

Sociable Objects Workshop

Instructor: Rob Faludi

Plan for Today

- Introductions
- Syllabus Review
- Sociable Objects
- ZigBee
- XBees, adaptors and terminal programs
- Readings & Assignments

Introduction

- Sociable Objects
 - Connections are Collaboration
 - Networks
 - Mesh Networking
- Rob Faludi
 - Background
 - Motivations for this class

Introductions

- Name, graduation semester
- Projects from the last semester
- What you'll do this summer
- What you wish you were doing this summer
- How you ended up in this class, hopes and plans

Syllabus Review

- Syllabus review
 - Class schedule
 - Assignments
 - Documentation
 - Grading
 - Office Hours
 - Projects

Radio Communications

- electromagnetic waves



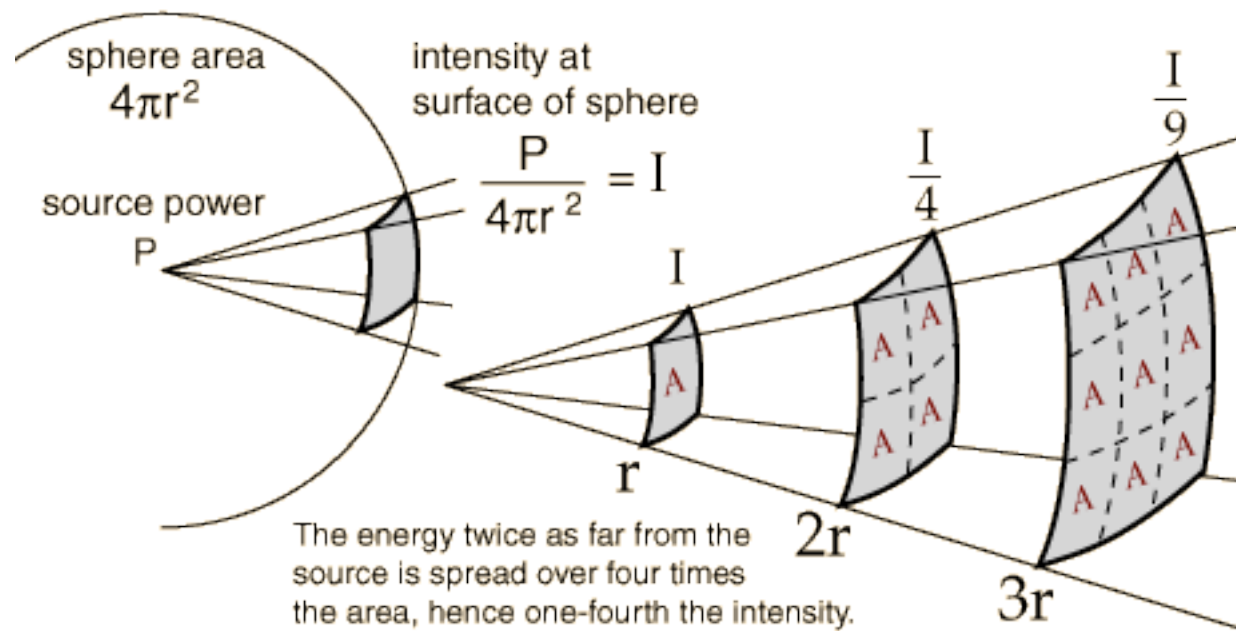
- no medium required

- modulation

- Well-described mystery: “air waves” “wireless” “ethereal communication”

Inverse Square Law

- power needs increase exponentially with distance



ZigBee & 802.15.4

- ZigBee is built on top of the IEEE 802.15.4 protocol
- XBee radios can be purchased with or without ZigBee
- XBee 802.15.4 vs. ZNet 2.5 vs. ZB Pro vs. DigiMesh
- All ways are useful

