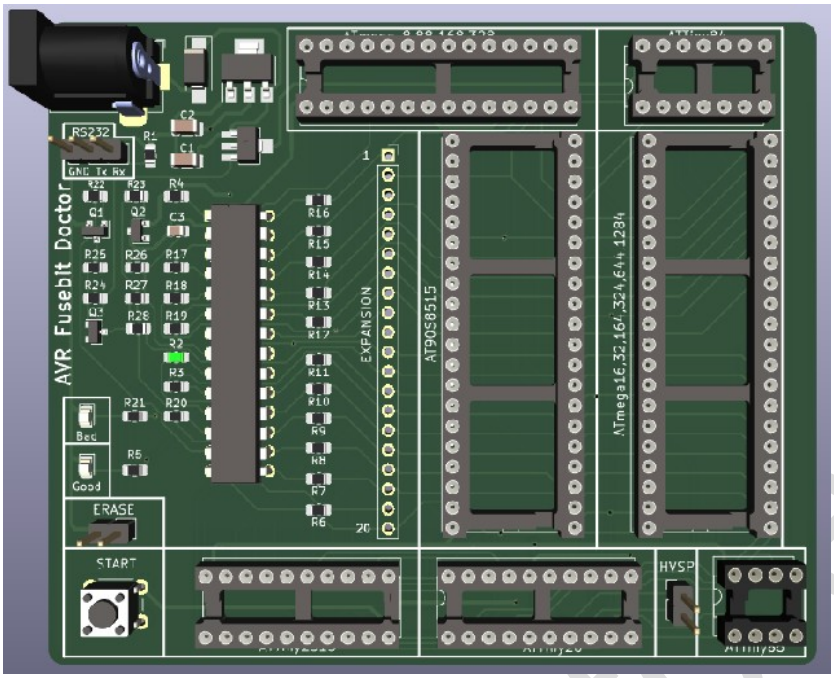


AVR ATmega / ATtiny Fuse Bit Doctor

Software version 2.11

AVR Fusebit Doctor is a device used for repairing incorrect fuse settings for the ATmega and ATtiny family of AVR microcontrollers.

A common mistake is setting the incorrect value for CKSEL or disabling SPI programming which causes the microcontroller to appear dead.

This design is based off the work of the original project by Manekinen, and then work resumed by SukkoPera.

To obtain the latest updates and firmware see https://github.com/SukkoPera/avr-fusebit-doctor

Supported chips

Some of the below chips (mostly SMD's) will require a custom built adaptor to work with the doctor (Adaptor not included).

Code to this point supports 145 chips, but not all have been tested. Untested ones are listed *in italic*.

1kB

AT90s1200, *ATtiny11*, *ATtiny12*, ATtiny13/A, *ATtiny15*

2kB

ATtiny2313/A, *ATtiny24/A*, ATtiny26, *ATtiny261/A*, *ATtiny28*, *AT90s2333*, *ATtiny22*, ATtiny25, AT90s2313, *AT90s2323*, *AT90s2343*

4kB

ATmega48/A, *ATmega48P/PA*, ATtiny461/A, *ATtiny43U*, *ATtiny4313*, *ATtiny44/A*, *ATtiny48*, *AT90s4433*, *AT90s4414*, *AT90s4434*, ATtiny45

8kB

ATmega8515, ATmega8535, ATmega8/A, ATmega88/A, *ATmega88P/PA*, *AT90pwm1*, *AT90pwm2*, *AT90pwm2B*, *AT90pwm3*, AT90pwm3B, *AT90pwm81*, *AT90usb82*, *ATtiny84*, ATtiny85, *ATtiny861/A*, *ATtiny87*, *ATtiny88*, AT90s8515, *AT90s8535*

16kB

ATmega16/A, *ATmega16U2*, *ATmega16U4*, *ATmega16M1*, *ATmega161*, ATmega162, *ATmega163*, *ATmega164A*, *ATmega164P/PA*, *ATmega165A/P/PA*, ATmega168/A, *ATmega168P/PA*, *ATmega169A/PA*, *ATtiny167*, *AT90pwm216*, *AT90pwm316*, *AT90usb162*

32kB

ATmega32/A, *ATmega32C1*, *ATmega323/A*, *ATmega32U2*, *ATmega32U4*, *ATmega32U6*, *ATmega32M1*, *ATmega324A*, *ATmega324P*, ATmega324PA, *ATmega325*, *ATmega3250*, *ATmega325A/PA*, *ATmega3250A/PA*, *ATmega328*, ATmega328P, *ATmega329*, *ATmega3290*, *ATmega329A/PA*, *ATmega3290A/PA*, *AT90can32*

64kB

ATmega64/A, *ATmega64C1*, *ATmega64M1*, *ATmega649*, *ATmega6490*, *ATmega649A/P*, *ATmega6490A/P*, *ATmega640*, ATmega644/A, ATmega644P/PA, *ATmega645*, *ATmega645A/P*, *ATmega6450*, *ATmega6450A/P*, *AT90usb646*, *AT90usb647*, *AT90can64*

