**Datasheet**

Qosain Scientific I, V and R Probes

Introduction:

The I, V, and R Probes are highly adaptable, plug and play modules to measure current, voltage, and resistance, respectively. Each probe hosts a banana socket which can accept several kinds of connectors to interface with other equipment and circuits.

Features:

- Intuitive and wizard guided configuration
- PhysInstruments class: Analog
- Banana socket
- Hot pluggable

- ive   + ive
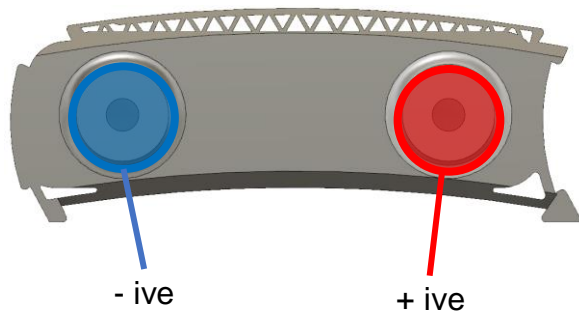
Specifications:

- I Probe
    - Ranges: ± 10 A, ± 1 A, ± 10 mA
    - Resolution: 0.05% of full scale range
    - Measurement method: in-circuit series connection
- V Probe
    - The voltage resolutions and ranges are determined by PhysLogger. (Commonly available ranges: ± 10 V, ± 1 V, ± 10 mV)
    - Optical isolation: None

- R Probe
    - Range: 50 kΩ
    - Resolution: 0.1% of full-scale range
    - Uncertainty: ± 5% Measure method: Potential divider

Typical Applications

- Explore Ohm's law
- RC circuit calculations
- Model the response of a thermistor
- Investigate Maxwell's equation
- Investigate laws of electromagnetism
- Monitor electrochemical reactions
- Measure the conversion of sunlight to

Power LED   USB-C Receptacle
(Continuously On)
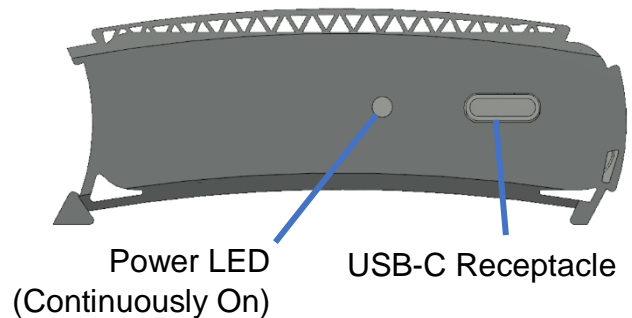
electricity in your solar cells

Transfer Functions:

- I Probe:
    - $V_{output} = 0.1 \, I_{Input}$
- V Probe:
    - $V_{output} = V_{Input}$
- R Probe:
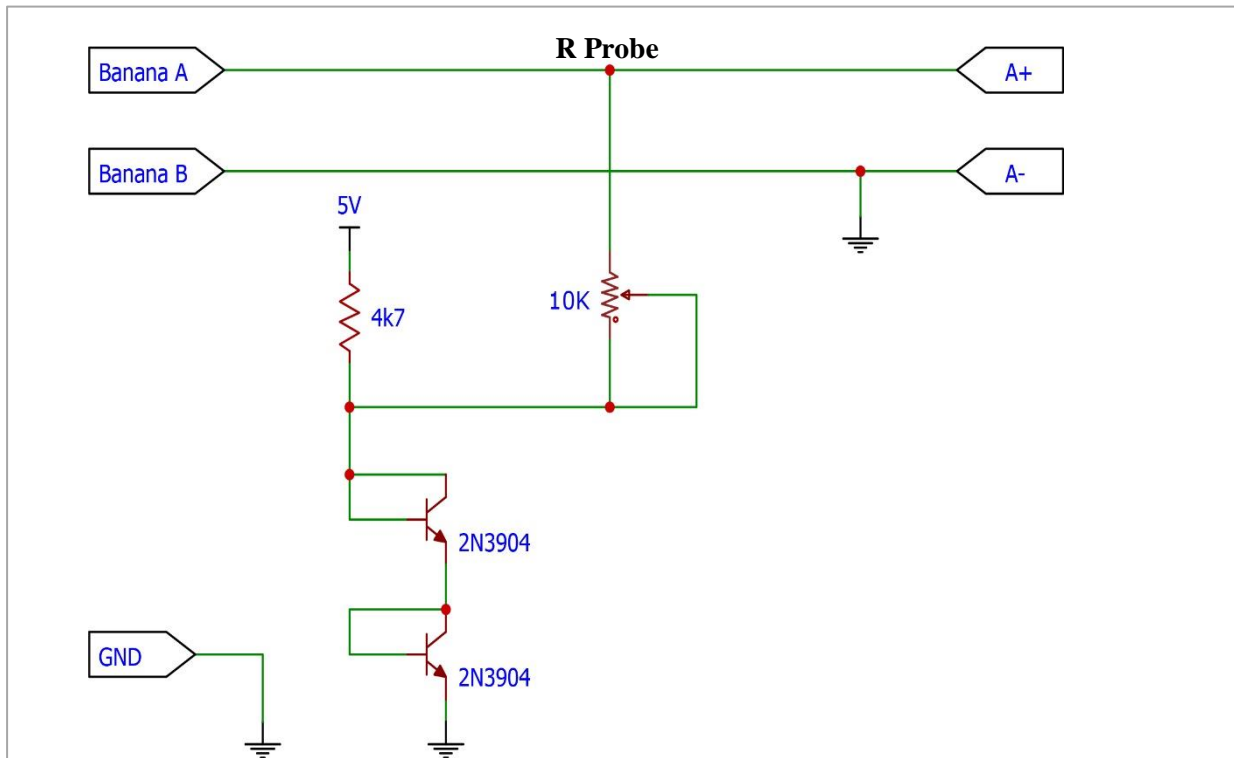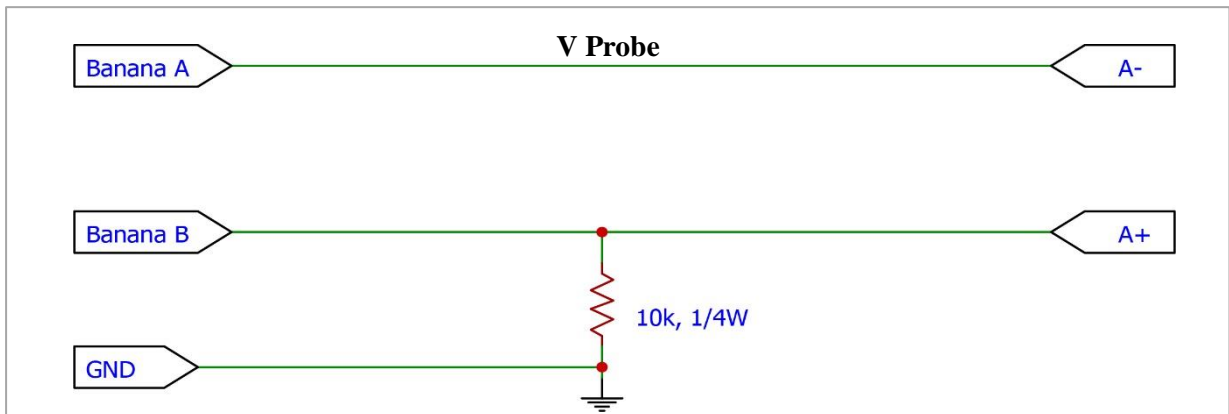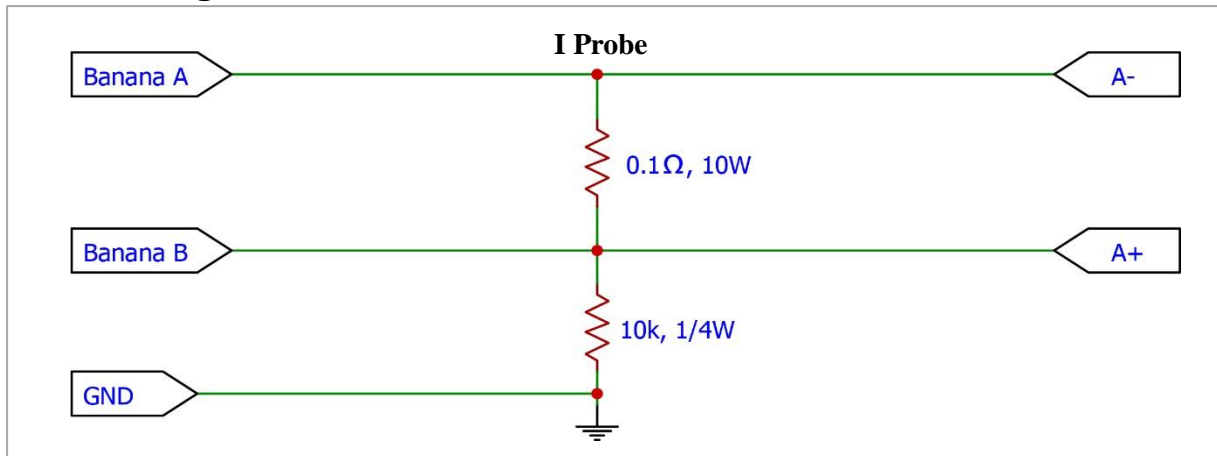   - $V_{output} = \frac{1.24R}{7500+R}$

