

## Chapter 6

# The Arpeggiator

The Arpeggiator takes input from the PC88 keyboard and turns it into a constant rhythmic pattern. The speed and nature of the pattern is controllable in real time. It recalls old-time analog “sequencers” which played a finite series of notes over and over, with changes in the series dictated by the musician as the instrument played. The power of the Arpeggiator is not limited to the PC88: it also can control MIDI instruments, by sending MIDI data out just as if you were playing the keyboard.

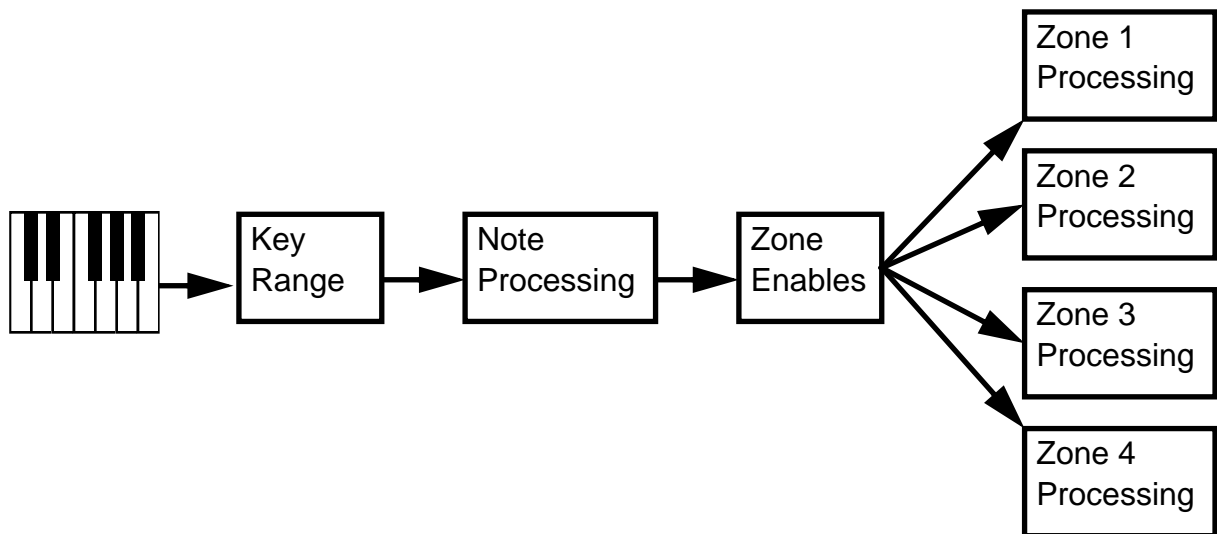
The concept behind the PC88’s Arpeggiator is fairly simple, although the options are extensive. You might think of it as a “note processor”, generating complex output from relatively modest input. You can select any number of notes for the input, and tell the Arpeggiator to recognize and remember them. This is called “latching” the notes. The Arpeggiator will then process them by playing them repeatedly, and/or having them fly up and down the keyboard. You have control over a number of processing parameters: tempo, velocity, order, duration, transposition, orchestration, and whether the intervals between notes will be filled in chromatically. You can also tell the Arpeggiator how to deal with new information coming from the keyboard.

MIDI Setup 3, “Rhythm Pad”, provides a good example of how to use the Arpeggiator. Take a look at it now. And while you’re at it, double-check to see that the Clock parameter in the **Global** menu is set to “Internal”. If it isn’t, you will have trouble getting the Arpeggiator to run.

Press the **Arpeggiator** button in the **Zone Parameters** section to enter the Arpeggiator mode. There is one Arpeggiator per Setup, and therefore all of the parameters are common to the entire Setup, with one exception. The table below summarizes the Arpeggiator’s features:

| Parameter     | Values   |
|---------------|--|
| Arp Active    | On, Off  |
| Key Range     | C-1 to G9  |
| Zone Enable   | On, Off (per Zone)   |
| Latch Mode    | Keys, Overplay, Arpeggiation, Add, Auto, Pedals            |
| Play Order    | Played, Up, Down, Up/Dwn, Up/Dwn Rp, Random, Shuffle, Walk |
| Beats         | 4th notes – 32nd trips                                     |
| Initial Tempo | 20 – 300 beats per minute                                  |
| Duration      | 1% – 100%  |
| Vel Mode      | Fixed, Played, Last, Pressure, Ctrl 117                    |
| Fixed Vel     | 1 – 127  |
| Note Shift    | -12 to 12  |
| Shift Limit   | 0 – 88   |
| Limit Option  | Stop, Reset, Unipolar, Bipolar, Flt Reset, Flt Unip        |
| Glissando     | On, Off  |

