bento - Sampling Production Lab

User Manual

for Firmware v 1.1.4

Aug 1, 2025

1010 music

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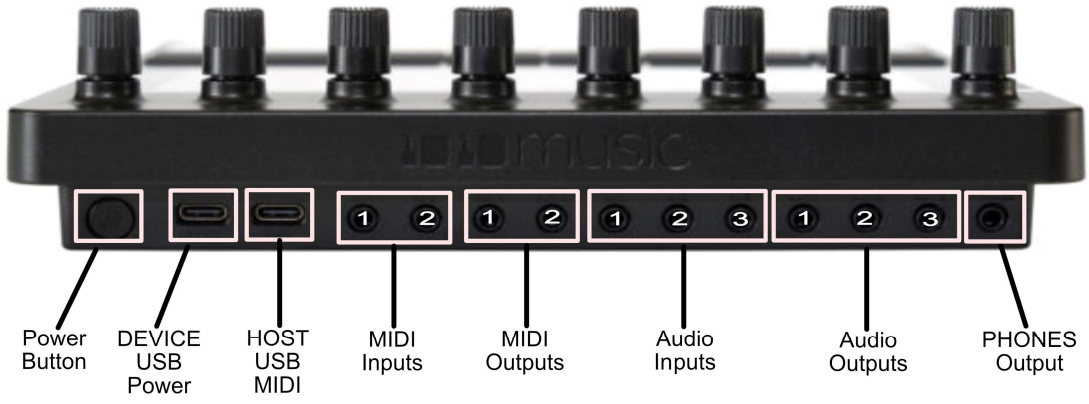
Setting Up

Before you begin making music with your bento, you'll need to insert the microSD card, and establish audio connections. bento requires external speakers and a microSD card to operate—there's no internal memory or built-in speaker.

Take your time with these initial connections to ensure reliable operation and access to the latest features.



Back panel connections diagram

Connecting External Power

bento includes a USB-C cable for charging and external power. The built-in rechargeable battery provides three hours of operation, but you'll want external power for extended sessions and firmware updates.

To connect external power:

1. Locate the **DEVICE USB** port on the back panel (labeled for power and computer connectivity).
2. Connect the included USB-C cable to this port.
3. Connect the other end to a USB power supply capable of providing adequate current.
4. bento will begin charging immediately and can operate while charging.

The device charges much faster when turned off, but you can use bento while it's charging. Monitor battery status using the battery icon and percentage in the lower corner of the screen.

Note: Use a standard 30 Watt USB power supply that can provide at least 2000mA (2 amps) at 5V. The internal battery specifications are 3.8V - 5120mAh - 19.5Wh. Not all USB power supplies or cables are created equal—some cables are designed only for data transfer rather than adequate power delivery. Newer iPad adapters typically provide sufficient power.

Inserting the microSD Card

bento requires a microSD card to operate and stores all samples, patches, and projects on the card. The microSD slot is located on the right panel of the device.

microSD card slot location

To insert the microSD card:

1. Locate the microSD card slot on the right panel.
2. Insert the card with metal leads facing up and the notched edge oriented correctly.
3. Push the card firmly into the slot until it clicks into place.
4. The card reader is spring-loaded—push to eject when needed later.

Important: bento cannot operate without a microSD card. The card stores your projects, samples, and system data. You can remove and reinsert the microSD card while bento is powered up, but save your work first to prevent data loss.

Connecting To Headphones

bento provides a dedicated **PHONES** output bus for private monitoring. This output bus has independent level control and receives the same mix as Output 1.

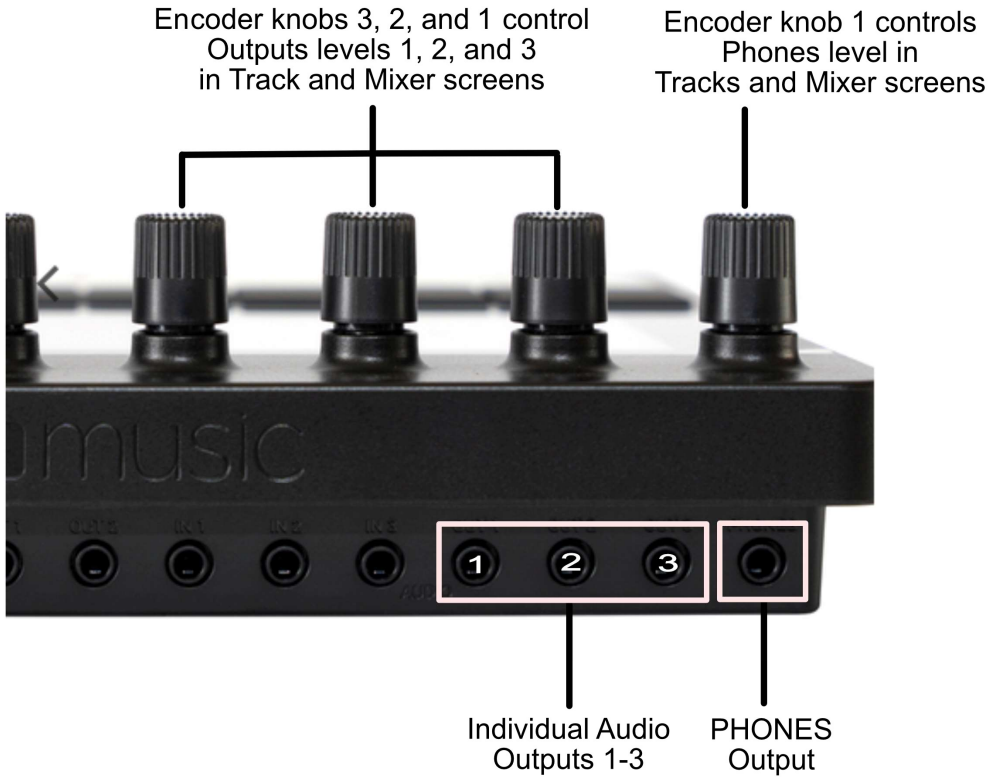
To connect headphones:

1. Locate the **PHONES** audio output jack on the back panel.
2. Connect your headphones using a 3.5mm TRS stereo cable.
3. The PHONES output bus receives audio routed to Output 1 and Output 1 w/ Mod FX, along with the metronome.

The PHONES audio output uses a 3.5mm TRS connector and provides adequate power for most headphones.

Connecting To a Mixer or Amplifier

bento provides four stereo audio outputs for connecting to mixers, amplifiers, or audio interfaces. The audio outputs use 3.5mm TRS jacks and operate at Eurorack levels (+/- 5 volts), which is louder than consumer line level.



Audio outputs diagram showing PHONES and Out 1 ports

To connect external audio equipment:

1. Connect a 3.5mm TRS stereo cable from **audio output 1** to your mixer or amplifier input.
2. Set your mixer or amplifier to a low level initially.
3. Gradually increase levels to avoid distortion, as bento's output is louder than typical consumer electronics.

Important: bento's audio outputs operate at Eurorack levels, which can cause distortion if your receiving equipment expects consumer line levels. Start with low levels and adjust gradually.

In the Next Steps section, we'll suggest connecting to other audio outputs for more complex routing configurations.

Powering Up for the First Time

bento ships with firmware version 1.0 on the microSD card, which does not include all features described in this manual. To access the latest bento features, you should install the latest firmware before using the device.

To download and prepare the latest firmware:

1. Visit 1010music.com/downloads to find the latest firmware and content files.
2. Download the latest firmware package and release notes.
3. Extract the files (bento1.bin and bento2.bin) if the download is in a compressed format (ZIP).
4. Use your computer to copy the bento1.bin and bento2.bin files to the root directory of the microSD card (this will replace the original firmware files).
5. Check the release notes for any additional files you might need to install on the microSD card.
6. Safely eject the microSD card from your computer and insert it into bento.

To power up and access the bootloader:

1. Ensure the microSD card with updated firmware is properly inserted.
2. Verify power connections are secure.
3. Hold the power button (located on the back right corner) down until the **Bootloader** screen appears.

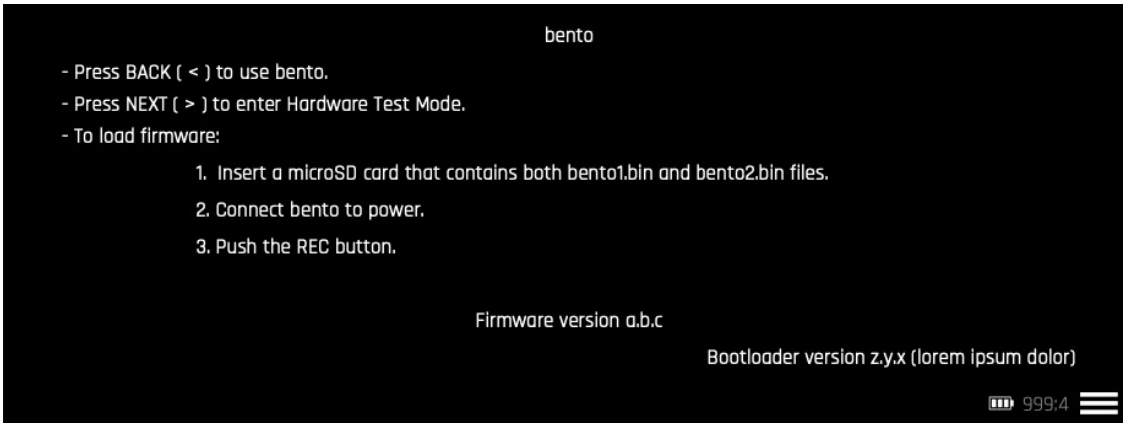


Figure: Bootloader screen

4. The Bootloader screen shows three options and indicates the current firmware version installed on bento.

Warning: If you explore the Bootloader's hardware test option, disconnect bento's audio outputs from headphones, speakers, or other equipment. The hardware audio test generates an extremely loud audio signal that could damage your hearing or connected equipment.

Installing Firmware

Unlike some other 1010music instruments, bento does not boot directly from firmware files on the microSD card. If bento has firmware installed, it can operate without accessing the bento1.bin and bento2.bin files on the microSD card.

To install firmware:

1. With the Bootloader screen displayed, press the **REC** button to install firmware from the microSD card.
2. The bootloader displays progress of the firmware installation.
3. Wait for the firmware installation process to complete—do not disconnect power or eject the microSD card during installation.
4. bento will restart automatically when installation finishes.

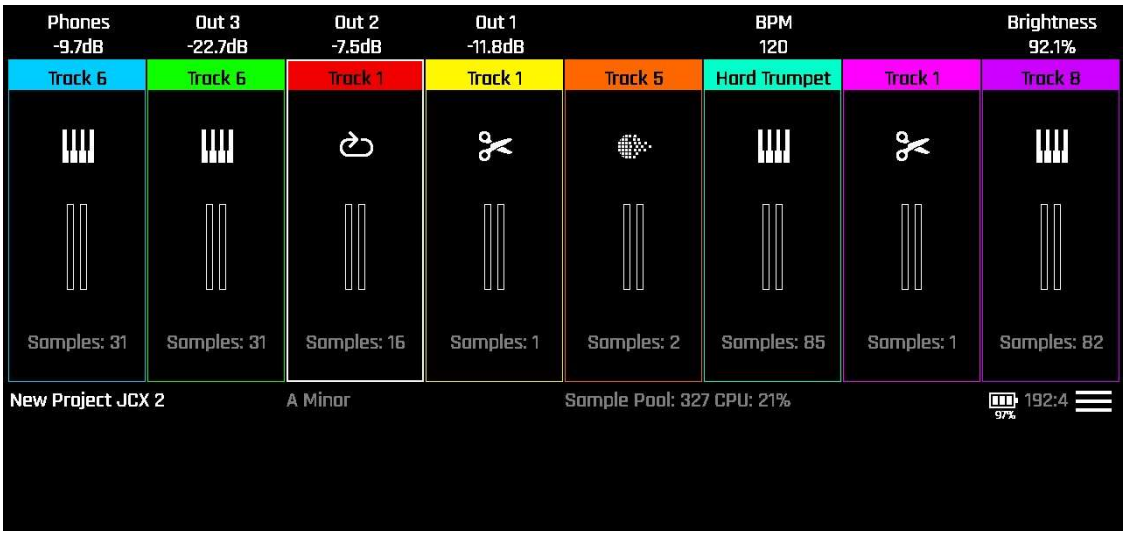
Important: bento must be connected to power to perform firmware updates. Firmware upgrades cannot be performed while running on battery power alone.

Verifying Firmware Installation

After firmware installation completes, bento automatically restarts and displays the firmware version during startup, then loads the Tracks screen.

To verify successful installation:

1. Observe the firmware version displayed during startup.
2. Confirm that bento displays the Tracks screen when startup completes.
3. Look for “Welcome to the Future” in the bottom left corner of the Tracks screen, indicating the current project name.



Tracks screen showing Welcome to the Future project

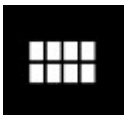
You can check the firmware version anytime by pressing **PROJ**—the firmware version appears in the lower left corner of the screen.

Playing Tracks from the Pads

Once bento has completed firmware installation and startup, you can test basic functionality by triggering the built-in sounds using the velocity-sensitive pads.

bento supports 6 different track types:

Table 2-1: Track Types and Symbols

Track Type	Icon	Description	How to Use
Granular		Granular synthesis engine (limit 1 per project)	Play notes with pads, extensive sound design options
One-shots		16 individual samples	Trigger samples using pads
Multisample		Chromatically playable instruments	Play notes with pads, change octaves with Up/Down arrows
Loops		16 loops that can be mixed	Trigger loops with pads
Slicer		WAV file with user-defined slices	Trigger individual slices with pads
External		External MIDI instruments with audio input	Play external gear with pads/sequences, mix with bento's effects

To test pad functionality:

1. Press the **TRACKS** button to access the track selection screen.
2. Tap a track to select it—you'll see the track highlighted.
3. Press the pads to trigger sounds from the selected track.
4. Try different tracks to hear various instrument types.
5. Use the up and down arrow buttons to change octaves for melodic tracks.

The 16 velocity and pressure-sensitive pads respond to your playing dynamics. Press gently for quiet sounds and firmly for louder sounds.

Adjusting the Phones Level

Proper headphone level setting prevents hearing damage and provides comfortable monitoring. The Tracks screen assigns encoder knob 1 to the Phones output bus level.

To adjust headphone levels:

1. With headphones connected to the **PHONES** audio output.
2. Play some tracks using the pads to generate audio.
3. On the Tracks screen, use encoder knob 1 (labeled “Phones”) to adjust the level
4. Start with a low level and gradually increase until comfortable.
5. Set the level so you can hear details without strain.

Important: Protect your hearing by starting with low levels and increasing gradually. The PHONES output can drive headphones to high levels that may cause hearing damage.

Adjusting the Output 1 Level

Output 1 typically serves as your main output bus for connecting to mixers or amplifiers. The Tracks screen assigns encoder knob 4 to the Output 1 bus level. Adjusting the Output 1 level affects what you hear both in the Phones mix and from the audio output 1 port, but adjusting the Phones level does not affect what you hear from the audio output 1 port.

To adjust Output 1 levels:

1. Play tracks on bento to generate audio signal
2. On the Tracks screen, use encoder knob 4 (labeled “Out 1”) to adjust the level
3. Notice how this affects both the headphone mix and the signal from audio output 1
4. Adjust the level to optimize signal-to-noise ratio without distortion
5. Monitor for distortion and reduce level if necessary

Remember that bento’s audio outputs operate at Eurorack levels, which are higher than consumer line levels. You may need to reduce bento’s output level or increase your mixer’s input headroom to prevent distortion.

Next Steps

You have now successfully installed the latest firmware, verified that bento works properly, and played the pads to hear each of bento's 8 tracks individually. With bento properly set up and tested, you're ready to explore its creative capabilities through the walkthrough exercises in the next chapter.

The **Finding Your Way Around** chapter will guide you through:

- **Launching Sequences** to understand musical arrangements
- **Mixing Tracks** to balance levels and apply effects
- **Recording Sequence Notes** to capture your musical ideas
- **Editing One-Shot Tracks** to modify drums and samples
- **Backing Up Projects** to protect your work

These walkthroughs will help you understand bento's workflow and unlock its full potential for music creation and performance.

Finding Your Way Around

Now that you have your bento set up, it's time to explore what it can do. This chapter will guide you through three hands-on exercises that introduce bento's core capabilities. By working through these exercises, you'll learn the essential skills needed to create music with bento.

Each exercise builds on the previous one:

- First, you'll explore bento's included patches and learn basic playback, mixing, and project management.
- Next, you'll arrange musical ideas using sequences, scene creation, and dynamic track control.
- Finally, you'll discover loop tracks and build complete arrangements using real-time loop launching and mixing.

After completing these exercises, you'll be ready to dive deeper into any aspect of bento that interests you most.

Exercise 1: Exploring Patches and Basic Mixing

Now that you have your bento set up, listen to the patches it includes and get familiar with how you play, arrange, and mix with it.

In this exercise, you will:

- Load the demo project and explore its two tracks.
- Play different types of tracks using the pads.
- Try playing in different octaves and keys.
- Change the project's musical key and save your work.

Loading the Demo Project and Exploring Tracks

1. Press **PROJ** to open the project browser.
2. Load the “0-Start Here” project by either double-tapping its name or tapping once to select it and then pressing **Load**. You will see the Tracks screen for this project.
3. Identify that Track 1 is a granular track by looking at its icon.
4. Identify that Track 2 is a One-Shot track by looking at its icon.
5. Select Track 1 in the Tracks screen by tapping it.
6. Play Track 1 from bento’s pads. Try varying the pressure to hear how the sound changes.
7. Notice the colors of the pads follow Track 1’s color (blue).

Playing Both Tracks and Exploring Transposition

1. Select Track 2 on the Tracks screen by tapping it.
2. Play Track 2 from bento's pads. Try pushing the pads with different velocities to hear how the sound varies.
3. Notice the colors of the pads follow Track 2's color (green).
4. Select Track 1 (Razored Waves, the granular track).
5. Transpose the notes by pressing the **Up** arrow button on the front panel.
6. Press the **Down** arrow button on the front panel to transpose down.
7. Select Track 2 (Pulsy Kit 2, the One-Shot track) and try transposing with the **Up** and **Down** arrows.
8. Notice that Track 2 doesn't respond to transposing because it's a One-Shot track and each of its 16 one-shots is tuned individually.

Viewing Project Settings and Changing the Key

1. Select Track 1.
2. Look at the Tracks screen and notice it shows “A# Minor” as the project’s key.
3. Press **PROJ**.
4. Tap the **Menu** icon in the lower right corner.
5. Tap **Project Settings**. You are now on the Project Settings screen.
6. Turn **Knob 1** to change the Root Note from A#.
7. Turn **Knob 2** to change the Scale from “Minor” to other modes like Chromatic.
8. Push the pads to hear how the sound changes as you select different Root Notes and Scales. Since Track 1 is selected, you can play Track 1 here using the blue pads
9. Press **TRACKS** to get back to the Tracks screen.

Saving the Project with a New Name

1. Now that you've changed a couple of things in the project, save it with a different name.
2. Press **PROJ**.
3. Tap the **Menu** icon.
4. Choose **Save As**.
5. Edit the name with the on-screen keyboard (bento already edited it a little by appending 2 to the original name, making it "0-Start Here 2").
6. Press **Enter**.
7. When bento is done saving your new project, the Tracks screen returns.
8. The new name and edited key appear at the bottom of the screen.

Playing Sequences and Adjusting Tempo

1. With the Tracks screen open, press the **PLAY** button.
2. You should hear something being played on both tracks.
3. The Tracks screen will show signal levels for each track's stereo signal.
4. If bento's output is too quiet or too loud, adjust the phones level with **Knob 1**.
5. If your audio system is connected to bento's audio Out 1, adjust that level with **Knob 4**.
6. Look at the top of the screen and notice the BPM is 80.
7. Speed it up by turning the tempo knob - you'll hear everything play faster.
8. Find a tempo you prefer and leave it there so you have audio to work with on the Mixer screen.

Mixing Tracks in the Mixer

1. Press the **MIXER** button.
2. Notice the tracks in the lower half of the screen.
3. Notice the output levels in the top part: Phones, Out 3, Out 2, Out 1 (in that order from left to right), and Main in the top right corner.
4. Before turning any knobs, notice there are more than 8 things you can adjust in the Mixer screen.
5. You have to select the things you want to adjust with the knobs.
6. Touch any of the controls in the top part of the screen - a white rectangular outline surrounds those 5 output level controls.
7. These are assigned to **Knobs 1-4** and **Knob 8**.
8. Touch the Track 1 or Track 2 area (the area for Tracks 3-8 is empty).
9. They get highlighted and **Knobs 1** and **2** now adjust Tracks 1 and 2's levels.
10. Adjust the levels to balance the tracks.
11. Notice the 4 controls below the tracks area labeled **Level** (currently selected), **Mute**, **Delay**, and **Reverb**.
12. Only one is active at a time because the knobs match the function of the currently chosen control.
13. Tap **Level** to adjust track levels.
14. Tap **Mute** - turning a track's knob clockwise mutes the track, turning counter-clockwise unmutes it. You can also tap a track while Mute is active to toggle the track's mute state. Muted tracks appear dim and have an M below the track name.
15. Tap **Delay** and the knobs now control the track's send level to bento's Delay effect, which appears as a thin line to the right of each track's signal level indicator.
16. Tap **Reverb** and the knobs now control each track's Reverb send level, indicated by the same thin line to the right of the track's signal level.
17. Use the knobs to adjust the level, mute, delay, and reverb settings.
18. Make sure you unmute the tracks before continuing.
19. Tap **Level** and adjust the levels one last time.
20. Touch the **Phones** control at the top of the screen to highlight the top row of controls.

21. Adjust the phones or Out 1 level again to remind yourself that screens often require you to select groups of controls so that you can edit them with bento's 8 knobs.

22. Press Stop once when you are done listening to this project. The sequences will continue to play until they reach the quantization break specified for each sequence, and then they will stop.

Note: If you are hearing some bleed through of audio when a track is muted, you are hearing the output of the Effects for that track, including pad level effects sends. We will discuss this more later.

Saving Your Work

1. Press **PROJ**.
2. Tap **Save** in the Projects screen.
3. Your edited project is now saved so you can load it again later.

What You Accomplished

In this exercise, you:

- Loaded a demo project and identified different track types by their icons
- Played granular and One-Shot tracks using the pads and observed how pad colors match track colors.
- Learned that granular tracks respond to transposition while one-shot tracks don't.
- Changed the project's musical key and scale in Project Settings.
- Saved the project with a new name.
- Started sequence playback and adjusted the tempo.
- Explored the Mixer screen and learned how to select different control groups.
- Balanced track levels and experimented with mute, delay, and reverb effects.
- Saved your edited project for future use.

You now understand the basics of loading projects, playing tracks, mixing, and saving your work. These skills will be essential as you explore more advanced features in the following exercises.

Exercise 2: Arranging with Tracks and Sequences

Building on your basic familiarity with bento, learn to arrange musical ideas using sequences and real-time mixing.

In this exercise, you will:

- Load a multi-track project and explore different track types.
- Mix and balance multiple tracks playing simultaneously.
- Launch and stop individual sequences for dynamic arrangement.
- Copy and edit sequences to create variations.
- Create and recall scene combinations for song structure.

Loading and Exploring a Multi-Track Project

1. Press **PROJ** to open the project browser.
2. Load the “3-lofi tracks” project by either double-tapping its name or tapping once to select it and then pressing **Load**.
3. Notice there are 6 tracks: Track 1 (granular), Track 2 (One-Shot), Track 3 (slicer), Track 4 (One-Shot), Track 5 (multisample), and Track 6 (One-Shot).
4. Select each track by tapping on them in the Tracks screen.
5. Play the pads for each track to hear the different sounds.
6. Press **PROJ**, tap **Menu**, then choose **Save As** to save with a different name.
7. When the Tracks screen returns, you can see the new name of the project in the lower left of the screen. You’re now ready to explore sequences.

Mixing Multiple Playing Tracks

1. Press **PLAY** and you'll hear each track playing a different part.
2. Press **MIXER** to adjust the track levels.
3. Turn down or mute tracks to remove them from the mix.
4. Turn them up or unmute to bring them back into the mix.
5. Make sure the knobs are assigned to the tracks by touching the track area.
6. Check that the **Level** control is selected (not Mute, Delay, or Reverb).
7. Practice adjusting track levels to hear what each track contributes to the mix.

Playing Tracks Live While Sequences Run

1. Notice that all the pads have the same color.
2. If you play the pads, you can play the selected track while the sequences are playing.
3. It might be difficult to hear what you're playing while sequences are running.
4. Press **STOP** so you can clearly hear the pads.
5. Play the pads and, if you want, change the selected track's level in the **MIXER**.
6. To change the selected track, press **TRACKS** and tap a different track.
7. See the pad colors change to match the new selected track.
8. Press **MIXER** to adjust its level and send levels if desired.
9. Press **TRACKS** again when ready for the next task.

Launching Individual Sequences

1. Press **LAUNCH** to open the Sequence Launcher screen.
2. Notice 8 columns of 8 sequence slots - column 1 shows sequences for Track 1, column 2 for Track 2, and so on.
3. Tracks 7 and 8 are currently empty.
4. Notice the top row of pads (9-16) change colors to match Tracks 1-6.
5. Notice pads 15 and 16 are unlit because Tracks 7 and 8 are empty.
6. Notice the bottom row of pads (1-8) are unlit because there are no sequences for those pads.
7. Push Pad 3 (the pad below the red pad).
8. Press **PLAY** to start playing sequences again. If the sequences don't start, push the lit-up blue, green, yellow, orange and teal pads to launch the individual sequences.
9. You'll see colored progress bars moving in the top row of each column for the 6 loaded tracks, except Track 3.
10. Track 3's sequence didn't launch automatically - tap pad 11 (3rd pad in the top row) to launch it.
11. Tap pad 3 (below pad 11) to stop Track 3's sequence - it stops at the end of the current bar.
12. Try launching and stopping other tracks by pressing their pads (lit launches, unlit stops).
13. All sequences start or stop when each bar starts.

Understanding Bar and Beat Timing

1. Push Launch if needed to return to the Launch screen.
2. Turn **Knob 8** to turn on the Metronome so you can hear the timing. If you don't hear the metronome, connect your speakers to the Phones output. The metronome only plays to the Phones output.
3. Look at the lower right of the screen, to the left of the **Menu** icon.
4. bento displays the current bar and beat in grey text.
5. Press **STOP** then press **PLAY** and you'll see it return to bar 1, beat 1 as "1:1".
6. Press **STOP** twice, then press **PLAY** - no sequences resume playing.
7. Pressing **STOP** twice stops immediately and resets sequence cues.
8. Launch whichever sequences you want with the pads before or after pressing **PLAY**.
9. Try launching different combinations of sequences.
10. Press **MIXER** to change the mix at any time, then return with **LAUNCH**.

Exploring Multiple Sequence Rows

1. Notice the white rectangular outline around the top two rows of all 8 tracks.
2. Press the **Down** arrow button to move to rows 3 and 4.
3. These contain no sequences and all pads are unlit.
4. Press **Down** again to highlight rows 5 and 6, then 7 and 8 - all empty.
5. Press the **Up** arrow button a couple times to return to rows 1 and 2.
6. The top row of pads lights up again.

Copying and Editing Sequences

1. Tap the first sequence in Track 5's column (Vintage EP) to select it.
2. Tap the **Menu** icon and choose **Copy Seq**.
3. Tap the empty slot below "Seq 1" in Track 5's column (automatically named "Seq 2").
4. Tap **Menu** and choose **Paste Seq**.
5. Pad 13 is now lit, indicating you can cue two sequences for Track 5 with pads 5 and 13.
6. If transport isn't running, press **PLAY** and use pads 5 and 13 to cue each sequence.
7. The sequences are identical copies, so you don't hear any difference yet.
8. Tap the second sequence under Track 5 to select it.
9. Tap **Menu**, choose **Rename Seq**.
10. When the keyboard appears, press **Clear** at the bottom.
11. Type something different like "EP1" and tap **Enter** to return to the Sequence Launcher.
12. Make sure your renamed sequence is selected, then press **SEQ** to open the Piano Roll editor.
13. You'll see the notes that your sequence plays.
14. Drag a rectangle across the lowest 4 notes to select them.
15. Turn **Knob 3** (mapped to "Note") to move the selected notes up or down.
16. Select other notes and move them with **Knob 3** or change their timing with **Knob 2** (Start).
17. When done editing, press **LAUNCH**.
18. Use the pads to switch Track 5 between Seq 1 and your edited sequence to hear the difference.
19. Hold Launch and push either pad for Track 5. Note that all sequences for that track stop playing.

Note:

- Tapping the screen to select a sequence selects it for editing, but does not start it playing. Pushing a pad starts the sequence playing but does not select it for editing.
- Only one sequence per track can play at a time.

Creating and Using Song Scenes

1. Press **STOP** twice to clear all sequence cues.
2. In the Sequence Launcher screen, press pads 9 and 10 to cue sequences for Tracks 1 and 2.
3. Press **PLAY** - you're now listening to what might be an introduction.
4. Tap **Menu** and choose **Snap Scene** to capture this combination.
5. Press **SONG** to open the Song Scenes screen with 8 scene columns. Each scene has a row for each of the 8 tracks.
6. Scene 1 should be selected - tap **Menu** and choose **Paste Scene**.
7. You'll see the sequence names you cued pasted into Scene 1.
8. Press **LAUNCH** to return to the Sequence Launcher.
9. Cue your edited sequence for Track 5 with pad 5.
10. Choose **Snap Scene** from the menu again.
11. Press **SONG**, tap Scene 2 to select it, then choose **Paste Scene** from the menu.
12. You now see which sequences will launch for Scene 1 and Scene 2.
13. Notice the top row of pads lights up in green - you can launch scenes 1-8 with pads 9-16.
14. Tap the **Song** button at the bottom of the screen to the left of the menu to enable Song mode.
15. While sequences play, use pads 9 and 10 to switch between scenes and hear the differences. A progress bar appears above the name of the playing scene.
16. Notice scenes wait until the end of the bar to stop or start.
17. Turn **Knob 8** (Quant Size) from "1 bar" to "1/4".
18. Now when you switch between scenes, they start at the next downbeat or quarter note.
19. Push pad 1 to start scene 1 and don't change scenes. The song will play through all of the loaded scenes and then stop.
20. Tap **Play Count** at the bottom of the screen. Note the knobs are now controlling the Scene Play count for each scene.
21. Turn Knob 1 to select a play count of 2.
22. Push Pad 9 to start scene 1. Let it play through until Scene 2 starts. Note that Scene 1 plays two times before advancing to Scene 2.

Saving Your Work

1. Press **PROJ**.
2. Tap **Save** to save your edited project.

What You Accomplished

In this exercise, you:

- Loaded a complex multi-track project with 6 different track types.
- Mixed multiple tracks playing simultaneously and learned to balance levels.
- Launched and stopped individual sequences for dynamic arrangement control.
- Understood bar and beat timing with the metronome and visual feedback.
- Explored multiple sequence rows and navigation.
- Copied, renamed, and edited sequences to create musical variations.
- Used the Piano Roll editor to modify note pitches and timing.
- Created song scenes to capture and recall sequence combinations.
- Adjusted quantization timing for smoother scene transitions.
- Adjusted the Play Count for a scene to make it loop the desired number of times.
- Saved your arrangement work for future sessions.

You now understand how to arrange music dynamically using sequences, create variations through editing, and build song structures using scenes. These skills form the foundation for creating complete musical compositions with bento.

Exercise 3: Building Songs with Loop Tracks

Take your skills further by building complete songs using loop tracks and advanced arrangement techniques.

In this exercise, you will:

- Create a new project and load loop tracks.
- Understand how loop tracks differ from other track types.
- Launch and mix multiple loops simultaneously.
- Work with loop tracks in different bento screens.
- Build arrangements using loop combinations and scenes.
- Understand tempo considerations for loop playback.

Creating a New Project for Loop Work

1. If you haven't already saved your project from Exercise 2, do so now.
2. Press **PROJ** and tap the **Menu** icon.
3. Choose **New** from the menu.
4. When the keyboard screen appears, change the new project name to "whole lotta loops" or something you'll recognize.
5. Tap **Enter** and you'll see a completely empty Tracks screen.

Loading Your First Loop Track

1. Double-tap Track 1 to open bento's patch browser screen.
2. You'll see Instrument categories in the left column and patch names with type icons in the rest of the screen.
3. Select the **All** category (if it's not already highlighted with a white rectangle).
4. The list becomes all patches, organized by patch type.
5. Swipe the screen left past the granular patches until you find 6 Loop patches with this icon:  .
6. Select **Drum and Perc** and tap **Load**.

Understanding Loop Tracks vs. Sequences

1. Press **LAUNCH** to see what happened.
2. Instead of sequence names, you see the names of 8 loops in the slots.
3. This is because bento treats each loop as both a sample AND timing details for sync.
4. The Loop patch contains 16 loops, but you can’t hear them unless transport is running.
5. Press **PLAY**.
6. Now when you play the pads, you’re launching loops instead of playing notes.

Exploring the Loop Bank

1. Select Track 1 in the Tracks screen.
2. Press **INST** to open Track 1's Loop Bank screen.
3. The 16 samples are arranged in 2 rows of 8 loops.
4. As you play the pads, each pad toggles a corresponding loop on or off (pad 3 starts/stops loop 3, pad 9 starts/stops loop 9).
5. Notice bento lets you play any combination of loops simultaneously.
6. When you play pads, the most recent pad stays lit in white instead of track color (blue for Track 1) to show it is selected.
7. The Loop Bank screen highlights the selected loop when you play pads.
8. Launch a couple of loops from both the top and bottom rows of pads.

Mixing Individual Loops

1. While loops are running, look at the top of the Loop Bank screen.
2. There are 8 level controls you can adjust with bento's 8 knobs for the 8 loops in the currently selected row.
3. The row selection changes (indicated by white rectangular outline) when you play a pad or tap a loop.
4. Try adjusting the volumes of the loops you're playing.
5. Notice how easy it is to mix this one track as if it were multiple instruments.

Loop Tracks in the Sequence Launcher

1. While samples continue playing, press **LAUNCH**.
2. You'll see the loops currently playing on Track 1.
3. Pads 1 and 9 are blue, indicating you can launch two of Track 1's loops.
4. Play pads 1 and 9 to launch those loops.
5. Notice that launching loops from the Sequence Launcher only lets you cue one loop at a time.
6. Doing so stops all other loops, just like sequences.
7. For multiple simultaneous loops, use the Tracks screen, Loop Bank screen (**INST**), or other screens that show all 16 pads.
8. The Launcher only gives access to the "top row" of loops (1-8) because there are only 8 sequence slots.

Creating Scenes with Loop Tracks

1. From the Launcher screen, launch a loop.
2. Tap the **Menu** icon and choose **Snap Scene**.
3. Press **SONG**.
4. Tap the **Menu** icon and choose **Paste Scene**.
5. This creates arrangements you can launch from pads, just like Exercise 2.
6. bento also lets you set up Song Scenes to play one after another in Song mode.

Adding More Loop Tracks

1. Using the same steps as Track 1, load the Loop patch **Instruments 1** into Track 2.
2. Load **Female Vocals 2** into Track 3.
3. Press **PLAY** and start and stop loops by selecting tracks in the Tracks screen and pushing the pads.
4. Press **INST** to see the Loop Bank screen and play the pads.
5. Don’t be surprised if some loop combinations sound better than others.
6. They were recorded in different keys or at different tempos.

Understanding Tempo and Loop Playback

1. Loop tracks play loops in sync with bento's transport without changing pitch.
2. If a sample is recorded at a specific BPM (say, 120), 1010music recommends keeping playback tempo within 10 BPM of the original.
3. Look at loop names in each track - factory patches include original BPM in filenames.
4. Try listening to how Tracks 1-3 respond to slower and faster tempos.
5. Adjust the project tempo and notice the differences in how loops sound.

Final Mixing and Arrangement

1. Open the **Mixer** to adjust relative volumes of the loop tracks.
2. You may need to lower all levels to prevent the final mix from clipping.
3. Return to the Mixer if volumes need adjusting or to add reverb or delay to inspiring loops.
4. With multiple loops and tracks, try working from the Launcher screen.
5. Capture different combinations of loops with **Snap Scene** and **Paste Scene**.
6. Move between the Launcher and Song Scenes screens.
7. Build a set of arrangements using just three Loop tracks.
8. Develop muscle memory with bento's unique workflows.

Saving Your Loop Project

1. Press **PROJ**.
2. Tap **Save** to save your loop project.

What You Accomplished

In this exercise, you:

- Created a new project from scratch and loaded multiple loop tracks.
- Learned how loop tracks differ from sequence-based tracks.
- Discovered that loops function as both samples and timing elements.
- Explored the Loop Bank interface for detailed loop control.
- Mixed individual loops within tracks using dedicated level controls.
- Understood the difference between loop launching in various bento screens.
- Learned that the Sequence Launcher limits loop playback compared to other screens.
- Created scenes using loop combinations for arrangement building.
- Added multiple loop tracks with different musical content.
- Understood tempo considerations and BPM matching for optimal loop playback.
- Applied mixing techniques to balance multiple loop tracks.
- Built complete arrangements using loop combinations and scene management.

You now understand how to work with loop tracks as a powerful arrangement tool. Loop tracks offer a different approach to music creation, allowing you to build complex arrangements by layering and mixing individual loops in real-time. These skills complement your sequence-based arrangement knowledge from previous exercises, giving you multiple creative approaches for building complete songs with bento.

What's Next?

After completing these three exercises, you'll have hands-on experience with bento's core features. You can now:

- Load and manage projects with confidence.
- Work with different track types and understand their unique behaviors.
- Create dynamic arrangements using sequences and loops.
- Mix tracks and apply effects for polished results.
- Build song structures using scenes and real-time launching.
- Save your musical work.

The following chapters will provide detailed information about each track type and advanced techniques for getting the most from your bento. You're now ready to explore any aspect of bento that captures your musical imagination.

Managing bento Projects

After setting up your bento and following the walk-through exercises in the previous chapters, you'll have seen and heard the scope of bento's features, one at a time. To combine bento's features in ways that suit your own forms of creative expression and develop efficient music creation workflows, you'll need to know how to manage bento projects. Projects organize the elements of your musical compositions, arrangements, and performances as manageable units, so they can be stored and recalled collectively.

The following sections in this chapter describe the foundation of managing bento projects:

To do this...	**read...**
Learn how bento loads and saves track setting, sequences, mix levels, song settings, scenes settings and effects settings collectively as projects	Understanding Projects
Save projects to microSD cards	Saving Projects
Load entire projects from microSD cards	Loading Projects
Create new projects	Creating New Projects
Adjust project-wide settings like tempo, key, and scale	Editing Project Settings
Back-up your projects	Managing Project Files

Unlike some music software that automatically saves changes, bento requires you to manually save projects. This intentional design prevents accidental modifications to your saved work, but it means you need to develop good saving habits to protect your creative efforts.

Understanding Projects

A project serves as the master container for your musical composition. When you load a project, bento retrieves all the track assignments, sample mappings, sequence data, effects settings, and mix parameters that define your arrangement.

Each project contains:

- Track settings, such as pitch, filter, envelope, polyphony, sample playback settings, MIDI configuration, and audio routing for up to eight tracks of any supported type.
- All sequences for those tracks.
- Effects settings for Delay, reverb, and mod FX (chorus, phasor, flanger+distortion).
- Mixer settings including levels and routing assignments.
- Playback and performance settings like tempo and swing for sequences, and the key root and mode for the pads.
- Names and locations of all samples used by each track.

Projects do not contain:

- The actual sample data at the core of most bento tracks. bento streams samples directly from specific locations on microSD cards.
- Global settings like screen brightness and pad sensitivity threshold.
- System-wide MIDI configurations like the MIDI pitch-bend range and the TRS MIDI connector polarity, generally referred to as the TRS MIDI type.

Understanding this distinction helps you manage your sample libraries effectively and troubleshoot issues when moving projects between different microSD cards.

Note: All project data is stored as complete projects on microSD. bento does not support saving and loading individual tracks, sequences, mix levels, or effects settings.

Opening the Projects Screen

The Projects screen provides the central interface for all project management operations. From here you can load existing projects, save your current work, create new projects, and access project-wide settings.

To open the Projects screen, press the **PROJ** button on the front panel.

Projects screen showing 1-Welcome to the Future project

The Projects screen displays a list of available projects on your microSD card. The currently loaded project appears highlighted, and this highlight moves when you use the touch screen to select different projects. Basic project operations are always available from this screen.

Saving Projects

Saving preserves your current creative work as a named project on your microSD card. Regular saving prevents loss of work and provides stable reference points as your composition develops.

To save the current project:

1. Press **PROJ** to access the Projects screen.
2. Tap **Save** to save the current project.

The save operation preserves all tracks, sequences, mix settings, effects configurations, and project-wide parameters. If this is a new project, bento prompts you to enter a project name before saving.

Important: bento saves projects immediately when you tap Save. The Save button will become grayed out to show that there are no changes to save.

Saving with a Different Name

Creating copies of projects allows experimentation without affecting your original work. This approach helps preserve successful arrangements while exploring creative variations.

To save a copy of the current project with a different name:

1. Press **PROJ** to access the Projects screen.
2. Tap the **Menu** button in the lower right corner.
3. Tap **Save As** to save a copy with a new name.
4. Enter a new project name using the on-screen keyboard.
5. Tap **Enter** to save the copy.

Both the original project and the new copy exist independently on your microSD card. Changes to the project settings for one copy do not affect the other, allowing you to develop different versions of your musical ideas. However, the copied project will still point to the sample files used by the original project, even if they are stored in the original project's folder.

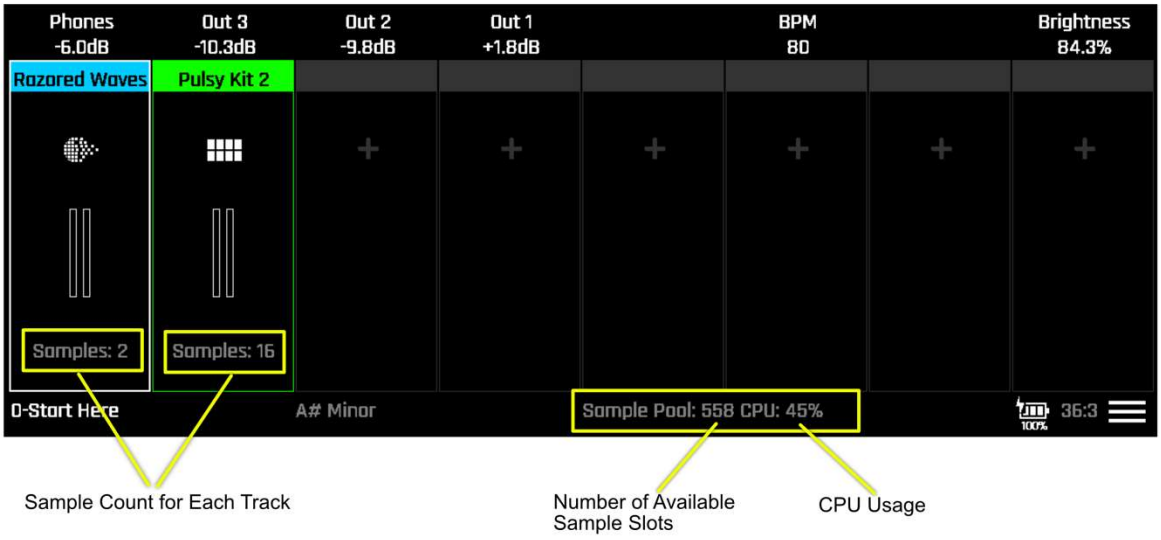
Monitoring Project Resources

Each project operates within specific resource limitations that affect your creative possibilities. Monitoring these limitations helps you plan your arrangements and avoid resource conflicts.

Project limitations include:

- Maximum of eight tracks per project.
- 576 individual samples across all tracks.
- Individual sample size limit of 4GB each.
- One granular instrument maximum per project.

The bottom of the Tracks screen displays your current resource usage, showing both individual track sample counts and your remaining sample allocation.



Tracks screen showing resource indicators

This real-time feedback helps you manage resources as you build complex arrangements.

Loading Projects

Loading retrieves a complete saved project from your microSD card, replacing your current work with the loaded project's tracks, sequences, and settings. This operation provides quick access to previously saved musical compositions.

To load an existing project:

1. Press **PROJ** to access the Projects screen.
2. Tap the project name you want to load.
3. Tap **Load** to load the selected project.

Loading takes several moments, especially for projects containing many samples or complex configurations. During loading, bento retrieves all project data and initializes tracks according to the saved settings.

Important: Loading a project discards any unsaved changes to your previous project. bento does not warn you about unsaved changes, so develop the habit of saving frequently to protect your work.

When a project loads successfully, all tracks, sequences, and settings return to their saved state. If the project references samples that are missing from your microSD card, those tracks may not load properly or may produce no sound.

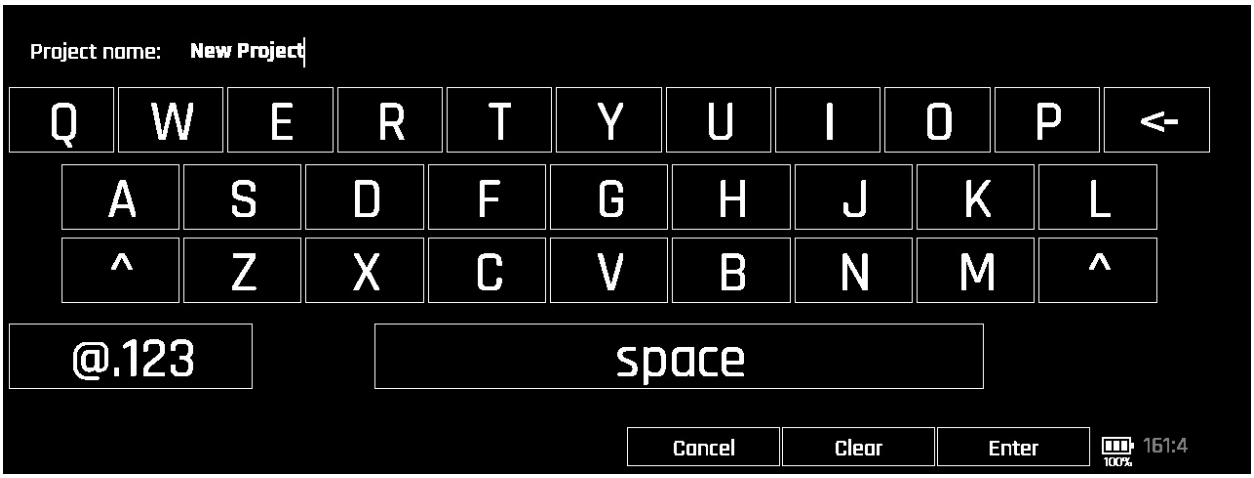
Creating New Projects

New projects start with empty tracks and default settings, providing a clean slate for your musical ideas. Creating a new project helps you organize different compositions and prevents creative work from interfering with existing projects.

To create a new project:

1. Press **PROJ** to access the Projects screen.
2. Tap the **Menu** button in the lower right corner.
3. Select **New** from the menu options.

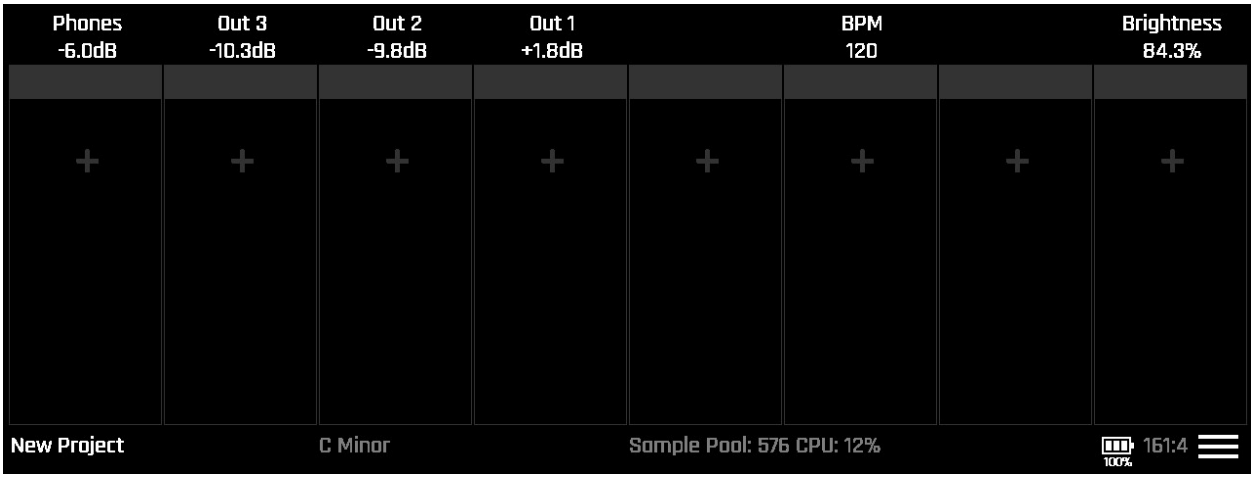
   The file naming screen appears for entering your project name.



Naming keyboard screen

4. Enter a descriptive name for your project by tapping the keys in the on-screen keyboard.
5. Tap **Enter** to create and load the new empty project.

   bento displays the Tracks screen with eight empty track slots.



Tracks screen showing new project

Your new project begins with default settings and no assigned tracks. You can immediately begin adding tracks, loading samples, and creating sequences. Remember to save frequently as you develop your new composition.

For details on managing tracks in the current project, see Managing bento Tracks.

Editing Project Settings

Project settings control parameters that affect all tracks within your project. These settings include musical parameters like tempo and key, as well as technical settings that influence how the project behaves.

To access project settings:

1. Press PROJ to access the Projects screen.
2. Tap the **Menu** button.

Projects screen menu opened

3. Select **Project Settings** from the menu options. The Project Settings screen opens.

Project Settings screen

The Project Settings screen displays the Config parameter group. The knobs are assigned to the visible parameters, allowing you to adjust settings directly without touching the screen. Settings save automatically as you change them.

Project Settings Parameters

Parameter	Knob	Description
Root Note	1	Musical root note for scale-based playing modes (A to G#)
Scale	2	Scale selection including Chromatic, Major, Major Pentatonic, Minor, Minor Pentatonic, Minor Blues, Raga Bhairav, Taga Todi, Gypsy, Arabian, Egyptian, Miyakobushi, Ryukyu, Wholetone, Diminished, Harmonic Minor, Melodic Minor, Dorian, Phrygian, Lydian, Mixolydian, Aeolian, and Locrian
Swing	5	Sequence swing timing (1 to 99, with 50 being no swing)
BPM	6	Master tempo for sequences and synchronization (40 to 250)

Changes to project settings affect all tracks and sequences within the project. These settings save with the project and load automatically when you reload the project later.

Editing Global Settings

Global settings affect all projects and control system-wide behaviors that persist across power cycles. Unlike project settings, global settings do not save with individual projects but maintain their values regardless of which project you load.

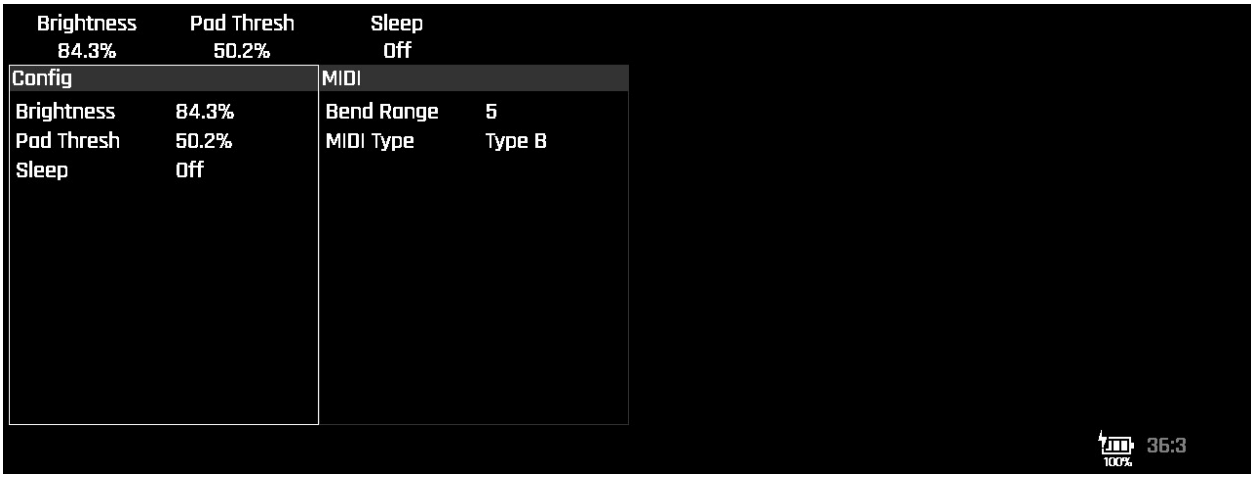
To access global settings:

1. Press PROJ to access the Projects screen.
2. Tap the **Menu** button.

Projects screen menu opened

3. Select **Global Settings** from the menu options. The Global Settings screen opens.

The Global Settings screen provides access to two parameter groups: Config and MIDI.



Global Settings Config section

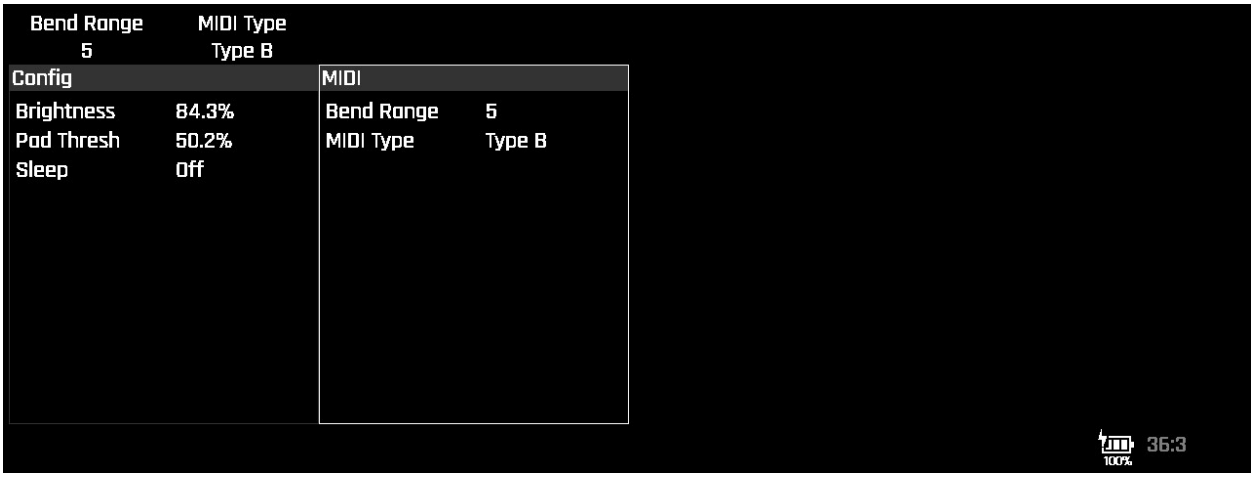
Tap anywhere within a parameter group to select it and see the knob assignments for those parameters. The knobs are assigned to the visible parameters in the selected group, allowing you to adjust settings directly without touching the screen. A white rectangle indicates which group is selected.

The following table describes each parameter in the Config group and identifies the knob assigned to it.

Global Settings Config Parameters

Parameter	Knob	Description
Brightness	1	Screen brightness level (0-100%)
Pad Thresh	2	Pad sensitivity threshold for triggering (0-100%)
Sleep	3	Automatic sleep timer settings. Turn sleep mode on to conserve battery. Touch any button to wake up from sleep mode.

The parameters assigned to each knob appear at the top of the screen.



Global Settings MIDI section

The following table describes each parameter in the MIDI group and identifies the knob assigned to it.

Global Settings MIDI Parameters

Parameter	Knob	Description
Bend Range	1	MIDI pitch bend sensitivity range
MIDI Type	2	TRS MIDI connector polarity (Type A or Type B)

Global settings take effect immediately and persist across all projects. These settings remain active even after powering off bento and loading different projects.

Managing Project Files

Effective file organization becomes increasingly important as your sample library and project collection grows. Understanding how bento organizes files helps you maintain a manageable creative environment.

