

Introduction to the MinKNOW software



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MinKNOW

Main Interface to your MinION sequencer to

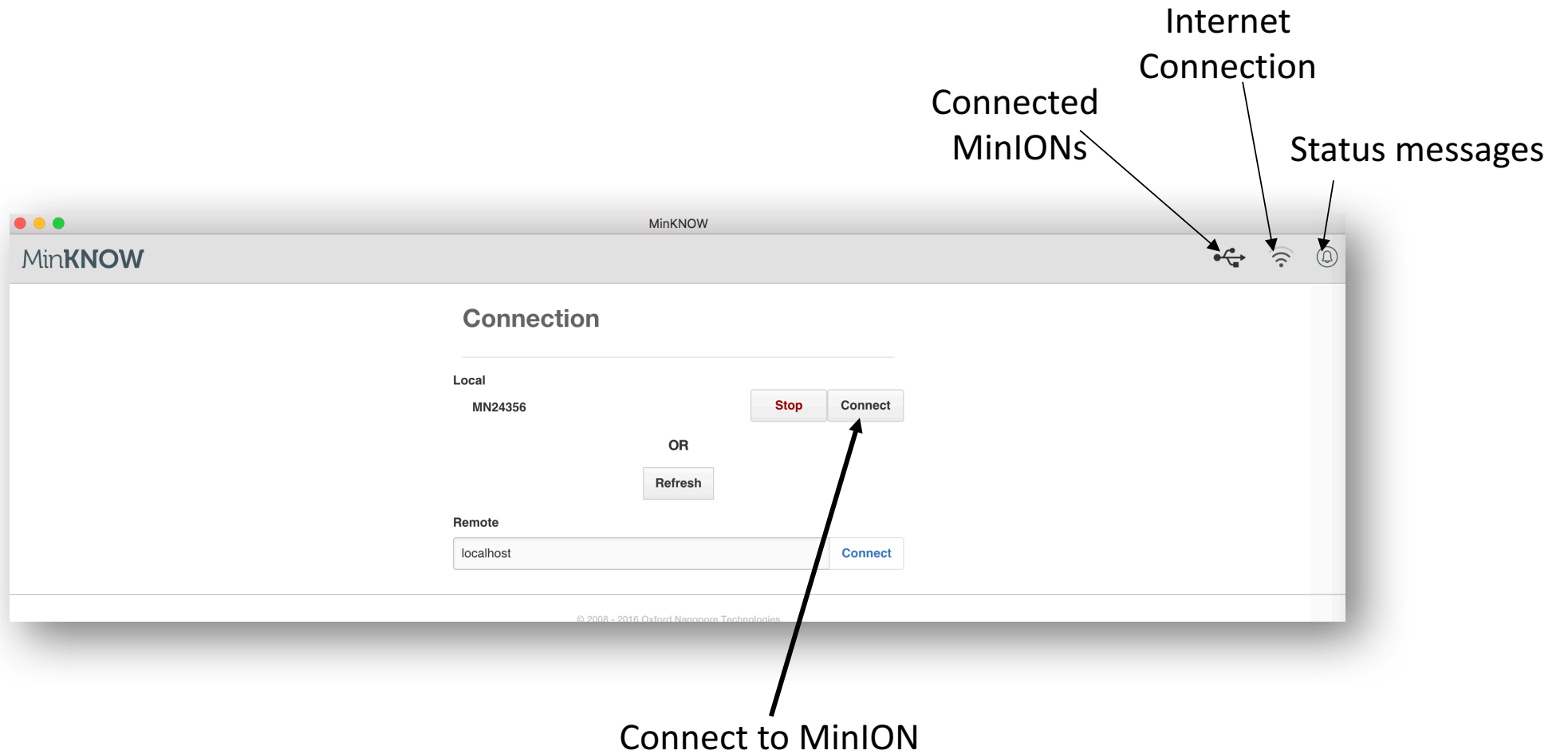
- Conduct flow Cell QC
- Configure and monitor the sequencing run
- Perform life base calling
- Store the sequencing data

MinKNOW

- Free software
- Available only through the Oxford Nanopore Community
- Supports Windows, Mac and Linux
- Regularly updated

MinKNOW GUI

Main Menu



Main Menu

General Information

Sample / Experiment
identifier

Flow Cell ID

Available memory

MinION
Operation

The screenshot shows the MinKNOW main menu interface. A vertical line is drawn on the left side of the interface, with five blue lines extending from it to the left, pointing to the labels in the adjacent column. These lines connect the labels to specific sections of the interface: 'General Information' points to the 'Connection' section, 'Sample / Experiment identifier' points to the 'Label Experiment' section, 'Flow Cell ID' points to the 'Flow Cell ID' input field, 'Available memory' points to the 'Disk Space' section, and 'MinION Operation' points to the 'Choose Operation' section.

