10x GENOMICS

User Guide | CG000396 | Rev N

Chromium X Series Instrument

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 Xo & Accessory Kit, *12-Month Warranty, PN-1000812*

Chromium X Series Refurbished
PN-1000326R | PN-1000818R

Notices

Document Number

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Document Revision Summary

Document Number

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Title

Chromium X Series Instrument User Guide with Readiness Test

Revision

Rev M to Rev N

Revision Date

September 2025

Description of Changes

- Updated accessory kit to include Power Cord (PN 3002748) (p. 14)
- Included additional hosts for network connectivity (p. 34) and Remote Support Enablement section (p. 35)
- Minor updates in grammar and formatting

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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.
- Compatibilty (depending on the firmware license) with both GEM-X and Next GEM single cell assays, including:

Assay	Cells per Lane
GEM-X	
Universal	500-20,000
Universal Multiplex (4-Plex)	500-5,000/lane or channel (20,000/emulsion)
Flex	500-320,000
Next GEM	
Standard	500-10,000
Standard with CellPlex	500-30,000
HT	2,000-20,000
HT with CellPlex	2,000-60,000

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

Introduction
contd.

A comparison of the various capabilities of the Chromium X Series instrument firmware licenses:

	Assay	Xo	iX	X
GEM-X Assays (v2.0.0 required)	GEM-X Universal 3’	✓	✓	✓
	GEM-X Universal 5’	Upgrade to X	✓	✓
	GEM-X Flex	Upgrade to X	✓	✓
	GEM-X Universal 3’ Multiplex (4-plex)	✓	Upgrade to X	✓
	GEM-X Universal 5’ Multiplex (4-plex)	Upgrade to X	Upgrade to X	✓
Next GEM Assays	Next GEM Single Cell Gene Expression Flex	Upgrade to X	✓	✓
	Next GEM Single Cell 3’ Gene Expression	Upgrade to X	✓	✓
	Next GEM Single Cell 3’ Gene Expression HT	Upgrade to X	Upgrade to X	✓
	Next GEM Single Cell Immune Profiling	Upgrade to X	✓	✓
	Next GEM Single Cell Immune Profiling HT	Upgrade to X	Upgrade to X	✓
	Next GEM Single Cell ATAC	Upgrade to X	✓	✓
	Next GEM Single Cell Multiome ATAC + Gene Expression	Upgrade to X	✓	✓

Run the most up-to-date firmware version to ensure optimal instrument performance and assay compatibility.

Upgrades

The same instrument is used for all firmware licenses in the X series. Chromium iX and Xo can both be upgraded to X. The iX cannot be changed to Xo, and vice versa.

Product Identification Label

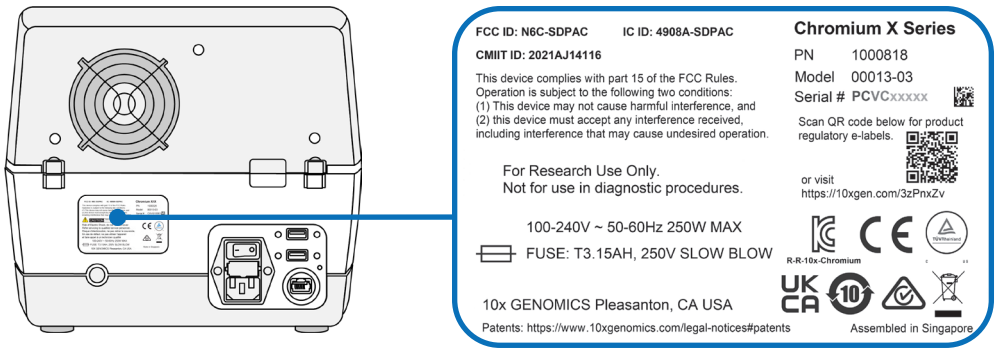
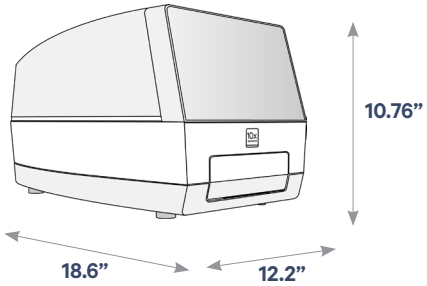


Image of label for reference only

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] × 18.6”[47.2 cm] × 10.2”[26.0 cm] 12.2”[31.0 cm] × 22.8”[58.0 cm] × 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 *Power cables will be in accordance with regional specifications*	6-7 ft [2 m] Standard



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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 Series instrument in a manner not specified by 10x Genomics. *The instrument has been designed to protect the user. If used improperly, the intended user protections can be impaired.*

Heavy Load: Total box weight with the accessory kit is 51.6 lb (23.4 kg). Two-person lift required. Lift the tote bag with the instrument from the packaging (41.4 lb [18.8 kg]).

