



## ELEKTRON SPS1 Machinedrum

### Synthetic Percussion Sequencer

Reviews : Drum machine

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Swedish manufacturer Elektron claim that their SPS1 rhythm synth is the most sophisticated drum machine ever built, with a stunning specification that includes no less than four different types of percussion synthesis.

**Chris Carter**

Elektron are the Swedish manufacturer of the under-rated SidStation synth based on the sound chip used in the Commodore 64 home computer (see SOS November '99 or [www.soundonsound.com/sos/nov99/articles/sidstation.htm](http://www.soundonsound.com/sos/nov99/articles/sidstation.htm)). If you thought that bringing out a synth like the SidStation seemed an anachronistic move, you'll probably find the company's new product, the Machinedrum SPS1 drum machine/percussion synth, even more out of step with the times. A drum machine, in the 21st century? But Elektron aren't an ordinary company, and the SPS1 is no ordinary drum machine...



#### Out Of Time

According to Elektron's Daniel Hansson, the idea behind the Machinedrum was to incorporate the sounds and features of the most highly regarded drum machines and electronic percussion of the past, such as the Roland TR-series, Simmons kits, the LinnDrum and the Emu SP1200, and to include the popular TR-style rhythm grid/programming interface, whilst bringing the overall feature-set up to 2001 standard — so there's a comprehensive MIDI spec, and plenty of modulation and real-time control potential.

Of course, Elektron aren't the first company to produce a 'sound-alike' drum machine, and samples of classics are available everywhere. But a sample, no matter how good, is a poor substitute for many rhythm *aficionados*. As a result, although the Machinedrum does feature sampled drums, it also has three other main means of sound generation: FM synthesis, modelled analogue percussion synthesis on classic TR-series Roland lines, and physical models of real drums and percussion. Now that's what I *call* a percussion synth...

Before you head for your local music shop, credit card at the ready, I should point out two things: firstly, the Elektron Machinedrum is a professional piece of kit from a small manufacturer, and consequently has a decidedly pro price tag (about 850 pounds at the current exchange rate); and secondly, it's currently only available directly from Elektron themselves, via their excellent web site. If you're still interested, read on.

#### User Interface

Elektron are boldly touting the Machinedrum as "the most sophisticated drum machine ever", and looking down the SPS1 spec, I have a feeling they may be right. This machine has an outstanding feature-set, as you can see in the box on the next page. In brief, the SPS1 consists of three main programmable elements — a percussion synth, a percussion sequencer and built-in effects.

The SPS1 is superbly constructed, with a Swedish steel casing and a heavy-duty brushed aluminium front panel. At 340 x 176 x 68mm (including knob depth), it's compact, but still weighs in at a fairly hefty 3kg, not including its power supply.

On power-up, the Machinedrum's most striking feature is its large bright red backlit LCD. The display is essential for almost all operational functions, from selecting Songs and Patterns and adjusting tempo to sound editing, Pattern programming and MIDI settings. The control panel layout closely follows standard 16-step drum machine conventions, and the large continuous data wheel, knobs, buttons and LED indicators are logically laid out. Good use is made of LEDs, including one above each of the 16 pads to show rhythm pattern activity, mirrored in another group of 16 (the Sound Selection indicators) directly above the data wheel. This second bank of LEDs also indicates which of the 16 percussion voices is being edited in the main LCD window. Apart from selecting percussion sounds for editing, the data wheel is only used for adjusting global parameters such as Tempo (30-300 bpm), Accent, Swing and Machine selection in Kit Edit mode.

The Master Volume and Track Level controls are self-explanatory, and other parameter adjustments are carried out using a bank of eight so-called Data Entry knobs, which take on different functions depending on

**Elektron  
Machinedrum  
SPS1 1350 Euros**

**pros**

- \* Outstanding percussion (and synth) sounds.
- \* Vast array of programmable features.
- \* Real-time editing controls.
- \* Good MIDI spec.
- \* Individual outputs.
- \* Beautifully constructed.
- \* Nothing else quite like it.

**cons**

- \* A few inscrutable operating procedures.
- \* Song composing mode needs tidying up.
- \* It's a premium-quality instrument... but it comes with a premium-quality price tag.
- \* Pads not velocity sensitive.
- \* Red LCD can be hard on the eyes.

