

# NimbleGen Hybridization System User's Guide

Version 1.6



For life science research only.  
Not for use in diagnostic procedures.





# **NimbleGen Hybridization System User's Guide**

**Version 1.6**

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## Edition

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# Before You Begin

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## Safety Instructions

Please read the entire user's guide prior to operating the NimbleGen Hybridization System.

**Lab Safety:** Take appropriate safety precautions when working with any laboratory equipment. Always wear all necessary and appropriate protective equipment, including gloves and protective eyewear. You assume all safety risks in connection with your use of the Hybridization System.

**Environmental Conditions:** Use the Hybridization System on a dry, flat surface away from intense light and humidity and temperature extremes.

**Spills:** Avoid spilling liquids on the Hybridization System, particularly on the electronics module. Fluid seepage into internal components creates a potential shock hazard. If a spill occurs, unplug the system and wipe up immediately to prevent electrical shock.

**High Temperatures:** The Hybridization System operates at high temperatures (42 - 65°C) for extended periods of time and can cause skin burns. Use caution when handling system components or accessories.

**Broken Glass:** Improper slide placement within the Hybridization System could result in broken glass slides. To avoid injury, use caution when handling slides. Should breakage occur, immediately clean up any broken glass.

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## Declaration of Conformity



Conforms to ANSI/UL STD. UL 61010-1

Cert. to CAN/CSA STD. C22.2 No. 61010-1

Listed 4001346

## Safety and Information Labels

Safety and information labels on the Hybridization System warn of potential hazard or highlight important information. These labels refer to issues that must be taken into account when using this instrument.

The following symbols appear on the instrument:



- Do not let water or chemicals come into contact with any electrical components.
- Unplug the instrument if it will not be used for extended periods of time.
- Do not modify any part of the instrument. Modification may cause fire or malfunction and may void the manufacturer's warranty.



- Do not touch the surface of the heat block. The block may be hot enough to cause immediate burning.

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## Electrical Safety

The Hybridization Systems 4 and 12 are designed in accordance with Protection Class I (IEC). The chassis/housing of the instrument is connected to Protection Earth (PE) by means of a cord. For protection against electrical shock hazards, the instrument must be directly connected to an approved power source, such as a 3-wire grounded receptacle for the 110V or 220V line.

Where an ungrounded receptacle is encountered, a qualified electrician must replace it with a properly (PE) grounded receptacle in accordance with the local electrical code. An extension must not be used. Any break in the electrical ground path, whether inside or outside the instrument, may create a hazardous condition. Under no circumstances should the user attempt to modify or deliberately defeat the safety features of this instrument. If the power cord becomes cracked, frayed, broken, or otherwise damaged, it must be replaced immediately with the equivalent part from Roche Diagnostics.

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## Care and Maintenance

- Always disconnect power from the Hybridization System prior to cleaning. Clean the Hybridization System with a cloth dampened with a mild solution of soapy water. Do not use solvents and aggressive chemicals.
- When not in use, switch off the mixing component of the Hybridization System.
- Have the Hybridization System serviced only by Roche NimbleGen. If the Hybridization System is in need of service or you have questions, contact your local Roche Microarray Technical Support (refer to page 7). They will provide instructions for getting the Hybridization System serviced, if needed.

You may void your warranty if you fail to report a maintenance issue in a timely manner or if the Hybridization System is serviced by any party other than Roche NimbleGen.

## Intended Use Statement

The Hybridization System is designed for use in the semi-automated hybridization of NimbleGen arrays. It is intended for life science research only and is not for use in diagnostic procedures.

## System Specifications

Specification		Hybridization System 4	Hybridization System 12
<b>Dimensions</b> (width x depth x height)	Cover open	20 x 37 x 39cm	29 x 73 x 30cm
	Cover closed	20 x 37 x 17cm	29 x 73 x 14cm
<b>Weight</b>		7.9kg	19.0kg
<b>Capacity</b>		4 slides	12 slides
<b>Slide formats</b>		24.9 - 25.5mm x 75.4 - 76.4mm	
<b>Electrical requirements</b>	Power	210VA (heating) / 12VA (mixing)	580VA total
	Voltage	100 - 110V 60Hz (standard) 220 - 230V 50Hz (optional)	
	Fuses	5.0 AT	5.0 AT (220V) 8.0 AT (110V)
<b>Electromagnetic emission</b>		Class A	Class B
<b>Temperature</b>	Ambient operating temperature	16.5 - 27.5°C	
	Incubation temperature range	42 - 65°C	
	Temperature control precision	± 1.0°C	

**Warning:** The Hybridization System 4 is a Class A product. In a domestic environment, this product may cause radio interference that may require you to take adequate measures.

## Shipping Packaging

The Hybridization System 4 is shipped within a cardboard box. The Hybridization System 12 is shipped secured to a pallet within a cardboard box.

## Carrying / Lifting

The Hybridization Systems 4 and 12 can be lifted by the base plate at any position.



The Hybridization System 12 should be handled by two people.

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## Installation Requirements

The Hybridization System is intended for indoor use only: altitude above sea level (0m to 2000m).

Be aware of these requirements when choosing a location for the Hybridization System:

- Place the instrument on a flat, stable and vibration-free surface.
- Place the instrument with its backside no closer than 10cm to the next object (for example, a wall or another instrument).
- A gap of 10cm is required on the left and right side of the instrument to allow for air circulation.
- Ensure the ventilation outlet of the cooling unit is not obstructed.
- Ensure the wall outlet is always reachable to easily unplug the instrument.

