Gotharman's microGOTHAR Duo

User Manual

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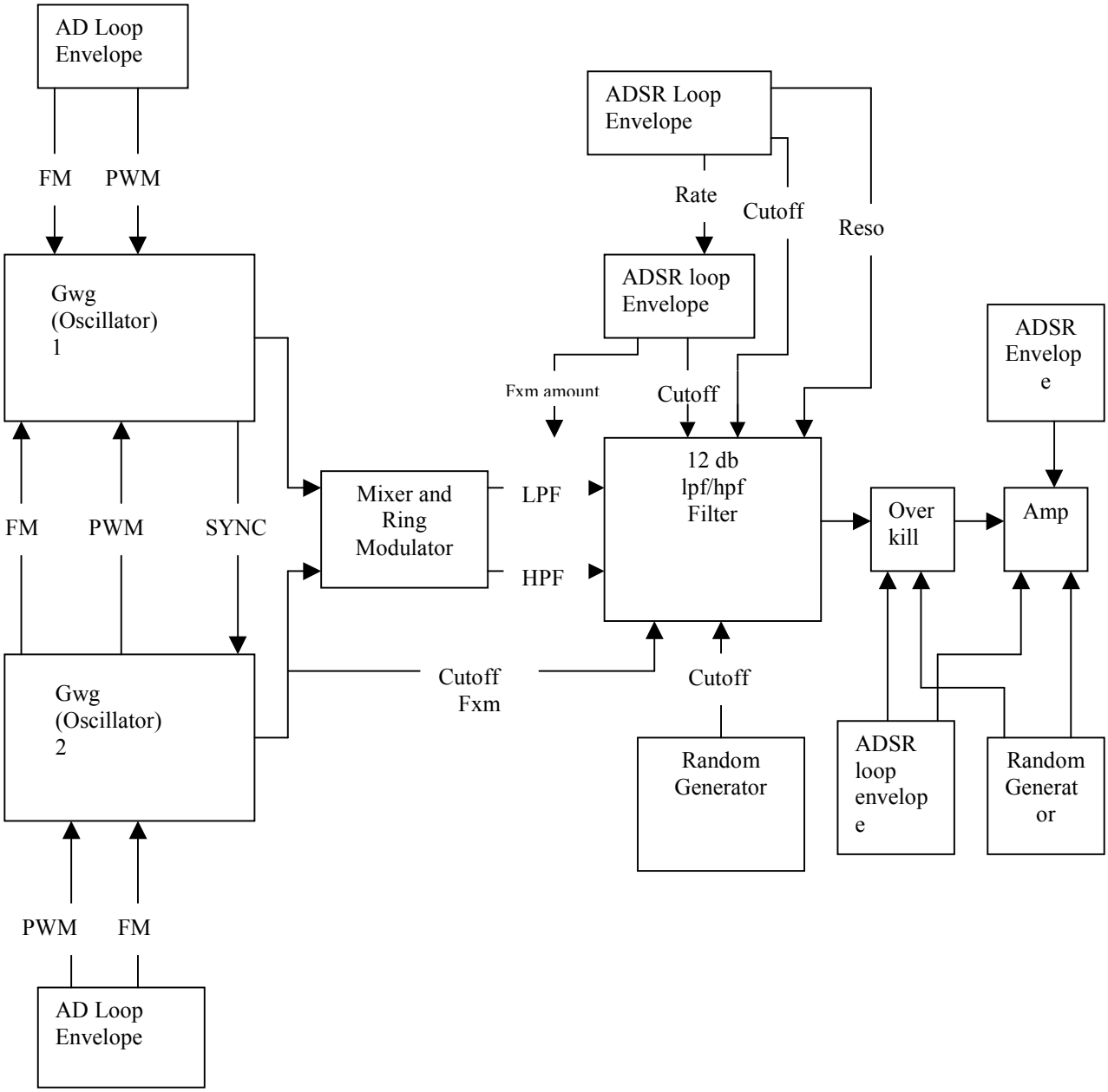
Main Features

- 2 voices. Can run in mono, duo, unison or dual synth (bi-timbral) modes.
- Each voice has:
- 2 Oscillators with sync, fm, ringmodulator and pwm which works on all of their 16 different waveforms.
- A high quality unique sounding analog lpf/hpf filter.
- Overkill distortion.
- 5 loop envelopes.
- 2 random generators.
- Velocity control of filter cutoff and final amp level.
- 16-step step sequencer which is MIDI-syncable, is able to control 2 selectable parameters, has realtime transpose, and a keyboard (arpeggiator) mode, in which, you start/stop and transpose the sequence via a connected MIDI-keyboard.
- Storage of 256 sounds and sequences in Microchip 24LC256 eeproms, which is guaranteed to retain data for at least 200 years! No need to worry about changing back-up batteries.
- MIDI-control of 15 parameters.
- Boxed small and compact – easily portable.
- EVERYTHING IS ENGINEERED BY GOTHARMAN.

