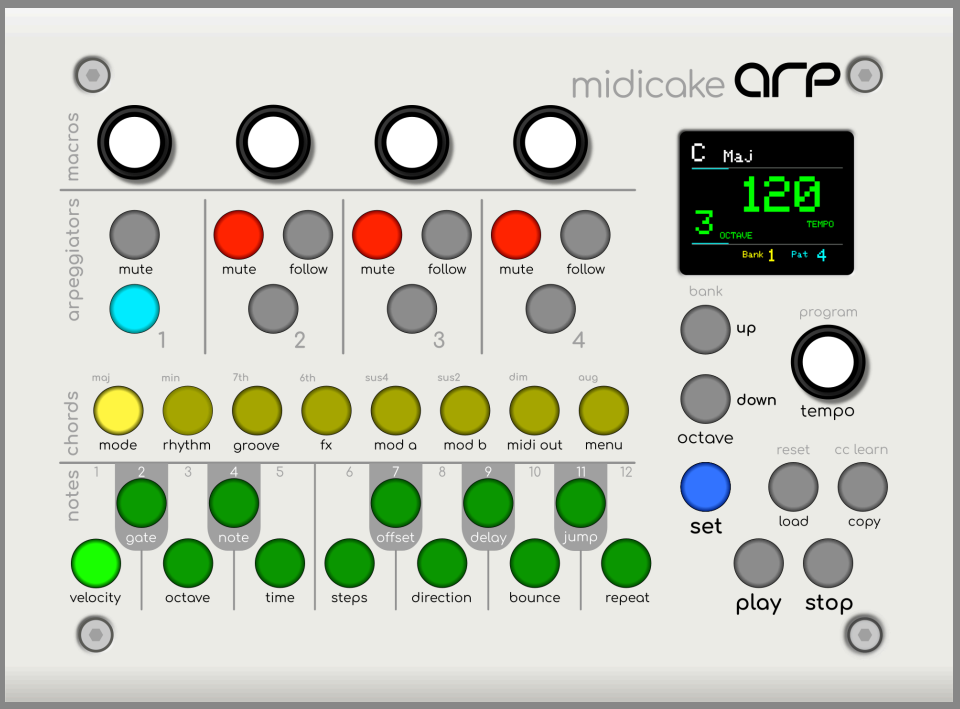

midicake™ ARP

User Manual

Mark 1 and 2

V8 Firmware

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Introduction to ARP

Overview

Midicake ARP has 4 polyphonic "arpeggiators" that can be combined and chained together to form complex but repeatable musical sequences.

ARP does not make any sounds. It generates MIDI information that can be used by Synthesizers, Groove Boxes, Samples, DAWs and Plugins.

Each arpeggiator is controlled via a set of configurable parameters. These parameters can be modified independently or all arpeggiators can be controlled together; even while the sequence is playing.

All arpeggiators can share a single MIDI output channel or output on separate channels, allowing for independent sequencing of up to 4 MIDI-compatible sound generators, VSTs or synthesizers.

Sequences are based on a root note and chord which can be changed during playback.

ARP has 16 banks, each with 12 patches that can be saved and recalled, again while the music is playing, providing many creative options.

Each patch consists of 4 independent sequences. These sequences all use the same notes from a shared Chord or Scale, so everything stays in harmony.

Glossary

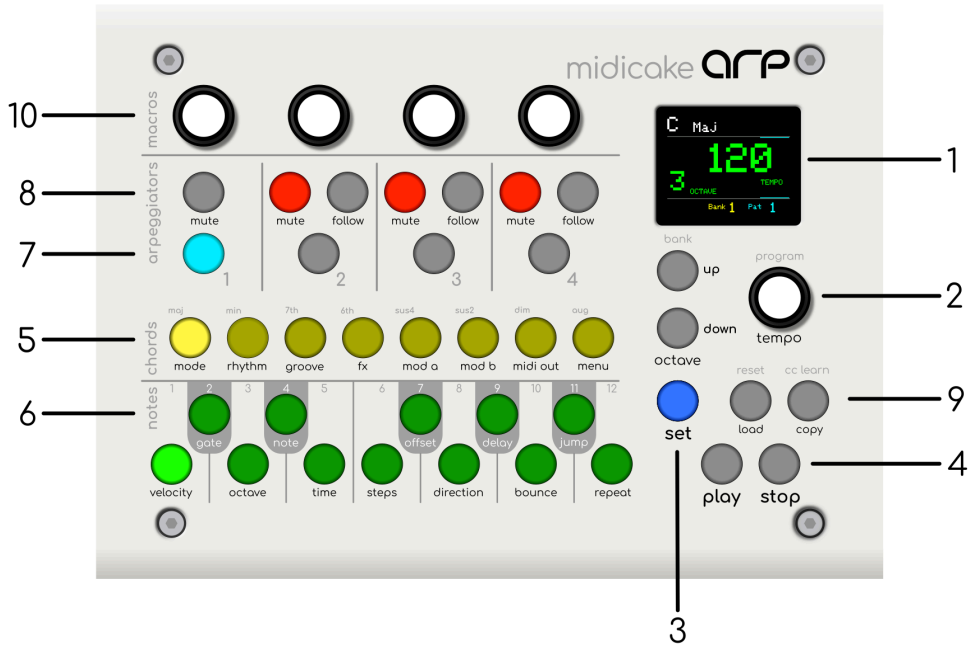
- **Arpeggiator** is an individual sequencer track, ARP has 4.
- **arp** or **arp track** is used informally to mean arpeggiator
- **Sequence** is a series of steps that define how the musical melody is constructed
- A **Step** is a single event in the sequence that is determined by the parameters
- **Parameters** hold the values that are used to construct a sequence
- A **Patch** stores 4 sequences, 1 per arp track
- Each **Bank** stores up to 12 patches
- A **Note** is a single musical note event and is output as a MIDI note, containing Pitch, Gate, Velocity and Channel information
- **Note Letter** is used to represent the note regardless of octave. If you play a C1 or a C3 or a C6 the index is the same, it's a C
- **Chord/Scale (Note Set)** is set of Note Letters that ARP uses to translate a sequence into notes
- **Root Note** is the lowest note in the Chord/Scale (Note Set)
- **Tick** is a single MIDI clock tick.
- **Bar (MIDI Bar)** is 96 ticks. The bar time depends on Tempo
- **Beat** is 24 clock ticks. There are 4 beats in a MIDI Bar
- **Tempo** is the speed of playback in Beats per Minute

Key

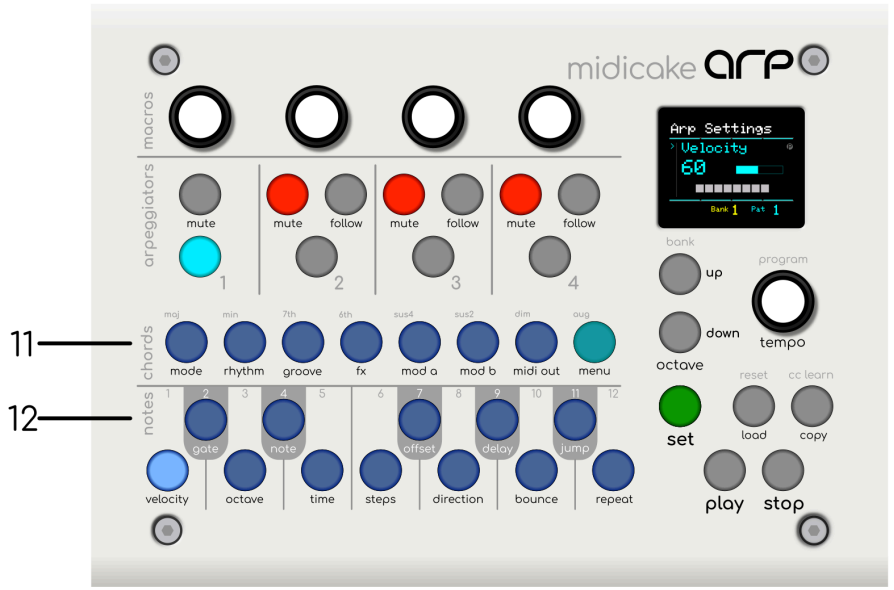
- All controls are highlighted in CAPITALS
- All Parameters are highlighted in **Bold**

Main Controls

PLAY Mode



SET Mode



1. LCD Display
2. UP/DOWN Buttons and KNOB Control - (aka PROGRAM Button)
3. SET Button
4. PLAY and STOP Buttons
5. CHORD Buttons - (PLAY Mode)
6. NOTE Buttons - (PLAY Mode)
7. TRACK SELECT Buttons
8. MUTE and FOLLOW Buttons
9. LOAD and COPY Buttons
10. MACROS Controls
11. Behaviour PARAMETER Buttons - (SET Mode)
12. Sequence PARAMETER Buttons - (SET Mode)

Basic Operation

Power On

Connect the USB cable from a computer USB port or any 5v USB power supply.

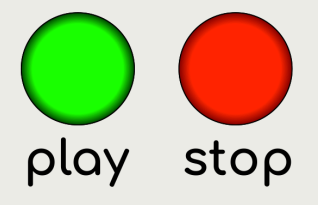
Midicake ARP will flash its startup sequence and you'll be ready to go.

When switching on for the first time Midicake ARP will have a default patch loaded.

Power Off

Press and Hold the Stop button for 2 seconds and ARP will turn off. Press any button to turn ARP on. *This feature is available on* ARP *hardware version 1.5 only.*

Start and Stop



Press **PLAY** to start the sequence. The LED will light up to indicate the sequence is playing.

Press **PLAY** again to pause the sequence. This leaves all playing notes held and can be used to create a long sustain at the end of a musical phrase.

Press **STOP** to stop the sequence. This will play out all notes per their individual gate parameter values.

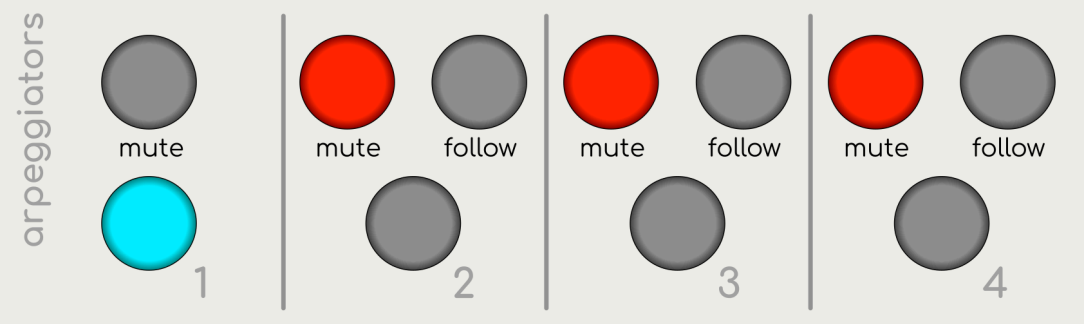
Press **STOP** again to immediately stop all playing notes.

Notes:

- *During Playback, a progress meter is displayed to represent the speed of playback. It is just a visual indicator, like a metronome.*
- *Repeatedly pressing the STOP button will engage a panic stop. The 2nd press emits a CC120 ALL NOTES OFF message and the 3rd press emits a CC123 ALL SOUND OFF message. All sound on connected devices to cease.*

Arpeggiator Controls

Pressing the **TRACK SELECT** 1, 2, 3, or 4 buttons will select the arpeggiator. (ARP 1 is selected by default).



Pressing **MUTE** (above each arpeggiator) will mute or unmute that individual arpeggiator. The LED will light when the arpeggiator is muted.

Toggling **FOLLOW** (above each arpeggiator) will set that arpeggiator to follow the previous arpeggiator, thus playing the sequence associated with it and the previous arpeggiator on alternate bars. For example, selecting arpeggiator 2, 3 & 4 to follow will play all 4 arpeggiators in sequence over 4 bars, before going back to arpeggiator 1 on the 5th bar. The LED will light when the arpeggiator is set to follow.

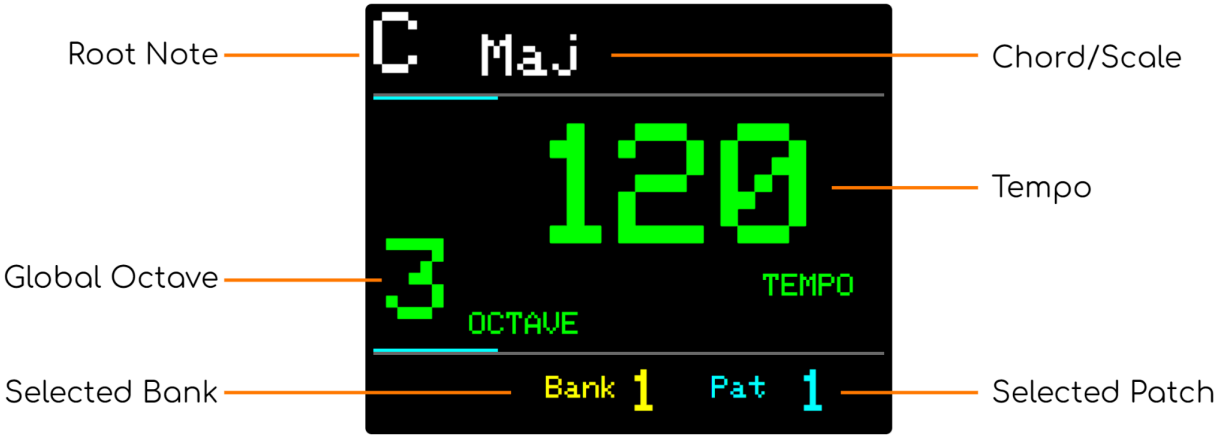
Operation Modes

PLAY Mode

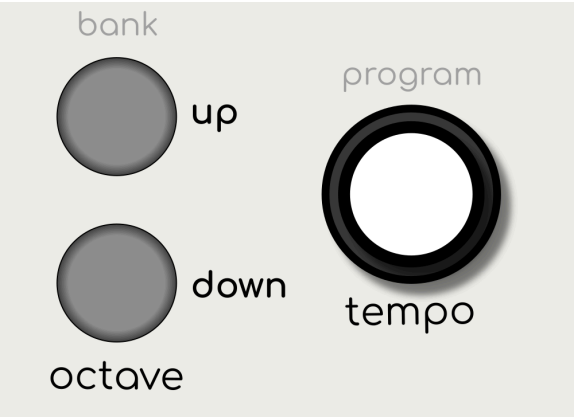
By default, ARP starts in **PLAY Mode**.

This is indicated by green NOTE buttons and the current **NOTE** and **Chord** shown on the display.

The display also shows the current **Tempo** and **Octave** and the selected **Bank** and **Patch**.



Turning the main **KNOB control** will alter the current **tempo** (if not synced with an external midi clock).



Pressing the **up** or **down** buttons will increase or decrease the current **octave** of all arpeggiators.

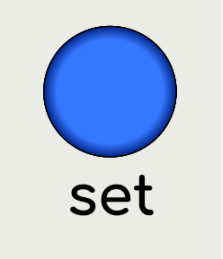
Live Play

When in **PLAY Mode,** if the sequence is not playing, pressing down on any **NOTE** button will play all arpeggiator sequences.

This can be disabled in the menu. See: Live Play on Note Input

SET Mode

The current sequence can be modified at any time (even while playing) by entering SET Mode.



Press the **SET** button to enter SET Mode.

(In PLAY Mode, the SET Button is indicated in blue. When pressed, ARP enters SET Mode and the button turns green, to highlight the way back to PLAY Mode.).

SET Mode Display

The screen will display the current parameter name and value.

For more information about working in SET Mode, see Creating Sequences

Press the **SET** button again to return to **PLAY Mode**.

Chords and Scales

One of ARP's key features is its ability to synchronize the scale that all 4 arpeggiators are playing. Keeping everything in harmony. It does so by using a **Global Scale**.

This scale defines the notes that are available to the arpeggiators sequences. Change the scale and all 4 arpeggiators update to match.

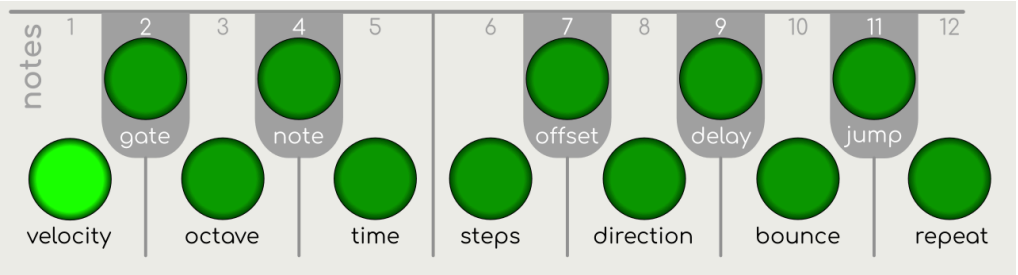
There are 2 ways to set the global scale:

- Internal Note Sync - Using ARP's chord and note buttons
- External Note Sync - Using a MIDI Controller/Keyboard to send note data to ARP

Internal Note Sync

Notes

There are 12 **NOTE** buttons representing musical notes C through to B. Like a single octave on a piano.



Pressing a **NOTE** button will change all arpeggiators to play with the selected note as the root note.

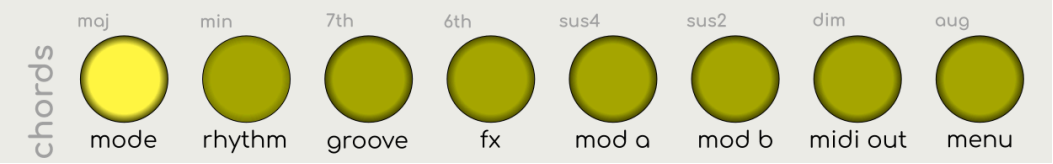
Chords

Chords are used to define the scale notes available to the arpeggiator sequence.

There are 8 **CHORD** buttons that (by default) represent 8 common chord types:

- *Major, Minor, 7th, 6th, Suspended (Sus4), Suspended 2, Diminished, Augmented*

Chord 1 (Major) is selected by default)

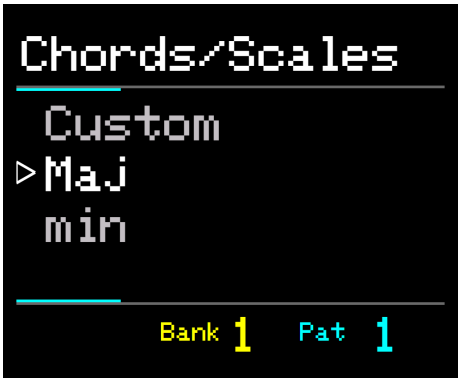


Pressing a **CHORD** button will select that chord type but it will not change the current playing sequence. It will only affect the chord that plays the next time a **NOTE** button is pressed.

For example, if C major is currently playing and you wish to change to E Minor, press the **"min" CHORD** button then press the **E NOTE** button. As the button is pressed the note and chord will change.

In this way, you are free to create any chord progression you like.

Alternative Chords and Scales



You may assign an alternative chord or scale to a **CHORD** button by selecting from a predefined list.

Press and hold a **CHORD** button and use the **UP** and **DOWN** buttons or the main **KNOB control** to cycle through the available chords and scales. The notes that make up that chord/scale will be highlighted on the NOTE buttons.

Release the button and the selected chord or scale will be assigned.

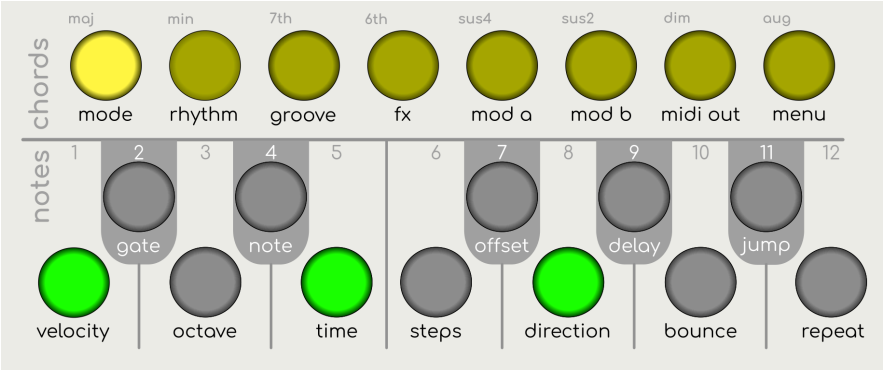
To reset to the default chord, press and hold the **CHORD** button and press the **LOAD/RESET** button.

See the [full list of ARP's Chords and Scales]

Custom Chords and Scales

ARP enables you to create your own chords or scales by overriding the 8 default chords.

Hold down one of the **CHORD** buttons; the notes that make up that chord will be highlighted on the **NOTE** buttons.



Still holding the **CHORD** button, press any of the **NOTE** buttons to toggle that note on or off. You may add up to 12 notes to form your custom chord, scale or just set of notes.

Important Note: All chords are represented with the root note of **C**, regardless of the currently selected note. Please bear this in mind when editing.

Release the **CHORD** button when done. The new chord/scale will be shown as **"CUSTOM X"** in the display (where X is the chord number from 1 to 8).

Note: You can change the notes in a custom chord or scale during playback.

To reset the custom chord or scale back to its default chord, press and hold the **CHORD** button and press the **LOAD/RESET** button.