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## Disposal of the Instrument

All electrical and electronic products should be disposed of separately from the municipal waste system. Proper disposal of your old appliance prevents potential negative consequences from the environment and human health.



The instrument must be treated as biologically contaminated hazardous waste. Decontamination (i.e., a combination of processes, including cleaning, disinfection and/or sterilization) is required before reuse, recycling, or disposal.



Dispose of the instrument according to local and/or laboratory regulations. For more information, contact your local Roche Microarray Technical Support.

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## Technical Support

If you have questions, contact your local Roche Microarray Technical Support. Go to [www.nimblegen.com/arrayssupport](http://www.nimblegen.com/arrayssupport) for contact information.

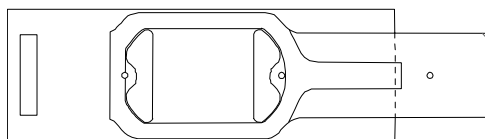
# Chapter 1. Introduction

This chapter introduces the NimbleGen Hybridization System 4 and NimbleGen Hybridization System 12, describing the benefits and components of these systems.

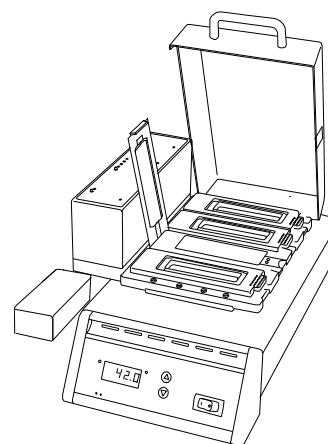
## Hybridization System Overview

A NimbleGen Hybridization System enables quick, consistent, and reproducible microarray hybridizations. This easy-to-use system provides an active mixing action and constant incubation temperature to improve hybridization uniformity and enhance signal. Its robust and proven design ensures smooth operation, while its modular framework facilitates rapid scale-up of your microarray experiments.

NimbleGen mixers, which you adhere directly to microarray slides before sample loading and hybridization, are a key component of the Hybridization System. They are optimized for NimbleGen array dimensions, ensuring uniform signal and high sensitivity with minimal sample volume. Mixers are supplied with your NimbleGen arrays or purchased separately.



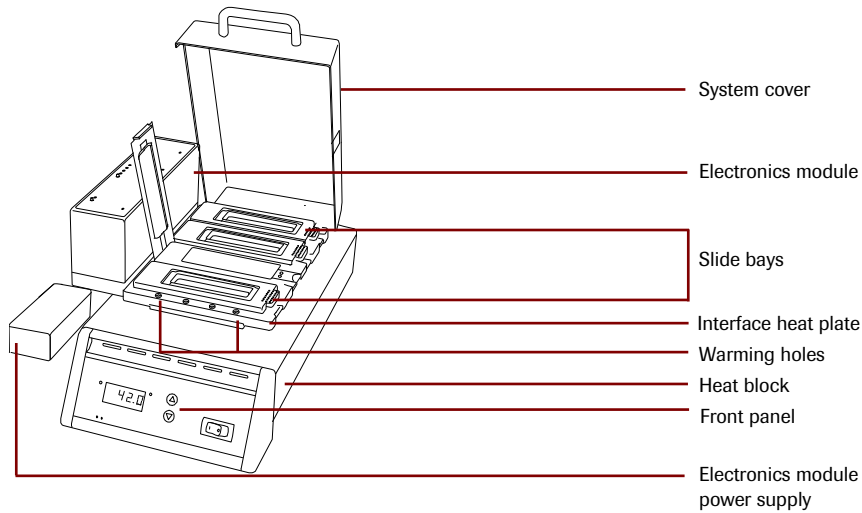
**Figure 2: NimbleGen Mixer.** Adhere the NimbleGen mixer directly to the microarray slide before sample loading and hybridization. The mixer ensures uniform signal and high sensitivity.



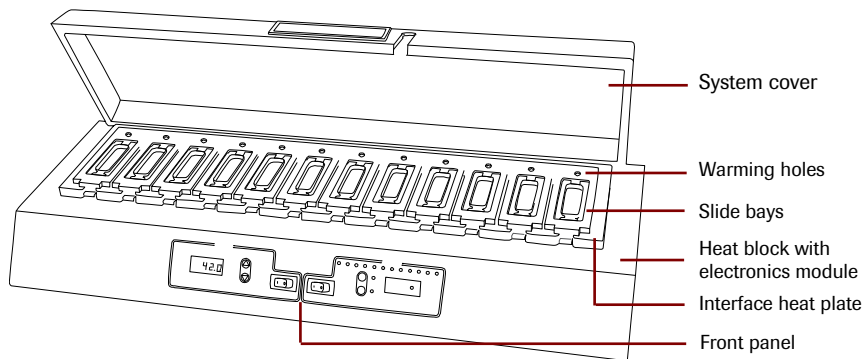
**Figure 1: Hybridization System.** The NimbleGen Hybridization System 4, illustrated above, enables you to incubate four slides at once, while the Hybridization System 12, not shown, processes up to 12 slides.

## System Components

Refer to the illustrations and table below to identify the components of the NimbleGen Hybridization System.



