Firmware updates for the GND-1T will be available on the website to incorporate any bug fixes, or add occasional features. If you believe you've found a bug, please try updating to the latest version. If you still see an issue, please send bug reports to gnd1t@richardvanhoesel.com.The update procedure below requires access to a computer with Windows 10 or later or MAC OS Catalina 10.15 or later. Earlier OS versions may work but have not been tested by us. We recommend closing all other software while performing the update. Note especially the instructions in red if using a MAC.

If you have any trouble, power cycle the GND-1T and reconnect the USB cable to your computer before running the loader again. In particular, if an initial update attempt fails and you get a blank screen, DON'T PANIC. It's extremely unlikely you've bricked your synth. Just follow the instructions below to rectify the problem.

Update Instructions:

Check your current firmware by holding the Patch button on your GND-1T during power up, and compare it to the latest version indicated on the website at https://richardvanhoesel.com/gnd1t.

Download the latest firmware using the "Latest firmware download" button on the website

You will also need these tools installed:

1. Teensy loader app:

Windows (exe file)

https://www.dropbox.com/scl/fi/38e6aa1chyjawl9vr2ndu/teensy.exe?rlkey=zya7oeijin9pqt53fw1b7mse7&st=qxrr2b0e&dl=0

MAC OS (tar file requires unzipping)

https://www.dropbox.com/scl/fi/et96e1orxejxdzt424gls/teensy-tools-0.60.3-macos.tar?rlkey=e15gjc62cad46x1u8d7qkgt7p&st=uc720z5u&dl=0

2. TyTools (latest version for Windows or MAC OS)

https://github.com/Koromix/tytools/releases

In the TyTools package, we'll be using just TyCommander.

Instructions to load the ehex firmware file:

Please follow these instructions carefully

If using Mac OS, do not use your computer for anything else whilst the firmware update is in progress. It only takes a minute or two. Ensure the firmware installation completes before using your computer for any other purpose or even switching to any other window/software, otherwise the firmware installation may fail.

Start the Teensy app (MAC) or run teensy.exe (Windows):
File>Open Hex File (direct it to where you have downloaded the firmware)
Enable the "Auto" button underneath Help

Start TyCommander:
Press the "Bootloader" button. This will get the Teensy process started, which is all we're using

TyCommander for (you do not need to touch any other buttons in the TyCommander app, just the bootloader button).

The GND-1T screen should go blank at this point.

After a second or two you should see the Teensy program start the upload process, and show ‘erasing’.

After up to about 20-30 seconds (and sometimes longer), this should switch to "Programming" and display a progress indicator.

After programming is completed, it's usually a good idea to power cycle the GND-1T to run the new firmware.

Troubleshooting, especially if using Mac:

If after the erasing stage you get an error message (**e.g. “Download failed”**), follow these exact steps:

- Unplug both the usb and the power to the GND-1T.
- Close the teensy app.
- Plug the GND-1T power and usb cables back in.
- The GND-1T screen should still be black (if it instead the GND-1T boots up normally then go back to the start of the instructions above and try again from the beginning).
- Open the teensy app again, and load the firmware into it.
- Press the Auto button again in the teensy app.
- This time the programming phase should start, and there should be no error.

Ensure that the firmware update completes and the GND-1T boots up normally before switching to any other window/software, otherwise the firmware installation may fail. Be sure to close and reopen the Teensy app if retrying an upload. If you try to load the firmware again without closing and reopening the Teensy app, it will likely fail (on Mac).

If you still have any issues just get in touch.

Firmware changes since November 2024:

V2.23D FW260213 *February 13, 2026*
Adds a new encoder XP option that **sets the main encoder as a drift buffer scaler** when on the main patch page, regardless of whether XPress is held down or not. To set this mode, go to the XP mapping page, (XPress+long enc hold), and set the Enc XP 'pot' to the last item on the list: "DbufScl".

V2.23C FW260210 *February 10, 2026* (recommended update)
Corrects a potential issue with block step rates when they are modulated using continuously changing expression matrix waveforms (as opposed to 'discrete value' waveforms like square waves that hold steady values for a while).
Improves repeatability of patches that use bend-mod parameters when switching between (non-morphed) patches while RUN is on.
Corrects a display bug for the Drum Pitch expression active modulation indicator (*) on Scene load.

V2.23A FW260208 *February 8, 2026* Adds DriftMode (Synth, Drums or Both) to Scenes. Scenes saved with older firmware versions will henceforth set this option to "Both" on Scene load.

