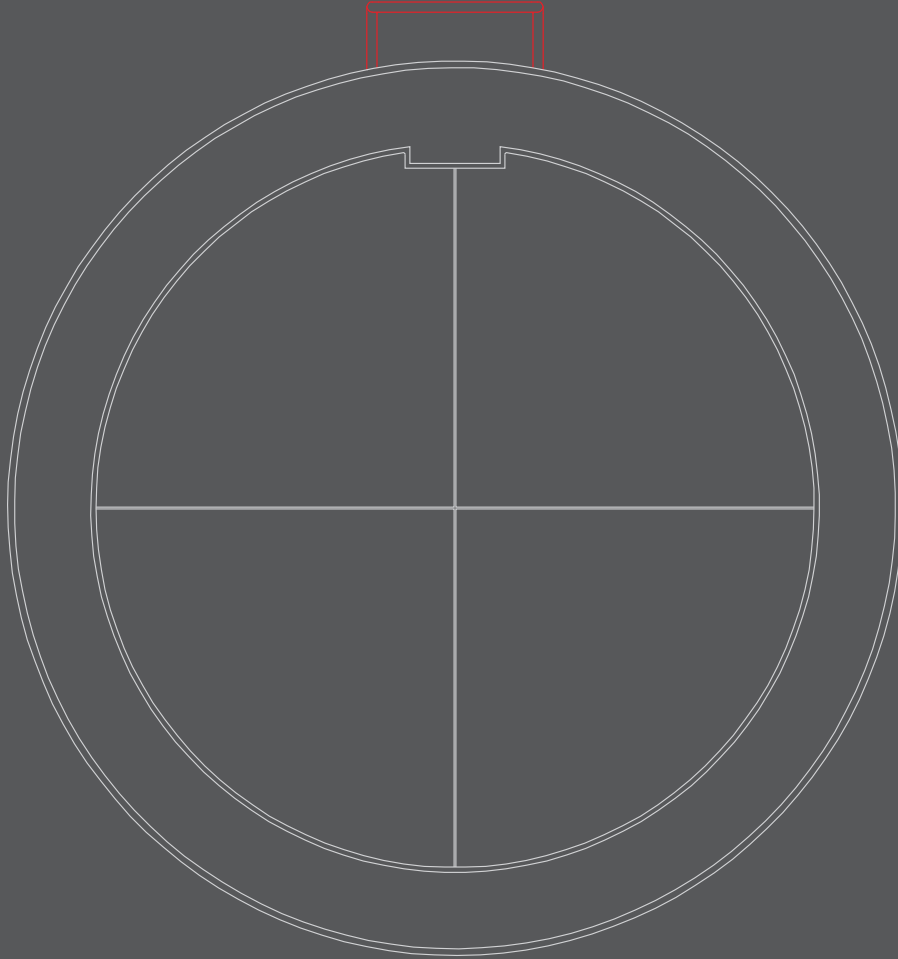


Keith McMillen
INSTRUMENTS



BOPPAD USER MANUAL

Bop-Pad

Created by Keith McMillen, Evan Adams, Brent Allen, Noah Ambrose, Evan Bogunia, Dave Criss, Tom Ferguson, Andrej Hronco, Conner Lacy, Kyle Lobedan, Dan McAnulty, Chloe Stamper, Maxime Stinnett, Alex Vittum, Greg Wille, Brian Wright, and Stephen Wright

This reference manual was written by Evan Bogunia and designed by Carson Whitley and Evan Bogunia.

Version 1.0, May 1, 2017.

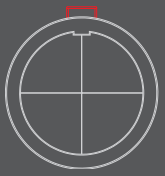
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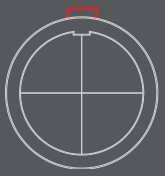


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WELCOME

Hello, and welcome to the world of BopPad! Taking the time to read this document is a huge step toward mastering the BopPad.

The purpose of this document is to provide a resource containing helpful information regarding the use of the BopPad hardware and software. While this document is written for people of all levels, it does not attempt to explain basic, fundamental MIDI concepts or terminology, and it is assumed that you have at least basic experience working with MIDI devices, MIDI software, and MIDI hardware

QUESTIONS? FEEDBACK? CONTACT US!

Any questions or feedback that may come up regarding BopPad or its software can be directed to us here:

- **Technical Support:** <http://www.keithmcmillen.com/support>
- **General Questions:** <http://www.keithmcmillen.com/contact-us>
- **User Forum:** <http://forum.keithmcmillen.com>

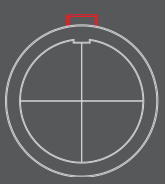
WHERE TO DOWNLOAD EVERYTHING

All BopPad software can be downloaded on the KMI website: <https://www.keithmcmillen.com/downloads/>

You can also access the BopPad Editor online: <https://files.keithmcmillen.com/products/boppad/editor/>

Before You Begin





1.1 WHAT'S IN THE BOPPAD BOX?

BOPPAD

For Bopping.

MICRO-USB CABLE

For connecting BopPad to a computer, tablet, or MIDI Expander.

1.2 WHAT'S IN THE MIDI EXPANDER PACKAGE?

MIDI EXPANDER

For expanding.

