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Revision

1.1.2

RoHs Compliant

# WI.M868(900)X-R/
# WI.M868(900)T-R/
# WI.M868(900)X-DP-R
# DATASHEET

RADIOTRONIX, INC.

# WI.M868X-R/ WI.M868T-R/ WI.M868X-DP-R DATASHEET

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Chapter 1

# 1. Introduction

The Radiotronix family of 868-870MHz and 902-928MHz embedded “Radio-Only” modules are designed to meet European and US certification requirements.

This family consists of the Wi.M868/900X-R™, Wi.M868/900T-R™, and the Wi.M868/900X-DP-R™ modules. These modules are designed to allow the design engineer to control the radio at the physical level using any microcontroller. The Wi.M868/900T-R ™is a transmit only radio while the Wi.M868/900X-R™ is a transceiver only radio module.

The embedded only modules are footprint compatible with the Radiotronix family of Microcontroller + SW protocol versions in both 902-928MHz (Wi.232DTS-R and Wi.232FHSS-25-R) radio modules and the 868-870MHz Euro module (868-870 MHz). This allows the designer a flexible platform to start work with fully transparent serial UART solutions and later move to the lower cost microcontroller-less radio only versions.

The Wi.M868/900X-DP-R, transceiver only radio was designed as a footprint compatible module with the Semtech DP1203-868/915 modules. For new designs, it is recommended that the designer goes with the Wi.DP1203-868/915-R module which is a direct replacement for the Semtech module.

The Wi.M900™ modules support 32 wide band high power channels and 84 narrow band low power channels. The Wi.M868™ modules support two modes of operation: wide-band (2 channels) and narrow-band (6 channels). In wide-band mode, the channel width is 600 kHz and in narrow-band mode the channel width is 200 kHz. The module is configured via a simple SPI style serial interface. Data is transmitted and received using a separate digital serial interface that includes pre-amble and start-of-packet detection.

The radios are capable of +15dBm on chip power output with a -112 RF sensitivity. The RF data rate is 152.34 with UART data rates selectable from 1.2kbps to 115kbps.

A typical circuit consists of a low-cost microcontroller, a power source, an embedded module, and an antenna.

## 1.1. Features

- Instant Physical Radio Solution (no external RF components required)
- 868 – 870 MHz and 902 – 928 MHz versions
- Simple FCC certification as Digital Spread Spectrum Device
- Supports Frequency Hopping
- Based on the Xemics XE1203F transceiver
- Wi.M868X/T is footprint-compatible with Wi.232EUR Euro module
- Built-in data clock recovery
- Automatic Packet Start Detection
- 2.4V – 3.6V Operation

- 1.2 – 152.34kbit per second data rate
- SPI Style Digital Serial Interface
- Smallest form factor in the world (under 0.8”)
- Maximum Output Power: +15dBm
- Maximum RF Sensitivity: -112dBm
- RF Sensitivity at Max Data Rate: -103dBm (typ.)
- Tx Current: 62mA @ 15dBm (typ.)
- Rx Current: 14mA (typ.)
- NV Personality Memory stores factory calibration and unique ID (Wi.M868(900)X-R™/ Wi.M868(900)T-R™ versions only)
- Can be provided with or without a SAW Filter

## 1.2. Applications

- Asset Tracking
- Automated Meter Reading
- Industrial and/ or Home Automation
- RFID
- Wireless Sensors
- Remote Data Logging
- Fleet Management

Chapter 2

# 2. Theory of Operation

## 2.1. General

The Wi.M868X-R™/ Wi.M868T-R™/ Wi.M868X-DP-R™ module is based on the XEMICS XE1203F transceiver RFIC. It encapsulates the remaining circuitry required to complete an RF module.

Any 50 ohm antenna can be used with the Wi.M868X-R™/ Wi.M868T-R™/ Wi.M868X-DP-R™. The Wi.M868X-R™/ Wi.M868X-DP-R™ module is populated with all of the transceiver components shown in figure 1. The Wi.M868T-R™ is only populated with the transmitter components; it does not have the SAW filter or the RF switch.

