Spherical Wavetable Navigator — Firmware v2.2

New Features added in Firmware v2.2

Sept 25, 2020

Firmware Version 2.2

Firmware version 2.2 adds some exciting new features to the SWN, allowing you to control panning of each channel, control envelope sustain with sequencers, save and recall Presets with Select Bus devices, and more!

CV/Gate/Sustain Mode

to toggle modes



Press both buttons CV/Gate Mode was added in firmware version 2.1. In firmware version 2.2, we've added another mode called CV/Gate/Sustain Mode. This mode is identical to CV/Gate with two exceptions: the pulse-width (gate length) of the incoming gates controls the sustain of the SWN's envelopes, and the Sphere CV jack is used for Channel A's Gate jack instead of the Waveform In jack.

Entering CV/Gate mode

Firmware version 2.2 adds CV/Gate/Sustain Mode as the fifth button mode. Press the LFO-**>VCA** and **LFO Type** ($\bigcirc \square \bot$) buttons at the same time to toggle between the five modes in this order: Mute \rightarrow Note \rightarrow Keyboard \rightarrow CV/Gate \rightarrow CV/Gate/Sustain.

Using CV/Gate/Sustain Mode

Channel buttons are dim yellow in **CV/Gate/Sus Mode**



You can use CV/Gate/Sustain in the same way that you use CV/Gate mode. See the User Manual for a full discussion if you're not familiar with CV/Gate Mode. The main difference is that the Sphere CV jack must be used instead of the Waveform In jack for Channel A's gate. Another difference is that the gate length (pulse width) of the incoming gates controls the sustain of the envelope.

The rising edge of the incoming gate will trigger the channel's envelope. Each envelope has an attack segment and a decay segment. If the attack segment ends and the gate is still high, the envelope will hold, or sustain, at that position until the gate falls. At this point, the envelope's decay segment will play.



Adjust Panning



When using the **SWN** in stereo (by patching both **Audio Out** jacks) each channel can be positioned in the stereo field. By default, channels A, C, and E are panned to the right **Audio Out** jack, and channels B, D, and F are panned to the left **Audio Out** jack.

Hold down a **Channel** button while moving the channel's slider to adjust the panning. When the slider is all the way down, the channel will be panned fully to the left **Audio Out** jack. When the slider is all the way up, it will be panned fully to the right **Audio Out** jack. The channel can be panned to any other position in the stereo field by setting the slider in between these extremes.

After panning, the slider will often be in a new position that no longer represents the level of the channel. For example, if you pan a channel fully left, the slider will be all the way down, but the level will not necessarily be zero. In order to remind you that the slider's position doesn't represent the level, the slider light will flicker once per second after you pan a channel. Adjusting the slider will have no effect on the volume until you bring the slider back to its original position before the panning was adjusted. At this point, the slider will stop flickering.

When you save or load a preset, the panning of each channel is saved or loaded along with the channel's pitch, sphere navigation, and other parameters.

Select Bus – Preset Load/Save

Enable/Disable Select Bus: Hold "B" and Preset... B B Load Preset

Save Preset

... and use LFO buttons to enable/disable:







Save En/Disabled (hold 2 sec. to enable)

dim = disabled bright = enabled

This feature is present in firmware v2.2 and later.

The **SWN** can load and save presets via the Select Bus. The Select Bus is a protocol used by several Eurorack manufacturers that sends messages between modules connected to the same power bus board. To use Select Bus, the **SWN** must be connected to the same power bus as a Select Bus compatible "Leader", "Master", or "Transmitter". Such modules are listed at the end of the manual.

The **SWN** can only receive messages on the Select Bus, it can't transmit. There are two messages to which the **SWN** will respond: Load Preset, and Save Preset. Each of these can be enabled or disabled. By default, both are disabled.

Load Preset

A Load Preset command, also known as "Recall Preset" or "State Select", sends a preset number to the **SWN** and asks that it be loaded. If enabled, the **SWN** will load the preset exactly as if you had used the **Load Preset** knob. If the preset slot is blank, then a blank preset will be loaded.

Save Preset

A Save Preset command, also known as "Save Preset" or "State Save", sends a preset number to the **SWN** and asks that the current state be saved into that slot. If enabled, the **SWN** will save the state exactly as if you have used the **Save Preset** knob. If a preset already exists in the preset slot, it will be over-written.

Enabling Select Bus

- Hold down the Load Preset knob and the Channel Button B at the same time. Keep holding them down and notice that the LFO->VCA button turns green and the LFO Type button turns red.
- Tap the LFO -> VCA button to enable or disable the SWN from loading presets when the appropriate message is received over the Select Bus. When preset loading is enabled, the button will show bright green. When disabled, the button will show dim green.

