# BananaKastle Firmware tutorial v1 2023

This is a detailed guide on how to write the Kastle firmware to the 3 ATtiny IC's used by the Reverselandfill BananaKastle.

See below if you want to use the programming headers.

**Step 1: Setup the Arduino as an ISP:**

Download the Arduino software.
Open the ArduinoISP sketch from the examples menu
Select the board and serial port that correspond to your Arduino board
Upload the ArduinoISP sketch

**Step 2: Setup the Attiny85**

The Arduino does not support the Attiny85 by default, so we'll add it to the Arduino IDE

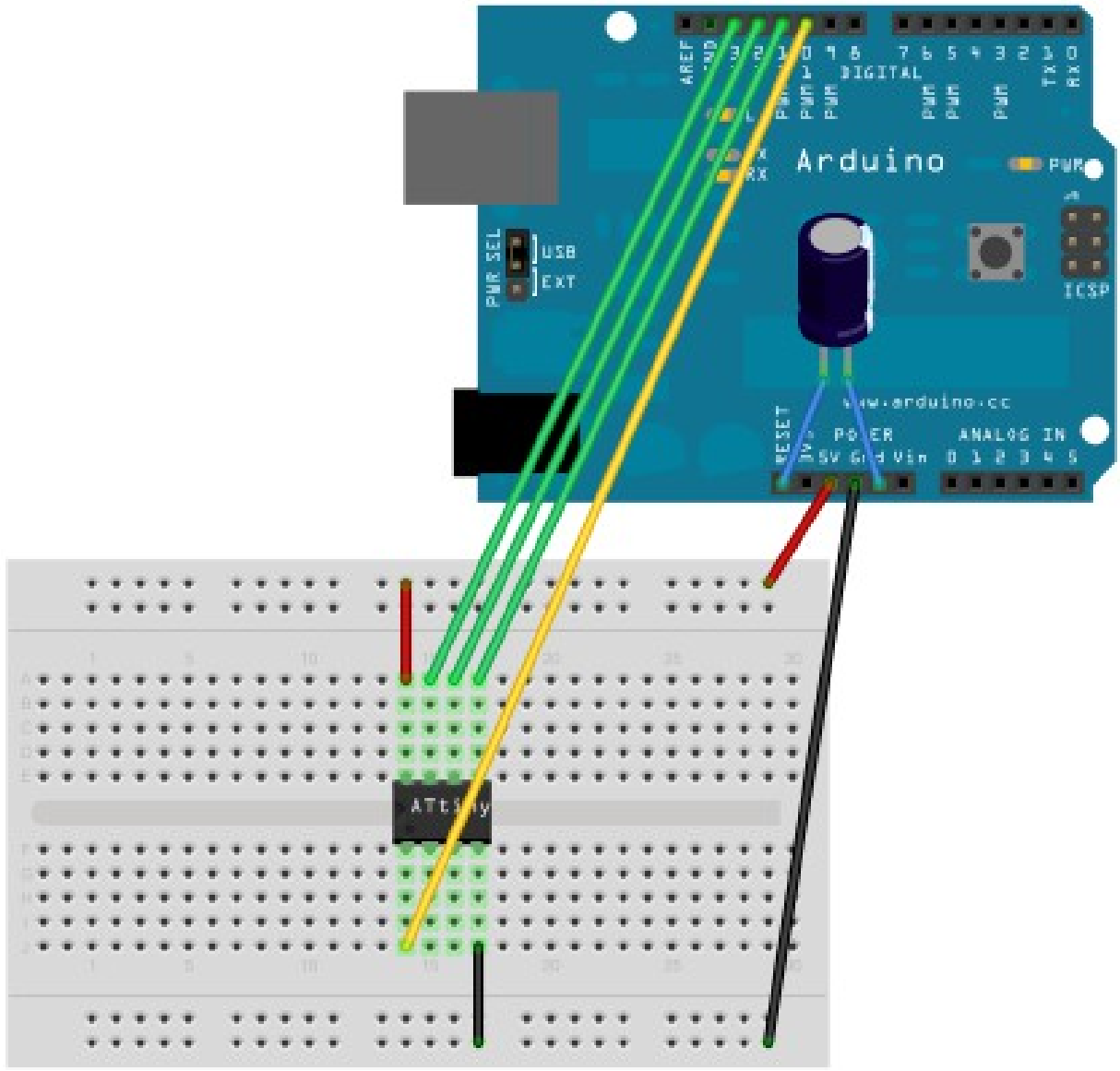
Go to File > Preferences
In the Add-on Manager URL' field, paste this code:
**https://raw.githubusercontent.com/damellis/attiny/ide-1.6.x-boards-manager/package_damellis_attiny_index.json**

