Oxford Nanopore Technologies

REQUIREMENTS

MinION Mk1D – device and IT specifications

FOR RESEARCH USE ONLY

Contents

Device model

MinION Mk1D (MIN-101D)

Device and IT specifications

Overview

The MinION™ Mk1D is a compact, portable nanopore sequencing device designed to bring sequencing to the sample. It must be connected to a computer for power and sequencing control is via the MinKNOW™ software. MinKNOW manages key sequencing tasks, including:

- Data acquisition and real-time analysis
- Data streaming and device control
- Run parameter selection
- Sample identification and tracking

In addition to collecting raw nanopore signal data, MinKNOW includes a basecalling algorithm that converts this signal into DNA or RNA sequences using machine learning.

This document outlines the technical specifications of the MinION Mk1D and provides guidance for selecting a compatible computer to run the device effectively.

Technical specifications

Component	Specification
Size and Weight	H 13 × W 55 × D 125 mm; 130 g
Maximum rated power	7.5 W
Installation ports	1 × USB Type-C
Software installed	MinION driver
Sequencing temperature	Designed for sequencing at environmental temperatures of +10°C to +35°C*
Heat output	25.6 BTU/hr maximum
Installation requirement	Maintain a minimum 5 cm clearance on all sides of the device except the base. Do not place the device on top of a laptop or other heat source.

*The device electronics are functional within environmental temperatures of +5°C to +40°C.

Site-planning (pre-delivery)

Configuring a new host computer

Important: The MinION Mk1D requires MinKNOW version 24.11.10 or later.

The specifications below ensure your computer can efficiently acquire data and perform basecalling. Using an unsupported computer may lead to reduced performance, slower basecalling, or failed runs.

Recommended

The recommended specification ensures real-time, high-accuracy basecalling, including detection of modified bases (CpG-context 5mC/5hmC), alignment, and adaptive sampling. This level of performance also supports the generation of super-accurate basecalls in real time.

Minimum

The minimum specification is designed to balance performance and cost. It enables high-accuracy basecalling, with data ready for use at the end of a typical 72-hour sequencing run.

Limitations of the minimum specification:

Real-time performance may not be achievable for shorter runs or more intensive analytical tasks.

Adaptive sampling and high-accuracy basecalling may not run simultaneously.

Super-accurate (SUP) basecalling may require significant additional processing time after a run completes.

Component	Minimum	Recommended
Operating system	Windows 10/11 Ubuntu 22.04/24.04 LTS MacOS	Windows 10/11 Ubuntu 22.04/24.04 LTS
Peripheral	USB Type-C (USB 2.0 or higher)	USB Type-C (USB 2.0 or higher)
Memory	16 GB + Apple: 24 GB + Unified Memory	32 GB +
GPU	NVIDIA RTX 5060 Laptop GPU + Apple: M4 Pro +	NVIDIA RTX 5090 Laptop GPU
CPU	Intel I5 + / AMD Threadripper + / Apple M4 Pro + (6-cores +)	Intel I7 + (12-cores +)
Storage	1 TB SSD +	2 TB SSD +

Note: Compatibility and performance on newly released hardware, such as next-generation GPUs or processors, may be limited until testing and optimisation are complete. Hardware marked with the '+' symbol indicates suitability of that specification or better.

Processor compatibility

- MinKNOW is only supported on modern Intel, AMD, and Apple Silicon processors.
- Ensure your CPU supports AVX-2 (Intel Haswell, AMD Steamroller, or newer).
- Intel-based Macs are not supported.

- Other processors, such as Qualcomm Snapdragon or other ARM-based chips, are not supported.

Network and connectivity requirements

USB connectivity

The MinION Mk1D must be connected to a computer via its USB-C port. It only requires USB 2.0 data transfer speeds, so all USB-C ports capable of data transfer are compatible.

- USB-A to USB-C adapters or cables are not supported, as USB-A ports may not provide sufficient power.

Network access is required for the correct functionality and to receive system updates. All connections are outbound only over TCP ports 80 and 443. No inbound access is required.

Oxford Nanopore does not have remote access to your system.

Access type	Purpose	Required domains
Telemetry	Enables MinKNOW to run and communicate telemetry	`ping.oxfordnanoportal.com`

Software and OS updates	Access to MinKNOW updates, OS packages, and GPU drivers	`cdn.oxfordnanoportal.com`
		`*.ubuntu.com`
		`*.nvidia.com`

EPI2ME	Access for container-based analysis workflows	`*.github.com` `hub.docker.com`
Nanopore account login	Required to log into your Oxford Nanopore account and access cloud services	`id.nanoporetech.com` `*.okta.com`

Note: If your institution uses a proxy or firewall, ensure outbound access to these domains is permitted to avoid issues with software functionality, updates, or user authentication.