When creating new projects, consider your intended workflow and resource requirements. Planning ahead helps you make the most of bento's capabilities within the system limitations.

Project limitations include:

- Maximum of eight tracks per project.
- 576 individual samples across all tracks.
- One granular synthesis track per project.
- Maximum of 8 sequences per track.

Understanding these limitations helps you plan your projects effectively and make the most of bento's capabilities.

Project Backup Strategies

Protecting your creative work requires regular backups and thoughtful file management practices. Developing backup habits prevents loss of important musical work.

Effective backup practices include:

- **Regular project saves:** Save frequently during creative sessions.
- **Periodic microSD card backups:** Copy entire cards to computer storage.
- **Version management:** Use Save As to create project snapshots at important milestones.

Consider using multiple microSD cards for different types of projects or maintaining backup cards with copies of your most important work.

Understanding bento's File Structure

bento organizes files on your microSD card using a specific directory structure that supports efficient project management and sample organization.

Key directories include:

- **Projects folder:** Contains individual project files and data.
- **Patches folder:** Contains preset instrument configurations.
- **Root directory:** Contains firmware files and system data.

Projects reference samples by their file paths, so maintaining consistent sample organization prevents broken links when you reload projects later.

Sample File Organization Strategy

Organizing your sample library effectively improves workflow efficiency and prevents project loading problems when samples move or become unavailable.

Effective sample organization includes:

- **Consistent folder structures:** Use predictable naming and hierarchy.
- **Descriptive folder names:** Choose names that clearly indicate content.
- **Logical categorization:** Group related samples together.
- **Consistent file naming:** Use systematic naming conventions.

Well-organized sample libraries make it easier to find sounds during creative sessions and reduce the likelihood of missing sample references when sharing projects or moving to different microSD cards.

Managing Sample Dependencies

Projects depend on external sample files, which can create complications when sharing projects or moving them between different microSD cards. Understanding these dependencies helps you maintain project integrity.

Sample dependency considerations include:

- **Missing samples:** Projects may load with silent tracks if samples are unavailable.
- **File path changes:** Moving samples to different folders can break project links and patches.
- **Sample organization:** Consistent organization reduces dependency problems.
- **Project portability:** Consider sample availability when sharing projects.

Planning your sample organization strategy early in your bento workflow prevents these complications and maintains reliable project loading across different scenarios.

Next Steps

With a solid understanding of project management, you're ready to dive deeper into bento's creative capabilities. Effective project management provides the foundation for all your musical work on bento.

Consider exploring this topic next:

- **Track Management:** Learn to create and configure different track types.

Strong project management skills enhance every aspect of your bento experience, from initial creative exploration through final project completion and sharing.

Managing Tracks

This chapter provides an overview of the features that all bento tracks have in common and just enough information about their differences to help you prepare for them when you start exploring each track in later chapters.

To do this...	read this...
Understand the components of each bento track	Understanding bento Tracks
Identify elements of traditional samplers and synthesizers in bento tracks and how these make bento's unique combination of sample engines easier to master.	**Error! Reference source not found.Error! Reference source not found.**
Recognize similarities between bento's user interfaces for editing each type of track.	Where to Find the Instrument Controls for a Track
Discover bento's track editing screens and develop workflows that suit your own personal approach to improvising, composing, performing and recording.	Navigating the Track Editing Screens
Follow the audio signal flow of each bento voices, from its VCA through output routing and effects sends, through bento's mixer and compressor, and out through bento's four audio outputs.	Audio Routing, Effects Processing, and Mixing
Find the simple habits that you can develop to avoid overloading bento and factors	Balancing Sample Playback Quality and CPU Usage

Understanding bento Tracks

In practice, each bento track behaves like an individual sample-base instrument that you can play from bento's physical pads, from a MIDI controller, or from a sequence stored as part of the track.

Each tracks voice begins with a sample being played by a sample engine that serves as the equivalent of a traditional synthesize oscillator, routed through a filter and a VCA controlled by an envelope generator. External tracks don't have a voice of their own, and instead send MIDI out to other devices and bring external audio into the mixer.

Choosing the Right Track Type

Beyond the common voice parameters, each track type provides specialized controls tailored to its synthesis method. One-shot tracks include percussion-optimized settings like choke groups. Granular tracks offer grain size, density, and position controls. Loop tracks provide recording and tempo synchronization features. External tracks replace sample controls with audio input processing parameters. These specialized features receive detailed coverage in the track-specific chapters.

Table: Differences Between Track Types

Track Type	Sample Engine	Notes
Multisample	Key-mapping and velocity-mapping sample playback, with interpolation options for lower CPU impact or higher quality. 1 sample per voice, played start-to-end with optional sustain loop if there are loop points in each sample file.	Samples are loaded when track is first created and cannot be changed afterwards. Sample start, end and loop points must be specified in the sample files before loading. Some Multisample patches use a large number of samples. Plan carefully to avoid exceeding the limit of 576 samples per project.
Granular	Each voice loads two samples into two granular oscillators, each of which divides the sample into small "grains" that they play in a variety of manners to produce textures that are at both familiar and abstract at the same time.	Samples can be replaced or cleared at any time. Tends to be CPU intensive, so bento supports only one granular track in each project.
One-shot	16 samples, mapped to 16 pads and MIDI notes 36-51.	Samples can be replaced or cleared at any time.

Track Type	Sample Engine	Notes
	1 sample per voice, played start-to-end, with no sustain loop option.	
Loop	16 samples, mapped to 16 pads and MIDI notes 36-51. 1 sample per voice, played start-to-end, with optional loop, time stretched to match the tempo.	Samples can be replaced, unloaded (cleared), or recorded from live audio sources or resampled from the mixer output.
Slicer	Divide a sample into multiple slices, which play as if they were independent sample files, each mapped to consecutive pads and MIDI note numbers starting with pad 1 and MIDI note 36.	After loading a sample into a slicer track, you cannot replace it with another sample, but you can modify slice positions at any time.
External	No sample engine. Provides a convenient way to integrate external MIDI instruments with bento's unique workflows.	Anything played from bento's pads and sequences or received over MIDI can be sent to external MIDI instruments and their audio outputs fed back into bento and blended with other tracks with bento's Mixer and Delay and Reverb effects.

Some of bento's sample engines are modeled after sampling instruments that have gained acceptance over the years for introducing new sounds to the public, often to the degree that they are associated with specific types of sounds (e.g., Multisample instruments are for emulating pianos and orchestral instruments) despite being capable of much more. There is nothing preventing anyone from doing the unexpected with any of bento's track types.

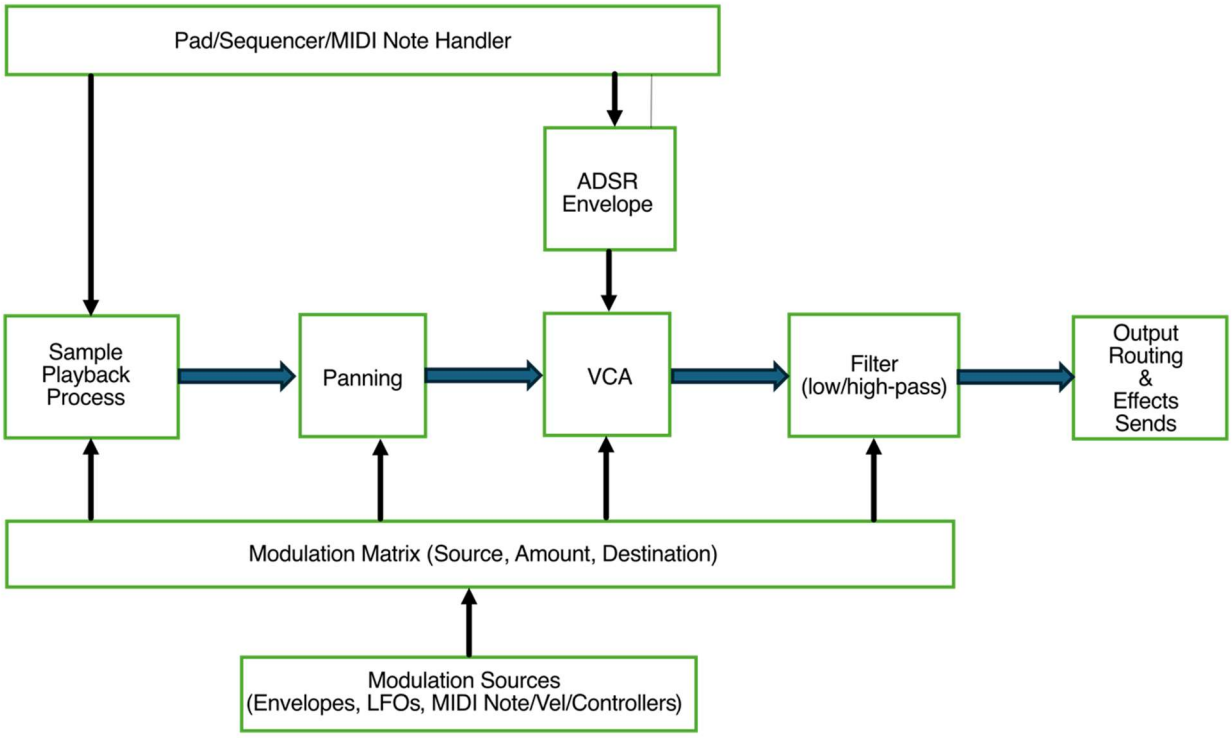
Adjust Sound Controls Common to All Track Types

Every track type includes a core set of voice parameters that control how sounds behave when you play them. These parameters work the same way whether you're adjusting a drum sample, a piano note, or an experimental granular texture.

The main voice parameters include Level, Pitch, Pan, Overdrive, Filter, Resonance, and envelope controls (Attack, Decay, Sustain, Release). Most tracks also include LFO parameters for adding movement to your sounds.

How the Signal Path Impacts Sound

Each of bento's sample-based tracks uses a voice architecture based on a common analog synthesizer voice.



Voice Component	Description
Sample Playback Engine	The sample equivalent of an oscillator, implemented in software and executed by bento's CPU. Plays one sample, from a start point to an endpoint, potentially looped between loop start and end points while sustaining notes, transposed from the sample's root pitch for purposes of melodic performance or textural effect. During playback, bento streams sample data directly from the microSD card. Note: Granular and Slicer track types employ sophisticated techniques to divide samples into multiple regions that can be played back, start-to-end, as if they were individual samples.
Resonant Filter	Modifies harmonic content of audio signal by emphasizing frequencies at, below, or above a cutoff frequency according to filter type (low-pass, high-pass). Note: Granular tracks include two independent filters that support low-pass, high-pass, band-pass, and notch filtering.
VCA	Emulates analog voltage-controlled amplifier (VCA) to impart dynamic characteristics on the audio signal modulating the level with a dedicated ADSR envelope generator.
ADSR Envelope Generator	Traditional 4-stage envelope (Attack, Decay, Sustain, Release)
Voice Panning	Produces 2-channel audio, with voice positioned in the stereo field.
Modulation Matrix	Defines which parameters are impacted by the available modulation sources, and by how much. For example, sample playback pitch can be used to modulate filter cutoff for a track or pad.
Modulation Sources	Provide signals that can be applied as modulation sources through the modulation matrix. Modulation sources always include at least one low frequency oscillator (LFO).

Voice Component	Description
Output Routing and Effects Sends	Sends a variable amount of each voice's audio to bento's Delay and Reverb effects processors and routes the voice's 2-channel audio signal to one of four available output busses, three of which correspond to bento's audio outputs 1-3 and a fourth that routes the signal through a modulation effects processor before routing the signal to output buss 1. Effects send levels, output buss levels, main mix level, and phone output levels are controlled on the central mixer.
Pad/Sequencer/MIDI Note Handler	Routes each note played from bento's pads or sequences or received over MIDI to the appropriate voice. Sends control signals to the voice's sample playback engine and ADSR envelope, each of which then render the voice with the correct pitch and dynamics. Each track's note handling is subject to parameters such as Poly Mode (limits how many of the track's voices can play simultaneously), Launch Mode (trigger, gate or toggle), MIDI In Channel (which channel messages to accept) and MIDI Out channel (which channel to use when sending notes to external MIDI devices). The note handling parameters are accessible for editing in each track's Track Configuration screen and Dashboard..

Where to Find the Instrument Controls for a Track

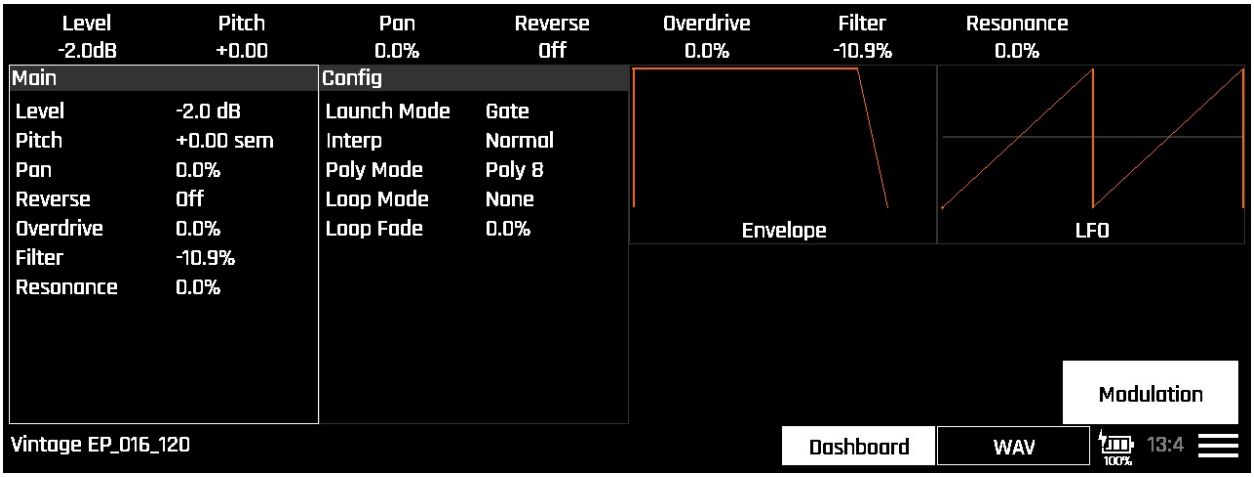
bento organizes track controls across a small number of user interface screens.

Table: Voice Editor Screens

Voice Editor Screen	Description
Dashboard	For editing a core set of voice parameters, such as: Sample playback pitch, Launch mode, and Poly Mode. Filter cutoff and resonance VCA. Envelope ADSR values. LFO shape, rate, and depth. Track level and stereo panning.
Sample Waveform screen	Displays a sample waveform and controls for configuring the sample engine to play the sample. Called a “WAV” screen for Multisample, slicer, one-shot, and loop tracks, and called a “Grain” screen for granular tracks.
Modulation screen	Provides a central location for routing modulation sources to modulation targets, and for setting a modulation amount for each. This screen can be accessed from the Menu of the Dashboard screen for each track or pad.
Sample Bank screen	One-shots and loops have similar voice architectures as Multisample and slicer voices, except that each one-shot (or loop) has its own dashboard with independent settings and is mapped to a single pad and MIDI note number. You can consider one-shot and loop tracks as groups of 16 “sub-tracks” with their own dashboards, sample waveform screens, and modulation screens.
Track Configuration screen	The Track Configuration screen provides control over track-level settings like audio output, and MIDI configuration. It also provides controls for renaming the selected track and for replacing the track’s current patch settings without erasing the current track’s sequences.

Dashboards

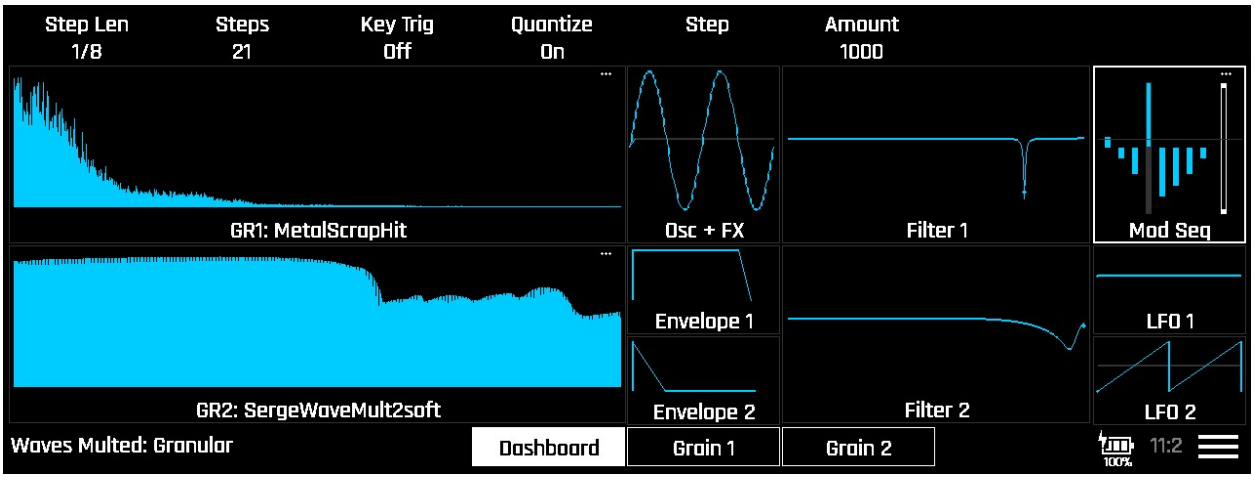
The following is a screenshot of the most common form of Dashboard, used by Multisample, slicer, one-shot, and loop tracks:



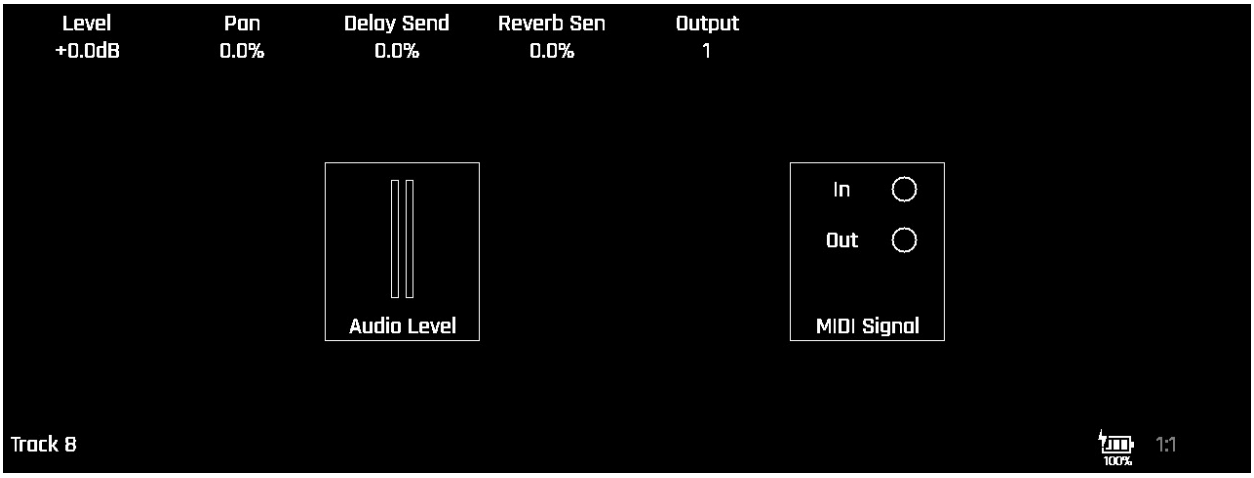
The dashboard gives access to the sound design controls for a track, with the track, one-shot, or loop name in the lower left of the screen and the shape of the voice's envelope and LFO, rendered in the track color.

The lower right corner of the screen contains navigation controls for opening the Dashboard, WAV, and Modulation screens, the latter visible as a menu option when you touch the Menu icon.

The granular track dashboard packs double the controls in one screen than the other track types primarily because each granular voice features two granular oscillators, a traditional oscillator, two envelopes, two LFOs, and more.



External tracks do little more than route audio inputs to bento's mixer and route inbound MIDI messages out to external MIDI instruments, so its Dashboard controls are minimal:



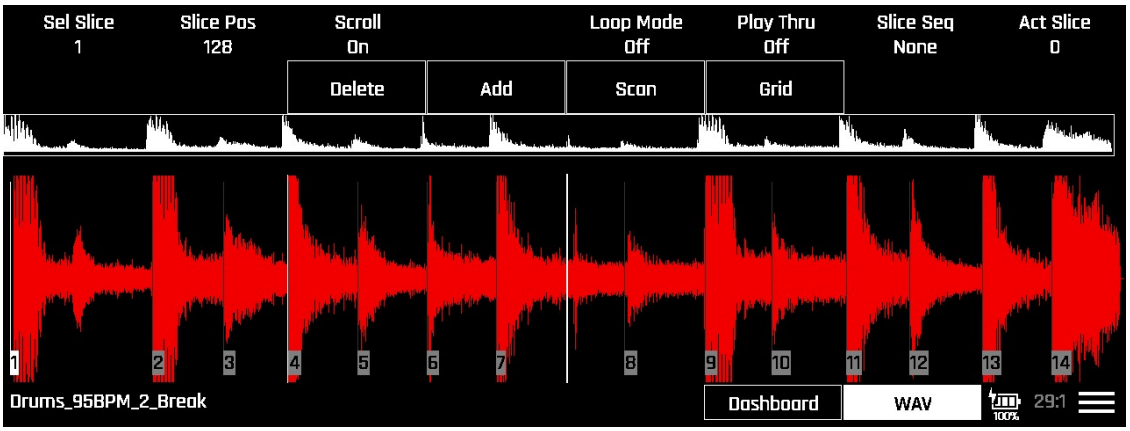
Note: Some track types have additional screens for editing features unique to them. For example, granular tracks have a Mod Sequence screen for a feature not included in any other track type.

WAV Screens

Each Sample Waveform screen displays a visual representation of the sample and controls for configuring some aspects of the sample engine.

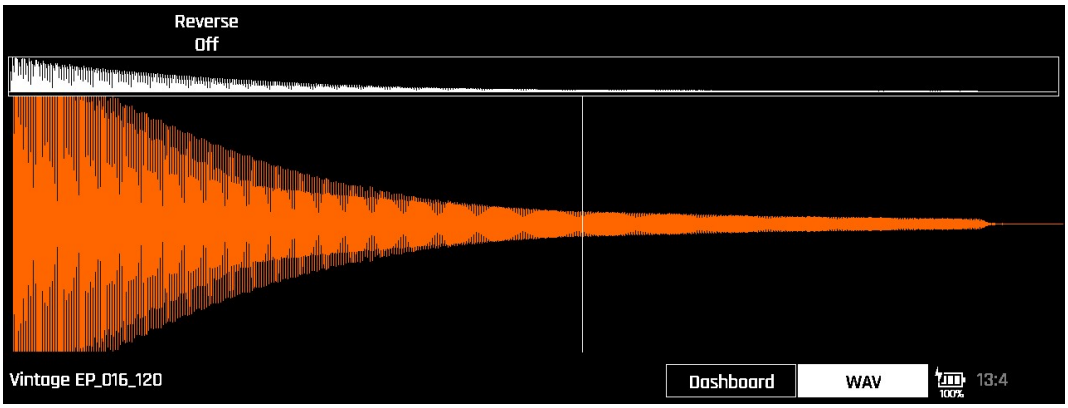
For example, the Slicer track WAV screen includes:

- the positions of each slice,
- controls for editing individual slices,
- controls for automatically adding slices on a grid,
- controls for adding slices that coincide with transients in the sample, and
- controls for playback options.



On this screen, you can watch how the playback position moves through the waveform in real-time.

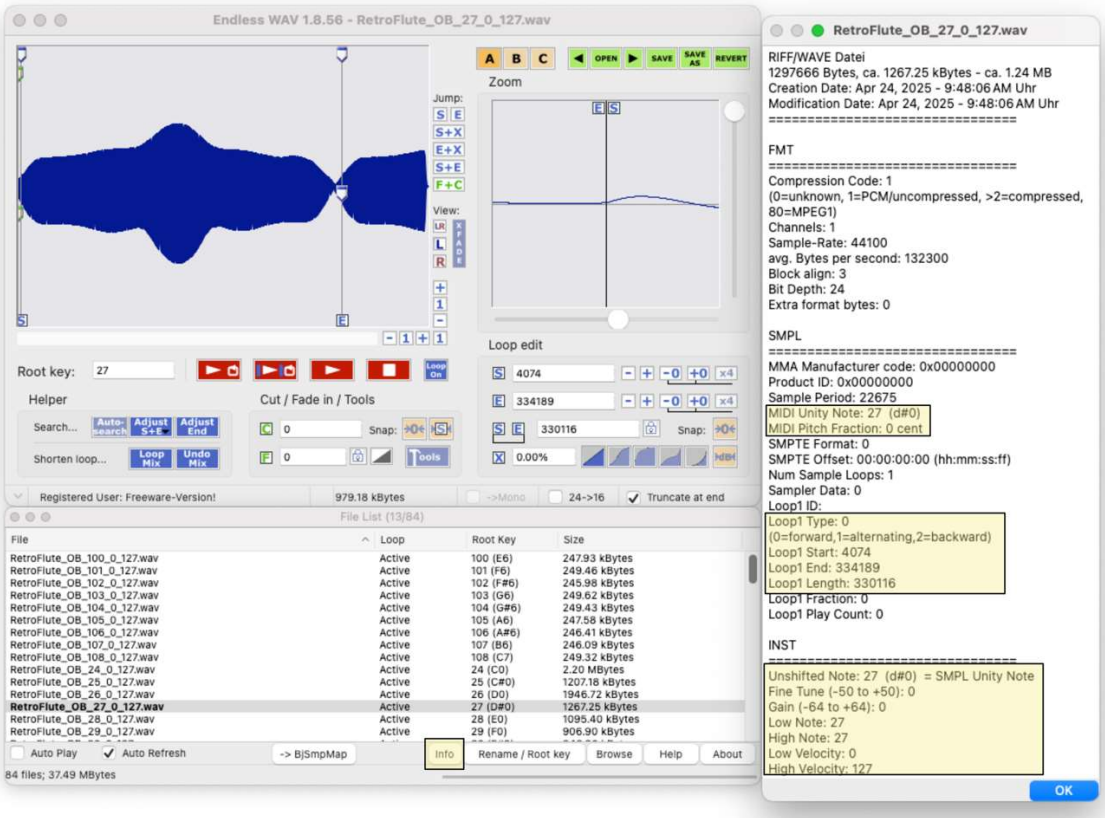
The following screenshot is from a Multisample track WAV screen. It does little more than display the waveform of one sample in the track's Multisample set and provide a parameter mapped to knob 2 for reversing the playback direction of all samples in the track.



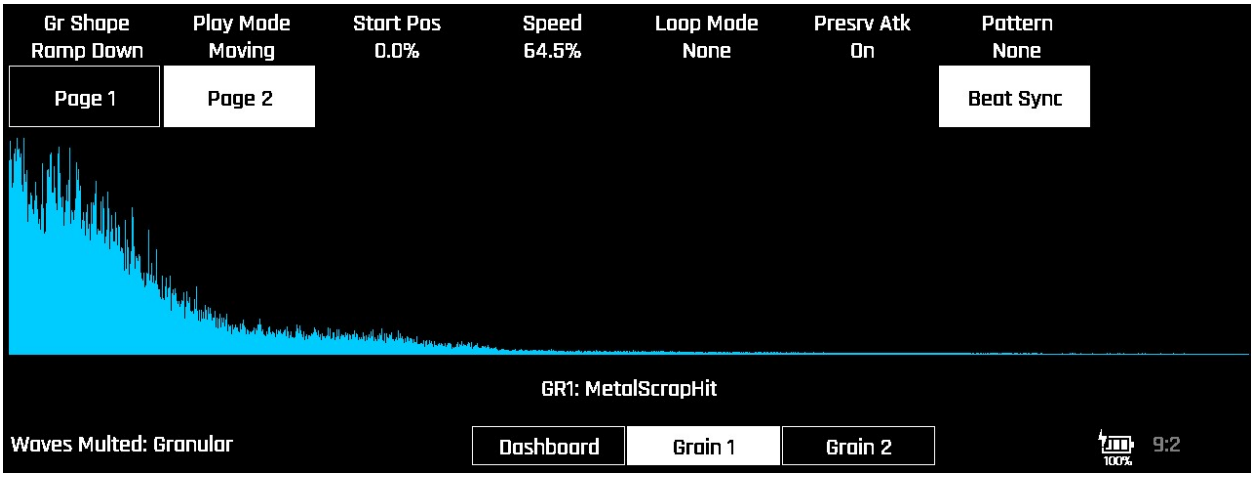
The simplicity of the Multisample WAV screen hides the fact that bento automatically takes care of the tedious task of finding details about each sample when it first loads a set of samples into a new Multisample track. One step in bento's auto-mapping process is looking for information in sample file headers, in loop point tags, and in sample filenames, which often include note names and numbers.

bento analyzes the sample meta data to create a keymap that spans the complete range of MIDI notes and velocities to which each sample is assigned a limited range of notes, so that bento won't need to transpose it by more than a couple of steps up or down from its root note, minimizing undesirable audible artifacts, such as aliasing.

Note: If you open one of the samples from bento's RetroFlute Multisample patch in a program such as Eternal Wave, you can see the note played when the sample was recorded, where to start and end playback, and the start and end points of the samples to loop when the sample reaches the sustain stage.



Like the WAV screens, the granular track Grain 1 and Grain 2 screens (one screen for each granular oscillator sample) display the main sample waveform, but when bento plays this track, this screen displays the motion of each grain.



Modulation Screens

Parameter modulation lets you route sources like envelopes, LFOs, velocity, and MIDI controllers to various sound parameters, creating dynamic, expressive sounds.

All track types use the same modulation interface, though the available parameters and sources vary with each track type.

The following Modulation screen shows parameters that are modulation “targets” in the first column, and selected by the Line parameter, mapped to Knob 1, which lets you scroll through the entire list of modulation targets in this track. Three sets of Source and Amount parameters for each target are mapped to Knobs 2-7.

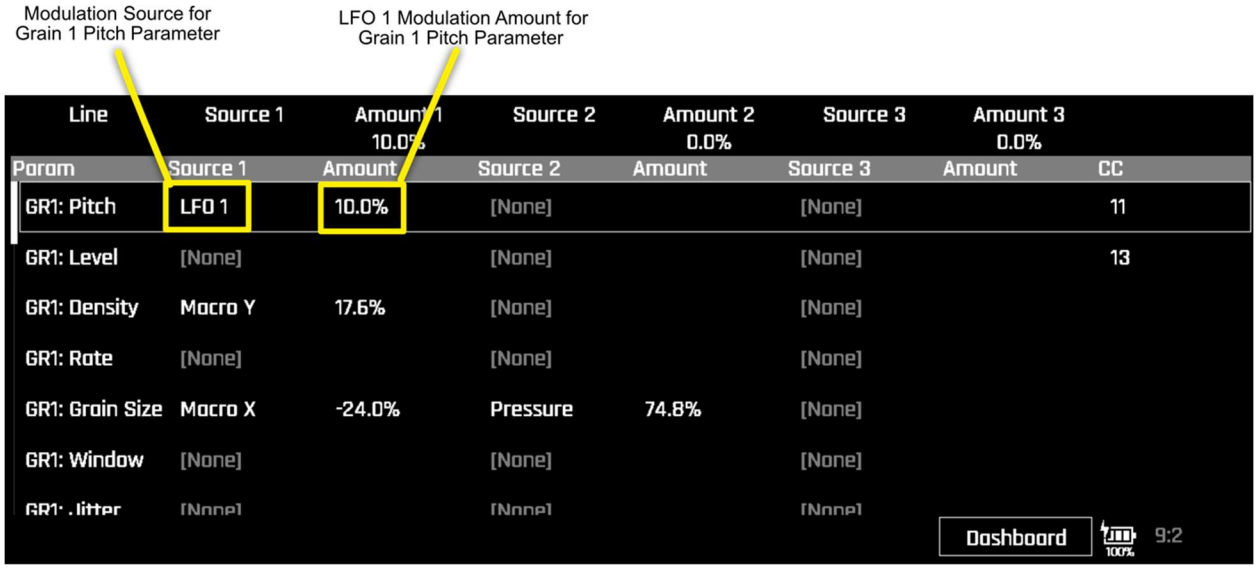


Figure: Modulation Screen showing parameter routing

In the case of this Modulation screen screenshot, the highlighted parameters indicate that 10% of the LFO 1 signal is modulating the Pitch of the GR1 granular oscillator, possibly to apply some vibrato.

Sample Bank Screens

When you press INST to start editing a bento One-shot or Loop tracks, you will first see a Sample Bank or Loop Bank screen which displays a grid containing the names of 16 One-shots or 16 Loops, organized in two rows of 8 grid cells.

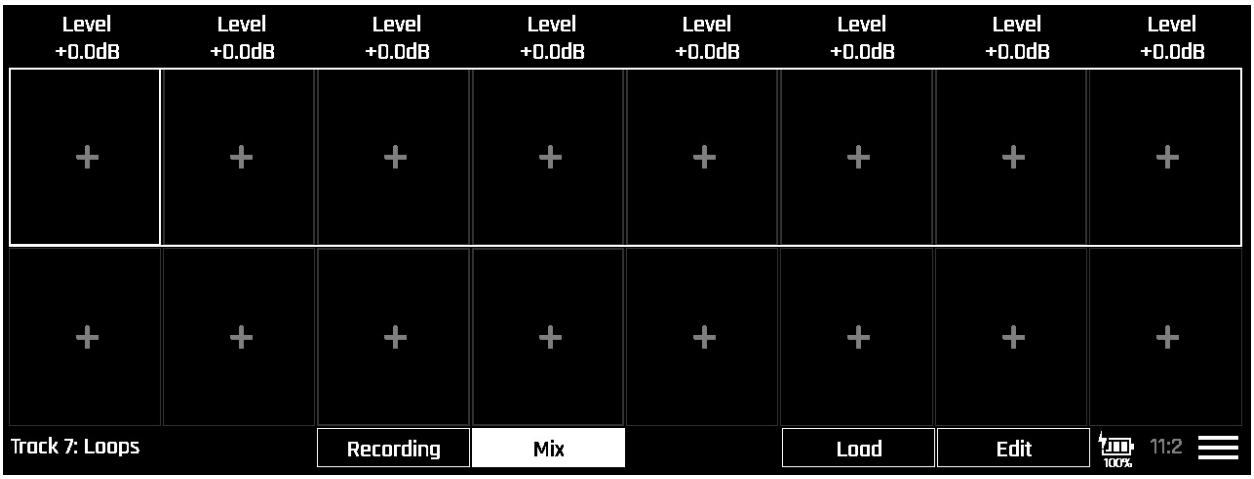


Figure: Sample Bank Screen for a Loop Track

Note: The only difference between the Sample Bank screen of a one-shot track and of a loop track is the **Recording** navigation control in loop track Sample Banks. Loop tracks are currently the only track types that let you record new samples from bento's three audio inputs or resample the output of bento's mixer.

The first step to opening a one-shot or loop dashboard is selecting the one-shot or loop in the Sample Bank. bento offers two ways to select a cell in the Sample Bank:

- Tap the cell.
- Play the pad corresponding to the cell.

With the cell selected, to open the dashboard, do one of the following:

- Tap the **Edit** on-screen control.
- Press the **RIGHT** arrow button.
- Double tap the cell in the Sample Bank or Loop Bank screen.

The one-shot and loop Dashboards look very similar to the Multisample and slicer Dashboards, but the pads only light up if they correspond to a Sample Bank cell that already loaded a sample. Also, one of the pads is white instead of the track color to indicate that it is the selected one-shot or loop.

Note: You can switch which cell you are editing on the Dashboard by playing pads 1-16 or, by playing MIDI notes 36-51 (C1-D#2) from a MIDI controller. The controller must send MIDI notes on the same channel as the track's MIDI In channel, set in the Track Configuration screen.

Track Configuration Screens

The Track Configuration screen lets you control track-level settings, such as audio output and MIDI configuration.

The following screenshot is an example of the most common Track Configuration screen, used for Multisample, slicer, granular, one-shot, and loop tracks.

Figure: Granular Track Configuration Screen

External tracks do not have the usual voice architecture common across all other track types, because its “sound” comes from an external source connected to one of bento’s 3 audio inputs. The External Track Configuration screen replaces the **Poly Mode** parameter with an Input parameter, with which you can choose which audio input will provide the External track’s audio signal that will be routed to the mixer and eventually to the bento Output specified by the **Output** parameter.

Figure: External Track Configuration Screen

Navigating the Track Editing Screens

The first step in editing bento tracks is selecting a track. Most often you will select a track directly from the Tracks screen. From that point, you can navigate to any of the track editing screens.

The following figure shows the navigation paths from the Tracks screen to each of the track editing screens for Multisample, slicer, granular, and external tracks.

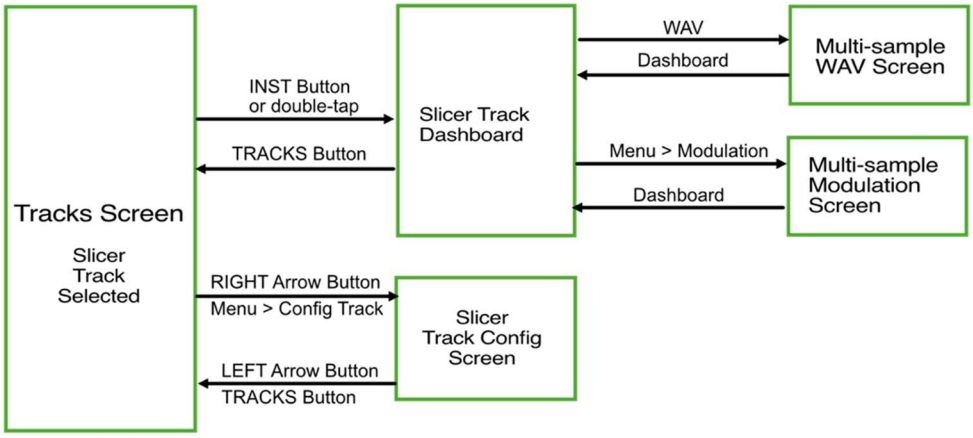


Figure: Slicer Track Screen Navigation

The following figure shows the navigation paths from the Tracks screen to each of the track editing screens for one-shots. Loop tracks have the same general organization as one-shot tracks.

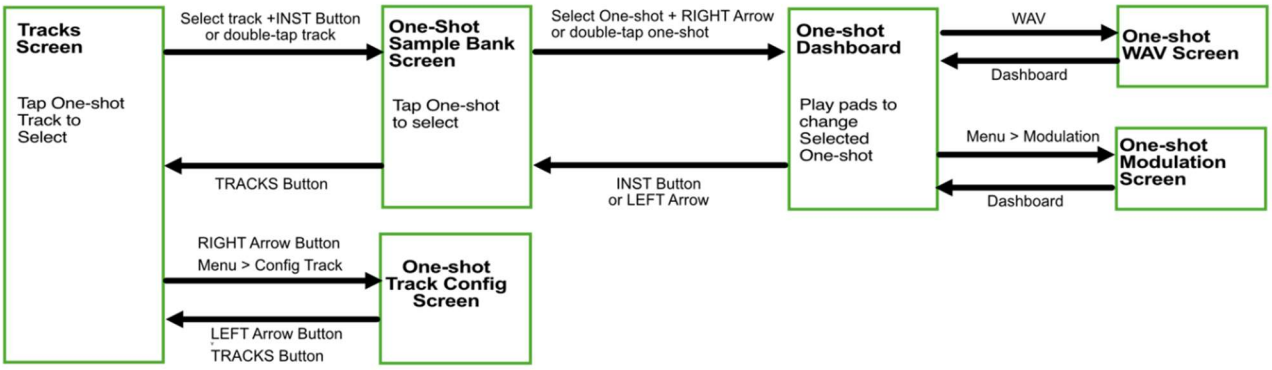


Figure: One-shot Track Screen Navigation

Tip: The above diagrams show all navigation paths start at the Tracks screen, but you can also initiate these navigation paths by pressing **INST** from other screens, such as the Sequence Launcher and Sequence editor screens because the “selected track” doesn’t change when you open other screens unless you tap the screen to select something in a different track.

Audio Routing, Effects Processing, and Mixing

bento provides four audio output routing options, each with different characteristics.

Table: bento Audio Output Routing Options

Output	Description
1	Serves as the main output and is the only output bus that includes delay and reverb effects. This is the default routing for new tracks.
1 w/ Mod FX	This routing sends the track through one of the modulation effects (chorus, phaser, or flanger+distortion) before reaching Output 1.
2	Provides a dry signal with no effects processing.
3	Provides a dry signal with no effects processing.

The following diagram shows how the audio is routed from a single voice to one of the three independent audio outputs.

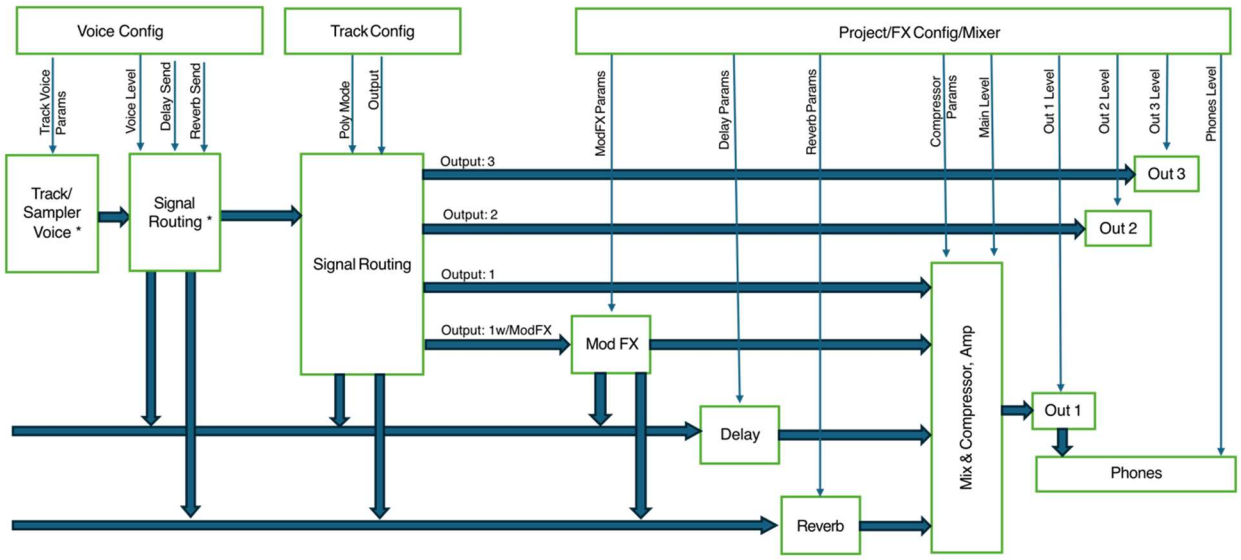


Figure: bento Voice Audio Signal Routing

The Phones output jack will have the same signal as Output 1, with the addition of the metronome.

Pre-Mixer Effects Sends

The signal routing diagram shows the flow of audio from the single voice to the Mixer, to bento's individual audio outputs, and to bento's effects processors. There are three points in the signal flow from which each voice's signal can be sent to the Delay and Reverb effects busses.

Note that the first pair of effects sends comes from individual voices before being routed to the Mixer, which means they are not affected by the track's level in the Mixer. As a result, there may be occasions when you fade out a track in the Mixer but continue to hear the track at a very low volume through the Delay or Reverb effects.

This type of "leakage" is easy to fix when it comes from Multisample, slicer, or external tracks because these have one pair of send parameters in their Dashboards. One-shot tracks and loop tracks have 16 dashboards, however, which means that there are potentially 16 pairs of effects sends to adjust.

Balancing Sample Playback Quality and CPU Usage

When you play a bento track, the track's sample engine determines which samples it needs to play and how to play them, which, depending on the track's sample engine type, keeps bento's CPU busy for the duration of every note you play.

For example, when you load a complex patch, such as the 10 Grand piano, into a Multisample track, bento transposes each sample by a specific interval to reach the pitch of each note played while also making sure that each sample's timbre responds to the dynamics of your performance, all without introducing any notable latency.

bento is powerful enough and flexible enough to take on the challenge of allocating voices dynamically, even with an unforeseeable range of demands on its CPU, but it does have finite processing resources. If you give bento too much to do, there's a chance that it might make compromises to keep up with your demands and a chance that you might not like how those compromises sound.

One way that bento encourages you to play within reasonable boundaries is its limit of one granular track per project. While that's an understandable first step, it does not guarantee you won't find other ways to overload bento's CPU. Fortunately, bento provides a small set of parameters for setting limits on processes that could eventually push bento too far.

The following table summarizes parameters that you can turn to if bento starts sounding like it's having a hard time keeping up with you. Look for these parameters, try them out and see if perhaps you could make a habit of not setting every track's Poly Mode to Poly X, or if you could get used to leaving some tracks empty when you feel the need to max-out a new granular track.

Table: Parameters For Limiting Impact on bento CPU Usage

Parameter	Location	Impact
Poly Mode	Dashboards and Track Config screens	Limits how many notes bento lets you play for each track, one-shot, or loop.
Grain Density & Rate	Granular Track Dashboard and Grain 1 and Grain 2 screens	Grain density determines how many grains (short regions of a main sample) the sample engine plays for each note. This is somewhat like stacking multiple voices for each note, and though the samples are very short and not triggered simultaneously, the sample engine must calculate each grain's start and end points and trigger their corresponding grain envelopes (grain shape) before playing them. The very nature of granular tracks makes them more CPU-intensive than traditional sample engines, which is why bento only lets you include one granular track per project.
Interpolation quality (Interp)	Multisample and One-shot Dashboards	Like all samplers, bento's sample engine performs calculations to transpose samples by equal tempered intervals and in small increments for pitch bends, and to emulate notes played with different levels of velocity, as the Multisample engine does when given dozens or hundreds of related samples played at multiple pitches and velocity levels. High-quality interpolation techniques minimize audible artifacts, such as aliasing while preserving the original waveforms of the emulated instrument. Hi-quality interpolation requires more CPU processing, however, so in some situations you might have to use "normal" interpolation to free up the CPU to support tracks with higher Poly Mode settings, such as Poly X.

Exploring Multisample Tracks

Multisample tracks spread a folder full of WAV files across the keyboard to get more realistic instrument sounds or to map different sounds to each key on the keyboard.

Multisample tracks excel at recreating traditional instruments like pianos, strings, and synthesizers where different samples capture the natural timbral variations across pitch and velocity ranges.

To do this...	Read this...
Understanding Multisample Tracks	Understanding Multisample Tracks
Configure audio routing, polyphony, and MIDI routing.	Configuring Multisample Track Playback Parameters
Playing Multisample tracks with bento's pads and from a MIDI controller.	Playing Multisample Tracks
Editing Multisample track voice parameters.	Editing Voice Parameters in the Multisample Dashboard
Creating new Multisample tracks.	Creating a New Multisample Track
Use your own samples in Multisample tracks.	Preparing Your Own Samples for Multisample Tracks

Understanding Multisample Tracks

Multisample tracks create melodic instruments by mapping multiple samples across different pitch and velocity ranges, enabling natural-sounding chromatic performance.

Each Multisample track contains a collection of audio samples that have been organized into zones based on pitch (root note) and velocity ranges. When you play a note, bento automatically selects the appropriate sample based on the note's pitch and velocity, then transposes it minimally to reach the exact requested note.

Multisample tracks respond to the full 128-note MIDI range (C-1 to G9), automatically selecting appropriate samples based on the note pitch and velocity. A greater number of pitches sampled in the sample set will minimize transposition and interpolation artifacts.

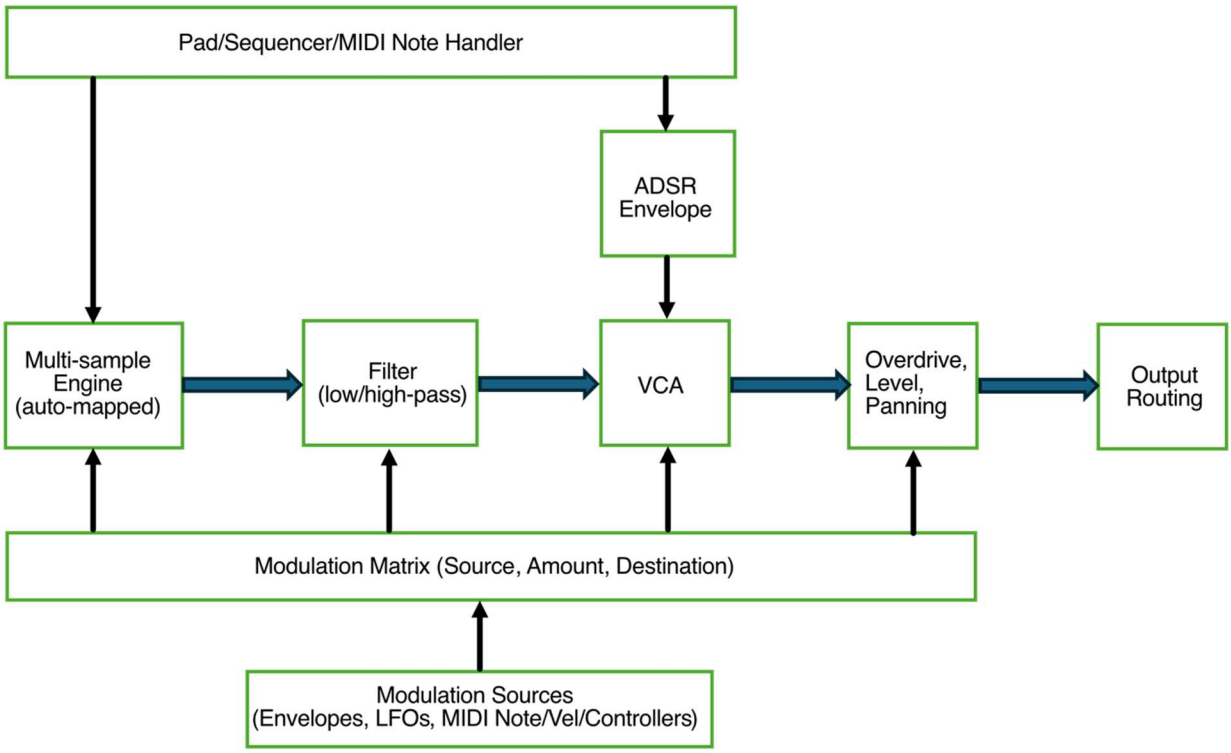
A great example of Multisample tracks is 1010music's "10 Grand" piano patch, which includes a set of over 120 sample files, each of which is a recording of one piano note played at one of three different dynamics (MIDI velocities), and no more than three semitones above or below the next sample. When you play a note, bento finds the samples recorded at the nearest note and then selects the sample recorded with similar dynamics. Because the sample root notes are no more than 3 three semitones apart, it never transposes any sample up or down by more than a semitone or two.

bento also uses the note velocity to interpolate between two of the velocity-specific samples for the note, emulating the original sound source when played at different dynamic levels.

bento's Multisample implementation lets you load patches with factory sample sets or to create new Multisample tracks using your own samples. bento creates sample maps automatically when the track is created by gathering details about each sample from the sample file names and data embedded in the sample file headers.

Voice Architecture

The sample engine in bento Multisample tracks maintains a map of note and velocity ranges for each sample. When you play a note, bento picks the sample closest to the note you played, to minimize the artifacts of transposing the sample and of interpolating between samples recorded at different velocities.



Multisample tracks have one set of voice parameters for all notes, whether the track uses one sample or 100 samples.

Multisample Track Control Screens

Multisample tracks provide four main control screens for comprehensive parameter editing and sample management.

Table: Multisample Track Control Screens

Screen	Description
Multisample Dashboard	Displays voice parameters and performance controls organized into four sections (Main, Config, Env, LFO). **Note:** Multisample track screens do not include a sample map editor. bento configures sample maps automatically when the track is created or loaded.
Multisample WAV screen	Displays the waveform of one of the track's samples and offers **Reverse** parameter for controlling sample playback direction.
Multisample Modulation screen	Provides a central location for routing modulation source to modulation targes, and for setting a modulation amount for each.
Multisample Track Config screen	Manages MIDI routing and audio output assignment.

The first step in accessing the Multisample track control screens is selecting the track.

To select a Multisample track:

1. Press **TRACKS** to open the Tracks screen.
2. Tap the Multisample track you want to select.
3. The pad colors change to match the color of the track you selected.
4. Play the pads to confirm that you selected the Multisample track you want to edit or examine.
5. To access the other Multisample track screens, follow the navigation paths shown in the following figure.

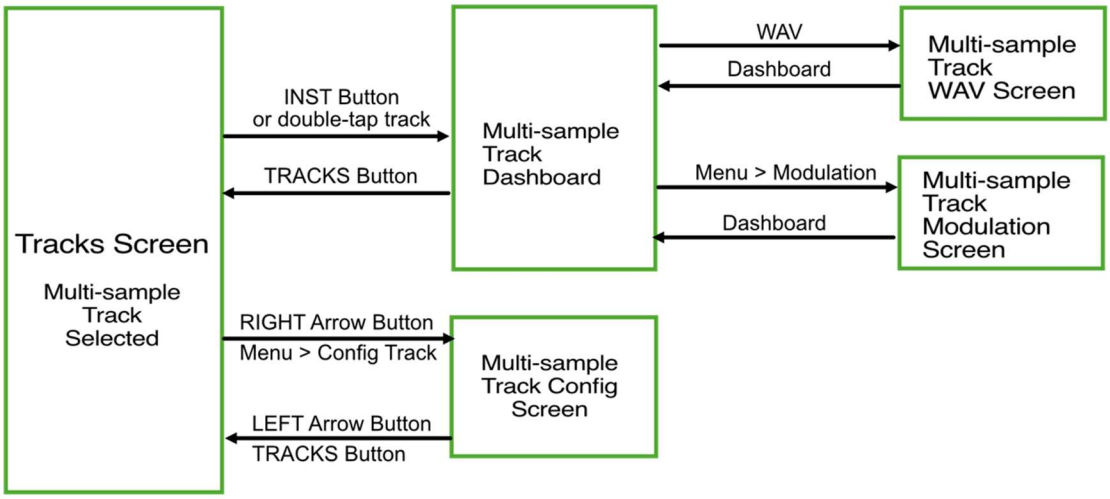


Figure: Multisample Track Control Screen Navigation

Note: The Multisample track screens do not include editors for sample-mapping or for individual sample parameters, such as start and end points, loop points, or root note. If you want to use your own samples in Multisample tracks, you can embed the relevant details in each sample or in the sample file names. For details on preparing samples for Multisample tracks, see Preparing Your Own Samples for Multisample Tracks.

Configuring Multisample Track Playback Parameters

The Multisample Track Config screen manages track-level operational settings including audio routing, polyphony limits, and MIDI channel assignments.

To access the Multisample Track Config screen:

1. Select the Multisample track, then do one of the following:
   - Tap **Menu** and select **Config Track**.
   - Press **RIGHT** arrow button.

Multisample Track Config screen with routing and MIDI settings

2. Adjust track configuration parameters.

   The following table summarizes configuration options.

Table: Multisample Track Configuration Options

To do this...	**Edit this parameter...**
Choose the audio output route for this track	Adjust **Output** parameter
Limit this track's polyphony	Adjust **Poly Mode** parameter
Play this track when bento receives MIDI notes on a specific channel.	Adjust **MIDI In Ch** parameter
Enable bento to send this tracks notes to external MIDI instruments	Adjust **MIDI Out P** parameter (ALL=enabled)
Choose the MIDI channel on which bento sends notes played by this track to external MIDI instruments.	Adjust **MIDI Out C** parameter (None, 1-6)

The following table describes the parameters mapped to bento's eight knobs.

Table: Multisample Track Config Parameters

Parameter	Knob	Range	Description
Output	1	1, 1 w/Mod FX, 2, and 3	Audio output routing destination
Poly Mode	2	Mono, Poly 2, Poly 4, Poly 6, Poly 8, and Poly X	Maximum simultaneous notes for this track
MIDI In Ch	6	None, 1-16	MIDI input channel for external control
MIDI Out P	7	All, A, B	MIDI output port routing
MIDI Out C	8	None, 1-16	MIDI output channel for played notes

3. To navigate to the Multisample track's Dashboard, press INST.

For details on the **Rename Track** and **Change Patch** features, see *Chapter 5: Managing Tracks*.

