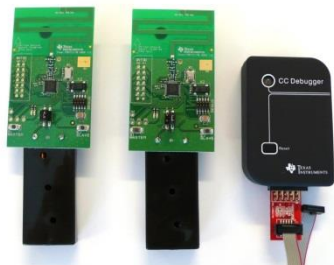TEXAS INSTRUMENTS

CC1110 Mini Development Kit 868-915 MHz
Quick Start Guide

1   Kit Contents

2 x SmartRFCC1110-868 boards
1 x CC Debugger
1 x 10- pin flat cable with 2x5 2.54 mm connector
1 x 10-pin flat cable with 2x5 1.27 mm connector
1 x Converter board 2.54 mm – 1.27 mm connector
1 x Mini USB cable
Documentation

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

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

2   Running the Preprogrammed Link Test

2.1 Introduction

The CC1110 on the SmartRFCC1110 target board is preprogrammed with a link test which operates at 868.3 MHz, and uses GFSK modulation and a bit rate of 2.4 kbps.

The link test runs a point-to-point communication between a Slave and a Master node based on the SimpliciTI 1.1.0 protocol.

First the Master and Slave nodes must be configured as described in the following sections. The two nodes will then establish a link. When this link is established, the Master starts to periodically send packets to the Slave. Between each transmission, the Master goes to receive mode and waits 250 ms for an acknowledgement packet from the Slave. The Slave node is in receive mode waiting for packets from the Master. For each received packet, the Slave automatically responds with an acknowledgement packet.

2.2 Powering the Boards

Place 2 1.5V AAA alkaline, non-rechargeable batteries in the battery holder placed on the bottom side of each of the SmartRFCC1110-868 boards. Place the jumper on the power selection connector P1 between pin 1 and pin 2 on each board.

Applying power to the SmartRFCC1110-868 starts the preprogrammed link test on the CC1110 and the two LEDs on the board are on for 1 s.

Warning! Never use rechargeable batteries when powering the board.

2.3 Configure the Master Node

Press the S1/MASTER button that is placed on the left hand side of the board.

When this button is pushed, the two LEDs on this board will blink rapidly. The Master now waits for a Slave node to establish a link.
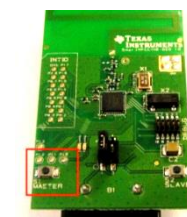
Note that the boards only respond to the first button push. To reconfigure the board, the board must be reset, see point 2.9 in this manual.

2.4 Configure the Slave Node

On the other board, press the S2/SLAVE button that is placed on the right side of the board.

When the button has been pushed, the two LEDs on this board will blink very slowly until a link with a Master node is established. Note that establishing the link may finish in less than 1 s depending on the environment.

It is important to keep distance (more than 1 meter) between the two nodes when they are trying to establish the link to avoid saturation. This is because full output power (12 dBm) is used for this communication between the nodes.

2.5 The LEDs on the Master Node

LEDs	State
Both LEDs blink rapidly	The Master is trying to establish a link with a Slave
Green LED on for 0.5 s	The Master has received an ACK to a packet sent, link ok
Red LED on for 0.5 s	The Master has not received an ACK to the last 3 packets sent
Red LED on for 3 s	If the Master does not receive ACKs from the SLAVE in ~70 s, the Master will stop to send packets to save power. Press S1/MASTER to resume the link test
Red LED on for 5 s	For test only: When the link is established, pressing the S2/SLAVE button turns the red LED on for 5 s

2.6 The LEDs on the Slave node

LEDs	State
Both LEDs blink slowly	The Slave is trying to establish a link with a Master
Red LED on continuously	The link between the Slave and Master is established and the Slave is in RX waiting for packets from the Master
Green LED on for 0.5 s while red LED on continuously	The Slave has received a packet from the Master and sent an ACK, link ok

2.7 Antenna Performance

The PCB antenna length on the SmartRFCC1110-868 is tuned for optimal performance with two AAA batteries present in the battery holder. As this antenna is directive (see DN024 www.ti.com/lit/swra227) it is important to place the two nodes so that the arrow in the silk print next to the antenna on both boards points upwards (towards the sky) for optimal performance.
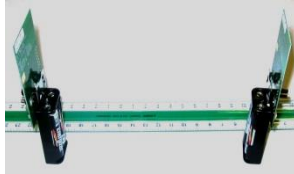
2.8 Range testing

The preprogrammed link test is well suited for range testing. Place the Slave in an open field and bring the Master a known distance away. Use the LED signaling to decide the link quality.

