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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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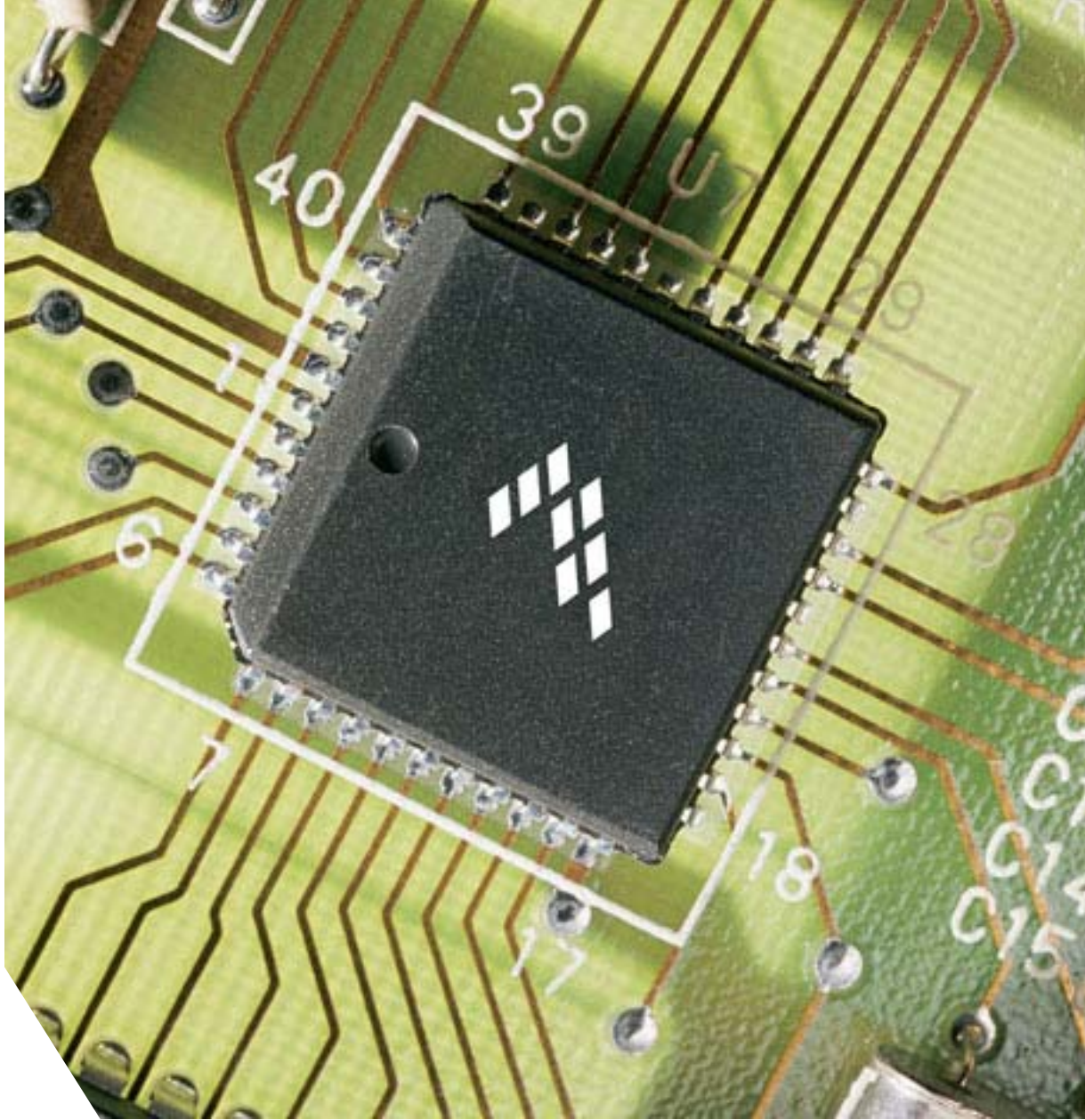


Freescale ZigBee™ - Compliant Platform - 1st and 2nd Generations

April 2006



Where is Freescale Winning?



- **Freescale offers world's first ZigBee™-compliant platform**
Home automation and industrial control OEMs able to implement ZigBee technology
- **Freescale to demonstrate world's first single-package ZigBee™-compliant solution**
Ultra-small footprint, a giant leap for ZigBee technology
- **Millennial Net and Freescale to deliver industrial-strength wireless sensor networks**
Scalable to hundreds of nodes, MeshScope offers low-power, robust wireless solution
- **Panasonic Selects Freescale's ZigBee™-Compliant Platform**
ZigBee communication module enables new markets for wireless home and industrial automation
- **NESA deploys wireless Automated Meter Reading system powered by Freescale solution**
Consumers, utilities to receive text message updates from electricity meters
- **Motorola, Freescale, and Nikko Collaborate on a New Remote Control Toy Car Operated By Mobile Devices**
Wireless Wheels Connect Toys and Motorola iDEN Mobile Devices to Make Life More Fun
- **Hawking Technologies unveils The HomeRemote™ System built on Freescale's ZigBee™ compliant platform**
HomeRemote enables homeowners to monitor, control and secure their homes from the Web
- **Freescale Semiconductor's ZigBee-compliant Platform Selected For NEC Engineering's ZB24FM Embedded Module**
- **Compal Communications selects Freescale's platform for ZigBee™ module**

