

CC1101 Evaluation Module Kit Quick Start Guide

Opening the box and using the modules with SmartRF04EB

1. Kit Contents



2 x CC1101 Evaluation Modules (433 or 868-915)
2 x Antennas (type depending on frequency)
Documentation

The RF boards in this kit are designed to comply with ETSI, FCC and IC regulations over temperatures from 0 to +35°C.

Antenna types:

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

(picture may deviate)

2. How to use the modules

The CC1101EM boards can be plugged into several development boards from Texas Instruments. One option is to use the SmartRF04EB, which is included in the CC1101DK.

Alternatively, you can use the SmartRF Transceiver EB (sold separately as SmartRFTrxEBK). Both boards let you run a packet error rate (PER) test, control the device from SmartRF™ Studio, and they can be used as software development platforms.

For prototyping with other microcontrollers, plug the EM into the “SoC Battery Board” (www.ti.com/tool/soc-bb).

This guide will show how to use the modules together with SmartRF04EB. The procedure is similar for the SmartRF TrxEB.

3. Plug EM into SmartRF04EB



Insert a CC1101EM (EM) with an antenna into the SmartRF04EB (EB). The connectors will only fit in one position, so that the EM cannot be inserted the wrong way.



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

4a. Power: Battery

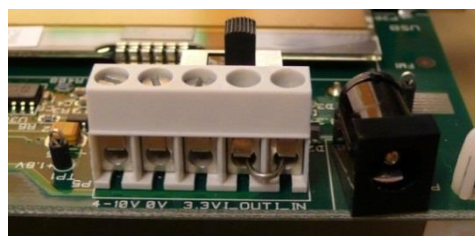


There are three different ways of applying power to the EB:

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, centre 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 Supply¹ 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

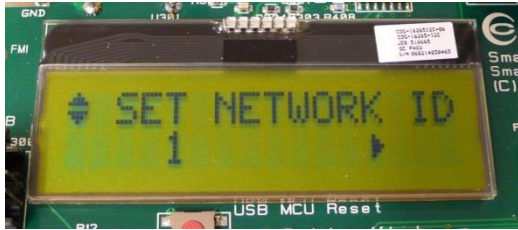


Select the desired frequency band of operation by using the joystick. The frequency should match the evaluation module and antenna you are using.

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.

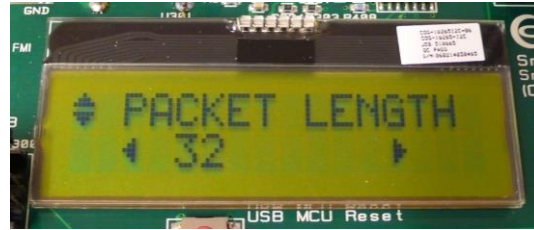
¹ When using an external power supply, make sure it meets the listed requirements in addition to complying with applicable regional product regulatory and safety certification requirements such as UL, CSA, VDE, CCC, and PSE

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



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/cc1101emk433.html>

<http://www.ti.com/tool/cc1101emk868-915.html>

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/smarterstudio. Install the program and follow the instructions in the wizard.

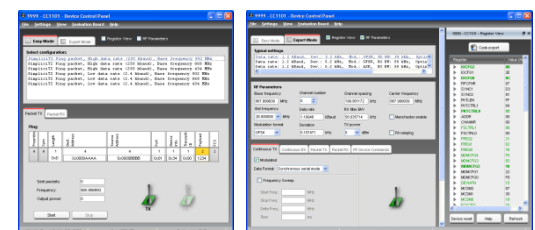
Connect the EB with a CC1101EM to the PC using the USB cable and install the USB driver as described in the manual.

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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