V2.23 FW260127 *January 27, 2026* (recommended update)

- Adds the option to **clear echo tails on patch changes** when not morphing**.** Set/clear this mode using ALT + Patch # button on the main patch page. Shows "clr E" (clear Echo) when enabled, unless block morphing is active. **The PANIC STOP shortcut to stop all audio immediately is now moved to ALT + RUN.**
- Adds the ability to **enable XPlfo and P mix based mod freeze automation** by running LFOs in 'background mode'. Normally this isn't possible because mod freeze locks up the LFOs used by XPlfo and P mix in the expression matrix. This mode only affects expression initiated mod freeze events, and not manual modFreeze or modHold actions. It has no effect on other Xfrz Modes (loop, echo, and drift) and is not morphed. To activate it, double tap the XFreeze threshold pot (XFrz T) on the Bend 2 page (shows "B"), or via MIDI NRPN CC 98 =98, CC 6 >0.
- Adds the ability to retain drum parameter modulation when OscEnv = modfrz or cycMdfz modes
- Adds the ability to request an entire bank of 100 driftbuffers over sysex (see midi ref 2.23, P34)
- Corrects a bug in manual clocked Tempo control during modFreeze or OscEnv=modFrz modes

V2.22 FW260118 *January 18, 2026* (recommended update)

- Corrects a bug introduced in FW260112/A, affecting patches that use the **ladder2** post filter option by causing errors in resonance and tuning.
-Adds an **Overdrive Boost** mode using a double-tap on the overdrive pot on the Post Filter page (shows "+"). Via MIDI set CC98=96, CC 6 >0. Allows fuller distortion, especially in mid-range frequencies. Use low overdrive values with this mode for a 'clean' tube sound.
- Adds an option to **smooth the oscillator PWM mode** pulse-width steps. Double-tap the OscWav select pot on the Post Filter page (shows ~). Or VIA MIDI NRPN CC98 = 96, CC 6 > 0. Note this option is not morphed.
- Extends the analog tube model used for post filter distortion
- Revises the effect of RANDOM (synth) on the TEMPO parameter.
- Corrects the STEADYBEAT exclude flag in Scene SysEx files.

V2.21 FW260112A *January 12, 2026*

When manually assigning the encoder mode on the XP mapping page (in stand-alone operation), assigning it to a Scene-select option now prevents any subsequently loaded Scenes from automatically changing that option. The encoder assignment button/pot turns red to show this. Selecting any non-scene option clears the assignment lock. On power-up the lock is also cleared.

V2.21 FW260112 *January 12, 2026* (recommended update, significant features added)

- Adds (expression mappable) Drum Pitch control via a new DPITCH parameter on the Drum2 page, or MIDI NRPN CC98 = 89. To accommodate this in stand-alone operation, RAND WORD and GLITCH WORD are now available via ALT Word and ALT WBank respectively.
- Adds the ability to replace Aftertouch control in the expression matrix with the output from the Pitch nodulation block (P mix). This provides a second expression LFO signal in addition to the XPlfo. Enable this option using a double-tap of either the P mix pot on the pitch page (shows "X" for expression control), or the AfterT pot on the expression mapping page. Via MIDI it can be enabled via NRPN CC98 = 90, CC 6 >0. This setting is patch specific, and when morphing is updated at the end-points of the morph range, as is the case for all expression values.
- Adds the ability to **invert the ROM pitch contour** by using a double-tap on the Pitch pot. (shows "?" because clean speech can sound like questions). Via MIDI use CC 98 = 95, CC6 >0.
- Adds an option to **route the post-filter output strictly through the Echo** delay buffer before being sent to the audio output. When active, there is no pre-delay PF signal at the output, and the output signal level is determined by both PF vol (input to the Echo buffer) and Echo vol (output from the buffer). This option allows the Delay time and its modulation (including Tape Delay pitch shifts) to affect the PF signal even when Repeats = 0. To enable it in stand-alone operation, double-tap the PFvol pot on the Mix page (shows "E" = Echo buffer routing). Or via MIDI set CC 98=93, CC 6>0.
- Adds a new **Linear speech filter** option that shifts the speech formants downwards in frequency as the Filter parameter increases. Formant resonance levels remain unaffected, unlike the standard Filter mode that can be much more non-linear in that regard. Combine this Filter mode with Pitch changes **to create a wide range of talker characteristics**. In stand-alone operation the Linear option button replaces SoftClip on the Filter page. Via MIDI, send CC 98 = 92, CC6 > 0 to enable it.
- **SoftClip** is still available using a double-tap of the Filter pot (shows "s"). This mode now also activates a **smoother unvoiced excitation** source than the one used by default (and in the Speak and Spell for speech fricatives, sibilants and unvoiced stops).
- Adds a **new BLUR bend variation** (PBLUR) on the Bend 2 page, which smooths only those ROM fragments related to pitched sounds, and leaves the unvoiced ones unsmoothed. This avoids the high pitch bends that otherwise arise at high BLUR levels, and can be used effectively to smooth speech. Double tap the Blur pot to activate this mode (shows "P"), or via MIDI send CC 98 = 96, CC 6 >0.
- Adds a **Linear Loop Length** option which sets the number of ROM fragments in the loop to exactly the number shown on the Loop pot, whereas by default the loop length pot is logarithmic. Linear loop length is particularly useful for MIDI clock applications where you want to sync the number of drums triggers and ROM fragments in a (clocked) loop. To enable Linear length, double tap the Loop (length) pot, or via MID set NRPN CC98 = 91, CC 6>0.
- **The double-tap shortcut to set Oneshot mode is now moved to the LPmod pot**. Oneshot triggering now applies to both note-on events and RUN activation.
- The older oneshot mode that was activated by setting **LPleng= 127** while in WORD mode without glitches, no longer activates oneshot. Instead, under those conditions, it now **automatically adjusts the internal loop length** to match each new word.