ZigBee at Freescale

PowerQuicc Communications Gateways



HS08/ColdFire Consumer Automotive Industrial



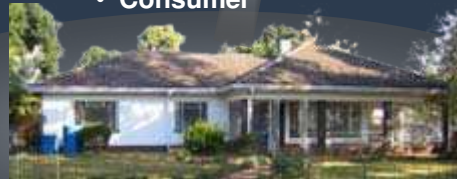
Sensors

Medical
Blood pressure
Glucose Monitor
Consumer
Industrial



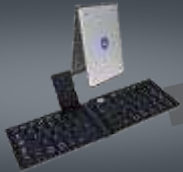
Markets

- Home
- Industrial
- Commercial
- Consumer
- Cellular
- Medical
- Automotive



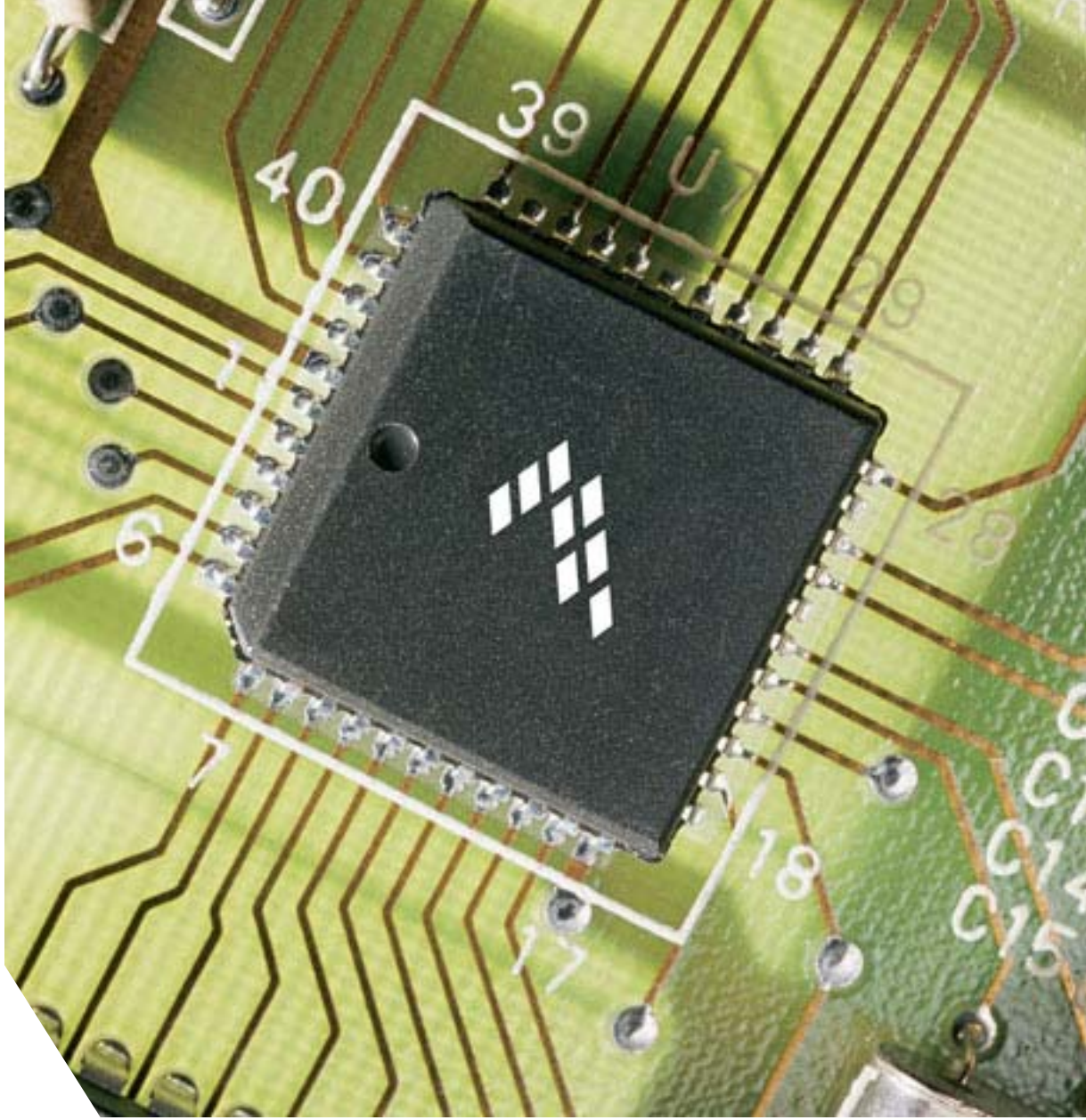
i.MX

Portable Media
High-end Remote Control
PDA



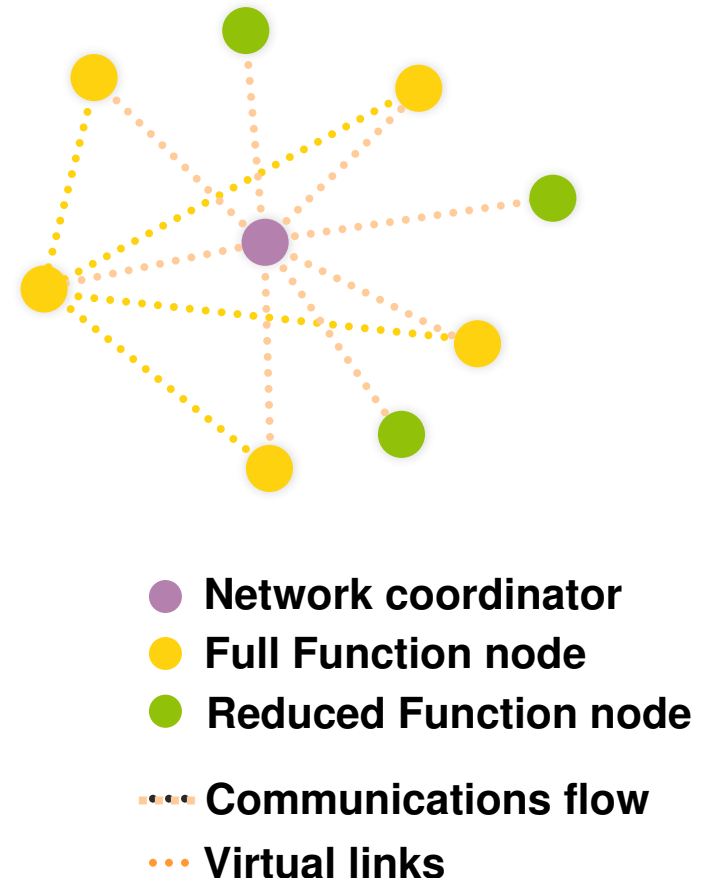
DSC (56800)
Motor Control
Power Supplies

What is ZigBee?



