GLIGLI'S OVERCYCLER

Affordable polyphonic hybrid single cycle / analog synthesizer.

Manual version 1.0 (draft) for firmware build 2024-07-23.

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Introduction

This project started about 10 years ago, when I wanted to make use of spare SSM2044 voltage controlled low pass filters I had laying around.

The goal was to make a synthesizer that had a very strong character, while staying focused on polyphonic sounds, and the SSM2044 was perfect for that because even when strongly over-driven, it never sounds aggressive.

It went through 3 major revisions until it became the full-fledged retail synthesizer it is now

As new SSM2044 are becoming rare, the synthesizer uses SSI2144, which are modern surface-mounted clones, and also embarks LM13700-based voltage controlled amplifiers.

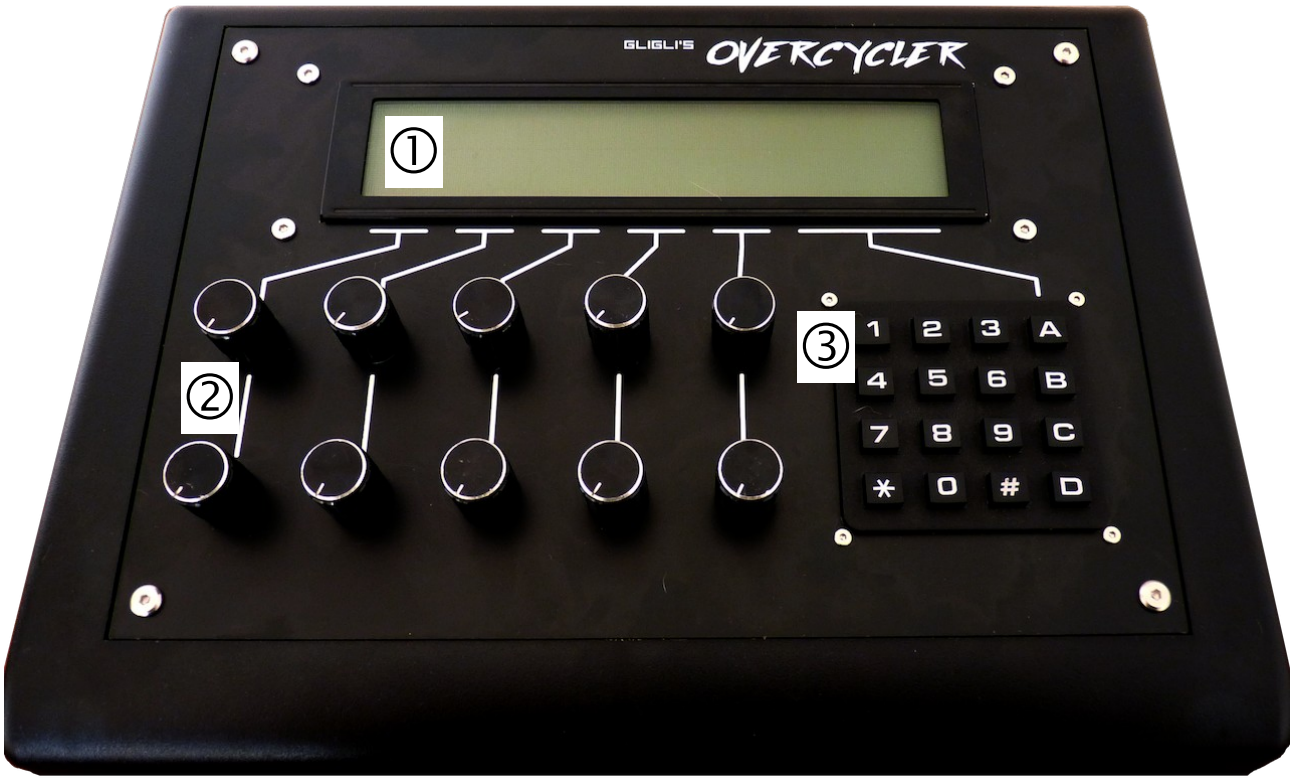
There is 2 versions of this synthesizer, “Fully built” and “DIY”. This manual is about operating the synthesizer for both. Build instructions for the “DIY” version will be available in another document.

Overview

1 Features

- 6-voice polyphony using hybrid synthesis (digital “single cycle” oscillators / per-voice SSI2144 analog voltage-controlled filter and LM13700 voltage-controlled amplifier).
- 2 custom-designed synchronizable oscillators per voice, duty cycle modulation on any waveform, dual waveform mix modulation, “grit” modulation (from a subtle veil to “ring modulation”-like sounds), 64KHz sample rate for a clean sound by default.
- 3 complete envelopes with linear/exponential choice and looping (oscillators / filter / amplifier).
- 2 complete low frequency oscillators with 6 modulation destinations.
- 1 analog noise generator.
- Voice panning on the stereo output.
- Sequencer / arpeggiator.
- Patches and single cycles (AKWF, ProphetVS, ...) stored on an internal flash chip, accessible through USB mass storage.
- USB powered with USB MIDI and regular MIDI, CCs for coarse values, NRPN, channel aftertouch,...

2 Front panel



① Back-lit character LCD screen, 4 rows of 40 characters.

② 10 potentiometers, in 2 rows of 5.

③ Keypad, 4 rows of 4 keys.

3 Rear panel

① Main output 6,35mm jacks.

- Connect a single jack to get TRS (tip-ring-sleeve) stereo (eg. headphones).

- Connect 2 jacks to get TS (tip-sleeve) left and right stereo (eg. connect to 2 mono channels on a mixer).

Note: As the synthesizer voices are hard-panned on the stereo output, it is recommended to connect to a mixer through 2 mono channels. This way, mixer channel panning can be used to moderate the stereo effect by setting channel panning symmetrically from the center.

② Main volume knob, from low volume (left) to high volume (right).

③ DIN MIDI input.

④ Pedal (aka. foot switch) 6,35mm TS input jack, “press to connect” configuration.

