

## MSP-RFLINK development board

## Users Manual



All boards produced by Olimex are ROHS compliant

Revision Initial, May 2011  
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## **INTRODUCTION:**

MSP-RFLINK is wireless 2.4 GHz module. It is realized with MSP430F1232 ultra-low-power microcontroller.

## **BOARD FEATURES:**

- MSP430F1232 microcontroller
- nRF24L01 Nordic 2.4Ghz low power transceiver
- status LEDs
- user button
- JTAG connector
- pin holes for all microcontroller pins
- Dimensions: 73.71 x 19.56 mm (2.90 x 0.77")

## **ELECTROSTATIC WARNING:**

The **MSP-RFLINK** board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

## **BOARD USE REQUIREMENTS:**

**Cables:** The cable you will need depends on the programmer/debugger you use. If you use MSP430-JTAG-TINY, MSP430-JTAG-TINY-V2 or MSP430-JTAG-ISO, you will need USB A-B cable. If you use MSP430-JTAG, you will need LPT cable.

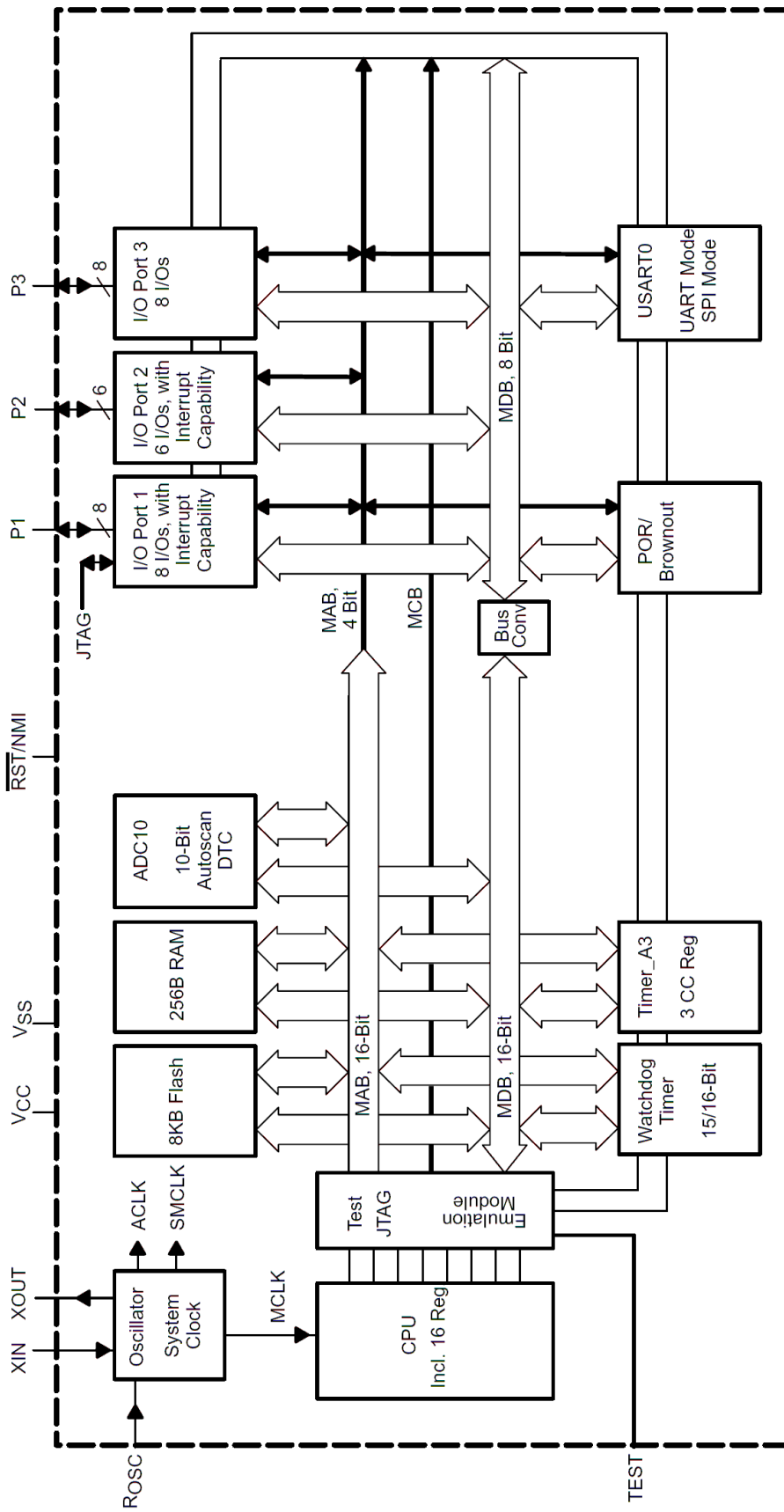
**Hardware:** Programmer/Debugger [MSP430-JTAG](#), [MSP430-JTAG-TINY](#), [MSP430-JTAG-TINY-V2](#), [MSP430-JTAG-ISO](#) by OLIMEX, or other compatible programming/debugging tool.

