

The MeshConnect™ EM357 module (ZICM357P2) is based on the *Ember EM357 system on chip (SoC)*. The module includes a high performance Renesas power amplifier that increases power out to +20 dBm, making it one of the most powerful modules on the market. With its 120 dB link budget, the module provides range up to 2.5 miles, ensuring reliable transmission even in harsh environments and reducing the number of nodes needed in the network. The increased output power also provides better interior penetration from devices installed outside the home such as smart meters that need to connect to devices inside the home. The MeshConnect EM357 module also integrates 1 MB of flash memory which enables over-the-air programming updates in the field.

The MeshConnect EM357 module is compliant with ZigBee Alliance specifications and IEEE 802.15.4, making it applicable for all ZigBee applications and profiles. The SoC consists of an RF transceiver with a baseband modem, a hardwired MAC and an embedded 32-bit ARM® Cortex™-M3 microcontroller with internal RAM (12kB) and flash (192kB) memory. The SoC provides numerous general-purpose I/O pins and peripheral functions such as timers and UARTs enabling customers to access a rich mix of on-chip functionality.

A complete development kit is available including evaluation boards, software tools, and cables which help engineering staff quickly develop their end product.

CEL's MeshConnect™ line of 802.15.4/ZigBee products delivers industry-leading range, high performance, and a rich feature set at low cost. CEL's design examples, reference designs, and engineering support help customers get their product designs to market quickly. Key applications include ZigBee Pro Smart Energy focused applications: thermostats, meters, in-home-displays, as well as LED lighting control, solar/wind power, HVAC control, and security systems. MeshConnect certified and qualified modules enable customers to reduce their design and certification costs of development as well as development risk, while reducing time to market.

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MeshConnect™ EM357 Module for 802.15.4/ZigBee™ Applications



FEATURES

- Transmit Power: +20 dBm
- 1MB integrated Flash memory for over the air program updates
- Sensitivity: - 100 dBm
- RF link budget: up to +120 dB
- Range: up to 2.5 miles (line of sight)
- Network Speed: 250Kbps
- 16 RF channels
- Inverted-F PCB antenna with Optional U.FL external Antenna
- Advanced Power Management Scheme w/ Deep Sleep Mode
- Integrated MCU functionality:
 - 32-bit ARM® Cortex™-M3
 - Up to 23 GPIO Pins
 - 192KB Flash; 12KB RAM
 - SPI Master /Slave, TWI, UART
 - Timers, Serial Wire /JTAG Interface
 - 5-channel, 14-bit ADC
- Software support: *EmberZNet PRO™ (ZigBee PRO)*
- Mesh, point-to-point, and point-to-multipoint networks
- Small footprint: 25.4 mm x 35.9 mm (1" x 1.41")

SPECIFICATIONS

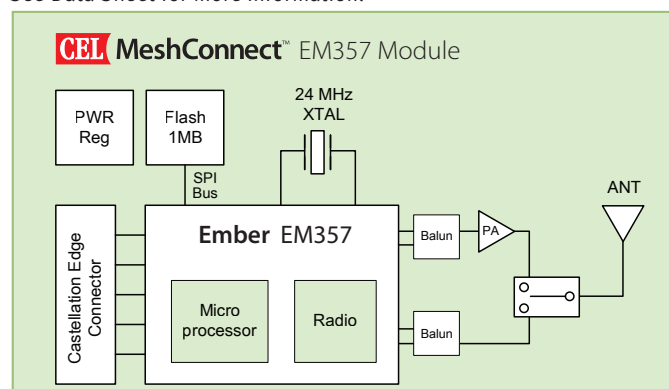
- ▶ Frequency: 2405 to 2475 MHz
- ▶ Operating Voltage: 2.7 to 3.6 V
- ▶ Output Power: +20 dBm
- ▶ Rx Sensitivity: -100 dBm
- ▶ Power Consumption:
 - Transmit Mode: 170 mA @ 20 dBm
 - Receive Mode: 28 mA
 - Sleep Mode: 6 µA
- ▶ Operating Temperature: -40°C to +85°C
- ▶ AES encryption
- ▶ RoHS Compliant
- ▶ Regulatory Certification: FCC /IC /CE

APPLICATIONS

- ▶ Smart Energy / Grid Markets
 - Smart Meters
- ▶ Building automation and control
- ▶ Home automation and control
 - Thermostats
 - Displays
 - Energy Management
 - Security Devices
 - HVAC Control
- ▶ General ZigBee wireless sensor networking

BLOCK DIAGRAM

See Data Sheet for more information.



