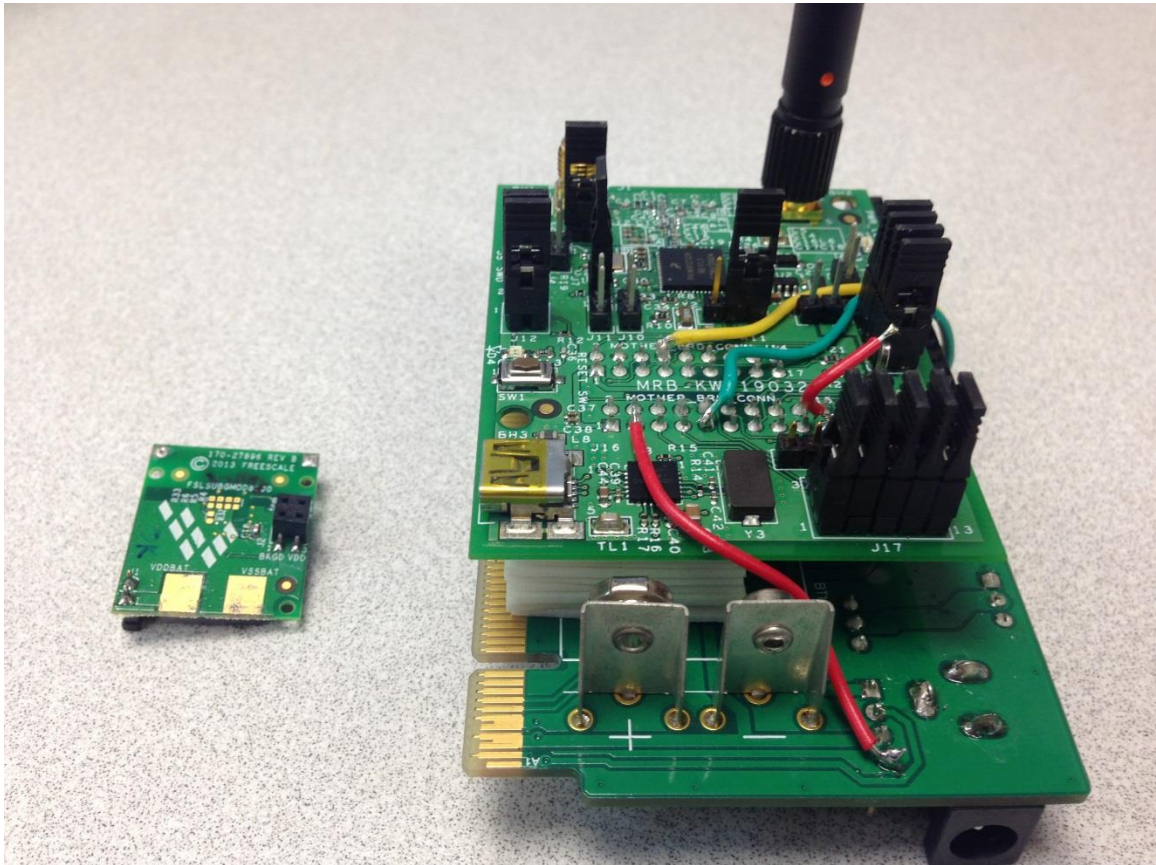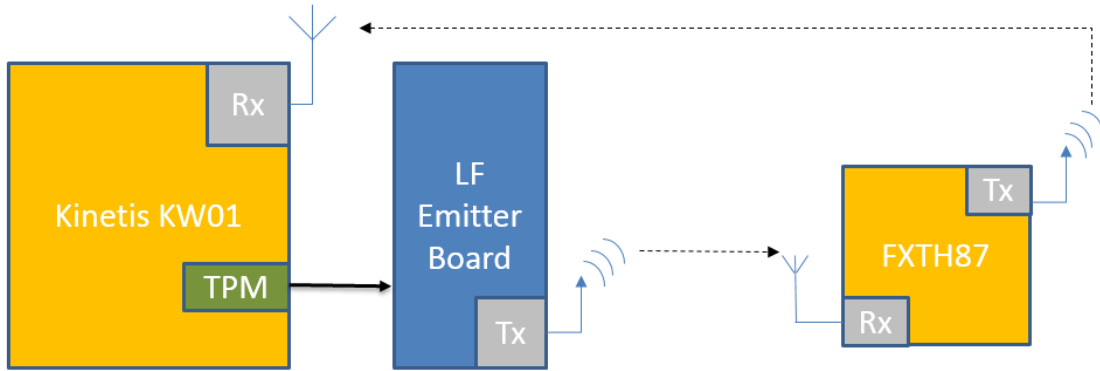# Kinetis KW01 for TPMS Over-the-Air Software Update

