

UCSC Extension Fall 2014 E4357 Final Project
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ZigBee + MBED

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- Low-power radios
 - Meant for operation off battery.
- Data rates up to 250 kb / s
 - Good for sensors - Internet of things
 - Simpler, less expensive than Bluetooth / WiFi
- 30-300ft line of sight
- Repeaters allow extension of distance
- Standard: IEEE 802.15.4

XBee = Digi's ZigBee brand.

What is ZigBee??

1 Coordinator /
multiple routers or end-devices

Types of ZigBee networks

Radios must be in same personal area network (PAN) and using the same Channel (0-12) to communicate.

(Credit: [Building Wireless Sensor Networks](#) by Robert Faludi. O'Reilly Press. 2010.

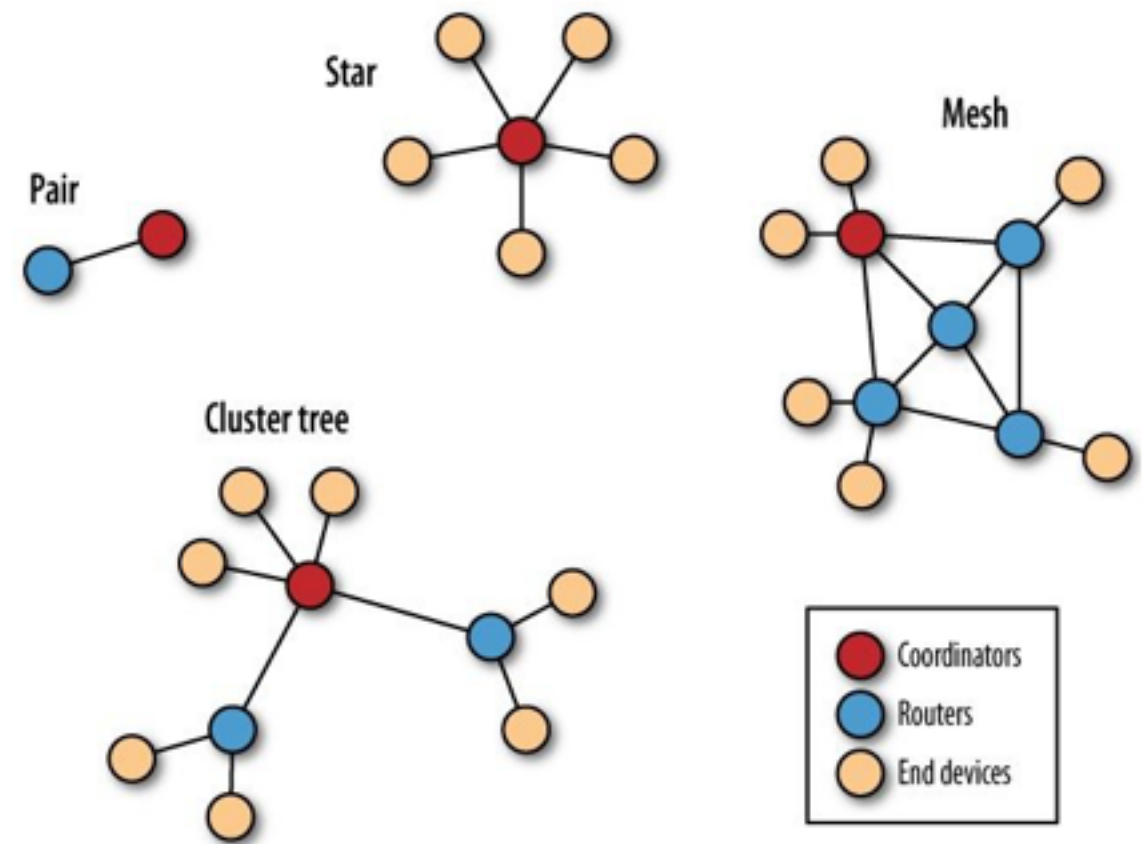


Figure 2-3. ZigBee pair, star, mesh, and cluster tree topologies

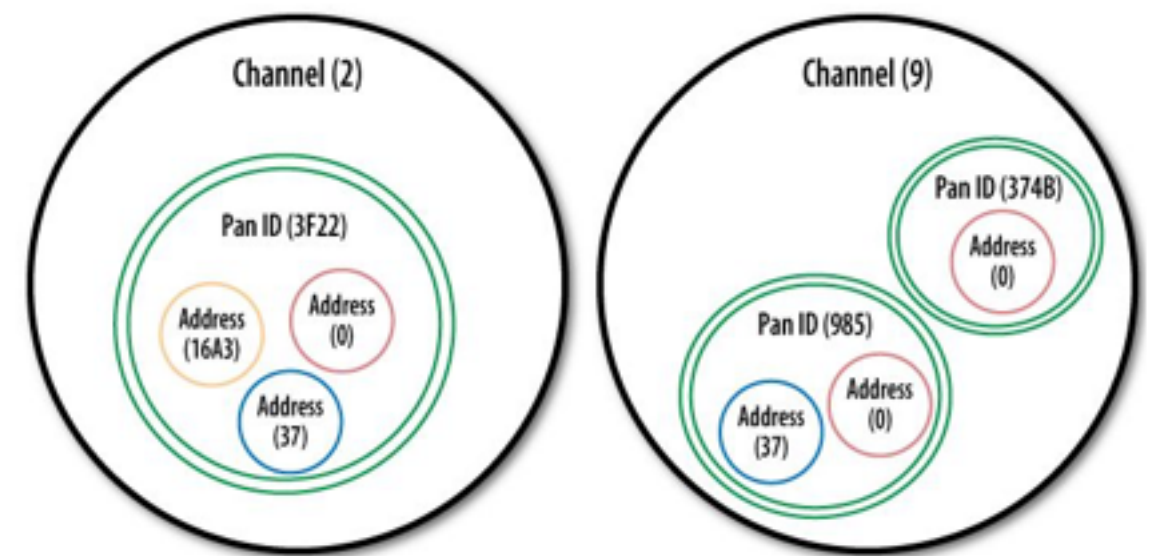
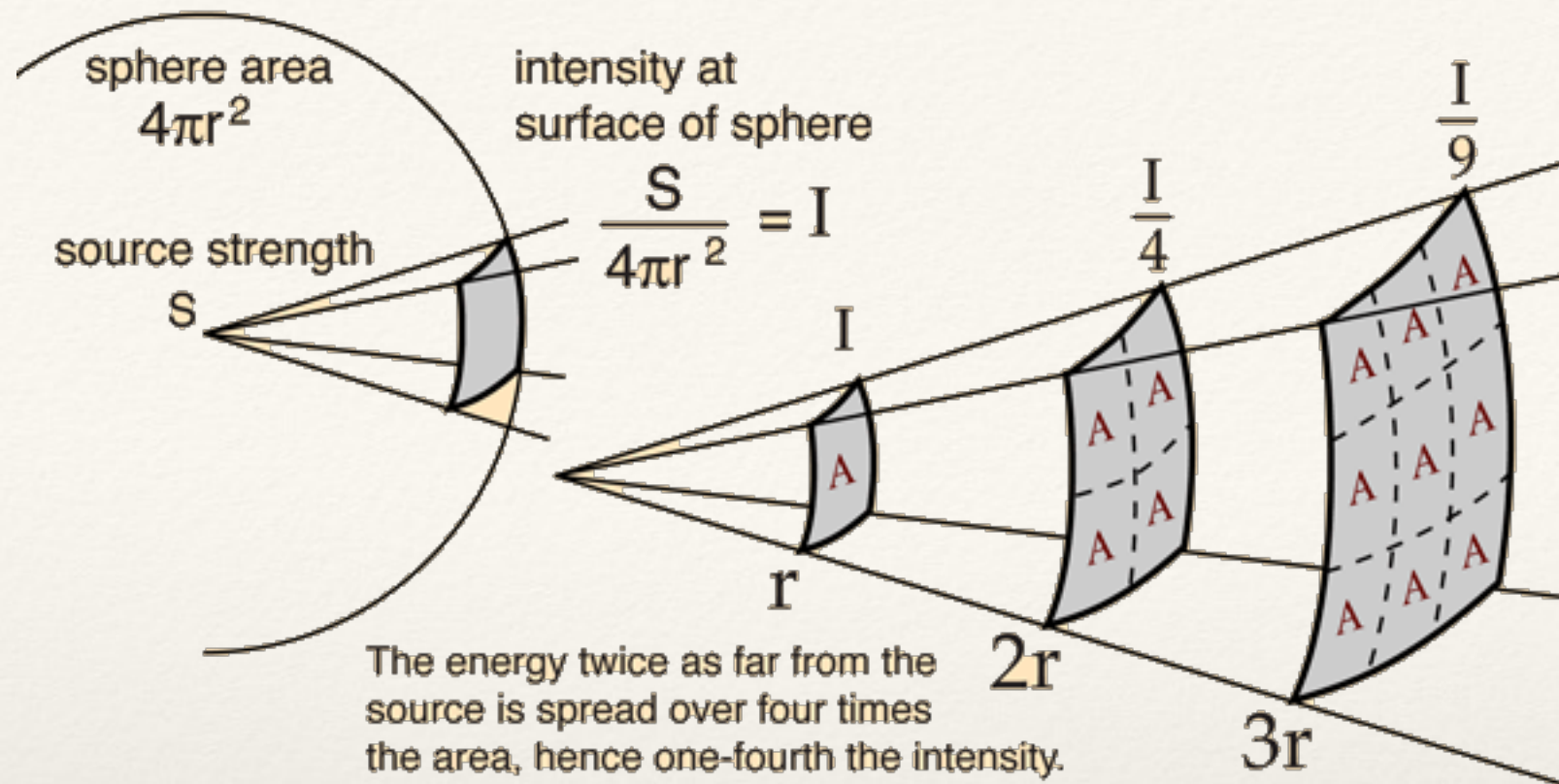


