

Theory of Operation/Technical Description FCC ID: 2AHDLNGCR

Model No: VR10S-MF / VR40S-MF / AR10S-MF / AR40S-MF

The product is an RFID reader operating at 13.5 MHz for communicating with passive tags and transmission of the tag data on a low speed wired connection using RS485 industry standard interface to connected equipment.

The reader consists of plastic front, metal bezel, metal base, electronics, pin code entry keypad (models VR40S-MF/AR40S-MF only), OLED display, LED indicator and internal sounder and provides terminal block for power and communication signals. The reader is suitable for indoor or outdoor installation.

RFID reader circuitry consists of a 13.5 MHz CLRC663 Mifare reader frontend IC, inductive coupling external antenna coil and microcontroller. When the reader is on and a tag is in close proximity of the reader it will be energized by the 13.5MHz field.

The CLRC663's internal transmitter is able to drive an antenna designed to communicate with ISO/IEC 14443A/MIFARE cards , tags and transponders. The digital module manages the complete ISO/IEC 14443A framing and error detection functionality (parity and CRC). The CLRC663 supports MIFARE Classic 1K, MIFARE Classic 4K, MIFARE Ultralight, MIFARE Ultralight C, MIFARE Plus and MIFARE DESFire products.

The reader communicates to the passive tags using 100% Amplitude Shift Keying at a data rate of 106 Kbits/s. The passive tags send data to the reader using a load modulation to generate a subcarrier at a 16th of the 13.56Mhz carrier, data is communicated to the reader at 1/8 of the subcarrier frequency 106Kbits/s. After the initial communication between reader and tag the communication rate maybe increase to 212Kbits/S or 424Kbits/s.

The analog interface of CLRC663 handles the modulation and demodulation of the antenna signals for the contactless interface. The maximum radiated power is -45dBm measured under max power operation of the continuous unmodulated carrier.

After a tag or card is read by CLRC633 Mifare reader frontend an interrupt is generated to communicate with the microcontroller to be able to deliver the content of a tag to the connected system via RS485 interface.

The keypad consists of 12 buttons, decimal digits 0 -9 and special keys ✓ and X. The keypad is constantly scanned for a keypress. A keypress will result in the encoded key data to be transmitted using RS485 industry format to equipment connected to the terminal blocks. User interface LED indicators, Lightframe, backlight or sounder are controlled via RS485 interface.