Connection

Local
MN24356 Stop Connect

OR

Refresh

Remote
 Connect

MinION Connection
 ✓

Flow Cell Connection
 ✓ ✓
The ASIC identifier The EEPROM identifier

Label Experiment

Sample ID

Must only contain letters, numbers, white spaces, '-' and be between 1 and 50 characters long.
Sample ID should not contain any personally identifiable information. See documentation

Flow Cell ID

Submit

Disk Space
16777220 (236,478Mb free)

Choose Operation

☐ Configuration Test Cell (CTC) expert
☒ Platform Quality Control (QC)
☐ Sequencing Run
☐ Control Experiment

Flow cell product code
☒ FLO-MIN106 ☐ FLO-MIN107

There is 1 script choice:
NC_Platform_QC_FLO-MIN106

Execute

MinION Operation

1. Configure Minion using the Test Flow cell that comes with the MinION
2. Check your Flow Cell, i.e., how many pores are active
3. List of sequencing scripts for actual sequencing
4. Specific parameters for provided control experiment

Choose Operation

- ☐ Configuration Test Cell (CTC)
- ☒ Platform Quality Control (QC)
- ☐ Sequencing Run
- ☐ Control Experiment

☐ *expert*

Flow cell product code

- ☒ FLO-MIN106 ☐ FLO-MIN107

There is 1 script choice:

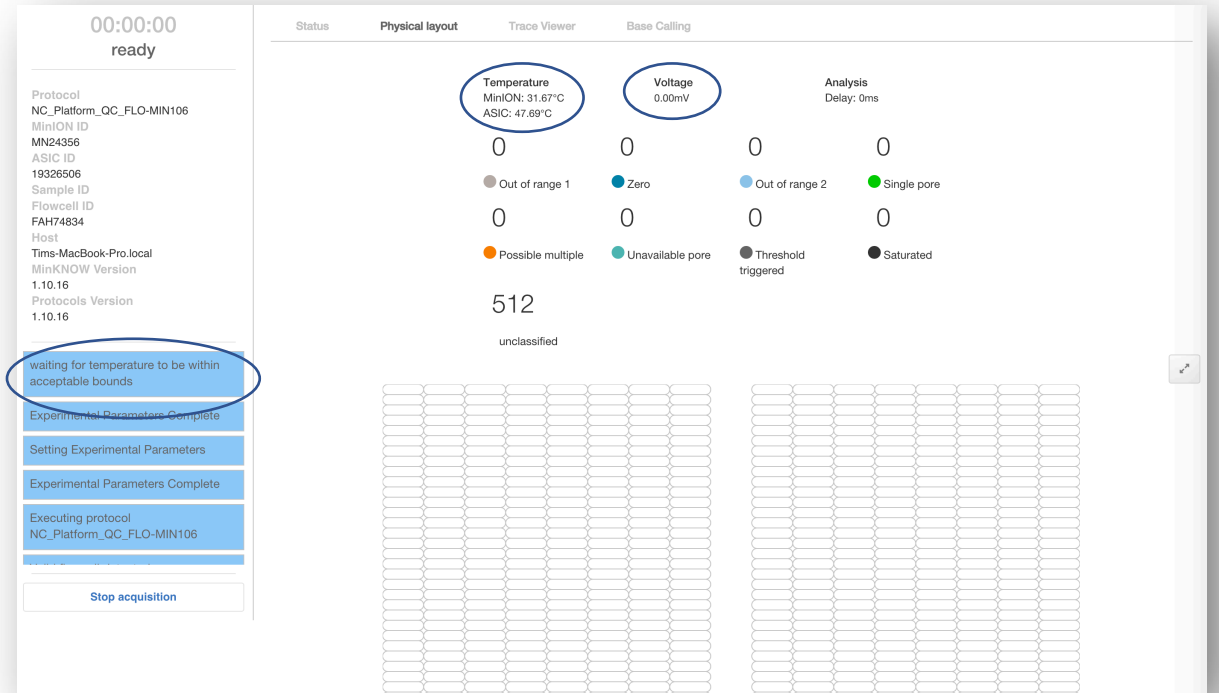
NC_Platform_QC_FLO-MIN106 

Execute

MinKNOW GUI – Flow Cell QC

Flow Cell QC

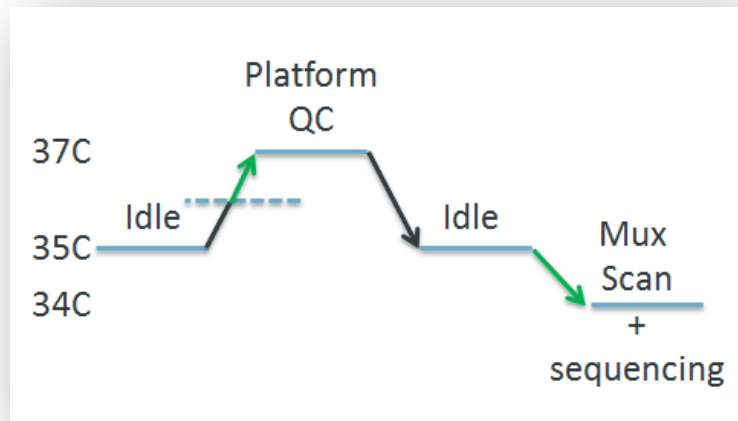
- Should be performed before every sequencing run
- Temperature has to be reached
- A series of current changes form positive (reversed) to negative -180mA to maximise number of free active pores



Flow Cell QC run

Temperature

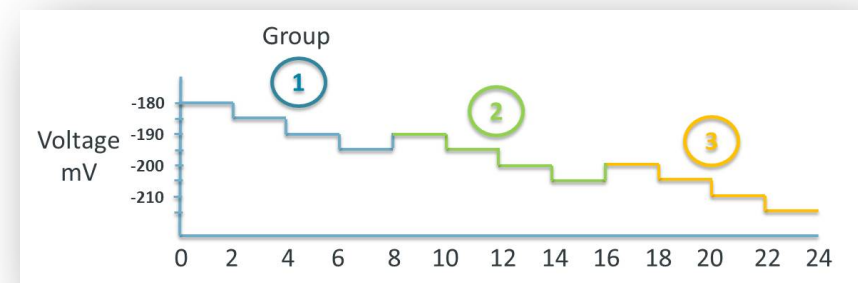
- Higher temperature increase mobility of charged particles



Source: <https://community.nanoporetech.com>

Voltage

- Positive / reverse voltage to clear pores
- Over time current is decreased in 5mV steps to account for loss of potential (drift)