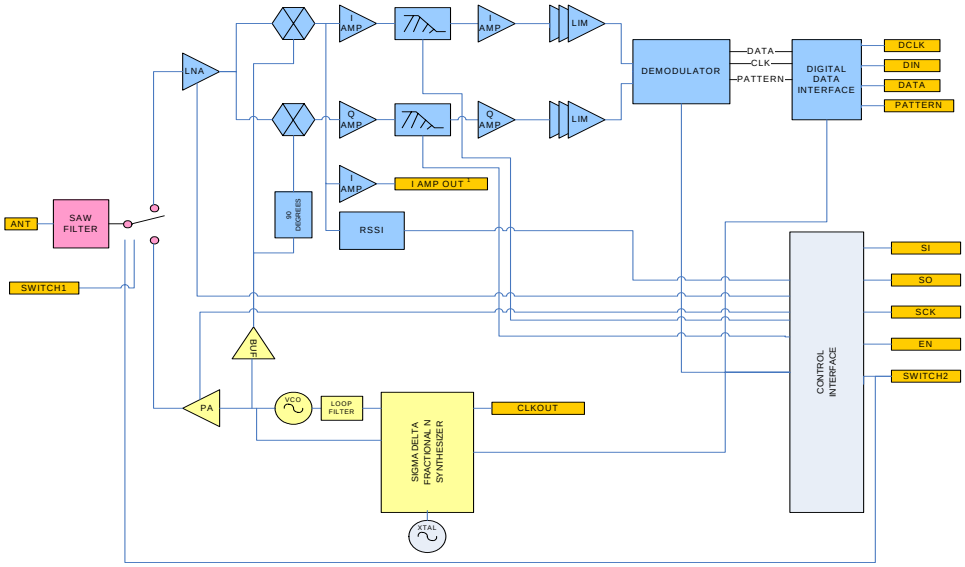


Figure 1: Wi.M868X-R™ /Wi.M868T-R™ /Wi.M868X-DP-R™ Block Diagram

On the Wi.M868X-R™/ Wi.M868X-DP-R™ the antenna pin on the module goes either to the SAW filter or to the RF switch directly. The module can be ordered with or without a SAW filter. If the SAW filter is populated, it is critical that the antenna be AC coupled if it has a DC path to ground (which is true for most PCB antennas).

On the Wi.M868T-R™ the antenna pin connects directly to the output of the power amplifier.

If populated, the RF switch connects the antenna port to either the transmit or receive RF chain. It is controlled by TRSW and RXSW. For the Wi.M868X-R™, TRSW is also connected to the TRSW input of the XE1203F. For the Wi.M868X-DP-R™, there is a separate pin (SWITCH) that couples to the TRSW pin of the XE1203F. The following table shows how TRSW and RXSW affect the operation of the module.

| RXSW | TRSW | RF Mode (Wi.M868X Only) | XE1203F Reg Set |
|---|---|---|---|
| Low | Low | Receive - switch sleep | SWParam1 |
| High | Low | Receive | SWParam1 |
| Low | High | Transmit | SWParam2 |
| High | High | Transmit – switch indeterminate | SWParam2 |

Table 1, Wi.M868X-R™/ Wi.M868T-R™ Switch and Mode Parameters

| RX | TX | Switch | RF Switch State | XE1203F Reg Set |
|---|---|---|---|---|
| Low | Low | Low | Sleep | SWParam1 |
| High | Low | Low | Receive path | SWParam1 |
| Low | High | Low | Transmit path | SWParam1 |
| High | High | Low | Indeterminate | SWParam1 |
| Low | Low | High | Sleep | SWParam2 |
| High | Low | High | Receive path | SWParam2 |
| Low | High | High | Transmit path | SWParam2 |
| High | High | High | Indeterminate | SWParam2 |

Table 2, Wi.M868X-DP-R™ Switch and Mode Parameters

Internally, the XE1203F has two identical sets of programming registers (SWParam) that control the operation of the chip. Generally, one set is programmed for receive mode and the other set is programmed for transmit mode. For the Wi.M868X-R™ module, set 1 is for receive mode and set 2 is for transmit mode. With the Wi.M868T-R™/ Wi.M868X-DP-R™, you can utilize either register set for either TX or RX.

For the Wi.M868T-R™ module, the register sets can be used to quickly switch between two frequencies. Register set 1 is selected when TRSW is low, and register set 2 is selected when TRSW is high.

In addition to the SWParam registers, there are three other register sets that set the operation of the module.

The RTParam registers control the operation of the radio itself. The FSParam registers control the operation of the frequency synthesizer. The ADParam register determines the parameters of operation for the digital data interface. All of these registers are used in both receive and transmit mode. They can be programmed to meet the customer's needs. A specific requirement of the Wi.M868X-R™ is that bit 3 (RTParam_Switch_Ext) of RTParam must be set to 1. For the Wi.M868T-R™ and Wi.M868X-DP-R™, you may select the mode that best suits the application.

When the SWITCH pin of the XE1203F is configured as an output, the ConfigSwitch register selects the SWParam register set to use. A value of 0 selects SWParam0; a value of 1 selects SWParam1.

The receive chain is a traditional zero-IF architecture. The filter bandwidth is programmable and can be set to 200 kHz or 600 kHz. RSSI is derived from the I-channel. It is digitized internally and can be read from the DataOut register.

Frequency error indication (FEI) is derived from both the I and Q channels. Its value can be read from the DataOut register. FEI can be used to compensate for slight frequency differences between the transmitting module and receiving module.

