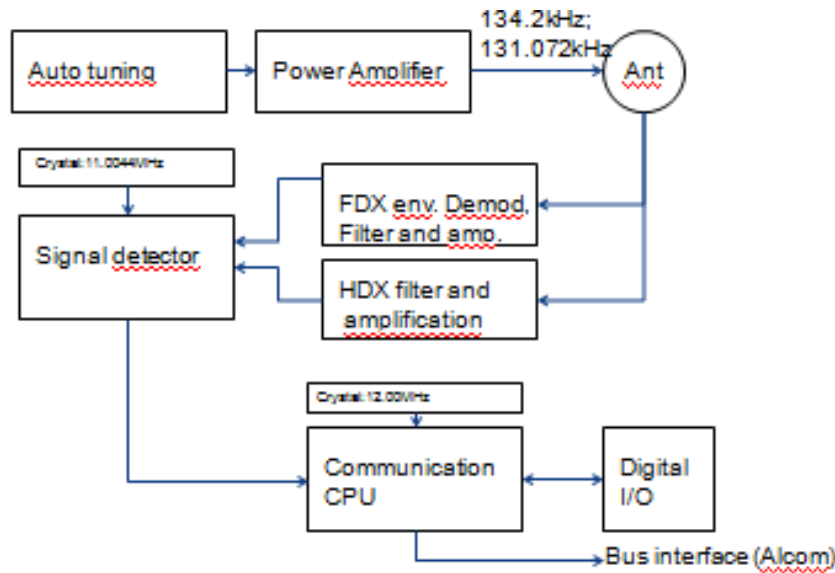**Draft 0.1**

1 Description IRW

1.1 Block diagram IRW

1.2 Operational Description IRW

1.2.1 Power amplifier

For the energy-transmission. The energy is sent as a signal with frequency 131,3 kHz or 134.2 kHz. The frequency is set via the bus interface.

1.2.2 Autotuning

Circuitry to adapt the IRW to variations in the antenna coil inductance, and the different transmitted frequencies.

1.2.3 FDX env. Demod Filter and amp

Transponder signal demodulation and preamplification circuitry. FDX signals goes through an envelope demodulator, filter and amplifier.

1.2.4 HDX filter and amplification

The HDX signal goes through filtering and amplification.

1.2.5 CPU signal detector

The micro controller detects the transponder signal after previous signal conditioning. The CPU also controls the auto tuning to adapt for antenna variations and other variables that affect the inductance for the antenna.

1.2.6 Communication CPU, DIG I/O

An administrative processor handling communication to the bus interface and controlling the digital

inputs and outputs.

Digital inputs and outputs used for reading sensors like photocell, and when the IRW is used for applications like pneumatic selection gates.
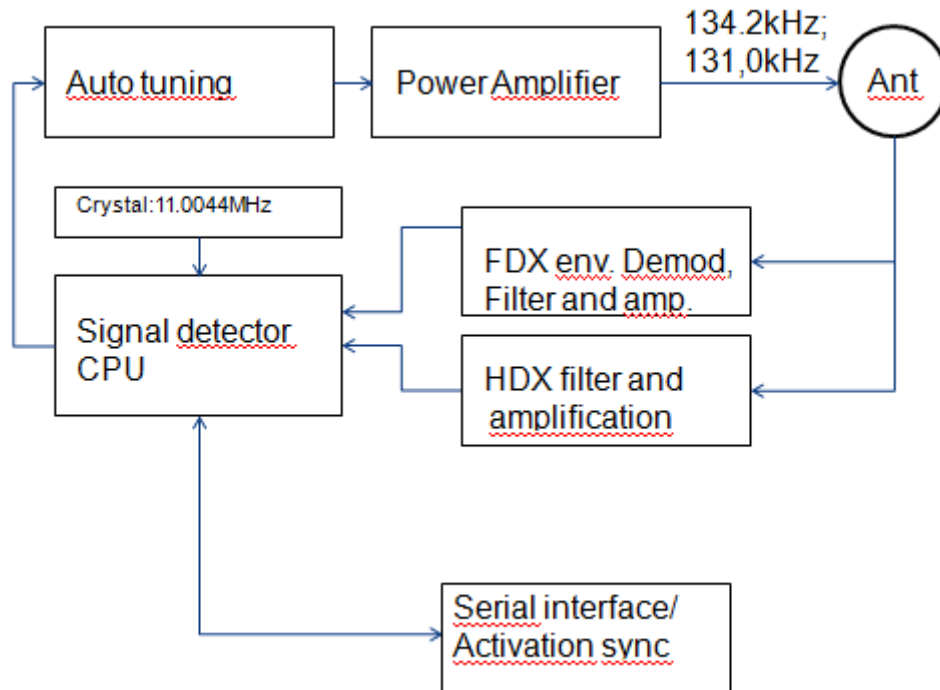
1.2.7 Antenna

The antenna is made of litz wire formed like an eight on a plastic panel.

1.2.8 Power supply

Circuitry including a bridge rectifier and step-down converter.

2 Description MRR

2.1 Block diagram MRR

Auto tuning → Power Amplifier → 134.2kHz; 131,0kHz → Ant

Crystal:11.0044MHz

Signal detector CPU

FDX env. Demod, Filter and amp.

HDX filter and amplification

Serial interface/ Activation sync

2.2 Operational Description MRR

2.2.1 Power amplifier, Transmitter, Autotuning

The MultiRod transmitter is automatically tuned. The auto tuning starts immediately after power startup.
The transmitter starts when the signal Activation sync, X1-2, in the serial interface receive 12VDC.

When the controller signal is high a pulse train is given from to the transmitters MOSFET driver. This pulse train is 131kHz or 134,2kHz every second time. The FET:s are then powering the antenna.
During auto tuning a combination of capacitors are set for the two frequencies 131kHz and 134,2kHz to make the antenna and the capacitors in resonance.

2.2.2 Receiver, Serial interface

During excitation the FDX signal will be received trough the antenna and the envelope detector. The demodulated signal is amplified.
The received signal both for HDX B and FDX chain is decoded by the CPU and the signal is converted to Manchester code and NRZ code. The NRZ coded signal is sent first followed by the Manchester code over the serial interface. ISO transponders sent as Manchester code is a shortened number and contains only the 4 les s significant digits in the number. B-transponder sent as NRZ code is sent as a 64 bit identification code followed by 16 bit CRC.

2.2.3   Antenna

The antenna is potted inside the unit and is built by copper windings on ferrite material.

2.2.4   Power supply

Circuitry including internal linear regulators to provide regulated power to the electronic circuits in the other blocks.