Regulatory

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

Certification	Standards
	TUV Certification only for Chromium X Series instrument 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.

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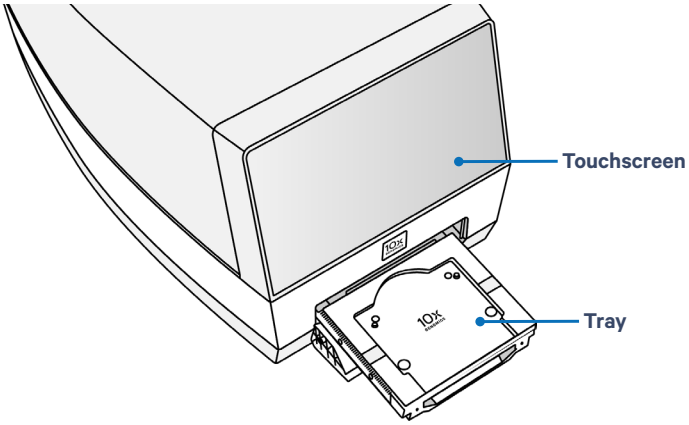
System Components

System Components

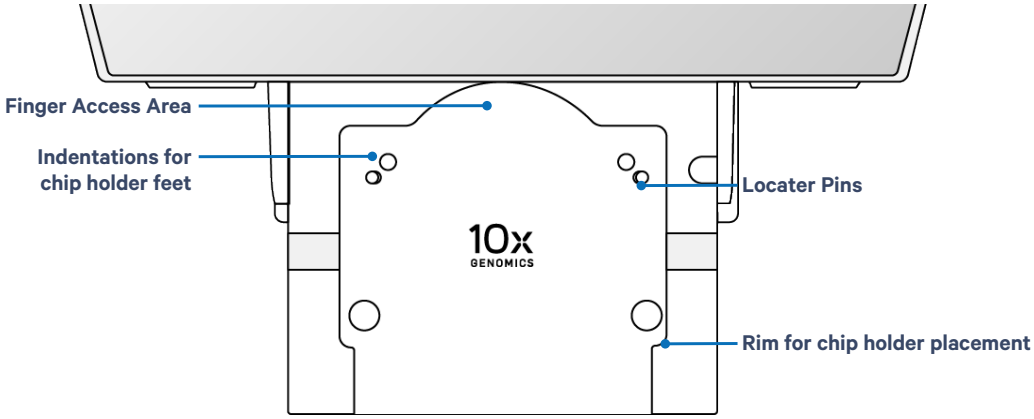
Accessory Kits

System Components

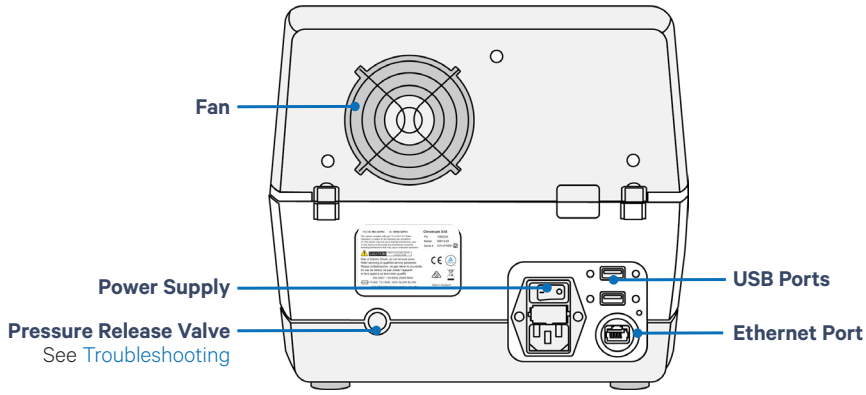
Front



Tray



Back



Accessory Kits

Chromium X Series Accessory Kit PN-1000821

Similar components can be found in discontinued kits, as listed in the Appendix. They have the same functionality and can be used interchangeably. Verify by part number.

