

# PMAfob RKE Demo

## User Guide V2.1

October 20<sup>th</sup>, 2010



Never stop thinking

# PMAfob RKE Demo User Guide

## ■ Overview

- PMAfob Software
- PMAfob Hardware
- Receiver Software
- Receiver Hardware

## ■ Setup of the PMAfob RKE Demo

- Step 1: Installation of the PC-Application
- Step 2: Installation of the PMAfob Software
- Step 3: Configuration of the PMAfob
- Step 4: Connection of the Receiver Board
- Step 5: Handling of the PC-Application

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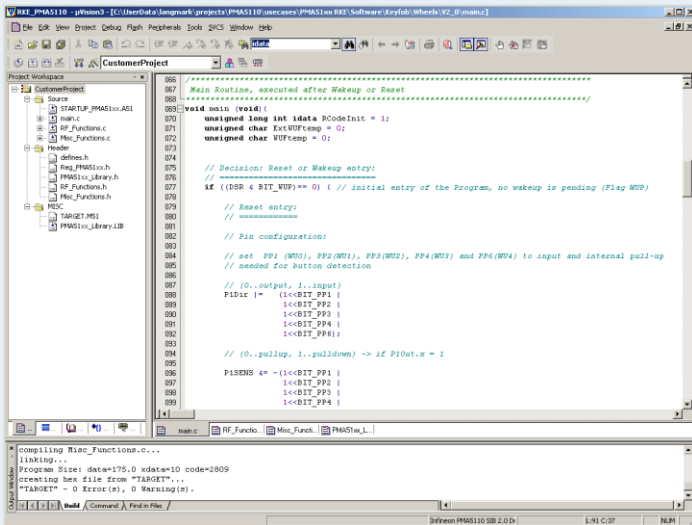
## ■ Setup of the PMAfob RKE Demo

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# Overview

TX

## PMAfob Software Example



```
1 // PMA51xx - Infineon Technologies AG
2 // Main Routine, executed after Wakeup or Reset
3 //
4 // void main(void)
5 // {
6 //     unsigned long int idata_RCodeInit = 1;
7 //     unsigned char ExtVFFreq = 0;
8 //     unsigned char VFFreq = 0;
9 //
10 //     // Decision: Reset or Wakeup entry:
11 //     // (DSB & BIT_VFFreq == 0) // Initial entry of the Program, no wakeup is pending (Flag WUP)
12 //     if ((DSB & BIT_VFFreq == 0) { // Initial entry of the Program, no wakeup is pending (Flag WUP)
13 //         // Reset entry:
14 //         // =====
15 //         // Pin configuration:
16 //         // set PP1 (WD0), PP2 (WD1), PP3 (WD2), PP4 (WD3) and PP6 (WD4) to input and internal pull-up
17 //         // needed for button detection
18 //         // (0..output, 1..input)
19 //         PDir |= (1<<BIT_PP1 |
20 //                1<<BIT_PP2 |
21 //                1<<BIT_PP3 |
22 //                1<<BIT_PP4 |
23 //                1<<BIT_PP6);
24 //
25 //         // (0..pullup, 1..pulldown) -> if P1Out.x = 1
26 //         P1SENS &= (1<<BIT_PP1 |
27 //                   1<<BIT_PP2 |
28 //                   1<<BIT_PP3 |
29 //                   1<<BIT_PP4 |
30 //                   1<<BIT_PP6);
31 //     }
32 // }
```



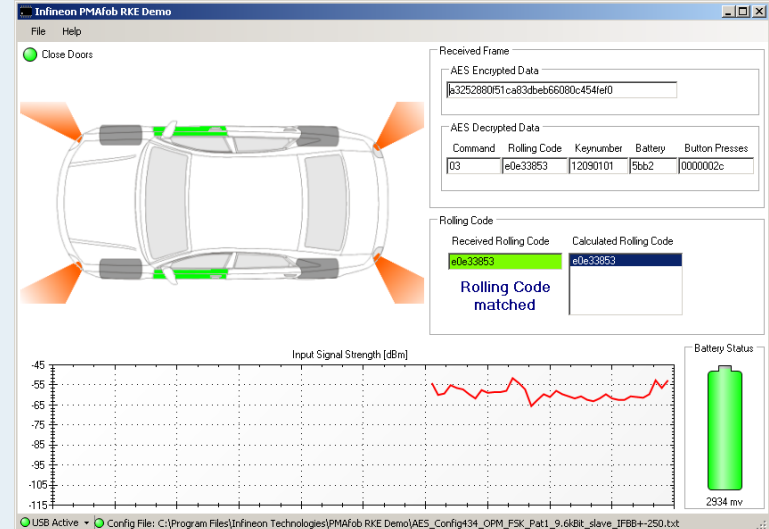
PMAfob (PMA51xx)



RF

RX

## Visualization on PC



USB

TDA5230 UWLlink Stick

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### □ PMAfob Software

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□ Step 5: Handling of the PC-Application

# Overview – PMAfob Software

## ■ Features

- Five buttons (Handling of five external wake-ups)
- Button stuck detection
- Debounce buttons
- Secure communication
  - ▮ Advanced Encryption Standard (AES) or
  - ▮ eXtended Tiny Encryption Algorithm (XTEA) encryption
  - ▮ Rolling code generation
- Battery voltage measurement
- Energy saving by using Power Down Mode
- Configurable software by long button presses






■ Note: An Application Note describing the PMAfob Software can be found here: <http://www.infineon.com/pma>

- After reset (change of battery) the following configuration is used:
  - **Baudrate:** 9600 bps
  - **RF Framing:** AES
  - **Encryption:** ON
  - **Unique Key Number:** User defined unique id

# PMAfob Software Configuration by long button presses

- If buttons are pressed longer then  $\sim 3$  s, the software configuration is changed as shown in the table.

- Note: If the Framing is changed the Receiver has to be reconfigured!  
The PC Application only accepts encrypted frames!

