RICHTER
WOGGLEBUG

MAKENOISE

Limited WARRANTY:
Make Noise warrants this product to be free of defects in materials or construction for a period of one year from the date of purchase (proof of purchase/invoice required).

Malfunction resulting from wrong power supply voltages, backwards power cable connection, abuse of the product or any other causes determined by Make Noise to be the fault of the user are not covered by this warranty, and normal service rates will apply.

During the warranty period, any defective products will be repaired or replaced, at the option of Make Noise, on a return-to-Make Noise basis, with the customer paying the transit cost to Make Noise. Please contact Make Noise for Return To Manufacturer Authorization.

Make Noise implies and accepts no responsibility for harm to person or apparatus caused through operation of this product.

Please contact technical@makenoisemusic.com with any questions, needs & comments, otherwise... go MAKE NOISE.
http://www.makenoisemusic.com

Special Thanks to Grant Richter for his genius and contributions to the world of synthesizers and for granting Make Noise permission to design a version of the Wogglebug!

Thanks to Beta Analysts: Walker Farrell, Lee Coleman, Devin Booze, Richard Devine, Robert AA Lowe, Pete Speer

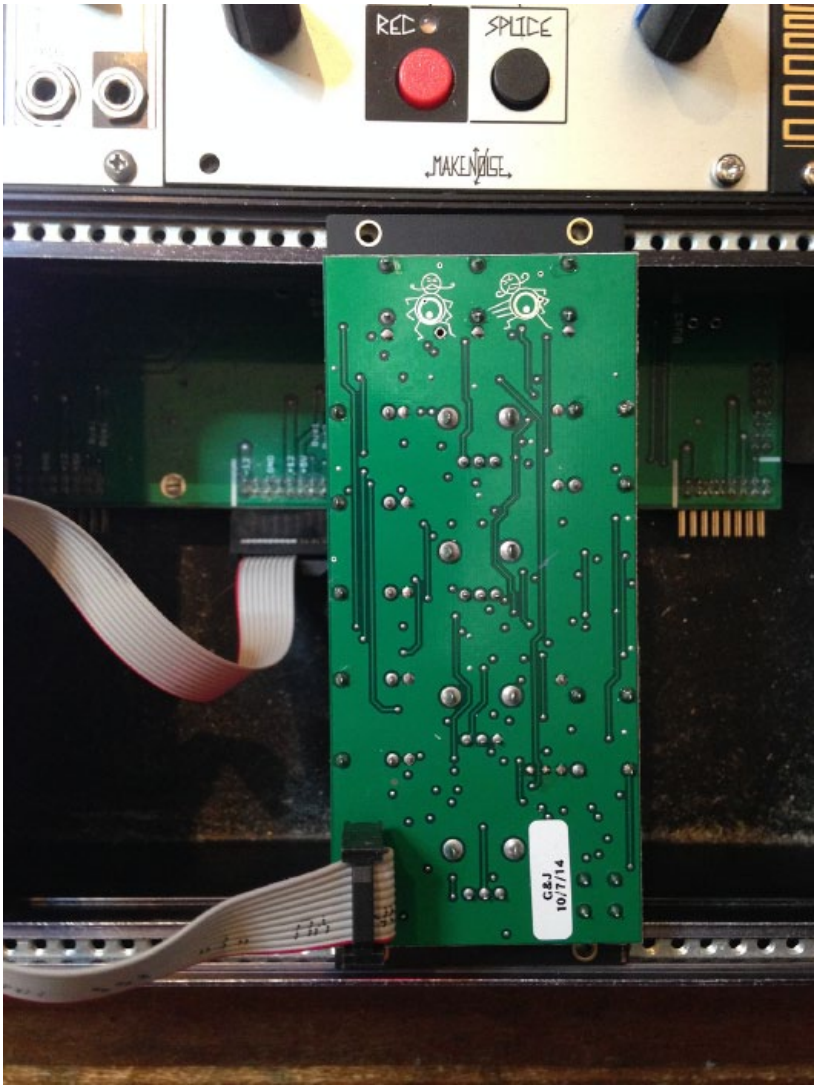
Installation:

The Make Noise Richter Wogglebug is an electronic signal generator requiring 50mA of +/-12V regulated power and properly formatted distribution receptacle to operate. It is designed to be used within the euro format modular synthesizer system.

