How to use USB-NES Lite

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Hardware you will need

- A computer, tablet or other smart device that can access USB mass storage devices
- A micro USB cable for interfacing USB-NES to a smart device
- A USB-NES unit
- A NES game cart
- One or more USB game pads

Software you will need

- NES Emulator application installed locally to smart device.
  These links will take you directly to a few emulator download pages.
  Here, you can choose the app version for your platform.
  Any of these emulators can work if it supports your smart platform.
  It is recommended to consult the emulator's user's guide after install.

FCEUX	http://www.fceux.com/web/download.html
Mesen	https://www.mesen.ca/#Downloads
Nestopia UE	http://0ldsk00l.ca/nestopia/
Nintendulator	https://www.qmtpro.com/~nes/nintendulator/#downloads
RETRO ARCH	https://www.retroarch.com/?page=platforms

  RETRO ARCH is not an emulator but rather a front-end (similar to RetroPie) that
  makes it easy to manage collections of ROMs and emulators for hundreds of systems.
  The application is designed to work on touch-screen smart devices, and has very
  good platform support to date. A setup guide is mentioned later.

Quick RETRO ARCH (RA) setup

- Download and install RA on your device.
- Connect your USB game pad to your device.
- Connect USB-NES to your device.
- Run RA. The main menu should appear.
- Navigate into "Load Core -> Download a Core".
- Browse down to where you'll find a "Nintendo - NES / Famicom" section.
- Select an NES emulator; it will download and install automatically.
- Back in the main menu, navigate to "Load Content" and then to the USB-NES drive.
- Select "ROM.NES", and then select the NES emulator to run the ROM on.
- USB game pads should work immediately with no additional configuration necessary.

Firmware you need

Visit https://usbnes.com/usb-nes-firmware-upgrades-compatibility/
to upgrade your unit.

- USB-NES_Lite version 0.71 (or later)
- USB-NES kernel version 0.08

How to connect USB-NES

1. Plug your NES game cart into USB-NES with the label facing towards the front of the unit.

2. Plug your USB-NES into a smart device using a micro-USB cable. The red light on USB-NES will light; this is the USB power indicator.

3. Wait for your smart device to recognize USB-NES as attached mass storage media. When this happens, you will see a green light on the unit go on for a second; this is USB-NES trying to detect the type of NES cart (your OS may also pop up a USB-NES drive folder on the screen after this).

What's on the USB-NES drive?

ROM.NES	The game cart ROM file in .NES format
ROM.SAV	The game save file (games with save RAM)
REPORT.TXT	auto-detected information about ROM.NES
SETTINGS.TXT	USB-NES system enable controls and timings
VERSION.TXT	Reports the firmware name and version
README.TXT	Link to USB-NES website
SECURITY.BIN	Authentication file for firmware upgrades
FIRMWARE.BIN	USB firmware upgrade file (write-only)

New USB-NES files

DETECT.TXT	Autodetect the cartridge and display REPORT.TXT data
OVERRIDE.TXT	Create and edit text override patches to read and auto-detect more games
OVERRIDE.BIN	A compressed binary mirror of OVERRIDE.TXT
PRG.BIN	abstract file for PRG-ROM flash (write-only)
CHR.BIN	abstract file for CHR-ROM flash (write-only)

Bus conflict mapper test system files

BCMTABLE.BIN	Bus conflict mapper test descriptor table
BCMSCORE.BIN	BCM test score results
ROOT_TBL.BIN	BCM root bankswitch table
DATA_TBL.BIN	BCM value bankswitch table

How to run the ROM

1. Before starting the game, ROM.SAV may have to be copied out to your emulator's SAV file folder to play saved games properly. The ROM.SAV may also be written back to the cart.

2. ROM.NES can be dragged & dropped onto your NES emulator app to run the cart. You can also use the "Open ROM" file menu dialog to browse to the USB-NES drive and open the ROM.NES file there. Running from command line is also possible.

3. You will have to configure your emulator's input settings to map your keyboard or game pad to the NES 8-button layout. Most emulators have a similar way of doing this; it is recommended to consult the user's guide to find the specific way your emulator maps NES controller buttons.

Edit SETTINGS.TXT

The settings file is the main way to configure USB-NES. It allows CPU/PPU bus timings to be adjusted, the enabling or disabling of many system files and internal auto-detection tests, and the unit may be configured to operate in a manual override mode where USB-NES behaviour can be fixed to implement a specific mapper abstract.

CPU_R, CPU_W, PPU_R, PPU_W
bus timing parameters in nanoseconds between 0-1000.
A setting of 0 for all parameters yields the fastest cart reading.
(removed since firmware version 0.75)

powerup_warmup_ms
A delay in milliseconds from cart power activation to first ROM read access.

idle_powerdown_ms
wait time from last ROM read access to switching the cart power off.

batt_powerdown_ms
power down wait time in milliseconds before reactivating cartridge power when trying to detect save RAM.