**Figure 3: Hybridization System 4 – System Components**



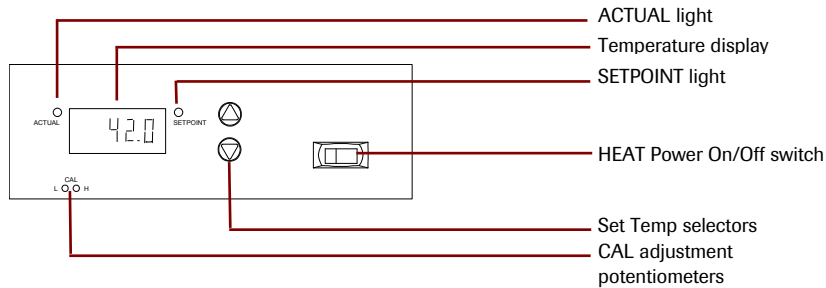
**Figure 4: Hybridization System 12 – System Components**

The following table describes the system components identified in Figure 3 and Figure 4:

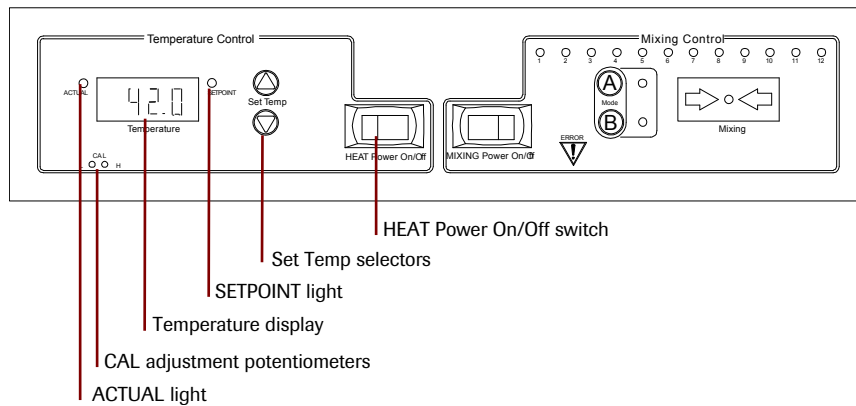
System Component	Description
System cover	The hinged cover assists in maintaining system temperature and prevents photo bleaching of the labeled target. The cutout in the cover enables you to insert a thermometer when the cover is closed. The temperature at the thermometer port typically varies $\pm 3^{\circ}\text{C}$ of the actual temperature shown on the Hybridization System's temperature display.
Slide bays	The slide bays hold the mixer-slide assemblies during hybridization. Each slide bay includes a clear plastic clamp, which enables you to see the mixing action of the NimbleGen mixer during hybridization. The bay clamp ensures a connection between the NimbleGen mixer and the Hybridization System's mixing module. The connection occurs via air ports on the mixer and two small O-rings located on the slide bay. (Refer to Figure 10 on page 20 for the location of the O-rings.)
Warming holes	Each warming hole can hold a single 1.5ml microcentrifuge tube. (Hybridization System 12 only) A warming hole is also available for a 0.2ml PCR tube.
Electronics module	The electronics module controls the mixing functions of the Hybridization System.
Heat block and interface heat plate	The heat block and interface heat plate warm the slide bays and warming holes.
Electronics module power supply (Hybridization System 4 only)	A DC power supply is provided for the electronics module for the Hybridization System 4.
Front panel	For the Hybridization System 4, the front panel includes the temperature control panel, which is described in more detail on page 8. For the Hybridization System 12, the front panel includes the temperature control panel and mixing control panel, which are described in more detail on pages 8 and 13, respectively. <b>Note:</b> The mixing control panel of the Hybridization System 4 is located on the top of its electronics module (Figure 3).

### Temperature Control Panel

Use the temperature control panel to turn on the heat block, set the hybridization temperature, and determine if the Hybridization System has reached the requested hybridization temperature.



**Figure 5: Hybridization System 4 – Temperature Control Panel**



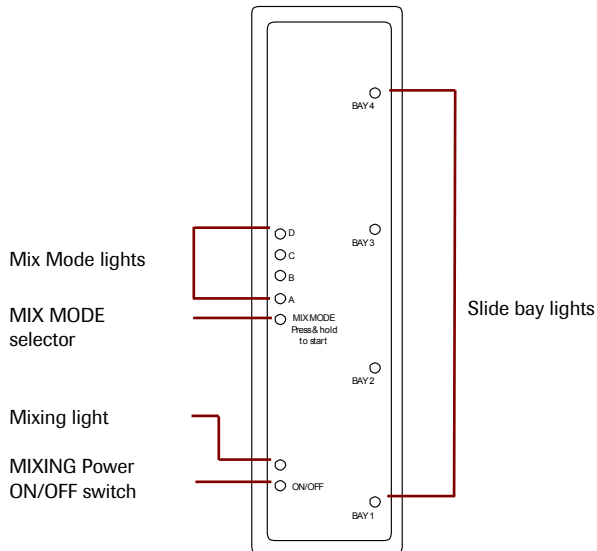
**Figure 6: Hybridization System 12 – Temperature Control Panel**

The following table describes the temperature controls identified in Figure 5 and Figure 6:

