



Wireless Connectivity

## ZigBee® RF4CE

### Target Applications

- Remote controls
- Set-top boxes
- Televisions
- Projectors
- Video player/recorders (VCR, DVR, DVD, Blu-Ray, portable)
- Audio player/recorders (CD, portable)
- Audio/video recorders
- Home theater systems
- Media centers/PCs
- IR extenders

### Overview

The RF4CE Consortium began with the commitment to create an RF remote control standard based on IEEE® 802.15.4 MAC/PHY radio technology. Comprised of leaders in the consumer electronics industry, including Panasonic, Philips, Sony and Samsung, RF4CE technology has now been merged into the ZigBee Alliance® and is quickly becoming a consumer RF control technology.

With an aggressive goal to replace IR remote control technology over the next five years, ZigBee RF4CE provides for a common RF remote control network layer that builds on top of the IEEE 802.15.4 standards specification.

What does this mean to the consumer electronics equipment designer? Now the historical technology challenges of IR remote controls can be eliminated. Gone are:

- Interference factors like the high frequency inverters in plasma televisions and backlighting of LCD televisions.
- Issues surrounding line of sight and field of vision essential for predictable, power optimized remote functioning.

With the exceptional features of RF remote control, bi-directional, reliable communications and long battery life are now the standard. The consumer's experience is improved and

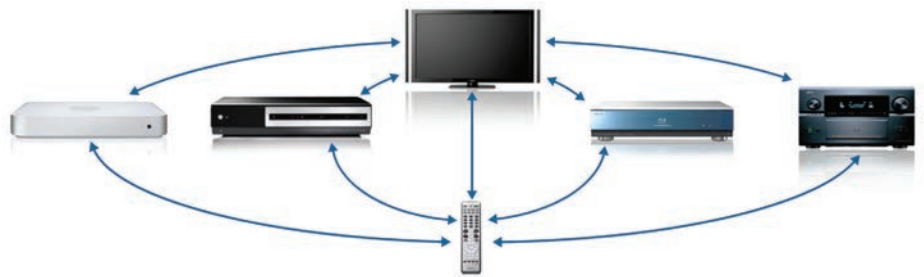
the consumer electronics equipment providers can expand their service offerings and revenue potential. These gains can be achieved through a combination of the IEEE 802.15.4 capabilities that were selected for cost, interference avoidance, robustness and the unique features of the ZigBee RF4CE protocol.

The Freescale ZigBee RF4CE protocol stack is called BeeStack Consumer. Access BeeStack Consumer through the BeeKit wireless connectivity toolkit included in development kits and downloadable from [freescale.com/ZigBee](http://freescale.com/ZigBee). Freescale continues to lead the IR-to-RF evolution as it has for many years by providing the first standards-based, networking protocol for the consumer electronics marketplace, SynkroRF, which is the foundation for the current RF4CE specification.

## Technical Features

- Networking protocol code features
  - Reliable data delivery with CSMA-CA and message acknowledgement
  - Channel agility interference avoidance techniques
  - Power saving modes
  - Increased battery life
  - Lower standby current
  - Allows designs to meet Energy Star requirements
  - Support for acknowledged, non-acknowledged, unicast and broadcast messages
  - Support for non secure and secure communications with AES-128 bit encryption
  - Simple pairing mechanism
  - Only authorized paired devices can communicate
  - Support for interoperability through standardized profiles
- Target processor architectures supported
  - MC13234CHT
  - MC13237CHT
- Development kits supported
  - 13234DSK-BDM
  - 13234NSK-BDM
  - 13234NSK-SFTW
  - 13237ADC-BDM
  - 13237ADC-SFTW
  - TWR-13237
  - TWR-13237-KIT

## Home Control



## The RF Evolution

ZigBee RF4CE is the evolution of the home entertainment experience. The next generation of RF control technologies, our RF4CE (BeeStack Consumer) is a platform solution for wireless monitoring, control and complete automation for home consumer products. Wireless connectivity for consumer electronics has never been easier. With protocol stack features such as enhanced RF technology, two way communications and easy device configuration, ZigBee RF4CE offers an improved consumer electronics experience with product differentiation in a cost-sensitive market.

With the ability to send information to a remote control via RF functionality, designers can eliminate the need for extensive IR device databases. Simple device pairing offers direct communication between any two devices. Achieve the benefits of RF technology with the simple to use, lightweight ZigBee RF4CE protocol stack and begin the evolution of your consumer electronics product portfolio.

For more information about ZigBee RF4CE and BeeKit Consumer, visit [freescale.com/ZigBee](http://freescale.com/ZigBee)

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