USB POWER SUPPLY + CONVERTER BLADES

+5V DC, 500 mA

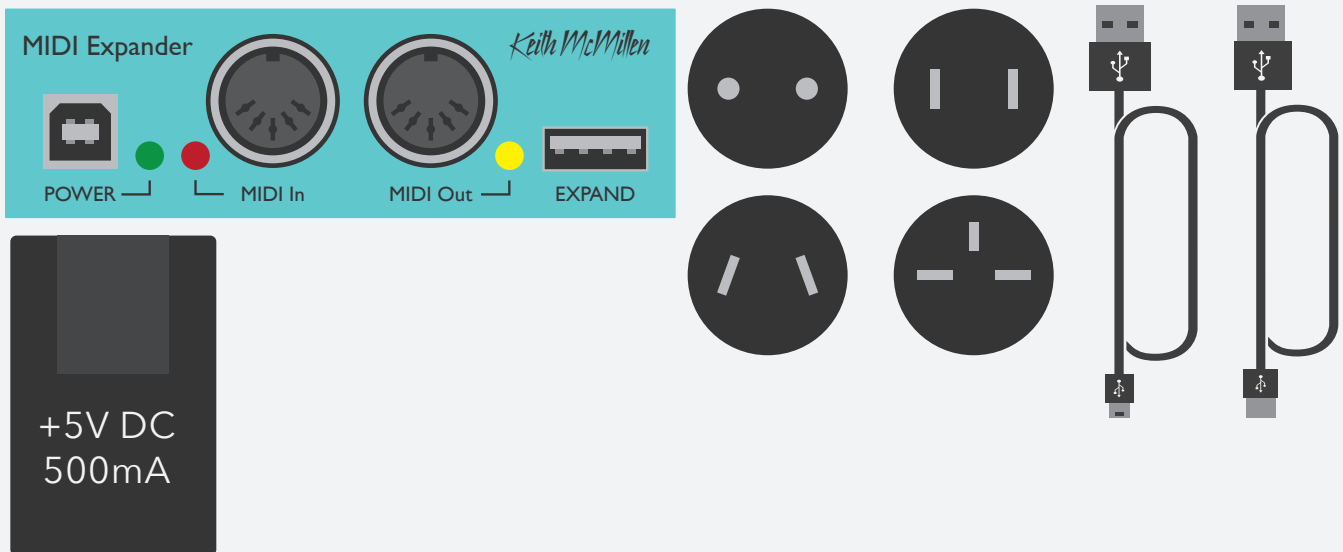
Includes power converter blades for non-United States AC sockets.

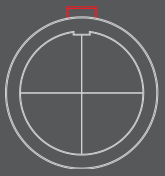
USB CABLE

For connecting the Expander to the USB power supply.

MINI-USB CABLE

For connecting a KMI device to the Expander (Although this cable is included with the MIDI Expander, use a micro USB cable to connect BopPad to a MIDI Expander).





1.3 – SYSTEM REQUIREMENTS

1.3.1 – HARDWARE

MAC OS

- Mac OS 10.6 (or greater)
- Intel Core 2 Duo (or greater)
- USB 2.0 (or greater) port

WINDOWS

- Windows 7, 8, & 10
- USB 2.0 (or greater) port

1.3.2 – SOFTWARE

MAC OS

- Mac OS 10.9 or later
- Intel Core 2 Duo (or greater)
- USB 2.0 (or greater) port
- 100 MB free hard disk space

WINDOWS

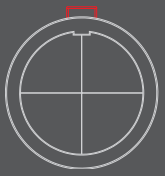
- Windows 7, 8, & 10
- 64 bit
- 2.5 GHz processor (or greater)
- 4 GB RAM (or greater)
- USB 2.0 (or greater) port
- 100 MB free hard disk space

WEB EDITOR

- Chrome, Opera or other Web MIDI capable web browser. To check compatibility with WebMIDI, go here: <http://caniuse.com/#feat=midi>

Getting Started





2 - GETTING STARTED

This section covers information that will help you get started with the BopPad. We will introduce the BopPad hardware, discuss how to connect your BopPad to the world, and go over basic operation of the device and the editor. More in-depth information is available in the BopPad Hardware and BopPad Editor sections.

2.1 THE BOPPAD HARDWARE

The BopPad hardware is pretty straight forward. The playing surface is divided into four separate quadrants, where you strike the instrument to produce amazing sounds.

There is a micro USB port on the back of the device that you can use to connect to a computer, tablet, or MIDI Expander. Once connected, you can open the DAW/music software of your choice, make sure that the application is listening to the BopPad, and start triggering drums, playing synths, or sending dynamic control data to go into more unexplored territory. More information can be found in the [BopPad Hardware](#) section.



To connect to an iOS device, we recommend using an Apple branded Camera Connection Kit (USB to Lightning adapter). To connect to an Android device, you should use a USB OTG cable.

2.2 THE BOPPAD SOFTWARE

The BopPad Editor runs on the desktop, and in WebMIDI capable browsers. The Web Editor for BopPad is compatible with any device that can run a WebMIDI capable browser. The Standalone Editor is compatible with any device running macOS or Windows. The Editor allows you to customize nearly all aspects of how the BopPad responds to user input. More information can be found on the [BopPad Software](#) section.

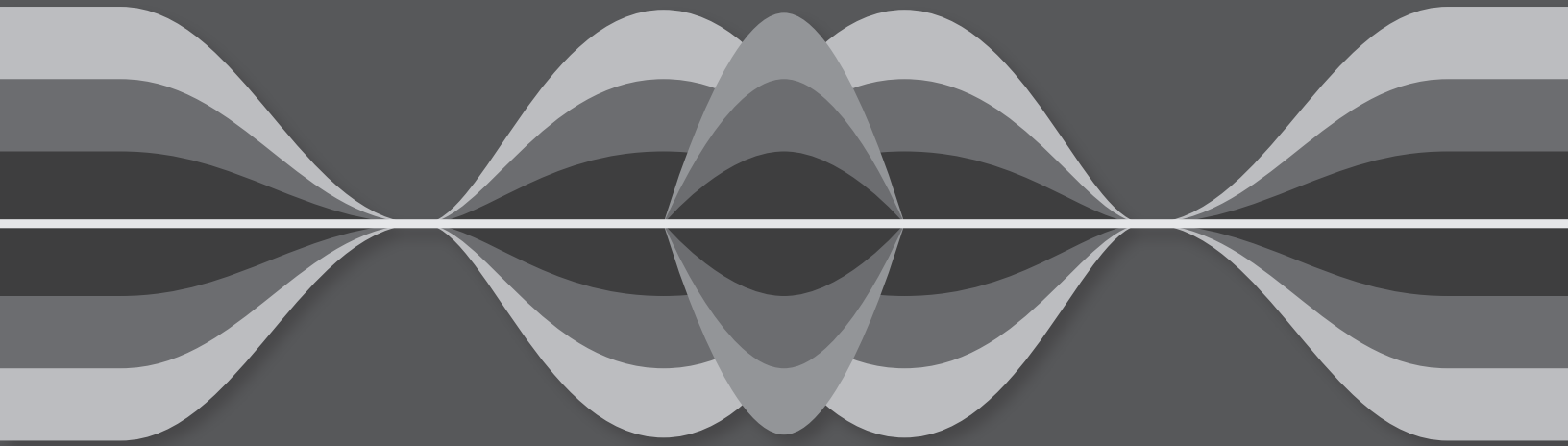


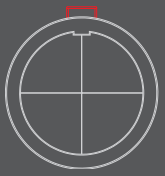
You may need to give the browser permission to control your MIDI device. This is simply a security precaution when sending SysEx to a MIDI device.