PMAfob Button	Software Configuration
	Choose AES Framing.
	Choose 4 bytes of PMA unique id.
	Choose XTEA Framing.
	Choose user defined unique id.
	Switch encryption on / off: ON => baudrate: 9600 bps OFF=> baudrate: 4800 bps



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- **PMAfob Hardware**

- Receiver Software

- Receiver Hardware

## ■ Setup of the PMAfob RKE Demo

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# Overview – PMAfob Hardware

## ■ Settings

- 5 buttons enclosure
- 434MHz band
- 9.6kbaud Manchester code
- FSK modulation
- 5dBm output power
- Frequency deviation of approx. 50kHz
- Duty cycle setting of 34%



**Keyfob enclosure**



**Top view**



**Bottom view**

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# Overview – Receiver Software

## ■ Features

- Configure TDA5230
- Read out data from TDA5230
- Decrypt AES or XTEA encrypted RF-Frame
- Calculate rolling code for every PMAfob
- Illustrate the received command
- Illustrate signal strength (measured by TDA5230)

## ■ NOTE:

- The UWLink is flashed by Infineon with the appropriate firmware.
- The firmware installer  
“PMAfob\_DEMO\_UWLink\_Firmware\_Vx.y.msi” is included in  
“PMAfob\_RKE\_DEMO\_SW\_Vx.y.zip” available at  
<http://www.infineon.com/pma>

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# Overview – Receiver Hardware

## ■ Features

- SmartLEWIS RX – TDA5230 UWLink Stick used as Receiver Board
- USB communication done with FTDI chip
- Matching Network for 434MHz

## ■ Note

- More information about the UWLink can be found on <http://www.infineon.com/uwlink>
- More information about TDA523x can be found on <http://www.infineon.com/tda5230>

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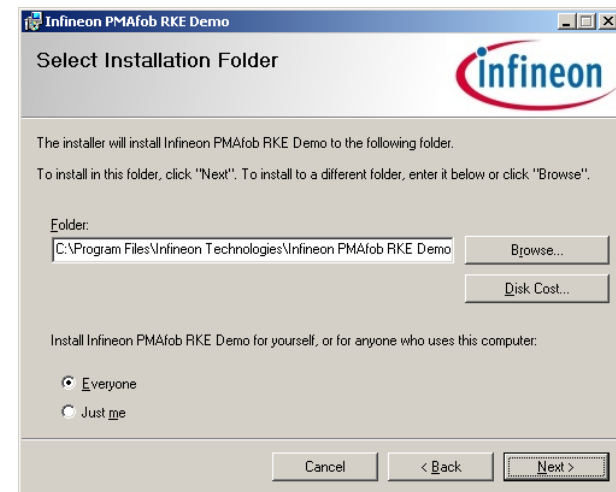
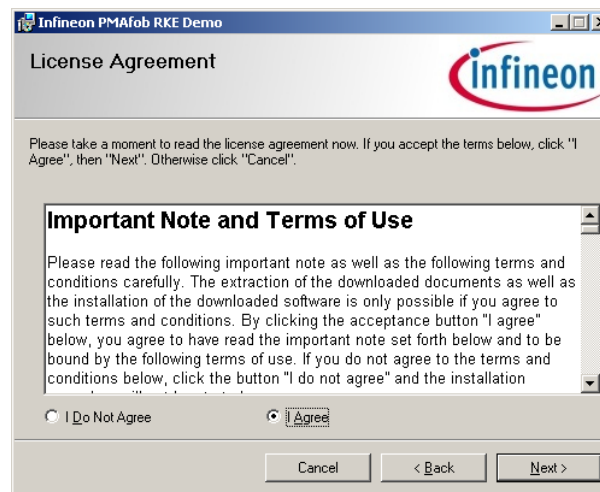
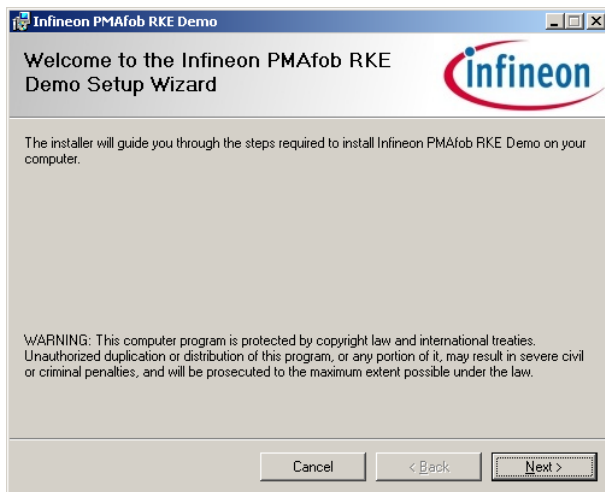
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# Setup of the PMAfob RKE Demo

## ■ Step 1: Installation of the PC-Application

- Double click *PMAfob\_RKE\_DEMO\_Rx\_Vx.y.msi* and follow the onscreen installation instructions.  
This will run the PMAfob RKE Demo setup.

