

# Current Probe

## Quick Start Guide



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## What is in the box

In the box you will find the Current Probe and all accessories to connect it to an oscilloscope.



### Box content checklist

Quantity	Description		Identifier [1]
1	Current Probe 1		
1	Amplifier: - low-noise amplifier, HD24248  Power jack female, BNC signal jacks.		
1	Power Supply Unit, 12V DC input 100 – 240 V AC, 50 .. 60 Hz		PSU
-	Power cord (included with PSU)	 Country specific	
1	Current Probe input cable: - 3 wires (white, blue, shielding) to 3-pin shielded input plug (female)		CPINP
1	Current Probe output cable: - BNC to SMB, 50 $\Omega$ , coaxial		CPOUT
-	This “Current Probe - Quick Start Guide”		

[1] Identifier is referenced by this document only.

## **Manufactured by**

Riscure BV

Delftechpark 49, 2628 XJ Delft, The Netherlands

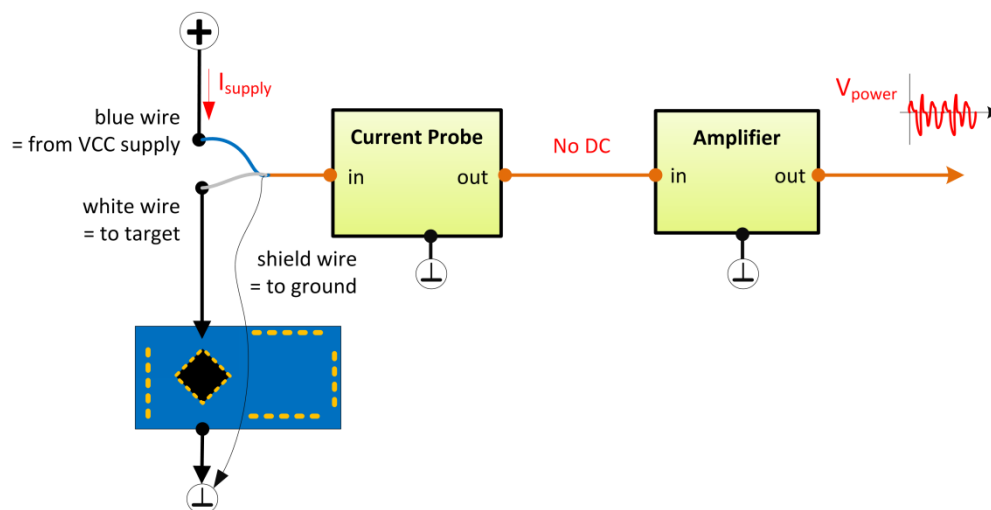
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## What does it do

The Current Probe is a passive, high frequency pick-up device for electric currents. It is used in Side Channel Analysis (SCA) to measure the power consumption of a target with great sensitivity.



*Figure 1 The Current Probe used to pick up a power consumption signal.*

The Current Probe is inserted in the power supply line of a target and is capable of transferring current variations up to 1000 MHz.

When used in combination with the Amplifier, the Current Probe is capable of measuring pA variations.

