

Bucket Pops

Vintage Rhythm Machine

Version 1.0

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Introduction

Bucket Pops is a software instrument plug-in for Microsoft Windows (VST) and Apple macOS (VST/AU) simulating the classic KORG® *Mini Pops-7 Rhythm Machine* from 1966. It is written in native C++ code for high performance and low CPU consumption. The main features are:

- 20 original rhythms
- 15 modeled drum instruments (no samples)
- Tweakable instrument parameters
- Tweakable rhythm sequencer
- Resizable user interface (not "N" version)
- All parameters can be controlled by MIDI controllers
- Plug-in supports Windows and macOS (32 bit and 64 bit)

Bucket Pops is based on the new **iPlug2** framework maintained by **Oli Larkin and the iPlug2 team**. Big thanks, guys!!! Without your work it would not have been possible to create a resizable user interface.

To resize the plug-in you just grab the yellow triangle at the bottom right of the *Bucket Pops* window and drag it. You can save the current window size using the menu entry "Save Window Size" in the *Options Menu*.

The KORG *Mini Pops-7*

If you have no idea what the *Mini Pops-7* is or how it sounds, just put Jean-Michel Jarre's classic *Oxygene* or *Equinoxe* long players on your turntable, press "Play" and wonder what has produced most of those funky drum/percussion sounds – this is it!

You are not fond of Rumba? Well, I never heard a more impressive "Rumba" pattern than that at the very beginning of *Oxygene Part 6* where the *Mini Pops-7* slowly blends into the artificial sound of sea waves, bird cries, and *Eminent* strings.

Released in 1966 (!) the *Mini Pops-7* was not the first but became one of the most iconic rhythm machines – not a drum computer because there is no computer inside. The twenty different rhythm patterns are fixed (although it is possible to combine them) and hard-coded into a *Diode Matrix*, the early version of a ROM (Read-Only Memory). You won't find any integrated circuits inside the clunky box, everything is realized using discrete electronics.

The *Bucket Pops*

Why should one want to recreate the *Mini Pops-7* as a software instrument? Because it is so much fun – not only the *playing* (well, you just can select a rhythm and press "Start"...) but the *doing* (sorry that I cannot share this kind of experience with you!). It took me some time to decipher the rhythms from the diode matrix and it would have taken even longer if the KORG engineers had not put some hints into the schematics. I also simulated the 15 individual instruments using *LTspice* to get the sound right. I don't ask you to understand my motivation. ☺

Mind that each original *Mini Pops-7* sounds different due to various internal trimpots, tolerances and aging of the electronic components etc. In the *Bucket Pops* you can

tweak the instruments beyond recognition, and you can change the rhythm patterns themselves, too!

The *Bucket Pops* "N" Version

Many users with older operating systems (Windows 7, macOS 10.10 or below) and/or incompatible graphic cards/drivers may have problems with the resizable user interface of version 1.0. Thus, I decided to provide a non-resizable version of the *Bucket Pops* based on the old iPlug framework – this is called the "N" version. It should work on almost all machines (even on 32 bit Macs).

Acknowledgments

Big thanks to:

- **kraftraum** (<https://soundcloud.com/kraftraum>) who has again designed many of the default patches and was again THE Beta tester.
- **Oli Larkin** and the iPlug/iPlug2 team.
- **Laurent Bergman** for translating the *Full Bucket* manuals to French.

And at this point I would also like to say **Thank you!** to all the people who share their information about the *Mini Pops-7* via the Internet. Last not least another THANK YOU! to the KVR Audio community and to the KORG engineers.

No, I am not affiliated with KORG in what relation ever except that I always find myself entangled with their instruments. ☺

General Operation

Bucket Pops is a rhythm machine with 20 different rhythm patterns and 15 individual instruments. The patterns are 2 bars long (although the second bar of most of the patterns is just a repetition of the first bar) and have 64 steps (the original *Mini Pops-7* had "only" 32; see *Editing Steps The Mini Pops Way*).

Mouse Clicking Convention

Many functions of the *Bucket Pops* are triggered or activated by clicking at various buttons or labels in the user interface (UI). Since older Macs mice may have only one button, *Bucket Pops* uses the following convention:

- **"Left Clicking"**
Denotes that the left (or single) mouse button is clicked.
- **"Right Clicking"**
Denotes that the right mouse button is clicked or that the CTRL, ALT, or COMMAND key is held while (left) clicking.