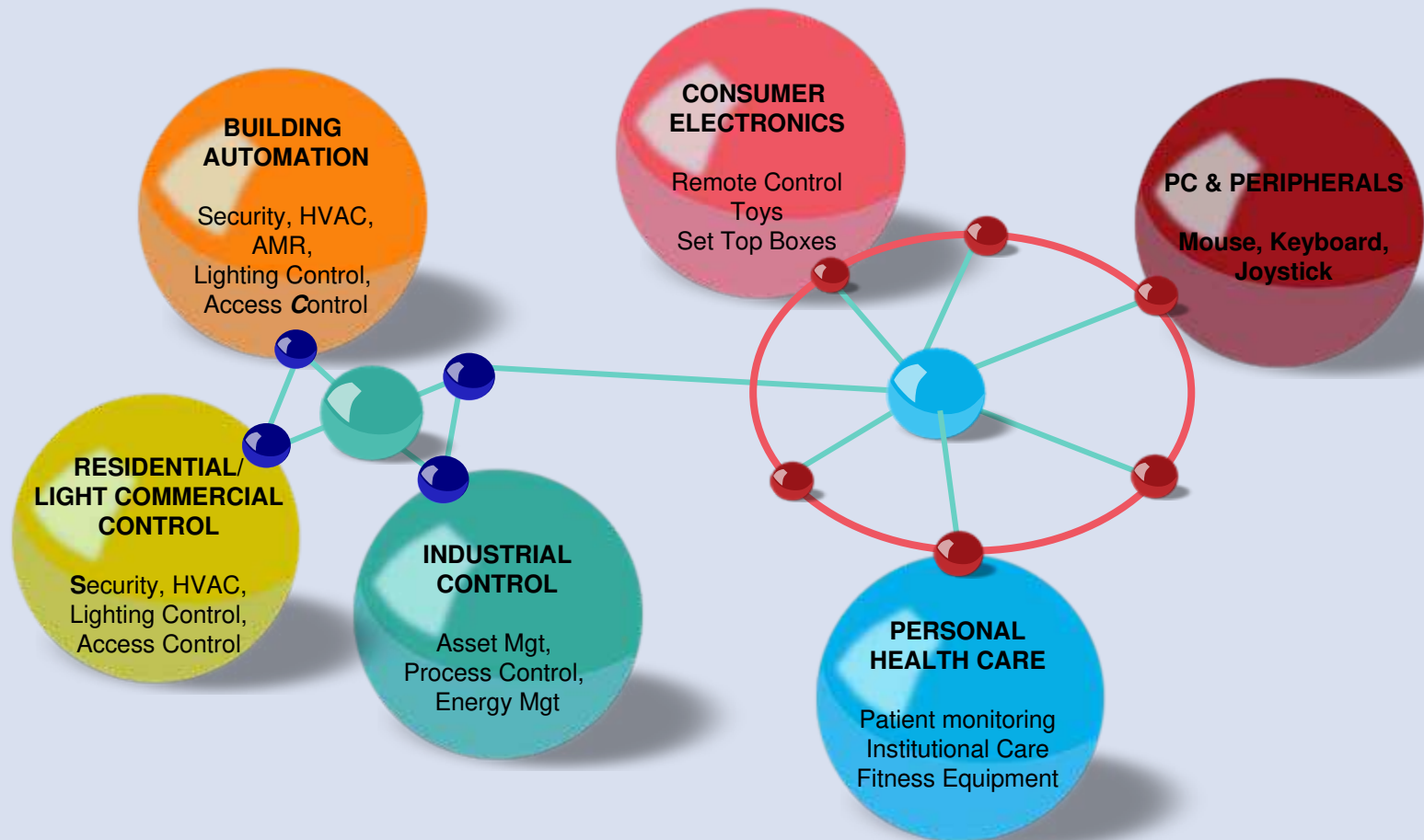
ZigBee Value Propositions

- Addresses the unique needs of most remote monitoring and control network applications
 - **Infrequent, low rate data**
- Enables the broad-based deployment of wireless networks with low cost & low power solutions
 - **Supports peer-to-peer, star and mesh networks**
- Supports applications with low-power requirements
 - **Months to Years of Battery Life**
- Provides a business environment that supports deployment of these applications
 - **Profiles for Interoperability**
 - **Reduced Cost of Entry compared with other Wireless standards**



- **Short-Range Wireless Technology Adoption**
 - 2.4 GHz unlicensed RF spectrum globally adopted.
 - Wi-Fi and Bluetooth proven capabilities and market traction/growth.
- **Low-Cost**
 - Wired infrastructure is expensive.
 - Chipsets reaching acceptable price points.
 - Remote monitoring and control savings.
- **Standards-Based Wireless Technologies**
 - IEEE 802.15.4 technology standard.
 - ZigBee Alliance interoperability, conformance testing and global branding.
 - ZigBee-compliant platforms.
- **End-User**
 - Remote monitoring and control for convenience.
 - Increased functionality through two-way RF.

ZigBee Markets and Applications



Slide 8

- **Applications are targeted toward convenience, energy management and whole home connectivity.**
 - Lighting
 - On/off, dim (load control)
 - Home Control Lighting Profile approved as part of 1.0 specification
 - Heating, Ventilation, Air Conditioning (HVAC)
 - Thermostats, temperature sensors, etc.
 - Security/Access Control
 - Door, window and motion sensors, entry monitoring, smoke detectors, etc.
- **ZigBee provides for integration of multiple systems (lighting, HVAC and security) that are separate today.**
 - Home Automation Profile
 - Gateway for control while outside the home
 - 6% of homes have some type of HA system
 - 20% of homes have a network
 - 20% of homes are interested in purchasing a HA system

