



BeatPad 1.1

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www.miniMusic.com

Visit our website for further help, frequently asked questions, and other resources for making music on your handheld computer. Also feel free to e-mail your questions or comments to us at support@minimusic.com

INSTALLING SOFTWARE

IMPORTANT NOTES BEFORE INSTALLATION

- Before installing BeatPad on your Handheld, please read the license found at the end of this manual.

INSTALLING THE SOFTWARE SIGNIFIES YOUR ACCEPTANCE OF THIS LICENSE.

- The BeatPad application can be installed on any handheld computer that uses the Palm Operating System (version 3.0 or higher).
- BeatPad should be installed directly into your handheld's RAM (not onto a removable memory card).

INSTALLING SOFTWARE ON YOUR HANDHELD

Consult the portion of the manual that came with your Handheld computer entitled "Installing add-on applications". This will show you how to get the application onto your Handheld using a Macintosh or Windows computer.

INSTALLING BEATPAD

If you have an earlier version of BeatPad already installed, the new application file (beatpad.prc) will automatically replace it and be filed in the same application category of the Palm Launcher. All of your patterns written with the older version will be imported into a new bank. The new BeatPad 1.1 Demo (beatdemo.prc) can happily co-exist on your Handheld along with the full BeatPad application. This way you can beam a copy of the demo to your friends or any Palm users you run into!

The sample BeatPad database (beatpad.pdb) contains sample patterns in the A and B banks (any pattern that begins with either of those letters). The other patterns remain in their default positions for you to manipulate. If you do not install the sample database, BeatPad will create one with all patterns set to the default positions (no drums, pitches centered, octaves centered, etc.)

SONY CLIE USERS

If your Sony Clie has a "High Res Support" feature, please turn it off for BeatPad. You will find this option by running the Prefs application that came pre-installed on your Clie. Choose "High Res Support" from the pop-up menu in the top right corner of the Prefs screen and find BeatPad in the list of applications.

MINIMUSIC BEAT PAD

WHAT IS BEAT PAD?

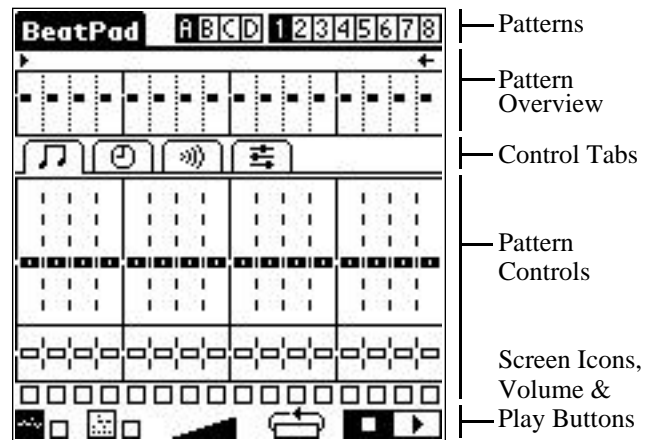
BeatPad is a pattern-based sequencer. This means you can work on repeating patterns of notes and drums and make changes while the patterns play! BeatPad gives you interactive and graphical control over every aspect of the pattern including pitch, duration, and volume of each note as well as the length and tempo of the pattern. It is a powerful performance tool allowing you to change patterns without missing a beat. You can use our built-in software synthesizer to play your patterns, or some handhelds can be connected to electronic music instruments or MIDI hardware.

There are three “Screens” in the BeatPad application. The first you will see is the Library Screen. This simply lists all of your pattern banks, which can be stored in separate categories. Tap on the name of a bank to open it or tap the “New” button to create an empty bank. For each bank there is a Melodic Screen and a Drum Screen. You can switch back and forth by tapping the Screen Icons in the bottom left corner of the screen. Next to each Screen Icon there is also a small mute box. Tapping in this box will mute that portion of the pattern. To return to the Library Screen, choose “Close Bank” from the Options menu (playback must be stopped to open the menu).