Chord Inversions

A chord inversion rearranges the order of notes in a chord while maintaining the same pitch classes. For example , the C major chord (C-E-G) can be played in three positions:

- Root position: C-E-G
- First inversion: E-G-C
- Second inversion: G-C-E

Smooth Voice Leading

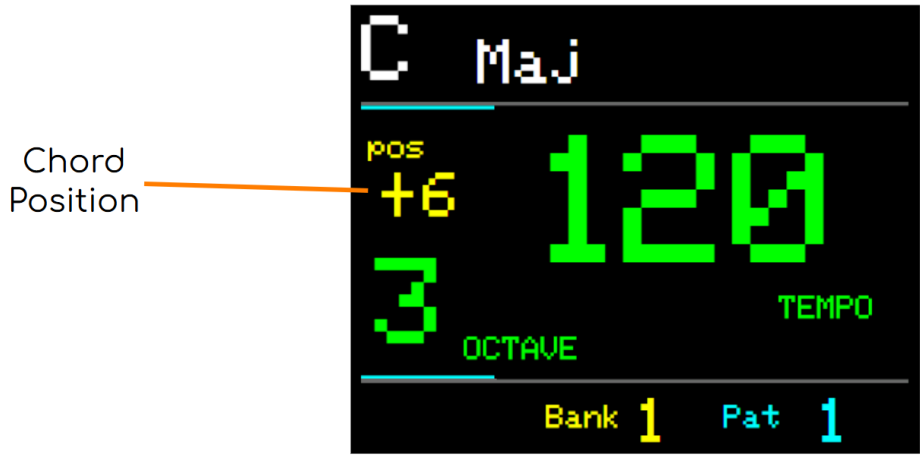
Inversions enable smooth transitions between chords by minimizing the distance between successive notes. Instead of large jumps between root positions, inversions can reduce the interval movement:

For Example: When moving from C major (C3-E3-G3) to G major (G3-B4-D4), using the root positions creates a 7-semitone jump. Using G major's first inversion (D3-G3-B4) reduces this to just 2 semitones, creating smoother voice leading.

Chord Positions

The Chord Positions feature enables manual control of chord inversions and positioning:

1. In PLAY Mode, hold the **NOTE** button (of your chosen root note)
2. Use **UP/DOWN** buttons to cycle through up to 12 positions from the root
3. The current position displays on screen



Reset the Chord Position by holding the **NOTE** button and pressing **RESET**

Important behaviors:

- Positions persist when changing octaves
- New notes default to root position
- Position changes follow the global scale, regardless of Note Offset Mode
- Enabling Note Lock overrides Chord Position settings
- Some positions may exceed MIDI note range (0-127), producing no output

Chord Change Voice Leading

This feature automatically selects the closest inversion when transitioning between chords in PLAY Mode:

Example:

- From C major (C-E-G) to A major:
    1. First press: C#-E-A (Position -2)
    2. Second press: E-A-C# (Position -1)
    3. Third press: A-C#-E (Root)

Configuration

1. Enter **SET** Mode
2. Press **MENU**
3. Enable **Chord Change Voice Leading**

Notes.

Enabling Octave Lock will disable Voice Leading for the associated Track.

Voice Leading does not function when using an external keyboard.

Performing with Chord Positions and Voice Leading

Voice Leading works alongside manual Chord Position adjustments:

Example:

- If C major is at position -5 (E1-G1-C2)
- Selecting A plays A major at -6 (E1-A1-C#2)

Repeatedly press the current NOTE button to move the chord towards the root position or UP/DOWN for manual positioning.

These two tools are a great way to explore, experiment and perform with chords and scales.

For more ideas see Appendix X - Ideas and Tips for performing with Chords and Chains

Chord Chain Sequencing

ARP enables you to create chord progressions (known as Chord Chains) of up to 32 chords.

During playback, a chord chain will automatically change the note and chord as sequenced by the chain. The chain will repeat until a new chord is entered manually (by pressing a NOTE button) or when loading a new chain.

ARP can save up to 12 chains that can be quickly edited and activated. The chains can be recalled at any time. You can also quickly load chord chains during a performance.

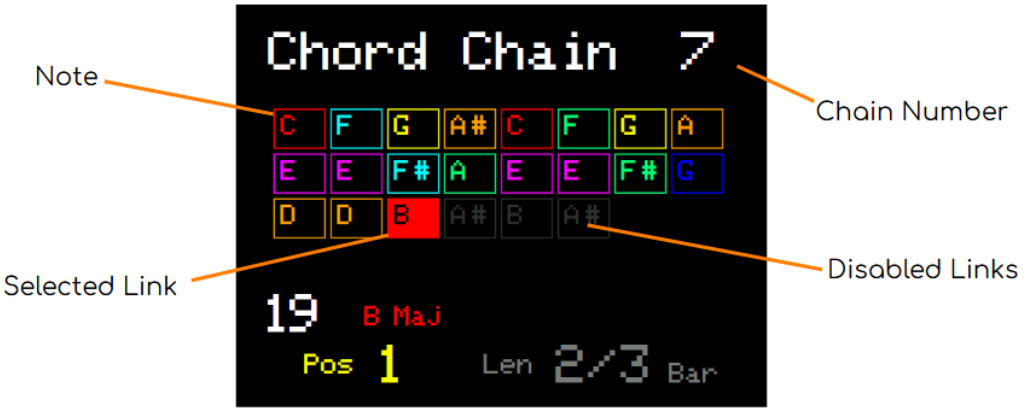
Each link in a chain has 4 properties that define how that link will sound and behave.

- Chord (1-8)
- Note (C-B)
- Position (-12 to +12)
- Length (1 tick to 256 bars)

These parameters enable you to create virtually any chord progression.

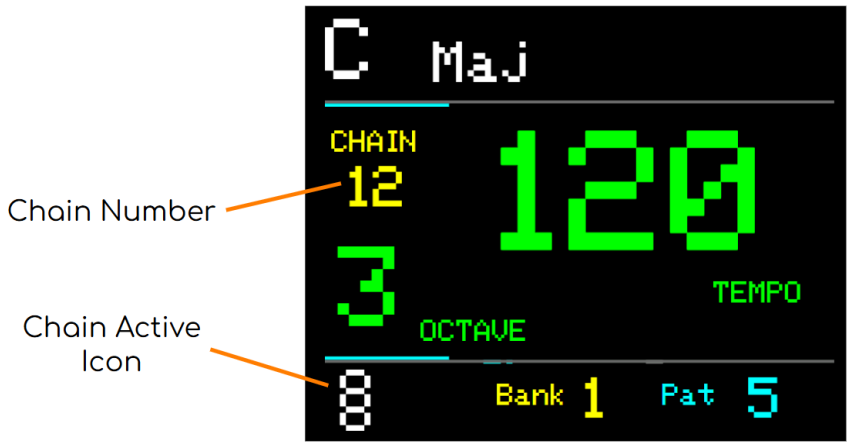
Editing Chains

In PLAY Mode, press the **PROGRAM** button (KNOB control) to enter the Chord Chain Editor.



- The first link in the chain will be highlighted
- Select a chord by pressing a CHORD button
- Then press a **NOTE** button to add a link to the chain
- The next link in the chain will be automatically selected
- Continue pressing **NOTE** buttons to add more links
- Rotate the **KNOB** control to change the selected link
- Note that this also sets the length of the chain! (i.e. the number of chord changes)
    - Be sure to select the last link before exiting the Chord Chain Editor if you want the full chain to be played

Press the **PROGRAM** button to exit the Chord Chain Editor and activate the chain.



If a chain is active, an icon will appear in the bottom left of the Display.

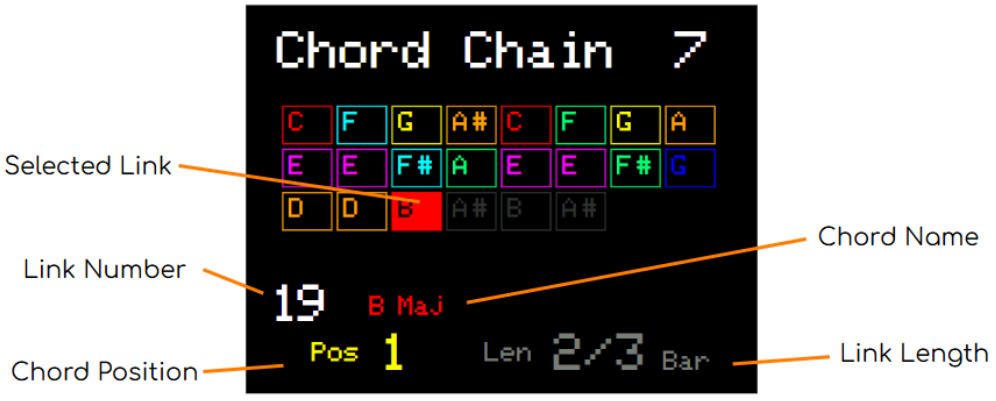
In **PLAY Mode**, the Chain Number is also displayed.

*On pressing a **NOTE** button (or playing an external keyboard key), the chain will be deactivated and the selected note/chord will play.*

If a chain is active when the unit is switched off, it will be automatically activated again when ARP is switched on.

Changing a Link's Parameters

Each of the possible 32 links in a chain has parameters that control how it behaves. These allow you to make more interesting progressions.



- Press **PROGRAM** to enter Chord Chain Editor
- By default, the **Position** parameter is highlighted
- Use the **UP/DOWN** buttons to change the position (for the selected link)
- Press the **SET** button to switch between the Position and Length parameters
- ARP's 8 **CHORD** buttons are colour coded to match the corresponding chord on screen
- You can change the **Chord**, for the selected link, by pressing a **CHORD** button

- The **Position** parameter (Pos) allows you to create chord inversions (see Chord Inversions)
- The **Length** parameter (Len) defines how a link will play before moving to the next link
    - By default this is 1 bar
- You can also change the Note of the selected link by pressing one of the **NOTE** buttons

Tip. When creating a long chain, it is helpful to set the parameters of the first link before adding links as the last parameter values will be assigned to each new link.

Chain Length

Setting the length of the chain, using the **KNOB** control, disables any links after the selected link. These links will not play when the chain is activated, however, they are saved and can be reactivated at a later point by increasing the Chain length.

Resetting the Chain

If you wish to remove the disabled links...

- Select the last link to be included in the chain, then...
- Press and hold the **RESET** button to delete all subsequent links

To start a new chain, simply select the first link and hold the **RESET** Button.

Don't forget to set your parameters before adding new chain links.

Loading Chains

You can create up to 12 different Chord Chains that will be stored and recalled later.

Any changes you make to a chain will be saved automatically and will overwrite the existing link parameters.

In the Chord Chain Editor...

- Press the **LOAD** button
- Press a **NOTE** button to select a chain to load

To cancel loading, before pressing a NOTE button, press the **LOAD** button again or **PROGRAM** to exit the Chord Chain Editor.

Loading a Chain that has not yet been edited will default to a one link chain.

Copying Chains

Duplicating chains is a good way to reuse an existing chain and create variations.

- Load the chain to be copied
- Press the **COPY** button
- Press the **NOTE** button representing the chain you wish to copy to

Note, the existing Chain will be overwritten and this cannot be undone.

Playing the Chain

On exiting the Chord Chain Editor, the chain will automatically be activated.

On pressing **PLAY**, the sequencer will play the chord progression defined by the chain, starting at the first link.

The Chain will be deactivated when pressing a **NOTE** button. Or sending in chords via an external keyboard. See External Note Sync

TIP. When playing a chain, the global Octave will still function to shift the pitch of the chord chain up or down by 12 semitones.

Playing During Chord Chain Edit

You may enter the Chord Chain Editor while ARP is playing. Similarly, if you are in the Chord Chain Editor, you can press PLAY to start the sequencer.

However, only the currently selected link will play. This allows you to test how a chord will sound.

Tip. Scrolling through the links, using the KNOB control, will allow you to test each chord in turn, which can be useful when composing.

A Note on Deterministic Link Selection

If ARP is playing, on exiting the Chord Chain Editor, the position of the chord progression will be calculated deterministically. This means that the correct chord will be played based on the current MIDI clock tick.

For example: Imagine you have a Chord Chain with two chords that are 1 bar in length. When you exit the editor, part way through the 2nd bar, Chord 2 will be played.

Quick Loading Chains

During a performance you can activate a chain without entering the Chord Chain Editor.

You can do this in PLAY Mode at any time.

- **Hold** the **PROGRAM** button
- Press any **NOTE** button to load the associated Chain
- Release the **PROGRAM** button

As the new chain is activated, the link that is played (from the chain) will depend on the current MIDI Clock Tick. (see above)

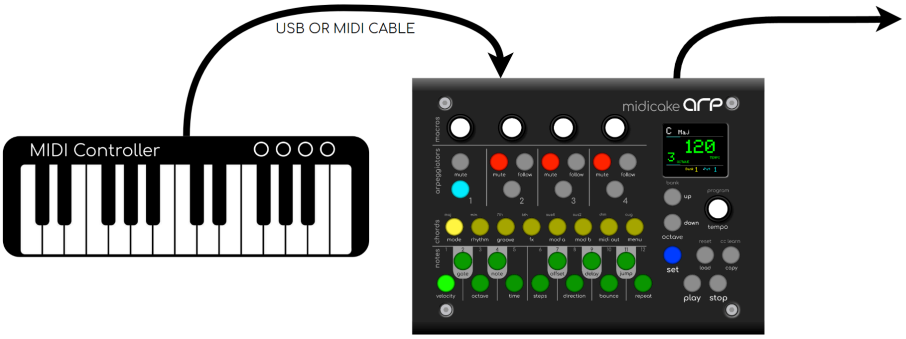
Timing the change between Chains forms part of your performance and can be used creatively to build complex song structures in real time.

For more ideas, see Appendix X - Ideas and Tips for performing with Chords and Chains

External Note Sync

A key feature of Midicake™ ARP is its ability to track live musical performances.

In the same way that the current sequence is transposed when selecting the chord and note (see above), **Note Sync** samples incoming MIDI notes to transpose the whole sequence and to follow all root note, chord and key changes.



Note Sync operates by sampling all incoming MIDI note messages, building a scale from all active notes and taking the lowest note as the root note.

For example, you might play a chord progression on a keyboard and have the same MIDI notes used by ARP to build its sequences. ARP will create a sequence that matches those notes based on the parameter values defined for each arpeggiator.

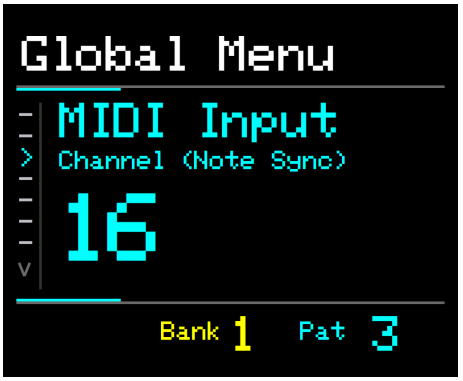
Another idea might be to use a step sequencer or piano roll pattern to drive arpeggios that reflect the original pattern. There are many creative possibilities.

See also: Appendix V - MIDI Input Arpeggiation Mode Behaviour

Configuring External Note Sync

In **SET Mode**, use the **MENU** button to select **MIDI INPUT CHANNEL (Note Sync)**

- Set this to match the MIDI output channel of the external controller (keyboard or sequencer)
- All incoming MIDI notes on this channel will be used to build the sequence



In **PLAY Mode**, on detecting MIDI notes, the active notes will be highlighted on the **NOTE** buttons and the display will show the external notes played.

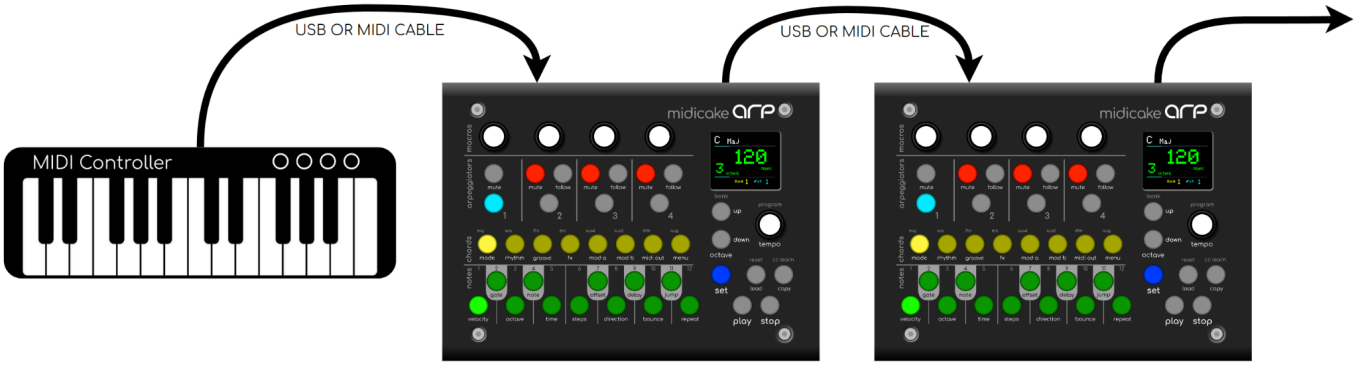
Daisy Chaining

Multiple ARPs can be connected together and Note Sync can be used to harmonize the output of all arp sequences. Imagine 3 ARPs with 12 separate MIDI channels all sharing the same Root Note, Chord/Scale and Tempo and Octave.

External Note Sync

To control multiple ARPs with an external MIDI keyboard or Sequencer, configure them in the following way:

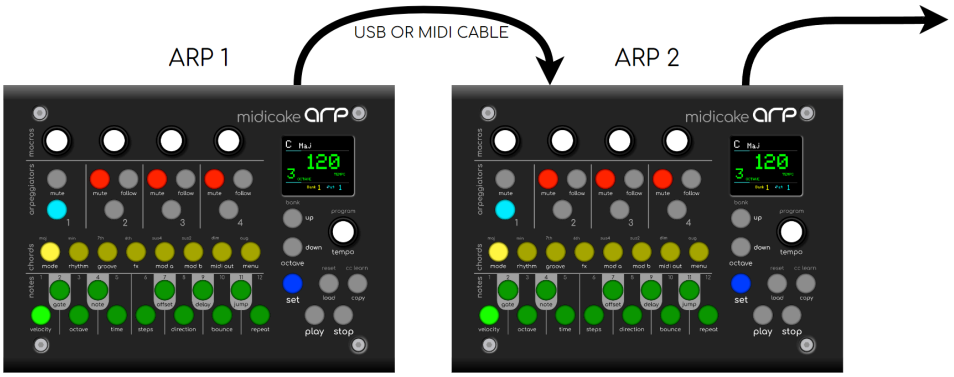
- Set the MIDI Input Channel (Note Sync) to match the Output Channel of your MIDI Controller.
- Do this for all ARPs
- Set **MIDI Thru** to ON



Internal Note Sync

To control multiple ARPs with the note buttons of just one ARP, configure them in the following way:

- Set the MIDI Output Channel (Note Sync) of **ARP 1** to match the **MIDI Input Channel (Note Sync)** of **ARP 2**
- Set **MIDI Thru** to ON



Notes

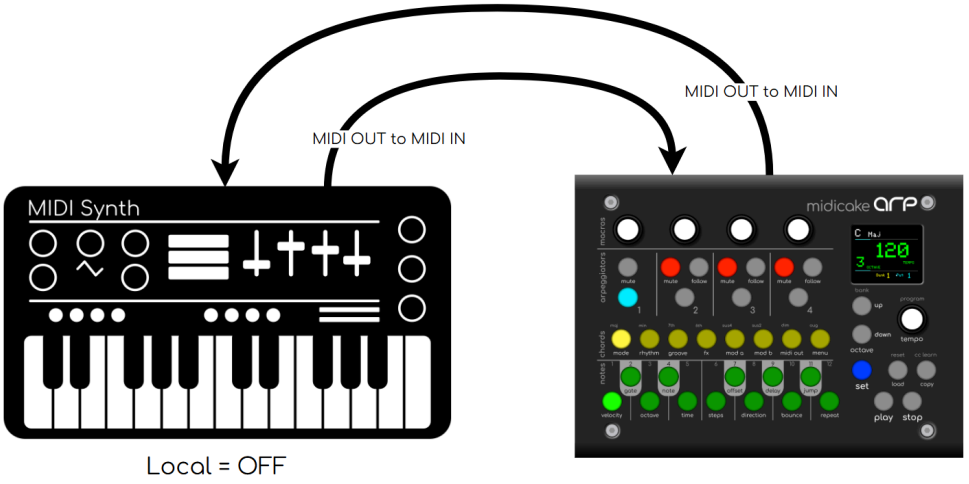
- *When using an External keyboard for note sync, internal note sync is disabled.*
- *Beware of sending other MIDI notes on the same channel as ARP's MIDI Input Channel, when daisy changing, as this may cause unexpected behaviour.*

Adding an Arpeggiator to your Keyboard Synthesizer

You can use ARP as an arpeggiator for your synthesizer, utilizing the synthesizer's own built in keyboard (if the synth supports this).

You can then play the keyboard to drive ARP which in turn drives the synthesizer.