## **PROCESSOR FEATURES:**

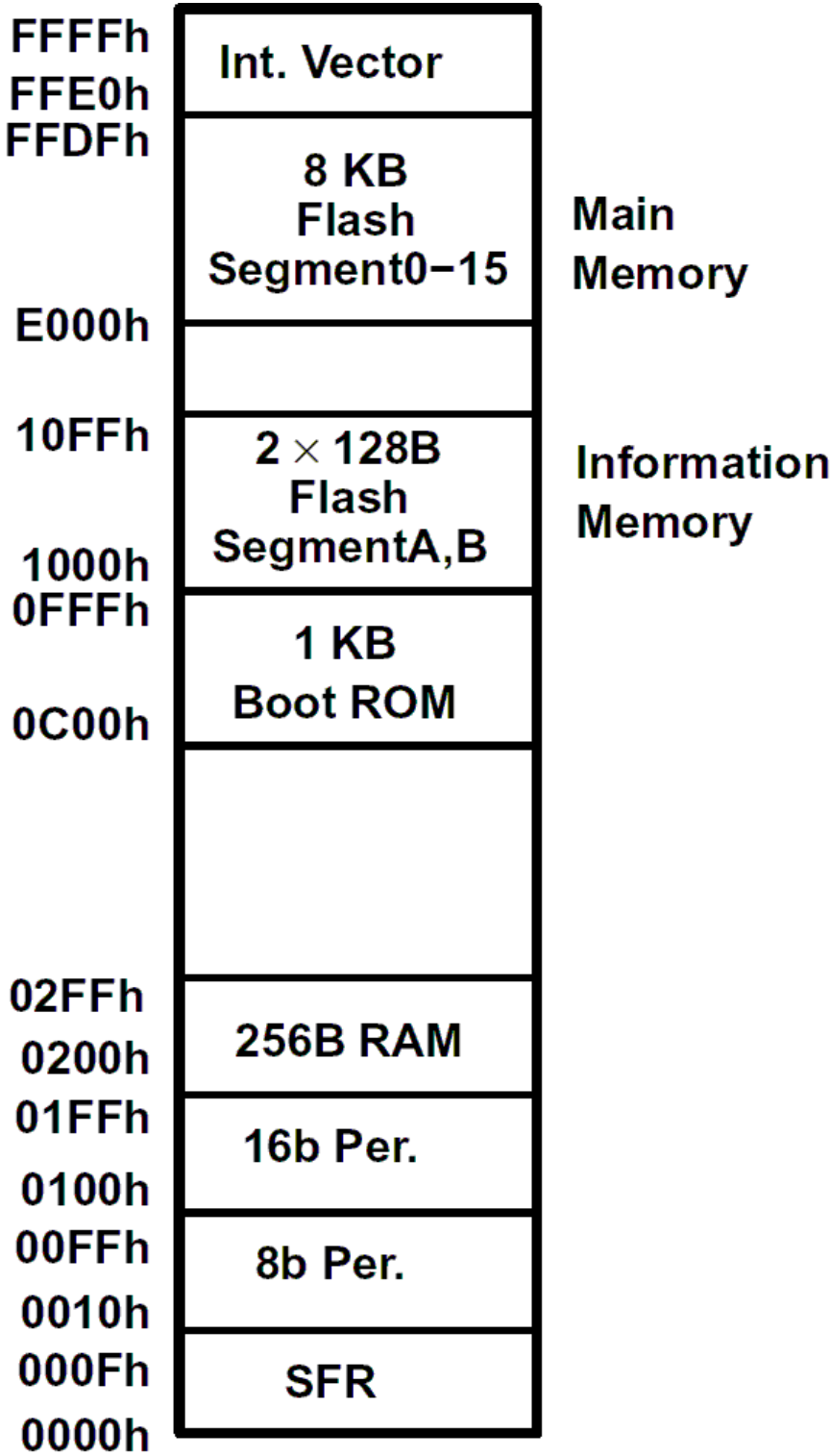
**MSP-RFLINK** board use **MSP430F1232** microcontroller from Texas Instruments with these features:

