

## RF Integrated Module

### WITECH MD868W25-1AM

868 MHz - Wide Band - 25 mW  
Core 1 - Footprint A - Microstrip Antenna

Rev 1.0 02/13



Witech MD868W25-1AM is a 868 MHz, wide band 25 mW fully integrated (hardware/firmware) RF module with antenna, specially suited for OEM integrators who wish a high optimized and completely designed RF platform with true low power and long range features, achieving the fastest time to market and the lowest development risk. The module includes a medium size, high performance microstrip antenna with a very homogenous radiation pattern. This wide band solution is specially designed for applications requiring more data rate than narrow band options, giving up some sensitivity and number of channels to these solutions.

#### General Features

- Fully Integrated RF Module (Hardware/Firmware)
- License Free 868 MHz ISM Band
- Wide Band for High Sensitivity, High Data Rate and Ultra Low Power Consumption
- Long Range:  $\approx 1700$  m (line-of-sight)
- Fastest Time to Market, Lowest Development Risk
- Multiple I/O Interfaces and Assembly Options

#### RF Performance

- Output Frequency Range: 862-870 MHz
- Channel Spacing: 50, 100, 200, 500 KHz
- Output Power Range: -60 to 13 dBm
- High Performance PCB Microstrip Antenna
- Modulations: GFSK
- Radio Data Rates: 1.2 to 500 Kbps (Max Actual Data Rate can be Limited by the Local Available Bandwidth)
- Sensitivity ( $BER < 10^{-3}$ )
  - 114 dBm (1.2 Kbps)
  - 105 dBm (38.4 Kbps)
  - 96 dBm (250 Kbps)
  - 91 dBm (500 Kbps)
- Compliant with ETSI EN 300 220 Standard

#### Power Supply and Consumptions

- Voltage Range: 3 to 6 V
- Internal Ultra Low Power Regulator Included
- Consumptions:
  - Standby 5  $\mu$ A
  - Peak TX 41 mA
  - Peak RX 18 mA
  - Average  $< 20$   $\mu$ A (RX 1 sec latency, 38.4 Kbps)

#### Temperature Range

- Storage Temperature: -40 $^{\circ}$  to 85 $^{\circ}$  C
- Operating Temperature: -30 $^{\circ}$  to 75 $^{\circ}$  C

#### Dimensions

- Size: 40 x 55 x 7.65 mm
- Weight: 8 g

#### Firmware Stack Options

- Firmware Stack Options Suited for Different Applications Types

- WITECH LINK STACK
- WITECH ULP-NET STACK
- WITECH METERING STACK
- WITECH RTLS STACK
- WITECH DOMO STACK

- Wireless Link/Network Bootloader (WLBOOT/ WNBOOT) Included for Complete Remote Firmware Update (Witech Stack and Application)

- Complete and Easy to Use Witech APIs in C Programming Language for all Stack Options:

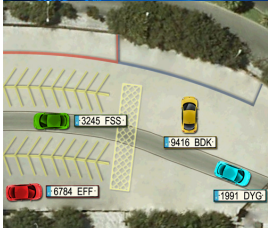
- WITECH LINK STACK API
- WITECH ULP-NET STACK API
- WITECH METERING STACK API
- WITECH RTLS STACK API
- WITECH DOMO STACK API

- For Every Stack, same API for Two Integration Scenarios:

- Local Integration on Witech CPU
- External Integration in a Second CPU (USB/ Serial interface). Cross-Platform Libraries for:
  - Low Level Integration (ARM, MIPS, MSP430, AVR, COLDFIRE, ...)
  - High Level Integration (Windows, Windows CE/Mobile, Linux, ...)