The demodulator re-creates the data stream. It demodulates the FSK modulated base-band carrier, extracts the bit stream timing, and samples the raw bit stream to accurately reproduce the original data.

In receive mode, the data interface is synchronous, operating as an SPI master. The module determines the data timing; the DCLK pin is the clock and the DATA pin is the data output.

In transmit mode, the data interface is asynchronous, operating as an SPI slave. The data timing is determined by the host microcontroller. The DCLK pin is not used in transmit mode. The data input could be either DATA or DATAIN, depending on ADParam_disable_data_bidir register configuration.

Figure 2 shows a typical connection between the module and a host microcontroller SPI port. In this configuration, the DATA pin is programmed to be a data output in receive mode and a data output in receive mode. In receive mode, the microcontroller SPI port is configured as an SPI slave. The module generates data timing. In transmit mode, the microcontroller SPI port is configured as a SPI master. Timing is generated by the microcontroller.

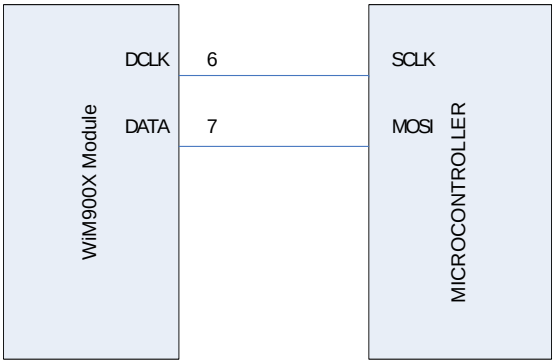


Figure 2: Microcontroller Data Interface

The transmit chain is essentially a VCO locked to a crystal reference frequency by a fractional N synthesizer. The synthesizer allows the VCO frequency to be set in 501Hz steps. It also supports direct digital FSK modulation of the transmit carrier. Frequency deviation can be set from 0 to 255 kHz in 1 kHz steps.

The output of the VCO is amplified by the power amp, which can be set to one of four output power levels.

For detailed information about programming the Wi.M868X-R™/ Wi.M868T-R™/ Wi.M868X-DP-R™ module, please consult the current XE1203F data sheet which can be found at http://www.semtech.com.

## 2.2. Programming Interface

The serial programming interface is compatible with any hardware or software implementation of a SPI serial port.

The following code example shows functions for reading and writing module registers using a software SPI implementation. The XE_SCLK, XE_SI, XE_SO, XE_EN definitions are hardware specific and correspond to the microcontroller IO pins that are connected to the XE1203F SPI pins.

```
//-------------------------------------------------------------------------
//  void halRFWriteReg(reg, val)
//
//  Description:
//      Function used to write registers in the XE1203F
//
//  Arguments:
//         byte reg
//                Register number to write
//         byte val
//                Value to write to register
//
//  Return value:
```

```
//      void
//---------------------------------------------------------------------------
void halRFWriteReg(byte reg, byte val)
{
    byte data i;

    XE_SCLK=0;     // Always start in a low condition
    XE_SI=1;
    XE_EN=0;       // enable the serial port

    // start condition

    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_SI=1;
    XE_SCLK=1;
    XE_SI=0;       //
    XE_SCLK=0;
    XE_SI=0;       // for delay only

    // write bit

    XE_SCLK=1;
    XE_SI=0;
    XE_SCLK=0;
    XE_SI=0;       // for delay only

    for(i=0;i<=4;i++)
    {

           XE_SCLK=1;
           XE_SI=(reg&0x10);
           XE_SCLK=0;
           reg<<=1;
    }

    for(i=0;i<=7;i++)
    {
           XE_SCLK=1;
           XE_SI=(val&0x80);
           XE_SCLK=0;
           val=val<<1;
    }
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_SI=1;
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_EN=1;
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
}

//---------------------------------------------------------------------------
//  void halRFReadReg(reg, val)
//
//  Description:
//      Function used to read registers in the XE1203F
//
//  Arguments:
//          byte reg
//                  Register number to write
//          byte val
//                  Value to write to register
//
//  Return value:
//      void
```

```
//-------------------------------------------------------------------------------
byte halRFReadReg(byte reg)
{
    byte data i;
    byte data regdat;

    regdat=0;

    XE_SCLK=0;     // Always start in a low condition
    XE_SI=1;
    XE_EN=0;       // enable the serial port

    // start condition

    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_SI=1;
    XE_SCLK=1;
    XE_SI=0;       //
    XE_SCLK=0;
    XE_SI=0;       // for delay only

    // write bit

    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_SI=1;       // for delay only

    for(i=0;i<=4;i++)
    {

           XE_SCLK=1;
           XE_SI=(reg&0x10);
           XE_SCLK=0;
           reg<<=1;
    }

    for(i=0;i<=7;i++)
    {
           regdat=regdat<<1;
           XE_SCLK=1;
           regdat|= (byte)XE_SO;
           XE_SCLK=0;
    }
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_SI=1;
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;
    XE_EN=1;
    XE_SCLK=1;
    XE_SI=1;
    XE_SCLK=0;

    return  regdat;

}
```

