Visium CytAssist: Network Connectivity Guidelines

Introduction

This Technical Note provides an overview of network connectivity guidelines for the Visium CytAssist instrument in order to describe:

- remote performance monitoring
- data collected by 10x Genomics
- live remote support
- security considerations
- additional connectivity details

The Visium CytAssist is a compact, benchtop instrument that automates the transfer of transcriptomic probes from standard glass slides to Visium slides, enabling spatial profiling insights from an expanded range of samples. Visium CytAssist is designed to be connected to the 10x Cloud. The instrument provides an easy way to connect to Wi-Fi or Ethernet. Ethernet connections are recommended for optimal performance.

Refer to the Visium CytAssist Instrument user guide (CG000542) for details regarding various instrument components, user interface navigation, firmware upgrade options, and all additional features.

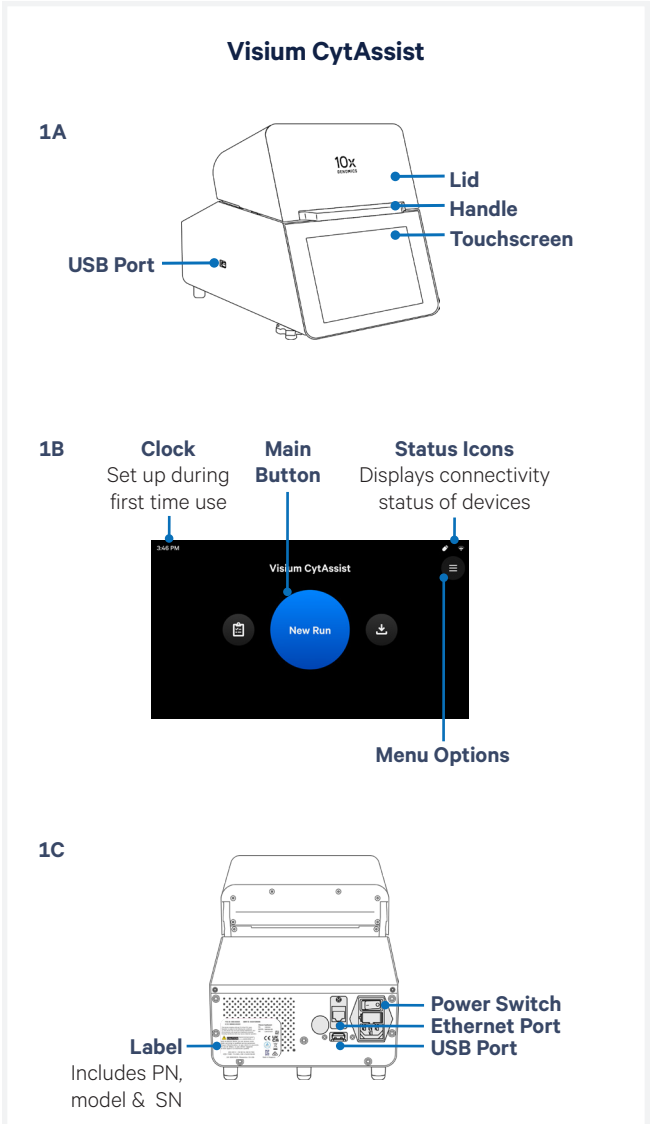


Figure 1. Visium CytAssist instrument (1A) has a user-friendly interface (1B). The back of the instrument includes various connection ports, including a port for Ethernet connectivity (1C).

Remote Performance Monitoring

Monitoring the performance of the Visium CytAssist helps ensure that the instrument is performing optimally and maximizes instrument uptime. This also gives 10x Genomics the ability to respond quickly and troubleshoot any issues that may occur. While you focus on processing samples and data collection, the instrument will proactively collect performance data to allow the 10x Support Team to address any potential instrument downtime.

