



DrumPerfect Pro (v2.0)

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1 Introduction

DrumPerfect Pro is the *Human Feel* virtual drummer for iOS that aims at creating extremely naturally sounding drum tracks.

For this purpose, DrumPerfect Pro (DPP) features the following views for easy interaction with the advanced drum engine:

- The *Pattern* view for programming drum patterns with full control over each individual drum stroke's velocity, timing and probability. Each pattern can have different BPM, time signature and beat subdivision settings.
- The *Grid* view which shows all instrument parts in a single screen and allows for editing of velocity and probability per stroke or per instrument. Programmed drum strokes can be copied and moved across different instruments and across different patterns.
- The *Kit* view offers room for up to 16 different drum kits with 16 instruments each. Every instrument consists of up to 16 different user-selectable audio samples. DPP comes with a number of multi sampled kits already, each of which built up of high quality samples from the public domain, however, users can easily create their own custom kits as well. With the built-in high-quality convolution reverb the drum kits can be convincingly simulated in a large set of different rooms.
- The *Song* view in which a song is built of pattern/kit events. Songs or arbitrary selections within a song can be played in a loop. Patterns within a song can be grouped to form parts, which facilitates structuring of the song in verses, choruses etc. Also, *random* parts can be created, the song patterns in which are randomly selected during play.
- The *Pad* view for live-playing and recording of patterns and songs. The view features 32 velocity-sensitive pads.
- The *Export* view which offers an extensive range of options for export of the created patterns and songs. Export as stereo audio, or as mono/stereo stems per instrument. Export as midi file. Export to well known audio hubs as AudioShare, AudioCopy or SoundCloud. Or to Dropbox or any other app the supports the audio and midi file format by *Open-in*.
- The *Settings* view for configuration DPP's options. Amongst others, this view hosts extensive midi-in configuration options per port. Several of DPP's functions can be controlled via external midi CC. DPP supports both coremidi and virtual midi input ports.
- The *Store* view offers professional musical content in different styles and contains patterns, songs and drumkits.

DrumPerfect Pro exploits an extensive probabilistic scheme to randomly and on-the-fly create both subtle and convincing variations on the programmed patterns. As a result, songs -while even consisting of only a few patterns, can sound as if they are played by a human drummer. Complementary to this, the probabilistic instrument sample selector will on-the-fly alternate between multiple samples for one and the same instrument, which adds a lot to the realism of the sound.

DrumPerfect Pro offers extensive options for audio-transfer with other apps:

- Live-audio source for other apps via Audiobus and Inter-App-Audio (IAA). DPP supports live-streaming of individual outputs per instrument. Audiobus State Saving supported.
- Audio rendering/upload to AudioShare, AudioCopy2, SoundCloud, Dropbox and Open-in.
- Import of audio samples from AudioShare, AudioPaste and iTunes file sharing.
- Import of audio and midi files (also as zip archive) from other apps via Open-in.
- Solid clock sync via either Ableton Link, Inter-App Audio or Midi-clock input.
- Extensive midi-in support for real-time processing of incoming midi streams via virtual midi or coremidi (hardware) ports.
- Midi file import and export.

In the rest of this document, DPP's 8 views will be our guide in this manual. These views are always accessible from the navigation bar at the top of the screen, which facilitates switching between them. Also, the navigation bar contains a direct link to this help file via the DPP logo. There's also a QuickStart available under this logo.

2 Pattern view

Fig. 1 shows the Pattern view which is the startup view. Patterns are the building blocks of a *song*. They can best be interpreted as a single bar consisting of a number of beats, each of which can be subdivided into subbeats. Each pattern has its own tempo, time signature and beat subdivision. If the number of beats in the pattern is too large to be shown in a single view, navigation buttons will appear to the left and right of the pattern to enable scrolling over multiple pages. Drum strokes are inserted by tapping or brushing over the pattern at



Figure 1: Pattern view

the desired location. The respective (sub)beat(s) will turn green. Tapping once more will remove the stroke. Swiping down-up from the inside of an existing stroke to the outside will turn the stroke into a right-handed stroke. Left- and right-handed strokes typically play different samples of the same instrument. Swiping once again will return it into the default left-handed state. Swiping up-down will turn the stroke into a *choked* stroke which mutes the instrument. Below, the various controls in the view will be explained.

2.1 Kit selector

Select one of the kits by scrolling the selector bar and touching the desired drum kit. The selected kit is used during play of the pattern. In total, 16 different drum kits can be loaded at the same time. However, be warned that multi-sampled kits can take up a lot of memory, in which case having a few kits loaded at the same time could already fill up the iPad's memory. If memory usage becomes too high, iOS will abort the app, so it is good practice to keep an eye on the memory indicator in *Kit view*. DPP will issue a warning if the user wants to load a new kit while memory usage is high already.

2.2 Instrument selector

Select one of the instruments by scrolling the selector bar and touching the desired instrument. The selected instrument gets the focus in the pattern beat grid. Each drum kit can contain up to 16 different instruments. Touching one of the tabs for a short amount of time will turn on the *laid-back* function for that instrument, which will change the feel of the pattern by playing the instrument just a bit later in time than programmed. Experiment with it while carefully inspecting the result by ear. Well-known examples of laid-back sounding drum patterns are the ones where either the snare or the hats are delayed. The amount of time delay used in the laid-back function can be set in the *Settings view*

in the *Settings view* the laid-back level can be configured between *subtle*, *medium* and *strong*.

2.3 Live pad

Next to the instrument selector is the Live Pad, which can be used to play the instruments by tapping the pad. The drum engine must be running to activate the Live pad. If the **Record** button is pressed first, the played strokes are recorded into the pattern. The Live pad is velocity-sensitive from left to right. Live strokes inherit velocity, probability and time shift settings from the current slider settings and will be quantized to the beat grid. While connected via Inter-App Audio or Audiobus, the Live pad play can suffer from additional latency as a result from the presence of multiple apps in the audio pipeline. It is recommended to run DPP as a standalone app during Live pad play.

In the *Settings view* the Live Pad can be configured in **Dual Pad** mode, which will let you play both left-handed and right-handed strokes.

2.4 Tempo

For each pattern a BPM-value can be set between 20 and 340. A Tap Pad allows to tap the desired beat rate. Up/down buttons facilitate tuning the BPM-value. The BPM-value can be set for all patterns at once after keeping the Tap Pad pressed for more than three seconds. The tempo of a pattern or a song can be synced to a master or host app in three ways:

- Ableton Link. Enable Ableton Link in the *Settings view*. DPP will now automatically connect to other active Link-enabled apps, either locally or via the network. Link will ensure that the connected apps play in sync, that is with the same tempo and beat-aligned. DPP will handle the beat-alignment as follows. On **Play**, DPP will wait for the first beat out of *num* beats where *num* represents the number of beats in the current pattern. Once DPP is playing, beat alignment will be on a single beat basis as

the history of patterns since start is not tracked. If you want to re-align with the number of beats, e.g. after a series of pattern or tempo changes, *Stop* and *Play* again.

- **Midiclock sync.** For midiclock, select "DrumPerfect Pro" in the master app as destination for midiclock. Furthermore, configure the master app to send start/stop en song pointer messages via midi. Press the **Midi-clock** button. If incoming midi clock pulses are detected while in Midiclock mode, the Midiclock button will turn fully orange.
- **IAA sync.** Select DrumPerfect Pro as an IAA-node in the host app. In DPP, the IAA transport bar will show that will allow to run DPP in sync with the host, adopting both song position and tempo from the host. IAA transport control requires the *All instruments* channel to be selected in the IAA host.

While either the IAA or MIDI external sync mode is active, it will not be possible to change the tempo of a pattern (in Pattern mode) or a song (in Song mode=while inside Song view) from within DPP. In Link mode, the tempo *can* be changed and will be adopted by connected apps.

2.5 Time signature

For each pattern a time signature can be set as **num/den** where **num** is a integer number between 1 and 32 and **den** is an integer number from the set {1, 2, 4, 8, 16, 32}. On a change of time signature existing strokes will be automatically remapped to the new grid.