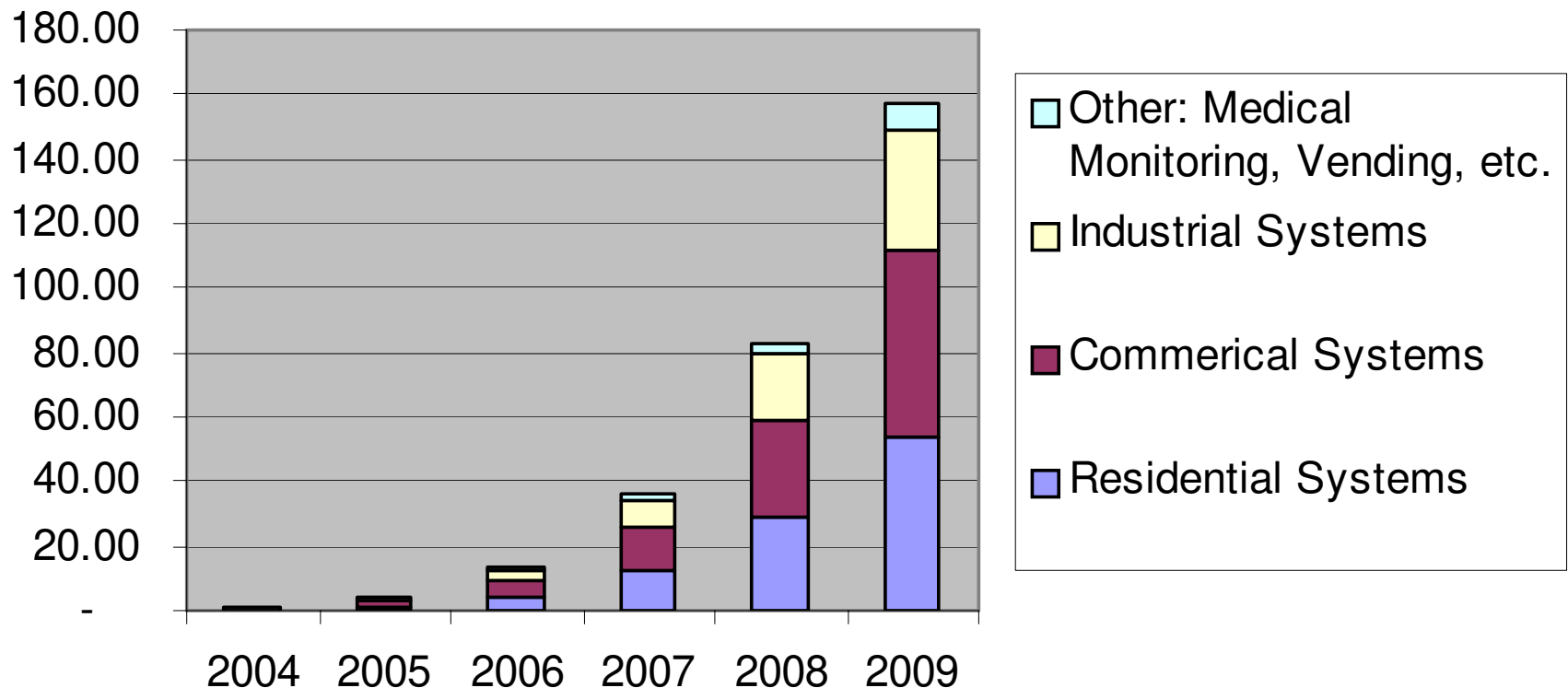
Building Control and Automation

- **Applications are targeted toward reducing Total Cost of Ownership (TCO) in areas such as energy cost.**
 - Lighting
 - On/off, occupancy detection
 - Heating, Ventilation, Air Conditioning (HVAC)
 - Thermostats, temperature sensors, etc.
 - Security/Access Control
 - Door, window and motion sensors, entry monitoring, fire detectors, etc.
 - Automated Meter Reading (AMR)
 - Strong interest within alliance on AMR.
- **Gateways/Bridges provide integration of multiple systems**

- **Applications are targeted toward reducing cost in areas such as manufacturing**
 - Process Control
 - Monitoring of manufacturing flow and material handling
 - throughput, container volume and pressure, etc.
 - shock & vibe, bottlenecks, etc.
 - Profile for Industrial Process Control is being actively worked within Alliance
 - Energy Management
 - Lighting and HVAC control
 - Asset Management
 - Monitoring/location of assets

- **Hospital - Long-Term/Non-Acute**
 - Networked wireless devices to maximize patient monitoring by reducing nurse to patient ratio
 - Wireless devices include EKG, blood pressure, pulse oximetry, capnometry, infusion pumps and spirometry
- **Patient Monitoring - Home Care**
 - Telemetry for off-site diagnosis by collecting data of glucose levels, blood pressure, heart rate, etc. while patients are recovering at home
- **Fitness**
 - Heart rate monitors for athletes

Wireless Market TAM (Units - Millions)



