

## Extended Range Module

CEL's MeshConnect™ Extended Range module delivers industry-leading range, high performance, and a rich feature set, all at a surprisingly low cost.

The module's +20 dBm output power means extensive range – over two miles - plus more reliable transmission and fewer nodes in your network. It is especially useful for open outdoor applications where the nodes are physically far apart, or for indoor use where the nodes have to connect in a noisy RF environment. The Extended Range Module's outstanding +123.5 dB link budget ensures high quality connections even in such harsh environments.

Applicable to both the original Module and the new Extended Range Module, CEL has complete development kits which include a wide range of software packages that will help you develop your end product quickly. The modules support SNAP™, a software tool that quickly establishes simple mesh networks with minimal development time. Both modules also support SMAC, MAC and the full ZigBee stack where needed.

Data rates up to 1 Mbps help you meet the demands of higher bandwidth networks, while a unique, on-chip voice CODEC opens the door voice transmission applications. A variety of other robust peripherals — battery monitor, temperature sensor, RSSI and AES encryption engines — are all included to help lower total system cost and component count.

The MeshConnect modules are ideal for mesh, point-to-point, and point-to-multipoint networks. Their low current consumption especially in standby mode makes them ideal for battery-powered designs, while their miniature footprint and integrated antenna helps to further reduce system size.

FCC, IC and CE certification eliminates the need for costly, time-consuming certification of your design.

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## MeshConnect™ Extended Range Module for 802.15.4 Applications



### KEY FEATURES

- Extended range: up to 12,000 feet
- Increased receiver sensitivity: - 103.5 dBm; +123.5 dB link budget
- Extended software support:
  - SNAP™ for simple, for rapid development of auto-forming mesh networks
  - SMAC, MAC
  - ZigBee
- High Power out:
  - Up to 100mw (+20dBm)
  - Software configurable for multiple levels of power out
  - Extremely efficient low-power sleep mode
- Mesh, point-to-point, and point-to-multipoint networks
- Small footprint: 25 x 34 mm
- Hi-Speed Network support: 250Kbps, 500 Kbps & 1 Mbps
- Integrated voice CODEC (a-Law,  $\mu$ -Law & ADPCM)
- 16 RF channels
- Inverted-F PCB antenna, plus support for external antennas
- Integrated MCU functionality:
  - Timers, UARTs(2), SPI Master/Slave, I<sup>2</sup>/S
- Based on the MeshConnect IC Platform

### SPECIFICATIONS

Frequency	2405 to 2480 MHz
Operating Voltage	2.1 to 3.3 V
Output Power	+20 dBm
Rx Sensitivity	-103.5 dBm
Power Consumption:	
Transmit Mode:	175 mA
Receive Mode:	38 mA
Standby Mode:	<1.0 $\mu$ A
Operating Temperature	-40°C to +85°C
Regulatory Certification	FCC / IC / CE

### APPLICATIONS

Wide open long range environments  
RF-noisy environments

## CEL MeshConnect™ Product Family

### MeshConnect™ EM357 Module

ZICM357P2-1	EM357 Module with integrated PCB antenna and ZigBee Pro Software
ZICM357P2-1C	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

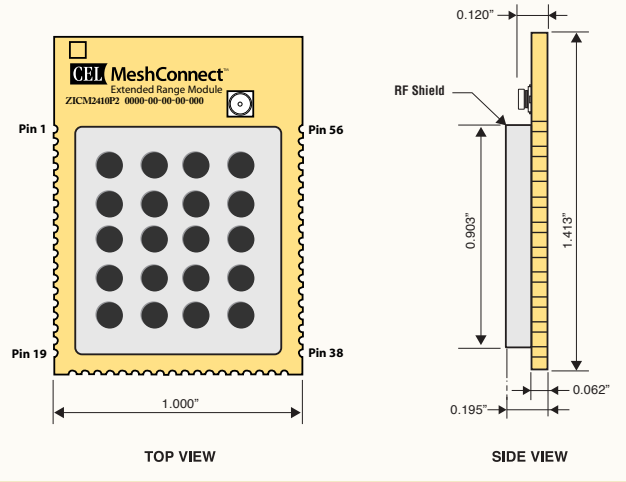
ZICM2410P2-2	Extended Range Module with integrated PCB antenna
ZICM2410P2-2-SN	Extended Range Module with integrated PCB antenna and SNAP OS with MAC address
ZICM2410P2-2C	Extended Range Module with connector for external antenna option
ZICM2410P2-2C-SN	Extended Range Module with external antenna option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

