

μ Current Probe™

μ CP100

μ CP120



The μ CP100™ and μ CP120™ are state of the art analog current probes for taking precise current measurements in modern ultra-low power products. The μ CP100/ μ CP120 addresses all of these issues facing designers of low-power electronics:

- With wide ranging current levels, a sense resistor sized to give enough voltage drop to measure microamps on a typical oscilloscope drops so much voltage the circuit stops operating when the current changes to the milliamp range.
- With voltage drops of a few millivolts across the sense resistor, the signal level can be less than the resolution of most oscilloscopes.
- With signals of just a few millivolts in amplitude, the accuracy of the measurement can be impacted by the accuracy of the oscilloscope.

Few current probes on the market today can even measure currents below 100mA. The “precision” current probes that can measure below 1mA have proprietary interfaces to the oscilloscope. The μ CP100 can measure currents from 5nA to 120mA, the μ CP120 can measure currents from 25nA up to 600mA. Both probes can be used with any scope with a standard probe BNC connector.

The probes features a 20VDC input range to allow use in a variety of applications. The high end of the range makes the them suitable for use with 12V solar panels that may reach up to 17V under open-circuit and light load conditions. They can also be used with voltages as low as a few millivolts, making them ideal for use with single 1.5V cell battery applications as well as “low voltage” energy harvesting power sources that can be in the 150mV range.

The μ CP100/ μ CP120 supports two measurement ranges using internal sense resistors along with support for an external sense resistor in the target system. The probes also feature a “Zoom In” view to enable more accurate measurements with mid-range and low-end scopes and a “Zoom Out” view for times when seeing the entire waveform is more important than precise measurements. These features combine to allow an engineer to focus on taking current measurements instead of changing out sense resistors as the current draw changes under different product use conditions.

The probes are intended for use in applications where instantaneous current measurements are sufficient and power measurements over time are not required. These applications would include:

- Energy harvesting power sources (“low” and “high” voltage)
- Low power products with simple power management schemes
- Low power products featuring low-power wireless radios such as ANT, Bluetooth, ZigBee or WiFi
- Research in low-current power source and energy storage technologies

μCP100/μCP120

Features & Benefits

Features	Benefits
Wide input voltage range	Input voltages up to 20VDC for use with 12V lead-acid battery, solar cell or “high” voltage energy harvesting power sources. Input voltage range extends to ground for use with single cell 1.5V batteries and “low” voltage energy harvesting power sources.
0 to 40V output swing	Wide output range simplifies taking current measurements and allows use with lower resolution oscilloscopes.
Wide dynamic range	Allows for use on devices with wide ranging current draws between active and sleep modes, particularly useful for products with wireless radios.
Switch selectable current ranges	Two ranges to match the system measurement requirements without having to change sense resistor values.
Internal/external current sense resistor	The internal current sense resistor can be bypassed so that a resistor on the board under test can be used, allowing the user to tailor the current range to their specific needs.
Switch selectable “normal” and zoom views	Zoom in amplifies signal by 10X to allow use with oscilloscopes with 8-bit or 10-bit A/D converters without compromising measurement accuracy. Zoom out reduces signal by 10X for increased dynamic range.

Specifications

Input voltage range	0VDC to 20VDC			
Output voltage range	0VDC to 40VDC			
Bandwidth	550 KHz			
	μCP100		μCP120*	
“Zoom in” (10:1) mode	Precision mode	Wide range mode	Precision mode	Wide range mode
Output voltage	10mV = 1nA	10mV = 1uA	10mV = 10nA	10mV = 10uA
Current range	5nA to 4uA	5uA to 4mA	50nA to 40uA	50uA to 40mA
Dynamic range	800:1	800:1	800:1	800:1
Normal (1:1) mode				
Output voltage	1mV = 1nA	1mV = 1uA	1mV = 10nA	1mV = 10uA
Current range	5nA to 40uA	5uA to 40mA	50nA to 400uA	50uA to 400mA
Dynamic range	8,000:1	8,000:1	8,000:1	8,000:1
“Zoom out” (1:10) mode				
Output voltage	1mV = 10nA	1mV = 10uA	1mV = 100nA	1mV = 100uA
Current range	5nA to 100uA	5uA to 100mA	50nA to 800uA	50uA to 800mA
Dynamic range	20,000:1	20,000:1	16,001	16,000:1
Sense resistor voltage drop	5uV / nA	5uV / uA	0.75uV / nA	0.75uV / uA
Sense resistor accuracy	± 1%			
Sense resistor temperature coefficient	± 100 ppm / °C			
Measurement accuracy	± 2.5%			
Common mode noise rejection	130 dB (typical)			
Interface to target board	Clip leads or standard 0.1” header			
Power supply	48VDC, 94-264VAC 50/60Hz (included)			
Enclosure	Aluminum 3.4” x 2.9” x 0.8”			

* μCP120 specifications are preliminary and subject to change.