

Axiom™ 2.0 Assay 96-Array Format Automated Workflow SITE PREPARATION GUIDE

for use with:

Axiom™ 2.0 Reagent Kit

Axiom™ Array Plates

Applied Biosystems™ NIMBUS™ Target Preparation Instrument

Catalog Number 901758

Publication Number MAN0017741

Revision F.0



Affymetrix Pte Ltd |
7 Gul Circle #2M-01 |
Keppel Logistics Building |
Singapore 629563

Products manufactured at this site:

- Axiom™ Array Plates
- Axiom™ myDesign™ Array Plates



Thermo Fisher Scientific Baltics UAB |
V.A. Graiciuno 8, LT-02241 |
Vilnius, Lithuania

Products manufactured at this site:

Axiom™ 2.0 Reagent Kit

Revision history: MAN0017741 F.0 (English)

Revision	Date	Description
F.0	28 September 2023	<ul style="list-style-type: none"> • Updated product information for Axiom™ 96 Consumables Kit for Applied Biosystems™ NIMBUS™ 2.0 and Axiom™ NIMBUS™ Starter Pack-NC. • Content reorganization.
E.0	10 March 2023	<p>Added information regarding the optional use of the Fisher Scientific™, Nunc™ 96-Well Polypropylene DeepWell™ Storage Plate and adapter, as well as the associated new kits:</p> <ul style="list-style-type: none"> • Axiom™ NIMBUS™ Starter Pack-NC, 952493. • Axiom™ Starter Kit for Applied Biosystems™ NIMBUS™ Instrument-NC Combo Kit, 952496. • NIMBUS™ Upgrade Kit for NC, 952495.
D.0	28 April 2021	<ul style="list-style-type: none"> • Added options for using alternative 96-well round deepwell plates and 96-well PCR plates. • Added Axiom™ NIMBUS™ 2.0 Consumables Kit v2. • Changed method name to Axiom™ 96 Sample Automated Target Preparation Solution. • Added optional Digital Microplate Shaker.
C.0	13 December 2019	Added information for Windows™ 10 users.
B.0	26 November 2018	Corrected typos.
A.0	18 October 2018	<p>Initial release in Thermo Fisher Scientific document control system. Supersedes legacy Affymetrix publication number 703350. Updated to the current document template, with associated updates to trademarks, logos, licensing, and warranty.</p>

The information in this guide is subject to change without notice.

DISCLAIMER: TO THE EXTENT ALLOWED BY LAW, THERMO FISHER SCIENTIFIC INC. AND/OR ITS AFFILIATE(S) WILL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, MULTIPLE, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM THIS DOCUMENT, INCLUDING YOUR USE OF IT.

Important Licensing Information: These products may be covered by one or more Limited Use Label Licenses. By use of these products, you accept the terms and conditions of all applicable Limited Use Label Licenses.

TRADEMARKS: All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. Alpillo is a trademark and brand of Alpaqua Engineering, LLC. Axygen, is a trademark of Axygen, Inc. Bel-Art, Cryo-Safe, and Scienceware are trademarks or registered trademark of Bel-Art Products Corp. Beckman Coulter is a registered trademark of Beckman Coulter, Inc. Bio-Rad, Microseal, DNA Engine Tetracel, and Hard-Shell are registered trademarks of Bio-Rad Laboratories, Inc. Boekel Scientific and Jitterbug are trademarks of Boekel Scientific. Eppendorf and Mastercycler are registered trademarks of Eppendorf AG. Hamilton, Microlab, NIMBUS, and CO-RE are owned and/or registered by Hamilton Company in the U.S. and/or other countries. INHECO is a trademark of INHECO GmbH. New England Biolabs is a trademark of New England Biolabs. Microsoft, Windows, and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Rainin and Pipet-Lite are registered trademarks of Mettler-Toledo Rainin, LLC.. SpectraMax is a registered trademark of Molecular Devices Corporation. Thomas Scientific is a trademark of Thomas Scientific LLC. Vortex-Genie is a registered trademark of Scientific Industries, Inc.

©2018-2023 Thermo Fisher Scientific Inc. All rights reserved.

Contents

■	CHAPTER 1	NIMBUS™ Target Preparation Instrument configuration for Windows™ 7	5
		Preinstallation information	5
		Site selection	5
		Inventory of components	6
		Computer and software method for Windows™ 7	6
		Power requirements	7
		Hamilton™ Company equipment and software	7
		Operation specifications	7
		Components	8
		Install and test the instrument for Windows™ 7	9
		Software installation requirements	11
■	CHAPTER 2	NIMBUS™ Target Preparation Instrument configuration for Windows™ 10	12
		Preinstallation information	12
		Site selection	12
		Inventory of components	13
		Computer and software method for Windows™ 10	13
		Power requirements	14
		Hamilton™ Company equipment and software	14
		Operation specifications	14
		Components	15
		Install and test the instrument for Windows™ 10	16
		Software installation requirements	18
■	CHAPTER 3	NIMBUS™ Target Preparation Instrument setup	19
		Hamilton™ Company equipment and software	19
		Set up the INHECO™ devices	19
		Pedestals, Thermoshake, and CPAC accessory tool kit	20
		Assemble the trash chute	26
		Set up the Thermoshake Deepwell Plate Adapter	29
		Assemble the Alpillio™ Plate Cushion	31
		Assemble the CPAC tube adapter and cover	32
		O-ring care	34

- **CHAPTER 4 Assay equipment and supplies required** 35
 - Applied Biosystems™ equipment, software, reagents, and arrays required 35
 - Axiom™ consumables kits for the NIMBUS™ Instrument 37
 - Labware and accessories required 38
 - Deck accessories required from other vendors 38
 - Pipette tips 39
 - Labware used on the deck 39
 - Other equipment, consumables, and reagents required 43
 - Preamplification/amplification staging area 43
 - Oven requirements 44
 - Spectrophotometer 44
 - Thermal cycler recommendations and protocol 45
 - Shakers 45
 - Plate centrifuge 46
 - Other equipment, reagents, and supplies required 47
- Documentation and support** 49
 - Related documentation 49
 - Customer and technical support 50
 - Limited product warranty 51



NIMBUS™ Target Preparation Instrument configuration for Windows™ 7

The Applied Biosystems™ NIMBUS™ Target Preparation Instrument is required to run this version of the Axiom™ 2.0 Assay with the automated target preparation. This chapter contains information specific to the setup, maintenance, and safe use of the NIMBUS™ Instrument and equipment.

Preinstallation information

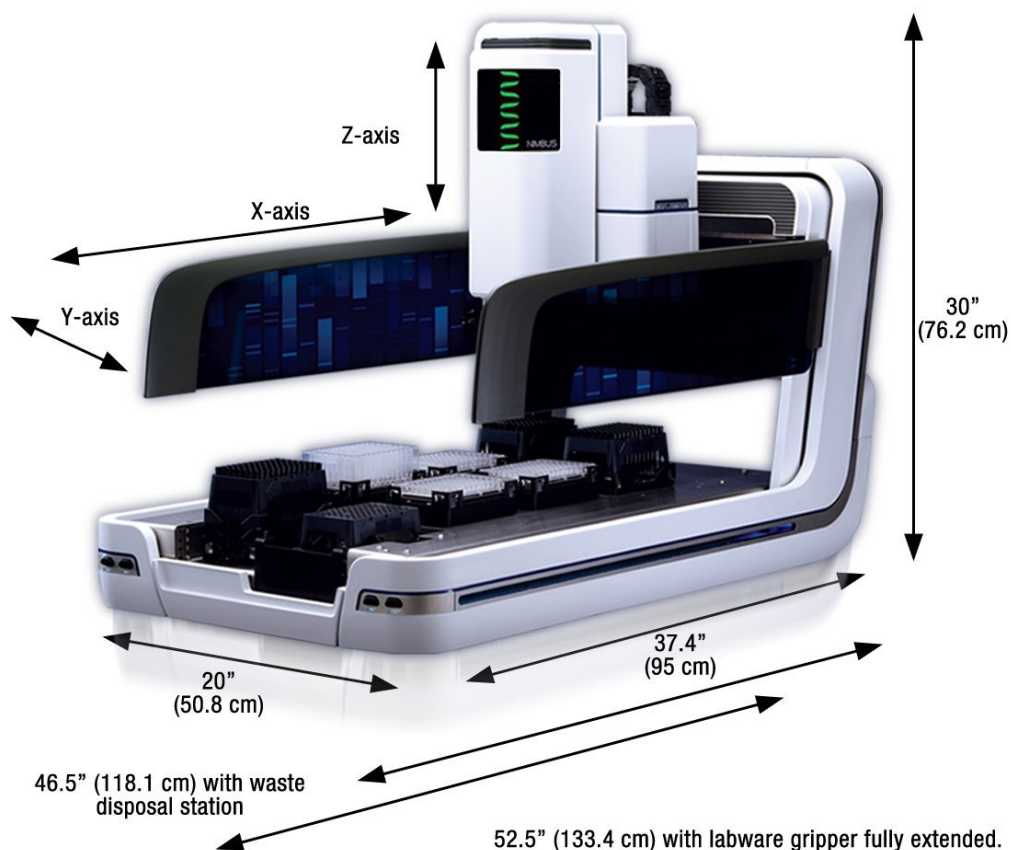
IMPORTANT! Read all of the information in this chapter before unpacking or moving the instrument.

Site selection

IMPORTANT! Determine the NIMBUS™ Instrument location carefully. Moving the instrument after installation requires recalibration.

Location considerations and requirements

- Keep the instrument away from direct sunlight, drafts, excessive vibrations, and widely fluctuating temperatures or humidity. This requirement is especially critical for low volume (<10 µL) applications that require highly accurate and precise pipetting.
- The instrument must be placed on a stable bench, table, or hood that can support up to 200 lbs (89.6 kg) without bowing or swaying.
- The instrument must be oriented so that when facing the instrument, the waste disposal station is on the *left* side of the instrument.
- Ensure that the bench/table surface is as level as possible and affords, at a minimum, the following dimensions:
 - Width (front to rear) 20 inches (50.8 cm)
 - Length (left to right) 52.5 inches (133.4 cm)
 - Height 30 inches (76.2 cm)



For optimum serviceability, it is best to position the NIMBUS Instrument on an island location in the laboratory. Ensure to plan additional space for:

- Computer, mouse, and other accessories such as a printer.
- Storage of manuals, tips, components, and labware.
- Integrated off-deck accessories and third-party devices.

The NIMBUS™ Instrument has a solid waste chute for collection of used tips which is mounted on the front left side of the instrument. The chute is designed with a slide such that the tips are directed off the bench/table into a waste collection bag or bin. Therefore, the front of the instrument must be approximately 1 inch (2.5 cm) from the front edge of the supporting table or bench.

Inventory of components

Find the NIMBUS™ Inventory List that is shipped with the unit. Use this list to check off each item as the components are unpacked. Components that are kits have their own inventory list inside the kit packaging.

Computer and software method for Windows™ 7

The NIMBUS™ Instrument includes a laptop running the Microsoft™ Windows™ 7 operating system. A Thermo Fisher Scientific field application scientist installs the Axiom™ 96 Sample Automated Target Preparation Solution method software for the instrument.

Power requirements

The input power (universal supply) is 100-240 VAC, 50–60 Hz, 5A. The power supply is a UL/CSA/CE-approved universal power supply with IEC connection. International power adapters must be supplied before installation.

A multiport power strip is supplied with each instrument and can be plugged into a single outlet. If the power strip is not used, 3 power outlets are required: 1 for the NIMBUS™ Instrument, 1 for a laptop or PC, and 1 for the Multi TEC Controller integration. Uninterruptible power supply (UPS) backup for both the computer and NIMBUS™ Instrument is recommended, but not required.

Hamilton™ Company equipment and software

Operation specifications

IMPORTANT! The NIMBUS™ Target Preparation Instrument is for indoor operation only.

Table 1 Operation specifications for the NIMBUS™ Target Preparation Instrument, Thermoshake, and CPAC devices.

