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# eONE Family (Gen 2)

eONE Light (Gen2) Product Code 003703

eONE Plus (Gen2) Product Code 003704

eONE HC (Gen2) Product Code 003705

eONE ULN (Gen2) Product Code 003706

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# Revision History

| Date | Version | Description |
|---|---|---|
| 2026-06-11 | 1.0 | First version of document |

# Acronyms

**eONE**: Elements single channel amplifier family.

**eONE Light (Gen 2)**: Elements single channel amplifier, Light version, 2nd generation.

**eONE Plus (Gen 2)**: Elements single channel amplifier, Plus version, 2nd generation.

**eONE HC (Gen 2)**: Elements single channel amplifier, High Current version, 2nd generation.

**eONE ULN (Gen 2)**: Elements single channel amplifier, Ultra Low Noise version, 2nd generation.

**BLM**: bi-layer membrane – A membrane composed of 2 layers of phospholipids as happens in cell membranes.

**SSN**: solid-state nanopore – A nanometric pore obtained on a solid scaffold, typically made of glass or silicon, used to detect the passage of molecules in a buffer.

**DUT**: device under test – the device connected to the amplifiers input, usually a flow cell with a BLM or an SSN, but it can also be a model cell with resistors and / or capacitors.

**GND**: ground – the potential of the Faraday cage.

**Vc**: Voltage command – the stimulus applied by the user via the software interface.

**Vcm**: Voltage common mode – the neutral potential of the amplifier.

**IN**: input pin.

**REF**: reference pin – the DUT is typically a bi-pole connected between IN and REF. By convention the Vc is the difference of potential between IN and REF, and the measured current is positive when exiting IN and entering REF.

**EMI**: electro-magnetic interference – Environmental noise affecting the measurements.

# 1. Introduction

This document provides installation, setup, and operating instructions for the eONE (Gen 2) amplifiers. It is intended for qualified technical personnel familiar with laboratory equipment.

The eONE Light, Plus and ULN amplifiers are low-noise electrophysiology current amplifiers designed for the measurement of ionic currents across artificial lipid bilayers containing ion channels, nanopores, or other pore-forming proteins. Their primary function is to detect, amplify, and record very small electrical currents, in the fA - nA range, generated by the transport of ions through pore forming proteins. On the other hand, the eONE HC amplifier is meant to measure higher currents (pA - µA range), typically generated by single molecule events in SSN experiments.

## 1.1 Intended Use

They are intended for research applications involving the measurement and analysis of ionic currents through ion channels and pore-forming proteins reconstituted in artificial lipid bilayers, and ionic currents through an SSN. They are used to support electrophysiological studies aimed at investigating membrane transport mechanisms, channel kinetics, pore properties, and biomolecular interactions at the single-molecule level. The target environment are research laboratories, biotechnology companies, pharmaceutical research facilities, and other scientific institutions conducting electrophysiology, biophysics, nanobiotechnology, or related life science research. The amplifiers are designed to be operated by researchers and technical personnel.

## 1.2 System Requirements

### Minimum

- Operating System: Windows 10/11 (64-bit)
- CPU: Dual core 2.0 GHz
- RAM: 4 GB
- Available disk space: 1 GB
- Ports: USB 2.0 port or above
- Display: 1366 x 768

### Recommended

- CPU: Quad core 2.6 GHz
- RAM: 8 GB
- Display: 1920 x 1080

# 2. Technical Specifications

The tables below list the key technical specifications of the eONE (Gen 2) amplifiers.

| Parameter | Value | Unit |
|---|---|---|
| Clamping modalities | Voltage clamp | |
| Channels | 1 | |
| ADC ranges | ±200<br>±20 | pA<br>nA |
| ADC bit-depth | 16 | bits |
| Maximum sampling rate | 200 | ksps |
| Maximum bandwidth | 100 | kHz |
| Stimulus range | ±500 | mV |
| Stimulus resolution | 100 | µV |
| Stimulus bandwidth | 0.1<br>10 | kHz<br>kHz |

