RF430CL330HTB

Concept for Wireless Power Supply

Texas Instruments
MCU Safety & Security
Product Line NFC, Animal ID & RFID

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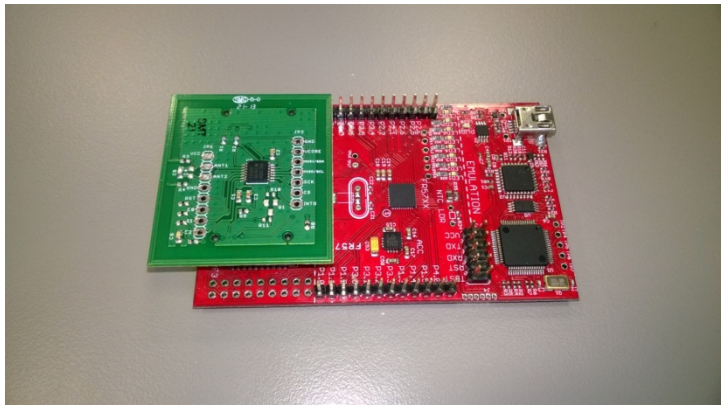
RF430CL330HTB Wireless Power Supply General

The RF430CL330HTB is a reference evaluation board which is to be plugged into an MCU experimenter's board and then this board is ordinarily powered externally via USB (or battery) to enable operation. Figure below shows the RF430CL330HTB plugged into the MSP430FR5739 experimenter's board, using the EM header connections.

This Product Note describes the operation of the RF430CL330HTB + MSP-EXP430FR5739 without using an external power supply. Minor modifications to the RF430CL330HTB evaluation board are needed for enabling the system to operate wirelessly by generating the necessary power out of the magnetic field provided by the reader/initiator.



RF430CL330HTB Wireless Power Supply Scope

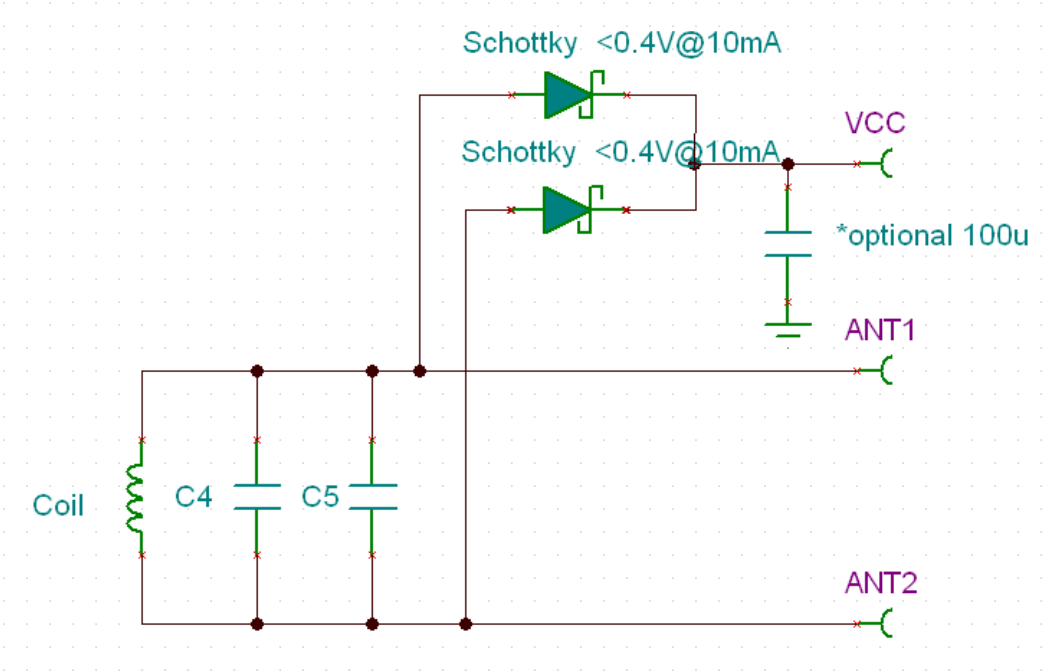
This document shows a concept, which allows the evaluation board to operate without power supply over the USB. In that case the power is derived from the RF field using the onboard antenna and some minor modification on the RF430CL430HTB.

The detailed board schematic of the RF430CL330HTBcan be found at:
http://www.ti.com/general/docs/lit/getliterature.tsp?literatureNumber=slor112&fileType=zip

The modifications necessary for a wireless power operation are given in this document

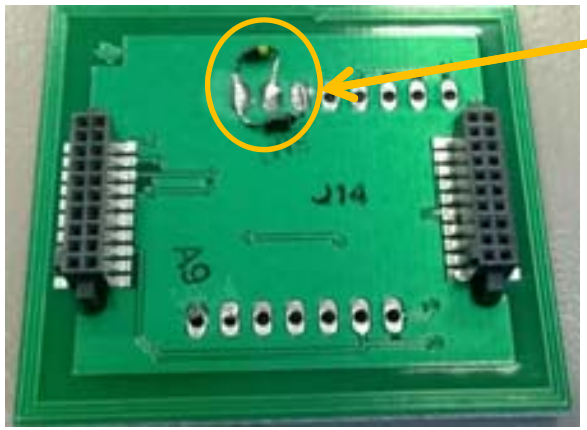
RF430CL330HTB Wireless Power Supply Modifications

To use the onboard PCB antenna as the power source, the antenna has to be tapped at the pins ANT1 and ANT2, by **adding two Schottky diodes** (low forward voltage drop) according to the following schematic.
The voltage drop of the diodes must be as low as <0.4V@10mA (e.g. BAT43).

