

# III. Appendix



## Appendix A.

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# Glossary

*ADSL*—Asynchronous Digital Subscriber Line; a new type of service run over regular voice-grade telephone lines; requires special end-user equipment, but provides from 400Kbps-1Mbps transfer speeds. Not yet available in most areas.

*airwaves*—radio waves used to transmit radio and television broadcasts across free space; also used to describe the connection medium between two wireless bridges.

*ASCII*—American Standard Code for Information Interchange; a code for microcomputers that assigns a numeric code from 0 to 255 to each of the letters of the English alphabet, numerals, punctuation marks, and many other language characters.

*bandwidth*—commonly used to indicate how much, or how fast, data can be transmitted across a telecommunications line or network connection in a period of time, usually one second; used synonymously with data transfer rate, throughput, and line speed.

*binary*—the base-2 number system, representing all numeric values with just two digits, 0 and 1.

*bit*—acronym for *binary digit*; represents a binary value of zero or one; the smallest unit of storage on a computer; represented by the lowercase letter b.

*bps, bits-per-second*—a common unit of measure for data transfer rates.

*byte*—a unit of eight bits commonly used to encode textual data; now used to measure the storage requirements of various data objects; represented by the uppercase letter B.

*Cat5, or Category 5, cable*—the recommended level of unshielded twisted pair cable used in most new local area network installations.

*channels*—a specific band of the radio frequency spectrum used for radio transmissions.

*communications medium*—the electronic component used to connect two network devices to facilitate network data transmission; usually refers to some type of data cabling (coaxial, thinnet, or twisted pair) or telecommunications line; in RF wireless networking, refers to radio energy.

*community network*—in this manual refers to the equipment and telecommunications services making up a community-wide computer network or WAN; technically referred to as a municipal area network. In many other contexts, it is used to describe a computer service through which information about a community is collected and disseminated.

*crosstalk*—a type of interference in a cabled medium caused by emanations from a nearby cable.

*data*—any type of information transmitted across a computer network from one machine to another; includes such items as word processing files, database records (like patron records, student grades, or customer billing records), card catalog information, pictures, sounds, or even just keystrokes.

*data circuit*—a leased telecommunications line; also called a dedicated data circuit.

*data transfer rate, or data rate*—the number of bits that can be transferred across a network connection in one second; commonly used as a synonym for throughput or bandwidth; technically, it is always greater than throughput because extra bits are included in each data packet for routing purposes.

*driver*—software included as part of a hardware kit, providing functions which allow an operating system to control the hardware device.

*Ethernet*—a standard computer networking communication format. It is the most common network format in use today. Token Ring is another that is still in wide use in businesses.

*fiber optics*—technology that uses the transmission of light along glass tubes (fibers) for data communications.

*G, giga*—an abbreviation for the value one billion; since computers use the binary number system instead of decimal, the actual value represented is 1,073,741,824.

*gain*—a measure of the amount of focus an antenna uses transmitting/receiving a radio signal.

*hardware*—the physical components of a computer or network.

*hertz*—a unit of measure of electromagnetic frequency named after Heinrich Hertz; one hertz corresponds to one cycle per second (or one wave per second).

*interference*—extraneous natural or man-made radio emissions that overpower or cancel a portion of a radio signal.

*interlocal agreement*—a legal document describing an agreement between two or more local governmental agencies to work as one agency on a project. The agreement generally lists the rights and responsibilities of each participant.

*Internet backbone*—the top-level, or primary, routers and telecommunications circuits interconnecting all of the major computer networks that make up the Internet.

*Internet Service Provider (ISP)*—a commercial or public agency providing interconnections to the Internet, either via network or dial-up services; services rendered vary greatly between public and commercial providers.

*ISDN line*—(Integrated Services Digital Line); a special phone line, carrying only digital (discrete) signals. ISDN lines are switchable and can be used as regular phone lines; they are primarily used to carry data traffic. Two types are available: BRI (basic rate interface) and PRI (primary rate interface), which is equivalent to 23 BRI lines.