Go to http://www.doepfer.de/a100_man/a100t_e.htm for the details of this format.

To install, find 10HP of space in your euro-rack synthesizer system, confirm proper installation of included power cable on backside of module (see picture below), plug the 16pin end power cable into the euro-rack style power distribution board, minding the polarity so that the RED stripe on the cable is oriented to the NEGATIVE 12 volt supply line. This is USUALLY at the bottom. On the Make Noise power bus board, the negative 12 volt supply is indicated by the white stripe.

Please refer to your case manufacturers' specifications for location of the negative supply.



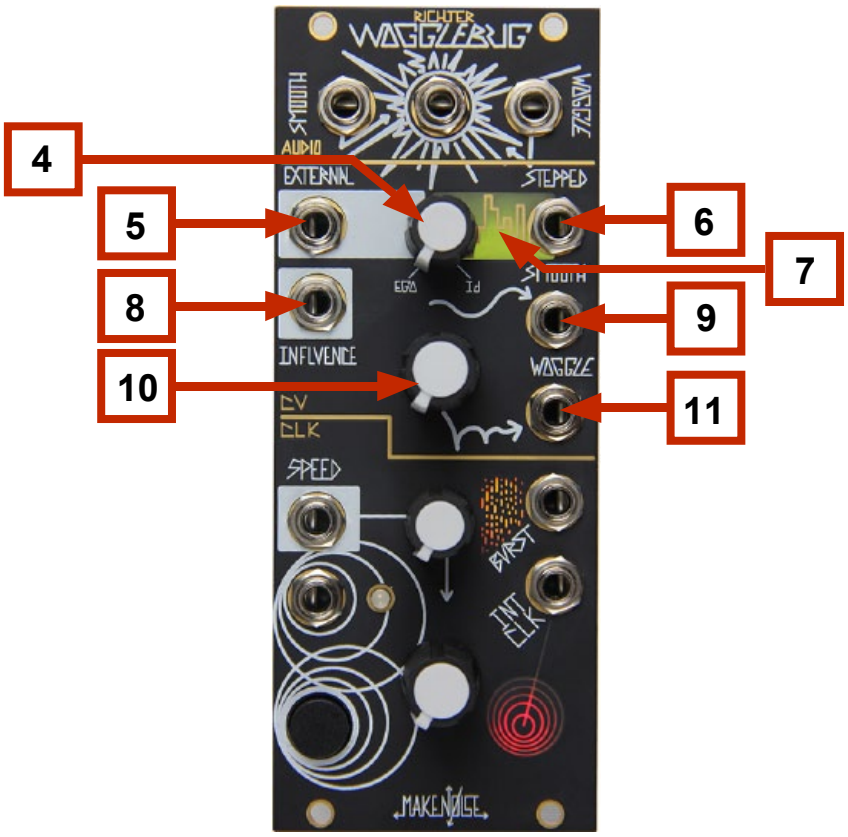
Panel Controls:

Audio:

1. SMOOTH VCO OUT: Shark's Fin wave audio rate signal controlled by the Ego Input, Ego/Id panel setting, Influence CV IN, and Clock Rate/Chaos controls; 10Vpp.

2. Ring-Mod OUT: Pulse Wave Audio rate signal, ring modulated product of Smooth VCO, Woggle VCO and audio rate signal at the Influence IN (if present). It gets messy, real fast. The digital nature of the Ring-Mod circuit makes Simple waveforms (Pulse, Square, Triangle, Sine, Saw) almost necessary to achieve something remotely musical, but don't let that stop you from pumping Motown samples into this circuit! 10Vpp.

3. Woggle VCO OUT: Square Wave audio rate signal, controlled by Woggle panel control, Ego IN, Ego/Id Balance Control, Influence CV IN, and Clock Rate/ Chaos controls; 10Vpp.



Panel Controls (cont'd)

CV:

4. Ego/Id Balance Control: with nothing inserted at the Ego Input, sets the range of probable values. Turning this control CCW, the random values generated by the system tend to "cluster." With a signal applied to the Ego IN, it allows that external signal to be balanced with the internal signal source to generate random voltages.

5. Ego Input (external input for S&H): Signals applied here will be injected directly to the uncertainly, beating heart of the Wogglebug. Accepts Control Voltages or Audio Rate signals; expects 10Vpp max.