Source: In-Stat/MDR, #IN0501836MI, 2005

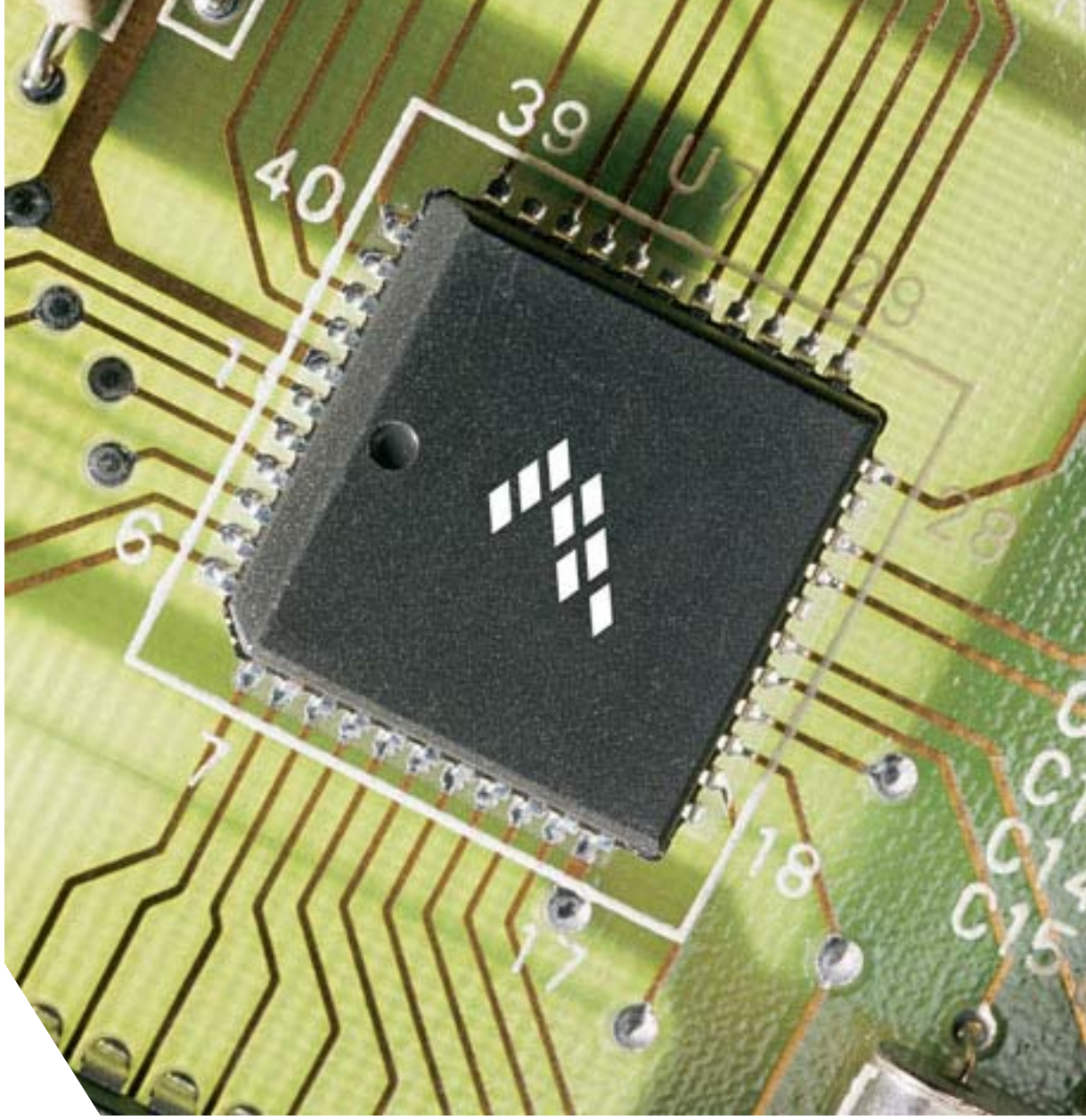
Wireless Networking Technologies

	ZigBee	Bluetooth	UWB	Wi-Fi	LonWorks	Proprietary
Standard	IEEE 802.15.4	IEEE 802.15.1	IEEE 802.15.3a (to be ratified)	IEEE 802.11 a, b, g (n to be ratified)	EIA 709.1,2,3	Proprietary
Industry Orgs.	ZigBee Alliance	Bluetooth SIG	UWB Forum & WiMedia Alliance	Wi-Fi Alliance	LonMark Interoperability Association	N/A
Topology	Mesh, Star, Tree	Star	Star	Star	Medium- dependent	P2P, Star, Mesh
RF Frequency	868/915 MHz 2.4 GHz	2.4 GHz	3.1-10.6 GHz (U.S.)	2.4 GHz 5.8 GHz	N/A (wired technology)	433/868/900 MHz 2.4 GHz
Data Rate	250 Kbps	723 Kbps	110Mbps- 1.6Gbps	11-105 Mbps	15 Kbps- 10 Mbps	10-250 Kbps
Range	10-70 m	10 m	4-20 m	10-100 m	Medium Dependent	10-70 m
Power	Very Low	Low	Low	High	Wired	Very Low-Low
Battery Operation (Life)	Alkaline (Months-Years)	Rechargeable (Days-Weeks)	Rechargeable (Hours-Days)	Rechargeable (Hours)	N/A	Alkaline (Months-Years)
Nodes	65,000	8	128	32	32,000	100-1,000

