miniMusic ™

SOUNDPAD APPLICATION
for Palm OS

SOUNDPAD 1.0

INSTALLING SOFTWARE

IMPORTANT NOTES BEFORE INSTALLATION
• Before installing SoundPad on your handheld computer, please read the license found at the end of this manual. INSTALLING THE SOFTWARE SIGNIFIES YOUR ACCEPTANCE OF THIS LICENSE.

• The SoundPad application can be installed on any handheld computer that uses Palm OS version 5.0 or higher.

• SoundPad requires sound streaming libraries that are missing on some OS5 handhelds (like the Zire 21).

INSTALLING SOUNDPAD ON YOUR HANDHELD
Inside the SoundPad folder (or on the SoundPad CD-ROM) is the SoundPad application "SoundPad.prc" and a sample sound bank named "NotePad Sounds.pdb". The "SoundPad.prc" file is the one you will install on your handheld computer. We recommend that you also install the "NotePad Sounds.pdb" file if you do not already have NotePad installed, but it is optional (SoundPad will create a new sound bank if none exist on your handheld).

Consult the documentation that came with your handheld to learn how to install new software during your next HotSync.

SONY CLIE USERS
Some OS 5 Clies do not have the needed Sound Libraries to run our Krikit Audio Engine which is need for SoundPad to play the sounds you design. You may be able to install the MCA(Modern Clie Audio) patch available from another developer ("CliePet") to run SoundPad on such devices.

SOUNDPAD

SoundPad lets you edit or design your own sounds for the miniMusic Krikit Audio Engine. You can design your own sounds by changing the frequency, waveshape and amplitude envelope for up to four oscillators for each sound. You can also use one oscillator to modulate the frequency of another oscillator.
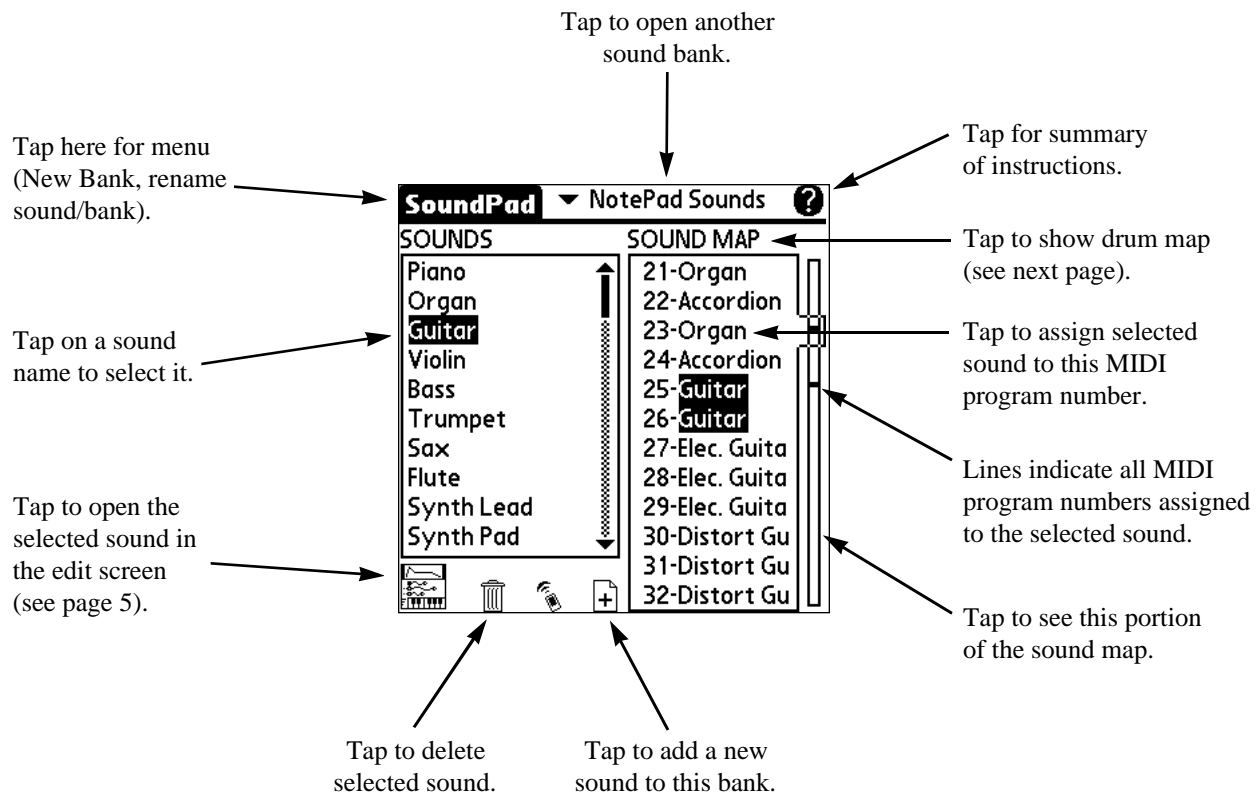
The sounds are collected into banks which are saved on your handheld (and backed up to your desktop or laptop). Each bank can contain 128 different sounds plus up to 128 drum sounds (each drum sound can only be played at a single pitch).

