Bluetooth

ITS 437
Where to find information

- [http://www.bluetooth.com](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

Source: Bluetooth SIG
http://www.bluetooth.com
RF System

- 2.4 GHz band
  - 79 channels
    - 1 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