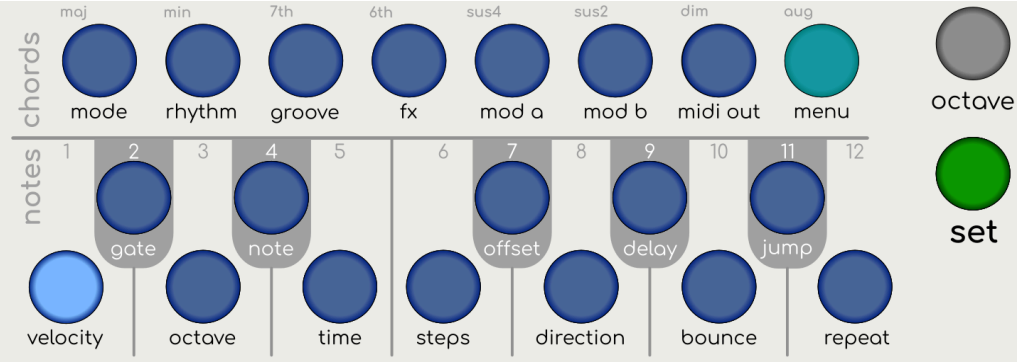
- Set ARP's MIDI Input Channel (Note Sync) to match the MIDI Output channel coming from your synth
- Set the MIDI Out parameter to match the MIDI Input channel going to you synth
- On your Synth, disable MIDI Local (to prevent the keyboard playing the synth directly.
- You may also enable Live Play on ARP



Creating Sequences

In **SET Mode**, **NOTE** or **CHORD** buttons become **PARAMETER** selection buttons

Press one of the **PARAMETER** buttons to choose the parameter to change. The parameter type associated with each button is shown below the button.



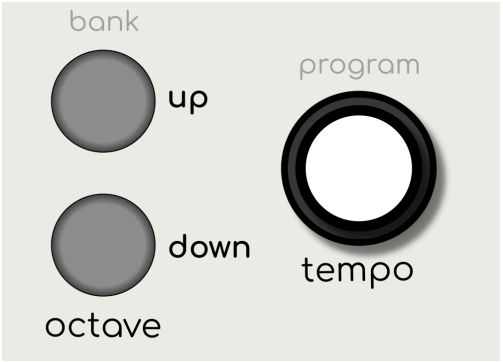
The screen will display the selected parameter and its current value. The button will light up to highlight the selected parameter.

Many of the parameters have multiple options.

- Press the PARAMETER button repeatedly to cycle through the list of options
- Alternatively, Hold the PARAMETER button and press UP or DOWN to move through the list of options

Additionally, you can configure the UP/DOWN buttons to select the parameter options. See [*Up Down Behaviour*]

Changing Parameter Values



Use the **UP/DOWN** buttons or rotate the **KNOB control** to change the value.

Hold **UP/DOWN** to change values quickly.

Select a different parameter by pressing another **NOTE** or **CHORD** button.

To exit **SET Mode** and return to **PLAY Mode**, press the **SET** button again.

Selecting Arp Tracks

Pressing the **TRACK SELECT** 1, 2, 3, or 4 buttons will select the arpeggiator. (ARP 1 is selected by default).

Pressing an already selected **TRACK SELECT** will select all arpeggiators. This enables parameters to be modified across all arpeggiators at the same time.

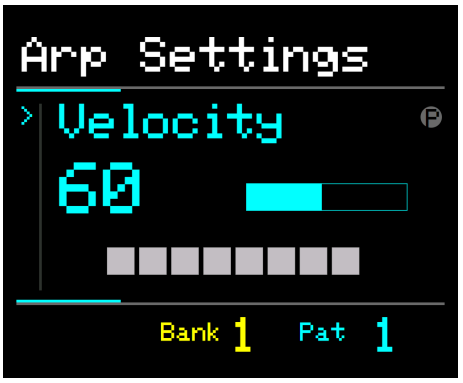
Modifying Multiple Arpeggiators

If all arpeggiators are selected, changes to the Velocity, Gate, Octave, and Note will be relative to the original value on each arpeggiator, e.g. on increasing the velocity by 5 steps, where arp 1 is set to 100 and arp 2 is set to 90 will result in arp 1 becoming 105 and arp 2 becoming 95.

For all other parameters, changes will result in the selected value being set for all arpeggiators.

Arp Sequence Parameters

Velocity

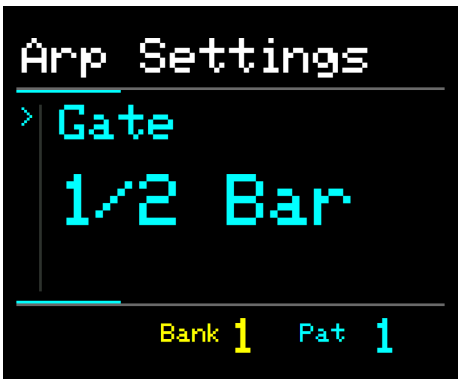


The **Velocity** parameter controls how loud the individual arpeggiator sounds. Useful in balancing the volume of multiple arpeggiators.

Values: 0 to 127

Velocity supports Binary Patterns via the PROGRAM button.

Gate

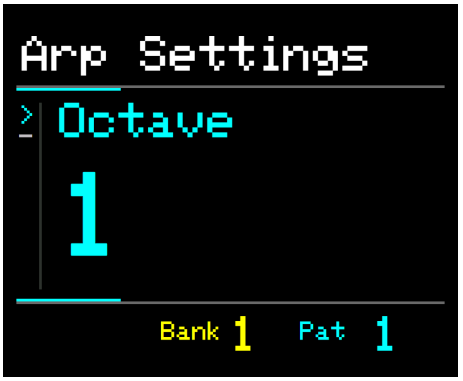


Sets the release time for all notes on the selected arpeggiator.

Lower values will give short "staccato" sounds and higher values will allow longer "sustained" sounds that can fade over time.

Values: 1 Tick to 256 Bars

Octave



Modifies the octave of the selected arpeggiators.

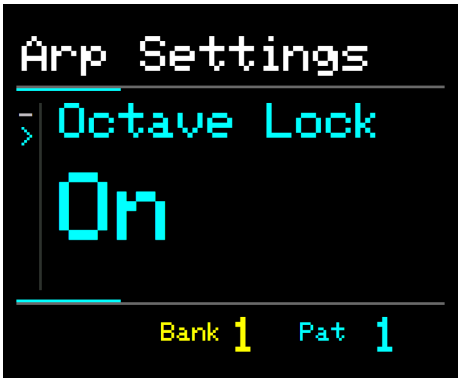
Changing the octave up or down can be a useful way to quickly change the pitch and intensity of a playing sequence without changing the melodic pattern.

Values: -3 to +3 (default 0)

Note that the **Octave** parameter value is relative to the **Global Octave.**

e.g. If the Global Octave is set to 3, and the Octave parameter for the arp is set to 1, a chord of C major will play the notes C4, E4, G4.

Octave Lock



Pressing the OCTAVE button again will select Octave Lock.

When enabled, the selected octave of the individual arp will not be affected by changes to the global octave or by external sync notes. e.g. If **Octave Lock** is set to ON, notes

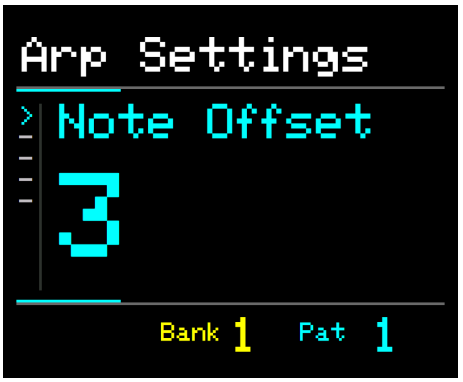
played on an external MIDI keyboard will be transposed to the locked octave.

Note

Press the **note** button to select the note-related parameters (listed below). Pressing the button repeatedly will toggle through each of the note parameters.

You can also hold the Note button and use the Up and Down buttons to select parameters.

Note Offset



Offsets the currently playing notes by an interval determined by the Offset Mode below.

This is intended for use in combination with the other arpeggiators and the **SCALE** Mode to build harmonies. Imagine using two arpeggiators playing an identical sequence but the 2nd being offset by 5 notes. Working in this way offers very precise control over musical notes in your sequence.

Offset Mode

Controls how the Note offset is applied during playback.

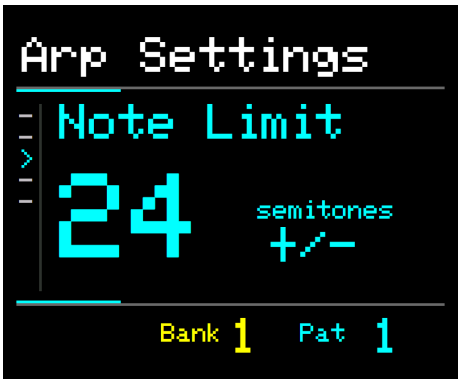
In the default **SCALE** mode, the offset equates to the note intervals of the current chord or scale.

e.g, If the current note/chord is C Major, an offset of +1 will move the root note from **C to E**.

Changing to **CHROMATIC** mode, the offset equates to individual semi-tones. As such it is not limited to the current chord or scale.

e.g, If the current note is C, an offset of +1 will move the root note from **C to C#**, regardless of the chord or scale.

Note Limit



Sets a maximum range to the number of semitones that a sequence note can be played (away from the root note). Up to +/- 48 semitones.

When Note Limit is set, any note in the sequence that falls outside of the range will be played at the furthest position that semitone can be played within the range.

e.g. If the limit is set to 24 semitones and the root note is C3: if a B5 is then demanded by the sequence, a B4 would be played in its place.

This behaviour is useful in 2 ways: -

- When using an external keyboard, if you press a single key, the scale would be a single note, as such the sequence may trigger a single note at rising or falling octaves, depending on the settings. This might result in undesirable effects, Note Limit can help prevent this behaviour.
- Used creatively, particularly with **Modulation**, it can be used to create interesting variations in a sequence.

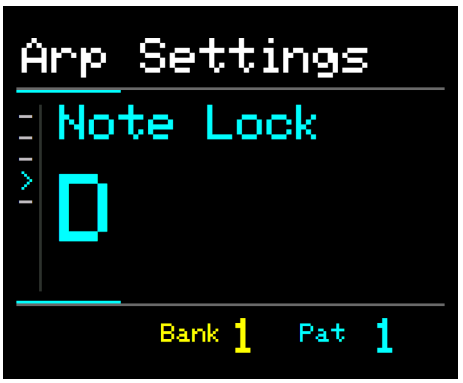
Set to **Off** to disable.

Note Lock

Allows you to fix the selected arpeggiator to a specific root note. It prevents the root note from being changed, either via the note buttons or external MIDI Note input.

Select one of the 12 semitones, C through to B.

Locking the root note can be useful for creating, for example, a continuous drone, or static melody, or if you are triggering fixed-note percussion instruments or samples.



Scale Lock

Allows you to fix the chord/scale of the arpeggiator, preventing the active chord from affecting the sequence. Simply select one of the in-built chords or scales.

As with Key Lock, above, this can be used creatively or to ensure that fixed-note instruments such as samplers do not change when you change the chord externally.

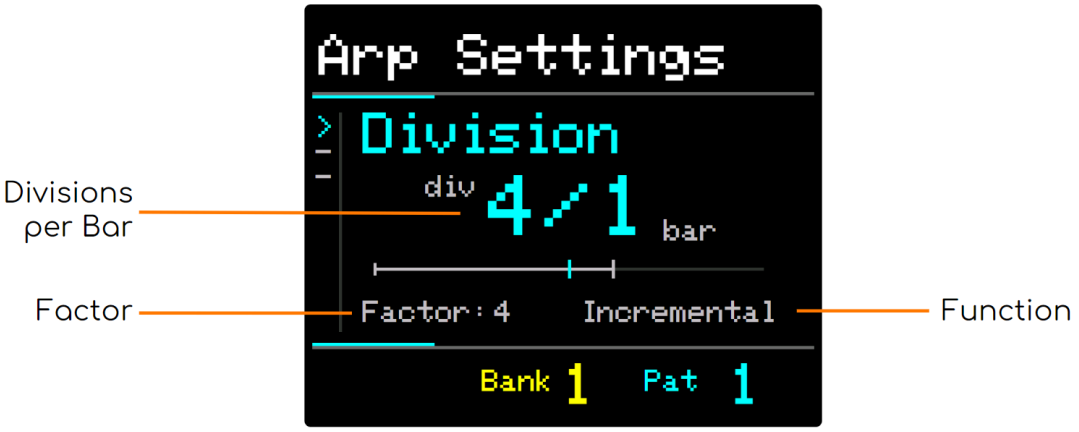
Setting both Key Lock and Scale Lock together effectively disengages the selected arpeggiator from any input notes and note sync.

Combined with bounce and rhythm patterns you can create drum beats or melodies that remain static as you play different notes and chords. In combination with the other arpeggiators that are synced to the played chords, this can create some very interesting, and perhaps highly discordant, effects.

Time

ARP has a unique and innovative way of controlling musical timing and rhythm.

It skips standard music terminology to enable exploration way beyond the conventional.



ARP can divide any number of bars by any number of divisions using 3 parameters.

Time Division

Sets the number of divisions per bar. Each division is a sequencer step.

e.g. 4/1 will play 4 steps in 1 MIDI bar

Time Factor

Sets the base number for the divisions. This is just a way to set how the Time Division behaves when you change it.

e.g. Factor 3 will divide the bar in multiples of 3

Time Function

Sets how the divisions increase or decrease as the Division value changes.

- **Incremental**, the factor is added or subtracted
- **Exponential**, the factor is doubled or halved

Example 1 - With a Factor of 3 and Incremental Function

- Increasing Division will result in 3/1, 6/1, 9/1, 12/1 etc.
- Decreasing will result in 3/1, 3/2, 1/1 (3/3), 3/4 etc.

Example 2 - With a Factor of 3 and Exponential Function

- Increasing Division will result in 3/1, 6/1, 12/1, 24/1 etc.
- Decreasing will result in 3/1, 3/2, 3/4, 3/8 etc.

For more information on Time Parameters, how they interact and how they can be used during a performance, see: Appendix III - Time Parameters

Steps

Determines the number of steps used in creating the sequence of notes to be played. The Sequence is repeated.

e.g. Given the C Maj chord (C, E, G)

- A value of 1 will produce a sequence [C3] which would repeat as => C3, C3, C3, C3... etc.
- A value of 8 might produce a sequence [C3, E3, G3, C4, E4, G4, C5, E5], depending on other parameters such as direction and repeats.

The maximum sequence length is 16. Notes that fall outside the range C0 to B6 will not be heard.

Pitch Filter

Limits the note pitches, taken from the active chord or scale, such that only the first few notes from the scale are used for the arpeggio sequences. Its purpose is in making simpler melody patterns from just a small number of notes when there are many notes that make up the scale.

For example: If the chord/scale is C Major7, the notes C, E, G, & B will be available to the sequence. If we set Pitch Filter to 2, then this limits the available notes to C & E.

This gives us the ability to create more stable basslines and melodies, that do not wander too far from a theme when playing more complex chords.

Combining **Pitch Filter** with **Jump** and **Note Limit** parameters can create some very interesting results.

*For example: Given the C Major7 chord, a **Filter** of 2 and **Jump** of 2 would limit the available notes to C & G. Interesting huh?*

Offset

The Step Offset can be used to shift the sequence (up to 12 steps) to start in a different position.

Given the sequence from above [C3, E3, G3, C4, E4, G4, C5, E5]...

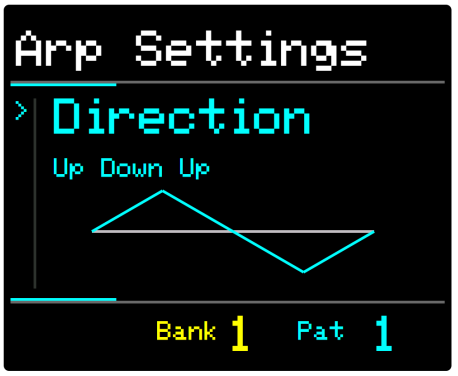
... an offset of 2 will create the sequence [G3, C4, E4, G4, C5, E5, C3, E3]

This enables a “round” to be created when combined with another arp.

Note: Step Offset is similar to Note Offset but with a key difference.

Step Offset is limited by the number of steps in the sequence, where Note Offset is not, e.g. if you have a Steps value of 4, the 5th offset will be applied to the 1st step. However, with Note Offset, the 5th offset will be 5 intervals above the 1st step, no matter the number of steps.

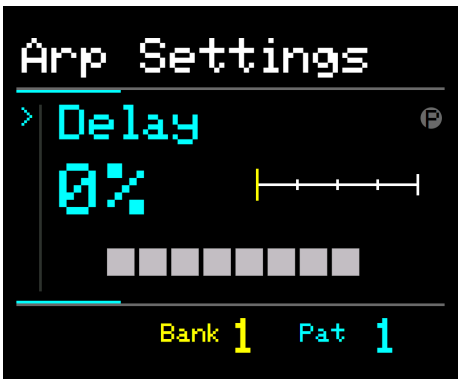
Direction



This sets the direction in which the sequence is travelled during playback.

- Up
  - [C3, E3, G3, C4, E4, G4, C5, E5]
- Down
  - [C3, G2, E2, C2, G1, E1, C1, G0]
- **UpDown** - changes from up to down mid-way through the sequence
  - [C3, E3, G3, C4, E3, C4 G3, E3]
- **DownUp** - changes down to up mid-way
  - [C3, G2, E2, C2, G1, E1, C1, G0]
- **UpDownUp** - changes up to down quarter past and back to up at quarter to
  - [C3, E3, C3, G2, E2, C2, E2, G2]
- **DownUpDown** - opposite of above
  - [C3, G2, C3, E3, G3, C4, G3, E3]

Delay



Delay pushes the MIDI notes forward in time, delaying all the notes for the selected arpeggiator.

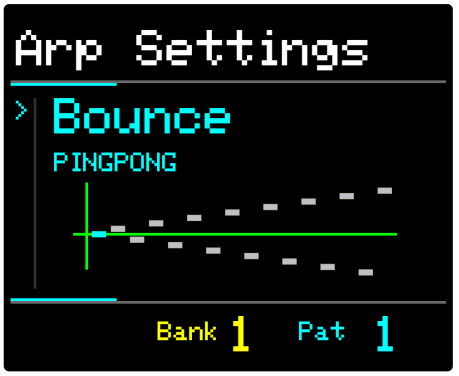
It is useful when combined with another arp playing a similar pattern to create a classic delay/echo effect. It can also be used to create off-beat patterns.

The delay value represents a percentage time difference to the next step so the delay time changes depending on the Time Division value.

Delay supports Binary Patterns via the PROGRAM button.

Bounce

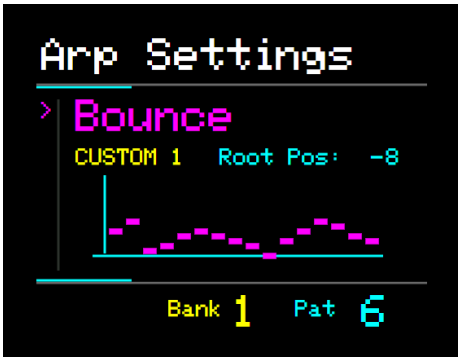
Controls the order in which notes in the sequence are played. E.g. Where Direction controls the next note in the sequence, **Bounce** creates a more interesting movement through the sequence.



Tip. Try it with a Chromatic Scale and simple Up or Down directions to get started.

Custom Bounce Patterns

There are 9 default and 20 custom bounces. These patterns are shared between all banks and patches.



Press **program** to select the first custom pattern or, if a custom pattern is already selected, to begin editing.

Rotate the KNOB control to select the step and use the Up/Down buttons to change the value.

The value is the number of steps in the scale away from the root note of the current chord.

Rotate all the way to the left to select the Root position and use Up/Down to change the position.

The Root position represents the root note of the sequence and all steps in the bounce pattern are relative to it.

For example, if the root position is set to the lowest value, all individual steps in the bounce pattern will be on or higher than the root note.

Jump

Sets the interval between the selected notes used in the sequence.

A value of 1 will select every note in the scale or chord when creating the sequence.

A value of 2 will skip every other note.

The maximum value of 12, can easily take you out of the note range C0 to B6. So larger values are only really beneficial for fine control of the chromatic scale.

Combining Jump with Directions and Bounce parameters can create interest.

Repeat

Sets the number of times each note in the sequence repeats before the next note is played. The default repeat is 1 and this will play each note in the sequence just once. You can set up to 32 repeats for each note.

This parameter is good for bouncing basslines or long pads that retrigger often but change note only after every nth step.

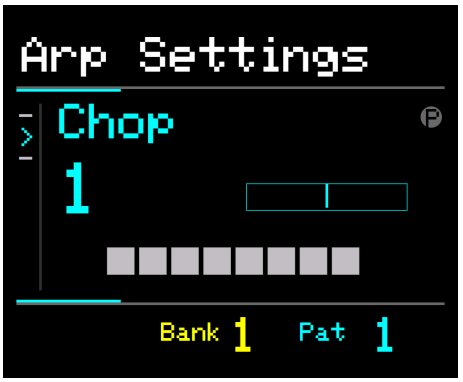
For example. A 4 steps rising sequence, played over two bars it might look like this:

Setting **Repeat** to 2 would repeat each step, like this:

It is still a 4 step sequence, but each note is played twice.