MELODIC VIEW

Across the top of the screen, to the right, are the 4 letters and 8 numbers representing the 32 patterns you can work with: A1, A2, A3, A4,... B1, B2, etc. This is where you can change and recall the patterns you have created. See “Working with Patterns” (page 8) for more details.

Beneath this is the **Pattern Overview**. In the Overview you can see every aspect of the current pattern. As we go through the following screens, you can watch how the Overview mirrors the controls below. Tapping in the Overview will not do anything, but the display will be updated whenever the pattern is modified.



In each pattern there are up to 16 **steps** running across the screen. Each step has its own column, starting in the overview and continuing down to the mute boxes near the bottom of the display. Dotted lines separate the steps, and solid lines separate the four beats. The overview has a small dash for each note played. Its position represents the pitch (higher on the screen means a higher pitch), its length represents the duration, and its thickness represents its volume or “velocity”. Very short notes may show up as a single pixel while a note that is tied (longer than one step) will be a very long line which may cross over several steps. If a step has been muted, there will be no line shown in the overview.

At the bottom of the overview, small arrows will indicate if a note is being played in a higher or lower octave. A pattern can cover a range of 5 octaves (see the section on Pitch Controls on page 5 for more about the octaves).

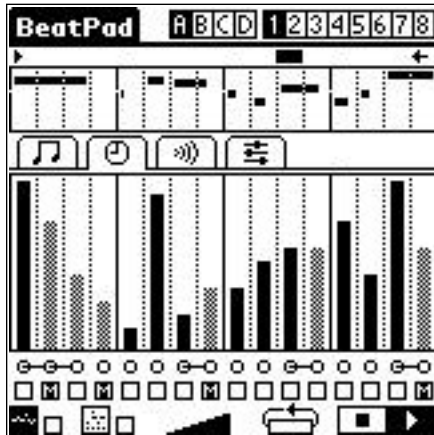
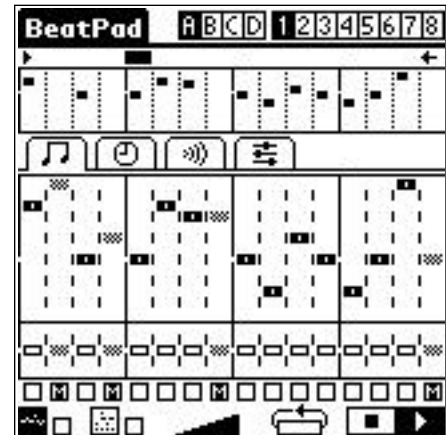
Beneath the overview are four tabs. Each tab contains different controls, and you can switch between them at any time by simply tapping on the tab. All of BeatPad’s controls can be changed while it is playing (except the menu items) so **tapping play right now** (the button with the triangle in it in the lower right corner) is a great way to hear what each control does as you read the rest of the instructions. If a step is not being played (muted, or tied to a previous step, for example) the pitch, duration and volume controls will be grayed out.

Regardless of what tab is selected, there is a row of small boxes beneath the control area which act as a mutes for each step. Tap on one of these to mute, or silence, that step of the pattern.

PITCH CONTROLS

The first tab on the left is the 'pitch' tab. Here you can set the pitch and octave of each step. You can move the controls over a range of 13 half-steps (the smallest unit of pitch in traditional western music). Simply tap where you want the control to move, or tap on it and drag it to a new position. You can also drag the pen across the screen to position all of the controls with a single stroke. As the pen crosses each step the control will jump to the pen's position.

Below the pitch controls are the octave controls (open rectangles). These have a center position and can be moved up to raise a step one or two octaves or down to lower a step one or two octaves. Raising an octave will make the step sound much higher, the equivalent of 12 half-steps. Try changing the octaves of a few steps to see how it sounds.



