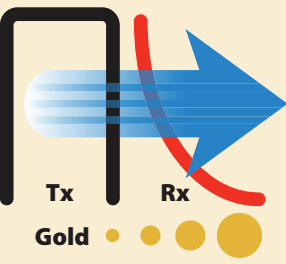


The SDC 2300 and MPF Technology Explained

Minelab’s SDC 2300 gold detector uses Multi Period Fast (MPF) Pulse Induction (PI) technology to give significant performance improvements over conventional PI metal detectors, for gold prospecting in mineralised ground. In this article, the inventor of MPF, Bruce Candy, explains further how the SDC 2300 works.

“You will find more small nuggets and fine-threaded specimen gold in mineralised soils with the SDC 2300 than any other gold detector, including the GPX 5000.” –Bruce Candy



MPF Technology:
 MPF incorporates extremely fast Pulse Induction switching between Transmit (Tx) and Receive (Rx) detector signals. Therefore minimal residual transmit signal is present during the receive cycle, enabling clear sharp detection of very small gold.

signals when the coil is passed over highly magnetic soils, and many gold fields have such soils. Conventional Pulse Induction detectors typically produce a decaying transmit signal of significant duration, and this limits the earliest possible receive signal processing after the transmit signal begins to decay. This is a major limitation for the detection of small gold, (e.g. <0.1gram), because small gold (and specimen gold) signals only exist for a very short duration after the transmit pulse begins to decay.

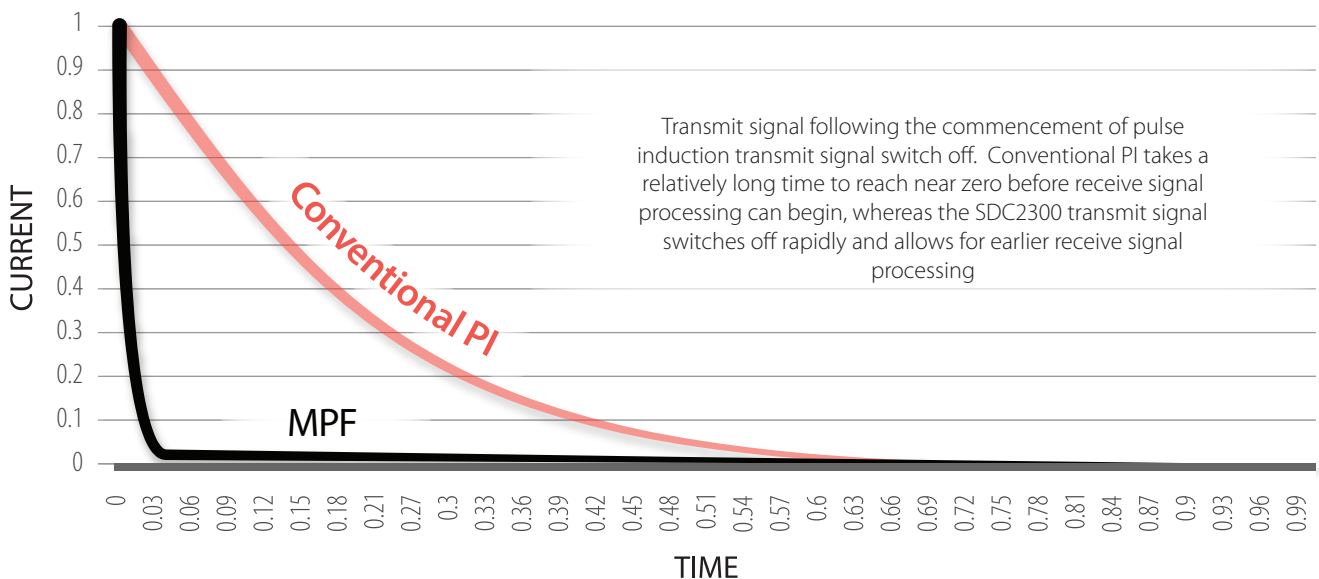
Thus with conventional pulse induction electronics, high sensitivity to small gold comes at the expense of extra ground noise in highly magnetic soils.

The problem with conventional PI detectors for small gold

In pulse induction metal detectors, the transmit signal needs to be completely ‘shut down’ before the tiny receive signals can be processed and sent to the audio, especially if the same coil is being used to transmit and receive, such as a mono-loop coil. If the transmit signal is still present when receive processing commences, it in effect adds variable un-ground-balanced

The MPF technology solution for small gold

The electronics in the SDC 2300 produces a near instantaneous transmit waveform switch-off. This innovation thus allows for receive signal processing ASAP immediately after this rapid termination of the transmit waveform, and hence MPF’s receive processing allows for higher sensitive detection of small gold without the associated extra soil signal in highly magnetic soils. The graph below compares MPF to conventional PI.



What are the performance advantages?



Improved Sensitivity

To improve sensitivity to small targets, the transmit frequency is about 3kHz, which is much faster than a conventional PI detector. This means more averaged signal per second (3000 signals per second) of the weak small gold signals. The faint metal target signals are the same following each transmit pulse, whilst the electronic noise is random. This means that the noise averages to a low level compared to the faint metal target signals, making the target signal 'stand out' from the noise.



Greatly Reduced EMI

The SDC 2300 electronics has low EMI susceptibility, especially from mains-borne EMI, and sferics as well.



Performance in Salty Conditions

The SDC 2300 incorporates a Salt Mode for which the transmit and receive timing signals have been optimised for saline conditions found in some gold field areas.



Matched Coil

The ideal coil depends a lot on what targets you want the best chance of finding. Small coils are particularly sensitive to targets which are buried shallow, while large coils maintain their sensitivity better at greater depths but sacrifice sensitivity to shallow targets. The MPF technology is tuned to find small gold nuggets. These nuggets are typically found closer to the coil than larger targets. To further enhance the ability of the SDC 2300 in finding small gold nuggets we've equipped it with an 8" mono-loop coil, which is ideally suited to finding the small gold at the depths where it is predominantly found.



Reduced Ground Noise

The SDC 2300 incorporates Minelab's proven "Enhance/Fine Gold" type of receive processing that minimises mineralised soil signals and false detection of hot rocks, unlike traditional PI detectors. This greatly assists with nugget detection in most gold fields, especially in highly mineralised gold fields. This substantial reduction in ground noise makes prospecting less confusing and more time efficient. It incorporates Automatic Ground Tracking and Fast Ground Balance so that the detector is always optimally ground balanced.

"The SDC's unique advantage is ultra-low ground noise in mineralised and saline soils AND very high sensitivity to fine gold and fine targets (like chains) at the beach." –Bruce Candy

Where to find more information

The following pending patents provide further insight into the SDC 2300 and Minelab's advanced technologies:

WO2011156870; Patent for the near instantaneous pulse induction transmit waveform switch-off. This also allows for high power efficiency compared to normal pulse induction and thus lower battery power consumption.

WO2013131133; Assists with the receive signal processing ASAP immediately after the rapid termination of the transmit waveform.