Specification	
NIMBUS™ Target Preparation Instrument	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 35°C (59°F to 95°F) • 30% to 85% R.H. (noncondensing) • 2,000 m (1.2 miles) above sea level
<ul style="list-style-type: none"> • Temperature • Relative humidity • Altitude 	
INHECO™ Thermoshake device	
Technical data:	<ul style="list-style-type: none"> • 4°C to 70°C (39.2°F to 158°F)
<ul style="list-style-type: none"> • Temperature range 	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 32°C (59°F to 90°F) • 10-80% RH (noncondensing) at 20°C up to 30°C (68°F to 86°F)
<ul style="list-style-type: none"> • Temperature • Tolerable relative humidity 	
INHECO™ CPAC device	
Technical data:	<ul style="list-style-type: none"> • 4°C to 70°C (39.2°F to 158°F)
<ul style="list-style-type: none"> • Temperature range 	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 32°C (59°F to 90°F) • 30-80% relative (noncondensing)
<ul style="list-style-type: none"> • Temperature • Tolerable relative humidity 	



WARNING! Condensate can prevent the Thermoshake and CPAC devices from operating properly and can damage the unit. Eliminate condensate daily, or if needed, especially in between heating and cooling cycles. To prevent or minimize condensation, on completion of a method run, click **Finish** in the final **Cleanup** window for that stage.

Components

The Applied Biosystems™ NIMBUS™ Target Preparation Instrument is used to run the Axiom™ 2.0 Assay with the automated target preparation. This workstation includes the accessories, software, and deck configuration listed in the following table. In addition to this workstation, the components that are listed in the next chapter are required.

Table 2 NIMBUS™ Target Preparation Instrument (Cat. No. 00-0401) components.

✓	Item
<input type="checkbox"/>	Applied Biosystems™-specific Hamilton™ Company Microlab™ NIMBUS™ 96 System: <ul style="list-style-type: none"> • 96-well CO-RE™ pipetting head (1,000 µL) • 9+2 deck, +2 position at –48 mm • Labware Gripper Arm
<input type="checkbox"/>	Hamilton™ Company deck hardware: <ul style="list-style-type: none"> • 2 FTR Pedestals: (Hamilton™ Company, Cat. No. 61054-01) • One 1,000 µL Tip Isolator: (Hamilton™ Company, Cat. No. 64668-01) • 2 Precision DWP Pedestals: (Hamilton™ Company, Cat. No. 66591-01) • One 96 Tip Adapter pedestal: (Hamilton™ Company, Cat. No. 66450-01) • 3 DWP pedestals: (Hamilton™ Company, Cat. No. 61053-01)
<input type="checkbox"/>	INHECO™ devices: <ul style="list-style-type: none"> • INHECO™ Variomag™ Thermoshake with dock base (Hamilton™ Company, Cat. No. 59151-01) • INHECO™ CPAC with dock base (Hamilton™ Company, Cat. No. 59146-02) • INHECO™ Tube Rack 24 x 1.5 mL (INHECO™, Cat. No. 7900029) • INHECO™ Multi TEC (INHECO™, Cat. No. 8900030) • INHECO™ Slot Module Board 12V (INHECO™, Cat. No. 2400128) • INHECO™ Slot Module Board 24V (INHECO™, Cat. No. 2400125)

Table 2 NIMBUS Target Preparation Instrument (Cat. No. 00-0401) components. (continued)

✓	Item
☐	<p>Other items in the accessories kit include:</p> <ul style="list-style-type: none"> • Custom solid waste chute • Solid waste chute components • Power cables (3) and power strip <p>Note: Supplied power cables are compatible with USA power outlets only. Compatible power cables for international power outlets are not included and must be obtained before installation.</p> <ul style="list-style-type: none"> • Ethernet (Cat 5) cable • Integration hardware for the INHECO™ CPAC and Thermoshake devices • Laptop computer • IP address setup and quick start instructions

Install and test the instrument for Windows™ 7

To ensure successful performance of the Axiom™ 2.0 Assay on the NIMBUS™ Target Preparation Instrument, a Hamilton® field service engineer must perform installation and testing of the NIMBUS™ Instrument system in the following order:

1. Uncrate, place, then level the NIMBUS™ Instrument.
 - NIMBUS™ Instrument placed on designated bench or table.
 - All required pedestals and labware have been received.
 - Verify levelness and flatness of deck.
 - Verify that the recess deck is at the –48 position.
 - Verify that the integration plate is attached to INHECO™ Thermoshake.
 - Verify that the integration plate is attached to INHECO™ CPAC (factory installed).
 - Attach INHECO™ tube rack to CPAC.
 - Install CPAC and Thermoshake slot modules in MTEC.
 - Connect power/communication cables from INHECO™ devices to MTEC.
 - Slot 1: CPAC.
 - Slot 2: Thermoshake.
 - Connect USB cable to MTEC and laptop computer.
 - Connect MTC power cord to outlet
 - Connect Ethernet Cat 5 cable to NIMBUS™ Instrument and laptop computer.
 - Connect NIMBUS™ Instrument power cord.
 - Connect laptop computer power cord.
 - 96-head foam shipping block removed.
2. Install the waste chute.
 - Ensure that the waste chute is installed and level to the deck.

3. Prepare the laptop, then install NIMBUS™ Software v5.3.8.0 (for Axiom™ 2.0 Assay).

Note: NVK can also be executed off the service engineer's laptop, in which case the customer's laptop can be configured with the appropriate version of NIMBUS™ Software for the application (v5.3.8.0 Axiom™ 2.0 Assay).

- Verify that the computer has a 64-bit operating system.
 - Language setting that is configured to English—United States.
 - User Account Control set to "Never Notify".
 - Computer power setting that is changed to never sleep or hibernate.
 - IP address set.
 - NIMBUS™ Software installed:
 - Phoenix version—4.3.0.7270.
 - NIMBUS™ version—5.3.8.0 for Axiom™ 2.0 Assay.
 - Checksum validation disabled.
 - Set values in **System Configuration Editor**:
 - Deck Configuration "9 +2, left recess at -48 mm".
 - Gripper set to "Available".
 - Pipette Head set to "CORE—96 Head, 1 mL".
 - Hamilton™ Company INHECO™ driver software installed v1.2.
 - Allow access of HxMTecServer through Windows™ firewall if needed.
4. Verify or load firmware to execute NVK.
5. Perform 96 head and gripper calibration.
6. Perform NVK positional and volume verifications.
7. Install INHECO™ devices.
8. Perform NVK INHECO™ device verifications.
9. If needed, load and install the final NIMBUS™ software and firmware.

10. Set up the Axiom™ 2.0 Assay NIMBUS™ Instrument Deck configuration (Figure 1).



Figure 1 NIMBUS™ Instrument deck configuration for the Axiom™ 96 Sample Automated Target Preparation Solution method.

- | | |
|---|--------------------------|
| ① Variomag™ Thermoshake with adapter | ⑥ Tip adapter |
| ② CPAC with reagent template | ⑦ Precision DWP pedestal |
| ③ Precision DWP pedestal | ⑧ DWP pedestal |
| ④ DWP pedestal | ⑨ FTR pedestal |
| ⑤ 35-mm pedestal with Alpi™ Plate Cushion | ⑩ FTR pedestal |
| | ⑪ Tip isolator |

Note: Positions 6, 9, 10, and 11 must be fastened onto the deck before use.

Software installation requirements

NIMBUS™ Software version for Windows™ 7

- Phoenix version 4.3.0.7270
- NIMBUS™ version 5.3.8.0 (for Axiom™ 2.0 Assay)

NIMBUS™ firmware versions for Windows™ 7

Component	Version
NIMBUS™ System Controller	1.48
CORE 96 pipette head	5.0S
GripperGwz	1.32
Dac2 (gw, y, x drives)	1.20a
Force monitor	1.10
CPU status indicator	1.00
IO board	1.20

INHECO™ driver software for Windows™ 7

Hamilton® INHECO™ driver software v1.2.

2

NIMBUS™ Target Preparation Instrument configuration for Windows™ 10

The Applied Biosystems™ NIMBUS™ Target Preparation Instrument is required to run this version of the Axiom™ 2.0 Assay with the automated target preparation. This chapter contains information specific to the setup, maintenance, and safe use of the NIMBUS™ Instrument and equipment.

Preinstallation information

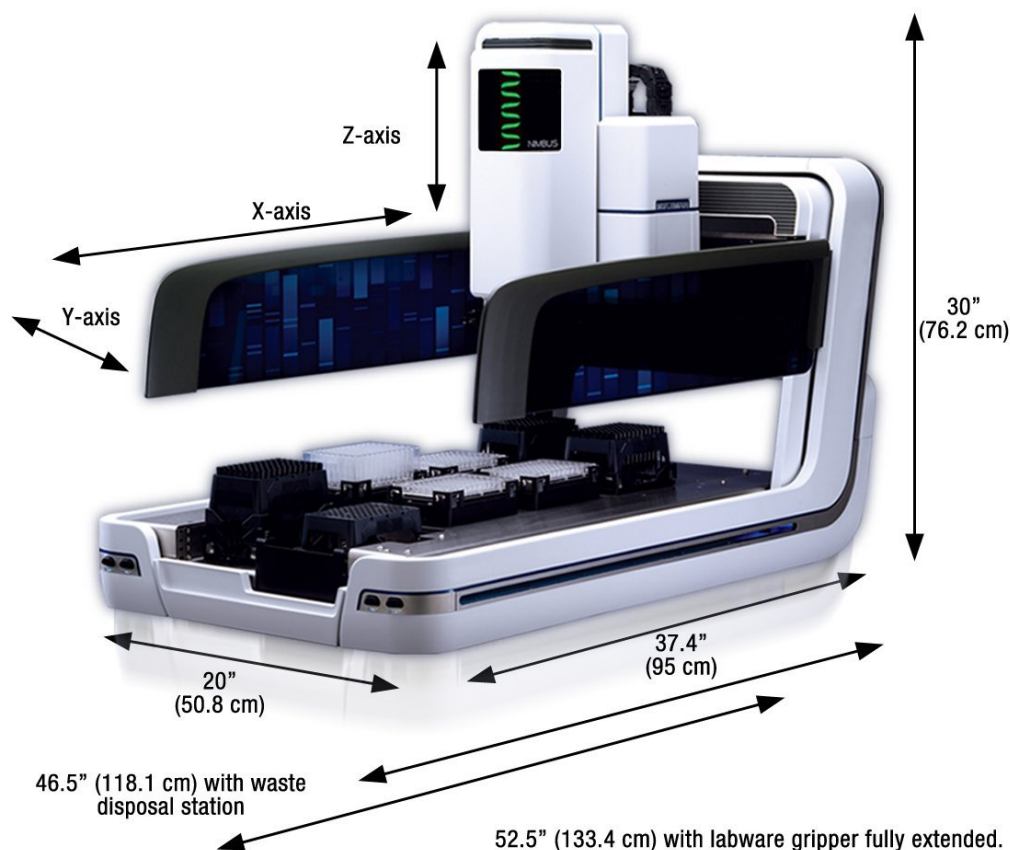
IMPORTANT! Read all of the information in this chapter before unpacking or moving the instrument.

Site selection

IMPORTANT! Determine the NIMBUS™ Instrument location carefully. Moving the instrument after installation requires recalibration.

Location considerations and requirements

- Keep the instrument away from direct sunlight, drafts, excessive vibrations, and widely fluctuating temperatures or humidity. This requirement is especially critical for low volume (<10 µL) applications that require highly accurate and precise pipetting.
- The instrument must be placed on a stable bench, table, or hood that can support up to 200 lbs (89.6 kg) without bowing or swaying.
- The instrument must be oriented so that when facing the instrument, the waste disposal station is on the *left* side of the instrument.
- Ensure that the bench/table surface is as level as possible and affords, at a minimum, the following dimensions:
 - Width (front to rear) 20 inches (50.8 cm)
 - Length (left to right) 52.5 inches (133.4 cm)
 - Height 30 inches (76.2 cm)



For optimum serviceability, it is best to position the NIMBUS Instrument on an island location in the laboratory. Ensure to plan additional space for:

- Computer, mouse, and other accessories such as a printer.
- Storage of manuals, tips, components, and labware.
- Integrated off-deck accessories and third-party devices.

The NIMBUS™ Instrument has a solid waste chute for collection of used tips which is mounted on the front left side of the instrument. The chute is designed with a slide such that the tips are directed off the bench/table into a waste collection bag or bin. Therefore, the front of the instrument must be approximately 1 inch (2.5 cm) from the front edge of the supporting table or bench.

Inventory of components

Find the NIMBUS™ Inventory List that is shipped with the unit. Use this list to check off each item as the components are unpacked. Components that are kits have their own inventory list inside the kit packaging.