- Acts as a sustain input when not arpeggiating or in unison mode.

- Holds the arpeggiator pattern when arpeggiating (has priority over sustain).

- Sets a chord pattern when in unison mode (has priority over sustain and arpeggiator hold).

⑤ USB-B input, power input for the synthesizer. It can also be used for USB MIDI and for internal disk access through USB mass storage.

⑥ Synthesizer on / off switch, pressed is on.

4 Basic ergonomics

Basically, the ergonomics are centered around the use of the screen, which primarily displays potentiometers and buttons values for the current page of parameters.

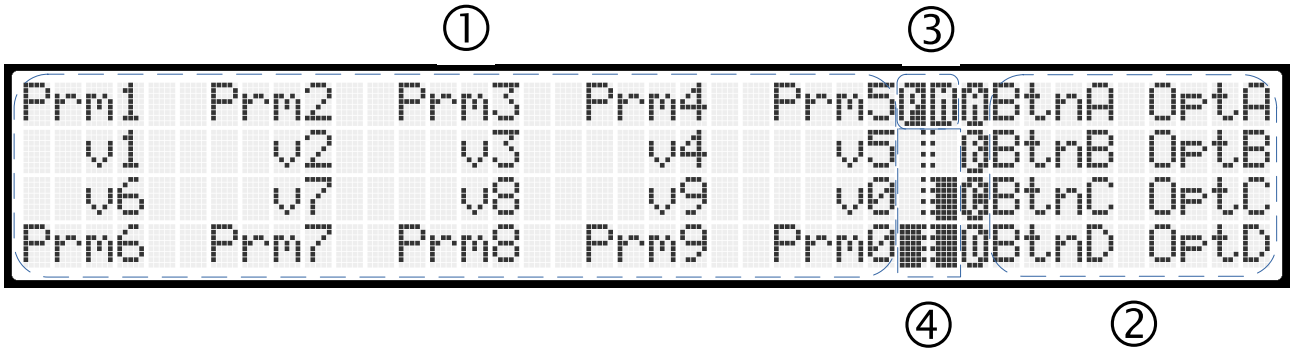
The startup screen

Upon powering the synthesizer, this screen is displayed. It shows the names of the parameter pages, and the corresponding buttons on the keypad. Other pages are always accessible from any page by pressing the corresponding keypad button. Button "Help" from the Miscellaneous page returns to this screen.

Note: From any page, pressing the (*) button allows you to set the last adjusted potentiometer value using the keypad. Each value is entered with 3 digits, eg. press (0) (5) (0) to set the value to 50. Dual sided potentiometers (ie. ranging from -500 to 499) are treated as if they range from 0 to 999.

Note: From any page, pressing the (#) button enables you to transpose the synthesizer voices using the keyboard, by pressing a key relative to C5. Pressing (#) twice will lock the keyboard in transpose mode. Pressing (#) again will return the keyboard to its normal function.

The main screen



① 2 rows of 5 parameters, one for each potentiometer from the front panel. Each parameter has a short name on 4 characters and a value. Turning a potentiometer will allow changing the corresponding parameter value through the “Potentiometer edit screen”.

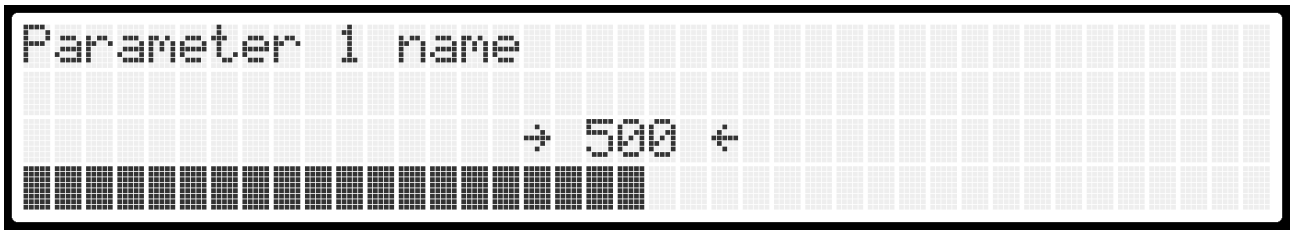
② 4 rows of parameters, corresponding to the rightmost (A / B / C / D) buttons of the keypad. Pressing one of those keypad keys will allow changing the corresponding parameter to a new value through the “Button edit screen”.

③ ”Preset modified” indicator. Changing any parameter from the current preset will show this indicator as a reminder that changes may need to be saved to persist.

④ .”Voice activity” indicators. One for each of the 6 voices, giving an overview of the amplifier envelope state for each voice. The layout is as follows:

Voice 1	Voice 2
Voice 3	Voice 4
Voice 5	Voice 6

The potentiometer edit screen



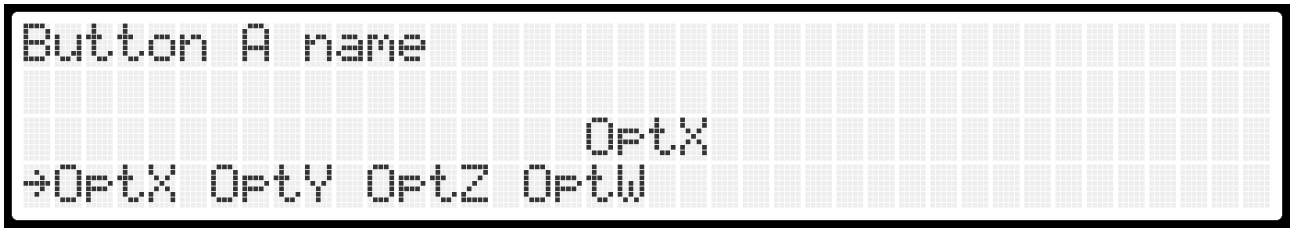
When a potentiometer is turned, this screen shows detailed information about the parameter being edited:

- The long parameter name at the top.
- The current parameter value in the middle.
- A bar graph showing the approximate value at a glance.

