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iLep - a live electronic instrument

The iLEP (Live Electronic Patch) is the result of many years of collaboration between composers and software designers with the aim of creating a live-electronic instrument that works at its best in conjunction with an acoustic musical instrument and is especially suitable for use in concerts.

With the iLEP, musicians can control the most versatile live-electronic sound transformations with an individual setup consisting of an instrument microphone, loudspeaker, foot pedal etc. while being largely independent of an assistant, mixing console or an amplifier system in the hall, especially for solo performances.

The iLEP was programmed in Max-MSP. The first version (LEP) for laptops (Mac Powerbooks and Windows computers) by Wolfgang Heiniger and Thomas Kessler was later further developed by Thomas Seelig and has now, in collaboration with Oliver Greschke, been translated to the iOS operating system for iPad and redesigned to make it "more mobile" and accessible to a wider range of users.

The program itself has no special live-electronic settings. All data of a composition (samples, modulation parameters, etc.) are stored in a set folder that can be called up at any time and loaded into the application. A library and several introductions with interesting cues as presets are included in iLEP right from the start. They are explained in more detail in this manual.

Installation and start:

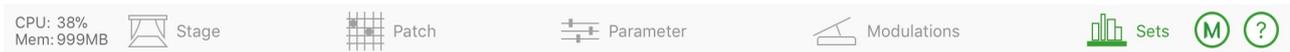
Once you have downloaded the application from the Apple Store, it will appear on your desktop with this icon:



Insert suitable headphones to avoid feedback between the built-in microphone and the built-in speakers. A headset, as described in Introduction 4, is best.

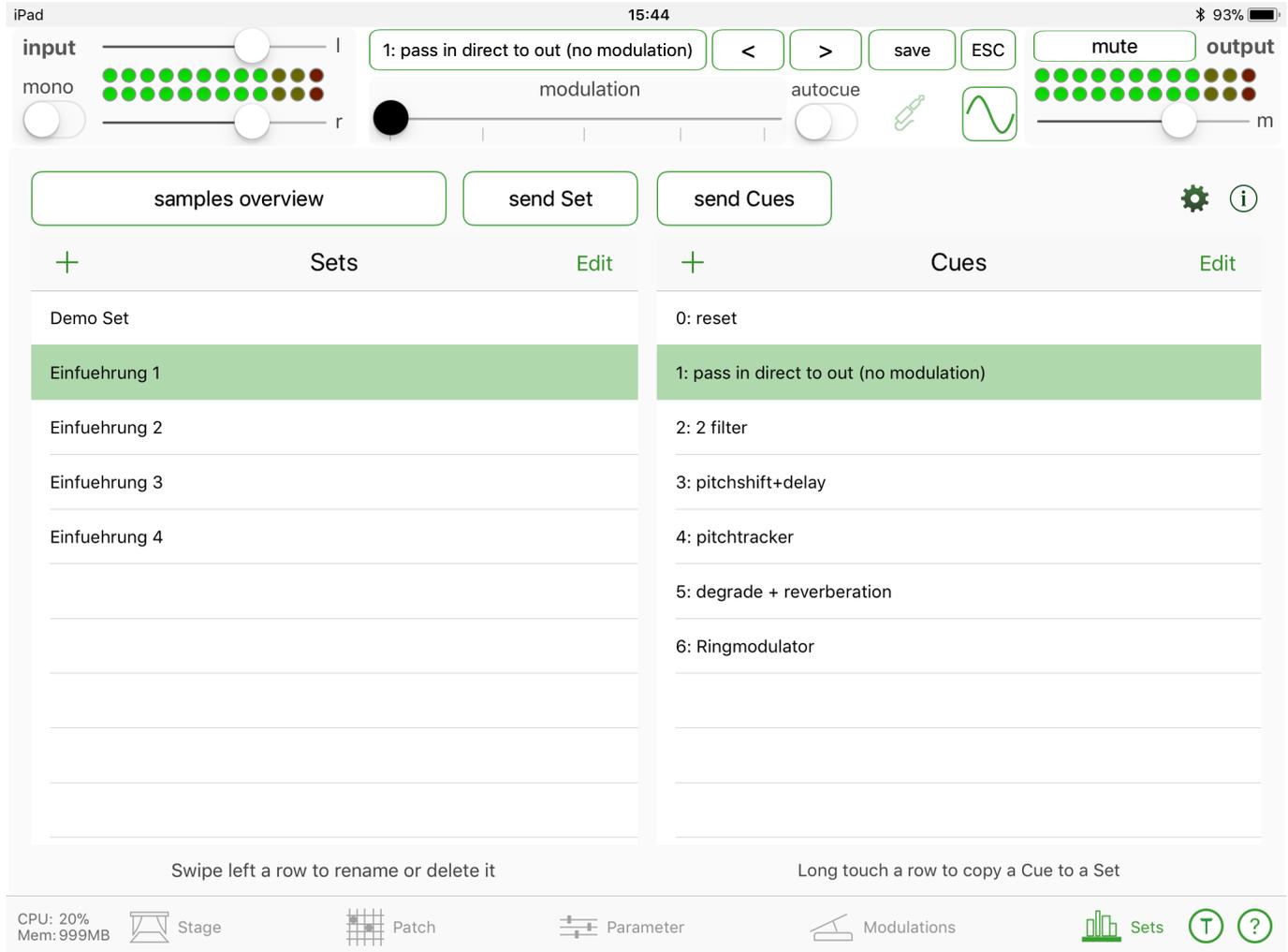
There are five main windows: if you open the app (by tapping on the icon), the one that was last opened appears.

At the bottom of each main window, the main navigation bar with the five icons of the main windows is visible.



Introduction 1

To start the introduction, we select the 5th main window "Sets" on the main navigation bar, which is shown as an icon on the far right.