## 2.3. Non-Volatile Memory

The on-board nonvolatile memory stores a 32-bit unique identification number and a signed 16-bit calibration constant.

| Address | Meaning |
|---|---|
| 0 | Reserved |
| 1 | Reserved |
| 2 | Reserved |
| 3 | Reserved |
| 4 | Reserved |
| 5 | Reserved |
| 6 | Reserved |
| 7 | Reserved |
| 8 | XTAL calibration constant, byte 0 |
| 9 | XTAL calibration constant, byte 1 |
| 10 | Unique Address, byte0 |
| 11 | Unique Address, byte1 |
| 12 | Unique Address, byte2 |
| 13 | Unique Address, byte3 |
| 14 | Reserved |
| 15 | Reserved |

Table 3, Non-Volatile Memory (Wi.M868X-R™/ Wi.M868T-R™ only)

The calibration constant is used to correct the channel programming for offset error caused by the reference crystal. The following code snippet shows how to use this constant:

```
#define XTCAL_LOWER_LIMIT -1024
#define XTCAL_UPPER_LIMIT 1023

void halRFSetChan(byte chan)
{
    int     offset, txword, rxword;


    txword=chanDTS[chan];
    rxword=chanDTS[chan];

    // Read offset.  If the XTCAL value is below min or above max, it will
    // default to 0 (no offset).
    // -----------------------------------------------------------------
    offset = (int)i2cRead(NV_XTCAL);
    if ((offset < XTCAL_LOWER_LIMIT) || (offset > XTCAL_UPPER_LIMIT))
            offset = 0;

    // Set the transmit parameters
    // ---------------------------
    txword+=offset;
    halRFWriteReg(rfrSWPARAMB_2,(byte)txword);
    halRFWriteReg(rfrSWPARAMB_1,(byte)(txword>>8));

    // Set the receive parameters
    // --------------------------
    rxword+=offset;
    halRFWriteReg(rfrSWPARAMA_2,(byte)rxword);
    halRFWriteReg(rfrSWPARAMA_1,(byte)(rxword>>8));
```

The channel programming word is determined by chanDTS[channel]. The calibration constant is then read in using the I2C bus; it is stored in offset. The offset is then added to the channel programming word and sent to the Wi.M868X/T module using the programming interface.

## 2.4. Sample Channel Tables

```
#ifdef INTERNATIONAL
  // 868MHz EUR Frequencies
  // ----------------------
  int chanWB[2]=
  {
    0xFA87, 0xFF9C
  };

  int chanNB[6]=
  {
    0xF9F2, 0xFB1E, 0xFED4, 0x0063, 0x0419, 0x06A4
  };
#else
  // 915MHz US Frequencies
  // ---------------------
  int chanDTS[32]=
  {
    0xA240,0xA81C,0xADF8,0xB3D4,0xB9B0,0xBF8C,0xC568,0xCB44,
    0xD120,0xD6FC,0xDCD8,0xE2B4,0xE890,0xEE6C,0xF448,0xFA24,
    0x0000,0x05DC,0x0BB8,0x1194,0x1770,0x1D4C,0x2328,0x2904,
    0x2EE0,0x34BC,0x3A98,0x4074,0x4650,0x4C2C,0x5208,0x57E4
  };

  int chanLP[84]=
  {
    0x9CC8,0x9F20,0xA178,0xA3D0,0xA628,0xA880,0xAAD8,0xAD30,
    0xAF88,0xB1E0,0xB438,0xB690,0xB8E8,0xBB40,0xBD98,0xBFF0,
    0xC248,0xC4A0,0xC6F8,0xC950,0xCBA8,0xCE00,0xD058,0xD2B0,
    0xD508,0xD760,0xD9B8,0xDC10,0xDE68,0xE0C0,0xE318,0xE570,
    0xE7C8,0xEA20,0xEC78,0xEED0,0xF128,0xF380,0xF5D8,0xF830,
    0xFA88,0xFCE0,0xFF38,0x0190,0x03E8,0x0640,0x0898,0x0AF0,
    0x0D48,0x0FA0,0x11F8,0x1450,0x16A8,0x1900,0x1B58,0x1DB0,
    0x2008,0x2260,0x24B8,0x2710,0x2968,0x2BC0,0x2E18,0x3070,
    0x32C8,0x3520,0x3778,0x39D0,0x3C28,0x3E80,0x40D8,0x4330,
    0x4588,0x47E0,0x4A38,0x4C90,0x4EE8,0x5140,0x5398,0x55F0,
    0x5848,0x5AA0,0x5CF8,0x5F50
  };
#endif
```