2.6 Beat subdivision

Each beat is subdivided into a number of subbeats. The subdivision can be set per beat as an integer number between 1 and 16. The **Subdiv** parameter can be used to set the same beat subdivision for all beats. On a change of subdivision existing strokes will be automatically remapped to the new grid. For example, this feature can be exploited for programming triplets in a 4/4 beat: first, set the subdivision to 3 and program the triplets, then reset the subdivision to 4. In this process, go from low to higher resolution in order not to loose strokes during remapping.

2.7 Beat grid

The beat grid is shown as a series of bars, each of which represents a subbeat in the beat grid. Strokes in the beat grid can be programmed by touching a subbeat. The subbeat will turn green. Touching it again will remove the stroke.

Each stroke has 3 parameters: velocity, probability and time shift. These parameters have corresponding sliders and edit fields in Pattern view. The stroke parameters can be modified by selecting the stroke (**Select** button, stroke will turn blue) and subsequently changing the parameters. Pressing **Select** again will deselect the selected strokes. Multiple strokes can be selected and edited at the same time, even strokes of multiple instruments. The **Select all** button will select all strokes of the current instrument. If strokes have been selected, **Erase** will remove the selected strokes, **Copy** will copy them into memory, and **Paste** will merge them. If no strokes have been selected, **Erase**, **Copy** and **Paste** will apply to all strokes of the current instrument. If the beat grid does not fit the one screen view it will be divided over multiple screens, in which case navigation buttons will show up on the left and right side of the beat grid. Down-swiping a drum stroke in the grid will create a red-colored *choking stroke*, which will choke the corresponding instrument. For choking strokes, velocity is used to indicate the force of choking between soft (velocity zero) and firm (velocity one) choking. As for the rest, choking strokes are treated in the same way as normal strokes. Next to the stroke editing buttons are the **Undo** and **Redo** buttons which allow to undo and redo the recent editing actions.

2.8 Polyphony and CPU monitor

The **Voices** label shows the actual polyphony value of the sequencer engine. In the current version, the maximum polyphony is 64 (default 32) voices. If more voices are needed, the most advanced voices will be sacrificed, which will -in most cases- not be audible, as percussive voices tend to decay over time. The CPU monitor shows the app's computational load. DPP features active CPU Load Control to limit its claim of computational resources. If the cpu-value turns green, the user setpoint for CPU load (see **Settings**) has been reached. On older iDevices such as iPad2/3 it is recommended to not increase the default maximum number of voices due to the limited computational resources of those devices.

2.9 Velocity

Each instrument can use a set of up to 16 samples. Typically, an instrument contains separate samples for high-velocity and for low-velocity, as softly played drums sound quite different from firmly played drums. The high and low samples are linearly interpolated depending on the stroke velocity. There can be up to 4 different samples for the low and for the high strokes. Moreover, instruments support both left-handed and right-handed strokes, which explains the total of 16 samples per instrument. How to select and tune the samples will be explained in the section about the Kit view. For choking strokes velocity has the meaning of choking force resulting in a sample decay time between 0.5 s for soft choking (velocity zero) and 0.1 s for firm choking (velocity one).

2.10 Random and linked strokes

Each stroke is given a probability of between 0 and 1 (default). A value of 1 means that the stroke will be played with Velocity A. A value of 0 means that the stroke will be played with Velocity B. Next to the velocity slider, a button allows to switch the slider velocity type from A to B and vice versa. Any probability between 0 and 1 will cause a random draw between the two possible velocities A and B. The closer the probability value is to one, the bigger the chance that the stroke will be played with velocity A. By default, velocity B is set to zero, such that the strokes will either be played (velocity A) or not (velocity B). This two-velocity feature per stroke opens up many opportunities to create interesting variations from a single pattern. As an example, think of a snare roll where both the velocity A and B level of all strokes are set to the same low value. Such pattern -when played- will result in a soft roll. Now, select the strokes where you would like to hear some snare accents every now and then and increase velocity B for those selected strokes. Depending on the value of the probability the roll will now be decorated with less (probability close to 1) or more (probability close to 0) snare accents. In the beginning, a simple strategy would be to program the body of the rhythm with probability 1 and to add decorating strokes with probability <1 .

Sometimes, the decorations or fills only make sense if they are either all played or all not played. Or -more general- if they need to be all played with velocity A or all played with velocity B. In that case, these strokes can be linked via the **Link** button. First select the strokes at hand and then **Link** them. The Link button is left-right scrollable to select one out of the ten linked sets. The linked strokes will turn orange to indicate the link. Up to 16 different linked sets can be created, named Link1 to Link16. Strokes can be selected and linked across multiple instruments. So, as long as the **Select** button is blue, there may be selected strokes for other instruments than the current one, and which are thus not shown in the current beat grid view! If you want to be sure that no strokes have been selected, first press **Select** twice (deselect and select). To indicate where the string of linked strokes actually starts, touch the objective first stroke while linked (=orange stroke). The selected first stroke in the linked set will turn yellow. The strokes preceding the yellow stroke will be played on the next instance of the pattern, unless there has been a change of pattern. The Pattern view will only show a linked set when it has been selected. Pressing the **Link** button again while it is active will unlink the set of strokes. Touching the orange **Link** button for a short amount of time will reveal the linked strokes in the currently selected linked set. If the **Link** button is pressed while the linked set is active, the linked set will be deleted, but only after asking for confirmation. Drum strokes can be member of multiple linked sets. Only one of those sets will be played if they are to be played at the same time, in which case a random

selection is made.

Each linked set can be assigned a period in bars and the position in the period where the linked set needs to be played or needs not to be played. A common use-case would be to play a drum fill every four bars at the fourth bar (*Every 4 At 4*). The bar counter for this feature is relative to the pattern that contains the link. So, in a song, the fourth bar would mean the fourth occurrence of the pattern at hand, even if there are occurrences of other patterns in between. Also, a linked set can be set in *Triggered* mode where its occurrence is triggered by an external midi command.

Longpress of the **A<->B** button will bring up a number of options at the location of what previously was the velocity slider. **A=B** assigns velocity B values of the existing drum strokes in the current instrument to velocity A of those strokes. **A=0** sets the velocity A values to zero. **A=1** sets the velocity A values to 1. **A=rand** sets the velocity A values to randomly chosen values. Similar function buttons are available for velocity B. Tapping **A<->B** again brings back the velocity slider.

2.11 Time shift

The timing slider allows each stroke to be shifted in time with +/- half of the sub-beat length. In this way, strokes can be placed at every possible time instance in the pattern. The only restriction is that the strokes have to stay within the bounds of the pattern, which means that a stroke on the first (sub)beat cannot be moved forward in time.

2.12 Humanize

A human drummer will inherently suffer from small variations in timing and velocity during play. DPP mimics this by imposing small random variations on timing and velocity via the **Humanize** button, which turns coloured on activation. In the current version, the maximum random variation in timing of the strokes is +/- 100 samples (2.3 ms). The maximum random variation in velocity is +/-15% on a velocity scale from 0 to 1. The Humanize option is saved in the pattern.

2.13 Two-handed

A human drummer only has two hands and two feet. DPP mimics this with its **Two-handed** option. When turned on, the drum engine will select at most two hand-played and two foot-played strokes out of the set of coinciding strokes. In the current version, DPP assumes separate strokes to be at least 100 ms apart.

Strokes that are closer together will be treated as if they take place at the same time instance. Linked strokes have priority over non-linked strokes and will be played as much as possible, counting from Link0 and up. The Two-handed option is saved in the pattern.

2.14 JAM!

The **JAM!** button turns the probability slider per drum stroke into a global probability slider for *all* probabilistic strokes, i.e. strokes with a probability <1. In the left position, all probabilistic strokes will be played with velocity B, whereas in the right position, all probabilistic strokes will be played with velocity A. A possible scenario would be to control the JAM! slider via a midi-controlled footswitch to intensify the probabilistic variations during a live performance. When JAM! is active, the probabilistic strokes themselves will not be shown; only the drum strokes with probability equal to 1 (velocity A) will be shown.