- Adds a new option **PF+D/3** to the **echo input selector** on the Mix page, which scales down the drum signal by a factor of three before adding it to the Post Filter signal. The first four input options are now arranged in order of increasing drum contributions relative to PFilter. If you have patches using echo input select values other than PF, they may require an adjustment to allow for this change.
- **Implements smoother Digital echo (non-tape) mode delay time changes**, and allows morphing between Tape and Digital delay modes.
- **Improves Drum audio quality** when the same drum sound is retriggered very quickly
- **Inhibits further drum triggers** after the Post Filter / Synth signal has faded out when switching RUN off or releasing keys, so as to avoid endless echo/drum loops when drums are routed into the echo input.
- Removes the double-tap shortcut to randomize the loop ROM address on the Loop FREEZE button on the main patch page, which was added in FW251210 but could cause unwanted pauses in the audio due to the first tap.
- The RAND Word button now overrides the WORD exclude flag (the patch page RAND button still respects it)
- The Drum trigger mod-wave mix pot is relabelled from DTmix to DTKmix to indicate the mix is also used for Kit modulation.
- The positions of the Loop and Bend2 buttons on the Index page are swapped so that both Drum 1 / 2 and BEND 1 / 2 are left-right orientated.
- Fixes a display bug on the Drift button when Drift depth was adjusted using the P1-3 encoders in some circumstances.
- Fixes a potential display and encoder XP mode bug when reading Scenes in some circumstances.

V2.20 FW251225 *December 25, 2025*
Adds a new Bends parameter “Orbit” that corrupts ROM data in an address dependent manner. In stand-alone operation, it takes the place of the NULL bends button on the BEND 1 page, and NULL is now available via a double-tap of the Glitch pot. Over MIDI, Orbit it can be set (CC6>0) or cleared (CC6=0) using NRPN CC 98 = 88.
Improves OscGain continuous updates (e.g. via expression mapping) when OscEnv modes are active.
Fixes an incorrect button highlight on the Multi-SCENE-Keybd page when Null Multi was pressed after selecting Mult Lfo.

V2.19 FW251210 *December 10, 2025* (recommended update)
- Adds a new Drum Kit “LO-FI a/b" placed after “HARD a/b” in the stand-alone kit list, or selected as kits #45 and 46 via MIDI using CC 98 = 47- 49.
- The ModFREEZE and LoopFREEZE buttons (and their XFREEZE counterparts) now act as UNFREEZE controls when OscEnv is set to a mode that activates mod or loop freeze during the OscEnv Attack-Hold-Decay (AHD) period.
- The OscEnv mode “cycMfzX” has been changed to cycMdfz, and no longer releases the mod freeze for mod-depth parameters with active exclude flags. This is now consistent with the other three Oscenv freeze modes, and avoids patches differing from their saved sound due to exclude states.
- ~~Adds a double-tap shortcut on the Loop FREEZE button (main patch page) to randomize the ROM Loop address (similar to the Rand Loop function on the LOOP page)~~
- Extends echo Repeats parameter to allow self-sustaining feedback at high settings
- Removes the ‘slow echo clear’ function using ALT+long encoder press on the patch page, which has been replaced by the ‘instant clear’ shortcut using a double-tap of the echo freeze button (or Repeats pot on the Mix page).
- [Xpress] + short encoder click on the main page now always nulls modw, breath, afterT, and pitch

bend regardless of the encoder/touch button mapping settings.
- Bugfix in stand-alone parameter editing, which in rare circumstances allowed the parameter display update to not take effect immediately.