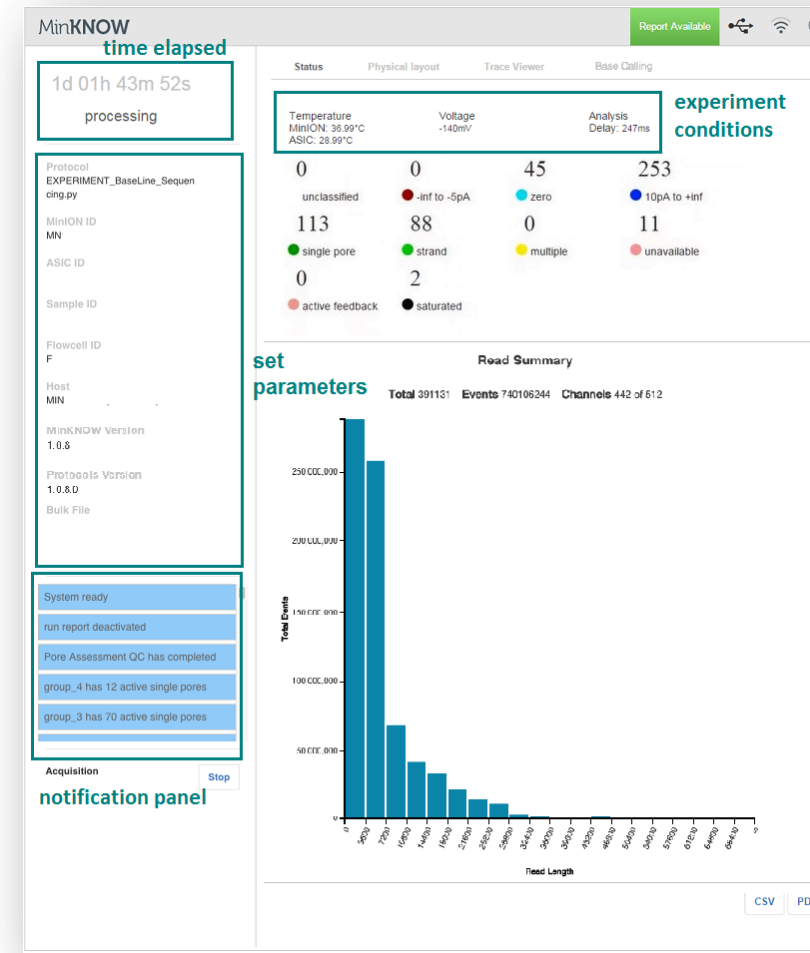


Source: <https://community.nanoporetech.com>

MinKNOW GUI – Sequencing Run

MinION – Status Widget

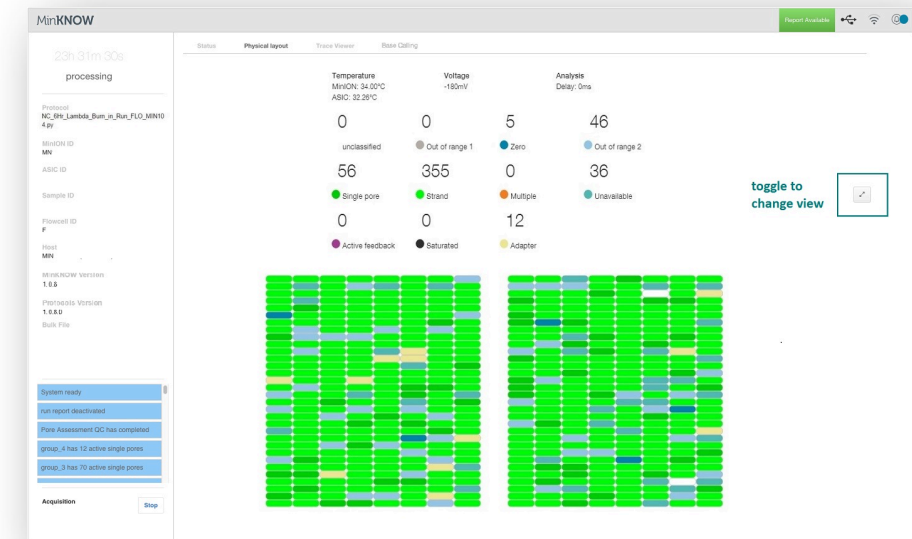
- Sequencing yield overview
 - Events \neq nucleotides
- Per event ~ 1.7 (R9 Flow cells)
nucleotides pass through one pore