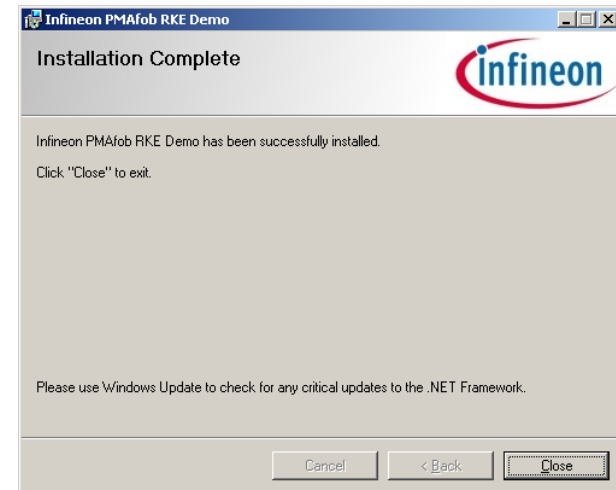
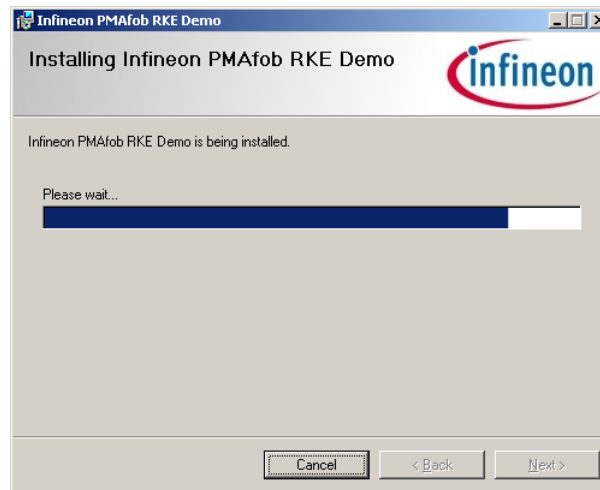
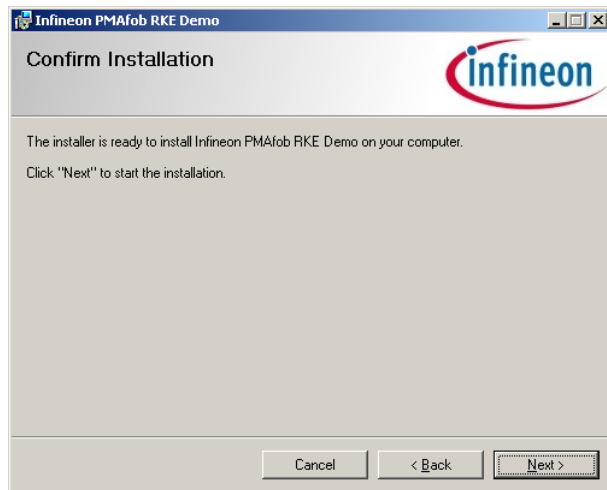




# Setup of the PMAfob RKE Demo

## ■ Step 1: Installation of the PC-Application

- Double click *PMAfob\_RKE\_DEMO\_Rx\_Vx.y.msi* and follow the onscreen installation instructions.  
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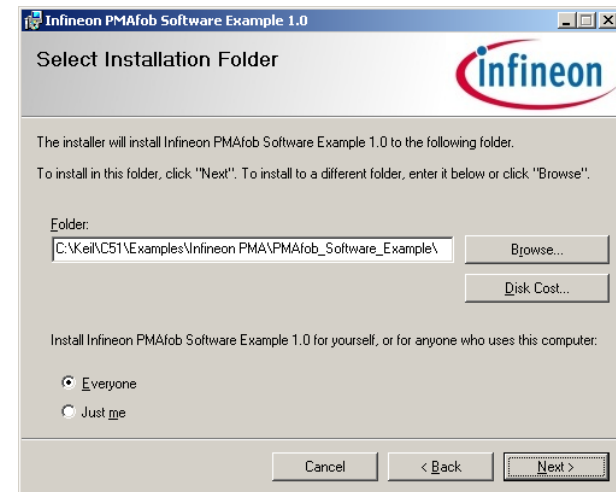
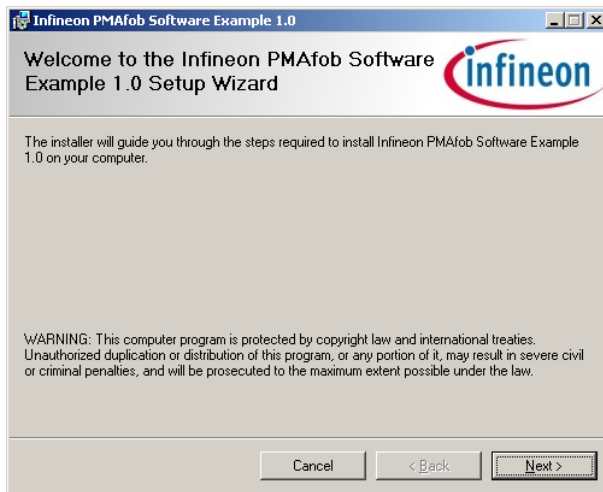
## ■ Setup of the PMAfob RKE Demo

- Step 1: Installation of the PC-Application
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- Step 5: Handling of the PC-Application

# Setup of the PMAfob RKE Demo

## ■ Step 2: Installation of the PMAfob Software

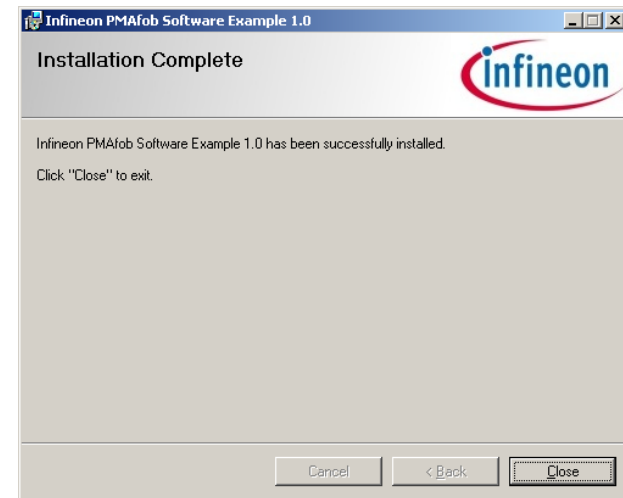
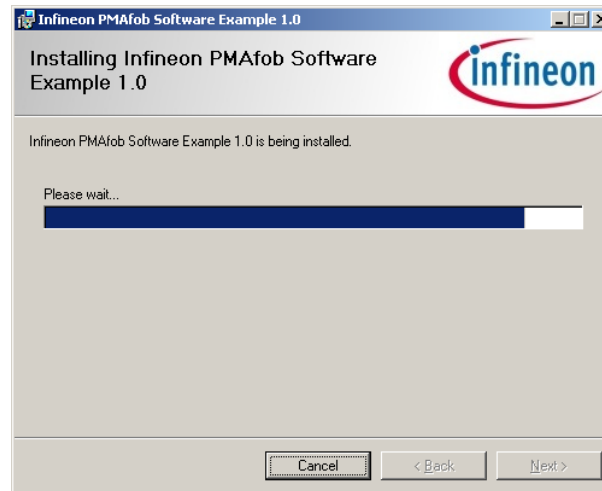
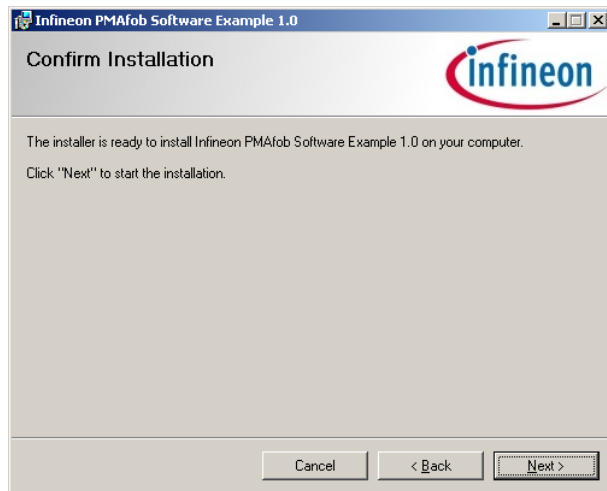
- Double click *PMAfob\_DEMO\_Tx\_Sources\_Vx.y.msi* and follow the onscreen installation instructions.  
This will run the PMAfob Software Example setup.