Product	#	Part Number
10x Vortex Adapter	3	330002
10x Strip Vortexer	2	230002
10x Magnetic Separator B *Same functionality as 10x Magnetic Separator HT*	1	2001212 *Interchangeable with 230003, 2000431*
Chromium Next GEM Secondary Holder *Compatible with X/iX; not with compatible with Xo*	1	3000332
Chromium X Series Chip Holder	1	3000598
Shipping/Readiness Test Block	1	3000896
Chip Gasket, Blank X Series *Blank gaskets have no holes. Use only with the shipping/readiness test block. Not compatible with the chip holder.*	1	3002180 *Interchangeable with 3001663*
Power Cord, IEC C13, NEMA 5-15P, US & JP, 6 FT	1	3002748
Universal Power Cord, 10 Amp-250 V *(IEC 60320 C-14, with C-13 Detachable Adapters)*	1	3000603
USB, 8 GB *The Chromium X Series instrument is compatible with VFAT, FAT32, and exFAT formatted USBs.*	1	3000664

GEM-X Transition Kit PN-1000707

Available for purchase separately.
Similar components can be found in discontinued kits, as listed in the Appendix. They have the same functionality and can be used interchangeably. Verify by part number.

Product	#	Part Number
10x Magnetic Separator B *Same functionality as 10X Magnetic Separator HT*	1	2001212 *Interchangeable with 230003, 2000431*
Chromium X Series Chip Holder	1	3000598

Additional Items

Product	#	Part Number
Shipping/Readiness Test Block*	1	3000652
Chip Gasket, Blank X Series**	1	3002180 *Interchangeable with 3001663*
Shipping Lock *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.*	1	1000657
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.

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System Operation

Step 1: Installation

Step 2: First-Time Use

Step 3: Readiness Test

Step 4: Main One-Touch Operation

Step 1: Installation

Verify Bench Space

Follow these instructions for installation to operate the Chromium X Series instrument 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 Series instrument in a manner not specified by 10x Genomics. *The instrument has been designed to protect the user. If used improperly, the intended user protections can be impaired.*

General Power Safety

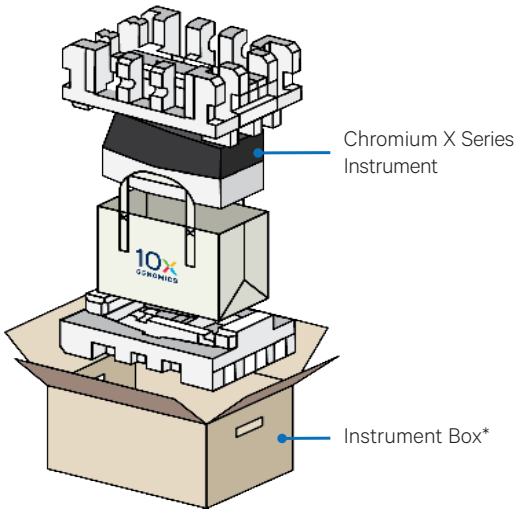
Grounding is required to prevent electric shock. If the power source is not grounded, qualified personnel must first install a reliable safety ground.

- 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



**Some shipping packages may include an additional outer box & slightly differently configured packaging material*

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

Heavy Load: Total box weight with the accessory kit is 51.6 lb (23.4 kg). Two-person lift required. Use the tote bag included in the packaging to lift the instrument up from the packaging (41.4 lb [18.8 kg]).

The Chromium X Series Accessory Kit (PN-1000821) is not shown in the diagram; comprises components formerly listed in both the Chromium iX Accessory Kit (PN-1000323) and the Chromium X Upgrade Kit (PN-1000327). See Appendix for more information.

a. Open the 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 Accessory Kit box and packaging material.

c. Carefully lift the tote bag with the instrument out of the box and place on bench top. 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.

Use sticker tab to safely open the tray door, then remove the shipping lock

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 Series instrument 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

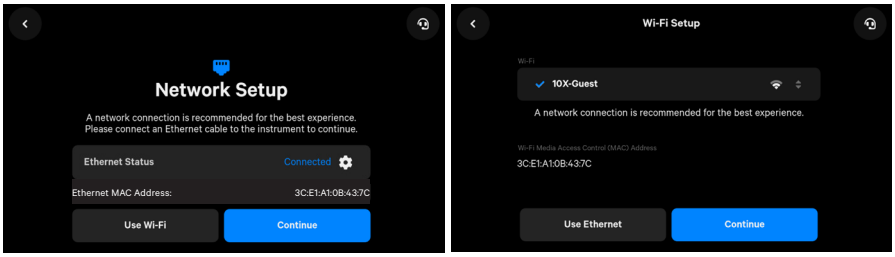
The instrument will walk through a first-time setup protocol. Setup requires the following:

- 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.

