

ST-1 Speak & Tweak



Rack Extension for Propellerhead Reason



User Manual

Version 1.0

INTRODUCTION

ST-1 Speak & Tweak is an emulation of the classic SP0256-AL2 speech chip that was a popular add-on for many home computers in the early 80s.

The SP0256 (and therefore Speak & Tweak) produces sounds using a crude model of the human vocal tract with 6 cascaded digital filters, white noise generator (breath) and tone generator. The AL2 variant contains 59 allophones which when concatenated correctly, can create most English words.

In addition, Speak & Tweak contains the English rules that were commonly used at the time to convert text into a series of allophones.

The result is a monotonic, robotic sounding voice that can be tuned precisely to any MIDI note.

Other features:

- Speed and pitch controls
- Lock tempo control (allows multiple voices to play at same speed, different pitch)
- Bucket Brigade Device (BBD) Delay
- Polyphonic use
- Damage control to artificially detune the filters
- Pitch bend and after-touch support
- Low DSP usage
- Plenty of CV inputs

USAGE INSTRUCTIONS – FRONT PANEL

Speak & Tweak has 4 phrase boxes which can contain any English text. Simply double click to edit. Each phrase has a play button to the right to preview the audio.

The **Mode** section on the right dictates how the synth will play the phrases. Please see the appropriate section below for details on each mode.

The **Pitch** knob changes the pitch of the voice. If **Lock Tempo** is disabled, the speed will get quicker as pitch is increased. If **Lock Tempo** is enabled, then extra vocal cycles will be added or removed to keep the speed approximately the same.

The **Speed** knob changes the speed of the voice without adjusting the pitch. This is done by adding or removing vocal cycles from the SP0256 emulation (the original chip could not do this).

The **Damage** knob adjusts various parameters of the SP0256 digital filters to create a circuit bending effect.

The **Filter** knob controls a simple Low Pass Filter that is used to remove some of the digital noise from the SP0256 (the chip would normally run at 10kHz so needs a LPF to remove aliasing).

Delay and **Feedback** control the built in BBD Delay which provides an authentic 80s style echo.

Lock Tempo tells the emulation to maintain the same playback speed when pitch changes.

USAGE INSTRUCTIONS – REAR PANEL

The **Control** section allows standard CV connection from Matrix or other CV sources such as AS-16.

The **Pitch** section allows control of the speed and pitch of the playback.

The **Echo** section allows CV access to the delay time and feedback of the BBD delay unit.

The **Corrupt** section allows access to the Damage control. It also features a **Slur** input which when active, will repeat the current allophone leading to interesting robotic sounds.

USAGE INSTRUCTIONS – MODES

PHRASES MODE

In Phrases mode, the 4 phrases are mapped over one octave of the keyboard each. Each phrase is monophonic, playing a new note will cause the pitch to change. However, different phrases can be played at once.

ALLOPHONES MODE

The Allophones mode allows direct access to the individual 59 allophones which make up speech. In this mode, the synthesis is monophonic, and each new midi key is added to the playback queue. This allows for words to be created by hand.

For reference, the allophones start at MIDI note 32 (Ab) although the first 5 are silent pauses. Please see <http://www.futurebots.com/spo256.pdf> for the SP0256 data sheet and list of allophones.

SPLIT WORDS MODE

Split Words mode works like Phrases mode, except that only one word is played per note. This allows you to play phrases with more control of the timing. If no note is pressed for around 2 seconds, then the phrase will reset.

LOOP PHRASE MODE

Loop Phrase mode works like Phrases mode, but each phrase is played in a continuous loop.

PHRASE 1 – PHRASE 4 MODE

Phrase 1-4 map a single phrase across the keyboard. This mode is completely polyphonic, so choruses can be played (works best with Lock Tempo enabled).

SPLIT ALL WORDS MODE

Split All Words mode combines all 4 phrases into one single phrase, and allows it to be played back one word at a time over the complete keyboard. If no MIDI keys are received after approx. 2 seconds, then the phrase will reset to the first word. Pressing a new key whilst holding a previous key down will cause the current word to change pitch.

PRESETS MODE

Presets mode plays one word per midi key. See the Preset List at the end of the manual.

COMPARISON WITH SPEAK & SPELL

Many people remember Speak & Spell as their first introduction to a speech synthesizer, although in reality it was a playback device rather than a true speech synthesizer.

However, the audio playback system worked in a similar way – using a slightly different emulation of the vocal tract. This was done to save ROM memory which was very expensive at the time. Speak & Spell came with several hundred words that were recorded, then processed and edited to play correctly using the vocal emulation – it could not generate new words like the SP0256-AL2 chip.

PRESETS LIST

Octave	Note	Preset	
1	C	Alert	
	C#	All	
	D	Baby	
	D#	Bang	
	E	Base	
	F	Bomb	
	F#	Brake	
	G	Dance	
	G#	Dancing	
	A	Dark	
	A#	Day	
	B	Ecstasy	
	2	C	Faster
		C#	Fire
D		Floor	
D#		Great	
E		Groove	
F		Hack	
F#		Hardcore	
G		Hate	
G#		I	
A		Laser	
A#		Light	
B		Love	
3		C	Music
		C#	Naughty
	D	Need	
	D#	Night	
	E	Order	
	F	Police	
	F#	Pull	
	G	Push	
	G#	Rave	
	A	Reason	

	A#	Rock
	B	Shoot
4	C	Slave
	C#	Slower
	D	Strobe
	D#	Synthesizer
	E	Tempo
	F	The
	F#	To
	G	Wont
	G#	We
	A	Wicked
	A#	Woop
	B	Yeah

REVISION HISTORY

V1.00 Initial Version

V1.01 Improved sound quality when lock tempo is enabled.

CREDITS

Design and coding by Richard Harvie, DLD Technology Ltd – <http://www.dldtechnology.com>

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Thanks to all that have helped test Speak & Tweak on the DLD beta test group.