

Mataki-Classic Programming Guide

Version 1

This document describes how to set up the software and hardware required to load firmware onto a Mataki-Classic tag and then explains the firmware loading process. This guide uses an Olimex MSP programmer and the Olimex programming utility on a Windows PC.

Version History

Version	Date	Changes
1	28 Feb 2018	First Release

Related Documents

Mataki-Classic User Guide

Mataki Support Board User Guide

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1. Hardware

1.1. Required Hardware

There are two pieces of hardware required to program a Mataki-Classic tag with new firmware:

• An Olimex MSP430-JTAG-TINY-V2 Programmer

- This is the programmer used to load the firmware onto the MSP430 CPU used on Mataki-Classic tags
- It connects to a PC with a USB cable
- $\circ~$ It connects to the support board with a 14 pin IDC ribbon cable connected to J3



• A Mataki Support Board

- This provides an interface between the Olimex programmer and the Mataki-Classic tag
- The connectors seen in the image below are:
 - J1 (Also labelled 'Avian GPS') is where the tag is inserted
 - J2 (Also labelled 'Serial USB') is where the FTDI serial USB cable is inserted to connect the support board to the PC
 - J3 (Also labelled with 'JTAG') is the programmer connection



Mataki Support Board

1.2. Hardware Setup

A block diagram showing the wiring for the hardware is shown below:



Mataki-Classic tag

2. Olimex Programmer Software

In order to program a tag, the flash loader utility for the Olimex programmer is required.

2.1. Installation

At the time of publication, both the drivers and software can be found at <u>https://www.olimex.com/Products/MSP430/JTAG/MSP430-JTAG-TINY-V2/</u>. Follow the instructions provided to install both of these.

2.2. Settings

The required settings can be seen below (in this example, the utility is loaded with a base configuration binary file):

🚾 Olimex - C:\Source\trunk\Mataki\Software\Firmware\builds\released\V5.4.4\Base.hex — 🛛	×
File Edit Command Help	
□ 🖙 🖫 ≎ x1 x2 x4 big itte	
Progress Port	1
MSP430F2618 USB SpyBìWire	
]
Program memory Serialization information (32bit value)	1
00003100 31 40 00 31 15 42 20 01 75 F3 35 D0 08 5A 3F 40 10.1.B .u.5Z?0 🔨 🗖 Enable	
00003110 D6 01 0F 93 07 24 82 45 20 01 2F 83 9F 4F 84 FB\$.E ./	
00003120 00 11 F9 23 3F 40 A0 18 0F 93 06 24 82 45 20 01#2@\$.E .	
00003130 1F 83 CF 43 D6 12 FA 23 31 50 6C FF 82 43 70 2BC#IPICp+ Start	
00003140 B2 40 80 5A 20 01 B0 12 5E B8 B0 12 18 C2 B0 12 . (e.z End	
00003160 02 D3 0F 41 B0 12 7C 33 2 D2 32 43 DE 2 / D5 12	
00003170 0F 43 B0 12 F4 D1 B2 40 C6 8E 3E 13 3F 40 6F 2B .C	
00003180 B0 12 F4 DA B0 12 IC 93 22 12 22 12 30 12 05 00	
00003190 30 12 6A 3B B0 12 AE 8E 31 52 30 12 52 F9 30 12 0.j;1R0.R.0.	
000031A0 A9 3B B0 12 AE 8E 21 52 30 12 49 F9 30 12 CC 3B .;!R0.I.0;	
000031B0 B0 12 AE 8E 21 52 30 12 49 F9 30 12 E5 3B B0 12!R0.I.0; Start 10/8	
000031C0 AE 8E 21 52 30 12 19 3C B0 12 AE 8E 21 53 B0 12 !R0 Ston</td <td></td>	
000031D0 3A C2 4A 4F B0 12 64 C3 7A 90 52 00 0A 28 7A 90 :.JOd.z.R(z. V	
Data memory Post-session actions	_
00001000 FF ······· A Erase V Program memory V Data memory Software reset	
00001008 FF	
00001010 FF	
00001018 FF	
00001020 FF ······	
00001028 FF	
00001030 FF ······	
00001036 FF	
00001048 FF	

The important settings circled in red are:

- Little endianness has been selected ('litle')
- The selected device is 'MSP430F2618'

3. Programming New Tag Firmware

WARNING

All the tag settings are erased when new firmware is loaded and will need reconfiguring. Ensure you know what settings you need before proceeding.

To program a tag with new firmware, use the following steps:

- 1. Ensure all the hardware is connected
 - Support board is plugged into the PC
 - Olimex programmer is plugged into the PC and the support board
 - A Mataki-Classic tag is fully inserted into the support board
- 2. Open a PuTTY terminal as per normal operation
- 3. Switch the red slide switch on the tag to the OFF position
- **4.** Switch SW1 (power) on the support board to the ON position to power the tag. If the tag already has firmware loaded, it will startup as normal.
- **5.** On the programmer software, click on the open file icon, navigate to the required firmware file (ends with a .hex extension) and open it. The 'Program memory' window contents will change to the new file contents.
- **6.** Press 'Erase & Write & Verify & Run' to start programming the firmware (the large button in the bottom right hand corner)
- **7.** The firmware will be written and verified then the tag will be reset. The progress bar will move across the screen as each stage happens. Check the correct firmware is now running by examining the startup messages.
- **8.** Programming new firmware will erase all the tag settings. They will need to be set again the most important ones are:
 - The tag ID (use the 'id' command)
 - The base radio frequency (use the 'fbase' command)
 - The tracker and sensor settings ('setgps', 'setradio' and 'setacc')