

midicake™ ARP

User Manual

v1.5.5

*also covers version 1.4.5

Contents

Overview.....	5
Glossary.....	5
Key.....	5
Basic Operation.....	6
Power On.....	6
Power Off.....	6
Start and Stop.....	6
Arpeggiator Controls.....	7
Play Mode Display.....	7
Live Play.....	8
Changing Root Note and Chord/Scale.....	9
Notes.....	9
Chords.....	9
Alternative Chords and Scales.....	9
Custom Chords and Scales.....	10
Sequencing Chords Chains.....	10
External Key Synchronization.....	10
Set Mode vs Play Mode.....	11
Set Mode Display.....	11
Editing a Sequence.....	12
Selecting Arp Channels.....	12
Modifying Multiple Arpeggiators.....	13
Arp Parameters.....	14
Velocity.....	14
Gate.....	14
Mode.....	14
Octave.....	14
Octave Lock.....	14
Note.....	15
Note Offset.....	15
Offset Mode.....	15
Note Limit.....	15
Note Lock.....	15
Scale Lock.....	16
Time.....	16
Time Division.....	16
Time Factor.....	16
Time Function.....	17
Steps.....	17
Pitch Filter.....	17
Offset.....	18
Direction.....	18
Delay.....	19
Bounce.....	19
Custom Bounce Patterns.....	19
Jump.....	20

Repeat.....	20
Rhythm.....	21
Rhythm Pattern.....	21
Rhythm Length.....	21
Editing Rhythm Patterns.....	21
Groove.....	22
Groove Pattern.....	22
Groove Length.....	22
Editing Groove Patterns.....	22
Saving and Resetting Patterns.....	23
FX.....	23
Modulation.....	24
MIDI Out.....	25
Voice Mode.....	25
Combining Parameters.....	26
Saving Parameters.....	26
Copying Arp Parameters.....	26
Global Settings.....	27
MIDI Control Mode.....	27
MIDI Thru.....	27
MIDI Input Channel.....	27
MIDI Input Arpeggiation Mode.....	27
MIDI Input Keyboard Split.....	28
Live Play on Note Input.....	28
Program Change Channel.....	29
MACRO CC Channel.....	29
MIDI Output Options.....	29
Stop Play Behaviour.....	29
Patch Change Behaviour.....	29
LEDs Brightness.....	29
Macro Controls.....	30
Assigning to Arp Parameters.....	30
Setting to Output MIDI CC.....	30
Patches and Banks.....	32
Copying Patches.....	32
Default Patches.....	32
Connectivity.....	33
MIDI In.....	33
MIDI Out.....	33
USB.....	33
USB Host.....	33
MIDI Thru.....	33
MIDI Automation.....	35
Program Changes.....	35
Control Changes.....	35
Workflow Ideas.....	37
Tricks and Tips.....	38
Firmware Updates.....	39

Resetting your Device.....	40
Troubleshooting.....	40
Device is not responding?.....	40
Only One Note heard?.....	40
Notes keep playing after pressing stop?.....	40
Mounting Options.....	40
Appendix I – Default Patches.....	41
Appendix II - Why is there no such thing as Random?.....	43
ARP's Deterministic System.....	43
Appendix III - Controlling Note Timing.....	45
Time Parameters.....	45
MIDI Bar and Resolution.....	45
A Fresh Approach.....	45
Delay.....	46
Groove.....	46
Modulation.....	46
Steps, PolyRhythm and PolyMeter.....	47
Appendix IV - MIDI Input Arpeggiation Mode Behaviour.....	48
ARP Default Mode vs Classic Mode.....	48
Appendix V - Patch Change Behaviour.....	52

Overview

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

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

All arpegiators can share a single 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.

Glossary

- **Arpegiator** is an individual sequencer channel, ARP has 4.
- **arp** or **arp channel** is used informally to mean arpegiator
- **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 channel
- 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** is set of Note Letters that ARP uses to translate a sequence into notes
- **Root Note** is the lowest note in the Chord/Scale
- **Bar** is a fixed length period of time that is common to all ARP's sequences
- **Tick** is a single MIDI clock tick. There are 96 ticks in a Bar
- **Beat** is a quarter note or 24 clock ticks. There are 4 beats in a Bar
- **Tempo** is the speed of playback in Beats per Minute

Key

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

Basic Operation

Power On

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

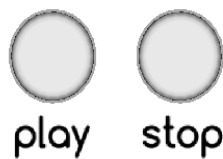
Midicake ARP will flash its startup sequence and you'll be ready to go.

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.

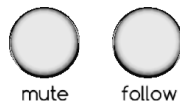
Note: During Playback, a bar progress indicator will be displayed to visually represent the current position within the bar.

Arpeggiator Controls

Pressing the ARP 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.