Note that this convention applies for the whole manual.

MIDI Learn And The Config File "bucketpops.ini"

Every parameter of the *Bucket Pops* can be controlled by one MIDI controller. If you want to change the assignment of MIDI controller (CC; *MIDI Control Change*) to a *Bucket Pops* parameter the *MIDI Learn* function comes in quite handy: Just click the *LEARN* button on the Sound Manager panel and wiggle both the MIDI controller and the parameter you want to assign (you can abort *MIDI Learn* by clicking the button again). If you want to unlearn the assignment, right-click the *LEARN* button (the label now reads "UNLRN") and activate it. Now wiggle the MIDI controller or the parameter that you want to unlearn. To save the controller assignments use "Save Configuration" in the *Options Menu* (see below); they are stored in the `bucketpops.ini` configuration file. The exact location of this file depends on your operating system and will be displayed when you click on "Reload" or "Save Configuration".

Options Menu

When clicking on the *OPTIONS* button a menu opens with the following options:

Command	Description
Copy Program	Copy current program to internal clipboard
Paste Program	Paste internal clipboard to current program
Init Program	Initialize the current program
Load Program	Load <i>Bucket Pops's</i> current program from a FXP file
Save Program	Save <i>Bucket Pops's</i> current program to a FXP file
Load Bank	Load 64 patches from a FXB file into <i>Bucket Pops</i>
Save Bank	Save <i>Bucket Pops's</i> 64 patches to a FXB bank file
Select Startup Bank	Select the bank file that should always be loaded when <i>Bucket Pops</i> is started
Load Startup Bank	Load the Startup bank file; can also be used to check what the current Startup bank is
Unselect Startup Bank	Unselect the current Startup bank
MIDI Thru	Set globally if MIDI data sent to <i>Bucket Pops</i> should be sent through to its MIDI output
Ignore Program Change	Set globally if MIDI Program Change data sent to <i>Bucket Pops</i> should be ignored
Reload Configuration	Reload <i>Bucket Pops's</i> configuration file
Save Configuration	Save <i>Bucket Pops's</i> configuration file
MIDI File...	Export the current rhythm pattern to a MIDI file type 0 or 1 (also see section <i>Import and Export of MIDI Files</i>)
Window Size...	Change the window size of <i>Bucket Pops</i>
Save Window Size	Stores the current window size to the configuration file so that it will be restored on the next loading of <i>Bucket Pops</i>
Check Online for Update	When connected to the Internet, this function will check if a newer version of <i>Bucket Pops</i> is available at fullbucket.de
Visit fullbucket.de	Open fullbucket.de in your standard browser

The Main Page

All controls of the original *Mini Pops-7* are placed on the *Main Page* of *Bucket Pops*; any additional parameters are accessible via the *Settings* and the *Sequence* pages.



Selecting Rhythms

Rhythm patterns are organized in two rows: The *Top Row* (*Waltz* to *Swing*) and the *Bottom Row* (*Jazz Waltz* to *Latin Swing*). The switch located below the POWER switch at the very right is used to flip between the two rows.

You can select a rhythm pattern by clicking one of the white push buttons. Right-clicking on a button will allow you to select multiple patterns at once.

Note that it is not possible to combine rhythm patterns of different rows – thus, *Rumba* + *Habanera* is an impossible combination (unless you are willing to re-create such a pattern yourself – see section *The Sequence Page*).

Playing Rhythms

To start or stop the machine just click the "PLAY/STOP" push button or the "PLAY" button at the bottom screen. The difference between both buttons is that the "PLAY/STOP" button will reset and start at the beginning of the pattern while the "PLAY" button will continue playing from the last position – except if you right-click it.

The TEMPO knob sets the playback tempo. Hovering with the mouse over the knob reveals the current tempo in BPM. If the SYNC button is lit, *Bucket Pops* will synchronize playback tempo as well as start/stop to the host DAW. Finally, the aforementioned POWER knob disables playback. This might be useful if you want to start/stop the machine via parameter automation.

Level Sliders

The *Mini Pops-7* featured extra volume sliders for the instruments *Quijada*, *Guiro* and *Tambourine* since they were always playing – even if no rhythm was selected – the same *pattern*, regardless of what rhythm was selected (except for slight variations of non-4/4 signature rhythms). Thus it was possible to attenuate or even “mute” these instruments.