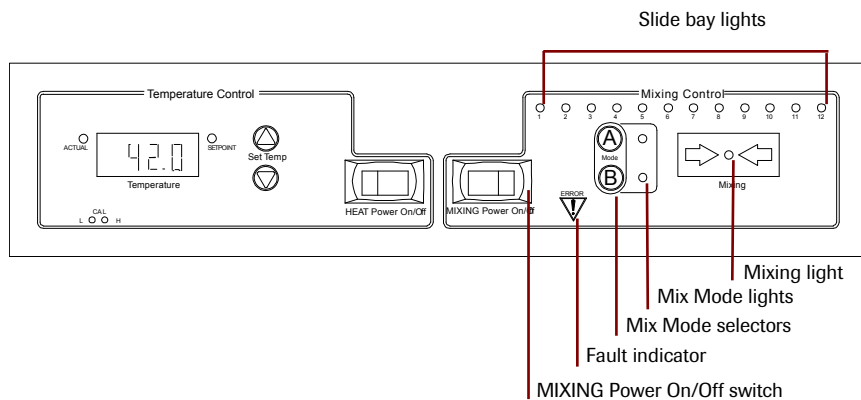
Temperature Control	Description
ACTUAL light	Is lit when the temperature display shows the actual temperature of the heat block.
SETPOINT light	Is lit when the temperature display shows the selected hybridization temperature.
Temperature display	Displays either the actual or selected hybridization temperature, respectively, depending on whether the ACTUAL or SETPOINT light is lit.
Set Temp selectors	Press $\Delta$ to raise and $\nabla$ to lower the hybridization temperature.
HEAT Power On/Off switch	Use this toggle switch to turn on/off power to the heat block.
CAL adjustment potentiometers	For use by Roche Microarray Technical Support only.

## Mixing Control Panel

The mixing control panel enables you to select the mixing mode to use during hybridization, start mixing and stop mixing, and identify the status of the slide bays. Use mix mode B to process NimbleGen arrays.



**Figure 7: Hybridization System 4 – Mixing Control Panel**



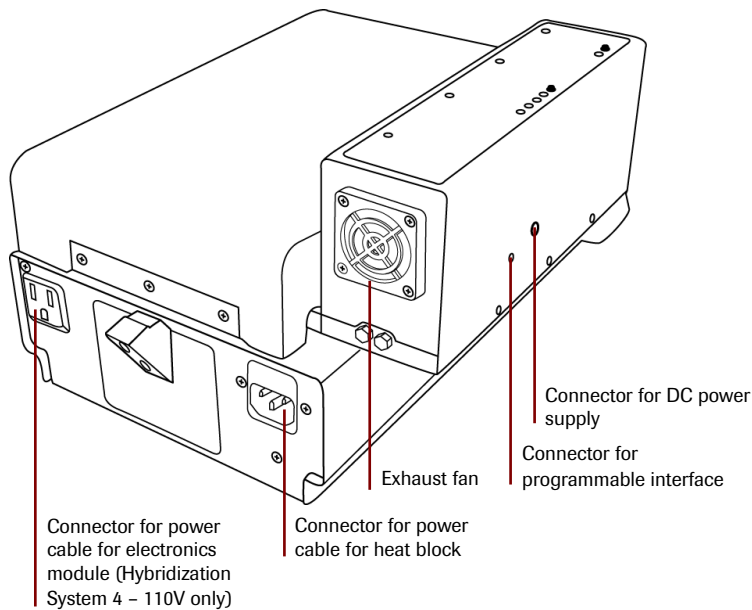
**Figure 8: Hybridization System 12 – Mixing Control Panel**

The following table describes the mixing controls identified in Figure 7 and Figure 8:

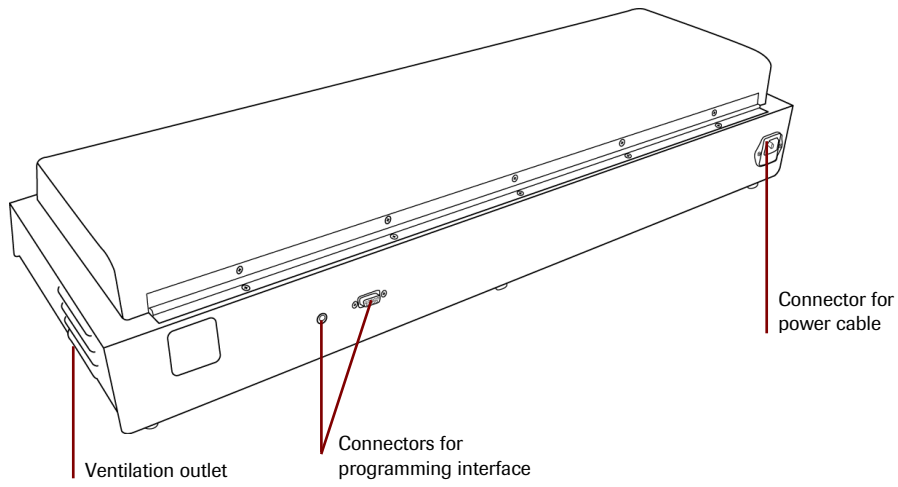
Mixing Control	Description
Slide bay lights	During mixing, the light for each occupied bay is green. The light is red or remains off if the bay is empty. Refer to <i>Chapter 4, Troubleshooting</i> for additional details on these lights.
MIXING Power On/Off switch	Use this toggle switch to turn on/off power to the mixing module.
Mix Mode selector(s)	Select between four pre-programmed modes for Hybridization System 4 or two modes for the Hybridization System 12. If you don't select a mix mode, the Hybridization System will default to the last-used mode. Refer to <i>Chapter 3, Operation</i> for details on selecting a mix mode.

