



MinION Mk1B user manual

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Checking the MinION™ Mk1B has been assembled, installed and set up correctly.

Our device FAQs are located [here](#).

For Research Use Only

FOR RESEARCH USE ONLY

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1. Device information

The MinION Mk1B

The Oxford Nanopore Technologies® MinION™ is an electronic device that provides the interface between the user's computer and the nanopore sensor array. The MinION powers to the application-specific integrated circuit (ASIC), performs temperature control and transfers data to the PC through a single USB 3.0 port. The MinION Mk1B can be used with MinION flow cells and Flongle adapter and flow cells. The MinION device can be used for DNA and RNA sequencing. The MinION is operated using the MinKNOW™ software, which controls the device, experimental scripts and also performs basecalling.

The hardware

Component	Specification
Size and weight	H 23 mm x W 33 mm x D 105 mm, 100 g
Power	5 W
Ports	1 x USB Type-B
Environmental conditions	Designed to sequence at 18°C to 25°C

MinION Mk1B information

[MinION Mk1B IT requirements](#)

[MinION Mk1B technical specification](#)

[Safety and regulatory information](#)

FAQs

Our MinION Mk1B FAQs are located [here](#).

2. What's in the box

What's in the box

The MinION Mk1B is shipped with:

- Configuration Test Cell (CTC)

- USB cable
- Quick Start Guide

Flongle adapters are shipped with a Flongle CTC.



The components of the MinION Mk1B are shown below.



LED lights There are four LED lights on each side of the device. The LEDs on the left side of the device display the following patterns:

- (top) red LED: ON when a flow cell has been detected
- blue LED: ON when a flow cell has **not** been detected
- green LED: BLINKING when the flow cell has been inserted and firmware loaded
- second blue LED: BLINKING when the flow cell has been inserted and firmware loaded

The LEDs on the right side of the device display the following patterns:

- top red LED: ON when a sequencing script is running
- second red LED: ON when a flow cell has been detected
- third red LED: BLINKING when the MinKNOW software passes instructions to the MinION
- bottom red LED: BLINKING when the MinKNOW software passes instructions to the MinION

Lid The lid can be flipped open to access the flow cell housing. **Clip** The clip holds the flow cell or Configuration Test Cell securely in place. **Configuration Test Cell (CTC)** The CTC is used during the hardware check to ensure that the communication between the device and the flow cell is working correctly. **USB 3.0 port** The USB 3.0 port is for connecting the MinION to the host computer for powering the device and data transfer.

3. Installing sequencing software

Downloading and installing MinKNOW

All Oxford Nanopore devices use MinKNOW™ as the primary software. The MinKNOW software carries out several core tasks: data acquisition, real-time analysis and feedback, basecalling, data streaming, controlling the device, and ensuring that the platform chemistry is performing correctly to run the samples. MinKNOW takes the raw data and converts it into reads by recognition of the distinctive change in current that occurs when a DNA strand enters and leaves the pore. MinKNOW then basecalls the reads, and writes out the data into FASTQ or BAM files.

Please follow the [MinKNOW protocol](#) for information on how to install the software on Windows, Mac OS X or Linux.

4. Setting up the MinION Mk1B

Equipment MinION Mk1B
 Configuration test cell

1 Insert the CTC into the MinION Mk1B.

- Clip the CTC into place in the MinION Mk1B and connect to the host computer.



- Gently press down on the CTC; there will be a slight click as the CTC clips into place.

- Close the MinION Mk1B lid.

2 Close the MinION Mk1B lid and connect the MinION Mk1B device to the host computer using the included USB 3.0 cable.

The MinION Mk1B is ready for the hardware check to be performed.
Lights will be visible inside the MinION Mk1B device and the fan may be audible.

5. Setting up the MinION Mk1B for Flongle

Equipment MinION Mk1B
 Flongle adapter

1 Place the Flongle adapter into the MinION Mk1B.

The adapter should sit evenly and flat on the MinION Mk1B. This ensures the flow cell assembly is flat during the next stage.



2 Close the MinION Mk1B lid and connect the MinION Mk1B device to the host computer using the included USB 3.0 cable.

The Flongle adapter is ready for the hardware check to be performed.
Lights will be visible inside the MinION Mk1B device and the fan may be audible.

For regular use of a Flongle adapter, we recommend checking the thermal pad on the back of the adapter for wear. Worn thermal pads should be replaced following the instructions on the Flongle Thermal Pad Replacement pack.