*ISM bands*—three non-licensed radio frequency bands, originally intended for the Industrial, Scientific, and Medical communities; these are typically used for radio frequency wireless networks.

*K, kilo*—an abbreviation for the value one thousand; since computers use the binary number system instead of decimal, the actual value represented is 1,024.

*LAN*—local area network; a group of computers connected over a communications medium for the purpose of sharing access to centralized resources (files, printers, CD-ROM products).

*latency*—the very short delays created in the packaging, transmission, and acknowledgement of network data requests.

*licensing*—the process of regulating the use of radio and microwave frequencies by assigning rights to use specific frequency bands in a geographic area; the U.S. Federal Communications Commission (FCC) is the administrative agency responsible for licensing these frequencies.

*line of sight, also radio line of sight*—the visible, unobstructed path required to enable radio communications between two distinct access points.

*M, mega*—an abbreviation for the value one million; since computers use the binary number system instead of decimal, the actual value represented is 1,048,576.

*MAN*—municipal area network; a network of two or more interconnected local area networks, generally located inside a single community.

*medium*—see *communications medium*.

*multi-point*—a network connection that allows one centralized site to connect to multiple remote sites simultaneously.

*narrowband transmissions*—radio frequency transmissions that use a very thin slice of frequencies; the narrow bands are sometimes referred to as *channels*.

*network operating system*—software which provides control of the network functions of a computer and the local area network (LAN).

*network protocol*—a set of rules used for the process of packaging, starting, interrupting, and continuing network data communications.

*network security*—the implementation of procedures designed to limit access to resources to a predetermined set of staff and/or public computer users and prevent the tampering, unauthorized use, or destruction of computer data.

*point-to-point*—a network connection that is tied directly to two locations.

*POTS*—Plain Old Telephone Service; a regular voice-grade telephone line.

*protocol*—see *network protocol*.

*radio energy*—electromagnetic radiation in the radio frequency spectrum.

*radio frequency spectrum*—the portion of the electromagnetic spectrum from approximately 30kHz to 1GHz.

*radio frequency communications*—the use of radio energy to carry voice and data signals between two or more access points.

*redundancy*—the characteristic of having independent, alternative routes available for data communications in the event of failure of a primary connection.

*repeater link* or *repeater station*—a third site in a wireless network connection which has line of sight to the two primary access points; the repeater link uses a pair of wireless bridges and antennas to repeat signals to each of the remote sites.

*right-of-way fees*—fees incurred by crossing public or private land in the process of burying cable or pipeline or installing cable on utility poles. These usually take the form of monthly or annual payments to the rights holder.

*site survey*—the preliminary investigation of the sites involved in a wireless network installation; explores line of sight issues, sources of potential interference, transmission distances, and physical structures.

*security*—see *network security*.

*software*—a set of binary instructions that allows a user to control a computer or network device.

*spectrum analysis*—the process of analyzing a portion of the radio spectrum to determine if another agency may be using it for communications.

*spectrum analyzer*—a device that searches a band of radio frequencies for the presence of radio signals.

*T-1 Lines*—a special type of telephone line called a data circuit. They connect two distinct points to allow intercommunication. They are not “dialable,” or switchable. They can carry both voice and data signals.

*telecommunications*—the process of communicating over telephone wires, either by voice conversation or computer networking; also used to describe equipment used in the communication process, such as telephones or network devices.

*telecommunications line*—a “telephone” line leased from the local phone company; also known as a dedicated data circuit.

*throughput*—commonly used as a synonym to data transfer rate or bandwidth. In wireless applications it refers to the actual quantity of data that can be transmitted over a wireless link.

*transponder*—the portion of a satellite which transmits and receives radio signals in a prescribed frequency range, from ground stations or other satellites (transmitter/responder).

*under-utilized line*—a telecommunications line in which much of the potential throughput is unused.