Mixing Control	Description
Mixing light	Indicates if active mixing is occurring within the slide bays.
Mix Mode lights	Identify the status of mixing for the slide bay. The light is green if the experiment is proceeding normally. Refer to <i>Chapter 4, Troubleshooting</i> if another color is displayed.
Fault indicator (Hybridization System 12 only)	Indicates a problem with the Hybridization System. Contact Roche Microarray Technical Support.

### Locations of Connectors and Fan / Ventilation Outlet



**Figure 9: Hybridization System 4 – Locations of Connectors and Exhaust Fan**



**Figure 10: Hybridization System 12 – Location of Connectors and Ventilation Outlet**



## Chapter 2. Installation

This chapter describes how to install the Hybridization System and verify it is operating properly.

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### System Inspection

1. Inspect the shipping box, packaging, instrument, and accessories for damage. If the system is damaged, immediately notify the carrier and Roche NimbleGen.

The following items should be supplied in the Accessory Kit: Precision Mixer Alignment Tool (PMAT), Mixer Disassembly Tool, Mixer Brayer, System Verification Assemblies, replacement O-rings, forceps, and this user's guide.

2. Save all packaging materials for the unlikely case you need to send the Hybridization System to Roche NimbleGen for service.

*Note:* Before returning the system, contact Roche Microarray Technical Support and obtain a Return Authorization (RA) number.

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### Operating Environment

For optimal operation, locate the Hybridization System away from excessive humidity, intense light, air drafts, and temperature extremes.

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### System Installation

1. Place the Hybridization System on a solid, level surface.
2. Plug the power cord into the back panel of the Hybridization System and into a wall power receptacle.
3. (Hybridization System 4 – 110V only) Plug one end of the power cable of the electronic module power supply into the side of the electronics module. Plug the other end into the receptacle provided on the back panel of the Hybridization System 4 – 110V.

## System Verification

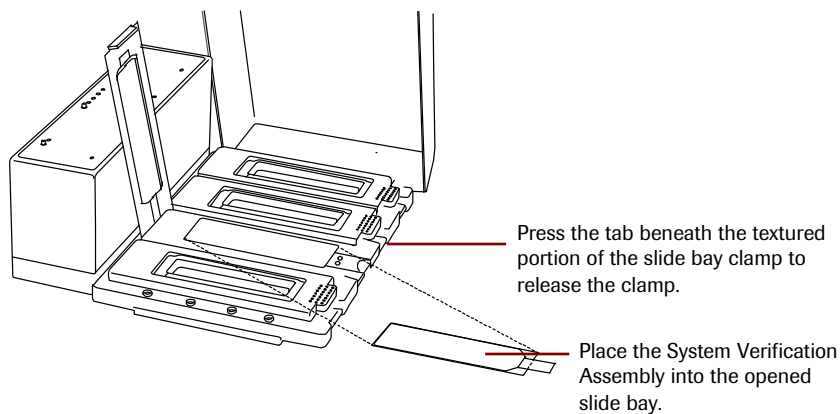
To perform system verification, use the two System Verification Assemblies provided with the Hybridization System and optionally an alcohol or mercury thermometer provided by you.

1. Turn on the HEAT Power On/Off switch.
2. Adjust the temperature set point to 42°C by pressing ▽ or △.
3. With the system cover closed, wait at least 3 hours for the heat block to stabilize at the target temperature.

The temperature display alternates between the actual temperature and temperature set point. When the ACTUAL light is lit, the actual temperature is being displayed. When the SETPOINT light is lit, the set point temperature is being displayed.

It is normal for the temperature within the system to fluctuate a small amount as the heat block cycles on and off.

4. (Optional) With the system cover closed, insert a thermometer into the system cover's cutout. Check the thermometer's reading against the actual temperature shown on the Hybridization System's temperature display. The temperature at the thermometer port typically varies  $\pm 3^{\circ}\text{C}$  from the actual temperature.
5. Open the system cover.
6. Place the System Verification Assemblies into slide bays:
  - a. Press the tab beneath the textured portion of the slide bay clamp to release the clamp and then lift the clamp.
  - b. Insert the assembly into the slide bay, making sure it is seated completely within the bay.
  - c. Close the slide bay clamp and press its textured portion to lock into place.



**Figure 11: Placing System Verification Assemblies into Slide Bays**

7. Turn on mixing and select the mix mode:

Hybridization System Model	Procedures
Hybridization System 4	<p><b>a.</b> Turn on the MIXING Power On/Off switch. All lights flash briefly. You then see a solid green Mixing light above the switch and a flashing green light next to the last mix mode used.</p> <p><b>b.</b> Repeatedly press the Mix Mode selector until the light is flashing next to the B mode.</p> <p><b>c.</b> Press and hold the Mix Mode switch for approximately 2 seconds to begin mixing.</p> <p><b>Note:</b> If you don't select a mix mode, the Hybridization System defaults to the last-used mode and automatically begins mixing after 10 seconds.</p>
Hybridization System 12	<p><b>a.</b> Turn on the MIXING Power On/Off switch. The two green Mix Mode lights on the front panel will flash for 5 seconds.</p> <p><b>b.</b> Press the B Mix Mode selector. After 5 seconds, mixing will begin automatically.</p> <p><b>Note:</b> If you don't select a Mix Mode, the Hybridization System defaults to the last-used mode and automatically begins mixing after 5 seconds.</p>

8. Wait while the mixing system performs an initial Station Seal Test (SST):

- The slide bay indicator will light up green if the slide bay passes the test.
- If a slide bay is empty or if the slide is not properly seated, the indicator light for that bay will remain off or light up red.