6. Hardware check

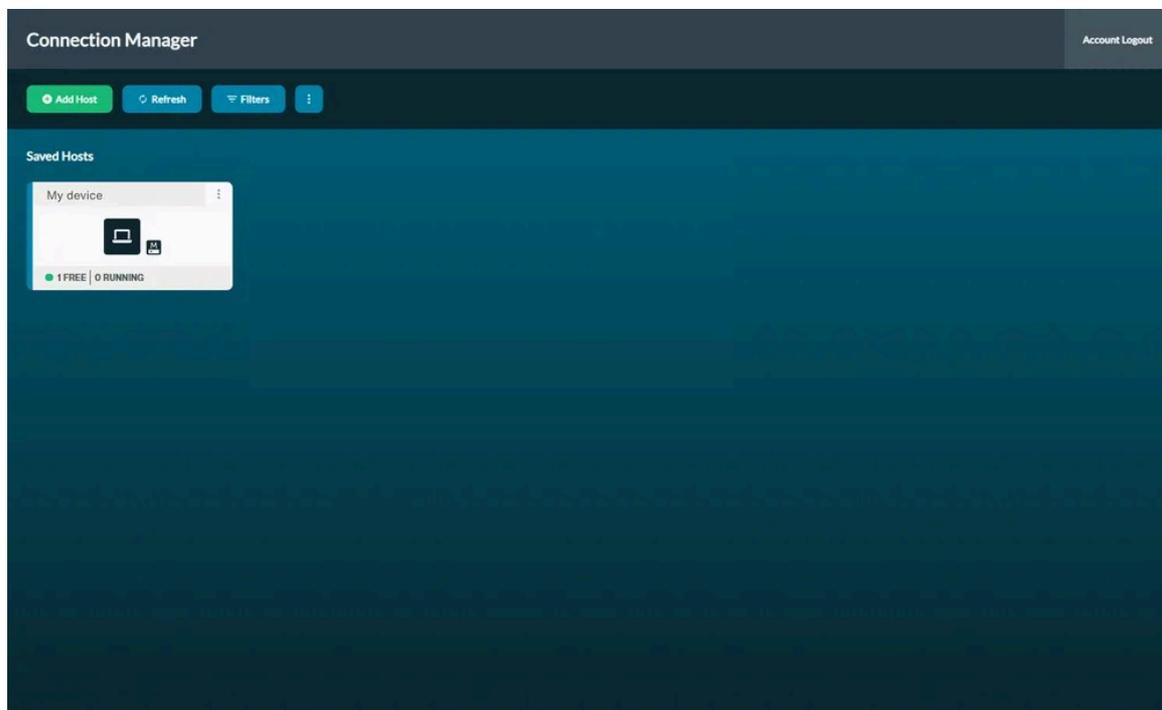


Hardware check

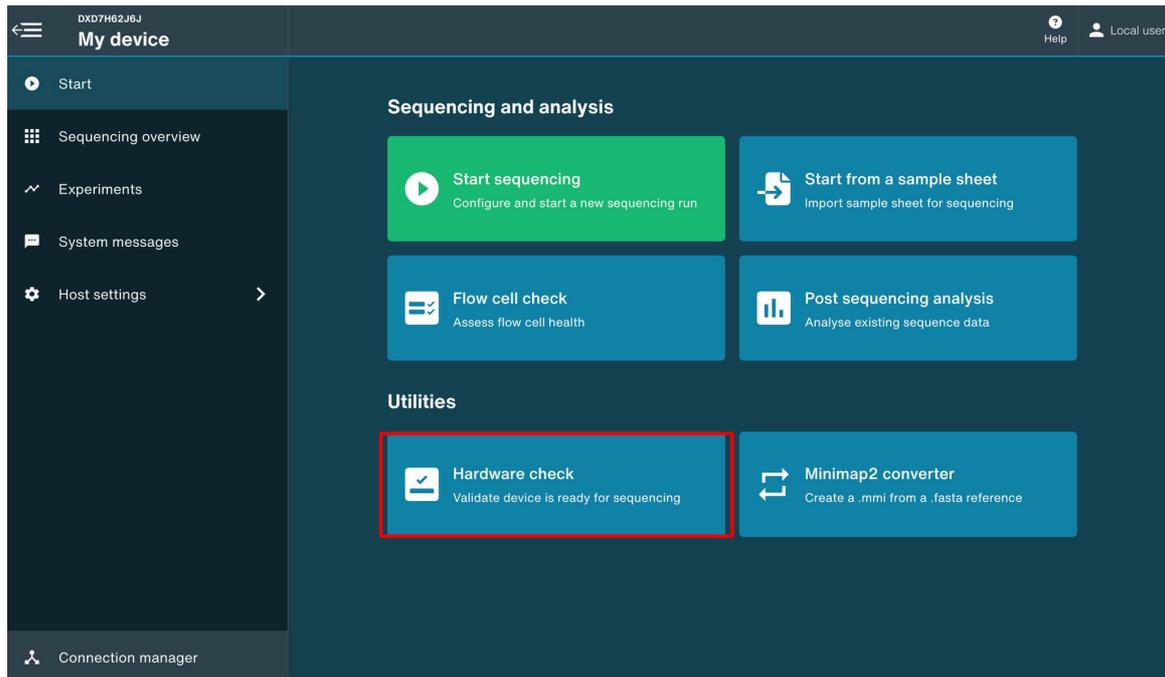
A hardware check must be performed on all new devices or when software has been updated. This uses the Configuration Test Cell(s) (CTC), that come pre-inserted into your device in place of flow cells.

Note: If using a Flongle Flow Cell, we recommend regularly checking the Flongle adapter by inserting the **empty** adapter and completing a hardware check. For checking the device, use a MinION CTC, even if a Flongle Flow Cell will be used for sequencing.

1 Select the sequencing device connected to the computer.



2 Navigate to the Start homepage and click 'Hardware check'.

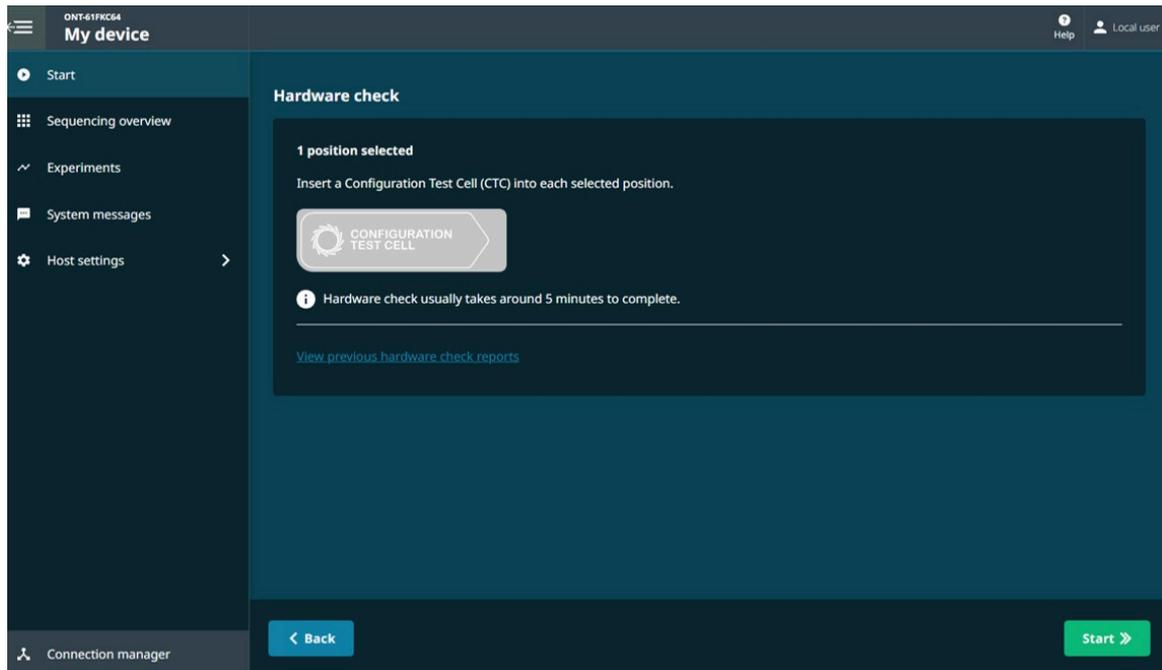


3 Click 'Start' for the check to begin.

Ensure the position selected is ready to start, as indicated on the GUI.

