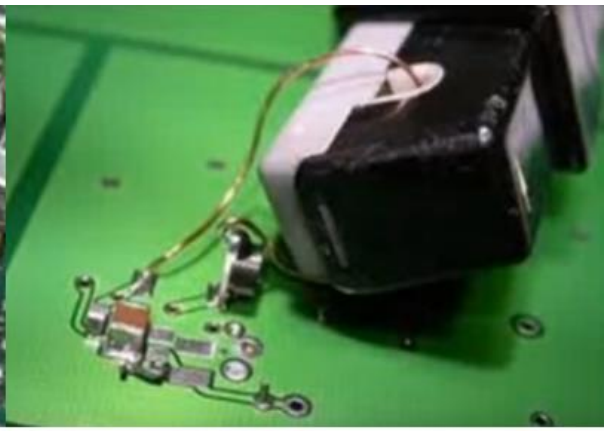
Measure PCB current without breaking the circuit

Current measurement is simple when you can break the circuit or clip a current clamp around the current carrying conductor, but in the case of a multi-layer PCB this is not always practical or possible.

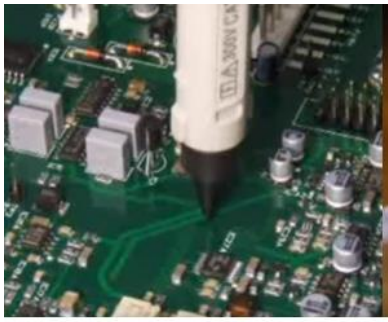
Breaking the circuit and inserting a resistive shunt



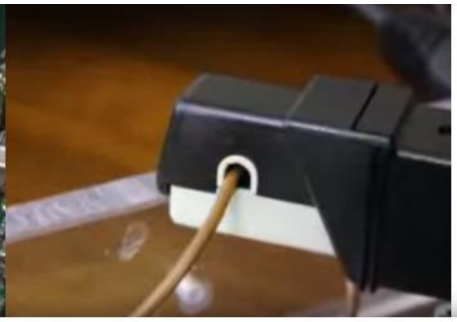
Current clamp around current carrying conductor

Aim-TTi have come up with a solution to this problem with the I-prober 520, which can measure current (dc up to 5MHz) simply by placing the insulated tip onto the current carrying conductor without making any electrical contact.

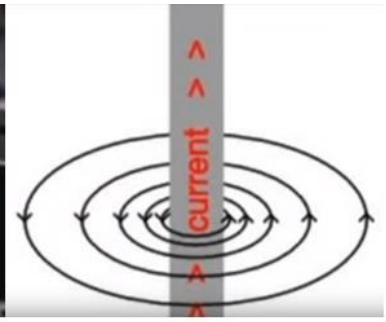
The I-prober measures current by simply placing the insulated tip onto the current carrying conductor without making and electrical contact and measures the magnetic field that results from current flowing through the conductor, the same way as a conventional current loop probe does, by surrounding the conductor with high Mu material (like ferrite).



I-Prober current measurement

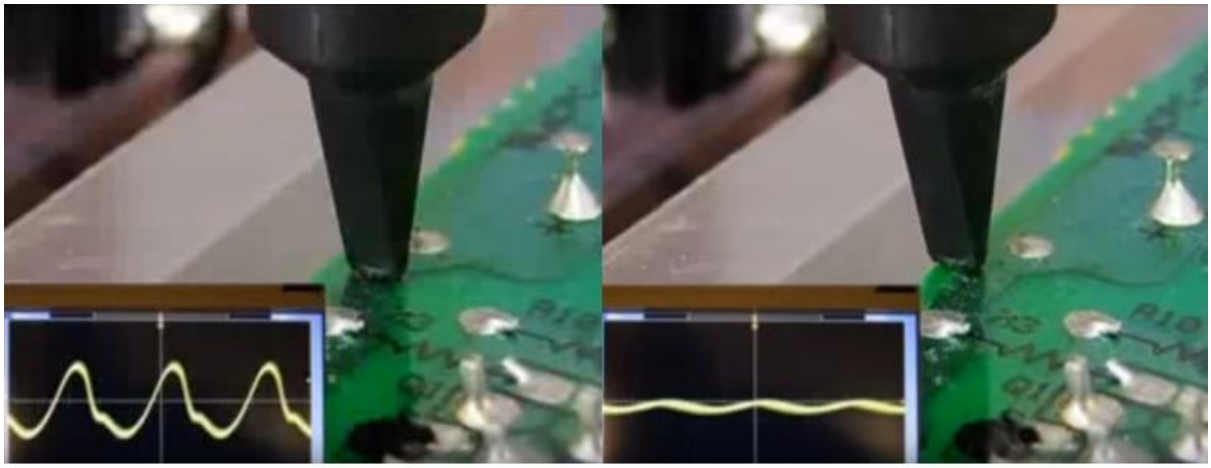


Conventional current loop probe



Magnetic field in conductor

The positioning of the I-prober on the pcb is critical, as the signal is effected relative to the conductor, as the I-prober measures the magnetic field at a precise point on the board, so moving it away from the conductor reduces the measured signal, this is why the I-prober is known as a positional current probe.