Computer and software method for Windows™ 10

The NIMBUS™ Instrument includes a laptop running the Microsoft™ Windows™ 10 operating system. A Thermo Fisher Scientific field application scientist installs the Axiom™ 96 Sample Automated Target Preparation Solution method software for the instrument.

Power requirements

The input power (universal supply) is 100-240 VAC, 50–60 Hz, 5A. The power supply is a UL/CSA/CE-approved universal power supply with IEC connection. International power adapters must be supplied before installation.

A multipoint power strip is supplied with each instrument and can be plugged into a single outlet. If the power strip is not used, 3 power outlets are required: 1 for the NIMBUS™ Instrument, 1 for a laptop or PC, and 1 for the Multi TEC Controller integration. Uninterruptible power supply (UPS) backup for both the computer and NIMBUS™ Instrument is recommended, but not required.

Hamilton™ Company equipment and software

Operation specifications

IMPORTANT! The NIMBUS™ Target Preparation Instrument is for indoor operation only.

Table 3 Operation specifications for the NIMBUS™ Target Preparation Instrument, Thermoshake, and CPAC devices.

Specification	
NIMBUS™ Target Preparation Instrument	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 35°C (59°F to 95°F) • 30% to 85% R.H. (noncondensing) • 2,000 m (1.2 miles) above sea level
<ul style="list-style-type: none"> • Temperature • Relative humidity • Altitude 	
INHECO™ Thermoshake device	
Technical data:	<ul style="list-style-type: none"> • 4°C to 70°C (39.2°F to 158°F)
<ul style="list-style-type: none"> • Temperature range 	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 32°C (59°F to 90°F) • 10-80% RH (noncondensing) at 20°C up to 30°C (68°F to 86°F)
<ul style="list-style-type: none"> • Temperature • Tolerable relative humidity 	
INHECO™ CPAC device	
Technical data:	<ul style="list-style-type: none"> • 4°C to 70°C (39.2°F to 158°F)
<ul style="list-style-type: none"> • Temperature range 	
Environmental conditions for operation:	<ul style="list-style-type: none"> • 15°C to 32°C (59°F to 90°F) • 30-80% relative (noncondensing)
<ul style="list-style-type: none"> • Temperature • Tolerable relative humidity 	



WARNING! Condensate can prevent the Thermoshake and CPAC devices from operating properly and can damage the unit. Eliminate condensate daily, or if needed, especially in between heating and cooling cycles. To prevent or minimize condensation, on completion of a method run, click **Finish** in the final **Cleanup** window for that stage.

Components

The Applied Biosystems™ NIMBUS™ Target Preparation Instrument is used to run the Axiom™ 2.0 Assay with the automated target preparation. This workstation includes the accessories, software, and deck configuration listed in the following table. In addition to this workstation, the components that are listed in the next chapter are required.

Table 4 NIMBUS™ Target Preparation Instrument (Cat. No. 00-0401) components.

✓	Item
<input type="checkbox"/>	Applied Biosystems™-specific Hamilton™ Company Microlab™ NIMBUS™ 96 System: <ul style="list-style-type: none"> • 96-well CO-RE™ pipetting head (1,000 µL) • 9+2 deck, +2 position at -48 mm • Labware Gripper Arm
<input type="checkbox"/>	Hamilton™ Company deck hardware: <ul style="list-style-type: none"> • 2 FTR Pedestals: (Hamilton™ Company, Cat. No. 61054-01) • One 1,000 µL Tip Isolator: (Hamilton™ Company, Cat. No. 64668-01) • 2 Precision DWP Pedestals: (Hamilton™ Company, Cat. No. 66591-01) • One 96 Tip Adapter pedestal: (Hamilton™ Company, Cat. No. 66450-01) • 3 DWP pedestals: (Hamilton™ Company, Cat. No. 61053-01)
<input type="checkbox"/>	INHECO™ devices: <ul style="list-style-type: none"> • INHECO™ Variomag™ Thermoshake with dock base (Hamilton™ Company, Cat. No. 59151-01) • INHECO™ CPAC with dock base (Hamilton™ Company, Cat. No. 59146-02) • INHECO™ Tube Rack 24 x 1.5 mL (INHECO™, Cat. No. 7900029) • INHECO™ Multi TEC (INHECO™, Cat. No. 8900030) • INHECO™ Slot Module Board 12V (INHECO™, Cat. No. 2400128) • INHECO™ Slot Module Board 24V (INHECO™, Cat. No. 2400125)

Table 4 NIMBUS Target Preparation Instrument (Cat. No. 00-0401) components. (continued)

✓	Item
☐	<p>Other items in the accessories kit include:</p> <ul style="list-style-type: none"> • Custom solid waste chute • Solid waste chute components • Power cables (3) and power strip <p>Note: Supplied power cables are compatible with USA power outlets only. Compatible power cables for international power outlets are not included and must be obtained before installation.</p> <ul style="list-style-type: none"> • Ethernet (Cat 5) cable • Integration hardware for the INHECO™ CPAC and Thermoshake devices • Laptop computer • IP address setup and quick start instructions

Install and test the instrument for Windows™ 10

To ensure successful performance of the Axiom™ 2.0 Assay on the NIMBUS™ Target Preparation Instrument, a Hamilton™ Company field service engineer must perform installation and testing of the NIMBUS™ Instrument system in the following order:

1. Uncrate, place, and level the NIMBUS™ Instrument.
 - NIMBUS™ Instrument placed on designated bench or table.
 - All required pedestals and labware have been received.
 - Verify levelness and flatness of deck.
 - Verify that the recess deck is at the –48 position.
 - Verify that the integration plate is attached to INHECO™ Thermoshake.
 - Verify that the integration plate is attached to INHECO™ CPAC (factory installed).
 - Attach INHECO™ tube rack to CPAC.
 - Install CPAC and Thermoshake slot modules in MTEC.
 - Connect power/communication cables from INHECO™ devices to MTEC.
 - Slot 1: CPAC.
 - Slot 2: Thermoshake.
 - Connect USB cable to MTEC and laptop computer.
 - Connect MTC power cord to outlet .
 - Connect Ethernet Cat 5 cable to NIMBUS™ Instrument and laptop computer.
 - Connect NIMBUS™ Instrument power cord.
 - Connect laptop computer power cord.
 - 96-head foam shipping block removed.
2. Install the waste chute.
 - Ensure that the waste chute is installed and level to deck.

3. Prepare the laptop and install NIMBUS™ Software v8.0.4.0 (for Axiom™ 2.0 Assay).
 - Verify that the computer has a Windows™ 10 operating system installed.
 - Language setting that is configured to English—United States.
 - User Account Control set to "Never Notify".
 - Computer power setting that is changed to never sleep or hibernate.
 - IP address set.
 - NIMBUS™ Software installed:
 - Phoenix version—4.5.0.7977.
 - NIMBUS™ version—8.0.4.0 for Axiom™ 2.0 Assay.
 - Checksum validation disabled
 - Set values in **System Configuration Editor**:
 - Deck Configuration "9 +2, left recess at -48 mm".
 - Gripper set to "Available".
 - Pipette Head set to "CORE—96 Head, 1 mL".
 - Hamilton™ Company INHECO™ driver software installed v1.2.7.2 .
 - Allow access of HxMTecServer through Windows™ firewall if needed.
4. Perform 96 head and gripper calibration.
5. Perform NVK positional and volume verifications.
6. Install INHECO™ devices.
7. Perform NVK INHECO™ device verifications.

8. Configure the Axiom™ 2.0 Assay NIMBUS™ Instrument deck as shown.



Figure 2 NIMBUS™ Instrument deck configuration for the Axiom™ 96 Sample Automated Target Preparation Solution method.

- | | |
|--|--------------------------|
| ① Variomag™ Thermoshake with adapter | ⑥ Tip adapter |
| ② CPAC with reagent template | ⑦ Precision DWP pedestal |
| ③ Precision DWP pedestal | ⑧ DWP pedestal |
| ④ DWP pedestal | ⑨ FTR pedestal |
| ⑤ 35-mm pedestal with Alpillo™ Plate Cushion | ⑩ FTR pedestal |
| | ⑪ Tip isolator |

Note: Positions 6, 9, 10, and 11 must be fastened onto the deck before use.

Software installation requirements

NIMBUS™ Software version for Windows™ 10

- Phoenix version 4.5.0.7977
- NIMBUS™ version 8.0.4.0 (for Axiom™ 2.0 Assay)

NIMBUS™ firmware versions for Windows™ 10

Component	Version
NIMBUS™ System Controller	6.1.0.186
CORE 96 pipette head	5.0Si
GripperGwz	1.32
Dac2 (gw, y, x drives)	1.41
Force monitor	1.15
CPU status indicator	1.00
IO board	1.23

INHECO™ driver software for Windows™ 10

Hamilton™ Company INHECO™ driver software v1.2.7.2.

3

NIMBUS™ Target Preparation Instrument setup

Hamilton™ Company equipment and software

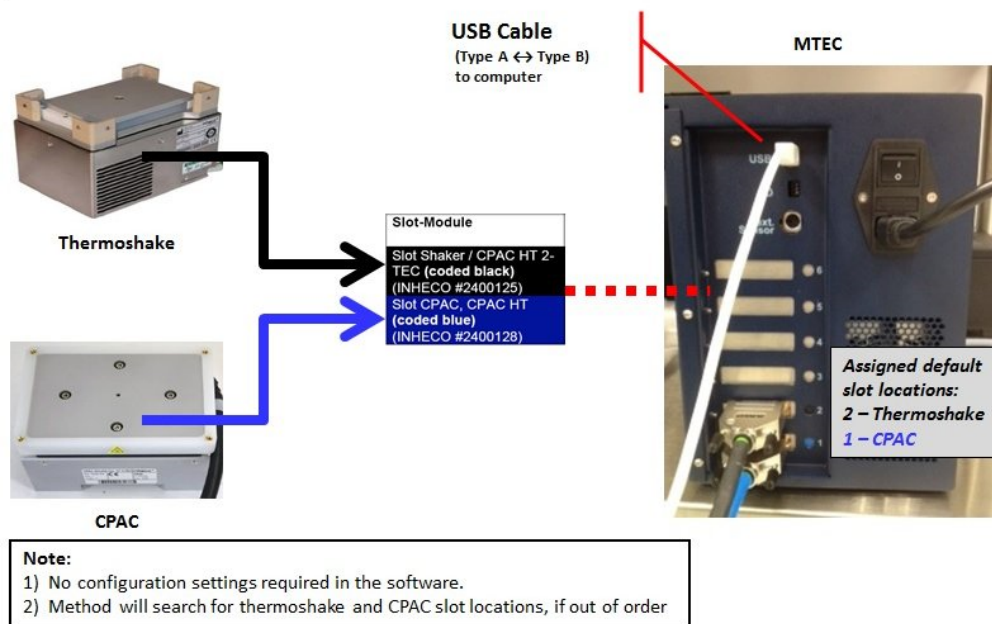
Set up the INHECO™ devices

The INHECO™ Multi TEC (MTEC) Controller is used to operate the Thermoshake and the CPAC devices. There are 2 slot modules on the Multi TEC Controller where cables from each INHECO™ device must be attached into the assigned default slot locations:

- Slot 1: CPAC
- Slot 2: Thermoshake

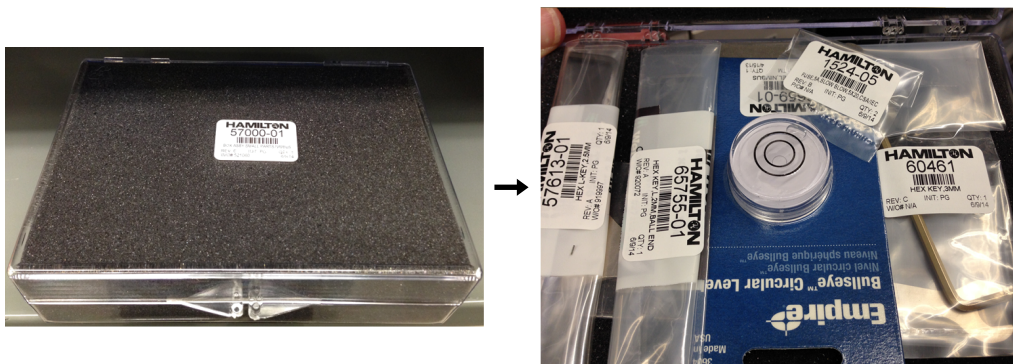
The Thermoshake device must be set up with the adapter plate for the round deepwell plate to allow precise temperature control during fragmentation. The Hamilton™ Company field service engineer installs a 24-position tube rack into the CPAC device during system install. A cooling block template that is placed on top of the CPAC guides operators where reagents must be placed before the start of each run.