*Table 1 — eONE Light (Gen 2) technical specifications*

| Parameter | Value | Unit |
|---|---|---|
| Clamping modalities | Voltage clamp | |
| Channels | 1 | |
| ADC ranges | ±200<br>±2<br>±20<br>±200 | pA<br>nA<br>nA<br>nA |
| ADC bit-depth | 16 | bits |
| Maximum sampling rate | 200 | ksps |
| Maximum bandwidth | 100 | kHz |
| Stimulus range | ±2000 | mV |
| Stimulus resolution | 62.5 | µV |
| Stimulus bandwidth | 3<br>180 | Hz<br>kHz |

*Table 2 — eONE Plus (Gen 2) technical specifications*

| Parameter | Value | Unit |
|---|---|---|
| Clamping modalities | Voltage clamp | |
| Channels | 1 | |
| ADC ranges | ±20<br>±200<br>±2<br>±20 | nA<br>nA<br>µA<br>µA |
| ADC bit-depth | 16 | bits |
| Maximum sampling rate | 200 | ksps |
| Maximum bandwidth | 100 | kHz |
| Stimulus range | ±2000 | mV |
| Stimulus resolution | 62.5 | µV |
| Stimulus bandwidth | 3<br>180 | Hz<br>kHz |

*Table 3 — eONE HC (Gen 2) technical specifications*

| Parameter | Value | Unit |
|---|---|---|
| Clamping modalities | Voltage clamp | |
| Channels | 1 | |
| ADC ranges | ±200<br>±2<br>±20<br>±200 | pA<br>nA<br>nA<br>nA |
| ADC bit-depth | 16 | bits |
| Maximum sampling rate | 200 | ksps |
| Maximum bandwidth | 100 | kHz |
| Stimulus range | ±700 | mV |
| Stimulus resolution | 100 | µV |
| Stimulus bandwidth | 0.1<br>10 | kHz<br>kHz |

*Table 4 — eONE ULN (Gen 2) technical specifications*

## 2.1 Simplified schematics

The figures below show a simplified schematic of the eONE (Gen2) amplifiers, aimed at showing the voltages at play and the sign of the measured current and of the applied stimulus.

