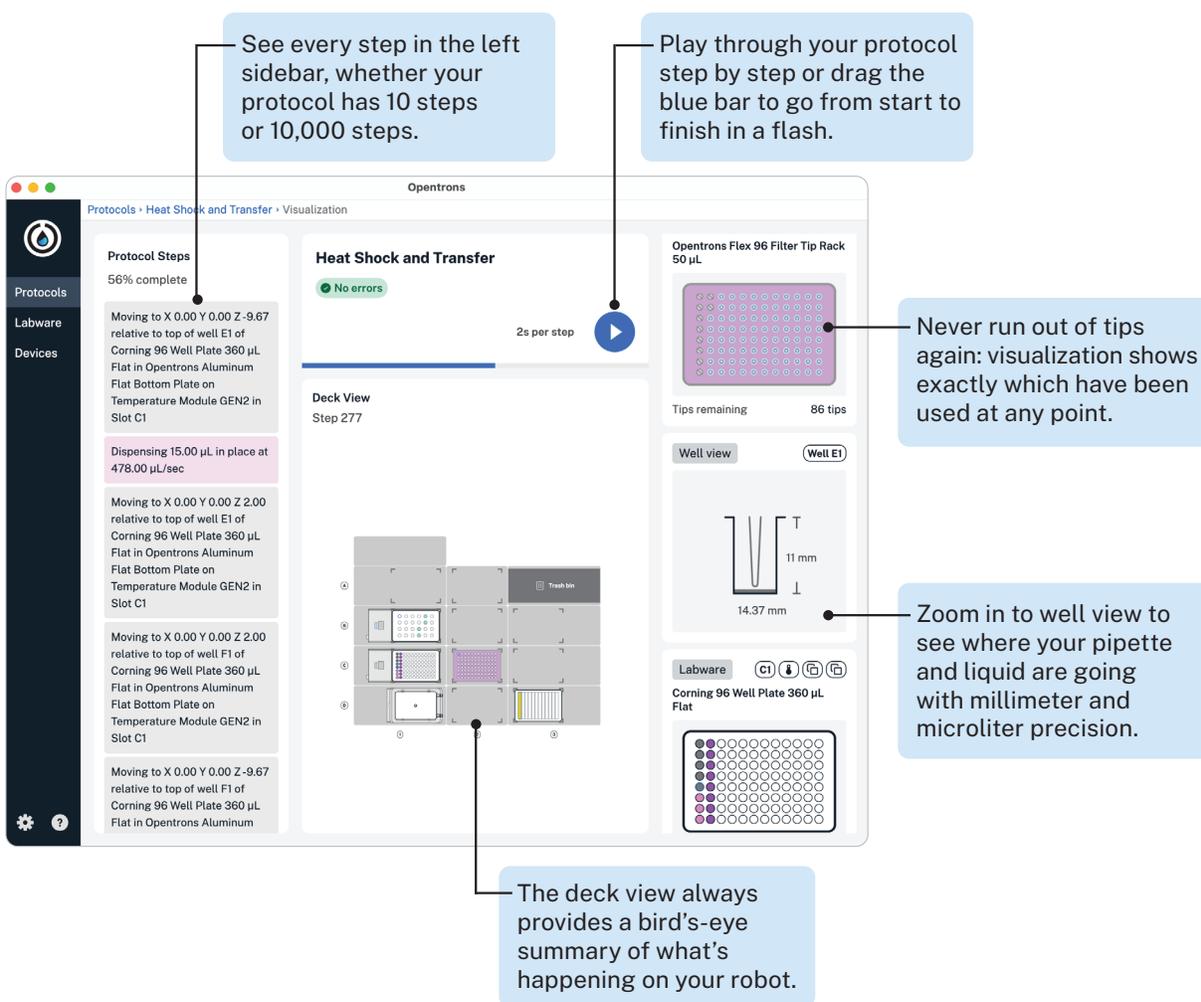# Protocol Visualization for Opentrons Flex®

Protocol Visualization works with your protocol development workflow. Whether you use OpentronsAI to generate rapid prototypes, implement complex logic in our Python Protocol API, or build with the Protocol Designer web app, your protocol is ready to view in detail. Visualization lets you iterate quickly on your protocol during development, and confirm its behavior when you're ready to run it on your Flex robot.

