Submission Title: ZigBee and Bluetooth – Competitive or Complementary?
Date Submitted: September 2002
Source: Venkat Bahl **Company:** ZigBee Alliance

Re: 02/054

Abstract: Comparison of Bluetooth and ZigBee protocols

Purpose: Marketing and information

Notice: This document has been prepared to assist the ZigBee Alliance. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.

Release: **The contributor acknowledges and accepts that this contribution will be posted in the member area of the ZigBee web site.**

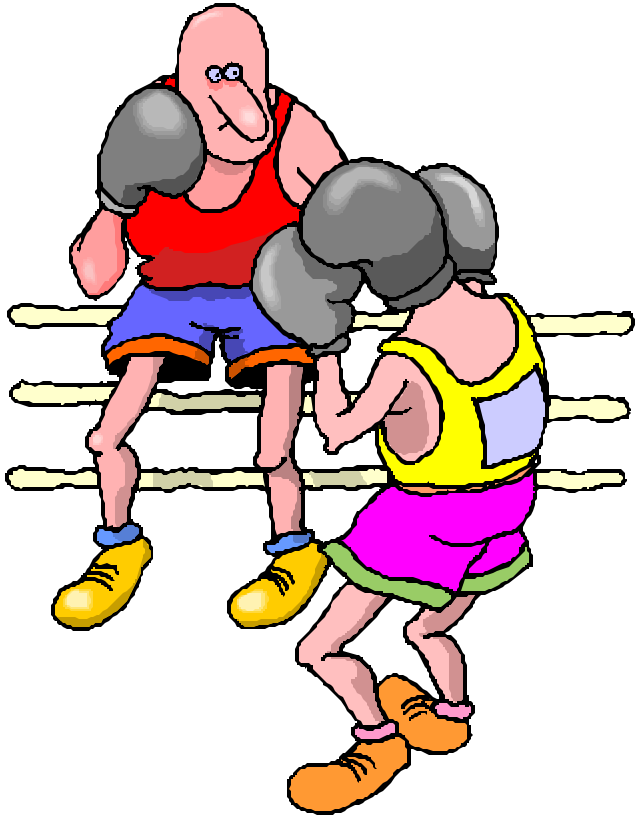
ZigBee™ Alliance

ZigBee and Bluetooth:

Competitive or Complementary?

ZigBee vs. Bluetooth

Competition or
Complementary?



ZigBee Alliance

Bluetooth is Best …

FOR:

- Ad-hoc networks between capable devices
- Hands-free audio
- Screen graphics, pictures…
- File transfer

But ZigBee is Better …

IF:

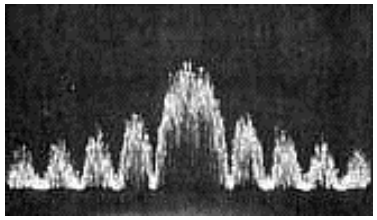
- The Network is static
- Lots of devices
- Infrequently used
- Small data packets

ZigBee Alliance

Air interface

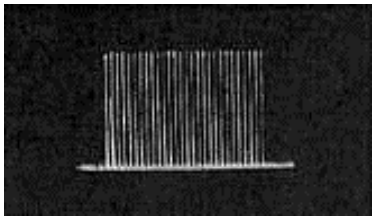
ZigBee

- DSSS
- 11 chips/ symbol
- 62.5 K symbols/s
- 4 Bits/ symbol
- Peak Information Rate ~128 Kbit/second



Bluetooth

- FHSS
- 1 M Symbol / second
- Peak Information Rate ~720 Kbit / second



ZigBee Alliance

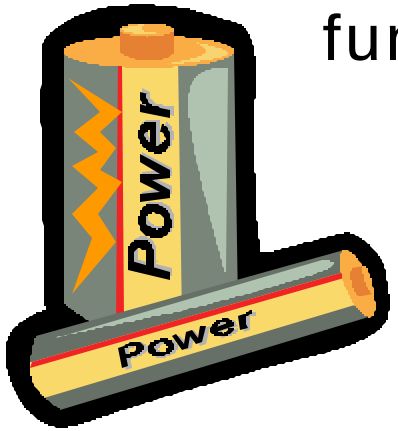
Power Considerations

ZigBee

- 2+ years from ‘normal’ batteries
- Designed to optimize slave power requirements

Bluetooth

- Power model as a mobile phone (regular charging)
- Designed to maximize ad-hoc functionality



ZigBee Alliance

Timing Considerations

ZigBee:

- New slave enumeration = 30ms typically
- Sleeping slave changing to active = 15ms typically
- Active slave channel access time = 15ms typically

Bluetooth:

- New slave enumeration = >3s
- Sleeping slave changing to active = 3s typically
- Active slave channel access time = 2ms typically

ZigBee protocol is optimized for timing critical applications

ZigBee Alliance

Initial Enumeration

ZigBee

Master

Bluetooth

Master

ZigBee Alliance

Cost Standpoint

ZigBee:

- Minimum slave cost
- Minimum software and processing (80C51), no host platform
- System design for eventual single-chip antenna-to-application realisation

Bluetooth:

- Low added cost connectivity
- Take advantage of host processor power (ARM7…)
- 802.11 functionality but with simplified r.f. specifications

ZigBee Alliance

Solution Prices

ZigBee:

- The ZigBee alliance will meet the cost sensitivity of its target applications

Bluetooth:

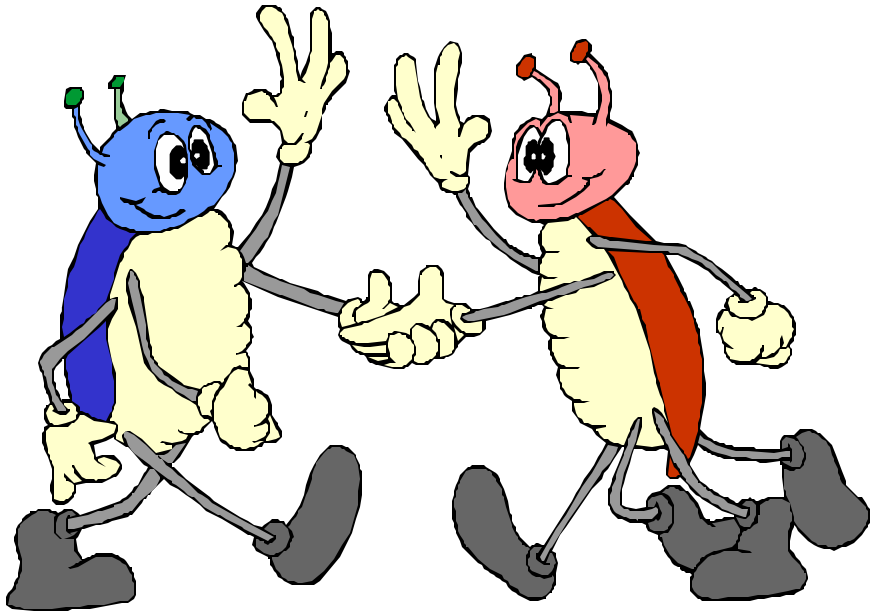
- Price Now - $10 - $15
- Price 2005 - $5

Two different solutions optimised for different applications…

ZigBee Alliance

Conclusion

- ZigBee and Bluetooth are two solutions for two application areas



ZigBee Alliance


ZigBee™ Alliance