V2.18 FW251201 *December 1, 2025* Adds instant echo buffer null function: double-tap either ECHO FREEZE on the main patch page, or the Repeats pot on the Mix page, or via MIDI CC 98=87, CC6 > 0. Improves Tape Echo response during high signal levels and Repeat settings.

V2.17 FW251130 *November 30, 2025*
- Adds a TAPE ECHO option for the echo effect. Toggle it on/ff by double-tapping the echo volume pot on the MIX page (shows "T" when enabled). Or via NRPN CC 98 = 86, CC 6 =0 = off / CC6 >0 = on.
- Implements 10-bit echo delay times now. Via NRPN set CC98= 119, CC38=0-7 low 3 bits (0.125 steps), CC6 =0-127 high 7 bits (same value as CC 51, which still sends 7 bit delays), in that order.
- Allows access to the MIDI page (hold ALT) from the main patch page when ECHOFREEZE is on (previously not possible during ECHOFREEZE)
- Preserves the Dsrc0 selection (Drum 1 page) when "Global Drums" is active.
- Allows MIDI channel 16 GND-1T STATUS messages (CC 98=6, CC 6 = 17) and MORPH progress updates (CC 98 = 24, CC 6 > 0) to be sent via the MIDI DIN output socket too. Previously this was only sent to the USB MIDI output.
- Adds the option to have the current patch SysEx-format parameter block continuously sent out on channel 16 in smaller SysEx chunks of 10 parameters at a time. Chunks are sent at intervals specified by NRPN CC 98 = 86, CC 6 = number of 10ms intervals between chunks (see MIDI ref).

V2.16E FW251118 *November 18, 2025* Adds the ability to preserve in Scenes the exclude flags for ERODE, STEADY BEAT, STEADY GAIN, and ONESHOT options
V2.16C FW251116 *November 16, 2025* Display improvement for the Patch button on the main patch page when morphing is enabled by external controllers while the green Patch select highlight is on.
V2.16B FW251114 *November 14, 2025* Display improvement for Drift button on main patch page when Drift depth is adjusted using external controllers.
V2.16A FW251107 *November 7, 2025* Adds the ability to use encoder ALT-P1, rather than P1, to adjust driftdepth whenever Drift is enabled. To toggle between the two options, double tap the driftdepth pot on the drift/morph params page.

V2.16 FW251031 *October 31, 2025* (significant features added:)

The current ENC XP mapping is now always shown at the bottom of the RAND button on the main Patch page.

Adds a post-filter **diode-ladder filter type ("Ladder 2")** that's set for higher self-resonance levels than the existing ladder filter.

Adds a '**driftbuffer scaler'** (0-127 = 0 to 1.0) that scales the values of the currently active driftbuffer. This scaler inherits the value of Drift Depth (and its expression values) whenever Drift Depth changes. The value of the scaler is shown in the top left corner of the Drift button when continuous Drifting is off. Assign Drift Depth to one of the P1-3 encoders to make the driftbuffer scaler accessible from any page. If mapped to P1, then that encoder always controls Drift Depth whether drifting or not. The driftbuffer scaler can also be changed *without affecting Drift Depth* by using the main encoder on the Patch page. To enable this, set ENC XP (on the XP mapping page) to a mode that includes 'DbufScl'. To access it while patch-morphing, ensure DbufScl shows as the second ENC

XP parameter, which is the one affected by encoder turns while the XP button is held down. Use Midi CC 98=83, CC 6 = 0-127 to set the scaler via MIDI (without affecting Drift Depth).

Adds a **double-tap function to the DRIFT button**, which instantaneously generates a new **random driftbuffer**, with its values constrained by Drift Depth parameter value. This same function is also available using a double-tap of the "Drift Buf" button on the Morph/Drift Page. In addition, for that button Alt-tap it to zero the temporary driftbuffer. Neither function affects the saved permanent driftbuffer indicated on the button. To generate a random buffer via MIDI, send NRPN CC98=82, followed by CC6 (0-127) to scale/constrain the driftbuffer values (CC6=0 creates a zero valued buffer). In this case, the Drift depth parameter is not used.

Expands the number of permanent driftbuffers from 128 to 1000. Driftbuffer # selection can be done using the Drift Buf button on the Morph/Drift params page, from the Patch page using the main encoder when the current ENC XP mode includes "Dbuf #", or via MIDI using NRPN CC 98 = 118.