Playing Multisample Tracks

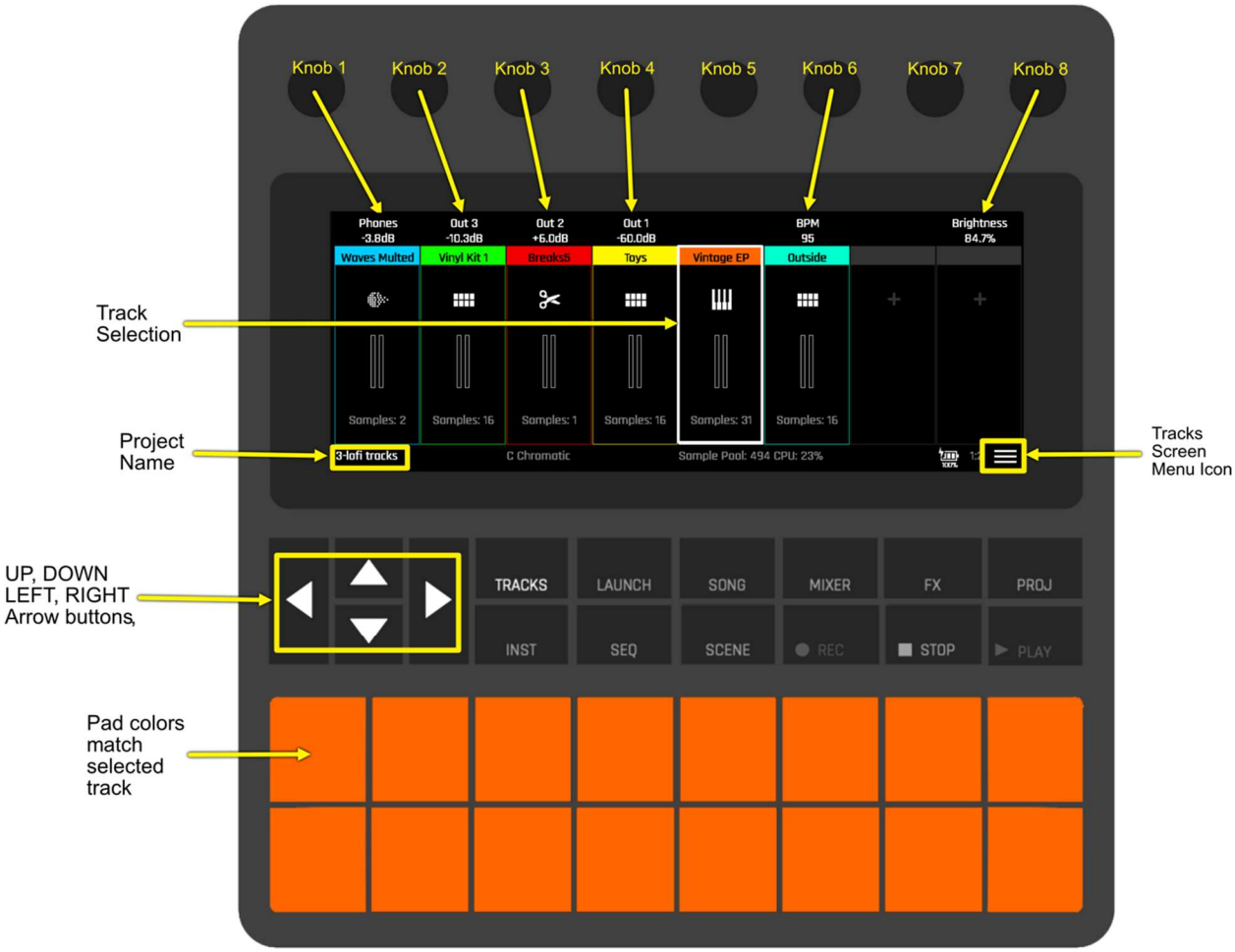
Multisample tracks respond to musical input like other bento track types, triggering notes that play through the Multisample voice architecture. You can play Multisample tracks using bento's built-in pads, sequencer, or from external MIDI controllers, in any combination up to the maximum number of voices allocated to it through its **Poly Mode** parameter setting.

Playing Multisample Tracks with bento's Pads

bento's pads provide immediate access to Multisample tracks with chromatic note mapping and octave transposition controls.

To play Multisample tracks with pads:

1. Select the Multisample track from the Tracks screen.



Multisample track icon and track selection interface

   Note the key and scale information displayed at the bottom of the screen.

2. Play the pads to hear the Multisample track.
3. Use the **UP** and **DOWN** arrow buttons to transpose the pad range by octaves.
4. To increase the number of notes you can play, adjust the Multisample track's **Poly Mode** parameter in the Multisample Track Dashboard screen. For details, see Editing Multisample Voice Parameters in the Config Group.

5. If you want to configure the pads to play in a specific scale, edit the **Root Note** (Knob 1) and **Scale** (Knob 2) in the Project Settings screen. For details, see *Chapter 4: Managing Projects*.

6. Press **TRACKS** to return to the Tracks screen.

Playing Multisample Tracks over MIDI

External MIDI controllers provide the most natural interface for Multisample track performance, especially keyboard controllers that match the chromatic mapping structure. Full velocity sensitivity and continuous controller support enable professional-level expression and integration.

To play Multisample tracks via MIDI:

1. Open the Multisample Track Config screen and set the track's **MIDI In Ch** parameter to a channel not used by any other track. For details, see *Configuring Multisample Track Playback Parameters*.

2. Set your MIDI controller to send note messages on the same channel as the **MIDI In Ch** parameter.

Figure: Multisample Track Config with MIDI In Channel 1

3. Play notes on your controller and listen as the Multisample track plays.

4. To increase the number of notes you can play, adjust the Multisample track's **Poly Mode** parameter in the Multisample Track Dashboard screen. For details, see Editing Multisample Voice Parameters in the Config Group.

   Note: When you play a track over MIDI, the pads always light up when you play notes, regardless of the pads' current transposition or the current project's Root Note and Scale parameters.

5. If you want bento to send the notes that this track plays to other MIDI instruments, set **MIDI Out P** to “All” and set **MIDI Out C** to the channel of the external MIDI instrument.

Editing Voice Parameters in the Multisample Dashboard

The Multisample Dashboard provides immediate access to the voice parameters, organized into four parameter groups: Main, Config, Envelope, and LFO. The parameter group selection buttons allow quick switching between different parameter sets using the same eight knobs.

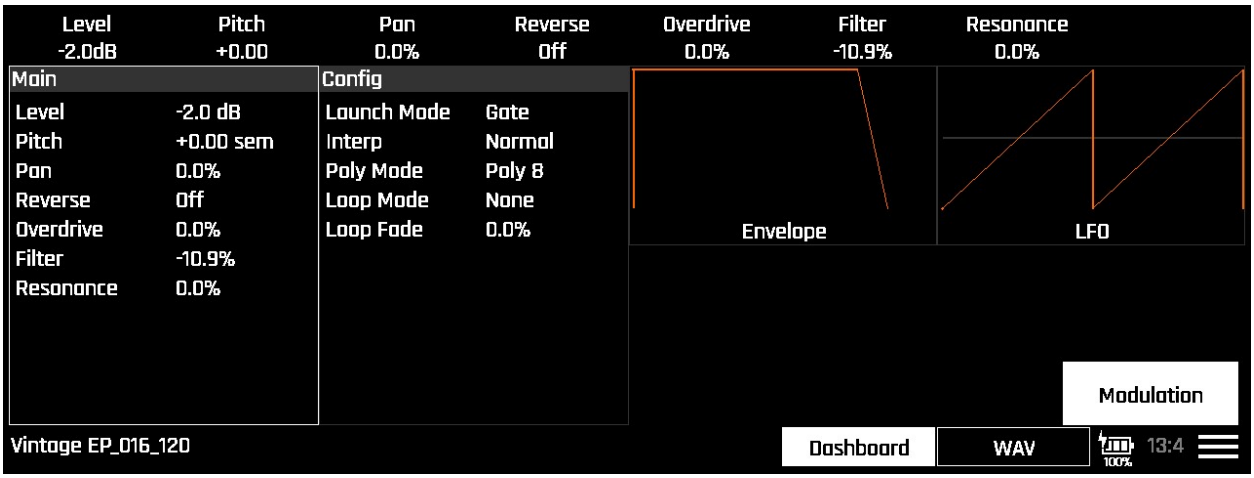
To navigate the Multisample Dashboard:

1. Press **INST** while a Multisample track is selected.
2. Tap the parameter group buttons (Main, Config, Envelope, LFO) to switch parameter sets.
3. Use knobs 1-8 to adjust the displayed parameters.

Note: The Multisample track screens do not include editors for sample-mapping or for individual sample parameters, such as start and end points, loop points, or root note. If you want to use your own samples in Multisample tracks, you can embed the relevant details in each sample or in the sample file names. For details on preparing samples for Multisample tracks, see Preparing Your Own Samples for Multisample Tracks.

Editing Multisample Voice Parameters in the Main Group

The following screenshot shows the Multisample track Dashboard with the Main parameter group selected.



Multisample Dashboard with Main parameter group selected

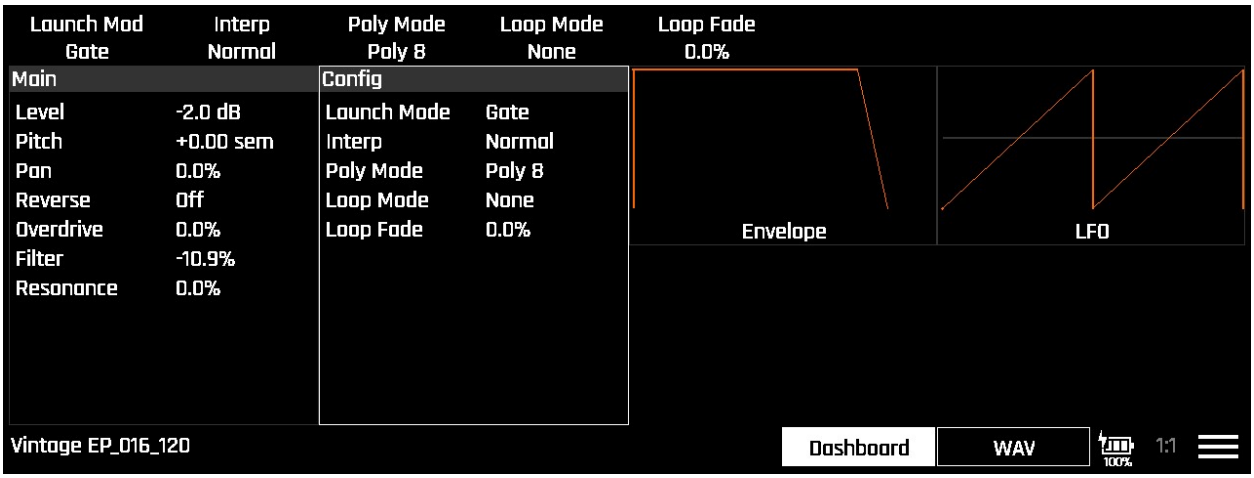
Table: Multisample Track Main Parameters

Parameter	Knob	Range	Description	Modulation Target?
Level	1	-96dB to +12dB	Overall track volume	Yes
Pitch	2	-24 to +24 semitones	Global pitch offset for entire track	Yes
Pan	3	-100% to +100%	Stereo positioning from full left to full right	Yes
Reverse	4	Off, On		
Overdrive	5	0 to 100%		
Filter	6	-100% to 100%	Filter cutoff frequency. Negative values control a low pass filter. Positive values control a high pass filter.	Yes
Resonance	7	0 to 100%	Filter resonance amount	Yes

The Main parameter group provides the essential voice shaping controls that most directly affect the sound character and musical integration of your Multisample track.

Editing Multisample Voice Parameters in the Config Group

The following screenshot shows the Multisample track Dashboard with the Config parameter group selected.



Multisample Dashboard with Config parameter group selected

Table: Multisample Track Config Parameters

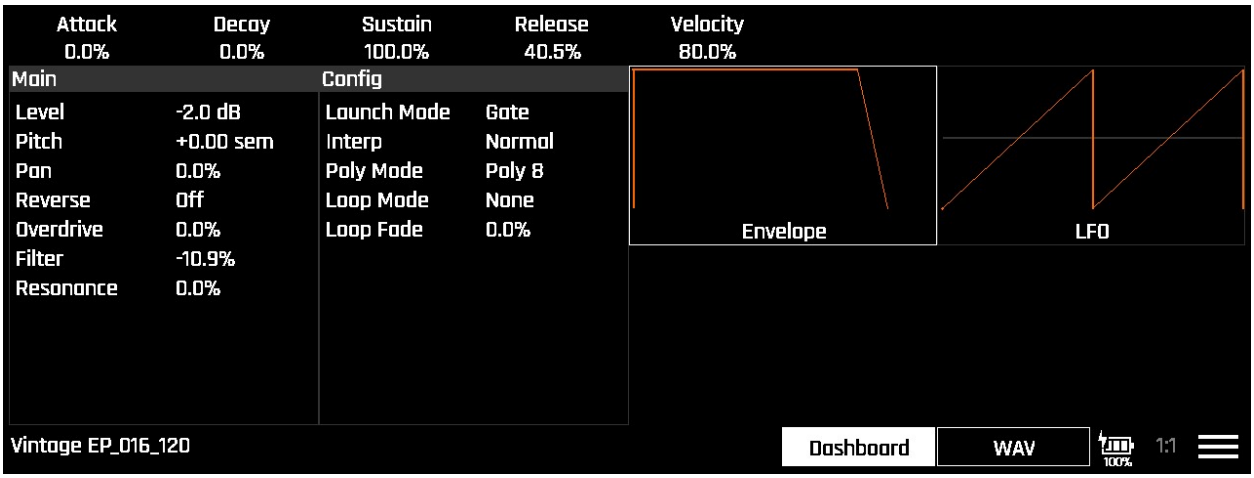
Parameter	Knob	Range	Description	Modulation Target?
Launch Mode	1	Trigger, Gate, Toggle	**Trigger**: Activate the Pad by touching the pad or through MIDI note on. bento will start playback of the WAV file and play through to the end. **Gate**: Begin the WAV file playback in the same manner as Trigger mode. But in Gate mode, playback will stop when you release the touch or the MIDI note is released. **Toggle**: Begin the WAV file playback in the same manner as Trigger mode. When another trigger event happens for this note, the playback will stop.	No
Interpolation	2	Normal, High Q	Sample quality when transposed. To minimize impact on the CPU, only use High Q when needed to reduce artifacts.	No
Poly Mode	3	Mono, Poly 2, Poly 4, Poly 6, Poly 8, Poly X	Maximum simultaneous notes. Poly X will make use of all notes available.	No
Loop Mode	4	None, Forward, Bidirect	Sample looping behavior	No

Parameter	Knob	Range	Description	Modulation Target?
Loop Fade	5	0 to 100%	Crossfade amount at loop points. Increase this amount to smooth the transition when the sample loops during sustained notes.	No

Config parameters control the fundamental operational behavior of the Multisample track, affecting how notes trigger, sustain, and loop within each sample.

Editing Multisample Voice Parameters in the Envelope Group

The following screenshot shows the Multisample track Dashboard with the Envelope parameter group selected.



Multisample Dashboard with Envelope parameter group selected

Table: Multisample Track Envelope Parameters

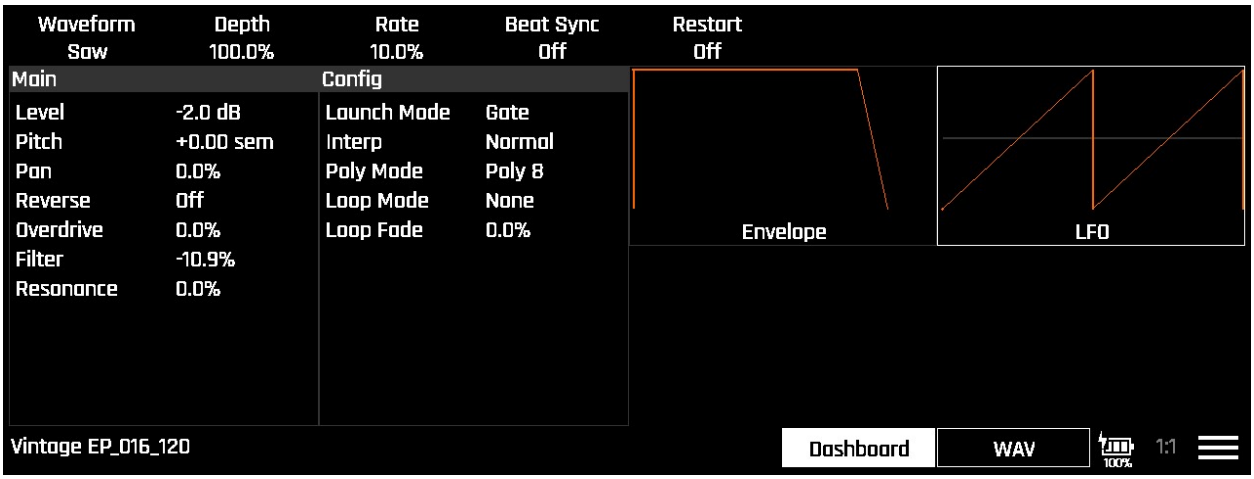
Parameter	Knob	Range	Description	Modulation Target?
Attack	1	0 to 100% 100% = 9 seconds	Envelope attack time	Yes
Decay	2	0 to 100% 100% = 38 seconds	Envelope decay time	Yes
Sustain	3	0 to 100%	Envelope sustain level	Yes

Parameter	Knob	Range	Description	Modulation Target?
Release	4	0 to 100% 100% = 38 seconds	Envelope release time	Yes
Velocity	5	0 to 100%	Velocity sensitivity amount	Yes

The Envelope parameter group provides detailed ADSR envelope control for precise amplitude shaping and velocity response configuration.

Editing Multisample Voice Parameters in the LFO Group

The following screenshot shows the Multisample track Dashboard with the LFO parameter group selected. The LFO is a modulation source that can enable rhythmic and expressive effects, from subtle vibrato to dramatic tremolo and filter sweeps.



Multisample Dashboard with LFO parameter group selected

Table: Multisample Track LFO Parameters

Parameter	Knob	Range	Description	Modulation Target?
Waveform	1	Sine, Pos Sine, Triangle, Pos Tri, Square, Pos Square, Saw, Rev Saw, Random	LFO shape selection	No
Depth	2	0 to 100%	LFO modulation intensity	Yes
Rate	3	0 to 100%	LFO speed from slow to fast	Yes
Beat Sync	4	Off, On	Synchronize LFO to project tempo	No
Restart	5	Off, On	Reset LFO phase on each note	No

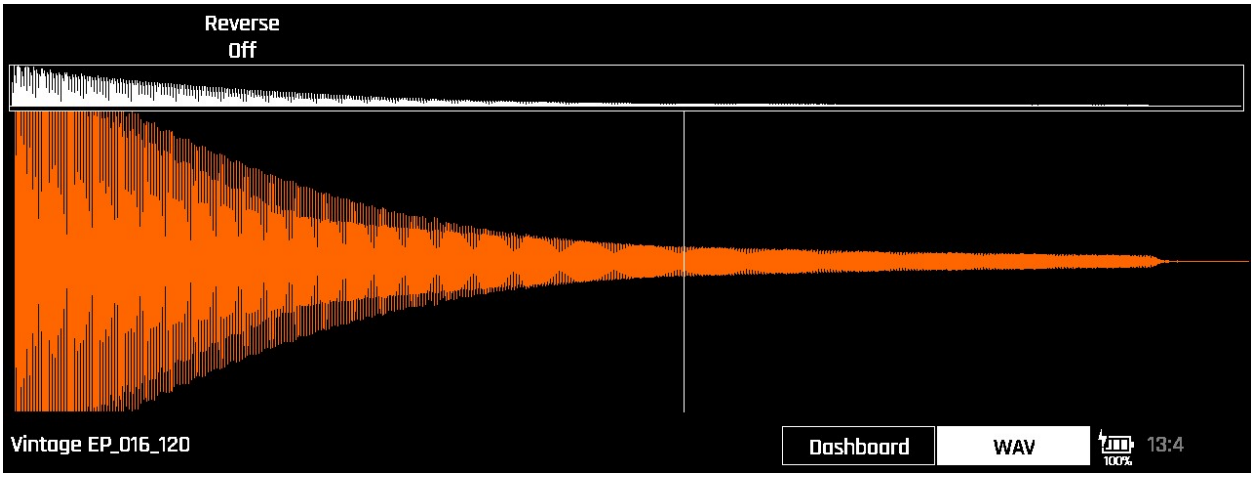
Multisample WAV Screen

The Multisample WAV screen provides a live view sample playback and a **Reverse** parameter for reversing the playback direction of all samples in the Multisample track.

To access the Multisample WAV screen:

1. From the Multisample Dashboard, tap **WAV** in the navigation area.

   The Waveform screen opens.



Multisample Waveform screen

   When you play a note from the pads, sequencer, or over MIDI, a vertical line moves across the waveform display.

   If the sample file has embedded loop points, and if the Multisample track's Loop Mode is either Forward or Bidirect (in the Multisample track Dashboard), bento loops between those points while the note is held.

2. Zoom in or out on the waveform by pinching or spreading the touchscreen with two fingers.
3. Scroll through the waveform by swiping left or right on the touchscreen.
4. To change the Multisample track's playback direction, adjust the **Reverse** parameter (On = reverse playback) with Knob 2.
5. Tap **Dashboard** to return to the main parameter interface.

Editing Multisample Track Modulation

Each bento Track includes a central Modulation screen within which you can configurate all modulation settings.

The modulation system enables dynamic control of Multisample parameters through various sources such as note velocity, envelopes, LFOs, and external MIDI controllers.

The specific modulation sources available vary with each track type.

To configure modulation in a Multisample track:

1. Open the Multisample track dashboard, then tap the **Menu** icon in the lower right corner of the screen. The Menu opens, displaying a single option, Modulation.

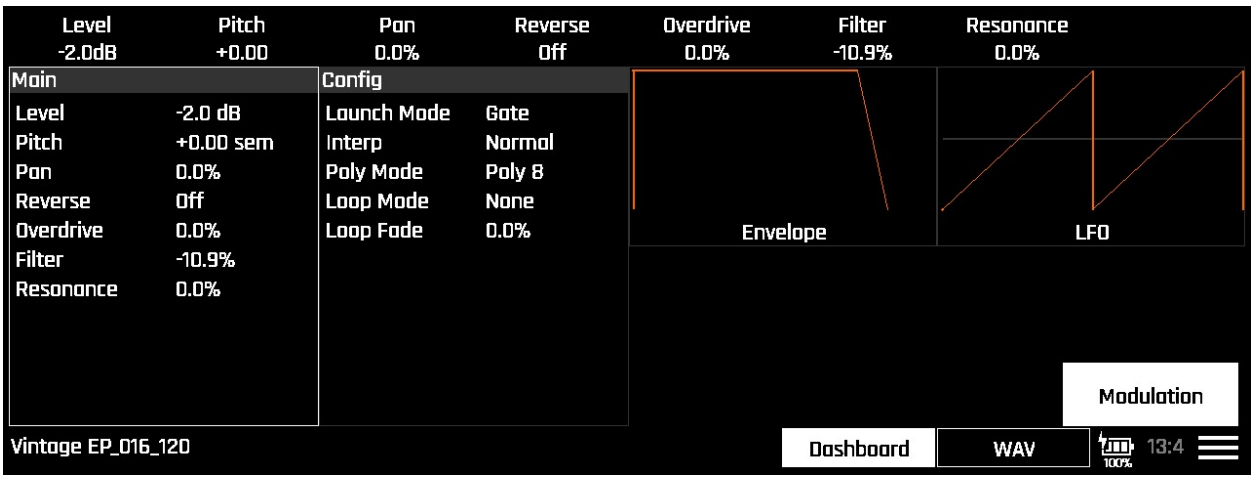


Figure: Multisample Dashboard Modulation Menu Option

2. Tap **Modulation**.

   The Multisample Track Modulation Screen opens.

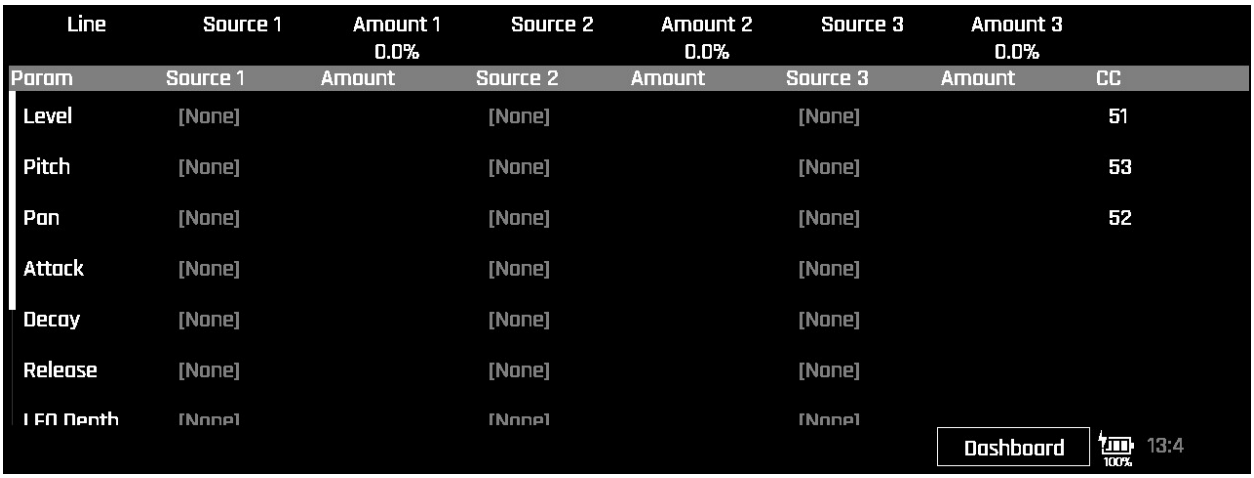


Figure: Multisample Track Modulation Screen

The first column in the Modulation screen contains the name of every granular track parameter that can be a modulation “target.” Columns 2 through 7, let you set up three modulation sources and three modulation amount values for the modulation target of the selected row.

3. To see the complete list of modulation targets in the Modulation screen you can either:
   - swipe the screen up or down, or
   - turn Knob 1 to scroll up and down through the Modulation screen.
4. Select the line of the parameter you want to modulate, then use Knobs 2-7 to configure one or more modulation sources and modulation levels.

The following table describes the parameters you can modulate, the modulation sources you can route to them, and the range of modulation levels.

Table: Modulation Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description
Line	1	Level Pitch Pan Attack Decay Release Filter Cutoff Filter Resonance LFO Depth LFO Rate	Moves the Modulation screen's line selection through the parameters listed in the first column. Once you have selected a modulation target, you can configure up to 3 modulation sources and modulation amounts with knobs 2-7.
Source 1	2	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (1 of 3)
Amount 1	3	-100% to +100%	Modulation Amount (1 of 3)
Source 2	4	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (2 of 3)
Amount 2	5	-100% to +100%	Modulation Amount (2 of 3)
Source 3	6	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (3 of 3)
Amount 3	7	-100% to +100%	Modulation Amount (2 of 3)

5. To return to the Multisample track Dashboard, tap **Dashboard** or press **INST**.

Creating a New Multisample Track

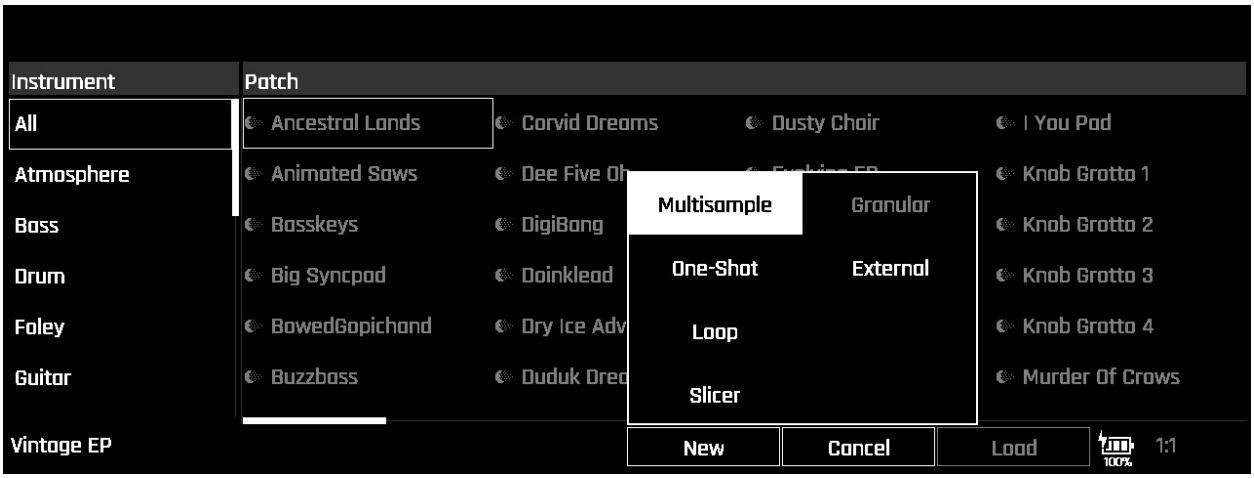
Creating new Multisample tracks involves either loading samples from bento's factory microSD card or building custom instruments from your own sample libraries. In either case, loading samples into a new Multisample track requires all samples to be in the same folder on the microSD card.

The process of creating a new Multisample track is simple, but to create a Multisample track that maps multiple samples across the entire MIDI note range and across multiple velocity layers, the samples themselves need to be configured and named in specific ways. For details on preparing your own samples for Multisample tracks, see *Preparing Your Own Samples for Multisample Tracks*.

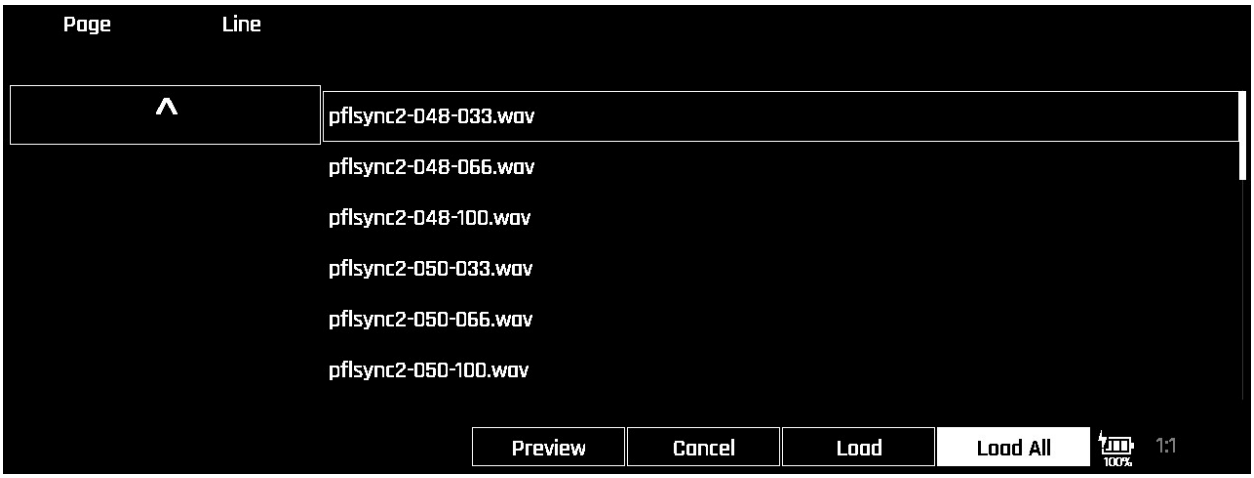
Note: Creating a new Multisample track requires an empty track. If you cut a track from a project, the sequences for that track are also cut.

To create a new Multisample track:

1. Organize your samples in a single folder on the microSD card, applying file naming and tagging conventions recommended in Preparing Your Own Samples for Multisample Tracks.
2. Choose an empty track in your bento project.
3. Double tap the empty track slot on the Tracks screen.
4. Tap **New** and select **Multisample** from the track type options.



The Multisample track sample browser screen opens.



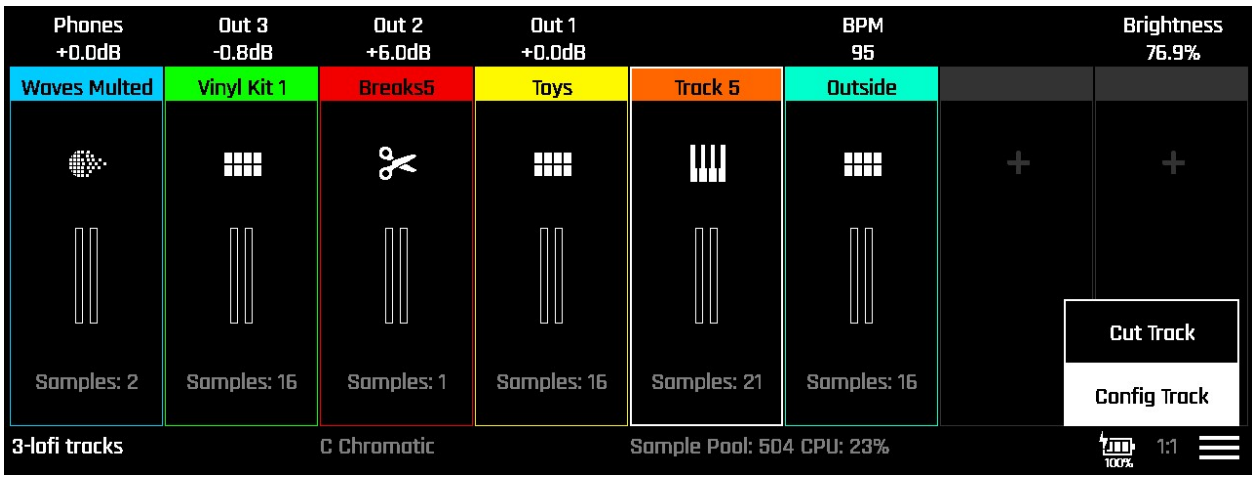
Multisample track sample browser

Note: The Instrument categories do not appear in the sample browser because bento lets you browse for samples in any folder on the microSD card. bento only displays instrument categories when you browse for patches to load into a track.

5. Browse to the location of the samples you want to load, whether they are in a factory patch folder or in a folder you copied to the microSD card with your custom samples.

6. Select any of the samples in the sample folder source and tap **Load All.**

   bento reads the headers and file names of every sample in the folder to create a complete sample map for the new track and then returns you to the Tracks screen, where the new track is selected and displayed with a default name.

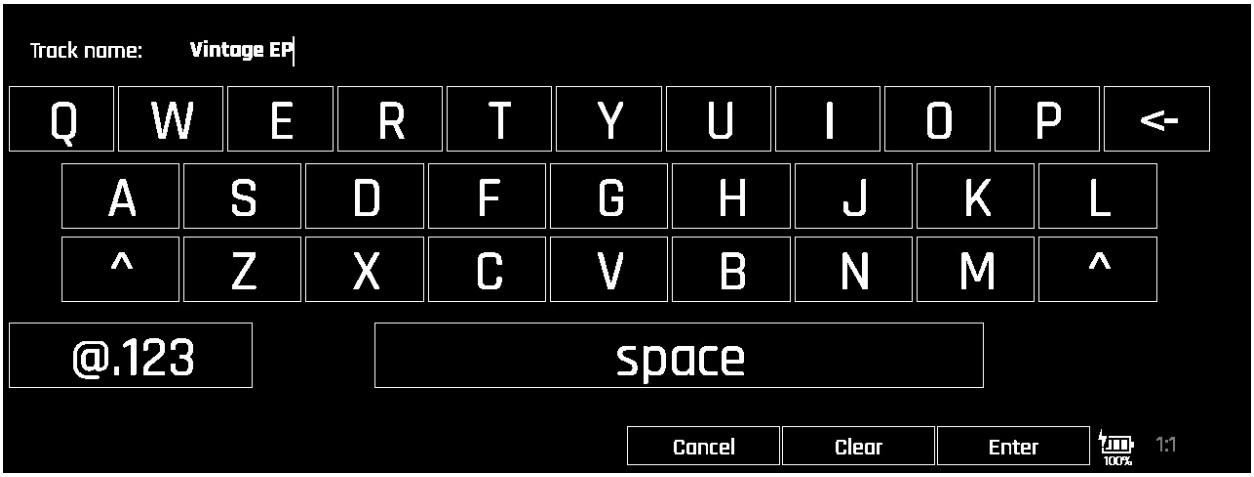


Note: If you want to hear how bento has mapped each sample by playing the pads, consider changing the current project Scale to “Chromatic” in the Project Settings.

7. To rename the new track, open the new track’s Track Config screen by selecting the track and pressing the **RIGHT** arrow button or choosing **Config Track** from the Track Screen menu, and then tapping **Rename Track**.

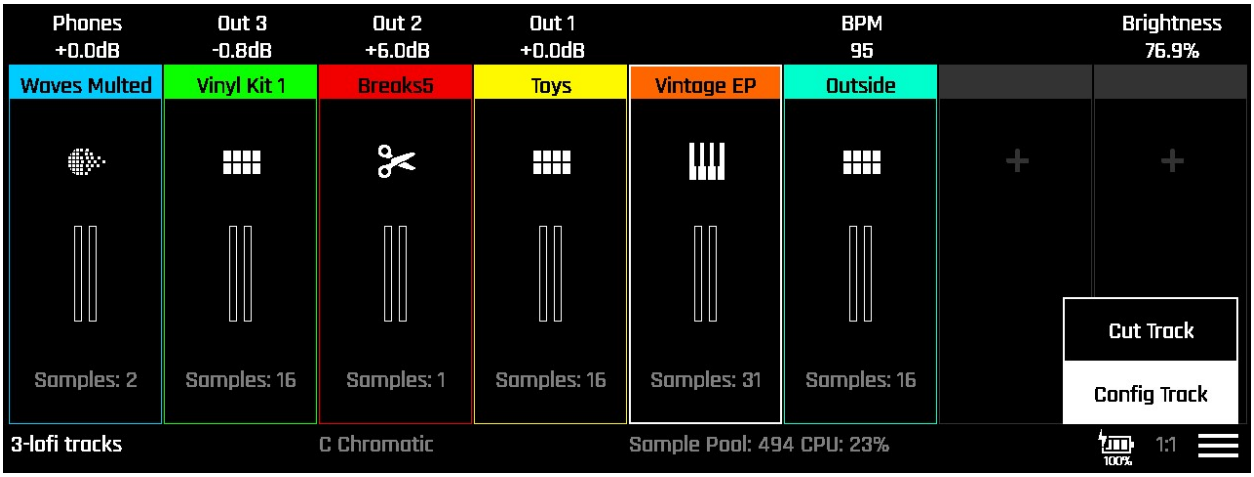
Rename Track in Multisample Track Configuration Screen

8. Tap the keys to enter a new track name in the naming keyboard screen., then tap **Enter**.



Naming Keyboard Screen

The track now appears in the Tracks screen with its new name.



Preparing Your Own Samples for Multisample Tracks

If you plan to prepare your own Multisample file sets using your own samples, you need to take steps to make sure that:

- The samples meet bento's file requirements,
- The filenames meet bento's requirements, and
- The files make their Root Note and velocity details evident enough for the bento to find them.

Sample File Requirements

Before copying your own sample files to a microSD card, makes sure the sample files meet bento's criteria:

- Sample format: WAV file format.
- Audio Channels: 1 or 2.
- Resolution: 16-, 24-, or 32-bit.
- Sample Rate: bento supports any sample rate, but to minimize load on the microprocessor, use 48kHz, bento's native sample rate.

Multisample File-Naming Requirements

bento only recognizes sample files that meet the following criteria:

- Fewer than 256 characters, including the path name.
- May include alpha numeric characters (A-Z, 0-9) and some special characters.
- Must not contain any of the following characters:
- " / \ ? * < > : |

NOTE: bento will not recognize or load sample files that do not meet its naming criteria.

Where bento Looks for Note and Velocity Information

When you use the Load All feature to load multiple files into a muti-sample track, bento looks for each file's Root Note so it can map the file to a MIDI Note, and if multiple files have the same Root Note, bento looks for velocity information so it can map each file to a range of MIDI Note velocities and respond dynamically to the way a performer plays each note.

To find the Root Note and velocity information, the bento looks in the following places, in the following order until it finds what it needs:

1. SMPL tags of the WAV files
2. INST tags of the WAV files
3. The file names for the WAVs

When parsing the file names, it looks for the following format:

[Text name] + [- or _] + [note number] + [- or _] + [Vel1] + [- or _] + [Vel2]

bento interprets the [note number] as a decimal MIDI Note number. If bento finds both [Vel1] and [Vel2], it will use them as the lowest and highest velocities for playing this WAV.

Table: Sample Filenames with Velocity Ranges

Filename	**Root Note**	**Velocity Range**
tetrasync-048-000-049.wav	48 (C3)	0-49
tetrasync-048-050-083.wav	48 (C3)	50-83
tetrasync-048-084-127.wav	48 (C3)	84-127

If bento finds only Vel1, it will use that as the center point for the range of velocities when this WAV should be applied.

For example, the following filenames indicate that each sample has the same root note (048) and one of three unique mid-point velocity:

Table: Sample Filenames with Mid-point Velocities

Filename	Root Note	Velocity Mid-point	Velocity Range
tetrasync-048-033.wav	48 (C3)	33	0-49
tetrasync-048-066.wav	48 (C3)	66	50-83
tetrasync-048-100.wav	48 (C3)	100	84-127

If bento doesn't find the root note information in those three places, it will map the files in alphabetical order, starting at C2 (MIDI Note 36) and map one file per semi-tone, one velocity per note. If bento finds no velocity information, it will use one WAV file for all velocities.

Loading tangerine and blackbox Multisample File Sets

If you have created Multisample file sets with a 1010music tangerine or blackbox, you can load those file sets into Multisample tracks on bento with the Load All feature.

The files that tangerine and blackbox generate include enough information in their filenames and in the SMPL and INST tags for bento to determine how to map WAV files to an appropriate span of MIDI notes and MIDI velocities.

Chapter 7: Exploring Granular Tracks

Granular tracks provide bento's most sophisticated synthesis capabilities, combining two independent granular oscillators with comprehensive modulation and effects processing. Each granular track can load two different samples and process them through separate signal paths with independent envelopes, filters, and modulation sources. A shaped-based oscillator signal is then added to the mix to add even more character to the sound.

Table: Chapter 7 Navigation

To do this...	**read this...**
Understand how granular synthesis works on bento	Understanding Granular Tracks
Play granular tracks using pads and MIDI	Playing Granular Tracks
Edit voice parameters and granular-specific controls	Editing Granular Tracks
Configure audio and MIDI routing	Editing Track Configuration Settings
Create new granular tracks from scratch	Creating New Granular Tracks
Apply best practices for granular synthesis	Best Practices for Granular Tracks

Understanding Granular Tracks

Granular synthesis is a sample playback technique that plays short segments of a sample in many ways beyond the traditional linear method. These short segments are called ‘grains.’ The result is a ‘granular oscillator’ - a sophisticated alternative to the simple sample playback engines found in other track types.

The results range from slightly textured versions of the original sample to completely transformed soundscapes that barely resemble the source. Each granular track gives you control over how many grains play, their size, which parts of the sample they come from, and how these factors change over time. Like bento’s other sample-based tracks, granular oscillators feed through the same familiar filters, envelopes, and effects that you can play polyphonically.

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Granular Synthesis Concepts

Each granular oscillator selects small pieces, or grains, of sound from loaded samples. You can manipulate the sound by adjusting the size and position of the grains, the frequency at which new grains are triggered, and the range of the sample from which grains are selected. You can also add randomness to the timing of the grain triggers and the stereo position of each grain.

Due to the complexity of bento’s granular oscillators and the impact on bento’s CPU, bento projects can only include one granular track.

Granular Track Architecture

At the heart of each granular track are two granular oscillators, each of which loads a different sample from microSD and applies granular synthesis techniques with separate granular parameter settings.

You can customize the sound with a third traditional waveform oscillator, 2 filters, 2 envelopes, 2 LFOs, a modulation sequencer and effects engines, with everything accessible from a small number of granular track editor screens.

The signal flow of each granular track voice resembles that of traditional synthesizer voices, with a mix of one or more oscillators fed into a filter and on to an Envelope+VCA for final dynamics processing before routing to a voice mixer and effects. What makes bento's Granular tracks different, however, is its ability to route the oscillators through two separate filters in three different configurations.

The following figure shows the signal flow when the filters are configured in parallel.

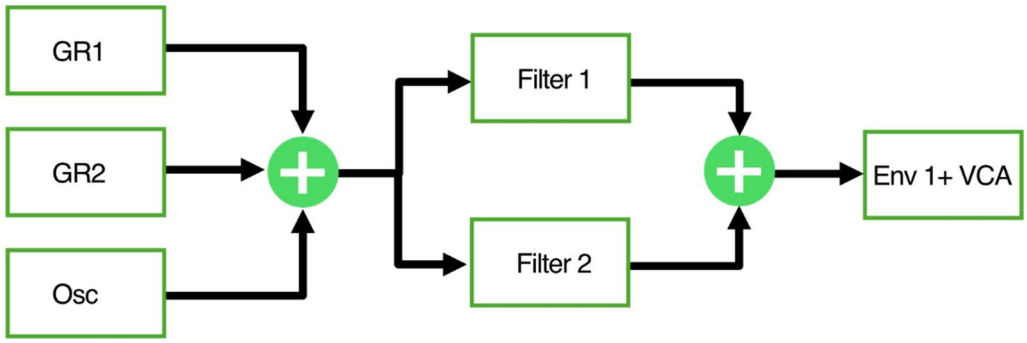


Figure: Granular Track Voice Signal Flow with Parallel Filter Configuration

The following figure shows the signal flow when the filters are configured in series.

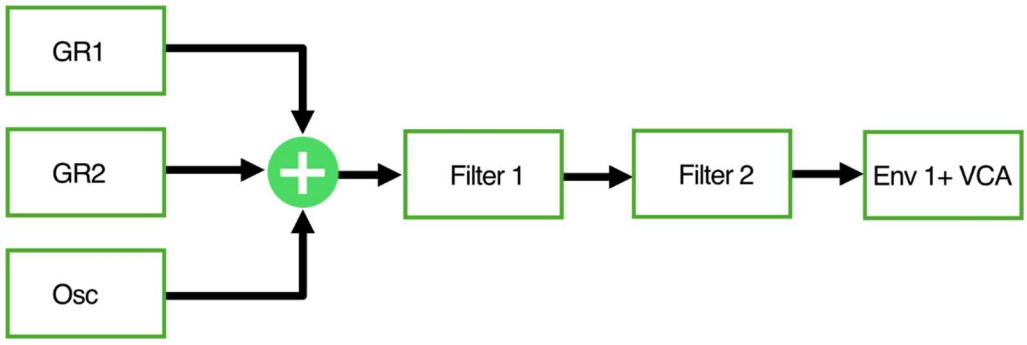


Figure: Granular Track Voice Signal Flow with Series Filter Configuration

When the filters are configured in a one-per-oscillator configuration, each granular oscillator runs through a dedicated filter, and the waveform oscillator goes directly to the Envelope+VCA as show in the following figure.

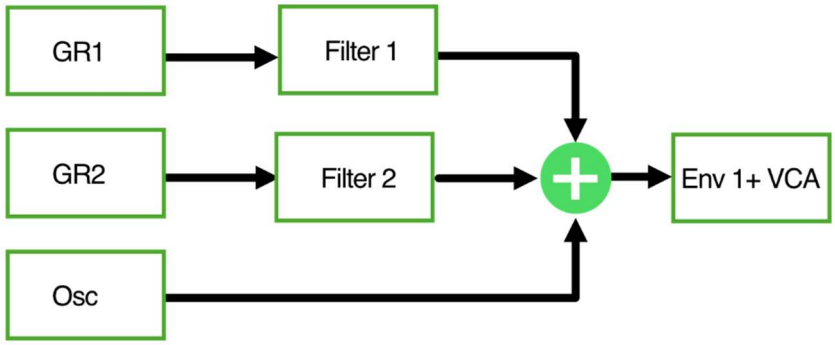


Figure: Granular Track Voice Signal Flow with Per-Oscillator Filter Configuration

For details on configuring granular track filter configuration, see *Editing Granular Track Filter Settings*.

Granular Track Control Screens

bento organizes granular track controls across four main screens to manage the complexity while maintaining intuitive access:

- The Granular Track Dashboard provides a view of both granular oscillators with animated representations of every grain and quick access to essential parameters from bento's 8 knobs.
- The Grain 1 screen provides access to the parameters that affect the GR1 granular oscillator. Within this screen, parameters are organized in two pages of eight parameters to allow easy adjustment from bento's eight knobs.
- The Grain 2 screen provides access to the parameters that affect the GR2 granular oscillator. Within this screen, parameters are organized in two pages of eight parameters to allow easy adjustment from bento's eight knobs.
- The Track Configuration screen provides control over track-level settings like polyphony, audio output, and MIDI configuration.

Playing Granular Tracks

Granular tracks respond to musical input like other bento track types do, triggering notes that play through the granular oscillators and voice architecture. You can play granular tracks using bento's built-in pads or external MIDI controllers, with each method offering different advantages for performance and control.

Table: Granular Track Playing Methods

Method	Description	Best Use
Pad Playing	Direct triggering using bento's touch pads	Quick experimentation, live performance
MIDI Input	External keyboard or controller input	Precise pitch control, complex sequences
Velocity and Pressure Control	Dynamic response to playing strength, applied as a modulation source to any granular track parameter that is a modulation "target."	Expressive parameter modulation
Mod Wheel	Real-time parameter control, applied as a modulation source to any granular track parameter that is a modulation "target."	Live texture manipulation

Both playing methods trigger the same granular synthesis engine, with pads offering immediate experimentation and MIDI providing precise control. You can switch between methods during performance or use MIDI controllers alongside pad playing for hybrid control. Understanding these performance options prepares you to effectively shape granular textures through the editing controls covered in the next section.

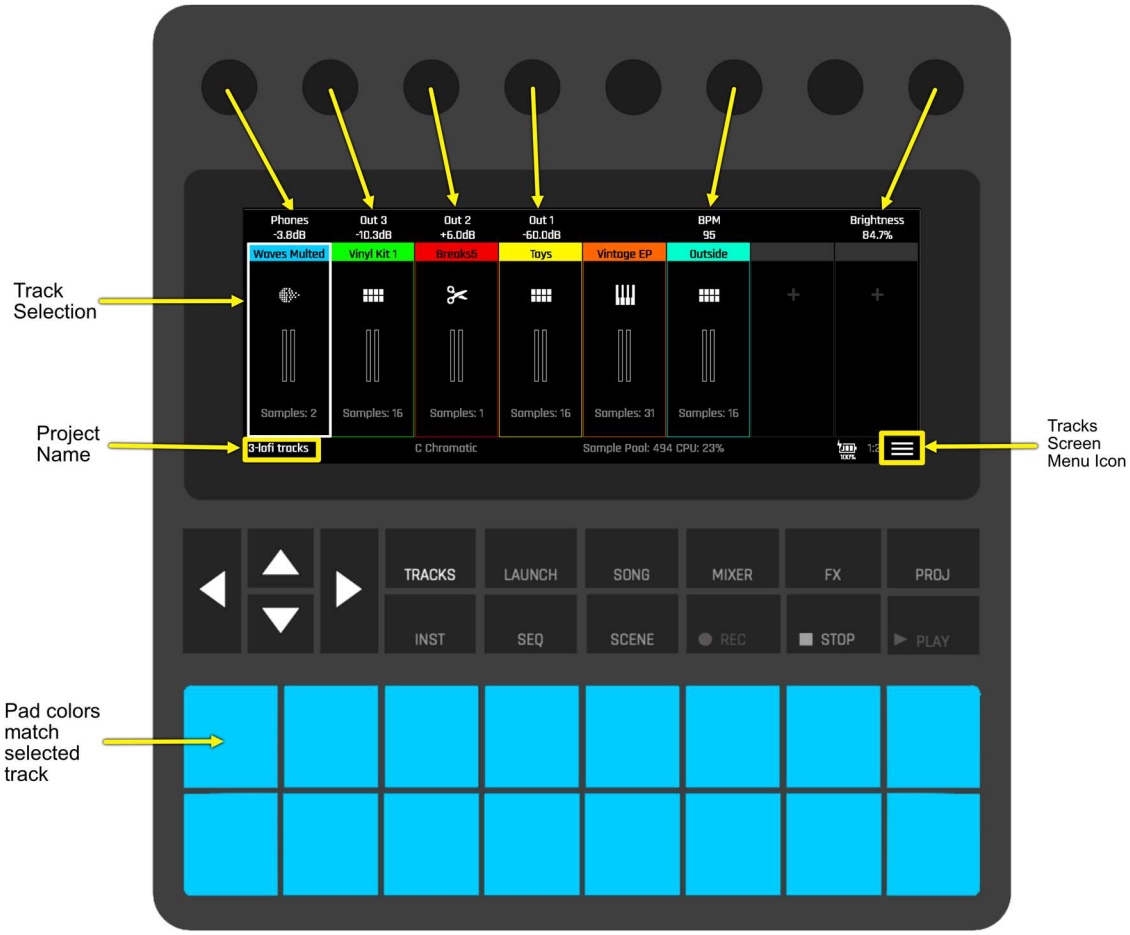
Playing Granular Tracks with bento's Pads

bento's pads provide immediate access to granular textures with velocity-sensitive triggering, pressure-sensitive modulation, and octave transposition controls.

To play a granular track using the pads:

1. Press **TRACKS** to open the Tracks screen.
2. Select a granular track by tapping its track slot.

The color of the pads changes to match the selected track's color.



Tracks screen with granular track selected and matching pad colors

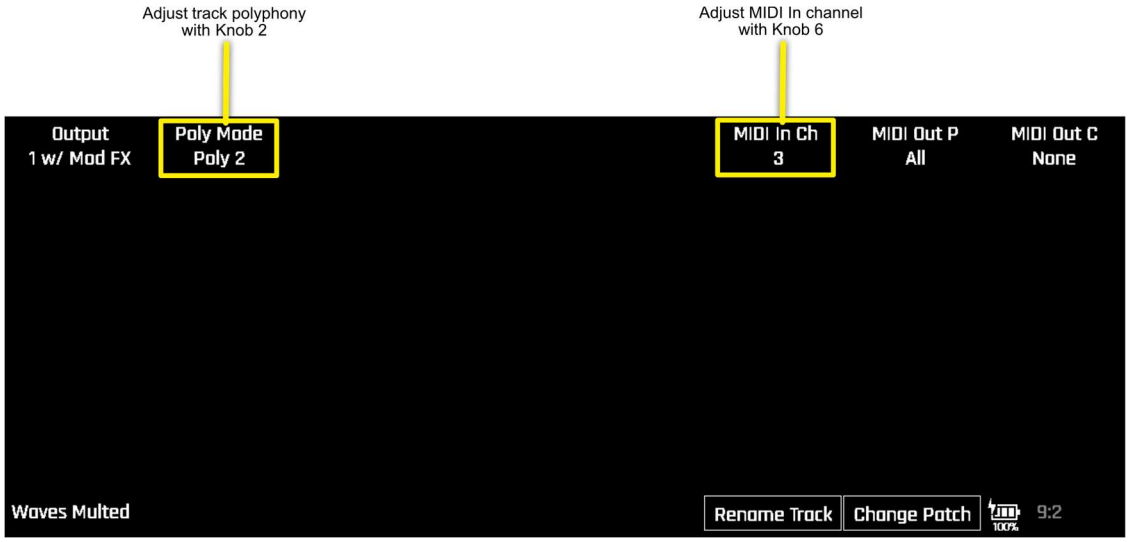
3. Play the pads to trigger notes across the current scale and octave.
4. Use the **UP** and **DOWN** arrow buttons to shift the pads to control different octaves.

Playing Granular Tracks over MIDI

External MIDI controllers offer precise pitch control and access to continuous controllers for real-time granular parameter manipulation.

To play a granular track via MIDI:

1. Connect your MIDI controller to bento's MIDI input.
2. Select the granular track on the Tracks screen.
3. Press the **RIGHT** arrow button to open the Track Configuration screen for the granular track. Adjust Knob 6 to set the MIDI In Ch parameter to the same channel number as the one your MIDI controller uses.