Tip. Repeat can also be used to create polyrhythmic and sequence phasing effects by using different repeats on different arpeggiator sequences. As an example, the two sequences above, played together, would be in an out of phase every 2 bars but far more complex phasing can be achieved.

Chop



Press the REPEAT button twice to access the Chop parameter.

Chop divides individual steps into 2, 3 or 4 duplicate notes and spaces them evenly across the time division.

It's like increasing the Time Division for each step.

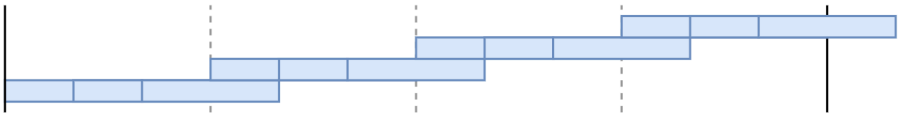
For example: Given a time division of 4/1 and this sequence:

Setting a **Chop** of 2 would create this sequence:

Note that length of the original note is maintained, as per the **Gate** parameter, so the duplicate notes have the same length.

e.g. Given this sequence:

A Chop of 3 would give this sequence:

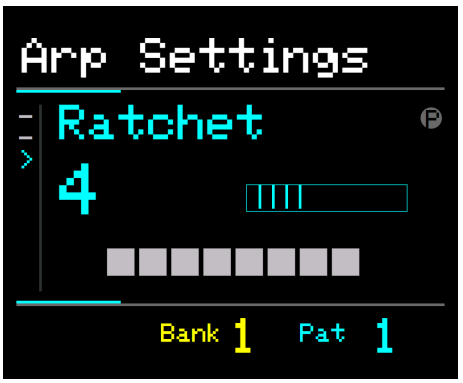


*(Note that if **Voice Mode** is set to MONO. only the last duplicate note will be the full gate length).*

Unlike simply increasing the Time Division to create more notes, Chop enables note repeats to be generated.

When combined with FX, Modulation and Binary Patterns, very interesting musical sequences can be generated.

Ratchet



Press the REPEAT button three times to access the **Ratchet** parameter.

Ratchet duplicates or retriggers individual notes, on each step, up to 8 times, adding a buzz or drill effect.

Given the following sequence (with a 3/1 Time Division) :

Adding 4 ratchets would produce this sequence:

Just like **Chop**, the **Gate** length is maintained for each new note.

- If **Voice Mode** is set to MONO, only the last ratchet note will be the full gate length. The note is retriggered
- If **Voice Mode** is set to POLY, all ratchet notes will be the full gate length. The note is duplicated.

Note. How Ratchets are interpreted as sound, depends on the connected Synthesizer. Some will simply retrigger, others will layer the note; possibly resulting in a volume increase.

Ratchet can be combined with FX, Modulation and Binary Patterns, to create highly interesting results.

Binary Patterns

Overview

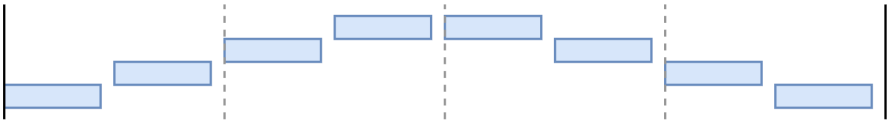
The **Velocity, Delay, Chop** and **Ratchet** parameters all have a powerful sequencing feature called **Binary Patterns.**

This allows you to apply the parameter value only on specific steps, to create complex rhythmic sequences.

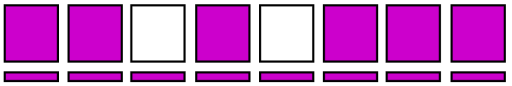
There are 255 possible patterns, based on a binary counter, and can be set to between 1 and 8 steps in length.

Each step in the pattern either enables or disables the parameter value. Think of it as OFF being 0 and ON being the current parameter value.

For Example. Given the following sequence:



A **Pattern Number** of 20 and **Pattern Length** of 8:

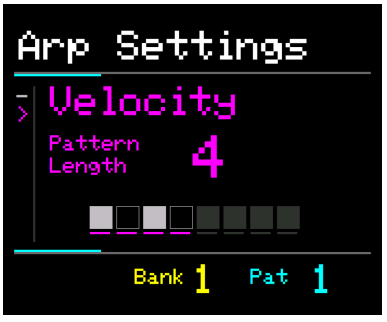


Would produce the following sequence:

There are examples of how to make creative use of **Binary Patterns** in Appendix VII - Creative Ideas for Binary Patterns.

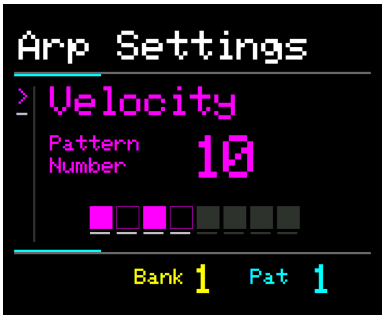
Configuring Binary patterns

- In **SET Mode**, select either **Velocity, Delay, Chop** or **Ratchet** parameters using the buttons.



- Press PROGRAM
- The **Pattern Length** parameter will be highlighted
- Use the UP/DOWN buttons or rotate the KNOB control to adjust the length

- Press the parameter button again to select **Pattern Number**
- Again, use the UP/DOWN buttons or rotate the KNOB control to adjust the number.
- When finished, press PROGRAM to return to the original parameter

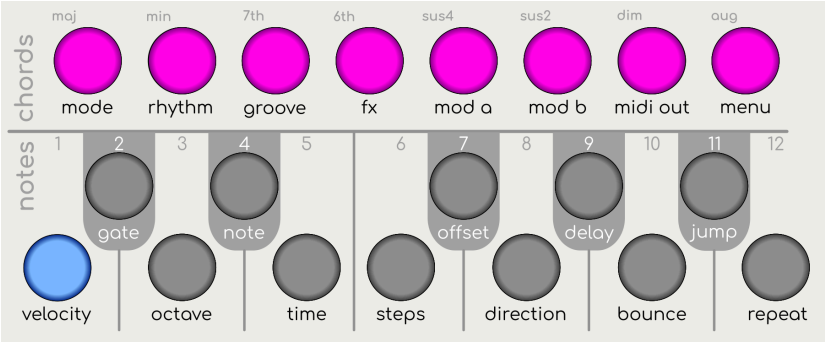


There are 255 possible patterns so it can take some time to go through them all.

Press and hold the UP or DOWN buttons to scroll through the Pattern Numbers quickly.

You can also use the 8 CHORD buttons to edit the pattern.

Pressing a chord button will toggle the corresponding step of the pattern and update the pattern number.

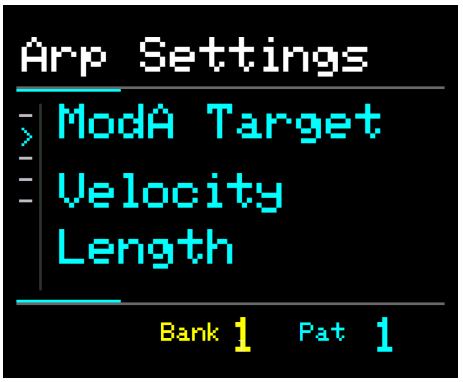


Modulating Binary Patterns

It is worth knowing that you can modulate both the **Pattern Number** and **Pattern Length** parameters for **Velocity**, **Delay**, **Chop** and **Ratchet.**

See Modulation.

In **SET Mode**, select **Mod A Target** or **Mod B Target** and choose the desired parameter.



Arp Behaviour Parameters

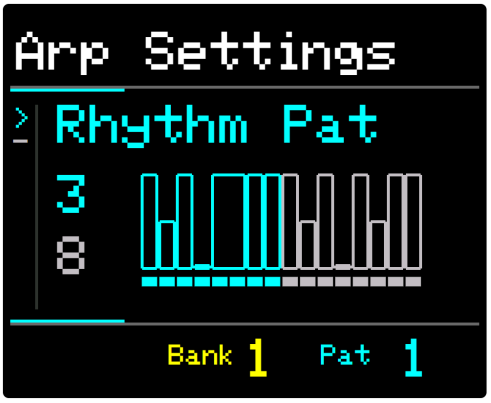
Mode

Each arpeggiator can operate independently in any of 4 modes: **ARP, CHORD, PAD, or DRONE.**

- **ARP** Mode will play each note in the chord or scale sequentially one after the other. Imagine playing the notes in a chord one at a time on a piano. Works well with shorter **GATE** values.
- **CHORD** Mode will play all notes in the chord or scale at the same time; in line with the **STEPS** parameter. Imagine playing a chord stab on a piano. The chord will repeat on every step, so can often work better with lower **TIME DIVISION** and medium **GATE** values.
- **PAD** Mode, similar to chord Mode, will play all notes in a chord or scale, but will not release the note until the Note or Chord is changed. Imagine playing and holding a piano chord with sustain. It works well with longer **GATE** values or synthesizer pad sounds that play indefinitely.
- **DRONE** Mode is similar to PAD mode but as the chord/scale is changed, any notes that belong to both the current chord and the new chord will be held. This creates a drone effect that keeps notes playing longer. E.g. If you change from a C major chord to E Minor, the E and G notes will be sustained and only the C will be replaced by B.

Rhythm

Press the **Rhythm** button to toggle between Rhythm Pattern and Rhythm Length parameters.



Rhythm Pattern

Enables the creation of 16-step patterns that modify the velocity and gate of individual notes in a sequence.

Rhythm Patterns, using ties, mutes and accents, can add movement to your sequence.

There are 16 default patterns to select, each of which can be edited.

Rhythm Length

Allows control of the length of the pattern and therefore how often the pattern repeats.

Note that the pattern repeats independently of the sequence (i.e. number of steps). Thus, a pattern and sequence of different lengths will move in and out of phase, creating interesting effects.

Editing Rhythm Patterns

With either Pattern or Length highlighted, press the Program button (KNOB control) to enter Edit Mode.

The pattern display will change colour with the first step in the sequence highlighted.

Rotate the KNOB control to change the selected step.

Use the Up & Down buttons to change the velocity of the highlighted step.

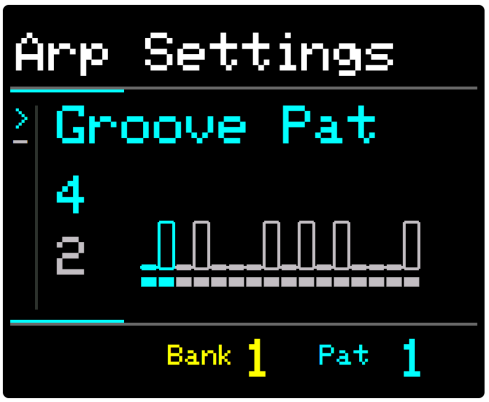
To create Tied Steps: Press the **UP** button until the step reaches maximum velocity and press again to tie the step to the one previous, thus allowing you to create longer notes in the sequence.

To create Muted Steps: Press the **DOWN** button until the step reaches the minimum velocity, this will mute the step and the midi note will not be played for this step.

Note that the maximum velocity is controlled by the Velocity setting of the selected arp. Therefore, to create Accent Steps, set the Velocity setting quite high, then edit the Rhythm Pattern, setting most steps to a mid-level value with individual peak steps at a higher velocity.

Groove

Press the **Groove** button to toggle between the Groove Pattern and Length parameters.



Groove Pattern

The groove parameters let you create up to 16 step patterns that affect the timing of notes (similar to Delay), by offsetting individual notes in the sequence. From swing effects to drunken sounds, Grooves can add feeling.

There are 16 default patterns to choose from, all of which can be edited.

Tips. It's easy to create random-sounding sequences with groove patterns, but they always repeat. Try using lower values to create swing-style effects. Use higher values to create different rhythmic patterns.

Groove Length

Groove Length allows you to set the length of the pattern and how often the pattern repeats.

Groove Patterns repeat independently of the sequence length (i.e. number of steps). Changing a pattern to a different length from the sequence length can create interesting phasing effects.

Editing Groove Patterns

With either Pattern or Length highlighted, press the Program button (KNOB control) to enter Edit Mode.

The pattern display will change colour with the first step in the sequence highlighted.

Rotate the KNOB control to change the selected step.

Use the Up & Down buttons to change the timing delay of the highlighted step.

Note: Groove values are added to the Delay value when calculating note timing. Therefore, shifting the arp Delay will also shift the Groove pattern by the same amount, keeping the note timing in sync.

Saving and Resetting Patterns

Press the Reset button when in Edit Mode to clear a Rhythm or Groove pattern back to a simple default pattern.

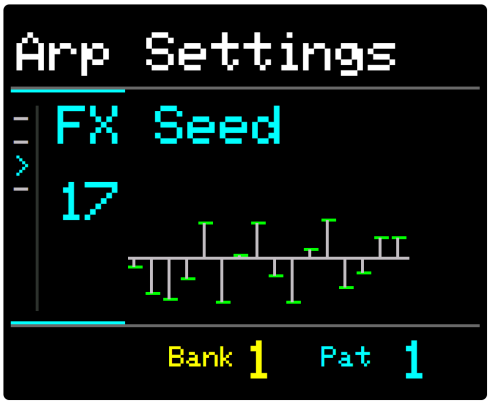
Edited patterns are saved automatically and are global to all patches within each bank. Editing a pattern with any arp or patch selected will change the pattern for any other arps or patches in the same bank. Therefore, it is recommended to use different patterns for each patch.

FX

The FX parameter is a powerful tool to create variation and interest in your arp sequences.

It utilizes a repeating pseudo-random sequence to modify a parameter value by a different value for each step of the sequence.

Think of it as a reproducible randomizer.



In **SET Mode**, press the **FX** button to show the effects menu. There are 6 controls:

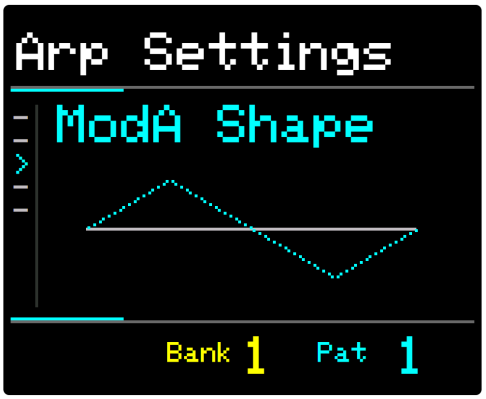
- **Amount**
  - Controls how much the target parameter is affected by.
    - *0 to 100%*
- **Target**
  - Determines the parameter that is affected by the FX sequence.
    - *Velocity, Octave, Note Offset, Time Division, Step Offset, Direction, Bounce, Repeat, Delay, Chop, Ratchet, MIDI Channel*
- **Seed**
  - Sets the seed value for the sequence to be applied. (The first 16 steps are visualized in the display)
    - *1-127*
- **Repeat**
  - Determines how often the sequence will repeat.
  - *¼ bar to 256 bars*
- **Pre Mod**
  - The length of time, with no modulation, before the modulation starts.
    - *¼ bar to 256 bars*
  - See Modulation Cycle

- **Post Mod**
    - The length of time, with no modulation, after the modulation ends
        - *¼ bar to 256 bars*
    - See Modulation Cycle

FX can be used creatively in many ways and the possibilities are extensive.

Modulation

Modulation can be used to evolve individual arp sequences over time, returning to the starting point based on the rate.



There are 2 modulations per arp: **Mod A** and **Mod B**.

Press the **SET** button, then **Chord 5** to edit **Mod A** (or Chord 6 for Mod B)

Press the Chord button again to cycle through the **Parameters**:

- **Amount**
  - Controls how much the target parameter is affected by.
    - *0 to 200%*
- **Target**
  - Determines the parameter that is affected by the modulation.
    - *Almost all parameters can be targeted (there are too many to list here).*
- **Shape**
  - The wave shape of the modulation applied over time.
    - *Sine, Square, Triangle, Saw*
    - *Plus, equivalent Half and Inverted Shapes*
- **Rate**
  - The wavelength. How often the modulation repeats
    - *1 tick to 256 bars*
- **Pre Mod**
  - The length of time, with no modulation, before the modulation starts.
    - *¼ bar to 256 bars*
  - See Modulation Cycle
- **Post Mod**
  - The length of time, with no modulation, after the modulation ends
    - *¼ bar to 256 bars*
  - See Modulation Cycle
- **Toggle**
  - Enables or disables the modulation
    - *On, Off*

On pressing **play**, the modulation will start from the currently stored value of the selected parameter.

For list parameters like direction and bounce, the modulation will cycle through the parameter options in the same order they appear when editing that parameter.

If the modulation takes the value of the parameter beyond its minimum or maximum value it will hold at that value until the modulation brings it back within its valid range.

Combining 2 Modulations allows huge scope for creativity.

Using 2 modulations of different rates can greatly extend the length of the sequence pattern, up to many minutes. Modulating all 4 arps and setting them to follow can produce hours of evolving patterns.

Doing this can cause the sequence to appear random, but remember that there is no such thing as random and it will always return to the start.

For more detailed information about Modulation, please refer to Appendix IX - How Does Modulation Work

MIDI Out

Sets the midi channel on which the individual arpeggiator will output.

Voice Mode

Also under the MIDI Out parameter, Voice Mode sets how the MIDI note output should behave.

- **Poly Mode**
  - By default, ARP respects the gate times of every note. This creates layered notes during playback and relies on the external instrument to control how it handles polyphony.
- **Mono Mode**
  - ARP will stop all notes on the current midi channel before sending new notes. This supports monophonic instruments that cannot handle polyphonic note input or behave erratically (which sometimes is no bad thing).

Note that Mono mode is per MIDI channel, so you can still layer notes using up to 4 separate monophonic instruments.

As an alternative to Mono Mode, try setting the **gate** value to 1.

Experiment with gate times to see how your mono instrument behaves; the results can be pretty interesting.

CC Output

Introduction

ARP has the ability to output automated MIDI CC (Control Change) messages as a continuous modulation (LFO).

This is controlled by 2 parameters under the MIDI OUT button:-

- **CC Number** (Off, 0 to 127)
  - The Control Number of the CC message
- **CC Value** (0 to 127)

If CC Number is Off, MIDI CC Output is disabled for the selected track and no messages will be sent.

The MIDI Output Channel for all CC Messages is set using **Menu >> CC Output Channel**

When **CC Value** is assigned to a modulator, the modulated CC Value will be emitted as a continuous output (up to 50 times per second).

This can be used to change external sounds over time by assigning the CC Output to any control or parameter on your Synth, Groovebox, VST, DAW.

It's like automating a MIDI controller knob.

It means that ARP has 4 automatable MIDI CC outputs that work independently of the ARP's MIDI Note output.

How to configure

In Set Mode,

- Press the **MIDI OUT** button until **CC Number** is shown
- Select the desired Control number, using the **UP/DOWN** buttons or KNOB control.
- Press the **MIDI OUT** button again to select **CC Value** is shown
- Set the baseline value for the output using the **UP/DOWN** buttons or KNOB control.

Assign to a modulator

- Press **MOD A** or **MOD B** and set the **Target** to **CC Value**.

If **CC Value** is the target of multiple modulators, the output value will be the sum of the modulation.

Assigning CC to your device

You can assign the CC output to an external control (such as filter cutoff on your synthesizer) in one of two ways.

If your external device has a defined like of CC Assignments, simply set the **CC Number** as defined in your device's documentation.

If using a Device, DAW or VST that has a CC Learn function, you need ARP to output only the MIDI CC message and no other messages. (Pressing **PLAY** may output 4 CC Numbers simultaneously, which will confuse the device.)

Therefore, ARP provides a solution...

- In Set Mode, Select either **MIDI Out**, **CC Number** of **CC Value**
- Press the Program button (Tempo Knob)

This will emit a single MIDI CC message with the baseline CC Value.

Disabling note output

If you don't want note data (sent alongside CC), simply mute the track. Alternatively, you can set **Velocity** to zero.

Working with parameters

Combining Parameters

ARP is not your regular sequencer and if you have experience of step sequencing or editing in a pattern roll it may not behave as you expect. The key to getting the best from arp is experimentation. There are a lot of parameters and how they interact doesn't make for a linear journey of creation; a small tweak can drastically change the resulting sequence.

Embrace it, you wouldn't be here if you wanted to stick to your tried and tested methods.

Remember that ARP's parameters are predictable. There is no such thing as random, only complex patterns.

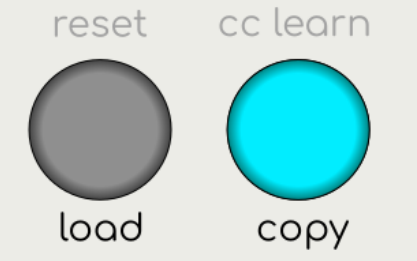
Saving Parameters

All changes you make are automatically saved.

Copying Arp Parameters

You can easily create a variation of a sequence on a different arp track by copying the parameters.

Select the Arp you wish to copy, press the **COPY** button, then select the arp you wish to copy to.

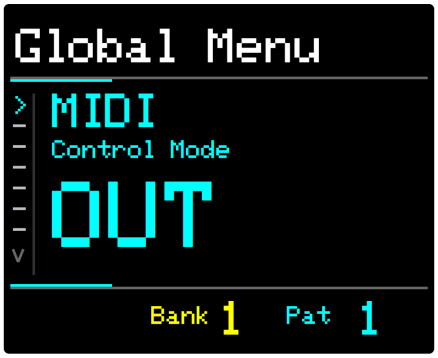


Global Settings

Press the **MENU** button to enter the global setting menu.