DURATION CONTROLS

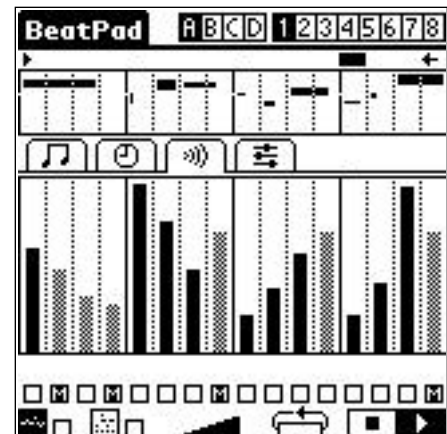
Tap on the second tab to see the duration controls, controlling how much time the note is played. Each step can be played very abruptly, or for the full length of the step. This bar-graph shows the length of each step. Like the pitches, you can tap where you want a duration to be set or you can drag the pen to quickly adjust all sixteen durations. The shorter the bar, the shorter the note is played.

Below the duration bars is a row of circles. Tap on a circle to "tie" that step to the next. Even though BeatPad moves on to the next step, the first note will continue to play. Any number of steps can be tied together to create long held notes. You can turn ties on or off by dragging the pen across the circles. When steps are tied together, only the controls for the first step are used, the controls of the following tied steps are grayed

out.

VOLUME CONTROLS (VELOCITY)

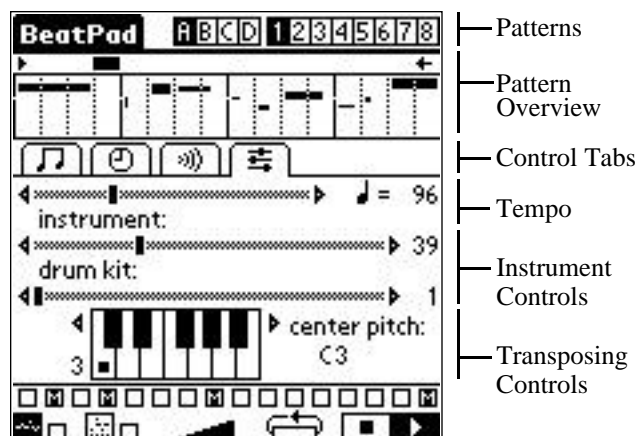
The third tab, the Volume Controls, work much like the duration controls except that now you are changing the volume or "velocity", of each note. The term "velocity" is used because for some instruments a note that is struck harder (with a higher velocity) may have a different sound quality rather than simply being louder. For example a real piano has a harsher sound when the keys are hit hard and quickly than when the keys are played gently. On some handhelds BeatPad can be used to control a wide range of MIDI hardware (see page 10), and some may reflect this concept of velocity rather than simply volume.



BANK CONTROLS

Tap on the forth tab to see the Bank Controls. These settings apply to the entire bank of 32 patterns. You can set the tempo, the instrument sound used for both the melodic and drum parts, and the center pitch.

The first slider sets the tempo. This can be in the range from 40 to 240 beats per minute (BPM). A beat is defined as four steps of a pattern. As you move this slider the number of beats per minute is displayed to the right, and playback responds to the change immediately. The arrows on either end can move a single BPM at a time. Tap on the number itself to toggle into slow tempos ranging from 4 to 24 BPM.



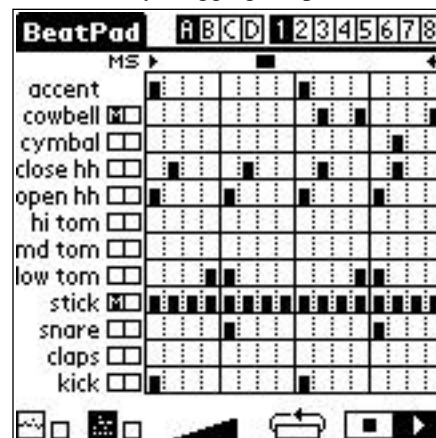
Below the tempo are sliders for the Melodic and Drum instruments (MIDI Programs). These determine what instrument timbre will be used to play your patterns: pianos, guitars, violins, oboes, trumpets or others. The instrument settings are ignored if you are using “Basic Sound” playback (see the “Preferences Screen” on page 8). The Krikit Synth and Sound Card playback modes only have a single drum kit available, so that slider will have no effect unless you assign the drum pattern to another MIDI channel (other than channel 10).

