



## FREQUENTLY ASKED QUESTIONS

# Bluetooth™ Technology

### **What is Bluetooth™ wireless technology?**

Bluetooth™ wireless technology is an open, global standard for radio links that provides affordable wireless connections between PCs, handhelds, mobile phones, and many other devices, as well as access to network resources. The Bluetooth specification defines a low-power radio link optimized for secure short-range connections, and defines standard steps for connecting various devices. Bluetooth radios, which can be incorporated into most any electronic device, offer a universal wireless communication link that enables reliable interoperability between devices from different manufacturers.

### **How does Bluetooth Wireless technology work?**

Bluetooth radios operate in the 2.4 GHz spectrum. Each unit includes a radio, a baseband link controller, and software for link and data-flow management. Users have a choice of two signal strengths: a low-power level with up to a 10-meter range and a high-power level with a 100-meter range for access points. Bluetooth devices can simultaneously connect with up to seven other devices. Maximum data transfer rate is about 720 Kbps per channel. These radios also use a frequency hopping spread spectrum (FHSS) transmission

mode to minimize interference and enhance security.

Turn on a Bluetooth device, and it automatically searches out and identifies other devices within range. When up to seven simultaneous devices are connected to the master device, users have created a personal network. In addition, multiple personal networks can connect to form what is called a scatternet.

### **What is the bandwidth of Bluetooth technology?**

Bluetooth is designed to support a data rate that provides more than enough bandwidth for the designated usage models. Currently, Bluetooth technology has gross data rates of up to 1 Mbps, without line-of-sight requirements.

### **What is the typical range of a Bluetooth-enabled device?**

Power levels defined in the Bluetooth specification are designed to support a variety of usage models, either optimized for usage within a user's "personal" space or for network connections in the user's home or office. In the end, it's up to the device manufacturer to determine what range their devices will support. 3Com® Wireless Bluetooth products support a range of 10 meters between client devices and 100 meters between client devices and an access point.

3Com's extensive experience in networking technology, combined with our broad product line, offers customers the wireless solutions they want and need.

### How will Bluetooth recognize the correct device when there could be many devices within reach?

Each Bluetooth-enabled device is identified by a unique Bluetooth address, password, and user-specified name. Users can configure their Bluetooth devices to be available to a select group or multiple devices within range, depending on their personal preferences. For example, if a user wants to connect to another user's Bluetooth device, she will be presented with the all of the user-specified names within range, so she can choose the device herself.

### Is Bluetooth always active?

Bluetooth connections are transactional by nature, so they're not "always active" like LAN connections. In order to communicate with other devices, Bluetooth devices must be aware of others within range. Each device periodically sends out a request to locate all devices within range. Once a request is sent, responses are immediate. Although Bluetooth devices are always on and ready for communication, they're only active during a transaction, such as a file transfer or print job.

### How secure is this technology?

While the FHSS radio mode and limited transmission range provide inherent security, additional features are available to ensure privacy and security. User and device authentication and 128-bit encryption protect against spoofing and eavesdropping. Plus, three user-defined security levels limit the visibility and accessibility of a Bluetooth client to other devices, ensuring the safety of the host system and its data.

### What type of products will feature Bluetooth technology?

Currently, Bluetooth-enabled mobile phones, notebook PCs, handhelds, access points, and more are in the works. But this is only the beginning. New and innovative products will continuously come to market.

## 3Com and Bluetooth

### What Bluetooth products does 3Com offer?

- 3Com Wireless Bluetooth PC Cards connect notebooks to other Bluetooth devices simply and securely at a range of up to 10 meters. And Bluetooth Connection Manager software provides an intuitive, easy-to-use interface that supports drag-and-drop connections, file sharing, and synchronization.
- 3Com Wireless Bluetooth USB adapters bring the all the benefits of our Bluetooth PC Cards to any device with a USB port, including notebook and desktop PCs, projectors, and scanners—to name just a few.