- 8KB + 256B Flash Memory
- 256B RAM
- Ultralow-Power Consumption:
  - Active Mode: 200  $\mu$ A at 1 MHz, 2.2 V
  - Standby Mode: 0.7  $\mu$ A
  - Off Mode (RAM Retention): 0.1  $\mu$ A
- Five Power Saving Modes
- Wake-Up From Standby Mode in less than 6  $\mu$ s
- 16-Bit RISC Architecture, 125 ns Instruction Cycle Time
- Basic Clock Module Configurations:
  - Various Internal Resistors
  - Single External Resistor
  - 32-kHz Crystal
  - High Frequency Crystal
  - Resonator
  - External Clock Source
- 16-Bit Timer\_A With Three Capture/Compare Registers
- 10-Bit, 200-ksps A/D Converter With Internal Reference, Sample-and-Hold, Autoscan, and Data Transfer Controller
- Serial Communication Interface (USART0) With Software-Selectable Asynchronous UART or Synchronous SPI
- Serial Onboard Programming, No External Programming Voltage Needed
- Programmable Code Protection by Security Fuse
- Supply Voltage Brownout Protection

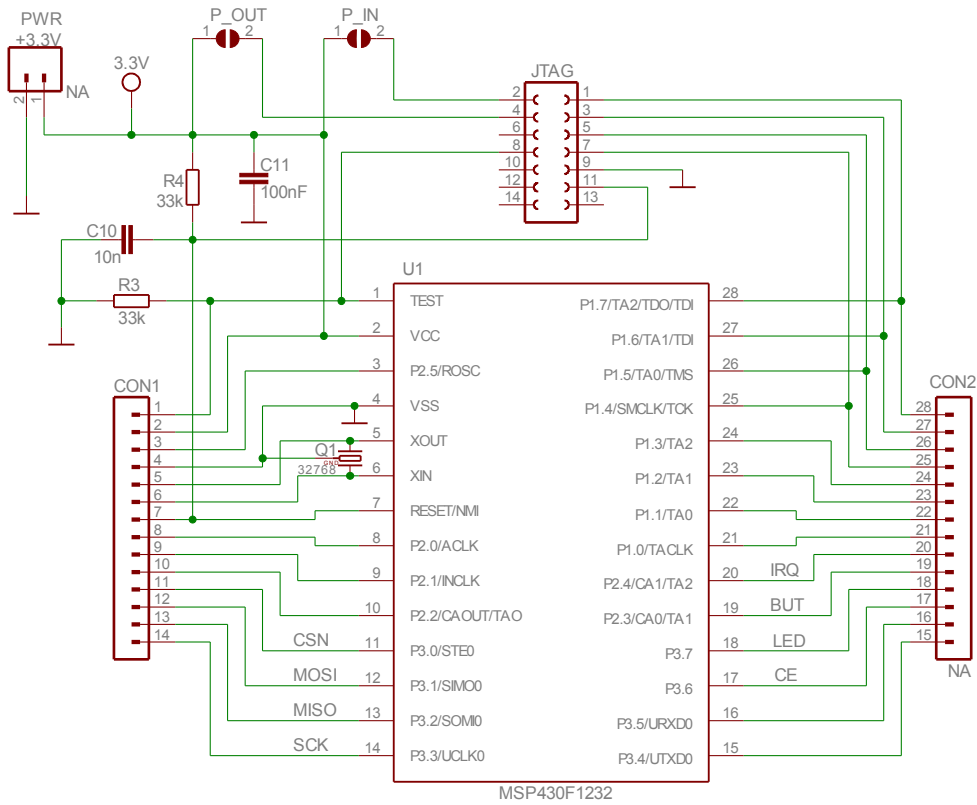
# BLOCK DIAGRAM:



MEMORY ORGANIZATION:



# SCHEMATIC:

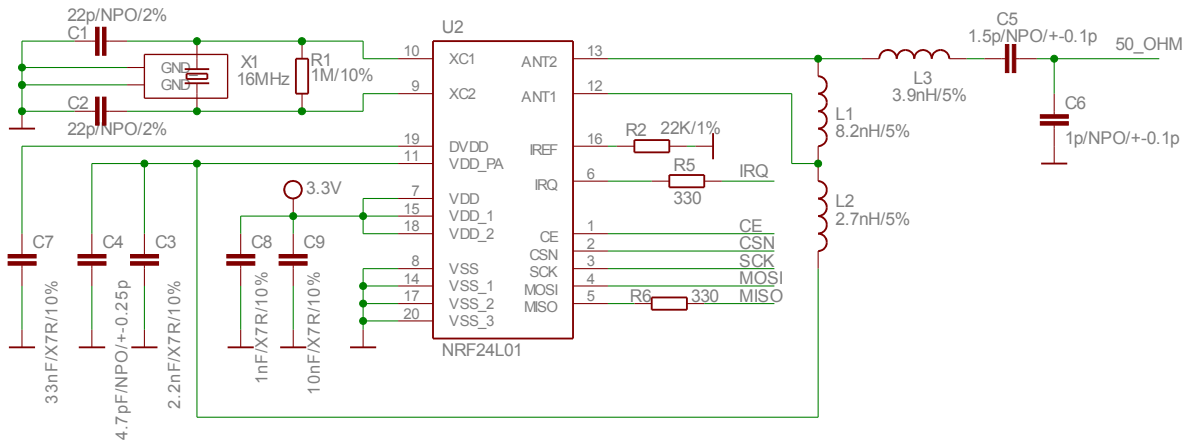
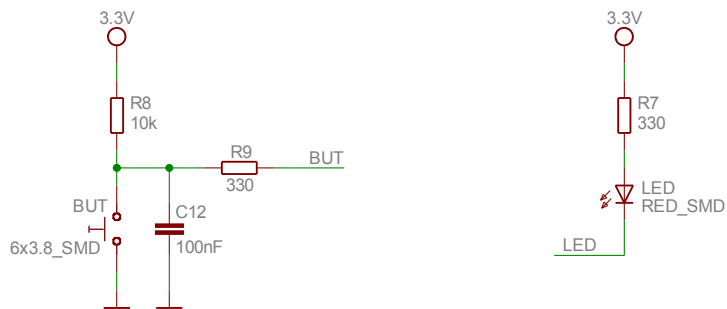


## MSP-RFLNK

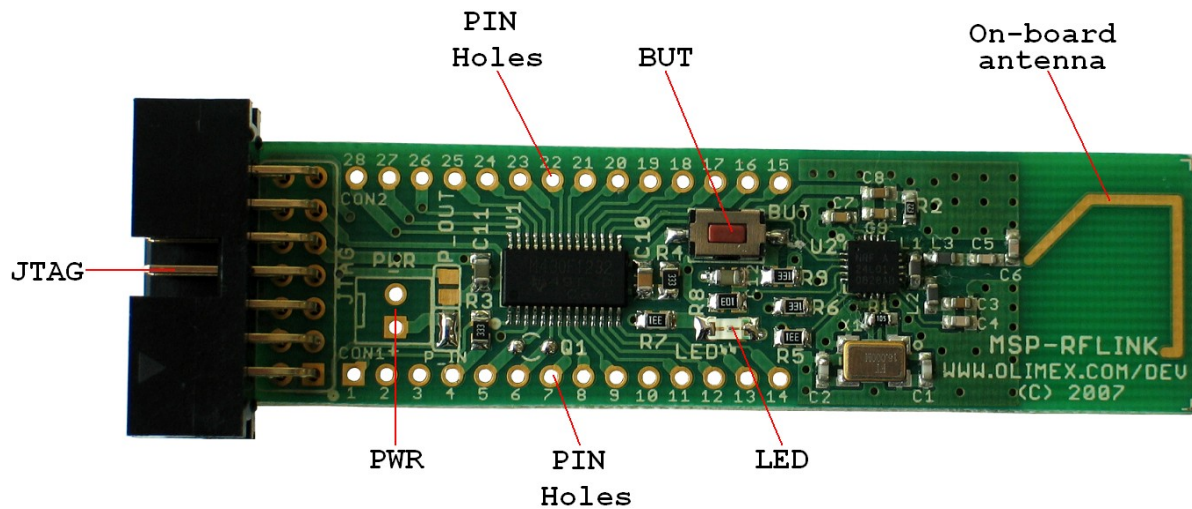
Rev. Initial

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## BOARD LAYOUT:



## POWER SUPPLY CIRCUIT:

MSP-RFLINK is typically power supplied with 3.3VDC via PWR pin holes.

The programmed board power consumption is up to 20 mA with all peripherals enabled.

## RESET CIRCUIT:

MSP-RFLINK reset circuit includes MSP430F1232 pin 7 (RESET/NMI), JTAG connector pin 11, C10 (10nF), R4 (33k $\Omega$ ).

## CLOCK CIRCUIT:

Quartz crystal **Q1** 32.768 kHz is connected to MSP430F1232 pin 5 (XOUT) and pin 6 (XIN).

Quartz crystal **X1** 16MHz is connected to NRF24L01 pin 9 (XC2) and pin 10 (XC1).

## JUMPER DESCRIPTION:

P\_IN



When this jumper is closed, the board is power supplied by the standard JTAG pin 2. This is only possible when the consumption of the board is not very high which is typically the case with MSP430 microcontrollers. If this jumper is open the board should be power supplied by another external source. This jumper and P\_OUT should always be reversely open/closed, i.e. if P\_IN is closed, P\_OUT should be open and vice versa.

Default state is closed.

P\_OUT



When this jumper is closed, the board is power supplied not by the JTAG but from external source. Then the JTAG has to synchronize with the working voltages which is done through this line. This is especially important when debugging with JTAG. This jumper and P\_IN should always be reversely open/closed, i.e. if P\_OUT is closed, P\_IN should be open and vice versa.

Default state is open.

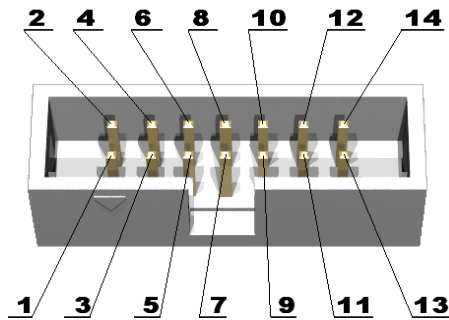
## INPUT/OUTPUT:

Status led (red) with name **LED**, connected to MSP430F1232 pin 18 (P3.7).

User button with name **BUT** connected to MSP430F1232 pin 19 (P2.3/CA0/TA1).

## EXTERNAL CONNECTORS DESCRIPTION:

### JTAG:



Pin #	Signal Name	Pin #	Signal Name
1	P1.7	2	Via P_IN to 3.3V
3	P1.6	4	Via P_OUT to 3.3V
5	P1.5	6	NC
7	P1.4	8	TEST
9	GND	10	NC
11	RESET	12	NC
13	NC	14	NC

CON1:



Pin #	Signal Name	Pin#	Signal Name
1	TEST	2	VCC
3	P2.5	4	GND
5	XOUT	6	XIN
7	RESET	8	P2.0
9	P2.1	10	P2.2
11	CSN	12	MOSI
13	MISO	14	SCK

CON2:



Pin #	Signal Name	Pin#	Signal Name
15	P3.4	16	P3.5
17	CE	18	LED
19	BUT	20	IRQ
21	P1.0	22	P1.1
23	P1.2	24	P1.3
25	P1.4	26	P1.5
27	P1.6	28	P1.7



## AVAILABLE DEMO SOFTWARE:

- MSP430-RFLINK [test software](#)

## **ORDER CODE:**

MSP-RFLINK - assembled and tested board

### **How to order?**

You can order to us directly or by any of our distributors.  
Check our web [www.olimex.com/dev](http://www.olimex.com/dev) for more info.

## **Revision history:**

Board's revision	Rev. Initial, November 2007
Manual's revision	Rev. Initial, May 2011

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