Windows Users: if using Chrome versions 58 - 60, you must disable a flag in the browser, go to: `chrome://flags/#enable-midi-manager-dynamic-instantiation` and set it to "disabled" and then restart your browser.

Features Overview





3 - FEATURES OVERVIEW

The BopPad is a versatile percussion instrument capable of sending accurate, and highly nuanced MIDI data to your computer. We should all know how to interact with the device - you hit it! You can use drumsticks, your hands, or pretty much any other object to play the BopPad.

3.1 MULTI-DIMENSIONAL CONTROL

The BopPad can send a variety of different MIDI Data.

NOTES

You can send up to 6 MIDI notes from each of the four quadrants.

CONTROL DATA

Each quadrant can send a variety of control data from each quadrant. You can send up to 5 additional MIDI messages from each quadrant along with Notes, which can be controlled by multiple types of sensor data. Continuous control, poly aftertouch, channel pressure, and pitch bend are all available.

More information on configuring the MIDI output can be found in the [BopPad Editor](#) section.

3.2 CONNECTIVITY

The BopPad is a class compliant MIDI device, which means you can connect it to just about anything that speaks MIDI.

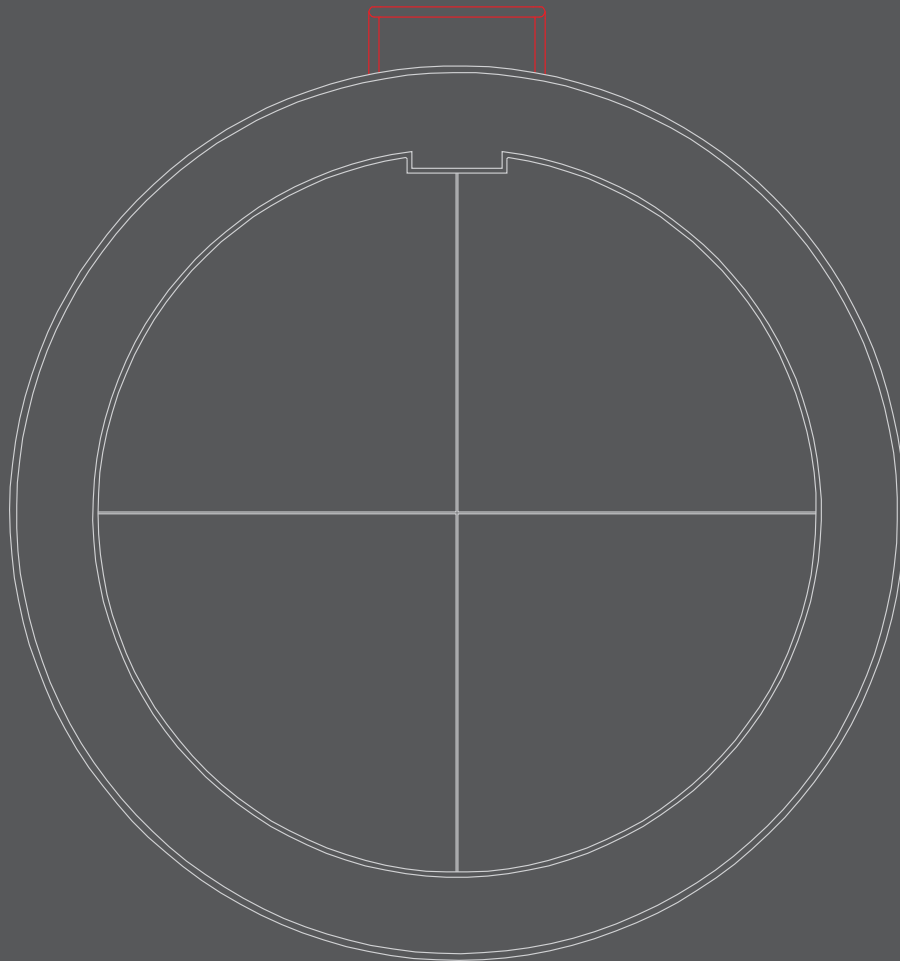
Using the included micro USB cable you can connect to a computer running any modern OS (Mac, Windows, and Linux) that supports the Class Compliant MIDI standard.

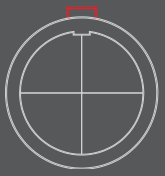
You can also connect to the optional MIDI Expander to communicate with MIDI hardware using traditional 5 pin MIDI connections.



Due to there being only one USB port, communication is limited to Computer OR Expander, not both simultaneously.

BopPad Hardware





4 - BOPPAD HARDWARE

The BopPad hardware consists of the playing surface, the USB port and the USB Guard.

THE PLAYING SURFACE

The playing surface consists of four distinct quadrants. Striking the quadrants with your preferred object (hands, sticks, mallets, spoons, whatever!) will send out MIDI data corresponding to the preset currently in use, as defined in the Editor.



The playing surface responds best if the BopPad is placed on a flat surface, or is being used in the BopPad basket.

THE USB PORT

The micro USB port is the only port on the device. It will allow you to connect to your favorite devices, from computers, to MIDI capable tablets, to any hardware that has a 5 pin MIDI connection (using the optional MIDI Expander).

THE USB GUARD

The red USB guard is there to protect the micro USB cable and the micro USB port. These connections are small and do not respond well to direct impact or other stresses. We recommend not transporting the device with the USB cable plugged in.

