



## MOD-MRF24J40 development board Users Manual



All boards produced by Olimex are ROHS compliant

Rev. Initial, May 2011  
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## **INTRODUCTION:**

MOD-MRF24J40 is a small module board with MRF24J40 – complete IEEE 802.15.4 radio and operates in the 2.4GHz freq band. The MRF24J40 supports ZigBee™, MiWi™ protocols and proprietary protocols. MOD-MRF24J40 has female UEXT extension connector for connecting to any of our development boards with male UEXT extension connector on it.

## **BOARD FEATURES:**

- MRF24J40 RF transceiver
- UEXT connector
- On-board antenna
- Pin holes for most of the transceiver signals
- PCB: FR-4, 1.00 mm (0,039"), solder mask, silkscreen component print
- Dimensions: 39.55 x 20.40 mm (1.56 x 0.80")

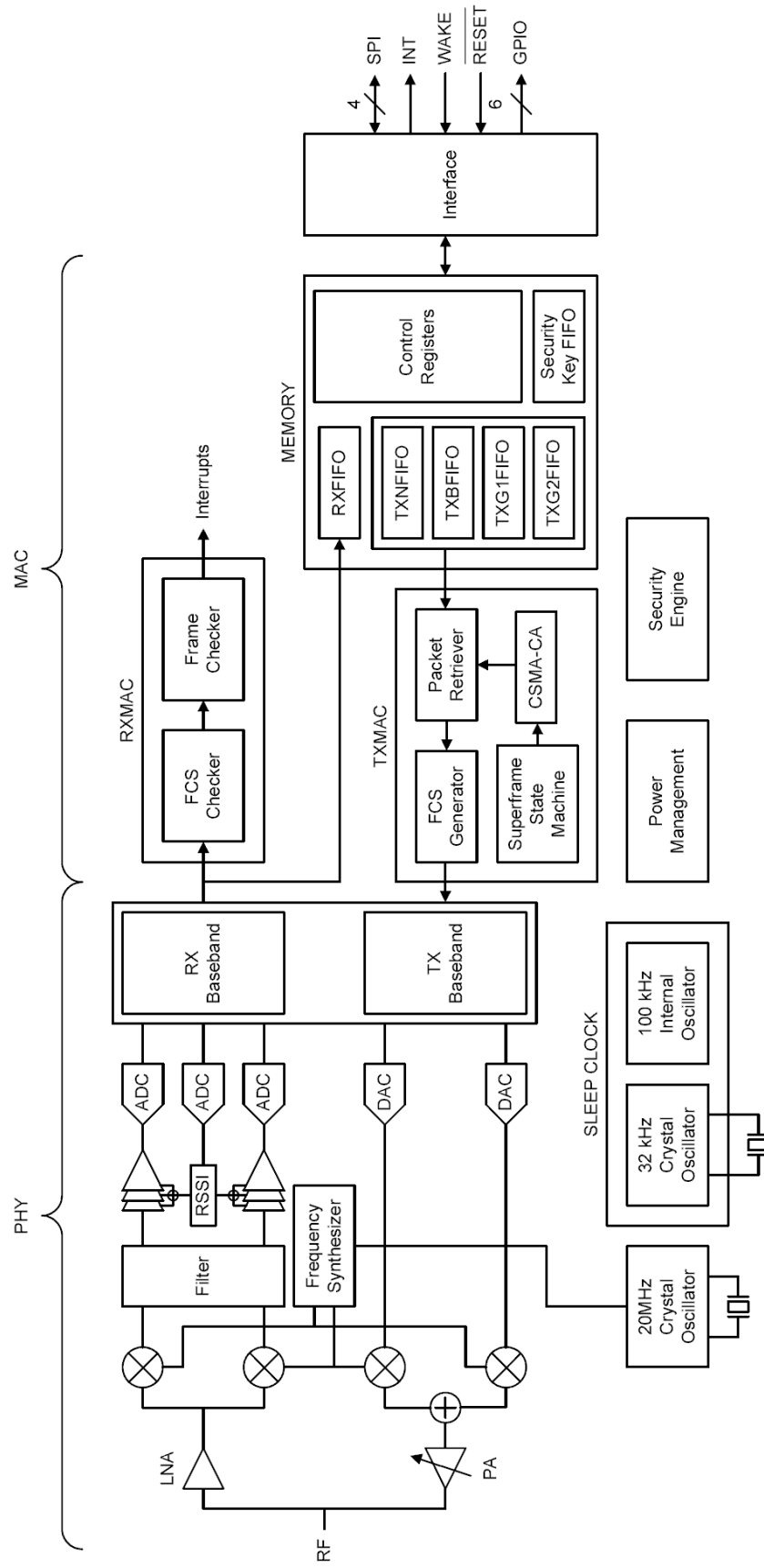
## **ELECTROSTATIC WARNING:**

The MOD-MRF24J40 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.

