



User Guide | CG000396 | Rev J

Chromium X Series (X/iX)

with Readiness Test

For use with:

Chromium X & Accessory Kit

12-Month Warranty, PN-1000331; 24-Month Warranty, PN-1000332

Chromium iX & Accessory Kit

12-Month Warranty, PN-1000328; 24-Month Warranty, PN-1000329

Chromium X/iX Refurbished, PN-1000326R



Notices

Document Number

CG000396 | Rev J

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Document Revision Summary

Document Number

CG000396 | Rev J

Title

Chromium X Series (X/iX) User Guide with Readiness Test

Revision

Rev H to Rev J

Revision Date

March 2024

Specific Changes

Rev J

- The instrument now requires an internet connection for firmware updates. The method for a firmware update with no internet connection was removed on pages 20-21, 30, 33, 35-36.
- The method for deleting run data was added on page 33.

Rev H

- Updates for functionality corresponding to firmware update 2.0.0 were added, which includes GEM-X compatibility and a new alternate mode known as Fluidics Flush Mode.
- The Introduction now contains information about GEM-X chips and assays, and the supported assays listed in the table have been updated on pages 6-7.
- The following kits are being phased out: the Chromium iX Accessory Kit and the Chromium X Upgrade Kit. The new Chromium X/iX Accessory Kit includes the components from both previous kits. The new GEM-X Transition Kit contains components that are interchangeable with the previous Chromium X Upgrade Kit on pages 14-15.
- Tips and best practices were added for GEM-X Chips on pages 27-30.
- The diagram in the unboxing section was updated to portray the new kit configuration on page 18.
- A new alternate mode for troubleshooting—Fluidics Flush Mode—is described on pages 34 and 42.

General Changes

Rev J

- The instrument now uses an internet connection for firmware updates. References to using a USB due to no internet connection were removed.

Rev H

- Photos were replaced with line drawings for clarity and consistency with other 10x Genomics documentation.
- The user interface screenshots have been updated throughout to reflect the latest software.
- The document was updated for general minor consistency of language and terms throughout.

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Introduction

Introduction

Product Identification

Product Specifications

Introduction

The Chromium X Series is the next generation of instrumentation, purposefully designed to enable high-throughput experiments. Chromium X Series instruments include:

- Advanced sensors, improved pressure control systems, and precise temperature control on the tray.
- A highly interactive user interface with familiar one-button operation.
- Seamless firmware upgrades, secure network connectivity, and easy syncing to the 10x Genomics Cloud.
- Similar performance as assessed by multiplet rates, library complexity, read mapping rates, and cell clustering.
- Compatible with both GEM-X and Next GEM single cell assays, including:
 - GEM-X:
500–20,000 cells per channel
 - Next GEM Standard assay:
500–10,000 cells per channel
500–30,000 cells per channel with CellPlex
 - Next GEM HT:
2,000–20,000 cells per channel
2,000–60,000 cells per channel with CellPlex

Consult the relevant assay-specific user guide on the 10x Genomics Support website for the list of compatible kits and consumables.

Introduction

contd.

Comparison of Controller, Chromium X and Chromium iX capabilities

Assay	Chromium		
	Controller*	iX	X
GEM-X Assays	GEM-X Single Cell 3'	Unsupported	✓ <i>Firmware version 2.0.0 or higher required</i>
	GEM-X Single Cell 5'	Unsupported	✓ <i>Firmware version 2.0.0 or higher required</i>
Next GEM Assays	Next GEM Single Cell Gene Expression Flex	Unsupported	✓ <i>Firmware version 1.1.0 or higher required</i>
	Next GEM Single Cell 3' Gene Expression	✓	✓ ✓
	Next GEM Single Cell 3' Gene Expression HT	Unsupported	Upgrade to X required ✓
	Next GEM Single Cell Immune Profiling	✓	✓ ✓
	Next GEM Single Cell Immune Profiling HT	Unsupported	Upgrade to X required ✓
	Next GEM Single Cell ATAC	✓	✓ ✓
	Next GEM Single Cell Multiome ATAC + Gene Expression	✓	✓ ✓
	Next GEM Single Cell 3' Gene Expression LT*	✓	✓ ✓

* Discontinued

Product Identification Label

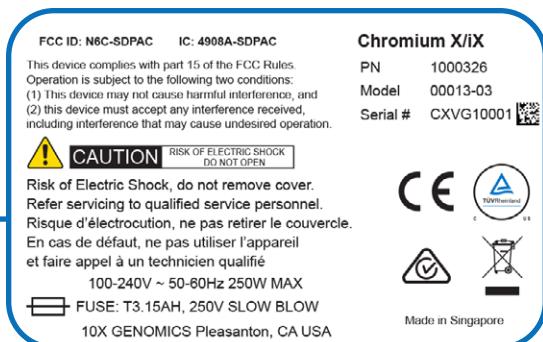
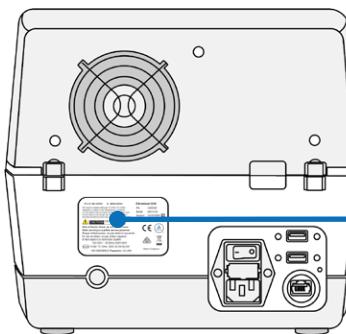
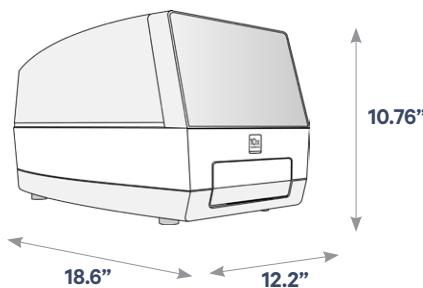


Image of label for reference only

Product Specifications

Parameter	Specifications
Weight	41.4 lb (18.8 kg)
Instrument Dimensions with: Tray close Tray open	W D H 12.2"[31.0 cm] x 18.6"[47.2 cm] x 10.2"[26.0 cm] 12.2"[31.0 cm] x 22.8"[58.0 cm] x 10.2"[26.0 cm]
Electrical Requirements Nominal from a standard 3-prong wall receptacle that includes a safety ground pin	100-240 VAC, 50/60 Hz, 250 W 90-264 V operational range (+/- 10% of nominal) Overvoltage Category II (standard receptacle)
Pollution	Degree 2 (Indoor Use Only)
Ventilation Requirement	Minimum 4" [10 cm] Around all sides
Operating Temperature	64-82°F [18-28°C] Use in a typical indoor laboratory environment. Extreme temperature conditions will affect the sensitive reagents used with the instrument.
Humidity	30-80% R.H. non-condensing
Altitude	Altitude up to 7500 ft [2286 m] above sea level
Power Cable Length <i>Power cables will be in accordance with regional specifications</i>	6-7 ft [2 m] Standard





Safety & Compliance Information

Safety

Regulatory

Safety

Before operation, ensure that all potential users have received:

- Instruction in general safety practices for laboratories.
- Instruction in specific safety practices for the instrument.
- All related Safety Data Sheet (SDS) documents.

Precautions are illustrated in the following way:

Symbols	Description
	The general Warning symbol indicates the possibility of damaging the instrument or compromising the results of a method.
	The Electrical Hazard symbol indicates the presence of electrical components that can be harmful to the operator if handled incorrectly.
	The Mechanical Hazard symbol indicates the presence of moving mechanical parts that can be harmful to the operator if handled incorrectly.
	The Hazardous Materials symbol indicates the presence of materials that are toxic or otherwise harmful to the operator if handled incorrectly.
	The Biohazard symbol indicates the presence of biological samples that can be harmful to the operator if handled incorrectly.



Ensure ground is reliably connected before plugging the instrument's power cord into the power source (receptacle). *Grounding is required to prevent electric shock. If the power source is not grounded, qualified personnel must first install a reliable safety ground.*



Warning: The tray door is capable of moving an object that is in its opening path. If near the edge of the workspace, the object could fall and create a hazard.



