



SMARTMESH® IA-510

M2510

WirelessHART®

PRODUCT DESCRIPTION > The WirelessHART®-compliant M2510 mote module combines Dust Networks' robust Intelligent Networking Platform and industry-leading low-power radio technology in an easy-to-integrate 22-pin module. As part of the SmartMesh® IA-510 system, the M2510 provides industrial automation vendors with an embedded wireless system complete with RF certifications for easy integration and reuse in developing multiple WirelessHART products.

The M2510 is tailored for use in battery-powered and energy-scavenging wireless devices, and is engineered for applications that demand proven performance and scalability. With Dust Networks' innovative IEEE 802.15.4-compliant design and integrated long-range signal amplification, the M2510 enables a decade of battery life on two AA batteries. Additionally, all motes can function as both battery-powered routers and nodes, enabling a full mesh topology that provides more redundant routes and higher network performance.

The network-ready module integrates all radio circuitry components, including an MMCX-type antenna connector, to eliminate the burden of complex RF design. The international modular certifications, fully engineered RF solution, comprehensive APIs and Development Support Suite of the M2510 mote module offer rapid field device integration and reduced development time and cost for WirelessHART solutions.

ABOUT SMARTMESH IA-510 > Dust Networks' SmartMesh® IA-510 is the first WirelessHART-compatible system in the SmartMesh IA-500™ family of products. The SmartMesh IA-510 system offers industrial automation vendors an industry-leading standards-based system that delivers flexible, secure solutions. The SmartMesh IA-510 system's Intelligent Networking Platform delivers dynamic network optimization and intelligent routing to achieve the carrier class data reliability, lower latency and deterministic power management required for the industrial automation market. The SmartMesh IA-510 system consists of the PM2510 embedded network manager and two mote form factors: the DN2510 Mote-on-Chip™ and the M2510 RF-certified mote module. SmartMesh IA-510 systems are easy for industrial automation vendors to integrate and simple for end users to deploy.

KEY FEATURES

WIRELESSHART COMPLIANCE

- ☒ Interoperable with other WirelessHART field devices and gateways

SUPERIOR RELIABILITY

- ☒ >99.99% data reliability even in the most challenging industrial environments
- ☒ Every M2510 can act as both an endpoint and a router, increasing network reliability
- ☒ Leverages SmartMesh IA-510's network manager's Intelligent Networking Platform to ensure optimal mote performance

ULTRA LOW-POWER CONSUMPTION

- ☒ Industry-leading radio technology optimized for battery-powered operation
- ☒ Over a decade of network operation on two AA batteries
- ☒ Automatic network-wide coordination for efficient power usage

EASY INTEGRATION

- ☒ Fully engineered RF—power amplifier, balun, crystals, antenna matching circuitry and antenna connector on module
- ☒ Comprehensive APIs deliver rich functionality and flexibility without complex coding

GLOBAL MARKET SOLUTION

- ☒ Modular RF certifications for FCC, IC, and CE
- ☒ IEEE 802.15.4-certified radio operates on 2.4 GHz global license-free band
- ☒ Configurable radio output power—meets RF emission limits for different regions with a single product

NORMAL OPERATING CONDITIONS

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Operational supply voltage range	2.75	3.0	3.3	V	
Operating temperature range	-40		85	°C	
Operating relative humidity	10		90	%RH	Non-condensing

CURRENT CONSUMPTION

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Transmit PA enabled		18 [†]		mA	
PA disabled		7		mA	
Receive		6		mA	

DETAILED RADIO SPECIFICATIONS

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Operating frequency	2.4000		2.4835	GHz	
Number of channels		15			
Channel separation		5		MHz	
Occupied channel bandwidth		2.7		MHz	At -20 dBc
Modulation					IEEE 802.15.4 direct sequence spread spectrum (DSSS)
Raw data rate		250		kbps	
Receiver sensitivity		-90		dBm	At 1% PER, V _{cc} = 3 V, 25° C
Output power, EIRP PA enabled		10		dBm	V _{cc} = 3 V, 25° C, +2 dBi antenna
PA disabled		0		dBm	
Range* PA enabled: Indoor		100		m	
Outdoor		300		m	
PA disabled: Indoor		25		m	
Outdoor		200		m	

* Actual performance varies depending on the specific installation environment.

† Preliminary.

INNOVATIVE RADIO TECHNOLOGY

- IEEE 802.15.4-compliant radio
- 80% less receiver current than comparable radios on the market
- Direct Sequence Spread Spectrum (DSSS), frequency-hopping operation for interference rejection

POWER MANAGEMENT

- Configurable mote current consumption, enabling power scavenging technologies (e.g. 4-20mA loop scavenging, solar cells)
- Battery metering

COMPREHENSIVE API

- Support for file transfer and request/response data traffic
- Configuration parameters provide control of mote operation
- Flow controlled serial interface enables integration with resource-constrained microprocessors

FULL DEVELOPMENT SUPPORT SUITE

- Development Kit available—rich library of app notes, reference designs, sample code, software debug utilities
- OEM support—SW version management, RF functional test commands

ROBUST SECURITY

- AES 128-bit encryption
- Dynamically updated multiple encryption key scheme