THE LED

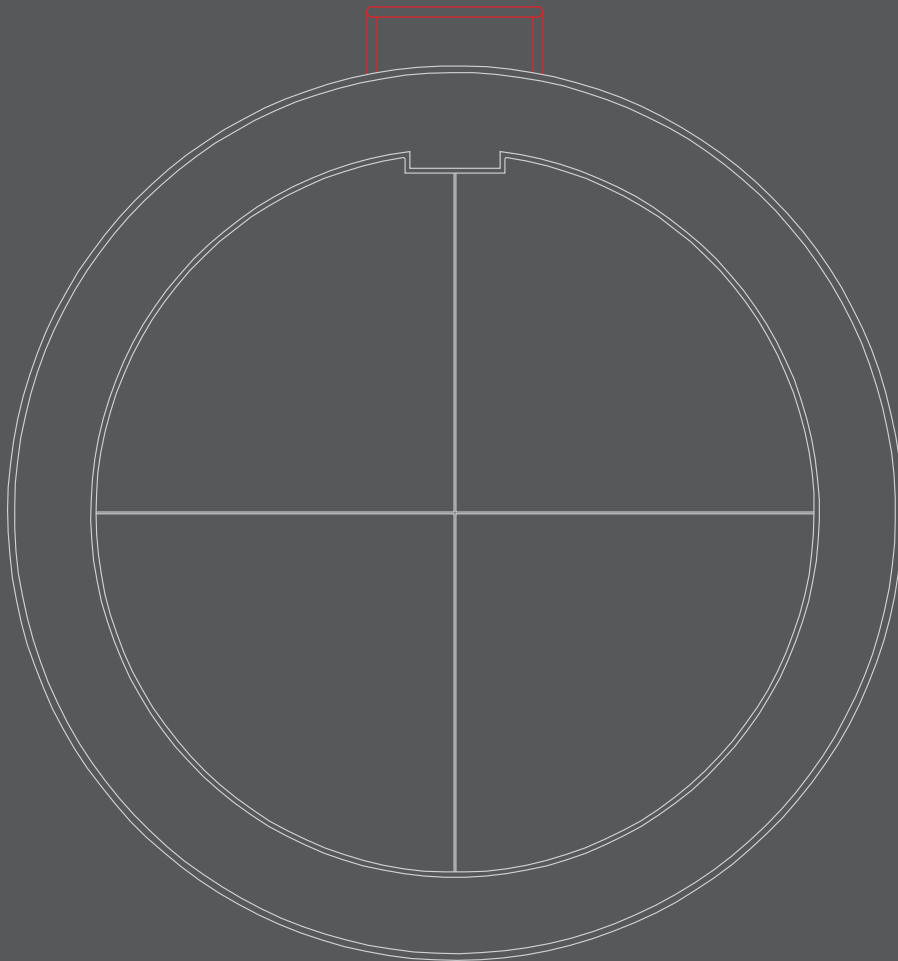
The LED is used to show different states of the BopPad.

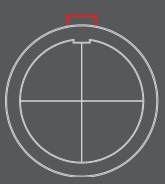
While connected via USB, the LED is green when powered on, and orange when the BopPad is being interacted with.

When connected to a MIDI Expander, the LED is red when powered on and orange when the BopPad is being interacted with.

A breathing green/red combination indicates the device is in bootloader mode, ready to receive a firmware update.

BopPad Editor





5 - BOPPAD EDITOR

This section covers the BopPad Editor. It will cover the basic operation and features of the Editor, along with any differences between the desktop and web editors.

5.1 THE EDITOR

The BopPad Editor is where you define what data your BopPad will send, how it will send the data, and how that data is controlled by the different sources.

5.1.1 THE PRESET SECTION

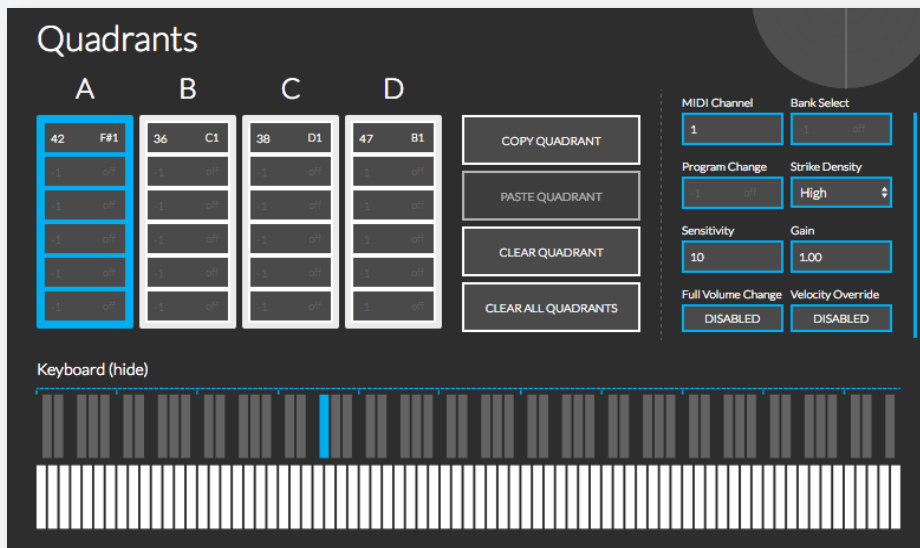


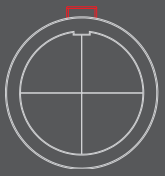
The Preset section allows you to save, recall, and send presets to the BopPad. The BopPad can hold up to 4 presets. Presets can be selected by sending Program Change Messages to the BopPad from Software or Hardware. Simply send a program change message 0-3 to select one of the 4 onboard presets.

You select a preset with the menu at the top. There are buttons, for choosing a destination on the BopPad, sending the preset to a slot on the BopPad, saving the preset, saving the preset as a copy, reverting the preset, and deleting the preset. When saving as a copy, preset names are limited to 16 characters.

The Editor can store an unlimited amount of presets, and you can import and export presets using the File Menu. You can also import user presets by dragging and dropping .json files onto the Presets box. As long as there are no naming conflicts or duplicates, the preset will be imported.

5.1.2 THE QUADRANTS SECTION





The Quadrant section allows you to select and edit the notes for a particular quadrant. Select a quadrant by clicking the corresponding portion of the BopPad icon. You can also select quadrants by pressing shift + z, x, c or v. The BopPad icon also provides useful information on connection status, and firmware updates.