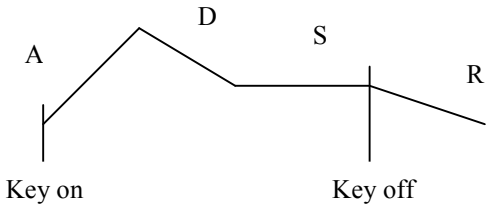
microGothar voice structure



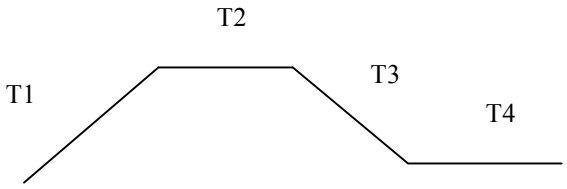
Loop Envelopes (Modulators)

Instead of the usual envelope/LFO configuration found on many synthesizers, the microGothar has loopable envelopes. When loop is off it acts like an ordinary AD(SR) envelope, but when loop is on it acts like an LFO where you can almost freely shape the waveform, and make it sync to note on's if desired.

Loopenvelope loop=off:



Loopenvelope loop=on:



Connections

9V DC power connector: Connect the supplied 9-12 V DC power supply to this.

MIDI in: Connect this to the MIDI out of a MIDI transmitting device (MIDI keyboard, sequencer, computer or whatever).

Audio In Jack: Here you can connect a line level sound source, like a cd player, a drum-machine, a sampler, or another synthesizer. That signal can run through the microGothar's ring modulator and filters, plus it can be used as an FM source (it replaces oscillator 2, when selected in the mixer section).

Out 1 Jack: This is a line output, of voice 1 solo, and needs to be amplified. Connect it to an amplifier or a mixer. When a jack is plugged into this, voice 1 is no longer present on the Mix Out output.

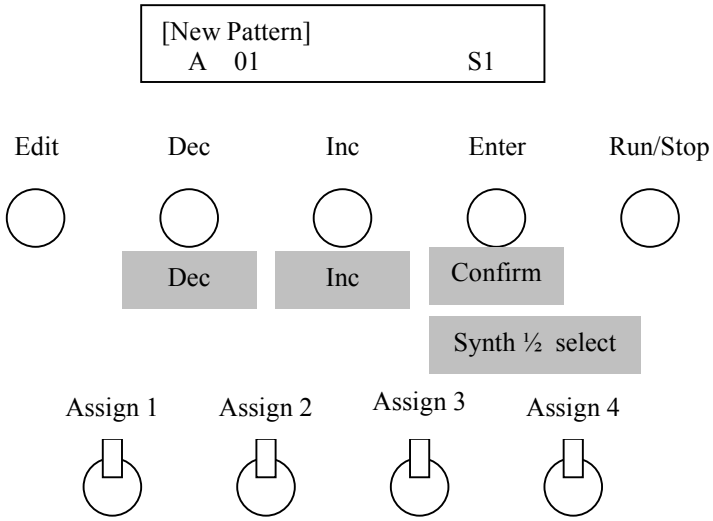
Out 2 Jack: This is a line output, of voice 2 solo, and needs to be amplified. Connect it to an amplifier or a mixer. When a jack is plugged into this, voice 2 is no longer present on the Mix Out output.

Mix Out Jack: This is a line output, of voice 1 and 2 mixed together, and needs to be amplified. Connect it to an amplifier or a mixer. The level of this output is adjusted by the volume knob on the front panel.

The sound/pattern select page:

This is the default page. When no knobs are lit (except for the Run/Stop knob), the microGothar are on this page.
A pattern on the microGothar consist of one sound, and one 16-step sequence (if created)., in mono, duo and unison modes, or 2 sounds and a 2-track 16-step sequence in dual mode.

