

CEL's MeshConnect ICs combine a powerful RF transceiver with an industry-standard, 8051-based 8-bit microprocessor. Available in a QFN48 or VFBGA72 package, these low cost, highly integrated System-on-Chip radios can help simplify your design, reduce its size, lower its power consumption, and reduce your overall system costs.

At +8 dBm, the MeshConnect IC delivers the industry's leading output power. Combined with excellent -98 dBm receiver sensitivity, the MeshConnect IC provides a best-in-class link budget of 106 dB. The high output power ensures immunity to interference from other 2.4GHz transmissions, while the high sensitivity and link budget can help eliminate the need for power amplifiers and peripheral range extension components.

With 1 Mbps data rates and an on-chip Voice CODEC the MeshConnect IC can handle high-bandwidth voice /data transmission. A variety of other robust peripherals — battery monitor, temperature sensor, RSSI and AES encryption engines — are all designed to help lower your system component count.

MeshConnect ICs are ideal for home and building automation, lighting control, solar/wind, HVAC control, security networks, cable replacement, video, asset management, AMR/AMI, remote sensing and voice applications. With their low Tx, Rx and standby power consumption, they're an excellent choice when battery life is critical.

MeshConnect ICs are part of a broad family of CEL ZigBee products, including integrated radio modules and discrete power amplifiers, LNAs and RFIC switches for ZigBee range extension.

**CEL** California Eastern Laboratories

4590 Patrick Henry Drive  
Santa Clara, CA 95054  
408.919.2500  
[www.cel.com](http://www.cel.com)

## Integrated RF Transceiver/MCU for ZigBee / IEEE 802.15.4 Networks

### FEATURES

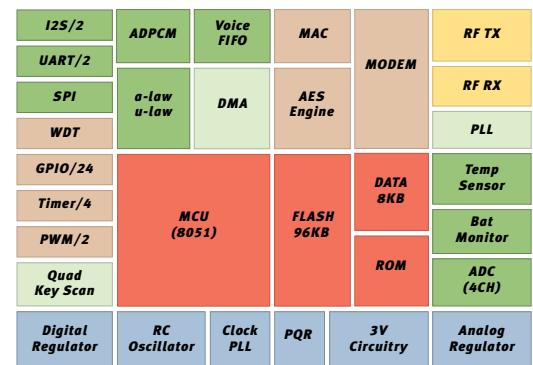
- Integrated 2.4 GHz Transceiver and 8-bit 8051-based Microprocessor
- 106 dB RF Link Budget
- Supports up to 1Mbps Wireless Networks
- On-chip Voice CODEC
- On-chip AES Encryption Engine
- On-chip Battery Monitor and Temperature Sensor
- On-chip RSSI Engine
- Four 16-bit Timers, Two PWMs
- Two UARTs plus SPI Interface
- Single 16MHz Crystal Design
- Single-Differential Bidirectional Antenna Interface

### SPECIFICATIONS

Operating Voltage	1.5 – 3.3V
Output Power	+8 dBm max
Sensitivity	-98 dBm
Flash Memory	96 KB
Data Memory	8 KB
Power Consumption	
<i>Transmit Mode</i>	QFN48: 30.6 mA @ 0 dBm VFBGA72: 29.7 mA @ 0 dBm
<i>Receive Mode</i>	33.2 mA
<i>Standby Mode</i>	0.3 µA

### APPLICATIONS

- Home & Building Automation
- Lighting Control
- Solar/Wind
- HVAC Control
- Security Networks
- Cable Replacement
- Video
- Asset Management
- AMR/AMI
- Remote Sensing
- Voice



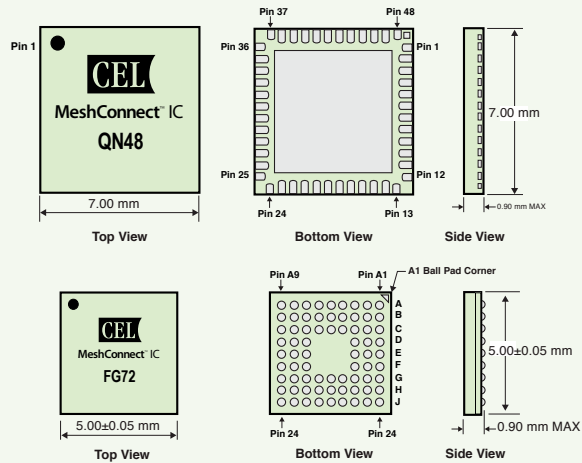
MeshConnect IC Block Diagram

**CEL** MeshConnect™ Product Family

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 integrated PCB antenna and SNAP OS with MAC address
MeshConnect™ Extended Range Module	
ZICM2410P2-2	Extended Range Module with integrated PCB antenna
ZICM2410P2-2-SN	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	Module with integrated PCB antenna and SNAP OS with MAC address
MeshConnect™ System on Chip ICs	
ZIC2410QN48	48 pin QFN package
ZIC2410FG72	72 pin VFBGA package