The “BALANCE” slider adjusts the volume balance between the *Base* drum and the cymbal group of instruments (*Hihat*, *Cymbal 1*, *Cymbal 2*) while the “VOLUME” slider does the obvious thing.

The POWER Button

The “POWER” button seems to be a bit useless. However it makes perfect sense to automate this button when running the *Bucket Pops* in sync to your DAW: This way you can for example delay the playback or disable it during breaks.

User Rhythm Patterns

Bucket Pops allows you to edit rhythm patterns (see *The Sequence Page*) – this was not possible with the original hardware (at least not with reasonable effort). Once an original rhythm pattern is changed, the *Main Page* symbolizes that with a tape strip and the name “USER *n*” where *n* is the number of the rhythm (1 to 20).



The Settings Page

In contrast to many other rhythm machines plug-ins, the *Bucket Pops* instruments are not based on samples of the original *Mini Pops* but are synthesized in real time and can be tweaked in their relevant parameters. This is done using the *Settings Page*.



Instrument Parameters

The following table lists the various parameters of the 15 instruments (note that not all parameters are available for all instruments).

parameter	instrument	description
TUNE	all	Frequency of main oscillator or filter
ATTACK	all except <i>Guiro</i>	Attack time of amplitude envelope
DECAY	all except <i>Guiro</i>	Decay time of amplitude envelope
RESO	<i>Snare 1+2, Cymbal 1+2, Hihat, Tambourine</i>	Level of filter resonance
TICK	<i>Snare 1 & 2</i>	Level of initial attack impulse
HIGHP.	<i>Snare 1+2, Cymbal 1+2, Tambourine</i>	Frequency of highpass filter
TUNE2	<i>Conga, Cowbell</i>	Frequency of secondary oscillator
LEVEL2		Level of secondary oscillator
DECAY2		Decay time of secondary oscillator
RATE	<i>Guiro, Quijada</i>	Repeat rate of signal pulses
DENSITY		Density of signal pulses

Output Mixer and Note Assignment

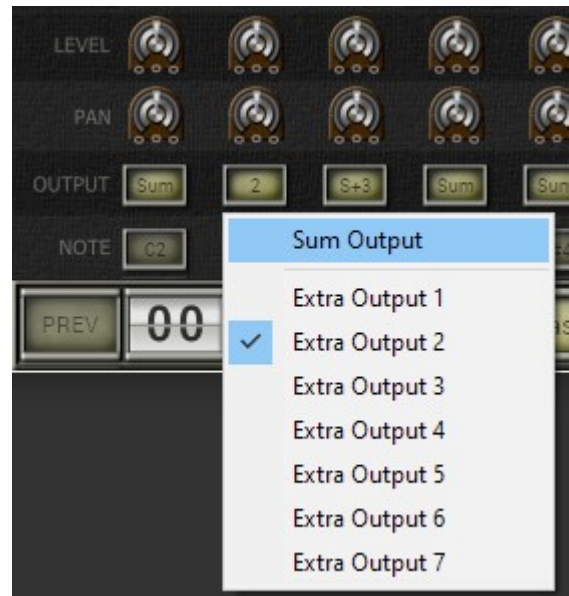
The level and the panorama position of all 15 instruments can be adjusted individually. Furthermore, each instrument can be assigned to one of 7 "extra" stereo output pairs. This is done by clicking on the "OUTPUT" button which opens a dedicated context menu. It is also possible to keep the instrument in or remove it from the standard stereo sum output – just check or uncheck the "Sum Output" entry of the context menu.

Left-clicking the "NOTE" button triggers the respective instrument while right-clicking opens another context menu used to assign an instrument to a specific (MIDI) note or even to turn it off.

The menu entry "Set Middle C" allows you to select the notation schema of your choice. The idea here is to select which name to use for MIDI note number 60:

- "C3": Used for example in Cubase, Ableton and Bitwig.
- "C4": The scientific standard notation; used for example in Reaper and MuLab.
- "C5": Used for example in FL Studio, Cakewalk and many trackers.

Finally, when you click on the label of an instrument at the very top of the screen, another context menu opens where you can rest all instrument parameters or note assignments to their defaults.