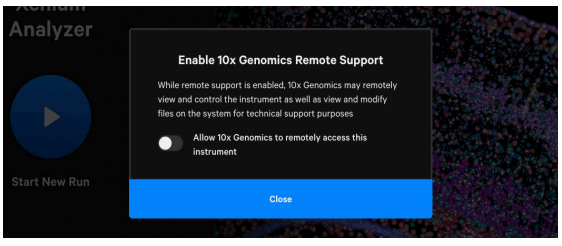
Data Collected by 10x Genomics

No biological sample data is being collected by 10x Genomics. Remote data collection is limited to the following items:

- Calibration data
- Instrument operation logs
- Optical, mechanical, and fluidic system logs
- Computer system logs

Customer-controlled Live Remote Support

Should an unexpected error occur with the instrument, 10x Genomics is committed to troubleshooting the problem as soon as possible. On instruments with firmware 2.5 or higher, an optional, customer-controlled live support feature allows you to invite a 10x Genomics representative to remotely access the instrument and observe the problem in real-time to find and implement an appropriate solution. The live support option is completely customer controlled and can be locally enabled or disabled by the customer at any time by using the instrument settings menu.



Security Considerations & Features

Topic	Feature
Data NOT collected	Biological sample data, personal health information
Required inbound ports	No open inbound ports required
Data center encryption at rest	Encrypted at rest with AES-256
Data encryption in transit	Encrypted with TLS
Access Limitations	Live support can be disabled on instrument at any time
Instrument firewall	Blocks all inbound connections
On instrument restrictions	No installed browser, account runs with restricted permissions
Operating System	Linux-based OS
Updates & Patches	Provided by 10x Genomics directly to the instrument

Table 1. Security considerations.

Detailed Allowlist of Hosts & Ports

Table 2 below lists the complete set of hosts, ports, and protocols in use by CytAssist. It is highly recommended to use the DNS entries in your firewall rules instead of the IP addresses as the IP addresses may be updated from time to time.

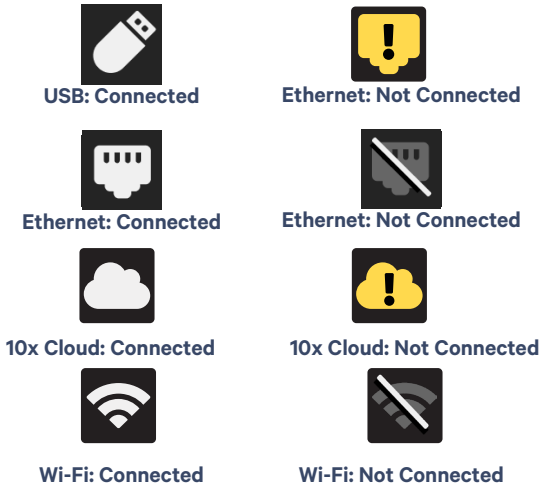
Local Connectivity

The CytAssist instrument is designed to integrate into the customer's local network without the need for joining a specific local domain. It is also shipped as a complete software system without the option to install additional software or security solutions.

Additional Technical Details

Connectivity

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



To access Connectivity options from the home screen (see Figure 1B), click the Menu Options button in the top right corner > Connectivity. If your network supports DHCP, plugging in an ethernet cable to your local network should automatically configure the connection. Contact your IT department if the Visium CytAssist shows that it cannot reach 10x Genomics servers.

Setting Up a Static IP

If your IT department requires a static IP, obtain the reserved IP address, the DNS servers, netmask and gateway for the Visium CytAssist. Once these are available:

a. Navigate to the Connectivity page on the user interface.

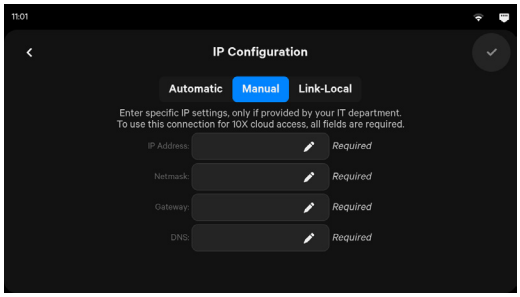
b. Select either Ethernet or Wi-Fi.

c. Select on the IP configuration, which is set to automatic by default.

d. When presented with the option of Automatic or Manual, select Manual.

e. Input the manual IP, Netmask, Gateway, and DNS values.

IP Configuration



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

Table 2. Complete set of hosts, ports and protocols in use by the CytAssist instrument.

