



LOGI BOLT

Secure, robust
wireless connections

logitech®

Contents

Introducing Logitech's new standard for secure, robust wireless connectivity	1	Features and performance	6
Logi Bolt wireless technology at a glance	1	Recommendations for deploying and optimizing the performance of Logi Bolt wireless products	8
The foundation of Logi Bolt wireless technology— <i>Bluetooth</i> [®] Low Energy protocol		Plug-in options for your Logi Bolt USB receiver	
Robust connectivity even in congested wireless environments		How to pair additional devices to a Logi Bolt USB receiver	
Optimized power consumption technology		Ensuring sufficient spacing between multiple Logi Bolt setups	
Pair multiple Logi Bolt devices to a single receiver		Determining the maximum user density	
Security and encryption	4	Laptop setup recommendations	
Logi Bolt technology is fully encrypted and FIPS compliant		Optimizing your wireless environment	
Enforced LE Secure Connection (LESC)		Connecting via <i>Bluetooth</i>[®]	14
Safeguarding security updates with anti-rollback DFU		The Logitech promise	15

Introducing Logitech's new standard for secure, robust wireless connectivity

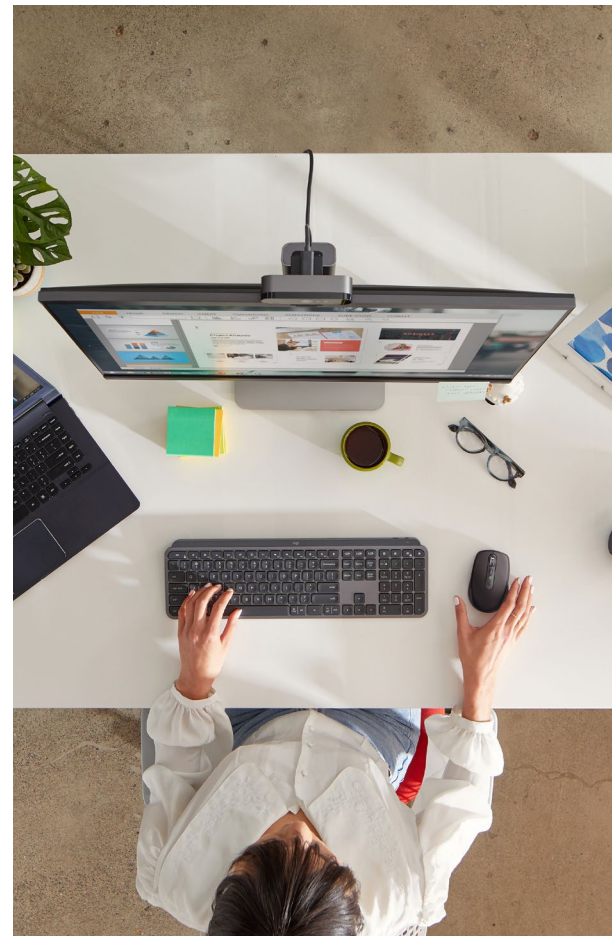
Your Logi Bolt wireless peripherals have been delivered and are ready for deployment. But how should you proceed? This guide contains best practices and provides recommendations for optimizing the performance of Logi Bolt wireless products in your workplace environment.

Logi Bolt wireless technology at a glance

Logi Bolt is Logitech's next-gen wireless connectivity protocol. In addition to improved security, wireless reliability and connection strength, Logitech engineers were tasked with ensuring the technology works across multiple operating systems while enhancing the end user experience. Based on *Bluetooth*® Low Energy wireless technology, Logi Bolt includes multiple security measures designed to minimize vulnerability risks in both office and work-from-home environments.

The foundation of Logi Bolt wireless technology—*Bluetooth* Low Energy protocol

When Logitech engineers set about developing a next-generation wireless protocol, step one was choosing a foundational technology to undergird the protocol architecture. The selection of *Bluetooth* Low Energy proved a logical choice. The global wireless standard for simple, secure connectivity, *Bluetooth* Low Energy is the latest technology from the Bluetooth SIG, Inc., of which Logitech is a member. The Bluetooth SIG is a global community of over 36,000 companies that are the caretakers and innovators of *Bluetooth* technology. Their mission is to promote the expansion



Logitech MX Keys for Business and Logitech MX Anywhere 3 for Business

of Bluetooth wireless technology by fostering member collaboration to create new and improved specifications and facilitate global *Bluetooth* interoperability through a product qualification program.

