

1.0 General Description

1.1 Product Description

This product is a 315 MHz RF receiver and micro controller intended for automotive use. All timing in the receiver is derived from 315 MHz RF and 4.19 MHz micro-processor clock oscillators. The receiver works in conjunction with a handheld transmitter carried by the vehicle operator. The transmitter/receiver system communicates, via the vehicle system bus, with other vehicle system control modules to lock and unlock the passenger compartment doors, control the horn (Panic security mode) and, if so equipped, unlock the vehicle rear access door remotely.

In operation, pressing a switch on the transmitter transmits an amplitude shift keyed serial data signal at an RF frequency of 315 MHz. A *wake-up* pulse is sent first to enable the receiver's micro-controller. It is followed by a synchronization bit, an authentication code, fixed identification code, error correction code and flag bits.

The receiver module is located in the vehicle passenger compartment. A printed circuit board antenna receives the RF signal from the transmitter. It is followed by an RF amplifier which provides signal gain. The RF signal then passes to an LC super-regenerative detector tuned to 315 MHz. The detected data waveform is low-pass filtered and the data is amplified before being fed to the micro-controller. When valid data is detected at the micro-controller, the micro-controller examines the data to see if it is a valid vehicle access code. Upon validation, the micro-controller passes the requested function commands to other vehicle control modules via the system communication bus.

The valid vehicle access codes are calculated from data stored in non-volatile memory, so a loss of vehicle power does not disable the system.

EXHIBIT 12

Page 1 of 1

U of Mich file 415031- 018