The illustration below shows the processing order the PC88 uses to create arpeggios from your keyboard input:



## Arpeggiator Active

The first parameter on the Arpeggiator menu is **Arp Active** — is the Arpeggiator **On** or **Off**? This can be switched from here, or for convenience in live performance, it can be switched using MIDI Controller number 116. This can either be assigned to a PC88 physical controller, or come from an external MIDI source.

## Key Range

Notes played on the keyboard within the range specified by the **Key Range** parameter will be processed by the Arpeggiator, while notes outside will not (but they will play normally). Setting the Key Range **Hi** and **Low** notes can be done with the Data Entry wheel or buttons, or by using Intuitive Entry: press and hold **Enter** and play the note you want.

## Zone Enable

**Zone Enable** determines whether the Arpeggiator will play notes in the selected Zone. Turning some Zones **On** and not others means that some Voices will be Arpeggiated and some will not. If all Zone Enables are **Off**, then the Arpeggiator won't do anything. The Arpeggiator not only produces notes from the PC88 — it can also control external MIDI instruments. Just as if you were playing the keyboard normally, the notes produced by the Arpeggiator in a Zone will go to all of that Zone's destinations: local, MIDI, or both.

The notes that are generated by the Arpeggiator are restricted in each Zone to that Zone's Key Range. If the Arpeggiator, for example, tries to play a C#4 in a Zone, but that Zone's Key Range ends at C4, the note will not sound. However, another Zone whose Key Range ends at C5 *will* be able to play the C#4 from the Arpeggiator. Therefore, setting a Zone's Key Range can be important in deciding how it will respond to the Arpeggiator. (The Arpeggiator's Key Range only restricts notes you play into the Arpeggiator, not notes created by the Arpeggiator.)

## Latch Mode

**Latch Mode** determines how the Arpeggiator will respond to notes played on the keyboard.

**Keys** means that the Arpeggiator will only play while you are holding down one or more keys. As you play different notes, they get added to the Arpeggiator, and as you release notes, they get taken out. The Arpeggiator has a consistent tempo, which is adhered to no matter how fast or slow you play the keyboard, so some notes may take a little while to speak after you play them, until the Arpeggiator's clock catches up. This clock stays constant as long as you are playing any key, but if you let go of *all* the keys, then the clock "resyncs" itself, and the Arpeggiator starts immediately when you play the next key.

In the next three modes, the Arpeggiator is listening to a switch to latch notes on and off. That switch happens to be MIDI Controller 119, which in this Setup (and as a factory default) is assigned to Button **G** as a Toggle: press the button once and the Arpeggiator starts, press it again and it stops.

In **Overplay** mode, the Arpeggiator will grab ("latch") any notes that are being held when the switch goes on, and will continue playing them, even after you let them go, until the switch is turned off. Any new notes you play on the keyboard will sound normally, and will not be arpeggiated.

**Arpeggiation** mode ("Arpeg") is similar: any notes held when the switch goes on will be latched and arpeggiated, and keep going until the switch is turned off. Subsequent played notes will join in the arpeggiation, but will not latch: when you let go of such a note, it will no longer play in the arpeggiation.

**Add** mode means that any note played after the switch goes on will be added to the Arpeggiator, and will *keep* playing after you let go of the key, until you shut the switch off.

**Auto** mode doesn't listen to the switch: the Arpeggiator goes on whenever you play a note. The note is latched on. Play more notes, and they get latched on, too. You don't have to be holding notes for them to stay on: as long as you hold down at least *one* key, every note played is added to the Arpeggiator. Therefore, you could have 88 notes going at once, if you were so inclined.

**Pedals** mode is a combination of Keys, Add, and Overplay modes. If neither latch controller is on, notes will arpeggiate only while you are holding down keys (similar to **Keys** mode). If you activate Controller 119, the keys currently held down will latch, and any additional keys played while Controller 119 is on will also latch (similar to **Add** mode). When Controller 119 is off, any keys that are not currently held down will be removed from the arpeggiation. If you activate Controller 118, keys currently held down will latch, and any additional keys played while Controller 118 is on will play normally (similar to **Overplay** mode). This mode is called **Pedals** mode because you might want to assign Switch Pedal 1 to Controller 119 (Latch 1) and Switch Pedal 2 to Controller 118 (Latch 2) to make the pedals function similarly to sustain and sostenuto pedals.