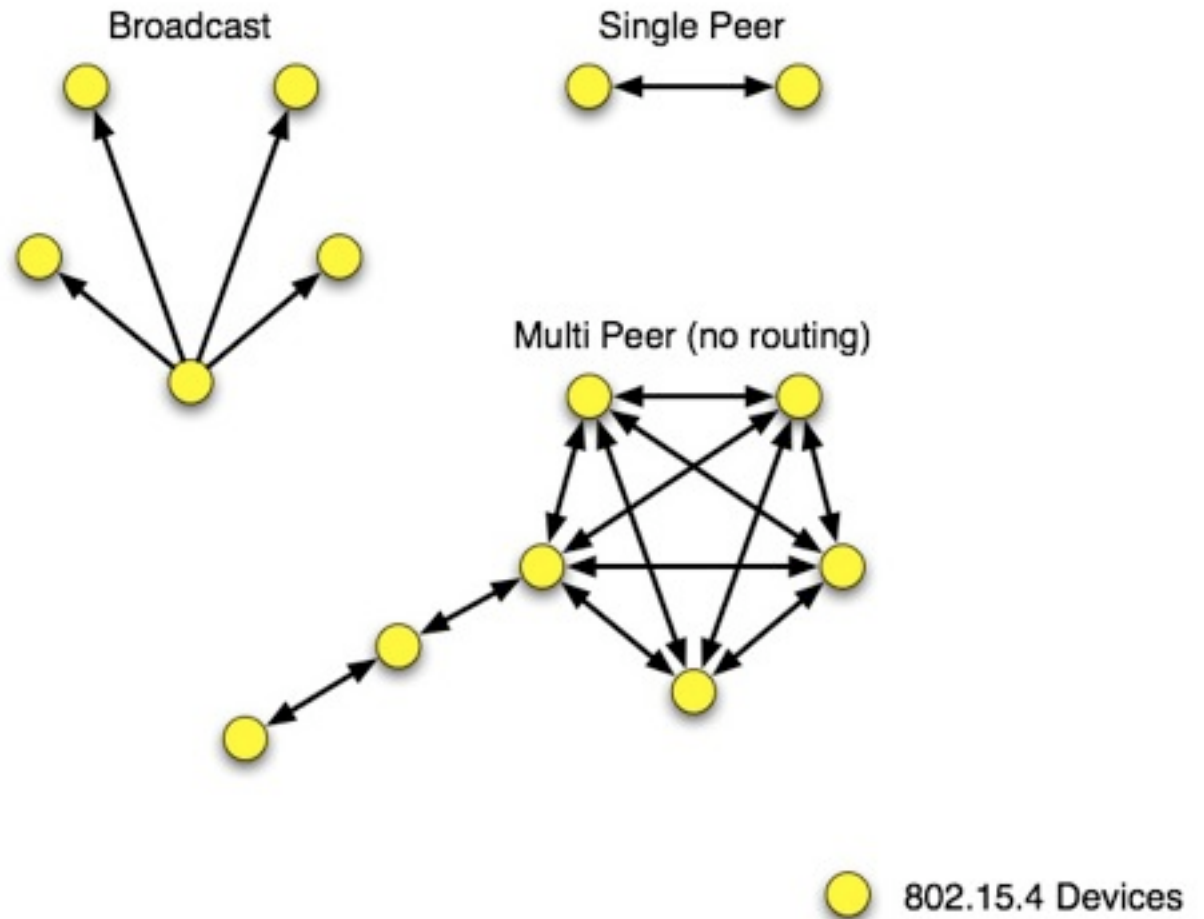
802.15.4

- low power
- low bandwidth
- addressing
- affordable
- small
- standardized
- popular for DIY, easy to learn