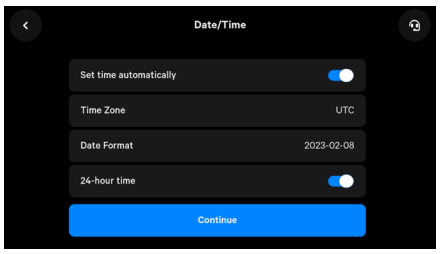
Turn on the System

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).



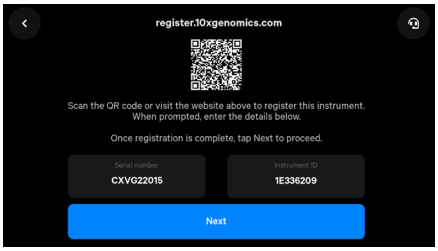
c. Set the Date and Time.



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.

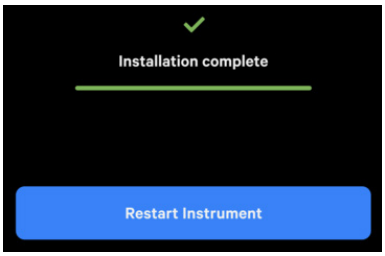


e. Update the firmware.

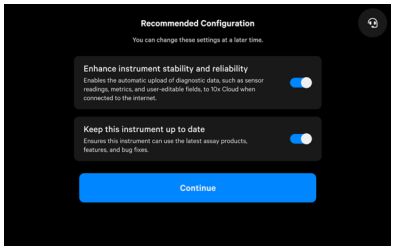
After registration, the instrument will automatically search for the latest firmware update. Confirm data transmission settings for automatic upload/download.

Once the update is complete, click the "Restart Instrument" button.

DO NOT skip this button and use the power switch at the back of the unit; this could result in lost data

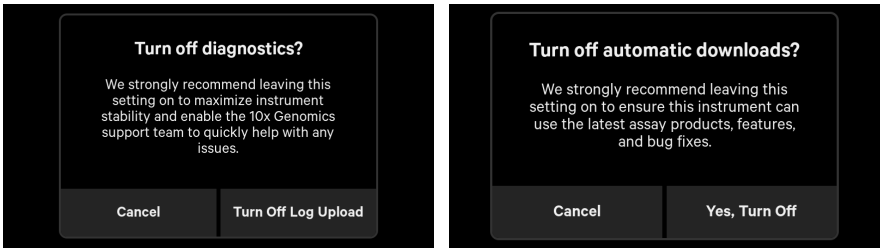


After the instrument updates, a recommended configuration screen will appear. On this screen, the ability of the instrument to automatically upload diagnostic data as well as automatically download updates can be adjusted. 10x Genomics recommends keeping these settings on. These settings can be changed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

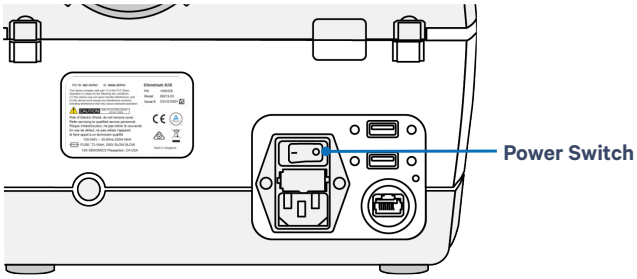
Step 3: Readiness Test

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.

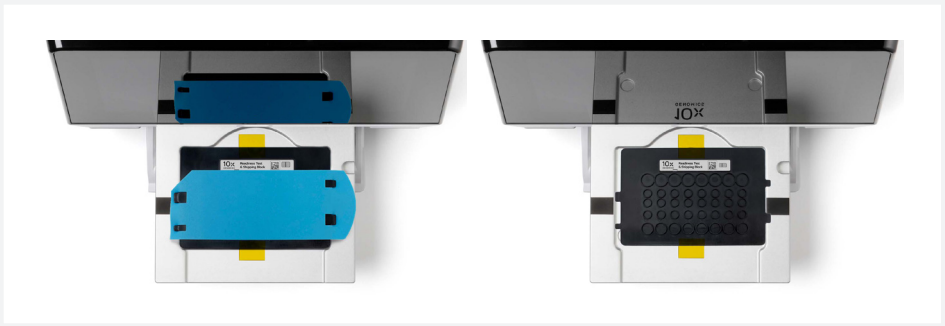
a. Follow screen instruction to launch the Readiness Test.