Press the Menu button repeatedly to select each of the multiple global settings.

You can also hold the Menu button and use the Up and Down buttons to select the global settings.



MIDI Control Mode

Set to **OFF** to isolate ARP from all incoming midi transport/control messages. (Start, Pause, Stop & Clock).

Set to **IN** to allow control of ARP from an external device via the MIDI In connector or USB port.

Set to **OUT** to use the Play and Stop buttons to send Start, Continue, Stop, and MIDI Clock messages to external devices via the MIDI Out connector or USB port.

MIDI Thru

Enables or disables throughput of MIDI messages on all channels, via MIDI DIN, USB and USB Host.

MIDI Input Channel (Note Sync)

Arp will sync to incoming MIDI Notes on the specified channel. (See External Note Sync)

Set to **Off** to disable Input note sync. Set to **Omni** to sync to note messages on any incoming channel.

MIDI Output Channel (Note Sync)

In order to sync multiple ARPs when Daisy Chaining, ARP will emit MIDI messages for the notes of the current chord, whenever it changes.

Set this to the MIDI Channel that matches the MIDI Input Channel of the ARP you are connecting to.

Set to **Off** to disable Input note sync.

MIDI Input Arpeggiation Mode

Multiple modes determine how ARP behaves when playing an external MIDI keyboard or other note-input device.

- **ARP DEFAULT Mode** is ARP's unique approach to arpeggiation. It uses the played keys to set the note letters available to the ARPs sequence. In this mode, ARP is responsive to all note input and it is the best way to get the most out of ARP. Read more about how it works here: Appendix V - MIDI Input Modes

- **ONE FINGER Mode** allows you to use keyboard notes to select the note and Global Octave. You must select the chord using ARP or assign MIDI CC controls to the Chord selection buttons. If you just want to explore chords this is a handy option.

- **CLASSIC Mode** behaves much like a classic synth arpeggiator.

  When selected, only the active notes sent from an external device, e.g. the keys pressed on a MIDI keyboard, will be made available to the arpeggiator sequence.

  The Steps parameter will be overridden and replaced with the number of active notes.

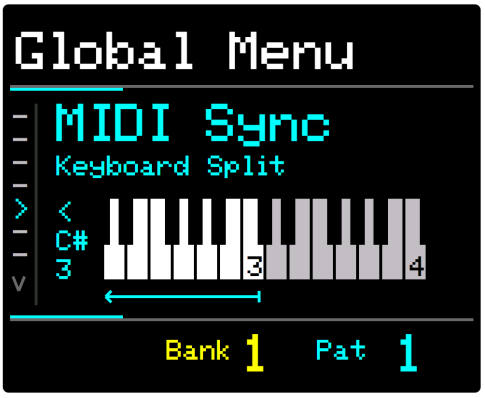
  When ARP is playing and all notes are released, the last active notes will continue to play until new notes are played.

  Note that Bounce patterns in Classic mode can give unexpected results. This is because the note pool is limited and some bounce steps may not have a corresponding note. When in doubt, set the bounce value to HOP.

For more information on MIDI Input Modes, please read: Appendix V - MIDI Input Modes

MIDI Input Keyboard Split

This setting lets you specify the MIDI Note, above or below which keyboard notes will be ignored for note sync and live play but will pass through to your sound generating device.



This enables you to "split" an external MIDI keyboard such that one hand can set the chord for ARP and the other hand can, for example, play a melody or bassline that does not affect ARP's MIDI Input notes.

Options are: - OFF, < C0 to < C7, >B6 to >B-1

Live Play on Note Input

Live Play is the triggering of ARP's sequences on input: when holding NOTE buttons or when sending MIDI Note messages (on the MIDI Input Channel) via an external keyboard or sequencer.

Setting Live Play to **Off** in the menu will disable this feature. This is useful if you wish to select the Note/Chord or Scale silently before pressing PLAY.

Program Change Channel

Sets the MIDI Channel for incoming Program Change messages. Set this to match the external source for Bank and Patch change messages to be obeyed.

Set to **Off** to disable or **Omni** to receive PC messages on all MIDI channels.

CC Output Channel

Sets the MIDI Channel for Control Change output from ARP.

CC Output Channel is used when: -

- Macros are set to output CC.
- Macros assigned to the **CC Value** parameter
- Modulation Targets are set to **CC Value**

You can also select the **"Per Track"** option, which outputs the CC Value for each track on the track's own MIDI Channel. This makes it possible to send CC on different channels.

Note. If "Per Track" is selected, Macros that are set to output CC will output on Channel 1.

MIDI Output Options

This option enables you to enable/disable specific MIDI Output ports, DIN, USB and HOST, by selecting the ports that you wish to be enabled.

Options: **ALL**, DIN+USB, DIN+HOST, HOST+USB, DIN ONLY, USB ONLY, HOST ONLY

Stop Play Behaviour

Offers 3 options for how ARP ends playback when pressing the Stop button.
- On Press - Stops playback immediately

- At End of Bar - waits until the end of the current bar before stopping, the last note played will be the last step in the current bar

- On Root/At Start of next bar - waits until the first step of the next bar before stopping. The last note played is the first step of the next bar, so this is usually the root note and resolves the music nicely.

This behaviour also functions when running an external MIDI clock. The internal clock detects the tempo from the external clock and will continue playing at that tempo until the end of the bar/start of the next bar. If these options are enabled.

Patch Change Behaviour

This setting controls how the sequences are triggered when loading patches during playback.

There are 2 options:

- **NON-STOP**
- **RETRIGGER**

For more information see: Appendix VI - Patch Change Behaviour

Up Down Behaviour

In SET Mode, the UP and DOWN buttons change the value of the selected parameter..

Alternatively, they can be used to navigate the menus.

In the Menu, select **Up/Down Behaviour** and choose between:

- **Change Value**
- **Navigate**

Note that if set to Navigate, only the KNOB Control can be used to change a parameter value.

LEDs Brightness

Controls the brightness of the button LEDs. Options: [**Low, Medium, High**].

Macro Controls

The Macro knobs are an incredibly powerful way to control any of ARPs parameters. Either for a single or mulitiple arps.

By default, the 4 knobs are set to control the velocity of arps 1 to 4.

Assigning to Arp Parameters

To set a knob to control a different parameter, press and hold down the knob button.

While still holding the button, select one or more arps to control by toggling the TRACK SELECT buttons so that only the arps you want are lit.

Then, while still holding the button, select the parameter you wish to control by pressing the associated **CHORD** or **NOTE** button.

Where a button has multiple parameters, (e.g. Dynamics, Groove, FX, Mod A, and Mod B) press the button multiple times until you reach the desired parameter.

Release the knob to save the change.

Rotating the knob will now modify the parameter you selected.

The parameter value will be shown briefly in the display.

Holding down the knob button will highlight the arps and the parameter associated with that knob, and the display will also show the selected parameter and its value.

This applies in both **SET** and **PLAY Mode**s.

Setting to Output MIDI CC

The Macro controls can be set to output MIDI Control Change messages (Used to modify external hardware or software controls/sounds).

- Press and hold a Macro knob, then press the CC Learn button.

The knob will now output CC values from 0 to 127 when rotated.

Pressing the button will also send CC values.

You can set the button to either Latch or Momentary by pressing the CC Learn button repeatedly while assigning.

- *When set to **Latch**, emitted values will toggle between 127 and 0 each time the button is pressed.*
- *When set to **Momentary**, a CC value of 127 will be emitted when the button is pressed and 0 will be emitted when the button is released.*

The MIDI CC output channel can be set in the global menu.

In SET Mode, press the menu button repeatedly until you see "CC Output Channel". Then, use the UP/Down buttons or the KNOB control to select the desired channel.

The last value for each CC assigned Macro is stored automatically and will be recalled when powering up.

To remove the CC assignment, simply assign the MACRO to a different parameter.

Please Note that, in using this method: -

- *Macro assignments are global and not saved per patch*
- *CC control numbers are fixed*
- *Macros cannot be assigned to both ARPs parameters AND MIDI CC*

Assigning Macros to CC Value

As an alternative method of outputting CC messages via the Macro controls, you can assign a macro knob to the **CC Value** parameter

- Press and Hold the Macro knob
- Use the MIDI OUT button to select **CC Value**

As the CC Value changes, the corresponding CC message will be emitted from ARP.

The CC message number is set by the **CC Number** parameter

The CC MIDI channel is defined via **Menu >> CC Output Channel**

When assigning macros to CC Output in this way: -

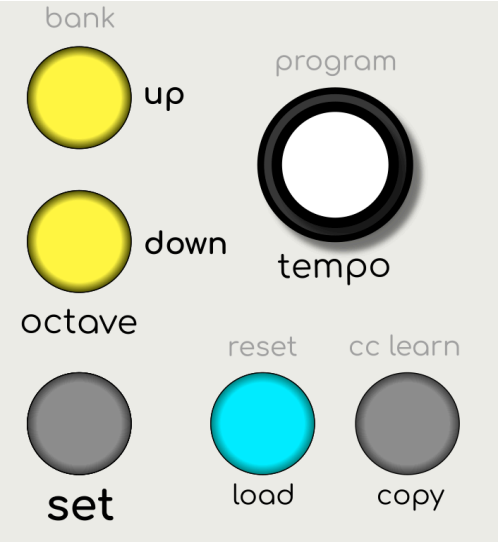
- CC Numbers are not fixed and can be set to any control number
- Macro buttons are not enabled as CC Outputs

Patches and Banks

Patches offer a way to build a collection of different sequences that you can switch between during a performance.

ARP offers 192 patches. These are stored in 16 banks, each having 12 patches. The 12 correspond to the 12 **NOTE** buttons.

While in PLAY Mode, use the **LOAD** button to quickly restore the sequences you create.



To recall a patch...

- Press the **LOAD** button
- Use the **UP** and **DOWN** buttons to select the bank
- Then press the **NOTE** button that corresponds to the patch you wish to load

To cancel the operation, simply press the **LOAD** button again without selecting a patch.

Synchronization

When loading a patch during playback, the patch will change on the bar to keep everything in sync. When this occurs a **"LOADING..."** message will be displayed. The bar progress indicator will also change colour to highlight the pending change.

External Control

Banks and Patches can also be changed using MIDI Program Change messages from an external hardware or software sequencer. See **MIDI Automation**

Copying Patches

To duplicate a patch, press the COPY button and then press one of the 12 **NOTE** buttons to store the sequence against that note. Note that the existing patch on that note button will be overwritten with a duplicate of the current patch.

This operation is useful in creating multiple related patches to create compositions.

Default Patches

ARP is pre-loaded with 12 default patches on each bank. These examples show how parameters can affect the sequence. (see Appendix i)

Resetting Patches

ARP has several options to reset the current patch to an earlier or default state.

Hold the **RESET** button. The Patch Menu appears on screen and there are 3 options available.

Press **RESET** to exit the **Patch Menu**

Undo All Changes

Press the **NOTE 1** button to return your patch to the state when the patch was first loaded.

Every time you start ARP or load a new patch, a snapshot of the current patch state is stored temporarily. This allows you to roll back any changes you've made to your sequences.

Load Default Patch

Press the **NOTE 3** button to return the current patch to the factory default patch.

The sequences on all 4 arpeggiator tracks will be lost. Although you can still Undo All Changes to return to the state when the patch was first loaded.

Clear Selected Track

Press the **NOTE 5** button to set the currently selected arpeggiator track to a simple basic sequence.

Use the **TRACK SELECT** buttons (1,2,3, or 4) to select the arp track you wish to clear.

This provides a blank canvas on which to start creating your sequence.

Connectivity

ARP can be connected to external devices via midi messages over USB or the MIDI DIN connections.

MIDI In

Midi In enables connection to any MIDI-compatible device via the DIN port.

It can be used to tempo sync to a master midi clock.

Note sync is also supported via **MIDI In,** forcing ARP to track the incoming notes. This can be combined with MIDI Thru, enabling a keyboard or sequencer to control both ARP and an external sound generator, via either MIDI Out or USB.

MIDI Out

Midi Out enables connection to any midi-compatible device via the DIN port.

It can be used to send MIDI clock and MIDI note messages to external devices.

It also passes external messages via Midi Thru from both MIDI in and MIDI over USB, if enabled.

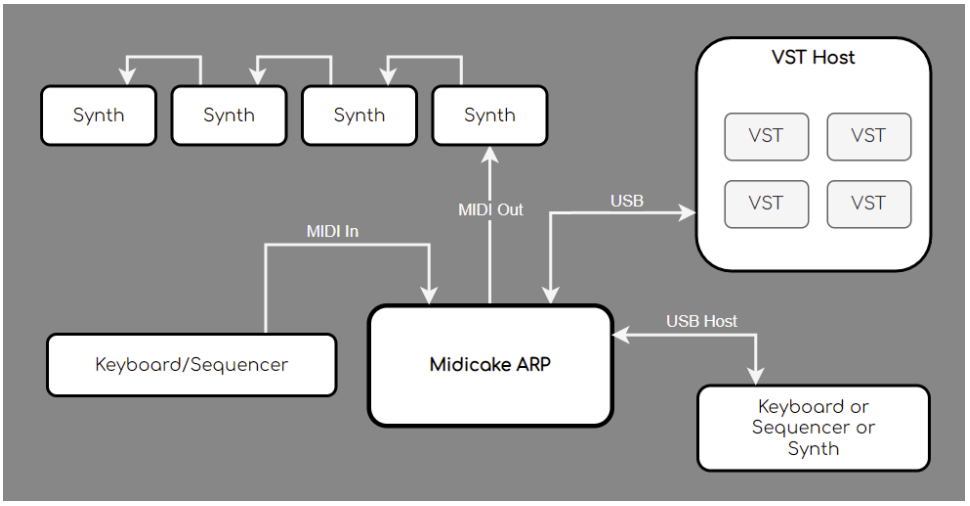
USB

The Type-B **USB** port provides power to the unit. It also supports MIDI over USB to connect to software sound generators, VSTs and DAWs.

It supports both incoming and outgoing MIDI clock and MIDI note messages.

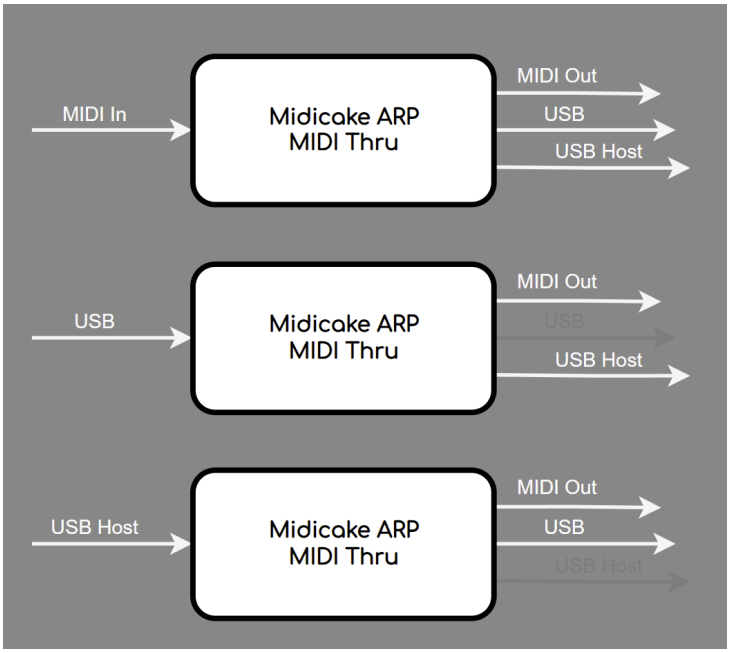
USB Host

The Type-A USB Host port supports MIDI note and CC input from a USB MIDI device such as a keyboard or sequencer.



MIDI Thru

If enabled, (via the Menu) ARP will forward any incoming MIDI messages to all applicable MIDI output ports.



Notes

- MIDI Thru for Transport and Clock messages is only enabled when ARP has **MIDI Control Mode** set to **IN**
- A software MIDI Thru is used so a small latency may be evident

MIDI Log

You can check the messages being sent and received by ARP using the MIDI Log.

- Press and Hold the LOAD/RESET button for 3 seconds to enter the BIOS Menu
- Press Note 2 to Show MIDI Log

The last 100 MIDI messages in and out of ARP will be displayed.

- Use the UP/DOWN buttons to scroll

MIDI Control Messages

Program Changes

MIDI Program Change messages from an external hardware or software sequencer can be used to change the active patch.

In **SET Mode**, select **Menu** and toggle through the settings to **PC Channel**. Select the incoming channel to match the output of your external MIDI device.

ARP will then respond to...

- Bank Change messages (using CC 0) with a value between 0 and 15 (bank 1 to 16)
- Program Change messages with a value between 0 and 11 (patch 1 to 12)

Example: The following MIDI messages will change to bank 3, patch 9, if the PC Channel is set to 5.

Action	Status	Byte 1	Byte 2	Channel	Note
Control Change	B0	00	02	05	Byte 2 = Bank
Program Change	C0	08	00	05	Byte 1 = Patch

Control Changes

MIDI Control Change messages from an external MIDI controller can be used to remotely change the value of any setting or parameter.

MIDI CC Learn Mode

Press and hold the **CC LEARN** button for 1 second to enter **MIDI LEARN MODE**.

The display will show the default or last selected control.

Press the **CC LEARN** button to exit MIDI LEARN MODE.

Arp and Chord Controls

In **MIDI LEARN MODE**... select any of the 4 **TRACK SELECT, MUTE, FOLLOW** or the 8 **CHORD** buttons you wish to assign external control to.

Transmit a MIDI CC message by activating any external control that is connected to ARP via the MIDI or USB MIDI ports. E.g. move the knob or slider.

The display will update to show the assigned MIDI Channel and Control numbers.

Arp Parameters

When in **MIDI LEARN MODE**... enter **SET Mode** by pressing the **SET** button.

Use the **CHORD** and **NOTE** buttons to select the parameter to which you wish to assign external control.

Remember... some parameters have multiple options, simply repeat press the button to select the desired parameter.

Use the **TRACK SELECT** buttons to select which arp to assign to.

Transmit a MIDI CC message by manipulating the external control.

The incoming MIDI CC channel and control number will be displayed and the external control will be assigned to the parameter.

***For Example,** press the **Note 1** button, then press **TRACK SELECT** button 1 and assign the CC, then **TRACK SELECT** button 2 and again assign the same CC. The external MIDI CC will now affect the velocity parameter for both arpeggiators, 1 and 2.*

Note that a parameter can have only a single CC assigned, but the same CC can be assigned to multiple parameters.

Clearing MIDI CC Assignments

To clear the assignment, enter **MIDI LEARN MODE**, select the chord, arp control, or parameter, and then press the **LOAD/RESET** button.

Controller Type Support

ARP supports two control types.

Select the controller type by entering MIDI Learn mode and pressing the **UP** or **DOWN** buttons to toggle.

Absolute (ABS)

Controllers such as a slider or rotary potentiometer have a fixed range of movement.

> In **ABS** mode ARP will map the incoming MIDI value to the parameter value range.
>
> This means that you must use the full range of movement of the external control to fully control the parameter value. I.e. To get the highest value for the parameter you would have to set the controller to its max position.
>
> *Example... Octave (with a range of -3 to +3) requires a value of 0 to 18 to set it to -3, and 19 to 36 to set it to -2 etc.*

Incremental (INC)

Controllers such as rotary encoders have stepped movement and rotate infinitely.

> In **INC** mode ARP will use the incoming MIDI value as the exact value for the parameter.
>
> Where parameters have a negative value range, the incoming value will be offset to make a value of 0 equal to the lowest value in the parameter range.
>
> Any value above the highest value in the parameter's range will be ignored.
>
> This means that each increment on the controller will change the parameter value by a single step
>
> Example... Octave (with a range of -3 to +3) requires a value of 0 to set it to -3 and a value of 6 to set it to +3.

Workflow Ideas

1. Connect Midicake ARP to a single hardware or software synth via MIDI Out or USB and create a simple sequence on arp 1.
2. Explore the Chord and Note buttons to create interesting chord progressions.
3. Copy your parameters to a different patch and tweak the parameter values slightly, then load each patch in turn during playback to get interesting variations.
4. Copy the arp 1 parameters to arp 2, then tweak the values to create two complementary sequences. Do the same for arp 3 and arp 4.
5. Create a long-running sequence by setting each arp to follow the previous.
6. Increase the complexity of the sequence by modulating one or two parameters across the 4 arps.
7. Program the **Macro Controls** to modify any parameter you desire to create unique performances.
8. Change the **Midi Out Channel** parameter of each arp to control a different sound generator or hardware synth.
9. If you can, why not connect 4 Hardware synths and 4 Software VSTs and control them all with ARP.
10. Connect a midi keyboard via USB or MIDI In and set the (menu) **MIDI Input Channel** to match the keyboard. Then play the keyboard and the sequence will track the incoming notes.
11. Connect a sound generator via MIDI Out or USB to the same MIDI channel as the keyboard, then you can play sounds with the keyboard and ARP will continue to track.
12. Experiment with Scales and Custom Chords.
13. Set the (menu) **Midi Control** to OUT and connect to external sequencers, DAWs, drum machines, etc. to control their playback and tempo.
14. Set (menu) **Midi Control** to IN to control ARP with external sequencers and DAWs.