Chapter 3

# 3. Application Information

## 3.1. Pin-out Diagram for Wi.M868X-R™/ Wi.M868T-R™

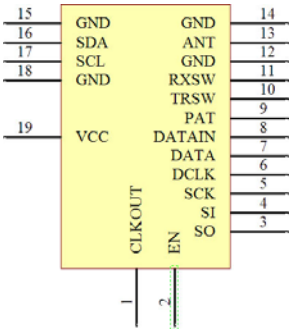


Figure 3: Pin-out Diagram for Wi.M868X-R™/ Wi.M868T-R™

## 3.2. Pin Description for Wi.M868X-R™/ Wi.M868T-R™

| No. | Name | Description |
|---|---|---|
| **1** | CLKOUT | Clock output from XE1203F |
| **2** | EN | XE1203F Programming port enable |
| **3** | SO | XE1203F Programming port serial output |
| **4** | SI | XE1203F Programming port serial input |
| **5** | SCK | XE1203F Programming port dock |
| **6** | DCLK | XE1203F Data port dock |
| **7** | DATA | XE1203F Data I/O pin; ADParam_disable_data_bidir register determines whether this pin is bi-directional (0) or an output (1) |
| **8** | DATAIN | XE1203F Data In pin; ADParam_disable_data_bidir register determines whether this pin is active (1) or not used (0) |
| **9** | PAT | XE1203F Pattern Output (indicates start-of-packet) |
| **10** | TRSW | XE1203F TRSW pin (also Transmit RF Switch) |
| **11** | RXSW | Receive RF Switch (not used in transmit only version) |
| **12** | GND | Ground |
| **13** | ANT | 50 Ohm Antenna Output |
| **14** | GND | Ground |
| **15** | GND | Ground |
| **16** | SDA | Serial Data Pin for NV Personality Memory – I2C bus |
| **17** | SCL | Serial Clock Pin for NV Personality Memory – I2C bus |
| **18** | GND | Ground |
| **19** | VCC | 2.7 to 3.6 Volt Power Supply |

Table 4, Module Pin Descriptions for Wi.M868X-R™/ Wi.M868T-R™

## 3.3. Pin-out Diagram for Wi.M868X-DP-R™

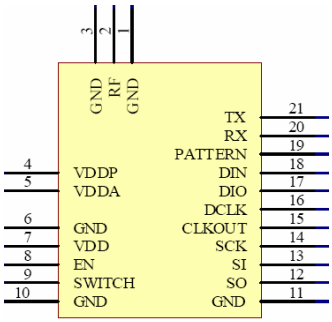


Figure 4: Pin-out Diagram for Wi.M868X-DP-R™

## 3.4. Pin Description for Wi.M868X-DP-R™

| No. | Name | Description |
|---|---|---|
| **1** | GND | Ground |
| **2** | RF | 50 Ohm Antenna Output |
| **3** | GND | Ground |
| **4** | VDDP | 2.4 – 3.6 Volt Power Supply |
| **5** | VDDA | 2.4 – 3.6 Volt Power Supply |
| **6** | GND | Ground |
| **7** | VDD | 2.4 – 3.6 Volt Power Supply |
| **8** | EN | XE1203F programming port enable |
| **9** | SWITCH | XE1203F TRSW pin (also Transmit RF Switch) |
| **10** | GND | Ground |
| **11** | GND | Ground |
| **12** | SO | XE1203F Programming port serial output |
| **13** | SI | XE1203F Programming port serial input |
| **14** | SCK | XE1203F Programming port dock |
| **15** | CLKOUT | XE1203F Data port dock |
| **16** | DCLK | XE1203F Programming port serial output |
| **17** | DIO | XE1203F Data I/O pin; ADParam_disable_data_bidir register determines whether this pin is bi-directional (0) or an output (1) |
| **18** | DIN | XE1203F Data In pin; ADParam_disable_data_bidir register determines whether this pin is active (1) or not used (0) |
| **19** | PATTERN | XE1203F Pattern Output (indicates start-of-packet) |
| **20** | RX | Receive Antenna Switch Select |
| **21** | TX | Transmit Antenna Switch Select |

