

>Talko

Have your modular speak out the CV, the LPC, 8 bits, vintage way.



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1 Short description

This module is performing real time LPC synthesis to produce intelligible voice or ... not if you choose to.

The module produces sounds in 3 major mode: Speech, Repeat and VCO.

In **Speech** mode, the speech starts with a gate signal and complete before waiting for a new gate signal. The speech has the priority.

In **Repeat** mode the speech starts and stops with the gate signal going high or low. The gate has the priority and the speech repeats while the gate is high. This mode is very useful to create crazy rhythms.

In **VCO** mode, the LPC engine loops while the gate is high, producing steady notes.

The VCO mode can also produce sound using white noise instead of tones, making strange growling sounds.

The sound synthesis is altered via CV signals to affect pitch, speed, bending.

Talko is an Arduino based synthesizer developed under open-source hardware and software. It's firmware can be updated via the onboard USB port.

The module can be powered via USB if needed.

The PCB has a breakout section connected to 4 of the ATmega328p free pins for hacking (included A4 & A5 for the I2C bus).

2 Technical details

- format: Eurorack
- width: 10hp
- depth: 30 mm skiff friendly
- power: + 12V: 65ma . Talko can also be powered via USB when using a jumper.
- audio: un-filtered 5V PWM carrier at 62500 Hz, the output is protected against over or under voltage by clipping from 0 to +5V
- inputs: protected against over or under voltage by clipping from 0 to +5V
- CV attenuators potentiometer on each CV entry

3 Banks

A rotary encoder is used to select the bank, while its button can be used to simulate the gate going high and have the module speak when pressed.

- 0: Digits (from 0 to 9) male voice
- 1: Digits (from 0 to 9) female voice
- 2: Spell the Alphabet
- 3: Nato alphabet
- 4: Vocabulary
- 5: Big numbers
- 6: Voltmeter (reading the CV voltage from the Sound entry)
- 7: Frequency meter (just saying "Hertz" instead of "Volts")
- 8: Counter (each gate trigger increments the counter while any change on the Sound entry resets it)
- 9: Number radio (each gate trigger a 4 number sequence while any change on the Sound entry triggers a new "transmission")
- 10: Timer: time elapsed since the last cv reset (each gate triggers telling the time in minutes/seconds while any cv change on the Sound entry resets the clock to zero)
- 11: Random vocabulary (53 words)
- 12: Sentences (13)
- 13: French vowels "a e i o u" (female)
- 14: French Digits (from 0 to 9) male voice
- 15: French vowels "a e i o u" (male)
- 16: English voiced allophones (72)
- 17: VCO friendly voiced allophones (25)

4 Panel

Please note that all CV pots are also acting as voltage attenuators.

When using a CV signal you may want to turn the knob fully clockwise unless you want to attenuate the incoming signal.

4.1 Mode Switch

The switch has 3 positions to set the mode between Speech mode (position: up) , Repeat (position: middle) mode or VCO (position: low).

