Description of Circuit Function

The LEGIC Advant Card Reader is a reader for contactless smart cards from LEGIC. It operates in the 13.56 MHz ISM band.
The communication with these smart cards is managed by the chip set SC-2560 from LEGIC. The chip set consists of a digital controller and a RF chip.

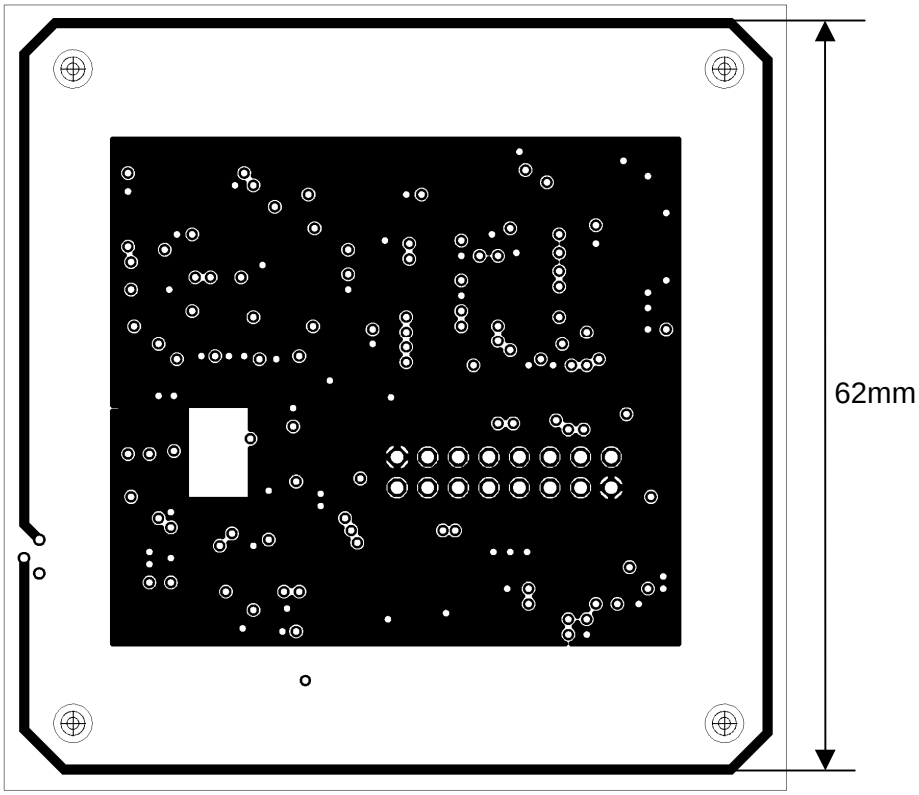
The LEGIC Advant Card Reader is splitted into two boards:
- Reader Board
- Supply and Interface Board

The Supply and Interface Board includes the circuit for the power supply and an interface converter from serial TTL to RS485 (refer to Legic Advant Card Reader block diagram).
The power supply is based on the step-down converter LM2671 from National. This converter works with a switching frequency from about 260 kHz and provides a fixed output voltage of 5V for the Reader Board.
The interface converter is based on the isolated transceiver MAX3535 from Maxim. This device includes a switching regulator to generate an isolated voltage for the RS485 communication with the help from a transformer. The used switching frequency is about 460 kHz. The interface converter also includes a microcontroller which controls the communication. The microcontroller works with an external ceramic resonator with 8 MHz.

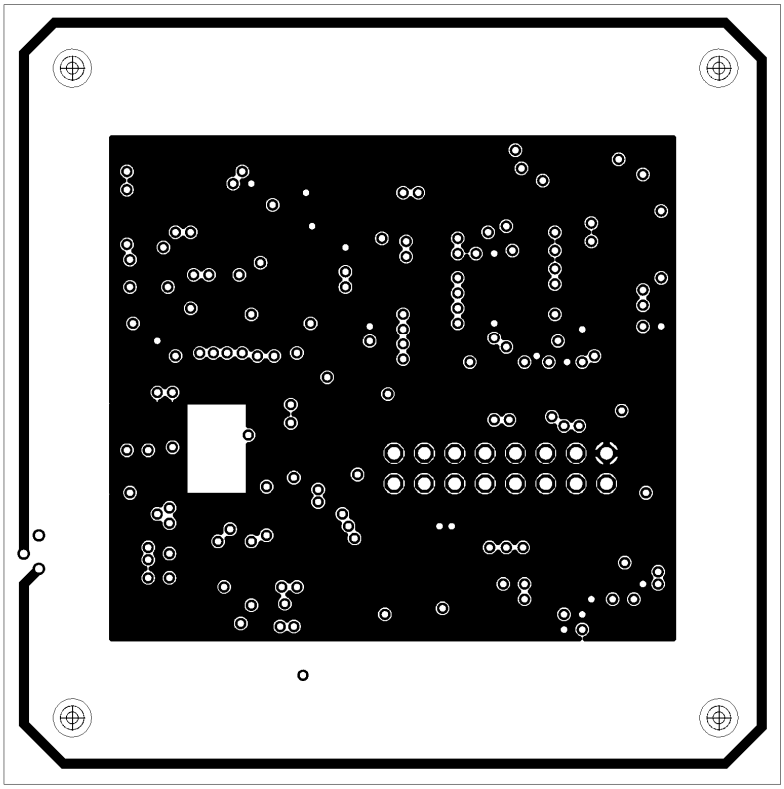
The circuit of the Reader Board can be divided into two parts. A digital and an analog part.
The digital part is based on the SC-2560 controller chip from LEGIC. It communicates over a serial interface with the Supply and Interface Board. A Crystal with 13.56 MHz provides the system clock.
The analog part is based on the SC-2560 HF chip from LEGIC. It communicates over a digital interface with the SC-2560 digital controller. This interface also includes the 13.56 MHz clock frequency which is also used for the analog part. The output of the HF chip follows a matching circuit and the antenna which is implemented as a rectangle with two windings on the PCB board (refer to antenna design on next page). The maximum output level is 200 mwatts.

Antenna Design

The Antenna for the Card Reader is implemented in the PCB-Layout within the two Supply-Layers. There are two windings, the dimension of these windings are 62mm x 62mm.



Picture 1: Inside Layer 1 (GND)



Picture 2: Inside Layer 2 (Vcc)