HackHD arduino interface setup
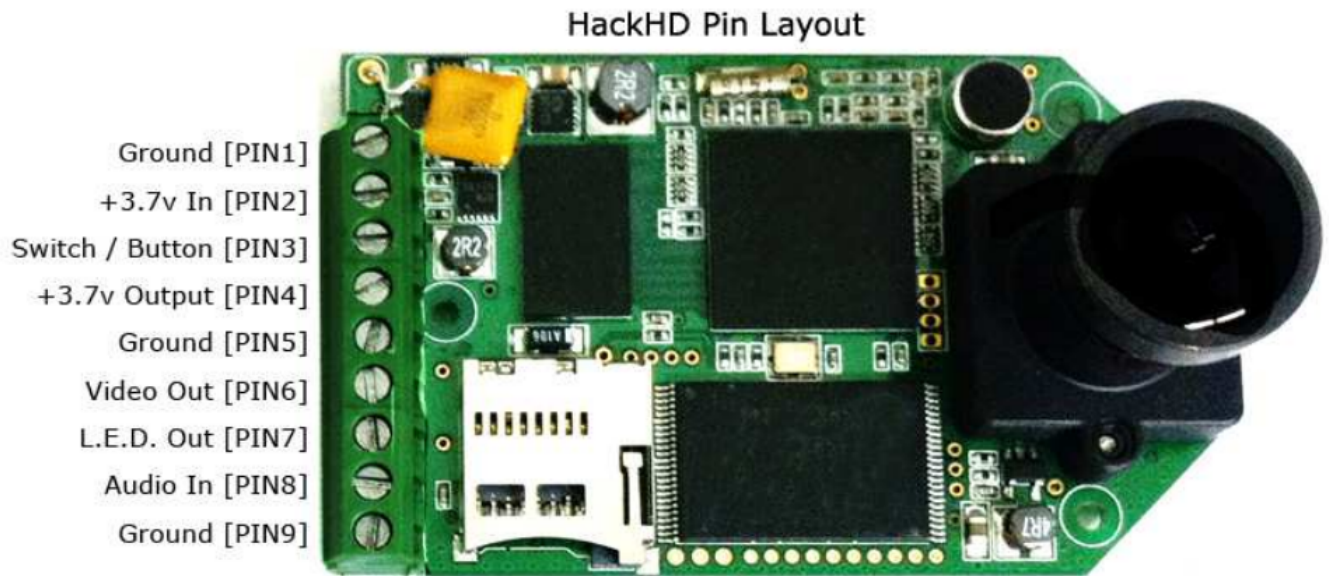
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1 Hardware connections

Please program arduino and make all the necessary hardware connections *before* plugging the arduino into the USB. Transistor and pull-down resistor (see below) are already connected, information on them is included for reference.

1.1 HackHD pin connections

HHD pin	Connection
Ground [PIN 1]	External supply negative (NOT Supply GND)
+3.7 V in [PIN 2]	External supply positive (+4 V, >700 mA)
Switch/ button [PIN 3]	transistor drain (see 2N7000 diagram)
+3.7 V output [PIN 4]	Not connected
Ground [PIN 5]	transistor source (see 2N7000 diagram)
Video out [PIN 6]	Not connected
L.E.D. out [PIN 7]	Arduino Uno digital I/O pin 10
Audio in [PIN 8]	Not connected
Ground [PIN 9]	Arduino GND pin

- Additionally, a pull-down resistor of 1 MΩ is already connected between L.E.D. out [PIN 7] and Ground [PIN 9].

1.2 2N7000 transistor switch
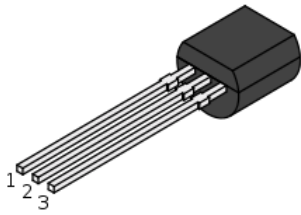
The transistor shown above is already connected to the HackHD. The middle pin of the transistor should be connected to Arduino Uno digital I/O pin 12. The following information is just in case you want to make any changes to the setup:

The 2N7000 is housed in a TO92 package, with lead 1 connected as the source, lead 2 as the gate, and lead 3 as the drain.

1. Pin 1 (source) should be connected to PIN 5 of the HHD (GND)
2. Pin 2 (gate) should be connected to Arduino Uno digital I/O pin 10
3. Pin 3 (drain) should be connected to PIN 3 of the HHD (Switch/button)

1.3 External power supply

The external power supply should be set between +3.7 V and +5 V. It should be capable of supplying > 700 mA (note that an Arduino powered by USB will NOT be able to supply this).

1. Positive terminal (+3.7 V -> 5 V) should be connected to PIN 2 of the HHD (+3.7 V in).
2. Negative terminal should be connected to PIN 1 of the HHD (Ground).
3. Ground terminal of the power supply should NOT be connected to anything (ground reference is provided by Arduino).

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2 Operation notes

Once hardware is set up and connected, plug the arduino into the computer via USB. The Arduino will automatically attempt to boot the HackHD. This may take anywhere between 12 and 25 seconds. Once succesful the indicator LED on the Arduino (labelled 'L' on the Mega), should be lit without flashing.

Recording functionality and status checking of the HHD is provided by the python library hhd_{auto}.py. While recording, the indicator LED should flash at approximately a rate of once per second.

N.B. The HHD takes around 3 seconds to save a file once it has finished recording. The Arduino will only report succesful recording once that is done.

If there are any power shortages or disconnections, the Arduino will continuously attempt to reboot the HHD until it is back on-line.

If the microSD card is corrupt or missing, the HHD will not boot fully and the Arduino will loop trying to boot it.

If the microSD runs out of memory during a recording, the HHD will save what it can and then turn itself off. The hhd_{auto}.py library should raise an exception with "STATUS 0" or "STATUS 3". So if you repeatedly get either of these exceptions when trying to record then check the memory card.

WARNING If you are using the Arduino IDE to re-program the Arduino (for instance to change the pin assignements to suit your model) whilst it is connected to the HHD, then every time you open a serial connection to the Arduino - whether to reprogram it OR to communicate with it directly via the IDE's serial terminal - the Arduino will reboot the HackHD. This will again take anywhere between 12 and 25 seconds during which you will not get a sensible response from the system. Please wait for it to finish before attempting to check status or record.

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