CEL MeshConnect™ Product Family
MeshConnect™ EM357 Module

ZUSNAP357P2-1	EM357 USNAP module with integrated PCB antenna and ZigBee Pro Software
ZICM357P2-2	EM357 Module with integrated PCB antenna and ZigBee Pro Software
ZICM357P2-2C	EM357 Module with connector for external antenna option

MeshConnect™ Module

ZICM2410P0-1	Module with integrated PCB antenna
ZICM2410P0-1-SN	Module with integrated PCB antenna and SNAP OS with MAC address
ZICM2410P0-1C	Module with connector for external antenna option
ZICM2410P0-1C-SN	Module with external antenna option and SNAP OS with MAC address

MeshConnect™ Extended Range Module

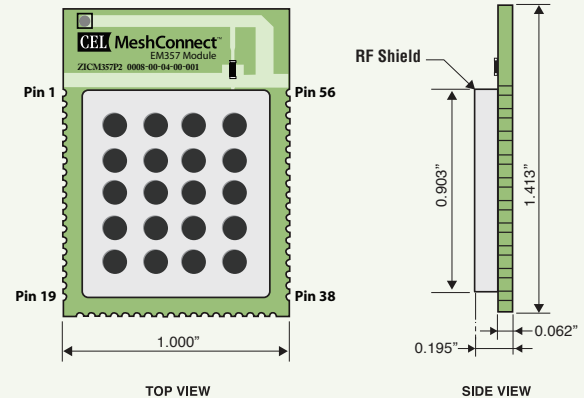
ZICM2410P2-2	Extended Range Module with integrated PCB antenna
ZICM2410P2-2-SN	Extended Range Module with integrated PCB antenna and SNAP OS with MAC address
ZICM2410P2-2C	Extended Range Module with connector for external antenna option
ZICM2410P2-2C-SN	Extended Range Module with external antenna option and SNAP OS with MAC address

MeshConnect™ System on Chip ICs

ZIC2410QN48	48 pin QFN package
ZIC2410FG72	72 pin VFBGA package

MODULE DIMENSIONS (inches)

See Data Sheet for Pin Outs, RF and Electrical Specifications.


MeshConnect™ Development Kits

ZICM357P2-KIT1-1	Evaluation and Development Kit for EM357 Module
ZICM2410P0-KIT2-1	Evaluation and Development Kit for both Transceiver ICs and MeshConnect Module
ZICM2410P2-KIT1-1	Evaluation and Development Kit for both Transceiver ICs and Extended Range Module

CEL MESHCONNECT / ZIGBEE MODULES

MODULE ►		MeshConnect™	MeshConnect™ Extended Range	MeshConnect™ EM357
RADIO		2405 to 2480 MHz / DSSS / IEEE 802.15.4	2405 to 2480 MHz / DSSS / IEEE 802.15.4	2405 to 2480 MHz / DSSS / IEEE 802.15.4
MCU	Transceiver Chipset	MeshConnect™ ZIC2410 (SoC) 8 bit, 8051	MeshConnect™ ZIC2410 (SoC) 8 bit, 8051	Ember™ EM357 32 bit, ARM® Cortex™-M3
	Fmax	16 MHz	16 MHz	24 MHz
	Memory	96 KB Flash; 8 KB RAM	96 KB Flash; 8 KB RAM	192 KB Flash; 12 KB RAM
	Inputs/Outputs	22	20	23
NETWORK	Network	Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint
	Software/ ZigBee Stack	SNAP®, MAC, S-MAC, ZigBee®	SNAP®, MAC, S-MAC, ZigBee®	EmberZNet PRO™ (ZigBee Pro)
PERFORMANCE	Tx Power Output	+6dBm	+20dBm	+20dBm
	Rx Sensitivity	-97dBm	-103dBm	-100dBm
	Range (line of sight)	2,000 ft (609 M)	16,000 ft (4,876 M)	13,000 ft (3,962 M)
	Vcc	2.1– 3.3V	2.1– 3.3V	2.7 - 3.6V
	Rx Current	35mA	38mA	28mA
	Tx Current @ max dBm	44mA	200mA	170mA
	Sleep Current	<1.0µA	<1.0µA	6.0µA
	Dimensions	25 x 36 mm		25 x 36 mm
PART NO. ►		ZICM2410P0-1 ZICM2410P0-1C	ZICM2410P2-2 ZICM2410P2-1C	ZICM357P2-2 ZICM357P2-2C
		ZICM2410P0-1-SN ZICM2410P0-1C-SN	ZICM2410P2-2-SN ZICM2410P2-1C-SN	ZUSNAP357P2-1
EVAL KIT ►		ZICM2410P0-KIT2-1	ZICM2410P2-KIT1-1	ZICM357P2-KIT1-1