Pinch risk: Ensure no obstructions or fingers present near closing tray.



Warning: Avoid using the Chromium X/iX in a manner not specified by 10x Genomics. *The Chromium X/iX has been designed to protect the user. If used improperly, the intended user protections can be impaired.*



Heavy Load: Total Chromium iX box weight is 49.9 lb (22.6 kg). Two-person lift required. Use the tote bag included in the packaging to lift the instrument itself (41.4 lb [18.8 kg]).

Regulatory

The Chromium X Series has been designed, tested, and certified to be in compliance with the following standards:

Certification	Standards
	TUV Certification only for Chromium X/iX UL 61010-1:2012 and CAN/CSA C22.2 No. 61010-1-12 with a cTUVus mark to indicate that the product has been tested and certified to Canadian and US standards by TUV Rheinland and can be legally installed in those countries.
	IEC/EN 61010-1:2010 (3rd Edition): Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory use.
	EN 61326-1:2013: Electrical Equipment for Measurement, Control and Laboratory Use. EMC Requirements.
	The RCM mark indicates an electrical product complies with all the requirements of the electrical and EMC regulations of Australia and New Zealand in accordance with AS/NZS Standards
	CE Mark indicates that assembly is covered by a Declaration of Conformity, and has been declared in conformity with the provisions of all applicable directives in the European Union.
	EN 61326-2-6: Specifies minimum requirements for immunity and emissions regarding electromagnetic compatibility for in vitro diagnostic medical equipment, taking into account the particularities and specific aspects of this electrical equipment and their electromagnetic environment.
	EN 61000-3-2: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <16 A per phase).
	EN 61000-3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <16 A per phase and not subject to conditional connection.
	RoHS Directive (2011/65/EU): Restriction of the use of certain hazardous substances in electrical and electronic equipment.
	WEEE Directive (2012/19/EU): Waste Electrical and Electronic Equipment.
	FCC ID: N6C-SDPAC, IC: 4908A-SDPAC FCC Part 15 Class A. NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
	ICES-003 (Canada): This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada. CAN ICES-003 (A) / NMB-003 (A)
	In accordance with the provisions on the Radio Regulations of the People's Republic of China, this radio transmission equipment, after examination, conforms to the provision with its CMIIT ID.

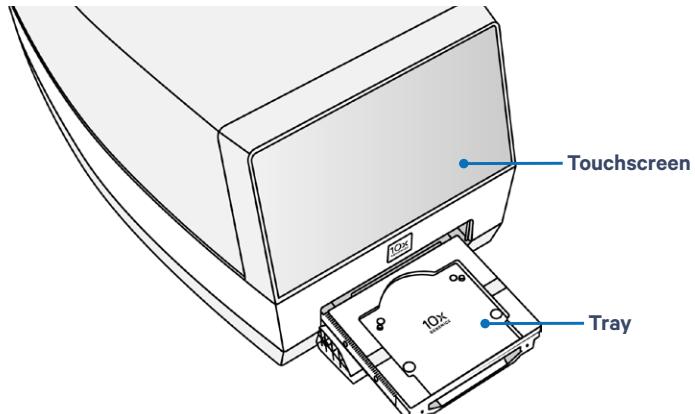
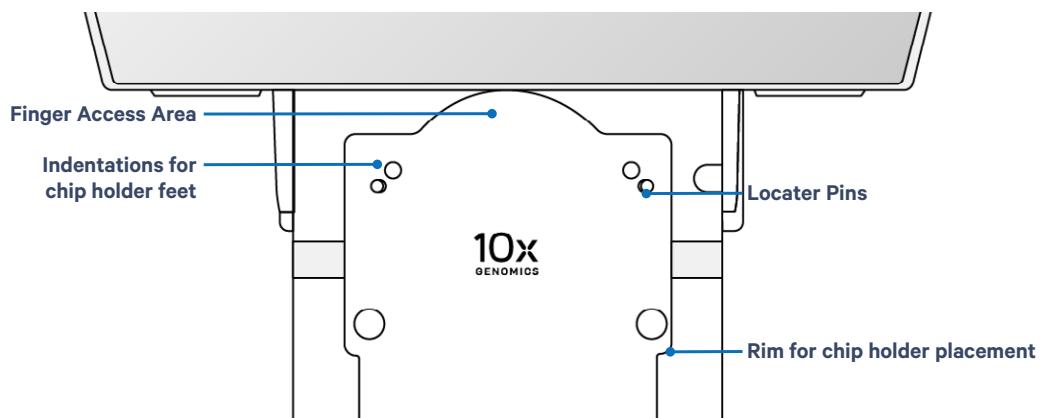
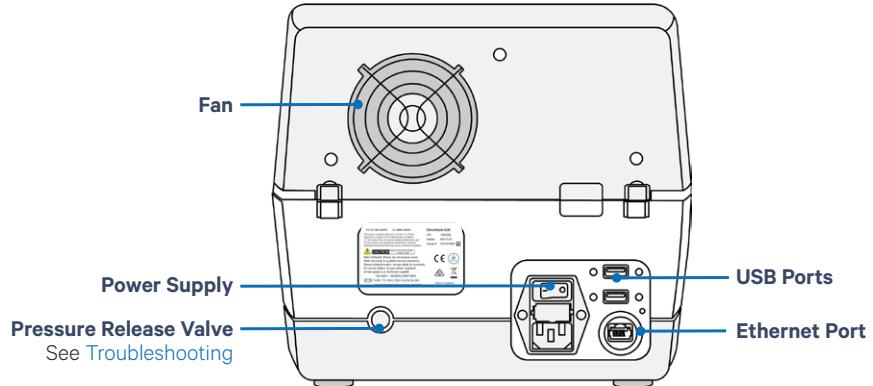


System Components

System Components

Accessory Kits

System Components

Front**Tray****Back**

Accessory Kits

Chromium X/iX Accessory Kit PN-1000709

This kit is comprised of the components formerly listed in both the Chromium iX Accessory Kit (PN-1000323) and the Chromium X Upgrade Kit (PN-1000327). They have the same functionality and can be used interchangeably.

Product	#	Part Number
10x Vortex Adapter	3	330002
10x Strip Vortexer	2	230002
10x Magnetic Separator B <i>Same functionality as 10X Magnetic Separator HT</i>	1	2001212 <i>Interchangeable with 230003, 2000431</i>
Chromium Next GEM Secondary Holder	1	3000332
Chromium X/iX Chip Holder <i>Same functionality as Chromium X Chip Holder</i>	1	3000598
Shipping/Readiness Test Block	1	3000896
Chip Gasket, Blank X/iX*	1	3002180 <i>Interchangeable with 3001663</i>
Universal Power Cord, 10 Amp-250 V <i>(IEC 60320 C-14, with C-13 Detachable Adapters)</i>	1	3000603
USB, 8 GB**	1	3000664

* Blank gaskets have no holes. Use only with shipping/readiness test block. Not compatible with the chip holder.

** The Chromium X Series instrument is compatible with VFAT, FAT32, and exFAT formatted USBs.

GEM-X Transition Kit PN-1000707

The components of this kit are similar in functionality to the components of the former Chromium X upgrade Kit (PN-1000327) and can be used interchangeably.

Product	#	Part Number
10x Magnetic Separator B <i>Same functionality as 10X Magnetic Separator HT</i>	1	2001212
Chromium X/iX Chip Holder <i>Same functionality as Chromium X Chip Holder</i>	1	3000598

Additional Items

Product	#	Part Number
Shipping/Readiness Test Block*	1	3000652
Chip Gasket, Blank X/iX**	1	3002180 <i>Interchangeable with 3001663</i>
Shipping Lock	1	1000657
		<i>Located inside the tray door during transportation to secure and stabilize; removed during installation and stored apart from the instrument. Email support@10xgenomics.com to request a shipping lock for pre-existing instruments.</i>
Lifting Tote Bag	1	3001480

*A shipping/readiness test block and blank gasket assembly is located on the tray within the instrument during shipping.

