



SMARTMESH® IA-510

M2510

Industrial

PRODUCT DESCRIPTION > The M2510 mote module combines Dust Networks' robust sensor networking solution with industry-leading low-power radio technology in an easy-to-integrate 22-pin module. As part of the SmartMesh® IA-510 system, the M2510 enables customers to integrate a standards-based wireless network into sensors and actuators to provide scalable bidirectional communications.

The M2510 is designed for use in line-powered, battery-powered, or energy-scavenging sensor and actuator applications that demand reliable performance and ultra-low power operation. With Dust Networks' innovative IEEE 802.15.4-compliant design and integrated power amplifier, the M2510 enables a decade of battery life on two AA batteries. All motes function as wireless routers, enabling a redundant, high performance, full-mesh topology.

The M2510 integrates all radio circuitry components, including an MMCX-type antenna connector to eliminate the need for complex RF design. To accelerate customer development time and reduce development costs, Dust Networks provides a fully engineered RF solution, comprehensive APIs, and complete development documentation.

ABOUT SMARTMESH IA-510 > Dust Networks' SmartMesh® IA-510 is an industry-leading wireless networking solution designed for critical monitoring and control applications. IA-510 serves a wide range of applications from renewable energy generation, such as solar and wind power, to factory machine health monitoring and data center HVAC energy management. The SmartMesh IA-510 system delivers dynamic network optimization and intelligent routing to achieve unsurpassed levels of wireless network scalability, system-wide reliability and low latency, coupled with industrial-class security. Additionally, ultra-low power operation permits even greater deployment flexibility for wire-free applications.

KEY FEATURES

HIGHLY SCALABLE

- ⊗ Automatic network formation—new motes join automatically from anywhere in the network
- ⊗ All motes are wireless routers, providing a full-mesh network that easily scales to tens of thousands of motes per square kilometer
- ⊗ Time-synchronized communication across 15 channels virtually eliminates in-network collisions, allowing for dense deployments in overlapping radio space

SUPERIOR RELIABILITY

- ⊗ SmartMesh IA-510 Intelligent Networking Platform enables greater than 99.99% network reliability even in the most challenging monitoring and control environments
- ⊗ Time-synchronized channel hopping minimizes the impact of crippling multipath interference in dynamic RF environments

ULTRA-LOW POWER OPERATION

- ⊗ Industry-leading radio technology capable of line-powered, battery-powered, or energy-scavenging operation
- ⊗ Automatic network-wide coordination optimizes power consumption, enabling a decade of network operation on two Lithium AA batteries

EASY TO INTEGRATE AND DEPLOY

- ⊗ Fully engineered RF, with power amplifier (PA), balun, crystals, antenna matching circuitry and antenna connector
- ⊗ Comprehensive APIs provide rich and flexible functionality to ease software development and device integration

GLOBAL MARKET SOLUTION

- ⊗ Modular 2.4GHz band RF certifications for FCC, IC and CE dramatically reduce cost and complexity of global wireless device certification

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, Vcc = 3 V, 25° C
Output power, EIRP					Vcc = 3 V, 25° C, assumes +2 dBi antenna
PA enabled		10		dBm	
PA disabled		0		dBm	
Range*					
PA enabled:					
Indoor		300		m	
Outdoor					
PA disabled:					
Indoor		25		m	
Outdoor		200		m	

* Actual performance varies depending on the specific installation environment.

INNOVATIVE RADIO TECHNOLOGY

- IEEE 802.15.4-compliant radio
- Integrated power amplifier for 10 dBm operation
- Ultra-low RF receiver current
- Direct Sequence Spread Spectrum (DSSS)
- Time-synchronized channel hopping operation

POWER MANAGEMENT

- Compatible with energy-scavenging technologies
- Charge consumption tracking for battery metering

COMPREHENSIVE API

- Supports fast file transfer and request/response data traffic
- Flexible configuration parameters for full control of all mote operations
- Flow-controlled serial interface supports resource-constrained microprocessors

FULL DEVELOPMENT SUPPORT

- OEM development kit:
 - Rich library of application notes
 - Reference designs
 - Sample code
 - Software debug utilities

ROBUST SECURITY

- Industry-proven security meets standards for critical infrastructure
- 128-bit AES encryption ensures secure data transmission