2.15 Smart Swing

The **Swing** function automatically determines which strokes will be played in a slightly delayed fashion to create swing in the rhythm. Swing can vary between 50% (no swing) up to 75% (music school swing). Depending on the style and tempo of the rhythm different swing percentages give a different feel. Even a very subtle swing percentage can already have a huge impact on how the rhythm is perceived. When the rhythm is programmed in 1/8 notes, swing will be applied to those. When the rhythm is programmed in 1/16 notes, swing will be applied to those. The swing function is *smart* in the following sense:

- In a 4/4 bar with a subdivision of 4 where only 1/8 notes are used, swing will be on the 1/8 notes.
- Deviating subdivisions in a beat such as triplets are excluded from swing.

2.16 Pattern selector

Select a pattern slot to program the pattern. Up to 64 different pattern slots are available. Patterns form the building blocks of a song, which can be composed in Song view via the **Song** button. Patterns can be cleared (**Clear** button), loaded (**Load** button), saved (**Save** button) and renamed and saved (**Save as** button). Patterns can also be copied and pasted/merged to and from other patterns (**Copy**, **Paste** and **Merge** buttons). When merging a pattern with a different time signature than that of the target pattern, the target pattern will be leading and the strokes of the merged pattern will be automatically remapped to the time signature of the target pattern. As an example, the **Merge** function could be especially useful for creating new patterns from a standard set of separate kick, snare and hi-hat patterns.

2.17 Export to other apps

DPP supports both Inter-App-Audio and Audiobus for sharing its output with other apps in real-time. In Audiobus, one of the 17 outputs can be selected in the audio input slot. The first output is the combined mix of all instruments. The remaining 16 outputs represent the individual instruments in the active drum kit. Presets can be saved, loaded and shared via the Audiobus state saving protocol. In IAA, DrumPerfect Pro shows up both as a Midi instrument and as an audio generator in the host program. When a connection with the host has been established, the **IAA** button with host logo will show up, which allows for fast switching to the IAA host (only if Audiobus is not active). If the host supports it, also the IAA transport bar will show, which will let you control the host (Rewind/Play/Record) . If the *All instruments* IAA-output is selected in the host, DPP will automatically inherit the tempo of the IAA host and run in perfect sync with it.

A typical use case would be to record the individual instruments of a DPP song into a DAW. First assign the individual outputs to the DAW's input tracks. Also, assign the combined output to one of the tracks. The latter is needed solely for the purpose of syncing and can be muted. The individual outputs can be either Audiobus or IAA. Then, the DPP song can be live-recorded into the DAW with separate instrument tracks and in perfect sync with the DAW.

3 Grid view

To facilitate easy setup of the basic part of a pattern the **Grid** button will bring up a grid view with all 16 instruments. The Grid view supports choosing between four levels of velocity and probability. Tapping one of the instrument names will return to Pattern view with the instrument selected. Also in Grid view, strokes can be selected after tapping **Select**. Tapping one of the instrument names when **Select** is active will select all strokes of the instrument. **Erase** will remove the selected strokes from the beat grid. In the **Settings** view, the grid can be set in **Dense** mode, which effectively doubles the amount of strokes that are shown on a single page. In the dense grid, time shifts are *not* shown anymore. Instruments can be muted/solo-ed by the **Mute** and **Solo** buttons, respectively. Furthermore, the Grid view features a **Play** and **Stop** button.

Drum strokes can be programmed via tapping or swiping over the grid. Vertical swiping of a programmed drum stroke will change the articulation of the stroke to be right-handed (down-up) or choked (up-down). Selected drum strokes can be copied and moved throughout the grid. First tap the **Copy** or **Move** button, then use the arrows to position the selected (copied) set of drum strokes. The set will wrap around the boundaries of the grid.



Figure 2: Grid view

Longpress **Select** will bring up the *PatKit* view for easy navigation between different patterns and kits. This view can be moved by dragging it around at its border. E.g. once a pattern is ready, tap **Copy** to copy the whole pattern, select a new target pattern in the *PatKit* view and tap **Paste** in order to make a new variation on the previous pattern. A second longpress **Select** will hide the *PatKit* view.

4 Kit view

Each instrument contains up to 16 user-loadable samples divided over 4 regions, i.e. high-velocity/left-handed, low-velocity/left-handed, high-velocity/right-handed and low-velocity/right-handed samples. When **Select** is off, active samples during play will turn green. Let's take a left-handed stroke as example. Assume that 4 high-velocity and 4 low-velocity samples have been loaded for this stroke. During play, the sequencer engine will randomly select one sample from both categories and mix them according to the stroke velocity. A sample can be selected by touching it in Kit view. The list of samples shows all wav-files that are in the /samples directory the iTunes file sharing directory. Optionally,

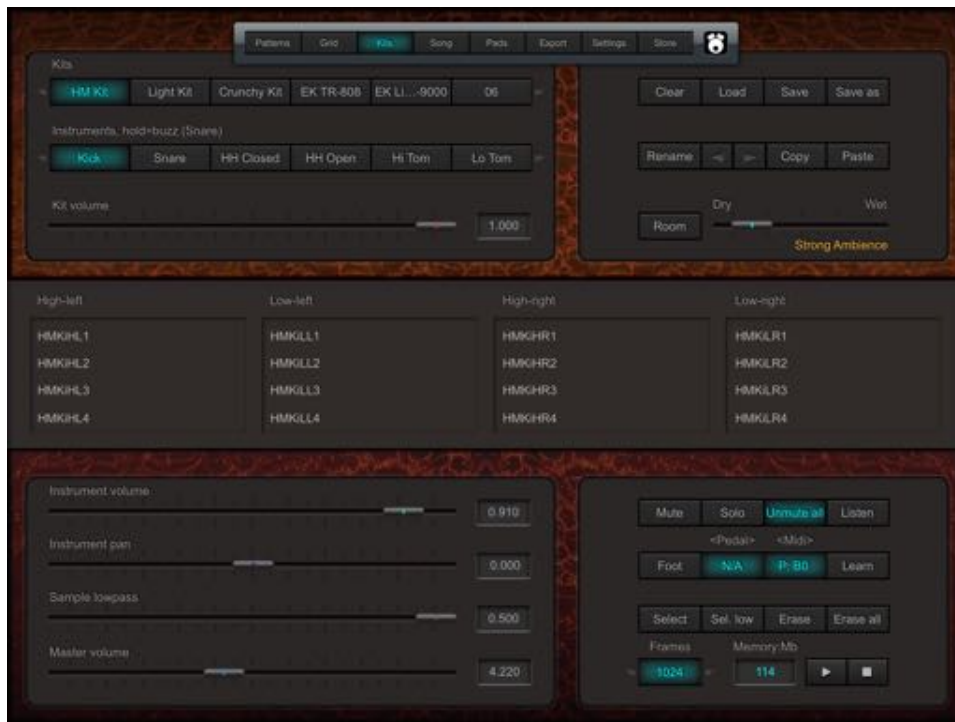


Figure 3: Kit view

the list will internal samples that are used in DPP's standard kits, which samples all come from the public domain. Samples are automatically auditioned on tapping. Also, samples can be imported via AudioPaste2 (AudioPaste button). For this option it is advised to install the free AudioCopy app by Reironyms, as this will drastically enhance the pasteboard capabilities. Samples can be 16-bit or 24-bit wav-files. To the right of the list of samples the selected sample slot is indicated. The < and > navigation buttons next to the slot name can be used to quickly fill a whole bank of samples: select a slot, touch a sample, select the next slot etc.

4.1 Kit selector

The Kit selector is also part of the Kit view. The amount of memory used is indicated on screen. DPP will issue a warning if the app uses too much memory. Drum kits can be cleared to free up memory (**Clear** button). After editing, the modified drum kit can either be saved (**Save** button) or renamed and saved (**Save as** button).