Holding the **LFO Type** button for 2 seconds will allow the **SWN** to save presets when receiving the appropriate message over the Select Bus. Tap the button to disable this function, the button will then show dim red. When the function is enabled, the button will show bright red. A short beep will be heard to confirm your Select Bus settings have been saved to memory and will persist after the power is turned off.

Troubleshooting

The CV pins on the bus-board are used for Select Bus, so in the rare case that you are using these pins for other purposes, Select Bus will not work.

Select Bus is designed to have exactly one module sending messages per power bus. All other modules on the power bus must either be ignoring or receiving messages. Multiple "masters" or transmitters will not be permitted. You must consult the user manual for the device you intend to use as the transmitter (leader/master) in order to configure it.

Note that the **SWN** has 108 presets. However, not all Select Bus modules can handle that many (some are limited to 64, some are limited to 100). For this reason, higher numbered presets may not be accessible via Select Bus.

Select Bus Compatible Modules

The **SWN** receives both known styles of Select Bus messages. The following modules are known to send Select Bus messages and be compatible with the **SWN**:

- MakeNoise Rene mk2 (Store All and Mesh commands are ignored)
- Malekko Varigate 4+ (Save and Recall)
- Malekko Varigate 8+ (Save and Recall)
- Expert Sleepers Select Bus Breakout Kit may be compatible if used with a MIDI device that can send the appropriate PC/Select Bus messages.

Two styles of Save and Recall Preset are accepted by the SWN:

Recall Preset (brief style)	Program Change + Preset#	(0xC0 0x##)
Recall Preset (brief style)	Command 0xF4 + Preset#	(0xF4 0x##)
Recall Preset (verbose style)	Control Change 16 + 64 + Program Change + Preset#	(0xB0 0x10 0x40 0xC0 0x##)
Save Preset (verbose style)	Control Change 16 + 127 + Program Change + Preset#	(0xB0 0x10 0x7F 0xC0 0x##)

Startup Preset

The SWN will startup with the last preset that was loaded or saved.

How to Upgrade Your SWN



If you purchased your **SWN** and a printed copy of this manual was included in the box, then you have version 2.2 already installed. If you need to double-check, watch the light ring when you power on the **SWN**. Version 2.2 has a red light at the 3:00 position on the inner ring, and a blue light at the 1:30 position on the outer ring (see diagram at left).

If you need to upgrade, download the firmware file from <u>https://4mscompany.com/SWN</u> We also recommend downloading the updated User Manual from the same page.

The following upgrade procedure is copied from the User Manual:

- 1. To enter bootloader mode, first unplug all cables.
- 2. Power off the module.
- 3. Connect a computer or phone audio output to the Waveform In jack.
- 4. Connect the right **OUT** jack to an amp/speakers so you can listen. Turn the amp/speaker volume down: this is going to be loud!
- 5. Set the computer/phone's volume to 100% and the audio player software to 100% volume.
- 6. Press and hold down the center knob (**Browse**).
- 7. Still holding down the Browse knob, power on the module.
- 8. Release the Browse knob when you see channel A's button blink green.
- 9. Begin playing the firmware file. Immediately you should see the slider lights animate and the LEDs on the light ring turn on, one at a time. You should be hearing the sounds very loudly from the **OUT j**ack.
- 10. If the sound stops before the file is done playing, there was an error. Some buttons will turn red to indicate the error code.
 - a. Stop the file and rewind to the beginning.
 - b. Check all cables are plugged in tightly.
 - c. Tap the channel A button and it will go back to flashing green.
 - d. Play the file again from the beginning.
- 11. If the file loads successfully, the **SWN** will do an animation of blue and green lights on the light ring and the top row of buttons will flash green and blue.
- 12. Press the Browse knob to start playing with the new firmware!

Troubleshooting and tips:

- Some audio cards, especially laptops, play a pop when they begin to play an audio file. If this happens, the error lights will turn on as soon as you start playing. One way to overcome this is to let the file keep playing on the computer but hit the channel A button immediately after it turns red and before the noise starts playing (there's a two second lead time of silence). If that doesn't work, use a different device.
- Do not play from advanced audio software like Ableton. We have seen that such software can alter the playback, which can cause problems. Instead, play from basic software such as VLC, QuickTime, Windows Media Player, or Chrome. Turn off any EQ or "Bass Boost" settings.
- Remove your phone case; it may be preventing the cable from fully plugging in.
- Turn off all audio and "vibrate" notifications.
- Close any applications that make notification sounds (such as Facebook or messaging apps).
- Try downloading the .wav file rather than playing it from the browser (or vice-versa).
- Try on your phone if you used a computer (or vice-versa).
- Try adjusting the volume on your device: usually 100% volume is best, but sometimes reducing it will
 output a more clean signal.

If you're interested in compiling your own modifications, the open-source licensed source files (in C) can be found at <u>https://www.github.com/4ms/SWN</u>

A vagrant virtual environment is also on our GitHub, and has a full toolchain and the SWN source-code already installed.