Device connections to multi TEC (MTEC) controller are color-coded



Pedestals, Thermoshake, and CPAC accessory tool kit

The Applied Biosystems™ NIMBUS™ Target Preparation Instrument comes with a small accessory tool kit that includes a 2-mm, 2.5-mm, and 3-mm hex wrench (also known as a hex key, Allen key, or Allen wrench). Also, the INHECO™ base plate kit comes with a 1.5-mm hex wrench. These tools are required for fastening pedestals and devices to the NIMBUS™ Instrument deck. Save the small accessory tool kit for future use.



Pedestals

The pedestals in deck positions 6, 9, 10, and 11 are fastened to the NIMBUS™ Instrument deck by tightening the set screws, which are on the left and right side of each pedestal, with a 2-mm hex wrench. When fastening the pedestals to the deck, it is best to start with the pedestals in the back of the deck and work to the pedestals in the front to help the ease of access to set screws.

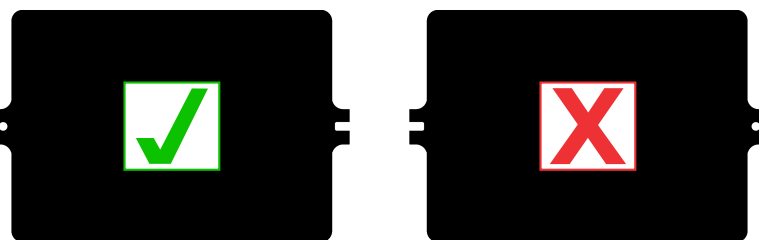
Therefore, using a 2-mm hex wrench, ensure that the pedestals are placed and locked down in the following order:

1. Tip adapter at deck position 6
2. FTR pedestal at deck position 9
3. FTR pedestal at deck position 10
4. Tip isolator at deck position 11

See Figure 2. The remaining pedestals are easily positioned by placing them on the locator pins that are on the deck.

Secure pedestals to the deck

When placing the pedestals on the deck, be aware of the correct orientation that is determined by the shape of the opening for the locator pins. The closed end must face left and the open end must face right.



1. Place a pedestal on the deck, positioned using the 2 locator pins on the left and right sides of the pedestal.

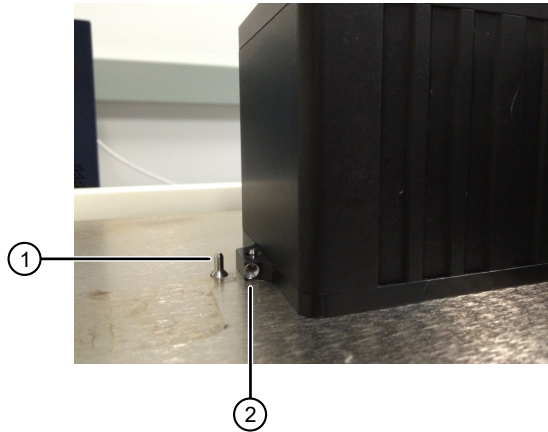
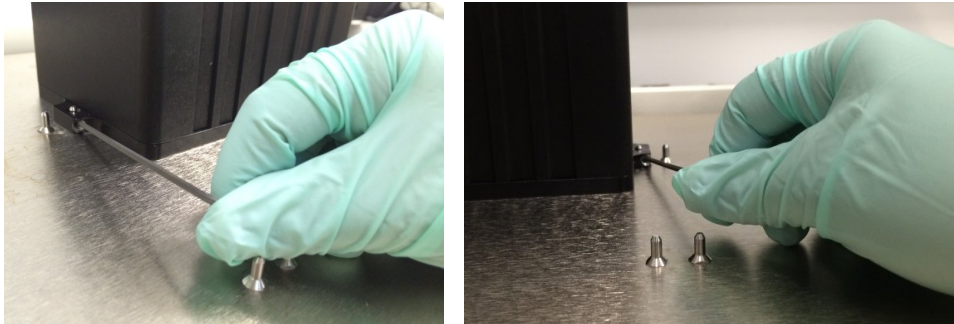


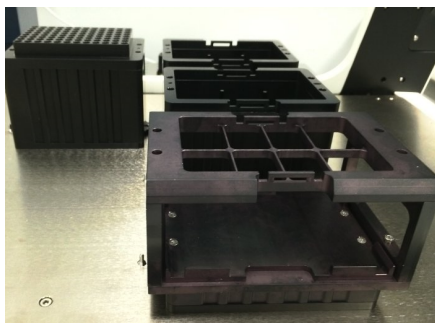
Figure 3 Pedestal placed on deck, positioned using locator pins (front view).

- ① Locator pin. The locator pin that is shown is for a pedestal that is not yet placed on the deck.
 - ② Set screw that tightens the pedestal to the locator pin.
2. Tighten the set screws on the left and right side of the pedestal using a 2-mm hex wrench.



3. Using the locator pins on the deck, place, then fasten the remaining pedestals on deck in proper order, working from the back to the front of the deck.
 - a. Deck position 6.
 - b. Deck position 9.
 - c. Deck position 10.

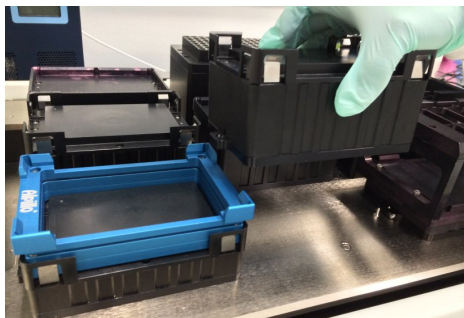
d. Deck position 11.



IMPORTANT! Place a pedestal on the deck and secure by tightening the set screws. Fasten each pedestal that is placed onto the deck before moving on to placing and fastening the next pedestal.

4. Place the remaining pedestals onto the deck, positioning them using the locator pins on the left and right side of each pedestal. These remaining pedestals are not fastened to the deck with set screws.

See Figure 2 for deck configuration.



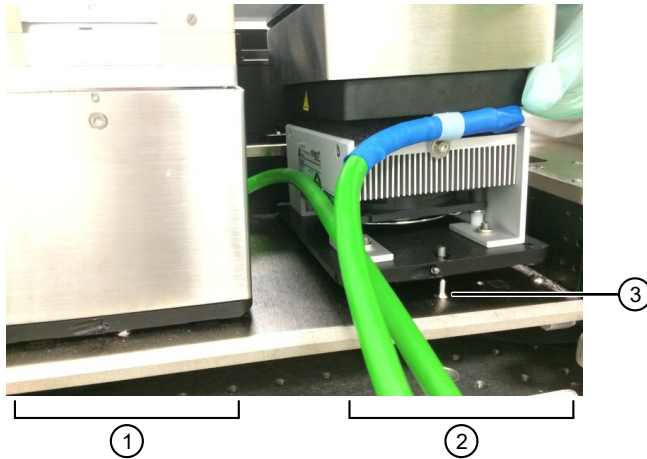
Thermoshake and CPAC devices

The Thermoshake and CPAC devices sit on the NIMBUS™ Target Preparation Instrument in deck positions 1 and 2. When fully assembled, they are found behind the trash chute attachment plate and trash chute mounting bracket. The Thermoshake and CPAC devices are fastened to the deck using a 1.5-mm hex wrench and set screws. The trash chute attachment plate and trash chute mounting bracket are fastened using a 2.5-mm hex wrench and M3 screws.

The instructions that follow assume the first setup. If the set screws for the Thermoshake or CPAC device require tightening after the first installation, the trash chute attachment plate and the trash chute mounting bracket must be removed first to allow access to the device set screws.

Fasten Thermoshake and CPAC devices to deck

1. Place the Thermoshake and CPAC devices in their proper locations onto the NIMBUS™ Instrument deck using the locator pins.

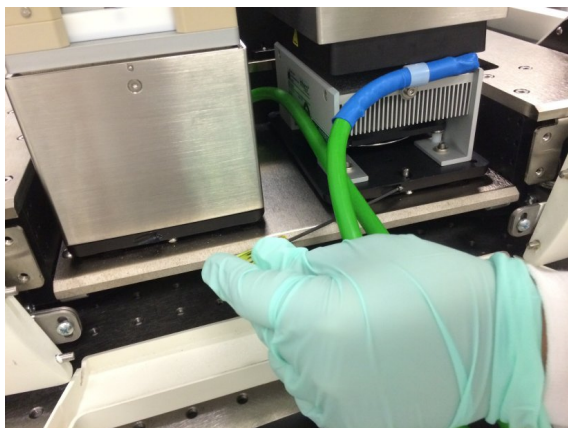


- ① Thermoshake in deck position 1
- ② CPAC in deck position 2
- ③ Locator pin on deck

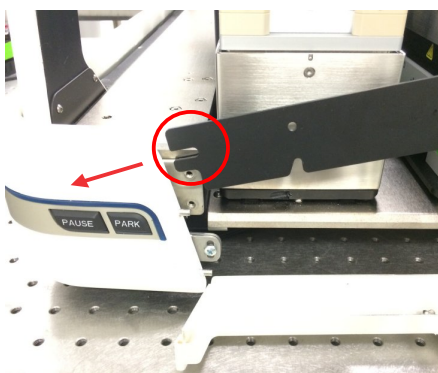


Figure 4 Each device has only 1 set screw.

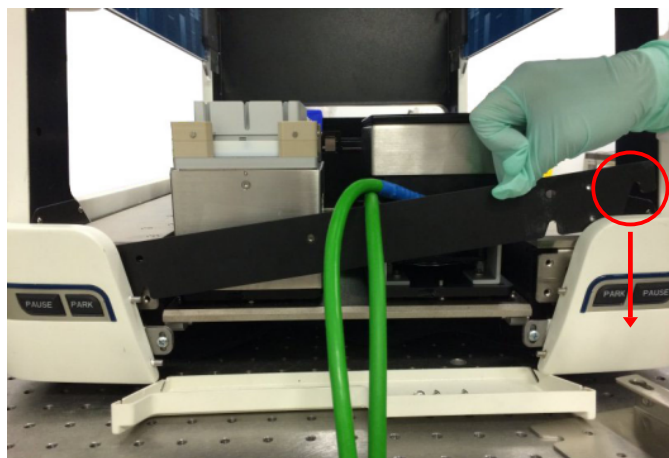
- Using a 1.5-mm hex wrench, tighten the set screws for each device to lock them into place on the deck.



- After fastening the devices, place the trash chute attachment plate onto the NIMBUS™ Instrument.



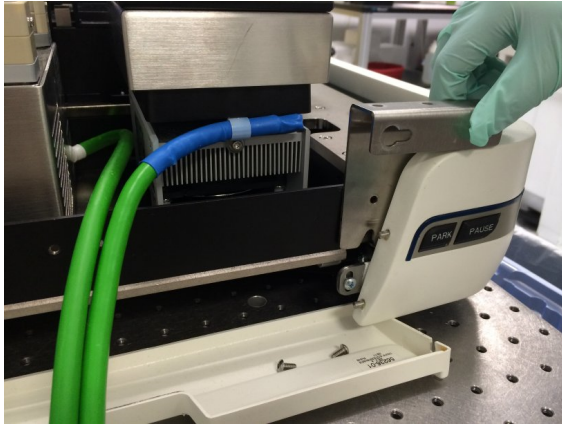
①



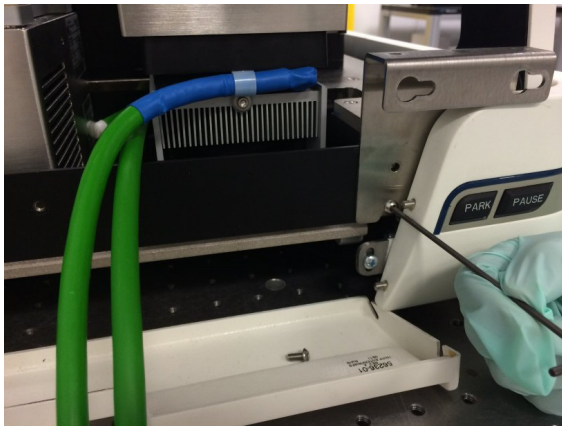
②

- Slide the left side of the trash chute attachment plate horizontally into position.
- Slide the right side down into place.