Adds a **secondary driftbuffer SAVE** option that applies the driftbuffer scaler before saving the driftbuffer. To use this method in stand-alone, select the "Drift Buf" button on the Drift/Morph params page, hold XPress (rather than ALT), and click the encoder. Then tap the highlighted Drift Buf button to complete the scaled save. Also available via MIDI by setting CC103 = 8. Note that saving using this option, and then immediately reloading the driftbuffer will cause the driftbuffer to be scaled twice.

Expands Morph Step Mode options to include "**Driftbuffer Step Morphing**", which steps between different permanent drift buffers rather than patches. The start of the block is the current selected driftbuffer shown on the Morph/Drift Params page. Stepping to an empty driftbuffer slot produces a new random driftbuffer, with its values constrained by the Drift depth parameter. **Six driftbuffer step modes are available**: free running at StepRate, Key (note on) step, Clock step, Drum step, and two Xfade modes: DrifXfd and DclkXfd. The last two modes cross-fade from old to new driftbuffers during each step, either free running (DrifXfd) or clock driven (DclkXfd). For MIDI control see NRPN CC98=25 in the MIDI reference document. Note that when step morphing driftbuffers rather than patches, the main encoder retains its XP ENC assigned function, rather than becoming a patch-morph control.

Expands the Patch increment/decrement MIDI NRPN (CC98=17) command to allow **increment/decrement (and activation) of Driftbuffers and Scenes** (See the MIDI reference document)

Adds a new **ONESHOT note-on mode** that can be set by double tapping the ~~loop~~ LPmod (revised) parameter, or via NRPN CC98=84, CC6 > 0. Upon receiving a note-on event, it plays the current loop only once, regardless of any patch parameters, and then issues an all-notes off command internally. ~~This mode is in addition to the existing mode that requires the loop length to be set to 127 while in WORD mode and without glitches. There are no such constraints on the new ONESHOT method.~~ An End-of-loop MIDI note out (note 61) can optionally be issued with this mode on MIDI channel 16 by setting NRPN CC 98=6, CC 6 = 19 (on), 18 (off).

The GND-1T's MIDI clocks are now automatically enabled (and sent out) **whenever a clock driven morphing mode is active**, unless "global external MIDI clock" is enabled. The clock mode shown on the BPM button in this case is ignored, and does not reflect the actual clock status.

The **MIDI clock-mode** is the only parameter **not included in the 'release all excludes'** action that's initiated by a long main encoder hold. Previously, to release the clock exclude required the somewhat obscure main Patch page shortcut: XP+ALT+Patch# (which remains available). The same function is now also available by selecting the BPM/clock pot on the MIDI page and using [ALT]+long encoder hold.

Adds the ability to capture combined BLOCK+MANUAL morphing configurations (i.e. 'paused' block morphing) in Scenes. In the paused state, you can advance to the next patch (or driftbuffer) in a block by tapping the patch number screen-button. Scenes have further been expanded to include the global Touch XP and ENC XP mappings (Note XP was already included), drift depth and its expression values, and the new driftbuffer scaler.

Improves on Save-during-morph by allowing you to delete a patch during morph (e.g. to make room for a subsequent save) without disrupting the morph.

Adds the ability to **restore default/power-up global parameters using a double-click of the main encoder** (useful e.g. after Scene loads, which overwrite the global parameters).

Screen pots that have an enabled **double-tap** function now have yellow, rather than cyan, text labels in the parameter edit pages

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V2.15A FW250921 *September 21, 2025* Modifies -Drm morph modes (Morph Drift params page) to ensure drum parameter expression values also remain unchanged (previously this wasn't the case).
V2.15 FW250920 *September 20, 2025* Expands the number of driftbuffers to 1000 (rather than 127). See the MIDI reference for details regarding driftbuffer specification via MIDI for values beyond 127 (P27, NRPN CC98 = 118), and the SysEx driftbuffer transfer commands (P34).
Also implements a bugfix for SysEx activated Scene writes to the GND-1T (recommended if using SysEx Scene transfers)

V2.14 FW250919 *September 19, 2025* Adds morphing ability for MIDI internal clock mode (off, on-run, always on, internal only). Clock-mode morphing is enabled by default on power-up. Any manual change to the clock mode invokes its *exclude*, which inhibits further changes while morphing. This also applies to the Patch page shortcut "Xpress + patch-number", which toggles the internal MIDI clock on/off. To release the clock-mode *exclude,* hold both Xpress+Patch buttons and tap the patch-number on the main patch page**. Note that the long encoder hold to "release all excludes" doesn't apply to the clock-mode *exclude*.**

V2.13A FW250916 *September 16, 2025* Sysex "Driftbuffer exists" command bugfix
V2.13 FW250915 *September 15, 2025* Added the ability to use any modblock mixer output as an input waveform to any other modblock mixer, essentially providing modulation waveform feedback and cross-feedback. These waveforms have been added at the end of the W1/W2 select lists (see also page 15 of the MIDI reference). Note that selecting a modblock mixer output as a 100%-mixed input into itself will cause the mixer output to remain at a constant value.