Each quadrant can send up to 6 notes at a time. You can type these into the boxes, or use the keyboard to enter them graphically. You can hide or show the keyboard by clicking the show/hide text.

There are buttons for copying, pasting, and clearing the selected quadrants note data, along with a button to clear all quadrants note data if you want to start over.

You can set the MIDI channel that the quadrant will send on with the MIDI Channel box. Use the Strike Density to optimize the response for different play styles. Fast and light stick playing will benefit from higher settings. More expressive playing will benefit from lower settings. You can choose to send program change and bank messages whenever the preset is selected with the Program Change and Bank Select Boxes. You can control the sensitivity of each quadrant individually, and the overall gain of the quadrant with the Sensitivity and Gain boxes. Gain will be applied to all data related to pressure. Sensitivity controls how hard you have to hit the BopPad surface to trigger the modlines. Gain controls the output values of the velocity and pressure sources.

You can enable or disable Full Volume on preset change, and Velocity Override with the Full Volume Change and Velocity Override buttons. Full Volume Change will send a 127 velocity when you change presets to prevent software or hardware instruments getting stuck at a lower volume when changing presets. Velocity override will force every note to output 127 velocity regardless of how hard you hit the BopPad surface.



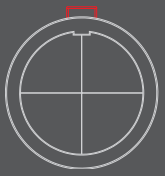
5.1.3 THE MODLINES

The modline section is where you define and edit any control data you wish to send from the BopPad. The Note modline is always active.

MESSAGE TYPE

The message type defines what type of data will be sent from the modline. The Note modline is always present (though it can be turned off). The other possible MIDI data includes:

- Pitch Bend
- Channel Pressure
- Polyphonic Aftertouch
- Continuous Controller (CC)



SOURCE

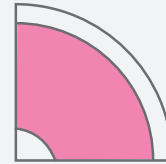
The source menu defines what data from the BopPad will be used to trigger this modline. Choices include:

- Off - no data will be sent.
- Velocity - velocity data (based on how hard you hit the surface) will be used.
- Pressure - how hard you press on the surface after striking will be used.
- Initial Radius - where you initially strike the surface will be used.
- Radius - the position of where you are pressing onto the surface.
- Relative Radius - the difference between where you are currently pressing the surface and where you initially struck the surface.



Radius values are measured with 1 at the center and 127 at the edge.

There is a usable area for radius values on the BopPad. The values do not go edge to edge, but start at 1 a small distance from center, and stop at 127 a small distance from the edge.



INVERT SOURCE

Inverts the data from the source.

GAIN

Applies a gain coefficient to scale the data from the source up or down.

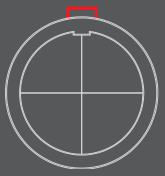
OFFSET

Offset the data by a fixed amount.

CURVE

Apply one of seven predefined curves, or a user defined curve to the data.

- Linear - no shaping of the data.
- Logarithmic - use a logarithmic curve to shape the data.
- Exponential - use an exponential curve to shape the data.
- Light - soft hits are unchanged, and it makes it harder to reach higher velocities
- Medium - makes softer hits softer, and then evens out as velocity goes higher.
- Hard - makes really soft hits 0 velocity, makes soft hits much softer and makes it easier to reach higher velocities. a



- Dynamic - soft hits are normalized and medium and hard hits have a logarithmic curve applied.
- User - use a user defined curve to shape the data.

MIN

Set a minimum value for the data.

MAX

Set a maximum value for the data.

SOLO

Only sends the data from the corresponding modline. Useful for MIDI mapping in DAWs and other music software. This is set to off on power cycle, or a preset load.

LIVE VALUE

The real-time value of the source. Helpful for fine tuning the response of a sensor to a desired range or destination.



Even though you can monitor the updates in real time, you still need to save and send the preset to the BopPad for the preset to be stored onto the device.

Device Settings

UNISON MODE

DISABLED

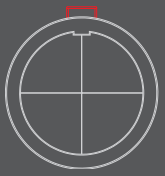
ALL QUADRANT MODE

DISABLED

5.1.5 THE DEVICE SETTINGS

The Device Settings section contains settings that influence the overall behavior of your BopPad.

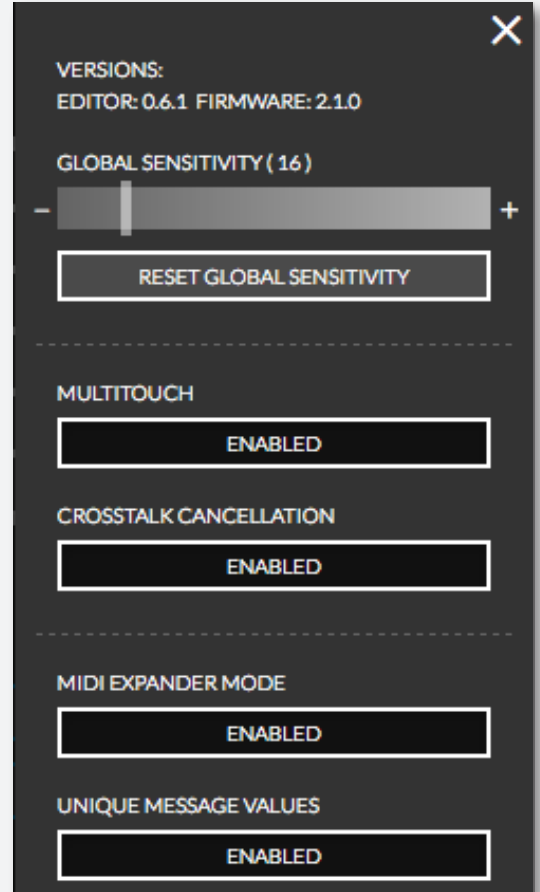
- Unison Mode - Makes BopPad function as one quadrant (all four quadrants use the settings for the selected Unison Quadrant). Any quadrant can be the Unison quadrant by selecting that quadrant and clicking on the Unison button.
- All Quadrant Mode - Allows you to edit the note values, modline values, and quadrant settings for all four quadrants at the same time.



5.1.6 PREFERENCES

The Preferences pane contains some additional options for fine tuning your BopPad that are device wide and apply to all presets. You can access the preferences pane by clicking the 'Preferences' button in the Web Editor, or by selecting 'Preferences' from the BopPad Editor menu (or by hitting cmd + ,).

- Global Sensitivity - Controls the sensitivity of the BopPad. Use this to adjust the response of the BopPad to fit your playing style and environment. This is very important for eliminating false triggers. You can reset the sensitivity (to the default 16) with the button below the slider.
- Send Full Volume on Preset Change - will send a full volume message (CC 7, value of 127), this prevents you getting the volume stuck in a lower position when moving from a preset that controls volume, to one that doesn't.
- Multitouch Mode - Allows BopPad to send/respond to additional hits without releasing any currently active quadrants. This is particularly useful for hand/finger drumming when retriggering a quadrant while manipulating pressure or radius is desired.
- Crosstalk Cancellation - Reduces the chances of unintended hits being triggered on nearby sensors/quadrants.
- MIDI Expander Mode - turn MIDI Expander communication on or off.
- Version numbers: The version of the Editor and the Firmware on the connected BopPad will be displayed in the lower left. There will be an auto update feature for the Editor, as well as new firmware notifications.
- Unique Message Values: Enabling this setting prevents the BopPad from sending messages associated with radius or pressure, unless they change. Some MIDI hardware does not respond well to extremely high density data streams.



5.2 THE DESKTOP EDITOR

The Desktop Editor will run on Mac OSX 10.6 - 10.12.

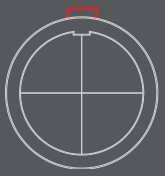
The Desktop Editor will run on Windows 7, 8, and 10.

5.2.1 THE MENU BAR (STANDALONE EDITOR ONLY)

The various menu items at the top give you access to file management features, the preferences, and built in help options.

The BopPad menu - open the preferences, check the firmware/Editor version or check for updates.

The View menu - allows you to customize the size of the Editor, enter/exit fullscreen, reload the editor, and open up the console to view status/error messages which can be helpful when contacting support.



The Presets menu - allows for importing and exporting of BopPad presets and exposes [User Tables](#).

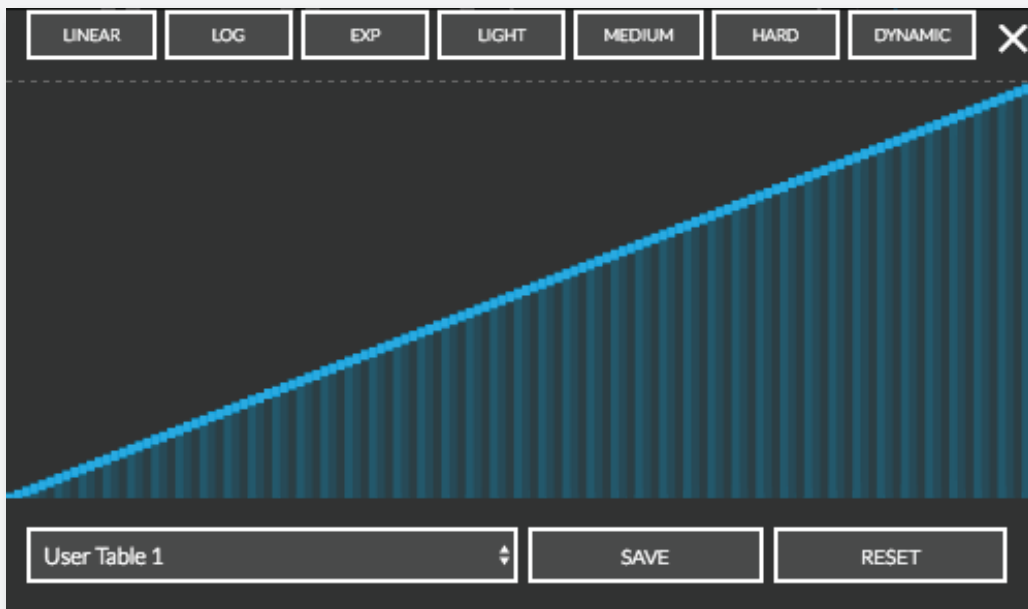
The Hardware menu - update/reload the firmware onto the connected device.

The Help menu - open the documentation, and toggle tooltips on or off.

5.2.2 USER TABLES

User tables can be edited by navigating to the User Tables item from the Presets Menu, accessible in the menu bar.

You can store up to 4 user tables in the BopPad. You can start from any of the included tables then



shape them to suit your needs. You can use the user tables to shape data from any source and they can be very useful in fine tuning the response of velocity and pressure. They can also be used to do more specialized data shapes, such as stair stepped, or quantized data. If you try to load a preset with a user table to a BopPad with no user tables on it, it will default to whatever is in that slot or a linear table.

To edit a table, select the destination then use your mouse to draw the desired table. Save the table, and then you can use this table in any modline.

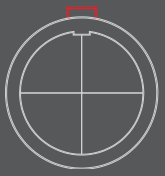
5.3 THE WEB EDITOR

Any WebMIDI capable browser will be able to successfully run the Web Editor. The Web Editor is functionally identical to the desktop Editor, with a few minor cosmetic differences.

Find the web Editor here: <https://files.keithmcmillen.com/products/boppad/editor/>



You may need to give the browser permission to control your MIDI device. This is simply a security precaution when sending SysEx to a MIDI device.



5.4 FACTORY PRESETS OVERVIEW

The Editor comes with four factory presets to get you started quickly.

PRESET 1 - UNIVERSAL

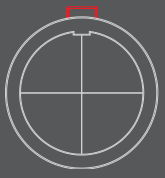
This preset will be on your BopPad when you power it on for the first time, and was designed with compatibility with a variety of MIDI software/hardware in mind.

- Quadrants output some standard General MIDI notes. Starting from quadrant 1, the notes are 42/F#1 (Hi Hat), 36/C1 (Kick), 38/D1 (Snare), 47/B1 (Low Tom)
- All Quadrants on MIDI channel 1
- All Quadrants have sensitivity of 10
- All Quadrants have a gain of 1.0
- Radius sends CC1 (mod wheel)
- Global sensitivity is set to 16
- Multitouch is set to ON
- Strike Density is set to High

PRESET 2 - UNISON

This preset uses unison mode and sends MIDI CCs for pressure and radius.