# Setup of the PMAfob RKE Demo

## ■ Step 2: Installation of the PMAfob Software

- Double click *PMAfob\_DEMO\_Tx\_Sources\_Vx.y.msi* and follow the onscreen installation instructions.  
This will run the PMAfob Software Example setup.



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# Setup of the PMAfob RKE Demo

## ■ Step 3: Configuration of the PMAfob

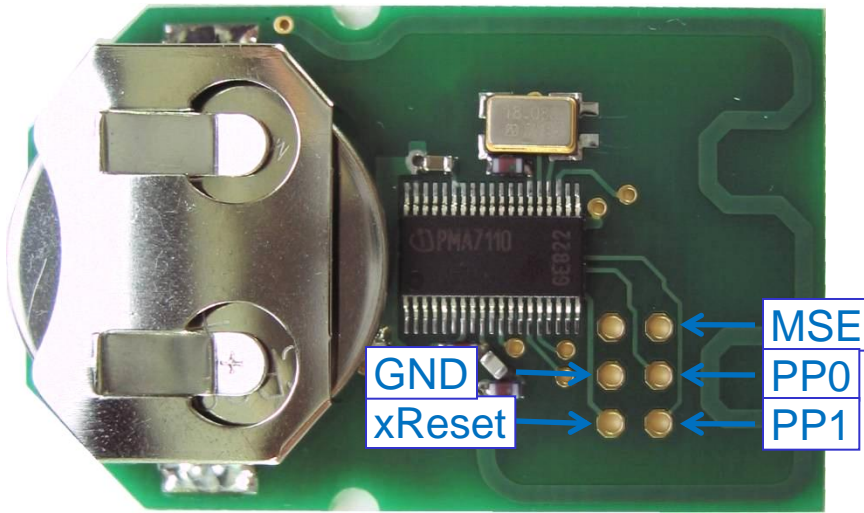
### □ Delivery status

- PMAfobs are delivered with PMAfob Software programmed on it.
- AES Framing is the default selection.

### □ Programming Connector

### □ Note:

- The PMAfobs can be reprogrammed using the PMA Starter Kit or PMA Evaluation Kit.
- The PMAfob needs to be self-powered during programming (e.g.: battery)



# PMAfob RKE Demo User Guide

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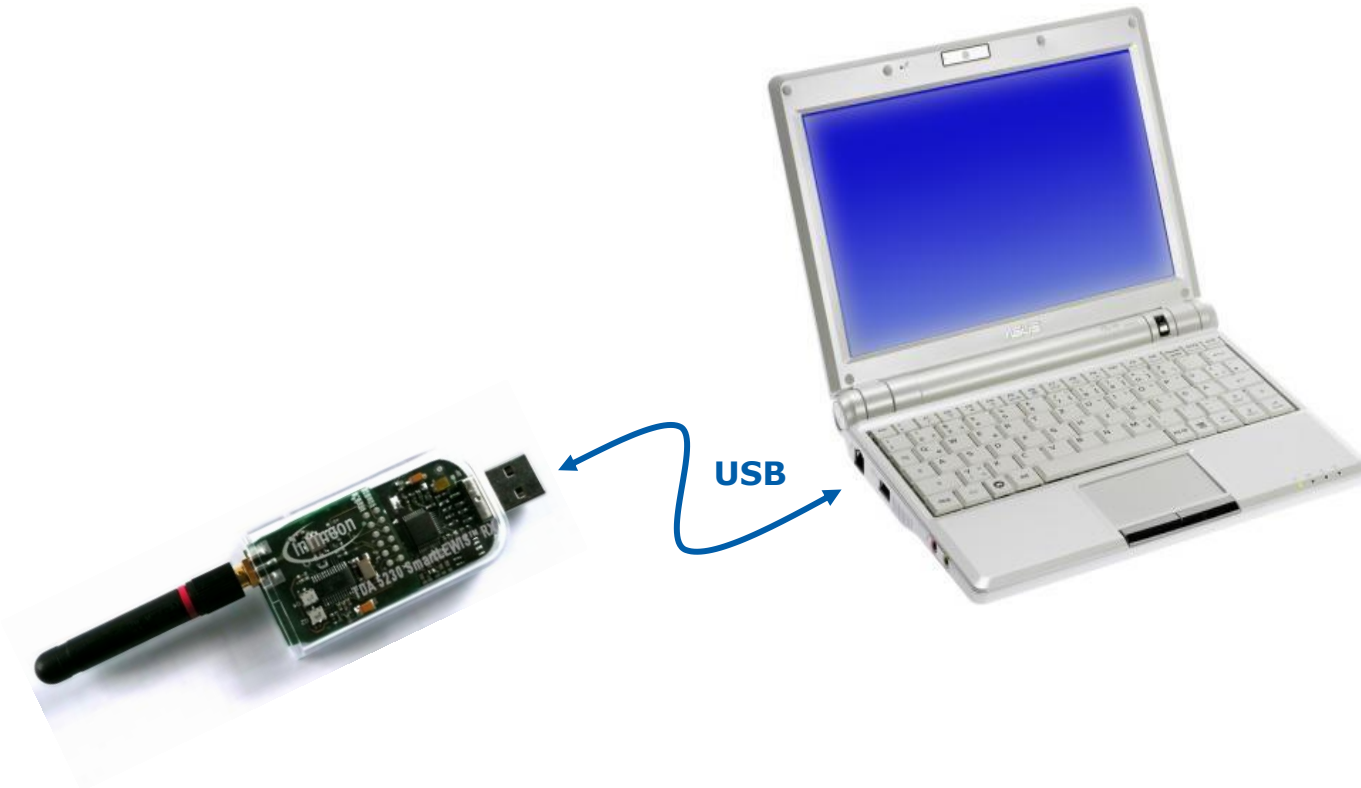
- PMAfob Software
- PMAfob Hardware
- Receiver Software
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## ■ Setup of the PMAfob RKE Demo

