

### NETWORK FEATURES

- Complete **Radio Transceiver, Embedded Processor, and Networking Software** for Forming a Self-Healing Mesh Network
- SmartMesh® Networks Incorporate:
  - Time Synchronized Network-Wide Scheduling
  - Per Transmission Frequency Hopping
  - Redundant Spatially Diverse Topologies
  - Network-Wide Reliability and Power Optimization
  - NIST Certified Security
- SmartMesh Networks Deliver:
  - >99.999% Network Reliability Achieved in the Most Challenging RF Environments
  - Sub 50µA Routing Nodes
- Compliant to 6LoWPAN Internet Protocol (IP) and IEEE 802.15.4e Standards

### LTP5901-IPM/LTP5902-IPM FEATURES

- Industry-Leading Low Power Radio Technology with 4.5mA to Receive and 9.7mA to Transmit at 8dBm
- RF Modular Certification Include USA, Canada, EU, Japan, Taiwan, Korea, India, Australia and New Zealand
- PCB Assembly with Chip Antenna (LTP5901-IPM) or with MMCX Antenna Connector (LTP5902-IPM). QFN Version (LTC®5800-IPM) Available
- Micrium µCOS-II Real Time Operating System Based On-Chip Software Development Kit

### DESCRIPTION

SmartMesh IP™ wireless sensor networks are self managing, low power Internet Protocol (IP) networks built from wireless nodes called motes. The [LTP™5901-IPM/LTP5902-IPM](#) is the IP mote product in the Eterna®\* family of IEEE 802.15.4e printed circuit board assembly solutions, featuring a highly-integrated, low power radio design by Dust Networks® as well as an ARM Cortex-M3 32-bit microprocessor running Dust's embedded SmartMesh IP networking software. Both the LTP5901-IPM (with chip antenna), at 24mm × 42mm, and the LTP5902-IPM (with MMCX connector), at 24mm × 37mm, are designed for surface mount assembly.

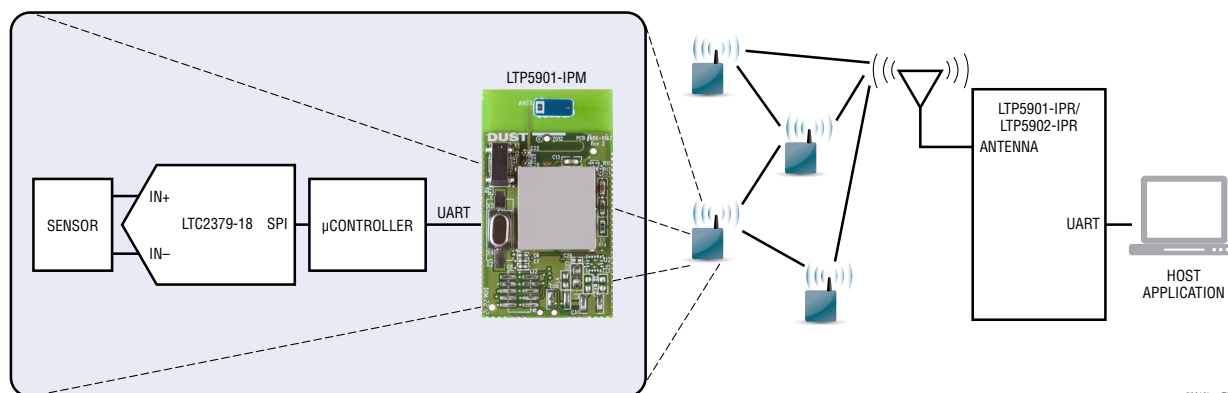
With Dust's time-synchronized SmartMesh IP networks, all motes in the network may route, source or terminate data, while providing many years of battery powered operation. The SmartMesh IP software provided with the LTP5901-IPM/LTP5902-IPM is fully tested and validated, and is readily configured via a software Application Programming Interface.

SmartMesh IP motes deliver a highly flexible network with proven reliability and low power performance in an easy-to-integrate platform.

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\* Eterna is Dust Networks' low power radio SoC architecture.

### TYPICAL APPLICATION



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59012ipm\_flyerfa

## APPLICATIONS INFORMATION

### MODES OF OPERATION

The SmartMesh IP Mote software can be operated in three distinct modes, namely, Slave, Master, and On-Chip SDK. Mode selection should be considered during the architecture/design phase of the development process.

#### Slave Mode

In Slave mode, the Eterna is connected to an external microprocessor through the API UART and is solely used as a networking device. None of the built in I/Os are accessible in this mode. Refer to the [SmartMesh IP User's Guide](#) for more detailed information.

#### Master Mode

In Master mode, no external  $\mu$ Processor is required and a limited set of functionality is made available with no programming required on the device. The following features are available

- On-Chip Temperature Sensor
- 4 Analog Inputs
- 4 Digital Inputs
- 3 Digital Outputs

Refer to the [SmartMesh IP User's Guide](#) for more detailed information.

#### On-Chip SDK (OCSDK)

The SmartMesh IP [On-Chip Software Development Kit \(On-Chip SDK\)](#) enables development of C-code applications for execution on the LTC5800-IPM, running Micrium's  $\mu$ COS-II real-time operating system. With the On-Chip SDK, users may quickly and easily develop application code without the need for an external microprocessor.

Applications written within the On-Chip SDK may send and receive wireless messages through the mesh network; process data, such as statistical analysis; execute local decision-making and control; and manage the following peripherals:

- General Purpose Input-Output (GPIO) pins
- Analog-to-Digital Converter (ADC)
- Universal Asynchronous Receiver/Transmitter (UART)
- Serial Peripheral Interface (SPI) Master
- Inter-Integrated Circuit (I<sup>2</sup>C) Master
- 1-Wire Master

Network connectivity and quality of service is handled by the SmartMesh IP protocol stack. The SmartMesh IP stack comes as a pre-compiled library and delivers >99.999% data reliability while providing ultra low power operation.

### REGULATORY AND STANDARDS COMPLIANCE

#### Radio Certification

The LTP5901 and LTP5902 have been certified under a single modular certification, with the module name of ETERNA2. Following the regulatory requirements provided in the [ETERNA2 User's Guide](#) enables customers to ship products in the supported geographies, by simply completing an unintentional radiator scan of the finished product(s). The [ETERNA2 User's Guide](#) also provides the technical information needed to enable customers to further certify either the modules or products based upon the modules in geographies that have not or do not support modular certification.

#### Compliance to Restriction of Hazardous Substances (RoHS)

Restriction of Hazardous Substances 2 (RoHS 2) is a directive that places maximum concentration limits on the use of certain hazardous substances in electrical and electronic equipment. Linear Technology is committed to meeting the requirements of the European Community directive 2011/65/EU.