When the current potentiometer position is out of range, and the value hasn't been reacquired (that is, the potentiometer is still locked to its previous value), the screen will show one of two arrows around the numerical value to hint which way it should be turned.

Note: when more than one potentiometer is turned at the same time, this screen will not show. Instead, the main screen will directly reflect the changes.

The button edit screen



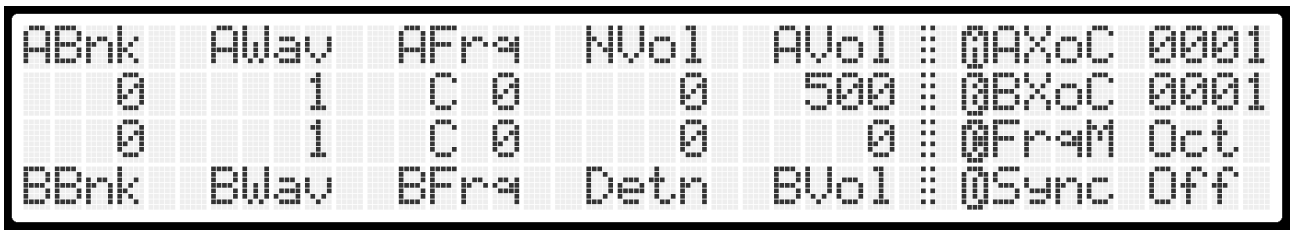
When a button (A / B /C / D) is pressed, this screen shows detailed information about the parameter being edited:

- The long parameter name at the top.
- The current parameter value in the middle.
- A list of all the possible values for the parameter, with an arrow indicating which is currently chosen.

Note: some buttons are used for actions. In such cases, the action is performed immediately upon pressing the button and only the long name of the action is displayed on the screen.

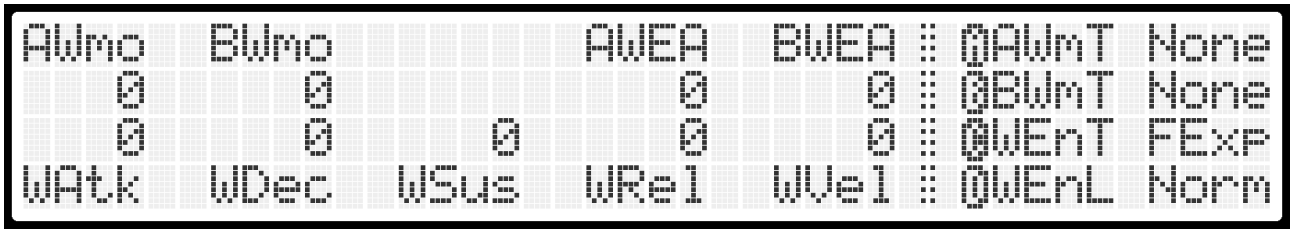
The pages

1 Oscillators



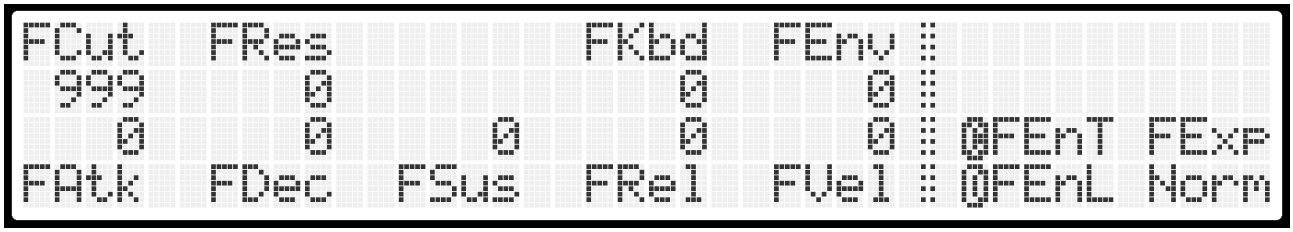
- ABnk / BBnk: Oscillator A / B Single-cycle bank.
- AWav / BWav: Oscillator A / B Single-cycle waveform. *Note: Waveforms are displayed on the screen while they are chosen.*
- AFrq / BFrq: Oscillator A / B base frequency. *Note: The "FrqM" parameter can be used to change the granularity.*
- Detn: Oscillator A / B relative detune. *Note: This parameter will slightly change both oscillators pitch, to ensure the overall tuning stays the same.*
- NVol / AVol / BVol: Oscillator A / B and noise generator volume. *Note: When the sum of these 3 volumes exceeds 1000, a strong but pleasing overdrive will be heard.*
- AXoC / BXoC: Copy A / B bank/wave to A / B Crossover. *Note: The "Crossover" WaveMod has to be chosen for these parameters to have an effect.*
- FrqM: Granularity for AFrq and BFrq, either in octaves, in semitones, or freeform.
- Sync: Oscillator A to B Synchronization. *Note: Try the "Frequency" WaveMod on oscillator B to get typical sounds.*