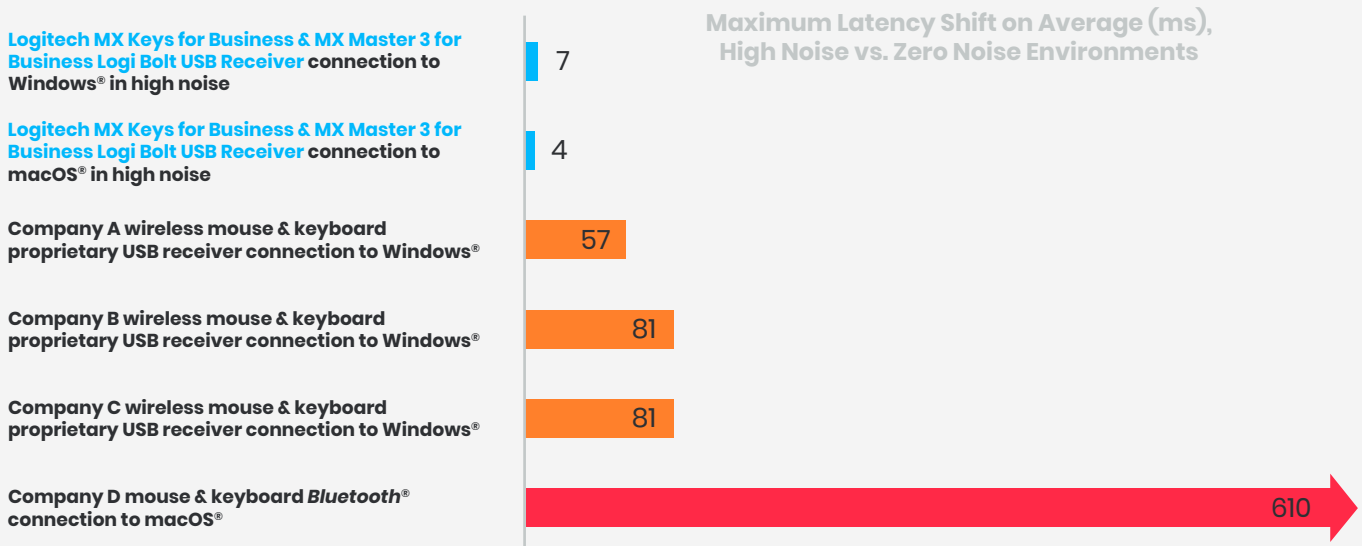
Robust connectivity even in congested wireless environments

Bluetooth technology has a proven ability to coexist with other wireless technologies in the same 2.4 GHz frequency band. These include Wi-Fi access points and commonly-used *Bluetooth* and *Bluetooth* Low Energy devices such as headsets, mobile phones and other wireless devices with a proprietary protocol. But while certainly convenient, this high level of compatibility often comes at a cost—low

device reactivity manifesting in latency. This is due to both the insufficient strength of the device receiver’s RF link and inefficient frequency hopping.

Logi Bolt solves this with an intensified RF link budget that powers through ambient noise and therefore overcomes the majority of interference. In addition, Logi Bolt devices leverage a proprietary algorithm that helps improve the efficiency of frequency hopping. The result is reduced latency, typically below 8 milliseconds. In especially noisy environments, this number could increase depending on the strength, type and overall volume of interference but in general, Logi Bolt device users will experience negligible latency.

Logi Bolt connection using a paired Logi Bolt USB receiver significantly outperforms other protocols in highly congested (noisy) environments



Optimized power consumption technology

Logi Bolt wireless mice and keyboards feature optimized *Bluetooth* Low Energy (BLE) parameters including an enhanced data rate of 2 Mbits/s and a minimal, 7.5ms connection interval for a lag-free user experience. Yet despite the enhanced connection strength, there's no observable power degeneration with Logi Bolt devices.