 Key strengths

 Key weaknesses

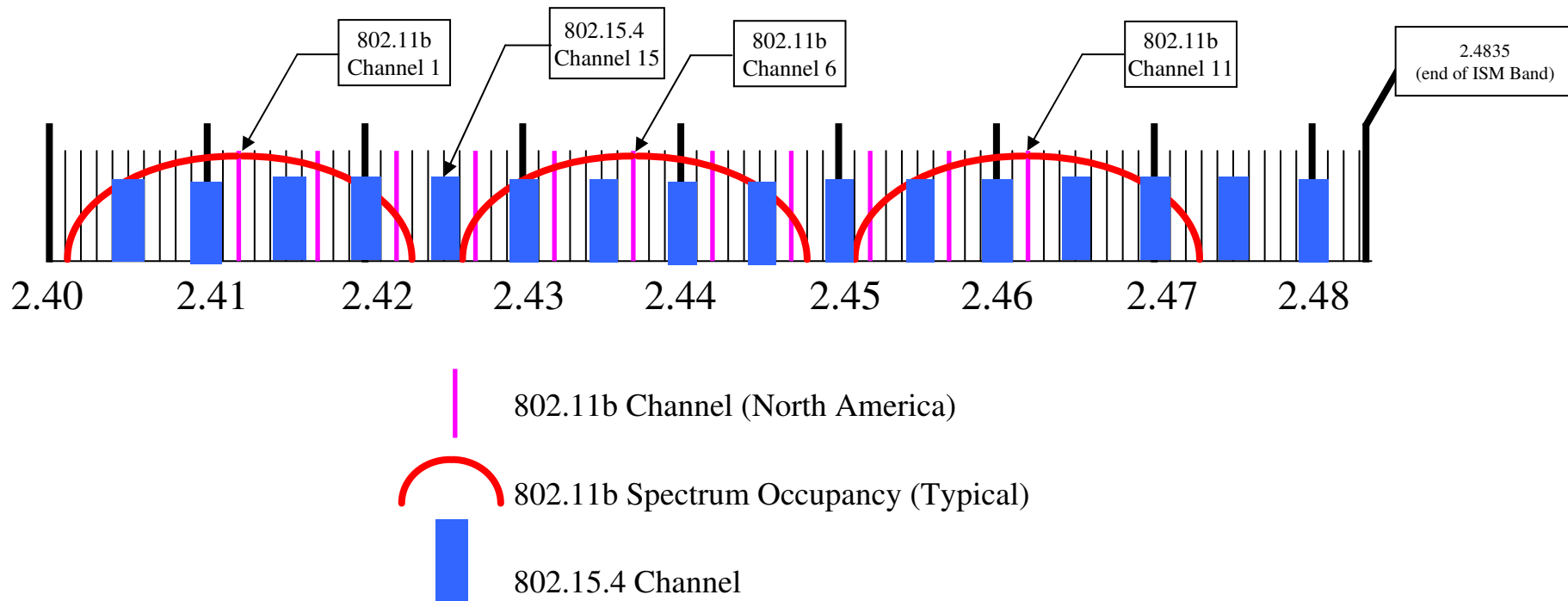
802.15.4 & ZigBee Fundamentals



Wireless Standards Compared

Feature(s)	IEEE 802.11b Wi-Fi	IEEE 802.15.3 Bluetooth	IEEE 802.15.4 ZigBee
Power Profile	Hours	Days	Years
Complexity	Very Complex	Complex	Simple
Nodes/Master	32	7	64000
Latency	Enumeration upto 3 seconds	Enumeration upto 10 seconds	Enumeration 30ms
Range	100 m	10m	70m-300m
Extendability	Roaming possible	No	YES
Data Rate	11Mbps	1Mbps	250Kbps
Security	Authentication Service Set ID (SSID)	64 bit, 128 bit	128 bit AES and Application Layer user defined

2.4 GHz Channel Occupancy



ZigBee Standard Overview

- **ZigBee Builds on the IEEE 802.15.4 PHY and MAC Specification**
 - Adds network, security, and application software layers
 - The Alliance provides interoperability, branding, and certification testing.
- **Addresses a unique niche in the Wireless Market**
 - Infrequent data transfer at low data rates and in short data packets
 - Battery powered applications requiring a long battery life
 - Simple cable replacement applications
- **Enables broad-based deployment of low power wireless networks**
 - Data Routing Algorithms
 - Self Forming/Self Healing
 - All network Management

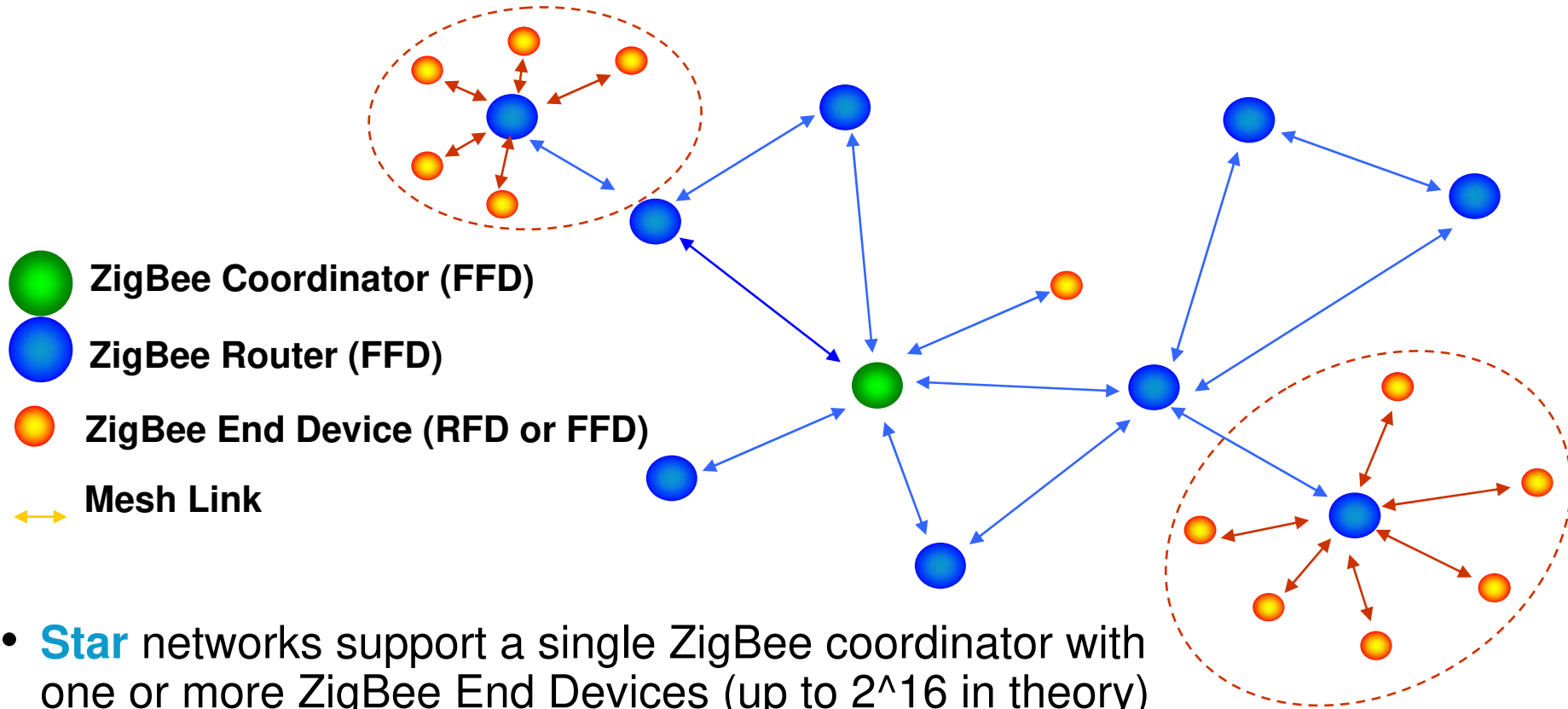
- **Ideal For**

- Large area coverage
 - Using the mesh networks that support as many devices
- Interoperability
- Infrequent communications
 - Ultra low power monitoring applications that operate for years on inexpensive alkaline batteries