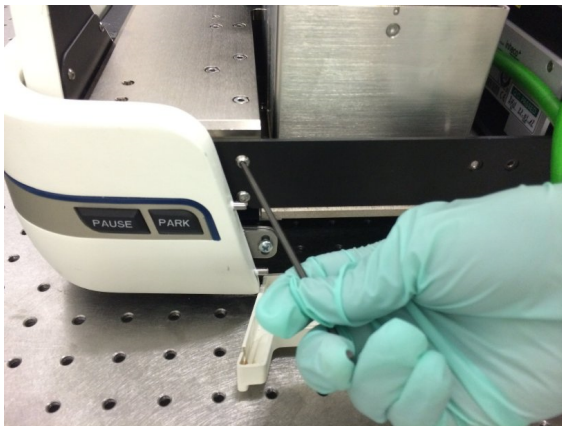
4. With the trash chute attachment plate in place, insert the trash chute mounting bracket into position on the right side.



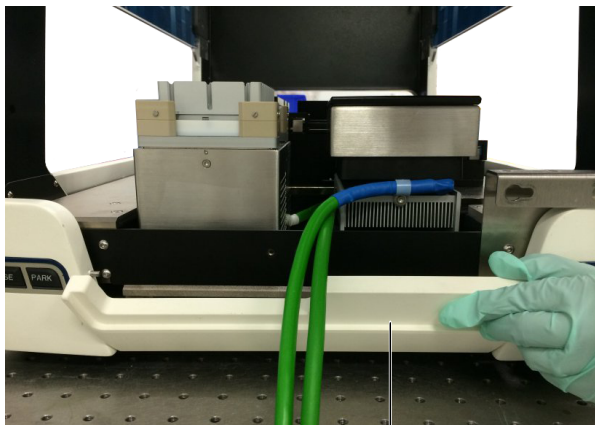
5. Using a 2.5-mm hex wrench and 2 M3 screws, fasten the trash chute mounting bracket onto the NIMBUS™ Instrument.



6. Using a 2.5-mm hex wrench and 2 M3 screws, fasten the left side of the trash chute attachment plate onto the NIMBUS™ Instrument.



7. Snap the end cover into place.



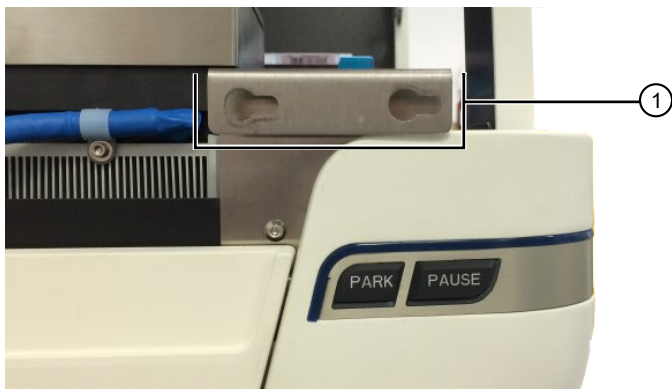
①

① End cover

Assemble the trash chute

This section provides instructions for the proper assembly of the trash chute and trash chute cover to the NIMBUS™ Instrument. Use these instructions to attach properly or remove the trash chute if needed for cleaning or other purposes. To remove the trash chute, follow these instructions in reverse.

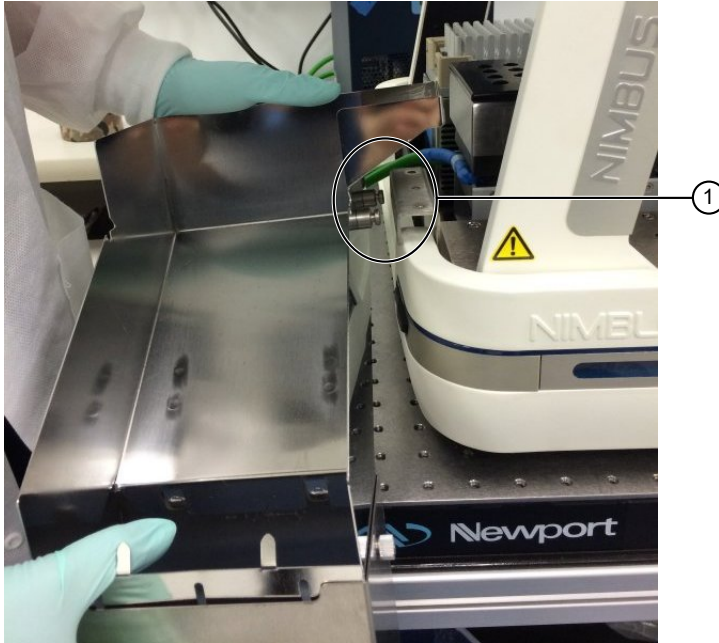
1. Find the trash chute mounting bracket on the left side of the NIMBUS™ Instrument.



①

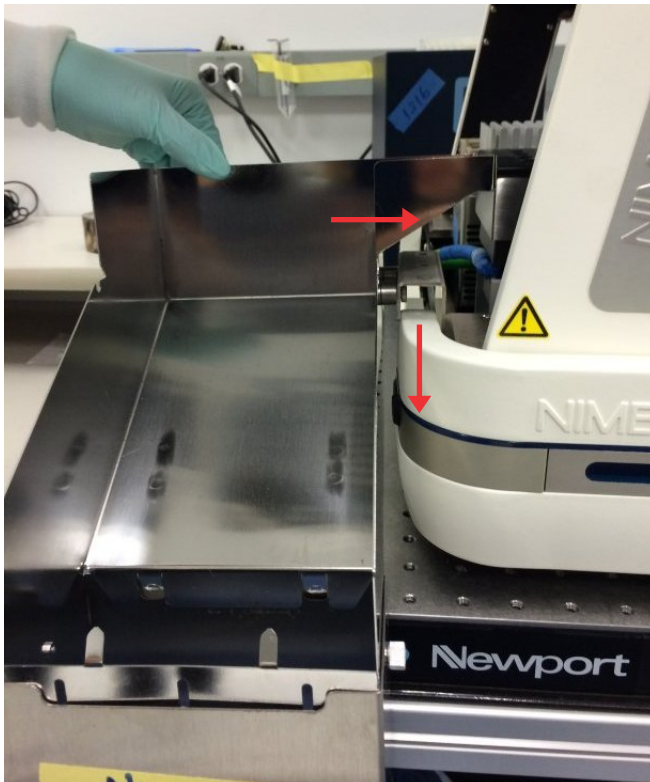
① Trash chute mounting bracket

2. Hold the trash chute with both hands, then align the 2 securing pins on the right side of the trash chute with the 2 holes in the trash chute mounting bracket.

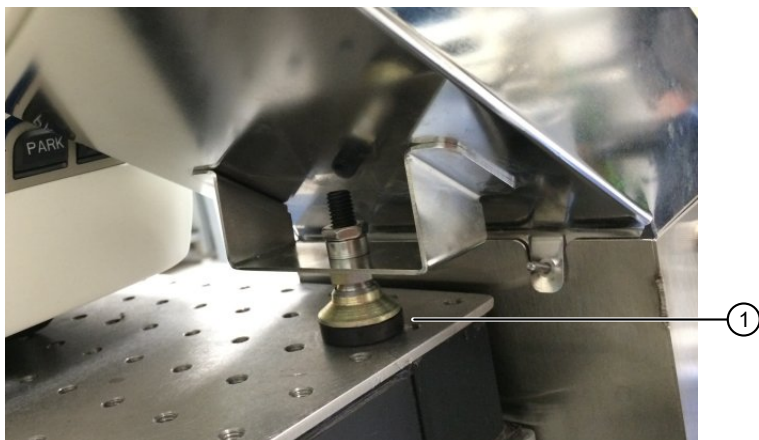


- ① Align the securing pins with holes in trash chute mounting bracket.

3. Insert the securing pins into the holes in the trash chute mounting bracket, then pull the trash chute forward toward the front of the NIMBUS™ Instrument. This action holds the trash chute in place.



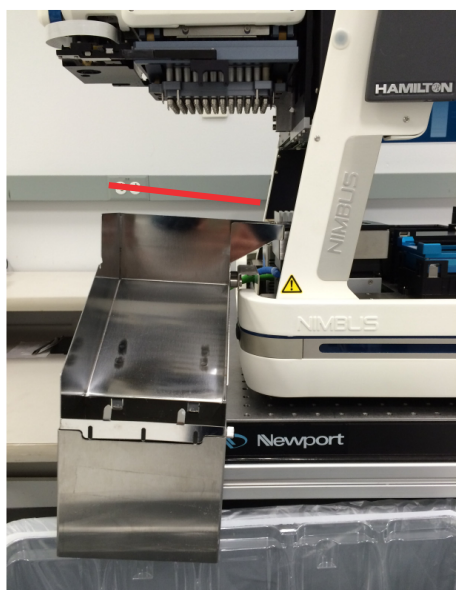
4. After successfully attaching the trash chute to the NIMBUS™ Instrument, turn the leveling foot, on the underside of the trash chute, to support, then level the trash chute.



① Leveling foot

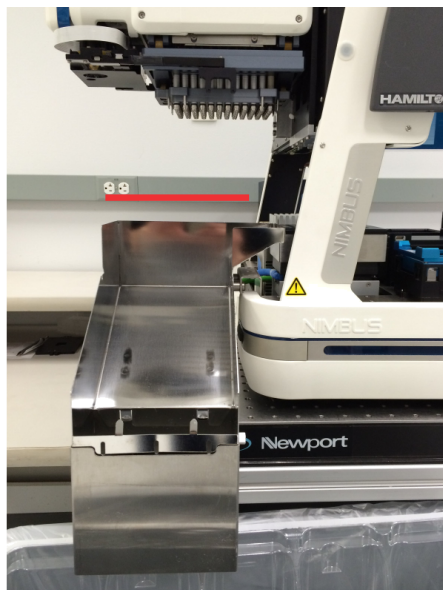
5. Ensure that the trash chute is level.

IMPORTANT! Ensure that the trash chute is level. Trash chutes that are not level result in problems with disposal of tips, plates, or other materials from the deck.



①

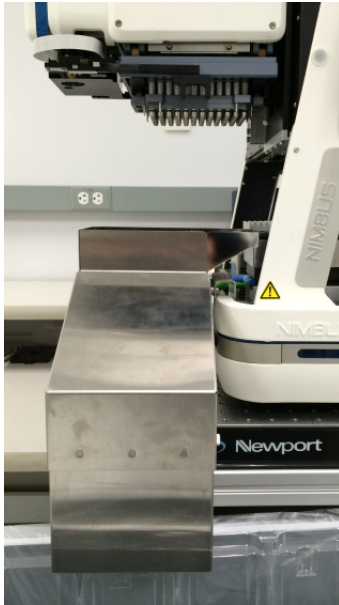
- ① Example of a trash chute that is not level.



②

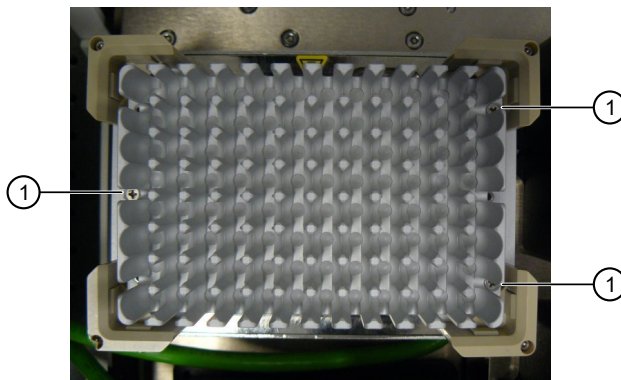
- ② Example of a trash chute that is properly attached and leveled.

6. After the trash chute has been installed, then leveled, attach the trash chute cover.



Set up the Thermoshake Deepwell Plate Adapter

1. Gather materials that are needed for setting up the INHECO™ Thermoshake device with the adapter plate.
 - Thermoshake device
 - Thermoshake Deepwell Plate Adapter (INHECO™, Cat. No. 203368)
 - 1/8-inch (4 mm) slotted screwdriver
 - No. 1 Phillips screwdriver
 - 3 screws that are provided with the adapter plate
2. Fasten the adapter plate onto the Thermoshake device using the 3 screws and the Phillips screwdriver.