**summary**

The Machinedrum is an outstanding drum machine. Its percussion sounds outshine anything currently available, and range from spookily authentic-sounding classics to off-the-wall, hardcore beatbox and synth mayhem. Some operational quirks still need ironing out, but if you can live with its idiosyncrasies you won't be disappointed. Professional and pricey, but very, very tasty.

**SOUND ON SOUND**

the mode and current LCD screen. Most of the front-panel knobs and buttons can also be used to control external MIDI equipment, and conversely the majority of internal parameters (384 of them) are adjustable via MIDI.

Not only are the Data Entry knobs on the Machinedrum infinite rotary types, they also incorporate a useful, and I think a fairly unique, push-switch function; if you push down on a knob while rotating it, the data values change at a much faster rate.

Navigation when editing via the LCD is by four dedicated arrow buttons directly under the display. There is also a pair of Enter/Yes and Exit/No keys to round off this much-used section. The Transport controls consist of Record, Play and Stop buttons, which also double as Copy, Clear and Paste functions when used with Patterns and Songs (in fact, most of the front-panel keys operate as dual-function buttons). There are, however, no dedicated fast-forward or backward transport controls, so if you wish to jump to a new song position, you need to enter Edit mode while the song is playing, and use the arrow keys to move up and down the song Pattern list — a slightly messy solution.

The five-button section marked Pattern Selection is used for moving between the eight Pattern Banks (a total of 128 Patterns) and also for activating track Mutes, Accents, Swing and Slide settings; more on these later.

The back panel of the Machinedrum is just as well kitted out as the top panel, with audio jack sockets for headphone connection, main stereo audio outs, four further individual assignable outputs, stereo audio inputs (of which more later), and MIDI In, Out and Thru sockets. Also here are the power switch and a 6V AC socket for the external PSU. Like most people, I'm not really keen on external power supplies, but I can accept that the SPS1 has one; what I *really* wish was that it had been one of the more common 9V DC types. Believe me, if you are in the middle of a tour and break or lose an AC-to-AC wall wart, you have about as much chance of finding a replacement at the local electrical store as you have of finding a nun at a Marilyn Manson gig.

### Machinedrum Synths

The basic percussion building blocks used in the SPS1 are called MD-Synths, of which there are four types: TRX, EFM, E12 and PI. The MD-Synths are available to the user as various percussion Kits, each containing 16 sounds called Machines. All Kits offer a range of Machines so that all the usual drum machine sounds and percussion instruments are present, such as bass drums, snares, toms, claps, cymbals and so on, and many metallic and synth-like sounds are also included.

The TRX Kit takes Roland TR-series synthesis as its starting point, and indeed the TRX Machines are quite capable of sounding just like an original TR drum machine. However, the recreations have extended controls not found on the original machines. The bass drum, for instance, has parameters for Pitch, Decay, Noise, Harmonics and Clip (distortion) amongst others, while the snare offers Snap, Tone, Tune (which detunes the oscillators) and Clip (distortion). Of the 12 TRX Machines available, all have various extended parameters, with up to eight variables on offer in some cases.

The EFM Kit is based on FM algorithms, and once again the percussion voices cover the usual fare of bass drum, snare, toms, and hi-hats, although in this case only eight different Machines are available. The (numerous) adjustable parameters for the EFM Machines are subtly different too, with more emphasis on filtering and pitch modulation. The preset Kits are relatively laid back considering what the Machines are capable of with a little tweaking; you can treat each individual EFM Machine as a

programmable FM synth and conjure up the most outrageous rhythm patterns. Think Kraftwerk on LSD...

The E12 Kit is the sample-based one, and the 16 Machines encompass everything from bass drum, snare and tambourine to shaker, triangle and something called 'BongoCongo'. Unlike on the other Kits, most of the E12 adjustable parameters are much the same from Machine to Machine, but each contains a different sample. All have Pitch, Decay, Retrigger, and Bend parameters, and most have a high-pass filter with resonance.

Retrigger is an interesting function that doesn't appear in the other MD-Synths. It retriggers the sample at an adjustable rate, from just one trigger for each step event to continuously retrIGGERING. But usefully, it also allows you to vary the time between each trigger using the 'Rtim' parameter; decreasing this setting closes up the gaps between triggers, until at the minimum settings the effect becomes so fast that it acts as a kind of modulation LFO. This allows the creation of unusual discordant cross-modulation and ring modulator-like percussion sounds, and if used with the high-pass filter and bend options, the samples take on a completely new life.

