



DLP-RF430CL331BP

BoosterPack User's Guide



FEATURES:

- Texas Instruments RF430CL331H
- ISO14443B Compliant
- 13.56MHz RF Interface Supports up to 848 Kbps
- NFC Tag Type 4 Compliant
- 3K SRAM Bytes Available for NDEF Message Storage
- Automatic Checking of NDEF Structure
- Interrupt to Indicate End of Read or End of Write
- Onboard Antenna or Optional External Antenna Connection (Remove R2 and R3)
- Operational Power Supplied by the LaunchPad (Purchased Separately)

1.0 INTRODUCTION

The DLP Design DLP-RF430CL331BP BoosterPack is used to demonstrate the capabilities of the RF430CL331H and help aid in the development process by providing a working hardware/firmware reference example for NFC operations. This BoosterPack demonstrates a secure, simplified pairing process for Bluetooth® and Wi-Fi connections with the only dynamic NFC tag device designed specifically for NFC connection handover and service-interface functions.

The main benefit of the DLP-RF430CL331BP vs. DLP-RF430CL330BP is that you can now use the device in a “pass-through” mode where the connected microcontroller (LaunchPad) handles the commands which are sent by the reader/writer device. This allows for NDEF messages larger than the 3KB limit of the CL330H. The only limitation is the size of the memory in the microcontroller.

The RF430CL331H requests responses to NFC Type 4 commands on demand from the host controller and stores only a portion of the NDEF message in its buffer at any one time. This allows NDEF message size to be limited only by the memory capacity of the host controller and specification limitations. Support of read caching, prefetching, and write automatic acknowledgment features allows for greater data throughput.

The DLP-RF430CL331BP BoosterPack is an add-on board designed to fit TI's MCU LaunchPads. This product allows the software application developer to get familiar with the functionalities of the RF430CL330H on their Texas Instruments embedded microcontroller platform of choice without having to worry about designing the antenna.

This document provides direction for RF430CL331H users who wish to implement an NFC tag emulator that is connected to and controlled by a Texas Instruments embedded microcontroller or microprocessor development platform. Examples of such development platforms are the MSP-EXP430G2 LaunchPad and the MSP-EXP430F5529LP LaunchPad.

LaunchPads from Texas Instruments are easy-to-use flash programming and debugging tools for the MSP430, C2000, TIVA, etc. lines of microcontrollers. They feature everything you need to start developing on a Texas Instruments microcontroller device. There is on-board emulation for programming and debugging, on-board button switches, LED's and BoosterPack-compatible pinouts to support a wide range of plug-in modules like the DLP-RF430CL331BP.

Free software development tools are also available, such as TI's Eclipse-based Code Composer Studio. Open-source development is also possible thanks to community-driven projects such as the MSPGCC compiler or Energia, a branch of the popular Wiring framework.

2.0 SCOPE

This document describes the DLP-RF430CL331BP module for evaluation and development purposes in conjunction with Texas Instruments embedded development platforms. This manual does not cover the in-depth details of the RF430CL331H family as these are documented in the datasheets for those parts along with application notes that can be found on their product pages (see the links in Section 3).

3.0 REFERENCES

- DLP-RF430CL331BP Datasheet: www.dlpdesign.com
- DLP-RF430CL331BP Firmware for LaunchPad: <http://www.ti.com/lit/zip/sloc330>
- RF430CL331H Product Page: <http://www.ti.com/product/rf430cl331h>
- RF430CL331H Datasheet: <http://www.ti.com/lit/ds/symlink/rf430cl331h.pdf>

4.0 MODULE DESCRIPTION

The DLP-RF430CL331BP BoosterPack allows NFC connection handover for an alternative carrier like Low Energy (BLE) and Wi-Fi as an easy and intuitive pairing or authentication process with only a tap. As a general NFC interface, the RF430CL331H enables electronic products to communicate with the fast-growing infrastructure of NFC-enabled smart phones, tablets and notebooks.

Connection to Texas Instruments LaunchPad platforms are made via 10-pin, 0.1-inch spaced, 0.025-square inch female headers located on the back of the board. The electrical schematic is available for download from www.dlpdesign.com.

5.0 MODULE PINOUT

DLP-RF430CL331BP MODULE PIN CONNECTIONS TO THE LAUNCHPAD	
1	VCC - 3.0V power from the LaunchPad
2	Unused
3	Unused
4	Unused
5	Unused
6	Unused
7	DATA_CLK - I2C Clock from the microcontroller
8	RESET
9	GPIO
10	GPIO
11	GPIO
12	INTO - Interrupt to microcontroller
13	I2C_Ready - Ready signal to microcontroller
14	SCL - I2C Clock from microcontroller
15	SDA - I2C Data to/from microcontroller
16	Unused
17	Unused
18	Unused
19	Unused
20	GROUND

6.0 QUICK START GUIDE

If using Code Composer to load, edit and compile the demonstration firmware:

1. Remove jumper P1.6 from the G2 LaunchPad.
2. Attach the G2 LaunchPad to the DLP-RF430CL331BP as shown here.



3. Apply power by connecting a USB cable to the LaunchPad.
4. Load (Import) the base application firmware into Code Composer Studio. The firmware project is available for download from this link: <http://www.ti.com/lit/zip/sloc330>
5. Enter Debug mode and test for basic functionality by holding an NFC-enabled smart phone, tablet or notebook close to the onboard loop antenna. The device should display "Hello, world!" for the default NDEF message.
6. Modify the source code as desired to change the default message.