- **Not Ideal For**

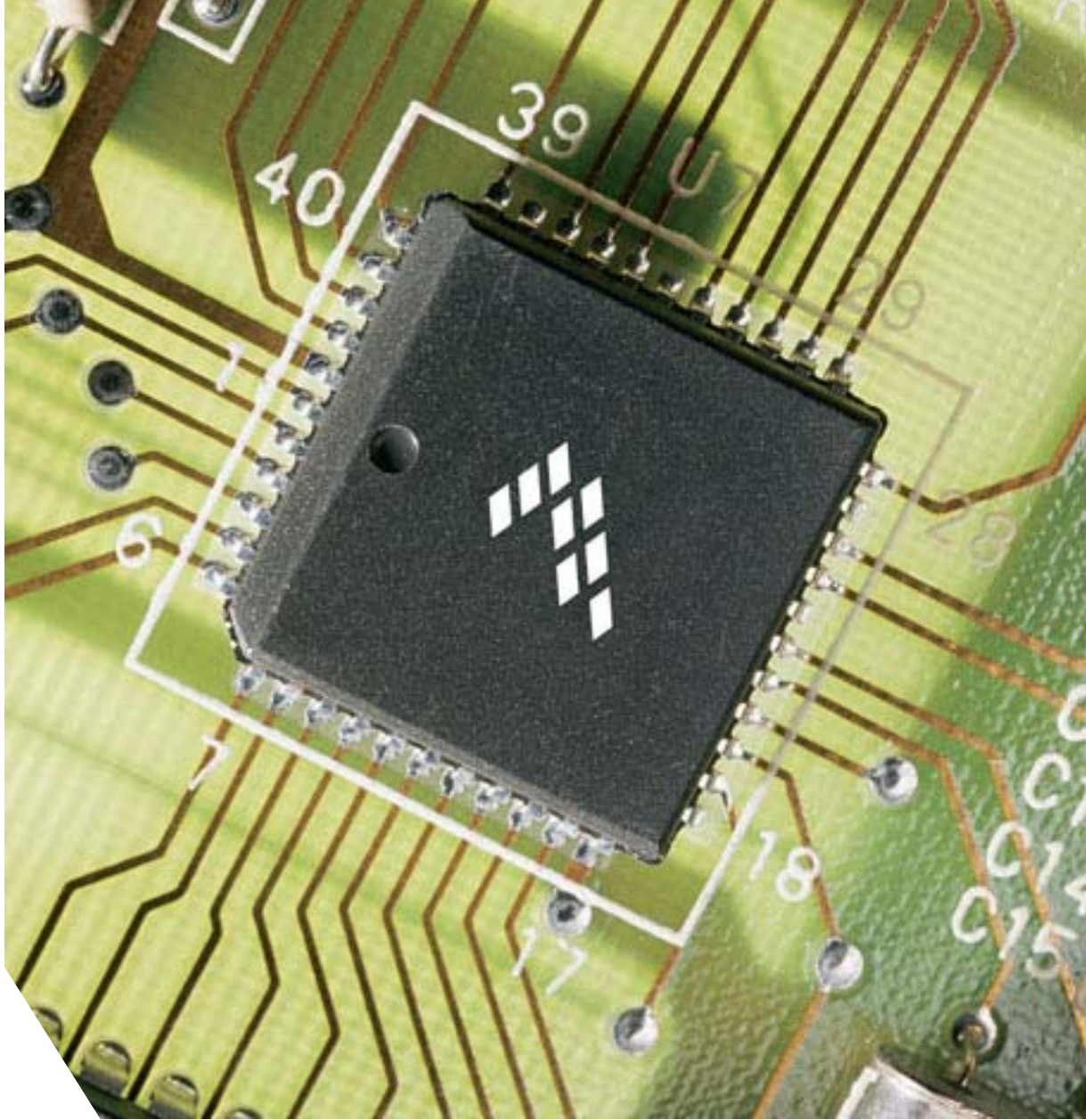
- Applications requiring long range without using routers
- Mobile applications (being addressed in ZigBee v1.1)
- Streaming audio, data and video

ZigBee Network Model



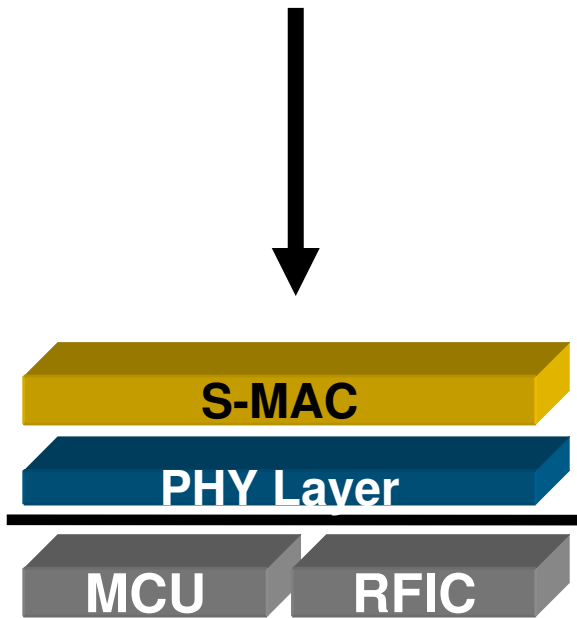
- **Star** networks support a single ZigBee coordinator with one or more ZigBee End Devices (up to 2^{16} in theory)
- **Mesh** network routing permits path formation from any source device to any destination device