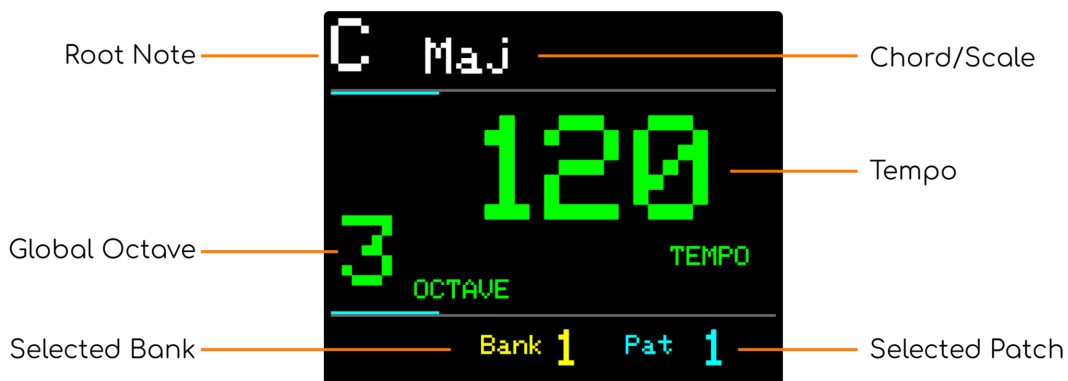
Pressing FOLLOW (above each arpeggiator) will set that arpeggiator to follow the previous arpeggiator, thus playing the sequence associated with it and the previous arpeggiator on alternate bars. For example, selecting arpeggiator 2, 3 & 4 to follow will play all 4 arpeggiators in sequence over 4 bars,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

Play Mode Display

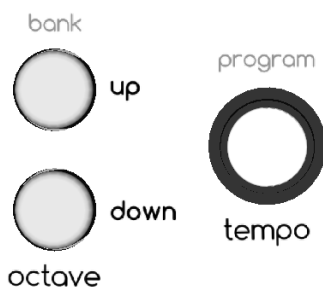
By default, ARP starts in PLAY MODE.

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.

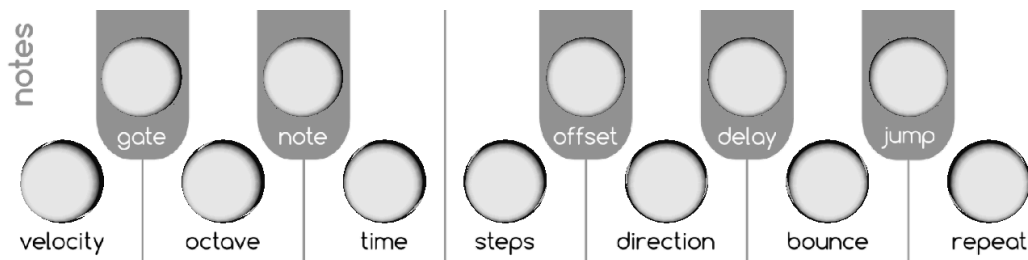
Live Play

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

Changing Root Note and Chord/Scale

Notes

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

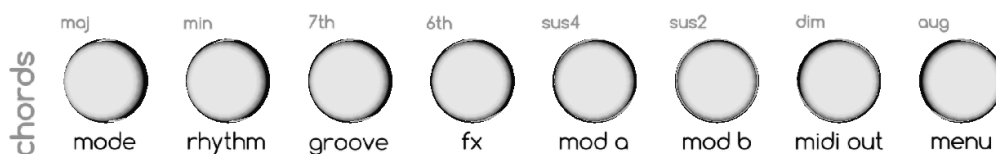


Pressing a **NOTE** button will change all arpeggiators to play with the selected note as the root note.

Chords

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

There are 8 **CHORD** buttons representing 8 common chord types: Major, Minor, 7th, 6th, Suspended (Sus4), Suspended 2, Diminished and 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.

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.

Sequencing Chords Chains

ARP enables you to create chord progressions up to 32 bars in length.

During playback, the chord chain will automatically set the chord and note for each bar. The chain will repeat until a new chord is entered manually, by pressing a note button.

In **PLAY MODE**, press the **PROGRAM** button (KNOB control)

- Select a chord, then press a note button to add a link to the chain
- The 8 chord buttons are colour coded
- Each link in the chain represents a chord playing for 1 bar
- Rotate the KNOB control to select any link in the chain
- Press **RESET** button to delete a link
- Press the **PROGRAM** button to exit

For more granular control of automated chord changes, use an external sequencer to control the chords, see External Key Synchronization (below). In this way, you are not limited to chord changes on the bar.

External Key Synchronization

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), when Key Sync is enabled, incoming MIDI notes are sampled to transpose the whole sequence and to follow the root note, chord and key changes.

Key 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.

In **SET MODE**, use the **MENU** button to select **SYNC CHANNEL**

- 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. The display will show "FREE PLAY".

Set Mode vs Play Mode

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

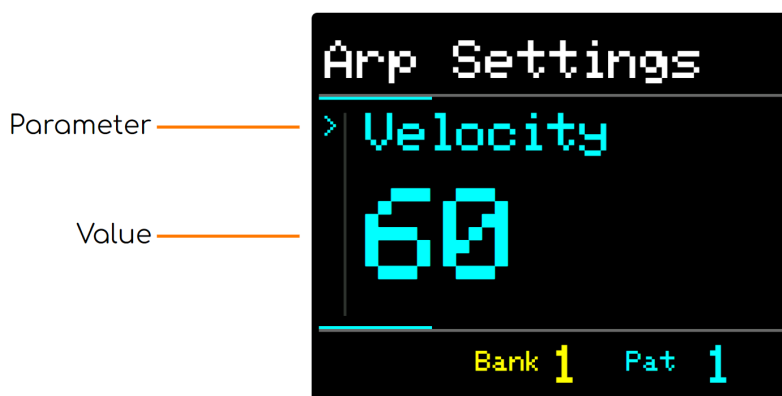


Press the **SET** button to enter **SET MODE**.

(Indicated by blue NOTE buttons and "Arp Settings" on the display).

Set Mode Display

The screen will display the current parameter name and value.

