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# TX ASSY-KEYLESS ENTRY / RX ASSY-KEYLESS ENTRY

## User's Manual

TX Model: 100060233 / 100060234 / 100060235
RX Model: 223004360

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# FCC STATEMENT

FCC NOTICE: This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This devices may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void user's authority to operate the equipment.

# 1. Constitution of the Radio Frequency Keyless Entry System for vehicle

The radio frequency keyless entry is a system that it controls locking and unlocking doors. It can open and close sliding doors and tail gate automatically. It can notice us where the car is by panic button.

The TRANSMITTER is a device that transmits the signal when the button is pressed. The transmission signal consists of several synchronous codes, unique identification code, security code and function code.

The RECEIVER is fixed inside the vehicle. It works intermittently to prevent the battery exhaustion. When the receiver detects the synchronous code, it runs continuously to receive the signals completely. After receiving the signal, the receiver decides which operation will be performed. The user can select the following operations by pressing the button of the remote transmitter.



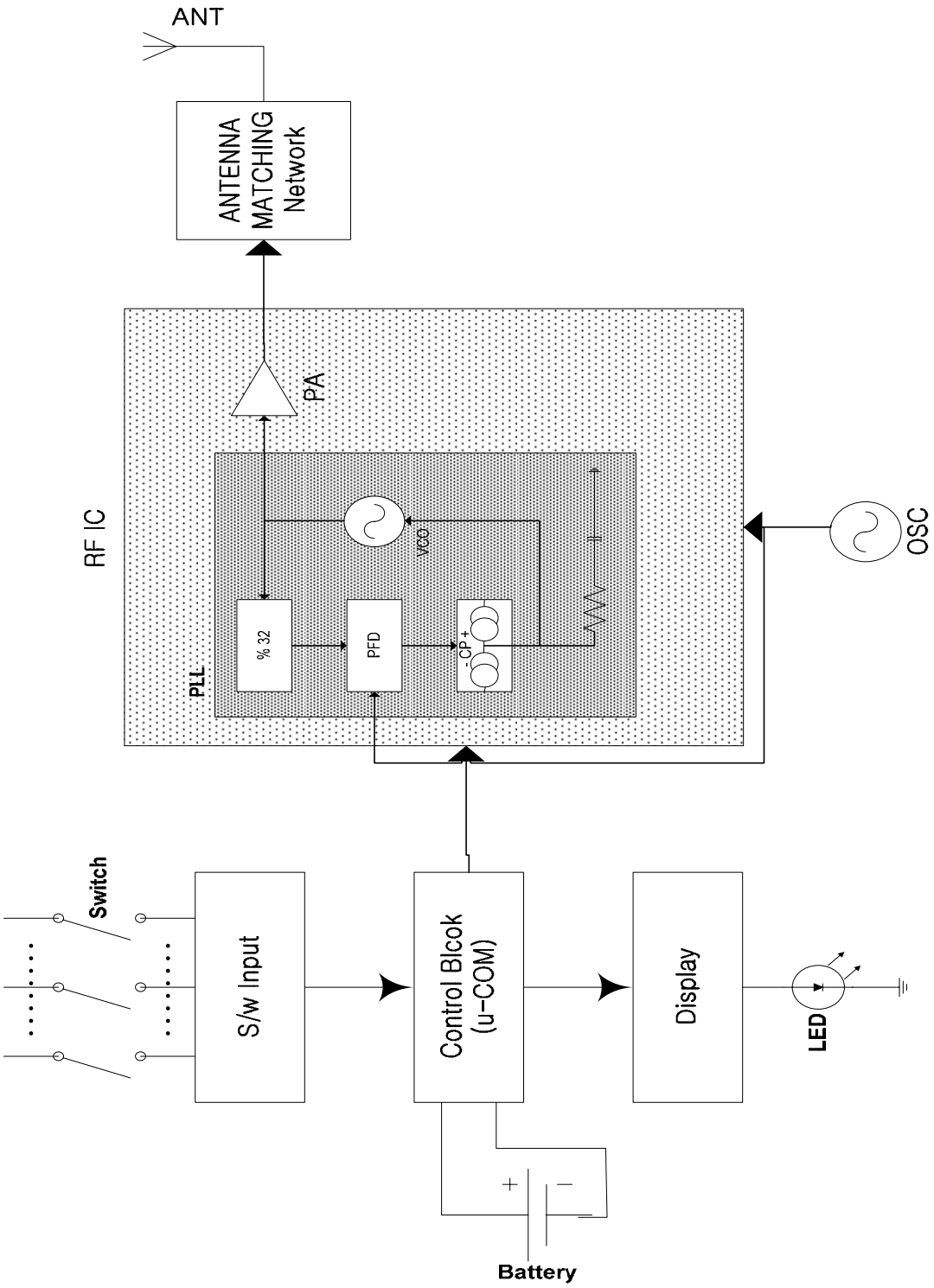