Tricks and Tips

Midicake™ ARP can seem a bit overwhelming at first and can be a little tricky to find great-sounding sequences.

- Start with something simple and gradually increase the complexity.
- To begin with, set the sequence to a small number of **Steps**.
- Sometimes parameters won't seem to have an effect because of another parameter's selected value, e.g. bounce and jump won't do anything if **Steps** is set to 1.
- If you don't understand what's going on with your sequence try setting **Scale** to Chromatic.
- Check you are in SET Mode before tweaking parameters, it's easy to change the chord or note during a performance.
- Octave, Note, Steps, Step Offset, and Delay parameters can all be used to create rounds or out-of-phase sequences over two or more arps.
- Use Repeat to build simple basslines.
- Try assigning parameters to the **Macro Controls** and use those to experiment.
- Dynamics patterns don't work on Hardware synths that don't support velocity.
- Beware of polyphony when working with mono synths, the results can be interesting.
- Modulation waveforms take their starting position from the selected parameter's value. Try changing the main parameter value to see the effect on the modulation.
- Beware modulating Time Division and Delay parameters, modulation is only updated on each note played and if the time between notes is pushed to 2 or more bars, it'll seem like the sequence has stopped. Just wait, or set the modulation back to Off and things will get back to normal.

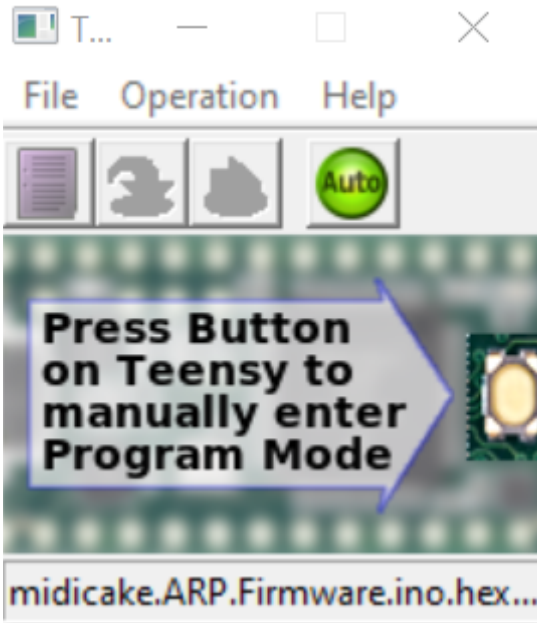
Updates and Hardware

Firmware Updates

To see the current firmware version, press and hold the **stop** button.

To install firmware updates:

1. Download the **Midicake™ ARP firmware** package and unzip it somewhere
    1. Midicake™ ARP firmware packages are available via midicake.com
2. Download the **Teensy Loader**
    1. Windows: https://www.pjrc.com/teensy/teensy.exe
    2. Mac: https://www.pjrc.com/teensy/teensy.dmg
3. Open the Teensy Loader



4. Select **File** > **Open HEX File**, then select the **v1.x.x.x_midicake_ARP_Firmware.ino.hex** file downloaded in step 1, then click **Open**
5. Make sure the (green) **Auto** button is selected.
6. Press the **UPDATE** button on the back of the unit (next to the USB port).
7. The arp should restart within a couple of seconds with the new firmware.

    Note: the firmware version number is displayed on the logo screen at startup and can be shown by holding down the stop button.

Resetting your Device

To reset the unit to its factory defaults...

- Restart the device by temporarily unplugging the USB cable
- Hold the **RESET** button for 2 seconds to enter the BIOS menu
    - There are 2 options:
        - **Soft Reset** will clear all global settings
        - **Full Factory Reset** will clear all stored settings including your patches
- Press the **COPY** button to confirm

Warning, all user parameters, patches, patterns, and chords will be lost!

Troubleshooting

Device is not responding?

- Restart the device by temporarily unplugging the USB cable

Still not working?

- Restart the device while holding the **RESET** button, to enter the BIOS menu, and then perform a **Soft Reset**
- If it is still not working, please contact us via the website: midicake.com/contact-us

Only One Note heard?

On Play, you only hear the first note played but ARP looks like it's still playing.

Is your instrument monophonic? Try setting **Voice Mode** to **Mono** or reducing the **gate** value to 1.

Notes keep playing after pressing stop?

This can occur (rarely) when multiple notes of the same pitch are sent to some instruments. Setting an arpeggiator to **Mono Voice Mode** may help. Pressing **Stop** 3 times should stop all notes. If all else fails, restart ARP and/or the instrument that's in a twist.

No sound heard

- Have you set **Velocity** to 0 (zero)?
- Have you set a **Binary Pattern** for **Velocity** where all steps are off?
- Do you have the correct MIDI Channel set for your Synthesizer/VST?
- Are the outputted MIDI notes within the range of your Synthesizer or VST?
- Check the Global Settings... Are MIDI Output Options set correctly?
- Has the cable come out?

Steps Parameter has no effect

If your sequence length does not seem to correspond to the number of steps, check the following:

- Are you in Classic Mode?
    - In **SET Mode**, go to **Menu >> MIDI Input Arpeggiation Mode** and set it to **ARP Default**
- Do you have a FX or Modulation targeting **Note Offset** or **Octave?**
- Is Pitch Filter set to a number, try setting it to Off?

Mounting Options

ARP has 100mm VESA mounting points on its underside that enable ARP to be attached to a bracket or stand.

IMPORTANT NOTE: Ensure to use M4 bolts that do not intrude into the case by more than 12mm. Exceeding this depth may damage internal components.

Appendix I - List of Default Patches

ARP is pre-loaded with 12 default patches on each bank. These examples show how parameters can affect the sequence.

Tips

- Use a polyphonic synth on MIDI channel 1 or set each arp to a different MIDI OUT channel
- Try setting all arps to 'follow' to hear each arp sequence in turn (see fig 1)
- Switch chords and patches during playback to turn the sequence into a composition

Patch 1 (C) - Basic Quartet

- Set all arps to play simultaneously, the 4 sequences should compliment

Patch 2 (C#) - Direction and Bounce

- Each sequence differs only by the direction and bounce parameters
- Direction and Bounce both define how individual notes are selected from the available notes in the chord or scale

Patch 3 (D#) - Repeat and Jump

- Each arp has different repeat or jump values
- Jump defines the number of notes in the scale that will be skipped between steps

Patch 4 (D) - Time Divisions

- All 4 arps are playing the same sequence but at a different number of divisions per bar

Patch 5 (E) - Triplets & Polyrhythms

- Arps 1 & 2 have a time division of 1 and 4 steps per bar
- Arps 3 & 4 have a division of 3 and 12 steps per bar creating an interesting polyrhythm
- To access triplet timings, increase the Time parameter past 32/1

Patch 6 (F) - Step Offsets

- Arps 2 & 4 are offset from 1 & 3 by two steps. Set 2 and 4 to follow

Patch 7 (F#) - Note Offsets

- Arps 2 & 4 are offset from 1 & 3 by a number of notes, creating harmonies of the same sequence

- The Note parameter has a second option to switch the offSET Mode between scale and chromatic, press the button twice to access

Patch 8 (G) - Note Delay

- Arps 2 & 4 have a Delay value that pushes the notes off the main step

Patch 9 (G#) - Mode - Chords and Pads

- Arps 1 & 2, in Chord Mode, will play all sequence notes simultaneously on each step
- Arps 3 & 4, in Pad Mode, will play only when the Note/Chord is updated

Patch 10 (A) - Rhythm and Groove Patterns

- Arps 1 & 2 have a Rhythm Pattern, affecting note velocity
- Arps 3 & 4 have a Groove Pattern, affecting note timing

Patch 11 (A#) - Modulation

- Arp 1 modulates the Octave parameter. Arp 2 modulates Note Delay
- Arps 3 & 4 have an alternating velocity sweep

Patch 12 (B) - Modulation steps and timing

- Arps 1 & 2 have an alternating modulation on Time Division, causing the number of notes in the bar to change
- Arp 3 has a modulation on the number of steps
- Arp 4 has timing delay increasing over 4 bars

Appendix II - Why is there no such thing as Random?

There's a philosophical viewpoint that "there are only patterns too complex to understand".

However, in the scientific sense and in the context of music, there are two potential issues with a random approach.

1) You are not in control. You are leaving the decision-making up to the algorithm.

2) It's not possible to repeat a truly random sequence.

Can it be called a "musical" melody if it's just an ever-changing stream of notes with no repeat?

Instead, ARP allows you to mix and match the many parameter values to create complexity and, yet, always in a repeatable pattern. **A**utomate, **R**epeat, **P**lay. That's where the name came from.

Even the FX parameter uses a repeatable, pseudo-random sequence. This was added to satisfy the demands of early customers who asked for some random for their generative compositions. ARP obliged this request with something that provided a generative feel but also met ARP's **non-random** rule.

But the concept goes deeper...

ARP's Deterministic System

Have you ever uncovered a lovely little melody (sequence) and then pressed stop, then play, and it is doing something completely different?

This is the problem ARP solves.

ARP is fundamentally a deterministic system. One in which no randomness is involved in the development of future states of the system. It will always produce the same output from a given set of inputs.

Most sequencers do not take into account their current position in time. They simply count upwards.

Example:

Imagine 2 sequences, each with 4 steps and the following patterns: (A,B,A,B) & (C,C,D,D). If you change from sequence 1 to sequence 2, after the 3rd step, the sequence would be: -

A,B,A,C|C,D,D,C|C,D,D,C|C,D,D,C|...

(*See how it plays the 1st step of sequence 2 at step 4?*)

Press Stop and Play and you get

C,C,D,D|C,C,D,D|C,C,D,D|C,C,D,D|...

The pattern has changed from **|C,D,D,C|** to **|C,C,D,D|**. (Though you might only notice it if it was played in sync with something else, a metronome, kick drum, or another sequence, for example).

This is the problem that ARP resolves. ARP calculates the step (pitch, gate, timing, etc.) based on the current time (i.e. the number of clock ticks since you pressed play).

ARP ignores everything that came before, meaning it always plays the step as if the parameters had never changed since you pressed play.

So, given the same example as before, the 2nd sequence would play as if it had been playing from the start: -

A,B,A,D|C,C,D,D|C,C,D,D|C,C,D,D|...

(*See how it plays the 4th step of the 2nd sequence, not the first step!!*)

This is key to how ARP operates.

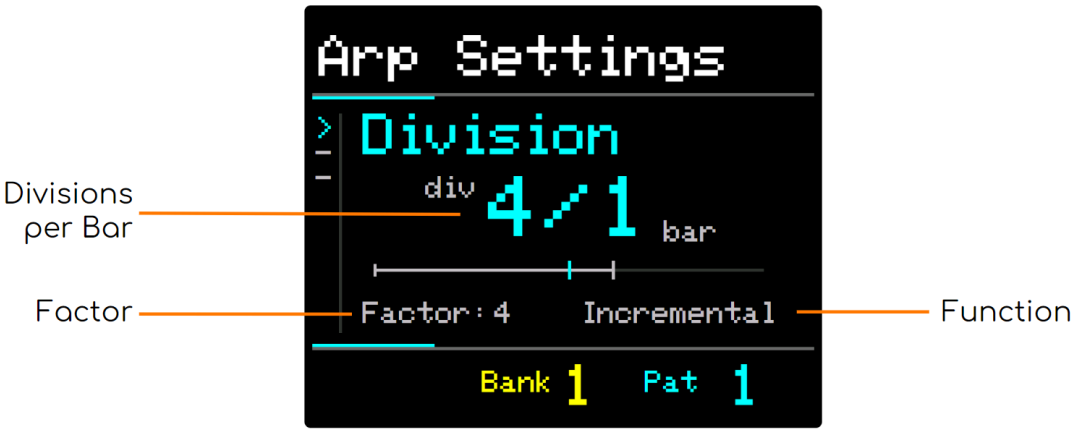
ARP has many, many parameters that impact the length of the sequence and the order in which notes play... if it wasn't deterministic, every time you changed a parameter you'd be moving the start point of the sequence; and constantly be finding and **losing** those lovely melodies.

That's why there is **No Such Thing As Random**.

Appendix III - Controlling Note Timing

Time Parameters

Before reading this, ensure you are familiar with how ARP's Time parameters work. Read this first: [Arp Parameters - Time]



MIDI Bar and Resolution

ARP supports high-resolution bar division, enabling more accurate note timing when playing unusual factors, e.g. 5, 7, 9, 10 and so on.

The Time Factor parameter can be set to any integer value between 1 and 16.

Using the Division parameter, to increase or decrease the division, allows for timing sub-divisions between 1 step every 8 bars and 32 steps every bar and, of course, any variation in between those limits.

Want 7 notes spread evenly over 23 bars? ARP can do that!

A Fresh Approach

So why not use a conventional approach? Why not just have a parameter to set the time signature?

1. Not everyone knows or wants to learn music theory
2. Allowing unusual time divisions enables unlimited new musical exploration

The combination of Factor and Function allows you to quickly change the timing of sequences during a performance and keep it to the rhythm of the track.

For example... jumping from 8/1 to 4/1 via 7/1, 6/1, & 5/1 would result in notes being played at undesired times and would potentially ruin a performance.

ARP allows you to halve, double or divide exactly, **keeping everything in sync**. While still enabling you to go timing crazy if you want to.

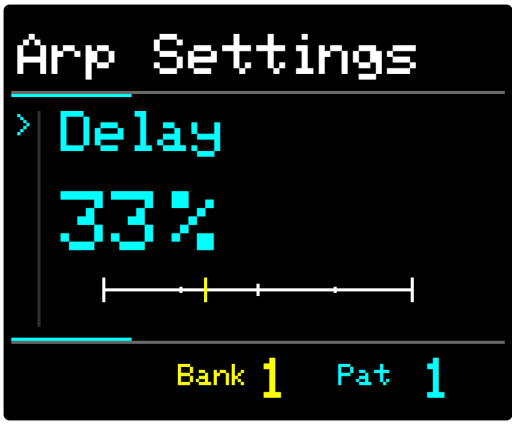
Delay

The Delay parameter adds a timing offset to all notes in the sequence, effectively shifting the sequence forward in time.

The value is the percentage distance to the next step in the sequence.

Example:

Given a Division of 4/1, a Delay value of 50% will push all notes forward by half the distance to the next note. i.e. an 8th note interval.

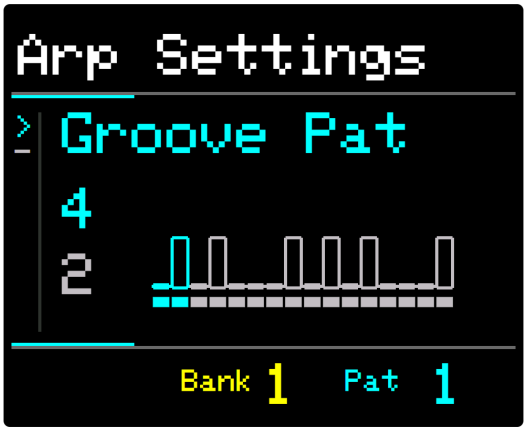


Groove

The Groove parameters affect the timing of individual notes in the sequence. (Similar to Delay, but per note).

You can achieve swing or highly complex timing patterns.

- **Groove Pattern** selects the pattern for the sequence. (You can create custom patterns by pressing Program).
- **Groove Length** sets how many steps of the pattern are played before it repeats. You can even create polyrhythms within the note-timing patterns.



Individual step timings are a percentage of the distance to the next step.

Modulation

ARP enables you to apply modulation to almost any parameter and timing is no exception.

Targeting Time Division, Delay or Groove Length allows enormous scope for both conventional and unusual rhythmic patterns to be achieved and can be used to evolve sequence rhythms over time.

It's all deterministic, though, so ARP will always return to the original sequence when switching off the modulation.

Appendix IV - Steps, PolyRhythm and PolyMeter

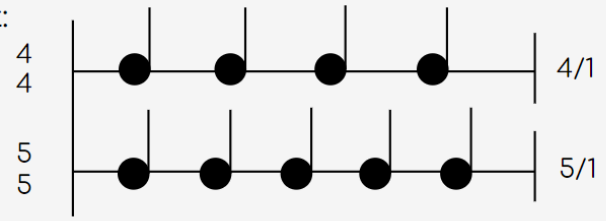
The Steps parameter sets the number of notes before the sequence repeats.

While not directly related to timing, Steps is key to creating PolyRhythms and PolyMeters.

Example 1: **PolyRhythm**

Arp 1, set Steps per Bar to **4/1** and Steps to **4**
Arp 2, set Steps per Bar to **5/1** and Steps to **5**

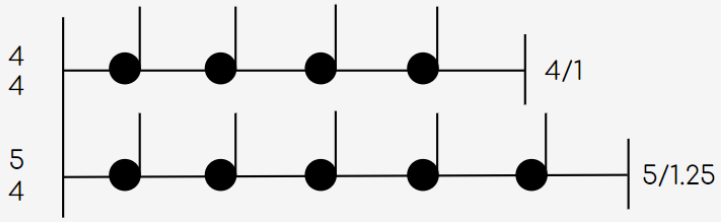
Result:



Example 2: **PolyMeter**

Arp 1, set Steps per Bar to **4/1** and Steps to **4**
Arp 2, set Steps per Bar to **4/1** and Steps to **5**

Result:



Appendix V - MIDI Input Arpeggiation Mode Behaviour

ARP responds to MIDI Note Input in different ways, depending on the Arpeggiation Mode.

In **SET** Mode press **Menu** repeatedly until you see **MIDI Input Arpeggiation Mode.**

ARP Default Mode vs Classic Mode

By default, ARP uses a behaviour that is unique and very powerful. It is important to understand how it works because it offers so much more creative control than classic modes.

A classic arpeggiator uses the specific notes you play to create its arpeggios.

ARP's Default mode, however, takes those specific notes as the note "indexes" on which its sequences are built. This is a subtle difference but has a big impact on the resulting sequences.

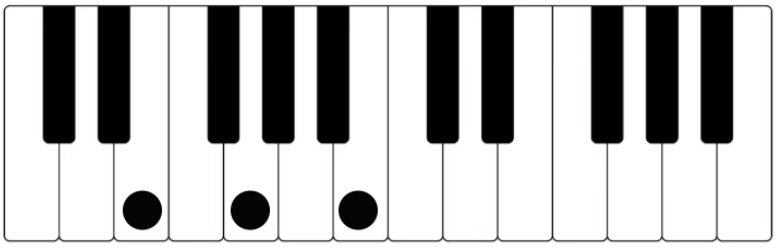
The length of a sequence in classic mode depends on the number of keys played. Whereas, in ARP Default mode, the length is set by the Steps parameter. This means that the musical rhythm does not change when you change to a chord with a different number of notes.

Let's look at some examples of how a sequence would be generated in each mode.

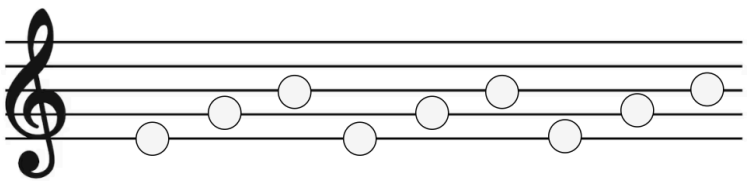
We will also assume that: -

- The **Direction** parameter is set to **UP**
- The **Bounce** parameter is set to **HOP**
- The **Steps** parameter is set to **3,** to begin

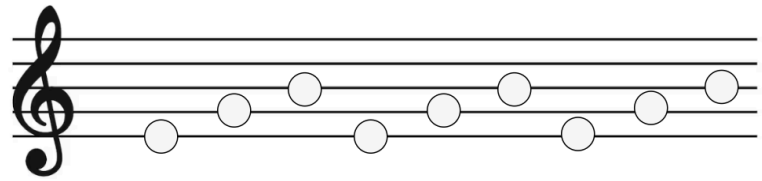
Example 1 - Given this 3-note input...



Classic Mode would play the following sequence

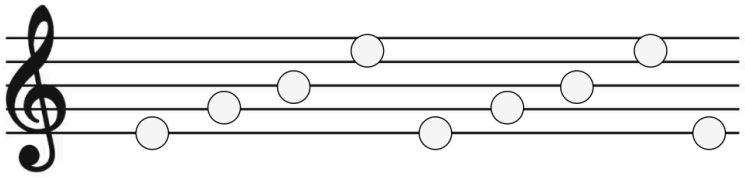


ARP Default Mode would play this sequence



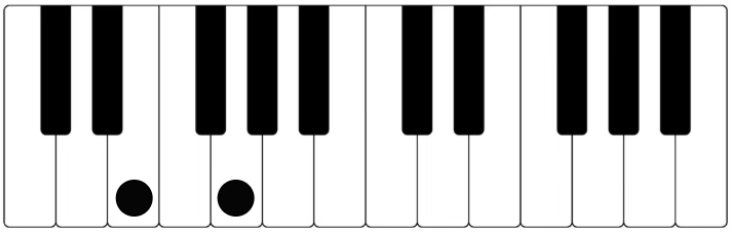
It's the same, because the number of steps matches the input notes.

However, if we changed the **Steps** parameter to **4**...