### Why is 3Com interested in this market?

3Com is already a global leader in data networking, so expanding to include wireless networking is a natural step. Developing wireless products that help ensure seamless connectivity and ease of use is critical, as users increasingly demand wireless access to data. With our extensive experience in networking technology combined with our broad product line, we are in a unique position to offer our customers the wireless solutions they want and need. We plan to leverage our leadership and experience in wired networking to promote, develop, and expand the Bluetooth vision of a global standard for wireless technology.

### 3Com is currently shipping 802.11b products. Does this create a conflict of interest between 3Com and the Bluetooth SIG?

No, 3Com is committed to both technologies. Each plays an important, but distinct role. 802.11b is the standard for wireless local area networking. Basically, it's a wireless extension to a LAN, providing all wired-Ethernet services and continuous connectivity as the user roams across the campus. Bluetooth provides

3Com is committed to the future of both Bluetooth and 802.11b standards. We continue to develop solutions that will minimize and eventually eliminate interference between these and other technologies.

spontaneous connectivity for user's mobile devices and allows instant access to information using LAN and WAN access points. As complementary technologies, these standards ensure simple, immediate, and continuous access to information.

## Interference

### **Are there other standards/offerings within the 2.4 GHz band that will interfere with Bluetooth?**

Bluetooth uses the 2.4GHz band, which is unlicensed. It's also used by cordless phones, microwave ovens, baby monitors, HomeRF, 802.11b wireless LANs, and more. Any device designed for use in an unlicensed band should be able to withstand at least some degree of interference, and 3Com's Wireless Bluetooth products have been designed with this in mind.

### **What are the differences between Bluetooth and 802.11b wireless technology?**

Bluetooth and 802.11b are almost entirely complementary technologies. Bluetooth solutions are designed for personal networking with an emphasis on mobility and affordability. These solutions allow you to connect all of your Bluetooth devices—notebooks, handhelds, mobile phones, and more. Plus, you'll have light LAN and WAN access through an access point or dial-up connection.

On the other hand, 802.11b networks are intended to extend or replace conventional wired networks. They use higher radio power on fixed channels of greater bandwidth, so they can deliver the throughput necessary to support a full range of LAN and Internet services.

### **Can Bluetooth and 802.11b technologies co-exist?**

Yes. They can co-exist today with certain limits. Although the potential for interference is rather low, you need to know there is a possibility

that the two technologies could interfere with one another, but only when they're simultaneously transmitting in close proximity. If interference occurs, it will probably appear as an interruption of the 802.11b signal with possible data loss, but no physical damage to either system. Though this interference isn't likely to be noticed by users, in cases when it is noticeable, moving the two devices farther apart usually solves the problem. However, sometimes it may be necessary to discontinue operation of one of the devices.

### **What happens when interference occurs between Bluetooth and 802.11b?**

Interference, in many cases, isn't noticeable. If it does occur, users of both technologies will need to manually manage their devices to eliminate the interference in one of two ways. First, moving the devices farther apart, or second, discontinuing operation of one of the two radios. Cahners In-Stat Group claims that when radios are more than two meters apart, there's generally no perceptible degradation in either device. From two meters to about one-half meter, there's a slight degradation. When devices are in very close proximity or collocated, the degradation can be quite noticeable.\*

### **What is being done to address the interference issue?**

The Bluetooth SIG and IEEE are working to develop technology that will reduce and eventually eliminate interference between these systems. There's no reason to hesitate deploying either technology because of fears over co-existence. While there are potential problems, the Bluetooth and 802.11b communities are well on their way to delivering solutions. 3Com is committed to the future of both the Bluetooth and 802.11b standards and is actively researching techniques for co-existence in the airspace. As such, we continue to

\*Cahners In-Stat Group. *Bluetooth & Wi-Fi: "The Crusade for Coexistence."* February 2001.

