The Integrated Key Transmitter (IKT) is a remote keyless entry (RKE) transmitter that is integrated with a key blade.

Theory of Operation

There are two main components that comprise the IKT. The first component is the mechanical case with the over-molded ignition key blade. The second component is the RKE transmitter with built in immobilizer functionality. The main micro-controller (TMS37136) is a custom device from Texas Instruments that combines their standard line of MSP430 controllers with their Radio Frequency Identification Device (RFID) transponder IC.

The RKE portion of the IKT is activated when the user presses one of the four buttons (Lock, Unlock, Trunk, and Panic). The micro-controller wakes up from its sleep mode (used to conserve battery life) and deciphers which button was pressed. Once the button is deciphered, it sends a Shark encrypted code to the Radio Frequency Transmitter Chip (RF IC). This Shark code is Amplitude Shift Key (ASK) modulated using a highly accurate local oscillator built from a crystal resonator. Once this ASK modulated code is sent out via the trace antenna, the micro-controller goes back into its sleep mode.

The transponder functionality is activated whenever the user inserts the IKT into the lock cylinder. The Passive Anti-Theft System (PATS) transceiver, which is mounted onto the ignition lock cylinder assembly, initiates the system. The transceiver provides power and communicates to the transponder within the key via a low frequency magnetic field antenna at a nominal frequency of 134.2kHz. This transceiver has four hard wire connections, Ign Run/Start, Ground, Tx Signal and Rx Signal, which interface with a control module. The control module is typically located within the automobiles instrument cluster.