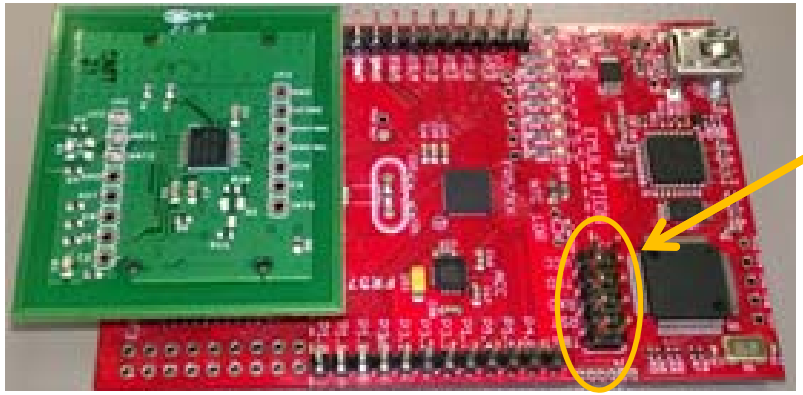


The Coil represents the onboard antenna. C4 and C5 are the antennas resonance capacitors.

RF430CL330HTB Wireless Power Supply Implementation on PCB Board



The diodes were soldered on the backside of the board. Make sure to mind the directions in which the diodes are mounted

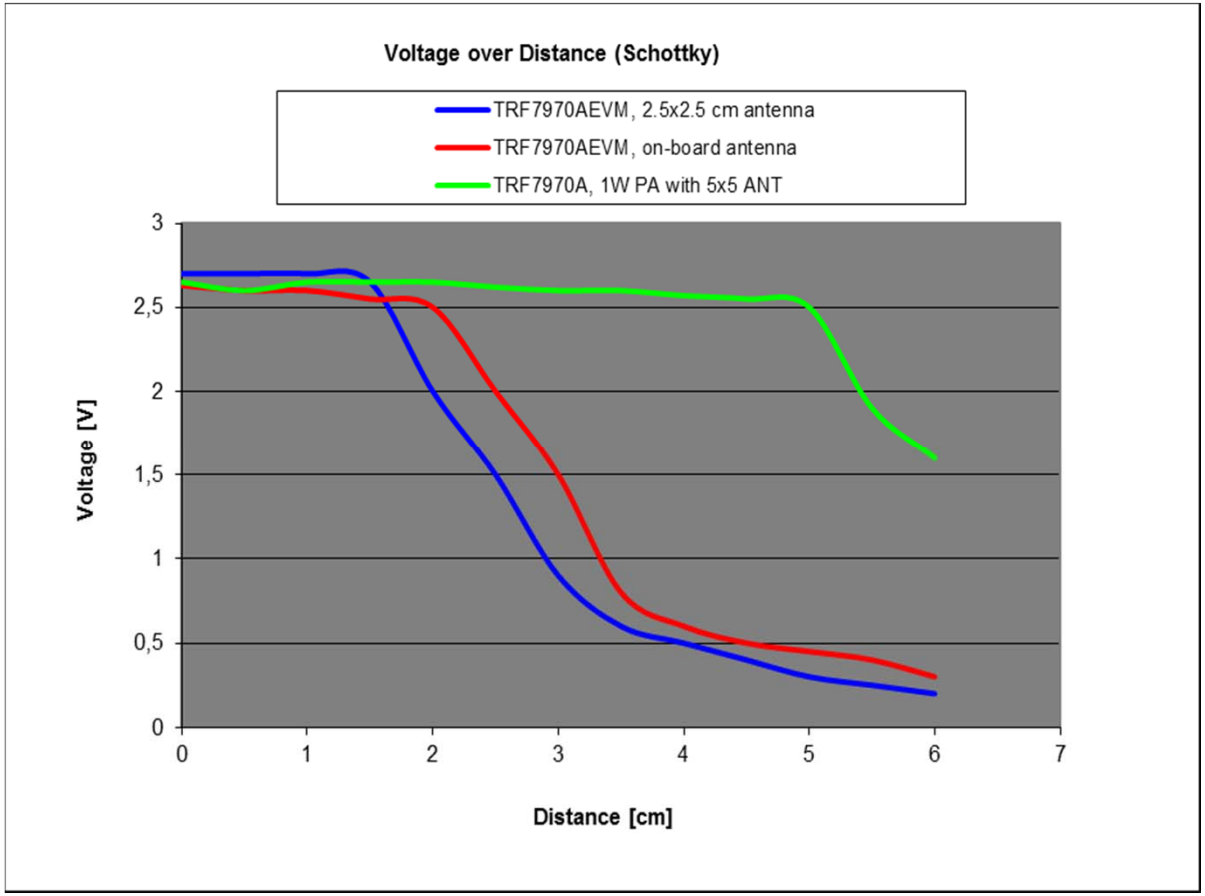


For wireless power operation, all jumpers on the Experimenters Board have to be disconnected!

RF430CL330HTB Wireless Power Supply Performance

Different Readers were used:

- TRF7970AEVM with the on-board antenna
- TRF7970AEVM with a 2.5x2.5 cm antenna
- TRF7970A_PA, a 1W Power Amplifier based on the TRF7970A with an external 5x5cm antenna.



Reading distances results:

- ✓ 3 cm with the TRF7970ATB
- ✓ 1.5 cm with a Nokia Lumia 720 and a Samsung Galaxy S3