#### Applications

- Automatic Meter Reading Networks (AMR) for water, electricity and gas.
- General Purpose Ad-hoc Sensor Networks
- Wireless Domestic Systems
- Industrial Control
- Solar Panel Monitoring Networks
- Marinas Dock Pedestals
- Real Time Location Systems (RTLS)
- Indoor Navigation and Access Control
- Healthcare and Wellness Networks
- Weather Stations
- Watering and Irrigation Control Networks



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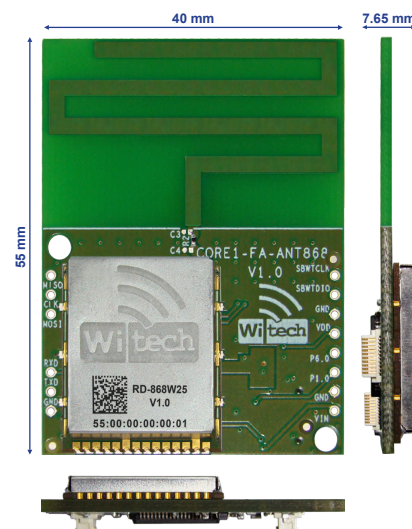
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### Internal CPU: Witech Core 1

- Flash based Ultra Low Power Microcontroller
- 16-Bit RISC Architecture
- 2.2V to 3.6V Operation
- Max Frequency: 25 Mhz
- Ultra Low Power Consumption:
  - 0.1  $\mu$ A RAM retention
  - 2.5  $\mu$ A RTC operative
  - 165  $\mu$ A/MIPS in active state
- Wake-up from Standby Mode < 5  $\mu$ s
- Flash Options: up to 256 KBytes
- RAM Options: 16 KBytes
- Integrated LDO, Monitoring and Brownout
- Integrated Peripherals
  - 3 16-Bit Timers, 15 Cap/Comp Channels
  - Up to 4 Serial Modules (UART/SPI/I2C/IRDA)
  - RTC
  - ADC (12-Bit, 16 Channels)
  - DMA (3 Channels)
  - Hardware Multiplier (32-Bit)
  - External Interrupt Inputs (up to 16)
  - Embedded Emulation Module (JTAG/SBW)



### Support for Witech Devices

- HW Design Support
- FW/SW Design Support
  - HW Abstraction Layers (CPU and Peripherals)
  - Libraries for Peripherals and Basic Utilities
  - Tutorials and Examples

### Assembly Options and Accessories

- SMD Assembly Option (Full Interface)
  - 40 (2 x 20) pins Interface (HIROSE DF-12 Series)
  - 3 Stacking Heights: 3.5, 4 or 5 mm
  - Vin, 3V, GND and 34 Input/Output Ports
- Through-Hole Assembly Option (Basic Interface)
  - 14 (8+3+3) pins Interface (2.54 mm)
  - Standard 2.54 mm Cables, Headers and Sockets
  - Vin, 3V, GND, SBW, 8 E/S (UART, SPI, I2C, ADC, INT)

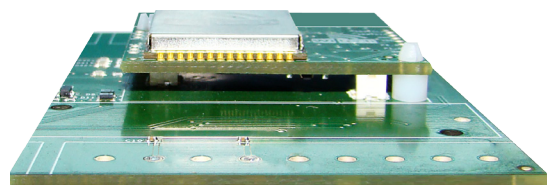


Mating Connectors (3 Stacking Heights)

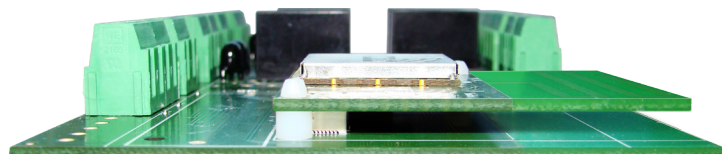


Plastic Support Spacers

*Note: All Images on this Page are Actual Size*



SMD Assembly Example, With Stackers (Back View)



SMD Assembly Example, With Stackers (Lateral View)



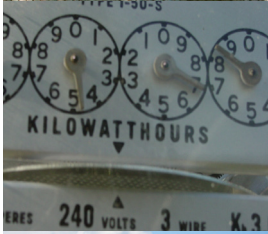
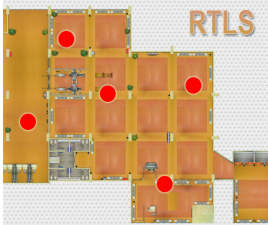
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### Witech Link Stack

- Data Interleaving, Data Whitening
- Forward Error Correction (FEC/BCH)
- Automatic Frequency Control (AFC)
- Frequency Hopping Spread Spectrum (FHSS)
- Encryption (AES 128)
- Quality of Service Management (RSSI)
- Output Power Control, Power Amplifier Ramping
- Automatic Sensitivity Control
- Communications Features
  - Point to point, Multicast, Broadcast, Muthop
  - Asynchronous/Synchronous
  - Connection-Based/Connection-Less
  - ACK/NACK
  - CS/LBT (Carrier Sense/Listen Before Talk)