The PI Kit is comprised of physical models of acoustic drums. There are six PI Machines, including bass drum, snare, toms and (peculiarly) maracas, and each has between four and seven parameters, including model

## Features At A Glance

### SOUND GENERATION

- Four MD-Synths (TRX, EFM, E12, PI).
- 39 individual Machines.
- 64 user-programmable kits.
- Five effects per Track.
- Four stereo master effects.

### PERCUSSION CONTROL SEQUENCER

- 16 Tracks.
- 128 user Patterns.
- 32 user Songs.
- Swing, Slide, and Accent options.
- 16 x 24 Parameter Locks per step.
- Real-time control.
- 384 MIDI-controllable parameters.

### EFFECTS

- Amplitude modulation.
- One-band EQ.
- Resonant 24dB low-, band-, or high-pass filter.
- Sample-rate reduction.
- Distortion.
- Rhythm echo delay.
- Gatebox reverb.
- High/low shelving and parametric EQ.
- Dynamics processor.

### HARDWARE

- 24-bit D-A converters.
- Left and Right stereo outputs.
- Six individual audio outputs.
- Two individual audio inputs.
- Stereo headphone output.
- 128 x 64-pixel backlit LCD.
- MIDI In, Out, and Thru.
- Flash-upgradable OS.

parameters such as: Tension, Dampening, Ringing, Grain, Rattle, Tune and Size. Playing the Machinedrum with a Roland Octapad, I was quickly able to get a custom PI kit I'd put together sounding highly expressive, and I imagine a 'real' percussionist would get even more impressive results.

Although the PI Kit doesn't include the same wide range of Machines as the others, or as many variable parameters per Machine, it is nevertheless a very versatile 'building block' and is capable of some outstanding percussion sounds, real and invented, which come across as more realistic than the sample-based E12 Machines in many ways.

Last amongst the kits is GND, which isn't really a MD-Synth. All it contains are a few miscellaneous Machines that don't come under any of the above types, such as a sine-wave oscillator, a white noise source, an impulse generator for pulses and clicks and the Input Machine, which allows external audio signals connected to the rear A and B inputs to be inserted into Patterns and/or passed through the SPS1's many effects options as if they were from an MD-Synth Machine on individual Pattern tracks. The inputs can also be set for triggering using standard piezo drum pad transducers.

The Machinedrum includes 30 factory default Kits which can be overwritten or recalled at any time, and space for 64 user kits. Also included is an uneven demo song with far too many weak spots amongst some real 'show off' sections. The supplied Kits are fine, if a little unadventurous, but they'll get you started, and you'll be building your own kits in no time. Most importantly, the user kits are not restricted to just one type of MD-Synth, as many of the presets are; you can mix and match different Machines within kits as you wish. Putting a TRX bass drum

and snare in the same kit as a few E12 toms and some EFM claps and hi-hats is no problem.

### Track Effects, LFOs & Master Effects

Each of the 16 Machines (as each individual SPS1 drum sound is called) has its own dedicated Track Effects: an amplitude modulator (with LFO Depth and Speed parameters ranging from tempo-locked tremolo to full amplitude modulation), a one-band parametric EQ (with fully variable boost, cut and frequency), a resonant 24dB-per-octave low-, high-, or band-pass filter, a sample-rate reducer (which does exactly what it says, and is capable of reducing your sparkling audio to lo-fi grunge with exaggerated aliasing artefacts), and distortion.

Further sonic mangling is possible with the detailed LFO sub-section, which has a dedicated display page for each of the 16 Machines in a Kit. At power-up, each LFO is mapped to its own Machine/Track, for example bass drum LFO to bass drum, snare drum LFO to snare drum, and so on. However, the Track parameter will let you re-route the LFO output to another track for multiple LFO modulation of a single Machine.

The Parameter control selects the Machine parameter you wish to modulate from a lengthy list covering every editable Machine variable. You can even modulate other LFOs. The Update function synchronises the LFO to the main tempo, lets it run free or resets the waveform when a trigger is received.

If there is one feature the SPS1 isn't short of it is LFOs; there are around 44 by my count, and I probably missed a couple somewhere! I can't think of many *synths* with that many LFOs, let alone a drum machine. But I'm far from complaining, as it's this sort of attention to detail which begs users to experiment with bizarre sound manipulation, and that's right up my street.