6. Stepped OUT: At lower Clock rates, the Stepped Random Voltage appears here: new value occurring at every clock pulse indicated by the blue System Clock LED. At higher (audio) clock rates, bit reduction effects may be achieved by inserting an audio signal into Ego IN and setting Ego/Id Balance full CCW;10Vpp range.

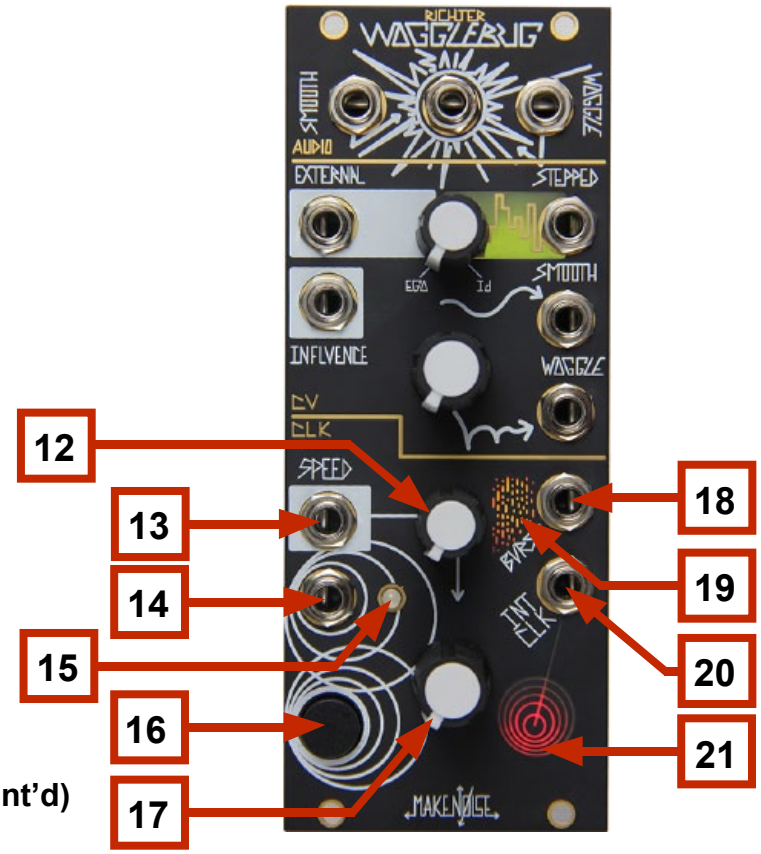
7. Stepped OUT LED: visual indication of approximate Stepped Random Voltage value.

8. Influence IN: CV and/ or Audio Signal input that performs the following duties: modulates frequency of SMOOTH and Woggle VCOs, inputs to the Ring-Mod circuit, and level shifts the Woggle CV signal. Responds 0V to 10V.

9. SMOOTH OUT: Smooth Control Voltage appears here, the smoothness of which is set by the Clock RATE/ Chaos Control; 0V to 10V.

10. Woggle Control: Sets how quickly (or slowly) the Woggle circuit is able to catch the Smooth/ Stepped circuit. Clockwise slows the Woggle CV, counterclockwise speeds it up.

11. Woggle CV OUT: A of product of the Smooth/ Stepped CV, this voltage quivers, shakes, and chases after the heart of the system... always, and is smoothed by the Woggle panel control; 0V to10V.



Panel Controls: (cont'd)

CLK:

12. Speed CV Attenuator: unipolar attenuator for Speed CV IN. Normalled to 8V (see below).

13. Speed CV IN: unipolar control signal input for Speed parameter. Normalled to +8V so that with nothing patched, the associated Speed CV attenuator will extend the internal clock generator range up to around 200hz; Range: 0V to +8V.

14. External Clock IN: any signal may be applied here, allowing for independent control of rate and smoothness.

15. System Clock LED: Displays rate of Sample and Hold clock. When a signal is applied to the External Clock In, shows the rate of the incoming clock/rising edge. With nothing patched, will mirror the Internal clock.

16. Disturb Button: Direct control of the Sample and Hold circuit: pressing Samples; holding Holds.

17. Speed Control: dual purpose control that sets the Rate of the Wogglebug Internal Clock generator & the lag processor feeding the Smooth CV circuit. Turning it CCW slows the system and smoothes its response. Turning it CW quickens the system with the Smooth CV response becoming jittery. Internal Clock generator range is 1 minute per cycle up to around 40hz (extended range pushes upper limit to around 200hz).