Pair multiple Logi Bolt devices to a single receiver

A total of six Logi Bolt devices can be paired with a single Logi Bolt USB receiver with three simultaneous, active connections. A Logi Bolt logo, typically found on the bottom of the device (the side that rests on the desk surface), confirms its compatibility with a Logi Bolt receiver.

The ability to pair up to six devices to a single Logi Bolt receiver with three active connections is especially convenient for employees issued separate bundles of wireless devices—a set for the office, another for work from home and occasionally a third set for traveling. Only the laptop needs transporting with the Logi Bolt receiver remaining plugged in at all times as the user moves from place to place.

For those desiring additional functionality (such as key customization and application-specific settings*), additional Logitech software, Logi Options+, is available for free download and can be mass deployed.



*Functionalities in Options+ may vary by product.

Security and encryption

Logi Bolt technology is fully encrypted and FIPS compliant

Logi Bolt was designed to help mitigate the risk of potential cyber-attacks while addressing growing security concerns resulting from an increasingly mobile workforce—work from home being an obvious example. It's engineered with *Bluetooth* security mode 1, level 4 (also known as Secure Connection Only mode), which is Federal Information Processing Standards (FIPS)* compliant. That means Logi Bolt enforces security by means of encryption. Level 4 uses Authenticated LE Secure Connections (LESC) encrypted pairing—specifically, Elliptic Curve Diffie-Hellman P-256 (ECDH) and AES-128-CCM encryption. This ensures a Logi Bolt wireless product and its Logi Bolt USB receiver can only communicate with each other.



Logitech Signature M650 for Business

* Federal Information Processing Standards (FIPS) is a set of data security and computer system standards created by the National Institute of Standards and Technology's (NIST's) Computer Security Division and applies to computer systems for non-military government agencies and government contractors. Organizations must adhere to these standards in order to be designated as FIPS compliant. Many private organizations have voluntarily adopted FIPS standards as a security benchmark.

Enforced LE Secure Connection (LESC)

Communication between wireless mice and keyboards and the USB receiver is always encrypted. Logitech Bolt wireless products are pre-paired to their Logitech Bolt USB receiver at the factory so they work straight out of the box. The encryption keys required by the mice and keyboard links are also pre-programmed at the factory.

Logitech Bolt USB receivers enforce Secure Connection Only Mode. Pairing involves authenticating the identity of the two devices, encrypting the link, and computing encryption keys which allows security to be established/reestablished on a connection/reconnection. In order to authenticate a connection at pairing, Logitech Bolt utilizes a LESOC passkey which requires a series of clicks—a security measure common to keyboards but one that also extends to Logitech Bolt mice and across most enterprise operating systems—an industry first. The passkey method is considered superior to LE Legacy connections given its enhanced resilience to on-path attackers.

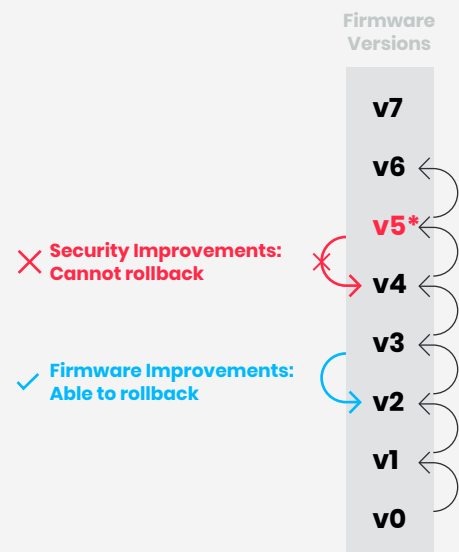
Safeguarding security updates with anti-rollback DFU

To help overworked IT managers maintain enterprise-level security over an increasingly far-flung employee base, Logitech equipped Logitech Bolt with self-service security measures that still allow for centralized oversight. When a pairing is attempted, the user receives a new device alert. Non-security related firmware updates can be rolled back by either the user or an IT manager should the need arise. Security updates, however, are permanent and can't be rolled back.