Select a pattern:



Use the Dec/Inc buttons to select a sound/pattern, and push the Enter button to confirm.
.
If you have not selected a new sound/pattern, and microGothar is set to be in dual mode (on the ”COMMON” edit pages explained later in this manual), pushing Enter will toggle between Synth 1 and 2, and will show in lower right of the display as ”S1” and ”S2”. When Synth 2 is selected, you can use the Inc/Dec buttons to select a sound for synth 2. Again you will have to push Enter to confirm, before it actually changes the sound.

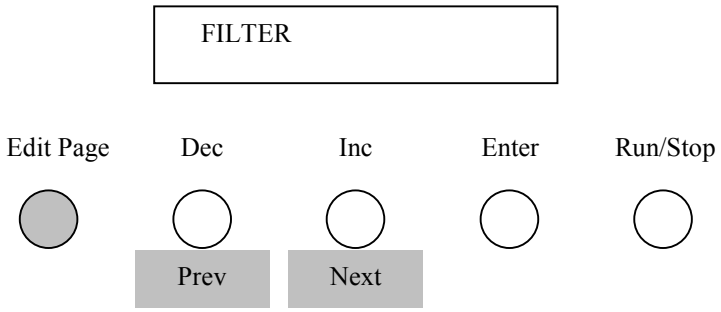
The sound selected for synth 2 is saved as a number, when you save the sound selected for synth 1. So when you again recall a sound in synth 1, that was saved as a dual mode sound, it will remember what sound was selected for synth 2.

You can also select a pattern by sending a MIDI program change message from another device. Since you can only select 128 programs over MIDI, controller 32 can be used to switch between bank A-H (Ctrl.32 value less than 64) and bank I-P (Ctrl. 32 value above 64).

The 4 turning knobs can each be assigned to a parameter.

Edit pages

Please note: In dual synth mode, all edits are done on the synth voice selected on the sound/pattern select page. See previous page in this manual.



On the edit pages you can adjust all the parameters regarding the sound, the sequence, the MIDI/synth setup, and you can save and name the pattern. If you, from the Pattern select page, push the Edit button one time, so it is lit, you can use the Dec and Inc buttons to select an edit page. push the Edit button once more, and you can see the parameters. Use the Dec and Inc buttons to select varios groups of four parameters. With the 4 edit knobs, you can change the parameter values.

Push Enter to exit edit mode, and return to pattern select page.

If there are a star before the pattern number, it means that you have edited the presence sound/sequence, and it is not saved. If you at that moment change pattern, without saving, your edits will be lost. Have a look at one of the following pages, to see how to save a pattern.

COMMON:

ChA.	ChB.	Syn .	Mode
1	2	int	duo

ChA: The common MIDI channel, on which microGothar will receive MIDI note on's and off's, bender, controller and program change messages. In dual synth mode, this is the receive channel for synth 1.

ChB: When in dual mode, this sets the MIDI receive channel for synth 2.

Syn: SYNC. Selects whether the build-in sequencer will sync to it's own internal speed clock, or to an external MIDI clock.

Mode: Selects what voice mode it will be in:

Duo: Duophonic mode.
Mono: Monophonic mode.
Unison: 2 sounds stacked upon each other, for a fatter sound.
Dual: The two voices is split into 2 synths, which can have their own sound and sequence.

GWG 1:

GWG stands for: Gotharman's Wave Generators, and is the oscillators of the microGothar. They are digital, but with no aliasing errors. Most other digital oscillators are using the sample frequency to adjust the pitch. They have a base frequency on maybe 44,1 KHz maybe on C4. Since we don't want to hear the sample frequency, we put a low-pass filter on the output, to remove everything above 20 KHz. This will work fine, as long as you play the C4 note, but if you go 1 octave (or more) up or down, the sample (playback) frequency will change, and the filter on the output (called anti-aliasing filter) will no longer work, and the strange effects you will hear (muddy bass and weak hi-tones) is called aliasing errors.

On the Gwg's I have developed a pitch-shifting system that doesn't change the sample/playback frequency when you shift a note, but instead stretches the waveform. No matter what note you play, the playback frequency is allways 44 KHz, which means, that all aliasing errors are eliminated. It sounds good in the whole note range, and doesn't sound muddy in the bass area.

Like analog oscillators, the oscillators on the microGothar is freely running. They dont restart when you hit a key (unless keysync is on). This makes them more alive.

Push the Dec/Inc buttons, to toggle between the various GWG1 edit pages.