**Blank gaskets have no holes. Use only with shipping/readiness test block. Not compatible with the chip holder.

Discontinued Kits

The following kits have been discontinued. Their components have the same functionality and can be used interchangeably with those in the Chromium X/iX Accessory Kit (PN-1000709) and the GEM-X Transition Kit (PN-1000707).

**Chromium iX Accessory Kit
PN-1000323,
discontinued**

Product	#	Part Number
10x Vortex Adapter	3	330002
10x Strip Vortexer	2	230002
10x Magnetic Separator	1	230003
Chromium Next GEM Secondary Holder	1	3000332
Shipping/Readiness Test Block	1	3000896
Blank Gasket, 2 Pack	1	3001663
Universal Power Cord, 10 Amp-250 V (IEC 60320 C-14, with C-13 Detachable Adapters)	1	3000603
USB, 8 GB	1	3000664

**Chromium X Upgrade Kit
PN-1000327,
discontinued**

Product	#	Part Number
Chromium X Chip Holder	1	3000598
10x Magnetic Separator HT	1	2000431



System Operation

Step 1: Installation

Step 2: First-Time Use

Step 3: Readiness Test

Main One-Touch Operation

Step 1: Installation

Verify Bench Space

Follow these instructions for installation to operate the Chromium X/iX properly and obtain maximum performance of the system. Before unboxing the instrument choose a location that:

- Is not situated in direct sunlight.
Direct sunlight leads to inadequate cooling conditions or rapid evaporation of reagents.
- Includes a level, sturdy laboratory bench that is not subject to movement or vibration.
- Provides maximum bench space (front to back).
Avoid areas that have obstruction in the rear such as power strips or house lines (spigots for vacuum or air).
- Allows access to the plug at the wall receptacle (to safely disconnect power).
- Allows access to the detachable power cord at the rear of the instrument.
- Provides a minimum of 4" (10 cm) clearance around unit to allow free air circulation.
- Provides a minimum of 6" (15 cm) directly in front of the instrument for unobstructed movement of the tray door.



Warning: The tray door is capable of moving an object that is in its opening path. If the object is near the edge of the workspace, it could fall and create a hazard.



Warning: Avoid using the Chromium X/iX in a manner not specified by 10x Genomics. *The Chromium X/iX has been designed to protect the user. If used improperly, the intended user protections can be impaired.*



General Power Safety

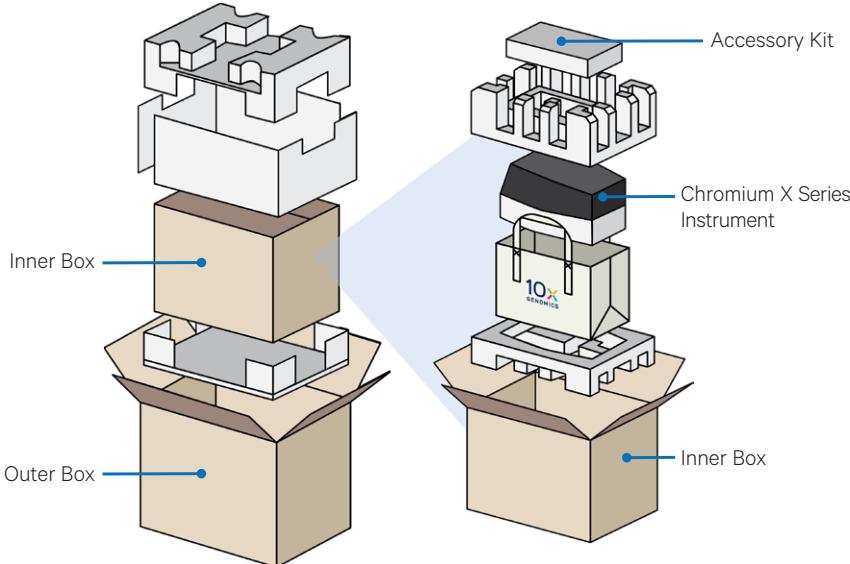
Grounding is required to prevent electric shock. If the power source is not grounded, qualified personnel must first install a reliable safety ground.

- DO NOT plug the instrument power cable into an electrical outlet if the power cable is damaged.
- To prevent electric shock, plug the instrument power cable into properly grounded outlets.
- When using an extension cable or power strip, ensure that the total ampere rating of the instrument does not exceed the ampere rating of the extension cable. The extension cable must be designed for grounded plugs and plugged into a grounded wall outlet.
- Be sure to grasp the plug, not the cable, when disconnecting the instrument from an electric socket.

Step 1: Installation *contd.*

Unbox

DO NOT POWER ON UNTIL READY FOR FIRST-TIME USE SETUP



Part numbers used for instrument sales differ from part numbers on the Outer Box label for Chromium X/iX purchases (PN-1000378) or replacements (PN-1000326).



Heavy Load: Total Chromium iX box weight is 49.9 lb (22.6 kg). Two-person lift required. Use the tote bag included in the packaging to lift the instrument itself (41.4 lb [18.8 kg]).

The Chromium X/iX Accessory Kit (PN-1000709) shown in the diagram is comprised of the components formerly listed in both the Chromium iX Accessory Kit (PN-1000323) and the Chromium X Upgrade Kit (PN-1000327). See [Accessory Kit Table](#) for more information.

a. Open box according to box label “this side up.”

Carefully cut or remove the tape on the top of the box and open the top flaps. Ensure that cut is not too deep as it may damage the contents.

b. Remove the Upgrade Kit box (present only if Chromium X upgrade was purchased) and packaging material. Carefully lift inner box out and open inner box according to box label “this side up.”

c. Remove the Chromium X/iX Accessory Kit box and packaging material.

d. Carefully lift the tote bag holding the Chromium X/iX instrument out of the box and place on bench top. Remove the instrument from the tote bag. Remove all outer transportation packaging materials and tape.

Step 1: Installation contd.

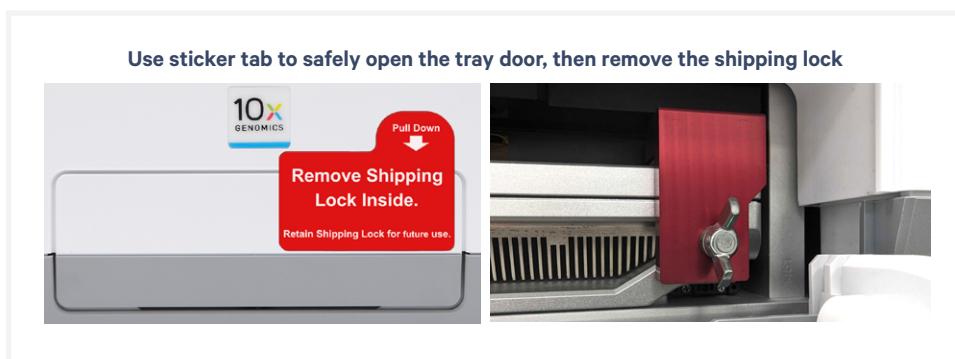
Remove Shipping Material from Tray

The instrument may now include a shipping lock that further secures and stabilizes internal components to prevent damage during shipping. See the [Accessory Kits](#) table for more information.

The instrument ships with a shipping lock and shipping/readiness test block in position on the tray. This hardware secures and stabilizes internal components to prevent damage during shipping.

Follow these steps to remove the shipping lock.

- a. Remove the shipping lock: grab the red sticker covering the tray door by the “pull” tab and pull down carefully. This will manually open the tray door. Unscrew (by hand) the red metal shipping lock. Retain shipping lock in a marked bag or container in a convenient location in case the instrument requires future transportation.
- b. Close the tray door.



