

## Appendix A: Resources

We recommend these resources for learning more about the various aspects of wireless networking. For more links and resources, see our website at <http://wndw.net/>.

### Antennas and antenna design

- Cushcraft technical papers on antenna design and radio propagation, <http://www.cushcraft.com/comm/support/technical-papers.htm>
- Free antenna designs, <http://www.freeantennas.com/>
- Hyperlink Tech, <http://hyperlinktech.com/>
- Pasadena Networks LLC, <http://www.wlanparts.com/>
- SuperPass, <http://www.superpass.com/>
- Unofficial NEC-2 code archives, <http://www.si-list.org/swindex2.html>
- Unofficial NEC-2 radio modeling tool home page, <http://www.nittany-scientific.com/nec/>
- USB WiFi dish designs, <http://www.usbwifi.orcon.net.nz/>

### Network troubleshooting tools

- Cacti network monitoring package, <http://www.cacti.net/>
- DSL Reports bandwidth speed tests, <http://www.dslreports.com/stest>
- Ethereal network protocol analyzer, <http://www.ethereal.com/>
- Iperf network performance testing tool, <http://dast.nlanr.net/Projects/iperf/>
- Iptraf network diagnostic tool, <http://iptraf.seul.org/>
- MRTG network monitoring and graphing tool, <http://people.ee.ethz.ch/~oetiker/webtools/mrtg/>
- My TraceRoute network diagnostic tool, <http://www.bitwizard.nl/mtr/>
- Nagios network monitoring and event notification tool, <http://www.nagios.org/>
- Ntop network monitoring tool, <http://www.ntop.org/>

- RRDtool round robin database graphing utility, <http://people.ee.ethz.ch/~oetiker/webtools/rrdtool/>
- SmokePing network latency and packet loss monitor, <http://people.ee.ethz.ch/~oetiker/webtools/smokeping/>
- SoftPerfect network analysis tools, <http://www.softperfect.com/>
- Squid transparent http proxy HOWTO, <http://en.tldp.org/HOWTO/mini/TransparentProxy-2.html>
- ttcp network performance testing tool, <http://ftp.arl.mil/ftp/pub/ttcp/>

## Security

- AntiProxy http proxy circumvention tools and information, <http://www.antiproxy.com/>
- Anti-spyware tools, <http://www.spychecker.com/>
- Driftnet network monitoring utility, <http://www.ex-parrot.com/~chris/driftnet/>
- Etherpeg network monitoring utility, <http://www.etherpeg.org/>
- Introduction to OpenVPN, <http://www.linuxjournal.com/article/7949>
- Lavasoft Ad-Aware spyware removal tool, <http://www.lavasoft.de/>
- OpenSSH secure shell and tunneling tool, <http://openssh.org/>
- OpenVPN encrypted tunnel setup guide, <http://openvpn.net/howto.html>
- Privoxy filtering web proxy, <http://www.privoxy.org/>
- PuTTY SSH client for Windows, <http://www.putty.nl/>
- Sawmill log analyzer, <http://www.sawmill.net/>
- Security of the WEP algorithm, <http://www.isaac.cs.berkeley.edu/isaac/wep-faq.html>
- Spyware prevention for Windows XP (German), <http://www.xp-antispy.de/>
- Stunnel Universal SSL Wrapper, <http://www.stunnel.org/>
- TOR onion router, <http://tor.eff.org/>
- Weaknesses in the Key Scheduling Algorithm of RC4, [http://www.crypto.com/papers/others/rc4\\_ksaproc.ps](http://www.crypto.com/papers/others/rc4_ksaproc.ps)
- Windows SCP client, <http://winscp.net/>
- Your 802.11 Wireless Network has No Clothes, <http://www.cs.umd.edu/~waa/wireless.pdf>
- ZoneAlarm personal firewall for Windows, <http://www.zonelabs.com/>