9. For the slide bays containing a System Verification Assembly, ensure that the slide bay indicator is green. If there is no light or it is red, refer to “If a Slide Bay Fails System Verification” below.

10. Turn off mixing using the MIXING Power On/Off switch.

11. Remove the System Verification Assemblies.

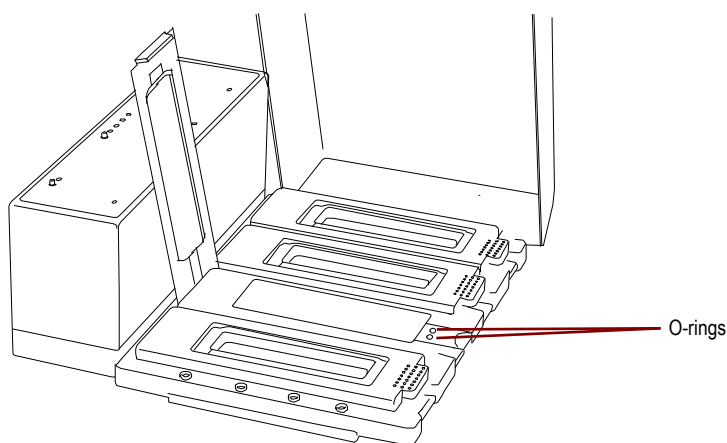
12. Repeat steps 5 - 11 until all you have verified all slide bays are functioning properly.

13. Remove the System Verification Assemblies from the Hybridization System and store for possible future use. During hybridization experiments, it is acceptable to run the Hybridization System with some of the bays empty.

### If a Slide Bay Fails System Verification

If the slide bay indicator remains off or lights up red for a slide bay containing a System Verification Assembly:

1. Turn off the HEAT Power On/Off switch.
2. Open the system cover.
3. Evaluate the cause of failure:
  - Make sure the slide bay clamp is tightly engaged. Push firmly on the textured portion of the clamp and listen for an audible snap.
  - Ensure the System Verification Assembly is seated correctly in the slide bay.
  - Check for the presence of O-rings in that slide bay. If an O-ring is missing, install a new one. You received replacement O-rings with your Hybridization System, and you can order additional replacements from Roche NimbleGen. Refer to *Appendix A, Ordering Information* for details about purchasing O-rings.



**Figure 12: Locating O-rings**

4. If the same slide bay fails a second time, contact Roche Microarray Technical Support.

## Chapter 3. Operation

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### Performing a Hybridization Experiment

Refer to the *NimbleGen Arrays User's Guide* that came with your microarray for a hybridization protocol specific to your application. That user's guide provides detailed instructions on performing the hybridization experiment using the Hybridization System, including how to adhere the NimbleGen mixer to the slide and how to load sample onto the microarray.

You are solely responsible for understanding and successfully completing the hybridizations on the microarrays you purchase from Roche NimbleGen. Roche NimbleGen does not guarantee any results that you may achieve.

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### Setting the Hybridization Temperature

1. Turn on the Hybridization System with the HEAT Power On/Off switch.
2. Adjust the temperature set point to 42°C by pressing ▽ or △.
3. With the system cover closed, wait at least 3 hours for the heat block to stabilize at the target temperature.

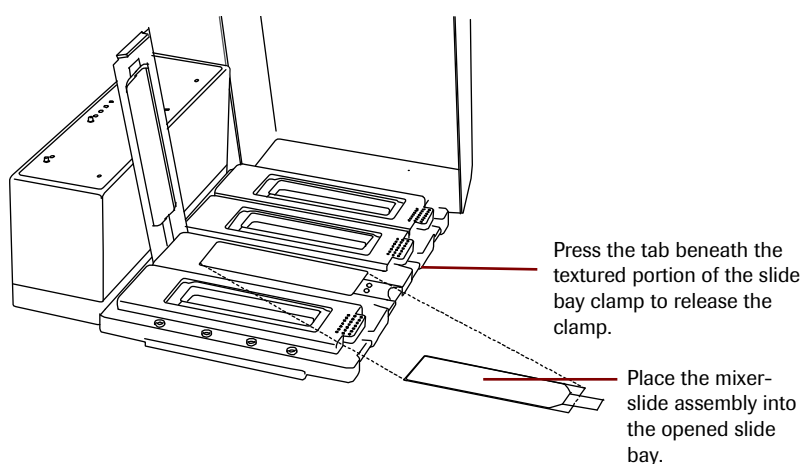
The temperature display alternates between the actual temperature and temperature set point. When the ACTUAL light is lit, the actual temperature is being displayed. When the SETPOINT light is lit, the set point temperature is being displayed.

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### Placing a Mixer-Slide Assembly into a Slide Bay

Refer to the *NimbleGen Arrays User's Guide* that came with your microarray for details on adhering the NimbleGen mixer to the microarray slide.

1. Press the tab beneath the textured portion of the slide bay clamp to release the clamp and then lift the clamp.
2. Insert the mixer-slide assembly into the slide bay.
3. Close the slide bay clamp and press its textured portion to lock the clamp into place.