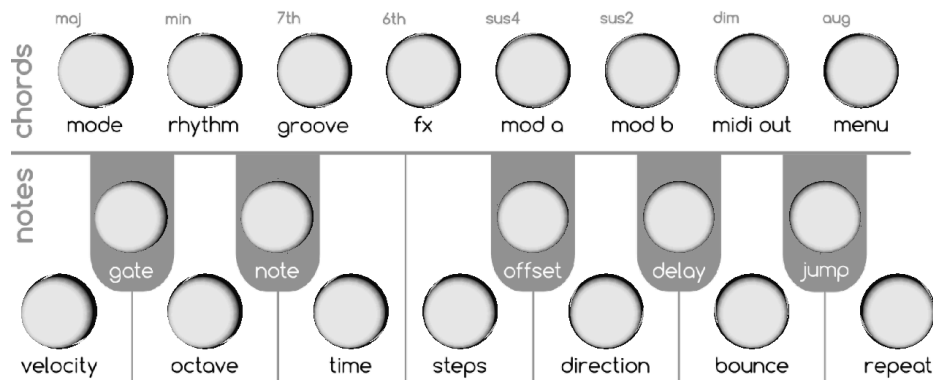


Press the **SET** button again to return to play mode.

Editing a Sequence

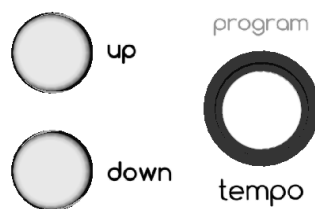
In SET MODE...

Select one of the NOTE or CHORD buttons to choose the parameter to change. The parameter associated with each button is shown below the button.



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

Many of the buttons have multiple parameters. Press the button repeatedly to select the desired parameter.



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 Channels

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



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

Modifying Multiple Arpegiators

If all arpegiators are selected, changes to the Velocity, Gate, Octave, and Note will be relative to the original value on each arpegiator, 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 arpegiators.

Arp Parameters

Velocity

Controls how loud the individual arpeggiator sounds. Useful in balancing the volume of multiple arpeggiators.

Values: 0 to 127

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 32 Bars

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.

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)

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 a single note.

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 semi-tone 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.

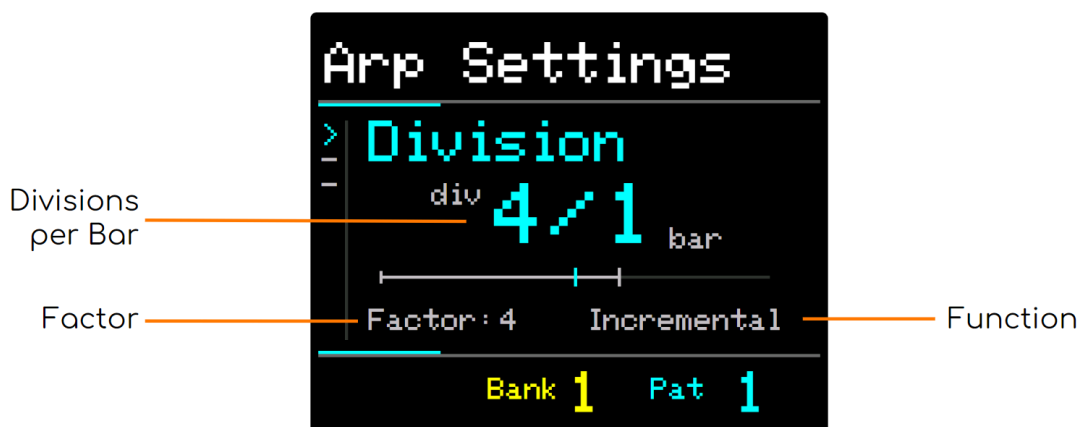
Setting both Key Lock and Scale Lock together effectively disengages the selected arpeggiator from any input notes and key sync.

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.

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

Time Factor

Sets the base number for the divisions.

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]

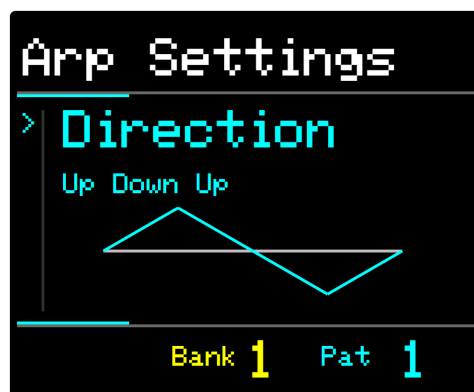
This enables a "round" to be created when combined with another arp.

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

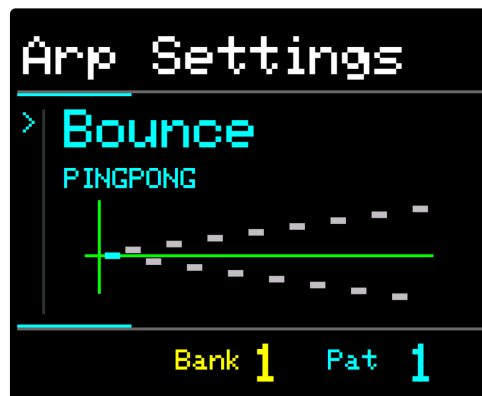
Delay pushes the MIDI notes forward in time, delaying all the notes for the selected arpeggiator.

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.

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.