# How to build a setup

## Overview of the typical setup

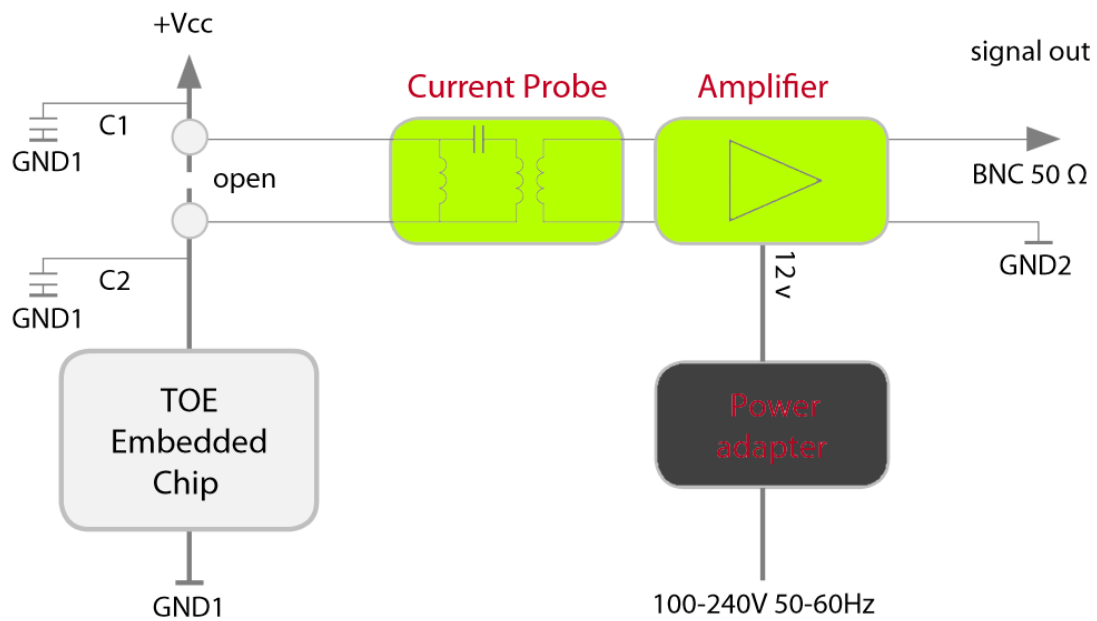


Figure 2 Inserting the Current Probe into the supply line of a target of evaluation.

## Connecting the setup.

### Preparation:

Create a tap point in the VCC supply line to the target chip.



The printed circuit board of the target may have a dedicated jumper block labelled VCC. Remove the jumper and apply jumper headers to the wires of the input cable of the Current Probe.

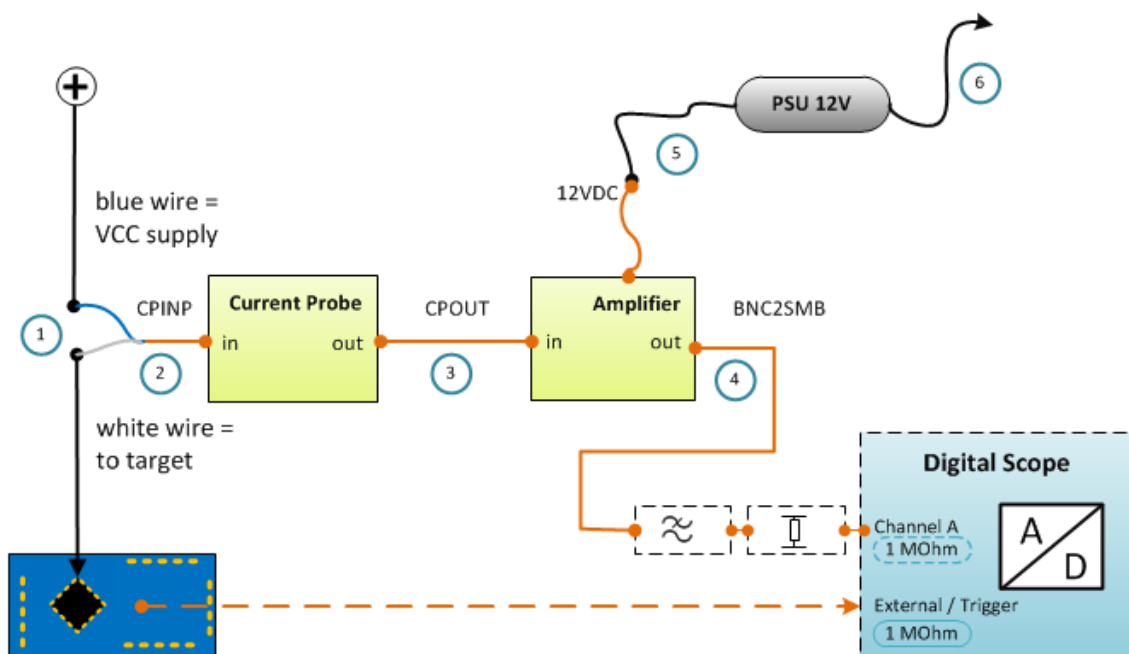


Figure 3 Order of connecting a typical setup using the Current Probe.