Wave.	Pw .	Npit.	Pwm .
Ssaw	20	On	0

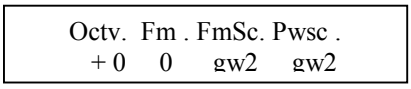
Wave:

Select the waveform you want. Choices are:
Hsaw: hpfsaw – when you turn the pw, it acts like a high-pass filtered saw-wave.
Ssaw: syncsaw – with the pw, you adjust the sync pitch.
Squ: square – pw adjusts the pulse width.
Tri: triangle – pw acts as phase distortion to create some strange waveforms.
Sine: pw adds harmonics to the sine-wave.
Sif 1-9: Sine-function wave 1-9. Waveforms created out of mathematical sine-functions. Pw acts as a kind of wavetable.
Vnoi: Voltage noise. Ordinary noise wave. Pw adjust the harmonic content. The **Npit** parameter determines if noise is pitched or unpitched.
Pnoi: Pulsed noise. Pw sets the offset point, **Npit** determines if it is pitched or unpitched.

Pw: See wave descriptions.

Npit: Noise pitch. When on, the noise-waves are pitched, when off, the noise-waves are unpitched.

Pwm: The amount of pw-modulation. The source can be Gwg 2 or the AD loop envelope.

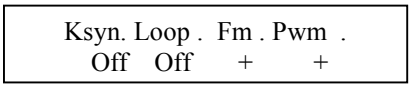


Octv: Octave switch.

Fm: Frequency modulation amount. Source can be Gwg 2 or the AD loop envelope.

FmSc: Fm source select.

PwSc: Pwm source select.

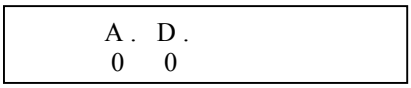


Ksyn: AD loop envelope key sync on/off select.

Loop: AD loop envelope loop on/off select.

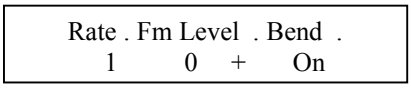
Fm: Fm positive/negative modulation select.

Pwm: Pwm positive/negative modulation select.



A: AD loop envelope attack time.

D: AD loop envelope decay time.



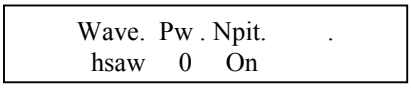
Rate: Adjusts the Gwg 1 sample rate. A higher value creates a lower sample rate.

Fm Level: The AD loop envelope controls the Fm amount.

Bend: Gwg 1 pitch bend control on/off.

GWG 2:

Push the Dec/Inc buttons, to toggle between the various GWG2 edit pages.



Wave:

Select the waveform you want. Choices are:
Hsaw: hpfsaw – when you turn the pw, it acts like a high-pass filtered saw-wave.
Ssaw: syncsaw – with the pw, you adjust the sync pitch.
Squ: square – pw adjusts the pulse width.
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Vnoi: Voltage noise. Ordinary noise wave. Pw adjust the harmonic content. The Npit parameter determines if noise is pitched or unpitched.
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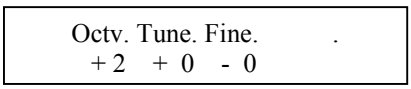
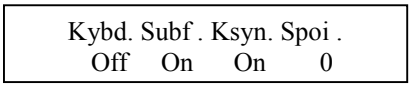
Npit: Noise pitch. When on, the noise-waves are pitched, when off, the noise-waves are unpitched.



Octv: Octave switch.

Tune: Gwg 2 tune.

Fine: Gwg 2 fine tune.



Kybd: Selects if Gwg 2 shall respond to keyboard CV or not.

Subf: Gwg 2 subfrequency on/off. When on, Gwg 2 acts as a slow running LFO.

Ksyn: Gwg 2 keysync on/off. When on, Gwg 2 is restarted when a note on message is recieved from the MDI-input or the internal sequencer.

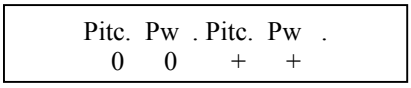
Spoi: Gwg 2 start point. If keysync or oscillator sync is on, this parameter sets, where the Gwg 2 wave form will start when triggered.

Rate: Adjusts the Gwg 2 sample rate. A higher value creates a lower sample rate.

Bend: Gwg 2 pitch bend control on/off.

GWG2 MODULATOR:

Push the Dec/Inc buttons, to toggle between the various GWG2 MODULATOR edit pages.