Logitech Ergo K860 Split Keyboard for Business and Logitech Lift for Business

Anti-rollback DFU



Logitech Bolt

Maintain rollback DFU as a feature

When it's not related to security improvements.

Anti-rollback for security updates

Whenever there is a security update, if device is upgraded, there is no turn back.

Features and performance

Logi Bolt Wireless Protocol Technical Specifications

Logi Bolt wireless devices:

- USB 2.0 Type-A.
- *Bluetooth* Low Energy 5.0 or higher.
- Backwards compatible to *Bluetooth* 4.0 or higher hosts when in direct *Bluetooth* connection.
- *Bluetooth* power class is class 2 with a transmission operating range of approximately 30 feet (10 meters) within a line of sight. This range will vary depending upon computing and environmental conditions.

		Logi Bolt Mouse	Logi Bolt Keyboard
Bluetooth Security Mode	Paired with Logi Bolt USB receiver	Security Mode 1- Security Level 4	Security Mode 1- Security Level 4
	Direct connect to host computer via <i>Bluetooth</i>	Security Mode 1- Security Level 2 (if the host computer can)	Security Mode 1- Security Level 3 (if the host computer can)
Authentication	Paired with Logi Bolt USB receiver	10-click passkey (which means an entropy of 2^{10})	6-digit passkey (which means an entropy of 2^{20})
	Direct connect to host computer via <i>Bluetooth</i>	Just Works Pairing is used per industry standard as there is no Passkey pairing standard for mice	Passkey is requested per industry standard



Logitech Signature M650 for Business

Features and performance

Transmission Parameters	Radio frequency band	2.4 GHz ISM
	Direct connect to host computer via <i>Bluetooth</i>	Up to 37 with frequency hopping (same as <i>Bluetooth</i> Low Energy)
	Transmission power (dBm)	4 -10 (same as <i>Bluetooth</i> Low Energy)
	Range: Logi Bolt USB receiver (ft/m)	33/10
Responsiveness	Bandwidth: peak, raw (Mbps bursts)	2
	Mouse report rate (rpts/s)	133 (1 report per 7.5 ms)
	Keyboard typing speed (keys/s)	25
	Latency in a clean environment (ms)	< 8
	Latency following a power up (ms)	< 300
	Latency following low power mode (ms)	Implementation specific
Resistance to Interference	Resistance to Wi-Fi perturbation	Excellent*
	Resistance to <i>Bluetooth</i> perturbation	Excellent
	Resistance to multipath effect (self-perturbation)	Excellent
	Resistance to RF analog surveillance camera	Excellent
	Resistance to other brands' proprietary protocols	Excellent
	Exposition to interference in continuous tracking (= typical percentage of time during which the radio channel is used, and prone to collide with other radio traffic)	2.5%
Architecture Capabilities	Mouse and keyboard encryption	Yes (AES-CCM 128-bits)
	Downstream capability	Yes
	Downstream bandwidth (kbits/s)	Up to 20
	Number of wireless products per Logi Bolt USB receiver	Up to 6 Logi Bolt wireless products
	Full compatibility with optional software (e.g., key customization, smooth scrolling and other advanced features)	Yes**

* Logitech proprietary algorithm makes frequency hopping more efficient compared to direct *Bluetooth* Low Energy connection. Wi-Fi access point impact on wireless link in the 2.4 GHz band: depending on the settings of the Wi-Fi network, interference may affect all wireless devices working in the same frequency band.

**While all Logi Bolt products are compatible with Options+ software, functionalities may vary by product.

Recommendations for deploying and optimizing the performance of Logi Bolt wireless products

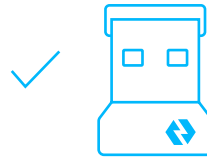
Plug-in options for your Logi Bolt USB receiver

Host computer/Port type

Connection method

MacOS or Windows laptop/notebook PC with USB-A port(s)

It's best to plug the Logi Bolt USB receiver directly into the laptop/notebook USB-A port.



MacOS or Windows laptop/notebook **without** a USB-A port:
Case 1 - Extender

It's best to plug the Logi Bolt USB receiver directly into the laptop/notebook USB-C port using a Logi USB-C to USB-A Adapter.



