

## Welcome to the Internet SIG



# Extending Wi-Fi



# Discussion Topics

- Wi-Fi Range History
- Tips for Better Wi-Fi Range
- Wi-Fi Range Extension Hardware
  - 1) Router/Network Adapters Upgrade
  - 2) Add a High-Gain Antenna
  - 3) Add a Wireless Repeater
  - 4) Use Access Points
  - 5) Mesh Networks
- Final Thoughts

Protocol	Year Adopted	Indoor Range	Outdoor Range	Maximum Linkrate
802.11	1997	66 feet	330 feet	1 to 2 Mbit/s
802.11a	1999	115 feet	390 feet	6 to 54 Mbit/s
802.11b	1999	115 feet	460 feet	1 to 11 Mbit/s
802.11g	2003	125 feet	460 feet	6 to 54 Mbit/s
802.11n	2008	230 feet	820 feet	72 to 600 Mbit/s
802.11ax	2019	230 feet	820 feet	600 to 9608 Mbit/s

**Although Wi-Fi range has increased, the biggest advances have been in speed.**

# Five Factors That Affect Wi-Fi

- 1) Physical distance
- 2) Obstructions
- 3) Interference
- 4) Router Capacity
- 5) Bandwidth Hoggers

# Router Tips to Boost Signal

- Make sure firmware is updated
- Check your router placement
  - 1) Center of home
  - 2) As high as possible
  - 3) Away from walls
- Vertical antenna placement is usually better
- Change your frequency
- Disable things that don't really need Wi-Fi

# Wi-Fi Extension Hardware



# Wi-Fi History

With some deep research on the Internet

I succeeded in finding the very first

# Range Extender





# Router/Network Adapters

- Replacing a Router or Network Adapter almost always increases Wi-Fi distance
  - 1) They use the latest standards
  - 2) Usually Increases Speed
  - 3) Sometimes Increases Range

# Antenna Upgrades

- Most routers have omni-directional antennas
  - 1) [Upgrading is easy and fairly inexpensive](#)
  - 2) Research and make sure your router supports new antenna
- A few links for DIYers
  - 1) [Google Images](#) – various homemade antennas
  - 2) [CompariTech](#) – one of many internet tutorials

# Wi-Fi Repeaters

- Have a receiver, amplifier and transmitter
- Work by placing at edge of Wi-Fi signal area
- Fairly cheap method of extending range
- Disadvantage is that speed is usually slower
- Usually best to use same brand as router

# Adding Access Points

- Four Methods
  - 1) Hard Wired
  - 2) Power Line
  - 3) Cable Outlets
  - 4) Bridge a Router

# Hard Wired Access Points

Functions nearly identically to an extender or repeater. It provides a wireless connection in a new area.

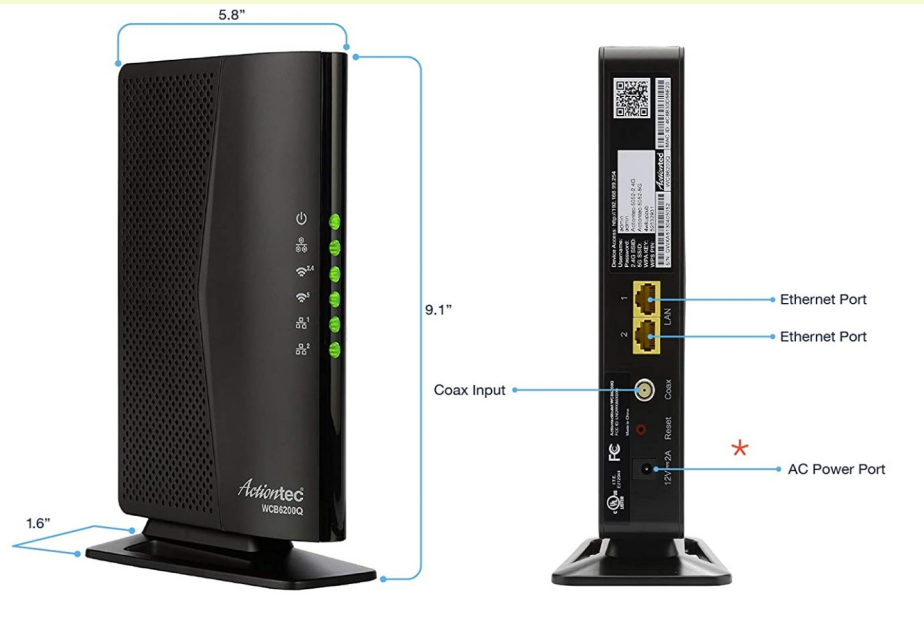
The main difference is that an access point relies on a hardwired connection to your network, as opposed to simply repeating an existing wireless signal.

This results in dramatically improved performance, but is more expensive to install.

# Power Line Access Points

- Uses the copper wiring in your house to transfer signal
- Best for wired connections but newer models have Wi-Fi capability
- Easy to use
- Can be easily re-positioned anywhere

# Cable Outlets



## Compatible

- ✓ Windows 10 and 8.1
- ✓ iOS
- ✓ Windows

- ✓ Mac OS
- ✓ Android devices

\*MoCa ECB6250, ECB7250 sold separately

- Similar to Power Line
- Signal over COAX
- Fast and Reliable
- Same technology as used by many cable, telco/IPTV and satellite operators.



# Bridging A Router

In Wi-Fi networking, bridge mode allows two or more wireless access points to communicate and join their respective local networks.

Repeater mode is a variation on bridging in Wi-Fi networking. Repeater mode extends the wireless signal of one network to longer distances for greater reach.

# How To Bridge A Router

- Varies by brand and Router Type. Search for specifics when setting up. General Setup Steps:
  - 1) Make a note of the WiFi settings of the second router
  - 2) You need to know the SSID, WiFi security mode, wireless password, and operating frequency (either 2.4 GHz or 5 GHz).
  - 3) Go to Wireless Bridge Settings in main router
  - 4) Enable Bridge Mode
  - 5) Select Setup Bridge Mode Wireless Settings
  - 6) Enter the settings you noted on the second router
  - 7) Apply settings and reboot the router

# Mesh Networking

- Theoretically Unlimited Range
- Used by Wi-Fi connected cities, colleges, etc.
- Similar to Extenders, but uses “nodes”
- Nodes communicate among each other to build up a picture of the entire network
- Each “node” is actually a router
- Company products are not interchangeable
- Mesh Networks are usually expensive

# Final Thoughts

- Most modern routers have adequate range
- If you need more range there are lots of options
- Like most things, you get what you pay for

Next Week:

Dark Patterns

Tricks Websites Use

THANKS FOR LISTENING 😊

# What's The Next SIG Topic



Have you got a topic idea? Want to learn about something special?  
Tell me anytime you see me or contact me online.

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