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.

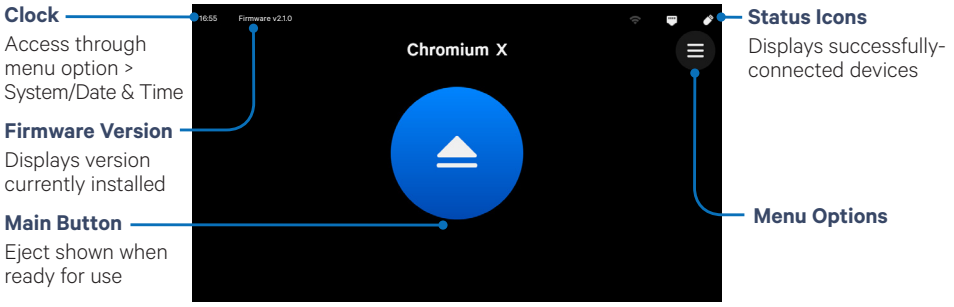
d. A successful Readiness Test marks the end of setup. The instrument is now ready for use.

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

a. Press eject button on the touchscreen to eject the tray. A chime will sound.

TIPS

b. Load an assembled chip and holder (See Tips & Best Practices as well as the appropriate assay kit user guide).

c. Press the eject button again to close the tray.

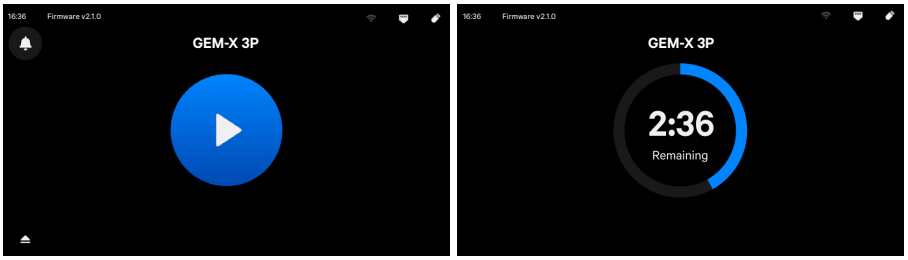
- If the eject button is not touched within 1 min, it will automatically close on its own.
- System requires a few seconds before the tray can be reopened again.

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).

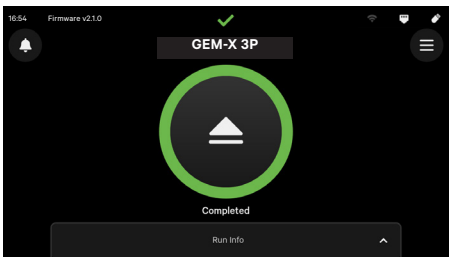
d. Press the play button to start the run.

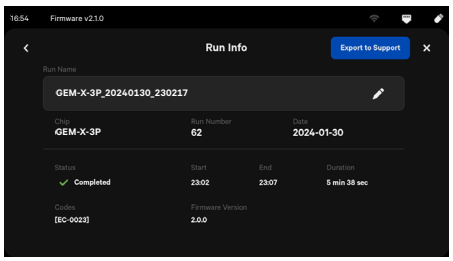
- A midrun progress bar will show the time remaining in the run.



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.

10x GENOMICS

Tips & Best Practices

Chip Handling

Chip Placement on Instrument 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 instuctions 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 X Series 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. DO NOT pick up the assembled chip holder by the holder lid as this could accidentally lead to spillage or dropping of the chip holder.

Chromium Next GEM Chip (HT) Specific 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 Specific 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.

GEM-X

GEM-X OCM Chip Specific Handling

- When running 4 samples (loading only one multiplexing set), fill the unused wells of the other set in rows labeled 1, 2, and 3 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.

Chromium X Series Chip Holders

- Chromium X Series 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

Chip in image is representative. Instruction applies to both Next GEM and GEM-X chips.

- 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.

Chip Handling
contd.

- 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.

