MX series
PERFORMANCE MICE

Logitech

Fast RF
Cordless Technology

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Introduction

Logitech pioneered the mouse industry more than 20 years ago with the introduction of its first mouse in 1981. This mouse was ahead of its time, and it wasn't until graphical user interfaces became popular a few years later that the mouse became an essential computing tool.

That happened in 1984, when Apple introduced its first Macintosh computer, featuring a mouse designed by Logitech. This mouse connected to the computer with a cable and used a rolling rubber-coated metal ball tracking mechanism.

Though they worked well, corded, ball-based mechanical mice suffered from two intrinsic shortcomings: those annoying cords always seemed to get in the way, and the tracking ball got gummed up with dirt and required frequent cleaning.

Setting out to conquer both problems, Logitech crafted two battle plans. In 1992, the company shipped MouseMan® Cordless, the world's first cordless mouse. Three years later, they introduced the first optical tracking technology with the launch of Marble™ technology for trackballs. Then, in 2001, Logitech achieved the best of both worlds with the introduction of Cordless MouseMan Optical.

The benefits of "no ball, no cord" proved to be substantial. Cordless mice untether computer users, enhancing usability while freeing valuable desktop real estate. Optical mice offer greater precision and smother cursor movement, and because there is no ball, no cleaning is necessary.

Now, in 2002, Logitech introduces the MX™700 Cordless Optical Mouse. Featuring advancements in both optical tracking and digital radio cordless technology, the MX700 delivers smooth, precise tracking, responding accurately to the fastest – or slightest – hand movements. A new benchmark in performance is established.

This paper discusses three factors that contribute to cordless performance and confirm the technological superiority of Logitech's new Fast RF cordless technology. These are reports per second, data-transmission speed and method, and delay between reports.

In A Nutshell

For those who don't care about technology, the lesson of the MX700 Cordless Optical Mouse is simple: Cordless mice are better and the MX700 with Fast RF is Logitech's best cordless mouse ever.

The advantages are obvious. Cordless mice are easier to use. They don't get tangled. They're not limited to one spot on the desktop. Put a book in your lap and you can use the mouse there. Desktop clutter is cleared from messy cables. And cordless mice just look better.

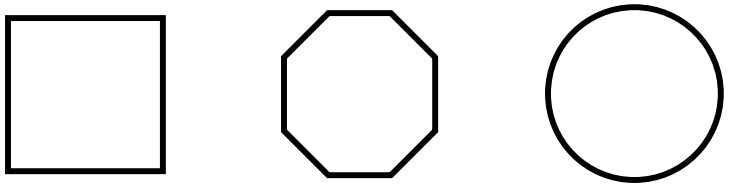
Add to that new optical technology that further improves accuracy and responsiveness, and rechargeable batteries, and the urge to get a new mouse becomes irresistible.

Logitech®
MX™700
Cordless Optical Mouse

The Reporting Advantage

The job of any mouse is simple: track movement and report it to the computer. The computer processes that information to move the cursor image on the screen. Crucial to success is how many times per second the mouse provides this location report. As the number of reports per second increases, the motion of the cursor on the screen becomes more fluid. Reports per second is the principal differentiating factor between the MX700 with Fast RF and mice from other manufacturers.

A good analogy for reports per second is to imagine a circle, defined as a series of points connected by straight lines. Think of each point as a report, saying, "I'm here." With just four points, that circle would be drawn as a square; with eight points, an octagon—closer to a circle. With 1,000 points, individual lines become virtually invisible. Clearly, as the number of points increases, the shape of the circle becomes smoother. Likewise, as the number of reports per seconds increases, the motion of the cursor more accurately follows the movement of the mouse.



4 points *8 points* *over 1000 points*

The single most significant feature of Fast RF cordless technology is the ability to deliver 125 reports per second, an astonishing 2.5 times improvement over existing cordless mouse technology. This increase in the report rate through Fast RF delivers "a corded performance without the cord."

Why not more than 125 reports per second? Certainly such a mouse can be built. The limiting factor isn't the mouse, but rather, the computer port that polls the data. For example, the universal serial bus (USB) ports present in every modern computer are not capable of polling faster than 125 reports per second.

Speeding Data Transmission

Every cordless mouse consists of two hardware components: the mouse itself, which contains a battery-powered transmitter, and the receiver, which plugs into the mouse port on the computer. Two methods exist for data transmission, infrared (IR) and radio frequency (RF). Each has pros and cons.

A television's remote control unit employs IR technology. IR takes advantage of the clear line of sight between transmitter and receiver, and works well at distances of up to 40 feet.

Logitech's cordless mice opt instead for digital RF technology. Doing so eliminates the line-of-sight requirement, allowing the receiver to be placed in a convenient, yet unobtrusive location, perhaps tucked behind a monitor. And since the mouse and receiver are never more than about 20 inches apart, a low-cost, low-power, short-range signal can be used, extending battery life significantly.

Of course, with Fast RF and the huge leap in reports per second, Logitech had to find a way to transmit so much additional data without allowing delays or backlogs to occur. This was accomplished by increasing the speed of data transmission. Matching the advancements in report rate, the bit rate for Fast RF was advanced 2.5 times over previous RF designs.

This faster data-transmission capability would mean nothing if there were not more data to transmit. It is the mouse's greatly increased number of reports per second that was the driving feature in developing Fast RF.

Delays Eliminated

The third factor in achieving superior cordless mouse performance is the time between each report transmitted by the mouse. After each report, the mouse must ready itself for the next report, gathering data about its motion, comparing it to its last position, and packaging that data in the correct format. Rapid preparation (or minimizing delay between reports) ensures a smooth data flow and maximizes reports made per second.

With Fast RF, Logitech has slashed delay time to less than half that required by other leading mice. Doing so ensures that the mouse's 125 reports per second are evenly spaced and sent as a series of discrete, yet smooth, continuous operations.

All three technical advances, increased reports per second, fast data-transmission rate, and reduced preparation time, work together as a system to provide a superior user experience.

Rechargeable Power

Logitech's MX700 Cordless Optical Mouse introduces another milestone—the elimination of replacement batteries. Thanks to the use of rechargeable nickel metal-hydride (NiMH) batteries, users no longer face the expense of purchasing and inserting replacement batteries, a significant and environmentally unfriendly inconvenience.

The rapid charge base station doubles as receiver and cradle into which the mouse nests and recharges. A fast charging system gives the mouse a day's worth of power in only 10 minutes of charging. A full charge provides up to 10 days worth of power – meaning that the mouse is always ready for work (and play).

Cost savings can be significant. Given the price of AA-size alkaline batteries, it is possible that, over the course of a mouse's use life, a user would spend as much for batteries as for the original purchase price of the mouse itself.

Conclusion

Though the benefits of cordless mice became clear years ago, now it can be said that technology has fully delivered on the vision. The technological leaps introduced by Logitech in the MX700 Cordless Optical Mouse deliver a cordless experience punctuated by a silky smoothness of operation heretofore unknown. Combined with its sophisticated optical-sensing technology, feature-laden driver software, and rechargeable-battery capability, Logitech remains a worldwide leader in input-device innovation.

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