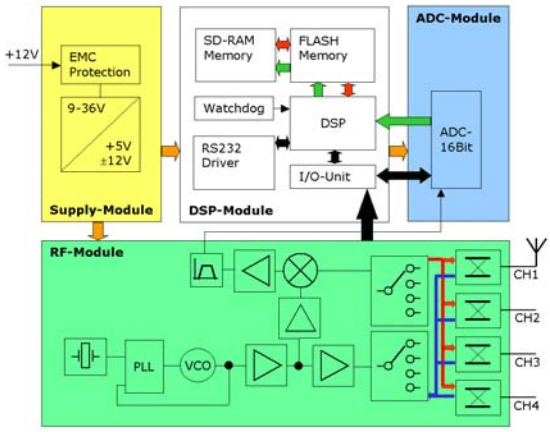

Figure 1: Block-diagram of the FSCW reader unit

Reader Unit

A schematic of the used FSCW readout unit can be seen in Figure 1.

A stabilized oscillator based on a phase locked loop (PLL) generates a stepped frequency ramp, which is amplified and then split up in two paths by a resistive coupler. The interrogation signal is transmitted over the system's antenna. Simultaneously, the reference path is fed to the local oscillator (LO) port of the mixer. When a target (for example, the reflector of a SAW device) in the antenna's beam reflects the interrogation signal, a time delayed and therefore phase-shifted version of the interrogation signal appears at the RF input of the mixer. Each frequency step on the ramp yields a different phase shift and – applying the homodyne principle – results in a DC-valued signal at the output of the mixer.

For onboard data analysis a DSP is employed. A serial interface (RS 232) is used for data transmission. The output power at the four RF-ports is software adjustable allowing for optimizing the radiated power according to the antenna configuration not to exceed +10 dBm. Four channels can be addressed via a multiplexer.