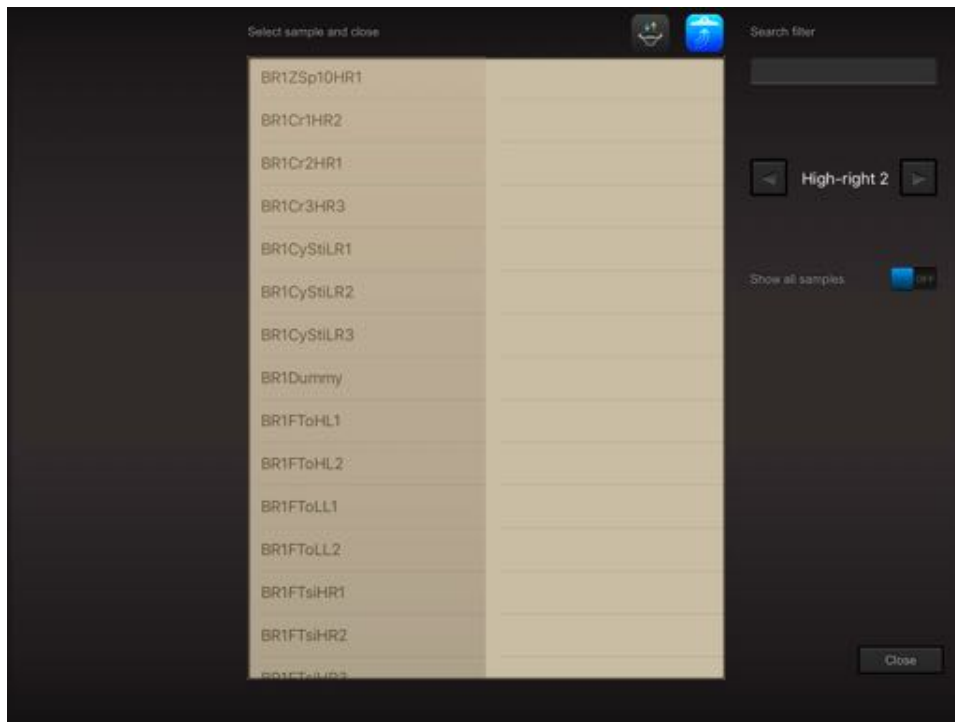


Figure 4: Sample list view

4.2 Instrument selector

Again, the Instrument selector allows to easily switch between instruments. The selected instrument shows its samples in each of the 4 categories. Instruments can be rearranged in the kit via the navigation buttons (< and >) next to the **Rename** button. Moreover, instruments can be copied and pasted to and from other kits. In this way, instruments can be easily reused in multiple kits.

Pressing an instrument for a short amount of time will put it in *snare buzz* (bleeding) mode, where each stroke of the instrument will also excite a bit the snare rattle of the snares. That is, the default buzz instrument is the snare (second instrument), but a longpress of the buzz instrument will let you define a new *buzz source*. Repeated longpress of an instrument will cycle along three levels of buzz-strength: weak, medium and heavy. In a typical scenario where the snare drum is the buzz instrument, the kick drum and toms will be set to cause the buzz.

4.3 Kit, instrument and master volume

The Kit volume slider sets the kit's volume between 0 (silent) and 1 (loudest). Next to this global volume setting, each instrument has its own volume setting

within the kit, again between 0 (silent) and 1 (loudest). Besides volume, each instrument has its own pan setting indicating the instrument's position in the stereo image (-1 means left, 1 means right). The master volume sets the overall app volume between 0 (silent) and 10 (loudest).

4.4 Convolution reverb

Each kit can be placed into a chosen room. An impulse response can be chosen from a list of different rooms (the *Room* button). The convolution of the drum kit sound with the room response will produce a high-quality reverberation effect (convolution reverb). Due to the fact that reverb processing is cpu-intensive, older iPad2 and iPad3 models will use shorter versions of the room response and in mono sound. iPad4 models will also process the reverb as a mono signal. More recent models apply the effect in stereo. Still, especially while using Audiobus and IAA, cpu usage can become too high, in which case DPP will issue a warning and will automatically turn off the reverb effect. In that case, the user can try to increase the allowed percentage of cpu usage (in the Settings view) or increase the audio buffer size (e.g. via buffer settings in Audiobus or host DAW). The mix of dry and wet signal can be controlled via the *Reverb* slider.

4.5 Hidden live-pad

Tapping the space besides the *Room* control, either left or right, brings up the live-pad, similar to the one in Pattern view. This way, instruments can easily be auditioned. Tapping the space again brings back the various kit/instrument buttons.

4.6 Mute and Solo

When an instrument is muted by touching the **Mute** button, it will not play on the upcoming strokes. Strokes that are being played will still continue. When an instrument is solo-ed by touching the **Solo** button, all other instruments will be muted on the upcoming strokes. **Unmute all** will let all instruments play again.

4.7 Hi-hat pedal simulation

Many electronic drum kits feature a controller pedal for hi-hat emulation. The pedal will not trigger a hi-hat open sample, but set a controller value somewhere between 0 (closed) and 127 (open). DPP offers a similar option, where two instruments can be linked via the **Pedal** controller. In Kit view, assign one instrument to "Closed" and one instrument to "Open" via the scrollable Pedal control. From now on, the velocity of strokes with the "Open" instrument will be interpreted as the pedal level (0 is closed, 1 is open). The "Closed" instrument

will account for the pedal level and take a pedal-dependent mix between the open en closed samples. Hi-hat instruments are of course an obvious choice for linking, but other use-cases could be interesting as well. As an example, the pedal controller could be used to simulate position-dependent strokes on a snare drum where two different instruments would contain snare samples from different sides of the drum head.

In existing patterns that were designed with a drum kit without pedal simulation you will typically notice the absence of an explicit pedal-close command, which *is* necessary in case of pedal simulation to close the pedal again.

4.8 Midi map

Each instrument in a kit can be mapped to a specific midi note according to the standard General Midi map. Multiple instruments can be mapped to the same midi note. Midi notes are used to map incoming midi notes to the right instrument and also to import and export standard midi files. Midi notes can be learned by first tapping the **Learn** button, which will turn red. Then, any incoming midi note within the GM map will be taken as note for the current instrument. By simply selecting a next instrument, the whole drum kit can be learned quickly. When ready, the learn button needs to be tapped again.

4.9 Filtering samples

Samples can be pre-filtered by a low-pass FIR filter with tuneable cut-off frequency. The cut-off frequency slider can be set between 0 (0 Hz) and 0.5 (half the sampling frequency). The filter can be used to mimic velocity-dependent strokes in case there are no separate samples available: soft strokes typically show less high-frequency content than loud ones. Pre-filtered samples are stored in the /cache directory and can be cleared via the *Settings* view. The filtering can be set per sample. Individual or multiple samples can be selected via the **Select** button. Select samples by touching them in the list. Selected samples will turn blue. Changes in the **Sample lowpass** slider will affect all selected samples. **Select low** will select all present low-velocity samples at once. **Erase** will erase the selected samples. **Erase all** will erase all samples in the selected instrument.

5 Pad view

Pad view offers 32 velocity-sensitive pads for live-playing and recording of patterns and songs. Velocity-sensitivity is achieved via the iPad's gyro sensor and works best if the iPad is suspended by a slightly flexible surface. The Pad view has a **Support** slider that represents the stiffness of the iPad's suspension. Also, there's a slider control for the **Sensitivity** of the pads. Slider to the left