V2.12 FW250914 *September 14, 2025* **Moved the ERODE double-tap shortcut** on the main patch page from the metal Patch button **to the Patch-number screen button**. Removed the potential for a

note-on activated background RUN state for direct-clock driven patches when sncRun is on (recommended update)

V2.11A FW250908 *September 8, 2025* Improved SysEx patch read compatibility so that older pre V2 FW generated SysEx files are better preserved when read into newer firmware versions.
V2.11 FW250907 *September 7, 2025* Added an option to start the SLFOs at their minimum value. To toggle this option, double tap the SLFO rate pot (shows "m" when active). See also NRPN CC98=81 (page 25) in the MIDI REFERENCE document.

V2.10C FW250904 *September 4, 2025* Added a Send Bank option (hold Xpress) to the MIDI SysEx send button when in the SAVE menu
V2.10B FW250902 *September 2, 2025* Bugfix for MIDI activated patch/bank changes for patches that use direct MIDI clock options (recommended update)
V2.10A FW250826 *August 26, 2025* Excluded Tempo and/or LFO rate parameters from being affected by DRIFT when they're directly MIDI clocked, and Drums are also MIDI clocked.
V2.10 FW250823 *August 23, 2025* Added "STEADY BEAT" for MIDI clocked drum modes, which triggers a kick drum on every MIDI quarter-beat (every 24 MIDI clocks) whenever D-trig and its modulation allow it. These kick triggers are not affected by D-rate, and momentarily set drum kit modulation to zero to retain a consistent kick drum sound. When STEADY BEAT is active, the Drum pattern pot (D pat) shows an "S" in its bottom right corner. Toggle it by double-tapping the D-pat pot. Or via MIDI send CC 98=80, followed by CC 6 = any non-zero value to turn it on, and CC 6 = 0 to turn it off. Note that STEADY BEAT has no effect on the drums when Dsrc0 = ROM.

V2.09C FW250820 *August 20, 2025* Minor bugfixes
V2.09A FW250816 *August 16, 2025* Eliminated the minor discontinuity that could sometimes occur in the audio stream when a patch was saved while the audio was running. Added the ability to undo patch changes in stand-alone operation using ALT RAND (UNDO) on the main patch page, and recover the previous patch parameters that may not have been saved prior to the patch change. See the ALT PATCH page (P17) in the updated user manual for details.
V2.09 FW250813 *August 13, 2025* Added a shortcut to toggle the ERODE function (Bends2 page) directly from the main Patch page by using a double-tap of the metal ALT/PATCH button. ERODE is great for imparting non-destructive dynamic variations for many patches, and especially useful for melodic (ROM contour quantized) loops.

V2.08A FW250809 *August 9, 2025* Minor display bugfix on the PostFilt/OSC page correcting the split red/blue display of the OscGain pot when its value exceeds 64 but the pot is not selected and STEADY GAIN is on. Releasing the OscGain pot exclude now also releases the STEADY GAIN exclude.
V2.08 FW250803 *August 3, 2025* Added "STEADY GAIN" which when activated replaces the speech ROM oscillator energy with a steady level set by the OscGain pot (and its expression values). When selected, the OscGain pot shows an "S" in the bottom right corner. Toggle this by double-tapping the OscGain pot. Or via MIDI send CC 98=79, CC 6 = any non-zero value to turn it on, and CC 6 = 0 to turn it off. OscEnv AHD level modifiers can still be used in this mode.

V2.07 FW250802 *August 2, 2025* Added a "Type II" MFO oscillator sync mode. The audio-band MFO in the GND-1T can be used to modulate amplitude, pitch, or the speech filter resonances, and can be tuned to be harmonically related to the audio oscillator. Enabling the original OSCsync mode then retains that tuning when you alter Pitch-pot (or its modulation) and/or change the MIDI note, but not when the Rom pitch contour changes.

The new Type II MFO sync option *does* allow the MFO to remain tuned even for ROM pitch-contour changes, which is particularly useful for melodic loops, but also expands the timbral palette more generally. You can select Type II in stand-alone operation on the MFO page, or via MIDI using CC98=32, CC6=127.

