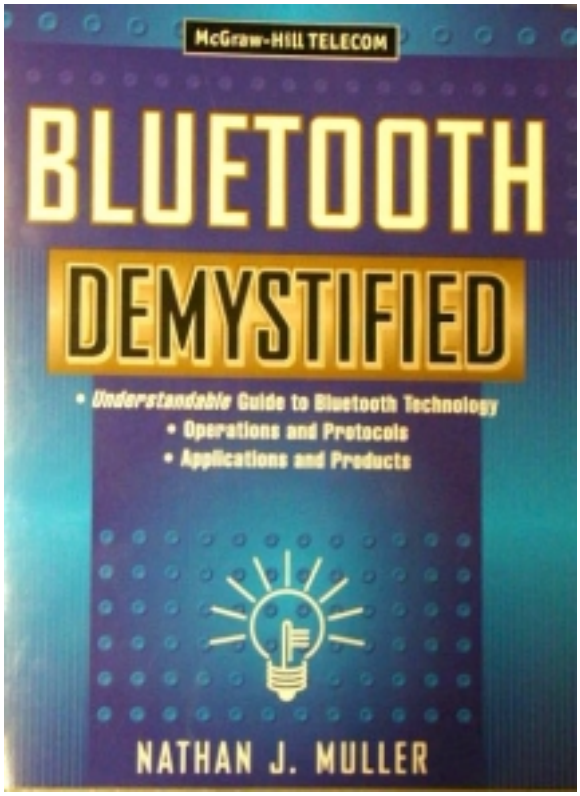
FURTHER READING

As a preview for further reading, the following reference has been provided from the pages of the book below:

Title: Bluetooth Demystified
Author: Nathan J. Muller
Publisher: McGraw-Hill

ISBN: 0071363238



her belt or in a pocket and walk around the room during the connection. Bluetooth technology does not require that the phone be positioned near any other device, as infrared does. Table 1.1 summarizes the performance characteristics of infrared products.

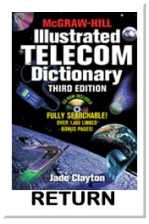


TABLE 1.1

Performance Characteristics of Infrared

Feature/Function	Performance
Connection Type	Infrared, narrow beam (30 degree angle or less)
Spectrum	Optical, 850 nanometers (nm)
Transmission Power	100 milliwatts (mW)
Data Rate	Up to 16 Mbps using Very Fast Infrared (VIFR)
Range	Up to 3 feet (1 meter)
Supported Devices	Two (2)
Voice Channels	One (1)
Data Security	The short range and narrow angle of the infrared beam provides a simple form of security; otherwise, there are no security capabilities at the link level.
Addressing	Each device has a 32-bit physical ID that is used to establish a connection with another device.

How About Wireless LANs?

Another wireless connectivity option is the local area network (LAN), as described by the 802.11 standard issued by the Institute of Electrical and Electronic Engineers (IEEE). Wirelss LANS using the 802.11 or Bluetooth specification are intended for completely different applications. Bluetooth devices require little power and are intended for transmitting small amounts of data at almost 1 Mbps over short distances of up to 30 feet, whereas 802.11 connections can range from 1 Mbps or 2 Mbps and 11 Mbps over distances of several hundred feet, making them suited for corporate offices and campuses where it may not be practical or economical to install cable, or where configuration flexibility is required.

In a typical wireless LAN configuration, one or more access points connect to an Ethernet hub, making the connection to the wired network. The access points are essentially bridges equipped with transceivers that provide the interface between the wired and wireless net-

works (Figure 1.2). At a minimum, the access point receives, buffers, and transmits data between the wireless LAN and the wired network infrastructure. A single access point can support a small group of users who connect to it through wireless LAN adapters in their PCs or notebook computers, which include a built-in antenna (Figure 1.3).

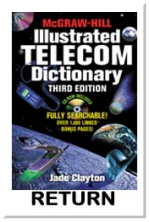


Figure 1.2
A wireless LAN access point, the Cisco Aeronet 340.

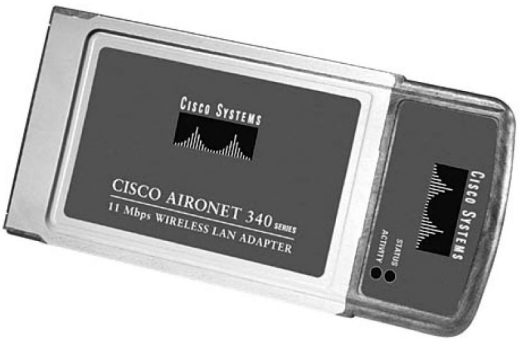
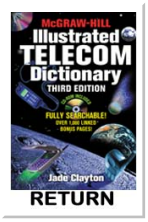


Figure 1.3
A wireless LAN adapter for a notebook computer from Cisco Systems.

Wireless LANs have been around for years, but market acceptance has been slow. Growth has been hampered by the lack of interoperability, which has only recently been addressed with the IEEE 802.11 standard. Even with the interoperability problem solved, the components required to implement a wireless LAN are still expensive for most people—$200 for an adapter card and close to $1,000 for an access point.



Wireless LANs can provide a data rate of up to 11 Mbps using direct sequence spread spectrum and 1 or 2 Mbps using frequency-hopping spread spectrum. With direct sequence spread spectrum, the base digital bit stream is modulated with a higher-rate chipping code to produce a very high bit rate data stream that, when transmitted, is spread across a broad portion of the frequency spectrum. With frequency hopping, the bandwidth is divided into 1 MHz channels. The FCC requires that the transmitter visit at least 79 of the channels at least once every 30 seconds, which produces a minimum rate of 2.5 hops per second. The hop sequence itself is a pseudorandom pattern, so that to conventional radios the frequency-hopping transmission appears to be nothing more than low-level background noise.

Although direct sequence offers the higher data rate, frequency-hopping spread spectrum is more resistant to interference and is preferable in environments with electromechanical noise and more stringent security requirements. In addition, direct sequence uses more power than frequency-hopping spread spectrum and is also more expensive to implement.

While useful in minimizing the need for cables, wireless LANs are not intended for interconnecting the range of mobile devices we carry around every day between home and office. For this, Bluetooth wireless technology is needed. Table 1.2 summarizes the performance characteristics of 802.11 wireless LANs.

HomeRF Networks

Another wireless technology that shares the unlicensed 2.4-GHz ISM band with the Bluetooth specification is called Home Radio Frequency (HomeRF); it is supported by more than 100 member companies belonging to the HomeRF Consortium. Many of these also belong to the Bluetooth Special Interest Group (SIG). HomeRF provides the foundation for a broad range of interoperable consumer devices by establishing an open industry specification for wireless digital communication between PCs and consumer electronic devices anywhere in and around the home. HomeRF devices run at 1.6 Mbps, and will eventually allow for speeds of 10 Mbps.

Like the Bluetooth specification, HomeRF uses frequency-hopping spread spectrum radio for reliability and security. The differences in the hop rate minimize the chance of interference between products