See every step in the left sidebar, whether your protocol has 10 steps or 10,000 steps.

Play through your protocol step by step or drag the blue bar to go from start to finish in a flash.

Never run out of tips again: visualization shows exactly which have been used at any point.

Zoom in to well view to see where your pipette and liquid are going with millimeter and microliter precision.

The deck view always provides a bird's-eye summary of what's happening on your robot.

Key features

- **Rapid prototype:** Instantly inspect protocols created with OpentronsAI, simply by dragging them into the app and clicking "Visualize".
- **Dynamic preview:** Watch liquid levels, labware positions, module status, and pipette movements throughout your protocol.
- **Visualize offline:** All you need to run visualization is a protocol file and the Opentrons App. Preview your protocols on the go or while your robot is busy.
- **Troubleshoot errors:** Visualization lets you see all of the successful steps up to an error, so you can figure out what went wrong and fix it quickly.

Slot Spotlight

Click any Flex deck slot to see more detail in the separate Slot Spotlight window. The Slot Spotlight updates in real time as you navigate your protocol in the main window. Use Slot Spotlight to see how quickly tips are used, changes in module temperature, or sample volume in a well plate.
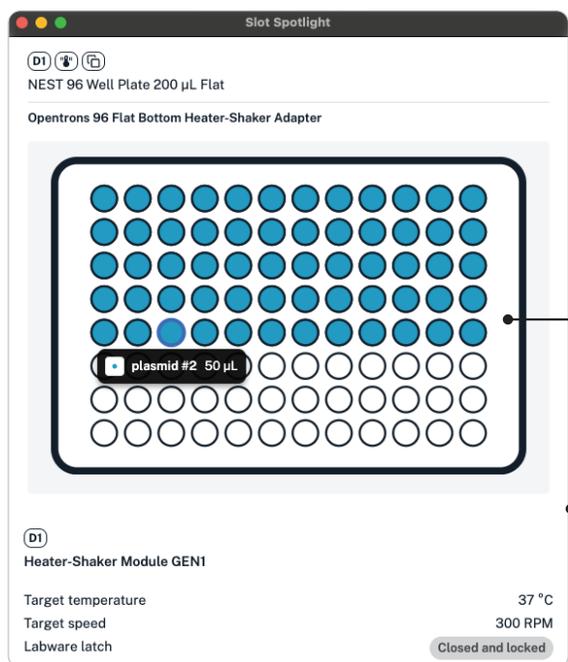
D1 ⏱ ⧉
NEST 96 Well Plate 200 µL Flat

Opentrons 96 Flat Bottom Heater-Shaker Adapter

plasmid #2 50 µL

Click individual wells to monitor liquid changes in microliter detail.

Open a new window to view continuous changes to module status and loaded labware.

D1
Heater-Shaker Module GEN1

Target temperature	37 °C
Target speed	300 RPM
Labware latch	Closed and locked

Specifications

Robot compatibility	Opentrons Flex
App compatibility	Version 9.0.0 and later
Authorship tool compatibility	• OpentronsAI • Protocol Designer 8.8.0 and later • Python API 2.16 and later
Visualized actions	• Pipette tip movement, pick up, and disposal • Liquid handling • Labware movement • Module status
Module support	Visualize actions for these Opentrons modules: • Absorbance Plate Reader • Flex Stacker • Heater-Shaker • Temperature Module • Thermocycler
Runtime parameters	Flex supports changing protocol behavior for each run with user-defined parameters. • Default parameter values available offline • Connect to a robot to visualize custom parameter values