SOUND BANK SCREEN
The first time you open SoundPad you will see this screen. Here you can change sound banks, add sounds, select sounds, and assign sounds to the sound map for the current bank. If you installed the "NotePad Sounds" sample sound bank you will see that, otherwise SoundPad will generate a default bank containing one default sound (a bank must always contain at least one sound).

Software using the Krikit Audio Engine (like miniMusic's NotePad sequencer) accesses a sound bank using the MIDI protocol. To ask for a particular sound, the application sends a MIDI program number (a number from 1 to 128). SoundPad gives you a "Map" to assign your sounds to these MIDI program numbers. When an application sends a program number, the map is consulted to see which sound should be used.

On the sound bank screen, all of your sounds are listed on the left. The sound map is on the right. When you tap on the sound list you will select a sound. When you tap on the sound map you will assign the selected sound to that program number.

Tap to open another
sound bank.

Tap here for menu
(New Bank, rename
sound/bank).

Tap on a sound
name to select it.

Tap to open the
selected sound in
the edit screen
(see page 5).

Tap for summary
of instructions.

SoundPad ▼ NotePad Sounds ❓

SOUNDS	SOUND MAP
Piano	21-Organ
Organ	22-Accordion
Guitar	23-Organ
Violin	24-Accordion
Bass	25-Guitar
Trumpet	26-Guitar
Sax	27-Elec. Guita
Flute	28-Elec. Guita
Synth Lead	29-Elec. Guita
Synth Pad	30-Distort Gu
	31-Distort Gu
	32-Distort Gu

Tap to show drum map
(see next page).

Tap to assign selected
sound to this MIDI
program number.

Lines indicate all MIDI
program numbers assigned
to the selected sound.

Tap to see this portion
of the sound map.

Tap to delete
selected sound.

Tap to add a new
sound to this bank.

To the right of the sound map list is an overview of the entire map. Tap on this overview to scroll to that part of the map. Lines on the overview will show all instances of the current selected sound.
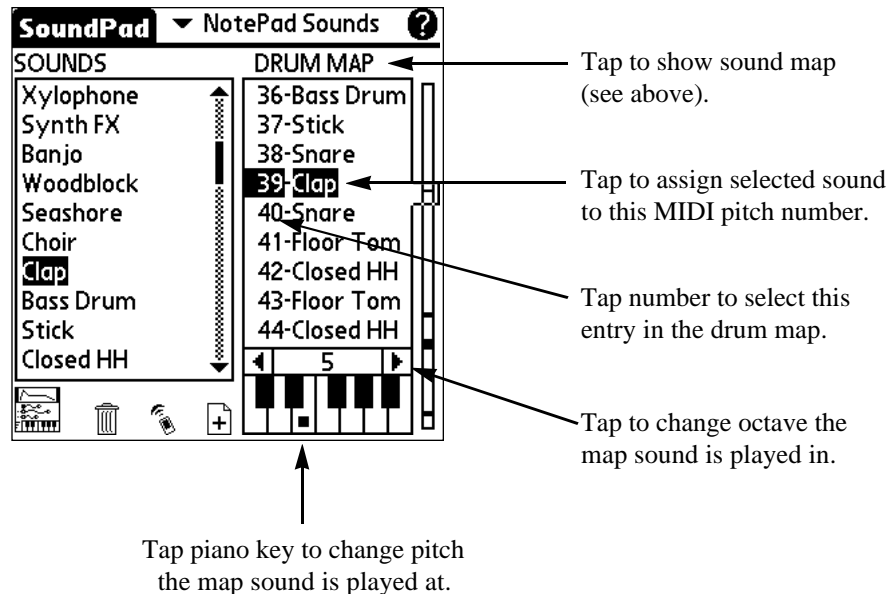
When an application wants to play drum sounds (mostly un-pitched instruments) it will send a MIDI pitch on MIDI channel 10. This way, if playing on a MIDI keyboard, every key plays a different drum sound. Also, in a MIDI sequencer all of the drum sounds can be easily grouped onto a single track (all playing on the same channel).

If you tap on the heading "SOUND MAP" you can toggle to the "DRUM MAP". The numbers on the Drum Map are MIDI pitches (from 0-127) instead of MIDI Program numbers. Pitch 0 is a very low C, while pitch 60 is usually used as middle C. NotePad can access MIDI pitches 36-84; pitches outside that range will be un-playable. Other applications using the Krikit Audio Engine may be able to access the full range.