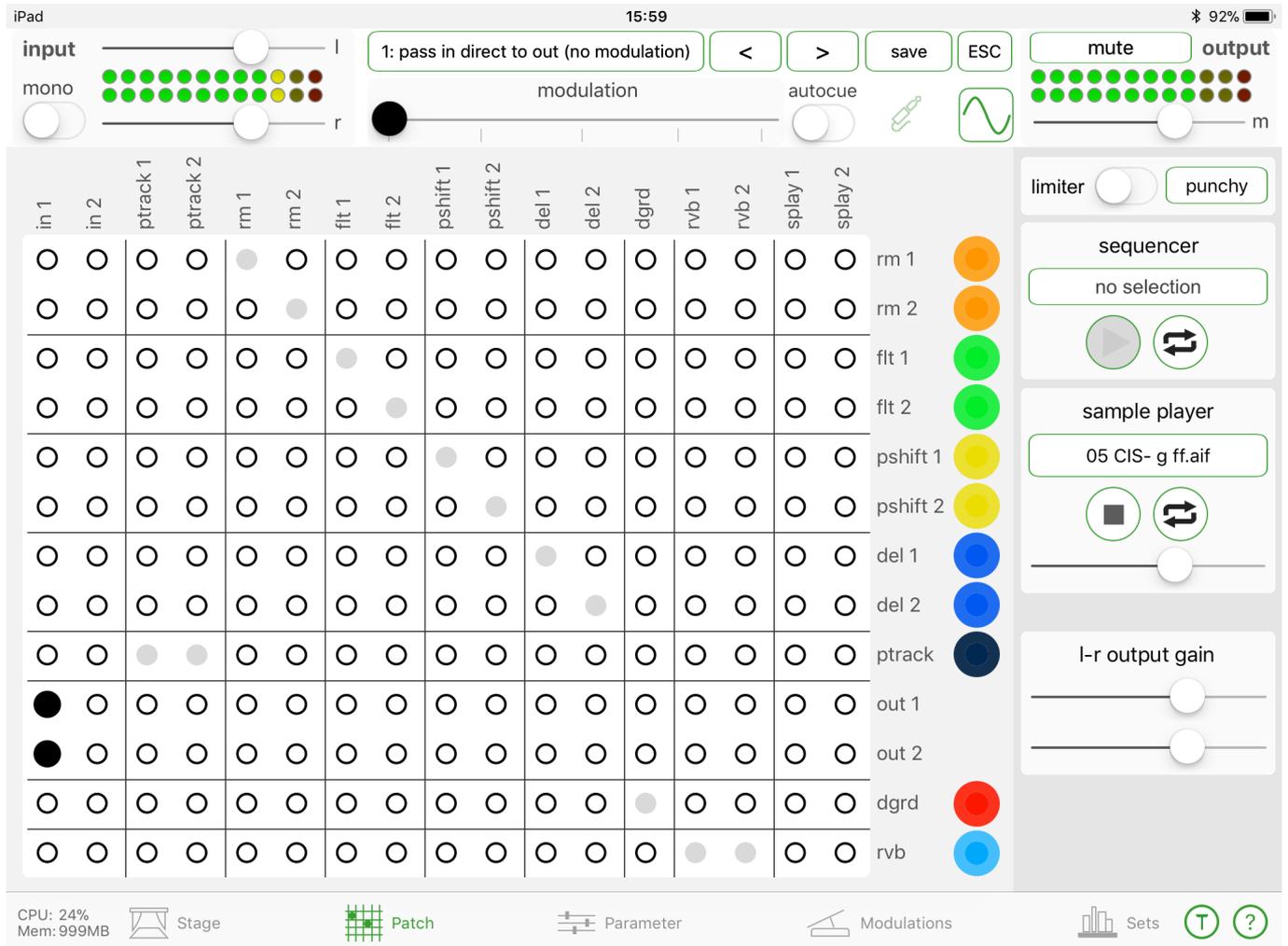
On this main window "Sets", we first look at the input control display, which shows the input signal on each of the five main windows in the upper left corner. Without the peripherals described later in "Introduction 4", the iLEP displays the input signal of the built-in or headset microphone. We will use our voice as the input for the first tests.

On the left side, under "Sets", we can select different sets, whose content appears on the right side as numbered "Cues". This arrangement is particularly useful in musical performance practice: a set could, for example, designate the name of a composition in which different cues or presets appear in sequence.

We now select the Introduction 1 and Cue 1 sets.

Cue1: „pass in direct to out (no modulation)

We will stay on Cue 1 and select the main window "Patch".

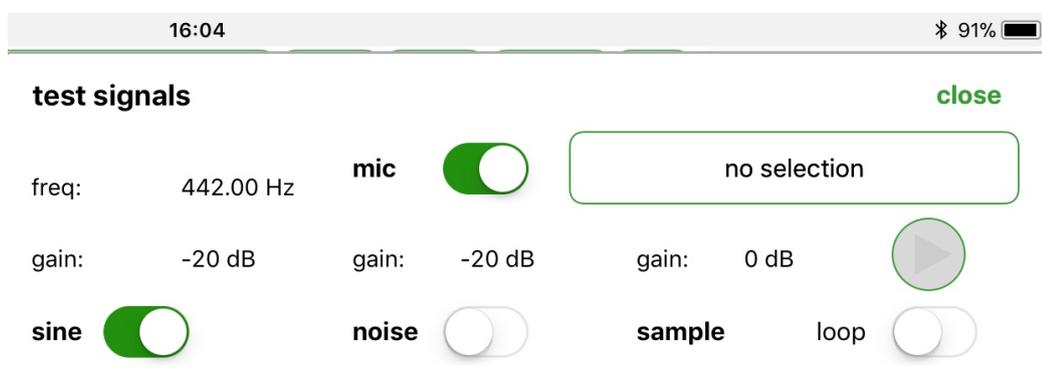


This explains the modular principle of the iLEP: like in modular analog synthesizers in the past, the most important sound modules can be connected here. These are: **Pitch tracker, ring modulator, filter, pitch shifter, delay, degrade, reverb, sound file player.** All these modules (virtual devices) have an input and an output. The inputs are indicated above, the outputs on the right side. The two black dots now connect the two vertical input channels directly to the horizontal outputs in Cue 1. Touch to delete points or set new points/connections.

The acoustic musical instrument or voice which has always been visible in the input display instrument is routed directly to the output "out1 and out2" in this cross field at the top left of "in1 and in2" on the right side. Now we can also see the signal on the display instrument of the output. The level of the two display instruments should be identical and use the full range displayed in green. Directly below the input and output display instruments are faders for adjusting the volume, which should not be touched yet. It is much

more important to adjust the listening volume to the headphones and our ears on the iPad itself so that we can now hear our voice slightly amplified. Not all headphones are suitable for the iPad: the introduction contains exact specifications at the very end.