For example, given a rising sequence with 4 steps, using C major:

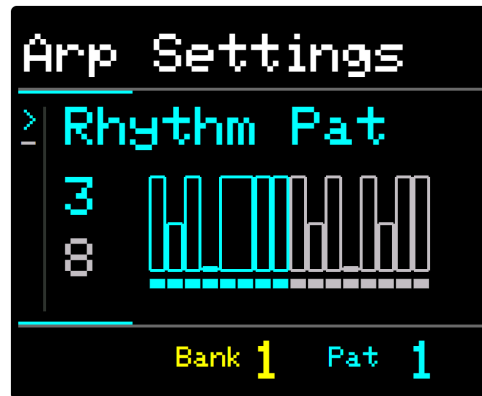
- A Repeat of 1 will play C E G C
- A Repeat to 2 will play C C E E G G C C

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

Repeat can also be useful in creating polyrhythmic and sequence phasing effects.

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.

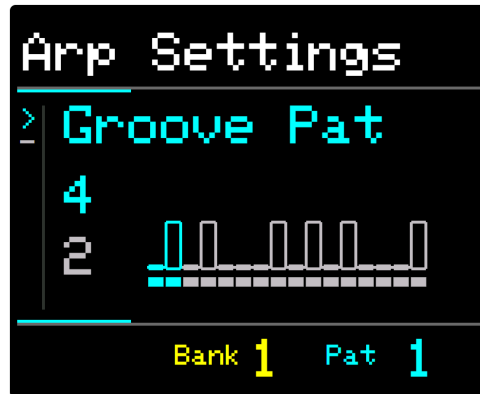
To create Tied Steps: Press the **UP** button until the step reaches maximum velocity and press again to tie the step to the one previous, thus allowing you to create longer notes in the sequence.

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.

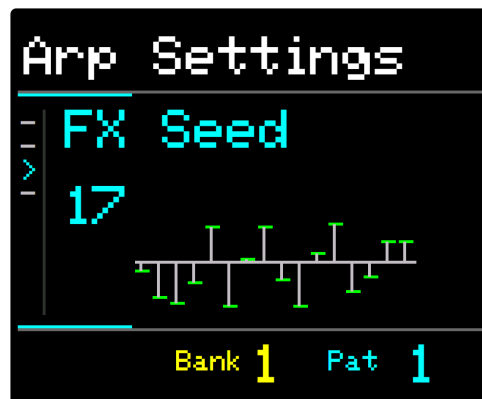
Saving and Resetting Patterns

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.



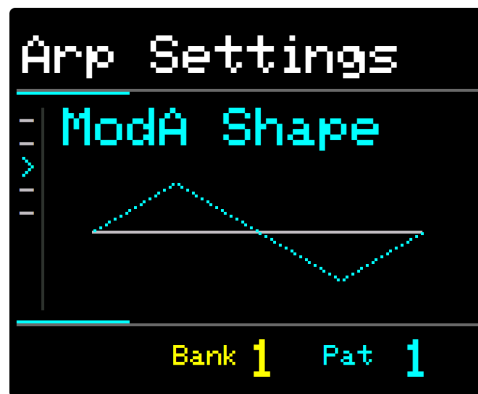
In SET Mode, press the FX button to show the effects menu. There are 4 controls:

- 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*
- Seed
 - Sets the seed value for the sequence to be applied. (The first 16 steps is visualized in the display)
 - 1-127
- Repeat
 - Determines how often the sequence will repeat.
 - $\frac{1}{4}$ bar to 32 bars

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 100%
- Target
 - Determines the parameter that is affected by the modulation.
 - *Velocity, Gate, Octave, Note Offset, Time Division, Steps, Step Offset, Direction, Delay, Bounce, Jump, Repeat, Rhythm Length, Groove Length, FX Amount, MIDI Channel, Note Limit*
- Shape
 - The wave shape of the modulation applied over time.
 - *Sine, Square, Triangle, Saw*
- Rate
 - The wavelength. How often the modulation repeats
 - *¼ bar to 32 bars*
- 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.

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.

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.

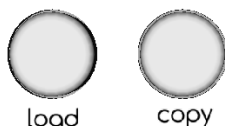
Saving Parameters

All changes you make are automatically saved.

Copying Arp Parameters

You can easily create a variation of a sequence on a different arp channel 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

Arp will key sync to incoming MIDI Notes on the specified channel. (See note on Key Sync)

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

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 ARP's 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 IV - 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.

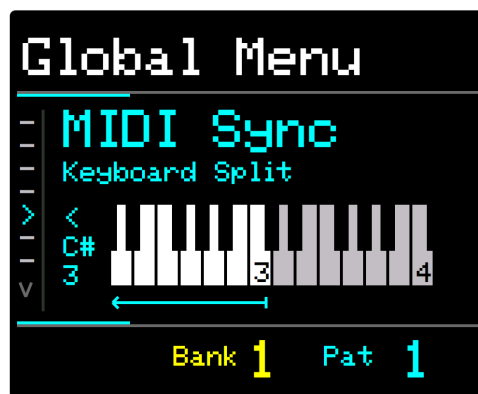
When ARP is playing and all notes are released, the last active notes will continue to play until new notes are played.

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 IV - 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 key 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.

MACRO CC Channel

Sets the MIDI Channel for Control Change output from the Macro controls, when they are set to output CC. See [Macro Controls >> Setting to Output MIDI CC](#)

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 V - Patch Change Behaviour](#)

LEDs Brightness

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

Macro Controls

The Macro knobs can be used to control any of the parameters for one or multiple 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 arp 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** modes.

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).