- c. Within the Accessory Kit box, locate the universal power cord and plug adaptors. Attach the correct country adaptor to the universal adaptor.
- d. Plug the Chromium X/iX into a properly grounded outlet of proper voltage.



DO NOT power on yet.



Ensure power source is reliably grounded before plugging the instrument’s power cord into the power source (receptacle).

- e. If using an Ethernet cable (not provided) to connect to the network, connect cable directly to the instrument.

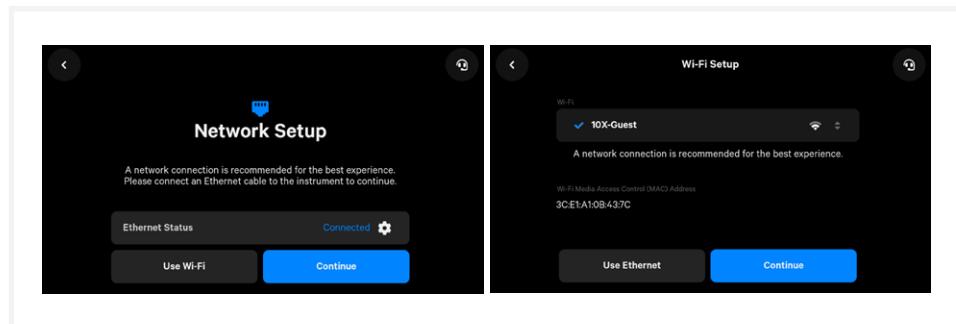
Step 2: First-Time Use

The instrument will walk through a first-time setup protocol. Setup requires the following:

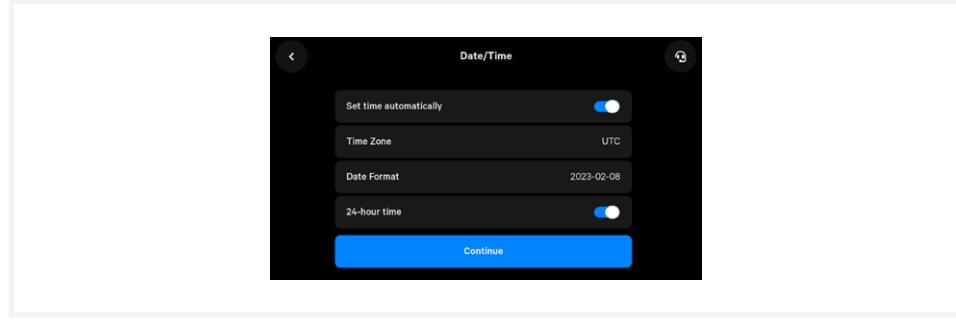
- **10x Genomics Account**
Onscreen instruction will guide account setup. Alternatively, visit cloud.10xgenomics.com/instruments to create an account beforehand.
- **Instrument serial number and instrument ID**
Located onscreen during setup, and also on the label at the back of the instrument
- **A computer with Internet access**
- **Network connection between instrument and 10x Cloud**
*An internet connection is used for firmware updates. Wi-Fi configuration may not be available in your region. Ethernet is recommended for optimal performance. See the [10x Genomics Cloud](#) section in *Tips & Best Practices* for more information.*

Turn on the System

- a. Power on the instrument using the power switch at the back of the unit.
If using Ethernet, connect the cable to the instrument Ethernet port.
- b. Follow onscreen instruction for Network Setup (via ethernet or Wi-Fi).



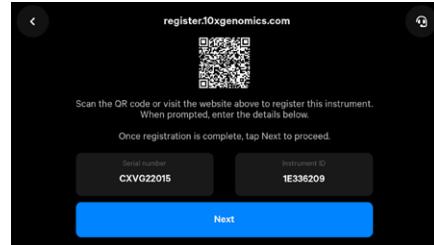
- c. Set the Date and Time.



Step 2:
First-Time Use
contd.

d. Register the instrument.

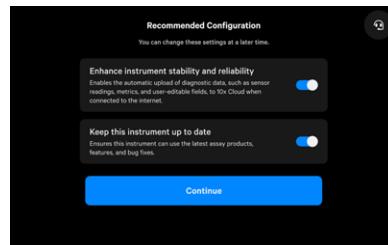
Navigate to register.10xgenomics.com using the onscreen QR code on a computer or phone with internet access. Create or log in to a 10x Genomics account. Enter the serial number + instrument ID found on the instrument screen. Read and accept the legal agreement.



e. Update the firmware.

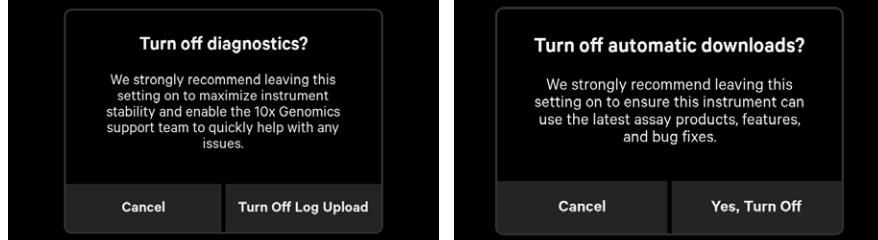
Download the latest firmware update from your 10x Genomics account to the USB provided in the Instrument Accessory Kit. Insert USB into the back of the instrument.

After the instrument updates, a recommended configuration screen will appear. On this screen, the ability of the instrument to automatically upload diagnostic data as well as automatically download updates can be adjusted. 10x Genomics recommends keeping these settings on. These settings can be changed later.



Step 2: First-Time Use *contd.*

If either setting is turned off, the following warnings will appear:



See the [Firmware Update Procedure](#) section for more details.



See [Troubleshooting](#) section if an error occurs during the first-time setup protocol.

Step 3: Readiness Test

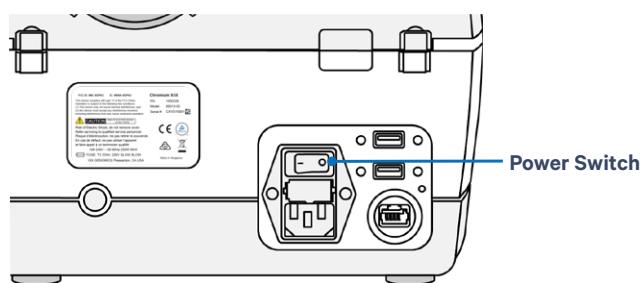


The Readiness Test verifies that all systems are working optimally. The first-time setup protocol will prompt the initial readiness test:



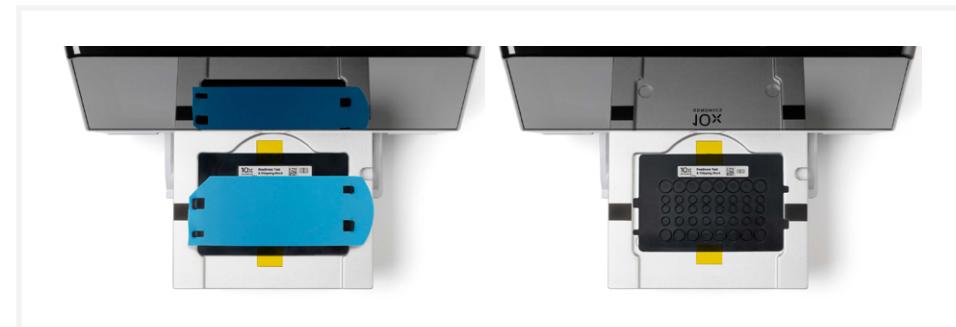
DO NOT start the Readiness Test until all shipping materials, including the shipping lock, block, and tape, have been removed. Starting the Readiness Test with shipping materials present will cause the hardware to audibly grind until the instrument is powered down.

- a. Follow screen instruction to launch the Readiness Test.
- b. Once the tray is fully extended into the loading position, power off the instrument by flipping the switch at the back of the instrument.
This step prevents the tray from auto-retracting during the procedure.



Step 3:
Readiness Test
contd.