As if that weren't enough sound-shaping potential, the Machinedrum also has four stereo Master Effects: the Rhythm delay, the Gatebox reverb, the Dynamix dynamics processor and a parametric and high/low shelving EQ section. The Rhythm echo and Gatebox reverb are accessed via dedicated sends in the 16 Machines/Tracks, while the Dynamix processor and EQ sections process the final stereo output signal.

The Rhythm echo is a tempo-synchronised (but variable) mono-in/stereo-out affair, with the added bonus of integrated high- and low-pass filters and an LFO for modulation effects. The Gatebox reverb covers workaday reverb, gated reverb and ambience effects, and although it has a decidedly 'budget' sound it isn't without low-tech charm.

The Dynamix processor is optimised for compressing percussive sounds, and includes all the parameters you'd expect to find on a well-specified compressor, including Attack, Release, Threshold, Ratio, Knee (hard/soft), 'HP' (a side-chain filter), and Gain. The compressor is used to good effect on some of the factory presets and can have a dramatic effect on a rhythm, particularly when used in conjunction with the EQ section. All settings for the Stereo Master Effects section are saved as part of a Kit.

### Pattern Sequencing

Pattern sequencing comes in two flavours: Classic and Extended. In Classic mode, the Patterns operate as on a traditional drum machine, with the Patterns and Kits as separate entities. In Extended mode, a Kit (including its Machines, effects and routing parameters) and a Pattern are bonded together. Extended is probably the most useful mode, as you can guarantee your rhythms will always sound as you intended, whereas Classic is useful for trying out different Kit and rhythm combinations while you're trying to get your sounds right.

Patterns are put together in the time-honoured fashion established by Roland's TR808 drum machine, called Grid Composing on the Machinedrum. With a new Pattern, you first need to decide the maximum number of steps (2-16 or 17-32) and the scale. The default setting is 16 steps and a 4/4 scale, but various other scales are also available. In the extended 32-step mode (2 x 16 steps), there are two LEDs at the right of the front panel to indicate which of the two 16-step patterns you are editing.

The 16 numbered drum keys along the front of the unit are labelled with the same percussion names as the Sound Selection LEDs above the data wheel. In normal Play mode, the LEDs above the drum keys flash to indicate which Machines are playing on any given Pattern step. Pressing Record, however, changes the LED arrangement to show a single running LED and non-flashing, lit LEDs at points where trigger steps have been programmed for the currently selected sound. Although the SPS1 allows you to enter Pattern step triggers in either Play or Stop modes, you cannot hear any real-time Machine editing unless the pattern is playing.

Other pattern/track options include Swing (50 to 80 percent), Accent (which works across the whole pattern, not on individual drums), Mute (to silence individual drums) and Slide. Slide is interesting as it works in conjunction with the Parameter Lock. This last feature is only available in Extended mode and is in my opinion one of the Machinedrum's most indispensable features; I used it extensively in this review. It allows any Machine, effects and routing parameters within a kit to be locked to a fixed value at any step in a pattern. Using it on the pitch control of a suitable Machine, you can compose basic monophonic melodies alongside the rhythm pattern, creating (say) bass lines, analogue sequencer-style synth patterns, or arpeggios. You could also use it on effect send parameters to add delay and/or reverb to specific steps in a Pattern, or on Level parameters as an accent for individual percussion sounds.

The default state for Parameter Lock is to move from one step to the next exactly as programmed; however, the Slide feature lets you apply an element of glide between steps for a smoother transition. There is an upper limit of 24 Parameter Locks for each



Pattern step on each track, but this equates to 384 parameters for each Kit, per Pattern, which is likely to be sufficient!

The Live Recording option lets you record drum triggers and Parameter Lock adjustments in real time. You

simply hold down the Record button and press Play, and can then enter rhythms by hand using the drum keys or via MIDI, although MIDI velocity information isn't recorded. In Live Recording mode, the Parameter Lock functions similarly to the Motion Control feature on some Korg, Roland and Yamaha gear, and records any tweaks or adjustments you make to the data knobs while looping. This allows you to add movement and expression to Patterns, with changes to level, decay time, filter frequency, and modulation over time.

Patterns are selected in Play mode by using a combination of the drum keys (1-16) and Pattern Selection buttons, plus the 'Bank Group' button to select banks A to D or E to H. Patterns can also be copied and pasted to other locations or erased, as can individual note triggers and Parameter Locks.

