

Super Wack Bros.

Or, what I did over Christmas vacation.

Keypad Competition Entry

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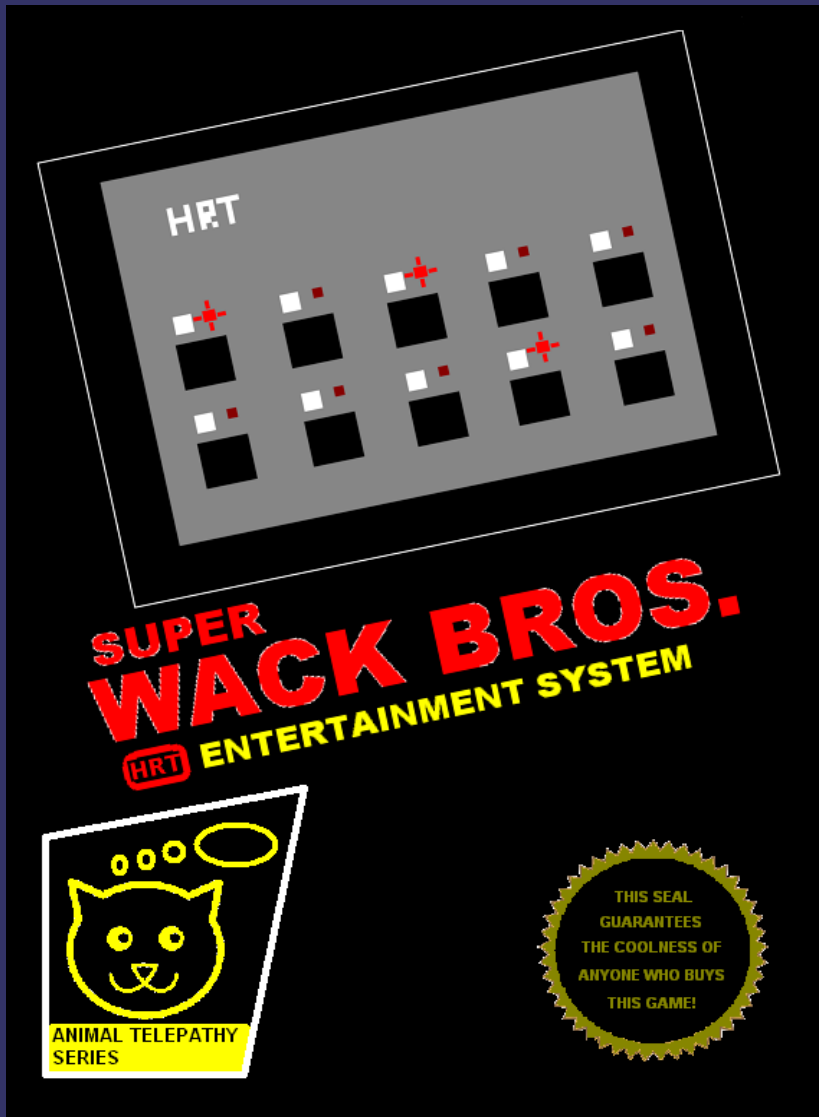
Overview

Super Wack Bros. is a super wack whack-a-mole game that pits two human players against each other. It's features include variable-speed game play, auto reset at end of game, player status feedback, music, sound, and an attract mode.