*WAN*—wide area network; a network of two or more interconnected local area networks (LANs), generally located in two or more communities.

*wideband transmissions*—radio frequency transmissions that use a very large range of frequencies; see also *narrowband transmissions*.

*wireless bridge*—a combination device that includes a network bridge and a radio transceiver; the bridge connects a local area network (LAN) to the radio link.

*wireless Ethernet*—wireless network connections that provide a throughput of 5-7Mbps, which is similar to the data throughput of standard, wired Ethernet networks.

*wireline connection*—a network connection using traditional cabled media such as network cable and telecommunications lines; also called *cabled connectivity*.



## Appendix B.

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# RF Wireless Equipment Manufacturers

### Aironet Wireless Communications, Inc.

Web site: <http://www.aironet.com/>  
Sales e-mail: [Sales@aironet.com](mailto:Sales@aironet.com)

3875 Embassy Parkway  
P.O. Box 5292  
Akron, OH 44334-0292

Phone: 800-247-6638  
330-664-7900  
Fax: 330-664-7922  
Sales Fax: 330-664-7990

### BreezeCOM Inc.

Web site: <http://www.breezecom.com/>  
Sales e-mail: [sales@breezecom.com](mailto:sales@breezecom.com)

USA & Canada:

2195 Faraday Avenue, Suite A  
Carlsbad, CA 92008

Phone: 760-431-9880  
Fax: 760-431-8177

### C-SPEC Corporation

Web site: <http://www.c-spec.com/>  
Sales e-mail: [kelly@overlan.com](mailto:kelly@overlan.com)  
(Kelley Spitzer)

20 Marco Lane  
Dayton, OH 45458

Phone: 800-462-7732  
937-439-2882  
Kelley Spitzer, x212  
Fax: 937-439-2358

Cylink Corporation

Web site: <http://www.cylink.com/>  
Sales e-mail: [Info@cylink.com](mailto:Info@cylink.com)

Phone: 800-533-3958

Mailing Address:  
P.O. Box 3759  
Sunnyvale, CA 94088-3759

Street Address:  
910 Hermosa Court  
Sunnyvale, CA 94086

Glenayre Electronics, Inc.

Web site: <http://www.glenayre.com/>  
5935 Carnegie Boulevard  
Charlotte, NC 28209

Phone: 704-553-0038  
Fax: 704-552-1091

Glenayre Western Multiplex Division

Web site: <http://www.wirelessinterconnect.com/>

SOUTH CENTRAL REGION  
Sales  
Glen Teason  
E-mail:  
[gteason@mux.glenayre.com](mailto:gteason@mux.glenayre.com)  
Phone: 972-238-7969

RadioConnect Corporation

Web site: <http://www.radioconnect.com/>  
Sales e-mail: [sales@radioconnect.com](mailto:sales@radioconnect.com)

Phone: 310-338-3388  
Fax: 310-338-3399

6041 Bristol Parkway  
Culver City, CA 90230

Solectek Corporation

Web site: <http://www.solectek.com/>  
Sales e-mail: [sales@solectek.com](mailto:sales@solectek.com)

Phone: 619-450-1220

6370 Nancy Ridge Drive  
Suite 109  
San Diego, CA 92121-3212

Central US & Canada Sales  
Phone: 800-437-1518  
ext. 3035

Wave Wireless Networking

Web site: <http://www.the-wave-wireless.com/>  
Sales e-mail: [caroline@speedlan.com](mailto:caroline@speedlan.com)  
(Caroline King)

Phone: 800-721-9283  
941-358-9283  
Fax: 941-355-0219

1748 Independence Blvd.  
Bldg. C-5  
Sarasota, FL 34234

Wi-LAN, Inc.