802.15.4 Topologies

- single peer
- multi-peer
- broadcast



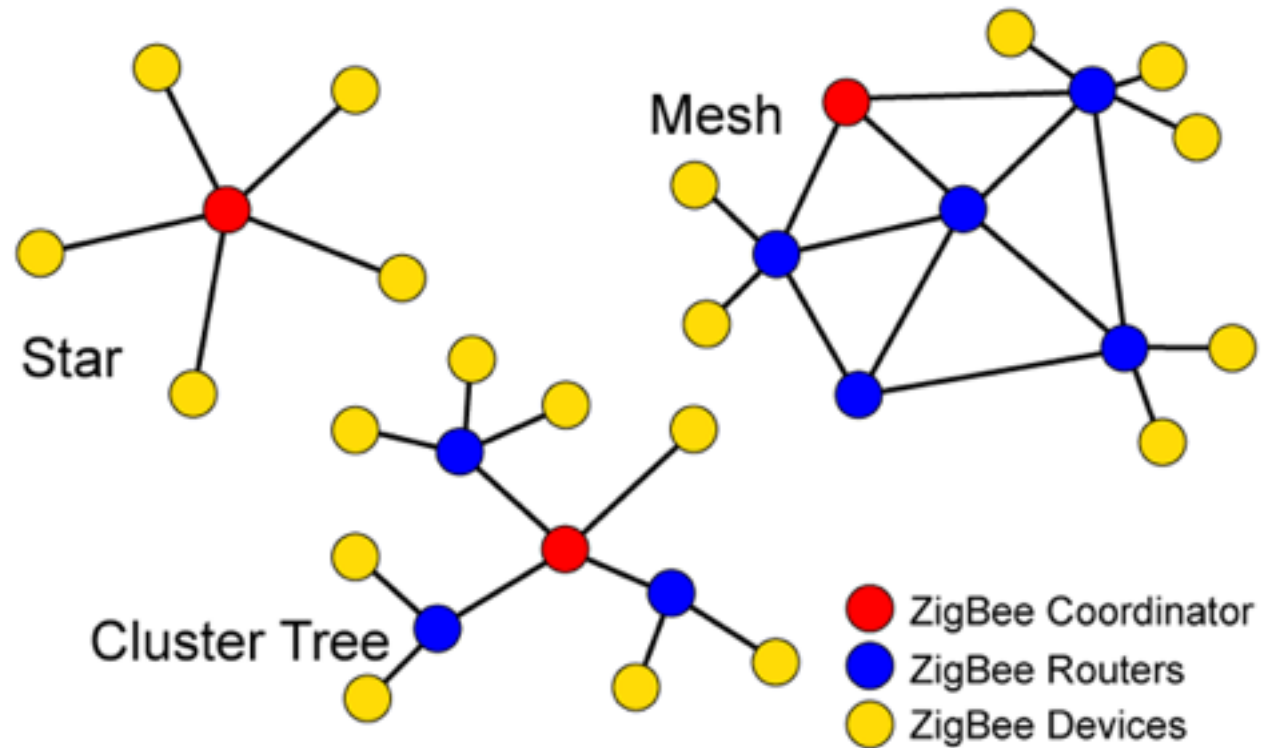
ZigBee

- routing
- self-healing mesh