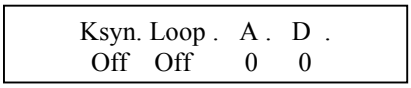


Pitc: Gwg 2 pitch modulation amoumt.

Pw: Gwg 2 pw modulation amount.

Pitc: Gwg 2 pitch positive/negative modulation.

Pw: Gwg 2 pw positive/negative modulation.



Ksyn: Gwg 2 loop envelope key sync on/off select.

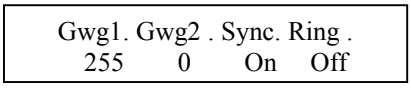
Loop: Gwg 2 loop envelope loop on/off select.

A/T1: Gwg 2 loop envelope attack time/Time 1.

D/T2: Gwg 2 loop envelope decay time/Time 2.

MIXER:

Push the Dec/Inc buttons, to toggle between the various MIXER edit pages.

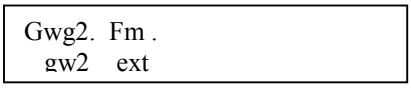


Gwg1: Gwg 1 level.

Gwg2: Gwg 2 level.

Sync: Oscillator sync on/off. When on, Gwg 2 syncs to Gwg 1.

Ring: Ring modulator on/off. When on, Gwg 1 are ringmodulated by gwg2.



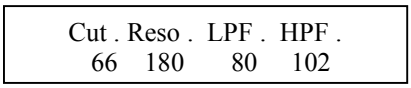
Gwg2: Select whether you want the gwg2 input on the filters to be gwg2 (gw2) or the external audio input (ext).

Fm: Select whether you want the FM source to be gwg2 (gw2) or the external audio input (ext). This setting will affect both FM, the ring modulator and the filter FM (Fxm).

FILTER:

The microGothar has a unique analogue filter, engineered by Gotharman to give a crunchy sound. It runs in lowpass and highpass mode at the same time, and levels can be independently adjusted for these two modes. The filter is made of 2 blocks on each 6 dB, to give it a total roll-off of 12 dB. The cutoff frequency of the 2 blocks can be spaced, using the Sep control.

Push the Dec/Inc buttons, to toggle between the various FILTER edit pages.

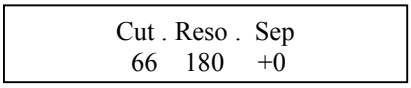


Cut: Adjusts the filter cutoff frequency.

Reso: Adjusts the filter resonance.

LPF: Adjusts the level of the Low-pass contents of the filter.

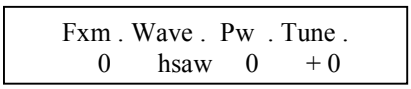
HPF: Adjusts the level of the High-pass contents of the filter.



Cut: Adjusts the filter cutoff frequency.

Reso: Adjusts the filter resonance.

Sep: Separates (spaces) the cutoff frequency of the 2 filter blocks. At the value +0, the cutoff frequency for the 2 blocks are exactly the same.

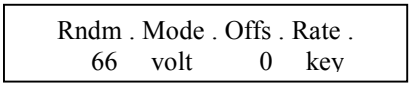


Fxm: Gwg 2 cutoff modulation amount (Filter FM).

Wave: Gwg 2 waveform select remote control.

Pw: Gwg 2 pw remote control.

Dtun: Gwg 2 tune remote control.

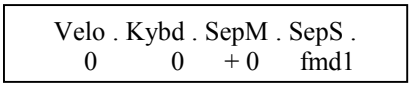


Rndm: Random generator cutoff modulation amount.

Mode: Voltage random or pulsed random select.

Offs: Pulsed random offset.

Rate: Random generator rate. When turned all the way down to zero (display writes: key), a new random value will show every time a note-on message is recieved.



Velo: Adjust how much recieved velocity values will influate the filter cutoff frequency.

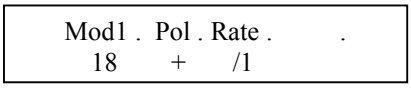
Kybd: Adjust how much recieved note values will influate the filter cutoff frequency.

SepM: Cutoff separate modulation value.

SepS: Cutoff separate modulation source. Choices are:
fmd1: Filter modulator 1
fmd2: Filter modulator 2
amod: Amp modulator
rndm: Filter random generator
velo: velocity
kybd: Note number
ct20: MIDI controller 20
valu: Fixed value

FILTER MODULATOR 1:

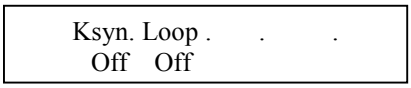
Push the Dec/Inc buttons, to toggle between the various FILTER MODULATOR 1 edit pages.