Below the sliders is a small keyboard where you can select the “center pitch”. Any pattern being played will be transposed to this center pitch, new pattern banks have all steps set to this center pitch. The small arrows on either side let you move up and down octaves (the octave number appears to the lower left) giving you a ten octave range (from -2 to 7). Setting very low or high center pitches may put notes of some patterns out of the playable range; such notes will be transposed by octaves until they are inside the range (the pitch will be the same).

THE DRUM VIEW

Tap on either icon in the lower left corner of the screen to switch over to the drum part of the pattern. The drum part will not be played when in “Basic Sound” playback mode. To make a particular drum play at a particular step in the pattern, simply tap in the appropriate square. You can also “paint” drum notes on or off by dragging the pen around the screen. This makes it easy to turn on every step of one drum or to play multiple instruments on a single beat. To give you even more control of which drums are played, there are columns of mute and solo boxes running down between the drum labels and the drum grid (they are labeled with a small “m” and “s” at the top of the screen). Tapping on a mute will silence that instrument for the entire length of the pattern. Turning on a solo will mute all other instruments in the pattern. Multiple solos and mutes can be used together.

Most handheld speakers are very small, low powered, and have very little bass. You may hear very little from bass instruments like the kick drum or low tom unless you use headphones or amplified speakers.



ACCENTS

The top row on the Drum View, labeled “accent”, lets you set BeatPad to play certain beats of the pattern harder/louder than others. Tapping a box in this row will make the velocity higher for every drum instrument in that step. Accents will not effect the melodic part, only the drums.



CHANGING DRUM INSTRUMENTS

The MIDI protocol dictates that all notes sent on MIDI channel 10 are interpreted as drums. Every pitch sent on that channel will sound like a different drum instrument. Percussion instruments are defined under General MIDI for pitch values ranging from 35 through 81, but many devices will include additional drum sounds in the full range from 0 through 127. BeatPad has assigned eleven common sounds by default, but you can change the pitch value being sent for any track letting you use different sounds, OR you can set the drum pattern to play on some other MIDI channel (See “Preferences Screen” on page 8) and use the drum tracks as a second melodic pattern of eleven pitches.

To change the pitch value being sent by a drum track, BeatPad must be stopped. Tap on the name of any drum track and a window will open showing the current pitch, the name of the track you tapped on, and a slider with which you can set a different pitch. Use the “Test” button to hear what each instrument sounds like before accepting the change and tapping “OK”.

LOOP POINTER

The end of a pattern is marked by the **Loop Pointer**. This small arrow is located just above the accent row on the drum screen or above the overview on the melodic screen, usually on the right side of the screen. Tapping anywhere in that row will move the Loop Pointer. This marks the end of the pattern causing BeatPad to loop back to the beginning of the current pattern or move on to the next pattern, skipping any notes to the right of that step.

START POINTER

The Start Pointer is a small triangle located on the left side of the same row as the Loop Pointer. It always resides above the first step of the pattern. If you want to change which step is first, simply drag the Start Pointer onto another step. The next time the pattern loops, everything will shift over so that the step you chose now appears at the far left. Moving the Start Pointer does not change the pattern, only where the steps are drawn on the screen.

MASTER VOLUME

Although each step has its own volume, you may want to control them all together with the master volume (located to the right of the screen icons found along the bottom of the screen). When playing with our Kriket Synth (the default on most modern handhelds) the master volume will be automatically lowered to prevent any audio clipping (broken distorted sounds) that could occur when many simultaneous sounds are played together at a high volume. You can turn this feature off in the Kriket Settings screen.

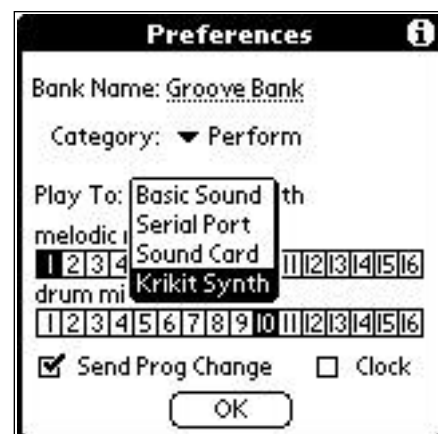
CHAINING PATTERNS

One pattern contains 16 steps, but you can link them together into groups of 2, 4, or 8 to make pattern chains up to 128 steps long. Tap on the Chain Icon (to the left of the stop button, right of the master volume) to toggle between chain modes. Consecutive patterns will be chained together (for example, when set to chain 4 patterns, A1 through A4 will be played as a group; A5 through A8 can be played as a separate group).