# Brief Description

NXP Tire Pressure Monitoring Sensors (TPMS) were preloaded the firmware libraries and test software for a variety of customer use cases. The preloaded TPMS bootloader provides wireless software update function for the aftermarket. This demo uses Kinetis KW01 and Low Frequency emitter to accomplish TPMS over-the-air software update.

# Reference Picture

# Block Diagram



# Features

315 MHz RF

125 KHz LF

FSK modulation

Manchester Encoding

Timer/PWM Modules

IAR Embedded Workbench for ARM 7.40

CodeWarrior V6.3

# NXP Parts Used

MRB-KW019032 (MKW01Z128CHN)

TPMS870911 (FXTH870911DT1)

LF Emitter Board

## Get Software

MKW01_TPMS_bootloader.rar
MPXY8702_TPMS_bootloader.rar
TPMS-MKW01-IAR7v4-Project.zip

## General Stage

Prototype Launched for Alpha customers

# Demo Setup

## Hardware Requirements

MRB-KW019032 x 2
- MRB-KW019032 Board A: Connected with LF Emitter Board
- MRB-KW019032 Board B: Standalone

TPMS879011 x 1

LF Emitter Board x 1

## Hardware Connection

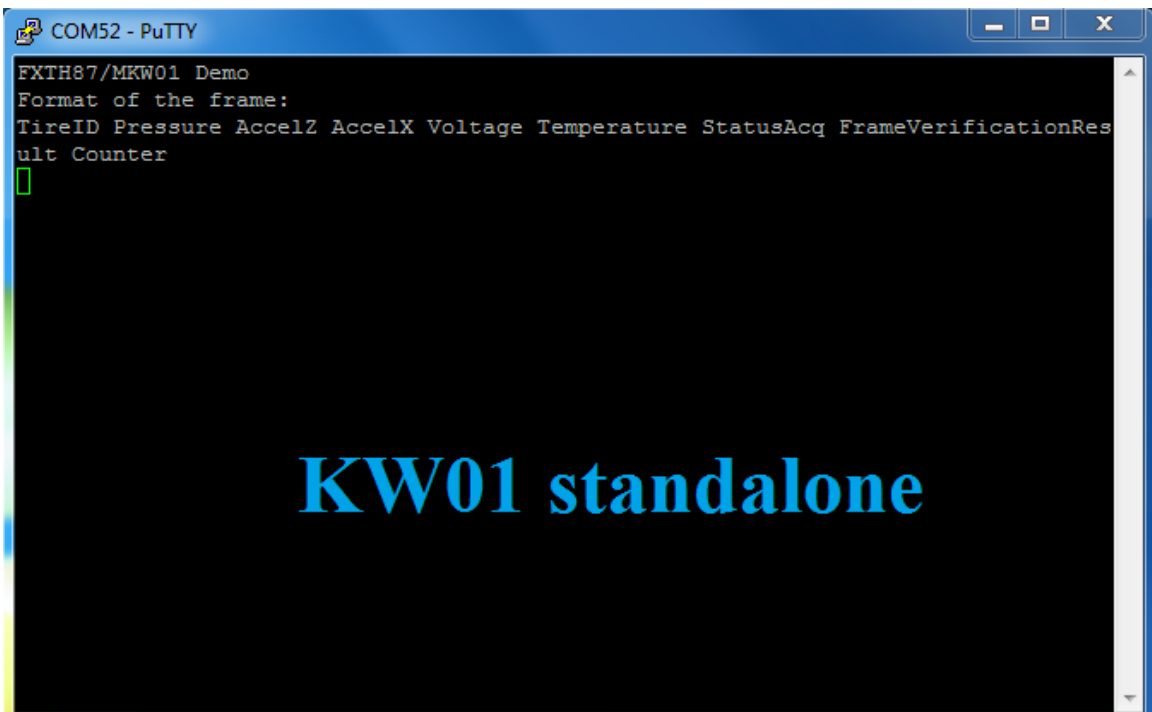| Pin function | MRB-KW019032 | LF Emitter Board |
|---|---|---|
| **TPM1_CH0** | PTB0 (J15-9) | J5-20 |
| **TPM1_CH1** | PTB1 (J14-8) | J5-28 |
| **GND** | GND (J15-2) | J6-4 |