Mod1: Loop envelope 1 filter cutoff modulation amount.

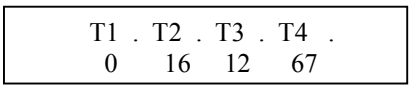
Pol: Loop envelope 1 polarity.

Rate: Loop envelope 1 speed.



Ksyn: Loop envelope 1 key sync on/off select.

Loop: Loop envelope 1 loop on/off select.



A/T1: Loop envelope 1 attack time/Time 1.

D/T2: Loop envelope 1 decay time/Time 2.

S/T3: Loop envelope 1 sustain level/Time 3.

R/T4: Loop envelope 1 release time/Time 4.

FILTER MODULATOR 2:

Push the Dec/Inc buttons, to toggle between the various FILTER MODULATOR 2 edit pages.

Mod2 .	Pol .	Rate .	Dest .
18	+	/1	cut

Mod2: Loop envelope 2 modulation amount.

Pol: Loop envelope 2 polarity.

Rate: Loop envelope 2 speed.

Dest: Loop envelope 2 destination: Cut, Reso, envelope 1 rate, Filter fxmd level (fxm).

Ksyn.	Loop .	.	.
Off	Off		

Ksyn: Loop envelope 2 key sync on/off select.

Loop: Loop envelope 2 loop on/off select.

T1 .	T2 .	T3 .	T4 .
0	16	12	67

A/T1: Loop envelope 2 attack time/Time 1.

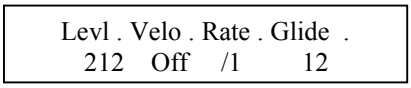
D/T2: Loop envelope 2 decay time/Time 2.

S/T3: Loop envelope 2 sustain level/Time 3.

R/T4: Loop envelope 2 release time/Time 4.

AMP:

Push the Dec/Inc buttons, to toggle between the various AMP edit pages.

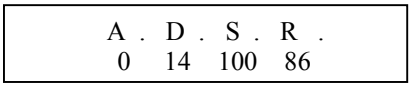


Levl: The overall sound level.

Velo: Velocity control of amp level on/off.

Rate: Amp envelope speed.

Glide: Pitch glide or portamento time.

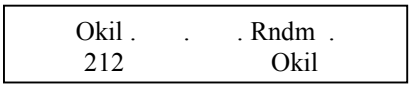


A: Amp envelope attack time.

D: Amp envelope decay time.

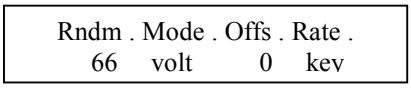
S: Amp envelope sustain level.

R: Amp envelope release time.



Okil: Overkill distortion level.

Rndm: Random modulation destination. Select between overkill and amp.



Rndm: Random generator amp modulation amount.

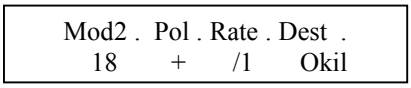
Mode: Voltage random or pulsed random select.

Offs: Pulsed random offset.

Rate: Random generator rate. When turned all the way down to zero (display writes: key), a new random value will show every time a note-on message is recieved.

AMP MODULATOR :

Push the Dec/Inc buttons, to toggle between the various AMP MODULATOR edit pages.

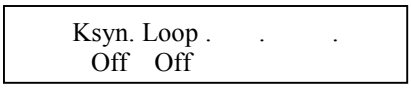


Mod2: Amp loop envelope modulation amount.

Pol: Amp loop envelope polarity.

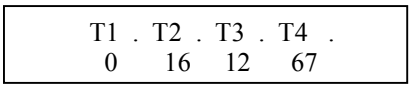
Rate: Amp loop envelope speed.

Dest: Amp loop envelope destination: overkill or amp.



Ksyn: Amp loop envelope key sync on/off select.

Loop: Amp loop envelope loop on/off select.



A/T1: Amp loop envelope attack time/Time 1.

D/T2: Amp loop envelope decay time/Time 2.

S/T3: Amp loop envelope sustain level/Time 3.

R/T4: Amp loop envelope release time/Time 4.