- Step 1: Installation of the PC-Application
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- Step 3: Configuration of the PMAfob
- **Step 4: Connection of the Receiver Board**
- Step 5: Handling of the PC-Application

# Setup of the PMAfob RKE Demo

- Step 4: Connection of the Receiver Board
  - Connect the Receiver Board via USB





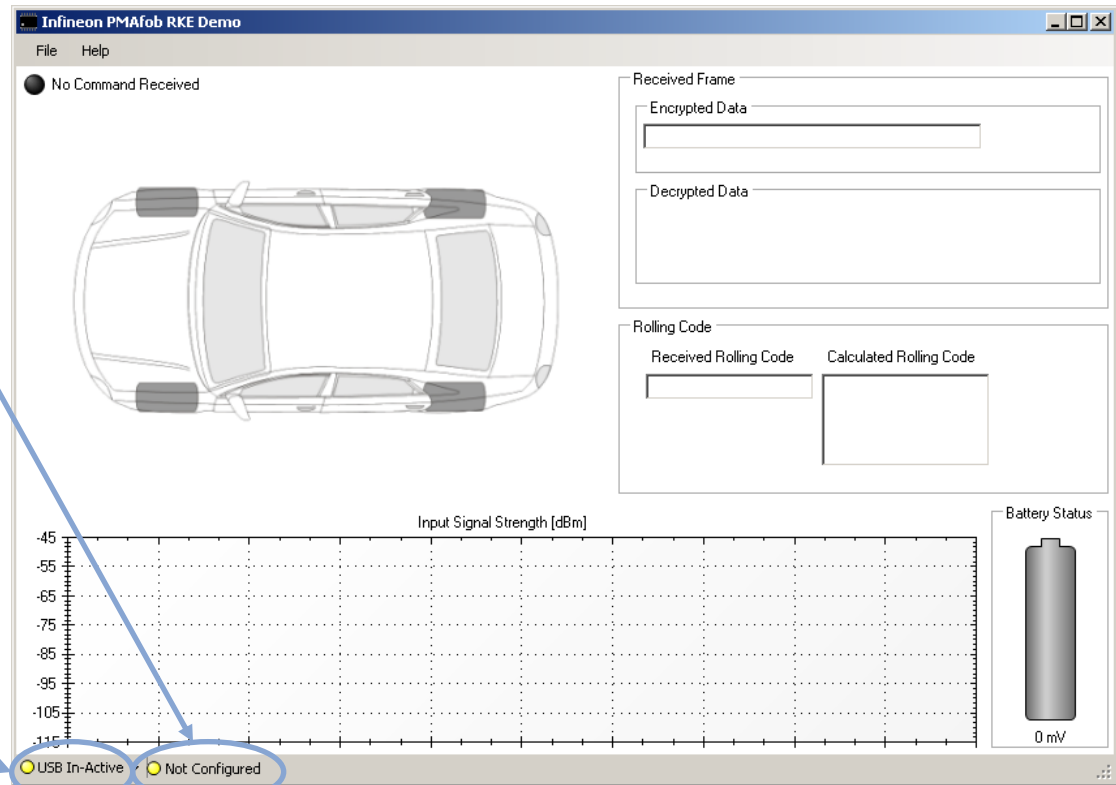
# Setup of the PMAfob RKE Demo

## ■ Step 4: Connection of the Receiver Board

□ After startup the PC-Application will look like the figure below

□ Receiver Board is not configured

□ USB connection is inactive if no Receiver Board is connected



