FLipMouse/Pad Arduino Initialisation

Fabrication Note v1.0, AsTeRICS Foundation

Scope

FLipMouse and FLipPad use from version 3 onward an **Arduino Nano RP2040 Connect** platform.

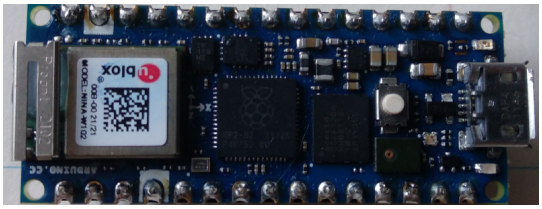
The big advantage over the TeensyLC from version 2, this controller has much more RAM & ROM and already contains the ESP32, which is used for the Bluetooth connectivity.

To fully use the update procedures from the WebGUI, the Arduino needs to be programmed initially:

- Upload a sketch to the RP2040 to act as an ESP32 programmer for *esp-idf*
- Upload the ESP32 bootloader/update code
- Upload FLipMouse/FLipPad firmware
- Upload the Bluetooth firmware

Preparation

Material

Nr.	Description	Source	Image
1	Arduino Nano RP2040 Connect	https://store.arduino.cc/products/arduino-nano-rp2040-connect	

Note: Material will be referenced in square brackets: []

Tools

Nr.	Description	Source
1	idf.py	Install esp-idf according to: https://docs.espressif.com/projects/esp-idf/en/latest/esp32/get-started/
2	Arduino	Install from: https://www.arduino.cc/en/software
3	Arduino RP2040 core	Install from (or with instructions from): https://github.com/earlephilhower/arduino-pico
4	ESP32 bootloader code	Download or clone from: https://github.com/asterics/esp32_addon_bootloader/
5	FLipMouse/FLipPad firmware	Download or clone from either: https://github.com/asterics/flippad or: https://github.com/asterics/flipmouse
6	Permanent marker (red/blue/green)	DYI store, paper store (possibly any store)

Note: Tools will be referenced in curly brackets: {}

Procedure

Install flasher sketch:

1. Open the file **esp32_addon_bootloader.ino** from the code *{4}*
2. Connect the Arduino Nano RP2040 Connect *[1]*, press the white button nearby the USB plug while inserting the USB cable.
3. Select the correct **board** via `Tools -> Board -> (Raspberry Pi RP2040) -> Arduino Nano RP2040 Connect` and select the correct **port** via `Tools -> Port`.
4. Upload the sketch to the board

Upload the ESP32 code:

1. Connect **D2/GPIO25** with GND to put the ESP32 into download mode
2. Flash the firmware *{4}* by calling following command from the *esp32_addon_bootloader* folder: `idf.py -b 115200 -p /dev/ttyUSB0 build flash`
3. Verify that everything worked without an error, the red LED should light up after a few seconds.
4. To ensure this step is done before any Arduino is shipped, **mark the white sticker on the Arduino with a permanent marker** *{6}*.

Upload the RP2040 firmware - variant 1:

1. Open the FLipWare sketch from *{5}* (subfolder FLipWare) with the Arduino IDE
2. Select the correct flash layout in Arduino via `Tools -> Flash Size -> 16MB (Sketch: 15MB, FS: 1MB)`
3. Upload the sketch to the board

Upload the RP2040 firmware - variant 2 (TODO: implement!):

1. Open https://flippad.asterics.eu or https://flipmouse.asterics.eu
2. Press **Device Initialisation** and follow the instructions.

Upload the ESP32 firmware:

1. Open https://flippad.asterics.eu or https://flipmouse.asterics.eu
2. Connect to the FLipMouse/FLipPad
3. Open the Tab **General**
4. Press **Overwrite Bluetooth firmware** and follow the instructions
5. The **blue LED should blink after the procedure is finished**

Testing

Not available, if procedure is followed, the software is flashed correctly:

- **Steady red** LED for a flashed bootloader code which is ready for an update
- **Blue blinking** LED for a flashed Bluetooth firmware

Documentation

For each produced batch, fill out one document **template_arduino_init_production.ots** and save it as: `arduino_init_<date>.ods` (e.g.: arduino_init_20221118.ods)