# Nesglovphone


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## Information

THIS ROM IS USELESS ON MOST CURRENT EMULATORS. UNLESS YOUR EMULATOR SUPPORTS POWER GLOVE EMULATION, YOU WILL HAVE ESSENTIALLY NO CONTROL OF THE GAME, AND MAY BE LOCKED OUT ENTIRELY.
If you have a real PowerGlove and a NES flashcart of some sort, or if this software persists to an era when PowerGlove is emulated as a known peripheral, Nesglovphone will allow you to play the 4 main channels of the NES sound chip as a performance instrument in real time.

## Startup Directions

It is probably safest to start the NES with your PowerGlove plugged into port 1. It doesn't matter if the glove starts up in normal gamepad emulation mode, as it will be able to be flashed to direct mode at boot, and can be re-flashed at any time. If you absolutely cannot navigate your flashcart bootloader with the glove plugged in, it does seem to be possible to plug it in after the software is running without ill effects. You will just need to flash the glove manually after plugging it in, as it will miss the usual flash on startup.
If you wish to change PowerGlove button mappings, or program/save/load your own (see subsequent sections), you will need to plug a regular gamepad into port 2.
Read your PowerGlove manual (or the internet) for information on properly setting up and centering your PowerGlove.

## Basic Controls


The Nesglovphone main screen displays 3 musical staves- a left bass clef with +/- 1 octave around low C3, a bass/treble clef with +/- 1 octave around middle C4, and a treble clef with +/- 1 octave around high C5 (actual pitches may be shifted up/down 1 octave from display, depending on channel).

The most basic way to control Nesglovphone is point-and-shoot. **X-axis motion** highlights a staff, **y-axis motion** moves the note-position marker (above image) on the highlighted staff, and A or B plays the marked note.


The **Select** button toggles between envelope (one press of a button plays a single sharp-falloff tone) and hold (even tone is played as long as button is held) modes. Envelope mode works on Square (Pulse) and Noise channels. On Triangle channel, enabling Envelope results in finite-short-length tones even if the button is held longer. The Env/Hold state is reflected by an icon above the staves.


The **Start** button toggles Echo mode. Echo is a subtle effect audible on Square (Pulse) and Noise channels which uses what would otherwise be idle waiting-for-the-Glove time to start a second tone 4 frames after the initial tone, providing slightly

beefier sound, particularly in Envelope mode. The Echo state is reflected by an icon above the staves. Echo mode may behave differently, and potentially undesirably, when combined with Chords / Baselines (see Advanced Controls).

The **D-pad** changes the channel used to produce notes. The current channel is reflected in the shape of the notes in the note display- a rectangle, triangle, or X respectively.

 **Up**: Triangle wave- a mellow tone lacking volume control but with increased bass frequency range

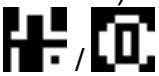
 **Left/Right**: Square pulse- a sharper tone with advanced control features

 **Down**: Noise- a static "hiss" or "rumble" most useful for percussion

The tone played may be modified in real time using the PowerGlove.

**Wrist-rotation** controls the tone volume (on Hold mode) or duration (on Envelope mode). The triangular meter at the bottom of the screen shows the current volume/ length level.


**Finger-flex** controls the tone duty-cycle (Square pulse channel) or noise type (Noise channel).

 With all fingers extended, the tone/noise will be smoother/mellower.

 With only the index finger extended (pointing gesture, with other fingers bent), the Square pulse will be slightly edgier.

 With all fingers bent, both Noise and Square tones will be substantially "tinnier." Pulse/noise type is reflected by an icon above the staves.

## Standard Controls

The basic controls are enough to become familiar with the sound generation capabilities of the NES, and create some tones and effects. Performing music, however, requires more control, reliability, and precision than point-and-shoot allows. The next level of control allows you to play note sequences around a specific pitch.

