

## PRODUCT OVERVIEW

The Passkey III Reader/Exciter module is part of a vehicle immobilization system intended to prevent amateur theft. The module, through its coil antenna, energizes a transponder embedded in the head of the ignition key and reads the unique security code from the transponder. The module sends the security code it receives from the transponder to a Controller Module for authentication.

The Passkey III Reader/Exciter module consists of the following functional block:

1. Closed-Loop Drive/Oscillator
2. Resonant L-C
3. Coil Drive Wave Shaping
4. AM detector
5. Data Filtering/Amplification

The Reader/Exciter (R/E) module receives power from the vehicle body controller module when vehicle ignition switch is activated. Once power is delivered to the R/E module, a current-controlled oscillator is activated with nominal frequency set to 125 kHz. The square wave signal generated by the oscillator is fed to a wave shaping stage and drives a series resonant RLC nominally tuned to 125 kHz (with lock cylinder effect). The inductor or the coil antenna is a 97-turn, 33 gauge wire wound with inside diameter of approximately 34.38mm. The coil antenna is fitted and positioned around the vehicle ignition lock cylinder.

The signal of the oscillator driving the series RLC is fed into a phase detector along with the sinusoidal resonant voltage formed by series RLC. The difference of phase between the oscillators drive signal and the sinusoidal resonant signal is converted into current sink or source to the current controlled oscillator. It effectively forms a closed loop system whereby the oscillator frequency tracks the resonant frequency of the series RLC.

The current generated in the coil antenna produces a magnetic field around the coil, which extends to couple to a transponder in the key. The coupled energy from the R/E module energizes the transponder and in turn transponder modulates the magnetic field in accordance to the security code at a rate of 2 kHz.