2014

Programmer AVR MKII



User manual

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2014-05-31

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1. INTRODUCTION

1.1 What is AVR MKII?

AVR MKII is a USB in-circuit programmer for controllers: Attiny, Atmega and Xmega. It cooperate with Atmel Studio and AvrDude.

This AVR programmer is LUFA powered which is open source software that emulates AVRISP-MKII functionality, programmer is supported by ATMEL STUDIO 6 (and older AVR Studio v4 and v5) and by other compilers as AVRISP mkII.



1.2 Technical teature

Programmer AVR MKII (clone AVRI MKII):

- Cooperate with controllers: Attiny, Atmega oraz Xmega,
- Have programming interfaces: ISP, PDI, TPI,
- Cooperate with programs: Atmel Studio and AvrDude,
- Allow to powered microcontroller directly from USB: 5V or 3,3V,
- Have hardware USB interface (it let programming in very fast),
- 2 leds which tell: one for connecting to a computer and one of the programming process.
- programmer can be connected to any computer with a USB 1.1 or USB 2.0. At the same time with the built-polymeric fuse 500mA is not possible to damage the port, even if the programmer is connected not to the end of the system tested.

1.3 Supported microcontrollers

Table 1 List of the microcontrollers supported by the MKII

ATmega:

| ATmega128 | ATmega1280 | ATmega1281 | ATmega1284 | ATmega1284P | ATmega128A | ATmega16 | ATmega162 |
|-------------|---------------|--------------|---------------------------------------|---|-------------|---------------------------------------|--------------|
| ATmega164A | ATmega164P | ATmega164PA | ATmega165 | ATmega165A | ATmega165P | ATmega168 | ATmega168A |
| ATmega168P | ATmega168PA | ATmega169 | ATmega169A | ATmega169P | ATmega169PA | ATmega16A | ATmega16HVB |
| ATmega16U2 | ATmega16U4 | ATmega2560 | ATmega2561 | ATmega32 | ATmega324A | ATmega324P | ATmega324PA |
| ATmega325 | ATmega3250 | ATmega3250A | ATmega3250P | ATmega325A | ATmega325P | ATmega328 | ATmega328P |
| ATmega329 | ATmega3290 | ATmega3290A | ATmega3290P | ATmega329A | ATmega329P | ATmega329PA | ATmega32A |
| ATmega32C1 | ATmega32HVB | ATmega32M1 | ATmega32U2 | ATmega32U4 | ATmega32U6 | ATmega48 | ATmega48A |
| ATmega48P | ATmega48PA | ATmega64 | ATmega640 | ATmega644 | ATmega644A | ATmega644P | ATmega644PA |
| ATmega645 | ATmega6450 | ATmega6450A | ATmega6450P | ATmega645A | ATmega645P | ATmega649 | ATmega6490 |
| ATmega6490A | ATmega6490P | ATmega649A | ATmega649P | ATmega64A | ATmega64HV | ATmega8 | ATmega8515 |
| ATmega8535 | ATmega88 | ATmega88A | ATmega88P | ATmega88PA | ATmega8A | ATmega8HVD | ATmega8U2 |
| ATtiny: | 12 | | · · · · · · · · · · · · · · · · · · · | × · · · · · · · · · · · · · · · · · · · | | · · · · · · · · · · · · · · · · · · · | - |
| ATtiny12 | ATtiny13 | ATtiny13A | ATtiny15 | ATtiny167 | ATtiny2313 | ATtiny2313A | ATtiny24 |
| ATtiny24A | ATtiny25 | ATtiny26 | ATtiny261 | ATtiny261A | ATtiny4313 | ATtiny43U | ATtiny44 |
| ATtiny44A | ATtiny45 | ATtiny461 | ATtiny461A | ATtiny48 | ATtiny84 | ATtiny85 | ATtiny861 |
| ATtiny861A | ATtiny88 | | | | | - | |
| Inne: | | | | | | | |
| AT90CAN128 | AT90CAN32 | AT90CAN64 | AT90PWM2 | AT90PWM21 | AT90PWM2B | AT90PWM3 | AT90PWM316 |
| AT90PWM3B | AT90USB1286 | AT90USB1287 | AT90USB162 | AT90USB646 | AT90USB647 | AT90USB82 | |
| ATxmega: | 36 | 20 | \$\$ | () () | A | × | |
| ATxmega128A | ATxmega128A1D | ATxmega128A1 | ATxmega128A | ATxmega128D | ATxmega16A4 | ATxmega16D4 | ATxmega192D3 |
| ATxmega256A | ATxmega256A3B | ATxmega256D3 | ATxmega32D4 | ATxmega64A1 | ATxmega64A3 | ATxmega64D3 | |

And all other microcontrollers which support ISP or PDI or TPI.