While pointing at a given note position, use the **1-9 buttons** on the PowerGlove to play notes in the first 5 whole-tones of the scale of whatever pitch you're pointing at. Think of them as the first few white/black keys on a piano scale. By default:

5: root (e.g. C)
1: minor second (e.g. C#)
6: major second (e.g. D)
2: minor 3rd (e.g. D#)
7: major third (e.g. E)
3: *
8: perfect 4th (e.g. F)
4: augmented 4th (e.g. F#)
9: perfect 5th (e.g. G)

* since there's no "black key" there, button 3 plays the note being pointed at (root)
** Button 0 is intentionally omitted, as it has identical functionality to the Center button and thus is no good as a control input.

The **A and B buttons** can also be used to play the pitch being pointed at

This takes a small amount of getting used to, but will allow you to play some limited melodies much more easily. However, after very little practice, it will become apparent that maintaining any kind of positional control while reaching for various buttons and using the wrist/finger controls is difficult. One more control is sorely needed:

While pointing at a pitch on any staff, press the **Enter** button on the PowerGlove. A pair of anchor icons should appear where you were pointing. Point at a different pitch and press Enter to move the anchors. Point at the current anchored pitch and press Enter to clear the anchors.

When Anchored, controls change slightly.
**Buttons 1-9** will play notes at their respective offsets *from the anchored note*. The only exceptions are buttons which have no pitch assigned (e.g. button 3 above) which will continue to play the note being pointed at irrespective of the anchor.

**Buttons A and B** may be used while anchored to increase and decrease the button map index (see Advanced Controls).

## Advanced Controls

The standard controls will allow real-time performance in limited contexts. However, many tunes use more than the first 7 semitones, and most don't use all of the first 7 semitones, so the default button mapping for 0-9 is far from ideal. If you have a **regular controller plugged into port 2** of the NES, you can access the most advanced features of Nesglovphone.

On the second controller:


**Up/Down**: changes the button mapping for buttons 0-9. There are a total of 16 button mapping slots numbered 0-9 and A-F. By default, mappings 0-3 are repeated in slots 4-7, 8-B, and C-F. Mapping 0 is the default already described. Mapping 1 is a full major scale on 5-6-7-8-9/1-2-3-4. Mapping 2 is like mapping 1, but 1-2-3-4 are from the octave below the anchor. Mapping 3 is the first 8 semitones on 5-1-6-2-7-3-8-4-9.


**Select**: toggles mapping edit/program mode. When the edit/program mode is active, numeric labels representing buttons 1-9, A and B appear on the middle staff, which becomes locked-active with the anchor locked to middle C. In edit/program mode, glove buttons 1-9, A and B no longer work as usual. Instead, pointing at a pitch and pressing one of these buttons will move its marker to the indicated pitch.

- **For buttons 1-9**, this pitch (as an offset from the anchor) will now be played by this button in regular play mode.
- **Button A** sets a "chord" pitch which, exclusively on the square channels, will play alongside any other note being played. The offset of the chord mark from the anchor is the offset the chord note will have from whatever *primary note* is being played.

- **Button B** sets a "baseline" pitch which, exclusively on the square channels, will play alongside any other note being played. The offset of the baseline mark from the anchor is the offset the baseline note will have from *the current anchor* irrespective of the note being played.

- *Because both the Chord and Baseline functions use the second square pulse channel, they cannot both be active at once.*

- *The Chord and Baseline functions will remain active even when unanchored, but in this case, the Baseline reference pitch (in lieu of an anchor) is the note currently being pointed at.*

Press a button while pointing at its current pitch to clear its marker. Any button without a displayed pitch marker will play the note currently being pointed at, irrespective of anchor.

**B**: Saves the current configuration for this button mapping to "battery RAM" (or whatever your cartridge has at $6000).

**A**: Loads the current configuration for this button mapping from "battery RAM" (or whatever your cartridge has at $6000).