PREFERENCES SCREEN

A new bank will be given a default name. Please enter a unique name for the bank here so you can identify it in the Library Screen. You can also assign it to a particular category to better organize all of your pattern banks in the Library Screen.

The “Play To:” pop-up menu lets you choose how BeatPad produces sound. “Krikrit Synth” is the default on most handhelds and uses our built-in software synthesizer to produce rich polyphonic sound. We’ve included a sample sound bank, or you can use our SoundPad application to design your own sounds. See the “Krikrit Audio Engine” section on page 9 for details.



“Basic Sound” is available on all handhelds but cannot produce the drum sounds or different instrument timbres. Select “Serial Port” to have BeatPad control electronic music hardware connected to the HotSync port on some handhelds; this includes clip-on MIDI tone modules like the SG20 or the Tsunami and external hardware like keyboards, samplers, and synthesizers (see “MIDI” on page 10). Select “Sound Card” to use the enhanced sound built into some handhelds (Tapwave Zodiac or Sony T, TG, NR, NX or NZ Clies) or the Beat Plus Springboard module.

Below the pop-up menu you can set what MIDI channel the melodic part and drum part should be played on. Channel 10 is the standard for non-pitched percussion but you could set drums to another channel to use some other instrument (in which case the instrument names in the Drum Screen will not apply). If both patterns are set to the same channel, they will be played by the same instrument. These channels apply only to the current pattern bank.

The check boxes only apply when “Play To: Serial Port” is selected. Check “Send Prog Change” to make BeatPad send MIDI program changes when it starts playing; otherwise, program changes will only be sent when the MIDI Program sliders are moved in the Master Controls. When “Clock” is checked BeatPad will command any attached MIDI sequencers to start playing when BeatPad does and follow BeatPad’s tempo. The MIDI hardware may need to be set to act as a “slave” for this to work.

WORKING WITH PATTERNS

The letter and number boxes along the top of the screen will let you quickly change between patterns and copy patterns. Every saved pattern (there are 32 to choose from on each bank) has a letter (A-D) and a number (1-8). The current pattern (the one that is being shown in the melodic and drum views) is indicated by the inverted (“dark”) letter and number. Patterns are saved as you work on them, so simply tap on one of the un-inverted letters or numbers to switch to that pattern. When BeatPad is stopped, a new pattern will appear immediately. If BeatPad is playing, it will wait until the end of the current pattern (until it reaches the Loop Pointer) before switching into the new one.

You can also use these pattern indicators to copy patterns. To do this, put the pen down on a selected box (either the letter or number of the current pattern) and without lifting the pen drag it to another letter or number. The “destination” will also be inverted while the pen is down. As soon as you lift the pen, the pattern is copied and the new pattern is open. You can now make alterations to the copy without affecting the original.

KRIKITAUDIOENGINE

Palm OS 5.0 (“Garnet”) or later is needed to use the Krikit Audio Engine (or “Krikit Synth”). Some handhelds have OS 5 but are missing needed sound libraries (e.g. the Zire 21). If your OS 5 handheld has a headphone jack it should support the Krikit Synth.

The Krikit Audio Engine is a polyphonic, multi-timbral software synthesizer. That means it can play many different pitches simultaneously and use different instrument sounds. The Krikit Synth uses banks of instrument sounds designed with the miniMusic SoundPad application. Each bank can contain up to 256 different instruments.

When using the Krikit Synth, BeatPad’s melodic and drum parts can be assigned to different instruments under the Bank Tab (see “Bank Controls” on page 5). To the right of the instrument number you will see how many oscillators are needed to play that instrument sound (a number from 1-4). The Krikit Synth has a limited number of oscillators available; if they are all being used, a new note will cause an older note to stop.