Since the MIDI pitch is used to determine which sound to play, you must also assign a pitch to each entry on the Drum Map. This is a little confusing: The application uses a pitch number to request a particular sound, and then that sound is played at a fixed pitch (different from the one used to request the sound. To assign this fixed pitch, tap on the Drum Map number and use the octave and piano controls at the bottom to select the desired pitch.

You can assign a sound to multiple MIDI programs and MIDI pitches. When SoundPad creates a new bank, it contains one sound which is mapped to every MIDI program in the Sound Map and every MIDI pitch in the Drum Map.

Tap on the icon in the lower left corner to edit the current selected sound.

Tap to show sound map (see above).

Tap to assign selected sound to this MIDI pitch number.

Tap number to select this entry in the drum map.

Tap to change octave the map sound is played in.

Tap piano key to change pitch the map sound is played at.

SOUND EDIT SCREEN
The folder icon at the very top of the screen will return to the Sound Bank Screen.

The Edit screen is divided into three areas. At the top are the envelopes, in the middle are the oscillators, and at the bottom is a piano keyboard and volume control. Lets start in the middle with the oscillators.

Oscillators:
Each oscillator can produce one frequency (or pitch) at a time. By using multiple oscillators you can get much richer sounds with greater harmonic content or overtones. Anew sound will use all four oscillators.
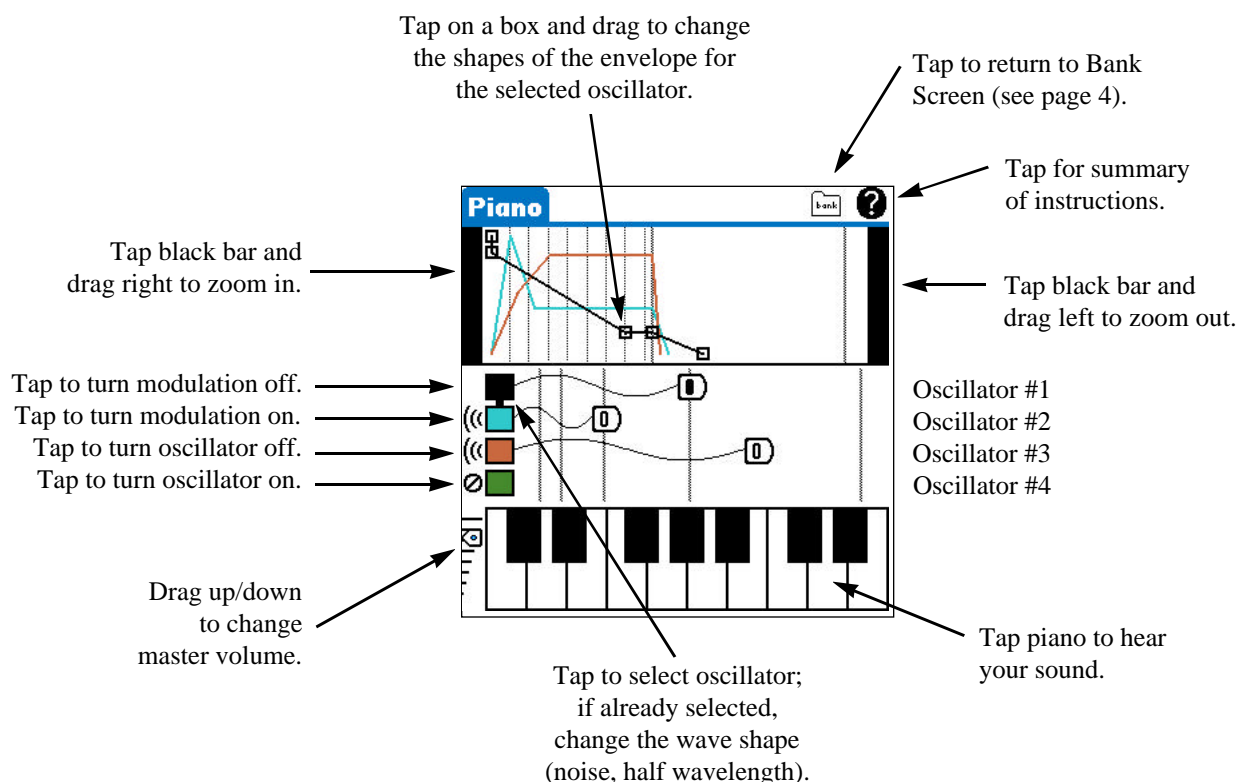
To the left of each oscillator is a small playing icon (three little sound waves next to the colored boxes). When this icon is present it means you can hear this oscillator directly or that it is wired directly to the speaker. If you tap on this playing icon, you can switch an oscillator to modulate the oscillator below it. The playing icon will vanish and a link will appear between the two icons. This is the case with Oscillator #1 in the diagram above. Tap in the same space to turn modulation off .

