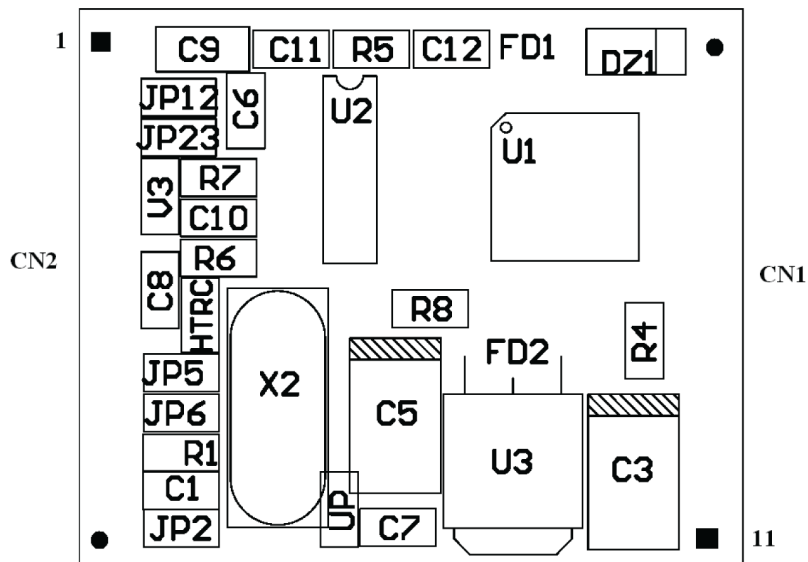
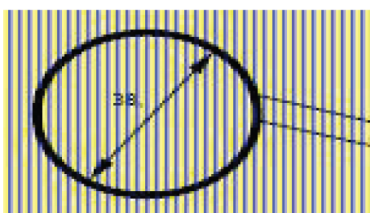


Antenna Design for the 125 kHz OEM Reader Module



A) Coil Antenna



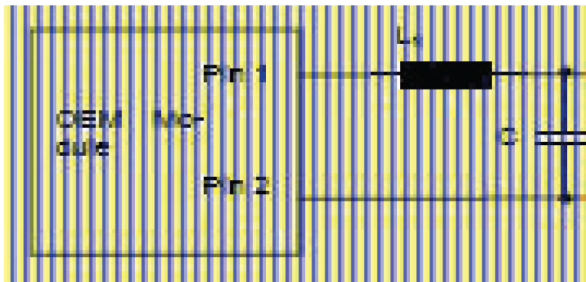
Requirements:

Wire antenna

coil, 38 mm diameter
 70 turns, 0,22 mm/ 0,355mm Cu wire
 connect to PIN 1 and 2 of reader module
 operating distance 80 mm (4x02 or 4x50 Isocard)
 power consumption 30 mA

$L = 390 \mu\text{H}$
 $Q < 15$
 (series resistor 5-100 may improve performance)

B) PCB Antenna

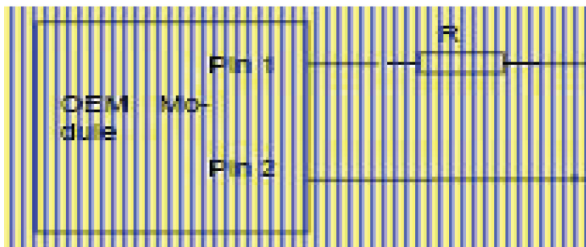


L_1 .. 470 μ H (core inductor)
 L_{ANT} ... PCB, 6-40 turns, 0.2 -1 mm track width, 2000 - 4000 mm² area
 C ... capacitor tuned to resonance with L_{ANT} (2.2 ... 330 nF)
 Operating distance: 60-80 mm (4x50 or 4x02 Isocard)
 Power consumption 150mA

Example 1:
 PCB Antenna 64x64 mm, 6 turns, 1 mm track,
 $C=330$ nF COG, $L_1=470$ μ H, operating distance 70mm

Example 2:
 PCB Antenna 84x40 mm, 34 turns, 0.2 mm track, $C = 3.6$ nF, $L_1=470$ μ H polypropylene 63V, operating distance 70mm

