## NANOMESHER

# Hackable Pi Switch Programming Guide

#### 1. Overview

The Hackable Pi Switch comes with an onboard microprocessor - Attiny85. The Attiny85 allow developers to modify the software using Arduino language. This guide provide instructions of how to do so.



### 2.Requirement

In order to program the onboard Attiny85, you will need a programmer. You may purchase a <u>programming kit</u> from <u>Nanomesher store</u>. This programming kit uses an Arduino Uno as ISP (In-System Programmer)

### 3.Instruction

The instruction are very similar regardless of platform

1. Download and install Arduino from https://www.arduino.cc/en/Main/Software

 Open Arduino, under Tools > Board, choose "Arduino / Genuino Uno" (The board to be used as programmer), choose the COM port which is used by Uno (tip: see which COM port appear / disappear when you plug the Uno into the computer)



#### 3. Load the Arduino as ISP example



- 4. Plug in the Arduino Uno into USB and choose Tools > Upload
- 5. Wire up the Attiny programmer as below



6. Start programming Attiny

Go to File > Preference

| Preferences             |   | ×      |
|-------------------------|---|--------|
| Settings Network        |   |        |
| Sketchbook location:    |   |        |
| C:\Users\Andrew\Docu    | uments \Arduino   | Browse |
| Editor language:        | System Default v (requires restart of Arduino)            |        |
| Editor font size:       | 12  |        |
| Interface scale:        | ✓ Automatic 100 ÷ % (requires restart of Arduino)         |        |
| Show verbose output d   | luring: compilation upload                                |        |
| Compiler warnings:      | None 🗸  |        |
| Display line number     | s   |        |
| Enable Code Foldin      | g   |        |
| Verify code after up    | pload   |        |
| Use external editor     | r -   |        |
| Check for updates       | on startup  |        |
| Update sketch files     | to new extension on save (.pde -> .ino)                   |        |
| Save when verifyin      | ng or uploading   |        |
| Additional Boards Mana  | ger URLs: http://drazzy.com/package_drazzy.com_index.json | C      |
| More preferences can b  | be edited directly in the file                            |        |
| C:\Users\Andrew\AppD    | Data\Local\Arduino15\preferences.txt                      |        |
| (edit only when Arduind | o is not running)   |        |
|                         |   |        |

## Add this URL to Additional Boards Manager URLs: <u>http://drazzy.com/package\_drazzy.com\_index.json</u>

7. Go to Tools > Board Manager

#### Search for AttinyCore , select it and Install

|  | attiny   |  |
|--|--|--|
| ATTinyCore<br>loards inclu<br>ATtiny441, A<br>ATtiny85, AT<br><u>fore info</u> | by <b>Spence Konde</b><br>ded in this package:<br>ITtiny841, ATtiny1634, ATtiny828, ATtiny2313, ATtiny4313, A <sup>-</sup><br>Tiny261, ATtiny461, ATtiny861, ATtiny87, ATtiny167, ATtiny48 | Ttiny24, ATtiny44, ATtiny84, ATtiny25, ATtiny45,<br>3, ATtiny88. |
|  |  | 1.1.2 V Install  |
| ATtiny Mode<br>loards inclu<br>ATTENTION!<br>button and i<br><u>Aore info</u>  | ern(deprecated, use ATTinyCore instead) by Spence Konde<br>ded in this package:<br>ATtiny Modern has been merged with ATTinyCore. If you hav<br>nstall ATTinyCore                          | e ATtiny Modern installed please click the Remove                |
| Statistics.  |  |  |

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8. Go to Tools , change the settings to as below. The COM Port should be whichever one detected which you plug in the Uno.

| Tools | Help                           |              |
|-------|--------------------------------|--------------|
|       | Auto Format                    | Ctrl+T       |
|       | Archive Sketch                 |              |
|       | Fix Encoding & Reload          |              |
|       | Serial Monitor                 | Ctrl+Shift+M |
|       | Serial Plotter                 | Ctrl+Shift+L |
|       | WiFi101 Firmware Updater       |              |
| (     | Board: "ATtiny25/45/85"        | >            |
|       | Timer 1 Clock: "CPU"           | >            |
|       | Chip: "ATtiny85"               | >            |
|       | Clock: "1 MHz (internal)"      | >            |
|       | B.O.D.: "B.O.D. Disabled"      | >            |
|       | LTO (1.6.11+ only): "Disabled" | >            |
|       | Port: "COM3"                   | >            |
|       | Get Board Info                 |              |
| (     | Programmer: "Arduino as ISP"   | >            |
|       | Burn Bootloader                |              |

9. Open the sketch to be uploaded

The Hackable Pi Switch sketch is in

https://github.com/nanomesher/Nanomesher\_PiSwitch\_Attiny

- 10. Put the attiny85 chip into the programmer
- 11. If you start from a brand new attiny85, Go to Tools > Burn Bootloader to burn the bootloader on to the Attiny85
- 12. Then upload the Sketch, Go to Sketch > Upload
- 13. Wait for the upload to complete.

| Done unloading    |    |  |     |      |    |    |   |   | -  |
|-------------------|----|--|-----|------|----|----|---|---|----|
|                   | а. |  |     |      | In | ρ. | n |   | 19 |
| porte aprovantig. | 98 |  | 2.8 | 1.00 |    | ~  |   | ~ | -  |

| Sketch | uses 2196 | bytes  | (26%) | of pi | rogram  | storage | e space. | Maximum | is  | 8192 1 | oytes | 3.    |            |         |    |     |        |
|--------|-----------|--------|-------|-------|---------|---------|----------|---------|-----|--------|-------|-------|------------|---------|----|-----|--------|
| Global | variables | use 22 | bytes | (4%)  | ) of dy | namic n | nemory,  | leaving | 490 | bytes  | for   | local | variables. | Maximum | is | 512 | bytes. |

14. Remove the Attiny85 chip and put it back onto the Pi Switch. **Remember to put back the chip in the right orientation, you might damage the chip if you put it the wrong way.** 

