TEXAS INSTRUMENTS

CC1101DK Quick Start Guide

Opening the box and running the Packet Error Rate Test

1. Kit Contents

2 x SmartRF04EB
2 x CC1101EM (433 or 868/915 MHz)
2 x Antennas (picture may deviate)
2 x USB cables
Documentation

The 868-915 MHz RF boards in this kit are FCC and IC certified. Both the 433 MHz and the 868-915 MHz boards are tested to comply with ETSI/R&TTE over temperatures from 0 to +35°C.

Antenna types:
868-915 MHz: Pulse W5017, 2 dBi
420-470 MHz: Pulse SPWH24433TI, 0 dBi

2. SmartRF04EB Overview

LCD
USB
UART
Joystick
EM connectors
Button S1
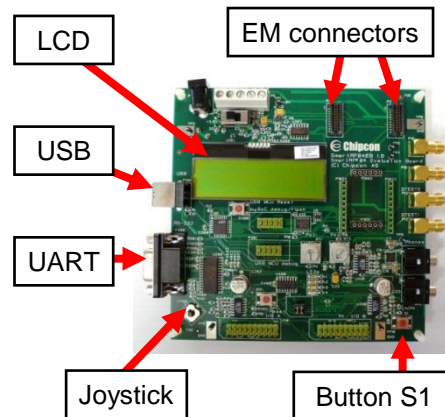
FCC/IC Regulatory Compliance (868-915 only)
FCC Part 15 Class A Compliant
IC ICES-003 Class A Compliant

3. Plug EM into SmartRF04EB

Insert a CC1101EM (EM) with an antenna into the SmartRF04EB (EB). Make sure the antenna is firmly connected for best performance.

Caution! The kit contains ESD sensitive components. Handle with care to prevent permanent damage.

4a. Power: Battery

There are three different ways of applying power to the EB:

The first method involves using an alkaline non-rechargeable battery, either a 9V or a 4xAA battery pack connected to the battery connector on the bottom side of the board

Warning! To minimize risk of personal injury or property damage, ONLY use alkaline non-rechargeable batteries. Never use rechargeable batteries to power the board.

4b. Power: DC/External
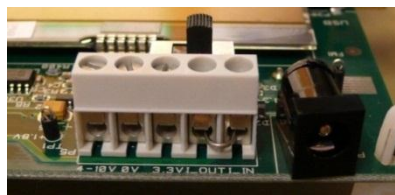
The second method applies DC power using the DC input jack (right in picture, center is +, sleeve is ground), or by connecting a 4-10V voltage source between the 4-10V and 0V terminals of the power connector (left in picture). It is also possible to connect a 3.3V voltage source between the 3.3V and 0V terminals. The on-board voltage regulators will be bypassed in this case.

External Power Supply[1] Requirements:
Nom Voltage: 6 VDC
Max Current: 800 mA
Efficiency Level V

4c. Power: USB
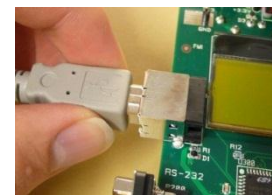
The EB can also be powered from the USB bus. Make sure that the SmartRF™ Studio software is installed before connecting the EB to the PC; otherwise you may experience problems in installing it later due to driver issues.

Note that if multiple power sources are connected, the source with the highest voltage will power the EB. **This means that you should disconnect any attached battery when using a lab supply or USB power; otherwise the battery will be drained.**

5. Set Power Switch
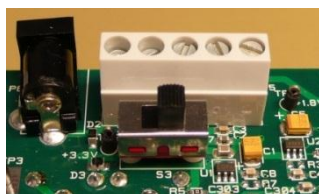
If a 3.3V source is used as described in 4b above, the switch should be set to the leftmost position. For all other cases, the switch should be set to the rightmost position. This switch can be used to turn off the EB by switching it to the opposite position of that used to turn it on

Do not leave the board powered when unattended.

