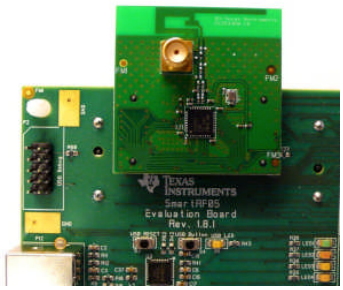
CC2533DK Quick Start Guide

1. Kit Contents

2 x CC2533EM with PCB antennas
2 x 2.4 GHz SMA antennas
2 x SmartRF05EB (prototype boards)
1 x CC2531 USB Dongle (packet sniffer)
Batteries, cables and documentation

This quick start guide will show how to run the packet error rate test which is preprogrammed on the CC2533 devices in this kit. It will also point to additional resources.

2. Plug EM into SmartRF05EB



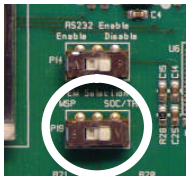
The CC2533EM can be plugged into the SmartRF05EB.

Note that you DO NOT need the SMA antenna, as the PCB antenna is used by default.

For more information about the SmartRF05 Evaluation Board, please refer to the User Guide [3].

3. Configure the SmartRF05EB

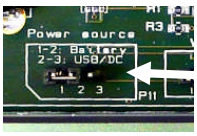
Set the EM Selection switch in position SOC/TRX.



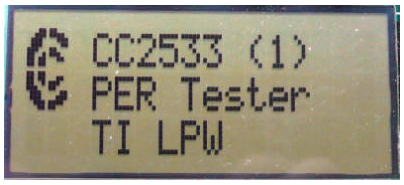
*If you have a SmartRF05EB version 1.7.1 or older, it is recommended to turn **off** the RS232 interface for best performance.*

Select power source with the jumper on header P11:

- Position 1-2: Batteries
- Position 2-3: USB or DC supply



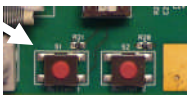
4. Packet Error Rate (PER)



When power is applied to the SmartRF05EB, the preprogrammed PER test on the CC2533 will start running.

The LCD will display the screen as shown in the picture above. The number in the parentheses is the revision of the CC2533.

Press Button 1 to continue.



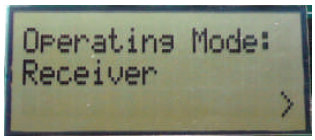
5. Select Channel

Select one of the 16 IEEE 802.15.4 channels, with channel number from 11 to 26 (2405-2480 MHz, 5 MHz channel spacing). Select the same channel for both boards.

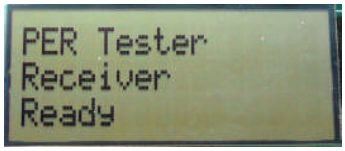
The channel number is increased by moving the joystick in any direction.

Press Button 1 to confirm the selection.

6 Set up the Receiver

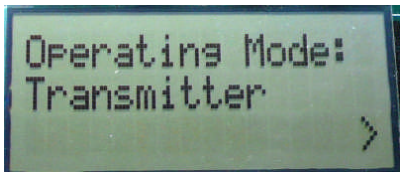


Set one of the boards to operate as receiver. Use the joystick to select mode. Confirm by pressing Button 1.



The receiver will now wait for packets from the transmitter.

7. Set up the Transmitter



Set the other board to operate as transmitter. Use the joystick to select mode. Confirm the selection by pressing Button 1.

On the transmitter node, additional parameters have to be set. On the next screen, select the TX output power (signal strength). Use the joystick to select between -3 dBm, 0 dBm, 4.5 dBm or 7 dBm. Confirm the selection with Button 1.

8. TX: Select Number of Packets and Packet rate

Next, select burst size (number of packets to send) by using the joystick, either 1000, 10K, 100K or 1M packets. Confirm the selection with Button 1.

After selecting burst size, select packet rate; 100, 50, 20 or 10 packet per second. Confirm the selection with Button 1.

9. TX: Start PER Test

The transmitter is now configured for the PER test. The PER test is started and stopped by moving the joystick (in any direction). The transmitter will display the number of packets sent during the PER test.

After stopping the test, it will start from the beginning if the test is restarted.

10. RX: Observe PER

The PER test receiver will display the PER value (number of lost and erroneous packets divided by the number of packets sent, displayed as a fraction of 1000).

The receiver will also display the number of received packets and a moving average RSSI value based on the last 32 packets.

By pressing button 1, all counters on the receiver will be reset and the receiver will restart the PER calculations.

11. SmartRF Studio 7

After running the PER test, the next recommended step is to install SmartRF Studio 7 and to connect the evaluation board to the PC.

When installing SmartRF Studio 7, you will also install the USB drivers required for Studio and other tools to communicate with the radio and the SmartRF05EB board.

SmartRF Studio 7 can be used for RF testing and evaluation of C2533 and can be downloaded from www.ti.com/smartrfstudio

12. Flash Programmer

Texas Instruments has a simple tool which can be used to program the flash on the CC2533.

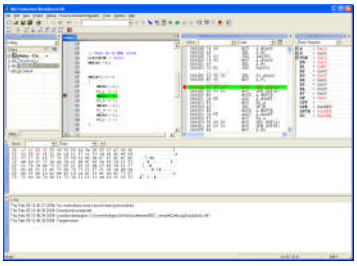
The Flash Programmer application, available on the kit web page [2], can be used to program Intel HEX files, read the contents of flash and several other operations.

Programming of a CC2533 can be done with a SmartRF05EB or a CC Debugger.

Production programming tools are available from TI's developer network [4].

13. IAR Embedded Workbench

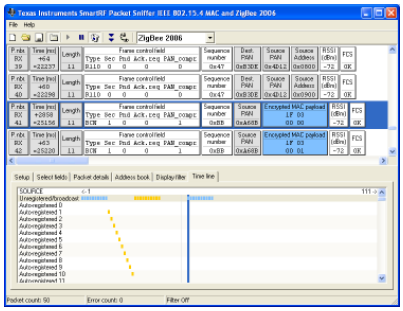
To develop software, program and debug the CC2533, you should use IAR Embedded Workbench for 8051.



A free, code size limited version can be downloaded from the web. See www.iar.com/ew8051.

14. Packet Sniffer

In order to debug RF protocols, it is possible to use TI's SmartRF Packet Sniffer.



You can use a CC2531 USB dongle or the SmartRF05EB with a CC2530EM to capture packets.

A. Available Software

CC2533 Software Examples
Source code for the PER test and other simple examples for the CC2533 [1].

RemoTI™ Network Protocol
TIs' implementation of the ZigBee RF4CE standard: www.ti.com/remoti

TIMAC Software
TI's IEEE 802.15.4 medium-access-control stack: www.ti.com/timac

B. More information

On Texas Instruments' Low-Power RF web site you will find all our latest products, application and design notes, FAQ section, news and events updates, and much more. Just go to www.ti.com/lprf

The Low Power RF Online Community has forums, blogs and videos. Use the forums to find information, discuss and get help with your design. Join us at www.ti.com/lprf-forum

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We hope you will enjoy working with the CC2533 and associated Low-Power RF products from Texas Instruments.

C. References

[1] CC2533 product web page
http://focus.ti.com/docs/prod/folders/print/cc2533.html

[2] CC2533DK kit web page
http://focus.ti.com/docs/toolsw/folders/print/cc2533dk.html

[3] SmartRF05EB User's Guide
www.ti.com/lit/pdf/swru210

[4] LPRF Developer's Network
http://focus.ti.com/general/docs/gencontent.tsp?contentId=29028

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