The Guiro

All instruments are one-shot triggered which means that they only react on *Note On* and ignore *Note Off* events – except for the *Guiro* which is gated. Thus, after a *Note On* event the *Guiro* sounds until a *Note Off* event is received. This is only partially the way how a true Guiro works but exactly the way it is realized in the original *Mini Pops-7*.



The Sequence Page

On the *Sequence Page* you can edit the 20 individual rhythm patterns. This is pretty straight forward – however, there are some peculiarities due to the nature of the original machine.



Editing Rhythm Patterns

The button on the top left denotes the rhythm pattern to edit. By left-clicking this button you can select a different rhythm to edit. Right-clicking opens another context menu where you can copy the pattern from another rhythm or restore the original pattern.

Note that the rhythm pattern you see on the *Sequence Page* is not necessarily the rhythm that *Bucket Pops* is playing – the rhythms to play are selected on the *Main Page*! If the current rhythm is selected for playing and *Bucket Pops* is actually playing, you will see a green dot at the top row with the step numbers.

Left-clicking inside the *event matrix* activates or deactivates an *event* (“beat”) for the current instrument and the respective step. Right-clicking opens a context menu where you can clear all events of the pattern, just the events of the selected row (instrument), or just the events of the selected column (step). You can also use the context menu to automatically fill or clear instrument events for various steps (each quarter or eighth note etc.). A similar context menu opens when you click on the label of an instrument.

Editing Steps The Mini Pops Way

The original *Mini Pops-7* had 32 steps (16 steps, 2 bars) while *Bucket Pops* doubles the total number of steps to 64. Each step can be activated or deactivated by clicking on the top row of the event matrix showing the step numbers – a deactivated step is denoted by a red column.

To create a 3/4 signature rhythm pattern like *Waltz*, the *Mini Pops-7* skipped steps 5+6, 9+10, 21+22 and 25+26 during playback. This way it was possible to reuse diode matrix patterns that were used by other rhythms, too (diodes are hardware and hardware is expensive!).

Bucket Pops emulates this behavior by deactivating steps. However, since the number of steps are doubled in *Bucket Pops*, the skipped (deactivated) steps for *Waltz* are 9–12, 17–20, 41–44, and 49–52.

Why does the *Bucket Pops* follow this (at first glance) weird schema and does not go for a simplification? For example, to create a 3/4 signature it would be easier just to limit the number of steps instead of skipping steps in between. The answer is that it makes a big difference when you *combine* rhythms (i.e. select more than one rhythm) for playback. The classic *Oxygene* patterns only emerge when the original diode matrix behavior is emulated!

Triplets and Templates

The way the *Mini Pops-7* reproduced a triplet-based rhythm like *Slow Rock* is even more tricky: Here every fourth step (4, 8, 12, ...) was skipped while the overall tempo was *slowed down* by the factor 3/4! In *Bucket Pops* the button "tripl." (for "triplets") activates exactly this specific tempo reduction, while in the case of *Slow Rock* each seventh and eighth step are deactivated (see image at the top of this section).

Clicking on the "STEPS" button or right-clicking the top row showing the step numbers opens a context menu where you can select a specific template for activated steps.

- Activate all steps:** activates all steps
- Deactivate steps 33 to 64:** deactivates the steps 33 to 64
- Template for 3/4:** deactivates the steps 13 to 16, 29 to 32, 45 to 48, and 61 to 64 (note that this is a different pattern as used for *Waltz* and *Jazz Waltz*)
- Template for 6/8:** deactivates the steps 25 to 32 and 57 to 64
- Template for 7/8:** deactivates the steps 29 to 32 and 61 to 64
- Template for Triplets:** deactivates every 7th and 8th step (same pattern as used for *Slow Rock*)

Import and Export of MIDI Files

Finally each rhythm pattern can be imported from or exported to a MIDI file.

- For MIDI files based on triplets you have the option to import them as *Bucket Pops* triplet patterns (see section above).
- Rhythm patterns can be exported as MIDI file type 0 (single track) or type 1 (15 tracks – one track per instrument).
- To export the combined pattern of all selected rhythms use the export functionality in the *Options Menu*.