## Bandwidth optimization

- Cache heirarchies with Squid, <http://squid-docs.sourceforge.net/latest/html/c2075.html>
- dnsmasq caching DNS and DHCP server, <http://thekelleys.org.uk/dnsmasq/doc.html>
- Enhancing International World Wide Web Access in Mozambique Through the Use of Mirroring and Caching Proxies, <http://www.isoc.org/inet97/ans97/cloet.htm>
- Fluff file distribution utility, <http://www.bristol.ac.uk/fluff/>
- Microsoft Internet Security and Acceleration Server, <http://www.microsoft.com/isaserver/>
- Microsoft ISA Server Firewall and Cache resource site, <http://www.isaserver.org/>
- Pittsburgh Supercomputing Center's guide to Enabling High Performance Data Transfers, [http://www.psc.edu/networking/perf\\_tune.html](http://www.psc.edu/networking/perf_tune.html)
- RFC 3135: Performance Enhancing Proxies Intended to Mitigate Link-Related Degradations, <http://www.ietf.org/rfc/rfc3135>
- Squid web proxy cache, <http://squid-cache.org/>

## Mesh networking

- Champaign-Urbana Community Wireless Network software, <http://cuwireless.net/download>
- Freifunk OLSR mesh firmware for the Linksys WRT54G, <http://www.freifunk.net/wiki/FreifunkFirmware>
- MIT Roofnet Project, <http://pdos.csail.mit.edu/roofnet/doku.php>
- OLSR mesh networking daemon, <http://www.olsr.org/>
- Real-time OLSR topology viewer, <http://meshcube.org/nylon/utls/olsr-topology-view.pl>

## Wireless operating systems and drivers

- HostAP wireless driver for the Prism 2.5 chipset, <http://hostap.epitest.fi/>
- m0n0wall wireless router OS, <http://m0n0.ch/wall/>
- MadWiFi wireless driver for the Atheros chipset, <http://madwifi.org/>
- Metrix Pebble wireless router OS, <http://metrix.net/metrix/howto/metrix-pebble.html>

- OpenWRT wireless router OS for Linksys access points, <http://openwrt.org/>
- Pebble Linux, <http://nycwireless.net/pebble/>

## Wireless tools

- Chillispot captive portal, <http://www.chillispot.org/>
- Interactive Wireless Network Design Analysis Utilities, <http://www.qsl.net/n9zia/wireless/page09.html>
- KisMAC wireless monitor for Mac OS X, <http://kismac.binaervarianz.de/>
- Kismet wireless network monitoring tool, <http://www.kismetwireless.net/>
- MacStumbler wireless network detection tool for Mac OS X, <http://www.macstumbler.com/>
- NetStumbler wireless network detection tool for Windows and Pocket PC, <http://www.netstumbler.com/>
- NoCatSplash captive portal, <http://nocat.net/download/NoCatSplash/>
- PHPMyPrePaid prepaid ticketing system, <http://sourceforge.net/projects/phpmyprepaid/>
- RadioMobile radio performance modeling tool, <http://www.cplus.org/rmw/>
- Terabeam wireless link calculation tools, <http://www.terabeam.com/support/calculations/index.php>
- Wellenreiter wireless network detection tool for Linux, <http://www.wellenreiter.net/>
- WiFiDog captive portal, <http://www.wifidog.org/>
- Wireless Network Link Analysis tool by GBPRR, <http://my.athenet.net/~multiplx/cgi-bin/wireless.main.cgi>

## General wireless related information

- DefCon long distance WiFi shootout, <http://www.wifi-shootout.com/>
- Homebrew wireless hardware designs, <http://www.w1ghz.org/>
- Linksys wireless access point information, <http://linksysinfo.org/>
- Linksys WRT54G resource guide, <http://seattlewireless.net/index.cgi/LinksysWrt54g>
- NoCat community wireless group, <http://nocat.net/>
- POE guide by NYCWireless, <http://nycwireless.net/poe/>
- Ronja optical data link hardware, <http://ronja.twibright.com/>

- SeattleWireless community wireless group, <http://seattlewireless.net/>
- SeattleWireless Hardware comparison page, <http://www.seattlewireless.net/HardwareComparison>
- Stephen Foskett's Power Over Ethernet (PoE) Calculator, <http://www.gweep.net/~sfoskett/tech/poecalc.html>

## Networking hardware vendors

- Alvarion wireless networking equipment, <http://www.alvarion.com/>
- Cisco wireless networking equipment, <http://www.cisco.com/>
- Metrix outdoor wireless networking kits, <http://metrix.net/>
- Mikrotik wireless network equipment, <http://www.mikrotik.com/routers.php#linx1part0>
- PowerNOC outdoor wireless networking equipment, [http://powernoc.us/outdoor\\_bridge.html](http://powernoc.us/outdoor_bridge.html)
- RAD Data Communications networking hardware, <http://www.rad.com/>
- Redline Communications WiMax wireless networking equipment, <http://www.redlinecommunications.com/>
- Trango wireless networking hardware, <http://www.trangobroadband.com/>
- WaveRider wireless hardware, <http://www.waverider.com/>

