TSM 2040z

Sub LowPass Filter

FX device by Turn2on Sofwtare
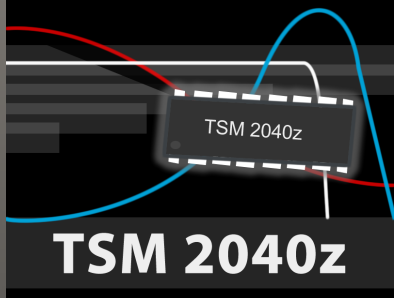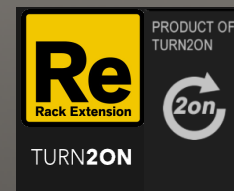
Although named as such, the **TSM 2040z Sub LowPass Filter** is not a typical Low Pass Filter. Such filters stem from the era of the earliest polyphonic synthesizers. They were designed in parallell to the filters of the monophonic synthesizers, and in the first stages of development produced bass enhancements at high resonance frequencies. However, they lacked gain compensation.

Returning to the beginings of filters, inspired us to create a Sub LP filter. In TSM 2040z we retained the charm of the low frequency boosting characteristics of some early polysynth filters.

Bass Boost is adjustable up to the +12dB for the selected low frequency. The boosting of sub-frequency can be adjusted within the range 40-160Hz. Signals coming through the TSM2040z Lowpass filter are boosted with sub frequency enhancement.

The Lowpass section of the filter include various modes: Brickwall (which doesn't have a slope) and Lowpass 12 / 18 / 24 / 30 / 36 / 48 dB/oct slope modes.
 The Resonance curve changes the attenuation character of the resonance.
 The Crasher can be used to add saturation or distortion as desired to the filtered sound as a filter-destruction effect.
The Limiter can be used to limit overclipping of the filtered signal keeping it warm, fat and soft.
 Sub bass on the Resonance is the thing which makes it loveable.
 Test the sub frequency boosting power of the TSM 2040z SLP filter for yourself.
When Boost is Off, the device works as LP Filter with Classic Resonance activity. Boost & Resonance filter mode as Hybrid filter with Boosted Subs activity and classic Resonance at the same time.

turn2on.com

2040 - "Best filter chip ever"

SSM2040 is one of the most famous filter chips produced during the era of early analogue polyphonic synthesizers.
The 2040 chip was used in many old and now rare analog synthesizers including the Prophet-5 rev.2, RSF Kobol. The 2040 filter sound is loved and highly rated by present day musicians.
Back in the day, synthesizer manufacturers were prone to swap out the SSM filter chips, which often had with defects, to more reliable CEM chips. Today, however, musicians look on the SSM 2040 as being the"best filter chip ever".
The SSM2040 is a very unique sounding filter which differs from all other 4-pole lowpass filters because it is based on the discrete OTA gain cell.
Over time, synthesizer manufactures turned predominantly to using CEM filters by Curtis. These chips were more stable filters, but had a completely different character to the SSM.
The SSM, however, was to return as the brother 2044 filter chip used in Korg Polysix and other synthesizers). Today modern versions of the 2044 can be found in instruments such as Sequential (Dave Smith) Prophet-5 and also in the Behringer clones.
In any case, musicians today hold the sound of the original 2040 filter with its own character in high regard.

A number of eurorack module designers created clones of the 2040. SynthesisTechnology, for example, introduced the MOTM440 module which modelled the sound of the 2040 but also incorporated a switch which added a low frequency boost at the higher resonance position.

TSM 2040z is not an exact emulation of the SSM2040 chip filter or the MOTM440 module scheme. It aims instead to extend the capabilities of the well known vintage sound in its own particular way.
TSM 2040z is a type of the Sub LowPass filter. We tried to compensate for the bass which is lost with increasing resonance by adding an Adjustable boost with a range up to 12 dB.

Selectable low boost frequencies allow for the character of the sound to be altered to taste.
Boost adjust adds low frequency loss compensation.
Resonance curve changes the attenuation character of the resonance.
The Crasher can be used to add saturation or distortion as desired to the filtered sound as a filter destruction effect,
The Limiter can be used to limit overclipping of the filtered signal keeping it warm, fat and soft.

2040 & 440 history

Modern TSM 2040z

CONNECTIONS:
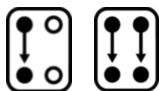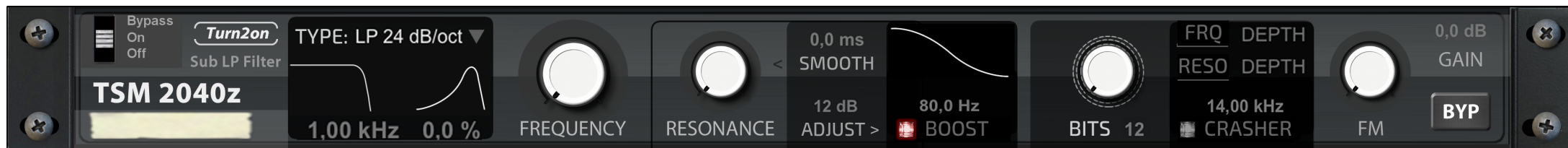
The device is a True-Stereo effect. For Mono input, the device produces mono output.
For Stereo input, the device sums the Left and Right channels before applying the effect. The output is in Stereo.
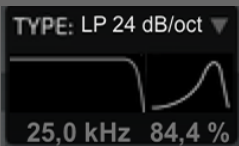
Rare, Fat, Soft & Modern
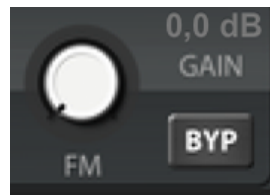
LP FILTER TYPES:

MODE SECTION

Just another multi-filter?
NO.
This is a Filter based on the idealogy of the early polysynthesizers [low frequency boost at Resonance rise] with various LP modes. But it also include Classic LP and Hybrid Boost&Reso filte modes

TYPE	FREQUENCY	RESO (BOOST OFF)	RESO (BOOST ON)	BOOST & RESO
BrickWall	Completely removes all audio signal below a selected frequency. This behaviour is different to traditional lowpass filters, which have a slope	No Resonance activity		
LP 12	12 dB/oct slope	*Classic LP filter*: Adjusts the resonant peak to the selected Frequency value. Boost of Low Freq is OFF.	*Sub LP Filter*: Resonance Boost selected low frequency.	*Boost & Reso filter*: Adjusts the resonant peak to the selected Frequency value and Boost low frequency at the same time.
LP 18	18 dB/oct slope			
LP 24	24 dB/oct slope			
LP 30	30 dB/oct slope	4-pole lowpass filter. Remove signal below selected frequency		
LP 36	36 dB/oct slope			
LP 48	48 dB/oct slope			
LP 24 x2R	24 dB/oct slope	Doubles the value of the Resonance		

FM / GAIN

PARAMETER	INFO
FM	Set the level of the frequency modulation. FM Input placed at the rear panel
GAIN	Controls the level of the master output signal (up to +12dB).
BYPASS	Bypass with soft fading of effect activity (without glitches)

BOOST

changes the character of the Resonance

The early filters found on the first polysynths produced bass enhancements at high resonance frequencies. However they lacked gain compensation.
Booster - is a psycho-acoustic low shelf filter.
In the TSM 2040z we retained the charm of the low frequency boosting characteristic to some early polysynth filters.
Bass Boost is adjustable up to the +12dB for the selected low frequency.

PARAMETER	INFO
Resonance	Sets the depth value of the Low Boost when in the On position. When Boost is disabled (Off), Resonance parameter works in normal mode and does not boost the low frequency
Resonance Smooth	Smoothing of the Resonance changes
Boost Adjust	Boost level of the selected Low Frequency in range +1..+12 dB
Boost Frequency	Frequenecy of the Low Boost. Sub-bass frequency range: 40-160Hz

BOOST SECTION
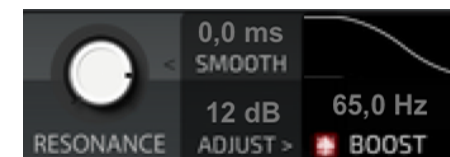
But.. when the Bass Boost no more needed, you can turn it off.

CRASHER SECTION

The Crasher effect controls the sample rate and bit depth of the audio signal and is used for adding saturation or distortion to the filtered sound.

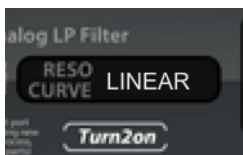| PARAMETER	INFO
Crasher On/Off	Enable or Disable Crasher effect
Depth	Dry/Wet mix of the Crasher effect
Bits	Bit reduction
Sample Rate	Downsampling rate
Freq Modulation	Source of the Frequency modulation: Depth, Sample Rate, Jitter
Reso Modulation	Source of the Resonance modulation: Depth, Sample Rate, Jitter

REAR SIDE PANEL

AUDIO INPUT / OUTPUT
Mono/Stereo connections for Input and Output audio signals

FM INPUT
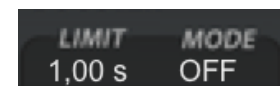Audio input for the Frequency modulation

RESONANCE CURVE
Attenuation of the Resonance parameter with selected curve type:
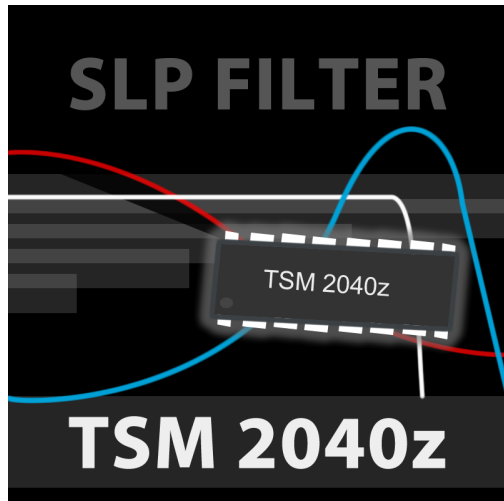- Linear
- Log
- Exponential
- Power

CV INPUTS
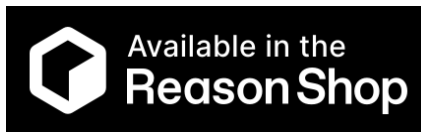Use these CV inputs to control the main parameters of the device

LIMITER
Keep levels with a fixed 0 dBFS threshold.
Limiter Release: recovery time
Mode: Off / Soft / Clip

TSM 2040z

- Sub LowPass Filter
- Classic LP Filter
- Hybrid Sub LP as Boost&Reso Filter

Available in the
Reason Shop

Turn2on

Rack Extension Developer

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supp.turn2on@gmail.com

Thanks to all beta-testers. Special thanks for help to:
- MrFigg
- Philip Meadows (Despondo)

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