## **RF TRANSCEIVER FEATURES:**

- IEEE 802.15.4™ Standard Compliant RF Transceiver
- Supports ZigBee®, MiWi™, MiWi P2P and Proprietary Wireless Networking Protocols
- Simple, 4-Wire SPI Interface
- Integrated 20 MHz and 32.768 kHz Crystal Oscillator Circuitry
- Low-Current Consumption:
  - RX mode: 19 mA (typical)
  - TX mode: 23 mA (typical)
  - Sleep: 2  $\mu$ A (typical)
- RF/Analog Features:
  - ISM Band 2.405-2.48 GHz Operation
  - Data Rate: 250 kbps (IEEE 802.15.4); 625 kbps (Turbo mode)
  - -95 dBm Typical Sensitivity with +5 dBm Maximum Input Level
  - +0 dBm Typical Output Power with 36 dB TX Power Control Range
  - Differential RF Input/Output with Integrated TX/RX Switch
  - Integrated Low Phase Noise VCO, Frequency Synthesizer and PLL Loop Filter
  - Digital VCO and Filter Calibration
  - Integrated RSSI ADC and I/Q DACs
  - Integrated LDO
  - High Receiver and RSSI Dynamic Range
- MAC/Baseband Features:
  - Hardware CSMA-CA Mechanism, Automatic Acknowledgement Response and FCS Check
  - Independent Beacon, Transmit and GTS FIFO
  - Supports all CCA modes and RSSI/ED
  - Automatic Packet Retransmit Capability
  - Hardware Security Engine (AES-128) with CTR, CCM and CBC-MAC modes
  - Supports Encryption and Decryption for MAC Sublayer and Upper Layer

# RF TRANSCEIVER BLOCK DIAGRAM:

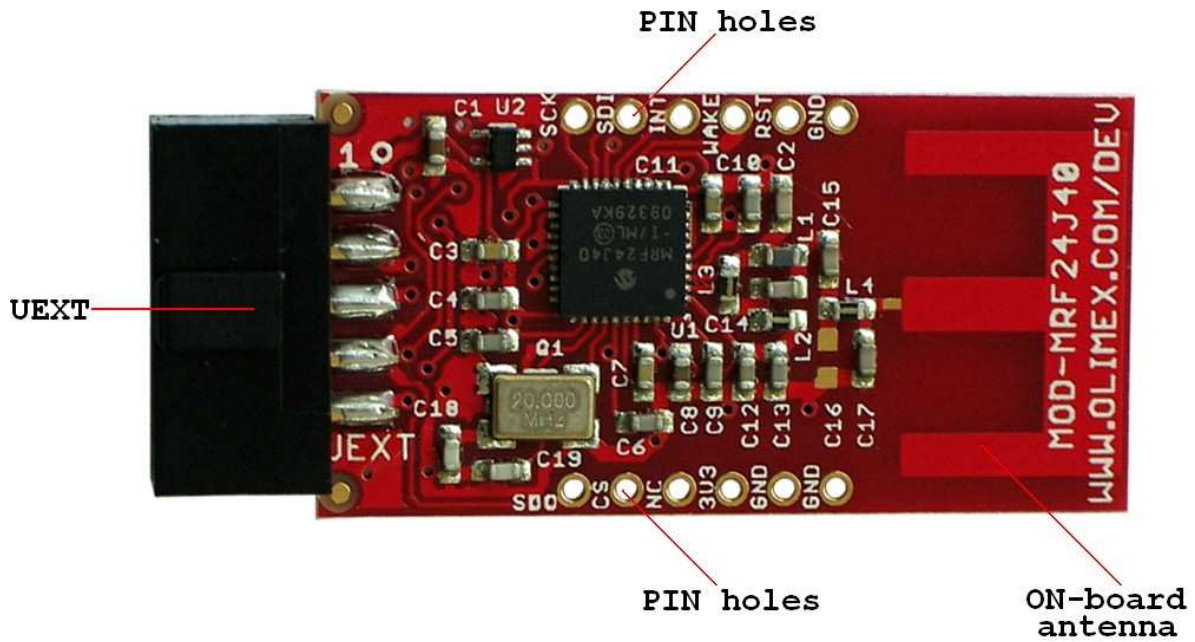


**RF TRANSCEIVER MEMORY MAP:**

Short Address Memory Space		Long Address Memory Space	
0x00	Control Registers	0x000	TX Normal FIFO
0x3F		0x07F	
	64 bytes	0x080	TX Beacon FIFO
		0x0FF	TX GTS1 FIFO
		0x100	
		0x17F	TX GTS2 FIFO
		0x180	
		0x1FF	Control Registers
		0x200	
		0x27F	Security Key FIFO
		0x280	
		0x2BF	Reserved
		0x2C0	
		0x2FF	RX FIFO
		0x300	
		0x38F	144 bytes



## BOARD LAYOUT:



## POWER SUPPLY CIRCUIT:

MOD-MRF24J40 may be power supplied with 3.3V - via UEXT and via pin holes 3V3 and GND.