- ① Locations for the 3 screws to fasten the adapter plate to the Thermoshake device.

- Using the slotted screwdriver, tighten the 8 grub screws, 2 at each corner, found at the top of the Thermoshake device (Figure 5).

On the opposite side of each grub screw, a tab that protrudes towards the adapter plate. As a grub screw is tightened, the tab becomes flush (Figure 6).

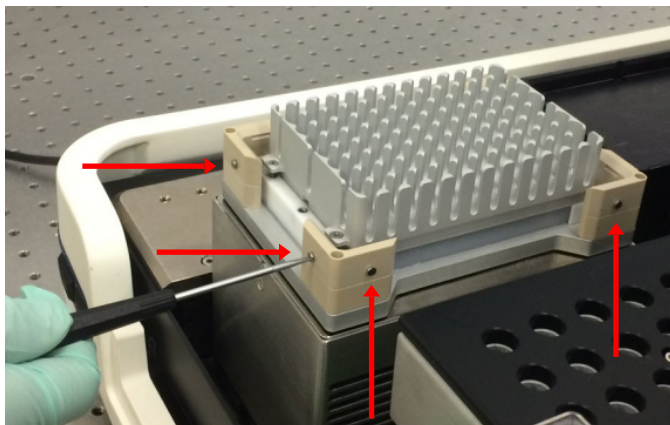


Figure 5 Grub screws on the Thermoshake device.

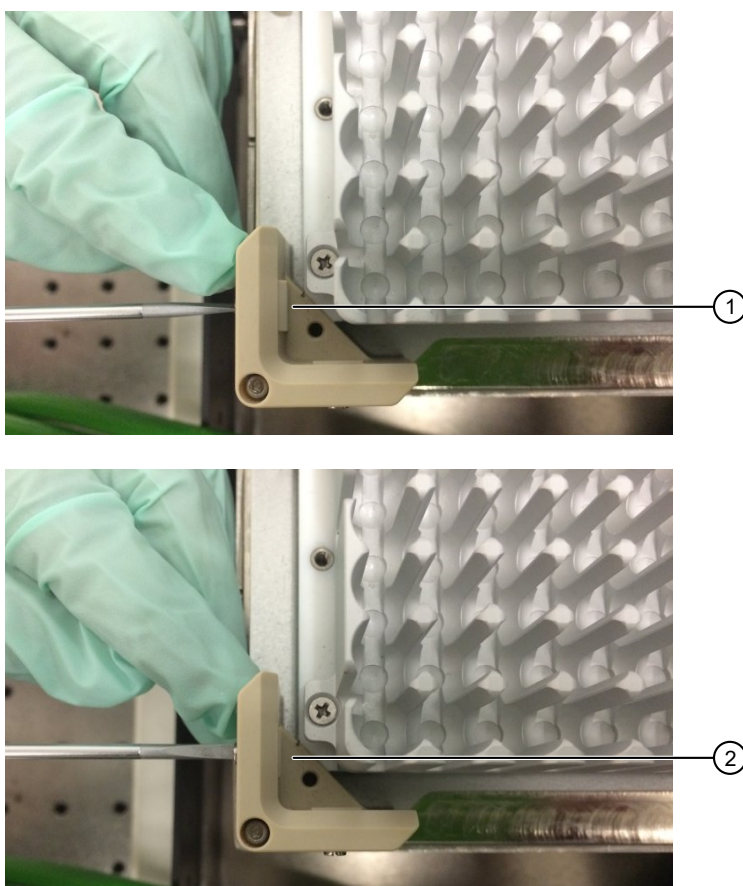


Figure 6 Image of a tab on the opposite side of a grub screw on the Thermoshake device before and after tightening.

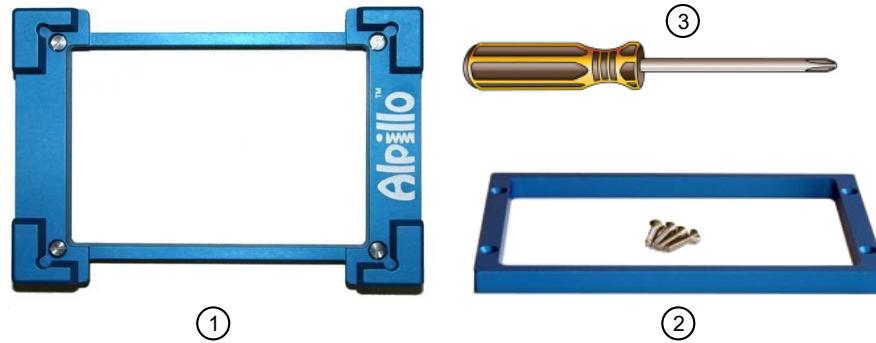
- Tab protruding
- Tab flush after tightening

Assemble the Alpillo™ Plate Cushion

The Alpillo™ Plate Cushion compensates for physical tolerances between labware and pipettor, and helps automated precision pipetting. The Alpillo™ Extension is used to increase the height of the plate cushion allowing it to be used for deeper plate nests.

The Alpillo™ Plate Cushion and extension must be assembled before use on the NIMBUS™ Instrument deck.

1. Gather the necessary materials.



- ① Alpillo™ Plate Cushion (Cat. No. A000007)
- ② Alpillo™ Extension (Cat. No. K000018) with the 4 screws provided
- ③ No. 1 Phillips screwdriver

2. Position the plate cushion on top of the extension such that the 4 screw holes align.
3. Using the 4 screws, fasten the plate cushion to the extension.

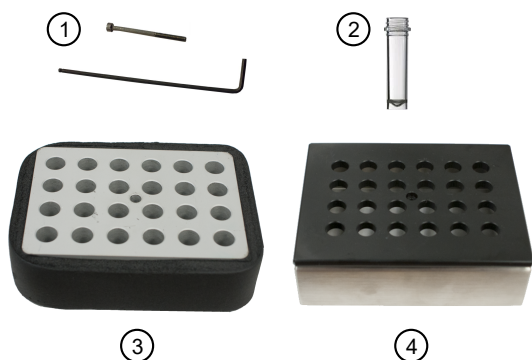


Figure 7 Plate cushion and extension assembled.

Assemble the CPAC tube adapter and cover

If the CPAC tube adapter and tube adapter cover are not properly aligned when installed on the CPAC unit, you can experience difficulty inserting the reagent tubes into the block. Tubes that are not correctly inserted can cause reagent tube labels to peel off, or can generate an error during the run. A properly assembled tube adapter and cover helps ensure proper alignment of the holes and adapter plates.

1. Gather the necessary materials as listed in the following figure.



- ① Fastening screw and hex wrench (also known as a hex key, Allen key, or Allen wrench)
- ② 24 2-mL tubes
- ③ 24-hole tube adapter
- ④ 24-hole tube adapter cover

2. Place the 24-hole tube adapter over the CPAC unit, ensuring that it is in the proper orientation with the bottom side down.



- ① Top side. This image shows the proper orientation.
- ② Bottom side. Identify the bottom side of the 24-hole tube adapter by the ridge along the edge of the adapter.

3. Place the 24-hole tube adaptor cover over the 24-hole tube adaptor.



①



②

- ① The 24-hole tube adaptor that is placed on the CPAC unit.
 - ② The 24-hole tube adaptor cover in place.
4. Insert 22 x 2-mL tubes into the cover with the upper left and lower right corner holes empty (Figure 8).
 5. After inserting the tubes, inspect the alignment of the holes, then adjust the alignment if needed. Figure 8 shows examples of both improper and proper alignment.



①



②

Figure 8 Hole alignment between the tube adapter and cover.

- ① The holes that are not properly aligned between the 24-hole tube adapter and the cover.
 - ② Proper aligned between the 24-hole tube adapter and the cover.
6. Complete the assembly of the CPAC unit:
 - a. Carefully insert 2 remaining 2-mL tubes into the 2 remaining empty holes.
 - b. Insert the fastening screw into the center hole.
 - c. Using the hex wrench, tighten the tube adapter and tube adapter cover to the CPAC unit.
 7. Remove all the 2-mL tubes from the unit to complete the assembly.

O-ring care

The O-rings on the head of the NIMBUS™ Target Preparation Instrument allow the instrument to pick up and manipulate the pipette tips that are loaded on the deck. When the head is left in a squeezed position for an extended amount of time, the O-rings wear out and the head is stressed.



WARNING! Do Not leave tips on the head or leave the head in a squeezed position for extended lengths of time. This practice can lead to premature O-ring wear and poor system performance.

On successfully completing a method, the head is normally parked with the O-rings in a relaxed position. If a method is interrupted or stopped, it is possible that the head can stand still with the O-rings in the squeezed position (Figure 9). For instances when the O-rings remain in the squeezed position, try initializing the instrument.

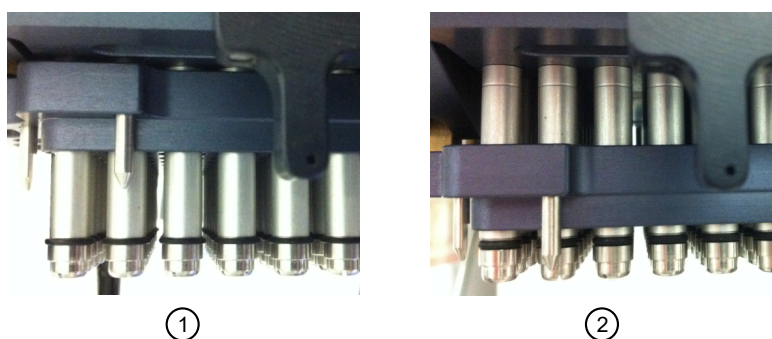


Figure 9 O-rings shown in a squeezed and relaxed state.

- ① "Squeezed" state.
- ② O-rings relaxed.

To help preserve the longevity of the O-rings, remember the following:

- Never power off the instrument with any tips that are loaded on the head.
- Never leave the instrument with the head in the squeezed position.
- Initializing the instrument usually resolves the head remaining in the squeezed position leaving the head in a relaxed position.

4

Assay equipment and supplies required

This chapter includes the supplier and ordering information for the equipment, software, reagents, arrays, labware, and other consumables that have been verified for use with the Applied Biosystems™ Axiom™ 2.0 Assay 96-Array Format Automated Workflow.

Applied Biosystems™ equipment, software, reagents, and arrays required

✓	Item	Source
Equipment		
<input type="checkbox"/>	GeneTitan™ Multi-Channel Instrument ^[1]	Contact Thermo Fisher Scientific
Software		
<input type="checkbox"/>	GeneChip™ Command Console™ (GCC)	version 4.3 or later
<input type="checkbox"/>	Axiom™ Analysis Suite	version 4.0 or later
Reagents		
<input type="checkbox"/>	Axiom™ 2.0 Reagent Kit Sufficient to process one 96-array format plate.	901758
<input type="checkbox"/>	Genomic DNA Standard (Ref 103) (optional)	951957
Arrays		
<input type="checkbox"/>	Axiom™ Array Plate	Varies by design
<input type="checkbox"/>	Axiom™ Microbiome Array Plate (96-array format)	902904

(continued)

✓	Item	Source
Training Kits		
<input type="checkbox"/>	Axiom™ 2.0 CEU Training Kit for Automated Target Preparation on Applied Biosystems™ NIMBUS™ Instrument Each kit includes: <ul style="list-style-type: none"> • Two Axiom™ CEU 96-Array Plates • Two Axiom™ 2.0 Reagent Kit (96 reactions per kit) • Two Axiom™ GeneTitan™ Consumables Kit • Two full plates of 96 HapMap DNA samples^[2] • One GeneTitan™ ZeroStat AntiStatic Gun 	902517
<input type="checkbox"/>	Axiom™ 2.0 CEU Training Kit for Automated Target Preparation on Applied Biosystems™ NIMBUS™ Instrument for Agrigenomics Each kit includes: <ul style="list-style-type: none"> • One Axiom™ CEU 96-Array Plate • Two Axiom™ 2.0 Reagent Kit (96 reactions per kit) • Two Axiom™ GeneTitan™ Consumables Kit • One full plate of 96 HapMap DNA samples^[2] • One GeneTitan™ ZeroStat AntiStatic Gun • Please order an additional catalog array plate of your choosing for use with your samples. 	902518
<input type="checkbox"/>	Axiom™ 2.0 Assay Training Module for Microbiome 96-Array Plates Each kit includes: <ul style="list-style-type: none"> • One Axiom™ CEU 96-Array Plate • One Axiom™ Microbiome Array Plate (96-array format) • Two Axiom™ 2.0 Reagent Kit (96 reactions per kit) • Two Axiom™ GeneTitan™ Consumables Kit • One full plate of 96 HapMap DNA samples^[2] • One GeneTitan™ ZeroStat AntiStatic Gun 	902988

(continued)

✓	Item	Source
GeneTitan™ consumables		
☐	<p>Axiom™ GeneTitan™ Consumables Kit</p> <p>Sufficient to process one 96-format array plate. Consists of:</p> <ul style="list-style-type: none"> • Five 96-layout GeneTitan™ stain trays with covers • One 96-layout GeneTitan™ hybridization tray • One 96-layout GeneTitan™ scan tray with cover and protective base <p>These trays are also required for processing a CarrierScan™ 1S 96F Array Plate on the GeneTitan™ Multi-Channel Instrument.^[1]</p>	901606

^[1] For a complete list of all equipment and supplies required for GeneTitan™ Multi-Channel Instrument installation and operation, consult the *GeneTitan™ Multi-Channel Instrument Site Preparation Guide*.