Track Configuration screen showing MIDI In Ch parameter setting

4. Play notes on your MIDI controller to trigger granular textures.
5. Use continuous controllers (mod wheel, aftertouch) for real-time parameter control.

Editing Granular Tracks

Granular tracks provide multiple levels of parameter control, from common voice parameters shared with other track types to specialized granular synthesis controls unique to this track type.

This section digs into bento's granular synthesis features so you can develop new skills and habits as you explore granular tracks.

To do this...	Read this...
Locate granular track voice parameters	Opening the Granular Track Dashboard
Explore bento's two granular oscillators	Editing the Granular Oscillators
Explore granular track envelopes	

Editing Oscillator 3 Settings and FX Send Levels

Granular tracks include a third oscillator that produces a traditional waveform, such as triangle, sine wave, sawtooth, noise, and square wave with variable pulse width.

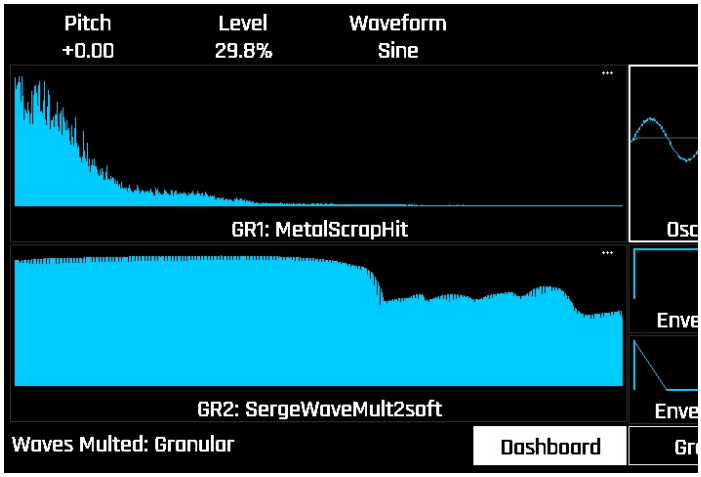
While its relatively simple waveforms may make the third oscillator seem out of place when compared with bento's two granular oscillators (per voice), it can become very useful as a tonal anchor against the backdrop of dozens of overlapping grains jumping from one random point in a sample file to another.

bento's granular track Dashboard groups the waveform oscillator's parameters with the Delay and Reverb send level parameters for the entire granular track.

To configure a granular track's waveform oscillator and Delay and Reverb send levels:

1. Open the granular track dashboard, then tap the **Osc + FX** control to select it, as shown in the following screenshot.

To do this...	Read this...



2. To edit the parameters displayed across the top of the screen, adjust the knobs that correspond to each parameter.

   The following table describes the Osc + FX parameters and the knobs to which they are mapped when **Osc + FX** is selected in the granular track Dashboard.

Table: OSC + FX Parameters Mapped to bento Knobs

Parameter	Knob	Range	Desc
Pitch	1	-24 to +24 semitones	Trans patch
Level	2	0 to 100% (-96dB to +12dB)	Level wavet
Waveform	3	Saw, Triangle, Square, Sine, Noise	Wave wavet

To do this...	Read this...

Pulse Widt (Waveform =Square)	4	0 to 100%	Only applies when selected for the Wa The portion of the that will have a hig A value of 50% will wave that is high h time and low half t A value of 75% will wave that is high 3 time and low 1/4 of
Delay Send	6	0 to 100%	Level of granular tr audio sent to bento FX.
Reverb Send	7	0 to 100%	Level of granular tr audio sent to bento Reverb FX.

Editing Granular Track Envelopes

Explore granular track filters — Editing Granular Track Filters

Explore the granular track waveform oscillator — **Error! Reference source not found.**

Send granular track output to bento's delay and reverb effects — **Error! Reference source not found.**

Explore granular track modulation options — Editing Granular Track Modulation

Configure LFOs for granular track modulation — Editing the Granular Track LFOs

Configure the Modulation Sequencer for granular track modulation — Editing the Granular Track Modulation Sequencer

Allocate voices for granular tracks — Editing Granular Track Configuration Settings

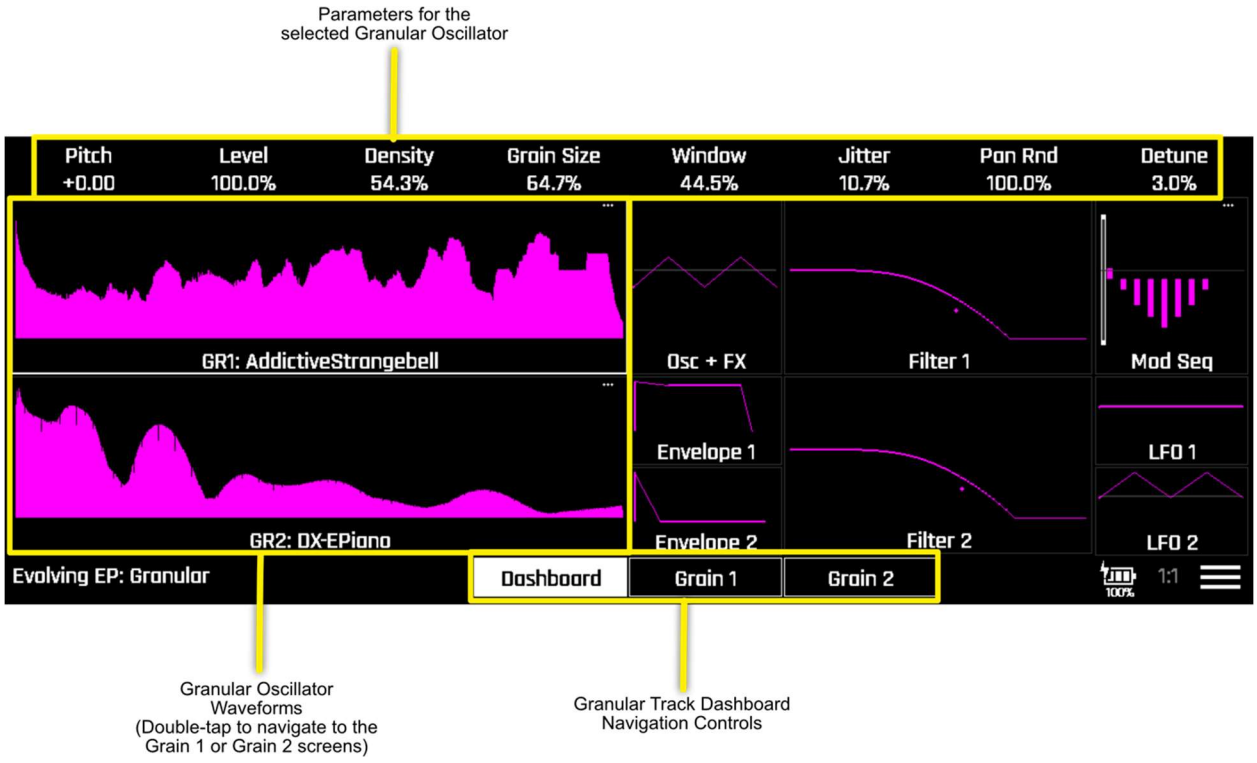
To do this...	Read this...
Configure granular tracks for receiving and sending MIDI	Editing Granular Track Configuration Settings
Route granular tracks to specific audio outputs	Editing Granular Track Configuration Settings

Opening the Granular Track Dashboard

To open the Granular Track dashboard for Track 1:

1. Press **TRACKS** to open the Tracks screen.
2. Tap the Granular Track you want to edit to select it.
3. Play the pads to hear track 1's current settings.
4. To open the selected track's dashboard, press **INST**.

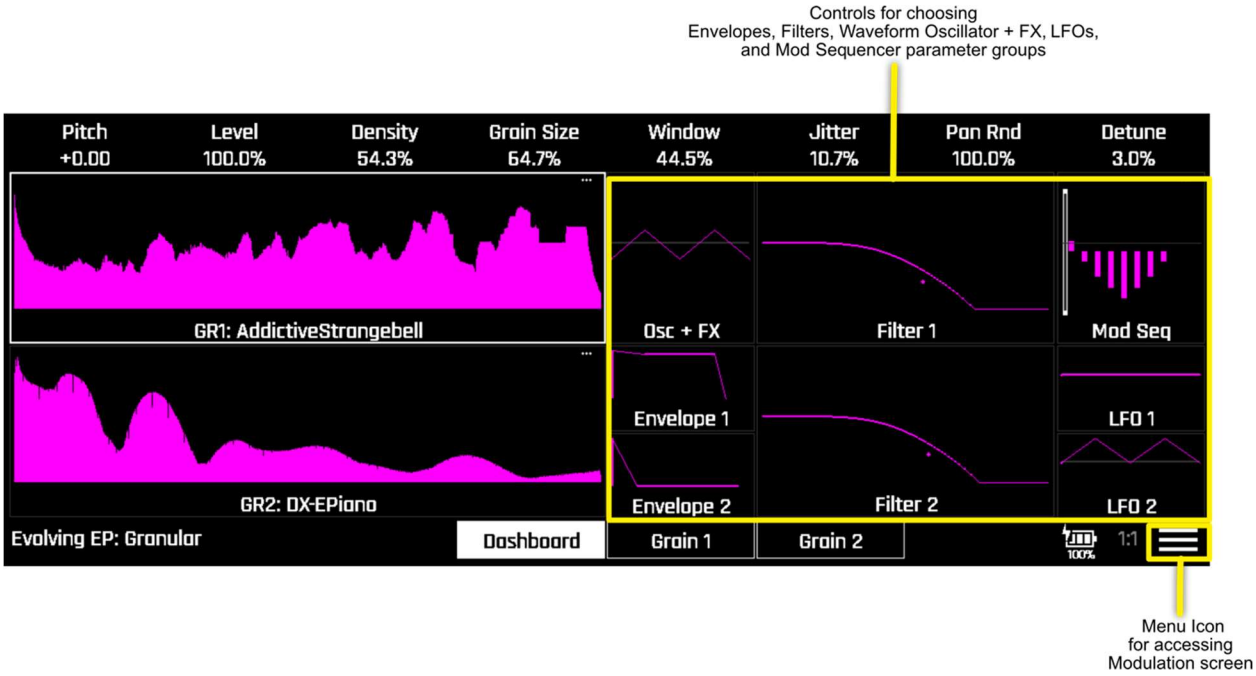
The granular track dashboard opens. The three dots in the top right corner of the grain graphs and the Mod Seq graph are a hint that you can open these graphs In a larger view by double tapping the graphs.



The granular track Dashboard provides a high-level view of the granular track's settings and presents parameter names and values across the top of the screen to indicate which parameters you can adjust with bento's 8 knobs. At any given time, only one granular track component (such as an oscillator, envelope, or filter) is selected for editing.
For example, the figure above shows the white selection rectangle around GR1's sample waveform, so the parameters at the top of the screen

correspond to GR1. At the bottom of the Dashboard are three controls for navigating to the Dashboard, the Grain 1 screen (with additional parameters for GR1, and the Grain 2 screen (with additional parameters for GR2).
When notes are playing for a Granular track, the Grain 1 and Grain 2 graphs display a moving white line for each grain that is playing.

The following figure identifies the location of granular track feature controls that you can select for editing.



The Menu icon in the lower right corner opens a menu from which you can navigate to a central Modulation screen.
The following table summarizes the granular track features that you can edit and which section in this chapter to read for more details.

To edit this granular track feature...	**See this section...**
Granular Oscillator GR1 and GR2	Editing Granular Tracks
Waveform oscillator	**Error! Reference source not found.**
Envelope 1 and	Editing Oscillator 3 Settings and FX Send Levels

To edit this granular track feature...	See this section...

Envelope 2

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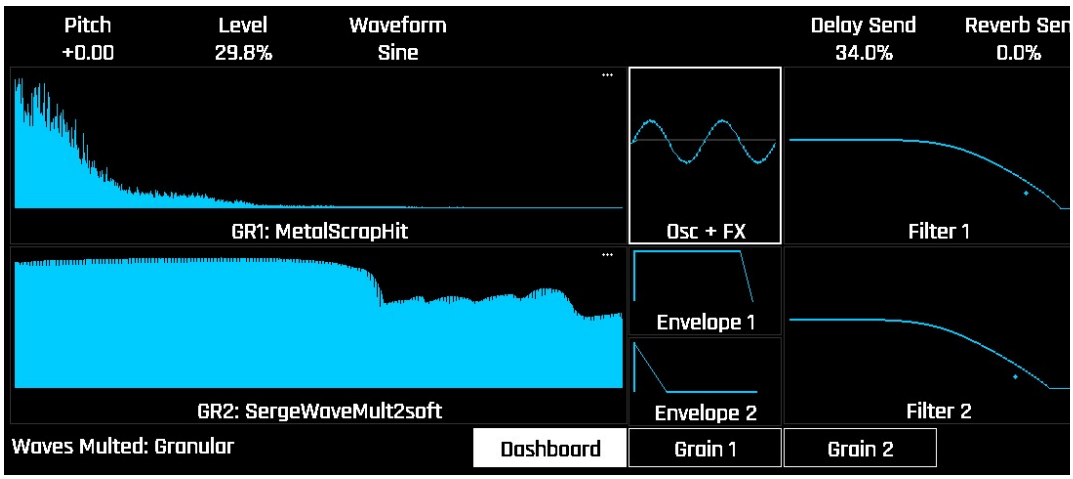
To configure a granular track's waveform oscillator and Delay and Reverb send levels:

5. Open the granular track dashboard, then tap the **Osc + FX** control to select it, as shown in the following screenshot.



6. To edit the parameters displayed across the top of the screen, adjust the knobs that correspond to each parameter.

   The following table describes the Osc + FX parameters and the knobs to which they are mapped when **Osc + FX** is selected in the granular track Dashboard.

Table: OSC + FX Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	N T
Pitch	1	-24 to +24 semitones	Transposition of granular patch oscillator	Y
Level	2	0 to 100% (-96dB to +12dB)	Level of granular patch waveform oscillator	Y
Waveform	3	Saw, Triangle, Square, Sine, Noise	Waveform of granular patch waveform oscillator	N
Pulse Widt (Waveform =Square)	4	0 to 100%	Only applies when Square is selected for the Waveform. The portion of the wave that will have a high signal. A value of 50% will create a wave that is high half the time and low half the time. A value of 75% will create a wave that is high 3⁄4 of the time and low 1⁄4 of the time.	Y
Delay Send	6	0 to 100%	Level of granular track audio sent to bento's Delay FX.	N
Reverb Send	7	0 to 100%	Level of granular track audio sent to bento's Reverb FX.	N

Editing Granular Track Envelopes

To edit this granular track feature...	See this section...
Modulation Sequencer	Editing the Granular Track Modulation Sequencer
Filter 1 and Filter 2	Editing Granular Track Filters
LFO 1 and LFO 2	Editing the Granular Track LFOs
Parameter Modulation	Editing Granular Track Modulation

Editing the Granular Oscillators

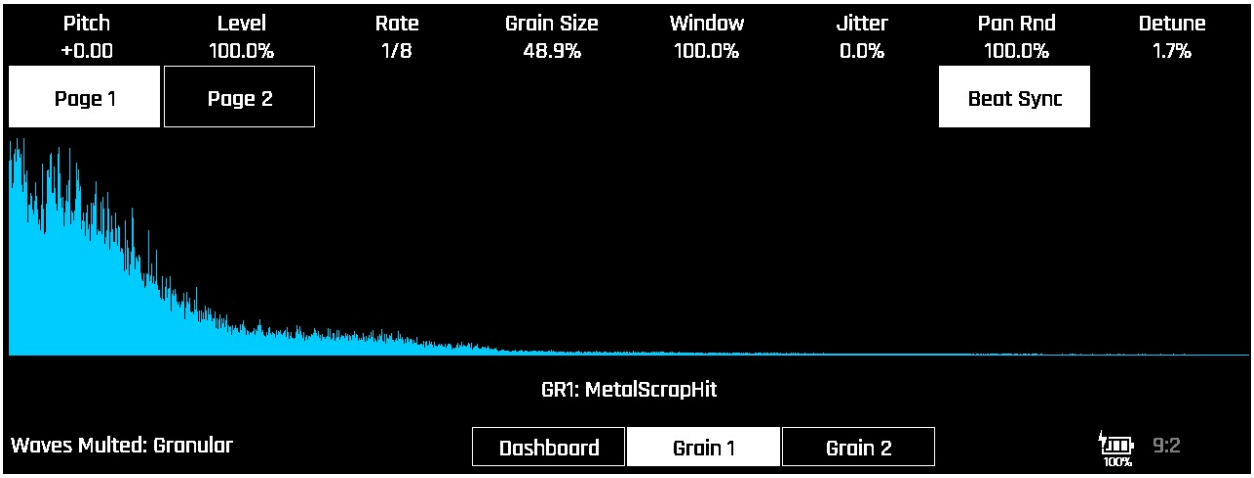
Granular-specific parameters control the unique aspects of granular synthesis, including grain characteristics, playback behavior, and oscillator interaction.

You can edit any of the granular oscillator parameters or you can replace either of the samples currently loaded into GR1 or GR2.

To edit granular oscillator parameters:

1. Open the granular track Dashboard, then tap Grain 1 or Grain 2 to open the editing screen for GR1 or GR2.

   The Grain editor screen opens.



   Like the Dashboard, the Grain 1 and Grain 2 screens display eight parameter names and values across the top of the screen. To edit any of these parameters, use the corresponding knob, directly above the parameter's location at the top of the screen (more or less).
   The Page 1 and Page 2 controls let you view and edit up to 8 granular oscillator parameters at a time.
   Note: The eight parameters that appear at the top of the granular track dashboard also appear in Page 1 of the Grain 1 and Grain 2 screens.

2. To view the eight granular oscillator parameters in Page 1, tap **Page 1** in the Grain editor screen.

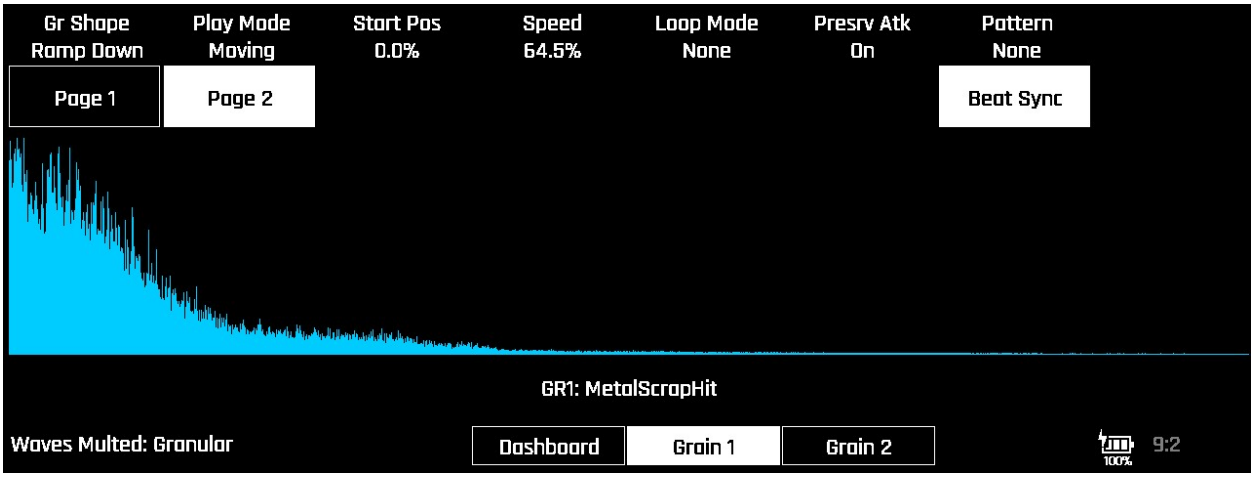
   The following table describes the granular oscillator parameters that you can edit while the Grain editor screen is in Page 1 view.

Table: Granular Oscillator Parameters in Page 1 of Grain Editor Screen

Parameter	**Knob**	**Range**	**Description**	**Modulation Target?**
Pitch	1	-24 to +24 semitones	How many semitones up or down you want to shift the pitch.	Yes
Level	2	0 to 100% (-96dB to +12dB)	The relative audio level of this waveform.	Yes
Density (Beat Sync= Off)	3	0 to 100%	When Beat Sync is OFF, the density controls the number of grains played per second. At the lowest end, you will get about 1 grain every few seconds. At 100% you will get maximum overlap of the grains.	Yes
Rate (Beat Sync=On)	3	1/64, 1/32T, 1/32, 1/16T, 1/16, 1/8T, 1/8, 1/4T, 1/4, 1/2T, 1/2, 1 bar, 2, bars, 4 bars, 8 bars (T = Triplet)	When Beat Sync is On, the musical interval between selection of new grains.	
Grain Size	4	0 to 100%	The length of the small segments of the WAV file that will be played, ranging from about 20 ms to about 1 second.	Yes

Parameter	Knob	Range	Description	Modulation Target?
Window	5	0 to 100%	The length of file on either side of the current playback position from which the grains are selected. When set to 0%, the grains are always pulled from the same place in the WAV file. When set to 100%, the grains are pulled from a window of about a few seconds around the current playback position.	Yes
Jitter	6	0 to 100%	How much random deviation is applied to the timing of the triggering of the grains. At 0%, it's machine like and smooth. At 100% it's chaotic.	Yes
Pan Rnd	7	0 to 100%	The stereo width of the random panning.	No
Detune	8	0 to 100%	The range of pitch deviation from the triggered note that may be used for each grain, from 0 to 1 semitone.	No
Beat Sync	N/A	On, Off	When ON, the Rate parameter controls how frequently grains are chosen in a way that is synced to musical intervals. When OFF, the Density parameter determines how frequently grains are chosen and how many are chosen.	No

3. Adjust the Page 1 parameters using the corresponding knobs.
4. To view the eight granular oscillator parameters in Page 2, tap **Page 2** in the Grain editor screen.



The following table describes the granular oscillator parameters that you can edit while the Grain editor screen is in Page 2 view.

Table: Granular Oscillator Parameters in Page 2 of Grain Editor Screen

Parameter	**Knob**	**Range**	**Description**	**Modulation Target?**
Gr Shape	1	Smooth, Ramp Down, Ramp Up	Grain envelope shape	No
Play Mode	2	Fixed, Moving	Controls whether the play head stays in one Fixed position, or is Moving through the WAV file at a rate controlled by the Speed parameter.	No
Play Pos (when Play Mode=Fixed)	3	0 to 100%	The current position of the play head which serves as the center of the grain selection window.	Yes

Parameter	Knob	Range	Description	Modulation Target?
Start Pos (when Play Mode=Moving)	3	0 to 100%	When Play Mode is Moving, this controls the starting position within the WAV file for selecting grains. See also Play Mode and Preserv Atk.	No
Speed	4	0 to 200%	When Play Mode is Moving, the speed at which the play head moves through the WAV file. 100% is normal audio playback speed.	Yes
Loop Mode	5	none, Forward, Bidirect	When Play Mode is Moving, this controls what happens when you reach the end of the sample. If None, the play position stays at the end of the file. If Forward, it loops back to the beginning of the WAV file. If Bidirect, it starts playing in reverse, and then bounces forward again when it reaches the other end.	No
Presrv Atk	6	Off, On	When ON, the playback will draw grains from the beginning of the WAV file for the attack. It will then select grains from the Start Pos (if Moving) or Play Pos (if Fixed) when the attack is complete. When OFF, playback will begin at Start Pos or Play Pos.	No
Pattern	7	None, Octaves, Fifths	Rhythmic grain patterns. When set to Octaves or Fifths, the sound engine will add pitch variations in increments of +/- 12 semitones for Octaves, or +/- 7 semitones for Fifths.	No
Beat Sync	N/A	On, Off	When ON, the Rate parameter is used to	No

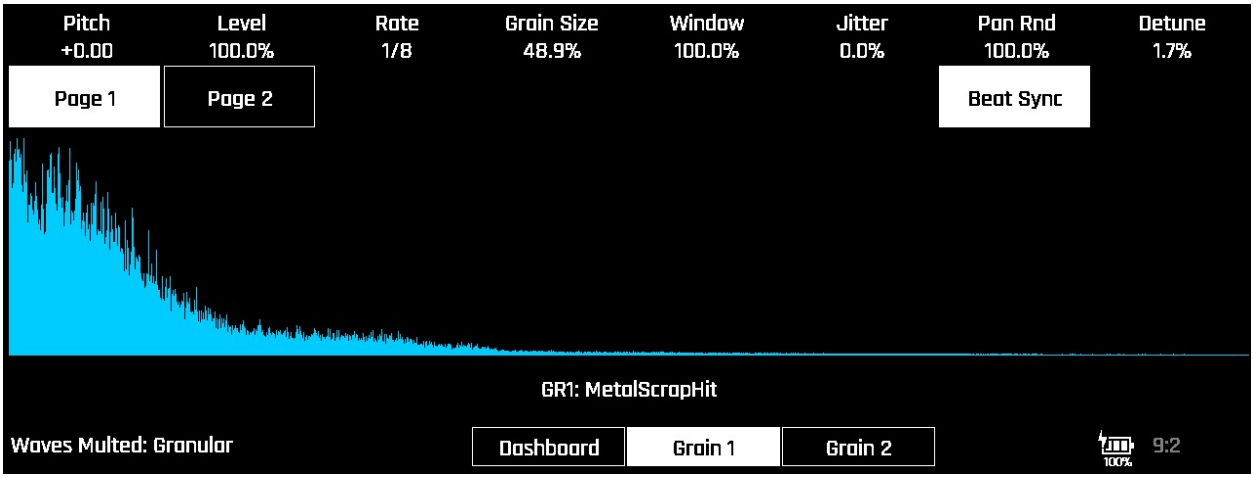
Parameter	Knob	Range	Description	Modulation Target?
			control how frequently grains are chosen in a way that is synced to musical intervals. When OFF, the Density parameter is used to select how frequently grains are chosen and how many are chosen.	

5. Adjust the granular oscillator parameters in Page 2 with the corresponding knobs.

To load a different sample into a granular oscillator:

1. Open the granular track Dashboard, then tap Grain 1 or Grain 2 to open the editing screen for GR1 or GR2.

   The Grain editor screen opens.

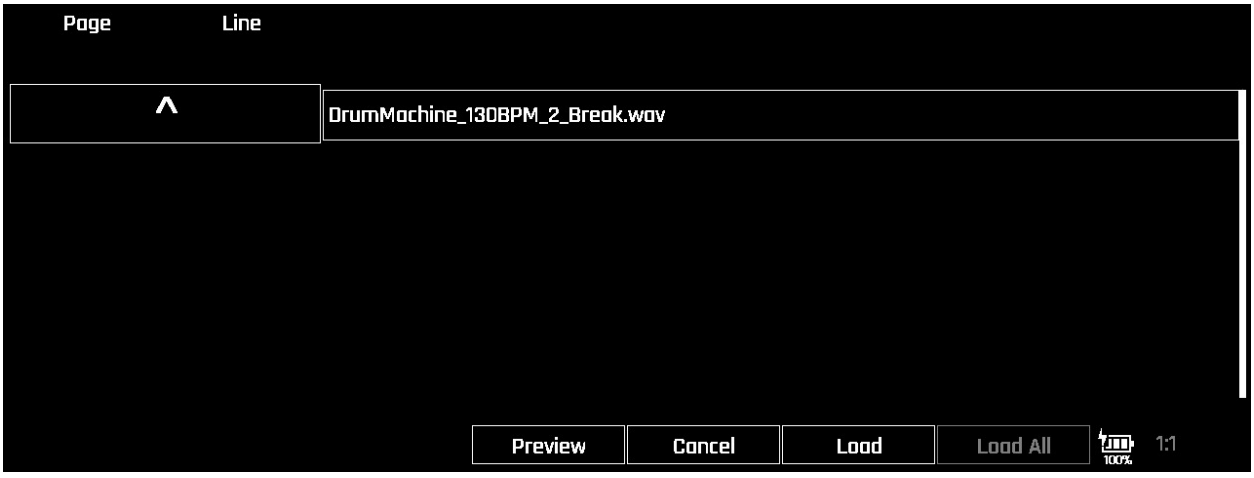


2. Double-tap the sample waveform. The sample browser screen opens.

3. Tap **^** to go up to the root of the microSD card, then browse for a different sample to load into your chosen granular oscillator.

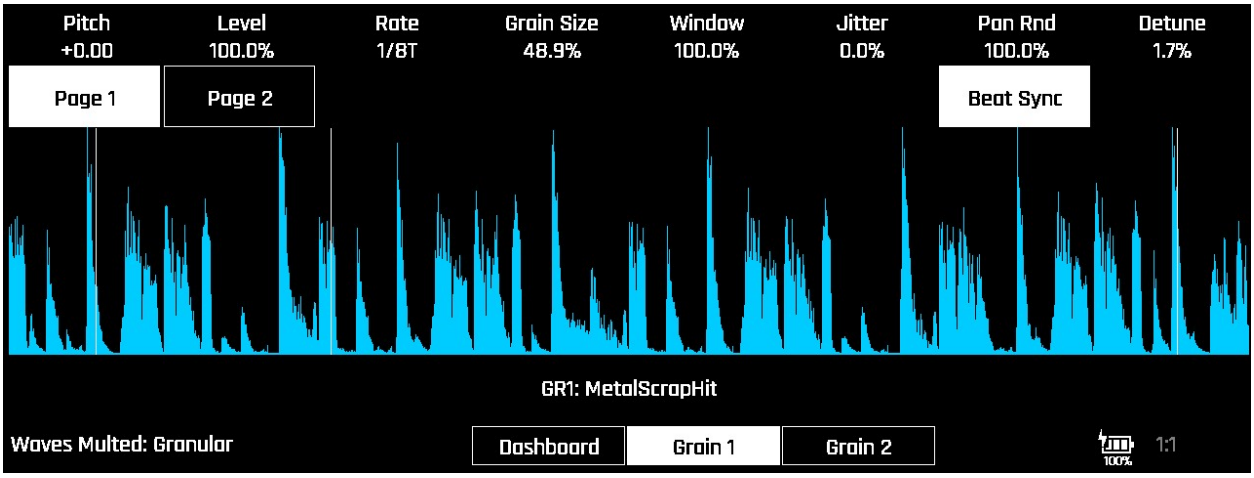
   You can navigate by double-tapping any folder you want to open or you can use Knob 2 to select a folder and then tap **Load**.

4. When you find a sample that interests you, tap **Preview** to turn it on (if necessary), then tap the sample you are considering loading.



5. The sample starts playing. If you don't want to load the sample or don't want to continue previewing it, continue browsing for other samples and previewing them.

6. When you decide on which sample you want to load, press **Load**. The Grain edit screen reopens with the new sample loaded into the granular oscillator.



Editing Oscillator 3 Settings and FX Send Levels

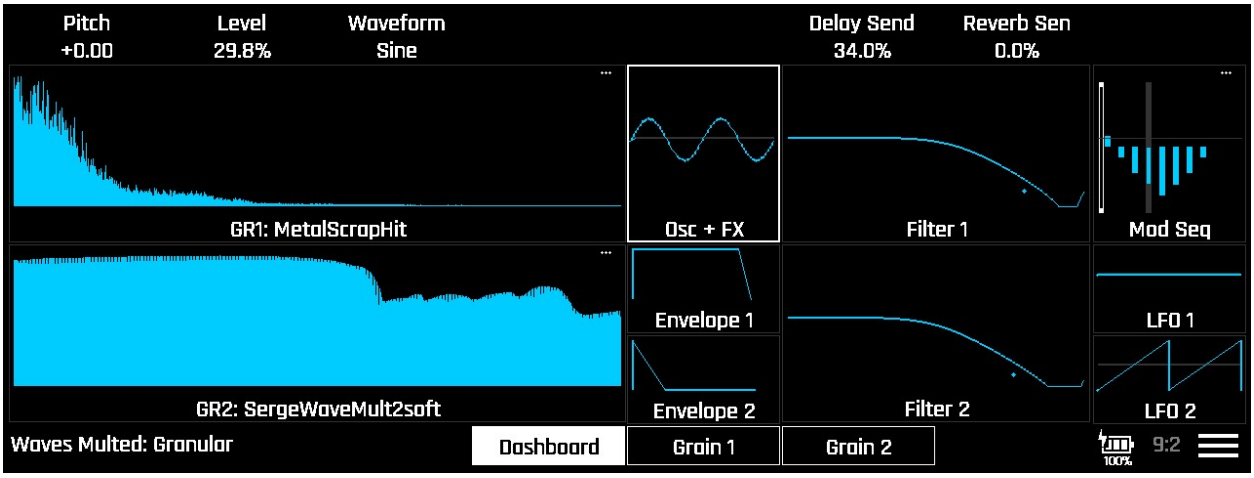
Granular tracks include a third oscillator that produces a traditional waveform, such as triangle, sine wave, sawtooth, noise, and square wave with variable pulse width.

While its relatively simple waveforms may make the third oscillator seem out of place when compared with bento's two granular oscillators (per voice), it can become very useful as a tonal anchor against the backdrop of dozens of overlapping grains jumping from one random point in a sample file to another.

bento's granular track Dashboard groups the waveform oscillator's parameters with the Delay and Reverb send level parameters for the entire granular track.

To configure a granular track's waveform oscillator and Delay and Reverb send levels:

7. Open the granular track dashboard, then tap the **Osc + FX** control to select it, as shown in the following screenshot.



8. To edit the parameters displayed across the top of the screen, adjust the knobs that correspond to each parameter.

   The following table describes the Osc + FX parameters and the knobs to which they are mapped when **Osc + FX** is selected in the granular track Dashboard.

Table: OSC + FX Parameters Mapped to bento Knobs

Parameter	**Knob**	**Range**	**Description**	**Modulation Target?**
Pitch	1	-24 to +24 semitones	Transposition of granular patch oscillator	Yes
Level	2	0 to 100% (-96dB to +12dB)	Level of granular patch waveform oscillator	Yes
Waveform	3	Saw, Triangle, Square, Sine, Noise	Waveform of granular patch waveform oscillator	No
Pulse Widt (Waveform =Square)	4	0 to 100%	Only applies when Square is selected for the Waveform. The portion of the wave that will have a high signal. A value of 50% will create a wave that is high half the time and low half the time. A value of 75% will create a wave that is high 3⁄4 of the time and low 1⁄4 of the time.	Yes
Delay Send	6	0 to 100%	Level of granular track audio sent to bento's Delay FX.	No
Reverb Send	7	0 to 100%	Level of granular track audio sent to bento's Reverb FX.	No

Editing Granular Track Envelopes

Each granular track voice includes two ADSR envelopes, Envelope 1 and Envelope 2.

In granular tracks, Envelope 1 always controls the VCA but it can also be used as a modulation source. Envelope 2 is only used as a modulation source.

To edit envelope parameters:

1. Open the granular track dashboard, then touch either **Envelope 1** or **Envelope 2**.

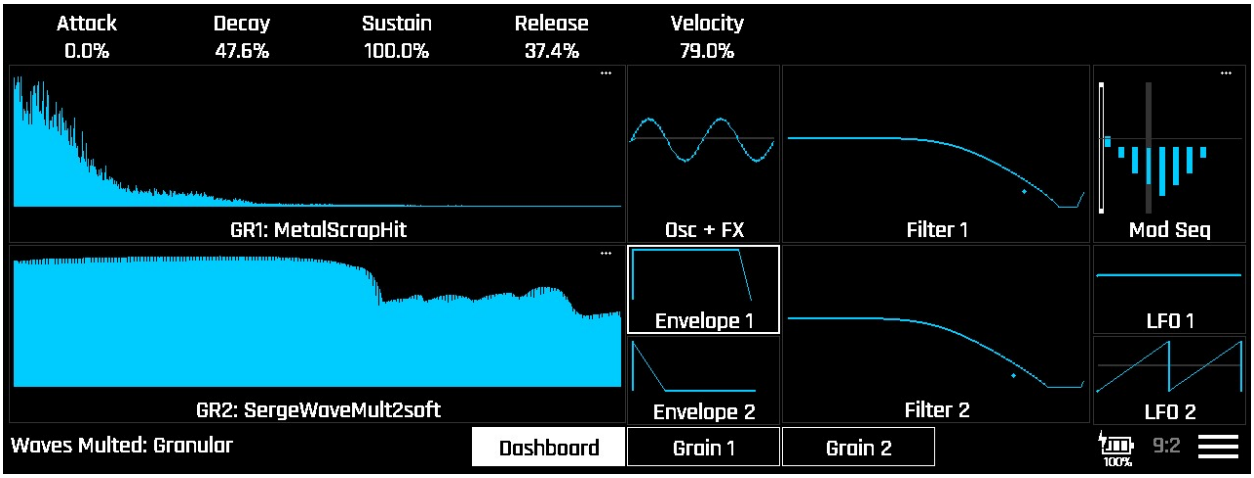


Figure: Envelope 1 selected for editing in Granular Track Dashboard

The five ADSR and Velocity parameters at the top of the screen represent the settings of the currently selected Envelope control.

The following table describes the envelope parameters for each of the two envelopes.

Table: Granular Track Envelope Parameters

Parameter	Knob	Range	Description	Modulation Target?
Attack	1	0 to 100% 100% = 9 seconds	Time to reach peak level after note trigger	Yes
Decay	2	0 to 100% 100% = 38 seconds	Time to fall from peak to sustain level	Yes
Sustain	3	0 to 100%	Level maintained while note is held	Yes
Release	4	0 to 100% 100% = 38 seconds	Time to fade to silence after note release	Yes
Velocity	5	-100 to 100%	Velocity sensitivity amount	Yes

2. Adjust envelope parameters using knobs 1-5 and play the track from the pads or over MIDI to hear the impact of the envelopes on the sound and how the envelope shape displayed in the Dashboard changes.

Remember: Envelope 2 only serves as a modulation source in granular tracks. Only Envelope 1 affects the VCA in granular tracks. If you edit Envelope 2 but don't hear any changes in a granular track's sound, it could be that the track doesn't use Envelope 2 for modulation.

Editing Granular Track Filters

Each granular track voice includes two filters, Filter 1 and Filter 2, which can be independently configured as Low-pass, High-pass, Band-pass, or Notch filters and configured in series or in parallel when processing a mix of the two granular oscillators and waveform oscillator.

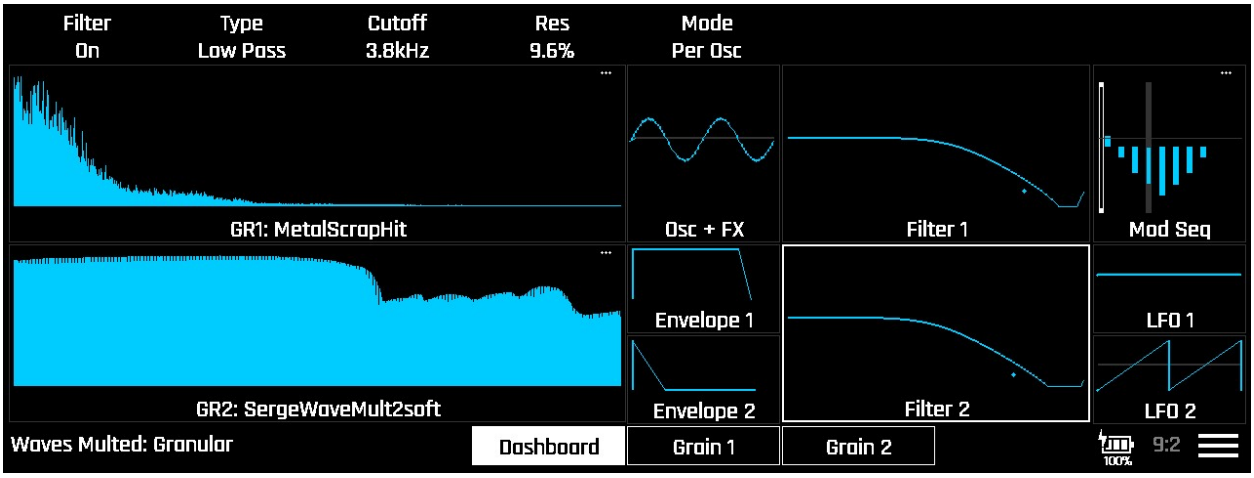


Figure: Filter editing screen showing frequency response and parameter controls

To edit filter parameters:

1. Open the granular track dashboard.
2. Tap **Filter 1** or **Filter 2** to select the filter you want to edit.

   The five parameters at the top of the screen represent the settings of the currently selected Filter.
3. Adjust filter parameters using knobs 1-8.
4. Listen to the filtering effect in real-time and notice how the selected filter's response curve changes in the Dashboard.

   The following table describes the filter parameters mapped to Knobs 1-8 when one of the filters is selected.

Table: Granular Track Filter Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Filter	1	On/Off	Enables or disables the selected filter.	No
Type	2	Low Pass, High Pass, Band Pass, Notch	The type of filter that will be applied.	No
Cutoff Frequency (Low Pass or High Pass)	3	20Hz to 20.4kHz	For High Pass and Low Pass filters, the frequency where the filter begins to attenuate the signal.	Yes
Center Frequency (Band Pass or Notch)	3	20Hz to 20.4kHz	For Notch and Band Pass filters, the frequency at the middle of the notch or band. This is the frequency that will be most attenuated.	Yes
Res (Low Pass or High Pass)	4	0% to 100%	For High Pass and Low Pass filters, controls how much of a boost is given to the signal near the cutoff frequency.	Yes

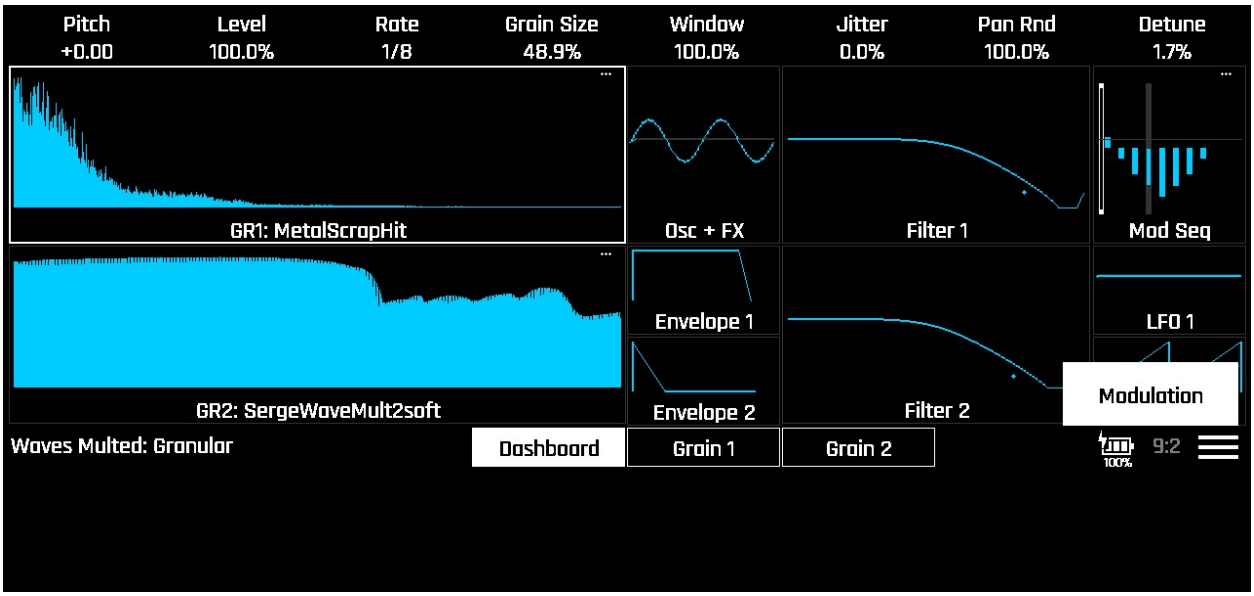
Parameter	Knob	Range	Description	Modulation Target?
Width (Band Pass only)	4	0% to 100%	For Band Pass filters, the width of the frequency range around the center point included in the notch or band.	Yes
Q (Notch)	4	0% to 100%	For Notch filters, Q controls the level of attenuation at and around the center frequency.	Yes
Mode (Filter 2 only)	5	Serial, Parallel, or Per Osc	Determines how bento routes granular track oscillator signals through Filter 1 and Filter 2 before reaching the VCA. When Mode is “Serial” or “Parallel,” all three oscillators are mixed and then routed through Filter 1 and Filter 2 configured in series or parallel. When Mode is “Per Osc,” GR1 is routed through Filter 1, GR2 is routed through Filter 2, and the waveform oscillator is routed directly to the VCA, bypassing both filters.	No

Editing Granular Track Modulation

Each bento Track includes a central Modulation screen within which you can configurate all modulation settings.

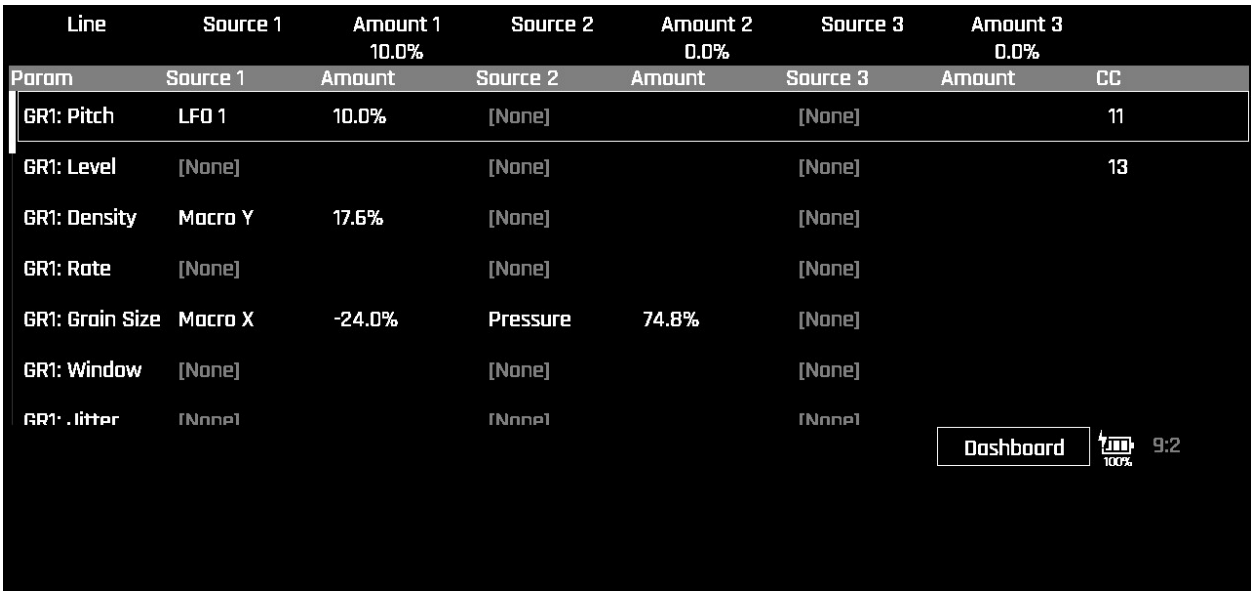
To configure modulation in a granular track:

1. Open the granular track dashboard, then tap the **Menu** icon in the lower right corner of the screen. The Menu opens, displaying a single option, Modulation.

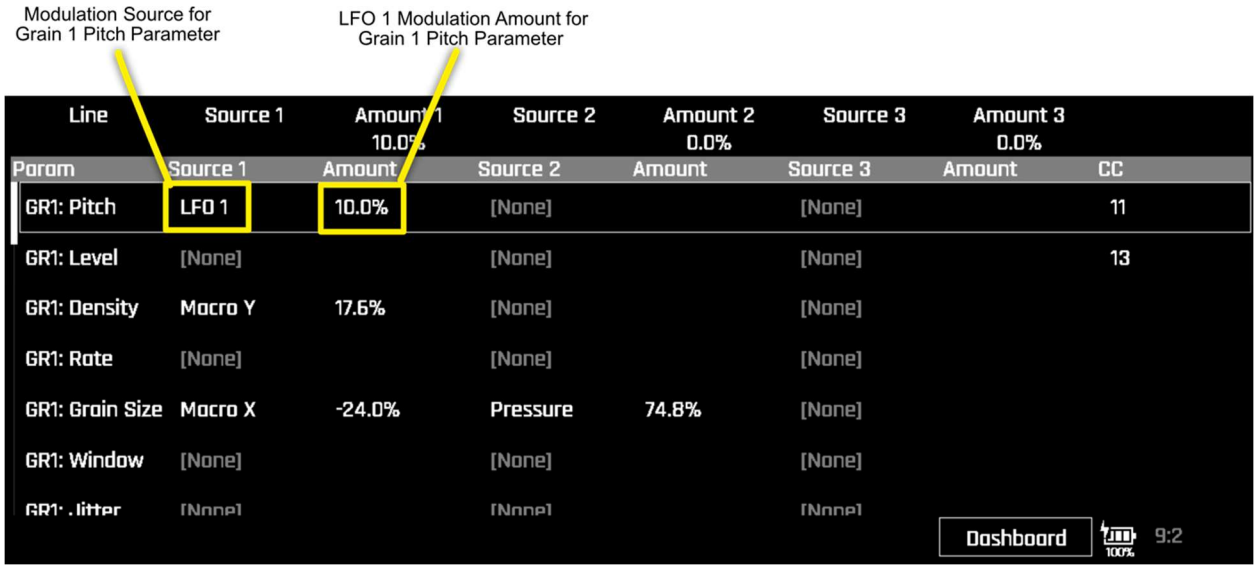


2. Tap **Modulation**.

   The Granular Track Modulation screen opens.



The first column in the Modulation screen contains the name of every granular track parameter that can be a modulation “target.” Columns 2 through 7, let you set up three modulation sources and three modulation amounts for the modulation target of the selected row.



3. To see the complete list of modulation targets in the Modulation screen you can either:

   - swipe the screen up or down, or
   - turn Knob 1 to scroll up and down through the Modulation screen. turn Knob 1 to scroll up and down through the Modulation screen. turn Knob 1 to scroll up and down through the Modulation screen.

4. To see if a specific granular track parameter is a modulation target, refer to the appropriate parameter tables elsewhere in this chapter and check the Modulation Target? column for the parameter you want to modulate.

   The following table describes the parameters on the Modulation screen.

Table: Modulation Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Line	1	GR1/GR2: Pitch, Level, Density, Rate, Grain Size, Window, Jitter, Play Pos, Speed Osc: Pitch, Level, Pulse Widt Filt1/Filt2: Freq/Cen, Res/Widt/Q Env1/Env2: Attack, Decay, Reelase LFO1/LFO2: Rate, Depth	Moves the Modulation screen's line selection through the parameters listed in the first column. Once you have selected a modulation target, you can configure up to 3 modulation sources and modulation amounts with knobs 2-7.	No
Source 1	2	Velocity, Pressure, Envelope 1, Envelope 2, LFO 1, LFO 2, Mod Seq. Key, Mod Wheel, Macro X, Macro Y	Modulation Source (1 of 3)	No
Amount 1	3	-100% to +100%	Modulation Amount (1 of 3)	No
Source 2	4	Velocity, Pressure, Envelope 1, Envelope 2, LFO 1, LFO 2, Mod Seq. Key, Mod Wheel, Macro X, Macro Y	Modulation Source (2 of 3)	No
Amount 2	5	-100% to +100%	Modulation Amount (2 of 3)	No

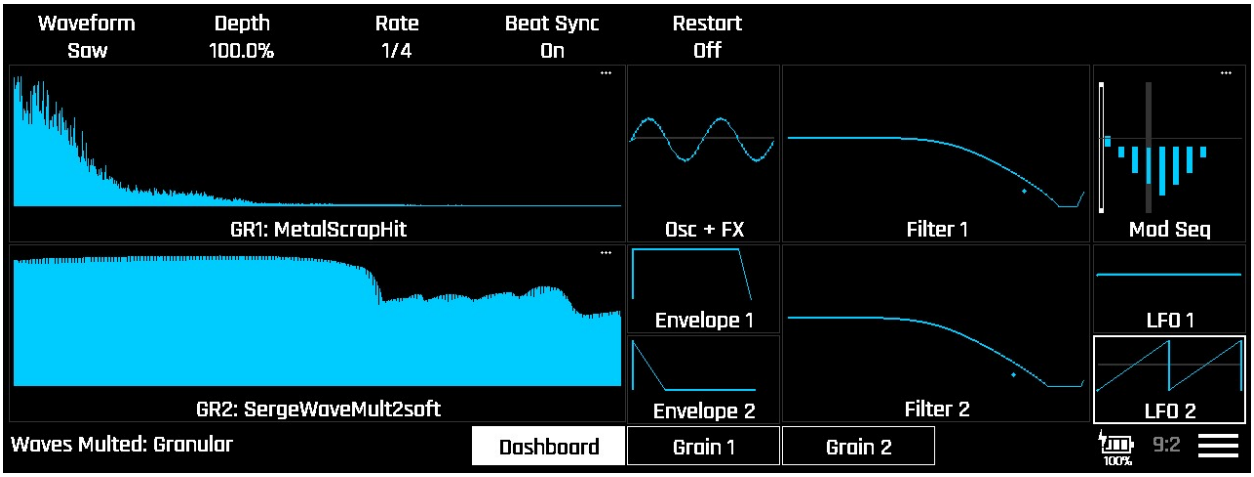
Parameter	Knob	Range	Description	Modulation Target?
Source 3	6	Velocity, Pressure, Envelope 1, Envelope 2, LFO 1, LFO 2, Mod Seq. Key, Mod Wheel, Macro X, Macro Y	Modulation Source (3 of 3)	No
Amount 3	7	-100% to +100%	Modulation Amount (2 of 3)	No

Editing the Granular Track LFOs

bento's two LFOs serve as internal modulators. They are great for adding life and variety to any sound. You can choose a different waveform for each of the two LFOs in the granular track dashboard and then apply them as modulation sources in the granular track's Modulation screen.

To configure one of the LFOs in a granular track:

1. Open the granular track dashboard, then tap **LFO 1** or **LFO 2** to select the LFO for editing.



The following table describes the parameters mapped to Knobs 1-8 when one of the LFOs is selected.

Table: Granular Track LFO Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Waveform	1	Saw, Rev Saw, Triangle, Pos Tri, Sine, Pos Sine, Square, Pos Square, Random	The shape of the wave used by the low frequency oscillator.	No
Depth	2	0 to 100%	The amplitude of the oscillating wave. Set this to 0 to disable the LFO.	Yes
Rate	3	When Beat Sync = Off: 0 to 100% (~0.1Hz to 12 Hz.) When Beat Sync=On, rate is specified in beats and measures: 8, 4, 2, 1, *1*⁄2, *1*⁄2 T, *1*⁄4, *1*⁄4 T, 1/8, 1/8 T, 1/16, 1/16 T, 1/32, 1/32 T, 1/64 bars	The frequency of the LFO.	Yes
Beat Sync	4	Off, On	Controls the behavior of the LFO Rate parameter. When Beat Sync=On, the LFO synchronizes with bento's transport.	No
Restart	5	Off, On	When On, the LFO restarts each time you trigger the track from a pad.	No

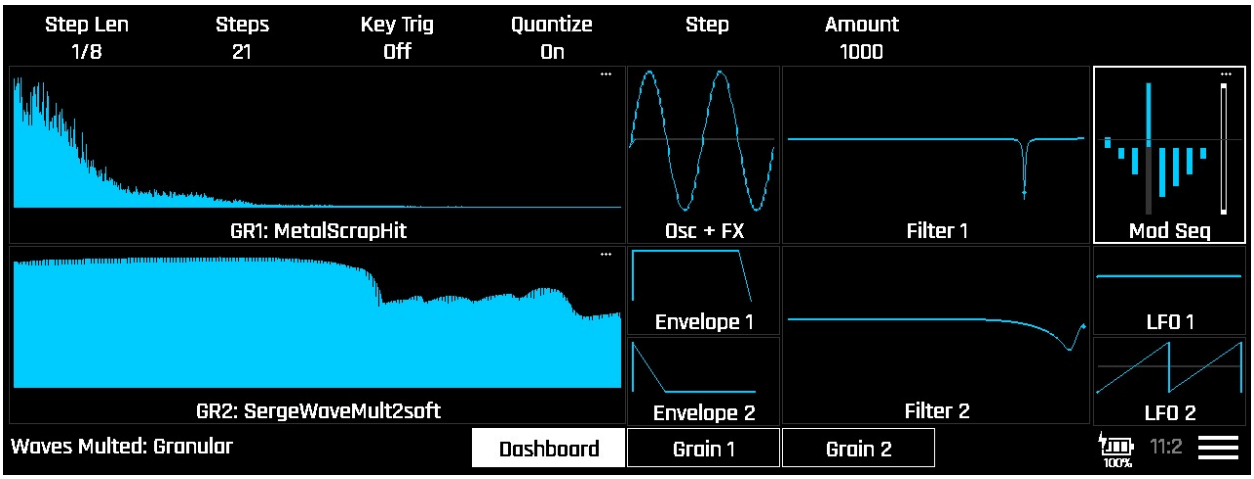
Editing the Granular Track Modulation Sequencer

The Modulation Sequencer is a sequencer reserved for granular track parameter modulation. It is another great way to add some life and variety to the sound. You can set the number of steps and the step length. You can also turn on the Quantize option to snap the values to pitch frequencies.