- ad-hoc network creation

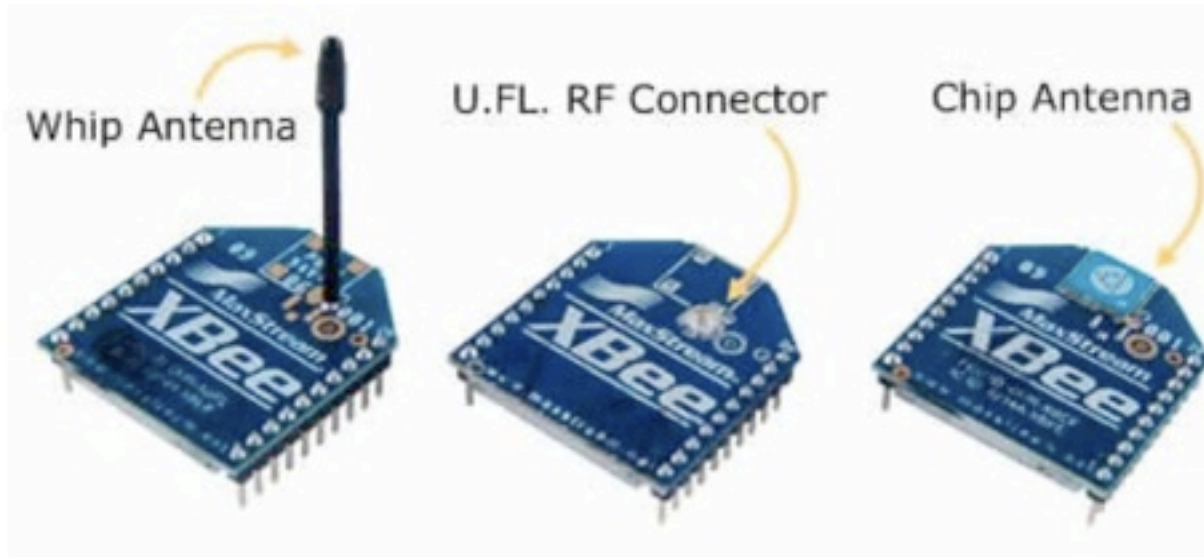


ZigBee Topologies

- peer
- star
- mesh
- routing