By the year 2005, more than 670 million devices will be equipped with Bluetooth wireless technology.

develop solutions that will minimize and eliminate interference between these and other technologies.

#### **Why do you need both?**

Bluetooth and 802.11b can and will work together to enable users to have access to their information—anytime and anywhere. Bluetooth will be used as a cable replacement and as a medium for communication with devices sensitive to power and size constraints such as mobile phones, handhelds, cameras, speakers, headsets, and more.

802.11b will be used to extend or replace wired LANS, giving users Internet access and full range of LAN features—without wires. Plus, they're very simple to install, making a home network more reasonable.

### **Bluetooth SIG**

#### **What is the Bluetooth Special Interest Group (SIG)?**

The Bluetooth specification was developed by a special interest group that's supported by nine promoter companies—3Com, Ericsson, IBM, Intel, Lucent, Microsoft, Motorola, Nokia, and Toshiba. Today, more than 2000 adopter companies have embraced the standard and are rapidly developing Bluetooth products. By the year 2005, more than 670 million devices will be equipped with Bluetooth wireless technology, providing a basis for wireless connectivity and information exchange (Cahners In-Stat Group, 2001).

#### **What is difference between a promoter and an adopter?**

All Bluetooth SIG members are adopters. Discussions are open to all member companies, but voting privileges are reserved for the nine promoter companies. However, adopter companies can participate in decisions by developing working groups that they chair. Promoters are responsible for the overall direction

and promotion of Bluetooth. They commit resources (financial and human) toward management of the SIG. Promoter companies also work closely with adopter working groups that are focused on specifications, interoperability, and marketing.

#### **What do promoters bring to the SIG?**

The Bluetooth SIG is an excellent example of an organization whose whole is greater than the sum of its parts. While each company in the Promoter Group brings unique strengths to the table, both the specification and product solutions are the result of a concerted team effort. The objective of the Promoter Group is to lead the efforts of the Bluetooth SIG, by creating a forum for enhancing and promoting the Bluetooth standard and providing a vehicle for interoperability testing.

#### **What does 3Com bring to the Promoter Group?**

We bring extensive experience in mobile technology, expertise in advanced engineering, and leadership in data networking that all complement the strengths of the other promoters, Lucent, Microsoft, and Motorola—and the five founding members: Ericsson, Nokia, IBM, Intel, and Toshiba.

#### **Who are the 2000 adopters?**

The Adopter Group represents a broad range of companies from diverse industries. For example, semiconductor and cores, telecom, computing and peripherals, consumer products, networking, automotive industrial, and many more. A complete list of adopters is available at [www.bluetooth.com](http://www.bluetooth.com).

#### **Why is this technology so valuable to so many manufacturers?**

Currently, there are more than 2000 adopters signed on to the SIG. It is popular due to many factors. Here are a few:



The possibilities for this low-cost, low-power technology are endless.

- It's an open, royalty free specification
- It has been driven by a group of influential companies
- It's a low cost, small form factor wireless technology extending its use to a wide variety of applications and products

**It has been rumored that France, Japan, and others will not allow Bluetooth to operate in their countries. Does this have an impact on Bluetooth's success?**

The Bluetooth SIG is working to overcome individual concerns over the utilization of the 2.4 GHz ISM band. Recently, both France and Japan announced that their concerns have been addressed, and these products will be allowed. As with any technological advance, concerns are to be expected, but so far none of the problems are anticipated to impede the success of Bluetooth.

## Benefits

**What will Bluetooth technology deliver to end-users?**

Bluetooth will enable users to connect a wide range of computing and telecommunications devices easily and quickly, without the need for cables.