Unlike bento's track sequencers, the Modulation Sequencer runs whenever you play the granular track, even if bento's transport is stopped.

To configure the Modulation Sequencer in a granular track:

1. Open the granular track dashboard, then tap **Mod Seq** to select the Modulation Sequencer for editing.

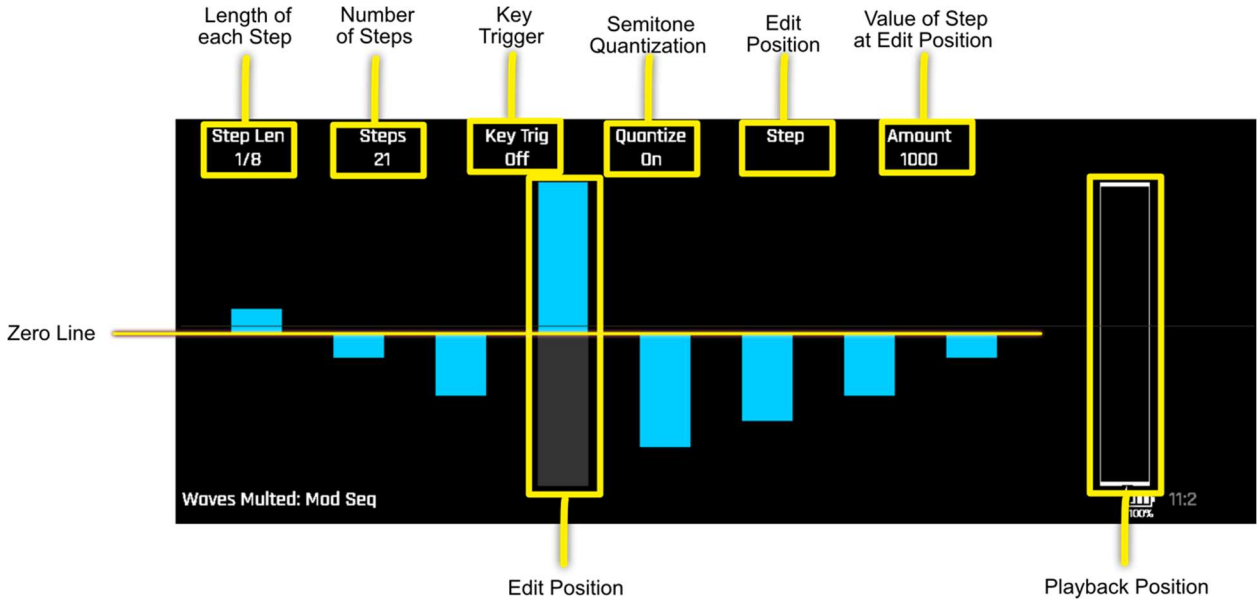


   The granular track Dashboard displays the Modulation Sequencer parameters across the top of the screen. You can edit the parameters from the Dashboard and observe the Mod Sequence's step levels change in the Mod Seq control's thumbnail. You can also navigate to the Modulation Sequencer screen for a magnified view of the step levels.

2. To open the Modulation Sequencer screen, do one of the following:

   - Press the RIGHT arrow button, or
   - Double-tap the Mod Seq control.

   The magnified view of the Modulation Sequencer Opens.
   The Modulation Sequencer screen displays the same parameters across the top of the screen that were visible in the Dashboard, and it also presents the same sequence steps as the ones in the Mod Seq control's thumbnail, but the magnified view makes it much easier to detect changes in each step's level as you edit them. You can also drag your finger across the screen to draw the sequence.



The following table describes the Modulation Sequencer's parameters mapped to Knobs 1-8 when the Mod Seq is selected in the granular track Dashboard or when the Mod Seq screen is open.

Table: Modulation Sequence Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Step Len	1	1/64, 1/32T, 1/32, 1/16T, 1/16, 1/8T, 1/8, 1/4T, 1/4,1/2T, 1/2, 1 bar, 2 bar (T=Triplet)	The length of each step in the sequence.	No
Steps	2	2 to 32	The number of steps in the sequence.	No
Key Trig	3	Off, On	When On, the sequencer is restarted when each note begins. When Off, it plays constantly in the background and resumes at current position when a new note is triggered.	No
Quantize	4	Off, On	When On, the levels of the sequencer are quantized to 12 distinct values (plus the off value). This allows for precise semitones in a pitch modulation.	No
Step	5	1 to 32	Select the step to edit.	No
Amount	6	-1000 to +1000	Changes the value of the selected step.	No

3. To return to the granular track dashboard from the Mod Seq screen, press **INST** or **Left Arrow**.
4. Note that the knobs continue to perform the same functions in the Dashboard when Mod Seq is selected as they did in the Modulation Sequencer screen.
5. If the Modulation Sequencer is not already modulating anything, go to the Modulation screen and apply it as a modulation source.

For example, try modulating one of the Filter's cutoff or center frequency, or modulating the waveform oscillator's pulse width. You may have to change the oscillator's Waveform to "Square" to hear the results, but it's well worth the effort!

Editing Granular Track Configuration Settings

Track configuration settings control MIDI input, audio routing, and other track-level parameters that affect how the granular track integrates with your project.

To access granular track configuration settings:

1. Select the granular track on the Tracks screen.
2. Press the **RIGHT** arrow button to open the **Track Configuration** screen.

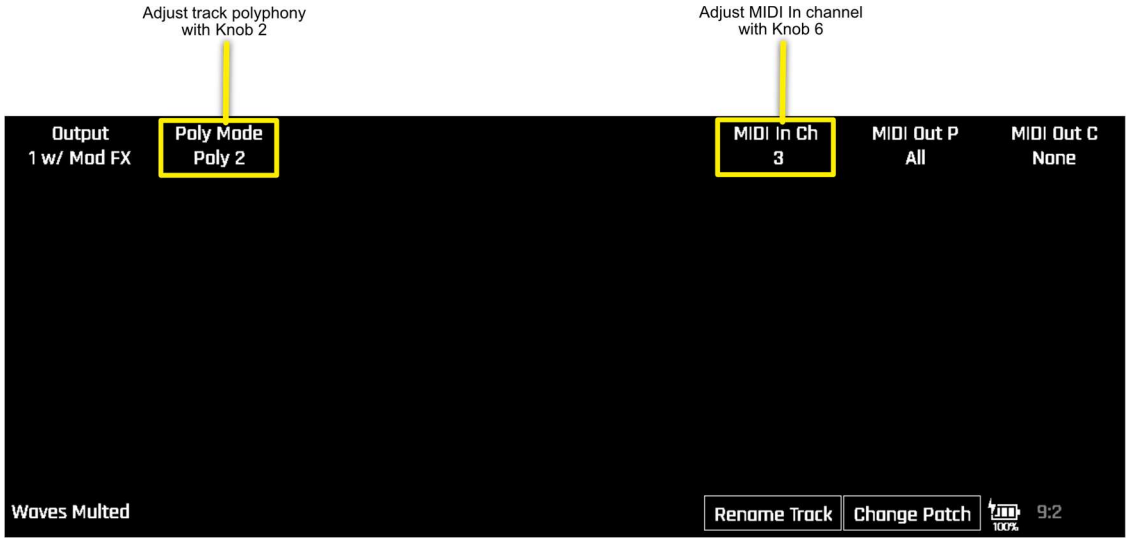


Figure: Track configuration screen showing MIDI and routing settings

The following table describes the parameter that you can edit from the Track Configuration screen.

Table: Track Configuration Parameters

Parameter	Knob	Range	Description	Modulation Target?
Output	1	1, 1 w/ Mod FX, 2, 3	Audio routing destination	No
Poly Mode	2	Mono, Poly 2, Poly 3, Poly 4, Poly X	Maximum simultaneous notes. Poly X will make use of all notes available.	No
MIDI In Ch	6	None, 1 – 16	Input MIDI channel	No
MIDI Out P	7	ALL (1 and 2 are not functional values)	MIDI Output port	

Parameter	Knob	Range	Description	Modulation Target?
MIDI Out C	8	None, 1 – 16	Input MIDI channel	No

Configuration settings save with the project and affect how the granular track responds to external control and integrates with other project elements.

Creating New Granular Tracks

Creating new granular tracks allows you to load custom samples and build instruments tailored to your creative needs. You can learn a lot about bento's granular tracks by exploring the granular tracks in the projects that 1010music includes on bento's factory microSD card, or by loading the factory granular tracks patches into an empty track, and then exploring the granular track parameters with the techniques described in this chapter.

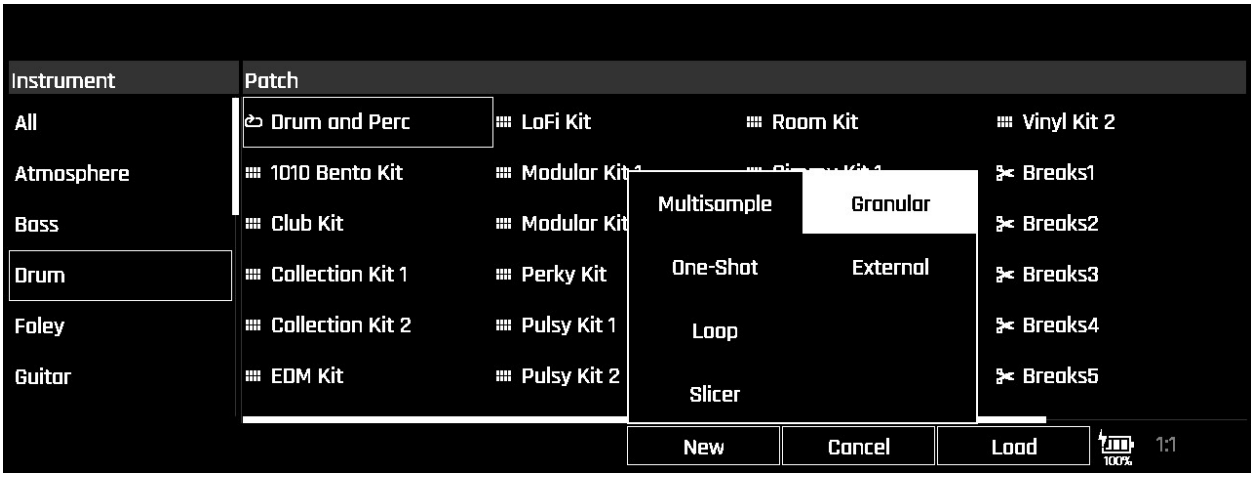
At some point, you may decide to create your own granular tracks, starting from a blank slate. Fortunately, bento makes it easy to create new granular tracks with a set of useful, but not overwhelming parameter settings that are perfect for making a fresh start.

To create a new granular track with default settings:

1. Press **TRACKS** to open the Tracks screen.
2. If the project has no empty tracks, you could cut one of the currently loaded tracks by choosing **Cut Track** from the Tracks screen's Menu in the lower right corner of the Tracks screen, or you could create a completely new project with 8 empty tracks. Either way, make sure that your project doesn't already include a granular track before you try to create a new one because bento projects can only include one granular track.

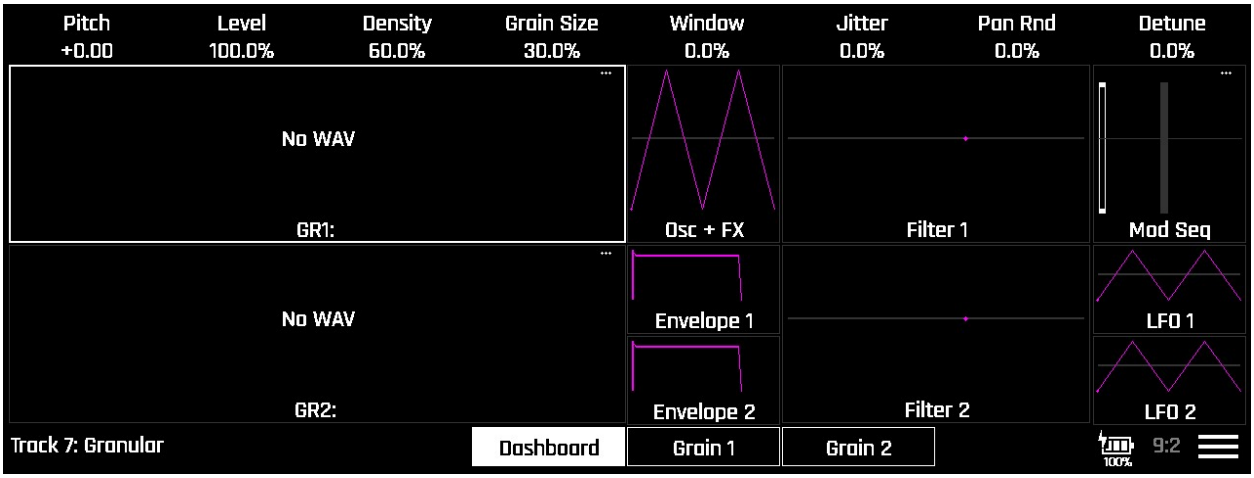
   Reminder: If you're not sure that your current project is already saved on the microSD card, this would be as good a time as any to back up your current bento project! For tips on saving copies of bento projects, see Chapter 4, Managing Projects.
3. When you have found an empty track, double-tap the empty track. The patch browser screen opens. At the bottom of the screen, are the **New**, **Cancel**, and **Load** controls.

   Tap **New** to create a custom track. A menu of bento track types opens.



If the Granular option is disabled, your project probably still has a granular track.

4. Tap **Granular** in the options menu. The granular track Dashboard opens with default parameter settings and no samples loaded into either GR1 or GR2, indicated by “No WAV” displayed where there should be a waveform.



5. Load samples into GR1 or GR2 using the sample browser:

   a) Navigate to the Grain 1 page by either tapping Grain 1 in the Dashboard or double-clicking the GR1 control area in the Dashboard. The Grain editor screen displays “Double-tap here to select a WAV” in the middle of the screen.

   b) Double-tap in the middle of the Grain editor screen. The sample browser screen opens.

   c) Browse for an interesting sample on the microSD card, then press Preview to hear it.

   d) When you decide which sample to load, you can load it by doing one of the following:

      - tap it to select the sample you want to load and then press **Load**, or
      - double-tap the sample you want to load.

   When the granular track Dashboard reopens, it displays the new sample waveform loaded in the granular oscillator.
   bento’s default parameters for new granular tracks are great for getting started, but you will probably find that they don’t produce the kind of sounds that you planned to hear.

6. Load other samples and adjust the granular track’s parameters. You’ll find help with bento’s granular synth editing capabilities in the previous sections in this chapter.

Best Practices for Granular Tracks

Effective granular track design balances technical understanding with creative experimentation. These practices help you achieve professional results while maintaining musical coherence.

Sample Selection Strategy

Choose samples with rich harmonic content and interesting internal textures. Percussive samples work well for rhythmic granular effects, while sustained tones excel for atmospheric textures. Longer samples provide more material for granular exploration, but shorter samples can create focused, intense effects.

Consider the spectral content of your samples. Samples with complex harmonic structures yield more interesting granular textures, while simple waveforms may sound repetitive when granulated. Field recordings and acoustic instruments often provide excellent source material due to their natural complexity.

If a sample is longer than 30 seconds, the granular engine will only use the first 30 seconds of the sample.

Parameter Relationship Management

Understanding how granular parameters interact helps you create cohesive sounds. Start with moderate grain sizes and densities, then adjust individual parameters to hear their specific effects. Small grain sizes create smooth, pitch-shifted textures, while large grains preserve more of the original sample character.

Position and Window parameters work together to control sample exploration. Low Window values create focused effects, while high Window values produce random, evolving textures. Use Window sparingly for realistic sounds, generously for abstract textures.

Modulation Strategy

Route modulation sources to multiple granular parameters for complex, evolving sounds. LFO modulation of position creates sweeping effects, while modulation of density produces rhythmic pulsing. Envelope modulation adds dynamic response to your playing, making the instrument feel more responsive and musical.

Consider the musical context when setting modulation amounts. Subtle modulation works well in ensemble situations, while dramatic modulation can create solo textures that capture listener attention. Layer different modulation sources for rich, complex movement.

Performance Optimization

Balance CPU usage by managing grain density and overlap. Higher densities create smoother textures but require more processing power. Monitor your system's performance and adjust parameters accordingly, especially when using multiple granular tracks in a project.

Select lower values for the Poly Mode setting to reduce the number of simultaneous notes the granular engine needs to manage.

Exploring Loop Tracks

Loop tracks provide rhythmic foundation and textural layering capabilities through collections of audio loops that can be triggered, layered, and manipulated in real-time. Each Loop track contains up to 16 individual loops that you can trigger independently or combine for complex rhythmic arrangements.

This chapter covers essential techniques for working with Loop tracks, from understanding their playback capabilities through recording new loop content. You'll learn how to organize loop collections, control playback behavior, record external audio sources, and integrate loop content into dynamic musical arrangements.

To do this...	read...
Understand how Loop tracks enable rhythmic loop playback	Understanding Loop Track Capabilities
Trigger and control loops with pads and MIDI	Playing Loop Tracks
Manage loop banks and record new loop content	Editing Loop Tracks
Record new loops from external sources and internal submixes	Recording New Samples in Loop Tracks
Set up new loop-based instruments	Creating New Loop Tracks
Optimize loop selection and recording workflows	Best Practices for Loop Tracks

Unlike One-shot tracks that play individual samples once or Multisample tracks that provide chromatic performance, Loop tracks specialize in continuous, repeating audio content that forms the backbone of rhythmic arrangements. The loops can play independently or in synchronized combinations, providing flexible foundation elements for your musical compositions.

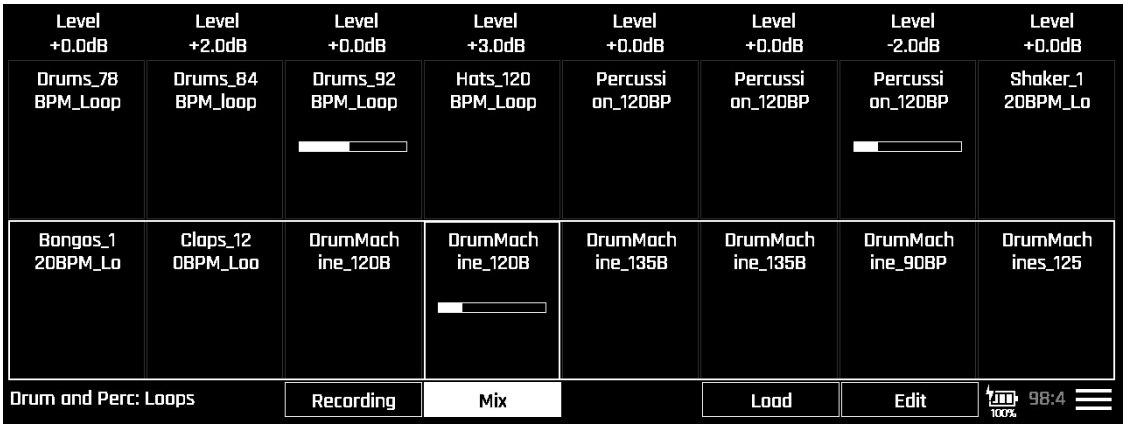
Understanding Loop Tracks

Loop tracks organize audio loops into a 16-slot bank where each pad can trigger a specific loop for continuous playback. The loops can play independently or in combination, enabling you to build complex rhythmic textures by layering multiple loop elements.

Loop tracks excel at providing rhythmic foundation, adding textural layers, and creating evolving arrangements through real-time loop triggering and layering. The ability to start and stop individual loops during performance makes them particularly effective for live arrangement and dynamic musical development.

You can use bento's pads to cue loops to start or stop playing in sync with bento's transport, giving you direct access to bring loops in and out of live performances or recording environments.

Loop tracks are the only type of track that lets you record new WAV files directly into any of the Sample Bank's 16 loops.



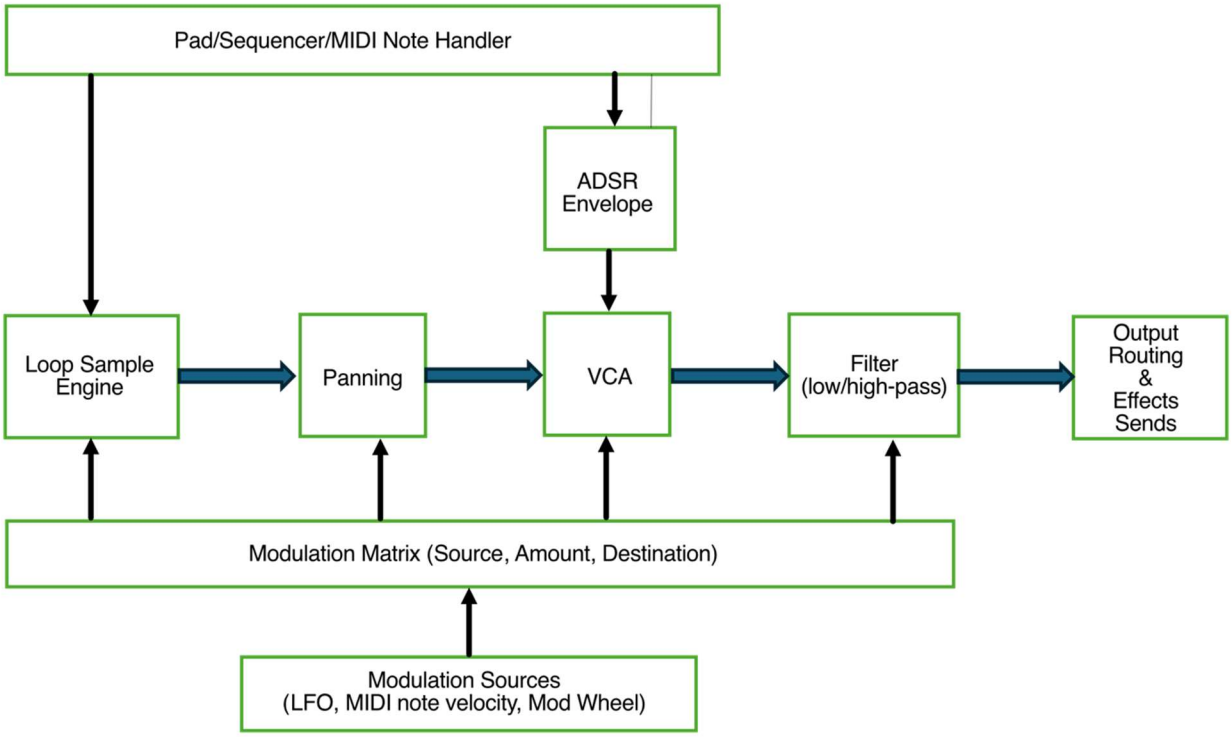
Loop track interface showing 16-slot bank with loaded loops

Loop tracks treat each loop as an independent instrument with its own sample, playback settings, filter, envelope, LFO, modulation settings, and individual levels, panning, and effects sends.

The loop sample engine provides transport synchronization so that loops stay in time with your project tempo, regardless of their original recording speed. This synchronization enables you to combine loops from different sources while maintaining tight rhythmic coordination. However, deviations in tempo of greater than 10 BPM between the sample and the project tempo may result in low sound quality.

Individual Loops and Screens

Each loop has its own sample, playback settings, filter, envelope, LFO, modulation settings and even their own individual FX sends.



Loop Track Screens

Multisample tracks provide four main control screens for comprehensive parameter editing and sample management.

Table: Loop Track Screens

Screen	Description
Loop Sample Bank	Displays 16 loops, with visual indicators for loops with samples loaded and progress bars for loops currently playing. Each loop shows the loaded sample name and provides access to the corresponding loop Dashboard for configuring loop voice settings. You can also adjust the levels of the individual loops to balance their mix.
Loop Track Config screen	Manages MIDI routing and audio output assignment.
Loop Dashboards	Displays voice parameters and performance controls organized into four sections (Main, Config, Env, LFO).
Loop WAV screen	Displays the waveform of one of the track's samples and allows you to turn Looping on or off.
Loop Modulation screen	Provides a central location for routing modulation sources to modulation targets, and for setting a modulation amount for each.

Navigation between loop track screens and individual loop Dashboards uses standard bento navigation patterns.

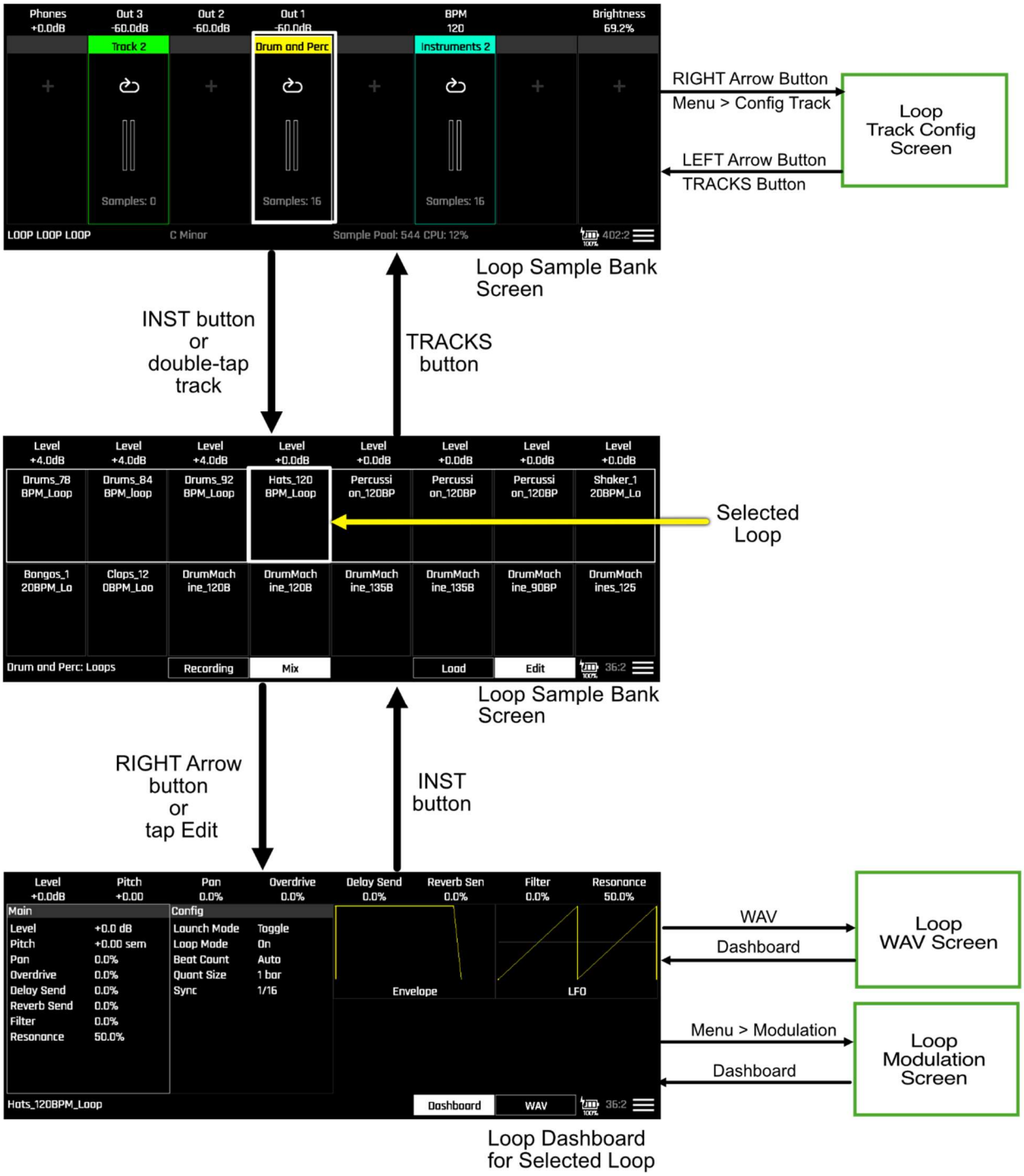


Figure: Loop Track Screen Navigation

Playing Loop Tracks

Loop tracks provide immediate access to rhythmic foundation elements and textural layers that you can trigger and combine in real-time. The playback system ensures that loops stay synchronized with your project tempo while providing flexible control over individual loop behavior.

The combination of independent loop control and synchronized playback makes Loop tracks ideal for building dynamic arrangements, adding rhythmic complexity, and creating evolving musical textures through live performance.

Playing Loop Tracks with bento's Pads

The hardware pads provide immediate tactile control over loop triggering and stopping, enabling you to build arrangements dynamically during performance.

To control loops with pads:

1. Push Play to start the Transports.
2. Select your Loop track from the Tracks screen.
3. Press pads to start individual loops.
4. Press playing pads again to stop specific loops.
5. Combine multiple loops for layered arrangements.

Each pad corresponds to a specific loop slot, with visual indicators showing which loops are currently playing. The pad interface provides immediate feedback about loop status, making it easy to manage complex combinations during live performance.

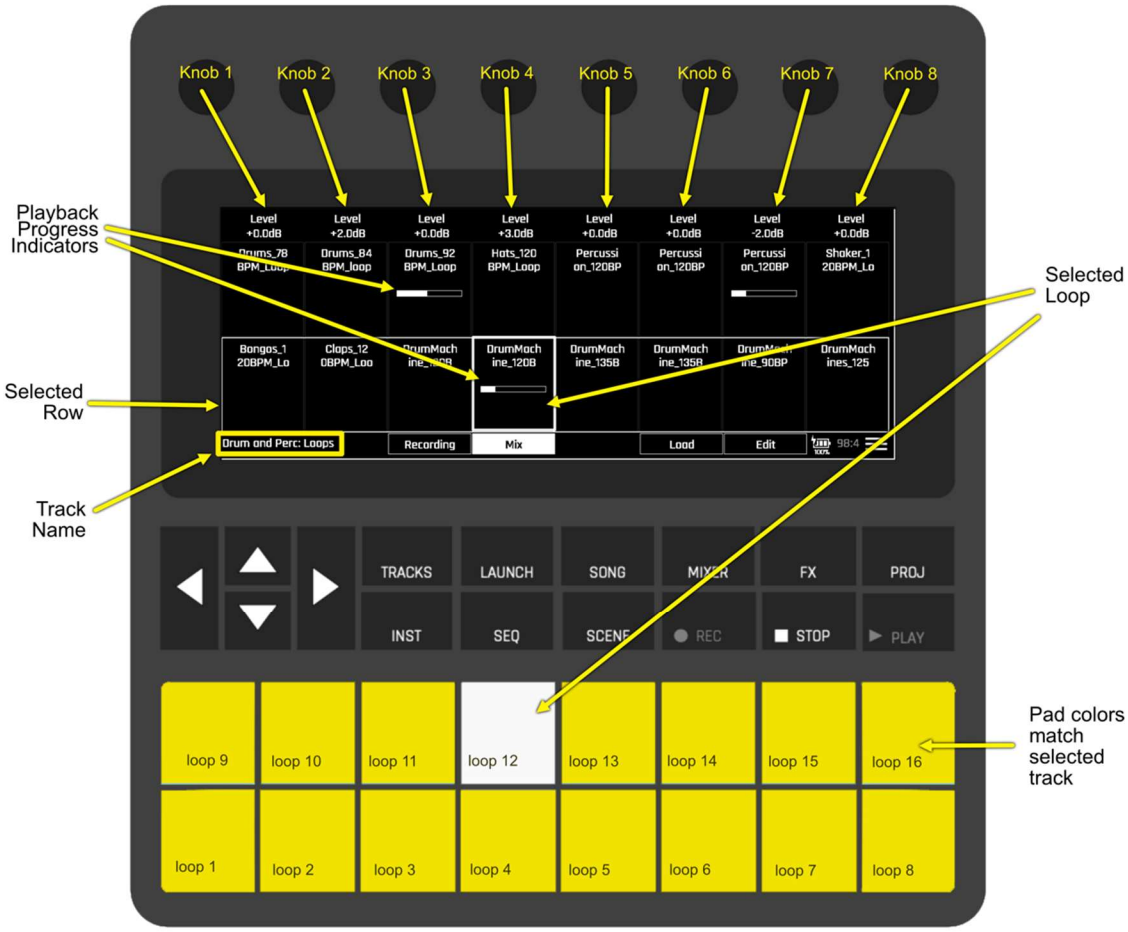


Figure: Loop pad launching

Loop triggering responds to project tempo and quantization settings, ensuring that loops start and stop at musically appropriate times. This synchronization maintains tight rhythmic coordination even when triggering multiple loops in rapid succession.

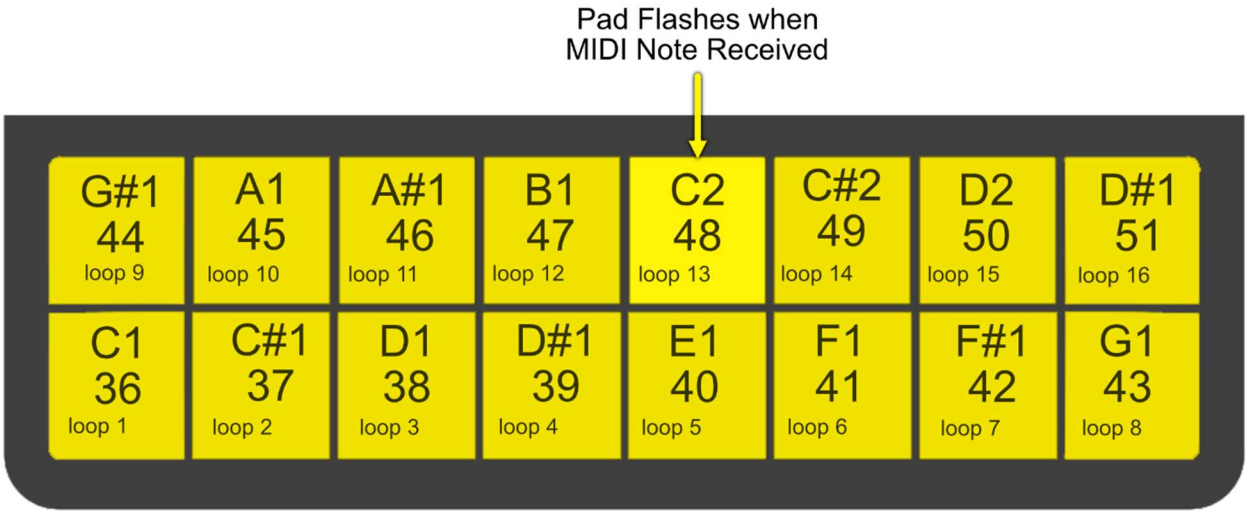
Playing Loop Tracks over MIDI

External MIDI controllers expand your loop control possibilities and enable integration with sequencers, controllers, and automation systems for complex arrangement development.

To control Loop tracks via MIDI:

1. Configure MIDI routing to your Loop track.
2. Push Play on your bento to start the transports.
3. Send MIDI note messages to trigger and stop specific loops.
4. Use MIDI automation for dynamic loop control.

MIDI control follows the same pad mapping as the hardware interface, with loops mapped to consecutive MIDI notes starting at C2.



This standardized mapping enables integration with drum controllers, pad controllers, and sequencer automation for sophisticated loop arrangement techniques.

MIDI velocity and other controller data can modulate loop parameters, providing expressive control over loop playback characteristics and enabling dynamic arrangement development through external controller input.

Editing Loop Tracks

Loop tracks provide comprehensive editing capabilities for managing loop collections, configuring playback behavior, and recording new loop content. Understanding these tools helps you create effective rhythmic arrangements and capture new musical ideas through live recording.

The editing workflow balances loop bank management with detailed playback control, allowing you to organize effective loop collections while fine-tuning individual loop characteristics and overall track behavior.

Editing Loop Banks

The loop bank provides tools for loading, organizing, and replacing loops within your Loop track. These operations affect the loop assignments while preserving voice parameter settings and playback configurations.

Loop bank editing focuses on building and maintaining effective collections of rhythmic content that work well together and serve your musical arrangement needs.

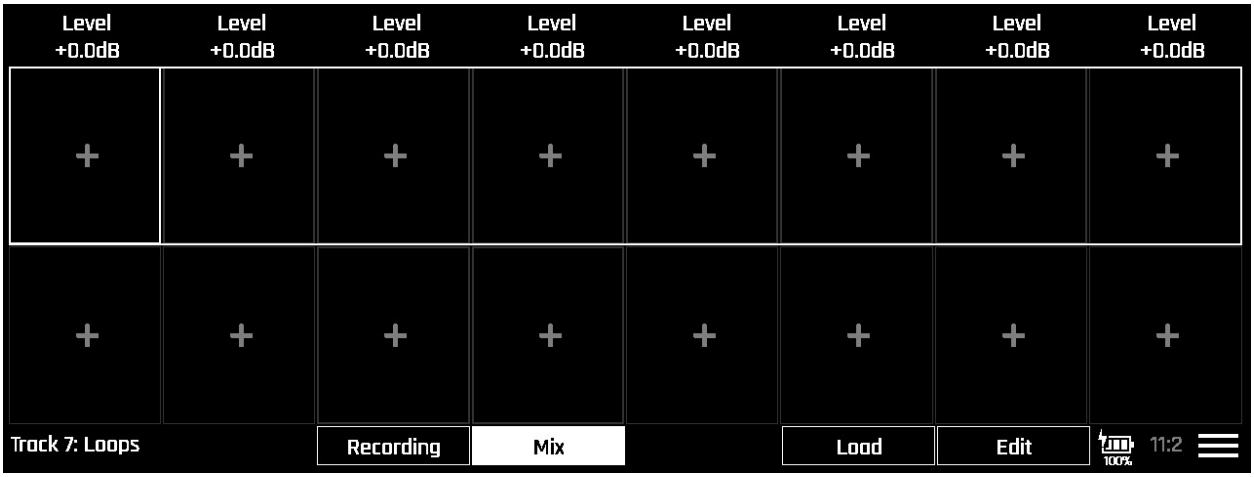
Creating a new Loop Track

Let's start with an empty loop track so we can explore adding new loops to it.

1. From the Tracks screen, select an empty track and push Inst. You are now on the patch browser screen.
2. Tap the New button at the bottom of the screen.
3. Tap Loop. You are now looking at an empty Loop bank.

Loading Samples into Empty Slots

Adding new loops to empty slots expands your Loop track's capabilities and provides additional elements for dynamic arrangement building.



To load a loop into an empty slot:

1. Select an empty loop slot in your Loop track, then tap **Load**.

   The sample browser screen opens.

2. Navigate to bento's patch folders on the microSD card.

   bento's factory samples are in the top-level Patches folder, organized by patch type (Granular, Loops, etc.). You can load samples from any of these categories, even if they were not originally intended to be played as a loop.

3. To hear a preview of a sample before you load it, tap Preview.

   When you select samples with Preview enabled, bento starts playing the sample.

4. When you have decided which sample to load, tap Load.

   bento re-opens the Sample Bank screen, with your chosen sample loaded in the selected loop.

Unloading Samples

Removing loops from your Loop track frees up memory resources and simplifies your loop bank organization for focused musical arrangements.

To unload a loop:

1. Select the loop slot containing the loop you want to remove.
2. Tap the menu icon in the lower right.
3. Choose the unload option to remove the loop from the slot.

The slot becomes empty and available for new loop assignments. Unloading unused loops helps manage bento's sample memory efficiently and keeps your loop banks focused on currently needed content.

Replacing Samples in the Sample Bank

Substituting existing loops allows you to update your rhythmic arrangements and experiment with different groove elements without rebuilding entire loop collections.

To replace an existing loop:

1. Select the loop slot containing the loop you want to replace.
2. Tap the Load button. You will see the WAV file browser.
3. Choose a new loop to substitute for the existing one.
4. Double tap the file name or tap Load to complete the swap.

The new loop inherits the playback settings from the previous loop, maintaining consistent behavior while providing new rhythmic content. This approach preserves your arrangement structure while updating the underlying musical elements.

Editing Voice Parameters in the Loop Dashboard

Each Loop Dashboard provides immediate access to a specific Loop's voice parameters, organized into four parameter groups: Main, Config, Envelope, and LFO. The parameter group selection buttons allow quick switching between different parameter sets using the same eight knobs.

To navigate to the Loop Dashboard:

1. Open the Loop Bank screen from the Tracks screen by selecting the Loop track and pressing **INST**.
2. In the Loop Bank screen, select the loop you want to edit and then either tap **Edit** or push the **Right Arrow** button.

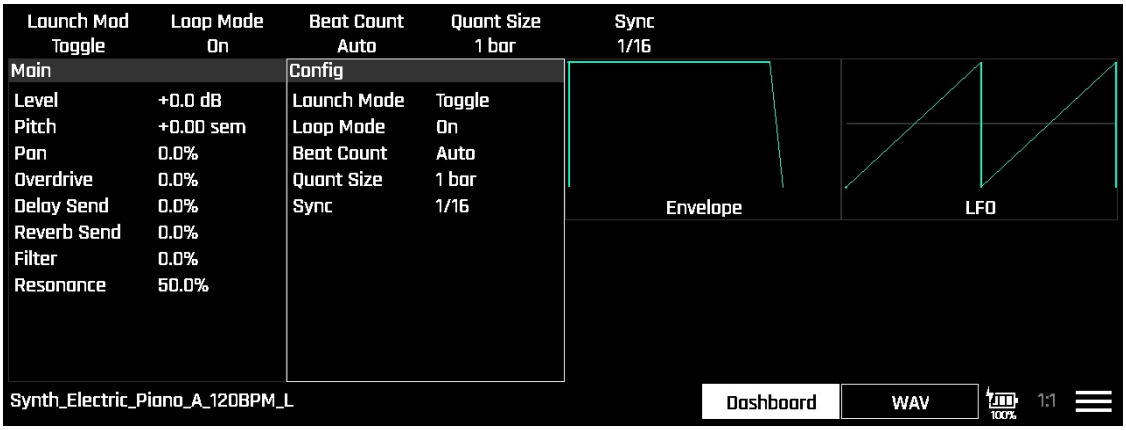


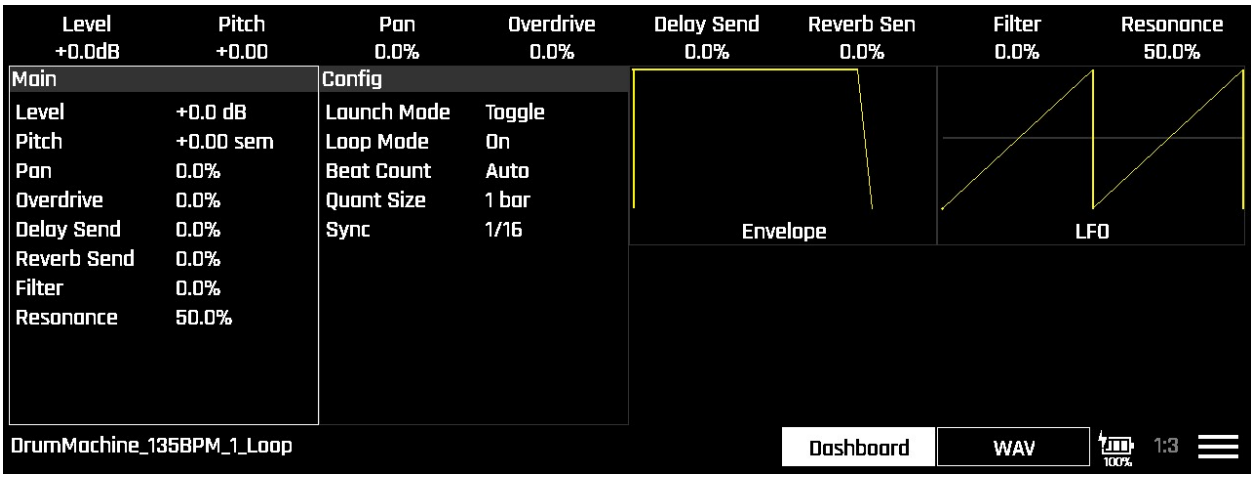
Figure: Loop track dashboard showing common voice parameters

3. Tap the parameter group buttons (Main, Config, Envelope, LFO) to switch parameter sets.
4. Use knobs 1-8 to adjust the displayed parameters.

Editing Loop Voice Parameters in the Main Group

The Main parameter group provides the essential voice shaping controls that most directly affect the sound character and musical integration of your Multisample track.

The following screenshot shows the Multisample track Dashboard with the Main parameter group selected.



Loop Dashboard with Main parameter group selected

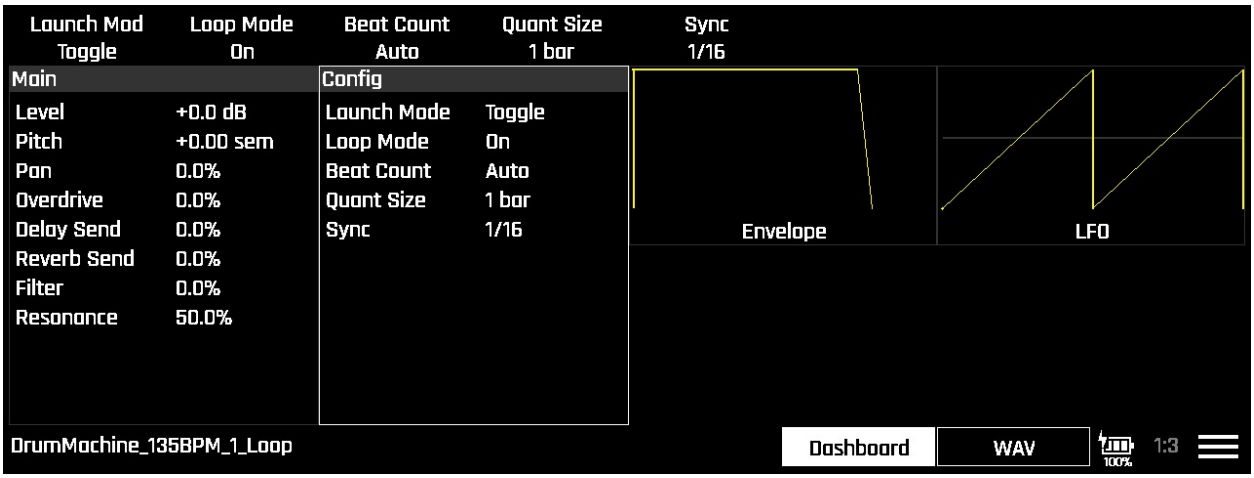
Table: Loop Dashboard Main Parameter Group

Parameter	Knob	Range	Description	Modulation Target?
Level	1	-96dB to +12dB	Volume of this loop.	Yes
Pitch	2	-24 to +24 semitones	Pitch offset for this loop.	Yes
Pan	3	-100% to +100%	Stereo positioning from full left to full right for this loop	Yes
Overdrive	4	0 to 100%	Sets the level of distortion applied to the loop's output audio. Caution: Overdrive causes significantly higher track audio levels.	
Delay Send	5	0 to 100%	Loop signal level sent to bento’s Delay effect.	
Reverb Send	6	0 to 100%	Loop signal level sent to bento’s Reverb effect.	
Filter	7	-100% to 100%	Filter cutoff frequency. Negative values control a low pass filter. Positive values control a high pass filter.	Yes
Resonance	8	0 to 100%	Filter resonance amount	Yes

Editing Loop Voice Parameters in the Config Group

Config parameters control the fundamental operational behavior of the Loop track, affecting how notes trigger, sustain, and loop within each sample.

The following screenshot shows the Loop Dashboard with the Config parameter group selected.



Loop Dashboard with Config parameter group selected

Parameter	Knob	Range/Options	Description	Modulation Target?
Launch Mode	1	Trigger, Gate, Toggle	**Trigger**: Activate the Pad by touching the pad or through MIDI note on. bento will start playback of the WAV file and play through to the end. **Gate**: Begin the WAV file playback in the same manner as Trigger mode. But in Gate mode, playback will stop when you release the touch or the MIDI note is released. **Toggle**: Begin the WAV file playback in the same manner as Trigger mode. When another trigger event happens, the playback will stop.	No
Loop Mode	2	On, Off	When Loop Mod is On, bento plays the sample in a loop. When Loop Mode is Off, bento plays the sample like a one-shot, stopping when playback reaches the end of the sample.	No
Beat Count	3	Auto, 1-512	Synchronization reference for tempo.	No

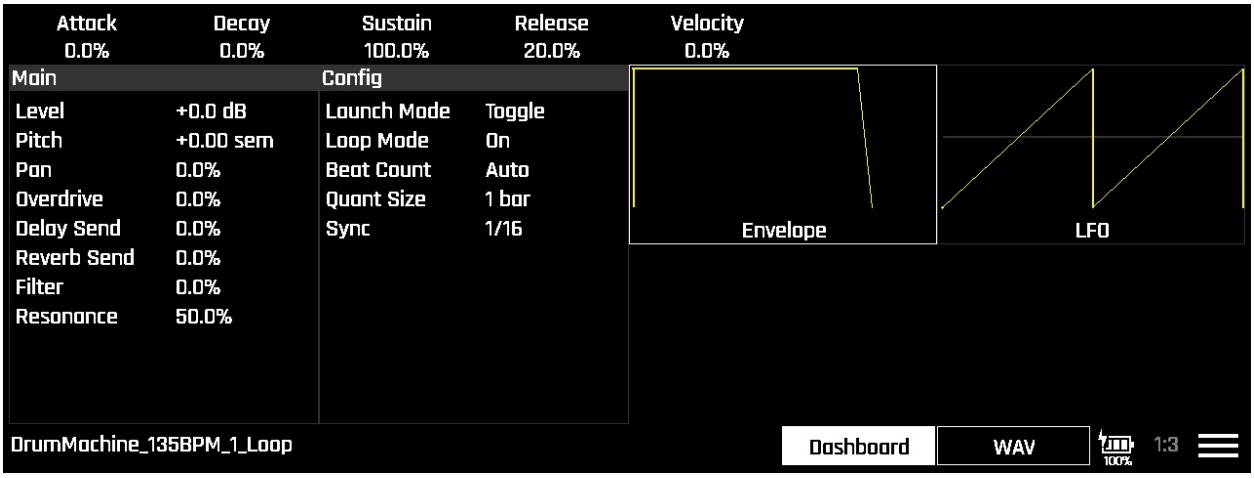
Parameter	Knob	Range/Options	Description	Modulation Target?
Quant Size	4	8 bars, 4 bars, 2 bars, 1 bar, 1/2, 1/4, 1/8, 1/16, none	Quantizes loop playback timing to bento transport. For example, if you play a pad when Quant Size is 1/4, the loop does not start playing until the next beat, which means the transport must be running. If Quantize is “none,” loops will start as soon as they are triggered.	No

Parameter	Knob	Range/Options	Description	Modulation Target?
Sync	5	None, 1/16, 1/8, 1/4, 1/2. 1 bar, slice	Sync is only enabled when quantizing is enabled (the Quant Size parameter is not None). The Sync feature prevents timing drift that can occur when the length and BPM of a clip does not align exactly with the tempo of playback. When Sync is used, bento will realign the audio to match the clock at the step size specified here. Even slight differences between WAV file BPM and clock tempo can cause significant drift over time. Select a value for Sync that will control the size of the musical unit to which the clip will be synchronized. Choose small settings, like 1/16th, for rhythmic or percussion clips. Choose large settings, like 1-bar, for sustained tones or drones	No

Editing Loop Voice Parameters in the Envelope Group

The Envelope parameter group provides detailed ADSR envelope control for precise amplitude shaping and velocity response configuration.

The following screenshot shows the Loop track Dashboard with the Envelope parameter group selected.



Loop Dashboard with Envelope parameter group selected

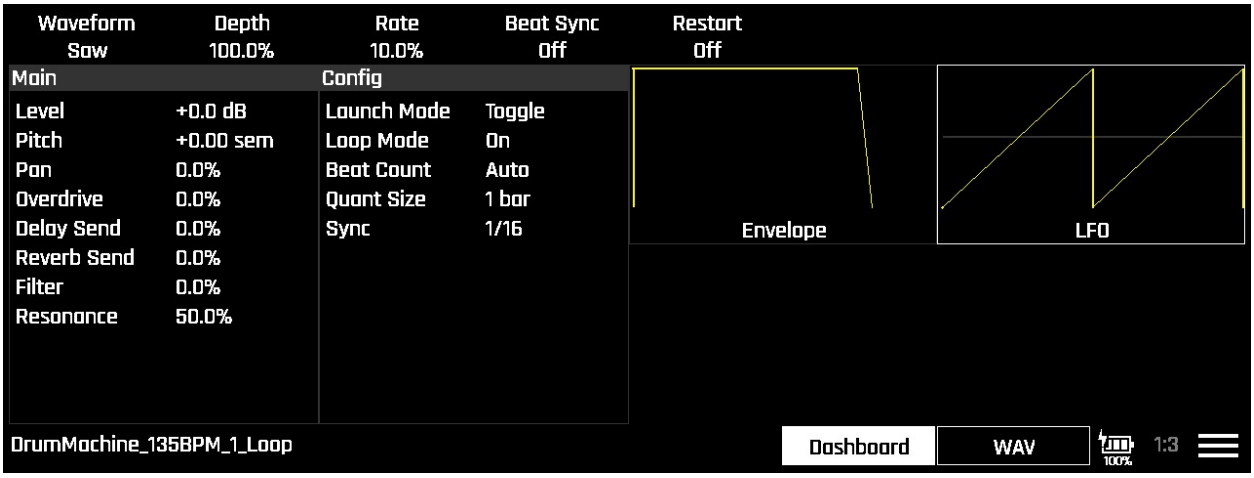
Table: Loop Envelope Parameters

Parameter	Knob	Range	Description	Modulation Target?
Attack	1	0 to 100% 100% = 9 seconds	Envelope attack time	Yes
Decay	2	0 to 100% 100% = 38 seconds	Envelope decay time	Yes
Sustain	3	0 to 100%	Envelope sustain level	No
Release	4	0 to 100% 100% = 38 seconds	Envelope release time	Yes
Velocity	5	-100 to 100%	Velocity sensitivity amount. Negative values cause an inverse response to the velocity.	No

Editing Loop Voice Parameters in the LFO Group

LFO parameters enable rhythmic and expressive modulation effects, from subtle vibrato to dramatic tremolo and filter sweeps.

The following screenshot shows the Loop track Dashboard with the LFO parameter group selected.



Loop Dashboard with LFO parameter group selected

Table: Loop LFO Parameters

Parameter	Knob	Range	Description	Modulation Target?
Waveform	1	Sine, Pos Sine, Triangle, Pos Tri, Square, Pos Square, Saw, Rev Saw, Random	LFO shape selection	No
Depth	2	0 to 100%	LFO modulation intensity	Yes
Rate	3	If Beat Sync is Off: 0 to 100%	LFO speed from slow to fast	Yes

Parameter	Knob	Range	Description	Modulation Target?
		If Beat Sync is On: 8 bars, 4 bars, 2 bars, 1 bar, 1/2, 1/2T, 1/4, 1/4 T, 1/8, 1/8T, 1/16, 1/16T, 1/32, 1/32 T, 1/64		
Beat Sync	4	Off, On	Synchronize LFO to project tempo	No
Restart	5	Off, On	Reset LFO phase on each note	No

Editing Loop Modulation

Each bento track includes a central Modulation screen within which you can configurate all modulation settings.

The modulation system enables dynamic control of Loop parameters through various sources such as note velocity, envelopes, LFOs, and external MIDI controllers.

The specific modulation sources available vary with each track type.

To configure Loop modulation:

1. Open the Loop Dashboard, then tap the **Menu** icon in the lower right corner of the screen. The **Menu** opens, displaying a single option, **Modulation**.