### Witech ULP-NET Stack

- Witech Link Stack + ULP-NET Layer
- True Ultra Low Power Ad-hoc Network
- Star, Tree or Mesh Network
- Full Mesh or Partial Mesh (Centralized)
- Dynamic Topology and Routing
- No different logical Devices (Planning Exempt, all Nodes are Routers and Endpoints)

### Witech Metering Stack

- Witech ULP-NET Stack + Metering Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Metering Network Systems
- Multiple Meter Interface Options:
  - Pulse Meters (up to 4 Meters per Node)
  - Bus Meters (Modbus, M-bus, Cbus, ...)
  - Serial (UART/SPI/I2C) for General Purpose
- Powerful Programming of Meter Readings
- Automatic Leak Detection, Anomalous Consumptions, Special Monitoring intervals, ...
- Remote Actuation Features: Supply Cutt off, Alarms Signaling, Redundancy Management
- Prepaid Management, Simple and Mixed

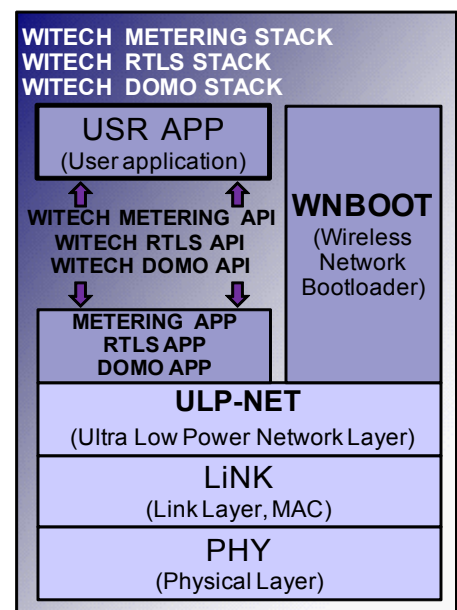
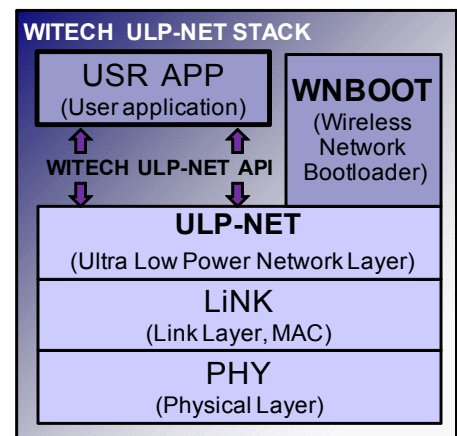
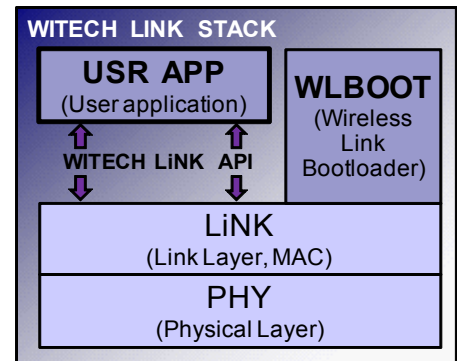
### Witech RTLS Stack

- Witech ULP-NET Stack + RTLS Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Real Time Location Network Systems
- Types of devices: Active Tags, Beacon nodes and Dongle Nodes
- Optimal Solution for Indoor Location and Navigation
- High Level Utilities for Access Control

### Witech DOMO Stack

- Witech ULP-NET Stack + DOMO Application Layer
- Fast Time to Market Solution for Complex Ultra Low Power Domotic Network Systems
- Types of devices: General purpose Analog and Digital Input/Output Devices, and Specific Devices (Light Control, Climate Control, Shutter and Blind Control, Dongle, ...)
- High Level Utilities: Scenarios, Programming, ReStart, ...

## FIRMWARE STACK OPTIONS



# Ultra Low Power High Performance Radio Modules for Easy Integration



[www.witechradio.com](http://www.witechradio.com)

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