2 WaveMod



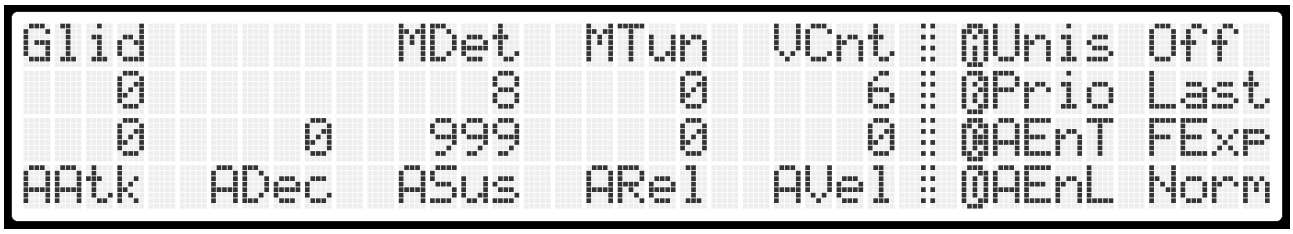
- AWmo / BWmo: Base amount of WaveMod for oscillator A / B.
- AWEA / BWEA: WaveMod Envelope Amount for oscillator A / B.
- WAtk / WDec / WSus / WRel / WVel: Attack time / decay time / sustain level / release time / velocity amount for the WaveMod ADSR envelope.
- AWmT / BWmT: WaveMod Type for oscillator A / B, available options:
  - None: No WaveMod.
  - Grit: Simulates low resolution relative to time. A positive amount gives a subtle veil, while a negative amount is wilder and can sound like ring-mod.
  - Width: Applies duty cycle modulation akin to “Pulse Width Modulation” but for any waveform.
  - Frequency: Frequency modulation. *Note: especially useful for drum sounds or typical Sync sounds.*
  - Crossover: Allows mixing 2 single cycle waveforms, controls the mix of both. *Note: use the buttons "AXoC" and "BXoC" from the Oscillators page to allow setting the second waveform for each oscillator.*
- WEnT: WaveMod Envelope Type, available options:
  - Fast-exponential.
  - Slow-exponential.
  - Fast-linear.
  - Slow-linear.
- WEnL: WaveMod Envelope Loop. *Note: When looped, a cycle of attack / decay happens in what is left of the sustain level. Eg. at full sustain, no looping can be heard.*

3 Filter



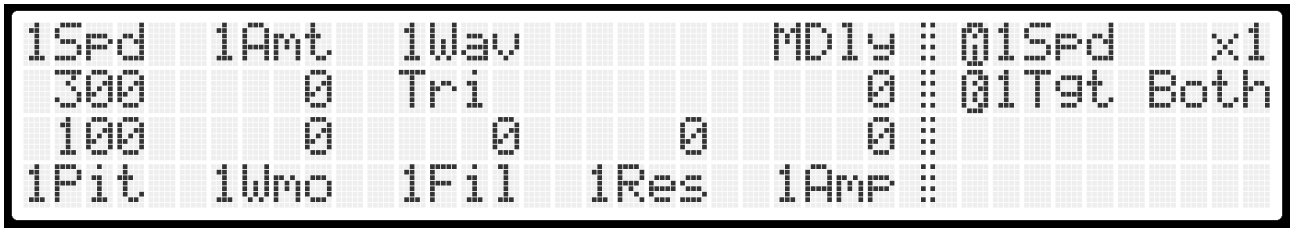
- FCut: Filter Cutoff frequency. *Note: The filter is tuned in C, so setting it to eg. 500 will allow to play the filter like an oscillator as long as the Resonance parameter is high enough.*
- FRes: Filter Resonance. *Note: Self-oscillation can be heard in the last third of amount.*
- FKbd: Filter Keyboard tracking. From 0 to 100%, relative to C5 on the keyboard.
- FEnv: Filter Envelope amount.
- FAtk / FDec / FSus / FRel / FVel: Attack time / decay time / sustain level / release time / velocity amount for the filter ADSR envelope.
- FEnT: Filter Envelope Type, available options:
  - Fast-exponential.
  - Slow-exponential.
  - Fast-linear.
  - Slow-linear.
- FEnL: Filter Envelope Loop. *Note: When looped, a cycle of attack / decay happens in what is left of the sustain level. Eg. at full sustain, no looping can be heard.*

4 Amplifier



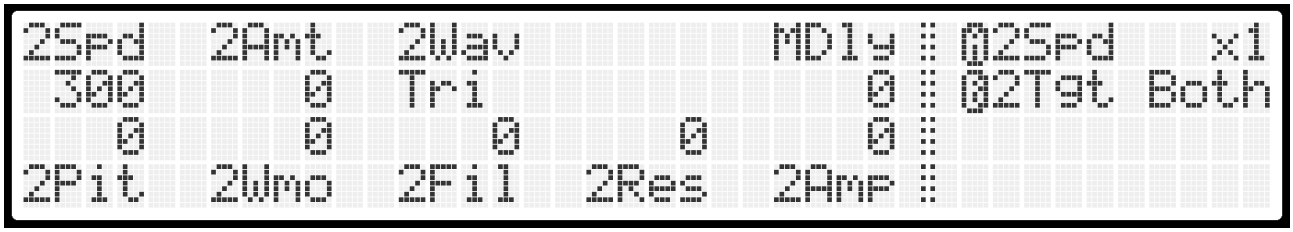
- Glid: Glide amount. This acts as a slew limiter on the oscillators pitch.
- MDet: Master unison Detune. This spreads voice tuning. *Note: A small amount can simulate the non-exactness of an analog oscillator.*
- MTun: Master Tune. Note: default tuning is A=440Hz.
- VCnt: Voice count.
- Unis: Unison mode (all voices play with a single key press). *Note: If a chord is pressed while activating this option, it functions as "chord mode". The pedal input can be used to latch a new chord.*
- Prio: Assigner Priority mode, available options:
  - Last: the last played note (relative to time) has priority.
  - Low: the lowest played note (relative to pitch) has priority.
  - High: the highest played note (relative to pitch) has priority.
- AAtk / ADec / ASus / ARel /AVel: Attack time / decay time / sustain level / release time / velocity amount for the amplifier ADSR envelope.
- AEnT: Amplifier Envelope Type, available options:
  - Fast-exponential.
  - Slow-exponential.
  - Fast-linear.
  - Slow-linear.
- AEnL: Amplifier Envelope Loop. *Note: When looped, a cycle of attack / decay happens in what is left of the sustain level. Eg. at full sustain, no looping can be heard.*