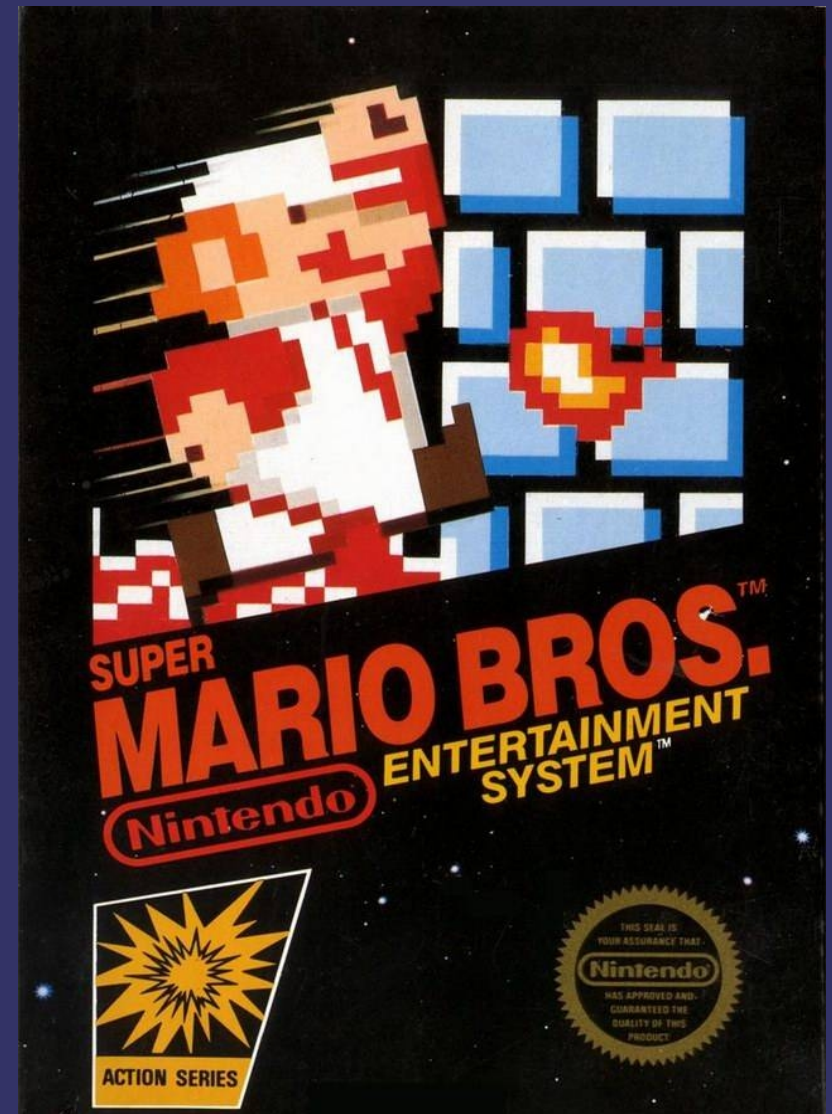


Old School Box Art

If you really want to know what an old-school game is about, you check out the box art, right?



Original?



Inspiration

Cooperative Multitasking Framework

- ⇒ Microcontrollers can generally only do one thing at a time.
- ⇒ Multitasking schemes can make it appear they're doing multiple things simultaneously.
- ⇒ Cooperative multitasking works by each task cooperating and relinquishing resources voluntarily.
- ⇒ Probably overkill for this game, but a learning experience for me.

Super Wack Bros. Tasks

- ➡ Read raw keypad input and debounce.
- ➡ Main game logic: From button, timing, and internally calculates states command lights and sound outputs.
- ➡ Music output routine
- ➡ Lights output routine

Task Dispatching

```
// A task gets dispatched on every millisecond based on examining a flag set by a timer interrupt routine.
void task_dispatch(void)
{
    /* Scan the task bits for an active task and execute it */
    uint8_t task;
    // Take care of the task timers. if the value is 0 skip it else decrement it.
    // If it decrements to zero, activate the task associated with it.
    task=0;
    while (task < NUM_TASKS )
    {
        // If the timer for this task is not zero.
        if (taskTimers[task])
        {
            // Decrement the timer.
            taskTimers[task]--;
            // If the timer for this task is now zero
            if (taskTimers[task] == 0 )
            {
                // Activate the task bit.
                taskBits |= 1<<task;
            }
        }
        // Examine the next task.
        task++;
    }
    // Below each task routine is called if its corresponding bit is set.
    ...
}
```

Optimizations

- ⇒ Final version binaries:
 - 2042 of 2048 bytes program space (99.7%)
 - 102 of 128 bytes EEPROM (81%)
- ⇒ 8-bit variables/constants when possible
- Reorganization of low-level lights command/switch read which allowed for per player assignment/reading.
- ⇒ Music and tones stored in EEPROM
- ⇒ Local variables vs global variables
- ⇒ Dynamically allocated variables vs automatic local variables

Optimizations (continued)

- ⇒ Understanding of volatile registers
 - Group references together
 - Most are 0 at reset
- ⇒ Compiler optimizer is magic
 - Tried many different things; very surprised at times.
 - Commenting out LFSR routine added ~50 bytes to program space.
 - Moving a line of code a few lines saved dozens of bytes of program space.

Miscellaneous Hacks

- ⇒ Watchdog timer was used to reset game.
- ⇒ User input used to provide initial seed to psuedo-random generator.
- ⇒ Music and sound played through RS-232 level converter
- ⇒ Music and multiple sound effects multiplexed on same lines using exclusive OR.

Questions?

SUPER WACK BROS.

Do you have what it takes to feed the world (and beat your competitor)!?!

You'll have to read the minds of moles faster and more accurately than your competitor or even the moles! The evil moles are trying to topple your corporate farm! It's up to you to squish them before they eat your food! But it won't be easy! To squish them all, you'll have to develop your animal telepathy skills and squish them fast! It's another non-stop adventure! This sentence also ends with an exclamation point!

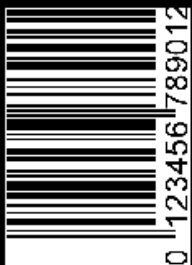
For use with the HRT Entertainment System!

What the experts are saying about Super Wack Bros.



The realism is just so real, that you'll really get a realistic experience! The moles in this game are more realistic than real moles!
Farmer Joe, 1986 Grand Dragon of Future Farmers of America

This is just a wonderful game! Children should play this game, and not do drugs! Just say "No" to drugs!
Nancy Reagan, first lady, and totally rad role model for totally awesome kids.



What a relief! The kids just LOVE this game, and they're learning so much too! It keeps them busy and out of my hair! Mrs. Butterworth, real mother of 17 children.

THIS SEAL
GUARANTEES
THE COOLNESS OF
ANYONE WHO BUYS
THIS GAME!



NES P SM

SUPER MARIO BROS.

Do you have what it takes to save the Mushroom Princess?

You'll have to think fast and move even faster to complete this quest! The Mushroom Princess is being held captive by the evil Koopa tribe of turtles. It's up to you to rescue her from the clutches of the Koopa King before time runs out. But it won't be easy. To get to the Princess, you'll have to climb mountains, cross seas, avoid bottomless pits, fight off turtle soldiers and a host of black magic traps that only a Koopa King can devise. It's another non-stop adventure from the SUPER MARIO BROS.!

Players: 1 or 2

For use with the Nintendo Entertainment System.



Nintendo

Game Pak (NES-GP)



ACTION SERIES



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Super Wack Bros. is open source and can be found at:
<https://github.com/oelgern/keypadContest>