Press OK

Go to Tools > Boards > Boards Manager
In the search, type “attiny”
Install the David A, Mellis ATtiny file.
After installing the file, you should see a new entry in the board menu titled Attiny25/45/85

Select the board, Tools > Boards > ATtiny25/45/85
Select the processor, Tools > Processor > ATtiny85
Set the clock, Tools > Clock > Internal 8Mhz
Set the Programmer, Tools > Programmer > Arduino as ISP

Now wire up the Arduino & Attiny85 on a breadboard like this:




On the ATtiny85, pin 1 is located on the lower left, pin 8 is located on the upper left.
The IC has a notch to specify the orientation (in this drawing the notch is on the left side)

On the Arduino, use a 10uF Electrolythic Capacitor between the Reset pin and the GND

| ATTINY | ARDUINO |
|---|---|
| 1 RST | 10 |
| 2 | |
| 3 | |
| 4 GND | GND |
| 5 MOSI | 11 |
| 6 MISO | 12 |
| 7 SCK | 13 |
| 8 +5V | +5V |

**Step 3: Kastle Firmware:**

Go here:
https://github.com/bastl-instruments/kastle

Download the software, Code > Download ZIP
Unpack the ZIP file and go to the kastleSynthe_VCO_2 folder
Doubleclick the kastleSynthe_VCO_2 INO file to open it in the Arduino software.

Uploading the sketch works a bit different than normal:
Sketch > Upload Using Programmer

Now the VCO ATtiny is ready for use. Take the VCO IC out of the breadboard.
Insert the next ATtiny IC.

Navigate to the kastleSynth_LFO folder and doubleclick the kastleSynth_LFO INO file.
Upload the LFO firmware, Sketch > Upload Using Programmer

Repeat this step for the second LFO IC

**Using the Programming Headers:**

The BananaKastle has 3 programming headers.
This way you can upload the firmware while the IC's are in the sockets.

Use male to female pincables or a 2x3 connector to pincable.

Programming header pinout

| | | |
|---|---|---|
| 2 GND | 4 MOSI | 6 +5V |
| 1 RST | 3 SCK | 5 MISO |

Connect the pins like this:

| ARDUINO | Header |
|---|---|
| 10 | 1 RST |
| GND | 2 GND |
| 13 | 3 SCK |
| 11 | 4 MOSI |
| 12 | 5 MISO |
| 5V | 6 +5V |

Follow the guide to setup the Arduino from step 1 to step 3, skip the breadboard wiring.

Start with the VCO firmware headers.
When the firmware is loaded, connect the pincables to the next programming header (LFO1) and repeat step 3

Repeat this for the LFO2 programming header.

How to upload the Attiny files

https://highlowtech.org/?p=1695

https://srituhobby.com/how-to-program-attiny85-with-arduino-uno-step-by-step/

https://forum.arduino.cc/t/a-programmer-is-required-to-upload/1101631/2

https://www.instructables.com/How-to-Program-an-Attiny85-From-an-Arduino-Uno/

https://docs.google.com/document/d/1T40cyKEE0bYxRSw4JoP4Z0kGpukS9gH5oQCyxj19cs0/edit

https://github.com/bastl-instruments/kastle