2. TECHNICAL DESIGN

2.1 Configuration

ATTENTION!!! INSTRUCTION FOR OLDER VERSIONS OF THE PROGRAMMERS IS AVAILABLE AT http://barion-st.com/

Before programmer is used following jumpers have to be set:

- power supply (3,3V or 5V)
- programming interface (ISP/PDI/TPI) microcontroller which is going to be programmed have to be connected to appropriate IDC pins



Programmer is set-up by switch:

Two tables below explains how to configure programmer (additionally they are placed on the device):

| 2 | 3 | | | 1 | ON | OFF |
|-----|-----|-----|--|---|----|-------|
| ON | OFF | TPI | | | 5V | 3.3V |
| OFF | ON | PDI | | I | • | 10.01 |
| OFF | OFF | ISP | | | | |

For example microcontroller with PDI interface and 3.3 V supply set appropriately: 1: OFF , 2: OFF , 3: ON.

3. PROGRAMMER MANUAL

3.1 Connection programmer and PC

To start use programmer you have to:

- Connect MKII programmer to PC USB ,
- Install drivers

BEFORE FIRST CONNECTION PROGRAMMER TO PC YOU HAVE TO INSTALL AVRJungoUSB DRIVERS

3.2 Driver instalation

Link to driver: http://barion-st.com/doc/install/AVRJungoUSB.exe

After installation AVRJungoUSB you can connect programmer to PC. In Device Manager you should have new device Jungo:



Atmel Studio

Programmer is ready to work with AvrSrudio. In AvrStudio you can choose option: **Tools/AVR Programming**, there should be available programmer:

Atmel Studio 7.0

Cooperating with Atmel Studio 7.0 requires more steps:

- 1. Download Zadig: <u>http://zadig.akeo.ie/</u>. Zadig is a USB driver manager for Windows
- 2. Open Zadig, Options, List All Devices. The AVRISP mkII device should appear in the list.
- 3. Replace its current driver by libusb-win32 (v1.2.6.0)

AvrDude

If you want to work with AvrDude, programmer software have to be changed (pt. 3.3) When programmer software is changed, you have to install: LibUsbDotNet_Setup.2.2.8

Link: barion-st.com/doc/install/LibUsbDotNet_Setup.2.2.8.exe

During installation the option: Source and Example Code should be unchecked:

| elect Components Which components should be insta | alled? |
|---|--|
| Select the components you want i install. Click Next when you are re | to install; clear the components you do not want to eady to continue. |
| Custom Installation | • |
| Runtime Files | 2.7 M |
| Source and Example Code | 3.2 M |
| | |
| Current selection requires at least | t 5.0 MB of disk space |
| Current selection requires at least | t 5.0 MB of disk space. |

Rest of the option stay default.

Run installed software: **Start/Programs/LibUsbDotNet/libUsb-win32/Filter Wizard.** (or run automatically after installation)

Choose Next:

| information | | | |
|---|-----------------------------------|--|--|
| This program adds/removes libusb-win32 a installation. | as a driver to an existing device | | |
| The libusb-win32 filter driver allows access to usb devices using the libusb- while maintaining compatibility with software which uses the original driver | | | |
| install/Remove Device Filter(s) | | | |
| Install a device filter | | | |
| 🖱 Remove a device filter | | | |
| Remove all device filters | | | |
| | | | |
| | | | |

Pay attention: In this moment programmer have to be connected to USB (if it isn't, connect it now).

Click Next. Choose AVRISP mkII from the list:

| evice Selection | | |
|--|---|---------|
| Connect your device and select it from device isn't listed, it may already be filt ncompatible with the libusb-win32 filte | the list of unfiltered devices below. tered, be in a "driverless" state, or r driver. | If your |
| Hardware ID | Description | • |
| vid:04f2 pid:b15e rev:8554 | Urządzenie kompozytowe USB | |
| vid:045e pid:0745 rev:0656 mi:02 | Urządzenie wejściowe USB | |
| vid:045e pid:0745 rev:0656 mi:01 | Urządzenie wejściowe USB | = |
| vid:045e pid:0745 rev:0656 mi:00 | Urządzenie wejściowe USB | - |
| vid:045e pid:0745 rev:0656 | Urządzenie kompozytowe USB | |
| vid:03eb pid:2104 rev:0200 | AVRISP mkII | - |
| | | |

Click Install, and next OK.

Programmer is ready to work with **AvrDude** – also in BASCOM (during configuration should be choosed: Atmel AVR ISP mkII (avrispmkII), Port – usb).

3.3 Programmer's software change

Download program FLIP:

http://www.atmel.com/dyn/resources/prod_documents/Flip%20Installer%20-%203.4.5.106.exe

This program is used to change the programmer's software. Download and install program FLIP.

Additionally download new programmer's software:

http://www.barion-st.com/doc/install/101116 AVRISP avrdude.zip

When FLIP and new software is ready, you can start changing the software:

1. Disconnect programmer and PC, connect the SVC pins (marked on the picture)



- 2. Connect programmer to USB
- 3. Press reset button on programmer (see picture in instruction's point 2.2) green diode will turn off
- 4. System should find new device:

| or pomaga zainstalować oprogramowanie dla: SB162 DFU |
|--|
| |
| rśli do sprzętu dołączony był instalacyjny rsk CD lub dyskietka, włóż ten nośnik teraz. |
| r, aby zrobił kreator? |
| aluj oprogramowanie automatycznie (zalecane) |
| aluj z listy lub <u>o</u> kreślonej lokalizacji (zaawansowane) |
| cisk Dalej, aby kontynuować. |
| |

Choose second option: Install from...(Advance) and click NEXT. Choose folder Program Files / Atmel / Flip 3.4.3 / usb, click OK.

If new devices wouldn't be found:

- Open Devices manager
- In Unknown devices find: AT90USB162 DFU.
- Click right mouse button on it and choose: Update Driver Software...
- Choose Browse my computer for driver software
- Choose folder: Program Files / Atmel / Flip 3.4.3 / usb, click OK.

If you get a warning, then you should choose: Install this driver software anyway



- 5. After installation open program Flip
- 6. In Flip choose processor (icon in the picture belowe):

| 🖬 Atmel Flip | | | | | | |
|----------------------------|-------------------------------------|-------------------|--|--|--|--|
| File Buffer Device Setting | gs Help | | | | | |
| S S | 3695 | 🐚 🏄 🍇 🥔 | | | | |
| Operations Flow Terase | FLASH Buffer Information Size 12 KB | AT90USB162 | | | | |
| • | Range 0x0 - 0x0 Checksum 0xFF | Device Boot Ids | | | | |
| Blank Check | Reset Before Loading | Bootloader Ver. | | | | |
| Program | HEX File: | | | | | |
| Verify | | | | | | |
| Run | Select EEPROM | Start Application | | | | |
| | | Communication OFF | | | | |

7. Choose: AT90USB 162

| 0 | Select a device | |
|---|-----------------|---|
| ٩ | AT90CAN128 | * |
| | AT90CAN32 | |
| | AT90CAN64 | |
| | AT90USB1286 | |
| | AT90USB1287 | = |
| | AT90USB162 | |
| | AT90USB646 | - |
| | AT90USB647 | |
| | AT90USB82 | |
| | ATmega16M1 | - |

- 8. Now choose Selekt communication (icon on the right of that you selected in step 6) and choose USB. In new window choose: Open.
- 9. Buttons in FLIP should be active now:

| Atmel Flip | | | | | | | |
|----------------------------|--------------------------|-----------------------------|--|--|--|--|--|
| File Buffer Device Setting | | | | | | | |
| 🤝 😴 🥔 | i 🖓 豢 🗞 | 🕑 🏄 🕍 🥩 | | | | | |
| Operations Flow | FLASH Buffer Information | AT900 SB162 | | | | | |
| Frase | Size 12 KB | Signature Bytes 58 1E 94 82 | | | | | |
| | Range 0x0 - 0x0 | Device Boot Ids 00 00 | | | | | |
| | Checksum 0xFF | | | | | | |
| Ø Blank Check | Reset Before Loading | Bootloader Ver. 1.0.5 | | | | | |
| Program | HEX File: | | | | | | |
| 🔘 🔽 Verify | | | | | | | |
| Run | Select EEPROM | Start Application 🛛 🖓 Reset | | | | | |
| | | USB ON | | | | | |

- 10. Click button: Load HEX File... (marked above) and choose software which you want to load to programmer (downloaded in first step: *101116_AVRISP_avrdude.zip* first unpack it).
- 11. Click button Run. New software is now in programmer.
- **12.** Disconnect HWB (switch 1 OFF), push button on the programmer: RESET (see picture in instruction's point 2.2) green diode will turn off.

Programmer is ready to work with AVRDUDE! (pt. 3.2 -> AvrDUDE)

If you want to use programmer with Atmel Studio again, you have to do all steps again (3.3 instruction's point), but you have to load to programmer file:

http://barion-st.com/doc/install/MKII_AvrStudio_LUFA.rar

THE END

Barion

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