Bluetooth
ITS 437

Where to find information

- http://www.bluetooth.com
- public site of the Bluetooth SIG
- All information in these slides comes from the Bluetooth site unless otherwise noted
- the membership site is bluetooth.org
- Brent A. Miller, Chatschik Bisdikian, "Bluetooth Revealed" (on Safari)

Basics

- Design Goals
  - Short ranges (1-10 m)
  - Very low cost
- Applications
  - Peer-to-Peer
  - Data Exchange
  - Real-time Audio

Structure

LC: Link Control
LMP: Link Manager Protocol
L2CAP: Logical Link Control and Adaptation Protocol
RF System

- 2.4 GHz band
- 79 channels
- 19 MHz per channel starting at 2402 MHz, ending at 2480 MHz. Low 2 MHz and upper 3.5 MHz of the ISM band reserved as guard bands
- FHSS, 1600 hops per second
- Power levels
  - Class 1: 100 mW
  - Class 2: 2.5 mW
  - Class 3: 1 mW

Modulation/Data Rate

- Basic Rate (mandated, original spec)
  - Binary Frequency Shift Keying at 1 Mbps
- Enhanced Data Rate
  - QPSK at 2 Mbps
  - 8PSK at 3 Mbps

Network Structure

- “Pico-Nets”
- Master/Slave architecture
  - The spec allows any device to be master or slave.
  - Master station selects the hopping pattern for the pico-net, and serves as master clock.
  - Device can only be master in one pico-net (since it defines the hopping pattern) but can participate in several
- Pico-net can have 1 master, 7 active slaves, 255 parked slaves

Usage Profiles

- Profiles define compatible applications that a device can support (and announce)
- Examples:
  - Headset Profile
  - Cordless Telephony Profile
  - Synchronization Profile
  - Dial-Up Network Profile
  - many others
Security

- Authentication Required
  - Challenge/Response based on link keys
  - Initial link keys are generated during “Pairing”
  - PIN numbers seed link key
  - More secure pairing in newer revisions
  - Numeric Comparison
    - Verification (not PIN) generated using public keys (without certificate verification)
  - Out of band
- Link Encryption Optional