PD_discharge_enable
discharge the cartridge in the middle of the batt_powerdown event to aid in the save RAM detection.
It is recommended to keep this parameter disabled = 0.

battery_test_enable
enable the detection of save RAM by turning cart power off for batt_powerdown_ms, and then back on.
This occurs when WRAM is detected in the cartridge.
This is usually enabled =1.

ROM.W_bus_disable
Disables USB-NES write cycles to PRG addresses $8000 - $FFFF.
This setting is mostly a curiousity for troubleshooting bus conflict mapper test identification mistakes.

OVERRIDE.BIN_enable, README.TXT_enable, DETECT.TXT_enable, OVERRIDE.TXT_enable, REPORT.TXT_enable
Creates the corresponding files in the USB-NES root when =1.

BCMTABLE.BIN_enable
Access the bus conflict mapper test descriptor system table.
This file must be present on USB-NES for any of the bus conflict boardsets to be auto-detected by USB-NES.
Note this file may be edited to provide customization for the user.

BCMTABLE_reporting
Creates the BCMSCORE.BIN, ROOT_TBL.BIN & DATA_TBL.BIN files.
These files are used as a diagnosis system for determining why mappers with bus conflicts sometimes can't be identified correctly.

ASIC_map_testing_on
Enables all the internal ASIC mapper tests.
These are all mappers free of bus conflicts when writing to the $8000 - $FFFF area.

alt_buscon_tests_on
	Enables testing for mappers that have bus conflicts but have
	their bankswitch registers outside the contentious PRG-ROM
	memory area.

conflict_testing_on
	Enables testing for mappers as per the BCMTABLE.BIN.
	Up to 32 BCM-type mappers can be described in this table.
	Note this table needs to be copied onto USB-NES after any
	kernel upgrades.

16_KB_PRG-ROM_test
	If the internal tests indicate the game has a 32 KB PRG-ROM,
	this test is carried out to determine if the ROM is just
	doubled-up or not.

override_testing_on
	Enables the testing of mapper override abstracts in
	OVERRIDE.TXT that have any TEST sequence scripts.

default_map_index
	Selects a default mapper override script to use for USB-NES
	when the unit detects no cartridge in the slot.

NES_2.0___enable
	Can force creation of the NES 2.0 flags in the header if =1.
	Note that games that use mapper numbers greater than 255 will
	automatically be set to NES 2.0.

	By setting this =2 to =9 you can enter the USB-NES into manual
	override mode where all autodetection is disabled, even when
	accessing DETECT.TXT. The index value here corresponds to the
	first 8 valid mapper override scripts present in OVERRIDE.TXT,
	plus the default_map_index value.

Stuff

- Most the new features, such as the OVERRIDE.TXT scripting language is documented
  on usbnes.com.

- For best results, always use NES carts that have clean cart edge fingers.
  There are many guides on the internet about how to clean NES game carts.

- Do not pull carts in and out of USB-NES when the green light is on. This light
  indicates when the cartridge is powered up; typically the first time the unit is
  plugged in to USB, and the first time the emulator reads the ROM.NES file.
  It is safe to change carts when the green light is off.

- There are 3 ways to change the NES media on USB-NES. The best and preferred way
  is simply to read out the DETECT.TXT file, and the host will wait until USB-NES
  probes the cartridge slot again to make a report. You may also press the reset
  button on USB-NES but this doesn't work as a fool-proof solution on every
  platform. The last is a simple USB unplug-replug; this re-initializes USB-NES
  and configures it for the new cart.

- Multiple USB-NES units may be connected to a computer at one time. It is
  recommended to use a powered USB hub for setting up this type of configuration.

- USB-NES has support for many cart types, but not all NES games can be
  autodetected with USB-NES. However USB-NES's autodetection system can be
  augmented to add support for more games at the user level with OVERRIDE.TXT.

- When a game doesn't work, try re-inserting the cart and USB cable 2 or 3 times.

- USB-NES may not work on smart devices lacking a proper type-A USB connector, or lacking USB on-the-go (OTG) support.

- To default the SETTINGS.TXT file you can delete one or all lines in the file, and then save it (make sure the file size is > 0 or the save won't work). The settings will be regenerated with the default parameters with the next autodetection.

- Future USB upgrades to the USB-NES firmware are possible. Visit: https://usbnes.com/usb-nes-firmware-upgrades-compatibility/

Anti-piracy terms

BTTD Group does not endorse piracy. The digital ROM image of a NES game cart's copyrighted work (ROM.NES) does not have to be copied off the virtual USB-NES drive in order for an NES emulator to run the ROM.NES file.

Commercial NES game cartridges purchased by consumers are allowed to be backed up to a digital copy for personal archival purposes. However, the distribution of copyrighted works, such as from the NES era, is still illegal and infringes the law.

It is therefore up to the user to determine whether their use of USB-NES infringes copyright laws or not. BTTD Group shall be in no way held accountable for the actions and subsequent legal consequences of users who use USB-NES to intentionally promote piracy and/or violate copyright laws.

Limited liability

BTTD Group is in no way responsible for any losses, damages or illness caused by the user's use of USB-NES, directly or indirectly, intentional or not. The user agrees to these terms and the anti-piracy terms by reading this README.TXT file, and using the USB-NES.

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