**Figure 13: Placing Mixer-Slide Assemblies into Slide Bays**

## Starting Mixing

Refer to the appropriate instructions below for your model of Hybridization System:

### Hybridization System 4

1. Turn on the MIXING Power On/Off switch. All lights flash briefly. You see a solid green Mixing light and a flashing green Mix Mode light next to the last mix mode used.
2. Repeatedly press the Mix Mode selector until the light is flashing next to the mix mode you want to use. Roche NimbleGen recommends mix mode B in its hybridization protocols.

Mix Mode	½ Cycle Time
A	3.3 seconds
B	4.3 seconds
C	6.3 seconds
D	6.7 seconds

3. Press and hold the Mix Mode switch for approximately 2 seconds to begin mixing.

*Note: If you don't select a mix mode, the Hybridization System defaults to the last-used mode and automatically begins mixing after 10 seconds.*

4. During normal mixing, the green light beside each bay will remain on steadily in each populated bay as long as normal mixing continues.

### Hybridization System 12

1. Turn on the MIXING Power On/Off switch. The two green Mix Mode lights on the front panel will flash for 5 seconds.
2. Press the Mix Mode A or B selector. Roche NimbleGen recommends mix mode B in its hybridization protocols. After 5 seconds, mixing will begin automatically.

Mix Mode	½ Cycle Time
A	3.3 seconds
B	4.3 seconds

**Note:** If you don't select a mix mode, the Hybridization System defaults to the last-used mode and automatically begins mixing after 5 seconds.

During normal mixing, the green light for each slide bay indicator remains on steadily for each occupied bay. In addition, the left and right Mixing lights on the front panel will alternately flash.

### Pausing and Restarting Mixing

You can pause mixing if you need to add or remove slides during an experiment, or to remove a slide for close examination, such as when a leak is detected.

#### Hybridization System 4

1. To pause mixing, press the Mix Mode selector. The Mix Mode light for the currently selected mode flashes green.
2. To restart mixing using the previously selected mix mode, press the Mix Mode selector again.

#### Hybridization System 12

1. To pause mixing, press the Mix Mode selector for the currently selected mix mode (A or B). Both Mix Mode lights will flash green while the Hybridization System is in pause mode.
2. To restart mixing, press the Mix Mode selector for the previously selected mix mode.

The Hybridization System automatically resumes mixing after approximately 20 minutes if you do not press a Mix Mode selector.

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### **If an Air Leak Occurs During Hybridization**

If an air leak occurs during hybridization, the Hybridization System detects a fault and performs a Station Seal Test (SST). If the system is unable to reestablish mixing within that slide bay, the indicator light changes from green to red and remains red until the system is restarted or the problem is fixed. Refer to *Chapter 4, Troubleshooting* for additional information.

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### **If Power Is Interrupted**

If power to the Hybridization System is interrupted and restored, the Hybridization System performs an SST, and then mixing automatically resumes using the last Mix Mode selected.

# Chapter 4. Troubleshooting

## Slide Bay Lights

Slide Bay Light(s)	Meaning	Corrective Action
<b>Hybridization System 4 (refer to Figure 7 on page 13)</b>		
Solid green	The slide bay passed the Station Seal Test (SST), and the experiment is continuing normally.	No action is necessary.
Solid red	There is no slide in the slide bay. -or- One of the following occurred: <ul style="list-style-type: none"> <li>■ The mixer-slide assembly was removed from the bay.</li> <li>■ A leak has been detected.</li> <li>■ The slide bay failed the secondary SST and was inactivated.</li> </ul>	Assuming a mixer-slide assembly is in the bay: <ol style="list-style-type: none"> <li>1. Turn off mixing using the MIXING Power On/Off switch.</li> <li>2. Open the system cover.</li> <li>3. Verify that the clamp is closed.</li> <li>4. If necessary, open the slide bay clamp, remove the mixer-slide assembly, and ensure both O-rings are present and intact. Install an O-ring if it is missing and then reinstall the mixer-slide assembly. (Refer to Figure 12 on page 20 for the location of O-rings.)</li> <li>5. Turn on mixing using the MIXING Power On/Off switch.</li> <li>6. Close the system cover.</li> <li>7. Contact Roche Microarray Technical Support if the condition persists.</li> </ol>
Flashing red	There is problem with the Hybridization System.	Contact Roche Microarray Technical Support.
Orange temporarily and then switches off	The slide bay did not pass the SST.	Assuming a slide is in the slide bay: Refer to the recommendation for a solid red indicator light, above.
No light	The slide bay failed initial SST. The test will continue on remaining slide bays.	Assuming a slide is in the slide bay: Refer to the recommendation for a solid red indicator light, above.
<b>Hybridization System 12 (refer to Figure 8 on page 13)</b>		
Solid green	The slide bay passed the Station Seal Test (SST), and the experiment is continuing normally.	No action is necessary.

