XMIT KEYBOARDS

Hall Effect Keyboard – Fall 2016

Designed with all the love in the world in Austin, Texas, USA.
Hand built in Guangzhou, China.

A note from XMIT:

Thank you so very much for your support of the first group buy of the Hall Effect Keyboard by XMIT Keyboards!

For XMIT, finding a usable Hall Effect keyboard has been something of a holy grail for almost ten years now. It's been such an adventure to learn about all the different kinds of keyboards made in the past 30 years to be able to bring this keyboard to you.

XMIT Keyboards is a tiny outfit in the Austin, TX area working to bring these keyboards to life. With your continued support, we'll see the designs continue to evolve.

I didn't make this possible, you did! ☺

--XMIT

INTRODUCTION

You hold in your hands the most reliable keyboard you will ever own.

What is a Hall Effect keyboard? In short, it is a mechanical keyboard with key switches that detect the position of a magnet. These switches are rated to 100 million cycles.

Most other keyboards on the market today use either a rubber dome and membranes, a physical switch, or in some cases, a capacitance sensor, to detect key position. These designs are simple, and effective, but suffer from a shorter working life, and poor performance in dirty or wet conditions.

Hall Effect keyboards were popular in the 1970s, and are still popular today in mission critical applications where switches must not fail (think: nuclear reactors, spacecraft, missile silos). They fell out of favor due to cost reasons. Now, with inexpensive surface mounted Hall sensors readily available, it is possible to re-introduce this design to the market!

For more background, please see: https://en.wikipedia.org/wiki/Hall_effect .

USAGE

87-key board (104-key board similar)

61-key board

To use the keyboard:
Connect the provided USB cable to the keyboard.
Connect the keyboard to an available USB port on your computer, game console, or other device.

The keyboard will power on, conduct a backlight test, and be ready for use. In some cases, it may take a moment for the host system to recognize the keyboard.

The keyboard features an extensive set of backlighting controls, and in the case of the 61-key board, function key overlays on an additional layer. Please see the KEYBOARD SHORTCUTS section of this manual for a discussion on keyboard shortcuts.

KEYBOARD SHORTCUTS

On all keyboards, Fn+Space will disable the LED immediately.

The 61 key layout boards employ the following Fn keyboard shortcuts:

Fn+Q (hold for three seconds) – Factory reset.
Fn+RShift – Toggle key switch actuation height.

Remapped keys:
Fn+` - Esc
Fn+1 through Fn+= - F1 through F12
Fn+Backspace – Delete
Fn+R - Insert
Fn+T – Home
Fn+G – End
Fn+Y – Page Up
Fn+H – Page Down
Fn+U – Print Screen
Fn+I – Scroll Lock
Fn+O – Pause/Break

Fn+P or Fn+W – Up
Fn+L or Fn+A – Left
Fn+; or Fn+S- Down
Fn+’ or Fn+D- Right

Fn+E (hold for 3s) – Enter WASD Lock mode. In this mode, the WASD keys map to arrow keys. Press Fn+E again to exit this mode.

Preset LED lighting modes for various games:

- Fn+LCtrl – First Person Shooter (FPS)
- Fn+LAlt – League of Legends (LOL)
- Fn+RAlt – Crossfire (CF)
- Fn+Menu – Various car racing games (CAR)
- Fn+RCtrl – Call of Duty (COD)

These preset LED lighting modes are programmable using the LED programming shortcut of Fn+/. To set a custom lighting mode:

1. Select the mode to program by typing one of the five keyboard shortcuts just described.
2. Enter LED programming mode by pressing Fn+/.
3. Type individual keys to change their color.
4. Type Fn+/ again to save and exit.

Multimedia controls:

- Fn+Z – Audio rewind or previous track.
- Fn+X – Audio fast forward or next track.
- Fn+C – Audio play or pause.
- Fn+V – Audio stop.
- Fn+B – Volume mute.
- Fn+N – Volume down.

Fn+M – Volume up.

LED Controls:

Fn+Space – Enable/Disable LED.
Fn+\ – Cycle through LED modes.
Fn+Return – Cycle through LED color options.
Fn+] – LED brightness increase.
Fn+[– LED brightness decrease.
Fn+, – LED cycle speed decrease.
Fn+. – LED cycle speed increase.

ISO Emulation:
Fn+Tab - <
Fn+CapsLock - >
Fn+LShift - |

The 87 and 104 key layout boards employ the following Fn keyboard shortcuts:

Fn+Esc (hold for three seconds) – Factory reset.
Fn+RShift – Toggle key switch actuation height.