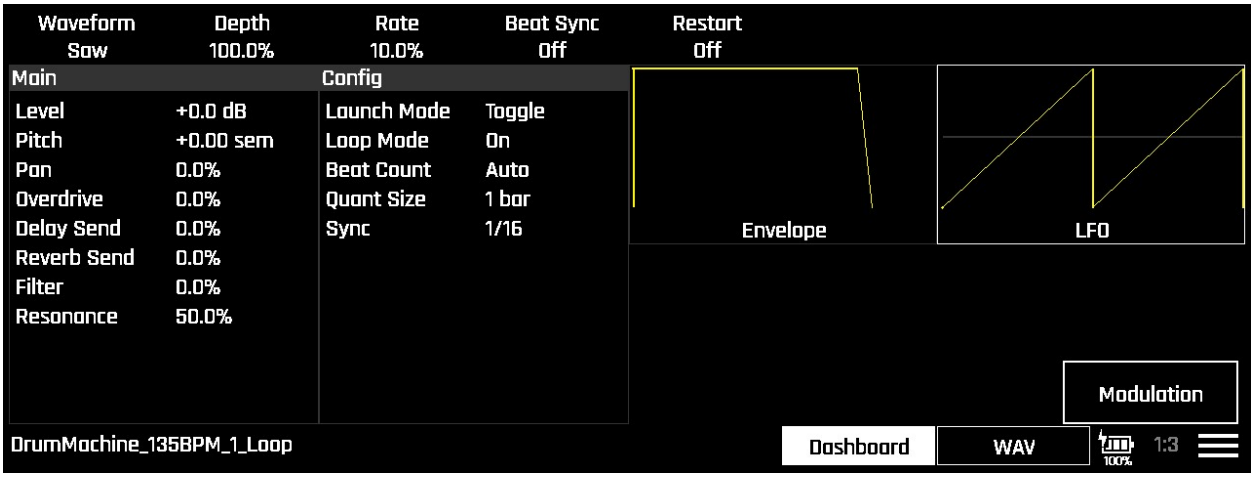


Figure: Loop Dashboard Modulation Menu Option

2. Tap **Modulation**.

   The Loop Modulation Screen opens.

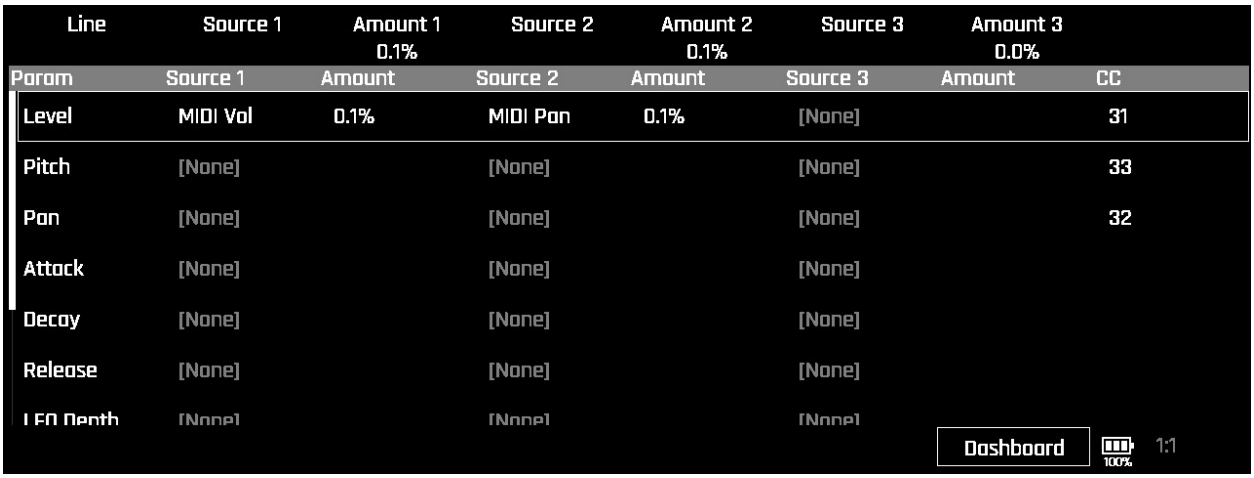


Figure: Loop Track Modulation Screen

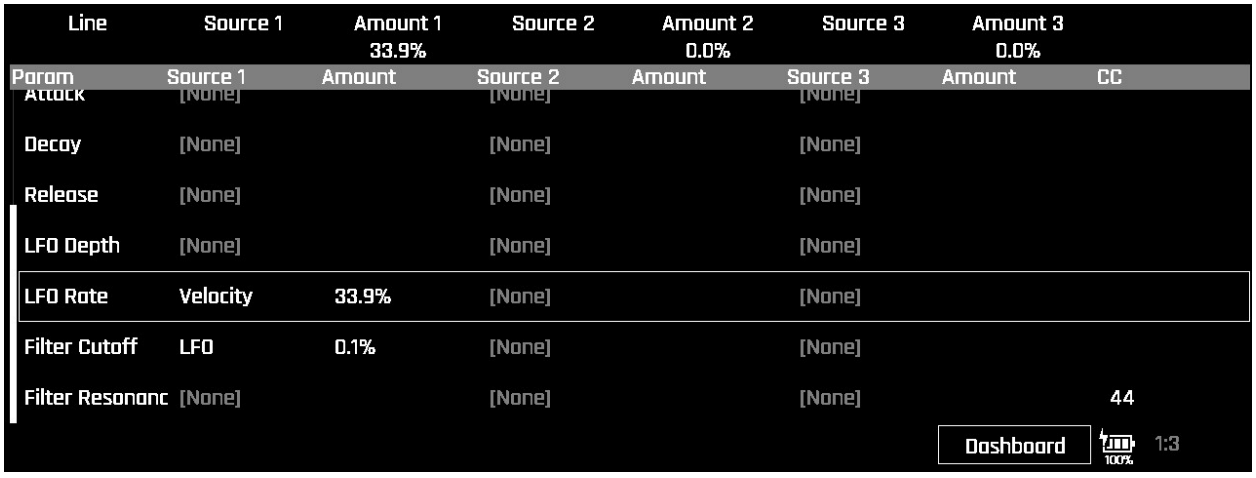
The first column in the Modulation screen contains the name of every Loop parameter that can be a modulation "target." Columns 2 through 7 let you set up three modulation sources and three modulation amount values for the modulation target of the selected row.

3. To see the complete list of modulation targets in the Modulation screen you can either:

   - swipe the screen up or down, or

   - turn Knob 1 to scroll up and down through the Modulation screen.

4. Select the line of the parameter you want to modulate, then use Knobs 2-7 to configure one or more modulation sources and modulation levels.



The following table describes the parameters you can modulation, the modulation sources you can route to them, and the range of modulation levels.

Table: Modulation Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description
Line	1	Level, Pitch, Pan, Attack, Decay, Release, Filter Cutoff, Filter Resonance, LFO Depth, LFO Rate	Moves the Modulation screen's line selection through the parameters listed in the first column. Once you have selected a modulation target, you can configure up to 3 modulation sources and modulation amounts with knobs 2-7.
Source 1	2	Velocity, LFO, Mod Wheel, MIDI Vol, MIDI Pan	Modulation Source (1 of 3)
Amount 1	3	-100% to +100%	Modulation Amount (1 of 3)
Source 2	4	Velocity, LFO, Mod Wheel, MIDI Vol, MIDI Pan	Modulation Source (2 of 3)
Amount 2	5	-100% to +100%	Modulation Amount (2 of 3)
Source 3	6	Velocity, LFO, Mod Wheel, MIDI Vol, MIDI Pan	Modulation Source (3 of 3)
Amount 3	7	-100% to +100%	Modulation Amount (2 of 3)

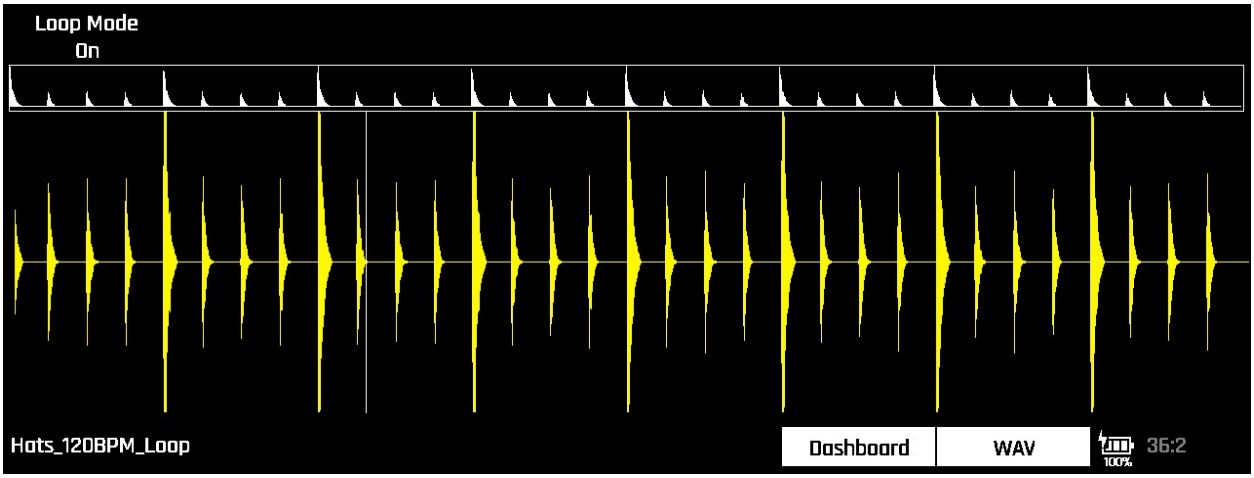
5. To return to the Loop Dashboard, tap **Dashboard** or press **INST**.

Viewing the Loop WAV Screen

The Loop WAV screen provides a live view sample playback and a **Loop Mode** parameter for turning looping playback on or off.

To access the Loop WAV screen:

1. From the Loop Dashboard, tap **WAV** in the navigation area.
   The Waveform screen opens.



Loop WAV screen

   When you play a note from the pads, sequencer, or over MIDI, a vertical line moves across the waveform display. Remember that the transports must be running for loops to play.

2. Zoom in or out on the waveform by pinching or spreading the touchscreen with two fingers.

3. Scroll through the waveform by swiping left or right on the touchscreen.

4. Tap **Dashboard** to return to the Loop Dashboard.

Editing Track Configuration Settings

Track configuration settings include output routing for complex mixing scenarios, and MIDI channel options for inbound and outbound note messages.

To navigate to the Loop Track Configuration Screen:

1. Open the Tracks screen and select the Loop track you want to configure, then push the **Right Arrow** button.

   The Loop Track Configuration screen opens.

Loop track configuration settings screen

2. Use bento's knobs to edit the Loop Track Configuration settings.

The following table describes the parameters mapped to bento's eight knobs.

Table: One-shot Track Config Parameters

Parameter	**Knob**	**Range**	**Description**
Output	1	1, 1 w/Mod FX, 2, and 3	Audio output routing destination.
Poly Mode	2	Mono, Poly 2, Poly 4, Poly 6, Poly 8, and Poly X	Maximum simultaneous notes. Poly X will make use of all notes available.
MIDI In Ch	6	None, 1-16	MIDI input channel for launching loops from external controllers. Pads 1-16 respond to MIDI notes 36-51.
MIDI Out P	7	All, 1, 2	MIDI output port routing.
MIDI Out C	8	None, 1-16	MIDI output channel for sending notes from bento's pads or sequencer.

3. To return to the Tracks screen, press **TRACKS**.

Recording New Samples in Loop Tracks

Loop tracks provide comprehensive recording capabilities for capturing external audio sources and creating new rhythmic content. The recording system integrates seamlessly with loop playback, enabling you to build arrangements by layering recorded content with existing loops.

bento's recording workflow supports both recording external audio input and resampling of bento’s main audio output bus, providing flexibility for capturing live performances, sampling other tracks.

Connecting Audio Sources for Loop Recording

Input level optimization prevents distortion while ensuring that your recorded loops have sufficient dynamic range and low noise floor. Proper monitoring during setup saves time and ensures consistent recording quality.

To prepare external audio sources:

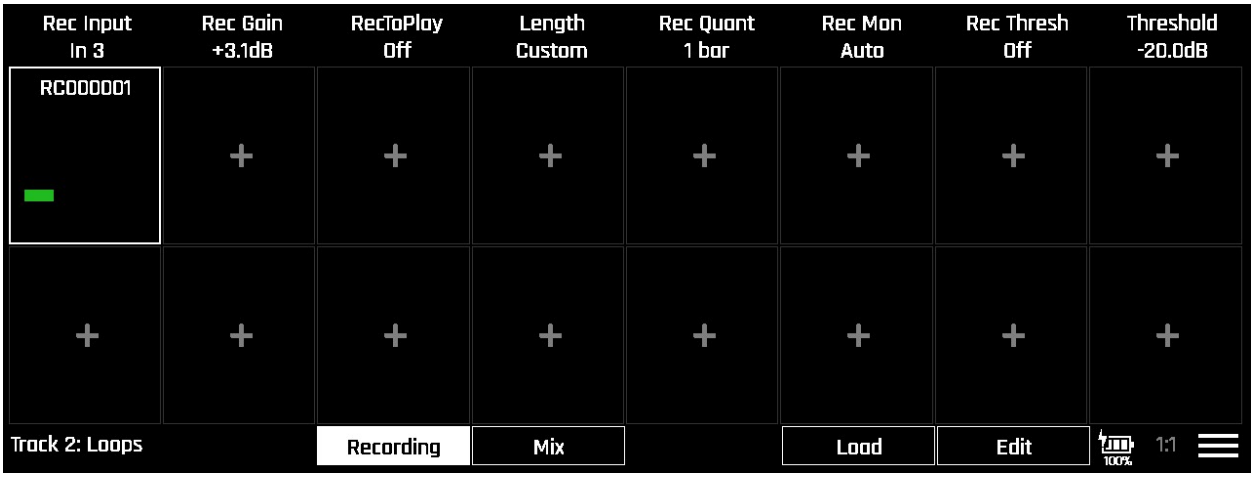
1. Connect your audio source to one of bento’s audio inputs.
2. Monitor the input signal through bento’s input metering. See Adjusting the Loop Recording Settings below.
3. Set your audio source level and the bento Rec Gain to avoid clipping and adjust while maintaining good signal-to-noise ratio. The input meter on the pad should stay as high as possible without entering the red range.
4. Test the audio path before beginning recording sessions.

Adjusting the Loop Recording Settings

Recording configuration affects both the technical quality and musical integration of your recorded loops. Proper setup ensures that recorded content synchronizes correctly with existing project elements and maintains consistent audio characteristics.

The Loop Sample Bank's recording configuration screen prepares Loop tracks for capturing new audio with appropriate timing, quality, and integration settings.

1. Select the Loop track in the Tracks screen, and push **INST** to open the Loop Bank screen.
2. Select an empty loop cell.
3. From the Loop Bank screen, tap **Recording** at the bottom of the screen.



Loop recording configuration showing length, timing, and sync settings

4. Set the loop recording settings with bento's knobs. Watch the input meter that appears on the loop cell to ensure you have the correct input selected and the proper gain amount.

The following table describes the loop recording options:

Table: Loop Recording Settings in the Loop Sample Bank Recording Screen

Parameter	Knob	Range	Description
Rec Input	1	1, 2, 3, 1L, 2L, 3L, or Resample	Audio source for loop recording. Use 1L, 2L or 3L for mono recording while sending a signal into the left channel of the corresponding input.
Rec Gain	2	-60dB to +6dB	Audio input gain.
RectoPlay	3	On, Off	Set to On to start playing the loop as soon as recording stops.
Length	4	Custom, 1/4 to 128 bars.	Specify length of new loop recordings before recording starts. If Length is “Custom,” recording starts by pressing the REC button while the transports are running and recording ends when REC is pressed a second time or when you push Stop.
Rec Quant	5	8 bars – 1/16, None	Quantizes recording to start at a specific beat or measure division after the REC button is pressed, so that recordings start and end in sync with bento’s transport.
Rec Mon	6	Off, Auto, On	Specifies when audio inputs are played out through bento’s main audio output. When set to Auto, monitoring is only heard while actively recording.
Rec Thresh	7	Off, On	When Rec Thresh is “On,” loop recording waits for audio input level to go over the Threshold.
Threshold	8	-96.0 dB to 0.0 dB	Sets a recording threshold for loop recording when Rec Thresh is On.

Recording New Samples

The loop recording process captures audio input as new loop content that immediately becomes available for triggering and arrangement integration.

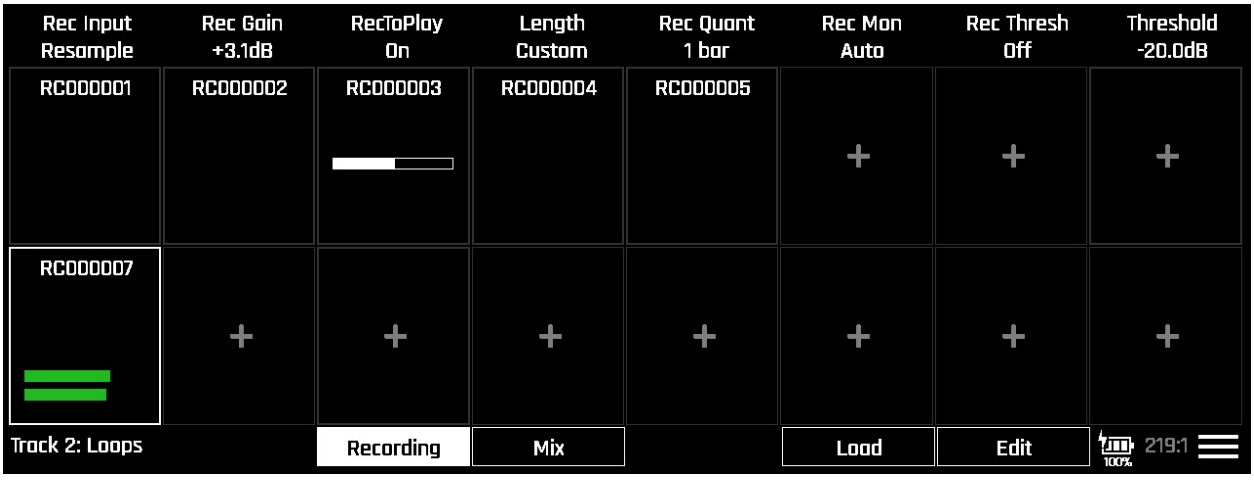
To record a new loop:

1. Open the Loop Bank's Recording screen.
2. Start bento's transport by pressing PLAY.
3. Select an empty loop with bento's touchscreen, bento's pads or from a MIDI controller (notes 36-51).
4. If wanted, launch any sequences or loops that you want to hear while recording.
5. Press **REC** to start recording at the next Quant time.

   The Loop Bank Recording screen shows the recording progress in the form of bars:beats. This real-time monitoring helps you capture precise loop lengths and musical timing for seamless integration.

   If the Loop recording Length parameter is anything other than Custom, recording will stop automatically after recording the specified number of beats.
6. If Length is Custom, press **REC** a second time to end the recording at the next "quant" time.

   If **RecToPlay** is On, the new loop starts playing in sync with bento's transport.



7. To record additional loops, select other loops, then press Rec to start and end each recording.
8. If you are dissatisfied with a new loop, and want to try recording into the same loop slot, choose **Unload** from the Loop Bank Menu.

The new recording is unloaded from the Loop Bank and you can continue recording into the same loop slot. Unloading does not remove the WAV file from the microSD card.

bento stores each new loop in the root of your current project's folder on the microSD card. Filenames start with RC000001 and increment with each successive recording.

Note: New loop recordings are available for use in bento Loop tracks, or any of bento's other sample-based tracks.

Creating New Loop Tracks

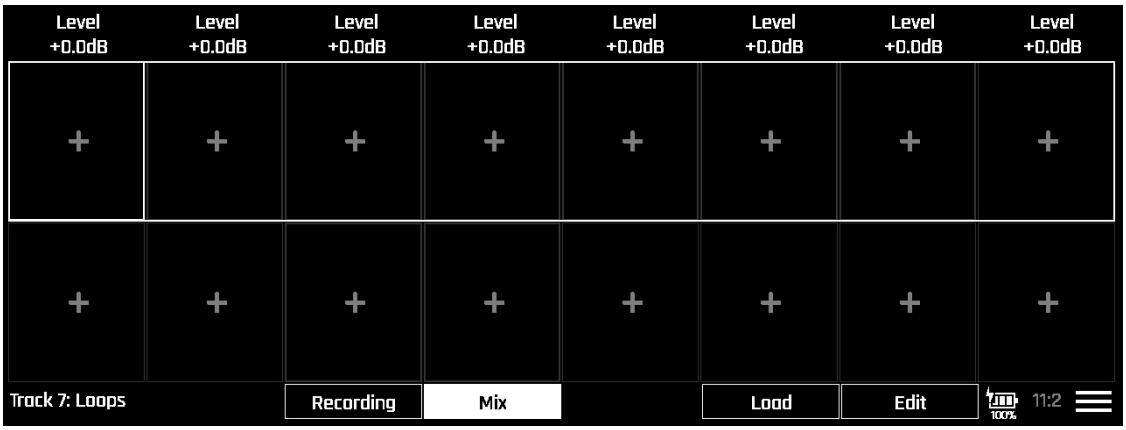
Setting up effective Loop tracks requires planning your loop organization and selecting appropriate source material for your intended rhythmic applications. The process involves both technical considerations about loop characteristics and creative decisions about arrangement structure.

A well-designed Loop track balances rhythmic coherence with dynamic possibility, providing the foundation elements you need while enabling flexible real-time arrangement development.

To create a new Loop track:

1. Double-tap an empty track slot on the Tracks screen.
2. Tap New on the Patch Browser screen, and select **Loop** from the track type options.
3. Begin loading loops into the empty bank slots or prepare for recording.
4. Configure playback parameters for musical integration.
5. Test loop combinations and timing relationships.

The empty Loop track provides 16 available slots for building your rhythmic foundation. Consider the musical relationships between loops and how they will combine in your intended arrangements.



The empty Loop track provides 16 available slots for building your rhythmic foundation. Consider the musical relationships between loops and how they will combine in your intended arrangements. Keep in mind that only the loops in the top row will be available on the Launch screen and in Scenes.

Best Practices for Loop Tracks

Successful Loop track implementation depends on thoughtful loop selection, effective organizational strategies, and consistent recording practices. These approaches help you build reliable rhythmic foundations while maintaining flexibility for creative arrangement development.

Developing systematic approaches to loop preparation, recording workflow, and arrangement integration enables you to create professional-quality rhythmic content that enhances your musical compositions.

Using Custom Loop Banks in Loop Tracks

Source material selection significantly impacts your Loop track's musical effectiveness and arrangement possibilities. Choose loops with complementary rhythmic characteristics and compatible tempo relationships for your intended musical applications.

Effective Loop track source characteristics include loops recorded at consistent quality levels for seamless integration, compatible rhythmic feels that work well in combination, appropriate loop lengths that maintain musical interest without becoming repetitive, and tempo flexibility that enables synchronization across different musical contexts.

Organize your loop libraries with clear tempo and style identification before loading into bento. This preparation streamlines the selection process and ensures effective musical relationships in your finished arrangements.

Backing Up Your Work

Loop tracks combine audio content with complex playback configurations and arrangement data. Regular backups should include both your loop source files and the complete bento project files containing all configuration and arrangement information.

Document effective loop combinations and arrangement techniques for future reference. Successful rhythmic patterns can serve as templates for similar projects and provide starting points for new creative work.

Export meaningful loop arrangements and combinations as audio stems when you develop particularly effective rhythmic foundations. This documentation preserves your creative work and provides reference material for arrangement techniques and musical applications.

Next Steps

With effective Loop tracks established, explore advanced arrangement techniques such as real-time loop layering for dynamic builds, tempo manipulation for creative effects, and integration with other track types for complete musical arrangements.

Loop tracks work particularly well as foundation elements that support melodic content from Multisample tracks and rhythmic accents from One-Shot tracks, providing the stable rhythmic base that enables other elements to shine in your musical compositions.

Exploring Slicer Tracks

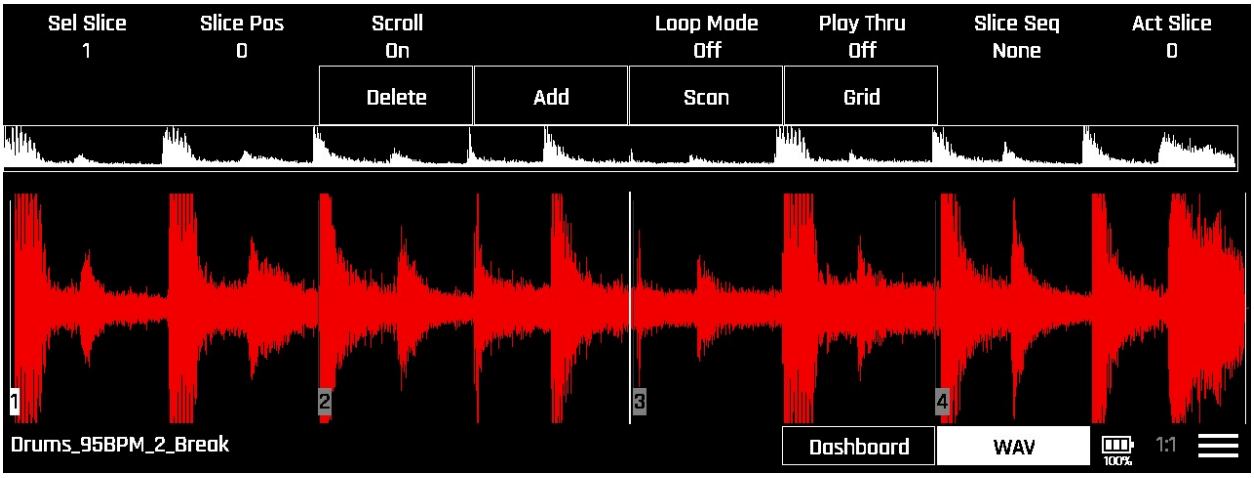
Slicer tracks transform a single source sample into multiple playable segments that can be triggered independently, providing access to internal audio structure without requiring separate sample files. Each slicer track analyzes source material to create slice points that divide the audio into musically useful segments, combining the flexibility of individual sample triggering with the efficiency of single-file storage.

Slicer tracks enable creative reconstruction of existing audio material, allowing you to reorganize rhythmic elements, create stutter effects, and build new arrangements from familiar source content. The slice system references specific time ranges within your source sample while applying shared track-level processing for consistent sonic character.

To do this...	Read this...
Understanding slicer tracks, signal flow, and control screens.	Understanding Slicer Tracks
Configure audio routing, polyphony, and MIDI routing.	Configuring Multisample Track Playback Parameters
Playing slicer tracks with bento's pads and from a MIDI controller.	Playing Slicer Tracks
Editing slicer track voice parameters.	Editing Voice Parameters in the Multisample Dashboard
Edit slices.	Editing Slices in the Slicer Track WAV Screen
Modulate slicer track voice parameters.	Editing Loop Modulation
Creating new slicer tracks.	Creating New Slicer Tracks
Use your own samples in slicer tracks.	Using Custom Samples in Slicer Tracks

Understanding Slicer Tracks

Slicer tracks organize a single source sample into multiple virtual segments that can be triggered independently while maintaining reference to the original audio file. This architecture enables access to internal sample structure without duplicating audio data or requiring separate sample files for each segment.

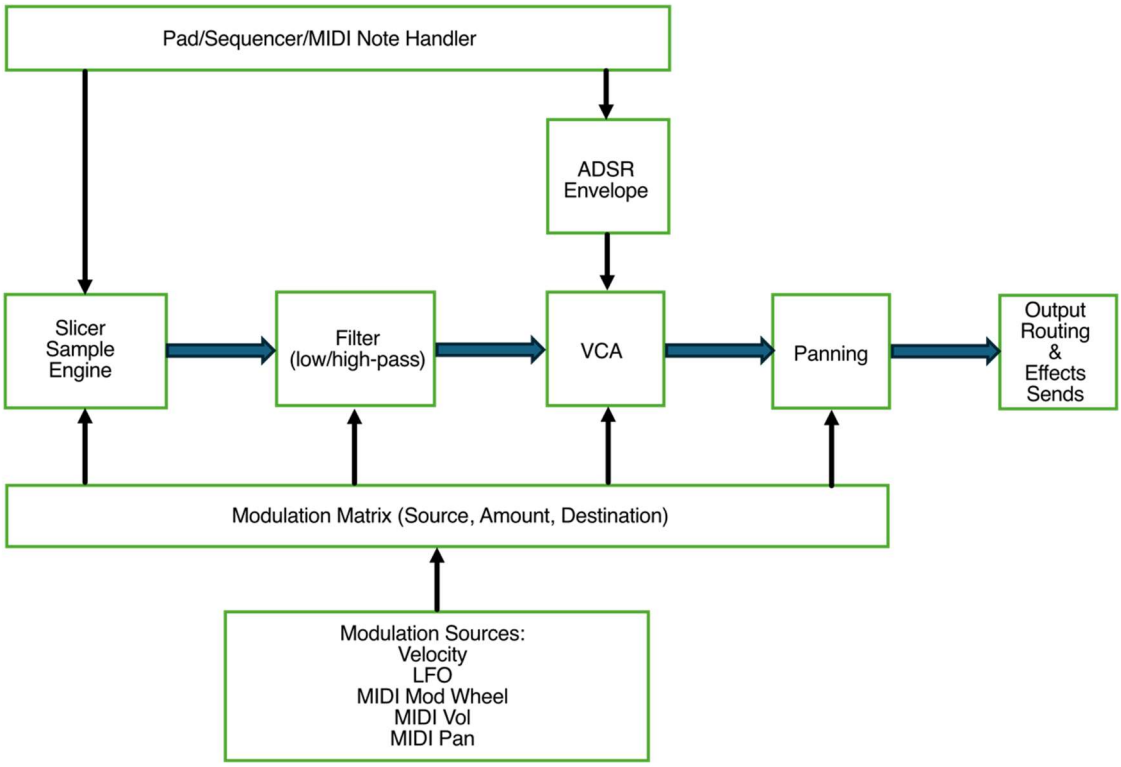


Each slice references specific start and end points within the source audio while sharing track-level filtering, envelope, and effects settings. bento supports up to 128 individual slices in each slicer track.

bento's slicer track control screens let you add, delete, and move slices manually or automatically by detecting transients in the sample or by defining grid divisions in the sample.

The slice selection process maps pads or consecutive MIDI note numbers, so that when played from the bento's pads, sequencer, or from MIDI controllers, the appropriate sample region plays. This approach preserves the original audio quality and slice order while providing random access to the individual sample slices in any order.

Slicer Voice Architecture



The signal flow begins with slice selection from pad triggers, MIDI input, or a sequence. The slicer sample engine determines which slice to play by the note it receives, with note 36 corresponding to slice 1, 37 corresponding to slice 2, and so on, up to the last slice. If you transpose the pads up or down an octave with the **UP** and **DOWN** arrow buttons you shift the range of slices mapped to the pads.

Slicer tracks have one set of voice parameters for all notes, whether the track contains one slice or 128 slices.

Slicer Track Control Screens

Slicer tracks provide four main control screens for comprehensive parameter editing and sample management.

Table: Slicer Track Control Screens

Screen	Description
Slicer Dashboard	Displays voice parameters and performance controls organized into four sections (Main, Config, Env, LFO).
Slicer WAV screen	Displays the waveform of the track's sample and offers controls for editing the slice points and parameter for controlling slice playback.
Slicer Modulation screen	Provides a central location for routing modulation source to modulation targes, and for setting a modulation amount for each.
Slicer Track Config screen	Manages MIDI routing, audio output assignment, and other track-level configuration that affects how the Slicer track integrates with your project's performance and mixing systems.

The first step in accessing the slicer track control screens is selecting the track.

To select a slicer track:

1. Press **TRACKS** to open the Tracks screen.
2. Tap the slicer track you want to select.
3. The pad colors change to match the color of the track you selected.
4. Play the pads to confirm that you selected the slicer track you want to edit or examine.
5. To access the other slicer track screens, follow the navigation paths shown in the following figure.

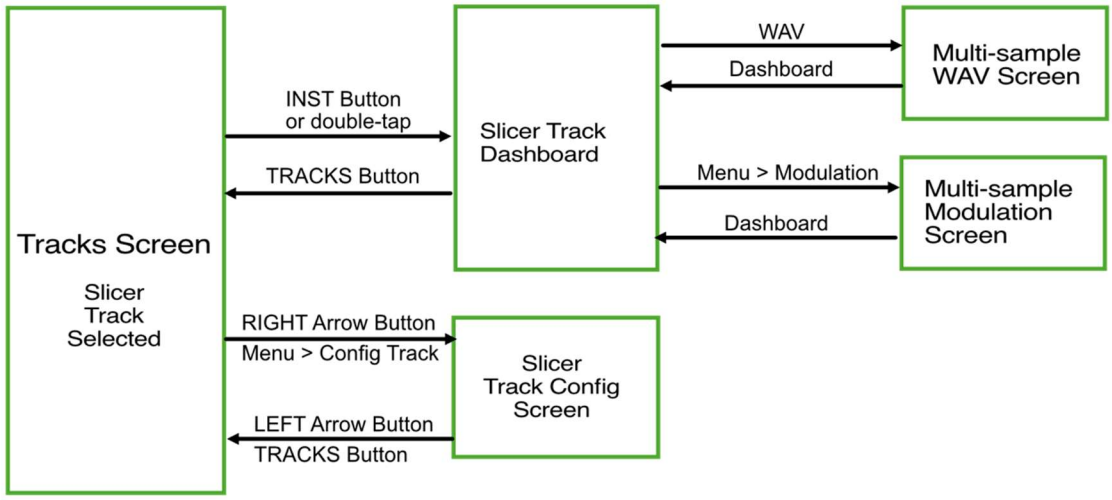


Figure: Slicer Track Control Screen Navigation

Configuring Slicer Track Playback Parameters

The Slicer Track Config screen manages track-level operational settings including audio routing, polyphony limits, and MIDI channel assignments.

To access the Slicer Track Config screen:

1. Select the Slicer track, then do one of the following:
   - Tap **Menu** and select **Config Track**.
   - Press **RIGHT** arrow button.

Slicer Track Config screen with routing and MIDI settings

2. Adjust track configuration parameters.

   The following table summarizes configuration options.

Table: Slicer Track Configuration Options

To do this...	Edit this parameter...
Choose the audio output route for this track.	Adjust Output parameter
Change the track polyphony.	Adjust Poly Mode parameter
Play this track when bento receives MIDI notes on a specific channel.	Adjust MIDI In Ch parameter
Enable bento to send this tracks notes to external MIDI instruments.	Adjust MIDI Out P parameter (ALL=enabled)
Choose the MIDI channel on which bento sends notes played by this track to external MIDI instruments.	Adjust MIDI Out C parameter (None, 1-6)

The following table describes the parameters mapped to bento's eight knobs.

Table: Slicer Track Config Parameters

Parameter	Knob	Range	Description
Output	1	1, 1 w/Mod FX, 2, and 3	Audio output routing destination
Poly Mode	2	Mono, Poly 2, Poly 4, Poly 6, Poly 8, and Poly X	Maximum simultaneous notes. Poly X will make use of all notes available.
MIDI In Ch	6	None, 1-16	MIDI input channel for external control
MIDI Out P	7	All, 1, 2	MIDI output port routing
MIDI Out C	8	None, 1-16	MIDI output channel for played notes

3. To navigate to the Slicer track's Dashboard, press **INST**.

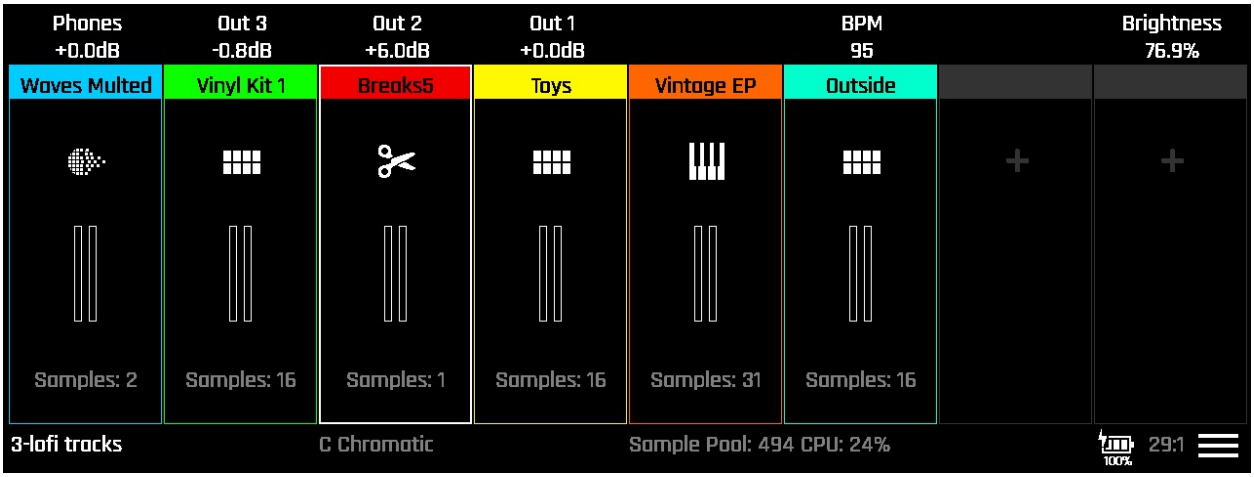
For details on the **Rename Track** and **Change Patch** features, see *Chapter 5: Managing Tracks*.

Playing Slicer Tracks

Slicer tracks respond to musical input like other bento track types, triggering notes that play through the Slicer voice architecture.

You can play Slicer tracks using bento's built-in pads, sequencer, or from external MIDI controllers, in any combination up to the maximum number of voices allocated to it through its **Poly Mode** parameter setting.

The sample engine in slicer tracks selects each sample slices according to which pad you play or by the note it receives over MIDI or from bento's sequencer.



Playing Slicer Tracks with bento's Pads

bento's 16 pads provide direct access to the first 16 slices of your slicer track, with UP and DOWN arrow controls extending access to 92 slices.

To play slices using the pads:

1. Select your Slicer track on the **Tracks** screen.

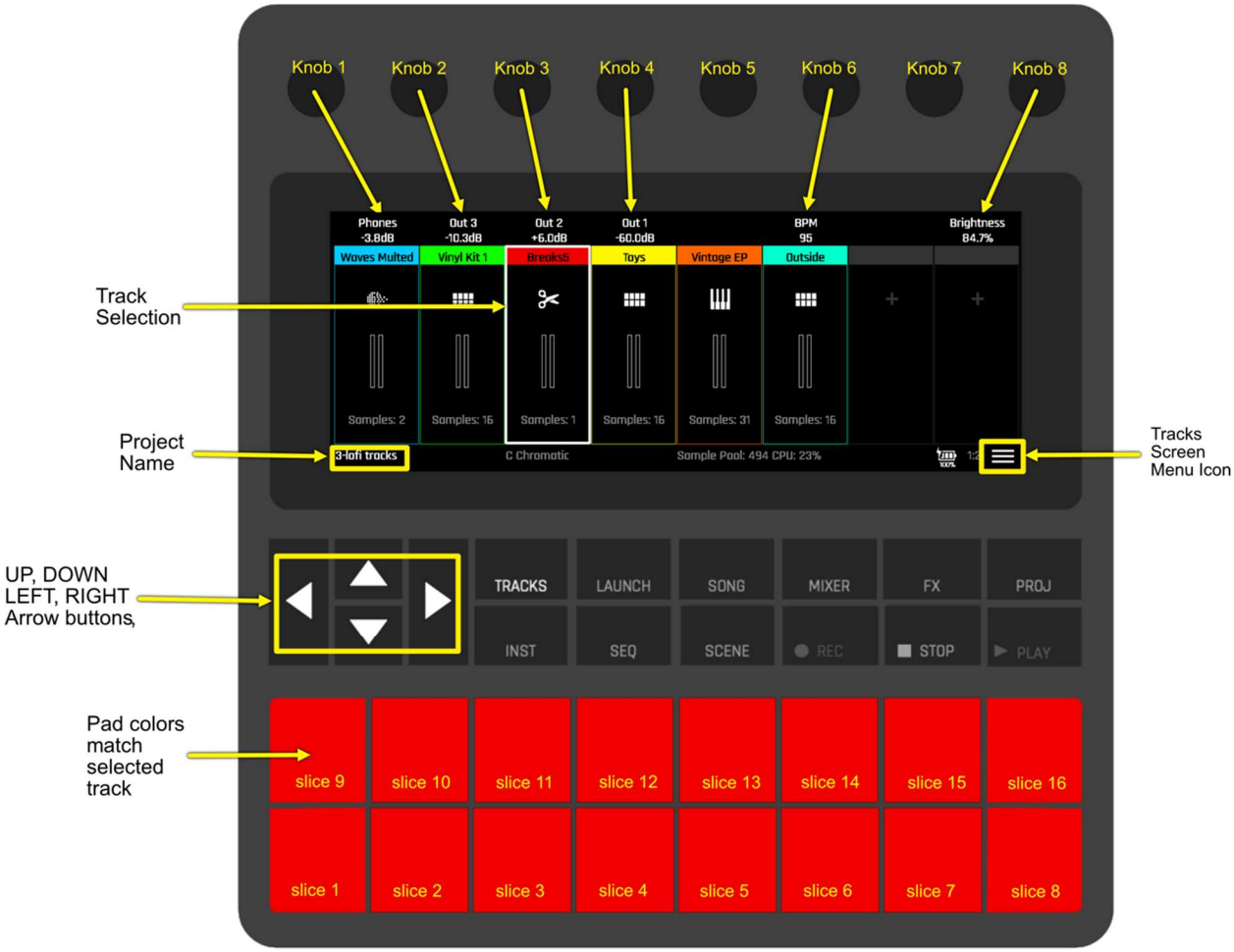


Figure: Slicer track icon and track selection interface

2. Play pads 1-16 to trigger the corresponding slices.
3. Press **UP** arrow to access slices 17-32 on pads 1-16.
4. Press **DOWN** arrow to return to slices 1-16.
5. Continue using the **UP** and **DOWN** arrow buttons to access the full range of slices, 16 at a time.

6. To change the number of notes you can play simultaneously (either Mono or Poly 2), adjust the Slicer track's **Poly Mode** parameter in the Slicer Dashboard screen. For details, see Editing Slicer Voice Parameters in the Config Group.

7. Press **TRACKS** to return to the Tracks screen.

Playing Slicer Tracks over MIDI

External MIDI controllers provide the most natural interface for Slicer track performance, especially keyboard controllers that match the chromatic mapping structure. Full velocity sensitivity and continuous controller support enable professional-level expression and integration.

To play Slicer tracks via MIDI:

1. Open the Slicer Track Config screen and set the track's **MIDI In Ch** parameter to a channel not used by any other track. For details, see Configuring Multisample Track Playback Parameters.

2. Set your MIDI controller to send note messages on the same channel as the **MIDI In Ch** parameter.

Figure: Slicer Track Config with MIDI In Channel 1

3. Play notes on your controller starting at note number 36 (C1) and listen as the slicer track plays.

4. To increase the number of notes you can play, adjust the Slicer track's **Poly Mode** parameter in the Slicer Dashboard screen. For details, see Editing Slicer Voice Parameters in the Config Group.

Note: When you play a track over MIDI, the pads always light up when you play notes 36-51 (C1-D#2), regardless of the pads' current transposition or the current project's **Root Note** and **Scale** parameters.

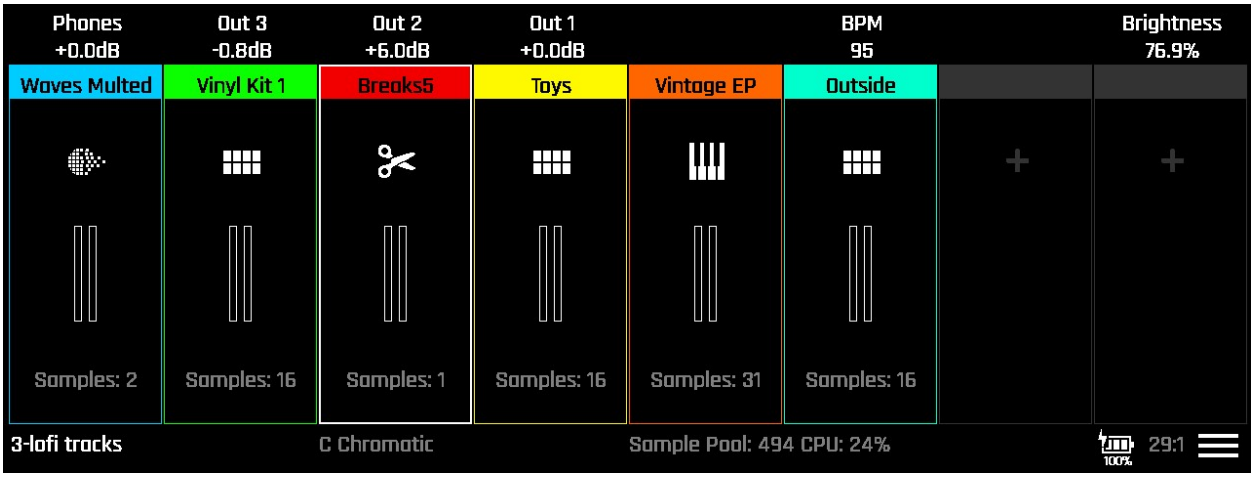
5. If you want bento to send the notes that this track plays to other MIDI instruments, set **MIDI Out P** to "All" and set **MIDI Out C** to the channel of the external MIDI instrument.

Editing Voice Parameters in the Slicer Dashboard

The Slicer Dashboard provides immediate access to the most frequently used voice parameters, organized into four parameter groups: Main, Config, Envelope, and LFO. The parameter group selection buttons allow quick switching between different parameter sets using the same eight knobs.

To open the Slicer Dashboard:

1. Press **TRACKS** to open the Tracks screen.
2. Select a Slicer track by tapping it.



3. Press **INST** to open the Slicer track dashboard.

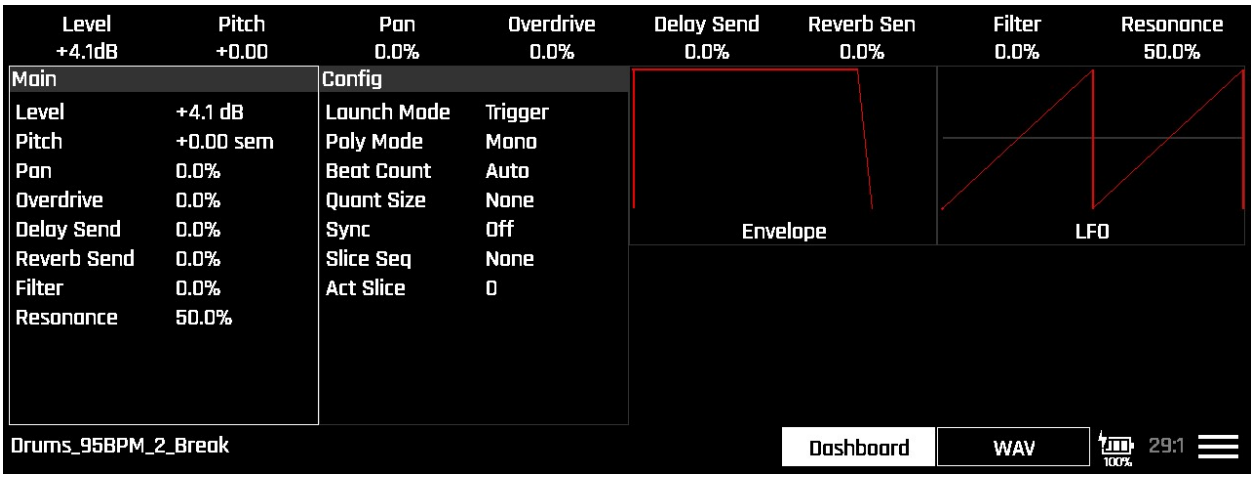


Figure: Slicer Track Dashboard (Main parameter group selected)

The dashboard displays the currently active slice number and provides real-time parameter feedback. Parameter groups appear as selectable sections at the top of the screen, with Knobs 1-8 mapped to the parameters in the currently selected group.

Editing Slicer Voice Parameters in the Main Group

The following screenshot shows the Slicer track Dashboard with the Main parameter group selected.

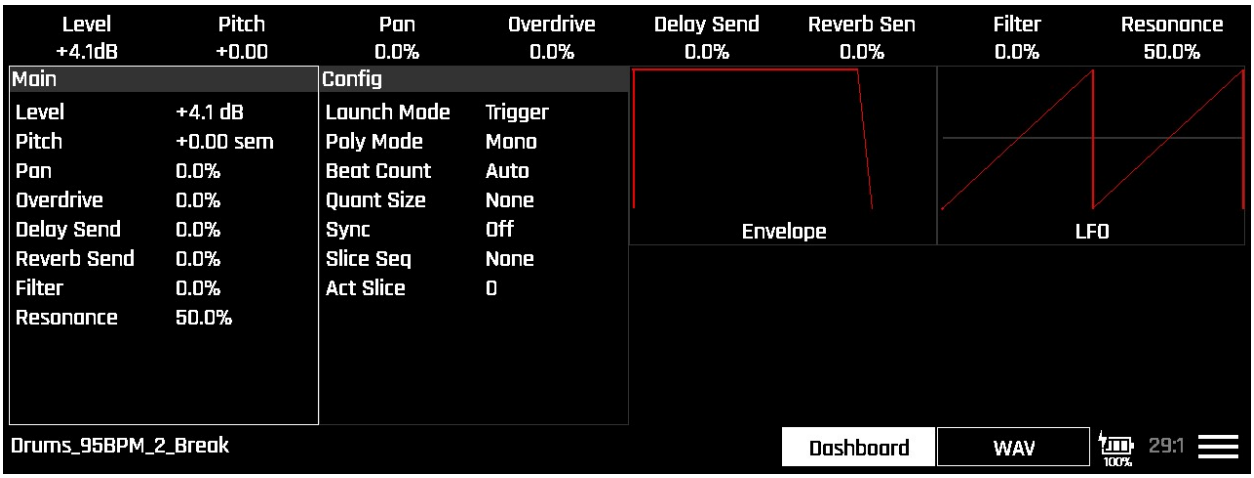


Figure: Slicer Dashboard with Main parameter group selected

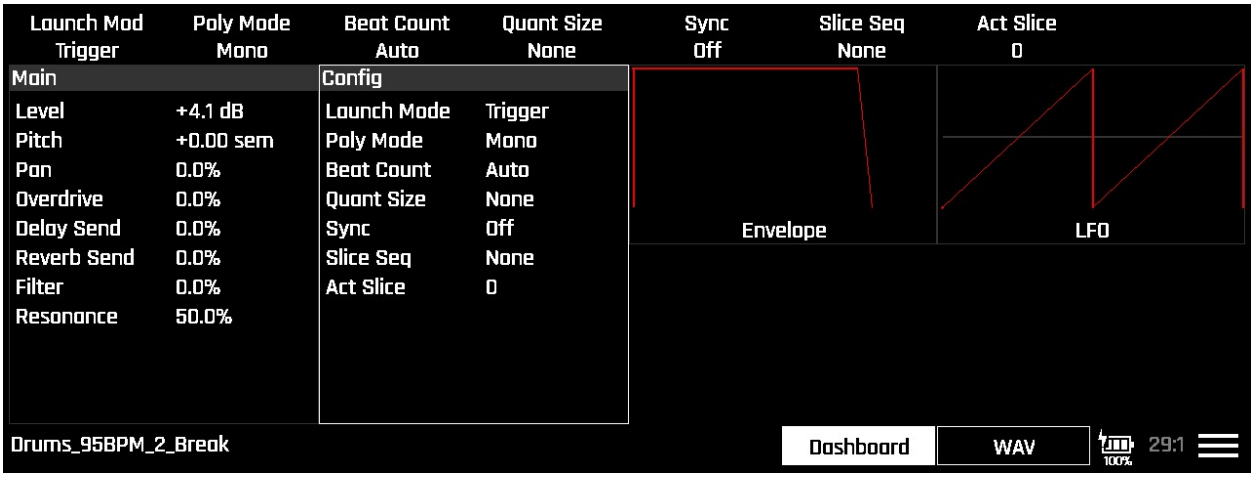
Table: Slicer Track Main Parameters

Parameter	Knob	Range	Description	Modulation Target?
Level	1	0 to 100% (-96dB to +12dB)	Overall track volume	Yes
Pitch	2	-24 to +24 semitones	Global pitch offset for entire track	Yes
Pan	3	-100% to +100%	Stereo positioning from full left to full right	Yes
Overdrive	4	0 to 100%	Sets the level of distortion applied to the track's output audio. Caution: Overdrive causes significantly higher track audio levels.	No
Delay Send	5	0 to 100%	Track signal level sent to bento's Delay effect. Mirrors the send level set in the Mixer.	No
Reverb Send	6	0 to 100%	Track signal level sent to bento's Reverb effect. Mirrors the send level set in the Mixer.	No
Filter	7	-100% to 100%	Filter cutoff frequency and filter type. Negative values set the cutoff frequency of a low pass filter. Positive values set the cutoff frequency of a high pass filter.	Yes
Resonance	8	0 to 100%	Filter resonance amount	Yes

The Main parameter group provides the essential voice shaping controls that most directly affect the sound character and musical integration of your slicer track.

Editing Slicer Voice Parameters in the Config Group

The following screenshot shows the Slicer track Dashboard with the Config parameter group selected.



Slicer Dashboard with Config parameter group selected

Table: Slicer Config Parameters

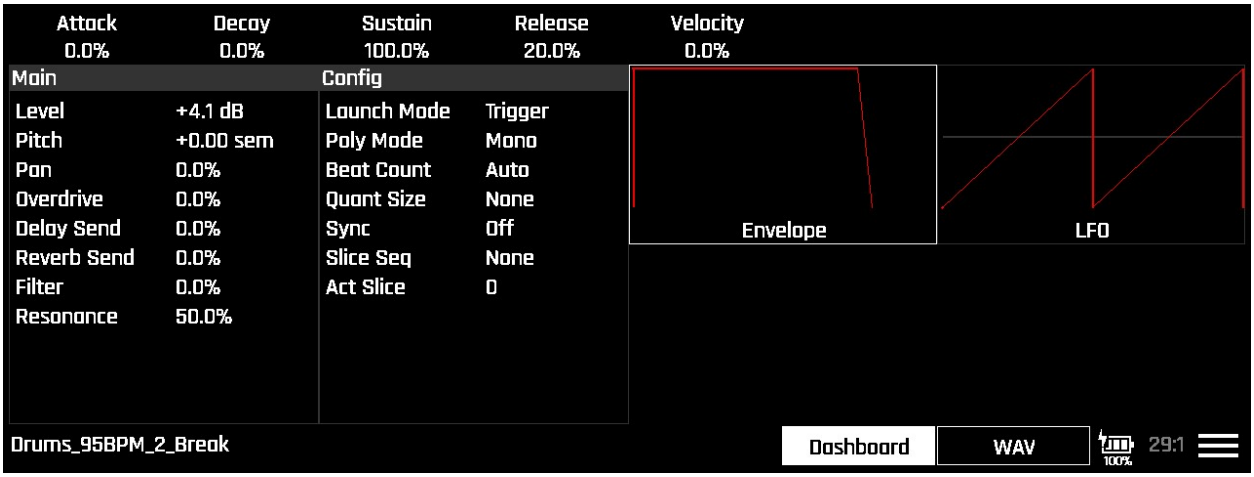
Parameter	Knob	Range/Options	Description	Modulation Target?
Launch Mode	1	Trigger, Gate, Toggle	Determines each voice responds to notes (note-on, note-off) played from pads, MIDI input, and track sequences.	No
Poly Mode	2	Mono, Poly 2	Number of slicer voices bento can play simultaneously.	No
Beat Count	3	Auto, 1-512	Synchronization reference for tempo.	No

Parameter	Knob	Range/Options	Description	Modulation Target?
Quant Size	4	2 bars, 1 bar, 1/2, 1/2T, 1/4, 1/4T, 1/8, 1/8T, 1/16, 1/16T, 1/32, 1/32T, 1/64, none	Quantizes slice playback timing to bento transport. For example, if you play a pad when Quant Size is 1/4, the slice does not start playing until the next beat, which means the transport must be running. If Quantize is “none,” you can play slices while the transport is stopped.	No
Sync	5	Off, On	Enables tempo synchronization.	No
Slice Seq	6	None, Forward, Backwards, Random, Stagger	Advances the slice number on consecutive notes using one of 5 patterns. When **Slice Seq** is “Forward,” playing pad 9 three times causes bento to play slice 9, 10, and 11. When **Slice Seq** is “none” playing pad 11 plays slice 11 repeatedly.	No
Act Slice	7	1-128	Slice number for first step when Slice Seq starts.	No

Config parameters control the fundamental operational behavior of the slicer track, affecting how notes trigger, sustain, and loop within each sample.