Table 5, Module Pin Descriptions for Wi.M868X-DP-R™

## 3.5. Mechanical Drawings for Wi.M868X-R™/ Wi.M868T-R™

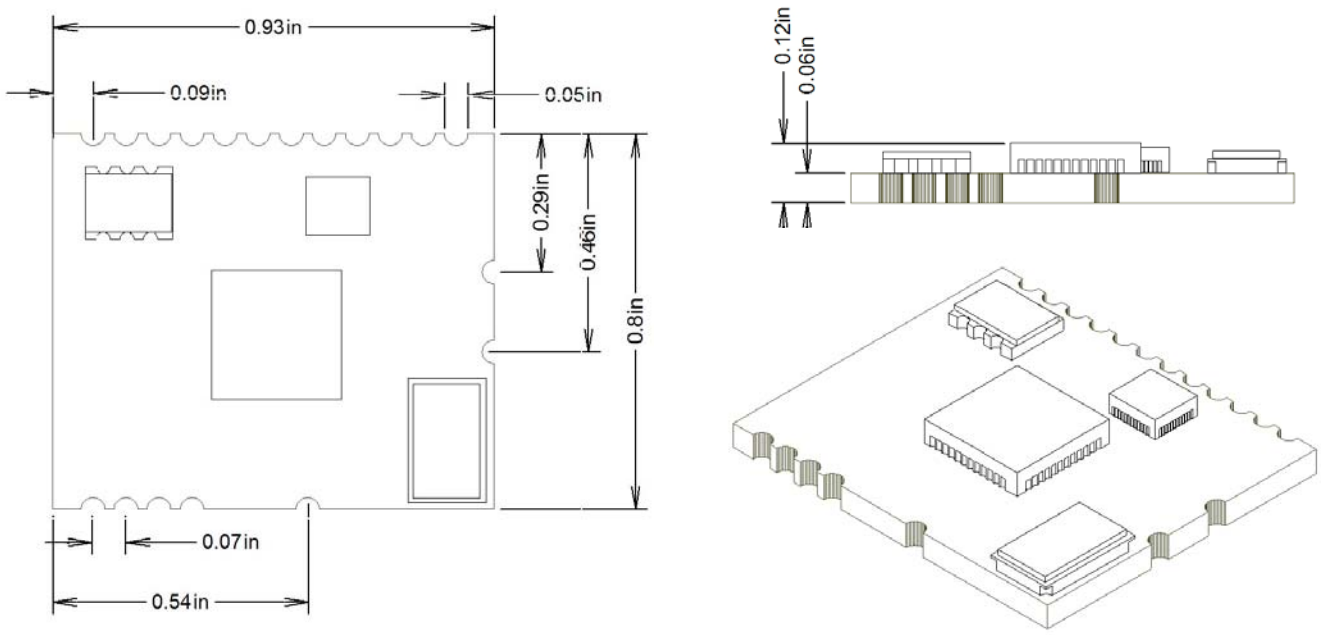


Figure 5: Module Mechanical Drawings for Wi.M868X-R™/ Wi.M868T-R™

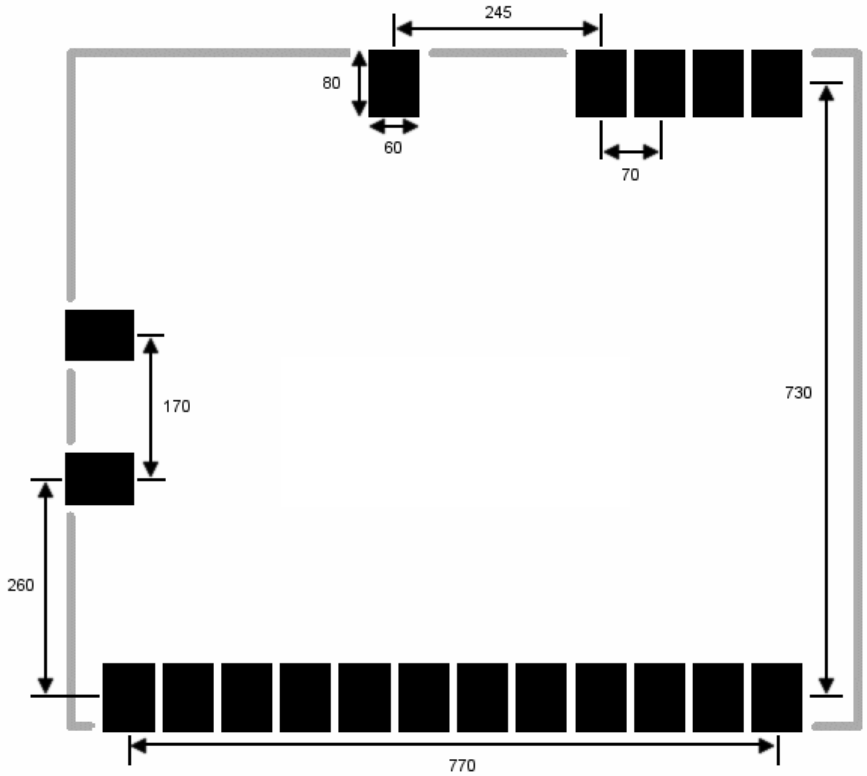


Figure 6: Suggested Footprint for Wi.M868X-R™/ Wi.M868T-R™

## 3.6. Mechanical Drawings for Wi.M868X-DP-R™

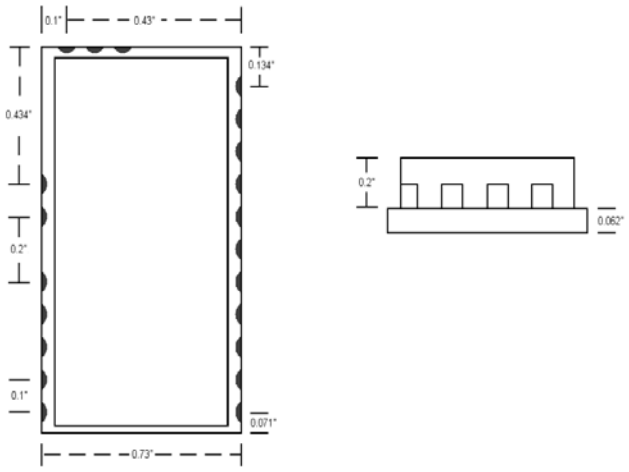