### MeshConnect™ System on Chip ICs

ZIC2410QN48	48 pin QFN package
ZIC2410FG72	72 pin VFPGA 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 IEE 802.15.4 / MESHCONNECT / ZIGBEE MODULES

MODULE ▶	MeshConnect™	MeshConnect™ Extended Range	MeshConnect™ EM357	Apex	Apex LT	FreeStar Pro	FreeStar	Matrix 10mW / 100mW
<b>MCU</b>	MeshConnect™ ZIC2410 (SoC) 8 bit, 8051		Ember™ EM357 32 bit, ARM® Cortex™-M3	Ember™ EM250 16 bit, XAP2b	Ember™ EM260 Network processor	Freescall™ MC13224 / MC13226 32 bit, ARM7	Freescall MC13192 8 bit, HCS08	TI™ CC2430 8 bit, 8051
<i>Fmax</i>	16 MHz		24 MHz	12 MHz	n/a	32 MHz	40 MHz	32 MHz
<i>Inputs/Outputs</i>	22	20	23	17	n/a	46	8	17
<b>NETWORK</b>	Mesh, Point-to-Point, Point-to-Multipoint		Mesh, Point-to-Point, Point-to-Multipoint	Mesh		Mesh, Point-to-Point, Point-to-Multipoint	Point-to-Point, Point-to-Multipoint	Point-to-Point, Point-to-Multipoint
<i>Software/ ZigBee Stack</i>	SNAP®, MAC, S-MAC, ZigBee®		EmberZNet PRO™ (ZigBee Pro)	EmberZNet PRO™ (ZigBee Pro)		Freescall BeeStack™ (ZigBee PRO, MAC, SMAC)	LSR STAR Protocol BeeStack	LSR STAR Protocol Z-Stack™
<b>PERFORMANCE</b>	<i>Tx Power Output</i>	+6dBm	+20dBm	+20dBm	+20dBm	+20dBm		+10dBm / +20dBm
<i>Rx Sensitivity</i>	-97dBm	-103dBm	-100dBm	-97dBm		-94dBm	-92dBm	-92dBm
<i>Range</i>	2000 +ft	16000+ft	13000+ft	4000+ft		4000+ft	4000ft	2000ft / 4000ft
<i>Vcc</i>	2.1– 3.3V		2.7 - 3.6V	2.1 – 3.6V		2.0– 3.6V	2.4 – 3.6V	2.1 –3.6V
<i>Rx Current</i>	35mA	38mA	28mA	37mA		30mA	42mA	27mA
<i>Tx Current</i>	44mA	200mA	170mA	170mA		193mA	150mA	50mA / 130mA
<i>Sleep Current</i>	<1.0µA		6.0µA	5µA		5µA	<5µA	5µA
<i>Dimensions</i>	25 x 36 mm		25 x 36 mm	25 x 33mm		25 x 36 mm		23 x 29mm / 23 x 31mm
<b>PART NO. ▶</b>	ZICM2410P0-1 ZICM2410P0-1C	ZICM2410P2-2 ZICM2410P2-2C	ZICM357P2-1 ZICM357P2-1C	ZAXM-201-1 ZAXM-201-1C	ZALM-301-1 ZALM-301-1C	(MC13224) ZFSM-201-1 ZFSM-201-1C	ZFSM-101-1	Matrix 10mW ZMXM-400-1 ZMXM-400-1C
	ZICM2410P0-1-SN ZICM2410P0-1C-SN	ZICM2410P2-2-SN ZICM2410P2-2C-SN				(MC13226) ZFSM-201-2 ZFSM-201-2C		Matrix 100mW ZMXM-401-1 ZMXM-401-1C
<b>EVAL KIT ▶</b>	ZICM2410P0-KIT2-1	ZICM2410P2-KIT1-1	ZICM357P2-KIT1-1	ZAXM-201-KIT-1	ZAXM-201-KIT-1	ZFSM-201-KIT-1	ZFSM-101-KIT-1	ZMXM-400-KIT-2 ZMXM-401-KIT-1