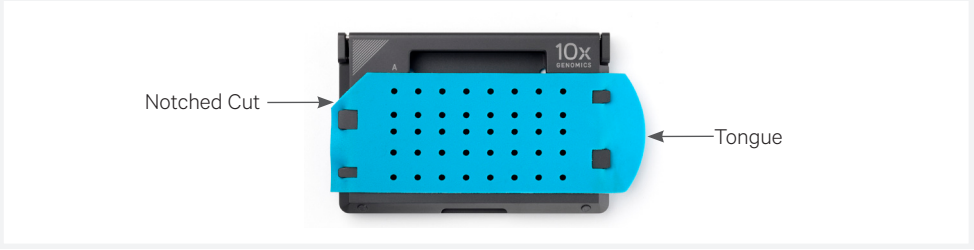
Chip Loading

- 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

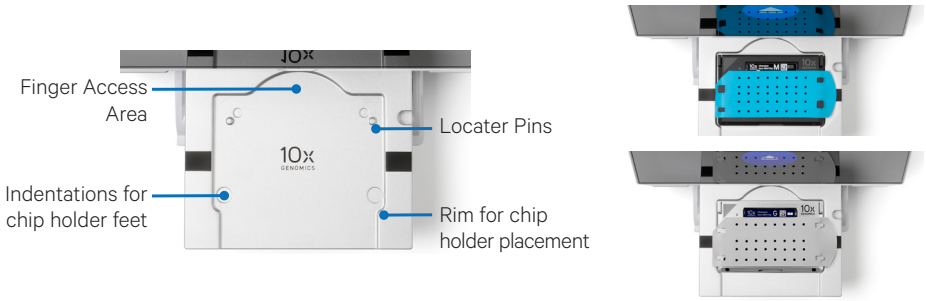
- **Before reagents are loaded,** attach the gasket by holding the tongue (curved end, to the right) and hook the gasket on the left-hand tabs of the holder. Gently pull the gasket toward the right and hook it on the two right-hand tabs.
- DO NOT touch the smooth side of the gasket.
- Keep the assembled 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 Series Chip Holder.



Chip Placement on Instrument Tray

Indentations and locater 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.

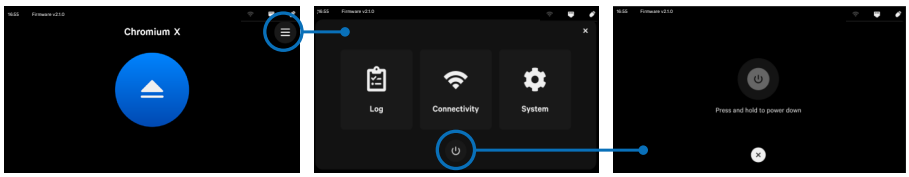
Menu Options

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.



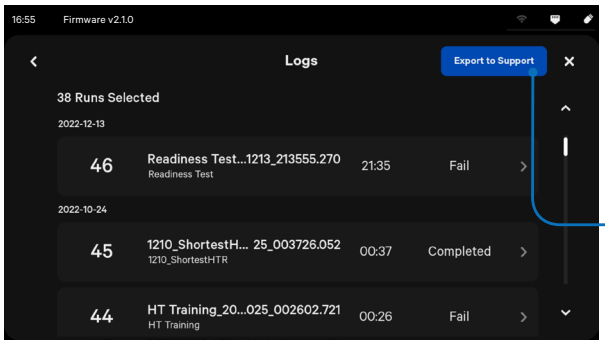
Power off the instrument by first performing a soft power down, by holding the power icon at the bottom of the menu options screen. In the soft power down mode, the screen will dim and display the time and the name of the instrument. To complete the shut down process, flip the power switch at the back.

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 ~500 runs. Oldest files are deleted first. Log export ranges in size from 10s to 100s of MB, depending on how many runs are selected.



Export to Support
Upload logs to 10x Genomics (with network connection) or to USB

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.

a. 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.

b. Select runs for export, then click "Start Export". A progress bar will show the export status.

c. Once export is complete, the user will be redirected back to the Run Data log screen.

Deleting Run Logs

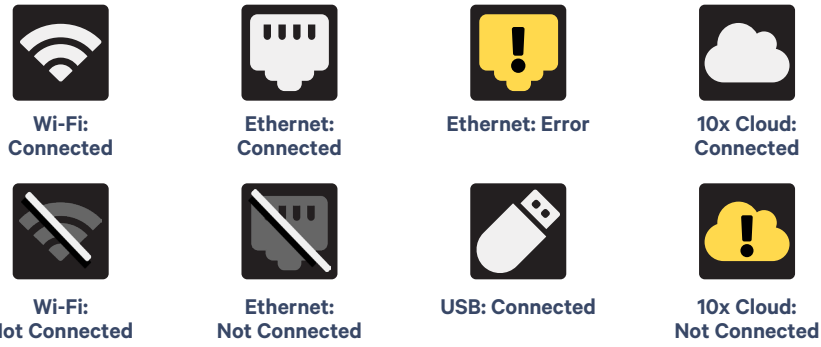
The instrument stores ~500 run logs. The instrument does not automatically delete run logs without user permission, while older system logs are deleted automatically (oldest files are deleted first).