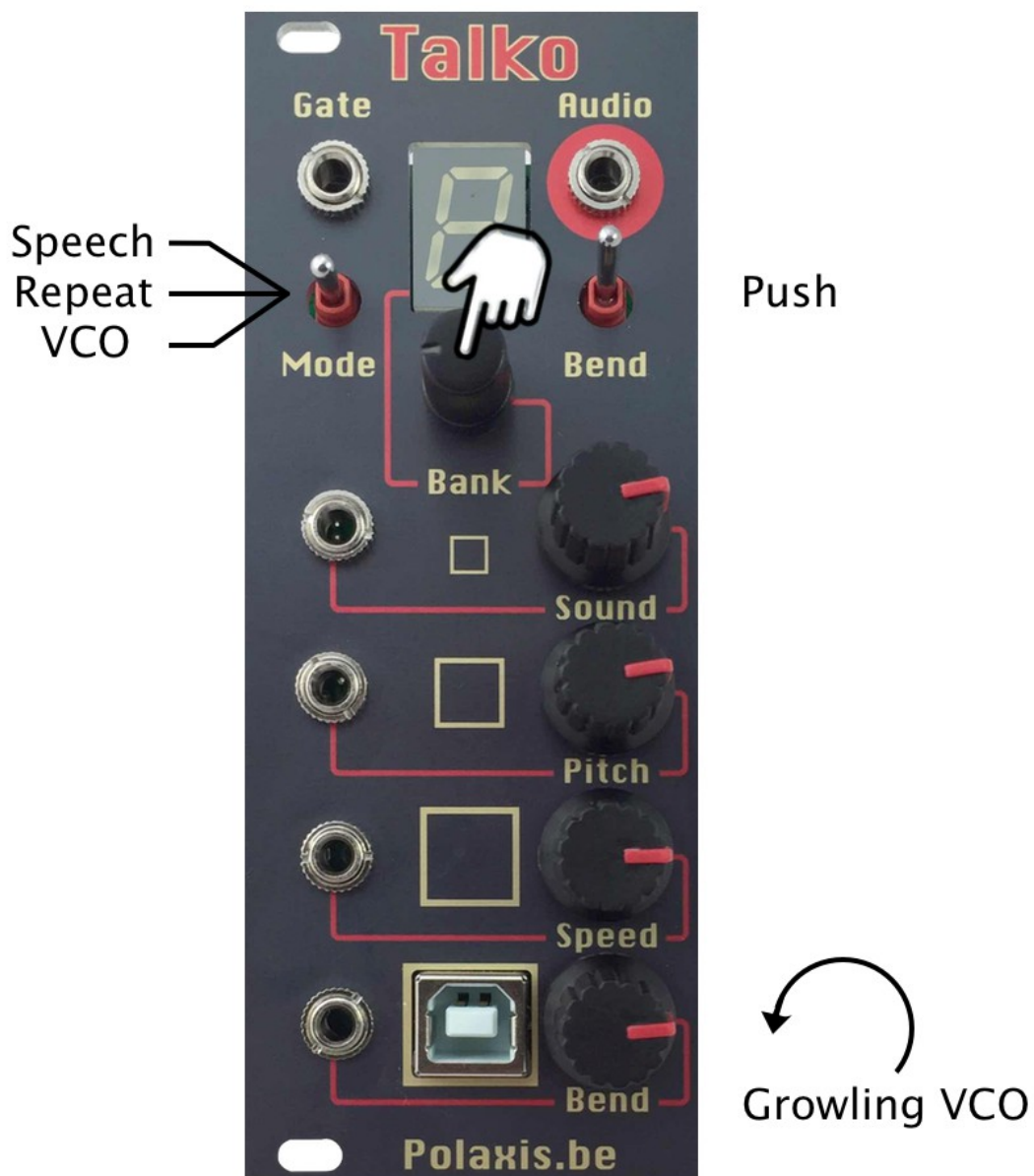
In **Repeat mode**, the gate has the priority and the speech is active only while the gate level is high. Playing with the gate length or duty cycle allows making nice shopping effects.

In **Speech mode**, the speech has the priority and will complete before starting again on the new gate signal.

in **VCO mode** the Speed is not active (unless Bending is turned CCW, see below). The VCO play semi-tones with 1V/Octave on Pitch input while the Bend pot affect the master tuning.

Growling mode is active when Bending is turned CCW while in VCO mode. The LPC tone is then replaced with the white noise generator and the Speed affects the noise volume.

Note : bending can be active in all modes and the Bending pot has then 2 functions in VCO mode (Bending & Pitch)



4.2 Sound jack & pot

CV signal in allows to choose the word, phrase or allophone to be generated.

Any change on the Sound entry reset the counter in bank N°8 and start a new transmission in Bank 9.

4.3 Gate jack

A high level high start the complete sound in Speech mode. (regardless of its length)

If the mode switch is on Repeat , the gate will start the sound and repeat it as long as the gate level stays high.

If the mode switch is on VCO, the gate will start a tone and hold it as long as the gate level stays high.

4.4 Bend Switch

If the bend is on, the bend pot ... well, distorts the sound.

In VCO mode it affect the master tune and if fully CCW rotated, engage the growling mode.

4.5 Speed jack & pot

Change the speed of the voice. Not used in normal VCO mode. Affects volume in Growling mode.

4.6 Pitch jack & pot

Change the pitch of the voice and change the noise volume in VCO mode

4.7 Bend jack & pot

Change the amount of bending or the pitch of the tone in VCO mode.

5 Basic Patches

Beyond having it to speak and bending it in (the obvious) Speech mode, test the Repeat mode by feeding some rhythmic pattern into the Gate entry and particularly play with the Gate length.