- All quadrants send MIDI note 38/D1 (GM Snare) on MIDI channel 1
- All Quadrants have sensitivity of 10.
- All Quadrants have a gain of 1.0
- Velocity Curve is Logarithmic
- Pressure sends CC1 (mod wheel)
- Radius sends CC 2
- Crosstalk cancellation is set to ON
- Global sensitivity is set to 16
- Multitouch is set to ON
- Strike Density is set to High



PRESET 3 - STICKS

This preset is tuned for use with sticks, and is multi-channel

- Quadrants output some standard General MIDI notes. Starting from quadrant 1, the notes are 42/F#1 (Hi Hat), 36/C1 (Kick), 38/D1 (Snare), 47/B1 (Low Tom)
- Each quadrant sends on a unique MIDI channel
- All Quadrants have sensitivity of 10.
- All Quadrants have a gain of 1.0
- Velocity Curve is Logarithmic
- Pressure sends CC1 (mod wheel)
- Radius sends CC 2
- Crosstalk cancellation is set to ON
- Global sensitivity is set to 16
- Multitouch is set to ON
- Strike Density is set to High

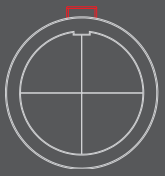
PRESET 4 - HANDS

This preset is tuned for use with hands.

- Quadrants output hand percussion General MIDI notes. Starting from quadrant 1, the notes are 61/C#3, 64/E3, 63/D#3 and 60/C3
- Each quadrant sends on a unique MIDI channel
- All Quadrants have sensitivity of 10.
- All Quadrants have a gain of 1.0
- Velocity Curve is Logarithmic
- Pressure sends CC1 (mod wheel)
- Radius sends CC 2
- Crosstalk cancellation is set to ON
- Global sensitivity is set to 16
- Multitouch is set to ON
- Strike Density is set to Low

Troubleshooting





TRY A NEW USB CABLE

One of the first (yet most often overlooked) things to try is a different USB cable, preferably one that is known to work well. When a cable goes bad it can lead to all sorts of odd behavior (flaky connections, dropped messages), or no behavior at all (won't even power on).

TRY PLUGGING INTO A DIFFERENT USB PORT

It's possible that trying a different USB port on the computer may lead to a proper connection. While extremely rare, we have come across USB ports that just don't seem to like some USB devices.

DO NOT USE AN UNPOWERED USB HUB

Unpowered USB hubs may not be able to provide enough power to the BopPad, leading to connectivity issues. Unpowered hubs typically divide the power coming from the computer's USB port and split it up between all of the hub's ports – providing less power than if the BopPad were to be directly connected to the computer's USB port. If a USB hub is absolutely necessary, it is recommended to always use a powered hub.

TRY WITH OR WITHOUT A USB HUB

If experiencing connectivity issues while using a USB hub, try without the hub and plug directly into the computer's USB port. The reverse holds true as well – if experiencing connectivity issues while not using a USB hub, try with a hub (if one is available to you).

BE AWARE OF BUGS NATIVE TO THE OPERATING SYSTEM BEING USED

While it is indeed possible the BopPad may be the source of issues, sometimes the cause is actually due to the operating system itself. Always be aware of these issues, like the Mac OS CoreMIDI bug or the Windows class-compliant device limitation.

SEND THE RECALIBRATION, AND ALL NOTES OFF MIDI MESSAGES

Sending the "Reset all controllers" message (CC 121) to the BopPad on any channel will perform a short recalibration. Sending the "All Sounds Off" message (CC 120) to the BopPad on any channel will make it output a note off message for all notes across all quadrants.

CONNECT TO A DIFFERENT COMPUTER

If the BopPad is not making a connection to the computer at all (and all other troubleshooting issues have been exhausted), it is recommended to try connecting it to a different computer. If it works on the new computer, try the original one again. In some circumstances we have seen this solve connection issues.

AN IMPORTANT NOTE ABOUT USB CABLES

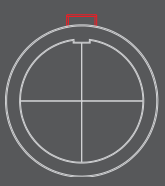
We always recommend using the USB cable(s) that shipped with your BopPad. Sadly, not all USB cables are created equal.

If you are having troubles powering your BopPad or connecting to a computer, please make sure you are using the USB cables that came with your BopPad.

We fully understand that it seems like using different USB cables shouldn't matter, but it really can have a drastic effect on operation, not just with BopPad, but with all USB devices. We often encounter devices that appear to not be functioning properly; very often the only thing needed is to swap out the USB cable for another one.

F.A.Q.





DO I NEED A COMPUTER TO USE MY BOPPAD?

No! With the optional MIDI Expander you can send MIDI data to any device that use a 5 pin MIDI connection. Keep in mind that the BopPad only has one USB port, so communication is limited to the computer, OR 5 pin MIDI devices.

WHAT CAN I USE TO INTERACT WITH MY BOPPAD?

The BopPad is comfortable with drum sticks, mallets, your bare hands, and many other objects!

MY BOPPAD JUST SENDS A CONSTANT NOTE. IS IT BROKEN?

Probably not, and there's a few things you can do. When powering on, BopPad goes through a short calibration routine. It's important not to be touching any of the sensors during this time. Placing pressure on the sensors could result in stuck notes. Generally a simple power cycle will restore the unit to normal behavior. A firmware reinstall from the Editor can also alleviate hardware quirks.

Sending the "Reset all controllers" message (CC 121) to the BopPad on any channel will perform a short recalibration. Sending the "All Sounds Off" message (CC 120) to the BopPad on any channel will make it output a note off message for all notes across all quadrants.

I PLUGGED IN MY BOPPAD AND IT ISN'T MAKING ANY SOUND. WHAT'S WRONG?

It's highly likely that nothing is wrong! The BopPad is a MIDI controller, which means it doesn't actually make sound on its own. Instead, it sends MIDI messages, which are used to control other sound generating software/hardware. A seemingly minor distinction, but is actually quite important to understand.