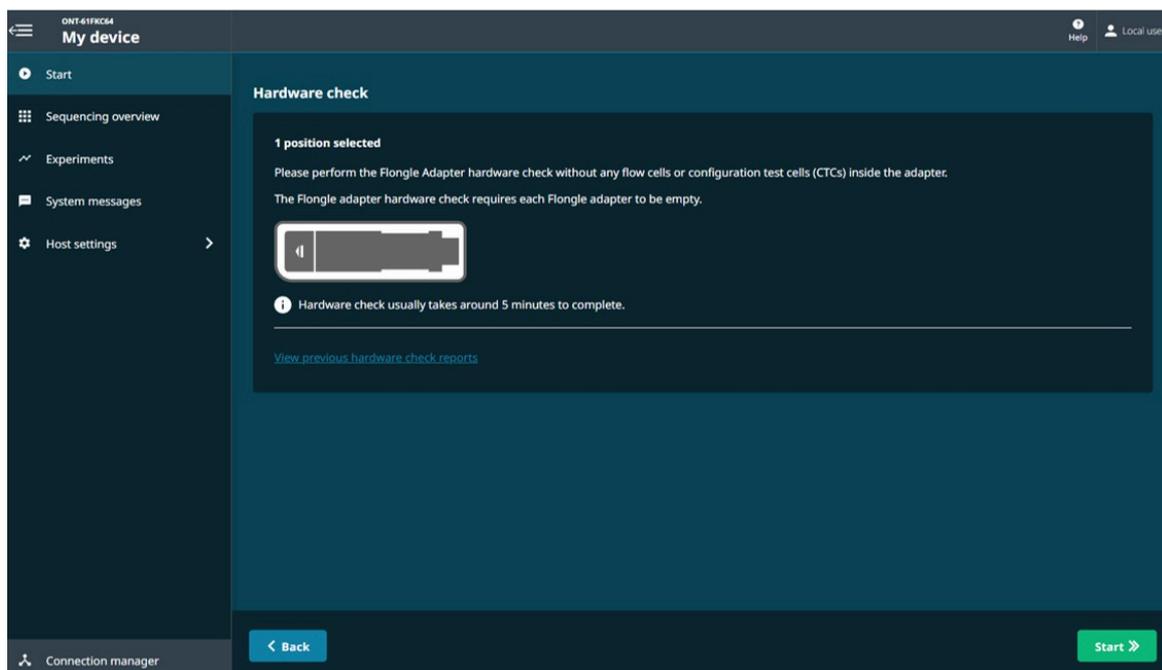
For MinION Flow Cells:

Note: To check the hardware, insert a MinION CTC and click 'Start'.

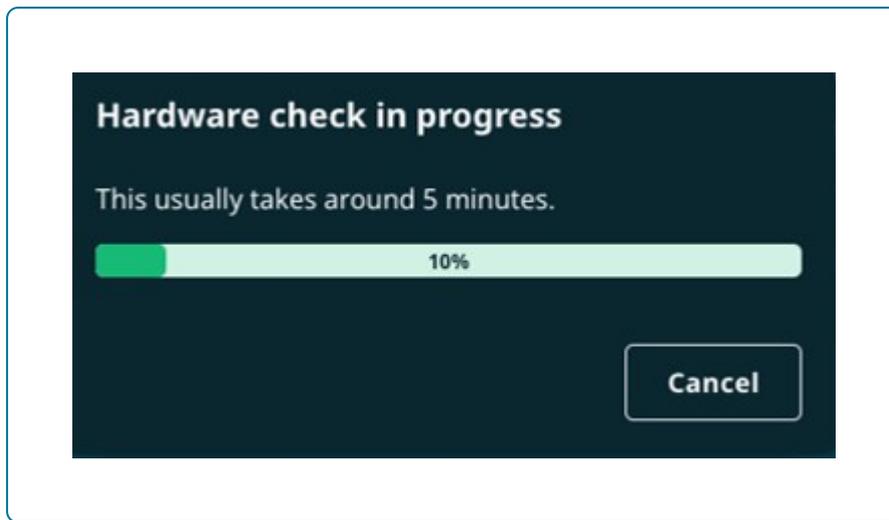


For Flongle Flow Cells:

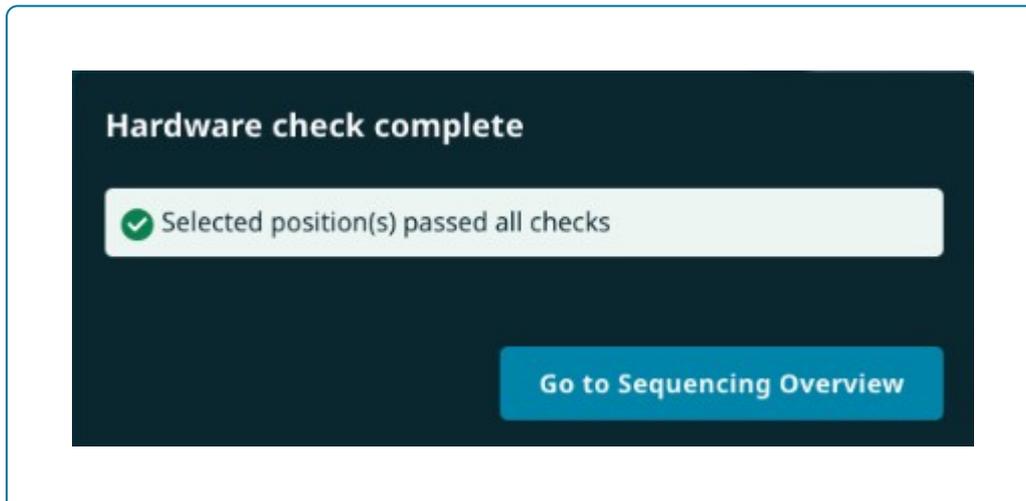
Note: To check the hardware, insert the empty Flongle adapter and click 'Start'.