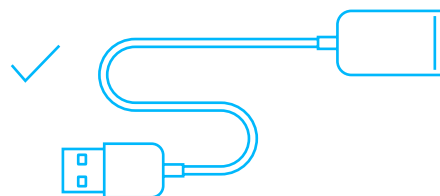
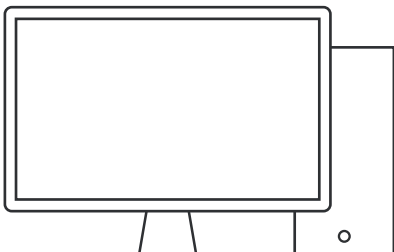
MacOS or Windows laptop/notebook **without** a USB-A port:
Case 2 - Docking Station and USB-C Hubs

For best results, use a **higher-quality docking station or USB-C Hub**. Many lower cost docking stations and hubs offer little protection against interference, leading to poor connections and discernable lag when in use. See appendix for a list of recommended docking stations and hubs.



With an **external Monitor** or a **Tower PC**

For best results, use a **shielded USB A Female to Male cable**. Note: receivers plugged into the backs of tower PCs or large monitors may lose line of sight to the wireless device which could affect RF link performance and overall robustness.



How to pair additional devices to a Logi Bolt USB receiver

To simplify out-of-the-box setup by IT for the end user, Logi Bolt wireless products are pre-paired to their Logi Bolt USB receiver at the factory. The pre-pairing process includes generating the encryption keys required by the mouse and keyboard links. Logi Options+ software can be utilized to pair Logi Bolt wireless products to another Logi Bolt USB receiver. Provided all wireless products and the USB receiver carry the Logi Bolt logo, Logi Options+ can be used to pair any configuration of up to six Logi Bolt compatible devices to a single Logi Bolt USB receiver with a total of three active connections at any one time.

When the Logitech software detects that a second Logi Bolt USB receiver has been plugged in, a pop-up wizard guides the user through the process of migrating all Logi Bolt-compatible devices to the first Logi Bolt USB receiver. When the pairing is complete, the second Logi Bolt USB receiver can be removed, freeing up a USB port.

Logi Options+ is available for free download at logitech.com/optionsplus



Logitech MX Keys Mini for Business and Logitech MX Master 3 for Business

Ensuring sufficient spacing between multiple Logi Bolt setups

Space around each Logi Bolt setup should be not less than 28 inches (0.7 meters) with the rule of thumb being 21.5 square feet (2 square meters) allotted per user.



Determining the maximum user density

The maximum number of users in an allotted space is calculated by taking the total area in square meters and dividing it by 2 or in square feet and dividing it by 21.5. For example, in a room with an area of 100 square meters, the maximum number of Logi Bolt setups that should be deployed is 50.

To get the most out of your deployment, Logitech recommends accounting for the following during setup:

A Logi Bolt setup (keyboard and mouse) needs a certain amount of space around it that's free from interference in order to ensure optimal radio link between the devices and the associated host.

The recommended device density, or the number of Logi Bolt setups that can exist in a specific area, should not be exceeded.

The distance between a Logi Bolt device and its receiver as well as the presence of metal or other nearby dense objects within line of sight may also affect radio link quality.

The co-existence of other radio wave-transmitting systems in the same area such as Wi-Fi (embedded in host and access points) could hinder the deployment of additional wireless devices.

