units are operating correctly. The test takes approximately two minutes to run.

To perform the Rate Test:

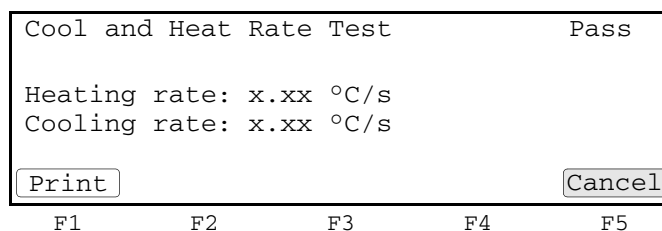
1. Press **Rate** in the System Performance screen. If appropriate, the following reminder is displayed.



2. After you have installed a plate and lid, press **Cont**.

The instrument then runs through a series of tests where the sample block is stabilized at 35 °C, 94 °C, and 4 °C.

At the conclusion of the test, the Cool and Heat Test screen is displayed. The screen displays the test results and whether the test results passed or failed.



The passing ranges for the Rate Test are:

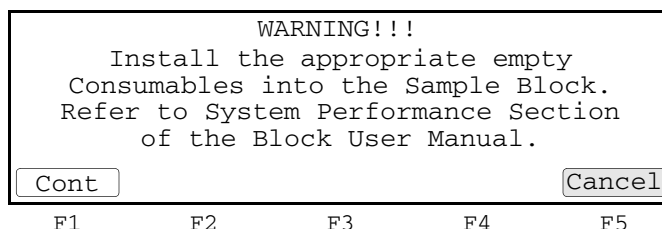
Block Type	Heating Rate	Cooling Rate
Dual 96-well	> 0.70 °C/second	> 1.4 °C/second

### Performing the Cycle Test

Use the Cycle Test to verify that the PCR cycling function operates properly. This test takes approximately 15 minutes to run.

#### To perform the Cycle Test:

1. Press **Cycle** from the System Performance screen. This runs the Cycle Test. If appropriate, the following reminder is displayed.

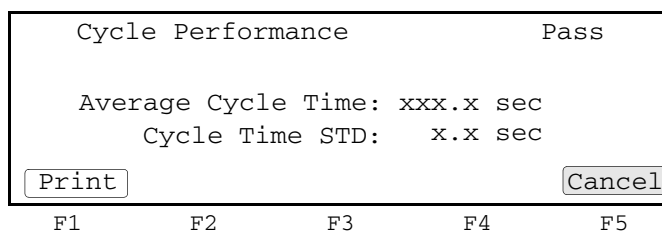


2. After you have installed a plate cover, press **Cont**.

The Cycle Test executes a standard PCR cycling reaction, measures, and reports the average cycle time, and the cycle to cycle variation.

**IMPORTANT!** Pressing Pause during the Cycle Test may generate false test results. Re-run the Cycle Test if Pause is pressed during the test.

3. At the conclusion of the test, the display indicates test results and whether the test results passed or failed.



The following table lists the passing ranges for the Cycle Test.

Average Cycle Time	<= 160 sec.
Cycle Time STD	< 5 sec.

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Printed in USA, 06/2003  
Part Number 4343363 Rev. B

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