V2.06C FW250729 *July 29, 2025* SysEx bugfix to ensure ERODE is always set correctly when sending SysEx Patches to the GND-1T.
V2.06B FW250725 *July 25, 2025* Bugfix for pitch quantization using major scales when BStereo (Bends Stereo) is non-zero, allowing tuned two-note polyphonic sequences to be created.
V2.06 FW250718 *July 18, 2025* Previously Tempo-Mod (Tmd) and Drum-pattern Mod (DPmod) functions were unavailable in *clocked Tempo and Drum modes*, and those screen-pots instead became Tempo Swing and Drum Swing controls. This firmware gives you the option of selecting whether mod or swing functions are in operation for those two parameters (when clocked) by double tapping their pots. Mod and swing cannot be combined as they share a common storage value. Mod/Swing selections are saved and loaded for each Patch. For MIDI control, use NRPN 98 =76 (see the MIDI ref document).
Holding the Xpress button down on the Loop page now also changes the "RAND LOOP" button function to "Nudge LOOP". This shifts the loop address in ROM by a small amount rather than completely randomizing it. You can also activate it over MIDI using NRPN 98 =78, and sending any non-zero value to CC 6.

V2.05 FW 250709 *July 9, 2025* Minor bug fix correcting the displayed polarity of the Filter modulation parameter (Fmod). This update won't alter any existing presets, it merely corrects the display.

V2.04 FW 250525 *May 25, 2025* Adds the ability to set the GND-1T in "global external MIDI clock" mode, which disables the internal MIDI clock for all patches and overrides their patch specific MIDI clock parameter. To enable (and disable) global external mode, double-tap the BPM/clock button on the MIDI page so it says "global EXT". Once activated, you can load any patch and retain the external clock sync mode. Global EXT mode is disabled by default on power up, and can also be set using NRPN with CC 98 =77, CC 6 = 0/1 (1=enabled).

V2.03 FW 250512 *May 12, 2025* Adds an additional OscEnv mode ("cycMfz X") that combines continuous AHD cycles with modFreeze during the AHD cycle. In addition, unique to this mode, individual modulators can be 'unfrozen' by activating their mod depth parameter eXcludes. E.g. by manually changing the Fmod parameter (speech filter mod) its exclude is activated, and it is also no longer frozen during AHD cycles in this mode. Note that patch loads and saves do not alter parameter excludes, so loading a previously saved patch that uses this OscEnv mode may not sound the same if current excludes differ from when the patch was saved. To preserve excludes in save/load operations, save the current configuration as a Scene instead.

This FW also eliminates the Drum status lock that in previous FW versions was enforced when echofreeze was activated.

V2.02 FW 250409 *April 9, 2025* Reverts a minor FW250325 code addition that was aimed at improving repeatably of patch loads for highly non-linear patches, but turned out to adversely affect some sounds.

V2.01 FW 250325 E/F *April 3, 2025* Adds a shortcut that allows toggling the internal MIDI clock on or off from the main patch page by holding the metal Xpress button and tapping the patch number

button. For patches that use the MIDI clock for any parameter, the clk symbol on the patch number button turns red when turned off, but only after checking there are no active external clocks as well, which takes a second or two.

~~The OscEnv mod-freeze mode now excludes drum modulators, which keep running in that mode (as do PostFilter and the Pitch / Attack-Decay mod blocks).~~ Removed in V2.02

Extends Drate to allow higher drum trigger rates when Drate is set in the range 100-127

V2.0 FW 250325 B *March 30, 2025* Revised Tempo rates in clocked mode (see MIDI reference P1-3), and minor change to the sounds in the MIX b drum kit for better contrast re MIX a.

V2.0 FW 250325 *March 25, 2025*

Adds many new features including internal MIDI clock generation and new direct clock sync of Drum triggers, Tempo, LFOs, Echo delay, and Block step morphing. **For full details, see P1-3 of the V2.0 MIDI reference**

V1.06 FW 250120 *January 20, 2025*

Adds the ability to trigger the internal drums via external MIDI note-on events on channel 10. The notes required to trigger the 8 drums correspond to those defined in MIDI DRUM MAP 0. To access the MIDI Drum mapping page, hold the metal PARAM button down until the Edit index page loads. Then while continuing to hold PARAM, tap the Drum2/WORD button.

The Drum Kit modulation, drum velocity sensitivity, and drum volume and FX parameters remain in effect for external triggers. To disable the automated algorithm drum triggers, and only hear externally triggered drums, turn off DRUMS on the main patch page, or set the drum trigger parameters on the Drum1 page (Dtrig, DTmod) to 0. Adjust the drum trigger values to non 0 values to mix internal and external triggers.