Note that the environment, antenna, etc greatly affect the range, see DN018 www.ti.com/lit/swra169.

2.9 Resetting the board

The recommended reset sequence is:

*   Remove jumper on P1 completely
*   Push one of the buttons to discharge the large capacitor on the power line. If this capacitor is not discharged, the SmartRFCC1110-868 boards may continue to run the current application until the capacitor is discharged. This may take several seconds.
*   Replace the jumper on P1 to power the board again

3 Using the CC Debugger with the Development Kit

3.1 The CC Debugger

The CC Debugger connects to the PC via a mini USB cable and uses the debug interface to communicate with the radio. The tool can be used for:

*   Programming the flash and debugging an application running on the CC1110. The PC tools available for these purposes are the SmartRF Flash Programmer from Texas Instruments and IAR Embedded Workbench for 8051 from IAR Systems.
*   Testing the radio performance of CC1110 using SmartRF Studio.

For more details, please refer to the CC Debugger User's Guide www.ti.com/lit/swru197 and the CC1110 & CC2510 Mini Development Kit User's Guide www.ti.com/lit/swru236.

3.2 SmartRF Studio
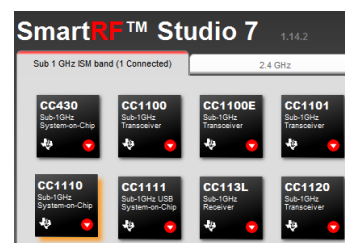
SmartRF Studio can be used for RF testing, evaluation of CC1110 and to find optimal register settings. It is available on www.ti.com/smartrfstudio.

3.3 Flash Programmer
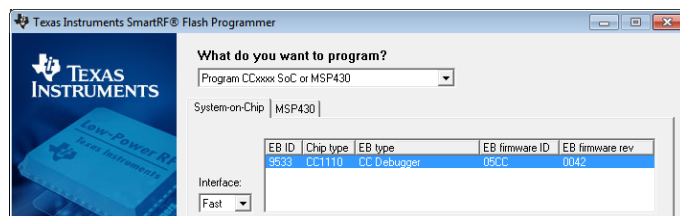
The SmartRF Flash Programmer application, which can be downloaded from http://www.ti.com/tool/flash-programmer, can be used to program and read the flash on the CC1110. The tool has a command line interface suitable for automated programming.

3.4 IAR Embedded Workbench
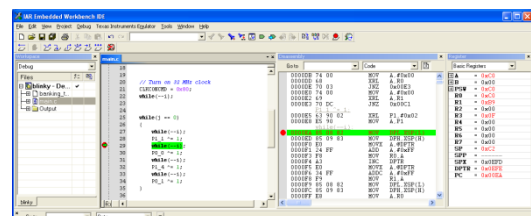
To develop software, program and debug the CC1110, IAR Embedded Workbench for 8051 is recommended. A free, full feature, time limited evaluation version or a code size limited kick start version, can be downloaded from www.iar.com/ew8051.

A. Available Software and User's Guides

CC1110 & CC2510 Mini DK Software Example User's Guide and Source Code
Source and documentation for the link test for the SmartRFCC1110 target board www.ti.com/lit/zip/swrc133 and www.ti.com/lit/swru237

CC1110 & CC2510 Mini Development Kit User's Guide
More documentation and details about the SmartRFCC1110 board www.ti.com/lit/swru236

CC1110, CC2510 Basic Software Examples
Source code for other, basic examples for the CC1110 www.ti.com/lit/zip/swrc117

SimpliciTI™ Network Protocol
An RF protocol targeting small star networks www.ti.com/simpliciti

B. More information

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

On the Texas Instruments' Low-Power RF web site www.ti.com/lprf, you will find all our latest products, news and events updates, and much more.

The TI LPRF newsletter keeps you up to date on e.g. new products, application notes, software and events. Sign up at www.ti.com/lprfnewsletter.

We hope you will enjoy working with the CC1110 Mini Development Kit and associated Low-Power RF products from Texas Instruments.

IMPORTANT NOTICE

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		