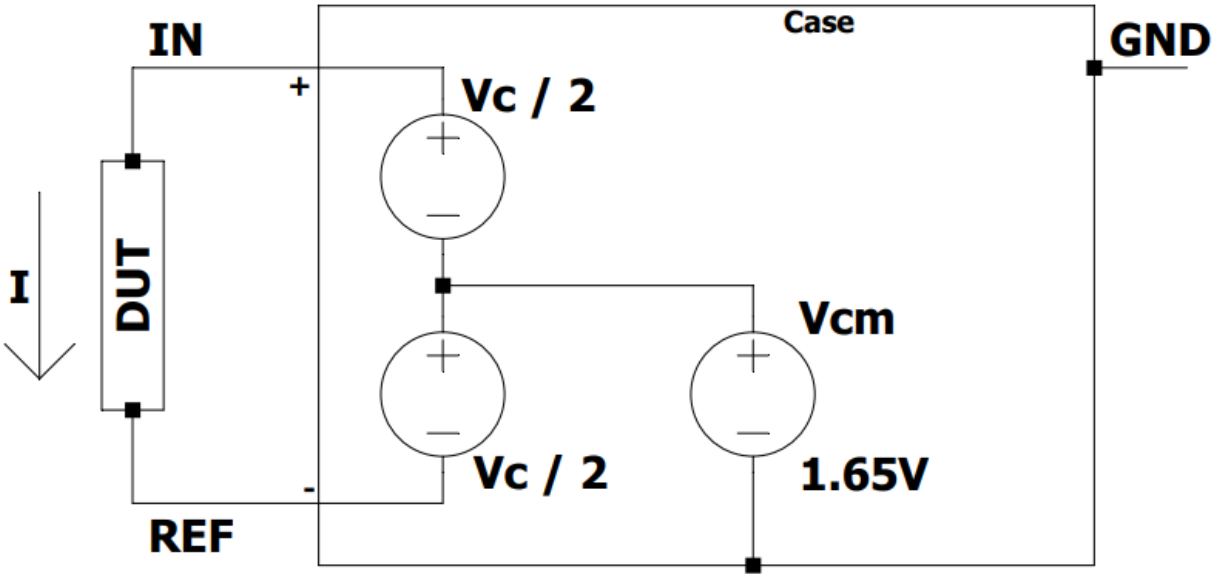


*Figure 1 — eONE Light (Gen 2) simplified schematic*

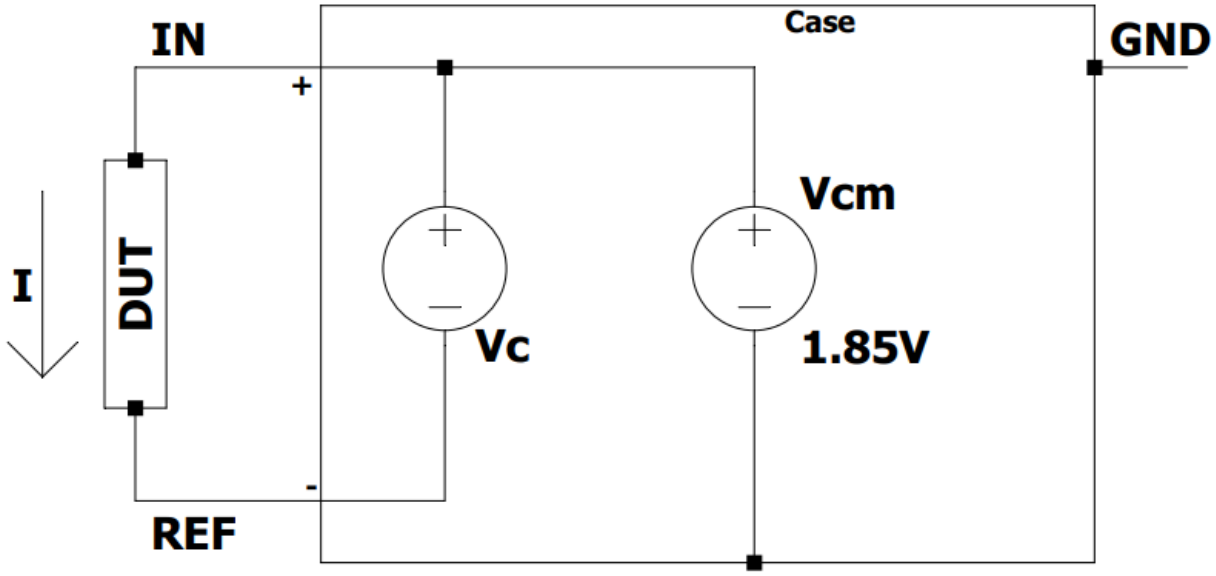


*Figure 2 — eONE Plus (Gen 2) simplified schematic*

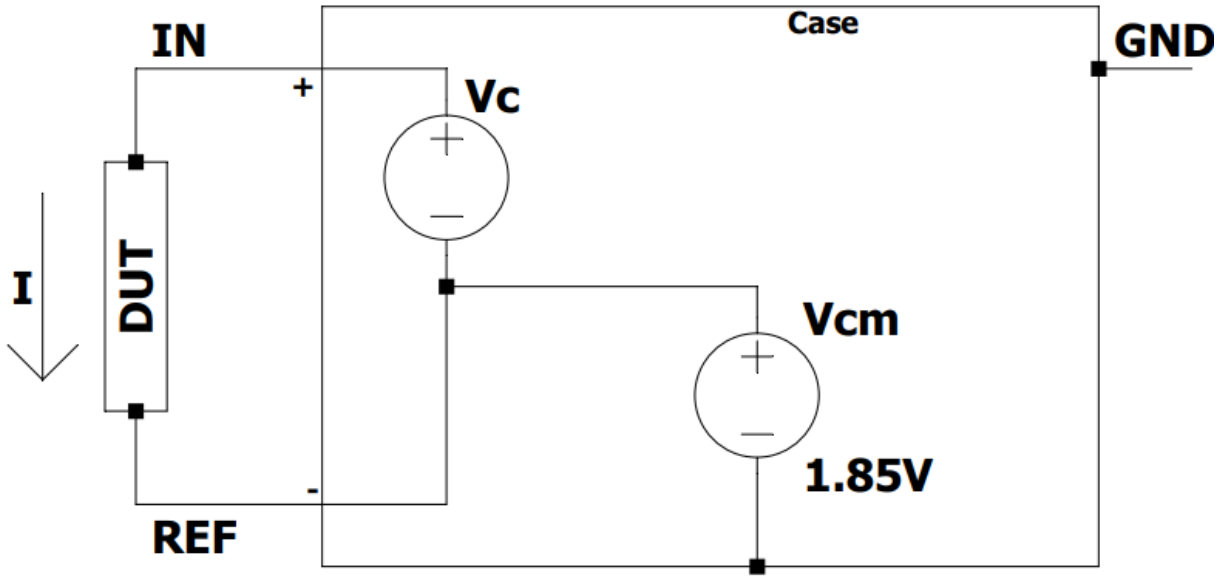


*Figure 3 — eONE HC (Gen 2) simplified schematic*

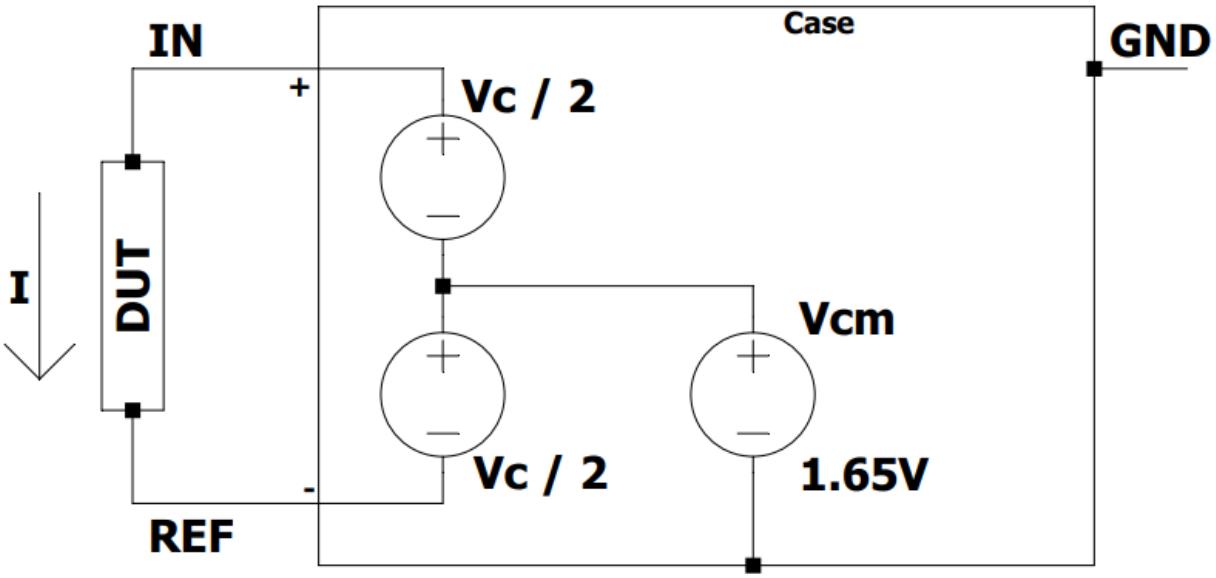


*Figure 4 — eONE ULN (Gen 2) simplified schematic*

# 3. Instructions for Use

This chapter shows how to correctly set up and operate the eONE (Gen 2) amplifiers.

## 3.1 Amplifier's views and connections

All eONE (Gen 2) amplifiers have the same case and come with the same cables and wires.