**MODULE DIMENSIONS (mm)**

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



**MeshConnect™ Development Kits**

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 / ICs**

MODULE / IC ▶	MeshConnect™	MeshConnect™ Extended Range	NEW: MeshConnect™ EM357 Mini		MeshConnect™ EM357	FreeStar Pro	MeshConnect™ IC
<b>RADIO</b>	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		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
<b>MCU</b>	MeshConnect™ ZIC2410 (SoC) 8 bit, 8051	MeshConnect™ ZIC2410 (SoC) 8 bit, 8051	Ember™ EM357 32 bit, ARM® Cortex™-M3		Ember™ EM357 32 bit, ARM® Cortex™-M3	Freescaler™ MC13224 / MC13226 32 bit, ARM7	MeshConnect™ CEL ZIC2410 8 bit, 8051
<b>Fmax</b>	16 MHz	16 MHz	24 MHz		24 MHz	32 MHz	16 MHz
<b>Memory</b>	96 KB Flash; 8 KB RAM	96 KB Flash; 8 KB RAM	192 KB Flash; 12 KB RAM		192 KB Flash; 12 KB RAM	128 KB Flash	96KB Flash
<b>Inputs/Outputs</b>	22	20	23		23	46	22 / 24
<b>NETWORK</b>	Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint		Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint	Mesh, Point-to-Point, Point-to-Multipoint
<b>Software / ZigBee Stack</b>	SNAP®, MAC, S-MAC, ZigBee® (RF4CE)	SNAP®, MAC, S-MAC, ZigBee® (RF4CE)	EmberZNet PRO™ (ZigBee Pro)		EmberZNet PRO™ (ZigBee Pro)	BeeStack™ ZigBee Pro - MC13226 MAC, S-MAC - MC13224	SNAP®, MAC, S-MAC, ZigBee® (RF4CE)
<b>PERFORMANCE</b>							
<b>Tx Power Output</b>	+6dBm	+20dBm	SP0 +8 dBm	SP2 +20dBm	+20dBm	+20dBm	+8 dBm
<b>Rx Sensitivity</b>	-97dBm	-103dBm	SP0 -100 dBm	SP2 -103 dBm	-100dBm	-94dBm	-98 dBm
<b>Range (line of sight)</b>	2,000 ft (609 M)	16,000 ft (4,876 M)	TBD		13,000 ft (3,962 M)	4,000 ft (1,219 M)	—
<b>Vcc</b>	2.1 - 3.3V	2.1 - 3.3V	2.1 - 3.6V		2.7 - 3.6V	2.0 - 3.6V	1.5V - 3.3V
<b>Rx Current</b>	35mA	38mA	SP0 30mA	SP2 34mA	28mA	30mA	33.2mA
<b>Tx Current @ max dBm</b>	44mA	200mA	SP0 44mA	SP2 150mA	170mA	193mA	30.6mA
<b>Sleep Current</b>	<1.0µA	<1.0µA	1.0µA		6.0µA	13µA	0.3µA
<b>Dimensions</b>	25 x 36 mm	25 x 36 mm	23.9 x 16.6 mm		25 x 36 mm	25 x 36 mm	QFN 7 x 7 48 pin VFBGA 5 x 5 72 pin
<b>PART NO. ▶</b>	ZICM2410P0-1 ZICM2410P0-1C	ZICM2410P2-2 ZICM2410P2-1C	ZICM357SP0-1 ZICM357SP0-1C	ZICM357SP2-1 ZICM357SP2-1C	ZICM357P2-2 ZICM357P2-2C	ZFSM-201-1 ZFSM-201-1C	ZICM2410QN48 ZICM2410FG72
<b>EVAL KIT ▶</b>	ZICM2410P0-KIT2-1	ZICM2410P2-KIT1-1	ZICM-EM35X-DEV-KIT-2		ZICM357P2-KIT1-1 ZICM-EM35X-DEV-KIT-1	ZFSM-201-KIT-1	ZICM2410P0-KIT2-1