Since there is nothing below the fourth icon for it to modulate, tapping on the playing icon for the last oscillator will turn that oscillator off. An off icon will appear. Tapping on an off icon will turn an oscillator back on.

Frequency:
To change the frequency of an oscillator, look near the center of the screen. You will see a wave-shape drawn for each oscillator currently being used, each anchored on the left by a colored box. On the right side of each wave-shape is a slider that you can grab with the stylus and drag to make the wave shorter or longer. Ashorter wavelength has a higher frequency; a longer wavelength has a lower frequency.

The vertical lines in the wave area mark octaves. When one oscillator has a wavelength exactly half as long as a n o t h e r, the frequency is one octave higher. These lines also indicate the correct frequency for the piano key being played. If an oscillator is to the left of the line, for example, the pitch will be higher than the note played. In the diagram on Page 5, Oscillator #1 is centered on the pitch being played; Oscillator #2 is an octave higher.
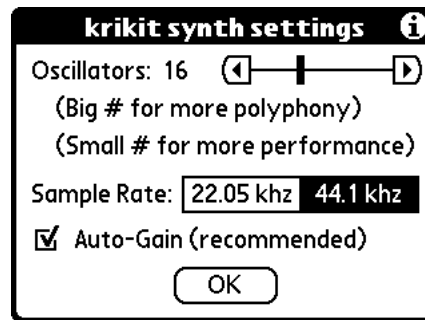
Tap on a box and drag to change
the shapes of the envelope for
the selected oscillator.

Tap to return to Bank
Screen (see page 4).

Tap for summary
of instructions.

Piano

Tap black bar and
drag right to zoom in.

Tap black bar and
drag left to zoom out.

Tap to turn modulation off.
Tap to turn modulation on.
Tap to turn oscillator off.
Tap to turn oscillator on.

Oscillator #1
Oscillator #2
Oscillator #3
Oscillator #4

Drag up/down
to change
master volume.

Tap piano to hear
your sound.

Tap to select oscillator;
if already selected,
change the wave shape
(noise, half wavelength).

Modulation:
When you hear an oscillator, it is controlling the rapid rise and fall of the amplitude of the sound. You can also think of it as controlling the position of the speaker's membrane or your ear drum, vibrating it quickly in and out to generate the sound you hear. When you instead use an oscillator to modulate another, it is controlling the rise and fall of the frequency of the 2nd oscillator (not the amplitude/volume). The 2nd oscillator has its own frequency assigned, but the modulator shifts the pitch up and down from that center frequency.

Envelopes:
Above the wave area are the envelopes. These control volume of each oscillator over time. When an oscillator is selected, small boxes will appear on its envelope so that you can change its shape. When you tap on a piano key, the volume moves from the 1st box to the 2nd (Attack), and then to the 3rd (Decay). It stays at that volume as long as you hold the stylus down (Sustain). When you release the note by lifting the stylus, the volume proceeds to the final box (release).

There are vertical lines every tenth of a second for the first second, and then one line every second after that. T h e horizontal distance is meaningless during the sustain phase since it will stay there until the note is released. T h e n there is a vertical line right at the moment of release and every second after that.

KRIKIT AUDIO ENGINE

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 is stuttering, broken audio. Reduce the number of oscillators or reduce the sample rate to improve playback.

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 to maximum volume available in the digital audio hardware. You can turn auto-gain off to get slightly more volume (but expect some clipping).

SOUND DESIGN TIPS

• Modulators should have longer releases that the carrier. If the modulator reaches the end of its envelope first you may hear a click.

• Try to avoid flat envelope segments (aside from the sustain). If a segment has no slope it will collapse to take no time. This is a waste of the segment (unless the sound has already reached silence).

• When a carrier (an oscillator that you can hear) reaches the end of its release, it will stop it's modulator immediately even if the modulator was not finished with its envelope. The modulator will not in turn stop other oscillators modulating it. This can cause some unexpected results when two or three modulators are chained together.

• Remember that a note may be released <u>before</u> reaching the sustain. What looks like a short release may be much longer if it starts at a higher amplitude found earlier in the envelope If you want a shallow release on an oscillator, try to avoid any portion of its envelope going higher than the amplitude of the sustain (no attack spike).

• Use the octave lines in the middle of the screen; otherwise your sounds may be out of tune with one another.

• Wavelength is meaningless for white noise. Also, you cannot modulate white noise.

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