Editing Slicer Voice Parameters in the Envelope Group

The following screenshot shows the Slicer track Dashboard with the Envelope parameter group selected.



Slicer Dashboard with Envelope parameter group selected

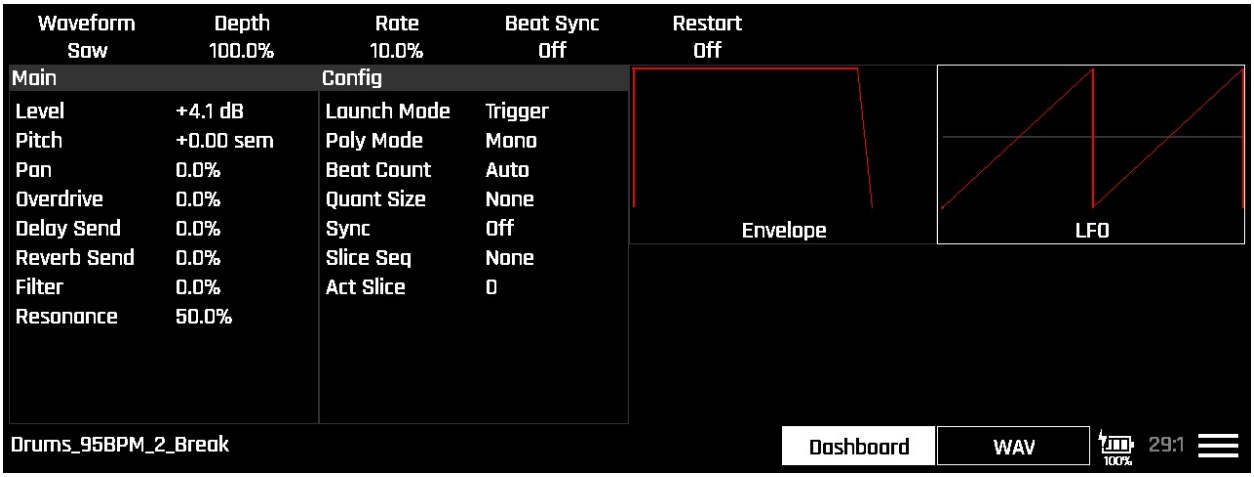
Table: Slicer Track Envelope Parameters

Parameter	Knob	Range	Description	Modulation Target?
Attack	1	0 to 100% 100% = 9 seconds	Envelope attack time	Yes
Decay	2	0 to 100% 100% = 38 seconds	Envelope decay time	Yes
Sustain	3	0 to 100%	Envelope sustain level	No
Release	4	0 to 100% 100% = 38 seconds	Envelope release time	Yes
Velocity	5	0 to 100%	Velocity sensitivity amount	No

The Envelope parameter group provides detailed ADSR envelope control for precise amplitude shaping and velocity response configuration.

Editing Slicer Voice Parameters in the LFO Group

The following screenshot shows the Slicer track Dashboard with the LFO parameter group selected.



Slicer Dashboard with LFO parameter group selected

Table: Slicer Track LFO Parameters

Parameter	Knob	Range	Description	Modulation Target?
Waveform	1	Sine, Triangle, Square, Saw, Random	LFO shape selection	No
Depth	2	0 to 100%	LFO modulation intensity	Yes
Rate	3	0 to 100%	LFO speed from slow to fast	Yes
Beat Sync	4	Off, On	Synchronize LFO to project tempo	No
Restart	5	Off, On	Reset LFO phase on each note	No

LFO parameters enable rhythmic and expressive modulation effects, from subtle vibrato to dramatic tremolo and filter sweeps.

Editing Slices in the Slicer Track WAV Screen

The Slicer Track WAV screen provides a live view of slice playback, slice playback options, and a set of tools for editing slices.

Opening the Slicer WAV Screen

The Slicer WAV screen provides comprehensive slice creation and editing capabilities, displaying your source material's waveform with visual slice markers and slice management tools.

To open the Slicer Track WAV screen:

1. Select the slicer track, then press **INST** to open the Slicer Track Dashboard.
2. From the Slicer Track Dashboard, tap **WAV** in the navigation area.

   The Slicer Track WAVE screen opens.

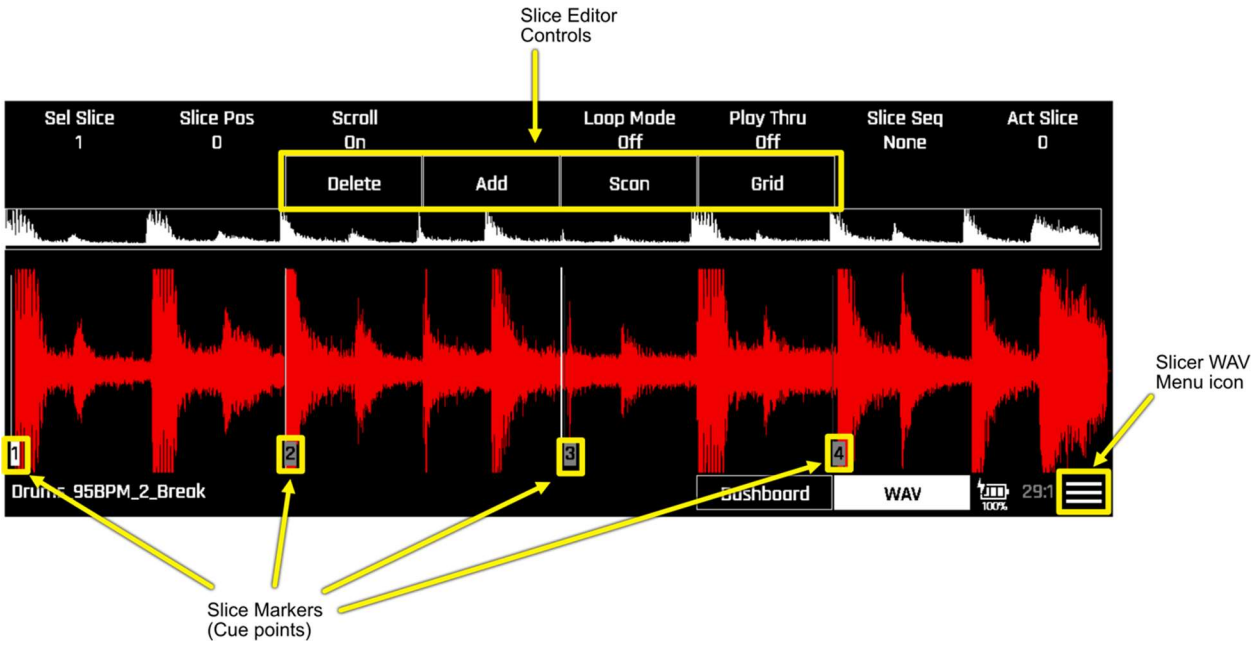


Figure: Slicer Track WAV screen

The Slicer Track WAV screen includes:

- A waveform display area that contains the waveform (in the same color as the track's pads) of the sample loaded in the slicer track, with numbered markers representing the slice points.
- A zoomed-out waveform overview in white for moving the waveform display area from one from one part of the sample to another.
- The names and current values of voice parameters that you can edit with bento's eight knobs.
- A set of controls for editing the slice points and a Menu that includes a Clear All control for removing all slice points.

The following table describes the slicer track parameters displayed across the top of the screen.

Table: Parameters in the Slicer Tract WAV Screen

Parameter	Knob	Range	Description	Modulation Target?
Sel Slicer	1	1 to the number of slices.	Selects a slice marker for editing.	No
Slice Position	2	0 to number of samples.	Sets the sample position at which the selected slice begins playing when triggered.	No
Scroll	3	Off, On	Disables screen scrolling during slice playback. Useful when screen is zoomed in on a small region of the sample.	No
Loop Mode	5	Off, On	Specifies if bento loops each slice during playback (**Loop Mode** = On) or plays the slice once and stops (**Loop Mode** = Off) like a one-shot.	No
Play Thru	6	Off, On	Specifies if bento plays from the beginning of one slice to the beginning of the next slice (Play Thru = Off) or if bento plays from the beginning of one slice to the end of the sample (Play Thru = On).	No
Slice Seq	7	None, Forward, Backwards, Random, Stagger	Advances the slice number on consecutive notes using one of 5 patterns. When **Slice Seq** is “Forward,” playing pad 9 three times causes bento to play slice 9, 10, and 11. When **Slice Seq** is “none” playing pad 11 plays slice 11 repeatedly.	No
Act Slice	8	1-128	Slice number for first step when Slice Seq starts.	No

Editing Slice Playback Parameters

When the Slicer Track WAV screen is open, Knobs 5-7 correspond to parameters that affect how bento plays slices.

Loop Mode (Knob 5) and **Play Thru** (Knob 6) determine how each note is played.

When **Loop Mode** is On, each slice plays in a loop while a note is held until the voice's envelope ends its release phase or until another note steals the voice. When **Loop Mode** is Off, bento plays the slice like a one-shot.

When **Play Thru** is On, each sample plays from its slice position to the end of the sample and then stops, unless **Loop Mode** is On, in which case playback returns to the sample start and loops the entire sample.

The **Slice Seq** (Knob 7) and **Act Slice** (Knob 8) parameters let you configure slicer tracks to handle each consecutive note by establishing a pattern for selecting a slice instead of playing the slice mapped to each note. **Act Slice** sets the next slice to be played and **Slice Seq** sets a pattern (None, Forward, Backwards, Random, or Stagger) for choosing the slice to play for subsequent notes.

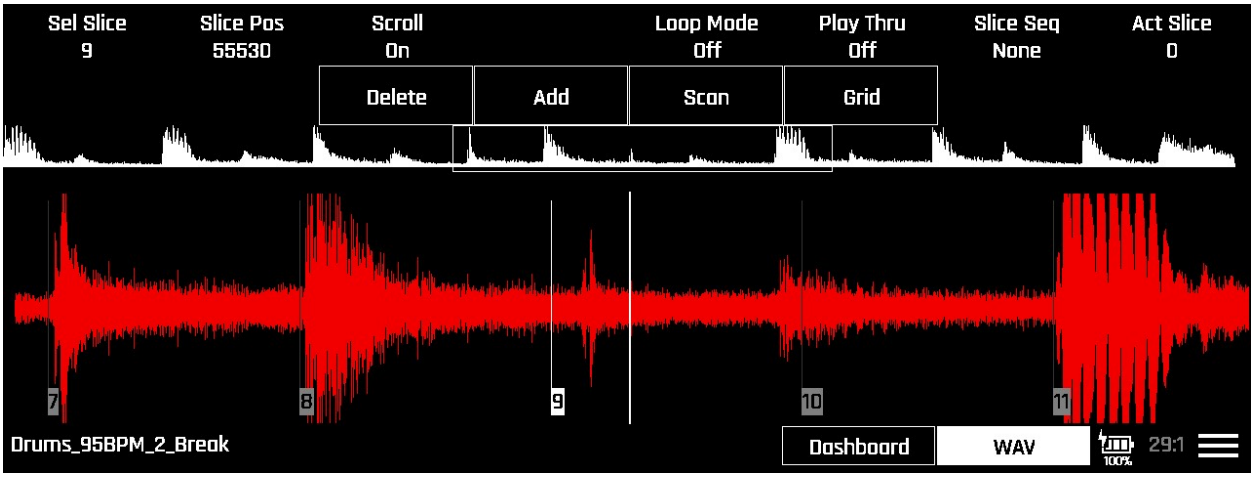
Moving Individual Slices

Knobs 1 and 2 are mapped to the **Sel Slice** and **Slice Pos** parameters, respectively, which make it easy to select and move existing slices.

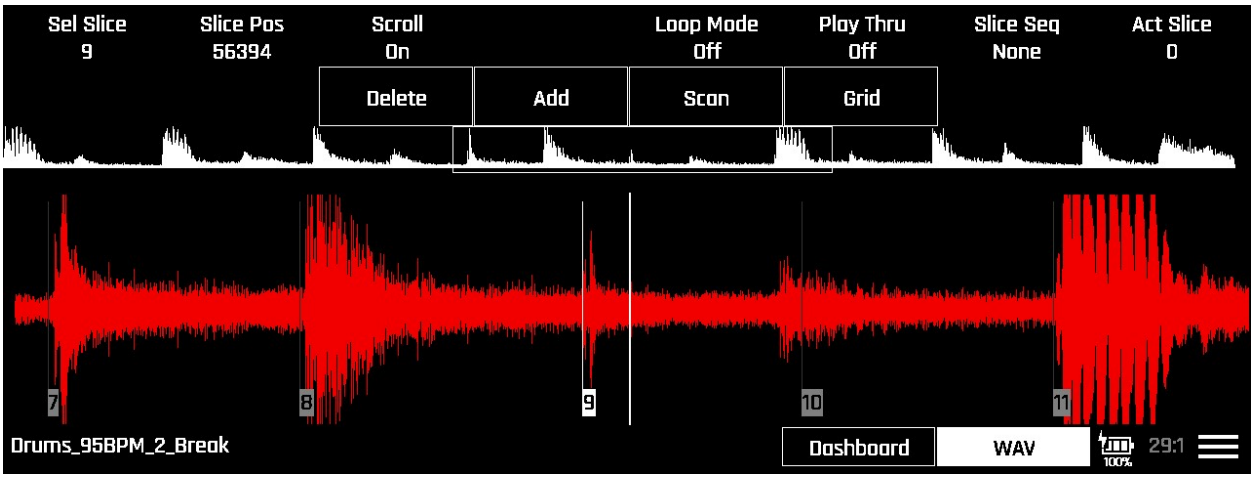
To move a slice:

1. Adjust Knob 1 to select a slice for editing. The marker of the selected slice is highlighted in white.

   For example, in the following screen, **Sel Slice** has selected slice 9, which begins at position 55530, slightly ahead of a transient.



2. Adjust Knob 2 to move the selected slice's marker to the correct position. For example, in the following screenshot, slice 9 has been moved from 55530 to 563934.



3. To view or edit the positions of other slices, use Knob 1 to select and Knob 2 to adjust each slice.

Zooming In and Out

When you play the pads, a vertical white line moves across the corresponding slice in the display as it plays. If the Slicer track's sample slices are difficult to distinguish, you can zoom in to see a range of slices in more detail by spreading the screen with two fingers or zoom out by pinching with two fingers.

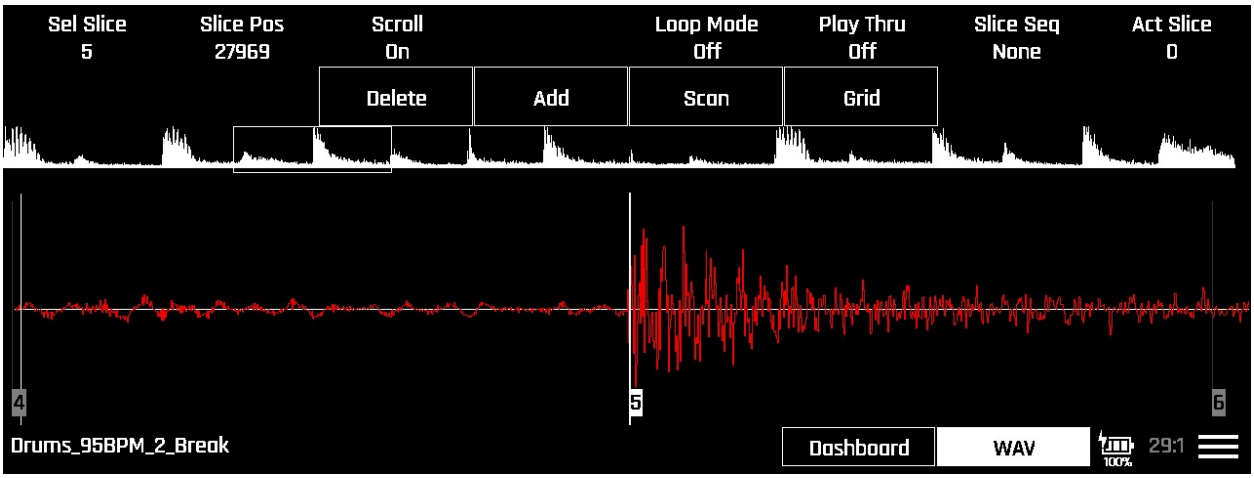


Figure: Slicer WAV Screen Zoomed-in

Zooming in makes it easier to view and move slice markers. For example, in the above screenshot, Knob 2 (Slice Pos) was able to move slice 5 to start precisely at slice position 27969 because of the waveform magnification. Above the main waveform display, is a complete overview of the sample's waveform, with the current zoom region highlighted. You can tap anywhere in the waveform overview to move the display to a different region while keeping the current magnification.

Disabling Playback Scrolling

If you zoom in on a slice point and then play a pad to test the new slice position, the display may scroll past the currently visible part of the sample. While this is the Slicer WAV screen's usual behavior, it can be distracting when you are trying to edit slice points.

Fortunately, the Slicer WAV scroll feature can be disabled with the **Scroll** parameter, which is mapped to Knob 3 in the Slicer Track WAV screen.

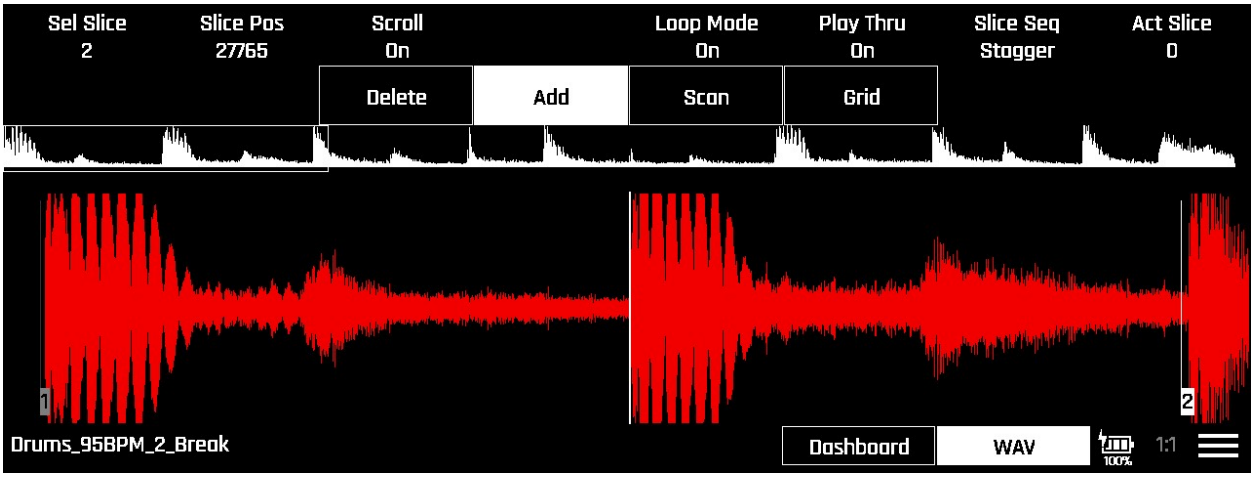
To disable playback scrolling, adjust Knob 3 to change **Scroll** to Off. When **Scroll** is off, the waveform display maintains its current view position and magnification even if you play slices that are not on screen, unless you intentionally move to a different part of the sample by swiping the screen with two fingers or tapping in the waveform overview.

Adding a New Slice

You can add new slices at any position in the slicer track's sample.

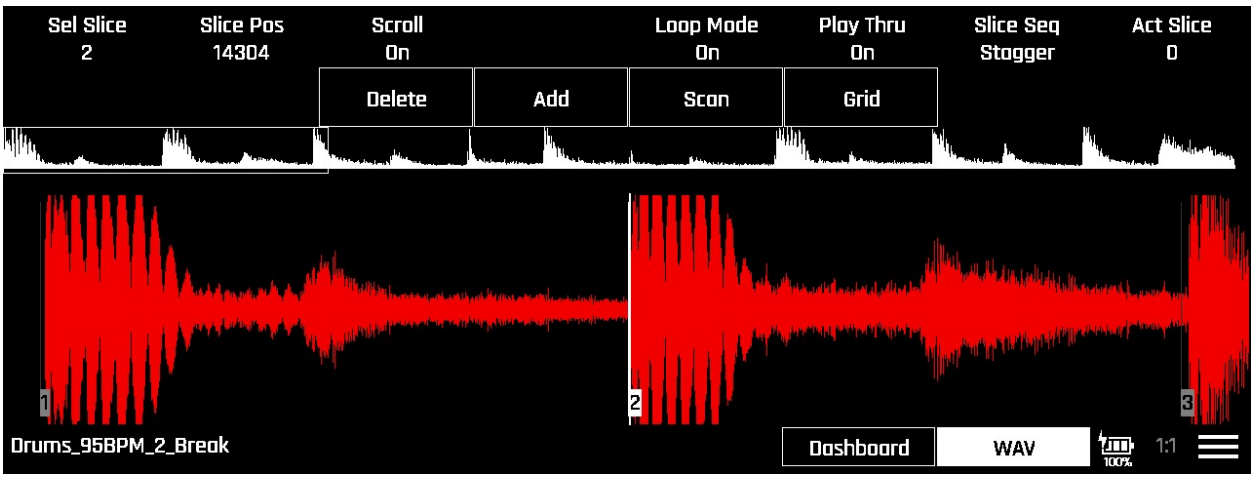
To add a new slice:

1. Using swiping and zooming gestures, move the waveform display so that the white vertical line in the middle of the waveform display coincides with the position in the sample where you want to add a new slice.



2. Tap **Add** in the Slicer Track WAV screen.

   The new sample is added at the chosen position.



Note that adding a new slice increases the slice numbers of higher-numbered slices.

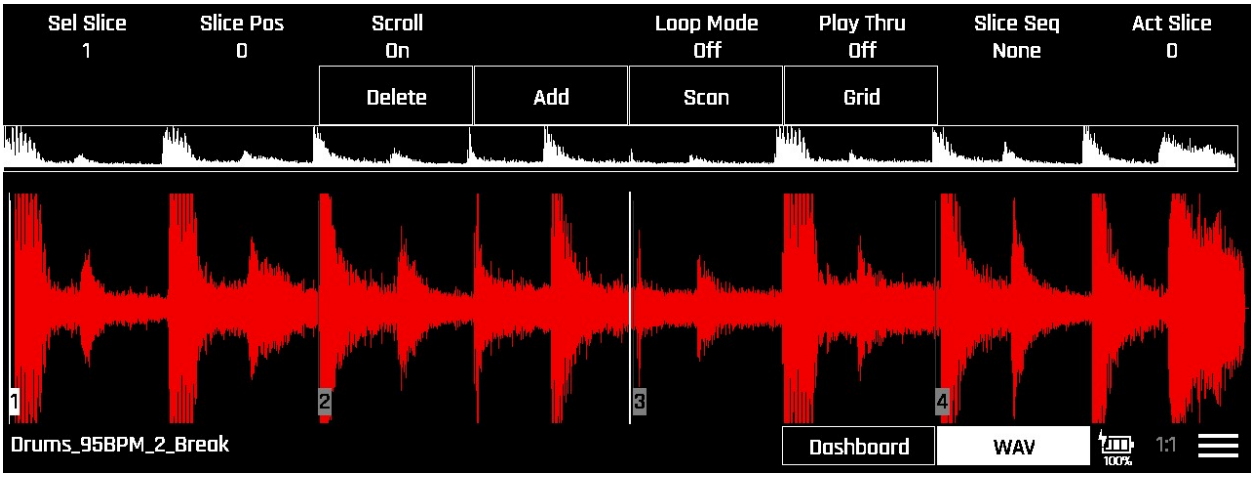
Deleting a Slice

You can delete existing slices from slicer track

To delete an existing slice:

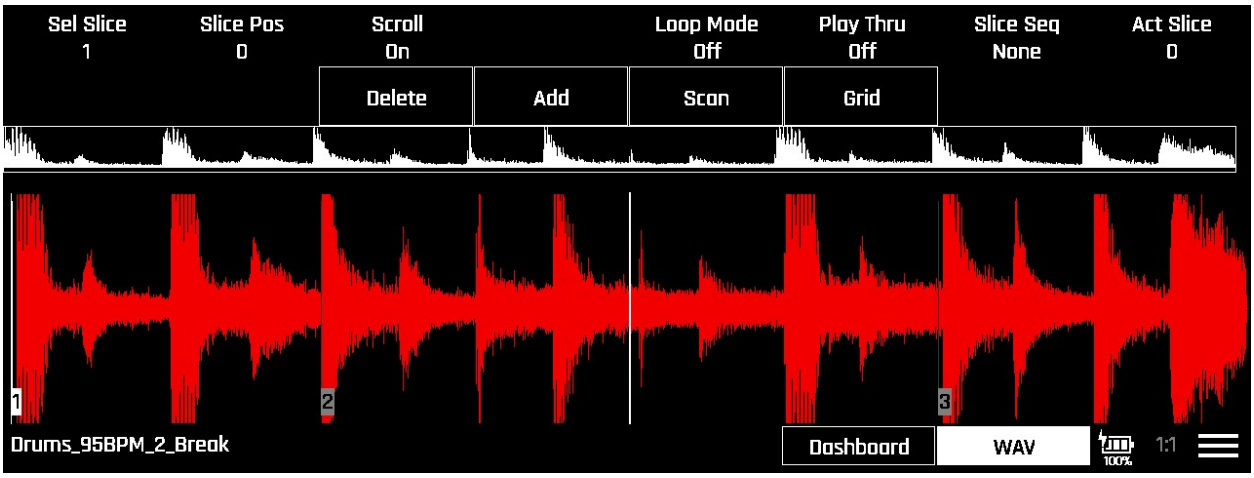
1. Using swiping and zooming gestures, move the waveform display so that the white vertical line in the middle of the waveform display is slightly to the left of the slice you want to delete.

   For example, the vertical position line is a slightly before the slice 3 marker.



2. Tap **Delete** in the Slicer Track WAV screen.

   The selected slice is deleted from the slicer track.



Note that deleting a slice decreases the slice numbers of higher-numbered slices.

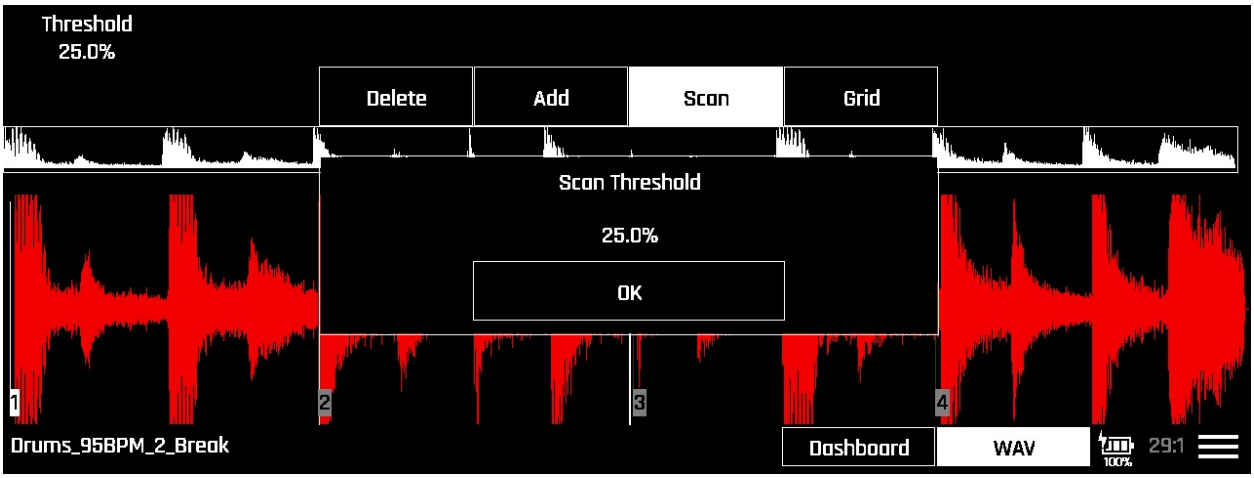
Creating Slices at Sample Transients

The Slicer Track WAV screen's Scan control lets you create slices that begin at transients in the sample waveform.

Caution: Creating slices with the Scan control deletes all existing slices.

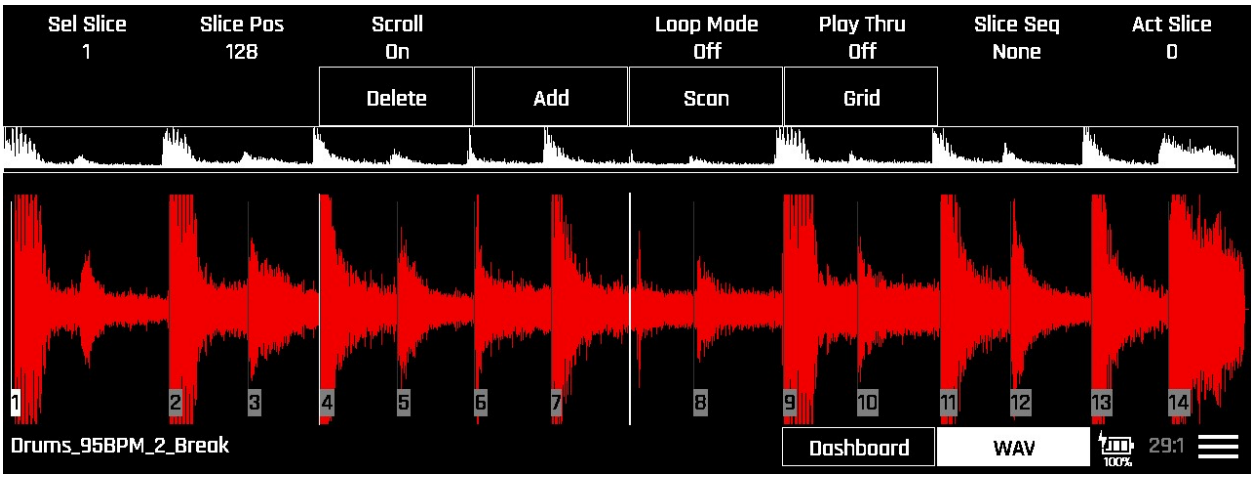
To configure slices at transients in the sample:

1. Tap **Scan** in the Slicer Track WAV screen.
   A dialog appears with a default **Scan Threshold** (25%) for detecting transient in the sample.



   Scan analyzes amplitude changes and frequency content to identify likely slice points at musical boundaries. Higher sensitivity settings create more slice points, while lower settings focus on the most prominent transients.

2. Adjust **Scan Threshold** with Knob 1 then tap **OK**.



You now move or delete any of the new slices manually or keep the as they are.

Creating Slices on a Grid

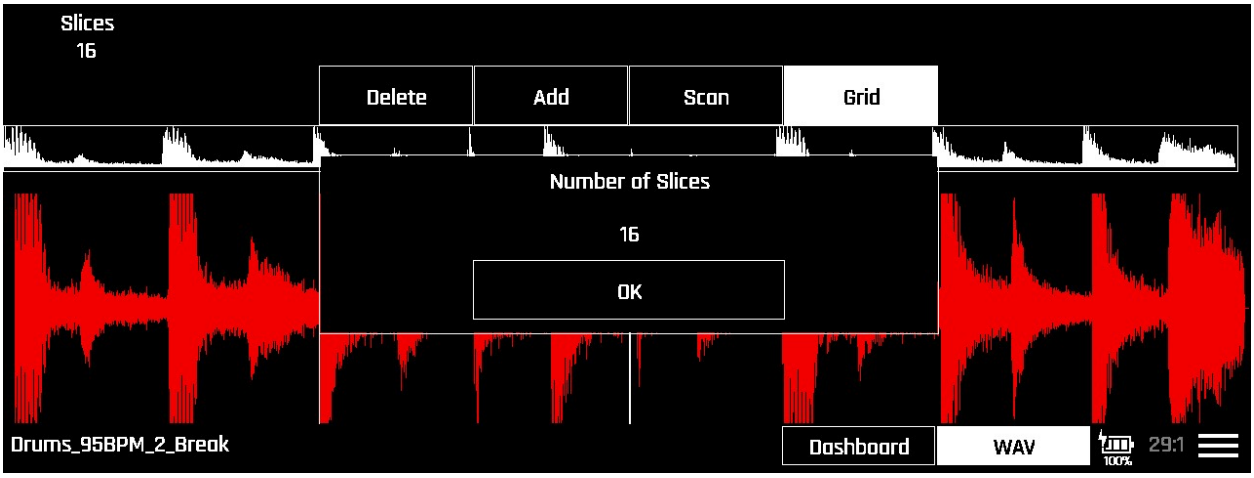
Grid-based slicing creates mathematically equal divisions, useful for material with consistent rhythmic structure or for creating specific slice counts. This approach works well with loops and rhythmic content where exact timing relationships are important.

Caution: Creating slices with the **Grid** control deletes all existing slices.

To create grid-based slices:

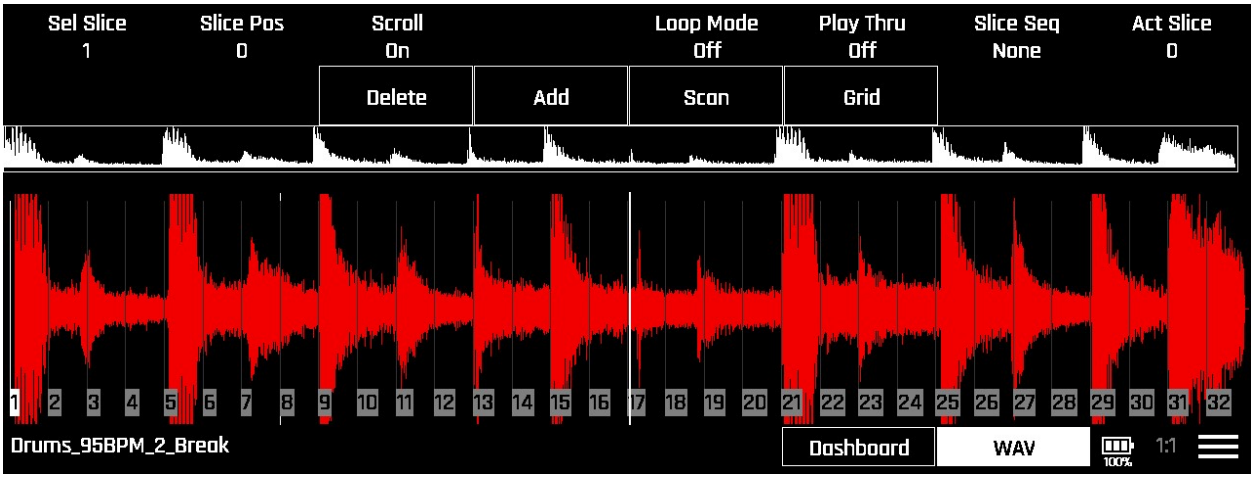
1. Tap **Grid** in the Slicer Track WAV screen.

   A dialog appears with a default Number of Slices (16) for the slice grid.



2. Adjust Knob 1 to change the **Slices** parameter, which specifies the number of slices to be added at evenly spaced grid points and tap **OK**.

   The Slicer Track WAV screen adds the chosen number of slices at evenly spaced positions in the sample. In the following screenshot, 32 slices have been created in a grid.



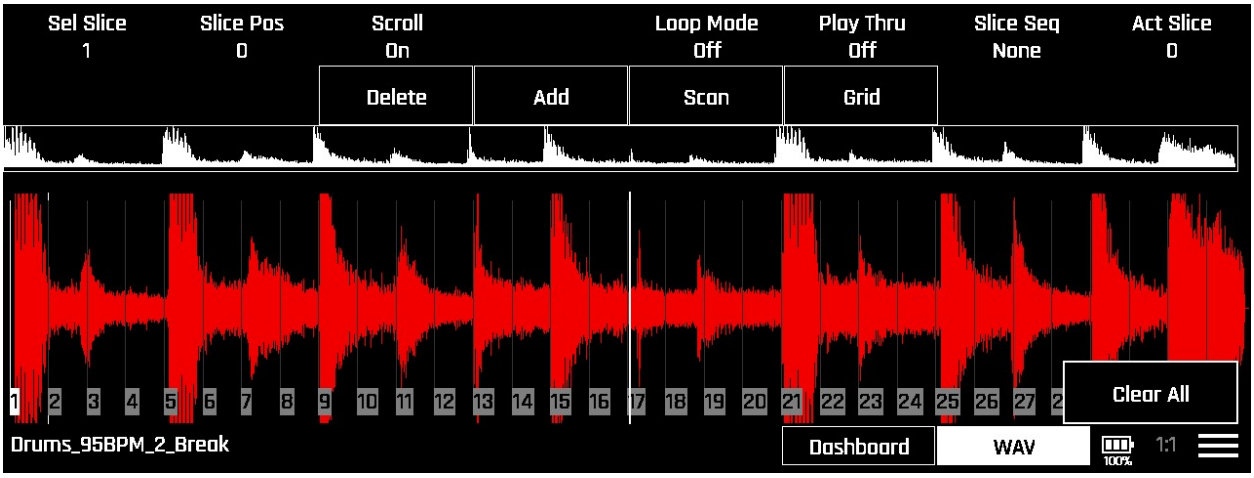
You now move or delete any of the new slices manually or keep the as they are.

Clearing All Slices

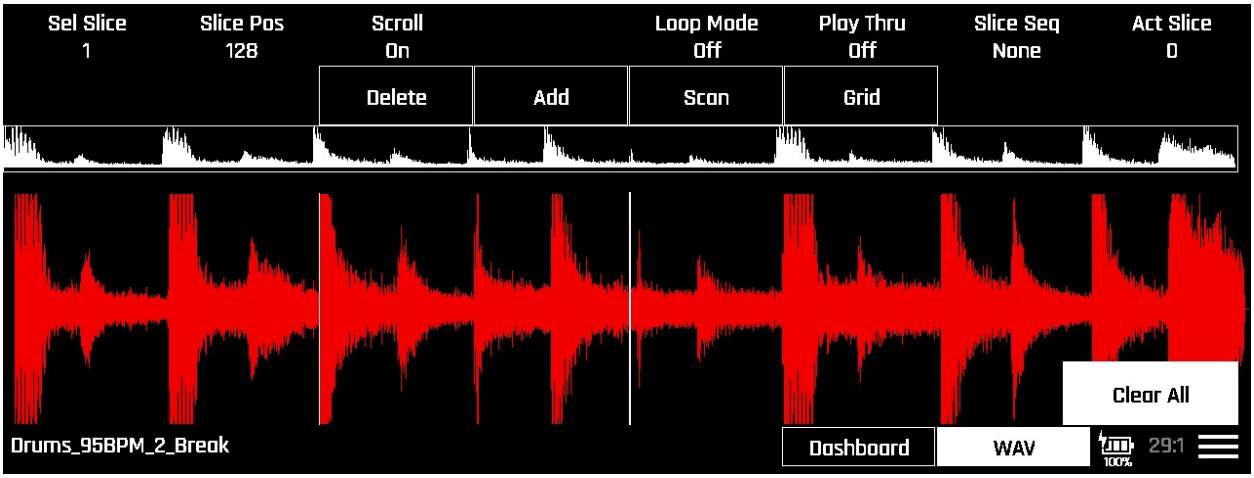
The Slicer Track WAV screen's menu provides access to a Clear All control that lets you delete all slices from the slicer track.

To clear all slices from the slicer track:

1. Tap the **Menu** icon in the Slicer Track WAV screen. The menu opens to display the **Clear All** control.



2. Tap **Clear All**. All slices are removed from the slicer track.


Sel Slice
1
Slice Pos
128
Scroll
On
Loop Mode
Off
Play Thru
Off
Slice Seq
None
Act Slice
0
Delete
Add
Scan
Grid
Clear All
Drums_95BPM_2_Break
Dashboard
WAV
100%
29:1

Editing Slicer Track Modulation

Each bento Track includes a central Modulation screen within which you can configurate all modulation settings.

The modulation system enables dynamic control of Slicer parameters through various sources such as note velocity, envelopes, LFOs, and external MIDI controllers.

The specific modulation sources available vary with each track type.

To configure modulation in a slicer track:

1. Open the slicer track dashboard, then tap the **Menu** icon in the lower right corner of the screen. The **Menu** opens, displaying a single option, **Modulation**.

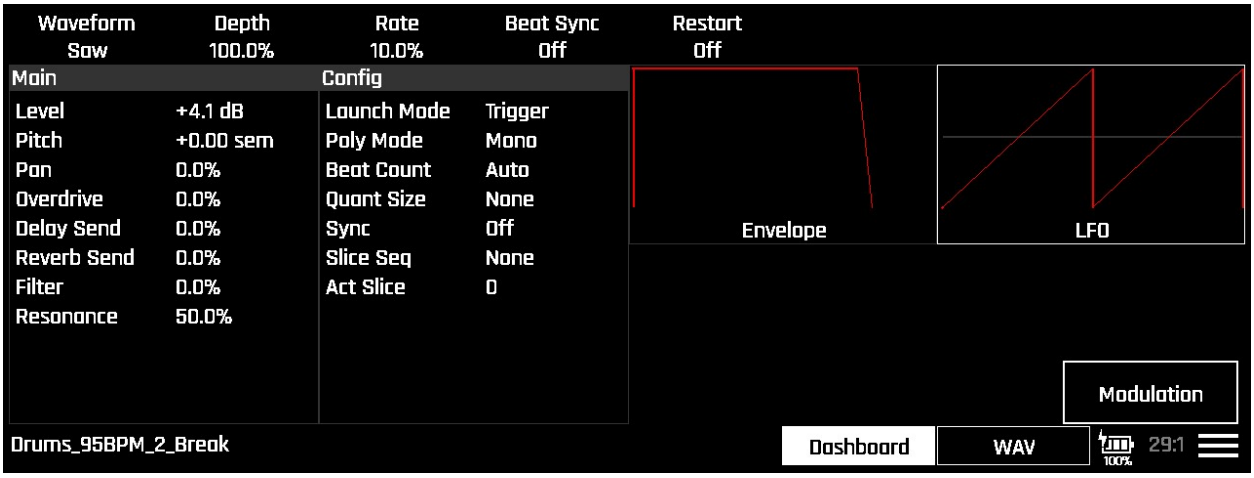


Figure: Slicer Dashboard Modulation Menu Option

2. Tap **Modulation**.

   The Slicer Track Modulation Screen opens.

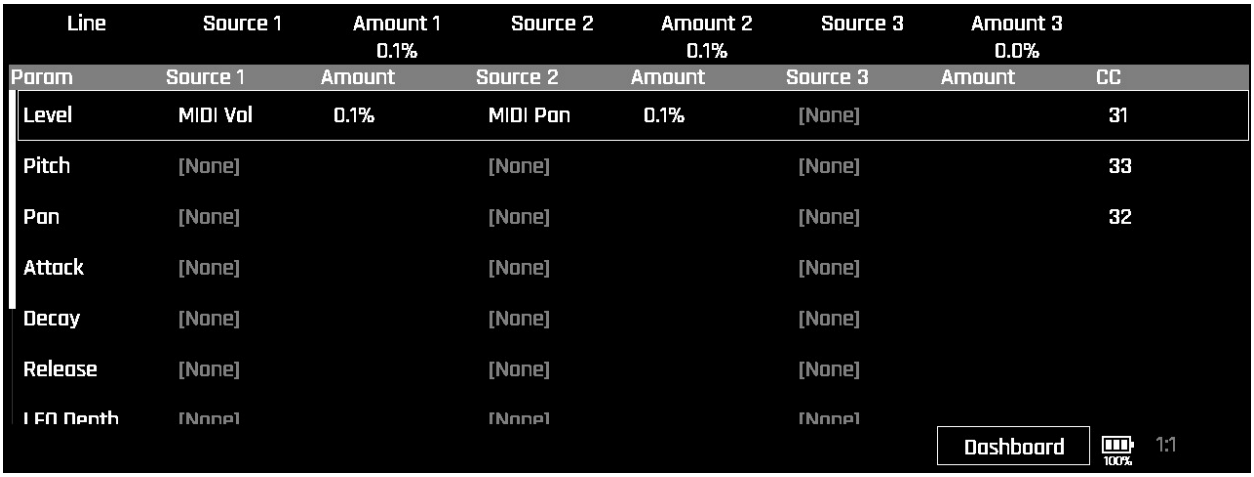


Figure: Slicer Track Modulation Screen

The first column in the Modulation screen contains the name of every slicer track parameter that can be a modulation "target." Columns 2 through 7 let you set up three modulation sources and three modulation amount values for the modulation target of the selected row.

3. To see the complete list of modulation targets in the Modulation screen you can either:

   - swipe the screen up or down, or

   - turn Knob 1 to scroll up and down through the Modulation screen.

4. Select the line of the parameter you want to modulate, then use Knobs 2-7 to configure one or more modulation sources and modulation levels.

   The following table describes the parameters you can modulate, the modulation sources you can route to them, and the range of modulation levels.

Table: Modulation Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Line	1	Level Pitch Pan Attack Decay Release Filter Cutoff Filter Resonance LFO Depth LFO Rate	Moves the Modulation screen's line selection through the parameters listed in the first column. Once you have selected a modulation target, you can configure up to 3 modulation sources and modulation amounts with knobs 2-7.	No
Source 1	2	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (1 of 3)	No
Amount 1	3	-100% to +100%	Modulation Amount (1 of 3)	No
Source 2	4	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (2 of 3)	No
Amount 2	5	-100% to +100%	Modulation Amount (2 of 3)	No
Source 3	6	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (3 of 3)	No

Parameter	Knob	Range	Description	Modulation Target?
Amount 3	7	-100% to +100%	Modulation Amount (2 of 3)	No

5. To return to the slicer track Dashboard, tap **Dashboard** or press **INST**.

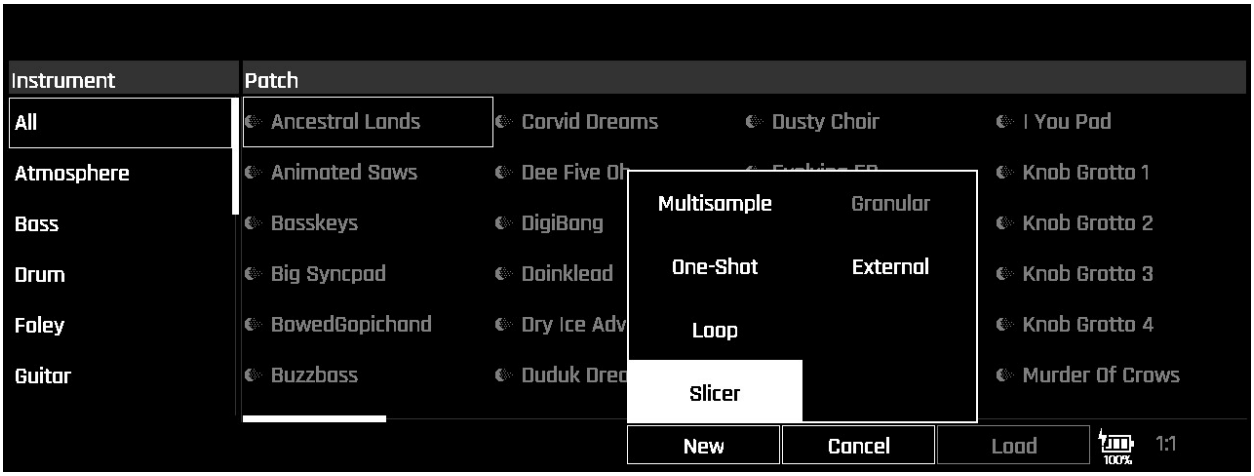
Creating New Slicer Tracks

Creating new slicer tracks involves loading a sample stored on bento's microSD card and configuring slices with the slice editing controls of the Slicer Track WAV screen.

Note: Creating a new slicer track requires an empty track. If you cut a track from a project, the sequences for that track are also cut.

To create a new slicer track:

1. Organize your original samples in folders on the microSD card. To avoid confusion, create your sample folders at the root level of the microSD card, and not under the factory Patches and Project folders.
2. Choose an empty track in your bento project.
3. Double tap the empty track slot on the Tracks screen.
4. Tap **New** and select **Slicer** from the track type options.



The slicer track sample browser screen opens.

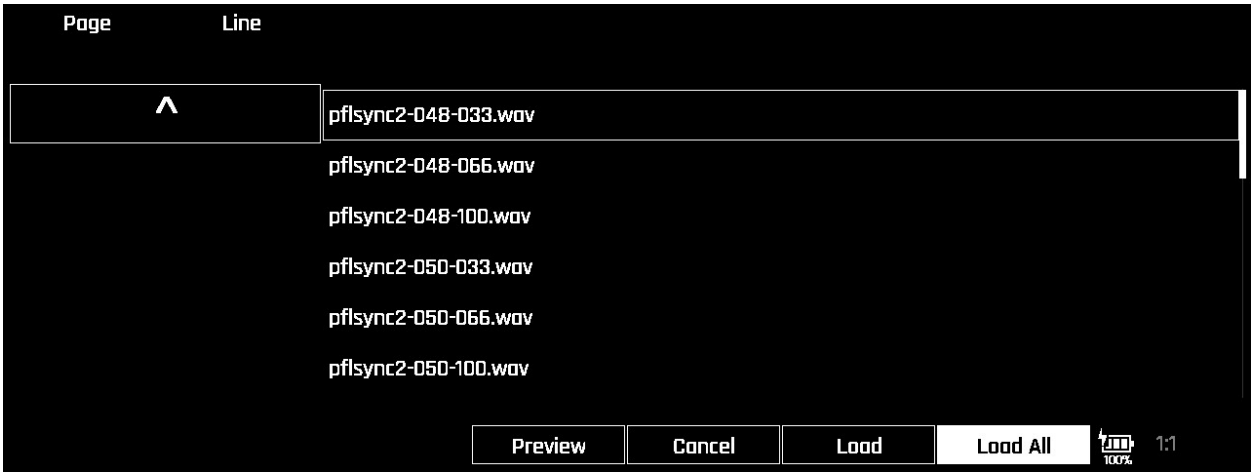


Figure Slicer track sample browser

Note: The Instrument categories do not appear in the sample browser because bento lets you browse for samples in any folder on the microSD card. bento only displays instrument categories when you browse for patches to load into a track.

5. Browse to the location of the sample you want to load in the new slicer track.

6. Select the sample you want to load, then tap **Load.**

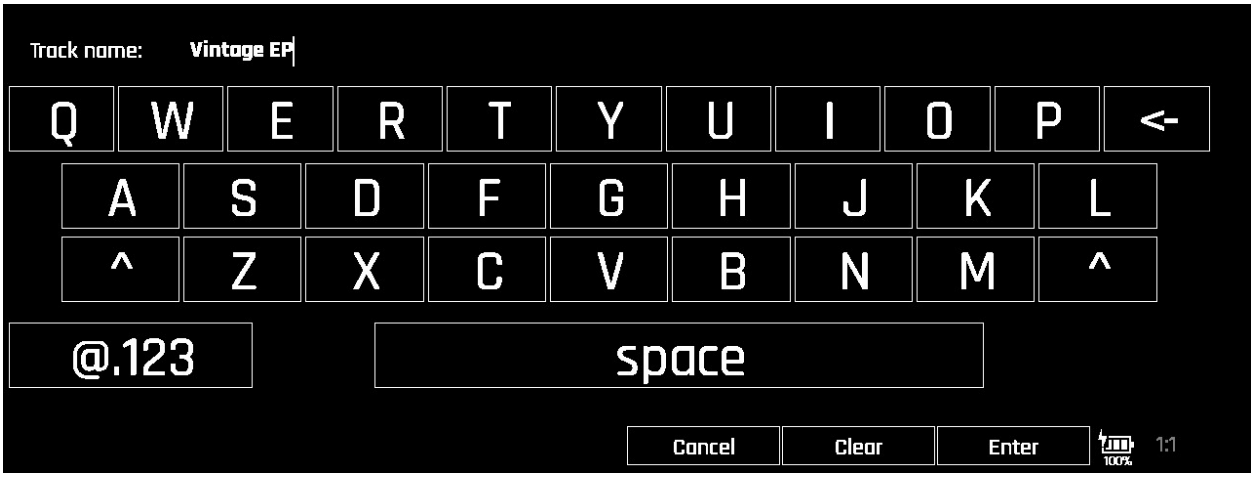
   bento reads the sample file header to find cue points that it can use as slice points in the new slicer track and then returns you to the Tracks screen, where the new track is selected and displayed with a default name.

7. Play the new slicer track from bento's pads and listen for any slices that bento may have created automatically from cue points in the WAV file header.

8. To rename the new track, open the new track's Track Config screen by selecting the track and pressing the **RIGHT** arrow button or choosing **Config Track** from the Track Screen menu, and then tapping **Rename Track**.

Rename Track in Slicer Track Configuration Screen

9. Tap the keys to enter a new track name in the naming keyboard screen., then tap **Enter**.



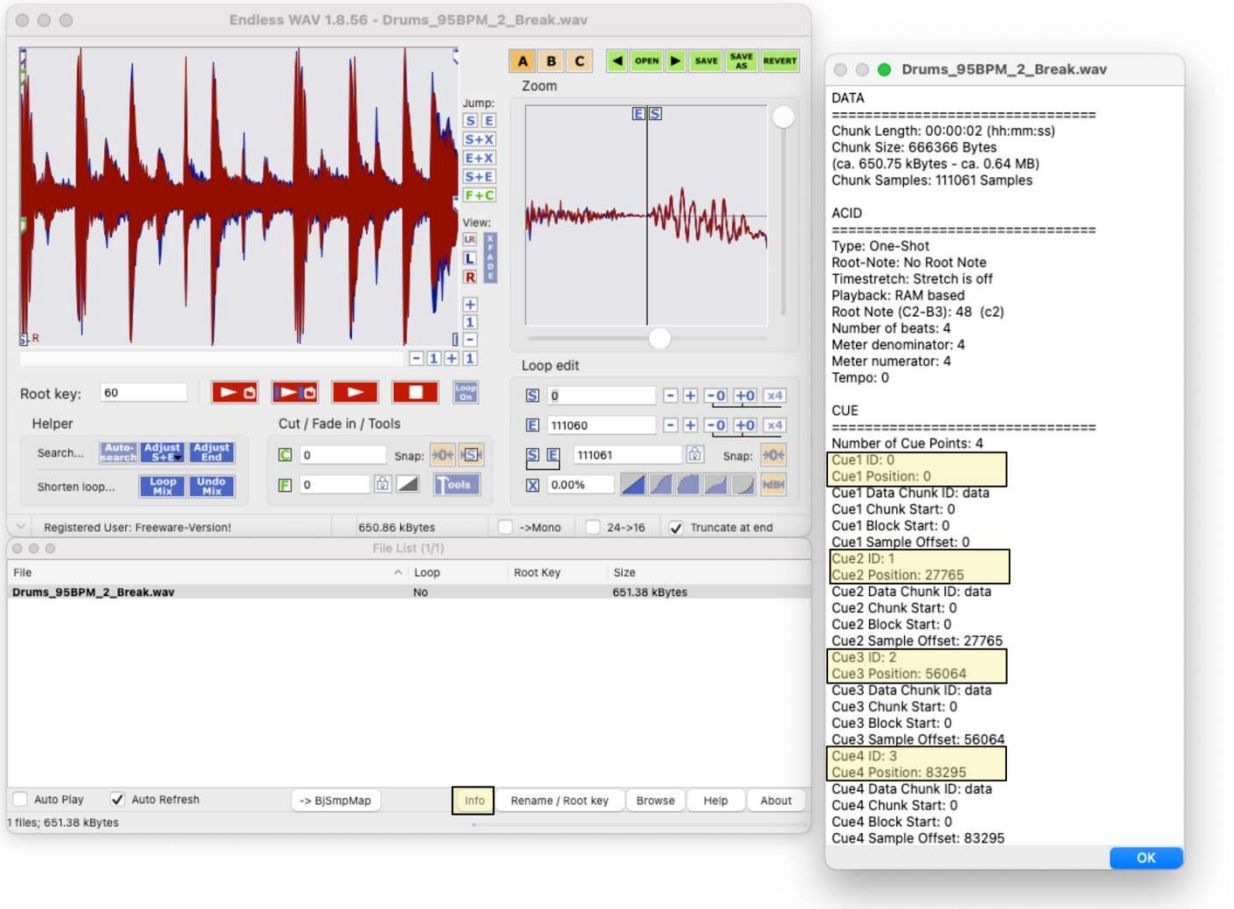
Naming Keyboard Screen

The track now appears in the Tracks screen with its new name.