^[2] Per agreement with Coriell Institute, all residual HapMap DNA samples must be destroyed immediately following completion of training.

Axiom™ consumables kits for the NIMBUS™ Instrument

Table 5 Axiom™ Starter Kit for Applied Biosystems™ NIMBUS™ Instrument–NC Combo Kit (Cat. No. 952496)

Component	Cat. No.
Axiom™ NIMBUS™ 2.0 Consumables Kit v2	952437
Axiom™ NIMBUS™ Starter Pack-NC	952493
Axiom™ Consumables Kit for QC	902909

Table 6 Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437).

Component ^[1]	Part No. ^[2]	Number	
		Per run	Per kit ^[3]
96-well full-skirt plate	203023	7	30
96 half-skirt plate	203244	1	4
Square deepwell plate	203016	3	12
Round deepwell plate	203367	2	8
Square 1.2-mL plate	203031	1	4
4-column reservoir	203056	9	36

^[1] This consumables kit does not include a 96-well UV plate. This plate is in the Axiom™ Consumables Kit for QC (Cat. No. 902909).

^[2] Plate part numbers are provided for identification purposes only.

^[3] The kit provides sufficient quantities of consumables for 4 runs of 96-format array plates.

Table 7 Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. [952493](#))

Component	Quantity per run
96 Half-Skirt Plate Holder	1
Thermoshake Deepwell Plate Adapter	1
Alpillo™ Plate Cushion	1
Alpillo™ Extension	1
Axiom™ 2.0 Reagent Kit Template	1
Pedestal, 35.48 mm	1
Reservoir holder	2
Axiom™ 96 Consumables Kit for Applied Biosystems™ NIMBUS™ 2.0	1
Axiom™ Consumables Kit for QC	1
2-mL tubes	25

Table 8 Axiom™ Consumables Kit for QC (Cat. No. [902909](#)).

Component	Part No.	Number	
		Per run	Per kit
96-well UV plate	202919	1	25

Labware and accessories required

Deck accessories required from other vendors

Item	Source	Quantity/run
24-Position Tube Rack	Beckman Coulter™, 373661	1
Insert, 11 mm, for 1.5-mL Microfuge Tubes	Beckman Coulter™, 373696	1

Pipette tips

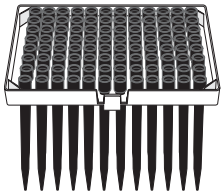
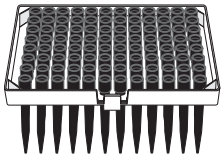
The following table provides the pipette tip usage for 1 full run of the Axiom™ 2.0 Assay 96-Array Format Automated Workflow on the NIMBUS™ Target Preparation Instrument.

Step	CO-RE™ II Filter Tips, 1,000 µL	CO-RE™ II Filter Tips, 300 µL	CO-RE™ II Filter Tips, 50 µL
DNA amplification	24 tips	120 tips	—
Fragmentation	33 tips	114 tips	—
Resuspension	—	104 tips	—
Hybridization preparation	14 tips	105 tips	—
Sample QC	—	16 tips	192 tips
Hybridization transfer	—	96 tips	—
GeneTitan™ preparation 1	47 tips	7 tips	—
GeneTitan™ preparation 2	28 tips	1 tip	—
Totals	146 tips	563 tips	192 tips

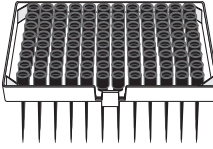
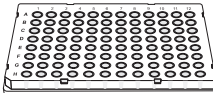
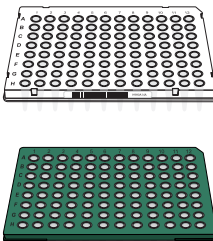
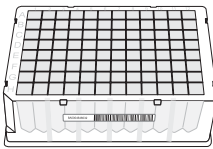
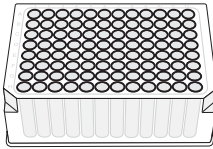
Labware used on the deck

Unless otherwise indicated, all materials are available through thermofisher.com.

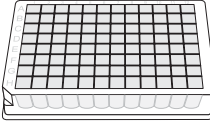

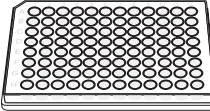


IMPORTANT! There are 2 types of compatible “Round deepwell plates” that can be used on the NIMBUS™ Instrument. Each type of “Round deepwell plate” has a specific plate adapter. The correct plate adapter must be paired with the correct “Round deepwell plate” to prevent part interference, which can lead assay failures.

Labware	Source	Image
CO-RE™ II Filter Tips, 1,000 µL Conductive 1,000 µL filter pipette tips in frames.	Hamilton™ Robotics (Cat. No. 235905)	
CO-RE™ II Filter Tips, 300 µL Conductive 300 µL filter pipette tips in frames.	Hamilton™ Robotics (Cat. No. 235903)	

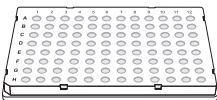
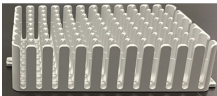
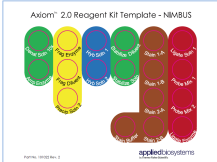
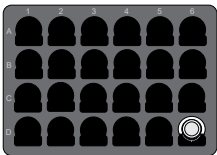
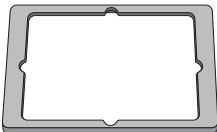
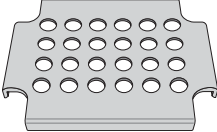
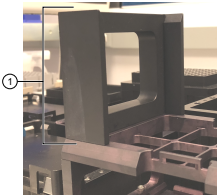
(continued)

Labware	Source	Image
<p>CO-RE™ II Filter Tips, 50 µL</p> <p>Conductive 50 µL filter pipette tips in frames.</p>	<p>Hamilton™ Robotics (Cat. No. 235948)</p>	
<p>96-well full-skirt plate</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, Fisher Scientific™ (Cat. No. 14-222-326). 	
<p>96 half-skirt plate</p> <p>Also called Hard-Shell™ 96-Well PCR Plate, high profile, semi skirted.</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, half- skirt plate (Cat. Nos. 4483354 or 4483352). Purchased separately, half-skirt plate (Bio-Rad™, Cat. Nos. HSS9641 (green) or HSS9601 (clear)). Purchased separately: MicroAmp™ EnduraPlate™ Optical 96-Well Clear Reaction Plates with Barcode (Cat. No. 4483354). 	
<p>Square deepwell plate</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, deepwell plate (Cat. No. AB0932). 	
<p>Round deepwell plate</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Purchased separately, Nunc™ 96-Well Polypropylene DeepWell™ Storage Plate (sterile) (Cat. No. 12-565-605). Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, Axygen™ 96-well Round Deepwell Plate (sterile, PDW20CS), (Cat. No. 14-222-354). Purchased separately, Axygen™ 96-well Round Deepwell Plate (nonsterile, PDW20C), (Cat. No. 14-222-353). <p>Note:</p> <ul style="list-style-type: none"> Use the correct plate adapter for each 96-deepwell plate type. See Table 9. Nunc™ plates are in kit 952437. 	




(continued)

Labware	Source	Image
Square 1.2-mL plate	One of the following: <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, square plate (Thomas Scientific™, Cat. No. OX1263). 	
4-column reservoir with reservoir frame	One of the following reservoirs: <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ 2.0 Consumables Kit v2 (Cat. No. 952437). Purchased separately, reservoir (Thomas Scientific™, Cat. No. EK-2119). Reservoir frame: Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493).	 <p>Note: The 4-column reservoir must always be placed on a reservoir frame when on the NIMBUS™ Instrument deck.</p>
Corning™ UV-Transparent Microplate 96-well UV plate	One of the following: <ul style="list-style-type: none"> Available as a component of the Axiom™ Consumables Kit for QC (Cat. No. 902909). Purchased separately, UV plate (Cat. No. 07-200-623). 	
Alpillo™ Plate Cushion and Alpillo™ Extension	One of the following: <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493). Purchase separately: plate cushion (Alpaqua™, Cat. No. A000007) and extension (Alpaqua™, Cat. No. K000018). 	 <p>The image shown displays the plate cushion and extension assembled.</p>
Pedestal, 35.48 mm Designed specifically for the Axiom™ 96 Sample Automated Target Preparation Solution method to fasten the Alpillo™ Plate Cushion and extension on deck position 5.	Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493).	

(continued)

Labware	Source	Image
<p>96 Half-Skirt Plate Holder</p> <p>Used as holder for 96 half-skirt plate.</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493). Purchased separately, skirt plate holder (Bio-Rad™, Cat. No. TRC 9601). 	
<p>Thermoshake Deepwell Plate Adapter</p> <p>Adapter plate for the Nunc™ round deepwell plate.</p>	<p>One of the following:</p> <ul style="list-style-type: none"> Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493). Purchased separately, plate adapter (INHECO™, Cat. No. 3200648). <p>Note: Use the correct plate adapter for each 96-deepwell plate type. See Table 9.</p>	
<p>Axiom™ 2.0 Reagent Kit cooling block template</p> <p>Designed specifically for use with the NIMBUS™ Instrument and the Axiom™ 2.0 Reagent Kit.</p>	<p>Available as a component of the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493).</p>	
<p>24-Position Tube Rack and Insert, 11 mm, for 1.5-mL Microfuge Tubes</p> <p>With one 11-mm tube insert in position D6.</p>	<p>Tube rack (Beckman Coulter™, Cat. No. 373661) and insert (Beckman Coulter™, Cat. No. 373696).</p>	
<p>Plate collar</p>	<p>Included as part of the NIMBUS™ Instrument configuration.</p>	
<p>Tube collar</p>	<p>Included as part of the NIMBUS™ Instrument configuration.</p>	
<p>Tip loading tool</p>	<p>Included as part of the NIMBUS™ Instrument configuration</p>	 <p>① Tip loading tool attached to deck.</p>

(continued)

Labware	Source	Image
GeneTitan™ ZeroStat AntiStatic Gun and Ion-Indicator Cap	Cat. No. 74-0014	
96-well Block Cooling Chamber for 0.2 mL tubes, 96 holes (4 for 1.5 mL and 6 for 0.5 mL tubes), Dim.: 6 1/8”L x 3 1/8”W x 1” H	Diversified Biotech™, Cat. No. CHAM-1000	
Adhesive film	Use one of the following: <ul style="list-style-type: none"> Applied Biosystems™ MicroAmp™ Clear Adhesive Film (Cat. No. 4306311) Microseal™ 'B' PCR Plate Sealing Film (Bio-Rad™, Cat. No. MSB1001) 	

Correct adapter for the 96-round deepwell plate type used

Table 9 Adapter for the 96-round deepwell plate type.

96-round deepwell plate	Adapter to use
Fisher Scientific™, Nunc™ 96-Well Polypropylene DeepWell™ Storage Plate (sterile), Cat. No. 12-565-605 .	INHECO™, 3200648. Also available in the Axiom™ NIMBUS™ Starter Pack-NC (Cat. No. 952493).
Axygen™ 96-well Round Deepwell Plate (sterile, PDW20CS), Cat. No. 14-222-354 .	INHECO™ (Cat. No. 3200390).
Axygen™ 96-well Round Deepwell Plate (nonsterile, PDW20C), Cat. No. 14-222-353 .	