## Play Order

This parameter determines the play order: how the notes will come out of the Arpeggiator. **Played** means they will play back in the order they were entered. **Up** means they will play in ascending order of pitch, regardless of their original order. **Down** means (you guessed it!) descending order of pitch. **Up/Down** means they will play up, then turn around and play down, and keep cycling like that until the Arpeggiator stops. The notes at the very top and very bottom only play once. **Up/Down Rp** is the same thing, except the notes at the top and bottom play *twice* (repeat) before the Arpeggiator turns around.

**Random** picks the notes out from the currently-latched ones totally at random. **Shuffle** picks the notes out at random, but keeps track of the notes so that no note repeats until all of the

others have played (Schoenberg would have approved). **Walk** is “random walk”: each successive note is either the next highest or the next lowest pitch in the cycle. For example, if the latched notes were (in ascending order) C, D, E, F, and G, and the first note was an E, the next note could be an F or a D. If it’s an F, the next note will be an E or a G, but if it’s a D, the next note will be a C or an E; and so on.

## Beats

**Beats** subdivides the Tempo setting. At its lowest value, **4th notes**, the Arpeggiator plays at the indicated tempo. Setting Beats to **8th notes** doubles the tempo, while setting it to **8th trips** triples it. The highest setting is **32nd trips**, in which the notes spew out at 24 times the Tempo setting.

## Initial Tempo

**Initial Tempo** is the tempo, in beats per minute (bpm), at which the Arpeggiator will play when first turned on. This tempo can be changed in real time by assigning any of the PC88’s physical controllers in the Setup to **Tempo**. The range is 20 to 300 bpm.

Note that this parameter will be relevant only if the Clock parameter in the **Global** menu is set to **Internal**. If it set to **External**, then the Arpeggiator will follow the timing of MIDI Clocks coming from an external source, such as a sequencer or drum machine.

## Duration

**Duration** determines how long the notes will play within the rhythm—i.e., the articulation. 100% means that a note will sustain until the next one sounds—very legato. 50% means that the note will fill half the space between itself and the next note. The lowest value is 1%—*staccatissimo*. This parameter has no effect on percussion sounds or other sounds whose duration is fixed.

## Velocity Mode and Fixed Velocity

**Vel Mode** sets the velocity of the played notes. **Fixed** means they all sound at the same level, determined by the **Fixed Vel** parameter (which is next on the menu). **Played** means each note repeats with the same velocity you played it at. **Last** means all notes play at the velocity of the most-recently played note. “Pressure” means the velocities are controlled by keyboard pressure: as you push down on any key, the velocities get higher, and as you ease up they get lower. Finally, **Ctrl 117** means the velocity is controlled by MIDI Controller number 117, which can be assigned to any PC88 physical controller or can come from an external MIDI source.

**Fixed Vel**, as we mentioned, sets the velocity of all notes if Fixed mode is selected.

## Note Shift

You can tell the Arpeggiator to transpose all of the currently-latched notes each time it plays through them. **Note Shift** determines how much transposition will occur. The transposition is cumulative from one cycle to the next: if you choose 2 as the value then after the initial cycle, the next cycle will be up a whole step, the one after that will be up two whole steps (a major third), the following one will be up three whole steps (an augmented fourth), and so forth. The values can be from -12 to 12, with 0 (the default) being no transposition.

## Shift Limit

What happens when you transpose so far that the resulting notes are out of range? That's where the **Shift Limit** parameter comes in. This number determines how far up *or* down the Arpeggiator will play from the original note. The minimum value is 0 (which is, admittedly, not of much use), and the maximum is 88. When the Arpeggiator reaches the limit, one of several things will happen, as determined by the **Limit Opt** parameter.

## Limit Option

If **Limit Opt** is set to **Stop**, then when the Arpeggiator has shifted notes up or down to the limit, it stops playing. If it is set to **Reset**, then when it reaches the limit, the Arpeggiator goes back to its original pitch and starts over again, continuing to transpose as it plays. If the limit allows the notes to go out of MIDI range (for example, if you set Shift to 12, set the limit to 80, and play C4), then those "ghost" notes will not sound, but they will take up rhythmic space: the Arpeggiator will wait for the cycle to play itself out before starting over.