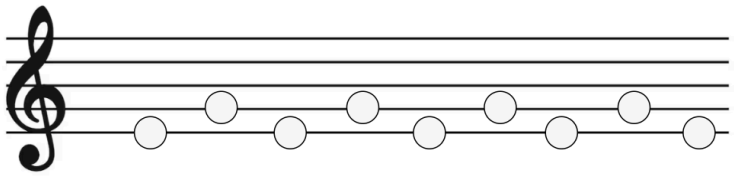


...ARP now plays a 4-note sequence of E,G,B,E

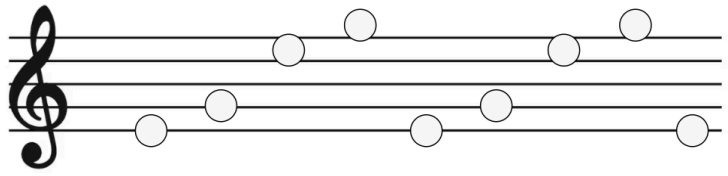
Example 2 - Given this 2-note input...



Classic Mode would play...



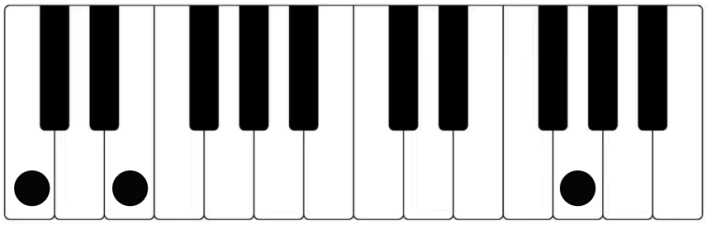
ARP Default Mode would play...



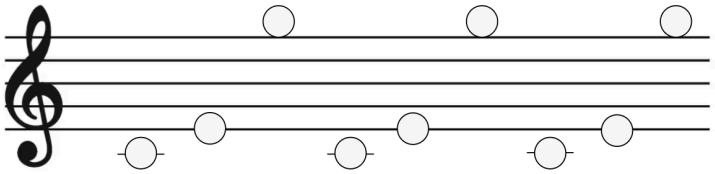
Again, Steps is set to 4, so the sequence is 4 steps before it repeats.

In ARP Default Mode, if you keep increasing the Steps parameter, the sequence will keep getting longer (to a max of 16 steps).

Example 3 - Given this 3-note input...

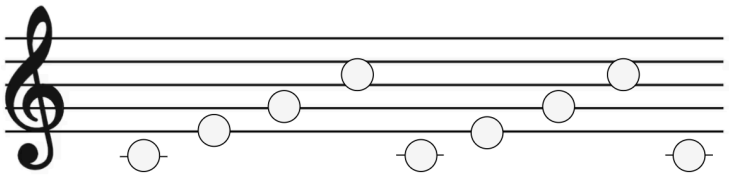


Classic Mode would play...



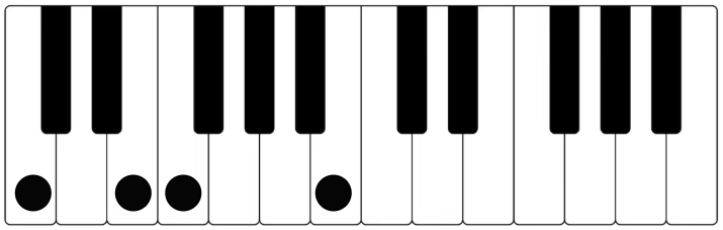
The exact notes played.

ARP Default Mode would play...

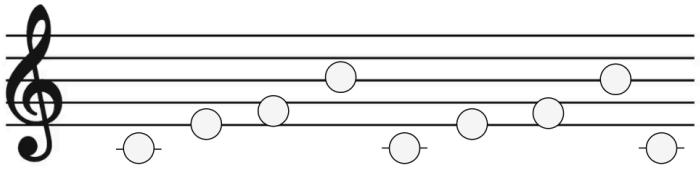


Because steps is set to 4 and the note letters are C,E,G

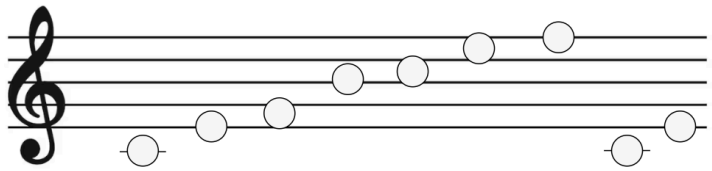
Example 4 - Given this 4-note input...



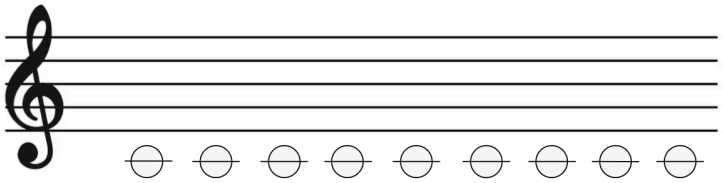
Classic Mode would play...



If we set the number of **Steps** to **7**, **ARP Default Mode** would play...



If we set the **Steps** to **1**, **ARP Default Mode** would play...



To reiterate, In **ARP Default Mode**, it is the number of steps that determines the length of the sequence and the input note letters are used to define the note pitches that are played as the sequence moves through the scale.

In Classic Mode, the sequence length is defined by the number of notes played and only the exact notes played are arpeggiated.

Appendix VI - Patch Change Behaviour

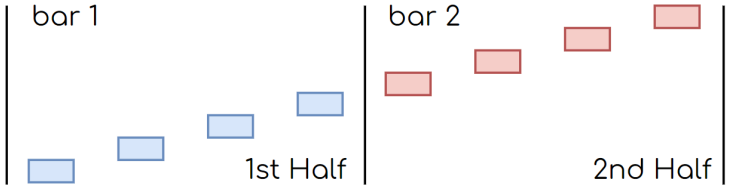
There are 2 options for how ARP behaves when changing patch during playback. Depending on the Patch Change Behaviour menu setting.

- NON-STOP
- RETRIGGER.

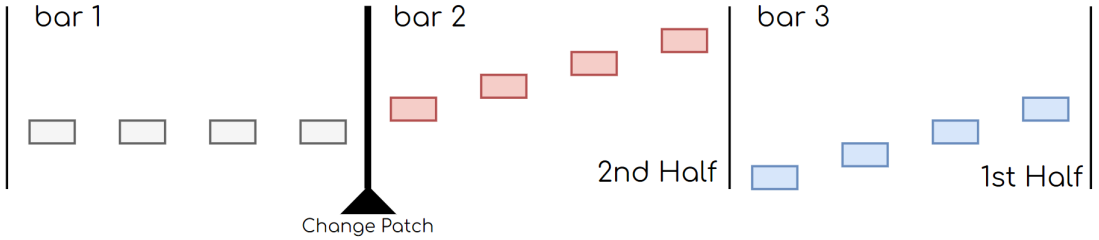
This setting is useful because we may be changing the patch mid-way through a sequence.

If a sequence is 2 bars long and you change on the 2nd bar, do you want to play the 2nd half or the 1st half of the new sequence?

Example: Given the following sequence:

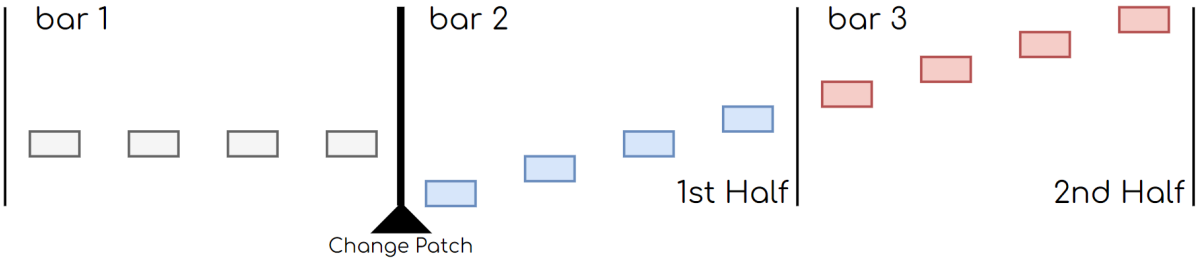


NON-STOP plays the new patch sequences as if they had been playing since you originally pressed play.



This option is better suited to generative, freeform, and evolving music.

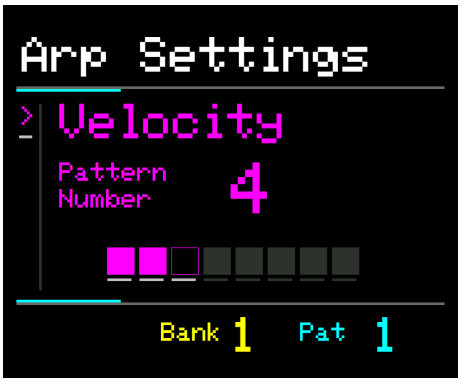
RETRIGGER plays the new patch sequences as if you had just pressed play.



This is better suited for more precise musical genres, where repetition is important.

Appendix VII - Creative Ideas for Binary Patterns

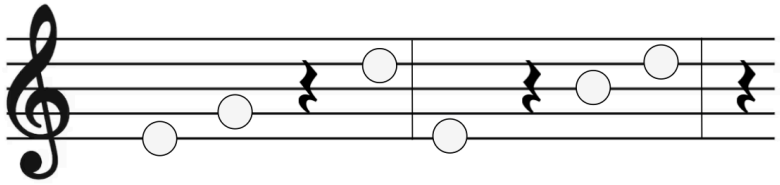
Example 1 - Mute Sequencing with Velocity

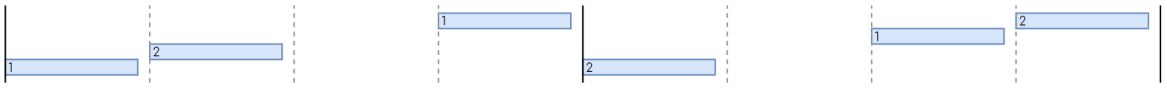


For the **Velocity** parameter, each step in the pattern that is set to OFF will effectively work like a MUTE for the individual step.

Just like a musical rest, where no note is played.

Press PROGRAM, then set **Pattern Number** to 4 and **Pattern Length** to 3 to create a sequence such as this:

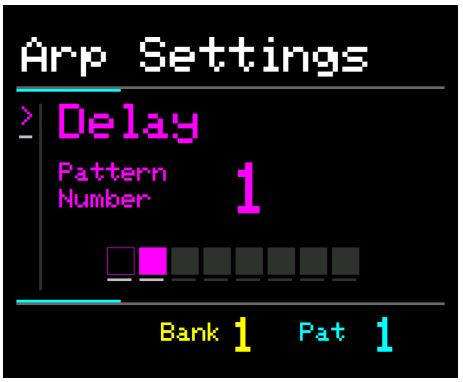




This is similar to **Rhythm Patterns** but much faster to create muted sequences.

You can use the Rhythm Patterns at the same time but with different pattern lengths.

Example 2 - Creating finely adjustable "Swing" with Delay



Each step in the pattern that is set to ON will apply the **Delay** amount, each OFF step will not apply delay. In this way you can create rhythmic patterns that affect the timing of notes. This is similar to the Groove Pattern but provides much finer grain control of the amount of delay.

To create a "Swing" feel to your sequence, select the **Delay** parameter and add a value greater than 0.

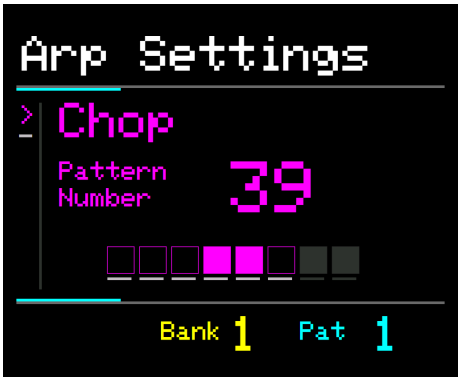
Press PROGRAM and set the **Pattern Number** to 1 and the **Length** to 2.

A sequence like this one will be created:

The pattern will repeat depending on the **Pattern Length**.

Therefore, setting the Pattern Length to 2 (as above) means that the parameter value will only be applied every other step, creating the swing effect

Example 3 - Time Sequencing with Chop



When used with the **Chop** parameter, each ON step of the Binary Pattern will subdivide the note by the number of Chops.

Each OFF step will only leave the note unaffected.

You can use this to create sequences that change the Time Division on specific steps.

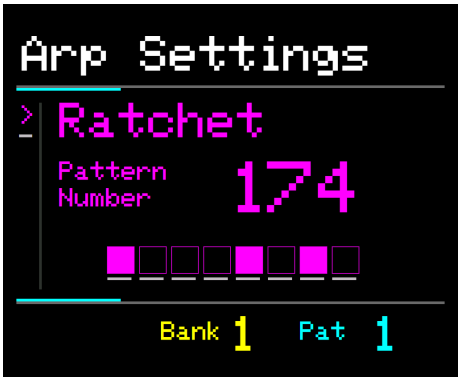
For example:

Set the **Chop** amount to 2.

Press PROGRAM and set the **Pattern Length** to 6 and the **Pattern Number** to 39.

The Chop will be applied on only the 4th and 5th of every 6 steps, like this:

Example 4 - Percussion Stutter with Ratchet



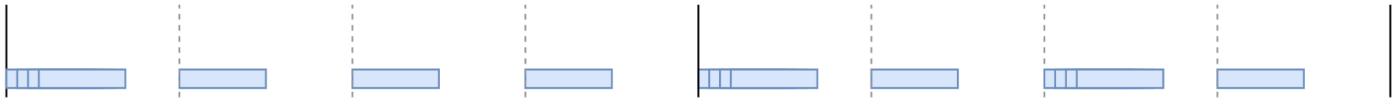
Adding a Binary Pattern to Ratchets can be used to great effect with percussion sounds.

Each ON step in the pattern will stutter the individual note.

As an example:

With **Steps** set to 1 and **Ratchet** selected and set to 4.

Press PROGRAM and set Pattern Length to 8 and Number to 174 and the following pattern will be created:



Appendix VIII - Logical Grouping of Parameters

ARP's parameters (in SET Mode) are laid out across the note and chord buttons in a way that makes them appear equally important. Indeed, They all have a role and function in shaping the sequence and its behaviour.

However, there is a logical flow to the sequence creation. Understanding this flow may be helpful in understanding what each parameter does and how they work together to create wonderful music.

It must be noted that the order in which parameters are configured has no impact on the sequence that ARP generates.

ARP is deterministic, so a given set of parameter values will always produce the same result.

ARP recalculates each current step as if the current configuration was in place since you first pressed play.

See ARP's Deterministic System

Parameters by Group

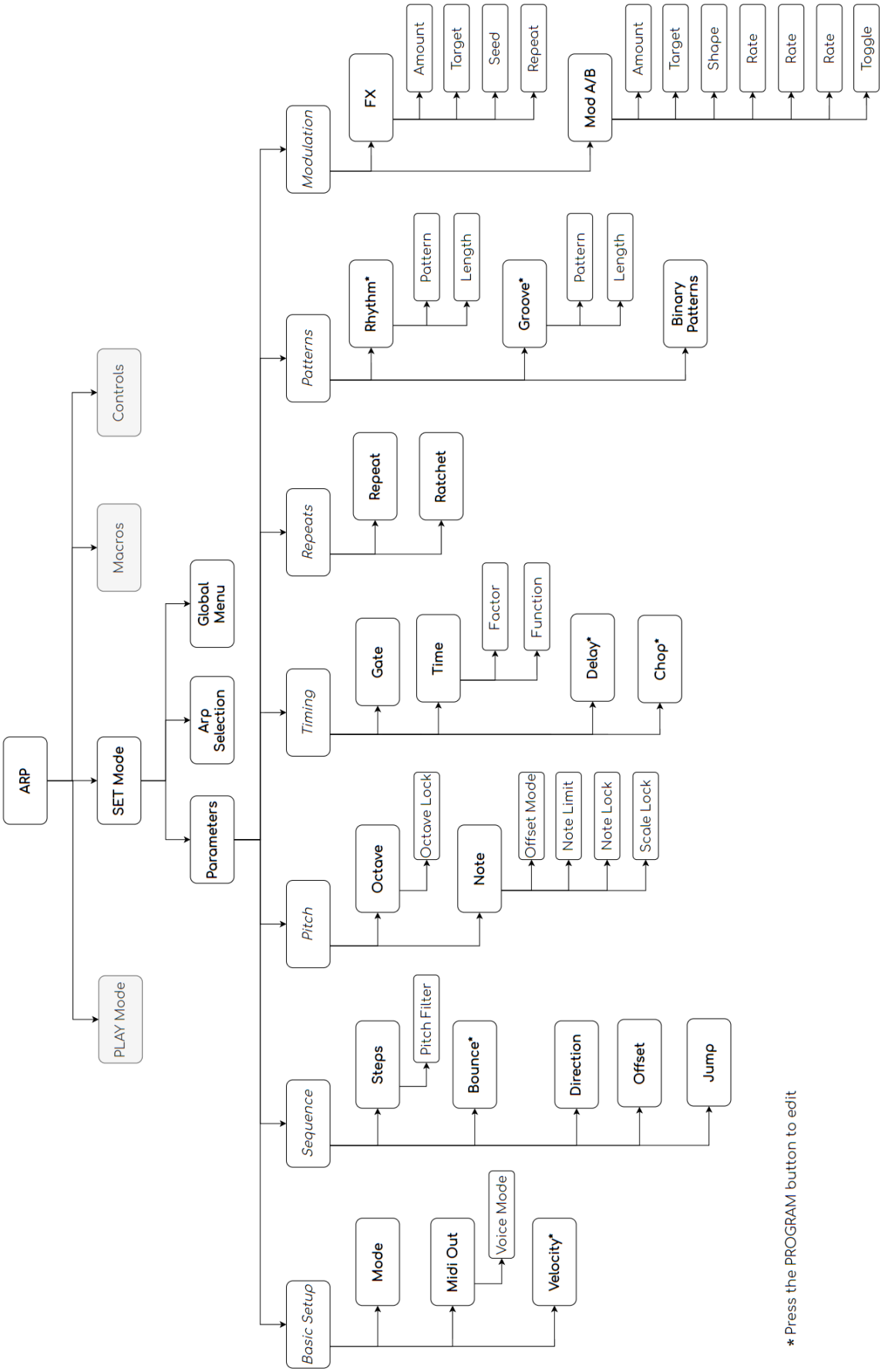
- Basic Setup
  - **Mode** - play notes sequentially or simultaneously
  - **Midi Out** - which MIDI Channel to send
    - **Voice Mode** - polyphonic or monophonic
  - **Velocity** - how loud notes are played
- Sequence
  - **Steps** - how many intervals to play from the Chord/Scale
    - **Pitch Filter** - limits the number of Chord/Scale intervals used for the sequence
  - **Bounce** - how to move through the Chord/Scale intervals
  - **Direction** - order that bounce intervals are played (TODO: This needs it's own appendix)
  - **Offset** - start position of the sequence
  - **Jump** - skips over Chord/Scale intervals
- Pitch
  - **Octave** - offsets the root note (relative to the Global Octave) by multiples of 12 semitones
    - **Lock** - overrides Global Octave
  - **Note** - offsets the root note by Chord/Scale intervals
    - Offset Mode - offsets by semitones, if is set to Chromatic
    - Note Lock - overrides selected root note
    - Scale Lock - overrides selected Chord/Scale
    - Limit - prevents notes being played too far from the root note

cont...

- Timing
    - **Gate** - length of individual notes
    - **Time** (Division) - how many steps are played per bar
        - **Factor/Function** - how changes to Time Division are applied
    - **Delay** - adds time before playing notes
    - **Chop** - sets the number of times a note plays within an individual step
- Repeats
    - **Repeat** - number of times steps are played before playing the next step
    - **Ratchet** - number of times steps are retriggered
- Patterns
    - **Rhythm** - pattern modulation of Velocity
    - **Groove** - pattern modulation of Delay
    - **Binary Patterns** - pattern modulation of Velocity, Delay, Chop and Ratchet
- Modulation
    - **FX** - pseudo-random pattern based modulation of various parameters
    - **Mod A/B** - wave/shape based modulation of almost all parameters

Parameter Map

The diagram below shows ARPs parameters by logical group.



Appendix IX - How Does Modulation Work

How Does Modulation Work?

Modulation changes the value of the **Target** parameter over time. You can think of it like a wave that changes the value as it rises and falls.

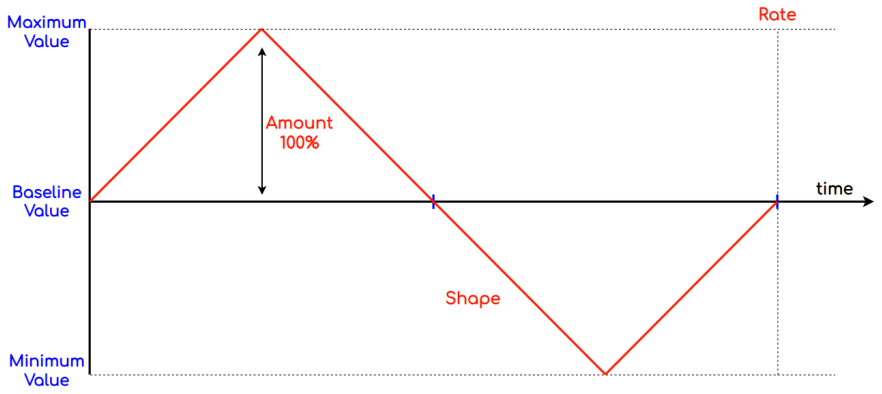
For example...