### Steps to follow:

1. Connect the **blue and white wires** of the CPINP cable to the tap point.
2. Connect the **CPINP** cable plug to the **In** port of the Current Probe.
3. Connect port **Out** of the Current Probe with cable **CPOUT** to port **In** of the Amplifier.
4. Connect the **Out** port of the Amplifier with cable **BNC2SMB** to input **Channel A** of the oscilloscope.

If your scope channel has a 1 M $\Omega$  impedance, you need to insert a 50  $\Omega$  impedance adapter (not supplied).

Depending your application you may need to insert a certain low-pass filter (not supplied).

5. Connect the **12V plug** from the PSU with the **power supply jack** in the cable of the Amplifier.
6. Plug the PSU into the mains power.

Your setup is ready to start measuring!

# Help and troubleshooting

## Still having questions?

1. The Inspector Help menu, has detailed information on the Current Probe.
2. Visit the Riscure internet support portal: <http://support.riscure.com>.

The support portal allows you to submit questions.



# Technical specifications

## Operational conditions

- Room temperature 20 - 30 °C, (68 – 86 F).



Maintain a stable environmental conditions (temperature, humidity, airflow etc.) in order to reliably repeat tests and compare test results.

## Power supply input

- Current Probe, passive.
- Amplifier, 12 V DC, load typical 20 mA.
- Center-positive plug, inner-Ø 2.5 mm, outer-Ø 5.5 mm.



Use of a PSU other than supplied by Riscure is not supported. Power spikes may cause internal damage and loss of accuracy.

## Current probe

- Bandwidth 1 MHz - 1000 MHz @ 3 dB.
- Transfer function output/input: 25 mV/mA (5 internal windings) @ output load 50  $\Omega$ .
- Max. continuous current 90 mA (RMS) AC.
- Max. pulse current 2.4 A, max. pulse energy  $0.2 \cdot 10^{-6}$  As (Ampere x second).
- For low frequencies DC .. 200 kHz, the input acts as short circuit (60 m $\Omega$  + 10  $\mu$ H).
- For high frequencies > 200 kHz, current fluctuations are picked-up and transferred.
- Output must work into 50  $\Omega$  load.
- Output signal  $\leq$  2.5 V (RMS) @ 90 mA (RMS).

## Amplifier

- Bandwidth 0.1 MHz .. 2500 MHz @ 3 dB.
- Gain 25 dB @ 500 MHz, amplification  $\geq 250$  x
- Low noise 2.4 dB @ 500 MHz.
- Output must work into 50  $\Omega$  load.

## Product case Current Probe

- Dimensions L x W x H: 80 x 54 x 23 [mm], 3.15 x 2.13 x 0.91 [inch].



Port	Label	Description
A1	<b>in</b>	Current pick-up circuit, $\leq 60$ m $\Omega$
A2	<b>out</b>	Voltage output, 50 $\Omega$

## Product case Amplifier

- Dimensions L x W x H: 32 x 32 x 14 [mm], 1.25 x 1.25 x 0.56 [inch].



Port	Label	Description
B1	<b>in</b>	Measurement signal input
B2	<b>GND</b>	PSU 12 V DC, negative potential wire, common shielding ground
B3	<b>12V</b>	PSU 12 V DC, positive potential wire
B4	<b>out</b>	Magnified signal output