At the top of the Krikit Settings screen (choose “Krikit Settings” from the Options menu) you can set how many oscillators are available. You can have up to 32 oscillators, but this requires extra processing power. Handhelds with slower CPUs will have to be set at a lower number.

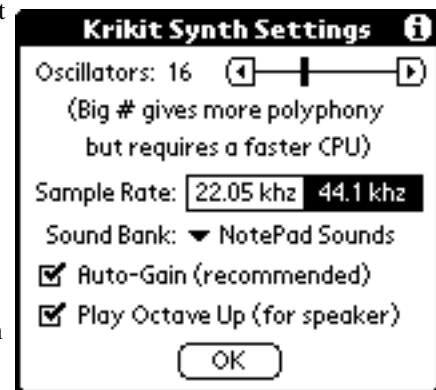
The Sample Rate determines how many digital samples are generated every second. The 44.1 rate gives you higher quality audio, however the 22.05 rate will allow a slower CPU to run more oscillators.

Trying to use more oscillators than your CPU can handle will result in stuttering, broken audio. Reduce the number of oscillators or reduce the sample rate to improve playback.

The Sound Bank pop-up menu will let you access other banks of instrument sounds. The miniMusic SoundPad application will let you edit or create your own sound banks.

With “Auto-Gain” turned on, the Krikit Synth will automatically lower the master volume during playback to prevent 'clipping'. Clipping occurs when the combined volume of all the sounds being mixed has exceeded the maximum volume available in the digital audio hardware. You can turn auto-gain off to get slightly more volume (but expect some clipping).

With “Play Octave Up” selected, notes will be played an octave higher than written. This greatly improves playback on the built-in speakers of most handhelds as they cannot play low frequencies well. This setting is less important when using headphones.



MIDI

WHAT IS MIDI?

MIDI (Musical Instrument Digital Interface) is an industry standard for communicating with electronic musical instruments. A computer might communicate with an electronic instrument or one electronic instrument might be communicating with another.

MIDI consists of very simple performance commands. This allows MIDI information to be very fast and stored in very small files making it ideal for the Palm platform. It is also very easy to make changes to MIDI data giving it much more flexibility than a Digital Audio or MP3 file.

CONNECTING YOUR PALM TO A MIDI INSTRUMENT.

Connecting to MIDI hardware requires an "RS232 Serial" connection. This was available on all early handheld computers, but is no longer common. Most handhelds today use USB and ship with USB cradles or cables. Since these handhelds can't act as USB hosts, they can't connect to MIDI hardware using USB. Many handhelds still offer limited support for serial connections (those using PalmOne's multi-connector, for example) but often is not full RS232 serial and would require additional hardware to bridge to a MIDI device. Future handhelds may be able to act as USB hosts and can then use USB-MIDI interfaces.

Older handhelds (like the Palm m100 or m500 series) can use our MIDI interface designed specifically for the Palm. It converts a Serial HotSync Cradle or Cable into a MIDI-out interface. Our interface can be ordered from our website at minimusic.com/interface.html. Some OS 5 handhelds with the "Universal Connector" (like the Tungsten T or Zire 71) can be connected to MIDI hardware either with our interface or with a direct serial connection.

DIRECT SERIAL CONNECTIONS FROM YOUR HANDHELD TO MIDI HARDWARE.

Many MIDI keyboards, sound modules, samplers, and synthesizers allow for "direct" serial connections (different than the usual large round 5-pin MIDI-In and MIDI-Out ports). This direct serial port is a smaller round 8-pin port usually labeled "serial", or "host" on the MIDI instrument. This additional port is intended for a direct connection to your computer (as opposed to another MIDI device) and will often have a Mac/PC switch next to it.

To connect the bottom of your handheld computer to the "host" serial port on a MIDI device you will need either the Serial HotSync Cradle that came with your handheld, or the optional Serial HotSync Cable. These HotSync cables/cradles end with a somewhat rectangular 9-pin connector. To make this fit in the round "host" port you will need the "Macintosh Serial Adapter" available from Palm for about \$5 US.