Identifying Instrument Hostname

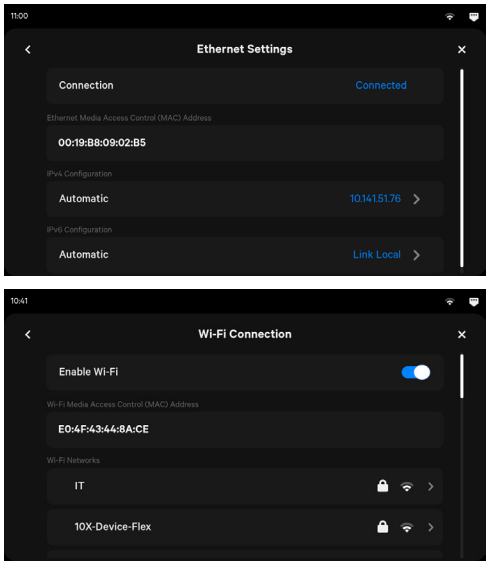
In firmware v1.1 or later, the instrument's hostname is set to its serial number. The serial number can be found in the back of the instrument as well as in the "About" section of the Systems menu on the screen.

MAC Address Lookup

The Ethernet and Wi-Fi adapters each have a MAC address, however, for Wi-Fi it will only appear if the instrument is connected to a Wi-Fi network. The address can be found by navigating to the Connectivity menu and selecting either Ethernet or Wi-Fi. The MAC address will be listed right below the connection status bar, and listed as either "Wi-Fi Media Access Control address" or “Ethernet Media Access Control address."

The MAC address is only visible on instruments running firmware version 1.1.0 and beyond. Instruments running older firmware versions will not see the MAC address.

MAC Address Lookup



Supported Wi-Fi Authentication Schemes

The Visium CytAssist supports the following Wi-Fi authentication schemes:

- Open
- WEP
- WPA1 PSK
- WPA2 PSK
- WPA2-Enterprise with PEAP-MSCHAPv2 (with firmware 2.1 or higher)

Guest Wi-Fi Networks

The Visium CytAssist may connect to any available Wi-Fi network. However, if the Wi-Fi network requires accepting a popup in a browser (similar to an airport or coffee shop network), the instrument connection may not be successful.

Outbound Connectivity

To provide remote monitoring and remote support, CytAssist solely requires outbound connectivity to 10x Genomics systems. No inbound ports need to be opened on your institution's firewall.

For remote support, 10x Genomics uses Tailscale, a modern, secure end-to-end encrypted tunnel built on Wireguard. For more information about Tailscale's security and compatibility with your network, refer to https://tailscale.com/security/ and https://tailscale.com/kb/1230/tailnet-lock-whitepaper/.

Given the outbound-only requirements, it is possible that Tailscale is already supported on your network. To confirm correct Tailscale operation, run the following command on your network on a computer separate from the instrument:

```
$ tailscale netcheck
```

A successful Tailscale connection should produce a result similar to the one shown below:

```
$ tailscale netcheck

Report:
    * UDP: true
    * IPv4: yes, 64.125.32.42:61871
    * IPv6: no, but OS has support
    * MappingVariesByDestIP: true
    * HairPinning: false
    * PortMapping:
    * Nearest DERP: San Francisco
    * DERP latency:
        - nyc: 68.3ms   (New York City)
```

An unsuccessful Tailscale connection should produce a result similar to the one shown below:

```
$ tailscale netcheck

Report:
    * UDP: false
    * IPv4: (no addr found)
    * IPv6: no, unavailable in OS
    * MappingVariesByDestIP:
    * HairPinning:
    * PortMapping:
    * Nearest DERP: unknown (no response to latency
```

Tailscale provides additional guidance on how the service operates at: https://tailscale.com/kb/1082/firewall-ports/

Document Revision Summary

Document Number	CG000653
Title	Visium CytAssist: Network Connectivity Guidelines
Revision	Rev C to Rev D
Revision Date	September 2025

Description of Changes

- Updated product images (p. 1)
- Live support information included. Also, added to Table 1 (p. 2)
- Updated connectivity icons (p. 3)
- Updated Table 2 to include additional ports (p. 3)
- Updated Supported Wi-Fi Authentication Schemes (p. 4)
- Added outbound connectivity section (p. 5)
- Updated grammar and formatting

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