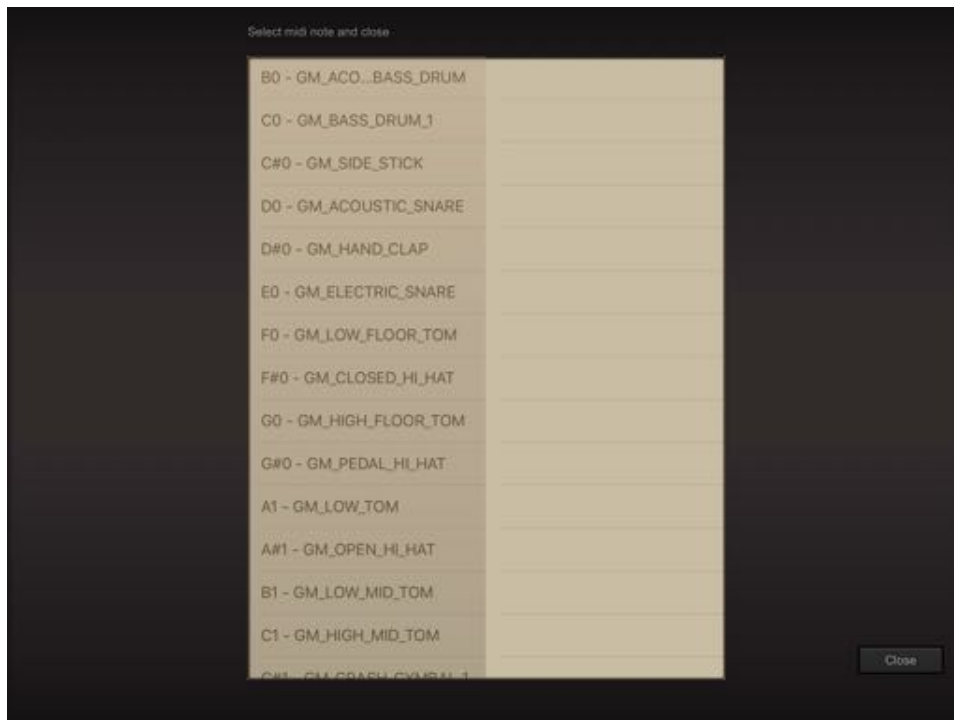


Figure 5: Midi note list

means that the pad's velocity is always equal to 0.5. The **PatKit** button brings up the PatKit view for fast navigation between patterns and kits. This view can be dragged around at its border. The **Pattern/Song button** switches between *Pattern* and *Song* mode. In Pattern mode, the **Clone** button will create a copy of the current pattern and place it in the subsequent pattern slot, which allows for easy and fast creation of variations of an existing pattern. The **Erase** button will show the active instruments in the current pattern (in Pattern mode) or the active instruments in the current song (in Song mode). Tapping an active instrument will erase all of its drum strokes.

For live recording a new song with the pads, start in Song view and tap **New**. Then go to Pad view, tap **Metronome**, **Record** button followed by **Play** button. Everything you play in the pads will be recorded according to the chosen time signature and subdivision of the pattern/song. For minimum latency, set the number of frames to the lowest possible value in Kit view.

Tapping the low-left corner of the screen an alternative pad layout will show up for users who like a more traditional drum kit in an inspiring atmosphere..



Figure 6: Pad view

6 Song view

Fig. 7 shows the **Song view**. A song is a set of ordered patterns that together form the rhythmic track of a piece of music. Extended kit and pattern selectors facilitate fast composition of songs. The building block of a song is the *song pattern*, which is a reference to a combined pattern/kit event.

6.1 Editing a song

To add a pattern to the song, first stop the audio engine (press **Stop**) and then select a position in the song by touching it. Next, select a kit and a pattern, both by touching them in the corresponding selector. By pressing either **<Insert** or **Insert>** a *song event* is inserted in the song, before or after the selected song position respectively. Existing song events can be erased, copied and pasted after having been selected by the **Select** button. Selected song events will turn blue. **<Paste** will paste copied song patterns before the current song pattern, **Paste>** will paste after the current one. Pasted song patterns will always be contiguous, even though the selected song events may have been scattered over the song.



Figure 7: Song view

6.2 Song pointer

Touching the song bar with song events during play will reset the song pointer to the touched position. **Rewind** will reset the song pointer to the start of the song. When **Midiclock** is active, DPP will listen to midi song pointer messages from midi hosts. Whenever a midi pointer message is received, the song pointer will be set accordingly. As an example, apps such as Auria and Cubasis can combine midi clock messages with song pointer messages, which facilitates the use of DPP as a midi slave. When DPP's *All Instruments* output is used as a node in an IAA host, and AudioBus is *not* active the IAA transport panel will appear that allows to start/stop/record the host synchronously with DPP at the song pointer position of the host. Also, DPP will automatically adopt the tempo of the host. The **Loop** button will put the song in loop mode. Long-press of this button will put the song in selected-loop mode in which the selected set of song patterns are played in a loop. The **Overwrite** option allows to overwrite the selected kit in a song pattern, which can be convenient in a scenario where the kit selection is to be controlled via an external controller via midi.

Tip for Cubasis users: as Cubasis will immediately send a midi start message

on Record and start sending midi clock after the count-in, insert an empty pattern in the DPP song with the length of the count-in.

6.3 Parts

Song patterns can be grouped into Parts to facilitate structuring of the song. For this purpose, select a set of contiguous song patterns and press the **Part** button. The newly created part can be named and will show in the song ribbon. Pressing the **Part** button again while Select is off will unfold parts in the song ribbon. The parts will still exist though. Pressing the **Part** button again while Select is on will *unpart* the song patterns in the selected parts. Parts can be copied/pasted just like song patterns. A special type of part is the *random* part, which can be created by a long-press of the **Part** button. Every time a random part is being played, one of the song patterns in the part will be randomly selected for playing. As an example, a random part of multiple fills could be created, such that every time a different fill would be played in the song.

6.4 Song import and recording

Tapping the **Load** button will bring up a list of available songs. The **Show midi files** switch includes the installed standard midi files in the list. Midi files can be installed in two ways: via iTunes file sharing and via Open-in from other apps. All midi channel 10 notes will be imported, the kit instrument midi map being applied. If the midi file contains notes that are currently not mapped in the drum kit, a message will show the unmapped notes. Remap the instruments in the drum kit if desired and reload the midi file. The midi file will be read as DPP patterns, which together constitute the song. Sometimes, a number of the imported patterns are identical. Use the **Pack** button to remove redundant patterns from the imported song. After the midi file has been imported, song and patterns need to be explicitly saved. Of course, the imported patterns can then be further edited to benefit from DPP's humanizing features!

The **New** button creates a new, empty song for the purpose of live recording via midi. Next, press the *record* button and configure one or more of the available midi-in ports to receive midi notes. Use one of the clock sync methods or use the metronome to keep time. Start recording by tapping **Play**.

6.5 Song tempo

The **Song tempo** slider sets the tempo of the song between 0.1 and 10 times the original tempo. BPM differences between the different patterns in song events will be maintained. **Reset** will reset the song tempo to the original tempo of 1.

7 Export view

A non-real-time option for sharing audio is available via the **Export** view. Audio can be rendered and exported to any app that supports *Open-in*, to Dropbox, AudioShare, Soundcloud, AudioCopy and DPP itself. Audio files exported to DPP as sample have a maximum duration of 20 s. Midi can be exported to *Open-in* apps, to Dropbox, AudioShare and DPP itself. As some midi sequencers need midi note-off messages matching the note-on messages, there's an option for this. You can chose between pattern and song rendering. In case of pattern rendering, the number of patterns can be set, which is especially useful in case of probabilistic strokes, as each realisation of the pattern will be slightly different. In case of song rendering, you can chose to include a tail to make sure that all decaying voices at the end of the song are included. Before rendering to Dropbox, make sure you have granted DPP access to Dropbox via the Settings view, which has to be done only once.

The **Separate tracks** option will let you save individual instrument tracks to

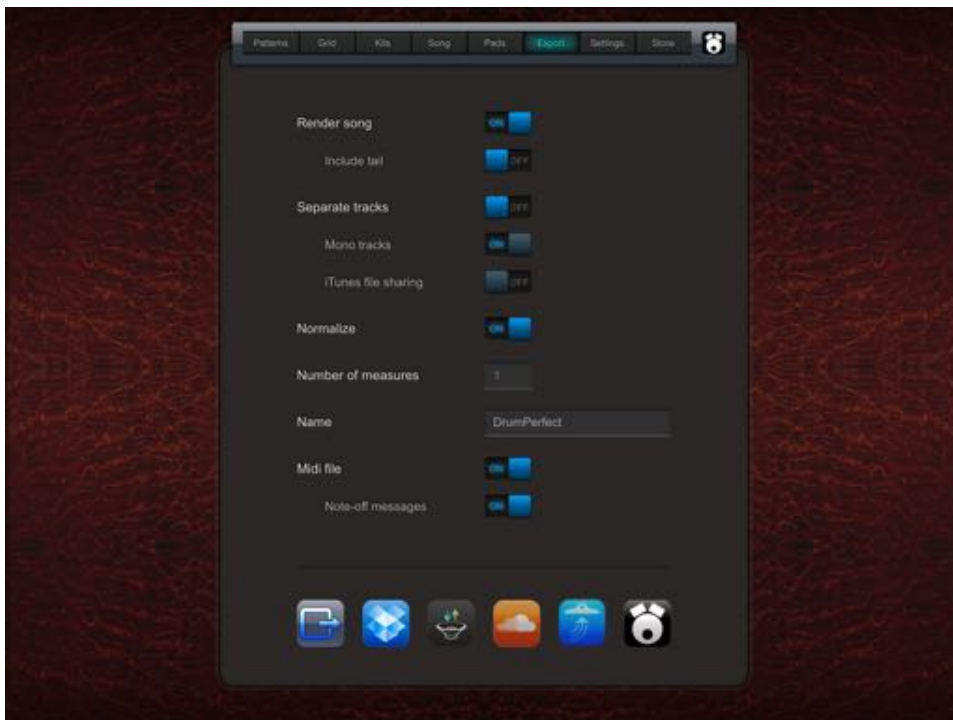


Figure 8: Export view

separate files. The track files get both an *instrument* and a *track* suffix to their name and are optionally stored in the */rendered* directory in the iTunes file sharing directory. At the same time, a combined mono or stereo track is created in

