06 Classroom lab

AT A GLANCE

For	Teaching with several boxes, or with none: sensor curves, controller checks, graded exercises, scripting.
You need	The Companion on each bench computer, or one computer with several boxes on USB. No boxes yet: the mock boxes.
Try it	Two benches simulating a Pt100 at body temperature, in Python, with mock boxes:

```
from ohmstar import Box, MockBox

benches = [Box(MockBox("ohmSTAR")), Box(MockBox("ohmSTAR+"))]
for n, box in enumerate(benches, 1):
    sent = box.set_sensor("pt100", 37)
    print(f"Bench {n}: {box.model} set to {sent.ohms} ohms")
    box.close()
Bench 1: ohmSTAR set to 114.4 ohms
Bench 2: ohmSTAR+ set to 114.38 ohms
```

Lab layouts

Layout	Use
One box and computer per bench	The Companion. In Settings pick a preset: **Just the box** (connect, set, console) or **Standard** (adds Sensor library, Temperature to ohms, Custom tables).
Several boxes on one computer	**Multiple boxes** page: add each by serial port; **Set** each or **Set all**. Or a Python loop, one `Box.connect("COM4")` per port.
Students without a box	**Mock ohmSTAR** / **Mock ohmSTAR+** in the app, `--mock` in the tool, `MockBox` in Python.
Instructor computer driving bench computers	HTTP API on each bench with **Allow other computers on the network** ticked; one token per bench (chapter 03).

Multiple boxes page

Add	**Serial port** and add, or a mock ohmSTAR / ohmSTAR+
Each box shows	Model, firmware, USB serial, last value sent; its own value and **Set**; **Remove**
Set all	One value to every box. A box with a table active is marked: it read the number in table units.
Told apart by	Port, because some units share a USB serial number
Device page box	Has its own connection; not in this list

Values are checked per model: `100.05` becomes 100.1 Ω on an ohmSTAR and stays 100.05 Ω on an ohmSTAR+.

Exercises and where they live

Topic	App feature
RTD and thermistor curves	Sensor library plots; Temperature to ohms
Controller or thermostat check	Sequences: a step per set point, Pass/Fail with the reading
Strain gauge	Sweeps, Strain gauge mode: R0, gauge factor, leads, με
Thermal cycling, ramps	Sweeps: Cycles (triangle, sine), Ramp
Sensor tables on the box	Custom tables, Send to box; then `table` at the box
Instrument scripting	Chapters 02 to 04, with mock boxes

Graded runs

1. Instructor: **Sequences and reports**, new sequence, one step per check (resistance or sensor value, label, what to check). Copy the `.ohmseq` file to each bench's `Documents/ohmSTAR Companion/Sequences`.

2. Student: run it with **Unit under test** and **Operator** filled in; mark each step Pass, Fail or Skip, typing the reading and a note.
3. Hand in **Save PDF** or **Save CSV**. Every run is also kept in `Reports`, and every value sent is in the day's CSV log.

Safe defaults for a class

- **Set `I set` on each box** to the student circuit's voltage before class. 1 W rating.
- **Calibration bench is off** until switched on in Settings. Python, the HTTP API and AI can't reach calibration.
- **At the box,** menu 3 starts calibration and Factory Reset replaces it. Brief students.
- **To stop table writes from the app,** switch off Table upload and download and the Command-line tool. The console still takes raw commands, after a warning.

AI in class

- Use a model on the computer (Ollama, LM Studio, llama.cpp server, vLLM): nothing leaves it.
- The assistant asks before every change to the box and can't reach calibration, firmware or raw commands.
- Sweeps, sequences, the HTTP API and AI work on the box connected on the Device page.