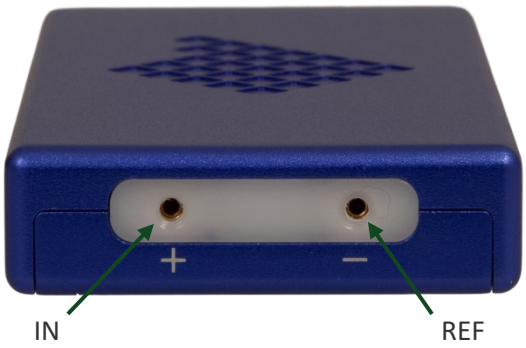


*Figure 5 — eONE (Gen 2) front view*

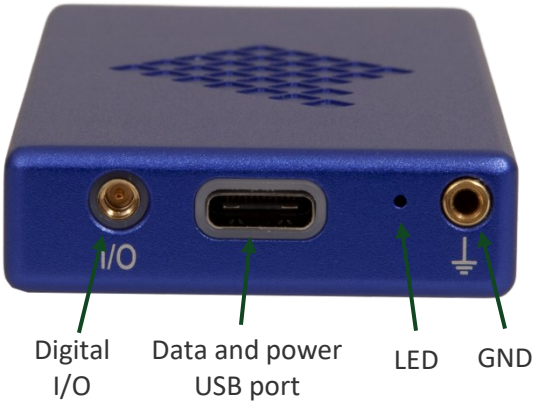


*Figure 6 — eONE (Gen 2) rear view*

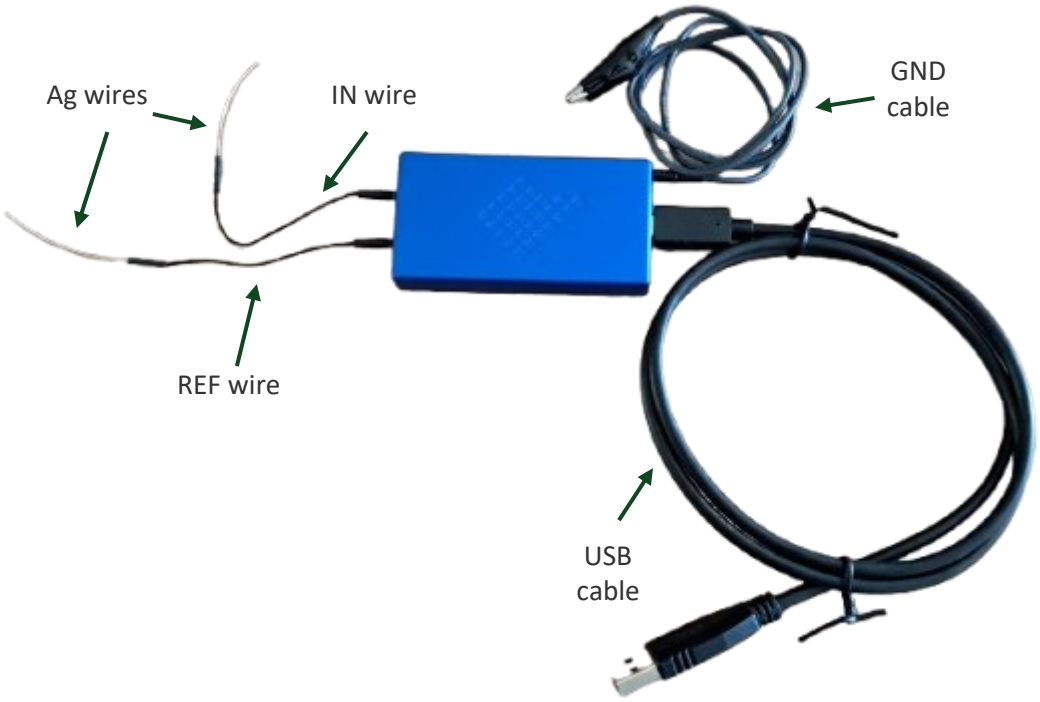


*Figure 7 — eONE (Gen 2) cables and wires connections*

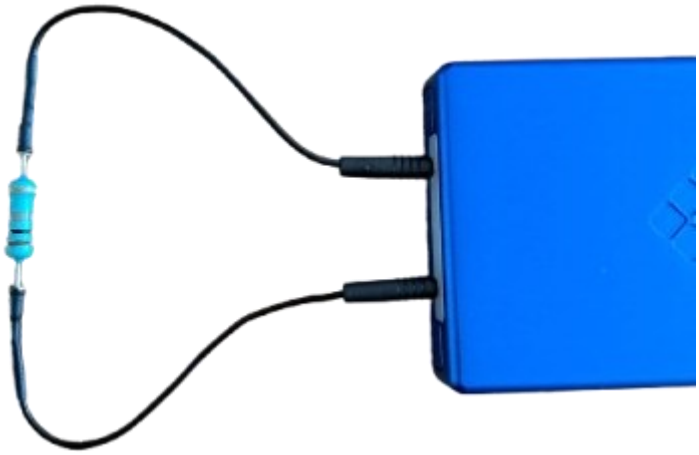

*Figure 8 — eONE (Gen 2) how to connect the model cell*

## 3.2 Setup

> **IMPORTANT NOTE:** Observe precautions for handling electrostatic sensitive devices. Check the *ESD Handling Guidelines for Elements Amplifiers* for detailed information: https://elements-ic.com/eone-single-channel-amplifier/#howto

1. Remove the device from packaging and inspect for damage.
2. Download EDR4 from Elements website: https://elements-ic.com/downloads/
3. Install EDR4 and check the *EDR4 Troubleshooting guide* in case of installation issues: https://elements-ic.com/edr4/#howto

4. Connect the USB cable to the amplifier and to the computer.
5. Launch the software and verify that the device's serial number is shown near the *Connect* button.

