

ENSONIQ SQ-80 WAVES

The Ensoniq SQ-80 has a great set of digital waves stored in the DWM (Digital Wave Memory). Just as important the waves are "multi sampled" every 8 notes (half steps). The selection and quality of wave samples is just one more reason this is a great sounding synth.

The first 32 waves are "shared" by the SQ-80's little brother the ESQ-1/ESQ-M (Rack mount version of the ESQ-1). Any sounds that only use these waves will also sound about the same on an ESQ-1. All ESQ-1 sounds will work on an SQ-80. If you use a SQ-80 sound that contains a wave higher then "OCT+5" on an ESQ-1 it will sound weird but not break the ESQ-1. It was this behavior that lead to the discovery of waves from 76-255 on the SQ-80. These waves are created by using the OS ROMS as wave forms and "Hex" editing SYSEX voice dumps to select different then normal voices. Again the SQ-80 is not hurt but the sound may not be that useful. The "extra" waves are not shown here. Only the "normal" waves are.

The "Cross wave" part comes from the philosophy of adding an attack sound (a [pluck](#) for example) to the sustain part of a sound that originally didn't go with the attack. The SQ-80 has a number of waves and inharmonic loops for the sustain, and a few additional waves for the initial attack part of the sound. There is nothing to keep you from using any wave for the attack, and with the "sync" feature on OSC2 you can even use the attack waves in the sustain portion of the sound. This was the "big thing" when the SQ-80 and other synths of the time came out.

Here are the waves (in order) and descriptions taken from the SQ-80 Musician's Manual. If there is a link on that wave you can hear a few seconds of it in LO-FI 8 bit mono.

[Why 8 bit mono and only 11KHz...I didn't want anyone "stealing" the sounds...I just wanted you to have a "taste"...also you may need quicktime installed to play them]

THE 70 WAVES AND 5 DRUMKITS

CLASSIC SYNTH WAVEFORMS:

The basis of many classic Analog sounds.

[SAW](#)

Sawtooth [Almost all instruments create a Sawtooth like waveform. Contains All harmonics ... with the amplitude of the harmonic = to it's inverse in relation to the fundamental. IE: 2nd harmonic is 1/2, 3rd is 1/3 and so on.]

BELL	The Bell Waveform contains many widely spaced harmonics, many of them odd. [OK not bells]
SINE	The "Mother" of all waveforms.
SQUARE	[OK and not Clarinets which are more or less square waves.] Contains only ODD harmonics with the amplitude = to it's inverse. IE: 1, 3, 5, 7... harmonics have amplitude relations of 1, 1/3, 1/5, 1/7....
PULSE	A square like wave ... with a smaller duty cycle.
NOISE1	This filtered noise works best when tuned to OCT=-3.
NOISE2	This is close to white noise. Modulate this with a fast LFO or envelope to make it closer to "real" noise.
NOISE3	This has an unpredictable clangorous metallic quality.

SAMPLED WAVEFORMS:

These contain harmonics that can not be generated by an "ordinary" synthesizer [Remember this was 1987].

BASS	A bright Bass Waveform full of interesting harmonics. Higher up is takes on a Clav-like character.
PIANO	A multisampled acoustic Piano Wave. Its best range is OCT=-1.
EL PNO	Electric Piano.
VOICE1	The SQ80 singing "Ah".
VOICE2	The SQ80 singing "Ah" - with a higher split point however.
KICK	Tuned to OCT-3 this can make a good Kick drum. However it is looped. KICK2 is the oneshot or attack version of this wave.
REED	1 cycle from an Alto Sax.
ORGAN	The fundamental and four octaves. (Harmonics: 1, 2, 4, 8, 16).

ADDITIVE SYNTHESIS WAVEFORMS:

Created through Digital Additive Synthesis. Each contains the Fundamental and certain specific harmonics in *EQUAL* amounts. Note:See SQUARE and SAW waves, and the band limited waves that follow section after next.

SYNTH1	Contains the fundamental and every third harmonic, starting with the 2nd up to the 26th. (Harmonics: 1, 2, 5, 8, 11, 14, 17, 20, 23, 26)
SYNTH2	Contains the fundamental and every third harmonic starting from the 4th to the 25th. (Harmonics: 1, 4, 7, 10, 13, 16, 19, 22, 25)
SYNTH3	Contains the fundamental and <i>PRIME NUMBERED</i> harmonics up to the 23rd. (Harmonics: 1, 2, 3, 5, 7, 11, 13, 17, 19, 23).

