# 1 TOYOTA 300N/330N RECEIVER DESCRIPTION

The module consists of a Superhet Radio Frequency receiver operating at 315 MHz, used for Automotive Remote Keyless Entry and operating from the vehicle 12VDC battery. The receiver contains a superhet ASIC that uses a 10.7 MHz Intermediate Frequency, and internally generates a 325.7 MHz Local Oscillator. The receiver also contains a single four-pin connector for power, ground and control signals, internal antenna, RF SAW filter, linear 5.0V regulator, a Motorola MC68HC05JJ6 microcomputer, discrete components, a single piece polypropylene housing with a living hinge cover, and a Zinc plated bracket that is snapped into the housing. The housing is approximately 70mm X 60mm X 30 mm. All of the electronics are mounted the on topside a FR4 double sided PCB, and the board is spray coated with a conformal coating over all components.

## 1.1 CIRCUIT DESCRIPTION

### 1.1.1 SUPERHET CIRCUIT

The receiver utilizes an internal PCB antenna that is impedance matched into a SAW filter, then into another matching network, and then into a superhet chip (ASIC) made by Infineon which converts the RF signal into a demodulated data signal which is output to a microprocessor. A surface mount crystal is connected to the superhet chip to provide a reference frequency for the local oscillator, and a 10.7 MHz surface mount IF filter determines system bandwidth. Additional components (resistors, capacitors) are connected to the ASIC to set up the data splicer.

### 1.1.2 PREREGULATOR

The pre-regulator is comprised of Q3, R3, D1 and ZD1. D1 provides reverse bias protection, while Q3, ZD1 and R3 provide over voltage protection to the regulator and the serial data link. The voltage regulator, LP2951CD provides a well regulated 5 V source to the RF circuit, microcontoller and EEPROM.

## 1.2 MODULE OPERATION

The normal receiver state is the “sleep” mode. In this state the RF section is fully operational. The total module current draw is 3 ma max. When 4 good consecutive wake-up bits are received the micro stays awake and looks for the Keeloq signal data. The microcomputer will then set its initial values and start to look for good data. If this is received, the microcomputer then reads the Transmitter ID code. If it matches then the data is decrypted and if the result is valid then the selected function is implemented. The micro will continue to accept messages as long as a valid message is received. This will occur until no valid Keeloq data is received, at this point the enters sleep mode.

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## 1.3 SIGNAL DEFINITIONS

+B - Connects to vehicle positive battery power.

RDA - This serial data link is a single direction data channel (receiver to body module) that communicates received remote commands to the body module for execution. It also provides feedback during programming for service or plant use.

PRG - This serial data link is a single direction data channel (body module to receiver) that communicates commands to the receiver to enter programming modes.

GND - Connects to vehicle ground.

## 1.4 Identification

The 300N and 330N are identical except for vehicle mounting brackets.

The receiver was designed and manufactured by TRW Automotive, 24175 Research Drive, Farmington Hills, MI 48335. It is identified as:

TRW Toyota RKE Receiver
Model: 300N P/N 89741-AA020, and 330N P/N 89741-02070
FCC ID: GQ43VT27B
Canada IC: 1470104105B
Taiwan ID: