PianoHack

LIVE PIANO CHORDING ENGINE

PianoHack

User Manual

Right notes. Every time.

The right-notes MIDI add-on for any programmable controller.
Setup, play methods, hardware, MIDI reference, and updates.

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Contents

PianoHack User Manual

NOTE: This manual covers the PianoHack hardware unit and its MIDI feature set. Some features are optional .. you only need to set up the features you want to use!

01

WELCOME

Introduction

The PianoHack is a MIDI add-on that lets you play full piano chords on any programmable MIDI controller — without hitting wrong notes.*

You provide the rhythm and dynamics; the PianoHack turns your input into the right notes. You provide the rhythm and dynamics, the Piano Hack will turn wrong notes into right notes.

Plus if you know a little about piano chords, then all your right notes will still be right. And if you hit some clunkers than the PianoHack will turn them into right notes.

The Piano Hack provides many features like Bass accompaniment, quick Key change, double layering of midi sounds on a sound module, 1 button chords, some Scales, and our new 1 button Riff feature.

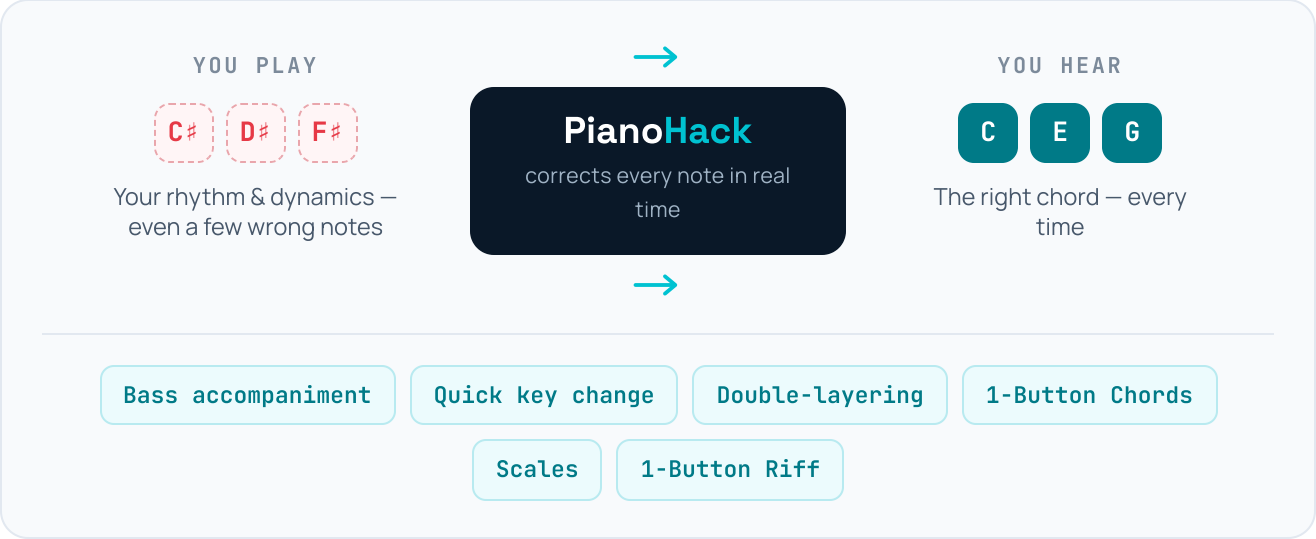


Diagram In a nutshell: you bring the rhythm and feel, the PianoHack turns whatever you play into the right notes — and adds a full set of performance features on top.

1.1 What the PianoHack Is

The PianoHack is a small hardware box with MIDI IN, MIDI OUT, and a microSD card slot. It sits between your MIDI controller and your sound source, listening to the notes you play and re-mapping them to the correct notes of the chord you have selected.

If you already know a little about piano chords, your right notes stay right. And if you hit a few clunkers, the PianoHack quietly corrects them to the nearest right note. Either way, the result is musical.

Beyond note correction, the PianoHack provides a deep set of performance features:

- **Bass accompaniment** — automatic root and inversion bass notes on their own channel.
- **Quick key changes** — transpose the whole instrument with one button.
- **Double-layering** of MIDI sounds across a sound module or DAW.
- **1-Button Chords** — play a full four-note chord from a single pad.
- Scales — 1 of 4 selectable scales mapped across the keybed for soloing.
- **1-Button Riff** — trigger stored riffs one note at a time, at your own timing.

> **NOTE · RECOMMENDED CONTROLLER**
>
> * A Novation Launchpad or Launchkey **MK3 or MK4** is recommended, as these are fully programmable MIDI controllers. See Chapter 5 for the complete hardware list.

1.2 The Isomorphic Chording Layout

The PianoHack's chord remap buttons use an **isomorphic note layout**, which means a musical interval always has the same shape. You use the same patterns and fingering in every key. If you play notes from a Launchpad, that grid is isomorphic too — though you can still use a standard MIDI piano controller to play the notes.

Once you learn a song or pattern in one key, you can play it in any key — no new fingerings to memorize.

This lets you set up your chord keybed remap buttons so the chord structures stay isomorphic. You skip the complex piano chording you would otherwise need to learn, which accelerates how quickly you can create and perform many styles of music.

Diagram The chord remap buttons (key-dependent). The same button shapes play the matching chord in whatever key you set — here, the **1** chord is highlighted. The full reference is in §7.13.

NOTE · MAKE IT YOURS

You can arrange your chord buttons any way you want that makes sense to you and your style of music creation! Also you do not have to use all the chord buttons available!

02

AUDIENCE

Who the PianoHack Is For

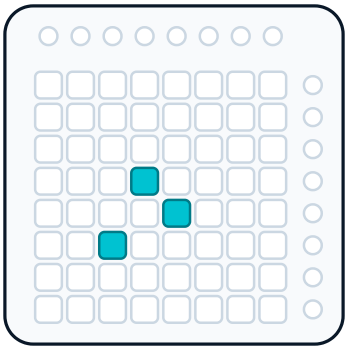
The PianoHack is for anyone — non-players and musicians, beginner to advanced — who wants to add real piano-style chording to their music and play in a natural, expressive way.

BACKGROUND

The PianoHack was created by a bass player who needed a way to play background chords, and melodies with chords, live and in the studio, for original music. It works just as well for learning and performing most standard music.

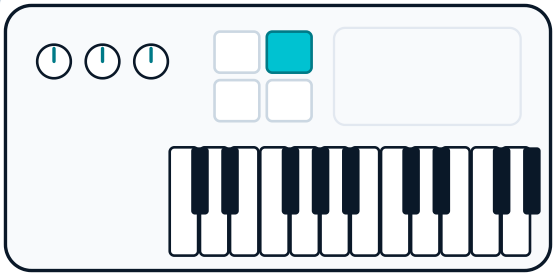
LEARN AS YOU PLAY

You will learn much about music theory while learning and playing the PianoHack.



Novation Launchpad

An isomorphic 8×8 grid — the same chord shape works in every key.



Traditional MIDI keyboard

A standard piano keybed — play the PianoHack the familiar way.

Diagram ***For 'playing' notes*** .. the PianoHack works with either kind of controller. A grid pad like the Launchpad keeps chord shapes identical in every key; a piano-style keyboard lets you play in the way you already know.

2.1 Who Gets the Most Out of the PianoHack

Bass & guitar players Add chords, progression's, & melodies without learning piano	**Music producers** Chording dynamics and multi MIDI channel recording
Beginners Play in key from day one, no wrong notes, experiment playing many chords	**Experienced players** Your right notes stay right; creative composing…your dynamics!

Whatever your musical background, or lack there of, the PianoHack is designed to give you easy music theory for long-lasting creativity for everyday musical productivity.

03

CONCEPT & SIGNAL FLOW

How the PianoHack Works

Technically, the PianoHack is a MIDI add-on product, that is powered by a dual-core 32-bit audio processor. It reads incoming MIDI notes and outputs the right notes based on the chord button you have selected.

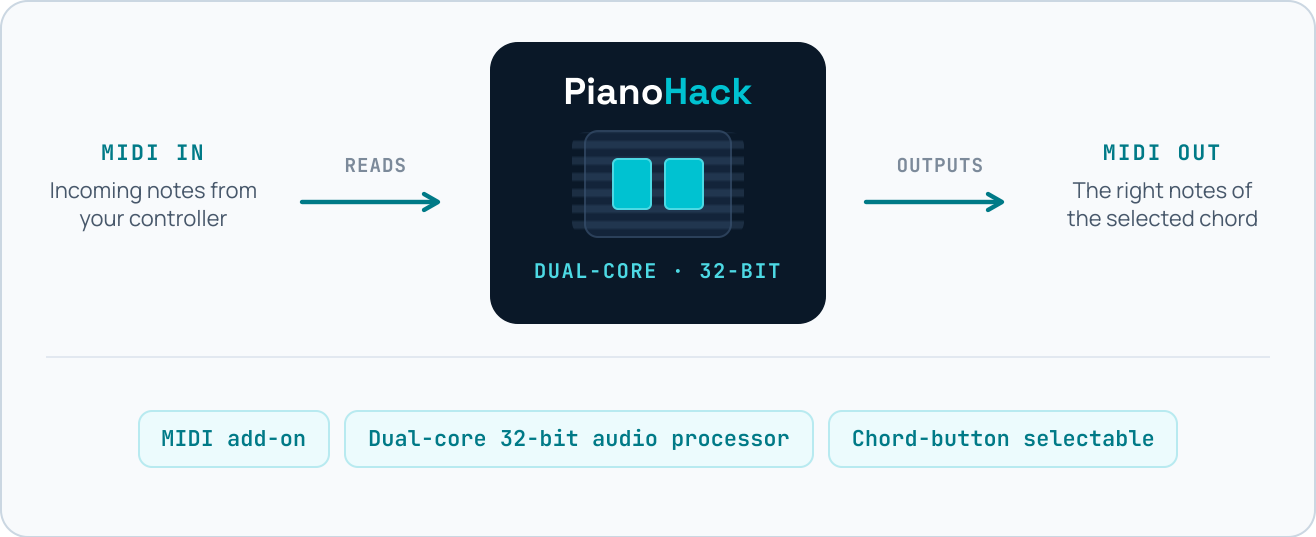


Diagram Inside the box: a dual-core 32-bit audio processor reads the MIDI notes coming in from your controller and outputs the right notes, chosen by whichever chord button you have selected.

3.1 The ”Man in the Middle”

The PianoHack is a *man-in-the-middle* program: it takes the incoming MIDI note and CC values from your controller, manipulates them, and outputs converted values. If you hit a wrong note on the incoming controller, the PianoHack outputs the closest right note instead.

Diagram The PianoHack sits between your controller and your sound source. It reads every incoming note and CC value, manipulates it, and passes on a converted value — so the three "wrong" notes you played (C♯, D♯, F♯) come out as the right notes of the chord (C, E, G).

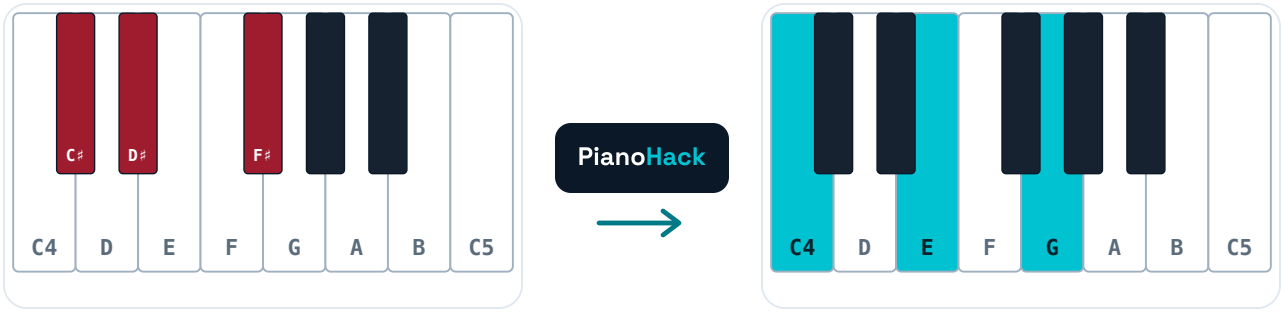
GOOD TO KNOW

All of the PianoHack's functions and features are set up and controlled by programmable MIDI controllers — for example the Novation MK3 / MK4 series, or Korg nano controllers. A programmable MIDI controller is any controller on which you can set Continuous Controller (CC) values, note data, and MIDI channel data. All of the PianoHack's settings arrive as MIDI CC values from those controllers.

A working example

EXAMPLE · KEY OF C, "1" CHORD PRESSED

With the key set to `C`, press the **1** button (C major) and play keys on your controller. If you press C♯, D♯, and F♯, the PianoHack maps those to the closest notes of the C major triad, depending on where you are on the keybed. Every note you play lands in the chord.



YOU PLAY C♯ · D♯ · F♯ YOU HEAR - PIANOHACK PLAYS: C · E · G

Diagram In the Key of C with the **1** chord pressed, the three "wrong" black keys you played (C♯, D♯, F♯) come out as the three notes of the C major triad — C, E, and G.

NOTE · ONE IN, ONE OUT

The PianoHack never adds notes of its own. Press one note and one note comes out; press ten notes and ten come out..Just like a real Piano! Each note(s) simply re-mapped to the right note(s) of the chord. You always stay in control of how many notes sound out of the PianoHack!

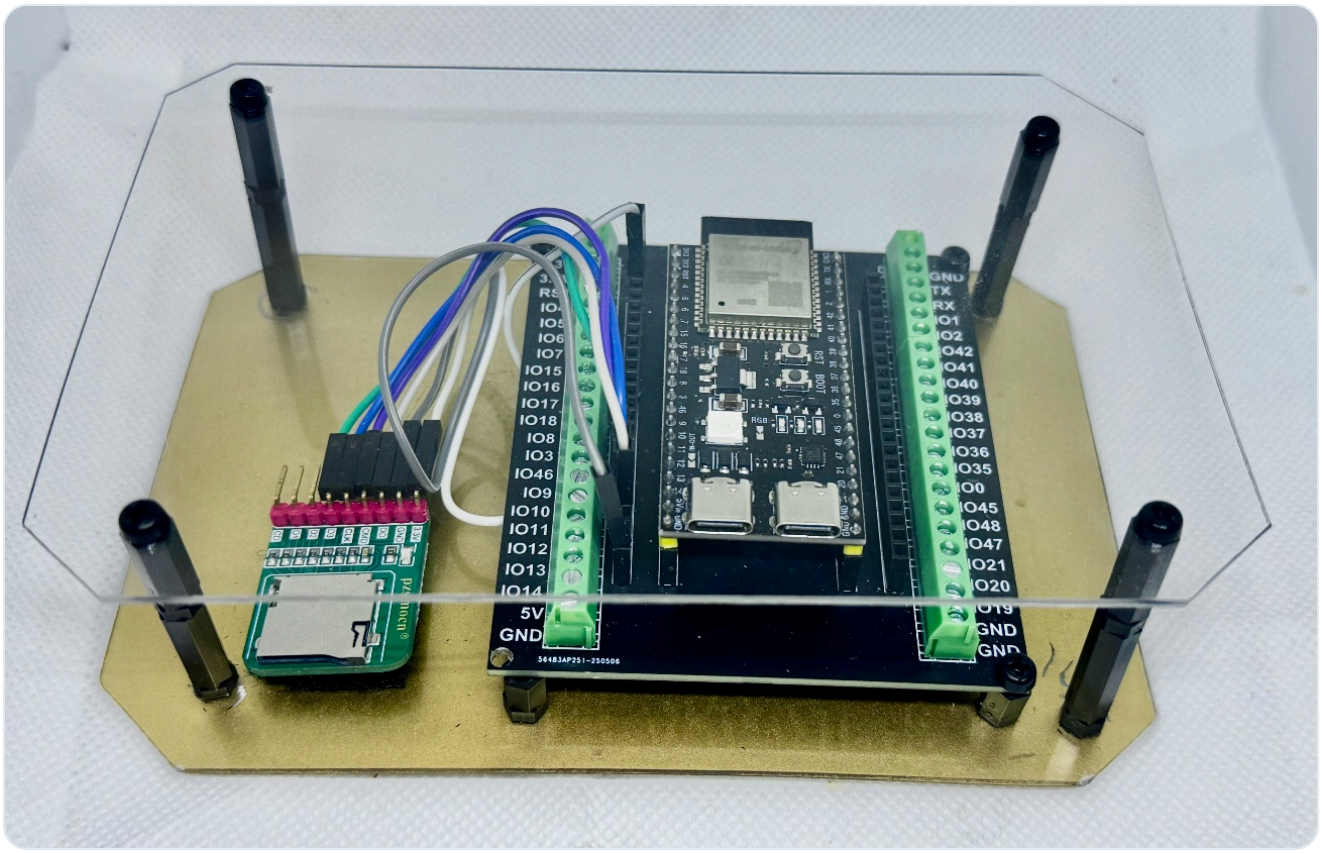


Figure 1 The PianoHack is just a box with MIDI IN, MIDI OUT, and an SD-card slot. You supply the MIDI equipment around it — so you never have to give up gear you already own.

This system works by connecting programmable MIDI controllers into the PianoHack. The PianoHack sits in between your MIDI controller and your MIDI sound module or DAW, processing everything in real time.

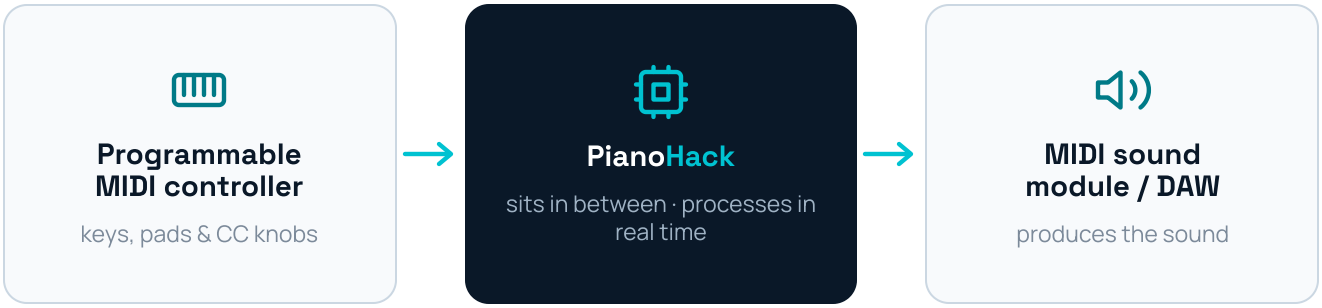
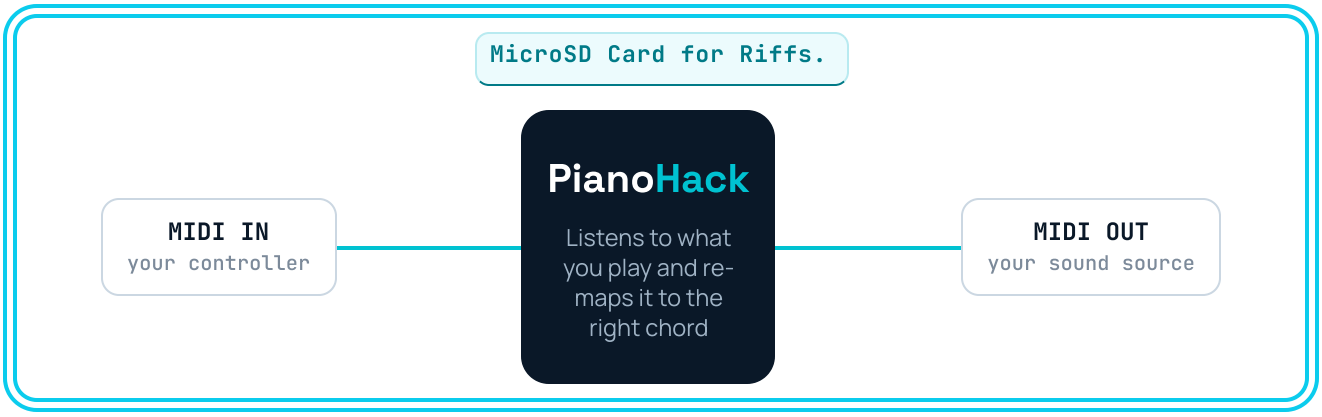


Diagram Your programmable MIDI controller connects into the PianoHack, which sits between it and your sound module or DAW — processing every note and CC value in real time before it reaches the sound source.

3.2 The PianoHack Does Not Produce Sound

> **IMPORTANT**
>
> The PianoHack **does not produce any sound** and has no internal audio output. It only outputs MIDI information. You must connect it to a sound source — a MIDI sound module, a software synth, or a DAW before you will hear anything.

Because the PianoHack outputs only MIDI, it sits in the signal chain like this:



DiagramWhat the PianoHack is: one small box with three connections. Your controller plugs into the MIDI IN, through a midi merge product of your choice and your sound source connects to MIDI OUT and the microSD card holds your custom riffs.

3.3 MIDI Channels Used

The PianoHack outputs on several MIDI channels at once. The main reason is flexibility: if you are recording into a DAW, you can assign a different sound to each channel. If you are using a hardware sound module or a synth, you can choose the sound for each layer just as easily.

Channel	Used for	Suggested sound
7	**Main output** — sends MIDI to your sound module or DAW.	Piano, Electric Piano
6	**2nd layer** — add any sound you want on this layer.	Strings or E-Piano
5	**1-Button Chord** play.	Strings or E-Piano
8	**Bass** — lower bass notes for chord roots and inversions.	Bass / Bass Piano
9	**1-Button Riff** — choose any sound you like.	Piano, Synth, Lead
11	**Scale mode** output — a separate sound for soloing or playing the four scales.	Synth, Leads

NOTE · CONTROLLER CHANNELS

MIDI controllers must be set to **channel 7**. Note pads or keyboard sections used for **One-Note Riffs** playing must be set to **channel 9**.

A full IN / OUT channel reference appears in Chapter 6.

04

PLAYING TECHNIQUES

Methods of Play

The PianoHack supports several ways to play, from the simple default mode through to combining chords, scales, and riffs in real time. You can mix and match these to accommodate many songs.

01

SET KEY

+ **BASS ROOT**

+ **CHORD REMAP**

02

SET KEY

+ **BASS ROOT**

+ **ONE BUTTON CHORD**

+ **CHORD REMAP**

03

SET KEY

+ **BASS ROOT**

+ **ONE BUTTON CHORD**

+ **SCALES FOR LEADS AND RIFFS**

04

SET KEY

+ **BASS ROOT**

+ **ONE BUTTON CHORD**

+ **ONE BUTTON RIFF**
- **UP TO 16 DIFFERENT RIFFS FOR LEADS**

This is what you would play with your left hand

This is what you would play with your right hand

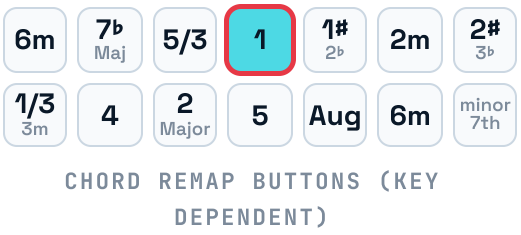
4.1 Default — Chord Remap Buttons & Keys

This is the default method. You can press a chord remap button at the same time as the note keys, *or* hold down keybed keys and then press a chord button. Both work.

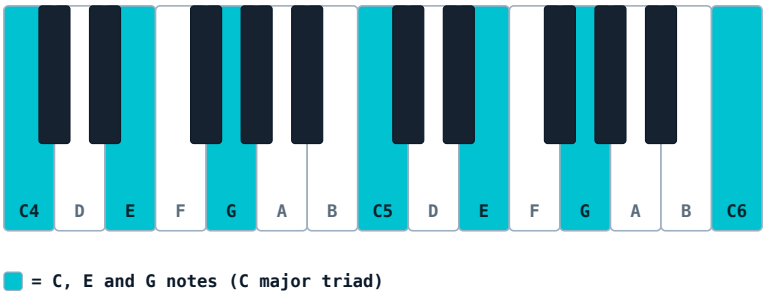
> **NOTE**
>
> In **1-Button Chord** mode, holding down keybed keys does not carry from chord to chord — you must re-play the notes on the keybed for each chord.

What "remap" means

When you press one of the chord buttons — for example, the **1** chord while you are in the Key of C — every note coming from your piano controller is set to the C major triad. The right notes stay right, and the wrong notes are mapped to the nearest note in the C major triad. So even if you played nothing but black keys in this mode, the audience would still hear a C major triad — high and low across the keyboard, but always in the chord.



CHORD REMAP BUTTONS (KEY DEPENDENT)



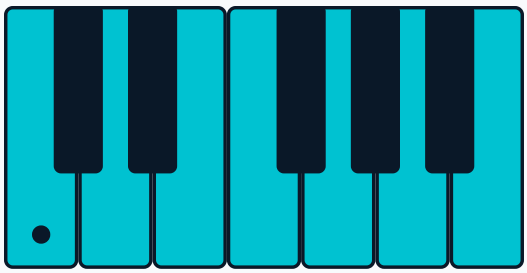
THE 1 CHORD IN C → EVERY KEY BECOMES C, E OR G

If you hold down notes on your controller that is sending the notes, then you can change chord remap buttons as well thusly maintaining your same hand position on the right, but allow free movement on the left, to play through many chord progressions.

4.3 One Chord with Scales

Place the PianoHack in **One-Button Chord** mode and choose one of the four **Set Scale** options. Now every note conforms to that scale, and the chord buttons play a held-down chord. This is ideal for working out melodies and solos that always stay in key. Plus, you can still play through notes and chords with your right note controller.

Major Scale

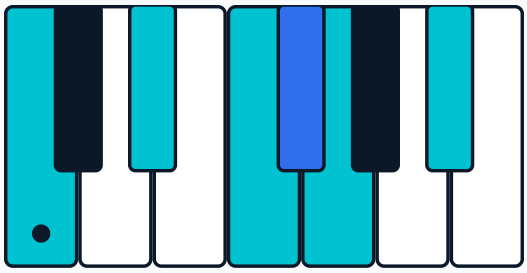


C D E F G A B

Pentatonic Scale

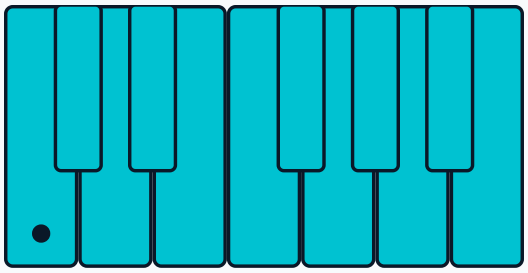
C D E G A

Minor Pentatonic Scale - (w/ Blue note)



C-E♭-F-F#-G-B♭

Chromatic Scale



All 12 semitones

NOTE

Scale examples are shown in the Key of C. All scales will be in the Key that you set on the PianoHack.

4.4 One Chord — One Riff — Scales

Building on the mode above, when you also use a riff, PianoHack has 16 programmable, you can switch between the selected riff and they all work in the set Key. This lets you work out melodies or solos *and* play riffs, all in key.

Because One-Button Chord, Riffs, and Scales each output to a different MIDI channel, you can assign a separate patch to each one for a rich, layered performance.

ONE BUTTON RIFF

Any notes coming in on MIDI channel 9 will trigger the selected riff. (You have 16 that you can program.) This way you can use 1, 2, or 5 fingers to play through the selected Riff. NOTE: Riff always resets once it gets to the end of the riff and circles back.

NOTE

You can also program riff notes to be played from a MIDI pad like a Launchpad MK3, as long as the notes it is sending are on MIDI channel 9.

EXAMPLE

If the default riff is loaded — which is a major scale, 7 notes — you can use only 1 note to play through the riff. But if you use 2 notes to trigger the riff, then you can play through the riff faster if needed.

4.5 The One-Riff Feature & Editor Tool

The **1-Button Riff** feature plays a stored riff one note at a time, following your tempo, timing, and dynamics. You can store up to **16 riffs**, each up to **49 notes** long. The PianoHack One-Riff Editor is a small, single-page web tool that lets you create, edit, audition, and save those riffs.

Figure 2 The One-Riff Editor runs entirely in your browser — no install, no internet connection — and reads and writes the `phRiffs.txt` file on your PianoHack's microSD card.

SEE ALSO

Chapter 8 — The One-Riff Editor is the complete guide to authoring your riffs: setting up the microSD card, every editor control, Riff Player, and how to program your controller to select and trigger riffs.

05

BUILDING YOUR RIG

Required Hardware

You will need some — but maybe not all — of the following hardware in addition to the PianoHack unit itself. This chapter walks through every piece, from the controller you play to the sound source you hear.

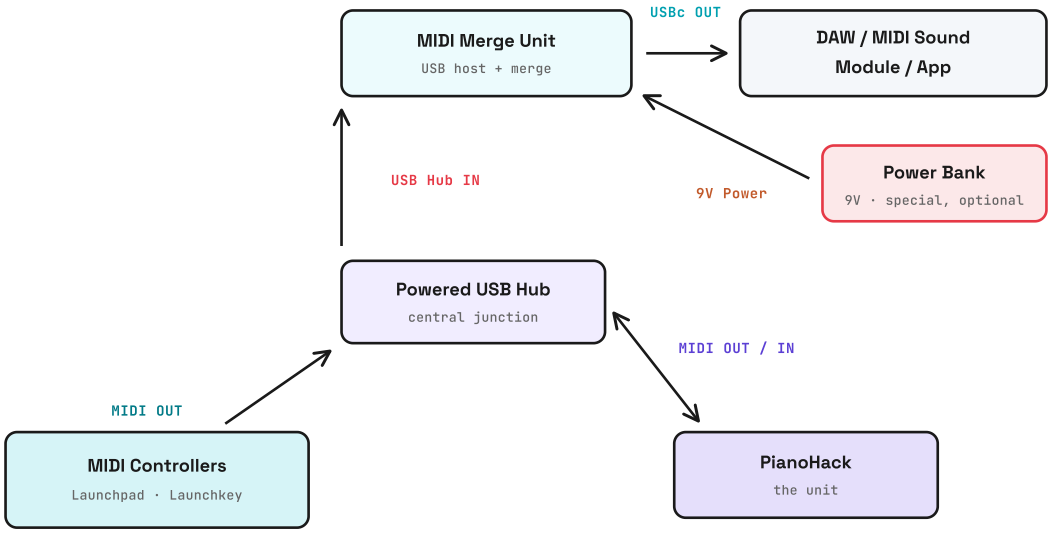
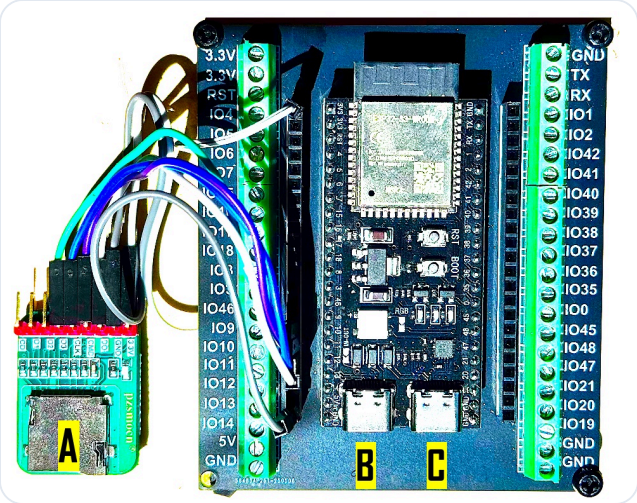


Diagram Basic signal flow: your MIDI controllers feed a powered USB hub, which connects both to the PianoHack and up to the CME MIDI merge. The merge sends USB-C out to your DAW or sound module, and a 9 V power bank feeds the merge.

5.1 The PianoHack Unit & Ports

The PianoHack itself has three connection points. It is seen by your system as a MIDI controller for IN / OUT messages when connected at the MIDI USB-C port (B).



A · microSD card slot
`stores your custom riffs (phRiffs.txt)`

B · MIDI IN / OUT — USB-C
`the main MIDI connection to your rig`

C · Programming / Update — USB-C
`used for firmware updates (Ch. 9)`

Figure 3 The PianoHack unit, with its three connection points labelled.

5.2 Hardware Requirements

To operate the PianoHack you need a **programmable MIDI controller**. The recommended options are the Novation Launchpad (X, Mini, or Pro) and the Novation Launchkey — **MK3 or MK4 only**, as these are programmable through Novation's free *Components* software.

Figure 4 Novation Launchpad X / Mini MK3 — an isomorphic grid for chords and notes.

Figure 5 Novation Launchkey 37 / 49 (MK3 or MK4) — a programmable keyboard controller.

The Novation *Components* software is free and lets you set up the Launchpad or Launchkey with the MIDI CC, note, and optional Program Change commands the PianoHack needs. Ready-made templates are available for Novation Launchpads and Launchkeys (MK3 / MK4). Korg's programmable **nanoPAD**, which has its own configurable editor, can also be used.

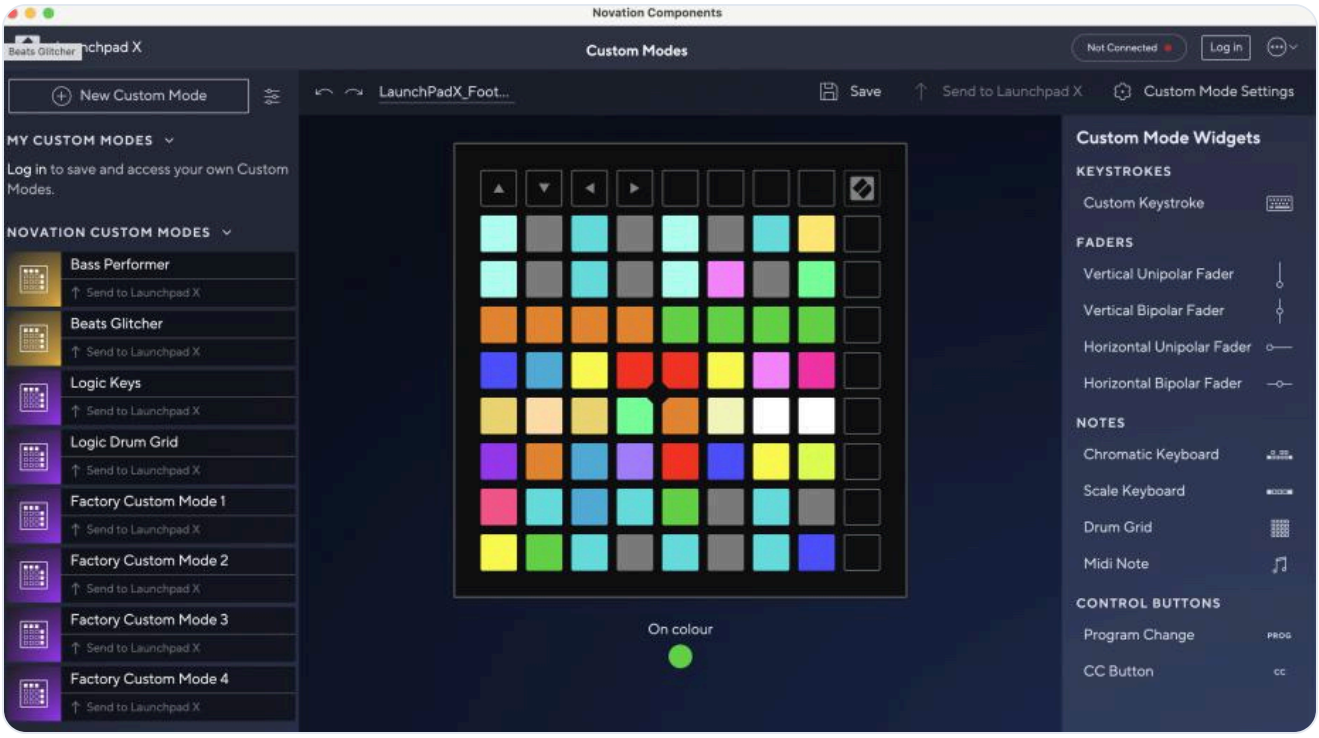


Figure 6 Novation Components — used to configure your controller's pads, CC values, and MIDI channels for the PianoHack.

Other items you may need

- A MIDI merge product (e.g. CME H2MIDI Pro or a DoreMidi merge unit) — see 5.6. REQUIRED
- A **MIDI-to-USB cable** to send the PianoHack's output into a DAW or app such as Numa Piano or Apple MainStage.
- A **microSD card** and a **card reader** if you want to load your own riffs for the 1-Button Riff feature.

Figure 7 A MIDI-to-USB cable carries the PianoHack's output to your computer or sound module.

Figure 8 A microSD card reader lets you edit the custom riff file and run the Riff edit tools.

> **NOTE**
>
> If you use the CME H2MIDI Pro, you can connect to your DAW with the cable shown above or with a standard USB-C cable.

5.3 Powering Up the PianoHack

Follow these rules for a consistent power-up every time. Remember that the PianoHack acts as just another MIDI controller connected to a port on your hub.

1. Connect your MIDI controllers (2–7 of them) into a powered USB hub. *If you only have one controller, you will not need a powered hub.*
2. Connect that powered USB hub to your CME H2 / H4 MIDI merge unit.
3. If you use two or more controllers — the suggested setup — a MIDI merge unit gathers all the different MIDI channels and routes them into the PianoHack.

Figure 9 A powered USB hub connects all your controllers (including the PianoHack) into the merge unit.

Figure 10 A pedal-style power bank can supply both 5 V (USB hub) and 9 V (merge unit) from one battery.

> **NOTE · EXTRA CABLE**
>
> You will need an extra USB-C cable to power the hub, plugged into the USB port on the CME H2 product.

Powering by battery (optional)

You can plug everything into the wall, or run the rig from a rechargeable pedal-style power bank for portability. Suggested batteries:

- **AROMA Guitar Pedal Battery Power Bank** — 10,000 mAh, 9 V. a.co/d/0hgsFjCk
- **On-Stage PS1000 Rechargeable Pedal Power Bank.**
- **Marbero portable power station** — a larger option for extended portability.

Figure 11 A pedal power bank can power the CME MIDI merge (DC 9 V) and the powered USB hub (USB 5 V) at once — leaving the USB-C or 5-pin MIDI port free to feed your DAW or sound module.

Figure 12 The Marbero portable power station — a higher-capacity option for longer sessions.

NOTE · ALTERNATIVE

A 9 V power bank can also power the CME H2 through its USB-C port. In that case, the MIDI leaves via the 5-pin DIN MIDI out to feed your DAW or sound module.

5.4 MIDI Mixers

With a MIDI mixer you can control the volume for each channel the PianoHack outputs on. These mixers each ship with configurable software for setting channel volumes and patch changes.

Figure 13 Korg nanoKONTROL2.

Figure 14 Novation LaunchControl XL.

> **NOTE**
>
> A MIDI mixer is optional. If your MIDI controller already has programmable sliders and knobs, you can use those instead. You will need to adjust the mixer's settings with the software that came with it.

5.5 MIDI Merge USB Products

If you use two or more controllers, a MIDI merge unit is required to combine their MIDI commands and route them into the PianoHack. Below are the recommended options.

Product	Price	Notes
CME H2MIDI Pro	~$49.99	8 USB MIDI inputs + 2 legacy inputs. Powers your controllers. Add a 4–8 port USB hub ($10–$15, power cord required).
CME H4MIDI WC	~$80	USB-host *and* merge in one. 8 USB MIDI inputs + 2 legacy inputs, plus two 5-pin DIN MIDI outs (the PianoHack needs one). Powers your controllers.
DoreMidi USB host	$45–$60	You will need at least two of these, plus a separate merge device. More cabling and more cost than the CME units.
DoreMidi merge device	$30–$40	Pairs with the DoreMidi USB hosts above.
MIDI-to-USB cable	$10–$20	For going from the PianoHack into a computer DAW or software sound module (MainStage, Sunday Keys, etc.).

Figure 15 CME H2MIDI Pro.

Figure 16 CME H4MIDI WC — USB host + merge in one.

Figure 17 DoreMidi USB-host device.

Figure 18 DoreMidi MERGE-3 device.

Reference links: cme-pro.com/product/h2midi-pro · cme-pro.com (H4MIDI WC) · doremidi.cn (host) · doremidi.cn (merge).

5.6 CME Merge Configuration

The following examples show how to set up the CME MIDI merge devices for use with the PianoHack. These routing templates can be downloaded from pianohack.org or requested by email.

> **NOTE · LOCKED PORT**
>
> The PianoHack port appears as `ESP32S3_DEV-1` and **must be locked**. For the SMC-Pad / Sinco, select only port 1.

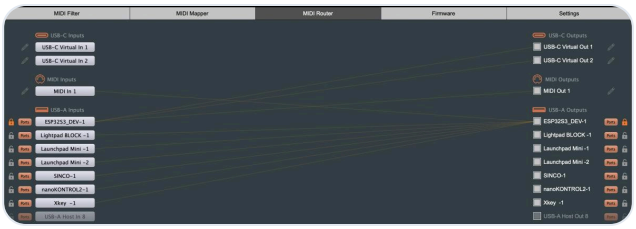


Figure 19 CME H2MIDI Pro routing (PianoHack port locked).

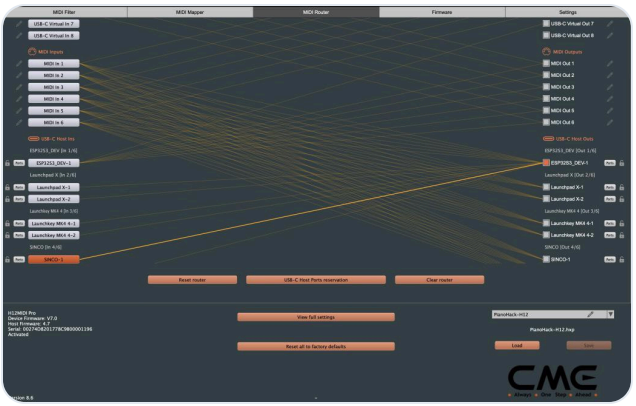


Figure 20 CME H12MIDI Pro routing.

Launchpad X + Ableton Live (Session mode)

To use a Launchpad X to control Ableton in Session mode alongside the PianoHack, configure the CME routing so that Launchpad X-1 is in DAW mode and Launchpad X-2 is in Note mode:

1. USB-C Input *Virtual In 1* → USB-A Output *Launchpad X-1*.
2. USB-A Input *Launchpad X-1* → `ESP32S3_DEV-1` (PianoHack default).
3. USB-A Input *Launchpad X-2* → `ESP32S3_DEV-1` (PianoHack default).

For a Launchkey MK4 (4-1 = Note mode, 4-2 = DAW mode): route USB-C *Virtual In 2* → USB-A Output *Launchkey MK4 4-2*; both Launchkey USB-A inputs → `ESP32S3_DEV-1`; USB-C Output *Virtual Out 2*. Then complete the setup inside Ableton Live.

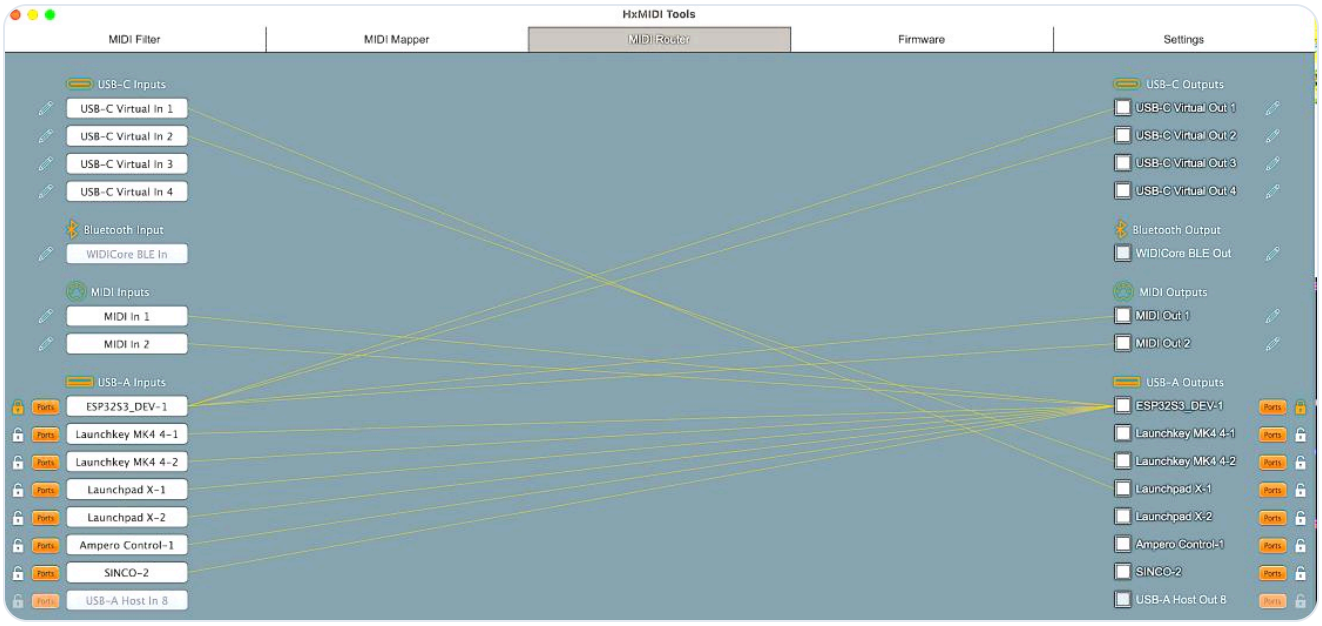


Figure 21 CME routing for Launchpad X with Ableton Live in Session mode.

5.7 Sound Sources

The PianoHack outputs MIDI only, so you choose how to make sound: a software synth, a hardware sound module, or a DAW.

Soft synths tested with the PianoHack

App	Platforms	Price
Numa Piano (StudioLogic)	iPad / iPhone / Mac / Windows / Linux	`Free`
MainStage	Mac	`$30`
Sunday Keys	iPad / Mac	`$120 / year`

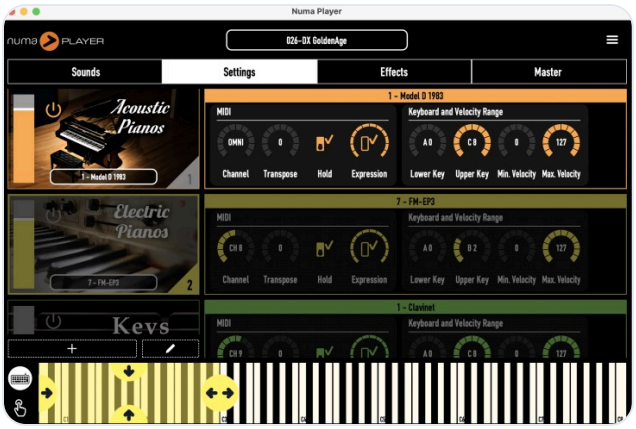


Figure 22 Numa Piano by StudioLogic — a great free piano app.

Figure 23 MainStage — tested software instruments.

MIDI sound modules

If you want to go DAWless, a MIDI sound module is a great option. Any module will work as long as it has a MIDI IN port. A General-MIDI module can often be found for under $80 on Amazon or eBay.

Figure 24 A compact General-MIDI sound module.

Figure 25The MIDIPLUS PianoEngine — a dedicated midi sound module with drums and aux in.

DAWs / Sound Modules / Sound Apps

The PianoHack has been tested for recording its outgoing MIDI into **GarageBand**, **Ableton Live**, and **Logic Pro**. A DAW is not required, however — you can use a hardware sound module or a free sound app such as Numa Piano instead.

Figure 26 Recording the PianoHack's multi-channel MIDI output into Ableton Live.

5.8 Visual Hardware Setup

The diagram below shows how every piece connects physically. Your MIDI controllers and the PianoHack both feed a powered USB hub; the hub feeds the CME merge unit; and the merge unit's output goes to your DAW, sound module, or sound app. The PianoHack itself appears to the system as just another MIDI controller on the hub.

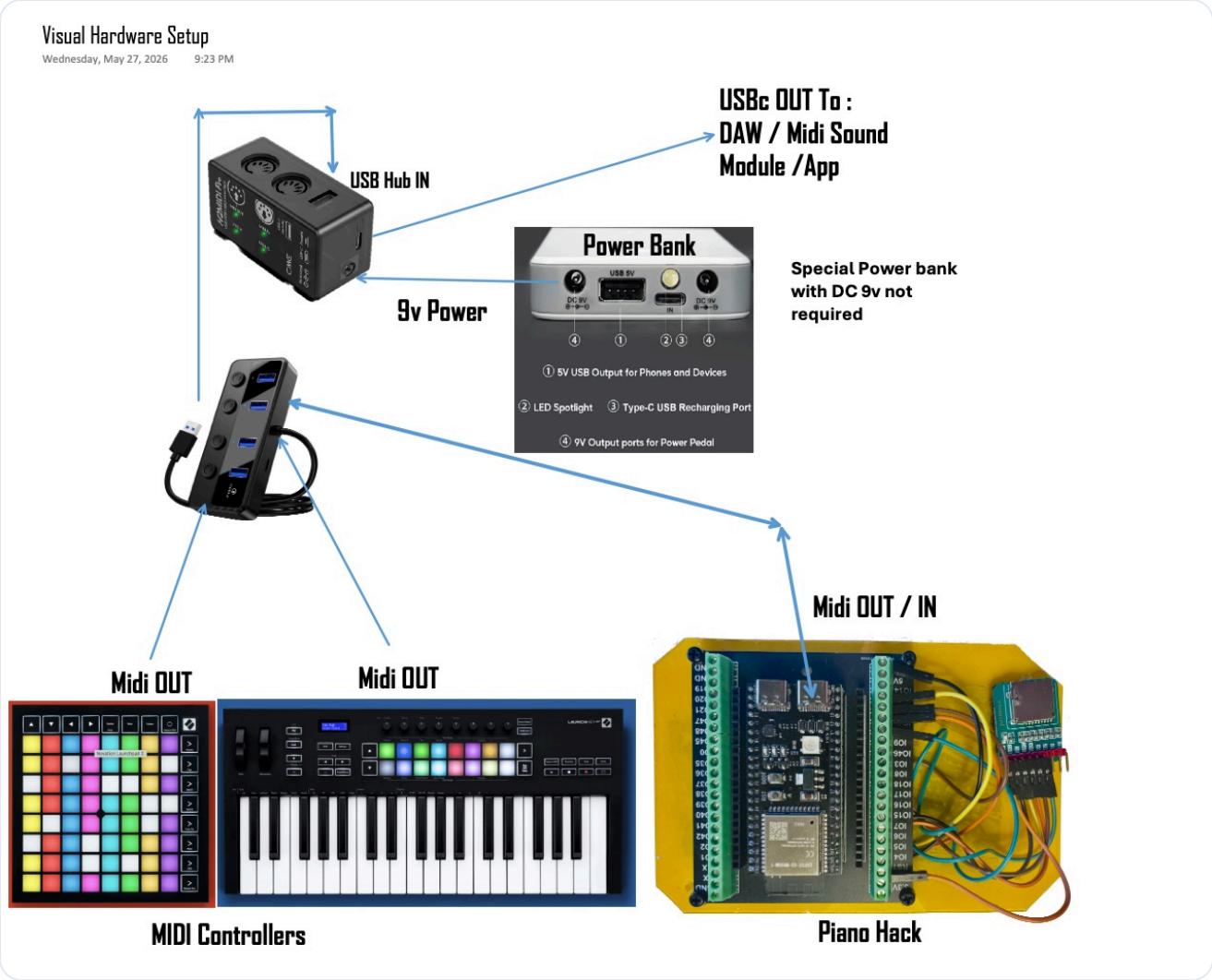


Figure 27Physical connections: MIDI controllers and the PianoHack connect into the powered USB hub (CME merge); the midi merge unit's USB-C output feeds your DAW, sound module / sound app, and a power bank supplies 9 V to the CME midi merge, (optional).

Basic hardware flow

```
MIDI Controllers  →  PianoHack (itself a MIDI controller)  →  Powered USB Hub
  →  CME H2 / H4 (or any MIDI merge device)  →  DAW / Sound Module / Sound App
    (e.g. MainStage, Numa Player, Sunday Keys)
```

NOTE · POWER

The CME H2 / H4 merge products can also be powered by USB-C. In that case the MIDI must leave via the 5-pin DIN MIDI out to reach your DAW or sound module. A special power bank with DC 9 V is helpful but not required.

5.9 Real-World Setups

A compact setup

In this configuration there is no separate piano controller — you play notes and chords directly from the Launchpad on the far right. There is a hardware sound module here, but you could just as easily go out of the USB-C port on the CME H2MIDI Pro to a DAW or sound app.

Figure 28 A compact PianoHack rig — left to right: a MIDI mixer, the PianoHack, a MIDIPLUS sound module, and two Novation Launchpads (one in chord-remap note mode, one in session mode).

A full setup

This is how the PianoHack fits into a full keyboard rack. Note that there are many extras here that are not required for basic operation.

Figure 29 A full keyboard-rack setup. Many of the components shown are optional.

06

REFERENCE

PianoHack MIDI Channels

The PianoHack receives MIDI on one set of channels and outputs on several, so you can assign a different patch to each layer. This is the complete IN / OUT channel map.

IN	OUT	Description	Suggested sound
7	7	**Main** — outputs MIDI to your sound module or DAW.	Piano, Electric Piano
7	6	**2nd layer** — add any sound on this layer.	Strings or E-Piano
7	5	**1-Button Chord** play.	Strings or E-Piano
7	8	**Bass** — lower bass notes for chord roots and inversions.	Bass / Bass Piano
9	9	**1-Button Riff** — any sound you like.	Piano, Synth, Lead
7	11	**Scale mode** — a separate sound for soloing or the four scales.	Synth, Leads

NOTE

The PianoHack does **not** output audio and has no internal sounds — it only outputs MIDI information. The "sound" you assign happens entirely in your sound module, synth, or DAW.

07

COMPLETE MIDI IMPLEMENTATION

CC MIDI Button Reference

This chapter lists every Continuous Controller, (CC) MiDi command that the PianoHack uses and understands. Use it to program your MIDI controller for the features you want. You do not need to implement every feature to get the PianoHack going.

7.1 Before You Begin

The PianoHack requires a programmable MIDI controller with editor software — such as Components for Novation or Kontrol Editor for Korg units. Pre-built layouts are available for any Novation MK3 / MK4 product, and routing files exist for the CME H2 merge products.

NOTE · WHAT'S REQUIRED

Most MIDI setup features are **optional**. The only required items are **Set Key** and the **chord remap buttons**. Everything else you can add as you need it.

Definitions

Keybed any piano-controller keys that produce note values	**Remap** PianoHack re-maps keybed notes to the selected chord, low to high
Toggle button latches the value on, then off	**Momentary / Trigger** value fires while pressed, then releases

7.2 Suggested Preset Layout

The arrangement of MIDI buttons on your controller is up to you. The chart below is the suggested preset layout for a Novation Launchpad MK3, designed from a bass player's perspective.

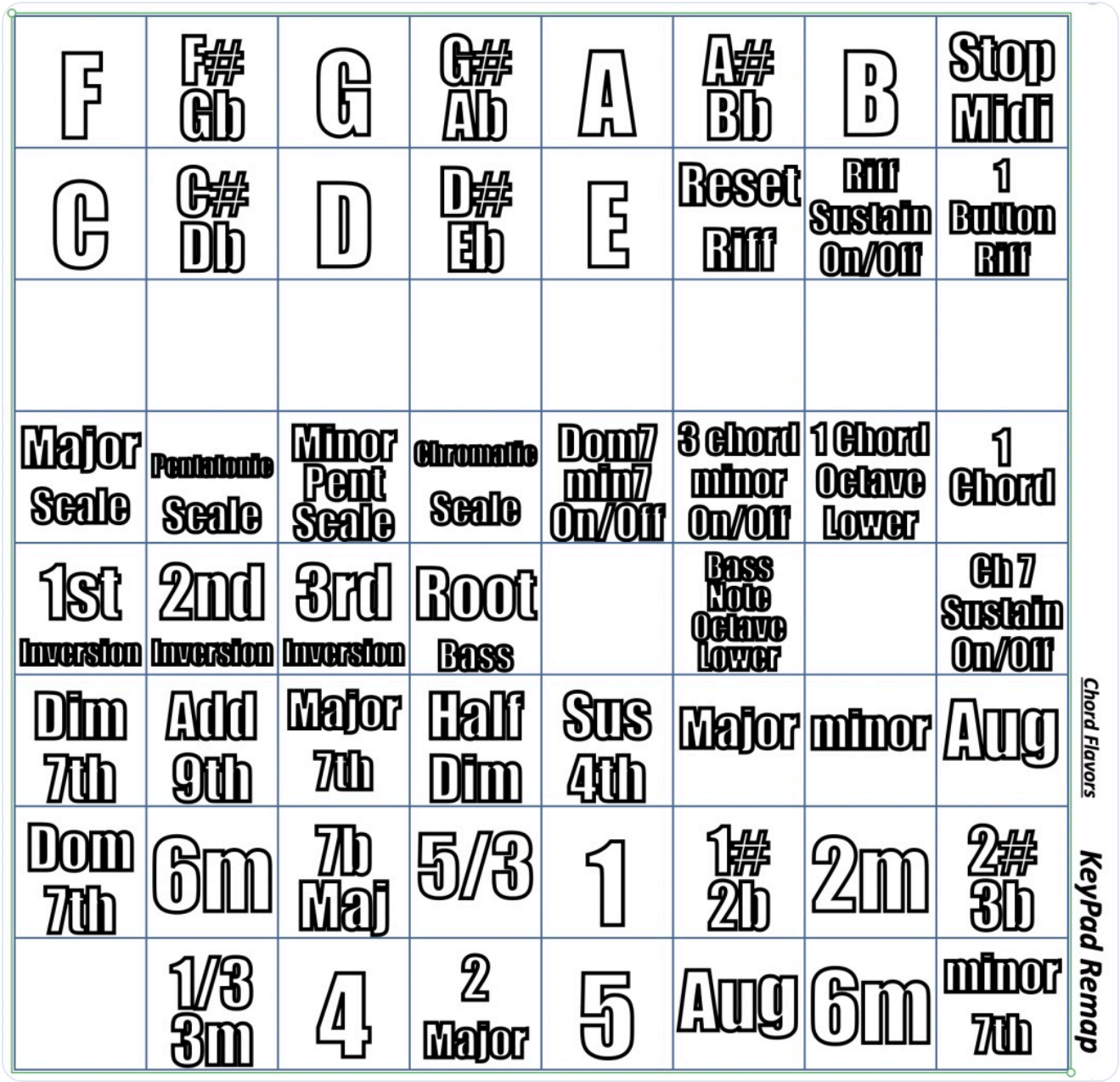


Figure 30 The PianoHack control map — keys, scales, riffs, bass options, and chord remap buttons grouped by function.

Program your controller in five steps

This works for a Launchpad MK3 (via Novation Components) or any programmable MIDI controller with editor software:

1. Open your controller's editor (`Components` for Novation, `Kontrol Editor` for Korg) and create a new **Custom Mode**.
2. Start with the two required groups: the 12 **Set Key** pads and your **chord remap** pads. Everything else is optional — add it as you need it.
3. For each pad, set the **MIDI channel**, **CC number**, and **ON / OFF values** from Table 7.0 below.
4. Set each pad's **button type** (Toggle, Momentary, or Trigger) as listed — this matters: a Momentary pad set to Toggle will stick on.
5. Save the custom mode to your device, then power up as described in section 5.3 and press a Set Key pad to confirm it works.

Function	Ch	CC#	On / Off	Button type
SET KEY — REQUIRED (SEE 7.3)				
Set Key: C · C# · D · D# · E · F · F# · G · G# · A · A# · B	7	3	12, 1–11 / 0	Toggle or Trigger
SCALES (SEE 7.6)				
Major scale	7	22	107 / 0	Toggle
Pentatonic major scale	7	22	108 / 0	Toggle
Pentatonic minor scale	7	22	109 / 0	Toggle
Chromatic scale	7	22	111 / 0	Toggle
CHORD BEHAVIOUR (SEE 7.7 – 7.9)				
Dominant 7th / minor 7th mode	7	9	44 / 0	Toggle
3 chord always minor	7	25	24 / 0	Toggle
1-Button Chord on / off	7	28	17 / 0	Toggle
1-Button Chord, one octave lower	7	28	12 / 1	Toggle
BASS & INVERSIONS (SEE 7.10 – 7.11)				

Function	Ch	CC#	On / Off	Button type
1st · 2nd · 3rd inversion (plays on next chord)	7	29	1 · 2 · 3	Trigger
Play bass root note with chord	7	29	05 / 08	Toggle
Bass notes higher / lower	7	29	77 / 67	Toggle
RIFFS (SEE 7.5)				
Trigger 1-Button Riff — any note works	9	—	e.g. Note G7	Momentary
Sustain for channel 9 riff	9	64	127 / 0	Toggle
Reset riff to start	7	27	37 / 0	Momentary
VOLUME & UTILITY				
Bass volume ladder (4 pads)	8	7	16/0 · 48/32 · 96/64 · 127/111	Toggle
Riff / lead volume ladder (4 pads)	9	7	16/0 · 48/32 · 96/64 · 127/111	Toggle
2nd-layer volume	6	64	127 / 0	Toggle
Piano volume	7	64	127 / 0	Toggle
Stop all MIDI sound	7	26	17 / 0	Toggle or Momentary
CHORD VARIATIONS — PRESS BEFORE OR WITH A CHORD (SEE 7.12)				
Convert to major 1.3.5	7	26	28 / 0	Momentary
Convert to minor 1.3♭.5	7	26	32 / 0	Momentary
Major 7th anywhere 1.3.5.7	7	26	44 / 0	Momentary
Minor 7th anywhere	7	26	42 / 0	Momentary

Function	Ch	CC#	On / Off	Button type
Adds a 9th or 2nd 1.2.3.5	7	26	29 / 0	Momentary
Sustained 4th (1.4.5)	7	26	66 / 0	Momentary
Augmented 1.3.5♯	7	26	33 / 0	Momentary
Half diminished 1.3♭.4♯	7	26	26 / 0	Momentary
Full diminished 1.3♭.4♯.6	7	26	27 / 0	Momentary
Diminished 7th 1.3.5.6♯	7	26	46 / 0	Momentary
OUT-OF-KEY CHORDS (SEE 7.13)				
1 Major 1.3.5	7	14	5 / 0	Momentary or Trigger
Major on the 1♯ / 2♭	7	14	6 / 0	Momentary or Trigger
2m 1.3♭.5	7	14	7 / 0	Momentary or Trigger
2♯ / 3♭ Major	7	14	8 / 0	Momentary or Trigger
3m, or 1 / 3	7	14	12 / 0	Momentary or Trigger
4 Major	7	14	13 / 0	Momentary or Trigger
2 / 3, or 2 Major from the 3rd	7	14	14 / 0	Momentary or Trigger
5 Major	7	14	15 / 0	Momentary or Trigger
5♯ / 6♭ Augmented	7	14	16 / 0	Momentary or Trigger
6m	7	14	20 / 0	Momentary or Trigger

Function	Ch	CC#	On / Off	Button type
6m chord 1.3♭.5	7	14	2 / 0	Momentary or Trigger
7♭ Major — bass on the 7♭	7	14	3 / 0	Momentary or Trigger
5 Major 5 / 3	7	14	4 / 0	Momentary or Trigger

TIP · LAUNCHPAD MK3

On a Launchpad, keep each group in its own block of pads (as in Figure 30) so your hands learn the geography — keys along the bottom rows, chord variations together, volumes in a column on the edge.

7.3 Set the Key — Trigger

The PianoHack can change the key of a song at the touch of a button. Normally you set a key right after powering on. Pressing any of the C–B buttons sets the musical key.

`Channel 07` `CC# 03` `Button Toggle` `Off 0`

Key	Value	Off Value
C	12	0
C♯ / D♭	1	0
D	2	0
D♯ / E♭	3	0
E	4	0
F	5	0
F♯ / G♭	6	0
G	7	0
G♯ / A♭	8	0
A	9	0
A♯ / B♭	10	0
B	11	0

7.4 Stop All MIDI Sound

This command turns off all currently processing MIDI — it triggers all-sound-off and all-notes-off, and resets volume levels. (Another good reason to have a MIDI mixer in your rig.)

Channel	CC#	Value	Off	Button
07	26	17	0	Toggle / Momentary

7.5 1-Button Riff

The 1-Button Riff plays a stored riff one note at a time, following your tempo and dynamics. Each press (of a button or a key) advances the riff by one note, then cycles back to the start. You can store up to **16 riffs**, each up to **49 notes** long. Author and audition them with the One-Riff Editor — see **Chapter 8**.

Trigger a riff

Any note on MIDI channel 9 triggers the riff, one note at a time, circling through the sequence. Tip: set several pads on a Launchpad to different notes on channel 9 for a wider spread; or, if your keyboard supports a split, set the split to channel 9.

`Channel 9` `Note any (e.g. G7)` `Button Momentary`

Reset riff to start

Resets the riff to the beginning even if you are in the middle of it — useful when you are not sure where you left off.

`Channel 07` `CC# 27` `Value 37` `Off Value 0` `Button Momentary`

Riff sustain on / off

Riffs play on MIDI channel 9, so this simply turns on sustain for that sound.

Select a riff (1–16)

Switch between your 16 stored riffs. Only the value changes for each riff.

`Channel 07` `CC# 27` `Button Toggle` `Off 0`

Riff	Value	Riff	Value
Riff 01	1	Riff 09	9
Riff 02	2	Riff 10	10
Riff 03	3	Riff 11	11
Riff 04	4	Riff 12	12

Riff	Value	Riff	Value
Riff 05	5	Riff 13	13
Riff 06	6	Riff 14	14
Riff 07	7	Riff 15	15
Riff 08	8	Riff 16	16

Scales, Chords & Bass

7.6 Set Scales — Toggle

You can choose from four scales. When you select a scale, it takes up the whole keybed of your controller — so you may want **One-Chord** mode enabled at the same time, letting you solo on the scale while moving through chord progressions with the buttons.

`Channel 07` `CC# 22` `Button Toggle` `Off 0` `Outputs on Ch 11`

Scale	Value ON
Major scale of the selected key	107
Pentatonic Major scale	108
Pentatonic Minor scale	109
Chromatic scale	111

> **NOTE**
>
> When Scale mode is enabled, the outgoing MIDI channel is **11**.

7.7 Dominant 7 — Toggle

When on, this turns every major chord into a dominant 7th and every minor chord into a minor 7th as it is played.

Channel **07** | CC# **09** | Value **44** | Off **0** | Button **Toggle**

7.8 3 Chord Always Minor — Toggle

When on, the **3** chord always plays minor — instead of the normal behaviour of a 1/3 (a major 1 chord with the 3rd as the bass note).

`Channel 07` `CC# 25` `Value 24` `Off 0` `Button Toggle`

7.9 1-Button Chord Mode

When on, pressing a single chord button plays a full four-note chord. This frees you to play a melody or scale on the keyboard while moving through progressions with the chord buttons.

`Channel 07` `CC# 28` `Value 17` `Off 0` `Button Toggle`

1-Button Chord — one octave lower

The same as above, but the four-note chord plays one octave lower.

`Channel 07` `CC# 28` `Value 12` `Off 1` `Button Toggle`

7.10 Bass Note Inversions

These options control the bass-note inversion. The default is **Root**. You can optionally select the 1st, 2nd, or 3rd inversion.

> **NOTE**
>
> If you select the 1st, 2nd, or 3rd inversion, the PianoHack plays it for that one chord, then automatically reverts to Root for the next chord. If you do not want any bass note, simply turn down the volume on MIDI channel 8.

Inversion	Value	Off	Button
Root (default)	5	8	Toggle
1st inversion (3rd of chord)	1	0	Trigger / Momentary
2nd inversion (5th of chord)	2	0	Trigger / Momentary
3rd inversion (7th / dom7 / m7)	3	0	Trigger / Momentary

7.11 Make Bass Notes Higher

When selected, the bass notes on MIDI channel 8 play one octave higher than the default.

`Channel 07` `CC# 29` `Value 77` `Off 67` `Button Toggle`

7.12 Chord Variation Buttons

Chord variation buttons are pressed **before** a chord keybed remap button. They are optional, and exist for songs that play a minor chord where a major would normally sit (or vice versa).

EXAMPLE

Make the 4 chord minor: press the *Minor* variation button, then the **4** chord remap button — the PianoHack maps a minor triad to the keybed.

Make the 2 chord major (common in country songs): press the *Major* variation button, then the **2** chord remap button.

There are **10** chord variations available for each of the 13 chord keybed remap buttons.

CHORD VARIATION (FLAVOR) BUTTONS — PRESS FIRST

Dim 7th	Add 9th	Major 7th	Half Dim	Sus 4th
Major	minor	Aug	Dom 7th	minor 7th

flavor button + chord remap button = the exact chord you want

CHORD REMAP BUTTONS — PRESS SECOND

6m	7♭ Maj	5/3	1	1♯ 2♭	2m	2♯ 3♭
1/3 3m	4	2 Major	5	Aug	6m	minor 7th

Diagram The two button groups work as a pair: a **flavor** button changes the *quality* of the next chord, while the **remap** button chooses *which* chord. Press a flavor button first, then a remap button.

For example : The 5 chord remap button will make a Major triad across you piano / note controller ..but if you press the minor chord variation button and then press the 5 chord remap button the keyboard / note controller will be a minor triad at the 5 position for the selected key.

Channel 07 | CC# 26 | Button Momentary | Off 0

Variation	Notes	Value
Full Diminished	1 · 3♭ · 4♯ · 6	27
9th (2nd) chord	1 · 2 · 3 · 5	29
Major 7th	1 · 3 · 5 · 7	44
Half Diminished	1 · 3♭ · 4♯	26
Sus 4th	1 · 4 · 5	34
Major	1 · 3 · 5	28
Minor	1 · 3♭ · 5	32
Augmented	1 · 3 · 6♭	33
Dominant 7th	1 · 3 · 5 · 7♭	46
Minor 7th	1 · 3♭ · 5 · 7♭	42

7.13 Chord Keybed Remap Buttons

These are the default PianoHack chord buttons. When pressed, they remap the keybed to the chord shown — a key must be selected first. You can position these chords in any order on your Launchpad, and you do not have to include all of them (using only 1, 4, 5, and 6m means just four chord remap buttons). Now you could play this chord progression in ALL 12 Keys, just by pressing the desired set Key button.

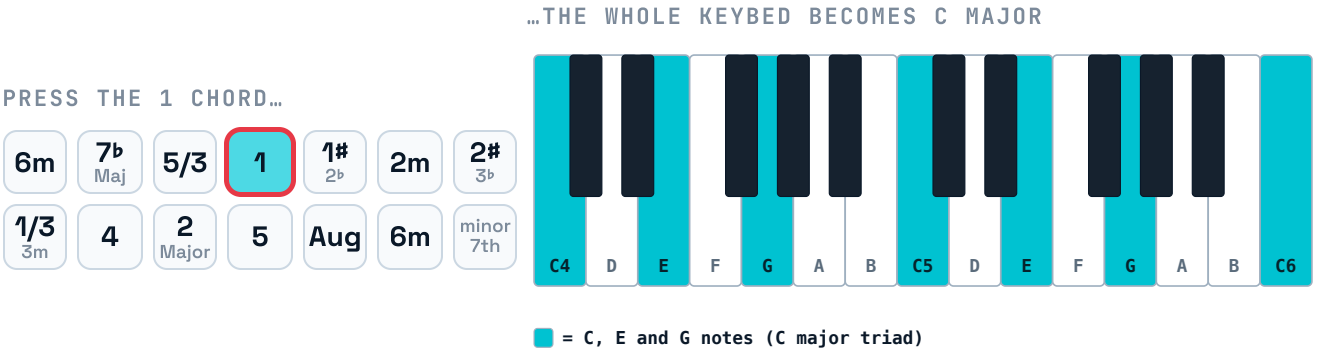
EXAMPLE · ISOMORPHIC IN ANY KEY

With the key set to **C**, the **1** chord remaps the keybed to a C major triad — every note you play becomes C, E, or G, and black keys map to their closest chord tone. Change the key to **D** and that same **1** button now produces D, F♯, and A. Your 1–4–6m–5 progression uses the same buttons in every key.

Each button always plays the chord for the set key unless a chord variation button was pressed first.

Worked example — the 1 chord in C

In the Key of C, pressing the **1** chord remap button turns your entire piano keyboard — or Launchpad in note mode — into a C major triad. Right notes work, and wrong notes (the black keys too) are mapped to the closest note in the C major triad.

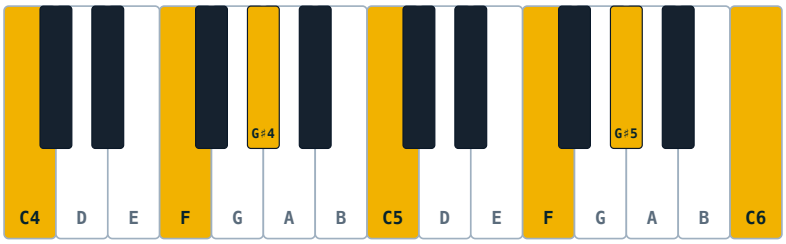


Another example — the 2m chord in E♭

In the Key of E♭, pressing the **2m** chord remap button turns your entire keyboard into an F minor triad. Correct notes work for an F minor triad, and wrong notes — any key that isn't F, A♭, or C — are mapped to the closest note in the F minor triad.

PRESS THE 2M CHORD…

…THE WHOLE KEYBED BECOMES F MINOR



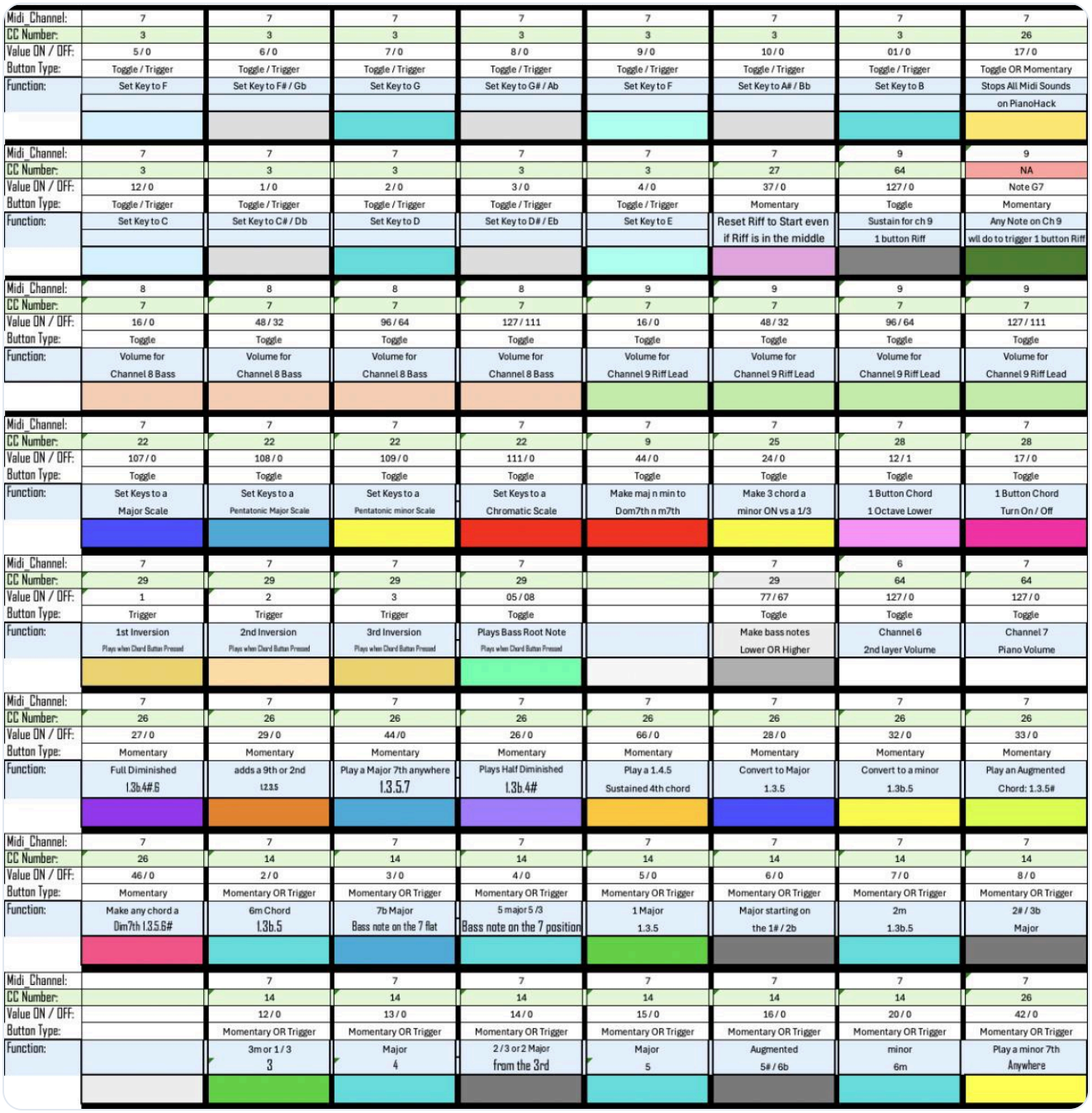
■ = F, A♭ and C notes (F minor triad)

Channel 07 | CC# 14 | Button Momentary / Trigger | Off 0

Value	Chord	Bass-note position
2	**6m** — 6 minor (play down from the 1)	6 position, lower from the key root
3	**7♭** — major chord in the 7♭ position	7♭ of the key
4	**5** major (3rd in the bass)	7 position (3rd as bass)
5	**1** — the One major chord	1 position
6	**1♯** — one-sharp major	1♯ / 2♭ position
7	**2m** — 2 minor	2 position
8	**2♯ / 3♭** major	2♯ / 3♭ position
12	**1/3** — major with 3rd in bass (or 3m if §7.8 is on)	3m position
13	**4** major	4 position
14	**2** major	4♯ / 5♭ position
15	**5** major	5 position
16	**Augmented**	6♭ / 5♯ position
20	**6m** — 6 minor	6 position

7.14 Suggested Setup — Novation Launchpad MK3

Putting it all together, here is one complete way to lay out every PianoHack control on a Novation Launchpad MK3 grid — another way of looking at the chart in §7.2.



Midi_Channel:	7	7	7	7	7	7	7	7
CC Number:	3	3	3	3	3	3	3	26
Value ON / OFF:	5 / 0	6 / 0	7 / 0	8 / 0	9 / 0	10 / 0	01 / 0	17 / 0
Button Type:	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle OR Momentary
Function:	Set Key to F	Set Key to F# / Gb	Set Key to G	Set Key to G# / Ab	Set Key to F	Set Key to A# / Bb	Set Key to B	Stops All Midi Sounds on PianoHack
Midi_Channel:	7	7	7	7	7	7	9	9
CC Number:	3	3	3	3	3	27	64	NA
Value ON / OFF:	12 / 0	1 / 0	2 / 0	3 / 0	4 / 0	37 / 0	127 / 0	Note G7
Button Type:	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Toggle / Trigger	Momentary	Toggle	Momentary
Function:	Set Key to C	Set Key to C# / Db	Set Key to D	Set Key to D# / Eb	Set Key to E	Reset Riff to Start even if Riff is in the middle	Sustain for ch 9 1 button Riff	Any Note on Ch 9 will do to trigger 1 button Riff
Midi_Channel:	8	8	8	8	9	9	9	9
CC Number:	7	7	7	7	7	7	7	7
Value ON / OFF:	16 / 0	48 / 32	96 / 64	127 / 111	16 / 0	48 / 32	96 / 64	127 / 111
Button Type:	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle
Function:	Volume for Channel 8 Bass	Volume for Channel 8 Bass	Volume for Channel 8 Bass	Volume for Channel 8 Bass	Volume for Channel 9 Riff Lead	Volume for Channel 9 Riff Lead	Volume for Channel 9 Riff Lead	Volume for Channel 9 Riff Lead
Midi_Channel:	7	7	7	7	7	7	7	7
CC Number:	22	22	22	22	9	25	28	28
Value ON / OFF:	107 / 0	108 / 0	109 / 0	111 / 0	44 / 0	24 / 0	12 / 1	17 / 0
Button Type:	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle	Toggle
Function:	Set Keys to a Major Scale	Set Keys to a Pentatonic Major Scale	Set Keys to a Pentatonic minor Scale	Set Keys to a Chromatic Scale	Make maj n min to Dom7th n m7th	Make 3 chord a minor ON vs a 1/3	1 Button Chord 1 Octave Lower	1 Button Chord Turn On / Off
Midi_Channel:	7	7	7	7		7	6	7
CC Number:	29	29	29	29		29	64	64
Value ON / OFF:	1	2	3	05 / 08		77 / 67	127 / 0	127 / 0
Button Type:	Trigger	Trigger	Trigger	Toggle		Toggle	Toggle	Toggle
Function:	1st Inversion Plays when Chord Button Pressed	2nd Inversion Plays when Chord Button Pressed	3rd Inversion Plays when Chord Button Pressed	Plays Bass Root Note Plays when Chord Button Pressed		Make bass notes Lower OR Higher	Channel 6 2nd layer Volume	Channel 7 Piano Volume
Midi_Channel:	7	7	7	7	7	7	7	7
CC Number:	26	26	26	26	26	26	26	26
Value ON / OFF:	27 / 0	29 / 0	44 /0	26 / 0	66 / 0	28 / 0	32 / 0	33 / 0
Button Type:	Momentary	Momentary	Momentary	Momentary	Momentary	Momentary	Momentary	Momentary
Function:	Full Diminished 1.3b.4#.6	adds a 9th or 2nd 1.2.3.5	Play a Major 7th anywhere 1.3.5.7	Plays Half Diminished 1.3b.4#	Play a 1.4.5 Sustained 4th chord	Convert to Major 1.3.5	Convert to a minor 1.3b.5	Play an Augmented Chord: 1.3.5#
Midi_Channel:	7	7	7	7	7	7	7	7
CC Number:	26	14	14	14	14	14	14	14
Value ON / OFF:	46 / 0	2 / 0	3 / 0	4 / 0	5 / 0	6 / 0	7 / 0	8 / 0
Button Type:	Momentary	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger
Function:	Make any chord a Dim7th 1.3.5.6#	6m Chord 1.3b.5	7b Major Bass note on the 7 flat	5 major 5 /3 Bass note on the 7 position	1 Major 1.3.5	Major starting on the 1# / 2b	2m 1.3b.5	2# / 3b Major
Midi_Channel:		7	7	7	7	7	7	7
CC Number:		14	14	14	14	14	14	26
Value ON / OFF:		12 / 0	13 / 0	14 / 0	15 / 0	16 / 0	20 / 0	42 / 0
Button Type:		Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger	Momentary OR Trigger
Function:		3m or 1 / 3 3	Major 4	2 / 3 or 2 Major from the 3rd	Major 5	Augmented 5# / 6b	minor 6m	Play a minor 7th Anywhere

Figure 31 A color-coded Launchpad MK3 layout grouping keys, chord variations, chord remaps, scales, riffs, and bass controls.

08

COMPANION SOFTWARE

The One-Riff Editor

The One-Riff Editor is a small, single-page web tool that lets you create, edit, audition, and save the 16 riffs your PianoHack plays through the 1-Button Riff feature. It runs entirely in your browser — no install, no internet connection — and reads and writes the `phRiffs.txt` file on your PianoHack's microSD card.

ABOUT THIS VERSION

This chapter covers **PianoHack Riffs Editor v22 — Riff Player**. Compared with earlier versions, v22 adds a built-in Riff Player that lets you preview any riff one note at a time, right inside the editor, using on-screen buttons or the Up Arrow and Left Arrow keys. The file is named `PianoHack_1-Riff_Editor_v_22.html` and ships on the microSD card alongside `phRiffs.txt`.

8.1 How Riffs Work on the PianoHack

Before you open the editor, it helps to understand exactly what a riff is from the PianoHack's perspective. There are four rules.

1. **Up to 16 riffs.** The PianoHack reads riffs 1 through 16 from the `phRiffs.txt` file. The editor shows them in a dropdown.
2. **Up to 49 notes per riff.** The editor lays out 49 numbered boxes. Empty boxes are ignored — the firmware pads internally, so a short riff is just as valid as a long one.
3. **Notes are MIDI numbers from 1 to 127.** Middle C is 60; C an octave higher is 72. Each step of 1 is one semitone (half step) up or down.
4. **Always write in the Key of C.** This is the most important rule. The PianoHack transposes your riff in real time to whatever key the unit is set to. Write in C and your riff plays correctly in every key; write in D and it will be wrong in 11 keys out of 12.

When you change the PianoHack's key, the unit transposes your stored C riff by the right number of semitones. Writing in C is what makes one set of 16 riffs usable in every song.

When the PianoHack is in 1-Button Riff mode and you press a trigger key (any note on MIDI channel 9), the unit outputs one note of the selected riff. Press again for the next note; keep pressing and the riff cycles to the end, then wraps to the start. You control the rhythm and dynamics — the editor just decides which notes come out, and in what order.

8.2 What You'll Need

microSD card 32 GB or smaller, formatted FAT32	**microSD card reader** USB or USB-C adapter for your computer
Chrome or Edge (recommended) can save directly back to the card	**Safari or Firefox (supported)** save by downloading a replacement file

Files on the microSD card

Create a folder named `PianoHack` at the root of the card. Inside it you should have four files:

File	What it is
`PianoHack_1-Riff_Editor_v_22.html`	The editor itself. Double-click to open in your browser.
`phRiffs.txt`	The active riff file — what the PianoHack reads on power-up.
`phRiffs_backup.txt`	A default backup. Copy and rename to `phRiffs.txt` to start over.
`ReadMe.txt`	A short text-file summary of these instructions.

8.3 Opening the Editor

1. **Open the editor file.** Right-click (or Control-click) `PianoHack_1-Riff_Editor_v_22.html`, choose *Open With*, and pick Google Chrome or Microsoft Edge. The editor opens as a single page — nothing is uploaded, everything runs locally.
2. **Load your riffs.** Click the orange *Click to Open phRiffs.txt* button. In the file picker, go to your microSD card → `PianoHack` folder → select `phRiffs.txt` and click Open.
3. **Confirm it loaded.** The editor fills the dropdown with all 16 riffs and turns the orange button blue. The status chip turns green and reads *File is Loaded* — direct saving is enabled.

> **NOTE · BROWSER DIFFERENCES**
>
> In Chrome or Edge the editor has full read/write access; Save writes back to the same file on the card. In Safari or Firefox the button reads *phRiffs.txt Loaded (Read-Only)*, and Save instead downloads a new `phRiffs.txt` you drag onto the card.

8.4 A Tour of the Editor

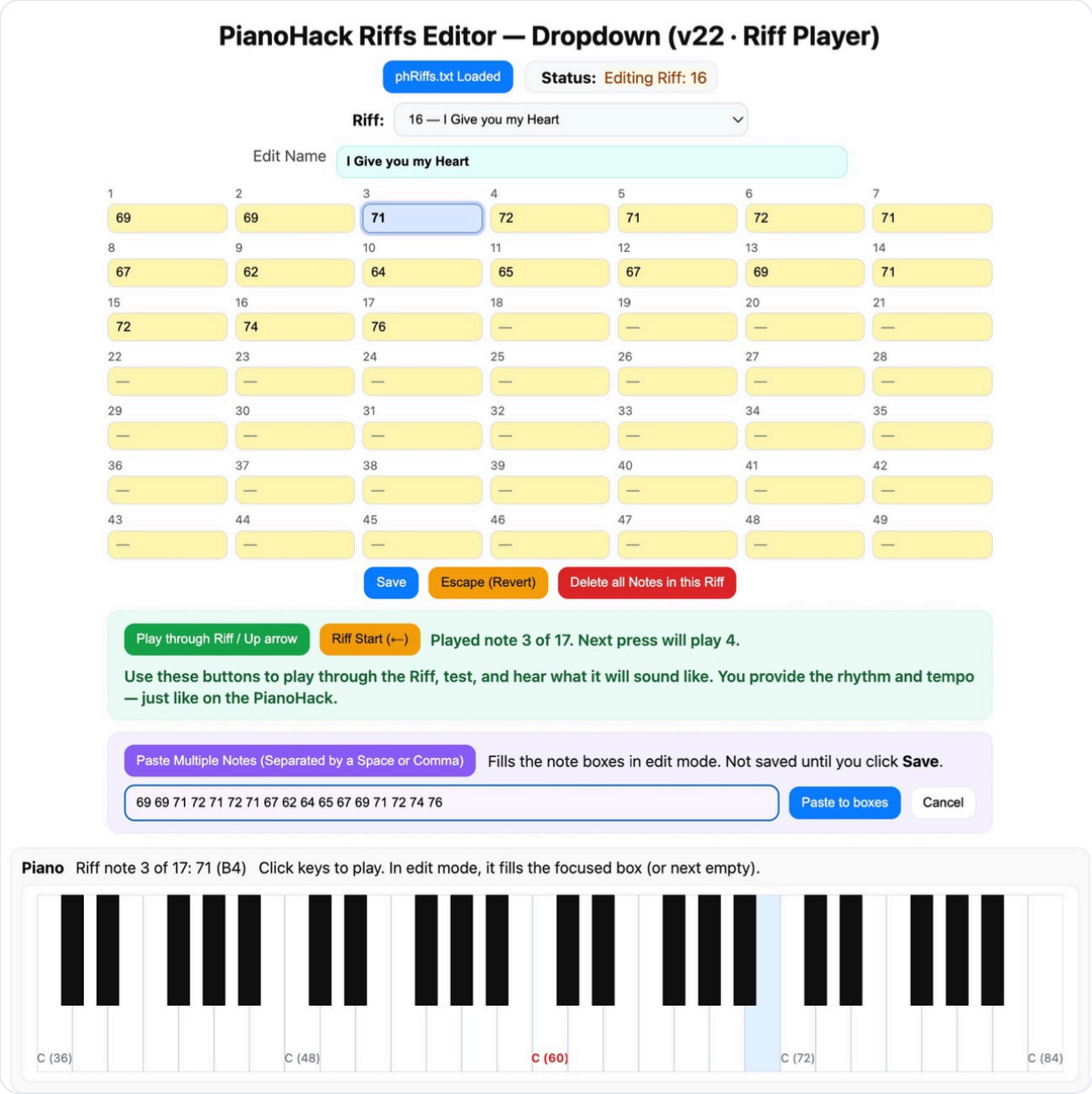


Figure 32 The full v22 editor with Riff 16 ("I Give you my Heart") loaded. Note the green *Play through Riff* button and the orange *Riff Start* button under the 49 note boxes — the Riff Player controls new in v22.

Top bar file button (orange → blue) + status chip; green = success, amber = warning, red = error	**Riff dropdown** lists all 16 riffs by number and name
Edit Name field mint box; renames the selected riff on Save	**49 note boxes** yellow fields, one MIDI number each; empty = ignored
Save / Escape / Delete all write changes · revert to disk · clear all boxes	**Riff Player (new)** green Play / orange Reset; Up & Left arrow shortcuts
Paste Multiple Notes purple button; paste a whole riff at once	**Piano keyboard** C(36)–C(84); Middle C in red; click to hear or enter notes

8.5 Editing a Riff — Step by Step

1. From the *Riff:* dropdown, choose the riff to change. The name field and all 49 boxes light up yellow to show they are editable.
2. *Optional:* type a new name in the Edit Name field — this appears in the dropdown next time.
3. Edit notes three ways: **(a)** type a MIDI number directly into a box; **(b)** click a box to focus it, then click a key on the on-screen piano — the number drops in and focus moves to the next empty box; **(c)** use Paste Multiple Notes to fill many boxes at once.
4. Audition with the green *Play through Riff* button (or the Up Arrow key) to step through one note at a time. Click *Riff Start* (or Left Arrow) to return to note 1.
5. Leave unused boxes blank. For a fresh start, click *Delete all Notes in this Riff*.
6. Click the blue *Save* button. The status chip turns green (e.g. "Saved Riff 16"). Your changes are now on the card.

> **CHANGED YOUR MIND?**
>
> Click the orange *Escape (Revert)* button any time before you save — it restores the riff exactly as it was when you loaded the file.

A sample riff — the default "I Give you my Heart" — looks like this as MIDI numbers (all in the Key of C; the PianoHack transposes at playback). That's 17 notes; the remaining 32 boxes stay empty:

69 69 71 72 71 72 71 67 62 64 65 67 69 71 72 74 76

8.6 Paste Multiple Notes

If you already have a riff written as a sequence of MIDI numbers, you don't have to enter them one box at a time. With a riff selected for editing, click the purple *Paste Multiple Notes* button, type or paste your notes (spaces and commas both work as separators), then click *Paste to boxes*. The 49 boxes refill left-to-right; click Save to commit.

> **NOTE · OUT-OF-RANGE VALUES**
>
> Numbers above 127 or below 1 are snapped to the nearest valid MIDI value. Entries the editor can't read (letters, symbols, blanks) are skipped, and anything past the 49th valid number is dropped.

8.7 The Riff Player (new in v22)

The Riff Player lets you audition any of your 16 riffs inside the editor, one note at a time, just as you would on the PianoHack itself — so you can catch typos and octave errors before you ever eject the card.

Button	Keyboard	What it does
Play through Riff	`Up Arrow`	Plays the next note of the current riff; wraps to note 1 after the last.
Riff Start	`Left Arrow`	Resets the riff to note 1. The next Play press plays note 1.

While a riff plays, the active note box glows blue, the matching piano key highlights, and the label updates to read something like "Riff note 3 of 17: 71 (B4)." The status line tells you what's next: "Played note 3 of 17. Next press will play 4." Editing any note resets playback to the start.

> **TIP · USE THE KEYBOARD**
>
> Click any non-input area of the page first to give it keyboard focus, then tap Up Arrow repeatedly to audition at your own tempo, and Left Arrow to jump back to the start.

8.8 Saving Your Work

Chrome and Edge — direct save

These browsers support the File System Access API. The first time you click Save, the browser shows a one-time permission prompt; click *Save changes* and from then on the editor writes directly back to the same file on the card. After saving, the status chip turns green and reads "Saved Riff N."

Safari and Firefox — download a replacement

These browsers open the file read-only. When you click Save, the editor downloads a new `phRiffs.txt` to your Downloads folder. Drag it into the `PianoHack` folder on your card and choose *Replace* to overwrite the old file.

> **NOTE · YOUR CHANGES ARE NEVER LOST**
>
> Even in Chrome/Edge, if the editor can't write back to the card (card removed, file locked, permission revoked) it automatically falls back to downloading a replacement and tells you so in the status chip.

Each riff occupies two lines in the file — a comment header with the number and name, then a line of space-separated MIDI numbers:

```
#-Riff 16: - Name: I Give you my Heart
69 69 71 72 71 72 71 67 62 64 65 67 69 71 72 74 76
```

8.9 The On-Screen Piano & MIDI Numbers

The piano runs four octaves from C2 (MIDI 36) to C6 (MIDI 84); Middle C (60) is labelled in red. Click any key to hear it, or — while editing — to drop its number into the focused box. During playback the current key lights up blue.

Octave	C	D	E	F	G	A	B
C2	36	38	40	41	43	45	47
C3	48	50	52	53	55	57	59
C4 (mid)	**60**	**62**	**64**	**65**	**67**	**69**	**71**
C5	72	74	76	77	79	81	83
C6	84	–	–	–	–	–	–

WORTH MEMORIZING

Add 12 to go up an octave, subtract 12 to go down. Sharps and flats are the in-between numbers (C♯ = 61, F♯ = 66).

8.10 Riff Ideas & Patterns

Many memorable riffs are only 4–8 notes long with a repeat or two — you don't need to fill all 49 boxes. Because the PianoHack steps one note per trigger press, you create rhythm by *when* you press, not by leaving gaps. Here are some safe starting points, all in the Key of C:

Idea	MIDI sequence
C major triad	`60 64 67`
C minor triad	`60 63 67`
Full C major scale up	`60 62 64 65 67 69 71 72`
Scale up & down	`60 62 64 65 67 65 64 62 60`
Octave hook	`60 72 72 67 67 74 74 76 77 76 72 67`
Pentatonic noodle	`60 62 64 67 69 67 64 62`
Bass-style root / fifth	`48 55 48 55 48 55 48 55`

8.11 Playing Your Riffs from a Controller

Once your riffs are saved and the card is back in the PianoHack, your controller needs to do three things: trigger the next note, reset to the beginning, and switch between the 16 riffs.

Function	Channel	CC# / Note	Value	Button
Play next riff note	9	any note	—	Momentary
Reset riff to start	7	CC#27	37 / 0	Momentary
Select riff 1–16	7	CC#27	1–16	Toggle

HEADS-UP · CC#27 DOES DOUBLE DUTY

The same CC#27 on channel 7 handles both *Reset Riff* (value 37) and *Riff Selection* (values 1–16). Send whichever value the button needs; other values on this CC are ignored. Configure the 16 riff-select buttons as toggles so the selection persists.

Performance tip: assign several pads or keys to different notes on channel 9 — or, if your keyboard supports a split, set one half to channel 9 — so you have a wider physical spread to drive the riff than a single button. Ready-made Novation Components templates with all of these buttons pre-wired are available (see Chapter 11).