BAND LIMITED WAVEFORMS:

These are like other waves but with the upper harmonics removed.

PULSE2	Like PULSE but with only the first 11 harmonics.
SQR2	A SQUARE wave with only the first 7 harmonics left in.
4OCTS	In equal amounts only four octaves (Harmonics: 1, 2, 4, 8).
PRIME	Only the first prime harmonics in equal amounts (Harmonics: 1, 3, 5, 7, 11)
BASS2	A bass wave with only the first 18 harmonics left in.
EPNO2	El PNO with only the first 9 harmonics (EL PNO with out the "ping")
OCTAVE	Fundamental and one octave in equal amounts. (Harmonics: 1, 2)
OCT+5	Fundamental, octave, and the fifth in equal amounts (Harmonics: 1, 2, 3)

This ends all waveforms that are common to the ESQ-1, ESQ-M, and the SQ-80.

MORE WAVEFORMS:

This Starts the waveforms that are new and "unique" to the SQ-80. Waves in this section are generally used for Sustain and have been "selected for maximum usability". Remember however that any wave can be used for an Attack sound given the proper envelope.

SAW 2	A "Sawtooth" with only the first 3 harmonics left in.
TRIANG	A triangle wave. Another "Classic" analogue waveform. It is composed of odd harmonics only whose amplitude falls as the inverse square (Harmonics:Amplitude)=1:1, 3:1/9 ,5:1/25, 7:1/49, ...
REED 2	Another Reed/Woodwind like wave form.
REED 3	This reed sound has a nasal oboe like quality with a frequency peak that tracks along with the keyboard(unlike the formant waves).
GRIT 1	The 3 Grit waveforms are harmonically dense and used to give an "edge" to the sound. GRIT1 is the least "aggressive" and GRIT 3 the most.
GRIT 2	This is the medium grade grit.
GRIT 3	This is the "brightest" of the GRIT waveforms.
GLINT1	The GLINT waveforms can be used to add "shimmer" to a sound. I have used them to make "sliver" bells. Setting the OCTave on these waveforms has NO EFFECT.
GLINT2	The high harmonic is a bit lower.
CLAV	Taken from the sustain portion of a "Clav" or clavanet. Clavanets are early electric keyboards where the key directly strikes a string or reed whose vibrations are picked

	up by a pickup (like an electric guitar). Sometimes rather than "hammer" the string a sticky pad "plucked" the string or reed.
BRASS	The lower range is a multi-sampled trombone, the upper a trumpet.
STRING	A multi-sampled cello note.
DIGIT 1	Created using FM (Frequency Modulation) with "large amounts of modulator feedback".
BELL 2	Another bell tone.
ALIEN	Partly synthetic, partly sampled vocal waveform.

INHARMONIC LOOPS:

These five waveforms have loops longer then a single cycle. The movement can give your sounds life or an "atmospheric" quality.

BREATH	Hollow and breathy, a little fundamental.
VOICE3	Females singing "Ooh". Remember this is from the sustain part of the wave.
STEAM	Lots of gas, little fundamental. Taken from a infomercial sales pitch.
METAL	Dense and deliberately synthetic.
CHIME	Started out life as a tubular bell...that is a chime. Go Figure.

TRANSIENT ATTACKS:

Finally we are here. The SQ-80 was billed as using Cross Wave Synthesis (CWS). CWS is just attaching a different attack to a different sustain. The "competition" like the Roland D-50 could to this too and called it LA (Linear Arithmetic) synthesis.

These attack waves are taken from just the start of sounds and do not normally repeat over and over. They automatically fade out. I usually use OSC3 for attacks that way OSC1 and 2 can do there AM modulation or SYNC things if you wish. If you set a transient attack wave (or drum) on OSC2 and set SYNC=ON on the modes page then you can use an attack or drum as a sustain wave too. Neat!

BOWING	The initial bow scratch in from a cello down low, from a violin up high.
PICK 1	Fingernail on a steel string acoustic guitar.
PICK 2	Electric guitar and a nylon pick.
MALLET	Mallet on vibraphone. Bright yet mellow.
SLAP	The <i>SLAP</i> from a slap bass.
PLINK	Can you say Karplus-Strong Plucked String Algorithm (KSPSA) three times fast? Well that is where this came from.