Figure 7: Mechanical Drawings for Wi.M868X-DP-R™

## 3.7. Example Circuit

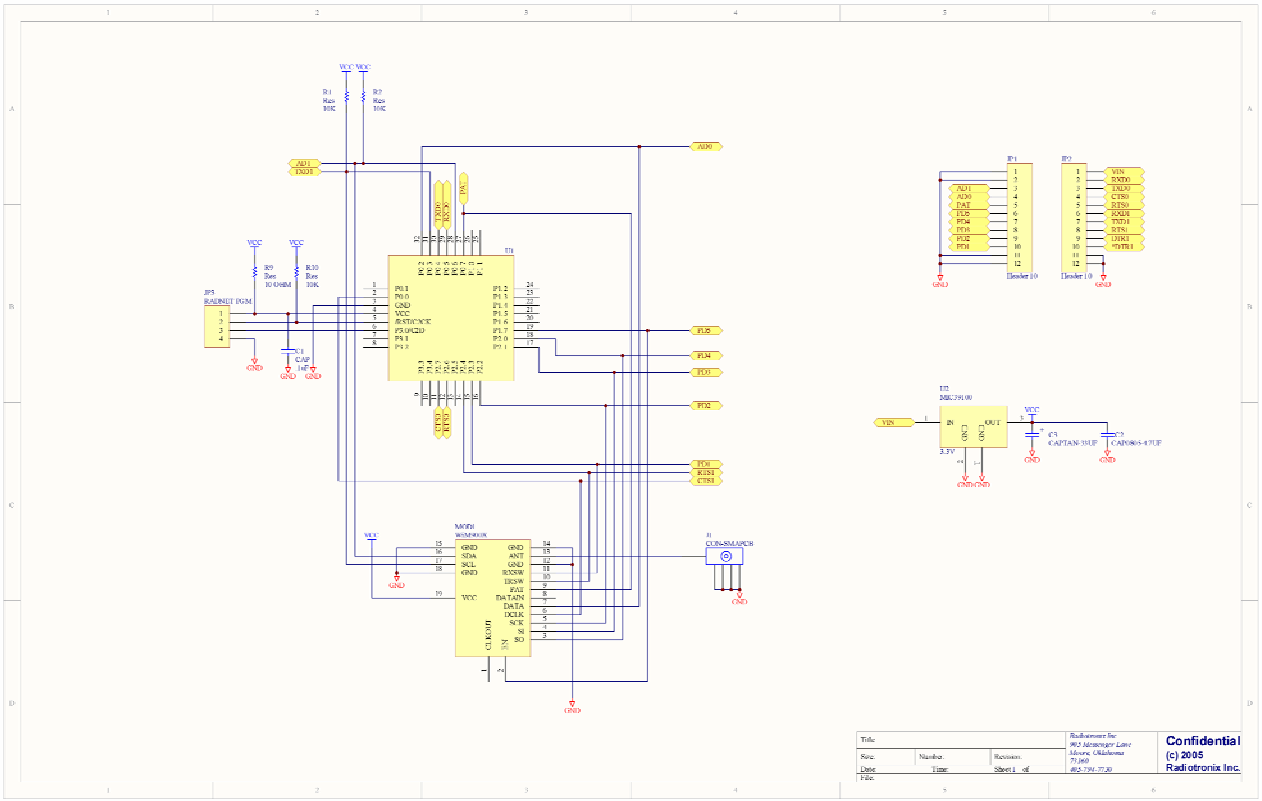

Figure 8: Evaluation Module Circuit

Chapter 4

# 4. Electrical Specifications

## 4.1. Absolute Maximum Ratings

| Parameter | Min | Max | Units |
|---|---|---|---|
| Vdd- Power Supply | -0.3 | 3.9 | VDC |
| Input RF Level | | 10 | dBm |
| Operating Temperature | -40 | +85 | $^{o}$C |

