



hover midi



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Credits

Designed in Bristol, UK by Archaea.

Many thanks to Sean Costello (Isostatic) and Martin Stürtzer for beta testing and feature suggestions.

MADE IN THE UNITED KINGDOM

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First of all, thank you for purchasing Hover MIDI from Archaea! We hope this provides you with a fun and useful way of adding movement to your modulations!

Overview

Hover MIDI is a MIDI synthesizer beam controller that can be used to add expression to modulation creation with the ease and control of a hand movement. Vertical hand movements are measured with an infrared beam and converted into MIDI control messages. The output can be frozen in a variety of ways using the modifier button. This manual covers the Hover MIDI model only, the Hover and Hover Euro analog beam controllers are covered [here](#).

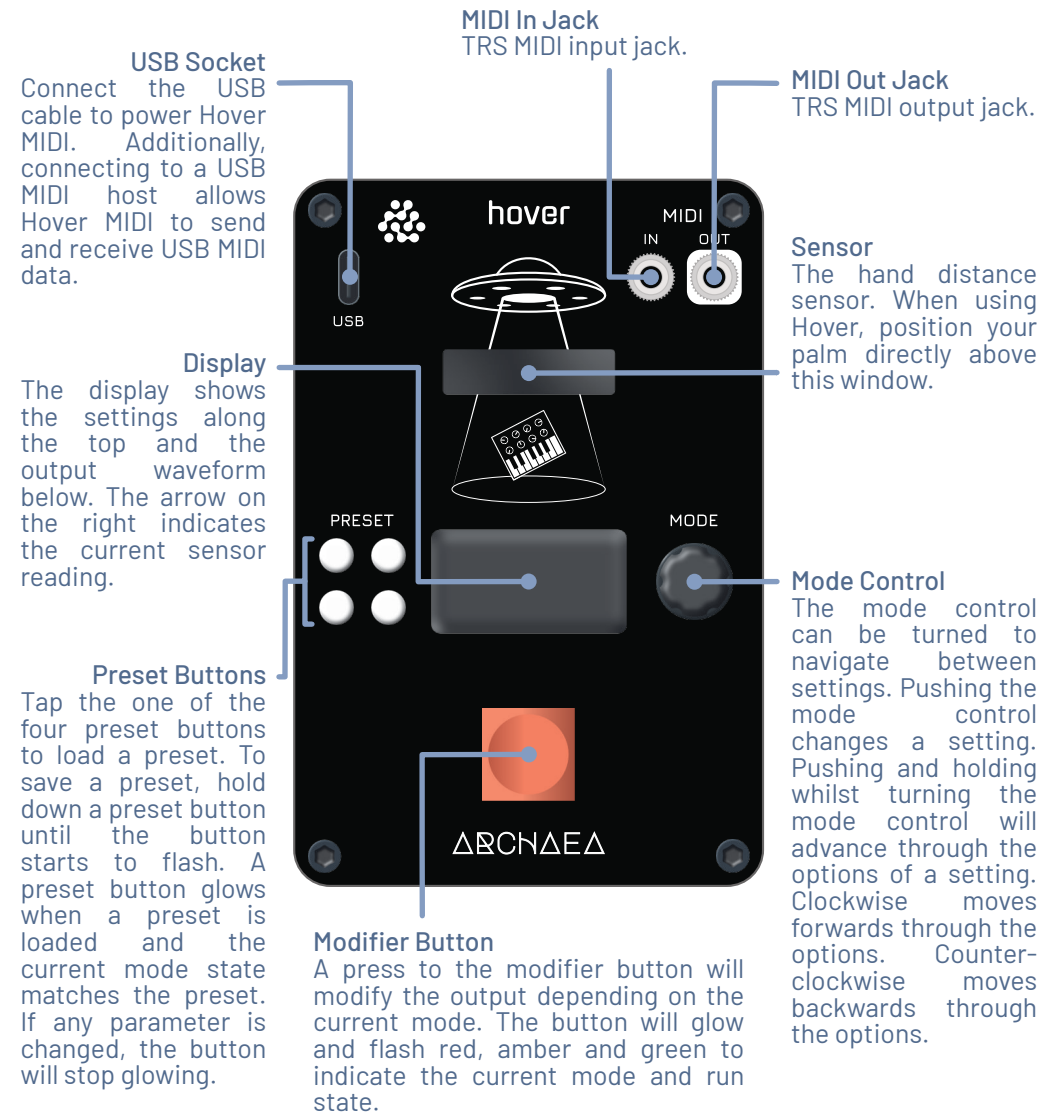
Getting Started

The front panel of Hover MIDI is shown in the diagram to the right, **Front Panel**. Hover MIDI is powered through the USB-C socket. First, connect the USB cable to a USB power source, or a USB host. A suitable USB host can be a computer, hardware USB host adapter, or hardware sequencer. When connected to a USB host, Hover MIDI can send and receive USB MIDI data. Hover can also send and receive MIDI data through the TRS MIDI in and out connections. MIDI data can be transferred directly to other MIDI devices using the TRS MIDI connections using standard MIDI cables.

Hover MIDI ships starting up in the first preset, which sets the modifier button mode to the toggle (TOGG). The modifier button glows continuous red, meaning the output is being held in the stop state. Press the modifier button to toggle into the run state, which is indicated by the modifier button flashing green. The MIDI output will send modulation wheel messages (MIDI continuous controller 1) tracking between 0 and 127 as you move your hand up and down in front of the sensor. To freeze the output, press the modifier button with your other hand, which toggles back to the stop state.

The display shows the output waveform as you move your hand. The waveform moves with your hand when in the run state, and stays at a fixed level in the stop state. The arrow on the right shows the current sensor level, which can be used to restart the output when aligned with the level where it was previously stopped. Additionally, the modifier button will also glow amber when the sensor level is aligned with the output stop level.

Front Panel





Settings

Navigating Settings

The settings are shown in a line at the top of the display. To navigate between settings, turn the mode control clockwise to move to the next setting on the right, or counter-clockwise to move to the next setting on the left. If you move beyond the rightmost setting, the display will switch to the next page. If you move beyond the leftmost setting, the display will switch to the previous page. An arrow at the left or right of the settings indicates that you can move to the next or previous pages. When there is no arrow on either side, you are at either the start or end page.

Changing Settings

Pushing the mode control changes a setting. Pushing and holding while turning the mode control will advance through the options of a setting. While holding, clockwise moves forwards through the options, and counter-clockwise moves backwards through the options.

Table 1 shows the settings in each of the pages, and the range of options for each setting. There are between 1 and 3 settings in each page. Pages 1 and 2 are performance related settings that can be stored in a preset. Pages 3 to 6 are global settings related to general operation. Each of the settings are described in more detail in the following sections.

Presets

There are 4 presets directly accessible from the preset buttons on the front panel. Hover MIDI can store 8 banks of 4 presets, giving 32 presets in total. Tapping a preset button will load the preset settings from one of the four presets in the currently selected bank. Holding down a preset button for 2 seconds will save the settings into the preset. The button flashes when the preset has been saved and the button can be released. The preset buttons glow when a preset is selected, and the current settings match the preset. Changing a setting cancels the preset and all preset buttons stop glowing.

Using Banks

To change the preset bank, navigate to the 'BANK' setting on page 3, setting 2, and change its value. When the bank number has been changed, the presets from that bank can then be loaded or saved using the preset buttons.

PAGE	TYPE	SETTING 1	SETTING 2	SETTING 3
1	PRESET	Modifier Mode TOGG / HOLD / ZERO / SAMP	Invert INVERT off / on (✓)	Linear LINEAR off / on (✓)
2	PRESET	MIDI Controller CC000 - CH127 / CCD00 - CCD31 / PITCH BEND / CHAN PRESS	MIDI Channel CH01 - CH16	MIDI Port USB / TRS
3	GLOBAL	MIDI Learn LEARN off / on (✓)	Preset Bank BANK 1 - BANK 8	NOT USED
4	GLOBAL	Display Scroll Speed LO / MED / HI	Output Frequency 10 / 20 / 50 / 100 / 200 / 500 (MIDI messages/sec)	NOT USED
5	GLOBAL	Display Sleep OFF / 1 / 2 / 5 / 10 (mins)	NOT USED	NOT USED
6	GLOBAL	Load Presets Using MIDI SysEx Start load on push	Save Presets Using MIDI SysEx Start save on push	NOT USED

Table 1: Settings pages.

The presets and banks can be changed by sending a program change MIDI message to Hover MIDI by either USB or TRS MIDI. The program change numbers are mapped in sequence to bank 1, preset 1 to 4, then bank 2, preset 1 to 4, and so on.



Modifier Button Modes

TOGG: Toggle Mode

The modifier button toggles between stop (red glow) and run (green flash) states. When running, the output follows the sensor input. When stopped, the output is the last sensor input before being stopped.

HOLD: Hold Mode

The modifier button switches between the run (green glow) state when held, and the stop (red flash) state when released.

ZERO: Zero Mode

The modifier button switches between the run (green glow) state when held, and the stop (red flash) state with the output returned to zero when released.

Note: when the MIDI Controller is set to PITCH BEND, the zero mode will output a pitch bend value of zero when the modifier button is released. This is in the middle of the MIDI pitch bend range, and so the output returns to the centre of the range.

SAMP: Sample Mode

The modifier button samples and holds the current sensor input when pressed (single green flash), and is otherwise in the stop (red glow) state.

Invert Mode

The invert mode will swap the direction of the output level with respect to the sensor level. When invert is enabled, the output will rise as your hand moves closer to the sensor.

Note: the ZERO mode always outputs a zero message when the modifier button is released in the stop state, even when the output is inverted.

Linear Mode

The intrinsic response of the sensor is a non-linear function of $1/\text{distance}$, which tends to bunch most of the response close to the sensor. The Linear setting allows Hover MIDI to give an output that is approximately proportional (linear) to hand distance. This gives a more natural 'feel' and a more usable hand-distance range, but a lower resolution and a slightly more noisy response at the top of the hand-distance range. The non-linear response may be useful if very a low-noise response is required



MIDI Controller

The MIDI Controller setting determines the MIDI controller output message. The display shows the MIDI message number and/or the standard MIDI naming, where one is assigned. Hover can output four types of MIDI controller messages which are described in **Table 2**.

Option	Description	Output Range
CC000 - CC127	The 128 continuous controller (CC) messages (each with 7-bit precision).	0 - 127
CCD00 - CCD31	The 32 double-precision CC messages (each with 14-bit precision).	0 - 16383
PITCH BEND	The pitch bend message (14-bit precision).	-8192 - 8191
CHAN PRESS	The channel pressure message.	0 - 127

Table 2: MIDI controller messages.

The sensor is read with a precision of 10-bits currently. For 7-bit messages, the lower 3 bits from the sensor are not used. For the 14-bit messages, the lower 4 bits in the output message are not used, giving an output precision of 10-bits.

MIDI Channel

The MIDI channel setting determines the channel that the output messages are sent out on, from 1 - 16.

MIDI Port

The MIDI port setting determines which front panel ports are used to transfer MIDI data over. This can either be the USB MIDI port, or the TRS MIDI input and output ports.

Note: the TRS MIDI jack sockets need type A cables.



MIDI Learn

When MIDI learn is enabled, the MIDI controller and channel from incoming MIDI CC messages will set the MIDI message settings. You can use this to quickly set up controlling a parameter on a synth, for example, by twiddling a knob when the synth is set to transmit CCs for each parameter. The learn function uses the port set by the MIDI Port setting as the source of MIDI CC messages.

Important: Currently, Hover does not support NRPN CC format so will not correctly learn if it receives these messages. Any learn source must transmit the basic 7-bit or 14-bit CC messages, pitch bend, or channel pressure.

Preset Bank

The preset bank setting determines the currently selected preset bank. There are 8 banks in total, each of which can store 4 presets. The 4 preset buttons will load and save presets using the currently selected bank.

Display Scroll Speed

The display scroll speed setting determines the rate that the scope display scrolls, with the options of high (HI), medium (MED), and low (LO). The display scroll speed can be lowered to allow more history to be displayed on the screen at one time.

Output Frequency

The output frequency setting determines the maximum number of MIDI messages transmitted per second, which can be between 10 - 500. The actual rate is usually lower in practice, as Hover MIDI only transmits a message when the output value changes.

Display Sleep

The display sleep setting determines the time in minutes to put the display to sleep after Hover MIDI is left inactive. The OFF option will never put the display to sleep.

Load Presets Using MIDI SysEx

Hover MIDI can transfer all the preset banks and global settings over MIDI to a computer or any other host that can manage MIDI System Exclusive (SysEx) data. A computer will need a suitable application for receiving, sending and storing the data, such as a SysEx librarian.

Before loading settings they must be previously saved from Hover MIDI, see Save Presets Using MIDI SysEx below. To load the settings from a MIDI host, click the mode control on the 'LOAD SYSX' utility. Hover MIDI will enter load waiting mode, displaying 'WAITING...', where it will wait for a suitable MIDI SysEx message containing the settings data on the currently selected port. Clicking the mode control will cancel load waiting mode.

If the message is successfully received, Hover MIDI will exit load wait mode. If the load fails, 'FAIL!' will be displayed. Clicking the mode control will clear the fail message and the load can be retried. The preset and global settings will only be updated if all the data is successfully received.

Save Presets Using MIDI SysEx

To save the preset bank and global settings to a host by SysEx message, first ensure a host is ready to receive on the selected port, and then click the mode control on the 'SAVE SYSX' utility. After 2 seconds Hover MIDI will transmit the preset and global data. If the data is successfully received and stored, then this data can be reloaded at a later time using the 'LOAD SYSX' utility.



- Hover MIDI is a class-compliant USB MIDI device, so it does not need a host driver to be installed on a computer when connected by USB. It should work with any class-compliant host that can provide at least 150mA of current to the USB port that Hover MIDI is connected to. It's been tested on Mac OS 13 and Windows 10.
- The sensor reading bottoms out at 'zero' when your hand is about 3-4cm away from the module panel. Moving your hand closer will eventually cause the sensor input to start rising again.
- The beam sensor samples at approximately 100 times a second.
- The mode settings are stored when the power is off. They are stored 2 seconds after the last mode change. IMPORTANT: Hover MIDI should be turned off a few seconds after any settings are changed to avoid the settings from being stored incorrectly.
- We recommend using right-angled MIDI TRS cables, as straight jack cables can prevent your hand from getting close enough to the panel when reaching the bottom of the range. A suitable cable is the Boss BMIDI-5-35:

<https://www.boss.info/uk/products/bmidi-5-35/>



New features and bug fixes are released as new firmware versions. They are made available at archaea.co.uk/hover-midi. The firmware can be updated by connecting Hover MIDI to a computer with the USB cable. The firmware update procedure is as follows:

1. Disconnect the USB cable from Hover MIDI.
2. To enter firmware programming, hold down MODE while you connect Hover MIDI directly to a computer USB port. The first preset button should glow red.
3. The firmware is released as a MIDI SysEx file, with extension .syx. To load the firmware into Hover MIDI, you need to use a SysEx utility. Elektron's Transfer utility is recommended for this as it is rate limited which makes it reliable:

<https://elektron.se/support-downloads/transfer#resources>

4. Start the SysEx file transfer. In Elektron Transfer, click on the 'go to the SYSEX TRANSFER page' and select the file and 'Hover' from the device list. Press Send.
5. The preset LEDs should flash and then glow one by one.
6. The transfer is complete when the blue preset LED has finished flashing. Hover MIDI will then reboot into the new firmware. If the transfer stalls, reboot Hover MIDI manually by unplugging and replugging the USB cable while holding down MODE and restart the transfer.



Features

- USB MIDI and TRS (3.5mm stereo jack, Type A) MIDI in and out
- Sensor range: 0-300mm
- Outputs continuous controller, pitch bend and channel pressure MIDI messages
- Modes: toggle, hold, zero, sample
- 32 presets over 8 banks, MIDI SysEx bank load/save
- Real-time output waveform display

Measurements

Width	77mm
Height	116mm
Depth	58mm
Power	USB-C 5V, 150mA requirement from host

Safety Instructions

1. Keep this equipment away from water.
2. Clean only with a dry cloth.
3. Keep away from sources of heat, such as radiators or other apparatus that produces heat.
4. Operating temperature range 5° to 45°C (41° to 113°F).

This product is not designed or intended to be used by children.

Warranty

Archaea Modular Synthesis Ltd warrants this product to be free of defects in materials or workmanship and to conform with the specifications at the time of shipment for two years from the date of purchase. During that period, any malfunctioning or damaged units will be repaired, serviced, and calibrated on a return-to-factory basis. This warranty does not cover any problems resulting from damages during shipping, incorrect installation or power supply, improper working environment, abusive treatment, or any other obvious user-inflicted fault. For more information contact support@archaea.co.uk quoting the serial number, which can be found on the reverse of the product.

Disposal



This product must NOT be disposed of with household waste. It should be taken to a recycling centre licensed for the recycling of waste electrical and electronic equipment (EEE). Please contact your local city office for more information of where you can take waste equipment.

Legal Disclaimer

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