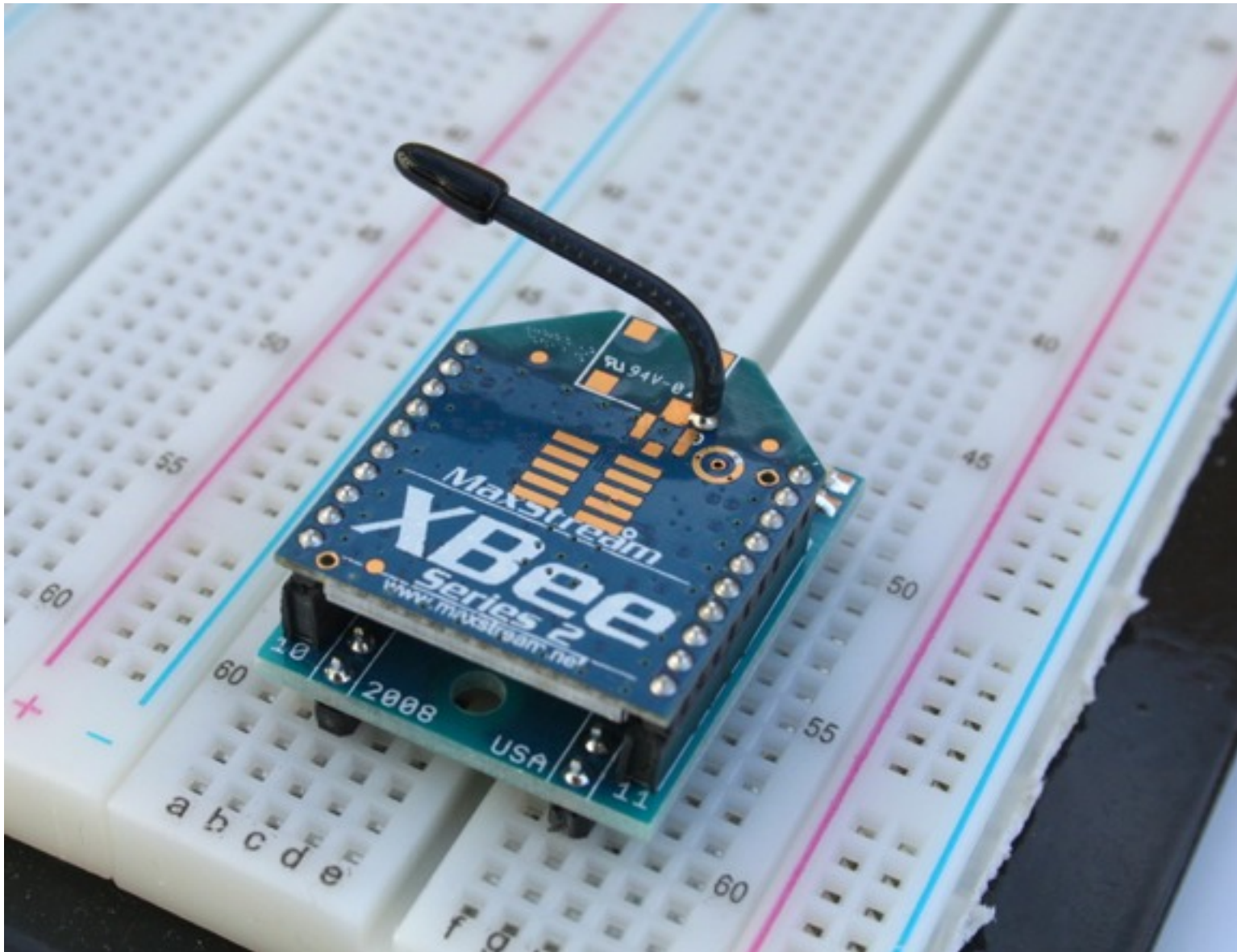
Antennas



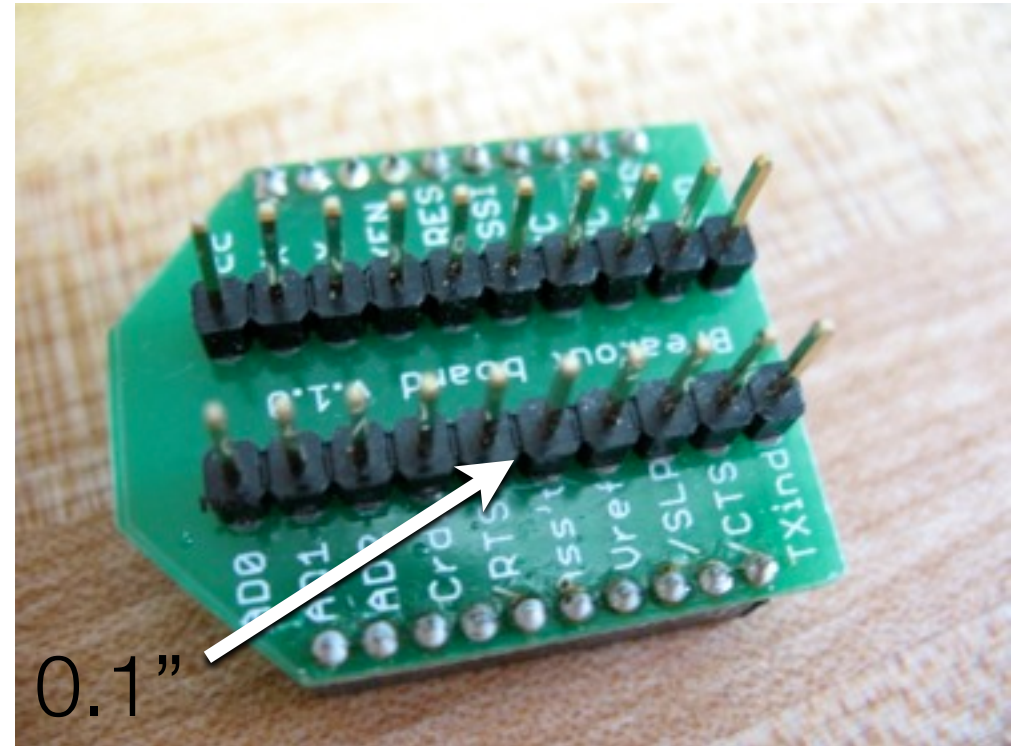
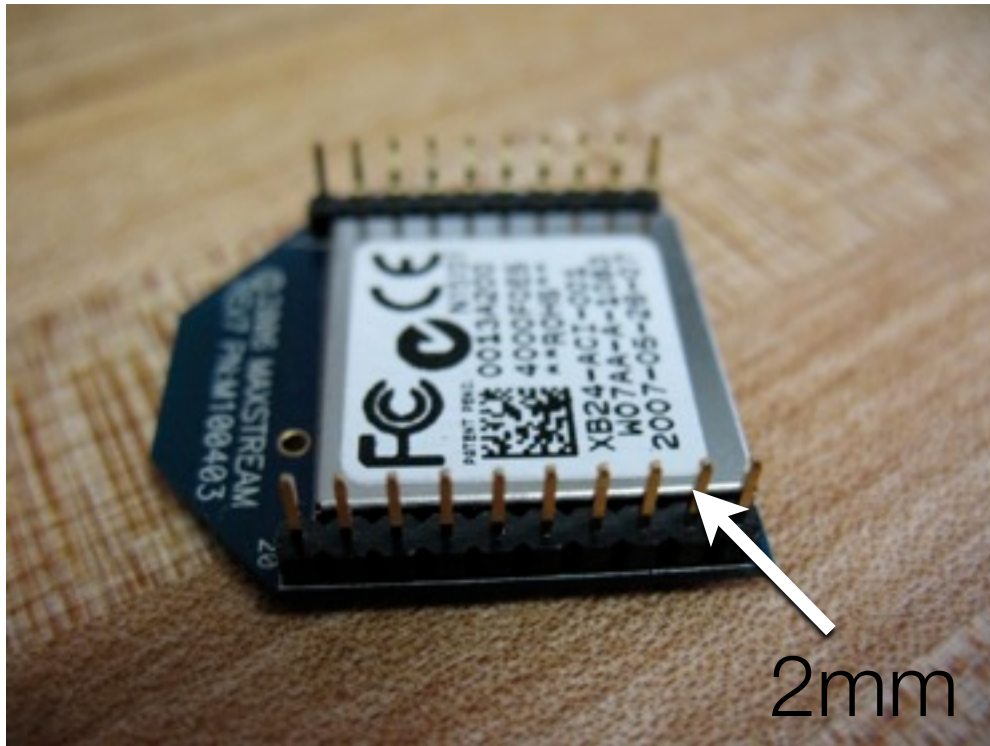
Chip Antenna on Pro