- c. Remove the blank, blue gasket from the shipping/readiness test block.



- d. Hold the block from one side and gradually apply force to lift the block from the tray.
- e. Peel off the yellow tapes from the block and discard.
- f. Reinstall blank gasket over the block to prepare for the Readiness Test.

TIPS

- Ensure that the gasket is properly attached (See [10x Gasket Attachment section](#)).
- Replace the assembled block on the tray.



Proceed to Readiness Test

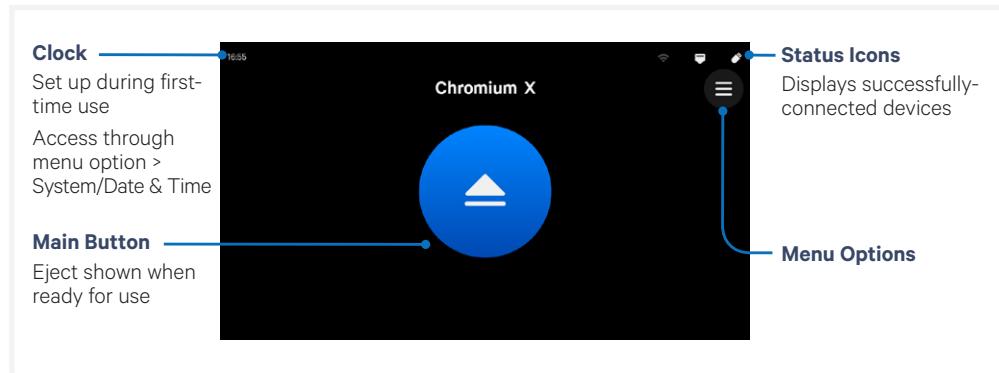
- a. Turn on the instrument. Retract the tray. Press play to start the Readiness Test.
- b. After the test is complete, follow the onscreen instruction to remove the block with blank gasket from the tray.
- c. Store the assembled block and blank gasket in a plastic bag, away from sun-light and extreme temperature. Retain for future use.
- d. A successful Readiness Test marks the end of setup. The instrument is now ready for use.

Initiate subsequent Readiness Tests through the home screen by loading the shipping/readiness test block with blank gasket into the instrument. For optimal performance, tests are recommended at the following times:

- During first-time use (the shipping/readiness test block will already be present in the instrument)
- After any firmware update
- After moving the instrument

Step 4: Main One-Touch Operation

The home screen indicates the instrument is ready for use. There are several key functions that provide valuable information.



Main Operation

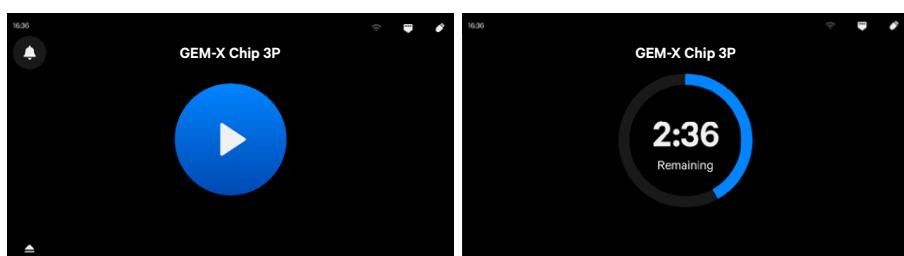
- Press eject button on the touchscreen to eject the tray. A chime will sound.
- Load an assembled chip and holder (See [Tips & Best Practices](#) as well as the appropriate assay kit user guide).
- Press the eject button again to close the tray.
 - If the eject button is not touched within 1 min, it will automatically close on its own.
 - System requires a few seconds before the tray can be reopened again.



Pinch risk: Ensure no obstructions or fingers present near closing tray.

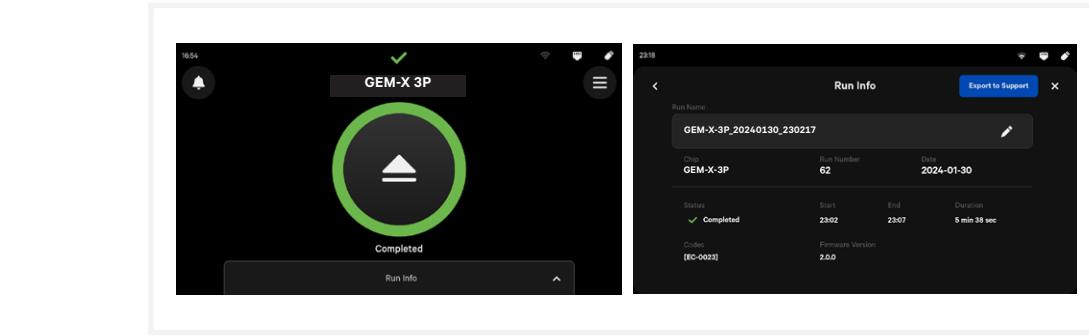
The home screen will now display a play symbol and the name of the chip type. (Use Eject button in lower left corner of the screen to abort).

- Press the play button to start the run.
 - A midrun progress bar will show the time remaining in the run.



Step 4: Main One-Touch Operation *contd.*

- e. At the end of a run, the button will display an eject symbol and a “Run Info” tab at the bottom of the screen. Green indicates a successful completed run.



See [Troubleshooting](#) section if an error occurs during operation.



Tips & Best Practices

Chromium Next GEM Chip

Chip Placement on Chromium X Tray

10x Genomics Cloud



Icons



Tips & Best Practices section includes additional guidance



Signifies critical step requiring accurate execution



Troubleshooting section includes additional guidance



HT specific protocol step updates



GEM-X specific protocol step updates

Chip Handling

For instructions on the standard assay Next GEM chip, consult the appropriate assay kit user guide.

General Chip Handling

- Minimize exposure of reagents, chips, and gaskets to sources of particles and fibers, laboratory wipes, frequently opened flip-cap tubes, clothing that sheds fibers, and dusty surfaces.
- After removing the chip from the sealed bag, use in ≤ 24 h.
- Execute steps without pause or delay, unless indicated. When using multiple chips, load, run, and collect the content from one chip before loading the next.
- Avoid contacting the bottom surface of the chip with gloved hands and other surfaces. Frictional charging can lead to inadequate priming of the channels, potentially leading to either clogs or wetting failures.
- Minimize the distance that a loaded chip is moved to reach the Chromium instrument.
- Keep the chip horizontal to prevent wetting the gasket with oil, which depletes the input volume and may adversely affect the quality of the resulting emulsion.



Chromium Next GEM Chip (HT) Handling

- Only even number of reactions can be run on the chip. Consult the “Load Chromium Next GEM Chip” section of the appropriate assay kit user guide for specific instructions.
- Fill all unused paired input wells on a chip with an appropriate volume of 50% glycerol solution before loading the used wells.



GEM-X Chip Handling

- Fill all unused input wells in rows labeled 1, 2, and 3 on a chip with an appropriate volume of 50% glycerol solution before loading the used wells. DO NOT add glycerol to the wells in the top NO FILL row.

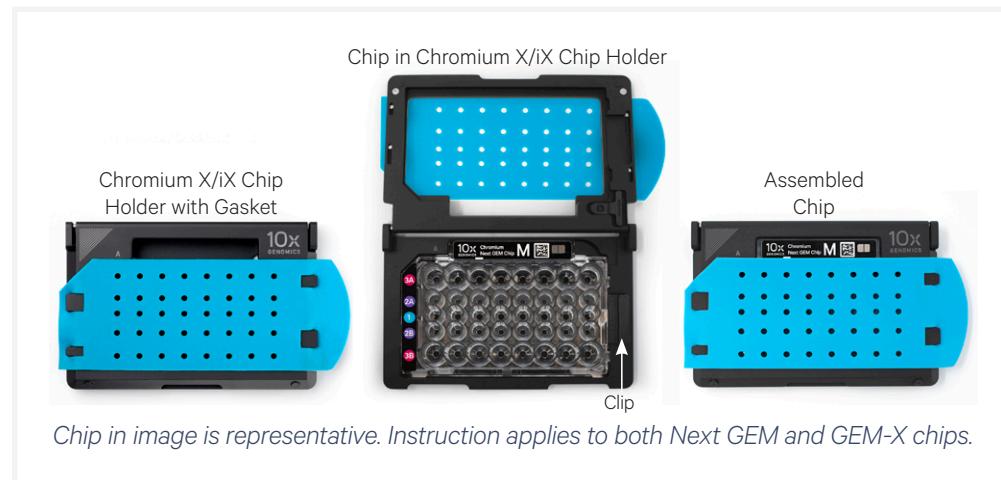
Chip Handling contd.