The "host" port will usually have a switch associated with it. This switch should be set to "Mac" (as opposed to "PC-1" or any other option). Consult the manual for your MIDI hardware for any special settings that it may require to receive serial data from a computer. Most electronic music products made in the 90s have the "host" serial port. Newer products may have a USB port instead which cannot be used to connect to any current handhelds.

USING OTHER MIDI INTERFACES WITH YOUR PALM

With a Serial HotSync cradle/cable as described above, you can plug into a number of older (pre-USB) MIDI adapters made for the Macintosh. We have successfully plugged some Palm handhelds into interfaces from Opcode (like the "Professional Plus" 1-in/3-out MIDI adapter) to drive MIDI hardware and our users have reported success with a variety of other Mac interfaces. Such interfaces have the small round serial port and full size round 5-pin MIDI ports to connect to other MIDI hardware.

TROUBLESHOOTING

Why don't I hear any sound when I tap "Play"?

Every note of the melodic pattern has its own volume found under the "velocity" tab (MIDI-speak for "volume") and its own "mute" which is a row of small boxes near the bottom of the screen. If the velocities are all set to zero or the mutes are all turned on, you might not hear anything on the speaker or on an attached MIDI instrument. There are also "Pattern Mutes" found next to the Screen Icons in the lower left corner. If these show little "M"s in them, the whole pattern has been muted. As for the Drum pattern, there is a column of mutes for each instrument (along the left side). In the Preferences Screen make sure you have "Play To:" set correctly for your handheld.

How do I save my song/pattern?

BeatPad edits songs/patterns "in place" in the memory of your Palm Handheld. This saves time and memory that would be required to create a "working copy" the way a desktop computer does when it copies a file from the hard drive to the RAM. Because of this, patterns are always saved as you are working on them. If you want to keep an old version of a pattern it is very easy to make a copy. Put the pen down on the highlighted letter or number of the current pattern and drag it to another letter or number where you want the copy. When you do you will be able to work on the copy without changing the original.

I changed the pitches sent by a drum pattern; how do I get the original settings back?

The default drum pitch values, from top to bottom are: 56, 49, 42, 46, 50, 47, 45, 37, 38, 39, 36 (56 is the cowbell).

I can hear the melodic pattern but why don't I hear any drums?

If you have "Play To: Basic Sound" set in the Preferences screen, only the melodic pattern can be played. Older handhelds do not have the power to generate rich audio and cannot play drum sounds. A newer handheld with an ARM processor running Palm OS 5 (Garnet) or later can generate more complex audio and can use the "Play To : Krikrit Synth" option.

How accurate is BeatPad's timing?

The accuracy of BeatPad is based upon the Palm OS 10 millisecond clock. BeatPad keeps a more accurate clock internally, then finds the nearest System Clock during playback so that notes played by BeatPad have an accuracy of +/- 5 milliseconds. We hope to improve this accuracy in future versions. Since BeatPad uses a more accurate clock internally, tempos are more accurate over longer time scales (e.g. tempos of 122bpm and 123bpm might have the same gap between two particular notes, but over the course of a minute, they will play a different number of beats).

Playing with the Krikrit Audio Engine can degrade the accuracy of timing on some handhelds. The Palm OS requires sound streams to be double buffered and the handheld manufacturer controls the size of these buffers. A large minimum buffer size can prevent BeatPad from being as accurate. We are working on a new version of our playback engine to avoid this problem.

The Palm OS is a multi-threaded operating system. Although only one application can run at a time, the operating system itself is working on several tasks simultaneously. This means that even though BeatPad completely takes over the system while it is playing (you will get no battery warnings or other interruptions during playback... you can't even turn the power off until you tap on the stop button), the system is still running these other tasks in the background. Such tasks include monitoring the touch sensitive screen and the real-time clock.

Other software can use background system operations and may have an effect on BeatPad's accuracy. For example, the Keyboard Utility that comes with Palm's folding keyboard has an "enable keyboard" check-box. When this is checked the utility constantly polls for events which may cause a repeating glitch in BeatPad playback (in testing we've found it to cause a short hiccup approximately every second, depending on the tempo). This can easily be remedied by un-checking this box in the keyboard utility whenever the keyboard isn't being used.

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