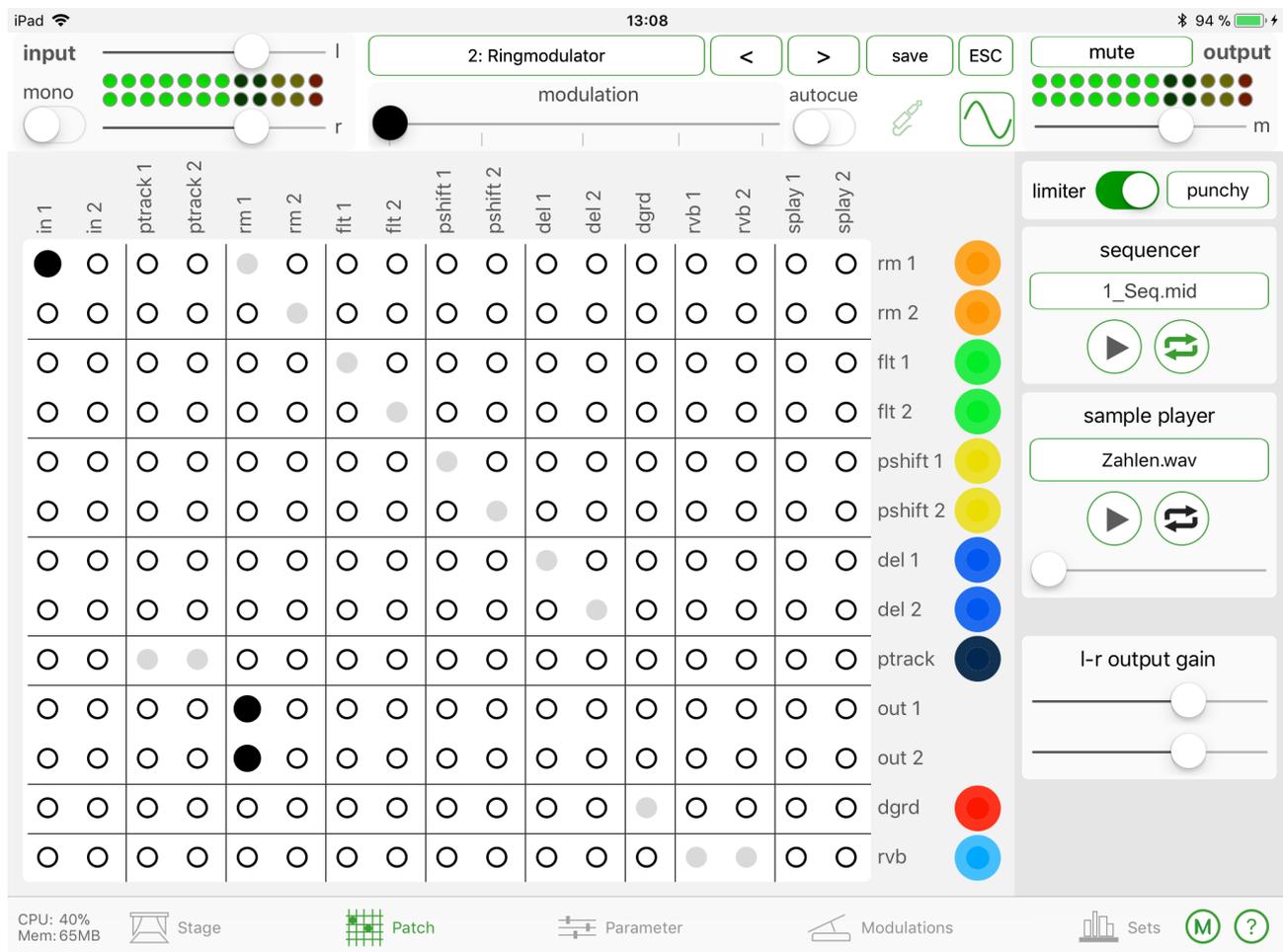
Now we will switch on a **test signal**: the subwindow can be brought up on all main windows by the sine symbol to the left of the output display. Here, we switch on a sine signal with a frequency of 442 Hz and volume -20 dB. You can also select a noise generator or a sample. The microphone input, "mic", which must always be switched on when starting up, can be switched off. The test generator always affects the input, regardless of which set is called and what is stored in the cues. It must be "manually" switched on and off again, which one can easily forget since this function is not stored. The "Close" function in the upper right corner of the Test Generator subwindow closes the subwindow, but the settings and the signal remain unchanged.



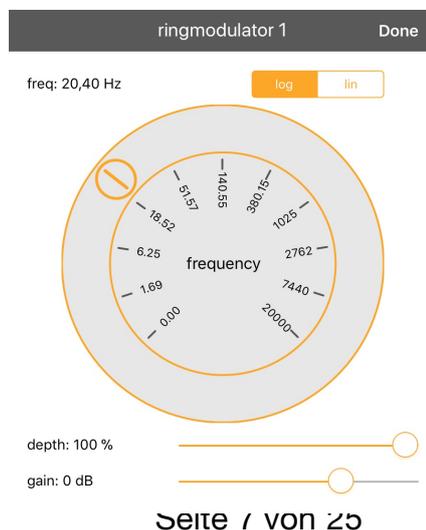
We will experiment with all settings in the test generator, but also with our voice, and then we switch on the "mic" again, close the test generator and go back to the "Cues" main window and select Cue 2 on the "Sets" main window, then go back to the "**Patch**" main window.

Cue2: Ring modulator

In the "Patch" main window, we see that the input, e.g. our voice or the test signal, is routed to the ring modulator (rm 1) on the first horizontal level on the right, and that this



leads to the output on the fifth vertical row: Input 1 > Ring modulator 1 > Output 1+2. By touching the first orange point, the subwindow of the respective ring modulator opens: here, rm1.