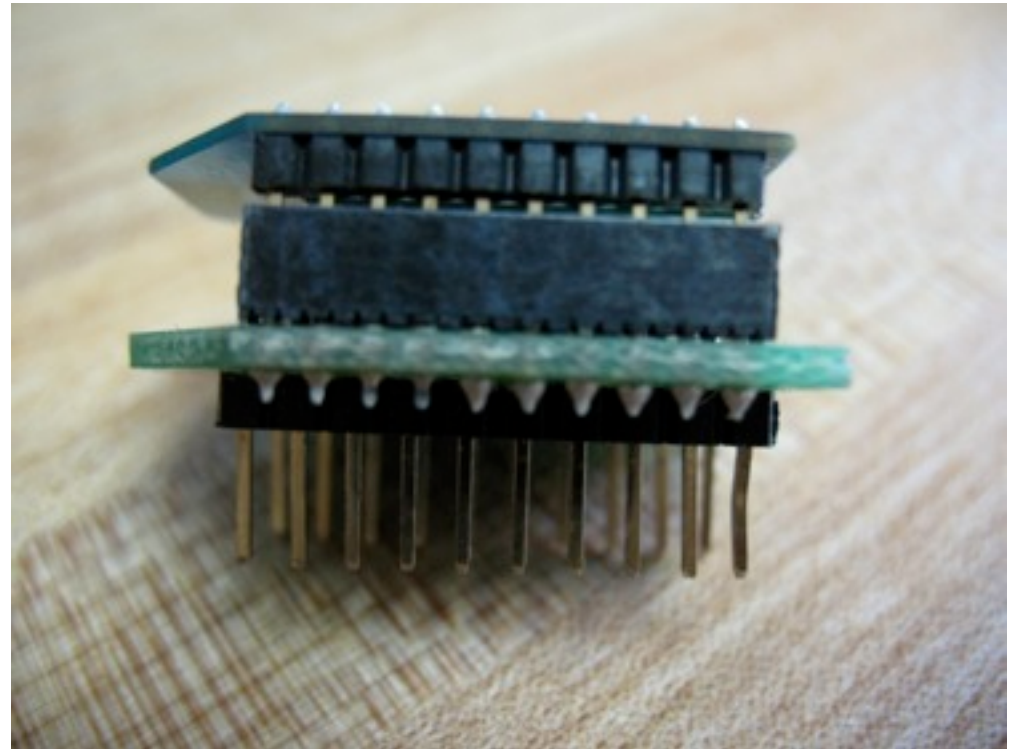
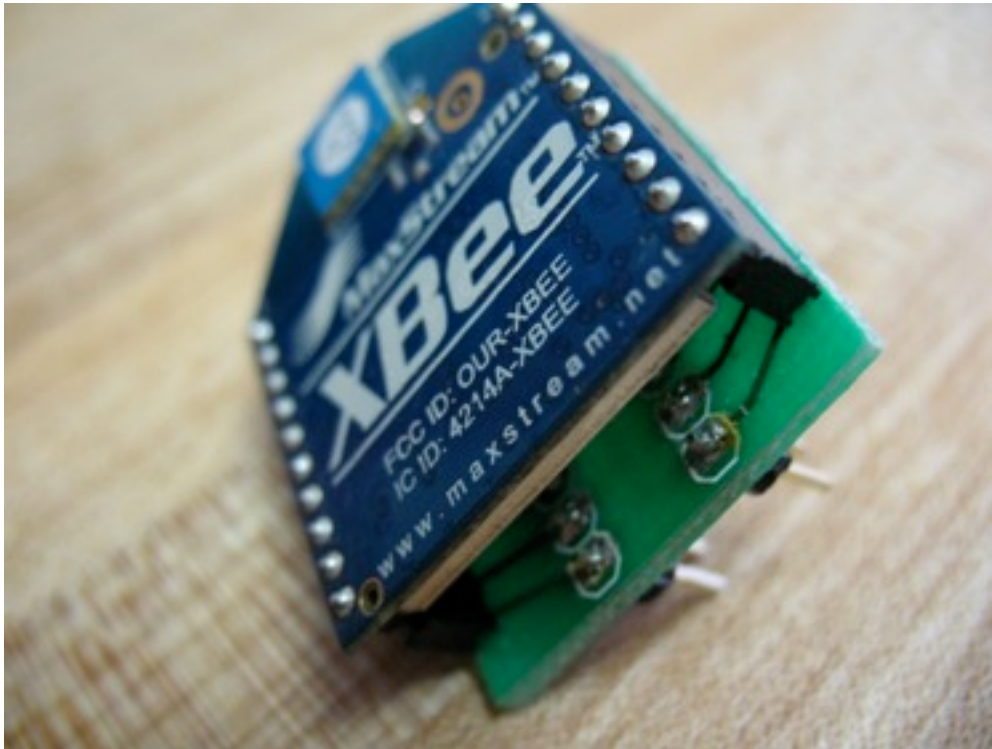
Breakout for Breadboards