Parameters

Main Page

parameter	ID	description
<i>Volume</i>	0	Total volume level
<i>Power</i>	1	Power switch
<i>Tempo</i>	2	Tempo control (bpm)
<i>Tempo Sync</i>	3	Tempo synchronization to host
<i>Quijada</i>	4	Level of instrument "Quijada"
<i>Guiro</i>	5	Level of instrument "Guiro"
<i>Tambourine</i>	6	Level of instrument "Tambourine"
<i>Balance</i>	7	Balance between <i>Base</i> and <i>Hihat/Cymbal 1+2</i>
<i>Rhythm 1-10</i>	8-17	Rhythm selector buttons 1 to 10
<i>Rhythm Row</i>	18	Rhythm row selector switch

Instruments

parameter	ID	description
<i>Level X</i>	19-33	Volume level of instrument <i>X</i>
<i>Pan X</i>	34-48	Panorama of instrument <i>X</i>
<i>Note X</i>	49-63	MIDI note assignment of instrument <i>X</i>
<i>Base Frequency</i>	64	Frequency of instrument <i>Base</i>
<i>Base Attack</i>	65	Attack time of instrument <i>Base</i>
<i>Base Decay</i>	66	Decay time of instrument <i>Base</i>
<i>Snare 1 Frequency</i>	67	Frequency of instrument <i>Snare 1</i>
<i>Snare 1 Attack</i>	68	Attack time of instrument <i>Snare 1</i>
<i>Snare 1 Decay</i>	69	Decay time of instrument <i>Snare 1</i>
<i>Snare 1 Resonance</i>	70	Resonance of instrument <i>Snare 1</i>
<i>Snare 1 Tick</i>	71	Tick level of instrument <i>Snare 1</i>
<i>Snare 1 Highpass</i>	72	Highpass frequency of instrument <i>Snare 1</i>
<i>Snare 2 Frequency</i>	73	Frequency of instrument <i>Snare 2</i>
<i>Snare 2 Attack</i>	74	Attack time of instrument <i>Snare 2</i>
<i>Snare 2 Decay</i>	75	Decay time of instrument <i>Snare 2</i>
<i>Snare 2 Resonance</i>	76	Resonance of instrument <i>Snare 2</i>
<i>Snare 2 Tick</i>	77	Tick level of instrument <i>Snare 2</i>
<i>Snare 2 Highpass</i>	78	Highpass frequency of instrument <i>Snare 2</i>
<i>Small Bongo Freq.</i>	79	Frequency of instrument <i>Small Bongo</i>

parameter	ID	description
<i>Small Bongo Attack</i>	80	Attack time of instrument <i>Small Bongo</i>
<i>Small Bongo Decay</i>	81	Decay time of instrument <i>Small Bongo</i>
<i>Large Bongo Freq.</i>	82	Frequency of instrument <i>Large Bongo</i>
<i>Large Bongo Attack</i>	83	Attack time of instrument <i>Large Bongo</i>
<i>Large Bongo Decay</i>	84	Decay time of instrument <i>Large Bongo</i>
<i>Conga Frequency 1</i>	85	Frequency 1 of instrument <i>Conga</i>
<i>Conga Attack</i>	86	Attack time of instrument <i>Conga</i>
<i>Conga Decay 1</i>	87	Decay time 1 of instrument <i>Conga</i>
<i>Conga Level 2</i>	88	Level of oscillator 2 of instrument <i>Conga</i>
<i>Conga Frequency 2</i>	89	Frequency 2 of instrument <i>Conga</i>
<i>Conga Decay 2</i>	90	Decay time 2 of instrument <i>Conga</i>
<i>Cowbell Frequency 1</i>	91	Frequency 1 of instrument <i>Cowbell</i>
<i>Cowbell Attack</i>	92	Attack time of instrument <i>Cowbell</i>
<i>Cowbell Decay 1</i>	93	Decay time 1 of instrument <i>Cowbell</i>
<i>Cowbell Level 2</i>	94	Level of oscillator 2 of instrument <i>Cowbell</i>
<i>Cowbell Frequency 2</i>	95	Frequency 2 of instrument <i>Cowbell</i>
<i>Cowbell Decay 2</i>	96	Decay time 2 of instrument <i>Cowbell</i>
<i>Claves Frequency</i>	97	Frequency of instrument <i>Claves</i>
<i>Claves Attack</i>	98	Attack time of instrument <i>Claves</i>
<i>Claves Decay</i>	99	Decay time of instrument <i>Claves</i>
<i>Hihat Frequency</i>	100	Frequency of instrument <i>Hihat</i>
<i>Hihat Attack</i>	101	Attack time of instrument <i>Hihat</i>
<i>Hihat Decay</i>	102	Decay time of instrument <i>Hihat</i>
<i>Hihat Resonance</i>	103	Resonance of instrument <i>Hihat</i>
<i>Rimshot Frequency</i>	104	Frequency of instrument <i>Rimshot</i>
<i>Rimshot Attack</i>	105	Attack time of instrument <i>Rimshot</i>
<i>Rimshot Decay</i>	106	Decay time of instrument <i>Rimshot</i>
<i>Cymbal 1 Frequency</i>	107	Frequency of instrument <i>Cymbal 1</i>
<i>Cymbal 1 Attack</i>	108	Attack time of instrument <i>Cymbal 1</i>
<i>Cymbal 1 Decay</i>	109	Decay time of instrument <i>Cymbal 1</i>
<i>Cymbal 1 Resonance</i>	110	Resonance of instrument <i>Cymbal 1</i>
<i>Cymbal 1 Highpass</i>	111	Highpass frequency of instrument <i>Cymbal 1</i>
<i>Cymbal 2 Frequency</i>	112	Frequency of instrument <i>Cymbal 2</i>
<i>Cymbal 2 Attack</i>	113	Attack time of instrument <i>Cymbal 2</i>
<i>Cymbal 2 Decay</i>	114	Decay time of instrument <i>Cymbal 2</i>