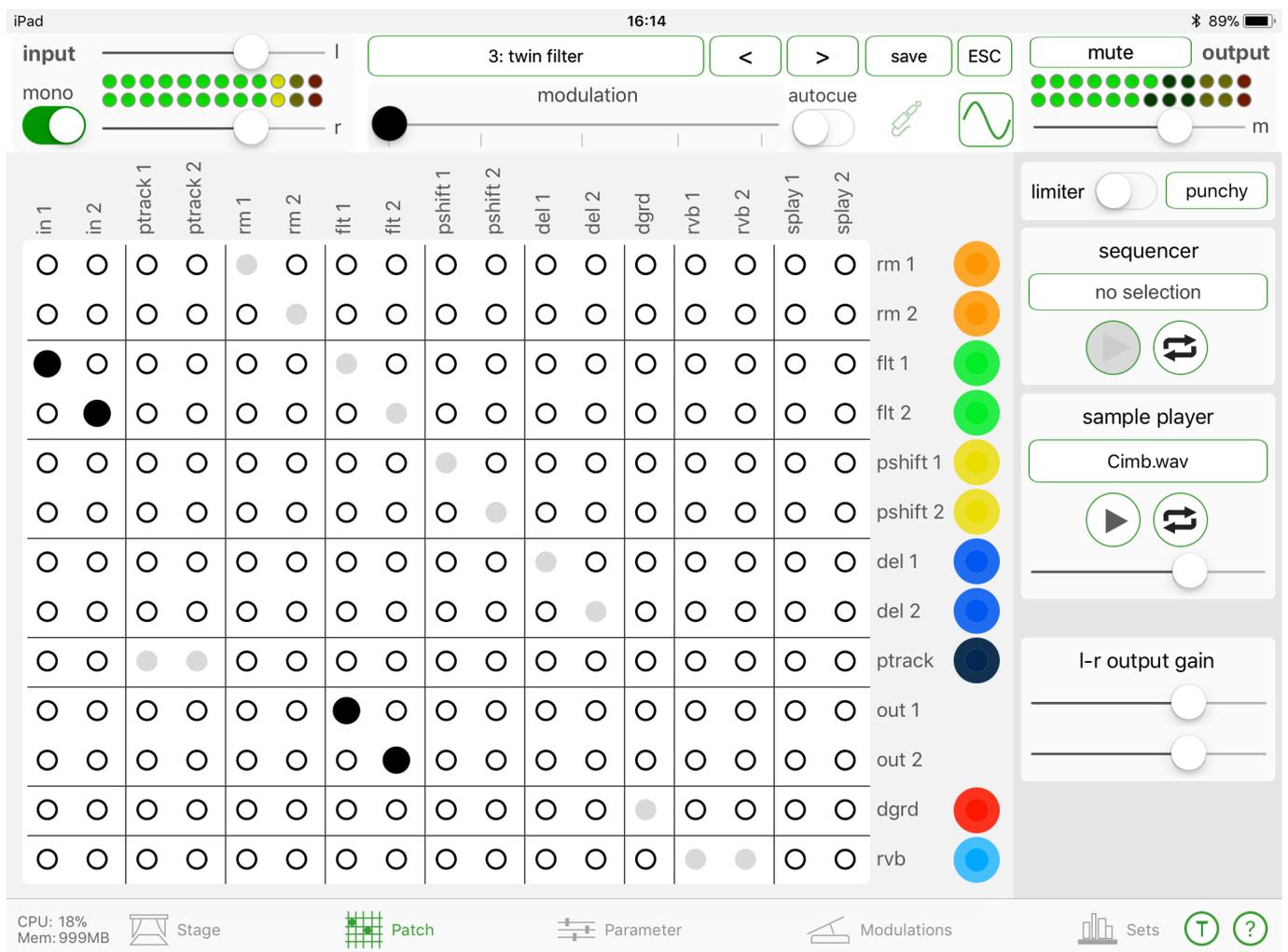


The ring modulator is not explained here, as its functions should be known. A good explanation for all modules can be found e.g. in Wikipedia. https://en.wikipedia.org/wiki/Ring_modulation

We can change three parameters here: frequency (on the round disc), depth (mixing ratio original/modulation) and gain (volume). In addition to our voice, a sine tone is also suitable as a test signal. With the noise generator, there is no interesting result from the ring modulator.

By clicking "Done", we close the subwindow. The next cue can also be accessed from this main window (and from all others) by tapping on the wide box at the top. A subwindow opens with all cues contained in the set, which we can call up immediately.

Cue 3: filter



Here, the noise generator is useful as a test signal, since a sine tone has practically no overtone spectrum that we could filter. We click on the "Patch" main window. Touching a green dot opens the subwindow of the relevant filter. Here, flt 1 is set as bandpass and flt 2 as highpass. With the green dot, we can change the filter frequency and the Q-factor

simultaneously. All our changes in the parameters are deleted as soon as we call another cue.

Cue 4: pitchshift

We turn off the noise generator and experiment with our voice. We can call up and change the relevant modules using the yellow dots.

We turn off the noise generator again and experiment with our voice. With short, rhythmic speech, we can hear the function of the delay better. We can call and change the relevant modules through the yellow and blue dots.

Cue 5: delay

With short, rhythmic speech sounds, we can get to know the functions best by calling up the corresponding modules through the blue dots and changing the parameters in them.

Cue 6: pitchshift + delay

The audio signal (our voice) is first modulated by the pitchshifter and then by the delays.

Cue 7: pitchtracker

The Pitchtracker module has only one input, but a stereo output. In the Pitchtracker, a sample is controlled, both in volume and pitch, by our voice.

Here, we control the sample of a constant organ tone with our voice or an instrument. It follows the pitch and dynamics in a relatively parallel way, but has some problems recognizing the pitch in the case of noise.

If we want to, we can select another sample and control it with the pitch tracker.

Wenn wir ein anderes Sample auswählen und mit dem Pitchtracker steuern möchten, gehen wir zum **Hauptfenster „Patch“** und tippen den schwarzen Punkt **„ptrack“** an. Um sicher zu sein, dass wir wirklich das aktuelle Sample sehen, tippen wir links auf das Sample, das wir hören wollen oder wählen ein anderes aus. Im Cue 7 ist eine Basiseinstellung als Ausgangspunkt zum Experimentieren vorbereitet.

Vor allem der Ambitus hat einen grossen musikalischen Einfluss. Um die einzelnen Parameter genauer einzustellen, gehen wir auf das **Hauptfenster „Parameter“**, wo wir durch Antippen der Zahlen einzelne Aufklappfenster öffnen und dort genaue Werte eintippen können. (Das Subfenster erscheint nur, wenn im iLep auch mind. ein Sample geladen ist.)

In Cue 7 ist im Ambitus der Wert 1 gespeichert. Das ist sozusagen die Grundstellung: das Sample folgt parallel dem Input, z.B. unserer Stimme. Wenn wir ihn vergrössern, wird der Ambitus des Sample gespreizt, beim Verkleinern immer enger, bis wir bei Ambi-

tus 0 keine Tonhöhenveränderung mehr im Sample hören. Nur noch die Dynamik folgt der Hüllkurve unserer Stimmdynamik.

Alle Sample finden wir auch im **Hauptfenster „Sets“** durch Antippen des breiten Balkens **„samples overview“**. Es kann hier wie ein „Tonband“ abgespielt werden, aber auch durch ein anderes ersetzt werden. Wir tippen „close“ an, um dieses Subfenster zu schliessen.

Cue 8: Degrade unserer Stimme mit Hall (rvb)

Alle Module können in unzähligen Kombinationen miteinander verbunden werden. Es sind jedoch keine Klangerzeuger oder Generatoren sondern klangtransformierende Module, die im Input immer ein externes Klangmaterial benötigen. Auch der Testgenerator wird deshalb als externes Klangmaterial betrachtet.

Introduction 2 - Das control principle: controlling the sound

All functions, also called parameters, which we learned in Introduction 1 can be controlled in different ways:

- By the horizontal modulation fader, with a black dot, which we can see and move in each main window under the heading "Modulation"
- By external MIDI devices, e.g. a keyboard or USB pedal: described in Introduction 4
- By the internal sequencer on the "Modulations" main page

If we already have a complete setup with USB pedal and Lightning connection, as described in Introduction 4, we can perform the following exercises much more easily.

In the "Sets" main window, we call up "Introduction 2" set and then cue 1. On the "Patch" main window, we see that the input is directly connected to the output. Now, we go to the „Modulations" window.