Users will be able to access flight and class schedules, local maps, special offers, and more in public areas such as schools, airports, shopping malls, and exhibition centers. Here are some examples of how Bluetooth can simplify your life:

- At the airport, Suzanne and Tom use their Bluetooth notebooks to reach the airline boarding service through a nearby Bluetooth access point, and discover their flight is delayed two hours. After security authentication, they confirm seats and receive digital boarding passes. While Tom e-mails their hotel and rental car agency about the delay,

Suzanne reviews their documents for the subcontractor. But alas, an attachment is missing. No worries. She dials up the company LAN, using her Bluetooth mobile phone, and downloads the missing appendix. Mission accomplished.

- At the ballpark, Julie relaxes with her children after a tough work-week. Using her Bluetooth handheld and one of the stadium's Bluetooth access points, Julie consults the team's Web site for the pitcher's ERA. When the home-team short-stop turns an amazing double play, Julie's son just has to e-mail his friend the details. Later, when her daughter and son get hungry, Julie uses her handheld to order and pay for hotdogs and drinks. And dinner is delivered to their seats, so no one misses any of the action.
- At the shopping mall, Bill can find special offers from his favorite stores. He's looking for a cashmere sweater under \$150, so he does an item search and then allows the merchants to respond, sometimes with a discount. Bill gets several responses; some stores even offer color photos of sweaters and cross-sells for matching pants and a hat. He gets a sweater at a great price. Now it's time for a CD. Bill enters his favorite CD shop and puts his headphones into his PDA. He can listen to CDs at the listening racks, but also hundreds of others transmitted from a listening station.

**What benefits will Bluetooth wireless technology bring to organizations?**

Ultimately, Bluetooth wireless technology makes employees more effective. After a meeting, users don't have to return to their desk to sync their handheld, check messages, and download e-mail. Users can make more informed business decisions because they have access to the most up-to-date information available, using their Bluetooth client devices.

Bluetooth can simplify your life by allowing users to access information easily and quickly.

And they don't have to waste time linking notebooks to projectors and printers—all that is done wirelessly.

- At company headquarters, the Project Zebra team is meeting in the main conference room. Each member carries a Bluetooth notebook and most have Bluetooth handhelds. As they power-up their notebooks, each machine connects to the conference room's Bluetooth access point, which links them to each other and the LAN. New members wirelessly exchange virtual business cards, and the team leader distributes the agenda and project schedule to everyone electronically. Then he starts a PowerPoint presentation on the Bluetooth projector, controlling the presentation and annotating the on-screen display from his Bluetooth PDA. As the meeting progresses, the project lead retrieves manufacturing drawings from an engineering database on the LAN and displays them on-screen. When an off-site subcontractor visit is proposed, the group consults airline schedules, purchases tickets, and notifies the vendor by e-mail. As the meeting closes, the team secretary wirelessly distributes minutes of the meeting to all participants.

## Future

### How long will it take Bluetooth to become a 'fully mature' technology?

Because Bluetooth is focused on 'personal' devices, it won't take long

for the technology to become an integral part of our daily lives. By 2002, Frost and Sullivan estimate for Europe that 6.7 million notebooks (68.7 percent of total shipments) and 6.4 million handhelds (65.6 percent of total shipments) will be Bluetooth enabled (Frost and Sullivan Report, "Impact of Bluetooth," January 2000). Applications are being developed for key markets such as home, office, automotive, entertainment, and more. The possibilities for this low-cost, low-power technology are endless.

### One of the major constraints on Bluetooth is that it's relatively costly. Will this inhibit rapid deployment of the technology?

Multiple PC vendors have announced that Bluetooth technology will ship standard on many of their products, as have manufacturers of other mobile devices. Today, the cost of a Bluetooth radio is rather high because most vendors are on their first iteration of the technology. However, the sheer number of vendors that will be developing Bluetooth solutions will create a competitive environment. That should drive the cost of the radio down to around five dollars quickly. Once Bluetooth Wireless technology reaches this price and users are confident that products are interoperable, you'll see vendors move away from shipping add-on modules toward shipping Bluetooth as standard. At this pace, we believe uptake will not be affected.



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