# USB-NES Do-It-Yourself Kit Assembly Guide

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Please see our DIY companion video and documentation on our website for more info:
https://usbnes.com/usb-nes-lite-diy-kit/

1. What you'll need:
    * USB-NES Lite parts kit (thank-you for your purchase)
    * USB-NES 3D print model
    * Filament 3D printer
    * Fine-tipped soldering iron + station + solder
    * Solder wick (optional; for removing solder bridges and excess solder)
    * "3rd Hand" PCB holder
    * Magnifying glass (optional; for inspecting solder joints)
    * Flat-tipped or electronics' tweezers
    * Lineman's pliers / needle-nose or similar type
    * #1 Phillips screwdriver
    * Utility knife
    * Flush cutters (optional)
    * Intermittent soldering skills
    * Patience and persistence (estimated 1 hour assembly time)

2. Open and Examine the USB-NES assembly kit:
    1x Protective jewel case
    1x STM32 barebones system "blue pill" board (preprogrammed with current USB-NES firmware)
    1x 40-pin single-inline header
    1x 4-pin single-inline header
    1x 6-pin dual-inline header
    1x thin jumper wire
    1x Printed circuit board "USB-NES-01"
    1x 72-pin NES cart connector
    1x surface-mount 10k-ohm resistor
    1x surface-mount P-channel power mosfet
    1x surface-mount level shifter
    1x 3ft. Micro-USB cord
    4x #4-40 x 1″ machine screws
    2x #4-40 x 11/16″ machine screws
    1x 560 uF electrolytic capacitor

3. Prep the pin headers:
    * Break the 40-pin header into 2 equal sections of 20 pins.
    * Use pliers to straighten the 4-pin header
    * Use pliers again to slide the 4-pin header spacer down to be equal to that of the other 20 pin ones.
    * Remove and discard the 2 yellow jumpers from the 6-pin header.

4. Prep the blue pill board (Very Important!):
    * Remove and discard R4 from the board with the soldering iron by heating both
      sides of the surface mount resistor and pushing it away from the other components.
    * Tin one end of the thin jumper wire that came with the kit.
    * Use the thin jumper wire to bridge R4. Cut the excess wire off neatly with a knife.
    * (optional) Apply some extra solder on the 4 mounting holes
      for the micro-USB header to improve structural integrity.

5. Prep the USB-NES board with the surface mount parts:
    * Place a small amount of solder on a single pad within the part's footprint.
    * Use the tweezers to place the part on top the board oriented with the footprint; hold it steady.
    * Heat the soldered pad with the soldering iron while pressing the part against
      the board until the lead from the part makes a good bond with the solder.
    * Solder the rest of the leads of the part to the pads.
    * Repeat this process for all 3 surface mount parts.
    * Use a magnifying glass to inspect for good solder joints and identify any solder
      bridges on the surface mount parts (especially on the 5-lead level shifter chip).
    * Use solder wick to clean up any bridges or excess solder.

6. Stuff the pin headers into the USB-NES board:
    * Stuff the 2x 20-pin and 6-pin headers long-side-up into
      the topside through-holes of the blue pill footprint.
    * Make sure the header spacers are flush with the surface of the board.
    * Repeat all these same steps for the 4-pin header afterwards.
    * Use pliers or other means when inserting tight headers.

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