Preset LED lighting modes for various games:
Fn+1 – First Person Shooter (FPS)
Fn+2 – League of Legends (LOL)
Fn+3 – Crossfire (CF)
Fn+4 – Call of Duty (COD)
Fn+5 – Various car racing games (CAR)

These preset LED lighting modes are programmable using the LED programming shortcut of Fn+Home. To set a custom lighting mode:

5. Select the mode to program by typing Fn+1 through Fn+5.
6. Enter LED programming mode by pressing Fn+Home.
7. Type individual keys to change their color.
8. Type Fn+Home again to save and exit.

Fn+E (hold for 3s) – Enter WASD Lock mode. In this mode, the WASD keys map to arrow keys. Press Fn+E again to exit this mode.

Fn+Win – Windows lock key mode. Press once to disable the Win key. Press again to enable.

Fn+F12 – Keyboard lock. Press once to lock the keyboard. Press again to unlock.

Multimedia controls – Fn+F1 through Fn+F11:
Fn+1 – Windows Explorer*
Fn+2–Search*

Fn+3–Calculator*
Fn+4–Music*
(*Windows OS only. May have alternate or no function in other OS environments.)
Fn+5–Audio rewind or previous track.
Fn+6–Audio fast forward or next track.
Fn+7–Audio play or pause.
Fn+8–Audio stop.
Fn+9–Volume mute.
Fn+10–Volume down.
Fn+11–Volume up.

LED Controls:

Fn+Space – Disable LED.
Fn+Insert – Cycle through LED modes.
Fn+Delete – Cycle through LED color options.
Fn+Up – LED brightness increase.
Fn+Down – LED brightness decrease.
Fn+Left – LED cycle speed decrease.
Fn+Right – LED cycle speed increase.

ISO Emulation:
Fn+Tab - <
Fn+CapsLock - >
Fn+LShift - |

PROGRAMMING

Unfortunately, this keyboard is not programmable at this time. We are looking into options that may include a keyboard remapping tool and/or a third party firmware at a future date. We appreciate that the ability to program the board is a very desirable feature!

We appreciate third-party contributions for firmware so long as you are able to license them under the MIT License. The keyboard is built around the SoNiXSN32F240/230/220 Series 32-Bit Cortex-M0 microcontroller.

WEATHER SEALING

The main circuit board of this keyboard is epoxy coated and fully weather sealed. If your keyboard has a fixed USB cable (which is sealed internally), it is fully weather proof and can even operate under water. If your keyboard has a detachable USB connector, it is water resistant but some small damage can still occur at the connector.

Some keyboard body materials are more resilient than others. ABS plastic, acrylic, and aluminum are of course waterproof. The bamboo body option may warp or distort with repeated exposure to moisture. We recommend keeping the bamboo keyboard as dry as possible.

If, by chance, you spill a beverage in the keyboard, it is recommended to remove the key caps, disassemble the board, gently rinse all components in purified water (distilled, deionized, or reverse osmosis), and let them air dry.

ABOUT BAMBOO KEYBOARDS

If you have a bamboo keyboard, this section will provide some helpful information.

Bamboo keyboards may be treated with a natural wax and/or tung oil at the factory to improve waterproofing. This oil can have a strong smell that some find unpleasant. If this happens, it is recommended to remove the keyboard from the box, possibly under a fan, for up to a week to help the smell dissipate.

Once a year, be sure to apply a sealing coat to the bamboo to preserve its life. A lightweight mineral oil or "cutting board oil" is perfect. Apply a light coat, let it sit for a few minutes, and then use a dry lint-free cloth to remove as much excess oil as possible.

Bamboo, like any wood, is a natural material that will absorb and release moisture over time, growing and shrinking slightly as it does. If you have any issues with your bamboo keyboard, please contact Support using the information later in this manual.

COMPARABLE BOARDS

With some searching, you may find other keyboards on the market with similar Hall switches, or similar-looking capacitive switches. Though it may be tempting to purchase these instead, the quality may be disappointing.

XMIT Keyboards is committed to quality. We have made substantial improvements to this keyboard design over time including new stabilizers, new key sliders, improved electronics, upgraded microcontrollers, improved springs, and improved key layouts. Your purchase from XMIT Keyboards allows us to bring to market future improvements such as: CNC aluminum cases; new keyboard layouts; tactile and clicky switches.

TROUBLESHOOTING

Q: The Fn key does not appear to work!
A: Very rarely, a firmware error will cause the board to stop responding to Fn key combinations. In this circumstance, we recommend unplugging the keyboard, waiting 5 seconds, and plugging it back in. You might also try a Fn+Esc reset (see next question).

Q: When I press the F, J, or K key, the keyboard sends garbage characters!
A: This may happen if the Macro function on some boards is not programmed correctly. Holding Fn+Esc for five seconds, until the keyboard LEDs recycle, should fix this. An alternate workaround is to:

1. Press Fn+F, J, or K for three seconds, to enter macro programming mode.
2. Press F or J or K.
3. Press Fn+F to exit macro programming mode.

This will set the "F (or J or K) key macro" to be "type F (or J or K)".