Freescale ZigBee Portfolio

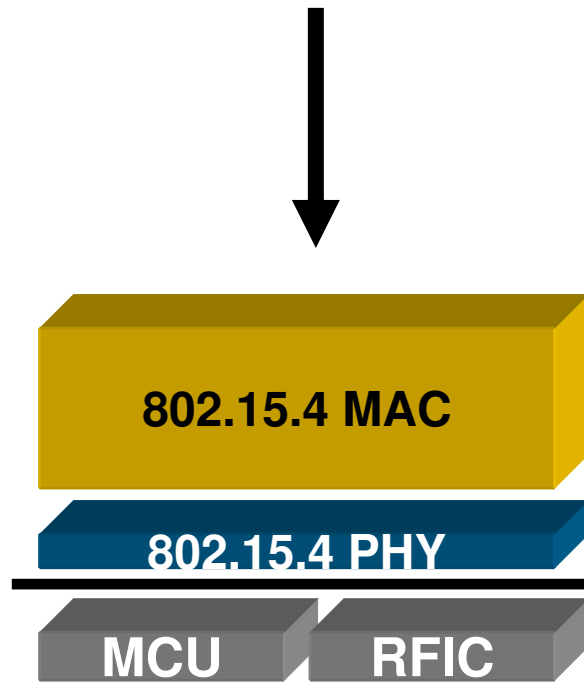


Multi-Offering Approach with 802.15.4 / ZigBee

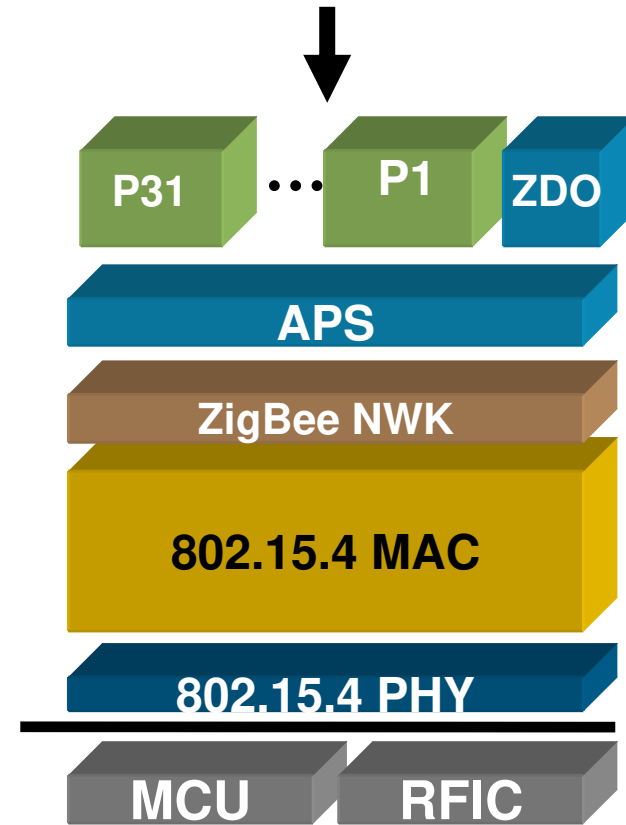
Simple Wireless Connectivity



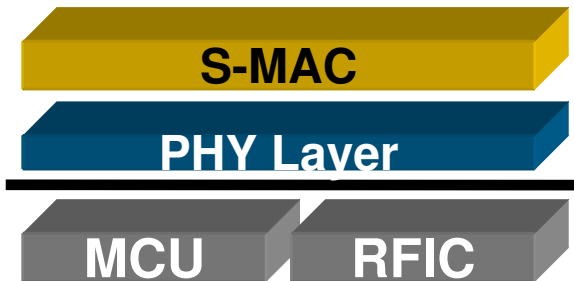
802.15.4 Solution



ZigBee



Simple Wireless Connectivity



- Features Highlights
- **Portfolio's Lowest Cost Solution**
- **Ease of Use**
 - Uses Simple Media Access Controller Software (SMAC)
 - Only 16 Primitives
 - Requires Less than 2.5K bytes of Memory
 - ANSI C Source Code Provided
- **Flexibility**
 - Generic SPI Targets any MCU
 - Provides Migration Path to ZigBee
- Target Applications
- **Point to Point and Star Networks**
- **Ultra Low Power Requirements**
- **Ultra Low Memory Requirements**
- **Processors supported**
 - HCS08, HC12, DSC, ColdFire

IEEE 802.15.4 Standard-Based Proprietary

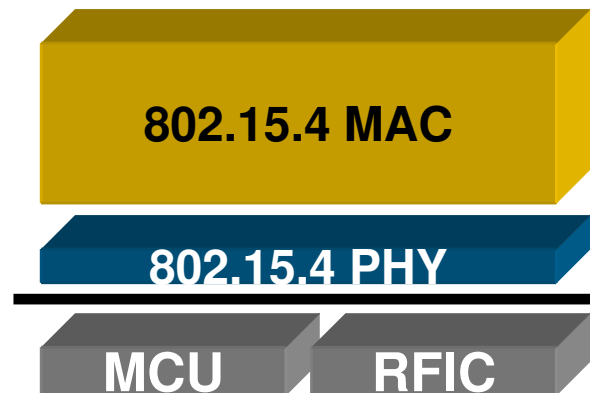
Hardware Features

- 802.15.4 PHY Compliant
 - MC13192/3 Transceiver
 - Supports Packet and Streaming Mode
 - Compliant to all RF Specs
- Targets the HCS08GT60

Target Applications

- Mesh/Clustertree NWKs
- Robust Communication and Timing Critical Protocol
- NWK Standard not needed
- Interoperability not needed

802.15.4 Solution



Software Features

- 802.15.4 MAC Compliant
 - Standardized Communication Protocol
 - Supports Beaconed and Non-Beaconed NWKs
 - GTS, 128 AES Encryption
 - Co-existence Mitigation Algorithm CSMA-CA
 - Mesh & Clustertree NWKs
- Option to Remove Unnecessary Features to reduce code size
- Provided in Object Code

Processors Supported

- HCS08, ColdFire (Feb/Mar)

Fully Compliant ZigBee

Features Highlights

- ZigBee Compliant Platform
- Complete Wireless Networking Standard – from Antenna to API
- Wireless Embedded or Dongle Options

Target Applications

- Mesh & Clustertree NWKs
- Established Routing Algorithm
- Network Recovery and Healing
- Device Interoperability

Processors Supported

- HCS08, ColdFire (Sep/Oct)

