

CEL's MeshConnect™ module delivers industry-leading performance and a rich set of features, all at a surprisingly low cost. It's based on CEL's MeshConnect™ IC, an integrated IC platform that combines a powerful RF transceiver with a baseband modem, a hardware MAC and an 8051-based 8-bit micro-processor.

The module's +6dBm output power means better range, more reliable transmission and fewer nodes in your network. It also makes these modules ideal for applications where cost and power constraints do not allow for external power amplifiers or peripheral range extension components.

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 to a new world of low cost, voice transmission applications. A variety of other robust peripherals — battery monitor, temperature sensor, RSSI and AES encryption engines — are all included to help lower your system's cost and component count.

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

CEL's MeshConnect tool chain supports a multitude of software options including 802.15.4, ZigBee, SNAP, and third party mesh solutions. These help streamline development and get you quickly to market. FCC, IC and CE certification eliminates the need for a costly, time-consuming certification of your design.

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## MeshConnect™ Single-Chip Radio Module for 802.15.4 Applications

### FEATURES

- Based on the MeshConnect™ IC (ZIC2410) IC Transceiver Platform
- Supports mesh, point-to-point, and point-to-multipoint networks
- Small footprint: 1.00 x 1.41 in (25.4 x 35.9 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 antenna
- Integrated MCU functionality
- Timers, UARTs (2), SPI Master/Slave, I<sup>2</sup>/S
- ZigBee, SNAP, and Other Software Support

### SPECIFICATIONS

Frequency	2405 to 2480 MHz
Operating Voltage	2.1 to 3.3 V
Output Power	+6 dBm @ 1.5 V
Rx Sensitivity	-97 dBm @ 1.5 V
Range	3,000+ feet
Power Consumption	
	<i>Transmit Mode:</i> 32.6 mA @ 0 dBm 44 mA @ +6 dBm
	<i>Receive Mode:</i> 35 mA
	<i>Standby Mode:</i> <1.0 $\mu$ A
Operating Temperature	-40°C to +85°C
Regulatory Certification	FCC / IC / CE

I2S/2	ADPCM	Voice FIFO	MAC	MODEM	RF TX	
UART/2	a-law u-law	DMA	AES Engine		RF RX	
SPI				PLL		
WDT	MCU (8051)	FLASH 96KB	ROM	Temp Sensor		
GPIO/24				Bat Monitor		
Timer/4				ADC (4CH)		
PWM/2						
Quad Key Scan	Digital Regulator	RC Oscillator	Clock PLL	PQR	3V Circuitry	Analog Regulator

**CEL** MeshConnect™ Product Family

**MeshConnect™ EM357 Module**

<b>ZICM357P2-1</b>	EM357 Module with integrated PCB antenna and ZigBee Pro Software
<b>ZICM357P2-1C</b>	EM357 Module with connector for external antenna option

**MeshConnect™ Module**

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

**MeshConnect™ Extended Range Module**

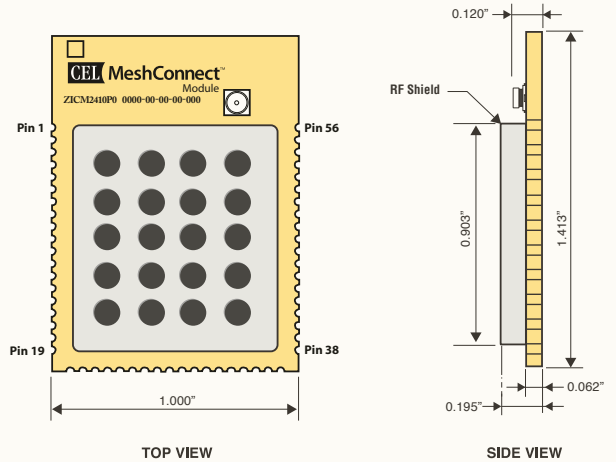
<b>ZICM2410P2-2</b>	Extended Range Module with integrated PCB antenna
<b>ZICM2410P2-2-SN</b>	Extended Range Module with integrated PCB antenna and SNAP OS with MAC address
<b>ZICM2410P2-2C</b>	Extended Range Module with connector for external antenna option
<b>ZICM2410P2-2C-SN</b>	Extended Range Module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

**MeshConnect™ System on Chip ICs**

<b>ZIC2410QN48</b>	48 pin QFN package
<b>ZIC2410FG72</b>	72 pin VFPGA package

**MODULE DIMENSIONS (inches)**

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



**MeshConnect™ Development Kits**

<b>ZICM357P2-KIT1-1</b>	Evaluation and Development Kit for EM357 Module
<b>ZICM2410P0-KIT2-1</b>	Evaluation and Development Kit for both Transceiver ICs and MeshConnect Module
<b>ZICM2410P2-KIT1-1</b>	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
<b>Fmax</b>	16 MHz		24 MHz	12 MHz	n/a	32 MHz	40 MHz	32 MHz	
<b>Inputs/Outputs</b>	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	
<b>Software/ ZigBee Stack</b>	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>	<b>Tx Power Output</b>	+6dBm	+20dBm	+20dBm	+20dBm		+20dBm		+10dBm / +20dBm
<b>Rx Sensitivity</b>	-97dBm	-103dBm	-100dBm	-97dBm		-94dBm	-92dBm	-92dBm	
<b>Range</b>	2000 +ft	16000+ft	13000+ft	4000+ft		4000+ft	4000ft	2000ft / 4000ft	
<b>Vcc</b>	2.1– 3.3V		2.7 - 3.6V	2.1 – 3.6V		2.0– 3.6V	2.4 – 3.6V	2.1 –3.6V	
<b>Rx Current</b>	35mA	38mA	28mA	37mA		30mA	42mA	27mA	
<b>Tx Current</b>	44mA	200mA	170mA	170mA		193mA	150mA	50mA / 130mA	
<b>Sleep Current</b>	<1.0µA		6.0µA	5µA		5µA	<5µA	5µA	
<b>Dimensions</b>	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	ZALM-301-1	(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		ZAXM-201-1C	ZALM-301-1C	(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	