4 The progress of the hardware check will be displayed.

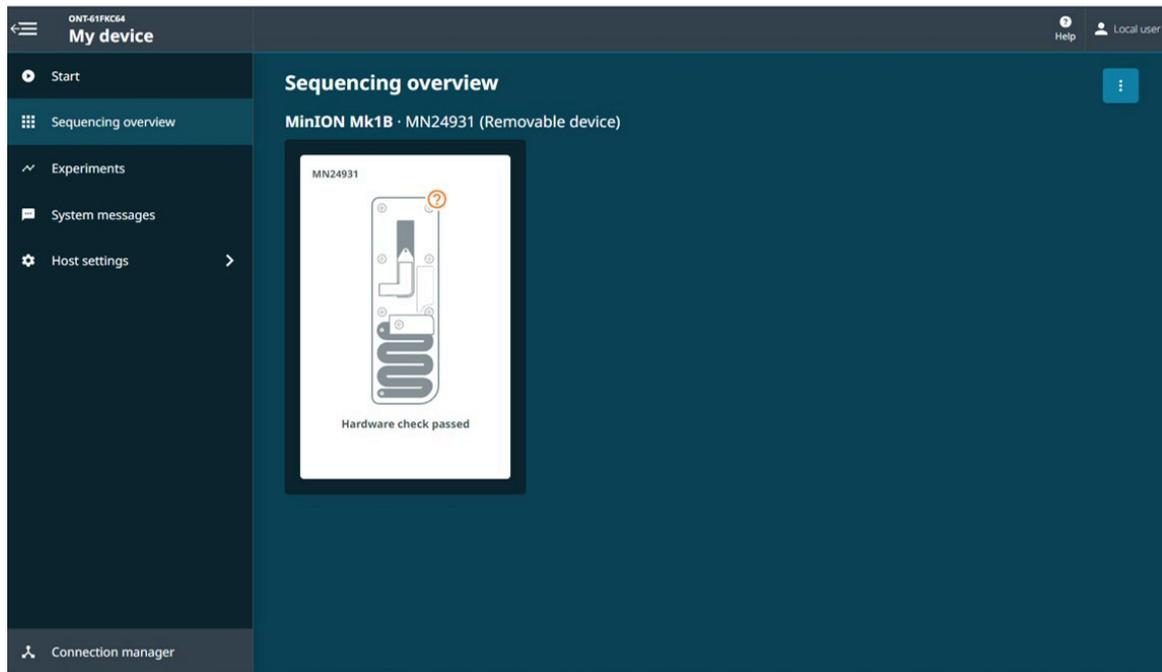


- 5 When the hardware check is complete, you will be notified if the selected position has passed or failed the hardware check.

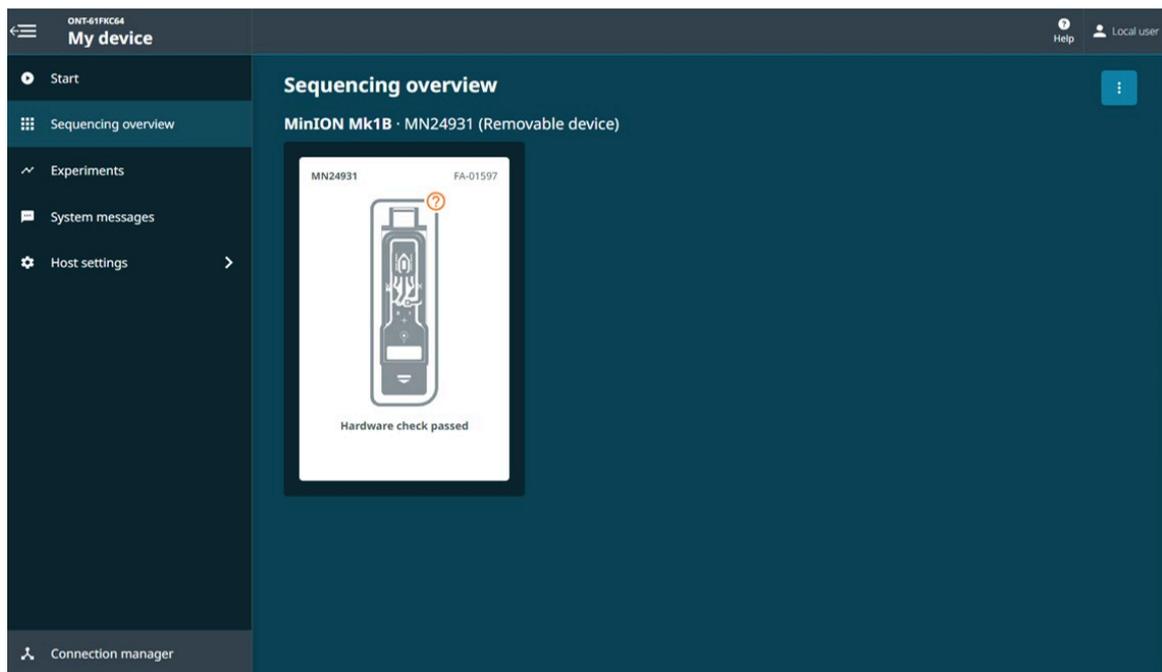


The 'Sequencing Overview' will show if the device passed or failed the hardware check.

Hardware check passed for MinION Flow Cell:

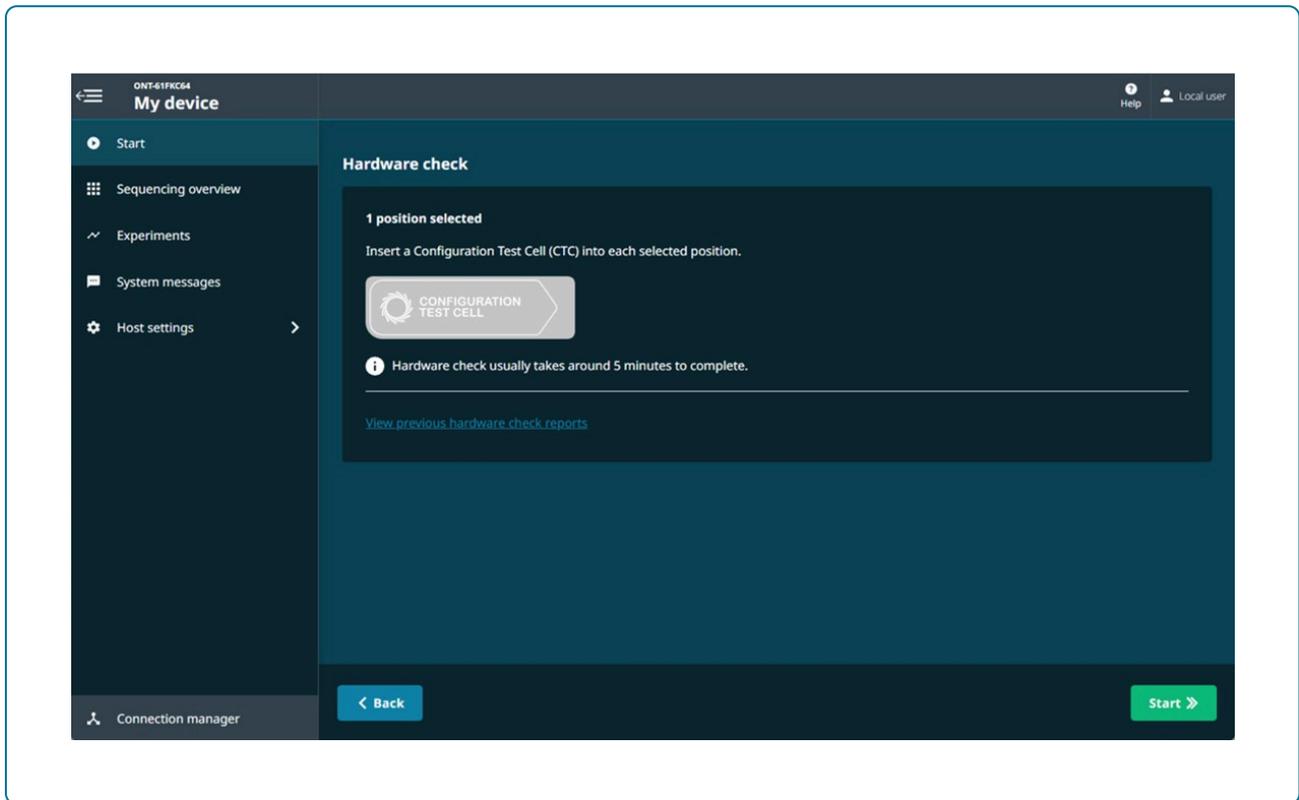


Hardware check passed for Flongle Flow Cell:



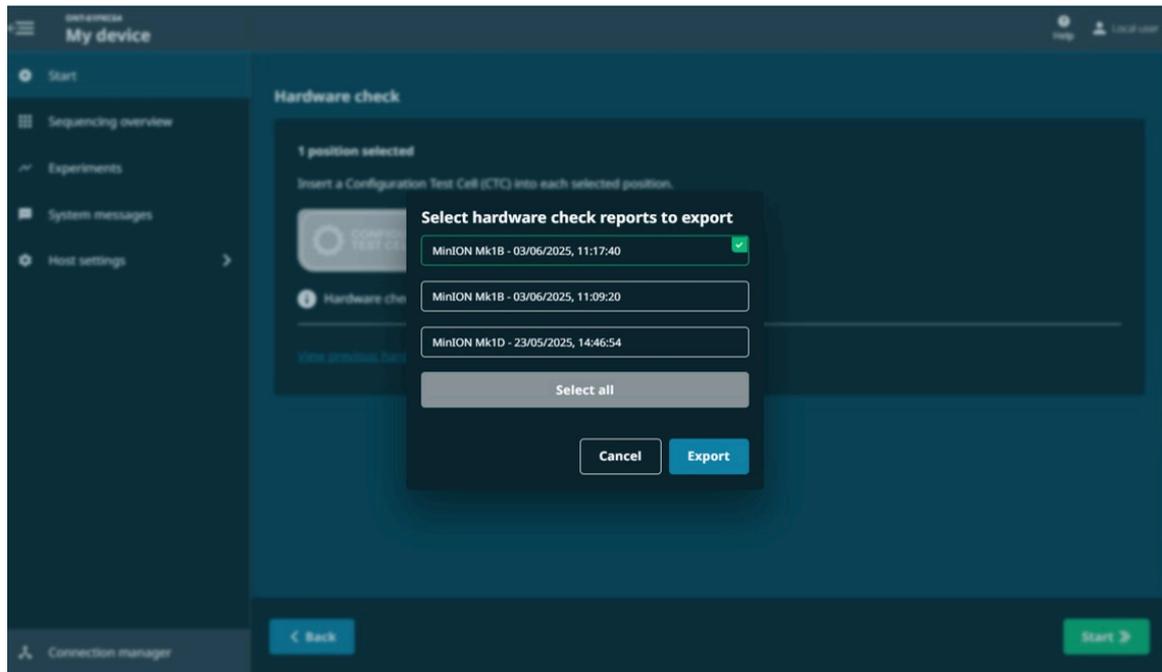
If the hardware check fails, remove and reinsert the CTC or empty Flongle adapter, and run a hardware check again. If the check fails for a second time, please contact Customer Support (online Live Support).

- 6 To view the hardware check report, return to 'Hardware check' and click on 'View previous hardware check reports'.



- 7 Select the report(s) for exporting.

A green tick will show on the selected report. Click 'Export' to download the report.



Hardware check report

The hardware check generates a report in HTML format and contains the following information:

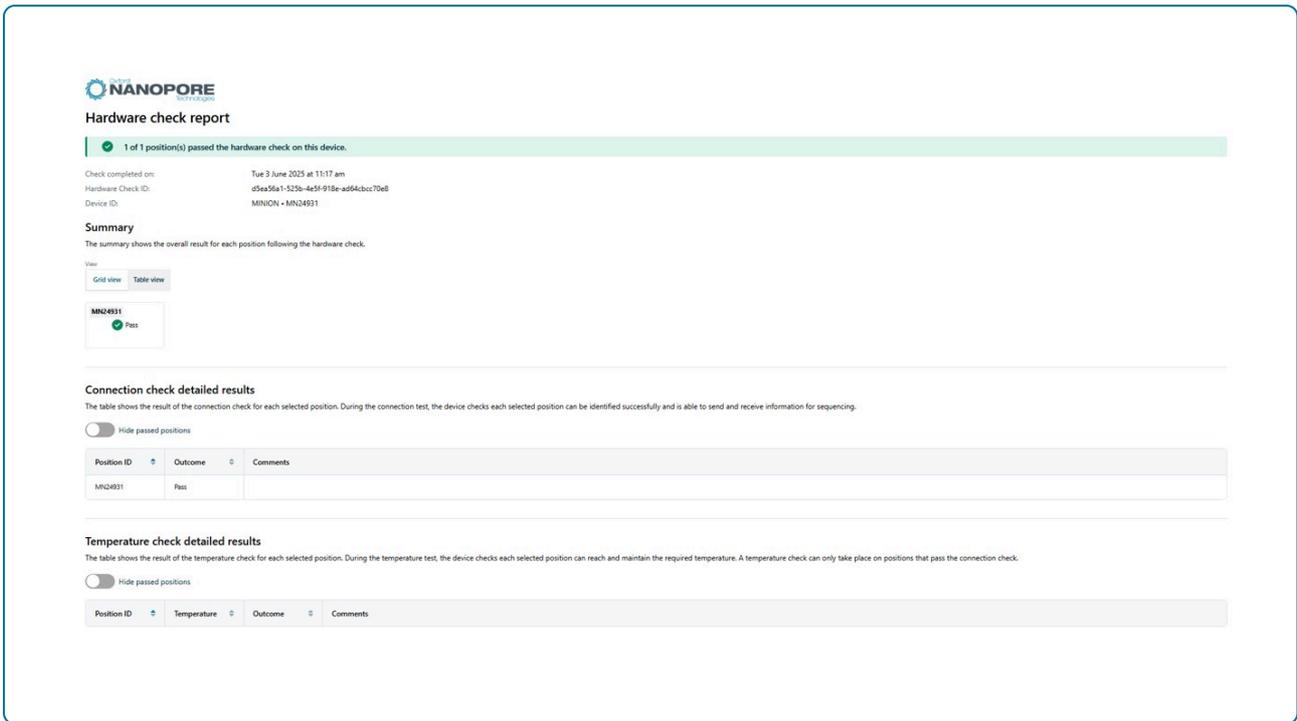
- Number of positions that passed/failed the hardware check on the device
- Date and time that the hardware check was completed
- Hardware check ID
- Device ID

Summary shows the overall result for each position following a hardware check.

Connection check detailed results contains information on whether the connection check passed or failed for the selected position with the option to hide passed positions.

Temperature check detailed results contains information on whether the temperature check passed or failed for the selected position with the option to hide passed positions. **Note that the temperature check is not included in the hardware check for MinION Mk1B devices.**

An example report is shown below:



7. Flow cell check

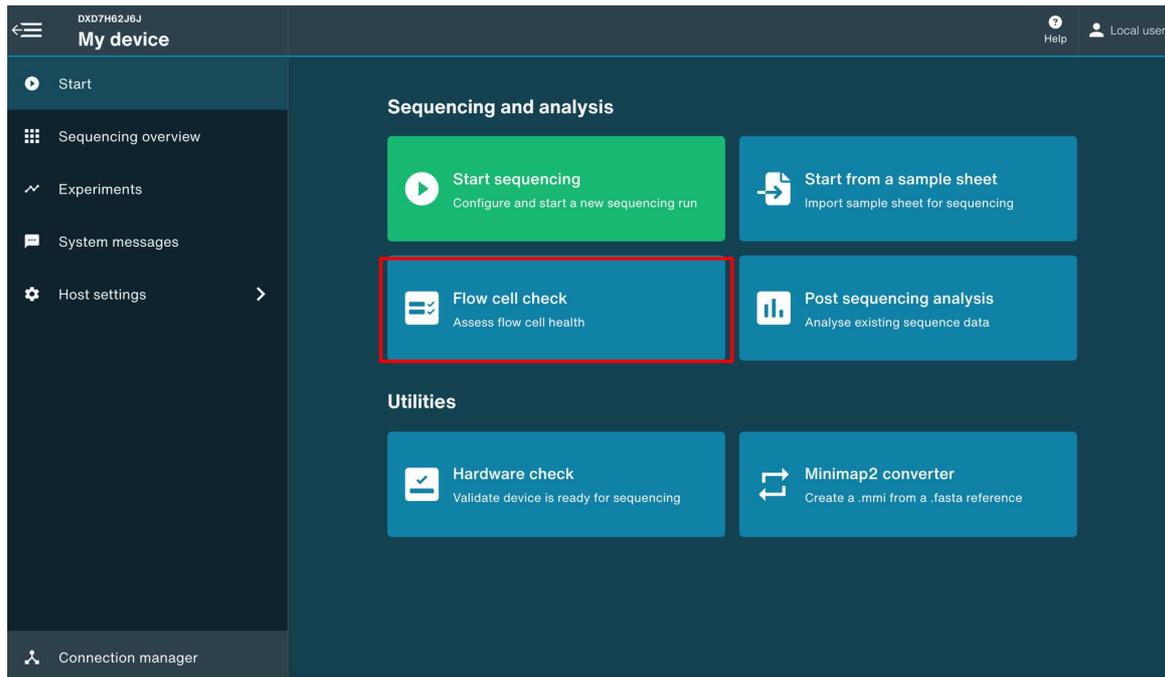
Flow cell check

We strongly recommend performing a flow cell check before loading a DNA or RNA library to assess the number of pores available.

Oxford Nanopore Technologies will replace any flow cell that falls below the warranty number of active pores within 12 weeks of purchase, provided that you report the results within two days of performing the flow cell check and you have followed the storage recommendations.