which each of the instrument tracks is separated by a one period 2205 Hz pure sine period as a visual marker. The latter is directly exported to one of Audio-Copy/SoundCloud/AudioShare. In case of export to Dropbox, separate track export will save an individual track file to Dropbox for each active instrument. The *Normalize* function will normalize the audio level during rendering, which will prevent the rendered track from clipping at the cost of some more computational effort.

8 Settings view

The **Settings** view allows to set a number of parameters:

- Maximum number of voices, which limits the amount of used voices during play. On iPad2/3 devices, values above 32 are not recommended. Higher values are likely to overload the CPU.
- Dual Live Pad mode, which splits the pad in two: one part for left-handed strokes and one part for right-handed strokes.
- CPU Load Control (CLC) power switch and maximum CPU level. The maximum CPU level serves as the setpoint for the CLC. During play, CLC will try to realise a cpu load that is lower than the specified maximum level.
- Background audio switch, which allows to switch off background audio in case the app goes into the background. While either Audiobus or Inter-App-Audio is active, background audio will automatically be on.
- Sample name edit on paste, which will allow to choose a different name for samples that are loaded via AudioPaste.
- Dense pattern grid, which doubles the amount of strokes on a single page.
- Flush, which will clear the sample cache. The /cache directory stores any pre-filtered samples that have been used as a result of the low-pass filter settings in Kit view. Pre-filtered samples will automatically be generated again once they are needed.
- Ableton Link configuration, which enables or disables sync on Link's shared beat timeline with other apps.
- Dropbox allow, which grants DPP permission to use the user's Dropbox account.
- Laidback level, which let the user choose a level for the laid-back function.

- Metronome option, which let the user configure a kit/instrument for both the first beat and the subsequent beats. Also, the metronome volume can be set.
- Midi sources, which show a list of available and/or previously used midi-in ports. Tap a port to activate it. If the port is on-line, it will turn green, otherwise it will turn red. To configure a port, touch it for a short amount of time. Now, the desired midi channels can be activated. Also, the

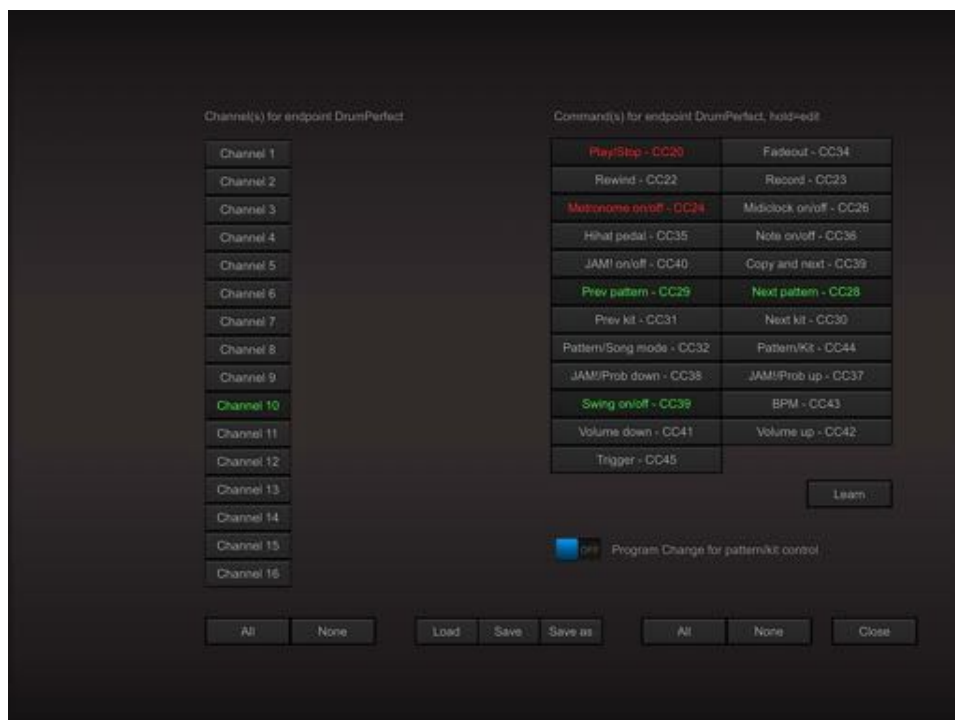


Figure 9: Midi map view

controller messages can be set that this port should listen to in order to control the commands in the list. Touch one of the commands for a short amount of time to map the command to a particular controller message. The controller message map can also be learned via the midi-in port: tap *Learn* and select the desired command. It will turn red. An incoming midi controller message will now be mapped to the selected command. If all commands have been configured, it is a good idea to save the port configuration to file via *Save* or *Save as* for later re-use, possibly for other ports. Patterns and kits are midi-assignable via midi Program Changes. Enable the switch and DPP will respond to PC00-63 for pattern selection and PC64-79 for kit selection.

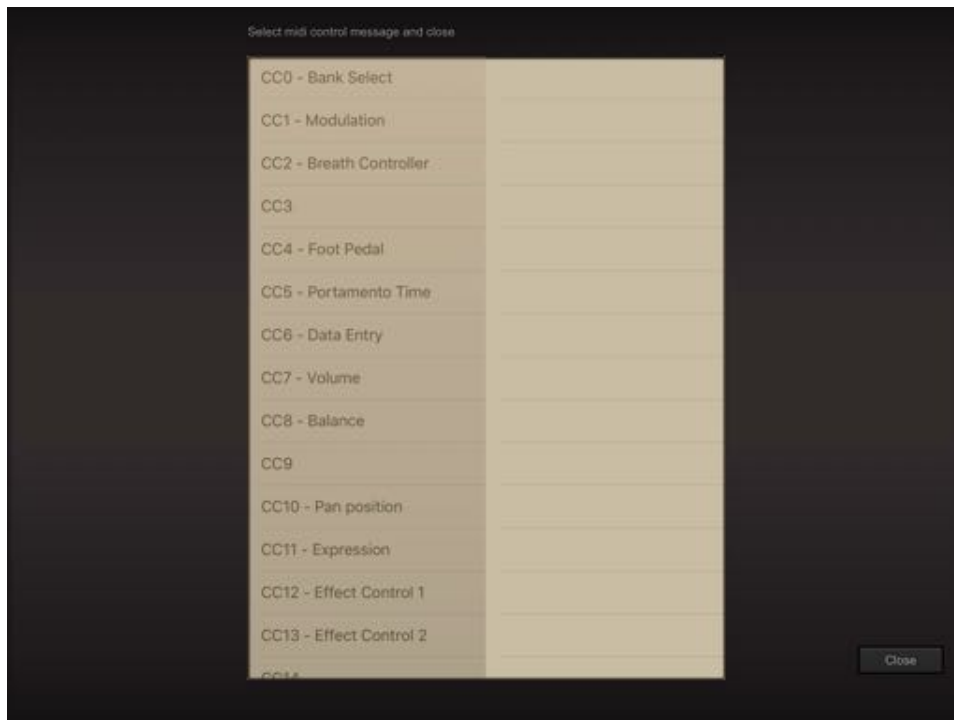


Figure 10: Midi controller message list

- Midi destination, named DrumPerfect, which represents the virtual midi endpoint for DPP. Tap to activate and it will turn green. Configure in the same way as the midi-in ports.