Laptop setup recommendations

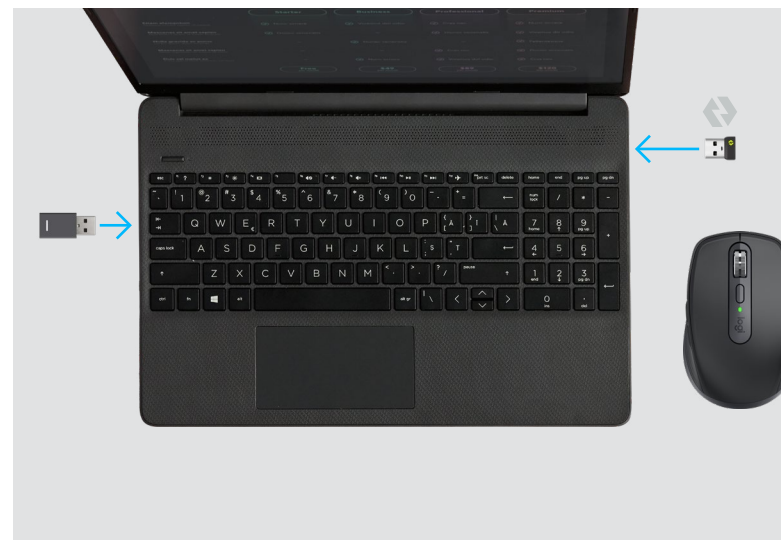
To ensure robust link quality, minimize the distance between Logi Bolt devices and their designated Logi Bolt receiver. Try to avoid placing metallic objects or consumer electronic devices between the mouse or keyboard and the receiver.



Logitech MX Keys for Business with MX Palm Rest and Logitech MX Master 3 for Business

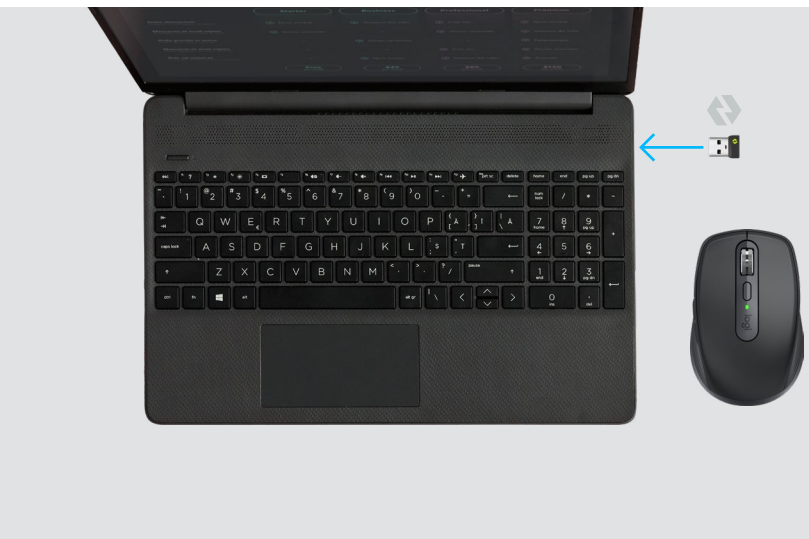
For a desktop computer, plug the Logi Bolt receiver into an available USB port on the front panel of the computer.

In the case where another USB receiver is plugged into the same laptop (headphones, as an example) maximize the distance between the two receivers by plugging the second receiver in on the opposite side of the laptop or otherwise using the farthest available USB port.



To minimize potential interference from Wi-Fi, Logitech recommends plugging in the Logi Bolt receiver on the same side as the mouse to reduce the physical distance between the keyboard, mouse and receiver.

Note: Since the 5 GHz band won't interfere with Logi Bolt transmissions, switching the local Wi-Fi to the 5 GHz band (if possible) may improve the overall quality of the Logi Bolt radio link.





Logitech MK540 and Logitech Ergo M575 Wireless Trackball for Business

Ultimately, Logitech understands that offices are filled with busy people on the move and less-than-ideal setups will naturally occur. Picture ten workers hastily assembled in a huddle room to put out the latest fire. Logi Bolt devices were designed for real-world situations and you can rest assured they'll function smoothly without lag or other issues caused by interference.

Optimizing your wireless environment

Tips for improving the performance of wireless devices operating in the 2.4 GHz band

Reduce the number of devices connected to the Wi-Fi network at 2.4 GHz band

1. Choose Wired LAN for docked notebooks whenever possible.
2. Choose 5 GHz band where possible for less interference. If it's not possible to switch entirely to Wi-Fi at 5 GHz band, adjust the network settings for 2.4 GHz Wi-Fi per the recommendations below.