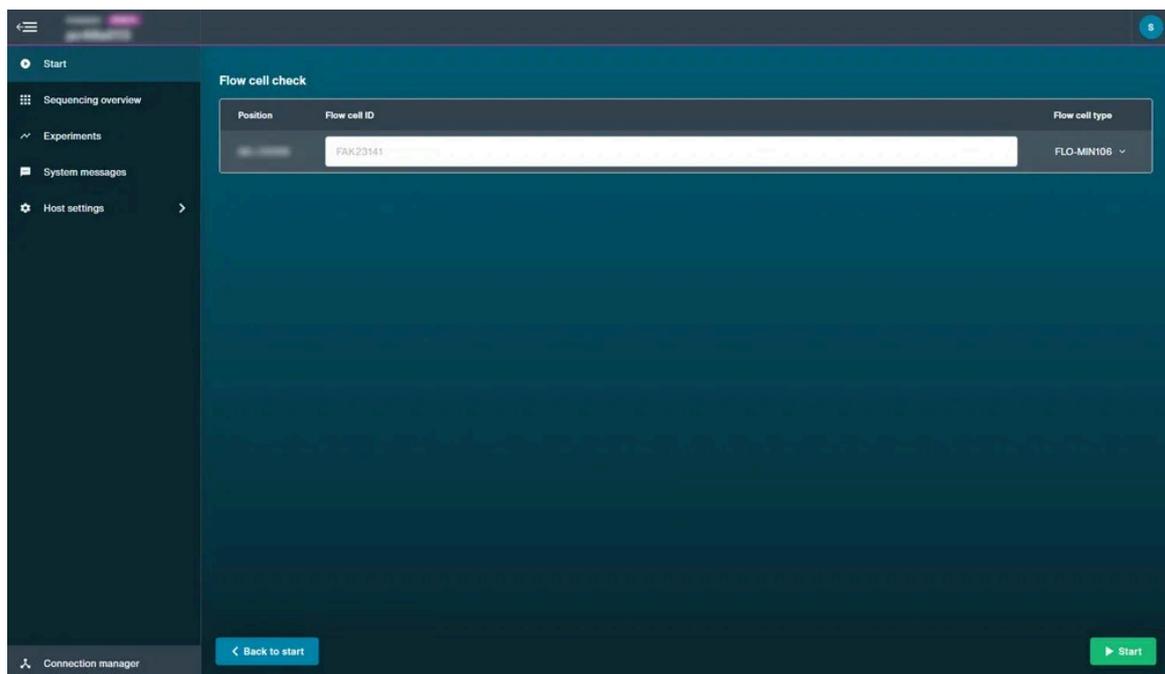
Flow cell	Minimum number of active pores covered by warranty
Flongle Flow Cell (FLO-FLG001)	50
MinION/GridION Flow Cell	800
PromethION Flow Cell	5000

- 1 Navigate to the Start page and select 'Flow Cell Check' to open the flow cell check page.



2 When you see the MinION Flow Cell type and flow cell IDs recognised has been recognised, click 'Start' to begin.

Note: For Flongle, ensure to fill in the flow cell ID.





For Flongle, flow cell ID is not automatically assigned in MinKNOW. It is imperative the flow cell ID is entered in the correct format: ABC123 i.e. ([A-Z] x 3 [0-9] x 3).

The ID is case sensitive with no spaces. The MinKNOW software will not allow you to proceed until the flow cell ID has been entered correctly.

The user will be notified in the bottom right corner of the GUI if any information entered is in the wrong format or missing.

The Flongle flow cell ID is shown in the blue box below:



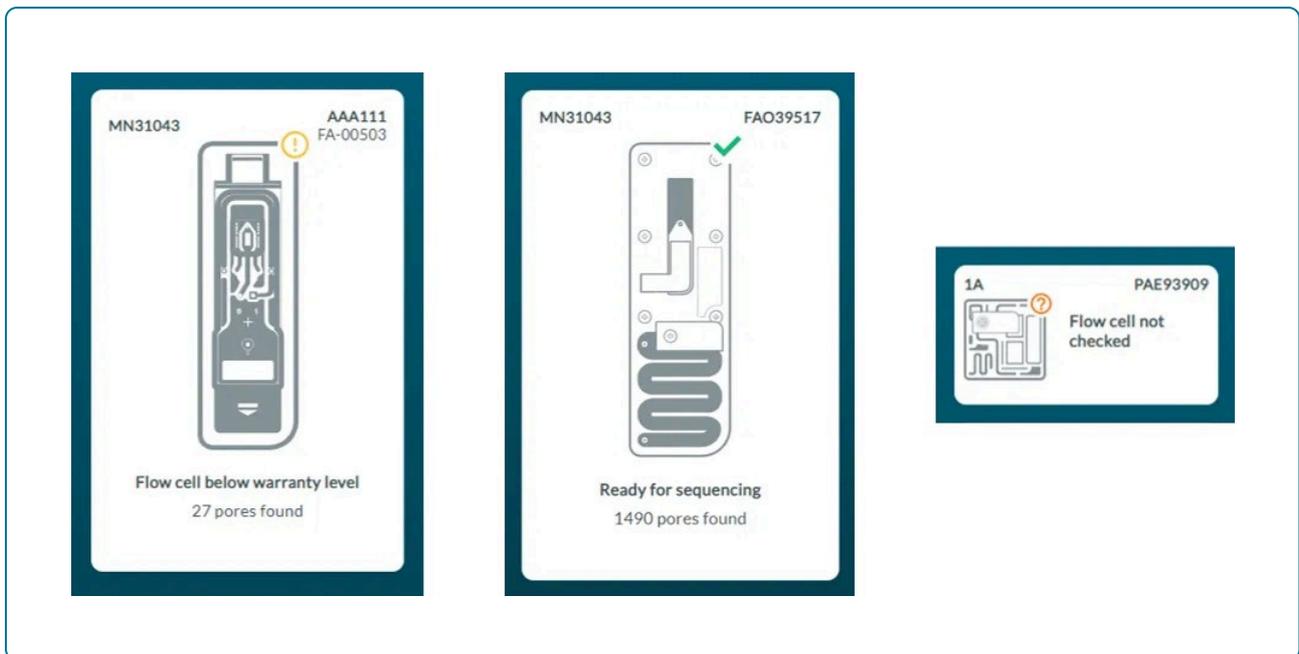
You will be automatically navigated to the Sequencing Overview page.

A loading bar will be displayed under the flow cell during the check.

Flow cell health indicators

The quality of the flow cell will be shown as one of the three outcomes:

1. **Yellow exclamation mark (Flongle flow cell):** The number of sequencing pores is below warranty. Take the flow cell out of the device, re-insert it and run a flow cell check again. If the flow cell is still below warranty, contact support@nanoporetech.com
2. **Green tick (MinION flow cell):** The number of sequencing pores is above warranty.
3. **Question mark (PromethION flow cell):** A flow cell check has not been run on the flow cell during this MinKNOW session.



Note: The indicator of quality will only remain visible during a MinKNOW session. Once the MinKNOW session has ended, the status of the flow cell will be erased.

8. Sequencing and monitoring the experiment

For instructions on how to set up a sequencing experiment and how to monitor the progress of the experiment, refer to the MinKNOW protocol in the Nanopore Community.

To run a sequencing experiment, you will need your DNA or RNA sample purified and a sequencing library prepared. For more information about sample preparation, refer to the [Prepare](#) section of our Documentation.

