

Nintendo Entertainment System Emulation

Team Members: Israel Bonilla, Sidne Gregory, and Daniel Klahn

One of the many applications for FPGAs is emulating outdated hardware. Now that modern systems are so much more powerful than those of a few decades ago, older hardware can be comfortably emulated on smaller, faster systems. The goal of this project is to emulate the original NES system as faithfully as possible, as acquiring genuine hardware is rapidly becoming inordinately expensive and difficult. Our ultimate stretch goal is to be able to play any official NES game off the original cartridge using an original NES controller.

Some potential hurdles awaiting this project include implementing the 6502 processor with both official and unofficial opcodes for similar behavior. As an added challenge, the NES had a dedicated Picture Processing Unit (PPU) and Audio Processing Unit (APU), all of which will need to be built in SystemVerilog from documented spec.

This project, therefore, consists of numerous challenges and will be a substantive undertaking. Completion of this project will likely not result in any advancement of society and might be copyright infringement, but at least Izzy will be able to play BattleToads again.