## Song Construction

Song construction is basically arranging a list of Patterns to be played in sequence. At each step in a Song you can determine the Pattern to be played, the number of times it repeats before moving to the next, whether a Pattern starts playback from its beginning, or override the pattern tempo with an alternative value. A Song can contain up to 256 steps and 32 Songs can be stored in memory.

Songs can be constructed to play to their end and stop, or play to a predetermined point and stop. Using the 'Loop & Jump' feature, Songs can loop indefinitely, loop at a certain point or play to a point and then jump to a different point in the Song. Thankfully, Songs (and their associated Kits) can be saved with meaningful names, unlike on a lot of drum machines. There is also a real-time Song recording mode, though there is little mention of it in the instruction manual. I found creating Song Patterns in this mode a lot easier.

## Final Thoughts

It would be easy to dismiss the Machinedrum as a repackaged bunch of 'has-been' drum machines, but I think this would be most unfair. Although my first few hours with it were indeed spent faithfully recreating and reminiscing over those golden oldies, I soon moved into the realms of custom Kit construction, modulation, manipulation, extreme percussion-warping and fancy rhythm-pattern programming. And from then on, I never looked back.

Having been using it for a while, it seems to me that the Machinedrum's appeal is twofold. Firstly, by incorporating high-quality software-based sound generation with real-time controllers in a hardware box, Elektron are hoping to attract the not-insubstantial following of dance musicians, DJs and producers who prefer to do their rhythm programming and playing with a 'hands on' instrument, as opposed to via a computer. Secondly, this machine will appeal to budding electronic percussionists who aspire to rhythm-making the 'old-school' way, but whose budget won't stretch to an arsenal of old TRs, Linns and Emus.

Having said that, at around £850, the SPS1 is hardly a snap purchase either — it may be a top-quality instrument, but it has a price to match, and despite the wealth of features it offers, a price this high will inevitably limit its appeal. Furthermore, although I can't fault the Machinedrum's construction, logical layout, external interfacing and its awesome sonic capabilities, it is let down a little by a few operational quirks, plus a couple of none-too-clear editing screens. Song construction and playback could be easier. I would also have liked a dedicated pattern fill-in feature and a few more master effects. Finally, I did find the red LCD a little hard on my eyes after prolonged use, but that was after an exceptionally long session.

According to Elektron, the next major SPS1 software revision (version 1.1) should be available from their web site by the time you read this. The company claim that this will rectify some of the shortcomings I've noted here, while also adding some useful extras, like MIDI Song Position Pointer recognition, MIDI sequencing Machines for control of external MIDI gear, new sound-generating Machines, a redesigned song interface, and many other general improvements.

I feel confident in guaranteeing that you'd be hard-pressed to find another drum machine, or even many synths, that can generate quite the extreme range of sounds this one is capable of; the nearest hardware equivalent would probably be a combination of a Korg ER1, a Yamaha AN200 and Jomox XBase09. Of course, you could get sounds similar to those in the Machinedrum using a couple of grand's worth of Mac or PC and some software, but I still doubt that this would sound quite as good, and it definitely wouldn't be as portable or half as much fun. In short, despite my (few) reservations, I think the Machinedrum is a truly awesome piece of kit. 808

### Mostly MIDI

The Machinedrum is well specified in the MIDI department, and I encountered no problems sync'ing it to, and controlling it from, other drum machines, keyboards and MIDI interfaces. At the moment, it doesn't respond to Song Position Pointers, but Elektron claim that this will be implemented in the next software update. At power-up, the SPS1 is arranged to allow you to trigger Patterns mapped across an external MIDI keyboard. This is a useful way of trying out combinations of rhythms and for jamming, although unfortunately this feature didn't seem to work in real-time Song recording mode.

Full support is given to external control of the SPS1 over MIDI; in fact there are 384 MIDI-controllable parameters. You can also use the Machinedrum's buttons and data knobs as a MIDI controller for external gear, and Patterns, Songs, or the entire contents of the SPS1 and its settings may be saved via SysEx.

### Test Spec

• SPS1 version reviewed: v1.00c.

**E** The SPS1 is available only at the Elektron web site, for 1350 Euros (about £840) including express shipping and Swedish sales tax. The optional rack kit is 40 Euros (about £25).

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