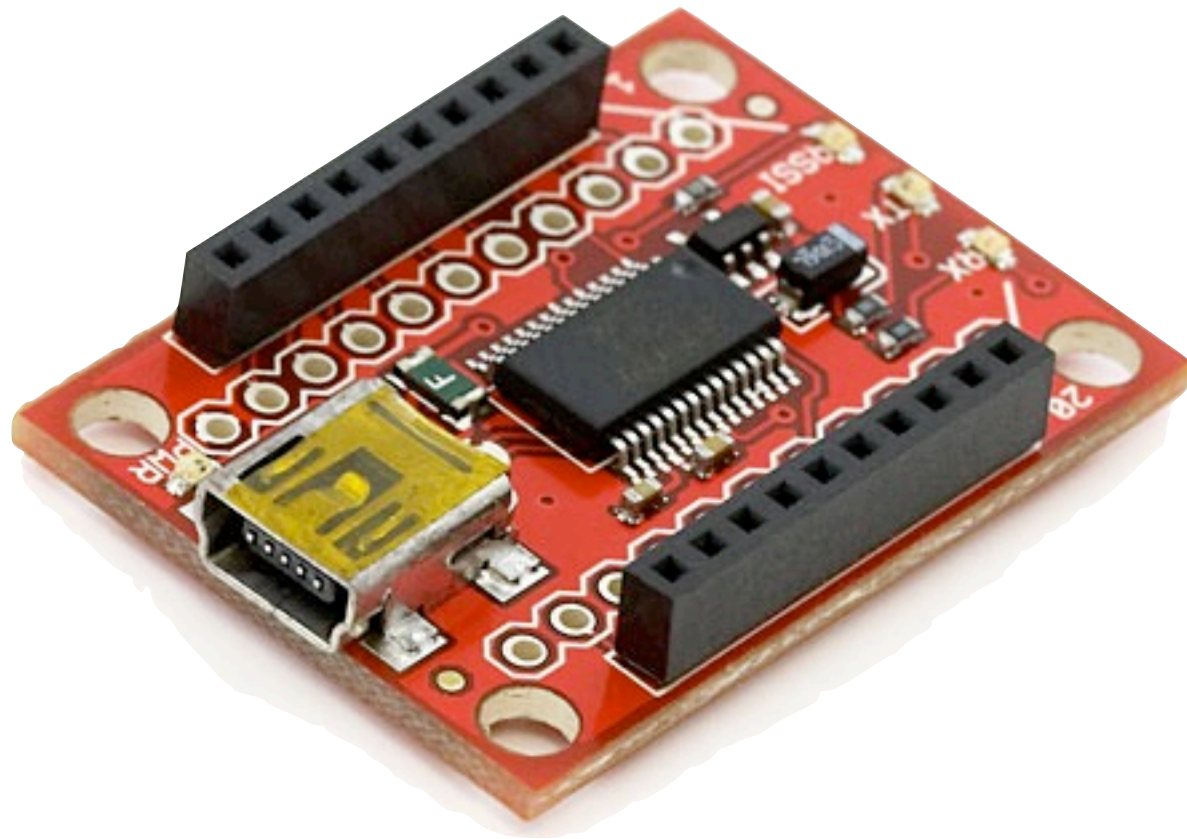
Breakout Boards for breadboarding



Soldering Breakout Boards: finished



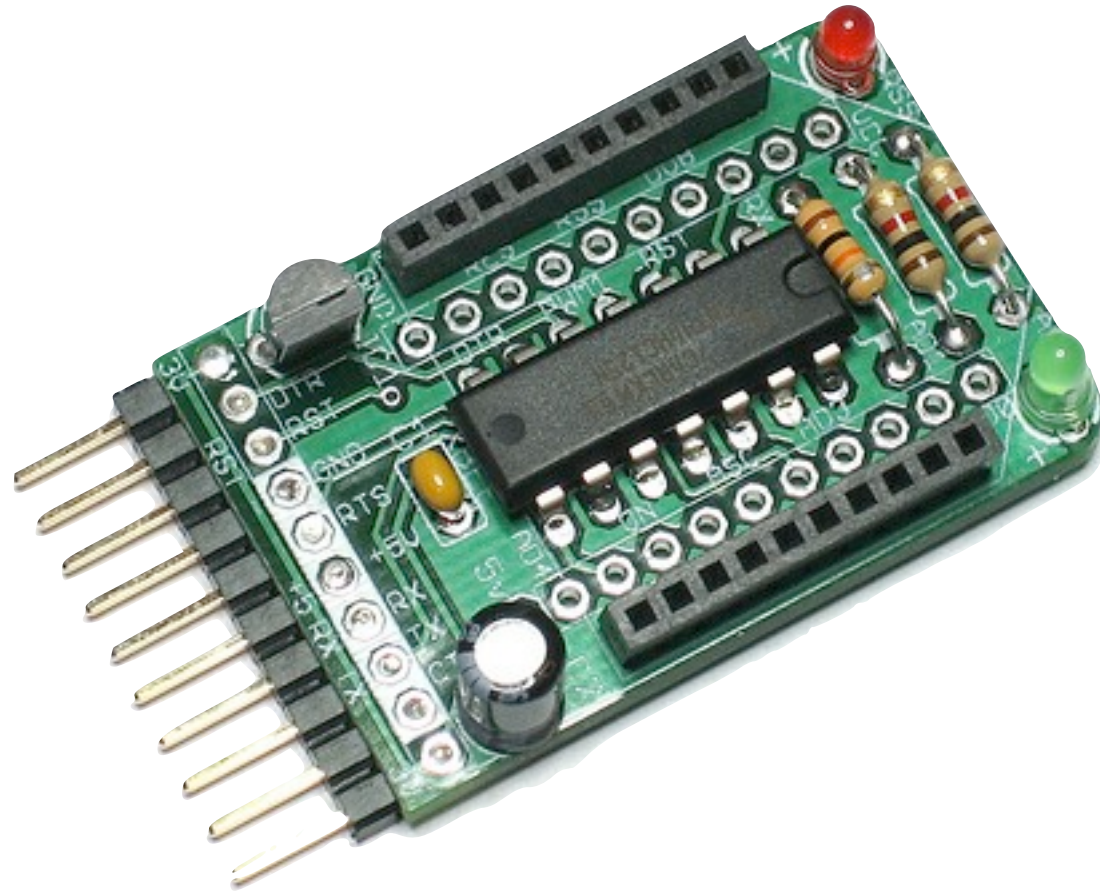
XBee Explorer from Sparkfun



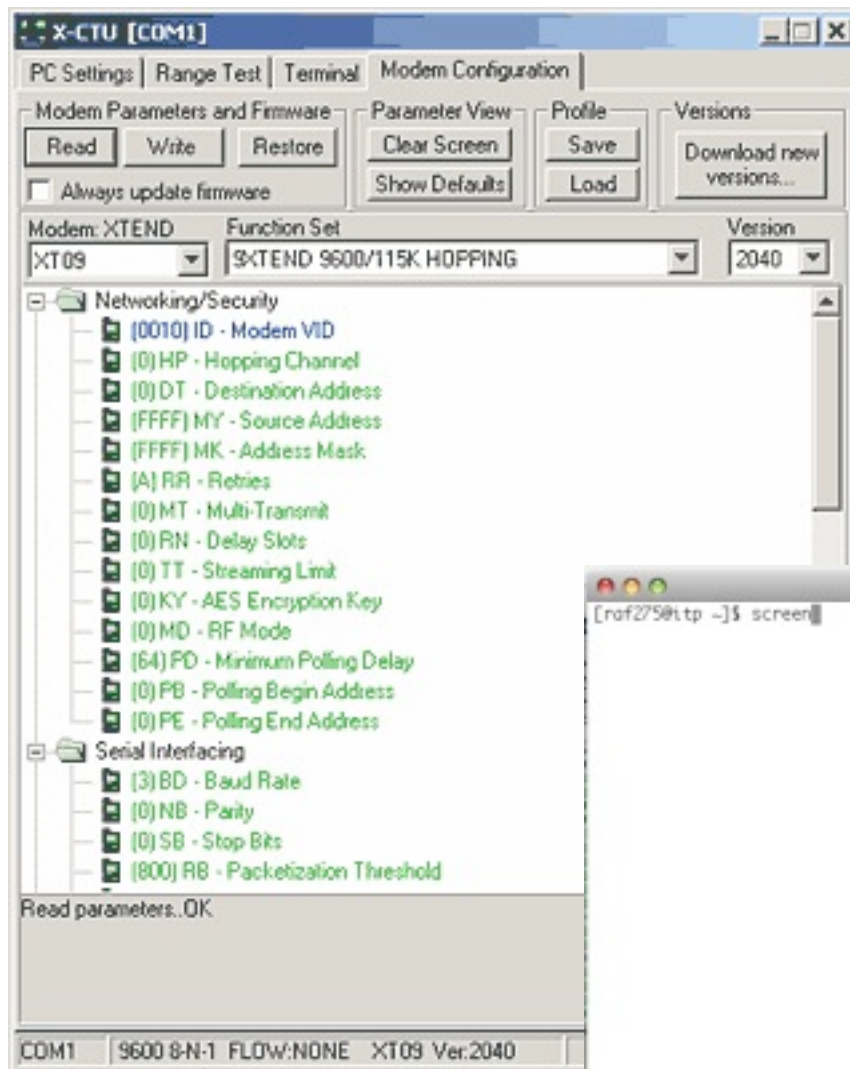
XBee Adapter from xbeeadapters.com



XBee Adapter kit from Adafruit



Serial Terminal Programs



HyperTerminal
by [Hilgraeve](#) Monroe, Michigan USA
For more power and convenience, upgrade to hot new
HyperACCESS, TODAY!

Developed for
Microsoft
by Hilgraeve Inc. [Upgrade Info...](#) Copyright 1999
Hilgraeve Inc.

Serial Terminal Programs

- X-CTU: <http://www.digi.com/support/productdetl.jsp?pid=3352&osvid=57&tp=4&s=316>
- XBee Config Tool: <http://code.google.com/p/funnel/downloads/list>
- Z-Term: <http://homepage.mac.com/dalverson/zterm/>
- HyperTerm: Windows Start Menu, Accessories, Communication
- screen: Terminal program on the Mac (or Linux)
- plenty of others!
- settings: 9600 baud, 8 bits, no parity, one stop bit, no flow control

Imagined Sociable Objects



Readings and Assignments

- Readings

- Weiser, M. The Computer for the 21st Century: <http://www.ubiq.com/hypertext/weiser/SciAmDraft3.html>
- There Will Come Soft Rains – Bradbury: http://faludi.com/classes/sociableobjects/readings/Bradbury_Soft_Rains_1950.pdf

- Assignments

- Imagined Sociable Objects
- Obtain two XBee ZB (series 2) radios and at least one XBee adapter
- Pick a PAN ID now and document it: <http://itp.nyu.edu/physcomp/Notes/XBeePANIDs>