5 LFO 1



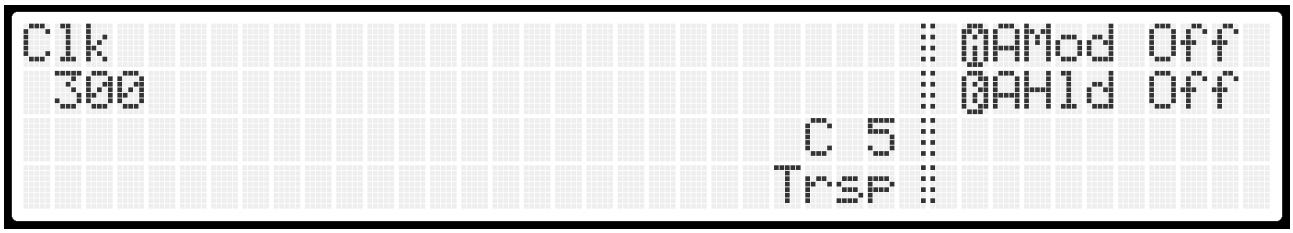
- 1Spd: LFO1 speed in BPM (Beats Per Minute), can be multiplied by 1x to 8x using the corresponding button.
- 1Amt: Base amount of modulation for LFO1. *Note: Mod-wheel amount is added to this if parameter "MTgt" on the Miscellaneous page is set to LFO1*.
- 1Wav: Waveform of LFO1, available options:
  - Square.
  - Triangle.
  - Random (sample and hold).
  - Noise. Note: richness of the noise can be controlled by the "1Spd" parameter.
  - Sawtooth.
  - Reversed sawtooth.
- MDly: Modulation delay, applied to the other LFO from parameter "MTgt" on the Miscellaneous page.
- 1Tgt: LFO1 Oscillator Target, available options:
  - None: No oscillator will be affected by LFO1.
  - OscA: Only oscillator A will be affected by LFO1.
  - OscB: Only oscillator B will be affected by LFO1.
  - Both: Both oscillators will be affected by LFO1.
- 1Pit / 1Wmo / 1Fil / 1Res / 1Amp: Amount of modulation from LFO1 going to Oscillators pitch / Oscillators WaveMod / Filter Cutoff / Filter Resonance / Amplifier.

6 LFO 2



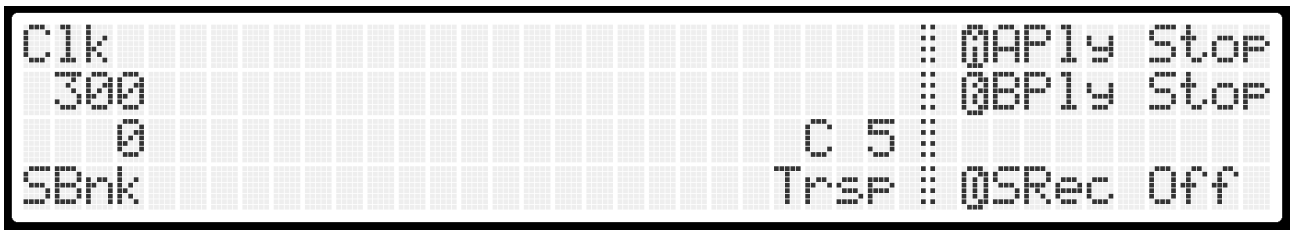
- 2Spd: LFO2 speed in BPM (Beats Per Minute), can be multiplied by 1x to 8x using the corresponding button.
- 2Amt: Base amount of modulation for LFO2. *Note: Mod-wheel amount is added to this if parameter "MTgt" on the Miscellaneous page is set to LFO2.*
- 2Wav: Waveform of LFO2, available options:
  - Square.
  - Triangle.
  - Random (sample and hold).
  - Noise. Note: richness of the noise can be controlled by the "2Spd" parameter.
  - Sawtooth.
  - Reversed sawtooth.
- MDly: Modulation delay, applied to the other LFO from parameter "MTgt" on the Miscellaneous page.
- 2Tgt: LFO2 Oscillator Target, available options:
  - None: No oscillator will be affected by LFO2.
  - OscA: Only oscillator A will be affected by LFO2.
  - OscB: Only oscillator B will be affected by LFO2.
  - Both: Both oscillators will be affected by LFO2.
- 2Pit / 2Wmo / 2Fil / 2Res / 2Amp: Amount of modulation from LFO2 going to Oscillators pitch / Oscillators WaveMod / Filter Cutoff / Filter Resonance / Amplifier.

7 Arpeggiator



- Clk: Sequencer / Arpeggiator clock. Either expressed in BPM (Beats Per Minute) when the "Sync" parameter from the Miscellaneous page is set to internal, or in MIDI clock divisor when it is set to MIDI or USB.
- Trsp: Keyboard transpose from C5. *Note: the (#) button can always be used to transpose the arpeggiator or sequencer on the fly.*
- AMod: Arpeggiator Mode, available options:
  - Off: Arpeggiator is deactivated.
  - UpDn: Arpeggiator works in Up / Down mode, not repeating the highest and lowest notes.
  - Rand: Arpeggiator works in Random mode, never repeating the same note twice.
  - Asgn: Arpeggiator works in Assign mode, playing notes in the order they were pressed.
- AHld: Arpeggiator Hold. Pressing this button will maintain the current arpeggio pattern, only allowing new notes in. *Note: The pedal input controls this parameter when the arpeggiator mode is not Off and Unison is not active.*