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 press 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 "MACRO CC 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: -

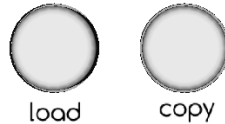
- *Macro assignments are global and not saved per patch.*
- *CC control numbers are fixed.*
- *Macros cannot be assigned to both ARPs parameters AND MIDI CC*

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.

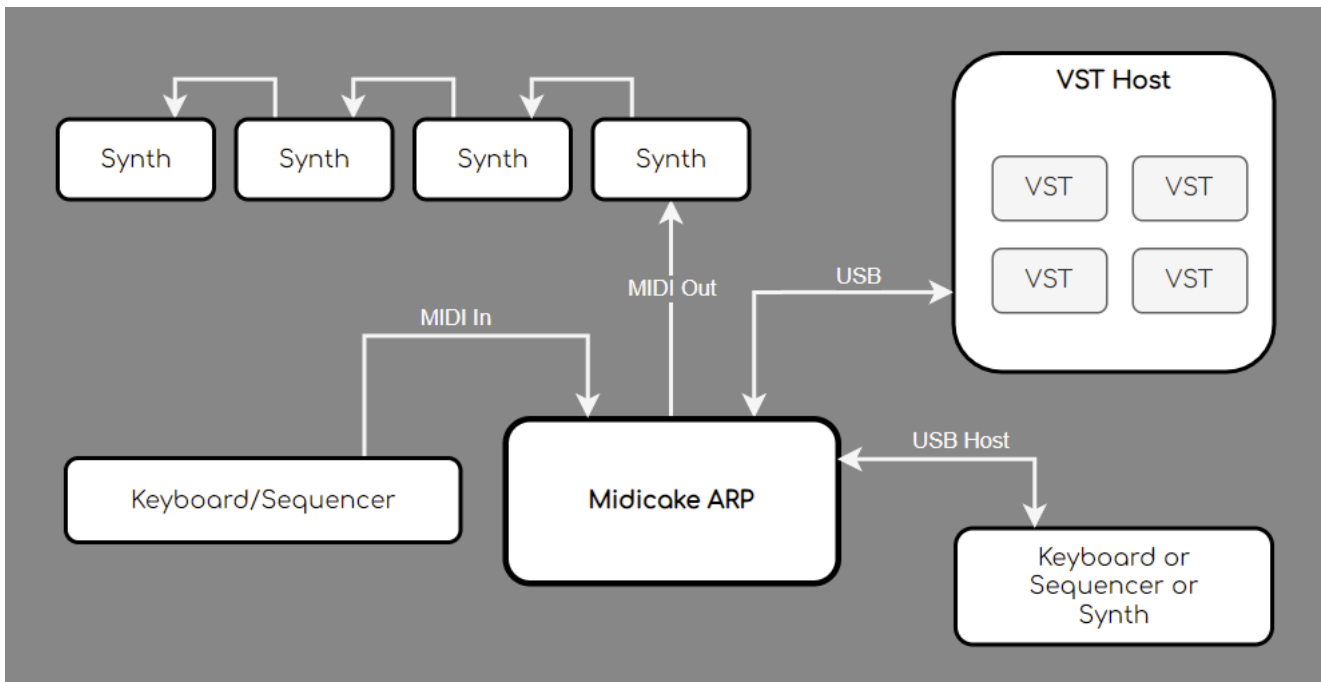
This operation is useful in creating multiple related patches to create compositions.

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)

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.

Key sync is also supported via **Midi In** forcing ARP to track to 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.

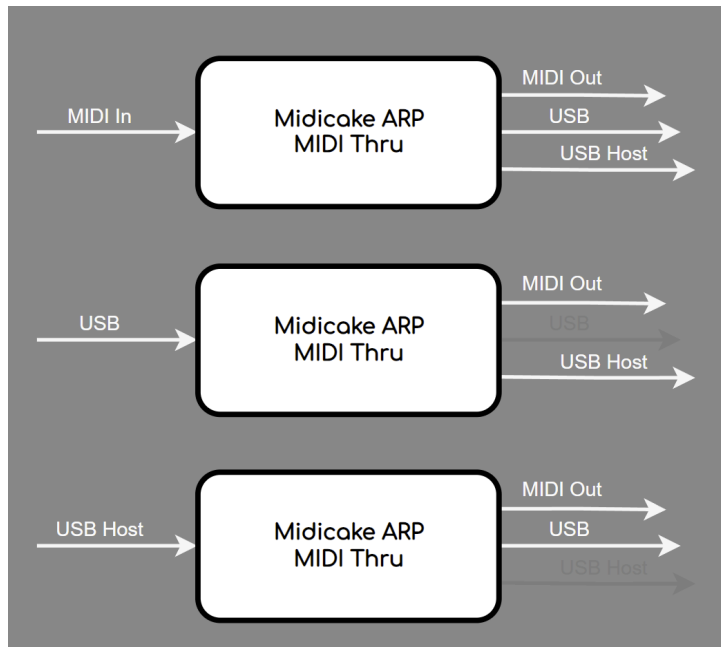
It supports both incoming and outgoing MIDI clock and MIDI note messages.

USB Host

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

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 Automation

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 **ARP 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 **ARP 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 ARP SELECT button 1 and assign the CC, then ARP 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 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) **Sync Channel** to match the keyboard and set **Key Sync** to Note. 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.