Slide Bay Light(s)	Meaning	Corrective Action
Solid red	There is no slide in the slide bay. -or- One of the following occurred: <ul style="list-style-type: none"> <li>■ The slide bay failed the secondary SST and was inactivated.</li> <li>■ The slide has been removed from the bay.</li> <li>■ A leak has been detected.</li> </ul>	Assuming a slide is in the bay: <ol style="list-style-type: none"> <li>1. Turn off mixing using the MIXING Power On/Off switch.</li> <li>2. Open the system cover.</li> <li>3. Verify that the slide bay clamp is closed.</li> <li>4. If necessary, open the slide bay clamp, remove the mixer-slide assembly, and ensure both O-rings are present and intact. Install an O-ring if it is missing and then reinstall the mixer-slide assembly.</li> <li>5. Turn on mixing using the MIXING Power On/Off switch.</li> <li>6. Close the system cover.</li> <li>7. Contact Roche Microarray Technical Support if the condition persists.</li> </ol>
No light	The slide bay failed the initial SST.	Assuming a slide is in the bay: Refer to the recommendation for a solid red indicator light, above.

## Mix Mode Lights

Mix Mode Light(s)	Meaning	Corrective Action
<b>Hybridization System 4 (refer to Figure 7 on page 13)</b>		
Solid green	The slide bay passed the Station Seal Test (SST), and the experiment is continuing normally.	No action is necessary.
Flashing green	The system is in pause mode.	Press and hold the Mix Mode selector to resume mixing.
Flashing green (alternating 1 light, then 3 lights)	A potential system fault has been detected.	<ol style="list-style-type: none"> <li>1. Allow the experiment to continue to completion.</li> <li>2. Contact Roche Microarray Technical Support at your earliest convenience.</li> </ol>
No light	The mixing unit is not receiving power.	<ol style="list-style-type: none"> <li>1. Verify the MIXING Power On/Off switch is in the on position.</li> <li>2. Verify the AC adapter cord is plugged into the Hybridization System and to a live receptacle.</li> <li>3. Contact Roche Microarray Technical Support if condition persists.</li> </ol>

Mix Mode Light(s)	Meaning	Corrective Action
<b>Hybridization System 12 (refer to Figure 8 on page 13)</b>		
Solid green (either light)	The mix mode next to that light is selected.	No action is necessary.
Flashing green (both lights)	The system is waiting for a Mix Mode to be selected. The Mix Mode next to that light is active.	<ol style="list-style-type: none"> <li>1. Do nothing, and mixing will begin automatically in 5 seconds using the last-selected mix mode.</li> <li>2. Select the Mix Mode to use.</li> </ol>
No light (both lights)	The mixing unit is not receiving power.	<ol style="list-style-type: none"> <li>1. Verify that the power cord is plugged into a live receptacle.</li> <li>2. Verify the MIXING Power On/Off switch is in the on position.</li> <li>3. Contact Roche Microarray Technical Support if condition persists.</li> </ol>
Flashing green concurrently (both lights)	The system is in a pause state.	Press either Mix Mode selector to resume mixing.
Alternately flashing green (both lights)	The system is operating normally.	No action is necessary.

## Temperature

Problem	Cause	Corrective Action
Warming holes and slide bays not being heated	Heat block not operating properly	<ol style="list-style-type: none"> <li>1. (Hybridization System 4 only) Verify the heat block power supply is plugged into the electronics module and into the receptacle provided on the back panel of the Hybridization System.</li> <li>2. Verify the HEAT Power On/Off switch is in the on position</li> <li>3. Contact Roche Microarray Technical Support if the condition persists.</li> </ol>

## Leaks / Fluid Loss

Problem	Cause	Corrective Action
Evaporation and absorption	It is normal for a small amount of solution to be lost by evaporation and by absorption into the NimbleGen mixer.	No action needed; the amount of fluid loss to evaporation or adsorption is insufficient to cause a change in hybridization conditions.
NimbleGen mixer gasket leaks	Adhesive gasket leaks can be caused by: Debris, fingerprints, or physical damage to the gasket caused during removal of the release liner, handling, or placement and subsequent removal and replacement. Local areas of inadequate gasket bonding are usually visible, appearing cloudy or as an air bubble inclusion. Failure to remove air from the bond line between the gasket and the slide during the braying process. The bond line should appear clear and uniform.	Use care when handling and adhering the NimbleGen mixer to the microarray slide. Refer to the <i>NimbleGen Arrays User's Guide</i> that came with your microarray for instructions on adhering the mixer to the slide.
NimbleGen mixer fill/vent port leaks	Port leaks are a result of wet surfaces under the port seals. The detergent in hybridization solution makes it particularly disruptive to sealing properly.	Be careful to thoroughly dry the surface around the ports and do not apply pressure to the top of the mixer when placing the port seals. Pressing on the top of the mixer before the port seals are firmly adhered will force the hybridization solution out of the chamber. Refer to the <i>NimbleGen Arrays User's Guide</i> that came with your microarray for instructions on placing the port seals.

## Appendix A. Ordering Information

To place an order, contact your Roche NimbleGen Account Manager. Following is a list of components associated with the NimbleGen Hybridization System. For a complete list of Roche NimbleGen products and services, go to [www.nimblegen.com](http://www.nimblegen.com).

Catalog Number	Product	Quantity
05327695001	Hybridization System Accessory Kit	1
05223652001	NimbleGen Hybridization System 4 (110V)	1
05223679001	NimbleGen Hybridization System 12 (110V)	1
05223687001	NimbleGen Hybridization System 4 (220V)	1
05223695001	NimbleGen Hybridization System 12 (220V)	1



## Appendix B. Warranty

Information on warranty conditions are specified in the sales contract.  
Contact your Roche representative for further information.

Any unauthorized modification of the instrument invalidates the guarantee  
and service contract.





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