Just open up any audio software that is able to respond to incoming MIDI messages and, depending on the software, BopPad should start working right away. It's possible there may be more steps required to properly configure an application to respond to an attached MIDI device – please refer to the software's documentation if this is the case.

CAN I USE MORE THAN ONE BOPPAD AT A TIME?

Yes! You can use as many BopPads as you can keep track of. It would be helpful to put different presets on each device that send on different MIDI channels, or that send different notes and control messages to avoid confusing the software or hardware you intend to control.

WHAT KIND OF CYMBAL STAND DOES THE BOPPAD MOUNTING BRACKET FIT ON?

Any standard cymbal stand with an 8 mm post size will do!

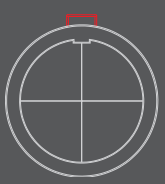
MY BOPPAD IS SENDING UNEXPECTED MESSAGES, IS IT BROKEN?

Probably not! Be sure that the BopPad is on a flat surface, or in the mounting bracket. You also might need to adjust the global sensitivity, quadrant sensitivity or enable crosstalk cancellation.

HOW DO I CONNECT TO A MOBILE DEVICE?

To connect to an iOS device, we recommend using an Apple branded Camera Connection Kit (USB to Lightning adapter). To connect to an Android device, you should use a USB OTG cable.

Safety Precautions



MEDICAL DEVICES

BopPad may emit electromagnetic fields. These electromagnetic fields may interfere with pacemakers or other medical devices. If you wear a pacemaker, maintain at least 6 inches (approximately 15cm) of separation between your pacemaker and BopPad. If you suspect BopPad is interfering with your pacemaker or any other medical device, stop using BopPad and consult your physician for information specific to your medical device.

MEDICAL CONDITIONS

If you have any medical condition that you believe could be affected by BopPad (for example, seizures, blackouts, eyestrain, or headaches), consult with your physician prior to using BopPad.

EXPLOSIVE ATMOSPHERES

Do not use BopPad in any area with a potentially explosive atmosphere, such as a fueling area, or in areas where the air contains chemicals or particles (such as grain, dust, or metal powders). Obey all signs and instructions.

REPETITIVE MOTION

When you perform repetitive activities (such as hitting the BopPad with sticks), you may experience occasional discomfort in your hands, arms, wrists, shoulders, neck, or other parts of your body. If you experience discomfort, stop using BopPad and consult a physician.

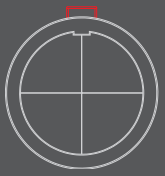
HIGH-CONSEQUENCE ACTIVITIES

BopPad is not intended for use where the failure of the device could lead to death, personal injury, or severe environmental damage.

CHOKING HAZARD

Some BopPad accessories may present a choking hazard to small children. Keep these accessories away from small children.

Kickstarter Backers



KICKSTARTER BACKERS

We would like to thank all of our backers that helped make BopPad a reality!

Alan Nguyen, Alexander von Schlinke, Andrew Traverse, Ben Kamen, Ben Woodruff, Brian K Cannon, Casey Neiditch, Chara Peisach, Daniel Silberstein, Dave Muhich, Dennis Talavera, Douglas Shagam, Elliot K. Goldman, Graham Hunter, Graham Jones, Grey Burkart, Harry Harcrow, Joel Sampson, John Holland, John Lee, Jonathan El-Bizri, Jonathan Newell, Joshua Dutton, Justin Carel, Kevin Mitts, Kevin Quickle, Marcus Jaynes, Matthew Boutwell McCaughan, Michael Dunkley, Michael Klatskin, Mitchell Fukumoto, Moti Zemelman, Nicholas Sylvester, Nick Yulman, Oren Levy, Peter Allen, Rene Beland, Richard Jernigan, Ryan DuBois, Scott Sharon, Steve Joslin, Steve Mendoza, Neil H Goldstein, Robin Nijor, Christian Armin David Hopkins, David Pulferer, Duncan MacLennan, Eluard Julien, Erling Zahl Urke, Gael Navard, Gert JALASS, Jan Ola Korte, Kaleb Laurence Stevens, Kazuhisa Sakai, Kim Kyeungwook, Lindsey Chua, Magnus Larsson, Matthew Martellacci, Matthias Maier, Michael Nickl, Mikko Ratia, Naoki Takahashi, Robert Reid, So Ishida, Stefano Scapin, Tim Nicholls, Tobias Boehm, Tomasz Matysiakiewicz, Yang Wang, Adam Partridge, Andrew Houchin, Andrew Kim, Andrew Raffo Dewar, Bill Gribble, Bob Morris, Brandon Granberry, Brian Ward, Bruno Orsini, Bryan Levay, Buzzy Manning, Carlos Herrera Delegado, Charles Andrew Edwards, Charles Neugebauer, Chris Ayers, Chris Chain, Dale Riffe, Damian Doucette, Dan Erlandson, Daniel Rodgers, Doug Werner, Eric Luce, Eric Tauer, Francis Brennan, Greg Lind, Howard McMillan, Ian Berve, Ian Remulla, James Neu, James Stokes, James Tetrick, Jamie Lowry, Jayant Menon, Jeff Sorbo, Jeffery L Moore, Jennifer Martinez-Bre, John "Jack" Cornell, John Hanes, Jon Harnum, Jonathan Bovey, Joseph Trent, Joshua Dilley, Juan Pablo Vidales, Justin Pearson, Kuantsai Lee, Landon Gennetten, Larry Ehrlich, Lee Elrod, Lee Ray, Leo posey, Mads V Pedersen, Marcus Segal, Matt Price, Matthew Osborne, Mea Lama, Michael Kivetz, Michael Wiener, Mine fullerton, Nathanael Iversen, Nicholas Mack, Nolan Reese, Otis Carroll, Paul Blair, Paul Walters, Peter R Valeri, Peter Schmalfeldt, Philip Naaden, Rafael Martinez, Raymond Porfiri, Richard J Seymour, Robert Yoso, Sami Al-Qaisi, Scott Downie, Scott Rhatigan, Shu-Kuang Lin, Steven Blum, Suryaprakash Tripathi, Tim

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