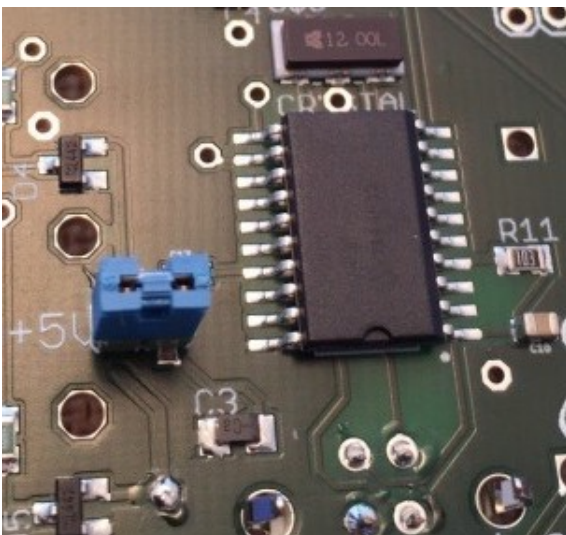
Another fun one is to set it to Bank 0, VCO mode, turn the Bend pot fully CCW for growling mode and then play with the Sound, Pitch and Speed pots.

Try also to press the rotary button while the Sound entry is being sequenced in VCO mode to hold notes on and manually alter the sequence

6 Hardware connections

6.1 USB

The USB port can be used to power the module.
In order to do so, the jumper has to be placed like this :



6.2 Connection to the modular system (Doepfer Bus)

The module is powered via a ribbon cable.
Please make sure to respect the polarity and place the redline as marked on the PCB. (there are no protecting diodes)

7 Software upload

7.1 Connect COM Port

The com port MUST to be recognized by the computer. (If not, you won't be able to communicate to the module and upload anything)

On Mac you just plug the module and a new com port shows up.

On PC you must install the MCP 2200 driver to create a com port.

The Windows driver can be found here :

<http://ww1.microchip.com/downloads/en/DeviceDoc/MCP2221%20Windows%20Driver%202014-10-09.zip>

You will need to unzip that file and start the driver installation

For this : Double-click the executable file within the appropriate folder for your system (x86 for 32-bit OS and x64 for 64-bit OS).

After installation, you must have a new COM showing up when you plug the module. This may require the computer to be restarted.

You can verify this by opening your control panel and plugging unplugging the module

If this works, leave the module connected and move to the next step.

7.2 Updating firmware

The simplest way to upload a new firmware is to use the Easy Uploader software that can be found on the Download page : <http://www.polaxis.be/downloads/>

Install Easy Uploader

Install the software from one of these links :

Mac version [EasyUploader.dmg](#)

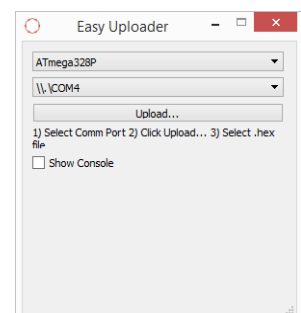
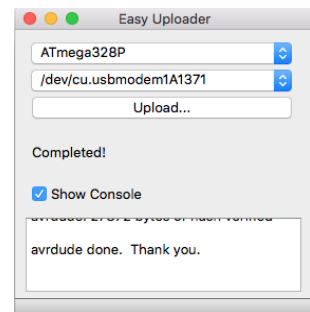
Windows version [EasyUploader.msi](#) **Connect the USB port**

Connect the module before launching EasyUploader

Run the Uploader

- 1) Select the chip : ATmega328P
- 2) Choose your com port
- 3) Pick the appropriate .hex file from the Download page

Attention do not upload any .hex file containing bootloader (files that can be produced by the Arduino software) : this would delete the original bootloader and would require the use of a programmer to reflash it.



8 Assembly

If you are assembling the kit, see the Github assembly page :
<https://github.com/deladriere/euro-modules/wiki/Assemble-Talko>

9 Appendix

9.1 List of phrases

0: "set the control for the start of the one"
1: "C time slow"
2: "start the fire"
3: "smoke the circuit"
4: "turn past the time"
5: "stop the machine"
6: "too low for you"
7: "fire and ice"
8: "heavy machine"
9: "new ground circuit"
10: "repair the machine"
11: "Wir Sind die Roboter"
12: "Error Instruments"

9.2 Revisions

- May 2016 rev0 : initial release
- Aug 2016 rev1 : new banks / 15: French Vowels Male / 16: Voiced allophones / 17: VCO friendly voiced allophones
- Feb 2017 rev2 : VCO mode play semi-tones with 1V/Cctave on Pitch input
Reduced the word vocabulary from 62 to 53 to fit programm into memory