SYNTH HACKS #09
NOT JUST ANOTHER MIDI FACE

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In my quest to build fun, portable synths, I'm always looking for breakthrough components. The WVR [pronounced "waver"] has been a wonderful find. This $25 circuit board is just 26×55mm, runs on USB power, and holds 8GB of audio files. Solder on a MIDI jack and a stereo audio jack, upload samples over Wi-Fi, and you have a thumb-size instrument you can take anywhere. I embedded my first WVR in a Japanese monster toy, Ultraman's chicken-shaped nemesis Birdon [Figure 1].

WVR developer Andrew March was inspired by the Robertsonics WAV Trigger, an earlier version of the board inside see my pig-shaped synth [Waveform Issue #7], but WVR has numerous advantages besides the smaller size and price:

- It's open source, with code and schematics at https://github.com/marchingband/wvr.
- It's based on the powerful ESP32 microcontroller, with Wi-Fi and Bluetooth, opening it to a world of peripherals.
- It's Arduino compatible and can store ten sets of firmware for fast feature switching.
- Its built-in web server lets you load, manage, and even trigger samples wirelessly.
- In addition to WAV, it plays compressed audio file types like Flac, MP3, and Ogg for longer sample times.
- It offers velocity sample-switching [up to 32 layers] as well as hi-hat exclusion groups.
- It can transpose a single audio file across a range of notes.
- It supports "attack-sustain-release" looping, which lets you play a sound with a distinctive attack, loop the body, and have playback jump to the release stage on note-off.

Andrew releases frequent updates in response to customer requests. Several of my suggestions are now in the firmware, and there's an imaginative user community. A company called Atonal Circuits just released a Eurorack version [Figure 2].

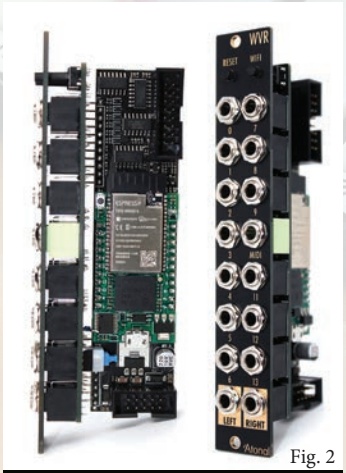

Fig. 2

Atonal Circuits [atonal.be] WVR-powered Eurorack module.

My Birdon project came out so well that I ordered a second WVR with the USB backpack [tindie.com/products/ultrapalace/wvr, $10]. This expansion board pairs with WVR to turn it into a USB host so you can plug in a USB MIDI controller and play; WVR even powers the controller. [Connecting the boards involves some tricky soldering, so I recommend spending the extra $2 to have them pre-assembled.] With the backpack, WVR responds to both 5-pin and USB MIDI at once, so you can play different sounds from two controllers by setting them to different channels. I embedded WVR #2 in the coin chamber of a Takada Face Bank [Figure 3], adding a CV input to wiggle its rubbery monkey lips with each note.

Fig. 1

The WVR board transformed Birdon into a MIDI-controlled sample player with 18-voice polyphony. This photo shows the USB backpack that lets you play WVR from a USB MIDI controller.

Figure 3 also shows another cool hack. As Altitude909 revealed on modwiggler.com, the classic KMI QuNexus controller has a hidden MIDI output inside the USB jack on its right side. Cut a USB cable in half, solder 220Ω resistors to the red and green wires, and solder them to pins 4 and 5 of a MIDI DIN connector to make a MIDI Out cable. KMI sells one with a female connector, but making my own let me use a male for more portability. Hear these hacks at instagram.com/davidbattino.

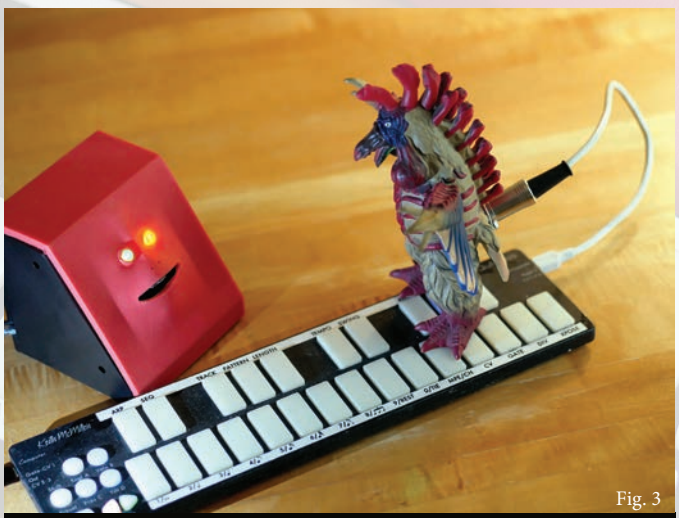

Fig. 3

The KMI QuNexus controller has a hidden MIDI output you can access by cutting the end off a USB Mini-B cable and adding two resistors and a MIDI connector. At left is my second WVR project, SampleChimp.