You can access the MinKNOW protocol by following [this link](#).

9. MinKNOW updates for Windows and Mac OS X

MinKNOW updates

Availability of updates to the MinKNOW software are indicated via the MinKNOW host settings or as a pop-up when first opening the software. The user should follow the on-screen instructions to install the new versions.

The details of the update will be communicated in Nanopore Community announcements.

We strongly recommend users to update as soon as reasonably possible after the release has been made available.

Note: Users will not be able to update their device if connected remotely or if a run is in progress.



Securing custom scripts prior to updating MinKNOW

If you have created custom scripts in MinKNOW, care should be taken to store them securely so they are not overwritten during software updates.

Please also be aware that the script structure can change between MinKNOW versions; custom scripts written for one version may not be compatible with the next.

1 Open the MinKNOW UI via the desktop icon and the auto-updater will automatically check for updates when connected to the device.

2 A dialogue box will open when a new update is available.

Select **Get Update** to update the device software automatically.

Updates may be skipped. However, we recommend to **update the device as soon as updates are available**. Some updates will be mandatory to use the device and are unable to be skipped.



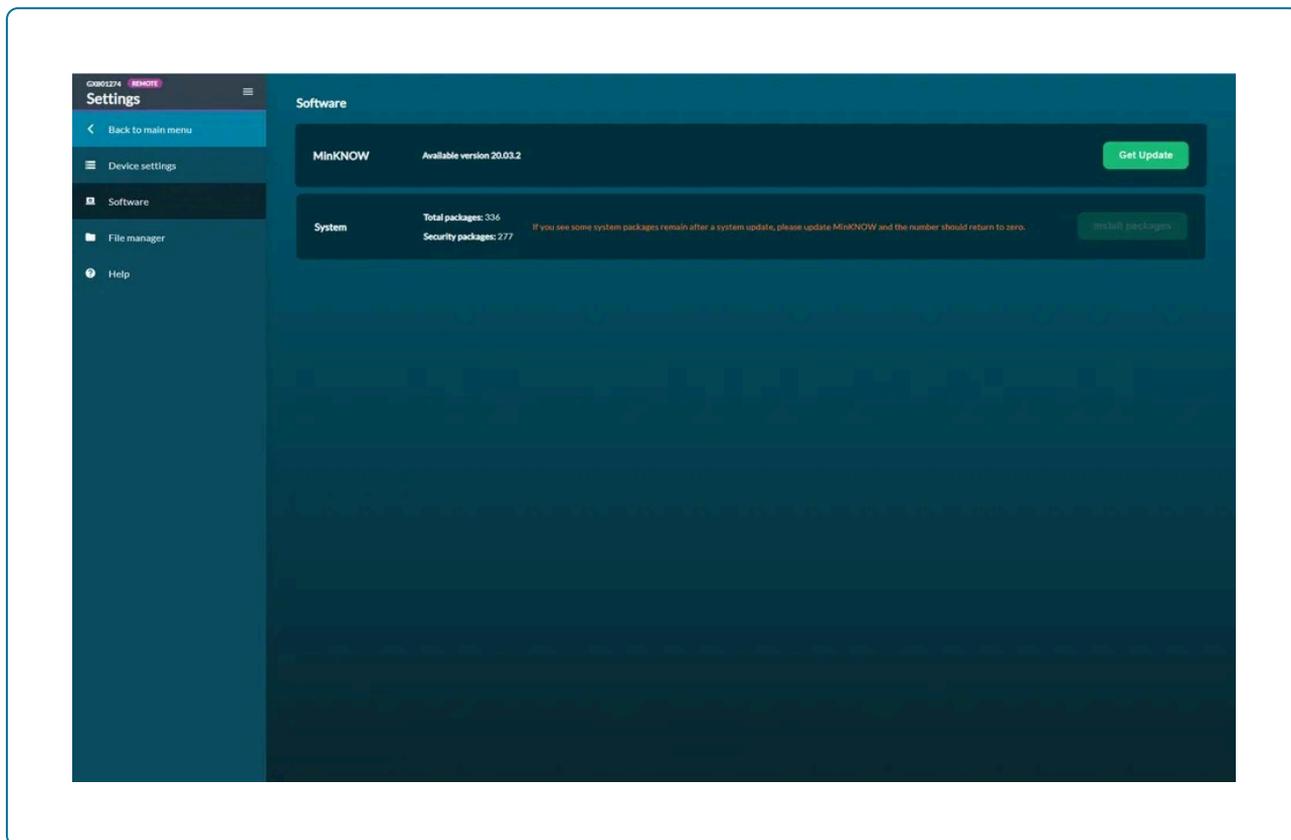
Note: For MinION Mk1B/Mk1D, clicking **Get Update** will open the [Software Downloads](#) page on the connected computer for you to download the updated MinION software.

You can also update the device from the Software page of the Host settings.

3 Navigate to Software in the Host settings and click Get Update to open the installer window.

An update button will only appear when a new version of the software is available to download.

Note: For MinION Mk1B devices, clicking **Get Update** will open the [Software Downloads](#) page on the connected computer for you to select and download the updated MinION software.



- 4 Navigate to "MinION Software" on the Software Downloads page and download and install the executable for your device.



Re-installing MinKNOW

In some cases (e.g. if there is a problem with the version of MinKNOW that you are using), it may be necessary to re-install the software. To do this, first do a full uninstall of the current version by following the instructions in the Support article: [How to uninstall MinKNOW Software for the MinION Mk1B, Mk1D and P2 Solo Devices](#).

10. Updating MinKNOW for Linux

- 1 To update MinKNOW to a new version:

```
sudo apt clean
sudo apt update
sudo apt install ont-standalone-minknow-release
```

The latest version of MinKNOW will be installed. Once these commands have completed successfully without errors, reboot the device:

```
sudo reboot
```



Re-installing MinKNOW

In some cases (e.g. if there is a problem with the version of MinKNOW that you are using), it may be necessary to re-install the software. To do this, first do a full uninstall of the current version by following the instructions in the Support article: [How to uninstall MinKNOW Software for the MinION Mk1B, Mk1D and P2 Solo Devices](#).

11. Export logs

Location of log files

Log files for each sequencing experiment can be found in:

Windows C:\data\logs

Mac OS X /private/var/log/MinKNOW

Linux /var/log/minknow