Sequencer pages

You can start and stop the sequencer by hitting the Run/Stop button, no matter what sequencer/synth page you are on. All edits can be made even while the sequencer is running.

SEQ MAIN:

Push the Dec/Inc buttons, to toggle between the various SEQ MAIN edit pages.

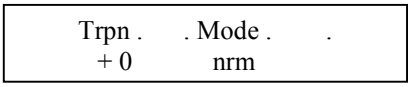
Lstp .	Sstp .	Par1 .	Par2 .
14	1	Cut	Off

Lstp: Last step. Selects how many steps (1-16), the sequence will have. You dont have to set this before you start creating a sequence, it is automaticly advanced as you create the steps.

Sstp: Start/shift step. Select at what step the sequence will start. On pattern shift, it will shift to the next pattern on the step before this.

Par1: Parameter 1. Select a parameter to be controlled by the sequencer. The choices are:
Off
Cut – Filter cutoff
Reso – Filter resonance
Fxm – Gwg 2 filter cutoff modulation amount.
Fmo1 – Filter loop envelope 1 modulation amount.
Fmo2 – Filter loop envelope 2 modulation amount.
Pw1 – Gwg 1 pw.
Pwm1 – Gwg 1 pw modulation amount.
Fm – Gwg 1 frequency modulation amount.
Pw2 – Gwg 2 pw.
Tune – Gwg 2 detune.
Spoi – Gwg 2 wave startpoint (if keysync or oscillator sync is on).
Pim2 – Gwg 2 pitch modulation amount.
Pwm2 – Gwg 2 pw modulation amount.
Glid – Glide (portamento) time.
Okil – Overkill distortion level.

Par2: Select a second parameter to be controlled by the sequencer. Choices are the same as Par1.

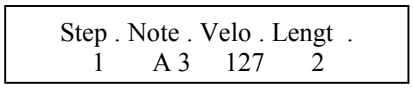


Trpn: Realtime transpose the sequence up to 63 semitones up and down.

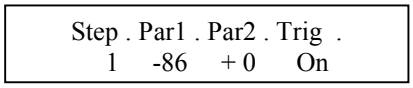
Mode: **nrm:** Normal mode. The sequencer starts/stops, whenever you hit the run/stop button.
kyb: Keyboard (arpeggio) mode. The sequencer starts when you hit a key on a connected MIDI-keyboard, and stops when you release it. If you hit a middle G, the sequence is played back in its original pitch, if you hit a note above or below the middle G, it will be transposed.

SEQ EDIT:

Push the Dec/Inc buttons, to toggle between the various SEQ EDIT edit pages.



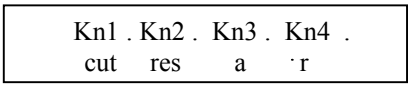
Use edit knob 1 to select what step you want to edit, and edit knob 2-4 to adjust the values for note, velocity and length for each step. If you edit a step number which is above the last step value on the sequencer main page, microGothar will automaticly change the last step value to this step number.



Use edit knob 1 to select what step you want to edit, and edit knob 2-4 to adjust the offset values of parameter 1 and 2, and whether loop envelope trigger (Trig) shall be on or off for each step.
The loop envelope trigger (Trig) retriggers loop envelopes in loop mode with keysync on.

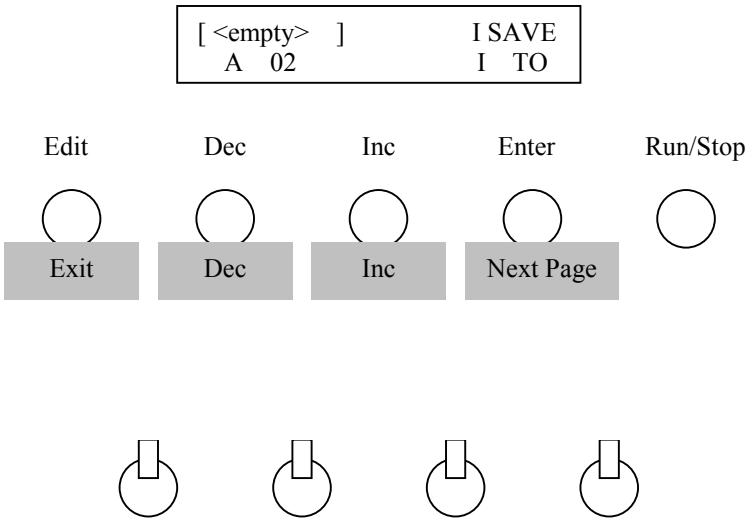
KNOB ASSIGN:

Assign a parameter to the turning knobs, when on the sound/pattern select (main) screen.