Web site: <http://www.wi-lan.com/>  
  
801 Manning Road NE  
Suite 300  
Calgary, Alberta  
T2E 8J5  
CANADA

Phone: 800-258-6876  
403-273-9133  
Fax: 403-273-5100



## Appendix C.

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# Other Resources

BDM Federal, Inc. "Electromagnetic Spectrum." *NASA Observatorium Education*. 1998. Available: <http://observe.ivv.nasa.gov/nasa/education/reference/emspec/emspectrum.html> (February 15, 1999).

Beaumont, Chris. "secret communications system: the fascinating story of the lamarr/antheil spread-spectrum patent." *webweavers community webdesign*. Available: <http://www.ncafe.com/chris/pat2/index.html> (February 15, 1999).

Brasseur, Eric. "How does a long distance receiver work?" *RF Globalnet*. Available: <http://www.rfglobalnet.com/library/tutorials/articles/receiver.htm> (February 15, 1999).

Brodsky, Ira. *Wireless Computing: A Manager's Guide to Wireless Networking*. Van Nostrand Reinhold, 1997. ISBN 0-442-01912-2.

Conover, Joel. "Bridging the Miles with 10-Mbps Spread Spectrum Wireless Networking." *Network Computing*. November 1997. Available: Network Computing Online: <http://www.networkcomputing.com/820/820r3.html> (February 15, 1999).

Garfinkel, Simson L. "Communicating without a Net," *WebServer Online Magazine*. 1998. Available: <http://webserver.cpg.com/features/cover/3.1/> (February 15, 1999).

Geier, James T. *Wireless Networking Handbook*. New Riders Publishing, 1996. ISBN 1-562-05631-X.

While written for the business market, this work provides a good intermediate user's look at wireless networking. It provides basic information about all of the wireless networking applications (LAN, WAN, and mobile). The author also presents a good introduction to project management as well.

Goralski, Walter. *Wireless Communications: A Management Guide to Implementation*. Computer Technology Research Corp., 1996. ISBN 1-56607-964-0.

Hughes, David. "Wireless Field Test for Education Project." *Old Colorado City Communications*. Available: <http://wireless.oldcolo.com/> (February 15, 1999).

This web site is a good demonstration of wireless networking. The school project, as well as Old Colorado City Communications itself, is online via a wireless connection. All web service is provided over that link. The web site is part of a report from a National Science Foundation grant project. Besides the information on the web site itself, it is a good jumping off spot to other wireless resources on the web.

"Idaho School District's Wireless WAN Opens Intranet, Internet Potential." *THE Online*. November 1997. Available: <http://www.thejournal.com/magazine/97/nov/telecom.html> (February 15, 1999).

Jain, Raj. "Wireless Data Networking." *CIS 788*. The Ohio State University. Available: [http://www.cis.ohio-state.edu/~jain/cis788-97/h\\_cwir.htm](http://www.cis.ohio-state.edu/~jain/cis788-97/h_cwir.htm) (February 15, 1999).

Katsiavriades, Kryss. "The Electromagnetic Spectrum." 1997. Available: <http://www.ultisoft.demon.co.uk/spectrum.html> (February 15, 1999).

Kmetz, Joel. "Radio Line of Sight: How Hard Can It Be?" *Tech Center*. Solectek Corporation. Available: <http://www.solectek.com/tech-center/tt-howhard.html> (February 15, 1999).

Linx Technologies. "RF 101: Information for the RF Challenged." Library. *RF Globalnet*. 1999. Available: <http://www.rfglobalnet.com/library/tutorials/articles.htm> (February 15, 1999).

McKinney, Michael. "LAN to LAN Spread Spectrum Radio Link Performance and Implementation." Wave Wireless Networking, Inc. Available: <http://www.the-wave-wireless.com/wiretut.html> (February 15, 1999).

Molta, Dave. "The Bridges of Wireless County" *Network Computing*. October 15, 1995. Available: *Network Computing Online*: <http://www.nwc.com/613/613f2.html> (February 15, 1999).