The screenshot displays the 'Modulations' window on an iPad. At the top, there are controls for 'input' (mono), 'modulation' (a horizontal fader with a black dot), and 'output' (a horizontal fader). Below this is a table of modulation parameters:

parameter	on	min	max	exponent
ring modulator 1				
freq	<input type="text"/>	0,00 Hz	1,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
ring modulator 2				
freq	<input type="text"/>	0,00 Hz	1,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
filter 1				
freq	<input type="text"/>	20,00 Hz	20,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
q	<input type="text"/>	0,10 u	1,00 u	3,00

Below the table is a sequencer section with a graph showing event values over time. The graph has three peaks, each with a value of 1.00 ms, 4.444,00 ms, and 9.999,00 ms. The sequencer is set to 'no selection' and 'parameter delay1.delaytime'. The MIDI section shows 'midi' set to 'Netzwerk Session 1 (via wifi: yes)' and 'controller no.' set to '1'. The bottom of the window has a navigation bar with icons for Stage, Patch, Parameter, Modulations, and Sets.

The functions, i.e. the influence, of the MIDI controller or modulation fader on the individual parameters of a module are assigned here. If we touch the dark green box "in/out" at the bottom edge, we see that the control for the master fader of the output is switched

on. By moving the black dot at the top of the horizontal modulation fader, we simultaneously control the output fader on the far right within the set range between -70 and 0 dB.

Let's do the following exercise: In the box with the sine symbol, switch on a test signal with noise and a gain of -20 dB; then use "Close" to close the subwindow again. When we have opened the master fader fully (to the right), we should be able to hear the noise in the headphones. We can now control the volume of the output. Then, leave the master fader fully open on the right and switch its control (bottom left) off again, so that the full volume now stops. Now, we switch on the two "l gain and r gain" functions. Now the modulation fader acts on both channels in reverse, like a left/right panorama change. This circuit is not so simple, because if we keep the master fader closed when switching, we hear nothing through the two "l gain and r gain" functions. However, we can always call cue 1 (reset). On the small subwindow "save changes?" which now appears, we always tap No! for the time being, because we don't want to overwrite anything. Then, we can do the exercise again.

After that, we turn off the test generator and go to Cue2.

The screenshot shows the 'Modulations' section of a software interface. At the top, there are controls for 'input' (mono), 'modulation' (a fader with a black dot), and 'output' (mute and fader). Below this is a table of modulation parameters:

modulations	parameter	on	min	max	exponent
ring modulator 1					
	freq	<input checked="" type="checkbox"/>	0,00 Hz	1,00 Hz	3,00
	depth	<input type="checkbox"/>	0 %	1 %	3,00
	gain	<input type="checkbox"/>	0 dB	1 dB	3,00
ring modulator 2					
	freq	<input type="checkbox"/>	0,00 Hz	1,00 Hz	3,00
	depth	<input type="checkbox"/>	0 %	1 %	3,00
	gain	<input type="checkbox"/>	0 dB	1 dB	3,00
filter 1					
	freq	<input type="checkbox"/>	20,00 Hz	20,00 Hz	3,00
	depth	<input type="checkbox"/>	0 %	1 %	3,00
	gain	<input type="checkbox"/>	0 dB	1 dB	3,00
	q	<input type="checkbox"/>	0,10 u	1,00 u	3,00

Below the table is a 'sequencer' window showing a sine wave and event values: dur: 8.00 s, 64 events, low - mapping - high, event value 1.00 ms, 4.444,00 ms, 9.999,00 ms. MIDI settings are also visible: 'midi' set to 'Netzwerk Session 1 (via wifi: yes)', controller no. 1, and invert off.

Cue2: Ring modulator

In the main window "Patch", we see the same circuit as in Introduction 1; in the main window "Modulations", we tap on the orange box "ring mod" at the bottom left and see that the modulation fader is switched on at the frequency of the ring modulator 1, with a range of min. 100 Hz and max. 2000 Hz. The movements of the modulation fader now control the frequency, and we can hear this with our voice.

If you have already connected a USB pedal, you can follow the control with the USB pedal in the main window "Patch", subwindow **rm1** and read the exact values.

In the "Modulations" main window, we can select another range or control other parameters at the same time. More than 50 different parameters can be controlled simultaneously from a single MIDI source, each with a separately defined range between min. and max. and its own influence curve between linear and exponential. Let's stick to cue 2 for now." main window, we can select another range or control other parameters at the same time. More than 50 different parameters can be controlled simultaneously from a single MIDI source, each with a separately defined range between min. and max. and its own influence curve between linear and exponential. Let's stick to cue 2 for now.

For the next exercise, we turn on a sine tone with a frequency of 600 Hz as a test signal. We hide the subwindow again (Close).

Module	Parameter	Value
in	mono	<input type="checkbox"/>
rm 1	freq:	100,00 Hz
rm 2	freq:	200,00 Hz
flt 1	freq:	245,00 Hz
flt 2	freq:	938,00 Hz
shft 1	semitones:	0 ht
shft 2	semitones:	0 ht
del 1	time:	10.000,00 ms
del 2	time:	10.000,00 ms
ptrck	Zahlen.wav	
ptrck	start:	0,000 s
ptrck	end:	0,550 s
ptrck	env gain:	0 dB
ptrck	ref. freq:	100,00 Hz
ptrck	mid:	43
ptrck	glisstime:	50,00 ms
ptrck	pitch gain:	-79 dB
ptrck	trigger:	-50 dB
ptrck	ambitus:	0,00 *
ptrck	pitch decay:	500,00 ms
ptrck	out gain:	0 dB
out	limiter	<input checked="" type="checkbox"/>
out	smooth	<input checked="" type="checkbox"/>
out	left gain:	-1 dB
out	right gain:	-1 dB
out	master:	0 dB
dgrd	drive:	0,00 %
dgrd	wordsize:	16,00 bit
dgrd	gain:	-2 dB
rvb	size:	35,00 m
rvb	decaytime:	10,00 s
rvb	damping:	200,00 Hz
rvb	diffusion:	0,90 u
rvb	early:	-2 dB
rvb	tail:	-6 dB
rvb	gain:	-70 dB
splay	Zahlen.wav	
splay	fade in:	0,00 ms
splay	fade out:	0,00 ms
splay	gain:	-77 dB