Telemetry

MinKNOW and EPI2ME™ collect telemetry data during use, as outlined in our Terms and Conditions. This helps monitor device performance, supports troubleshooting, and enables flow cell warranty replacement where applicable.

Privacy note: Some telemetry fields allow free text entry; therefore, avoid entering any personally identifiable information. We do not collect any sequencing data.

Other system considerations

System behaviours such as scheduled updates, antivirus scans, or managed IT policies can interfere with sequencing runs.

Below are some key areas to review and discuss with your IT department to ensure a smooth and uninterrupted sequencing experience.

Component	Minimum requirement
User account privilege level	Local Administrator privileges are required for installation and updates. They are not required for running sequencing experiments.
Internet connection	A stable internet connection is required at all times for software updates and telemetry. For offline use (e.g., fieldwork, expeditions), contact support@nanoporetech.com for guidance.
Antivirus settings	Antivirus software can consume significant system resources, potentially affecting sequencing performance. To avoid disruptions, we recommend disabling automatic scans and scheduling manual scans when the MinION is not in use.
Endpoint detection software	Endpoint detection software may interfere with system performance. We recommend disabling such software during sequencing.
BIOS/Chipset Settings & Updates	Ensure your BIOS firmware and chipset drivers are up to date. For EPI2ME analysis, ensure virtualisation is enabled.
OS update settings	Set OS updates to manual mode, as updates downloading during a sequencing run may cause issues. Updates requiring a restart will halt an active run Please coordinate with your IT department to ensure that Group Policies do not override local settings in a way that could cause unplanned updates or restarts.

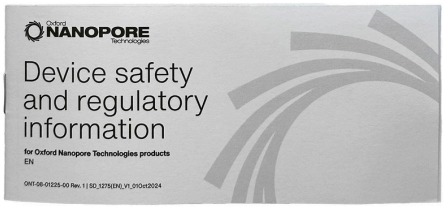
Package contents

MinION™ Mk1D

Configuration Test Cell (CTC)

USB-C Cable

Quick start guide



Safety and regulatory information

Quantity	Item	Function
1	MinION Mk1D	DNA/RNA sequencing instrument
1	MinION Configuration Test Cell (CTC)	Used to verify sequencing hardware functionality
1	USB-C 0.5 m cable	Connects the MinION to a compatible computer
1	Quick Start Guide	Gives an overview of the system setup
1	Safety and regulatory documentation	Covers safe use and regulatory compliance

Physical installation

- Allow at least 5 cm clearance at the front, rear and sides of each unit to ensure adequate ventilation and access.
- Do not place the device on top of a laptop/computer, and keep it away from active heat sources

Data formats and analysis

File types

The system stores nanopore sequencing data in the following file types:

- FASTQ - A text-based format that stores DNA/RNA sequences and quality scores
- BAM - A format for aligned reads, including modified base calls (e.g., methylation)
- `sequencing_summary.txt` - Contains metadata for all basecalled reads from a sequencing run. This includes details such as read ID, sequence length, per-read Q-score, and read duration. The size of a sequence summary file will depend on the number of reads sequenced

Optional:

POD5 - The primary raw data format, replacing the legacy .fast5. It is more efficient in both storage and processing

The table below provides estimated storage requirements based on different sequencing throughputs from a single flow cell. These values assume a run that saves POD5, FASTQ, and BAM files, with a read N50 of 23 kb.

Flow cell output (Gbases)	POD5 storage (Gbytes)	FASTQ.gz storage (Gbytes)	Unaligned BAM with modifications (Gbytes)
10	70	6.5	6
15	105	9.75	9
30	210	19.5	18
50	350	35	30

Note: When basecalling is turned on, the system will create FASTQ and/or BAM files, and will require additional temporary storage while the sequencing run is active. If you elect to turn on POD5 output, the system will generate POD5 files continuously during the experiment.

EPI2ME analysis

The EPI2ME Desktop Application provides user-defined local or cloud-based analysis solutions:

- Local analysis runs directly on the user's computer, using available compute resources
- The cloud-based analysis runs on Amazon Web Services (AWS) and requires an internet connection

Find out more about how EPI2ME can support your data analysis needs here.

Data upload formats: EPI2ME receives FASTQ, BAM, and other relevant workflow formats, processes data via custom Nextflow pipelines, and provides interactive HTML reports.

Software updates

You can download updates via the MinKNOW interface or terminal (using `apt`). The system only requires outbound access. We share notifications about software updates through the Nanopore Community and provide full update instructions in each release note.

Safety and compliance

Device identification

Device part number:

MIN-101D - MinION Mk1D

Intended use

Oxford Nanopore Technologies MinION Mk1D device is an electronic analysis system for use in scientific research. Its core technology uses a nanopore to detect single-molecule events, including nucleic acids (DNA/RNA), proteins, and small molecules.

This product is for research use only.

