Theory of Operation

The dual frequency card readers are composed of two major sections. There is the RF section operating at 13.56MHz and 125KHz communicating with the Host Interface and Configuration section. The physical interface to the Host equipment is via the USB port.

The Dual Antennas and mounting carrier is permanently attached to the reader and cannot be modified or replaced by the end user.

RF Section

The frequency of operation depends on the card type that is presented to be reader but is fixed to any 2 types of card format for any particular card reader. This is due to constraints in microprocessor space for any particular operating frequency band.

The card readers rely on a "back-scatter" modulation technique. The RF field produced by the reader is actually supplying power to the card that is being read. Once the card is powered from the RF field, data communication takes place by modulating the carrier in different ways particular to the card technology in use. The reader directly modulates the carrier when it is transmitting to the card and the card responds by "loading" its antenna circuit with the modulation data and thus reflecting this "detuning" into the reader antenna circuit. The "loaded" reader antenna circuit sees amplitude changes representing data and these changes are processed to recover the response data from the card.

The RF section is powered from a switched 3.3V source that is under control on the Host Interface microprocessor. The RF power is switched off during startup.

The RF section microprocessor communicates with the Host Interface section microprocessor via digital interface lines connecting the two sections together.

Host Interface Section

This section receives data from the RF section that represents either a non-solicited card ID (usually over "Wiegand" format) or a more elaborate two-way asynchronous data exchange when commands must be issued to the RF section to get an appropriate response from certain 13.56MHz cards. This two-way data exchange is used to read data from the card. These cards are all in the 13.56MHz group.

The Host Interface microprocessor communicates to the Host (usually a PC or printer) directly via a USB port.

The Host Interface microprocessor may be configured by the Host to control various behaviors (display LED and beeper), timing parameters, and card ID return format. The exchanged data may also include card data and overhead commands to the RF micro that set up card data access such as key exchanges and card data location.