The programmed board power consumption is about 25 mA with RF transceiver active.

## CLOCK CIRCUIT:

Crystal Quartz 20 MHz connected to MRF24J40 pin 33 (OSC2) and pin 34 (OSC1).

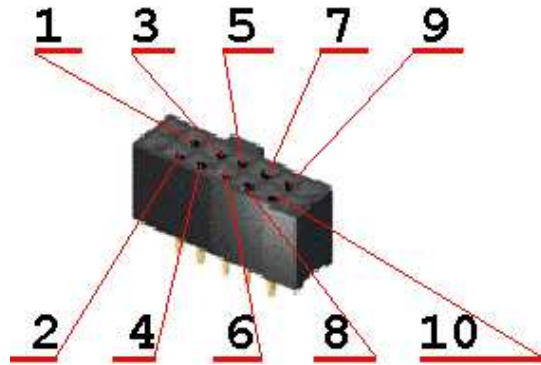
## RESET CIRCUIT:

MOD-MRF24J40 reset circuit includes MRF24J40 pin 13 (RESET), Pin hole RST and UEXT pin 5 (RST).

**CONNECTOR DESCRIPTIONS:**

**UEXT:**

Pin #	Signal Name
1	VCC (3V)
2	GND
3	WAKE
4	INT
5	RST
6	Not Connected
7	SDO
8	SDI
9	SCK
10	CS



**PIN HOLES:**



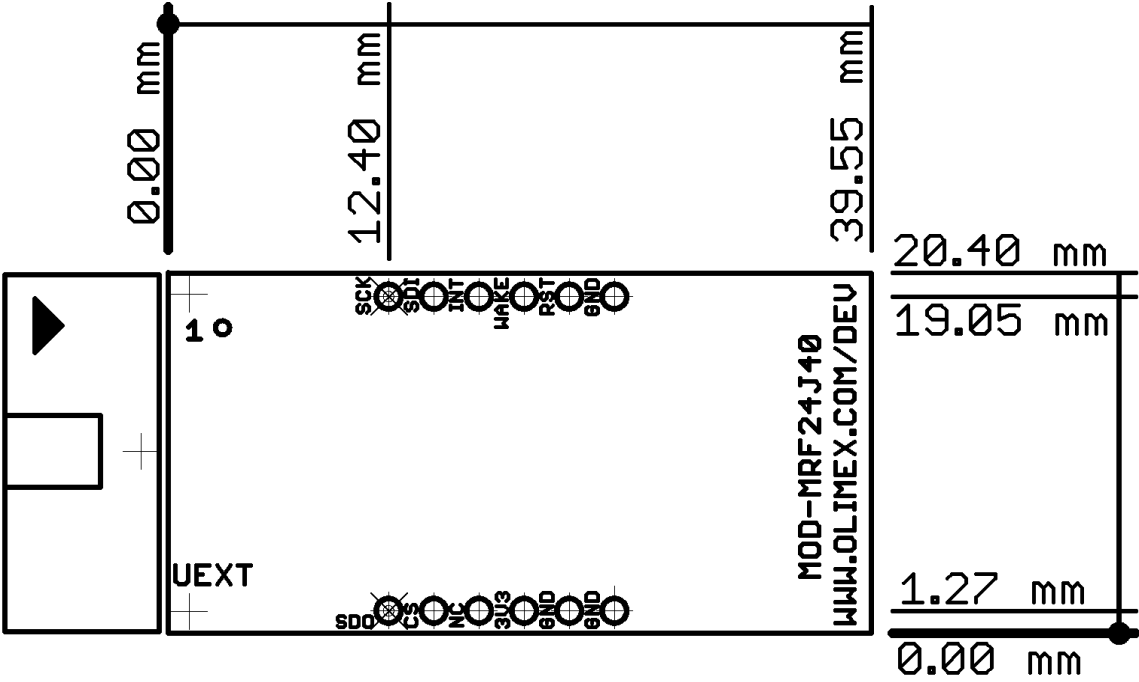
PIN  
HOLES



NC - Not Connected.



**MECHANICAL DIMENSIONS:**



## **AVAILABLE DEMO SOFTWARE:**

Available at [www.olimex.com/dev](http://www.olimex.com/dev)

- Basic connectivity demo using Microchip MiWi stack. In order to use this demo you will need two MOD-MRF24J40 and two PIC32-MX460 boards.

## ORDER CODE:

**MOD-MRF24J40** assembled and tested.

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	- created April 2009
Manual's revision:	Rev. Initial	- created May 2011

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