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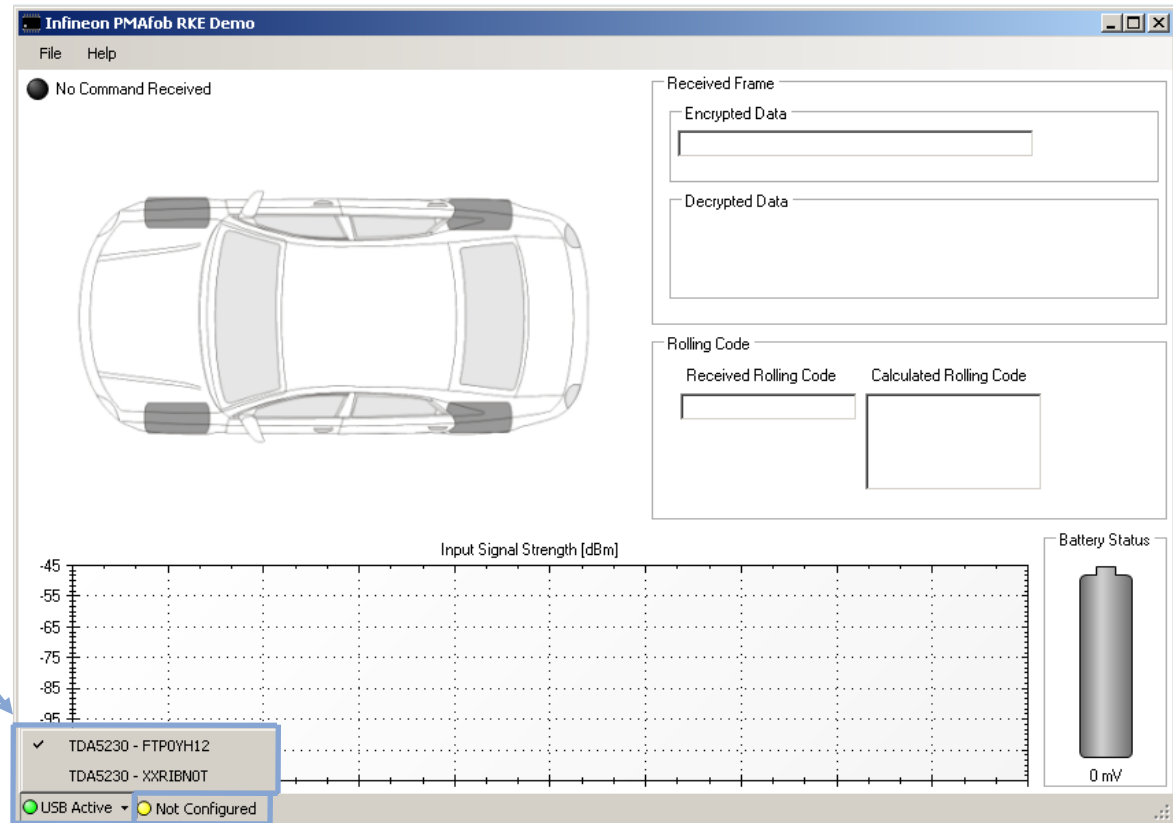
# Setup of the PMAfob RKE Demo

## ■ Step 5: Handling of the PC-Application

- After connecting the Receiver Board(s) the PC-Application will look like the figure below

- All connected Receiver Boards are listed. One is selectable

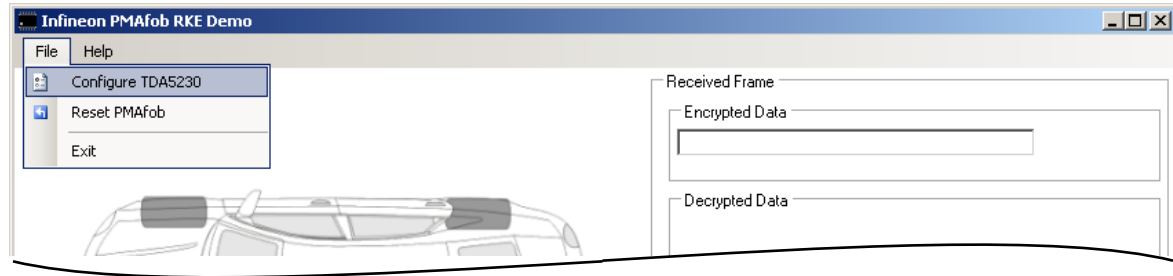
- Receiver Board is not configured



# Setup of the PMAfob RKE Demo

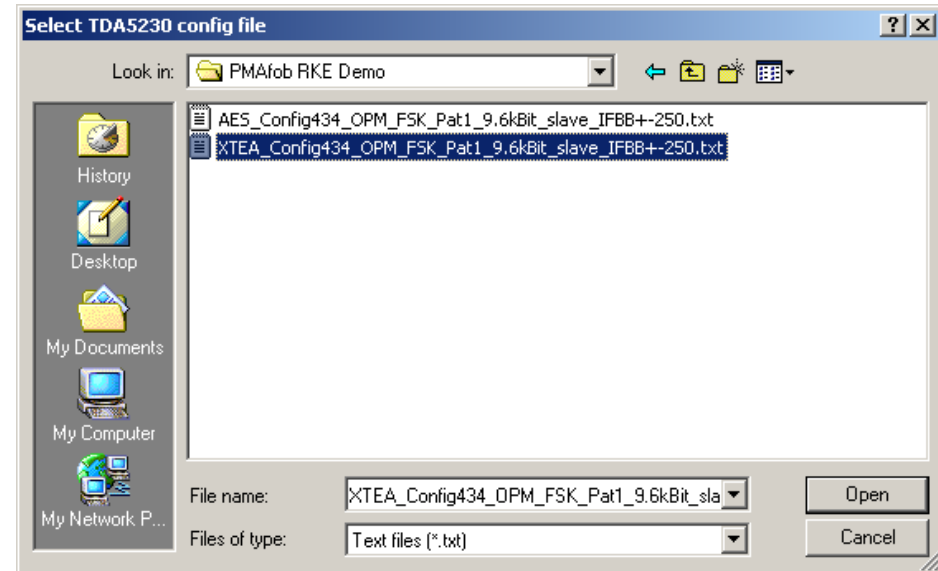
## ■ Step 5: Handling of the PC-Application

### □ Select File -> Configure TDA5230



### □ Choose the TDA5230 configuration file for AES or XTEA framing according to the configuration of your PMAfob (Default configuration of PMAfob is AES)