C) Inductor Antenna



R .. 5,6 Ohm
 L_{ANT} ... 470 μ H (core inductor)
 operating distance: 45-50 mm (4x02 or 4x50 Isocard)
 power consumption 140mA

Example 1:
 L_{ANT} high frequency inductor 470 μ H, available at RS Components, part no. 308-9012

D) Midrange Coil Antenna

Wire antenna

size 180 x 180 mm

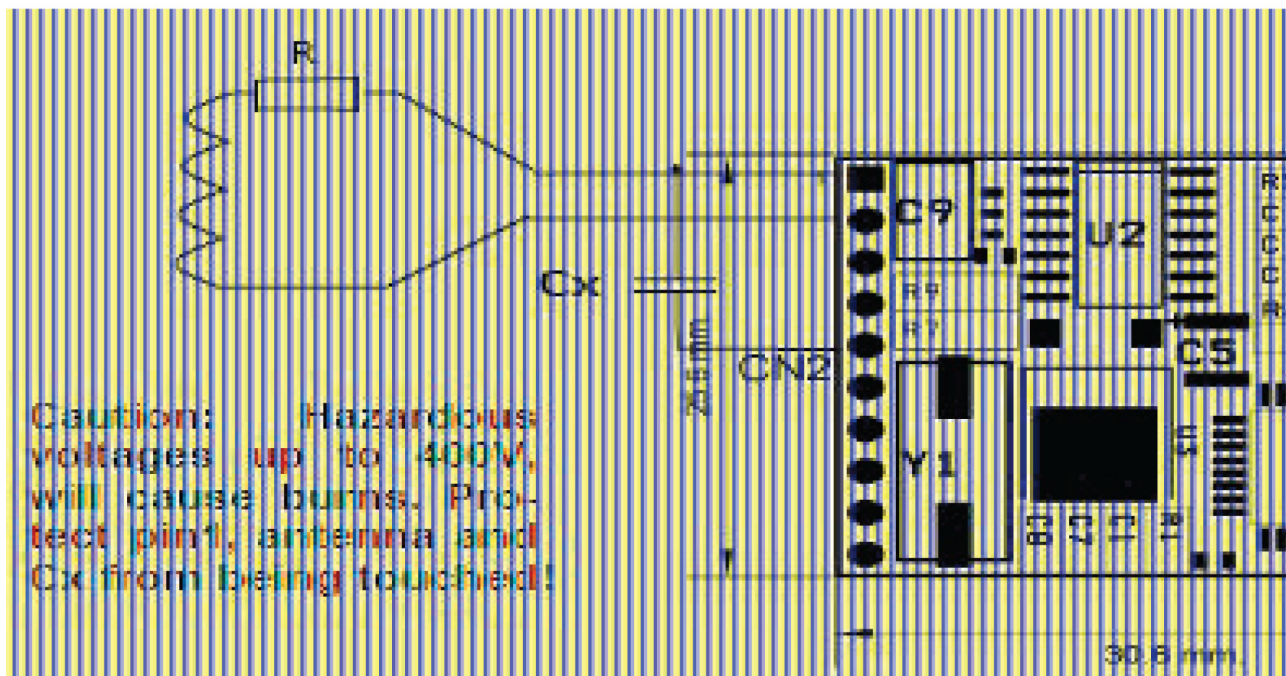
28 turns, 0,355mm Cu-wire

$L = 465 \mu\text{H}$

operating distance 200 mm (4x02 or 4x50 Isocard)

power consumption 200 mA

C09 to be removed



Cx = WIMA FKP1 3n3 / 630 V DC Polypropylene 5%

Note: The driver output of the reader module is specified with 200mA p continuously and 400 mAp pulsed. This results in voltages at Cx (3.3nF) and antenna of 155V pp continuously or 310 Vpp pulsed. Make sure, that humans are protected from those voltages and that the module does not got overloaded. The voltage can be lowered using detuned antennas or by putting an resistor in series (R).