128kB

ATmega103, ATmega128/A, ATmega1280, *ATmega1281*, *ATmega1284*, *ATmega1284P*, *AT90usb1286*, *AT90usb1287*, *AT90can128*

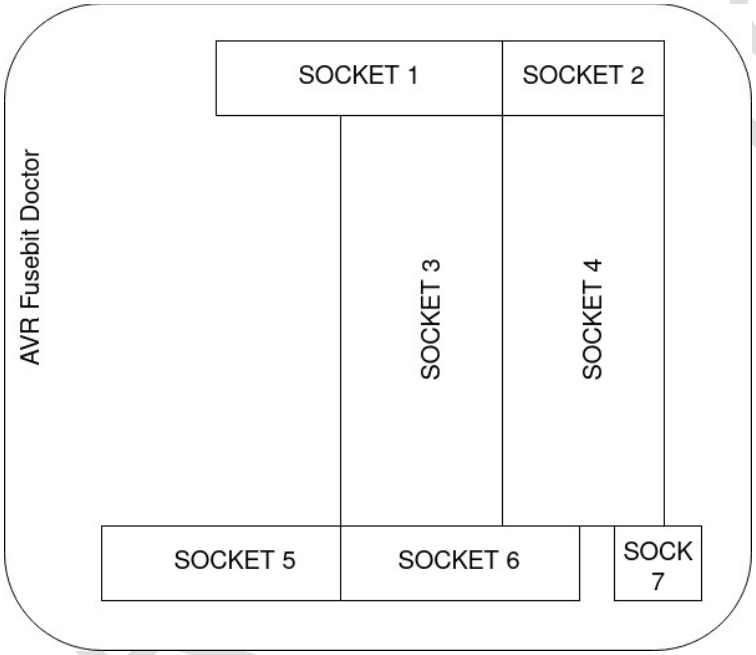
256kB

ATmega2560, ATmega2561

Usage

Check through the table below to determine which socket to install the microcontroller in.

Take care to the the orientation correct.



Size	Chip	Socket
1kB	AT90s1200	5
1kB	ATtiny11, ATtiny12, ATtiny13, ATtiny15	7
2kB	ATtiny2313	5
2kB	ATtiny24	2
2kB	ATtiny26, ATtiny261	6
2kB	ATtiny22 , ATtiny25	7
2kB	AT90s2313	5
2kB	AT90s2323, AT90s2343	7
4kB	ATtiny461	6
4kB	ATtiny4313	5
4kB	ATtiny44	2
4kB	ATtiny48, ATtiny45, AT90s4433	1

4kB	AT90s4414	3
8kB	ATmega8515. ATmega8535	4
8kB	ATmega8, ATmega88	1
8kB	ATtiny84	2
8kB	ATtiny84	7
8kB	ATtiny861	6
8kB	AT90s8515	3
8kB	AT90s8535	4
8kB	ATmega16	4
8kB	ATmega161, ATmega162	3
16kB	ATmega163, ATmega164	4
16kB	ATmega168	1
32kB	ATmega32. ATmega323, ATmega324	4
32kB	ATmega328	1
64kB	ATmega644	4
128kB	ATmega1284	4

The ERASE jumper allows doctor to erase whole flash and eeprom memory. If disabled the doctor will never erase the memory but may not fix the device if the lockbits are enabled.

If fixing HVSP proccessors (ATtiny85 / ATtiny85) select the HVSP jumper, otherwise this jumper should be removed.

Apply power to the DC connector. This needs to be 12V or greater as 12V is needed for high voltage programming. The doctor has a 12V regulator fitted so you can use more than 12V.

Recommended to supply 13-20V DC

After inserting the dead microntroller in one of the sockets (Only use one socket at a time), press the START button and doctor will initiate the parallel or serial high-voltage programming mode.

The device signature is checked and if supported the fusebits will be reset. After fusebits are verified, the LEDs will flash.

LED explanation

- Green – dead microcontroller is fixed, fusebits repaired.
- Red – signature problem. Unable to read / No device in socket / No signature in database.
- Green flashing – signature OK, fusebits are wrong. Lockbits enabled, chip erase permission required (read below).
- Red flashing – signature OK, no lockbits, but for some reason can’t write new fusebits.

Terminal

Note that terminal is not needed and the device works without pc. However if you want the device can be connected to a RS232 port to view debug/extra information.

Connect a USB to TTL Serial converter to the RS232 pins.

- USB Serial TX to doctor RX

- USB Serial RX to doctor TX

- USB Serial GND to doctor GND

Terminal settings

- Baud-rate: 4800
- Parity: none
- Data bits: 8
- Stop bits: 1
- Handshake: none

Manual Mode

If you connect terminal TX pin to PCB RX pin – manual mode will be enabled automatically. You will then be able to operate the doctor manually using a terminal emulator program. (See above for terminal settings)

```
What to do?...
1 - write fusebits
2 - modify fusebits
3 - set lockbits
4 - chip erase
5 - end
```


Expansion

The PCB can be expanded to incorporate other DIP/SMD packages using a 20 pin connector (not supplied) which will need to be soldered to the PCB.

You can then make your own adapters and connect it to the expansion port.

Consult the GitHub page and AVR datasheets on how to do this.