8 Sequencer

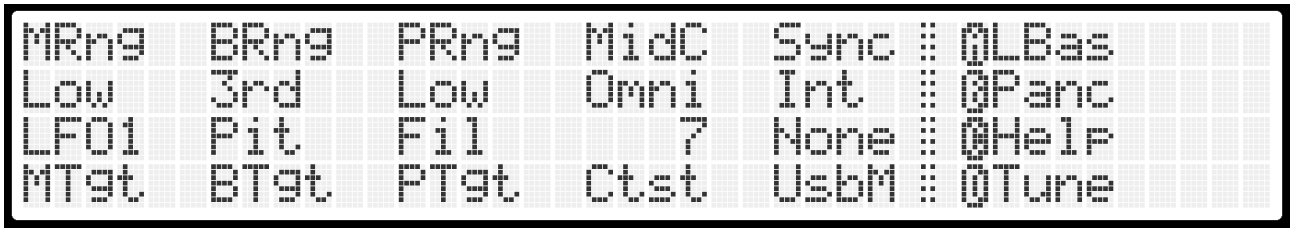


- Clk: Sequencer / Arpeggiator clock. Either expressed in BPM (Beats Per Minute) when the "Sync" parameter from the Miscellaneous page is set to internal, or in MIDI clock divisor when it is set to MIDI or USB.
- Trsp: Keyboard transpose from C5. Note: the (#) button can always be used to transpose the arpeggiator or sequencer on the fly.
- SBnk: Sequencer memory Bank. One of 20 banks of 2 sequences (A and B) can be chosen.
- APly / BPly: Play / Stop button for Sequences A and B.
- SRec: Sequence record, available options:
  - Off: No sequence is recording.
  - SeqA: Sequence A is recording.
  - SeqB: Sequence B is recording.

Note: When recording a sequence, buttons A / B / C correspond to the following actions:

- (A) TiRe: Add a Tie or a Rest to the sequence. If a keyboard note is pressed, then it will add a Tie with this note, else it will add a Rest.
- (B) Back: Back one step in the sequencer, erasing the current step.
- (C) Clr: Erases the entire sequence.

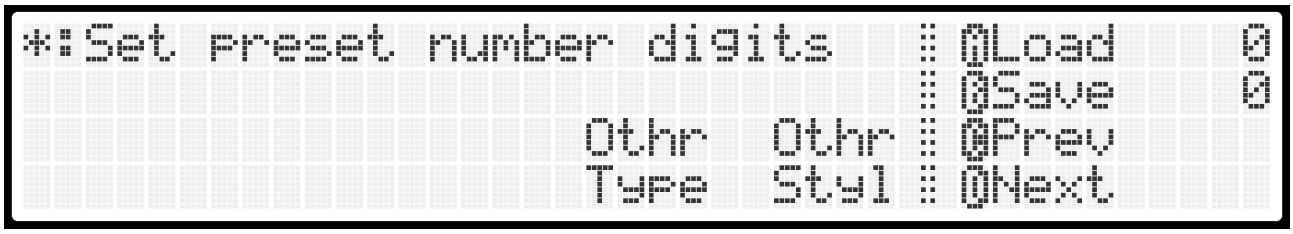
9 Miscellaneous



- MRng: Mod-wheel Range, from "Min" to "Full".
- MTgt: Mod-wheel Target, either LFO1 or LFO2. *Note: The other LFO is controlled by the "MDly" parameter from page LFO 1 or LFO 2.*
- BRng: Pitch bender range, either a major third, a fifth or an octave up and down.
- BTgt: Pitch bender target, available options:
  - None: Nothing is affected by the pitch bender.
  - Pit: Pitch bender targets oscillators pitch.
  - Fil: Pitch bender targets filter cutoff frequency.
  - Vol: Pitch bender targets oscillators volume.
  - XOvr: Pitch bender targets oscillators "Crossover" WaveMod mix.
- PRng: Channel pressure range, from "Min" to "Full".
- PTgt: Channel pressure target, available options:
  - None: Nothing is affected by channel pressure.
  - Pit: Channel pressure targets oscillators pitch.
  - Fil: Channel pressure targets filter cutoff frequency.
  - Vol: Channel pressure targets oscillators volume.
  - XOvr: Channel pressure targets oscillators "Crossover" WaveMod mix.
  - LFO1: Channel pressure targets LFO1 amount.
  - LFO2: Channel pressure targets LFO2 amount.

- MidC: Input MIDI channel, either "Omni" or 1-16. Note: also affects USB MIDI.
- Ctst: Screen contrast, from 0 (dim) to 10 (strong).
- Sync: Synchronization source for arpeggiator and sequencer, either "Internal", "MIDI", or "USB" (USB MIDI).
- UsbM: USB mode, available options:
  - None: USB cable only acts as a power source.
  - Disk: USB is in "Mass Storage" mode, this mode is blocking and can be quit by pressing a keypad button. **Warning: be sure to eject the corresponding drive before quitting this mode while connected to a computer!**
  - MIDI: USB is in "MIDI" mode. *Note: parameter "MidC" also affects USB MIDI channel.*
- LBas: Loads a basic (plain sawtooth) patch. *Note: if the current preset was modified beforehand, a warning will be displayed and the button will have to be pressed again to take effect.*
- Panc: MIDI Panic, all voices are immediately silenced and assigner restarts at voice 1.
- Help: Returns to the startup page.
- Tune: Performs the filter calibration procedure. *Note: It takes about 1 minute, progress will be displayed while running.*

10 Presets



- Load: Loads the current preset from the preset number that is active. *Note: if the current preset was modified beforehand, a warning will be displayed and the button will have to be pressed again to take effect.*
- Save: Saves the current preset to the preset number that is active. *Note: if a preset with that number already exists, a warning will be displayed and the button will have to be pressed again to take effect.*
- Prev: Loads the previous preset number. *Note: if the current preset was modified beforehand, a warning will be displayed and the button will have to be pressed again to take effect.*
- Next: Loads the next preset number. *Note: if the current preset was modified beforehand, a warning will be displayed and the button will have to be pressed again to take effect.*
- Type: Basic type of instrument for the preset (informative only), available options:
  - Other.
  - Bass.
  - Pad.
  - Strings.
  - Brass.
  - Keys.
  - Lead.
  - Arpeggios.
- Style: Basic style of sound for the preset (informative only), available options:
  - Other.
  - Neutral.
  - Clean.
  - Real.
  - Silky.

- Raw.
- Heavy.
- Crunchy.

Note: pressing the (*) button allows selecting the 3-digit preset number, as there are 1000 possible presets. Pressing the (*) button again cancels preset number selection.

Maintenance

1 Adding single-cycle waveforms

To add new single-cycle waveforms to the synthesizer, first connect it to a computer and set the "UsbM" parameter from the Miscellaneous page to "Disk".