Muller, Nathan J. *Wireless Data Networking*. (Mobile Communications Series.) Artech House, Inc., 1995. ISBN 0-890-06753-8. (Chapter 1, "The World of Wireless," is available online at <http://www.ddx.com/wless1.html>.)

*RF Globalnet Library*. Microwave Online Service Co. 1998. Available:  
<http://www.rfglobalnet.com/library/home.htm> (February 15, 1999).

Presents a library of articles related to the wireless industry. Of special interest are the "RF & Wireless Tutorials."

Roberts, Randy. "Spread Spectrum Primer." *Spread Spectrum Scene Online*. 1997. Available: <http://sss-mag.com/primer.html> (February 15, 1999).

This article is a technical look at the differences in spreading techniques. This and the following article are written for the more technical reader wanting further detail on spread spectrum technology.

Roberts, Randy. "The ABCs of Spread Spectrum -- A Tutorial on SS." *Spread Spectrum Scene Online*. 1998. Available: <http://www.sss-mag.com/ss.html> (February 15, 1999).

Russell, Deborah and G. T. Gangemi, Sr. *Computer Security Basics*. O'Reilly & Associates, Inc. 1991. ISBN 0-937175-71-4.

"School Gives Wireless Network A+." *Communications News*: v. 34, no. 9, September 1997. p. 84.

Schuyler, Michael. "The Wonderful, Wireless WAN." *Computers in Libraries*: v. 17, no. 1, January 1997. p. 39.

Sheldon, Tom. *Windows NT Security Handbook*. Osborne McGraw-Hill. 1997. ISBN: 0-07-882240-8.

*Spread Spectrum Scene Online*. Available: <http://www.sss-mag.com/> (February 15, 1999).

This resource is oriented to the wireless professional and is somewhat technical.

*THE Online*. Technological Horizons in Education. Available:  
<http://www.thejournal.com/> (February 15, 1999).

Tucker, Terrell. "ISDN vs. Spread Spectrum, Part I," *The DataBus*: v. 36, no. 4, June-July 1996. Available: <http://www.cedpa-k12.org/databus-issues/v36n4/spectrum.html> (February 15, 1999).

This article, and its continuation below, are written for the school leader. They detail the problems and benefits encountered by the implementation of a wireless network.

Tucker, Terrell. "ISDN vs. Spread Spectrum-Part II," *The DataBus*: v. 37, no. 1, December 1996-January 1997. Available: <http://www.cedpa-k12.org/databus-issues/v37n1/isdn.html> (February 15, 1999).

*Wireless Design Online*. Available: <http://www.wirelessdesignonline.com/> (February 15, 1999).

A business marketplace for wireless product purchasers and designers. Contains product information that may be useful during an initial investigation phase.

WLANA. The Wireless LAN Alliance. Available: <http://www.wlana.com/> (February 15, 1999).

A site maintained by several vendors in the wireless networking industry. It is devoted to wireless LAN issues. There are many resources of interest to those investigating wireless networking in general.

## Appendix D.

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# Comment Form

Please take a moment to complete this form and share your reaction with us. Your input will help us revise the guide as needed.

	Very			Not at all
1. How helpful and interesting is the content of the guide?	5	4	3	2 1
2. How much did the organization and writing style help you understand the material?	5	4	3	2 1
3. How successful was the guide in helping you understand the potential benefits and disadvantages of wireless networking in a community setting?	5	4	3	2 1

4. Overall, did the guide meet your expectations?

- Yes
- Partially
- No

5. Which aspects of the guide were most helpful to you?

6. How could the guide have been made more useful?

7. Other comments:

Mail a copy of the completed form to Christine Peterson/Manager, Continuing Education & Consulting/Texas State Library and Archives Commission/Library Development Division/P. O. Box 12927/Austin, TX 78711-2927.



# Colophon

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You can find out more information about these programs at the following web sites:

<http://www.microsoft.com/office/>

<http://www.visio.com/products/standard/>

<http://www.netdraw.com/>