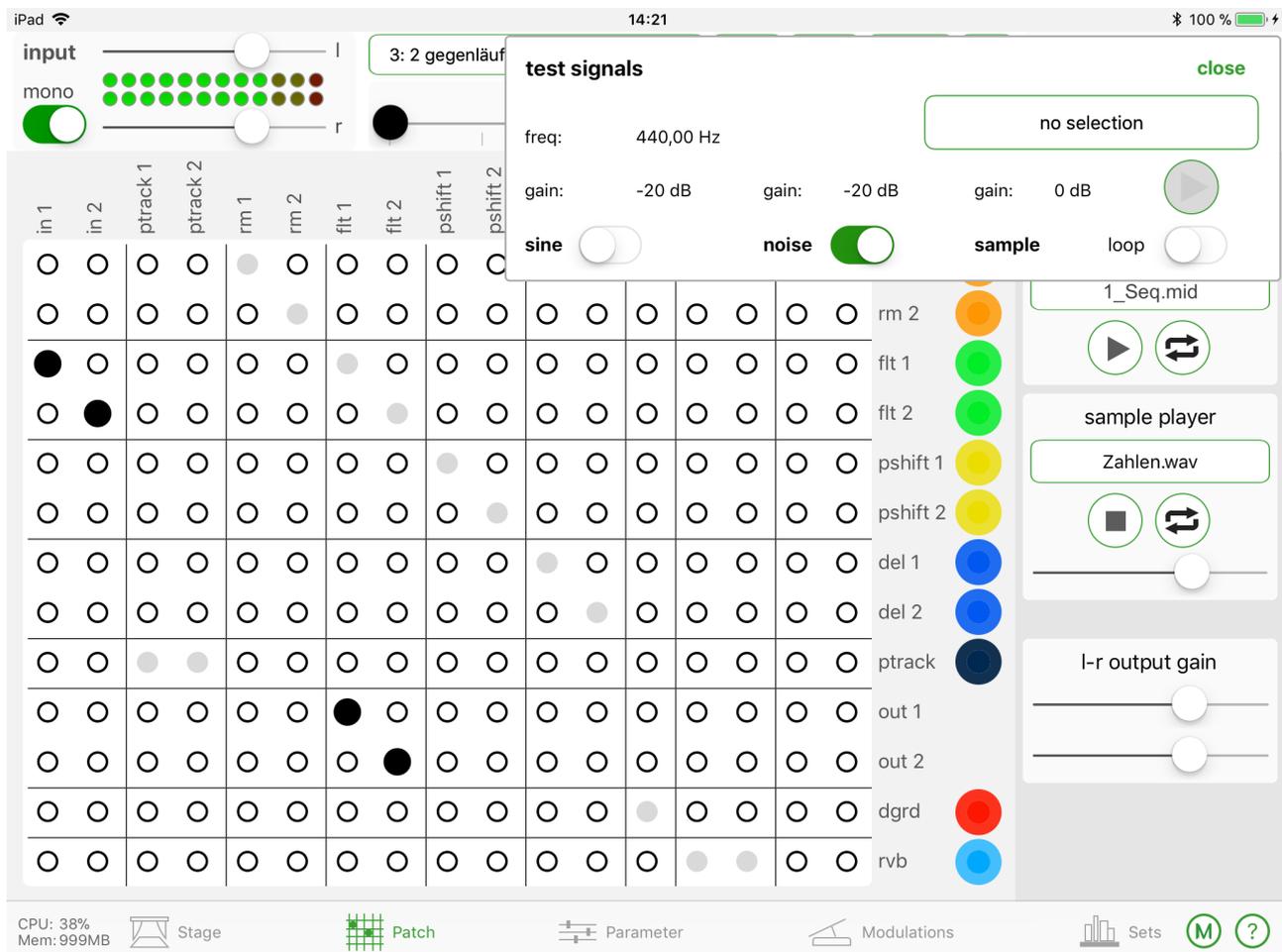
To see the frequency changes, the main window "Parameter" must now be explained, which is actually the summary of all parameters that we have learned from the sub-windows in the main window "Cues". As in the "Patch" main window, subwindow rm1, we can also read the exact frequency movements in green.

While we move the MIDI fader with the black dot or the USB pedal, we can now use our ears to select a section that interests us most. For example, if we select the range between approx. 710 Hz and approx. 884 Hz, we can adjust this range on the "Modulations" main window between min. and max. by tapping the frequency number on the appearing small sub-windows. We now have a ring modulation in the limited range between 710 and 884 Hz of an instrument playing a tone of 600 Hz (which is the test signal here). The exponent factor should be set to linear (1.00) for more continuous modulation.

Cue 3: 2 filters with counter-rotating frequency modulation

A sine tone is not suitable as a test signal for this example, so the "noise" generator must be switched on.

We hear two counter-rotating filter modulations through the control fader and experiment with this circuit. If you have already connected a USB pedal, you can access the filter submenu in the "Patch" main window and view it in real time. In the "Modulations" main window, we can also change the range.