If it's not possible to switch entirely to Wi-Fi at 5 GHz band, adjust the network settings for 2.4 Wi-Fi

1. Reduce router output power if possible (higher power does not always equal higher performance) and disable beamforming.
2. Disable all local hot spots including smartphone tethering levels.
3. Move PC and access points closer to each other.

How to reduce interference in the 2.4 GHz band

Determine the source of interference

Microwave ovens, external displays, wireless speakers, headphones and video transmitters are known to produce interference in the 2.4 GHz band.

Cables and USB dongles

External hard drives with poorly shielded cables, memory sticks and other types of cables (coaxial, power sources, etc.) can interfere with wireless signals.

Shielding effects, attenuation and reflections

Materials used in buildings and office furniture

1. Reinforced concrete, metal tables and bulletproof glass have a strong shielding effect on wireless signals.
2. Water, bricks and some plastics have medium impact on wireless signals.
3. Other materials such as wood and standard glass have minimal impact on wireless signals.

Reflective surfaces in indoor environments

Wireless signals can reflect off certain surfaces causing weakened signals and interference. Maintaining line of sight between routers and wireless devices can help mitigate this problem.

This white paper from Cisco is a recommended resource for the deployment and maintenance of Wi-Fi networks:

[WiFi Troubleshooting Cheat Sheet](#)

Connecting via *Bluetooth*

An alternative solution for connecting Logi Bolt wireless devices to a laptop is by using *Bluetooth* Low Energy (BLE). This may be required when the host computer doesn't include external ports of any kind.

A direct *Bluetooth* connection also proves convenient should a user wish to connect their mouse or keyboard to multiple devices simultaneously. For example, a user might connect a keyboard to their laptop via the Logi Bolt receiver while at the same time connecting the keyboard via *Bluetooth* to a tablet or phone. Some Logitech mice and keyboards have *Easy-Switch* buttons/keys that allow the user to quickly switch between those devices.



Logitech Ergo K860 Split Keyboard for Business and
Logitech Ergo M575 Wireless Trackball for Business

Logitech devices with *Bluetooth* technology can connect to any host computer that includes *Bluetooth*. No USB receiver is needed and pairing is done with the help of the computer's operating system.



Characteristics of direct connection via *Bluetooth*:

- High Density: 37 channels in *Bluetooth* Low Energy
- Immunity to Wi-Fi: Due to Frequency Hopping
- Reconnection time: >2 seconds (versus 300ms for Logi Bolt USB receiver)
- Pairing to PC via OS: Versus pre-paired receiver for Logi Bolt USB receiver
- AES-128-CCM encryption of the signal between the device and computer
- Long battery life: As with all Logitech devices due to power optimization features integrated into the products

The Logitech promise

With Logi Bolt, Logitech is committed to providing enterprise-grade enhanced security, a robust signal even in congested wireless environments and, with its compatibility with all major OS's and platforms, ease of deployment and management for IT departments.

For questions regarding Logi Bolt or technical support, visit prosupport.logi.com



Appendix

The following USB hubs and docking stations have been Logitech tested to work with Logi Bolt USB receivers in noisy environments. Logitech highly recommends updating the firmware on any of these devices before use with a PC or MacBook.

- Logitech Logi Dock
- Apple® USB-C Digital AV Multiport Adapter
- Belkin® 4-Port USB 3.0 Hub (F4U073)
- Belkin® 4-Port Powered Desktop Hub (F4U020)
- Belkin® Thunderbolt™ 3 Dock Core
- CalDigit® USB-C Pro Dock
- CalDigit® Thunderbolt™ 4 Element Hub
- Dell® Dock WD15
- Kensington® CHI000 USB-C 4-Port Hub
- Lenovo® ThinkPad Thunderbolt™ 3 Dock Gen 2
- Plugable® Thunderbolt™ 3 Dock with 60W Host Charging
- StarTech.com® Thunderbolt™ 3 Dock (TB3CDK2DP)
- Targus® Thunderbolt™ 3 8K Docking Station (DOCK221USZ)
- Transcend® HUB3
- VisionTek® VT4800 - Dual Display Thunderbolt™ 3
- WAVLINK® Thunderdock Pro/Thunderdock Pro III - Thunderbolt™ 3 Dual 4K Docking Station

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