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:



Firmware versions prior to v1.2 may not utilizie all icons

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, ports and protocols:

Application	Protocol	Source IP:Port	Destination IP:Port
10x Telemetry	TCP	<Chromium IP>:*	envoy.10xgenomics.com:443 10x-cloud-saas-instrument-assets.s3.us-west-2.amazonaws.com:443
Tailscale Login, Log and Control	TCP	<Chromium IP>:*	login.tailscale.com:443 controlplane.tailscale.com :443 log.tailscale.com:443 log.tailscale.io:443
Tailscale DERP	TCP	<Chromium IP>:*	derp1f.tailscale.com:443 derp1g.tailscale.com:443 derp1h.tailscale.com:443
NTP	UDP	<Chromium IP>:123	pool.ntp.org:123

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

Menu Options
contd.

Enable Remote Support

On instruments with firmware 2.5 or higher, the user can enable remote support by clicking "Menu > Connectivity >Remote Support", and then moving the toggle to ON. Once enabled, the header bar on the instrument screen will display "10x Genomics Remote Support On". Authorized 10x Genomics personnel will remotely access the instrument when given explicit permission from the user to do so. Only data necessary to provide troubleshooting support will be recovered and handled by 10x Genomics for technical support.

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 in the following section.

Firmware Update Procedure

Step 1: Download and install the update

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.

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

a. A pop-up on the home screen will alert the user of available updates.

b. Open the pop-up and click to install.

c. Once the update is complete, click the "Restart Instrument" button.
DO NOT skip this button and use the power switch at the back of the unit; this could result in lost data.

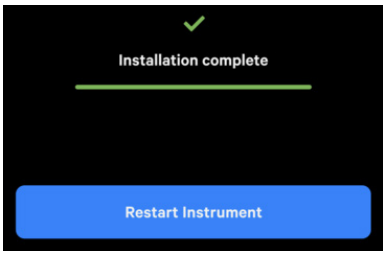
Procedure with an instrument connected to the internet, **auto-download disabled**:

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.

d. Once the update is complete, click the "Restart Instrument" button.
DO NOT skip this button and use the power switch at the back of the unit; this could result in lost data.



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.

10x GENOMICS

Maintenance

System Maintenance

Moving & Shipping the Instrument

System Maintenance

Interior

The Chromium X Series instrument 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 10% Bleach solution followed by a 70% ethanol or 70% isopropanol wash. Follow the relevant lab safety requirements when cleaning the instrument.

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 Series instrument. There are no user-serviceable parts inside. Refer all servicing to qualified 10x Genomics service personnel.

Servicing is required when the Chromium X Series instrumenthas 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 Series instrument. 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 Series instrument 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 Series instrument 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 Series instrument 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 instrument in shipping mode, even for short distances (e.g., from one bench to another). If the instrument 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 onscreen instruction for loading the shipping/readiness test block with blank gasket.

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 Series instrument 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 contact support@10xgenomics.com if no shipping lock is present.

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.

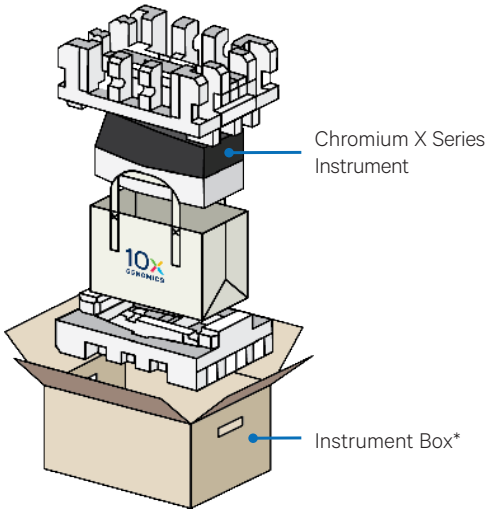
b. Pull down on the folded end of the tape carefully. This will manually open the tray door. Screw in (by hand) the red metal shipping lock.

c. Close the tray door.