Then, from the computer, browse to the synthesizer disk "WAVEDATA" folder, create a new folder inside (named as you wish) and copy the single-cycle files to it. The only supported format is ".WAV" (Standard Microsoft Wave File), 16 bits mono or stereo and maximum 2400 samples. *Note: Left channel is used as main waveform while right channel is used as WaveMod crossover waveform for stereo files.*

Then, safely eject the disk from the computer, quit the disk mode on the synthesizer by pressing any keypad key, and you should be able to use your new single-cycle waveforms.

2 Data backup

To backup the contents of the synthesizer, connect it to a computer, set the "UsbM" parameter from the Miscellaneous page to "Disk", and just copy the entire synthesizer disk contents to a safe location. Make sure to safely eject the disk from the computer when you are done.

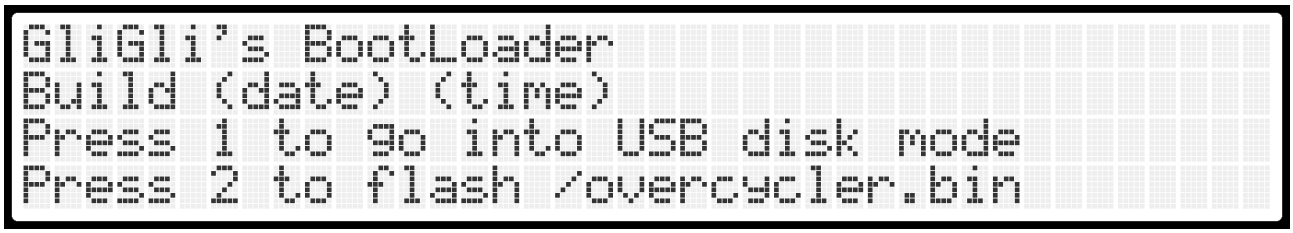
3 Upgrading the firmware

To upgrade the firmware, first download the latest version from:
https://github.com/gligli/overcycler/releases (the file should be named "overcycler.bin").

Then, with the synthesizer connected to a computer, using the "UsbM" parameter from the Miscellaneous page set to "Disk", copy the "overcycler.bin" file to the root folder of the synthesizer disk (ie. there should be a "overcycler.conf" file in that folder).

Safely eject the disk from the computer, power off the synthesizer.

While pressing (0) on the keypad, power up the synthesizer again and you should be in boot loader mode:



From there, just press (2) on the keypad and the new firmware will be flashed onto the synthesizer, rebooting to it directly.

Note: If there is a problem with the new firmware and the synthesizer doesn't start anymore, you can also use the boot loader to go into disk mode using the (1) keypad button and rollback to the last firmware that worked using the same procedure.

MIDI implementation

1 Chart

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	× ×	1 – 16 ✓	See Miscellaneous
Mode	Default Messages Altered	× × ×	1 × ✓	See Amplifier
Note Number	 True Voice	× ×	0-127 0-120	
Velocity	Note On Note Off	× ×	✓ ×	See Amplifier, Filter, WaveMod
After Touch	Key Channel	× ×	× ✓	See Miscellaneous
Pitch Bend		×	✓	See Miscellaneous
Control Change		×	✓	See Detailed continuous controllers
Program Change	 True #	× ×	✓ 0-99	See Presets
System Exclusive		×	×	
System Common	Song position Song select Tune request	× × ×	× × ×	
System Real Time	Clock Start Continue Stop	× × × ×	✓ ✓ ✓ ✓	See Arpeggiator, Sequencer, Miscellaneous
Aux Messages	All Sound Off Reset Controllers Local On/Off All Notes Off Omni Mode Off Omni Mode On Mono Mode On Poly Mode On Active Sensing System Reset	× × × × × × × × × ×	✓ × × ✓ × × × × × ×	

2 Detailed continuous controllers

Number	Type	Parameter
0	Standard	Preset bank coarse
1	Standard	Modulation wheel
2		
3		
4		
5		
6	Standard	NRPN Data Coarse
7		
8		
9		
10		
11		
12	Continuous Coarse	cpAFreq
13	Continuous Coarse	cpAVol
14	Continuous Coarse	cpABaseWMod
15	Continuous Coarse	cpBFreq
16	Continuous Coarse	cpBVol
17	Continuous Coarse	cpBBaseWMod
18	Continuous Coarse	cpDetune
19	Continuous Coarse	cpCutoff
20	Continuous Coarse	cpResonance
21	Continuous Coarse	cpFilEnvAmt
22	Continuous Coarse	cpFilKbdAmt
23	Continuous Coarse	cpWModAEnv
24	Continuous Coarse	cpFilAtt
25	Continuous Coarse	cpFilDec
26	Continuous Coarse	cpFilSus
27	Continuous Coarse	cpFilRel
28	Continuous Coarse	cpAmpAtt
29	Continuous Coarse	cpAmpDec
30	Continuous Coarse	cpAmpSus
31	Continuous Coarse	cpAmpRel
32	Standard	Preset bank fine
33		
34		
35		
36		
37		
38	Standard	NRPN Data Fine
39		
40		
41	Stepped	spLFO2Speed
42		