## Demo Description

A prebuild TPMS870911 firmware is stored in MRB-KW019032 Board A and this firmware will be sent to TPMS870911 via 125kHz LF signal. After TPMS870911 completes the firmware update, TPMS870911 will send the information of pressure sensor to MRB-KW019032 Board B via 315 MHz RF signal.

## Demo Procedure

1. Download MKW01_TPMS_bootloader.rar into MRB-KW019032 Board A with IAR 7.40
2. Download TPMS-MKW01-IAR7v4-Project.zip into MRB-KW019032 Board B with IAR 7.40
3. Download MPXY8702_TPMS_bootloader.rar into TPMS870911 with CodeWarrior V6.3
4. Connect USB cable between PC and both of MRB-KW019032 boards, and open the terminal with the following settings
   - 115200 baud rate
   - 8 data bits
   - No parity
   - One stop bit

• No flow control

5. Press the reset button on both of MRB-KW019032 boards and then the demo message will be shown on the terminal.



6. Short Pin19 of J15 (PTD6) on MRB-KW019032 Board A as SW3 press to start TPMS870911 over-the-air software update

7. After TPMS870911 completes software update, MRB-KW019032 Board B will print the received RF message which was sent from TPMS870911 on the terminal.



```
COM42 - PuTTY
TPMS Field Software Updates by KW01
Press SW3 for FLASH PROGRAM command
FLASH PROGRAM start
FLASH PROGRAM success !
```

KW01 with LF board



```
COM52 - PuTTY
FXTH87/MKW01 Demo
Format of the frame:
TireID Pressure AccelZ AccelX Voltage Temperature StatusAcq FrameVerificationResult Counter
BB02BB02000101040102BD5300000000
CC03CC03000101040102BD5300000001
DD04DD04000101050101BD5300000002
AA01AA01000101050102BD5300000003
BB02BB02000101050102BD5300000004
CC03CC03000101050102BD5300000005
DD04DD04000101050102BD5300000006
AA01AA01000101040102BD5300000007
BB02BB02000101040102BD5300000008
CC03CC03000101050102BD5300000009
DD04DD04000101040102BD530000000A
AA01AA01000101050102BD530000000B
BB02BB02000101050102BD530000000C
CC03CC03000101040102BD530000000D
DD04DD04000101050102BD530000000E
AA01AA01000101040102BD520000000F
BB02BB02000101050102BD5300000010
CC03CC03000101050102BD5300000011
DD04DD04000101040102BD5300000012
AA01AA01000101040103BD5300000013
```

➡ **Message from TPMS870911**

KW01 standalone