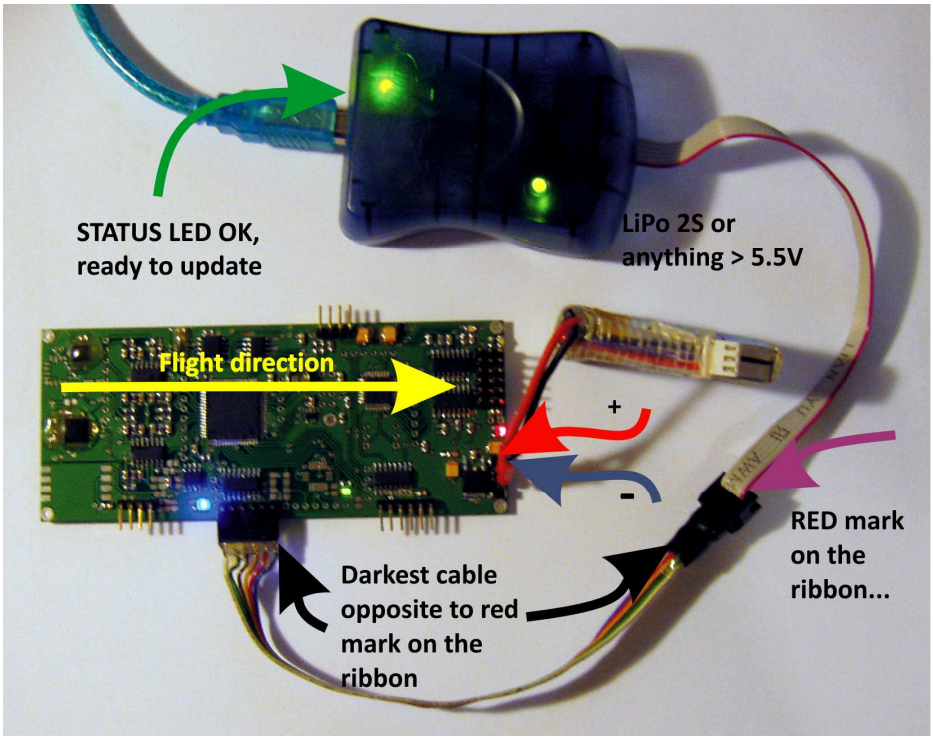
FLEXIPILOT 1.35

Updating FLEXIPILOT firmware

This document describes firmware update of the main processor used in FLEXIPILOT.
The update allows adding new features, but requires storing tuning adjustments in a separate ASCII configuration file.
The process is based on
- freely available software with User Interface
and
-inexpensive, high-performance AVRISP MKII in-system programmer from ATMEL.

Updating FLEXIPILOT firmware on the main processor

Minimal hardware setup



Necessary equipment

-PC computer
-power supply for FLEXIPILOT
-RC transmitter if the motor is connected to the RC receiver already
-AVRISP MKII
-AerialRobotics transconnector 2x3pin to 6pin

Updating the flash memory containing firmware

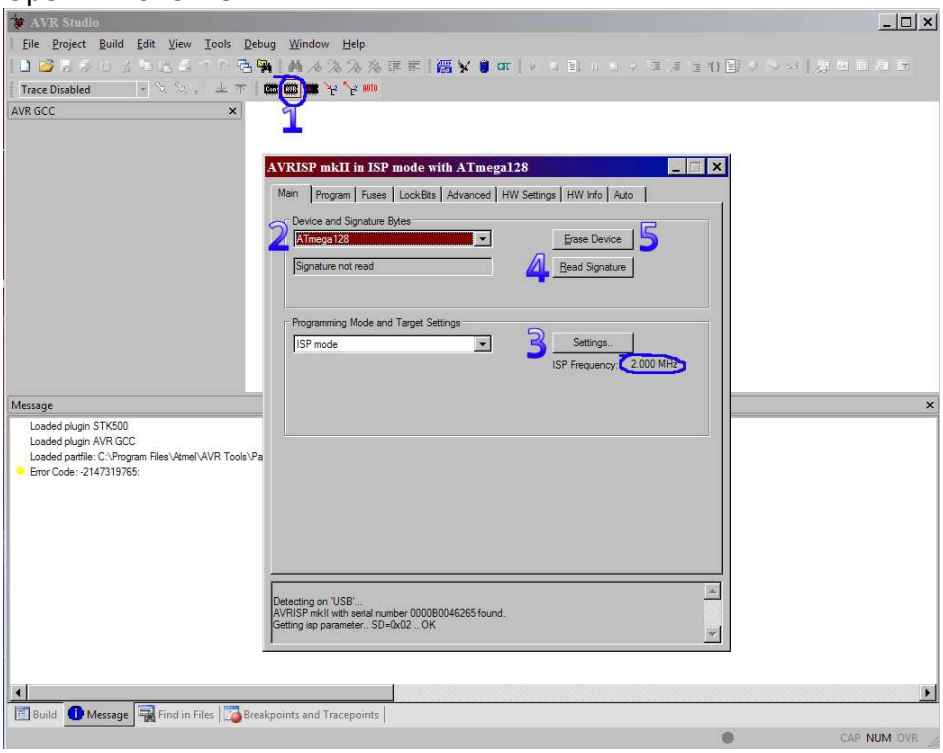
1. Backup all data into your configuration file, as after reprogramming with more recent firmware, the variables will be most probably relocated and will need to be refreshed. Example content (user specific):
   ```
   @@@WAYPOINT_CYCLES=1
   @@@WAYPOINT_BEGIN=0
   @@@WAYPOINT_END=3
   ```
   etc.
   Note: you should have obtained as a backup your complete configuration file bundled with the autopilot
2. Download all remaining logs, clearing is not necessary
3. Install AVRISP MKII for 8-bit AVR ATMEGA processors
4. Install AVR studio from ATMEL website, followed by reboot
5. Run AVR studio, click Cancel when asked to start a new project
6. Following 'AVRISP MKII User Guide.pdf', perform 'Manual Firmware Update' (page 28) then 'Using the AVR Studio with AVRISP mkII' (page 8), followed by reboot of the PC
7. Connect the 1x6-pin AerialRobotics connector to 2x3pin AVRISP MKII connector
   Both hardware parts are protected against reversed polarity connection, you can reconnect/disconnect at any time.

Green status led

Red status led

Possible outcome:
Status LED not lit – AVRISP not activated yet, run AVR Studio
Orange blinking LED – Reversed polarity on 2x3 pin connector between AVRISP and AerialRobotics transconnector
Red LED lit – Connected, but autopilot not powered (just connect battery to FLEXIPILOT) OR 6x1pin connector polarity reversed between AerialRobotics transconnector and ISP connector on the autopilot.
Green LED – FLEXIPILOT powered, AVRISP connected ok (AVRISP resets FLEXIPILOT when connecting)

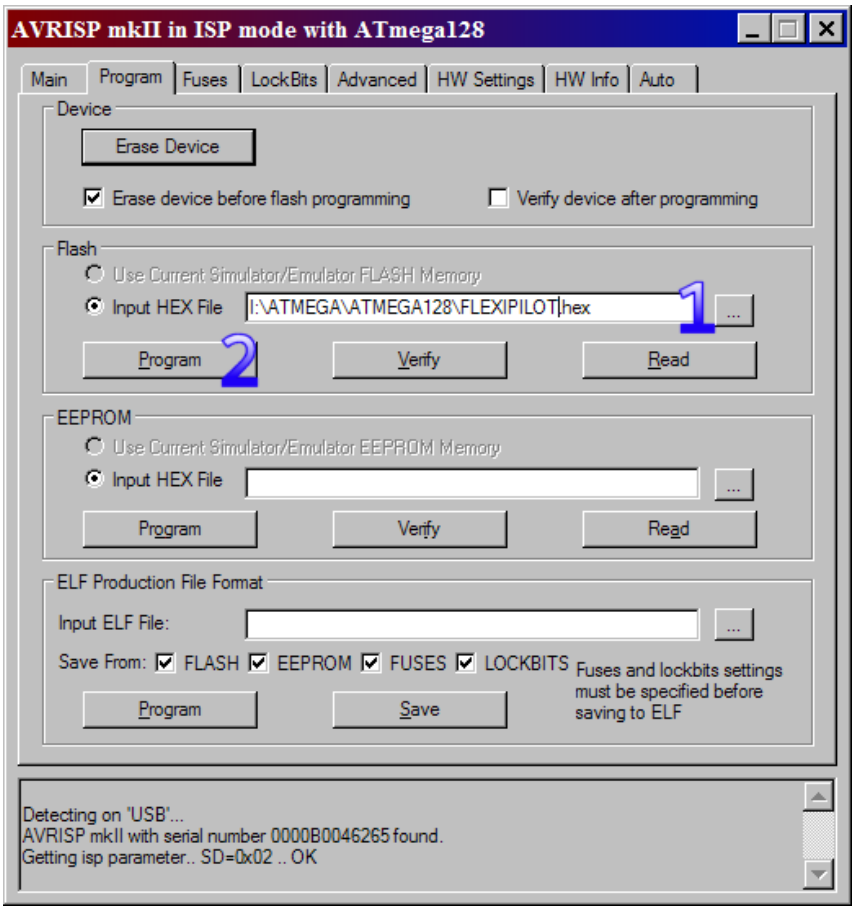
8. Power up FLEXIPILOT
9. Turn on RC transmitter, **block throttle in low position** as during programming the FLEXIPILOT will switch to manual mode
10. Connect AVRISP to the main processor ISP connector, black pin is first from the front of the autopilot
11. Open AVRSTUDIO



Select options as follows:

1. Activate AVRISP programmer
2. Select chip ATMEGA2561
3. Adjust communication frequency settings (max 2MHz)
4. Read processor signature in order to make sure it is properly recognized.
   DO NOT PROCEED if the chip is not recognized properly at this stage.
5. Erase Device

* Switch to Program tab



1. Select HEX file name sent to you for update
2. Click program, it should take around 10-20s depending on baudrate

Post-update actions

* Open HyperTerm console and connect to FLEXIPILOT as usually
* Copy-paste all setting from configuration file

(after the next step you might see waterfall of errors coming on,
don't forget to have RC transmitter in manual mode, throttle low)

* Issue @@@RESET
* Issue @@@DEEPCLEAN
* Issue @@@RESET
* Copy-paste all setting from configuration file

(this time positions of all data in flash is refreshed)

* Issue @@@RESET
* Issue I, observe IMU output, may need a minute to equalize, issue @@@RESET
* Inspect system components working: GPS (G), Altimeter (H), Servo capture (S), IMU (I)
* Read if all the variables are valid after RESET on the console

(no INVALID sign present)

AerialRobotics transconnector pinout

1x6 connector FLEXIPILOT side, female	**1=GND**	**2=VCC**	**3=RESET**	**4=SCK**	**5=ISP TX**	**6=ISP RX**

2x3 connector AVRISP MKII side, male	**3=RESET**	**4=SCK**	**6=ISP RX**
	1=GND	**5=ISP TX**	**2=VCC**