**NOTE: a new/uninitialized cartridge or .sav file may have invalid data in save memory. It is recommended that you save the default configuration to each mapping before trying to load anything.*

***OTHERNOTE: Some programmable cartridges which may be used to play Nesglovphone do not have save RAM, or do not have save RAM correctly implemented. The retrousb PowerPak, for instance, claims to support .sav files but really doesn't. If configuration saving isn't working for you, try a known-good commercial title with a save function and verify the problem isn't in your hardware.*

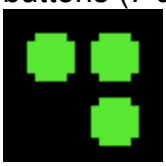
**Start**: re-flashes the PowerGlove into direct-control mode (in case you accidentally hit Prog and end up in a joystick program)

## Troubleshooting

**I plug my glove in and my screen goes crazy!**
Mine did to when I first got it from the used game shop. I'm not sure why the glove hardware seems to be able to affect the startup and memory reading, I can only surmise that it may contain some really thirsty capacitors that yank on the overall console voltage when first plugged in. My glove was back in the land of the living after I spent 15 minutes or so unplugging and replugging the control box from the system and the glove from the control box between a series of restarts.

**I plug my glove in and can't control anything!**
Read the PowerGlove instructions. The glove stays silent until you first press Start. You should flex your fingers a few times and hit Center between powering up the system and pressing Start so your fingers don't immediately register as bent and trigger A/B button events.

**I plug my glove in, do all that, and when I hit Start, it's like someone's mashing all the controls at random!**
No, really, you need to flex your fingers before hitting Start, otherwise any bending of your thumb will register as pressing A, and any bending of your index finger will register as B. Use your left hand to really-tight-flex your thumb and index fingers. That first press of Start will also register as a Start button press to the game, so be careful. You should also hit Center when and only when the glove is held in a comfortable neutral position in front of the general center of the speaker frame. Finally, I've found my own glove starts up with rapid-A and rapid-B enabled. Press the A-off and B-off buttons (7 and 9) on the glove pad before pressing Start.


Also, observe the 3 dots to the left and right of the volume meter. Those dots represent the real-time occlusion state of the 3 microphone/sensors relative to the left and right emitters on the glove. 3 green dots on each side is good. If you start seeing yellow dots, be sure the glove is in front of the sensors and facing the right way. If one or two positions are occluded, verify there's nothing between you and the screen. If 3 or more are occluded, you may have a broken glove setup, or your environment may be too noisy or have too much echo.

**The dots left and right of the volume meter are always yellow, but the glove seems to be working fine…?**
Ha. Someone's emulating or spoofing a real PowerGlove! I'm impressed! Tell the author of your emulator or the manufacturer of your peripheral to check out my detailed PowerGlove interface documentation rather than just using the canonical initialization string and return data fields. Most of Nesglovphone lines up with the past 20 years of understanding, but I am initializing slightly differently and retrieving slightly different data since the PowerGlove actually has some 14 operating modes and half a dozen

data fields more than were ever used in commercial software.

**It looks like it's working, but some of the note markers are really flickery and/or I'm missing markers in edit/program mode!**
This is the software and/or your hardware. ~~I'm seeing this frequently on arbitrary startups on my PowerPak, but not in emulation~~ *I think I've fixed this, and on my hardware it seems to be behaving*, but I've seen reports that the PowerPak has sprite issues on some titles. I'll be keeping my eyes out for memory/initialization/timing issues in the codebase (about the only difference between a good emulator and real hardware), but since I don't know the precise root cause, I can't give an ETA on a fix. For now, I advise cold-restarting until it comes up correctly.

## Changelog

**v1.3**
Added Chord and Baseline functions (in the process drastically altering the behavior of the glove A and B buttons).
Made the pitch cap more intelligent: if a combination of [reference pitch + offset] yields a pitch outside the payable range, the pitch will be shifted up/down by an octave rather than simply capped to the lowest/highest playable pitch.

**v1.2**
I was not keeping as close notes at the time, but as I recall this was the first release with configurable and saveable button mappings.  Also the first public release.

**v1.1**
I was not keeping as close notes at the time, and progress was rapid, but as I recall this was the first version to include anchoring.

**v1.0**
First build with all originally conceived functions working: channel selection, pitch control, volume control, duty-cycle/noise-type control.