Source: <https://community.nanoporetech.com>

MinION – Physical Layout Widget

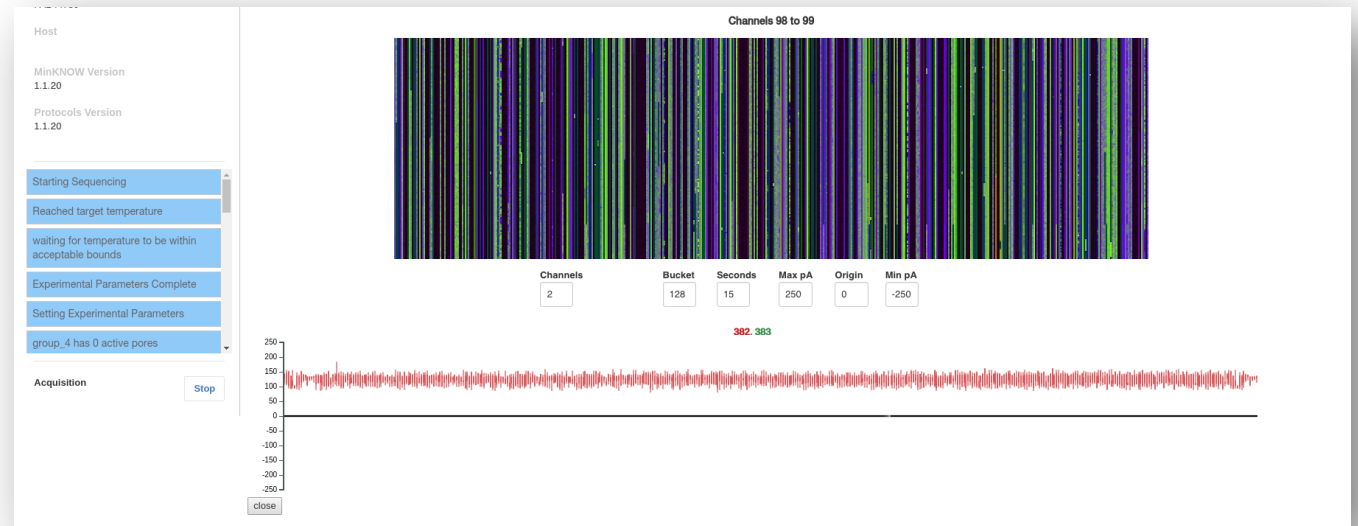
Single pore	Open but empty pore
Strand	DNA translocating through pore, i.e., sequencing
Adapter	Pore sequencing unligated adapter oligo
Multiple	The current levels indicate that more than one pore is active
Active feedback	The current is flicked, e.g., to remove a stalled strand
Saturated	Current outside detector range and channel is switched of and won't be used for sequencing anymore



Source: <https://community.nanoporetech.com>

MinION – Trace Viewer Widget

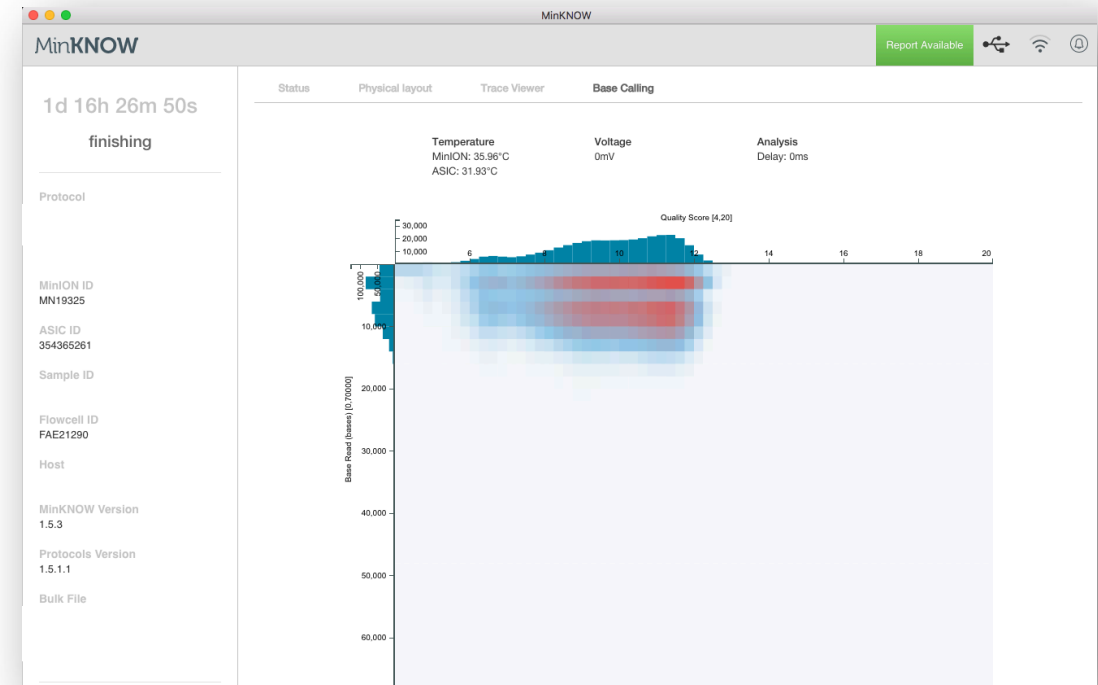
- Visualisation of channels
- Each channel is represented by one pixel in waterfall plot



Source: <https://community.nanoporetech.com>

MinION – Base Calling Widget

- Overview over local base calling
- Plot showing quality score of base-called reads in relation to read length



Source: <https://community.nanoporetech.com>

Questions?