Resources

- Instrument URL: www.physlogger.com/I,_V_and_R_Probes.html
- Discussion: community.physlogger.com/c/physinstruments/v-r-probe/13

Circuit Diagrams:

I Probe

Banana A ——————————————●——————————————— A-

0.1Ω, 10W

Banana B ——————————————●——————————————— A+

10k, 1/4W

GND ——————————————●

V Probe

Banana A ——————————————————————————————— A-

Banana B ——————————————●——————————————— A+

10k, 1/4W

GND ——————————————●

R Probe

Banana A ——————————————●——————————————— A+

Banana B ——————————————————————●——————— A-

5V

4k7

10K

2N3904

2N3904

GND

Software Block Diagrams:

I Probe

$I\ (In\ amperes) = 10\ x\ Voltage$

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┌─────────────────────────┐
│  Voltage Input Quantity │
│                         │
│    Gain and range:      │         ┌─ A
│                         │────────►│      ╲
│   ±1V => ±10A           │         │  AxB  ╲──────►  Current (A)
│                         │         │      ╱
│   ±100mV => ±1A         │    ┌────►└─ B  ╱
└─────────────────────────┘    │
                               │
        ┌──────────┐           │
        │    10    │───────────┘
        └──────────┘
```
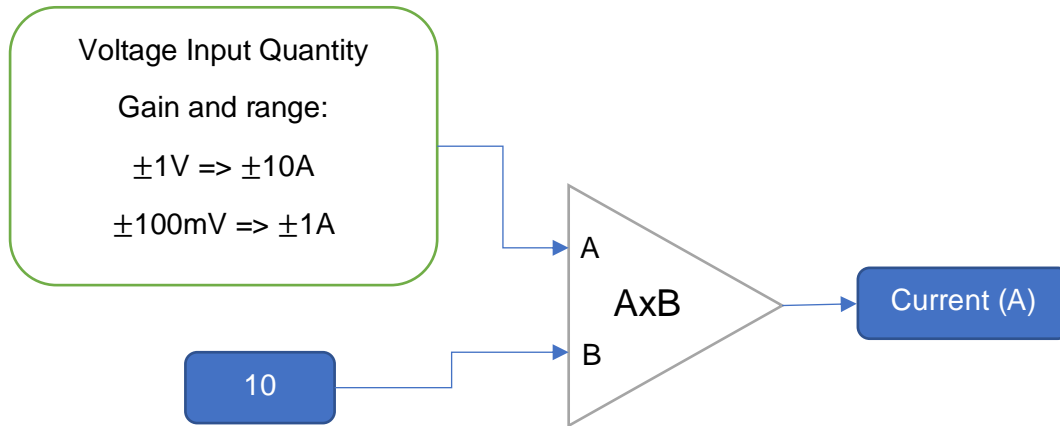
R Probe

$$R \ (\Omega) = \frac{7500[V]}{1.24-[V]}$$
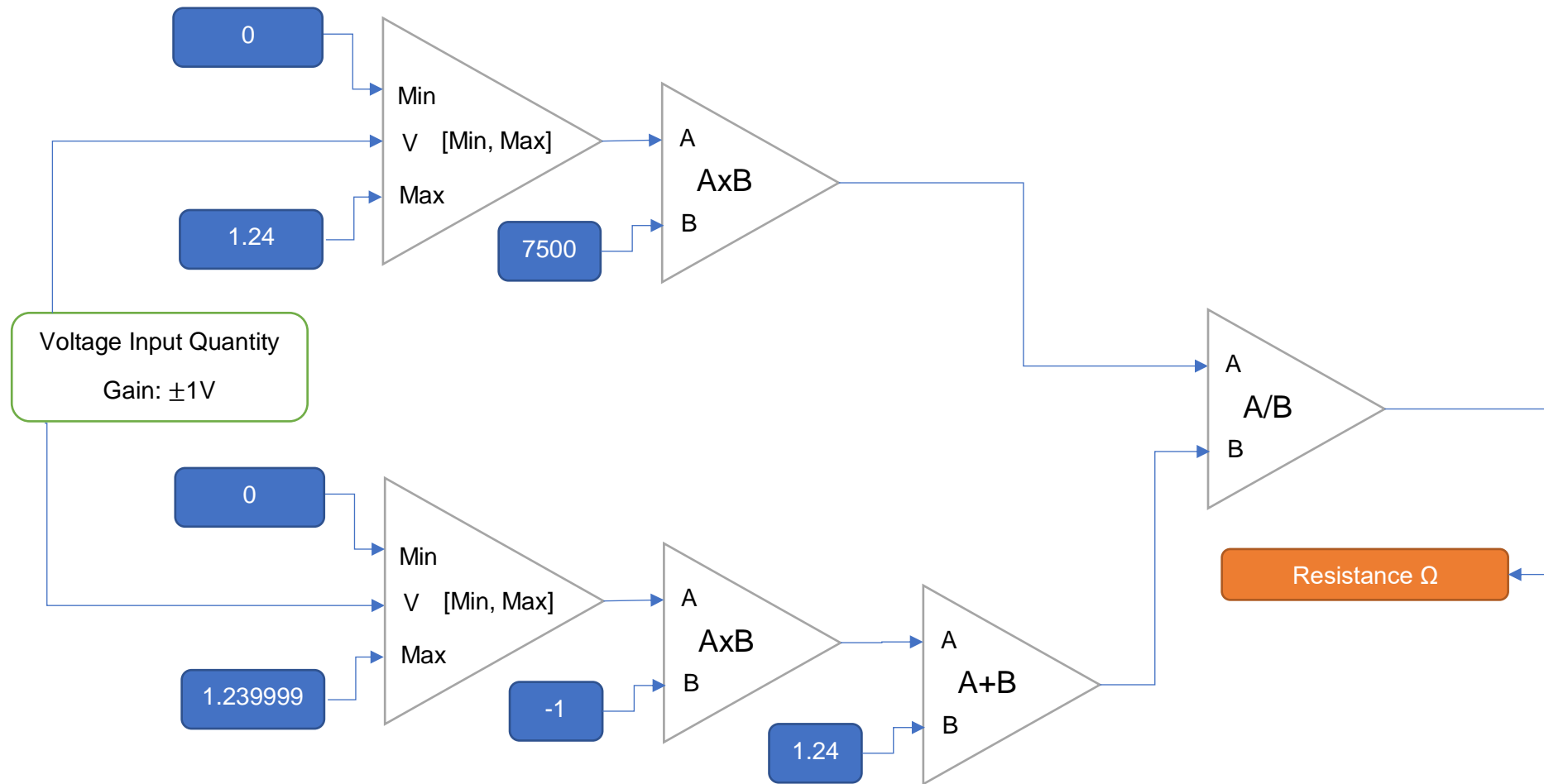
Complete Circuit Diagrams:

I Probe

5V

5V

Banana A — A-

0.1Ω, 10W

Banana B — A+

10k, 1/4W

GND

5V

1K

Red LED

V Probe

5V

5V

Banana A — A-

Banana B — A+

10k, 1/4W

GND

5V

1K

Red LED