18. Burst OUT: Square random gate signal, synced to the Clock and influenced by the Stepped, Smooth and Woggle controls; 0 to +10V.

19. Burst OUT LED: Visual respresentation of random gates.

20. Clock OUT: Square clock signal from the internal clock generator. Not influenced by signal at External Clock IN; 0V to +10V.

21. Internal clock LED: Displays rate of internal clock. NOT affected by External Clock In.

Overview:

Amongst other things, the Make Noise Wogglebug contains the following: 1 Voltage-Controlled Clock, 1 Sample & Hold, 2 Lag Processors, 1 Random Gate Burst Generator, and 2 VCO Digital Ring Mod: most of which are patchable via the instrument's panel in a system that is capable of CV and Audio Signal generation and processing.

While we have broken the Panel Controls & I/O description into Sections for explanation, please understand that ALL portions of the Wogglebug interact with each other. For example, changing the Ego/Id Balance will affect the Stepped, SMOOTH, and Woggle CVs, the SMOOTH VCO, Ring-Mod and Woggle VCO OUTs! The way that we like to think of the system is that the Woggle Circuit is chasing the SMOOTH/ Stepped Circuit, which is being kicked in the ass by the Internal Clock. It is very possible to make patches and panel settings which lock up the Wogglebug, and thus the CV outputs will hang at the last voltage level while the VCOs will drone on almost unchanging. When this happens, adjusting just about any panel control will disturb and wake the Wogglebug. Finally, consider that many changes in the system are NOT immediate. This is because the Wogglebug is a complex feedback system where several sub-circuits are responding to each other.

IS THE WOGGLEBUG MY SYNTHESIZER'S ID MONSTER? SHOULD I BEWARE OF THE WOGGLEBUG?

YES and maybe.

The Wogglebug is a random voltage generator, originally designed by Grant Richter of Wiard Synthesizers. The Wogglebug's purpose is to overtake the control voltages produced by your keyboard or sequencer during performance and give a voice to your synthesizer's ID. It is your synthesizer's ID MONSTER. A continuation of the SMOOTH and Stepped, fluctuating, Random Voltage Sources, pioneered by Don Buchla, the core of the circuit is based on the Buchla Model 265 "Source of Uncertainty" module, which many consider to be the most musical of all random voltage generators. Like the 265, the Wogglebug utilizes a lag processor (low frequency smoothing filter), a VCO, and a Sample & Hold in order to produce Stepped and SMOOTH (or lagged, slewed) Control Voltages in the range of 0 to 10 volts.

Grant's Wogglebug design expands on this system to include the otherworldly Woggle CVs (stepped voltages with decaying sinusoids at the edges), which must be heard in action to be truly appreciated. In a moment of considerable noise, Richter decided to tap into the sound sources at the uncertainly beating heart of the Wogglebug and bring them forth to the instrument's panel. He then figured a clever way to Ring Modulate these sounds and that too is on the panel of all Wogglebugs. Thus, the Wogglebug is a complete system: no external modules are required to Woggle; however, all voltage-controlled systems long to be tickled, bitten, plagued, and eventually, destroyed by the Wogglebug.

Tony fell in love with Grant's #3 circuit the moment his first Wogglebug came to life on an experimenter's breadboard. He built a few DIY Wogglebug #3, including the Ryan Williams designed clone PCB and was lucky enough to have used the Wiard Wogglebug #5 extensively. Now, we at Make Noise feel honored to be presenting this circuit as a Make Noise module.

The Make Noise Wogglebug is neither version #3 nor #5. In the truest spirit of Grant Richter, the Make Noise Wogglebug is not a clone. Instead, it is a tribute to all that Woggles and is an evolution of the original Richter design. Like the #3, the Make Noise Wogglebug is a single system; however, it improves upon the #3 by offering further functionality, such as an Influence IN to the Ring Mod circuit, the ability to directly inject a signal to the heart of the Wogglebug via the Ego IN, and a Random Gate Burst function: all of which have never appeared on any other Wogglebug. We also redesigned the Cluster circuit, and thus it has been renamed as Ego/Id Balance to reflect its further purposes, allowing for new functionality that has again, never existed with any other Wogglebug.