6. Packet Error Rate Test

When power is applied to the board, the PER test program will start. You should see the text shown above on the LCD display on both evaluation boards.

Press the button marked S1 (lower right corner) to continue.

7. Set Frequency Band

Select the desired frequency band of operation by using the joystick. The frequency should match the evaluation module and antenna you are using.

Note that the value shown in the display is also the selected value. There is no need to press a button to select or activate the selection.

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[1] When using an external power supply, make sure it meets the listed requirements in addition to complying with applicable regional product regulatory and safety certification requirements such as UL, CSA, VDE, CCC, and PSE

8. Set Network ID
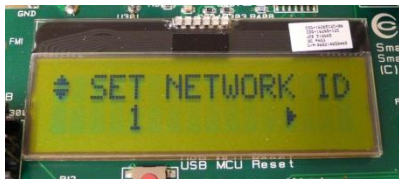
Push the joystick down to display the screen shown above. This lets you set the ID of the node in case you need to run several PER tests simultaneously and you have multiple development kits. Leave this set to 1 for now.

9. Packet Length

Push the joystick down to display the screen shown above. This lets you set the length of the packets to be transmitted. The packet length will affect the measured packet error rate. Push the joystick left or right to select the packet length you want to use.

10. Number of Packets

Push the joystick down to display the screen shown above. This lets you set the number of packets to be transmitted. Set this to the desired value using the joystick.

11. Select RF Settings

Push the joystick down to display the screen shown above. This lets you select preset RF configurations, including modulation and data rate

    Preset 0: GFSK, 1.2 kBaud
    Preset 1: GFSK, 10 kBaud
    Preset 2: GFSK, 38.4 kBaud
    Preset 3: GFSK, 250 kBaud

12. Select Mode

Push the joystick down to display the screen shown above. Use the joystick to select master mode. The EB you have configured now will be the master in the PER test.

13. Configure 2nd EB

13. Configure 2nd EB

Perform steps 3 through 11 on the second EB. Push the joystick down until you get the display shown above. Leave this EB in slave mode.

14. Start PER

Push the joystick down on both EBs, and the screen shown above is displayed. Push the joystick right on the slave EB first, and then push the joystick right on the master EB. The PER test will start when the two nodes have successfully connected.

Note that the PER test uses 10 dBm as default output power, so the EBs should be placed at least 1m apart to avoid saturation of the receiver.

15. Run PER Test

The uppermost line of the LCD will show the PER for packets transmitted from the slave to the master, while the second line will show the PER for packets transmitted from the master to the slave.

The PER test will end when the number of packets you selected in step 10 is reached or if 100 consecutive packets are lost.

16. References

Please visit www.ti.com and

http://www.ti.com/tool/cc1101dk433

http://www.ti.com/tool/cc1101dk868-915

Download the CC1101DK User Manual, the SmartRF™ Studio software, examples, as well as datasheets, reference designs and application notes.

You will also find a lot of information on the TI E2E forum at http://e2e.ti.com

We hope that you will enjoy working with the CC1101 device.

SmartRF™ Studio

1. Download and Install

Before connecting the EB to your PC, download SmartRF™ Studio from

    www.ti.com/smartrfstudio.

Install the program and follow the instructions in the wizard.
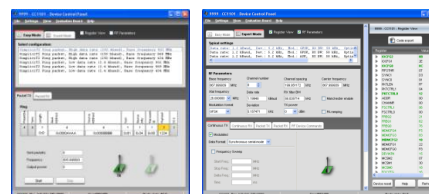
Connect the EB with a CC1101EM to the PC using the USB cable. USB drivers will be installed automatically.

2. Launch SmartRF Studio

Launch SmartRF Studio and double click on the highlighted CC1101 device icon to get complete control of the device from the PC.

3. Configure the Radio

You can now configure the radio, run tests, export register settings and run link tests with another CC1101 on a SmartRF04EB connected to the PC.

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