

## RF Integrated Module

### WITECH MD868N25-1AM

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

Rev 1.0 02/13



Witech MD868N25-1AM is a 868 MHz, narrow 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 narrow band solution is specially designed for applications requiring ultra-high sensitivity for extreme link-budget, like ultra low power ad-hoc networks with extensive coverage.

#### General Features

- Fully Integrated RF Module (Hardware/Firmware)
- License Free 868 MHz ISM Band
- Narrow Band for Extreme Link-Budget
- Ultra Low Power Consumption
- Long Range:  $\approx 2000$  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: 12.5, 25, 50 KHz
- Output Power Range: -20 to 13 dBm
- High Performance PCB Microstrip Antenna
- Modulations: GFSK
- Radio Data Rates: 0.1 to 25.0 Kbps
- Sensitivity ( $BER < 10^{-3}$ )
  - 130 dBm (0.1 Kbps)
  - 121 dBm (1.0 Kbps)
  - 114 dBm (9.6 Kbps)
  - 113 dBm (25.0 Kbps)
- Frequency Stability 2.5 ppm (Temp Compensated)
- 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 43 mA
  - Peak RX 26 mA
  - Average  $< 60$   $\mu$ A (RX 1 sec latency, 9.6 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:

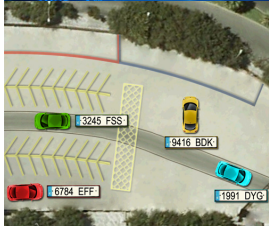
- WITECH LINK STACK API
- WITECH ULP-NET STACK API
- WITECH METERING STACK API
- WITECH RTLS STACK API
- WITECH DOMO STACK API

- 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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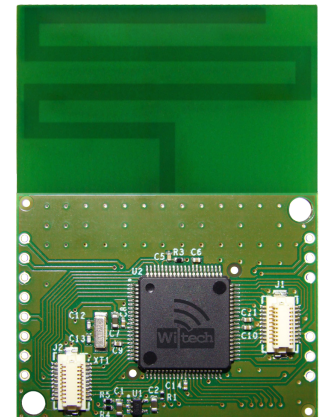
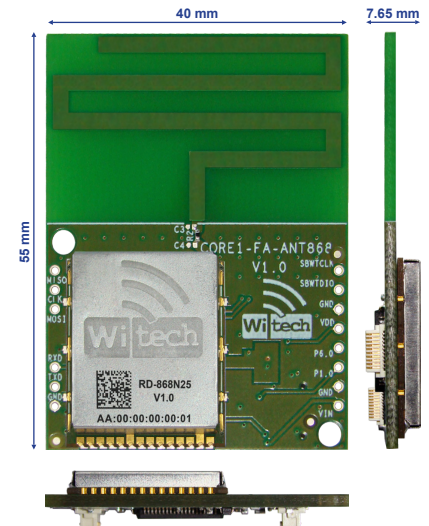
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### Internal CPU: Witech Core 1

- 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)

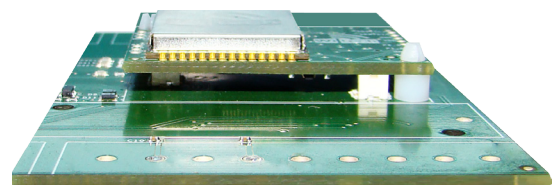


Mating Connectors (3 Stacking Heights)

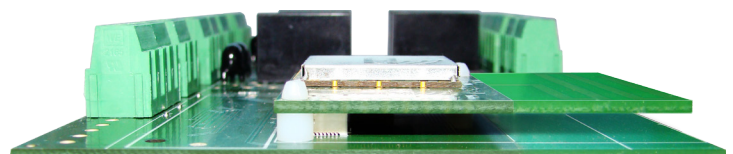


Plastic Support Spacers

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



SMD Assembly Example, With Stackers (Back View)



SMD Assembly Example, With Stackers (Lateral View)



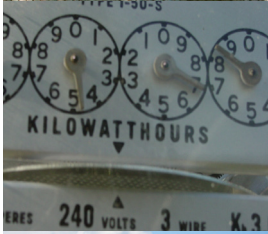
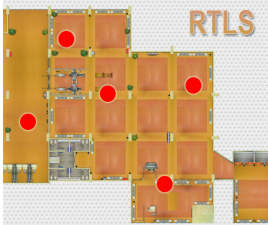
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### Witech Link Stack

- 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

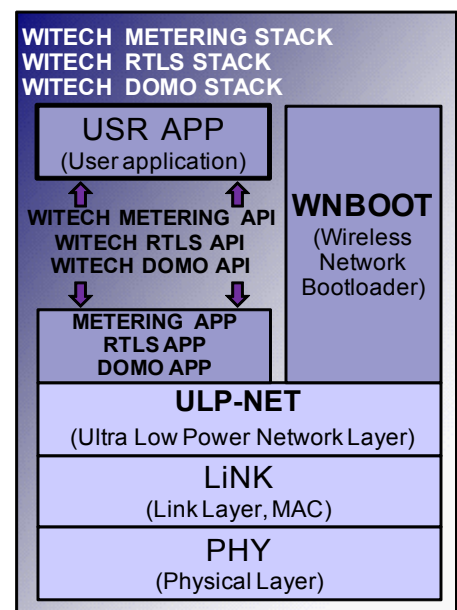
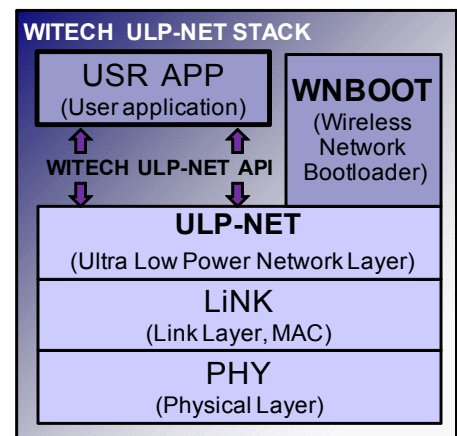
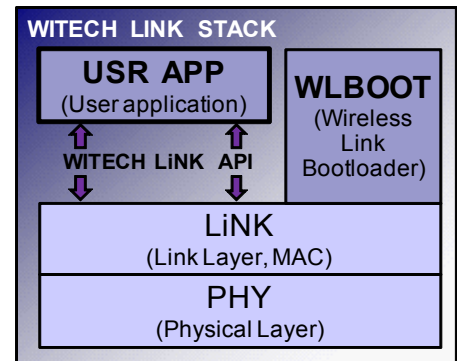
### Witech RTLS Stack

- 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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