Use lab tape in place of sticker tab to open the tray door, then insert shipping lock

Moving & Shipping the Instrument *contd.*

Step 3: Packaging Diagram (for shipping)



**Some shipping packages may include an additional outer box & slightly differently configured packaging material*

Troubleshooting

Error Screens

Network Diagnostic Test

Fluidics Flush Mode

Pressure Release Valve

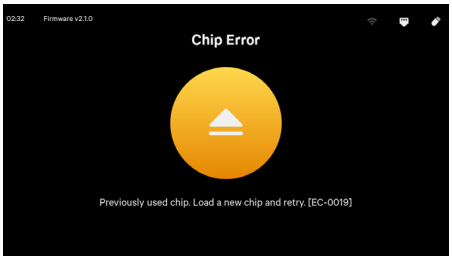
Error Screens

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.

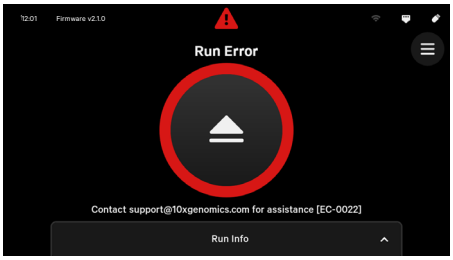
Support will request log files for troubleshooting. Upload pertinent logs to 10x Genomics by navigating to the Logs menu option on screen. (See Logs section).

There are two types of errors:

User Recoverable Error



Critical Error



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

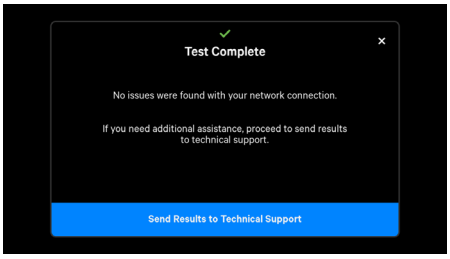
Critical Errors – (red circle on screen) When the instrument has seen a critical error, the run will immediately abort. Do not proceed with any further runs. Contact support@10xgenomics.com with the error code.

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

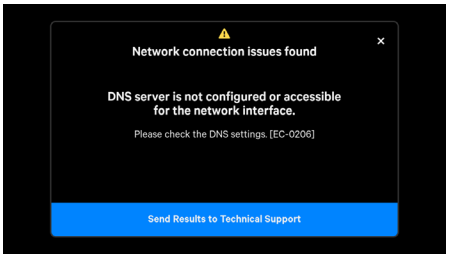
Network Diagnostic Test

This Network Diagnostic feature allows a user to test their network configuration. The user interface will either show a success screen or a failure screen with a specific error code and corresponding resolution.

Success: Test Complete



Failure: Issues Found



Initiate a Network Diagnostic Test through one of the following pathways:

- Menu > Connectivity > Run Network Diagnostic Test
- Menu > System > Help > Run Diagnostic Test

Examples of tests performed by the Network Diagnostic Test:

- Check if the active interface is operational
- Check if the active interface is assigned a single, valid IP address
- Check if a gateway is configured
- Check if a DNS server is configured and is reachable
- Check for connectivity to the 10x cloud (i.e., not blocked by a firewall)
- Check for TLS interception (i.e., no MITM)

The Failure screen offers the option to click and "Send results to Technical Support." Contact support@10xgenomics.com if the issue does not resolve.

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 Series instrument. There are no user-serviceable parts inside. Refer all servicing to qualified 10x Genomics service personnel.

10x GENOMICS

Appendix

Discontinued Kits

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 Series Accessory Kit (PN-1000821) and the GEM-X Transition Kit (PN-1000707). Verify by part number.

The Chromium X Series Accessory Kit (PN-1000821) was formerly known as the Chromium X/iX Accessory Kit (PN-1000709), with updated item names. The part numbers of items did not change.

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 *Interchangeable with 2001212, 2000431*
Chromium Next GEM Secondary Holder	1	3000332
Shipping/Readiness Test Block	1	3000896
Blank Gasket, 2 Pack	1	3001663 *Interchangeable with 3002180*
Universal Power Cord, 10 Amp-250 V *(IEC 60320 C-14, with C-13 Detachable Adapters)*	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.

Chromium X Upgrade Kit PN-1000327, *discontinued*

Product	#	Part Number
Chromium X Chip Holder	1	3000598
10x Magnetic Separator HT	1	2000431 *Interchangeable with 2001212, 230003,*