Table 6, Absolute Maximum Ratings

## 4.2. Detailed Electrical Specifications

### 4.2.1. AC Specifications- Rx

| Parameter | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|
| Receive Frequency (US) | 902.2 | | 928 | MHz | |
| Receive Frequency (EUR) | 868 | | 870 | MHz | |
| Wideband Channels (US) | | 32 | | | 750 kHz channel spacing<br>235 kHz deviation<br>Channel usage depends on application |
| Wideband Channels (EUR) | | 2 | | | 400 kHz channel spacing<br>80 kHz deviation<br>Channel usage depends on application |
| Narrowband Channels (US) | | 84 | | | 300 kHz channel spacing<br>80 kHz deviation<br>Channel usage depends on application |
| Narrowband Channels (EUR) | | 6 | | | 150 kHz channel spacing<br>40 kHz deviation<br>Channel usage depends on application |
| Receiver Sensitivity | | -102 | | dBm | Wideband Mode<br>152.34 kbps Data Rate |
| | | -108 | | dBm | Wideband Mode<br>2.4 kbps Data Rate |
| | | -110 | | dBm | Narrowband Mode<br>2.4 kbps Data Rate |
| Receiver Noise Bandwidth | | 200 | | kHz | Wideband |
| | | 600 | | kHz | Narrowband |
| Adjacent Channel Rejection | | 55 | | dBc | Chan + 750 kHz for wideband<br>Chan + 300 kHz for narrowband |
| LO Leakage | | | -70 | dBm | |

Table 7, AC Specifications- Rx

## 4.2.2. AC Specifications- Tx

| Parameter | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|
| Receive Frequency (US) | 902.2 | | 928 | MHz | |
| Receive Frequency (EUR) | 868 | | 870 | MHz | |
| Wideband Channels (US) | | 32 | | | 750 kHz channel spacing<br>235 kHz deviation<br>Channel usage depends on application |
| Wideband Channels (EUR) | | 2 | | | 400 kHz channel spacing<br>80 kHz deviation<br>Channel usage depends on application |
| Narrowband Channels (US) | | 84 | | | 300 kHz channel spacing<br>80 kHz deviation<br>Channel usage depends on application |
| Narrowband Channels (EUR) | | 6 | | | 150 kHz channel spacing<br>40 kHz deviation<br>Channel usage depends on application |
| Transmit Power | | +15 | | dBm | No SAW Filter |
| | | +12 | | dBm | With SAW Filter |
| Harmonics | | | -55 | dBc | |

Table 8, AC Specifications- Tx

## 4.2.3. DC Specifications

| Parameter | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|
| Operating Temperature | -40 | | +85 | $^{o}$C | |
| Tx Current | | 62 | 75 | mA | +15 dBm power setting |
| | | 55 | | mA | +10 dBm power setting |
| | | 33 | | mA | +5 dBm power setting |
| | | 22 | | mA | 0 dBm power setting |
| Rx Current | | 14 | 17 | mA | |
| Sleep Current | | .2 | 1 | μA | |

Table 9, DC Specifications

Chapter 5

# 5. Custom Applications

For cost-sensitive applications, such as wireless sensors and AMR, Radiotronix can embed the application software directly into the microcontroller built into the module. For more information on this service, please contact Radiotronix.

Chapter 6

# 6. Ordering Information

| Product Part Number | Description |
|---|---|
| Wi.M868X-R | Embedded Wireless Module (868 MHz) |
| Wi.M868T-R | Embedded Wireless Module (868 MHz) |
| Wi.M868X-DP-R | Embedded Wireless Module (868 MHz) |
| Wi.M900X-R | Embedded Wireless Module (900 MHz) |
| Wi.M900T-R | Embedded Wireless Module (900 MHz) |
| Wi.M900X-DP-R | Embedded Wireless Module (900 MHz) |

## 6.1. Contact Information

Corporate Headquarters:
905 Messenger Lane
Moore, Oklahoma 73160
405-794-7730
website: www.radiotronix.com
support: support@radiotronix.com

### 6.1.1. Technical Support

Radiotronix has built a solid technical support infrastructure so that you can get answers to your questions when you need them. Our primary technical support tools are the support forum and knowledge base found on our website. We are continuously updating these tools. To find the latest information about these technical support tools, please visit http://www.radiotronix.com/support. Our technical support engineers are available Mon-Fri between 9:00 am and 5:00 pm central standard time. The best way to reach a technical support engineer is to submit a Webcase. Webcase submissions can be made at http://www.radiotronix.com/support/webcase.asp. For customers that would prefer to talk directly to a support engineer, we do offer phone support free of charge.

### 6.1.2. Sales Support

Our sales department can be reached via e-mail at sales@radiotronix.com or by phone at 405-794-7730. Our sales department is available Mon-Fri between 8:30 am and 5:00 pm central standard time. Visit our web site at http://www.radiotronix.com/corpsales.asp for information on where to buy our products.

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