### □ For SmartLEWIS RX – TDA5230 UWLlink Stick use config files starting with “UWLINK\_...”



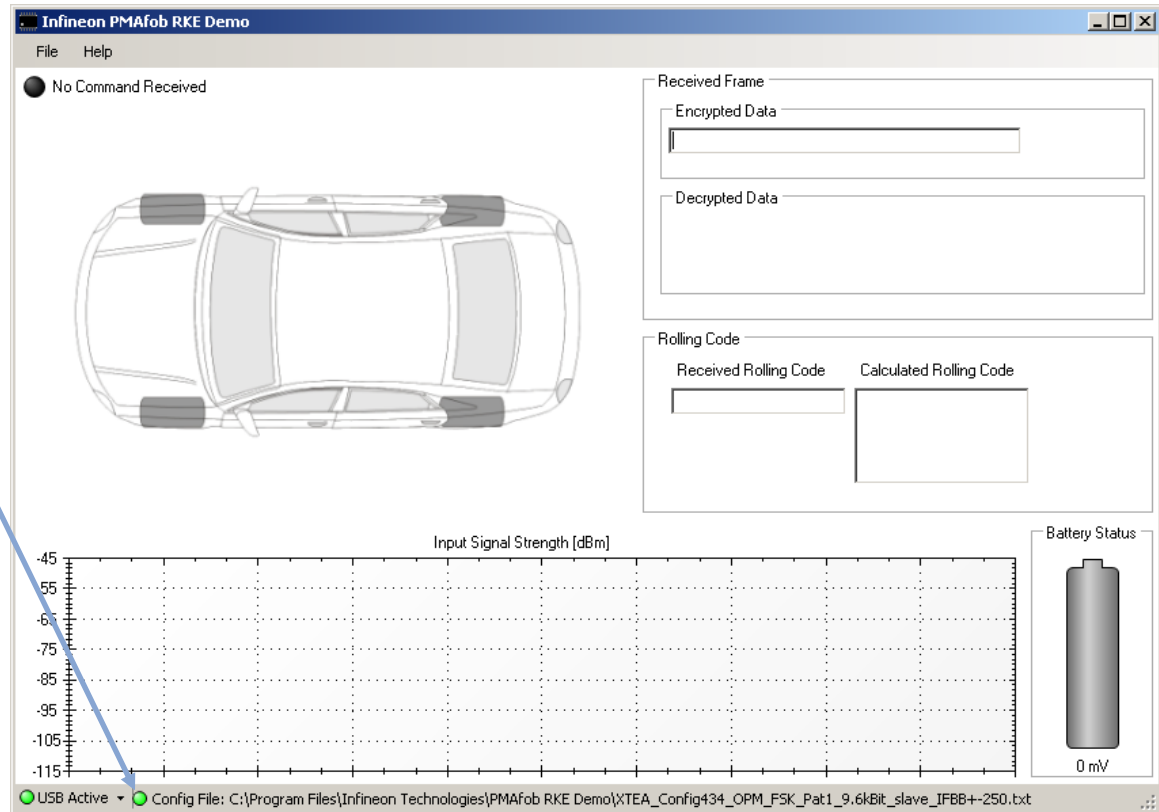
# Setup of the PMAfob RKE Demo

## ■ Step 5: Handling of the PC-Application

- After successful configuration of the Receiver Board the PC-Application looks like the figure below

- Configuration LED is green and Config File is shown.

- Note:  
If the Receiver Board is unplugged and reconnected again it will be automatically configured with the selected Config File



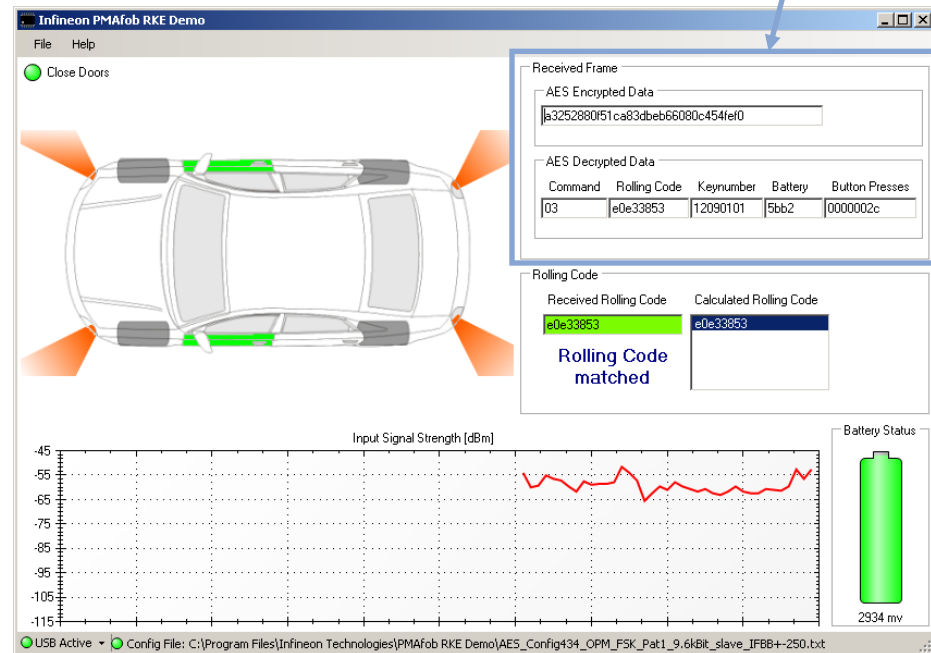
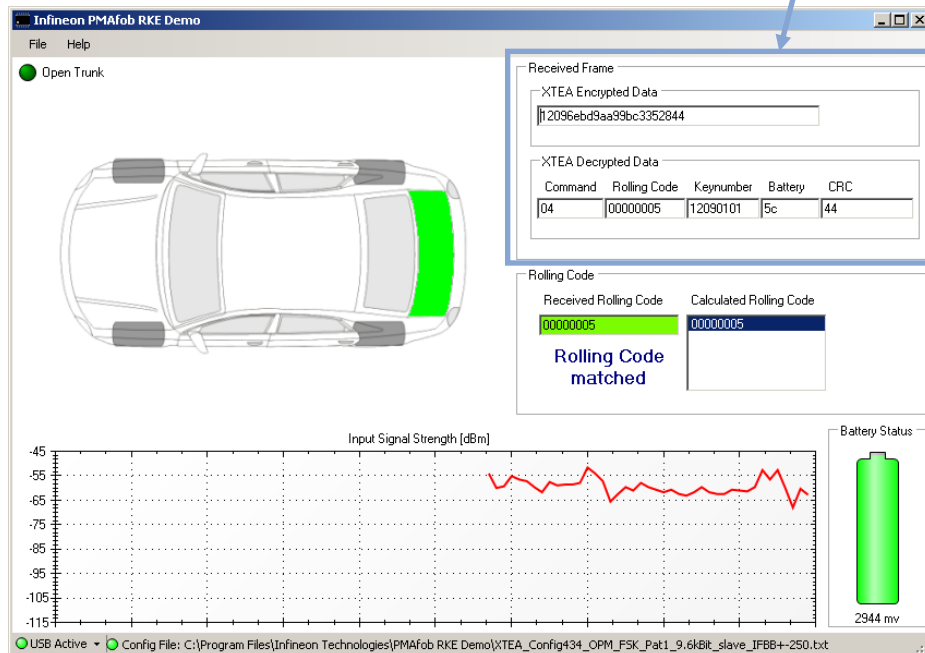
# Setup of the PMAfob RKE Demo