43		
44	Continuous Coarse	cpLFOFreq
45	Continuous Coarse	cpLFOAmt
46	Continuous Coarse	cpLFOPitchAmt
47	Continuous Coarse	cpLFOWModAmt
48	Continuous Coarse	cpLFOFilAmt
49	Continuous Coarse	cpLFOAmpAmt
50	Continuous Coarse	cpLFO2Freq
51	Continuous Coarse	cpLFO2Amt
52	Continuous Coarse	cpModDelay
53	Continuous Coarse	cpGlide
54	Continuous Coarse	cpAmpVelocity
55	Continuous Coarse	cpFilVelocity
56	Continuous Coarse	cpMasterTune
57	Continuous Coarse	cpUnisonDetune
58	Continuous Coarse	cpNoiseVol
59	Continuous Coarse	cpLFO2PitchAmt
60	Continuous Coarse	cpLFO2WModAmt
61	Continuous Coarse	cpLFO2FilAmt
62	Continuous Coarse	cpLFO2AmpAmt
63	Continuous Coarse	cpLFOResAmt
64	Standard	Hold Pedal
65		
66		
67		
68		
69		
70	Continuous Coarse	cpLFO2ResAmt
71	Continuous Coarse	cpWModAtt
72	Continuous Coarse	cpWModDec
73	Continuous Coarse	cpWModSus
74	Continuous Coarse	cpWModRel
75	Continuous Coarse	cpWModBEnv
76	Continuous Coarse	cpWModVelocity
77		
78		
79		
80	Stepped	spLFOSpeed
81	Stepped	spABank
82	Stepped	spAWave
83	Stepped	spAWModType
84	Stepped	spBBank
85	Stepped	spBWave
86	Stepped	spBWModType
87	Stepped	spLFOShape
88	Stepped	spLFOTargets
89	Stepped	spFilEnvSlow
90	Stepped	spAmpEnvSlow

91	Stepped	spBenderRange
92	Stepped	spBenderTarget
93	Stepped	spModwheelRange
94	Stepped	spModwheelTarget
95	Stepped	spUnison
96	Standard	spAssignerPriority
97	Standard	spChromaticPitch
98	Standard	spOscSync
99	Standard	NRPN Number Coarse
100		
101		
102	Stepped	spAXOvrBank
103	Stepped	spAXOvrWave
104	Stepped	spFilEnvLin
105	Stepped	spLFO2Shape
106	Stepped	spLFO2Targets
107	Stepped	spVoiceCount
108	Stepped	spPresetType
109	Stepped	spPresetStyle
110	Stepped	spAmpEnvLin
111	Stepped	spFilEnvLoop
112	Stepped	spAmpEnvLoop
113	Stepped	spWModEnvSlow
114	Stepped	spWModEnvLin
115	Stepped	spWModEnvLoop
116	Stepped	spPressureRange
117	Stepped	spPressureTarget
118	Stepped	spBXOvrBank
119	Stepped	spBXOvrWave
120	Standard	All sounds off
121		
122		
123	Standard	All notes off
124		
125		
126		
127		

3 Continuous NRPN parameters list

Coarse number	Fine number	Parameter	Zero centered?
0	0	cpAFreq	-
0	1	cpAVol	-
0	2	cpABaseWMod	Yes
0	3	cpBFreq	-
0	4	cpBVol	-
0	5	cpBBaseWMod	Yes
0	6	cpDetune	Yes
0	7	cpCutoff	-
0	8	cpResonance	-
0	9	cpFilEnvAmt	Yes
0	10	cpFilKbdAmt	-
0	11	cpWModAEnv	Yes
0	12	cpFilAtt	-
0	13	cpFilDec	-
0	14	cpFilSus	-
0	15	cpFilRel	-
0	16	cpAmpAtt	-
0	17	cpAmpDec	-
0	18	cpAmpSus	-
0	19	cpAmpRel	-
0	20	cpLFOFreq	-
0	21	cpLFOAmt	-
0	22	cpLFOPitchAmt	-
0	23	cpLFOWModAmt	-
0	24	cpLFOFilAmt	-
0	25	cpLFOAmpAmt	-
0	26	cpLFO2Freq	-
0	27	cpLFO2Amt	-
0	28	cpModDelay	-
0	29	cpGlide	-
0	30	cpAmpVelocity	-
0	31	cpFilVelocity	-
0	32	cpMasterTune	Yes
0	33	cpUnisonDetune	-
0	34		-
0	35		-
0	36		-
0	37	cpNoiseVol	-
0	38	cpLFO2PitchAmt	-
0	39	cpLFO2WModAmt	-
0	40	cpLFO2FilAmt	-
0	41	cpLFO2AmpAmt	-

0	42	cpLFOResAmt	-
0	43	cpLFO2ResAmt	-
0	44	cpWModAtt	-
0	45	cpWModDec	-
0	46	cpWModSus	-
0	47	cpWModRel	-
0	48	cpWModBEnv	Yes
0	49	cpWModVelocity	-

4 Stepped NRPN parameters list

Coarse number	Fine number	Parameter	Number of steps
1	0		-
1	1		-
1	2	spABaseWMod	5
1	3		-
1	4		-
1	5		--
1	6	spBBaseWMod	5
1	7		-
1	8	spLFOShape	7
1	9	spLFOSpeed	4
1	10	spLFOTargets	4
1	11	spFilEnvSlow	2
1	12	spAmpEnvSlow	2
1	13	spBenderRange	3
1	14	spBenderTarget	5
1	15	spModwheelRange	4
1	16	spModwheelTarget	2
1	17	spUnison	2
1	18	spAssignerPriority	3
1	19	spChromaticPitch	3
1	20	spSync	2
1	21		-
1	22		-
1	23	spFilEnvLin	2
1	24	spLFO2Shape	7
1	25	spLFO2Speed	4
1	26	spLFO2Targets	4
1	27	spVoiceCount	6
1	28	spPresetType	8
1	29	spPresetStyle	8
1	30	spAmpEnvLin	2
1	31	spFilEnvLoop	2
1	32	spAmpEnvLoop	2
1	33	spWModEnvSlow	2
1	34	spWModEnvLin	2
1	35	spWModEnvLoop	2
1	36	spPressureRange	4
1	37	spPressureTarget	7
1	38		-
1	39		-

Notes

1 Credits

Fabrice Guilhaume (GliGli): Lead, firmware design, schematics design, manual,...

Nicolas Weill (Guimli): Hardware design.

Bastiaan Barth (Solidtrax): Manual editing.

2 Useful links

https://gligli.store/en/: Where to buy the synthesizer.

mailto:gligli.shop@free.fr: For any question about the synthesizer, this manual, overall support.

https://github.com/gligli/overcycler: Project page on GitHub (firmware updates, source code).