## 2. User's manual

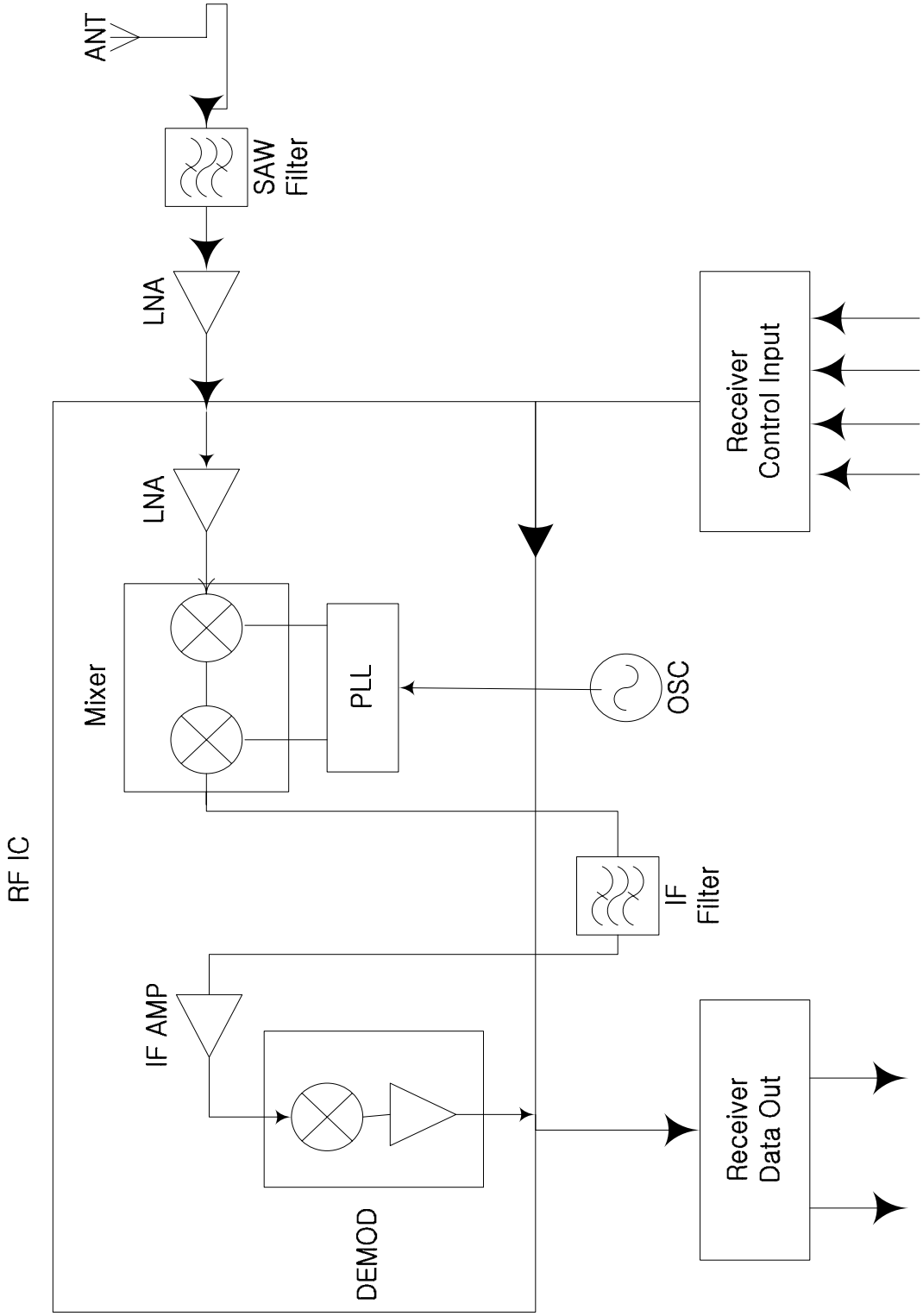
| Key | Mark | Operation | Function | Model |
|---|---|---|---|---|
| Lock |  | Lock key is pressed | CENTRAL LOCK | 100060233<br>100060234<br>100060235 |
| | | | Horning for 30ms | |
| | | | Lighting turn lamp for 1 second | |
| | | Lock key is pressed for 0.5 seconds | DRIVER POWER WINDOW CLOSE | |
| | | | Closing window of driver's seat | |
| Unlock |  | Unlock key is pressed | CENTRAL UNLOCK | 100060233<br>100060234<br>100060235 |
| | | | Blinking turn lamp twice for 1 second | |
| | | Unlock key is pressed for 0.5 seconds | DRIVER POWER WINDOW OPEN | |
| | | | Opening window of driver's seat | |
| Panic |  | Panic key is pressed | To stop horning by pressing the panic key | 100060233<br>100060234<br>100060235 |
| | | | Horning for 27 seconds | |
| | | | Blinking turn lamp for 27 seconds | |
| Sliding Door Left |  | Sliding door left key is pressed for 0.5 seconds | To open or close LEFT sliding door by pressing the Sliding Door Left button | 100060234<br>100060235 |
| Sliding Door Right |  | Sliding door right key is pressed for 0.5 seconds | To open or close RIGHT sliding door by pressing the Sliding Door Right button | 100060234<br>100060235 |
| Tail Gate |  | Tailgate key is pressed for 0.5 seconds | To open or close tailgate by pressing the tailgate button | 100060235 |
| | | | Blinking turn lamps 5 times | |