## ■ Step 5: Handling of the PC-Application

- After successful configuration of the Receiver Board pressing any button on the PMAfob will show the received data
- Depending on the encryption you use (must be equal for PMAfob and PC-Application) the appropriate RF-Framing is displayed

XTEA-Framing

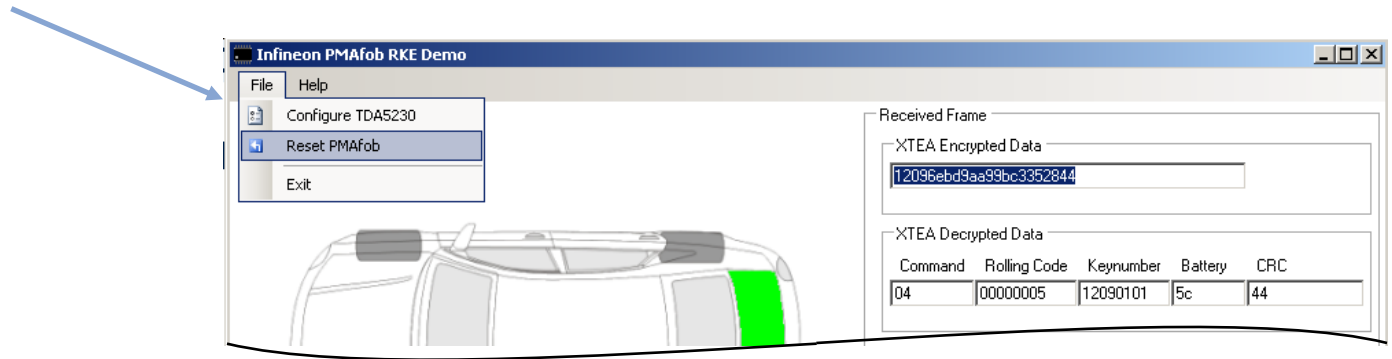
AES-Framing



# Setup of the PMAfob RKE Demo

## ■ Step 5: Handling of the PC-Application

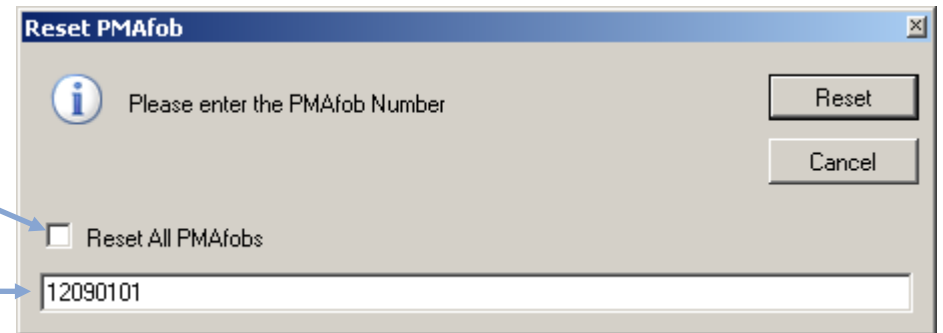
### □ Select File -> Reset PMAfob



### □ Reset the Rolling Code counter (Reset Button) for

→ all PMAfobs by checking "Reset All PMAfobs" or

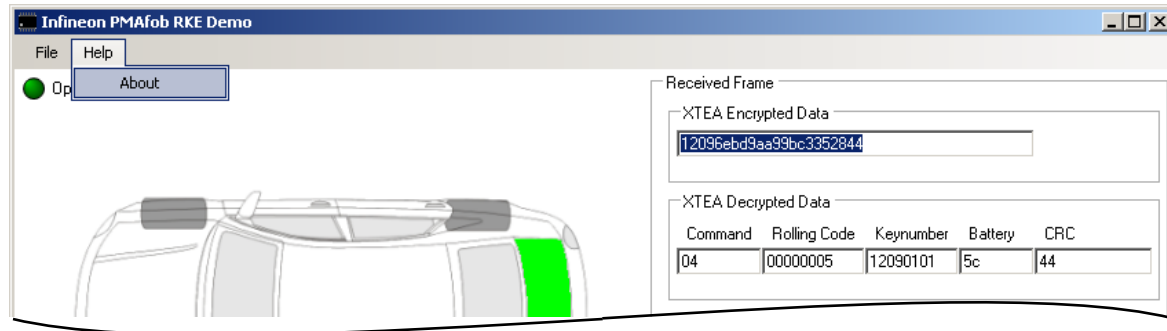
→ a special PMAfob, by entering the *Keynumber*



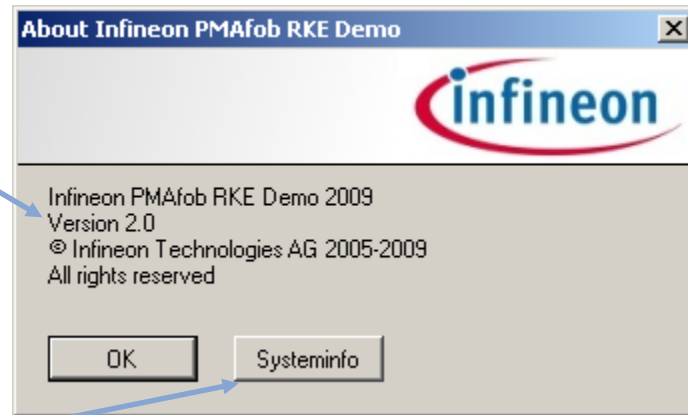
# Setup of the PMAfob RKE Demo

## ■ Step 5: Handling of the PC-Application

- Select Help -> About



- This dialog shows the currently used version



- Press *Systeminfo* to get information about your PC system





**We commit.**  
**We innovate.**  
**We partner.**  
**We create value.**



Never stop thinking