## Networking services

- Access Kenya ISP, <http://www.accesskenya.com/>
- Broadband Access Ltd. wireless broadband carrier, <http://www.blue.co.ke/>
- Virtual IT outsourcing, <http://www.virtualit.biz/>
- wire.less.dk consultancy and services, <http://wire.less.dk/>

## Training and education

- Association for Progressive Communications wireless connectivity projects, <http://www.apc.org/wireless/>
- International Network for the Availability of Scientific Publications, <http://www.inasp.info/>
- Makerere University, Uganda, <http://www.makerere.ac.ug/>
- Radio Communications Unit of the Abdus Salam International Center for Theoretical Physics, <http://wireless.ictp.trieste.it/>
- World Summits on Free Information Infrastructures, <http://www.wsfii.org/>

## Miscellaneous links

- Cygwin Linux-like environment for Windows, <http://www.cygwin.com/>
- Graphviz graph visualization tool, <http://www.graphviz.org/>
- ICTP bandwidth simulator, <http://wireless.ictp.trieste.it/simulator/>
- ImageMagick image manipulation tools and libraries, <http://www.imagemagick.org/>
- NodeDB war driving map database, <http://www.nodedb.com/>
- Open Relay DataBase, <http://www.ordb.org/>
- Partition Image disk utility for Linux, <http://www.partimage.org/>
- RFC 1918: Address Allocation for Private Internets, <http://www.ietf.org/rfc/rfc1918>
- Spectropolis NYC art project, <http://www.spectropolis.info/>
- Ubuntu Linux, <http://www.ubuntu.com/>
- wget web utility for Windows, <http://xoomer.virgilio.it/hherold/>
- WiFiMaps war driving map database, <http://www.wifimaps.com/>

## Books

- *802.11 Networks: The Definitive Guide, 2nd Edition*. Matthew Gast, O'Reilly Media. ISBN #0-596-10052-3
- *802.11 Wireless Network Site Surveying and Installation*. Bruce Alexander, Cisco Press. ISBN #1-587-05164-8
- *The ARRL Antenna Book, 20th Edition*. R. Dean Straw (Editor), American Radio Relay League. ISBN #0-87259-904-3
- *The ARRL UHF/Microwave Experimenter's Manual*. American Radio Relay League. ISBN #0-87259-312-6
- *Building Wireless Community Networks, 2nd Edition*. Rob Flickenger, O'Reilly Media. ISBN #0-596-00502-4
- *Deploying License-Free Wireless Wide-Area Networks*. Jack Unger, Cisco Press. ISBN #1-587-05069-2
- *TCP/IP Illustrated, Volume 1*. W. Richard Stevens, Addison-Wesley. ISBN #0-201-63346-9
- *Wireless Hacks, 2nd Edition*. Rob Flickenger and Roger Weeks, O'Reilly Media. ISBN #0-596-10144-9

## Appendix B: Channel Allocations

The following tables list the channel numbers and center frequencies used for 802.11a and 802.11b/g. Note that while all of these frequencies are in the unlicensed ISM and U-NII bands, not all channels are available in all countries. Many regions impose restrictions on output power and indoor / outdoor use on some channels. These regulations are rapidly changing, so always check your local regulations before transmitting.

Note that these tables show the center frequency for each channel. Channels are 22MHz wide in 802.11b/g, and 20MHz wide in 802.11a.

802.11b / g			
Channel #	Center Frequency (GHz)	Channel #	Center Frequency (GHz)
1	2.412	8	2.447
2	2.417	9	2.452
3	2.422	10	2.457
4	2.427	11	2.462
5	2.432	12	2.467
6	2.437	13	2.472
7	2.442	14	2.484

802.11a	
Channel Number	Center Frequency (GHz)
34	5.170
36	5.180
38	5.190
40	5.200
42	5.210
44	5.220
46	5.230
48	5.240
52	5.260
56	5.280
60	5.300
64	5.320
149	5.745
153	5.765
157	5.785
161	5.805