# 3. Block diagram

## 3.1 Transmitter



3.2 Receiver


ANT
SAW Filter
LNA
LNA
Receiver Control Input
Mixer
PLL
OSC
RF IC
IF Filter
IF AMP
Receiver Data Out
DEMOD

# 4. Specification

## 4.1 CPU

| | |
|---|---|
| Type | PIC16F676<br>Manufacturer : MICROCHIP |
| RFIC | TH72001<br>Manufacturer : Melexis |
| Memory | 2K × 8bit |
| Clock frequency | 4.00MHz |
| Clock frequency generation | INTERNAL |
| Package | 14pin TSSOP |

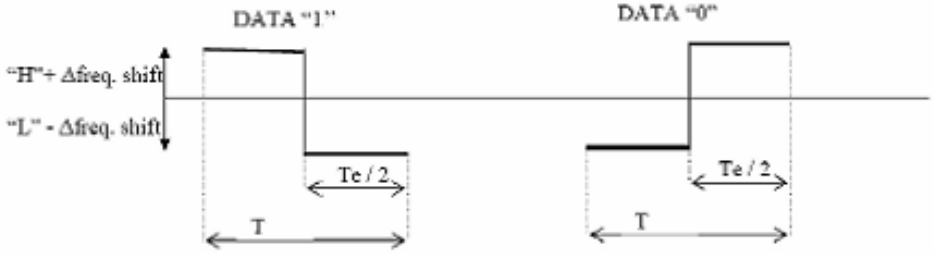
## 4.2 RF Receiver module

| | |
|---|---|
| Local clock frequency | 315 MHz |
| Frequency generation | Crystal |
| Modulation Scheme | FM (Single Superheterodyne) |
| Bandwidth | ±100KHz |
| RFIC | TH71102<br>Manufacturer : Melexis |

## 4.3 Others

| | |
|---|---|
| Dimension | 68.3 x 37.8 x 11.0 |
| Weigh | 30g |
| Battery | Car Battery(DC 12V) |
| Operation Voltage,Current | DC3V, 14mA(1uA on standby) |
| Operation Temperature | -30℃ ~ +80℃ |

## 5. DATA structures




First frame structure :

| Preamble $T_{preamb}$ | Header $T_{head}$ | Random code $T_{rand}$ | Key data (Tkeydata) | Synch. Counter (Tsynch) | Check Sum (Tchksum) | Interframe (Tinter) |
|---|---|---|---|---|---|---|
| 40 bits Manchester data "0" (1200Hz 50% duty cycle | 4 bits Manch data at "1010" | 20 bits coded data | 6 bits key data | 20 bits incremental counter data | 8 bit SUM of data | Manchester code violation |

Message field table :

| FRAME | Field | Length (Tbits) | Value (Bin=binary/hex= hexadecimal) | Duration (ms) |
|---|---|---|---|---|
| First frame | Preamble | 40 | 00000 hex | 33.33 |
| | Header | 4 | 1010 bin | 3.332 |
| | Random | 20 | RRRRR hex | 16.66 |
| | Key | 6 | k-k-k-k-k-k-bin | 4.998 |
| | Sync. | 20 | SSSSS hex | 16.66 |
| | Check sum | 8 | XX hex | 6.664 |
| | **Inter-frame** | 6 | **"H"+"L" + 0000 bin** | 4.998 |
| Second frame | Header | 4 | 1010 bin | 3.332 |
| | Random | 20 | RRRRR hex | 16.66 |
| | Key | 6 | k-k-k-k-k-k-bin | 4.998 |
| | Sync. | 20 | SSSSS hex | 16.66 |
| | Check sum | 8 | XX hex | 6.664 |
| | **Inter-frame** | 6 | **"H"+"L" + 0000 bin** | 4.998 |
| Third frame | Header | 4 | 1010 bin | 3.332 |
| | Random | 20 | RRRRR hex | 16.66 |
| | Key | 6 | k-k-k-k-k-k-(b) | 4.998 |
| | Sync. | 20 | SSSSS (h) | 16.66 |
| | Check sum | 8 | XX (h) | 6.664 |
| | **Inter-frame** | 2 | **"H"+"L"** | **1.666** |
| | *TOTAL* | *228 bits* | | ***190 ms*** |

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