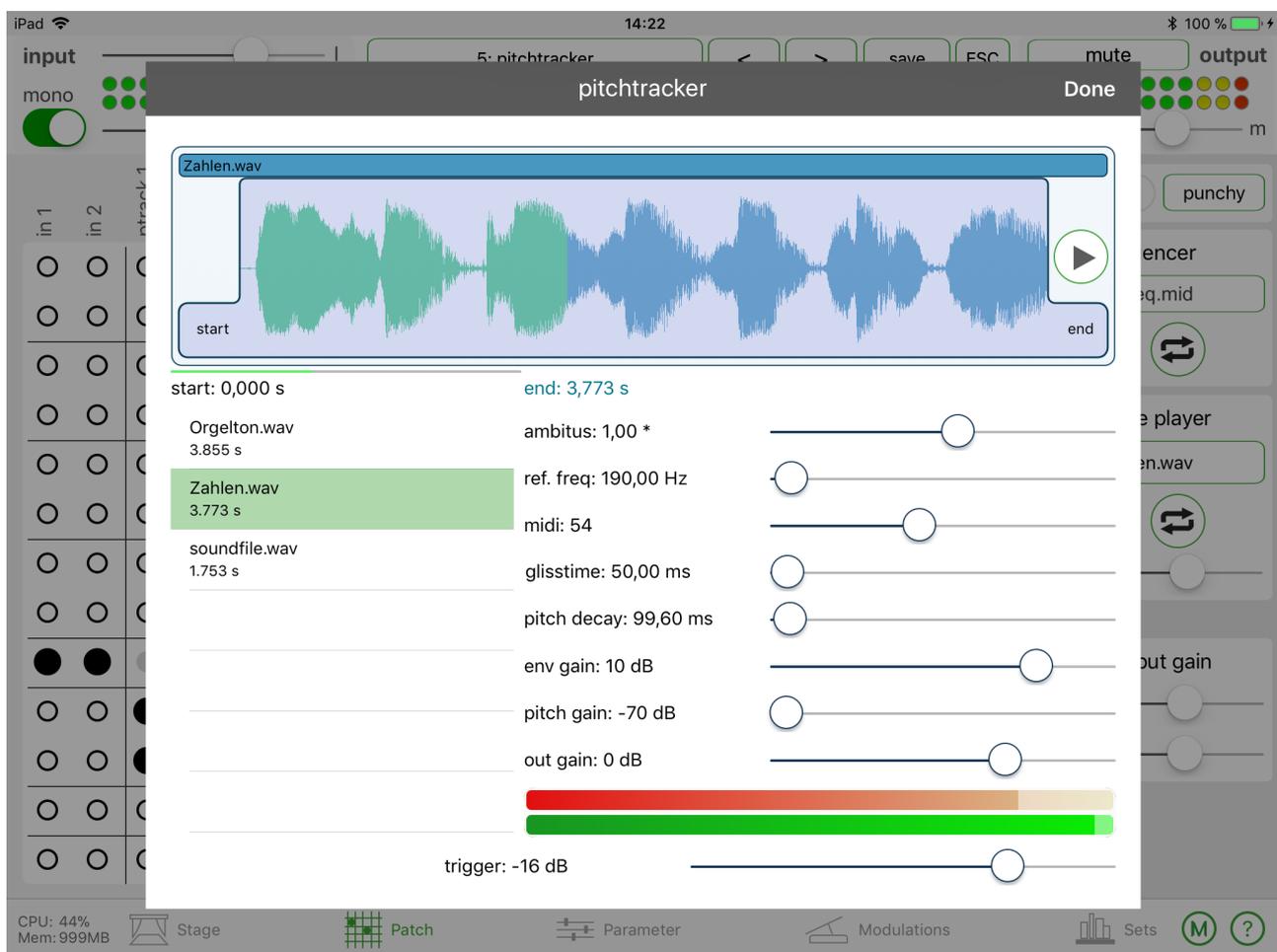


Cue 4: Pitch shift and delay

We turn off the noise generator and test with our voice. Short beat or voice noises through the mic input are best suited. The control fader controls the feedback: at 0, we hear the two independent delays only once; at 100, they remain in "infinite" repetition.

Cue 5: Pitch tracker

In the "Patch" main window, tap on the black box "**pitchtracker**". Here, the control by the foot pedal or the modulation fader was set to the starting point of the sample as a basic function. In order to hear this starting point better, the "Numbers" sample has been selected.



Cue 6: Degrade our voice with reverb (rvb)

The modulation fader or the USB pedal is assigned to the "window size" parameter (6 - 10 bit linear) in the "Modulations" main window in the degrade function and to the "decaytime" parameter (0.1 - 3 sec linear) in the reverb function.

Cue 7: The sequencer

We switch on a sine tone of 442 Hz in the test generator and hear the modulation of the test signal through pitch shifter 1, which is controlled on the "Modulations" main window by the "Chaos" sequence in loop mode.

The screenshot shows a software interface for audio modulation and sequencing. At the top, there are input and output controls, including a 'modulation' fader and an 'autocue' button. Below this is a table of modulation parameters:

modulations parameter	on	min	max	exponent
ring modulator 1				
freq	<input type="text"/>	0,00 Hz	1,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
ring modulator 2				
freq	<input type="text"/>	0,00 Hz	1,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
filter 1				
freq	<input type="text"/>	20,00 Hz	20,00 Hz	3,00
depth	<input type="text"/>	0 %	1 %	3,00
gain	<input type="text"/>	0 dB	1 dB	3,00
q	<input type="text"/>	0,10 u	1,00 u	3,00

Below the table is a 'sequencer' section with a dropdown menu set to 'chaos.mid' and a 'parameter' dropdown set to 'pitchShifter1.semitone'. A MIDI event viewer shows a sequence of events. At the bottom, there are MIDI controller settings, including 'midi' set to 'Netzwerk Session 1 (via wifi: yes)' and 'controller no.' set to '1'.

By touching the drop-down menu under "sequencer", we can see the different sequences that can be selected in this set. The pop-up menu appears under "parameters" with all parameters on which the sequence can affect. Here, the sequence in pitch shifter 1 controls the frequency, i.e. the pitch, between -24 and +12 semitones.

If we select another sequence to control a modulation, we may have to redefine the parameter and its range.

Introduction 3 - Save and retrieve, export and import

Now, at the latest, we may want to save certain settings that we have made by experimenting on the cues of these tutorials. However, this will cause the original settings to be lost. There are also cues in the library that could serve as a template for further development. It is recommended to create a duplicate (copy) beforehand and to continue working and experimenting on it.

Create a duplicate of a cue or a whole set:

In the "Sets" main window, to the left of the "Set" or "Cue" heading, press the green "+" and then "copy" on the pop-up menu that appears. The resulting copy can be found at the end of the order. We can move them into the correct order by tapping the green "Edit" button in the upper right corner, then touching the symbol with the three horizontal lines on the right and immediately moving items up or down to insert the copy into the new location. Then, tap on "Done".

We can rename the copy by tapping the green "Edit" to the right of the "Set" or "Cue" heading, then tapping the red dot or quickly wiping the field to the left and tapping "Rename" on the green field that appears. Do not use special characters when naming! Then tap on "Done".

We can also copy "cues" from one "set" to another by holding the field with the name a little longer and then moving it into the new "set". In the new "Set", we recognize a copied "Cue" by its (copy) name.

Save

If you now want to save the settings that you have made on a duplicate (copy) yourself, then you can touch the box "save" on the top of each main window and confirm the save to a certain cue.

Attention: the settings change naturally when using the foot pedal if a control was defined in the main window "modulations" and made active with the green switch. This save is definite. It is therefore worth to making a duplicate beforehand. All settings within a "cue" are always overwritten, including the samples and MIDI sequences. If I switch to another "cue" without saving it first, I will lose it.

Export

More importantly, from time to time, you should save a reliable backup copy to your iPad, external Mac, or iCloud by exporting it.

In the "Sets" main window, you can touch "Send Set" or "Send Cue" and, in the "samples overview", you can touch the "Send Sample" field. A subwindow appears with various options for export: Via AirDrop to another Apple device, sending the data via e-mail or saving the data in the file system of the iPad.

Export within iPad (save to files):

When we export a set, sample or cues via file backup, we can choose between iCloud-Drive (save in the "cloud") or "Save to my iPad". If you use this type of backup more often, it is recommended to create your own "iLEP" folder.

Import within iPad:

We can later return the file to the iLEP by tapping it in the File Browser and selecting iLEP in the Open In dialog. If the import is successful, a message is displayed. Possible import formats are: Set (Zip), Cue (XML), Audio (Wav, Aif, Aiff) and Midi (mid).

Export to a Mac:

As mentioned above, you can export a whole set to a desktop computer to save a backup or to continue working on it, e.g. to exchange audio files, add midi files, etc...

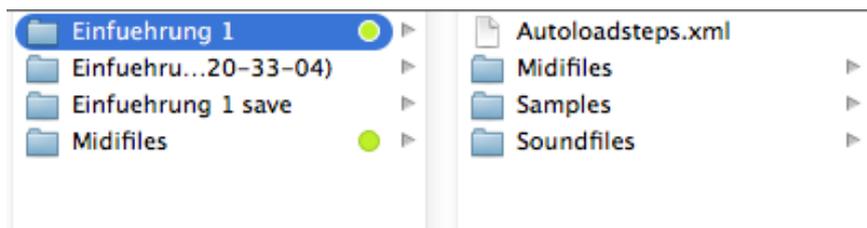
If you have LEP for Mac installed(vgl. <http://mspcafe.g2312.de/projects/utopia/>) you can import this set into LEP and edit it there.