Safety information

Before use, review the following safety guidelines:

- Maintain a minimum 5 cm clearance on all sides of the device except the base
- Do not place the device on top of a laptop or other heat source.

Emergency procedures

In case of an emergency, switch the computer off at the power switch and unplug the USB-C cable.

Declaration of conformity

The MinION Mk1D complies with relevant EMC and Electrical Safety directives, as outlined in the EC Declaration of Conformity below.

Declaration of conformity for the MinION Mk1D

Compliance labels

Label on the MinION Mk1D

International standards

The MinION Mk1D is certified to the following international standards:

Certification	Country
MET; UL61010/CSA-C22.2 No. 61010, third Edition: Electrical Equipment for Measurement, Control and Laboratory Use, Revision: May 11, 2012	USA and Canada
FCC	USA
RCM compliance	Australia and New Zealand
ISC Safety Compliance	Cambodia
UAE RoHS	UAE
NRCS and SABS	South Africa
EAC	Customs Union of the Eurasian Economic Union

License and warranty

The license and warranty contract ensure your instrument performs optimally by providing the latest up-to-date hardware and software. Oxford Nanopore Technologies guarantees the delivery of its support obligations during the contract period, as laid out in sections 4 and 7 of the Nanopore Product Terms and Conditions.

For more information on device warranty, visit this page on the Oxford Nanopore Store.

Support

For more information and FAQs about the MinION Mk1D, please refer to our devices page on Support.

Frequently asked questions

Can I use a computer that differs from or is older than the specifications listed here?

Yes, but performance, especially basecalling speed, may vary depending on the hardware. The choice of GPU has the greatest impact on performance.

Hardware compatibility

Older hardware:

- Computers released before 2015 are unlikely to work.
- Ensure your GPU supports Compute Capability 6.1 or higher (e.g., RTX 10XX series or newer).
- Ensure your CPU supports AVX2 (e.g. Intel Haswell, AMD Steamroller or newer).
- A USB-C port (USB 2.0 or higher) is required for device connection.

Newer hardware:

- Compatibility and performance on newly released hardware, such as next-generation GPUs or processors, may be limited until testing and optimisation are complete.

I bought a computer based on a previous version of this document. Is it now obsolete?

This document is intended to guide you when purchasing a new computer for use with the MinION Mk1D. As hardware availability changes over time, we update our recommendations to reflect current, readily available components. If your existing computer still meets the specifications listed in question 1 above, it remains compatible with our software.

I want to basecall my data on another computer / HPC. What is the actual minimum specification for data acquisition only?

For data acquisition only (sequencing without any basecalling), the minimum specification (excluding the GPU) is sufficient.

Can I use Linux distributions other than Ubuntu 22.04/24.04 LTS?

We recommend using only Ubuntu 22.04 or 24.04 LTS. Other Linux distributions have not been tested or validated and may not be compatible with our software or support processes.

Why is there no recommended specification for Mac?

While Apple silicon is supported, sequencing performance, especially for resource-intensive models like super accuracy (SUP), is better on systems with NVIDIA GPUs, which also offer a more favourable price-to-performance ratio for basecalling.

Appendix A: Shipment and logistics

The Oxford Nanopore Technologies MinION device is stored and shipped at ambient temperature (+2°C to +25°C). MinION devices are shipped either in a padded envelope or a shipping box with flow cells and reagents.

Please note that the MinION is shipped separately from the kits and flow cells in the Starter Pack.

Appendix B: Compatibility

The MinION Mk1D is compatible with all the latest versions of chemistry for MinION/GridION Flow Cells, sequencing kits, and expansions.

This includes compatibility with:

- Flow Cells: MinION and GridION R10 Series Flow Cell (FLO-MIN114)
  RNA004 MinION Flow Cell (FLO-MIN004RA)
  Flongle R10 Series Flow Cell (FLO-FLG114)
- Sequencing kits: The MinION is compatible with all V14 chemistry kits, including ligation, multiplex, rapid, barcoding, ultra-long, PCR, cDNA, 16S, and Direct RNA kits.
- Latest sequencing software: MinKNOW, Dorado Basecall Server
- Downstream analysis tools: EPI2ME (and included workflows), Oxford Nanopore pipelines (MinKNOW-compatible workflows), and custom-developed tools (Nanopore Community developed tools)

Change log

Date	Version	Changes made
7 Jan 2026	V1	This document consolidates the MinION Mk1D Technical Specifications and the MinION MK1D IT Requirements into a single document. The previous documents are now in legacy. What's new: - Combined the two documents and reorganised the overall structure. - Made the compatibility section easier to read: instead of lists of kit codes, it now provides a simple statement about which kits and software are compatible, along with notes on any exceptions. - Added details of package contents - Added a new subsection under section 3 (Other system considerations) and another under section 8 (International standards).