In virtual midi, there are two ways to create a midi connection between apps:

1. Connect the receiver app, in our case DPP, to the virtual midi source of the sender app. The sender app must be configured to send midi to its virtual midi source port. *Some iOS apps do advertise a virtual midi source, but do not actually send midi data to it.* The advantage of this type of connection is that there's only a single sender using it.
 2. Connect the sender app to the virtual destination endpoint of the receiver app, in our case DrumPerfect Pro. The virtual destination endpoint must be enabled. The sender app must be configured to send midi to DrumPerfect Pro. A possible disadvantage of this type of connection is that multiple sender apps may -even by default- send their midi data to DPP's virtual destination endpoint.
- Clock source, which let the user select the midi clock source of choice.

This control is scrollable and contains all core midi and virtual midi-in ports that are of have been on-line, as well as the virtual destination endpoint. There can only be one clock source at the time.

9 Store view

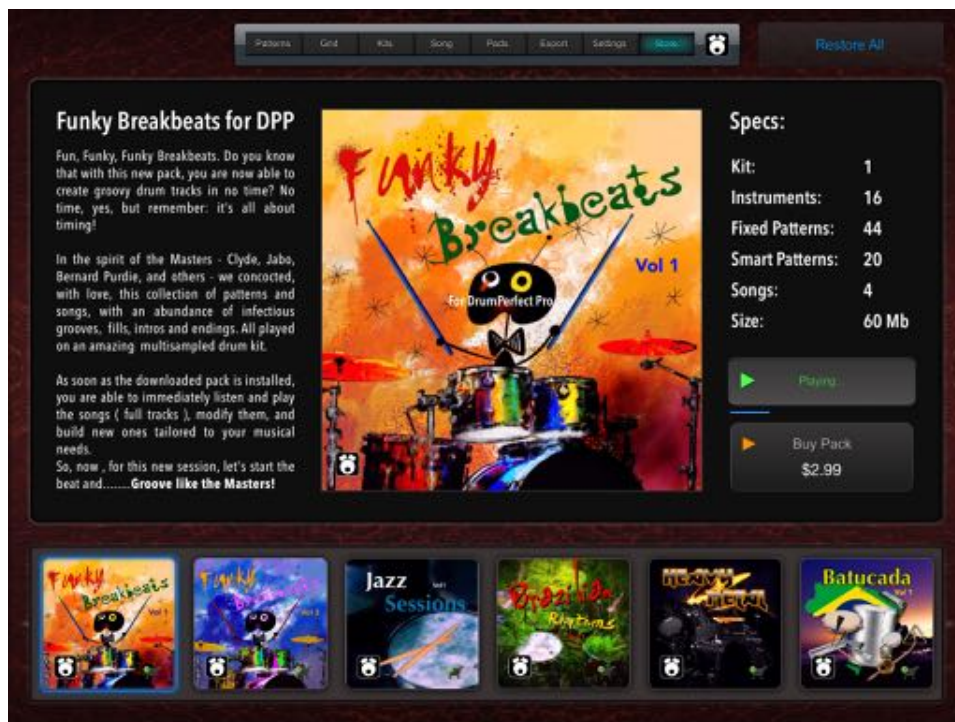


Figure 11: Store view

DPP offers professional grade In-App Purchases with patterns, songs and drum kits in various musical styles. At the time of writing the following packs are available:

- Funky Breakbeats Vol. 1
- Funky Breakbeats Vol. 2
- Jazz Sessions Vol. 1
- Brazilian Rhythms Vol. 1
- Heavy Metal
- Batucada Vol. 1

The packs are hand-crafted by musician/designer Gilbert Medam and are characterised by their high level of authenticity and musicality. The patterns and songs in the packs form a perfect starting point for further exploration and creation of music in the respective styles. Each pack has a demo track that puts the pack's content in a musical context. Each pack contains a high-quality multi-sampled kit that matches the style of the pack.

10 Cpu Load Control

The real-time audio engine of DPP has been completely programmed in C for maximum performance. Still, dealing with all audio in real-time on the current iPad hardware is a real challenge. To reduce its cpu resource claim, DPP implements CPU Load Control (CLC), which exploits the fact that humans cannot perceive weak sounds in the presence of louder ones and the fact that percussive sounds are mostly transient impulses that decay. It works as follows: the user sets a desired cpu load level (See **Settings** in Pattern view) and CLC automatically reduces the number of voices by smartly removing the weaker sounds. In many cases, humans will not be able to tell the difference between the CLC-on and CLC-off case. CLC will enable more apps to be used in parallel with DPP.

11 iTunes file sharing

The app uses a number of directories to store its data:

- */cache* - stores low-pass filtered sample files.
- */kits* - stores kit preset files in XML-format.
- */pasted* - stores pasted sample files.
- */patterns* - stores pattern preset files in XML-format.
- */rendered* - stores rendered files from export function.
- */samples* - stores user sample files.
- */songs* - stores song preset files in XML-format.
- */state* - stores app state data for internal use.
- */themes* - stores app theme data for internal use.
- */undo* - stores undo data for internal use.
- */irs* - stores impulse response data for reverb effect.

In the various list views for loading songs, kits and samples, files can be removed by the usual *swipe-left* gesture, followed by *delete*. In the pattern list view, multiple patterns can be selected and deleted via the **Erase** button.

Kit, pattern, song and sample files that are copied to the iTunes file sharing

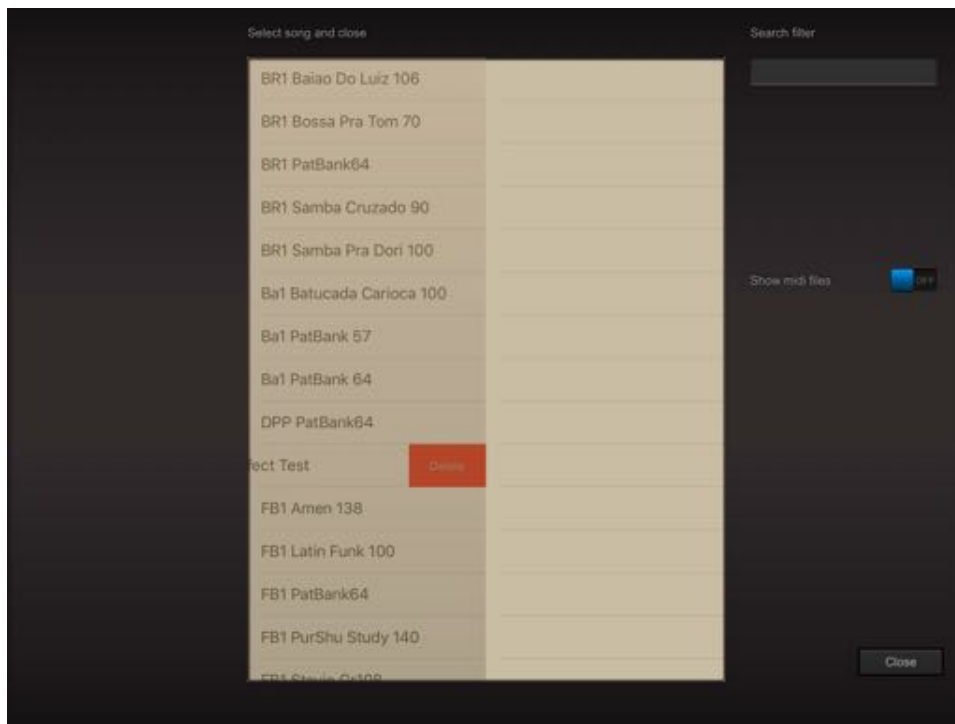


Figure 12: Left-swipe and delete

directory root will be automatically installed in the proper directories on restart of the app. These files are also accepted if packed in zip-format. The above directories can be saved to your local computer via iTunes file sharing. It is highly recommended to make regular backups of these directories to avoid data loss in case of calamities. In order to make a backup, first select your iDevice in iTunes, then select the **Apps** tab, and select **DrumPerfect Pro** in the File sharing apps list. Then the *DrumPerfect Pro Documents* directory list will show, from which directories can be selected and copied to the local computer via **Save as**. Especially, the *kits*, *patterns*, *songs* and *samples* directories are of interest, as they contain your sound and music files.