Chromium X/iX Chip Holders

- Chromium X/iX Chip Holders encase both Chromium Next GEM Chips used for HT (high throughput assay) and Chromium GEM-X Chips.
- The holder lid flips over to become a stand, holding the chip at 45 degrees for optimal recovery well content removal.
- Squeeze the sliders on the back side of the holder together to unlock the lid and return the holder to a flat position.



Chip & Holder Assembly



- Close the holder lid. Attach the gasket by holding the tongue (curved end, to the right) and hook the gasket on the left-hand tabs of the holder. Gently pull the gasket toward the right and hook it on the two right-hand tabs.
- DO NOT touch the smooth side of the gasket.
- Open the chip holder.
- Align notch on the chip (upper left corner) and the open holder with the gasket attached.
- Slide chip to the left until the guide on the holder is inserted into the chip.
- Depress the right hand side of the chip until the spring-loaded clip engages.
- Keep the assembled unit with the attached gasket until ready for dispensing reagents into the wells.

Chip Handling contd.

Chip Loading

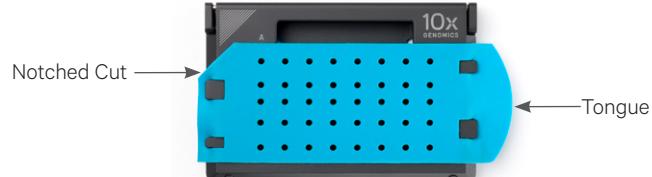
- Place the assembled chip and holder flat (gasket attached) on the bench with the lid open.
- Dispense at the bottom of the wells without introducing bubbles.
- When dispensing Gel Beads into the chip, wait for the remainder to drain into the bottom of the pipette tips and dispense again to ensure complete transfer.
- Consult the “Load Chromium Next GEM Chip” or “Load GEM-X Chip” section of the appropriate assay kit user guide for specific instructions.



10x Gasket Attachment

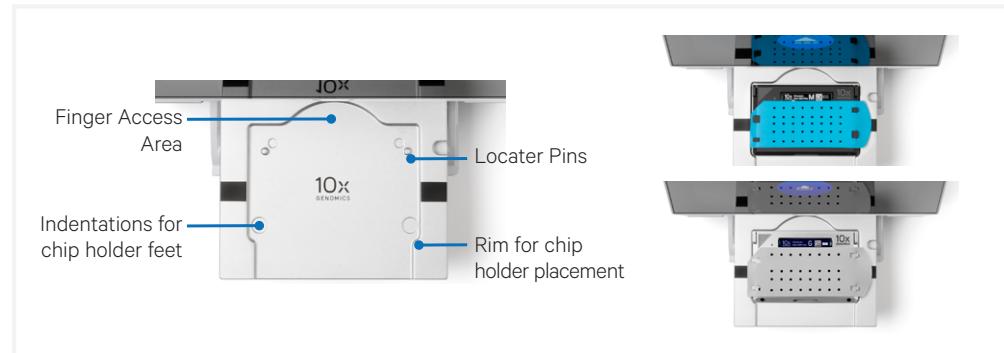
- **Before reagents are loaded**, attach the gasket by holding the tongue (curved end, to the right) and hook the gasket on the left-hand tabs of the holder. Gently pull the gasket toward the right and hook it on the two right-hand tabs.
- DO NOT touch the smooth side of the gasket.
- Keep the assembled unit with the gasket attached until ready for dispensing reagents into the wells.
- After loading reagents, DO NOT press down on the top of the gasket. Keep the assembly horizontal to avoid wetting the gasket with Partitioning Oil.

Blank gaskets meant for the shipping/readiness test block are not compatible with the Chromium X/iX Chip Holder.



Chip Placement on Chromium X Tray

Indentations and locator pins assist in proper placement of the assembled chip and holder on the instrument tray.



10x Genomics Cloud

10x Genomics Cloud (accessible through cloud.10xgenomics.com/instruments), allows creation of a universal user account for all of the web services offered by 10x Genomics. Using the instrument management tool, users can access the instrument information and download the latest firmware updates for their instruments.

Each Chromium X Series instrument is required to be registered to the 10x Genomics Cloud during the First Time Use (FTU) set up process. Users may register multiple instruments to their accounts, and each instrument can optionally be registered to multiple 10x Genomics accounts. Instruments connected to the network can also transfer serviceability data directly to 10x Genomics, enabling streamlined customer service.



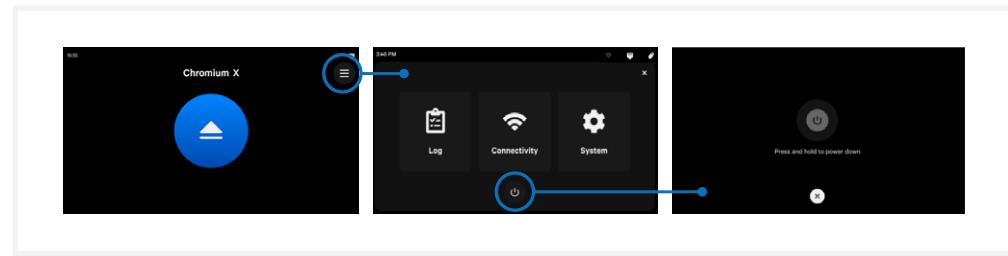
Menu Options

Menu Options

Firmware Update Procedure

Menu Options

The menu options page can be used to access run logs, configure network connectivity, and access system settings.



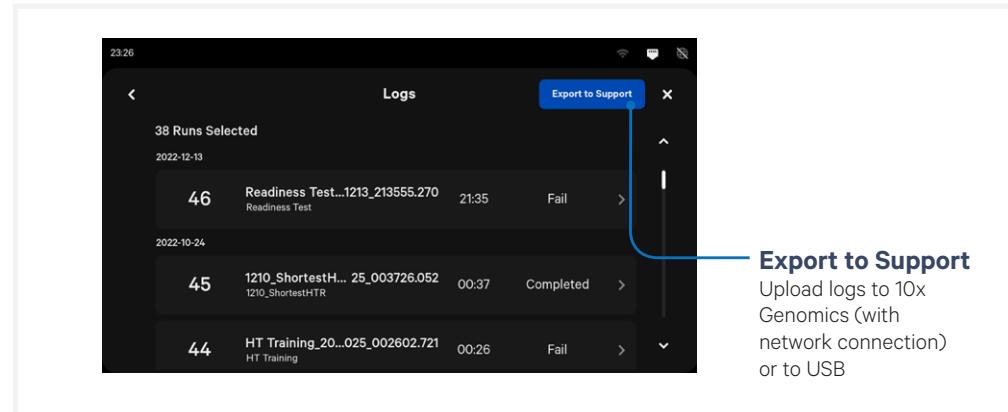
Power off the instrument by first performing a soft power down, by holding the power icon at the bottom of the menu options screen. In the soft power down mode, the screen will dim and display the time and the name of the instrument. To complete the shut down process, flip the power switch at the back.

Performing a soft power down prior to completely powering down the instrument enables the instrument to save logs.

See the [Moving & Shipping the Instrument](#) section for more information on powering off the instrument before transport.