As of this writing the macro programming mode is experimental. Please feel free to experiment with it!

Q: Some keys appear to be misaligned.
A: The bamboo and acrylic keyboard bodies have some manufacturing tolerance. To align the keys, simply rotate them gently into position.

Q: Some stabilized keys squeak.
A: The current version of the Cherry style stabilizers may squeak some on bamboo and acrylic keyboard bodies. To help prevent this, remove the key cap on the stabilizer in question, and apply Super Lube 51014 lubricant (not included) to help prevent squeaking.

Q: The USB cable pulls out easily, and the board power cycles if moved.
A: Due to manufacturing tolerances of the cables and connectors provided with this keyboard, some USB cables may not have a tight fit into the connector. This is a known issue.

Q: My acrylic board has a film attached to it that is unattractive.
A: Please remove this film. Raw acrylic sheet from the factory comes with a protective film. This film may remain on the keyboard in transit.

Q: My bamboo keyboard has a strong odor!
A: Some bamboo boards may ship with a Tung Oil treatment to preserve the bamboo. Over time, this smell will dissipate. You can accelerate this process by placing the keyboard in front of a fan for 24-72 hours.

SERVICE

Your keyboard is designed to be maintenance free. However, if you would like to open the board to change a spring, to perform cleaning, to remove the stabilizer bar, or simply to see the internals, this is possible with no soldering and relatively few tools.

Please note that a full disassembly and re-assembly can easily take 2-3 hours.

Tools required:
#2 screwdriver
Small pick (optional)

Disassembly directions:

0. Unplug the keyboard and move it to a comfortable working space.
1. Remove the key caps from the sliders you would like to remove.
2. Remove and set aside eight (8) Philips screws from the rear of the case.
3. Remove the rear of the case. At this point, you may remove the stabilizer bar if desired, to lower the board's table height.
4. Remove the intermediate layer.
5. At this point, the clips that hold individual key sliders in place will be apparent. Together, all the clips hold the PCB together.
6. To remove a single key slider: press the tabs apart gently (perhaps using a small pick) until the clips release the PCB. Then, remove the slider from the other side of the board, taking care not to lose the spring in the process.
7. To remove the PCB: remove all 61, 87, or 104 key sliders. The PCB will come out easily, since nothing will be holding it in place.

Re-assembly is the reverse of disassembly. Please take care to insert the springs perfectly perpendicular to the board. Test sliders often, and re-seat sliders that do not feel “right”.

Bamboo boards benefit from regular treatment as described in the BAMBOO section above.

SUPPORT

If you have any questions, comments, or concerns, please feel free to e-mail support@xmitkeyboards.com. If you are a member of the Deskthority, Geekhack, or Reddit keyboard forums, please feel free to PM XMIT with questions, comments, or concerns.

SPECIFICATIONS

Hall Effect Keyboard by XMIT Keyboards
Layout: 104-key ANSI, 87-key ANSI, or 61-key ANSI
Body material: CNC-cut bamboo or acrylic with hidden screws.
Key caps: PBT+POM double shot with backlight compatibility, Cherry MX mount, white or black
Spring weight: 50g (about 35g actuation) or 70g (about 50g actuation).
Actuation point: about 1.8-2.0 mm.
Key travel: 4.0 mm.
Backlighting: Full RGB backlighting with surface mount LEDs and a variety of color patterns. High frequency, silent PWM brightness control.
Key sliders: POM slider with upstroke damping in polycarbonate housing. Provisions for click and tactile leaves in future revisions.
Interface: Mini USB cable at rear of keyboard.
Cable: USB to mini USB, 1.5m, with ferrite bead, black.
Stabilizers: integrated Cherry style key stabilizers with updated design to reduce binding.
PCB assembly: surface mount.

ABOUT XMIT KEYBOARDS

XMIT Keyboards was established in 2015 by XMIT, a keyboard collector, repairperson, and enthusiast who is active on the Deskthority and Geekhack keyboard forums.

LEGAL

Although we don’t foresee any problems with our product, we cannot accept any liability in case of failure.

Even though we mentioned some applications like nuclear reactors and spacecraft above, DO NOT use this keyboard in an environment where failure could lead to loss of life, injury, or property damage! There are all sorts of specifications and standards for such hardware and our keyboards are certified for none of them at this time.

Apart from a best-effort promise to attempt to repair or replace dead-on-arrival product within a week of arrival, XMIT Keyboards is unable to offer a warranty program at this time. If you purchased this keyboard through a group buy partner (such as Massdrop), they may be able to offer some assistance.

THE HARDWARE AND SOFTWARE ARE PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE DESIGNERS, MANUFACTURERS, RESELLERS, AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE HARDWARE OR SOFTWARE OR THE USE OR OTHER DEALINGS IN THE HARDWARE OR SOFTWARE.