Responses to channel 10 drum notes can be inhibited/enabled using the “drmRX on/off” parameter on the [ALT] MIDI page by holding ALT and tapping the Midi Ch button. This function replaces the ability to inhibit SysEx responses, and SysEx is now permanently enabled.

Adds a new parameter “sncRun on/off”, which when enabled, activates RUN on receiving a MIDI Start and clocks. Toggle this on the MIDI page by holding ALT and tapping the “Thru” button.

Status of both “drmRX” and “sncRun” can be saved for future powerups using SAVE Globals (click the encoder on the main patch page).

Corrected a MIDI latency issue that previously could arise when switching quickly between different screen pages

V1.05 FW 250109 *January 9, 2025*

Added the ability to set Touch expression mode (Tch XP) and Note Expression Mode (Note XP) via MIDI NRPN CC 98 = 69, 70. Added new ENC XP (encoder expression) modes to allow permanent Drift Buffers to be loaded directly from the MAIN PATCH page. New modes:

Driftbuf: Turn the encoder to increment or decrement the current permanent DriftBuffer number. If the buffer exists (i.e. has been saved previously) it is loaded immediately. To skip over buffers and scroll to a particular one, hold [Xpress] while scrolling.

ModWL XPDbf: Turn the encoder to affect modwheel, hold [Xpress] + turn to select DriftBuffer

Breath XPDbf: Turn the encoder to affect breath control, hold [Xpress] + turn to select DriftBuffer

AfterT XPDbf: Turn the encoder to affect aftertouch, hold [Xpress] + turn to select DriftBuffer

V1.04 FW 241225 *December 25, 2024*

New MIDI-clock based drum trigger option, selected by setting the Dsrc=0 selector to "clk" on the Drum1 Page (replaces previous LFO1+2 option). This new option creates a drum trigger every 6 MIDI clocks (i.e. 16th notes). The count can be restarted using a MIDI Start command. The clk based triggers are subsequently rate-limited by the Drate parameter as per usual, which in turn can be varied using clkDrum/ppq Drm. Accordingly, the Drum PPQN controls only affect the Drate parameter, and not the underlying Dsrc clk rate that responds strictly to MIDI clocks.

When this mode is active, as long as clocks are sent to the 1T and Drums are enabled, it will fire drums whenever RUN, run-drums-only, or NoteOn events are issued. The run-drums-only option may be particularly useful for DAW synchronous control of the 1T's drums/synth along with other devices, but I'm sure you will find various interesting ways to make use of this new mode.

Addition of two new NoteXP modes on the XP mapping page: Patch(4) and Note+Patch (5). These modes allow each key (MIDI note) to play a different patch. Set the patch selected by middle C (MIDI note 60) by selecting a patch in the usual way without pressing any keyboard notes.

Addition of a LOOP Restore function (ALT RAND LOOP on the Loop edit page). Allows restoring the loop ROM address after any number of RAND LOOP commands. Great for restoring e.g. intelligible speech sounds after glitching them out using RAND LOOP. The restore address is reset by Word changes, patch changes and Save commands.

V1.03 FW 241211 *December 11, 2024*

New "Rungler" style modulator waveforms "mfo.lfo1" and "mfo.lfo2". These are shift register based waveforms sampling the mfo waveform at lfo1 or lfo2 rates.

Addition of two new NoteXP modes on the XP mapping page: Patch(4) and Note+Patch (5). These modes allow each key (MIDI note) to play a different patch. Set the patch selected by middle C (MIDI note 60) by selecting a patch in the usual way without pressing any keyboard notes.

Addition of LOOP Restore function (ALT RAND LOOP) on the Loop edit page, which allows reinstating the original loop (e.g. a spoken word) after multiple RAND LOOP presses. See the Loop edit page in the revised manual.

BLOCK morph button on the main patch page now always shows the number of patches in a block in the top right corner

New SysEx commands to ask the GND-1T whether a specific drift-buffer or Scene exits (MIDI Ref)

Bug fix for “excludes” when using external MIDI control of pot-parameters but not morphing.

V1.02 FW 241103 *November 2024*

Addition of drum overdrive control (Drum2 page), and a new Erode bend (Bends2 page), and deletion of warp-bend parameter. Manual and MIDI ref versions 1.02 describe these two new parameters. Bug fix for the ‘clear parameter’ button on the XP mapping page (and extension to now also allow clearing of global matrix parameters).