12 Troubleshooting

In case the app crashes or locks, shutdown the app by double clicking the home button and swipe it away. Then, restart the app. If the problem persists, please try to remove the file *startup.dat* and the *state* directory via iTunes file sharing. Then restart the app. As a last resort, delete and reinstall the app, but not before having created a back-up of the app's File sharing directory.

In case of issues chances are that the same problem has been discussed already at the forum at drumperfect.nl. If not, please prepare an accurate description of the problem and the sequence of actions that leads to it and send it by email to Marinus@drumperfect.nl.

13 Midi implementation chart

See the subsequent pages for DPP's Midi implementation chart.

MIDI Implementation Chart v. 2.0 (Page 1 of 3)				
Manufacturer:	Model:	Version:	Date:	
		Transmit/Export	Recognize/Import	Remarks
<i>1. Basic Information</i>				
MIDI channels			1-16	
Note numbers			35-93	
Program change			Yes	Pattern select (1-64), Kit select (65-80)
Bank Select response? (Yes/No)			No	
If yes, list banks utilized in remarks column				
Modes supported : Mode 1: Omni-On, Poly (Yes/No) Mode 2: Omni-On, Mono (Yes/No) Mode 3: Omni-Off, Poly (Yes/No) Mode 4: Omni-Off, Mono (Yes/No) Multi Mode (Yes/No)			Mode 1	
Note-On Velocity (Yes/No)			Yes	
Note-Off Velocity (Yes/No)			Yes	Note-off means "choke"
Channel Aftertouch (Yes/No)			No	
Poly (Key) Aftertouch (Yes/No)			No	
Pitch Bend (Yes/No)			No	
Active Sensing (Yes/No)			No	
System Reset (Yes/No)			No	
Tune Request (Yes/No)			No	
Universal System Exclusive: Sample Dump Standard (Yes/No)			No	
Device Inquiry (Yes/No)				
File Dump (Yes/No)				
MIDI Tuning (Yes/No)				
Master Volume (Yes/No)				
Master Balance (Yes/No)				
Notation Information (Yes/No)				
Turn GM1 System On (Yes/No)				
Turn GM2 System On (Yes/No)				
Turn GM System Off (Yes/No)				
DLS-1 (Yes/No)				
File Reference (Yes/No)				
Controller Destination (Yes/No)				
Key-based Instrument Ctrl (Yes/No)				
Master Fine/Coarse Tune (Yes/No)				
Other Universal System Exclusive				
Manufacturer or Non-Commercial System Exclusive			No	
NRPNs (Yes/No)			No	
RPN 00 (Pitch Bend Sensitivity) (Yes/No)			No	
RPN 01 (Channel Fine Tune) (Yes/No)				
RPN 02 (Channel Coarse Tune) (Yes/No)				
RPN 03 (Tuning Program Select) (Yes/No)				
RPN 04 (Tuning Bank Select) (Yes/No)				
RPN 05 (Modulation Depth Range) (Yes/No)				
<i>2. MIDI Timing and Synchronization</i>				
MIDI Clock (Yes/No)			Yes	Receive only
Song Position Pointer (Yes/No)			Yes	
Song Select (Yes/No)			No	
Start (Yes/No)			Yes	
Continue (Yes/No)			Yes	
Stop (Yes/No)			Yes	
MIDI Time Code (Yes/No)			No	
MIDI Machine Control (Yes/No)			No	
MIDI Show Control (Yes/No)				
If yes, MSC Level supported			No	
<i>3. Extensions Compatibility</i>				
General MIDI compatible? (Level(s)/No)			Level 1	
Is GM default power-up mode? (Level/No)				
DLS compatible? (Levels(s)/No)			No	
(DLS File Type(s)/No)				
Standard MIDI Files (Type(s)/No)			Yes, format 0/1	Import: selectable channel
XMF Files (Type(s)/No)			No	
SP-MIDI compatible? (Yes/No)			No	

MIDI Implementation Chart v 2.0 Control Number Information (Page 2 of 3)				
Manufacturer:		Model:		Version: Date:
Control #	Function	Transmitted (Y/N)	Recognized (Y/N)	Remarks
0	Bank Select (MSB)			The following commands can be
1	Modulation Wheel (MSB)			assigned to any control message
2	Breath Controller (MSB)			via midi learn:
3				Play/Stop
4	Foot Controller (MSB)			Fadeout
5	Portamento Time (MSB)			Rewind
6	Data Entry (MSB)			Record
7	Channel Volume (MSB)			Metronome on/off
8	Balance (MSB)			Midiclock on/off
9				Hihat pedal
10	Pan (MSB)			Note on/off
11	Expression (MSB)			JAM! on/off
12	Effect Control 1 (MSB)			Copy-and-next
13	Effect Control 2 (MSB)			Previous pattern
14				Next pattern
15				Previous kit
16	General Purpose Controller 1 (MSB)			Next kit
17	General Purpose Controller 2 (MSB)			Pattern/Song mode
18	General Purpose Controller 3 (MSB)			Pattern/Kit
19	General Purpose Controller 4 (MSB)			JAM!/Prob down
20				JAM!/Prob up
21				Swing on/off
22				BPM
23				Volume down
24				Volume up
25				Trigger
26				
27				
28				
29				
30				
31				
32	Bank Select (LSB)			
33	Modulation Wheel (LSB)			
34	Breath Controller (LSB)			
35				
36	Foot Controller (LSB)			
37	Portamento Time (LSB)			
38	Data Entry (LSB)			
39	Channel Volume (LSB)			
40	Balance (LSB)			
41				
42	Pan (LSB)			
43	Expression (LSB)			
44	Effect Control 1 (LSB)			
45	Effect Control 2 (LSB)			
46				
47				
48	General Purpose Controller 1 (LSB)			
49	General Purpose Controller 2 (LSB)			
50	General Purpose Controller 3 (LSB)			
51	General Purpose Controller 4 (LSB)			
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				

MIDI Implementation Chart v 2.0 Control Number Information (Page 3 of 3)					
Manufacturer:		Model:		Version:	Date:
Control #	Function	Transmitted (Y/N)	Recognized (Y/N)	Remarks	
64	Sustain Pedal				
65	Portamento On/Off				
66	Sostenuto				
67	Soft Pedal				
68	Legato Footswitch				
69	Hold 2				
70	Sound Controller 1 (default: Sound Variation)				
71	Sound Controller 2 (default: Timbre / Harmonic Quality)				
72	Sound Controller 3 (default: Release Time)				
73	Sound Controller 4 (default: Attack Time)				
74	Sound Controller 5 (default: Brightness)				
75	Sound Controller 6 (GM2 default: Decay Time)				
76	Sound Controller 7 (GM2 default: Vibrato Rate)				
77	Sound Controller 8 (GM2 default: Vibrato Depth)				
78	Sound Controller 9 (GM2 default: Vibrato Delay)				
79	Sound Controller 10 (GM2 default: Undefined)				
80	General Purpose Controller 5				
81	General Purpose Controller 6				
82	General Purpose Controller 7				
83	General Purpose Controller 8				
84	Portamento Control				
85					
86					
87					
88					
89					
90					
91	Effects 1 Depth (default: Reverb Send)				
92	Effects 2 Depth (default: Tremolo Depth)				
93	Effects 3 Depth (default: Chorus Send)				
94	Effects 4 Depth (default: Celeste [Detune] Depth)				
95	Effects 5 Depth (default: Phaser Depth)				
96	Data Increment				
97	Data Decrement				
98	Non-Registered Parameter Number (LSB)				
99	Non-Registered Parameter Number(MSB)				
100	Registered Parameter Number (LSB)				
101	Registered Parameter Number(MSB)				
102					
103					
104					
105					
106					
107					
108					
109					
110					
111					
112					
113					
114					
115					
116					
117					
118					
119					
120	All Sound Off				
121	Reset All Controllers				
122	Local Control On/Off				
123	All Notes Off				
124	Omni Mode Off				
125	Omni Mode On				
126	Poly Mode Off				
127	Poly Mode On				