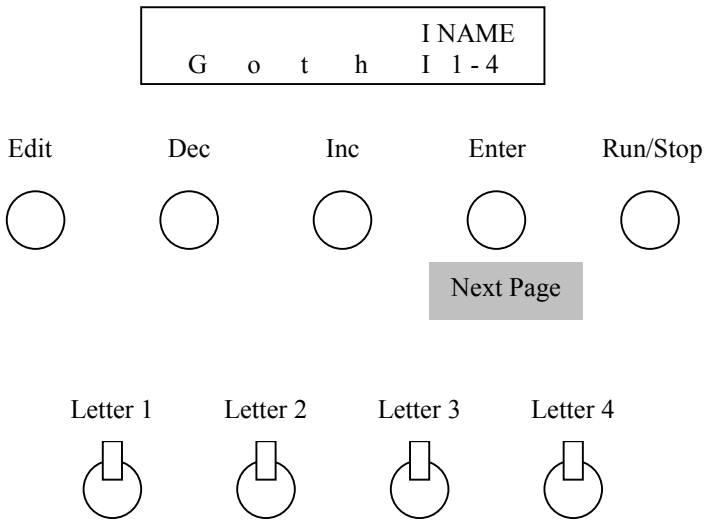


Kn1-4: The choices are:
Wv1 – Waveform GWG1.
Wv2 – Waveform GWG2.
Oki – Overkill distortion level.
Cut – Filter cutoff
Res – Filter resonance
Mo1 – Filter loop envelope 1 modulation amount.
Mo2 – Filter loop envelope 2 modulation amount.
M1a – Filter modulator 1 attack.
M1d – Filter modulator 1 decay.
M1r – Filter modulator 1 release.
M2a – Filter modulator 2 attack.
M2d – Filter modulator 2 decay.
M2r – Filter modulator 2 release.
A – Amp envelope attack.
D – Amp envelope decay.
R – Amp envelope release.

SAVE PATTERN:



Select the location where you want to save your sound/sequence to, using the Dec/Inc buttons, and push the Enter button to confirm and move to the name pages. Push the Edit button to exit save mode, if you regret.



Use edit knob 1-4 to select the first four letters in the name. Push the Enter button to select letter 5-8, and one more time select the last four letters. Pushing Enter after entering the last four letters, saves the pattern and returns to the Pattern Select page.

MicroGothar Duo MIDI implementation

After setting the MIDI channel as explained in the pattern page section, microGothar can be controlled from an external MIDI device on that MIDI channel. If sync on the pattern pages is set to Ext, microGothar's sequencer will start, stop and syncronize to the external device.
It receives note numbers 0-120, pitch bend, program change, and the following MIDI controllers:

Ctrl 1 – Filter cutoff
Ctrl 2 – Filter resonance
Ctrl 3 – Gwg 2 filter cutoff modulation amount.
Ctrl 4 – Filter loop envelope 1 modulation amount.
Ctrl 5 – Filter loop envelope 2 modulation amount.
Ctrl 6 – Gwg 1 pw.
Ctrl 7 – Gwg 1 pw modulation amount.
Ctrl 8 – Gwg 1 frequency modulation amount.
Ctrl 9 – Gwg 2 pw.
Ctrl 10 – Gwg 2 detune.
Ctrl 11 – Gwg 2 wave startpoint (if keysync or oscillator sync is on).
Ctrl 12 – Gwg 2 pitch modulation amount.
Ctrl 13 – Gwg 2 pw modulation amount.
Ctrl 14 – Glide (portamento) time.
Ctrl 15 – Overkill distortion level.

Ctrl 32 – value below 64 selects pattern bank A-H, a value above 64 selects pattern bank I-P.

Ctrl 21 – Sequence start point, when seq mode is kyb.

INFORMATION

The microGothar Duo is engineered by Gotharman (Flemming Christensen) in the year 2011. It is protected by the law of copyright, and is therefore not allowed to be copied by any other than Gotharman himself, unless an agreement is made.

I hope you will have years of trouble-free fun with your microGothar.

If you have any questions or troubles with your microGothar, feel free to contact me.

I also repair almost every electronic musical devices, implement MIDI in non-midi devices, and engineer musical electronics after your wish.

My Best Regards

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