Using Custom Samples in Slicer Tracks

If you plan to use your own samples in slicer tracks, you can add cue points to the sample files with software tools such as Sound Forge or even with hardware devices such as 1010music's tangerine and blackbox, which let you load a sample into a pad, edit slices, and then save a copy of the sample with the new slice markers (cue points) to microSD card.

If you're not sure if a file already has cue points, use a tool like Endless Wave to view the sample file details.



In this example, Drums_95BPM_2_Break.wav has four slices (cue points):

Cue1 ID: 0	**Cue1 Position: 0**
Cue2 ID: 1	**Cue2 Position: 27765**
Cue3 ID: 2	**Cue3 Position: 56064**
Cue4 ID: 3	**Cue4 Position: 83295**

Note: If you create a slicer track and load a sample that contains cue points, bento uses those cue points as slice markers, but you can edit them with the slice-editing tools in the Slicer Track WAV screen and save them as part of the project. The next time you load the project bento restores the saved slice markers instead of the embedded cue points.

Exploring One-shot Tracks

One-shot tracks provide the foundation for drum programming, percussion performance, and sound effect triggering in bento. Each One-shot track contains up to 16 individual samples that you can trigger independently using the hardware pads or external MIDI controllers.

This chapter covers essential techniques for working with One-shot tracks, from understanding their sample bank organization through creating effective instrument collections. You'll learn how to load and organize samples, configure playback parameters, and integrate One-shot content into your musical arrangements.

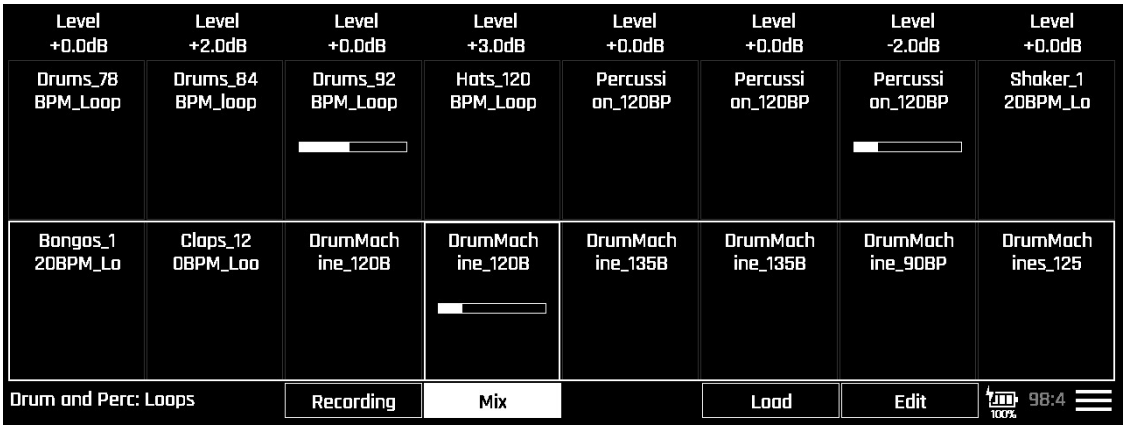
To do this...	**read...**
Understand how One-shot tracks organize individual samples	Understanding One-shot Tracks
Trigger samples with pads or MIDI for live performance	Playing One-shot Tracks
Manage sample banks and individual sample assignments	Editing One-shot Tracks
Set up new One-shot instruments from individual samples	Creating New One-shot Tracks
Optimize sample selection and performance workflows	Best Practices for One-shot Tracks

While Loop tracks play tempo synchronized audio files, and Slicer tracks allow you to trigger different segments of long samples, One-shot tracks are designed for sequencing playback of individual samples. This makes them ideal for building drum kits, organizing percussion sounds, or creating banks of sound effects that you can trigger on demand.

Understanding One-shot Tracks

One-shot tracks organize individual samples into a 16-slot sample bank where each pad triggers a specific sample. This direct one-to-one relationship between pads and samples makes One-shot tracks an obvious choice for creating a custom drum machine-like instrument or for crafting a unique live electronic percussion performance instrument.

One-shot tracks are the only type of track that let you change each one-shot's sample start and end points in real time.



One-shot Sample Bank screen in Mix View

One-shot tracks treat each one-shot as an independent instrument with its own sample, playback settings, filter, envelope, LFO, modulation settings, and individual levels, panning, and effects sends.

You could just as easily load 16 tonal instrument samples and play chords or melodies from bento's pads or from a MIDI controller.

The sample bank structure provides both flexibility and organization. You can load different samples into each slot, creating custom drum kits or sound collections tailored to your musical needs. Empty slots remain available for additional samples, and you can replace existing samples without affecting the overall track configuration or sequences.

Individual One-shots and Screens

Each one-shot has its own sample, playback settings, filter, envelope, LFO, modulation settings and even their own individual FX sends.

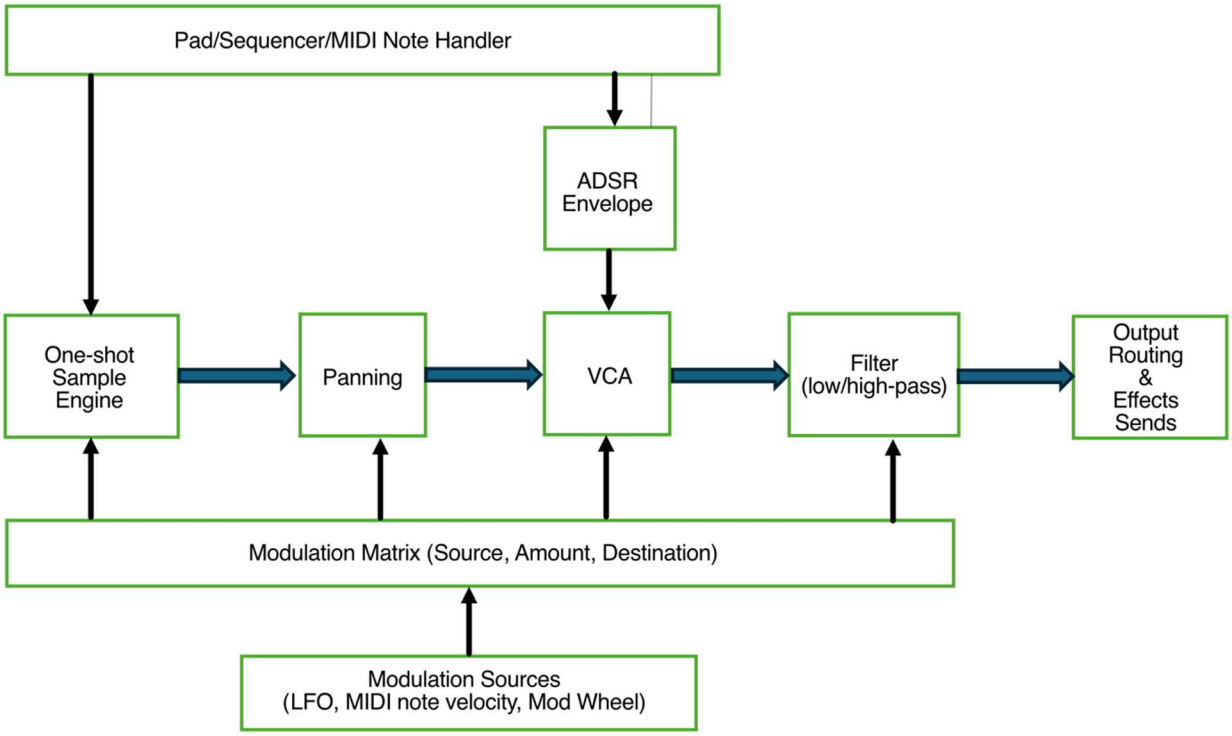


Figure: Individual One-shot Voice Structure

One-shot Track Screens

Multisample tracks provide four main control screens for comprehensive parameter editing and sample management.

Table: One-shot Track Screens

Screen	Description
One-shot Sample Bank	Displays 16 one-shots. Each one-shot displays a progress bar when is playing. Each one-shot shows the loaded sample name and provides access to the corresponding one-shot Dashboard for configuring one-shot voice settings.
One-shot Track Config screen	Manages MIDI routing and audio output assignment.
One-shot Dashboards	Displays voice parameters and performance controls organized into four sections (Main, Config, Env, LFO).
One-shot WAV screen	Displays the waveform of one of the track's samples and offers controls for the sample playback start point and playback length, and **Reverse** parameter for controlling sample playback direction.
One-shot Modulation screen	Provides a central location for routing modulation sources to modulation targets, and for setting a modulation amount for each.

Navigation between loop track screens and individual loop Dashboards uses standard bento navigation patterns.

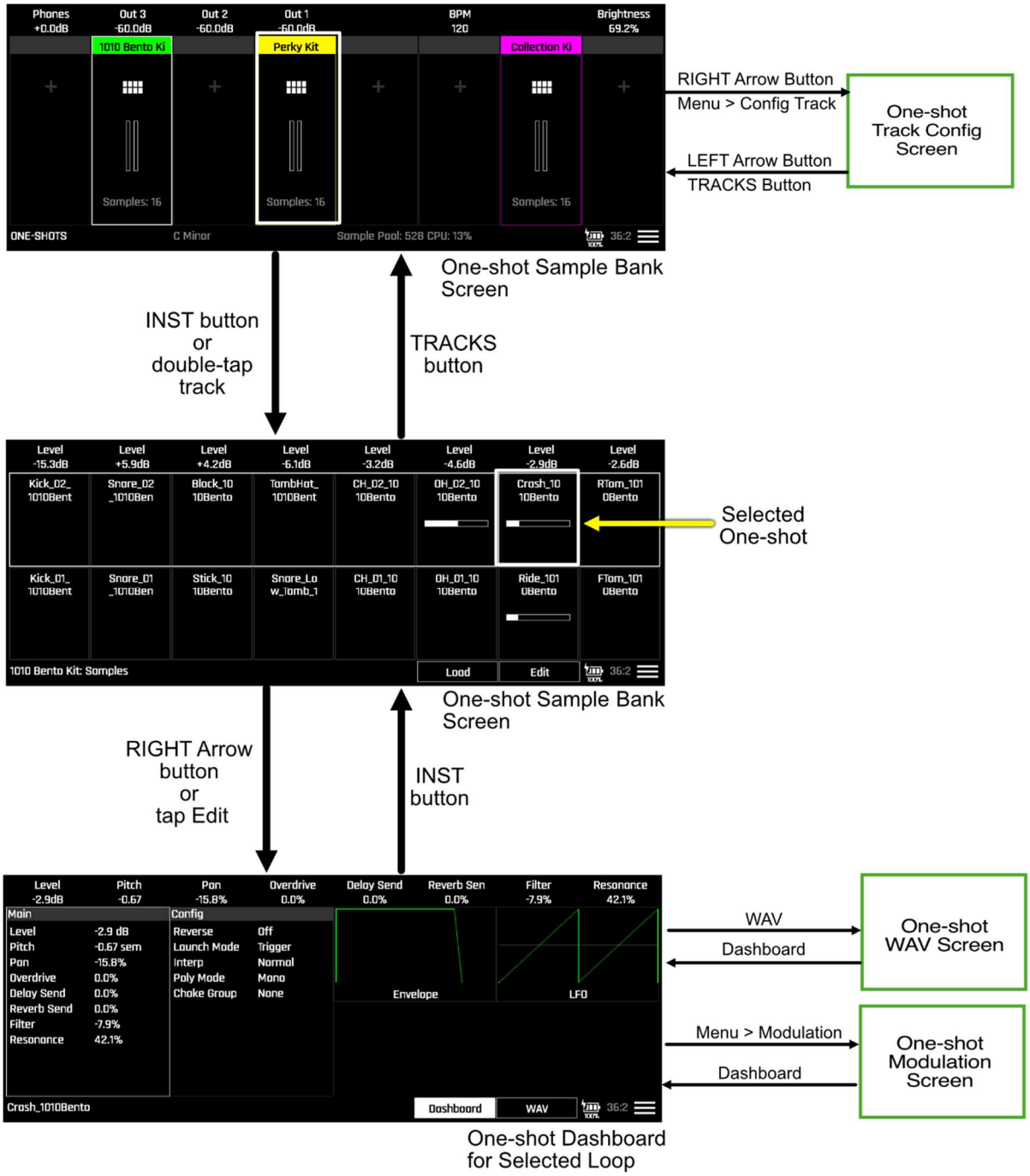


Figure: One-shot Track Screen Navigation

Playing One-shot Tracks

One-shot tracks excel in live performance situations where you need immediate access to individual sounds. Each pad triggers its assigned sample with velocity and pressure sensitivity, providing dynamic control over your drum programming and percussive performance.

The direct pad-to-sample relationship makes One-shot tracks particularly effective for building rhythm tracks, adding percussion accents, and triggering sound effects at precise moments in your arrangements.

Playing One-shot Tracks with bento's Pads

The hardware pads provide immediate tactile control over your One-shot samples, responding to both velocity and pressure for expressive performance possibilities.

To trigger One-shot samples with pads:

1. Select your One-shot track from the Tracks screen.
2. Press the pads to trigger individual samples.
3. Vary your touch pressure and velocity for dynamic control.

Each pad corresponds directly to a sample slot—pad 1 triggers sample slot 1, pad 2 triggers sample slot 2, and so forth. This consistent mapping makes it easy to develop muscle memory for drum patterns and percussive performances.

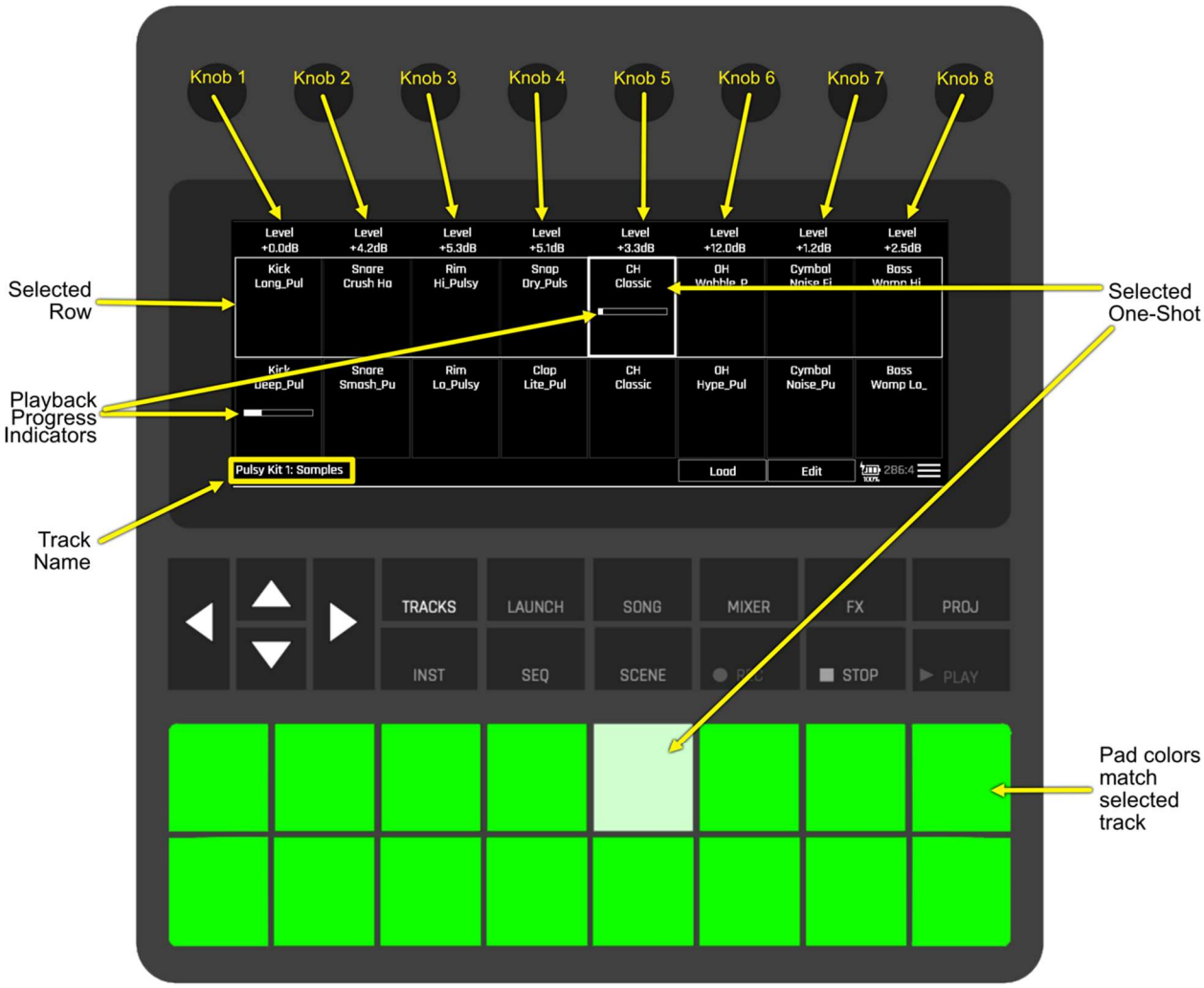


Figure: One-shot pad triggering with velocity response

The velocity-sensitive pads respond to your playing dynamics, allowing you to create natural-sounding drum performances with varying intensity levels. Light touches produce quiet sounds while firm presses generate louder outputs, mimicking the response of acoustic drums.

Playing One-shot Tracks over MIDI

External MIDI controllers expand your performance possibilities and enable integration with sequencers, drum controllers, and keyboard instruments.

To control One-shot tracks via MIDI:

1. Configure MIDI routing to your One-shot track.
2. Send MIDI note messages to trigger specific samples.
3. Use velocity data for dynamic control.

   bento maps One-shot samples to MIDI notes starting at C2 (MIDI note 36).

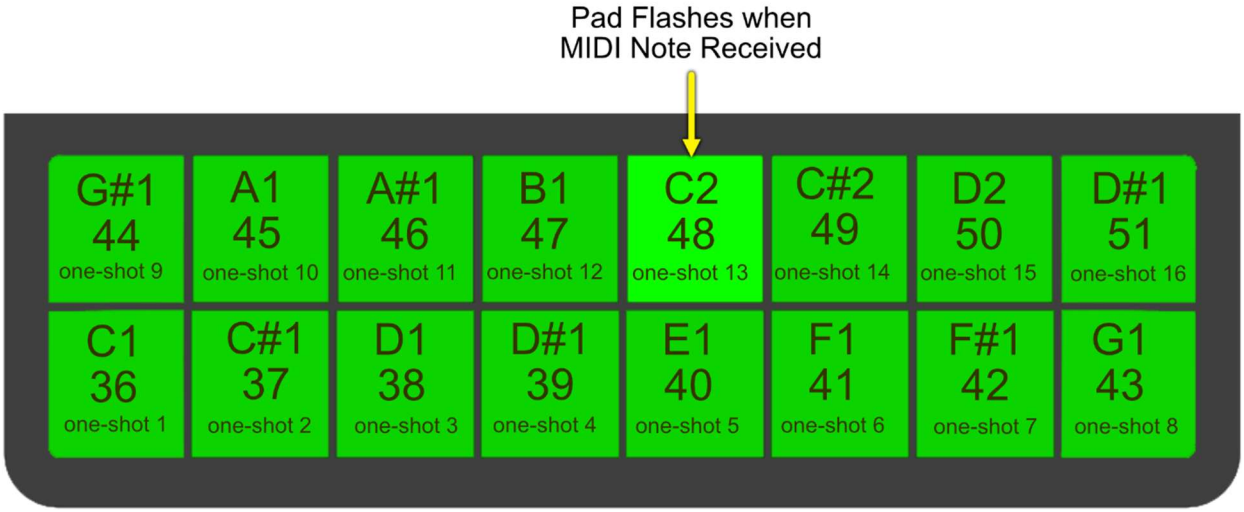


Figure: MIDI Note to One-shot Mapping

Sample slot 1 responds to C2, slot 2 to C#2, slot 3 to D2, and so forth. This standard drum mapping enables compatibility with drum machines, drum controllers, and DAW drum tracks.

MIDI velocity data translates directly to sample playback dynamics, allowing you to program realistic drum parts with varied intensity levels and create expressive performances through external controllers.

Note: If the One-shot Sample Bank Screen is open, each MIDI note-on makes a pad a little brighter than the other pads to show it is playing. The most recently triggered pad turns white to show it is selected for editing.

Editing One-shot Tracks

One-shot tracks provide comprehensive editing capabilities for both individual samples and overall track behavior. Understanding these parameter groups helps you create polished drum kits and percussion instruments that integrate seamlessly into your musical arrangements.

The editing workflow balances sample bank management with detailed parameter control, allowing you to organize your sounds effectively while fine-tuning individual sample characteristics.

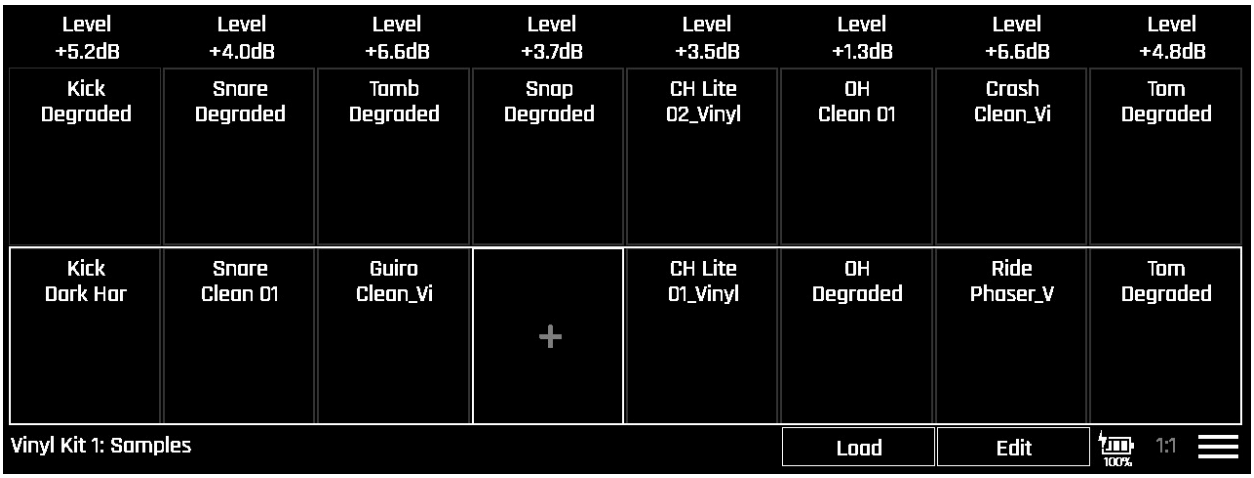
Editing One-shot Sample Banks

The one-shot sample bank provides tools for loading, organizing, and replacing samples within your One-shot track. These operations affect the sample assignments without changing the underlying track voice parameters.

Sample bank editing focuses on the practical aspects of building and maintaining your sample collections, ensuring that your One-shot tracks contain the sounds you need for your musical projects.

Loading Samples into Empty Slots

Adding new samples to empty slots expands your One-shot track's capabilities and builds custom instrument collections.



To load a sample into an empty one-shot:

1. Select an empty loop slot in your One-shot track, then tap **Load**.

   The sample browser screen opens.

2. Navigate to bento's patch folders on the microSD card.

   bento's factory samples are in the top-level Patches folder, organized by patch type (Granular, Loops, etc.). You can load samples from any of these categories, even if they were not originally intended to be played as a one-shot.

3. To hear a preview of a sample before you load it, tap **Preview**.

   When you select samples with Preview enabled, bento starts playing the sample.

4. When you have selected a sample to load, tap **Load**.

   bento re-opens the Sample Bank screen, with your chosen sample loaded in the selected one-shot.

The newly loaded sample becomes immediately available for triggering through the corresponding pad.

Unloading Samples

Removing samples from your One-shot track frees up memory resources and simplifies your sample bank organization.

To unload a one-shot:

1. Select the sample slot containing the sample you want to remove.
2. Tap the menu icon in the lower right.
3. Choose the Unload option to remove the sample from the slot.

The slot becomes empty and available for new sample assignments. Unloading samples helps you manage bento's 576-sample limit across all tracks and keeps your sample banks focused on currently needed sounds.

Replacing Samples in the Sample Bank

Substituting existing samples allows you to update your drum kits and percussion collections without rebuilding entire sample banks.

To replace an existing sample:

1. Select the sample slot containing the sample you want to replace.
2. Tap Load.
3. Choose a new sample to substitute for the existing one.
4. Tap Load to complete the swap.

The new sample inherits the voice parameter settings from the previous sample, maintaining consistent sound character while providing new source material. This approach preserves your parameter tweaks while updating the underlying audio content.

Editing Voice Parameters in the One-shot Dashboard

Each One-shot Dashboard provides immediate access to a specific One-shot's voice parameters, organized into four parameter groups: Main, Config, Envelope, and LFO. The parameter group selection buttons allow quick switching between different parameter sets using the same eight knobs.

To navigate to the One-shot Dashboard:

1. Open the One-shot Sample Bank screen from the Tracks screen by selecting the One-shot track and pressing **INST**.
2. In the Sample Bank screen, select the One-shot you want to edit and then either tap **Edit** or push the **Right Arrow** button.

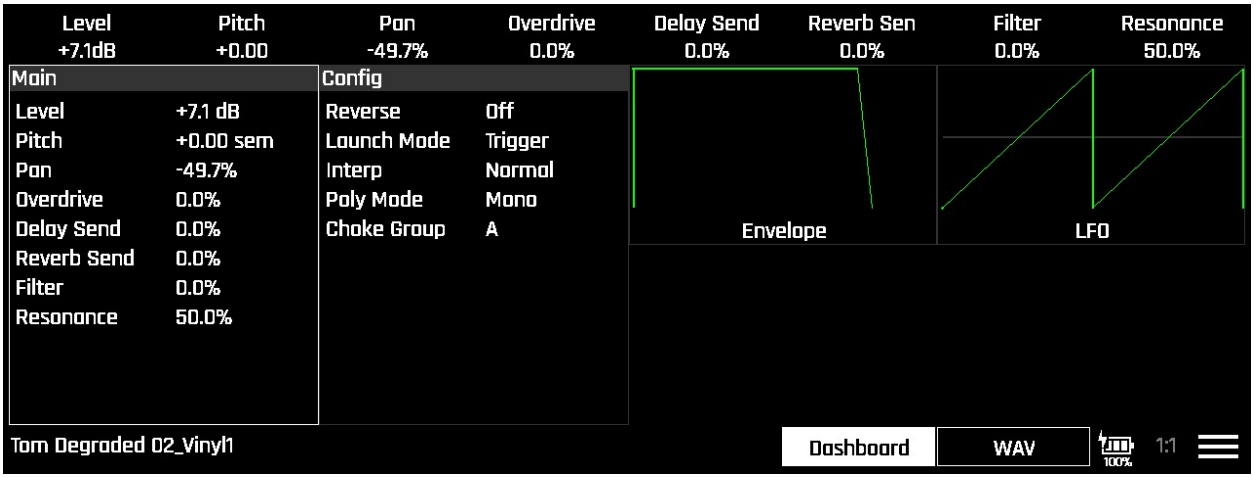


Figure: One-shot track dashboard showing common voice parameters

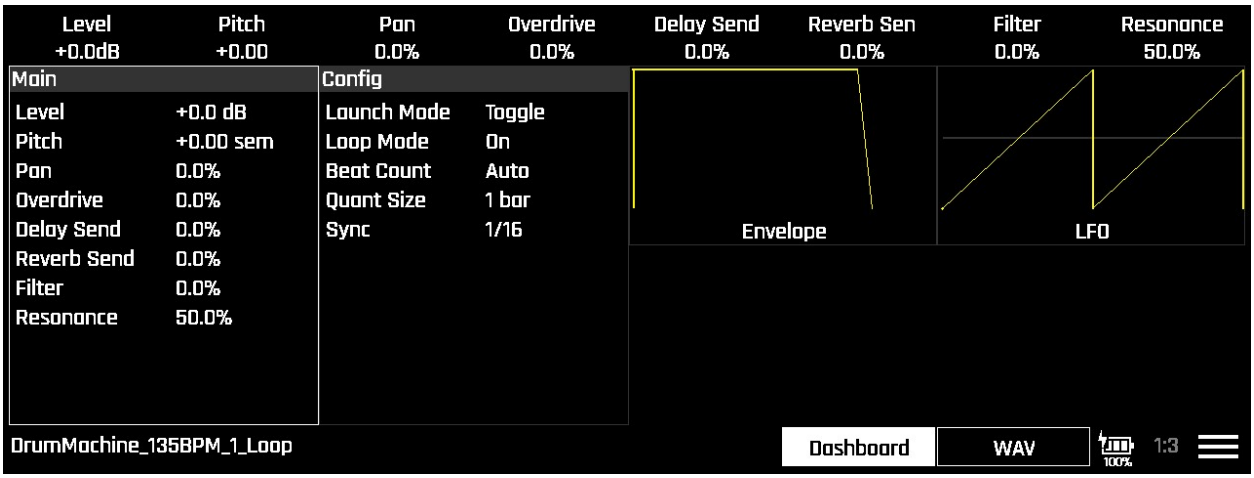
3. Tap the parameter group buttons (Main, Config, Envelope, LFO) to switch parameter sets.
4. Use knobs 1-8 to adjust the displayed parameters.
5. To view or edit the Dashboard settings of another One-shot in same track, press the INST button or the Left Arrow button, then open the Dashboard again with the Right Arrow button or by tapping Edit.

   Note: You can also switch to the Dashboard of another One-shot without returning to the Sample Bank screen by playing the corresponding pad (1-16) or playing the corresponding note (C1/26 to D#2/51) from a MIDI controller. bento indicates which One-shot is currently selected by changing the corresponding pad color to white.

Editing One-shot Voice Parameters in the Main Group

The Main parameter group provides the essential voice shaping controls that most directly affect the sound character and musical integration of your Multisample track.

The following screenshot shows the One-Shot track Dashboard with the Main parameter group selected.



One-shot Dashboard with Main parameter group selected

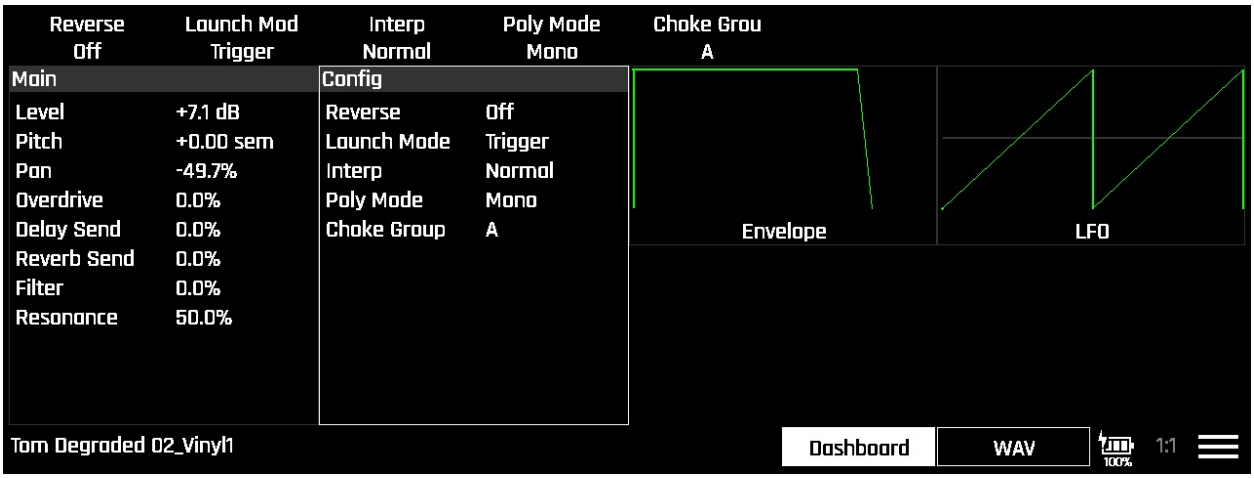
Table: One-shot Dashboard Main Parameter Group

Parameter	Knob	Range	Description	Modulation Target?
Level	1	-96dB to +12dB	Pad volume	Yes
Pitch	2	-24 to +24 semitones	Pitch offset for this pad	Yes
Pan	3	-100% to +100%	Stereo positioning from full left to full right	Yes
Overdrive	4	0 to 100%	Sets the level of distortion applied to the pad's output audio. Caution: Overdrive causes significantly higher track audio levels.	
Delay Send	5	0 to 100%	Pad signal level sent to bento’s Delay effect.	
Reverb Send	6	0 to 100%	Pad signal level sent to bento’s Reverb effect.	
Filter	7	-100% to 100%	Filter cutoff frequency. Negative values control a low pass filter. Positive values control a high pass filter.	Yes
Resonance	8	0 to 100%	Filter resonance amount	Yes

Editing One-shot Voice Parameters in the Config Group

Config parameters control the fundamental operational behavior of the One-shot track, affecting how notes trigger and sustain within each sample and each track.

The following screenshot shows the One-shot Dashboard with the Config parameter group selected.



One-shot Dashboard with Config parameter group selected

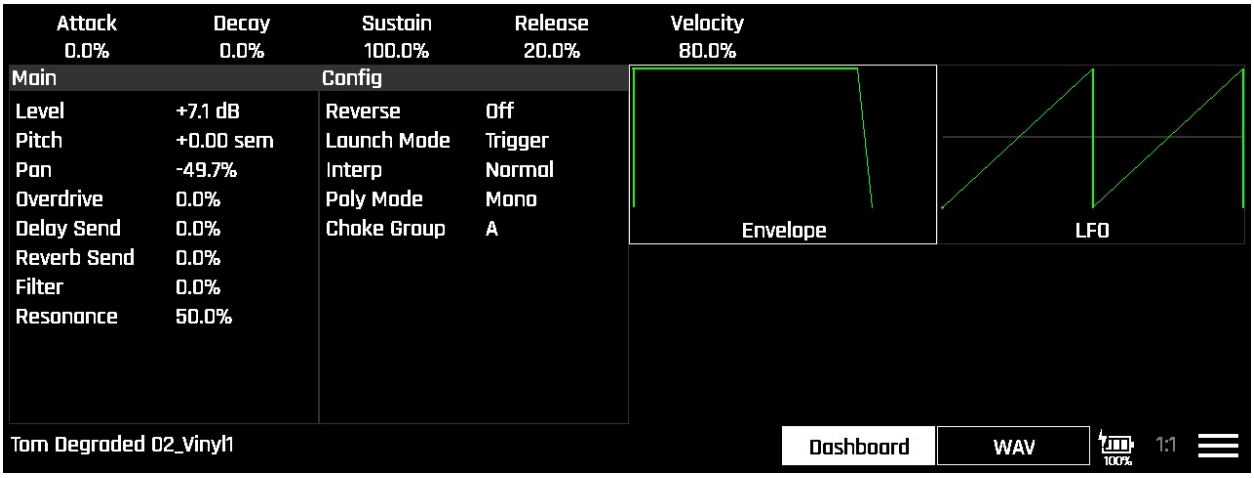
Parameter	Knob	Range/Options	Description	Modulation Target?
Reverse	1	Off, On	When On, One-shot plays backwards, starting at its end position and ending at its Start position, according to the Start and Length parameters, set in the One-shot Wav screen.	No
Launch Mode	2	Trigger, Gate, Toggle	**Trigger**: Activate the Pad by touching the pad or through MIDI note on. Bento will start playback of the WAV file and play through to the end. **Gate**: Begin the WAV file playback in the same manner as Trigger mode. But in Gate mode, playback will stop when you release the touch or the MIDI note is released. **Toggle**: Begin the WAV file playback in the same manner as Trigger mode. When another trigger event happens, the playback will stop.	No
Interp	3	Normal, High Q	Sample quality when samples are transposed. To conserve CPU, choose Normal unless you hear artifacts that are	No

Parameter	Knob	Range/Options	Description	Modulation Target?
			improved by High Q mode.	
Poly Mode	4	Mono, Poly 2, Poly 4, Poly 6, Poly 8, and Poly X	Maximum simultaneous notes for this One-shot track. Poly X will make use of all notes available.	No
Choke Group	5	None, A, B, C, D	Joins the one-shot to one of four “choke” groups (A-D), in which no two one-shots can play simultaneously. Typically used to deliver realistic open/closed/in-between hi-hat response when playing multiple hi-hat one-shots from multiple pads.	No

Editing One-shot Voice Parameters in the Envelope Group

The Envelope parameter group provides detailed ADSR envelope control for precise amplitude shaping and velocity response configuration.

The following screenshot shows the One-shot track Dashboard with the Envelope parameter group selected.



One-shot Dashboard with Envelope parameter group selected

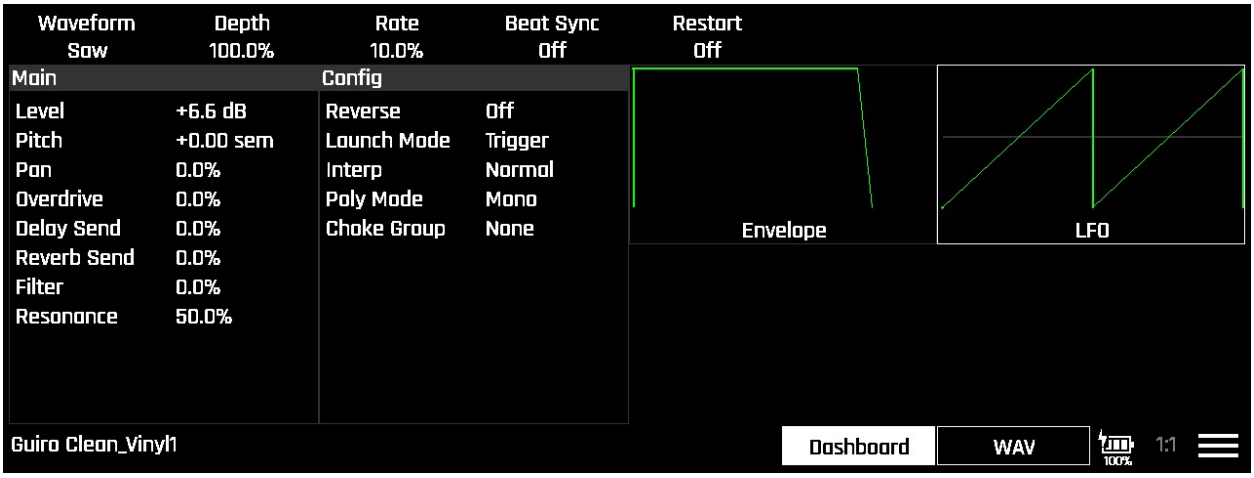
Table: One-shot Envelope Parameters

Parameter	Knob	Range	Description	Modulation Target?
Attack	1	0 to 100% 100% = 9 seconds	Envelope attack time	Yes
Decay	2	0 to 100% 100% = 38 seconds	Envelope decay time	Yes
Sustain	3	0 to 100%	Envelope sustain level	No
Release	4	0 to 100% 100% = 38 seconds	Envelope release time	Yes
Velocity	5	0 to 100%	Velocity sensitivity amount	No

Editing One-shot Voice Parameters in the LFO Group

LFO parameters enable rhythmic and expressive modulation effects, from subtle vibrato to dramatic tremolo and filter sweeps.

The following screenshot shows the One-shot track Dashboard with the LFO parameter group selected.



One-shot Dashboard with LFO parameter group selected

Table: One-shot LFO Parameters

Parameter	Knob	Range	Description	Modulation Target?
Waveform	1	Sine, Pos Sine, Triangle, Pos Tri, Square, Pos Square, Saw, Rev Saw, Random	LFO shape selection	No
Depth	2	0 to 100%	LFO modulation intensity	Yes
Rate	3	If Beat Sync is Off: 0 to 100%	LFO speed from slow to fast	Yes

Parameter	Knob	Range	Description	Modulation Target?
		If Beat Sync is On: 8 bars, 4 bars, 2 bars, 1 bar, 1/2, 1/2T, 1/4, 1/4 T, 1/8, 1/8T, 1/16, 1/16T, 1/32, 1/32 T, 1/64		
Beat Sync	4	Off, On	Synchronize LFO to project tempo	No
Restart	5	Off, On	Reset LFO phase on each note	No

Editing One-shot Modulation

Each bento track includes a central Modulation screen within which you can configurate all modulation settings.

The modulation system enables dynamic control of One-shot parameters through various sources such as note velocity, envelopes, LFOs, and external MIDI controllers.

The specific modulation sources available vary with each track type.

To configure One-shot modulation:

1. Open the One-shot Dashboard, then tap the **Menu** icon in the lower right corner of the screen. The **Menu** opens, displaying a single option, **Modulation**.

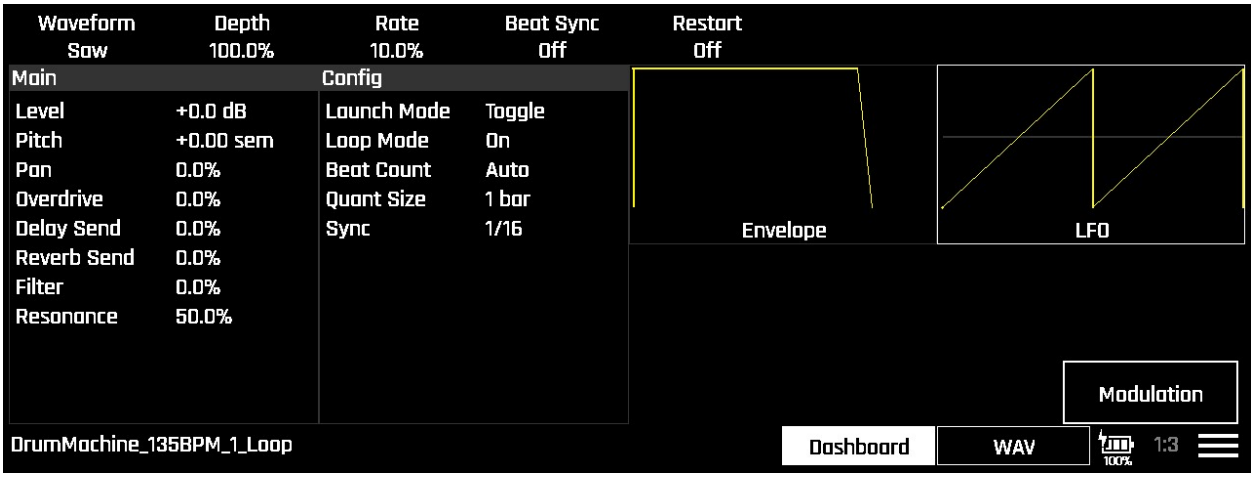


Figure: One-shot Dashboard Modulation Menu Option

2. Tap **Modulation**.

   The One-shot Modulation Screen opens.

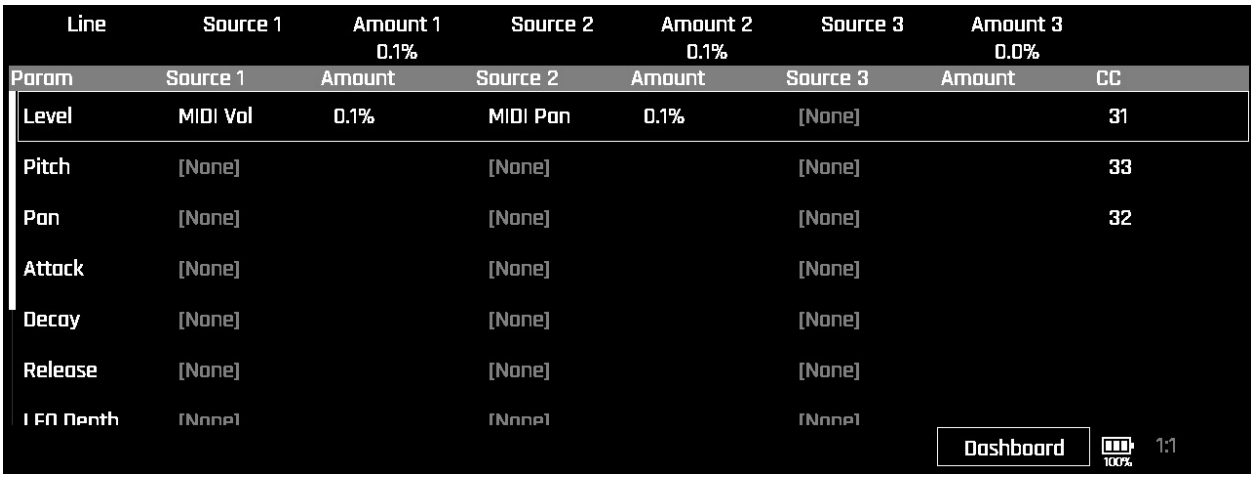


Figure: One-shot Track Modulation Screen

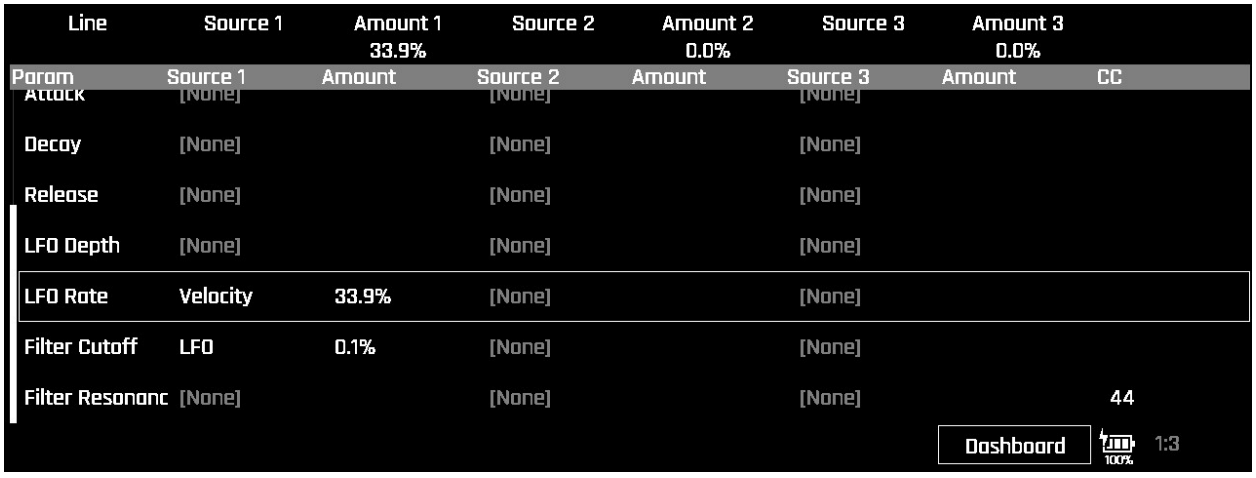
The first column in the Modulation screen contains the name of every One-shot parameter that can be a modulation "target." Columns 2 through 7 let you set up three modulation sources and three modulation amount values for the modulation target of the selected row.

3. To see the complete list of modulation targets in the Modulation screen you can either:

   - swipe the screen up or down, or

   - turn Knob 1 to scroll up and down through the Modulation screen.

4. Select the line of the parameter you want to modulate, then use Knobs 2-7 to configure one or more modulation sources and modulation levels.



The following table describes the parameters you can modulation, the modulation sources you can route to them, and the range of modulation levels.

Table: Modulation Parameters Mapped to bento Knobs

Parameter	Knob	Range	Description	Modulation Target?
Line	1	Level Pitch Pan Attack Decay Release Filter Cutoff Filter Resonance LFO Depth LFO Rate	Moves the Modulation screen's line selection through the parameters listed in the first column. Once you have selected a modulation target, you can configure up to 3 modulation sources and modulation amounts with knobs 2-7.	No
Source 1	2	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (1 of 3)	No
Amount 1	3	-100% to +100%	Modulation Amount (1 of 3)	No
Source 2	4	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (2 of 3)	No
Amount 2	5	-100% to +100%	Modulation Amount (2 of 3)	No
Source 3	6	Velocity LFO Mod Wheel MIDI Vol MIDI Pan	Modulation Source (3 of 3)	No
Amount 3	7	-100% to +100%	Modulation Amount (2 of 3)	No

5. To return to the One-shot Dashboard, tap **Dashboard** or press **INST**.

Viewing the One-shot WAV Screen

The One-shot WAV screen provides a live view of sample playback and controls for the Start, Length and direction of playback of the sample

To access the One-shot WAV screen:

1. From the One-shot Dashboard, tap **WAV** in the navigation area.
   The Waveform screen opens.

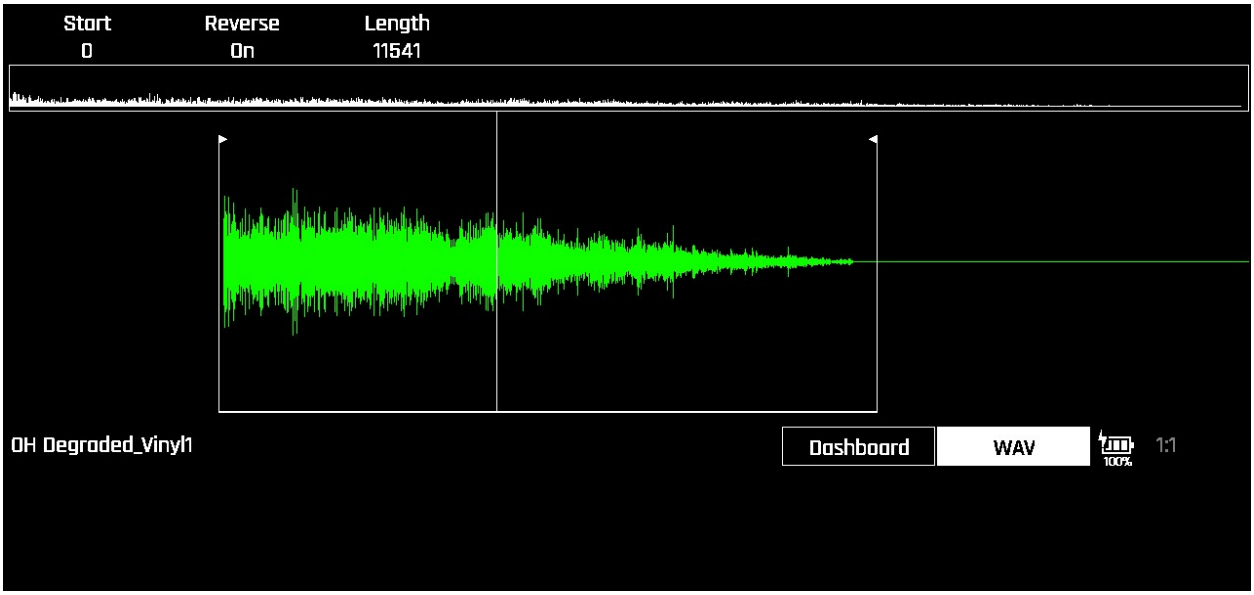


Figure: One-shot WAV screen

   When you play a note from the pads, sequencer, or over MIDI, a vertical line moves across the waveform display.

2. Zoom in or out on the waveform by pinching or spreading the touchscreen with two fingers.

3. Scroll through the waveform by swiping left or right on the touchscreen.

4. To change the One-shot's start and end sample positions, or change its playback direction, use Knobs 1-3.

   As you adjust Knob 1 and Knob 3, the Waveform display moves the start and end points between which the One-shot plays. A vertical white line moves across the waveform when the One-shot is played. The following table describes the three parameters mapped to Knobs 1-3 and how they affect the playback of the One-shot.

Parameter	Knob	Range	Description	Modulation Target?
Start	1	0 – sample length	Sets the sample position from which the One-shot begins playback. If **Reverse** is On, playback ends at the Start position.	No
Reverse	2	Off, On	When **Reverse** is On, the One-shot plays backwards within the range specified by the Start and Length parameters.	No
Length	3	0 – sample length	Sets the number of samples that get played, which bento uses as an offset from the Start point to calculate the "end" sample position at which the One-shot ends playback. If **Reverse** is On, playback starts at the "end" sample position and ends at the Start position.	No

   Note: The Waveform screen displays the sample of the One-shot that was selected when you tapped WAV in the Dashboard or when you pushed the Right Arrow button to open it, even if you change the selected One-shot from the pads or from a MIDI controller.

5. Tap **Dashboard** to return to the One-shot Dashboard.

Editing Track Configuration Settings

Track configuration settings include output routing for complex mixing scenarios, and MIDI channel options for inbound and outbound note messages.

To navigate to the One-shot Track Configuration Screen:

1. Open the Tracks screen and select the One-shot track you want to configure, then push the **Right Arrow** button.

   The One-shot Track Configuration screen opens.

Figure: One-shot track configuration settings screen

2. Use bento's knobs to edit the One-shot Track Configuration settings.

The following table describes the parameters mapped to bento's eight knobs.

Table: One-shot Track Config Parameters

Parameter	**Knob**	**Range**	**Description**
Output	1	1, 1 w/Mod FX, 2, and 3	Audio output routing destination.
Poly Mode	2	Mono, Poly 2, Poly 4, Poly 6, Poly 8, and Poly X	Maximum simultaneous notes for this One-shot track.
MIDI In Ch	6	None, 1-16	MIDI input channel for launching One-shots from external controllers. Pads 1-16 respond to MIDI notes 36-51.
MIDI Out P	7	All, 1, 2	MIDI output port routing.
MIDI Out C	8	None, 1-16	MIDI output channel for sending notes from bento's pads or sequencer.

3. To return to the Tracks screen, press **TRACKS**.

Creating New One-shot Tracks

Setting up effective One-shot tracks requires planning your One-shot organization and selecting appropriate source material for your intended rhythmic applications. The process involves both technical considerations about One-shot characteristics and creative decisions about arrangement structure.

A well-designed One-shot track balances rhythmic coherence with dynamic possibility, providing the foundation elements you need while enabling flexible real-time arrangement development.

To create a new One-shot track:

1. Double-tap an empty track slot in the Tracks screen.
2. When the patch browser appears, tap **New**, then select **One-shot** from the track type options.

   bento creates the new One-shot track and opens the One-shot Sample Bank screen.

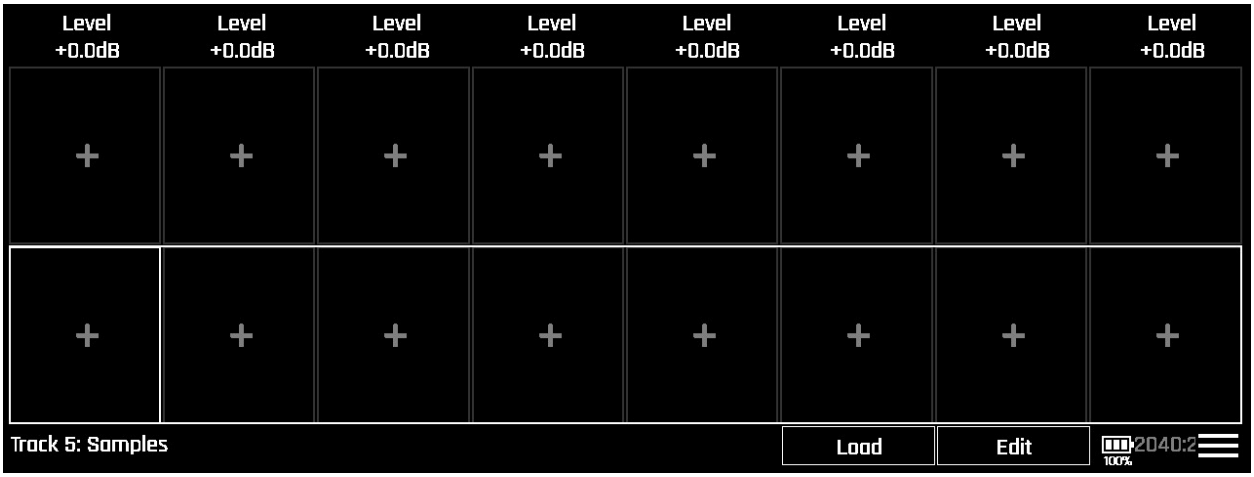


Figure: Initial One-shot Sample Bank

3. Assemble your One-shot Sample Bank by loading, unloading, or replacing One-shots as described in *Editing One-shot Sample Banks*.
4. Configure One-shot voice parameters as described in *Editing Voice Parameters in the One-shot Dashboard*.
5. Save the new One-shot track with the other tracks in the current project.