**Unipolar** means the Arpeggiator will play the last note before it reaches the limit and then start shifting notes in the *opposite* direction, using the same interval. When it gets back to its starting point, it reverses again, and so keeps bouncing back and forth between the original pitch and the limit, until you pull the plug.

**Bipolar** starts out the same way as Unipolar, but as the cycle bounces its way back to the original pitch, it keeps going *past* the original pitch, and continues to shift until it hits the Shift Limit in the *opposite* direction. Then it reverses and heads back to the original pitch, going past it until it hits the Shift Limit again, and thus bouncing back and forth between the Shift Limit and its negative counterpart ("evil twin", if you will) for all of eternity.

**Flt Reset** adds a little bit of randomness to the process. "Flt" stands for "Float", and it means that when the Arpeggiator reaches the Shift Limit, it doesn't necessarily reset to the original pitch. Instead, it looks at the first note that would exceed the Shift Limit, and calculates the interval between it and the Shift Limit. It then starts the cycle over again, but instead of starting with the first original pitch, it *transposes* that pitch by the interval it just calculated, and continues from there. Here's a very simple example. The only note in the Arpeggiator cycle is C3, the Note Shift is 7 (a perfect fifth), and the Note Limit is 26. The Arpeggiator plays C3, then G3, then D4, then A4. The next note, E5, would be above the Limit, D5 (26 semitones above C3). With a normal Reset, the Arpeggiator would start over again at C3. With the Float turned on, however, the Arpeggiator (clever little devil!) looks at the difference between E5 and D5 — a whole step — and applies it to the starting note, raising *it* by a whole step from C3 to D3. Subsequent notes will then be A3, E4, and B4. Then it will see that the next note — F#5 — would be a major third above the limit, and so it applies *that* interval to the starting point — and you get E3, and the beat goes on.

**Flt Unip** uses the same concept and applies it to the Unipolar mode: when it reaches the limit, the Arpeggiator calculates the difference between the next note and the limit, and transposes all subsequent notes by that interval, even though they're now going in the opposite direction. "Flt Bip!" does the same thing with the Bipolar mode: after the limit is exceeded in one direction, notes are transposed by the usual interval, and when the cycle goes back and reaches the opposite end, another calculation is done, and subsequent notes are transposed according to that interval — which is going to be in the opposite direction of the first transposing interval, and not necessarily the same distance.

The Arpeggiator can be a lot of fun, even if you don't always understand exactly what it's doing. Keep in mind that the stranger the algorithm you set up, the more unlikely the notes will stay close to one key, so if you want to create something that's going to sound at all diatonic, keep it simple.

## Glissando

When the **Glissando** parameter is **On**, then the Arpeggiator chromatically fills in between notes as it cycles through them. Example: If the Arpeggiator is supposed to play a D and an F, with Glissando on it will play **D**, D#, E, **F**, E, D#, **D**.

## Available MIDI controllers

To recap the MIDI controllers available for the Arpeggiator:

116 — Turns the Arpeggiator Active parameter on or off.

117 — Adjusts the velocity of arpeggiated notes (when Velocity is in Ctrl 117 mode).

118 — Latch 2 (**Pedals** mode only) Engages Overplay in **Pedals** mode.

119 — Turns the Arpeggiator's latch on and off when Latch mode is set to **Overplay**, **Arpeggiation**, **Add**, or **Pedals** mode.

Mono Pressure — Adjusts the velocity of arpeggiated notes (when Velocity is in Pressure mode).

## Copying the Arpeggiator

If you have an Arpeggiator that you like in one Setup, and you wish you could use it in another Setup without rebuilding it from scratch, there is a Copy mode for the Arpeggiator. While in the **Arpeggiator** menu, press **Copy**. At the prompt "Copy Arpeg?", press **Enter**. Now go to the Setup you want to copy the parameters to, by pressing **MIDI Setup** and the appropriate group and number buttons. Press **Arpeggiator** to go into *this* Setup's Arpeggiator, and press **Copy**. Press the right cursor so the display says "Paste Arpeg?". Press **Enter**, and the Arpeggiator's settings are now part of this Setup. Now press **Store** so you don't lose everything.

As we saw in the last chapter, each type of Copy operation has its own distinct memory buffer. Therefore, you can overlap Arpeggiator copy and paste operations with those of different types.