Other equipment, consumables, and reagents required

Preamplification/amplification staging area

Precautions are required when manipulating genomic DNA to avoid contamination with foreign DNA amplified in other reactions and procedures. It is recommended that genomic DNA manipulations are performed in a dedicated preamplification room or in an area separate from the main laboratory.

This preamplification area must have a dedicated set of pipettes and plasticware. If no dedicated area is available, use of a dedicated bench or a dedicated biosafety hood and dedicated pipettes is suggested. If no dedicated bench or biosafety hood is available, a set of dedicated pipettes is recommended.

Oven requirements

We recommend using the BINDER™ ED 56 oven that is listed in the table below. If another oven is used, it must be able to maintain a constant temperature of 37°C for at least 24 hours, and have a temperature accuracy of ±1°C.

Unless otherwise indicated, all materials are available through [thermofisher.com](https://www.thermofisher.com).

✓	Item	Source
<input type="checkbox"/>	Oven: Required if processing more than 3 array plates per week: Heratherm™ Advanced Protocol Microbiological Incubator BINDER™ ED 56 drying and heating chamber <ul style="list-style-type: none"> ED056UL-120V Voltage: 120 V 1~60 Hz ED056-230V Voltage: 230 V 1~50/60 Hz 	51028066 <ul style="list-style-type: none"> BINDER™, 9010-0334 BINDER™, 9010-0333
	Optional—for low throughput of 3 or fewer array plates per week: GeneChip™ Hybridization Oven 645 ^[1]	00-0331

^[1] The GeneChip™ Hybridization Oven 640 is currently not supported with the Axiom™ 2.0 Assay. However, to use it in the workflow contact your field service engineer (FSE) or Thermo Fisher Scientific Technical Support regarding the compatibility of this oven with the Axiom™ 2.0 Assay.

Spectrophotometer

We recommend using 1 of the following spectrophotometers, or equivalent.

Unless otherwise indicated, all materials are available through [thermofisher.com](https://www.thermofisher.com).

✓	Item	Source
<input type="checkbox"/>	Thermo Scientific™ Multiskan™ Sky Microplate Spectrophotometer	51119500
<input type="checkbox"/>	SpectraMax® Plus 384 Microplate Reader	Molecular Devices™, PLUS 384
<input type="checkbox"/>	DTX 880 Multimode Detector with genomic filter slide	Beckman Coulter™, A30184

Thermal cycler recommendations and protocol

We have verified the performance of this assay using the following thermal cyclers.

- Applied Biosystems™ GeneAmp™ PCR System 9700 (with gold-plated or silver block)
- Applied Biosystems™ Veriti™ Thermal Cycler
- Applied Biosystems™ ProFlex™ PCR System
- Eppendorf™ Mastercycler™ pro S

IMPORTANT! Always use the heated lid option when programming protocols. See the appropriate thermal cycler user guide for programming information.

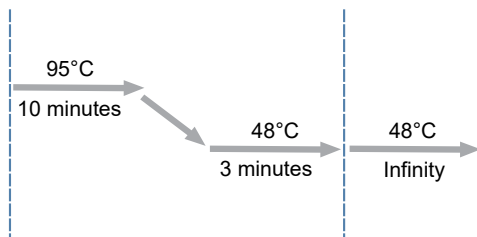


Figure 10 Axiom 2.0 Denature protocol (Stage 5).



WARNING! Evaporation during denaturation can negatively affect assay performance. Use the recommended thermal cycler consumables and sealing film to eliminate condensation and evaporation.

Shakers

Unless otherwise indicated, all materials are available through [thermofisher.com](https://www.thermofisher.com).

We recommend using one of the following shakers.

Item	Source
Thermo Scientific™ Digital Microplate Shaker	88882005 or 88882006
Thermo Scientific™ Compact Digital Microplate Shaker	Fisher Scientific™ 88880023 or 88880024
Jitterbug™	Boekel Scientific™: 130000 (115V), 130000-2 (230V)

Plate centrifuge

One plate centrifuge is required for the Axiom™ 2.0 Assay. The plate centrifuges listed in Table 10 are recommended for the Axiom™ 2.0 Assay 96-Array Format Automated Workflow. When centrifuging and drying pellets, the centrifuge must be able to centrifuge plates at:

- rcf: 3,200 × *g* with an appropriate rotor/bucket combination (4,000 rpm for the Eppendorf™ Centrifuge 5810 R that is described in Table 10)
- Temperature: 4°C

Relative centrifugal force (rcf) is calculated using the following formula:

$$\text{rcf} = (1.118 \times 10^{-5}) R S^2$$

where R is the radius of the rotor in centimeters, and S is the speed of the centrifuge in revolutions per minute.

In addition, the bottom of the rotor buckets must be soft rubber to ensure that the deepwell plates do not crack. Do not use buckets where the plates sit directly on a metal or hard plastic bottom. For the Eppendorf™ Centrifuge 5810 R, do not use the A-4-62 rotor with a WO-15 plate carrier (hard bottom).

Table 10 Plate centrifuge recommendations for the Axiom™ 2.0 Assay 96-Array Format Automated Workflow.

✓	Item	Source
<input type="checkbox"/>	Thermo Scientific™ Sorvall™ X4R Pro-MD Centrifuge (refrigerated), with:	<ul style="list-style-type: none"> • 75009520 (240 V, 50 Hz) • 75009521 (120 V) • 75009620 (220 V, 60 Hz)
<input type="checkbox"/>	TX-1000 Swinging Bucket Rotor Body	75003017 (rotor)
<input type="checkbox"/>	• Adapter for TX-1000 Swinging Bucket Rotor	• 75007303 (adapter, pack of 4)
<input type="checkbox"/>	• Buckets for TX-1000 Rotor	• 75003001 (buckets, set of 4)
<input type="checkbox"/>	Eppendorf™ Centrifuge 5810 R, with:	022625551 (230 V, 50–60 Hz)
<input type="checkbox"/>	• Rotor A-4-81, with 4 MTP/Flex buckets	022625501 (120 V, 50–60 Hz, 15 A)
		022625101 (120 V, 50–60 Hz, 20 A)
		022638807 (rotor)

Other equipment, reagents, and supplies required

Unless otherwise indicated, all materials are available through [thermofisher.com](https://www.thermofisher.com). "MLS" indicates that the material is available from [fisherscientific.com](https://www.fisherscientific.com) or another major laboratory supplier.

Item	Source
Common laboratory equipment	
Freezer, -20°C	MLS
Refrigerator, 2°C to 8°C	MLS
Vortex-Genie™ 2 (for plates and microtubes) ^[1]	Fisher Scientific™ 50-728-002 (120 V/60 Hz) 50-728-004 (230 V/50 Hz)
Mini microcentrifuge, for 2-mL tubes ^[1]	MLS
Benchtop cooler, -15°C ^[1]	MLS
Ice bucket, 4–9 liters	MLS
Electronic pipette	MLS
GeneTitan™ ZeroStat AntiStatic Gun	74-0014
Reagents	
2-Propanol, anhydrous, 99.5% (isopropanol)	Sigma-Aldrich™, 278475
Low EDTA TE Buffer (10 mM Tris-HCl pH 8.0, 0.1 mM EDTA)	Fisher Scientific™, AAJ75793AE
Quant-iT™ PicoGreen™ dsDNA Assay Kit	P7589
Materials, reagents, and gels required to run QC steps	
Mother E-Base™ Device	EBM03
Daughter E-Base™ Device	EBD03
E-Gel™ 48 Agarose Gels, 4%	G800804
TrackIt™ 25 bp DNA Ladder or equivalent (Follow the product instructions for dilution method.)	10488022
TrackIt™ Cyan/Orange Loading Buffer	10482028
E-Gel™ 48 Agarose Gel, 1%	G800801
E-Gel™ 48 Agarose Gels, 2%	G800802
E-Gel™ 96 High Range DNA Marker	12352019
Water, Nuclease-free, Molecular Biology Grade, Ultrapure	Fisher Scientific™, 71786
Pipettes and tips recommended for performing the gel QC steps^[2]	
Single-channel P20	MLS

(continued)

Item	Source
Single-channel P200	MLS
Single-channel P1000	MLS
Pipette 12-channel P20	MLS
Pipette 12-channel P50 (optional)	MLS
Pipette 12-channel P200	MLS
Pipette 12-channel P1200	MLS
Pipette tips 10 µL refill	MLS
Pipette tips 200 µL refill	MLS
Pipette tips 1,000 µL refill	MLS
Pipette tips RT 10 µL (racked tips)	MLS
Pipette tips RT 200 µL (racked tips)	MLS
Pipette tips RT 1,000 µL (racked tips)	MLS
Other laboratory supplies	
Adhesive film for 96-well plates—use one of the following: <ul style="list-style-type: none"> Applied Biosystems™ MicroAmp™ Clear Adhesive Film Microseal™ 'B' PCR Plate Sealing Film 	4306311 Bio-Rad™, MSB1001
Laboratory tissue	MLS
Markers, permanent, fine point	MLS

^[1] Equivalent item from other manufacturer is acceptable.

^[2] Filtered pipette tips are recommended.

Documentation and support

Related documentation

Document	Publication number	Description
<i>Axiom™ 2.0 Assay 96-Array Format Automated Workflow User Guide—Applied Biosystems™ NIMBUS™ Target Preparation Instrument</i>	MAN0017740	This document provides instruction on running the Axiom™ 2.0 Assay on 96-array format plates using an automated workflow on the on the Applied Biosystems™ NIMBUS™ and array processing on the GeneTitan™ Multi-Channel Instrument.
<i>Axiom™ 2.0 Assay 96-Array Format Automated Workflow Quick Reference—Applied Biosystems™ NIMBUS™ Target Preparation Instrument</i>	MAN0017742	An abbreviated reference for the target preparation step of the Axiom™ 2.0 Assay 96-Array Format Automated Workflow on the Applied Biosystems™ NIMBUS™. This quick reference document is for experienced users.
<i>Axiom™ 2.0 gDNA Sample Preparation Quick Reference</i>	MAN0017720	An abbreviated reference on preparing the genomic DNA sample.
<i>GeneTitan™ MC Protocol for Axiom™ Array Plate Processing Quick Reference</i>	MAN0017718	An abbreviated reference for processing Axiom™ Array Plates with the GeneTitan™ Multi-Channel Instrument.
<i>GeneTitan™ Multi-Channel Instrument User Guide</i>	MAN0027694	The GeneTitan™ Multi-Channel Instrument automates array processing from target hybridization to data generation by combining a hybridization oven, fluidics processing, and state-of-the art imaging device into a single benchtop instrument. This document details the use, care, and maintenance for the GeneTitan™ Multi-Channel Instrument.
<i>GeneTitan™ Multi-Channel Instrument Site Preparation Guide</i>	MAN0025571	Provides guidance on creating and maintaining the proper environment required for the GeneTitan™ Multi-Channel Instrument.
<i>Recommended Alternative Microarray Consumables Quick Reference</i>	MAN0019853	A quick reference document identifying recommended alternative replacement consumables for use in microarray assays.

(continued)

Document	Publication number	Description
Analysis and software		
<i>Axiom™ Genotyping Solution Data Analysis User Guide</i>	MAN0018363	This guide provides information and instructions for analyzing Axiom™ genotyping array data. It includes the use of Axiom™ Analysis Suite, Applied Biosystems™ Analysis Power Tools (formerly APT) and SNPolisher™ Package to perform quality control analysis (QC) for samples and plates, SNP filtering before downstream analysis, and advanced genotyping methods.
<i>GeneChip™ Command Console™ (GCC) User Guide</i>	MAN0027771	This user guide provides instructions on using GeneChip™ Command Console™ (GCC) used to control GeneChip™ instrument systems. GeneChip™ Command Console™ software provides an intuitive set of tools for instrument control and data management used in the processing of GeneChip™ arrays.
<i>Axiom™ Analysis Suite User Guide</i>	MAN0027928	This user guide provides instructions on using Axiom™ Analysis Suite—a single-source software package to enable complete genotyping analysis of all Axiom™ arrays.
NIMBUS™ Target Preparation Instrument documents		
<i>Microlab NIMBUS™ User Guide</i>	62965-01	The Hamilton™ Company user guide for the NIMBUS™ Instrument. This document is shipped in the deck hardware kit.

Customer and technical support

Visit thermofisher.com/support for the latest service and support information.

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

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

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have any questions, please contact Life Technologies at www.thermofisher.com/support.