## 3.3 Best Practices

- Keep the wiring between the amplifier and the DUT as short as possible to minimise noise.
- Connect the GND cable to a metallic Faraday cage. Ensure the Faraday cage is closed and properly connected to the GND plug.

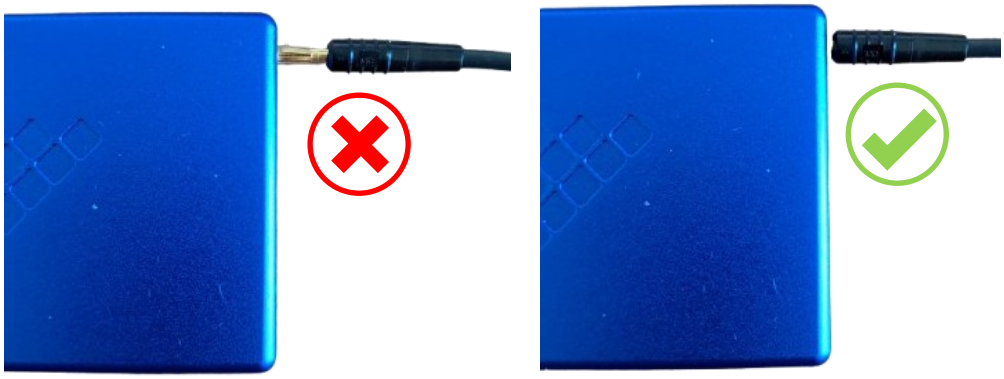

*Figure 9 — Proper connection of GND cable*

- Remove unused instruments from within the Faraday cage during measurements.
- If additional instruments have to stay in the Faraday cage power them from the same outlet used to power the computer that controls the amplifier, to avoid ground loops. A battery powered laptop is fine as well.
- Connect the amplifier's USB cable to a direct USB port rather than a USB hub if possible.

# 4. Contacts & Support

For technical support, product information, or to report an issue, contact the Elements team using the details below.

## Technical Support

**Email:** support@elements-ic.com

**Website:** www.elements-ic.com

## Company Information

**Elements S.r.l.**

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