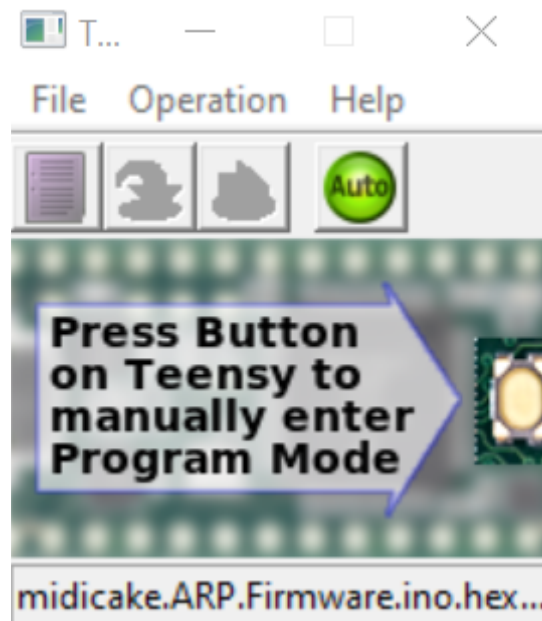
- Start with something simple and gradually increase the complexity.
- To begin with, set the sequence to a small number of **Steps**.
- Sometimes parameters won't seem to have an effect because of another parameter's selected value, e.g. bounce and jump won't do anything if **Steps** is set to 1.
- 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.

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 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** twice should stop all notes. If all else fails, restart ARP and/or the instrument that's in a twist.

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 – Default Patches

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. Automate, Repeat, Play. 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.

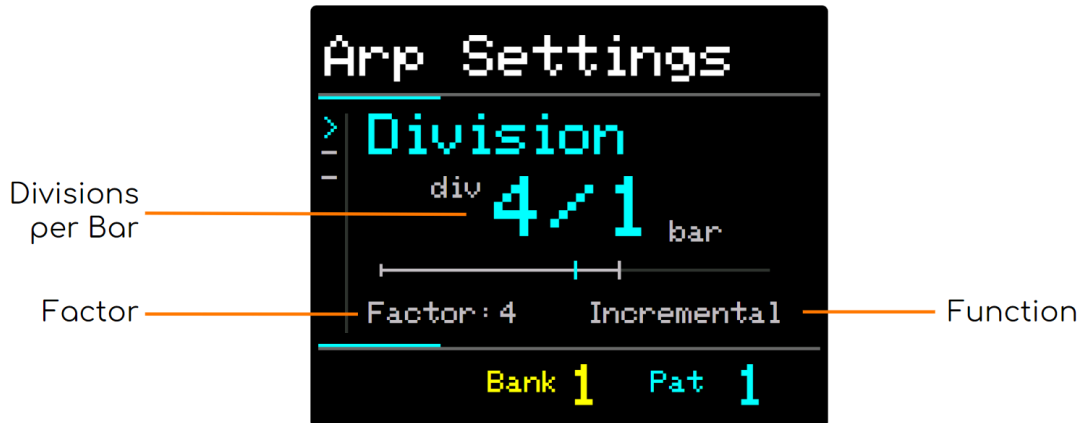
ARP has many, many parameters that impact the length of the sequence and the order in which notes play... if it wasn't deterministic, every time you changed a parameter you'd be moving the start point of the sequence; and constantly be finding and losing those lovely melodies.

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.

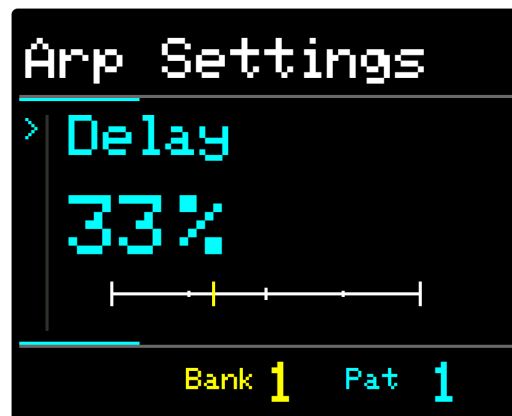
Delay

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. on 8th note interval.

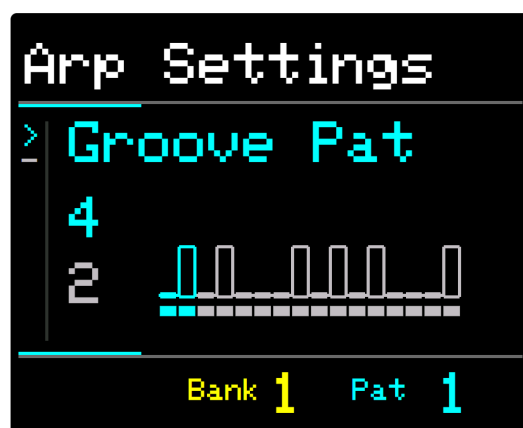


Groove

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.



Steps, PolyRhythm and PolyMeter

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

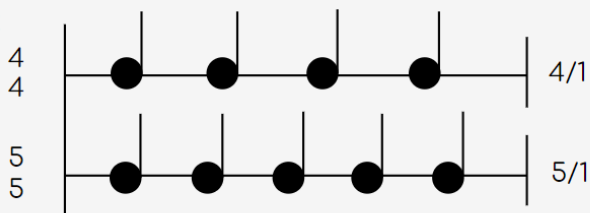
While not directly related to timing, Steps is key to creating PolyRhythms and PolyMeters.