The new Richter Wogglebug has yet a few more tricks up its sleeve...

- A much more stable clock output with the widest frequency range yet seen on a Wogglebug. The clock now goes up to about 200Hz, allowing the Control Voltage and Gate OUTputs to be heard directly as different flavors of analog and digital noise.

- In previous Wogglebugs, the clock had been locked to the internal Sample and Hold Circuit. Now, with the Richter Wogglebug, the clock can be freed by the independent External Clock INput or the Disturb Button. Regardless of what is happening at these control points, the Internal Clock OUTput will continue to run at the specified rate, keeping it open for use as a Master Clock at all times.

- The Disturb Button allows the Sample and Hold Circuit to be clocked manually: press to sample, release to hold. When the Wogglebug is running fast, this can slow it down. When running slow or not at all, this kicks it in the ass and delivers the next set of random values.

- The Smooth VCO is a brand new waveform, Sharktooth.

- The Influence input has a greater effect on all parts of the Wogglebug's psyche than the previous Ring Mod input.

- The Burst output is more active and ALL portions of the Wogglebug are more responsive to control and touch.

Patch Ideas:

Tame The Bug
Set Ego/Id Balance to 9 o'clock. Patch a master clock to the External Clock INput. Attenuate all CVs at destinations.

Basic Random Sequencing
Patch Clock OUTput to STRIKE in on Optomix, Stepped Random output to 1v/oct input on DPO. Patch DPO output to same Optomix channel Signal input. Adjust Speed Panel Control and Ego/Id Balance Control to taste.

Sample and Hold
Patch signal to be sampled to Ego Input. Set Ego/Id balance full CCW. Take S/H output from Stepped CV OUTput. Set sample rate with Speed panel control, or use the External Clock INput. Add uncertainty by turning Ego/Id Balance clockwise until completely random at full CW. Use the slewed version of the signal by patching from the SMOOTH CV OUTput.

Jittery Clock
Patch Stepped Random Output to Speed CV INput, adjust Speed CV INput Attenuator to about 8 o'clock. Add more or less jitter by increasing the attentuator value.

Chaotic Clock
Same as above but adjust Speed CV INput Attenuator to about 12 o'clock.

Make Noise
Remove cable from Speed CV input. Adjust Speed panel control and Speed CV Input Attenuator both full CW so the Wogglebug runs at audio rate. Monitor any CV or audio output for different flavors of noise. Adjust overall rate with Speed Panel Control and Speed CV Input Attenuator.

Pitch-to-Voltage (PLL)
Adjust Ego/ID control to EGO. Patch a waveform output from a VCO, such as the DPO sawtooth, to the Influence Input. Sequence the VCO. Take the Woggle CV output for a slightly random voltage that "follows" the sequence. Woggle and Ego/Id Panel Controls will allow some control over the degree and type of following.

Lag Processor/Slew Limiter
Apply voltage to be slewed to Ego input. Adjust Ego/Id panel control to full Ego. Patch audio rate clock to External Clock INput. Take the slewed output from the SMOOTH Random CV out. The Slew rate is set by Speed Panel Control.

BitCrush
Adjust Speed Panel Control until the internal clock is at audio rate. Apply a signal to be crushed to Ego/Id input. Start with panel control at full Ego and monitor the Stepped Random OUTput.

Dirty CV
Patch CV of your choice to Ego/Id Input. Adjust the Speed Panel Control and the Speed Input Attenuator full clockwise for audio-rate clock speed. Adjust Ego/Id Balance to taste (further clockwise will be filthier.)

Patch Ideas (cont'd):

Kick the Bug
Patch the dummy cable to External Clock INput. Wogglebug will stop dead in its tracks. Pressing the Disturb Button will "kick the bug," generating new random voltages each time you press.

Kill the Bug
Set Speed panel control to 3 o'clock or greater. Press and hold the Disturb Button to "kill" the bug and the last generated random voltages will hang until release.

Child Tones
To achieve something similar to Child Tones, utlize 2 Wogglebugs, inserting the Smooth or Woggle VCO out from one into the External Ring Mod INput of the other. The Child appears at the Ring-Mod OUTput of the second Wogglebug.

Patch Exciter
Patch Stepped, Smooth, or Woggle CVs to any parameter in a patch that is not exciting. If nothing is patched to the Ego INput, make sure the Ego/Id Balance is in the Id position.