PLUCK	Yep it's the return of the KSPSA ... only a bit higher.
PLUNK	Started life as two wine glasses clinked together ... then you guessed it the attack of the KSPSA again.
CLICK	Try this with no keyboard tracking by setting on of the modulators of the OSC to KBD2*-63. Then tune using OCTave and SEMItone to taste. Oh by the way ... you guessed it - it's a click.
CHIFF	A fluten tooten start up. (I think I have been at this a bit to long).
THUMP	The actual sound of a piano hammer hitting an actual piano string ... except all the strings were well dampened. Again try this with keyboard tracking eliminated (see CLICK).

DRUM/ATTACKS:

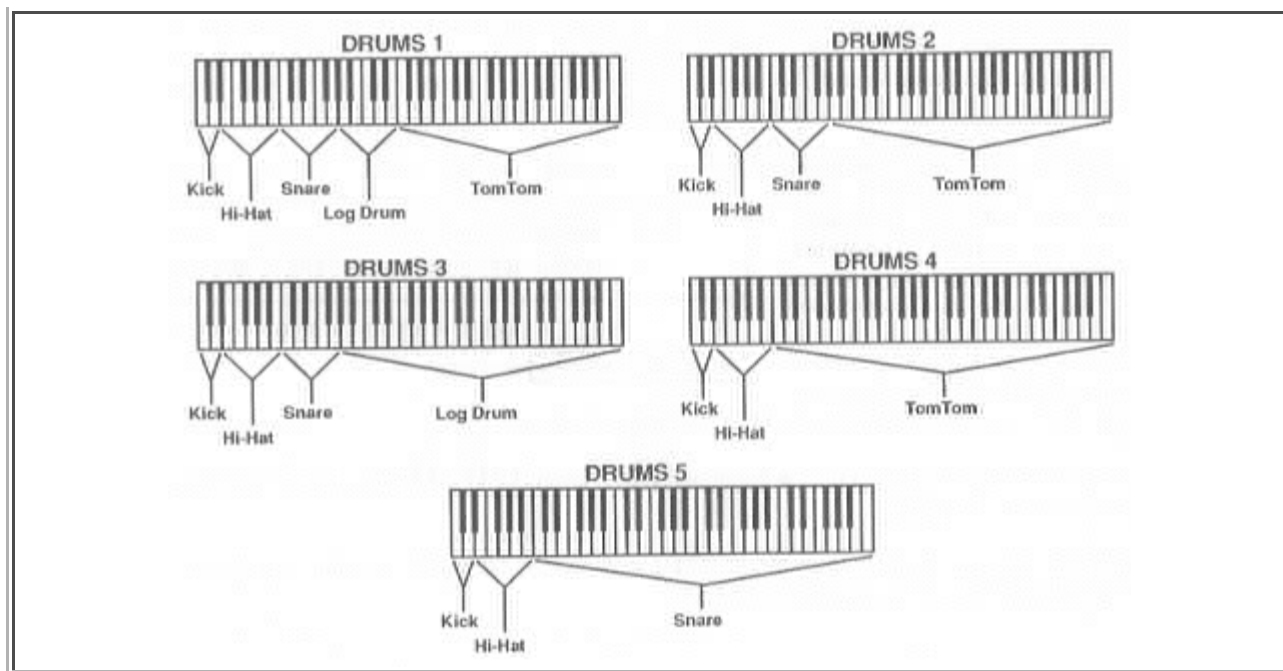
These drum sounds are not looped. Try them as drums when sequencing, or even as attack portions on your patches (works well when tuned higher then normal)...or even OSC2 and SYNCed as a sustain wave (try the LOGDRM).

LOGDRM	A good "native" sounding drum wave. Useful as an attack (try tuning up an octave and a fifth above the sustain portion), or a sustain. I really like this wave (can you tell).
KICK2	A nice tight kick drum with a BIG BOTTOM END and a good pop too. For the drum try tuning WAY down and play at the bottom end of the keyboard. For a looped version of this wave see KICK
SNARE	A Snare drum with a good amount of ambience thrown in.
TOMTOM	This tomtom has a nice descending pitch cowponent. Try tuning it high and use it as an attack wave.
HIHAT	A sampled closed hi hat. Try this with METAL or CHIME as a sustain.

This brings us to a close as to the waves we will be sampling.

MULTISAMPLED DRUM SETS:

The last five waves are the "DRUMKITS". DRUMS 1 - 5 are the same waves as the DRUM/ATTACK waves above combined in different ways. The diagram shows how the drumkits are set up when tuned OCT=+0.



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