8.12 Troubleshooting the Editor

Symptom	Fix
Editor opens but the dropdown stays empty	You haven't loaded a file. Click *Click to Open phRiffs.txt* and select it from your PianoHack folder.
"Loaded read-only" in Chrome/Edge	Open the file directly from the microSD card volume, not a downloaded copy or restricted location.
Up / Left Arrow do nothing	Click a non-input area first to give the page keyboard focus. In a note box, arrows move between fields instead.
Clicking Save does nothing visible	Check the status chip. If amber and it mentions "downloaded," copy the new file from Downloads back to the card.
PianoHack doesn't play the edited riff	Confirm (1) the card is FAT32, (2) the file is exactly `phRiffs.txt` in a folder named `PianoHack`, (3) you selected the correct riff number on your controller.
Controller selects a riff but nothing plays	Selecting and triggering are separate. Selection uses Ch 7 CC#27 (toggle); playing needs a note on Ch 9 (momentary).
Riff plays in the wrong key	Almost always the riff was written in a key other than C. Re-enter it in C — the Set-Key buttons handle transposition.
I accidentally cleared all notes	If you haven't saved, click *Escape (Revert)*. If you've saved, copy the riff out of `phRiffs_backup.txt` and paste it back.

09

POWER-ON & STATUS

Booting the PianoHack

When you power on, the PianoHack runs a short boot sequence and signals its status with a colored LED. Learning these colors tells you, at a glance, whether your custom riffs are loaded and ready.

9.1 Power Options

Power the PianoHack as part of your rig — from the wall, or from a rechargeable pedal power bank (see §5.3). As a MIDI controller in the chain, it draws power through the same powered USB hub or merge unit as your other controllers.

9.2 Boot-LED Sequence & microSD Loading

The boot LED is located on the ESP32 (PianoHack) unit. Its sequence is meant for troubleshooting and for confirming whether your custom riffs are loaded.

You don't have to take your microSD card to the gig — just load up your riffs at home, and the PianoHack remembers them.

LED on boot	Meaning	What it tells you	Data source
Green (1 sec)	**Success!**	New custom riffs were just loaded from the SD card and saved to memory.	SD card
Blue (1 sec)	**Gig Ready**	Found your previously saved custom riffs in memory — loaded on an earlier boot and ready to perform.	Internal EEPROM
Red → Blue	**Gig Ready (no SD)**	No SD card found, but your custom riffs are safely loaded from memory and ready to perform.	Internal EEPROM
Red → Yellow	**First run / no data**	No SD card found and no previous saves exist, so the PianoHack loads the default riffs it shipped with.	Factory defaults

10

FIRMWARE

Updating the PianoHack

Keep your PianoHack current with the latest features and MIDI improvements. Updates run right from your web browser — no coding and no software installation required.

10.1 Web-Based Firmware Update

Before you begin

- **Browser compatibility:** use Google Chrome or Microsoft Edge. Safari and Firefox do not yet support web-based hardware updates.
- **Cable check:** use a USB-C cable capable of data transfer (the one included with your unit is perfect).

Step by step

1. **Visit the update page** — go to pianohack.org/update.
2. **Connect to your PC / Mac** — plug the USB-C cable into the **LEFT** USB-C port of your PianoHack. *(The right port is for MIDI and power only.)*
3. **Start the update** — click the "Update my PianoHack" button on the page.
4. **Select the port** — in the pop-up, choose the device labelled "USB Serial", "ESP32-S3", or "CP210x" and click Connect.
5. **Wait for completion** — keep the tab open until the progress bar reaches 100%. This typically takes less than 60 seconds, after which your PianoHack reboots automatically with the new features.

10.2 Troubleshooting

DEVICE NOT FOUND?

Ensure the cable is in the **LEFT** USB-C port. The right port is for MIDI / power and will not allow programming.

CONNECTION FAILED?

Close any other programs that might be using MIDI or serial ports (such as the Arduino IDE or DAW software), then try again.

MAC USERS

If the device does not appear, make sure you have the CH34x drivers installed and allowed in your Privacy & Security settings.

If you run into any issues or have questions, contact the PianoHack team — details are on pianohack.org.

11

DOWNLOADS

Templates & Tools

To make setup as fast as possible, we provide downloadable tools and templates for the products that work with the PianoHack. All are available on the website and by email request.

Logic Pro templates ready-made project templates	**MainStage templates** ready-made concert files
Numa Player templates for iPad and Mac	**Novation Components files** Launchpad MK3, Launchkey MK3 & MK4
Printable overlays / stickers window-style overlays for Launchpad MK3 & Launchkey MK3/MK4	**CME Hxmidi routing profiles** H2MIDI Pro, H4MIDI WC, H12MIDI Pro
One-Riff web app custom HTML tool to set up the 1-Riff feature	**How to get them** download at pianohack.org or request by email

12

WHAT YOU'RE GETTING

Product Gallery

The PianoHack ships as a single compact unit. Here it is up close — the box that turns any programmable MIDI controller into a right-notes chord machine.

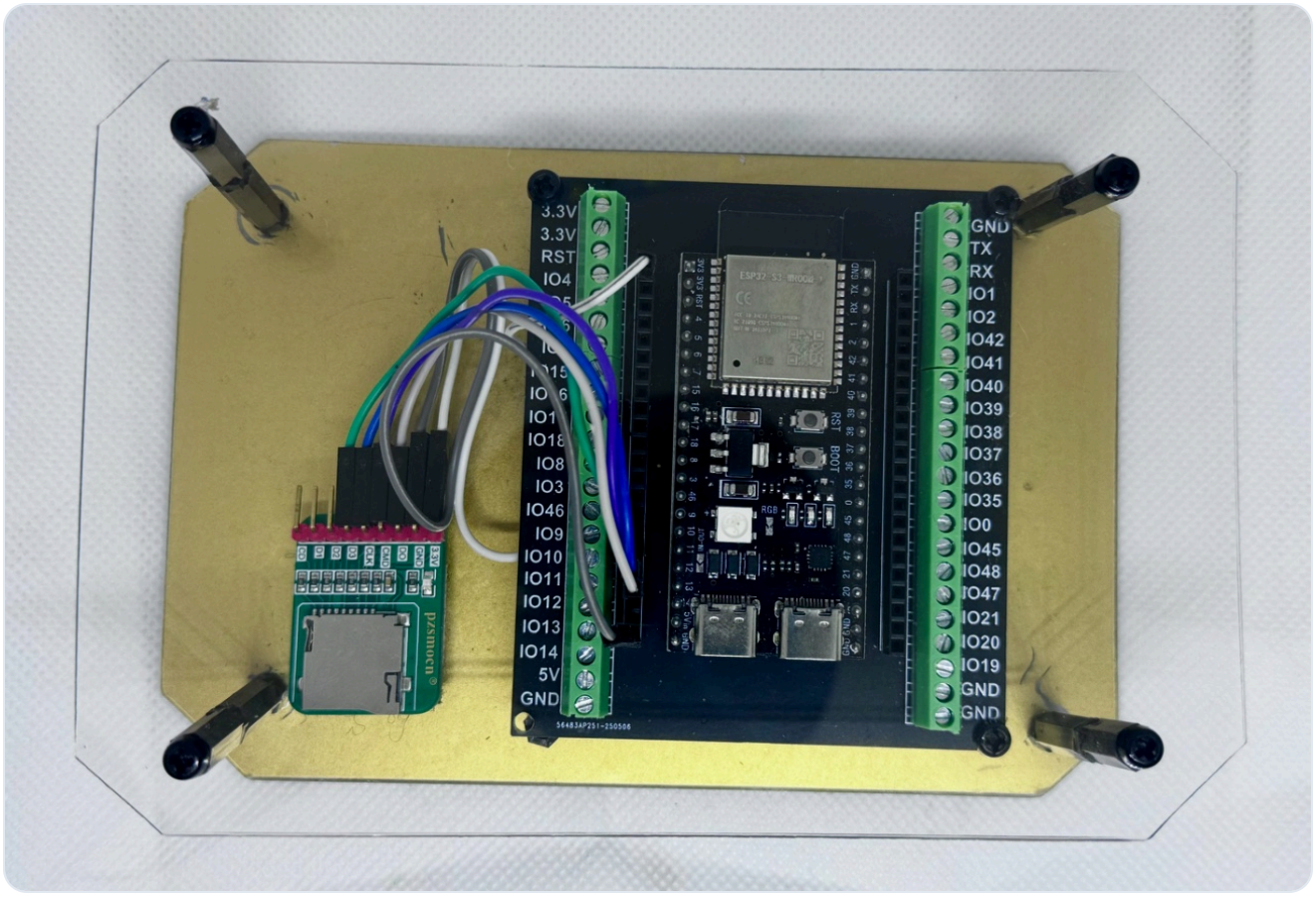


Figure 33 The PianoHack in its housing, viewed top-down — the ESP32-S3 processor, microSD card module, and dual USB-C ports.

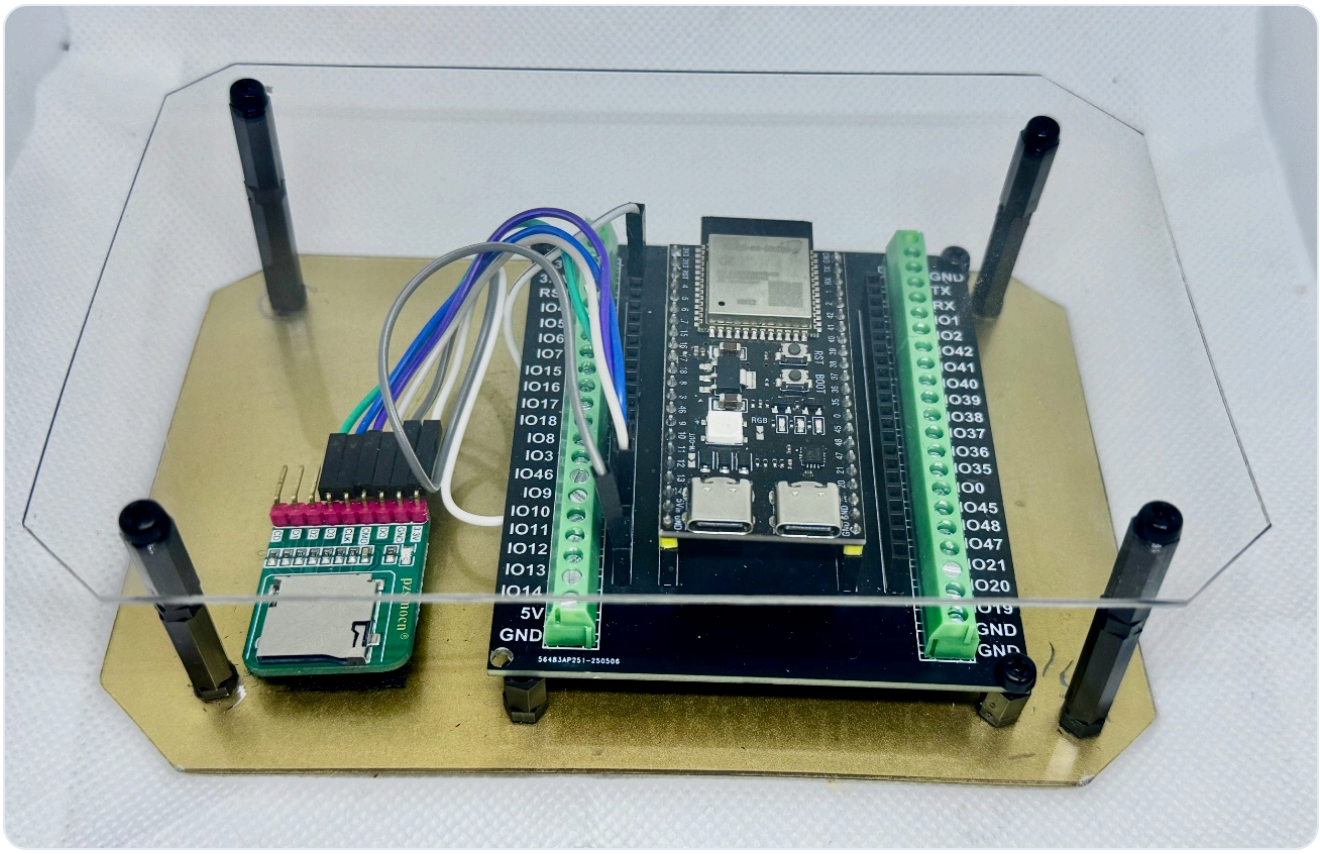


Figure 34 The PianoHack in its housing, front-angled — MIDI IN/OUT and the programming port on the dual USB-C connectors.

A

QUICK REFERENCE

Appendix

A.1 CC Command Map

Every PianoHack command at a glance. Unless noted, commands are on channel 7. Full details are in Chapter 7.

CC#	Function	Values
03	Set Key (C–B)	12, 1–11
09	Dominant 7 toggle	44
14	Chord keybed remap buttons	2–20
22	Set Scales (outputs Ch 11)	107, 108, 109, 111
25	3 chord always minor	24
26	Chord variations · Stop all sound	26–46 · 17
27	Riff select · reset riff	1–16 · 37
28	1-Button Chord mode · octave lower	17 · 12
29	Bass inversions · bass higher	1–5, 8 · 77
—	Trigger riff (note, **channel 9**)	any note

A.2 Source-Coverage Checklist

Confirmation that every section and figure from the source notes has been incorporated into this manual.

- [x] Introduction & isomorphic chording layout — Ch. 1
- [x] Who the PianoHack is for — Ch. 2
- [x] How it works, "man in the middle," no sound output, MIDI channels — Ch. 3
- [x] All five methods of play, including the One-Riff feature — Ch. 4
- [x] Full hardware list: controllers, power, mixers, merge units, sound sources, setups, visual hardware flow — Ch. 5 (Figs 3–29)
- [x] MIDI channel IN/OUT reference — Ch. 6
- [x] Every CC command: keys, riffs, scales, dom7, 3-minor, 1-button chord, bass, variations, remaps, layout — Ch. 7 (Figs 30–31)
- [x] One-Riff Editor: setup, controls, Riff Player, saving, MIDI, troubleshooting — Ch. 8 (Fig 32)
- [x] Power options & boot-LED sequence — Ch. 9
- [x] Web firmware update & troubleshooting — Ch. 10
- [x] Templates & downloadable tools — Ch. 11
- [x] Product photos — Ch. 12 (Figs 33–34)

SOURCE COVERAGE

This manual incorporates the full PianoHack notes, the One-Riff Editor manual (v22), and the Visual Hardware Setup diagram. The riff capacity is confirmed at **16 riffs, up to 49 notes each**.

PianoHack

Right notes. Every time. · pianohack.org

Concept, design, and programming by David Commisso

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Questions? Send to DCPaypal1000@hotmail.com