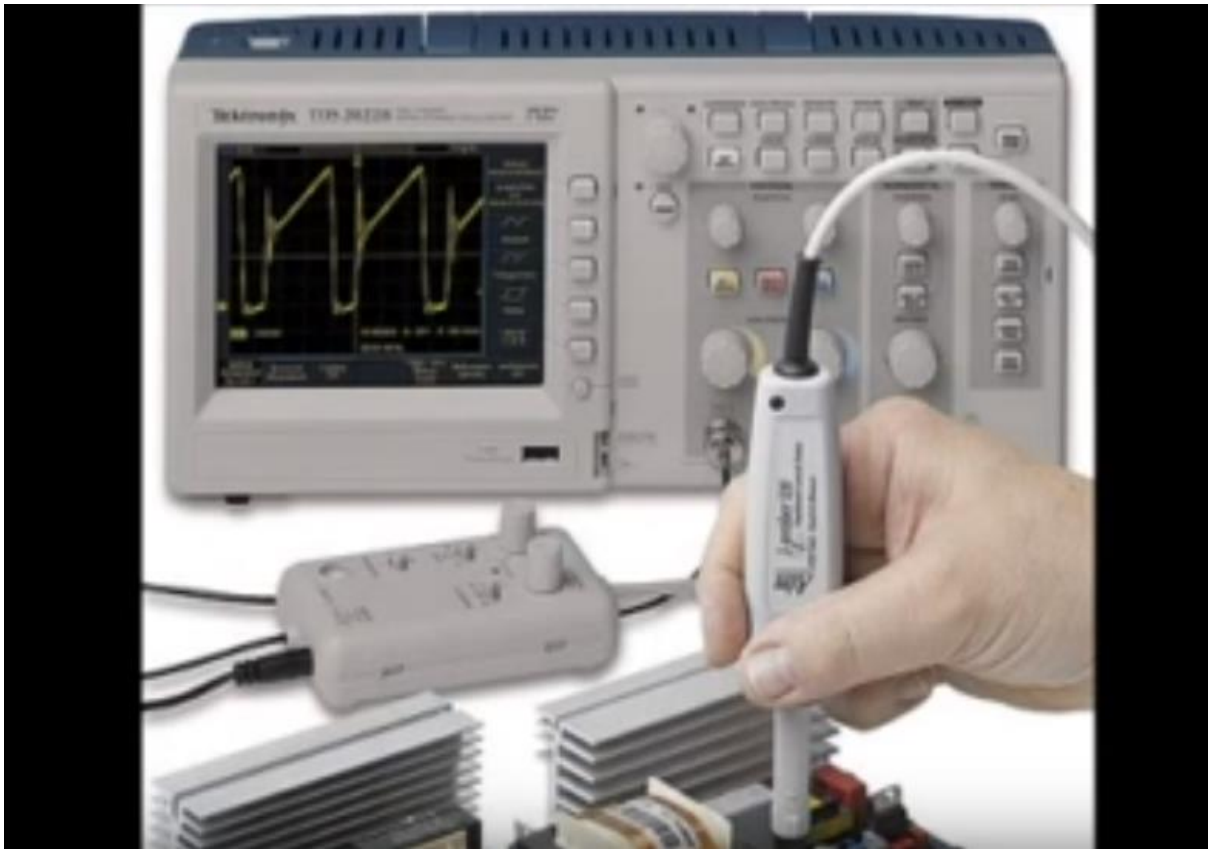
Positioning of the i-Prober to the conductor is critical

Positional current probes are not new, however they were originally physically large and only suitable for measuring high current at low bandwidths, however at the heart of the probe is a patented miniaturised Fluxgate Magnetometer which is capable of measuring the field at a precise position, but it also has a much lower noise and wider bandwidth than a conventional Fluxgate Magnetometer.

The key performance and features of the I-prober 520 are:

- Wide bandwidth of DC to 5MHz
- Wide dynamic range of 10mA to 20A peak to peak
- Low noise equivalent to <6mA rms
- Rated to 300V CATII so ideal for measuring PSU circuits
- Suitable for connection to any oscilloscope
- Converts to a standard “closed magnetic circuit” current probe
- Don’t need to break or surround the conductor
- Observe and measure currents in PCB tracks directly
- Minimal disturbance to circuit conditions through very
- low insertion impedance and stray capacitance
- Can observe currents flowing within ground planes
- Useable on high voltage conductors and in high temperature areas

Aim-TTi have produced an introductory video, talking about the above features, but also goes into more details about the operational functionality:



https://youtu.be/7Koz5smFJvg

- **Aim-TTi I-prober 520 Positional Current Probe (737-7192)**