Logs

Access and upload past run information. File capacity is 650 runs. Oldest files are deleted first. Log export ranges in size from 10s to 100s of MB, depending on how many runs are selected.



Idle time data are only instrument-specific logs that are not related to runs. The data can be exported during First-Time Use (FTU) setup by using the help icon on the top right corner of the screen. If the instrument is not performing a run, it can also be exported by navigating to **Menu > System > Help** and pressing "Send System Logs to Technical Support".

Menu Options contd.

To review run logs with 10x Genomics Technical Support:

- Email Support@10xgenomics.com with any applicable error codes.
- Upload pertinent logs directly to 10x Cloud or via USB.
Support personnel will guide the user through these steps.

Export Procedure for Support Packages

Support packages can be exported from the Run Data page by pressing the Support button.

- Select a location to export support packages. Support packages can be exported directly to 10x Genomics on instruments connected to the internet (recommended), or to a USB drive.
- Select runs for export, then click “Start Export”. A progress bar will show the export status.
- Once export is complete, the user will be redirected back to the Run Data log screen.

Deleting Run Data

The instrument stores up to 100 Run Data and up to 10 Support Data. The instrument does not automatically delete Run Data without user permission, while older Support Data is deleted automatically (oldest files are deleted first).

When data storage is full, a popup error message will inform the user to export and delete stored data before starting a new run.

- Export all important run data before permanently deleting.
- Navigate to Menu > Run Data.
- Click the trash can icon. Select individual runs or click Select All.
- Confirm Delete Data in the popup. A loading screen may appear while the instrument is deleting data.
- The screen will redirect back to Run Data. Deleted runs should no longer appear in the list.

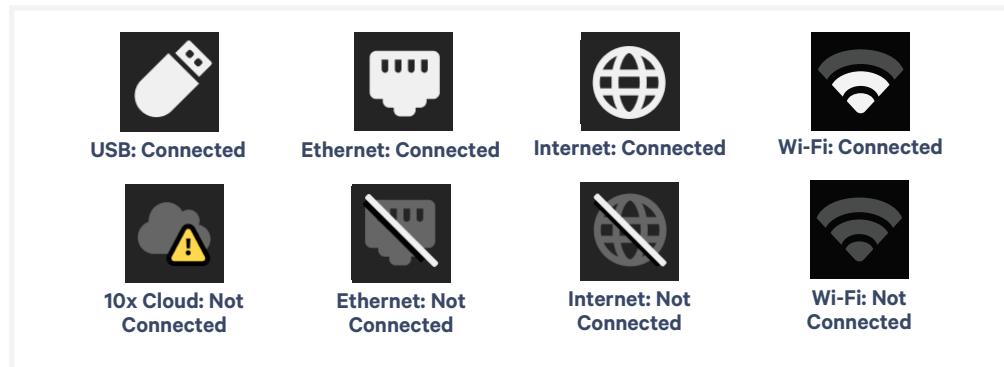
Menu Options

contd.

Connectivity

Configure parameters for Wi-Fi and Ethernet from this menu option. Ethernet is recommended for optimal performance.

The following connectivity icons may be found in the upper right corner of the screen:



Click Diagnostics to enhance instrument stability and reliability. This enables the automatic transmission of diagnostic data, such as sensor readings, metrics, and user-editable fields to 10x Cloud when connected to the internet. To maximize internet stability and enable the 10x Genomics support team to quickly respond to issues, Diagnostics is enabled after software updates.

Network & Security

Allow outbound TCP port 443 for 10x Genomics Cloud access. As an additional (optional) level of security, the instrument can be put on its own network VLAN with Internet-only access.

For connectivity to work correctly, the network should allow unrestricted outbound access to the following hosts:

- envoy.10xgenomics.com:443
- pool.ntp.org:123
- 10x-cloud-saas-instrument-assets.s3.us-west-2.amazonaws.com:443

Consult the Chromium X Series: Network Connectivity Guidelines Technical Note (CG000508) for additional information.

Menu Options

contd.

System

The system runs on a Linux platform. The instrument's hardware and software have been securely implemented to prevent modification and to only execute trusted 10x code. There is no end-user configuration or access to the internal hardware, OS, or applications. The system menu can be used to:

- **Locate information** about this instrument such as serial number, instrument ID, and firmware version.
- **Change the date and time** by country or time zone. Time can be set automatically via network connection. Toggle between 12-hour or 24-hour time.
- **Launch an alternate mode**
 - **Shipping Mode** is used for safe instrument transportation. The shipping/readiness test block and a gasket are required for transporting the Chromium X in shipping mode. See the Maintenance section [Moving & Shipping the Instrument](#), for specific instructions for shipping mode.
 - **Fluidics Flush Mode** is used for clearing liquid from the gasket only in specific troubleshooting instances. Use only if directed by 10x Genomics Support.
 - **Export idle instrument logs to 10x Genomics** by navigating to Alternative Modes > Help.
 - **Enable automatic firmware downloads**
Firmware update notifications will appear on the home screen when the instrument is connected to a network.

Review the firmware update procedure below:

Firmware Update Procedure

Step 1: Download and install the update

Procedure with an instrument connected to the internet and auto-download enabled (recommended):

Automatic downloads of updates are enabled after firmware updates to ensure the instrument is up-to-date with the latest assay products, features, and bug fixes.

- a. A pop-up on the home screen will alert the user of available updates.
- b. Open the pop-up and click to install.

Procedure with an instrument connected to the internet, auto-download disabled:

- a. A pop-up on the home screen will alert the user of available updates.
- b. Open pop-up and click to download.
- c. Once the update has been downloaded, install the update.

Step 2: Reinitialize the instrument

After installing an update, run a Readiness Test. See [Readiness Test](#) section for further guidance.

- a. Retrieve the shipping/readiness test block with attached blank gasket.
See the [Readiness Test](#) section for more information on the block.
- b. Initiate a Readiness Test through the home screen by loading the block into the instrument.
- c. After the test is complete, follow screen instruction to remove the block from the tray.
- d. Store the assembled block and gasket in a plastic bag, away from sunlight and extreme temperature. Retain for future use.
- e. The instrument is now ready for use.



Maintenance

System Maintenance

Moving & Shipping the Instrument

System Maintenance

Interior

The Chromium X Series tray and door areas have been designed to catch and contain drips and a small volume of liquid spills. Occasionally, use a soft lab towel to clean these areas with a mixture of mild detergent and distilled water. For deeper, more thorough cleaning, it is acceptable to use a 5-10% Bleach solution followed by a 70% ethanol wash.



Do not use acetone or other harsh solvents, as these may remove the colored markings in the tray. Apply all standard safety practices when using cleaners, and dispose of any generated waste in a responsible manner.

Exterior

The exterior of the Chromium X Series instrument should always be kept clean and free of dust and debris that may affect its function and/or cooling efficiency. Generally, the exterior finish can be wiped down using a mixture of mild detergent and distilled water applied to a slightly dampened lab towel. As an added precaution it is recommended that the instrument be unplugged from the power source before beginning any cleaning process.

Service



Electrical shock hazard. Do not open the Chromium X/iX. There are no user-serviceable parts inside. Refer all servicing to qualified 10x Genomics service personnel.

Servicing is required when the Chromium X/iX has been damaged in any way (e.g., a power entry module or plug is damaged, liquid was spilled into, or objects fell into the instrument, the instrument does not operate properly, or has been dropped).

Use only the power cord supplied with the Chromium X/iX. Do not replace it with a non-approved power cord as it may be inadequately rated to handle the electrical loads.

If replacing the externally accessible fuses in the power entry module becomes necessary, use only certified (EN60127 Sheet 5) 5 x 20 mm sized fuses rated T3.15AH, 250V Slow-Blow or equivalent.

When returning a Chromium X/iX for repair, take steps to ensure that the instrument has been decontaminated so as not to pose a hazard for 10x Genomics service personnel.