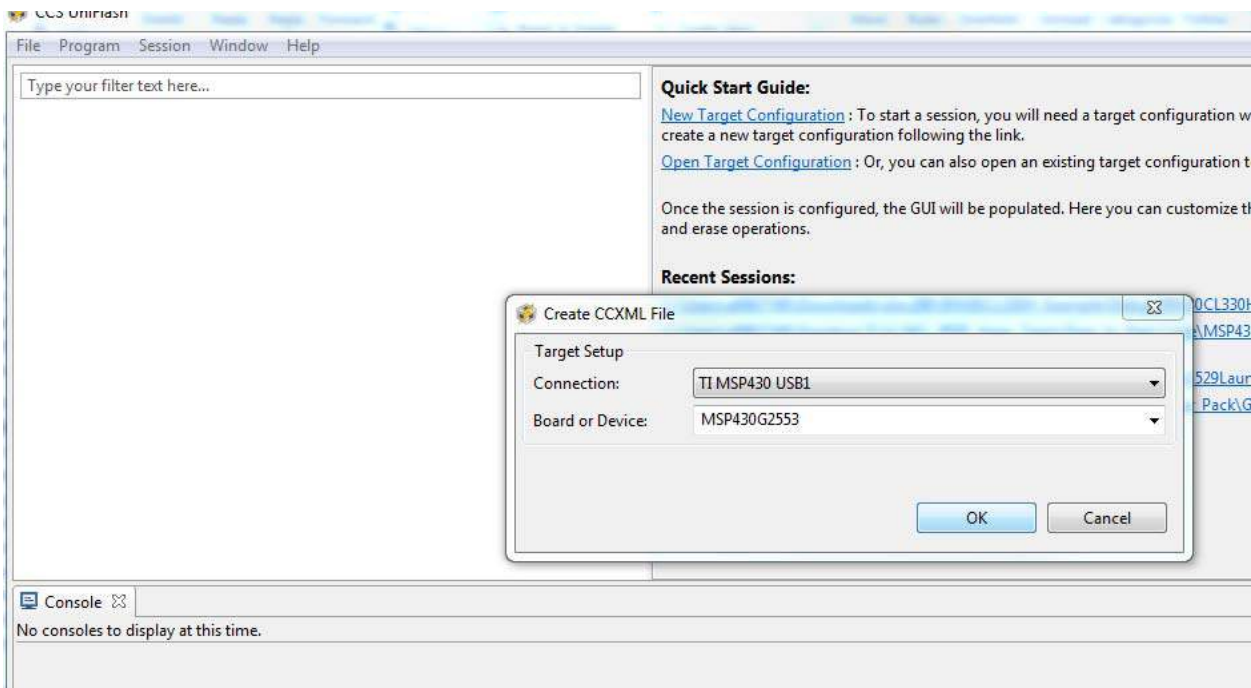
If using Uniflash to load the precompiled .out file:

1. Remove jumper P1.6 from the G2 LaunchPad.
2. Attach the G2 LaunchPad to the DLP-RF430CL331BP as shown here.

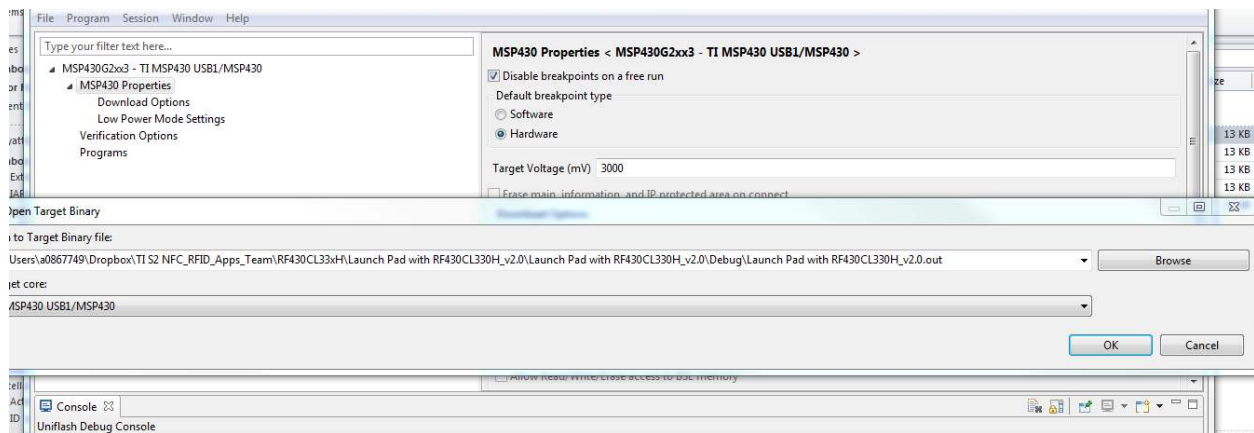


3. Apply power by connecting a USB cable to the LaunchPad.
4. Download Uniflash - <http://www.ti.com/tool/uniflash>

5. Make a new target configuration for the MSP430G2553: Click on File, New Target Configuration, which leads you to this window to launch the session:



6. Next, click on Program, Load Program, and navigate (using Browse button) to the project files and find the .out file



7. Click OK to load the .out file.

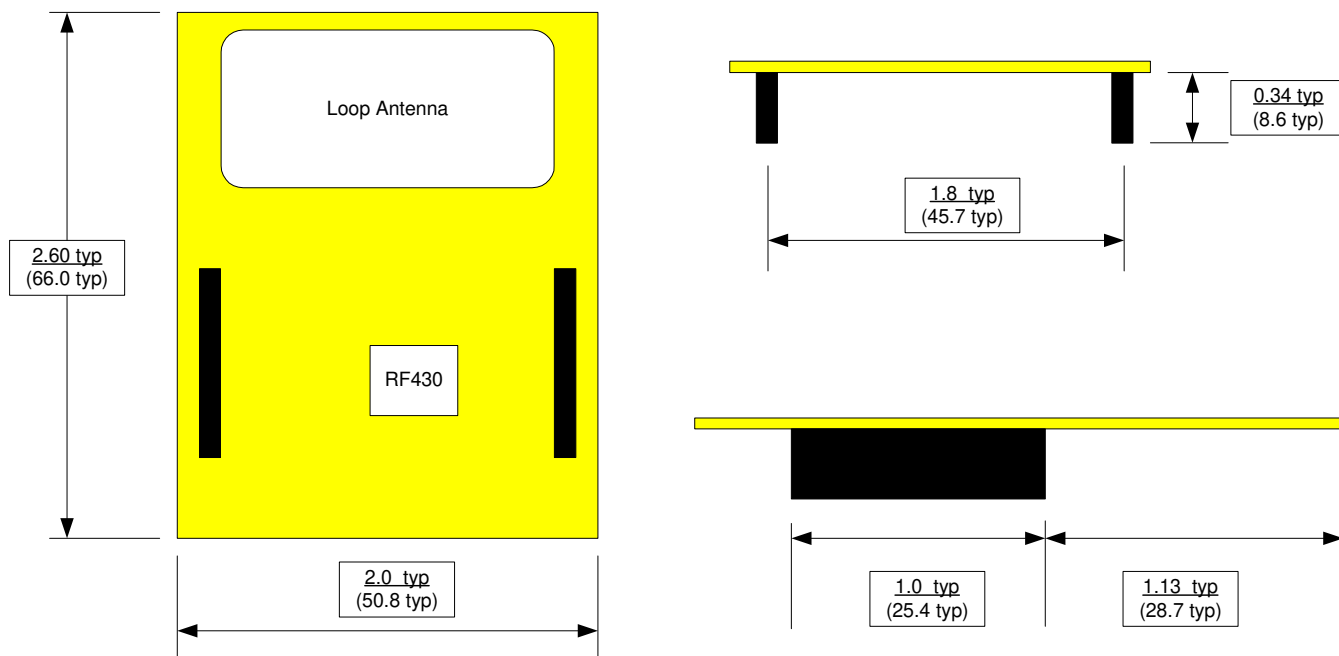
8. Cycle power on the LaunchPad (unplug - replug) and the code will be running.

9. Test for basic functionality by holding an NFC-enabled smart phone, tablet or notebook close to the onboard loop antenna. The device should display "Hello, world!" for the default NDEF message.

7.0 BASE APPLICATION FIRMWARE

DLP-RF430CL331BP Module Application Firmware for the various Texas Instruments LaunchPads is available from the DLP Design websites. Visit the appropriate download/product pages for all available firmware project downloads.

8.0 MECHANICAL DIMENSIONS – Inches (mm)



9.0 DISCLAIMER

Neither the whole nor any part of the information contained herein nor the product described in this datasheet may be adapted or reproduced in any material or electronic form without the prior written consent of the copyright holder.

This product and its documentation are supplied on an as-is basis, and no warranty as to their suitability for any particular purpose is either made or implied. DLP Design will not accept any claim for damages whatsoever arising as a result of the use or failure of this product. Your statutory rights are not affected.

This product or any variant of it is not intended for use in any medical appliance, device or system in which the failure of the product might reasonably be expected to result in personal injury.

This document provides preliminary information that may be subject to change without notice.

10.0 CONTACT INFORMATION

DLP Design, Inc.
1605 Roma Lane
Allen, TX 75013

Phone: 469-964-8027
Fax: 415-901-4859
Email: support@dlpdesign.com
Internet: <http://www.dlpdesign.com>