

Toyota 500N/592N TRANSMITTER DESCRIPTION

The Toyota 500N and 592N transmitters are designed to operate Remote Keyless Entry functions in automotive vehicles. The Toyota 500N/592N transmitter will utilize six design configurations. These are listed by part number below:

- 1) 89742-AE010 - 3 button - Lock, Unlock, Panic.
- 2) 89742-AE020 - 4 button - Lock, Unlock, P-Back Door, Panic.
- 3) 89742-AE030 - 5 button - Lock, Unlock, P-Slide Door LH, P-Slide Door RH, Panic.
- 4) 89742-AE040 - 5 button - Lock, Unlock, P-Back Door, P-Slide Door, LH, Panic.
- 5) 89742-AE050 - 6 button - Lock, Unlock, P-Slide Door LH, P-Slide Door RH, P-Back Door, Panic.
- 6) 89742-AA040 - 4 button - Lock, Unlock, Trunk, Panic.

The Toyota 500N and 592N transmitter is a Microchip ASIC based transmitter that utilizes a RF oscillator and RF amplifier with a tuned output antenna as the RF circuit. The transmitter operates from a single 3V CR2032 lithium battery, and transmits at 315 MHz using a Variable Pulse Width Modulation bit format.

The Microchip ASIC (U1) is used for encoding and control. The design uses special Toyota transmitter tooling for the top and bottom plastic housing, and switchpad. The PCB utilizes all surface mount components except the battery terminals. The PCB utilizes .031" FR4 material and a common PCB is used for all six design configurations. The different configurations are determined by which switches are or are not populated. The transmitter utilizes surface mount tact switches with switch functions mapped to the ASIC as shown below.

Lock Function:	The Lock function is mapped to ASIC input S1 (pin 2).
Unlock Function:	The Unlock function is mapped to ASIC input S2 (pin 3).
P-Back Door/Trunk Function:	The P-Back Door/Trunk function is mapped to ASIC input S3 (pin 4).
P-Slide Door LH Function:	The P-Slide Door LH function is mapped to ASIC input S5 (pin 6).
P-Slide Door RH Function:	The P-Slide Door RH function is mapped to ASIC input S4 (pin 5).
Panic Function:	The Panic function is mapped to ASIC input S0 (pin 1).

The Microchip HCS1370T-I/SL042 ASIC is normally in the standby mode in which the current draw is very low. When a switch is depressed, the output pin (12) goes high and low to gate the RF oscillator and RF amplifier on or off at times that achieve the RF pulse widths required (200us and 400us). The RF oscillator is a common base Colpitts configuration, with base grounded at the frequency of operation by the SAW resonator. Radiation is by a loop from the RF amp collector to ground (One end is grounded by the 330pF capacitor C2.).

Data is encoded via variable pulse width modulation by gating the Colpitts oscillator on and off via data out (pin 12 of the Microchip ASIC). When Data Out goes high, the Colpitts is enabled to oscillate at 315 MHz for the period that data out remains high. Typical oscillator startup and decay periods are 15 to 20 μ S. The Colpitts oscillator is pulled to 315 MHz due to the resonance of the SAW at 315 MHz, given that the natural frequency of the oscillator (less SAW) is near 315 MHz.