Environmental Requirements

It is the design intent of the Chromium X/iX that it be used in a typical indoor laboratory environment. The instrument's operating temperature is 18–28°C (64–82°F), Humidity 80% Max (Non-Condensing) Altitude 0–7500 ft (0–2286 m) (See [Product Specifications](#)).

Moving & Shipping the Instrument

The Chromium X/iX utilizes a shipping mode for safe instrument transportation. Shipping mode can be launched through the Alternate Modes menu option. The shipping/readiness test block and a blank gasket are required for transporting the Chromium X/iX in shipping mode, even for short distances (e.g., from one bench to another). If the Chromium X/iX will be transported in a vehicle or shipped, it should also be repackaged according to the instructions below. The Readiness Test should be re-run (See [Readiness Test](#) section) after relocating the instrument.

Step 1: Shipping Mode (for all transportation)

- a. Retrieve the shipping/readiness test block and blank gasket from storage.
- b. Launch Shipping Mode (for safe instrument transportation).
Menu Options > System > Alternate Modes > Shipping Mode
- c. Follow the screen prompts for loading the shipping/readiness test block with blank gasket, which will instruct a soft power down.
- d. Turn off the instrument completely using the power switch on the back of the instrument.
- e. Remove the power cord.

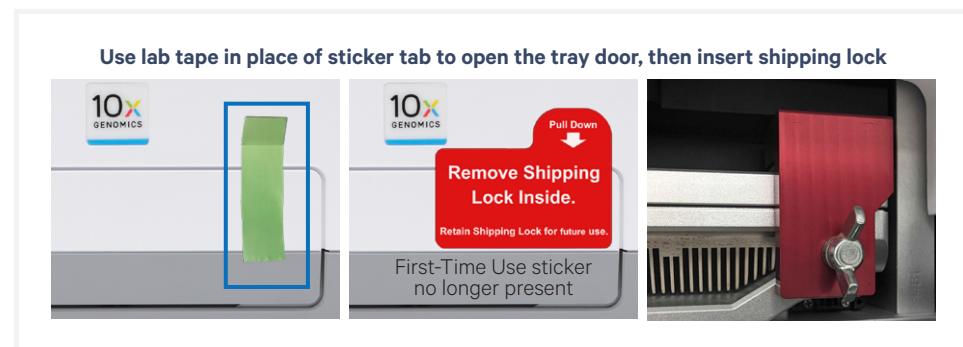


DO NOT turn on the Chromium X/iX again after inserting the shipping/readiness test block. It will raise the manifold into a position unsafe for shipping.

Step 2: Shipping Lock (for shipping)

The instrument may now include a shipping lock that further secures and stabilizes internal components to prevent damage during shipping. See the [Accessory Kits](#) table for more information and email support@10xgenomics.com to request a shipping lock for pre-existing instruments.

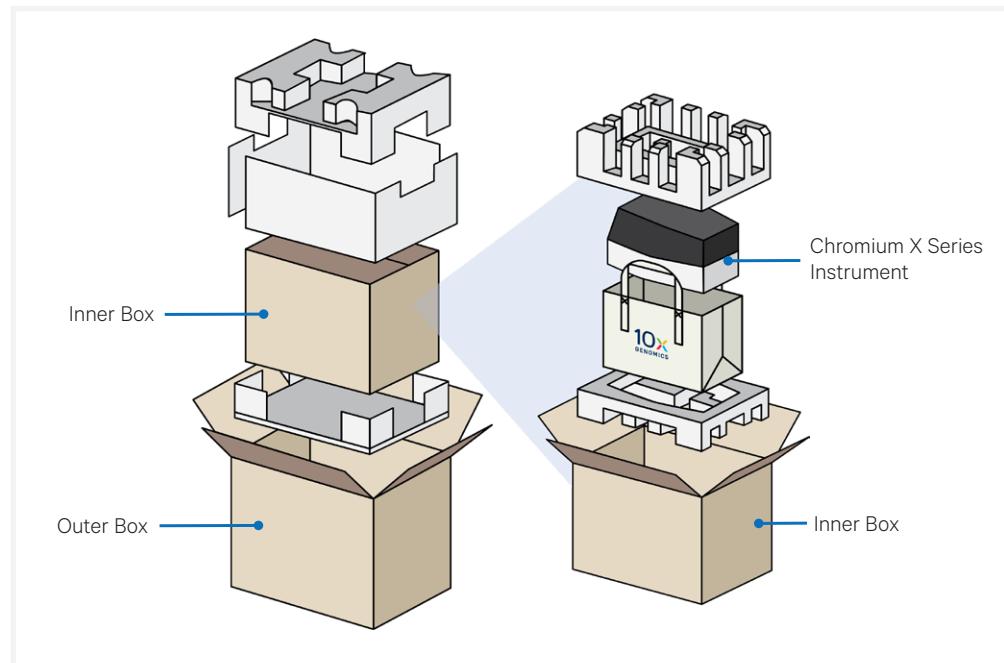
- a. Fold over the end of a length of lab tape and place top-to-bottom along the right side of the tray door, to imitate the First-Time Use sticker tab.
- b. Pull down on the folded end of the tape carefully. This will manually open the tray door. Screw in (by hand) the red metal shipping lock.
- c. Close the tray door.



Moving & Shipping the Instrument

contd.

Step 3: Packaging Diagram (for shipping)



Troubleshooting

Error Screens

Pressure Release Valve

Fluidics Flush Mode

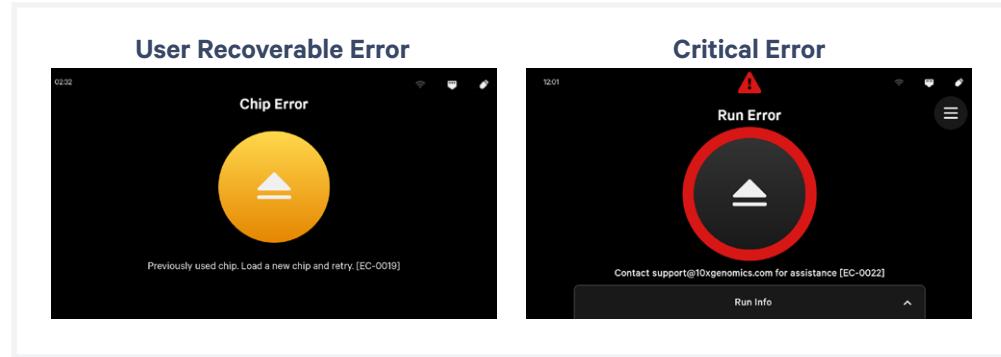


Error Screens

The touchscreen will guide the user through recoverable errors. If the error continues, or if the instrument has seen critical or intermediate errors, email Support@10xgenomics.com with the error code displayed.

Support will request log files for troubleshooting. Upload pertinent logs to 10x Genomics by navigating to the Logs menu option on screen. (See [Logs](#) section).

There are two types of errors:



User Recoverable Errors – (yellow circle on screen) Follow error handling instructions through the touchscreen and continue the run.

- Gasket Error
- Tray Error
- Chip Loading Error / Chip Locating Error / Missing Chip Error
- Unsupported Chip Error
- Network Error
- Update Error

Critical Errors – (red circle on screen) When the instrument has seen a critical error, the run will immediately abort. Do not proceed with any further runs. Contact support@10xgenomics.com with the error code.

- System Error
- Pressure Error
- Chip Error
- Run Error
- Temperature Error
- Firmware Error

Fluidics Flush Mode

This alternate mode is used for clearing liquid from the gasket. Only use if directed by 10x Genomics Support.

Pressure Release Valve

This factory button aids qualified 10x Genomics service personnel in manually ejecting the instrument tray in the event that the instrument is unresponsive.



DO NOT open the Chromium X/iX. There are no user-serviceable parts inside. Refer all servicing to qualified 10x Genomics service personnel.