Let's imagine our modulation **Target** is set to Velocity.

We chose **Shape** as Triangle (below) which will increase and then decrease, and then increase the velocity value back to its Baseline **Value.** That is, the value set for the parameter itself.

How much it is increased and decreased is set by the **Amount**, which is a percentage of the half of the total range of the parameter value.

The minimum velocity is 0 (no sound) and the maximum is 127, so an **Amount** of 100% would equal +/- 63.5.



The **Rate** determines the wavelength, that is how long the wave lasts before it returns to the original value and then repeats.

So, Given...

- **Velocity** = 64
- **Time Division** = 12/1 (12 steps per bar)
- **Modulation Rate** = 1 bar

In one bar, ARP would output 8 notes with the following velocities: -

64, 85, 106, 127, 106, 85, 64, 43, 22, 0, 22, 43

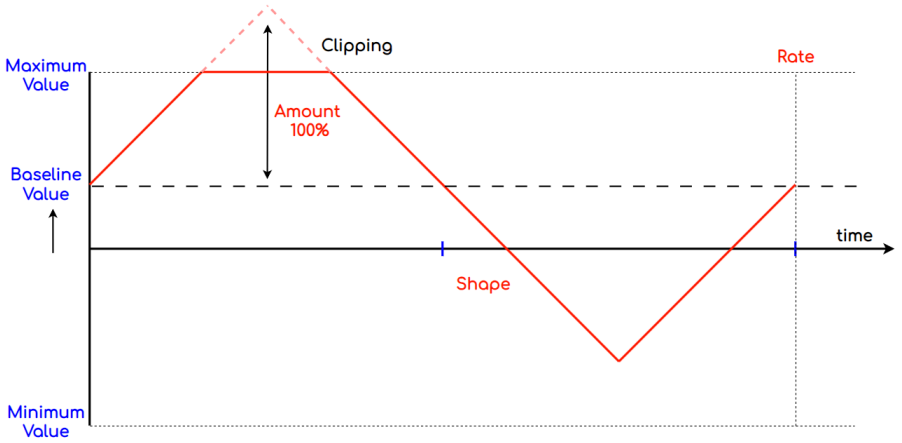
Our sound would increase in volume to max and then decrease in volume to zero before returning to the original value.

Modulation Limits (Floor and Ceiling)

What happens if we increase or decrease the **baseline Value**?

The answer is simple, the value will increase to the maximum and if the modulation pushes beyond that value, the value remains at the maximum. This is similar to clipping an audio signal.

The same is true if the Value is reduced. Should the modulation push the value below the minimum, the value remains at the minimum until the modulation pushes the value back up.



You can also see here that as the bassline value has gone up, so has the lowest value that the modulation reaches. Well above the minimum.

This is because the **Amount** is a percentage of the range, and so the amplitude of the modulation is unchanged.

So, Given our example...

- **Velocity** = 80
- **Time Division** = 8/1 (8 steps per bar)
- **Modulation Rate** = 1 bar

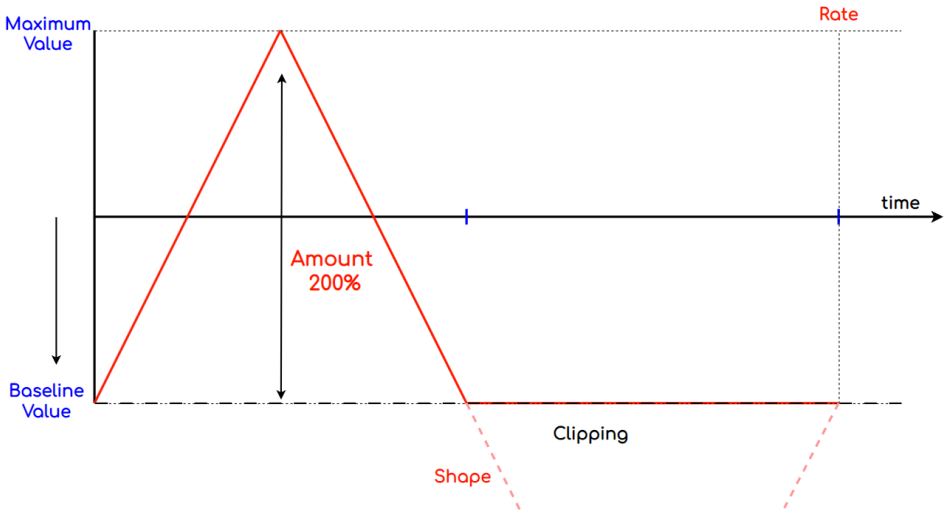
The result would be: -

80, 101, 122, 127, 122, 101, 80, 59, 38, 16, 38, 59

Pushing the Limits

To allow greater range of movement and to create more interesting shapes, ARP allows you to set the Modulation **Amount** up to **200%**.

Using the same examples as above, if we reduce the baseline **Value** all the way to zero and increase the modulation **Amount** to 200%, the shape below is produced.



Now the top half of the triangle wave modulates the value by the full range of values and the lower half of the triangle wave is clipped entirely.

Again, Given our example...

- **Velocity** = 0
- **Time Division** = 8/1 (8 steps per bar)
- **Modulation Rate** = 1 bar

The result would be: -

0, 42, 85, 127, 85, 42, 0, 0, 0, 0, 0, 0

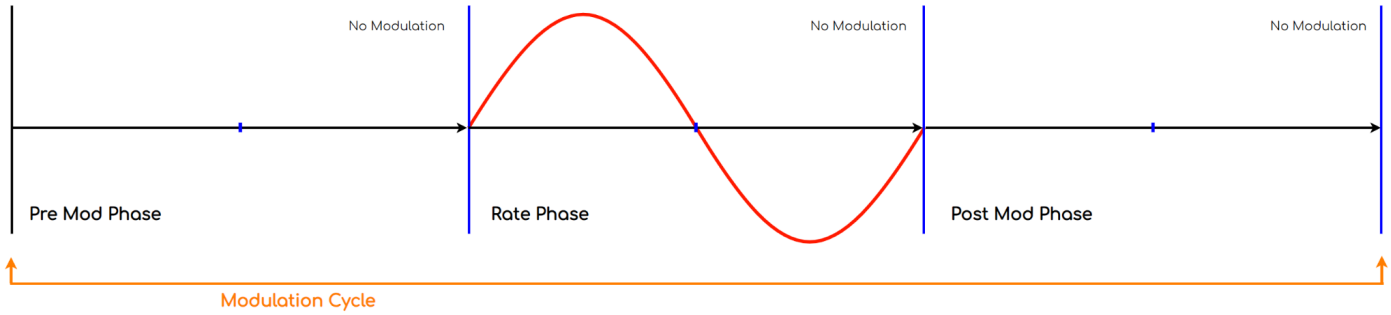
There are the basic principles, but the possibilities are huge. Go explore!

Modulation Sequence

The Modulation Sequence refers to the time period in which the modulation runs and repeats. Then the Cycle completes and it starts again at the beginning.

It is made up of 3 phases: -

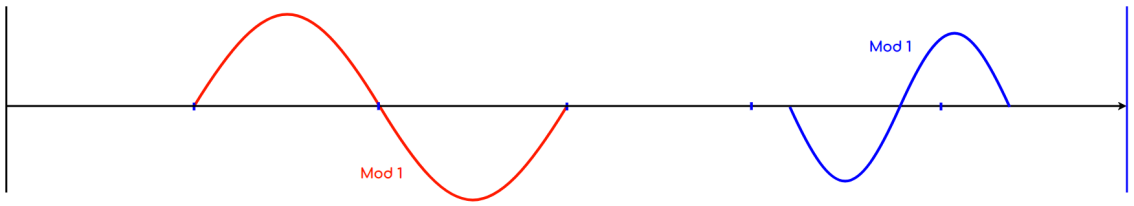
- **Pre Mod**: The time before modulation starts
- **Rate**: The actual modulation
- **Post Mod**: The time after modulation ends and before the cycle repeats.



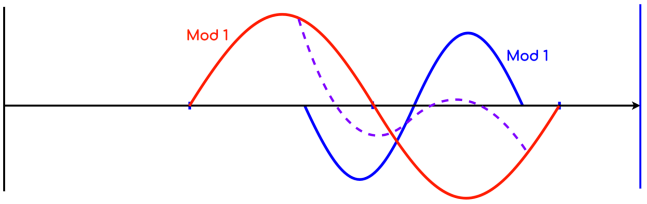
During the Pre Mod and Post Mod phases, there is no modulation of the Target parameter's value and it remains static.

Layering Modulators

The Modulations can also be layered. If you have 2 modulations set to the same target, you can get different modulations running at different points within the cycle.



Or, If the modulations occur at the same time, the results will be summed.



The true power of ARP's modulators is in its ability to target any parameter. Modulation can be used in so many creative ways. Go have some fun!

Appendix X - Ideas and Tips for performing with Chords and Chains

Here are a few examples of how Chords, Octave, Chord Inversions and Chord Chains might be used creatively during a performance.

After creating a sequence, press **PLAY**, then...

- Try pressing the **CHORD** and **NOTE** buttons to explore different chord progressions.
- Try changing the default chords.
- Try changing the Octave and Tempo to vary the feel of the music.
- Try assigning a macro to the Velocity parameter of one or more tracks to control the dynamics of the piece.
- Try using Chord Positions to create chord inversions on the fly.
    - To create subtle changes, without the jump you get when changing the chord or octave.
    - Or creatively. For example, move a chord up through its possible positions, then quickly reset it; creating harmonic builds and excitement.
- Try alternating between chord positions, with Voice Leading enabled, simply by repeatedly pressing the same notes.
    - For example, set the chord to 7th and switch back and forth pressing the C and A Notes multiple times. This works great with fast arpeggios.

  Once you are happy with a chord progression....

- Try creating a Chord Chain so you can recall this at any time.
    - Then, during playback, you can Quick Load Chord Chains in real time, switching different chord chains in and out.
- Try switching between manually selecting chords and then loading a Chord Chain, allowing you time to edit the sequence or simply to vary a song's structure.

Appendix XI - Troubleshooting MIDI Channels, Routing and Live Play

MIDI Channels and MIDI routing can be complex and difficult to fix when things aren't working as expected.

This section has some information about MIDI and how to help resolve issues.

How MIDI works

MIDI data is a string of messages. Each message has a meaning which is understood by all MIDI devices because the mechanism was set in stone by the MIDI Standard.

Half of each message says how to read the message and the rest is the information.

For example, one message might say:

- *"I'm a note message and I say turn on Middle C at this loudness and also I'm a message only for anything listening on channel 1."*

Then another message comes along and says:

- *"Turn off middle c on channel 1"*

MIDI devices can read about 300 messages every second.

MIDI Channels

All MIDI note messages are marked with a "channel" number.

Any connected MIDI devices that are configured to receive on channel 1 will ignore any messages marked with different channel numbers.

MIDI Channel Parameter

ARP can be configured to play different instruments on different channels.

- In SET Mode, press the Midi Out button to select the **Midi Out** parameter
- This value must match the MIDI channel that your MIDI device is set to receive on

Note Sync Settings

If you want to set ARP's Chord/Scale (Note Sync) with an external Keyboard or sequencer:

- In SET Mode, press Menu to select **MIDI Input Channel (Note Sync)**
- This value must match the MIDI Channel on which your MIDI device is set to send on

Live Play

To Play ARP Live (Live Play) using an external Keyboard or sequencer:

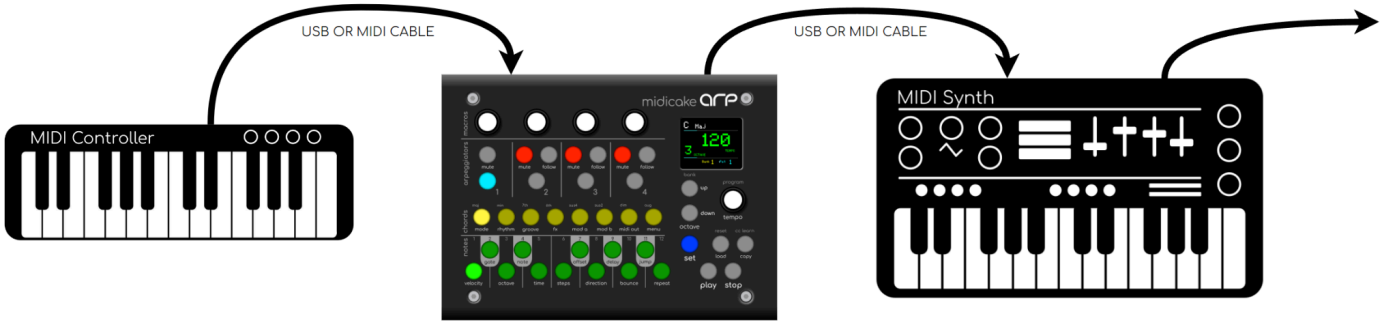
- In SET Mode, press the Menu button to select **MIDI Input Channel (Note Sync)** and check that the value matches the MIDI Channel on which your MIDI device is sending note data
- Use the Menu button to select **Live Play on Note Input** and check that it is "On"

MIDI Thru

MIDI Thru simply passes all messages from a devices' MIDI Input port to it's MIDI Output port(s).

This allows you to connect multiple devices (on different MIDI Channels) using a single cable between each device.

This is known as Daisy Chaining.



ARP will MIDI Thru from any MIDI connection to all it's other connections. For example, MIDI messages received via DIN In will be forwarded to the DIN Out, USB Host and USB MIDI connections.

Note that, messages received via USB on ARP will not be forwarded on the same USB connections as this can cause a MIDI loop which can cause timing problems and even crashes..

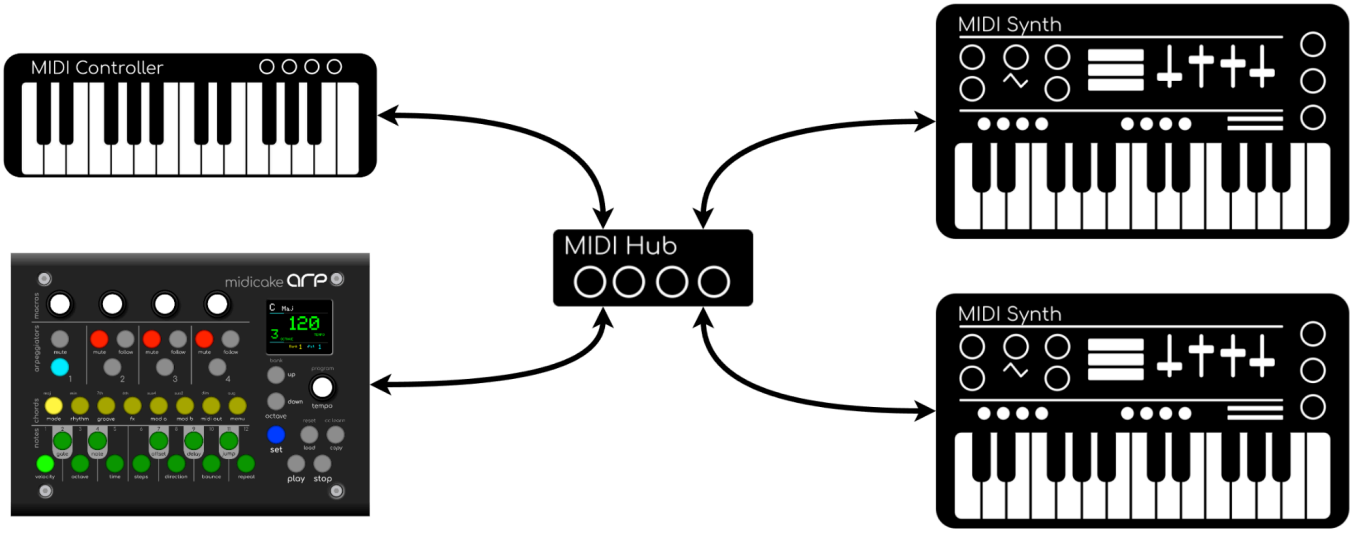
The disadvantage of daisy chaining is that the time it takes to read and forward messages introduces a latency, that is, a delay before the receiving device responds to the MIDI message. The further down the chain, the greater the latency.

Using a MIDI Hub

For daisy chains of 3 or 4 devices the latency is barely noticeable, but if you want to connect more devices, you might want to try a MIDI Hub.

A MIDI Hub can connect many MIDI devices in parallel. This means that they all receive the MIDI data at the same time and the latency is all but eliminated.

Sometimes called a MIDI Splitter, the MIDI Hub will duplicate incoming MIDI messages and forward them to all its output ports at the same time.



There are numerous options available and some have advanced switching and scripting capabilities to help incorporate many synths into your studio. It is worth investing in if you have many synths and want to make the best use of ARP's MIDI channel switching and harmony syncronization capabilities.

Appendix XII - List of Chords and Scales

Full list of ARP's Chords and Scales

	Number	Full Name	Display Name (in ARP)
1	145	Maj	Maj
2	137	min	min
3	1169	7th	7th
4	657	6th	6th
5	161	sus4	sus4
6	133	sus2	sus2
7	73	dim	dim
8	273	aug	aug
9	81	Majb5	Majb5
10	585	dim7	dim7
11	161	aug sus4	aug sus4
12	673	6 sus4	6 sus4
13	661	6 add9	6 add9
14	649	m6	m6
15	653	m6 add9	m6 add9
16	1185	7 sus4	7 sus4
17	1297	7#5	7#5
18	1105	7b5	7b5
19	1177	7#9	7#9
20	1171	7b9	7b9
21	1305	7#5#9	7#5#9
22	1299	7#5b9	7#5b9
23	1107	7b5b9	7b5b9
24	2193	Maj7	Maj7
25	2129	Maj7b5	Maj7b5
26	2321	Maj7#5	Maj7#5
27	1161	m7	m7
28	1097	m7b5	m7b5
29	1163	m7b9	m7b9
30	2185	m-Maj7	m-Maj7
31	149	add9	add9
32	1173	9th	9th
33	1189	9 sus4	9 sus4
34	1301	9#5	9#5
35	1109	9b5	9b5
36	2197	Maj9	Maj9
37	2213	Maj9 sus4	Maj9 sus4
38	2325	Maj9#5	Maj9#5
39	1165	m9	m9
40	141	m add9	m add9
41	1101	m9b5	m9b5
42	2189	m9-Maj7	m9-Maj7
43	4095	Chromatic	Chromatic
44	2741	Major Scale	MAJOR

45	1453	Minor Scale	MINOR
46	1709	Dorian	Dorian
47	1451	Phrygian	Phrygian
48	2773	Lydian	Lydian
49	1717	Mixolydian	Mixolydian
50	1387	Locrian	Locrian
51	2477	Harmonic Minor	Har Minor
52	661	Maj Pentatonic	Maj Penta
53	1189	Min Pentatonic	min Penta
54	1193	Yo	Yo
55	1187	Insen	Insen
56	3411	Enig	Enigmatic
57	1485	Gypsy	Romani
58	1257	Blues	Blues
59	3765	Bebop	Bebop
60	1235	Tritone	Tritone
61	1749	Acoustic	Acoustic
62	1365	Whole Tone	Wholetone
63	1389	Aeolian	Aeolian
64	2777	Aeolian Harmonic	Aeolian Har
65	1877	Aeroptian	Aeroptian
66	731	Alternating Heptamode	Alt Heptamod
67	1651	Asian	Asian
68	2483	Double Harmonic	Dbl Har
69	2509	Double Harmonic Minor	Dbl Har Min
70	1707	Dorian Flat 2?	Dorian b2
71	2413	Harmonic Minor Flat 5	Har Min b5
72	1273	Heptatonic Blues	Hept Blues
73	1627	Hungarian Major 4th Mode	Hun Maj 4th
74	2861	Hungarian Major 5th Mode	Hun Maj 5th
75	1753	Hungarian Minor	Hun Min
76	2873	Ionian Augmented Sharp	Ionian+ #2
77	3667	Kaptian	Kaptian
78	2383	Katorian	Katorian
79	1845	Lagian	Lagian
80	1395	Locrian Dominant	Locrian Dom
81	1643	Locrian Natural	Locrian Nat
82	3289	Lydian Sharp 2 Sharp 6	Lydian #2#6
83	2901	Lydian Augmented	Lydian +
84	1741	Lydian Diminished	Lydian Dim
85	1493	Lydian Minor	Lydian Min
86	1397	Major Locrian	Maj Locrian
87	2869	Major Augmented	Major +
88	1739	Mela Sadvidhamargini	Mela Sadvi
89	3285	Mela Citrambari	Mela Citram
90	2745	Mela Sulini	Mela Sulini
91	3239	Mela Tanarupi	Mela Tan
92	2733	Melodic Minor	Melodic Min
93	3881	Morian	Morian

94	2731	Neapolitan Major	**Neopol Maj**
95	2475	Neapolitan Minor	**Neopol Min**
96	2917	Nohkan Flute Scale	**Nohkan Flute**
97	1459	Phrygian Dominant	**Phryg Dom**
98	855	Porian	**Porian**
99	871	Hungarian Romani Minor	**Romani Min**
100	997	Rycrian	**Rycrian**
101	1373	Storian	**Storian**
102	671	Stycrian	**Stycrian**
103	1371	Superlocrian	**Super Loc**
104	859	Ultralocrian	**Ultra Loc**
105	923	Ultraphrygian	**Ultra Phryg**