02 Command line

AT A GLANCE

For	Setting values from a terminal or script, and the box's own serial commands.
You need	Node.js 20 or newer and the `ohmstar` tool (`ohmstar.mjs`; not in the app installer: [tool download link]). Or no install at all: the **Command-line tool** page in the Companion.
Try it	No box needed with `--mock-plus`:

```
$ ohmstar set 138.505 --mock-plus
Set 138.51 Ω on the mock ohmSTAR+.
Rounded 138.505 Ω to 138.51 Ω, the nearest step the ohmSTAR+ can make.
The box cannot report its output, so check that its LCD shows 138.51.
This was the built-in mock box, so no real box changed.
```

`ohmstar` below means `node ohmstar.mjs`. The tool and the app can't share a box: press **Disconnect** in the app first. Ports: FTDI only (USB `0403:6001`, `6014`, `6015`); none or several found, the tool lists them and you add `--port`. macOS: `/dev/cu.*`, not `/dev/tty.*`. Linux: the `dialout` group (`uucp` on Arch).

Commands

Command	What it does	Example
`list`	Serial ports that could be a box. Sends nothing.	`ohmstar list`
`info`	Model, firmware, port, USB serial.	`ohmstar info`
`set <value>`	Set the resistance. Checked first; rounding reported.	`ohmstar set 1.5M`
`temp <sensor> <value> [--unit C|F]`	Resistance a sensor has at a value. Strain and position sensors take με and %. Says which sensor it picked.	`ohmstar temp pt100 77 --unit F`
`sensors [search]`	Search the 128-curve library. No box needed.	`ohmstar sensors "10k ntc"`
`table read <slot> [--file f]`	Read user table 1–9; save as a table file.	`ohmstar table read 3 --file t.txt`
`send <line> [--yes]`	One line of the box's serial commands. Anything that changes the box needs `--yes`.	`ohmstar send t,1,2`

Option	Meaning	Exit code	Meaning
`--port PORT`	Use this port. Default: the one FTDI port found.	`0`	Worked
`--mock`, `--mock-plus`	Built-in pretend ohmSTAR or ohmSTAR+.	`1`	Failed or refused
`--json` · `--help`, `-h` · `--version`	JSON result · help, also per command · version	`2`	Typed wrongly

```
$ ohmstar set 10k --json --mock
{"ok":true,"model":"ohmSTAR","modelId":"ohmstar","port":null,"mock":true,"requestedOhms":10000,"ohms":1000
0,"rounded":false}
$ ohmstar set 6M --mock-plus                          # exit 1
Nothing was sent. 6 MΩ is out of reach. The ohmSTAR+ goes from 1 Ω to 5 MΩ.
```

In the Companion, the **Command-line tool** page has a command line for the connected box: `set 10k`, `info`, or a raw line such as `r100` or `t,1,2`. `help` lists commands; Up and Down recall lines. A line that changes what the box stores asks you to confirm. No `--file` there.

Serial commands (firmware 6.1)

9600 baud, 8 data bits, no parity, 1 stop bit. End text commands with `\n` or `\r`. Single-byte commands (`R`, `Z`, `[`, `Q`) take no line ending.

Send	What it does	Reply
`r<ohms>`	Set the resistance, e.g. `r5.123`. With a table active, the value is in the table's units.	`y`
`R`	Open the output. Setting a value closes it again.	`y`
`t,0,<x>`	Read calibration value `x`: 0 = R1 … 30 = R31, 31 = residual.	`t,0,x,value`
`t,0`	Read all 32 calibration values.	One line each
`T,0,<x>,<value>,DO`	**Write a calibration value.** `DO` guards against accidents. Write 0–30, then 31, with no `r` between. Writing 31 reloads settings: the output returns to its last saved value.	`y`, or `G` if refused
`T,<n>,0,<name>` / `T,<n>,1,<units>`	Name table `n` (1–9), up to 20 characters / its units, up to 6.	`y`
`T,<n>,2,-1`	**Erase** its points.	`y`
`T,<n>,3,<value>,<ohms>`	Add a point to the end (max 426).	`y`
`t,<n>,<p>` / `t,<n>`	Read part of a table (`p` 0 name, 1 units, 3+ points) / the whole table.	`t,n,p,value`
`Z` / `[`	Model / firmware version. One byte back: `0x3D` ohmSTAR, `0x33` ohmSTAR+ / `0x61` = 6.1.	One byte
`Q` + one raw byte	One ladder resistor in circuit, 1–31, or 0 for the residual. For calibration. Display unchanged.	`y`
`X7`	Restart. On USB the link drops for about 1 s.	`y`

Rules

- **One command, then wait for the reply.** The buffer is small; overflow is lost silently.
- `y` **means received.** For `r` it doesn't mean accepted: check values first. For `T`, `G` means refused.
- **The reply comes after the last relay pulse** (slowest seen: 300 ms). Let contacts settle before measuring.
- `G`: not understood, or a command arrived in pieces more than 5 s apart.
- **Numbers come back with at most 3 decimals,** fewer for large values, cut off, not rounded.
- **Digit limits.** Largest value with 0 decimals: 268,435,455; 1: 26,843,545.5; 2: 2,684,354.55; 3: 268,435.455; 4: 26,843.5455. Over that, a value silently becomes another number: `r1000000.000` sets about 194,694 Ω; send `r1000000`. Same for table points and calibration values.

Table file example:

```
PRTD_100_385_C
3
0     100
10    103.9
```

```
> Z          < 3     (0x33, an ohmSTAR+)
> r1000      < y
> t,0,31     < t,0,31,0.596
```

> **A bad `r` can put a near-short on your circuit.** `rabc`, empty `r`, `r0` and `r-5` all go to the residual, and the box still answers `y`. Parsing stops at the first bad character: `r10k` sets 10 Ω.

Loading a table

1. At the box, choose no table: `table` `0`.
2. Send `T,n,2,-1`, then the name, units and each point.
3. Read back with `t,n` in the same session. After a power-up `t,n,2` can say 0 although the points are stored.

Table file format

Line 1: name, up to 20 characters. Line 2: decimals shown, 0–5. Then value and ohms in full (no K or M), split by spaces, tabs or commas. Each column only rises or only falls. Comments may follow the numbers. Used by `table read --file`, Python and Custom tables.