Import from Mac:

1. Import a whole set:

If you want to import an iLEP set back to iLEP, you have to archive the set as a zip.

Below, you can see the data structure of a set. The folder name corresponds to the set name. The autoloadsteps.xml contains all cue data, and then there are folders for midi-files, samples and sound files. This structure must be adhered to for a set import to work.



Once you have zipped the set, you can send it back to your iLEP and import it there by email, AirDrop, etc.

2. Import of samples:

Newly imported samples are automatically copied to the currently opened set.



3. Import of midi files:

Newly imported midi files are automatically copied to the currently opened set. If a midi-file with the same name exists, the import does not work.

4. Import the Autoloadsteps.xml

The Autoloadsteps.xml contains all control data of a set. It is located as shown below, always in the root level of a set. If you import it, all control data overwrites the currently selected set.



The Import of new midi sequences:

iLEP can only play back midi sequences in this version, but you cannot record or edit midi sequences with iLEP. The best way to do this is to use external apps—these are available in large numbers for the iPad or desktop computer.

The easiest way is to record a monophonic midi sequence with a keyboard, correct it and edit it and then create a midi file using "save" or "export", which is accepted by the iLEP without compression.

Introduction 4 - Peripherals: Foot pedal und acoustic performance

The iLEP shows its versatility and performance value especially in connection with a musical instrument or the human voice. In this manual, a relatively simple compilation of peripheral devices is shown in a concrete example, which sounds very convincing even without an interface and of course offers the same musical possibilities.

Apple's iPad has an analog and a digital connection for interface with peripherals (the wireless interfaces through WiFi and Bluetooth will be explained later).

a) The analog interface

The fastest way to test this connection is to use a headset with a 4-pin jack plug.



Headsets allow simultaneous speaking through a microphone (mono) and listening through headphones (stereo). For a composer, a headset is actually the ideal tool to test modulations or prepare a composition with a voice.

However, not all headsets are compatible with the iPad!

OMTP	CTIA		
		L	Linkes Tonsignal
		R	Rechtes Tonsignal
		AUX	Zusatzsignal, z.B. Mikrofon
		GND	gemeinsame Masse (Rückleitung)

The pin assignment from <https://de.wikipedia.org/wiki/Klinkenstecker>. iPad supports CTIA.

If I now want to connect an instrument microphone and two speakers instead of the headset, I have to connect the four-pin connector (1 x 4-pin male 3.5 mm jack plug with the assignment L,R,GND,MIC TRRS) into separate inputs and outputs, see figure below.
(2 x 3-pin female jack, color-coded for headphones and microphone TRS)
Adapter: <http://www.kvconnection.com/product-p/km-iphone-2trs.htm>
Tests have shown that this connection sounds very good even without an interface.

b) The digital Interface

The following picture shows a simple setup for a live performance in connection with a musical instrument. Not in the photo is the musical instrument with the instrument microphone, which is plugged into the red analog jack plug, and also the speakers, which are plugged into the green analog jack plug. Nothing needs to be configured in the iPad: it immediately recognizes the external devices (in the picture above left).

b) the digital interface



In the picture below left, we see the power supply and a "Lightning" adapter from Apple, which establishes the connection to a USB pedal. Apple's power supply must be connected to a network when a USB pedal is connected.

Our iLEP app does not require any configuration either: it recognizes the USB pedal and we immediately see the movements on the controller fader with the black dot under the heading "Modulation" in each main window, which we can now move with our feet.

Recommended peripherals:

- USB pedal from EOWAVE www.eowave.com
- Instrument microphone from MONACOR <https://www.monacor.de/produkte/beschallungstechnik/mikrofone-und-kopfhoerer/ansteckmikrofone/ecm-2500/> (32.-€) but also ecm-16N (30.-€)

To the USB pedal:

In the main window "modulations", we see the controller number of the USB pedal in the lower right corner. We can also connect other MIDI controllers (sensors, faders, etc.) with different controller numbers. On the right, there is the possibility to reverse the pedal movement.

I recommend the following position:

When the pedal is up ↑ (open), the black dot is at 0%.

When the pedal is down ↓ (flat), the black dot is at 100%.

The USB pedal makes working much easier. I can assign the pedal movements to one or more parameters on the "modulations" main page and set their range, but I can also hear them simultaneously: see introduction 2. Then, I observe the result of my pedal movements on the "Parameters" main page and can limit the desired sound settings more quickly by listening simultaneously, reading exact values, entering them in the "modulations" main window and saving them.

If you are using an **audio** or **midi interface**, you may need a second Lightning adapter to connect the interface to the USB pedal simultaneously. A USB hub with its own power supply also allows the connection, and then the power supply is no longer necessary, as shown in the picture above.

Introduction 5 - Compiling cues and the library

The "Stage" main window is mainly used for performances to call up the cues in the order in which they were arranged in the "Sets" main window. A cue can occur several times in this order. For example, if you want to repeat the setting that was saved on cue 1 later on, e.g. on cue 7, you should first make a duplicate of it in the "Sets" main window with the green "+" sign (see Introduction 3). It will appear at the end of the cue row and the three-line symbol in the "Edit" function allows you to move it up or down to the position you want. Then you can also repeat other cues at other places and put together a longer, permuting sequence with 5 cues, which then automatically gets sequential numbers on the main window "Stage", which are called up in this sequence.

Escape key: the "set" sequence jumps to cue 0: reset (a kind of emergency stop key for feedback or when the conductor requires rest).

Jump to a specific number: touch the top wide field with the step number: all cues are listed on the appearing subwindow and can be selected immediately.

Take care: you cannot tap too fast, because a lock of 0.5 seconds is built in so that nervous finger movements are not registered.

In the lower left corner, there is the option to define "autocues", where the next cue is automatically called after a specified time.

Cues do not always have to be called or stitched "by hand". In the "Stage" main window, you can add the "autocue" function to a cue and define the time when it automatically moves on to the next cue. To activate the function in general, however, the "Autocue" function must be activated at the top right of the modulation fader.

In the lower half of the main window "Stage", there is the possibility to assign a cue to each capital letter. For example, I can assign the letter A to cue 7, the letter B to cue 3, etc. All of this is stored in bank 1. In bank 2, I can freely assign new cues to the letters and save them. Beware of autocues: they also work here.

The Library

With the purchase of the iLEP, you also receive a small library that is constantly being expanded. It consists of a collection of cues or "presets". There is a description for each cue so that the library also allows you to get to know the program with its versatile possibilities in more detail. You can also have interesting cues entered into the library by the planned "users group". The exchange of cues and complete sets is described in Introduction 3.

It is recommended to create your own library over time, in which you save your own cues in order to use them later in new works. They are then simply dragged from right to left in the "Sets" main window into a new set and then pulled up or down in the desired order.