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:

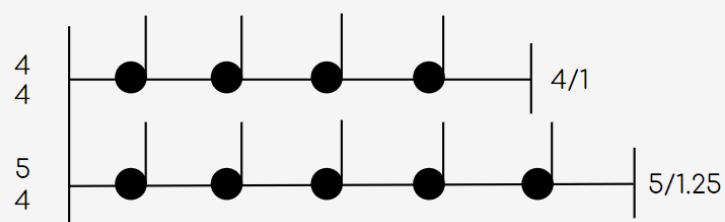


Example 2: PolyMeter

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 IV - 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.

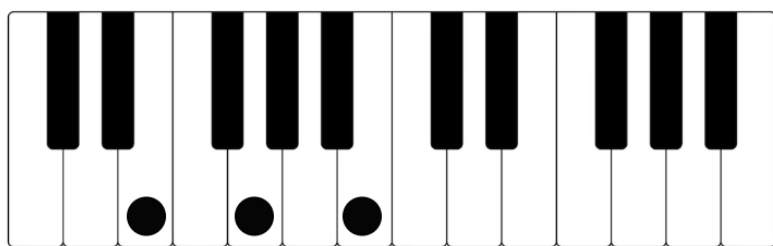
The length of a sequence in classic mode depends on the number of keys played. Whereas, in ARP Default mode, the length is set by the Steps parameter. This means that the musical rhythm does not change when you change to a chord with a different number of notes.

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

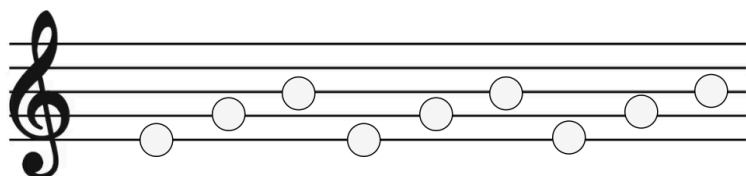
We will also assume that: -

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

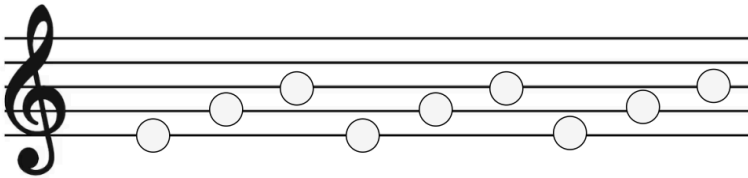
Example 1 - Given this 3-note input...



Classic Mode would play the following sequence

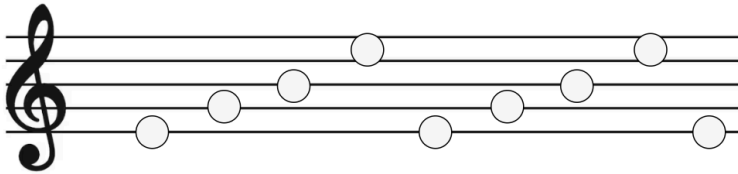


ARP Default Mode would play this sequence



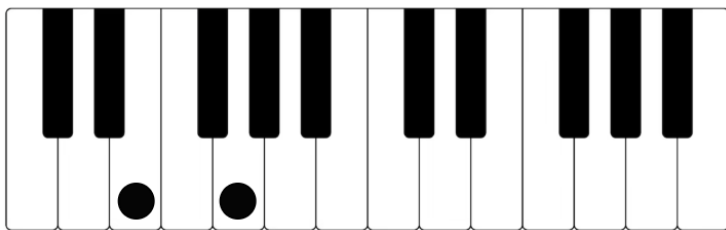
It's the same, because the number of steps matches the input notes.

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

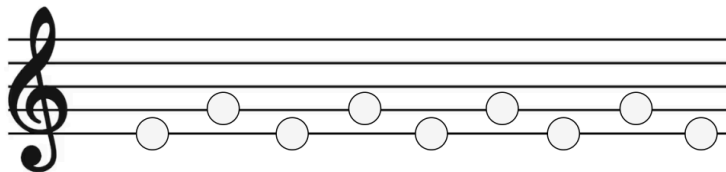


...ARP now plays a 4-note sequence of E,G,B,E

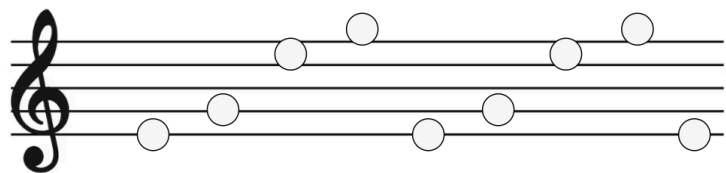
Example 2 - Given this 2-note input...



Classic Mode would play...



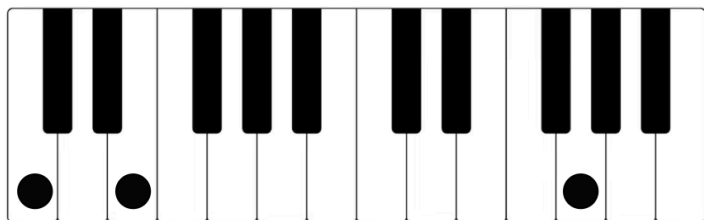
ARP Default Mode would play...



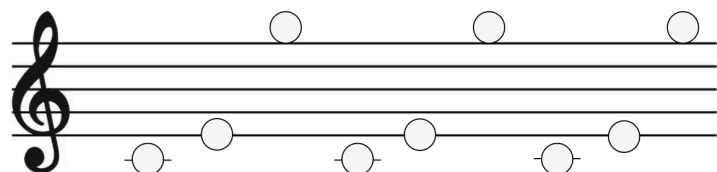
Again, Steps is set to 4, so the sequence is 4 steps before it repeats.