Figure 2-4. Venn diagram showing channel, PAN, and addressing

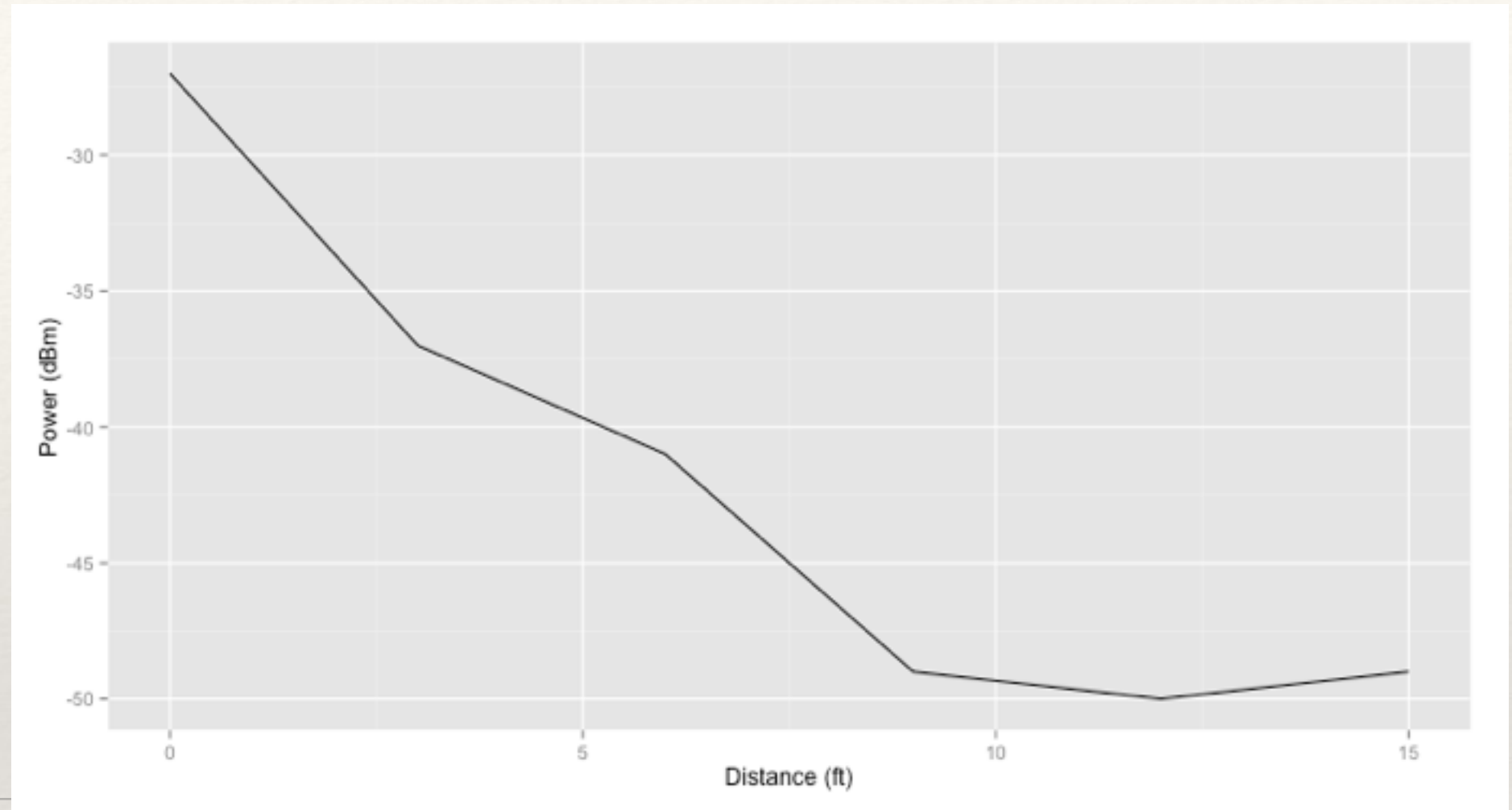
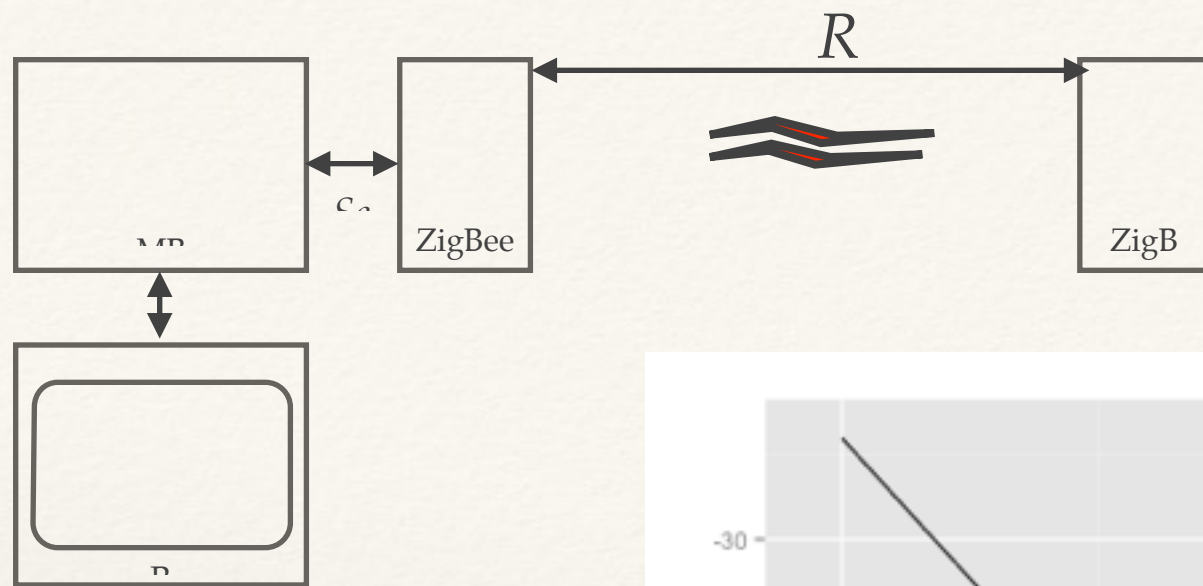


Credit: <http://hyperphysics.phy-astr.gsu.edu/hbase/forces/isq.html>

ZigBee has RSSI

Devices can report their received signal strength (RSSI) encoded in dBm.

$$10 \log_{10} (\text{Power} / 1\text{mW})$$



Connections