parameter	ID	description
<i>Cymbal 2 Resonance</i>	115	Resonance of instrument <i>Cymbal 2</i>
<i>Cymbal 2 Highpass</i>	116	Highpass frequency of instrument <i>Cymbal 2</i>
<i>Tambourine Freq.</i>	117	Frequency of instrument <i>Tambourine</i>
<i>Tambourine Attack</i>	118	Attack time of instrument <i>Tambourine</i>
<i>Tambourine Decay</i>	119	Decay time of instrument <i>Tambourine</i>
<i>Tambourine Reso.</i>	120	Resonance of instrument <i>Tambourine</i>
<i>Tambourine Highpass</i>	121	Highpass frequency of instrument <i>Tambourine</i>
<i>Guiro Frequency</i>	122	Frequency of instrument <i>Guiro</i>
<i>Guiro Rate</i>	123	Rate of instrument <i>Guiro</i>
<i>Guiro Density</i>	124	Density of instrument <i>Guiro</i>
<i>Quijada Freq.</i>	125	Frequency of instrument <i>Quijada</i>
<i>Quijada Attack</i>	126	Attack time of instrument <i>Quijada</i>
<i>Quijada Decay</i>	127	Decay time of instrument <i>Quijada</i>
<i>Quijada Rate</i>	128	Rate of instrument <i>Quijada</i>
<i>Quijada Density</i>	129	Density of instrument <i>Quijada</i>

Frequently Asked Questions

How do I install the Bucket Pops (Windows 32 bit version)?

Just copy the files `bucketpops.dll` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the *Bucket Pops* VST plug-in the next time you start it.

How do I install the Bucket Pops (Windows 64 bit version)?

Just copy the file `bucketpops64.dll` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the *Bucket Pops* VST plug-in the next time you start it.

Note: You may have to remove any existing (32 bit) `bucketpops.dll` from your VST plug-in folder or else your DAW may screw the versions up...

How do I install the Bucket Pops (Mac VST/AU 64 bit)?

Locate the downloaded PKG package file `bucketpops_1_0_0_mac.pkg` in Finder (!) and do a right- or control-click on it. In the context menu, click on "Open". You will be asked if you really want to install the package because it comes from an "unidentified developer" (me 😊). Click "OK" and follow the installation instructions.

What is the "N" version of the Bucket Pops?

The "N" version is the non-resizable version of the *Bucket Pops* that should run on almost any older Windows or Mac machine. So if you have problems with the standard *Bucket Pops* version, this is the one to go for.

What is the plug-in ID of the Bucket Pops?

The ID is `fbp7`.

How do I know if a new version of the Bucket Pops is available?

When connected to the Internet, open the File menu (see section *Options Menu*) by clicking the disk icon and select the entry "Check Online for Updates". If a new version of the *Bucket Pops* is available on fullbucket.de the respective information will be shown in a message box.

How do I resize the Bucket Pops window?

Just grab the yellow triangle at the bottom right of the *Bucket Pops* window and drag it. You can save the current window size using the menu entry "Save Window Size" in the *Options Menu*.