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...

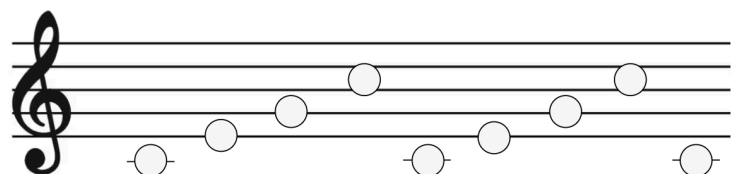


Classic Mode would play...



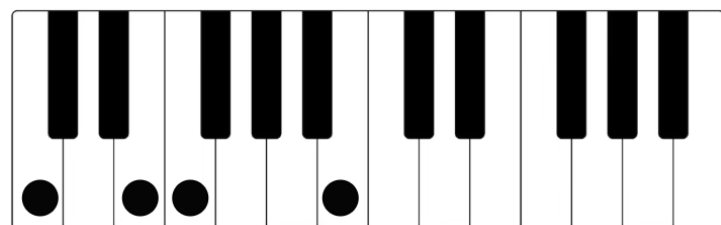
The exact notes played.

ARP Default Mode would play...

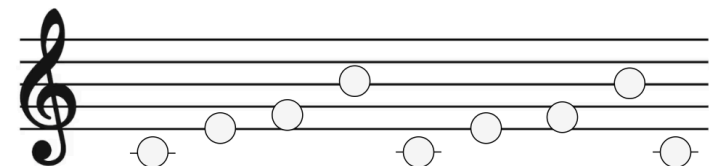


Because steps is set to 4 and the note letters are C,E,G

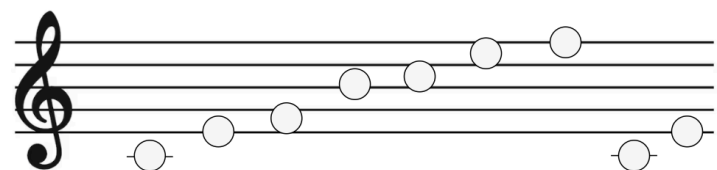
Example 4 - Given this 4-note input...



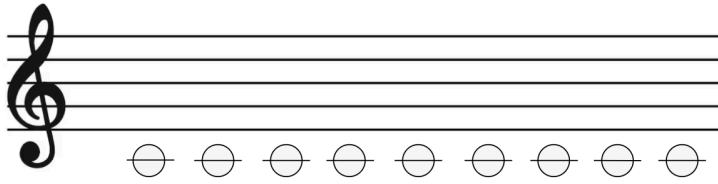
Classic Mode would play...



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 re-iterate, 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 V - Patch Change Behaviour

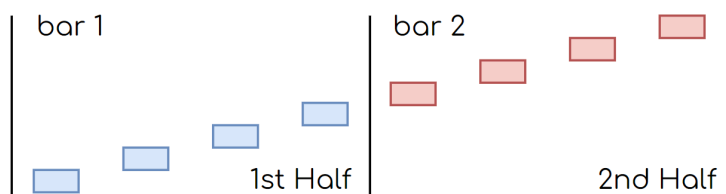
There are 2 options for how ARP behaves when changing patch during playback. Depending on the [Patch Change Behaviour](#) menu setting.

- NON-STOP
- RETRIGGER.

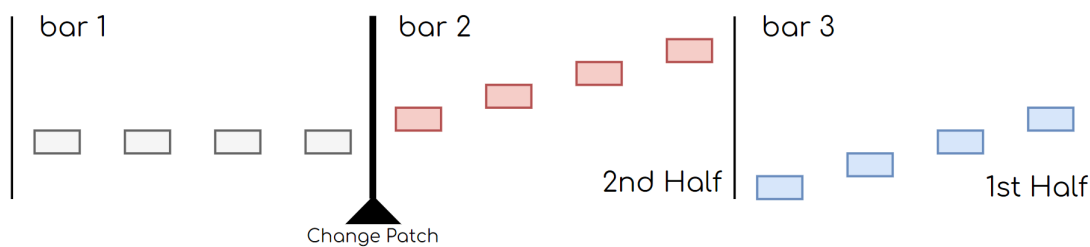
This setting is useful because we may be changing the patch mid-way through a sequence.

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:

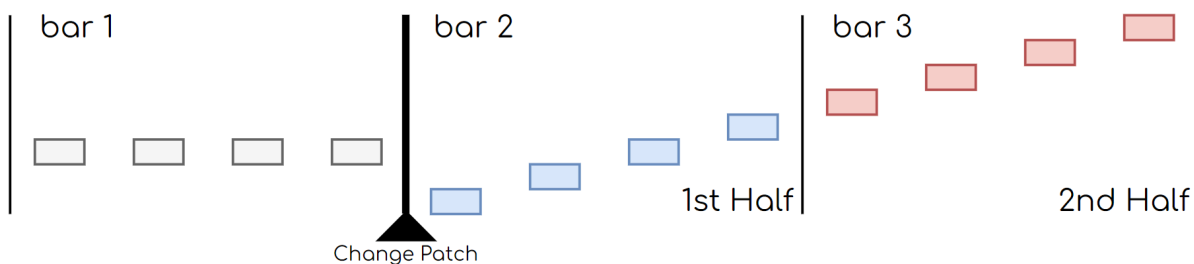


NON-STOP plays the new patch sequences as if they had been playing since you originally pressed play.



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.